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NASA CR-134827

AiResearch 74-310862

(NAS-CR-134827-Vol-2) SMALL AXIAL  
COMPRESSOR TECHNOLOGY, VOLUME 2 Final  
Report (AiResearch Mfg. Co., Phoenix, Ariz.)  
329 D MC A15/LF A01

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# SMALL AXIAL COMPRESSOR TECHNOLOGY PROGRAM

(VOLUME II - DATA COMPILATION)

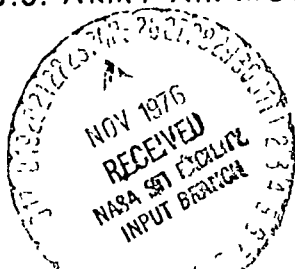
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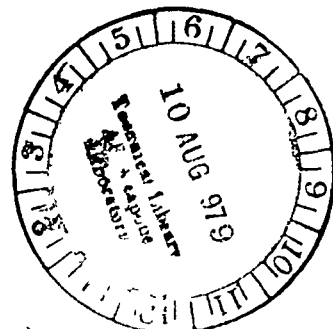
AIRESEARCH MANUFACTURING COMPANY OF ARIZONA  
A DIVISION OF  
THE GARRETT CORPORATION  
Phoenix, Arizona

Prepared for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
AND  
U.S. ARMY AIR MOBILITY RESEARCH AND DEVELOPMENT LABORATORY



Lewis Research Center  
Contract NAS 3-17846



FINAL REPORT  
SMALL AXIAL COMPRESSOR  
TECHNOLOGY PROGRAM

INTRODUCTION

This volume contains complete computer printout data supporting Tests 1, 2, 3, and 4 discussed in Volume I and referred to as Reference 6.

ORIGINAL PAGE IS OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 2  
EQUIVALENT FLOW / INLET ANN AREA = 7881.610 R.P.M.  
PERCENT DESIGN EQUIVALENT FLOW = 3.5708 (HM/SEC) EQUIVALENT FLOW / INLET ANN AREA = 38.9746 LHM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	HETA01 (DEG)	V01 (FT/SEC)	V0191 (FT/SEC)	M01 (DEG)	HETA1 (DEG)	V1 (FT/SEC)	V11 (FT/SEC)	M1	VM1 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	70.96	1476.95	1583.07	1.578	0.00	547.00	0.00	.502	546.00	520.37	1583.07
13.31	68.55	1607.03	1504.80	1.477	0.00	541.04	0.00	.514	541.03	542.66	1504.80
26.87	66.05	1502.33	1372.94	1.303	0.00	609.84	0.00	.564	609.84	504.62	1372.94
43.71	63.29	1349.51	1241.22	1.246	0.00	624.53	0.00	.578	624.51	622.50	1241.22
62.32	61.12	1251.41	1095.71	1.146	0.00	604.47	0.00	.558	604.46	606.24	1095.71
85.11	58.30	1078.26	937.40	.982	0.00	566.53	0.00	.521	566.51	558.91	937.40
100.00	55.74	964.65	800.00	.800	0.00	544.68	0.00	.500	544.67	524.16	800.00

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8889

PERCENT SPAN FROM TIP (I. F.)	HETA02 (DEG)	V02 (FT/SEC)	V0292 (FT/SEC)	M02 (DEG)	HETA2 (DEG)	V2 (FT/SEC)	V29 (FT/SEC)	M2	VM2 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	60.22	1177.14	1006.37	.964	42.06	771.80	514.17	.665	774.66	556.15	1522.34
13.35	58.50	1094.05	912.44	.915	41.07	810.79	542.17	.678	802.49	549.65	1455.12
26.75	52.54	1007.33	736.82	.847	41.01	819.04	545.97	.691	810.49	608.69	1342.40
40.60	46.01	897.06	652.66	.762	43.40	847.65	581.31	.710	816.80	616.36	1233.27
47.40	38.57	793.74	494.58	.678	45.23	880.58	625.11	.752	820.17	614.35	1114.70
60.41	22.89	720.41	283.74	.631	46.67	929.21	712.25	.847	871.94	640.90	995.59
100.00	13.70	692.04	161.04	.602	48.67	1018.09	784.44	.885	872.34	649.49	924.34

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	DELTA FLOW (LPM)	DELTA FLOW (DEG)	DELTA FLOW (DEG)	INCIDENCE ANGLE (DEG)	AVG SUCT SWIRL (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTATION PERCENT	ROTATION PERCENT	ROTATION PERCENT	ROTATION PERCENT
0.00	0.00	0.00	10.72	7.102	6.674	.1982	1.233	1.854	.7416	.7812	.7812
10.01	11.7	12.44	12.49	7.225	6.396	.1948	1.571	1.873	.7751	.7940	.7940
26.07	30.25	42.76	13.51	7.221	5.069	.1344	2.204	1.498	.8540	.8665	.8665
43.71	48.60	52.63	16.69	6.714	3.873	.1036	4.337	1.921	.8907	.9002	.9002
62.32	67.40	71.63	22.54	6.868	2.930	.0224	4.224	1.916	.9086	.9165	.9165
85.11	84.61	90.43	35.61	7.031	1.949	.0482	16.206	1.990	.9540	.9582	.9582
100.00	100.00	100.00	42.04	7.037	.968	.0430	20.750	1.990	.9539	.9582	.9582

MOMENTUM AVG. MOTOR EFFICIENCY = .8760 (POLYTROPIC)  
MOMENTUM AVERAGE MOTOR EFFICIENCY = .8643 (ADIABATIC)  
MOMENTUM AVG. ROTOR LOSS RATIO = 1.4099  
MASS AVERAGE TEMPERATURE RISE = 1.2345

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METERIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.6006 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 96.3663  
 100 PERCENT DESIGN SPEED = SCAN NO 2  
 EQUIVALENT SPIN  
 EQUIVALENT FLOW / INLET ANN AREA = 7411.410 R.P.M.  
 190.2905 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	REFLX (DEG)	V01 (M/SEC)	VU01 (M/SEC)	HETA1 (DEG)	V1 (M/SEC)	VH1 (M/SEC)	W1 (M/SEC)	V71 (M/SEC)	W1 (M/SEC)
0.00	70.74	513.52	482.52	0.00	144.72	0.00	.507	141.75	642.52
10.00	69.25	490.43	458.66	0.00	171.01	0.00	.516	145.40	648.66
20.00	66.05	457.21	414.47	0.00	185.09	0.00	.564	145.40	614.67
40.00	63.29	423.02	378.32	0.00	197.36	0.00	.570	140.74	374.32
60.00	61.12	391.43	333.97	0.00	184.24	0.00	.558	144.17	333.97
80.00	58.30	344.55	279.83	0.00	172.68	0.00	.521	170.75	279.83
100.00	55.74	295.25	264.14	0.00	164.02	0.00	.500	140.74	244.14

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .8889

PERCENT SPAN FROM TIP (I. F.)	REFLX (DEG)	V02 (M/SEC)	VU02 (M/SEC)	HETA2 (DEG)	V2 (M/SEC)	VH2 (M/SEC)	W2 (M/SEC)	V72 (M/SEC)	W2 (M/SEC)
0.00	60.22	352.21	306.13	62.00	235.85	157.94	.665	140.51	664.07
10.00	56.26	317.67	274.27	41.97	247.13	165.25	.574	143.74	443.52
20.00	52.54	305.97	262.87	41.31	249.44	166.42	.691	146.00	609.29
40.00	46.01	273.62	198.67	41.30	248.76	177.18	.710	148.02	374.05
60.00	34.57	241.79	150.75	45.23	269.40	190.53	.757	140.03	341.28
80.00	22.99	222.99	86.94	46.67	294.46	217.09	.847	201.44	303.58
100.00	13.70	210.33	62.24	44.47	310.31	233.01	.806	167.97	242.94

ROTOR PERFORMANCE DATA

LEADING EDGE	PERCENT SPAN FROM TIP	WASH FLOW (PCT)	DELTA HETA0 (DEG)	INCIDENCE ANGLE (DEG)	ANGLE SUCT (DEG)	FACTOR	OMEGA HAN (M/SEC)	LOSS PARAMETER (M/SEC)	DEVIATION ANGLE (DEG)	ROTOR LOSS RATIO	ROTOR ANTIADHATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	12.72	7.112	6.536	.4249	.1987	.0375	1.231	1.854	.7416	.7412
10.00	11.34	30.25	12.00	7.725	6.334	.4414	.1944	.0393	1.571	1.473	.7451	.7440
20.00	30.25	30.25	13.51	7.221	6.069	.4530	.1734	.0270	2.234	1.498	.4540	.4665
40.00	44.61	44.61	16.67	6.714	3.803	.4807	.1096	.0229	4.337	1.921	.8007	.9002
60.00	67.80	67.80	22.54	6.404	2.920	.5013	.1067	.0224	4.221	1.914	.9046	.9165
80.00	84.61	84.61	35.41	7.031	1.989	.4757	.1682	.0147	1.6206	1.930	.9540	.9542
100.00	100.00	100.00	42.04	7.032	.954	.4502	.0830	.0172	20.750	1.990	.9530	.9542

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9760 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8443 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.9099  
 MASS AVERAGE TEMPERATURE RISE = 1.2345



NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 2

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9045

PERCENT SPAN FROM TIP (I. F.)	DELTA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VW3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	37.30	470.63	533.55	.741	698.04	698.04	698.37	1478.64
10.00	44.20	495.40	554.42	.757	702.76	702.76	701.60	1421.96
20.00	47.36	511.54	572.98	.778	724.71	724.71	724.70	1326.03
30.00	47.36	511.54	582.47	.803	732.06	732.06	731.52	1231.32
40.00	46.47	503.96	619.19	.823	725.54	725.54	722.99	1130.41
50.00	45.44	1031.77	696.22	.899	761.42	761.42	751.20	1019.92
100.00	43.75	1072.77	741.98	.941	774.85	774.85	753.44	956.49

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9341

PERCENT SPAN FROM TIP (I. F.)	DELTA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VW4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	70	704.42	867	.587	709.35	709.35	709.35	1467.91
11.31	65	723.21	826	.599	723.16	723.16	723.05	1417.15
22.25	57.6	744.82	744.82	.623	744.79	744.79	744.44	1332.18
34.54	51.4	767.03	767.03	.645	767.01	767.01	766.22	1250.03
47.30	52	750.81	646	.639	750.84	750.84	748.42	1165.96
61.12	51	725.94	57	.608	725.93	725.93	723.27	1072.52
100.00	50.0	730.99	50	.613	730.97	730.97	720.97	1019.23

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (I. F.)	DELTA (DEG)	INCIDENCE (DEG)	MEAN SUFF AIR (DEG)	DELTA ANGLE (DEG)	D FACTOR	LOSS PARAMETER	DELTA ANGLE (DEG)	STAGE EFFICIENCY RATIO	STATION POLYTROPIC EFF
0.00	0.00	1.074	-2.868	.0447	.4076	.0197	27.889	1.873	1.2528
10.00	11.31	2.176	-1.217	.0444	.4044	.0194	17.213	1.840	1.2528
20.00	17.64	3.792	-2.544	.0424	.3826	.0130	12.043	1.872	1.2744
30.00	22.25	4.42	-2.164	.0284	.3647	.0087	11.434	1.902	1.2208
40.00	27.30	1.019	-1.840	.0384	.3832	.0111	11.614	1.889	1.2242
50.00	34.54	1.02	-2.748	.0467	.4647	.0491	11.537	1.839	1.2273
100.00	43.75	5.877	-4.318	.0432	.4832	.0440	14.700	1.840	1.2274

MOMENTUM AVERAGE STAGE EFFICIENCY = .8454 (POLYTROPIC)      MOMENTUM AVG. STAGE EFFICIENCY = 1.8673  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8313 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.2345

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (MFTIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 2

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9045

PERCENT SPAN FROM TIP (I. C.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	V/A (M/SEC)	U3 (M/SEC)
0.00	17.39	267.41	162.63	.741	212.74	210.67	450.69
10.95	11.39	272.92	163.11	.757	214.20	213.86	434.41
20.23	17.14	277.86	164.52	.770	220.49	220.80	438.17
47.14	34.51	245.15	177.54	.803	223.13	222.97	375.31
64.42	47.67	240.77	184.73	.823	221.17	220.37	344.55
89.04	47.44	317.64	212.21	.899	232.04	220.47	310.57
100.00	41.75	326.94	224.13	.941	234.17	229.65	291.54

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9161

PERCENT SPAN FROM TIP (I. C.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	V/A (M/SEC)	U4 (M/SEC)
0.00	.70	216.23	2.54	.587	214.21	216.21	447.42
11.31	.65	220.43	2.52	.599	220.41	220.29	411.95
30.25	-.34	227.02	-1.37	.623	227.01	224.91	406.05
48.54	-.16	233.79	-.54	.645	233.74	233.54	341.01
47.30	.52	231.31	2.09	.639	231.29	231.17	355.39
44.12	.11	221.27	.02	.608	221.26	220.45	326.90
100.00	-.00	222.41	-1.00	.613	222.40	222.80	310.66

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. C.)	LEADING EDGE	TRAILING EDGE	MASS FLOW (CFM)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR FACTOR	DELTA HETA (DEG)	LOSS PARAMETER	OMEGA HAN	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMPR RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	0.10	36.69	1.074	-.2548	4096	.0197	.0547	22.840	1.829	1.2524	.8715
10.95	11.31	12.44	12.44	37.54	2.124	-1.237	4044	.0194	.0559	17.213	1.840	1.2524	.8494
20.23	30.25	34.34	34.34	37.04	.792	-2.244	3826	.0130	.0224	12.863	1.872	1.2524	.8441
47.14	48.54	52.73	52.73	38.66	.459	-2.149	3687	.0087	.0245	11.934	1.902	1.2524	.8715
64.42	67.30	71.52	71.52	39.34	1.019	-1.940	3632	.0111	.0344	11.414	1.849	1.2242	.9174
89.04	89.12	92.12	92.12	42.44	1.102	-2.244	3467	.0491	.1854	11.537	1.839	1.2274	.7111
100.00	100.00	100.00	100.00	43.74	-.077	-4.314	3432	.0440	.1741	14.700	1.840	1.2274	.717

MOMENTUM AVERAGE STAGE EFFICIENCY = .9454 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .4313 (ADIABATIC)  
MOMENTUM AVG. STAGE LOSS RATIO = 1.8673  
MASS AVERAGE TEMPERATURE RATIO = 1.2345

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.6727 LHM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 94.8163  
 100 PERCENT DESIGN SPEED = 5000 RPM  
 EQUIVALENT SPEED = 7495.518 R.P.M.  
 38.3554 LHM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	W01 (FT/SEC)	W101 (FT/SEC)	HETA1 (DEG)	V1 (FT/SEC)	W01 (FT/SEC)	W101 (FT/SEC)	W1 (FT/SEC)	W2 (FT/SEC)	W3 (FT/SEC)	W4 (FT/SEC)	W5 (FT/SEC)	W6 (FT/SEC)	W7 (FT/SEC)	W8 (FT/SEC)	W9 (FT/SEC)	W10 (FT/SEC)
0.00	1673.42	1585.94	0.00	533.92	0.00	0.00	.490	533.92	516.73	516.73	516.73	516.73	516.73	516.73	516.73	516.73
10.14	1492.77	1506.50	0.00	547.75	0.00	0.00	.503	547.75	520.82	520.82	520.82	520.82	520.82	520.82	520.82	520.82
27.11	1407.14	1373.53	1.381	505.70	0.00	0.00	.550	505.70	544.76	544.76	544.76	544.76	544.76	544.76	544.76	544.76
44.07	1313.03	1241.20	1.274	470.09	0.00	0.00	.565	470.09	603.13	603.13	603.13	603.13	603.13	603.13	603.13	603.13
62.43	1243.93	1095.23	1.147	481.89	0.00	0.00	.544	481.89	580.80	580.80	580.80	580.80	580.80	580.80	580.80	580.80
82.33	1030.75	917.21	0.963	550.53	0.00	0.00	.504	550.53	543.14	543.14	543.14	543.14	543.14	543.14	543.14	543.14
100.00	939.14	802.44	0.879	524.75	0.00	0.00	.482	524.75	507.80	507.80	507.80	507.80	507.80	507.80	507.80	507.80

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .8483

PERCENT SPAN FROM TIP (I. F.)	W02 (FT/SEC)	W102 (FT/SEC)	BETA2 (DEG)	V2 (FT/SEC)	W02 (FT/SEC)	W102 (FT/SEC)	W2 (FT/SEC)	W3 (FT/SEC)	W4 (FT/SEC)	W5 (FT/SEC)	W6 (FT/SEC)	W7 (FT/SEC)	W8 (FT/SEC)	W9 (FT/SEC)	W10 (FT/SEC)
0.00	1123.05	977.59	0.931	773.49	587.73	.644	554.61	554.61	554.61	554.61	554.61	554.61	554.61	554.61	554.61
11.45	1055.57	883.74	0.878	813.71	573.36	.677	577.30	577.30	577.30	577.30	577.30	577.30	577.30	577.30	577.30
30.57	964.36	762.55	0.811	819.07	523.79	.689	584.51	584.51	584.51	584.51	584.51	584.51	584.51	584.51	584.51
44.91	873.02	670.62	0.749	853.65	603.52	.722	603.52	603.52	603.52	603.52	603.52	603.52	603.52	603.52	603.52
62.44	774.33	482.17	0.644	885.07	680.34	.755	680.34	680.34	680.34	680.34	680.34	680.34	680.34	680.34	680.34
82.36	646.72	274.00	0.501	960.24	725.31	.821	725.31	725.31	725.31	725.31	725.31	725.31	725.31	725.31	725.31
100.00	547.57	150.28	0.561	1042.38	779.75	.888	779.75	779.75	779.75	779.75	779.75	779.75	779.75	779.75	779.75

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TRAILING EDGE	DELTA (DEG)	HETA0 (DEG)	INCIDENCE (DEG)	ANALF (DEG)	ETA FACTOR	HAR	OMEGA	LOSS	REYNOLDS	REYNOLDS	REYNOLDS	REYNOLDS	REYNOLDS	REYNOLDS	REYNOLDS	REYNOLDS
0.00	0.00	10.06	7.557	7.044	.4530	.2134	.0401	3.442	1.995	1.995	1.995	1.995	1.995	1.995	1.995	1.995
10.14	11.45	13.14	8.219	6.991	.4712	.2142	.0420	1.874	1.919	1.919	1.919	1.919	1.919	1.919	1.919	1.919
27.11	30.57	13.77	7.845	5.547	.4822	.1538	.0309	2.662	1.934	1.934	1.934	1.934	1.934	1.934	1.934	1.934
44.07	44.91	17.54	7.206	4.349	.4004	.1154	.0242	4.125	1.943	1.943	1.943	1.943	1.943	1.943	1.943	1.943
62.43	62.43	23.91	7.478	3.599	.5137	.1011	.0217	7.825	1.955	1.955	1.955	1.955	1.955	1.955	1.955	1.955
82.33	82.33	35.44	7.284	2.733	.5146	.1107	.0237	14.392	1.942	1.942	1.942	1.942	1.942	1.942	1.942	1.942
100.00	100.00	43.35	8.015	1.941	.4946	.1332	.0276	20.471	1.982	1.982	1.982	1.982	1.982	1.982	1.982	1.982

MOMENTUM AVERAGE ROTOR EFFICIENCY = .6678 (POLYTROPIC)  
 MASS AVERAGE ROTOR EFFICIENCY = .4550 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.9440  
 MASS AVERAGE TEMPERATURE RISE = 1.2442

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TESTS)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW = 1.5742 KG/SEC 100 PERCENT DESIGN SPEED = SCALING FACTOR = 74951.518 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 94.8161 EQUIVALENT FLOW / INLET AIN AREA = 187.2685 M/SEC-50 M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	HETA2 (DEG)	W1 (M/SEC)	HETA1 (DEG)	V1 (M/SEC)	W2 (M/SEC)	HETA2 (DEG)	V2 (M/SEC)	W3 (M/SEC)	HETA1 (DEG)	V3 (M/SEC)	W4 (M/SEC)	HETA2 (DEG)	V4 (M/SEC)	W5 (M/SEC)	HETA1 (DEG)	V5 (M/SEC)
0.00	71.32	510.06	483.90	1.575	0.00	162.74	0.00	0.00	0.00	162.74	0.00	0.00	162.74	157.50	431.40	659.38
10.14	70.92	400.50	454.18	1.472	0.00	164.95	0.00	0.00	0.00	164.95	0.00	0.00	164.95	161.49	414.65	614.65
27.11	68.55	456.33	418.65	1.301	0.00	181.57	0.00	0.00	0.00	181.57	0.00	0.00	181.57	174.23	374.32	498.99
46.00	63.12	421.55	374.12	1.274	0.00	185.96	0.00	0.00	0.00	185.96	0.00	0.00	185.96	174.23	374.32	498.99
62.53	61.69	376.16	332.02	1.147	0.00	173.80	0.00	0.00	0.00	173.80	0.00	0.00	173.80	174.23	374.32	498.99
85.36	59.01	326.04	274.57	0.993	0.00	167.80	0.00	0.00	0.00	167.80	0.00	0.00	167.80	164.55	274.57	498.99
100.00	56.77	242.41	214.59	0.879	0.00	160.25	0.00	0.00	0.00	160.25	0.00	0.00	160.25	154.80	242.41	498.99

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8983

PERCENT SPAN FROM TIP (I. F.)	HETA2 (DEG)	W1 (M/SEC)	HETA1 (DEG)	V1 (M/SEC)	W2 (M/SEC)	HETA2 (DEG)	V2 (M/SEC)	W3 (M/SEC)	HETA1 (DEG)	V3 (M/SEC)	W4 (M/SEC)	HETA2 (DEG)	V4 (M/SEC)	W5 (M/SEC)	HETA1 (DEG)	V5 (M/SEC)
0.00	60.41	342.50	247.97	0.931	0.00	237.59	0.00	0.00	0.00	237.59	0.00	0.00	237.59	169.05	444.44	646.92
11.45	56.74	321.77	269.14	0.878	0.00	238.02	0.00	0.00	0.00	238.02	0.00	0.00	238.02	175.90	444.44	646.92
30.57	52.74	294.59	234.56	0.811	0.00	249.65	0.00	0.00	0.00	249.65	0.00	0.00	249.65	178.14	444.44	646.92
44.91	46.24	268.10	192.21	0.733	0.00	260.19	0.00	0.00	0.00	260.19	0.00	0.00	260.19	177.05	444.44	646.92
67.64	40.21	237.24	161.97	0.644	0.00	261.77	0.00	0.00	0.00	261.77	0.00	0.00	261.77	184.00	444.44	646.92
84.26	33.57	204.11	130.70	0.591	0.00	292.71	0.00	0.00	0.00	292.71	0.00	0.00	292.71	185.41	444.44	646.92
100.00	13.42	197.78	124.41	0.561	0.00	305.53	0.00	0.00	0.00	305.53	0.00	0.00	305.53	191.90	444.44	646.92

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE FROM TIP	SPAN FROM TIP (I. F.)	HETA (DEG)	INCIDENCE (DEG)	ANGLE OF ATTACK (DEG)	INCIDENCE (DEG)	ANGLE OF ATTACK (DEG)	INCIDENCE (DEG)	ANGLE OF ATTACK (DEG)	INCIDENCE (DEG)	ANGLE OF ATTACK (DEG)	INCIDENCE (DEG)	ANGLE OF ATTACK (DEG)	INCIDENCE (DEG)	ANGLE OF ATTACK (DEG)	INCIDENCE (DEG)	ANGLE OF ATTACK (DEG)
0.00	0.00	0.00	7.557	7.019	0.4530	0.2134	0.0401	3.442	1.005	0.7439	0.7439	0.7439	0.7439	0.7439	0.7439	0.7439
10.14	11.45	13.18	8.219	6.891	0.4712	0.2162	0.0420	3.476	1.010	0.7432	0.7432	0.7432	0.7432	0.7432	0.7432	0.7432
27.11	30.57	13.77	7.765	5.597	0.4822	0.1534	0.0369	2.642	1.034	0.734	0.734	0.734	0.734	0.734	0.734	0.734
44.91	44.91	17.54	7.286	4.359	0.5009	0.1154	0.0252	2.125	1.043	0.726	0.726	0.726	0.726	0.726	0.726	0.726
67.64	67.64	21.41	7.474	3.589	0.5137	0.1011	0.0217	1.825	1.055	0.717	0.717	0.717	0.717	0.717	0.717	0.717
84.26	84.26	34.44	7.744	2.711	0.5146	0.107	0.0217	14.387	1.982	0.717	0.717	0.717	0.717	0.717	0.717	0.717
100.00	100.00	43.34	8.015	1.941	0.4946	0.1332	0.0274	20.471	1.982	0.717	0.717	0.717	0.717	0.717	0.717	0.717

MOMENTUM AVERAGE EFFICIENCY = 0.8478 (POLYTROPIC) MOMENTUM AVERAGE EFFICIENCY = 0.8550 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 1.9440 MASS AVERAGE TEMPERATURE RATIO = 1.2442

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 19 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 7

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9119

PERCENT SPAN FROM TIP (I. F.)	HETA 3 (DEG)	V4 (FT/SEC)	V13 (FT/SEC)	M3	VW3 (FT/SEC)	U73 (FT/SEC)	U3 (FT/SEC)
0.00	40.31	815.39	543.99	.733	669.50	542.14	1401.33
10.00	41.14	891.30	580.73	.748	670.67	644.56	1423.89
20.55	39.96	906.51	580.05	.767	673.31	693.70	1376.77
47.67	40.33	936.15	606.59	.799	712.11	711.54	1211.95
62.68	41.41	951.91	646.57	.819	709.58	706.08	1142.73
87.70	48.66	1009.62	703.43	.875	717.98	708.34	1022.15
100.00	65.94	1052.55	756.61	.918	711.93	711.70	958.23

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9109

PERCENT SPAN FROM TIP (I. F.)	HETA 4 (DEG)	V4 (FT/SEC)	V14 (FT/SEC)	M4	VW4 (FT/SEC)	U74 (FT/SEC)	U4 (FT/SEC)
0.00	1.22	609.88	14.69	.566	609.68	589.68	1470.59
11.76	1.21	608.14	14.76	.574	607.98	597.89	1419.51
30.55	1.5	716.05	8.12	.595	715.00	715.69	1331.93
47.73	1.52	730.22	-6.70	.617	739.19	736.63	1251.57
67.62	1.45	724.21	-6.61	.606	724.20	723.40	1167.54
84.53	1.17	689.26	2.03	.574	689.26	694.76	1076.06
100.00	1.10	693.50	2.18	.578	693.30	693.33	1021.09

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM LEADING EDGE	MASS FLOW (LBS/SEC)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	REFL. SUPT 5 HR (DEG)	REFL. SUPT 5 HR (DEG)	FACTOR	OMEGA HAN	LOSS PARAMETER	DI' EATION ANGLE (DEG)	STAFF PRESS	STAFF TIME	STATION
0.00	0.00	30.84	3.793	-1.29	6.399	.6367	.0567	.0203	23.490	1.873	1.2477	8778
10.00	11.30	32.97	5.014	1.457	5.745	.0617	.0614	.0214	17.759	1.882	1.2477	8895
20.55	30.50	39.31	3.397	.971	6.149	.0393	.0393	.0129	13.423	1.909	1.2469	9151
47.67	44.74	40.84	2.657	-3.166	6.059	.0373	.0373	.0090	11.463	1.941	1.2386	9315
67.62	67.62	42.15	2.347	-2.223	6.263	.0440	.0440	.0161	10.750	1.921	1.2303	9043
87.70	88.22	44.49	2.306	-2.220	6.942	.1432	.1432	.0379	11.702	1.871	1.2323	7494
100.00	100.00	45.76	1.310	-2.131	5.118	.1334	.1334	.0338	14.880	1.871	1.2323	8186

MOMENTUM AVERAGE STAFF EFFICIENCY = .8409 (POLYTROPIC)  
 MOMENTUM AVERAGE STAFF EFFICIENCY = .8259 (ADIABATIC)  
 MASS AVERAGE TEMPERATURE RISE = 1.9084  
 MASS AVERAGE TEMPERATURE RISE = 1.2662



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OF POOR QUALITY

JASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (CONTINUED) TEMP.)

MOTOR PERFORMANCE JASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

PERCENT SPAN FROM TIP (U. S.)	HEIGHT (IN.)	WIDTH (FT/SEC)	DEPTH (IN)	ANGLE (DEG)	VELOCITY (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)
0.00	21.87	165.11	1503.27	1.526	518.60	0.00	0.00	0.00	0.00	0.00	0.00
10.00	70.93	1503.50	1502.06	1.441	532.09	0.00	0.00	0.00	0.00	0.00	0.00
20.00	67.07	1405.16	1364.20	1.368	579.71	0.00	0.00	0.00	0.00	0.00	0.00
40.00	44.19	1371.26	1236.54	1.245	592.70	0.00	0.00	0.00	0.00	0.00	0.00
60.00	62.25	1212.50	1000.91	1.115	573.76	0.00	0.00	0.00	0.00	0.00	0.00
80.00	54.87	1066.15	819.73	0.973	537.29	0.00	0.00	0.00	0.00	0.00	0.00
100.00	57.27	972.32	601.09	0.872	514.96	0.00	0.00	0.00	0.00	0.00	0.00

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC HLOSSAGE = .9700

PERCENT SPAN FROM TIP (U. S.)	HEIGHT (IN.)	WIDTH (FT/SEC)	DEPTH (IN)	ANGLE (DEG)	VELOCITY (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)
0.00	61.10	1043.26	950.19	0.902	47.74	773.57	577.54	637	637	637	637
10.00	57.11	1012.25	844.98	0.837	47.55	814.41	600.90	674	674	674	674
20.00	51.25	916.76	736.13	0.784	45.13	871.20	598.18	694	694	694	694
40.00	44.06	816.12	597.96	0.705	47.10	858.53	624.92	724	724	724	724
60.00	36.24	705.70	460.34	0.653	46.05	896.28	658.04	764	764	764	764
80.00	21.23	600.12	341.71	0.573	50.52	977.61	758.58	840	840	840	840
100.00	19.76	633.04	314.24	0.547	52.49	1071.38	810.22	883	883	883	883

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC HLOSSAGE = .8980

PERCENT SPAN FROM TIP (U. S.)	HEIGHT (IN.)	WIDTH (FT/SEC)	DEPTH (IN)	ANGLE (DEG)	VELOCITY (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)
0.00	61.10	1043.26	950.19	0.902	47.74	773.57	577.54	637	637	637	637
10.00	57.11	1012.25	844.98	0.837	47.55	814.41	600.90	674	674	674	674
20.00	51.25	916.76	736.13	0.784	45.13	871.20	598.18	694	694	694	694
40.00	44.06	816.12	597.96	0.705	47.10	858.53	624.92	724	724	724	724
60.00	36.24	705.70	460.34	0.653	46.05	896.28	658.04	764	764	764	764
80.00	21.23	600.12	341.71	0.573	50.52	977.61	758.58	840	840	840	840
100.00	19.76	633.04	314.24	0.547	52.49	1071.38	810.22	883	883	883	883

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (U. S.)	HEIGHT (IN.)	WIDTH (FT/SEC)	DEPTH (IN)	ANGLE (DEG)	VELOCITY (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)	WINDMILL (FT/SEC)
0.00	0.00	10.57	10.57	8.034	7.546	4.007	0.239	0.637	0.311	1.920	0.734
10.00	12.00	13.30	13.30	8.744	7.472	4.012	0.232	0.471	2.264	1.942	0.749
20.00	31.50	15.12	15.12	8.348	6.146	4.045	0.165	0.341	2.144	1.947	0.803
40.00	44.74	18.73	18.73	7.895	6.042	4.285	0.134	0.294	3.942	1.970	0.816
60.00	68.50	25.70	25.70	8.077	6.176	4.218	0.094	0.215	7.224	1.980	0.818
80.00	88.67	34.34	34.34	8.343	6.284	4.352	0.130	0.247	12.451	2.014	0.818
100.00	100.00	44.50	44.50	8.514	6.440	4.512	0.154	0.283	17.816	2.015	0.818

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8572 (POLYTROPIC)  
 MASS AVERAGE MOTOR EFFICIENCY = .8430 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS. RATIO = 1.988  
 MASS AVERAGE TEMPERATURE RATIO = 1.2528

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR METRIC UNITS

EQUIVALENT WEIGHT FLOW = 1.5422 KG/SEC  
 EQUIVALENT DESIGN FLOW = 92.8246  
 100 PERCENT DESIGN SPEED = SPAN NO 4  
 EQUIVALENT SPEED = 74821.774 P.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 193.7629 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.9700

PERCENT SPAN FROM TIP (I. F.)	W1 (M/SEC)	W2 (M/SEC)	W3 (M/SEC)	W4 (M/SEC)	W5 (M/SEC)	W6 (M/SEC)	W7 (M/SEC)	W8 (M/SEC)	W9 (M/SEC)	W10 (M/SEC)
0.00	71.417	507.779	502.550	1.526	0.000	159.601	0.000	.475	150.001	152.002
10.00	70.411	485.770	457.842	1.461	0.000	152.110	0.000	.448	142.110	154.112
20.00	67.211	452.111	427.011	1.368	0.000	174.319	0.000	.531	174.319	174.319
30.00	62.511	417.011	376.011	1.245	0.000	180.445	0.000	.567	180.445	180.445
40.00	57.211	374.011	332.511	1.135	0.000	174.800	0.000	.528	174.800	174.800
50.00	50.517	323.335	270.011	.973	0.000	163.177	0.000	.493	163.177	163.177
100.00	57.217	240.127	240.127	.842	0.000	156.095	0.000	.472	156.095	156.095

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.9900

PERCENT SPAN FROM TIP (I. F.)	W1 (M/SEC)	W2 (M/SEC)	W3 (M/SEC)	W4 (M/SEC)	W5 (M/SEC)	W6 (M/SEC)	W7 (M/SEC)	W8 (M/SEC)	W9 (M/SEC)	W10 (M/SEC)
0.00	61.210	330.110	289.612	.892	47.74	275.278	174.51	.637	154.55	153.65
10.00	57.111	300.511	259.017	.837	47.55	244.211	183.115	.674	167.55	167.55
20.00	51.215	268.011	226.517	.765	46.13	253.735	162.613	.698	174.50	174.50
30.00	45.214	236.011	182.210	.664	47.10	261.648	131.619	.724	174.13	174.13
40.00	38.214	204.011	140.311	.543	46.05	273.119	109.612	.764	184.54	184.54
50.00	31.211	172.011	101.011	.412	50.42	297.010	230.000	.840	189.64	189.64
100.00	30.216	142.011	66.011	.281	52.49	311.112	266.016	.881	189.64	189.64

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	W1 (M/SEC)	W2 (M/SEC)	W3 (M/SEC)	W4 (M/SEC)	W5 (M/SEC)	W6 (M/SEC)	W7 (M/SEC)	W8 (M/SEC)	W9 (M/SEC)	W10 (M/SEC)
0.00	0.00	10.57	10.57	8.018	7.548	4.807	.239	.047	4.311	1.020
10.00	12.04	13.34	13.34	8.768	7.372	5.012	.232	.047	2.261	1.462
20.00	11.58	15.12	15.12	8.301	6.156	5.065	.166	.034	2.166	1.947
30.00	9.78	18.71	18.71	7.079	4.952	5.205	.134	.029	3.382	1.919
40.00	8.05	23.10	23.10	6.077	4.178	5.218	.098	.015	7.224	1.940
50.00	6.42	28.36	28.36	5.167	3.208	5.312	.030	.008	12.553	2.014
100.00	100.00	46.50	46.50	4.514	2.440	5.512	.158	.032	17.414	2.014

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.6572  
 MASS AVERAGE MOTOR EFFICIENCY = 0.6470  
 MOMENTUM AVERAGE MOTOR PRESS. RATIO = 1.9618  
 MASS AVERAGE MOTOR PRESS. RATIO = 1.2524



NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 15, 1974 (COMBINED) TEMP. 1

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCALING NO. 4

INLET VELOCITY DIAGRAM DATA  
CALCULATED, AERODYNAMIC BLOCKAGE = .9214

PERCENT SPAN FROM TIP (I. S.)	REF. 3 (O/F)	V3 (FT/SEC)	VU1 (FT/SEC)	W3 (FT/SEC)	VU3 (FT/SEC)	W3 (FT/SEC)	U3 (FT/SEC)
0.00	43.54	455.26	519.54	.711	619.58	612.77	1676.97
11.55	44.63	477.97	616.67	.711	626.87	624.93	1619.50
30.65	42.26	481.66	606.21	.761	667.15	667.14	1319.91
44.60	42.44	485.06	629.58	.787	677.74	677.74	1225.60
67.24	45.10	498.97	668.49	.815	692.92	692.92	1126.56
88.11	47.71	1013.59	737.42	.975	696.97	696.97	1018.73
100.00	47.97	1050.60	746.12	.921	708.75	679.17	956.61

EXIT VELOCITY DIAGRAM DATA  
CALCULATED, AERODYNAMIC BLOCKAGE = .9209

PERCENT SPAN FROM TIP (I. S.)	REF. 4 (O/F)	V4 (FT/SEC)	VU4 (FT/SEC)	W4 (FT/SEC)	VU4 (FT/SEC)	W4 (FT/SEC)	U4 (FT/SEC)
0.00	-1	601.65	2.02	.546	681.68	681.68	1464.10
11.55	-1	590.39	-2.73	.545	680.34	680.30	1416.40
30.65	-1.33	608.04	-16.62	.768	688.78	688.44	1330.74
44.60	-1.20	715.77	-15.04	.596	715.21	714.67	1248.15
67.24	-1.54	677.67	-6.93	.502	697.86	697.47	1166.40
88.11	-1.54	654.11	-17.74	.566	648.87	656.66	1072.11
100.00	-1.57	663.67	-14.10	.550	663.42	679.47	1019.36

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. S.)	INCIDENTAL ANGLES (DEG)	MASS FLOW (LBS/SEC)	INCIDENTAL ANGLES (DEG)	SUCT. SUPP. (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS	STATION POLYTROPIC EFF.
0.00	43.75	0.10	7.250	3.117	.0072	22.010	1.2703	.9363
11.55	44.66	12.05	9.253	4.921	.0206	16.301	1.2703	.8778
30.65	43.74	33.61	5.650	2.841	.0234	11.771	1.2573	.8510
44.60	44.00	44.11	5.164	2.151	.0101	10.761	1.2573	.8350
67.24	43.63	71.26	3.564	.686	.0179	10.571	1.2361	.8924
88.11	48.76	100.00	4.301	1.475	.0460	4.900	1.2400	.7820
100.00	49.56	100.00	3.310	-2.113	.0351	17.110	1.2410	.8024

MOMENTUM AVERAGE STAGE EFFICIENCY = .8266 (POLYTROPIC)  
 MASS AVERAGE TEMPERATURE RISE = 1.9214  
 MASS AVERAGE TEMPERATURE RISE = 1.2528

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAY NO 4

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9214

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	V13 (M/SEC)	M3 (M/SEC)	V73 (M/SEC)	M3 (M/SEC)
0.00	41.24	209.64	179.69	144.05	186.77	450.75
11.55	46.43	267.54	187.34	191.07	190.75	432.36
30.65	42.25	274.74	186.77	203.35	213.75	402.29
49.60	42.83	241.94	191.89	206.54	206.42	373.56
67.44	43.10	209.25	197.63	211.20	210.63	343.37
85.11	44.71	308.96	226.89	211.83	208.98	310.51
100.00	47.47	322.66	239.67	216.03	208.06	291.58

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9099

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	V14 (M/SEC)	M4 (M/SEC)	V74 (M/SEC)	M4 (M/SEC)
0.00	-1.17	207.77	-1.42	207.77	207.77	447.64
11.63	-1.23	207.30	-1.33	207.30	207.35	431.94
30.63	-1.34	210.00	-1.46	209.94	209.84	405.62
49.63	-1.29	210.06	-1.54	214.00	217.77	380.56
67.51	-1.53	212.72	-1.36	212.71	212.59	355.04
84.24	-1.54	210.90	-1.41	209.42	209.09	326.74
100.00	-1.67	202.29	-1.56	202.21	202.21	310.70

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (PCF)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SWIRL (DEG)	DELTA FACTOR	DELTA OMEGA (DEG)	LOSS PARAMETER	DELTA ANGLE (DEG)	STAGE BPFSS RATIO	STAGE BPFSS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	43.75	7.53	3.37	.6562	.0201	.0072	22.010	1.909	1.2703	.943
11.55	12.05	44.56	8.253	4.331	.6644	-.0592	.0206	16.301	1.907	1.2703	.8774
30.65	33.61	43.64	5.070	2.353	.6662	.0711	.0236	11.771	1.923	1.2563	.8410
49.60	44.93	44.00	5.146	2.153	.6741	.0324	.0101	10.765	1.957	1.2172	.9350
67.44	71.26	43.63	3.543	.686	.6562	.0622	.0179	10.573	1.934	1.2740	.8925
85.11	90.56	40.26	4.361	1.875	.6380	.1664	.0400	9.930	1.892	1.2408	.7720
100.00	100.00	49.54	3.334	-.103	.5542	.1569	.0391	17.130	1.883	1.2410	.8029

MOMENTUM AVERAGE STAGE EFFICIENCY = .8266 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8100 (ADIABATIC)

MOMENTUM AVG. STAGE BPFSS RATIO = 1.9219  
MASS AVERAGE TEMPERATURE RISE = 1.2528

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE: NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 3.3594 LHM/SEC  
 EQUIVALENT FLOW / INLET ANN AREA = 76440.528 R.P.M.  
 PERCENT OF SEC J EQUIVALENT FLOW = 21.7204  
 EQUIVALENT SPEED = 76440.528 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 37.1073 LHM/SEC-SU FT

100 PERCENT DESIGN SPEED - SCAN NO 5

EQUIVALENT SPEED

EQUIVALENT FLOW / INLET ANN AREA = .9700

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (U. S.)	HEIGHT (IN)	V01 (FT/SEC)	V01E (FT/SEC)	W1 (DEG)	BETA1 (DEG)	V1 (FT/SEC)	V1E (FT/SEC)	W1 (DEG)	W1E (DEG)	V04 (FT/SEC)	V04E (FT/SEC)	W4 (DEG)	W4E (DEG)	V07 (FT/SEC)	V07E (FT/SEC)	W7 (DEG)	W7E (DEG)
0.00	72.15	1607.76	157.67	1.523	0.00	510.00	0.00	.67	.67	510.00	0.00	.67	.67	493.57	1593.67	.11	.11
10.45	70.74	1510.54	1501.41	1.454	0.00	523.52	0.00	.480	.480	523.52	0.00	.480	.480	504.38	1501.91	.11	.11
27.59	67.50	1401.66	1367.41	1.364	0.00	545.33	0.00	.524	.524	545.33	0.00	.524	.524	554.87	1367.91	.11	.11
46.37	64.75	1327.07	1276.49	1.260	0.00	573.07	0.00	.537	.537	573.07	0.00	.537	.537	581.20	1276.49	.11	.11
62.94	62.54	1274.34	1224.34	1.190	0.00	564.41	0.00	.519	.519	564.41	0.00	.519	.519	564.42	1090.90	.11	.11
82.88	59.24	1044.70	974.46	.949	0.00	529.00	0.00	.445	.445	529.00	0.00	.445	.445	521.00	974.46	.11	.11
100.00	57.67	940.29	801.29	.848	0.00	507.13	0.00	.464	.464	507.13	0.00	.464	.464	489.90	801.29	.11	.11

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9079

PERCENT SPAN FROM TIP (U. S.)	HEIGHT (IN)	V02 (FT/SEC)	V02E (FT/SEC)	W2 (DEG)	BETA2 (DEG)	V2 (FT/SEC)	V2E (FT/SEC)	W2 (DEG)	W2E (DEG)	V02 (FT/SEC)	V02E (FT/SEC)	W2 (DEG)	W2E (DEG)	V02 (FT/SEC)	V02E (FT/SEC)	W2 (DEG)	W2E (DEG)
0.00	61.35	1076.44	947.26	.894	48.37	775.74	579.86	.638	.638	515.31	498.71	.638	.638	515.31	1523.12	.12	.12
12.61	58.61	957.45	840.01	.811	49.95	798.03	609.36	.654	.654	512.20	501.00	.654	.654	512.20	1449.37	.12	.12
32.64	51.28	826.26	722.64	.775	46.30	838.73	606.41	.702	.702	579.66	575.82	.702	.702	579.66	129.05	.12	.12
50.11	46.59	842.10	591.19	.711	46.60	872.75	634.04	.737	.737	599.49	599.66	.737	.737	599.49	125.27	.12	.12
64.16	37.84	761.44	459.29	.649	47.31	896.08	654.66	.743	.743	607.50	604.79	.743	.743	607.50	117.44	.12	.12
84.21	21.06	645.30	277.95	.553	51.75	948.85	740.84	.870	.870	599.49	589.97	.870	.870	599.49	99.80	.12	.12
100.00	10.47	610.44	110.93	.527	53.72	1014.42	817.75	.875	.875	600.87	570.87	.875	.875	600.87	94.69	.12	.12

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	HEIGHT FROM TIP (IN)	MASS FLOW (PCF)	DELTA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUIC SUM (DEG)	INCIDENCE FACTOR (DEG)	OMEGA* (DEG)	PARAMETER LOSS (DEG)	ANGLE OF LOSS (DEG)	REYNOLDS NUMBER	ROTOR ANTI-RATE EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	10.00	4.313	7.944	.4867	.2471	.0451	4.361	1.924	.7259	.7498
10.45	12.61	12.93	12.16	9.047	7.690	.5199	.2442	.0499	3.853	1.914	.7201	.7443
27.59	12.65	13.69	14.11	8.691	6.494	.5098	.1659	.0365	1.906	1.078	.4714	.8467
46.37	50.11	53.04	20.16	8.265	5.318	.5236	.1297	.0290	3.028	2.003	.8802	.8912
62.94	64.16	71.49	24.55	8.458	4.556	.5247	.1087	.0237	7.328	1.990	.9115	.9196
84.21	84.21	90.57	34.32	8.736	3.891	.5456	.1486	.0366	12.372	1.994	.8947	.9043
100.00	100.00	100.00	47.20	8.918	2.844	.5362	.2017	.0422	17.522	1.995	.8946	.9043

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8694 (POLYTROPIC)

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8349 (ADIABATIC)

MOMENTUM AVE. ROTOR EFFICIENCY = 1.9688

MASS AVERAGE TEMPERATURE RISE = 1.2552

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.5219 KG/SEC 100 PERCENT DES. GN SPEED - SCAN NO 5  
 PERCENT DESIGN EQUIVALENT FLOW = 91.7204 FLOW/EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 78840.528 M.P.M.  
 = 191.1540 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	HETA#1 (DEG)	V#1 (%/SEC)	W#1 (M/SEC)	HETA1 (DEG)	V1 (%/SEC)	W1 (M/SEC)	M1	V#11 (%/SEC)	W#11 (M/SEC)	V#1 (%/SEC)	W#1 (M/SEC)	U1 (M/SEC)
0.00	72.15	507.11	482.70	0.00	155.65	0.00	.447	0.00	155.65	150.64	150.64	442.70
10.45	70.74	406.40	457.74	0.00	150.57	0.00	.440	0.00	150.57	156.95	156.95	457.74
27.59	67.40	451.61	416.94	0.00	173.53	0.00	.524	0.00	173.53	170.34	170.34	416.94
46.37	64.75	416.64	376.84	0.00	173.72	0.00	.537	0.00	177.79	177.15	177.15	376.84
62.98	62.04	374.40	332.51	0.00	172.09	0.00	.519	0.00	172.09	172.04	172.04	332.51
85.49	59.94	322.11	270.85	0.00	161.24	0.00	.485	0.00	161.24	159.07	159.07	270.85
100.00	57.57	289.04	246.23	0.00	156.57	0.00	.464	0.00	156.57	149.32	149.32	246.23

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9079

PERCENT SPAN FROM TIP (I. F.)	HETA#2 (DEG)	V#2 (%/SEC)	W#2 (M/SEC)	BETA2 (DEG)	VP (%/SEC)	W#2 (M/SEC)	M#2	V#2 (%/SEC)	W#2 (M/SEC)	V#2 (%/SEC)	W#2 (M/SEC)	U2 (M/SEC)
0.00	61.35	327.61	287.50	48.37	236.45	176.74	.638	176.74	176.74	157.07	157.07	464.25
12.41	59.63	295.88	256.03	49.95	242.63	145.73	.654	145.73	145.73	152.71	152.71	441.77
32.15	51.28	242.12	220.26	66.30	255.65	144.83	.702	144.83	144.83	175.51	175.51	405.09
50.11	44.57	256.67	180.20	46.60	266.01	193.27	.737	193.27	193.27	182.70	182.70	373.46
61.14	37.09	212.15	130.99	47.31	273.13	200.76	.743	200.76	200.76	185.10	185.10	340.75
84.21	21.54	196.69	72.53	51.75	295.30	231.91	.830	231.91	231.91	182.42	182.42	304.43
100.00	10.47	146.04	33.81	53.72	309.20	249.25	.875	249.25	249.25	182.04	182.04	293.06

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HETA#0 (DEG)	MASS FLOW (PC)	INCIDENCE MEAN (DEG)	SUCT SIB (DEG)	OMEGA RAP (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR LOSS ANGLE (DEG)	ROTOR LOSS ANGLE (DEG)	ROTOR LOSS ANGLE (DEG)	ROTOR LOSS ANGLE (DEG)	ROTOR LOSS ANGLE (DEG)
0.00	0.00	0.00	8.313	7.845	.4867	.0451	4.341	1.924	1.924	.7259	.7259	.7498
10.45	12.41	12.32	9.047	7.630	.5199	.0499	3.853	1.914	1.914	.7201	.7201	.7443
27.59	32.15	31.65	8.691	6.604	.5098	.0345	1.906	1.974	1.974	.8467	.8467	.8617
46.37	50.11	50.11	8.265	5.218	.4236	.0280	3.022	2.003	2.003	.8802	.8802	.8912
62.98	62.98	71.09	8.458	4.556	.4047	.0237	7.028	1.980	1.980	.9115	.9115	.9146
85.49	85.49	85.49	8.736	3.691	.3556	.0266	12.372	1.976	1.976	.9067	.9067	.9043
100.00	100.00	100.00	8.938	2.844	.3017	.0422	17.522	1.995	1.995	.9043	.9043	.9043

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8498 (POLYTROPIC)

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8349 (ADIABATIC)

MOMENTUM AVG. ROTOR LOSS RATIO = 1.9686

MASS AVERAGE TEMPERATURE RISE = 1.2552

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 5

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9343

PERCENT SPAN FROM TIP (L. F.)	HETA 3 (DEG)	VJ (FT/SEC)	VIIJ (FT/SEC)	MJ	VMJ (FT/SEC)	U73 (FT/SEC)	U3 (FT/SEC)
0.00	44.71	848.66	597.98	.704	603.10	594.47	1479.20
11.88	46.84	853.81	623.21	.708	593.60	582.63	1417.16
31.41	42.80	902.05	612.84	.761	661.90	641.89	1315.10
44.84	42.90	932.39	634.69	.791	681.03	662.52	1224.10
67.26	43.77	943.66	652.30	.809	681.43	678.94	1127.98
87.89	44.04	1001.16	744.96	.862	668.84	659.85	1020.09
100.00	44.30	1046.57	793.42	.908	682.50	663.64	936.85

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9072

PERCENT SPAN FROM TIP (L. F.)	HETA 6 (DEG)	V4 (FT/SEC)	VII4 (FT/SEC)	M4	VM4 (FT/SEC)	U74 (FT/SEC)	U6 (FT/SEC)
0.00	-0.97	678.41	-10.30	.553	678.33	678.31	1468.47
11.41	-0.91	679.81	-10.74	.554	679.73	679.64	1417.26
30.48	-1.54	679.04	-14.23	.559	678.79	678.49	1331.65
44.45	-1.04	707.32	-12.44	.586	707.20	706.47	1269.21
67.47	-1.06	690.82	-12.54	.574	689.71	689.33	1165.63
88.17	-1.34	651.14	-15.70	.538	651.00	648.62	1072.73
100.00	-1.39	653.94	-15.47	.541	653.75	653.75	1019.61

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (LBT)	DELTA HETA (DEG)	INCIDENCE HETA (DEG)	ANGLE SUCT (DEG)	FACTOR 0	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAFF OFFSET RATIO	STAGE TIME RATIO	STATOR POLYTROPIC EFF
0.00	0.00	45.59	4.334	4.472	.4605	.0224	.00A1	21.310	1.913	1.2820	.9493
11.88	12.22	47.79	10.670	7.371	.4609	.0037	.0013	15.627	1.914	1.2820	.9319
31.41	33.63	44.33	6.134	2.865	.4737	.0941	.0309	11.627	1.918	1.2592	.8224
44.84	51.05	43.94	5.123	2.137	.4498	.0703	.0216	10.934	1.955	1.2489	.8473
67.26	71.79	44.81	4.244	1.391	.4650	.0662	.0190	10.058	1.934	1.2359	.8968
87.89	90.57	49.47	5.781	2.812	.5416	.1495	.0394	10.151	1.881	1.2435	.7944
100.00	100.00	50.63	4.666	1.225	.5594	.1389	.0351	17.310	1.880	1.2433	.8233

MOMENTUM AVERAGE STAFF EFFICIENCY = .8191 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.9210  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8018 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.2552

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 5

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9343

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	V113 (M/SEC)	M3	V13 (M/SEC)	V173 (M/SEC)	W23 (M/SEC)	U13 (M/SEC)
0.00	44.71	251.67	181.99	.704	193.82	191.80	191.80	40.86
11.88	46.88	240.24	189.96	.708	177.88	177.59	177.59	43.94
31.41	42.70	276.96	186.79	.761	201.75	201.75	201.75	400.94
48.94	42.90	286.19	193.35	.793	208.19	208.03	208.03	373.11
67.24	44.77	287.63	198.97	.809	207.70	206.94	206.94	343.81
87.00	48.04	305.15	227.07	.862	203.86	201.12	201.12	310.92
100.00	49.30	310.99	241.83	.908	208.03	202.28	202.28	291.65

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9072

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	V114 (M/SEC)	M4	V14 (M/SEC)	V174 (M/SEC)	W24 (M/SEC)	U14 (M/SEC)
0.00	-0.17	206.74	-3.14	.553	206.75	206.75	206.75	467.59
11.81	-0.1	207.21	-1.29	.554	207.18	207.15	207.15	431.98
31.48	-1.54	206.97	-5.56	.559	206.90	206.80	206.80	405.49
48.85	-1.04	215.59	-3.71	.586	215.54	215.33	215.33	380.76
67.47	-1.14	210.26	-3.82	.574	210.22	210.11	210.11	355.24
88.17	-1.30	198.48	-4.78	.538	198.42	197.70	197.70	326.97
100.00	-1.30	192.32	-4.84	.541	199.26	198.26	198.26	310.71

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE FROM TIP	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE MEAN (DEG)	SUPT SUR ANGLE (DEG)	n FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	STATOR PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	45.50	8.396	4.772	.6605	.0224	.0081	21.310	1.013	1.2820	.9481
11.88	11.41	12.32	47.79	10.690	7.371	.6609	.0037	.0013	15.627	1.014	1.2829	.9919
31.41	30.40	33.50	44.33	6.134	2.865	.4737	.0941	.0309	11.627	1.019	1.2882	.8224
48.94	44.85	33.05	43.94	5.123	2.137	.6498	.0703	.0216	10.914	1.055	1.2689	.8473
67.24	67.47	71.94	44.81	4.244	1.381	.4650	.0662	.0190	10.050	1.036	1.2359	.8968
87.00	88.17	90.57	49.66	5.781	2.882	.5416	.1694	.0396	10.151	1.041	1.2435	.7264
100.00	100.00	100.00	50.69	4.666	1.225	.5594	.1304	.0351	17.310	1.800	1.7411	.8233

MOMENTUM AVERAGE STAGE EFFICIENCY = .8191 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .8018 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.9210

MASS AVERAGE TEMPERATURE RISE = 1.2552

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.5283 LAM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 96.3332  
 100 PERCENT DESIGN SPFFD = SCAM NO 4  
 EQUIVALENT SPFD = 76987.33A R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 39.9A93 LAM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9610

PERCENT SPAN FROM TIP (L. F.)	RETA#1 (DEG)	V#1 (FT/SEC)	VI#1 (FT/SEC)	W#1 (DEG)	RETA1 (DEG)	V1 (FT/SEC)	VI1 (FT/SEC)	M1	VM (FT/SEC)	V71 (FT/SEC)	VI1 (FT/SEC)
0.00	70.99	1478.10	1584.61	1.541	0.00	544.51	0.00	.502	544.51	528.01	1544.61
10.03	69.61	1508.90	1507.98	1.479	0.00	560.57	0.00	.515	560.57	542.22	1507.98
24.04	66.10	1500.46	1475.43	1.390	0.00	604.59	0.00	.563	604.59	594.39	1375.43
43.87	63.33	1300.75	1242.74	1.247	0.00	424.33	0.00	.578	424.33	422.32	1242.74
62.60	61.14	1252.65	1097.52	1.157	0.00	403.80	0.00	.559	403.80	603.59	1097.52
85.10	58.47	1078.42	919.55	.992	0.00	544.16	0.00	.519	544.16	554.58	919.55
100.00	56.07	967.49	802.78	.888	0.00	534.98	0.00	.496	534.98	571.63	802.78

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8529

PERCENT SPAN FROM TIP (L. F.)	RETA#2 (DEG)	V#2 (FT/SEC)	VI#2 (FT/SEC)	W#2 (DEG)	RETA2 (DEG)	V2 (FT/SEC)	VI2 (FT/SEC)	M2	VM2 (FT/SEC)	V72 (FT/SEC)	VI2 (FT/SEC)
0.00	60.66	1193.75	1040.63	1.000	37.68	760.04	485.32	.637	586.31	586.08	1525.95
11.70	55.79	1146.07	947.75	.966	38.28	820.89	508.53	.692	644.60	630.32	1456.28
30.45	52.12	1043.93	873.99	.896	39.02	875.01	519.44	.700	680.94	671.97	1363.92
49.63	45.74	934.85	672.80	.801	40.48	840.83	548.79	.735	654.89	654.78	1231.59
69.47	37.04	845.23	509.63	.727	42.07	908.32	608.57	.781	674.31	672.32	1114.20
88.73	22.59	786.97	302.35	.645	43.74	1005.59	695.20	.875	726.57	714.64	997.55
100.00	14.27	750.23	144.95	.657	45.72	1041.32	745.66	.911	727.00	702.37	940.41

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA META# (DEG)	INCIDENCE ANGLE (DEG)	SUCT SWIRL (DEG)	OMEGA# (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ADIBATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	10.33	7.157	6.689	.3988	.0381	3.670	1.764	.7487	.7600
10.03	0.00	12.66	13.82	7.785	6.654	.4212	.0371	.888	1.815	.7813	.7488
24.04	30.65	13.04	17.94	7.280	5.123	.4210	.0267	2.009	1.841	.8508	.8630
43.87	49.43	52.59	17.55	6.771	3.451	.4463	.0215	3.493	1.880	.8951	.9040
62.60	68.47	71.68	24.10	6.942	3.042	.4582	.0183	.271	1.904	.9251	.9316
85.10	88.73	90.28	35.88	7.195	2.154	.4789	.0085	14.069	1.996	.9731	.9756
100.00	100.00	100.00	41.80	7.321	1.247	.3853	.0094	21.324	1.997	.9731	.9756

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8799 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8689 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.8692  
 MASS AVERAGE TEMPERATURE RISE = 1.2248

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.6004 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 96.3372  
 100 PERCENT DESIGN SPEED = 5041 NO  
 EQUIVALENT SPEED = 7493.338 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 190.2464 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9610

PERCENT SPAN FROM TIP (I. F.)	RETAIN (DEG)	VEL (M/SEC)	VU*1 (M/SEC)	VE1 (M/SEC)	VE2 (M/SEC)	VE3 (M/SEC)	VE4 (M/SEC)	VE5 (M/SEC)	VE6 (M/SEC)	VE7 (M/SEC)	VE8 (M/SEC)	VE9 (M/SEC)	VE10 (M/SEC)	VE11 (M/SEC)	VE12 (M/SEC)
0.00	70.99	511.64	483.60	1.541	0.00	166.58	0.00	502	166.58	161.21	161.21	161.21	161.21	161.21	161.21
10.00	69.61	490.36	459.63	1.479	0.00	170.86	0.00	515	170.86	165.27	165.27	165.27	165.27	165.27	165.27
20.00	66.10	458.56	414.23	1.300	0.00	185.80	0.00	563	185.80	182.39	182.39	182.39	182.39	182.39	182.39
30.00	63.39	423.90	378.79	1.287	0.00	190.30	0.00	578	190.30	184.68	184.68	184.68	184.68	184.68	184.68
40.00	61.14	381.91	336.52	1.157	0.00	186.04	0.00	558	186.04	183.94	183.94	183.94	183.94	183.94	183.94
50.00	54.47	324.82	280.28	1.002	0.00	171.46	0.00	519	171.46	169.65	169.65	169.65	169.65	169.65	169.65
60.00	56.07	294.89	244.69	0.888	0.00	166.59	0.00	494	166.59	168.09	168.09	168.09	168.09	168.09	168.09

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8529

PERCENT SPAN FROM TIP (I. F.)	HETA*2 (DEG)	VE*2 (M/SEC)	VU*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)	VE*2 (M/SEC)
0.00	60.66	362.85	317.18	1.000	39.64	231.66	147.92	637	174.20	172.54	172.54	172.54	172.54	172.54	172.54
10.00	55.79	349.52	298.87	0.966	38.24	240.21	155.00	692	194.61	192.12	192.12	192.12	192.12	192.12	192.12
20.00	52.12	314.19	251.15	0.886	38.02	251.46	154.32	700	195.37	194.15	194.15	194.15	194.15	194.15	194.15
30.00	45.71	285.07	205.07	0.801	40.44	262.78	170.32	735	199.50	199.50	199.50	199.50	199.50	199.50	199.50
40.00	48.47	257.63	155.34	0.727	42.07	276.86	185.49	781	206.53	206.53	206.53	206.53	206.53	206.53	206.53
50.00	22.59	234.87	92.16	0.695	43.74	306.50	211.90	876	221.88	217.02	217.02	217.02	217.02	217.02	217.02
60.00	14.27	224.67	56.37	0.657	45.72	317.60	227.22	911	221.61	216.18	216.18	216.18	216.18	216.18	216.18

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HETA* (DEG)	MASS FLOW (PCT)	INCIDENCE MEAN (DEG)	SUCT AIR (DEG)	FACTOR	OMEGA* (RPM)	PARAMETER	LOSS (DEG)	DEVIATION (DEG)	ROTOR ANTIADIBATIC EFF	STATOR ANTIADIBATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	7.157	0.689	0.998	2044	0.031	0.031	3.670	1.766	1.766	0.760
10.00	11.70	12.66	7.785	6.456	0.872	1820	0.037	0.037	4.668	1.815	1.815	0.798
20.00	30.65	33.04	7.280	5.123	0.610	1305	0.067	0.067	2.009	1.641	1.641	0.830
30.00	49.63	52.59	6.771	3.851	0.463	1013	0.075	0.075	3.893	1.480	1.480	0.900
40.00	68.47	71.49	6.942	3.062	0.362	0.838	0.103	0.103	7.271	1.904	1.904	0.916
50.00	88.73	90.29	7.195	2.156	0.419	0.392	0.085	0.085	14.064	1.986	1.986	0.956
60.00	100.00	100.00	7.321	1.267	0.3853	0.0677	0.009	0.009	21.324	1.987	1.987	0.976

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8799 (POLYTROPIC)

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8489 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.8692

MASS AVERAGE TEMPERATURE RATIO = 1.2248



NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 6

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .0824

PERCENT SPAN FROM TIP (I. I.)	BETA 3 (DEG)	V3 (FT/SEC)	V113 (FT/SEC)	M3	V13 (FT/SEC)	V173 (FT/SEC)	U3 (FT/SEC)
0.00	34.21	866.63	490.73	.735	708.04	700.24	1471.95
11.13	35.14	902.54	520.16	.749	737.62	736.40	1423.72
22.26	35.71	916.62	525.00	.747	750.50	750.57	1377.17
33.39	36.14	947.30	549.36	.818	764.53	743.96	1230.34
44.52	38.00	978.24	602.27	.849	770.05	748.04	1129.90
55.65	40.15	1053.77	679.66	.924	805.46	794.64	1020.60
66.78	41.50	1091.70	723.78	.963	817.64	795.05	958.63

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .08758

PERCENT SPAN FROM TIP (I. I.)	BETA 4 (DEG)	V4 (FT/SEC)	V114 (FT/SEC)	M4	V14 (FT/SEC)	U4 (FT/SEC)
0.00	-1.92	879.11	-27.78	.700	828.64	1471.20
11.21	-1.87	853.64	-27.90	.723	853.19	1420.77
22.29	-1.88	867.64	-13.32	.740	867.59	1350.53
33.36	-1.75	844.14	-27.24	.767	893.72	1253.72
44.44	-2.78	872.95	-42.29	.747	871.93	1169.25
55.51	-1.77	842.72	-18.93	.727	852.52	1074.62
66.59	-1.22	860.12	-18.36	.734	859.93	1021.51

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. I.)	FRONTING LOSS	FRONTING LOSS	FRONTING LOSS	INCIDENCE ANGLE (DEG)	SUCT 5/16 ANGLE (DEG)	DELTA BETA (DEG)	MASS FLOW (PPT)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	INCIDENCE ANGLE (DEG)	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE LOSS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	0.00	-1.104	-5.024	37.13	0.00	37.13	-1.104	-5.024	.2643	.0242	20.260	1.724	1.2173	.3319
11.13	11.21	12.46	12.46	-1.440	-4.314	37.05	12.46	37.05	-1.440	-4.314	.2650	.0314	14.710	1.741	1.2373	.3054
22.26	22.26	13.06	13.06	-1.543	-4.314	35.84	13.06	35.84	-1.543	-4.314	.2650	.0293	12.339	1.796	1.2236	.3141
33.39	33.39	42.59	42.59	-1.520	-4.517	37.04	42.59	37.04	-1.520	-4.517	.2626	.0284	10.260	1.827	1.2205	.3336
44.52	44.52	67.15	67.15	-1.530	-4.302	40.78	67.15	40.78	-1.530	-4.302	.2911	.0462	8.324	1.789	1.2100	.3435
55.65	55.65	84.19	84.19	-2.212	-5.024	41.42	84.19	41.42	-2.212	-5.024	.2916	.0745	10.267	1.749	1.2222	.3554
66.78	66.78	100.00	100.00	-3.132	-4.574	42.72	100.00	42.72	-3.132	-4.574	.3741	.0673	17.474	1.749	1.2222	.4857

MOMENTUM AVERAGE STAGE EFFICIENCY = .8114 (POLYTROPIC)      MOMENTUM AVG. STAGE LOSS RATIO = 1.7806  
 MASS AVERAGE STAGE EFFICIENCY = .7958 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.2248

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NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (MFRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 6

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8828

PERCENT SPAN FROM TIP (I. F.)	RETA 3 (DEG)	V1 (M/SEC)	V13 (M/SEC)	M13	V14 (M/SEC)	M14	V15 (M/SEC)	M15	V16 (M/SEC)	M16	V17 (M/SEC)	M17	V18 (M/SEC)	M18	V19 (M/SEC)	M19
0.00	45.21	264.15	152.12	.715	215.81	.715	215.81	.715	215.81	.715	213.44	.715	213.44	.715	213.44	.715
11.13	45.19	275.11	150.55	.769	226.83	.769	226.83	.769	226.83	.769	224.45	.769	224.45	.769	224.45	.769
22.50	35.01	279.33	160.26	.787	220.78	.787	220.78	.787	220.78	.787	224.77	.787	224.77	.787	224.77	.787
40.00	34.14	288.74	170.44	.810	211.03	.810	211.03	.810	211.03	.810	215.84	.810	215.84	.810	215.84	.810
57.27	34.00	298.17	183.57	.849	194.94	.849	194.94	.849	194.94	.849	206.10	.849	206.10	.849	206.10	.849
94.15	40.15	321.19	202.10	.924	185.50	.924	185.50	.924	185.50	.924	242.21	.924	242.21	.924	242.21	.924
100.00	41.50	332.75	220.49	.963	189.22	.963	189.22	.963	189.22	.963	242.11	.963	242.11	.963	242.11	.963

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8759

PERCENT SPAN FROM TIP (I. F.)	RETA 4 (DEG)	V4 (M/SEC)	V16 (M/SEC)	M16	V14 (M/SEC)	M14	V15 (M/SEC)	M15	V16 (M/SEC)	M16	V17 (M/SEC)	M17	V18 (M/SEC)	M18	V19 (M/SEC)	M19
0.00	-1.22	252.71	-4.47	.700	252.57	.700	252.57	.700	252.57	.700	252.57	.700	252.57	.700	252.57	.700
11.21	-1.27	260.19	-4.50	.723	260.05	.723	260.05	.723	260.05	.723	260.02	.723	260.02	.723	260.02	.723
22.05	-0.81	264.67	-4.74	.740	264.44	.740	264.44	.740	264.44	.740	264.42	.740	264.42	.740	264.42	.740
40.14	-1.75	272.53	-4.30	.767	272.41	.767	272.41	.767	272.41	.767	272.13	.767	272.13	.767	272.13	.767
57.15	-2.74	276.08	-12.99	.767	265.76	.767	265.76	.767	265.76	.767	265.62	.767	265.62	.767	265.62	.767
74.10	-1.27	243.01	-5.74	.727	259.85	.727	259.85	.727	259.85	.727	259.00	.727	259.00	.727	259.00	.727
100.00	-1.22	262.16	-5.69	.736	262.11	.736	262.11	.736	262.11	.736	262.11	.736	262.11	.736	262.11	.736

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	LEADING EDGE	TRAILING EDGE	MASS FLOW (G)	DELTA HFA (DEG)	INCIDENCE MEAN (DEG)	MEAN SUCTION (DEG)	OMEGA HAW	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE LOSS RATIO	STAGE LOSS RATIO	STAGE LOSS RATIO	STAGE LOSS RATIO	STAGE LOSS RATIO	STAGE LOSS RATIO
0.00	0.01	0.01	0.00	37.11	-2.104	-5.024	.0499	.0742	20.260	1.724	1.724	1.724	1.724	1.724	1.724	1.724
11.13	11.21	11.21	12.49	37.06	-2.940	-4.310	.0514	.0319	16.710	1.741	1.741	1.741	1.741	1.741	1.741	1.741
22.50	22.05	22.05	11.04	35.00	-1.553	-4.919	.0501	.0291	12.310	1.784	1.784	1.784	1.784	1.784	1.784	1.784
40.00	40.00	40.00	52.00	37.04	-1.529	-4.517	.0794	.0264	10.260	1.837	1.837	1.837	1.837	1.837	1.837	1.837
57.27	57.15	57.15	71.44	40.74	-1.510	-4.302	.1411	.0462	4.320	1.789	1.789	1.789	1.789	1.789	1.789	1.789
74.10	74.10	74.10	90.24	41.52	-2.212	-5.016	.2816	.0745	10.247	1.740	1.740	1.740	1.740	1.740	1.740	1.740
100.00	100.00	100.00	100.00	42.72	-3.132	-6.574	.2660	.0673	17.474	1.740	1.740	1.740	1.740	1.740	1.740	1.740

MOMENTUM AVERAGE STAGE EFFICIENCY = .8114 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7958 (ADIABATIC)  
MOMENTUM AVG. STAGE LOSS RATIO = 1.7404  
MASS AVERAGE TEMPERATURE RISE = 1.2248

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW WEIGHT FLOW = 100 PERCENT DESIGN SUFPO = SCAN NO 7  
 PERCENT DESIGN EQUIVALENT FLOW = 96.0310 LHM/SEC EQUIVALENT SPFD FLOW INLET ANN AREA = 7A020,019 R.P.M.  
 3A.RA70 LR4/SEC-50 FT

PERCENT SUFPO (U. S.)	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	
0.00	71.14	1674.14	1563.44	1.537	0.00	544.31	0.00	500	500	544.31	524.74	524.74	544.31	544.31	544.31	544.31	544.31	544.31
0.04	69.06	1505.89	1405.45	1.476	0.00	544.14	0.00	513	513	544.14	520.92	520.92	544.14	544.14	544.14	544.14	544.14	544.14
28.11	66.17	1401.81	1314.74	1.387	0.00	544.44	0.00	551	551	544.44	545.64	545.64	544.44	544.44	544.44	544.44	544.44	544.44
63.14	63.81	1340.56	1261.70	1.285	0.00	544.67	0.00	575	575	544.67	610.67	610.67	544.67	544.67	544.67	544.67	544.67	544.67
12.70	61.27	1251.17	1006.26	1.154	0.00	544.98	0.00	554	554	544.98	600.74	600.74	544.98	544.98	544.98	544.98	544.98	544.98
45.12	58.28	1075.72	917.89	0.989	0.00	544.82	0.00	516	516	544.82	553.48	553.48	544.82	544.82	544.82	544.82	544.82	544.82
100.00	56.15	904.87	801.18	0.875	0.00	544.41	0.00	493	493	544.41	519.05	519.05	544.41	544.41	544.41	544.41	544.41	544.41

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC HLOSSAGE = .9700

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC HLOSSAGE = .8768

PERCENT SUFPO (U. S.)	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19
0.00	60.24	1170.50	1016.06	0.977	41.12	770.64	506.85	687	687	506.85	506.85	506.85	506.85	506.85	506.85	506.85	506.85	506.85	506.85
13.06	59.14	1115.05	925.86	0.936	40.67	716.77	530.14	645	645	530.14	530.14	530.14	530.14	530.14	530.14	530.14	530.14	530.14	530.14
34.98	52.87	1015.00	802.62	0.850	40.44	617.27	545.51	691	691	545.51	691	691	617.27	617.27	617.27	617.27	617.27	617.27	617.27
61.43	46.73	914.01	665.91	0.774	42.21	647.22	568.14	720	720	568.14	720	720	647.22	647.22	647.22	647.22	647.22	647.22	647.22
87.88	39.27	813.01	504.29	0.693	44.10	677.49	612.25	751	751	612.25	751	751	677.49	677.49	677.49	677.49	677.49	677.49	677.49
100.00	34.44	718.36	391.65	0.611	44.10	677.46	705.18	864	864	705.18	864	864	677.46	677.46	677.46	677.46	677.46	677.46	677.46

ROTOR PERFORMANCE DATA

PERCENT SUFPO	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19
0.00	70.7	10.77	10.77	7.193	6.725	4.164	0.144	0.195	0.195	0.195	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829
13.06	11.26	13.52	13.52	7.419	6.892	4.255	0.187	0.245	0.245	0.245	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829
34.98	24.84	16.34	16.34	7.324	6.174	4.413	0.187	0.245	0.245	0.245	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829
63.14	45.43	16.71	16.71	6.812	5.372	4.645	0.187	0.245	0.245	0.245	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829
87.88	67.50	22.29	22.29	7.015	5.118	4.444	0.187	0.245	0.245	0.245	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829
100.00	100.00	41.94	41.94	7.267	4.662	4.662	0.187	0.245	0.245	0.245	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829	1.829

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.179 (POLYTHROMIC) MOMENTUM AVG. ROTOR PRESS GATTD = 1.4424  
 MASS FLOW AVERAGE MOTOR EFFICIENCY = 0.0665 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.2303

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10, 1974 (COMBINED TRIP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.5456 KG/SEC      100 PERCENT DESIGN SUFED = SCAN NO 7  
 PERCENT DESIGN EQUIVALENT FLOW = 92.0310      FOUTVALENT SPFFD  
     FOUTVALENT FLOW / INLET ANN AREA = 76029.910 R.P.M.  
     = 149.6477 M/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (R. F.)	W01 (M/SEC)	W101	METAL (INFG)	V1 (M/SEC)	V11 (M/SEC)	W1	V01 (M/SEC)	V71 (M/SEC)	J1
0.00	11.04	482.63	0.00	165.90	0.00	5.00	165.20	160.56	642.63
0.04	62.66	444.80	0.00	170.14	0.00	5.13	170.14	166.57	644.89
26.00	66.17	418.72	0.00	166.97	0.00	5.63	166.97	161.57	614.72
63.70	67.41	401.29	0.00	164.42	0.00	5.75	164.42	160.91	624.47
72.70	61.27	336.13	0.00	161.18	0.00	5.55	161.18	163.12	336.13
85.10	46.56	274.88	0.00	171.12	0.00	5.14	171.12	164.82	274.88
100.00	56.15	246.20	0.00	163.77	0.00	4.93	163.77	158.21	246.20

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8768

PERCENT SPAN FROM TIP (R. F.)	W02 (M/SEC)	W102	WETA2 (INFG)	V2 (M/SEC)	V12 (M/SEC)	W2	V02 (M/SEC)	V72 (M/SEC)	W2
0.00	60.24	302.09	4.77	61.12	276.49	5.63	176.04	171.24	648.18
11.24	67.11	282.20	4.36	60.47	269.45	6.05	169.31	165.25	644.74
31.24	62.07	268.71	3.66	60.90	263.22	6.91	164.12	167.00	609.96
50.53	65.71	278.40	4.73	62.21	258.49	7.20	191.20	191.27	624.65
67.44	70.47	246.67	6.04	66.22	267.58	7.51	191.77	191.20	641.76
84.00	53.32	226.50	6.31	64.13	254.80	6.44	204.25	202.84	603.40
100.00	64.16	212.47	6.04	64.21	230.96	6.85	204.40	190.10	643.02

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (R. F.)	DELTA (INFG)	DELTA (INFG)	MASS FLOW (PCT)	LOSS PARAMETER (INFG)	DEVIATION ANGLE (DEG)	ROTOR PRESS LOSS RATIO	ROTOR ANTIADAPTIVE EFF	ROTOR POLYTRONIC EFF		
0.00	0.00	10.77	0.90	0.166	6.724	0.371	6.269	1.820	0.797	0.7791
0.04	11.20	13.42	7.810	0.250	6.432	0.377	1.122	1.861	7.036	0.8016
26.00	20.24	19.50	7.324	0.147	5.179	0.264	2.314	1.477	0.520	0.653
63.69	64.43	16.71	6.132	0.454	3.922	0.215	6.353	1.904	0.956	0.945
67.26	67.54	22.29	7.015	0.314	3.114	0.211	4.451	1.404	0.122	0.9147
85.10	80.44	34.24	7.267	0.662	2.221	0.177	16.634	1.975	0.904	0.849
100.00	100.00	41.89	7.600	0.379	1.326	0.186	21.210	1.475	0.904	0.9569

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8770 (POLYTRONIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8665 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.4928  
 MASS AVERAGE TEMPERATURE RISE = 1.2303

NASA SMO, AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 7

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCCAGE = .9003

PERCENT SPAN FROM TIP (I. F.)	BETA 1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	VM1 (FT/SEC)	V77 (FT/SEC)	U2 (FT/SEC)
0.00	36.43	871.32	521.90	.736	697.73	600.06	1478.09
11.74	37.25	875.44	542.54	.750	712.45	711.47	1622.67
20.01	36.00	905.70	562.56	.774	725.32	725.31	1727.64
27.26	37.77	911.64	570.54	.801	736.23	735.60	1732.15
34.53	39.73	940.01	608.74	.839	748.42	745.74	1711.65
42.02	42.10	1027.12	689.70	.895	761.11	750.00	1019.70
100.00	43.50	1040.24	715.14	.937	774.06	753.65	936.72

EXIT FLOW VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCCAGE = .9037

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	U2 (FT/SEC)
0.00	-1.57	722.06	-19.74	.600	721.79	721.79	1464.26
11.26	-1.57	743.02	-20.19	.618	742.74	742.65	1417.73
20.07	-1.74	763.95	-23.14	.642	743.60	743.26	1333.30
27.26	-1.57	744.03	-21.43	.662	743.74	742.93	1250.97
34.53	-1.22	773.70	-16.51	.654	773.52	773.10	1166.58
42.02	-1.39	744.87	-14.04	.626	744.65	741.93	1072.44
100.00	-1.19	750.24	-14.20	.631	750.02	750.02	1019.47

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (LBS)	DELTA WETA (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR FANG (DEG)	INCIDENCE MEAN (DEG)	DELTA WETA (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	STAGE TEMPERATURE RATIO	STATOR POLYTROPIC EFF
0.00	0.01	11.00	34.37	.478	-1.444	.3970	.0526	.0190	20.010	1.800	1.2473	.4425
10.74	11.20	10.34	34.45	1.112	-2.253	.3690	.0543	.0206	14.003	1.826	1.2473	.4463
20.01	30.17	10.14	30.54	.250	-2.042	.3608	.0374	.0105	11.446	1.854	1.2307	.4114
27.26	44.82	9.60	30.36	.133	-2.474	.3502	.0287	.0048	10.436	1.886	1.2252	.4228
34.53	67.21	71.34	41.01	.356	-2.527	.3473	.0432	.0124	9.981	1.849	1.2104	.4244
42.02	80.11	50.23	43.57	-1.110	-3.026	.4490	.14.5	.0501	10.143	1.821	1.2253	.4474
100.00	100.00	100.00	44.01	-1.111	-2.573	.4658	.1777	.0449	17.310	1.823	1.2254	.4730

MOMENTUM AVERAGE STAGE EFFICIENCY = .4460 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .4331 (ADIABATIC)  
MOMENTUM AVERAGE STAGE PRESS RATIO = 1.8506  
MASS AVERAGE TEMPERATURE RISE = 1.2303

MASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (CONTINUED TEMP.)

STATOR PERFORMANCE MASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAM NO 7  
 INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9007

PERCENT SPAN FROM TIP (I. P.)	BETA 3 (DEG)	V3 (M/SEC)	V13 (M/SEC)	V3 (M/SEC)	V13 (M/SEC)	V73 (M/SEC)	U13 (M/SEC)
0.00	16.00	265.64	143.97	.716	212.67	210.73	650.90
10.74	17.27	271.08	165.87	.749	217.24	216.92	431.61
20.00	18.00	276.08	174.74	.774	221.04	221.07	406.62
47.26	17.77	241.00	173.10	.801	224.40	224.24	375.56
66.56	16.74	200.05	144.31	.819	227.02	227.21	366.47
87.04	6.714	313.07	210.22	.895	231.99	224.87	310.41
100.00	4.150	325.60	224.11	.937	236.18	220.62	241.61

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9077

PERCENT SPAN FROM TIP (I. P.)	BETA 4 (DEG)	V4 (M/SEC)	V14 (M/SEC)	V44 (M/SEC)	V74 (M/SEC)	U14 (M/SEC)
0.00	-1.57	220.00	-4.04	.600	220.00	647.53
13.74	-1.57	226.87	-6.22	.618	226.71	632.12
30.07	-1.74	232.84	-7.07	.642	232.74	606.79
64.62	-1.57	234.97	-6.53	.662	234.88	341.30
67.00	-1.22	245.82	-4.83	.654	235.77	355.40
88.13	-1.39	227.04	-5.50	.626	226.97	327.01
100.00	-1.37	228.67	-5.54	.631	228.61	310.73

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM LEADING EDGE	DELTA (DEG)	INCIDENCE ANGLE (DEG)	INCIDENCE ANGLE SUPT 514 (DEG)	DELTA FACTOR	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMPR RATIO	STATOR POLYTROPIC EFF
0.00	0.00	14.37	-3.644	.3970	.0524	.0130	20.610	1.400	1.2473	.4429
10.74	12.40	16.45	-2.253	.3990	.0493	.0206	14.992	1.024	1.2473	.4443
20.00	30.07	30.36	-3.912	.3608	.0320	.0104	11.464	1.859	1.2307	.9114
47.26	44.02	39.36	-3.133	.3502	.0247	.0084	10.434	1.406	1.2262	.4224
66.56	87.26	71.00	-3.366	.3673	.0432	.0124	9.401	1.849	1.2109	.8944
87.04	89.13	89.24	-3.024	.4490	.1494	.0501	10.143	1.823	1.2253	.6974
100.00	100.00	64.49	-3.113	.4454	.1777	.0469	17.310	1.023	1.2264	.7320

MOMENTUM AV. OF STAGE EFFICIENCY = .8469 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8131 (ADIABATIC)  
 MOMENTUM AV. STAGE PRESS RATIO = 1.4506  
 MASS AVERAGE TEMPERATURE RISE = 1.2303

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.6774 LBM/SEC      110 PERCENT DESIGN SPEED = SCAR NO 10      R0721.000 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 100.5173      EQUIVALENT SPFD      EQUIVALENT FLOW / INLET ANN AREA = 40.4157 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPA. FROM TIP (I. F.)	HETA01 (DEG)	V01 (FT/SEC)	VU01 (FT/SEC)	HETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	W1 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	71.25	1070.72	1746.09	0.00	502.59	0.00	537	542.50	1746.09
5.73	70.23	1765.70	1661.66	0.00	507.40	0.00	551	507.40	1661.66
20.37	66.04	1511.55	1416.62	0.00	642.16	0.00	602	637.23	1511.62
43.10	64.14	1525.14	1413.63	0.00	664.64	0.00	618	662.50	1373.63
62.56	62.09	1600.61	1210.07	0.00	641.09	0.00	594	640.87	1210.07
85.25	59.83	1174.14	1010.93	0.00	507.17	0.00	551	507.17	1010.93
100.00	57.13	683.67	683.67	0.00	570.78	0.00	524	570.78	683.67

PERCENT SPA. FROM TIP (I. F.)	HETA02 (DEG)	V02 (FT/SEC)	VU02 (FT/SEC)	HETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	W2 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	61.25	1107.27	1044.61	48.76	644.31	636.92	683	556.61	1579.33
11.65	55.07	1143.06	937.82	45.44	633.76	655.16	763	645.04	1502.94
20.62	50.42	1177.09	814.09	45.24	643.58	670.51	780	667.20	1485.20
47.67	43.04	954.14	654.12	45.91	900.01	709.21	825	689.72	1347.53
65.20	36.50	475.14	514.27	45.84	1011.65	725.22	854	706.71	1265.69
87.33	21.54	220.75	267.61	51.10	1070.66	839.42	917	677.60	1107.07
100.00	0.77	681.52	681.52	53.25	1132.36	907.28	971	677.55	1023.94

ROTOR PERFORMANCE DATA

PERCENT SPA. FROM TIP (I. F.)	INCIDENCE ANGLE (DEG)	MEAN SUCT SUR (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	ANGLE (DEG)	DEVIATION ANGLE (DEG)	ROTOR PRESS. RATIO	ROTOR POLYTROPIC EFF.
0.00	0.00	9.60	7.712	0.283	0.012	9.954	2.105	0.8023
9.79	11.65	15.16	4.352	0.249	0.025	0.137	2.210	0.7629
20.37	29.22	16.04	7.964	0.205	0.026	0.360	2.224	0.8251
43.10	47.57	20.50	7.532	0.170	0.034	0.093	2.275	0.8666
62.56	66.23	25.84	7.110	0.131	0.030	4.809	2.240	0.9034
85.25	87.33	37.47	5.170	0.277	0.045	11.052	2.225	0.8485
100.00	100.00	67.37	2.342	0.277	0.050	14.921	2.224	0.8483

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8194 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8199 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS. RATIO = 2.2263  
 MASS AVERAGE TEMPERATURE RISE = 1.3129

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT DESIGN FLOW = 1.6480 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 100.6033  
 110 PERCENT DESIGN SPEED = 5040 RPM  
 EQUIVALENT SPEED = 4472.100 RPM  
 EQUIVALENT FLOW / INLET ANN AREA = 19.8033 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	HETA0 (DEG)	V01 (M/SEC)	V02 (M/SEC)	HETA1 (DEG)	V1 (M/SEC)	V03 (M/SEC)	HETA2 (DEG)	M1	V04 (M/SEC)	V05 (M/SEC)	V06 (M/SEC)	V07 (M/SEC)	U1 (M/SEC)
0.00	71.55	541.05	537.21	1.674	177.57	0.00	0.00	.537	177.57	177.57	177.57	171.06	532.21
0.70	70.23	534.21	506.67	1.670	162.09	0.00	0.00	.551	162.09	162.09	162.09	174.13	506.47
2.37	66.86	532.13	452.80	1.533	177.86	0.00	0.00	.602	177.86	177.86	177.86	174.23	462.88
4.14	56.18	465.12	418.04	1.414	202.58	0.00	0.00	.618	202.58	202.58	202.58	201.93	418.68
6.21	42.16	417.40	368.03	1.270	195.40	0.00	0.00	.594	195.40	195.40	195.40	195.34	368.63
8.52	50.43	357.09	308.13	1.084	182.02	0.00	0.00	.551	182.02	182.02	182.02	179.57	308.13
100.00	57.13	320.59	260.28	.948	173.98	0.00	0.00	.525	173.98	173.98	173.98	188.05	269.28

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8299

PERCENT SPAN FROM TIP (I. F.)	HETA0 (DEG)	V02 (M/SEC)	V03 (M/SEC)	HETA2 (DEG)	V2 (M/SEC)	V04 (M/SEC)	HETA3 (DEG)	M2	V05 (M/SEC)	V06 (M/SEC)	V07 (M/SEC)	U2 (M/SEC)
0.00	61.04	300.72	318.34	48.76	257.36	193.52	0.00	.693	193.52	193.52	189.65	511.86
11.43	55.07	308.67	285.85	45.64	280.55	202.74	0.00	.763	202.74	202.74	190.64	484.59
20.62	50.82	320.33	240.32	45.24	297.60	204.37	0.00	.780	204.37	204.37	202.84	452.89
27.57	43.60	271.53	200.66	45.81	301.45	216.17	0.00	.825	216.17	216.17	210.09	418.82
66.20	36.40	266.40	158.27	45.83	309.15	221.35	0.00	.854	221.35	221.35	214.04	379.63
87.32	21.50	222.00	81.58	51.10	328.77	255.86	0.00	.917	255.86	255.86	206.67	337.44
100.00	4.77	200.56	18.56	53.29	343.18	276.54	0.00	.971	276.54	276.54	200.40	312.10

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HETA (DEG)	MAS FLOW (PCT)	MEAN (DEG)	INCIDENCE (DEG)	INDUCER SUCT SWIRL (DEG)	FACTOR	OMEGA (RPM)	LOSS PARAMETER	ANGLE (DEG)	DEVIATION (DEG)	ROTOR EFF	ADIBATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	7.712	7.24	4.884	0.2753	0.00	.0512	4.954	2.105	.6223	.7224	
2.70	11.85	12.23	6.352	7.036	4.888	0.2529	0.00	.0525	.137	2.210	.7420	.7694	
24.37	29.62	32.43	7.373	5.822	4.905	0.2025	0.00	.0426	.344	2.224	.8045	.8251	
43.18	47.57	51.76	7.532	4.665	5.171	0.1702	0.00	.0374	.493	2.275	.8504	.8664	
62.16	64.29	71.12	7.418	3.971	5.059	0.1371	0.00	.0302	4.804	2.260	.8024	.8038	
85.22	87.22	80.63	8.170	3.124	4.658	0.2275	0.00	.0695	11.052	2.225	.8605	.8757	
100.00	100.00	47.37	8.342	2.308	4.263	0.2717	0.00	.0570	15.821	2.224	.8603	.8750	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8308 (POLYTROPIC)  
 MASS AVERAGE ROTOR EFFICIENCY = .8199 (ADIBATIC)  
 MOMENTUM AVERAGE ROTOR PRESS RATIO = 2.2263  
 MASS AVERAGE TEMPERATURE RISE = 1.3128



NASA SMALL AXIAL COMPRESSOR TEST I MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE 'NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

110 PERCENT DESIGN SPEED - SCAN NO 10

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9309

PERCENT SPAN FROM TIP (I. F.)	DELTA 3 (DEG)	V3 (FT/SEC)	V113 (FT/SEC)	M3	VM3 (FT/SEC)	V23 (FT/SEC)	U3 (FT/SEC)
0.00	44.71	470.14	653.77	.706	574.23	547.92	1630.90
11.37	46.37	941.02	681.10	.770	649.33	644.25	1563.45
22.74	45.03	961.84	680.49	.797	679.81	674.09	1463.40
34.11	45.10	1005.20	712.49	.841	710.30	709.77	1360.85
45.48	45.25	1016.67	721.98	.859	715.80	713.19	1252.41
56.85	47.15	1069.03	823.11	.907	682.14	672.94	1129.00
68.22	51.54	1123.46	880.37	.962	697.90	674.62	1054.99

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9006

PERCENT SPAN FROM TIP (I. F.)	DELTA 4 (DEG)	V4 (FT/SEC)	V114 (FT/SEC)	M4	VM4 (FT/SEC)	V24 (FT/SEC)	U4 (FT/SEC)
0.00	-3.00	670.45	-42.12	.534	669.48	649.64	1619.08
11.37	-3.67	617.66	-43.97	.568	646.25	606.17	1563.15
22.74	-4.00	704.86	-49.47	.571	707.23	706.92	1469.63
34.11	-2.72	740.56	-35.11	.598	737.74	736.94	1378.61
45.48	.70	776.50	9.00	.602	736.48	736.04	1285.54
56.85	.87	682.74	10.34	.553	647.66	600.17	1183.17
68.22	.87	686.24	10.42	.556	646.20	606.20	1124.14

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE FROM TIP	PERCENT SPAN FROM TIP	MASS FLOW (PPH)	DELTA HETA (DEG)	INCIDENCE HETA (DEG)	ANGIF SUCT (DEG)	DELTA FACTOR	OMFRA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE EFF	STAGE TEMPRAT. O	STATOR POLYTROPIC EFF
0.00	0.00	0.00	52.37	12.344	4.466	.5197	.0304	.0110	14.520	2.097	1.7416	.9374
11.37	11.37	12.23	50.03	10.191	6.451	.5365	.1433	.0497	12.406	2.167	1.7416	.7470
22.74	22.74	12.60	49.03	8.444	5.144	.5110	.1153	.0378	9.192	2.140	1.7107	.7962
34.11	34.11	12.96	47.42	7.487	4.473	.4908	.1104	.0339	9.266	2.152	1.7107	.8111
45.48	45.48	13.12	44.55	5.421	3.016	.4718	.0684	.0186	11.099	2.184	1.7208	.8940
56.85	56.85	13.43	49.44	4.215	5.242	.5539	.1339	.0354	12.399	2.102	1.7207	.8250
68.22	68.22	13.60	50.72	6.263	3.522	.5733	.1232	.0352	19.570	2.101	1.7207	.8521

MOMENTUM AVERAGE STAGE EFFICIENCY = .7986 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7762 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 2.1426  
MASS AVERAGE TEMPRATURE RATIO = 1.3128

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

110 PERCENT DESIGN SPEED - SCAN NO 10

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9309

PERCENT SPAN FROM TIP (T. C.)	RFTA 3 (DEG)	V1 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	U3 (M/SEC)
0.00	44.71	245.22	109.27	.706	175.02	477.10
11.37	44.37	240.60	207.60	.770	197.91	477.15
20.00	44.03	243.10	207.41	.747	207.21	446.04
44.00	44.10	304.60	217.23	.841	214.50	414.79
65.65	45.24	303.88	220.06	.854	218.18	371.96
47.15	50.14	325.84	250.09	.907	207.92	344.12
100.00	51.54	342.43	268.34	.962	212.77	321.56

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9004

PERCENT SPAN FROM TIP (T. C.)	RFTA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	U4 (M/SEC)
0.00	-1.66	204.67	-13.05	.534	204.04	493.49
11.30	-3.67	240.60	-13.60	.568	209.17	476.65
20.00	-4.00	214.00	-15.94	.571	215.56	447.94
44.00	-2.72	225.12	-10.70	.598	224.86	420.20
67.00	.70	224.50	2.74	.602	224.48	371.85
84.00	.97	204.10	3.15	.553	208.07	360.63
100.00	.47	209.14	3.14	.556	209.16	342.65

STATOR PERFORMANCE DATA

PERCENT SPAN FROM LEADING EDGE	FROM TIP (T. C.)	LOSS FLOW (PCT)	DELTA HFTA (DEG)	INCIDENCE ANGLE (DEG)	FACTOR	OMEGA MAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	1.00	52.37	12.398	4.946	.5197	.0304	14.520	2.097	1.7416	.9374
11.37	11.30	12.24	50.04	10.191	6.841	.5765	.1433	12.896	2.107	1.7416	.7870
20.00	20.20	12.49	49.03	8.444	5.144	.5110	.1153	9.192	2.140	1.7190	.7362
44.00	44.54	11.94	47.82	7.457	4.473	.4908	.1104	4.265	2.182	1.7107	.8111
65.65	67.34	71.42	46.55	5.921	3.014	.4718	.0449	11.793	2.184	1.2888	.8960
87.15	84.00	20.43	49.44	8.215	5.242	.5539	.1339	12.399	2.102	1.2977	.8250
100.00	100.00	100.00	50.72	6.943	3.522	.5733	.1232	19.570	2.101	1.2976	.8521

MOMENTUM AVERAGE STAGE EFFICIENCY = .7986 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7762 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 2.1426  
 MASS AVERAGE TEMPERATURE RISE = 1.3128

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NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.7060 LHM/SEC 110 PERCENT DESIGN SPEED - SCAN NO 11  
 PERCENT DESIGN EQUIVALENT FLOW = 101.1436 EQUIVALENT SPEED  
 Rotor tip speed = 40,9314 LHM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	HETA01 (DEG)	V01 (FT/SEC)	VU01 (FT/SEC)	HETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	VM1 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	71.26	143.35	174.22	0.00	591.76	0.00	.546	591.74	532.70	1744.21
0.50	64.36	170.39	1662.22	0.00	404.43	0.00	.560	404.43	504.44	1662.22
2.00	66.04	163.09	1522.97	0.00	457.47	0.00	.611	457.47	645.79	1522.97
4.00	63.42	153.21	1379.67	0.00	473.36	0.00	.627	473.36	671.17	1379.67
61.40	61.41	1377.45	1215.16	0.00	648.45	0.00	.602	648.45	648.45	1215.16
46.00	59.25	1178.43	1013.15	0.00	602.75	0.00	.557	602.75	594.66	1013.15
100.00	56.42	1053.10	802.52	0.00	574.78	0.00	.529	574.78	544.25	802.52

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8114

PERCENT SPAN FROM TIP (I. F.)	HETA02 (DEG)	V02 (FT/SEC)	VU02 (FT/SEC)	HETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VM2 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	60.41	1224.53	1063.08	45.51	461.39	614.45	.701	603.60	540.25	1577.53
11.26	52.76	1177.13	961.34	43.41	475.09	642.62	.764	679.22	664.54	1603.97
21.17	50.45	1081.57	834.17	43.64	482.17	648.39	.702	683.59	670.32	1486.50
47.00	43.42	1001.31	684.02	43.15	494.54	641.51	.836	727.08	727.08	1349.51
65.00	36.35	914.45	542.91	43.72	1020.73	705.47	.866	735.53	735.53	1248.38
84.07	21.45	756.04	281.40	49.67	1084.41	826.71	.924	701.70	690.25	1104.11
100.00	10.24	713.53	127.28	51.90	1137.96	895.56	.974	702.00	674.23	1022.04

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DEFTA (DEG)	HETA2 (DEG)	INCIDENCE ANGLE (DEG)	SUCT S/H (DEG)	LOSS PARAMETER	04EG40 HAH	DEVIAATION ANGLE (DEG)	RATOR PRESS RATIO	RATOR ANTIADIBATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	7.423	6.955	.2692	.0506	3.418	2.093	.7049	.7334
0.50	11.24	15.20	4.026	6.727	.2451	.0513	.262	2.162	.7447	.7706
25.64	24.17	14.84	7.608	5.531	.1961	.0408	.195	2.191	.8049	.8266
42.31	47.04	20.57	7.221	4.344	.1394	.0307	.353	2.256	.8734	.8470
61.40	65.55	70.72	7.559	3.715	.1122	.0247	4.240	2.228	.9028	.9193
84.04	84.47	37.60	7.542	2.911	.2144	.0477	10.877	2.207	.8429	.9772
100.00	100.00	46.65	4.171	2.097	.2662	.0553	17.327	2.204	.8427	.8771

MOMENTUM AVERAGE RATOR EFFICIENCY = .8474 (POLYTROPIC) MOMENTUM AVG. RATOR PRESS RATIO = 2.1472  
 MASS AVERAGE ROTOR EFFICIENCY = .8297 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.3034

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.6910 KG/SEC  
 PERCENT HEIGHT FLOW EQUIVALENT FLOW = 1.011846  
 110 PERCENT DESIGN SPEED = SCAN NO 11  
 EQUIVALENT SPFD  
 EQUIVALENT FLOW / INLET ANN AREA = 0.000000  
 109.0000 K/M/SEC-50 M

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. I.)	W01 (M/SEC)	HETA01 (DEG)	V1 (M/SEC)	W11 (M/SEC)	M1	V01 (M/SEC)	V71 (M/SEC)	W71 (M/SEC)
0.00	571.66	0.00	180.37	0.00	.566	180.37	178.56	531.64
0.52	510.31	0.00	186.86	0.00	.560	186.86	178.79	506.64
26.60	505.66	0.00	200.52	0.00	.611	200.52	190.84	484.20
47.31	477.33	0.00	205.23	0.00	.627	205.23	206.57	470.52
71.47	410.95	0.00	197.71	0.00	.602	197.71	197.64	370.39
96.86	357.37	0.00	183.72	0.00	.557	183.72	181.25	308.81
100.00	260.33	0.00	175.19	0.00	.529	175.19	169.24	258.99

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8114

PERCENT SPAN FROM TIP (I. I.)	W02 (M/SEC)	HETA02 (DEG)	V2 (M/SEC)	W12 (M/SEC)	M2	V02 (M/SEC)	V72 (M/SEC)	W72 (M/SEC)
0.00	372.07	65.51	262.55	187.28	.701	187.28	178.08	511.31
11.26	350.79	63.41	285.02	195.87	.768	195.87	202.52	484.89
29.37	300.66	61.44	287.17	197.63	.742	207.35	207.06	453.10
47.06	270.11	63.15	303.75	207.72	.836	221.61	221.60	417.43
65.55	270.19	63.72	311.12	215.03	.866	226.45	226.19	380.51
96.07	231.66	69.67	330.53	251.98	.924	217.08	210.39	337.75
100.00	217.64	51.90	346.85	272.97	.978	214.00	206.72	311.76

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. I.)	DELTA HETA0 (DEG)	DELTA HETA9 (DEG)	INCIDENCE ANGLE SUPT SUR (DEG)	INCIDENCE ANGLE SUPT SUR (DEG)	OMEGA HAR (M/SEC)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	WATTIN PRESS RATIO	WATTIN PRESS ANTIARATIC EFF	POLYTROPIC EFF
0.00	0.00	10.85	7.423	6.955	.6633	.0506	3.618	2.093	.7069	.7734
9.50	11.26	15.20	8.026	6.727	.6667	.0513	-.262	2.162	.7647	.7706
25.60	26.17	15.84	7.604	5.531	.6791	.0488	.195	2.181	.8068	.8266
47.31	47.06	20.57	7.221	4.396	.6838	.0307	.353	2.256	.8736	.8870
61.40	65.55	25.56	7.559	3.715	.6756	.0267	4.260	2.229	.8008	.8193
86.86	86.07	37.60	7.944	2.911	.6721	.0477	10.877	2.207	.8629	.8772
100.00	100.00	46.65	8.171	2.027	.6999	.0553	17.377	2.206	.8627	.8771

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8474 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8297 (ADIARATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 2.1972  
 MASS AVERAGE TEMPERATURE RISE = 1.3034

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

110 PERCENT DESIGN SPEED - SCAN NO 11

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9107

PERCENT SPAN FROM TIP (L. S.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VW3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	45.32	849.81	532.69	.727	625.67	518.80	1629.15
10.01	44.21	940.72	554.05	.776	676.64	675.32	1566.37
24.53	43.12	962.55	657.92	.801	702.60	752.59	1495.02
46.73	42.41	1015.14	684.57	.854	749.55	788.93	1363.21
68.98	43.12	1026.01	701.24	.871	749.96	746.22	1252.89
86.70	44.96	1076.52	810.55	.914	705.53	696.05	1130.34
100.00	50.25	1129.91	869.73	.970	722.50	702.54	1053.85

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9026

PERCENT SPAN FROM TIP (L. S.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VW4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	-1.16	669.71	-44.85	.535	668.20	644.20	1517.14
11.27	-1.04	686.74	-45.43	.549	685.25	684.17	1561.66
30.13	-1.30	709.67	-40.86	.574	708.49	706.19	1468.38
49.55	-2.54	746.11	-33.98	.617	755.37	754.59	1377.31
67.92	-1.87	760.92	-11.50	.625	760.84	740.42	1246.52
88.83	-2.25	711.47	-27.99	.579	711.32	708.72	1182.16
100.00	-2.27	716.14	-28.40	.583	715.58	715.54	1122.98

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCF)	DELTA HETA (DEG)	INCIDENCE HETA (DEG)	ANGLE SUCT 5-HR (DEG)	DELTA FACTOR	DELTA HAR	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE LOSS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	49.16	9.001	5.079	.5238	.0470	.0470	.0241	14.360	2.042	1.3302	.8719
10.01	11.27	11.91	48.04	8.044	4.695	.5413	.1407	.1407	.0447	12.743	2.062	1.3102	.7568
24.53	30.13	31.74	46.62	6.605	3.250	.5005	.1133	.1133	.0372	9.899	2.094	1.3088	.7999
46.73	48.45	51.12	44.99	4.846	1.812	.4699	.1078	.1078	.0330	9.417	2.144	1.2990	.8105
68.98	67.92	70.72	43.99	3.892	0.613	.4536	.0613	.0613	.0176	10.224	2.175	1.2822	.8953
86.70	88.83	90.23	51.21	6.919	3.948	.5360	.1224	.1224	.0324	9.277	2.094	1.2915	.8327
100.00	100.00	105.00	52.52	5.619	2.177	.5556	.1126	.1126	.0245	16.424	2.094	1.2915	.8597

MOMENTUM AVERAGE STAGE EFFICIENCY = .8079 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7458 (ADIABATIC)

MOMENTUM AVG. STAGE LOSS RATIO = 2.1181  
MASS AVERAGE TEMPERATURE RISE = 1.3034

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

110 PERCENT DESIGN SPEED - SCAN NO 11

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9107

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	V13 (M/SEC)	W3 (M/SEC)	VH3 (M/SEC)	W77 (M/SEC)	W73 (M/SEC)
0.00	45.32	271.21	192.94	.727	190.70	194.41	496.57
10.01	44.21	247.04	200.57	.776	206.19	205.04	477.43
20.53	43.12	243.39	200.53	.801	216.15	214.15	466.54
46.23	42.41	309.63	208.49	.854	224.46	224.29	415.51
64.88	44.12	312.73	213.76	.871	224.24	227.45	382.81
86.70	44.96	317.51	247.73	.914	215.04	212.14	384.53
100.00	50.25	304.60	266.79	.970	220.22	214.13	321.21

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9024

PERCENT SPAN FROM TIP (L. F.)	HETA 4 (DEG)	V4 (M/SEC)	V14 (M/SEC)	W4 (M/SEC)	VH4 (M/SEC)	W74 (M/SEC)	W4 (M/SEC)
0.00	-3.84	206.13	-13.47	.535	203.67	203.47	492.94
11.27	-3.81	209.33	-13.97	.549	208.86	208.86	475.99
30.13	-3.30	216.31	-12.45	.574	215.95	215.85	447.56
44.55	-2.54	230.67	-10.37	.617	230.24	230.00	419.80
67.23	-1.87	231.93	-3.54	.625	231.90	231.74	391.52
81.03	-2.25	216.94	-4.53	.579	216.81	216.02	380.32
100.00	-2.27	210.24	-4.66	.583	214.11	214.11	342.24

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE FROM TIP (PCT)	PERCENT TRAILING EDGE FROM TIP (PCT)	MASS FLOW (PCT)	DELTA HETA (DEG)	INLET MEAN (DEG)	INLET SUPT SW (DEG)	DELTA FACTOR	WREAR BAR	WREAR BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	49.16	9.001	5.079	.5238	.0670	.0670	.0241	14.340	2.062	1.3302	.8719
10.01	11.27	11.13	48.04	8.064	6.685	.5313	.1607	.1607	.0607	12.763	2.062	1.3302	.7564
20.53	30.13	31.74	46.42	6.605	3.250	.5005	.1133	.1133	.0332	4.899	2.006	1.3088	.7994
46.23	49.25	51.12	44.90	4.456	1.412	.4639	.1078	.1078	.0330	9.617	2.144	1.2980	.8105
66.88	67.12	70.72	43.94	3.842	.944	.4536	.0613	.0613	.0176	10.226	2.175	1.2822	.8953
86.70	89.34	90.24	51.21	6.319	3.348	.5360	.1224	.1224	.0324	4.277	2.006	1.2935	.8127
100.00	100.00	100.00	52.52	5.619	2.177	.5556	.1126	.1126	.0245	16.674	2.006	1.2935	.8597

MOMENTUM AVERAGE STAGE EFFICIENCY = .8079 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .7868 (ADIABATIC)

MOMENTUM AVERAGE STAGE LOSS RATIO = 2.1181

MASS AVERAGE TEMPERATURE RATIO = 1.3034

QUALITY PAGE 18  
 DR. FOUR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW FROM TIP (I. F.) = 3.7061 LHM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 101.1863  
 110 PERCENT DESIGN SPEED = SCAN NO 12  
 EQUIVALENT SPFFD  
 EQUIVALENT FLOW / INLET ANN AREA = 84555.491 R.P.M.  
 60.9375 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	RFTA#1 (DEG)	V01 (FT/SEC)	V01#1 (FT/SEC)	M01	RFTA1 (DEG)	V1	VU1 (FT/SEC)	M1	V41 (FT/SEC)	V41#1 (FT/SEC)	U11 (FT/SEC)
0.00	71.23	1840.42	1742.67	1.638	0.00	592.11	0.00	.546	592.11	573.04	1742.67
0.76	69.95	1787.32	1662.11	1.634	0.00	606.54	0.00	.540	606.54	584.48	1662.11
2.14	66.60	1650.26	1524.14	1.562	0.00	657.63	0.00	.611	657.63	645.55	1524.14
42.00	64.00	1517.70	1380.31	1.473	0.00	773.13	0.00	.628	773.13	670.96	1380.31
61.30	61.31	1377.13	1216.93	1.274	0.00	840.40	0.00	.602	840.40	648.14	1216.93
84.79	59.24	1174.41	1012.65	1.068	0.00	602.66	0.00	.556	602.66	594.54	1012.65
100.00	56.70	1042.56	881.74	.949	0.00	574.81	0.00	.529	574.81	555.28	881.74

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8004

PERCENT SPAN FROM TIP (I. F.)	RFTA#2 (DEG)	V02 (FT/SEC)	V02#2 (FT/SEC)	M02	RFTA2 (DEG)	V2	VU2 (FT/SEC)	M2	V42 (FT/SEC)	V42#2 (FT/SEC)	U12 (FT/SEC)
0.00	76.25	1230.13	1074.97	1.011	44.37	859.48	601.07	.702	614.14	594.56	1676.04
11.14	54.61	1195.41	974.82	.984	42.25	934.67	624.38	.770	691.92	676.80	1603.20
24.04	50.48	1104.44	851.31	.919	42.99	946.97	634.70	.788	702.70	684.41	1446.61
44.91	43.50	1017.31	701.05	.856	42.19	956.93	664.16	.837	737.10	717.15	1369.21
65.75	31.15	939.04	544.86	.793	42.74	1025.60	644.44	.872	752.61	750.39	1246.31
87.10	22.00	701.91	292.42	.649	44.29	1080.58	613.39	.932	724.97	713.06	1106.32
100.00	11.04	739.02	141.53	.637	50.52	1140.71	640.41	.984	725.34	700.69	1021.93

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE TRAILING EDGE	LEFLTA (DEG)	LEFLTA# (DEG)	MASS FLOW (LHM)	INCIDENCE ANGLE (DEG)	SUCT SU1M (DEG)	OMEGA# HAP	OMEGA# HAP	LOSS PARAMETER	ANGLE (DEG)	ROTOR DIFFS RATIO	ROTOR ANTIADABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	10.96	0.00	7.397	6.929	.4917	.2472	.0504	3.262	2.047	.7025	.7306
9.36	11.14	15.32	11.74	7.989	6.790	.4535	.2410	.0504	3.404	2.124	.7448	.7702
25.24	24.46	16.14	31.41	7.582	5.524	.4670	.1847	.0391	3.195	2.161	.8133	.8323
42.00	44.91	20.44	50.23	7.209	4.386	.4707	.1362	.0300	4.24	2.225	.8743	.9474
61.30	65.75	25.76	70.44	7.553	3.713	.4619	.1061	.0234	4.175	2.212	.9136	.9227
84.79	87.10	37.24	94.17	7.428	2.498	.4972	.0718	.0437	11.194	2.197	.8728	.8860
100.00	100.00	45.86	100.00	8.147	2.073	.4724	.0246	.0507	14.092	2.194	.8726	.8858

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8505 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8335 (ADIABATIC)  
 MOMENTUM AVGS. ROTOR DIFFS RATIO = 2.1737  
 MASS AVERAGE TEMPERATURE RISE = 1.2974

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

130 PERCENT DESIGN SPEED - SCAN NO 12  
 FORTIVALFENT SPEED  
 FORTIVALFENT FLOW / INLET ANN AREA = 0.6555,491 R.P.M.  
 1.6410 KR/SEC  
 101.1463 199.8499 KR/SEC-50 M

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	REF1#2 (DEG)	V01 (M/SEC)	V02 (M/SEC)	V03 (M/SEC)	V04 (M/SEC)	WETA1 (DEG)	VI (M/SEC)	VII (M/SEC)	W1 (M/SEC)	VW1 (M/SEC)	VW2 (M/SEC)	U1 (M/SEC)
0.00	71.24	540.99	571.17	1.604	0.00	0.00	100.47	0.00	.566	180.47	174.66	531.17
0.14	62.95	510.27	506.61	1.634	0.00	0.00	186.47	0.00	.560	184.97	174.82	506.61
0.28	66.66	507.04	466.56	1.542	0.00	0.00	200.45	0.00	.611	200.45	194.76	506.56
0.42	64.00	464.19	420.72	1.422	0.00	0.00	205.17	0.00	.624	205.17	204.51	420.72
0.56	61.91	414.75	370.31	1.274	0.00	0.00	197.63	0.00	.502	197.63	197.57	370.31
0.70	59.24	344.19	304.66	1.028	0.00	0.00	183.49	0.00	.556	183.49	181.22	304.66
1.00.00	56.94	320.02	264.75	.969	0.00	0.00	175.20	0.00	.529	175.20	169.25	264.75

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8004

PERCENT SPAN FROM TIP (I. F.)	REF1#2 (DEG)	W02 (M/SEC)	W03 (M/SEC)	W04 (M/SEC)	W05 (M/SEC)	HETA2 (DEG)	V2 (M/SEC)	VII2 (M/SEC)	M2 (M/SEC)	VW2 (M/SEC)	U2 (M/SEC)
0.00	60.25	177.74	127.64	1.011	44.17	261.97	103.21	.702	147.25	181.22	510.86
0.14	54.63	161.45	237.12	.985	42.25	206.49	191.53	.770	210.00	204.29	494.64
0.28	50.44	336.62	259.66	.919	42.09	203.64	193.46	.799	214.21	212.87	453.12
0.42	43.56	310.09	213.68	.856	42.19	203.24	203.66	.837	226.74	226.68	417.14
0.56	34.15	240.10	167.60	.703	42.74	212.54	217.28	.872	224.30	220.72	374.87
0.70	22.00	230.33	84.28	.669	40.29	222.11	267.92	.932	220.97	217.34	337.21
1.00.00	11.14	225.25	43.14	.637	50.52	246.69	244.35	.944	221.00	213.57	311.49

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA (DEG)	MASS FLOW (KGT)	INCIDENCE (DEG)	MEAN SUCT SHR (DEG)	OMEGA (RPM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR ANTIADIBATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.03	0.00	7.397	6.324	.6517	.2672	3.242	2.047	.7025	.7306
0.14	11.14	11.74	7.244	6.700	.6515	.2610	-4.604	2.124	.7464	.7702
0.28	24.96	31.43	7.542	5.526	.6430	.1847	-1.194	2.161	.4131	.4323
0.42	46.01	50.20	7.204	4.386	.6707	.1362	.424	2.224	.0743	.0814
0.56	65.71	70.54	7.253	3.713	.6619	.1061	4.175	2.212	.0136	.0227
0.70	87.10	90.17	7.928	2.928	.6972	.2018	11.194	2.107	.0129	.0460
1.00.00	100.00	100.00	45.86	2.073	.6724	.2424	19.092	2.106	.8726	.8858

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8505 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8335 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 2.1737  
 MASS AVERAGE TEMPERATURE RISE = 1.2474



NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

110 PERCENT DESIGN SPEED - SCAN NO 12

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9004

PERCENT SPAN FROM TIP (I. F.)	HETA 3 (DEG)	V3 (FT/SEC)	V13 (FT/SEC)	M3	VM3 (FT/SEC)	U73 (FT/SEC)	U3 (FT/SEC)
0.00	44.26	887.15	614.02	.727	635.60	638.61	1627.71
10.00	47.00	961.00	643.67	.777	687.85	688.70	1465.62
20.00	41.41	966.00	644.04	.806	719.97	719.97	1465.05
40.00	41.26	1012.32	671.22	.844	757.75	757.10	1362.88
60.00	45.02	1024.97	692.17	.876	761.37	758.68	1256.00
80.00	47.72	1077.50	797.29	.920	724.96	715.22	1129.67
100.00	43.33	1131.17	856.13	.974	741.74	721.25	1052.92

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8994

PERCENT SPAN FROM TIP (I. F.)	HETA 4 (DEG)	V4 (FT/SEC)	V14 (FT/SEC)	M4	VM4 (FT/SEC)	U74 (FT/SEC)	U4 (FT/SEC)
0.00	-3.20	567.23	-42.69	.534	665.87	665.87	1615.91
11.20	-7.66	621.14	-46.00	.555	689.75	689.57	1560.45
30.00	-3.00	719.27	-43.76	.583	716.96	716.62	1467.71
50.00	-3.40	772.62	-41.14	.632	770.72	759.93	1376.45
67.27	-3.7	771.11	-41.16	.636	771.00	771.37	1293.66
88.00	-1.00	722.44	-27.07	.590	722.04	719.40	1140.00
100.00	-1.00	726.71	-26.36	.594	726.30	726.10	1121.99

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	INCIDENCE ANGLE (DEG)	MEAN SUCT SURF (DEG)	INCIDENCE ANGLE (DEG)	D FACTOR	HAR	OMEGA	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS	STAGE LOSS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	1.920	3.938	.5186	.0470	.0470	.0241	12.520	2.007	1.3227	.8723
10.00	11.24	6.427	3.563	.5199	.1328	.1328	.0460	12.921	2.035	1.3227	.7547
20.00	30.01	3.305	1.969	.4899	.3140	.3140	.0377	4.2721	2.075	1.3023	.7338
40.00	43.64	3.997	.659	.6534	.6437	.6437	.0256	4.201	2.155	1.2931	.8442
60.00	67.27	3.031	.199	.4401	.0436	.0436	.0182	10.711	2.157	1.2701	.8449
80.00	88.00	5.652	2.798	.5213	.1318	.1318	.0349	3.620	2.075	1.2883	.4166
100.00	100.00	4.393	.962	.5427	.1217	.1217	.0308	16.777	2.074	1.2882	.8457

MOMENTUM AVERAGE STAGE EFFICIENCY = .8124 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7921 (ADIABATIC)  
 MOMENTUM AVG. STAGE LOSS RATIO = 2.0995  
 MASS AVERAGE TEMPERATURE RISE = 1.2974

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

110 PERCENT DESIGN SPEED - SCAN NO 12

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9004

PERCENT SPAN FROM TIP (T. C.)	DELTA 1 (CM)	V1 (M/SEC)	V1X (M/SEC)	V1Y (M/SEC)	V1Z (M/SEC)	U3 (M/SEC)
0.00	45.29	270.40	190.45	.777	191.73	496.13
10.00	43.07	207.09	146.13	.777	209.66	477.20
20.00	41.31	296.46	196.70	.806	219.45	486.55
30.00	41.56	398.76	206.60	.856	230.95	415.40
40.00	42.27	313.63	210.37	.876	232.04	312.22
50.00	47.72	328.45	263.01	.920	220.97	386.02
100.00	63.14	366.74	260.31	.976	226.08	320.93

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8996

PERCENT SPAN FROM TIP (T. C.)	DELTA 4 (CM)	V4 (M/SEC)	V4X (M/SEC)	V4Y (M/SEC)	V4Z (M/SEC)	U4 (M/SEC)
0.00	-1.66	203.37	-12.38	.514	202.96	492.53
10.00	-1.76	217.67	-13.44	.555	210.21	472.63
20.00	-1.99	218.93	-13.33	.583	214.61	447.36
30.00	-1.90	235.43	-15.59	.632	236.67	419.56
40.00	-2.17	235.25	-17.57	.636	235.11	391.26
50.00	-1.99	220.20	-17.31	.590	220.08	359.46
100.00	-1.12	221.50	-17.63	.596	221.38	341.98

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (T. C.)	MASS FLOW (KGS)	DELTA 1 (CM)	DELTA 4 (CM)	INCIDENCE ANGLE (DEG)	SUCT SURF ANGLE (DEG)	LOSS COEFF	DEFLECTION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMPRATIO	STATOR POLYTROPIC EFF
0.00	0.00	7.00	7.00	7.920	7.194	.5186	.0670	14.520	1.3227	.9121
10.00	11.24	11.24	6.927	6.927	7.563	.5199	.1324	12.921	1.3227	.7647
20.00	31.31	31.31	5.305	5.305	1.860	.6894	.1164	4.731	1.3023	.7938
30.00	50.30	50.30	4.937	4.937	.660	.6536	.0837	4.291	1.2031	.9462
40.00	67.07	71.06	3.013	3.013	1.199	.6801	.0616	10.733	1.2741	.8849
50.00	84.05	80.62	5.052	5.052	2.704	.5233	.1314	4.672	1.2043	.8166
100.00	100.00	100.00	6.393	6.393	.5627	.1217	.0369	14.772	1.2682	.8857

MOMENTUM AVERAGE STAGE EFFICIENCY = .8126 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7923 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 2.0995  
 MASS AVERAGE TEMPERATURE RISE = 1.2974

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (CONTINUED (EMP.))

