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COMPARISON OF AERODYNAMIC DATA MEASURED IN AIR AND FREON-12 WIND-TUNNEL TEST MEDIUMS

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COMPARISON OF AERODYNAMIC DATA MEASURED IN AIR AND FREON-12 WIND-TUNNEL TEST MEDIUMS

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SUMMARY

An experimental investigation has been carried out to measure two-dimensional static aerodynamic characteristics of a 65_1-213 airfoil in air and Freon-12 (dichlorodifluoromethane) test mediums at corresponding test conditions. The purpose of the tests was to compare measurements in the two test mediums and to evaluate reported methods of converting Freon-12 data to equivalent air values. The test article was a two-dimensional wing instrumented to measure chordwise surface pressure distributions. The parameters considered were Mach numbers from 0.6 to 1.0, angles of attack of 0° and 1°, and Reynolds numbers based on model chord from 2×10^6 to 21×10^6.

Test results are presented in this report. Aerodynamic data measured in air and Freon-12 are generally in good agreement. The agreement between data measured in the two test mediums is further improved by application of the transonic or area ratio similarity laws. Where flow conditions are characterized by surface shocks or stall, the effects of flow separation may not be identically reflected in the Freon-12 data, even when converted in accordance with existing similarity laws.

INTRODUCTION

A comprehensive survey