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FIGHT FLOW = 3.7311 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 101.4696  
 110 PERCENT DESIGN SPEED = SCAN NO 13  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET AREA AMFA = 46655.976 R.P.M.  
 = 41.2088 LBM/SEC-50 FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. P.)	HETAP (DEG)	V01 (FT/SEC)	V01 (DEG)	V1 (FT/SEC)	V1 (DEG)	V11 (FT/SEC)	M1	V04 (FT/SEC)	V04 (FT/SEC)	V07 (FT/SEC)	U11
0.00	71.05	1354.64	1.703	0.00	594.95	0.00	.557	590.95	579.64	579.64	1744.74
4.12	63.74	1774.36	1.641	0.00	613.22	0.00	.567	613.22	603.15	603.15	1406.00
25.00	65.51	1567.54	1.550	0.00	663.59	0.00	.619	663.59	652.74	652.74	1529.27
41.81	63.44	1407.33	1.434	0.00	700.15	0.00	.633	700.15	677.94	677.94	1346.04
60.64	61.01	1116.67	1.247	0.00	754.25	0.00	.609	754.25	745.25	745.25	1221.87
84.43	59.01	1104.37	1.095	0.00	803.94	0.00	.563	803.94	800.77	800.77	1017.00
100.00	56.01	1057.97	.974	0.00	801.45	0.00	.534	801.45	801.45	801.45	882.79

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8036

PERCENT SPAN FROM TIP (I. P.)	HETAP (DEG)	V02 (FT/SEC)	V02 (DEG)	V2 (FT/SEC)	V2 (DEG)	V11P (FT/SEC)	M2	V04P (FT/SEC)	V04P (FT/SEC)	V07P (FT/SEC)	U1P
0.00	53.92	1250.04	1.052	41.61	660.54	571.64	.707	663.62	627.70	627.70	1674.03
11.00	55.05	1271.25	1.010	40.91	611.97	547.26	.754	660.17	674.11	674.11	1507.64
29.65	50.74	1121.73	.962	40.61	674.57	610.94	.744	720.50	704.06	704.06	1493.46
47.97	46.13	1144.74	.876	40.74	602.93	642.07	.830	744.20	744.15	744.15	1361.49
67.04	35.33	956.30	.817	41.26	1034.72	847.43	.884	777.70	775.49	775.49	1234.94
87.04	20.79	1000.00	.749	44.44	1134.62	744.43	.931	810.00	786.78	786.78	1101.97
100.00	11.00	877.69	.721	44.55	1174.66	855.46	1.027	810.53	782.98	782.98	1023.15

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. P.)	HETAP (DEG)	INCIDENCE ANGLE (DEG)	SUCT S14 (DEG)	U FACTOR	U44GAB (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	RATOR PRESS (DEG)	RATOR EFF	POLYTRONIC EFF
0.00	0.00	7.216	4.748	.4241	.2663	.0509	2.034	1.945	.6514	.7191
9.12	11.00	14.15	5.504	.6364	.2577	.0527	.594	2.003	.7133	.7197
25.10	29.65	15.73	5.332	.4468	.1954	.0412	.330	2.067	.7022	.8121
41.61	47.97	13.74	4.207	.6431	.1480	.0322	1.544	2.126	.8554	.8444
60.64	67.04	7.370	3.553	.4462	.1106	.0244	4.649	2.154	.8044	.9153
84.43	87.96	10.33	34.30	.6242	.1209	.0264	11.142	2.240	.9220	.9303
100.00	100.00	44.94	1.402	.3859	.1466	.0305	14.740	2.239	.9219	.9302

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8421 (POLYTRONIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8269 (ADIABATIC)  
 MOMENTUM AVG. RATOR PRESS RATIO = 2.1026  
 MASS AVERAGE TEMPERATURE RISE = 1.2487

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.6324 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 101.865%  
 330 PERCENT DESIGN SPEED = SCAN NO 13  
 EQUIVALENT SPEED = 8455.074 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 201.1001 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .0700

PERCENT SPAN FROM TIP (R. C.)	HETA11 (DEG)	V11 (M/SEC)	V101 (M/SEC)	U11 (M/SEC)	HETA1 (DEG)	V1 (M/SEC)	V111 (M/SEC)	M1	V11 (M/SEC)	V7 (M/SEC)	U1 (M/SEC)
0.00	71.05	562.26	511.50	1.701	0.00	187.56	0.00	.553	182.56	174.64	571.80
0.12	69.79	501.13	517.82	1.561	0.00	186.91	0.00	.567	186.91	140.79	507.82
25.00	66.31	500.26	466.12	1.550	0.00	202.57	0.00	.610	202.57	104.85	466.12
41.61	63.46	470.59	422.67	1.434	0.00	207.31	0.00	.633	207.31	206.64	422.67
60.66	61.10	422.60	372.62	1.247	0.00	192.72	0.00	.609	192.72	190.45	372.62
86.63	59.20	361.30	309.90	1.095	0.00	185.61	0.00	.563	185.61	183.11	309.90
100.00	56.01	322.19	269.07	.976	0.00	177.23	0.00	.536	177.23	171.20	269.07

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .0836

PERCENT SPAN FROM TIP (R. C.)	HETA12 (DEG)	V12 (M/SEC)	V102 (M/SEC)	U12 (M/SEC)	HETA2 (DEG)	V2 (M/SEC)	V112 (M/SEC)	M2	V12 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	59.42	491.16	377.27	1.052	41.61	262.29	176.17	.707	191.11	180.80	511.65
11.00	55.65	372.26	397.30	1.010	40.21	277.97	182.05	.756	210.04	245.47	449.35
23.45	50.74	363.65	266.07	.962	40.61	286.07	186.21	.786	217.17	215.82	452.28
47.07	46.13	316.00	220.21	.876	40.79	290.59	192.70	.830	226.49	226.82	415.71
67.24	45.59	291.51	169.86	.817	41.25	288.01	204.01	.886	237.07	236.37	377.66
87.05	40.71	266.11	131.76	.769	41.46	282.16	242.91	.991	246.91	242.91	315.88
100.00	11.09	252.24	51.11	.721	44.55	269.75	269.75	1.027	267.05	274.65	311.95

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	INCIDENCE ANGLE (DEG)	HETA0 (DEG)	DELTA HETA0 (DEG)	DELTA HETA1 (DEG)	DELTA HETA2 (DEG)	DELTA HETA3 (DEG)	DELTA HETA4 (DEG)	DELTA HETA5 (DEG)	DELTA HETA6 (DEG)	DELTA HETA7 (DEG)	DELTA HETA8 (DEG)	DELTA HETA9 (DEG)	DELTA HETA10 (DEG)	DELTA HETA11 (DEG)	DELTA HETA12 (DEG)	DELTA HETA13 (DEG)	DELTA HETA14 (DEG)	DELTA HETA15 (DEG)	DELTA HETA16 (DEG)	DELTA HETA17 (DEG)	DELTA HETA18 (DEG)	DELTA HETA19 (DEG)	DELTA HETA20 (DEG)	DELTA HETA21 (DEG)	DELTA HETA22 (DEG)	DELTA HETA23 (DEG)	DELTA HETA24 (DEG)	DELTA HETA25 (DEG)	DELTA HETA26 (DEG)	DELTA HETA27 (DEG)	DELTA HETA28 (DEG)	DELTA HETA29 (DEG)	DELTA HETA30 (DEG)	DELTA HETA31 (DEG)	DELTA HETA32 (DEG)	DELTA HETA33 (DEG)	DELTA HETA34 (DEG)	DELTA HETA35 (DEG)	DELTA HETA36 (DEG)	DELTA HETA37 (DEG)	DELTA HETA38 (DEG)	DELTA HETA39 (DEG)	DELTA HETA40 (DEG)	DELTA HETA41 (DEG)	DELTA HETA42 (DEG)	DELTA HETA43 (DEG)	DELTA HETA44 (DEG)	DELTA HETA45 (DEG)	DELTA HETA46 (DEG)	DELTA HETA47 (DEG)	DELTA HETA48 (DEG)	DELTA HETA49 (DEG)	DELTA HETA50 (DEG)	DELTA HETA51 (DEG)	DELTA HETA52 (DEG)	DELTA HETA53 (DEG)	DELTA HETA54 (DEG)	DELTA HETA55 (DEG)	DELTA HETA56 (DEG)	DELTA HETA57 (DEG)	DELTA HETA58 (DEG)	DELTA HETA59 (DEG)	DELTA HETA60 (DEG)	DELTA HETA61 (DEG)	DELTA HETA62 (DEG)	DELTA HETA63 (DEG)	DELTA HETA64 (DEG)	DELTA HETA65 (DEG)	DELTA HETA66 (DEG)	DELTA HETA67 (DEG)	DELTA HETA68 (DEG)	DELTA HETA69 (DEG)	DELTA HETA70 (DEG)	DELTA HETA71 (DEG)	DELTA HETA72 (DEG)	DELTA HETA73 (DEG)	DELTA HETA74 (DEG)	DELTA HETA75 (DEG)	DELTA HETA76 (DEG)	DELTA HETA77 (DEG)	DELTA HETA78 (DEG)	DELTA HETA79 (DEG)	DELTA HETA80 (DEG)	DELTA HETA81 (DEG)	DELTA HETA82 (DEG)	DELTA HETA83 (DEG)	DELTA HETA84 (DEG)	DELTA HETA85 (DEG)	DELTA HETA86 (DEG)	DELTA HETA87 (DEG)	DELTA HETA88 (DEG)	DELTA HETA89 (DEG)	DELTA HETA90 (DEG)	DELTA HETA91 (DEG)	DELTA HETA92 (DEG)	DELTA HETA93 (DEG)	DELTA HETA94 (DEG)	DELTA HETA95 (DEG)	DELTA HETA96 (DEG)	DELTA HETA97 (DEG)	DELTA HETA98 (DEG)	DELTA HETA99 (DEG)	DELTA HETA100 (DEG)
0.00	0.00	11.21	7.215	6.764	.624	.2663	.0503	2.836	1.066	.016	.714																																																																																												
2.12	11.04	14.15	7.742	6.508	.636	.2577	.0527	.594	2.003	.713	.7397																																																																																												
25.00	20.65	15.71	7.366	5.332	.668	.1958	.0612	.330	2.057	.7022	.6121																																																																																												
41.61	47.07	17.76	7.006	4.207	.651	.1680	.0323	1.543	2.124	.6555	.6699																																																																																												
60.66	67.06	26.21	7.370	3.553	.662	.1106	.0240	1.148	2.148	.6254	.9153																																																																																												
86.63	87.20	39.30	7.731	2.712	.622	.1209	.0264	1.102	2.220	.6220	.9303																																																																																												
100.00	100.00	46.06	7.477	1.802	.3859	.1466	.0305	14.760	2.219	.6219	.6302																																																																																												

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8621 (POLYTROPIC)  
 MASS AVERAGE ROTOR EFFICIENCY = .8240 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR LOSS RATIO = 2.1024  
 MASS AVERAGE ROTOR LOSS RATIO = 1.2862

INASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TESTS)

STATOR PERFORMANCE INASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

110 PERCENT DESIGN SPEED - SCAN NO 13

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8940

PERCENT SPAN FROM TIP (I. F.)	HETA 3 (DEG)	V3 (FT/SEC)	M3	VH3 (FT/SEC)	U3 (FT/SEC)
0.00	830.75	588.41	.742	679.36	679.36
10.72	923.77	611.54	.770	698.95	697.79
24.00	960.66	619.47	.813	744.64	744.64
47.00	1011.71	646.73	.857	774.70	774.70
66.75	1046.93	677.28	.896	798.21	798.21
87.67	1127.02	777.97	.974	816.64	805.67
100.00	1174.19	929.97	1.072	830.69	807.73

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9011

PERCENT SPAN FROM TIP (I. F.)	HETA 3 (DEG)	V4 (FT/SEC)	M4	VH4 (FT/SEC)	U4 (FT/SEC)
0.00	679.19	37.20	.568	674.17	674.17
11.19	704.53	38.50	.570	703.30	703.30
19.00	750.36	34.27	.614	747.58	749.25
46.46	774.35	50.61	.655	792.73	791.92
67.19	805.26	26.70	.668	804.86	804.42
84.94	770.80	11.47	.634	770.71	777.89
100.00	775.77	11.77	.639	775.68	775.68

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TAILING FRINGE	MASS FLOW (LBS)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SWIRL (DEG)	FACIOM	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE DPFSS RATIO	STAGE IFMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	44.04	4.578	0.559	0.970	0.994	0.214	14.040	1.920	1.3072	0.8463
10.72	11.17	44.72	5.123	1.454	0.967	0.972	0.231	13.454	1.940	1.3072	0.8710
24.00	29.99	45.37	3.225	-1.121	0.961	0.990	0.194	10.600	2.024	1.2904	0.8934
47.00	49.43	43.26	1.287	-1.026	0.921	0.937	0.134	4.354	2.091	1.2805	0.9121
66.75	67.17	42.08	0.916	-1.076	0.912	0.958	0.161	9.340	2.109	1.2709	0.8950
87.67	89.04	44.64	1.370	-1.524	0.948	0.948	0.504	10.652	2.045	1.2805	0.7304
100.00	100.00	45.85	0.340	-3.101	0.910	0.9780	0.452	17.831	2.045	1.2804	0.7669

MOMENTUM AVERAGE STAGE EFFICIENCY = .8112 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7914 (ADIABATIC)  
 MOMENTUM AVERAGE TEMPERATURE RISE = 2.0460  
 MASS AVERAGE TEMPERATURE RISE = 1.2862

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMPRESSOR TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

110 PERCENT DESIGN SPEED - SPAN NO 15

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8940

PERCENT SPAN FROM TIP (I. F.)	HETA 3 (DEG)	V1 (M/SEC)	VIII3 (1/SEC)	W13	VM3 (M/SEC)	V73 (M/SEC)	U13 (M/SEC)
0.00	40.90	211.04	179.35	.742	207.07	204.79	494.72
10.72	41.14	244.07	186.40	.770	213.04	212.63	477.92
20.93	39.76	295.24	198.81	.813	226.98	226.09	444.05
47.01	39.61	304.06	194.39	.857	237.35	237.17	414.26
66.25	40.31	319.07	206.44	.896	243.29	242.60	385.52
87.62	43.61	343.76	237.10	.974	244.91	245.57	343.03
100.00	44.97	357.89	252.04	1.022	253.19	246.28	321.31

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9011

PERCENT SPAN FROM TIP (I. F.)	HETA 4 (DEG)	V4 (M/SEC)	VIII4 (1/SEC)	W4	VM4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	-3.14	207.02	-11.74	.548	206.71	206.71	473.11
11.19	-3.13	214.76	-11.73	.570	214.42	214.79	476.25
20.93	-2.61	220.71	-10.43	.614	224.47	224.37	447.91
49.34	-3.65	242.12	-15.43	.655	241.63	241.74	420.25
67.19	-1.74	263.44	-7.55	.668	245.32	245.19	391.84
88.04	-0.88	274.94	-3.60	.634	244.91	244.04	360.42
100.00	-0.87	276.64	-3.54	.639	246.43	246.43	342.39

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCT SUR (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE LOSS RATIO	STAGE LOSS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	11.00	44.04	4.578	.656	.6970	.0594	13.040	1.929	1.7072	1.7072	.4963
10.72	11.19	11.47	44.32	5.023	1.654	.6867	.0472	14.456	1.940	1.7072	1.7072	.4710
20.93	20.99	31.01	42.37	3.225	-2.121	.6461	.0590	10.600	2.026	1.7004	1.7004	.4934
47.01	48.34	50.42	43.26	1.987	-1.026	.6221	.0437	9.354	2.091	1.7005	1.7005	.49121
66.25	67.19	70.06	42.08	.914	-1.976	.6182	.0548	9.360	2.109	1.7009	1.7009	.49050
87.62	88.04	81.88	44.44	1.370	-1.544	.6938	.1406	10.652	2.065	1.7005	1.7005	.47104
100.00	100.00	109.00	45.86	.340	-3.101	.6101	.1749	17.831	2.064	1.7004	1.7004	.47569

MOMENTUM AVERAGE STAGE EFFICIENCY = .4112 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7914 (ADIABATIC)

MOMENTUM AVG. STAGE LOSS RATIO = 2.0460  
MASS AVERAGE TEMPERATURE DISC = 1.28A2

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OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 7.7418 LBM/SEC  
PERCENT DESIGN EQUIVALENT FLOW = 102.1635  
110 PERCENT DESIGN SPEED = SCAN NO. 4  
EQUIVALENT SP-FD  
EQUIVALENT FLOW / INLET ANN AREA = 44702.310 R.P.M.  
41.327A LRM/SEC-50 FT

INLET VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (I. F.)	HETA#1 (DEG)	V#1 (FT/SEC)	W#1 (DEG)	RFTA1 (DEG)	V1 (FT/SEC)	VII (FT/SEC)	M1	V#1 (FT/SEC)	V71 (FT/SEC)	U1
0.00	71.02	1866.02	1765.70	0.00	0.00	0.00	.554	600.30	590.97	1745.70
0.20	69.74	1775.51	1665.65	0.00	616.86	0.00	.568	614.44	594.74	1665.65
25.44	64.14	1685.43	1526.08	0.00	667.37	0.00	.621	667.37	655.11	1526.08
42.25	63.68	1541.06	1391.36	0.00	693.17	0.00	.634	693.17	680.97	1391.36
61.04	61.63	1365.74	1219.30	0.00	658.48	0.00	.612	658.48	654.26	1219.30
84.52	58.36	1145.74	1016.81	0.00	112.00	0.00	.566	612.00	603.78	1016.81
100.00	56.51	1059.06	883.27	0.00	606.33	0.00	.539	584.33	564.47	883.27

EXIT VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (I. F.)	HETA#2 (DEG)	V#2 (FT/SEC)	W#2 (DEG)	RFTA2 (DEG)	V2 (FT/SEC)	VII2 (FT/SEC)	M2	V#2 (FT/SEC)	V72 (FT/SEC)	U2
0.00	60.04	1711.00	1137.10	1.084	869.36	541.77	.702	456.13	433.07	1578.95
11.20	55.52	1261.50	1030.05	1.044	911.16	566.53	.759	713.43	694.02	1405.58
26.44	50.93	1157.91	897.62	.973	977.18	586.08	.787	731.31	726.75	1493.70
42.26	48.43	1061.29	764.17	.900	971.72	614.55	.824	752.71	752.67	1362.72
61.67	36.62	846.13	570.31	.817	1016.45	666.52	.869	767.63	765.15	1236.43
84.41	23.71	905.92	324.27	.708	1167.43	775.60	.998	845.70	831.00	1094.87
100.00	12.72	887.64	191.00	.760	1197.20	812.70	1.039	884.10	817.44	1023.71

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	FROM TIP TRAILING EDGE	MASS FLOW (LBM)	DELTA (DEG)	HETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTOR	OMEGA (RPM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR ANTI-RATIFIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	13.93	7.146	6.718	6.011	.2633	3.101	1.889	1.889	.6826	.7094	
9.28	11.20	11.85	16.22	7.700	6.476	4.060	.2465	4.93	1.943	1.943	.7154	.7608	
25.44	26.44	31.00	14.55	7.316	5.251	4.225	.1924	4.31	2.000	2.000	.7001	.8094	
42.26	44.26	51.06	14.86	6.714	4.040	4.324	.1507	2.401	2.052	2.052	.8484	.8629	
61.04	67.67	70.37	25.01	7.243	3.411	4.406	.1463	6.014	2.681	2.681	.8739	.8842	
84.52	88.41	99.92	37.44	7.510	2.548	3.876	.0916	11.994	2.228	2.228	.9307	.9461	
100.00	100.00	100.00	43.79	7.761	1.687	3.650	.1110	19.771	2.228	2.228	.9398	.9660	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8365 (POLYTROPIC)  
MOMENTUM AVERAGE ROTOR EFFICIENCY = .8194 (ADIABATIC)  
MOMENTUM AVG. ROTOR PRESS RATIO = 2.0414  
MASS AVERAGE TEMPERATURE RISE = 1.2755

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.6973 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 102.1635  
 110 PERCENT DESIGN SPEED = 50000 RPM  
 EQUIVALENT SPEED = 201.7709 KG/SEC-50 M  
 K.P.M.

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	HETA#1 (DEG)	V#1 (M/SEC)	HETA1 (DEG)	V1 (M/SEC)	M1	V#1 (M/SEC)	V#1 (M/SEC)	U1 (M/SEC)
0.00	71.02	562.67	1.704	182.97	0.554	182.97	177.08	532.09
9.28	64.76	541.14	0.00	187.41	0.568	187.41	191.28	507.69
25.66	66.38	507.64	1.536	203.42	0.621	203.42	199.68	463.15
42.25	63.63	464.72	0.00	208.23	0.636	208.23	207.54	421.04
61.04	61.07	422.37	0.00	200.70	0.612	200.70	200.64	371.64
84.55	54.26	363.71	1.097	184.74	0.566	184.74	184.03	309.92
100.00	56.91	322.80	0.976	178.10	0.533	178.10	172.05	264.22

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9072

PERCENT SPAN FROM TIP (I. F.)	HETA#2 (DEG)	V#2 (M/SEC)	HETA2 (DEG)	V2 (M/SEC)	M2	V#2 (M/SEC)	V#2 (M/SEC)	U2 (M/SEC)
0.00	60.09	322.87	39.63	258.88	0.702	185.13	194.30	511.74
11.20	54.52	384.20	38.45	277.72	0.759	172.68	217.41	449.38
29.00	50.83	432.90	38.71	285.65	0.787	178.64	222.20	452.23
48.26	46.83	473.48	30.23	296.14	0.824	187.31	228.67	415.36
67.67	36.52	491.63	40.98	302.82	0.869	203.16	233.01	376.99
88.63	25.28	476.10	42.51	340.74	0.998	230.34	257.80	335.18
100.00	12.72	466.41	46.54	361.86	1.039	253.81	257.09	312.03

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (KGT)	DELTA (DEG)	HETA# (DEG)	INCIDENCE ANGLE (DEG)	SUCT S IP (DEG)	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR STRESS RATIO	ROTOR POLYTHROPIC EFF
0.00	0.00	0.00	10.93	7.146	6.718	6.011	.2633	.0609	3.101	1.889	.6826
9.28	11.20	11.66	14.22	7.760	6.476	6.060	.2405	.0506	4.93	1.943	.7408
25.66	29.01	31.52	15.55	7.314	5.251	6.225	.1924	.0404	4.31	2.002	.8045
42.25	48.26	51.06	18.86	6.911	4.000	6.326	.1507	.0324	4.601	2.052	.8629
61.04	67.67	70.37	25.01	7.283	2.411	6.486	.1463	.0321	5.014	2.069	.8842
84.55	84.54	89.92	37.94	7.610	2.544	6.376	.0914	.0200	11.994	2.228	.9107
100.00	100.00	100.00	43.79	7.761	1.687	6.350	.1110	.0230	19.771	2.228	.9460

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8365 (POLYTHROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8194 (ADIABATIC)  
 MOMENTUM AVG. ROTOR STRESS RATIO = 2.0414  
 MASS AVERAGE TEMPERATURE RISE = 1.2755



NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (CONTINUED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

110 PERCENT DESIGN SPEED - SCAN NO 14

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8876

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	30.03	905.54	557.86	.753	713.30	705.44	1630.54
10.75	37.35	962.97	574.97	.788	743.60	742.37	1508.66
20.00	37.27	900.71	593.32	.824	780.51	780.50	1404.13
37.10	37.57	1011.94	616.30	.863	802.67	802.08	1358.85
66.54	32.55	1040.35	650.98	.893	803.39	800.46	1247.21
87.00	41.20	1149.77	744.49	1.000	863.92	852.32	1123.88
100.00	42.71	1190.85	807.75	1.043	875.03	850.84	1056.75

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8830

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-1.92	746.87	-25.92	.610	746.64	746.44	1618.71
11.12	-2.00	783.24	-27.28	.643	782.81	782.71	1563.66
20.76	-3.36	827.81	-34.39	.686	825.96	825.59	1471.49
44.14	-2.27	852.01	-33.92	.711	851.34	850.46	1400.43
67.10	-3.92	857.66	-21.81	.718	857.19	856.70	1246.71
88.14	.90	836.48	11.64	.694	834.40	831.35	1182.63
100.00	.87	840.65	12.70	.699	840.58	840.44	1123.93

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA (NEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TIP RATIO	STATOR POLYTHROPIC EFF
0.00	0.00	1.00	39.95	1.710	-2.212	.4089	.0509	.0183	20.260	1.850	1.2014	.8709
10.75	11.12	11.85	39.94	1.785	-1.542	.1931	.0548	.0190	14.607	1.907	1.2014	.8596
20.76	29.70	31.32	41.11	.737	-2.678	.3725	.0457	.0150	9.401	1.976	1.2784	.8764
47.10	44.10	51.16	39.74	-1.16	-3.127	.3522	.0462	.0142	8.741	2.014	1.2643	.8792
66.54	67.10	70.37	41.37	.005	-2.870	.3406	.0539	.0155	9.191	2.009	1.2641	.8736
87.00	88.14	33.00	40.49	-1.035	-1.939	.4381	.2417	.0639	12.331	1.974	1.2732	.6175
100.00	100.00	100.00	41.84	-1.922	-5.363	.4528	.2288	.0579	19.565	1.974	1.2731	.6664

MOMENTUM AVERAGE STAGE EFFICIENCY = .7990 (POLYTHROPIC)

WORKING AVERAGE STAGE EFFICIENCY = .7790 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.9770

MASS AVERAGE TEMPERATURE RISE = 1.2755

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SEAL AXIAL COMPRESSOR (METRIC UNITS)

110 PERCENT DESIGN SPEED - SCAN NO 14

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8874

PERCENT SPAN FROM TIP (T. F.)	BETA 3 (DEG)	V3 (M/SEC)	V13 (M/SEC)	M3	VM3 (M/SEC)	V/3 (M/SEC)	J3 (M/SEC)
0.00	34.03	276.01	170.04	.753	217.41	215.03	476.99
10.75	37.95	287.62	174.74	.788	228.65	226.27	474.13
20.50	37.27	298.06	181.03	.824	237.90	237.00	466.27
30.25	37.52	308.45	187.85	.863	246.85	246.47	461.14
40.00	39.65	317.10	201.47	.903	254.87	243.28	460.15
50.00	41.24	324.65	231.25	1.000	263.22	259.79	442.56
100.00	42.71	362.97	266.20	1.043	266.71	259.34	421.49

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8830

PERCENT SPAN FROM TIP (T. F.)	BETA 4 (DEG)	V4 (M/SEC)	V14 (M/SEC)	M4	VM4 (M/SEC)	V/4 (M/SEC)	J4 (M/SEC)
0.00	-1.22	227.65	-7.63	.610	227.52	227.52	433.38
11.12	-2.00	230.74	-8.32	.643	238.60	238.57	476.60
22.24	-3.84	242.74	-16.48	.686	251.75	251.64	448.51
33.36	-2.27	254.69	-10.31	.711	259.49	259.22	420.76
44.48	-1.22	261.61	-8.74	.718	261.27	261.12	392.19
55.60	.80	264.35	3.55	.694	254.32	253.79	300.47
100.00	.87	256.23	3.87	.699	256.20	256.20	382.57

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	INCIDENCE ANGLE (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE TEMPERATURE RATIO	STATOR POLYTROPIC EFF
0.00	0.00	1.710	.009	20.260	1.859	1.2014	.8709
10.75	11.62	1.745	.0931	16.607	1.907	1.2014	.8596
20.50	20.74	1.717	.0457	9.601	1.974	1.2746	.8759
30.25	40.15	-1.16	.0462	3.761	2.016	1.2683	.8792
40.00	67.10	.005	.0534	9.191	2.023	1.2661	.9736
50.00	84.14	-1.035	.2417	12.331	1.974	1.2732	.6175
100.00	100.00	-1.222	.4521	19.566	1.974	1.2731	.6554

MINIMUM AVERAGE STAGE EFFICIENCY = .7900 (POLYTROPIC)  
 MINIMUM AVERAGE STAGE EFFICIENCY = .7799 (ADIABATIC)  
 MOMENTUM A.O. STAGE PRESS RATIO = 1.9770  
 MASS AVERAGE TEMPERATURE RATIO = 1.2755

11A5A SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEST)

ROTOR PERFORMANCE VASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT HEIGHT FLOW = 2.9376 LRM/SEC 90 PERCENT DESIGN SPEED = SCAN NO 20  
 PERCENT DESIGN EQUIVALENT FLOW = 80.0953 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69284.8A1 R.P.M.  
 32.6006 LRM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .9971

PERCENT SPAN FROM TIP (I. F.)	HETA* (DEG)	V01 (FT/SEC)	W01 (DEG)	HETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	U*1 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	73.26	1641.16	1627.94	0.00	429.56	0.00	.391	429.54	415.73	1427.94
10.00	71.94	1646.49	1356.62	0.00	440.66	0.00	.401	440.44	426.26	1356.62
20.00	68.02	1326.36	1226.91	0.00	478.41	0.00	.437	474.41	464.62	1226.91
30.00	66.35	1221.15	1114.61	0.00	484.81	0.00	.448	480.91	484.23	1114.61
40.00	66.32	1097.67	984.10	0.00	475.51	0.00	.434	475.51	475.75	984.10
50.00	61.65	941.25	828.36	0.00	446.99	0.00	.407	446.99	440.99	828.36
100.00	59.27	846.54	722.50	0.00	429.53	0.00	.391	429.53	414.33	722.50

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .9223

PERCENT SPAN FROM TIP (I. F.)	HETA*2 (DEG)	V02 (FT/SEC)	W02 (DEG)	HETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	U*2 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	60.89	922.74	849.90	47.49	705.62	523.45	.589	473.10	457.04	1373.35
10.00	58.05	835.68	759.79	49.21	725.61	549.19	.607	473.92	463.57	1304.98
20.00	53.21	627.51	662.74	47.39	732.01	534.78	.619	485.43	492.64	1201.52
30.00	48.94	461.16	542.57	47.84	759.87	549.87	.643	506.21	506.21	1102.39
40.00	37.06	304.36	426.44	45.13	806.65	578.55	.695	562.11	560.46	1002.99
50.00	21.47	204.27	221.07	50.32	880.71	677.78	.743	562.30	563.14	895.45
100.00	11.07	573.63	110.15	52.26	914.66	727.82	.801	562.98	563.82	937.37

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA (DEG)	HETA*0 (DEG)	INCIDENCE MEAN (DEG)	ANG1 (DEG)	SU1 (DEG)	FACTOR	DELTA* (DEG)	HAR	OMEGA* (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	12.36	9.420	4.452	4.814	.4814	.2439	.0451	3.903	1.710	1.710	.7177	.7180	
10.00	12.00	13.93	10.212	4.479	5.110	.5110	.2607	.0500	3.190	1.706	1.706	.7144	.7149	
20.00	13.37	15.61	10.077	4.473	5.007	.5007	.1884	.0375	3.621	1.712	1.712	.7002	.7002	
30.00	14.41	19.37	9.745	4.476	5.300	.5300	.1486	.0329	5.645	1.714	1.714	.6444	.6458	
40.00	19.10	27.27	10.063	4.189	6.098	.6098	.0188	.0188	7.769	1.745	1.745	.9240	.9316	
50.00	20.51	30.39	10.380	4.322	5.240	.5240	.1400	.0305	12.652	1.774	1.774	.9107	.9174	
100.00	100.00	40.20	10.516	4.442	.4981	.4981	.1706	.0356	18.122	1.774	1.774	.9107	.9176	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8372 (POLYTROPIC)

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8243 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.7266

MASS AVERAGE TEMPERATURE RISE = 1.2044

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW = 1.3706 KG/SEC 90 PERCENT DESIGN SPEED - SCAN NO. 20  
 PERCENT DESIGN EQUIVALENT FLOW = 00.0453 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69296.861 R.P.M.  
 = 158.1974 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9971

PERCENT SPAN FROM TIP (U. S.)	HETA01 (DEG)	V01 (M/SEC)	W01 (M/SEC)	BETA1 (DEG)	V1 (M/SEC)	W11 (M/SEC)	H1	V41 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	73.74	654.50	475.24	0.00	170.93	0.00	.391	170.93	174.71	435.24
10.30	71.78	634.10	412.89	0.00	174.31	0.00	.401	174.31	170.92	412.49
27.34	68.82	613.66	374.40	0.00	145.82	0.00	.437	145.82	163.14	374.40
34.45	66.35	592.21	340.95	0.00	149.29	0.00	.449	149.29	149.81	340.95
42.21	64.12	574.71	301.48	0.00	144.24	0.00	.434	144.24	144.89	301.48
55.00	61.65	546.89	252.64	0.00	136.24	0.00	.407	136.24	174.61	252.64
100.00	59.27	246.19	220.22	0.00	130.92	0.00	.391	130.92	174.67	220.22

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9223

PERCENT SPAN FROM TIP (U. S.)	HETA02 (DEG)	V02 (M/SEC)	W02 (M/SEC)	BETA2 (DEG)	V2 (M/SEC)	W12 (M/SEC)	M2	V42 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	60.84	294.49	259.05	47.89	215.07	159.55	.549	144.22	139.58	414.60
12.01	58.05	272.94	231.58	44.21	221.10	167.39	.607	144.45	141.29	348.98
32.06	53.21	242.23	202.00	47.33	223.12	164.22	.619	151.04	150.10	365.22
50.55	48.94	226.18	175.37	47.88	230.05	170.63	.643	156.34	154.29	336.01
69.10	37.04	214.60	179.37	45.83	244.87	174.34	.695	171.33	170.83	305.71
88.53	21.44	144.14	67.38	50.32	249.44	206.59	.743	171.61	148.60	273.97
100.00	11.07	174.84	33.57	52.26	240.31	21.66	.401	171.59	145.76	255.23

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM LEADING EDGE	DELTA (DEG)	HETA0 (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACOR	OMEGA* (RPM)	LOSS PARAMETER (M/SEC)	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	ROTOR ANTIADIC EFF	POLYTROPIC EFF
0.00	0.00	12.46	9.420	8.952	.5814	.2439	.0451	3.203	1.710	.7177	.7340
10.30	12.01	12.91	10.232	8.879	.5110	.2607	.0500	3.190	1.704	.7144	.7349
27.34	32.06	15.61	10.077	7.493	.5097	.1484	.0375	3.621	1.712	.7002	.8137
43.85	50.55	19.37	9.745	6.876	.5300	.1546	.0328	3.645	1.718	.6844	.8454
62.21	69.10	27.27	10.063	6.189	.4998	.0450	.0388	7.269	1.745	.9240	.9316
88.53	88.53	40.10	10.360	5.322	.5240	.1400	.0308	12.652	1.775	.9107	.9176
100.00	100.00	48.20	10.516	4.642	.4981	.1706	.0344	14.122	1.774	.9107	.9176

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8372 (POLYTROPIC) MOMENTUM AVG. MOTOR PRESS RATIO = 1.7264  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .8243 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.2044

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TRMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 20

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9330

PERCENT SPAN FROM TIP (I. F.)	HETA 3 (DEG)	V3 (FT/SEC)	VII3 (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	44.02	775.57	539.00	.653	557.66	551.54	1333.75
11.58	45.97	781.67	561.98	.658	543.31	542.41	1279.20
30.08	41.20	796.14	566.96	.678	500.46	500.63	1157.85
40.15	41.11	816.30	559.89	.700	546.03	503.59	1102.24
67.00	42.01	855.12	572.28	.741	615.39	533.07	1013.96
88.11	46.64	915.24	661.10	.796	610.05	622.37	919.76
100.00	47.61	955.26	705.77	.836	643.75	655.96	867.76

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9141

PERCENT SPAN FROM TIP (I. F.)	HETA 4 (DEG)	V4 (FT/SEC)	VII4 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	-1.72	626.04	-17.11	.518	626.00	626.00	1324.07
11.66	-1.22	616.00	-11.17	.511	616.66	616.59	1277.77
30.70	-1.61	625.64	-16.22	.524	625.66	625.14	1199.49
40.70	-2.01	643.40	-12.98	.546	647.57	646.90	1126.17
67.60	-1.92	653.11	-21.56	.545	662.75	662.60	1050.92
88.15	-2.30	622.69	-22.64	.524	622.28	620.00	967.33
100.00	-2.09	625.63	-22.92	.527	625.22	625.22	919.36

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (I. F.)	INCIDENCE ANGLE (DEG)	MEAN SUCT SW (DEG)	FACTOR	OMEGA HAR	PARAMETER	DEFLECTION ANGLE (DEG)	STAGE PRESS RATIO	STAGE EFF	STATOR POLYTROPIC EFF
0.00	0.00	7.07	0.479	.0476	.0171	20.960	1.690	1.2303	.8965
11.58	11.54	9.715	0.460	.0542	.0202	15.303	1.641	1.2303	.8443
30.08	31.64	9.557	0.428	.0409	.0136	11.660	1.624	1.2074	.9101
40.15	44.90	5.500	0.235	-.0005	-.0001	4.044	1.719	1.1977	1.0010
67.00	67.64	2.395	0.406	.0541	.0170	4.179	1.714	1.1849	.8402
88.11	80.15	4.074	0.500	.1451	.0384	9.444	1.687	1.1952	.7795
100.00	100.00	3.000	0.570	.1349	.0341	16.610	1.684	1.1951	.8109

MOMENTUM AVERAGE STAGE EFFICIENCY = .8125 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7980 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.6998  
 MASS AVERAGE TEMPERATURE RISE = 1.2044

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NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 20

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .0330

PERCENT SPAN FROM TIP (I. F.)	RFTA 3 (DEG)	V3 (M/SEC)	VII3 (M/SEC)	M3	VH3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	44.02	276.30	164.24	.653	169.98	148.11	406.53
11.53	64.07	278.25	171.24	.658	165.60	145.33	389.90
30.99	63.20	262.64	166.11	.678	176.92	174.92	362.06
49.15	63.71	248.81	170.65	.700	181.06	180.91	335.46
67.20	62.01	240.66	174.43	.741	193.67	192.06	300.06
88.11	66.43	278.96	202.11	.796	192.28	199.70	280.04
100.00	67.63	291.16	215.12	.836	196.21	190.79	262.97

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .0314

PERCENT SPAN FROM TIP (I. F.)	RFTA 4 (DEG)	V4 (M/SEC)	VII4 (M/SEC)	M4	VH4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	-1.22	190.48	-4.76	.518	190.44	190.44	403.58
11.64	-1.22	188.00	-4.91	.511	187.54	187.03	389.47
30.69	-1.42	190.70	-4.76	.524	190.03	190.54	365.73
49.00	2.91	197.63	-10.22	.546	197.38	197.18	343.26
67.60	-1.42	196.02	-4.57	.545	195.91	195.80	320.32
88.15	-2.07	199.80	-4.92	.526	199.67	199.08	294.84
100.00	-2.04	190.69	-4.96	.527	198.57	198.47	280.72

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (KGT)	DELTA P (DEG)	INCIDENCE ANGLE (DEG)	SUCT 5/8 FACTOR	D FACTOR	LOSS PARAMETER	REVIATION ANGLE (DEG)	STAGE EFF	STAGE LOSS RATIO	STAGE POLYTROPIC EFF
0.00	0.00	0.00	45.24	7.707	3.284	.4528	.0171	20.960	1.690	1.2303	.8845
11.58	11.44	12.40	67.19	9.785	6.454	.4660	.0202	14.705	1.681	1.2303	.8893
30.99	30.69	33.17	64.66	6.557	3.274	.4628	.0144	11.660	1.676	1.2074	.9101
49.15	48.90	52.44	66.21	5.300	2.319	.4235	-.0004	4.064	1.694	1.1977	1.0010
67.20	67.69	71.30	43.93	2.395	-.448	.4406	.0591	4.179	1.714	1.1059	.8882
88.11	88.15	91.24	48.52	4.074	1.188	.5090	.0384	4.444	1.687	1.1052	.7795
100.00	100.00	100.00	40.72	3.000	-.441	.5270	.0341	14.610	1.684	1.1051	.8109

MOMENTUM AVERAGE STAGE EFFICIENCY = .8125 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7780 (ADIABATIC)

MOMENTUM AVG. STAGE LOSS RATIO = 1.6988  
 MASS AVERAGE TEMPERATURE RISE = 1.2084

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.0131 LBM/SEC  
 PERCENT DISTOR EQUIVALENT FLOW = 0.24305  
 90 PERCENT DEVIATION SPEED = 5044 RPM  
 FORTVALFNT SPFD = 69331.211 R.P.M.  
 FORTVALFNT FLOW / INLET ANV ANFA = 11.1663 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .09883

PERCENT SPAN FROM TIP (I. P.)	HETA01 (DEG)	V01 (FT/SEC)	V101 (FT/SEC)	HETA1 (DEG)	V1 (FT/SEC)	V11 (FT/SEC)	M1	V41 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	72.70	1400.50	1420.00	0.00	664.07	0.00	.405	466.07	430.66	1624.00
10.22	71.41	1431.44	1350.73	0.00	656.30	0.00	.414	456.30	441.36	1356.79
27.13	60.14	1332.03	117.60	0.00	644.81	0.00	.453	444.81	400.31	1237.60
42.77	65.61	1223.65	1110.90	0.00	507.30	0.00	.464	507.30	505.67	1119.90
62.10	63.76	1105.05	942.76	0.00	492.16	0.00	.450	492.16	492.20	949.96
84.00	60.03	949.42	824.96	0.00	462.63	0.00	.422	462.63	456.62	924.96
100.00	54.42	804.50	722.90	0.00	464.50	0.00	.405	464.50	490.40	722.90

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .0143

PERCENT SPAN FROM TIP (I. P.)	HETA02 (DEG)	V02 (FT/SEC)	V102 (FT/SEC)	HETA2 (DEG)	V2 (FT/SEC)	V112 (FT/SEC)	M2	V42 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	60.73	1000.00	874.54	45.44	702.32	500.72	.589	492.67	476.61	1374.27
11.73	57.41	931.00	780.64	44.21	726.87	524.74	.611	502.40	491.04	1311.37
31.10	52.21	871.00	695.20	44.23	733.65	511.74	.623	524.44	522.39	1205.98
49.50	47.65	770.00	576.22	45.40	750.71	534.55	.642	527.00	527.00	1104.77
64.60	30.64	712.07	446.99	45.43	700.77	502.60	.641	554.90	544.24	1007.39
84.54	22.50	627.00	240.00	44.44	677.34	644.60	.761	579.63	570.61	899.40
100.00	12.71	524.04	131.05	50.62	614.51	700.68	.794	540.22	540.50	837.93

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. P.)	DELTA HETA0 (DEG)	MASS FLOW (LBM)	INCIDENCE ANGLE (DEG)	DELTA ANGLE (DEG)	OMEGA MAX	LOSS PARAMETER	DEVIATION ANGLE (DEG)	DEVIATION RATIO	ROTOR ANTIADHATIC EFF	ROTOR POLYTHROPIC EFF
0.00	0.00	0.00	0.398	0.474	.2261	.0422	3.597	1.496	.7200	.7480
10.22	11.74	12.00	0.427	0.406	.2364	.0462	2.491	1.499	.7114	.7507
27.13	31.19	33.12	7.226	0.476	.1549	.0311	2.990	1.703	.6284	.8411
42.77	49.40	52.41	6.167	0.473	.1303	.0268	5.602	1.707	.6479	.9174
62.10	64.60	71.27	5.420	0.431	.0894	.0192	4.815	1.719	.6203	.9261
84.00	84.50	90.22	4.508	0.498	.1062	.0229	12.767	1.768	.6300	.9153
100.00	100.00	100.00	3.590	0.429	.1297	.0269	19.779	1.768	.6300	.9154

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8530 (POLYTHROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8415 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.7117  
 MASS AVERAGE TEMPERATURE RISE = 1.1969

NASA SMALL AXIAL COMPRESSOR TEST 1 M APR 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 21  
 EQUIVALENT FLOW = 3.7624 M<sup>3</sup>/SEC EQUIVALENT FLOW / INLET ANN AREA = 69131.211 M<sup>3</sup>/SEC-M  
 PERCENT DESIGN EQUIVALENT FLOW = 62.6305

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9883

PERCENT SPAN FROM TIP (I. F.)	REFLX1 (DEG)	V01 (M/SEC)	V101 (M/SEC)	HFL01 (DEG)	V1 (M/SEC)	V10 (M/SEC)	M1	V02 (M/SEC)	V20 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	72.70	656.16	435.53	0.00	135.53	0.00	.605	135.53	135.53	131.26	435.53
10.25	71.41	436.41	413.55	0.00	172.08	0.00	.416	172.08	172.08	136.53	413.55
27.13	67.14	415.26	377.16	0.00	151.00	0.00	.453	151.00	151.00	149.23	377.16
43.77	65.63	178.77	341.75	0.00	154.62	0.00	.464	154.62	154.62	154.13	361.35
62.19	63.56	337.00	301.74	0.00	140.07	0.00	.450	140.07	140.07	150.02	301.74
86.00	60.83	200.35	252.67	0.00	141.01	0.00	.422	141.01	141.01	130.12	252.67
100.00	58.62	258.68	220.16	0.00	135.48	0.00	.405	135.48	135.48	130.88	220.16

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9143

PERCENT SPAN FROM TIP (I. F.)	REFLX2 (DEG)	V02 (M/SEC)	V202 (M/SEC)	HFL22 (DEG)	V2 (M/SEC)	V20 (M/SEC)	M2	V03 (M/SEC)	V30 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	60.53	305.65	260.26	65.64	214.07	152.62	.580	152.62	150.10	145.27	610.88
11.73	57.41	246.50	232.27	46.21	221.55	159.94	.611	159.94	153.31	149.06	394.71
31.10	52.91	265.74	211.90	46.23	223.62	155.99	.623	155.99	160.27	150.22	367.47
49.50	47.45	237.50	175.02	45.40	224.02	152.93	.642	152.93	160.64	140.65	337.95
68.60	38.00	177.04	135.63	45.33	241.03	171.42	.601	171.42	160.88	140.94	307.85
88.56	22.54	101.31	73.40	44.65	267.41	200.74	.741	200.74	176.67	173.77	274.18
100.00	12.73	103.31	39.94	50.62	274.74	215.46	.748	215.46	176.85	170.84	255.40

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TREATING ENGINE	MASS FLOW (M <sup>3</sup> /SEC)	DELTA HFLX0 (DEG)	INCIDENCE MEAN (DEG)	ANGIF (DEG)	FACTOR	OMEGA (RPM)	WAR	PARAMETER LOSS	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR ANTIADIBATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	12.12	0.000	0.128	0.374	0.221	0.022	0.022	1.537	1.606	0.790	0.7480
11.73	11.71	14.01	0.027	0.285	0.306	0.2104	0.042	0.042	2.691	1.689	0.738	0.7507
27.13	31.19	15.27	0.195	7.226	0.2736	0.1569	0.031	0.031	2.990	1.703	0.688	0.4411
43.77	49.50	10.14	0.162	0.187	0.4973	0.1307	0.024	0.024	5.602	1.707	0.479	0.9775
62.19	60.61	0.00	0.203	5.320	0.6931	0.0899	0.012	0.012	4.815	1.710	0.503	0.9261
86.00	84.54	34.24	0.545	4.508	0.4988	0.1062	0.020	0.020	11.747	1.740	0.900	0.9353
100.00	100.00	45.69	0.614	3.530	0.4729	0.1297	0.026	0.026	14.779	1.748	0.900	0.934

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8530 (POLYTROPIC)

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8415 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.7117

MASS AVERAGE TEMPERATURE RISE = 1.1949



NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 21

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9256

PERCENT SPAN FROM TIP (I. F.)	RETA 3 (DEG)	V1 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	WZ3 (FT/SEC)	U3 (FT/SEC)
0.00	41.41	77.52	515.59	.659	549.66	574.23	1336.64
11.29	42.90	740.92	536.39	.660	577.96	577.00	1241.66
20.10	40.11	400.12	514.07	.644	614.90	614.90	1142.34
30.77	40.40	415.32	535.74	.706	620.24	619.74	1107.16
42.31	41.12	440.41	545.45	.735	637.96	635.63	1017.62
48.00	40.50	917.64	644.20	.801	653.21	646.73	919.50
100.00	45.02	956.66	686.07	.839	666.71	644.29	803.36

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9210

PERCENT SPAN FROM TIP (I. F.)	RETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	WZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-0.70	630.14	-7.70	.525	610.09	630.09	1324.96
11.29	-0.71	613.32	-8.10	.524	633.26	633.10	1276.85
20.10	-1.00	646.57	-5.61	.545	646.30	646.10	1231.54
30.77	-1.22	660.05	-14.20	.566	667.91	667.22	1127.64
42.31	-1.74	659.67	-20.01	.581	659.33	654.44	1021.91
48.00	-0.99	640.47	-4.98	.561	640.39	634.05	967.66
100.00	-0.87	646.02	-4.74	.544	663.95	643.95	919.97

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP EDGE	FRONT TIP	MASS FLOW (LBS)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	DELTA FACTOR	DELTA (DEG)	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	62.11	5.090	1.148	.674	.674	.0450	.0162	21.480	1.667	1.2204	.4997
11.29	11.39	17.50	43.63	6.721	1.377	.670	.670	.0452	.0157	15.804	1.670	1.2204	.4925
20.10	20.48	33.12	41.49	3.514	.217	.611	.611	.0434	.0111	11.743	1.698	1.1979	.4906
30.77	30.76	42.91	62.02	1.071	.077	.484	.484	.0094	.0029	10.745	1.712	1.1809	1.0231
42.31	42.42	71.27	62.44	1.501	-1.240	.610	.610	.0314	.0091	4.361	1.702	1.1814	.9337
48.00	48.23	90.23	45.68	2.242	.042	.482	.482	.0410	.0399	10.660	1.674	1.1898	.7403
100.00	100.00	100.00	44.69	1.148	-2.243	.500	.500	.1107	.0356	17.810	1.674	1.1898	.7464

STATOR AVERAGE STAGE EFFICIENCY = .4914 (POLYTROPIC)

STATOR AVERAGE STAGE EFFICIENCY = .4919 (ADIABATIC)

STATOR AVERAGE TEMPERATURE RISE = 1.6890

STATOR AVERAGE TEMPERATURE RISE = 1.1969

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (CONTINUED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAL NO 21

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9756

PERCENT SPAN FROM TIP (I. F.)	HETA 3 (DEG)	V3 (M/SEC)	V13 (M/SEC)	M3	V13 (M/SEC)	V13 (M/SEC)	U3 (M/SEC)
0.00	41.41	217.60	157.15	.449	178.20	178.25	406.90
11.29	42.90	240.44	163.67	.468	176.16	175.47	390.59
20.19	45.11	265.10	167.31	.489	187.65	187.45	363.42
40.27	40.90	269.73	163.17	.706	189.85	184.91	317.66
67.31	41.12	254.11	163.73	.715	196.45	183.74	310.11
88.09	46.59	279.70	136.15	.801	199.19	197.52	280.26
100.00	45.42	201.54	200.11	.819	203.21	197.40	263.15

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9210

PERCENT SPAN FROM TIP (I. F.)	HETA 6 (DEG)	V4 (M/SEC)	V14 (M/SEC)	M4	V14 (M/SEC)	V14 (M/SEC)	U4 (M/SEC)
0.00	-70	192.07	-2.35	.525	192.05	192.05	403.85
11.29	-71	193.03	-2.47	.520	193.02	193.00	399.79
20.19	-1.38	192.07	-6.76	.544	192.02	192.93	366.21
40.27	-1.22	203.63	-4.35	.566	203.50	203.37	343.56
67.31	-1.76	201.05	-6.10	.561	200.94	200.85	300.52
88.09	-0.89	195.22	-3.04	.541	195.19	196.00	246.94
100.00	-0.17	196.30	-2.04	.544	196.27	196.27	240.41

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM LEADING EDGE	PERCENT SPAN FROM TIP FROM LEADING EDGE	MASS FLOW (KGT)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMPR RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	42.11	5.090	1.144	4.354	.0450	21.490	1.667	1.2204	.9997
11.29	11.29	17.00	43.63	4.721	1.377	4.370	.0452	15.900	1.670	1.2204	.9225
20.19	20.19	43.12	41.02	3.514	.207	4.110	.0334	11.741	1.640	1.1079	.9204
40.27	40.27	52.41	42.02	3.071	.377	3.864	-.0094	10.255	1.712	1.1009	1.0231
67.31	67.31	71.27	42.95	1.501	-1.290	4.105	.0031	9.341	1.702	1.1015	.9317
88.09	88.09	90.22	45.48	2.242	.666	4.020	.0349	10.640	1.676	1.1004	.7403
100.00	100.00	100.00	46.69	1.148	-2.253	4.501	.0350	17.830	1.674	1.1009	.7964

MOMENTUM AVERAGE STAGE EFFICIENCY = .9318 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .9190 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.6490  
MASS AVERAGE TEMPR RATIO = 1.1969

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.1164 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 85.0471  
 50 PERCENT DESIGN SPEED = 5040 RPM  
 EQUIVALENT SPEED = 4923.665 RPM  
 EQUIVALENT FLOW / INLET ANN AREA = 36.8109 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.9817

PERCENT SPAN FROM TIP (I. F.)	HETA91 (DEG)	V91 (FT/SEC)	W91 (DEG)	HETA1 (DEG)	V1 (FT/SEC)	W1 (DEG)	VII (FT/SEC)	H1 (DEG)	V41 (FT/SEC)	W41 (DEG)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	72.54	1401.97	1624.74	0.00	461.26	0.00	0.00	0.22	463.24	0.00	460.34	1428.74
10.11	70.71	1400.10	1357.30	0.00	674.94	0.00	0.00	0.34	674.94	0.00	674.94	1370.30
20.22	67.50	1341.71	1234.60	0.00	515.60	0.00	0.00	0.72	515.60	0.00	508.13	1214.60
30.33	64.79	1332.41	1121.34	0.00	527.94	0.00	0.00	0.84	527.94	0.00	524.24	1111.34
40.44	62.04	1315.70	1021.22	0.00	512.14	0.00	0.00	0.60	512.14	0.00	511.91	961.22
50.55	59.50	1251.64	820.45	0.00	480.81	0.00	0.00	0.30	480.81	0.00	476.35	921.35
60.66	57.43	1172.90	722.90	0.00	461.85	0.00	0.00	0.21	461.85	0.00	460.14	720.90

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = 0.8770

PERCENT SPAN FROM TIP (I. F.)	HETA92 (DEG)	V92 (FT/SEC)	W92 (DEG)	HETA2 (DEG)	V2 (FT/SEC)	W2 (DEG)	VII2 (FT/SEC)	U2 (FT/SEC)	V42 (FT/SEC)	W42 (DEG)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	50.54	1070.45	921.49	39.72	707.61	0.00	452.23	0.59	744.26	0.00	524.71	1374.12
10.11	55.74	1013.72	840.00	39.02	739.88	0.00	474.20	0.28	567.67	0.00	555.07	1313.21
20.22	52.51	926.61	731.00	40.14	731.36	0.00	471.94	0.24	554.57	0.00	555.14	1211.00
30.33	48.08	842.52	611.77	40.74	765.02	0.00	499.66	0.58	579.30	0.00	579.27	1111.43
40.44	44.74	774.72	522.51	40.43	791.54	0.00	514.56	0.44	598.03	0.00	598.26	1011.04
50.55	43.12	669.08	270.87	45.08	879.16	0.00	630.31	0.66	612.80	0.00	602.02	900.94
60.66	44.60	634.09	159.85	47.45	914.43	0.00	677.99	0.80	613.61	0.00	592.76	937.84

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	UETA (DEG)	HETA9 (DEG)	INCIDENCE ANGLE (DEG)	U (DEG)	UACTOP (DEG)	HAW (DEG)	U-ANGLE (DEG)	UACTOP (DEG)	U-ANGLE (DEG)	UACTOP (DEG)	U-ANGLE (DEG)	UACTOP (DEG)
0.00	0.61	12.59	8.198	7.240	0.019	0.183	0.035	0.017	2.454	1.641	0.7426	0.7785
10.11	11.36	14.76	8.407	7.571	0.416	0.1434	0.0373	0.069	0.969	1.654	0.7755	0.7407
20.22	20.62	14.69	8.501	6.435	0.268	0.1274	0.0256	0.270	2.720	1.660	0.8005	0.8598
30.33	30.54	18.20	8.390	5.248	0.422	0.0867	0.0177	0.471	1.602	0.902	0.9092	0.9157
40.44	67.73	23.20	8.391	4.525	0.315	0.073	0.0079	4.065	1.603	0.646	0.6472	0.6472
50.55	88.23	36.07	8.509	3.665	0.530	0.0740	0.0150	14.597	1.744	0.989	0.9827	0.9827
60.66	100.00	42.82	8.674	2.690	0.258	0.0904	0.0187	21.653	1.744	0.689	0.689	0.689

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8834 (POLYTROPIC)  
 MASS AVERAGE ROTOR EFFICIENCY = 0.8747 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR PRESS RATIO = 1.6815  
 MASS AVERAGE TEMPERATURE RATIO = 1.1027

MASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE MASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW FROM TIP (L/S) = 1.4136 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 85.0871  
 90 PERCENT DESIGN SPEED = 3500 RPM  
 EQUIVALENT SPEED = 149.0528 M/S

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9817

PERCENT SPAN FROM TIP (L/S)	HETA92 (DEG)	V02 (M/SEC)	V01 (M/SEC)	M01 (DEG)	HETA1 (DEG)	V1 (M/SEC)	V11 (M/SEC)	M1 (DEG)	V04 (M/SEC)	V71 (M/SEC)	J1 (M/SEC)
0.00	72.74	457.40	141.20	0.00	0.00	0.00	0.00	0.22	141.20	174.66	635.68
10.11	70.71	434.43	144.78	0.00	0.00	0.00	0.00	0.34	144.78	140.04	613.71
20.22	67.80	405.05	157.16	0.00	0.00	0.00	0.00	0.47	157.16	154.27	577.55
30.33	64.79	377.77	160.42	0.00	0.00	0.00	0.00	0.60	160.42	140.60	541.79
40.44	62.08	360.07	156.10	0.00	0.00	0.00	0.00	0.69	156.10	156.05	502.12
50.55	59.46	252.74	146.55	0.00	0.00	0.00	0.00	0.39	146.55	144.58	252.78
100.00	57.63	261.67	140.77	0.00	0.00	0.00	0.00	0.62	140.77	174.09	220.34

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8770

PERCENT SPAN FROM TIP (L/S)	HETA92 (DEG)	V02 (M/SEC)	V2 (M/SEC)	M2 (DEG)	HETA2 (DEG)	V2 (M/SEC)	V12 (M/SEC)	M2 (DEG)	V02 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	59.44	280.29	215.68	0.00	32.72	137.84	137.84	0.00	145.00	140.54	418.81
10.11	55.76	256.03	225.21	0.00	30.12	140.23	140.23	0.28	172.37	150.10	600.27
20.22	52.71	225.25	227.92	0.00	27.92	143.86	143.86	0.26	170.20	140.20	349.11
30.33	48.54	186.67	233.14	0.00	26.78	152.30	152.30	0.58	176.57	174.56	338.76
40.44	40.67	150.12	241.26	0.00	24.26	158.06	158.06	0.64	182.20	181.74	304.17
50.55	33.82	82.69	267.07	0.00	21.12	192.12	192.12	0.76	186.81	183.74	274.61
100.00	14.50	48.72	278.72	0.00	17.65	200.65	200.65	0.80	187.07	180.17	255.37

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (G)	HETA9 (DEG)	INCIDENCE ANGLE (DEG)	U FACTOR	U/FAC2	HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR EFF	ROTOR POLYTROPIC EFF
0.00	0.00	12.53	7.740	0.419	0.1433	0.355	0.355	2.454	1.641	0.785
10.11	12.69	14.76	7.571	0.416	0.1436	0.373	0.373	2.69	1.656	0.797
20.22	32.32	14.49	6.425	0.248	0.1274	0.256	0.256	2.720	1.660	0.858
30.33	42.23	10.21	5.208	0.422	0.1847	0.177	0.177	4.471	1.693	0.9157
40.44	61.30	71.10	4.525	0.315	0.1373	0.079	0.079	9.066	1.693	0.9672
50.55	84.92	88.23	3.545	0.450	0.1740	0.158	0.158	14.597	1.748	0.9527
100.00	100.00	42.82	2.600	0.4258	0.0900	0.187	0.187	21.653	1.748	0.9527

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.815 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.4747 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS. RATIO = 1.6815  
 MASS AVERAGE TEMPERATURE DISC = 1.1827

NASA SHIFIL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

40 PERCENT DESIGN SPEED - SCAN NO 22

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8969

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VIII3 (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	35.014	795.25	665.66	.680	644.66	677.59	1334.69
10.94	34.83	808.00	684.36	.692	646.72	645.65	1242.95
20.67	34.07	811.89	678.07	.701	656.21	656.20	1195.61
30.33	35.48	841.79	500.49	.731	676.84	676.84	1109.59
40.00	36.90	855.74	513.76	.748	684.34	681.88	1020.51
50.00	41.73	876.40	616.60	.812	691.39	602.11	920.97
100.00	43.00	964.69	657.92	.851	705.53	686.03	863.25

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9138

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VIII4 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	-1.04	661.56	-12.15	.565	649.45	649.45	1324.82
11.32	-1.12	681.61	-13.14	.576	681.48	681.39	1279.98
20.67	-2.55	695.23	-10.08	.592	694.54	694.24	1202.40
30.33	-1.22	717.03	-15.27	.614	716.86	716.13	1149.13
40.00	-1.22	711.98	-15.16	.612	711.78	711.38	1052.19
50.00	-1.54	695.00	-6.51	.593	694.97	692.43	987.71
100.00	-1.52	699.55	-6.35	.597	699.53	699.53	919.87

STATOR PERFORMANCE DATA

PERCENT SPAN FROM LEADING EDGE	MASS FLOW (LBS)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCTION (DEG)	FACTOR	OMEGA HAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	36.88	-4.77	-4.319	.3762	.0475	.0171	21.140	1.621	1.1991	.8631
10.94	12.43	37.95	.665	-2.694	.3704	.0463	.0161	15.436	1.633	1.1991	.8561
20.67	30.21	38.63	-4.86	-4.814	.3483	.0190	.0062	10.526	1.651	1.1991	.8412
30.33	42.20	37.70	-1.189	-4.201	.3329	.0296	.009	10.772	1.677	1.1779	.8123
40.00	67.31	38.17	-2.552	-5.433	.3404	.0415	.0119	9.800	1.671	1.1680	.8906
50.00	84.18	42.26	-5.540	-3.468	.4199	.1706	.0451	10.095	1.643	1.1619	.6945
100.00	100.00	43.52	-1.612	-5.073	.6388	.1592	.0403	14.100	1.643	1.1820	.7335

MOMENTUM AVERAGE STAGE EFFICIENCY = .8554 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.6540  
 MASS FLOW AVERAGE STAGE EFFICIENCY = .8449 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1827

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 22

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8959

PERCENT SPAN FROM TIP (F. F.)	BETA 3 (DEG)	V3 (M/SEC)	V1/3 (M/SEC)	M3	V4/3 (M/SEC)	V1/4 (M/SEC)	U3 (M/SEC)
0.00	35.84	242.39	141.03	.600	196.49	104.32	406.75
10.04	35.01	246.24	142.53	.642	197.12	106.74	371.04
20.67	34.07	247.60	145.71	.701	200.01	108.01	366.62
47.73	32.44	256.54	152.54	.731	206.30	106.15	338.20
67.63	30.90	250.84	156.59	.744	208.60	107.84	311.05
87.75	41.73	242.37	107.94	.812	210.74	207.91	280.71
100.00	43.00	294.04	297.53	.851	215.04	209.10	263.12

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9139

PERCENT SPAN FROM TIP (F. F.)	BETA 4 (DEG)	V4 (M/SEC)	V1/4 (M/SEC)	M4	V1/4 (M/SEC)	V1/4 (M/SEC)	U4 (M/SEC)
0.00	-1.04	204.04	-3.70	.565	204.05	204.05	413.80
11.32	-1.12	207.74	-4.07	.576	207.71	207.69	389.83
30.23	-2.55	211.91	-9.44	.592	211.70	211.60	367.49
48.57	-1.22	210.54	-4.65	.614	218.50	218.28	343.35
47.32	-1.22	217.00	-4.62	.612	216.95	216.83	320.71
88.19	-5.54	211.84	-1.94	.593	211.83	211.85	296.96
100.00	-5.52	213.22	-1.94	.597	213.22	213.22	280.38

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	OMEGA RAR	FACTOR	D	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	36.88	-0.477	-4.394	3762	.0171	.0475	.3762	21.140	1.621	1.1991	.8521
10.04	11.32	12.69	37.94	.665	-2.694	3794	.0161	.0463	.3794	15.476	1.633	1.1991	.8461
29.47	30.23	32.92	38.63	-0.486	-3.814	3863	.0190	.0190	.3863	10.636	1.651	1.1831	.9412
47.73	47.57	52.20	37.70	-1.199	-4.201	3329	.0091	.0296	.3329	10.772	1.677	1.1779	.9123
66.63	67.32	71.10	38.12	-2.552	-5.433	3404	.0119	.0414	.3404	9.800	1.671	1.1400	.8306
87.75	88.14	90.14	42.26	-0.340	-1.448	4199	.0451	.1095	.4199	20.995	1.663	1.1414	.6465
100.00	100.00	100.00	43.52	-1.632	-5.073	4388	.0403	.1592	.4388	14.180	1.643	1.1820	.7335

MOMENTUM AVERAGE STAGE EFFICIENCY = .8454 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.6540  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8449 (ADIABATIC)      MASS AVERAGE TEMPERATURE RATIO = 1.1827

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NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 3, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 1.1607 LHM/SEC  
 EQUIVALENT FLIGHT SPEED = 36.2974  
 90 PERCENT DESIGN SPEED = SCAN NO 23  
 ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)  
 EQUIVALENT FLIGHT SPEED = 36.2974 R.P.M.  
 EQUIVALENT FLIGHT FLOW / INLET ANN AREA = 36.0805 LHM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. F.)	HETA01 (DEG)	V01 (FT/SEC)	VI01 (FT/SEC)	W01 (DEG)	HETA1 (DEG)	VI (FT/SEC)	W1 (DEG)	VM1 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	71.74	1500.26	1430.43	1.374	0.00	471.91	0.00	471.91	454.71	1430.43
10.00	70.42	1447.25	1359.76	1.318	0.00	483.74	0.00	483.74	447.91	1359.76
20.00	67.04	1344.07	1241.67	1.236	0.00	524.93	0.00	524.93	515.28	1241.67
30.00	64.44	1244.41	1123.89	1.143	0.00	537.50	0.00	537.50	535.77	1123.89
40.00	62.31	1171.63	993.21	1.028	0.00	521.27	0.00	521.27	521.00	993.21
50.00	59.51	964.24	730.90	.891	0.00	489.23	0.00	489.23	482.66	730.90
60.00	57.01	792.99	523.76	.747	0.00	463.46	0.00	463.46	453.49	523.76

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8598

PERCENT SPAN FROM TIP (I. F.)	HETA02 (DEG)	V02 (FT/SEC)	VI02 (FT/SEC)	W02 (DEG)	HETA2 (DEG)	VI2 (FT/SEC)	W2 (DEG)	VM2 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	59.90	1101.44	954.08	.940	37.21	497.20	471.66	554.24	537.36	1375.74
10.00	55.02	1057.02	873.07	.905	36.46	742.64	441.34	597.27	584.22	1314.41
20.00	52.71	994.17	767.19	.829	37.36	735.13	446.07	584.33	560.69	1213.25
30.00	46.49	961.68	629.94	.763	32.33	759.71	491.49	587.65	587.62	1111.42
40.00	38.33	806.47	500.94	.703	34.72	810.73	507.14	632.63	530.67	1008.08
50.00	27.05	727.99	292.03	.638	42.33	902.70	608.43	664.45	654.50	900.45
60.00	15.59	693.05	186.23	.610	44.35	933.56	652.60	667.64	644.87	838.83

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (PCT)	DELTA HETA0 (DEG)	INCIDENCE (DEG)	SUCT SIRM (DEG)	OMEGA0 (DEG)	HAR (DEG)	PARAMETER	LOSS (DEG)	DEVIATION (DEG)	ROTOR LOSS RATIO	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	11.94	7.905	7.437	.3738	.1760	.0337	2.812	1.588	1.588	.7682	.7733
10.00	11.42	14.79	8.547	7.258	.3781	.1414	.0330	.648	1.617	1.617	.7909	.8045
20.00	30.20	14.38	8.228	6.906	.3950	.1126	.0227	2.462	1.628	1.628	.8404	.8677
30.00	49.24	17.45	7.819	4.926	.4253	.0930	.0107	5.013	1.650	1.650	.8680	.9030
40.00	61.44	23.91	8.011	4.150	.4626	.0719	.0041	8.575	1.668	1.668	.8813	.9266
50.00	80.52	35.86	8.202	3.171	.4905	.0096	.0021	14.832	1.757	1.757	.9031	.9436
60.00	100.00	41.42	8.256	2.142	.4546	.0103	.0021	22.639	1.756	1.756	.9031	.9935

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8491 (POLYTROPIC)  
 MASS AVERAGE ROTOR EFFICIENCY = .8874 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6563  
 MASS AVERAGE TEMPERATURE RATIO = 1.1744

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (CONTAINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW = 1.6317 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 86.2914  
 90 PERCENT DESIGN SPEED = SCAN NO 21  
 EQUIVALENT SPEED = 49405.562 R.P.M.  
 FLOW / INLET ANN AREA = 170.4633 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9700

PERCENT SPAN FROM TIP (I. P.)	RFTAO1 (PFC)	V01 (M/SEC)	VU01 (M/SEC)	RFTAO1 (DFG)	V1 (M/SEC)	VU1 (M/SEC)	M1	VW1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	71.74	649.11	434.00	0.00	143.84	0.00	.431	143.84	130.21	436.00
10.00	70.42	630.00	416.66	0.00	147.44	0.00	.442	147.44	142.62	414.46
20.71	67.08	610.00	374.46	0.00	160.00	0.00	.441	160.00	157.04	374.46
33.33	64.44	370.72	362.46	0.00	143.83	0.00	.493	143.83	143.30	342.54
41.47	62.31	343.40	302.71	0.00	150.44	0.00	.478	150.44	140.00	302.71
44.44	53.51	273.99	253.26	0.00	143.12	0.00	.441	143.12	147.11	253.26
100.00	57.01	243.01	220.60	0.00	143.21	0.00	.429	143.21	134.35	220.60

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8594

PERCENT SPAN FROM TIP (I. P.)	RFTAO2 (DFG)	V02 (M/SEC)	VU02 (M/SEC)	RFTAO2 (DFG)	V2 (M/SEC)	VU2 (M/SEC)	M2	VW2 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	53.40	346.46	220.00	37.21	212.51	124.52	.504	140.24	143.79	410.33
13.42	55.62	326.42	260.11	34.46	224.36	134.52	.635	182.05	174.07	400.53
30.34	52.71	293.94	233.44	37.34	226.07	135.96	.632	178.10	174.09	369.40
40.57	34.00	242.54	192.00	30.33	231.56	144.76	.655	170.10	170.11	314.76
49.00	38.38	245.33	142.69	34.72	247.11	154.54	.704	192.00	192.23	307.26
84.52	23.64	221.49	89.01	42.34	275.14	145.45	.791	203.24	190.02	274.46
100.00	14.59	111.24	50.76	44.35	284.55	148.91	.422	203.67	144.56	254.04

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (KGT)	DELTA HFTAO (MFC)	INCIDENCE ANGLE (DFG)	SUCT SUR (DFG)	LOSS PARAMETER	AVG VELOCITY (M/SEC)	ROTOR LOSS	ROTOR EFF	POLYTROPIC EFF
0.00	0.00	11.94	7.904	7.417	.1740	2.412	.0337	1.508	.7733
10.00	12.17	14.79	4.507	7.250	.1614	2.648	.0330	1.617	.7009
24.71	30.26	14.30	4.220	4.016	.1126	2.442	.0227	1.630	.8604
43.74	49.23	17.44	7.419	4.976	.0930	5.013	.0172	1.650	.9030
61.47	68.43	23.94	4.011	4.026	.0191	4.574	.0041	1.686	.9426
84.84	88.52	25.86	4.202	3.171	.0096	14.812	.0021	1.757	.9436
100.00	100.00	41.42	4.256	2.142	.0103	22.630	.0021	1.754	.9936

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8251 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8874 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR LOSS RATIO = 1.6543  
 MASS AVERAGE THROUGHFLOWS RATIO = 1.1744



NASA SMALL AXIAL COMPRESSOR 1FST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 23

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8767

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (FT/SEC)	V113 (FT/SEC)	M3	V14 (FT/SEC)	V173 (FT/SEC)	U3 (FT/SEC)
0.00	32.05	800.36	436.18	.689	672.34	664.95	1336.07
10.96	33.24	873.46	451.63	.711	689.02	687.87	1384.47
20.20	33.88	927.73	451.74	.719	693.56	693.55	1447.89
30.58	34.58	969.27	482.14	.741	699.22	699.70	1510.15
42.25	34.59	1044.03	501.92	.777	727.79	725.13	1618.78
54.05	38.46	956.72	525.87	.845	749.14	739.08	1920.66
100.00	39.73	990.78	613.28	.880	761.97	760.47	864.27

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8979

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (FT/SEC)	V114 (FT/SEC)	M4	V14 (FT/SEC)	V174 (FT/SEC)	U4 (FT/SEC)
0.00	-2.03	721.51	-26.31	.616	721.03	721.03	1326.38
11.22	-2.09	743.94	-27.10	.636	743.45	743.45	1380.88
20.20	-1.92	754.55	-25.24	.649	753.12	752.79	1405.06
30.58	-2.27	745.90	-31.13	.680	745.28	744.47	1430.45
42.25	-2.27	776.88	-30.67	.671	773.67	773.25	1456.64
54.05	-2.23	760.59	-31.10	.655	760.58	757.91	1469.43
100.00	-2.17	765.40	-27.23	.653	765.40	765.40	920.96

STATOR PERFORMANCE DATA

LEADING EDGE	PERCENT SPAN FROM TIP	TRAILING EDGE	MASS FLOW (LBS)	DELTA (DEG)	INFLUENCE (DEG)	MEAN SUCTION (DEG)	FACTORS	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	POLYTROPIC EFF
0.00	0.00	0.00	0.00	34.96	-3.465	-7.397	.3074	.0517	.0184	20.090	1.565	1.1859	.7701
10.96	11.22	11.22	12.17	35.33	-2.923	-6.292	.2988	.0571	.098	14.493	1.521	1.1859	.7657
20.20	20.20	20.20	12.51	35.00	-3.471	-6.805	.2779	.0498	.0166	11.297	1.605	1.1734	.7519
30.58	30.58	30.58	12.51	34.85	-3.111	-6.111	.2568	.0115	.0035	4.734	1.665	1.1714	.9359
42.25	42.25	42.25	12.51	36.84	-4.941	-7.874	.2918	.1036	.0297	8.834	1.629	1.1670	.8627
54.05	54.05	54.05	12.51	38.70	-3.876	-6.766	.1628	.2355	.0637	11.297	1.602	1.1755	.8468
100.00	100.00	100.00	100.00	39.90	-4.902	-8.343	.3802	.2521	.0521	18.533	1.602	1.1754	.8658

MOMENTUM AVERAGE STAGE EFFICIENCY = .8474 (POLYTROPIC)  
 MASS AVERAGE STAGE EFFICIENCY = .8370 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.6124  
 MASS AVERAGE TEMPERATURE RATIO = 1.1744

NASA 5-MAIL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED T-T-P.)

STATOR PERFORMANCE NASA 5-MAIL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 23

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8767

PERCENT SPA I FLOW TIP (T. F.)	HETA 3 (NEG)	V3 (M/SEC)	VU3 (M/SEC)	MO	VW3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	32.15	247.94	132.34	.689	204.93	202.68	407.23
10.00	33.24	251.11	137.66	.711	210.01	209.66	391.51
20.00	34.03	252.27	137.70	.719	211.40	211.39	365.12
47.00	34.54	250.86	144.94	.741	213.12	212.94	338.37
67.00	34.95	249.45	152.25	.777	221.43	221.02	310.53
89.00	35.46	241.41	181.18	.845	228.34	225.27	280.62
100.00	37.73	301.99	193.02	.880	232.25	225.83	263.43

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8979

PERCENT SPA I FLOW TIP (T. F.)	HETA 4 (NEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VW4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	-2.07	219.92	-0.02	.616	219.77	219.77	408.28
11.00	-2.09	226.75	-0.26	.636	226.60	226.57	390.41
20.00	-1.12	229.64	-7.71	.669	227.55	229.44	307.30
44.33	-2.27	239.54	-9.43	.680	239.34	239.11	344.50
57.00	-2.27	236.00	-0.35	.671	235.82	234.64	321.39
80.00	-0.21	231.81	-0.34	.655	231.83	230.84	295.48
100.00	-0.17	233.30	-0.50	.659	233.29	233.29	280.71

STATOR PERFORMANCE DATA

PERCENT SPA I FLOW TIP (T. F.)	PERCENT SPA I FLOW TIP (POS)	MASS FLOW (KGS)	DELTA HETA (MPS)	INCIDENCE ANGLE (DEG)	SUPT SHW (DEG)	F FACTOR	OMEGA RAD	LOSS PARAMETER	REYNOLDS NUMBER (NRS)	STAGE WORK RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	34.94	-3.465	-7.307	.3074	.0417	.0184	20.000	1.444	1.1449	.7701
10.00	11.00	12.17	35.33	-2.923	-6.232	.2988	.0471	.0108	14.493	1.491	1.1049	.7457
20.00	20.00	32.43	35.00	-3.471	-6.805	.2779	.0494	.0144	11.297	1.495	1.1734	.7419
47.00	48.33	52.03	36.15	-4.111	-6.111	.2568	.0315	.0045	9.734	1.665	1.1714	.9359
67.00	67.00	71.01	36.86	-4.341	-7.804	.2918	.1036	.0207	8.816	1.499	1.1439	.6827
80.00	83.04	90.10	38.70	-3.876	-6.746	.3428	.2355	.0623	11.297	1.602	1.1755	.6964
100.00	100.00	100.00	39.00	-4.902	-8.343	.3802	.2221	.0562	14.533	1.602	1.1744	.5658

MOMENTUM AVERAGE STAGE EFFICIENCY = .8476 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8370 (ADIABATIC)

MOMENTUM AVG. STAGE WORK RATIO = 1.6124  
MASS AVERAGE TEMPERATURE RISE = 1.1744

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.4567 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 67.0745  
 70 PERCENT DESIGN SPEED = SCAM NO 25  
 EQUIVALENT SPEED = 5393R.P.M.  
 EQUIVALENT FLOW / INLET AREA = 27.1334 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0001

PERCENT SPAN FROM TIP (U. S.)	HFT401 (INP)	V01 (FT/SEC)	V0191 (FT/SEC)	RETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	72.46	1165.44	1111.66	0.00	351.28	0.00	.314	341.28	330.97	3111.66
9.59	71.25	1114.37	1053.01	0.00	350.51	0.00	.326	349.51	327.74	1059.01
25.67	68.22	1044.44	971.75	0.00	349.23	0.00	.352	348.23	321.10	971.75
41.43	65.11	969.39	884.29	0.00	347.14	0.00	.360	347.14	305.47	944.29
59.65	63.71	874.00	784.04	0.00	344.13	0.00	.350	344.04	284.04	784.04
83.40	60.88	744.24	652.51	0.00	343.55	0.00	.329	343.55	258.67	652.51
100.00	58.09	667.64	562.46	0.00	350.31	0.00	.317	350.31	334.40	562.46

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8557

PERCENT SPAN FROM TIP (U. S.)	HFT402 (INP)	V02 (FT/SEC)	V1102 (FT/SEC)	HFT403 (INP)	V2 (FT/SEC)	V112 (FT/SEC)	M2	V42 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	60.51	917.26	794.61	31.44	525.54	274.54	.460	444.13	431.70	1049.15
11.26	56.31	801.34	735.01	30.34	547.87	287.16	.499	489.97	470.21	1022.18
24.70	52.07	703.57	650.67	27.66	555.37	294.54	.488	471.54	444.40	945.31
44.61	47.71	535.33	535.51	34.14	504.85	330.80	.518	487.15	487.15	965.31
67.07	44.14	420.63	413.16	36.50	475.57	364.81	.573	473.47	532.10	744.97
84.61	40.30	317.43	287.52	37.17	422.87	436.74	.643	474.01	546.54	700.26
100.00	37.54	244.91	182.46	34.14	343.63	444.63	.683	474.73	547.13	651.49

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HFT40 (DEG)	DELTA INCFMFC (INP)	DELTA HFT40 (INP)	DELTA SUCT S4R (INP)	DELTA FACTOR	DELTA OMEGA (DEG)	DELTA LOSS PARAMETER	DELTA DEVIATION ANGLE (DEG)	DELTA ROTOR LOSS RATIO	DELTA ROTOR POLYTROPIC EFF
0.00	0.00	4.627	4.159	3.072	.1760	.0254	3.584	1.272	.7556	.7634
9.59	11.26	4.133	4.030	3.034	.1104	.0222	1.303	1.295	.8141	.4207
25.67	20.70	4.159	7.034	3.262	.0773	.0153	3.639	1.302	.8745	.4401
41.43	40.61	4.427	4.141	3.568	.0476	.0114	4.467	1.329	.9209	.9240
59.65	67.07	4.422	5.466	3.374	-.0117	-.0025	7.454	1.349	1.0133	1.0124
83.40	84.61	4.422	4.425	3.271	-.0769	-.0164	12.603	1.415	1.0623	1.0593
100.00	100.00	4.413	3.259	3.249	-.0454	-.0194	24.603	1.415	1.0623	1.0533

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9230 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .9197 (ADIABATIC)  
 MOMENTUM AVG. ROTOR LOSS RATIO = 1.3342  
 MASS AVERAGE TEMPERATURE RISE = 1.0432

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW = 1.1143 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 67.0745  
 70 PERCENT DESIGN SPEED = SCAN NO 25  
 EQUIVALENT SPEED = 53018.301 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 132.6747 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0001

PERCENT SPAN FROM TIP (I.F.)	REF101 (DEG)	VE1 (M/SEC)	VI1P1 (M/SEC)	REF101 (DEG)	VI (M/SEC)	VIU1 (M/SEC)	M1	VM1 (M/SEC)	V71 (M/SEC)	UI (M/SEC)
0.00	72.66	355.85	130.81	0.00	107.07	0.00	.319	107.07	103.62	338.83
0.10	71.25	340.00	122.79	0.00	103.58	0.00	.324	109.58	105.09	322.70
0.20	69.87	318.35	116.19	0.00	114.33	0.00	.352	118.33	116.16	315.19
0.30	65.41	295.67	109.53	0.00	121.05	0.00	.369	121.05	120.66	269.53
0.40	63.70	266.00	130.99	0.00	117.69	0.00	.350	117.69	117.65	234.99
0.50	60.88	227.87	198.89	0.00	110.41	0.00	.329	110.41	109.32	194.89
100.00	58.09	201.97	171.44	0.00	104.77	0.00	.317	106.77	103.15	171.44

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8557

PERCENT SPAN FROM TIP (I.F.)	VE2 (M/SEC)	VI1P2 (M/SEC)	VE1P2 (M/SEC)	VE2 (M/SEC)	VI1P2 (M/SEC)	VI2 (M/SEC)	M2	VM2 (M/SEC)	V72 (M/SEC)	UIP (M/SEC)
0.00	60.54	242.20	160.18	31.49	160.18	83.68	.460	136.50	132.10	325.88
0.10	56.31	226.03	173.09	30.33	173.09	87.53	.489	140.33	146.06	311.56
0.20	54.07	193.32	163.46	31.99	163.46	89.78	.489	143.73	142.83	244.10
0.30	47.71	163.22	179.48	36.14	179.48	100.83	.519	148.00	148.67	264.05
0.40	44.14	127.76	197.34	34.50	197.34	111.80	.573	162.64	162.18	239.56
0.50	26.54	30.32	220.33	37.17	220.33	133.12	.643	175.57	172.44	213.64
100.00	17.56	55.61	224.66	31.16	224.66	143.04	.663	175.70	149.81	194.70

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I.F.)	MASS FLOW (DFT)	DELTA HETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	ETA FACTOR	OMEGA HAY (DEG)	LOSS PARAMETER	DEFLECTION ANGLE (DEG)	ROTOR EFFICIENCY	ADIABATIC EFFICIENCY	POLYTROPIC EFFICIENCY
0.00	0.70	11.40	8.627	8.159	.3072	.1360	.0254	3.500	1.272	.7556	.7638
0.10	11.16	14.93	9.333	8.030	.3036	.1106	.0222	1.303	1.205	.8141	.8207
0.20	31.26	14.15	9.159	7.095	.3262	.0743	.0153	4.639	1.302	.8755	.8801
0.30	41.10	14.11	8.427	6.161	.3568	.0576	.0114	5.447	1.329	.9209	.9240
0.40	67.87	25.63	9.237	5.466	.3374	-.0117	-.0025	7.856	1.368	1.0113	1.0124
0.50	83.76	36.23	9.422	4.425	.2871	-.0769	-.0154	14.603	1.415	1.0423	1.0593
100.00	100.00	40.53	9.333	3.259	.2389	-.0956	-.0194	24.604	1.615	1.0623	1.0593

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9230 (POLYTROPIC)  
 MASS AVERAGE TEMPERATURE RATIO = 1.3342  
 MASS AVERAGE TEMPERATURE RATIO = 1.0912

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 25

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8614

PERCENT SPAN FROM TIP (U.S.)	WETA 3 (DEG)	V3 (FT/SEC)	V113 (FT/SEC)	M3	VM3 (FT/SEC)	W73 (FT/SEC)	U3 (FT/SEC)
0.00	27.26	613.14	282.70	.540	-44.09	538.10	1044.32
10.74	27.44	636.16	293.14	.563	565.03	644.03	948.96
20.61	27.89	637.67	298.26	.565	563.62	643.61	933.61
40.04	29.68	600.31	310.77	.593	580.65	600.22	866.07
60.30	30.55	713.27	362.54	.636	514.26	612.02	795.22
87.87	33.46	773.22	426.62	.693	665.47	676.91	714.98
100.00	34.65	801.36	453.64	.720	659.22	661.01	671.66

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9170

PERCENT SPAN FROM TIP (U.S.)	WETA 4 (DEG)	V4 (FT/SEC)	V114 (FT/SEC)	M4	VM4 (FT/SEC)	W74 (FT/SEC)	U4 (FT/SEC)
0.00	-1.06	545.61	-36.41	.479	565.34	565.34	1030.74
11.24	-1.86	566.96	-38.12	.497	565.18	565.11	945.37
21.03	-2.07	576.61	-40.76	.508	574.38	574.12	936.57
40.13	-3.41	614.55	-37.54	.546	617.41	616.74	878.33
67.17	-2.28	639.74	-25.67	.566	639.24	639.44	819.16
88.14	-2.90	654.63	-19.24	.578	654.55	652.14	751.07
100.00	-2.47	659.91	-19.00	.582	658.84	658.84	715.72

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (U.S.)	LOSS FLUX (PCT)	DELTA INCIDENCE (DEG)	MEAN SUCT VIR (DEG)	DELTA FACTOR	OMEGA HAN	LOSS PARAFETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE LOSS RATIO	STAGE LOSS RATIO	STATOR POLYTROPIC EFF
0.00	0.10	31.30	-8.463	.2975	.0308	.0143	18.360	1.263	1.0060	1.0060	.8774
10.74	11.24	31.36	-8.605	.2917	.0670	.0262	17.717	1.278	1.0060	1.0060	.7043
20.61	29.80	32.96	-8.630	.2750	.0356	.0215	4.172	1.285	1.0092	1.0092	.6927
40.04	44.13	33.16	-7.919	.2613	.0393	.0120	4.523	1.318	1.0014	1.0014	.7516
60.30	62.02	32.94	-8.057	.2552	.1019	.0292	4.822	1.334	1.0024	1.0024	.5525
87.87	88.14	34.16	-8.745	.2468	.1730	.0678	10.615	1.364	1.0080	1.0080	.6551
100.00	100.00	35.52	-9.281	.2163	.1683	.0428	17.615	1.364	1.0080	1.0080	.5561

MAINTAIN AVERAGE STAGE EFFICIENCY = .8723 (POLYTROPIC)  
MAINTAIN AVERAGE STAGE EFFICIENCY = .8672 (ADIABATIC)  
MOMENTUM AVERAGE STAGE LOSS RATIO = 1.3112  
MASS AVERAGE TEMPERATURE DIST = 1.0932

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NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1976 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 25

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8614

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	V113 (M/SEC)	M3	VM3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	27.66	186.89	86.17	.540	175.86	144.01	316.44
10.74	27.61	190.12	83.56	.543	172.22	171.93	304.48
20.41	27.51	194.36	80.91	.545	171.79	171.79	294.59
30.08	27.41	200.70	100.16	.593	176.98	176.98	263.94
40.74	27.55	217.41	117.50	.646	187.23	196.56	242.34
50.41	33.66	235.81	130.33	.703	196.74	196.74	214.59
100.00	46.65	264.25	138.08	.720	200.93	195.34	206.72

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9379

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	V114 (M/SEC)	M4	VM4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	-3.04	166.61	-11.14	.479	166.23	166.23	314.14
11.24	-3.06	172.64	-11.82	.497	172.27	172.24	303.39
22.41	-4.05	175.75	-15.47	.508	175.07	174.99	285.47
33.58	-3.64	188.54	-11.45	.546	188.19	187.99	267.72
44.74	-2.24	194.84	-7.76	.566	194.84	194.73	244.64
55.91	-2.90	199.63	-3.12	.578	199.51	198.74	229.54
100.00	-2.17	200.84	-3.05	.582	200.41	200.41	218.15

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (I. F.)	PERCENT SPAN FROM TIP (I. F.)	MASS FLOW (KGT)	DETA (DEG)	INFLUENCE (DEG)	SUCT SUR (DEG)	FACTOR	ORFICA MAP	LOSS PARAMETER	DEFLECTION ANGLE (DEG)	STAGE STRESS RATIO	STAGE STRESS RATIO	STATION POLYTROPIC EFF
0.00	0.00	0.00	31.30	-8.863	-12.745	.2975	.0794	.0163	18.340	1.263	1.0040	.8274
10.74	11.24	11.46	31.34	-8.695	-12.053	.2917	.0694	.0242	12.717	1.278	1.0040	.7861
20.41	20.40	31.25	32.94	-8.630	-11.393	.2750	.0554	.0215	4.172	1.295	1.0002	.6927
30.08	40.49	42.30	33.16	-7.739	-10.952	.2413	.0393	.0120	0.521	1.318	1.0018	.7416
40.74	67.17	61.00	32.44	-8.857	-11.765	.2552	.1014	.0272	4.422	1.315	1.0024	.5725
50.41	84.14	83.24	36.34	-8.785	-11.634	.2968	.1790	.0474	10.635	1.264	1.0040	.4651
100.00	100.00	100.00	35.52	-9.911	-13.422	.3163	.1683	.0426	17.430	1.146	1.0080	.5561

MOMENTUM AVERAGE STAGE EFFICIENCY = .8723 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8672 (ADIABATIC)  
MOMENTUM AVG. STAGE STRESS RATIO = 1.3132  
MASS AVERAGE TEMPERATURE DISF = 1.0932

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.6073 (LBS/SEC) 70 PERCENT DESIGN SPEED = SCAN NO 24  
 EQUIVALENT FLOW / INLET ANN AREA = 53906.323 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 65.6165 EQUIVALENT FLOW / INLET ANN AREA = 26.4676 LHM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0040

PERCENT SPAN FROM TIP (I. F.)	HETA21 (DEG)	V01 (FT/SEC)	V101 (FT/SEC)	HETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	VW1 (FT/SEC)	VZ1 (FT/SEC)	UI (FT/SEC)
0.00	72.46	1162.63	1113.00	0.00	342.65	0.00	.310	342.65	331.61	1111.00
0.50	71.57	1116.93	1054.30	0.00	350.68	0.00	.317	350.68	330.20	1056.30
25.53	60.09	1042.13	770.87	0.65	374.75	0.00	.343	370.75	371.79	970.87
51.06	61.64	966.37	884.56	0.75	387.45	0.00	.351	387.45	384.20	883.56
59.66	64.32	889.43	784.56	0.78	376.74	0.00	.34	374.74	374.62	783.56
82.59	61.46	762.91	652.18	0.90	356.74	0.00	.321	356.74	369.97	652.18
100.00	54.70	657.37	562.13	0.98	341.77	0.00	.309	341.77	330.15	562.13

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8642

PERCENT SPAN FROM TIP (I. F.)	HETA22 (DEG)	V02 (FT/SEC)	V102 (FT/SEC)	HETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VW2 (FT/SEC)	VZ2 (FT/SEC)	UI (FT/SEC)
0.00	60.77	541.09	777.59	33.74	527.46	290.93	.657	435.17	421.15	1068.52
11.23	56.74	457.57	717.44	32.93	553.72	304.26	.690	469.40	450.53	1021.70
29.91	56.29	780.96	635.02	36.31	548.49	309.20	.681	457.04	450.21	944.22
48.64	47.74	706.76	521.96	35.97	585.18	363.74	.514	473.50	473.55	865.67
57.93	37.74	664.01	475.13	37.45	642.21	390.54	.464	509.41	504.31	785.67
84.69	24.06	611.53	264.10	38.84	717.47	450.39	.637	558.69	567.32	699.49
100.00	16.08	583.68	167.55	40.04	739.47	483.96	.654	549.11	540.11	651.51

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA (DEG)	INCIDENCE ANGLE (DEG)	MAI (DEG)	SUCT SIB (DEG)	LOSS PARAMETER	OMEGA HAH	OMEGA B	FACTOR	ANGLE (DEG)	ROTOR LOSS PARAMETER	ROTOR ANTI-RATE EFF	ROTOR POLYTRONIC EFF
0.00	0.00	9.023	9.555	8.555	.7289	.1462	.7289	.7289	3.776	.0272	1.244	.7511
0.50	11.23	9.756	9.450	8.450	.7300	.1290	.7300	.7300	4.100	.0256	1.306	.7043
25.53	29.91	9.636	9.547	7.547	.7507	.0937	.7507	.7507	4.100	.0181	1.311	.6579
48.64	48.64	9.440	9.440	6.440	.7776	.0666	.7776	.7776	4.536	.0136	1.340	.6122
59.66	67.93	9.778	9.778	6.007	.7799	.0314	.7799	.7799	7.452	.0064	1.335	.6663
84.69	84.69	10.003	5.004	5.004	.8164	-.0498	.8164	.8164	15.172	-.0106	1.419	1.0371
100.00	100.00	9.948	3.974	3.974	.7653	-.0812	.7653	.7653	23.733	-.0125	1.419	1.0371

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9018 (POLYTRONIC) MOMENTUM AVG. ROTOR LOSS PARAMETER = 1.3424  
 MASS FLOW AVERAGE ROTOR EFFICIENCY = .8976 (ANTI-RATE) MASS AVERAGE TEMPERATURE RISE = 1.0477

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.0001 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 65.6145

70 PERCENT DESIGN SPEED = SCAN NO 26  
 EQUIVALENT SPEED  
 FULLVALVE FLOW / INLET ANN AREA = 5906.323 R.P.M.  
 120.5071 KG/SEC-SU M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0040

PERCENT SPAN FROM TIP (I. F.)	HETA91 (DEG)	V01 (1/SEC)	V02 (1/SEC)	V03 (1/SEC)	HETA1 (DEG)	V1 (1/SEC)	V11 (M/SEC)	M1	V12 (M/SEC)	V13 (M/SEC)	V14 (M/SEC)	U1
0.00	72.06	354.37	334.63	1.052	0.00	104.44	0.00	.310	104.44	101.08	107.63	374.63
4.61	71.07	319.12	272.57	1.009	0.00	106.49	0.00	.317	106.49	107.34	122.57	322.57
9.23	69.63	283.63	235.92	.965	0.00	115.44	0.00	.343	115.44	117.32	149.92	295.92
13.84	67.78	248.09	199.30	.921	0.00	124.09	0.00	.351	124.09	117.71	187.30	249.30
18.46	65.32	212.55	163.76	.878	0.00	132.93	0.00	.341	132.93	114.79	224.83	214.83
23.07	62.36	177.01	128.21	.835	0.00	141.12	0.00	.321	141.12	108.67	198.74	198.74
27.69	58.90	141.47	92.66	.792	0.00	149.17	0.00	.309	149.17	104.63	171.34	171.34

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8682

PERCENT SPAN FROM TIP (I. F.)	HETA92 (DEG)	V02 (1/SEC)	V03 (1/SEC)	V04 (1/SEC)	HETA2 (DEG)	V2 (1/SEC)	V21 (M/SEC)	M2	V22 (M/SEC)	V23 (M/SEC)	V24 (M/SEC)	U2
0.00	60.77	271.60	217.01	.777	33.76	154.55	84.67	.457	132.64	128.37	128.68	325.68
4.61	56.78	261.39	214.68	.750	32.93	170.60	92.74	.490	163.19	140.06	141.41	311.41
9.23	54.50	237.76	193.56	.684	34.31	167.18	94.24	.481	138.07	137.23	147.40	287.40
13.84	47.78	216.01	159.09	.614	35.97	178.30	104.77	.514	144.35	145.34	161.46	261.46
18.46	37.74	196.60	129.61	.549	37.45	194.75	119.04	.564	155.35	154.93	179.47	239.47
23.07	26.04	186.39	75.93	.543	34.83	214.49	137.28	.637	170.23	167.83	213.21	213.21
27.69	16.61	177.30	51.07	.520	40.88	224.39	147.51	.658	170.42	144.63	194.58	194.58

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	LOSS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DELTA ANGLE (DEG)	DELTA RATIO	ROTOR POLYTROPIC EFF
0.00	0.00	12.04	4.554	.3249	.1462	.0272	3.776	1.248	.7511
4.61	11.16	14.88	4.450	.3300	.1290	.0256	1.764	1.306	.8019
9.23	31.13	14.19	7.567	.3507	.0937	.0193	4.100	1.311	.8633
13.84	50.07	14.56	6.652	.3776	.0666	.0136	5.434	1.340	.9158
18.46	67.83	26.56	6.097	.3799	.0314	.0068	7.452	1.375	.9678
23.07	81.62	37.42	5.004	.3164	-.0494	-.0104	15.174	1.419	1.0371
27.69	100.00	47.02	3.874	.2663	-.0612	-.0125	23.733	1.419	1.0371

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8018 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8074 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3424  
 MASS AVERAGE TEMPERATURE RISE = 1.0977



NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 26

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8751

PERCENT SPAN FROM TIP (U.S.)	WETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	V43 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	10.00	509.14	209.56	.526	518.87	513.17	1037.71
10.75	70.20	618.96	311.74	.544	538.97	536.05	998.32
24.75	31.72	620.25	313.14	.547	535.41	535.60	932.15
47.06	31.60	656.72	343.90	.579	557.12	556.71	865.27
66.30	33.51	609.34	346.67	.621	583.16	581.03	748.77
87.60	35.33	760.52	430.79	.679	620.46	612.13	716.36
100.00	36.56	748.71	464.57	.700	633.69	616.19	671.20

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9410

PERCENT SPAN FROM TIP (U.S.)	WETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	V44 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	36.64	266.64	-30.79	.458	523.77	523.77	1030.18
11.27	33.54	549.17	-31.67	.472	539.25	539.19	994.69
31.06	40.01	549.60	-34.60	.485	552.25	552.00	935.37
43.66	33.42	591.74	-33.61	.520	586.47	586.96	877.60
67.73	31.70	614.20	-34.11	.540	613.91	613.57	818.47
84.17	30.31	627.50	-40.95	.542	627.53	624.24	752.56
100.00	28.57	631.64	-46.73	.556	631.61	631.61	715.29

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (U.S.)	WETA 3 (DEG)	WETA 4 (DEG)	INCIDENCE ANGLE (DEG)	REFL. SURF (DEG)	DELTA (DEG)	LOSS PARAMETER	REVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE LOSS RATIO	STATION POLYTROPIC EFF
0.00	10.00	36.64	-0.319	-10.241	.3242	.0374	14.870	1.279	1.0006	.8547
10.75	11.27	33.54	-5.959	-9.126	.3198	.0652	11.229	1.200	1.0004	.7960
24.75	31.72	40.01	-6.203	-8.542	.2931	.0434	4.201	1.300	1.0034	.8092
47.06	31.60	45.51	-5.437	-8.929	.2733	.0390	4.179	1.329	1.0053	.8199
66.30	33.51	35.26	-5.900	-9.749	.2836	.0904	4.345	1.346	1.0073	.8585
87.60	35.33	35.86	-5.926	-9.815	.3231	.1670	10.994	1.356	1.1009	.8527
100.00	36.56	37.06	-8.033	-11.516	.3427	.1766	10.180	1.356	1.1010	.8313

MOMENTUM AVERAGE STAGE EFFICIENCY = .8621 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .8465 (ADIABATIC)

MOMENTUM AVG. STAGE LOSS RATIO = 1.3253

MASS AVERAGE TEMPERATURE RATIO = 1.0977

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 26

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8751

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	V13 (M/SEC)	M3	V43 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	11.00	142.62	91.31	.525	159.15	156.62	316.21
10.75	10.29	140.66	94.31	.564	163.05	162.78	306.24
20.75	9.57	140.05	95.64	.579	163.19	163.19	286.18
47.05	8.69	139.56	106.92	.579	169.81	169.69	263.71
66.10	8.51	213.17	117.67	.621	177.75	177.10	242.25
87.65	8.33	211.81	136.05	.679	189.12	186.58	219.35
100.00	8.54	240.40	143.12	.706	193.15	187.81	200.50

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9410

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	V14 (M/SEC)	M4	V44 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	11.31	159.01	-3.73	.658	159.64	174.64	316.00
11.27	10.36	166.66	-3.59	.672	169.36	164.36	303.18
30.04	9.01	168.76	-11.74	.685	169.32	169.25	285.16
48.06	8.44	140.34	-12.02	.620	179.94	179.73	267.49
67.23	8.16	187.21	-5.74	.640	187.12	187.02	249.67
84.17	8.53	191.28	-1.78	.652	191.27	190.57	229.37
100.00	8.51	192.52	-1.74	.656	192.51	192.51	218.02

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP EDGE	MASS FLOW (PCF)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	ANGLE FACTOR (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR LOSS RATIO	STATOR LOSS RATIO	STATOR LOSS RATIO	STATOR LOSS RATIO
0.70	0.00	33.31	-6.319	-10.241	.3242	.0136	14.870	1.279	1.0006	1.0006	.9547
10.75	11.27	33.54	-5.949	-9.136	.3198	.0226	13.229	1.290	1.0006	1.0006	.7540
20.75	30.04	34.33	-6.203	-9.552	.2931	.0164	9.201	1.300	1.0035	1.0035	.4092
47.05	51.13	35.51	-5.917	-8.949	.2733	.0116	4.179	1.329	1.0053	1.0053	.8199
66.10	69.15	35.24	-5.900	-8.789	.2816	.0259	4.365	1.366	1.0083	1.0083	.6585
87.65	84.17	35.84	-6.924	-9.815	.2731	.0462	10.998	1.354	1.1000	1.1000	.5527
100.00	100.00	37.06	-8.093	-11.514	.2627	.0396	18.140	1.356	1.1010	1.1010	.6313

MOMENTUM AVERAGE STAGE EFFICIENCY = .8431 (POLYTROPIC)  
MASS FLOW AVERAGE STAGE EFFICIENCY = .9565 (ADIABATIC)  
MOMENTUM AVERAGE TEMPERATURE RATIO = 1.3253  
MASS AVERAGE TEMPERATURE RATIO = 1.0977

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NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 7.3496 LAM/SEC 70 PERCENT DESIGN SPEED = SCAN NO 27  
 PERCENT DESIGN EQUIVALENT FLOW = 64.1522 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANGLE = 53952.930 R.P.M.  
 25.9512 LAM/SEC-50 FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0045

PERCENT SPAN FROM TIP (I. F.)	HETA01 (DEG)	V01 (FT/SEC)	V101 (FT/SEC)	HETA11 (DEG)	V1 (FT/SEC)	V11 (FT/SEC)	V111 (FT/SEC)	M1	V41 (FT/SEC)	V71 (FT/SEC)	UI (FT/SEC)
0.00	73.74	1171.05	1111.06	0.00	134.03	0.00	0.00	.302	334.03	323.27	1111.96
4.74	72.11	1112.16	1059.02	0.00	361.88	0.00	0.00	.309	361.88	330.69	1059.02
75.53	69.13	1034.19	971.37	0.00	363.27	0.00	0.00	.335	363.27	362.69	971.37
61.51	66.06	901.24	843.31	0.00	177.76	0.00	0.00	.342	377.74	374.54	843.91
53.03	64.04	845.12	783.21	0.00	347.29	0.00	0.00	.333	367.29	367.17	783.29
43.74	62.05	737.42	651.75	0.00	345.83	0.00	0.00	.313	345.83	361.19	651.75
100.00	59.37	651.13	562.62	0.00	333.10	0.00	0.00	.301	333.10	321.78	562.62

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8636

PERCENT SPAN FROM TIP (I. F.)	HETA02 (DEG)	V02 (FT/SEC)	V102 (FT/SEC)	HETA21 (DEG)	V2 (FT/SEC)	V112 (FT/SEC)	V1112 (FT/SEC)	M2	V42 (FT/SEC)	V72 (FT/SEC)	J2 (FT/SEC)
0.00	50.79	850.57	744.14	36.30	525.88	311.31	0.457	.457	423.14	410.19	1069.44
11.36	57.17	820.94	690.40	35.35	554.49	325.75	.404	.404	449.22	439.40	1022.04
30.27	54.39	755.62	616.11	34.77	543.26	324.74	.404	.404	434.88	437.24	943.10
49.10	47.47	637.65	506.06	37.57	584.70	357.74	.515	.515	465.01	444.08	954.41
64.15	37.04	611.17	399.24	38.78	646.25	404.78	.569	.569	503.70	502.30	745.02
84.53	23.24	594.47	234.11	40.15	719.43	463.85	.638	.638	549.93	540.00	599.98
100.00	15.04	711.77	154.53	42.11	742.01	497.54	.660	.660	550.40	531.78	652.07

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HETA0 (DEG)	MASS FLOW (PCF)	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	LOSS PARAMETER	OMEGA0 BAR	DELTA ANGLE (DEG)	ROTOR EFF	ANTONOV ANTIROTARY EFF	POLYTROPIC EFF
0.00	0.00	0.70	4.443	8.975	.0301	.1622	3.002	1.305	.7403	.7499
7.74	11.35	11.49	10.203	8.477	.0305	.1550	2.182	1.318	.7471	.7760
27.59	34.27	31.43	10.142	8.070	.0217	.1171	4.149	1.324	.8191	.8453
41.51	49.04	50.10	9.987	7.195	.0151	.0736	5.419	1.352	.8066	.9105
59.81	68.15	69.22	10.344	6.575	.0077	.0353	6.974	1.388	.8636	.9653
84.74	88.53	89.34	10.615	5.613	-.0087	-.0207	14.423	1.429	1.0306	1.0291
100.00	100.00	100.00	10.620	4.545	-.0525	-.0243	22.732	1.429	1.0307	1.0231

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8935 (POLYTROPIC) ROTOR PRESS RATIO = 1.3555  
 MOMENTUM AVERAGE POLYTROPIC EFFICIENCY = .8857 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.1023

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAM NO 27  
 EQUIVALENT FLOW 1.0650 KG/SEC  
 EQUIVALENT FLOW / INLET ANN AREA = 53952.930 R.P.M.  
 PERCENT DESIGN FLOW = 44.1522 EQUIVALENT FLOW / INLET ANN AREA = 126.7050 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0045

PERCENT SPAN FROM TIP (I.E.)	HETAO1 (DFO)	V01 (M/SEC)	VU01 (M/SEC)	M01	BETA1 (DEG)	V1 (M/SEC)	M1	VM1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	71.24	353.00	314.92	1.050	0.00	101.81	.302	101.81	88.53	338.92
9.66	72.11	349.19	322.79	1.007	0.00	104.21	.302	104.21	100.80	322.79
25.59	69.13	316.75	296.07	.942	0.00	112.55	.315	112.55	110.49	296.07
41.51	66.06	282.93	269.61	.871	0.00	115.14	.342	115.14	116.77	269.61
59.83	66.88	263.69	233.76	.794	0.00	111.95	.313	111.95	111.95	233.76
81.78	62.05	226.99	198.65	.663	0.00	105.41	.313	105.41	103.99	198.65
100.00	59.37	199.39	171.63	.591	0.00	101.53	.301	101.53	88.08	171.63

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8636

PERCENT SPAN FROM TIP (I.E.)	HETAO2 (DFO)	V02 (M/SEC)	VU02 (M/SEC)	M2	BETA2 (DEG)	V2 (M/SEC)	M2	VM2 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	60.79	266.73	231.00	.755	36.30	160.27	.457	129.19	125.87	325.97
11.36	57.17	252.57	212.23	.722	35.95	161.13	.484	126.92	131.93	311.52
30.27	56.43	210.31	187.24	.660	36.77	167.41	.480	124.11	122.27	297.46
43.00	47.47	203.74	156.69	.603	37.57	178.82	.515	141.73	151.73	263.53
79.15	37.04	192.30	115.90	.554	38.78	194.98	.569	153.55	153.10	239.27
88.53	27.24	182.61	71.97	.531	40.15	219.28	.678	167.62	164.87	213.35
100.00	15.64	174.27	47.10	.508	42.11	226.16	.660	167.70	162.09	198.75

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE FROM TIP	FROM TIP TRAILING EDGE	MASS FLOW (KGT)	INCIDENCE ANGLE (DEG)	INCIDENT SUCT SUR (DEG)	D FACTOR	OHFGAP (MM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR LOSS COEFF	ROTOR POLYTROPIC EFF
0.00	0.00	9.00	9.423	8.975	.3540	.1622	.0301	3.802	1.305	.7499
9.66	11.36	11.49	10.203	8.937	.3617	.1550	.0305	2.142	1.318	.7760
25.59	30.27	11.14	10.142	8.870	.3784	.1121	.0217	4.149	1.324	.8391
41.51	49.83	9.10	9.947	7.135	.3971	.0730	.0151	5.419	1.352	.9105
59.83	68.15	7.22	10.354	4.574	.4970	.0353	.0077	6.974	1.388	.9651
81.78	88.53	4.34	10.615	5.613	.3340	-.0407	-.0087	16.423	1.429	1.0291
100.00	100.00	100.00	10.620	4.544	.2883	-.0525	-.0107	22.732	1.429	1.0291

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8405 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8457 (ADIABATIC)  
 MOMENTUM AVG. ROTOR LOSS COEFF = 1.3555  
 MASS AVERAGE TEMPERATURE RISE = 1.1023

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (CONTINUED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 27

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8804

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	J3 (FT/SEC)
0.00	32.84	511.14	320.55	.517	496.68	401.22	1038.61
10.01	31.41	505.55	332.39	.530	505.51	504.44	998.60
20.24	32.04	511.55	332.33	.537	517.97	512.26	931.38
47.57	33.54	646.97	357.34	.571	530.93	518.53	864.14
64.74	35.14	746.71	400.13	.615	567.78	545.71	793.74
87.33	36.92	746.74	453.40	.672	607.37	505.27	716.10
100.00	38.10	787.20	482.67	.699	615.52	508.51	671.84

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9390

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	-2.04	508.20	-10.53	.441	507.84	507.84	1031.07
11.41	-2.21	518.05	-20.01	.451	514.50	514.50	995.41
30.10	-4.40	535.04	-41.07	.460	536.61	536.01	935.93
70.53	-2.93	570.21	-24.15	.499	565.44	548.90	878.01
77.34	-1.22	599.32	-12.79	.526	599.18	598.85	818.84
88.13	.10	598.74	1.44	.524	598.78	597.60	753.33
100.00	.14	601.77	1.91	.527	601.76	601.74	715.91

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	LEADING EDGE	TRAILING EDGE	MASS FLOW (GPM)	DELTA BETA (DEG)	TWIST ANGLE (DEG)	SUCT SWIRL (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	DELTA TATION (DEG)	STAGE EFFICIENCY	STATOR POLYTROPIC EFF
0.00	7.00	7.00	0.00	34.93	-3.480	-7.643	.3485	.0377	20.090	1.297	1.1067
10.01	11.31	11.31	11.44	35.61	-2.761	-6.120	.3457	.0570	14.749	1.304	1.1067
20.24	30.14	30.14	31.44	37.64	-3.504	-6.094	.3240	.0311	4.702	1.317	1.0993
47.57	48.57	48.57	50.10	36.92	-4.076	-7.080	.2992	.0112	9.862	1.342	1.0993
64.74	67.33	67.33	69.22	36.41	-6.273	-7.155	.3031	.0756	9.877	1.345	1.1018
87.33	88.13	88.13	91.44	36.77	-5.348	-9.205	.3577	.1803	11.608	1.342	1.1040
100.00	100.00	100.00	100.00	37.92	-6.529	-9.971	.3769	.0428	10.842	1.362	1.1039

MOMENTUM AVERAGE STAGE EFFICIENCY = .8544 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8482 (ADIABATIC)  
MOMENTUM AVG. STAGE EFFICIENCY = 1.3389  
MASS AVERAGE TEMPERATURE RISE = 1.1023

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 27

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8804

PERCENT SPAN FROM TIP (I. P.)	BETA 3 (DEG)	V3 (M/SEC)	VIII3 (M/SEC)	M3	VM3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	12.84	180.14	97.70	.517	151.39	149.72	316.57
10.11	33.41	146.57	101.62	.530	154.04	153.43	304.37
20.24	42.04	146.40	101.48	.537	156.35	156.35	283.88
47.57	33.59	197.20	109.10	.571	164.27	164.14	263.34
66.74	35.14	211.75	122.02	.615	173.06	172.43	241.93
87.93	36.92	230.04	134.50	.672	183.91	181.44	219.27
100.00	38.10	238.47	147.12	.699	187.61	182.43	204.78

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9190

PERCENT SPAN FROM TIP (T. C.)	BETA 4 (DEG)	V4 (M/SEC)	VIII4 (M/SEC)	M4	VM4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	-2.79	154.90	-5.65	.441	154.80	154.80	314.27
11.71	-2.21	158.14	-6.10	.451	159.06	158.04	303.40
30.10	-1.40	163.74	-7.29	.468	162.44	162.77	285.27
48.57	-2.23	173.91	-8.84	.499	173.58	173.40	267.62
67.34	-1.22	182.67	-9.90	.526	182.63	182.53	249.58
88.13	.10	182.51	.50	.524	182.51	181.84	229.62
100.00	.18	183.42	.58	.527	183.42	183.42	218.21

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP TRAILING EDGE	MASS FLOW (KGT)	BETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT ANGLE (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMPRATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	16.93	-3.480	-7.403	.3485	.0377	.0174	20.000	1.297	1.1067	.8599
10.01	11.41	11.00	35.61	-2.761	-6.130	.3457	.0570	.0108	14.349	1.306	1.1067	.8074
21.74	10.13	11.14	37.64	-3.594	-6.819	.3240	.0311	.0102	9.702	1.317	1.0003	.8806
47.57	40.57	50.10	36.52	-4.076	-7.000	.2992	.0365	.0112	4.062	1.342	1.0001	.8561
66.74	67.74	61.22	34.41	-6.278	-7.155	.3031	.0756	.0217	4.877	1.355	1.1018	.7440
87.93	88.13	44.14	36.77	-5.348	-8.285	.3577	.1803	.0677	11.684	1.342	1.1060	.5916
100.00	100.00	100.00	37.92	-6.529	-9.971	.3769	.1691	.0628	14.882	1.362	1.1039	.6475

MOMENTUM AVERAGE STAGE EFFICIENCY = .8544 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8482 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.3389  
MASS AVERAGE TEMPERATURE PIECE = 1.1023

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.2504 LBM/SEC 70 PERCENT DESIGN SPEED = SCALD 24  
 PERCENT DESIGN EQUIVALENT FLOW = 61.6479 LBM/SEC EQUIVALENT SPEED  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0102

INLET VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (I. E.)	W01	HFT01	V1	V1U	M1	V41	V71	U1
	(FT/SEC)	(DEG)	(FT/SEC)	(FT/SEC)		(FT/SEC)	(FT/SEC)	(FT/SEC)
0.00	73.24	112.77	1.046	320.28	.249	320.28	309.97	1112.77
2.53	72.43	1060.78	1.003	327.71	.296	327.71	316.08	1060.39
25.71	70.76	173.71	.934	353.64	.320	353.64	347.14	973.71
41.14	67.40	1102.60	.867	361.73	.324	361.73	360.56	906.44
50.67	65.16	736.76	.778	351.62	.314	351.62	351.50	794.76
63.73	63.10	652.46	.661	331.03	.292	331.03	324.59	652.46
100.01	61.49	561.33	.584	319.87	.209	319.87	307.84	563.03

EXIT VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (I. E.)	W02	HFT02	V2	V2U	M2	V42	V72	U2
	(FT/SEC)	(DEG)	(FT/SEC)	(FT/SEC)		(FT/SEC)	(FT/SEC)	(FT/SEC)
0.01	62.37	721.97	.704	513.91	.444	777.89	764.71	1070.22
11.75	59.64	656.04	.657	520.12	.454	344.61	376.01	1021.13
31.27	56.13	572.60	.594	529.78	.460	344.27	341.88	937.10
50.80	46.25	472.70	.572	504.34	.520	452.49	452.46	958.05
64.87	36.43	357.27	.530	645.98	.568	444.24	444.24	792.55
84.74	22.04	212.52	.498	703.27	.621	509.24	500.47	599.57
100.00	14.57	132.49	.466	724.18	.645	509.24	692.38	652.55

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. E.)	MASS FLOW (PCT)	DELTA HFTAP (DEG)	INCIDENCE ANGLE (DEG)	D FACTOR	O RIGOR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR LOSS	ROTOR POLYTROPIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	11.57	10.104	.4109	.2057	.0363	5.381	1.326	.7012	.7128
2.53	11.75	13.19	10.879	.4361	.2161	.0396	4.725	1.327	.7060	.7155
25.70	31.87	17.01	10.946	.4511	.1691	.0314	6.462	1.310	.7748	.7837
51.17	50.81	21.55	10.802	.4374	.0835	.0175	5.033	1.376	.9001	.9045
50.67	64.87	24.56	11.322	.4316	.0469	.0103	6.832	1.404	.9539	.9561
63.73	84.74	40.26	11.601	.3916	.0291	.0061	14.341	1.424	.9792	.9802
100.00	100.00	45.92	11.733	.3537	.0370	.0076	21.623	1.426	.9781	.9802

MOMENTUM AVERAGE ROTOR EFFICIENCY = .4534 (POLYTROPIC)

MOMENTUM AVERAGE ROTOR EFFICIENCY = .4470 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.3674

MASS AVERAGE TEMPERATURE RISE = 1.1102

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TESTS)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW = 1.0264 KG/SEC 70 PERCENT DESIGN SPEED = SCAY NO 24  
 PERCENT DESIGN EQUIVALENT FLOW = 61.6479 EQUIVALENT FLOW / INLET AVN AREA = 121.0377 KG/SEC-50 M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0102

PERCENT SPAN FROM TIP (I. C.)	HETA0P (DEG)	V01 (M/SEC)	V01P (M/SEC)	V1 (M/SEC)	V1P (M/SEC)	V41 (M/SEC)	V41P (M/SEC)	V71 (M/SEC)	U11 (M/SEC)
0.00	73.34	142.36	139.17	97.62	0.00	0.00	0.00	06.64	331.17
0.53	72.43	134.79	123.20	92.49	0.00	0.00	0.00	06.62	323.20
25.31	70.06	115.75	99.79	107.79	0.00	0.00	0.00	105.01	246.79
41.14	67.81	97.81	77.02	119.26	0.00	0.00	0.00	110.24	270.20
50.57	65.06	76.21	53.19	107.17	0.00	0.00	0.00	107.14	279.19
62.73	63.10	53.00	27.00	100.90	0.00	0.00	0.00	99.54	194.47
100.00	60.49	197.19	171.61	97.13	0.00	0.00	0.00	97.13	171.61

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9023

PERCENT SPAN FROM TIP (I. C.)	HETA0P (DEG)	V02 (M/SEC)	V02P (M/SEC)	V2 (M/SEC)	V2P (M/SEC)	V42 (M/SEC)	V42P (M/SEC)	V72 (M/SEC)	U12 (M/SEC)
0.00	62.47	244.16	220.04	156.64	106.16	0.00	0.00	111.47	326.20
11.74	59.61	211.77	199.47	141.58	111.27	0.00	0.00	114.61	311.24
31.37	56.14	210.14	174.47	141.49	111.16	0.00	0.00	114.40	245.63
50.30	46.25	193.85	146.08	141.16	117.46	0.00	0.00	137.91	241.53
74.47	36.31	143.31	104.90	106.49	127.62	0.00	0.00	144.21	234.52
88.76	22.46	100.63	65.30	214.36	147.84	0.00	0.00	152.67	213.23
100.00	14.57	160.52	40.48	221.95	154.51	0.00	0.00	155.37	194.90

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TRAILING EDGE	DELTA HETA0 (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (NEG)	FACTOR	WEGAP MAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	AVN DRESS RATIO	ADIAHATIC EFF	POLYTROPIC EFF
0.00	0.00	10.109	9.634	0.109	0.2057	0.363	5.381	1.324	0.702	0.7120
0.53	11.74	10.449	9.499	0.341	0.2161	0.196	4.725	1.327	0.700	0.7154
25.31	31.87	10.066	9.833	0.451	0.1693	0.114	4.662	1.330	0.7748	0.7837
41.14	50.80	10.482	9.110	0.374	0.0935	0.175	5.033	1.374	0.8001	0.9045
50.57	60.87	11.422	7.551	0.316	0.0469	0.107	6.432	1.404	0.839	0.9561
62.73	80.74	11.661	6.660	0.376	0.0291	0.063	14.341	1.424	0.8702	0.9802
100.00	100.00	11.738	5.664	0.337	0.0370	0.074	21.623	1.474	0.8701	0.9802

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.836 (POLYTROPIC) MOMENTUM AVG. MOTOR DRESS RATIO = 1.3674  
 MASS AVERAGE MOTOR EFFICIENCY = 0.870 (ADIADHATIC) MASS AVERAGE TEMPERATURE DISC = 1.1102



NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEM.)

STATOR PERFORMANCE (NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS))

70 PERCENT DESIGN SPEED - SCAN NO 24

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9055

PERCENT SPAN FROM TIP (U. S.)	HETA 3 (DEG)	V3 (FT/SEC)	VIII (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	34.69	576.24	359.64	.500	451.04	466.08	1039.36
11.10	40.00	510.25	374.39	.504	465.06	444.72	948.29
22.20	45.31	443.86	349.23	.514	469.07	423.36	878.04
33.30	49.72	378.47	316.23	.520	472.03	391.65	800.56
44.40	53.21	314.08	284.04	.529	474.78	360.78	742.69
55.50	55.11	251.69	252.40	.532	476.45	330.90	716.17
100.00	61.30	766.78	504.90	.640	576.52	558.64	672.34

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (U. S.)	HETA 4 (DEG)	V4 (FT/SEC)	VIII4 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	-1.04	481.64	-4.74	.415	481.36	491.76	1031.42
11.10	-1.10	417.94	-9.39	.420	487.45	467.79	946.02
22.20	-2.43	354.74	-21.64	.438	506.32	506.10	936.09
33.30	-2.23	291.71	-21.33	.477	547.31	546.75	878.00
44.40	-1.17	228.33	-28.73	.503	576.26	575.96	818.45
55.50	-0.70	164.74	-36.04	.495	567.70	545.63	753.36
100.00	-0.70	570.64	-6.38	.497	570.64	570.64	716.44

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	THAILING EDGE	MASS FLOW (LBS)	DELTA HETA (DEG)	INCIDENCE HETA (DEG)	ANGIF SUCT (DEG)	OMEGA HAR	LOSS PARAMETER	REVEATION ANGIF (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	19.51	2.171	-1.751	.0402	.0145	21.140	1.317	1.1194	.8793
11.10	11.10	11.77	41.10	3.423	.475	.0272	.0095	15.447	1.321	1.1194	.9167
22.20	22.20	31.04	41.12	2.077	-1.226	-.0129	-.0042	10.743	1.333	1.1004	1.0436
33.30	44.77	43.77	30.51	-1.412	-4.600	.0414	.0120	9.747	1.365	1.1004	.8712
44.40	67.53	62.12	34.30	-2.004	-4.468	.0573	.0164	10.233	1.387	1.1064	.9364
55.50	80.29	49.40	40.91	-2.210	-5.119	.1366	.0361	10.932	1.377	1.1087	.7079
100.00	100.00	100.00	42.00	-3.328	-6.749	.1273	.0322	14.000	1.377	1.1087	.7548

MOMENTUM AVG. STAGE EFFICIENCY = .8349 (POLYTROPIC)

MASS AVERAGE STAGE EFFICIENCY = .8278 (ADIBATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.3581

MASS AVERAGE TEMPERATURE RATIO = 1.1102

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NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (COMBINED TESTS)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 28

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9055

PERCENT SPAN FROM TIP (T. S.)	BETA 4 (DEG)	V3 (M/SEC)	V13 (M/SEC)	M3	V41 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	35.64	175.64	104.31	.500	177.48	175.97	716.90
11.10	30.00	177.07	113.81	.504	175.65	175.43	734.24
30.33	30.54	179.60	117.35	.514	140.20	170.20	242.87
48.72	36.43	177.57	117.11	.570	159.12	159.00	262.30
67.21	37.52	210.12	127.97	.609	165.66	166.05	241.61
88.04	40.11	224.15	166.81	.652	171.43	169.13	214.24
100.00	41.30	233.10	153.86	.680	175.11	170.27	206.93

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (T. S.)	BETA 4 (DEG)	V4 (M/SEC)	V14 (M/SEC)	M4	V44 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	-1.06	145.74	-2.66	.415	146.72	146.72	314.50
11.10	-1.10	144.72	-2.06	.420	148.70	144.68	303.54
30.33	-2.63	141.06	-6.53	.438	153.72	153.65	285.37
48.77	-2.23	166.34	-6.50	.477	165.82	166.65	267.61
67.53	-2.57	175.64	-2.66	.503	175.66	175.55	249.54
88.33	-2.70	173.04	-2.12	.495	173.04	172.40	274.62
100.00	-2.70	173.94	-2.13	.497	173.93	173.93	219.37

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP FROM TIP	INCIDENCE ANGLE (DEG)	REFLECTIVITY (DEG)	INCIDENT SUCT 510 (DEG)	REFLECTIVITY (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE EFFICIENCY RATIO	STATOR POLYTROPIC EFF
0.00	3.17	0.00	-1.74	.1960	.0402	21.140	1.117	1.1104
11.10	11.77	41.13	3.023	.3488	.0272	15.467	1.221	1.1104
30.33	31.06	41.12	2.077	.3584	-.0042	10.741	1.314	1.1005
48.72	42.77	34.53	-1.912	.3630	.0128	7.747	1.365	1.1059
67.21	67.53	38.30	-2.004	.3349	.0573	10.233	1.387	1.1066
88.04	88.27	40.41	-2.230	.3931	.1364	10.032	1.377	1.1087
100.00	100.00	42.00	-3.328	.4132	.0322	14.000	1.377	1.1087

MOMENTUM AVERAGE STAGE EFFICIENCY = .8369 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8276 (ADIABATIC)  
MOMENTUM AVG. STAGE LOSS RATIO = 1.3541  
MASS AVERAGE TEMPERATURE DIFF = 1.1102

NASA SHAW AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FIGHT FLOW = 2.1603 70 PERCENT DESIGN SPEED - SCALING 29 R.P.M. R.P.M.  
 PERCENT FIGHT FLOW = 59.2011 EQUIVALENT SPEED / INLET AREA = 21.0484 LHM/SEC-50 FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0296

PERCENT SPAN (1.5)	SPAN (IN)	VELOCITY (FT/SEC)	ANGLE (DEG)	ANGLE (DEG)	VELOCITY (FT/SEC)	ANGLE (DEG)	ANGLE (DEG)	VELOCITY (FT/SEC)	ANGLE (DEG)	VELOCITY (FT/SEC)	ANGLE (DEG)
			M1	M2	M3	M4	M5	M6	M7	M8	M9
0.00	74.03	1113.12	1.042	0.00	305.96	0.00	0.00	0.276	305.24	294.11	1113.12
6.44	73.57	1106.20	0.999	0.00	312.99	0.00	0.00	0.283	312.99	302.75	1061.09
5.07	70.91	1037.37	0.933	0.00	337.46	0.00	0.00	0.305	337.46	331.26	975.23
60.96	64.75	952.76	0.862	0.00	345.18	0.00	0.00	0.312	345.18	344.07	947.90
59.71	66.05	885.73	0.772	0.00	335.50	0.00	0.00	0.303	335.50	335.47	784.79
43.40	64.10	724.53	0.553	0.00	315.43	0.00	0.00	0.286	315.43	312.18	651.77
100.00	63.54	563.21	0.570	0.00	305.35	0.00	0.00	0.276	305.35	294.07	563.21

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.8653

PERCENT SPAN (1.5)	SPAN (IN)	VELOCITY (FT/SEC)	ANGLE (DEG)	ANGLE (DEG)	VELOCITY (FT/SEC)	ANGLE (DEG)	ANGLE (DEG)	VELOCITY (FT/SEC)	ANGLE (DEG)	VELOCITY (FT/SEC)	ANGLE (DEG)
			M1	M2	M3	M4	M5	M6	M7	M8	M9
0.00	62.03	701.24	0.672	0.00	513.72	376.34	0.447	350.30	364.05	1070.56	
12.00	61.23	719.47	0.620	0.00	532.58	395.03	0.459	347.10	342.30	1020.03	
32.53	56.73	620.65	0.571	0.00	549.07	395.80	0.470	340.55	374.14	934.36	
51.26	45.14	626.51	0.567	0.00	601.22	411.97	0.527	441.50	441.50	850.37	
60.40	35.20	501.13	0.519	0.00	652.52	434.91	0.573	482.04	441.47	780.26	
83.07	20.19	319.16	0.476	0.00	720.11	512.34	0.635	506.03	497.71	694.43	
100.00	11.04	517.19	0.453	0.00	746.60	544.52	0.661	506.50	444.36	632.75	

ROTOR PERFORMANCE DATA

PERCENT SPAN (1.5)	SPAN (IN)	VELOCITY (FT/SEC)	ANGLE (DEG)	ANGLE (DEG)	VELOCITY (FT/SEC)	ANGLE (DEG)	ANGLE (DEG)	VELOCITY (FT/SEC)	ANGLE (DEG)	VELOCITY (FT/SEC)	ANGLE (DEG)
			M1	M2	M3	M4	M5	M6	M7	M8	M9
0.00	0.00	11.24	10.794	10.234	0.474	0.233	0.407	5.703	1.345	0.676	0.665
6.44	12.03	11.54	11.624	10.324	0.786	0.247	0.449	5.413	1.343	0.709	0.624
25.07	32.03	16.16	11.781	9.742	0.476	0.190	0.365	5.367	1.355	0.742	0.741
41.96	51.26	23.57	11.403	9.047	0.476	0.110	0.236	4.109	1.392	0.758	0.814
59.71	63.54	31.54	12.310	8.517	0.453	0.050	0.112	6.295	1.417	0.824	0.547
83.40	83.40	43.01	12.684	7.579	0.415	0.041	0.047	12.154	1.467	0.907	0.917
100.00	100.00	49.01	12.743	6.739	0.371	0.057	0.019	14.674	1.468	0.972	0.917

INLET VELOCITY AVERAGE ROTOR EFFICIENCY = 0.8400 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.4334 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.3462  
 MASS AVERAGE TEMPERATURE RISE = 1.1171

HASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TESTS)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 0.9434 KG/SEC 70 PERCENT DESIGN SPEED - SCAN NO 29 EQUIVALENT SPEED R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 59.2% U11 FLOW/SEC 116.9262 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = 1.0296

PERCENT SPAN FROM TIP (I. C.)	INLET VELOCITY (M/SEC)	INLET ANGLE (DEG)	INLET TANGENTIAL VELOCITY (M/SEC)	INLET RADIAL VELOCITY (M/SEC)	INLET AXIAL VELOCITY (M/SEC)	INLET MASS FLOW (KG/SEC)	INLET DENSITY (KG/M3)	INLET TEMPERATURE (K)	INLET STATIC PRESSURE (N/SEC2)
0.00	351.16	0.00	0.00	0.00	0.00	0.00	0.00	273.15	0.00
0.25	317.20	0.00	0.00	0.00	0.00	0.00	0.00	273.15	0.00
0.50	270.63	0.00	0.00	0.00	0.00	0.00	0.00	273.15	0.00
0.75	210.15	0.00	0.00	0.00	0.00	0.00	0.00	273.15	0.00
1.00	141.67	0.00	0.00	0.00	0.00	0.00	0.00	273.15	0.00

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9863

PERCENT SPAN FROM TIP (I. C.)	EXIT VELOCITY (M/SEC)	EXIT ANGLE (DEG)	EXIT TANGENTIAL VELOCITY (M/SEC)	EXIT RADIAL VELOCITY (M/SEC)	EXIT AXIAL VELOCITY (M/SEC)	EXIT MASS FLOW (KG/SEC)	EXIT DENSITY (KG/M3)	EXIT TEMPERATURE (K)	EXIT STATIC PRESSURE (N/SEC2)
0.00	211.57	0.00	0.00	0.00	0.00	0.00	0.00	273.15	0.00
0.25	190.51	0.00	0.00	0.00	0.00	0.00	0.00	273.15	0.00
0.50	165.15	0.00	0.00	0.00	0.00	0.00	0.00	273.15	0.00
0.75	135.45	0.00	0.00	0.00	0.00	0.00	0.00	273.15	0.00
1.00	106.04	0.00	0.00	0.00	0.00	0.00	0.00	273.15	0.00

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. C.)	INLET MASS FLOW (KG/SEC)	EXIT MASS FLOW (KG/SEC)	ROTOR EFFICIENCY (%)	ROTOR LOSS COEFFICIENT	ROTOR LOSS PARAMETER	ROTOR LOSS RATIO	ROTOR POLYTROPIC EFFICIENCY (%)	ROTOR POLYTROPIC EFFICIENCY RATIO
0.00	10.794	10.336	0.674	0.2333	0.007	5.703	1.345	0.806
0.25	11.624	10.324	0.676	0.2497	0.049	5.413	1.363	0.799
0.50	11.793	9.762	0.676	0.1901	0.065	5.167	1.355	0.791
0.75	11.404	9.047	0.679	0.1103	0.076	4.102	1.402	0.814
1.00	12.110	8.537	0.643	0.0502	0.112	6.225	1.617	0.956
1.00	12.684	7.879	0.615	0.043	0.097	12.154	1.447	0.702
1.00	12.783	6.709	0.374	0.0572	0.119	14.674	1.648	0.717

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.630 (POLYTROPIC)  
 MASS AVERAGE ROTOR EFFICIENCY = 0.736 (ADIABATIC)

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 29

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8997

PERCENT SPAN FROM TIP (I. I.)	WETA 3 (DEG)	V3 (FT/SEC)	VU2 (FT/SEC)	H3	VM3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	42.68	511.72	347.56	.494	420.31	415.70	1039.69
11.41	44.67	574.67	403.08	.496	408.64	408.96	997.44
31.00	51.92	597.86	330.63	.520	444.85	444.78	925.97
49.73	54.25	649.11	410.73	.563	502.64	502.27	850.76
67.87	49.01	640.13	373.13	.606	534.72	532.76	790.68
84.85	42.20	744.64	500.24	.659	553.65	564.24	715.33
100.00	31.39	775.02	532.61	.688	563.21	547.64	672.55

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (I. I.)	WETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	H4	VM4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	-2.74	451.60	-5.52	.386	451.57	451.57	1032.14
11.41	-2.74	454.17	-5.06	.389	454.13	454.08	996.22
31.00	-1.57	471.34	-12.02	.406	471.21	471.01	935.94
49.73	-1.52	526.28	-13.34	.434	524.10	523.56	877.74
67.87	-2.10	540.84	-13.55	.478	549.88	549.58	816.94
84.85	3.35	533.72	3.22	.463	533.71	533.76	753.78
100.00	3.35	530.70	3.28	.465	536.64	526.69	710.66

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. I.)	FRONT TIP FLOW	MASS FLOW (PCF)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT AIR (DEG)	W FACTOR	W OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STATOR LOSS RATIO	POLYTHROPIC EFF
0.00	0.00	1.00	43.34	6.360	2.638	.6598	.0481	.0173	21.480	1.335	1.1201	.8934
11.41	11.49	11.49	45.41	4.691	5.157	.6569	.0314	.0107	15.801	1.337	1.1701	.9239
31.00	30.50	30.71	43.41	5.241	1.939	.6352	.0314	.0104	11.504	1.340	1.1165	.9247
49.73	48.34	47.90	40.78	1.442	-1.538	.3884	.0257	.0079	10.444	1.385	1.1130	.9346
67.87	67.54	67.11	39.17	-2.595	-3.441	.3760	.0396	.0113	10.940	1.405	1.1097	.9053
84.85	84.25	84.65	41.86	-2.208	-3.040	.4514	.1546	.0420	11.879	1.389	1.1146	.7173
100.00	100.00	100.00	43.04	-1.242	-4.683	.4699	.1477	.0374	14.050	1.390	1.1147	.7569

MOMENTUM AVERAGE STAGE EFFICIENCY = .8193 (POLY TROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.3747  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8110 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1171

HASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (CONTINUED TRIP,)

STATOR PERFORMANCE HASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 29

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8997

PERCENT SPAN FROM TIP (I. C.)	BETA 3 (DEG)	V3 (M/SEC)	V13 (M/SEC)	V13 (M/SEC)	V13 (M/SEC)	V13 (M/SEC)	U3 (M/SEC)
0.00	22.01	174.24	118.11	.494	128.11	126.70	715.90
11.51	65.67	175.14	121.13	.496	124.55	126.35	704.02
31.00	61.95	162.23	121.74	.520	134.50	134.50	247.21
53.23	49.24	147.83	124.19	.549	153.20	153.00	261.91
67.82	39.61	209.74	132.02	.606	162.98	162.39	241.00
88.15	42.70	226.94	152.67	.639	168.14	154.88	219.03
100.00	43.14	236.23	162.68	.688	171.67	166.92	208.99

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (I. C.)	BETA 4 (DEG)	V4 (M/SEC)	V14 (M/SEC)	M4	V14 (M/SEC)	V14 (M/SEC)	U4 (M/SEC)
0.00	-7.0	137.65	-1.64	.309	137.64	137.64	314.80
11.51	-7.1	130.63	-1.79	.349	130.42	130.40	303.54
31.00	-11.57	141.68	-3.94	.406	143.63	143.51	295.27
49.23	-11.52	159.87	-6.75	.454	159.74	159.57	267.54
67.82	-11.1	167.60	-7.47	.478	167.60	167.51	249.61
88.15	-7.5	162.60	-3.81	.463	162.67	162.04	224.75
100.00	-7.14	161.59	-1.00	.465	163.58	163.58	219.44

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP	THREATENED AREA (%)	INCIDENCE ANGLE (DEG)	SUCT VOR (DEG)	DELTA (DEG)	DELTA (DEG)	MASS FLOW (PCT)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	43.38	6.360	2.434	.4598	.0411	.0173	21.480	1.335	1.1231
11.51	11.32	45.41	8.691	5.157	.4569	.0314	.0109	15.801	1.337	1.1231
31.00	30.50	43.60	5.241	1.349	.4357	.0314	.0104	11.526	1.348	1.1145
49.23	40.04	40.78	1.547	-1.531	.4084	.0257	.0079	10.464	1.385	1.1130
67.82	67.58	39.17	-5.35	-1.441	.3760	.0394	.0113	10.460	1.405	1.1097
88.15	80.24	41.86	-2.04	-3.000	.4514	.1506	.0420	11.49	1.389	1.1144
100.00	100.00	43.04	-1.242	-4.443	.4699	.1477	.0374	19.050	1.390	1.1147

MOMENTUM AVERAGE STAGE EFFICIENCY = .9193 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .9110 (ADIABATIC)

MOMENTUM AVERAGE STAGE PRESS RATIO = 1.3767

MASS AVERAGE TEMPERATURE RISE = 1.1171

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NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED IMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.0912 LHM/SEC 70 PERCENT DESIGN SPEED - SCAN NO 30  
 PERFECT DESIGN EQUIVALENT FLOW = 57.0466 EQUIVALENT SPEED  
 R.P.M. = 53975.608 R.P.M.  
 INLET ANN AREA = 23.0970 LB4/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0347

PERCENT SPAN FROM TIP (I. C.)	HETA01 (DEG)	V01 (FT/SEC)	H01 (DEG)	RETA1 (DEG)	V1 (FT/SEC)	V01 (FT/SEC)	M1	V01 (FT/SEC)	V01 (FT/SEC)	U1 (FT/SEC)
0.00	75.20	1150.544	112.443	0.00	293.446	0.00	.265	293.446	216.78	1112.43
0.66	74.15	1101.110	105.232	0.00	300.731	0.00	.271	300.731	200.89	1059.32
25.30	71.76	1025.244	97.290	0.00	326.15	0.00	.293	326.15	316.39	972.90
43.17	69.08	949.603	88.645	0.00	331.72	0.00	.300	331.72	330.65	946.45
59.76	67.06	867.066	78.611	0.00	322.55	0.00	.291	322.55	322.44	786.11
83.06	64.46	716.666	65.113	0.00	304.14	0.00	.275	304.14	300.06	651.13
100.00	62.46	616.77	56.245	0.00	293.448	0.00	.265	293.448	283.51	562.85

EXIT VELOCITY DIAGRAM DATA

(CALCULATED AERODYNAMIC BLOCKAGE = .8650)

PERCENT SPAN FROM TIP (I. C.)	HETA02 (DEG)	V02 (FT/SEC)	H02 (DEG)	RETA2 (DEG)	V2 (FT/SEC)	V02 (FT/SEC)	M2	V02 (FT/SEC)	V02 (FT/SEC)	U2 (FT/SEC)
0.00	61.61	772.40	66.4	46.70	309.97	309.97	.460	367.54	355.70	1064.00
11.00	62.07	714.11	61.1	48.12	540.69	408.04	.472	376.54	358.53	1020.54
31.85	62.73	666.77	57.14	47.67	550.71	611.78	.484	376.08	376.15	970.92
50.62	64.24	606.25	52.57	45.14	607.47	410.82	.520	428.84	428.81	454.35
64.72	65.13	567.29	48.33	43.34	651.36	487.37	.571	473.65	472.02	742.94
83.66	67.01	513.02	42.47	47.46	715.62	527.29	.630	473.42	475.87	694.70
100.00	68.11	422.00	37.5	49.45	746.99	508.03	.658	486.37	487.00	552.35

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. C.)	DELTA (DEG)	HETA0 (DEG)	INCIDENCE ANGLE (DEG)	U (FT/SEC)	W (FT/SEC)	W/U (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	W/U (DEG)	W/U (DEG)	ROTOR POLYTROPIC EFF
0.00	0.00	13.60	11.367	10.000	6.573	.2333	.0422	6.615	1.365	6.067	.7078
0.66	11.00	15.08	12.252	10.763	6.070	.2511	.0468	6.175	1.343	6.008	.7040
25.30	31.85	17.34	12.444	10.626	5.049	.2043	.0605	6.554	1.369	7.551	.7657
43.17	50.62	24.50	12.554	9.704	4.964	.1429	.0377	3.576	1.390	4.473	.8544
59.76	64.72	32.11	13.106	9.331	6.579	.0163	.0163	1.730	1.418	0.227	.9360
83.06	83.06	46.15	13.568	8.562	6.545	.1072	.0236	10.900	1.462	9.106	.9341
100.00	100.00	52.36	13.709	7.735	6.110	.1372	.0287	17.154	1.442	9.106	.9341

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8263 (POLYTROPIC)

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8179 (ADIABATIC)

MOMENTUM AVG. ROTOR LOSS RATIO = 1.3942

MASS AVERAGE TEMPERATURE RISE = 1.1215

NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 10 1974 (CONTINUED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (MFRIC UNITS)

EQUIVALENT WEIGHT FLOW = 0.0665 KG/SEC 70 PERCENT DESIGN SPEED - SCAN NO 30  
 PERCENT DESIGN EQUIVALENT FLOW = 57.0966 EQUIVALENT SPEED EQUIVALENT FLOW / INLET AREA = 53975.408 R.P.M.  
 = 112.7407 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = 1.0347

PERCENT SPAN FROM TIP (I. F.)	VECT	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT
	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)
0.00	130.20	779.07	82.56	0.00	0.65	80.54	86.64	377.07	
0.66	74.15	122.04	71.65	0.00	0.71	91.67	80.64	322.00	
24.33	71.56	216.54	99.46	0.00	0.93	98.07	97.05	296.56	
41.12	69.49	270.19	101.11	0.00	0.90	101.13	100.70	270.19	
59.76	67.64	279.00	94.31	0.00	0.91	88.31	86.28	239.00	
83.04	64.96	194.66	92.70	0.00	0.75	92.70	91.64	194.66	
100.00	62.64	171.56	89.45	0.00	0.65	89.45	86.61	171.56	

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = 0.6450

PERCENT SPAN FROM TIP (I. F.)	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT
	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)
0.00	276.51	207.24	163.74	114.86	0.60	112.07	104.62	376.10	
11.00	217.36	186.65	167.36	126.61	0.72	111.75	109.28	311.04	
31.00	56.27	150.67	170.60	126.12	0.84	114.00	116.16	245.57	
50.00	44.28	130.62	181.24	131.11	0.90	120.71	120.70	261.93	
74.72	32.11	102.20	189.53	130.36	0.91	146.34	143.04	239.64	
88.04	19.71	52.55	210.12	160.72	0.90	167.67	165.05	213.27	
100.00	10.10	26.31	227.07	172.53	0.88	147.63	152.62	198.44	

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT	WVECT
	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)
0.00	0.00	13.60	11.167	10.809	0.673	0.233	0.622	6.615	6.627
0.66	11.67	15.01	12.252	10.963	0.670	0.211	0.600	6.175	6.008
25.00	11.00	17.33	12.486	10.626	0.669	0.203	0.605	6.556	6.451
41.12	9.00	24.51	12.530	9.744	0.664	0.190	0.607	6.576	6.473
59.76	6.00	32.31	13.105	8.311	0.659	0.183	0.613	6.730	6.527
83.04	4.00	45.35	13.568	6.542	0.655	0.172	0.626	6.720	6.524
100.00	2.00	52.36	13.709	7.515	0.610	0.172	0.627	6.756	6.524

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.843 (POLYTHROPIC)  
 MASS AVERAGE MOTOR EFFICIENCY = 0.870 (ADIABATIC)

MOMENTUM AVG. ROTOR DEPRESS RATIO = 1.3942  
 MASS AVERAGE TEMPERATURE DECF = 1.1215



NASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 30

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8957

PERCENT SPAN FROM TIP (F.)	BETA 1 (DEG)	V1 (FT/SEC)	VU3 (FT/SEC)	M3	V43 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	43.51	543.04	401.55	.503	422.78	418.14	1039.04
11.36	45.51	546.46	418.33	.506	411.01	410.33	977.34
30.53	43.40	604.21	418.20	.524	476.12	476.12	927.02
44.53	41.50	649.14	430.14	.567	486.19	485.83	860.62
67.22	40.30	683.47	422.03	.601	521.30	519.30	772.41
87.04	46.34	737.02	515.13	.650	527.11	520.03	716.21
100.00	45.56	763.37	549.35	.681	538.65	523.77	672.13

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9103

PERCENT SPAN FROM TIP (F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	V14 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	-1.10	454.81	-11.03	.389	454.70	454.70	1031.51
11.36	-1.40	457.02	-11.13	.390	456.88	456.88	995.77
30.53	-1.74	452.54	-14.02	.397	462.38	462.38	935.98
44.53	-1.14	500.72	-10.46	.440	509.61	509.61	877.84
67.22	.52	530.63	6.21	.468	538.66	538.37	814.91
87.04	1.04	524.81	9.56	.454	524.73	522.81	753.77
100.00	1.05	527.02	9.64	.457	527.07	527.07	716.21

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (F.)	LOSS FLOW (PCT)	DELTA HFTA (DEG)	DELTA HFTA (DEG)	INFLUENCE MEAN (DEG)	SUCT SWIRL (DEG)	DELTA FACTOR	DELTA BAR	DELTA BAR	LOSS PARAMETER	DELTA ANGLE (DEG)	STAGE PRESS RATIO	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	44.92	7.207	3.235	.4769	.0914	.0330	20.730	1.345	1.1337	1.1337	.7863	
11.36	11.21	46.96	9.320	5.348	.4747	.0754	.0201	15.157	1.367	1.1337	1.1337	.8254	
30.53	31.11	45.53	7.146	3.837	.4664	.0416	.0248	11.447	1.350	1.1242	1.1242	.8519	
44.53	41.94	42.64	3.744	.755	.4187	.0404	.0185	10.885	1.392	1.1166	1.1166	.8504	
67.22	61.14	39.77	.772	-2.072	.3995	.0431	.0124	11.622	1.604	1.1122	1.1122	.9009	
87.04	37.45	43.30	2.019	-.875	.4600	.1420	.0376	12.575	1.391	1.1122	1.1122	.7499	
100.00	100.00	44.51	44.51	-2.510	.4405	.1315	.0333	14.751	1.492	1.1183	1.1183	.7869	

MOMENTUM AVERAGE STAGE EFFICIENCY = .7945 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7850 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.3765  
MASS AVERAGE TEMPERATURE RISE = 1.1215

MASA SMALL AXIAL COMPRESSOR TEST 1 MARCH 1, 1976 (COMBINED TEMP.)

STATOR PERFORMANCE MASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 30

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8857

PERCENT SPAN FROM TIP (T. F.)	HETA 3 (DEG)	V3 (M/SEC)	VH3 (M/SEC)	W/3 (M/SEC)	U3 (M/SEC)
0.00	47.54	177.72	122.34	129.46	127.65
11.36	45.51	178.75	127.51	125.28	125.07
30.53	43.00	174.17	127.47	132.93	132.56
48.73	41.50	197.87	171.12	148.19	174.08
67.22	40.30	208.32	134.73	158.89	158.31
87.58	44.34	224.64	157.01	160.66	158.50
100.00	45.56	234.50	167.64	164.18	159.64

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9103

PERCENT SPAN FROM TIP (T. F.)	HETA 4 (DEG)	V4 (M/SEC)	VH4 (M/SEC)	W/4 (M/SEC)	U4 (M/SEC)
0.00	-1.34	138.63	-3.16	138.59	138.59
11.36	-1.60	139.30	-3.39	139.26	139.26
30.53	-1.76	141.00	-4.27	140.93	140.87
48.73	-1.91	154.36	-3.19	155.33	154.17
67.22	0.52	164.19	1.50	164.18	164.00
87.58	1.04	152.96	2.31	159.96	159.34
100.00	1.65	160.92	2.35	160.89	160.89

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE FROM TIP	MASS FLOW (KG/S)	HETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCTION (DEG)	DELTA (DEG)	INCIDENCE MEAN (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAFF TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	7.207	3.245	44.42	0.018	0.730	29.790	1.345	1.1317	0.7964
11.36	11.31	46.00	9.328	5.088	46.00	0.753	0.761	14.157	1.347	1.1377	0.8258
30.53	30.39	45.53	7.146	3.187	45.53	0.816	0.760	11.447	1.350	1.1242	0.8219
48.73	63.46	42.64	3.746	0.745	42.64	0.604	0.815	10.805	1.382	1.1186	0.8504
67.22	67.43	40.77	0.772	-2.092	40.77	0.431	0.824	11.622	1.404	1.1122	0.9009
87.58	88.19	43.30	2.019	-0.875	43.30	0.420	0.876	12.575	1.391	1.1182	0.7699
100.00	109.00	44.51	0.931	-2.510	44.51	0.315	0.833	19.751	1.372	1.1183	0.7869

MOMENTUM AVERAGE STAGE EFFICIENCY = 0.7965 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = 0.7850 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.3745  
 MASS AVERAGE TEMPERATURE RISE = 1.1215

NASA SMALL AXIAL COMPRESSOR TEST 2.FEB..20, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT HEIGHT FLOW = 3.3236 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 90.7380

100 PERCENT DESIGN SPEED - SCAN 10 2  
 EQUIVALENT SPEED = 76603.647 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 36.7059 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9894

PERCENT SPAN FROM TIP (L. L.)	ETA*1	V*1 (FT/SEC)	M*1	DELTA1 (DEG)	V1 (FT/SEC)	U*1	M1	VM1	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	72.36	1656.95	1.516	0.00	502.79	0.00	.460	502.79	485.59	1178.79
10.29	71.00	1594.00	1.451	0.00	475.89	0.00	.472	494.98	475.89	1498.55
27.19	67.70	1477.20	1.358	0.00	436.73	0.00	.515	560.40	550.10	1356.73
43.86	65.11	1323.39	1.255	0.00	373.83	0.00	.528	573.81	571.47	1236.71
61.51	61.01	1124.56	1.125	0.00	313.19	0.00	.511	555.68	555.68	1091.19
81.29	50.33	1051.46	.963	0.00	220.55	0.00	.477	520.54	513.55	913.54
100.00	59.01	941.97	.801	0.00	498.88	0.00	.456	498.87	481.91	798.82

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9202

PERCENT SPAN FROM TIP (L. L.)	ETA*2	V*2 (FT/SEC)	M*2	DELTA2 (DEG)	V2 (FT/SEC)	U*2	M2	VM2	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	60.72	1013.43	.846	50.65	797.53	616.72	.653	505.65	489.36	1519.42
17.29	59.16	915.35	.770	52.59	815.55	647.76	.669	495.47	674.64	1445.66
33.51	52.53	844.63	.701	51.68	827.91	649.21	.687	513.09	501.89	1319.85
50.77	41.41	784.60	.660	46.98	877.05	666.68	.718	565.83	571.40	1205.69
70.55	36.96	765.77	.619	46.37	913.94	668.74	.790	734.03	635.16	1097.96
81.45	17.46	695.08	.600	69.60	1023.02	779.66	.883	663.93	651.11	988.36
100.00	4.02	670.72	.582	51.41	1064.02	832.28	.924	664.15	641.58	925.83

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE (%)	M*1	DELTA1 (DEG)	DELTA2 (DEG)	ANGLE SUCT SUR (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR P-LOSS RATIO	ROTOR ADIABATIC EFF	POTPC POLYTRPCIC
0.00	0.00	0.499	0.031	.5178	.2758	3.727	1.962	.7061	.7123
10.29	12.79	12.04	9.234	.5592	.2971	3.361	1.766	.6971	.7238
27.19	13.73	15.12	8.929	.5727	.3305	3.444	1.698	.7178	.7818
43.86	52.43	8.552	5.633	.5652	.1729	3.215	1.987	.8395	.8545
61.51	70.35	29.05	8.786	4.901	.0789	6.292	2.007	.8350	.9410
81.29	90.35	42.87	9.025	5.082	.0917	9.981	2.084	.9440	.9404
100.00	100.00	50.00	9.262	3.188	.1115	15.019	2.084	.9440	.9495

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8149 (POLYTRPCIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8182 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.9870  
 MASS AVERAGE TEMPERATURE RISE = 1.2644

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (CONTINUED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.5075 KG/SEC 100 PERCENT DESIGN SPEED - SPAN NO. ?  
 PERCENT DESIGN EQUIVALENT FLOW = 90.7380 EQUIVALENT SP. FLOW = 76603.647 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 179.2137 KG/SEC-30 M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC LOSS COEFFICIENT = .189A

PERCENT SPAN FROM TIP (L. C.)	DELTA1 (DEG)	V*1 (M/SEC)	H*1 (M/SEC)	DELTA1 (DEG)	V1 (M/SEC)	H1 (M/SEC)	VM1 (M/SEC)	V/1 (M/SEC)	U1 (M/SEC)
0.00	72.34	505.04	491.21	1.536	0.00	152.25	0.00	152.25	601.21
10.29	71.00	481.98	456.76	1.451	0.00	157.24	0.00	157.24	457.76
27.19	67.70	450.25	418.58	1.358	0.00	173.81	0.00	173.81	418.58
53.86	65.11	415.56	376.55	1.255	0.00	174.90	0.00	174.90	376.55
80.51	61.91	373.25	337.60	1.125	0.00	169.17	0.00	169.17	337.60
100.00	58.13	320.45	278.45	.903	0.00	154.61	0.00	154.61	278.45
	58.01	297.07	243.48	.861	0.00	152.06	0.00	152.06	243.48

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC LOSS COEFFICIENT = .9212

PERCENT SPAN FROM TIP (L. C.)	DELTA*2 (DEG)	V*2 (M/SEC)	H*2 (M/SEC)	DELTA*2 (DEG)	V2 (M/SEC)	H2 (M/SEC)	VM2 (M/SEC)	V/2 (M/SEC)	U2 (M/SEC)
0.00	90.72	315.11	274.84	.846	50.65	243.09	182.97	154.12	462.81
10.29	58.16	286.98	243.50	.770	57.59	248.38	192.44	151.02	448.74
31.51	52.50	257.59	204.61	.701	51.68	252.23	197.89	146.31	402.27
53.86	45.41	218.08	166.24	.660	45.48	267.12	203.39	171.69	367.50
80.51	31.96	134.47	130.58	.658	46.12	281.62	203.68	194.47	314.66
100.00	17.46	112.02	63.61	.600	49.60	312.06	237.64	202.24	301.25
	9.02	204.44	28.51	.502	51.41	324.96	253.68	202.41	282.19

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. C.)	DELTA (DEG)	DELTA*1 (DEG)	DELTA*2 (DEG)	INCIDENCE ANGLE (DEG)	SUCT. SURF. (DEG)	LOSS PARAMETER (C-C)	CMFGA* (M/SEC)	DELTA (DEG)	DELTA*1 (DEG)	DELTA*2 (DEG)	ADJ. LOSS PARAMETER (C-C)	ROTOR EFFICIENCY (%)
0.00	0.00	11.62	9.499	6.031	5.117	.0513	.2758	3.727	1.067	2.061	1.067	73.74
10.29	12.72	12.84	9.234	7.803	5.552	.0518	.2971	3.211	1.066	1.071	1.066	72.39
27.19	13.51	15.12	8.929	6.756	4.727	.0482	.2485	3.544	1.048	1.048	1.048	74.28
53.86	52.77	21.70	8.532	5.633	5.538	.0181	1.729	6.215	1.087	1.087	1.087	81.45
80.51	71.52	20.05	8.786	4.001	5.107	.0178	.0788	6.202	2.007	2.007	2.007	74.10
100.00	89.55	42.87	9.075	4.026	5.082	.0217	.0017	9.791	2.084	2.084	2.084	74.04
	100.00	50.00	9.262	3.188	4.772	.1115	.1115	15.069	2.084	2.084	2.084	74.00

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8368 (POLYTOPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8182 (ADIABATIC)  
 MOMENTUM AVG. ROTOR LOSS COEFFICIENT = 1.9470  
 MASS AVERAGE TEMPERATURE RISE = 1.2644

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO. 2

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9575

PERCENT SPAN FROM TIP (L. L.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	47.08	856.09	635.03	.705	574.10	567.90	1474.64
11.89	50.38	870.50	642.80	.709	544.67	547.76	1412.72
32.32	44.13	880.87	655.43	.730	507.92	587.91	1306.34
51.13	45.35	925.48	659.71	.783	643.61	642.91	1208.36
69.57	43.67	958.70	659.59	.824	695.77	693.23	1112.35
88.41	46.93	1042.29	761.45	.902	711.69	702.14	1012.00
100.00	44.15	1083.92	807.35	.944	723.19	703.71	933.90

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (L. L.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	2.02	643.54	29.69	.524	648.85	648.85	1483.94
11.39	2.62	653.45	29.87	.528	652.75	652.67	1413.73
30.39	2.06	652.85	30.29	.534	652.13	651.84	1327.96
48.77	3.45	682.00	45.83	.562	680.44	679.74	1245.72
67.42	4.31	677.20	50.77	.554	669.74	668.88	1142.74
88.13	5.84	639.55	65.35	.575	639.17	638.86	1069.56
100.00	5.93	640.34	66.15	.528	636.89	636.89	1016.47

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (%)	PERCENT TRAILING EDGE (%)	BETA 3 (DEG)	BETA 4 (DEG)	INLET ANGLE (DEG)	OUTLET ANGLE (DEG)	UAR	UOR	GA	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STAGE TEMP. RATIO
0.00	6.00	45.26	11.566	7.644	4.082	.1130	.0409	24.800	1.899	1.3000	1.2745	.745
11.89	12.72	42.76	10.146	10.075	.4953	.0792	.0275	12.114	1.902	1.3000	1.2745	.745
32.32	30.30	45.47	11.417	8.177	.4876	.0702	.0231	15.834	1.906	1.2745	1.2745	.745
51.13	52.49	47.10	7.967	5.017	.4614	.0642	.0196	15.834	1.904	1.2745	1.2745	.745
69.57	67.44	39.11	3.628	.838	.4780	.1063	.0304	15.468	1.930	1.2351	1.2351	.8354
88.04	80.13	41.04	4.404	1.561	.5562	.2313	.0609	17.425	1.847	1.2469	1.2469	.7069
100.00	100.00	42.22	1.515	.074	.5710	.2171	.0346	24.630	1.887	1.2469	1.2469	.7407

MOMENTUM AVERAGE STAGE EFFICIENCY = .7893 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7631 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS. RATIO = 1.9140  
 MASS AVERAGE TEMPERATURE RISE = 1.2644

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO. 2

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9575

PERCENT SPAN FROM TIP (L. L.)	DELTA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	V43 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	47.48	271.24	193.56	.705	174.99	173.07	449.47
11.33	50.18	262.28	202.04	.709	167.23	166.95	410.60
32.32	48.13	249.49	199.93	.736	179.20	179.20	308.17
51.13	42.95	242.09	202.70	.783	176.11	176.27	168.31
69.57	43.47	202.23	201.04	.874	212.07	211.30	339.05
88.84	46.33	317.69	232.09	.902	216.92	216.01	309.42
100.00	48.15	330.38	246.08	.944	220.43	216.36	290.75

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (L. L.)	DELTA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	V44 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	2.02	107.98	9.05	.524	197.77	177.77	446.21
11.33	2.62	109.17	9.37	.528	194.96	176.31	410.69
32.32	2.06	158.39	9.23	.533	198.77	170.60	404.76
49.77	3.06	207.87	11.97	.562	207.60	172.19	379.69
67.56	6.10	203.30	12.67	.554	207.77	172.75	374.76
85.13	5.09	194.02	11.92	.525	192.99	172.29	326.49
100.00	5.33	165.17	20.16	.528	184.12	174.12	362.87

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. L.)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	FACTOR	OMEGA (R)	LOSS (LFC)	DEVIATION (DEG)	STATOR PRESS (MPA)	STATOR TEMP (K)	POLYTROPIC EFF
0.00	45.20	11.566	7.664	.4982	.0409	24.900	1.899	1.3000	.7745
11.33	42.70	14.194	10.875	.4953	.0792	19.184	1.702	1.3000	.8416
32.32	45.47	11.417	4.177	.6970	.0711	15.833	1.906	1.2745	.8714
51.13	42.10	7.967	5.017	.4614	.0642	15.833	1.964	1.2575	.8808
69.57	39.11	3.628	.838	.4780	.0163	15.663	1.930	1.2351	.8354
88.84	41.04	4.604	1.561	.5562	.0689	17.426	1.837	1.2469	.7069
100.00	42.22	3.515	.074	.5710	.0546	24.630	1.887	1.2419	.7407

MOMENTUM AVERAGE STAGE EFFICIENCY = .7893 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .7633 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS. RATIO = 1.0140

MASS AVERAGE TEMPERATURE RISE = 1.2644

*DRIVE, 2 PAGES  
BY FOUR QUALITY*

NASA SMALL AXIAL COMPRESSOR TEST 2 SEP. 20, 1974 (COMBINED TESTS)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW = 3.0046 LHM/SEC 100 PERCENT DESIGN SPEED - SCAN NO 3  
 PCXIRI DESIGN EQUIVALENT FLOW = 02.9556 EQUIVALENT FLOW / INLET ANN AREA = 76607.937 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 37.6029 LHM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BUCKAGE = .9473

PERCENT SPAN FROM TIP (C.F.)	BETA*1 (DEG)	V*1 (FT/SEC)	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V*1 (FT/SEC)	VU1 (FT/SEC)	M1	V*1 (FT/SEC)	VU1 (FT/SEC)	M1
0.50	71.80	1062.72	1.574	0.00	514.56	0.00	0.00	0.00	0.476	514.56	502.83	1.580
10.75	71.84	1497.57	1.460	0.00	533.12	0.00	0.00	0.00	0.489	533.12	515.67	1.500
27.25	72.05	1495.78	1.309	0.00	579.31	0.00	0.00	0.00	0.536	579.31	568.67	1.699
43.50	72.49	1572.01	1.266	0.00	574.20	0.00	0.00	0.00	0.547	574.20	593.29	1.737
62.77	72.77	1233.67	1.136	0.00	574.11	0.00	0.00	0.00	0.529	574.11	573.97	1.691
85.30	71.50	1060.73	0.973	0.00	374.45	0.00	0.00	0.00	0.493	374.45	530.24	1.914
100.00	57.22	703.63	0.871	0.00	514.95	0.00	0.00	0.00	0.472	514.95	497.45	1.799

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BUCKAGE = .8765

PERCENT SPAN FROM TIP (C.F.)	BETA*2 (DEG)	V*2 (FT/SEC)	BETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V*2 (FT/SEC)	VU2 (FT/SEC)	M2	V*2 (FT/SEC)	VU2 (FT/SEC)	M2
0.00	57.57	1074.05	0.885	47.46	805.11	0.00	0.00	0.00	0.663	805.11	520.86	1.720
11.00	57.66	1073.60	0.874	47.71	840.05	0.00	0.00	0.00	0.697	840.05	553.62	1.699
31.00	58.00	1132.76	0.703	47.60	837.55	0.00	0.00	0.00	0.700	837.55	563.44	1.572
50.57	58.03	938.67	0.703	46.54	808.42	0.00	0.00	0.00	0.733	808.42	591.77	1.720
61.82	57.77	785.11	0.679	45.50	803.88	0.00	0.00	0.00	0.778	803.88	619.87	1.810
89.03	58.13	717.74	0.616	47.36	1031.44	0.00	0.00	0.00	0.874	1031.44	661.50	1.914
100.00	58.25	317.27	0.594	50.26	1052.04	0.00	0.00	0.00	0.915	1052.04	670.24	1.926

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (C.F.)	BETA (DEG)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	U FACTOR (DEG)	OMEGA* (DEG)	LOSS PAPER (DEG)	DEVIATION (DEG)	AVG. LOSS PAPER (DEG)	AVG. DEVIATION (DEG)	AVG. LOSS PAPER (DEG)	AVG. DEVIATION (DEG)
0.00	0.00	12.23	7.966	7.459	4.897	0.479	2.581	1.955	1.955	2.291	2.291
10.75	13.91	16.90	8.803	7.319	5.110	0.514	2.532	1.968	1.968	2.711	2.711
27.25	15.03	15.93	8.275	6.113	5.220	0.599	1.872	1.962	1.962	3.050	3.050
43.50	16.52	19.76	7.842	5.921	5.270	0.751	3.101	1.981	1.981	3.410	3.410
62.77	17.53	26.51	8.044	5.157	5.039	0.853	6.743	1.991	1.991	3.942	3.942
85.30	19.33	40.22	8.107	3.259	4.917	0.835	11.740	2.072	2.072	4.614	4.614
100.00	19.00	47.54	8.469	2.396	4.593	0.756	16.935	2.071	2.071	5.916	5.916

PERCENT AVERAGE ROTOR EFFICIENCY = 0.8614 (POLYTROPIC)  
 PERCENT AVERAGE ROTOR EFFICIENCY = 0.8674 (ADIABATIC)  
 PERCENT AVERAGE ROTOR EFFICIENCY = 1.9473  
 PERCENT AVERAGE TEMPERATURE RISE = 1.2593

NASA SMALL AXIAL COMPRESSOR TEST 2 FLP 20, 1974 (COMBINED ICMPI)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (MFRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.5643 KG/SEC 100 PERCENT DESIGN SPEED - SCAN NO 1  
 EQUIVALENT FLOW / INLET ANN AREA = 76687.417 R.F.P.  
 PERCENT DESIGN EQUIVALENT FLOW = 52.9556

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9873

PERCENT SPAN FROM TIP (U.F.)	DELTA*1 (DEG)	VU*1 (M/SEC)	M*1	PFIA1 (DEG)	V1 (M/SEC)	M1	VU1 (M/SEC)	VP1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	71.80	537.10	4.9174	1.524	0.00	158.16	0.00	159.35	153.26	481.74
10.76	70.44	441.11	4.9747	1.440	0.00	167.50	0.00	162.50	157.18	457.12
27.16	67.05	452.33	6.1703	1.369	0.00	176.57	0.00	176.57	171.33	417.09
43.89	64.19	438.17	3.7729	1.266	0.00	180.41	0.00	180.41	180.23	377.29
61.17	62.27	376.07	3.3182	1.136	0.00	174.90	0.00	174.90	174.93	332.82
84.10	59.57	323.31	2.7874	.973	0.00	163.82	0.00	163.82	161.82	278.74
100.00	57.22	282.91	2.4175	.871	0.00	156.96	0.00	156.96	151.62	243.75

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8765

PERCENT SPAN FROM TIP (U.F.)	DELTA*2 (DEG)	VU*2 (M/SEC)	M*2	PFIA2 (DEG)	V2 (M/SEC)	M2	VU2 (M/SEC)	VP2 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	51.57	327.65	2.0257	.885	47.46	180.80	0.667	185.63	160.59	463.12
11.89	55.64	317.56	2.1123	.828	47.71	199.59	0.695	172.45	168.68	441.83
31.01	51.62	270.16	2.1922	.763	47.60	256.26	0.700	177.41	171.76	406.12
50.97	46.63	246.53	1.7910	.700	46.59	266.70	0.733	181.01	181.00	371.89
71.27	42.76	230.55	1.4909	.672	46.50	277.33	0.778	194.13	193.81	337.80
91.03	38.11	217.24	1.1922	.616	49.34	308.41	0.874	204.93	201.62	302.14
100.00	34.81	208.16	1.0175	.544	50.26	320.91	0.915	205.17	198.19	282.50

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (U.F.)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	DELTA SUCT SUQ (DEG)	OPFG* BAR	LOSS PARAMETER (DEG)	DELTA P/1 (DEG)	DELTA P/2 (DEG)	DELTA P/3 (DEG)	DELTA P/4 (DEG)	DELTA P/5 (DEG)	DELTA P/6 (DEG)	DELTA P/7 (DEG)	DELTA P/8 (DEG)	DELTA P/9 (DEG)	DELTA P/10 (DEG)	DELTA P/11 (DEG)	DELTA P/12 (DEG)	DELTA P/13 (DEG)	DELTA P/14 (DEG)	DELTA P/15 (DEG)	DELTA P/16 (DEG)	DELTA P/17 (DEG)	DELTA P/18 (DEG)	DELTA P/19 (DEG)	DELTA P/20 (DEG)	DELTA P/21 (DEG)	DELTA P/22 (DEG)	DELTA P/23 (DEG)	DELTA P/24 (DEG)	DELTA P/25 (DEG)	DELTA P/26 (DEG)	DELTA P/27 (DEG)	DELTA P/28 (DEG)	DELTA P/29 (DEG)	DELTA P/30 (DEG)	DELTA P/31 (DEG)	DELTA P/32 (DEG)	DELTA P/33 (DEG)	DELTA P/34 (DEG)	DELTA P/35 (DEG)	DELTA P/36 (DEG)	DELTA P/37 (DEG)	DELTA P/38 (DEG)	DELTA P/39 (DEG)	DELTA P/40 (DEG)	DELTA P/41 (DEG)	DELTA P/42 (DEG)	DELTA P/43 (DEG)	DELTA P/44 (DEG)	DELTA P/45 (DEG)	DELTA P/46 (DEG)	DELTA P/47 (DEG)	DELTA P/48 (DEG)	DELTA P/49 (DEG)	DELTA P/50 (DEG)	DELTA P/51 (DEG)	DELTA P/52 (DEG)	DELTA P/53 (DEG)	DELTA P/54 (DEG)	DELTA P/55 (DEG)	DELTA P/56 (DEG)	DELTA P/57 (DEG)	DELTA P/58 (DEG)	DELTA P/59 (DEG)	DELTA P/60 (DEG)	DELTA P/61 (DEG)	DELTA P/62 (DEG)	DELTA P/63 (DEG)	DELTA P/64 (DEG)	DELTA P/65 (DEG)	DELTA P/66 (DEG)	DELTA P/67 (DEG)	DELTA P/68 (DEG)	DELTA P/69 (DEG)	DELTA P/70 (DEG)	DELTA P/71 (DEG)	DELTA P/72 (DEG)	DELTA P/73 (DEG)	DELTA P/74 (DEG)	DELTA P/75 (DEG)	DELTA P/76 (DEG)	DELTA P/77 (DEG)	DELTA P/78 (DEG)	DELTA P/79 (DEG)	DELTA P/80 (DEG)	DELTA P/81 (DEG)	DELTA P/82 (DEG)	DELTA P/83 (DEG)	DELTA P/84 (DEG)	DELTA P/85 (DEG)	DELTA P/86 (DEG)	DELTA P/87 (DEG)	DELTA P/88 (DEG)	DELTA P/89 (DEG)	DELTA P/90 (DEG)	DELTA P/91 (DEG)	DELTA P/92 (DEG)	DELTA P/93 (DEG)	DELTA P/94 (DEG)	DELTA P/95 (DEG)	DELTA P/96 (DEG)	DELTA P/97 (DEG)	DELTA P/98 (DEG)	DELTA P/99 (DEG)	DELTA P/100 (DEG)
0.00	0.00	12.22	7.466	7.499	.6897	.0478	2.583	1.055	.722	.7633																																																																																															
10.76	11.09	12.71	8.083	7.319	.5114	.0518	.710	1.050	.7171	.7607																																																																																															
27.16	11.63	15.17	8.275	6.304	.5220	.0389	1.027	1.067	.8610	.8275																																																																																															
43.89	10.57	19.70	7.847	4.921	.5278	.0241	1.001	1.041	.7150	.8446																																																																																															
61.17	6.967	20.91	8.044	4.157	.5039	.0153	6.743	1.091	.9617	.9475																																																																																															
84.10	4.903	20.77	8.307	3.259	.4917	.0135	11.240	2.072	.6616	.9451																																																																																															
100.00	100.00	47.34	8.469	2.394	.4593	.0158	16.035	2.071	.6614	.9652																																																																																															

MECHANICAL EFFICIENCY = .8614 (POLYTROPIC)  
 POLYTROPIC EFFICIENCY = .8674 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8614 (POLYTROPIC)  
 MASS AVERAGE TEMPERATURE RISE = 1.2553



NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED = SCAN NO. 1  
 INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9157

PERCENT SPAN FROM TIP (I. I.)	DELTA T (DEG)	V3 (FT/SEC)	VUS (FT/SEC)	M3	VMS (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	44.57	874.14	610.79	.725	626.37	618.40	1476.25
11.40	45.50	801.53	631.55	.742	629.63	624.60	1416.49
16.14	44.93	693.76	623.97	.757	647.60	647.60	1316.52
40.20	47.93	51.51	631.03	.780	678.40	677.00	1219.80
63.19	42.28	913.05	641.73	.821	705.83	703.25	1123.77
85.40	45.35	1038.13	738.51	.900	729.58	736.78	1015.41
100.00	44.61	1090.55	735.61	.943	742.24	721.73	964.95

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9154

PERCENT SPAN FROM TIP (I. I.)	DELTA T (DEG)	V6 (FT/SEC)	VU6 (FT/SEC)	M6	VMS (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	3.96	667.80	446.51	.538	641.11	651.11	1445.54
11.27	3.93	618.75	446.44	.543	677.26	677.18	1414.60
30.27	3.19	677.91	372.04	.544	666.78	666.68	1329.51
48.76	4.35	609.06	518.03	.580	677.05	676.11	1247.13
67.40	4.01	643.40	476.74	.599	688.72	670.55	1163.62
83.14	5.54	600.76	627.8	.579	647.73	645.16	1070.72
100.00	4.54	655.46	637.4	.547	652.35	652.35	1017.58

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. I.)	PRE-TIP TIP (DEG)	HAUS FLOW (LBS)	DELTA P13 (DEG)	INDICATED HEAD (DEG)	INDICATED SUCT SUR (DEG)	FACTOR	OMEGA PAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAG PRESS RATIO	STAG TEM RATIO	E-TATOR FOLYTROFC (LFI)
0.00	0.00	0.00	40.48	0.005	4.093	4.772	.1128	.0405	26.070	1.890	1.2889	.7786
11.40	11.47	12.72	41.67	0.316	5.480	4.807	.1193	.0433	20.172	1.896	1.2884	.7745
16.14	10.17	31.33	40.75	7.513	4.013	4.691	.0997	.0377	16.156	1.908	1.2632	.9177
40.20	48.27	52.59	48.58	5.120	2.133	4.319	.0892	.0181	16.331	1.986	1.2466	.8497
63.19	57.00	71.51	58.26	2.624	-2.211	4.564	.0967	.0777	15.111	1.923	1.2704	.8472
85.40	84.14	90.17	54.03	2.925	.057	5.163	.2292	.0605	17.069	1.877	1.2402	.6995
100.00	100.00	100.00	41.03	1.302	-1.459	5.514	.2154	.0542	24.280	1.878	1.2404	.7354

MOMENTUM AVERAGE STAGE EFFICIENCY = .8009 (POLYTROPIC)  
 MASS AVERAGE TEMPERATURE P1/P = .9074  
 MEDIUM AVERAGE STAGE EFFICIENCY = .7419 (ADIABATIC)  
 MASS AVERAGE TEMPERATURE P1/P = 1.2553

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 70, 1976 (COMBINED TRIP)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO. 3

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9157

PERCENT SPAN FROM TIP (L. S.)	BETA 1 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	V43 (M/SEC)	V73 (M/SEC)	U7 (M/SEC)
0.00	46.17	266.66	106.17	.725	190.61	188.57	669.96
11.65	46.50	272.04	104.02	.742	190.67	190.50	631.75
30.37	47.34	276.09	98.17	.757	197.39	197.39	601.27
49.76	48.93	287.60	92.56	.788	206.78	206.67	471.79
69.13	42.20	300.76	89.60	.821	215.16	216.15	341.61
88.40	45.15	316.42	82.10	.900	227.37	219.39	309.50
100.00	46.61	329.15	73.15	.963	226.23	219.00	291.07

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9354

PERCENT SPAN FROM TIP (L. S.)	BETA 6 (DEG)	V6 (M/SEC)	VU6 (M/SEC)	M6	VH6 (M/SEC)	V76 (M/SEC)	U4 (M/SEC)
0.00	3.86	262.07	13.51	.538	201.57	271.57	646.70
11.37	5.43	263.84	13.81	.543	203.78	273.36	631.17
30.37	3.88	273.57	11.29	.548	201.23	273.14	609.23
49.76	4.35	284.07	10.16	.580	212.65	272.74	330.13
69.13	4.01	297.99	14.55	.569	207.68	297.37	364.67
88.40	5.54	300.35	19.14	.539	197.43	176.71	324.36
100.00	5.58	333.78	19.41	.567	198.04	130.33	310.16

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (G)	BETA (DEG)	INCIDENCE ANGLE (DEG)	LOSS FACTOR	DIFFERENTIAL PARAMETER (L/S)	STATOR EFFICIENCY	STATOR LOSS RATIO
0.00	0.00	40.68	8.005	4.772	.1128	1.800	1.2889
11.65	17.71	41.67	9.516	4.607	.1193	1.806	1.2889
30.37	33.23	40.75	7.113	4.691	.1007	1.800	1.2889
49.76	47.55	38.58	6.120	4.516	.0992	1.807	1.2889
69.13	71.13	38.71	7.676	4.564	.0967	1.807	1.2889
88.40	102.37	39.81	2.325	5.363	.0299	1.807	1.2889
100.00	100.00	41.03	1.907	5.514	.0254	1.808	1.2889

MOMENTUM AVERAGE STAGE EFFICIENCY = .8093 (POLYTROPIC)

MASS AVERAGE TEMPERATURE RATIO = 1.2074

MASS AVERAGE PRESSURE RATIO = 1.2553

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (CONTINUED TEST 1)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.4502 100 PERCENT DESIGN SPEED - SCAN NO 4  
 PERCENT DESIGN EQUIVALENT FLOW = 94.4466 EQUIVALENT SPEED R.P.M. = 76575.052  
 EQUIVALENT FLOW / INLET ANN AREA = 39.2061 LBM/SEC-50 FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9847

PERCENT SPAN FROM TIP (L. L.)	BETA*1 (DEG)	V*1 (FT/SEC)	BETA1 (DEG)	V1 (FT/SEC)	VI (FT/SEC)	MI	VM1 (FT/SEC)	V71 (FT/SEC)	UI (FT/SEC)	
0.00	71.47	165.18	1528.19	1.577	0.00	511.14	0.00	487	531.14	1578.19
10.06	73.04	156.61	1499.74	1.565	0.00	504.71	0.00	500	544.71	1499.74
20.70	68.61	1491.04	1368.48	1.375	0.00	592.00	0.00	546	592.00	1368.48
43.72	63.90	1377.85	1247.71	1.273	0.00	606.24	0.00	560	606.24	1237.85
62.40	61.75	1259.27	1091.69	1.142	0.00	586.51	0.00	541	586.51	1091.69
75.24	59.02	1055.55	915.57	0.979	0.00	548.43	0.00	504	548.43	915.57
100.00	56.67	955.08	798.52	0.876	0.00	525.06	0.00	481	525.06	798.52

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8527

PERCENT SPAN FROM TIP (L. L.)	BETA*2 (DEG)	V*2 (FT/SEC)	BETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VM2 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)	
0.00	59.20	1101.91	949.70	0.935	45.11	802.02	508.15	560.07	547.84	1517.85
11.52	54.66	1064.74	851.87	0.871	44.31	808.97	595.14	406	592.21	1449.01
30.71	51.06	964.23	739.31	0.810	44.04	842.90	585.73	708	605.95	1335.94
43.46	48.10	871.96	671.14	0.763	44.28	914.70	603.74	733	619.00	1224.88
63.14	46.48	807.70	477.37	0.688	44.44	904.71	633.93	775	645.47	1111.26
80.79	20.49	743.05	450.34	0.645	44.39	1010.27	731.52	876	690.40	931.86
100.00	11.49	711.57	141.69	0.620	48.34	1049.08	793.79	915	697.32	925.48

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	PERCENT SPAN FROM TIP	DELTA (DEG)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCI SUR (DEG)	FACTOR	OMEGA* (R/R)	LOSS PARAMETER (DEG)	DEVIATION ANGLE (DEG)	POTOP PRESS RATIO	RCTOR ANTIADABATIC LFF	ROTOR POLYTROPIC EFF
0.00	0.00	12.20	7.562	7.094	4.660	0.2293	0.047	2.212	1.923	7419	7419	7683
10.06	12.44	15.17	8.220	6.887	4.793	0.2279	0.047	-0.74	1.954	7621	7621	7813
20.70	15.43	15.54	7.783	6.629	4.941	0.224	0.047	0.74	1.954	8302	8302	8536
43.72	18.81	18.81	7.121	4.509	4.956	0.220	0.047	1.220	1.965	8967	8967	9050
63.14	21.43	21.43	7.513	3.637	4.899	0.210	0.047	6.313	1.971	9479	9479	9528
80.79	28.11	36.54	7.766	2.720	4.598	0.207	0.047	12.058	2.065	9887	9887	9887
100.00	100.00	45.19	7.921	1.847	4.424	0.208	0.047	18.537	2.065	9886	9886	9887

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8829 (POLYTROPIC) MOMENTUM AVG. ROTOR PRESS RATIO = 1.9736  
 MACHINERY AVERAGE ROTOR EFFICIENCY = .8711 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.2456

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (POLYTRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.5661 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 94.4466  
 10% PERCENT DESIGN SPEED - SCAN NO. 4  
 EQUIVALENT SPEED = 76575.052 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 106.5384 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9847

PERCENT SPAN FROM TIP (L. L.)	DELTA*1 (DEG)	WU*1 (M/SEC)	DELTA*1 (DEG)	WU1 (M/SEC)	P1 (MP)	V1 (M/SEC)	DELTA*1 (DEG)	WU1 (M/SEC)	P1 (MP)	V1 (M/SEC)	DELTA*1 (DEG)	WU1 (M/SEC)	P1 (MP)	V1 (M/SEC)
0.00	71.40	507.25	1.427	0.00	4.87	161.80	0.00	0.00	4.87	161.80	0.00	0.00	154.68	4.81.03
10.06	70.04	491.54	1.415	0.00	4.80	160.07	0.00	0.00	4.80	160.07	0.00	0.00	160.07	4.87.12
20.90	66.01	446.42	1.375	0.00	4.44	150.44	0.00	0.00	4.44	150.44	0.00	0.00	177.11	4.17.11
33.72	61.50	415.97	1.273	0.00	4.00	144.76	0.00	0.00	4.00	144.76	0.00	0.00	184.19	3.77.13
42.40	61.25	377.73	1.147	0.00	3.73	139.77	0.00	0.00	3.73	139.77	0.00	0.00	178.71	3.32.75
46.24	57.02	324.78	0.979	0.00	3.24	127.11	0.00	0.00	3.24	127.11	0.00	0.00	164.92	2.78.46
100.00	54.67	243.39	0.876	0.00	2.43	103.04	0.00	0.00	2.43	103.04	0.00	0.00	154.60	2.43.39

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8927

PERCENT SPAN FROM TIP (L. L.)	DELTA*2 (DEG)	WU*2 (M/SEC)	DELTA*2 (DEG)	WU2 (M/SEC)	MP (MP)	V2 (M/SEC)	DELTA*2 (DEG)	WU2 (M/SEC)	MP (MP)	V2 (M/SEC)	DELTA*2 (DEG)	WU2 (M/SEC)	MP (MP)	V2 (M/SEC)
0.00	53.20	336.99	0.715	65.11	244.45	173.17	65.11	173.17	65.11	173.17	65.11	173.17	166.58	4.62.64
11.42	54.66	310.04	0.871	64.51	258.77	181.60	64.51	181.60	64.51	181.60	64.51	181.60	180.50	4.41.66
30.71	51.00	259.10	0.810	64.03	250.92	174.59	64.03	174.59	64.03	174.59	64.03	174.59	181.54	4.07.13
41.46	46.10	217.19	0.743	64.21	243.54	164.02	64.21	164.02	64.21	164.02	64.21	164.02	184.17	3.74.14
46.14	46.68	194.69	0.698	64.68	225.70	153.22	64.68	153.22	64.68	153.22	64.68	153.22	191.16	3.38.71
48.77	40.41	171.72	0.645	61.34	207.91	122.97	61.34	122.97	61.34	122.97	61.34	122.97	208.81	3.02.32
100.00	31.49	114.19	0.620	60.34	119.71	238.90	60.34	238.90	60.34	238.90	60.34	238.90	205.32	2.82.09

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. L.)	DELTA (DEG)	WU (M/SEC)	DELTA (DEG)	WU (M/SEC)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	LOSS PARAMETER (DEG)	DEVIATION ANGLE (DEG)	ROTOR P*1.55 RATIO	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	7.562	7.094	4.660	0.293	0.447	2.112	1.923	7.643
10.06	11.17	1.448	8.220	6.887	4.793	0.229	0.467	2.274	1.944	7.433
20.90	19.71	32.95	7.793	5.628	4.861	0.154	0.174	0.974	1.954	8.932
33.72	49.46	52.33	7.321	4.403	4.950	0.072	0.072	1.278	1.965	9.000
42.40	62.46	71.43	25.77	3.632	4.899	0.110	0.110	6.913	1.973	8.679
46.24	98.71	90.37	7.766	2.729	4.598	0.176	0.176	12.058	2.065	8.887
100.00	100.96	109.00	7.921	1.847	4.260	0.208	0.208	18.537	2.065	8.886

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8929 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8711 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.9716  
 MASS AVERAGE TEMPERATURE RISE = 1.2456

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO. 4  
 INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .0967

PERCENT SPAN FROM TIP (L. S.)	DELTA S (DEG)	V5 (FT/SEC)	VU5 (FT/SEC)	M5	VW5 (FT/SEC)	VZ5 (FT/SEC)	U5 (FT/SEC)
0.00	41.97	874.77	585.02	.710	640.37	643.21	1474.09
11.19	42.47	907.01	609.09	.755	665.31	664.21	1415.86
24.22	40.09	905.53	593.52	.768	665.11	665.30	1318.85
40.29	40.79	925.80	604.79	.791	700.95	700.43	1222.76
67.57	41.26	951.71	627.67	.820	715.19	712.77	1122.35
88.27	43.52	1038.50	715.14	.904	753.04	742.92	1014.58
100.00	46.80	1070.85	760.20	.945	765.52	744.37	951.55

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (L. S.)	PETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VW4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	3.14	671.02	45.07	.550	671.51	671.51	1463.39
11.19	3.94	685.19	45.86	.560	683.64	683.76	1412.74
30.25	3.68	695.79	44.63	.576	694.36	694.05	1328.07
46.62	4.18	721.62	52.53	.602	719.90	719.16	1241.90
67.57	3.60	705.59	45.13	.592	705.15	704.76	1162.22
88.27	3.11	671.75	34.11	.563	675.62	673.15	1068.99
100.00	3.11	680.54	39.23	.567	679.49	679.49	1016.09

STATOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	PERCENT SPAN TRAILING EDGE	INCIDENCE ANGLE (DEG)	MEAN SUCTION SURFACE ANGLE (DEG)	OMEGA PAR	LO-S PARAMETERS	DIVERTION ANGLE (DEG)	STAGE PRESS. RATIO	STATOR POLYTROPIC EFF.
0.00	0.00	38.13	5.654	1.119	.0402	26.020	1.859	1.2773
11.19	11.19	38.64	6.101	1.131	.0461	20.393	1.872	1.2763
24.22	30.25	37.22	4.317	.0999	.0128	18.865	1.891	1.2508
40.29	40.29	36.61	3.008	.0574	.0175	17.161	1.927	1.2369
67.57	67.57	37.60	1.693	.0639	.0269	16.761	1.907	1.2257
88.27	88.27	40.21	1.129	.2377	.0628	14.847	1.863	1.2327
100.00	100.00	41.49	1.168	.2234	.0564	22.010	1.863	1.2324

MOMENTUM AVERAGE STAGE EFFICIENCY = .8275 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8114 (ADJ ADIABATIC)

MOMENTUM AVG. STAGE PRESS. RATIO = 1.8917  
 MASS AVERAGE TEMPERATURE RISE = 1.2456

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (CONTINUED, I.F.P.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO. 6

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8967

PERCENT SPAN FROM TIP (I. E.)	BETA 3 (DEG)	V3 (M/SEC)	M3	VN3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	61.97	266.67	.710	194.23	196.76	469.30
11.19	62.47	274.93	.755	207.79	202.65	431.55
29.82	40.09	276.33	.768	200.88	208.08	401.99
48.28	40.79	282.19	.791	213.69	213.69	377.70
67.57	43.26	290.08	.820	218.05	217.25	342.09
88.27	43.52	316.54	.904	229.53	226.64	308.24
100.00	44.80	328.84	.945	233.33	226.24	290.64

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (I. E.)	DELTA 4 (DEG)	V4 (M/SEC)	M4	VN4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	3.04	205.14	.550	204.68	274.68	646.04
11.32	3.96	208.90	.560	203.44	208.41	410.60
30.25	1.68	212.04	.576	211.64	211.55	404.79
48.62	4.18	220.01	.602	219.42	219.20	379.75
67.33	3.56	235.37	.692	216.93	214.81	354.24
88.17	3.31	255.27	.863	205.93	205.18	325.83
100.00	3.31	267.43	.967	207.08	207.08	300.70

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCF)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR ANGLE (DEG)	OMEGA BAR	L 1/3 AMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	38.13	5.654	1.732	.4550	.1119	26.020	1.859	1.2763	.7719
11.19	11.32	12.64	38.64	6.301	2.951	.4560	.1331	20.393	1.872	1.2763	.7403
29.82	18.25	32.95	37.22	4.717	.993	.4270	.0999	16.865	1.891	1.2763	.8020
48.28	48.62	52.34	36.61	3.060	.066	.3991	.0175	16.164	1.927	1.2369	.8431
67.57	67.33	71.43	37.60	1.693	-1.160	.4269	.0539	14.761	1.907	1.2257	.8138
88.27	68.17	90.37	40.21	1.129	-1.740	.5116	.0628	14.847	1.863	1.2375	.8728
100.00	100.00	100.00	41.40	.168	-3.273	.5277	.0564	22.010	1.863	1.232	.8724

MOMENTUM AVERAGE STAGE EFFICIENCY = .8275 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8114 (ADIABATIC)  
MOMENTUM AVERAGE STAGE PRESS RATIO = 1.8913  
MASS AVERAGE TEMPERATURE RISE = 1.2456

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED IMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 3.5162 LHM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 96.0023  
 100 PERCENT DESIGN SPEED - SCAN NO 6  
 EQUIVALENT SPEED R.P.M. = 76634.428  
 EQUIVALENT FLOW / INLET ANN APFA = 38.8354 LHM/SEC-SC FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9774

PERCENT SPAN FROM TIP (L. L.)	DELTA*1 (DEG)	V*1 (FT/SEC)	M*1	UETA1 (DEG)	V1 (FT/SEC)	M1	VU1 (FT/SEC)	M1	VU1 (FT/SEC)	M1	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	71.00	1670.41	1579.42	1.534	0.00	543.00	0.00	.499	543.00	0.00	526.28	1579.42
9.81	69.65	1602.94	1502.89	1.473	0.00	527.45	0.00	.512	527.45	0.00	539.21	1502.89
26.61	66.17	1499.04	1371.75	1.381	0.00	605.97	0.00	.560	605.97	0.00	594.84	1371.75
43.66	61.19	1385.55	1239.74	1.262	0.00	620.70	0.00	.574	620.70	0.00	618.70	1239.74
62.40	61.21	1246.01	1092.54	1.151	0.00	600.12	0.00	.556	600.12	0.00	590.11	1092.54
83.22	58.46	1072.91	914.43	.987	0.00	563.19	0.00	.516	563.19	0.00	543.66	914.43
100.00	56.07	963.09	799.14	.884	0.00	537.51	0.00	.493	537.51	0.00	519.25	799.14

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8317

PERCENT SPAN FROM TIP (L. L.)	DELTA*2 (DEG)	M*2	UETA2 (DEG)	V2 (FT/SEC)	M2	VU2 (FT/SEC)	M2	VU2 (FT/SEC)	M2	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	58.98	1168.27	1001.19	.976	40.70	794.12	517.84	.663	602.05	582.66	1519.03
11.24	58.08	1124.59	910.79	.946	35.39	851.53	541.60	.718	650.64	645.27	1452.19
25.80	51.18	1042.94	804.76	.876	39.68	841.33	517.13	.713	647.55	643.51	1341.90
49.80	45.69	978.88	671.85	.802	40.39	861.03	557.90	.735	655.84	655.80	1229.75
68.19	37.53	863.07	513.50	.726	41.93	809.27	600.86	.724	650.07	667.09	1114.76
89.71	22.04	717.87	295.60	.686	63.68	1008.91	697.53	.830	730.31	718.32	993.13
100.00	13.74	752.40	178.70	.659	45.64	1045.43	747.50	.916	738.87	706.03	926.20

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. L.)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCT SU <sup>2</sup> (DEG)	0 FACTOR	OMEGA* BAR	LOSS PARAMETER ANGLT (DEG)	DEVIATION ANGLT (DEG)	POTOP POTSS RATIO	ROTOR EFF	ADIANATIC EFF	POLYTROPIC EFF	HOIOP FFF
0.00	0.00	12.02	7.164	0.695	.4187	.2055	1.980	1.838	.7523	.7523	.7724	.7724
9.81	11.24	12.56	7.789	0.662	.4212	.1946	.4212	1.889	.7895	.7895	.8074	.8074
26.61	7.94	14.99	7.295	0.559	.4300	.2239	.067	1.891	.8632	.8632	.8749	.8749
43.66	6.80	17.65	6.802	0.494	.4444	.0773	3.514	1.904	.9207	.9207	.9276	.9276
62.40	6.819	23.69	6.972	0.432	.4534	.0544	7.494	1.918	.9514	.9514	.9596	.9596
83.22	8.171	36.43	7.203	0.357	.4153	.0066	13.685	2.025	1.0044	1.0044	1.0040	1.0040
100.00	100.00	42.34	7.322	1.248	.3807	-.0031	20.791	2.024	1.0044	1.0044	1.0040	1.0040

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8997 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8992 (ADIADATIC)

MOMENTUM AVG. ROTOR EFFSS RATIO = 1.9148  
 MASS AVERAGE TEMPERATURE RISE = 1.2287

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TYP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.5949 KG/SEC  
 EQUIVALENT FLOW / INLET ANN AREA = 76634.428 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 96.0023

100 PERCENT DESIGN SPEED = 76634.428 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 189.6111 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9774

PERCENT FROM TIP (L. C.)	BETA*1 (DEG)	V*1 (M/SEC)	M*1	BETA1 (DEG)	VI (M/SEC)	VU1 (M/SEC)	H1	VNI (M/SEC)	VZ1 (M/SEC)	U1 (M/SEC)
0.00	71.00	500.14	401.41	1.534	0.00	155.75	0.00	165.75	160.41	461.41
9.81	69.65	488.58	458.08	1.473	0.00	169.91	0.00	169.91	154.35	458.08
26.61	68.17	452.09	418.11	1.305	0.00	184.70	0.00	184.70	191.31	418.11
43.66	63.59	422.11	377.57	1.287	0.00	189.16	0.00	189.16	189.58	377.57
62.40	61.21	376.97	331.01	1.151	0.00	182.98	0.00	182.98	182.91	331.01
85.22	58.46	327.02	278.72	.907	0.00	171.05	0.00	171.05	188.75	278.72
100.00	56.07	293.55	243.58	.836	0.00	161.83	0.00	161.83	158.27	243.58

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8317

PERCENT FROM TIP (L. C.)	BETA*2 (DEG)	V*2 (M/SEC)	M*2	BETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	H2	VM2 (M/SEC)	VZ2 (M/SEC)	U2 (M/SEC)
0.00	58.98	356.09	305.16	.976	40.70	242.05	157.84	183.50	177.60	463.00
11.24	54.98	342.78	277.61	.946	30.39	260.16	165.08	201.07	196.68	442.59
29.88	51.18	314.44	245.29	.876	39.68	256.44	163.72	197.37	191.14	409.01
48.80	45.64	281.17	204.79	.802	40.39	262.44	170.05	199.90	190.89	374.83
60.12	37.53	252.14	156.44	.726	41.93	274.10	183.14	203.91	201.71	339.78
88.71	22.04	240.14	98.10	.686	43.60	307.02	212.61	222.00	213.94	302.71
100.00	13.74	225.13	54.47	.659	45.54	318.65	227.84	222.77	215.20	282.11

ROTOR PERFORMANCE DATA

PERCENT LEADING LOG	SPAN FROM TIP TRAILING EDGE	MASS FLOW (PC)	DELTA UFTA* (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR (DEG)	ANGLE (DEG)	LOSS PARAMETER (DEG)	OMEGA* OAR (DEG)	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	12.02	7.164	6.696	.4187	.2055	.0403	1.989	1.838	.7523	.7724
9.81	11.24	32.19	15.56	7.780	6.462	.4212	.1846	.0191	-.931	1.889	.7895	.8074
26.61	29.88	32.05	14.59	7.295	5.157	.4302	.1239	.0258	.807	1.891	.8632	.8749
43.66	48.80	52.30	17.60	6.802	3.894	.4444	.0773	.0164	3.514	1.908	.8207	.9277
62.40	68.19	71.47	21.69	6.372	3.092	.4514	.0564	.0118	7.496	1.718	.9514	.7556
85.22	88.71	90.75	36.43	7.203	2.157	.4153	-.0056	-.0014	13.485	2.025	1.0044	1.0040
100.00	100.00	100.00	42.34	7.322	1.249	.3807	-.0091	-.0019	20.791	2.024	1.0044	1.0040

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8977 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8902 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.9148  
 MASS AVERAGE TEMPERATURE RISE = 1.2207



NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED\_TFMP.1)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 6

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8824

PERCENT SPAN FROM TIP (L. L.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VH3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	37.75	871.05	533.22	.734	648.78	691.21	1475.23
10.82	37.66	907.48	554.39	.768	718.46	717.26	1418.84
29.89	36.86	907.64	544.50	.776	726.18	726.17	1323.74
47.75	37.19	925.41	559.40	.797	737.20	736.65	1226.46
67.26	38.84	949.41	595.47	.822	739.45	716.75	1124.85
88.27	41.00	1040.00	682.26	.910	784.93	774.39	1015.37
100.00	42.30	1077.19	725.10	.949	796.86	774.85	954.28

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9131

PERCENT SPAN FROM TIP (L. L.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	H4	VH4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	3.49	709.32	43.12	.540	707.00	707.00	1464.53
11.20	3.48	710.79	44.09	.543	717.42	717.44	1414.41
29.89	3.31	761.56	43.97	.640	760.29	759.95	1330.74
43.29	3.31	778.84	44.93	.659	777.59	776.79	1248.35
67.14	4.00	764.46	53.36	.647	762.60	762.18	1113.94
88.14	3.50	779.68	44.43	.613	728.32	728.66	1069.96
100.00	3.49	733.89	44.63	.617	732.53	732.53	1016.88

STATOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FROM TIP TRAILING EDGE	MACH'S FLCH (PPT)	DELTA CETA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUPT SUR (DEG)	D FACTOR	OMFGA BAP	LOSS PARAMETER	DEVIATION ANGLE (D. C)	STAGE PRESS RATIO	STATOR TEMP POLYTROPIC EFF
0.00	0.00	6.00	14.26	1.427	-2.495	.3913	.1047	.0176	25.070	1.740	1.2520
10.82	11.20	12.19	34.17	1.432	-1.872	.1811	.1178	.0408	20.070	1.817	1.2520
29.89	29.89	31.65	31.55	3.23	-3.017	.3410	.0617	.0202	10.534	1.853	1.2409
47.75	48.29	52.16	33.88	-4.91	-3.492	.3255	.0445	.0136	15.322	1.879	1.2198
67.26	67.14	71.47	34.84	-6.95	-3.547	.3528	.0893	.0256	15.107	1.957	1.2146
88.27	88.14	90.36	37.50	-1.396	-4.272	.4524	.2151	.0700	15.027	1.802	1.2219
100.00	100.00	100.00	38.81	-2.372	-5.773	.4605	.2503	.0632	22.191	1.807	1.2218

MOMENTUM AVERAGE STAGE EFFICIENCY = .8645 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8307 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.8401  
MACH'S AVGRAGE TEMPERATURE RISE = 1.2287

ORIGINAL PAGE IS OF POOR QUALITY

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPFD. - SCAN NO. 6

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .0824

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VN3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	37.75	267.50	167.57	.734	209.94	207.63	449.65
10.82	37.66	276.60	168.98	.768	218.99	218.62	432.47
29.08	36.86	276.65	165.96	.777	221.34	221.74	403.48
47.77	37.19	287.07	70.50	.797	224.70	224.53	373.83
67.26	38.94	289.38	181.50	.822	225.39	224.56	342.85
84.27	41.00	316.99	207.95	.910	239.25	236.03	309.68
100.00	42.30	328.39	271.01	.949	242.80	236.17	290.87

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .0131

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VN4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	3.49	215.90	13.14	.586	215.69	215.69	446.39
11.20	3.48	225.18	17.68	.613	224.77	224.74	421.11
29.89	3.31	232.12	13.40	.640	231.74	231.63	405.61
48.20	3.31	237.41	13.71	.659	237.01	236.77	380.50
67.14	4.00	243.01	16.26	.647	232.44	237.31	354.78
84.14	3.50	222.41	13.56	.613	221.99	221.18	324.12
100.00	3.49	223.69	13.62	.617	223.28	223.28	309.94

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA OFTA (DEG)	INCIDENCE MEAN (DEG)	ANGL SUCT (DEG)	ANGL SUR (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR TEMP POLYTROPIC RATIO
0.00	0.00	0.00	34.27	1.627	-2.495	.3913	.1047	.0175	55.670	1.780	1.2520	.7448
10.82	11.20	12.19	34.17	1.692	-1.872	.3411	.1178	.0409	20.970	1.817	1.2420	.7157
29.08	29.89	37.65	33.55	.323	-3.017	.3410	.0517	.0202	16.534	1.853	1.2309	.9310
47.75	48.29	52.16	31.80	-.691	-7.692	.3255	.0465	.0136	15.322	1.979	1.2190	.9795
67.26	67.14	71.47	34.84	-.685	-3.587	.3529	.0993	.0256	15.107	1.877	1.2146	.7918
84.27	84.14	90.35	37.50	-1.396	-4.272	.4524	.2651	.0700	15.027	1.907	1.2219	.5871
100.00	100.00	100.00	38.81	-2.332	-5.773	.4685	.2503	.0632	22.191	1.802	1.2218	.6582

MOMENTUM AVERAGE STAGE EFFICIENCY = .8445 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8307 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.8401  
MASS AVERAGE TEMPERATURE RISE = 1.2287

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (UNHEIRED ICRP)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.8211 LB4/SEC 90 PERCENT DESIGN SPEED - SCAN NC 8  
 PERCENT DESIGN EQUIVALENT FLOW = 77.0248 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 68919.280 R.F.P.  
 = 31.1585 LBM/SEC-50 FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AFRODYNAMIC BLOCKAGE = 1.0179

PERCENT SPAN FROM TIP (L.C.)	PETA*1 (DEG)	V*1 (FT/SEC)	M*1 (DEG)	BETA1 (DEG)	VI (FT/SEC)	VUI (FT/SEC)	M1 (DEG)	VM1 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	73.88	1478.54	1420.41	1.343	0.00	410.50	0.00	373	410.50	1420.41
10.12	72.00	1412.15	137.98	1.284	0.00	420.99	0.00	383	420.99	1347.08
27.03	69.65	1312.63	1230.73	1.196	0.00	456.40	0.00	414	456.40	1230.73
41.14	67.32	1211.35	1117.70	1.105	0.00	467.04	0.00	426	467.04	1117.70
61.43	65.37	1088.32	989.31	1.092	0.00	451.55	0.00	413	451.55	989.31
84.62	62.71	940.18	826.61	1.846	0.00	426.55	0.00	388	426.55	826.61
100.00	60.28	827.50	718.69	1.752	0.00	410.30	0.00	373	410.30	718.69

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AFRODYNAMIC BLOCKAGE = .9813

PERCENT SPAN FROM TIP (T.I.)	SCA*2 (DEG)	V*2 (FT/SEC)	M*2 (DEG)	PETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2 (DEG)	VM2 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	62.09	894.97	790.65	7.41	54.59	569.46	0.580	407.83	394.70	1366.10
12.76	60.72	801.13	698.80	6.64	56.83	599.29	0.594	391.76	383.20	1248.09
34.52	53.40	711.03	578.82	6.05	54.52	740.79	0.622	429.04	427.27	1132.07
51.35	44.76	655.79	461.73	5.56	53.09	619.96	0.657	465.60	465.67	1001.69
71.44	36.25	616.83	375.29	5.74	47.90	609.92	0.707	551.20	540.57	983.21
89.60	16.63	603.77	172.76	5.23	51.05	715.64	0.790	578.52	569.02	888.39
100.00	6.86	583.26	69.69	5.08	52.81	763.26	0.835	579.09	559.41	832.95

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	SPAN FROM TIP (INCH)	DELTA BETA* (DEG)	INCIDENCE ANGLE MEAN (DEG)	SUCT SUR ANGLE (DEG)	OMEGA BAR (DEG)	LOSS PARAMETER (DEG)	LEVITATION ANGLE (DEG)	POTOR PRESS RATIO	POTOR EFF	POTICR POLYTROPIC EFF
0.00	0.00	10.99	10.044	9.570	5.414	293.4	3.509	1.732	0.601	0.7036
10.12	12.76	11.93	10.893	9.544	5.859	317.7	6.024	1.719	0.701	0.6940
27.03	34.52	10.26	10.071	9.689	6.010	261.3	4.758	1.725	0.7367	0.7560
41.14	51.35	22.57	10.669	7.789	6.102	222.9	4.675	1.734	0.7911	0.8066
61.43	71.44	31.12	11.027	7.182	5.358	110.8	7.029	1.751	0.8937	0.9073
84.62	89.60	89.45	11.370	6.345	5.270	152.5	9.374	1.819	0.9134	0.9203
100.00	100.00	100.00	11.525	5.451	4.877	177.0	13.914	1.819	0.9133	0.9203

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8027 (POLYTROPIC) MOMENTUM AVG. ROTOR PRESS RATIO = 1.7456  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .7868 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.2189

NASA SMALL AXIAL COMPRESSOR TEST 2, FEB. 20, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.2796 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 77.3248  
 90 PERCENT DESIGN SPEED - SCAN NO. 8  
 EQUIVALENT SPFO  
 EQUIVALENT FLOW / INLET ANH AREA = 6.9919, 280 R.F.M.  
 192.1292 K7/SEC-50 M

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = 1.0179

PERCENT SPAN FROM TIP (L.F.)	9TA*1 (DEG)	V*1 (M/SEC)	M*1	9TA1 (DEG)	V1 (M/SEC)	M1	V*1 (M/SEC)	M1	9TA1 (DEG)	V1 (M/SEC)	M1	V*1 (M/SEC)	M1	9TA1 (DEG)	V1 (M/SEC)	M1
0.00	73.88	450.66	432.64	1.343	0.00	125.12	0.00	173	125.12	121.09	0.173	121.09	0.173	121.09	0.173	417.04
10.32	72.66	410.44	410.84	1.284	0.00	128.32	0.00	383	128.32	124.12	0.383	124.12	0.383	124.12	0.383	410.87
27.03	69.65	400.09	375.13	1.96	0.00	139.11	0.00	416	139.11	136.55	0.416	136.55	0.416	136.55	0.416	375.11
43.14	67.32	366.22	340.67	1.105	0.00	142.35	0.00	426	142.35	141.90	0.426	141.90	0.426	142.35	0.426	340.67
61.43	65.37	311.72	301.54	.992	0.00	138.24	0.00	413	138.24	138.19	0.413	138.19	0.413	138.24	0.413	301.54
84.62	62.71	281.52	251.75	.846	0.00	130.01	0.00	388	130.01	128.27	0.388	128.27	0.388	130.01	0.388	281.52
100.00	60.28	252.24	219.06	.752	0.00	125.04	0.00	373	125.04	125.06	0.373	125.06	0.373	125.04	0.373	219.06

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9813

PERCENT SPAN FROM TIP (L.F.)	9TA*2 (DEG)	V*2 (M/SEC)	M*2	9TA2 (DEG)	V2 (M/SEC)	M2	V*2 (M/SEC)	M2	9TA2 (DEG)	V2 (M/SEC)	M2	V*2 (M/SEC)	M2	9TA2 (DEG)	V2 (M/SEC)	M2
0.00	62.89	272.79	242.82	.741	54.19	213.49	173.57	.560	124.31	120.30	0.560	120.30	0.560	120.30	0.560	416.39
12.76	60.72	244.18	211.00	.664	56.83	218.23	182.66	.594	119.41	116.80	0.594	116.80	0.594	116.80	0.594	395.66
34.52	53.40	216.77	176.43	.605	54.52	225.70	183.87	.627	131.05	130.23	0.627	130.23	0.627	130.23	0.627	350.30
53.35	44.76	194.99	140.74	.556	53.09	236.34	188.96	.657	141.04	141.94	0.657	141.94	0.657	141.94	0.657	328.70
71.44	34.75	203.25	114.19	.574	47.90	250.57	185.90	.707	168.01	167.51	0.707	167.51	0.707	167.51	0.707	300.79
89.60	16.61	184.03	54.16	.523	51.05	280.49	218.13	.798	176.33	173.44	0.798	173.44	0.798	173.44	0.798	270.79
100.00	6.86	177.78	21.24	.508	52.81	292.02	232.64	.835	176.51	170.51	0.835	170.51	0.835	170.51	0.835	253.88

POTOP PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	IP	MASS FLOW (PCT)	DELTA 9TA* (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCTION SURFACE ANGLE (DEG)	D FACTOR	OMEGA* BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	POTOP PRESS RATIO	ROTOR ANADIATIC EFF	POTOP EFF
0.00	0.00	0.00	10.99	10.044	9.574	.5414	.2933	.0509	5.900	1.717	.6801	.7036
10.32	17.76	12.72	11.93	10.993	9.544	.5850	.3177	.0563	6.024	1.719	.6701	.6940
27.03	34.52	31.01	16.21	10.851	8.680	.6010	.2613	.0518	6.758	1.725	.7167	.7520
43.14	51.43	51.74	27.57	10.669	7.783	.6102	.2229	.0480	6.875	1.734	.7011	.7066
61.43	71.44	70.60	31.12	11.027	7.182	.5358	.1180	.0268	7.029	1.751	.8907	.9073
84.62	89.60	89.95	46.00	11.370	6.345	.5270	.1425	.0119	9.174	1.819	.9134	.9203
100.00	100.00	100.00	51.42	11.525	5.451	.4877	.1770	.0174	11.914	1.819	.9133	.9203

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8027 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .7864 (ADIABATIC)  
 MOMENTUM AVG. ROTOP PRESS RATIO = 1.7456  
 MASS AVERAGE TEMPERATURE RISE = 1.2189

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINFID. I.F.M.P.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 8

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9311

PERCENT SPAN FROM TIP (L. E.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	49.08	766.84	586.36	.639	494.10	494.77	1326.71
12.11	52.61	770.99	617.56	.643	468.18	467.40	1259.94
32.41	49.58	797.82	607.43	.674	517.26	517.26	1171.95
50.96	48.20	826.84	616.34	.705	551.12	550.71	1073.96
69.42	44.20	850.70	600.03	.744	617.07	614.82	1001.46
88.73	47.63	944.41	698.06	.822	636.69	628.34	913.76
100.00	48.01	984.18	740.66	.861	648.11	630.20	858.21

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (L. E.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	3.11	587.53	33.92	.482	546.55	544.55	1317.09
11.42	3.30	582.16	33.51	.477	581.20	511.13	1271.11
30.57	58.13	58.43	29.43	.481	580.39	530.13	1144.02
48.82	60.65	57.02	50.0	.500	601.95	601.31	1120.53
67.52	41.76	59.72	59.72	.517	610.84	610.51	1045.28
87.16	58.00	63.42	63.42	.500	594.63	592.46	362.17
100.00	60.52	63.97	63.97	.506	598.11	534.11	914.50

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. E.)	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGL SUCT SUR (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGL (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	46.57	13.558	9.636	.4956	.1107	.0198	25.490	1.685	1.2492	.7479
12.11	11.42	49.31	16.414	13.103	.5048	.0525	.0321	19.833	1.680	1.2492	.4142
32.41	30.57	46.68	12.854	9.624	.5047	.0568	.0318	16.059	1.682	1.2285	.8241
50.96	51.74	42.79	10.228	7.276	.4692	.0580	.0177	17.387	1.706	1.2148	.8955
69.42	67.52	38.63	6.375	1.591	.4588	.0606	.0173	16.645	1.718	1.1925	.8986
88.73	88.16	41.54	5.117	2.270	.5350	.1076	.0493	17.670	1.697	1.2037	.7647
100.00	109.00	42.71	4.181	.740	.5514	.175	.0460	24.800	1.697	1.2017	.7763

MOMENTUM AVERAGE STAGE EFFICIENCY = .7615 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7432 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS. RATIO = 1.6964  
MASS AVERAGE TEMPERATURE RISE = 1.2189

NASA SMALL AXIAL COMPRESSOR TEST 2 FCU, 20, 1374 (COMBINED I.F.M.P.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

20 PERCENT DESIGN SPEED - SCAN NO. 8

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9731

PERCENT SPAN FROM TIP (L. E.)	DELTA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	V33 (M/SEC)	U3 (M/SEC)
0.00	49.98	233.73	178.72	.639	150.63	149.97	404.38
12.11	52.61	235.00	186.71	.643	162.70	162.46	387.09
12.61	49.58	243.18	185.14	.674	157.66	157.66	357.82
20.96	48.20	252.02	187.87	.705	167.86	167.86	331.61
69.42	44.20	262.34	182.89	.744	188.08	187.40	305.24
88.78	47.63	287.98	212.77	.822	194.06	191.46	277.60
100.00	48.81	299.98	225.75	.861	197.54	197.08	261.58

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9100

PERCENT SPAN FROM TIP (L. E.)	DELTA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	V44 (M/SEC)	L4 (M/SEC)
0.00	3.31	173.08	10.34	.482	178.74	178.74	401.45
11.42	5.30	177.64	10.21	.477	177.14	177.13	387.43
10.57	2.90	177.13	8.97	.481	176.90	171.82	383.94
48.87	5.41	184.10	17.38	.504	183.48	181.29	341.54
67.52	5.98	187.07	18.29	.517	186.18	186.06	318.60
88.16	8.09	182.27	19.31	.500	181.24	180.58	293.27
100.00	6.10	183.34	19.49	.504	182.31	182.31	278.74

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLCH (PCI)	OFLTA DELTA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SURT (DEG)	U FACTOR	OMEGA GAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	POLYTROPIC EFF
0.00	0.00	46.57	13.558	9.636	.4958	.1107	.0198	25.490	1.685	1.2492	.7679
12.11	11.42	49.31	16.414	13.103	.5048	.0975	.0121	19.813	1.680	1.2432	.8142
12.61	10.57	46.68	12.854	9.624	.5067	.0968	.0318	16.059	1.682	1.2285	.8241
20.96	49.82	42.79	10.220	7.276	.4692	.0580	.0177	17.187	1.706	1.2148	.8955
69.42	67.52	38.61	6.175	1.581	.4588	.0606	.0171	16.685	1.718	1.1925	.8886
88.78	88.16	41.54	5.117	2.270	.5350	.1876	.0493	17.620	1.697	1.2037	.7847
100.00	100.00	42.71	4.181	.740	.5514	.1751	.0440	24.800	1.697	1.2037	.7763

MOMENTUM AVERAGE STAGE EFFICIENCY = .7615 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7432 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.6964  
 MASS AVERAGE TEMPERATURE RISE = 1.2189

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.9210 LBM/SEC 90 PERCENT DESIGN SPEED - SCAN NO. 9  
 EQUIVALENT SPEED = 68947.760 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 79.7518 EQUIVALENT FLOW / INLET ANGLE AREA = 32.2617 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0101

PERCENT SPAN FROM TIP (L.F.)	BETA*1 (DEG)	V*1 (FT/SEC)	M*1	BETA1 (DEG)	V1 (FT/SEC)	M1	VH1 (FT/SEC)	VZ1 (FT/SEC)	UI (FT/SEC)
0.00	71.76	1487.89	1.350	0.00	427.43	0.00	399	427.43	1421.00
10.24	77.00	1418.53	1.291	0.00	438.30	0.00	399	438.30	1349.12
27.08	68.87	1315.59	1.204	0.00	475.58	0.00	434	475.58	1230.91
43.50	66.42	1217.72	1.112	0.00	486.87	0.00	445	486.87	1119.61
61.95	64.39	1097.49	0.998	0.00	472.66	0.00	431	472.66	986.07
84.87	61.68	931.05	0.873	0.00	444.41	0.00	405	444.41	824.51
100.00	53.27	811.41	0.761	0.00	427.19	0.00	369	427.19	719.98

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9487

PERCENT SPAN FROM TIP (L.F.)	BETA*2 (DEG)	V*2 (FT/SEC)	M*2	BETA2 (DEG)	V2 (FT/SEC)	M2	VH2 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	61.20	910.17	0.774	50.91	710.69	0.591	449.15	431.72	1366.47
12.32	58.94	842.27	0.702	54.13	724.20	0.603	434.56	424.06	1300.95
31.58	52.75	760.26	0.647	51.09	740.20	0.624	464.97	462.97	1187.58
52.22	46.30	717.95	0.613	48.65	778.81	0.663	514.54	514.51	1088.15
70.13	35.61	692.49	0.597	46.28	815.07	0.702	563.20	561.6	992.60
89.11	19.47	610.40	0.529	50.08	846.90	0.778	675.58	666.04	891.37
100.00	9.60	584.24	0.509	51.94	944.48	0.815	876.05	856.47	811.30

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA U/LTA* (D/G)	INCIDENCE ANGLE (DEG)	MEAN SUCT SUP (DEG)	FACTOR	OMEGA* UAR	PARAMETER	LOTS ANGLE (DEG)	DEVIATION	ROTOR PRIEST	ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	0.60	12.06	9.422	8.954	0.5147	0.721	0.0499	4.207	1.774	0.660	0.660	0.7182
10.24	12.32	12.61	17.06	10.222	8.879	0.5540	0.261	0.54	4.149	1.711	0.693	0.693	0.7080
27.08	31.58	33.05	16.12	10.081	7.915	0.5612	0.203	0.664	3.744	1.718	0.7013	0.7013	0.7787
43.50	52.22	52.10	22.04	9.818	6.916	0.5516	0.1649	0.358	3.991	1.741	0.808	0.808	0.8527
61.95	70.13	71.05	20.78	10.102	6.238	0.5101	0.0915	0.263	7.214	1.748	0.815	0.815	0.9274
84.87	89.11	90.11	42.71	10.183	5.347	0.5170	0.1271	0.280	11.502	1.790	0.919	0.919	0.9262
100.00	100.00	100.00	49.67	10.519	4.445	0.4851	0.1560	0.327	16.656	1.790	0.919	0.919	0.9262

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8235 (POLYTROPIC) MOMENTUM AVG. ROTOR PRESS. RATIO = 1.7376  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8095 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.2109

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NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.1249 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 79.7518  
 90 PERCENT DESIGN SPEED - SCAN NO. 9  
 EQUIVALENT SPEED = 68947.760 R.F.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 157.5153 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0101

PERCENT SPAN FROM TIP (L. E.)	V*1 (M/SEC)	VU*1 (M/SEC)	M*1	DELTA1 (DEG)	V1	VU1 (M/SEC)	M1	VH1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	73.26	62.79	1.310	0.00	130.28	0.00	.389	130.28	126.08	433.12
10.24	72.00	617.87	1.291	0.00	133.59	0.00	.394	133.59	170.22	411.21
27.08	69.87	607.21	1.2704	0.00	144.96	0.00	.414	144.96	142.50	375.19
43.50	66.62	571.01	1.112	0.00	148.40	0.00	.445	148.40	147.57	340.04
61.55	64.39	533.10	1.055	0.00	144.07	0.00	.431	144.07	144.07	300.52
84.97	61.68	265.49	0.753	0.00	135.46	0.00	.405	135.46	133.64	251.31
100.00	59.27	254.94	0.761	0.00	130.27	0.00	.389	130.27	125.84	219.15

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9487

PERCENT SPAN FROM TIP (L. E.)	BETA*2 (DEG)	V*2 (M/SEC)	VU*2 (M/SEC)	M*2	BETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	VH2 (M/SEC)	V/2 (M/SEC)	U/2 (M/SEC)
0.00	61.20	281.52	248.44	.774	50.91	218.62	168.12	.591	136.60	132.20	416.56
12.32	58.54	254.72	219.62	.707	53.13	220.76	176.61	.611	132.45	120.56	396.53
33.58	52.75	234.17	196.41	.647	51.09	225.63	175.57	.624	141.72	140.84	361.99
52.22	44.19	210.43	153.47	.613	48.65	237.38	170.20	.663	158.83	156.92	331.67
70.11	31.61	211.19	122.98	.597	46.28	248.43	179.50	.702	171.49	171.19	307.56
93.11	19.47	148.05	62.01	.573	50.08	273.37	209.68	.778	175.41	172.53	271.69
100.00	9.60	178.08	29.71	.509	51.94	284.83	224.28	.815	175.58	169.61	253.99

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGL	FRCH TRAILING EDGE	TIP FLOW (PCT)	MASS FLOW (PCT)	DELTA (DEG)	BETA* (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCT SUR (DEG)	D	OMEGA BAR	FACTOR	LOSS PARAMETER	DELTA ANGLE (DEG)	DEVIATION ANGLE (DEG)	R10IP	R10IP ANIATIC EFF	R0ICP POLY TROPIC EFF
0.00	0.00	0.00	0.00	12.00	9.422	8.954	5147	.2721	.0499	1.774	.6960	4.207	1.774	.7182	.7182	
10.24	12.18	17.61	11.06	11.06	8.879	7.915	5540	.2961	.0564	1.711	.6853	4.149	1.711	.7080	.7080	
27.08	33.58	33.05	16.12	10.881	7.915	6.919	5612	.2303	.0464	1.718	.7613	3.744	1.718	.7787	.7787	
43.50	52.22	52.10	22.04	9.818	6.919	5.516	5516	.1649	.0359	1.741	.8408	3.891	1.741	.8408	.8408	
61.55	70.11	71.03	28.78	10.102	6.238	5.101	5101	.0915	.0203	1.748	.9215	7.214	1.748	.9215	.9215	
84.97	86.11	90.19	42.21	10.343	5.347	4.851	5170	.1871	.0280	1.700	.8159	11.562	1.700	.9262	.9262	
100.00	100.00	100.00	49.67	10.519	4.445	4.851	4851	.1560	.0127	1.790	.9199	16.656	1.790	.9199	.9199	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8235 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8093 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS. RATIO = 1.7376  
 MASS AVERAGE TEMPERATURE RISE = 1.2109



NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEST)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO. 9

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9556

PERCENT SPAN FROM TIP (L. E.)	BETA 3 (DEG)	V2 (FT/SEC)	VU3	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	46.90	777.89	567.95	.672	531.54	525.70	1327.26
11.79	44.50	779.36	592.44	.651	506.15	505.11	1271.98
31.02	46.52	800.87	591.09	.679	551.13	551.12	1177.20
50.28	44.29	834.63	582.80	.716	597.45	597.45	1091.59
68.57	42.59	858.99	581.34	.744	632.18	630.07	1005.87
88.48	46.49	926.55	671.91	.807	637.97	629.40	912.57
100.00	47.69	965.54	711.99	.846	620.00	632.84	858.57

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9422

PERCENT SPAN FROM TIP (L. E.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	4.53	555.19	47.01	.490	593.33	573.33	1317.63
11.40	4.52	506.11	47.02	.491	594.26	574.18	1271.74
30.50	4.24	603.84	44.63	.502	602.19	601.93	1104.79
48.78	5.19	620.81	50.21	.521	618.26	617.63	1121.17
67.53	4.36	624.58	47.44	.528	622.78	622.41	1045.66
88.23	4.36	567.22	45.40	.501	595.49	593.12	962.30
100.00	4.33	600.62	45.66	.504	598.88	598.88	914.88

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING TO GC	TRAILING (DEG)	MASK (PCF)	FLCH (PCF)	DELTA (DEG)	BETA (DEG)	INCIDENCE MEAN (DEG)	SUCTY SURF (DEG)	ANGLE (DEG)	LOSS PARAMETER	OMEGA BAR	FACTOR	U	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STATOR EFF
0.00	0.00	0.00	0.00	42.37	10.579	10.579	6.656	.4782	.1057	.0379	26.710	1.079	1.2415	.7804	
11.79	11.40	17.01	44.98	44.98	11.313	11.313	9.990	.4776	.0740	.0256	21.061	1.079	1.2415	.8478	
32.02	30.50	33.05	42.28	42.28	9.820	9.820	6.571	.4620	.0612	.0701	17.402	1.090	1.2191	.8001	
50.28	48.78	52.10	39.09	39.09	6.381	6.381	3.418	.4437	.0643	.0196	17.123	1.709	1.2038	.8403	
68.57	67.53	71.05	38.23	38.23	2.888	2.888	.065	.4430	.0614	.0176	15.465	1.715	1.1873	.8929	
88.48	88.23	90.19	42.13	42.13	4.043	4.043	1.179	.5250	.1741	.0659	15.891	1.682	1.1964	.7562	
100.00	100.00	100.00	43.33	43.33	3.054	3.054	-.387	.5419	.1624	.0407	23.050	1.682	1.1964	.7871	

MOMENTUM AVERAGE STAGE EFFICIENCY = .7802 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7693 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS. RATIO = 1.6947  
MASS AVERAGE TEMPERATURE RISE = 1.2109

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 9

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9556

PERCENT SPAN FROM TIP (L.F.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VW3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	46.90	237.10	173.11	.652	162.01	160.23	404.75
11.79	49.50	237.54	180.66	.653	154.27	174.07	377.70
32.02	46.57	264.11	177.11	.679	167.98	167.08	354.81
50.28	44.79	254.59	177.64	.716	182.10	191.97	332.72
60.57	42.29	261.87	177.19	.744	182.75	172.05	306.59
88.48	36.49	287.41	204.80	.807	194.45	171.84	278.15
100.00	47.69	296.30	217.62	.846	198.12	172.64	251.69

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9427

PERCENT SPAN FROM TIP (L.F.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VW4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	44.51	191.41	14.31	.490	183.85	180.85	401.61
11.40	44.52	181.70	14.33	.491	181.13	181.11	337.63
30.50	44.24	184.05	13.67	.502	181.55	181.87	364.17
48.78	5.19	189.22	17.13	.521	180.45	188.25	341.73
67.53	4.16	190.37	14.47	.528	189.82	189.72	318.72
88.23	4.36	182.03	13.84	.501	181.51	180.84	293.31
100.00	4.16	181.07	13.92	.504	182.54	182.54	278.96

STATOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	PERCENT SPAN TRAILING EDGE	MASS FLOW (PCT)	OFLTA (DEG)	INCLINCE (DEG)	ANGLE NEAR SUCT SUR (DLG)	D FACTOR	OMEGA BAR	LOSS PAPER AFTER	DEVIATION ANGLE (DEG)	STAGE PRESSURE RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	42.37	10.570	6.656	.4782	.1057	.0179	26.710	1.679	1.2416
11.79	11.40	12.71	44.54	13.313	9.980	.4776	.0740	.0256	21.071	1.679	1.2416
32.02	30.50	33.03	42.28	9.820	6.571	.4620	.0612	.0201	17.492	1.690	1.2416
50.28	48.78	52.10	39.09	6.181	3.419	.4437	.0643	.0186	17.273	1.709	1.2038
68.57	67.53	71.05	38.21	2.818	.065	.4430	.0614	.0176	15.461	1.716	1.1873
88.48	88.23	90.19	42.13	4.043	1.179	.5250	.1741	.0459	15.893	1.682	1.1914
100.00	100.00	100.00	43.33	3.054	-.387	.5419	.1624	.0409	23.060	1.687	1.1914

MOMENTUM AVERAGE STAGE EFFICIENCY = .7867 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7699 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESSURE RATIO = 1.6947  
 MASS AVERAGE TEMPERATURE RISE = 1.2109

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB 20 1974 (COMBINED IMP-1)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT HEIGHT FLOW = 2.9698 LDM/SEC 90 PERCENT DESIGN SPEED - SCAN NO. 10  
 PERCENT DESIGN EQUIVALENT FLOW = 81.0847 EQUIVALENT SPEED R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 32.8009 LDM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AEROYNAMIC BLOCKAGE = .9971

PERCENT SPAN FROM TIP (L. L.)	BETA*1 (DEG)	V*1 (FT/SEC)	BETA1 (DEG)	V1 (FT/SEC)	M*1	VU1 (FT/SEC)	M1	VM1 (FT/SEC)	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	72.91	1485.54	1470.70	1.353	0.00	436.83	.398	436.83	422.76	1420.70
10.14	71.64	1421.71	1343.54	1.295	0.00	447.85	.408	447.85	431.19	1349.54
26.89	68.48	1324.28	1231.95	1.210	0.00	485.81	.444	485.81	476.89	1231.95
43.34	65.99	1228.28	1115.52	1.118	0.00	578.34	.455	497.34	495.74	1116.52
61.74	63.94	1099.11	987.37	1.004	0.00	482.86	.441	482.86	482.70	987.17
84.74	61.19	943.00	825.64	.859	0.00	454.24	.414	454.24	448.14	825.94
100.00	58.68	861.61	718.83	.766	0.00	437.42	.398	437.42	422.46	718.83

TIPT VELOCITY DIAGRAM DATA  
 CALCULATED AEROYNAMIC BLOCKAGE = .9957

PERCENT SPAN FROM TIP (T. F.)	BETA*2 (DEG)	V*2 (FT/SEC)	BETA2 (DEG)	V2 (FT/SEC)	M*2	VU2 (FT/SEC)	M2	VM2 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	59.99	965.76	833.16	.804	47.89	932.72	.600	941.58	666.08	1366.18
11.09	56.70	885.88	741.16	.749	48.84	958.87	.622	980.51	477.83	1402.84
32.76	51.87	812.91	630.17	.687	47.90	959.19	.633	981.64	488.51	1194.36
49.17	46.90	716.97	519.08	.626	45.67	954.60	.663	941.86	561.84	1074.94
69.04	36.64	716.19	424.21	.617	44.83	972.23	.700	974.51	673.86	996.84
89.04	19.92	644.89	220.44	.563	47.82	671.14	.786	608.16	598.17	891.59
100.00	10.64	619.37	114.38	.542	46.74	718.74	.827	508.72	588.03	833.12

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FRM TIP	TRAILING EDGE	MASS FLOW (LBS)	DELTA BETA* (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCTION ANGLE (DEG)	DELTA FACTOR	OMEGA* BAR	LOSS PARAMETER (LFC)	DEVIATION ANGLE (LFC)	POTR PRESS RATIO	ROTOR EFF	POTR POLYTROPIC EFF
0.00	0.00	0.00	0.00	12.92	9.872	8.804	.688	.2486	.0471	2.195	1.718	.7156	.7167
10.14	11.99	12.57	12.57	14.95	9.841	8.503	.916	.2617	.0521	1.934	1.718	.7160	.7367
26.89	72.76	32.88	32.88	16.60	9.556	7.791	.6250	.1994	.0410	2.376	1.723	.7900	.8053
43.34	50.97	51.59	51.59	21.09	9.364	6.472	.9101	.1223	.0243	3.458	1.738	.8781	.8874
61.74	69.17	70.02	70.02	27.50	9.629	5.772	.8899	.0855	.0144	7.164	1.765	.9425	.9469
84.74	89.04	90.09	90.09	41.27	9.870	4.842	.8774	.0583	.0128	11.845	1.811	.9624	.9654
100.00	100.00	100.00	100.00	49.04	9.932	3.653	.8421	.0732	.0163	17.654	1.811	.9624	.9654

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8525 (POLYTROPIC) MOMENTUM AVG. ROTOR PRESS. RATIO = 1.7419  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8406 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.2040

NASA SMALL AXIAL COMPRESSOR TEST 2 FFD. 201 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.1471 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 81.0847  
 90 PERCENT DESIGN SPEED - SCAN NO 19  
 EQUIVALENT SPEED = 60933-145 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 160.1479 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9971

PERCENT SPAN FROM TIP (L. S.)	UETA*1 (DEG)	V*1 (M/SEC)	M*1	UETA1 (DEG)	V1 (M/SEC)	M1	UETA2 (DEG)	V2 (M/SEC)	M2	UETA3 (DEG)	V3 (M/SEC)	M3
0.00	72.91	453.04	1.353	0.00	133.15	0.00	0.00	133.15	0.398	128.86	0.413	0.31
10.14	71.64	433.70	1.295	0.00	136.50	0.00	0.00	136.50	0.409	132.04	0.411	0.34
26.89	68.48	403.64	1.210	0.00	148.08	0.00	0.00	148.08	0.446	145.76	0.437	0.50
43.34	65.99	375.50	1.118	0.00	151.59	0.00	0.00	151.59	0.455	151.10	0.440	0.32
61.74	63.06	340.32	1.118	0.00	147.18	0.00	0.00	147.18	0.441	147.13	0.440	0.95
84.74	61.19	287.11	0.859	0.00	138.45	0.00	0.00	138.45	0.414	136.59	0.414	0.75
100.00	58.68	256.46	0.766	0.00	131.10	0.00	0.00	131.10	0.398	128.77	0.398	0.10

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8957

PERCENT SPAN FROM TIP (L. S.)	UETA*2 (DEG)	V*2 (M/SEC)	M*2	UETA2 (DEG)	V2 (M/SEC)	M2	UETA3 (DEG)	V3 (M/SEC)	M3	UETA4 (DEG)	V4 (M/SEC)	M4
0.00	59.99	293.45	0.804	47.89	218.80	0.608	0.00	162.17	0.608	146.71	0.608	0.47
11.59	56.70	271.17	0.745	48.84	226.26	0.627	0.00	170.36	0.627	148.08	0.627	0.94
32.26	51.87	247.65	0.687	47.90	238.07	0.633	0.00	169.22	0.633	152.90	0.633	0.94
50.97	46.90	232.16	0.656	45.67	236.33	0.633	0.00	169.04	0.633	165.16	0.633	0.71
69.37	46.84	217.68	0.617	44.88	247.16	0.700	0.00	171.41	0.700	175.12	0.700	0.71
89.04	49.92	197.17	0.563	47.82	276.06	0.788	0.00	204.56	0.788	185.37	0.788	0.75
100.00	48.64	188.78	0.542	49.74	287.08	0.824	0.00	219.07	0.824	185.56	0.824	0.94

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	UETA* (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTORS	OMEGA* PAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS. RATIO	ROTOR EFFICIENCY	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	12.97	9.872	8.604	0.498	0.2486	0.0473	2.995	1.718	0.7156	0.7156
10.14	11.99	12.52	14.95	9.841	8.503	0.5166	0.2617	0.0521	1.844	1.718	0.7160	0.7367
26.89	32.26	32.88	16.60	9.654	7.499	0.5250	0.2694	0.0410	2.351	1.723	0.7900	0.9053
43.34	50.97	51.99	21.00	9.364	6.472	0.5101	0.2233	0.0263	3.278	1.738	0.8783	0.8474
61.74	69.37	70.92	27.50	9.629	5.772	0.4999	0.0652	0.0144	3.106	1.745	0.9425	0.9459
84.74	87.74	90.03	41.27	9.870	4.847	0.4774	0.0583	0.0128	11.955	1.811	0.9124	0.9654
100.00	100.00	100.00	49.04	9.932	3.858	0.4421	0.0732	0.0153	17.634	1.811	0.9624	0.9654

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8525 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8406 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS. RATIO = 1.7419  
 MASS AVERAGE TEMPERATURE RISE = 1.2040

NASA SMALL AXIAL COMPRESSOR TFST 2 FEB. 20, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 10

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9175

PERCENT SPAN FROM TIP (L. L.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	44.21	786.42	548.54	.662	563.19	557.20	1176.98
11.52	45.92	796.00	571.79	.670	553.78	552.86	1271.01
31.04	43.83	810.35	561.23	.690	584.55	584.54	1101.51
49.37	41.03	838.10	554.08	.718	621.87	621.87	1055.61
68.01	41.26	857.50	565.49	.745	644.69	642.14	1008.31
88.39	44.63	936.50	655.55	.818	668.80	659.82	912.80
100.00	45.66	975.17	697.50	.857	681.50	662.67	818.38

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9366

PERCENT SPAN FROM TIP (L. L.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	5.06	606.34	51.43	.501	603.98	603.98	1317.35
11.37	4.90	609.29	52.97	.504	606.98	606.91	1271.55
30.45	3.71	619.39	40.00	.517	618.09	617.82	1154.74
60.73	4.53	638.10	50.40	.538	636.10	635.45	1121.13
67.43	4.53	638.95	50.45	.542	637.95	638.00	1045.84
88.19	4.02	618.95	43.47	.522	617.83	615.17	962.26
100.00	4.01	623.23	43.59	.525	621.70	621.70	914.69

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	YAW	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	FACTOR	OMEGA BAR	LOSS PARAMETER	ROTATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR EFFICIENCY	
0.00	0.00	0.00	39.17	7.917	3.994	.4577	.1055	.0379	27.240	1.672	1.2332	.7771
11.52	11.37	17.52	40.93	9.736	6.402	.4606	.0994	.0346	-1.512	1.674	1.2332	.7951
31.04	30.45	17.84	40.12	7.192	3.912	.4430	.0702	.0210	16.878	1.687	1.2124	.8456
49.37	48.77	51.94	37.10	3.803	.825	.4153	.0573	.0175	16.517	1.709	1.1945	.8954
68.01	67.43	70.95	30.73	1.628	-1.213	.4206	.0638	.0183	15.678	1.711	1.1827	.8823
88.39	88.19	70.09	40.40	2.006	-0.863	.5031	.1955	.0516	15.555	1.685	1.1917	.7165
100.00	100.00	100.00	41.65	1.033	-2.409	.5198	.1826	.0461	22.713	1.685	1.1913	.7527

MOMENTUM AVERAGE STAGE EFFICIENCY = .8085 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7939 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.6927  
MASS AVERAGE TEMPERATURE RISE = 1.2040

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TRHP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPFD. - SCAN NO. 10

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9175

PERCENT SPAN FROM TIP (L. C.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	44.23	230.67	167.19	.662	171.72	150.84	494.44
11.52	45.92	267.62	174.28	.670	168.79	148.51	508.01
31.04	43.31	247.00	171.06	.690	170.17	149.17	510.13
49.37	41.81	254.23	168.89	.718	190.03	180.89	511.94
68.01	41.26	261.38	172.35	.745	196.50	195.76	507.33
89.39	44.41	285.45	194.01	.810	203.85	201.11	528.22
100.00	45.86	297.73	217.60	.857	207.72	201.98	561.64

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9355

PERCENT SPAN FROM TIP (L. C.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	5.06	186.81	16.30	.501	186.09	186.09	401.53
11.37	4.99	185.71	16.15	.504	185.01	184.98	387.57
30.45	3.71	188.79	12.22	.517	188.39	184.31	364.16
50.73	4.53	184.69	15.36	.538	193.88	193.68	341.72
67.43	4.51	186.75	15.38	.542	194.14	194.04	318.77
88.19	4.82	189.66	13.23	.522	188.19	187.50	271.30
100.00	4.81	189.96	13.28	.525	189.49	189.49	278.49

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA PETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE EFFICIENCY	STATOR POLYTROPIC EFFICIENCY
0.00	0.00	0.00	39.17	7.917	3.994	.4577	.1055	.0179	27.240	1.672	1.2332
11.52	11.37	12.57	40.93	9.716	6.402	.4606	.0594	.0344	21.572	1.674	1.2332
31.04	30.45	32.34	40.12	7.192	3.917	.4439	.0762	.0250	16.078	1.687	1.2124
49.37	48.73	51.91	37.10	3.803	.825	.4152	.0573	.0175	16.512	1.709	1.1945
68.01	67.43	70.92	36.73	1.628	-1.213	.4206	.0628	.0183	15.678	1.711	1.1827
88.19	88.19	90.09	60.40	2.006	-1.861	.5031	.1959	.0516	15.554	1.685	1.1917
100.00	100.00	100.00	41.65	1.013	-2.409	.5198	.1826	.0461	22.710	1.685	1.1918

MOMENTUM AVERAGE STAGE EFFICIENCY = .8095 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7919 (ADIABATIC)

NONIUM AVG. STAGE PRESS RATIO = 1.6927  
 MASS AVERAGE TEMPERATURE RISE = 1.2040

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (CONTINUED, IMP. 1)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT HEIGHT FLOW = 3.0453 LBM/SEC 90 PERCENT DESIGN SPEED -- SCAN NO. 11  
 PERCENT DESIGN EQUIVALENT FLOW = 84.3475 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 6.0861, 735 R.P.M.  
 14.1207 LBM/SEC-SC FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0034

PERCENT SPAN FROM TIP (L. E.)	PETA*1 (DEG)	V*1 (FT/SEC)	M*1	BETA1 (DEG)	V1 (FT/SEC)	M1	VH1 (EI/SEC)	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	72.10	1431.44	1.359	0.00	458.34	0.00	.418	458.54	1419.27
9.91	79.81	1420.14	1.394	0.00	469.59	0.00	.429	464.59	1349.75
26.59	67.54	1333.97	1.221	0.00	509.57	0.00	.466	509.57	1332.80
43.73	64.95	1232.11	1.129	0.00	521.76	0.00	.478	521.76	1116.19
61.74	62.84	1108.67	1.014	0.00	506.17	0.00	.463	506.17	986.39
84.79	60.05	951.33	.869	0.00	475.31	0.00	.434	475.31	874.78
100.00	57.55	853.00	.776	0.00	450.64	0.00	.416	456.64	718.11

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8771

PERCENT SPAN FROM TIP (L. E.)	PLTA*2 (DEG)	V*2 (FT/SEC)	M*2	BETA2 (DEG)	V2 (FT/SEC)	M2	VP2 (EI/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	58.90	1018.72	.858	43.12	720.80	.607	526.22	509.28	1165.00
11.39	55.74	960.06	.811	43.29	752.04	.635	547.41	515.47	1104.42
30.90	52.13	872.33	.743	43.68	737.59	.628	533.41	530.09	1200.42
49.99	45.60	616.75	.702	42.03	769.35	.661	571.46	571.41	1098.68
68.80	37.30	748.19	.648	42.46	806.32	.699	594.35	593.10	998.47
83.07	21.34	690.66	.604	44.85	907.64	.793	643.32	632.75	891.58
100.00	12.80	660.32	.580	46.81	940.86	.826	643.97	622.04	832.28

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FPCY TIP TRAILING FUGI	MACS (PCY)	DELTA BETA* (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCT SUR (DEG)	U FACTOR	OMEGA* BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PLOSS ANTIADAPTIC PLOSS	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	13.20	8.206	7.799	.6428	.2150	.0423	1.908	1.079	.7590
9.91	11.39	12.25	15.58	8.966	7.642	.6592	.2181	.0451	.253	1.690	.7492
26.59	30.90	32.54	15.21	8.668	6.532	.4726	.1451	.0116	2.311	1.681	.8148
49.99	51.85	51.85	19.35	8.305	5.420	.6630	.0850	.0100	3.988	1.704	.9103
68.80	70.87	70.87	25.48	8.524	4.667	.6571	.0421	.0091	7.825	1.721	.9613
83.07	88.87	90.04	38.71	8.731	3.701	.8292	.0020	.0014	11.017	1.801	.9586
100.00	100.00	100.00	44.75	8.795	2.721	.6923	.0029	.0006	19.848	1.801	.6986

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8792 (POLYTROPIC) MOMENTUM AVERAGE ROTOR PRESS RATIO = 1.7131  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8698 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.1908

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 OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 2, FEB. 20, 1974 (COMBINED ICPP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.4013 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 84.1475  
 30 PERCENT DESIGN SPEED - SCAN NO. 11  
 EQUIVALENT SPEED / INFLY ANN AREA = 68667.735 R.F.P.  
 EQUIVALENT FLOW / INFLY ANN AREA = 166.5920 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0034

PERCENT SPAN FROM TIP (L. L.)	DELTA1 (DEG)	V*1 (M/SEC)	H*1	DELTA1 (DEG)	V1 (M/SEC)	MI	VM1 (M/SEC)	VZ1 (M/SEC)	UI (M/SEC)
0.00	72.10	454.59	1.359	0.00	139.70	0.00	137.70	135.20	432.59
9.91	70.81	441.60	1.304	0.60	143.10	0.00	143.16	139.48	411.49
26.59	67.54	401.59	1.221	0.00	153.32	0.00	155.32	152.46	175.76
43.23	64.95	375.55	1.129	0.00	159.03	0.00	159.03	153.52	140.21
61.74	62.84	347.02	1.014	0.00	154.28	0.00	154.28	154.23	300.65
80.79	60.05	290.15	0.869	0.00	144.87	0.00	144.87	142.93	251.39
100.00	57.55	250.38	0.776	0.00	139.15	0.00	139.19	134.46	218.88

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8771

PERCENT SPAN FROM TIP (L. L.)	DELTA2 (DEG)	V*2 (M/SEC)	H*2	DELTA2 (DEG)	V2 (M/SEC)	M2	VM2 (M/SEC)	VZ2 (M/SEC)	U2 (M/SEC)
0.00	58.90	310.51	0.858	47.12	219.73	0.00	150.18	160.39	155.23
11.19	55.74	297.00	0.811	43.29	229.22	0.00	157.17	163.21	397.56
30.90	52.33	264.07	0.743	47.68	224.82	0.00	155.27	162.59	161.17
49.99	45.60	248.94	0.702	42.03	234.50	0.00	152.01	174.17	334.88
68.80	37.36	228.11	0.648	42.46	245.77	0.00	165.72	181.31	304.33
88.87	21.34	210.51	0.604	44.86	276.65	0.00	195.15	192.86	271.75
100.00	12.80	201.26	0.580	46.81	286.78	0.00	209.10	195.27	251.68

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FRONT TIP	FRM TIP	DELTA (DEG)	INCIDENCE MEAN (DEG)	ANGL SUCT SHR (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGL (DEG)	POTOP PRESS RATIO	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	11.20	8.266	7.794	0.428	0.2150	0.0423	1.908	1.679	0.7572
9.91	11.39	12.27	15.58	8.956	7.642	0.492	0.2181	0.0451	2.53	1.690	0.7659
26.59	10.90	32.54	15.21	7.668	6.532	0.426	0.1651	0.0136	2.311	1.681	0.8777
43.23	69.09	51.85	19.35	8.305	5.420	0.4630	0.0850	0.0100	3.948	1.709	0.9168
61.74	64.80	70.87	25.48	8.524	4.667	0.4571	0.0421	0.0091	7.825	1.721	0.9641
84.79	88.87	90.04	38.71	8.731	3.701	0.292	0.0020	0.0004	13.016	1.801	0.9986
100.00	100.00	100.00	44.75	8.795	2.721	0.1923	0.0029	0.0006	17.848	1.801	0.9987

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8792 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8698 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.7111  
 MASS AVERAGE TEMPERATURE RISE = 1.1908



NASA SMALL AXIAL COMPRESSOR TEST 2 FEB 20 1974 (COMBINED TEMP)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 11

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9123

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	40.03	709.96	507.35	.669	604.07	537.43	1325.64
11.01	41.03	803.16	577.06	.682	605.31	604.32	1274.12
24.96	40.70	800.96	515.07	.686	612.71	612.70	1185.19
40.65	38.40	829.97	515.50	.718	650.28	649.80	1077.88
67.12	39.08	824.42	538.61	.745	663.27	660.85	1009.10
88.30	41.80	938.71	625.73	.824	699.74	690.35	912.31
100.00	43.06	975.02	665.66	.861	712.43	697.74	857.52

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9450

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	5.23	621.20	50.61	.518	613.67	618.67	1316.03
11.30	5.18	634.91	57.35	.530	632.31	632.24	1270.58
30.22	4.01	654.47	45.72	.552	652.87	652.59	1154.48
48.51	3.83	671.76	44.88	.572	670.26	669.57	1120.88
67.28	2.61	669.85	30.73	.572	664.15	668.78	1045.40
88.09	5.15	652.05	58.56	.554	650.26	647.88	961.68
100.00	5.23	657.13	59.91	.558	654.39	654.39	913.77

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCF)	DELTA P/F1 (INCH)	INCIDENCE ANGLE (DEG)	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	POLYTROPIC EFF
0.00	0.00	0.00	34.80	3.708	.214	.1072	27.410	1.632	1.2155	.7591
11.01	11.30	12.25	35.91	4.921	1.566	.0992	21.745	1.645	1.2155	.7758
29.96	10.22	12.54	36.05	3.511	.197	.0267	17.197	1.669	1.1959	.8227
48.05	48.51	51.85	34.57	6.65	-2.344	.3604	15.920	1.670	1.1813	.9111
67.62	67.28	70.87	36.45	-6.98	3.150	.3805	11.730	1.687	1.1741	.8672
88.30	88.09	90.04	36.51	-5.94	-3.463	.4599	16.677	1.663	1.1829	.8142
100.00	100.00	100.00	37.83	-1.575	4.729	.1997	23.931	1.663	1.1829	.7072

MOMENTUM AVERAGE STAGE EFFICIENCY = .8373 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8252 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.6697  
 MASS AVERAGE TEMPERATURE RISE = 1.1908

STATOR PERFORMANCE NACA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO. 11

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9123

PERCENT SPAN FROM TIP (L. E.)	V1 (M/SEC)	VU3 (M/SEC)	M3	VW3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	240.44	154.64	.669	184.12	192.10	404.06
11.01	244.80	160.83	.682	184.50	194.20	398.35
29.96	246.13	157.26	.690	186.75	196.75	381.31
48.65	242.93	157.12	.718	193.20	198.06	334.63
67.62	200.43	164.17	.745	202.17	201.43	307.57
83.30	286.12	190.72	.824	213.28	210.42	278.07
100.00	297.18	202.09	.861	217.15	211.15	261.37

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9450

PERCENT SPAN FROM TIP (L. E.)	V4 (M/SEC)	VU4 (M/SEC)	M4	VW4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	189.16	17.26	.518	188.57	188.57	401.12
11.30	193.52	17.48	.530	192.73	192.71	387.27
30.22	199.48	15.93	.552	193.00	198.91	346.08
48.51	204.75	13.68	.572	204.29	204.08	141.64
67.28	204.17	9.37	.572	203.96	211.94	310.64
88.09	190.00	17.85	.554	198.20	197.47	263.12
100.00	200.29	18.26	.558	199.46	199.46	278.52

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	WASS FLUX (G/CM <sup>2</sup> )	DELTA FCIA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	FACTOP	CHGGA RAD	LOSS PAPERLET (DEG)	DEVIATION ANGLE (DEG)	STAGE PITCH (MM)	STATOR POLYTROPIC EFF
0.00	0.00	34.80	3.708	-2.14	.8202	.0172	.0185	27.418	1.617	1.2154
11.01	11.70	37.91	4.921	1.569	.8130	.0992	.0363	21.265	1.645	1.2155
29.96	30.22	32.54	3.511	.197	.7118	.0267	.0087	17.197	1.669	1.1950
48.65	48.51	34.57	4.645	-2.344	.8604	.0372	.0114	15.826	1.690	1.1813
67.62	67.28	36.45	4.698	-3.350	.8405	.0225	.0173	13.740	1.687	1.1741
88.09	88.09	30.66	3.594	-3.469	.8556	.0229	.0561	16.677	1.663	1.1829
100.00	100.00	37.83	4.575	-5.017	.8729	.0197	.0503	23.931	1.603	1.1829

MOMENTUM AVERAGE STAGE EFFICIENCY = .8373 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8252 (ADIABATIC)  
 MOMENTUM AVG. STAFF PRESS RATIO = 1.6697  
 MASS AVERAGE TEMPERATURE RISE = 1.1908

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED I.C.P.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.16C7 LBM/SEC [EQUIVALENT SPEED - SCAN NO 12] = 68902.068 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 86.4613 F/EQUIVALENT FLOW / INLET ANN AREA = 34.9758 LOP/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9960

PERCENT SPAN FROM TIP (L. L.)	PETA*1 (DEG)	V*1 (FT/SEC)	M*1	DETA1 (DEG)	V1 (FT/SEC)	VU1	M1	VMI (EJ/SEC)	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	71.59	1490.02	1.166	0.00	472.54	0.00	.431	472.54	457.34	1420.06
10.02	70.26	1434.00	1.110	0.00	484.43	0.00	.412	484.43	460.44	1349.76
20.81	66.88	1335.53	1.228	0.00	525.90	0.00	.482	525.90	516.24	1231.98
43.47	64.22	1238.31	1.136	0.00	538.50	0.00	.494	538.50	516.70	1115.10
61.89	67.89	1115.57	1.022	0.00	522.21	0.00	.479	522.21	522.03	985.86
84.47	59.29	955.16	.876	0.00	489.81	0.00	.448	489.81	483.23	824.66
100.00	56.81	850.57	.783	0.00	470.00	0.00	.429	470.00	454.02	718.51

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8607

PERCENT SPAN FROM TIP (L. L.)	PETA*2 (DEG)	V*2 (FT/SEC)	M*2	PETA2 (DEG)	V2 (FT/SEC)	VU2	M2	VM*2 (EJ/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	59.26	1071.14	.909	39.11	705.70	445.16	.599	547.54	529.95	1365.76
11.57	54.19	1021.59	.871	38.58	747.69	466.22	.617	584.53	571.75	1304.06
30.68	51.64	939.57	.806	38.59	746.13	465.41	.600	583.18	570.55	1232.22
49.37	46.52	860.13	.743	38.95	781.11	478.58	.657	591.80	591.85	1102.59
63.49	33.14	780.53	.678	40.19	803.13	518.64	.698	613.47	612.06	1000.72
88.81	27.79	723.14	.634	42.55	805.22	612.31	.794	666.71	655.76	892.38
100.00	14.79	690.74	.604	44.53	836.19	656.55	.825	667.38	644.70	832.75

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FRONT TIP (DEG)	MACH FLOW (MCT)	DELTA (DEG)	DELTA* (DEG)	MEAN ANGLE (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTOR	OMEGA* BAR	LOSS PARAMETER (DEG)	DEVIATION ANGLE (DEG)	POTIOR PRESS RATIO	ROTOR ADIABATIC EFF	POTIOR POLYTROPIC EFF
0.00	0.00	0.00	12.34	7.57	7.289	7.289	.3976	.1874	.0365	2.765	1.618	.7534	.7604	
10.02	11.57	12.34	15.16	8.432	7.101	7.101	.4056	.1772	.0369	.154	1.642	.7709	.7346	
26.81	10.68	32.70	15.25	8.065	5.896	5.896	.4119	.1119	.0231	.158	1.659	.8670	.8752	
43.47	44.37	52.10	17.71	7.015	4.716	4.716	.4271	.0597	.0125	.108	1.671	.9333	.9380	
61.89	68.49	70.94	23.95	7.794	3.933	3.933	.4257	.0259	.0056	.048	1.644	.9751	.9784	
84.47	84.41	90.07	36.51	7.987	2.955	2.955	.3930	-.0058	.0058	14.183	1.778	1.0102	1.0177	
100.00	100.30	100.00	42.02	8.058	1.984	1.984	.3556	-.0319	.0066	21.441	1.779	1.0191	1.0176	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9850 (POLYTROPIC) MOMENTUM AVG. ROTOR PRESS. RATIO = 1.6786  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8967 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.1775

NASA SMALL AXIAL COMPRESSOR TEST 2, FEB. 20, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (INTRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.4364 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 86.4(13)  
 90 PERCENT DESIGN SPEED - SCAN NO. 12  
 EQUIVALENT SPEED = 68902.0 RPM R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 170.7669 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9960

PERCENT SPAN FROM TIP (I. F.)	BETA*1 (DEG)	V*1 (M/SEC)	M*1	BETA1 (DEG)	V1 (M/SEC)	M1	VU1 (M/SEC)	HI	VH1 (M/SEC)	V71 (M/SEC)	UI (M/SEC)
0.00	71.59	456.17	4.17.03	1.366	0.00	144.03	0.00	.431	174.03	139.40	437.83
10.02	70.26	447.10	4.11.41	1.310	0.00	147.66	0.00	.462	147.62	142.82	411.41
20.81	66.88	408.29	3.75.51	1.278	0.00	160.29	0.00	.482	160.29	157.35	375.51
43.47	66.22	377.44	3.39.88	1.136	0.00	164.13	0.00	.496	164.13	163.40	339.88
61.83	62.09	356.04	3.00.49	1.022	0.00	159.17	0.00	.479	159.17	159.49	300.49
88.87	58.29	292.35	2.51.36	.876	0.00	149.29	0.00	.448	149.29	147.29	251.35
100.00	56.81	261.09	2.19.80	.747	0.00	143.25	0.00	.429	143.25	138.39	219.00

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8607

PERCENT SPAN FROM TIP (I. F.)	BETA*2 (DEG)	V*2 (M/SEC)	M*2	BETA2 (DEG)	V2 (M/SEC)	M2	VU2 (M/SEC)	HI	VH2 (M/SEC)	V72 (M/SEC)	UI (M/SEC)
0.00	59.26	326.49	2.90.60	.709	30.11	215.10	135.69	.599	160.97	161.53	416.28
11.57	56.10	311.10	2.75.37	.871	30.58	227.86	142.11	.637	173.16	174.27	397.48
30.78	51.64	281.41	2.24.58	.806	31.59	277.42	141.86	.640	177.76	178.65	366.44
49.37	46.52	262.17	1.90.27	.743	38.95	231.95	145.95	.657	180.41	180.40	336.07
68.49	44.14	237.91	1.66.96	.678	40.19	244.95	158.00	.698	187.11	187.11	305.02
88.81	42.79	220.41	1.52.36	.634	42.56	279.91	186.63	.794	203.21	190.47	277.00
100.00	44.79	210.39	1.43.70	.608	44.53	285.35	200.12	.825	203.47	196.50	251.82

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE TO TIP (DEG)	SPAN FROM TIP (DEG)	MASS FLOW (PCT)	DELTA BETA* (DEG)	INCIDENCE ANGLE MEAN (DEG)	SUCTI SUR (DEG)	FACTOP	OMEGA* PAR	PARAFLETR (DEG)	LOTS (DEG)	DEVIATION (DEG)	ROTOR EFF	ADIAUATIC EFF	POLYTROPIC EFF	ROTC7
0.00	0.00	0.00	12.34	7.57	7.28	.3976	.1074	.0365	.0365	2.765	1.634	.714	.7694	.7694
10.02	11.57	15.31	8.432	8.045	7.101	.405C	.1772	.0368	.0368	1.94	1.642	.7709	.7846	.7846
20.81	30.78	32.78	15.77	8.896	6.896	.4152	.1119	.0731	.0731	1.538	1.659	.8160	.8752	.8752
43.47	46.52	52.10	17.71	7.015	6.716	.4271	.0597	.0729	.0729	1.600	1.671	.8331	.9380	.9380
61.83	68.49	70.97	21.95	7.795	6.933	.4257	.0259	.0056	.0056	1.638	1.676	.8751	.9769	.9769
88.87	88.81	90.07	36.51	7.987	2.955	.4930	-.0270	-.0098	-.0098	14.383	1.778	1.0197	1.0177	1.0177
100.00	100.00	100.00	42.02	8.058	1.984	.3556	-.0319	-.0066	-.0066	21.861	1.779	1.0191	1.0176	1.0176

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8040 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8967 (ADIAUATIC)  
 MOMENTUM AVG. ROTOR PRESS. RATIO = 1.6786  
 MASS AVERAGE TEMPERATURE RISE = 1.1775

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED IMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO. 12

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8974

PERCENT SPAN FROM TIP (L. E.)	BETA 3 (DEG)	V3 (FT/SEC)	M3	VMS (FT/SEC)	V/3 (FT/SEC)	U3 (FT/SEC)
0.00	39.00	783.57	.671	635.50	623.52	1326.38
11.12	36.51	805.78	.691	649.34	644.26	1274.27
29.74	35.25	816.69	.707	666.94	665.93	1187.07
44.12	35.23	830.75	.724	678.62	678.12	1101.01
57.29	36.65	859.42	.753	689.95	687.42	1011.21
88.15	39.36	943.17	.832	729.25	719.45	913.51
100.00	40.64	977.78	.867	741.96	721.46	858.00

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9100

PERCENT SPAN FROM TIP (L. E.)	BETA 4 (DEG)	V4 (FT/SEC)	M4	VH4 (FT/SEC)	V/4 (FT/SEC)	U4 (FT/SEC)
0.00	3.66	679.23	.567	668.87	668.87	1316.76
11.27	3.06	689.53	.583	687.13	687.05	1271.41
30.07	3.50	702.52	.600	701.21	700.90	1165.72
44.42	3.94	720.17	.619	718.70	717.96	1121.88
57.21	3.06	719.11	.616	714.65	714.26	1046.27
88.17	3.14	707.64	.601	700.96	698.40	961.91
100.00	3.84	707.54	.600	705.95	705.95	914.28

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. E.)	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	HEAR SUCT SUR (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAFF P2-SS RATIO	STAGE TEMPERATURE RATIO	STATOR POLYTROPIC EFF.
0.00	0.00	32.14	-5.16	-4.439	.3374	.0374	.0134	25.840	1.601	1.1948	.8828
11.12	11.27	32.65	.137	-3.213	.3322	.0480	.0169	20.227	1.620	1.1948	.8688
29.74	10.07	31.75	-1.121	-4.644	.3106	.0432	.0142	19.702	1.638	1.1793	.8610
48.12	48.42	31.30	-2.487	-5.483	.2887	.0216	.0066	15.839	1.661	1.1690	.9289
67.29	67.21	32.90	-2.807	-5.749	.3178	.0259	.0217	14.743	1.653	1.1613	.7987
88.15	88.17	35.52	-1.003	-5.887	.4013	.2279	.0602	15.370	1.630	1.1750	.5852
100.00	100.00	36.80	-3.992	-7.433	.4191	.2166	.0541	22.540	1.631	1.1752	.6413

MOMENTUM AVERAGE STAGE EFFICIENCY = .8623 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .8524 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.6390

MASS AVERAGE TEMPERATURE RISE = 1.1775

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 12

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8974

PERCENT SPAN FROM TIP (L. L.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	75.80	238.83	159.71	.671	193.70	191.57	404.20
11.12	36.31	245.60	145.43	.691	197.07	197.59	388.40
23.74	35.25	249.93	143.67	.707	203.28	203.74	361.82
48.12	35.23	251.21	140.06	.724	206.84	206.69	335.59
67.29	36.65	247.10	156.44	.753	210.30	209.53	308.22
88.15	39.34	287.48	187.31	.832	222.27	219.29	278.44
100.00	40.54	299.03	194.11	.857	226.11	219.90	261.52

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (L. L.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	3.66	204.79	13.04	.567	203.87	213.87	401.35
11.27	3.56	209.87	13.33	.583	209.94	209.41	387.51
40.07	3.50	214.13	13.06	.600	213.71	213.51	364.45
48.42	3.46	219.55	14.63	.619	219.06	213.84	341.95
57.21	3.66	238.27	13.93	.616	217.83	212.71	318.90
88.17	3.94	234.13	14.13	.601	213.65	212.87	281.19
100.00	3.94	235.66	14.44	.606	215.17	215.17	278.67

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (MCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUPT (DEG)	LOSS FACTOR	OMEGA BAR	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	32.14	-0.516	-4.430	.3374	.0174	25.840	1.691	.8828
11.12	11.77	32.05	.137	-1.713	.3322	.0489	20.727	1.620	.8488
23.74	10.07	31.75	-1.323	-0.644	.3106	.0432	16.707	1.639	.8630
48.12	49.42	31.35	-2.487	-5.483	.2887	.0216	15.839	1.661	.9289
67.29	67.71	32.96	-2.087	-5.749	.178	.0759	16.763	1.653	.7987
88.15	88.17	35.52	-3.003	-5.887	.4018	.0279	15.370	1.630	.5852
100.00	100.00	36.80	-3.932	-7.433	.6101	.0546	22.540	1.631	.6413

MOMENTUM AVERAGE STAGE EFFICIENCY = .8623 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8524 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.6390  
MASS AVERAGE TEMPERATURE RISE = 1.1775

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 29, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.1679 LBM/SEC 90 PERCENT DESIGN SPEED - SCAL. NO. 13  
 PERCENT DESIGN EQUIVALENT FLOW = 86.4932 EQUIVALENT SPEED = 68898.110 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 34.987 LDM/SEC-SC FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT FROM TIP (L. L.)	BETA*1 (DEG)	V*1 (FT/SEC)	M*1	BETA1	V1 (FT/SEC)	M1	VU1 (FT/SEC)	M2	VU2 (FT/SEC)	M2	VZ2 (FT/SEC)	U1
0.00	71.59	1496.60	1419.07	1.366	0.00	472.75	0.00	472.75	0.00	472.75	457.53	1419.97
10.07	70.25	1434.90	1349.62	1.310	0.00	484.65	0.00	484.65	0.00	484.65	469.78	1349.62
26.82	66.87	1339.51	1231.86	1.278	0.00	526.12	0.00	526.12	0.00	526.12	516.45	1231.86
43.49	64.21	1238.21	1114.87	1.136	0.00	538.73	0.00	538.73	0.00	538.73	537.00	1114.87
61.94	67.07	1115.80	985.47	1.022	0.00	522.42	0.00	522.42	0.00	522.42	527.24	985.49
84.88	59.28	959.16	824.53	.876	0.00	490.04	0.00	490.04	0.00	490.04	483.46	824.53
100.00	56.00	857.05	718.46	.783	0.00	470.20	0.00	470.20	0.00	470.20	454.23	718.46

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8495

PERCENT FROM TIP (L. L.)	BETA*2 (DEG)	V*2 (FT/SEC)	M*2	BETA2	V2 (FT/SEC)	M2	VU2 (FT/SEC)	M2	VZ2 (FT/SEC)	U2	
0.00	59.03	1086.70	931.80	.924	37.81	707.76	433.88	.702	559.17	541.16	1365.68
11.18	56.03	1316.74	849.54	.886	37.41	744.08	454.42	.709	594.24	581.26	1303.95
10.82	51.78	944.44	745.88	.916	37.79	743.37	455.51	.639	507.45	583.78	1201.41
49.54	45.70	878.51	628.51	.760	37.65	774.61	473.14	.671	613.35	613.78	1101.65
63.46	39.29	782.22	498.37	.606	38.63	801.32	512.41	.693	614.69	614.47	1000.78
84.89	22.53	738.01	281.07	.649	41.75	914.39	608.84	.803	687.22	671.01	891.91
100.00	14.79	706.24	189.25	.623	43.69	944.47	652.44	.833	682.90	659.89	832.70

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP (DEG)	MACS FLOW (PPI)	DELTA BETA* (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTOR	OMEGA* (RPM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	12.55	7.749	7.281	.1843	1784	.0349	2.042	1.605	.7607	.7760
10.03	11.58	12.71	15.22	9.423	7.097	.3920	1689	.051	.084	1.628	.7860	.8002
26.82	30.82	12.71	15.10	9.035	5.886	.4061	1080	.0222	1.776	1.643	.8771	.8771
43.49	65.54	52.12	19.51	7.603	4.704	.4061	1080	.0089	1.670	1.679	.9534	.9567
61.94	63.46	71.62	23.79	7.781	3.917	.172	.0262	.0056	8.472	1.683	.9746	.9764
84.88	82.49	10.04	16.74	7.973	2.840	.1750	-.0447	-.0097	14.264	1.786	1.0318	1.0293
100.00	100.00	100.00	42.01	8.044	1.970	.3360	-.0537	-.0110	21.838	1.784	1.0317	1.0293

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9113 (POLYTROPIC) MOMENTUM AVG. ROTOR PRESS RATIO = 1.6726  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .9047 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.1747

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NASA SMALL AXIAL COMPRESSOR TEST 2-EE-1-20-1974 (COMBINED IMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO. 11

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8656

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VH3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	34.50	768.74	446.76	.677	450.06	642.02	1326.30
11.17	35.10	808.97	465.04	.696	461.76	650.67	1274.17
29.85	34.31	817.39	461.25	.709	474.80	676.71	1196.51
48.25	34.05	846.09	471.72	.719	481.05	700.51	1100.11
67.50	36.03	817.32	507.19	.756	607.40	694.86	1011.04
88.76	30.58	953.93	594.87	.843	747.77	735.75	912.94
100.00	39.86	987.98	632.99	.877	753.18	757.23	857.95

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9197

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VH4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	4.37	689.68	52.47	.586	607.58	677.58	1316.68
11.17	4.33	709.02	53.57	.593	707.00	706.91	1271.39
29.85	3.67	720.87	66.16	.618	719.39	719.08	1155.81
48.25	4.00	743.27	51.91	.641	741.42	749.55	1121.89
67.50	7.66	735.56	66.90	.635	734.06	733.55	1047.36
88.76	4.01	723.29	50.54	.621	721.52	718.89	981.96
100.00	4.01	728.52	50.94	.626	728.74	726.74	914.72

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP	TRAILING EDGE	MASS FLOW (LBS)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCTION SURFACE ANGLE (DEG)	LOSS PARAMETER (DEG)	DEVIATION ANGLE (DEG)	STAGE EFFICIENCY	STATOR POLYTROPIC EFFICIENCY
0.00	0.00	0.00	30.14	-1.819	-5.791	.0154	26.340	1.587	.8482
11.17	11.75	12.39	39.77	-1.075	-4.425	.0169	21.102	1.604	1.1808
29.85	30.83	32.79	30.60	-2.225	-5.43	.020	13.991	1.624	1.1753
48.25	48.40	42.12	30.04	-3.677	-6.672	.021	13.008	1.652	1.1670
67.50	67.17	71.02	32.17	-3.500	-6.389	.021	14.764	1.660	1.1643
88.76	88.14	100.00	34.47	-5.813	-8.090	.021	15.548	1.617	1.1740
100.00	100.00	100.00	35.85	-6.774	-8.215	.021	22.710	1.38	1.1741

MOMENTUM AVERAGE STAGE EFFICIENCY = .8610 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS. RATIO = 1.6265  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8520 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1747

NASA SMALL AXIAL COMPRESSOR TEST 2, FEB. 20, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO. 11

INLET VELOCITY DIAGRAM DATA

CALCULATED AERO-DYNAMIC BLOCKAGE = .0056

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V1 (M/SEC)	VU3 (M/SEC)	M3	VW3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	34.50	240.42	136.17	.67	194.14	115.96	404.26
11.13	34.10	246.53	141.74	.696	201.71	211.17	394.17
29.05	34.15	243.14	140.59	.709	205.68	214.06	341.65
48.26	34.05	257.99	146.39	.730	213.68	213.22	315.34
67.30	34.03	272.04	154.59	.756	222.57	211.79	308.18
89.26	34.54	290.76	181.39	.843	227.31	224.26	278.26
100.00	39.46	301.05	197.94	.877	231.09	274.71	251.50

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERO-DYNAMIC BLOCKAGE = .0197

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VW4 (M/SEC)	V24 (M/SEC)	U4 (M/SEC)
0.00	4.36	210.18	15.99	.586	203.57	209.47	404.33
11.25	4.33	216.11	16.31	.603	215.49	215.47	387.52
30.03	3.67	219.72	14.07	.618	219.27	219.17	364.48
48.40	4.00	276.54	15.82	.641	225.98	225.75	341.95
67.17	3.66	224.70	14.31	.635	223.74	223.62	318.93
88.14	4.01	220.44	15.40	.621	219.92	219.12	293.21
100.00	4.01	222.05	15.51	.626	221.51	221.51	278.66

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	TRAILING EDGE	FLCH (%)	MATS (%)	CILTA (DEG)	BETA (DEG)	TRAILING MEAN (DEG)	INFLUENCE MEAN (DEG)	ANGLL (DEG)	SUCT SUR (DEG)	D FACTOR	OHCGA (DEG)	UAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PERF5 PATTN	STAGE PERF6 PATTN	STATOR POLYTROPIC EFF
0.00	0.00		0.00	30.14		-1.419	-5.741			.3076	.0420		.0154	26.540	1.587	1.1890	.8402
11.13	11.25		12.39	30.77		-1.075	-4.425			.3001	.0461		.0160	20.902	1.609	1.1898	.8347
29.05	30.03		37.73	30.68		-2.275	-5.543			.2832	.0420		.0130	16.891	1.624	1.1753	.8444
48.26	48.40		52.12	30.04		-3.672	-6.672			.2711	.0426		.0163	16.008	1.652	1.1670	.8131
67.30	67.17		71.02	32.17		-3.503	-6.363			.2947	.0421		.0235	14.764	1.640	1.1643	.7667
88.26	88.14		90.04	34.57		-3.813	-6.690			.3849	.0413		.0663	15.538	1.617	1.1740	.5220
100.00	100.00		100.00	35.85		-4.774	-8.215			.4018	.0418		.0598	22.710	1.610	1.1741	.5665

MOMENTUM AVERAGE STAGE EFFICIENCY = .8518 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8520 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS. RATIO = 1.6765  
 MASS AVERAGE TEMPERATURE RISE = 1.1747

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NASA SMALL AXIAL COMPRESSOR TEST 2 FEB, 20, 1975 (COMBINED TEMP)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT HEIGHT FLOW = 3.4874 LBM/SEC  
 EQUIVALENT FLOW / INLET ANN AREA = 76673.388 R.P.M.  
 100 PERCENT DESIGN SPEE' = 520.07 FT/SEC  
 EQUIVALENT FLOW / IMLET ANN AREA = 38.5179 LBP/SEC-SC FT

PERCENT SPAN FROM TIP (L. C.)	BETA*1 (DEG)	V*1 (FT/SEC)	W*1 (C.F.)	V1 (EJ/SEC)	VU1 (EI/SEC)	M1	VM1 (SI/SEC)	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	71.27	1069.39	1580.22	0.00	537.38	0.00	537.38	520.07	1580.22
9.09	69.87	1000.83	1503.03	1.471	570.96	0.00	570.96	532.92	1503.03
20.05	66.47	1497.00	1372.18	1.302	593.67	0.00	593.67	587.67	1372.18
43.54	63.70	1383.57	1240.31	1.279	613.10	0.00	613.10	611.13	1240.31
62.23	61.65	1284.72	1094.37	1.148	593.02	0.00	593.02	542.81	1094.37
85.15	58.81	1070.20	915.51	0.993	554.23	0.00	554.23	546.79	915.51
100.00	56.44	959.49	799.54	0.880	530.42	0.00	530.42	512.40	799.54

EXIT VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (L. C.)	BETA*2 (DEG)	V*2 (FT/SEC)	W*2 (C.F.)	V2 (EJ/SEC)	VU2 (FI/SEC)	M2	VM2 (SI/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	59.34	1133.44	975.03	0.941	43.31	7.422	544.78	559.32	1519.80
11.40	54.76	1076.91	802.02	0.902	42.46	8.446	570.15	609.52	1452.17
30.31	51.52	942.58	716.05	0.837	42.37	8.576	563.18	613.66	1340.03
49.31	50.27	846.39	646.39	0.771	42.50	8.623	582.15	635.19	1228.54
63.27	50.84	818.38	596.89	0.702	41.52	8.977	618.16	649.13	1114.85
88.66	41.40	760.70	277.52	0.660	45.33	10.074	716.43	693.95	993.95
100.00	12.62	726.17	158.56	0.654	47.29	10.512	768.01	684.74	970.67

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FRM TIP	TRAILING EDGE	INCIDENT MEAN ANGLE (DEG)	INCIDENT SURF ANGLE (DEG)	LOSS PARAMETER	OMEGA BAR	FACTOR	DIVIATION ANGLE (DEG)	ROTOR LOSS RATE	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	11.88	7.182	0.417	0.452	4.452	2.353	1.490	0.7719
9.09	11.40	12.23	5.11	8.016	0.426	4.547	2.015	2.221	1.028	0.7958
26.65	10.31	12.67	16.91	7.563	0.426	4.626	1.187	1.791	1.028	0.8647
43.54	49.11	42.21	18.20	7.097	0.419	4.723	0.847	1.465	1.050	0.9234
62.23	63.27	71.28	24.21	7.290	0.415	4.761	0.815	1.312	1.054	0.9379
85.15	89.66	90.24	37.41	7.541	0.436	4.436	-0.005	12.771	2.054	1.0003
100.00	100.00	100.00	43.82	7.687	0.410	4.100	-0.0017	19.668	2.055	1.0003

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8943 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8850 (ADIABATIC)  
 MOMENTUM AVG. ROTOR LOSS RATE = 1.9532  
 MASS AVERAGE TEMPERATURE RISE = 1.2380

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (CONDITIO TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.5019 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 95.2173  
 100 PERCENT DESIGN SPEED - SCAN NO 14  
 EQUIVALENT SPEED = 76.71.188 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 189.0607 KG/SEC-50 H

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AEROYNAMIC BLOCKAGE = .9804

PERCENT SPAN FROM TIP (L. F.)	UETA*1 (DEG)	V*1 (M/SEC)	U*1 (M/SEC)	M*1	UETA1 (DEG)	V1 (M/SEC)	U1 (M/SEC)	M1	U*2 (M/SEC)	V*2 (M/SEC)	U*2 (M/SEC)	M*2	UETA2 (DEG)	V2 (M/SEC)	U2 (M/SEC)	M2
0.00	71.22	508.74	481.65	1.531	0.00	153.73	151.79	.493	0.00	0.00	176.15	.560	4.91	242.08	170.42	463.24
9.89	69.87	487.13	458.12	1.471	0.00	167.93	162.44	.506	0.00	0.00	185.78	.705	4.76	257.44	185.78	442.62
20.65	66.43	456.31	438.24	1.382	0.00	182.47	179.12	.553	0.00	0.00	189.72	.705	4.57	266.74	187.04	409.44
43.54	63.70	421.71	378.05	1.279	0.00	196.87	186.27	.567	0.00	0.00	193.63	.770	4.35	273.64	193.63	378.66
62.23	61.55	379.39	333.57	1.148	0.00	180.75	180.75	.567	0.00	0.00	198.45	.770	4.53	273.64	197.85	339.81
85.15	58.81	321.20	279.05	.983	0.00	168.93	165.66	.509	0.00	0.00	215.84	.875	4.53	307.07	212.34	302.95
100.00	56.44	292.45	243.70	.880	0.00	161.67	161.67	.486	0.00	0.00	234.09	.913	4.72	318.55	208.71	282.45

FIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8446

PERCENT SPAN FROM TIP (L. F.)	BETA*2 (DEG)	V*2 (M/SEC)	U*2 (M/SEC)	M*2	BETA*1 (DEG)	V1 (M/SEC)	U1 (M/SEC)	M1	BETA*2 (DEG)	V*2 (M/SEC)	U*2 (M/SEC)	M*2	BETA*1 (DEG)	V1 (M/SEC)	U1 (M/SEC)	M1
0.00	59.34	345.47	297.19	.941	4.91	242.08	166.05	.660	4.91	242.08	166.05	.660	4.91	242.08	166.05	.660
11.40	58.76	325.16	268.86	.902	4.76	257.44	173.78	.705	4.76	257.44	173.78	.705	4.76	257.44	173.78	.705
30.31	51.52	302.48	236.78	.817	4.57	266.74	171.06	.705	4.57	266.74	171.06	.705	4.57	266.74	171.06	.705
48.11	45.50	276.23	197.82	.771	4.35	273.64	177.84	.770	4.35	273.64	177.84	.770	4.35	273.64	177.84	.770
68.27	37.34	246.58	151.30	.702	4.53	273.64	188.42	.770	4.53	273.64	188.42	.770	4.53	273.64	188.42	.770
88.66	21.40	231.86	84.59	.650	4.53	307.07	218.17	.875	4.53	307.07	218.17	.875	4.53	307.07	218.17	.875
100.00	12.62	221.40	40.36	.634	4.72	318.55	234.09	.913	4.72	318.55	234.09	.913	4.72	318.55	234.09	.913

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FRM TIP (PCT)	MAS FLCH (PCT)	DELTA TRAILING EDGE (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR (DEG)	ANGL F (DEG)	D FACTOR	ORFCA* BAR	LOSS PARAMETER (DEG)	DEVIATION ANGL (DEG)	POTOP PRESS RATIO	POTOP ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	11.80	7.382	6.914	4.452	.2149	.0417	2.353	1.090	.7504	.7719	
9.89	11.40	12.78	15.11	0.016	6.634	4.547	.2035	.0426	2.221	1.928	.7762	.7958	
26.65	30.31	32.67	14.91	7.563	5.425	4.626	.1387	.0287	1.291	.928	.817	.8547	
43.54	49.11	57.21	19.20	7.097	4.195	4.723	.0847	.0180	3.465	1.950	.9158	.9234	
62.23	68.27	71.28	24.21	7.290	3.415	4.761	.0531	.0115	7.372	1.954	.9537	.9579	
85.15	88.66	90.24	37.41	7.541	2.494	4.434	-.0005	-.0001	12.771	2.056	1.0001	1.0003	
100.00	100.00	100.00	43.82	7.687	1.611	4.100	-.0017	-.0004	19.868	2.055	1.0003	1.0003	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8943 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8840 (ADIABATIC)  
 MOMENTUM AVG. ROTOP PRESS RATIO = 1.9532  
 MASS AVERAGE TEMPERATURE RISE = 1.2380

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED I.F.P.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO. 14

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8868

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VI3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	34.99	872.92	560.35	.732	668.82	661.47	1475.98
10.96	40.29	902.49	581.57	.759	688.17	677.10	1418.86
29.42	39.10	904.69	570.51	.749	702.06	702.05	1322.63
47.95	36.77	927.58	583.17	.796	721.21	720.68	1226.08
67.25	40.15	947.66	612.54	.820	725.88	723.23	1125.46
88.19	42.37	1039.72	700.64	.907	718.20	757.88	1016.34
100.00	43.56	1079.16	745.00	.948	780.74	759.17	964.77

EXII VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9218

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	3.84	681.12	45.61	.559	679.79	579.79	1465.27
11.28	3.84	700.47	46.91	.576	693.90	698.81	1414.77
30.13	3.84	721.19	48.55	.600	719.56	719.25	1330.33
48.48	4.17	742.80	54.01	.623	740.83	740.07	1248.16
67.24	2.61	728.65	31.44	.613	727.88	727.48	1174.10
88.14	3.81	702.52	46.90	.587	700.96	698.60	1070.53
100.00	3.84	706.19	47.30	.591	704.81	704.81	1017.40

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	FRONT TRAILING EDGE	MASS FLOW (LBS)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	D FACTOR	OMEGA CAR (DEG)	LOSS PARAMETER (LBS)	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	36.15	1.659	-2.51	.4740	.1108	.0198	26.020	1.428	1.2653
10.96	1.78	12.28	36.45	4.123	-2.65	.4304	.1277	.0443	20.408	1.850	1.2653
29.42	30.13	32.67	35.26	2.545	-2.85	.3911	.0750	.0246	17.044	1.881	1.2653
47.95	68.48	52.21	34.80	1.268	-1.731	.3707	.0567	.0173	16.168	1.912	1.2291
67.25	67.24	71.28	37.52	2.622	-2.241	.4018	.0382	.0251	13.732	1.493	1.2208
88.19	88.14	90.24	38.54	-0.005	-2.886	.4823	.2403	.0634	15.159	1.852	1.2281
100.00	100.00	103.00	39.82	-0.974	-4.415	.4986	.2262	.0571	22.540	1.851	1.2280

MOMENTUM AVERAGE STAGE EFFICIENCY = .8407 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8260 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS. RATIO = 1.8762  
 MASS AVERAGE TEMPERATURE RISE = 1.2300

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT UFSION SPEED - SCAN NO 14

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8860

PERCENT SPAN FROM TIP (L. E.)	BETA 3 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M3	VM1 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	39.99	266.06	170.98	.732	203.06	231.62	449.08
10.96	40.29	275.05	177.86	.759	209.80	239.45	432.47
29.42	39.10	275.75	173.92	.769	213.97	213.98	403.14
47.95	38.97	282.73	177.80	.796	219.82	219.66	373.71
67.25	40.15	289.45	180.64	.820	221.25	220.46	361.04
88.19	42.37	316.91	213.56	.907	234.15	231.00	309.78
100.00	43.56	320.93	227.97	.948	237.97	231.40	291.01

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9218

PERCENT SPAN FROM TIP (L. E.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	V24 (M/SEC)	U4 (M/SEC)
0.00	3.86	207.67	13.91	.550	207.20	207.20	446.62
11.28	3.84	213.50	14.30	.576	213.02	213.00	431.22
30.13	3.84	219.82	14.74	.600	219.32	219.23	405.49
48.48	4.17	226.41	16.46	.623	225.81	225.57	390.44
67.24	2.63	222.09	10.13	.613	221.86	221.74	374.82
88.14	3.03	216.13	14.23	.587	213.65	212.87	326.30
100.00	3.04	215.31	14.42	.591	214.83	214.83	310.10

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (PCT)	DELTA DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTOP	OMEGA PAR	LOSS PARAM	DEVIAION ANGLE (NEG)	STAGE PFF55 RATIO	STAGE PFF55 RATIO	STATOR POLYTROPIC EFF
0.00	0.00	36.15	3.669	-2.51	4.140	.1100	.0198	26.020	1.828	1.2653	.7647
10.96	11.78	36.45	4.123	-2.51	4.104	.1277	.0443	20.408	1.850	1.2653	.7160
29.42	10.13	35.26	2.545	-7.85	3.911	.0750	.0246	17.046	1.881	1.2418	.9316
47.95	48.48	34.80	1.268	-1.731	3.707	.0567	.0173	16.168	1.912	1.2291	.8741
67.25	67.24	37.52	.622	-2.241	4.018	.0882	.0253	13.732	1.891	1.2208	.8101
88.19	88.14	38.54	-0.005	-2.886	4.623	.2403	.0634	15.359	1.852	1.2281	.6511
100.00	100.00	39.82	-0.974	-6.415	4.986	.2262	.0571	22.540	1.851	1.2200	.6940

MOMENTUM AVERAGE STAGE EFFICIENCY = .9407 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8200 (ADIABATIC)  
MOMENTUM AVG. STAGE PFF55 RATIO = 1.8762  
MASS AVERAGE TEMPERATURE RISE = 1.2380

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED IMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.4176 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 66.0007  
 70 PERCENT DESIGN SPEED - SCAN NO. 16  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 51491.600 R.F.W.  
 26.7814 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0025

PERCENT SPAN FROM TIP (L. E.)	BETA*1 (DEG)	V*1 (FT/SEC)	M*1	BETA1 (DEG)	V1 (FT/SEC)	M*1	VU1 (FT/SEC)	P1	VM1 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	72.61	1155.25	1.045	0.00	345.2	0.00	0.00	.312	345.25	334.14	1102.45
9.59	71.40	1102.05	1.001	0.00	353.55	0.00	0.00	.320	353.55	341.79	1050.20
25.45	68.41	1036.61	.940	0.00	381.47	0.00	0.00	.346	381.47	374.46	961.86
41.23	66.04	968.68	.872	0.00	390.16	0.00	0.00	.354	390.16	384.91	877.88
59.52	64.01	885.83	.785	0.00	379.30	0.00	0.00	.344	379.30	379.26	778.29
81.54	61.09	736.61	.670	0.00	357.56	0.00	0.00	.324	357.56	352.76	647.83
100.00	59.71	655.92	.593	0.00	345.08	0.00	0.00	.312	345.08	333.35	557.81

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8533

PERCENT SPAN FROM TIP (L. E.)	DELTA*2 (DEG)	V*2 (FT/SEC)	M*2	DELTA2 (DEG)	V2 (FT/SEC)	M*2	VU2 (FT/SEC)	M*2	VM*2 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	59.98	805.09	.782	31.98	531.55	0.00	293.98	.464	462.86	428.60	1060.30
11.11	55.91	842.37	.746	37.71	567.95	0.00	307.55	.447	477.49	467.04	1013.52
21.94	51.63	778.07	.683	33.09	555.82	0.00	309.42	.488	461.39	428.52	936.43
48.00	47.26	718.99	.633	34.16	509.68	0.00	311.13	.519	467.91	487.90	859.21
67.73	38.35	610.43	.584	35.56	630.67	0.00	370.27	.563	517.41	517.41	780.03
88.51	23.98	524.78	.555	37.67	720.57	0.00	440.31	.641	570.39	561.02	694.04
100.00	16.90	596.48	.532	39.63	741.53	0.00	472.98	.661	571.10	551.69	646.50

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FIRCH TRAILING EDGE (PCT)	MAJ FLOW (PCT)	DELTA (DEG)	DELTA* (DEG)	MEAN ANGLE (DEG)	SUCT SUR (DEG)	INCIDENCE ANGLE (DEG)	OMEGA* PAR FACTOR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	POIN* PRESS RATIO	POIN* ADIABATIC EFF	POICP POLYTROPIC EFF
0.00	0.00	0.00	12.63	8.774	8.306	8.306	3308	.1514	.0288	2.986	1.286	.7449	.7538
9.59	11.51	11.50	15.48	9.490	8.186	8.186	3316	.1340	.0772	.926	1.306	.7884	.7982
25.45	29.96	31.27	14.78	9.339	7.277	7.277	3497	.0932	.1084	3.277	1.309	.8584	.8640
41.23	48.00	44.83	18.77	9.128	6.351	6.351	3562	.0375	.0077	4.994	1.319	.5489	.9509
59.52	67.73	68.95	25.66	9.453	5.689	5.689	3533	-.0041	-.0009	7.946	1.365	1.0046	1.0046
81.54	89.51	99.21	37.11	9.629	4.674	4.674	2934	-.0930	-.0199	15.147	1.420	1.0740	1.0705
100.00	100.00	100.00	41.31	9.505	3.431	3.431	2405	-.1156	-.0215	23.952	1.420	1.0740	1.0704

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9210 (POLYTROPIC)      MOMENTUM AVG. ROTOR PRESS. RATIO = 1.3408  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .9176 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.0951

NASA SMALL AXIAL COMPRESSOR IFSI 2 FED. 20, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FIGHT FLOW = 1.0965 KG/SEC 70 PERCENT DESIGN SPEED - SCAN NO 16  
 PERCENT DESIGN EQUIVALENT FLOW = 66.00E7 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 53491.600 P.F.P.  
 = 130.3676 KG/SEC-50 M

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = 1.0025

PERCENT SPAN FROM TIP (L. E.)	BETA*1 (DEG)	V*1 (M/SEC)	WU*1 (M/SEC)	H*1	BETA1 (DEG)	VI (M/SEC)	VUI (M/SEC)	H1	VM*1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	72.11	552.12	336.03	1.045	0.00	105.23	0.00	.112	105.23	101.84	336.03
9.59	71.40	517.71	300.10	1.001	0.00	107.70	0.00	.120	107.70	104.17	320.10
25.45	68.41	315.96	231.79	.940	0.00	116.27	0.00	.166	116.27	114.14	293.79
41.23	66.04	292.81	207.58	.872	0.00	118.92	0.00	.154	118.92	118.54	267.58
59.52	64.01	263.91	237.22	.785	0.00	115.64	0.00	.164	115.64	115.60	237.22
83.54	61.09	225.41	197.34	.670	0.00	104.98	0.00	.124	104.98	107.52	197.34
100.00	58.26	105.92	170.02	.593	0.00	105.18	0.00	.112	105.18	101.61	170.02

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9531

PERCENT SPAN FROM TIP (L. E.)	BETA*2 (DEG)	V*2 (M/SEC)	WU*2 (M/SEC)	H*2	BETA2 (DEG)	V2 (M/SEC)	VU*2 (M/SEC)	H2	VM*2 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	59.90	260.77	213.57	.772	33.58	162.02	89.61	.456	134.08	130.14	323.18
11.31	55.93	259.77	215.18	.746	32.79	173.11	93.74	.497	145.51	142.15	309.92
29.94	51.63	237.16	190.05	.683	33.89	169.41	94.46	.480	143.41	139.76	285.42
48.60	47.26	210.15	160.96	.613	34.16	179.73	100.91	.519	163.72	149.71	261.89
67.73	43.35	201.30	124.00	.584	35.56	194.06	112.86	.563	157.87	157.60	237.75
86.51	23.98	190.24	77.34	.555	37.67	219.63	134.21	.641	173.86	171.00	211.14
100.00	16.90	181.93	52.89	.532	39.63	226.02	144.16	.661	174.07	168.16	197.05

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	SPAN FROM 4 TIP TRAILING EDGE	MASS FLOW (MG)	DELTA DELTA* (DEG)	INCIDENCE ANGLE (DEG)	PLAN SUCT SUR (DEG)	FACTOR	OMEGA* PAR (RPM)	LOSS PARAMETER (DEG)	DEVIATION ANGLE (DEG)	POTOR P.T.55 RATIO	PC12R ADIABATIC EFF	POTCP POLYTROPIC EFF
0.00	0.00	0.00	12.63	8.774	8.305	.3308	.1514	.0298	2.986	1.286	.7409	.7538
9.59	11.11	11.86	15.48	9.490	8.186	.3316	.1340	.0272	3.920	1.704	.7884	.7962
25.45	29.94	31.24	14.78	9.139	7.277	.3493	.0332	.0194	3.277	1.109	.9588	.8649
41.23	48.60	49.83	18.77	9.128	6.351	.3562	.0375	.0077	4.394	1.318	.6489	.9509
59.52	67.73	68.95	25.66	9.453	5.689	.3533	-.0041	-.0009	7.946	1.166	1.0041	1.0044
83.54	86.51	89.73	37.11	9.629	4.634	.2934	-.0930	-.0199	15.147	1.420	1.0740	1.0745
100.00	100.00	100.00	41.36	9.505	3.431	.2405	-.1156	-.0235	23.952	1.420	1.0740	1.0740

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9210 (POLYTROPIC) MOMENTUM AVG. ROTOR PRESS RATIO = 1.3408  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .9176 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.0951



NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (CONTINUED IMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 16

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8700

PERCENT SPAN FROM TIP (L. E.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	10.04	604.63	302.71	.531	523.40	517.55	1029.73
10.81	10.27	624.41	314.75	.549	539.28	517.31	990.33
20.81	10.13	625.27	313.86	.552	540.79	540.66	924.66
47.07	10.27	657.41	331.38	.583	567.78	557.36	858.56
66.11	11.30	603.09	306.24	.616	588.43	546.28	708.61
87.82	34.34	762.50	430.17	.682	629.58	621.12	710.40
100.00	35.53	790.96	459.09	.709	642.99	625.22	666.10

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9376

PERCENT SPAN FROM TIP (L. E.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	4.19	532.86	38.93	.665	531.44	531.43	1022.26
11.26	4.13	518.01	39.47	.679	546.59	546.52	997.06
30.02	2.82	554.96	25.34	.687	554.38	554.14	928.45
48.46	2.45	596.86	25.46	.524	574.31	533.70	870.85
67.23	4.00	629.01	43.83	.556	627.48	627.13	812.19
89.04	5.38	634.28	59.49	.559	631.48	629.10	747.18
100.00	5.41	638.60	60.23	.563	635.75	635.75	709.79

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCF)	DILTA PETA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCT SUR (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	STATOR TEMP RATIO	POLYTROPIC EFF
0.00	0.00	0.00	25.85	-6.275	-10.197	.2773	.0286	.0103	26.370	1.280	1.0999	.8855
10.83	11.26	11.16	26.11	-5.894	-9.257	.2756	.0576	.0199	20.701	1.290	1.0999	.7771
28.49	30.02	31.24	27.51	-6.401	-9.747	.2613	.0555	.0182	15.828	1.296	1.0930	.7681
67.07	48.46	49.81	27.82	-7.155	-10.366	.2356	.0387	.0118	14.432	1.327	1.0911	.8135
66.11	67.23	68.93	27.90	-7.509	-10.398	.2217	.0340	.0097	15.098	1.355	1.0925	.8344
87.82	88.04	89.21	28.96	-7.939	-10.843	.2099	.0676	.0442	16.912	1.356	1.0979	.5358
100.00	100.00	100.00	30.11	-9.106	-12.547	.3107	.1574	.0396	24.112	1.357	1.0980	.6171

MOMENTUM AVERAGE STAGE EFFICIENCY = .8668 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8822 (ADIABATIC)  
MOMENTUM AVG. STATOR PRESS RATIO = 1.3262  
MASS AVERAGE TEMPERATURE RISE = 1.0991

ORIGINAL PAGE IS OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO. 16

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8700

PERCENT SPAN FROM TIP (L. L.)	BETA 1 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	H3	VM3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	10.04	184.79	92.27	.531	159.53	157.70	313.86
10.87	30.27	150.12	95.94	.549	164.37	166.10	301.95
24.87	30.17	180.58	95.66	.552	164.83	166.83	281.84
47.07	30.27	201.18	101.00	.583	173.06	172.93	261.69
66.31	31.90	211.25	111.63	.616	179.35	178.70	240.37
87.82	34.34	232.41	131.12	.682	191.89	189.32	216.53
100.00	35.53	240.81	139.97	.709	195.98	190.57	203.03

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9176

PERCENT SPAN FROM TIP (L. L.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	H4	VM4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	4.19	162.42	11.87	.465	161.98	161.98	311.58
11.26	4.13	167.03	12.03	.479	166.00	166.68	300.86
30.02	2.62	167.15	7.72	.487	168.90	168.90	292.99
48.45	2.45	181.31	7.76	.524	181.15	180.96	265.54
67.23	4.00	191.72	13.16	.556	191.25	191.15	247.55
88.04	5.38	193.33	18.13	.559	192.48	191.77	227.74
100.00	5.41	194.65	18.36	.563	193.78	193.78	216.34

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	FRCH TRAILING EDGE	MASS FLUX (G/CM <sup>2</sup> )	DILTA U <sup>2</sup> (M/SEC) <sup>2</sup>	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STAGE POLYTROPIC EFF	
0.00	0.00	0.00	25.85	-6.275	-10.197	.2713	.0286	.0103	26.170	1.200	1.0999	.8854
10.93	11.26	11.06	26.14	-5.894	-9.257	.2740	.0376	.0199	20.701	1.200	1.0999	.7771
28.99	30.02	11.24	27.51	-6.401	-9.747	.2633	.0555	.0182	15.828	1.294	1.0930	.7661
47.07	48.46	49.81	27.82	-7.355	-10.366	.2356	.0387	.0118	14.452	1.327	1.0911	.8135
66.31	67.23	68.95	27.90	-7.509	-10.393	.2217	.0340	.0097	15.098	1.351	1.0925	.8364
87.82	88.04	89.23	28.90	-7.939	-10.843	.2899	.0676	.0447	16.912	1.356	1.0970	.5358
100.00	100.00	100.00	30.11	-9.106	-12.547	.3107	.0574	.0396	24.112	1.357	1.0986	.6171

MOMENTUM AVERAGE STAGE EFFICIENCY = .8863 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .8822 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS. RATIO = 1.3262

MASS AVERAGE TEMPERATURE RISE = 1.0951

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB 1970 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.3541 LBM/SEC 70 PERCENT DESIGN SPEED - SCAN NO. 17 R.P.M. = 53580.729  
 PERCENT DESIGN EQUIVALENT FLOW = 44.2751 EQUIVALENT FLOW / INLET ANN AREA = 26.0009 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0130

PERCENT SPAN FROM TIP (U. L.)	BETA*1 (DEG)	V*1 (FT/SEC)	VU*1 (FT/SEC)	M*1	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	VM1 (FT/SEC)	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	73.12	1154.00	1104.29	1.047	0.00	335.05	0.00	0.00	335.05	324.76	1104.29
9.48	71.36	1107.98	1052.57	1.001	0.00	742.90	0.00	0.310	742.89	711.58	1052.57
25.24	69.06	1034.96	966.59	0.938	0.00	369.94	0.00	0.335	369.94	363.14	966.59
41.04	66.74	958.74	880.37	0.869	0.00	378.37	0.00	0.343	378.37	377.15	880.37
59.40	64.76	862.63	730.24	0.781	0.00	367.90	0.00	0.333	367.90	367.77	780.24
83.98	61.87	735.12	645.32	0.665	0.00	346.53	0.00	0.314	346.53	341.88	648.32
100.00	59.11	651.04	559.74	0.585	0.00	334.16	0.00	0.302	334.16	324.81	558.74

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8712

PERCENT SPAN FROM TIP (U. F.)	BETA*2 (DEG)	V*2 (FT/SEC)	VU*2 (FT/SEC)	M*2	BETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VM2 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	69.62	840.90	740.59	0.738	37.63	526.50	321.47	0.457	416.56	411.53	1067.07
11.40	57.19	807.21	678.19	0.702	37.56	551.48	316.44	0.480	437.47	427.91	1014.82
30.87	55.27	720.33	599.41	0.636	38.85	533.53	334.69	0.466	415.49	412.90	934.10
50.16	46.81	697.05	501.49	0.606	36.66	590.85	352.75	0.519	474.00	473.57	654.24
68.70	37.29	644.03	389.56	0.569	37.09	642.95	387.76	0.568	512.86	511.34	777.32
80.84	23.20	606.28	292.41	0.538	30.21	718.86	454.42	0.630	557.01	547.85	691.84
101.00	16.04	510.22	160.28	0.517	41.15	740.55	487.29	0.659	557.64	548.89	647.97

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (U. F.)	TRAILING EDGE	FLCH (PCU)	HACS	DELTA (DEG)	BETA* (DEG)	INFLUENCE MEAN (DEG)	SUCT SUR (DEG)	ANGLF (DEG)	OMEGA* (RPM)	DAE	LOSS PARAMETER	DEVIATION ANGLF (DEG)	POTOR PRESS RATIO	POTOR ADIABATIC EFF	POTOR POLYTROPIC EFF
0.00	0.00	0.00	12.56	9.295	8.817	3696	0.118	3.629	1.106	0.118	0.118	3.629	1.106	0.7181	0.7284
9.48	11.40	11.71	14.78	10.023	8.726	3811	0.151	4.726	1.313	0.151	0.151	4.726	1.313	0.7180	0.7479
25.24	30.87	30.99	31.70	9.953	7.904	4028	0.270	5.240	1.304	0.270	0.270	5.240	1.304	0.7915	0.8041
41.04	50.16	49.61	20.13	9.807	7.041	3908	0.101	5.072	1.354	0.101	0.101	5.072	1.354	0.8319	0.8448
59.40	68.70	68.81	27.54	10.182	6.423	3747	0.068	4.894	1.385	0.068	0.068	4.894	1.385	1.0073	1.0070
83.98	80.84	80.23	39.12	10.419	5.423	3177	0.084	4.430	1.430	0.084	0.084	4.430	1.430	1.0632	1.0601
100.00	100.00	100.00	41.08	10.365	4.291	2650	0.1023	23.086	1.430	0.1023	0.1023	23.086	1.430	1.0632	1.0601

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8951 (POLYTROPIC) MOMENTUM AVE. ROTOR PRESS RATIO = 1.3522  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8905 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.1009

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (MFRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.0678 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 64.2751  
 70 PERCENT DESIGN SPEED - SCAN NO. 17  
 EQUIVALENT SPEED = 53580.729 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 126.9477 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC DRAG COEFFICIENT = 1.0190

PERCENT SPAN FROM TIP (L. I.)	UETA1 (DEG)	V*1 (M/SEC)	U*1 (M/SEC)	UETA1 (DEG)	V1 (M/SEC)	U*1 (M/SEC)	UETA1 (DEG)	V1 (M/SEC)	U*1 (M/SEC)	UETA1 (DEG)	V1 (M/SEC)
0.00	71.12	335.59	1.043	0.00	102.12	0.00	303	102.12	98.83	336.59	
9.40	71.06	337.41	1.001	0.00	104.48	0.00	310	104.48	101.66	320.82	
25.24	69.00	315.46	0.938	0.00	112.76	0.00	335	112.76	110.69	294.62	
41.04	66.74	292.07	0.859	0.00	115.33	0.00	343	115.33	110.56	268.34	
57.40	64.76	267.93	0.781	0.00	112.14	0.00	333	112.14	112.10	237.82	
83.58	61.87	224.06	0.665	0.00	105.62	0.00	314	105.62	104.21	197.61	
100.00	59.12	198.44	0.589	0.00	101.85	0.00	302	101.85	98.39	170.30	

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC DRAG COEFFICIENT = .8712

PERCENT SPAN FROM TIP (L. I.)	UETA2 (DEG)	V*2 (M/SEC)	U*2 (M/SEC)	UETA2 (DEG)	V2 (M/SEC)	U*2 (M/SEC)	UETA2 (DEG)	V2 (M/SEC)	U*2 (M/SEC)	UETA2 (DEG)	V2 (M/SEC)
0.00	60.62	259.05	225.73	7.39	37.63	160.48	97.98	127.03	121.00	323.72	
11.40	57.19	241.36	206.77	7.02	37.56	168.21	102.55	131.36	130.43	309.32	
30.87	55.37	221.10	187.70	6.36	38.85	162.52	102.01	126.66	125.85	284.72	
50.14	56.61	210.12	157.04	6.06	36.66	140.06	107.52	144.47	144.47	260.37	
68.70	57.32	191.10	119.74	5.69	37.89	145.97	118.19	156.32	155.86	236.93	
88.84	51.76	184.79	77.97	5.18	35.21	219.11	130.51	169.78	166.69	211.48	
100.00	46.04	176.85	49.85	5.17	41.15	225.72	148.53	169.97	164.19	197.18	

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP (DEG)	MASS FLOW (PC)	DELTA UETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	ANGLE (DEG)	DEVIATION (DEG)	POLAR RATIO	ROTOR POLAR RATIO	ROTOR POLAR RATIO
0.00	0.00	11.71	12.50	9.245	8.817	3696	1.910	0.130	1.304	0.7284
11.40	11.40	10.97	14.78	10.073	8.725	3811	1.709	0.151	1.713	0.7479
25.24	30.14	10.40	13.79	9.945	7.804	4020	1.423	0.170	1.709	0.8041
41.04	49.11	9.811	20.13	9.807	7.041	3908	0.25	0.109	1.754	0.844
57.40	68.70	8.811	27.54	10.182	6.423	3747	-0.068	-0.015	1.185	1.0070
83.58	88.46	8.27	34.62	10.439	5.423	3177	-0.082	-0.017	1.430	1.0601
100.00	100.00	100.00	41.08	10.345	4.291	2650	-0.1023	-0.0209	1.430	1.0601

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8951 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8705 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3522  
 MASS AVERAGE TEMPERATURE RISE = 1.1009

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO. 17

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC LOSSAGE = .0933

PERCENT SPAN FROM TIP (L. L.)	BETA 1 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	34.41	505.75	131.07	.512	483.75	477.94	1011.44
10.00	35.18	502.62	146.45	.522	480.44	487.63	991.52
21.22	34.05	502.58	130.65	.520	486.28	486.77	923.20
48.36	33.33	505.31	252.32	.571	541.83	541.44	855.29
67.14	33.84	607.82	303.04	.610	571.29	569.21	786.91
84.09	30.22	750.92	443.71	.669	605.80	597.67	710.59
100.00	37.41	774.52	472.96	.696	618.38	601.10	667.21

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC LOSSAGE = .3185

PERCENT SPAN FROM TIP (L. L.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	4.71	504.42	41.47	.447	502.71	502.71	1023.96
11.30	4.07	515.02	41.90	.447	513.51	513.25	998.60
30.14	3.28	531.04	30.36	.463	530.17	533.94	929.46
44.57	2.17	549.77	21.02	.490	568.38	567.79	871.95
67.32	4.18	604.08	44.06	.531	602.48	602.14	813.26
87.08	4.53	605.03	47.73	.532	603.74	601.54	748.27
100.00	4.53	609.69	48.10	.535	607.79	607.79	710.97

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. L.)	DELTA TRAILING EDGE	MASS FLUX (PCF)	INCIDENCE ANGLE (DEG)	MEAN SUCT CUR (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	-1.90A	-5.839	.3186	.0109	.0111	26.890	1.297	1.1054	.891A
10.00	11.50	11.71	-2.986	-4.181	.3101	.0196	.0137	71.229	1.104	1.1004	.9020
30.14	10.19	30.93	-1.719	-5.040	.2732	-.0317	-.0104	16.472	1.116	1.1002	1.1432
48.36	4.057	49.61	-4.201	-7.694	.2738	.0299	.0091	14.110	1.145	1.0965	.8841
67.14	67.32	58.81	-5.672	-8.539	.2582	.0373	.0107	15.283	1.171	1.0966	.8590
84.09	88.08	99.22	-6.128	-9.015	.3256	.1581	.0417	16.057	1.371	1.1010	.6318
100.00	100.00	100.00	-7.222	-10.663	.3458	.1483	.0374	23.230	1.372	1.1011	.6749

MOMENTUM AVERAGE STAGE EFFICIENCY = .8760 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8707 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.3435  
 MASS AVERAGE TEMPERATURE RISE = 1.1009

NASA ALL AXIAL COMPRESSOR TEST 2 FFD. 20, 1974. (CONTINUED IFRP.2)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO. 17

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9933

PERCENT SPAN FROM TIP (%)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VH3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	76.41	178.54	100.89	.511	147.29	146.68	314.38
10.96	75.10	162.15	104.95	.522	146.80	146.61	302.21
29.72	34.85	180.62	103.22	.520	148.22	144.27	281.39
45.36	33.03	197.90	107.30	.571	165.15	165.03	260.69
67.14	33.94	209.65	116.75	.610	176.13	173.69	236.85
88.09	36.22	220.88	135.24	.669	184.65	182.17	216.59
100.00	37.41	237.29	144.36	.696	188.48	183.20	203.37

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9385

PERCENT SPAN FROM TIP (%)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VH4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	4.71	153.75	12.62	.437	153.23	154.23	312.10
11.30	4.67	150.98	12.77	.447	156.46	156.44	301.33
10.19	3.28	161.86	9.25	.463	161.60	161.52	293.30
49.57	2.17	173.36	6.41	.499	173.24	171.06	265.77
67.32	4.10	184.12	13.43	.531	183.53	183.53	247.88
88.08	4.53	184.60	14.57	.532	184.07	183.15	228.07
100.00	4.51	185.83	14.68	.535	183.25	183.25	216.70

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (%)	DELTA (DEG)	DELTA (DEG)	INCIDENCE MEAN (DEG)	ANGLT (DEG)	SUCT SUR (DEG)	LOSS PARAMETER	DEVIATION ANGL (DEG)	STAGE LOSS RATIO	STAGE LOSS RATIO	POLYTROPIC EFF
0.00	0.00	29.70	-1.900	-5.830	.318F	.0302	26.390	1.297	1.1094	.8918
10.96	11.30	30.52	-0.984	-4.741	.3181	.0396	21.229	1.104	1.1094	.8670
29.72	30.19	11.58	-1.719	-5.048	.2733	-.0317	16.472	1.116	1.1062	1.1472
48.36	44.77	30.02	-4.701	-7.694	.2730	-.0299	14.110	1.145	1.0765	.8841
67.14	67.32	29.66	-5.672	-8.532	.2582	-.0373	15.283	1.177	1.0916	.8500
88.09	88.08	31.60	-6.128	-9.615	.3256	.1581	16.057	1.371	1.1010	.6118
100.00	100.00	32.88	-7.222	-10.663	.3458	.1483	23.230	1.372	1.1011	.6749

MOMENTUM AVERAGE STAGE EFFICIENCY = .8760 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8707 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.3435  
MASS AVERAGE TEMPERATURE RISE = 1.1003

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 BUT POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED, I.P.P.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.2294 LBM/SEC      70 PERCENT DESIGN SPEED = 3400 RPM      18 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 60.8685      EQUIVALENT TIP SPEED = 24.6229 LBM/SEC-SQ FT

INLET VELOCITY DIA. 4.5 IN. DIA.  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.0074

PERCENT SPAN FROM TIP	BETA*1	V*1	VU*1	M*1	BETA1	V1	VC	P1	VM1	V71	U1
(L...E.)	(DEG)	(FT/SEC)	(FT/SEC)	(M)	(DEG)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)
0.00	74.07	1150.07	1105.49	1.039	0.00	315.71	0.00	.285	315.71	305.54	1105.89
9.19	73.00	1107.85	1055.65	.999	0.00	322.76	0.00	.292	322.76	312.20	1055.65
26.71	70.28	1031.46	970.87	.933	0.00	347.96	0.00	.315	347.96	341.57	970.87
40.62	68.07	952.95	883.98	.863	0.00	355.92	0.00	.322	355.92	354.78	883.98
54.26	66.13	855.22	782.10	.774	0.00	366.01	0.00	.313	366.01	345.89	782.10
63.62	63.36	724.10	649.06	.659	0.00	375.94	0.00	.295	375.94	321.56	649.06
100.00	60.69	641.72	559.54	.580	0.00	314.15	0.00	.284	314.15	303.51	559.54

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .0042

PERCENT SPAN FROM TIP	BETA*2	V*2	VU*2	M*2	BETA2	V2	VUP	P2	VM2	V72	U2
(L...E.)	(DEG)	(FT/SEC)	(FT/SEC)	(M)	(DEG)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)
0.00	61.57	790.71	695.31	.691	44.17	526.68	368.29	.454	776.00	164.18	1063.60
11.71	59.51	730.04	629.67	.639	41.17	534.95	385.92	.461	770.45	162.15	1014.99
17.23	54.13	671.42	544.04	.583	44.44	550.50	385.76	.478	793.47	150.27	929.84
50.87	45.21	654.15	474.27	.573	40.11	602.55	388.20	.527	460.81	450.81	852.47
68.51	36.06	612.67	412.67	.540	40.00	647.67	416.31	.570	496.03	496.03	777.55
88.73	21.69	560.46	207.11	.496	43.15	713.92	488.18	.631	520.79	512.24	695.29
100.00	13.50	536.18	125.21	.475	45.11	718.68	523.30	.655	521.35	503.63	648.51

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA P/TAP (C*G)	INCIDENCE ANGLE (DEG)	MEAN SUCTION (DEG)	DELTA P/SUCT (DEG)	DELTA P/DELTA P (DEG)	DELTA P/DELTA P (DEG)	DELTA P/DELTA P (DEG)	DELTA P/DELTA P (DEG)	DELTA P/DELTA P (DEG)	DELTA P/DELTA P (DEG)
0.00	0.00	0.00	12.50	10.230	9.762	4.344	.2289	.0415	4.575	1.334	.8435	.6961
9.19	11.71	11.37	13.49	11.002	9.723	4.654	.2487	.0454	4.550	1.329	.8741	.6869
26.71	32.23	10.13	16.15	11.089	9.073	4.727	.1855	.0167	4.599	1.161	.7617	.7733
40.62	50.87	49.17	22.86	11.079	8.332	4.358	.0779	.0167	4.028	1.340	.9074	.9115
54.26	68.51	68.72	30.07	11.545	7.762	4.136	.0211	.0047	6.618	1.404	.5189	.9800
63.62	88.73	49.26	41.55	11.894	6.886	3.834	.0039	.0003	13.116	1.435	.9972	.9973
100.00	100.00	100.00	47.18	11.913	5.079	3.346	.0047	.0010	20.557	1.445	.9972	.9973

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8552 (POLYTROPIC)      MOMENTUM AVG. ROTOR PRESS RATIO = 1.1744  
 MASS AVERAGE ROTOR EFFICIENCY = .8486 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1119

NASA SMALL AXIAL COMPRESSOR TEST 2, SEP. 20, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.0112 KG/SEC 70 PERCENT OF SIGN SPEED - SCAN NO. 18  
 EQUIVALENT FLOW = 53698.241 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 60.8685 EQUIVALENT FLOW INLET ANGLE = 120.7194 KG/SEC-SO M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0274

PERCENT SPAN FROM TIP (I. F.)	BETA*1 (DEG)	V*1 (M/SEC)	H*1 (M)	DRIFT1 (DEG)	V1 (M/SEC)	VUI (M/SEC)	HI (M)	VHI (M/SEC)	VZI (M/SEC)	UI (M/SEC)
0.00	74.07	350.54	1.039	0.00	96.23	0.00	.285	95.53	91.13	317.07
9.19	73.00	310.47	.998	0.00	98.32	0.00	.292	98.38	95.16	321.76
24.71	70.29	314.55	.933	0.00	106.0F	0.00	.315	106.05	104.11	295.92
40.62	66.07	290.46	.863	0.00	108.46	0.00	.322	108.46	108.14	269.44
50.26	66.13	260.57	.774	0.00	105.46	0.00	.313	105.45	105.43	278.38
83.62	63.34	221.30	.656	0.00	99.15	0.00	.295	99.15	98.01	197.83
100.00	60.69	195.10	.580	0.00	95.77	0.00	.284	95.77	92.51	170.55

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8842

PERCENT SPAN FROM TIP (I. F.)	BETA*2 (DEG)	V*2 (M/SEC)	H*2 (M)	DRIFT2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2 (M)	VM2 (M/SEC)	V72 (M/SEC)	U7 (M/SEC)
0.00	61.57	241.01	.681	64.37	160.52	112.25	.454	114.75	111.06	324.19
11.71	59.51	222.52	.630	61.17	163.05	117.63	.461	112.91	110.44	309.37
32.23	56.13	204.65	.583	64.44	167.94	117.58	.478	119.91	117.17	283.41
50.87	45.21	190.38	.441	60.11	181.66	118.37	.527	140.45	140.45	259.83
68.91	36.06	187.05	.340	60.00	197.39	126.89	.570	151.70	150.76	237.00
89.73	21.69	170.93	.246	63.15	217.57	148.80	.611	158.74	156.13	211.92
100.00	13.50	163.43	.175	65.11	225.15	159.50	.655	158.91	153.51	197.67

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA (DEG)	ETA* (DEG)	MASS FLOW (PCT)	INCIDENCE ANGLE (DEG)	SUCT SUP (DEG)	FACTOR	OMEGA* PAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	RATIO	PCICP EFF	ROICP EFF
0.00	0.00	12.50	0.00	10.240	9.762	.4344	.2289	.0415	4.575	1.134	.6815	.6961
9.19	11.71	17.49	11.37	11.902	9.723	.4654	.2487	.0454	4.590	1.129	.6741	.6969
24.71	32.23	15.15	10.39	11.079	9.073	.4727	.1955	.3162	4.599	1.163	.7617	.7733
40.62	10.87	22.86	49.17	11.075	8.337	.4358	.0775	.0167	4.628	1.100	.8074	.9115
59.26	63.91	30.07	68.77	11.545	7.797	.4136	.0211	.0047	6.618	1.406	.8789	.9800
83.62	88.73	41.64	89.76	11.884	6.886	.3834	.0039	.0009	13.156	1.436	.9072	.9973
100.00	100.00	47.10	100.00	11.913	5.853	.3346	.0047	.0010	20.557	1.486	.9972	.9973

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8572 (POLYTROPIC)      MOMENTUM AVG. RATIO PRESS RATIO = 1.3744  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8046 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1119



NASA SMALL AXIAL COMPRESSOR TFST 2 FEB. 20, 1974 (CONTINUED, ILPP<sub>2</sub>)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 10

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9088

PERCENT SPAN FROM TIP (I. L.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	41.24	575.31	179.27	.498	432.64	477.89	1072.93
11.21	41.50	573.65	194.85	.496	416.14	414.45	992.06
30.77	40.68	597.69	309.58	.521	453.28	453.28	920.71
49.00	36.83	646.26	387.42	.568	517.29	514.88	854.19
67.43	37.10	681.97	411.32	.602	543.94	541.97	796.99
84.15	40.33	737.15	477.12	.653	561.91	554.37	711.42
100.00	41.51	746.33	507.93	.682	573.87	557.95	668.18

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9191

PERCENT SPAN FROM TIP (I. L.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	5.59	455.01	44.24	.390	452.85	452.85	1025.44
11.27	5.54	468.02	44.11	.402	465.84	457.78	990.12
30.15	4.14	492.78	37.27	.426	491.17	471.15	930.95
48.51	3.51	513.04	32.17	.464	532.04	511.47	873.12
67.29	2.40	547.16	23.38	.495	564.64	544.33	814.53
84.82	5.76	586.23	55.78	.484	553.43	551.41	749.56
100.00	5.76	559.34	56.14	.487	556.52	556.52	712.00

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. L.)	MASS FLOW (PCT)	DELTA UETA (DEG)	INCIDENCE ANGLE (DEG)	DELTA UETA (DEG)	DIAGONAL ANGLE (DEG)	LOSS PARAMETER	STAGE PRESSURE RATIO	STATOR POLYTROPIC EFF
0.00	0.00	35.64	4.918	.995	27.760	.0339	1.315	1.1255
11.21	11.37	37.95	7.323	3.970	27.111	.0114	1.317	1.1255
30.77	10.15	36.34	4.051	.761	17.535	.0054	1.319	1.1149
49.00	49.17	33.32	-4.959	-3.942	15.508	.0124	1.369	1.1060
67.43	67.29	31.60	-7.656	-5.314	16.501	.0077	1.345	1.1037
84.15	84.02	34.58	-2.027	-4.911	17.286	.0379	1.383	1.1087
100.00	100.00	35.75	-3.118	-6.559	24.461	.0130	1.383	1.1087

MOMENTUM AVERAGE STAGE EFFICIENCY = .8345 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.3638  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8271 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1119

NASA SMALL AXIAL COMPRESSOR TEST 2, FEB. 20, 1974 (COMBINED I.E.P.P.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO. 18

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9088

PERCENT SPAN FROM TIP (L. L.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	H3	VM3 (M/SEC)	V77 (M/SEC)	U3 (M/SEC)
0.00	41.74	175.15	115.59	.498	131.87	130.62	314.84
11.21	43.50	174.05	120.35	.96	126.84	126.61	302.38
30.77	40.68	182.10	114.74	.521	138.16	138.16	233.63
49.00	36.83	190.98	118.09	.568	157.56	157.56	240.36
67.43	37.10	207.86	125.37	.602	165.80	165.19	219.87
80.15	40.33	224.68	145.42	.653	171.27	171.27	216.84
100.00	41.51	231.58	154.82	.682	174.90	170.07	203.56

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9393

PERCENT SPAN FROM TIP (L. L.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	H4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	5.58	139.69	13.63	.390	139.03	139.03	312.55
11.27	5.54	142.65	13.28	.402	141.99	141.47	301.79
30.15	4.34	150.20	11.35	.426	149.77	149.77	293.75
43.53	3.51	162.47	9.95	.464	152.17	152.00	246.19
67.29	5.40	172.87	14.27	.492	172.10	172.01	248.27
80.02	5.76	180.54	17.00	.484	168.69	168.17	229.47
100.00	5.76	170.49	17.11	.487	169.63	169.63	217.02

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TRAILING EDGE	MASC FLCH (PCT)	DELTA UCLTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTON	OMEGA BAR	LOTS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR POLYTROPIC EFF.
0.00	0.00	0.00	35.67	4.718	.995	.4208	.0746	.0339	27.740	1.115	1.1255
11.21	11.27	11.37	37.95	7.323	3.976	.3954	.0129	.0114	22.111	1.323	1.1255
30.77	30.15	30.39	36.34	4.051	.761	.3666	.0166	.0054	17.535	1.174	1.1149
49.00	48.51	49.17	33.37	-1.959	-3.942	.3394	.0407	.0124	15.508	1.169	1.1620
67.43	67.29	68.72	11.60	-2.456	-5.314	.3133	.0271	.0077	16.501	1.194	1.1037
80.15	80.02	89.26	34.58	-2.027	-4.911	.3886	.1440	.0379	17.286	1.301	1.1087
100.00	100.00	100.00	35.75	-3.118	-6.559	.4092	.1343	.0338	24.461	1.303	1.1087

MINIMUM AVERAGE STAGE EFFICIENCY = .6345 (POLYTROPIC)  
 MINIMUM AVERAGE STAGE EFFICIENCY = .0271 (ADIABATIC)

MINIMUM AVG. STAGE PRESS RATIO = 1.1639  
 MASS AVERAGE TEMPERATURE RISE = 1.1119

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COORDINATED) (REP. 1)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.0516 LBM/SEC 70 PERCENT DESIGN SPEED - SCAN NO 19  
 EQUIVALENT FLOW / INLET ANN AREA = 22.6587 LBM/SEC-SC FT R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 56.0154

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0461

PERCENT SPAN FROM TIP (L. E.)	V*1 (FT/SEC)	M*1	DELTA1 (DEG)	V1 (FT/SEC)	M1	VW1 (FT/SEC)	VZ1 (FT/SEC)	U1 (FT/SEC)			
0.00	75.70	1135.50	1102.30	1.028	0.00	288.78	0.00	.261	288.78	270.40	1107.30
4.61	74.24	1090.74	1049.05	.984	0.00	295.51	0.00	.267	295.51	285.84	1049.95
25.17	71.74	1011.47	965.24	.918	0.00	318.47	0.00	.288	318.47	312.52	965.24
40.60	69.72	975.45	881.23	.844	0.00	325.57	0.00	.294	325.57	324.52	881.23
54.16	67.92	841.98	780.55	.761	0.00	316.44	0.00	.286	316.44	316.37	780.25
67.54	65.29	712.04	647.39	.643	0.00	297.91	0.00	.269	297.91	293.91	647.19
100.00	62.78	627.17	557.73	.566	0.00	286.84	0.00	.259	286.84	277.00	557.73

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .0710

PERCENT SPAN FROM TIP (L. E.)	V*2 (FT/SEC)	M*2	DELTA2 (DEG)	V2 (FT/SEC)	M2	VW2 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)			
0.00	61.19	745.23	652.99	.639	48.59	542.92	407.17	.466	359.13	147.56	1050.16
11.93	54.99	681.04	581.71	.585	50.59	575.77	427.07	.475	350.09	343.72	1010.78
17.57	54.02	603.97	498.67	.571	50.90	562.70	436.71	.485	354.84	352.63	925.38
41.46	41.77	501.54	402.58	.506	66.66	611.83	444.95	.532	419.95	419.83	867.22
69.35	33.96	500.75	329.93	.519	67.22	668.60	443.47	.581	449.20	447.85	771.20
88.61	18.23	511.38	160.18	.451	47.84	721.75	533.34	.636	486.74	478.29	693.52
100.00	8.68	492.96	74.36	.435	49.60	751.22	572.05	.664	486.91	470.37	646.41

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE FROM TIP	MASS FLOW (PCF)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCT SUR (DEG)	D. FACTOR	OMEGA* (RPM)	GAR	LOSS F*AMPLTP	DEVIATION ANGLE (DEG)	ROTOR P*LOSS RATIO	ROTOR POLYTROPIC EFF
0.00	0.00	14.13	11.483	11.015	.4821	.2563	.0470	4.200	1.169	.6175	.6914
9.61	11.81	15.28	12.371	11.000	.5174	.2798	.0523	4.117	1.163	.6683	.6824
24.17	10.94	17.72	12.625	10.580	.5477	.2496	.0408	4.617	1.165	.7179	.7100
40.00	69.19	25.95	12.726	9.985	.5227	.1630	.0371	2.088	1.394	.8226	.8308
54.14	69.31	33.99	13.321	9.574	.4413	.0849	.0111	4.865	1.419	.9567	.9569
67.54	80.01	47.01	13.828	8.833	.4543	.1142	.0254	9.543	1.441	.9271	.9307
100.00	100.00	54.10	14.031	7.957	.4050	.1451	.0305	15.734	1.441	.9270	.9307

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8137 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8047 (ADIABATIC)  
 MOMENTUM AVG. ROTOR P\*LOSS RATIO = 1.3941  
 MASS AVERAGE TEMPERATURE RISE = 1.1235

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (IMPERIC UNITS)

EQUIVALENT WEIGHT FLOW = .9106 KG/SEC 70 PERCENT DESIGN SPEED - SCAN NO. 19  
 PERCENT DESIGN EQUIVALENT FLOW = 56.0154 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 53496.516 P.P.P.  
 = 110.6342 KG/SEC-SO M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0461

PERCENT SPAN FROM TIP (L. E.)	DELTA*1 (DEG)	V*1 (M/SEC)	DELTA1 (DEG)	V1 (M/SEC)	M1	DELTA2 (DEG)	V2 (M/SEC)	M2	DELTA3 (DEG)	V3 (M/SEC)	M3	DELTA4 (DEG)	V4 (M/SEC)	M4	DELTA5 (DEG)	V5 (M/SEC)	M5
0.00	75.32	347.32	335.09	1.028	0.00	88.02	0.19	0.261	83.02	85.14	335.09						
9.61	74.78	332.40	320.02	0.984	0.00	90.07	0.00	0.267	80.07	87.12	320.02						
25.17	71.74	309.81	294.20	0.918	0.00	97.07	0.09	0.288	97.07	95.27	294.20						
40.60	69.72	286.34	268.70	0.849	0.00	99.23	0.20	0.294	99.23	98.92	268.70						
50.14	67.92	254.63	237.82	0.761	0.00	96.45	0.00	0.286	96.45	96.42	237.82						
83.54	65.29	117.21	137.77	0.643	0.00	90.80	0.00	0.269	90.80	86.58	137.32						
100.00	62.78	191.16	170.00	0.566	0.00	87.42	0.00	0.259	87.42	84.46	170.00						

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8710

PERCENT SPAN FROM TIP (L. E.)	DELTA*2 (DEG)	V*2 (M/SEC)	DELTA2 (DEG)	V2 (M/SEC)	M2	DELTA3 (DEG)	V3 (M/SEC)	M3	DELTA4 (DEG)	V4 (M/SEC)	M4	DELTA5 (DEG)	V5 (M/SEC)	M5
0.00	61.19	227.14	199.03	0.630	48.59	165.48	124.11	0.666	103.40	105.94	323.14			
11.91	53.99	207.58	177.82	0.595	50.59	169.47	131.17	0.675	105.01	104.61	300.09			
35.57	50.02	184.07	148.05	0.521	50.90	171.51	133.11	0.685	108.16	107.48	282.06			
51.46	47.77	177.75	122.61	0.506	46.66	186.40	135.62	0.732	128.07	127.09	258.23			
69.56	44.94	174.75	100.35	0.518	42.22	201.38	135.32	0.781	149.14	148.70	235.83			
88.61	48.23	156.05	88.02	0.551	47.64	219.99	162.56	0.836	148.27	145.78	211.39			
100.00	46.68	150.13	22.60	0.435	40.60	228.97	174.36	0.864	148.41	143.37	197.03			

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING TRAILING EDGE	FRCH TIP	MASS FLOW (PCT)	DELTA (DEG)	DELTA* (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTOR	DELTA BAR	LOSS PARAMETER (DEG)	DEVIATION ANGLE (DEG)	POTOP PRESS (WATIO)	ROTOR ANTIANATIC (CF)	POTOP POLYTROPIC (FFF)
0.00	0.10	0.00	16.13	11.483	11.015	4.921	0.2563	0.0470	4.200	1.369	0.774	0.6914	
9.61	11.93	11.89	15.25	12.171	11.065	5.174	0.2798	0.0521	4.117	1.363	0.693	0.6924	
25.17	32.57	30.94	17.77	12.625	10.580	5.677	0.2498	0.0488	4.617	1.366	0.7129	0.7100	
40.60	51.46	49.19	25.95	12.726	9.985	5.227	0.1630	0.0371	2.888	1.394	0.8226	0.8308	
50.14	69.56	68.67	33.99	13.321	9.574	4.413	0.0409	0.0111	4.885	1.419	0.9547	0.9569	
81.54	88.61	89.30	47.06	14.878	8.811	4.561	0.1142	0.0254	9.541	1.441	0.8271	0.9107	
100.00	100.00	100.00	54.10	14.031	7.457	4.050	0.1491	0.0305	15.734	1.441	0.9270	0.9107	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8137 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8047 (ADIABATIC)

MOMENTUM AVG. POTOP PRESS RATIO = 1.3941  
 MASS AVERAGE TEMPERATURE RISE = 1.1235

NASA SMALL AXIAL COMPRESSOR TEST 2, FEB. 20, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO. 19

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9110

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VH3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	46.92	576.90	419.26	.496	396.13	391.78	1026.59
11.23	49.13	578.23	437.22	.497	378.39	377.76	987.29
13.53	47.81	575.09	441.69	.516	400.31	400.30	914.97
49.89	43.74	642.07	444.44	.561	464.47	464.13	848.19
80.07	39.97	681.22	438.92	.602	523.58	521.67	782.09
88.17	45.26	734.44	521.63	.648	516.95	510.00	709.01
100.00	40.48	765.89	555.35	.678	527.41	512.84	666.01

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9157

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VH4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	2.96	442.77	22.86	.177	442.18	442.18	1022.12
11.36	2.98	442.11	22.97	.177	441.91	441.46	986.64
10.36	3.90	446.58	30.41	.182	445.55	445.34	927.26
48.75	5.59	491.10	47.85	.423	488.76	488.26	869.80
87.50	5.93	532.84	55.06	.403	529.98	529.69	811.24
88.04	6.10	517.05	54.93	.447	514.12	512.24	747.07
100.00	6.10	519.63	55.22	.449	516.69	516.69	709.70

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (LBS/SEC)	DELTA DFLX (IN/IN)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	FACTOR	D	OMEGA PAR	LOSS PARAMETER	DEFLECTION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR FOLY TROPIC EFF
0.00	0.00	61.66	10.307	6.384	.4821	.0977	.0751	25.140	1.444	1.1383	.7876	
11.23	11.38	66.15	12.962	9.613	.4877	.0743	.0754	19.526	1.468	1.1381	.8170	
13.53	30.94	31.91	11.145	7.873	.4738	.0775	.0721	17.081	1.500	1.1395	.8605	
49.89	49.13	38.13	5.866	2.896	.4197	.0525	.0160	17.572	1.480	1.1208	.8876	
79.07	67.67	34.04	.337	-2.502	.3748	.0254	.0073	17.032	1.411	1.1100	.9433	
89.17	89.30	19.16	2.894	.011	.4552	.1279	.0336	17.620	1.436	1.1185	.7799	
100.00	100.00	40.38	1.846	-1.595	.4758	.1186	.0298	21.800	1.416	1.1185	.8118	

MOMENTUM AVERAGE STAGE EFFICIENCY = .7875 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7777 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.3793  
MASS AVERAGE TEMPERATURE RISE = 1.1235

NASA SMALL AXIAL COMPRESSOR TEST 2 FEB. 20, 1976 (COMBINED TESTS)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO. 19

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC LOSSAGE = .9110

PERCENT SPAN FROM TIP (L. E.)	DELTA 3 (DEG)	V1 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	V73 (M/SEC)	U*
0.00	66.62	175.91	127.77	.496	120.74	119.42	312.82
11.63	69.13	176.24	133.27	.497	119.51	115.14	300.93
31.53	47.81	181.89	136.67	.516	122.01	120.01	278.88
49.87	43.74	195.74	135.47	.561	141.57	141.67	258.53
68.07	39.97	208.25	133.78	.607	159.59	159.00	238.38
88.17	45.26	223.86	159.01	.648	157.56	157.45	216.11
100.00	46.48	233.44	169.27	.678	160.75	156.31	203.00

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC LOSSAGE = .9157

PERCENT SPAN FROM TIP (L. E.)	DELTA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4
0.00	2.36	136.96	6.97	.377	136.78	136.79	311.54
11.36	2.98	136.75	7.00	.377	135.57	134.56	300.73
30.36	3.98	136.12	9.27	.382	135.80	135.74	292.63
48.75	5.59	149.69	14.58	.423	148.97	148.02	265.12
77.50	5.93	162.41	16.78	.463	161.56	161.45	247.27
88.04	6.10	157.66	16.74	.447	156.70	156.13	227.71
100.00	6.10	158.38	16.83	.449	157.69	157.49	216.32

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP	DELTA (DEG)	INCIDENCE (DEG)	ANGL SURT (DEG)	FACTOR	OMEGA (RPM)	PARAMETER	DEVIATION ANGL (DEG)	STAGE PRF., RATIO	STAGE TFMF RATIO	STATOR POLYTROPIC EFF
0.00	0.00	47.60	10.307	.4821	.0977	.0351	25.140	1.349	1.1303	.7826
11.63	11.36	46.15	12.047	.4837	.0743	.0258	19.626	1.368	1.1383	.8170
31.53	30.36	43.91	11.445	.4738	.0622	.0221	17.081	1.350	1.1255	.8605
49.87	49.87	38.11	5.866	.4197	.0525	.0169	17.972	1.300	1.1208	.8876
68.07	67.00	34.84	3.337	.3748	.0254	.0073	17.932	1.411	1.1100	.9433
88.17	88.06	39.16	2.894	.4592	.1279	.0336	17.629	1.596	1.1105	.7799
100.00	100.00	40.38	1.846	.4758	.1186	.0297	24.800	1.346	1.1185	.8118

MOMENTUM AVERAGE STAGE EFFICIENCY = .7875 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7777 (ADIABATIC)

MOMENTUM AVG. STAGE PRFST. RATIO = 1.3793  
MASS AVERAGE TEMPERATURE RISE = 1.1235

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

ORIGINAL PAGE IS  
OF POOR QUALITY

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.2234 LBM/SEC  
 PERCENT DISTORT EQUIVALENT FLOW = 80.0000  
 EQUIVALENT SPEED = 76709.012 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 35.6015 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9927

PERCENT SPAN FROM TIP (L. T.)	BETA <sub>1</sub> (DEG)	V <sub>01</sub> (FT/SEC)	VU <sub>1</sub> (FT/SEC)	BETA <sub>1</sub> (DEG)	V <sub>1</sub> (FT/SEC)	VU <sub>1</sub> (FT/SEC)	M1	VM1 (FT/SEC)	VZ1 (FT/SEC)	UI (FT/SEC)
0.00	72.92	1623.96	1580.76	0.00	485.83	0.00	.484	485.81	470.17	1580.96
4.31	71.76	1500.10	1508.22	0.00	497.19	0.00	.455	497.14	440.90	1500.22
7.216	68.76	1445.18	1484.43	0.00	537.60	0.00	.493	537.59	527.71	1384.43
8.100	65.24	1367.74	1254.28	0.00	550.35	0.00	.506	550.34	544.56	1254.28
8.662	61.31	1270.11	1104.55	0.00	532.91	0.00	.489	532.88	532.71	1104.55
100.00	59.04	432.36	799.92	0.00	474.95	0.00	.437	474.94	442.65	920.03
									462.66	794.92

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7366

PERCENT SPAN FROM TIP (L. T.)	BETA <sub>2</sub> (DEG)	V <sub>02</sub> (FT/SEC)	VU <sub>2</sub> (FT/SEC)	BETA <sub>2</sub> (DEG)	V <sub>2</sub> (FT/SEC)	VU <sub>2</sub> (FT/SEC)	M2	VM2 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	57.00	1214.60	1019.47	1.023	630.27	501.04	.699	667.03	640.71	1520.51
11.44	57.04	1100.45	927.60	.942	677.22	524.54	.734	696.45	641.62	1452.41
30.51	49.20	1091.66	617.68	.934	691.72	521.43	.763	723.34	718.43	1334.01
49.12	41.07	1030.40	677.26	.892	953.04	551.74	.825	777.04	777.01	1224.00
68.05	33.12	853.53	520.47	.842	949.79	540.22	.874	806.44	804.57	1110.69
84.44	21.16	900.84	327.31	.802	1077.99	668.38	.953	845.73	831.44	945.69
100.00	13.31	871.55	209.44	.775	1109.41	717.66	.986	845.94	817.23	927.10

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. T.)	DELTA <sub>1</sub> (DEG)	DELTA <sub>2</sub> (DEG)	DELTA <sub>3</sub> (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	U FACTOR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	WOTON PRESS RATIO	WOTON ADIABATIC EFF	WOTON POLYTROPIC EFF
0.00	0.00	15.92	9.041	4.613	4.804	.2749	.0578	.010	1.677	.6509	.6751
9.31	11.44	14.66	9.703	4.497	.3492	.2777	.0605	-1.871	1.694	.6676	.6912
25.16	30.51	20.24	9.062	7.617	.4419	.1900	.0619	-1.635	1.757	.7799	.7966
41.00	49.12	9.00	9.404	4.671	.3694	.1121	.0257	-.951	1.850	.8831	.8927
61.00	61.07	7.005	9.025	6.025	.1445	.0726	.0166	2.973	1.881	.9341	.9405
84.44	68.05	40.35	10.174	5.149	.2811	.0379	.0083	12.224	1.934	.9744	.9766
100.00	100.00	45.14	10.537	4.753	.2758	.0460	.0095	20.957	1.934	.9744	.9766

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8444 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8313 (ADIABATIC)  
 MOMENTUM AVG. WOTON PRESS RATIO = 1.8118  
 MASS AVERAGE TEMPERATURE RISE = 1.2222

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW = 1.4621 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 88.0000  
 100 PERCENT DESIGN SPEED = SCAN NO 2  
 EQUIVALENT SPEED = 76709.012 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 173.8P17 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9927

PERCENT SPAN FROM TIP (L. P.)	VEL (M/SEC)	WUW1 (M/SEC)	MW1	RETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	VW1 (M/SEC)	WV1 (M/SEC)	U1 (M/SEC)
0.00	509.13	481.88	1.511	0.00	149.08	0.00	.444	149.08	143.31	481.88
3.31	604.05	459.70	1.442	0.00	151.54	0.00	.455	151.54	146.58	459.70
7.51	697.08	421.97	1.363	0.00	149.86	0.00	.493	163.84	140.85	421.97
11.71	787.50	382.40	1.279	0.00	147.75	0.00	.506	167.74	137.20	382.40
15.91	873.41	336.67	1.195	0.00	147.43	0.00	.489	162.47	142.37	336.67
20.11	954.04	288.42	.997	0.00	152.21	0.00	.457	152.20	150.16	288.42
24.31	1030.18	243.41	.891	0.00	145.98	0.00	.437	145.94	141.02	243.41

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7366

PERCENT SPAN FROM TIP (L. P.)	VEL (M/SEC)	WUW2 (M/SEC)	MW2	RETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	VW2 (M/SEC)	WV2 (M/SEC)	U2 (M/SEC)
0.00	370.52	310.74	1.073	37.12	253.07	157.72	.699	201.79	195.29	463.45
11.49	514.09	202.42	.942	36.97	269.85	159.88	.738	212.40	207.76	442.69
23.97	637.74	249.20	.934	35.79	271.80	158.93	.763	220.47	219.10	408.13
36.45	744.19	200.43	.872	35.38	290.49	168.17	.825	236.85	230.43	374.60
48.93	843.04	160.47	.842	36.10	304.74	174.90	.874	245.94	245.23	340.37
61.41	934.32	99.76	.802	36.12	324.57	203.72	.953	257.79	253.54	303.49
73.89	1019.05	63.84	.775	36.31	339.15	219.74	.986	257.84	249.04	262.58

ROTOR PERFORMANCE DATA

LEADING EDGE	PERCENT SPAN FROM TIP	TRAILING EDGE	MASS FLOW (KG)	DELTA (DEG)	INCIDENCE (DEG)	MEAN (DEG)	FACTOR	HAW (DEG)	HAM (DEG)	LOSS PARAMETER	ANGLE (DEG)	DEVIAION (DEG)	ROTOR PRESS RATIO	ROTOR AUTIARATIC EFF	POLYTHROPIC EFF
0.00	0.00	0.00	0.51	15.92	9.081	8.613	.1804	.2744	.0578	.010	.010	1.677	.6509	.6751	
9.31	11.49	11.49	11.33	19.60	9.703	8.497	.1492	.2777	.0605	-1.471	-1.471	1.608	.6676	.6912	
24.31	36.45	36.45	30.34	20.74	9.662	7.617	.1819	.1900	.0419	-1.435	-1.435	1.357	.7799	.7906	
41.43	61.41	61.41	28.40	25.24	9.800	6.571	.1544	.1121	.0257	-1.951	-1.951	1.150	.8431	.8927	
61.41	81.40	81.40	20.24	31.12	9.855	6.025	.1445	.0726	.0166	-2.973	-2.973	1.441	.9351	.9405	
81.40	98.92	98.92	14.31	40.35	10.173	5.149	.1811	.0379	.0083	12.224	12.224	1.978	.9744	.9766	
100.00	100.00	100.00	100.00	45.18	10.337	4.203	.2258	.0460	.0045	20.957	20.957	1.938	.9744	.9766	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8448 (POLYTHROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8313 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.8118  
 MASS AVERAGE TEMPERATURE RISE = 1.2222



NASA SMALL AXIAL COMPRESSOR (ST 3 JUNE 25, 1974 (COMBINED TEMP.))

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SLASH NO 2

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .0760

PERCENT SPAN FROM TIP (L. T.)	DELTA J (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	VJ3 (FT/SEC)
0.00	40.70	790.21	513.91	.662	598.53	591.45	1470.66
11.50	41.67	812.10	531.06	.682	608.53	607.52	1410.40
30.72	39.21	857.40	530.35	.731	673.66	673.65	1310.65
49.05	30.25	924.01	555.42	.797	730.42	737.04	1220.07
67.41	37.03	957.64	597.10	.832	750.23	753.67	1122.53
85.83	34.97	1014.23	655.13	.893	811.67	811.17	1010.83
100.00	41.27	1055.00	690.26	.930	893.38	893.38	935.21

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .0819

PERCENT SPAN FROM TIP (L. T.)	DELTA V (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	VJ4 (FT/SEC)
0.00	-4.12	605.05	-49.27	.508	604.06	604.06	1405.95
11.19	-4.06	670.12	-49.48	.579	696.34	696.25	1410.81
30.37	-2.33	740.03	-29.09	.614	740.20	724.04	1331.23
40.52	-1.60	801.96	-23.19	.661	801.62	800.79	1248.52
67.19	-3.21	794.29	-44.48	.675	792.95	792.51	1164.90
85.07	-4.11	761.19	-54.33	.644	759.21	756.44	1071.11
100.00	-4.12	760.39	-53.67	.649	764.38	744.38	1017.07

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	FROM TIP TRAILING EDGE	WAS FLOW (PCF)	DELTA (DEG)	MEAN INCIDENCE ANGLE (DEG)	MEAN SUCTION ANGLE (DEG)	U FACTOR	U/ERA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TRAMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	44.80	4.442	4.20	.3917	.0672	.0169	10.060	1.657	1.2441	.8388
11.50	11.19	14.74	45.54	5.291	1.759	.3911	.0617	.0214	12.524	1.670	1.2441	.8021
30.72	30.07	30.43	40.54	1.500	-1.703	.3597	.0801	.0243	10.078	1.712	1.2237	.7811
49.05	43.52	50.46	38.61	-3.807	-3.829	.3199	.0678	.0208	10.318	1.807	1.2172	.7928
67.41	67.19	70.24	41.04	-1.789	-4.632	.3537	.1252	.0359	7.893	1.735	1.2112	.6439
85.83	85.07	87.71	44.00	-2.450	-5.321	.4247	.2481	.0555	7.423	1.744	1.2132	.5377
100.00	100.00	100.00	45.39	-3.402	-6.803	.4442	.2306	.0592	14.579	1.744	1.2132	.6155

MU IF PLUS AVERAGE STAGE EFFICIENCY = .7932 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7764 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.7472  
MASS AVERAGE TEMPERATURE RISE = 1.2222

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 2

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC MLOCKAGE = .8760

PERCENT SPAN FROM TIP (L. S.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	90.70	260.00	157.25	.662	102.43	140.43	420.00
11.50	41.47	297.95	151.94	.602	145.48	145.17	431.72
30.72	38.21	291.33	161.05	.731	205.33	205.33	401.27
44.05	30.95	281.04	167.24	.797	227.07	224.90	372.12
67.31	37.83	291.83	174.50	.832	230.50	229.66	342.15
88.30	37.37	310.47	192.00	.893	230.25	235.05	309.02
100.00	41.27	321.75	212.22	.930	241.82	235.14	291.15

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC MLOCKAGE = .8819

PERCENT SPAN FROM TIP (L. S.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-4.12	209.05	-15.02	.568	209.50	209.50	448.82
11.14	-4.06	212.79	-15.08	.579	212.24	212.22	431.54
30.07	-2.33	222.76	-7.05	.614	222.57	222.47	405.76
44.52	-1.06	264.44	-7.07	.681	264.33	264.08	380.55
67.19	-2.21	262.10	-13.56	.675	261.69	261.54	355.06
88.17	-4.11	242.01	-16.02	.644	231.41	230.56	328.53
100.00	-4.12	233.59	-14.79	.649	232.98	232.98	310.25

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (L. S.)	DELTA FLUX (DEG)	DELTA FLUX (DEG)	INCIDENCE ANGLE (DEG)	SUCT NUM (DEG)	FACTOR	OMEGA UAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.20	44.04	4.442	1.20	.3917	.0472	.0169	16.060	1.657	1.2441	.8398
11.50	11.20	45.54	5.291	1.20	.4911	.0817	.0214	12.524	1.670	1.2441	.8021
30.72	40.24	40.54	1.584	-1.703	.3597	.0401	.0203	10.878	1.712	1.2237	.7411
44.05	50.45	38.61	-2.447	-3.129	.3199	.0674	.0208	10.334	1.807	1.2172	.7428
67.31	70.24	41.04	-1.789	-4.632	.3537	.1252	.0359	7.803	1.795	1.2112	.6934
88.30	84.91	44.08	-2.450	-5.121	.4297	.2401	.0625	7.423	1.744	1.2132	.5577
100.00	100.00	45.33	-3.362	-6.403	.4442	.2346	.0592	14.579	1.744	1.2132	.6155

MOMENTUM AVERAGE STAGE EFFICIENCY = .7932 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7764 (ADIABATIC)  
MOMENTUM AVE. STAGE PRESS RATIO = 1.7472  
MASS AVERAGE TEMPERATURE RISE = 1.2222

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.2426 LBM/SEC 100 PERCENT DESIGN SPEED = SCAN NO 3 76662.603 RPM  
 PERCENT DESIGN EQUIVALENT FLOW = 80.5361 EQUIVALENT SPEED INLET FLOW / INLET ANN AREA = 35.6143 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9889

PERCENT SPAN FROM TIP (L. T.)	HEIGHT (IN)	V01 (FT/SEC)	VE1 (FT/SEC)	W01 (DEG)	M01	W02 (FT/SEC)	VE2 (FT/SEC)	W03 (FT/SEC)	M03	V04 (FT/SEC)	VE4 (FT/SEC)	W05 (FT/SEC)	M05	V06 (FT/SEC)	VE6 (FT/SEC)	W07 (FT/SEC)	M07
0.00	72.78	1079.14	1580.00	0.00	0.00	489.09	0.00	0.00	0.00	449.09	473.92	0.00	0.00	449.09	473.92	0.00	0.00
4.43	71.00	1507.97	1506.78	0.00	0.00	501.24	0.00	0.00	0.00	501.24	446.43	0.00	0.00	501.24	446.43	0.00	0.00
25.49	64.57	1404.45	1401.92	0.00	0.00	557.38	0.00	0.00	0.00	557.38	537.41	0.00	0.00	557.38	537.41	0.00	0.00
42.16	60.16	1308.04	1250.91	0.00	0.00	557.34	0.00	0.00	0.00	557.34	557.55	0.00	0.00	557.34	557.55	0.00	0.00
61.40	53.77	1225.02	1101.68	0.00	0.00	777.94	0.00	0.00	0.00	777.94	537.76	0.00	0.00	777.94	537.76	0.00	0.00
84.71	61.21	1040.31	799.83	0.00	0.00	504.02	0.00	0.00	0.00	504.02	446.04	0.00	0.00	504.02	446.04	0.00	0.00
100.00	93.73	799.83	799.83	0.00	0.00	485.18	0.00	0.00	0.00	485.18	468.69	0.00	0.00	485.18	468.69	0.00	0.00

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .7330

PERCENT SPAN FROM TIP (L. T.)	HEIGHT (IN)	V02 (FT/SEC)	VE2 (FT/SEC)	W02 (DEG)	M02	V03 (FT/SEC)	VE3 (FT/SEC)	W04 (FT/SEC)	M04	V05 (FT/SEC)	VE5 (FT/SEC)	W06 (FT/SEC)	M06	V07 (FT/SEC)	VE7 (FT/SEC)	W08 (FT/SEC)	M08
0.00	56.55	1225.94	1022.95	36.35	0.943	838.69	497.14	707	0.707	675.47	653.72	1519.59	1519.59	711.27	695.72	1851.34	1851.34
11.33	57.02	1171.47	930.92	36.20	0.943	841.28	520.52	747	0.747	710.74	736.13	1337.08	1337.08	740.74	740.74	1496.61	1496.61
30.67	48.63	1107.05	623.52	36.77	0.917	901.70	543.47	832	0.832	817.04	817.04	1115.50	1115.50	817.04	817.04	1496.61	1496.61
49.17	40.42	1043.04	518.00	36.54	0.942	1007.70	560.70	861	0.861	856.50	856.50	926.54	926.54	856.50	856.50	1496.61	1496.61
64.14	32.57	963.02	377.78	37.84	0.912	1095.20	600.39	961	0.961	856.62	856.62	926.54	926.54	856.62	856.62	1496.61	1496.61
84.56	20.75	717.15	211.00	19.45	0.740	1115.77	714.94	993	0.993	856.62	856.62	926.54	926.54	856.62	856.62	1496.61	1496.61
100.00	13.08	812.37	711.00	19.45	0.740	1115.77	714.94	993	0.993	856.62	856.62	926.54	926.54	856.62	856.62	1496.61	1496.61

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	HEIGHT (IN)	MEAN ANGLE (DEG)	SUCT SURF ANGLE (DEG)	MEAN ANGLE (DEG)	FACTOR	OMEGA* (RPM)	WAKE LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTOR PRESS RATIO	MOTOR AUTIADIBATIC EFF	POLYTROPIC EFF
0.00	0.00	0.943	0.475	0.475	0.336	2736	0.074	2.441	1.676	0.657	0.676
4.43	11.33	0.942	0.331	0.331	0.312	2721	0.074	-2.342	1.697	0.677	0.676
25.49	30.67	0.941	0.423	0.423	0.372	2753	0.070	-2.075	1.762	0.756	0.812
42.16	49.17	0.944	0.420	0.420	0.400	2785	0.076	-1.804	1.849	0.866	0.951
61.40	64.14	0.913	0.472	0.472	0.425	2820	0.073	2.441	1.880	0.925	0.978
84.71	84.71	0.909	0.480	0.480	0.420	2717	0.070	12.193	1.978	0.978	0.982
100.00	100.00	0.994	0.420	0.420	0.336	2736	0.074	2.441	1.676	0.657	0.676

MOMENTUM AVG. MOTOR EFFICIENCY = 0.8976 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.8366 (ADIABATIC)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW = 1.4708 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 80.5341  
 100 PERCENT DESIGN SPEED = 76682.603 RPM  
 EQUIVALENT SPEED = 174.8609 KG/SEC-SQ M  
 EQUIVALENT FLOW / INLET ANN AREA =

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .0849

PERCENT SPAN FROM TIP (U. F.)	RE TAN (DEG)	V01 (M/SEC)	W1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	V02 (M/SEC)	W2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V03 (M/SEC)	W3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	V04 (M/SEC)	W4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	V05 (M/SEC)	W5 (DEG)	V5 (M/SEC)	VU5 (M/SEC)	M5	
0.00	72.74	509.14	441.54	149.26	0.00	0.00	447	149.26	0.00	0.00	0.00	447	149.26	0.00	0.00	0.00	149.26	0.00	0.00	0.00	0.00	0.00	149.26	0.00	0.00	0.00	0.00
2.38	71.00	409.01	459.27	152.78	0.00	0.00	454	152.78	0.00	0.00	0.00	454	152.78	0.00	0.00	0.00	152.78	0.00	0.00	0.00	0.00	0.00	152.78	0.00	0.00	0.00	0.00
25.13	58.57	457.46	421.18	145.32	0.00	0.00	491	145.32	0.00	0.00	0.00	491	145.32	0.00	0.00	0.00	145.32	0.00	0.00	0.00	0.00	0.00	145.32	0.00	0.00	0.00	0.00
42.16	56.06	417.16	381.28	149.27	0.00	0.00	510	149.27	0.00	0.00	0.00	510	149.27	0.00	0.00	0.00	149.27	0.00	0.00	0.00	0.00	0.00	149.27	0.00	0.00	0.00	0.00
61.30	64.97	371.03	345.73	161.96	0.00	0.00	494	161.96	0.00	0.00	0.00	494	161.96	0.00	0.00	0.00	161.96	0.00	0.00	0.00	0.00	0.00	161.96	0.00	0.00	0.00	0.00
84.71	61.71	314.53	280.04	153.87	0.00	0.00	467	153.87	0.00	0.00	0.00	467	153.87	0.00	0.00	0.00	153.87	0.00	0.00	0.00	0.00	0.00	153.87	0.00	0.00	0.00	0.00
100.00	58.75	285.03	243.87	147.88	0.00	0.00	443	147.88	0.00	0.00	0.00	443	147.88	0.00	0.00	0.00	147.88	0.00	0.00	0.00	0.00	0.00	147.88	0.00	0.00	0.00	0.00

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .0330

PERCENT SPAN FROM TIP (U. F.)	RE TAN (DEG)	V02 (M/SEC)	W2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V03 (M/SEC)	W3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	V04 (M/SEC)	W4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	V05 (M/SEC)	W5 (DEG)	V5 (M/SEC)	VU5 (M/SEC)	M5	V06 (M/SEC)	W6 (DEG)	V6 (M/SEC)	VU6 (M/SEC)	M6
0.00	76.05	373.31	311.56	255.03	151.53	0.707	36.37	36.37	255.03	151.53	0.707	205.04	205.04	199.25	199.25	0.6517	205.04	205.04	199.25	199.25	0.6517	205.04	205.04	199.25	199.25	0.6517
11.51	72.82	377.05	293.72	266.02	156.65	0.747	36.20	36.20	266.02	156.65	0.747	216.79	216.79	212.06	212.06	0.6237	216.79	216.79	212.06	212.06	0.6237	216.79	216.79	212.06	212.06	0.6237
30.67	68.03	337.81	251.07	274.86	156.72	0.774	34.77	34.77	274.86	156.72	0.774	225.74	225.74	226.17	226.17	0.6173	225.74	225.74	226.17	226.17	0.6173	225.74	225.74	226.17	226.17	0.6173
47.17	60.27	314.34	209.64	292.18	165.65	0.812	34.14	34.14	292.18	165.65	0.812	240.69	240.69	240.67	240.67	0.6129	240.69	240.69	240.67	240.67	0.6129	240.69	240.69	240.67	240.67	0.6129
61.14	52.57	271.71	159.13	307.15	181.88	0.861	33.11	33.11	307.15	181.88	0.861	247.57	247.57	247.57	247.57	0.6100	247.57	247.57	247.57	247.57	0.6100	247.57	247.57	247.57	247.57	0.6100
84.54	49.75	270.55	99.97	337.77	203.11	0.961	32.84	32.84	337.77	203.11	0.961	261.04	261.04	256.77	256.77	0.6100	261.04	261.04	256.77	256.77	0.6100	261.04	261.04	256.77	256.77	0.6100
100.00	43.84	266.25	64.50	360.09	217.91	0.993	32.85	32.85	360.09	217.91	0.993	261.10	261.10	252.23	252.23	0.6100	261.10	261.10	252.23	252.23	0.6100	261.10	261.10	252.23	252.23	0.6100

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (G/CF)	DELTA RE TAN (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUK (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTOR PRESS RATIO	MOTOR AUTOMATIC EFF	POLYTRONIC EFF
0.00	0.00	16.24	16.24	16.24	0.736	-2.441	1.674	0.6557	0.674
2.38	11.06	14.44	14.44	14.44	0.736	-2.342	1.674	0.6727	0.654
25.13	41.25	20.56	20.56	20.56	0.736	-2.075	1.674	0.7056	0.612
42.16	50.34	25.14	25.14	25.14	0.736	-1.844	1.674	0.8066	0.4051
61.30	70.56	31.40	31.40	31.40	0.736	-2.446	1.674	0.9255	0.418
84.71	90.07	40.26	40.26	40.26	0.736	12.193	1.674	0.9743	0.902
100.00	109.00	44.87	44.87	44.87	0.736	20.477	1.674	0.9782	0.982

MOTOR EFFICIENCY = 0.6496 (POLYTRONIC)  
 MOTOR EFFICIENCY = 0.9366 (ADIABATIC)  
 MOTOR AVERAGE MOTOR EFFICIENCY = 1.0115  
 MASS AVERAGE TEMPERATURE RISE = 1.2207

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 3

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8700

PERCENT SPAN FROM TIP (L. S.)	DELTA 3 (DEG)	V3 (FT/SEC)	V113 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	33.85	794.21	511.90	.670	512.45	605.72	1475.77
11.57	41.83	819.59	523.73	.690	622.00	620.97	1412.46
30.74	37.14	862.94	527.08	.740	700.25	690.24	1312.10
44.00	30.15	927.31	547.07	.801	749.75	744.20	1219.42
60.00	20.07	962.55	593.74	.836	757.60	754.13	1121.06
80.06	10.24	1024.36	653.00	.898	780.74	774.14	1013.82
100.00	41.45	1057.33	694.29	.934	800.09	777.94	954.64

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8415

PERCENT SPAN FROM TIP (L. S.)	DELTA 4 (DEG)	V4 (FT/SEC)	V114 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	4.12	673.36	17.05	.577	674.33	694.34	1462.07
11.57	7.92	710.35	36.14	.591	709.43	709.43	1414.76
30.74	-2.35	740.24	-30.05	.629	745.61	745.24	1330.17
44.00	-2.53	812.26	-33.79	.691	811.47	810.63	1247.60
60.00	-2.17	893.53	-30.44	.681	862.95	862.51	1164.04
80.06	-2.00	761.92	-26.01	.642	761.46	754.67	1070.60
100.00	-2.00	760.93	-26.76	.650	766.66	766.66	1017.25

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (L. S.)	DELTA (DEG)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	U FACTOR	O-4EGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATION POLYTROPIC EFF
0.00	0.00	35.77	3.571	.1647	.0592	.0209	25.300	1.651	1.2420	.7364
11.57	11.57	37.71	4.449	.3437	.0652	.0226	14.474	1.667	1.2420	.7910
30.74	30.74	39.20	5.317	.3958	.0673	.0287	10.867	1.714	1.2204	.7226
44.00	44.00	38.64	-1.040	.3127	.0692	.0212	9.467	1.805	1.2138	.7537
60.00	60.00	40.26	-1.249	.3451	.1328	.0341	8.929	1.749	1.2132	.6557
80.06	80.06	41.65	-2.335	.4236	.2609	.0706	9.529	1.727	1.2123	.5271
100.00	100.00	42.95	-3.042	.4384	.2527	.0639	16.700	1.727	1.2122	.5375

MOMENTUM AVERAGE STAGE EFFICIENCY = .7934 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7768 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.7417  
MASS AVERAGE TEMPERATURE RISE = 1.2207

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OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT UFS<sub>10M</sub> SPEED - SCAY NU 3

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8700

PERCENT SPAN FROM TIP (L. F.)	DELTA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	V43 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	37.47	243.29	158.03	.670	146.69	194.67	499.82
11.57	41.53	249.41	162.07	.690	149.59	199.27	491.43
30.79	37.14	243.96	157.37	.740	150.39	210.33	400.93
49.01	35.13	242.66	160.75	.801	228.22	228.05	371.83
68.05	31.07	243.34	140.97	.836	230.97	230.97	361.70
88.06	34.65	312.22	199.22	.898	240.41	237.19	309.01
100.00	40.75	322.49	211.62	.934	243.87	237.13	290.97

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8815

PERCENT SPAN FROM TIP (L. F.)	DELTA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	3.12	211.99	11.54	.577	211.63	211.63	446.55
11.57	2.77	210.57	11.02	.591	216.24	216.24	431.22
30.79	-2.35	227.45	-9.34	.629	227.26	227.16	405.44
49.01	-2.53	247.59	-10.91	.691	247.34	247.04	300.27
67.22	-2.17	244.92	-9.29	.683	244.74	244.61	354.90
88.06	-2.00	322.23	-8.11	.845	237.09	231.24	326.32
100.00	-2.00	332.76	-8.16	.850	233.62	233.62	310.06

STATOR PERFORMANCE DATA

LEADING EDGE	PERCENT SPAN FROM TIP	TRAILING EDGE	MASS FLOW (KGF)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUPT NUM (DEG)	U FACTOR	W AN	OMEGA	LOSS PARAMETER	OFFIATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	0.00	35.77	3.571	-3.321	.3447	.0582	.0709	25.300	1.651	1.2420	.7984
11.57	11.57	11.57	11.06	37.71	4.449	1.114	.3437	.0652	.0726	19.694	1.657	1.2420	.7910
30.79	30.79	30.79	31.25	33.50	.517	-2.772	.3454	.0473	.0247	10.847	1.715	1.2204	.7276
49.01	44.59	44.59	50.34	38.68	-1.646	-4.628	.3127	.0692	.0212	1.867	1.805	1.2138	.6557
68.10	67.22	67.22	70.54	40.26	-1.549	-4.188	.3451	.1328	.0381	4.929	1.749	1.2132	.6557
88.06	88.06	88.06	90.07	41.65	-2.435	-5.689	.4236	.2869	.0706	9.529	1.727	1.2123	.6271
100.00	100.00	100.00	100.00	42.95	-3.682	-7.123	.4384	.2527	.0639	16.700	1.727	1.2122	.5375

MOMENTUM AVERAGE STAGE EFFICIENCY = .7934 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7768 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.7417  
MASS AVERAGE TEMPERATURE RISE = 1.2207

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 3.2759 LBM/SEC  
 PERCENT DLS (100 EQUIVALENT FLOW) = 89.4329  
 100 PERCENT DESIGN SPEED = SCAR NO 4  
 EQUIVALENT SPEED = 76727.266 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 36.1779 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9836

PERCENT SPAN FROM TIP (L. T.)	HETAP (DEG)	V01 (FT/SEC)	VU01 (FT/SEC)	P.TA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SEC)	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	72.07	1057.00	1311.33	0.00	400.03	0.00	.453	495.03	474.04	1591.33
2.50	71.41	1540.22	1455	0.00	505.95	0.00	.464	505.85	490.26	1507.29
5.00	70.59	1635.00	1490.64	0.00	549.03	0.00	.504	549.03	538.95	1380.64
7.50	69.75	1697.22	1443.44	0.00	567.27	0.00	.517	567.27	560.46	1288.44
10.00	69.00	1226.00	1099.33	0.00	544.52	0.00	.500	544.52	544.33	1049.33
14.00	68.72	1050.15	1177.75	0.00	510.43	0.00	.467	510.43	503.58	917.75
18.00	71.53	930.10	1000.11	0.00	488.75	0.00	.440	489.75	473.11	800.11

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7327

PERCENT SPAN FROM TIP (L. T.)	HETAP (DEG)	V02 (FT/SEC)	VU02 (FT/SEC)	HETAP (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V42 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	46.37	1235.01	1020.76	35.72	142.94	492.11	.712	684.34	667.34	1520.87
2.50	52.35	1103.09	936.68	35.49	147.08	515.42	.754	722.72	705.93	1426.10
5.00	47.77	1110.60	823.12	34.13	140.00	504.44	.781	751.59	747.01	1337.57
7.50	44.37	1003.37	692.96	33.55	967.81	535.86	.842	806.54	806.54	1227.82
10.00	32.96	975.44	530.65	33.58	1005.82	555.80	.882	818.62	818.62	1110.70
14.00	21.25	914.04	332.75	37.74	1042.71	622.68	.959	856.23	842.16	925.63
18.00	14.16	843.24	216.10	39.71	1113.21	711.22	.991	896.40	877.29	927.32

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPIN FROM TIP (L. T.)	TRAILING EDGE	INCIDENCE ANGLE (DEG)	SUCT SUM (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	16.25	3.313	3.76	.0364	-2.024	1.675	.6610	.6845
2.50	11.59	11.77	14.07	4.179	3.76	.0345	-2.595	1.694	.6801	.7028
5.00	25.00	30.41	20.54	7.209	4.287	.0369	-2.254	1.766	.6065	.5213
7.50	42.61	49.37	25.09	9.010	6.179	.0742	-1.264	1.862	.9210	.9202
10.00	61.70	61.09	30.69	9.335	5.479	.0171	-2.147	1.874	.9362	.9416
14.00	88.44	88.44	34.67	9.023	4.587	.0084	12.307	1.927	.9737	.9760
18.00	100.00	100.00	44.37	9.776	3.702	.0095	21.214	1.927	.9737	.9760

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8580 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8457 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.8115  
 MASS AVERAGE TEMPERATURE RISE = 1.2184

NASA SMALL AXIAL COMPRESSOR INST J JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW PERCENT DESIGN FLOW = 1.6444H K0/SEC  
 EQUIVALENT FLOW / INLET ANN AREA = 76727.266 K0/SEC-SU M  
 100 PERCENT DESIGN SPEED = SCAN NO 4  
 EQUIVALENT SPEED  
 INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9834

PERCENT SPAN FROM TIP (L. F.)	VELOCITY (M/SEC)	W1	W2	W3	W4	W5	W6	W7	J1
0.00	72.22	481.99	1.515	1.000	150.88	9.00	.653	166.03	491.99
1.00	71.41	457.42	1.455	0.000	154.49	0.00	.464	167.63	459.42
25.00	65.31	420.82	1.365	0.000	167.35	0.00	.504	164.27	420.82
42.61	63.75	390.53	1.254	0.000	171.34	0.00	.517	170.83	390.53
61.70	63.03	335.08	1.126	0.000	165.97	0.00	.500	165.97	335.08
84.94	60.72	279.73	.961	0.000	155.58	0.00	.467	153.49	279.73
100.00	54.59	205.13	.857	0.000	149.28	0.00	.444	144.20	205.13

EXIT VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (L. F.)	W1	W2	W3	W4	W5	W6	W7	J2
0.00	56.37	37.42	1.043	150.00	.712	204.50	211.88	463.56
11.50	52.25	35.44	1.005	157.10	.754	220.29	215.47	442.60
31.00	47.77	34.13	.962	155.28	.781	229.12	227.69	407.69
44.37	44.07	33.55	.925	163.03	.842	245.45	244.43	374.24
60.00	42.76	35.58	.894	174.88	.882	249.58	249.86	340.37
71.75	41.01	37.74	.861	201.92	.959	260.98	246.69	303.47
100.00	34.16	39.71	.756	216.78	.991	261.07	252.16	282.65

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	DELTA (DEG)	BETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR LOSS PARAMETER	ROTOR AUTOMATIC EFF	POLYTROPIC EFF
0.00	0.00	16.24	4.781	4.313	.0564	-2.624	1.474	.0410	.6149
9.44	11.54	19.07	4.476	4.179	.0565	-2.575	1.604	.0401	.7028
25.00	30.83	20.56	4.257	7.209	.0364	-2.258	1.766	.0465	.8213
42.61	43.37	25.07	4.070	6.174	.0171	-1.243	1.862	.0716	.8202
61.70	61.09	30.69	4.332	5.679	.0103	-2.142	1.874	.0762	.9415
84.94	69.47	34.67	4.623	4.547	.0084	12.347	1.927	.0737	.9760
100.00	100.00	44.37	4.776	3.702	.0095	21.214	1.927	.0737	.9760

MOVEMENT AVERAGE ROTOR EFFICIENCY = .4580 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8457 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.8115  
 MASS AVERAGE TEMPERATURE RISE = 1.2194



NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 4

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8660

PERCENT SPAN FROM TIP (L. F.)	HETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SFC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	30.91	800.67	506.72	.670	627.66	670.76	1477.02
11.24	32.00	818.91	527.35	.697	638.70	677.66	1416.56
30.05	36.20	874.96	517.76	.749	705.33	705.32	1316.09
49.14	39.99	910.15	537.98	.813	768.57	740.00	1220.71
67.09	37.29	921.49	507.57	.836	764.70	747.10	1123.00
84.50	34.50	1021.41	644.75	.892	788.10	777.52	1013.42
100.00	30.91	1050.63	690.54	.932	799.76	777.66	955.44

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8777

PERCENT SPAN FROM TIP (L. F.)	HETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SFC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-1.70	719.82	-47.20	.600	718.28	718.28	1486.30
11.24	-1.70	734.20	-48.12	.613	732.70	732.61	1415.92
30.14	-3.51	773.98	-48.34	.655	772.47	772.13	1330.99
49.02	-2.26	830.69	-37.76	.710	830.04	829.19	1243.38
67.10	1.52	814.11	21.35	.694	813.82	813.37	1184.67
84.22	-1.92	776.00	-12.45	.659	776.56	773.72	1070.89
100.00	-1.94	781.84	-12.78	.664	781.73	781.73	1019.11

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	MASS FLOW (PCF)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	SUCTI SUM (DEG)	FACTOR	OMEGA (MR)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STAGE TEMP. RATIO	STATOR POLYTROPIC EFF.
0.00	0.00	42.67	2.596	-1.320	.359	.0560	.0201	12.470	1.630	1.2398	.7590
11.24	11.77	43.36	3.410	.085	.352	.0677	.0235	12.819	1.666	1.2398	.7396
30.05	31.30	37.85	-3.330	-3.637	.3255	.0410	.0266	9.613	1.721	1.2183	.6775
49.14	48.62	37.25	-2.012	-5.774	.2970	.0900	.0276	9.724	1.803	1.2104	.6726
67.09	70.05	35.78	-2.310	-5.161	.3147	.1450	.0418	12.018	1.774	1.2096	.5957
84.50	99.15	40.42	-2.742	-5.406	.4030	.2703	.0715	10.614	1.710	1.2114	.4928
100.00	100.00	41.74	-3.024	-7.205	.4187	.2557	.0547	17.763	1.716	1.2113	.5609

MOMENTUM AVERAGE STAGE EFFICIENCY = .7969 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS. RATIO = 1.7365  
 MASS AVERAGE STAGE EFFICIENCY = .7807 (ADIABATIC)              MASS AVERAGE TEMPERATURE RISE = 1.2184

NASA SMALL AXIAL COMPRESSOR TEST 3 JUN 25 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 4

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8660

PERCENT SPAN FROM TIP (L. E.)	BETA 3 (DEG)	V3 (M/SEC)	V113 (M/SFL)	M3	V43 (M/SEC)	V23 (M/SEC)	U3 (M/SEC)
0.00	33.91	245.47	194.95	.678	191.31	149.21	650.19
11.24	39.60	252.65	191.04	.697	194.68	194.35	431.77
30.85	38.24	266.69	197.81	.749	214.98	214.98	461.14
49.14	34.94	245.95	163.94	.813	234.26	234.09	372.07
67.81	37.29	233.06	177.57	.836	233.14	232.29	342.29
84.50	34.50	311.33	198.04	.896	240.41	236.93	309.51
100.00	40.81	322.06	210.44	.932	243.77	237.03	291.22

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8777

PERCENT SPAN FROM TIP (T. E.)	BETA 4 (DEG)	V4 (M/SEC)	V114 (M/SFL)	M4	V44 (M/SEC)	V24 (M/SEC)	U4 (M/SEC)
0.00	33.76	219.40	-14.39	.600	218.93	218.93	446.93
11.24	39.76	233.41	-14.67	.613	223.33	223.33	431.57
30.85	38.50	235.91	-14.73	.655	235.45	235.45	405.59
49.14	37.25	243.19	-9.39	.710	253.00	252.74	380.51
67.81	35.30	240.14	0.27	.694	248.05	247.92	354.94
84.50	34.22	236.72	-3.80	.659	246.69	235.43	326.41
100.00	33.74	248.30	-3.90	.664	238.27	238.27	310.32

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. E.)	MASS FLOW (KG/S)	DELTA PETA (N/CM <sup>2</sup> )	INCIDENCE ANGLE (DEG)	SUCT SUR (IN/CM)	EXCESS ANGLE (IN/CM)	LOSS PARAMETER	DEVIATION ANGLE (IN/CM)	STAGE PRESS (ATM)	STAGE LOSS (ATM)	STATOR POLYTROPIC EFF
0.00	0.00	42.47	2.596	-1.126	.369	.0560	12.420	1.650	1.2394	.7596
11.24	11.77	43.36	3.416	.005	.342	.0235	12.819	1.666	1.2394	.7396
30.85	31.76	42.86	-3.350	-3.257	.325	.0610	4.811	1.721	1.2183	.6375
49.14	51.26	37.25	-2.812	-5.794	.2970	.0900	3.724	1.403	1.2104	.6720
67.81	70.89	35.74	-2.310	-5.161	.3147	.1456	12.614	1.774	1.2096	.5392
84.50	90.15	40.42	-2.142	-4.806	.4030	.2703	10.614	1.716	1.2114	.6928
100.00	100.00	41.74	-3.424	-1.265	.4187	.2557	17.763	1.716	1.2113	.5509

MOMENTUM AVERAGE STAGE EFFICIENCY = .7969 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.7365  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7807 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.2184

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 3.0269 LBM/SEC 100 PERCENT DESIGN SPEED = SCAN NO 5  
 PERCENT DESIGN FLOW = 90.0153 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET AREA = 76791.679 R.P.M.  
 36.4135 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9792

PERCENT SPAN FROM TIP (I. P.)	BETA1 (DEG)	VU1 (FT/SEC)	VI (FT/SEC)	VU1 (FT/SEC)	M1	VU1 (FT/SEC)	V1 (FT/SEC)	VU1 (FT/SEC)	UI (FT/SEC)
0.00	72.23	1027.18	1582.85	1.517	0.00	494.08	0.00	494.08	1582.65
4.71	71.29	1391.81	1406.75	1.456	0.00	510.26	0.00	510.24	1506.75
26.27	68.10	1400.24	1377.89	1.364	0.00	554.71	0.00	553.71	1377.09
43.15	65.44	1306.72	1243.69	1.258	0.00	567.20	0.00	567.37	1243.69
62.12	63.37	1274.55	1045.41	1.126	0.00	549.37	0.00	549.37	1045.41
85.21	60.66	1051.21	916.41	.983	0.00	515.07	0.00	509.10	916.41
100.00	58.23	943.44	800.78	.863	0.00	493.57	0.00	477.18	800.78

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7349

PERCENT SPAN FROM TIP (I. P.)	BETA2 (DEG)	VU2 (FT/SEC)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VU2 (FT/SEC)	V2 (FT/SEC)	VU2 (FT/SEC)	U2 (FT/SEC)
0.00	55.99	1240.87	1035.19	1.047	.721	651.58	488.95	696.61	1322.14
11.71	71.72	1170.46	942.15	1.014	.764	697.48	510.31	738.25	1322.46
31.45	71.23	1123.47	829.32	.987	.785	911.81	508.59	757.17	1335.92
50.05	40.29	1007.71	694.65	.942	.846	970.98	530.15	813.47	1244.80
68.76	32.27	971.24	573.97	.882	.885	1010.16	584.73	820.15	1113.70
88.81	28.27	937.87	429.21	.832	.974	1100.93	604.92	877.33	994.13
100.00	13.23	903.50	216.87	.807	1.009	1127.95	712.03	877.34	928.10

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. P.)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCTION SUM (DEG)	U (FT/SEC)	FACUON (DEG)	OMEGA (RPM)	RAM (FT/SEC)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ADJACENT RATIO	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	0.226	.1591	.1591	.2639	.2639	.0562	-1.005	1.664	.6628	.6860
4.71	11.75	12.03	0.009	.1619	.1619	.2607	.2607	.0583	-2.994	1.693	.6824	.7049
26.27	31.33	32.72	7.054	.1691	.1691	.1691	.1691	.0380	-2.280	1.753	.6811	.8162
43.15	50.50	52.90	5.488	.1342	.1342	.0737	.0737	.0170	-1.089	1.450	.4217	.9281
62.12	68.76	71.34	30.79	.1353	.1353	.0891	.0891	.0205	3.000	1.660	.4202	.9289
85.21	88.80	90.33	4.258	.9403	.9403	.0180	.0180	.0039	12.269	1.946	.5977	.9888
100.00	100.00	100.00	3.505	.1975	.1975	.0214	.0214	.0044	20.886	1.446	.4977	.9888

MOMENTUM AVG. ROTOR EFFICIENCY = .8556 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8432 (ADIABATIC)

NASA SMALL AXIAL COMPRESSOR TEST 4, JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.0954 M/S  
 PERCENT DESIGN EQUIVALENT FLOW = 90.0153  
 100 PERCENT DESIGN SPEED = SCAN NO 5  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 74741.479 M.P.M.  
 177.7463 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9797

PERCENT SPAN FROM TIP (L. F.)	W1 (M/SEC)	UFTAL (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	V41 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	72.73	482.39	151.81	0.00	.455	151.81	146.92	482.39
4.71	71.29	459.26	155.73	0.00	.467	155.73	140.44	459.26
26.00	65.10	412.46	163.77	0.00	.509	168.77	165.67	419.74
43.35	65.40	374.08	172.88	0.00	.527	172.88	172.33	374.08
72.22	43.37	374.08	167.45	0.00	.505	167.45	167.39	333.88
85.21	37.32	274.32	158.98	0.00	.472	158.98	158.87	274.32
100.00	58.78	246.08	150.56	0.00	.452	150.56	145.45	246.08

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7349

PERCENT SPAN FROM TIP (L. F.)	W2 (M/SEC)	UFTAP (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V42 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	39.79	313.53	759.56	148.42	.721	212.94	204.08	463.95
11.73	51.22	287.17	733.54	155.54	.764	225.02	220.10	442.71
31.85	47.78	272.78	777.86	154.41	.784	231.01	229.57	407.19
50.00	40.49	211.73	295.95	161.59	.846	247.94	247.93	373.32
63.78	32.37	159.71	307.90	179.75	.885	249.98	244.25	319.46
85.08	20.37	100.44	335.53	202.67	.978	267.41	247.02	303.01
100.00	274.42	63.86	343.41	217.03	1.004	267.41	254.34	282.88

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM LEADING EDGE	DELTA HFTAP (DEG)	DELTA HFTAL (DEG)	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	U	FACTOR	DELTA H (DEG)	LOSS PARAMETER	DELTA H (DEG)	MOTOR EFF	MOTOR EFF	POLYTROPIC EFF
0.00	0.00	16.54	4.094	4.226	.3591	.2539	.0562	.0562	-1.005	1.669	4.628	.6800
4.71	31.73	19.37	9.401	9.089	.3639	.2607	.0583	.0583	-2.994	1.633	4.824	.7049
26.24	37.22	20.52	9.170	7.054	.3564	.1691	.0300	.0300	-2.240	1.753	4.811	.8102
43.35	50.03	24.59	4.859	5.468	.3342	.0737	.0170	.0170	-1.089	1.850	4.917	.9201
62.78	64.78	30.79	9.117	5.239	.3353	.0891	.0205	.0205	3.000	1.860	4.920	.9202
85.21	40.88	40.10	9.403	4.338	.2540	.0180	.0039	.0039	12.269	1.946	4.977	.9888
100.00	100.00	44.50	9.279	3.505	.1975	.0214	.0044	.0044	20.886	1.946	4.977	.9888

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8556 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .8432 (ADIABATIC)  
 MOMENTUM AVERAGE MOTOR PRESS RATIO = 1.8086  
 MASS AVERAGE TEMPERATURE RISE = 1.2175

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 5

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8658

PERCENT SPAN FROM TIP (U. S.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	37.83	417.50	501.41	.689	645.08	676.59	1475.25
11.70	36.50	419.13	523.01	.709	646.20	645.11	1417.20
31.25	35.82	417.27	514.02	.754	712.94	712.93	1315.07
49.74	34.90	422.00	527.94	.818	776.74	776.17	1218.39
68.23	34.40	426.94	546.13	.834	766.59	743.79	1120.53
86.00	34.42	429.60	621.72	.914	810.03	799.16	1014.20
100.00	34.13	427.50	691.32	.948	820.03	797.37	956.24

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8633

PERCENT SPAN FROM TIP (U. S.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	2.00	779.94	24.04	.655	779.48	774.44	1467.53
11.23	1.66	743.50	26.04	.667	743.13	743.01	1417.17
30.16	-3.04	613.04	-44.99	.710	632.42	632.06	1322.24
46.53	-4.41	475.60	-67.40	.753	473.00	472.16	1249.82
67.29	-4.43	442.40	-64.40	.730	452.37	451.91	1155.72
86.22	-1.11	415.24	-15.05	.695	415.09	412.11	1071.80
100.00	-1.12	421.35	-16.05	.701	421.20	421.20	1018.96

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM LEAD TO TRAILING EDGE	MASS FLOW (PLT)	DELTA DELTA (DEG)	INCIDENCE ANGLE (DEG)	FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE POLYTROPIC EFF
0.00	0.00	35.71	1.513	.563	.0482	.0204	24.260	1.643	1.2375
11.70	12.03	36.67	2.371	.575	.0495	.0241	10.462	1.660	1.2375
31.25	30.10	38.92	-4.31	.582	.0594	.0195	10.104	1.721	1.2180
49.74	41.54	38.97	-3.506	.614	.0971	.0297	7.500	1.786	1.2080
68.23	67.27	37.83	-2.247	.604	.1694	.0644	10.670	1.743	1.2104
86.00	85.22	39.93	-3.722	.574	.3236	.0850	10.414	1.683	1.2118
100.00	100.00	41.25	-4.949	.5914	.3076	.0774	17.501	1.683	1.2117

MOMENTUM AVERAGE STAGE EFFICIENCY = .7847 (POLYTROPIC)      MOMENTUM AVERAGE STAGE PRESS RATIO = 1.7184  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7678 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.2175

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OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 5

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .065P

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	VJ (M/SEC)	VU3 (M/SEC)	M3	VH3 (M/SEC)	VZ3 (M/SEC)	UJ (M/SEC)
0.00	37.83	249.17	152.83	.689	196.80	196.64	450.57
11.70	39.56	255.77	159.41	.709	200.01	194.68	431.96
31.27	35.82	263.00	156.06	.754	217.31	217.30	400.83
49.71	34.46	287.17	162.44	.818	236.75	236.54	371.37
66.53	37.40	298.13	178.05	.839	233.66	232.80	341.54
80.00	44.82	316.89	198.64	.914	246.90	243.54	309.15
100.00	40.13	326.91	210.72	.946	249.94	243.04	291.60

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .066J3

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VU (M/SEC)	M4	VH4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	27.06	237.74	14.55	.655	237.59	237.59	447.30
11.23	1.44	241.80	7.95	.667	241.75	241.72	431.95
30.16	-3.09	254.09	-13.71	.710	253.72	253.61	405.07
48.53	-4.41	266.50	-20.54	.753	266.11	265.94	380.94
67.20	-7.43	292.81	-1.95	.730	259.80	259.66	355.31
84.22	-1.11	260.40	-4.83	.695	248.44	247.53	326.69
100.00	-1.12	250.35	-4.89	.701	250.30	250.30	310.58

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	DELTA (DEG)	BETA (DEG)	INCIDENCE ANGLE (DEG)	SUCI ANGLE (DEG)	FACTOR	OMEGA	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	35.77	1.513	-2.409	-2.409	.2563	.0582	.0201	24.240	1.644	1.2775	.4624
11.70	36.67	2.371	-4.950	-4.950	.2595	.0695	.0241	18.462	1.660	1.2775	.4594
31.26	38.92	-0.031	-4.105	-4.105	.2592	.0594	.0195	10.106	1.721	1.2168	.5289
49.70	38.87	-3.406	-6.378	-6.378	.2614	.0771	.0297	7.580	1.746	1.2080	.4627
66.53	37.81	-2.297	-5.121	-5.121	.2664	.1699	.0648	10.670	1.743	1.2104	.3924
80.00	39.91	-3.722	-6.563	-6.563	.2774	.3236	.0956	10.419	1.683	1.2118	.3347
100.00	41.25	-4.449	-7.440	-7.440	.3914	.3914	.0776	17.581	1.643	1.2117	.4214

MOMENTUM AVERAGE STAGE EFFICIENCY = .707 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7570 (ADIABATIC)  
 MOMENTUM AVERAGE STAGE PRESS RATIO = 1.7184  
 MASS AVERAGE TEMPERATURE RISE = 1.2175

NASA SMALL AXIAL COMPRESSOR TEST 3 JUN 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT HEIGHT FLOW = 3.3454 LPM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 91.3387  
 100 PERCENT DESIGN SPEED = SCAL NO 6  
 EQUIVALENT SPEED = 76783.375 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 30.9488 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9850

PERCENT SPAN FROM TIP (L. P.)	HT INCH (INCH)	V <sub>01</sub> (FT/SEC)	VU <sub>01</sub> (FT/SEC)	M <sub>01</sub>	BETA <sub>01</sub> (DEG)	V <sub>1</sub> (FT/SEC)	VU <sub>1</sub> (FT/SEC)	M <sub>1</sub>	BETA <sub>1</sub> (DEG)	V <sub>2</sub> (FT/SEC)	VU <sub>2</sub> (FT/SEC)	M <sub>2</sub>	BETA <sub>2</sub> (DEG)	V <sub>2Z</sub> (FT/SEC)	VU <sub>2Z</sub> (FT/SEC)
0.00	72.74	1601.06	1586.94	1.521	0.000	506.79	0.000	.864	0.000	506.79	0.000	.864	0.000	490.47	1582.49
9.93	70.76	1572.22	1555.09	1.457	0.000	516.49	0.000	.876	0.000	519.40	0.000	.876	0.000	502.49	1505.09
20.75	67.56	1406.95	1373.39	1.366	0.000	549.42	0.000	.919	0.000	564.42	0.000	.919	0.000	554.05	1373.39
44.02	62.97	1306.72	1236.32	1.259	0.000	578.35	0.000	.933	0.000	578.35	0.000	.933	0.000	576.49	1238.32
62.04	62.02	1226.66	1090.06	1.128	0.000	600.13	0.000	.915	0.000	600.13	0.000	.915	0.000	559.93	1090.06
82.61	60.15	1056.71	916.77	.977	0.000	624.98	0.000	.881	0.000	624.98	0.000	.881	0.000	517.93	916.77
100.00	57.06	885.65	800.89	.885	0.000	603.13	0.000	.880	0.000	603.13	0.000	.880	0.000	444.83	800.89

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7406

PERCENT SPAN FROM TIP (L. P.)	HT INCH (INCH)	BETA <sub>02</sub> (DEG)	V <sub>02</sub> (FT/SEC)	M <sub>02</sub>	BETA <sub>02</sub> (DEG)	V <sub>2</sub> (FT/SEC)	VU <sub>2</sub> (FT/SEC)	M <sub>2</sub>	BETA <sub>2</sub> (DEG)	V <sub>2Z</sub> (FT/SEC)	VU <sub>2Z</sub> (FT/SEC)
0.00	70.91	30.91	1492.74	1.077	39.40	642.31	401.38	.713	77.2	691.20	1521.98
12.04	51.53	31.53	1207.36	1.030	33.47	605.12	505.13	.772	751.04	751.04	1450.44
31.06	47.08	47.08	1134.86	.979	33.07	621.91	503.11	.745	772.52	772.52	1313.93
50.46	46.17	46.17	1051.24	.925	32.64	672.05	525.20	.855	826.27	826.27	1222.60
61.95	32.97	32.97	977.15	.877	32.64	1017.58	587.72	.887	824.54	824.54	1112.43
80.30	17.24	17.24	930.20	.812	37.75	1117.16	683.69	.992	883.34	883.34	993.93
100.00	12.99	12.99	904.24	.808	39.65	1147.49	732.22	1.025	883.51	883.51	928.00

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. P.)	HT INCH (INCH)	DELTA (DEG)	W <sub>2</sub> (HP)	W <sub>1</sub> (HP)	DELTA (DEG)	SUCT NUM (DEG)	MEAN (DEG)	INCIDENCE (DEG)	DELTA (DEG)	W <sub>2</sub> (HP)	W <sub>1</sub> (HP)	DELTA (DEG)	W <sub>2</sub> (HP)	W <sub>1</sub> (HP)	DELTA (DEG)	W <sub>2</sub> (HP)	W <sub>1</sub> (HP)
0.00	65.00	65.00	15.94	15.94	15.94	7.937	15.94	15.94	15.94	15.94	15.94	15.94	15.94	15.94	15.94	15.94	15.94
9.93	12.65	12.65	19.44	19.44	19.44	7.704	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44	19.44
20.75	31.06	31.06	20.58	20.58	20.58	6.805	20.58	20.58	20.58	20.58	20.58	20.58	20.58	20.58	20.58	20.58	20.58
44.02	50.46	50.46	24.80	24.80	24.80	6.502	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80	24.80
62.04	60.75	60.75	30.34	30.34	30.34	6.734	30.34	30.34	30.34	30.34	30.34	30.34	30.34	30.34	30.34	30.34	30.34
82.61	80.30	80.30	40.81	40.81	40.81	6.801	40.81	40.81	40.81	40.81	40.81	40.81	40.81	40.81	40.81	40.81	40.81
100.00	100.00	100.00	45.36	45.36	45.36	6.029	45.36	45.36	45.36	45.36	45.36	45.36	45.36	45.36	45.36	45.36	45.36

W<sub>2</sub> (HP) AVG TORQUE MOTOR EFFICIENCY = .8575 (POLYTROPIC)  
 W<sub>1</sub> (HP) AVG TORQUE MOTOR EFFICIENCY = .8452 (ADIABATIC)

MOMENTUM AVG. MOTOR PRESS RATIO = 1.8052  
 MASS AVERAGE TEMPERATURE RISE = 1.2171

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW = 1.5174 KG/SEC 100 PERCENT DESIGN SPEED = 5644 RPM  
 PERCENT DESIGN & EQUIVALENT FLOW = 91.3307 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 76.43.7/5 R.P.M.  
 = 180.6001 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.9850

PERCENT SPAN FROM TIP (L. F.)	SPAN (MM)	W1 (M/SEC)	W2 (M/SEC)	W3 (M/SEC)	W4 (M/SEC)	W5 (M/SEC)	W6 (M/SEC)	W7 (M/SEC)	W8 (M/SEC)	W9 (M/SEC)	W10 (M/SEC)	W11 (M/SEC)	W12 (M/SEC)
0.00	72.64	507.47	406.34	1.521	154.47	0.00	0.00	0.00	0.00	154.47	154.47	154.47	482.34
2.00	70.74	505.41	405.74	1.459	154.14	0.00	0.00	0.00	0.00	154.14	154.14	154.14	450.73
26.75	67.06	472.50	410.61	1.360	172.04	0.00	0.00	0.00	0.00	172.04	172.04	172.04	418.61
44.00	64.37	416.50	377.44	1.253	174.28	0.00	0.00	0.00	0.00	174.28	174.28	174.28	377.44
62.00	62.02	373.77	332.50	1.124	170.73	0.00	0.00	0.00	0.00	170.73	170.73	170.73	332.50
80.00	60.15	321.48	274.82	0.967	160.61	0.00	0.00	0.00	0.00	160.61	160.61	160.61	274.82
100.00	57.06	250.23	244.05	0.865	153.35	0.00	0.00	0.00	0.00	153.35	153.35	153.35	244.05

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.7406

PERCENT SPAN FROM TIP (L. F.)	SPAN (MM)	V1 (M/SEC)	V2 (M/SEC)	V3 (M/SEC)	V4 (M/SEC)	V5 (M/SEC)	V6 (M/SEC)	V7 (M/SEC)	V8 (M/SEC)	V9 (M/SEC)	V10 (M/SEC)	V11 (M/SEC)	V12 (M/SEC)
0.00	56.71	301.77	317.18	1.057	34.16	190.73	0.13	0.13	210.64	203.49	203.49	203.49	463.90
12.00	51.33	300.00	280.13	1.040	33.92	193.96	0.772	0.772	224.92	224.92	224.92	224.92	442.09
31.66	47.03	344.79	253.73	0.979	33.07	193.35	0.745	0.745	235.94	235.94	235.94	235.94	400.58
50.00	40.17	329.56	212.57	0.945	32.44	190.08	0.55	0.55	251.45	251.45	251.45	251.45	372.65
68.45	32.47	297.46	159.93	0.87	30.43	179.14	0.87	0.87	251.34	251.34	251.34	251.34	339.07
88.00	19.34	282.36	94.50	0.832	34.01	204.45	0.942	0.942	264.25	264.25	264.25	264.25	302.95
100.00	12.49	275.03	59.67	0.808	34.75	223.18	1.025	1.025	269.29	269.29	269.29	269.29	282.85

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	SPAN (MM)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	FACTOR	MAF	MAF	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS LOSS	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	15.86	7.937	0.495	0.694	0.694	0.567	0.584	1.647	0.912	0.746
2.00	12.04	14.63	7.704	0.506	0.511	0.511	0.566	-1.316	1.695	0.916	0.735
26.75	31.66	20.50	6.685	0.442	0.685	0.685	0.359	-2.660	1.754	0.931	0.823
44.00	50.00	24.00	5.502	0.244	0.607	0.607	0.141	-1.244	1.453	0.932	0.900
62.00	62.00	30.45	4.734	0.317	0.626	0.626	0.214	3.054	1.451	0.919	0.923
80.00	60.15	40.41	3.401	0.2614	0.395	0.395	0.087	11.064	1.462	0.9735	0.9759
100.00	100.00	45.34	3.029	0.2046	0.471	0.471	0.098	14.546	1.962	0.9735	0.9759

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8575 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8452 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR PRESS LOSS = 1.8052  
 MASS AVERAGE TEMPERATURE RISE = 1.2171



NASA SMALL AXIAL COMPRESSOR TEST 1 JUN 25 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 6

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8700

PERCENT SPAN FROM TIP (I. F.)	HETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	17.70	810.50	495.00	.683	641.34	674.29	1474.10
11.23	17.55	842.14	517.50	.719	673.39	672.27	1413.25
30.14	31.01	470.30	510.70	.705	729.10	724.24	1313.00
50.00	33.75	444.01	527.00	.820	709.25	700.97	1217.03
65.00	37.23	405.77	541.00	.841	769.31	760.50	1119.11
84.00	37.42	1054.90	674.24	.927	814.72	803.78	1119.11
100.00	40.70	1044.83	710.70	.962	824.73	811.44	1119.11

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8678

PERCENT SPAN FROM TIP (I. F.)	HETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-4.1	810.42	-5.06	.691	818.40	818.40	1407.38
11.23	-5.3	833.60	-7.70	.705	833.57	833.46	1417.06
30.14	-1.59	447.88	-54.44	.745	867.78	871.39	1332.17
50.00	-3.00	408.01	-56.40	.785	906.22	905.29	1247.57
67.23	-6.12	869.55	-67.40	.787	867.30	866.83	1105.82
84.21	-4.03	842.37	-64.02	.718	839.62	836.55	1071.74
100.00	-4.05	842.27	-68.02	.725	846.49	846.49	1015.05

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (I. F.)	MASS FLOW (LBS)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUM (DEG)	U FACTOR	GRCLA HAN	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	39.11	1.361	-7.541	.2150	.0160	.0060	21.770	1.639	1.7347
11.23	11.23	38.04	1.354	-1.401	.2126	.0721	.0240	15.049	1.659	1.7347
30.14	30.14	38.61	-1.053	-4.926	.2291	.0743	.1244	9.806	1.717	1.7150
50.00	44.50	37.34	-2.131	-7.099	.2280	.1089	.0333	8.396	1.740	1.7057
67.23	67.23	41.31	-2.510	-5.330	.2451	.2040	.0586	6.947	1.711	1.7095
84.21	84.21	44.07	-3.097	-3.938	.1743	.3609	.0752	6.401	1.661	1.7174
100.00	100.00	45.40	-3.671	-3.313	.3914	.3430	.0865	14.060	1.661	1.2177

MOMENTUM AVERAGE STAGE EFFICIENCY = .7751 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .7576 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.7056

MASS AVERAGE TEMPERATURE RISE = 1.2171

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 65, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 6

INLET VELOCITY DIAGRAM DATA  
CALCULATED HYDRODYNAMIC BLOCKAGE = .0700

PERCENT STATOR FLOW TIP (L. F.)	WETA 3 (DEG)	V3 (M/SEC)	V03 (M/SEC)	M3	V43 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	37.30	247.00	151.00	.643	197.40	193.33	430.52
11.00	37.50	249.00	157.70	.719	205.25	205.91	431.60
31.00	37.01	249.00	155.00	.765	222.29	222.29	400.48
50.00	31.70	249.00	160.00	.820	240.05	240.44	370.95
66.00	37.20	249.00	177.00	.841	238.49	233.63	341.32
84.00	37.64	249.00	204.00	.927	248.33	248.93	309.12
100.00	40.70	249.00	231.00	.962	251.49	248.63	291.43

EXIT VELOCITY DIAGRAM DATA  
CALCULATED HYDRODYNAMIC BLOCKAGE = .0678

PERCENT STATOR FLOW TIP (L. F.)	WETA 4 (DEG)	V4 (M/SEC)	V04 (M/SEC)	M4	V44 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-4.1	243.46	-1.77	.691	249.65	249.45	447.26
11.00	-5.3	254.00	-2.35	.705	254.07	254.04	431.90
30.14	-3.57	265.02	-16.59	.745	264.50	264.39	406.05
44.50	-4.00	276.76	-17.37	.785	276.22	275.43	380.47
67.23	-4.17	265.04	-19.02	.747	264.35	264.21	355.34
84.21	-4.63	250.75	-20.73	.718	255.92	254.94	325.67
100.00	-4.64	248.86	-20.94	.725	258.01	258.01	310.55

STATOR PERFORMANCE DATA

PERCENT STATOR FLOW TIP (L. F.)	PERCENT STATOR FLOW TIP (L. F.)	DELTA RETR (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR (DEG)	DELTA ACTOR (DEG)	OMEGA HAR	LOYS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	3.00	1.30	-2.54	2.15	.019	.0060	21.770	1.639	1.2747	1.7004
11.00	11.00	12.25	1.37	-1.90	2.32	.021	.0250	16.049	1.657	1.2767	1.6016
31.00	30.14	46.71	-1.07	-6.42	2.91	.043	.0244	9.804	1.717	1.2150	1.2753
50.00	44.50	52.07	-4.13	-7.99	2.80	.087	.0333	8.196	1.740	1.2057	1.0163
67.00	67.23	71.00	-2.31	-5.30	2.51	.206	.0586	6.947	1.711	1.2095	1.1473
84.00	84.21	46.07	-3.07	-2.98	3.74	.309	.0952	6.901	1.661	1.2174	1.2107
100.00	100.00	45.40	-3.07	-2.31	4.91	.3430	.0365	14.050	1.660	1.2177	1.3186

PERCENT STATOR AVERAGE STAGE EFFICIENCY = .7751 (POLYTROPIC)  
PERCENT STATOR AVERAGE STAGE EFFICIENCY = .7576 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.7056  
MASS AVERAGE TEMPERATURE RISE = 1.2171

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW = 2.46434 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 77.7797  
 90 PERCENT DESIGN SPEED = SCAN NO. 4  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69178.836 R.P.M.  
 31.4639 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0036

PERCENT SPAJ FROM TIP (I. P.)	DELTA2 (INCH)	V42 (FT/SEC)	V041 (FT/SEC)	DELTA1 (INCH)	V1 (FT/SEC)	V01 (FT/SEC)	M1	V41 (FT/SEC)	V11 (FT/SEC)	U1 (FT/SEC)
0.00	73.07	1455.72	1.370	0.000	417.81	0.000	0.340	417.81	404.36	1425.76
4.31	72.33	1425.75	1.277	0.000	427.43	0.000	0.354	427.43	413.44	1360.17
24.97	69.75	1320.02	1.215	0.000	461.25	0.000	0.421	461.25	452.78	1250.25
41.01	67.40	1230.72	1.173	0.000	471.89	0.000	0.431	471.89	470.37	1136.87
74.00	65.57	1192.49	1.006	0.000	457.86	0.000	0.417	457.86	457.71	1004.01
83.95	62.72	720.03	0.834	0.000	430.34	0.000	0.391	430.34	424.56	936.39
100.00	60.14	431.03	0.710	0.000	414.16	0.000	0.376	414.16	406.09	721.31

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.7612

PERCENT SPAJ FROM TIP (I. P.)	DELTA2 (INCH)	V42 (FT/SEC)	V042 (FT/SEC)	DELTA2 (INCH)	V2 (FT/SEC)	V02 (FT/SEC)	M2	V42 (FT/SEC)	V22 (FT/SEC)	U2 (FT/SEC)
0.00	57.92	1085.07	0.921	34.18	732.34	452.71	0.622	575.70	557.16	1771.25
11.43	58.31	1020.04	0.875	34.48	761.54	473.85	0.649	596.14	541.13	1310.08
30.54	59.14	900.76	0.820	37.14	776.95	470.47	0.666	615.80	611.96	1207.94
42.71	60.71	808.31	0.763	36.53	827.42	491.31	0.718	665.74	665.73	1110.07
67.21	63.11	677.37	0.773	35.55	843.84	510.47	0.785	728.11	725.96	1011.38
87.58	60.37	420.37	0.667	42.17	954.70	639.14	0.836	705.14	691.58	902.85
100.00	11.59	720.48	0.637	44.14	947.94	609.94	0.872	706.02	642.03	836.09

MOTOR PERFORMANCE DATA

PERCENT SPAJ FROM TIP (I. P.)	DELTA (INCH)	DELTA (INCH)	MASS FLOW (LBM/SEC)	INCIDENCE ANGLE (DEG)	SUCT SUR (INCH)	FACTOR	OMEGA (RPM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTOR EFF	ADIABATIC EFF	POLYTROPIC EFF
0.00	30.00	13.74	0.00	4.430	4.302	0.384	2666	0.563	0.931	1.510	0.641	0.664
4.31	11.43	18.04	11.55	10.562	4.296	4.003	2744	0.573	0.874	1.539	0.676	0.676
24.97	30.22	17.61	30.09	10.591	4.562	3.967	1903	0.423	0.920	1.575	0.759	0.767
41.01	40.00	24.55	49.07	10.514	7.773	3.827	1209	0.269	0.731	1.660	0.667	0.457
74.00	67.21	31.38	65.27	10.907	7.166	3.109	0.224	0.051	3.291	1.766	0.790	0.905
83.95	87.57	42.23	87.57	11.305	6.299	3.564	0.147	0.323	10.324	1.717	0.919	0.901
100.00	100.00	48.45	100.00	11.397	5.313	3.063	0.128	0.081	18.744	1.717	0.919	0.901

AVG MOTOR EFFICIENCY = 0.891 (POLYTROPIC)  
 MOMENTUM AVG. MOTOR PRESS MATH = 1.6258  
 MASS AVERAGE TEMPERATURE RISE = 1.1820

ORIGINAL BY L-10  
 DT, POS. QUALITY

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW = 1.2922 KU/SFC  
 PERCENT DESIGN EQUIVALENT FLOW = 77.7747

90 PERCENT DESIGN SPEED = SCAN NO 8  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69178.476 R.P.M.  
 153.4207 KO/SEC-SU M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0036

PERCENT SPAN FROM TIP (L. F.)	RETA1 (DEG)	VI (M/SEC)	VIU (M/SEC)	MI	V41 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	73.27	434.47	171.35	0.30	127.34	123.25	434.57
4.31	72.75	434.47	139.28	0.00	130.28	126.02	414.53
24.92	67.73	406.18	140.59	0.00	140.59	134.61	381.08
41.41	61.48	346.52	141.43	0.00	143.43	143.37	366.52
54.11	65.44	306.02	137.56	0.00	134.54	137.51	306.02
61.34	62.72	254.12	131.17	0.00	131.17	129.41	254.32
100.00	60.14	214.49	126.24	0.00	126.24	121.53	214.48

EXIT VELOCITY DIAGRAM 'A A  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.7612

PERCENT SPAN FROM TIP (L. F.)	RETA2 (DEG)	V2 (M/SEC)	V2U (M/SEC)	M2	V42 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	57.97	310.41	273.23	0.62	175.47	164.42	417.46
11.63	54.91	314.02	147.43	0.64	181.71	171.74	394.31
30.52	50.14	274.74	143.40	0.66	187.49	181.52	360.14
42.70	47.40	277.40	144.75	0.71	202.42	202.41	334.35
61.21	34.11	204.83	134.03	0.74	221.47	221.47	308.33
87.56	28.49	224.44	144.41	0.83	214.47	211.40	275.13
100.00	11.07	214.75	210.31	0.87	215.20	207.44	254.44

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	DELTA (DEG)	RETA0 (DEG)	INCIDENCE ANGLE (DEG)	FACTOR	UAR	OMEGA*	LOSS PARAMETER	ANGLE (DEG)	DEVIATION	ROTOR PRESS RATIO	ROTOR AERODYNAMIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	15.76	9.402	0.384	0.288	0.543	0.543	0.11	1.530	0.681	0.684	0.684
9.31	11.43	14.26	9.276	0.403	0.274	0.578	0.578	0.49	1.517	0.674	0.676	0.676
24.92	30.52	10.591	8.562	0.397	0.143	0.621	0.621	0.20	1.575	0.704	0.707	0.707
41.41	41.41	24.55	7.153	0.387	0.209	0.244	0.244	0.31	1.640	0.647	0.657	0.657
54.11	61.21	31.34	7.146	0.224	0.224	0.051	0.051	0.23	1.706	0.719	0.719	0.719
83.46	67.21	42.23	6.249	0.564	0.147	0.023	0.023	10.32	1.717	0.919	0.919	0.919
100.00	100.00	48.44	5.313	0.303	0.142	0.031	0.031	14.74	1.717	0.919	0.919	0.919

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.291 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.170 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6258  
 MASS AVERAGE TEMPERATURE RISE = 1.1820

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT UPSILON SPEED - SCAN NO 8

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9060

PERCENT SPAN FROM TIP (L. F.)	ETA A (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	DEVIATION ANGLE (DEG)	LOSS PARAMETER	OMEGA (RPM)	FACTOR	INCIDENCE MEAN (DEG)	DELTA (DEG)	FROM TIP (IN)	FROM TIP (IN)	ETA (DEG)	ETA (DEG)	PERCENT SPAN FROM TIP (L. F.)	VZ3 (FT/SEC)	VM3 (FT/SEC)	U3 (FT/SEC)
0.00	41.90	697.98	466.15	.591	519.50	14.300	.0172	.0477	.4064	5.584	44.74	0.00	0.00	44.74	45.40	11.61	513.79	519.50	1331.71
11.61	43.03	712.37	486.06	.604	520.77	13.634	.0174	.0512	.4050	6.044	45.40	11.61	11.61	45.40	46.07	30.85	519.91	520.77	1277.11
30.85	37.67	750.19	478.97	.643	577.42	10.447	.0175	.0751	.3829	3.041	42.02	30.85	30.85	42.02	43.03	46.91	577.42	577.42	1166.53
46.91	37.09	809.67	495.04	.701	640.70	7.140	.0195	.0630	.3462	-0.042	40.44	46.91	46.91	40.44	41.14	67.14	640.23	640.70	1101.71
67.14	30.30	807.84	510.22	.760	647.68	5.473	.0176	.0438	.3438	-3.015	34.67	67.14	67.14	34.67	35.14	87.50	605.13	647.68	1015.94
87.50	43.30	913.15	676.92	.748	663.98	3.350	.0187	.0374	.3974	1.145	39.54	87.50	87.50	39.54	40.14	100.00	655.07	663.98	920.25
100.00	44.81	953.34	689.54	.830	678.65	2.252	.0188	.0424	.4194	-0.014	40.74	100.00	100.00	40.74	41.84	100.00	649.90	678.65	861.44

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9082

PERCENT SPAN FROM TIP (L. F.)	ETA A (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	DEVIATION ANGLE (DEG)	LOSS PARAMETER	OMEGA (RPM)	FACTOR	INCIDENCE MEAN (DEG)	DELTA (DEG)	FROM TIP (IN)	FROM TIP (IN)	ETA (DEG)	ETA (DEG)	PERCENT SPAN FROM TIP (L. F.)	VZ4 (FT/SEC)	VM4 (FT/SEC)	U4 (FT/SEC)
0.00	27.80	544.40	-24.07	.498	513.65	14.300	.0172	.0477	.4064	5.584	44.74	0.00	0.00	44.74	45.40	11.61	513.65	513.65	1322.05
11.61	27.87	602.83	-30.20	.500	602.07	13.634	.0174	.0512	.4050	6.044	45.40	11.61	11.61	45.40	46.07	30.85	602.00	602.07	1275.51
30.85	27.35	676.67	-27.71	.531	676.15	10.447	.0175	.0751	.3829	3.041	42.02	30.85	30.85	42.02	43.03	46.91	676.47	676.15	1177.99
46.91	27.30	688.11	-13.54	.588	647.24	7.140	.0195	.0630	.3462	-0.042	40.44	46.91	46.91	40.44	41.14	67.14	646.54	647.24	1125.52
67.14	1.07	706.36	21.10	.607	705.78	5.473	.0176	.0438	.3438	-3.015	34.67	67.14	67.14	34.67	35.14	87.50	705.54	705.78	1044.84
87.14	3.42	696.55	40.34	.543	695.01	3.350	.0187	.0374	.3974	1.145	39.54	87.14	87.14	39.54	40.14	100.00	692.47	695.01	985.64
100.00	2.43	700.94	40.74	.597	694.38	2.252	.0188	.0424	.4194	-0.014	40.74	100.00	100.00	40.74	41.84	100.00	694.34	694.38	917.95

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	ETA A (DEG)	ETA (DEG)	DELTA (DEG)	INCIDENCE MEAN (DEG)	FACTOR	OMEGA (RPM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TFRP RATIO	STATOR POLYTROPIC EFF
0.00	41.90	44.74	45.40	5.584	.4064	.0477	.0172	14.300	1.514	1.1044	.8683
11.61	43.03	45.40	46.07	6.044	.4050	.0512	.0174	13.634	1.521	1.1049	.8683
30.85	37.67	42.02	43.03	3.041	.3829	.0751	.0175	10.447	1.544	1.1071	.8724
46.91	37.09	40.44	41.14	-0.042	.3462	.0630	.0195	7.140	1.610	1.1167	.8943
67.14	30.30	34.67	35.14	-3.015	.3438	.0438	.0176	5.473	1.631	1.1140	.8560
87.50	43.30	39.54	40.14	1.145	.3974	.0374	.0187	3.350	1.611	1.1144	.8674
100.00	44.81	40.74	41.84	-0.014	.4194	.0424	.0188	2.252	1.611	1.1144	.8777

MOMENTUM AVERAGE STAGE EFFICIENCY = .8780 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7728 (ADIABATIC)  
MOMENTUM AVERAGE STAGE PRESS RATIO = 1.5862  
MOMENTUM AVERAGE TEMPERATURE RISE = 1.1820

NASA SMALL AXIAL COMPRESSOR TEST 3 JUN 25 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO B

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9060

PERCENT SPAN FROM TIP (L. T.)	HETA J (DEG)	VJ (M/SEC)	VUJ (M/SEC)	MJ	VMJ (M/SEC)	VZJ (M/SEC)	UJ (M/SEC)
0.00	41.90	212.74	142.00	.591	154.34	140.60	402.90
11.01	43.03	217.13	144.14	.604	158.73	144.67	397.26
20.05	44.07	220.66	145.97	.643	170.00	176.00	361.69
44.21	47.09	246.79	150.89	.701	195.29	195.14	335.90
67.14	50.50	266.53	157.34	.760	212.65	211.47	309.67
87.50	54.30	278.34	191.09	.790	207.30	199.66	280.69
100.00	44.51	270.50	204.00	.834	206.05	201.14	262.57

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9082

PERCENT SPAN FROM TIP (L. T.)	HETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-2.09	181.17	-9.10	.498	180.94	180.74	402.96
11.01	-2.07	183.74	-9.20	.506	183.51	183.49	397.00
20.05	-2.15	191.01	-7.04	.531	190.05	190.77	363.76
44.21	-2.00	209.74	-10.24	.588	203.69	209.27	343.06
67.14	1.17	215.30	7.04	.607	215.14	215.06	320.00
87.50	3.00	212.31	14.14	.593	211.84	211.01	294.34
100.00	4.03	213.65	14.26	.597	213.17	213.11	274.79

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. T.)	DELTA PETA (DEG)	INCIDENCE ANGLE MEAN (DEG)	SUCT SUR (DEG)	U FACTOR	U AREA	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STATOR POLYTROPIC EFF
0.00	44.70	5.504	1.602	.4004	.0477	.0172	17.700	1.514	.9483
11.01	45.90	6.044	1.514	.4050	.0512	.0174	15.641	1.521	.9431
20.05	42.00	3.041	-2.246	.3829	.0765	.0251	10.842	1.506	.7929
44.21	40.69	-3.092	-3.077	.3662	.0636	.0195	9.190	1.610	.8093
67.14	36.67	-3.015	-5.881	.3438	.1376	.0395	12.973	1.631	.6560
87.50	39.54	1.145	-1.774	.3474	.1807	.0477	15.350	1.611	.6479
100.00	40.79	-3.017	-3.460	.4194	.1680	.0474	22.524	1.611	.7077

MOMENTUM AVERAGE STAGE EFFICIENCY = .7870 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7728 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.5862  
 MASS AVERAGE TEMPERATURE RISE = 1.1820

ORIGINAL PAGE IS  
OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST JUNE 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW FROM TIP (LBS) = 2.0718 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 78.00%  
 90 PERCENT UFSIGN SPEED = SCAM NO 9  
 EQUIVALENT SPEED = 69144.904 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 31.7195 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9981

PERCENT SPAN FROM TIP (I. I.)	V01 (FT/SEC)	VU01 (FT/SEC)	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	1400.21	1425.06	1.351	421.94	0.00	.384	421.94	404.76	1425.06
4.03	1420.22	1361.52	1.219	431.36	0.00	.392	431.34	417.74	1361.52
8.04	1355.02	1251.43	1.218	445.61	0.00	.425	445.61	457.06	1251.43
12.04	1233.96	1137.75	1.126	476.41	0.00	.435	476.41	474.47	1137.75
16.04	1105.01	1005.57	1.008	462.23	0.00	.421	462.23	462.07	1005.57
20.04	991.04	839.57	0.850	439.37	0.00	.345	434.37	424.54	934.57
24.00	891.46	721.04	.756	414.04	0.00	.380	414.04	401.43	721.04

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7700

PERCENT SPAN FROM TIP (I. I.)	M02 (DEG)	DELTA02 (DEG)	V02 (FT/SEC)	M2	V42 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	54.50	920.15	450.22	.614	566.10	547.07	1370.58
4.03	55.14	834.53	470.89	.639	544.00	472.02	1310.42
8.04	50.33	742.10	465.50	.664	615.53	511.68	1207.61
12.04	43.17	624.03	482.45	.717	664.03	544.59	1110.13
16.04	34.31	497.48	514.04	.773	715.49	711.38	1011.57
20.04	25.70	267.22	634.52	.835	707.00	645.24	901.74
24.00	17.04	151.04	684.64	.870	707.91	643.41	835.64

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. I.)	DELTA4 (DEG)	DELTA04 (DEG)	INCIDENCE ANGLE (DEG)	FACTUM	ORIGANUM	LOSS PARAMETER (DEG)	REVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR AUTOMATIC EFF	TOTAL POLYTROPIC EFF
0.00	0.00	15.10	9.070	3.702	.3924	.0560	1.414	1.521	.6428	.6631
4.03	11.21	17.24	10.383	9.121	.4034	.0574	.125	1.529	.6408	.6710
8.04	30.27	19.27	10.396	7.376	.3943	.0403	.152	1.574	.7673	.7816
12.04	44.09	24.09	10.312	7.559	.3752	.0230	.066	1.641	.6840	.8418
16.04	67.12	30.64	10.756	6.462	.3385	.0071	.3931	1.691	.4701	.9723
20.04	87.05	41.40	11.502	6.018	.2800	.0280	1.200	1.721	.9140	.9203
24.00	100.00	47.05	11.144	5.009	.2029	.0331	1.0095	1.721	.9141	.9204

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8330 (POLYTROPIC)  
 MASS AVERAGE TEMPERATURE RISE = 1.0218

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.5126 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 76.9091  
 90 PERCENT DESIGN SPEED - SCAN NO 9  
 EQUIVALENT SPEED = 69144.904 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 154.8632 KG/SEC-SU M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9981

PERCENT SPAN FROM TIP (L. F.)	REL INCL (DEG)	WU1 (M/SEC)	WU2 (M/SEC)	WU3 (M/SEC)	WU4 (M/SEC)	WU5 (M/SEC)	WU6 (M/SEC)	WU7 (M/SEC)	WU8 (M/SEC)	WU9 (M/SEC)
0.00	71.21	434.90	434.36	1.351	124.61	0.00	.384	124.61	124.47	434.36
4.03	72.47	433.37	414.99	1.299	131.48	0.00	.392	131.44	127.18	414.99
24.41	67.09	407.10	381.76	1.216	141.92	0.00	.475	141.92	139.31	381.56
47.73	67.21	375.76	349.79	1.126	149.21	0.00	.435	149.21	144.74	349.79
67.17	65.29	337.15	306.19	1.008	140.89	0.00	.421	140.89	140.84	306.19
84.17	62.50	298.77	254.38	.858	132.40	0.00	.395	132.40	130.62	254.38
100.00	58.90	259.04	219.77	.758	127.42	0.00	.380	127.42	123.09	219.77

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7700

PERCENT SPAN FROM TIP (L. F.)	REL INCL (DEG)	WV1 (M/SEC)	WV2 (M/SEC)	WV3 (M/SEC)	WV4 (M/SEC)	WV5 (M/SEC)	WV6 (M/SEC)	WV7 (M/SEC)	WV8 (M/SEC)	WV9 (M/SEC)
0.00	54.40	324.34	290.52	.917	344.58	220.46	.614	172.55	166.99	417.75
11.25	55.14	311.95	255.89	.871	344.44	274.85	.639	174.25	174.35	344.42
30.67	59.33	273.67	220.47	.830	374.10	235.22	.664	181.89	184.44	358.08
48.69	61.19	242.33	191.32	.797	354.41	251.31	.717	203.80	204.79	334.37
67.17	60.82	204.82	151.63	.765	354.70	264.54	.773	218.08	217.44	308.33
84.17	60.70	173.37	114.45	.665	41.91	242.55	.835	215.69	211.95	274.85
100.00	57.04	120.83	66.04	.630	44.04	300.17	.870	215.77	204.44	254.72

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	REL INCL (DEG)	DELTA (DEG)	DELTA (DEG)	MASS FLOW (KG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	WU1 (M/SEC)	WU2 (M/SEC)	WU3 (M/SEC)	WU4 (M/SEC)	WU5 (M/SEC)	WU6 (M/SEC)	WU7 (M/SEC)	WU8 (M/SEC)	WU9 (M/SEC)
0.00	0.00	15.11	15.11	0.00	4.202	3084	.0740	1.414	1.521	1.521	1.521	1.521	1.521	1.521	1.521	1.521	1.521
4.03	11.25	17.24	17.24	10.384	4.121	4034	.0774	.125	1.529	1.529	1.529	1.529	1.529	1.529	1.529	1.529	1.529
24.41	30.67	19.27	19.27	10.386	4.376	3743	.0403	.142	1.574	1.574	1.574	1.574	1.574	1.574	1.574	1.574	1.574
47.73	48.69	24.47	24.47	10.312	7.559	3752	.0230	.066	1.641	1.641	1.641	1.641	1.641	1.641	1.641	1.641	1.641
67.17	67.17	30.68	30.68	10.256	5.982	3385	.0071	.071	1.631	1.631	1.631	1.631	1.631	1.631	1.631	1.631	1.631
84.17	84.17	41.90	41.90	11.012	4.078	3533	.0280	10.660	1.721	1.721	1.721	1.721	1.721	1.721	1.721	1.721	1.721
100.00	100.00	47.85	47.85	11.144	5.089	3429	.0331	17.095	1.721	1.721	1.721	1.721	1.721	1.721	1.721	1.721	1.721

MOMENTUM AVERAGE MOTOR EFFICIENCY = .4330 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .4212 (ADIABATIC)  
 MASS AVERAGE TEMPERATURE RATIO = 1.6218  
 MASS AVERAGE TEMPERATURE RATIO = 1.1801



NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 9

INLET VELOCITY DIAPHRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9042

PERCENT SPAN FROM TIP (I. I.)	BETA 3 (DEG)	V3 (FT/SEC)	V03 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	41.54	699.08	453.54	.592	527.26	517.51	1331.05
11.10	42.71	712.00	482.78	.604	523.14	522.27	1277.64
30.55	38.74	750.72	423.00	.650	570.20	540.14	1146.97
44.02	36.57	815.39	415.77	.708	654.89	654.41	1142.53
66.32	39.37	862.74	511.00	.752	694.68	692.14	1016.50
91.54	42.59	919.24	622.21	.805	676.83	677.75	919.57
100.00	43.85	954.84	684.22	.844	671.47	672.34	861.02

EXIT VELOCITY DIAPHRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9151

PERCENT SPAN FROM TIP (I. I.)	BETA 4 (DEG)	V4 (FT/SEC)	V04 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	42.23	590.43	-125.07	.495	577.03	577.03	1321.40
11.10	41.51	600.47	-120.21	.509	589.25	584.14	1275.73
30.55	37.22	633.06	-24.26	.537	632.55	632.27	1195.82
44.02	37.00	695.43	-34.73	.596	694.56	694.44	1124.54
66.32	42.21	710.24	17.12	.611	709.81	709.42	1049.23
91.54	38.24	703.34	88.91	.600	702.22	694.65	985.10
100.00	38.10	712.84	98.74	.604	706.67	706.67	917.50

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. I.)	DELTA BETA (DEG)	DELTA BETA (DEG)	INCIDENCE ANGLE MEAN (DEG)	SUCT SUM (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STAGE TEMP. RATIO	STATOR POLYTROPIC EFF
0.00	0.00	53.77	5.222	1.300	.0493	9.950	1.505	1.1977	.8496
11.10	12.11	56.23	6.537	3.177	.0474	4.943	1.513	1.1977	.8576
30.55	36.16	36.57	2.124	-1.109	.0745	15.602	1.545	1.1401	.7978
44.02	42.73	37.43	-3.191	-4.100	.0611	4.187	1.612	1.1716	.8143
66.32	67.10	33.78	-3.115	-4.408	.0336	13.649	1.629	1.1666	.7035
91.54	64.21	39.44	-3.72	-2.545	.0442	14.427	1.611	1.1433	.6341
100.00	100.00	40.54	-3.774	-2.220	.0433	21.909	1.611	1.1433	.6345

MOMENTUM AVERAGE STAGE EFFICIENCY = .7936 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7795 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS. RATIO = 1.5850  
 MASS AVERAGE TEMPERATURE RISE = 1.1001

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATUS PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAM NO 9  
 INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9042

PERCENT SPAN FROM TIP (L. S.)	DELTA 3 (DEG)	V3 (M/SEC)	V3 (M/SEC)	M3	M3	V21 (M/SEC)	V21 (M/SEC)	U3	U3
0.00	41.54	213.00	141.30	.592	.592	157.74	157.74	405.71	405.71
11.36	42.71	217.02	147.21	.604	.604	159.19	159.19	399.42	399.42
30.63	39.76	210.85	144.35	.630	.630	174.89	174.89	361.79	361.79
48.87	38.77	208.53	141.06	.709	.709	199.61	199.61	336.05	336.05
66.72	36.37	202.90	135.74	.755	.755	211.74	211.74	309.43	309.43
84.51	34.34	240.23	149.85	.805	.805	203.51	203.51	290.24	290.24
100.00	31.45	292.22	202.44	.844	.844	210.76	210.76	262.44	262.44

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9151

PERCENT SPAN FROM TIP (L. S.)	DELTA 4 (DEG)	V4 (M/SEC)	V4 (M/SEC)	M4	M4	VM4 (M/SEC)	VM4 (M/SEC)	U4	U4
0.00	32.23	177.20	131.12	.495	.495	175.00	175.00	402.76	402.76
11.36	31.74	183.02	136.73	.504	.504	179.30	179.30	399.84	399.84
30.63	29.22	192.93	147.49	.537	.537	192.71	192.71	355.40	355.40
48.87	27.43	211.37	170.59	.596	.596	211.70	211.70	342.78	342.78
66.72	25.57	216.57	174.74	.611	.611	216.35	216.35	319.41	319.41
84.51	23.29	214.33	172.52	.609	.609	213.25	213.25	294.16	294.16
100.00	21.10	215.75	172.42	.604	.604	215.39	215.39	277.65	277.65

STATUS PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. S.)	DELTA 4 (DEG)	DELTA 3 (DEG)	DELTA 2 (DEG)	DELTA 1 (DEG)	SUCT SUM (DEG)	ANGLE (DEG)	OMEGA (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE MASS FLOW	STAGE PRESS RATIO	STATION POLYTROPIC EFF
0.00	53.77	53.77	53.77	53.77	1.100	.0043	.0043	.0174	9.950	1.505	1.1977	.5496
11.36	54.21	54.21	54.21	54.21	3.197	.074	.074	.0141	9.943	1.513	1.1977	.5576
30.63	56.52	56.52	56.52	56.52	-1.169	.0745	.0745	.0245	15.402	1.565	1.1801	.7478
48.87	59.43	59.43	59.43	59.43	-4.180	.0611	.0611	.0187	9.119	1.612	1.1716	.9143
66.72	61.15	61.15	61.15	61.15	-5.948	.0334	.0334	.0166	13.639	1.629	1.1666	.7036
84.51	63.30	63.30	63.30	63.30	-7.245	.0445	.0445	.0142	19.827	1.611	1.1833	.6391
100.00	60.55	60.55	60.55	60.55	-4.220	.0459	.0459	.0176	21.999	1.611	1.1833	.6395

MASS FLOW AVG. STAGE EFFICIENCY = .7434 (POLYTROPIC)  
 MASS AVERAGE TEMPERATURE RISE = 1.5050

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW HEIGHT FLOW = 2.9158 LBM/SEC EQUIVALENT SPEED = SCAN NO 10  
 PERCENT DESIGN FLOW = 79.0093 PERCENT DESIGN SPEED = 69101.200 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 32.2040 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0070

PERCENT SPAN FROM TIP (L. F.)	RELATIVE HEIGHT (INCH)	V01 (FT/SEC)	W1FA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SEC)	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	71.21	1497.54	1474.10	0.00	427.60	0.00	479.60	415.77	1424.16
7.16	72.07	1427.07	1391.32	0.00	439.57	0.00	439.57	425.14	1354.32
27.07	68.18	1335.02	1247.40	0.00	474.01	0.00	474.01	465.09	1247.40
41.28	65.01	1233.30	1133.73	0.00	487.03	0.00	487.03	484.06	1133.73
60.00	61.00	1100.75	1001.42	0.00	471.22	0.00	471.22	471.06	1001.42
80.00	62.00	943.02	843.18	0.00	442.99	0.00	442.99	437.05	933.18
100.00	59.38	837.37	720.50	0.00	424.56	0.00	424.56	412.06	720.58

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7756

PERCENT SPAN FROM TIP (L. F.)	RELATIVE HEIGHT (INCH)	V02 (FT/SEC)	W2FA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V42 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	57.74	1010.70	922.66	0.00	730.72	0.00	576.01	559.40	1354.71
11.50	58.00	1010.73	890.10	0.00	754.70	0.00	597.11	544.06	1308.22
31.70	50.14	909.79	744.09	0.00	773.22	0.00	620.40	617.12	1205.39
40.01	48.14	871.79	631.70	0.00	627.01	0.00	676.24	674.21	1108.25
67.35	45.10	800.72	577.33	0.00	718.75	0.00	708.44	708.45	1004.89
82.01	20.44	707.74	476.75	0.00	453.59	0.00	716.71	704.93	994.79
100.00	17.12	733.93	354.16	0.00	944.20	0.00	717.54	691.15	835.15

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	SPAN FROM TIP (INCH)	FRONT TRAILING EDGE	DELTA HEIGHT (INCH)	INCIDENCE ANGLE (DEG)	SUCT SUM (INCH)	FACTOR	U/FLOW BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	15.24	9.377	0.909	0.025	0.2014	0.078	0.944	1.527	0.639	0.673
9.38	11.70	11.70	17.47	10.105	0.816	0.170	0.2670	0.062	-0.301	1.536	0.620	0.610
25.07	30.70	30.70	14.09	10.042	0.885	0.085	0.1415	0.037	0.000	1.574	0.742	0.740
41.28	44.91	44.91	13.67	9.308	7.129	0.3679	0.0915	0.203	1.013	1.064	0.903	0.903
60.00	67.32	67.32	27.70	10.307	6.516	0.3433	0.0407	0.091	4.401	1.078	0.610	0.638
80.00	87.41	87.41	41.52	10.593	5.502	0.3445	0.1053	0.231	10.799	1.130	0.297	0.350
100.00	100.00	100.00	47.25	10.024	4.549	0.2933	0.1300	0.272	19.175	1.170	0.287	0.340

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8343 (POLYTROPIC) MOMENTUM AVG. ROTOR PRESS RATIO = 1.6212  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.4270 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.1185

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW FROM TIP = 1.0226 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 77.00033  
 40 PERCENT DESIGN SPEED = SCAM NO. 3  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69101.200 K.G./SEC-SQ M  
 157.2374

INLET VELOCITY DYNAMIC DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0070

PERCENT SPAN FROM TIP (T. P.)	DELTA (DEG)	V01 (M/SEC)	DELTA1 (DEG)	V1 (M/SEC)	V01 (M/SEC)	MI	V01 (M/SEC)	V02 (M/SEC)	U1 (M/SEC)
0.00	73.21	453.40	0.00	130.94	0.00	.371	130.94	174.73	434.08
4.16	72.07	437.17	0.00	134.98	0.00	.400	134.98	179.59	414.01
25.07	67.14	406.91	0.00	144.56	0.00	.433	144.56	184.00	390.33
41.20	60.91	375.85	0.00	149.02	0.00	.444	149.02	187.54	365.56
60.04	64.00	347.14	0.00	144.63	0.00	.430	144.63	183.54	305.23
74.00	62.00	297.02	0.00	135.02	0.00	.403	135.02	174.21	253.95
100.00	59.38	233.23	0.00	110.02	0.00	.344	110.02	125.60	219.63

EXIT VELOCITY DYNAMIC DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7756

PERCENT SPAN FROM TIP (T. P.)	DELTA (DEG)	V02 (M/SEC)	DELTA2 (DEG)	V2 (M/SEC)	V02 (M/SEC)	M2	V02 (M/SEC)	V03 (M/SEC)	U2 (M/SEC)
0.00	57.93	296.03	37.72	222.72	130.26	.621	176.14	170.50	417.49
11.50	54.00	276.08	38.04	231.24	127.67	.647	147.00	174.02	398.75
40.70	30.14	245.59	36.57	235.08	140.44	.666	149.24	144.10	367.45
61.31	43.14	241.63	34.25	251.65	145.23	.719	205.51	205.50	337.79
67.34	35.16	203.93	35.04	260.38	155.94	.767	215.91	215.94	307.75
87.91	20.44	233.20	41.41	241.26	192.65	.841	218.45	214.86	274.26
100.00	12.12	223.09	43.70	201.53	207.57	.875	218.70	211.27	254.55

COMBINED PERFORMANCE DATA

PERCENT SPAN FROM TIP (T. P.)	DELTA (DEG)	LOSS	PARAMETER	DEVIATION (DEG)	ADJUSTED LOSS	ADJUSTED LOSS	ADJUSTED LOSS	POLYTROPIC EFF
0.00	9.00	0.00	0.025	0.025	0.028	0.027	1.527	.6737
4.16	11.02	11.02	0.070	0.070	0.062	0.061	1.514	.6816
25.07	30.70	30.70	0.096	0.096	0.085	0.084	1.574	.7900
41.20	41.91	41.91	0.129	0.129	0.115	0.114	1.641	.9037
60.04	67.43	67.43	0.160	0.160	0.143	0.142	1.674	.9638
74.00	67.91	67.91	0.185	0.185	0.165	0.164	1.730	.9340
100.00	100.00	100.00	0.293	0.293	0.272	0.271	1.730	.9340

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8389 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .8276 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6212  
 MASS AVERAGE TEMPERATURE RISE = 1.1785

ORIGINAL PAGE IS  
OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNIF 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED = SCAN NO 10

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9055

PERCENT SPAN FROM TIP (U.S.)	BETA 3 (DEG)	V3 (FT/SEC)	V13 (FT/SEC)	M3	VM3 (FT/SEC)	V23 (FT/SEC)	U3 (FT/SEC)
0.00	1.122	711.37	460.33	.604	547.35	576.19	1330.21
11.33	1.255	723.53	477.07	.615	541.47	560.54	1274.97
30.76	1.570	761.00	468.31	.655	549.86	549.15	1185.82
44.70	1.828	818.75	479.41	.712	663.71	663.22	1101.45
57.05	1.942	857.40	504.47	.751	684.47	687.65	1015.19
67.75	1.975	928.47	614.54	.813	689.33	691.07	917.75
100.00	1.821	985.14	660.03	.851	703.49	644.05	860.48

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9205

PERCENT SPAN FROM TIP (U.S.)	BETA 4 (DEG)	V4 (FT/SEC)	V14 (FT/SEC)	M4	VM4 (FT/SEC)	V24 (FT/SEC)	U4 (FT/SEC)
0.00	2.000	605.20	30.41	.509	604.51	604.51	1320.50
11.33	2.000	613.90	31.06	.510	613.19	613.11	1274.97
30.76	1.997	630.74	20.34	.543	630.47	630.14	1198.37
44.70	2.004	701.11	15.36	.602	700.21	699.49	1124.00
57.05	2.011	717.47	23.02	.613	710.81	710.02	1048.87
67.75	2.011	784.47	40.09	.601	703.84	701.07	964.61
100.00	2.010	709.41	40.85	.600	704.23	704.73	918.72

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (U.S.)	DELTA 1 (DEG)	DELTA 2 (DEG)	DELTA 3 (DEG)	DELTA 4 (DEG)	INCIDENCE ANGLE MEAN (DEG)	INCIDENCE ANGLE SURF (DEG)	FACTOR	UHM	UHEISA	LOSS PARAMETER	DELTA 1 (DEG)	DELTA 2 (DEG)	DELTA 3 (DEG)	DELTA 4 (DEG)	STAGE PRESS. RATIO	STAGE POLYTROPIC EFF
0.00	0.00	0.00	0.00	0.00	0.00	0.00	.1946	.0501	.0501	.0180	17.300	17.300	17.300	1.1942	.8422	
11.33	11.07	11.07	04.41	04.41	2.035	2.035	.3901	.0490	.0490	.0170	15.700	15.700	15.700	1.1942	.8490	
30.76	31.27	30.37	31.41	31.41	1.433	1.433	.3492	.0771	.0771	.0253	11.361	11.361	11.361	1.1779	.7777	
44.70	41.79	49.77	30.74	30.74	1.023	1.023	.3376	.0629	.0629	.0193	9.091	9.091	9.091	1.1642	.8051	
67.75	67.31	69.44	32.01	32.01	0.920	0.920	.3161	.1050	.1050	.0300	12.435	12.435	12.435	1.1445	.7275	
87.76	87.10	87.36	39.84	39.84	0.823	0.823	.3068	.2055	.2055	.0343	14.442	14.442	14.442	1.1422	.8039	
100.00	100.00	100.00	39.91	39.91	1.423	1.423	.4172	.1919	.1919	.0484	27.001	27.001	27.001	1.1422	.8670	

MOMENTUM AVERAGE STAGE EFFICIENCY = .7963 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7423 (ADIABATIC)  
MOMENTUM AVERAGE STAGE PRESS. RATIO = 1.5819  
MASS AVERAGE TEMPERATURE RISE = 1.1185

NASA SMALL AXIAL COMPRESSOR TEST 3 JULY 25, 1976 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 10

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9055

PERCENT SPAN FROM TIP (1. to 1.)	DELTA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	VM3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	90.14	210.02	140.03	115.01	153.04	405.65
11.55	91.22	210.23	136.27	105.04	150.77	308.92
31.76	91.93	211.07	132.70	102.06	147.93	301.64
48.73	92.96	212.35	140.11	207.30	207.15	305.72
67.06	93.02	211.33	135.19	107.30	209.51	309.63
87.76	93.25	210.50	141.09	210.11	207.29	279.79
100.00	93.21	210.13	201.42	214.42	208.50	202.27

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9205

PERCENT SPAN FROM TIP (1. to 1.)	DELTA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	72.00	108.09	70.27	104.26	114.26	407.21
11.55	72.06	107.11	71.35	106.70	106.04	348.51
31.77	72.02	108.07	68.20	104.39	104.50	303.20
48.73	72.00	213.70	-10.78	213.82	213.00	342.59
67.06	72.33	217.10	17.41	216.53	216.41	319.70
87.76	73.11	216.04	17.40	214.07	213.64	294.01
100.00	73.30	210.23	17.45	215.07	215.47	277.88

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (1. to 1.)	DELTA 5 (DEG)	DELTA 6 (DEG)	DELTA 7 (DEG)	DELTA 8 (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTOR	HAR	UR/CA	LOSS PARAMETER	DEFLECTION (DEG)	STAGE PRESS LOSS (ATD)	STATION POLYTROPIC EFF
0.00	11.00	11.00	11.00	11.00	4.005	0.01	.1996	.0501	.0180	.0180	12.300	1.1942	.9422
11.55	11.00	11.00	11.00	11.00	4.030	0.00	.1961	.0490	.0170	.0170	13.700	1.1902	.8490
31.76	10.77	10.77	10.77	10.77	-1.333	-1.333	.3672	.0771	.0253	.0253	11.701	1.1779	.7777
48.76	10.71	10.71	10.71	10.71	-4.111	-4.111	.3376	.0624	.0193	.0193	4.091	1.1692	.8031
67.06	10.71	10.71	10.71	10.71	-3.007	-3.007	.3161	.1050	.0300	.0300	15.475	1.1455	.7220
87.76	10.71	10.71	10.71	10.71	-3.324	-3.324	.1968	.2055	.0543	.0543	14.842	1.1677	.6034
100.00	10.00	10.00	10.00	10.00	-1.423	-1.423	.4372	.1919	.0484	.0484	22.002	1.1172	.6570

MOMENTUM AVG. STAGE PRESS RATIO = 1.5019  
 MASS AVERAGE TEMPERATURE RISE = 1.1785

NASA SMALL AXIAL COMPRESSOR TEST 3 JUN 25 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW  $\dot{V} = 2.9182$  LBM/SEC SLASH SPEED = SLASH NO 11  
 PERCENT DELTA EQUIVALENT FLOW  $\Delta = 79.8745$  LBM/SEC EQUIVALENT SPEED  
 69004-RAS H.P.-M. 32-2504 LBM/SEC-SLASH FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0010

PERCENT SPAN FROM TIP (L. S.)	DELTA (DEG)	V01 (FT/SEC)	VUPT (FT/SEC)	W01 (DEG)	WETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	VM1 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	73.14	1403.00	1422.15	0.00	0.00	429.78	0.00	.391	429.78	414.94	1422.15
4.00	72.01	1423.67	1350.14	0.00	0.00	447.79	0.00	.400	439.70	424.39	1350.14
8.00	69.14	1337.74	1445.20	0.00	0.00	475.07	0.00	.434	474.07	460.29	1445.20
12.00	66.75	1231.11	1431.07	0.00	0.00	486.07	0.00	.444	486.07	444.51	1431.09
16.00	64.72	1104.61	1444.80	0.00	0.00	471.04	0.00	.430	471.04	471.04	1444.80
20.00	61.73	942.13	1314.13	0.00	0.00	444.41	0.00	.404	443.41	437.46	1314.13
24.00	59.32	836.63	114.57	0.00	0.00	426.92	0.00	.388	426.92	412.41	114.57

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7735

PERCENT SPAN FROM TIP (L. S.)	V02 (FT/SEC)	VU02 (FT/SEC)	W02 (DEG)	WETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VM2 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)	
0.00	1022.28	924.43	37.31	731.46	443.34	0.00	.023	443.34	541.79	563.06	1307.78
4.00	1034.15	842.00	37.71	744.95	404.23	0.04	.044	404.23	600.41	547.29	1300.23
8.00	776.34	748.55	35.74	775.42	422.09	0.09	.069	422.09	627.83	623.92	1203.84
12.00	731.10	686.07	35.09	676.47	470.39	0.20	.170	470.39	674.51	674.51	1197.00
16.00	675.32	500.72	33.41	677.45	506.42	0.17	.171	506.42	714.14	713.04	1007.16
20.00	701.66	273.05	41.37	477.17	626.03	0.34	.284	626.03	710.70	609.10	999.68
24.00	727.14	154.00	43.44	480.73	674.90	0.40	.367	674.90	711.58	647.39	933.98

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. S.)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	U FACTOR	WASH HAM	DIFFERENTIAL (DEG)	LOSS PARAMETER	WASH ADIABATIC RATIO	MOTION ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	9.348	4.880	.3765	.2576	.0522	1.574	.6408	.6764
4.00	11.53	16.07	4.700	.1928	.2643	.0556	1.531	.6444	.6838
8.00	30.73	14.11	4.806	.1717	.1717	.0367	1.574	.7489	.8000
12.00	44.03	23.61	4.893	.1594	.0809	.0179	1.640	.9042	.9144
16.00	62.14	27.71	4.949	.1349	.0295	.0066	1.601	.9718	.9738
20.00	67.67	40.97	4.959	.1459	.1103	.0254	1.614	.9268	.9268
24.00	100.00	46.72	4.443	.2408	.1426	.0296	1.614	.9207	.9205

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8634 POLYTROPIC MOMENTUM AVERAGE MOTOR EFFICIENCY = .8337 ADIABATIC MOMENTUM AVERAGE MOTOR PRESS RATIO = 1.6179 MASS AVERAGE TEMPERATURE RISE = 1.1166

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW (M<sup>3</sup>/SEC) = 1.3237  
 PERCENT DESIGN EQUIVALENT FLOW = 79.67%

90 PERCENT DESIGN SPEED = SCAR NO 11  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69003.445 R.P.M.  
 157.1627 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0010

PERCENT SPAN FROM TIP (I.P.)	W1 (M/SEC)	W2 (M/SEC)	W3 (M/SEC)	W4 (M/SEC)	W5 (M/SEC)	W6 (M/SEC)	W7 (M/SEC)	W8 (M/SEC)	W9 (M/SEC)	W10 (M/SEC)	
0.00	73.17	652.01	1.31	0.00	131.00	0.00	0.00	0.00	131.00	176.78	433.97
0.00	72.01	639.76	1.23	0.00	130.05	0.00	0.00	0.00	130.05	174.66	419.35
25.00	69.12	606.23	1.21	0.00	129.79	0.00	0.00	0.00	129.79	174.33	377.55
50.00	66.75	579.76	1.17	0.00	129.15	0.00	0.00	0.00	129.15	167.64	364.76
75.00	64.72	556.09	1.10	0.00	128.76	0.00	0.00	0.00	128.76	163.71	360.45
100.00	61.73	527.38	0.98	0.00	128.15	0.00	0.00	0.00	128.15	153.34	273.39
100.00	59.32	503.02	0.91	0.00	131.12	0.00	0.00	0.00	130.17	125.70	219.32

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7735

PERCENT SPAN FROM TIP (I.P.)	U1 (M/SEC)	U2 (M/SEC)	U3 (M/SEC)	U4 (M/SEC)	U5 (M/SEC)	U6 (M/SEC)	U7 (M/SEC)	U8 (M/SEC)	U9 (M/SEC)	U10 (M/SEC)	
0.00	13.07	313.13	222.45	135.43	62.3	17.62	17.62	17.62	17.62	17.62	410.40
13.00	13.07	313.13	222.45	141.50	64.8	174.01	174.01	174.01	174.01	174.01	394.14
30.00	13.07	313.13	222.45	138.71	66.9	131.36	131.36	131.36	131.36	131.36	360.47
50.00	13.07	313.13	222.45	143.37	72.0	207.14	207.14	207.14	207.14	207.14	337.41
67.10	13.07	313.13	222.45	154.97	77.1	217.94	217.94	217.94	217.94	217.94	307.59
87.00	13.07	313.13	222.45	190.82	83.4	216.65	216.65	216.65	216.65	216.65	276.22
100.00	13.07	313.13	222.45	205.71	88.7	210.00	210.00	210.00	210.00	210.00	254.20

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I.P.)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	D FACTOR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTOR PRESS RATIO	MOTOR ADIABATIC EFF	MOTOR POLYTROPIC EFF
0.00	15.47	4.444	0.1745	0.2576	0.222	1.524	0.6568	0.6764
9.40	11.54	4.786	0.1728	0.2643	0.256	1.531	0.664	0.6839
25.10	12.11	5.006	0.1806	0.1717	0.367	1.574	0.744	0.8000
41.23	12.51	5.164	0.1845	0.0409	0.174	1.640	0.804	0.9144
59.75	12.73	5.249	0.1851	0.243	0.066	1.681	0.8718	0.9738
87.00	12.47	5.514	0.1859	0.1103	0.254	1.714	0.9208	0.9266
100.00	12.00	6.443	0.1908	0.1426	0.266	1.714	0.9207	0.9265

MOMENTUM AVG. MOTOR PRESS RATIO = 1.6179  
 MASS AVERAGE TEMPERATURE RISE = 1.1766



UNDA SMALL AXIAL COMPRESSION TEST 3 JULIF 29 1974 (CONTINUED TEMP.)

STATOR PERFORMANCE UNDER SMALL AXIAL COMPRESSION (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SERIAL NO 11

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .900H

PERCENT SPAN FROM TIP (L. S.)	DELTA S (IN)	V3 (FT/SEC)	V33 (FT/SEC)	M3	V43 (FT/SEC)	V43 (FT/SEC)	U3 (FT/SEC)
0.00	39.77	711.00	916.21	.809	543.58	547.55	1324.34
11.50	31.05	724.89	925.23	.810	545.77	545.47	1274.13
23.00	22.25	738.30	934.01	.811	548.47	548.16	1167.09
34.50	13.45	751.20	942.58	.814	551.39	549.50	1100.20
46.00	4.65	763.70	950.94	.815	554.12	549.57	1014.48
57.50	-4.15	775.80	959.11	.815	556.18	574.01	917.45
69.00	-13.00	787.50	967.10	.814	557.66	574.19	834.27

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9140

PERCENT SPAN FROM TIP (L. S.)	DELTA S (IN)	V4 (FT/SEC)	V44 (FT/SEC)	M4	V44 (FT/SEC)	V44 (FT/SEC)	U4 (FT/SEC)
0.00	-7.50	615.20	-77.19	.514	615.20	615.49	1319.70
11.50	-7.50	628.11	-77.52	.520	623.50	623.43	1273.20
23.00	-7.50	640.30	-77.80	.524	629.81	629.53	1176.70
34.50	-7.50	651.15	-78.02	.527	636.37	636.24	1122.51
46.00	-2.05	660.15	-78.19	.527	642.92	642.57	1047.15
57.50	2.05	667.15	-78.20	.527	649.38	649.79	953.18
69.00	7.77	671.20	-78.16	.526	655.37	655.37	872.63

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. S.)	SPAN FROM TIP (IN)	INCIDENCE ANGLE (DEG)	INCIDENCE MEAN SURF NORM (DEG)	D FACTOR	O-RING HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATION POLYTROPIC EFF
0.00	0.00	62.43	3.848	.8931	.0499	.0179	19.650	1.507	1.1943	.8305
11.50	11.29	63.56	4.230	.8795	.0479	.0166	19.037	1.514	1.1943	.8403
23.00	22.25	64.60	4.619	.8570	.0471	.0260	10.833	1.542	1.1755	.7502
34.50	33.00	65.67	5.006	.8223	.0416	.0219	9.201	1.606	1.1668	.7577
46.00	43.75	66.71	5.389	.7736	.0342	.0218	7.624	1.618	1.1744	.6750
57.50	54.50	67.71	5.760	.7183	.0280	.0218	6.021	1.594	1.1804	.6037
69.00	65.25	68.64	6.126	.6673	.0226	.0462	21.465	.597	1.1803	.5703

MOMENTUM AVERAGE STAGE EFFICIENCY = .7989 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .7850 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.5771

MASS AVERAGE TEMPERATURE RISE = 1.1766

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 11

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC HLOSSAGE = .9008

PERCENT SPAN FROM TIP (T. P.)	BETA 3 (DEG)	V1 (M/SEC)	V13 (M/SEC)	M3	VM3 (M/SEC)	VZ1 (M/SEC)	U3 (M/SEC)
0.00	37.77	217.53	137.19	.606	167.21	145.37	604.98
11.75	41.99	220.45	135.05	.610	166.95	146.34	309.35
30.75	37.65	212.74	141.00	.624	165.46	138.64	350.71
48.00	33.24	220.02	146.25	.711	206.21	206.98	335.37
66.31	32.46	222.51	146.15	.755	212.40	211.71	304.21
84.52	41.25	212.47	147.14	.805	208.23	205.44	274.61
100.00	43.23	241.61	137.62	.843	212.54	206.71	261.90

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC HLOSSAGE = .9140

PERCENT SPAN FROM TIP (T. P.)	BETA 4 (DEG)	V4 (M/SEC)	V14 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-2.53	147.73	-4.27	.515	147.54	147.54	601.94
11.75	-2.73	140.23	-4.34	.520	140.04	140.02	348.07
30.75	-2.35	139.23	-4.14	.554	144.06	147.40	354.75
48.00	-2.63	15.45	-10.15	.609	215.61	215.34	342.14
66.31	-1.47	212.50	-5.73	.621	214.43	214.31	314.17
84.52	2.66	216.90	11.12	.607	216.22	215.43	273.50
100.00	2.77	217.64	10.50	.611	217.44	217.44	272.04

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (T. P.)	DELTA BETA (DEG)	DELTA BETA (DEG)	INCLINER ANGLE (DEG)	FACTUM	OMEGA	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STAGE TEMP. RATIO	STATOR POLYTROPIC EFF.
0.00	0.00	42.30	3.444	0.911	0.644	0.017	14.640	1.507	1.104	0.705
11.75	11.66	43.56	4.456	0.744	0.674	0.016	14.037	1.514	1.104	0.603
30.75	30.77	37.70	0.17	0.570	0.741	0.020	10.833	1.542	1.1755	0.752
48.00	70.06	37.93	-2.521	0.223	0.710	0.019	9.291	1.604	1.1644	0.777
66.31	62.02	37.64	-3.524	0.147	0.612	0.032	4.624	1.614	1.1444	0.758
84.52	44.02	19.27	-1.710	0.146	0.190	0.019	14.212	1.514	1.1806	0.637
100.00	100.00	40.64	-1.443	0.073	0.142	0.042	21.465	1.507	1.1803	0.6703

MOMENTUM AVERAGE STATOR EFFICIENCY = .7919 (POLYTROPIC)  
 MOMENTUM AVERAGE STATOR EFFICIENCY = .7436 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS. RATIO = 1.5771  
 MASS AVERAGE TEMPERATURE RISE = 1.1766

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.9710 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 81.1716  
 70 PERCENT DESIGN SPEED = SC4V NO 12  
 EQUIVALENT SPEED = 6914.901 RPM  
 EQUIVALENT FLOW / INLET ANN AREA = 32.8360 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9995

PERCENT SPAN FROM TIP (L. F.)	HTA*1 (INCH)	V*1 (FT/SEC)	HTA1 (INCH)	V1 (FT/SEC)	M1	V*1 (FT/SEC)	V*2 (FT/SEC)	V*1 (FT/SEC)	U1
0.00	72.00	1475.06	0.00	433.96	0.00	0.00	438.94	424.82	1125.06
9.40	71.71	1355.05	0.00	444.22	0.00	0.00	449.22	434.51	1328.05
25.34	69.71	1246.60	0.00	445.73	0.00	0.00	445.73	476.40	1246.40
41.02	67.25	1130.65	0.00	447.16	0.00	0.00	447.16	495.56	1130.65
64.21	1100.70	999.27	0.00	402.37	0.00	0.00	442.37	442.20	999.27
74.30	61.42	947.08	0.00	453.31	0.00	0.00	453.31	447.22	931.55
100.00	54.03	721.04	0.00	433.17	0.00	0.00	436.17	421.35	721.04

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7700

PERCENT SPAN FROM TIP (L. F.)	HTA*2 (INCH)	V*2 (FT/SEC)	HTA2 (INCH)	V2 (FT/SEC)	M2	V*2 (FT/SEC)	V*2 (FT/SEC)	V*2 (FT/SEC)	U2
0.00	57.03	1100.37	36.71	735.38	0.27	434.41	593.34	574.25	1370.58
11.54	53.27	1052.02	36.23	767.75	0.29	434.41	620.94	607.38	1304.02
31.74	49.45	1001.15	36.39	784.72	0.32	434.45	650.64	644.43	1206.15
44.04	43.11	950.27	37.44	732.31	0.27	434.42	694.22	694.19	1109.04
67.37	37.05	900.50	37.44	674.93	0.23	434.62	720.04	714.74	1010.22
87.74	21.14	792.25	36.25	555.74	0.14	617.57	729.42	717.64	900.20
100.00	13.15	744.73	42.32	447.64	0.16	605.03	730.24	705.44	835.69

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP (INCH)	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR AUTARATIC EFF	POLYTROPIC EFF
0.00	0.00	4.043	4.575	0.1676	0.62	1.515	0.6593	0.706
9.40	11.55	4.174	4.402	0.176	-0.974	1.510	0.6740	0.647
25.34	30.7	4.024	7.571	0.1674	-0.61	1.511	0.7107	0.625
41.02	49.07	4.433	4.025	0.1477	0.135	1.061	0.7248	0.745
64.21	67.37	4.774	5.074	0.1295	4.361	1.077	0.731	0.750
87.74	87.74	10.031	5.015	0.1251	11.537	1.127	0.442	0.404
100.00	100.00	10.077	4.003	0.1249	20.705	1.122	0.622	0.464

ROTOR EFFICIENCY = 0.573 (POLYTROPIC)  
 ROTOR EFFICIENCY = 0.4471 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6190  
 MASS AVERAGE TEMPERATURE WISE = 1.1338

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIV LEAF FLOW TIP = 1.5485 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 41.1716  
 90 PERCENT DESIGN SPEED = SCAR NO 12  
 EQUIVALENT SPEED = 69144.901 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 160.3194 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9995

PERCENT SPAN FROM TIP (L. F.)	U1 (M/SEC)	V1 (M/SEC)	W1 (M/SEC)	U2 (M/SEC)	V2 (M/SEC)	W2 (M/SEC)	U3 (M/SEC)	V3 (M/SEC)	W3 (M/SEC)
0.00	22.04	436.16	0.00	131.79	0.00	0.00	0.00	113.70	179.49
2.00	71.71	416.18	0.00	136.92	0.00	0.00	0.00	136.92	172.44
4.00	94.71	374.90	0.00	161.05	0.00	0.00	0.00	144.05	145.33
6.00	98.26	344.62	0.00	151.56	0.00	0.00	0.00	151.56	344.62
8.00	99.21	337.81	0.00	147.03	0.00	0.00	0.00	147.03	304.27
10.00	91.49	293.67	0.00	131.17	0.00	0.00	0.00	131.17	253.46
100.00	504.04	250.05	0.00	120.96	0.00	0.00	0.00	120.96	214.43

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7700

PERCENT SPAN FROM TIP (L. F.)	U4 (M/SEC)	V4 (M/SEC)	W4 (M/SEC)	U5 (M/SEC)	V5 (M/SEC)	W5 (M/SEC)	U6 (M/SEC)	V6 (M/SEC)	W6 (M/SEC)
0.00	57.03	237.14	0.00	224.14	137.41	0.00	0.00	140.84	175.03
11.55	53.94	250.27	0.00	210.52	130.66	0.00	0.00	149.27	165.13
20.74	61.42	211.40	0.00	240.40	135.77	0.00	0.00	194.34	197.15
30.00	61.11	170.10	0.00	251.69	134.94	0.00	0.00	211.00	211.59
40.77	54.02	159.11	0.00	264.20	123.81	0.00	0.00	219.72	214.07
47.76	21.10	105.15	0.00	291.31	148.23	0.00	0.00	222.33	214.67
100.00	13.15	220.58	0.00	301.05	202.70	0.00	0.00	222.50	215.02

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	DELTA T (C)	DELTA T (M/SEC)	DELTA T (M/SEC)	DELTA T (M/SEC)	DELTA T (M/SEC)	DELTA T (M/SEC)	DELTA T (M/SEC)	DELTA T (M/SEC)	DELTA T (M/SEC)
0.00	0.00	15.25	4.043	41.575	0.512	0.512	0.662	1.515	0.543
2.00	11.55	17.73	4.754	44.402	0.535	0.535	-0.974	1.530	0.540
4.00	30.74	17.26	4.027	47.571	0.525	0.525	-0.631	1.541	0.520
6.00	40.00	23.15	4.433	6.625	0.000	0.000	0.000	1.641	0.295
8.00	67.37	23.16	4.774	5.403	0.000	0.000	0.000	1.677	0.475
10.00	87.44	40.22	10.031	5.015	0.251	0.251	11.537	1.721	0.482
100.00	100.00	45.86	10.077	4.003	0.248	0.248	20.205	1.722	0.464

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.6574 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.6073 (ADIABATIC)  
 MOMENTUM AVG. MOTOR PRESS RATIO = 1.6140  
 MASS AVERAGE TEMPERATURE RISE = 1.1738

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAM NO 12

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8906

PERCENT SPAN FROM TIP (L. T.)	DELTA S (IN)	V1 (FT/SEC)	V01 (FT/SEC)	M1	V03 (FT/SEC)	V04 (FT/SEC)	V05 (FT/SEC)	U3
0.00	0.00	777.22	647.31	.615	567.02	567.02	567.02	1331.05
11.51	2.610	739.30	606.60	.611	573.83	573.83	573.83	1276.96
22.99	5.330	701.55	627.33	.676	637.16	637.16	637.16	1197.27
34.51	8.050	629.55	601.01	.774	689.25	689.25	689.25	1103.05
46.01	10.770	560.00	501.04	.760	706.72	706.72	706.72	1015.22
57.51	13.490	477.76	407.31	.817	703.65	703.65	703.65	918.42
69.00	16.210	388.59	308.52	.854	714.62	714.62	714.62	801.02

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9076

PERCENT SPAN FROM TIP (L. T.)	DELTA S (IN)	V4 (FT/SEC)	V04 (FT/SEC)	M4	V04 (FT/SEC)	V04 (FT/SEC)	V04 (FT/SEC)	U4
0.00	0.00	662.03	-40.71	.542	640.77	640.77	640.77	1321.40
11.51	2.610	633.71	-10.44	.553	652.46	652.46	652.46	1275.91
22.99	5.330	609.01	-17.02	.590	686.24	686.24	686.24	1199.30
34.51	8.050	717.14	-41.25	.637	736.03	736.03	736.03	1125.37
46.01	10.770	745.84	-14.04	.645	745.67	745.67	745.67	1041.76
57.51	13.490	732.82	10.12	.628	737.75	737.75	737.75	965.74
69.00	16.210	737.89	10.73	.633	737.81	737.81	737.81	917.50

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. T.)	DELTA S (IN)	INCIDENCE ANGLE (DEG)	FACTOR	O/FGA MAX	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STAGE EFF.	STATOR POLYTROPIC EFF.
0.00	0.00	1.951	.3500	.0490	.0176	18.590	1.498	1.1907	.7981
11.51	2.610	2.214	.3535	.0503	.0202	13.072	1.509	.1907	.7712
22.99	5.330	-1.235	.3201	.0775	.0254	10.978	1.569	1.1721	.7073
34.51	8.050	-3.236	.2937	.0733	.0274	8.747	1.605	1.1641	.7191
46.01	10.770	-4.125	.3054	.1200	.0347	4.962	1.613	1.1633	.6213
57.51	13.490	-3.243	.3734	.2200	.0266	12.722	1.514	1.1741	.6289
69.00	16.210	-2.748	.3031	.2068	.0223	19.534	1.547	1.1740	.6057

STATOR AVERAGE STAGE EFFICIENCY = .6086 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7937 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS. RATIO = 1.5733  
MASS AVERAGE TEMPERATURE RISE = 1.1738

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OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR ILSI 3 JUNE 23, 1974 (COMBINED IMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 12

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8906

PERCENT SPAN FROM TIP (T. I.)	UETA 1 (DEG)	VJ (M/SEC)	VJ3 (M/SEC)	MJ	VM3 (M/SEC)	VJ4 (M/SEC)	UJ (M/SEC)
0.00	11.27	229.13	130.34	.615	172.93	170.91	405.71
11.51	11.10	225.10	127.12	.631	174.90	174.61	399.22
30.53	10.43	219.21	121.93	.676	176.21	174.81	391.88
44.51	9.83	212.45	115.70	.724	210.04	209.93	336.21
66.96	9.37	204.10	107.90	.760	215.41	214.67	309.74
87.73	9.02	213.87	113.30	.817	215.08	214.17	279.94
100.00	91.40	214.22	116.69	.854	219.34	213.24	262.44

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9076

PERCENT SPAN FROM TIP (T. I.)	UETA 4 (DEG)	V4 (M/SEC)	V43 (M/SEC)	M4	VM4 (M/SEC)	V44 (M/SEC)	U4 (M/SEC)
0.00	-1.57	175.69	-17.25	.542	195.31	195.31	402.76
11.51	-3.55	174.23	-17.16	.553	190.07	190.45	389.20
30.53	-2.71	210.01	-17.96	.590	204.77	204.64	355.57
44.51	-4.21	214.59	-12.57	.637	224.34	224.11	343.01
67.73	-1.14	227.33	-4.57	.645	227.28	227.14	320.00
86.15	.7	223.36	3.09	.628	223.34	222.53	296.30
100.00	.03	224.74	3.27	.633	224.76	224.76	274.65

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (T. I.)	INCIDENCE ANGLE (DEG)	INCIDENCE ANGLE SUCT SUR (DEG)	INCIDENCE ANGLE STAG SUR (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAG PRESS RATIO	STATOR POLYTROPIC EFF
0.00	41.06	1.951	-1.971	.0490	14.570	1.1907	.7941
11.51	42.66	2.914	-2.20	.0543	13.022	1.509	.7712
30.53	40.10	-1.235	-6.530	.0775	10.474	1.569	.7073
44.51	37.02	-3.336	-6.927	.0733	8.787	1.607	.7141
66.96	46.51	-6.125	-6.970	.047	9.942	1.613	.6213
87.73	39.44	-1.053	-4.550	.0209	12.322	1.589	.5254
100.00	41.05	-2.748	-6.189	.0200	19.534	1.597	.6057

MOMENTUM AVERAGE STAGE EFFICIENCY = .9084 (POLYTROPIC)  
 MASS AVERAGE TEMPERATURE RISE = 1.1738

11454 SMALL AXIAL COMPRESSOR TEST 3 JUIF 25 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW (CFM) = 2.9922 LBM/SEC EQUIVALENT SPEED = SCAN NO J3  
 EQUIVALENT FLOW / INLET AREA = 69147.619 MM.M.  
 EQUIVALENT FLOW / INLET AREA = 33.0485 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9945

PERCENT SPEED (U.S.)	U1 (FT/SEC)	U2 (FT/SEC)	U3 (FT/SEC)	U4 (FT/SEC)	U5 (FT/SEC)	U6 (FT/SEC)	U7 (FT/SEC)	U8 (FT/SEC)	U9 (FT/SEC)	U10 (FT/SEC)	U11 (FT/SEC)	U12 (FT/SEC)	U13 (FT/SEC)	U14 (FT/SEC)	U15 (FT/SEC)	U16 (FT/SEC)	U17 (FT/SEC)	U18 (FT/SEC)	U19 (FT/SEC)	U20 (FT/SEC)
0.00	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82
2.5	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82
5.0	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82
7.5	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82
10.0	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82	1477.82

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7634

PERCENT SPEED (U.S.)	U1 (FT/SEC)	U2 (FT/SEC)	U3 (FT/SEC)	U4 (FT/SEC)	U5 (FT/SEC)	U6 (FT/SEC)	U7 (FT/SEC)	U8 (FT/SEC)	U9 (FT/SEC)	U10 (FT/SEC)	U11 (FT/SEC)	U12 (FT/SEC)	U13 (FT/SEC)	U14 (FT/SEC)	U15 (FT/SEC)	U16 (FT/SEC)	U17 (FT/SEC)	U18 (FT/SEC)	U19 (FT/SEC)	U20 (FT/SEC)
0.00	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34
2.5	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34
5.0	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34
7.5	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34
10.0	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34	57.34

MOTOR PERFORMANCE DATA

PERCENT SPEED (U.S.)	U1 (FT/SEC)	U2 (FT/SEC)	U3 (FT/SEC)	U4 (FT/SEC)	U5 (FT/SEC)	U6 (FT/SEC)	U7 (FT/SEC)	U8 (FT/SEC)	U9 (FT/SEC)	U10 (FT/SEC)	U11 (FT/SEC)	U12 (FT/SEC)	U13 (FT/SEC)	U14 (FT/SEC)	U15 (FT/SEC)	U16 (FT/SEC)	U17 (FT/SEC)	U18 (FT/SEC)	U19 (FT/SEC)	U20 (FT/SEC)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MOTOR AVERAGE EFFICIENCY = 0.6015 (POLYTROPIC)  
 MOTOR AVERAGE EFFICIENCY = 0.6040 (ADIABATIC)

MOMENTUM AVG. MOTOR PRESS RATIO = 1.6201  
 MASS AVERAGE TEMPERATURE RISE = 1.1128

HASA SMALL AXIAL COMPRESSOR TEST 3 JUN 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE HASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW = 1.0573 KMG/SEC  
 PERCENT EFFICIENCY = 81.0249  
 90 PERCENT DESIGN SPEED = SCV NU 13  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 6917.619 K.G.P.M.  
 161.3449 KG/SEC-SU M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .1445

PERCENT SPAN FROM TIP (L. I.)	W	VW	W/F	V	W/F	W	VW	W/F	M1	VW1	VW1	W1	VW1	W1	VW1
(L. I.)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)
0.01	7.27	63.001	1.254	0.00	134.66	0.00	4.02	134.66	434.63	134.66	134.66	134.66	134.66	134.66	134.66
0.45	71.10	63.005	1.305	0.00	137.04	0.00	4.12	137.04	434.33	137.04	137.04	137.04	137.04	137.04	137.04
2.50	684.25	63.013	1.323	0.00	142.13	0.00	4.67	142.13	374.75	142.13	142.13	142.13	142.13	142.13	142.13
5.16	684.04	63.049	1.310	0.00	154.58	0.00	4.58	154.58	354.15	154.58	154.58	154.58	154.58	154.58	154.58
8.82	684.00	63.035	1.313	0.00	144.11	0.00	4.44	144.11	303.66	144.11	144.11	144.11	144.11	144.11	144.11
10.45	614.20	63.011	1.344	0.00	144.14	0.00	4.16	144.14	233.09	144.14	144.14	144.14	144.14	144.14	144.14
10.00	237.41	214.91	1.759	0.00	133.79	0.00	4.00	133.79	214.91	133.79	133.79	133.79	133.79	133.79	133.79

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .1634

PERCENT SPAN FROM TIP (L. I.)	W	VW	W/F	V	W/F	W	VW	W/F	M2	VW2	VW2	W2	VW2	W2	VW2
(L. I.)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)
0.00	57.12	461.25	4.00	35.37	275.46	130.74	6.53	184.27	174.11	184.27	184.27	184.27	184.27	184.27	184.27
11.50	534.27	464.21	4.17	35.27	237.22	136.46	6.64	191.69	149.45	191.69	191.69	191.69	191.69	191.69	191.69
30.00	410.04	410.04	4.04	34.24	244.28	134.97	6.94	204.27	204.27	204.27	204.27	204.27	204.27	204.27	204.27
40.00	422.02	244.17	4.01	32.04	254.48	134.02	7.34	216.44	214.03	216.44	216.44	216.44	216.44	216.44	216.44
47.87	348.25	214.14	3.80	32.72	270.71	144.34	7.81	222.34	221.72	222.34	222.34	222.34	222.34	222.34	222.34
67.25	214.24	184.17	3.70	34.43	291.83	147.30	8.45	223.74	220.11	223.74	223.74	223.74	223.74	223.74	223.74
100.00	134.25	230.25	4.70	42.00	301.44	201.64	8.77	224.07	216.41	224.07	224.07	224.07	224.07	224.07	224.07

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. I.)	W	VW	W/F	V	W/F	W	VW	W/F	MOMENTUM AVG. MOTOR PRESS RATIO	MASS AVERAGE TEMPERATURE RISE
(L. I.)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)	(M/SEC)		
0.01	63.00	154.87	0.444	44.40	154.85	245.0	0.503	1.511	0.644	6.035
2.50	11.71	134.05	4.257	44.352	244.3	245.0	0.522	1.530	0.865	7.024
25.00	30.44	144.60	4.214	44.41	134.0	134.0	0.291	1.540	0.914	5.420
40.00	44.40	214.2	4.214	44.403	134.0	134.0	0.119	1.693	0.983	4.424
61.14	70.24	224.34	4.203	44.774	144.0	144.0	0.064	1.630	0.974	4.744
74.25	92.24	194.24	4.204	44.322	114.0	114.0	0.193	1.715	0.944	4.430
100.00	100.00	45.33	4.257	44.640	108.4	108.4	0.224	1.715	0.934	4.431

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.015 (POLYTROPIC)  
 MASS AVERAGE MOTOR EFFICIENCY = 0.540 (ADIABATIC)



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OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 3 JUN 25 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAL NO 13

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8851

PERCENT SPAN FROM TIP (L. 1)	ETA 3 (DEC)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
10.0	17.44	726.79	441.83	.620	577.08	570.74	1331.88
11.5	14.14	745.07	440.52	.637	585.50	585.44	1277.91
13.0	10.84	742.30	440.45	.607	654.56	654.53	1108.50
14.5	7.54	816.06	451.49	.730	697.40	697.45	1104.85
16.0	4.24	872.05	501.39	.765	712.09	709.47	1017.07
17.5	0.94	928.27	502.18	.810	706.48	696.99	918.97
19.0	0.71	985.07	542.12	.853	720.45	700.55	801.55

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9042

PERCENT SPAN FROM TIP (L. 1)	ETA 4 (DEC)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
10.0	11.61	674.09	310.09	.554	622.73	622.73	1322.22
11.5	8.31	666.77	317.14	.565	665.42	665.34	1276.08
13.0	5.01	714.01	310.30	.605	704.16	703.87	1200.00
14.5	1.71	740.70	310.09	.650	744.01	744.02	1125.92
16.0	0.41	757.05	272.22	.655	756.49	756.07	1050.34
17.5	0.27	735.74	4.27	.631	735.76	733.07	966.08
19.0	0.27	740.94	0.00	.630	740.01	740.01	918.00

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. 1)	SPR (DEC)	DELTA ETA (DEC)	INCIDENCE ANGLE (DEG)	U FACTOR	OMEGA HAM	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATION POLYTROPIC EFF
10.0	0.0	43.85	1.121	1.121	0.491	0.177	18.770	1.496	1.1845	0.763
11.5	11.27	41.51	1.901	1.901	0.521	0.215	14.700	1.504	1.1845	0.760
13.0	30.27	30.84	2.713	2.713	0.581	0.289	10.644	1.552	1.1700	0.661
14.5	60.27	10.24	4.413	4.413	0.749	0.279	9.022	1.007	1.1622	0.791
16.0	67.27	31.04	4.229	4.229	1.205	0.289	1.313	1.011	1.1460	0.764
17.5	60.27	12.24	3.734	3.734	0.299	0.208	12.070	1.576	1.1773	0.472
19.0	100.00	41.24	2.722	2.722	0.254	0.254	14.164	1.575	1.1773	0.5918

MOMENTUM AVG. STAGE EFFICIENCY = .8813 (POLYTROPIC)  
 MASS AVERAGE TEMPERATURE RISE = 1.1728

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SERIAL NO 13

INLET VELOCITY DIAPHRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8851

PERCENT SPAN FROM TIP (I. I.)	W1 (M/SEC)	V1 (M/SEC)	VU1 (M/SEC)	W2 (M/SEC)	V2 (M/SEC)	VU2 (M/SEC)	U3 (M/SEC)
0.00	177.73	192.67	136.00	175.89	173.94	136.00	402.94
11.50	227.24	241.49	136.00	174.75	174.64	136.00	349.48
31.50	261.49	273.40	136.00	199.50	199.50	136.00	362.25
47.50	273.40	285.40	136.00	217.59	217.59	136.00	336.64
66.50	285.40	297.40	136.00	216.05	216.05	136.00	310.01
87.50	297.40	309.40	136.00	215.33	215.33	136.00	280.10
100.00	309.40	321.40	136.00	219.59	219.59	136.00	262.60

EXIT VELOCITY DIAPHRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9042

PERCENT SPAN FROM TIP (I. I.)	W4 (M/SEC)	V4 (M/SEC)	VU4 (M/SEC)	W5 (M/SEC)	V5 (M/SEC)	VU5 (M/SEC)	U4 (M/SEC)
0.00	192.67	211.04	148.95	198.95	194.05	148.95	403.01
11.50	241.49	241.49	202.82	202.82	202.79	202.82	399.13
31.50	273.40	273.40	218.63	218.63	218.54	218.63	362.76
47.50	285.40	285.40	224.51	224.51	224.27	224.51	343.14
66.50	297.40	297.40	230.58	230.58	230.45	230.58	320.14
87.50	309.40	309.40	226.26	226.26	226.04	226.26	298.46
100.00	321.40	321.40	225.74	225.74	225.74	225.74	279.83

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. I.)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SWT SUM (DEG)	FACTUM	DELTA HAM	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE POLYTROPIC EFF
0.00	40.28	1.121	-2.802	.1404	.0491	.0177	14.770	1.494	1.1885
11.50	41.51	1.291	-1.174	.3304	.0621	.0215	13.200	1.504	1.1725
31.50	36.94	-7.215	-7.913	.1023	.0931	.0289	10.644	1.552	1.1700
47.50	38.27	-4.413	-7.404	.2400	.0754	.0229	9.022	1.507	1.1622
66.50	34.04	-4.724	-7.101	.2124	.1285	.0309	13.313	1.611	1.1440
87.50	32.95	-1.834	-4.739	.3695	.2239	.0509	12.020	1.574	1.1773
100.00	31.24	-2.222	-4.363	.3493	.2154	.0545	14.169	1.575	1.1773

STATOR AVERAGE STAGE EFFICIENCY = .8083 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7957 (ADIABATIC)  
 STAGE PRESS RATIO = 1.5709  
 MASS AVERAGE TEMPERATURE RISE = 1.1728

NASA SMALL AXIAL COMPRESSOR TEST 3 JUMP 25s 1/4 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9905

Table with columns: PERCENT TIP FLOW, PERCENT TIP FLOW, VELOCITY (FT/SEC), METAL VELOCITY (FT/SEC), VU1 VELOCITY (FT/SEC), M1, VM1 VELOCITY (FT/SEC), VZ1 VELOCITY (FT/SEC), J1.

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .7639

Table with columns: PERCENT TIP FLOW, VELOCITY (FT/SEC), METAL VELOCITY (FT/SEC), VU2 VELOCITY (FT/SEC), M2, VM2 VELOCITY (FT/SEC), VZ2 VELOCITY (FT/SEC), J2.

ROTOR PERFORMANCE DATA

Table with columns: PERCENT TIP FLOW, INCIDENCE ANGLE, FACTOR, LOSS PARAMETER, DEVIATION ANGLE, ROTOR PRESS. RATIO, ROTOR POLYTROPIC EFF, POLYTROPIC EFF.

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE DATA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.0000 KG/SEC = 69163.455 (L.P.M.)  
 PERCENT DESIGN EQUIVALENT FLOW = 0.000000  
 90 PERCENT DESIGN SPEED - SCALING 14  
 FLOW/ALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 166.5407 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.905

PERCENT SPAN FROM TIP (L. F.)	VELOCITY (M/SEC)	BETA (DEG)	VI (M/SEC)	VUI (M/SEC)	M1	VMI (M/SEC)	V/1 (M/SEC)	U1 (M/SEC)
0.00	439.97	0.00	137.23	0.00	0.10	137.23	137.41	439.97
4.00	413.20	0.00	147.01	0.00	0.21	140.61	140.01	413.20
20.00	377.14	0.00	152.05	0.00	0.54	152.05	149.85	377.14
40.00	360.56	0.00	154.34	0.00	0.70	154.34	154.44	360.56
60.00	336.73	0.00	151.73	0.00	0.55	151.73	151.68	300.28
80.00	281.33	0.00	162.56	0.00	0.27	142.54	140.65	221.33
100.00	250.74	0.00	136.93	0.00	0.09	136.93	137.27	219.83

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.7639

PERCENT SPAN FROM TIP (L. F.)	VELOCITY (M/SEC)	BETA (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	VMP (M/SEC)	V/2 (M/SEC)	U2 (M/SEC)
0.00	172.54	14.12	227.36	125.33	0.54	192.04	145.90	617.86
11.21	257.24	17.54	243.46	131.37	0.61	205.57	201.04	398.05
31.00	237.22	31.55	267.94	124.72	0.70	211.50	209.74	350.74
40.00	207.99	31.31	257.19	133.65	0.81	219.74	219.73	300.61
60.00	151.04	34.91	269.54	154.26	0.74	221.04	220.34	307.49
80.00	97.31	36.77	293.26	175.57	0.55	236.98	231.05	172.48
100.00	60.77	39.04	300.49	188.01	0.41	235.04	227.05	254.78

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	MASS FLOW (KG/S)	EFFICIENCY (%)	INCIDENCE ANGLE (DEG)	FACTOR	CHARGE MASS	LOSS PARAMETER (DEG)	DEVIATION ANGLE (DEG)	MOTOR PRESS RATIO	ADJACENT EFF	POLYTROPIC EFF
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
0.00	12.17	10.76	0.00	0.00	0.00	0.00	0.00	1.42	0.73	0.69
20.00	31.00	12.00	6.00	0.00	0.00	0.00	0.00	1.57	0.70	0.65
40.00	50.00	12.00	6.00	0.00	0.00	0.00	0.00	1.57	0.70	0.65
60.00	71.00	12.00	6.00	0.00	0.00	0.00	0.00	1.57	0.70	0.65
80.00	90.00	12.00	6.00	0.00	0.00	0.00	0.00	1.57	0.70	0.65
100.00	100.00	12.00	6.00	0.00	0.00	0.00	0.00	1.57	0.70	0.65

MOTOR PERFORMANCE DATA  
 MOMENTUM AVGS. MOTOR PRESS. RATIO = 1.0025  
 MASS AVERAGE TEMPERATURE RISE = 1.0060

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (CONTINUED TP 2)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT URSPIN SPEED - SCAN NO 14

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8700

PERCENT SPAN FROM TIP (L. S.)	DELTA J (LBS)	V3 (FT/SEC)	V03 (FT/SEC)	M3	VM3 (FT/SEC)	VE3 (FT/SEC)	U3 (FT/SEC)
0.00	3.010	753.70	623.39	.647	623.85	617.00	1341.41
11.00	11.45	700.61	441.47	.672	643.54	642.44	1276.88
30.00	31.22	515.90	431.74	.711	642.55	642.35	1136.60
40.00	31.22	419.20	440.20	.746	716.19	725.69	1100.02
60.00	36.42	417.69	502.39	.771	719.68	717.05	1010.96
80.00	36.43	441.14	502.13	.834	753.32	743.21	914.12
100.00	37.08	471.20	599.52	.864	764.52	743.40	861.25

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8904

PERCENT SPAN FROM TIP (L. S.)	DELTA W (LBS)	V4 (FT/SEC)	V04 (FT/SEC)	M4	VM4 (FT/SEC)	VE4 (FT/SEC)	U4 (FT/SEC)
0.00	7.447	759.94	572.59	.693	736.73	736.73	1321.75
11.00	7.447	700.93	519.54	.652	756.69	756.59	1276.23
30.00	7.447	512.91	527.35	.689	791.45	791.14	1200.84
40.00	7.447	417.11	500.49	.719	819.16	818.12	1129.76
60.00	7.447	407.61	600.36	.703	811.25	804.70	1030.32
80.00	7.447	467.91	767.91	.665	767.90	745.10	905.74
100.00	7.447	473.35	810.10	.670	773.36	773.36	917.74

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. S.)	DELTA (LBS)	DELTA (LBS)	INCIDENCE ANGLE (DEG)	LOSS FACTOR	OMEGA (BAR)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR LOSS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	38.33	-2.155	.2514	.0306	.0142	17.710	1.477	1.1806	-.0463
11.00	11.24	38.07	-1.713	.2496	.0579	.0272	17.151	1.439	1.1806	-.0321
30.00	30.13	35.47	-2.467	.2190	.0746	.0285	9.777	1.554	1.1641	-.0777
40.00	29.49	35.17	-2.507	.2087	.0420	.0291	8.056	1.543	1.1551	-.0752
60.00	11.34	34.21	-4.730	.2592	.1673	.0479	6.816	1.557	1.1727	-.1179
80.00	10.11	36.66	-2.682	.2341	.0442	.0400	12.702	1.501	1.1452	-.1449
100.00	10.00	37.77	-2.556	.2454	.0314	.0277	19.003	1.501	1.1452	-.1129

MOMENTUM AVERAGE STATOR EFFICIENCY = .7949 (POLYTROPIC) MOMENTUM AVG. STATOR PRESS RATIO = 1.5359  
 MASS AVERAGE STAGE EFFICIENCY = .7143 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.1060

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

YU PERCENT DESIGN SPEED - SERIAL NO 14

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = 0.0700

PERCENT TIP FILLET (L/D)	DELTA 3 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4 (1/SEC)	VM4 (1/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	34.30	279.04	174.04	0.647	190.15	149.06	405.41
11.00	14.45	217.07	134.36	0.672	146.15	105.41	309.14
30.00	31.93	240.71	131.61	0.711	211.03	211.01	361.60
50.00	31.22	250.83	134.17	0.740	221.34	221.14	355.24
60.16	30.42	267.07	153.13	0.771	219.36	218.54	309.14
80.76	30.13	276.06	171.95	0.834	229.61	226.53	278.62
100.00	30.00	290.02	182.50	0.864	233.03	226.54	262.51

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = 0.0904

PERCENT TIP FILLET (L/D)	DELTA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4 (1/SEC)	VM4 (1/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	30.07	279.24	171.55	0.633	224.56	228.56	402.47
11.00	30.07	211.33	131.94	0.652	210.04	190.41	309.04
30.00	23.62	241.60	134.44	0.699	241.25	241.14	355.77
50.00	23.74	250.27	142.22	0.714	249.04	249.02	343.14
60.16	24.61	266.11	161.90	0.703	244.41	245.27	320.14
80.76	24.17	274.09	171.00	0.865	244.06	273.00	294.37
100.00	23.00	285.72	182.50	0.870	235.72	275.72	274.73

STATOR PERFORMANCE DATA

PERCENT TIP FILLET (L/D)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	DELTA SUBT (DEG)	OMEGA R/R	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE TEMP RATIO	STATION POLYTROPIC EFF
0.00	30.00	-2.125	-0.077	0.514	0.012	17.710	1.477	1.1406	-0.963
11.00	34.00	-1.733	-0.002	0.246	0.232	12.141	1.499	1.1406	-0.921
30.00	32.33	-0.079	-7.408	0.190	0.255	4.177	1.544	1.1441	-0.977
50.00	35.17	0.507	0.507	0.047	0.251	0.054	1.541	1.1541	-0.952
60.16	39.21	-4.730	-7.408	0.202	0.474	0.416	1.557	1.1427	-0.974
80.76	36.00	-5.042	-0.527	0.331	0.048	11.702	1.501	1.1442	-0.949
100.00	37.00	-0.556	-0.497	0.194	0.077	14.003	1.501	1.1442	-0.924

MOYENTUM AVERAGE STATOR EFFICIENCY = 0.909 (POLYTROPIC)  
 MOMENTUM AVERAGE STATOR EFFICIENCY = 0.7143 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.5459  
 MASS AVERAGE TEMPERATURE RISE = 1.1060

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.4277 LB/SEC 70 PERCENT DESIGN SPEED = SCALING 15 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 66.2824 EQUIVALENT FLOW / INLET ANN AREA = 53965.374 R.P.M.  
 26.8130 LB/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0244

PERCENT SPAN FROM TIP (I. L.)	DELTA1 (DEG)	V01 (FT/SEC)	DELTA1 (DEG)	VI (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SEC)	V21 (FT/SEC)	U1 (FT/SEC)
0.00	72.00	1164.03	1111.00	349.74	0.00	0.14	346.70	315.61	1111.80
0.13	71.01	1110.28	1000.44	144.00	0.00	0.21	356.04	303.07	1000.54
25.05	69.55	1040.71	774.21	342.78	0.00	0.37	342.74	375.74	774.21
41.03	66.17	769.17	686.44	391.58	0.00	0.55	391.58	340.32	686.44
54.41	64.15	671.07	643.03	380.72	0.00	0.45	380.72	340.58	643.03
63.55	61.24	744.44	653.08	394.47	0.00	0.32	394.47	353.08	653.08
100.00	58.44	680.17	562.54	345.50	0.00	0.13	345.50	333.76	562.54

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.8041

PERCENT SPAN FROM TIP (I. L.)	DELTA2 (DEG)	V02 (FT/SEC)	DELTA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V42 (FT/SEC)	V22 (FT/SEC)	U2 (FT/SEC)
0.00	54.72	719.34	767.47	551.49	201.87	0.83	474.50	459.31	1054.29
11.32	54.01	671.99	777.17	594.84	294.90	0.52	516.59	503.30	1072.06
24.04	51.55	647.32	663.55	597.59	281.88	0.52	525.73	525.43	945.43
47.74	47.00	707.05	567.31	624.89	302.69	0.54	566.09	566.09	870.00
66.07	37.26	711.04	430.50	671.02	300.58	0.56	565.91	554.24	791.08
87.89	23.40	658.80	261.59	744.32	440.91	0.67	604.04	594.70	702.51
100.00	16.28	630.76	176.87	764.01	475.11	0.68	605.45	584.88	531.98

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. L.)	DELTA (DEG)	DELTA (DEG)	MASS FLOW (MG)	DELTA (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTION PRESS RATIO	MOTION POLYTROPIC EFF
0.00	0.00	13.75	6.840	8.372	0.327	1.890	1.244	0.875
11.32	11.32	16.90	4.540	8.252	0.281	1.659	1.267	0.732
24.04	24.04	17.00	4.414	7.377	0.206	0.709	1.230	0.807
47.74	47.74	20.11	4.227	6.404	0.174	0.036	1.319	0.756
53.26	66.07	26.80	4.570	5.812	0.283	0.205	1.349	0.974
83.55	87.89	37.84	4.775	4.780	0.250	-0.143	1.444	1.019
100.00	100.00	42.16	4.690	3.816	0.197	-0.018	1.544	1.019

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.8964 (POLYTROPIC) MOMENTUM AVG. ROTOR PRESS RATIO = 1.3173  
 MASS AVERAGE MOTOR EFFICIENCY = 0.8923 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.0917

ORIGINAL PAGE IS OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 3 JUN 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.1012 KG/SEC 70 PERCENT DESIGN SPEED - SCAN NO 15  
 PERCENT DESIGN EQUIVALENT FLOW = 66.2824 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 53345.3/4 R.P.M.  
 130.9173 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0244

PERCENT SPAN FROM TIP (L. S.)	V01 (M/SEC)	V091 (M/SEC)	M01	BETA1 (DEG)	V1 (M/SEC)	VUI (M/SEC)	M1	V01 (M/SEC)	VMI (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	72.04	30.88	1.054	0.00	105.70	0.00	.314	105.70	105.70	102.29	335.44
0.31	71.31	323.25	1.012	0.00	100.11	0.00	.321	104.11	104.11	104.57	323.25
25.05	54.57	276.04	.949	0.00	114.67	0.00	.347	116.67	116.67	114.53	276.04
41.04	62.17	275.19	.873	0.00	114.35	0.00	.355	119.35	119.35	114.97	276.19
54.34	60.15	259.46	.792	0.00	116.04	0.00	.365	116.04	116.04	114.00	234.46
64.52	27.07	197.06	.575	0.00	107.26	0.00	.325	107.26	107.26	107.79	199.06
100.00	201.22	171.46	.597	0.00	105.31	0.00	.313	105.31	105.31	101.73	171.46

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8041

PERCENT SPAN FROM TIP (T. S.)	V02 (M/SEC)	VU02 (M/SEC)	M02	BETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V02 (M/SEC)	V02 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	54.42	240.01	.805	30.71	164.25	05.91	.483	164.04	164.04	140.00	325.92
11.12	54.01	221.08	.786	27.72	141.31	09.80	.523	157.44	157.44	156.02	311.53
24.00	51.35	204.26	.769	24.14	132.15	05.92	.524	140.61	140.61	154.61	286.17
41.16	46.06	172.42	.699	20.47	140.47	47.26	.554	166.63	166.63	166.62	265.17
60.67	37.26	131.22	.631	32.50	109.53	109.91	.596	172.40	172.40	171.94	241.12
87.09	23.40	79.73	.548	36.10	73.09	134.39	.667	184.23	184.23	141.27	214.12
100.00	16.24	53.91	.544	38.12	73.58	144.61	.689	184.54	184.54	174.27	194.72

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING TRAILING EDGE	LOSS FLOW (PCF)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTOR	OMEGA (RPM)	PARAMETER	LOSS ANGLE (DEG)	DEVIATION ANGLE (DEG)	MINOR PRESS	ADJACENT POLYTRONIC
0.00	2.00	17.75	4.040	4.112	.3027	.1490	.0371	1.931	1.244	.6653	.5755
9.33	11.52	16.90	4.340	4.252	.2981	.1659	.0344	1.300	1.267	.7241	.7332
25.05	24.74	17.00	4.414	4.377	.2906	.0709	.0147	1.109	1.270	.8425	.8467
41.04	47.76	20.11	4.229	4.404	.2822	.0113	.0036	3.364	1.319	.9766	.9756
54.34	60.57	26.84	4.570	4.412	.2743	.0215	.0045	6.034	1.369	.9764	.9774
64.52	87.44	37.84	4.775	4.790	.2630	-.0143	-.0031	13.684	1.324	1.0114	1.0109
100.00	100.00	42.16	4.690	4.610	.1947	-.0116	-.0036	23.336	1.344	1.0114	1.0109

MULTIPLIER AVERAGE ROTOR EFFICIENCY = .4964 (POLYTRONIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .4923 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR PRESS RATIO = 1.3173  
 MASS AVERAGE TEMPERATURE RISE = 1.0917



NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAM NO 15

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8919

PERCENT SPAN FROM TIP (L. F.)	H/LTA 3 (DEG)	V3 (FT/SEC)	V3J (FT/SEC)	M3	V3J3 (FT/SEC)	V3J3 (FT/SEC)	V2J3 (FT/SEC)	V2J3 (FT/SEC)
0.00	33.76	568.44	241.24	.499	488.76	488.76	443.33	443.33
11.00	33.42	596.65	302.07	.524	514.33	514.33	513.68	513.68
22.00	27.67	617.08	382.09	.546	548.76	548.76	546.75	546.75
40.00	27.00	648.47	304.02	.576	572.78	572.78	572.36	572.36
67.00	31.42	686.81	358.08	.611	586.10	586.10	543.46	543.46
77.00	34.44	733.67	431.08	.673	617.80	617.80	609.51	609.51
100.00	38.13	781.67	460.00	.700	631.33	631.33	613.89	613.89

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9443

PERCENT SPAN FROM TIP (L. F.)	H/LTA 4 (DEG)	V4 (FT/SEC)	V4J (FT/SEC)	M4	V4J4 (FT/SEC)	V4J4 (FT/SEC)	V2J4 (FT/SEC)	V2J4 (FT/SEC)
0.00	35.17	529.42	47.71	.463	527.27	527.27	527.27	527.27
11.00	35.18	546.75	49.32	.473	544.52	544.52	544.46	544.46
30.00	37.51	571.50	54.00	.504	568.86	568.86	548.81	548.81
40.00	40.47	611.58	47.04	.541	608.72	608.72	609.09	609.09
67.00	44.24	639.29	47.84	.566	637.49	637.49	637.14	637.14
77.00	46.20	653.25	37.15	.577	652.19	652.19	649.41	649.41
100.00	48.48	677.38	39.85	.580	656.17	656.17	646.17	646.17

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	INCLINE (DEG)	INCIDENCE (DEG)	SUCT. SUM (DEG)	FACTUR	OMEGA (RPM)	LOSS PARAMETER	DEVIATION (DEG)	STAGE MASS FLOW (LBS)	STAGE PRESS. RATIO	STAGE POLYTROPIC EFF.
0.00	0.00	35.07	-3.075	.2843	10000	.0012	17.010	1.243	1.0966	.9772
11.00	11.00	35.59	-5.754	.2880	10000	.0192	11.395	1.255	1.0966	.9597
22.00	22.00	33.13	-8.924	.2545	10000	.0212	7.694	1.275	1.0854	.9758
40.00	40.00	32.44	-9.658	.2711	10000	.0165	7.531	1.307	1.0844	.9250
67.00	67.00	35.71	-7.339	.2349	10000	.0207	6.411	1.328	1.0914	.9322
77.00	77.00	31.84	-7.271	.2651	10000	.0448	14.792	1.336	1.0992	.8175
100.00	100.00	32.66	-8.501	.2756	10000	.0401	22.175	1.336	1.0992	.9416

MOMENTUM AVERAGE STAGE EFFICIENCY = .8581 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE PRESS. RATIO = 1.3019  
MASS AVERAGE TEMPERATURE RISE = 1.0917

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 29, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 15

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8919

PERCENT SPAN FROM TIP (L. E.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.10	3.070	173.20	88.47	.498	149.97	167.11	316.52
11.11	30.42	141.46	97.07	.523	156.83	156.57	308.13
29.16	27.57	144.09	97.20	.546	166.65	146.65	283.93
46.94	27.46	147.65	92.67	.576	174.58	174.45	256.01
63.93	31.42	209.34	107.13	.611	174.64	177.93	242.83
81.51	35.94	279.72	131.58	.673	183.31	185.78	218.71
100.00	36.13	238.25	140.48	.760	192.43	197.11	204.75

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9443

PERCENT SPAN FROM TIP (L. E.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-5.17	161.37	-14.54	.463	140.71	140.71	318.73
11.25	-5.19	166.65	-15.03	.478	165.97	165.97	303.41
30.97	-5.51	174.19	-16.73	.504	173.34	173.31	295.35
47.46	-4.47	186.41	-14.52	.541	185.84	185.65	267.68
67.23	-4.27	194.85	-14.58	.566	194.31	194.20	249.66
84.11	3.26	174.11	11.32	.577	198.79	198.09	244.59
100.00	3.43	200.37	12.15	.500	200.00	200.00	218.18

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP (L. E.)	TRAILING EDGE	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	INCIDENCE ANGLE (DEG)	FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION (DEG)	STATOR PRESS. RATIO	STAGE TEMP. RATIO	STATOR EFF
0.00	0.00	0.00	-5.615	-4.538	2443	.0034	.0012	17.619	1.243	1.0966	1.0966	.4772
11.09	11.26	11.26	-7.754	-4.106	2090	.0456	.0192	11.395	1.255	1.0966	1.0966	.6197
29.16	30.07	30.07	-8.424	-12.701	2545	.0647	.0212	7.633	1.275	1.0966	1.0966	.2950
46.94	46.43	46.43	-9.658	-12.671	2711	.0474	.0145	7.591	1.307	1.0966	1.0966	.6256
63.93	67.23	67.23	-9.938	-10.438	2349	.0723	.0207	6.911	1.324	1.0966	1.0966	.5322
81.51	84.11	84.11	-7.271	-10.184	2651	.1696	.0948	14.792	1.334	1.0992	1.0992	.6175
100.00	100.00	100.00	-8.501	-11.942	2464	.1584	.0901	22.175	1.336	1.0992	1.0992	.5416

MOMENTUM AVERAGE STAGE EFFICIENCY = .8581 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8527 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS. RATIO = 1.3019  
 MASS AVERAGE TEMPERATURE RISE = 1.0917

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.1550 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 50.8309  
 70 PERCENT DESIGN SPEED = SCRU NO 16  
 EQUIVALENT SPEED = 539AS-954 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 23.4010 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0478

PERCENT SPAN FROM TIP (I. S.)	DELTA TIP (INCH)	W1 (FT/SEC)	WU1 (FT/SEC)	W2 (FT/SEC)	WU2 (FT/SEC)	M1	M2	V1 (FT/SEC)	V2 (FT/SEC)	U1
0.00	7.004	115.021	1110.73	1.041	0.000	0.000	0.275	304.72	294.91	1110.23
9.45	7.072	110.715	1080.28	0.999	0.000	0.000	0.282	311.72	301.51	1080.24
24.74	7.172	103.013	970.05	0.933	0.000	0.000	0.303	335.01	324.00	970.03
41.07	7.290	92.000	833.86	0.846	0.000	0.000	0.319	362.07	341.00	833.86
58.80	7.410	77.000	670.70	0.733	0.000	0.000	0.331	392.00	368.31	670.70
77.74	7.530	59.000	490.00	0.540	0.000	0.000	0.344	424.00	404.00	490.00
100.00	7.650	38.000	300.00	0.350	0.000	0.000	0.358	458.00	440.00	300.00

3000 RPM AVERAGE MOTOR DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0478

PERCENT SPAN FROM TIP (I. S.)	DELTA TIP (INCH)	W1 (FT/SEC)	WU1 (FT/SEC)	W2 (FT/SEC)	WU2 (FT/SEC)	M1	M2	V1 (FT/SEC)	V2 (FT/SEC)
0.00	7.004	115.021	1110.73	1.041	0.000	0.000	0.275	304.72	294.91
9.45	7.072	110.715	1080.28	0.999	0.000	0.000	0.282	311.72	301.51
24.74	7.172	103.013	970.05	0.933	0.000	0.000	0.303	335.01	324.00
41.07	7.290	92.000	833.86	0.846	0.000	0.000	0.319	362.07	341.00
58.80	7.410	77.000	670.70	0.733	0.000	0.000	0.331	392.00	368.31
77.74	7.530	59.000	490.00	0.540	0.000	0.000	0.344	424.00	404.00
100.00	7.650	38.000	300.00	0.350	0.000	0.000	0.358	458.00	440.00

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA TIP (INCH)	MASS FLOW (LBM)	INCIDENCE ANGLE (DEG)	W FACTOR	OMEGA (RPM)	PARAMETER	LOSS ANGLE (DEG)	DEVIATION ANGLE (DEG)	MOTOR PRESS. RATIO	MOTOR ANTIADABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	10.041	10.173	0.432	0.224	0.950	0.448	1.321	0.021	0.943
9.45	11.40	11.70	11.074	10.379	0.459	0.259	0.915	1.259	1.304	0.449	0.927
24.74	31.30	30.00	11.043	9.023	0.479	0.182	0.768	2.154	1.323	0.404	0.701
41.07	64.02	44.74	11.048	4.174	0.497	0.105	0.624	2.707	1.357	0.400	0.800
58.80	67.33	60.30	12.451	8.721	0.440	0.158	0.635	4.052	1.042	0.441	0.859
83.14	87.00	89.10	12.073	7.002	0.457	0.157	0.631	10.940	1.015	0.471	0.906
100.00	100.00	100.00	12.400	6.042	0.432	0.130	0.603	14.035	1.016	0.472	0.906

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.830 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.825 (ADIABATIC)  
 MOMENTUM AVG. MOTOR PRESS. RATIO = 1.3566  
 MASS AVERAGE TEMPERATURE RISE = 1.1101

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW = 0.9775 KG/SEC 70 PERCENT DESIGN SPEED - SCAM NO 16  
 PERCENT DESIGN EQUIVALENT FLOW = 56.0369 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET AREA = 51965.946 R.P.M.  
 EQUIVALENT FLOW / INLET AREA = 116.2064 KG/SEC-SQ M

INLET VELOCITY DYNAMICS DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0078

PERCENT SPAN FROM TIP (L. P.)	VE1 (M/SEC)	VE1A1 (DEG)	VE1 (M/SEC)	VE1 (M/SEC)	VE1 (M/SEC)	VE1 (M/SEC)	VE1 (M/SEC)	VE1 (M/SEC)
0.00	74.28	0.00	92.48	0.00	0.275	92.00	89.89	339.01
0.05	71.02	0.00	93.01	0.00	0.282	45.01	91.90	323.17
0.10	67.74	0.00	93.33	0.00	0.293	102.29	100.43	297.50
0.15	64.46	0.00	93.57	0.00	0.310	104.57	104.23	271.64
0.20	61.18	0.00	93.75	0.00	0.310	101.63	101.54	240.53
0.25	57.90	0.00	93.85	0.00	0.294	95.72	94.44	199.35
0.30	54.62	0.00	93.88	0.00	0.273	92.29	89.15	171.53

EXIT VELOCITY DYNAMICS DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.7891

PERCENT SPAN FROM TIP (L. P.)	VE2 (M/SEC)	VE2A2 (DEG)	VE2 (M/SEC)	VE2 (M/SEC)	VE2 (M/SEC)	VE2 (M/SEC)	VE2 (M/SEC)	VE2 (M/SEC)
0.00	57.84	0.733	34.13	174.50	107.75	0.496	132.84	320.05
0.05	54.56	0.676	30.86	172.37	112.77	0.490	130.37	311.54
0.10	51.28	0.619	27.59	170.04	117.47	0.503	126.11	281.47
0.15	48.00	0.562	24.32	167.71	122.16	0.544	120.65	263.67
0.20	44.72	0.505	21.05	165.38	126.85	0.605	117.10	240.16
0.25	41.44	0.448	17.78	163.05	131.54	0.649	113.34	214.32
0.30	38.16	0.391	14.51	160.72	136.23	0.676	109.13	190.80

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP EDGE	DELTA (DEG)	INCIDENCE (DEG)	SUCT SUM (DEG)	FACTON	LOSS PARASITEN	DEVIATION ANGLE (DEG)	MOTION PRESS RATIO	MOTION PRESS RATIO	ROTOR POLYTROPIC EFF
0.00	16.84	10.041	10.373	0.942	0.0450	0.044	1.371	0.821	0.643
0.05	16.84	11.074	10.379	0.939	0.0515	1.759	1.104	0.844	0.627
0.10	16.84	12.107	9.423	0.937	0.0348	2.154	1.323	0.849	0.701
0.15	16.84	13.140	8.467	0.935	0.0219	2.707	1.357	0.868	0.820
0.20	16.84	14.173	7.511	0.933	0.0035	3.052	1.402	0.841	0.949
0.25	16.84	15.206	6.554	0.931	0.0231	10.990	1.415	0.971	0.908
0.30	16.84	16.239	5.597	0.929	0.0783	19.035	1.416	0.972	0.936

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.830 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.827 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.056  
 MASS AVERAGE TEMPERATURE RISE = 1.1101

NASA SMALL AXIAL COMPRESSOR TEST 1 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 16

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC MLOSSAGE = .9416

PERCENT SPA / FROM TIP (L. F.)	HE1A 3 (UEN)	V1 (FT/SEC)	VU3 (FT/SEC)	M3	VH3 (FT/SEC)	V23 (FT/SEC)	U3 (FT/SEC)
0.00	41.70	547.22	30.002	.473	408.58	408.58	1033.06
11.71	43.74	579.77	374.72	.658	369.41	369.41	995.90
31.31	41.02	563.01	369.54	.690	424.75	424.75	921.74
49.27	30.10	612.69	377.90	.537	441.97	441.97	826.10
67.57	31.13	613.84	405.55	.543	535.68	535.68	741.32
87.77	41.27	713.21	408.90	.629	519.27	519.27	710.97
100.00	44.69	745.02	521.98	.660	531.59	531.59	672.01

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC MLOSSAGE = .9375

PERCENT SPA / FROM TIP (L. F.)	HE1A 4 (UEN)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VH4 (FT/SEC)	V24 (FT/SEC)	U4 (FT/SEC)
0.00	22.53	455.21	-20.09	.391	454.76	454.76	1031.32
11.71	22.58	471.64	-20.32	.393	451.18	451.18	995.35
31.31	25.79	460.16	-20.01	.378	454.26	454.26	925.01
49.27	26.32	435.91	-31.08	.449	514.94	514.94	876.88
67.57	26.08	440.15	-40.03	.447	558.11	558.11	818.00
87.77	30.73	544.47	30.24	.482	553.24	553.24	753.20
100.00	30.83	558.09	37.27	.485	556.84	556.84	716.09

STATOR PERFORMANCE DATA

PERCENT SPA / FROM TIP (L. F.)	MASS FLOW (LBS)	DELTA PETA (DLG)	INCIDENCE ANGLE (DEG)	SUCT SUM (LBS)	FACTOR	HAN	OMEGA	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STAGE TEMP. RATIO	STATION POLYTROPIC EFF.
0.00	0.00	0.00	7.300	1.458	.4230	.0725		.0225	17.650	1.304	1.1212	.8130
11.71	11.71	48.37	4.603	6.77	.4091	-.0141		-.0064	11.957	1.307	1.1212	1.0476
31.31	30.75	46.61	4.336	1.082	.4114	.0508		.0167	9.568	1.313	1.1091	.8503
49.27	44.74	41.82	2.268	-7.210	.3500	.0241		.0086	8.448	1.350	1.1038	.9130
67.57	67.57	37.81	-2.429	-7.205	.3347	.0676		.0194	10.422	1.342	1.1028	.8091
87.77	89.11	34.53	1.003	-1.904	.3023	.1194		.0315	15.280	1.376	1.1123	.7375
100.00	100.00	40.45	-.154	-3.593	.4050	.1103		.0278	22.524	1.376	1.1124	.7941

MOMENTUM AVERAGE STAGE EFFICIENCY = .8179 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8100 (ADIABATIC)  
MOMENTUM AVO. STAGE PRESS. RATIO = 1.3491  
MASS AVERAGE TEMPERATURE RISE = 1.1101

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OF POOR QUALITY

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SLASH NO 16

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9416

PERCENT SPAN FROM TIP (U.S.)	ETA 3 (U.S.)	V7 (M/SEC)	V03 (M/SEC)	M3	V43 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	0.170	146.79	110.75	.673	174.56	173.17	316.64
11.71	47.77	161.67	115.74	.650	117.60	117.41	303.55
31.97	91.02	171.61	117.69	.690	179.87	179.86	281.01
49.97	33.10	186.68	115.18	.537	146.90	146.40	261.33
67.97	37.13	206.74	121.61	.593	163.28	162.68	241.20
87.77	43.27	217.34	149.02	.679	158.27	158.15	218.50
100.00	66.94	227.08	159.10	.660	162.03	157.55	206.63

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9375

PERCENT SPAN FROM TIP (U.S.)	ETA 4 (U.S.)	V4 (M/SEC)	V04 (M/SEC)	M4	V44 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	72.53	138.75	86.17	.791	144.61	138.61	318.35
11.91	72.58	137.06	86.19	.380	137.52	137.50	303.34
31.53	31.53	140.25	88.78	.198	139.94	139.32	286.99
49.97	31.52	157.23	91.05	.647	156.93	156.74	267.27
67.97	31.60	170.12	101.02	.487	170.12	170.02	249.33
87.77	31.75	169.00	111.04	.482	168.64	168.03	224.57
100.00	31.63	170.11	111.36	.485	169.73	169.73	218.26

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TRAILING EDGE	MASS FLOW (MG)	DELTA HETA (U.S.)	INCIDENCE ANGLE (DEG)	SUCT SUR (U.S.)	FACTOR	HAP	OMEGA HAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STATOR POLYTROPIC EFF
0.00	0.00	44.24	5.480	1.454	.420	.0625	.0625	0.025	19.451	1.309	1.1217
11.71	11.71	44.37	4.803	1.277	.401	-.0191	-.0049	13.957	13.957	1.307	1.1217
31.97	31.97	44.61	4.316	1.002	.414	.0508	.0167	4.544	4.544	1.313	1.1217
49.97	49.97	41.62	3.766	-.710	.1540	.0241	.0046	8.446	8.446	1.310	1.1014
67.97	67.97	37.41	-.7427	-.5.285	.1397	.0476	.0194	10.472	10.472	1.342	1.1024
87.77	87.77	39.53	1.003	-1.464	.0823	.1194	.0215	25.280	25.280	1.376	1.1223
100.00	100.00	40.65	-.154	-3.545	.4050	.1193	.0278	22.524	22.524	1.376	1.1124

MOMENTUM AVERAGE STAGE EFFICIENCY = .8179 (POLYTROPIC)  
 MASS AVERAGE STAGE EFFICIENCY = .8100 (ADIABATIC)

MOMENTUM AVERAGE STAGE PRESS. RATIO = 1.3491  
 MASS AVERAGE TEMPERATURE WISE = 1.1101

MOTOR PERFORMANCE YASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW RELATION FLOW PERCENT DESIGN FLOW = 53.8500  
 70 PERCENT DESIGN SPEED - SCAN NO 17  
 EQUIVALENT SPEED 53933.917 RPM  
 EQUIVALENT FLOW / INLET ANN AREA = 24.2144 LBM/SEC-INCH FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0461

PERCENT SPAN FROM TIP (I, J)	DELTA (DEG)	DELTA1 (DEG)	V1 (FT/SEC)	V11 (FT/SEC)	V12 (FT/SEC)	M1	V41 (FT/SEC)	V42 (FT/SEC)	V11 (FT/SEC)	J1
0.00	74.90	114.07	1111.57	0.00	310.31	0.00	310.31	300.31	1111.57	
9.97	73.37	110.00	1059.26	0.00	317.45	0.00	317.45	307.06	1059.26	
24.90	70.07	103.97	974.94	0.00	341.96	0.00	341.96	315.68	974.94	
40.37	66.37	98.87	909.87	0.00	349.59	0.00	349.59	316.46	909.87	
54.73	62.07	93.87	849.87	0.00	349.79	0.00	349.79	314.68	849.87	
69.06	57.90	87.94	787.94	0.00	320.07	0.00	320.07	315.77	787.94	
83.00	53.03	82.42	724.42	0.00	304.03	0.00	304.03	314.14	724.42	

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.7862

PERCENT SPAN FROM TIP (I, J)	DELTA2 (DEG)	DELTA1 (DEG)	V2 (FT/SEC)	V12 (FT/SEC)	V11 (FT/SEC)	M2	V42 (FT/SEC)	V41 (FT/SEC)	V12 (FT/SEC)	J2
0.00	57.77	37.57	572.26	304.82	304.82	0.446	453.81	453.81	453.81	1069.07
11.27	55.47	34.43	581.26	304.89	304.89	0.503	453.09	453.09	453.09	1021.95
20.41	52.14	31.04	577.07	303.36	303.36	0.544	450.27	450.27	450.27	962.10
28.57	48.74	28.25	580.45	302.99	302.99	0.544	449.04	449.04	449.04	900.84
37.00	45.21	26.07	584.24	300.86	300.86	0.602	447.32	447.32	447.32	835.20
45.76	41.54	24.46	585.74	299.07	299.07	0.650	446.14	446.14	446.14	782.93
54.00	37.39	24.04	582.02	297.48	297.48	0.676	446.94	446.94	446.94	721.44

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I, J)	DELTA (DEG)	DELTA1 (DEG)	DELTA2 (DEG)	DELTA (DEG)	DELTA1 (DEG)	DELTA2 (DEG)	DELTA (DEG)	DELTA1 (DEG)	DELTA2 (DEG)	DELTA (DEG)	DELTA1 (DEG)	DELTA2 (DEG)	DELTA (DEG)
0.00	0.00	0.00	10.505	10.097	0.373	0.2174	0.442	0.03	1.317	0.443	0.503	0.503	0.503
9.97	11.27	10.000	11.302	10.000	0.381	0.2304	0.447	0.14	1.313	0.443	0.5087	0.5087	0.5087
20.41	10.47	9.480	11.508	9.480	0.394	0.2462	0.445	0.191	1.291	0.443	0.507	0.507	0.507
30.85	9.31	8.796	11.525	8.796	0.370	0.2494	0.441	0.247	1.255	0.441	0.496	0.496	0.496
40.37	8.47	8.107	12.064	8.107	0.324	0.2107	0.436	0.297	1.204	0.441	0.484	0.484	0.484
50.00	7.70	7.436	12.427	7.436	0.315	0.2012	0.431	0.305	1.164	0.431	0.478	0.478	0.478
60.00	7.00	6.418	12.442	6.418	0.298	0.1938	0.425	0.315	1.116	0.431	0.468	0.468	0.468

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.654 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.386 (ADIABATIC)  
 MOMENTUM AVE. ROTOR PRESS RATIO = 1.1061  
 MASS AVERAGE TEMPERATURE RISE = 1.1082

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (CONTINUED) (IMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW PERCENT DESIGN EQUIVALENT FLOW = 59.0544  
 70 PERCENT DESIGN SPEED = SCAM NO 17  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET AREA = 5993.517 R.P.M.  
 118.251 KG/SEC-SU M

INLET VELOCITY/DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0461

PERCENT SPAN FROM TIP (L. F.)	W1*	V1*	BETA1	VI	VU1	M1	V41	V71	J1
(DEG)	(M/SEC)	(DEG)	(M/SEC)	(M/SEC)	(M/SEC)		(M/SEC)	(M/SEC)	(M/SEC)
0.00	76.40	334.01	1.062	94.58	0.00	.286	96.54	91.54	330.81
4.47	74.17	337.14	.999	94.76	0.00	.287	96.74	93.59	322.95
24.41	70.07	277.13	.944	104.23	0.00	.309	104.23	104.31	297.13
40.37	63.55	271.41	.885	100.55	0.00	.316	100.55	106.21	271.23
54.04	60.07	260.16	.776	103.57	0.00	.307	103.57	103.57	260.16
64.44	63.70	221.72	.657	97.56	0.00	.289	97.56	94.25	199.11
100.00	61.24	171.43	.579	94.07	0.00	.279	94.07	90.87	171.43

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7462

PERCENT SPAN FROM TIP (L. F.)	M2	BETA2	V2	VU2	M2	V42	V72	J2
(DEG)	(M/SEC)	(DEG)	(M/SEC)	(M/SEC)		(M/SEC)	(M/SEC)	(M/SEC)
0.00	57.74	37.53	173.42	100.26	.496	134.32	133.87	325.85
11.27	55.42	35.43	177.27	111.16	.505	134.04	134.07	311.49
40.61	276.40	37.06	174.07	100.01	.504	134.05	134.19	297.14
44.57	45.00	36.25	184.63	111.55	.544	152.11	152.11	266.09
67.04	35.21	36.07	207.53	122.20	.602	157.74	167.24	260.25
87.76	21.20	41.36	224.86	141.08	.650	164.84	164.73	214.25
100.00	17.24	44.09	212.10	141.49	.676	160.71	161.04	198.86

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	MASS FLOW (KG)	DELTA PETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUCTION (DEG)	FACTUM	OMP 34*	LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTOR MASS ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	16.41	10.565	19.097	.3773	.2174	.0447	.803	1.317	.8943
9.47	11.27	17.90	11.302	10.086	.3981	.2309	.0407	.914	1.313	.8745
26.40	30.51	14.89	11.508	9.480	.3941	.1642	.0345	1.491	1.321	.7720
40.37	40.57	23.47	11.525	8.746	.4770	.0890	.0191	2.797	1.355	.4900
54.04	67.04	31.47	12.094	8.407	.4424	.0107	.0024	4.237	1.314	.4491
67.04	87.76	42.69	12.427	7.434	.4715	.0412	.0177	11.305	1.416	.4431
100.00	100.00	44.67	12.842	6.434	.4988	.1038	.0215	14.624	1.614	.4459

MOTOR AVERAGE MOTOR EFFICIENCY = .8954 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .8388 (ADIABATIC)  
 MOTOR AVERAGE MASS FLOW RISE = 1.3501  
 MASS AVERAGE TEMPERATURE RISE = 1.1082



NASA SMALL AXIAL COMPRESSOR TEST 3 JUN 25, 1976 (COMBINED TESTS)

STATION PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 17

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = 0.9300

PERCENT SPAN FROM TIP (I. P.)	HETA 5 (DEG)	V3 (FT/SEC)	VU3	M3	VM3 (FT/SEC)	V23 (FT/SEC)	J3 (FT/SEC)
0.00	40.00	547.20	350.97	0.70	417.72	411.16	1034.24
11.41	43.04	544.21	370.10	0.75	400.00	400.00	415.04
30.07	37.70	544.00	360.42	0.72	431.50	431.50	425.05
41.77	37.00	612.00	367.00	0.77	404.25	404.25	439.37
67.00	36.02	667.49	370.30	0.81	377.34	377.34	712.25
87.77	40.33	715.00	481.04	0.82	374.39	374.39	710.51
100.00	41.50	740.35	510.32	0.82	340.04	325.70	671.01

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = 0.9450

PERCENT SPAN FROM TIP (I. P.)	HETA 4 (DEG)	V4 (FT/SEC)	VU4	M4	VM4 (FT/SEC)	V24 (FT/SEC)	J4 (FT/SEC)
0.00	20.35	400.61	180.97	0.340	400.22	440.22	1030.71
11.41	20.92	437.10	170.34	0.39	457.75	477.10	416.70
30.07	18.74	407.52	170.00	0.40	404.52	440.31	430.67
41.77	18.37	519.20	180.55	0.52	514.46	517.93	470.43
67.00	18.20	763.07	181.74	0.63	503.75	543.64	811.51
87.77	40.26	559.82	180.55	0.60	557.29	555.25	752.03
100.00	40.10	562.34	170.75	0.69	500.71	540.71	712.00

STATION PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. P.)	ANX (DEG)	HETA (DEG)	INCIDENCE ANGLE (DEG)	U FACTOR	U/MAN	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS. RATIO	STAGE TRIP	STATION POLYTROPIC EFF.
0.00	0.00	43.16	4.472	0.112	0.530	0.015	14.810	1.300	1.1194	0.153
11.41	11.71	40.40	0.042	0.131	0.494	0.104	14.114	1.304	1.1194	0.527
30.07	30.57	43.52	3.167	0.130	0.480	0.187	9.414	1.312	1.1070	0.554
41.77	41.74	40.44	0.572	0.145	0.459	0.110	0.525	1.304	1.1010	0.834
67.00	60.47	37.02	2.007	0.127	0.427	0.100	4.405	1.379	1.1014	0.110
87.77	87.14	30.11	0.972	0.134	0.324	0.354	15.770	1.372	1.1100	0.709
100.00	100.00	39.20	1.072	0.160	0.220	0.209	23.040	1.372	1.1100	0.700

MOMENTUM AVERAGE STAGE EFFICIENCY = 0.704 (POLYTROPIC)  
 MASS AVERAGE STAGE EFFICIENCY = 0.169 (ADAPTATIC)  
 MOMENTUM AVERAGE STAGE PRESS. RATIO = 1.1359  
 MASS AVERAGE TEMPERATURE RISE = 1.1082

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 17

INLET VELOCITY DIAPHRAM DATA

CALCULATED AERODYNAMIC LOSS COEFF = .9370

PERCENT SPAJ FROM TIP (I. P.)	BETA 3 (DEG)	V3 (M/SEC)	V(U)	M3	VM3 (M/SEC)	VZ3 (M/SEC)	J3 (M/SEC)
0.00	40.01	127.41	104.91	.470	126.71	125.32	316.45
11.51	41.04	127.10	114.05	.475	122.12	121.92	303.59
20.87	37.74	121.94	114.05	.492	122.14	121.13	291.96
31.73	37.04	106.54	112.97	.537	148.02	146.71	291.93
47.03	36.62	204.06	121.72	.591	163.78	163.14	291.88
67.72	42.35	217.53	146.82	.63	161.05	160.89	219.82
100.00	43.56	227.45	156.77	.662	164.45	160.29	204.71

EXIT VELOCITY DIAPHRAM DATA

CALCULATED AERODYNAMIC LOSS COEFF = .9456

PERCENT SPAJ FROM TIP (I. P.)	BETA 4 (DEG)	V4 (M/SEC)	V(U)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	J4 (M/SEC)
0.00	-2.35	140.34	-5.74	.346	140.28	140.24	316.10
11.51	-2.42	137.65	-5.84	.374	139.52	139.51	303.21
20.87	-3.74	143.11	-4.35	.400	142.80	142.74	284.73
31.73	-3.37	138.30	-4.31	.452	154.03	154.00	267.15
47.03	-1.20	171.97	-3.59	.493	171.83	171.74	244.14
67.72	4.24	170.33	12.06	.480	164.86	164.24	224.80
100.00	4.36	171.40	13.03	.489	170.41	170.21	219.13

STATOR PERFORMANCE DATA

PERCENT SPAJ FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	U FACTOR	OMEGA PARAMETER	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE LOSS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	43.16	4.442	.4112	.0536	.0215	19.430	1.206	1.2114	.8153
11.51	11.51	11.71	45.46	6.002	.4131	.0486	.0144	19.114	1.104	1.1174	.8227
30.87	30.87	30.02	41.52	3.197	.3930	.0688	.0147	9.414	1.312	1.1070	.8324
47.03	47.03	41.71	40.45	-3.674	.3875	.0359	.0110	4.575	1.346	1.1016	.8454
67.03	67.03	60.41	37.42	-2.067	.3717	.0627	.0140	4.905	1.174	1.1016	.8110
87.72	87.72	47.14	38.11	-2.817	.3736	.1326	.0349	15.776	1.172	1.1124	.7834
100.00	100.00	100.00	39.20	-1.012	.3950	.1226	.0309	23.060	1.172	1.1106	.7560

MOMENTUM AVERAGE STAGE EFFICIENCY = .8264 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8169 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.3459  
 MASS AVERAGE TEMPERATURE RISE = 1.1042

ORIGINAL PAGE IS  
OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR IFSI 3 JUNE 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

DESIGN POINT FLOW = 2.2113 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 60.5370  
 MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)  
 10 PERCENT DESIGN SPEED = 5348.00 RPM  
 EQUIVALENT FLOW / INLET ANN AREA = 24.4490 LBM/SEC-IN<sup>2</sup> FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0426

PERCENT SPAN FROM TIP (I. F.)	V01	V01*	VF1	VF1*	VU1	M1	VM1	V71	U1
(I. F.)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)
0.00	7.20	1126.46	1106.91	0.00	0.00	0.28	313.84	303.73	1106.91
9.45	7.11	1134.10	1057.12	0.93	0.00	0.29	321.05	310.55	1057.12
23.33	7.00	1031.59	971.50	0.74	0.00	0.31	330.12	330.76	971.50
40.85	6.83	924.31	856.76	0.74	0.00	0.30	343.91	342.77	856.76
57.17	6.63	820.75	749.84	0.77	0.00	0.31	368.05	343.92	749.84
73.57	6.33	727.87	651.07	0.87	0.00	0.29	372.13	319.78	651.07
100.00	6.10	646.27	561.07	0.90	0.00	0.26	312.57	301.95	561.07

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.7858

PERCENT SPAN FROM TIP (I. F.)	V02	V02*	V2	V2*	VU2	M2	VM2	V72	U2
(I. F.)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)
0.00	175.03	250.70	25.77	567.64	341.16	0.45	450.20	441.51	1000.31
11.24	174.11	247.70	602.80	583.09	350.86	0.50	467.14	452.04	1019.53
30.24	172.76	242.63	570.60	582.00	344.35	0.50	465.44	462.48	940.02
40.85	176.34	246.77	508.47	613.57	352.84	0.51	502.44	502.42	954.00
57.17	176.17	248.75	570.47	611.40	395.55	0.53	556.47	551.20	806.52
73.57	178.04	246.27	717.91	735.48	401.44	0.50	553.34	544.27	700.36
100.00	174.32	247.40	131.17	747.31	519.11	0.675	554.14	535.31	550.28

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	TORQUE (LBS-FT)	PUMP HEAD (FT)	CORRECTION FACTOR (CF)	INCLINER ANGLE (DEG)	SUCTION DUCT LOSS (INLET)	FAN FLOW (CFM)	CORRECTION FACTOR (CF)	LOSS PARAMETER	DEVIATION ANGLE		MOTOR PRESS. RATIO	MOTOR ADIABATIC EFF.	TOTAL COMPRESSION RATIO
									(INLET)	(OUTLET)			
0.00	0.00	106.35	10.30	0.00	0.00	2282	0.00	0.00	0.00	0.00	1.00	0.00	0.00
9.45	11.24	108.00	11.24	0.00	0.00	2272	0.00	0.00	0.00	0.00	1.00	0.00	0.00
23.33	30.24	105.64	10.57	0.00	0.00	1607	0.00	0.00	0.00	0.00	1.00	0.00	0.00
40.85	57.17	103.14	10.31	0.00	0.00	1662	0.00	0.00	0.00	0.00	1.00	0.00	0.00
57.17	67.17	103.14	10.31	0.00	0.00	1662	0.00	0.00	0.00	0.00	1.00	0.00	0.00
73.57	87.17	103.14	10.31	0.00	0.00	1662	0.00	0.00	0.00	0.00	1.00	0.00	0.00
100.00	100.00	103.14	10.31	0.00	0.00	1662	0.00	0.00	0.00	0.00	1.00	0.00	0.00

CORRECTION FACTOR FOR POLYTROPIC EFFICIENCY = 0.8546  
 CORRECTION FACTOR FOR ADIABATIC EFFICIENCY = 0.8461

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW = 1.0057 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 60.4376  
 ROTOR PERFORM: WCE  
 EQUIVALENT FLOW = 57805.007 K.G./SEC  
 PERCENT DESIGN EQUIVALENT FLOW / INLET ANN AREA = 119.5659  
 INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0426

PERCENT SPAN FROM TIP (L. E.)	V01 (M/SEC)	V02 (M/SEC)	W01 (M/SEC)	W02 (M/SEC)	W03 (M/SEC)	M01 (M/SEC)	M02 (M/SEC)	M03 (M/SEC)	V71 (M/SEC)	V72 (M/SEC)	V73 (M/SEC)
0.00	74.20	538.00	1.041	0.00	92.59	0.00	.283	95.04	92.58	338.00	
9.05	73.11	522.21	0.948	0.00	92.46	0.00	.290	97.84	94.65	322.21	
25.03	70.00	476.20	0.833	0.00	90.50	0.00	.313	105.50	103.56	296.20	
40.00	64.23	400.13	0.666	0.00	87.87	0.00	.320	107.57	107.57	270.13	
54.13	60.32	339.16	.775	0.00	84.86	0.00	.311	104.84	104.84	239.16	
67.57	63.54	198.65	.657	0.00	91.80	0.00	.293	98.80	97.47	198.65	
100.00	60.58	171.02	.580	0.00	95.27	0.00	.282	95.27	97.03	171.02	

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7458

PERCENT SPAN FROM TIP (L. E.)	W02 (DEG)	W03 (DEG)	W04 (DEG)	V02 (M/SEC)	V03 (M/SEC)	M02 (M/SEC)	M03 (M/SEC)	V02 (M/SEC)	V03 (M/SEC)	W02 (M/SEC)	W03 (M/SEC)
0.00	57.03	251.18	221.09	.744	36.74	174.03	103.98	.495	139.05	136.57	325.07
11.20	55.11	200.25	201.98	.703	37.64	177.97	104.77	.504	140.84	137.78	310.75
40.00	51.74	215.22	180.03	.657	36.84	177.39	105.48	.509	161.84	160.99	296.52
60.65	49.34	217.06	175.95	.624	35.24	187.63	104.40	.541	152.15	151.14	269.35
67.57	35.17	206.34	114.17	.601	35.44	207.69	120.56	.603	164.11	164.61	239.13
87.05	21.03	181.44	66.47	.528	41.02	224.56	146.74	.650	164.84	164.84	213.02
100.00	13.02	173.57	39.98	.506	44.13	231.44	148.23	.675	168.40	163.16	198.21

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA (DEG)	INCIDENCE (DEG)	INCIDENCE (DEG)	INCIDENCE (DEG)	SUCT SUM (DEG)	FACTOR	DELTA (DEG)	PARAMETER	DELTA (DEG)	DEVIATION (DEG)	MOTN PRESS RATIO	MOTN ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	10.301	9.043	9.043	.1672	.2142	.0434	.043	1.304	.6417	.6417	.6754
9.05	11.24	14.00	11.103	9.869	9.869	.1901	.2272	.0471	.103	1.309	.6414	.6414	.6957
25.03	36.34	30.75	11.257	9.221	9.221	.1607	.1607	.0311	1.559	1.319	.7811	.7811	.7095
40.00	48.05	42.19	11.241	8.547	8.547	.1642	.0774	.0165	3.033	1.340	.9021	.9021	.9062
54.13	67.27	63.34	11.726	7.917	7.917	.1334	.0094	.0002	4.404	1.395	.6990	.6990	.9991
67.57	87.05	84.22	12.077	7.081	7.081	.0590	.0590	.0128	11.866	1.413	.4579	.4579	.9598
100.00	100.00	100.00	12.126	6.052	6.052	.0754	.0754	.0156	20.369	1.413	.9579	.9579	.9599

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8544 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8481 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3517  
 MASS AVERAGE TEMPERATURE RISE = 1.1058

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT UPSIG SPEED - SCAN NO 18

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9164

PERCENT SPAN FROM TIP (L. E.)	BETA 3 (DEG)	V3 (FT/SEC)	VIII3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	39.44	552.90	371.27	.480	127.00	422.34	1035.76
11.42	41.13	550.49	366.04	.483	419.16	418.46	993.98
30.73	38.26	578.13	355.52	.501	450.82	450.81	923.73
48.54	37.70	613.84	334.18	.540	498.50	498.13	857.86
67.11	37.70	674.57	333.05	.597	547.80	547.80	790.31
87.74	41.00	718.27	472.01	.636	541.40	534.13	714.54
100.00	47.22	744.60	503.87	.665	553.91	534.61	670.00

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9430

PERCENT SPAN FROM TIP (T. E.)	BETA 4 (DEG)	V4 (FT/SEC)	VII4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-2.00	466.80	-16.29	.402	469.57	466.57	1028.25
11.41	-2.00	470.12	-16.42	.405	469.81	464.76	992.49
30.43	-1.03	480.39	-10.81	.422	475.47	485.20	912.59
48.80	-4.23	527.44	-30.46	.461	526.55	526.01	874.05
67.60	-4.03	572.25	-5.80	.501	572.21	571.90	815.79
87.13	2.27	585.44	27.03	.493	563.55	761.79	751.26
100.00	5.41	567.56	53.74	.497	567.02	567.02	713.95

STATOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PLF)	DELTA HETA (DEG)	INCIDENCE MEAN (DEG)	SUCI SUM (DEG)	FACTOR	OMEGA VAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	41.44	3.119	-8.03	.3971	.0582	.0210	20.180	1.297	1.1166	.9166
11.42	11.38	11.88	43.19	4.951	1.614	.3939	.0489	.0170	14.481	1.299	1.1166	.8491
30.43	30.43	30.75	41.80	3.840	-1.854	.3714	.0424	.0139	9.538	1.310	1.1052	.8642
48.80	48.80	49.14	39.93	-2.061	-5.050	.3345	.0326	.0100	7.745	1.340	1.0944	.8840
67.11	67.60	68.04	36.34	-3.808	-6.675	.3168	.0227	.0209	10.421	1.373	1.0997	.7733
87.74	88.13	87.22	35.81	-1.182	-4.090	.2849	.0143	.0177	10.806	1.365	1.1081	.6718
100.00	100.00	100.00	36.08	-2.341	-5.702	.2813	.0124	.0134	24.114	1.365	1.1082	.7292

MOMENTUM AVERAGE STAGE EFFICIENCY = .8096 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8224 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.1400  
 MASS AVERAGE TEMPERATURE RISE = 1.1058

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 18

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9164

PERCENT SPAN FROM TIP (L. T.)	BETA 3 (DEG)	V3 (M/SEC)	V113 (M/SEC)	M3	VM3 (M/SEC)	VZ3 (M/SEC)	J3 (M/SEC)
0.00	39.64	160.55	107.07	.480	130.17	174.74	315.70
11.47	41.13	169.62	111.57	.483	127.76	171.55	302.96
30.64	38.26	175.00	104.36	.501	137.41	177.41	281.55
44.64	35.70	187.10	109.17	.540	151.94	181.83	261.68
67.11	35.70	205.61	114.94	.597	167.97	186.36	240.19
87.74	41.04	218.93	144.07	.616	165.02	182.80	217.88
100.00	47.24	228.21	153.59	.665	169.83	184.17	204.22

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9430

PERCENT SPAN FROM TIP (L. T.)	BETA 4 (DEG)	V4 (M/SEC)	V04 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	J4 (M/SEC)
0.00	-2.00	162.30	-4.77	.402	142.21	182.21	313.91
11.38	-2.06	163.24	-5.16	.405	143.20	183.14	302.51
30.64	-3.63	168.23	-9.39	.422	147.94	187.89	284.25
44.80	-6.23	168.94	-11.00	.461	160.94	186.33	255.60
67.60	-8.68	174.42	-2.07	.501	174.41	176.32	245.65
88.13	5.27	172.50	14.86	.493	171.77	171.14	228.94
100.00	5.81	173.60	16.38	.497	172.83	172.83	217.61

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (DEG)	MASS FLOW (KG)	DELTA P18 (DEG)	INCIDENCE ANGLE (DEG)	FAC TOR	ORIGA DIA	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS (ATM)	STAGE STATOR POLYTROPIC EFF
0.00	0.00	41.04	9.114	.971	.0502	.0210	20.180	1.297	1.1180
11.47	1.04	43.17	4.551	.939	.0489	.0170	14.481	1.299	1.1148
30.64	30.75	41.04	-1.654	.714	.0624	.0139	9.548	1.310	1.1052
44.80	47.19	37.93	-2.061	.3365	.0326	.0100	7.745	1.340	1.0984
67.11	69.54	36.34	-3.808	.3168	.0727	.0209	10.421	1.373	1.0937
87.74	87.22	35.41	-1.182	.3589	.1431	.0377	16.806	1.343	1.1081
100.00	100.00	36.88	-2.311	.3813	.1320	.0334	24.114	1.365	1.1002

MOMENTUM AVERAGE STAGE EFFICIENCY = .8294 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8224 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.3400  
 MASS AVERAGE TEMPERATURE RISE = 1.1058

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.2615 LBM/SEC  
 EQUIVALENT SPEED = 53905.692 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 0.17471  
 EQUIVALENT FLOW / INLET ANN AREA = 28.9783 LBM/SEC-SQ FT

INLET VELOCITY DIAPHRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0369

PERCENT SPAW FROM TIP (L. E.)	W01 (OZ)	VUW1 (FT/SEC)	W01 METAL (OZF)	V1 (F1/F2)	VU1 (FT/SEC)	M1	V01 (FT/SEC)	V01 (FT/SEC)	J1
0.00	73.70	1170.35	1.045	570.72	0.00	.290	320.72	310.39	1110.94
4.47	72.79	1100.00	1.007	320.11	0.00	.297	328.11	317.37	1059.03
7.50	70.03	1025.00	0.917	353.79	0.00	.320	353.79	347.29	973.35
9.73	67.02	950.00	0.860	361.77	0.00	.328	361.77	340.61	947.46
12.10	65.74	901.00	0.780	351.72	0.00	.318	351.72	341.60	886.18
14.52	63.04	831.00	0.662	311.35	0.00	.300	311.35	326.90	822.57
17.00	60.34	760.00	0.544	319.57	0.00	.289	319.57	304.71	762.12

EXIT VELOCITY DIAPHRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7954

PERCENT SPAW FROM TIP (L. E.)	W02 (OZ)	VUW2 (FT/SEC)	W02 METAL (OZF)	V2 (F1/F2)	VU2 (FT/SEC)	M2	V02 (FT/SEC)	V02 (FT/SEC)	J2
0.00	57.01	807.00	0.734	570.07	324.53	.496	461.59	444.73	1088.51
11.29	55.13	810.50	0.712	500.37	349.94	.509	468.00	457.77	1021.45
16.34	51.94	761.00	0.648	500.98	340.36	.504	470.04	467.91	941.77
20.63	48.10	727.00	0.61	610.44	340.71	.563	510.30	510.27	865.71
27.11	38.77	607.00	0.609	677.31	387.42	.602	558.01	558.01	788.07
37.70	22.10	409.00	0.577	734.07	475.23	.652	560.53	551.32	702.80
100.00	13.72	137.00	0.514	759.44	512.35	.676	561.25	542.18	651.50

ROTOR PERFORMANCE DATA

PERCENT SPAW FROM TIP (L. E.)	MASS FLOW (LBS)	DELTA H/FLOW (OZ)	INCLUDENCE ANGLE (DEG)	SUCT SUR (OZF)	FACTOR U	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	16.06	10.061	9.573	.1604	.2090	0.425	.844	1.303	.6841	.6457
9.47	11.70	17.66	10.046	9.550	.1764	.2220	0.461	.120	1.303	.6841	.6457
25.10	30.91	18.08	10.044	8.855	.1721	.1935	0.315	1.763	1.311	.7853	.7434
40.74	40.03	22.34	10.043	8.034	.1504	.0807	0.142	3.273	1.363	.9135	.9170
59.14	67.11	36.14	11.238	7.549	.1240	-.0003	-.0001	4.832	1.344	1.0003	1.0003
73.00	87.70	40.98	11.017	6.542	.1243	0.030	0.116	12.119	1.409	.9610	.9628
100.00	100.00	46.66	11.623	5.555	.1211	0.067	0.138	20.976	1.409	.9610	.9627

MOMENTUM AVERAGE ROTOR EFFICIENCY = .6577 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .6516 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR PRESS RATIO = 1.3082  
 MASS AVERAGE TEMPERATURE RISE = 1.1039

(NASA SMALL AXIAL COMPRESSOR TEST) / JUNE 25, 1976 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.0228 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 61.7471

70 PERCENT DESIGN SFFD = SCAN 10 19  
 EQUIVALENT SPEED = 53905.497 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 121.9548 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0369

PERCENT SPAN FROM TIP (T. %)	HELEA1 (DEG)	VI (M/SEC)	HELEA2 (DEG)	VII (M/SEC)	M1	V41 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	73.90	357.66	130.63	97.75	0.00	97.75	96.61	334.63
9.47	72.79	337.93	322.79	109.01	0.00	109.01	96.73	322.79
25.04	70.03	315.07	296.56	107.93	0.00	107.93	105.85	296.56
40.73	67.87	292.11	270.50	110.27	0.00	110.27	107.91	270.50
54.14	65.90	267.91	239.63	110.00	0.00	110.00	107.21	239.63
67.52	63.08	223.08	198.90	101.00	0.00	101.00	105.64	198.90
100.00	60.34	197.07	171.34	97.01	0.00	97.01	97.41	171.34

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7954

PERCENT SPAN FROM TIP (T. %)	HELEA2 (DEG)	V02 (M/SEC)	HELEA1 (DEG)	V2 (M/SEC)	M2	V42 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	57.01	266.28	35.93	175.76	0.96	140.00	136.16	329.68
11.20	55.13	249.00	35.74	174.11	0.60	142.64	139.51	311.34
40.40	51.74	237.01	45.86	177.48	0.74	143.51	142.62	297.05
48.63	45.48	221.85	44.19	177.4	0.68	155.54	155.53	263.87
67.11	35.72	207.49	44.77	176.05	0.62	170.00	170.00	240.19
77.76	27.10	184.39	40.24	175.79	0.65	170.65	170.65	214.21
100.00	13.92	176.24	47.39	176.16	0.76	171.07	165.26	198.58

MOTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP TRAILING EDGE (DEG)	MASS FLOW (KGT)	DELTA HELEA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SW (DEG)	FACTOR	OMEGA MAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTION PRESS RATIO	ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	16.06	10.001	9.593	0.604	0.2090	0.425	0.44	1.303	0.841	0.957
9.47	11.29	11.70	17.65	10.806	9.550	0.376	0.226	0.461	0.120	1.303	0.841	0.957
25.04	30.47	30.47	18.04	10.894	8.855	0.3721	0.1535	0.315	1.743	1.313	0.853	0.974
40.73	48.63	49.27	22.36	10.843	8.894	0.4506	0.667	0.142	3.232	1.341	0.935	0.970
54.14	67.11	68.00	10.18	11.274	7.589	0.326	-0.0003	-0.0001	0.032	1.344	1.0003	1.0003
67.52	87.70	88.10	40.90	11.617	6.622	0.3243	0.0536	0.116	12.119	1.404	0.9410	0.9624
100.00	100.00	100.00	46.46	11.627	5.555	0.2711	0.667	0.134	20.976	1.409	0.9409	0.9627

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.9577 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.9516 (ADIABATIC)

MOMENTUM AVG. MOTOR PRESS RATIO = 1.3462  
 MASS AVERAGE TEMPERATURE RISE = 1.1039



NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 19

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9219

PERCENT SPAN FROM TIP (L. E.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	51.30	547.24	144.46	.484	438.02	473.21	1037.70
11.36	34.06	549.86	158.85	.486	429.73	429.02	925.08
30.51	37.00	575.22	148.19	.503	459.79	459.14	925.91
44.51	34.44	616.52	144.04	.543	508.20	507.42	854.93
66.91	35.74	673.11	147.54	.596	551.76	544.74	746.50
87.67	40.74	720.12	166.19	.638	548.66	541.49	716.43
100.00	41.54	750.00	197.31	.666	561.42	545.90	671.26

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9481

PERCENT SPAN FROM TIP (L. E.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-2.00	477.39	-16.66	.412	477.10	477.10	1030.17
11.36	-2.00	480.11	-17.26	.414	474.80	474.74	944.34
30.51	-4.64	497.88	-31.57	.433	496.88	496.66	934.30
44.51	-4.61	519.88	-41.51	.472	534.28	537.73	876.54
66.91	-1.08	578.58	-10.90	.507	578.48	578.16	817.54
87.67	3.21	570.46	32.51	.507	574.55	577.43	752.64
100.00	4.31	543.40	33.65	.510	582.51	542.51	713.29

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. E.)	LEADING EDGE	TRAILING EDGE	MASS FLOW (LBS)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	EXHAUST ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE POLYTROPIC EFF
0.00	0.01	0.01	0.00	40.14	1.863	-2.034	.3786	.0546	20.183	1.242	1.1145
11.36	11.34	11.34	11.79	41.92	3.087	.147	.3725	.0463	19.483	1.274	1.1144
30.51	30.41	30.41	30.41	40.64	.368	-2.910	.3479	.0307	9.532	1.306	1.102
44.51	44.74	44.74	44.27	36.44	-3.266	-6.257	.3150	.0280	7.764	1.317	1.0942
66.91	67.73	67.73	69.82	36.02	-4.540	-7.413	.3045	.0730	10.021	1.346	1.0979
87.67	88.14	88.14	84.16	37.13	-1.905	-6.817	.3456	.1351	14.743	1.364	1.1070
100.00	100.00	100.00	100.00	38.23	-3.097	-6.538	.3645	.1255	22.006	1.164	1.1069

MOMENTUM AVERAGE STAGE EFFICIENCY = .8352 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8283 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.1337  
MASS AVERAGE TEMPERATURE RISE = 1.1039

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OF POOR QUALITY

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 19

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9219

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	34.18	149.85	104.99	.686	133.51	174.04	316.29
11.34	34.86	170.64	107.36	.686	130.98	140.76	303.50
30.51	37.00	175.33	105.52	.503	140.02	140.02	282.22
46.51	34.68	147.91	107.39	.543	154.90	156.74	262.11
66.91	36.34	205.17	117.51	.590	166.18	147.56	241.55
87.67	40.38	219.49	142.09	.638	167.24	145.05	219.37
100.00	41.54	228.60	151.58	.666	171.12	146.39	206.60

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9481

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-2.00	145.51	-5.04	.412	145.82	145.42	314.00
11.34	-2.06	146.34	-5.26	.414	146.24	146.22	303.08
30.51	-3.04	141.75	-9.02	.433	151.45	151.34	284.77
46.51	-3.41	144.56	-12.05	.472	154.97	143.40	257.17
66.91	-1.01	176.35	-3.37	.507	176.32	176.22	249.19
87.67	3.21	176.92	9.91	.507	176.65	176.00	224.40
100.00	4.41	177.44	10.26	.510	177.55	177.55	218.02

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TRAILING EDGE	MASS FLOW (KGF)	DELTA P (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR (DEG)	ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	STAGE PRESS RATIO	STATION
0.00	0.00	0.00	40.14	1.863	-2.059	.576	.0596	20.180	1.292	1.1145	8122
11.34	11.14	11.70	41.92	3.097	.487	.375	.0463	14.484	1.294	1.1145	3607
30.51	30.42	30.31	40.66	3.888	-2.910	.3474	.0307	4.532	1.304	1.1027	8476
46.51	44.74	47.27	38.49	-3.266	-6.257	.190	.0290	7.564	1.317	1.0942	8430
66.91	67.53	69.62	36.02	-4.540	-7.413	.3045	.0730	10.021	1.346	1.0979	7580
87.67	88.14	87.10	37.13	-1.029	-4.817	.3456	.1351	14.743	1.344	1.1070	6454
100.00	100.00	100.00	38.23	-3.097	-6.538	.3685	.1255	22.006	1.364	1.1069	7275

MOMENTUM AVERAGE STAGE EFFICIENCY = .4352 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .4203 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.1037  
 MASS AVERAGE TEMPERATURE RISE = 1.1039

NASA SMALL AXIAL COMPRESSOR TEST 3 JULIF 25, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.2941 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 62.7440  
 70 PERCENT DESIGN SPEED = SCAN 40 20  
 EQUIVALENT FLOW / INLET ANN AREA = 5391.076 M.P.M.  
 25.3415 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0331

PERCENT SPAN FROM TIP (L. F.)	W*1 (OLES)	V*1 (FT/SEC)	V*2 (FT/SEC)	W*1 (OLES)	W*2 (OLES)	W*1 (OLES)	W*2 (OLES)	W*1 (OLES)	W*2 (OLES)	W*1 (OLES)	W*2 (OLES)	W*1 (OLES)	W*2 (OLES)	W*1 (OLES)	W*2 (OLES)
0.00	73.94	1111.09	1111.09	1.047	0.00	375.25	0.00	.295	326.24	315.74	1111.09	326.24	315.74	1111.09	326.24
2.44	72.51	1110.53	1059.18	1.004	0.00	331.77	0.00	.295	333.77	327.84	1059.18	333.77	327.84	1059.18	333.77
4.88	69.70	1037.53	973.17	.940	0.00	360.01	0.00	.326	360.01	351.40	973.17	360.01	351.40	973.17	360.01
7.32	67.44	932.73	880.50	.870	0.00	461.21	0.00	.334	341.21	347.02	880.50	341.21	347.02	880.50	341.21
9.76	65.41	802.71	719.43	.811	0.00	557.97	0.00	.374	357.97	357.97	719.43	357.97	357.97	719.43	357.97
12.20	63.66	731.93	671.47	.864	0.00	537.28	0.00	.305	337.28	337.28	671.47	337.28	337.28	671.47	337.28
14.64	62.24	649.51	565.18	.837	0.00	523.30	0.00	.294	325.30	325.30	565.18	325.30	325.30	565.18	325.30

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7956

PERCENT SPAN FROM TIP (L. F.)	W*1 (OLES)	V*1 (FT/SEC)	V*2 (FT/SEC)	W*1 (OLES)	W*2 (OLES)	W*1 (OLES)	W*2 (OLES)	W*1 (OLES)	W*2 (OLES)	W*1 (OLES)	W*2 (OLES)	W*1 (OLES)	W*2 (OLES)	W*1 (OLES)	W*2 (OLES)
0.00	57.74	670.05	747.93	.763	34.77	571.09	325.68	.497	464.13	454.02	1068.01	464.13	454.02	1068.01	464.13
11.32	55.10	829.74	880.85	.723	37.66	585.49	340.74	.509	474.09	464.51	1021.39	474.09	464.51	1021.39	474.09
22.64	51.94	774.40	807.30	.679	34.77	582.48	331.75	.510	476.77	475.74	941.05	476.77	475.74	941.05	476.77
33.96	45.15	739.41	526.35	.633	33.03	620.08	337.98	.547	519.88	519.88	864.33	519.88	519.88	864.33	519.88
45.28	35.81	690.18	403.85	.612	34.46	674.30	382.83	.601	554.94	554.94	786.67	554.94	554.94	786.67	554.94
56.60	27.01	625.54	234.41	.550	34.82	748.36	463.80	.662	575.44	570.44	701.00	575.44	570.44	701.00	575.44
67.92	14.44	594.70	149.59	.535	43.84	767.62	501.97	.664	540.74	541.01	551.56	540.74	541.01	551.56	540.74

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	INCIDENCE ANGLE (DEG)	SUCT SUM (OLES)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	AVG. PRESS. RATIO	MOTOR EFF.	POLYTROPIC EFF.
0.00	4.87	9.331	.0414	.739	1.294	.6844	.6844
9.46	11.22	9.272	.0450	.899	1.294	.6844	.6844
24.13	30.39	8.534	.0295	1.707	1.307	.7941	.7941
40.42	48.79	7.732	.0106	3.254	1.342	.9361	.9361
56.60	61.13	7.153	-.0030	5.294	1.341	1.0032	1.0032
72.88	61.13	6.117	.0001	12.656	1.414	.9991	.9991
100.00	100.00	5.118	.0015	21.496	1.416	.9991	.9991

MOMENTUM AVERAGE MOTOR EFFICIENCY = .4701 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .8646 (ADIABATIC)  
 MOMENTUM AVG. MOTOR PRESS. RATIO = 1.3431  
 MASS AVERAGE TEMPERATURE RISE = 1.1015

ROTOR PERFORMANCE: NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW HEIGHT FLOW = 1.0476 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 62.7660  
 70 PERCENT DESIGN SUFFIX = SCALING 20  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 53311.076 R.P.M.  
 123.9236 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0331

PERCENT SPAN FROM TIP (I. I.)	REF. ANG. (DEG)	V01 (M/SEC)	V02 (M/SEC)	VI (M/SEC)	VU1 (M/SEC)	MI	VW1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	73.09	370.15	330.00	0.00	0.00	0.295	99.66	96.24	338.66
1.66	72.71	330.49	322.46	0.00	0.00	0.302	101.74	98.40	322.84
25.13	69.74	316.27	293.62	0.00	0.00	0.426	109.73	107.72	298.62
40.92	67.89	272.93	270.21	0.00	0.00	0.434	112.23	111.87	270.21
54.42	63.89	262.95	234.25	0.00	0.00	0.524	109.11	109.07	239.25
61.66	58.04	223.71	198.67	0.00	0.00	0.305	102.80	101.62	198.67
100.00	54.74	197.77	171.35	0.00	0.00	0.294	99.15	94.78	171.35

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.7954

PERCENT SPAN FROM TIP (I. I.)	REF. ANG. (DEG)	V02 (M/SEC)	V01 (M/SEC)	V7 (M/SEC)	VU2 (M/SEC)	M2	VW2 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	57.73	297.41	226.66	174.07	99.27	0.497	147.40	134.34	325.71
11.32	55.11	272.97	207.60	170.15	103.86	0.509	144.75	141.54	311.32
10.59	51.94	236.19	195.71	177.58	101.12	0.510	145.97	145.02	286.43
40.94	45.35	225.49	160.43	161.00	103.02	0.547	158.64	154.65	263.45
67.60	35.40	210.63	123.09	206.74	116.69	0.601	170.67	170.17	239.74
84.15	22.01	170.07	71.65	226.44	142.22	0.662	176.77	173.47	214.07
100.00	14.44	140.77	65.00	233.91	153.00	0.664	172.01	171.00	199.60

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. I.)	LEADING EDGE	TRAILING EDGE	INCIDENCE ANGLE (DEG)	MEAN SUCT. ANGLE (DEG)	FACTON	OMEGA (1/SEC)	UAH	PARAMETER	DEVIATION ANGLE (DEG)	MOTION PRESS. RATIO	MOTION AUTOMATIC EFF.	ROTOR POLYTROPIC EFF.
0.00	0.00	0.00	15.91	4.151	0.1693	0.260	0.814	0.714	1.294	0.848	0.848	0.690
9.46	11.32	11.32	17.41	9.272	0.1641	0.267	0.850	0.719	1.294	0.844	0.844	0.656
25.13	30.53	30.53	17.06	4.536	0.1647	0.266	0.845	0.707	1.107	0.741	0.741	0.617
40.92	48.04	48.04	22.09	7.732	0.160	0.265	0.816	3.264	1.342	0.941	0.941	0.507
54.42	67.60	67.60	29.04	10.713	0.1603	0.260	0.807	5.207	1.384	1.073	1.073	0.502
61.66	81.13	81.13	40.64	11.170	0.1617	0.264	0.803	12.656	1.414	0.991	0.991	0.491
100.00	100.00	100.00	45.50	11.142	0.1610	0.2380	0.803	21.496	1.414	0.991	0.991	0.491

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.701 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.646 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS. RATIO = 1.3431  
 MASS AVERAGE TEMPERATURE RISE = 1.0103

HASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 20

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9097

PERCENT SPAN FROM TIP (L. F.)	WETA J (DEG)	VJ (FT/SEC)	VUJ (FT/SEC)	MJ	VMJ (FT/SEC)	VZJ (FT/SEC)	VZJ (FT/SEC)
0.00	30.40	504.07	335.35	.491	411.58	444.60	1037.90
11.16	31.15	505.00	349.37	.492	444.00	446.00	990.17
31.59	32.31	513.30	337.20	.511	470.17	470.16	925.69
46.72	32.05	620.09	337.74	.553	576.45	576.00	859.25
67.20	34.11	674.74	340.62	.601	561.97	559.92	791.23
88.01	34.42	735.97	357.30	.654	576.79	576.79	715.20
100.00	37.00	766.30	407.20	.681	588.09	577.61	671.32

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9513

PERCENT SPAN FROM TIP (L. F.)	WETA K (DEG)	VK (FT/SEC)	VUK (FT/SEC)	MK	VMK (FT/SEC)	VZK (FT/SEC)	VZK (FT/SEC)
0.00	-2.00	486.09	-14.90	.420	445.74	445.74	1030.27
11.17	-2.12	489.83	-14.14	.424	489.49	489.43	994.65
31.54	-4.01	512.35	-41.33	.446	510.71	510.49	934.41
46.73	-4.19	542.70	-40.42	.485	541.30	540.73	870.63
67.24	-4.20	588.30	-27.02	.517	588.30	588.05	817.59
88.20	2.73	580.51	27.92	.513	585.05	583.71	752.51
100.00	2.77	589.77	28.51	.516	589.08	589.08	715.36

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (L. F.)	MASS FLOW (WCF)	WETA (DEG)	INCIDENCE ANGLE (DEG)	SUIT SUM (DEG)	LOSS FACTOR	UMENA HAR	PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	30.40	.157	-3.703	.3651	.0561	.0202	20.180	1.243	1.1112	.8019
11.16	11.00	31.15	1.171	-1.109	.3513	.0437	.0152	14.622	1.246	1.1115	.8015
31.59	30.74	32.31	-1.309	-0.604	.3328	.0275	.0090	8.563	1.301	1.1000	.8323
46.72	46.74	32.05	-0.713	-0.900	.3005	.0402	.0123	7.785	1.331	1.0916	.8399
67.20	67.54	34.11	-2.422	-1.204	.2898	.0401	.0230	10.904	1.354	1.0945	.7192
88.01	88.27	34.42	-3.908	-0.800	.3497	.1422	.0441	14.261	1.353	1.1048	.5570
100.00	100.00	37.00	-5.030	-0.471	.3706	.1702	.0530	21.470	1.353	1.1048	.6394

MOMENTUM AVERAGE STAGE EFFICIENCY = .8371 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8308 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.0282  
MASS AVERAGE TEMPERATURE RISE = 1.1015

STATOR PERFORMANCE MASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAL NO 20

INLET VELOCITY DIAPHRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9097

PERCENT SPAN FROM TIP (L. F.)	HETA 3 (DEG)	V3 (M/SEC)	V13 (M/SEC)	M3	VM3 (M/SEC)	V23 (M/SEC)	U3 (M/SEC)
0.00	35.69	171.93	102.22	.691	130.25	136.73	315.32
11.16	34.14	172.40	105.59	.692	135.54	135.15	204.63
10.53	35.31	177.45	107.00	.511	145.14	145.13	212.15
48.72	32.05	191.01	103.02	.553	160.66	160.36	261.90
67.00	34.11	206.80	110.01	.601	171.29	170.64	241.17
80.11	34.42	224.29	117.38	.651	174.73	173.17	219.01
100.00	33.00	242.90	124.20	.631	179.69	174.53	206.62

EXIT VELOCITY DIAPHRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9513

PERCENT SPAN FROM TIP (L. F.)	HETA 4 (DEG)	V4 (M/SEC)	V14 (M/SEC)	M4	VM4 (M/SEC)	V24 (M/SEC)	U4 (M/SEC)
0.00	27.00	169.10	73.17	.620	144.05	148.05	316.03
11.16	27.12	167.30	75.23	.626	147.20	149.19	203.11
30.53	27.03	156.17	77.00	.446	157.66	154.60	204.91
48.72	26.17	168.49	77.32	.615	168.04	167.86	267.20
67.00	27.21	179.14	80.7	.517	179.34	179.24	244.20
80.11	27.73	174.77	82.1	.413	178.57	177.91	224.37
100.00	27.77	174.76	81.09	.516	174.55	174.55	218.09

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	DELTA (DEG)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT ANGLE (DEG)	FACTOR	OMEGA HAR	LOSS PARAMETER	OBVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	34.48	-1.17	-1.763	.3851	.0581	.0202	21.188	1.211	1.1113	.9019
11.16	11.37	30.27	1.771	-1.309	.3393	.0637	.0152	14.427	1.244	1.1115	.8915
30.53	30.53	39.94	-1.307	-4.004	.0275	.0625	.0090	9.543	1.311	1.1000	.8423
48.72	42.72	37.05	-4.713	-7.900	.0002	.0602	.0123	7.785	1.331	1.0916	.8399
67.00	67.00	34.31	-5.422	-4.284	.0001	.0601	.0230	10.904	1.344	1.0845	.7192
80.11	80.11	35.69	-3.708	-6.700	.0497	.0422	.0481	14.261	1.353	1.0848	.5570
100.00	100.00	46.43	-5.030	-8.971	.0106	.0102	.0430	21.470	1.353	1.0768	.6334

MOMENTUM AVERAGE STAGE EFFICIENCY = .9371 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8304 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.3282  
MASS AVERAGE TEMPERATURE RISE = 1.1015

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OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 27, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW FLIGHT FLUX	70 PERCENT DESIGN SPEED - SCAN 40 21	EQUIVALENT SPEED			EQUIVALENT FLOW / INLET ANN AREA			S 3902.622 H.P. 4			25.933 LBM/SEC-SQ FT						
PERCENT DESIGN EQUIVALENT FLOW	CM <sup>3</sup> /SEC	CM <sup>3</sup>	INLET	VI	VU1	M1	V41	V21	U1	CM <sup>3</sup>	INLET	V1	VU2	M2	V42	V22	U2
(%)	(L/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)	(FT/SEC)
0.00	75.26	110.92	1.009	0.00	314.19	0.00	334.10	323.42	1110.92	0.302	334.10	323.42	3110.92		334.10	323.42	1110.92
9.63	72.11	112.74	1.007	0.00	161.98	0.00	309	310.69	1059.12	0.309	141.98	310.69	1059.12		310.69	310.69	1059.12
23.16	69.25	109.49	0.993	0.00	66.94	0.00	334	362.07	972.92	0.334	166.94	362.07	972.92		362.07	362.07	972.92
40.45	66.95	106.00	0.973	0.00	172.27	0.00	342	376.05	900.00	0.342	172.27	376.05	900.00		376.05	376.05	900.00
59.92	64.93	106.33	0.953	0.00	166.87	0.00	332	366.76	794.81	0.332	166.87	366.76	794.81		366.76	366.76	794.81
81.31	63.07	105.83	0.933	0.00	343.95	0.00	313	345.94	704.10	0.313	343.95	345.94	704.10		343.95	345.94	704.10
100.00	61.20	105.30	0.913	0.00	334.15	0.00	302	334.05	592.09	0.302	334.05	334.05	592.09		334.05	334.05	592.09

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = 0.7977

PERCENT SPANN TIP	WU1	MU1	WU2	MU2	WU3	MU3	WU4	MU4	WU5	MU5	WU6	MU6	WU7	MU7	WU8	MU8	WU9	MU9	WU10	MU10	WU11	MU11	WU12	MU12	WU13	MU13	WU14	MU14	WU15	MU15	WU16	MU16	WU17	MU17	WU18	MU18	WU19	MU19	WU20	MU20	WU21	MU21	WU22	MU22	WU23	MU23	WU24	MU24	WU25	MU25	WU26	MU26	WU27	MU27	WU28	MU28	WU29	MU29	WU30	MU30	WU31	MU31	WU32	MU32	WU33	MU33	WU34	MU34	WU35	MU35	WU36	MU36	WU37	MU37	WU38	MU38	WU39	MU39	WU40	MU40	WU41	MU41	WU42	MU42	WU43	MU43	WU44	MU44	WU45	MU45	WU46	MU46	WU47	MU47	WU48	MU48	WU49	MU49	WU50	MU50	WU51	MU51	WU52	MU52	WU53	MU53	WU54	MU54	WU55	MU55	WU56	MU56	WU57	MU57	WU58	MU58	WU59	MU59	WU60	MU60	WU61	MU61	WU62	MU62	WU63	MU63	WU64	MU64	WU65	MU65	WU66	MU66	WU67	MU67	WU68	MU68	WU69	MU69	WU70	MU70	WU71	MU71	WU72	MU72	WU73	MU73	WU74	MU74	WU75	MU75	WU76	MU76	WU77	MU77	WU78	MU78	WU79	MU79	WU80	MU80	WU81	MU81	WU82	MU82	WU83	MU83	WU84	MU84	WU85	MU85	WU86	MU86	WU87	MU87	WU88	MU88	WU89	MU89	WU90	MU90	WU91	MU91	WU92	MU92	WU93	MU93	WU94	MU94	WU95	MU95	WU96	MU96	WU97	MU97	WU98	MU98	WU99	MU99	WU100	MU100
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ROTOR PERFORMANCE DATA

PERCENT SPANN TIP	WU1	MU1	WU2	MU2	WU3	MU3	WU4	MU4	WU5	MU5	WU6	MU6	WU7	MU7	WU8	MU8	WU9	MU9	WU10	MU10	WU11	MU11	WU12	MU12	WU13	MU13	WU14	MU14	WU15	MU15	WU16	MU16	WU17	MU17	WU18	MU18	WU19	MU19	WU20	MU20	WU21	MU21	WU22	MU22	WU23	MU23	WU24	MU24	WU25	MU25	WU26	MU26	WU27	MU27	WU28	MU28	WU29	MU29	WU30	MU30	WU31	MU31	WU32	MU32	WU33	MU33	WU34	MU34	WU35	MU35	WU36	MU36	WU37	MU37	WU38	MU38	WU39	MU39	WU40	MU40	WU41	MU41	WU42	MU42	WU43	MU43	WU44	MU44	WU45	MU45	WU46	MU46	WU47	MU47	WU48	MU48	WU49	MU49	WU50	MU50	WU51	MU51	WU52	MU52	WU53	MU53	WU54	MU54	WU55	MU55	WU56	MU56	WU57	MU57	WU58	MU58	WU59	MU59	WU60	MU60	WU61	MU61	WU62	MU62	WU63	MU63	WU64	MU64	WU65	MU65	WU66	MU66	WU67	MU67	WU68	MU68	WU69	MU69	WU70	MU70	WU71	MU71	WU72	MU72	WU73	MU73	WU74	MU74	WU75	MU75	WU76	MU76	WU77	MU77	WU78	MU78	WU79	MU79	WU80	MU80	WU81	MU81	WU82	MU82	WU83	MU83	WU84	MU84	WU85	MU85	WU86	MU86	WU87	MU87	WU88	MU88	WU89	MU89	WU90	MU90	WU91	MU91	WU92	MU92	WU93	MU93	WU94	MU94	WU95	MU95	WU96	MU96	WU97	MU97	WU98	MU98	WU99	MU99	WU100	MU100
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MOMENTUM AVG. ROTOR PRESS RATIO = 1.0376  
MASS AVERAGE TEMPERATURE RISE = 1.0374

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.0444 kg/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 64.0444  
 10 PERCENT DESIGN SPEED = 5000 RPM  
 EQUIVALENT SPEED = 57902.672 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 126.5881 kg/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0330

PERCENT SPAN FROM TIP (1.1.)	V01 (M/SEC)	V02 (M/SEC)	DELTA (DEG)	W1 (M/SEC)	W2 (M/SEC)	V01 (M/SEC)	V02 (M/SEC)	W1 (M/SEC)	W2 (M/SEC)	U1 (M/SEC)	
0.00	71.60	130.01	0.00	101.06	0.00	0.00	0.00	0.00	0.00	101.06	71.60
5.00	72.11	128.02	0.00	100.20	0.00	0.00	0.00	0.00	0.00	100.20	72.11
10.00	72.19	126.55	0.00	112.42	0.00	0.00	0.00	0.00	0.00	112.42	72.19
15.00	72.07	124.05	0.00	114.99	0.00	0.00	0.00	0.00	0.00	114.99	72.07
20.00	71.85	121.21	0.00	111.82	0.00	0.00	0.00	0.00	0.00	111.82	71.85
25.00	71.51	118.91	0.00	108.44	0.00	0.00	0.00	0.00	0.00	108.44	71.51
30.00	71.00	116.30	0.00	101.82	0.00	0.00	0.00	0.00	0.00	101.82	71.00

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7977

PERCENT SPAN FROM TIP (1.1.)	V01 (M/SEC)	V02 (M/SEC)	DELTA (DEG)	W1 (M/SEC)	W2 (M/SEC)	V01 (M/SEC)	V02 (M/SEC)	W1 (M/SEC)	W2 (M/SEC)	U2 (M/SEC)	
0.00	72.00	230.27	7.70	171.30	97.39	0.98	0.98	0.98	0.98	140.11	325.00
5.00	71.94	211.92	7.11	170.07	94.82	0.513	0.513	0.513	0.513	145.19	311.23
10.00	71.85	190.71	6.60	170.00	90.17	0.516	0.516	0.516	0.516	149.09	295.88
15.00	71.74	175.24	6.20	168.88	84.22	0.507	0.507	0.507	0.507	140.72	263.95
20.00	71.51	158.25	5.74	166.76	77.37	0.502	0.502	0.502	0.502	171.49	234.01
25.00	71.00	140.76	5.32	163.72	70.84	0.671	0.671	0.671	0.671	179.01	213.56
30.00	70.51	120.51	4.87	160.28	65.30	0.692	0.692	0.692	0.692	176.05	198.57

MOTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP (1.1.)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	FACTOR	ORANGE	LOSS PARAMETER	DEVIATION ANGLE (DEG)	PERCENT LOSS	ROTOR AUTOMATIC EFF	STATOR POLYTROPIC EFF
0.00	0.00	15.82	4.421	0.735	0.904	0.039	0.51	1.282	0.842	0.891
9.44	11.23	17.22	4.470	0.650	0.207	0.042	0.101	1.205	0.845	0.702
25.14	30.52	17.61	4.475	0.354	0.121	0.029	1.057	1.300	0.179	0.828
40.44	45.73	21.31	4.491	0.195	0.061	0.017	0.511	1.316	0.401	0.950
50.82	67.71	24.36	4.515	0.103	0.036	0.001	0.501	1.376	1.009	1.000
63.51	88.22	30.02	4.513	0.016	0.001	0.000	1.273	1.422	1.025	1.025
100.00	100.00	44.47	4.451	0.010	0.000	0.000	21.462	1.422	1.025	1.025

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.847 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.479 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR LOSS RATIO = 1.3374  
 MASS AVERAGE TEMPERATURE RISE = 1.0983



NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT UPSILON SPEED - SCAN NO 21

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9024

PERCENT SPAN FROM TIP (L. E.)	ETA J (DEC)	VJ (FT/SEC)	VJ3 (FT/SEC)	MJ	VJ4 (FT/SEC)	VJ5 (FT/SEC)	UJ (FT/SEC)
0.00	545.19	322.26	467.94	.490	467.94	462.10	1037.64
11.35	574.10	335.00	485.01	.501	485.01	455.06	994.37
30.36	591.23	340.54	496.76	.520	496.76	440.75	928.63
44.51	631.47	327.20	540.09	.554	540.09	539.59	859.00
57.74	603.58	322.70	573.47	.607	573.47	571.14	791.26
69.08	594.70	344.93	594.56	.665	594.56	540.57	715.18
100.00	776.33	474.79	611.11	.693	611.11	566.22	671.22

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9517

PERCENT SPAN FROM TIP (L. E.)	ETA K (DEC)	VK (FT/SEC)	VK3 (FT/SEC)	MK	VK4 (FT/SEC)	VK5 (FT/SEC)	UK (FT/SEC)
0.00	499.54	222.05	499.05	.433	499.05	494.15	1030.11
11.35	507.80	234.44	507.26	.441	507.26	507.19	994.37
30.36	530.46	245.06	524.94	.464	524.94	524.73	946.59
44.51	560.76	212.98	567.21	.500	567.21	566.42	876.77
57.74	603.94	257.18	603.94	.532	603.94	603.83	817.03
69.08	607.47	232.25	604.57	.533	604.57	602.98	752.83
100.00	611.74	252.24	608.25	.537	608.25	604.25	715.25

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE FROM TIP	PERCENT SPAN FROM TIP	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	DELTA ANGLE (DEG)	DELTA ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	-1.764	-5.600	.340	.0490	.0176	19.650	1.272	1.1071
11.35	11.35	-1.720	-3.490	.326	.0424	.0147	13.904	1.277	1.1071
30.36	30.36	-3.172	-7.075	.303	.0290	.0095	6.203	1.294	1.0941
44.51	44.51	-6.539	-9.530	.278	.0433	.0133	7.750	1.323	1.0901
57.74	57.74	-6.501	-9.184	.270	.0471	.0250	16.542	1.350	1.0945
69.08	69.08	-5.426	-8.319	.316	.1973	.0519	17.503	1.350	1.1030
100.00	100.00	-6.554	-9.495	.337	.1840	.0465	24.422	1.350	1.1030

MOMENTUM AVERAGE STATOR EFFICIENCY = .8464 (POLYTROPIC)  
MOMENTUM AVERAGE STATOR EFFICIENCY = .8402 (ADIABATIC)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 21

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9024

PERCENT SPAN FROM TIP (L. E.)	DELTA 3 (DEG)	V3 (M/SEC)	W3 (M/SEC)	VM3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	34.52	173.18	94.23	142.63	141.06	316.27
11.32	37.74	175.01	102.11	141.98	141.74	703.63
30.45	32.53	180.20	97.70	151.41	151.41	202.38
48.51	33.21	192.47	94.73	164.62	164.50	252.10
67.26	33.03	203.44	113.52	174.79	174.16	241.18
84.00	34.70	224.15	134.34	182.44	179.99	217.94
100.00	33.64	236.83	147.33	185.25	181.12	204.54

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9517

PERCENT SPAN FROM TIP (T. P.)	DELTA 4 (DEG)	V4 (M/SEC)	W4 (M/SEC)	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	22.53	152.20	66.72	152.11	152.11	313.98
11.35	22.65	154.78	71.14	154.01	154.59	303.04
30.36	24.98	161.88	114.04	161.23	151.16	286.86
48.70	24.23	173.16	122.80	172.58	172.71	267.24
67.44	24.52	184.04	117.76	184.04	183.84	244.21
84.13	24.97	195.31	142.28	184.30	183.63	224.40
100.00	24.12	186.46	174.49	185.40	185.40	215.01

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (FRONT EDGE)	MASS FLOW (KG/S)	DELTA WETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUM (DEG)	FACTOR	W	OMEGA (RPM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	37.04	-1.764	-5.686	.3408	.0490	.0176	.0176	14.650	1.272	1.1071	.8041
11.32	11.97	38.42	-1.394	-3.740	.3326	.0424	.0147	.0147	13.904	1.277	1.1071	.8240
30.36	30.36	37.81	-3.772	-7.075	.3036	.0290	.0094	.0094	8.203	1.294	1.0951	.8577
48.70	48.70	35.44	-6.539	-9.536	.2753	.0433	.0133	.0133	7.750	1.323	1.0901	.7770
67.44	67.44	33.57	-6.501	-8.104	.2708	.0871	.0250	.0250	10.552	1.350	1.0945	.6562
84.00	84.00	30.93	-5.426	-8.119	.3169	.0973	.0519	.0519	17.503	1.350	1.1030	.6996
100.00	100.00	31.40	-6.554	-9.995	.3375	.1848	.0465	.0465	24.422	1.350	1.1030	.5940

MOMENTUM AVERAGE STAGE EFFICIENCY = .8466 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8407 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.3207  
MASS AVERAGE TEMPERATURE RISE = 1.0963

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 29, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW EQUIVALENT FLOW = 2.071\* LBM/SEC PERCENT DESIGN EQUIVALENT FLOW = 65.7458  
 ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)  
 /0 PERCENT DESIGN SPEED = SCAN NO 22  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 53856.M3A R.P.M.  
 = 26.1914 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0285

PERCENT SPAN FROM TIP (L. F.)	DELTA (DEG)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (DEG)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)
	DELTA (DEG)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (DEG)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)
0.00	73.07	1100.24	1109.09	0.00	337.94	0.00	306	317.94	327.06	327.06	1109.98
7.51	71.71	1111.96	1050.44	0.00	345.09	0.00	313	345.09	334.17	334.17	1058.44
25.11	69.01	1041.34	972.29	0.00	372.99	0.00	334	372.99	366.14	366.14	972.29
40.99	66.00	961.34	885.22	0.00	391.53	0.00	346	391.53	380.30	380.30	885.22
54.37	64.09	857.73	784.61	0.00	371.00	0.00	336	371.00	370.88	370.88	784.61
64.53	61.00	739.70	651.94	0.00	349.63	0.00	316	349.63	346.93	346.93	651.94
100.00	54.00	655.17	561.62	0.00	317.39	0.00	305	317.39	325.93	325.93	561.62

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7968

PERCENT SPAN FROM TIP (L. F.)	DELTA (DEG)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (DEG)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)
	DELTA (DEG)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (DEG)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)	DELTA (FT/SEC)
0.00	57.94	901.92	765.64	32.14	566.65	301.90	649	479.54	464.10	464.10	1067.54
14.31	54.75	862.80	704.49	32.30	589.70	315.83	616	497.98	487.10	487.10	1020.42
30.24	51.73	815.09	640.71	30.74	587.45	300.86	518	505.14	501.99	501.99	941.57
46.50	49.07	765.02	549.06	31.69	519.46	316.15	548	532.71	532.68	532.68	965.20
61.40	46.40	701.47	417.17	33.14	674.64	369.32	599	564.57	567.40	567.40	786.49
84.23	42.11	654.80	246.42	36.74	757.26	452.51	675	606.44	596.48	596.48	599.93
100.00	15.04	620.01	163.25	38.77	779.82	487.66	696	607.25	588.61	588.61	550.91

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)
	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)	DELTA (DEG)
0.00	0.00	15.13	9.230	8.607	3205	1904	6384	950	1.271	6866	6951
9.40	11.31	17.34	9.450	8.607	3201	1904	6399	953	1.278	7078	7130
25.11	30.27	17.26	9.086	7.845	3129	1890	6204	949	1.296	6452	6508
40.99	44.50	20.82	8.741	6.478	3060	1880	6061	943	1.327	4992	5008
54.37	67.40	24.23	10.110	6.453	3077	1883	6003	945	1.366	4985	4986
64.53	80.23	39.69	10.334	5.439	2950	1862	6010	942	1.421	1.0356	1.0339
100.00	100.00	93.96	10.252	4.170	1955	1856	6019	942	1.421	1.0356	1.0339

MOMENTUM AVG. ROTOR EFFICIENCY = .8932 (POLYTHROPIC)  
 MASS AVERAGE TEMPERATURE RISE = 1.0956  
 MOMENTUM AVG. ROTOR EFFICIENCY = .8880 (ADIABATIC)

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.0746 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 64.7459  
 ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)  
 70 PERCENT DESIGN SPEED = SCAN NO 22  
 EQUIVALENT FLOW / INLET ANN AREA = 53856.834 R.P.M.  
 127.8774 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0285

PERCENT SPAN FROM TIP (L. F.)	DELTA1 (DEG)	V01 (M/SEC)	M01	RETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	VW1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	73.07	353.65	1.049	3.00	103.00	0.00	.306	103.00	99.69	338.32
9.40	71.91	339.34	1.007	0.00	104.37	0.00	.313	105.37	101.92	322.61
25.11	69.01	296.35	.944	0.00	113.59	0.00	.334	113.60	111.60	296.35
40.00	66.09	269.41	.874	0.00	116.29	0.00	.346	116.29	115.91	269.41
54.17	64.04	244.44	.786	0.00	113.03	0.00	.334	113.04	113.04	239.09
63.53	61.00	225.44	.687	0.00	104.57	0.00	.316	106.57	104.13	199.71
100.00	59.00	199.70	.593	0.00	102.04	0.00	.305	102.04	99.34	171.18

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7968

PERCENT SPAN FROM TIP (L. F.)	DELTA2 (DEG)	V02 (M/SEC)	M02	DELTA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	VW2 (M/SEC)	VZ2 (M/SEC)	U2 (M/SEC)
0.00	57.94	275.30	.749	32.14	172.12	92.02	.495	146.14	141.46	323.39
11.31	54.75	262.94	.715	32.38	174.74	96.27	.516	151.79	144.47	311.02
40.24	51.75	246.09	.670	30.74	177.21	91.70	.518	153.97	153.01	286.99
64.66	45.07	233.14	.677	30.64	188.81	46.36	.544	162.37	162.36	263.71
87.66	36.46	213.96	.623	33.14	204.63	112.57	.599	172.08	171.57	239.72
94.23	22.11	194.52	.584	36.74	230.81	134.23	.675	184.84	171.81	213.34
100.10	15.05	191.06	.512	38.77	237.38	148.64	.695	185.00	174.80	198.40

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP (L. F.)	TRAILING EDGE	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	W/TOR PRESS RATIO	ROTOR EFF	POLYTROPIC EFF
0.00	0.00	0.00	4.230	0.702	.1904	.950	1.271	.6846	.6951
9.40	11.31	11.31	4.754	0.667	.1904	-2.53	1.274	.7024	.7130
25.11	30.24	30.24	4.886	1.445	.0940	1.494	1.294	.8452	.8508
40.00	40.00	40.00	4.741	6.978	.0288	3.583	1.327	.9592	.9508
54.17	59.37	67.60	10.110	4.007	.0013	5.445	1.366	.9945	.9986
63.53	84.23	84.23	10.334	5.139	.0462	12.886	1.421	1.0356	1.0334
100.00	100.00	100.00	10.252	4.178	.0555	22.099	1.471	1.0356	1.0339

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8433  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8488  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3309  
 MASS AVERAGE TEMPERATURE RISE = 1.0096

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 22

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8960

PERCENT SPAN FROM TIP (L. E.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	33.02	570.40	310.06	.499	478.26	473.00	1036.70
11.22	34.91	580.24	323.08	.506	481.57	480.78	995.68
24.06	36.73	590.05	335.57	.527	514.04	514.04	927.00
40.02	38.02	614.57	347.71	.562	544.29	546.49	860.75
60.41	38.51	642.02	366.05	.606	575.67	573.57	791.79
87.71	38.01	755.41	444.17	.673	611.03	602.83	714.66
100.00	37.17	782.92	473.22	.700	623.72	606.49	670.65

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9484

PERCENT SPAN FROM TIP (L. E.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	- .88	509.74	-25.01	.443	509.10	509.10	1029.24
11.13	-2.98	518.90	-26.96	.452	518.26	518.20	993.61
30.24	-5.00	544.62	-47.45	.478	542.55	542.31	933.96
40.63	-4.27	542.51	-43.32	.513	580.90	580.30	876.20
67.40	-2.16	614.01	-23.22	.542	614.47	614.13	817.21
88.17	2.49	622.62	27.04	.547	622.23	619.96	751.85
100.00	2.59	670.60	70.33	.551	675.64	625.84	714.04

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. E.)	MASS FLOW (PLF)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	U FACTOR	OMEGA HAH	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMPERATURE RATIO	STATOR POLYTROPIC EFF
0.00	0.00	35.70	-3.275	-7.217	.705	.0452	.0163	14.300	1.247	1.1033	.7962
11.22	11.33	36.80	-7.207	-5.813	.715	.0524	.0162	13.578	1.264	1.1013	.7636
29.76	30.20	35.72	-5.059	-4.172	.737	.0394	.0129	9.187	1.287	1.0907	.7936
40.02	44.03	34.31	-7.000	-10.658	.2536	.0428	.0121	7.724	1.316	1.0876	.7598
60.41	67.40	34.67	-6.376	-9.849	.2505	.0818	.0235	6.935	1.341	1.1031	.6220
87.71	84.17	33.53	-6.308	-9.202	.1114	.2059	.0544	14.020	1.344	1.1017	.6465
100.00	100.00	34.60	-7.444	-10.805	.1345	.1932	.0488	21.292	1.344	1.1017	.6428

MOMENTUM AVERAGE STAGE EFFICIENCY = .8931 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.1313  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8951 (ADIABATIC)      MASS AVERAGE TEMPERATURE RATIO = 1.0956

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 22

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8960

PERCENT SPAN FROM TIP (L.F.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	33.02	173.86	94.75	.499	145.77	144.17	316.00
11.22	33.91	176.86	10.06	.508	146.74	146.54	303.48
29.96	30.73	182.24	93.14	.527	156.59	156.69	282.57
48.02	30.05	193.41	96.04	.562	177.42	177.30	262.42
66.91	32.51	208.14	111.82	.606	175.46	174.82	241.34
87.04	30.01	210.25	135.38	.673	186.24	183.74	217.83
100.00	37.14	238.63	144.24	.700	190.11	184.86	206.41

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9484

PERCENT SPAN FROM TIP (L.F.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-2.88	155.37	-7.81	.443	155.17	155.17	313.71
11.33	-6.27	158.14	-11.22	.452	157.97	157.95	302.85
30.24	-5.00	166.00	-14.96	.478	165.37	165.30	284.67
48.63	-4.27	177.55	-13.20	.513	177.06	176.88	267.08
67.60	-2.16	187.42	-7.04	.542	187.29	187.19	249.04
88.17	2.44	189.04	4.24	.547	189.66	188.96	229.16
100.00	2.54	190.95	4.04	.551	190.76	190.76	217.82

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L.F.)	FRONTAL AREA (SQ M)	MASS FLOW (KG/S)	DELTA (DEG)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	FACTOR	OMEGA (RPM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE POLYTROPIC EFF
0.00	0.00	0.00	35.90	35.90	-3.275	-7.217	.3705	.0452	.0164	14.300	1.262	1.1013
11.22	11.33	11.04	36.74	36.74	-2.267	-5.413	.4153	.0524	.0182	13.578	1.254	1.1031
29.96	30.21	30.43	35.72	35.72	-5.890	-9.112	.4417	.0394	.0179	8.187	1.247	1.1007
48.02	44.63	44.27	34.31	34.31	-7.660	-10.858	.4526	.0428	.0131	7.723	1.316	1.1076
66.91	67.40	67.91	36.67	36.67	-6.976	-9.444	.4585	.0818	.0235	6.935	1.341	1.0731
87.04	84.17	84.20	33.53	33.53	-6.304	-4.202	.4144	.2054	.0544	14.020	1.344	1.1017
100.00	100.00	100.00	34.60	34.60	-7.444	-10.485	.3345	.1932	.0488	21.292	1.344	1.1017

MOMENTUM AVERAGE STATOR EFFICIENCY = .4511 (POLYTROPIC)  
 MOMENTUM AVERAGE STATOR EFFICIENCY = .4453 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.1013  
 MASS AVERAGE TEMPERATURE RISE = 1.0456

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DATA SMALL AXIAL COMPRESSOR TEST 3 JUNE 20, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE DATA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW 100 PERCENT DESIGN SPEED - SCAN NO 23  
 EQUIVALENT SPEED 76875.646 RPM  
 PERCENT DESIGN EQUIVALENT FLOW = 89.3343 FLOW / INLET ANN AREA = 36.1461 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9941

PERCENT SPAN FROM TIP (L. F.)	WETTING ANGLE (DEG)	V01 (FT/SEC)	DELTA1 (DEG)	VI (FT/SEC)	WU1 (FT/SEC)	M1	VW1 (FT/SEC)	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	72.07	1634.76	1.517	494.48	0.00	.457	494.48	476.55	1564.39
4.16	71.44	1571.07	0.000	505.13	0.00	.463	505.13	449.56	1511.16
25.51	64.70	1404.24	0.000	744.17	0.00	.503	744.17	546.17	1304.88
42.72	57.46	1371.71	0.000	561.44	0.00	.516	561.44	554.43	1231.25
61.74	44.72	1277.70	0.000	544.02	0.00	.494	544.02	543.44	1100.78
85.05	60.74	1051.56	0.000	507.45	0.00	.466	507.45	507.45	718.66
100.00	54.07	734.04	0.000	484.03	0.00	.447	484.03	477.41	401.65

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7400

PERCENT SPAN FROM TIP (L. F.)	WETTING ANGLE (DEG)	V02 (FT/SEC)	DELTA2 (DEG)	V2 (FT/SEC)	WU2 (FT/SEC)	M2	VW2 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	76.43	1275.01	1.032	471.19	0.00	.702	471.19	664.51	1523.81
11.50	72.71	1174.27	0.996	481.28	520.67	.747	520.67	711.90	1425.41
30.68	47.71	1110.26	0.953	906.47	517.50	.774	906.47	744.25	1341.37
44.30	41.77	1047.07	0.908	457.99	542.76	.831	457.99	749.41	1230.64
64.25	32.76	972.19	0.851	1006.7	589.05	.840	1006.7	415.72	1117.96
80.52	21.44	902.97	0.798	1072.64	666.73	.848	1072.64	440.24	997.37
100.00	14.26	867.21	0.770	1103.80	715.51	.980	1103.80	440.40	924.11

MOTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	WETTING ANGLE (DEG)	DELTA (DEG)	LOSS ANGLE (DEG)	DEVIATION ANGLE (DEG)	MOTOR PRESS. RATIO	MOTOR POLYTROPIC EFF.
0.00	0.00	15.74	0.000	0.000	1.671	0.646
4.16	11.02	18.74	0.231	-2.252	1.701	0.739
25.51	31.36	20.50	0.360	-2.196	1.772	0.825
42.72	47.30	24.77	0.503	-2.476	1.852	0.900
61.74	68.25	30.75	0.653	-2.968	1.843	0.943
85.05	80.52	39.50	0.859	1.661	1.916	0.962
100.00	109.00	44.36	0.755	21.311	1.916	0.962

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8479 (POLY TROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .8346 (ADIABATIC)  
 MOMENTUM AVG. MOTOR PRESS. RATIO = 1.8108  
 MASS AVERAGE TEMPERATURE RISE = 1.2211

MOTOR PERFORMANCE VASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW = 1.4865 M3/SEC  
 PERCENT DENSITY EQUIVALENT FLOW = 89.3543  
 100 PERCENT (UP SIGN SPEED) - SCAL NO 23  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 76875.69A R.P.#1.  
 = 170.480A KG/SEC-SU M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9941

PERCENT SPAN FROM TIP (L. F.)	BETA1 (DEG)	VU1 (M/SEC)	VI (M/SEC)	VU1 (M/SEC)	M1	VU1 (M/SEC)	V1 (M/SEC)	U1 (M/SEC)
0.00	72.07	505.49	432.42	1.517	0.00	150.77	0.00	452
9.36	71.44	405.75	450.60	1.458	0.00	151.27	0.00	463
25.51	68.40	473.42	422.05	1.368	0.00	167.04	0.00	503
42.52	65.04	414.10	311.67	1.261	0.00	171.13	0.00	516
61.74	63.72	374.20	335.52	1.177	0.00	165.70	0.00	499
85.05	60.94	370.21	280.01	.942	0.00	155.34	0.00	466
100.00	58.02	246.22	244.34	.858	0.00	149.05	0.00	447

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7400

PERCENT SPAN FROM TIP (L. F.)	BETA2 (DEG)	VU2 (M/SEC)	V2 (M/SEC)	VU2 (M/SEC)	M2	VU2 (M/SEC)	V2 (M/SEC)	U2 (M/SEC)
0.00	56.71	374.34	312.08	1.032	0.04	254.96	0.00	702
11.50	52.71	350.13	284.91	.976	0.14	264.83	0.00	747
30.64	47.71	338.91	251.12	.943	0.41	276.10	0.00	774
44.71	41.07	319.15	209.67	.908	0.51	292.00	0.00	831
64.25	32.95	240.42	151.21	.851	0.83	306.68	0.00	880
84.52	21.44	274.23	100.70	.798	1.43	326.94	0.00	948
100.00	14.26	264.32	85.11	.770	2.41	336.44	0.00	990

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	ANSA FLUJ (PCT)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTION PRESS RATIO	ADJACENT POLYTHROPIC EFF	ROTOR POLYTHROPIC EFF
0.00	0.00	15.74	8.830	4.362	0.370	0.274	0.577	0.646
9.36	11.07	14.70	9.719	0.231	0.313	0.270	0.595	0.719
25.51	11.36	20.50	9.346	7.279	0.170	0.171	0.391	0.777
42.52	11.47	20.77	9.193	6.257	0.153	0.096	0.273	0.794
61.74	10.75	30.76	9.411	5.553	0.137	0.044	0.159	0.875
85.05	90.24	34.50	9.099	4.639	0.088	0.040	0.064	0.943
100.00	100.00	44.35	9.804	3.789	0.235	0.074	0.139	0.954

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8679 (POLYTHROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .8344 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.8108  
 MASS AVERAGE TEMPERATURE RISE = 1.2211



NASA SMALL AXIAL COMPRESSION TEST 3 JULY 25, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 23

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8760

PERCENT SPAN FROM TIP (L. F.)	BETA J (DEG)	VJ (FT/SEC)	VIIJ (FT/SEC)	MJ	VMJ (FT/SEC)	VZJ (FT/SEC)	UJ (FT/SEC)
0.00	39.90	790.47	512.00	.609	610.70	604.00	1479.07
11.54	40.12	824.93	533.78	.694	629.02	627.95	1417.65
30.65	39.90	870.77	520.00	.747	648.96	628.95	1319.70
47.06	39.90	930.03	545.09	.804	752.97	742.41	1223.57
67.96	37.40	963.90	555.89	.830	763.80	743.00	1124.75
80.14	40.11	1013.93	653.20	.807	775.49	745.07	1019.03
100.00	41.60	1059.52	674.11	.824	787.22	745.46	957.29

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8888

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VII4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	33.90	694.77	470.74	.577	693.13	693.13	1469.14
11.20	34.90	715.21	480.01	.595	713.55	713.47	1418.87
30.06	32.04	750.92	480.26	.640	757.95	757.02	1334.14
47.29	31.20	817.07	470.09	.696	815.66	811.42	1251.37
67.21	30.00	860.06	450.37	.681	794.95	790.41	1107.34
80.14	28.23	752.91	290.25	.637	752.34	749.59	1073.50
100.00	28.24	757.01	270.63	.641	757.23	747.23	1020.08

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	DELTA (DEG)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	FACTOR	WAM	WIEGA	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	43.92	3.001	-.201	.3832	.0528	.0528	.0201	14.240	1.667	1.2428	.0061
11.54	11.02	44.21	4.136	-.303	.4778	.0674	.0674	.0215	12.640	1.664	1.2428	.7722
30.65	31.30	37.05	3.943	-2.921	.3420	.0819	.0819	.0267	10.317	1.727	1.2224	.7321
47.06	51.17	39.30	-1.053	4.836	.3132	.0665	.0665	.0203	9.637	1.804	1.2140	.7708
67.96	70.75	30.44	-2.221	5.003	.3383	.1471	.1471	.0422	12.000	1.741	1.2110	.8274
80.14	90.24	37.80	-2.310	5.100	.4121	.2600	.2600	.0703	13.757	1.712	1.2130	.5293
100.00	100.00	39.16	-3.223	6.669	.4242	.2513	.2513	.0635	20.941	1.712	1.2130	.5300

MOMENTUM AVERAGE STAGE EFFICIENCY = .7914 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7746 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.7406  
 MASS AVERAGE TEMPERATURE RISE = 1.2211

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 23

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8760

PERCENT SPAN FROM TIP (I. F.)	HETA 1 (DEG)	V3 (M/SEC)	V14 (M/SEC)	M3	VM3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.01	34.70	242.42	150.08	.669	184.14	144.10	451.07
11.53	41.12	251.45	162.70	.674	191.73	171.41	452.71
30.65	34.90	260.62	160.32	.747	213.04	213.04	402.25
49.04	32.94	263.47	166.34	.804	224.50	224.50	372.44
67.36	37.40	243.42	170.46	.838	233.41	232.56	342.52
80.40	40.11	207.00	172.10	.887	216.37	223.19	310.30
100.00	41.43	114.49	211.57	.924	239.44	233.31	241.70

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8888

PERCENT SPAN FROM TIP (I. F.)	HETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.10	31.94	211.77	-14.55	.577	211.76	211.26	447.74
11.20	23.00	210.00	-14.02	.595	217.49	217.49	432.97
30.06	22.01	211.32	-11.06	.640	231.02	230.72	405.65
48.29	23.16	244.04	-14.00	.696	248.61	244.36	381.42
67.21	24.96	243.80	4.07	.661	243.83	243.63	352.41
80.01	22.23	229.49	4.91	.637	224.31	228.48	327.23
100.00	24.24	240.98	4.03	.641	230.80	230.80	310.92

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	HETA FLUT (DEG)	HETA (DEG)	INCIDENCE ANGLE (DEG)	SUPT SUM (DEG)	FACTON	OMEGA MAX	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	STAGE TEMP RATIO	STATION POLYTROPIC EFF
0.00	0.00	43.72	3.001	-4.201	.4932	.0558	.0201	14.740	1.647	1.2424	.8041
11.53	11.02	44.21	4.146	-4.03	.4778	.0679	.0234	14.690	1.664	1.2424	.7722
30.65	11.36	39.05	3.43	-2.921	.4420	.0814	.0267	10.317	1.727	1.2224	.7421
49.04	11.17	37.30	-1.853	-4.416	.4132	.0665	.0203	8.637	1.409	1.2140	.7708
67.36	70.75	36.44	-2.221	-5.063	.3343	.1471	.0420	14.060	1.741	1.2110	.6275
80.40	80.24	37.04	-2.310	-5.140	.4121	.2640	.0703	13.757	1.712	1.2130	.5283
100.00	100.00	39.14	-3.220	-6.069	.4242	.2513	.0635	20.941	1.712	1.2130	.5300

MOMENTUM AVERAGE STAGE EFFICIENCY = .7914 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .7746 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.7406

MASS AVERAGE TEMPERATURE RISE = 1.2211

NASA SMALL AXIAL COMPRESSOR TEST 3 JUNE 25, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.2621 LBM/SEC      100 PERCENT DESIGN SPEED - (CAL) NO 24  
 PERCENT DESIGN EQUIVALENT FLOW = 89.0641 LBM/SEC      EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 76931.953 LBM/SEC-SQ FT  
 36.0277

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0001

PERCENT SPAN FROM TIP (L. F.)	WETA0 (DEG)	V01 (FT/SEC)	BETA1 (DEG)	V1 (FT/SEC)	M1	V02 (FT/SEC)	M2	V03 (FT/SEC)	M3	V04 (FT/SEC)	M4	V05 (FT/SEC)	M5
0.00	72.71	1600.55	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451
9.45	71.31	1576.40	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451
19.90	69.91	1552.25	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451
30.35	68.51	1528.10	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451
40.80	67.11	1503.95	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451
51.25	65.71	1479.80	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451
61.70	64.31	1455.65	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451
72.15	62.91	1431.50	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451
82.60	61.51	1407.35	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451
93.05	60.11	1383.20	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451
100.00	58.71	1359.05	0.00	493.92	0.00	0.00	0.00	0.00	0.00	477.42	0.451	493.92	0.451

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.7449

PERCENT SPAN FROM TIP (L. F.)	WETA0 (DEG)	V02 (FT/SEC)	BETA0 (DEG)	V0 (FT/SEC)	M0	V01 (FT/SEC)	M1	V02 (FT/SEC)	M2	V03 (FT/SEC)	M3	V04 (FT/SEC)	M4	V05 (FT/SEC)	M5
0.00	57.03	1200.78	0.00	671.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11.71	58.13	1195.08	0.00	671.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23.42	59.23	1189.38	0.00	671.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.13	60.33	1183.68	0.00	671.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
46.84	61.43	1177.98	0.00	671.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
58.55	62.53	1172.28	0.00	671.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70.26	63.63	1166.58	0.00	671.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81.97	64.73	1160.88	0.00	671.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93.68	65.83	1155.18	0.00	671.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	66.93	1149.48	0.00	671.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	INCIDENCE ANGLE (DEG)	SUCT SUM (DEG)	FACIOM (DEG)	UMFRAC	LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTOM PRESS RATIO	MOTOM AUTOMATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9.45	11.51	18.00	0.00	0.00	0.00	-1.024	1.004	0.00	0.00
19.90	23.02	36.00	0.00	0.00	0.00	-1.049	1.004	0.00	0.00
30.35	34.53	54.00	0.00	0.00	0.00	-1.074	1.004	0.00	0.00
40.80	46.04	72.00	0.00	0.00	0.00	-1.099	1.004	0.00	0.00
51.25	57.55	90.00	0.00	0.00	0.00	-1.124	1.004	0.00	0.00
61.70	69.06	108.00	0.00	0.00	0.00	-1.149	1.004	0.00	0.00
72.15	80.57	126.00	0.00	0.00	0.00	-1.174	1.004	0.00	0.00
82.60	92.08	144.00	0.00	0.00	0.00	-1.199	1.004	0.00	0.00
93.05	103.59	162.00	0.00	0.00	0.00	-1.224	1.004	0.00	0.00
100.00	115.10	180.00	0.00	0.00	0.00	-1.249	1.004	0.00	0.00

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.827 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.829 (ADIABATIC)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW = 1.6797 K0/SFC  
 EQUIVALENT FLUX = 69.0661  
 100 PERCENT DESIGN SPEED - SCAN NO 24  
 EQUIVALENT SPEED = 76931.447 M.P.H.  
 EQUIVALENT FLOW / INLET ANN AREA = 175.9097 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0001

PERCENT SPAN FROM TIP (L. S.)	MR	MFT41 (DEG)	V1 (M/SEC)	V01 (M/SEC)	M1	V41 (M/SEC)	V11 (M/SEC)	U1 (M/SEC)
0.00	7.071	0.000	150.39	0.00	.051	150.39	165.55	683.27
9.35	685.47	0.000	150.39	0.00	.052	150.39	165.55	683.27
25.26	623.07	0.000	165.48	0.00	.052	165.48	181.62	723.02
61.95	65.42	0.000	170.94	0.00	.056	170.94	188.49	733.12
61.24	375.11	0.000	188.49	0.00	.057	188.49	197.56	740.66
85.00	61.15	0.000	188.49	0.00	.057	188.49	197.56	740.66
100.00	286.03	0.000	188.49	0.00	.055	188.49	197.56	740.66

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.7469

PERCENT SPAN FROM TIP (L. S.)	MR2	MFT42 (DEG)	V2 (M/SEC)	V02 (M/SEC)	M2	V42 (M/SEC)	V12 (M/SEC)	U2 (M/SEC)
0.00	57.13	1.027	253.59	152.04	.700	206.51	197.99	663.42
11.51	53.13	0.953	253.59	152.04	.703	214.05	208.39	673.92
30.66	66.72	0.900	271.07	159.37	.703	220.90	214.53	684.21
49.11	61.12	0.808	291.24	167.65	.624	234.14	231.14	715.59
65.04	33.07	0.801	308.55	174.84	.680	244.54	247.41	741.30
85.44	21.54	0.791	325.67	203.93	.683	253.91	249.74	764.37
100.00	14.23	0.763	335.36	216.98	.676	258.00	245.97	783.40

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM LEADING EDGE	PERCENT SPAN FROM TIP (L. S.)	INCIDENCE MEAN (DEG)	ANGLE SUM (DEG)	LOSS FACTOR	U4E440 (M/SEC)	PARAETER	DEVIATION ANGLE (DEG)	ROTOR PRESS. RATIO	ROTOR POLYTROPIC EFF
0.00	0.00	6.877	4.804	.3797	.2776	.0277	.017	1.674	.5746
9.35	11.51	6.569	4.200	.0186	.2776	.0506	-1.024	1.674	.5746
25.26	31.07	6.414	7.104	.0110	.1071	.0416	-1.835	1.757	.7093
41.05	49.11	6.204	6.308	.0370	.1078	.0287	.000	1.855	.8470
51.24	64.00	6.553	5.713	.0318	.0622	.0142	2.947	1.872	.846
61.24	61.15	6.142	6.409	.0247	.0712	.0155	12.665	1.916	.8536
85.00	100.00	6.993	4.919	.0436	.0406	.0179	21.281	1.915	.8536

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.927 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.919 (ADIABATIC)  
 MOMENTUM AVE. ROTOR PRESS. RATIO = 1.8105  
 MASS AVERAGE TEMPERATURE RATIO = 1.0225

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SERIAL NO 24

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .0852

PERCENT SPAN FROM TIP (I. I.)	M13 (UM)	V3 (FT/SEC)	M13	V43 (FT/SEC)	M13	V43 (FT/SEC)	M13	V43 (FT/SEC)	M13	V43 (FT/SEC)	M13	V43 (FT/SEC)
0.00	40.77	742.80	.668	515.85	.668	507.60	.668	507.60	.668	507.60	.668	507.60
11.57	41.71	614.61	.639	517.62	.639	511.74	.639	511.74	.639	511.74	.639	511.74
30.74	38.03	454.24	.731	524.74	.731	670.03	.731	670.03	.731	670.03	.731	670.03
47.17	31.86	377.16	.900	553.82	.900	743.74	.900	743.74	.900	743.74	.900	743.74
67.00	23.42	263.26	1.208	595.49	1.208	767.24	1.208	767.24	1.208	767.24	1.208	767.24
88.14	14.77	169.00	1.804	673.06	1.804	767.82	1.804	767.82	1.804	767.82	1.804	767.82
100.00	0.74	104.00	2.770	677.10	2.770	774.97	2.770	774.97	2.770	774.97	2.770	774.97

PERCENT SPAN FROM TIP (I. I.)	M4 (UM)	V4 (FT/SEC)	M4	V4 (FT/SEC)	M4	V4 (FT/SEC)	M4	V4 (FT/SEC)	M4	V4 (FT/SEC)	M4	V4 (FT/SEC)
0.00	11.22	640.67	.569	378.36	.569	379.70	.569	379.70	.569	379.70	.569	379.70
11.57	13.24	625.13	.577	377.03	.577	374.14	.577	374.14	.577	374.14	.577	374.14
30.74	22.53	726.16	.610	374.06	.610	725.44	.610	725.44	.610	725.44	.610	725.44
47.17	37.96	801.47	.650	373.96	.650	390.13	.650	390.13	.650	390.13	.650	390.13
67.00	47.27	795.51	.677	373.00	.677	744.92	.677	744.92	.677	744.92	.677	744.92
88.14	34.14	744.57	.630	373.24	.630	745.29	.630	745.29	.630	745.29	.630	745.29
100.00	1.13	744.24	.634	373.24	.634	750.13	.634	750.13	.634	750.13	.634	750.13

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .0981

PERCENT SPAN FROM TIP (I. I.)	M5 (UM)	V5 (FT/SEC)	M5	V5 (FT/SEC)	M5	V5 (FT/SEC)	M5	V5 (FT/SEC)	M5	V5 (FT/SEC)	M5	V5 (FT/SEC)
0.00	11.57	625.13	.577	374.03	.577	374.14	.577	374.14	.577	374.14	.577	374.14
11.57	13.24	726.16	.610	374.06	.610	725.44	.610	725.44	.610	725.44	.610	725.44
30.74	22.53	801.47	.650	373.96	.650	390.13	.650	390.13	.650	390.13	.650	390.13
47.17	37.96	795.51	.677	373.00	.677	744.92	.677	744.92	.677	744.92	.677	744.92
67.00	47.27	744.57	.630	373.24	.630	745.29	.630	745.29	.630	745.29	.630	745.29
88.14	34.14	744.24	.634	373.24	.634	750.13	.634	750.13	.634	750.13	.634	750.13
100.00	1.13	744.24	.634	373.24	.634	750.13	.634	750.13	.634	750.13	.634	750.13

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. I.)	EFFICIENCY (PER)	DETA (DEG)	JUDGMENT (DEG)	CHORD SUCT (IN)	CHORD (IN)	UMFGA (UM)	LOSS PARAMETER	DEVIATION (DEG)	STAGE PRESS RATIO	STAGE EFF	POLYTROPIC EFF
0.00	100.00	40.81	40.23	1.27	3942	.0389	.0194	14.170	1.055	1.7447	.8265
11.57	11.57	44.76	44.18	1.27	4910	.0622	.0216	13.525	1.070	1.7407	.8081
30.74	30.74	40.86	40.89	1.000	4000	.0181	.0209	10.009	1.111	1.7230	.7632
47.17	40.00	37.62	41.14	1.000	4122	.0084	.0209	9.030	1.111	1.7173	.7503
67.00	67.00	33.21	42.14	1.000	4346	.0302	.0374	13.312	1.101	1.7112	.6734
88.14	88.14	37.40	41.23	1.000	4212	.0270	.0374	12.723	1.177	1.7140	.6680
100.00	100.00	40.81	40.86	1.000	4416	.0330	.0389	14.079	1.177	1.7140	.6239

MOMENTUM AVERAGE STAGE EFFICIENCY = .7713 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7773 (ADIABATIC)  
MOMENTUM AVERAGE STAGE PRESS RATIO = 1.7460  
MASS AVERAGE TEMPERATURE RISE = 1.225

ORIGINAL PAGE IS  
OF POOR QUALITY

STATOR PERFORMANCE NASA 5 ALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 24

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .0852

PERCENT SPAN FROM TIP (L. F.)	DELTA 3 (DEG)	V3 (M/SEC)	V113 (M/SEC)	M3	VM3 (M/SEC)	V23 (M/SEC)	U3 (M/SEC)
0.00	40.57	241.66	177.17	.666	142.57	141.56	451.34
11.29	41.31	249.23	187.07	.686	146.46	146.15	452.95
30.76	38.03	261.59	191.16	.731	206.05	206.05	482.39
49.07	36.63	267.60	199.74	.800	276.69	276.69	373.18
67.49	37.42	293.69	178.40	.838	233.76	233.76	343.18
86.56	40.99	307.75	149.82	.883	216.03	216.03	310.59
100.00	41.77	319.85	127.44	.920	237.73	237.73	291.94

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .0896

PERCENT SPAN FROM TIP (L. F.)	DELTA 4 (DEG)	V4 (M/SEC)	V114 (M/SEC)	M4	VM4 (M/SEC)	V24 (M/SEC)	U4 (M/SEC)
0.00	39.00	207.47	-11.08	.566	207.17	207.17	468.12
11.29	39.05	211.07	-11.24	.577	211.37	211.55	452.73
30.76	37.33	217.36	-9.77	.610	271.12	271.73	408.85
49.07	36.96	244.27	-12.81	.680	243.95	243.64	301.53
67.49	37.27	292.87	4.15	.877	262.29	262.16	325.94
86.56	41.14	277.21	6.74	.839	277.16	276.11	377.68
100.00	42.10	289.69	6.70	.868	278.64	278.64	311.15

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP (M)	DELTA (DEG)	INCIDENCE MEAN (DEG)	SUCT SINK (DEG)	IP FACTOR	U/DEN	MAX	PARAMETER	LOSS	DEVIATION AVECT (DEG)	STAGE LOSS	STAGE LOSS RATIO	STATION POLYTROPIC EFF
0.00	0.00	43.61	4.251	3.29	.3942	.0540	.0540	.0194	19.120	1.655	1.7447	1.7447	.8265
11.29	11.29	46.36	5.120	1.747	.3410	.0622	.0622	.0216	13.523	1.670	1.7447	1.7447	.8081
30.76	30.13	40.56	1.404	-3.080	.3660	.0891	.0891	.0293	10.669	1.711	1.7235	1.7235	.7852
49.07	45.02	39.62	-2.114	-2.114	.3282	.0686	.0686	.0203	9.070	1.811	1.2171	1.2171	.8463
67.49	67.27	35.21	-2.193	-2.193	.3336	.1307	.1307	.0314	13.312	1.801	1.2112	1.2112	.8784
86.56	86.30	34.30	-1.913	-2.705	.4212	.2470	.2470	.0643	12.721	1.727	1.2140	1.2140	.8586
100.00	100.00	40.61	-2.043	-0.284	.4376	.2330	.2330	.0589	19.873	1.727	1.2140	1.2140	.8259

MOMENTUM AVECT STAGE EFFICIENCY = .7913 (POLYTROPIC)  
MOMENTUM AVECT STAGE EFFICIENCY = .7743 (ADIABATIC)  
MOMENTUM AVECT STAGE PRESS RATIO = 1.7460  
MASS AVERAGE TEMPERATURE RISE = 1.2225

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 3.1677 LPH/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 91.9475  
 100 PERCENT DESIGN SPEED = SCAN NO 2  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 76798.174 R.P.M.  
 37.1951 LBM/SEC-SU FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9862

PERCENT SPAN FROM TIP (L. F.)	RETA#1 (DEG)	V01 (FT/SEC)	VU01 (FT/SEC)	NO1	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	72.04	661.40	1582.40	1.523	0.00	517.68	0.00	.469	517.67	496.16	1582.40
9.99	70.74	1593.93	1504.71	1.461	0.00	525.66	0.00	.482	525.65	504.64	1504.71
26.55	67.44	1484.41	1375.21	1.370	0.00	570.29	0.00	.525	570.27	559.79	1375.21
43.27	64.06	1376.64	1244.42	1.267	0.00	583.93	0.00	.534	583.91	547.03	1244.42
62.21	62.73	1233.45	1096.37	1.135	0.00	565.07	0.00	.520	565.05	546.46	1096.37
85.23	60.00	1054.13	916.37	.970	0.00	527.01	0.00	.485	527.00	521.89	916.37
100.00	57.67	947.79	800.45	.847	0.00	506.88	0.00	.466	506.86	489.64	800.45

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7889

PERCENT SPAN FROM TIP (L. F.)	RETA#2 (DEG)	V#2 (FT/SEC)	VU#2 (FT/SEC)	M#2	BETA#2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V#P (FT/SEC)	V7#P (FT/SEC)	U2 (FT/SEC)
0.00	57.24	1107.43	928.47	.995	39.16	824.92	523.41	.694	642.74	622.04	1522.28
11.77	53.41	1120.02	903.77	.941	34.67	853.40	548.60	.722	661.49	647.03	1452.34
31.23	49.67	1063.38	795.33	.887	31.69	865.17	540.79	.735	675.30	671.09	1336.12
49.77	43.29	987.47	677.09	.840	27.40	904.77	549.51	.778	718.74	719.70	1224.61
64.39	35.17	907.52	522.67	.787	23.65	949.44	593.27	.824	751.84	749.68	1115.95
84.54	22.54	819.32	316.57	.716	18.02	1018.28	641.58	.890	756.50	744.07	996.14
100.00	14.54	742.06	196.37	.687	14.03	1052.91	731.80	.925	756.40	731.25	928.18

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA# (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCT SUR (DEG)	FACTOR	HAR OMEGA#	LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTOR PRESS RATIO	ADIBATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	14.01	7.768	.4059	.2432	.0501	.0501	.244	1.790	.7078	.7305
9.99	11.77	12.34	16.04	7.583	.4221	.2516	.0539	.0539	-1.104	1.795	.7116	.7345
26.55	31.23	32.53	17.01	6.462	.4197	.1677	.0361	.0361	-1.07	1.830	.8120	.8280
43.27	49.77	51.91	21.57	5.340	.4022	.0776	.0172	.0172	1.569	1.687	.6195	.6263
62.21	64.39	71.27	27.57	4.600	.3940	.0462	.0133	.0133	5.294	1.914	.6589	.6625
85.23	84.56	90.32	37.42	3.698	.3741	.0542	.0124	.0124	13.914	1.944	.6499	.6635
100.00	100.00	100.00	43.13	2.844	.3360	.0725	.0149	.0149	21.594	1.945	.6400	.6605

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8663 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .854 (ADIBATIC)  
 MOMENTUM AVG. MOTOR PRESS RATIO = 1.8634  
 MASS AVERAGE TEMPERATURE RISE = 1.2274

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT W/FIGHT FLOW = 1.5275 100 PERCENT DESIGN S/FIELD - SCAN NO 2  
 PERCENT DESIGN EQUIVALENT FLOW = 91.9475 KG/SFC EQUIVALENT SPEED  
 R.P.M. = 76790.324 R.P.M.  
 INLET ANN AREA = 1.01.007A M<sup>2</sup>/SEC-50 M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9862

PERCENT SPAN FROM TIP (L. F.)	BETA*1 (DEG)	V01 (M/SEC)	VU01 (M/SEC)	BETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	M2	V41 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	72.05	507.13	0.02.44	0.00	156.26	0.00	.669		156.24	151.23	482.44
5.99	70.74	485.83	1.46.64	0.00	160.22	0.00	.682		160.22	150.97	458.64
26.55	67.48	451.79	4.14.10	0.00	173.82	0.00	.525		173.82	170.62	419.16
43.27	64.86	414.99	3.79.30	0.00	177.98	0.00	.520		177.98	177.40	379.10
62.21	62.73	375.76	3.34.17	0.00	172.23	0.00	.520		172.23	172.17	334.17
85.23	60.00	322.52	2.79.31	0.00	161.24	0.00	.685		161.24	150.07	279.31
100.00	57.67	248.09	2.44.10	0.00	154.50	0.00	.664		154.50	149.24	244.10

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7889

PERCENT SPAN FROM TIP (L. F.)	BETA*2 (DEG)	V02 (M/SEC)	VU02 (M/SEC)	BETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	M42	V42 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	57.24	302.05	3.04.45	39.16	252.66	159.54	.694		195.91	199.60	663.99
11.77	53.80	341.38	2.75.47	39.67	261.94	167.21	.722		201.62	197.21	442.69
31.33	49.67	314.02	2.47.42	38.59	263.70	164.83	.735		205.83	204.55	407.25
40.77	47.29	300.78	2.07.38	37.40	275.77	167.49	.778		219.07	219.06	373.87
68.19	35.17	274.61	1.59.31	38.65	289.54	180.83	.824		226.12	225.05	340.14
88.54	27.58	244.73	1.16.88	42.02	310.37	207.74	.890		230.59	226.79	303.62
100.00	14.54	248.37	59.86	44.03	320.93	223.05	.925		230.73	227.60	282.91

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA BETA* (DEG)	MASS FLOW (PCT)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	DELTA ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	RATIO	WROTOR ANTIADABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	14.81	7.748	.6059	.2432	.249	1.790	.7078	.7105
9.99	11.77	12.34	14.94	7.583	.4221	.2516	-1.106	1.795	.7116	.7142
26.55	31.33	32.57	17.81	6.462	.4197	.0361	-1.197	1.830	.9128	.8240
43.27	49.77	51.41	21.57	5.340	.4072	.0776	1.569	1.887	.9145	.8263
62.21	68.39	71.27	27.57	4.600	.3940	.0462	5.296	1.914	.9589	.9625
85.23	88.56	90.32	37.42	3.698	.3741	.0592	13.814	1.944	.9500	.9635
100.00	100.00	100.00	43.13	2.844	.3360	.0725	21.594	1.945	.9400	.9635

MO-MENTUM AVERAGE ROTOR EFFICIENCY = .8663 (POLYTROPIC) MO-MENTUM AVG. ROTOR PRESS RATIO = 1.8634  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8561 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.2274



STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 2

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8874

PERCENT SPAN FROM TIP (T. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	34.43	818.64	538.45	.712	655.50	648.30	1478.38
11.52	40.87	858.52	561.81	.721	649.15	648.07	1419.24
30.76	38.37	883.28	548.31	.752	692.45	672.44	1317.79
48.94	36.66	923.27	551.19	.796	720.66	740.11	1255.87
67.65	38.05	954.73	588.38	.829	751.84	749.09	1125.23
88.15	41.48	1006.80	666.81	.878	754.29	744.16	1019.20
100.00	42.78	1045.16	709.82	.917	767.10	745.91	956.33

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8999

PERCENT SPAN FROM TIP (T. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	-41	710.59	-5.08	.588	710.56	710.56	1467.66
11.52	-47	714.05	-5.91	.591	714.00	713.91	1416.40
30.76	-1.83	728.81	-23.25	.610	728.42	728.10	1330.56
48.94	-1.99	779.05	-27.09	.660	778.55	777.75	1217.89
67.65	-1.47	771.16	-14.08	.654	770.90	770.47	1164.55
88.15	3.71	730.10	47.22	.615	728.55	725.89	1072.02
100.00	3.83	735.39	44.16	.620	733.72	733.72	1019.05

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HEAT (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	ANGLE (DEG)	LOSS PARAMETER	OMEGA BAR	HAR	FACTOR	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE POLYTROPIC EFF
0.00	0.00	0.00	32.84	3.102	-4.13		.0221	.0613		.3955	21.770	1.2553	.8100
11.52	11.43	12.34	41.35	4.644	1.100		.0220	.0633	.3976		16.058	1.2553	.8105
30.76	30.57	32.54	40.20	1.747	-1.543		.0255	.0775	.3849		11.328	1.2553	.8105
48.94	48.94	51.91	38.65	-1.130	-4.114		.0139	.0655	.3442		9.972	1.2549	.8755
67.65	67.57	71.27	39.46	-1.234	-4.385		.0228	.1003	.3689		9.693	1.2121	.7730
88.15	88.19	90.12	37.77	-1.844	-3.768		.0557	.2109	.4294		15.241	1.2175	.6481
100.00	100.00	100.00	38.95	-1.853	-5.294		.0501	.1984	.4461		22.533	1.2176	.6353

MOMENTUM AVERAGE STAGE EFFICIENCY = .8232 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8080 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.8067  
 MASS AVERAGE TEMPERATURE RISE = 1.2274

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STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 2

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8874

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	39.43	258.67	144.27	.712	199.89	197.60	450.51
11.52	40.97	261.64	171.24	.721	197.85	197.53	432.28
30.74	38.37	269.22	167.10	.752	211.06	211.06	401.66
48.94	36.66	281.41	164.00	.796	225.75	225.59	372.73
67.65	38.05	291.00	179.34	.829	229.16	229.32	342.97
88.15	41.48	306.47	203.24	.878	229.91	229.91	310.35
100.00	42.78	318.56	214.35	.917	233.81	227.15	291.49

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8985

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-0.41	216.59	-1.55	.588	216.59	216.59	447.34
11.43	-0.47	217.64	-1.80	.591	217.63	217.60	431.72
30.57	-1.03	222.14	-7.09	.610	222.02	221.92	405.55
48.90	-1.90	237.65	-8.21	.660	237.30	237.06	380.36
67.57	-1.42	235.05	-5.82	.654	234.97	234.84	354.76
88.19	3.71	222.53	14.39	.615	222.06	221.24	326.75
100.00	3.83	224.15	14.94	.620	223.64	223.64	310.61

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR (DEG)	ANGLE (DEG)	FACTOR	D	OMEGA RAP	PARAMETER	LOIS	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE LOSS RATIO	STAGE LOSS RATIO	POLYTROPIC EFF
0.00	0.00	0.00	39.84	3.109	-0.813	.3955	.3955	.0613	.0721	.0721	21.770	1.759	1.2557	1.2557	.8300	
11.52	11.43	12.38	41.35	4.694	1.760	.3976	.3976	.0633	.0220	.0220	15.054	1.762	1.2553	1.2553	.8305	
30.74	30.57	32.73	40.20	1.747	-1.543	.3849	.3849	.0775	.0255	.0255	14.328	1.784	1.2115	1.2115	.8025	
48.94	48.99	51.91	38.65	-1.130	-0.114	.3442	.3442	.0455	.0139	.0139	9.972	1.844	1.2149	1.2149	.8755	
67.65	67.57	71.27	39.44	-1.534	-0.385	.3689	.3689	.1003	.0288	.0288	9.683	1.844	1.2121	1.2121	.7730	
88.15	88.19	90.32	37.77	-0.844	-2.768	.4294	.4294	.2109	.0557	.0557	15.241	1.783	1.2175	1.2175	.6491	
100.00	100.00	100.00	38.95	-1.853	-5.294	.4461	.4461	.1984	.0501	.0501	22.533	1.783	1.2176	1.2176	.6953	

MOMENTUM AVERAGE STAGE EFFICIENCY = .8232 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8080 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.8067  
MASS AVERAGE TEMPERATURE RISE = 1.2274

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNF 28 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.3259 LHM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 90.8040  
 100 PERCENT DESIGN SPEED = SCAN NO 3  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANGLE AREA = 76733.817 R.P.4.  
 36.7334 LHM/SEC-SU FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9887

PERCENT SPAN FROM TIP (L. F.)	HETA*1 (DEG)	VE*1 (FT/SEC)	VU*1 (FT/SEC)	W*1 (DEG)	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	72.30	1660.09	1581.47	1.519	0.00	504.85	0.00	.462	504.85	488.59	1581.47
9.42	71.02	1591.20	1504.73	1.447	0.00	517.39	0.00	.474	517.39	500.45	1504.73
26.16	67.84	1406.87	1377.09	1.367	0.00	560.72	0.00	.516	560.72	550.42	1377.09
42.82	65.28	1372.69	1246.89	1.264	0.00	574.06	0.00	.529	574.06	555.47	1246.89
61.84	63.17	1230.76	1098.28	1.131	0.00	555.47	0.00	.511	555.47	545.28	1098.28
85.08	60.45	1053.84	916.73	0.965	0.00	519.81	0.00	.476	519.81	512.83	916.73
100.00	58.11	942.41	800.17	0.862	0.00	497.85	0.00	.455	497.85	480.94	800.17

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .7836

PERCENT SPAN FROM TIP (L. F.)	HETA*2 (DEG)	VE*2 (FT/SEC)	VU*2 (FT/SEC)	W*2 (DEG)	BETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V42 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	57.98	1174.03	915.10	.981	40.17	814.77	525.62	.681	622.54	602.51	1521.00
11.72	54.50	1106.36	900.65	.928	40.40	846.31	550.81	.710	642.54	628.50	1451.45
31.19	50.21	1030.75	792.04	.874	39.50	854.90	543.83	.725	659.63	655.52	1335.87
49.67	43.63	973.14	671.51	.816	38.22	894.49	554.64	.770	704.42	704.29	1226.15
64.34	35.14	903.19	519.94	.783	38.47	948.85	595.42	.823	738.77	736.60	1115.35
88.44	22.51	807.11	388.83	.704	42.75	1013.46	686.98	.845	745.64	733.19	945.91
100.00	14.25	769.84	189.46	.676	44.68	1049.43	737.94	.921	746.17	720.81	927.40

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (P.T)	DELTA HETA* (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	FACTORS	OMEGA* HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	RATOR PRESS RATIO	ROTOR ANTIADIBATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	14.32	8.458	7.990	.4134	.2491	.0503	.986	1.785	.7016	.7247
9.42	11.72	12.19	16.53	9.158	7.840	.4302	.2559	.0539	-.421	1.793	.7074	.7302
25.16	31.19	32.10	17.63	8.897	6.790	.4283	.1734	.0169	.295	1.828	.8069	.8225
42.82	49.67	51.47	21.65	8.583	5.720	.4170	.0869	.0191	1.866	1.888	.9102	.9179
61.84	68.14	70.47	28.03	8.072	5.011	.3945	.0384	.0086	5.220	1.924	.9640	.9696
85.08	88.46	90.22	37.94	9.168	4.128	.3845	.0662	.0143	13.596	1.948	.9657	.9547
100.00	100.00	100.00	43.86	9.358	3.284	.3665	.0810	.0167	21.299	1.948	.9657	.9597

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8637 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8513 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.8651  
 MASS AVERAGE TEMPERATURE RISE = 1.2288

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.5086 KG/SEC 100 PERCENT DESIGN SPEED - SCAN NO 3  
 PERCENT DESIGN EQUIVALENT FLOW = 90.0040 EQUIVALENT SPEED  
 FLOW/EQUIVALENT FLOW / INLET ANGLE = 76733.917 R.P.M.  
 = 179.1680 KG/SEC-50 M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9887

PERCENT SPAN FROM TIP (L. F.)	RETA#1 (DEG)	VE1 (M/SEC)	VU#1 (M/SEC)	HETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	V41 (M/SEC)	V71 (M/SEC)	J1
0.00	72.30	506.00	482.03	0.00	153.88	0.00	.462	153.88	148.02	692.03
4.82	71.02	485.00	458.64	0.00	157.70	0.00	.474	157.70	152.54	658.64
26.16	67.84	453.20	419.74	0.00	170.91	0.00	.516	170.91	147.77	419.74
42.82	65.28	418.40	380.05	0.00	174.97	0.00	.529	174.97	174.41	380.05
61.84	63.17	375.14	334.76	0.00	169.31	0.00	.511	169.31	164.25	334.76
85.88	60.45	321.21	279.42	0.00	158.44	0.00	.476	158.44	154.91	279.42
100.00	58.11	287.25	243.89	0.00	151.75	0.00	.455	151.75	146.59	243.89

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7896

PERCENT SPAN FROM TIP (T. F.)	RETA#2 (DEG)	VE2 (M/SEC)	VU#2 (M/SEC)	BETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V42 (M/SEC)	V72 (M/SEC)	U2
0.00	57.98	357.85	303.19	40.17	248.34	160.21	.681	189.74	183.64	653.60
11.72	54.50	337.22	276.52	40.80	257.96	167.89	.710	195.45	191.57	642.40
31.19	50.21	314.17	241.41	37.50	260.57	165.76	.725	201.64	199.80	407.17
49.47	43.63	296.61	204.68	38.22	273.25	169.05	.770	214.68	214.67	373.73
44.34	35.14	275.35	158.68	34.87	282.21	181.48	.823	225.10	224.51	339.76
88.45	22.51	246.01	94.16	42.65	309.03	209.39	.885	227.27	221.54	303.55
100.00	14.25	234.65	57.75	44.68	319.87	224.92	.921	227.63	219.70	292.67

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PC)	DELTA HFL# (DEG)	INCIDENCE ANGLE (DEG)	SUCT ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	WOTOR PRESS RATIO	ADIBATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	14.32	8.458	7.130	.6503	.986	1.785	.7016	.7247
9.82	11.72	12.19	16.53	9.154	7.440	.6539	-.421	1.793	.7074	.7302
26.16	31.19	32.10	17.61	8.897	6.770	.6369	.295	1.829	.8069	.8225
42.82	49.67	51.47	21.65	8.583	5.720	.6191	1.866	1.884	.9102	.9179
61.84	68.34	70.97	28.01	8.872	5.011	.6086	5.220	1.926	.9640	.9690
85.88	88.46	90.22	37.94	9.168	4.828	.6143	13.596	1.949	.9557	.9597
100.00	100.00	100.00	43.86	9.358	3.284	.6167	21.299	1.948	.9557	.9597

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8637 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8513 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR PRESS RATIO = 1.8651  
 MASS AVERAGE TEMPERATURE RATIO = 1.2285

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 3

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8856

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VII3 (FT/SEC)	M3	VH3 (FT/SEC)	WZ3 (FT/SEC)	U3 (FT/SEC)
0.00	40.35	836.01	541.23	.700	637.17	630.17	1477.14
11.47	41.69	848.17	504.08	.712	633.41	627.36	1417.30
30.62	39.07	874.84	551.43	.744	679.17	679.16	1317.44
48.85	37.36	916.89	556.36	.789	728.80	728.26	1222.35
67.59	38.16	955.70	590.54	.829	751.41	748.66	1124.57
88.07	42.00	1004.62	672.23	.875	746.56	740.54	1017.75
100.00	44.30	1043.80	735.81	.915	759.70	738.71	955.52

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8982

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VII4 (FT/SEC)	M4	VH4 (FT/SEC)	WZ4 (FT/SEC)	U4 (FT/SEC)
0.00	.12	689.33	1.44	.569	689.33	689.33	1466.43
11.46	-.02	694.40	-.24	.573	694.40	694.32	1415.53
30.39	-2.82	710.99	-35.03	.594	710.13	709.42	1330.22
48.83	-1.82	765.65	-24.32	.647	765.26	764.47	1247.58
67.44	-1.80	760.54	-21.94	.644	760.17	759.75	1184.16
88.14	1.33	718.23	41.73	.604	717.02	714.40	1071.37
100.00	3.47	723.18	43.80	.608	721.85	721.85	1018.20

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (PCF)	DELTA HPTA (DEG)	INCIDENCE MEAN (DEG)	SUCT SUM (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	40.23	4.027	.105	.0216	22.300	1.755	.8442
11.47	12.19	41.71	5.507	2.171	.0219	16.525	1.740	.8412
30.62	32.10	41.90	2.455	-.839	.0251	10.350	1.745	.8158
48.85	51.47	39.18	-.420	3.551	.0120	10.155	1.641	.6378
67.59	70.97	39.97	-1.409	-.6262	.0302	9.296	1.852	.7737
88.07	90.22	38.67	-3.343	-.231	.0548	14.863	1.789	.6537
100.00	100.00	39.82	-1.336	-.4777	.0492	22.113	1.790	.7089

MOMENTUM AVERAGE STAGE EFFICIENCY = .8222 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .8069 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.8101

MASS AVERAGE TEMPERATURE RISE = 1.2285

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 3

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8856

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	V1/3 (M/SEC)	M3	VM3 (M/SEC)	V2/3 (M/SEC)	U3 (M/SEC)
0.00	40.35	154.82	164.97	.700	194.21	192.04	450.23
11.47	41.69	250.52	171.93	.712	193.04	192.74	431.94
30.62	39.07	266.65	169.04	.744	207.01	207.01	401.55
40.85	37.36	279.47	169.58	.789	222.14	221.97	372.57
67.50	34.16	291.20	180.00	.829	229.03	224.10	342.77
88.07	42.00	306.21	204.90	.875	227.55	224.50	310.21
100.00	43.30	318.15	218.18	.915	231.56	225.14	291.24

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8982

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	V7/4 (M/SEC)	U4 (M/SEC)
0.00	12	210.11	.44	.569	210.11	210.11	446.97
11.36	-0.2	211.65	-0.09	.573	211.65	211.63	411.45
30.39	-2.82	216.71	-10.68	.594	216.45	216.35	405.45
40.83	-1.82	233.37	-7.41	.647	233.25	233.01	380.26
67.44	-1.80	231.81	-7.30	.644	231.70	231.57	354.54
88.14	3.13	218.92	12.72	.604	218.55	217.75	326.55
100.00	3.47	220.42	13.35	.628	220.02	220.02	310.35

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	FACTOP	D	OMEGA	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE P/FSS RATIO	STAGE T/FMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	40.23	4.027	105	.4100	.7599	.0216	.0216	22.300	1.755	1.2541	.8442
11.47	11.36	12.19	41.71	5.507	2.171	.4120	.0431	.0219	.0219	16.525	1.746	1.2541	.8412
30.62	30.39	32.10	41.90	7.455	-0.839	.4150	.0764	.0751	.0751	10.350	1.795	1.2327	.8158
40.85	40.83	51.47	39.19	-4.20	-1.405	.3451	.0390	.0120	.0120	10.155	1.861	1.2179	.8978
67.50	67.44	70.97	39.47	-1.409	-4.262	.3828	.1052	.0302	.0302	9.296	1.452	1.2124	.7737
88.07	88.14	90.22	38.67	-2.343	-3.231	.4629	.2075	.0544	.0544	14.863	1.749	1.2192	.6437
100.00	100.00	100.00	39.82	-1.336	-4.777	.4537	.1049	.0492	.0492	22.173	1.790	1.2143	.7084

MOMENTUM AVERAGE STAGE EFFICIENCY = .8222 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8069 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.8101  
MASS AVERAGE TEMPERATURE RISE = 1.2285

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 3.4239 LBM/SEC 100 PERCENT DESIGN SPEED - SCAN NO 4  
 PERCENT DESIGN EQUIVALENT FLOW = 93.4433 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 76772.51A R.P.M.  
 37.8164 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .9842

PERCENT SPAN FROM TIP (I. F.)	HETA*1 (DEG)	V*1 (FT/SEC)	HETA1 (DEG)	V1 (FT/SEC)	M1	V*1 (FT/SEC)	V1 (FT/SEC)	U1 (FT/SEC)
0.00	71.09	1686.64	1582.26	1.527	0.00	523.69	523.69	506.82
10.16	70.13	1545.97	1505.43	1.444	0.00	477.24	477.24	519.65
27.02	66.74	1490.16	1371.04	1.373	0.00	583.72	583.72	573.00
43.86	64.25	1374.04	1239.40	1.270	0.00	597.80	597.80	594.87
60.71	62.11	1224.19	1092.72	1.149	0.00	574.47	574.47	578.27
77.57	45.37	1063.14	914.94	0.976	0.00	541.44	541.44	534.17
100.00	57.04	923.97	800.58	0.874	0.00	518.78	518.78	501.15

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .7826

PERCENT SPAN FROM TIP (I. F.)	HETA*2 (DEG)	V*2 (FT/SEC)	HETA2 (DEG)	V2 (FT/SEC)	M2	V*2 (FT/SEC)	V2 (FT/SEC)	U2 (FT/SEC)
0.00	55.70	1220.10	1010.36	1.027	0.00	654.02	654.02	683.97
11.69	52.72	1150.72	916.56	0.971	0.00	877.66	877.66	674.91
23.38	48.95	1084.27	802.19	0.909	0.00	840.62	840.62	694.55
35.07	42.92	1004.57	685.46	0.849	0.00	913.62	913.62	737.07
46.76	36.72	913.89	523.31	0.798	0.00	949.17	949.17	743.09
58.45	22.42	843.34	321.54	0.739	0.00	1030.15	1030.15	770.42
100.00	14.76	806.65	205.47	0.711	0.00	1063.17	1063.17	780.04

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	DELTA HETA* (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCT S/D (DEG)	FACTON	OMEGA* BAH	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR LOSS RATIO	ROTOR LOSS RATIO	POLYTROPIC EFF
0.00	0.00	15.78	7.850	7.382	.3848	.2193	-1.087	1.801	.7330	.7540
10.16	11.68	12.57	8.533	7.194	.4010	.2346	-2.099	1.794	.7275	.7489
27.02	31.60	33.07	8.134	5.972	.4038	.1553	-.945	1.831	.8254	.8376
43.86	49.93	52.51	7.694	4.775	.3867	.0657	1.274	1.890	.9310	.9368
60.71	68.57	71.30	7.488	3.944	.3656	.0476	4.993	1.907	.9575	.9612
77.57	88.71	101.44	8.143	3.092	.3525	.0379	13.865	1.946	.9730	.9763
100.00	100.00	122.10	8.304	.2126	.3126	.0467	21.809	1.946	.9740	.9763

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8762 (POLYTROPIC) MOMENTUM AVERAGE ROTOR LOSS RATIO = 1.8608  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8649 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.2240

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.5531 KG/SEC EQUIVALENT SPEED = 76777.510 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 93.6873 EQUIVALENT FLOW / INLET AIN AREA = 144.6150 KG/SEC-SQ M

100 PERCENT DESIGN SPEED - SCAN NO 4

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9842

PERCENT SPAN FROM TIP (I. F.)	RETA#1 (DEG)	VE1 (M/SEC)	VU#1 (M/SEC)	W#1 (INFO)	V1 (M/SEC)	VU1 (M/SEC)	M1	V#1 (M/SEC)	W1 (M/SEC)	V71 (M/SEC)	U1
0.00	71.69	508.00	407.27	1.527	153.62	0.00	.680	150.62	154.48	682.27	
10.14	70.31	404.45	454.06	1.464	163.74	0.00	.673	163.74	154.39	658.06	
27.02	68.93	454.20	417.90	1.373	171.92	0.00	.530	177.92	176.65	617.70	
43.84	64.25	414.62	377.77	1.270	182.21	0.00	.552	182.21	141.62	377.77	
62.63	62.10	376.85	333.86	1.139	176.32	0.00	.533	176.32	176.26	333.86	
84.37	59.38	324.05	278.97	.976	165.03	0.00	.497	165.03	165.03	278.97	
100.00	57.06	290.77	244.02	.874	154.12	0.00	.475	154.12	152.75	244.02	

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7826

PERCENT SPAN FROM TIP (I. F.)	RETA#2 (DEG)	VE2 (M/SEC)	VU#2 (M/SEC)	W#2 (INFO)	V2 (M/SEC)	VU2 (M/SEC)	M2	V#2 (M/SEC)	W2 (M/SEC)	V72 (M/SEC)	U2
0.00	55.90	371.49	307.96	1.027	36.79	260.71	.719	155.88	208.47	201.74	463.83
11.60	52.82	350.62	274.37	.971	37.63	267.51	.741	161.32	211.47	207.24	442.69
31.40	48.45	324.69	244.51	.909	37.26	269.41	.751	167.49	213.66	212.31	407.00
40.23	42.92	306.40	208.3	.849	36.22	271.67	.768	164.53	226.67	224.66	373.45
64.57	34.72	286.08	159.51	.738	34.05	292.36	.833	180.14	230.22	220.54	339.70
84.71	22.42	257.05	94.02	.719	40.42	311.99	.907	205.23	217.63	217.73	303.25
100.00	14.74	245.87	62.63	.711	62.80	324.05	.937	220.19	217.74	209.68	242.81

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP	TRAILING EDGE	MASS FLOW (PCT)	DELTA WETA# (DEG)	INCIDENCE ANGLE (DEG)	SUCT CURV (INFO)	OMEGA HAR	LOSS PARAMETER (INFO)	DEVIATION ANGLE (DEG)	MOTOR PRESS RATIO	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	0.03	15.70	7.850	7.382	.2193	.0468	-1.087	1.801	.7310
10.14	11.64	11.64	12.50	17.50	8.523	7.194	.2366	.0514	-2.093	1.784	.7459
27.02	31.40	31.40	33.07	18.09	8.134	5.972	.1553	.0340	-.945	1.831	.8376
43.84	49.93	49.93	52.73	21.33	7.694	4.775	.0657	.0166	1.274	1.880	.9304
62.63	68.57	68.57	71.65	27.39	7.488	3.999	.0474	.0107	4.093	1.907	.9612
84.37	88.71	88.71	90.44	36.97	8.143	3.042	.0379	.0082	13.845	1.846	.9763
100.00	100.00	100.00	100.00	42.30	8.304	2.230	.0467	.0094	21.809	1.946	.9763

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8762 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8649 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.8608  
 MASS AVERAGE TEMPERATURE RISE = 1.2240



NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1973 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 4

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8828

PERCENT SPAN FROM TIP (L. P.)	BETA 3 (DEG)	V3 (FT/SEC)	VII3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	37.14	872.17	526.59	.736	695.26	687.62	1477.89
11.67	38.96	872.69	548.74	.736	678.54	677.46	1418.24
20.83	37.04	896.46	540.50	.766	715.19	715.19	1317.00
49.12	35.61	929.00	541.42	.804	756.03	755.47	1224.53
67.05	37.59	911.23	586.30	.835	761.72	758.06	1123.80
88.32	40.45	1015.36	654.74	.888	772.65	762.27	1016.97
100.00	61.76	1052.25	700.87	.926	784.86	783.19	956.00

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8882

PERCENT SPAN FROM TIP (L. P.)	BETA 4 (DEG)	V4 (FT/SEC)	VII4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-1.12	748.24	-15.02	.641	769.14	748.14	1467.17
11.34	-1.13	745.81	-15.07	.638	765.66	745.57	1416.14
20.53	-1.27	784.32	-17.66	.661	786.12	793.78	1330.20
48.87	-1.71	819.56	-18.53	.694	819.35	816.51	1248.19
67.41	-1.67	806.67	-20.66	.685	804.41	803.97	1166.84
88.14	-1.47	766.31	-19.61	.647	766.06	741.26	1071.89
100.00	-1.47	770.12	-19.76	.652	769.87	749.87	1018.71

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PLT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	D FACTOR	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PPFSS MATIO	STAGE TFMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	38.26	.822	-3.100	.3466	.0718	.0249	21.060	1.762	1.2403	.7386
11.43	11.34	12.59	40.09	2.762	-5.555	.3465	.0661	.0230	15.416	1.754	1.2493	.7555
20.83	20.53	13.07	38.37	.650	-2.838	.3271	.0715	.0235	11.070	1.740	1.2281	.7550
49.12	48.87	42.51	36.90	-2.194	-5.175	.2942	.0583	.0166	10.680	1.845	1.2119	.8096
67.05	67.41	71.65	39.68	-2.021	-4.866	.3381	.1283	.0362	9.529	1.818	1.2111	.8485
88.32	88.14	40.44	41.92	-1.953	-4.827	.6159	.2438	.0665	10.062	1.755	1.2146	.8553
100.00	100.00	100.00	43.23	-2.868	-6.309	.4314	.2300	.0581	17.230	1.756	1.2147	.8160

MOMENTUM AVERAGE STAGE EFFICIENCY = .824 (POLYTROPIC)

MOMENTUM AVERAGE STAGE PRESS RATIO = 1.7434

MOMENTUM AVERAGE STAGE TEMPERATURE RISE = 1.2240

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 4

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8828

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V7 (M/SEC)	VII3 (M/SEC)	M3	V43 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	37.14	245.84	160.51	.736	211.91	209.59	450.86
11.43	38.96	266.00	167.26	.736	206.83	209.59	432.28
30.83	37.08	273.24	166.75	.766	217.99	217.99	401.82
49.12	35.61	283.43	165.03	.804	230.44	230.27	372.37
67.45	37.59	292.98	174.70	.835	232.17	231.72	362.53
88.12	40.45	309.48	200.78	.880	235.50	232.34	303.97
100.00	41.76	320.72	211.62	.926	239.23	232.62	291.19

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8882

PERCENT SPAN FROM TIP (T. F.)	BETA 4 (DEG)	V4 (M/SEC)	VII4 (M/SEC)	M4	V44 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-1.12	239.17	-4.58	.641	234.13	234.13	447.19
11.34	-1.13	233.42	-4.59	.630	233.37	233.15	431.64
30.53	-1.29	239.86	-5.38	.661	239.00	238.90	405.86
49.03	-1.30	249.80	-5.65	.699	249.74	249.48	380.45
67.41	-1.47	265.24	-6.29	.685	245.14	245.05	355.04
88.14	-1.47	272.96	-6.78	.647	232.88	232.83	326.71
100.00	-1.47	234.73	-6.02	.652	234.66	234.66	310.30

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (KGF)	DELTA HETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCTION (DEG)	FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATION POLYTROPIC EFF
0.00	0.00	0.00	38.26	.822	-3.109	.3446	.0718	.0259	21.060	1.762	1.2493	.7384
11.43	11.34	12.59	40.09	2.782	-5.55	.3465	.0661	.0230	15.414	1.758	1.2493	.7455
30.83	30.53	33.07	38.37	.450	-2.838	.3271	.0715	.0235	11.070	1.749	1.2281	.7550
49.12	48.83	32.53	36.90	-2.194	-5.175	.2992	.0543	.0166	10.690	1.865	1.2119	.8044
67.45	67.41	71.65	39.06	-2.021	-6.866	.3381	.1263	.0362	9.624	1.810	1.2111	.8485
88.12	88.14	90.44	41.92	-1.453	-6.827	.4159	.2438	.0645	10.062	1.755	1.2166	.8553
100.00	100.00	100.00	43.23	-2.868	-6.309	.4314	.2300	.0581	17.230	1.756	1.2187	.8160

MOMENTUM AVERAGE STAGE EFFICIENCY = .8261 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8091 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.7434  
MASS AVERAGE TEMPERATURE RISE = 1.2260

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT W/FIGHT FLOW PERCENT DESIGN EQUIVALENT FLOW = 3.2952 LHM/SEC  
 EQUIVALENT SPEED 100 PERCENT DESIGN SPEED - SCAN NO 5  
 EQUIVALENT FLOW / INLET ANN AREA = 76771.414 R.P.M.  
 69.9486 36.3946 LHM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9969

PERCENT SPAN FROM TIP (I. F.)	HETA#1 (DEG)	VO1 (FT/SEC)	VU*1 (FT/SFC)	MO1	HETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SFC)	V71 (FT/SFC)	U1 (FT/SEC)
0.00	72.97	1659.33	1582.24	1.518	0.00	491.65	0.00	.457	499.89	481.79	1582.24
4.67	71.23	1591.29	1506.64	1.457	0.00	512.10	0.00	.469	512.10	495.34	1506.64
25.85	64.11	1487.43	1380.20	1.367	0.00	554.52	0.00	.510	554.52	546.74	1380.20
42.45	65.58	1173.23	1250.40	1.264	0.00	567.67	0.00	.522	567.67	545.88	1250.40
61.67	63.69	1231.25	1101.77	1.131	0.00	544.61	0.00	.505	544.61	549.43	1101.77
84.84	60.73	1053.91	917.39	.965	0.00	515.22	0.00	.472	515.22	508.70	919.39
100.00	58.24	941.07	800.57	.860	0.00	494.68	0.00	.452	494.68	477.87	900.57

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .7997

PERCENT SPAN FROM TIP (I. F.)	HETA#2 (DEG)	VO2 (FT/SEC)	UO2 (FT/SEC)	MO2	HETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V42 (FT/SEC)	V72 (FT/SFC)	U2 (FT/SEC)
0.00	51.88	1154.77	992.86	.647	41.42	794.38	528.88	.664	599.41	580.10	1321.75
13.67	55.26	1091.12	870.29	.615	41.66	833.69	554.13	.698	622.40	600.27	1452.42
31.07	50.94	1018.86	749.68	.611	40.52	842.88	547.61	.713	640.75	634.76	1337.20
49.44	43.49	966.11	664.91	.628	38.74	899.04	563.10	.771	700.48	700.86	1228.01
67.79	35.44	898.25	521.76	.679	37.26	944.72	597.87	.818	731.47	724.31	1119.23
84.04	23.04	774.47	304.68	.677	64.10	997.56	494.23	.867	714.37	704.60	998.91
100.00	14.13	734.21	180.66	.666	66.20	1075.61	747.40	.905	714.86	692.49	927.85

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA# (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	DELTA FACTOR	OMEGA HAN	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS. RATIO	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	13.59	8.640	8.142	.4224	.2600	.0511	1.889	1.775	.6894	.7132
9.67	11.67	12.07	15.97	9.370	8.621	.4333	.2641	.0546	.778	1.747	.6985	.7219
25.85	31.07	31.79	17.17	9.111	7.023	.4347	.1837	.0789	.982	1.810	.7933	.8097
42.45	49.45	51.14	22.09	8.437	5.944	.4203	.0930	.0205	1.622	1.498	.9448	.9130
61.67	67.74	70.71	28.01	4.148	5.301	.4020	.0463	.0103	5.114	1.927	.6503	.9629
84.84	88.04	90.12	37.69	4.621	4.491	.4138	.1175	.0253	13.535	1.922	.9217	.9285
100.00	100.00	100.00	44.16	9.535	3.461	.3802	.1431	.0295	21.181	1.922	.9216	.9286

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8525 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8392 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS. RATIO = 1.8602  
 MASS AVERAGE TEMPERATURE RISE = 1.2308

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.4947 KG/SEC      SCAM NO 5      H.P.M.      R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 89.9686      EQUIVALENT SPEED      177.6041      76771.6414

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9969

PERCENT SPAN FROM TIP (L. F.)	HETA#1 (DEG)	W01 (M/SEC)	W1* (M/SEC)	BETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	V41 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	72.47	505.76	482.27	0.00	152.37	0.00	.457	152.37	147.66	442.27
9.67	71.23	485.03	459.22	0.00	156.09	0.00	.469	156.09	150.98	459.22
25.45	64.11	473.37	425.69	0.00	164.02	0.00	.510	169.02	145.91	420.69
42.65	65.54	414.56	381.12	0.00	173.02	0.00	.522	173.02	172.47	341.12
61.47	63.49	375.29	375.42	0.00	167.52	0.00	.505	167.52	167.46	335.82
64.44	60.73	321.24	280.23	0.00	157.04	0.00	.472	157.04	156.93	290.23
100.00	58.24	286.34	244.01	0.00	150.74	0.00	.452	150.74	145.46	244.01

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7997

PERCENT SPAN FROM TIP (T. F.)	HETA#2 (DEG)	W02 (M/SEC)	W1* (M/SEC)	BETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V42 (M/SEC)	V72 (M/SEC)	J2 (M/SEC)
0.00	58.44	353.50	302.62	41.42	243.65	161.20	.666	182.70	174.82	463.43
11.67	54.26	333.18	273.80	41.66	256.11	168.90	.698	189.84	194.71	442.70
31.07	50.24	309.44	240.67	40.52	256.91	166.91	.713	194.30	196.04	407.58
49.46	43.44	294.67	202.66	38.74	276.04	171.63	.771	213.63	213.62	374.30
67.78	35.48	273.79	158.91	39.26	287.45	182.23	.814	222.45	222.29	341.14
84.06	23.04	237.24	92.87	44.10	308.06	211.60	.867	218.35	214.76	304.47
100.00	14.13	225.31	55.00	46.20	315.65	227.81	.905	218.56	211.07	282.81

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	W1A (%)	DELTA HETA# (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR (DEG)	ANGLE (DEG)	LOSS PARAMETER	OMEGA#	WAR	DEVIATION ANGLE (DEG)	WOTOR PRESS RATIO	POLYTROPIC EFF
0.00	0.00	13.59	8.630	4.162	.4224	.0511	.2800	.0511	1.089	1.775	.6804
9.67	11.67	15.97	9.330	4.021	.4393	.0566	.2841	.0566	.718	1.787	.6805
25.45	31.70	17.17	9.211	7.023	.4947	.0789	.1937	.0789	.912	1.819	.7033
42.65	51.14	22.09	8.437	5.994	.4203	.0205	.0930	.0205	1.622	1.899	.6868
61.47	70.71	28.01	9.148	5.301	.6020	.0403	.0463	.0403	5.114	1.927	.6593
84.60	90.12	37.69	9.421	4.391	.4138	.0175	.1175	.0175	13.535	1.922	.6235
100.00	100.00	44.14	9.535	3.461	.1602	.0295	.1431	.0295	21.141	1.922	.6236

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8525 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8392 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.8002  
 MASS AVERAGE TEMPERATURE RISE = 1.2308

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 5

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8974

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (NEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	41.70	418.64	544.59	.684	611.22	604.50	1477.87
11.45	42.83	434.88	547.54	.644	623.30	611.29	1418.09
30.55	40.14	461.52	545.41	.731	634.5	654.54	1318.43
48.60	37.97	418.05	565.05	.789	723.56	723.03	1223.77
67.11	34.63	950.64	593.41	.824	742.69	734.97	1127.64
87.75	43.46	948.45	670.43	.858	717.44	707.41	1019.91
100.00	44.75	1030.21	725.26	.900	31.66	711.44	955.99

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9040

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (NEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-1.47	667.16	-17.12	.769	666.94	666.94	1467.15
11.42	-1.47	677.71	-17.34	.548	677.49	677.40	1416.39
30.27	-1.47	734.20	-17.81	.578	693.97	693.66	1331.40
48.73	-1.50	753.10	-19.65	.635	752.85	752.07	1248.61
67.14	-2.53	748.09	-31.04	.633	741.26	747.05	1165.17
88.08	-2.70	711.13	-33.48	.596	710.34	707.74	1072.14
100.00	-2.70	715.67	-33.72	.601	714.88	714.88	1018.70

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HFTA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCTION (DEG)	D FACTOR	OMEGA HAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE HP/SS RATIO	STAGE POLYTROPIC EFF
0.00	0.00	0.00	43.17	5.382	1.460	.4342	.0657	.0237	20.710	1.743	1.2578
11.45	11.32	12.02	44.30	6.048	3.117	.4312	.0656	.0234	15.087	1.754	1.2578
30.55	30.27	31.79	41.61	3.526	.230	.4104	.0752	.0247	11.716	1.778	1.2366
48.60	48.73	51.14	39.64	.224	-2.764	.3710	.0642	.0197	10.486	1.857	1.2215
67.11	67.34	70.71	41.15	-.864	-3.752	.3957	.1101	.0316	8.571	1.850	1.2144
87.75	88.08	90.12	46.16	1.195	-1.713	.4634	.1746	.0461	8.833	1.744	1.2222
100.00	100.00	100.00	47.45	.116	-3.325	.4812	.1629	.0412	16.000	1.794	1.2222

MOMENTUM AVERAGE STAGE EFFICIENCY = .9127 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7965 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.0070  
MASS AVERAGE TEMPERATURE RISE = 1.2308

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 5

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8974

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	VIII3 (M/SEC)	M3 (M/SEC)	V/3 (M/SEC)	U3 (M/SEC)
0.00	41.70	249.52	165.99	186.30	184.25	450.45
11.55	42.83	254.67	172.99	186.63	186.32	442.23
30.55	40.14	262.59	169.29	200.74	200.74	401.86
48.60	37.99	279.42	172.23	220.54	220.54	373.01
67.11	34.63	289.76	180.87	226.37	227.54	343.70
87.75	43.46	301.28	207.24	214.68	215.74	310.87
100.00	44.75	314.01	221.06	223.01	216.85	291.39

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9040

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VIII4 (M/SEC)	M4 (M/SEC)	V/4 (M/SEC)	U4 (M/SEC)
0.00	-1.47	203.35	-5.27	203.28	203.24	447.19
11.52	-1.47	206.57	-5.30	206.50	206.47	441.71
30.27	-1.47	211.59	-5.43	211.52	211.43	405.91
48.77	-1.50	229.55	-5.92	229.47	229.23	340.50
67.14	-2.51	224.29	-10.07	228.07	227.94	355.14
87.68	-2.70	216.75	-10.20	216.51	215.72	326.74
100.00	-2.70	210.14	-10.28	217.89	217.89	310.50

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	FROM TIP (DEG)	MASS FLOW (PCT)	DELTA (DEG)	INCIDENCE (DEG)	MEAN SUCTION SURF (DEG)	FACTUR N	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	43.17	5.382	1.460	.4342	.0657	.0237	20.710	1.743	1.2574	.8355
11.52	31.32	12.92	44.30	6.648	3.312	.4312	.0656	.0228	15.087	1.755	1.2578	.8392
30.27	30.27	31.74	41.61	3.525	.230	.4104	.0752	.0247	11.715	1.778	1.2366	.8232
48.60	48.73	51.14	39.60	.224	-2.764	.3710	.0642	.0197	10.686	1.857	1.2215	.8436
67.11	67.36	70.71	41.15	-.084	-3.752	.3957	.1101	.0316	8.571	1.850	1.2144	.7700
87.75	88.08	90.12	46.16	1.191	-1.713	.4634	.1746	.0461	8.933	1.794	1.2222	.7128
100.00	100.00	100.00	47.45	.116	-1.125	.4812	.1629	.0412	16.000	1.794	1.2222	.7154

MOMENTUM AVERAGE STAGE EFFICIENCY = .8127 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7965 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.6070  
 MASS AVERAGE TEMPERATURE RISE = 1.2308

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OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 3.2453 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 80.1520  
 100 PERCENT DESIGN SPEED = SCAN NO 6  
 EQUIVALENT SPEED = 76731.330 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 36.0043 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (L. F.)	HETA*1 (DEG)	W*1 (FT/SEC)	VU*1 (FT/SEC)	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	VW4 (FT/SEC)	VZ1 (FT/SEC)	U1 (FT/SEC)
0.00	72.57	1657.07	1581.42	0.00	494.81	0.00	.457	494.81	474.87	1591.42
9.52	71.47	1565.40	1407.00	0.00	506.68	0.00	.464	506.68	470.10	1507.00
25.49	68.37	1486.96	1342.25	0.00	543.11	0.00	.507	543.11	534.04	1382.25
41.96	65.89	1373.40	1253.40	0.00	560.99	0.00	.516	560.99	559.18	1253.40
61.00	63.82	1231.16	1104.85	0.00	543.19	0.00	.499	543.19	543.01	1104.85
84.58	61.05	1052.08	920.61	0.00	509.26	0.00	.466	509.26	502.53	920.61
100.00	54.58	937.06	800.15	0.00	489.23	0.00	.447	489.23	472.60	800.15

EXIT VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (L. F.)	HETA*2 (DEG)	W*2 (FT/SEC)	VU*2 (FT/SEC)	HETA*2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VW2 (FT/SEC)	VZ2 (FT/SEC)	U2 (FT/SEC)
0.00	59.44	1150.83	990.99	47.17	789.44	429.96	.657	585.12	564.27	1520.95
11.02	55.82	1043.45	896.27	42.37	823.96	555.30	.649	608.74	505.44	1451.57
31.13	51.43	1004.25	788.27	41.07	831.89	547.87	.705	624.74	424.74	1336.14
49.46	43.24	964.01	660.46	38.42	907.52	566.93	.776	702.23	702.19	1227.38
67.66	35.58	895.90	521.33	39.38	542.59	594.02	.816	728.50	726.45	1114.35
88.01	22.86	781.00	303.45	44.01	1000.50	695.07	.870	719.64	707.41	988.52
100.00	13.98	747.08	174.22	44.09	1038.40	748.15	.908	720.11	694.64	927.37

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HETA* (DEG)	MASS FLOW (PCT)	INCIDENCE ANGLE MEAN (DEG)	SUCT SUR (DEG)	FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	HATOR PRESS RATIO	ROTOR ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	8.784	4.321	.273	.2689	.0520	2.450	1.741	.8786	.7029
9.52	11.64	11.46	9.488	8.188	.452	.2726	.0555	.895	1.774	.8881	.7120
25.49	31.13	31.41	9.309	7.244	.444	.1944	.0403	1.491	1.805	.7825	.7597
41.96	49.46	50.66	9.079	6.264	.4228	.0952	.0210	1.375	1.707	.8028	.9111
61.00	67.66	70.32	9.429	5.549	.4040	.0514	.0114	5.125	1.921	.8547	.9587
84.58	88.01	90.00	9.709	4.686	.4106	.1137	.0255	13.326	1.926	.9244	.9310
100.00	100.00	100.00	44.58	3.731	.3752	.1285	.0286	21.027	1.925	.9243	.9309

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8482 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8345 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.8554  
 MASS AVERAGE TEMPERATURE RISE = 1.2310

ROTOR PERFORMANCE VASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.4911 K(M/SEC) 100 PERCENT DESIGN SPEED - SCAN NO 6  
 PERCENT DESIGN EQUIVALENT FLOW = 89.520 EQUIVALENT SPEED  
 R.P.M. = 76731.339 R.P.M. 178.0812 K0/SEC-S0 M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9978

PERCENT SPAN FROM TIP (L. F.)	BETA01 (DEG)	V01 (M/SEC)	W01 (M/SEC)	BETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	VU1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	72.67	505.06	482.02	0.00	150.2	0.00	.652	150.82	165.96	682.02
9.52	71.42	484.00	459.33	0.00	154.44	0.00	.664	154.44	169.78	659.33
25.47	68.37	453.23	421.31	0.00	167.07	0.00	.503	167.07	164.00	621.31
41.94	65.89	418.61	382.10	0.00	170.99	0.00	.516	170.99	170.44	582.10
61.00	63.42	375.26	336.76	0.00	165.57	0.00	.499	165.57	165.51	536.76
84.58	61.05	320.67	280.60	0.00	155.22	0.00	.466	155.22	153.14	280.60
100.00	58.56	285.86	243.89	0.00	142.12	0.00	.447	142.12	144.05	243.89

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8004

PERCENT SPAN FROM TIP (L. F.)	BETA02 (DEG)	V02 (M/SEC)	W02 (M/SEC)	BETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	VU2 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	59.44	370.77	302.05	42.17	240.62	161.53	.657	178.34	172.40	663.59
11.65	55.82	330.24	273.18	42.37	251.14	162.25	.689	185.54	181.49	642.44
31.13	51.43	307.32	240.27	41.07	254.17	165.99	.705	171.61	190.42	607.26
49.44	43.24	293.83	201.30	38.97	275.09	172.80	.774	214.04	214.03	574.10
67.66	35.58	273.07	159.90	39.38	287.30	182.28	.816	222.09	221.42	541.18
84.01	27.86	238.05	92.49	44.01	304.95	211.86	.870	219.34	215.74	504.35
100.00	13.98	226.18	54.43	46.09	315.51	224.04	.908	219.49	212.03	502.66

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (KGT)	DELTA BETA0 (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	8.789	8.321	.4773	2.450	1.761	.6786	.7029
9.52	11.47	15.60	9.488	8.188	.4452	.895	1.774	.6801	.7120
25.47	31.13	16.94	9.307	7.244	.4444	1.491	1.805	.7025	.7097
41.94	50.66	22.55	9.079	6.264	.4228	2.210	1.902	.7028	.9111
61.00	70.32	28.23	9.429	5.599	.4040	5.125	1.921	.9547	.9587
84.58	90.00	38.10	9.709	4.606	.4106	13.326	1.926	.9244	.9310
100.00	100.00	44.58	9.805	3.731	.3752	21.027	1.925	.9243	.9309

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8482 (POLYTROPIC) MOMENTUM AVG. ROTOR PRESS RATIO = 1.8554  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8345 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.2310



NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 6

INLET VELOCITY DIAGRAM DATA

CALCULATED AFRODYNAMIC BLOCKAGE = .8975

PERCENT SPAN FROM TIP (Y. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	42.43	908.75	544.70	.675	596.90	590.35	1477.09
11.47	41.52	825.95	568.74	.640	598.93	597.94	1417.24
30.61	40.65	852.95	555.66	.723	667.13	667.13	1317.42
44.69	38.12	921.62	568.89	.792	725.08	724.54	1223.14
47.01	31.74	968.70	593.65	.822	749.01	737.31	1127.59
47.76	43.37	991.58	680.81	.861	720.84	711.16	1017.31
100.00	44.64	1133.02	725.96	.903	734.92	714.62	955.49

EXIT VELOCITY DIAGRAM DATA

CALCULATED AFRODYNAMIC BLOCKAGE = .9020

PERCENT SPAN FROM TIP (Y. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-2.17	655.04	-26.80	.538	654.57	654.57	1466.38
11.31	-2.17	665.33	-25.14	.547	664.85	664.77	1415.69
30.27	-2.17	694.60	-25.86	.570	694.11	693.81	1330.72
44.73	-2.00	746.59	-26.06	.628	746.14	745.37	1247.96
47.38	-2.00	750.64	-26.18	.634	750.18	749.77	1164.35
94.13	.76	712.84	9.40	.598	712.82	710.22	1071.35
100.00	.83	717.03	10.40	.602	716.96	716.96	1018.16

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MAS3 FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE ANGLE MFAN (DEG)	SUCT SUR ANGLE (DEG)	OMEGA HAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TFMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	44.60	0.116	2.194	.4462	.0632	20.010	1.742	1.2542	.8447
11.47	11.41	45.69	7.339	4.004	.4438	.0654	14.789	1.743	1.2582	.8436
30.61	30.27	42.82	4.042	7.38	.4188	.0641	11.021	1.760	1.2345	.8417
44.69	48.73	40.12	.354	-2.634	.3838	.0818	9.982	1.849	1.2229	.8098
47.01	70.32	40.74	-1.759	-3.624	.3909	.0967	9.100	1.855	1.2144	.7957
47.76	90.00	42.61	1.097	-1.810	.4521	.1731	12.287	1.798	1.2223	.7162
100.00	100.00	43.82	.017	-1.425	.4706	.1616	19.531	1.788	1.2223	.7591

MOMENTUM AVERAGE STAGE EFFICIENCY = .8094 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7930 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.8038  
 MASS AVERAGE TEMPR. AIRE RISE = 1.2310

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 6

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8975

PERCENT SPAN FROM TIP (I. F.)	HETA 3 (DEG)	V3 (M/SEC)	VII3 (M/SEC)	M3	VM3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	42.43	240.51	166.33	.675	181.94	179.94	450.22
11.67	43.52	251.75	177.35	.690	187.55	182.75	431.97
20.61	40.65	259.98	169.36	.723	197.24	197.24	401.55
48.69	38.12	240.91	174.40	.792	221.00	220.84	372.91
67.01	34.74	249.16	180.94	.822	225.50	224.73	343.69
87.74	43.37	302.23	207.54	.861	219.71	216.76	310.69
100.00	44.67	314.86	221.27	.903	224.00	217.81	291.23

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9020

PERCENT SPAN FROM TIP (I. F.)	HETA 4 (DEG)	V4 (M/SEC)	VII4 (M/SEC)	M4	VM4 (M/SEC)	V24 (M/SEC)	U4 (M/SEC)
0.00	-2.17	149.06	-7.56	.538	199.51	194.51	446.75
11.11	-2.17	202.74	-7.64	.547	202.65	202.62	431.50
20.27	-2.17	208.67	-7.88	.570	208.52	208.42	405.60
48.73	-2.00	227.50	-7.94	.620	227.42	227.19	380.38
67.38	-2.00	228.79	-7.98	.634	228.66	228.53	354.89
88.13	.76	217.29	2.86	.598	217.27	216.47	325.55
100.00	.83	218.55	3.17	.602	218.53	218.53	310.34

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCTION ANGLE (DEG)	FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	44.60	6.116	2.194	.4462	.0632	.0228	20.010	1.732	1.2582	.8647
11.47	11.11	11.44	45.69	7.339	4.004	.4438	.0654	.0227	14.389	1.743	1.2582	.8636
20.61	20.27	31.41	42.82	4.032	.738	.4188	.0681	.0224	11.021	1.740	1.2745	.8617
48.69	48.73	50.86	40.12	3.54	-2.634	.3838	.0818	.0251	9.982	1.849	1.2229	.8098
67.01	67.38	70.32	40.74	-1.759	-3.629	.3908	.0967	.0277	9.100	1.855	1.2144	.7957
87.74	88.13	90.00	42.61	1.097	-1.810	.4521	.1731	.0458	12.287	1.798	1.2223	.7162
100.00	100.00	100.00	43.82	.017	-3.425	.4706	.1616	.0409	19.531	1.798	1.2223	.7159

MOMENTUM AVERAGE STAGE EFFICIENCY = .8094 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7930 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.8038  
MASS AVERAGE TEMPERATURE RISE = 1.2310

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.2232 LHM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 80.0031  
 100 PERCENT DESIGN SPEED = SCAN NO 7  
 EQUIVALENT SPEED = 74683.478 R.P.M.  
 EQUIVALENT FLOW / INLET ANN ARFA = 35.5995 LHM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9965

PERCENT SPAN FROM TIP (I. F.)	BETA*1 (DEG)	V*1 (FT/SEC)	VU*1 (FT/SEC)	M*1	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V*2 (FT/SEC)	VU*2 (FT/SEC)	M*2	BETA2 (DEG)	V*3 (FT/SEC)	VU*3 (FT/SEC)	M*3
0.00	72.89	1653.57	1580.43	1.511	0.00	486.36	0.00	.444	486.36	470.70	.470	0.00	486.36	470.70	.470
9.45	71.71	1586.81	1508.67	1.441	0.00	477.91	0.00	.455	477.91	461.61	.462	0.00	477.91	461.61	.462
25.13	68.72	1483.76	1382.63	1.362	0.00	451.39	0.00	.494	451.39	424.50	.494	0.00	451.39	424.50	.494
41.77	66.24	1370.00	1254.31	1.254	0.00	411.02	0.00	.506	411.02	394.24	.506	0.00	411.02	394.24	.506
60.06	66.23	1227.27	1107.22	1.126	0.00	433.57	0.00	.489	433.57	373.19	.489	0.00	433.57	373.19	.489
84.54	61.47	1047.21	920.05	.958	0.00	500.15	0.00	.457	500.15	493.43	.457	0.00	500.15	493.43	.457
100.00	49.01	932.76	799.65	.852	0.00	480.21	0.00	.438	480.21	480.21	.438	0.00	480.21	480.21	.438

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7964

PERCENT SPAN FROM TIP (I. F.)	BETA*2 (DEG)	V*2 (FT/SEC)	VU*2 (FT/SEC)	M*2	BETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V*3 (FT/SEC)	VU*3 (FT/SEC)	M*3	BETA3 (DEG)	V*4 (FT/SEC)	VU*4 (FT/SEC)	M*4
0.00	60.01	1141.94	989.08	.950	42.93	779.51	530.92	.648	779.51	570.75	.552	42.93	779.51	570.75	.552
11.74	56.09	1077.09	893.91	.900	42.80	819.94	556.42	.684	819.94	600.89	.684	42.80	819.94	600.89	.684
31.20	51.79	1000.44	780.06	.845	41.57	827.18	548.86	.699	827.18	618.44	.699	41.57	827.18	618.44	.699
49.70	41.26	953.03	653.06	.816	39.50	899.48	572.10	.770	899.48	694.10	.770	39.50	899.48	694.10	.770
68.05	35.42	890.73	516.20	.771	39.54	941.83	600.09	.815	941.83	725.90	.815	39.54	941.83	725.90	.815
84.26	27.18	792.85	299.36	.691	43.51	1017.36	697.05	.882	1017.36	734.17	.882	43.51	1017.36	734.17	.882
100.00	19.61	755.91	177.86	.642	45.55	1044.12	748.93	.919	1044.12	734.68	.919	45.55	1044.12	734.68	.919

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	MASS FLOW (PCF)	DELTA BETA* (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCTION SUR (DEG)	FACTORS (DEG)	OMEGA* BAN (DEG)	LOSS PARAMETER (DEG)	DEVIATION ANGLE (DEG)	MATCH LOSS (DEG)	ROTOR EFFICIENCY	ROTOR POLYTROPIC EFFICIENCY
0.00	0.00	12.84	9.058	8.590	.4317	.2787	.0530	3.022	1.767	.6670	.6919
9.45	11.75	15.62	9.768	8.474	.4483	.2785	.0503	1.181	1.766	.6675	.7057
25.13	31.20	16.94	9.637	7.581	.4486	.2036	.0419	1.875	1.793	.7720	.7899
41.77	44.70	23.01	9.446	6.641	.7304	.1093	.0242	1.502	1.893	.8887	.9982
60.06	70.17	28.81	9.820	6.000	.4065	.0575	.0128	5.273	1.914	.9493	.9537
84.54	89.95	39.29	10.131	5.104	.3967	.0917	.0198	12.948	1.948	.9497	.9450
100.00	100.00	45.41	10.262	4.188	.3571	.1112	.0230	20.661	1.945	.9196	.9450

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8437 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .8297 (ADIABATIC)  
 MOMENTUM AVERAGE MOTOR PRESS RATIO = 1.8512  
 MASS AVERAGE TEMPERATURE RISE = 1.2314

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT W/FIGHT FLOW = 1.4620 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 88.0031  
 100 PERCENT DESIGN SPEED - SCAN NO 7  
 EQUIVALENT SPEED / INLET ANGLE = 76493.474 R.P.M.  
 (73.8120 KG/SEC-50 M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9965

PERCENT SPAN FROM TIP (L. F.)	RETA*1 (DEG)	VE*1 (M/SEC)	VU*1 (M/SEC)	W*1 (M/SEC)	HTA*1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	V*2 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	72.89	504.01	491.71	1.511	0.00	149.24	0.00	.644	140.24	143.97	481.71
0.45	71.71	473.66	459.23	1.451	0.00	151.76	0.00	.655	151.74	146.00	459.23
25.13	68.72	452.25	421.63	1.362	0.00	164.10	0.00	.694	164.10	161.09	421.63
41.77	66.28	417.54	382.31	1.259	0.00	167.95	0.00	.504	167.95	167.61	382.31
64.05	64.23	374.07	336.87	1.126	0.00	162.63	0.00	.489	162.63	162.58	336.87
80.58	61.47	319.19	280.43	.958	0.00	152.46	0.00	.457	152.46	150.40	280.43
100.00	59.01	284.30	243.73	.852	0.00	146.37	0.00	.438	146.37	141.39	243.73

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7964

PERCENT SPAN FROM TIP (L. F.)	RETA*2 (DEG)	VE*2 (M/SEC)	VU*2 (M/SEC)	W*2 (M/SEC)	HTA*2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V*2 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	60.01	348.06	301.47	.950	42.93	237.59	161.83	.648	173.94	168.16	463.30
11.74	56.09	324.30	272.46	.900	42.40	249.61	169.60	.644	183.15	179.14	462.06
31.70	51.79	304.93	237.53	.845	41.57	252.13	167.29	.699	188.63	187.65	406.88
40.70	47.26	280.48	194.05	.816	39.50	274.16	174.29	.770	211.54	211.55	373.43
64.05	35.42	271.49	157.34	.771	39.59	247.07	142.91	.815	221.25	220.60	340.25
84.26	22.18	241.66	91.25	.691	43.51	308.57	212.46	.882	223.77	220.10	303.71
100.00	13.61	230.40	54.21	.662	45.55	319.77	228.27	.919	223.93	216.12	282.49

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP (L. F.)	WASH FLOW (PCT)	DELTA (DEG)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUM (DEG)	FACTOR	BETA (DEG)	OMEGA* (RPM)	MAP	PARAMETER	LOSS (DEG)	DEVIATION ANGLE (DEG)	ADJ PRESS RATIO	ADJ ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	12.88	15.62	9.058	8.590	.4317	.2787	.2787	.0530	.0530	3.022	1.767	.6670	.8918	
0.45	11.74	11.75	15.62	16.94	9.768	8.474	.4483	.2785	.2785	.0563	.0563	1.181	1.766	.6615	.7057	
25.13	31.20	31.20	16.94	16.94	9.637	7.581	.4486	.2036	.2036	.0419	.0419	1.875	1.793	.6720	.7899	
41.77	49.70	50.47	23.07	28.91	9.446	6.641	.4304	.1093	.1093	.0242	.0242	1.502	1.801	.6887	.8942	
64.05	68.05	70.17	28.91	39.29	4.826	6.000	.4065	.0575	.0575	.0128	.0128	5.273	1.914	.9493	.8537	
84.26	88.26	89.95	39.29	45.41	10.131	5.108	.3967	.0917	.0917	.0198	.0198	12.998	1.946	.9307	.9450	
100.00	100.00	100.00	45.41	45.41	10.262	4.188	.3571	.1112	.1112	.0230	.0230	20.661	1.945	.9406	.9650	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8637 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8297 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.8512  
 MASS AVERAGE TEMPERATURE DISF = 1.8314

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT INFSIGN SPEED = SCAN NO 7

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8955

PERCENT SPAN FROM TIP (I. F.)	RFTA 3 (DEG)	V3 (FT/SEC)	V1/3 (FT/SEC)	M3	VM3 (FT/SEC)	V7/1 (FT/SEC)	U3 (FT/SEC)
0.00	43.42	795.32	546.64	.662	577.63	571.29	1476.17
11.57	44.16	818.07	546.97	.683	586.84	585.47	1415.98
30.76	41.32	843.41	546.42	.714	633.48	633.47	1315.93
49.01	38.80	916.32	574.21	.786	714.09	713.57	1220.67
67.27	34.83	946.04	594.74	.819	734.91	732.22	1124.46
84.06	32.94	1001.16	642.86	.871	732.41	722.58	1017.13
100.00	44.26	1041.21	724.69	.911	745.68	725.07	924.90

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9009

PERCENT SPAN FROM TIP (I. F.)	RFTA 4 (DEG)	V4 (FT/SEC)	V1/4 (FT/SEC)	M4	VM4 (FT/SEC)	V7/4 (FT/SEC)	J4 (FT/SEC)
0.00	-2.70	642.77	-30.28	.527	642.05	642.05	1465.47
11.20	-2.71	657.40	-31.04	.540	646.87	646.79	1414.96
30.14	-2.89	675.98	-34.03	.562	675.12	674.82	1330.45
49.61	-3.05	738.71	-39.35	.621	737.67	736.91	1247.62
67.36	-2.88	746.91	-37.53	.631	745.99	745.58	1163.46
84.09	-3.06	707.72	-37.76	.593	706.72	704.13	1070.86
100.00	-3.06	711.56	-37.99	.597	710.55	710.55	1017.53

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA META (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR (DEG)	ANGLE (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	46.12	7.105	3.183	.4552	.4552	.0617	.0222	19.480	1.719	1.2585
11.57	11.20	11.75	46.87	7.482	4.651	.4508	.4508	.0674	.0274	13.062	1.734	1.2585
30.76	30.14	31.20	46.20	6.684	1.394	.4260	.4260	.0214	.0214	10.313	1.759	1.2347
49.01	48.63	50.43	41.85	1.011	-1.972	.3948	.3948	.0858	.0267	8.935	1.838	1.2246
67.47	67.14	70.17	41.91	-5.27	-3.384	.3967	.3967	.0966	.0277	8.219	1.850	1.2146
84.06	84.09	83.45	46.05	.653	-2.236	.4753	.4753	.2033	.0537	4.473	1.792	1.2225
100.00	100.00	100.00	47.32	-3.371	-3.812	.4920	.4920	.1906	.0481	15.640	1.791	1.2224

MOMENTUM AVERAGE STAGE EFFICIENCY = .8028 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7881 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.7957  
 MASS AVERAGE TEMPERATURE RISE = 1.2314

FINAL PAGE IS POOR QUALITY

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 7

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .0955

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	V113 (M/SEC)	M3	VM3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	47.42	262.41	166.63	.662	176.05	176.17	449.34
11.57	44.16	269.35	173.73	.683	174.87	174.57	431.56
30.74	41.32	247.07	169.72	.714	193.08	193.08	401.07
60.01	38.40	229.29	175.02	.746	217.66	217.66	372.05
67.67	39.03	249.35	181.59	.819	224.00	223.14	342.73
88.04	42.99	305.21	204.13	.871	223.24	220.24	310.02
100.00	44.25	317.36	221.49	.911	227.28	221.00	291.05

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	V114 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-2.70	195.92	-9.23	.627	195.70	195.70	446.67
11.29	-1.71	200.44	-9.46	.640	207.21	200.19	411.24
30.14	-2.49	205.04	-10.37	.662	205.74	205.69	403.52
48.63	-3.05	225.16	-11.49	.621	225.44	224.61	380.27
67.34	-2.44	227.66	-11.44	.631	227.34	221.25	374.74
84.00	-3.06	215.71	-11.51	.593	215.41	214.52	326.40
100.00	-3.06	216.44	-11.54	.597	214.58	214.52	310.14

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .0909

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCTION (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE PRESS RATIO	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	46.12	7.105	3.143	.6542	.0222	14.600	1.710	1.2585	1.2585	.8818
11.57	11.24	11.75	46.87	7.942	4.051	.4508	.0234	13.862	1.734	1.2585	1.2585	.8391
30.74	30.14	31.20	44.20	4.649	1.399	.6260	.0214	10.313	1.750	1.2747	1.2747	.8484
48.01	48.63	50.63	41.46	1.011	-1.977	.7948	.0254	8.935	1.838	1.2266	1.2266	.8035
67.67	67.34	70.17	41.91	-2.527	-3.744	.7967	.0277	8.219	1.850	1.2146	1.2146	.7371
84.04	84.09	82.35	46.05	.653	-2.236	.4753	.0233	4.473	1.792	1.2225	1.2225	.6774
100.00	106.00	100.00	47.32	-2.371	-7.112	.4920	.0241	15.640	1.791	1.2224	1.2224	.7217

MOENTUM AVERAGE STAGE EFFICIENCY = .8020 (POLYTROPIC)  
MOENTUM AVERAGE STAGE EFFICIENCY = .7851 (ADIABATIC)

MOENTUM AVG. STAGE PRESS RATIO = 1.7457  
MASS AVERAGE TEMPERATURE RISE = 1.2314

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 3.2032 LHM/SEC 100 PERCENT DESIGN SPEED = SCARI NO R  
 PERCENT DESIGN EQUIVALENT FLOW = 87.6575 EQUIVALENT FLOW / INLET ANN AREA = 76633.69 R.P.M.  
 35.37AA LBM/SEC-SU FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .9984

PERCENT SPAN FROM TIP (L.F.)	HETA*1 (DEG)	V*1 (FT/SEC)	VU*1 (FT/SEC)	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V*4 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	73.00	1651.56	1579.40	0.00	482.85	0.00	.441	482.85	467.70	1579.40
9.33	71.44	1585.59	1506.61	0.00	494.15	0.00	.452	494.15	477.97	1506.61
25.10	68.84	1483.05	1383.55	0.00	536.07	0.00	.490	536.07	464.25	1383.55
41.40	66.48	1369.40	1255.47	0.00	546.55	0.00	.502	546.55	454.74	1255.47
60.61	64.44	1226.58	1106.51	0.00	529.27	0.00	.485	529.27	449.09	1106.51
84.47	61.97	1045.51	920.30	0.00	497.11	0.00	.444	497.11	444.65	920.30
100.00	59.20	930.13	799.13	0.00	476.41	0.00	.435	476.41	440.22	799.13

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .8025

PERCENT SPAN FROM TIP (L.F.)	HETA*2 (DEG)	V*2 (FT/SEC)	VU*2 (FT/SEC)	HETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V*4 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	60.04	1132.17	986.95	43.74	764.96	532.07	.639	555.14	537.28	1514.01
11.00	56.81	1065.05	891.74	43.73	806.90	557.74	.673	582.97	570.23	1449.08
31.25	51.06	948.88	783.49	41.61	828.68	550.27	.700	619.68	615.74	1333.77
48.68	43.28	845.24	647.96	40.02	894.62	577.84	.769	688.29	688.16	1225.40
67.72	35.42	731.25	515.99	39.66	942.41	601.53	.815	725.64	727.32	1117.53
88.03	27.40	773.94	294.98	44.46	1002.41	702.14	.871	715.52	703.70	977.12
100.00	13.39	734.08	170.41	46.54	1041.14	755.78	.910	716.00	691.75	926.19

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM LEADING EDGE	DELTA (DEG)	INCIDENCE MEAN (DEG)	ANGL SUR (DEG)	INCIDENCE MEAN (DEG)	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	POLYTROPIC EFF
0.00	0.00	12.36	8.646	4.371	.2870	.0535	3.651	1.735	.6470
9.33	11.40	15.03	8.585	4.558	.2879	.0571	1.914	1.752	.6467
25.10	31.25	32.94	7.725	4.647	.2826	.0418	1.768	1.796	.7799
41.40	49.46	50.15	6.812	4.373	.1209	.0267	1.407	1.490	.8880
60.61	67.72	69.74	6.114	4.072	.0608	.0135	5.015	1.917	.9513
84.47	88.03	84.87	5.249	4.152	.1380	.0281	12.097	1.924	.9147
100.00	100.00	65.81	4.372	3.783	.1592	.0330	20.438	1.924	.9147

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8356 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8209 (ADIABATIC)

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (MTRIC UNITS)

EQUIVALENT WRIGHT FLOW = 1.4530 M/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 87.4575  
 100 PERCENT DESIGN SPEED = SCAN NO A  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 7.6633\*4.9A R.P.4.  
 = 172.7366 M/SEC\*50 M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9984

PERCENT SPAN FROM TIP (L. F.)	HETA*1 (DEG)	VE1 (M/SEC)	VU*1 (M/SEC)	M*1	RETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	V41 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	73.00	503.39	441.40	1.508	0.00	147.17	0.00	.441	167.17	147.43	491.40
9.17	71.84	443.29	454.22	1.449	0.00	150.62	0.00	.452	150.62	145.69	459.22
25.10	68.89	452.03	421.71	1.360	0.00	162.78	0.00	.490	162.78	150.79	421.71
41.49	66.44	417.41	382.73	1.258	0.00	166.59	0.00	.502	166.59	144.05	382.73
50.61	64.44	373.86	337.27	1.125	0.00	161.32	0.00	.485	161.32	141.27	337.27
64.47	61.67	314.87	280.51	.956	0.00	151.21	0.00	.454	151.21	140.19	280.51
100.00	59.20	243.57	243.57	.649	0.00	145.21	0.00	.435	145.21	140.27	243.57

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8025

PERCENT SPAN FROM TIP (L. F.)	HETA*2 (DEG)	VE*2 (M/SEC)	VU*2 (M/SEC)	M*2	RETA*2 (DEG)	V*2 (M/SEC)	VU*2 (M/SEC)	M*2	V4*2 (M/SEC)	V7*2 (M/SEC)	U*2 (M/SEC)
0.00	60.64	345.15	300.82	.940	43.74	236.39	162.17	.639	169.21	153.76	493.00
11.00	54.81	324.69	271.68	.888	43.74	245.91	170.00	.673	177.60	173.81	491.68
31.25	51.66	304.66	238.41	.844	41.61	252.50	167.72	.700	188.85	187.68	406.53
49.46	47.24	248.11	197.50	.808	40.02	273.90	176.13	.769	209.74	209.75	373.62
67.72	35.42	271.35	157.27	.770	39.66	287.25	143.35	.815	221.12	220.47	340.42
88.03	22.40	235.90	117.91	.673	44.66	305.56	214.01	.871	218.07	216.51	303.42
100.00	17.39	224.36	51.94	.643	46.54	317.34	230.36	.910	218.24	210.46	292.30

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	MASS FLOW (PCF)	DELTA HETA* (DEG)	MEAN INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	DELTA ANGLE (DEG)	OMEGA GAP (RPM)	LOSS PARAMETER (DEG)	DEVIATION ANGLE (DEG)	WATER PRESS RATIO	ROTOR ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	12.36	4.104	4.414	.871	.2870	.0535	3.451	1.735	.6570	.6023
9.17	11.61	15.03	4.445	4.445	.458	.2874	.0571	1.914	1.754	.6604	.6047
25.10	30.94	17.23	4.766	7.725	.467	.2026	.0418	1.763	1.796	.6731	.6009
41.49	50.15	23.20	4.603	6.412	.473	.1209	.0267	1.407	1.890	.6775	.6000
60.61	67.34	29.01	10.004	4.189	.4072	.0404	.0135	5.015	1.617	.6666	.5513
84.47	47.87	39.27	10.319	5.299	.6152	.1300	.0281	12.897	1.924	.6147	.6222
100.00	100.00	45.81	10.446	4.372	.3783	.1592	.0330	20.438	1.924	.6147	.6222

MOMENTUM AVERAGE ROTOR EFFICIENCY = .6356 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .6209 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6649  
 MASS AVERAGE TEMPERATURE RISE = 1.2325



NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 24, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 8

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9019

PERCENT SPAN FROM TIP (I. F.)	BETA J (DEG)	V3 (FT/SEC)	V113 (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	J3 (FT/SEC)
0.00	44.21	785.71	547.86	.654	563.19	557.01	1475.21
11.60	45.02	807.68	571.27	.674	570.46	570.02	1414.77
30.76	43.24	845.84	544.14	.716	635.55	635.54	1314.98
44.71	39.27	916.08	579.40	.785	709.17	708.65	1221.45
67.07	34.02	947.24	597.11	.820	735.34	732.65	1125.91
87.74	41.86	992.45	647.70	.861	715.56	705.95	1018.04
100.00	45.14	1034.47	733.24	.903	729.71	709.55	956.27

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9032

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (FT/SEC)	V114 (FT/SEC)	M4	VM4 (FT/SEC)	V74 (FT/SEC)	J4 (FT/SEC)
0.00	-7.23	631.24	-34.57	.117	630.28	630.28	1464.51
11.27	-3.20	644.36	-36.00	.124	643.36	643.24	1414.04
30.10	-2.53	669.86	-29.57	.157	664.21	664.91	1324.35
44.64	-2.53	732.74	-12.55	.185	732.07	731.32	1246.75
67.16	-2.53	745.42	-32.40	.179	744.70	744.29	1162.97
84.10	-2.53	706.72	-31.20	.192	706.03	707.44	1070.13
100.00	-2.53	710.97	-31.38	.196	710.27	710.27	1016.87

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUEY SUR (DEG)	DELTA FACTOR	DELTA RAB	DELTA RAB	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE LOSS RATIO	STAGE POLYTROPIC EFF
0.00	0.00	47.44	7.891	3.469	.4561	.0577	.0208	.0208	18.950	1.710	1.2589	.8412
11.27	11.61	44.22	4.832	5.502	.4628	.0644	.0271	.0271	13.366	1.723	1.2589	.8501
30.76	30.14	43.82	4.663	1.373	.4316	.0798	.0262	.0262	10.664	1.755	1.2551	.8221
44.71	44.65	41.41	1.508	-1.440	.4009	.0922	.0243	.0243	9.657	1.832	1.2269	.7338
67.07	67.46	41.61	-4.227	-1.296	.3483	.0970	.0278	.0278	8.569	1.850	1.2154	.7984
87.74	84.10	46.39	1.544	-1.313	.4714	.1780	.0471	.0471	9.001	1.792	1.2263	.7134
100.00	100.00	47.47	.506	-2.935	.4491	.1662	.0420	.0420	16.170	1.792	1.2242	.7553

MOMENTUM AVERAGE STAGE EFFICIENCY = .7459 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7786 (ADIABATIC)  
MOMENTUM AVERAGE STAGE PRESS RATIO = 1.7921  
MASS AVERAGE TEMPERATURE RISE = 1.2325

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 8

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9019

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	VII3 (M/SEC)	M3	VM3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	44.21	239.48	166.99	.654	171.66	159.78	449.64
11.60	45.02	246.18	174.12	.674	174.03	173.74	431.22
30.75	41.29	247.81	170.12	.716	193.72	197.71	400.41
48.71	37.27	272.22	175.75	.785	216.16	216.00	372.30
67.07	38.04	288.72	182.00	.820	224.13	223.31	343.15
87.74	43.84	302.50	209.61	.861	218.10	215.17	310.30
100.00	45.14	315.31	223.49	.903	222.42	216.27	290.86

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9032

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VII4 (M/SEC)	M4	VM4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	-3.27	192.62	-10.84	.517	192.11	192.11	445.38
11.27	-3.20	196.40	-10.97	.529	196.10	196.07	431.00
30.10	-2.53	204.17	-9.01	.547	203.97	203.84	405.19
48.65	-2.53	223.35	-9.86	.615	223.14	222.91	380.01
67.4	-2.53	227.21	-10.07	.629	226.94	226.84	358.47
88.10	-2.53	215.41	-9.51	.592	215.20	214.41	326.19
100.00	-2.53	216.70	-9.57	.596	216.49	216.49	309.94

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR ANGLE (DEG)	FACTOR D	OMEGA PAR	LOSS PARAFETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	47.44	7.891	3.969	.4651	.0577	.0208	14.950	1.710	1.2849	.8412
11.60	11.27	11.71	48.22	8.832	5.502	.4628	.0644	.0223	13.366	1.723	1.2589	.8501
30.75	30.10	10.94	43.82	4.663	1.373	.4336	.0794	.0262	10.664	1.744	1.2351	.8221
48.71	48.65	50.17	41.80	1.504	-1.480	.4009	.0922	.0213	9.447	1.812	1.2269	.7934
67.07	67.16	69.94	41.61	-1.427	-3.296	.3983	.0970	.0278	8.569	1.850	1.2146	.7884
87.74	88.10	89.87	46.39	1.594	-1.313	.4714	.1780	.0471	9.001	1.792	1.2263	.7136
100.00	100.00	100.00	47.67	.506	-2.935	.4891	.1652	.0420	16.170	1.792	1.2282	.7553

MOMENTUM AVERAGE STAGE EFFICIENCY = .7959 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7786 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.7921  
MASS AVERAGE TEMPERATURE RISE = 1.2325

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NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEST P.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 3.2026 LRM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 87.4308  
 100 PERCENT DESIGN SPEED = SCAN NO 9  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 76634.777 R.P.M.  
 35.3717 LHM/SEC-50 FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0037

PERCENT SPAN FROM TIP (L.F.)	HETA*1 (INLU)	V*1 (FT/SEC)	VU*1 (FT/SEC)	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	VM	V71 (FT/SEC)	U1 (FT/SEC)
0.00	73.00	1621.55	1579.63	0.00	482.75	0.00	.441	482.75	467.21	1579.63
9.33	71.04	1585.54	1506.59	0.00	476.06	0.00	.452	494.04	477.89	1506.59
25.04	68.90	1483.18	1383.76	0.00	533.88	0.00	.490	533.88	524.07	1383.76
41.87	66.49	1362.52	1255.82	0.00	546.35	0.00	.502	546.35	546.59	1255.82
60.65	64.44	1226.20	1106.21	0.00	529.64	0.00	.485	529.64	528.86	1106.21
84.51	61.67	1044.14	920.00	0.00	495.92	0.00	.453	495.92	489.26	920.00
100.00	59.21	930.27	799.14	0.00	476.21	0.00	.435	476.21	468.03	799.14

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7980

PERCENT SPAN FROM TIP (L.F.)	HETA*2 (INLU)	V*2 (FT/SEC)	VU*2 (FT/SEC)	BETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VMP (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	60.05	1133.53	987.99	43.70	768.33	531.05	.638	555.07	537.78	1519.04
11.06	56.81	1064.69	891.08	43.67	806.41	556.83	.673	589.31	570.56	1448.71
31.24	51.29	1003.14	787.73	41.24	836.92	550.87	.706	627.40	623.49	1333.60
49.33	43.19	955.74	656.63	34.14	898.45	569.97	.769	694.51	694.47	1228.01
67.54	35.45	892.80	517.80	29.45	943.22	600.58	.816	727.30	725.16	1118.38
87.08	22.53	772.76	296.09	44.50	1000.71	701.39	.869	713.78	702.06	917.47
100.00	13.46	734.52	170.97	46.59	1033.55	755.24	.909	714.35	698.07	826.20

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA*0 (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCTION (DEG)	FA - OR (DEG)	OMEGA*0 BAR	LOSS PARAMETER	DEVIATION ANGLE (NEG)	MOTOR LOSS RATIO	ROTOR ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	12.36	9.167	8.679	4.361	.2861	.0534	3.655	1.734	.6576	.6828
9.33	11.86	11.62	15.03	9.876	8.508	4.551	.2870	.0570	1.929	1.751	.6705	.6952
25.04	31.24	30.92	17.62	9.771	7.732	4.470	.1973	.1411	1.400	1.805	.7794	.7968
41.47	49.33	50.13	23.09	9.611	6.821	4.280	.1073	.0237	1.464	1.892	.8905	.8999
60.65	67.58	69.98	28.99	10.012	6.196	4.048	.0572	.0127	4.931	1.319	.9490	.9542
84.51	87.98	89.90	39.14	10.325	5.304	4.169	.1321	.0285	12.442	1.921	.9133	.9210
100.00	100.00	100.00	45.75	10.457	4.382	3.798	.1616	.0334	20.511	1.521	.9134	.9209

MOMENTUM AVERAGE ROTOR EFFICIENCY = .6395 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR PRESS RATIO = 1.8471  
 MASS AVERAGE TEMPERATURE RISE = 1.2318

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.4527 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 87.4308  
 100 PERCENT DESIGN SPEED = SCAN NO 9  
 EQUIVALENT SPEED = 74634.777 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 177.4995 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0037

PERCENT SPAN FROM TIP (L. E.)	HETA01 (DEG)	VO1 (M/SEC)	W01 (M/SEC)	BETA1 (DEG)	V1 (M/SEC)	W11 (M/SEC)	M1	V41 (M/SEC)	W1 (M/SEC)	J1
0.00	73.00	503.39	481.61	1.508	147.14	0.00	.441	147.14	142.40	481.41
0.33	71.84	483.27	455.21	1.449	150.59	0.00	.452	150.59	145.66	459.21
25.00	69.90	442.07	421.77	1.360	162.73	0.00	.490	162.73	145.74	421.77
41.67	65.49	417.43	382.77	1.258	166.53	0.00	.502	166.53	145.99	382.77
60.65	64.44	373.75	337.17	1.124	161.25	0.00	.485	161.25	141.20	337.17
84.51	61.67	314.56	280.41	0.946	151.16	0.00	.453	151.16	140.13	280.41
100.00	59.21	243.55	243.58	0.849	145.15	0.00	.435	145.15	140.22	243.58

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .7980

PERCENT SPAN FROM TIP (L. E.)	HETA02 (DEG)	VO2 (M/SEC)	W02 (M/SEC)	BETA2 (DEG)	V2 (M/SEC)	W12 (M/SEC)	M2	V42 (M/SEC)	W2 (M/SEC)	J2
0.00	60.65	345.50	301.14	43.70	234.28	161.86	.638	169.37	143.91	663.00
11.84	56.81	326.12	271.85	43.67	245.80	169.72	.673	177.73	173.91	641.57
31.20	51.29	305.74	238.54	44.42	254.66	167.91	.706	191.23	190.04	605.69
49.34	43.33	291.32	200.14	30.34	273.05	173.73	.769	211.60	211.60	473.87
67.58	35.45	272.12	157.83	39.55	287.49	183.06	.816	221.60	221.03	340.88
87.28	22.53	235.54	90.25	64.50	305.02	213.78	.869	217.54	213.99	304.03
100.00	13.36	223.88	52.11	66.59	316.85	230.20	.909	217.73	210.33	282.31

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	SPAN FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA0 (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	FACTOP	OMEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	WOTOR PREFSS RATIO	WOTOR ANTIADAPTIC EFF	WOTOR POLYTROPIC EFF
0.00	0.00	0.00	12.34	9.167	8.699	.4361	.2861	.0534	3.655	1.734	.6576	.6828
9.33	11.85	11.62	15.03	9.876	8.588	.4551	.2870	.0570	1.924	1.751	.6705	.6952
25.00	31.20	30.92	17.62	9.771	7.732	.4470	.1973	.0411	1.403	1.805	.7794	.7968
41.67	47.33	50.13	23.00	9.611	6.821	.4280	.1073	.0237	1.464	1.892	.8905	.9059
60.65	67.58	69.98	28.99	10.012	6.196	.4048	.0572	.0127	4.931	1.919	.9408	.9542
84.51	87.98	83.30	39.14	10.325	5.304	.4160	.1321	.0285	12.942	1.921	.9134	.9210
100.00	100.00	100.00	45.75	10.457	4.382	.3788	.1616	.0334	20.511	1.921	.9134	.9209

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8395 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8052 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PREFSS RATIO = 1.8471  
 MASS AVERAGE TEMPERATURE RISE = 1.2318

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 9

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8991

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	U23 (FT/SEC)	U3 (FT/SEC)
0.00	44.25	783.68	566.82	.652	561.38	555.22	1475.24
11.68	45.07	805.63	570.34	.672	569.00	548.05	1414.41
30.00	41.07	850.50	558.77	.720	641.19	641.19	1314.76
48.00	38.73	914.46	572.10	.785	713.39	712.87	1222.04
66.05	39.05	946.54	584.26	.819	735.13	732.45	1126.47
87.70	43.98	989.29	687.01	.858	711.83	702.28	1018.34
100.00	45.26	1031.57	732.72	.901	726.12	706.06	954.29

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9040

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	U24 (FT/SEC)	U4 (FT/SEC)
0.00	.47	630.04	5.17	.516	630.02	630.02	1404.54
11.28	.47	642.58	5.27	.527	642.56	642.44	1414.05
30.19	.46	666.40	5.35	.553	666.37	666.08	1329.39
48.67	.12	732.29	1.55	.615	732.28	731.53	1246.65
67.37	.30	744.42	3.90	.628	744.61	746.00	1162.95
88.11	.82	703.90	10.04	.590	703.83	701.25	1070.10
100.00	.93	708.08	10.26	.593	708.00	708.00	1016.88

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (LBS)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	D FACTOR	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	43.78	7.929	4.007	.4471	.0503	.0210	22.650	1.2884	.8593
11.68	11.62	44.60	6.883	5.555	.4454	.0659	.0229	17.037	1.2584	.8467
30.00	30.92	40.61	4.442	1.153	.4275	.1023	.0336	13.654	1.251	.7793
48.60	53.14	38.61	.972	-2.018	.3865	.0936	.0287	12.106	1.2260	.7901
66.05	67.37	38.75	-4.43	-3.315	.3876	.1022	.0293	11.399	1.1850	.7878
87.70	89.11	43.17	1.727	-1.183	.4613	.1795	.0475	12.348	1.241	.7110
100.00	100.00	44.43	.627	-2.814	.4801	.1674	.0423	19.530	1.281	.7536

MOMENTUM AVERAGE STAGE EFFICIENCY = .7971 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .7799 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.7908

MASS AVERAGE TEMPERATURE RISE = 1.2318

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

100 PERCENT DESIGN SPEED - SCAN NO 9

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8961

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	VIII3 (M/SEC)	M3	VM3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	44.25	218.87	166.67	.652	171.11	169.23	449.65
11.68	45.07	245.56	173.84	.672	173.43	173.14	431.11
30.00	41.07	250.23	170.31	.720	195.44	195.63	400.74
48.60	34.73	278.73	174.31	.785	217.44	217.28	372.48
66.95	39.05	288.51	181.74	.819	226.07	223.25	343.35
87.70	43.98	301.54	209.40	.858	216.97	214.05	310.39
100.00	45.26	314.62	223.35	.901	221.32	215.21	280.87

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9040

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VIII4 (M/SEC)	M4	VM4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	.47	192.04	1.58	.516	192.03	192.03	446.39
11.28	.47	195.86	1.61	.527	195.85	195.83	431.00
30.10	.46	203.12	1.63	.553	203.11	203.02	402.20
48.67	.12	223.20	.47	.615	223.20	223.07	373.98
67.37	.30	226.90	1.19	.628	226.90	226.77	354.47
88.11	.82	214.55	3.05	.590	214.53	213.74	325.17
100.00	.83	215.82	3.13	.593	215.80	215.80	309.45

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP (L. F.)	LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	SUCI SUR (DEG)	ANGLE (DEG)	n FACTOR	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	TARGE T1, MP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	0.00	43.78	7.929	4.007	4.471	.0533	.0210	.0210	22.650	1.709	1.2584	.8593
11.68	11.28	11.28	11.62	44.60	8.883	5.555	4.654	.0659	.0229	.0229	17.037	1.721	1.2584	.8657
30.00	30.10	30.10	30.92	40.61	4.442	1.153	4.275	.1023	.0336	.0336	13.654	1.751	1.2584	.7793
48.60	48.67	48.67	50.13	38.61	-972	-2.018	3.865	.0916	.0287	.0287	12.106	1.833	1.2240	.7201
66.95	67.37	67.37	68.98	38.75	-443	-3.315	3.876	.1022	.0293	.0293	11.399	1.850	1.2152	.7878
87.70	88.11	88.11	92.98	43.17	1.727	-1.183	4.613	.1795	.0475	.0475	12.368	1.790	1.2241	.7110
100.00	100.00	100.00	100.00	44.43	.627	-2.814	4.801	.1674	.0423	.0423	19.530	1.790	1.2241	.8536

MOMENTUM AVERAGE STAGE EFFICIENCY = .7971 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7799 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.7908  
 MASS AVERAGE TEMPERATURE RISE = 1.2318

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WING FLOW = 3.0936 LHM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 84.6638  
 90 PERCENT DESIGN SPEED - SCAN NO 11  
 EQUIVALENT SPEED = 69090.732 R.P.M.  
 INLET ANN AREA = 36.1678 LB4/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (L. F.)	BETA*1 (DEG)	V*1 (FT/SEC)	VI*1 (FT/SEC)	BETA1 (DEG)	VI (FT/SEC)	VIU1 (FT/SEC)	M1	VM1 (FT/SEC)	V71 (FT/SEC)	J1 (FT/SEC)
0.00	72.14	1496.01	1423.94	0.00	459.73	0.00	.419	459.73	443.96	1423.94
10.06	70.06	1437.71	1353.34	0.00	470.24	0.00	.429	470.24	454.45	1353.34
26.00	67.56	1336.71	1215.46	0.00	510.31	0.00	.467	510.31	500.94	1232.46
43.42	64.96	1234.55	1134.52	0.00	522.52	0.00	.479	522.52	520.84	1114.52
61.00	62.06	1111.32	988.97	0.00	506.93	0.00	.464	506.93	506.76	988.97
84.05	60.09	954.21	827.08	0.00	475.87	0.00	.434	475.87	449.48	927.08
100.00	57.61	853.21	720.47	0.00	457.03	0.00	.417	457.03	441.50	720.47

EXIT VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (L. F.)	BETA*2 (DEG)	V*2 (FT/SEC)	VI*2 (FT/SEC)	BETA2 (DEG)	VI2 (FT/SEC)	VIU2 (FT/SEC)	M2	VM2 (FT/SEC)	V72 (FT/SEC)	J2 (FT/SEC)
0.00	57.51	1124.10	937.51	34.06	755.85	431.99	.457	620.23	600.26	1369.50
11.67	53.10	1004.57	854.50	35.20	744.20	452.61	.470	641.62	627.60	1307.11
31.17	49.31	928.57	757.11	34.40	749.09	445.79	.479	651.10	647.04	1202.90
49.59	46.12	837.00	656.64	33.46	807.30	449.80	.404	670.38	670.35	1104.43
64.24	45.70	855.02	690.96	36.07	859.03	505.80	.753	696.34	692.29	1094.75
84.52	43.12	788.55	609.68	38.97	932.82	546.72	.824	725.20	711.29	996.40
100.00	41.76	754.16	509.88	40.97	941.13	630.15	.853	725.80	701.13	935.03

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA BETA*0 (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	OMEGA*0 (RPM)	LOSS PARAMETER (DEG)	DEFIATION ANGL (DEG)	KATOR LOSS RATIO	ROTOR POLYTROPIC EFF
0.00	0.00	15.63	7.838	3586	.1968	-.474	1.579	.7346
10.04	11.67	12.39	7.686	3687	.2004	-1.827	1.598	.7440
26.79	31.17	18.24	6.567	3637	.1104	-.614	1.624	.7620
43.42	49.59	20.64	5.444	3510	.0302	2.514	1.650	.8648
61.04	64.24	27.16	4.700	3535	.0084	5.709	1.690	.9918
84.05	84.52	36.96	3.746	3154	-.0207	14.294	1.739	1.0139
100.00	100.00	41.85	2.784	2702	-.0244	22.815	1.740	1.0139

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9021 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8950 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.6478  
 MASS AVERAGE TEMPERATURE RISE = 1.1710

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW = 1.4072 KG/SFC  
 PERCENT DESIGN EQUIVALENT FLOW = 86.4638  
 90 PERCENT DESIGN SPEED - SCAN NO 11  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69090.722 R.P.M.  
 166.8217 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9942

PERCENT SPAN FROM TIP (L. F.)	HETA#1 (DEG)	V#1 (M/SEC)	W#1 (M/SEC)	BETA1 (DEG)	V1 (M/SEC)	W1 (M/SEC)	M1	V#1 (M/SEC)	W#1 (M/SEC)	U1
0.00	72.14	455.98	434.02	0.00	139.02	0.00	.418	139.82	135.32	434.02
1.04	70.34	436.60	412.50	0.00	143.33	0.00	.429	143.33	134.64	412.50
2.07	67.56	407.43	376.57	0.00	154.54	0.00	.467	154.54	124.69	376.57
4.14	64.96	376.29	340.42	0.00	159.26	0.00	.479	159.26	120.75	340.42
6.18	62.46	341.73	301.44	0.00	154.51	0.00	.464	154.51	114.46	301.44
8.24	60.09	290.84	252.09	0.00	145.05	0.00	.434	145.05	107.10	252.09
100.00	57.61	240.06	219.60	0.00	139.30	0.00	.417	139.30	104.57	219.60

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .7863

PERCENT SPAN FROM TIP (T. F.)	HETA#2 (DEG)	V#2 (M/SEC)	W#2 (M/SEC)	HETA#2 (DEG)	V#2 (M/SEC)	W#2 (M/SEC)	M#2	V#2 (M/SEC)	W#2 (M/SEC)	U2
0.00	58.51	342.63	285.75	34.86	230.38	131.67	.644	149.05	182.04	417.42
1.04	57.10	325.70	260.45	35.20	232.33	137.96	.674	195.57	191.29	374.41
2.07	49.31	304.37	230.77	36.40	240.51	135.88	.683	198.44	197.22	366.64
4.14	44.59	285.60	199.53	33.86	246.06	133.10	.704	204.33	204.32	330.63
6.18	44.70	240.61	152.08	36.07	261.83	154.17	.753	211.63	211.63	306.25
8.24	23.12	240.35	94.39	38.97	284.32	174.83	.824	221.04	217.41	271.22
100.00	15.76	222.87	62.45	40.97	292.97	192.07	.853	221.22	213.70	254.52

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FROM TIP	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA# (DEG)	INCIDENCE MEAN (DEG)	SUCT ANGLE (DEG)	FACTOR	OMEGA HAW	PARAMETER	LOSS	DEVIATION ANGLE (DEG)	HOTOR PRESS RATIO	ROTOR ANTIADABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	0.00	15.63	8.306	7.838	.3586	.1960	.0413	-1.474	1.579	.7364	.7511	
10.04	11.67	31.17	12.39	17.74	9.017	7.686	.3687	.2004	.0436	-1.827	1.588	.7440	.7600	
26.79	49.57	64.24	32.75	18.25	8.715	6.567	.3637	.1104	.0239	-2.618	1.624	.8630	.8720	
43.42	61.83	88.52	52.02	20.64	8.344	5.449	.3510	.0502	.0066	2.514	1.650	.8648	.8672	
61.83	100.00	100.00	70.92	27.14	8.560	4.760	.3535	.0094	.0019	5.709	1.690	.9918	.9924	
88.52	100.00	100.00	90.05	36.96	8.778	3.746	.3154	-.0207	-.0045	14.298	1.739	1.0150	1.0139	
100.00	100.00	100.00	100.00	41.85	8.858	2.784	.2702	-.0244	-.0050	27.815	1.740	1.0150	1.0139	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9021 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8950 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6479  
 MASS AVERAGE TEMPERATURE RISE = 1.1710



NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 11

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8740

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VI,3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	34.61	742.04	444.42	.671	644.18	677.11	1330.01
11.40	35.43	791.77	463.47	.680	641.95	640.94	1276.49
30.53	31.66	815.40	451.40	.708	678.72	678.71	1186.63
44.70	32.64	835.37	451.08	.731	703.12	702.60	1101.30
57.41	34.98	874.82	501.44	.769	716.82	714.20	1013.40
88.05	37.94	933.42	573.86	.825	736.18	726.29	916.48
100.00	39.22	966.68	611.21	.858	748.92	728.23	860.35

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8986

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VI,4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-1.06	711.85	-38.00	.606	710.84	710.84	1320.36
11.37	-1.07	718.64	-38.44	.612	717.61	717.52	1274.64
30.43	-1.40	742.66	-44.04	.634	741.35	741.02	1197.55
44.70	-3.06	763.65	-40.76	.663	762.56	761.77	1123.80
67.30	-3.06	764.63	-40.82	.663	763.54	763.12	1044.43
88.18	-2.06	752.64	-40.18	.650	751.61	748.87	984.50
100.00	-1.06	758.38	-40.48	.655	757.30	757.30	916.78

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	SPAN FROM TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUPT SUR (DEG)	D FACTOR	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	37.69	-1.64	-5.615	.3146	.0665	.0239	14.120	1.552	1.1445	.6772
11.40	11.37	12.33	38.89	-1.350	-3.688	.3122	.0688	.0239	13.680	1.559	1.1495	.6731
30.53	30.43	12.74	37.04	-2.958	-6.255	.2849	.0715	.0235	9.770	1.591	1.1718	.6536
44.70	44.70	12.03	35.74	-5.083	-8.071	.2629	.0621	.0190	8.923	1.614	1.1591	.6325
67.41	67.30	70.32	38.04	-4.573	-7.431	.2985	.1364	.0391	8.039	1.616	1.1428	.5311
88.05	88.18	90.05	41.00	-4.401	-7.291	.3602	.2321	.0613	8.472	1.594	1.1485	.6435
100.00	100.00	100.00	42.28	-5.413	-8.855	.3766	.2188	.0553	15.640	1.595	1.1484	.5476

MOMENTUM AVERAGE STAGE EFFICIENCY = .8630 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .8324 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.5947

MASS AVERAGE TEMPERATURE RISE = 1.1710

ORIGINAL PAGE IS OF POOR QUALITY

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (MFRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 11

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8740

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	VH3 (M/SEC)	M3	VM3	U3 (M/SEC)
0.00	34.53	270.61	135.54	.671	196.35	405.39
11.40	35.43	241.33	120.67	.680	195.67	349.07
30.53	37.66	248.53	124.27	.708	206.87	361.69
48.70	37.68	254.62	127.31	.731	214.31	335.68
67.41	34.99	246.65	123.33	.769	218.49	303.94
88.05	37.94	246.51	123.26	.825	224.39	279.34
100.00	39.22	244.64	122.32	.850	228.27	262.23

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8984

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	VH4 (M/SEC)	M4	VM4	U4 (M/SEC)
0.00	-1.06	216.97	-11.54	.606	216.66	402.65
11.37	-1.07	219.04	-11.72	.612	218.73	388.47
30.43	-1.40	226.36	-13.92	.639	225.96	365.01
48.70	-1.06	232.76	-12.43	.663	232.43	342.53
67.39	-1.06	237.06	-12.44	.663	232.73	319.56
88.19	-1.06	229.42	-12.25	.650	229.09	293.98
100.00	-3.06	231.16	-12.34	.655	230.83	279.83

STATOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE FROM TIP	TRAILING EDGE	MASS FLOW (PCT)	DELTA HFTA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	D FACTOR	OMEGA BAR	LOSS PARAMETER	DEVIATION AVG. F (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	37.60	-1.693	-5.415	.7146	.0655	.0239	14.120	1.552	1.1895	.6772
11.40	11.37	12.33	30.00	-2.350	-7.688	.7122	.0688	.0230	13.480	1.549	1.1895	.6731
30.53	30.43	12.75	37.06	-2.940	-4.255	.7069	.0715	.0235	9.770	1.571	1.1714	.6536
48.70	48.70	52.03	35.74	-4.043	-8.071	.7029	.0621	.0190	8.923	1.614	1.1501	.6225
67.41	67.39	70.42	34.04	-4.573	-7.431	.7045	.1366	.0391	4.034	1.614	1.1428	.5911
88.05	88.19	90.05	41.00	-4.401	-7.291	.7002	.1362	.0613	8.472	1.594	1.1405	.4435
100.00	100.00	100.00	42.28	-5.413	-8.855	.7066	.2188	.0553	15.640	1.595	1.1486	.5476

MOMENTUM AVERAGE STAGE EFFICIENCY = .8430 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8324 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.5947  
 MASS AVERAGE TEMPERATURE RATIO = 1.1710

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT HEIGHT FLOW = 3.0269 LHM/SEC  
 EQUIVALENT FLOW = 82.6432  
 ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)  
 '0 PERCENT DESIGN SPEED - SCAN NO 12  
 EQUIVALENT SPEED = 69052.710 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 33.6317 LB4/SEC-50 FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .9483

PERCENT SPAN FROM TIP (I. P.)	W1 (OLE)	VW1 (FT/SEC)	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	VW1 (FT/SEC)	V7 (FT/SEC)	J1 (FT/SEC)
0.00	72.52	1492.05	1421.16	1.359	0.00	0.00	448.14	477.71	1423.16
9.87	71.77	1424.93	1354.23	1.303	0.00	0.00	459.09	444.14	1354.23
26.10	68.13	1335.09	1234.02	1.221	0.00	0.00	497.30	468.16	1234.02
42.53	65.82	1233.39	1123.44	1.121	0.00	0.00	509.04	507.40	1123.44
61.10	63.58	1109.65	993.60	1.014	0.00	0.00	494.04	493.87	993.60
84.18	60.77	950.94	829.87	.867	0.00	0.00	464.34	454.11	829.87
100.00	58.18	847.46	720.08	.772	0.00	0.00	446.84	431.67	720.08

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .7951

PERCENT SPAN FROM TIP (I. P.)	W2 (OLE)	VW2 (FT/SEC)	BETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VW2 (FT/SEC)	V77 (FT/SEC)	U2 (FT/SEC)
0.00	57.85	1090.67	923.67	.928	37.50	.622	645.24	641.63	1358.75
11.70	54.57	1010.49	819.68	.879	37.00	.647	660.50	644.31	1306.27
31.19	50.12	948.49	746.15	.836	36.30	.663	655.97	619.01	1202.12
49.67	46.03	910.32	641.82	.791	35.61	.690	662.65	645.57	1104.87
67.51	35.95	842.89	494.84	.738	36.03	.746	652.50	682.35	1005.87
84.18	23.99	754.11	306.59	.663	40.63	.798	591.10	677.66	897.69
100.00	16.05	717.56	194.18	.614	42.60	.829	636.18	664.16	834.57

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. P.)	MASS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUM (DEG)	OMEGA BAR	LOSS PARAMETER	NEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	14.67	4.684	4.216	.2134	.0432	.664	1.505	.718	.7364
9.80	12.14	16.70	4.403	4.086	.2194	.0461	-.364	1.591	.754	.7426
26.14	32.12	17.81	4.189	3.879	.221	.0259	.406	1.624	.8505	.8004
42.53	49.47	20.79	4.293	4.050	.2121	.0091	2.072	1.662	.9519	.9552
61.10	70.16	27.61	4.183	4.344	-.0054	-.0013	5.707	1.711	1.0055	1.0051
84.18	84.83	36.74	4.404	4.341	.0084	.0019	14.690	1.728	.9934	.9941
100.00	100.00	42.13	4.425	4.151	.0120	.0024	23.101	1.729	.4936	.9941

MOMENTUM AVERAGE MOTOR EFFICIENCY = .8934 (POLYTROPIC)  
 MOMENTUM AVERAGE MOTOR EFFICIENCY = .8856 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.6369  
 MASS AVERAGE TEMPERATURE RISE = 1.1745

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLOW = 1.3710 KG/SEC  
 PERCENT OF STAGN EQUIVALENT FLOW = 82.8472  
 90 PERCENT DESIGN SPEED - SCAN NO 12  
 EQUIVALENT SLEFD  
 FLOW/EQUIVALENT FLOW / INLET ANN AREA = 69052.710 H.P.M.  
 163.2220 KG/SEC-SO M

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9583

PERCENT SPAN FROM TIP (L. F.)	HETA#1 (DEG)	V#1 (M/SEC)	HFTA#1 (DEG)	VI (M/SEC)	VII (M/SEC)	M1	VM (M/SEC)	V71 (M/SEC)	J1
0.00	72.52	456.78	433.78	1.359	0.00	.408	136.50	132.10	433.78
9.40	71.27	416.84	416.77	1.303	0.00	.418	136.93	135.15	412.77
27.10	68.13	406.94	377.65	1.221	0.00	.455	151.58	148.79	377.65
42.63	65.02	375.94	342.3	1.129	0.00	.466	155.16	156.66	342.43
61.10	63.50	338.22	302.85	1.014	0.00	.452	150.58	150.53	302.85
84.18	60.77	289.05	252.94	.887	0.00	.423	141.53	139.63	252.94
100.00	58.14	258.31	219.48	.772	0.00	.407	136.20	131.57	219.48

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .7051

PERCENT SPAN FROM TIP (L. F.)	HETA#2 (DEG)	V#2 (M/SEC)	HFTA#2 (DEG)	V2 (M/SEC)	V12 (M/SEC)	M2	V12 (M/SEC)	V72 (M/SEC)	J2
0.00	57.85	332.44	281.47	.920	135.72	.622	176.80	171.14	417.19
11.70	54.57	315.09	255.74	.879	142.21	.647	182.80	178.10	398.15
31.10	50.32	275.50	227.43	.816	138.98	.663	188.62	187.50	356.41
49.47	48.83	277.47	175.63	.791	141.02	.690	196.77	196.77	336.64
67.93	45.75	256.91	150.83	.738	155.76	.746	207.90	207.37	306.59
88.18	43.93	229.85	93.45	.663	180.17	.798	210.00	206.55	273.62
100.00	42.05	214.71	60.47	.614	193.91	.829	210.19	201.05	256.38

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (PCT)	DELTA HETA# (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR (DEG)	ANGLE SUR (DEG)	FACTOR	BAR	UMFGM*	LOSS PARAMETH	DEVATION ANGLE (DEG)	WOTOR PRESS RATIO	ROTOR ANTIADIBATIC F-F	ROTOR POLYTROPIC EFF
0.00	0.00	14.57	8.684	8.216	8.216	.3827	.2135	.0432	.0432	.864	1.585	.7188	.7304
9.40	11.70	16.70	9.403	8.086	8.086	.3977	.2194	.0661	.0661	-.368	1.531	.7254	.7426
26.10	31.10	17.01	9.189	7.079	7.079	.4073	.1221	.0259	.0259	.406	1.629	.8505	.8804
42.63	49.47	20.79	8.903	6.059	6.059	.4172	.0091	.0091	.0091	2.072	1.662	.9519	.9552
61.10	67.93	27.61	9.183	5.149	5.149	.4651	-.0058	-.0013	-.0013	5.207	1.711	1.0055	1.0051
84.18	89.43	36.79	9.409	4.391	4.391	.4507	.0089	.0019	.0019	14.590	1.728	.9936	.9941
100.00	100.00	42.13	9.425	3.351	3.351	.4099	.0120	.0020	.0020	23.101	1.728	.9936	.9941

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8974 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8854 (ANTIADIBATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6349  
 MASS AVERAGE TEMPERATURE RISE = 1.1745

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 12

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8756

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VIII3 (FT/SEC)	M3	VM3 (FT/SEC)	V/3 (FT/SEC)	U3 (FT/SEC)
0.00	36.50	743.58	458.50	.652	610.60	603.90	1329.28
11.41	34.23	772.08	477.75	.660	609.52	605.52	1275.73
30.50	35.26	800.53	462.13	.673	653.67	653.66	1186.10
49.52	36.11	827.12	464.49	.722	686.79	686.24	1161.51
67.08	35.48	873.05	506.73	.766	710.95	708.35	1016.41
87.76	35.76	914.15	578.45	.805	707.86	698.76	917.32
100.00	41.54	949.85	617.37	.840	721.85	701.90	859.87

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8982

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VIII4 (FT/SEC)	M4	VM4 (FT/SEC)	V/4 (FT/SEC)	U4 (FT/SEC)
0.00	-0.06	644.76	-1.70	.561	666.36	644.76	1219.64
11.37	-0.06	671.01	-1.70	.567	671.01	670.93	1273.79
30.44	-0.06	695.17	-1.73	.594	695.17	694.86	1146.97
48.74	-0.06	729.05	-1.74	.629	729.05	728.70	1123.03
67.10	-0.12	733.67	1.56	.633	733.66	733.06	1047.41
84.20	-0.64	725.92	8.09	.624	725.87	723.22	963.86
100.00	-0.65	731.17	8.30	.629	731.13	731.13	916.27

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PCF)	DELTA HFTA (DEG)	INCIDENCE MEAN (DEG)	ANGLF SUCT (INFG)	DELTA FACTOR	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (INFG)	STAGE PROFFS RATIO	STAGE TEMPO RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	36.96	-5.05	-3.337	.7443	.0603	.0217	22.120	1.461	1.1953	.7491
11.41	11.37	12.14	35.29	2.049	-1.289	.7658	.0504	.0203	16.486	1.468	1.1943	.7381
30.50	30.44	32.12	35.72	-1.353	-4.051	.7194	.0706	.0232	11.109	1.528	1.1746	.7504
49.52	48.74	51.30	34.17	-3.034	-6.425	.6449	.0449	.0138	11.923	1.640	1.1637	.8351
67.08	67.34	70.36	35.36	-4.026	-6.494	.3208	.1262	.0302	11.219	1.642	1.1667	.6711
87.76	84.20	89.83	38.62	-3.015	-5.922	.3435	.1691	.0447	12.171	1.627	1.1709	.6300
100.00	100.00	100.00	39.89	-4.093	-7.536	.3927	.1585	.0401	19.350	1.628	1.1701	.6311

MOMENTUM AVERAGE STAGE EFFICIENCY = .8493 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8388 (ADIABATIC)  
MOMENTUM AVO. STAGE PRESS RATIO = 1.6183  
MASS AVERAGE TEMPERATURE RISE = 1.1745

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 12

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8756

PERCENT SPAN FROM TIP (U. S.)	BETA J (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VU3 (M/SEC)	VU3 (M/SEC)	U3 (M/SEC)
0.00	36.90	232.74	134.75	.652	186.11	186.07	405.16
11.41	40.23	235.73	145.62	.660	194.87	194.56	389.84
30.50	35.26	244.00	140.86	.693	199.26	199.24	361.52
48.52	34.11	252.11	141.39	.722	206.72	206.67	335.74
67.00	35.04	266.11	154.45	.766	216.70	216.01	309.19
87.74	39.26	278.63	176.31	.805	215.76	212.86	272.60
100.00	~0.54	284.51	188.17	.840	220.02	213.94	262.09

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8982

PERCENT SPAN FROM TIP (U. S.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VU4 (M/SEC)	VU4 (M/SEC)	U4 (M/SEC)
0.00	-0.6	202.50	-0.21	.561	202.50	202.50	402.23
11.37	-0.6	204.52	-0.21	.567	204.52	204.50	389.25
30.64	-0.6	211.42	-0.22	.594	211.89	211.79	366.41
48.74	-0.6	222.21	-0.23	.629	222.21	221.98	342.30
67.30	0.12	227.56	.47	.633	223.56	223.44	319.37
84.20	0.24	221.26	2.47	.624	221.25	220.64	293.79
100.00	.65	222.86	2.53	.629	222.85	222.85	279.28

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (GPT)	DELTA HETA (MER)	INCIDENCE ANGLE MEAN (DEG)	SUCT SUR (DEG)	FACTOR	OMEGA HAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	34.94	.585	-3.337	.74HJ	.0603	.0217	22.120	1.561	1.1843	.7991
11.41	12.14	34.20	2.049	-1.289	.745H	.0544	.0203	16.486	1.568	1.1847	.7981
30.50	32.17	33.72	-1.353	-4.651	.7194	.0706	.0272	11.109	1.538	1.1754	.7504
48.52	51.10	34.17	-3.634	-6.625	.2773	.0449	.0178	11.923	1.640	1.1437	.8752
67.04	70.16	35.36	-4.024	-6.894	.3208	.1262	.0362	11.219	1.642	1.1467	.8511
87.74	83.83	38.62	-3.015	-5.922	.3635	.1691	.0447	12.171	1.627	1.1700	.6700
100.00	100.00	39.89	-4.093	-7.534	.3827	.1585	.0401	19.350	1.628	1.1701	.6711

MOMENTUM AVERAGE STAGE EFFICIENCY = .8493 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .8388 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.6143

MASS AVERAGE TEMPERATURE RISE = 1.1745

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.49064 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 01.0116  
 40 PERCENT DESIGN SPEED = SCAN 1.0 17  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69049.715 R.P.M.  
 33.0449 LHM/SEC-SU FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0002

PERCENT SPAN FROM TIP (L. F.)	HEI TA #1 (DEG)	V01 (FT/SEC)	VU#1 (FT/SEC)	M#1	DELTA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	72.72	1470.16	1423.17	1.357	0.00	442.69	0.00	.403	442.69	474.44	1623.10
9.48	71.50	1424.04	1355.05	1.302	0.00	453.35	0.00	.413	453.35	434.52	1355.05
25.48	68.43	1336.61	1241.14	1.220	0.00	490.67	0.00	.444	490.67	441.65	1241.14
42.20	65.06	1232.72	1124.77	1.124	0.00	502.22	0.00	.459	502.22	500.61	1125.77
60.05	63.91	1104.17	995.26	1.012	0.00	487.34	0.00	.465	487.34	487.17	995.26
74.12	61.13	964.17	830.71	.864	0.00	457.83	0.00	.417	457.83	451.68	930.31
100.00	58.76	843.96	720.05	.748	0.00	440.24	0.00	.401	440.24	474.24	720.05

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8097

PERCENT SPAN FROM TIP (L. F.)	HEI TA #2 (DEG)	V#2 (FT/SEC)	VU#2 (FT/SEC)	M#2	HFTAP (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V#2 (FT/SEC)	V72 (FT/SEC)	J2 (FT/SEC)
0.00	59.14	1064.34	913.63	.902	34.81	710.77	435.06	.602	565.00	574.42	1768.69
11.45	55.00	1001.35	824.24	.851	40.29	737.81	477.13	.627	562.77	550.67	1305.37
31.52	51.15	945.48	736.66	.813	39.01	752.99	463.67	.647	593.30	589.60	1200.33
49.73	44.05	846.59	632.37	.774	34.52	790.88	470.65	.684	636.40	634.50	1103.02
64.00	38.52	826.66	491.07	.722	37.70	830.66	513.91	.733	664.33	662.37	1005.47
84.23	24.12	734.53	301.79	.648	41.44	899.49	595.60	.790	676.05	662.04	947.39
100.00	14.02	701.94	193.68	.619	43.53	930.53	640.85	.821	674.60	651.76	934.53

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE FROM TRAILING EDGE	MASS FLOW (PCT)	DELTA HEI TA# (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	OMEGA* BAR FACTOR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR EFF AUTIADATIC	ROTOR EFF POLYTROPIC
0.00	0.00	13.58	4.443	4.415	.6021	.0451	2.146	1.581	.6909
9.48	11.45	15.70	9.605	8.296	.4202	.0483	.917	1.589	.7254
25.48	31.76	17.24	9.445	7.345	.4065	.0284	1.347	1.627	.8436
42.20	50.93	21.10	9.190	6.356	.3879	.0435	3.117	1.673	.9504
60.05	64.00	27.30	9.505	5.681	.0021	.0005	6.331	1.709	.9902
74.12	81.74	37.01	9.747	4.741	.3663	.0029	14.880	1.732	.9910
100.00	100.00	42.54	9.406	3.732	.3267	.0037	23.068	1.732	.9902

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8465 (POLYTROPIC)      MOMENTUM AVG. ROTOR PRESS RATIO = 1.6565  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8760 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1767

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WRIGHT FLOW = 1.3592 K0/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 81.8116  
 90 PERCENT DESIGN SPEED = SCAN NO 17  
 EQUIVALENT SPEED = 69009.715 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 161.9074 K0/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0002

PERCENT SPAN FROM TIP (L. F.)	HETA*1 (DEG)	V01 (M/SEC)	VU01 (M/SEC)	M01	HETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	V01 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	72.72	454.26	413.26	1.357	0.00	134.93	0.00	.403	134.93	134.93	433.76
0.48	71.50	435.52	413.02	1.332	0.00	134.18	0.00	.411	134.18	134.18	413.02
25.00	68.44	404.79	374.40	1.220	0.00	149.26	0.00	.448	149.26	149.26	378.30
42.72	65.96	375.73	343.13	1.128	0.00	153.08	0.00	.459	153.08	153.08	343.13
60.85	63.91	337.71	303.35	1.012	0.00	144.54	0.00	.445	144.54	144.54	303.35
84.32	61.13	289.00	253.08	.864	0.00	139.51	0.00	.417	139.51	139.51	253.08
100.00	58.56	257.24	219.47	.768	0.00	134.19	0.00	.401	134.19	134.19	219.47

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8097

PERCENT SPAN FROM TIP (L. F.)	HETA*2 (DEG)	V02 (M/SEC)	VU02 (M/SEC)	M02	HETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V02 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	59.14	324.41	278.47	.902	39.81	215.64	134.70	.602	166.62	141.05	417.19
11.85	55.80	305.21	252.45	.851	40.29	224.89	145.43	.627	171.53	147.73	397.88
31.52	41.15	248.30	224.54	.813	39.01	229.51	141.33	.647	140.44	175.71	355.86
49.73	44.85	273.28	192.75	.778	34.52	241.06	143.46	.686	193.79	193.72	336.20
68.00	30.52	251.97	149.95	.722	37.70	255.23	150.52	.733	202.45	201.49	305.47
88.23	24.12	224.10	111.99	.648	41.44	274.17	181.54	.790	205.45	202.08	273.53
100.00	16.02	213.95	59.03	.614	43.53	283.63	195.33	.821	205.64	198.65	254.34

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (PCT)	DELTA BETA* (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	LOSS PARAMETER	OMEGA* HUB FACTOR	DEVIATION ANGLE (DEG)	HUB PRESS RATIO	ROTOR POLYTROPIC EFF
0.20	0.00	13.58	8.843	8.415	.0451	.2312	2.146	1.581	.6009
0.48	11.85	15.70	9.605	8.294	.0481	.2369	.717	1.599	.7071
25.00	31.52	17.24	9.435	7.945	.0284	.1359	1.357	1.627	.8454
42.72	44.73	21.10	9.190	6.956	.0094	.0434	3.117	1.673	.9542
60.85	68.00	27.33	9.505	5.681	.0005	.0021	5.331	1.709	.9982
84.32	88.23	37.01	9.757	4.741	.0029	.0137	14.869	1.732	.9910
100.00	100.00	42.54	9.606	3.732	.0037	.0181	23.068	1.732	.9909

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8445 (POLYTROPIC)      MOMENTUM AVG. ROTOR PRESS RATIO = 1.6565  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8760 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1707



NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAM NO 13

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8873

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	34.98	744.84	464.57	.633	578.99	572.67	1329.22
11.54	40.29	745.45	464.47	.643	576.27	575.72	1275.07
20.75	46.60	746.72	464.71	.679	631.11	631.10	1184.99
42.69	34.87	825.03	471.65	.719	676.92	676.42	1100.18
67.07	36.19	861.90	504.98	.745	645.67	645.11	1014.42
87.74	39.92	907.84	542.62	.798	696.24	696.89	917.39
100.00	41.20	913.77	621.67	.834	710.09	690.47	859.84

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9108

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	1.18	636.51	13.11	.535	636.38	636.34	1319.58
11.54	1.16	641.22	13.04	.540	641.09	641.71	1273.43
20.75	.83	666.97	9.66	.568	666.90	665.60	1196.91
42.69	.91	708.14	10.27	.609	708.57	707.84	1123.05
67.07	.81	710.45	10.29	.611	710.37	709.94	1064.00
87.74	.83	705.01	10.21	.605	704.94	702.34	963.97
100.00	.81	709.99	10.28	.609	709.92	709.92	916.24

STATOR PERFORMANCE-NCF DATA

PERCENT SPAN FROM TIP FROM TAILING ENCF	MASS FLOW (PCT)	DELTA HEAT (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCTION (DEG)	LOSS PARAMETER	OMEGA HAP	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMPERATURE RATIO	STATOR POLYTROPIC EFF
0.00	0.00	37.80	2.665	-1.257	.0197	.0546	23.360	1.541	1.1995	.8263
11.54	11.14	39.12	4.105	.772	.0210	.0606	17.717	1.565	1.1995	.8145
20.75	20.41	35.83	.033	-3.247	.0236	.0718	14.002	1.594	1.1783	.7849
42.69	40.72	34.04	-2.696	-5.804	.0179	.0584	12.412	1.645	1.1663	.8163
67.07	67.33	35.34	-3.113	-6.181	.0343	.1196	11.930	1.644	1.1654	.6945
87.74	84.17	39.09	-2.341	-5.250	.0442	.1671	12.362	1.633	1.1712	.8583
100.00	100.00	40.17	-3.430	-6.872	.0308	.1565	14.530	1.633	1.1713	.7125

MOMENTUM AVERAGE STAGE EFFICIENCY = .8418 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8307 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.6166  
 MASS AVERAGE TEMPERATURE RISE = 1.1767

ORIGINAL PAGE IS OF POOR QUALITY

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 13

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8873

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	VIII3 (M/SEC)	M3	VM3 (M/SEC)	U73 (M/SEC)	U3 (M/SEC)
0.00	30.98	227.03	142.42	.633	176.48	174.54	409.15
11.54	40.24	230.26	148.69	.643	175.65	175.36	398.64
30.75	36.66	239.79	163.17	.679	192.36	192.36	361.15
44.60	34.07	251.47	143.76	.719	206.33	206.17	335.49
67.07	36.19	262.73	155.14	.755	212.04	211.27	309.20
87.74	40.92	276.71	177.58	.798	212.21	209.36	279.62
100.00	41.20	287.66	189.49	.834	216.44	210.46	262.08

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9108

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	VIII4 (M/SEC)	M4	VM4 (M/SEC)	U74 (M/SEC)	U4 (M/SEC)
0.00	1.14	194.01	4.00	.535	193.97	193.97	402.21
11.34	1.14	195.65	3.97	.540	195.60	195.38	399.26
30.41	.83	203.29	2.94	.568	203.27	203.18	364.32
40.72	.83	215.99	3.13	.609	215.97	215.75	342.31
67.33	.83	218.54	3.14	.611	216.52	216.60	319.63
88.17	.83	214.89	3.11	.605	214.87	214.08	293.42
100.00	.83	216.41	3.13	.609	216.38	215.38	279.27

STATOR PERFORMANCE DATA

PERCENT LEADING FUSH	PERCENT SPAN FROM TRAILING EDGE	MASS FLOW (PCT)	DELTA HFTA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	FACTOR	OMEGA RAP	LOSS PARAMETER	DEVIATION ANGLE (NEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	37.80	2.665	-1.257	.3476	.0546	.0197	23.360	1.561	1.1905	.8263
11.54	11.34	11.34	39.12	4.105	-.772	.3696	.0606	.0210	17.717	1.565	1.1905	.8145
30.75	30.41	31.76	35.83	4.13	-1.257	.3419	.0714	.0236	14.002	1.596	1.1783	.7849
40.59	44.72	50.93	34.04	-2.896	-5.884	.3028	.0585	.0179	12.812	1.645	1.1663	.8163
67.07	67.33	70.12	35.36	-3.313	-6.181	.3366	.1196	.0343	11.930	1.644	1.1654	.6965
87.74	88.17	89.74	39.09	-2.341	-5.250	.3826	.1671	.0142	12.362	1.633	1.1712	.6583
100.00	100.00	100.00	40.37	-3.430	-6.812	.4017	.1565	.0396	19.570	1.633	1.1713	.7125

MOMENTUM AVERAGE STAGE EFFICIENCY = .8418 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.6166  
 MASS AVERAGE STAGE EFFICIENCY = .8307 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1767

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 24, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.9706 LBM/SEC 90 PERCENT DESIGN SPEED - SCAN NO 14  
 PERCENT DESIGN EQUIVALENT FLOW = 81.1069 LBM/SEC EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69066.688 R.P.M.  
 32.8098 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0003

PERCENT SPAN FROM TIP (I. E.)	HETA*1 (DEG)	V*1 (FT/SEC)	W*1 (OZ)	BETA1 (DEG)	V1 (FT/SEC)	M1	V*2 (FT/SEC)	M2	V*3 (FT/SEC)	M3	V*4 (FT/SEC)	V*5 (FT/SEC)	U1 (FT/SEC)
0.00	72.89	1489.39	1423.45	0.00	438.25	0.00	438.25	0.399	438.25	0.399	438.25	424.14	1423.45
9.60	71.69	1428.27	1355.96	0.00	428.70	0.00	428.70	0.409	428.70	0.409	428.70	424.02	1355.96
25.70	68.66	1334.14	1242.70	0.00	425.41	0.00	425.41	0.443	425.41	0.443	425.41	424.49	1242.70
42.07	65.22	1237.22	1127.63	0.00	426.81	0.00	426.81	0.454	426.81	0.454	426.81	425.21	1127.63
60.72	64.18	1106.90	926.82	0.00	422.05	0.00	422.05	0.440	422.05	0.440	422.05	421.89	926.82
84.32	61.40	945.92	730.67	0.00	422.86	0.00	422.86	0.413	422.86	0.413	422.86	422.78	730.67
100.00	58.44	841.65	720.22	0.0	435.50	0.00	435.50	0.396	435.50	0.396	435.50	420.70	720.22

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.8161

PERCENT SPAN FROM TIP (I. E.)	HETA*2 (DEG)	V*2 (FT/SEC)	W*2 (OZ)	BETA2 (DEG)	V2 (FT/SEC)	M2	V*3 (FT/SEC)	M3	V*4 (FT/SEC)	M4	V*5 (FT/SEC)	U2 (FT/SEC)
0.00	59.80	1051.56	908.08	41.02	701.03	0.593	460.15	0.621	528.88	0.593	511.85	1369.03
11.47	58.23	970.24	823.22	41.23	712.02	0.621	472.50	0.673	550.50	0.621	538.47	1305.61
31.41	51.50	937.04	737.79	38.69	747.77	0.642	474.39	0.673	580.71	0.642	580.07	1201.18
49.71	45.60	879.98	628.75	37.63	777.42	0.673	474.69	0.732	615.67	0.673	615.63	1103.44
64.21	36.49	822.04	488.81	37.37	819.35	0.732	515.76	0.788	660.92	0.732	658.98	1004.56
84.31	23.93	730.68	296.23	41.97	898.29	0.788	600.76	0.819	757.85	0.788	656.88	897.19
100.00	15.76	694.61	188.71	44.02	929.63	0.819	646.02		668.49	0.819	645.77	834.73

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE (I. E.)	MASS FLOW (LBS)	DELTA HETA*1 (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR ANGLE (DEG)	LOSS PARAMETER	OMEGA HAR (RPM)	DEVIATION ANGLE (DEG)	MOTOR PRESS RATIO	ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	13.04	9.051	8.582	0.664	2426	2.814	1.577	0.873	0.7065
9.60	11.89	15.46	9.777	9.472	-0.494	2453	1.141	1.588	0.900	0.7178
25.70	31.41	17.16	9.639	7.560	0.292	1444	1.666	1.625	0.953	0.8308
42.07	49.71	20.62	9.425	6.604	0.142	0.666	3.852	1.658	0.9248	0.9300
60.72	68.21	27.70	9.764	5.944	0.008	0.034	6.470	1.710	0.983	0.9966
84.32	84.31	37.46	10.076	5.010	0.052	0.243	14.416	1.733	0.829	0.9441
100.00	100.00	43.04	10.047	4.013	0.063	0.309	22.816	1.733	0.829	0.9442

MOMENTUM AVERAGE MOTOR EFFICIENCY = 0.8749 (POLYTROPIC) MOMENTUM AVG. MOTOR PRESS RATIO = 1.6536  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8657 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.1782

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.3475 KG/SEC SCAM: NO 14  
 PERCENT DESIGN EQUIVALENT FLOW = 81.1049 EQUIVALENT SPEED  
 90 PERCENT DESIGN SPEED = 62066 RPM R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 160.1014 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0003

PERCENT SPAN FROM TIP (L. E.)	HETA01 (DEG)	V01 (M/SEC)	VU01 (M/SEC)	M01	HETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	V04 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	72.89	453.96	433.47	1.356	0.00	133.58	0.00	.392	133.50	129.20	633.87
9.60	71.69	435.34	413.30	1.301	0.00	136.77	0.00	.409	136.77	132.29	613.30
25.70	68.66	406.65	374.74	1.219	0.00	147.95	0.00	.443	147.95	145.24	378.78
42.07	66.22	375.58	343.70	1.127	0.00	151.43	0.00	.454	151.43	150.94	363.70
60.72	64.14	337.34	303.71	1.011	0.00	146.93	0.00	.440	146.93	146.88	303.71
84.32	61.40	244.32	253.13	.842	0.00	134.03	0.00	.413	134.03	134.11	253.13
100.00	54.84	256.54	213.52	.746	0.00	132.74	0.00	.396	132.74	124.23	219.52

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8161

PERCENT SPAN FROM TIP (T. F.)	HETA02 (DEG)	V02 (M/SEC)	VU02 (M/SEC)	M02	HETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V02 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	50.90	320.51	277.03	.809	41.02	213.68	140.25	.591	161.20	156.01	417.28
11.87	54.23	301.42	250.83	.840	41.23	223.12	147.07	.621	167.70	146.13	397.95
31.41	51.50	245.79	223.66	.805	38.69	227.02	147.46	.642	177.91	176.80	366.12
49.71	45.80	264.22	161.64	.742	37.63	236.96	146.69	.673	187.65	187.64	316.33
68.21	36.49	250.56	148.99	.714	37.97	255.53	157.20	.732	201.65	200.86	306.19
84.31	23.43	222.71	90.35	.641	41.07	274.80	183.11	.788	203.54	200.22	273.46
100.00	15.76	211.72	57.52	.612	44.02	283.35	186.91	.819	203.74	196.83	256.83

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HETA0 (DEG)	MASS FLOW (KGT)	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	OMEGA HAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR LOSS PARAMETER	ADJACENT POLYTROPIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	9.051	8.582	.4116	.2426	2.814	1.577	.6073	.7065
9.60	11.87	11.89	9.777	8.672	.4091	.2453	1.741	1.588	.6000	.7174
25.70	31.41	31.56	9.639	7.560	.4134	.1444	1.666	1.625	.4253	.9368
42.07	49.71	50.70	9.425	6.604	.4071	.0660	3.852	1.650	.7248	.9300
60.72	68.21	70.01	9.764	5.944	.3933	.0038	6.470	1.710	.8063	.9966
84.32	88.31	83.75	10.026	5.010	.3763	.0243	14.816	1.733	.9829	.9841
100.00	100.00	100.00	10.087	4.013	.3369	.0709	22.814	1.733	.9829	.9842

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8749 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8657 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6535  
 MASS AVERAGE TEMPERATURE RISE = 1.1782

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 14

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8931

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	40.17	734.52	473.41	.623	561.27	555.11	1324.55
11.56	41.22	749.60	493.48	.637	563.81	562.88	1275.27
30.49	37.35	780.63	473.58	.672	620.58	620.57	1185.68
48.71	35.91	811.23	475.80	.705	657.04	656.56	1100.46
67.32	36.46	840.24	511.23	.753	691.86	689.33	1013.46
87.40	40.43	906.49	587.84	.796	690.05	690.78	916.90
100.00	41.69	942.52	624.92	.832	703.76	684.34	860.05

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9100

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-0.94	624.28	-10.24	.524	624.20	624.20	1319.91
11.92	-0.94	633.61	-10.36	.532	633.53	633.45	1274.22
31.33	-0.76	656.83	-8.76	.558	656.77	656.48	1197.56
48.71	-0.94	689.23	-11.47	.600	689.14	688.42	1123.63
67.47	-0.94	708.42	-11.62	.609	708.33	707.94	1047.99
88.24	-1.12	695.43	-13.55	.595	695.29	692.75	963.90
100.00	-1.12	700.14	-13.88	.600	700.00	700.00	916.46

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA WETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SURF (DEG)	D FACTOR	O MEGA BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	41.11	3.452	-0.070	.7894	.0556	.0200	21.240	1.557	1.2018
11.56	11.47	11.39	42.16	5.041	1.709	.7880	.0609	.0212	15.619	1.565	1.2018
30.49	30.73	31.56	38.11	.726	-2.567	.7592	.0753	.0247	12.416	1.593	1.1709
48.71	48.73	50.70	36.45	-1.855	-4.843	.7144	.0356	.0109	11.044	1.642	1.1678
67.32	67.40	70.01	37.40	-3.076	-5.937	.7454	.1114	.0320	10.159	1.651	1.1660
87.40	88.24	84.74	41.54	-1.871	-4.773	.6006	.1741	.0461	10.417	1.670	1.1727
100.00	100.00	100.00	42.81	-2.938	-6.379	.4192	.1630	.0412	17.580	1.630	1.1728

MOMENTUM AVERAGE STAGE EFFICIENCY = .8350 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8235 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.6161  
 MASS AVERAGE TEMPERATURE RISE = 1.1782

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 14

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8931

PERCENT SPAN FROM TIP (T. F.)	BETA 1 (DEG)	V3 (M/SEC)	V1/3 (M/SEC)	M3	VM3 (M/SEC)	V7/3 (M/SEC)	U3 (M/SEC)
0.00	40.17	223.88	144.42	.623	171.09	149.20	405.25
11.54	41.27	228.48	150.56	.637	171.45	171.56	388.70
30.50	37.35	237.94	144.35	.672	149.15	149.15	361.33
44.71	35.91	247.26	145.02	.705	200.27	200.12	335.54
67.32	36.48	262.70	155.42	.751	210.44	210.11	309.90
87.80	40.43	276.30	173.14	.796	210.33	207.50	279.47
100.00	41.59	287.28	191.09	.832	214.51	208.59	262.14

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9100

PERCENT SPAN FROM TIP (T. F.)	BETA 4 (DEG)	V4 (M/SEC)	V1/4 (M/SEC)	M4	VM4 (M/SEC)	V7/4 (M/SEC)	U4 (M/SEC)
0.00	-0.94	190.24	-3.12	.574	190.25	190.25	402.31
11.32	-0.94	193.12	-3.14	.532	193.10	171.08	388.14
30.33	-0.76	200.20	-2.67	.558	200.14	200.10	365.82
44.70	-0.94	213.13	-3.50	.600	213.10	212.44	342.42
67.50	-0.94	215.93	-3.54	.609	215.90	215.78	319.43
84.24	-1.12	211.97	-4.13	.595	211.93	211.15	293.90
100.00	-1.12	213.40	-4.17	.600	213.36	213.14	279.34

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TRAILING EDGE	MASS FLOW (PCT)	DELTA HFA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	DELTA FACTOR	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATION POLYTROPIC EFF
0.00	0.00	41.11	3.852	-0.70	.3894	.0554	.0200	21.240	1.557	1.2018	.8777
11.54	11.32	42.16	5.041	1.709	.3480	.0609	.0212	15.619	1.565	1.2018	.8170
30.50	31.56	38.11	7.25	-2.567	.3542	.0753	.0247	12.414	1.593	1.1799	.7923
44.71	44.70	36.45	-1.855	-4.843	.3144	.0356	.0109	11.044	1.642	1.1478	.8450
67.32	70.01	37.40	-3.076	-5.937	.3454	.1114	.0320	10.159	1.651	1.1460	.7169
87.80	89.75	41.54	-1.873	-4.773	.4005	.1741	.0461	10.417	1.630	1.1727	.6555
100.00	100.00	42.81	-2.938	-6.379	.4192	.1630	.0461	17.500	1.630	1.1728	.6590

MOMENTUM AVERAGE STAGE EFFICIENCY = .8350 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8235 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.6161  
 MASS AVERAGE TEMPERATURE RISE = 1.1792

AL P-10: IS  
FOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW FROM TIP (L.F.) = 2.9145 LHM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 79.5735  
 90 PERCENT DESIGN SPEED - SCAN NO 15  
 EQUIVALENT SPEED  
 FLOW/VALENT FLOW / INLET ANN ARFA = 60032.759 R.P.M.  
 32.1895 LHM/SEC-50 FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9994

PERCENT SPAN FROM TIP (L.F.)	HETA#1 (DEG)	V#1 (FT/SEC)	V#10 (FT/SEC)	HETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V#1 (FT/SEC)	V#11 (FT/SEC)	U1 (FT/SEC)
0.00	71.23	1405.04	1422.75	0.00	424.79	0.00	.390	424.79	414.94	1422.75
9.44	72.07	1425.49	1356.26	0.00	434.85	0.00	.399	434.85	424.48	1356.26
21.35	69.14	1331.46	1244.56	0.00	474.25	0.00	.431	474.25	444.54	1244.56
41.66	64.76	1230.07	1130.29	0.00	444.31	0.00	.443	444.31	444.74	1130.29
60.27	64.76	1104.55	999.11	0.00	474.56	0.00	.430	474.56	470.79	999.11
84.07	61.94	947.23	831.47	0.00	442.49	0.00	.403	442.49	474.55	831.47
100.00	59.41	834.28	719.87	0.00	424.62	0.00	.387	424.62	411.16	719.87

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8269

PERCENT SPAN FROM TIP (L.F.)	HETA#2 (DEG)	V#2 (FT/SEC)	V#10P (FT/SEC)	HETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V#2 (FT/SEC)	V#21 (FT/SEC)	U2 (FT/SEC)
0.00	90.26	1032.68	902.87	42.44	684.06	465.48	.577	684.06	485.11	1368.35
11.93	57.32	904.97	816.41	42.09	716.02	444.22	.606	716.02	512.71	1304.63
31.50	52.34	914.94	727.50	40.09	733.90	472.65	.628	733.90	557.94	1200.14
49.67	45.27	864.20	621.14	38.46	774.84	481.96	.670	774.84	606.87	1103.11
64.65	37.24	801.00	484.12	49.20	822.48	519.82	.716	822.48	637.39	1004.94
84.20	21.00	723.55	291.09	42.42	894.74	604.87	.786	894.74	642.02	996.86
100.00	15.55	647.40	104.33	44.45	924.22	649.99	.817	924.22	642.04	934.32

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	SPAN FROM TIP (L.F.)	TRAILING EDGE ENCL	MASS FLOW (LBM)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	DELTA HETA (DEG)	VELOCITY (FT/SEC)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	0.00	9.391	4.423	4.244	2545	.0477	3.971	1.647	.8491	.8894
9.44	11.93	31.50	31.17	10.174	4.834	4.436	2609	.0511	2.447	1.579	.8491	.7014
25.15	31.17	49.67	49.24	10.056	7.999	4.277	1630	.0331	2.539	1.613	.8494	.8162
41.61	49.67	64.65	64.24	9.404	7.107	4.124	0799	.0170	3.905	1.644	.8167	.9104
40.27	64.65	84.20	84.20	10.290	6.491	4.022	0381	.0043	7.128	1.649	.8494	.9064
44.07	84.20	100.00	100.00	10.591	5.541	3.805	0338	.0072	14.652	1.733	.9781	.9781
100.00	100.00	100.00	100.00	10.654	4.540	3.397	0414	.0045	22.597	1.732	.9784	.9781

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8587 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8484 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6454  
 MASS AVERAGE TEMPERATURE RISE = 1.1799

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW = 1.3220 KG/SEC 90 PERCENT DESIGN SPEED - SCAN NO 15  
 PERCENT DESIGN EQUIVALENT FLOW = 79.5735 EQUIVALENT SPEED

R.P.M. = 69032.749  
 INLET ANN AREA = 157.1631 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9994

PERCENT SPAN FROM TIP (I. F.)	RETA*1 (DEG)	V*1 (M/SEC)	W*1 (M/SEC)	VI (M/SEC)	M1	V*1 (M/SEC)	W*1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	73.23	652.92	433.65	170.70	0.00	170.70	0.00	170.70	433.65
9.56	72.07	434.49	413.39	131.76	0.00	131.76	0.00	131.76	413.39
25.35	69.14	405.95	379.34	146.55	0.00	146.55	0.00	146.55	379.34
41.61	66.76	374.93	344.51	167.92	0.00	167.92	0.00	167.92	344.51
60.27	64.76	335.67	304.53	183.55	0.00	183.55	0.00	183.55	304.53
82.07	61.99	287.19	253.55	194.87	0.00	194.87	0.00	194.87	253.55
100.00	59.41	244.90	214.42	199.73	0.00	199.73	0.00	199.73	214.42

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8769

PERCENT SPAN FROM TIP (I. F.)	RETA*2 (DEG)	V*2 (M/SEC)	W*2 (M/SEC)	V2 (M/SEC)	M2	V*2 (M/SEC)	W*2 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	60.76	314.76	275.19	200.50	0.00	200.50	141.88	157.79	417.07
11.93	57.32	294.65	244.84	214.24	0.00	214.24	144.81	159.64	397.65
31.50	52.34	280.10	221.74	221.69	0.00	221.69	144.06	171.17	365.80
48.67	48.67	264.65	189.32	216.17	0.00	216.17	146.90	184.42	336.23
68.05	47.24	244.14	147.87	250.69	0.00	250.69	154.44	194.27	306.31
88.29	43.90	220.54	89.00	273.33	0.00	273.33	184.37	201.79	273.36
100.00	41.55	200.64	56.18	289.92	0.00	289.92	198.12	201.97	254.30

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (KGT)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	INCIDENCE ANGLE (DEG)	FACTOR	OMEGA* (RPM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	RATOR PRESS RATIO	RATOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	17.27	9.921	8.923	4244	25494	0.477	3.971	1.567	0.693	0.714
9.56	11.93	11.73	14.75	10.124	8.833	4436	2609	0.511	2.447	1.579	0.617	0.704
25.35	31.50	31.17	16.80	10.056	7.999	4277	1430	0.311	2.519	1.613	0.636	0.162
41.61	48.67	50.24	21.00	9.904	7.107	4124	0.799	0.170	3.205	1.650	0.170	0.168
60.27	68.05	69.52	27.67	10.290	6.491	4022	0.381	0.083	7.124	1.699	0.239	0.664
82.07	88.29	89.57	30.16	10.591	5.581	3805	0.334	0.025	14.652	1.731	0.276	0.761
100.00	100.00	100.00	43.86	10.654	4.580	3397	0.414	0.085	22.597	1.732	0.276	0.781

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.887 (POLYTROPIC)

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.884 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.6454

MASS AVERAGE TEMPERATURE RISE = 1.1799



NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 15

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9021

PERCENT SPAN FROM TIP (I. P.)	HETA 3 (DEG)	V3 (FT/SEC)	VIII (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	51.90	717.68	479.71	.607	574.16	574.16	1724.90
11.51	42.80	724.74	490.80	.623	589.59	577.69	1774.39
20.75	38.66	765.57	474.85	.659	598.54	574.54	1744.60
44.67	36.74	807.69	443.10	.701	647.29	646.91	1700.51
67.20	37.63	864.26	515.47	.737	688.67	686.23	1613.53
87.25	40.87	904.94	542.11	.794	684.33	675.14	1616.14
100.00	47.11	940.56	630.74	.830	687.73	678.45	1659.63

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9118

PERCENT SPAN FROM TIP (I. P.)	HETA 4 (DEG)	V4 (FT/SEC)	VIIA (FT/SEC)	M4	VM4 (FT/SEC)	V/4 (FT/SEC)	U4 (FT/SEC)
0.00	-9.96	602.24	-9.88	.504	602.19	602.19	1319.26
11.51	-9.75	612.30	-10.12	.513	612.22	612.14	1273.54
20.75	-10.12	635.56	-12.42	.539	635.44	625.14	1197.21
44.67	-10.12	683.86	-13.37	.585	683.73	683.01	1123.04
67.20	-10.12	694.51	-13.57	.596	693.98	693.59	1047.69
84.22	-10.12	687.53	-13.44	.588	687.39	684.88	983.50
100.00	-10.12	691.49	-13.52	.592	691.36	691.16	916.01

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TRAIL IN LEAF	DELTA HETA (DEG)	INCIDENCE MEAN (DEG)	MEAN SUCTION SURFACE ANGLE (DEG)	FACTORS	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESSURE RATIO	STAGE TEMPERATURE RATIO	STATOR POLYTROPIC EFF
0.00	0.00	5.543	1.661	.4043	.0735	.0.03	21.240	1.544	1.2041	.8627
11.51	11.73	6.670	1.348	.4072	.0604	.0210	15.914	1.557	1.2041	.8706
20.75	30.27	2.035	-1.255	.3789	.0723	.0.78	12.066	1.541	1.1817	.8030
44.67	30.24	-1.026	-4.014	.3379	.0465	.0142	10.466	1.636	1.1703	.8440
67.20	67.20	-1.046	-4.761	.3521	.0434	.0239	9.979	1.667	1.1676	.7987
87.25	87.25	-1.446	-4.342	.4044	.1474	.0443	10.813	1.634	1.1714	.6774
100.00	100.00	-2.519	-5.960	.4281	.1503	.0396	17.580	1.636	1.1737	.7258

MOMENTUM AVERAGE STAGE EFFICIENCY = .8234 (POLYTROPIC)  
MASS AVERAGE STAGE EFFICIENCY = .8112 (ADIABATIC)

MOMENTUM AVERAGE STAGE PRESSURE RATIO = 1.6122  
MASS AVERAGE TEMPERATURE RATIO = 1.1799

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED = SCAN NO 15

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9021

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	VM3 (M/SEC)	VU3 (M/SEC)	U3 (M/SEC)
0.00	41.90	214.75	146.09	.607	162.41	141.02	405.05
11.61	42.86	223.06	152.34	.623	164.16	143.49	388.43
30.75	34.56	213.63	145.95	.659	162.44	102.63	351.06
44.67	34.74	245.18	147.25	.701	197.29	107.15	315.44
62.00	37.63	257.33	157.10	.737	203.41	203.07	308.22
87.95	40.47	275.42	180.48	.794	208.57	204.78	279.25
100.00	42.11	286.64	192.25	.830	212.67	206.79	262.01

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9118

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-7.4	113.57	-3.01	.504	117.55	113.55	402.11
11.33	-9.5	116.63	-3.09	.513	116.60	106.57	389.22
30.27	-1.12	131.72	-3.79	.539	143.68	103.60	304.91
44.65	-1.12	208.64	-4.07	.585	208.40	208.19	342.30
62.35	-1.12	211.56	-4.14	.596	211.52	211.61	319.34
84.22	-1.12	209.56	-4.10	.588	209.52	209.25	293.68
100.00	-1.12	210.77	-4.12	.592	210.73	210.72	279.20

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (PCT)	DELTA MEAN (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	OMF/A RATIO	DEVATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE LOSS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	42.84	5.583	1.661	4.083	.0534	.073	21.260	1.548	1.2041	.8627
11.61	11.30	43.91	6.678	3.368	.6072	.0504	.0210	15.614	1.557	1.2041	.8996
30.75	30.27	34.70	2.045	-1.255	.3749	.0723	.0238	12.066	1.503	1.1017	.9030
44.67	44.66	37.84	-1.026	-4.014	.3379	.0465	.0162	10.866	1.636	1.1703	.4540
62.20	62.35	38.75	-1.416	-4.761	.3521	.0034	.0239	9.979	1.647	1.1674	.7497
87.94	84.22	41.99	-1.446	-4.342	.4094	.1674	.0843	10.613	1.536	1.1738	.6776
100.00	100.00	43.23	-2.519	-5.960	.4241	.1568	.0396	17.580	1.636	1.1737	.7268

MOMENTUM AVERAGE STAGE EFFICIENCY = .8234 (POLYTROPIC)  
MASS AVERAGE STAGE EFFICIENCY = .8112 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.6122  
MASS AVERAGE TEMPERATURE RISE = 1.1799

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.9235 LMY/SEC 90 PERCENT DESIGN SPEED = SCAM NO 16  
 PERCENT DESIGN EQUIVALENT FLOW = 79.8195 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69038.901 R.P.M.  
 32.289 194/SEC-SU FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0129

PERCENT SPAN FROM TIP (I. F.)	HETA#1 (DEG)	VO1 (FT/SEC)	VO#1 (FT/SEC)	W#1	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	VM1 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	73.16	1400.62	1422.48	1.342	0.00	430.66	0.00	.392	430.66	414.79	1422.48
4.43	72.00	1426.38	1356.58	1.208	0.00	440.73	0.00	.401	440.73	424.30	1356.58
25.25	69.04	1333.30	1245.39	1.217	0.00	476.13	0.00	.435	476.13	447.38	1245.39
41.43	66.71	1242.04	1131.67	1.126	0.00	487.17	0.00	.445	487.17	485.60	1131.67
61.11	64.71	1106.40	1000.33	1.010	0.00	472.70	0.00	.431	472.70	472.54	1000.33
84.01	61.92	944.74	832.30	.859	0.00	444.04	0.00	.404	444.04	438.08	932.10
100.00	59.32	817.10	719.93	.761	0.00	427.12	0.00	.384	427.12	412.60	719.93

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8367

PERCENT SPAN FROM TIP (I. F.)	HETA#2 (DEG)	VO2 (FT/SEC)	VO#2 (FT/SEC)	W#2	BETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VM2 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	61.69	1071.10	894.96	.860	44.11	674.50	469.51	.568	484.24	448.67	1368.47
12.14	57.44	957.70	810.76	.809	44.03	709.08	492.87	.599	509.77	494.63	1303.63
31.77	52.14	810.16	719.13	.779	40.67	736.01	479.68	.630	558.29	554.74	1194.42
44.86	45.75	654.02	611.76	.737	33.44	771.78	490.45	.666	595.91	545.88	1102.21
61.17	36.40	406.73	474.70	.703	38.99	835.47	525.47	.728	649.34	647.45	1004.37
89.14	23.81	214.22	203.28	.625	43.01	893.69	609.65	.782	653.64	642.72	897.93
100.00	15.30	674.07	178.48	.506	45.06	926.01	655.52	.814	654.05	631.82	834.60

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (I. F.)	DELTA BETA# (DEG)	MEAN FLOW (L/SEC)	INDEPENDENCE FACTOR	W# (DEG)	ANGLE (DEG)	SUCT SUR (DEG)	LOSS PARAMETER	DELTA ANGLE (DEG)	DELTA ANGLE (DEG)	DELTA ANGLE (DEG)	DELTA ANGLE (DEG)
0.00	0.00	0.00	9.324	8.056	4.134	.2657	.0479	4.698	1.565	4.617	.6822
9.43	12.14	11.70	10.054	4.761	.6536	.2662	.0514	3.011	1.579	4.763	.6464
25.25	31.77	31.07	9.976	7.925	4.404	.1655	.0339	2.477	1.621	4.019	.6148
41.43	44.86	50.04	9.825	7.034	4.249	.0937	.0199	4.072	1.658	4.040	.6032
61.11	64.71	64.43	10.217	6.425	3.994	.0210	.0046	6.346	1.717	.9802	.6817
84.01	61.92	82.54	10.514	5.506	.3925	.0496	.0106	14.394	1.731	.8756	.9681
100.00	100.00	100.00	10.508	4.649	.3534	.0601	.0123	22.348	1.730	.9445	.9681

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8561 (POLYTROPIC) MOMENTUM AVERAGE ROTOR PRESS RATIO = 1.6516  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8456 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.1819

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.3761 KG/SEC 90 PERCENT DESIGN SPEED = SCAM NO 16  
 PERCENT DESIGN EQUIVALENT FLOW = 79.8195 EQUIVALENT SPEED  
 FOUVALENT FLOW / INLET ANN ARFA = 69038.001 R.P.M.  
 = 157.6690 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = 1.0129

PERCENT SPAN FROM TIP (L. F.)	HETA*1 (DEG)	V*1 (M/SEC)	BETA1 (DEG)	V1 (M/SEC)	M1	V*1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	73.16	451.12	0.00	171.26	.392	171.26	127.04	833.59
0.53	72.00	436.76	0.00	176.33	.401	176.33	129.04	813.49
25.25	69.08	406.19	1.217	145.12	.435	145.12	142.46	779.59
61.43	66.71	375.54	1.126	148.49	.445	148.49	148.01	744.93
60.11	64.71	337.23	0.00	146.08	.431	146.08	146.01	706.40
84.01	61.72	287.53	.459	137.34	.404	137.34	171.53	653.69
100.00	59.32	255.15	.761	130.19	.388	130.19	125.76	619.46

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8367

PERCENT SPAN FROM TIP (L. F.)	HETA*2 (DEG)	V*2 (M/SEC)	BETA2 (DEG)	V2 (M/SEC)	M2	V*2 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	61.00	711.23	0.00	285.59	.568	143.11	147.00	417.11
12.16	57.46	291.91	.403	176.13	.599	150.23	155.38	397.35
31.77	52.18	277.68	.779	226.34	.630	146.21	170.15	365.60
49.84	45.75	240.11	1.466	235.24	.666	149.49	181.67	335.95
68.17	36.40	215.89	.703	256.65	.728	160.23	197.97	306.13
86.10	23.81	177.69	.625	272.60	.782	185.82	199.17	273.69
100.00	15.50	200.68	.596	282.25	.814	199.80	199.35	254.32

ROTOR PERFORMANCE DATA

PERCENT TIP RANGE	PERCENT SPAN FROM TIP (L. F.)	MASS FLOW (KGF)	DELTA HETA (DEG)	INCIDENCE ANGLE (DEG)	ETA FACTOR	DELTA HETA (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR POLYTROPIC EFF
0.00	0.00	11.47	9.324	8.856	.6334	.2757	.0679	6.608	.5822
0.53	12.16	11.70	10.054	8.761	.6536	.2862	.0514	3.011	.6763
25.25	31.77	31.07	9.976	7.926	.6354	.1655	.0338	2.477	.6484
61.43	49.86	50.05	9.425	7.038	.6269	.0937	.0199	4.072	.6032
60.11	68.17	67.64	10.217	6.625	.6994	.0210	.0066	6.368	.6817
84.01	86.10	84.54	38.11	5.506	.6925	.0476	.0106	14.306	.6654
100.00	100.00	100.00	10.560	4.494	.6534	.0801	.0123	27.368	.6681

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8561 POLYTROPIC  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8454 (ADIABATIC)  
 MOMENTUM AVG. ROTOR LOSS RATIO = 1.6516  
 MASS AVERAGE TEMPERATURE RISE = 1.1819

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 16

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCCAGE = .9104

PERCENT SPAN FROM TIP (I. E.)	BETA 3 (DEG)	V3 (FT/SEC)	V113 (FT/SEC)	M3	VM3 (FT/SEC)	V13 (FT/SEC)	U3 (FT/SEC)
0.00	42.94	709.74	413.44	.600	519.62	513.91	1329.01
11.79	41.73	729.70	504.45	.618	527.25	526.37	1273.70
30.25	34.16	769.27	484.80	.660	596.41	596.40	1193.74
48.80	31.61	805.17	491.44	.698	637.80	637.33	1099.99
67.23	31.45	847.04	521.09	.749	680.43	677.94	1013.22
87.79	41.44	902.06	594.17	.791	676.27	677.19	917.01
100.00	42.68	938.25	636.01	.827	681.79	670.73	859.70

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCCAGE = .9300

PERCENT SPAN FROM TIP (I. E.)	BETA 4 (DEG)	V4 (FT/SEC)	V114 (FT/SEC)	M4	VM4 (FT/SEC)	V14 (FT/SEC)	U4 (FT/SEC)
0.00	-9.46	586.29	-9.62	.490	516.21	586.21	1319.37
11.71	-9.46	597.44	-9.80	.499	507.35	597.24	1273.75
30.27	-9.46	618.24	-10.14	.523	618.15	617.88	1197.32
48.60	-9.46	667.75	-10.45	.570	667.66	666.97	1123.03
67.39	-9.46	683.31	-11.21	.585	683.22	682.84	1047.60
88.23	-1.29	674.44	-15.09	.576	674.21	671.80	963.55
100.00	-1.29	677.82	-15.25	.579	677.64	677.64	916.09

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SWG (DEG)	FACTOR	B	OMEGA MAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	43.88	43.88	9.617	2.695	.4262	.0485	.0485	.0175	21.240	1.548	1.2058	.8470
11.71	11.71	11.70	44.67	44.67	7.547	4.224	.4254	.0597	.0597	.0207	15.619	1.548	1.2058	.8429
30.27	30.27	31.07	40.10	40.10	2.527	-1.757	.4054	.0981	.0322	.0322	12.246	1.541	1.1842	.7533
48.60	48.60	53.05	38.55	38.55	-1.58	-3.145	.3579	.0538	.0165	.0165	11.045	1.634	1.1732	.8564
67.20	67.20	49.48	38.39	38.39	-2.087	-6.949	.3754	.1175	.0337	.0337	10.158	1.650	1.1692	.7345
87.79	87.79	49.36	42.72	42.72	-2.643	-3.746	.4240	.1537	.0433	.0433	10.251	1.635	1.1744	.6970
100.00	100.00	100.00	43.97	43.97	-1.955	-5.496	.4430	.1531	.0387	.0387	17.410	1.634	1.1742	.7431

MOMENTUM AVERAGE STAGE EFFICIENCY = .6152 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8023 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.6124  
MASS AVERAGE TEMPERATURE RISE = 1.1819

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (MFRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 16

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9104

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	V1/3 (M/SEC)	M3	VM3 (M/SEC)	V2/3 (M/SEC)	U3 (M/SEC)
0.00	42.94	215.33	147.36	.600	149.34	156.64	405.04
11.79	43.71	222.41	153.76	.614	160.70	160.64	389.23
30.94	32.10	234.46	148.07	.660	181.79	181.70	360.90
49.00	37.61	245.82	143.74	.698	194.40	194.26	335.28
67.39	37.65	261.23	144.43	.749	207.39	206.64	304.83
87.70	41.64	276.94	141.95	.791	206.13	203.34	279.20
100.00	47.68	285.98	141.85	.827	210.25	204.44	262.04

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	V1/4 (M/SEC)	M4	VM4 (M/SEC)	V2/4 (M/SEC)	U4 (M/SEC)
0.00	-2.94	178.70	-2.93	.490	178.68	178.68	402.15
11.31	-2.94	182.10	-2.99	.494	182.07	182.05	388.24
30.27	-2.94	188.44	-3.09	.523	188.41	188.33	364.94
49.50	-2.94	203.53	-3.34	.570	203.50	203.22	342.30
67.39	-2.94	208.27	-3.42	.585	208.25	208.13	319.31
84.73	-1.20	205.57	-4.60	.576	205.52	204.77	293.69
100.00	-1.29	205.60	-4.65	.579	206.55	206.54	279.22

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUH (DEG)	ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	43.88	6.617	2.695	.4262	.0685	21.240	1.548	1.2048	.8570
11.79	11.31	1.70	44.67	7.547	4.224	.4254	.0597	15.619	1.559	1.2058	.8429
30.94	30.27	3.17	40.10	2.527	-7.57	.4054	.0441	12.246	1.581	1.1842	.7437
49.00	49.69	50.14	38.55	-2.150	-3.145	.3779	.0538	11.065	1.676	1.1712	.8564
67.39	67.39	69.44	38.33	-2.087	-4.949	.3754	.1175	10.150	1.650	1.1492	.7365
87.70	88.73	81.54	42.72	-1.840	-3.746	.4240	.1637	10.251	1.634	1.1754	.6270
100.00	100.00	100.00	43.97	-1.955	-5.386	.4230	.1533	11.410	1.634	1.1742	.7431

MOMENTUM AVERAGE STAGE EFFICIENCY = .8152 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8021 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.6124  
 MASS AVERAGE TEMPERATURE RISE = 1.1819

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NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAM NO 17  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69073.410 R.P.M.  
 PERCENT DESIGN EQUIVALENT FLOW = 2.4797 LBM/SEC  
 EQUIVALENT FLOW / INLET ANN AREA = 31.8054 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0150

PERCENT SPAN FROM TIP (I. E.)	HETA01 (DEG)	FO1 (FT/SEC)	VO1	WETA1 (DEG)	VI (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	73.54	1444.13	1422.56	0.00	423.05	0.00	.395	423.05	9.43	1422.56
9.41	72.30	1471.04	1350.44	0.00	432.91	0.00	.394	432.91	418.74	1350.44
24.19	69.42	1330.61	1245.54	0.00	467.57	0.00	.427	467.57	459.94	1245.54
41.28	67.10	1229.34	1137.40	0.00	474.34	0.00	.437	474.34	474.82	1132.46
59.92	65.17	1133.30	1001.44	0.00	464.22	0.00	.423	464.22	464.06	1001.44
87.43	62.36	832.73	855.85	0.00	436.09	0.00	.397	436.09	430.24	832.73
100.00	59.76	433.11	719.77	0.00	419.52	0.00	.381	419.52	405.26	719.77

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8395

PERCENT SPAN FROM TIP (I. E.)	HETA02 (DEG)	VO2 (FT/SEC)	VU02 (FT/SEC)	WETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V42 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	62.08	1010.62	892.45	45.17	670.80	475.72	.564	472.93	457.70	1368.17
17.20	54.44	943.04	803.52	45.54	702.27	499.50	.592	493.64	482.85	1303.02
31.92	52.20	898.55	709.95	41.53	735.71	487.76	.628	550.78	547.14	1197.71
49.71	45.46	846.88	603.00	40.04	775.91	499.15	.669	594.14	594.00	1102.75
67.71	36.74	701.34	479.59	39.38	811.01	527.02	.723	642.03	640.11	1006.61
87.43	24.13	604.14	241.27	44.53	881.01	617.86	.769	624.03	617.71	899.13
100.00	14.99	650.81	168.34	46.65	915.76	663.87	.803	628.60	607.31	934.21

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE FROM TIP (DEG)	SPAN FROM TIP (INCH)	MASS FLOW (PCT)	DELTA (DEG)	HETA0 (DEG)	INCIDENCE ANGLE (DEG)	SUCT SURF (DEG)	DELTA FACTOR	OMEGA (RPM)	WETA (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	WATER PRESS RATIO	ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	11.34	9.601	9.133	.4415	.2714	.0444	.0444	5.089	1.549	.6577	.6705	
9.41	12.20	11.67	13.86	10.347	9.055	.4666	.2753	.0523	.0523	3.619	1.580	.6685	.6891	
24.19	31.92	31.00	17.23	10.312	8.266	.4460	.1731	.0353	.0353	2.552	1.627	.7045	.8090	
41.28	47.71	49.90	21.64	10.156	7.417	.4337	.0993	.0212	.0212	3.707	1.669	.8017	.8992	
59.92	67.71	69.12	28.37	10.617	6.834	.4035	.0280	.0061	.0061	6.344	1.711	.8788	.9757	
87.43	87.43	89.68	34.23	10.943	5.838	.4204	.0970	.0207	.0207	16.748	1.714	.9335	.9384	
100.00	100.00	100.00	44.77	11.012	4.938	.3856	.1203	.0247	.0247	22.042	1.714	.9335	.9384	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8465 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8337 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6523  
 MASS AVERAGE TEMPERATURE RISE = 1.1846

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNF 28 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 1.3062 KG/SFC  
 PERCENT DESIGN EQUIVALENT FLOW = 78.6219  
 90 PERCENT DESIGN SPEED = SC41 NO 17  
 EQUIVALENT SPEED / INLET ANGLE = 49023.410 R.P.M.  
 R.P.M. = 185.2874 KG/SEC-50 M

INLET VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (I. F.)	RETA#1 (DEG)	V#1 (M/SEC)	WU#1 (M/SEC)	WV#1 (M/SEC)	WZ#1 (M/SEC)	WU (M/SEC)	WV (M/SEC)	WZ (M/SEC)	WU1 (M/SEC)	WV1 (M/SEC)	WZ1 (M/SEC)	
0.00	73.44	452.16	433.60	1.349	0.00	128.95	0.00	0.00	0.385	128.95	126.79	633.60
9.41	72.30	413.99	413.46	1.295	0.00	131.95	0.00	0.00	0.394	131.95	127.63	613.44
25.19	69.42	405.51	379.64	1.214	0.00	142.52	0.00	0.00	0.427	142.52	129.90	579.64
41.28	67.10	374.70	345.17	1.122	0.00	145.80	0.00	0.00	0.437	145.80	165.33	545.17
59.92	65.13	336.44	305.24	1.007	0.00	141.50	0.00	0.00	0.423	141.50	141.45	505.24
81.93	62.36	286.52	253.82	0.855	0.00	132.92	0.00	0.00	0.397	132.92	121.14	453.82
100.00	59.76	253.93	219.39	0.757	0.00	127.47	0.00	0.00	0.381	127.47	121.52	419.39

EXIT VELOCITY DIAGRAM DATA

PERCENT SPAN FROM TIP (I. F.)	RETA#2 (DEG)	V#2 (M/SEC)	WU#2 (M/SEC)	WV#2 (M/SEC)	WZ#2 (M/SEC)	WU (M/SEC)	WV (M/SEC)	WZ (M/SEC)	WU1 (M/SEC)	WV1 (M/SEC)	WZ1 (M/SEC)
0.00	62.08	307.45	272.02	0.449	45.17	204.46	145.00	0.564	144.15	139.51	417.02
12.20	54.44	287.64	244.91	0.795	45.34	214.05	152.25	0.592	150.44	147.17	397.16
31.02	52.20	273.88	216.39	0.768	41.53	224.24	148.67	0.628	147.88	146.83	365.06
49.71	45.46	258.13	183.08	0.730	40.04	236.50	152.14	0.669	141.04	141.05	336.12
67.71	36.76	244.25	146.18	0.698	38.38	251.17	160.64	0.721	145.68	145.11	306.81
87.84	24.13	209.74	85.73	0.601	44.53	268.53	188.32	0.769	191.42	188.28	274.06
100.00	14.99	148.37	51.31	0.571	44.65	279.12	202.96	0.803	191.62	195.11	254.27

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	PERCENT SPAN FROM TIP	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR ANGLE (DEG)	LOSS PARAMETER	DELTA ANGLE (DEG)	DEVIAATION ANGLE (DEG)	RATON	ADIRATIC	POLYTHROPIC
0.00	0.00	0.00	11.36	9.601	9.133	0.415	0.2714	5.089	1.549	0.477	0.785
9.41	12.20	11.67	13.84	10.347	9.055	0.446	0.2753	3.619	1.540	0.485	0.691
25.19	31.02	31.00	17.23	10.312	8.266	0.460	0.1731	2.552	1.627	0.795	0.800
41.28	49.71	49.90	21.64	10.196	7.417	0.437	0.0993	3.707	1.640	0.817	0.902
59.92	67.71	69.32	28.37	10.617	6.834	0.435	0.0280	6.344	1.711	0.738	0.757
81.93	87.84	89.48	38.23	10.943	5.938	0.404	0.0970	14.348	1.714	0.935	0.804
100.00	100.00	100.00	44.77	11.012	4.938	0.3856	0.1203	22.062	1.714	0.935	0.938

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.9465 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8353 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6523  
 MASS AVERAGE TEMPERATURE RISE = 1.1844



NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 17

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9126

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	41.94	705.89	489.84	.595	504.27	502.68	1328.72
11.83	44.95	723.51	511.19	.611	512.01	511.16	1273.22
31.06	39.97	768.80	493.82	.659	548.23	509.22	1183.00
44.60	38.19	808.82	506.08	.700	635.69	635.22	1100.70
66.79	37.81	852.16	522.47	.744	673.21	670.75	1015.37
87.46	42.82	898.07	604.94	.778	652.89	644.12	918.34
100.00	44.08	928.77	646.07	.816	667.25	648.81	859.51

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9222

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-1.12	540.02	-11.36	.484	579.91	579.91	1319.08
11.31	-1.10	549.86	-11.33	.492	589.75	589.68	1273.48
30.27	-1.58	611.71	-6.20	.516	611.68	611.41	1197.03
48.66	-2.41	647.93	-4.71	.560	657.91	657.24	1122.90
67.39	-2.41	678.73	-4.86	.581	678.72	678.34	1077.38
88.19	-2.59	671.17	-6.86	.572	671.13	664.68	963.49
100.00	-2.59	615.09	-6.95	.575	675.05	675.05	915.89

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	D FACTOR	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	45.06	7.624	3.702	.6361	.0491	.0177	21.060	1.553	1.2085	.8578
11.83	11.31	11.97	46.05	8.786	5.444	.4349	.0543	.0189	15.460	1.561	1.2085	.8592
31.06	30.27	31.00	40.55	3.323	.043	.4151	.1030	.0339	12.605	1.594	1.1972	.7595
48.66	48.66	49.90	38.60	4.36	-2.553	.3740	.0769	.0236	11.576	1.633	1.1763	.9100
66.79	67.39	69.32	38.22	-1.652	-6.529	.3759	.1048	.0301	10.689	1.656	1.1700	.7660
87.46	88.19	89.48	43.40	.614	-2.307	.4200	.1281	.0339	10.947	1.642	1.1740	.7578
100.00	100.00	100.00	44.67	-0.556	-3.997	.4406	.1191	.0301	18.110	1.642	1.1740	.7978

MOMENTUM AVERAGE STAGE EFFICIENCY = .8096 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.6165  
 MASS AVERAGE STAGE EFFICIENCY = .7963 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1844

## NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

## STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAY NO 17

## INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9126

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	V113 (M/SEC)	M3	VM3 (M/SEC)	V173 (M/SEC)	U3 (M/SEC)
0.00	43.94	215.15	149.30	.595	144.92	153.22	404.99
11.71	44.95	220.51	155.41	.611	156.06	155.30	348.08
31.06	39.37	234.33	150.52	.659	179.60	179.57	760.58
48.60	34.19	246.53	152.43	.700	193.76	173.61	335.49
66.74	37.41	259.74	159.25	.744	205.19	204.44	709.49
87.46	42.82	271.24	184.39	.778	199.00	196.33	279.91
100.00	44.08	283.04	196.42	.816	203.38	197.74	261.94

## EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9222

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	V114 (M/SEC)	M4	VM4 (M/SEC)	V174 (M/SEC)	U4 (M/SEC)
0.00	-1.12	176.79	-3.46	.484	176.74	176.74	402.06
11.71	-1.10	179.79	-3.45	.492	179.74	179.73	348.16
31.06	-1.50	186.45	-1.89	.516	186.44	186.36	364.05
48.60	-1.41	200.56	-1.44	.560	200.53	200.33	342.26
67.30	-1.4	206.88	-1.48	.581	206.87	206.76	319.24
88.19	-1.59	204.57	-2.09	.572	204.56	203.01	293.67
100.00	-1.59	205.77	-2.12	.575	205.76	205.76	279.16

## STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (LBS)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	MFAN SUCT SUR (DEG)	FACTAN	OMEGA BAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRFSS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	45.04	7.624	3.702	.4361	.0491	.0177	21.060	1.553	1.2045	.8478
11.71	11.71	11.67	46.05	8.766	5.444	.4369	.0543	.0149	12.460	1.561	1.2045	.8592
31.06	31.06	31.00	40.55	3.323	.043	.4151	.1030	.0334	12.605	1.584	1.1872	.7595
48.60	48.66	47.30	38.60	.436	-2.553	.3740	.0769	.0236	11.576	1.633	1.1743	.8100
66.74	67.39	69.32	38.22	-1.652	-4.529	.3759	.1044	.0301	10.689	1.654	1.1700	.7440
87.46	88.19	89.48	43.40	.614	-2.307	.4200	.1281	.0339	10.947	1.642	1.1740	.7528
100.00	100.00	100.00	44.67	-1.556	-3.997	.4406	.1191	.0301	10.110	1.642	1.1740	.7478

MOMENTUM AVERAGE STAGE EFFICIENCY = .8096 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .7963 (ADIABATIC)

MOMENTUM AVG. STAGE PRFSS RATIO = 1.6165

MASS AVERAGE TEMPERATURE RISE = 1.1844

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 29, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.8740 LHM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 77.3754  
 90 PERCENT DESIGN SPEED = SCAN NO 18  
 EQUIVALENT SPEED = 69042.777 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 31.0003 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = 1.0251

PERCENT SPAN FROM TIP (L. F.)	BETA#1 (DEG)	V#1 (FT/SEC)	HETA1 (DEG)	V1 (FT/SEC)	U1 (FT/SEC)	M1	V#1 (FT/SEC)	V71 (FT/SEC)	U1 (IFT/SEC)
0.00	77.75	1422.96	0.00	414.56	0.00	.377	414.56	401.21	1422.96
9.58	72.62	1355.60	0.00	424.38	0.00	.386	424.38	410.40	1355.60
25.53	65.75	1243.50	0.00	450.63	0.00	.414	450.63	450.21	1243.50
41.41	67.46	1224.44	0.00	469.24	0.00	.428	469.24	447.73	1130.42
60.24	65.50	1094.11	0.00	455.42	0.00	.415	455.42	415.26	999.22
84.17	62.76	914.96	0.00	427.95	0.00	.389	427.95	422.20	831.27
100.00	60.24	824.35	0.00	411.66	0.00	.374	411.66	197.67	719.97

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8452

PERCENT SPAN FROM TIP (T. E.)	BETA#2 (DEG)	V#2 (FT/SEC)	BETA2 (DEG)	V2 (FT/SEC)	U2 (FT/SEC)	M2	V#2 (FT/SEC)	V72 (FT/SEC)	U2 (IFT/SEC)
0.00	62.15	994.92	46.12	673.32	485.35	.565	485.35	466.68	1368.55
12.29	58.67	928.49	46.56	702.12	509.80	.591	509.80	482.78	1302.90
32.19	52.13	877.77	47.07	737.58	503.70	.623	503.70	538.81	1196.61
49.94	45.34	827.46	41.44	775.66	513.24	.667	513.24	581.59	1101.83
67.73	36.29	797.03	39.79	836.10	535.08	.727	535.08	642.44	1006.78
87.61	21.46	646.56	47.82	886.15	664.07	.779	664.07	601.74	900.61
100.00	11.08	613.99	49.94	936.17	716.68	.818	716.68	602.55	834.45

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA# (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	LOSS FACTOR	OMEGA# (RPM)	DEVIATION ANGLE (DEG)	ROTOR LOSS PARAMETER	ROTOR POFSS RATIO	ROTOR POLYTHROPIC EFF
0.00	0.00	0.00	11.61	9.452	4.507	.4507	2763	5.157	.0491	1.583	.6793
9.58	12.29	11.87	13.95	9.397	4.762	.4762	2832	3.872	.0514	1.591	.6861
25.53	32.19	31.37	17.62	8.633	4.636	.4636	1908	2.584	.0390	1.636	.7494
41.41	49.94	50.23	22.11	7.801	4.503	.4503	1201	3.781	.0256	1.673	.8812
60.24	67.73	69.63	29.21	7.227	4.063	.4063	8302	5.887	.0087	1.723	.9765
84.17	87.61	89.66	41.30	6.360	4.734	.4734	1793	11.362	.0390	1.731	.8932
100.00	100.00	100.00	49.16	5.414	4.339	.4339	2215	18.129	.0463	1.731	.8930

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8302 (POLYTHROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8176 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6621  
 MASS AVERAGE TEMPERATURE RISE = 1.1907

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNF 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW FROM TIP (L. F.) = 0.00  
 PERCENT DESIGN EQUIVALENT FLOW = 1.2815 KG/S-C  
 90 PERCENT DESIGN SPEED = SCAN NO 1A  
 EQUIVALENT SPEED = 152.8216 ROT/SEC-SO M  
 INLET VFLOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0251

PERCENT SPAN FROM TIP (L. F.)	V*1 (M/SEC)	VU*1 (M/SEC)	W*1 (DEG)	VI (M/SEC)	VU1 (M/SEC)	M1	V*1 (M/SEC)	VU1 (M/SEC)	W1 (M/SEC)
0.00	73.76	433.72	1.347	176.36	0.00	.377	126.36	172.29	126.36
9.58	72.62	413.19	1.292	174.35	0.00	.386	129.35	175.12	129.35
25.53	69.75	374.02	1.208	173.79	0.00	.418	129.79	177.22	129.79
41.61	67.46	344.55	1.117	173.02	0.00	.428	142.56	182.56	142.56
60.28	65.50	334.70	1.001	172.81	0.00	.415	138.81	178.76	138.81
84.17	62.76	253.37	.850	130.66	0.00	.389	130.66	128.69	130.66
100.00	60.24	219.45	.753	125.87	0.00	.374	125.87	121.21	125.87

EXIT VFLOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .6452

PERCENT SPAN FROM TIP (L. F.)	W*2 (DEG)	VU*2 (M/SEC)	M*2	BETA*2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V*2 (M/SEC)	VU2 (M/SEC)	W2 (M/SEC)
0.00	62.15	269.20	.838	66.12	205.23	147.93	.565	162.25	137.66	162.25
12.29	58.67	241.74	.781	64.56	214.01	155.39	.591	147.15	163.94	147.15
32.19	52.13	267.94	.748	63.07	224.81	153.53	.629	164.23	153.21	164.23
49.94	45.34	242.21	.712	61.43	236.82	156.83	.657	177.27	177.27	177.27
67.71	36.29	242.93	.693	59.79	254.84	163.09	.727	195.82	195.82	195.82
87.61	21.46	177.07	.562	67.82	273.15	206.41	.779	183.41	190.80	183.41
100.00	11.08	187.15	.537	69.94	285.34	218.38	.819	193.64	177.42	193.64

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FROM TIP	THAILING EDGE	MASS FLOW (PCT)	DELTA HFTA* (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	D FACTOR	OMEGA* BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	WATOP PRESS RATIO	POLYTROPIC EFF
0.00	0.00	0.00	0.00	11.61	9.920	9.452	.4507	.2763	.0491	5.157	1.583	.6793
9.58	12.29	12.29	11.87	13.95	10.700	9.397	.4762	.2832	.0534	3.872	1.593	.6863
25.53	32.19	32.19	31.37	17.62	16.700	8.633	.4636	.1908	.0390	2.588	1.616	.7454
41.61	49.94	49.94	50.23	22.11	10.5	7.801	.4503	.1201	.0256	3.703	1.673	.9112
60.28	67.73	67.73	64.63	29.21	11.021	7.227	.4063	.0302	.0067	5.887	1.723	.9724
84.17	87.61	87.61	89.66	41.30	11.372	6.380	.4736	.1793	.0390	11.362	1.731	.8932
100.00	100.00	100.00	100.00	49.14	11.488	5.614	.4399	.2215	.0463	18.129	1.731	.8930

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8102 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8176 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6621  
 MASS AVERAGE TEMPERATURE RISE = 1.1907

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 10

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9213

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	V1/3 (FT/SEC)	M3	VM3 (FT/SEC)	V2/3 (FT/SEC)	U3 (FT/SEC)
0.00	45.16	764.74	499.76	.593	496.96	491.50	1329.09
11.97	46.42	720.35	521.81	.607	496.60	495.77	1272.91
31.42	41.66	767.44	510.09	.656	573.39	573.74	1181.64
44.97	39.69	805.35	514.35	.695	619.71	619.25	1099.46
66.91	34.39	854.54	530.72	.745	669.76	647.31	1015.06
87.36	46.13	902.50	650.66	.785	625.41	617.01	918.17
100.00	47.37	944.98	695.24	.827	640.92	622.33	859.75

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	V1/4 (FT/SEC)	M4	VM4 (FT/SEC)	V2/4 (FT/SEC)	U4 (FT/SEC)
0.00	-94	569.00	-9.31	.473	568.92	544.92	1319.45
11.36	-95	577.02	-9.60	.480	576.94	574.47	1273.70
30.36	-1.30	593.53	-13.44	.499	593.38	573.12	1147.10
44.73	-1.44	635.13	-16.35	.539	634.92	624.27	1122.90
67.68	-1.64	659.09	-14.96	.562	658.82	648.45	1047.28
88.20	-1.54	645.87	-14.48	.546	645.60	643.24	963.75
100.00	-1.64	649.25	-14.58	.549	648.99	648.99	916.14

STATOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUPT (DEG)	D FACTOR	OMEGA BAH	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STATION POLYTROPIC EFF	
0.00	0.00	0.00	46.10	4.843	4.920	.4550	.0510	.0184	21.240	1.566	1.2128	.8720
11.97	11.34	11.87	47.97	10.226	6.411	.4543	.0516	.0179	15.599	1.573	1.2128	.8748
31.42	30.36	31.37	42.55	4.994	1.725	.4474	.1120	.0368	11.882	1.590	1.1931	.7405
44.97	44.73	50.23	41.17	1.407	-1.077	.4091	.0874	.0268	10.506	1.612	1.1726	.8056
66.91	67.44	64.53	40.03	-1.090	-3.963	.4079	.1213	.0368	9.460	1.658	1.1726	.7524
87.36	88.20	89.66	47.77	3.957	1.032	.4724	.1653	.0427	9.893	1.616	1.1916	.7220
100.00	100.00	100.00	49.01	2.736	-7.705	.4930	.1527	.0386	17.060	1.616	1.1915	.7673

MOMENTUM AVERAGE STAGE EFFICIENCY = .7870 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7721 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.6188  
 MASS AVERAGE TEMPERATURE RISE = 1.1407

ORIGINAL PHOTO COPY  
 OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 1A

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9213

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	VH3 (M/SEC)	M3	VM3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	5.16	214.02	152.33	.593	151.47	149.81	405.14
11.97	46.42	219.56	159.05	.507	151.36	151.11	387.98
31.42	41.66	233.92	155.47	.656	174.77	174.77	360.16
44.93	34.69	245.47	154.77	.495	148.89	148.75	335.11
66.91	38.39	260.46	161.76	.745	204.14	203.40	309.39
87.34	46.13	275.08	198.32	.785	190.62	188.04	280.16
100.00	47.37	288.03	211.91	.827	195.08	189.49	261.35

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VH4 (M/SEC)	M4	VM4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	-0.94	173.43	-2.85	.473	173.41	173.41	402.17
11.34	-0.95	175.88	-2.93	.480	175.85	175.83	388.22
30.34	-1.30	180.91	-4.10	.499	180.86	180.78	364.97
44.73	-1.49	193.59	-4.98	.539	193.52	193.32	342.26
67.48	-1.64	200.89	-5.75	.562	200.81	200.70	319.21
88.20	-1.64	196.86	-5.63	.546	196.78	196.76	293.75
100.00	-1.64	197.89	-5.66	.549	197.81	197.81	279.24

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	FROM TIP TRAILING ED C	MASS FLOW (PCT)	DELTA HETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	FACTOR O	OMEGA HIR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	46.10	8.843	4.920	.4550	.0510	.0194	21.240	1.566	1.2128
11.97	11.34	11.37	47.37	10.226	6.911	.4543	.0516	.0179	15.599	1.573	1.2128
31.42	30.34	31.37	42.95	4.994	1.725	.4474	.1120	.0368	11.882	1.590	1.1931
48.93	44.73	50.23	41.17	1.907	-1.077	.4991	.0874	.0268	10.506	1.632	1.1812
66.91	67.48	69.03	40.03	-1.090	-3.963	.4079	.1213	.0368	9.460	1.658	1.1726
87.34	88.20	89.66	47.77	3.957	-1.032	.4724	.1453	.0437	9.893	1.636	1.1916
100.00	100.00	100.00	49.01	2.736	-2.705	.4930	.1527	.0386	17.060	1.636	1.1915

MOMENTUM AVERAGE STAGE EFFICIENCY = .7870 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7721 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.6188  
MASS AVERAGE TEMPERATURE RISE = 1.1907

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.8790 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 78.6059  
 90 PERCENT DESIGN SPEED - SCAN NO 19  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69037.431 R.P.M.  
 31.79A1 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0220

PERCENT SPAN FROM TIP (I. E.)	HETA*1 (DEG)	V*1 (FT/SEC)	VII*1 (FT/SFC)	M*1	BETA1 (DEG)	V1 (FT/SEC)	M1	DEVIATION ANGLE (DEG)	OMEGA* BAR	LOSS PARAMETER	ROTOR POLY TROPIC EFF
0.00	73.45	1414.34	1422.85	1.350	0.00	422.79	0.00	.384	478.97	.0488	.6765
9.47	72.30	1423.61	1356.26	1.295	0.00	432.71	0.00	.394	502.99	.0528	.6800
25.29	69.42	1329.95	1265.11	1.213	0.00	467.40	0.00	.426	493.24	.0372	.6652
41.37	67.10	1229.89	1132.04	1.122	0.00	474.19	0.00	.437	504.72	.0238	.7448
60.11	65.12	1102.70	1000.33	1.006	0.00	463.98	0.00	.427	529.43	.0079	.6868
84.09	62.34	939.03	831.74	.855	0.00	437.89	0.00	.397	457.10	.0346	.9887
100.00	59.78	833.13	719.92	.747	0.00	419.30	0.00	.381	704.84	.0414	.9029

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8503

PERCENT SPAN FROM TIP (I. E.)	HETA*2 (DEG)	V*2 (FT/SEC)	VII*2 (FT/SFC)	M*2	BETA2 (DEG)	V2 (FT/SEC)	M2	DEVIATION ANGLE (DEG)	OMEGA* BAR	LOSS PARAMETER	ROTOR POLY TROPIC EFF
0.00	62.22	1005.37	889.49	.844	45.43	670.06	0.00	.563	478.97	.0488	.6765
12.24	58.67	937.07	800.09	.789	45.48	700.69	0.00	.590	502.99	.0528	.6800
32.02	52.42	888.50	764.18	.758	42.30	732.83	0.00	.625	493.24	.0372	.7448
49.88	45.58	836.40	597.35	.720	40.77	772.98	0.00	.666	504.72	.0238	.6868
67.70	36.27	808.37	476.99	.702	34.16	839.46	0.00	.730	529.43	.0079	.9887
87.66	21.88	694.34	243.19	.573	47.04	897.81	0.00	.781	457.10	.0346	.9029
100.00	11.58	625.42	125.54	.547	49.18	936.93	0.00	.800	704.84	.0414	.8343

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA* (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	DELTA FACTOR	OMEGA* BAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR POLY TROPIC EFF
0.00	0.00	0.00	11.23	9.614	9.146	.4456	.2749	.0488	5.229	.6555
9.47	12.24	11.75	13.68	10.366	9.070	.4696	.2795	.0528	3.821	.6652
25.29	32.02	31.10	17.01	10.329	8.277	.4546	.1835	.0372	2.809	.7448
41.37	49.88	49.39	21.52	10.209	7.425	.4432	.1122	.0238	3.908	.6868
60.11	67.71	69.44	28.85	10.626	6.834	.3949	.0174	.0079	5.908	.9887
84.09	87.56	89.50	40.66	10.946	5.936	.4614	.1606	.0346	11.047	.8951
100.00	100.00	100.00	48.20	11.030	4.956	.4268	.1985	.0414	18.631	.8951

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8357 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8236 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.6564  
 MASS AVERAGE TEMPERATURE RISE = 1.1880

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW = 1.3059 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 78.6059  
 90 PERCENT DFCION SPEED = SCAN NO 19  
 FOUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 69037.011 R.P.M.  
 155.2520 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0220

PERCENT SPAN FROM TIP (L. F.)	HETA°1 (DEG)	V*1 (M/SEC)	VII*1 (M/SEC)	M*1	BETA1 (DEG)	V1 (M/SEC)	VUI (M/SEC)	M1	V*1 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	77.45	452.43	473.69	1.350	0.00	128.87	0.00	.354	128.87	124.72	433.69
9.47	72.30	433.92	413.39	1.295	0.00	131.49	0.00	.394	131.49	127.57	413.39
24.20	63.42	405.37	379.51	1.213	0.00	142.46	0.00	.426	142.46	129.85	379.51
41.37	61.10	374.57	345.05	1.172	0.00	145.75	0.00	.437	145.75	145.28	345.05
60.11	65.12	336.10	304.90	1.086	0.00	141.42	0.00	.423	141.42	141.77	304.90
84.09	62.34	286.22	253.51	.855	0.00	132.86	0.00	.397	132.86	131.07	253.51
100.00	59.78	253.94	219.43	.757	0.00	127.80	0.00	.381	127.80	123.46	219.43

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8503

PERCENT SPAN FROM TIP (L. F.)	HETA°2 (DEG)	V*2 (M/SEC)	VU*2 (M/SEC)	M*2	HETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V*2 (M/SEC)	V72 (M/SEC)	U2 (M/SEC)
0.00	62.22	306.44	271.12	.844	45.63	204.23	145.99	.563	145.99	138.23	417.10
12.24	58.63	285.52	243.47	.789	45.88	211.57	153.31	.570	153.31	145.44	397.18
32.42	52.42	271.85	214.63	.758	42.30	221.37	150.34	.625	150.34	144.17	346.47
46.84	48.54	254.94	192.07	.720	40.77	235.60	153.84	.666	153.84	178.44	335.91
47.70	36.27	245.78	165.39	.702	39.14	255.56	161.37	.730	161.37	197.59	306.76
87.66	21.64	200.66	74.12	.573	47.05	273.65	200.29	.781	200.29	186.47	276.41
100.00	11.58	190.63	34.26	.547	47.14	289.58	216.06	.820	216.06	180.75	216.06

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (PCT)	DELTA HETA° (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	LOSS PARAMETER	OMEGA RAV	DEVIATION ANGLE (DEG)	HOTAP PRESS RATIO	POLYTROPIC EFF
0.00	0.00	11.23	9.614	9.146	.0488	.2749	5.229	1.572	.6555
9.47	11.75	13.68	10.366	9.070	.0524	.2795	3.821	1.582	.6452
25.24	31.10	17.01	10.324	4.277	.0372	.1435	2.809	1.625	.7948
41.37	49.99	21.52	10.209	7.425	.0238	.1122	3.909	1.665	.9809
60.11	69.48	28.84	10.626	6.874	.0039	.0179	5.908	1.723	.9847
84.09	87.66	40.66	10.946	5.916	.0349	.1606	11.047	1.732	.9029
100.00	100.00	48.20	11.030	4.956	.0414	.1985	18.631	1.712	.8951

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8357 (POLYTROPIC)  
 MASS AVERAGE ROTOR EFFICIENCY = .8236 (ADIABATIC)  
 MOMENTUM AVERAGE ROTOR PRESS ^TIO = 1.6564  
 MASS AVERAGE TEMPERATURE PISE = 1.1890



NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 19

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9246

PERCENT SPAN FROM TIP (I. F.)	HETA 3 (DEG)	V3 (FT/SEC)	V113 (FT/SEC)	M3	V43 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	44.48	707.86	493.19	.593	592.19	496.67	1328.99
11.40	45.56	720.97	514.80	.609	504.75	503.92	1273.20
11.19	40.76	764.92	499.43	.655	579.37	579.37	1182.60
48.80	38.92	804.94	505.08	.696	626.27	626.27	1099.98
66.90	37.68	858.81	524.94	.750	619.70	677.22	1015.04
87.34	44.23	905.87	643.65	.789	637.93	628.87	919.11
100.00	46.52	947.83	687.77	.831	652.19	644.17	859.69

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (FT/SEC)	V114 (FT/SEC)	M4	V44 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	-1.64	579.23	-16.58	.483	518.99	578.99	1319.35
11.30	-1.64	588.75	-16.82	.491	588.51	588.43	1273.90
70.27	-1.47	605.36	-15.57	.510	605.16	604.89	1197.47
48.64	-1.64	652.84	-18.68	.555	652.57	651.90	1123.19
67.41	-1.64	675.62	-19.34	.578	675.34	674.47	1047.52
88.10	-1.64	663.48	-18.99	.562	663.21	660.78	963.71
100.00	-1.64	667.18	-19.09	.565	666.91	666.91	916.08

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	D FACTOR	OMEGA PAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE POLSS RATIO	STAGE YFMP RATIO	STATOR POLYTHROPIC EFF
0.00	0.00	0.00	46.12	8.164	4.242	.4400	.0496	.0178	20.540	1.555	1.2100	.8555
11.49	11.30	11.75	47.20	9.375	6.056	.4387	.0527	.0183	14.926	1.563	1.2100	.8524
31.14	30.22	31.10	42.24	4.112	.836	.4267	.1073	.0352	11.717	1.581	1.1002	.7534
49.80	48.64	49.73	40.56	1.146	-1.841	.3845	.0755	.0231	10.347	1.630	1.1782	.8151
66.90	67.41	69.68	39.32	-1.803	-4.676	.3899	.1260	.0361	9.459	1.456	1.1707	.7277
87.34	88.14	89.60	46.92	3.102	1.177	.4531	.1695	.0468	9.892	1.633	1.1895	.7005
100.00	100.00	100.00	48.16	1.889	-1.552	.4739	.1570	.0397	17.060	1.633	1.1895	.7593

MOMENTUM AVERAGE STAGE EFFICIENCY = .7927 (POLYTHROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.6139  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7783 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1880

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STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

90 PERCENT DESIGN SPEED - SCAN NO 19

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9246

PERCENT SPAN FROM TIP (I. F.)	AFTA 3 (DEG)	V3 (M/SEC)	V1/3 (M/SFC)	M3	VM3 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	44.48	214.54	150.32	.593	153.07	151.33	405.08
11.89	45.56	214.74	154.91	.609	153.65	153.59	388.07
31.19	40.76	213.15	152.23	.655	176.59	176.59	360.46
44.80	33.92	245.35	154.13	.696	190.89	190.75	335.27
66.90	37.68	261.76	160.00	.750	207.17	206.42	309.38
87.74	45.20	276.11	196.18	.789	194.29	191.68	280.15
100.00	46.52	288.90	209.63	.831	198.79	193.29	262.03

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (I. F.)	AFTA 4 (DEG)	V4 (M/SEC)	V1/4 (M/SFC)	M4	VM4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-1.64	176.54	-5.05	.483	176.49	176.48	402.14
11.30	-1.64	179.75	-5.13	.491	179.38	179.35	388.25
30.22	-1.47	184.51	-4.74	.510	184.45	184.37	364.99
44.64	-1.64	198.90	-5.69	.555	198.90	198.70	342.35
67.61	-1.64	205.93	-5.89	.578	205.84	205.73	319.29
88.19	-1.64	202.23	-5.79	.562	202.15	201.41	293.74
100.00	-1.64	203.36	-5.82	.565	203.27	203.27	279.22

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP TO TIP	MASS FLOW (PCT)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCT S1/3 (DEG)	FACTOR	OMEGA	MAH	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	46.12	8.164	4.242	.4400	.0696	.0178	20.540	20.540	1.555	1.2100	.8455
11.89	11.75	47.20	9.375	6.056	.4787	.0527	.0143	14.926	14.926	1.543	1.2100	.8424
31.19	31.10	42.24	4.112	4.35	.4267	.1073	.0352	11.717	11.717	1.541	1.1992	.8534
44.80	49.39	40.56	1.146	-1.841	.3845	.0755	.0231	10.347	10.347	1.630	1.1782	.8151
66.90	67.41	39.32	-1.803	-4.676	.3499	.1260	.0361	9.459	9.459	1.654	1.1707	.7277
87.74	89.50	46.92	3.102	-1.77	.4531	.1695	.0448	9.992	9.992	1.633	1.1895	.7005
100.00	100.00	48.16	1.889	-1.552	.4139	.1570	.0397	17.060	17.060	1.633	1.1895	.7503

MOMENTUM AVERAGE STAGE EFFICIENCY = .7927 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .7783 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.6139

MASS AVERAGE TEMPERATURE R15F = 1.1880

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 20, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.3508 LRM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 64.1650  
 70 PERCENT DESIGN SPEED = SCAN NO 20  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 53712.636 R.P.M.  
 = 25.9665 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = 1.0192

PERCENT SPAN FROM TIP (I. E.)	HETA#1 (DEG)	V#1 (FT/SEC)	VU#1 (FT/SFC)	W#1 (DEG)	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	VW1 (FT/SEC)	VZ1 (FT/SFC)	UI (FT/SEC)
0.00	73.20	1156.38	1107.01	1.046	0.00	334.29	0.00	.302	334.29	323.53	1107.01
9.43	72.05	1109.46	1055.44	1.004	0.00	341.98	0.00	.309	341.98	330.79	1055.44
25.26	69.14	1036.82	969.86	.939	0.00	349.22	0.00	.335	349.22	342.43	969.86
41.22	66.01	959.08	881.58	.869	0.00	377.11	0.00	.342	377.11	376.50	881.58
59.59	64.82	863.18	781.14	.782	0.00	367.29	0.00	.333	367.29	367.17	781.14
81.67	61.95	735.82	649.41	.666	0.00	345.97	0.00	.313	345.97	341.33	649.41
100.00	59.23	651.20	560.11	.589	0.00	333.55	0.00	.302	333.55	322.21	560.11

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .8308

PERCENT SPAN FROM TIP (I. E.)	HETA#2 (DEG)	V#2 (FT/SEC)	VU#2 (FT/SFC)	W#2 (DEG)	HETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	VW2 (FT/SFC)	VZ2 (FT/SFC)	UJ (FT/SEC)
0.00	59.86	869.00	751.50	.756	35.67	537.12	313.18	.467	436.31	422.32	1066.68
11.51	58.13	829.79	688.26	.724	35.34	566.94	321.91	.495	462.40	452.78	1016.87
30.37	52.94	742.39	624.96	.696	32.71	572.82	309.55	.503	481.88	478.97	978.51
44.42	47.16	738.90	541.44	.652	32.63	596.53	321.64	.526	502.30	502.36	963.67
67.09	37.70	676.32	413.60	.598	34.83	651.90	372.33	.577	535.11	533.54	785.93
87.88	23.88	601.91	243.67	.534	39.63	714.54	455.84	.634	550.39	541.34	599.51
100.00	15.99	573.37	157.97	.510	41.71	738.29	491.20	.657	551.14	532.45	549.17

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA2 (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	DELTA FACTOR	OMEGA H-R	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	13.34	9.360	8.892	.3517	.1974	.0377	2.867	1.280	.6839	.6947
9.43	11.51	11.64	15.92	10.099	9.805	.3593	.1910	.0386	1.169	1.293	.7123	.7225
25.26	30.37	31.00	16.60	10.039	7.488	.3353	.0874	.0177	2.328	1.313	.8675	.8725
41.22	44.42	44.79	19.64	9.895	7.119	.3315	.0244	.0050	4.617	1.335	.8662	.9676
59.59	67.09	68.98	27.12	10.265	6.497	.3360	-.0062	-.0013	6.798	1.372	1.0069	1.0065
87.88	87.88	89.28	38.07	10.508	5.509	.3257	.0120	.0026	14.161	1.402	.9908	.9913
100.00	100.00	100.00	43.23	10.474	4.400	.2777	.0150	.0031	23.044	1.402	.9309	.9912

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8917 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8871 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3366  
 MASS AVERAGE TEMPERATURE RISE = 1.0973

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE VASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW = 1.0643 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 64.1850

70 PERCENT DESIGN SPEED = SCAN NO 20  
 EQUIVALENT SPEED = 53712.676 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 126.7493 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0192

PERCENT SPAN FROM TIP (L. F.)	HETA*1 (DEG)	V*1 (M/SEC)	V*1 (M/SEC)	W*1 (M/SEC)	VI (M/SEC)	VU1 (M/SEC)	M1	V*1 (M/SEC)	V*1 (M/SEC)	U1 (M/SEC)
0.00	73.20	352.46	337.42	1.046	101.89	0.00	.302	101.89	94.61	337.42
9.43	72.05	334.16	321.70	1.004	104.24	0.00	.309	104.24	100.82	321.70
25.26	69.14	316.02	295.31	.919	112.54	0.00	.335	112.54	110.67	295.31
41.22	66.01	292.33	264.70	.869	115.13	0.00	.342	115.13	114.76	264.70
59.59	64.82	263.10	234.09	.742	111.55	0.00	.331	111.55	111.91	234.09
84.67	61.94	224.24	197.94	.666	105.45	0.00	.313	105.45	106.04	197.94
100.00	59.23	194.70	170.72	.549	101.66	0.00	.302	101.66	94.21	170.72

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8304

PERCENT SPAN FROM TIP (T. F.)	HETA*2 (DEG)	V*2 (M/SEC)	V*2 (M/SEC)	W*2 (M/SEC)	VP (M/SEC)	VU2 (M/SEC)	M2	V*2 (M/SEC)	V*2 (M/SEC)	U2 (M/SEC)
0.00	59.86	264.47	229.06	.756	143.72	95.46	.457	143.72	124.72	229.06
11.51	56.13	252.92	209.99	.724	172.00	99.95	.495	140.94	137.44	209.99
30.17	52.54	241.52	191.71	.696	174.59	94.35	.507	145.99	145.99	191.71
44.62	47.16	225.22	165.15	.652	141.82	94.03	.526	153.12	153.12	165.15
67.09	37.70	204.14	126.06	.598	149.70	94.49	.577	163.10	162.62	126.06
87.08	27.84	141.46	74.27	.514	217.82	138.94	.634	167.74	165.00	74.27
100.00	15.94	174.76	43.15	.510	225.03	149.72	.657	164.00	162.29	43.15

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA* (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	D FACTOR	OMEGA* (RPM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR EFF	POLYTROPIC EFF
0.00	0.00	0.00	13.74	4.360	4.892	.3517	.1974	.0377	2.467	1.280	.6470	.6947
9.43	11.51	11.64	15.92	10.059	8.405	.3593	.1910	.0386	1.165	1.273	.7123	.7225
25.26	30.17	31.00	16.60	10.034	7.984	.3353	.0874	.0177	2.328	1.313	.6475	.6725
41.22	44.42	44.79	19.64	4.095	7.119	.3315	.0244	.0050	4.817	1.315	.6462	.6676
59.59	67.09	64.94	27.12	10.265	6.497	.3340	-.0062	-.0012	6.798	1.372	1.0064	1.0065
84.67	87.08	84.24	30.07	10.508	5.509	.3257	.0120	.0026	14.141	1.402	.9908	.9913
100.00	100.00	100.00	43.23	10.474	4.400	.2777	.0150	.0031	23.044	1.402	.9909	.9912

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8917 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8071 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3366  
 MASS AVERAGE TEMPERATURE RISE = 1.0073

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 20

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8928

BETA 3 (NEG)	V3 (FT/SEC)	VII3 (FT/SEC)	M3	VH3 (FT/SEC)	V73 (FT/SEC)	U3 (FT/SEC)
0.00	571.31	322.48	.499	471.59	446.41	1033.98
11.10	587.75	335.75	.514	482.41	461.61	993.11
20.66	608.03	314.43	.536	520.78	520.77	925.70
47.63	634.07	322.64	.561	545.84	545.44	860.79
66.10	680.60	369.34	.604	571.43	549.15	792.29
87.40	712.69	446.27	.651	581.10	571.70	714.52
100.00	761.91	476.64	.680	596.42	577.99	608.85

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9369

BETA 4 (NEG)	V4 (FT/SEC)	VII4 (FT/SEC)	M4	VH4 (FT/SEC)	V74 (FT/SEC)	U4 (FT/SEC)
0.00	507.63	-13.02	.441	507.47	507.47	1026.48
11.70	520.91	-13.31	.453	520.74	520.68	931.01
30.21	544.12	-12.20	.477	543.98	543.74	931.70
48.56	577.83	-11.29	.509	577.71	577.12	874.17
67.32	609.04	-11.90	.537	608.92	608.58	815.26
86.12	615.25	-12.01	.540	615.13	612.80	760.00
100.00	618.82	-12.10	.544	618.70	618.70	712.72

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PC)	DELTA HETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	REACTOR FACTOR	OMEGA HAR	LOSS PARAMETER	REVEALATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	35.44	- .953	-5.875	.7247	.0420	.0151	20.710	1.272	1.1066	.8191
11.10	11.30	11.64	36.10	-1.336	-4.683	.3198	.0574	.0194	15.096	1.281	1.1068	.7587
20.66	30.21	31.00	32.74	-5.493	-8.419	.2799	.0596	.0146	11.908	1.290	1.0911	.7327
47.63	48.54	49.79	31.71	-7.069	-10.075	.2615	.0391	.0120	10.874	1.324	1.0820	.7966
66.10	67.32	68.48	34.00	-6.516	-9.609	.2615	.0738	.0217	9.980	1.349	1.0938	.8589
87.40	88.12	89.28	38.44	-4.606	-7.606	.3188	.1479	.0391	10.412	1.351	1.1022	.8478
100.00	100.00	100.00	39.84	-5.907	-9.344	.3407	.1379	.0349	17.580	1.351	1.1022	.8552

MOMENTUM AVERAGE STAGE EFFICIENCY = .8589 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .8533 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.3225  
MASS AVERAGE TEMPERATURE RISE = 1.0973

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 20

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .8928

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	V113 (M/SEC)	M3	V13 (M/SEC)	V173 (M/SEC)	U3 (M/SEC)
0.00	34.37	174.14	98.29	.499	143.74	142.16	315.16
11.19	34.84	179.15	102.34	.514	147.04	146.90	302.79
22.66	31.07	185.33	95.64	.536	149.73	149.73	282.15
47.43	39.59	193.26	94.34	.561	164.37	171.25	262.37
64.19	37.88	207.39	112.57	.604	174.17	173.56	241.49
87.49	37.52	223.32	136.07	.651	177.12	176.74	217.79
100.00	34.72	232.23	145.28	.680	181.18	176.17	203.87

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9369

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	V114 (M/SEC)	M4	V14 (M/SEC)	V174 (M/SEC)	U4 (M/SEC)
0.00	-1.47	154.73	-3.97	.441	154.68	154.61	312.97
11.19	-1.46	154.77	-4.06	.453	154.72	154.70	302.06
22.66	-1.29	165.85	-4.72	.477	165.81	165.73	293.98
44.54	-1.12	176.12	-3.44	.509	176.09	175.91	286.45
67.32	-1.12	185.63	-3.63	.537	185.60	185.50	289.49
89.12	-1.12	187.53	-3.67	.548	187.49	186.81	284.60
100.00	-1.12	198.62	-3.69	.544	188.58	188.58	277.24

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCTION ANGLE (DEG)	D FACTOR	OMEGA HAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	35.84	-1.953	-5.875	.3247	.0420	.0151	20.710	1.272	1.1048
11.19	11.64	36.70	-1.316	-4.483	.3198	.0574	.0199	15.094	1.281	1.1049
22.66	31.50	32.36	-5.445	-8.819	.2799	.0396	.0196	11.908	1.299	1.0931
47.43	49.79	31.71	-7.068	-10.075	.2477	.0391	.0270	10.874	1.325	1.0890
64.19	68.98	34.00	-6.516	-9.409	.2615	.0758	.0217	9.940	1.349	1.0938
87.49	84.28	38.64	-4.646	-7.606	.3148	.1479	.0391	0.412	1.351	1.1022
100.00	100.00	39.84	-5.907	-9.349	.3407	.1374	.0369	17.580	1.351	1.1022

MOMENTUM AVERAGE STAGE EFFICIENCY = .4589 (POLYTROPIC)      MOMENTUM AVG. STATOR PRESS RATIO = 1.3225  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8537 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.0973

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NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WINGT FLOW = 2.0551 LHM/SEC  
 70 PERCENT DESIGN FLOW = 56.1093  
 70 PERCENT DESIGN SPEED = SCAN NO 21  
 EQUIVALENT SP/CD  
 EQUIVALENT FLOW / INLET ANN AREA = 53744.604 R.P.M.  
 22.6977 LHM/SEC-SO FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.9523

PERCENT SPAN FROM TIP (L. F.)	BETA#1 (DEG)	V#1 (FT/SEC)	WU#1 (FT/SFC)	HFTA1 (DEG)	VI (FT/SEC)	M1	VU1 (FT/SEC)	V#1 (FT/SEC)	U1 (FT/SEC)
0.00	75.39	1144.70	1107.66	1.073	289.81	.261	0.00	289.81	279.51
0.68	74.34	1095.32	1054.68	.988	295.60	.267	0.00	295.60	285.92
25.31	71.00	1020.21	969.18	.922	314.63	.284	0.00	314.63	312.77
40.77	69.78	942.63	884.56	.852	325.75	.294	0.00	325.75	324.70
59.33	67.98	844.63	782.99	.763	316.73	.286	0.00	316.73	316.62
83.74	65.30	714.78	649.41	.645	299.63	.270	0.00	299.63	294.62
100.00	62.78	630.24	560.44	.569	289.28	.260	0.00	289.28	278.49

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8715

PERCENT SPAN FROM TIP (L. F.)	BETA#2 (DEG)	V#2 (FT/SEC)	WU#2 (FT/SFC)	HFTA2 (DEG)	V2 (FT/SEC)	M2	VU2 (FT/SEC)	V#2 (FT/SEC)	U2 (FT/SEC)
0.01	63.47	756.11	676.49	.649	515.01	.442	388.82	337.72	326.84
12.40	50.10	698.07	605.14	.600	536.71	.461	408.60	368.01	340.40
32.65	55.33	637.44	524.25	.551	441.19	.470	405.30	362.62	340.16
51.05	45.79	605.40	473.94	.527	419.84	.518	419.07	422.15	422.13
68.90	35.52	590.32	363.18	.518	448.48	.569	435.68	480.32	478.91
88.44	21.11	507.36	182.75	.447	499.30	.615	514.78	477.31	465.53
100.00	11.55	483.63	91.85	.427	728.01	.643	552.71	473.84	467.73

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA (DEG)	MEAN INCIDENCE (DEG)	SUCT ANGLE (DEG)	LOSS PARAMETER (DEG)	OMEGA* (RPM)	HAR	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ADJARIATIC EFF	POLYTROPIC EFF
0.00	0.00	11.549	11.001	.4688	.7471	.0420	6.600	1.352	.6761	.6845
0.68	12.40	11.448	11.134	.4975	.7575	.0466	5.721	1.355	.6822	.6955
25.31	32.65	12.709	10.656	.5063	.4044	.0387	5.961	1.358	.7546	.7650
40.77	51.05	12.810	10.059	.4910	.1246	.0274	4.704	1.349	.4578	.8643
59.33	68.90	13.394	9.638	.4401	.0385	.0086	6.091	1.418	.9639	.9657
83.74	88.44	13.867	8.866	.4566	.1015	.0221	12.204	1.630	.9331	.9305
100.00	100.00	14.027	7.453	.4156	.1285	.0268	18.603	1.430	.9332	.9305

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8313 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8234 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3861  
 MASS AVERAGE TEMPERATURE RISE = 1.1185

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 0.9322 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 56.1093  
 70 PERCENT DESIGN SPEED - SCAN NO 21  
 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 53744.604 R.P.M.  
 110.8197 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = 1.0523

PERCENT SPAN FROM TIP (L. F.)	HETA*1 (DEG)	V*1 (M/SEC)	VU*1 (M/SEC)	M*1 (DEG)	BETA1 (DEG)	V1 (M/SEC)	M1	V*1 (M/SEC)	VU*1 (M/SEC)	M1	V*1 (M/SEC)	VU*1 (M/SEC)	M1	V*1 (M/SEC)	VU*1 (M/SEC)	M1
0.00	75.39	348.90	337.62	1.033	0.00	89.03	0.00	0.00	89.03	.261	89.03	85.20	337.62	85.20	337.62	337.62
9.69	74.34	333.85	321.47	.988	0.00	90.10	0.00	0.00	90.10	.267	90.10	87.15	321.47	87.15	321.47	321.47
25.31	71.40	310.06	295.41	.922	0.00	97.12	0.00	0.00	97.12	.288	97.12	95.33	295.41	95.33	295.41	295.41
40.77	69.78	287.31	269.61	.852	0.00	99.29	0.00	0.00	99.29	.294	99.29	98.07	269.61	98.07	269.61	269.61
50.33	67.98	257.44	238.66	.763	0.00	96.16	0.00	0.00	96.16	.286	96.16	96.51	238.66	96.51	238.66	238.66
63.74	65.30	217.46	197.94	.645	0.00	91.02	0.00	0.00	91.02	.270	91.02	99.80	197.94	99.80	197.94	197.94
100.00	62.78	192.10	170.82	.569	0.00	87.87	0.00	0.00	87.87	.260	87.87	86.88	170.82	86.88	170.82	170.82

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC HLOSSAGE = .8715

PERCENT SPAN FROM TIP (L. F.)	HETA*2 (DEG)	V*2 (M/SEC)	VU*2 (M/SEC)	M*2 (DEG)	BETA2 (DEG)	V2 (M/SEC)	M2	V*2 (M/SEC)	VU*2 (M/SEC)	M2	V*2 (M/SEC)	VU*2 (M/SEC)	M2	V*2 (M/SEC)	VU*2 (M/SEC)	M2
0.00	63.47	230.46	206.20	.669	49.02	156.98	118.51	.442	102.94	99.62	102.94	99.62	324.71	99.62	324.71	324.71
12.40	60.10	212.77	184.45	.600	49.54	161.59	124.54	.461	106.07	103.75	106.07	103.75	308.99	103.75	308.99	308.99
27.65	55.33	196.29	159.79	.551	48.18	165.76	121.53	.470	110.53	109.84	110.53	109.84	283.33	109.84	283.33	283.33
51.06	45.79	184.53	132.26	.527	46.79	181.31	127.73	.518	128.67	124.14	128.67	124.14	260.00	124.14	260.00	260.00
68.90	35.54	170.93	104.60	.518	45.21	197.66	132.79	.569	146.40	145.07	146.40	145.07	237.39	145.07	237.39	237.39
84.66	21.11	154.64	55.70	.447	47.40	213.15	156.91	.615	144.24	141.89	144.24	141.89	212.61	141.89	212.61	212.61
100.00	11.55	147.41	29.52	.427	49.39	221.90	164.7	.643	144.43	139.52	144.43	139.52	197.98	139.52	197.98	197.98

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA* (DEG)	INCIDENCE MEAN (DEG)	SUCT S1H (DEG)	DELTA FACTOR	DELTA OMEGA* (DEG)	HAR	LOSS PARAMETER	DEVIATION ANGLE (NEG)	ROTOR PRESS RATIO	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	11.92	11.549	11.081	.488	.2471	.0420	6.480	1.152	.6741	.6895	
9.69	12.40	11.95	14.25	12.448	11.138	.4975	.2575	.0466	5.323	1.155	.6822	.6955	
25.31	32.65	31.06	16.47	12.709	10.656	.5063	.2644	.0387	5.941	1.158	.7546	.7657	
40.77	51.06	49.31	23.99	12.810	10.059	.4910	.2674	.0274	4.704	1.189	.8578	.8643	
50.33	68.90	68.77	32.43	13.394	9.638	.4401	.0385	.0086	6.091	1.419	.9439	.9557	
63.74	84.66	89.36	44.19	13.867	8.866	.4566	.1015	.0221	12.204	1.430	.9333	.9365	
100.00	100.00	100.00	51.23	14.027	7.953	.4156	.1285	.0268	18.603	1.430	.9312	.9365	

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8313 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8234 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3281  
 MASS AVERAGE TEMPERATURE PISE = 1.1185



NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 21

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9250

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (NEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	47.35	544.37	400.37	.468	368.44	344.79	1034.60
12.07	44.07	550.92	414.14	.480	367.40	347.19	990.52
31.73	45.78	572.24	410.10	.496	399.11	309.10	914.67
49.72	47.34	621.75	414.11	.543	459.27	454.93	852.95
67.79	40.26	667.29	431.21	.587	509.24	507.39	786.93
88.05	45.26	709.07	503.68	.625	490.08	492.34	712.91
100.00	46.44	740.28	536.41	.654	510.17	496.04	669.25

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9180

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (NEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-1.12	444.70	-4.69	.380	444.61	444.61	1027.09
11.41	-1.12	441.70	-4.61	.377	441.62	441.56	991.27
30.52	-1.95	444.98	-7.42	.382	444.92	444.72	931.28
44.93	-1.28	490.19	-10.96	.423	490.07	490.57	873.49
67.64	-1.12	533.00	-10.42	.463	532.90	532.60	816.74
88.14	-1.12	517.46	-10.11	.468	517.36	515.47	750.37
100.00	-1.12	519.88	-10.16	.450	519.78	519.76	713.15

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	SUCT SUR (DEG)	ANGLE (DEG)	D FACTOR	OALPHA HAP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	48.47	11.029	7.107	.4560	.0641	.0231	21.064	1.339	1.1727	.8228	
12.07	11.41	11.95	49.78	12.473	4.161	.4721	.0497	.0311	15.419	1.317	1.1727	.7781	
31.73	30.52	31.06	46.73	9.038	5.144	.4542	.0439	.0276	12.206	1.340	1.1727	.8061	
49.72	44.93	49.31	43.66	4.526	1.752	.4184	.0773	.0237	10.688	1.360	1.1727	.8171	
67.79	67.64	64.77	41.34	6.57	-2.190	.3849	.0583	.0167	9.982	1.401	1.1727	.8584	
88.05	88.14	89.36	46.34	2.924	.035	.4533	.1309	.0346	10.412	1.387	1.1727	.7548	
100.00	100.00	100.00	47.56	1.804	-1.637	.4736	.1210	.0306	17.580	1.387	1.1727	.7935	

MOMENTUM AVERAGE STAGE EFFICIENCY = .8001 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.3692  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .7910 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1185

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 21

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9250

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	VH3 (M/SEC)	M3	VM3 (M/SEC)	V73 (M/SEC)	U3 (M/SEC)
0.00	47.35	165.92	122.03	.468	112.42	111.19	315.34
12.07	48.67	169.75	127.46	.480	112.11	111.92	301.91
31.73	45.78	174.42	124.00	.496	121.65	121.65	280.01
49.72	42.38	189.51	127.74	.543	139.98	139.98	259.98
67.79	40.26	203.39	131.43	.587	155.22	154.65	239.86
89.05	45.26	216.12	153.52	.625	152.12	150.08	217.30
100.00	46.44	225.64	167.50	.654	155.50	151.20	203.99

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9180

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (M/SEC)	VH4 (M/SEC)	M4	VM4 (M/SEC)	V74 (M/SEC)	U4 (M/SEC)
0.00	-1.12	135.54	-2.65	.780	135.52	135.52	313.06
11.41	-1.12	134.63	-2.62	.777	134.61	134.59	302.14
30.52	-0.95	135.93	-2.76	.782	135.61	134.55	293.85
49.03	-1.24	149.91	-3.34	.823	149.37	149.22	266.74
67.64	-1.12	162.46	-3.18	.863	162.43	162.34	248.33
88.14	-1.12	157.72	-3.08	.848	157.69	157.12	228.71
100.00	-1.12	158.46	-3.10	.850	158.43	158.41	217.37

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (KGT)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCT ANGLE (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE LOSS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	48.47	11.029	7.107	4.560	.0231	21.060	1.319	1.1227	.8228
12.07	11.45	49.78	12.473	9.161	.8721	.0311	15.619	1.337	1.1227	.7781
31.73	31.06	46.77	9.098	5.840	.4502	.0276	12.206	1.340	1.1207	.8061
49.72	49.31	43.64	4.526	1.554	.4184	.0237	10.688	1.349	1.1145	.8171
67.79	68.77	41.38	.657	-2.150	.3849	.0167	9.982	1.401	1.1087	.8584
88.05	89.36	46.38	2.924	.035	.4533	.0366	10.412	1.387	1.1150	.7548
100.00	100.00	47.56	1.804	-1.637	.4736	.0306	17.580	1.387	1.1150	.7935

MOMENTUM AVERAGE STAGE EFFICIENCY = .4001 (POLYTROPIC)  
 MASS AVERAGE STAGE EFFICIENCY = .7910 (ADIABATIC)  
 MOMENTUM AVG. STAGE TEMPERATURE RATIO = 1.0692  
 MASS AVERAGE TEMPERATURE RATIO = 1.0185

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.0660 LHM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 56.40%  
 70 PERCENT DESIGN SPEED - SCAN NO 22  
 EQUIVALENT SPED  
 EQUIVALENT FLOW / INLET ANN AREA = 53743.472 R.P.M.  
 22.8187 LHM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0493

PERCENT SPAN FROM TIP (I. F.)	HETA*1 (DEG)	V*1 (FT/SEC)	VU*1 (FT/SEC)	HETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V*1 (FT/SEC)	VU1 (FT/SEC)	M1	V*1 (FT/SEC)	VU1 (FT/SEC)	M1	V*1 (FT/SEC)	VU1 (FT/SEC)	M1
0.00	75.31	1145.06	1107.64	0.00	290.33	0.00	.262	290.33	0.00	.262	290.98	0.00	290.98	0.00	.262	1107.64
9.72	74.26	1075.50	1054.43	0.00	297.18	0.00	.268	297.18	0.00	.268	287.45	0.00	287.45	0.00	.268	1054.43
25.39	71.70	1020.33	968.73	0.00	320.38	0.00	.289	320.38	0.00	.289	314.69	0.00	314.69	0.00	.289	968.73
40.93	69.66	942.41	883.65	0.00	327.58	0.00	.296	327.58	0.00	.296	320.52	0.00	320.52	0.00	.296	883.65
54.62	67.83	843.81	781.41	0.00	314.46	0.00	.288	314.46	0.00	.288	314.76	0.00	314.76	0.00	.288	781.41
67.94	65.15	715.50	648.32	0.00	300.32	0.00	.271	300.32	0.00	.271	294.28	0.00	294.28	0.00	.271	648.32
100.00	62.65	630.97	560.43	0.00	299.89	0.00	.262	299.89	0.00	.262	280.04	0.00	280.04	0.00	.262	560.43

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8761

PERCENT SPAN FROM TIP (I. F.)	HETA*2 (DEG)	V*2 (FT/SEC)	VU*2 (FT/SEC)	HETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V*2 (FT/SEC)	VU2 (FT/SEC)	M2	V*2 (FT/SEC)	VU2 (FT/SEC)	M2	V*2 (FT/SEC)	VU2 (FT/SEC)	M2
0.00	63.11	701.15	674.85	0.00	517.55	386.44	.644	517.55	386.44	.644	333.18	0.00	333.18	0.00	.644	1065.29
12.74	60.14	700.72	604.03	0.00	534.91	405.98	.660	534.91	405.98	.660	360.88	0.00	360.88	0.00	.660	1014.01
17.60	59.45	640.49	527.56	0.00	541.65	401.83	.669	541.65	401.83	.669	360.03	0.00	360.03	0.00	.669	929.39
51.08	45.89	612.48	439.74	0.00	593.69	413.17	.518	593.69	413.17	.518	426.30	0.00	426.30	0.00	.518	952.92
68.80	35.53	546.20	346.43	0.00	650.71	432.82	.571	650.71	432.82	.571	485.22	0.00	485.22	0.00	.571	779.25
84.76	20.50	492.53	172.51	0.00	699.19	525.41	.615	699.19	525.41	.615	461.31	0.00	461.31	0.00	.615	697.92
100.00	10.39	464.60	84.67	0.00	729.68	564.87	.644	729.68	564.87	.644	461.91	0.00	461.91	0.00	.644	564.54

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HETA* (DEG)	MASS FLOW (PCT)	INCIDENCE MEAN (DEG)	SUCT SUR (DEG)	ANGLE (DEG)	LOSS PARAMETER	OMEGA* HAR	FACTOR	DEVIATION ANGLE (DEG)	ROTOR LOSS ANGLE (DEG)	ROTOR ANTIADIBATIC FFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	11.476	11.007	.4638	.2425	.4638	.4638	6.119	1.352	.6805	.6937
9.72	12.14	11.99	12.374	11.061	.4944	.2564	.4944	.4944	5.406	1.352	.6814	.6966
25.39	32.69	31.13	12.621	10.563	.5022	.2021	.5022	.5022	6.100	1.355	.7557	.7660
40.93	51.08	49.46	12.709	9.944	.4815	.1200	.4815	.4815	6.412	1.397	.8669	.8729
54.62	68.80	64.02	13.279	9.509	.4317	.0064	.4317	.4317	5.989	1.420	.9790	.9744
67.94	84.76	83.50	13.731	8.725	.4806	.1384	.4806	.4806	11.460	1.428	.9105	.9149
100.00	100.00	100.00	13.897	7.823	.4426	.1763	.4426	.4426	17.439	1.428	.9105	.9149

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8301 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8221 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3044  
 MASS AVERAGE TEMPERATURE RISE = 1.1182

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NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT FLIGHT FLOW HETA\*1 (DEG) V01 (M/SEC) VU\*1 (M/SEC) M\*1 BETA1 (DEG) V1 (M/SEC) VU1 (M/SEC) M1 (M/SEC) U1 (M/SEC)  
 PERCENT DESIGN EQUIVALENT FLOW = 56.4086 70 PERCENT DESIGN SPEED - SCAN NO. 22 EQUIVALENT SPEED R.P.M. 51743.472  
 PERCENT DESIGN EQUIVALENT FLOW = 56.4086 EQUIVALENT FLOW / INLET ANN AREA = 111.4107 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0493

PERCENT SPAN FROM TIP (L. E.)	HETA*1 (DEG)	V01 (M/SEC)	VU*1 (M/SEC)	M*1	BETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	V41 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	75.31	349.01	337.61	1.033	0.00	89.49	0.00	.262	88.49	85.64	337.61
9.72	74.26	333.91	321.39	.989	0.00	90.58	0.00	.269	90.58	87.61	321.39
25.39	71.70	311.00	295.27	.922	0.00	97.65	0.00	.289	97.65	95.84	295.27
40.07	69.06	287.25	269.74	.852	0.00	99.85	0.00	.296	99.85	99.52	269.74
59.62	67.83	257.19	238.17	.762	0.00	97.07	0.00	.294	97.07	97.03	238.17
83.96	65.15	217.78	197.61	.665	0.00	91.54	0.00	.271	91.54	90.31	197.61
100.00	62.65	143.32	170.02	.569	0.00	88.36	0.00	.262	88.36	85.36	170.02

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8761

PERCENT SPAN FROM TIP (T. F.)	HETA*2 (DEG)	V*2 (M/SEC)	VU*2 (M/SEC)	M*2	BETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V*2 (M/SEC)	U2 (M/SEC)	
0.00	67.11	237.00	206.01	.654	49.30	157.75	117.79	.444	104.93	101.55	324.70
12.34	60.19	213.54	185.33	.602	49.31	163.04	123.74	.460	106.31	103.84	309.07
32.69	55.45	194.22	160.80	.554	47.49	165.09	127.48	.465	110.70	110.01	283.28
51.08	45.89	180.68	136.03	.534	44.10	180.96	125.94	.518	129.94	129.94	259.97
68.80	35.53	181.72	105.59	.524	41.73	174.18	131.92	.571	147.90	147.46	237.52
88.16	20.50	150.12	52.58	.433	48.72	160.14	160.14	.615	140.61	134.30	212.73
100.00	10.39	143.14	25.81	.414	50.73	222.41	172.17	.644	140.70	136.00	147.98

ROTOR PERFORMANCE DATA

PERCENT SPAN LEADING EDGE	FROM TIP TRAILING EDGE	MASS FLOW (KG)	DELTA HETA*0 (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	OMEGA* RMP	LOSS PARAMETER	DEVIATION ANGLE (DEG)	WOTON P/FSS	ROTOR P/FSS	ADIABATIC EFF	POLYTROPIC EFF
0.00	0.10	0.00	12.20	11.476	11.007	.4639	.2425	6.119	1.352	.885	.6937	.6937
5.72	12.34	11.09	14.07	12.374	11.061	.4944	.2559	5.404	1.352	.884	.6946	.6946
25.39	32.69	31.13	16.25	12.621	10.563	.5022	.2021	6.100	1.355	.7457	.7660	.7660
40.07	51.08	43.46	23.77	12.709	9.949	.4815	.1200	4.812	1.347	.8449	.8729	.8729
59.62	68.80	69.02	32.30	13.279	9.509	.4317	.0287	5.989	1.420	.9730	.9744	.9744
83.96	88.16	84.50	44.84	13.731	8.725	.4806	.1364	11.450	1.420	.9105	.9149	.9149
100.00	100.00	100.00	52.26	13.897	7.423	.4426	.1763	17.439	1.420	.9105	.9105	.9105

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8301 (POLYTROPIC) MOMENTUM AVERAGE ROTOR P/FSS RATIO = 1.3844  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8221 (ADIABATIC) MASS AVERAGE TEMPERATURE RISE = 1.1182

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 22

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9263

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3	M3	VM3 (FT/SEC)	VU3	U3 (FT/SEC)
0.00	46.47	548.79	397.92	.472	377.94	373.74	1034.57
11.03	44.24	546.94	415.49	.480	370.94	370.32	990.42
31.68	45.29	571.86	406.44	.496	402.29	402.29	918.44
49.65	41.60	622.09	417.04	.546	465.19	464.45	853.20
67.63	46.72	678.22	428.23	.590	515.52	513.64	787.44
87.91	46.36	710.20	513.99	.625	490.10	491.52	713.42
100.00	47.55	743.08	548.30	.656	501.53	487.67	669.24

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9184

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4	M4	VM4 (FT/SEC)	VU4	U4 (FT/SEC)
0.00	-1.12	450.20	-4.40	.385	450.11	450.11	1027.07
11.42	-1.12	444.20	-4.64	.379	444.11	444.06	991.22
30.59	-1.12	448.44	-4.77	.385	448.35	444.14	911.04
48.09	-1.12	497.24	-4.72	.430	497.14	496.63	873.28
67.66	-1.12	537.18	-10.52	.467	517.08	516.74	814.67
88.14	-1.24	516.21	-11.58	.450	516.08	514.20	750.38
100.00	-1.29	519.17	-11.69	.449	519.03	519.03	713.13

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	INCIDENCE MEAN (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STATOR POLYTROPIC EFF
0.00	0.00	47.59	10.157	6.234	.4488	.0229	21.060	1.1719	.8214
11.54	11.99	49.36	12.050	8.734	.4661	.0292	15.413	1.1719	.7976
31.68	31.13	46.41	8.618	5.357	.4506	.0249	12.035	1.1196	.9205
49.65	49.46	42.72	7.752	.779	.4040	.0196	10.845	1.1129	.9418
67.63	69.02	40.44	4.142	-2.710	.3803	.0183	9.980	1.1080	.8437
87.91	87.50	47.65	4.059	1.160	.4402	.0372	10.246	1.1175	.7390
100.00	100.00	48.84	2.419	-5.522	.4809	.0327	17.410	1.1175	.7414

MOMENTUM AVERAGE STAGE EFFICIENCY = .7995 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7904 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.3679  
MASS AVERAGE TEMPERATURE RISE = 1.1182

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 22

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9263

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (M/SEC)	VU3 (M/SEC)	M3	V43 (M/SEC)	VZ3 (M/SEC)	U3 (M/SEC)
0.00	46.67	167.27	121.28	.472	115.20	113.93	315.34
11.04	48.24	169.77	126.64	.480	113.06	112.87	302.00
31.64	47.29	174.30	123.04	.496	122.62	122.62	280.04
49.65	41.60	189.61	125.89	.544	141.79	141.69	260.05
67.63	34.72	208.28	130.54	.590	157.13	156.56	240.03
87.91	46.36	216.47	156.66	.625	149.38	147.38	217.65
100.00	47.55	226.49	167.12	.656	152.87	148.64	203.98

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9184

PERCENT SPAN FROM TIP (L. E.)	BETA 4 (DEG)	V4 (M/SEC)	VU4 (M/SEC)	M4	VH4 (M/SEC)	VZ4 (M/SEC)	U4 (M/SEC)
0.00	-1.12	137.22	-2.68	.385	137.20	137.20	313.05
11.42	-1.12	135.34	-2.65	.379	135.37	135.35	302.12
30.50	-1.12	136.68	-2.67	.385	136.65	136.60	283.78
44.00	-1.12	151.56	-2.96	.430	151.53	151.37	256.18
67.66	-1.12	163.73	-3.21	.467	163.70	163.61	249.31
88.16	-1.29	157.36	-3.53	.466	157.30	156.73	224.72
100.00	-1.29	158.26	-3.56	.469	158.20	158.20	211.36

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (KGT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCTION (DEG)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STATOR PRESS RATIO	STATOR TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	47.50	10.157	6.234	.0229	21.060	1.760	1.1319	.8214
11.04	11.99	49.36	12.050	8.734	.0292	15.613	1.314	1.1319	.7476
31.64	31.13	46.43	8.618	5.357	.0249	12.035	1.319	1.1196	.8205
49.65	43.46	42.72	3.752	.774	.0196	10.445	1.371	1.1129	.8418
67.63	69.02	40.84	.142	-2.710	.0636	9.890	1.401	1.1080	.8637
87.91	89.50	47.65	6.059	1.160	.0372	10.246	1.392	1.1175	.7390
100.00	100.00	48.94	2.919	-5.22	.0327	17.610	1.382	1.1175	.7914

MOMENTUM AVERAGE STAGE EFFICIENCY = .7995 (POLYTROPIC)

MOMENTUM AVERAGE STAGE EFFICIENCY = .7904 (ADIABATIC)

MOMENTUM AVG. STAGE PRESS RATIO = 1.3079

MASS AVERAGE TEMPERATURE RISE = 1.1182

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NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLIGHT FLOW = 4.0860 LHM/SEC 70 PERCENT DESIGN SPEED = SCAN NO 23  
 PERCENT DESIGN EQUIVALENT FLOW = 56.9546 EQUIVALENT SPEED R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 23.0396 LHM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = 1.0466

PERCENT SPAN FROM TIP (I. F.)	BETA*1 (DEG)	V*1 (FT/SEC)	M*1	BETA1 (DEG)	V1 (FT/SEC)	M1	V*2 (FT/SEC)	M*2	BETA2 (DEG)	V2 (FT/SEC)	M2	V*3 (FT/SEC)	M*3	BETA3 (DEG)	V3 (FT/SEC)	M3
0.00	75.13	1146.74	1.073	0.00	293.69	0.00	0.00	0.00	0.00	293.69	0.265	293.69	0.265	284.24	1106.03	0.265
9.73	74.06	1094.43	1.052	0.00	300.63	0.00	0.00	0.00	0.00	300.63	0.271	300.63	0.271	290.79	1052.85	0.271
25.44	71.67	1014.91	0.967	0.00	324.21	0.00	0.00	0.00	0.00	324.21	0.293	324.21	0.293	318.55	967.01	0.293
40.07	69.41	942.41	0.882	0.00	331.49	0.00	0.00	0.00	0.00	331.49	0.300	331.49	0.300	330.42	882.18	0.300
59.62	67.57	844.16	0.763	0.00	322.13	0.00	0.00	0.00	0.00	322.13	0.291	322.13	0.291	322.02	760.28	0.291
73.91	64.71	715.04	0.645	0.00	303.26	0.00	0.00	0.00	0.00	303.26	0.274	303.26	0.274	299.19	547.54	0.274
100.00	62.45	631.14	0.569	0.00	291.93	0.00	0.00	0.00	0.00	291.93	0.263	291.93	0.263	282.01	559.62	0.263

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = 0.8768

PERCENT SPAN FROM TIP (I. F.)	BETA*2 (DEG)	V*2 (FT/SEC)	M*2	BETA2 (DEG)	V2 (FT/SEC)	M*2	V*3 (FT/SEC)	M*3	BETA3 (DEG)	V3 (FT/SEC)	M*3	V*4 (FT/SEC)	M*4	BETA4 (DEG)	V4 (FT/SEC)	M*4
0.00	62.77	766.85	0.659	47.42	514.61	0.444	341.83	0.444	47.42	341.83	0.444	341.83	0.444	330.60	1063.74	0.444
12.29	60.05	705.42	0.607	48.70	533.01	0.459	401.12	0.459	48.70	401.12	0.459	401.12	0.459	344.47	1012.70	0.459
32.66	55.11	648.35	0.531	48.40	542.77	0.470	396.34	0.470	48.40	396.34	0.470	396.34	0.470	370.62	928.17	0.470
50.94	46.14	617.17	0.445	43.00	590.50	0.515	407.24	0.515	43.00	407.24	0.515	407.24	0.515	364.52	828.28	0.515
64.74	35.04	600.39	0.349	41.24	649.27	0.571	424.39	0.571	41.24	424.39	0.571	424.39	0.571	347.54	778.30	0.571
84.78	21.07	624.43	0.437	48.21	695.17	0.611	514.34	0.611	48.21	514.34	0.611	514.34	0.611	345.62	598.82	0.611
100.00	11.15	472.69	0.417	50.23	724.97	0.640	557.22	0.640	50.23	557.22	0.640	557.22	0.640	344.02	548.54	0.640

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HETA* (DEG)	MASS FLOW (PCT)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	O OMEGA* HAK	LOSS PARAMETER	DEVIATION ANGL (DEG)	ROTOR PRESS RATIO	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	11.292	10.824	0.4570	0.0414	5.778	1.348	0.678	0.6069
9.73	17.24	12.02	12.179	10.866	0.4879	0.0459	5.254	1.348	0.678	0.6155
25.44	32.66	31.24	12.396	10.334	0.4225	0.0364	5.746	1.353	0.7634	0.7132
40.07	50.44	49.56	12.460	9.694	0.4747	0.0443	6.996	1.383	0.705	0.8762
59.62	64.74	69.10	13.019	9.250	0.0222	0.0409	6.076	1.417	0.900	0.8800
73.91	84.78	89.54	13.487	8.482	0.4733	0.0284	12.055	1.423	0.9147	0.9189
100.00	100.00	100.00	13.699	7.625	0.4353	0.0346	18.197	1.423	0.9147	0.9188

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8341 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8263 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3806  
 MASS AVERAGE TEMPERATURE RISE = 1.1166

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT W/FIGHT FLOW = 0.9642 KG/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 56.9546  
 70 PERCENT DESIGN SPEED = SCAN NO 73  
 EQUIVALENT SPEED = 53665.293 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 112.6003 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0466

PERCENT SPAN FROM TIP (L. F.)	HETA#1 (DEG)	VE1 (M/SEC)	VU#1 (M/SEC)	M#1	BETA1 (DEG)	V1 (M/SEC)	VU1 (M/SEC)	M1	V#1 (M/SEC)	VU#1 (M/SEC)	M1	M1	V#1 (M/SEC)	VU#1 (M/SEC)	M1
0.00	75.13	344.90	337.12	1.033	0.00	92.52	0.00	.265	89.52	89.52	.265	.265	89.52	89.52	.265
9.73	74.06	337.73	320.91	.988	0.00	91.63	0.00	.271	91.63	91.63	.271	.271	91.63	91.63	.271
25.44	71.47	316.47	294.74	.922	0.00	91.82	0.00	.293	91.82	91.82	.293	.293	91.82	91.82	.293
40.97	69.41	287.25	268.89	.852	0.00	101.04	0.00	.300	101.04	101.04	.300	.300	101.04	101.04	.300
59.62	67.57	257.30	237.83	.763	0.00	98.19	0.00	.291	98.19	98.19	.291	.291	98.19	98.19	.291
83.91	64.91	217.94	197.37	.645	0.00	92.43	0.00	.274	92.43	92.43	.274	.274	92.43	92.43	.274
100.00	62.45	192.38	170.57	.569	0.00	89.98	0.00	.263	89.98	89.98	.263	.263	89.98	89.98	.263

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8768

PERCENT SPAN FROM TIP (L. F.)	HETA#2 (DEG)	VE2 (M/SEC)	VU#2 (M/SEC)	M#2	BETA2 (DEG)	V2 (M/SEC)	VU2 (M/SEC)	M2	V#2 (M/SEC)	VU#2 (M/SEC)	M2	M2	V#2 (M/SEC)	VU#2 (M/SEC)	M2
0.00	62.77	233.74	207.83	.659	47.42	154.07	116.40	.446	106.95	106.95	.446	.446	106.95	106.95	.446
12.29	60.05	215.13	186.41	.607	48.70	162.74	122.26	.459	107.40	107.40	.459	.459	107.40	107.40	.459
32.66	54.11	197.62	162.10	.561	46.90	165.44	120.80	.470	113.02	113.02	.470	.470	113.02	113.02	.470
50.04	46.18	184.11	135.45	.538	43.60	179.98	124.13	.515	130.37	130.37	.515	.515	130.37	130.37	.515
64.76	34.65	143.00	106.05	.528	41.28	197.20	130.57	.571	144.71	144.71	.571	.571	144.71	144.71	.571
84.78	21.07	151.31	54.40	.437	48.21	211.49	157.99	.611	141.12	141.12	.611	.611	141.12	141.12	.611
100.00	11.15	144.08	27.45	.417	50.23	220.97	149.84	.640	141.34	141.34	.640	.640	141.34	141.34	.640

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA# (DEG)	INCIDENCE ANGLE (DEG)	D FACTOR	OMEGA* HAH	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR POLY TROPIC EFF	ROTOR ADIABATIC POLY TROPIC EFF
0.00	0.00	0.00	12.34	11.292	10.824	.4570	.0414	5.778	1.748	.6418
9.73	12.29	12.02	14.01	12.179	10.866	.4879	.0459	5.254	1.748	.6955
25.44	32.66	31.24	14.35	12.396	10.334	.4925	.0348	5.746	1.353	.7732
40.97	50.97	44.56	27.26	12.440	9.698	.747	.0243	4.996	1.191	.8762
59.62	59.62	64.10	31.92	13.019	9.250	.4256	.0049	6.076	1.417	.9800
83.91	84.78	89.56	43.83	13.487	8.442	.4733	.0284	12.055	1.423	.9147
100.00	100.00	100.00	51.31	13.699	7.625	.4353	.0344	18.197	1.423	.9188

MOMENTUM AVERAGE ROTOR EFFICIENCY = .9341 (POLYTROPIC)  
 MASS AVERAGE ROTOR EFFICIENCY = .8263 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3806  
 MASS AVERAGE TEMPERATURE RISE = 1.1166



NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 24, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 23

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9277

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	VJ3 (FT/SEC)
0.00	45.65	569.91	493.22	.674	314.42	300.20	1023.07
11.95	47.60	555.06	410.54	.674	374.91	374.29	949.48
31.67	44.37	573.34	400.93	.698	403.84	409.44	917.54
49.54	41.09	619.60	407.21	.542	466.99	466.65	852.35
67.61	39.27	669.79	423.46	.590	518.53	516.64	786.43
87.93	45.85	706.73	507.09	.622	492.27	485.64	712.28
100.00	47.04	739.08	540.49	.653	503.66	489.75	668.76

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (L. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	VJ4 (FT/SEC)
0.00	-1.12	648.45	-8.77	.383	448.36	448.36	1025.58
11.65	-1.12	643.01	-8.69	.379	442.92	442.87	989.69
30.47	-1.24	648.51	-10.04	.386	444.40	444.20	929.44
49.07	-1.12	692.52	-9.63	.426	492.43	491.92	871.74
67.82	-1.12	510.51	-10.53	.469	530.40	528.11	813.03
87.23	-1.12	511.98	-10.01	.443	511.88	510.01	749.00
100.00	-1.12	514.99	-10.07	.445	514.89	514.89	714.10

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP TO TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE ANGLE (DEG)	MEAN SUCTION ANGLE (DEG)	INCIDENCE ANGLE (DEG)	LOSS PARAMETER	OMEGA BAR	FACTOR	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TIP POLYTROPIC EFF
0.00	0.00	46.77	9.330	5.667	.4499	.0414	.0221	21.060	1.337	1.1301	.8317
11.95	12.02	48.72	11.806	8.001	.4642	.0742	.0257	15.403	1.333	1.1301	.8140
31.67	31.24	45.65	7.694	4.433	.4495	.0744	.0264	11.863	1.337	1.1178	.8252
49.54	49.36	42.21	3.642	.274	.4664	.0660	.0202	10.840	1.366	1.1112	.8192
67.61	69.10	40.39	-3.305	-3.158	.3761	.0579	.0166	9.945	1.400	1.1048	.8504
87.93	89.56	46.97	3.539	6.42	.4605	.1416	.0375	10.413	1.377	1.1157	.7384
100.00	100.00	48.15	2.609	-1.032	.4808	.1305	.0330	17.580	1.377	1.1158	.7901

MOMENTUM AVERAGE STAGE EFFICIENCY = .8043 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7955 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.3680  
MASS AVERAGE TEMPERATURE RISE = 1.1166

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNF 28 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (IMFTRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 23

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9277

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	V1/3 (M/SEC)	M3	VM3 (M/SEC)	U/23 (M/SEC)	U3 (M/SEC)
0.00	45.65	167.61	119.85	.474	117.17	115.89	314.99
11.45	47.60	169.46	125.13	.479	114.27	114.04	301.59
30.67	44.37	174.75	127.20	.498	124.92	124.92	279.67
49.54	41.09	188.85	124.12	.542	142.34	142.34	259.90
67.61	39.27	204.15	129.22	.590	159.05	157.47	239.70
87.93	45.85	215.41	154.54	.622	150.04	148.93	217.10
100.00	47.04	225.27	164.86	.653	153.52	149.27	203.69

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPA FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	V1/4 (M/SEC)	M4	VM4 (M/SEC)	U/24 (M/SEC)	U4 (M/SEC)
0.00	-1.12	136.69	-2.67	.383	136.66	136.66	312.60
11.45	-1.12	135.03	-2.65	.379	135.00	136.99	301.66
30.67	-1.24	136.71	-3.06	.386	136.67	136.61	283.29
49.54	-1.12	150.12	-2.93	.426	140.09	149.94	265.71
67.61	-1.12	164.14	-2.21	.469	164.11	164.01	247.81
87.93	-1.12	156.05	-3.05	.443	156.02	154.45	228.29
100.00	-1.12	156.97	-3.07	.445	156.94	156.94	217.05

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	FACTOR	OMEGA RAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	46.77	9.330	5.407	.4499	.0614	.0221	21.060	1.377	1.1701	.8717
11.45	11.45	12.02	48.72	11.406	4.049	.4642	.0742	.0257	15.403	1.373	1.1301	.8140
30.67	30.67	31.24	45.65	7.694	4.433	.4495	.0744	.0244	11.863	1.377	1.1179	.8252
49.54	49.54	49.56	42.21	3.249	.274	.4064	.0660	.0202	10.840	1.366	1.1112	.8392
67.61	67.61	69.10	40.39	-3.305	-3.158	.3761	.0579	.0166	9.905	1.400	1.1049	.8564
87.93	88.23	89.54	46.97	3.539	.642	.4605	.1416	.0375	10.413	1.377	1.1157	.8744
100.00	100.00	100.00	48.14	2.409	-1.032	.4808	.1365	.0330	17.580	1.377	1.1158	.7901

MOMENTUM AVERAGE STAGE EFFICIENCY = .7954 (POLYTROPIC)  
MOMENTUM AVERAGE STAGE EFFICIENCY = .7955 (ADIABATIC)  
MOMENTUM AVG. STAGE PRESS RATIO = 1.3648  
MASS AVERAGE TEMPERATURE DISF = 1.1166

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

MOTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 7.1028 LBM/SEC 70 PERCENT DESIGN SPEED - SCAM NO 24  
 PERCENT DESIGN EQUIVALENT FLOW = 57.4125 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 53732.621 R.P.M.  
 23.2248 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0384

PERCENT SPAN FROM TIP (T. F.)	HETA*1 (DEG)	V*1 (FT/SEC)	VI*1 (FT/SEC)	HTA1 (DEG)	VI (FT/SEC)	M1	VM1 (FT/SEC)	V1 (FT/SEC)	U1 (FT/SEC)
0.00	75.02	114.39	1107.42	0.00	294.39	0.00	296.34	296.84	1107.42
5.64	73.45	1077.16	1054.61	0.00	303.33	0.00	303.33	293.41	1054.61
25.26	71.36	1022.48	969.21	0.00	326.98	0.00	326.98	320.97	969.21
40.82	69.27	945.21	896.11	0.00	334.33	0.00	334.33	333.25	896.11
50.43	67.44	847.07	782.27	0.00	328.92	0.00	328.92	326.81	782.27
62.77	64.77	717.40	644.34	0.00	305.92	0.00	305.92	303.02	644.34
100.00	62.27	633.02	560.32	0.00	294.56	0.00	294.56	294.53	560.32

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .8686

PERCENT SPAN FROM TIP (T. F.)	HETA*2 (DEG)	V*2 (FT/SEC)	VI*2 (FT/SEC)	HTA2 (DEG)	V2 (FT/SEC)	M2	VM2 (FT/SEC)	V2 (FT/SEC)	U2 (FT/SEC)
0.00	42.97	774.69	684.94	46.68	519.27	.466	377.04	346.14	1065.08
12.99	59.24	720.40	619.12	47.05	540.60	.466	359.71	340.27	1014.83
31.90	55.43	660.99	544.10	45.99	532.73	.468	384.16	372.64	932.47
50.90	46.71	620.66	454.34	42.62	586.71	.513	377.24	431.72	855.61
64.90	36.16	604.08	356.04	40.96	646.64	.568	423.87	484.90	740.81
81.18	21.33	508.06	184.80	47.35	694.49	.615	513.72	444.48	544.52
100.00	11.50	484.67	96.92	49.38	727.87	.643	552.49	457.76	669.41

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HETA*0 (DEG)	MASS FLOW (PCT)	INCIDENCE MEAN (DEG)	ANGLF SUCT (DEG)	ONFGA* HAX FACTOR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	MOTOR PRESS RATIO	ROTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	11.180	10.712	.4497	.0413	5.678	1.343	.6811	.6941
9.44	12.04	11.93	12.052	10.744	.4741	.0454	4.411	1.347	.6896	.7054
25.26	21.90	31.04	12.258	10.207	.4794	.0359	5.782	1.347	.7639	.7736
40.82	50.34	44.61	12.319	9.565	.4683	.0224	5.292	1.377	.8747	.8821
50.43	68.33	68.93	12.874	9.114	.4212	.0054	6.288	1.413	.8765	.8776
81.73	88.18	89.42	13.315	8.314	.4579	.0248	12.032	1.425	.9244	.9282
100.00	100.00	100.00	13.518	7.444	.4180	.0201	18.611	1.425	.9244	.9281

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8377 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8303 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3773  
 MASS AVERAGE TEMPERATURE PT5F = 1.1151

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNF 24 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = 0.9518 KG/SEC      70 PERCENT DESIGN SPEED = SCAN NO 24      R.P.M. = 53732.421  
 PERCENT DESIGN EQUIVALENT FLOW = 57.4125      EQUIVALENT SPEED / INLET ANN AREA = 113.7934 KG/SEC-50 M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0384

PERCENT SPAN FROM TIP (L. F.)	RETA#1 (DEG)	V#1 (M/SEC)	W#1 (M/SEC)	VI (M/SEC)	VU1 (M/SEC)	M1	V#1 (M/SEC)	V#2 (M/SEC)	W#2 (M/SEC)	U2
0.00	75.02	344.42	337.54	0.00	90.34	0.00	90.34	90.34	87.43	337.54
9.65	71.45	314.48	321.44	0.00	92.45	0.00	92.45	92.45	89.43	321.44
25.26	71.36	311.77	295.41	0.00	92.66	0.00	92.66	92.66	87.43	295.41
40.82	69.74	288.10	269.40	0.00	101.90	0.00	101.90	101.90	85.44	269.44
50.43	67.44	254.19	238.44	0.00	93.04	0.00	93.04	93.04	83.44	238.44
81.73	64.77	218.78	197.92	0.00	93.25	0.00	93.25	93.25	81.44	197.92
100.00	62.27	192.94	170.79	0.00	82.78	0.00	82.78	82.78	84.73	170.79

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.6886

PERCENT SPAN FROM TIP (T. F.)	RETA#2 (DEG)	V#2 (M/SEC)	W#2 (M/SEC)	V2 (M/SEC)	VU2 (M/SEC)	M2	V#2 (M/SEC)	V#2 (M/SEC)	W#2 (M/SEC)	U2
0.00	67.67	236.07	209.71	46.68	157.97	0.466	114.92	108.38	104.09	324.64
12.00	59.25	219.58	184.71	47.05	144.77	0.466	120.61	112.24	102.81	309.32
21.00	55.43	201.47	165.90	45.99	144.51	0.468	118.31	114.30	113.59	284.22
34.19	46.71	191.92	139.70	42.62	178.83	0.512	121.09	131.44	131.59	260.79
46.19	36.16	184.37	104.80	40.94	177.09	0.568	129.20	148.84	148.41	237.99
48.18	21.33	154.46	56.33	47.15	212.90	0.615	156.58	144.25	141.88	212.91
100.00	11.56	147.42	24.54	49.38	221.85	0.643	168.40	144.43	139.53	197.94

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	MASS FLOW (KGF)	DELTA HFT#9 (M/SEC)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTOR	OMEGA* (M/SEC)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	WOTOR PRESS RATIO	WOTOR ADIABATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	12.35	11.180	10.712	0.4497	0.2366	0.913	5.478	1.347	0.6911	0.6941
9.65	12.09	14.70	12.052	10.744	0.4741	0.2449	0.954	4.411	1.347	0.6966	0.7024
25.26	31.90	15.52	12.258	10.207	0.4794	0.1900	0.759	5.782	1.347	0.7439	0.7736
40.82	50.19	22.41	12.319	9.565	0.4603	0.1076	0.624	5.202	1.377	0.4767	0.821
57.43	68.19	31.28	12.874	9.114	0.4212	0.0245	0.054	6.288	1.413	0.2745	0.9776
81.73	88.14	43.44	13.315	8.134	0.4579	0.1140	0.040	12.037	1.425	0.244	0.9282
100.00	100.00	50.71	13.518	7.444	0.4180	0.1443	0.0301	18.411	1.425	0.244	0.9281

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8377 (POLYTROPIC)      MOMENTUM AVG. ROTOR PRESS RATIO = 1.3773  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8303 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1151

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAM NO 24

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9187

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VII3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	44.83	550.64	380.24	.475	390.49	346.20	1034.30
11.75	46.00	563.06	405.04	.486	391.13	390.48	991.45
31.00	43.44	571.49	392.95	.497	414.96	414.96	921.12
49.00	40.00	617.23	397.51	.500	472.19	471.84	855.11
67.32	34.89	668.59	419.75	.509	520.41	518.50	788.49
87.41	44.99	711.24	502.86	.627	507.06	496.30	713.61
100.00	46.17	743.29	536.25	.657	514.70	500.68	694.10

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VII4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-1.12	450.73	-8.81	.386	450.65	450.65	1026.86
11.65	-1.12	444.30	-8.66	.380	444.27	444.22	990.93
30.69	-.94	452.14	-7.44	.389	452.08	451.98	930.53
49.10	-1.12	501.95	-9.81	.435	501.85	501.33	872.75
67.74	-1.12	540.43	-10.56	.471	540.33	540.03	814.24
84.24	-1.12	524.63	-10.25	.454	524.53	522.41	749.88
100.00	-1.12	526.99	-10.30	.456	526.89	526.49	712.99

STATOR PERFORMANCE DATA

PERCENT LEADING EDGE	PERCENT SPAN FROM TIP TRAILING EDGE	MASS FLOW (PCF)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGUL SUCT (DEG)	FACTOR 0	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE EFF	STATOR POLYTROPIC EFF
0.00	0.00	0.00	45.95	8.516	4.594	.4433	.0585	.0211	21.060	1.371	1.1287
11.75	11.45	11.73	47.17	9.814	6.490	.4654	.1000	.0347	15.411	1.327	1.1287
31.00	30.67	31.04	44.39	6.799	3.517	.4360	.0676	.0222	12.197	1.333	1.1160
49.00	49.61	49.61	41.21	2.295	-.068	.3846	.0433	.0133	10.836	1.366	1.1089
67.32	67.74	69.93	40.01	-.647	-3.509	.3706	.0617	.0177	9.984	1.394	1.1060
87.41	88.24	89.42	46.11	2.707	-1.197	.4651	.1391	.0368	19.413	1.379	1.1150
100.00	100.00	100.00	47.29	1.562	-1.899	.4662	.1283	.0324	17.580	1.379	1.1169

MOMENTUM AVERAGE STAGE EFFICIENCY = .8088 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.3622  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8003 (ADIABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1151

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 OF POOR QUALITY

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 29, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 24

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9187

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	VIII (M/SEC)	M3	VM3 (M/SEC)	V7/4 (M/SEC)	U3 (M/SEC)
0.00	44.83	167.44	118.33	.675	119.02	117.71	315.27
11.75	46.00	171.42	123.46	.686	119.22	119.02	302.19
31.00	47.44	174.19	119.77	.697	126.48	126.48	240.76
49.00	48.00	168.13	121.16	.640	143.92	143.92	260.64
67.75	34.89	203.79	127.94	.584	158.62	158.62	240.33
87.81	44.99	216.80	153.27	.627	153.33	151.27	217.51
100.00	46.17	226.55	163.45	.657	156.88	152.55	203.94

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	VIII4 (M/SEC)	M4	VM4 (M/SEC)	V1/4 (M/SEC)	U4 (M/SEC)
0.00	-1.12	127.38	-2.69	.386	137.76	127.36	312.99
11.45	-1.12	135.44	-2.64	.380	135.41	135.40	302.04
30.60	-1.95	127.81	-2.74	.389	137.79	127.73	283.63
49.10	-1.12	152.99	-2.99	.435	152.96	127.41	266.02
67.74	-1.12	164.72	-3.22	.371	164.69	144.60	248.16
88.24	-1.12	159.85	-3.12	.454	159.81	159.23	228.56
100.00	-1.12	160.63	-3.14	.456	160.60	140.60	217.32

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (KGT)	DELTA (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUR (DEG)	FACTOR	MAP	OMEGA	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	45.95	0.516	4.594	.4433	.0585	.0211	21.060	21.060	1.331	1.1287	.8372
11.75	11.45	11.93	47.12	9.814	6.490	.4654	.1000	.0347	15.411	15.411	1.327	1.1287	.7512
31.00	30.60	31.04	44.39	6.799	7.517	.4360	.0676	.0222	12.197	12.197	1.333	1.1340	.6354
49.00	49.10	49.41	41.21	2.295	-0.688	.3846	.0433	.0133	10.878	10.878	1.366	1.1059	.8957
67.33	67.74	69.93	40.01	-0.647	-3.509	.3706	.0617	.0177	9.904	9.904	1.394	1.1060	.8438
87.81	88.24	89.42	46.11	2.707	-1.197	.4451	.1391	.0367	10.413	10.413	1.379	1.1150	.7333
100.00	100.00	100.00	47.29	1.542	-1.899	.4662	.1283	.0324	17.580	17.580	1.379	1.1149	.7770

MOMENTUM AVERAGE STAGE EFFICIENCY = .8088 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8003 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.3622  
 MASS AVERAGE TEMPERATURE RISE = 1.1151

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT FLOW = 2.1573 LBM/SEC  
 PERCENT DESIGN EQUIVALENT FLOW = 58.9000  
 70 PERCENT DESIGN SPEED - SCAN NO 25  
 EQUIVALENT SPEED = 53717.786 R.P.M.  
 EQUIVALENT FLOW / INLET ANN AREA = 23.8766 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = 1.0389

PERCENT SPAN FROM TIP (I. F.)	HETA*1 (DEG)	V*1 (FT/SEC)	VU*1 (FT/SEC)	M*1	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V*4 (FT/SEC)	VU*4 (FT/SEC)	V*7 (FT/SEC)	VU*7 (FT/SEC)	M2	V*7 (FT/SEC)	VU*7 (FT/SEC)	M2
0.00	74.63	1148.14	1107.10	1.037	0.00	304.38	0.00	.275	704.38	704.38	294.48	294.48	.273	1107.10	1107.10	.273
9.62	73.54	1094.55	1054.50	.993	0.00	311.49	0.00	.281	311.49	311.49	301.29	301.29	.281	1054.50	1054.50	.281
24.31	70.87	1025.29	964.69	.927	0.00	335.74	0.00	.304	335.74	335.74	320.76	320.76	.311	964.69	964.69	.311
41.04	68.73	947.16	882.66	.857	0.00	343.56	0.00	.311	343.56	343.56	362.46	362.46	.302	882.66	882.66	.302
54.72	66.84	840.91	780.68	.784	0.00	333.91	0.00	.302	333.91	333.91	333.91	333.91	.284	780.68	780.68	.284
63.92	64.12	724.81	648.13	.651	0.00	314.50	0.00	.284	314.50	314.50	316.27	316.27	.273	648.13	648.13	.273
100.00	61.60	636.82	560.16	.575	0.00	302.92	0.00	.273	302.92	302.92	292.62	292.62	.273	560.16	560.16	.273

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC HLOSSAGE = .8696

PERCENT SPAN FROM TIP (I. F.)	HETA*2 (DEG)	V*2 (FT/SEC)	VU*2 (FT/SEC)	M*2	HETA*2 (DEG)	V2 (FT/SEC)	VU*2 (FT/SEC)	M2	V*7 (FT/SEC)	VU*7 (FT/SEC)	V*7 (FT/SEC)	VU*7 (FT/SEC)	M2	V*7 (FT/SEC)	VU*7 (FT/SEC)	M2
0.00	61.79	795.71	701.17	.686	44.03	523.19	263.60	.451	376.19	376.19	364.08	364.08	.451	701.17	701.17	.451
11.43	59.24	737.25	633.87	.636	45.37	535.80	341.35	.462	376.50	376.50	358.28	358.28	.462	633.87	633.87	.462
32.00	55.25	682.88	561.08	.593	43.60	537.54	370.72	.467	390.25	390.25	384.83	384.83	.467	561.08	561.08	.467
50.47	48.82	652.26	475.60	.571	40.37	585.87	374.66	.513	446.38	446.38	444.35	444.35	.513	475.60	475.60	.513
64.43	36.21	620.50	366.51	.546	33.58	649.82	413.90	.572	500.84	500.84	499.21	499.21	.572	366.51	366.51	.572
84.19	27.12	520.07	195.85	.458	44.20	496.11	502.44	.613	481.79	481.79	473.87	473.87	.613	195.85	195.85	.613
100.00	17.72	494.61	108.89	.437	48.24	724.39	540.33	.640	482.48	482.48	466.08	466.08	.640	108.89	108.89	.640

ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	PERCENT SPAN FROM TIP	MASS FLOW (PCT)	DELTA HETA* (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	DELTA ANGLE (DEG)	DEVIATION ANGLE (DEG)	ROTOR PRFSS RATIO	ADIBATIC PRFSS RATIO	ROTOR POLYTHROPIC EFF
0.00	0.00	0.00	12.84	10.790	10.722	.476	4.795	1.373	.883	.7007
9.62	11.93	11.87	14.24	11.634	10.729	.239	4.617	1.371	.873	.6978
25.71	31.06	31.06	15.62	11.782	9.724	.451	5.634	1.375	.7749	.7858
41.04	49.61	49.61	21.92	11.795	9.030	.438	5.473	1.369	.9015	.9057
54.72	64.43	69.14	30.63	12.301	8.527	.408	6.363	1.410	.9945	.9948
83.92	88.19	89.51	41.99	12.699	7.693	.4395	12.837	1.418	.9321	.9354
100.00	100.00	100.00	48.88	12.845	6.770	.4004	19.770	1.418	.9321	.9354

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8479 (POLYTHROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8910 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRFSS RATIO = 1.3681  
 MASS AVERAGE TEMPERATURE RISE = 1.1112

## NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

## ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT WEIGHT FLOW = .9785 K0/SEC SCAM NO 75  
 PERCENT DESIGN EQUIVALENT FLOW = 58.9000 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 53717.384 R.D.4.  
 = 116.3314 K0/SEC-50 M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0389

PERCENT SPAN FROM TIP (I. F.)	RETA*1 (DEG)	V*1 (M/SEC)	W*1 (M/SEC)	VI (M/SEC)	VU1 (M/SEC)	M1	V*1 (M/SEC)	V41 (M/SEC)	V71 (M/SEC)	U1 (M/SEC)
0.00	74.63	349.97	317.44	1.037	0.00	0.00	92.77	92.77	94.79	317.44
0.62	73.54	335.14	321.41	0.933	0.00	0.00	94.94	94.94	91.83	321.41
25.31	74.87	312.51	275.26	0.927	0.00	0.00	102.39	102.39	100.52	275.26
41.04	64.73	248.62	269.03	0.857	0.00	0.00	104.72	104.72	104.72	269.03
59.72	66.84	258.75	237.89	0.748	0.00	0.00	101.78	101.78	101.78	237.89
83.02	64.12	219.58	197.55	0.651	0.00	0.00	95.86	95.86	96.57	197.55
100.00	61.60	174.10	170.74	0.575	0.00	0.00	92.33	92.33	89.19	170.74

## EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8696

PERCENT SPAN FROM TIP (T. F.)	RFTA*2 (DEG)	V*2 (M/SEC)	VU*2 (M/SEC)	BETA*2 (DEG)	M*2	U*2 (M/SEC)	V*2 (M/SEC)	V4*2 (M/SEC)	V7*2 (M/SEC)	U2 (M/SEC)
0.00	61.79	242.53	213.72	44.03	0.696	110.83	159.47	114.64	110.97	724.04
11.93	57.29	224.71	193.20	45.37	0.636	116.24	143.34	114.74	112.25	704.44
32.00	55.25	208.14	171.02	43.60	0.593	112.99	143.84	118.44	117.00	294.01
50.47	44.82	194.81	144.96	40.37	0.571	115.66	178.57	136.04	136.05	260.62
68.43	34.21	149.13	111.71	39.58	0.546	120.16	198.00	152.61	152.16	237.97
84.19	22.12	158.52	59.69	45.20	0.454	153.14	212.17	146.45	146.44	212.84
100.00	12.72	150.76	33.19	48.24	0.437	162.69	220.79	147.04	147.04	197.88

## ROTOR PERFORMANCE DATA

PERCENT LEADING EDGE	PERCENT SPAN FROM TIP	MASS FLOW (PCT)	DELTA HETA* (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT SUR (DEG)	D FACTOR	OMEGA* PAR (RPM)	LOSS PARAMETER	DEVIATION ANGLE (DEG)	ROTOR PRESS RATIO	ROTOR ADIABATIC EFF	POLYTROPIC EFF
0.00	0.00	0.00	12.84	10.740	10.322	0.276	0.2239	0.003	4.795	1.333	0.693	0.707
9.52	11.41	11.87	15.25	11.614	10.329	0.451	0.2999	0.044	4.417	1.331	0.683	0.678
25.31	32.00	32.00	14.67	11.782	9.728	0.4536	0.326	0.026	5.634	1.315	0.719	0.719
41.04	41.04	41.04	21.92	11.795	9.030	0.4318	0.425	0.171	5.433	1.340	0.815	0.815
59.72	59.72	59.72	30.63	12.301	8.527	0.4008	0.056	0.012	6.363	1.410	0.945	0.945
83.02	83.02	83.02	41.99	12.599	7.693	0.395	0.0994	0.0216	12.837	1.418	0.931	0.931
100.00	100.00	100.00	48.88	12.845	6.770	0.4004	0.1256	0.0261	19.770	1.418	0.931	0.931

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8479 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8410 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.3681  
 MASS AVERAGE TEMPERATURE RISE = 1.1112



NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 23, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAM NO 25

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9266

PERCENT SPAN FROM TIP (T. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	42.72	551.84	374.40	.77	405.47	401.02	1034.07
11.44	46.71	555.10	39.50	.480	394.52	303.87	991.43
31.24	41.38	568.02	375.47	.495	426.23	426.22	920.00
49.32	38.08	616.08	374.94	.541	444.94	444.62	853.97
67.49	37.65	671.37	410.13	.592	531.54	530.59	787.61
87.00	43.95	708.90	421.98	.625	510.40	503.54	713.14
100.00	45.13	740.08	524.51	.655	522.12	507.69	688.91

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (T. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	-1.12	462.67	-9.04	.397	462.58	442.54	1026.57
11.41	-1.12	461.06	-8.94	.396	460.97	440.91	990.77
30.55	-1.05	471.54	-7.79	.408	471.49	471.24	930.71
48.95	-1.12	520.56	-10.14	.452	520.44	519.92	872.96
67.61	-1.10	555.88	-10.64	.485	555.74	555.47	814.42
84.15	.78	577.65	7.31	.467	577.60	575.64	747.98
100.00	.83	540.17	7.05	.469	540.11	540.11	712.79

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP FROM TIP	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLE SUCT (DEG)	FACTOR	OMEGA RAR	LOSS PARAMETER	DEVIATION AIGLF (DEG)	STAGE PRESS RATIO	STAGE TRMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	43.84	6.400	2.478	.4140	.0476	.0208	21.060	1.322	1.1240	.8223
11.41	11.87	45.42	8.522	5.195	.4188	.0551	.0192	11.420	1.320	1.1240	.8366
31.24	31.06	42.32	4.725	1.450	.3884	.0365	.0120	12.212	1.328	1.1107	.8430
49.32	49.61	39.20	-1.256	-2.722	.3447	.0273	.0084	10.847	1.342	1.1039	.9150
67.49	67.61	30.75	-1.906	-4.762	.3461	.0210	.0204	10.005	1.389	1.1035	.6017
87.00	87.51	43.17	1.645	-1.252	.4141	.1439	.0381	12.311	1.371	1.1124	.7035
100.00	100.00	44.30	.499	-2.942	.4361	.1331	.0337	19.533	1.311	1.1124	.7537

MOMENTUM AVERAGE STAGE EFFICIENCY = .8239 (POLYTROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.3560  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8162 (AD/ABATIC)      MASS AVERAGE TEMPERATURE RISE = 1.1112

NASA SMALL AXIAL COMPRESSOR TEST 4 JUN 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 25

INLET VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9266

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	V113 (M/SEC)	M3	V117 (M/SEC)	V173 (M/SEC)	U3 (M/SEC)
0.00	42.72	148.22	114.12	.477	123.59	122.21	315.18
11.65	44.71	149.20	119.03	.480	120.25	120.05	302.19
31.24	41.38	173.13	114.44	.495	129.91	129.91	280.42
49.12	38.08	147.78	115.41	.541	147.82	147.71	260.29
67.49	37.65	204.63	125.01	.502	162.01	161.42	240.06
87.89	43.95	216.07	149.95	.625	155.57	153.48	217.17
100.00	45.13	225.58	159.87	.655	159.14	154.74	203.88

EXIT VELOCITY DIAGRAM DATA  
CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	V114 (M/SEC)	M4	V146 (M/SEC)	V174 (M/SEC)	U4 (M/SEC)
0.00	-1.12	141.02	-2.76	.397	140.99	140.99	312.90
11.41	-1.12	140.53	-2.74	.396	140.50	140.49	301.99
30.55	-0.95	143.73	-2.37	.408	143.71	143.65	283.58
48.95	-1.12	148.67	-3.10	.453	154.64	148.47	266.08
67.61	-1.10	149.43	-3.74	.485	149.40	149.31	248.24
86.15	.78	143.88	2.23	.467	143.86	143.26	228.60
100.00	.83	164.64	2.39	.469	164.63	164.63	217.26

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	FROM TIP TRAILING EDGE	MASS FLOW (PCT)	OFLTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGLF SUCT (DEG)	D FACTOR	OMFGA HAR	LOSS PARAMETER	DEVIATION ANGLF (DEG)	STAGE POEFFS RATIO	STAGE TFMF RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	43.84	6.800	2.478	.4140	.0574	.0208	21.060	1.322	1.1260	.8273
11.65	11.41	11.47	45.82	8.522	5.195	.4183	.0554	.0192	15.420	1.320	1.1260	.8166
31.24	30.55	31.06	42.32	4.725	1.450	.3884	.0365	.0120	12.212	1.324	1.1107	.8330
49.12	48.95	49.51	39.20	.246	-2.722	.3447	.0273	.0044	10.847	1.362	1.1039	.9150
67.49	67.61	69.15	38.75	-1.906	-4.762	.3461	.0710	.0204	10.005	1.384	1.1035	.8817
87.89	88.15	94.51	43.17	1.648	-1.252	.4141	.1439	.0381	12.311	1.371	1.1124	.7935
100.00	100.00	100.00	44.31	.699	-2.842	.4361	.1331	.0337	19.533	1.371	1.1124	.7537

MOMENTUM AVERAGE STAGE EFFICIENCY = .8239 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8162 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.3460  
 MASS AVERAGE TEMPERATURE DISF = 1.1112

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NASA SMALL AXIAL COMPRESSOR TEST 4 JUNF 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

EQUIVALENT WEIGHT FLOW = 2.2448 LBM/SEC 70 PERCENT DESIGN SPEED = SCAN NO 26  
 PERCENT DESIGN EQUIVALENT FLOW = 61.2892 EQUIVALENT FLOW / INLET ANN AREA = 53723.201 R.P.M.  
 26.7931 LBM/SEC-SQ FT

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0329

PERCENT SPAN FROM TIP (L. F.)	HETA1 (DEG)	V01 (FT/SEC)	VU01 (FT/SEC)	BETA1 (DEG)	V1 (FT/SEC)	VU1 (FT/SEC)	M1	V41 (FT/SEC)	V71 (FT/SEC)	U1 (FT/SEC)
0.00	73.99	1151.93	1107.22	0.00	317.80	0.00	.287	317.80	307.57	1107.22
9.45	72.88	1104.47	1055.54	0.00	325.11	0.00	.296	325.11	114.47	1055.54
25.20	70.11	1030.03	969.40	0.00	350.81	0.00	.314	350.81	344.37	969.40
41.02	67.08	952.96	882.83	0.00	358.82	0.00	.325	358.82	357.67	952.83
54.52	65.95	855.96	781.64	0.00	349.86	0.00	.316	349.86	348.76	781.64
83.75	63.15	727.51	649.09	0.00	329.57	0.00	.297	329.57	324.15	649.09
100.00	60.52	643.52	560.22	0.00	314.65	0.00	.286	314.65	305.89	560.22

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .8532

PERCENT SPAN FROM TIP (L. F.)	HETA2 (DEG)	V02 (FT/SEC)	VU2 (FT/SEC)	BETA2 (DEG)	V2 (FT/SEC)	VU2 (FT/SEC)	M2	V42 (FT/SEC)	V72 (FT/SEC)	U2 (FT/SEC)
0.00	60.93	826.75	722.63	40.44	527.69	767.26	.457	401.64	391.71	1064.89
11.48	58.00	774.61	657.77	41.11	545.43	758.60	.473	410.98	302.00	1016.37
31.28	53.79	724.90	585.66	39.14	553.07	349.22	.482	424.87	426.20	936.88
49.53	47.11	693.04	507.73	35.88	589.17	351.31	.514	471.75	471.70	853.04
67.73	36.81	646.32	387.22	37.44	651.74	396.21	.575	517.48	515.96	783.42
87.95	23.21	557.77	219.81	43.09	701.96	479.54	.620	512.63	504.21	694.36
100.00	14.53	530.29	133.08	45.16	724.00	516.22	.645	513.32	495.88	664.29

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	DELTA HETA (DEG)	MASS FLOW (PCT)	INCIDENCE MEAN (DEG)	ANGLE SURF SUM (DEG)	LOSS PARAMETER (DEG)	OMEGA HAP (DEG)	DEVIATION ANGLE (DEG)	MOTOR PRESS RATIO	ROTOR ANTIADIBATIC EFF	ROTOR POLYTROPIC EFF
0.00	0.00	0.00	10.148	9.480	.0399	.2158	3.944	1.304	.819	.6937
9.45	11.68	11.67	10.937	9.642	.0432	.2248	3.078	1.311	.6875	.6992
25.20	31.28	30.93	10.995	8.948	.0290	.1478	3.903	1.324	.7977	.8056
41.02	49.53	49.59	10.942	8.177	.0116	.0564	5.271	1.352	.9278	.9309
54.52	67.73	69.94	11.389	7.624	.0003	.0014	6.401	1.394	.9986	.9986
83.75	87.05	89.36	11.716	6.715	.0136	.0634	13.589	1.408	.9545	.9586
100.00	100.00	100.00	11.771	5.697	.0162	.0787	21.585	1.408	.9544	.9586

MOMENTUM AVERAGE ROTOR EFFICIENCY = .8605 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = .8546 (ADIABATIC)

MOMENTUM AVG. ROTOR PRESS RATIO = 1.3525  
 MASS AVERAGE TEMPERATURE RISE = 1.1952

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

ROTOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

EQUIVALENT HEIGHT FLOW = 1.0182 70 PERCENT DESIGN SPEED = SCAN NO 26  
 PERCENT DESIGN EQUIVALENT FLOW = 61.2492 EQUIVALENT SPEED  
 EQUIVALENT FLOW / INLET ANN AREA = 51771.201 R.P.M.  
 121.0504 KG/SEC-SQ M

INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 1.0329

PERCENT SPAN FROM TIP (L. F.)	HETA*1 (DEG)	V*1 (M/SEC)	VU*1 (M/SEC)	BETA1 (DEG)	V1 (M/SEC)	M*1	M1 (M/SEC)	V*2 (M/SEC)	VU*2 (M/SEC)	BETA2 (DEG)	V2 (M/SEC)	M*2	M2 (M/SEC)	V*3 (M/SEC)	VU*3 (M/SEC)	BETA3 (DEG)	V3 (M/SEC)	M*3	M3 (M/SEC)
0.00	73.49	351.11	337.48	1.041	96.87	0.00	0.00	0.00	0.00	0.00	96.87	0.287	0.287	96.87	96.87	93.75	93.75	0.287	0.287
0.45	72.88	336.64	324.73	0.900	92.09	0.00	0.00	0.00	0.00	0.00	92.09	0.294	0.294	92.09	92.09	95.85	95.85	0.294	0.294
25.20	70.11	314.23	295.47	0.843	106.93	0.00	0.00	0.00	0.00	0.00	106.93	0.318	0.318	106.93	106.93	106.96	106.96	0.318	0.318
41.02	67.44	290.46	269.09	0.843	106.93	0.00	0.00	0.00	0.00	0.00	106.93	0.325	0.325	106.93	106.93	109.02	109.02	0.325	0.325
59.52	65.95	270.90	238.24	0.775	106.33	0.00	0.00	0.00	0.00	0.00	106.33	0.316	0.316	106.33	106.33	106.30	106.30	0.316	0.316
73.75	63.15	221.74	197.84	0.658	100.15	0.00	0.00	0.00	0.00	0.00	100.15	0.287	0.287	100.15	100.15	98.80	98.80	0.287	0.287
100.70	60.52	196.14	170.76	0.581	96.51	0.00	0.00	0.00	0.00	0.00	96.51	0.286	0.286	96.51	96.51	93.23	93.23	0.286	0.286

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = 0.8532

PERCENT SPAN FROM TIP (L. F.)	HETA*2 (DEG)	V*2 (M/SEC)	VU*2 (M/SEC)	RETA2 (DEG)	V2 (M/SEC)	M*2	M2 (M/SEC)	V*3 (M/SEC)	VU*3 (M/SEC)	RETA3 (DEG)	V3 (M/SEC)	M*3	M3 (M/SEC)	V*4 (M/SEC)	VU*4 (M/SEC)	RETA4 (DEG)	V4 (M/SEC)	M*4	M4 (M/SEC)
0.00	60.93	251.99	220.26	715	40.44	160.84	104.32	104.32	104.32	457	122.62	118.68	118.68	122.62	122.62	118.68	118.68	118.68	118.68
11.68	59.00	236.41	200.49	672	41.11	166.25	109.30	109.30	109.30	473	125.27	122.53	122.53	125.27	125.27	122.53	122.53	122.53	122.53
31.28	57.74	221.25	178.51	633	39.16	168.58	106.44	106.44	106.44	482	130.72	129.20	129.20	130.72	130.72	129.20	129.20	129.20	129.20
49.53	67.11	211.24	154.75	609	36.68	174.27	107.08	107.08	107.08	516	137.77	142.83	142.83	137.77	137.77	142.83	142.83	142.83	142.83
67.73	36.81	197.00	114.02	570	37.44	199.65	120.76	120.76	120.76	575	157.28	157.28	157.28	157.28	157.28	157.28	157.28	157.28	157.28
87.94	27.21	170.01	67.00	493	43.09	219.66	144.16	144.16	144.16	620	194.28	189.68	189.68	194.28	194.28	189.68	189.68	189.68	189.68
100.00	14.93	161.63	49.56	470	46.14	221.40	157.39	157.39	157.39	649	196.65	196.65	196.65	196.65	196.65	196.65	196.65	196.65	196.65

ROTOR PERFORMANCE DATA

PERCENT SPAN FROM TIP (L. F.)	MASS FLOW (MCT)	DELTA HETA*0 (DEG)	INCIDENCE ANGLE (DEG)	SUCT SUH (INFG)	FACTOR	OMEGA (RAD)	PARAMETER	LOSS (INFG)	DEVIATION ANGLE (INFG)	ROTOR PRESS RATIO	ROTOR POLYTROPIC EFF
0.00	0.00	13.04	9.680	0.955	0.1955	0.2158	0.0399	3.944	1.308	0.814	0.837
9.45	11.67	14.68	9.642	0.155	0.2244	0.2244	0.0432	3.078	1.311	0.875	0.892
25.20	30.93	16.32	8.948	0.084	0.1474	0.1474	0.0290	3.903	1.324	0.797	0.806
41.02	49.53	20.70	8.177	0.384	0.0564	0.0564	0.0116	5.271	1.352	0.978	0.909
59.52	67.73	29.14	7.624	0.014	0.0014	0.0014	0.0003	6.401	1.397	0.986	0.986
73.75	87.95	39.94	6.715	0.161	0.0634	0.0634	0.0136	13.501	1.408	0.954	0.956
100.00	100.00	45.99	5.697	0.333	0.0787	0.0787	0.0162	21.585	1.408	0.954	0.956

MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8605 (POLYTROPIC)  
 MOMENTUM AVERAGE ROTOR EFFICIENCY = 0.8544 (ADIABATIC)  
 MOMENTUM AVG. ROTOR PRESS RATIO = 1.3525  
 MASS AVERAGE TEMPERATURE RISE = 1.1052

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNF 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (ENGLISH UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 26

INLET VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9134

PERCENT SPAN FROM TIP (L. F.)	BETA 3 (DEG)	V3 (FT/SEC)	VU3 (FT/SEC)	M3	VM3 (FT/SEC)	VZ3 (FT/SEC)	U3 (FT/SEC)
0.00	33.16	559.12	352.42	.684	432.78	428.03	1034.18
11.40	40.55	548.07	347.20	.490	429.24	420.53	992.56
30.55	37.22	543.06	343.06	.512	465.48	445.08	922.63
48.47	34.56	621.02	352.00	.547	511.57	511.20	857.16
64.84	35.55	675.69	392.87	.598	549.74	547.73	790.08
87.64	40.97	716.43	469.69	.634	540.98	533.72	714.03
100.00	42.16	746.47	501.00	.663	553.36	538.07	668.98

EXIT VELOCITY DIAGRAM DATA

CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (T. F.)	BETA 4 (DEG)	V4 (FT/SEC)	VU4 (FT/SEC)	M4	VM4 (FT/SEC)	VZ4 (FT/SEC)	U4 (FT/SEC)
0.00	.83	480.34	6.96	.414	480.29	480.29	1026.68
11.34	.84	486.95	7.12	.420	486.90	486.84	991.11
30.35	1.00	508.65	8.88	.442	508.57	508.75	931.84
48.60	1.00	542.60	9.47	.475	542.51	541.96	873.91
67.60	1.00	581.67	10.15	.510	581.59	581.27	814.87
84.10	1.00	573.68	10.01	.501	573.59	571.49	744.92
100.00	1.00	576.42	10.06	.503	576.33	574.33	712.86

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA HETA (DFG)	INCIDENCE ANGLE (DEG)	SUCT SUH (DEG)	DELTA HETA (DFG)	MEAN (DFG)	FACTOR	D	OMEGA HAM	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TRIP RATIO	STATION POLYTHROPIC EFF
0.00	0.00	0.00	38.33	2.838	-1.084	.7642	.0499	.0140	23.010	1.298	1.1148	1.1148	1.1148	.8252	
11.40	11.34	11.67	39.71	4.368	1.029	.3591	.0423	.0147	17.391	1.303	1.1148	1.1148	1.1148	.8703	
30.55	30.35	30.33	36.22	6.03	-2.693	.3220	.0295	.0097	14.178	1.318	1.1046	1.1046	1.1046	.8913	
48.47	48.68	49.59	33.54	-3.207	-6.149	.2919	.0323	.0099	12.945	1.343	1.0947	1.0947	1.0947	.8791	
64.84	67.43	68.34	34.55	-3.923	-6.798	.2967	.0681	.0195	12.100	1.373	1.0994	1.0994	1.0994	.7709	
87.64	98.19	89.30	39.97	-1.282	-4.194	.3613	.1350	.0357	12.537	1.363	1.1074	1.1074	1.1074	.6730	
100.00	100.00	100.00	41.14	-2.475	-5.916	.3861	.1254	.0317	19.700	1.363	1.1074	1.1074	1.1074	.6732	

MOMENTUM AVERAGE STAGE EFFICIENCY = .8379 (POLYTHROPIC)      MOMENTUM AVG. STAGE PRESS RATIO = 1.3418  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8310 (ADIABATIC)      MASS AVERAGE TEMPERATURE PISF = 1.1052

NASA SMALL AXIAL COMPRESSOR TEST 4 JUNE 28, 1974 (COMBINED TEMP.)

STATOR PERFORMANCE NASA SMALL AXIAL COMPRESSOR (METRIC UNITS)

70 PERCENT DESIGN SPEED - SCAN NO 76  
 INLET VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9134

PERCENT SPAN FROM TIP (I. F.)	BETA 3 (DEG)	V3 (M/SEC)	V1/3 (M/SEC)	M3	V4/3 (M/SEC)	V7/3 (M/SEC)	U3 (M/SEC)
0.00	39.16	170.12	107.42	.484	131.91	170.44	315.22
11.40	40.55	172.17	111.92	.490	130.83	170.42	302.53
30.55	37.22	178.32	107.46	.512	142.00	170.40	281.22
48.47	34.54	189.29	107.91	.447	155.93	154.81	261.26
66.84	35.55	205.95	114.75	.598	167.56	146.95	240.92
87.66	40.97	218.37	163.16	.634	164.89	142.48	217.58
100.00	42.16	227.52	152.71	.663	168.67	144.00	203.91

EXIT VELOCITY DIAGRAM DATA  
 CALCULATED AERODYNAMIC BLOCKAGE = .9300

PERCENT SPAN FROM TIP (I. F.)	BETA 4 (DEG)	V4 (M/SEC)	V1/4 (M/SEC)	M4	V4/4 (M/SEC)	V7/4 (M/SEC)	U4 (M/SEC)
0.00	.83	146.41	2.12	.414	146.39	146.39	312.93
11.31	.84	149.42	2.17	.420	148.41	148.39	302.09
30.35	1.00	155.04	2.71	.442	155.01	154.94	287.90
48.68	1.00	165.34	2.99	.475	165.36	165.14	266.37
67.49	1.00	177.29	3.09	.510	177.27	177.17	248.37
88.19	1.00	174.96	3.05	.501	174.83	174.19	228.58
100.00	1.00	175.69	3.07	.503	175.67	175.67	217.28

STATOR PERFORMANCE DATA

PERCENT SPAN FROM TIP LEADING EDGE	TRAILING EDGE	MASS FLOW (PCT)	DELTA BETA (DEG)	INCIDENCE MEAN (DEG)	ANGL SUR (DEG)	D FACTOR	OMEGA HAR	LOSS PARAMETER	DEVIATION ANGLE (DEG)	STAGE PRESS RATIO	STAGE TEMP RATIO	STATOR POLYTROPIC EFF
0.00	0.00	0.00	38.33	2.438	-1.084	.3642	.0499	.0180	23.010	1.298	1.1148	.8952
11.40	11.34	11.47	39.71	4.368	1.029	.3591	.0423	.0147	17.301	1.303	1.1148	.8503
30.55	30.35	30.93	36.22	.603	-2.693	.3220	.0295	.0097	14.178	1.318	1.1046	.8213
48.47	48.68	47.59	33.54	-3.207	-4.199	.2919	.0321	.0099	12.985	1.343	1.0947	.8191
66.84	67.49	68.94	34.55	-3.923	-6.798	.2967	.0481	.0195	12.100	1.373	1.0904	.7708
87.66	88.19	87.16	39.97	-1.282	-4.194	.3613	.1350	.0357	12.532	1.343	1.1074	.6730
100.00	100.00	100.00	41.16	-2.475	-5.916	.3841	.1254	.0317	19.700	1.361	1.1074	.7332

MOMENTUM AVERAGE STAGE EFFICIENCY = .8370 (POLYTROPIC)  
 MOMENTUM AVERAGE STAGE EFFICIENCY = .8310 (ADIABATIC)  
 MOMENTUM AVG. STAGE PRESS RATIO = 1.3418  
 MASS AVERAGE TEMPERATURE RISE = 1.1052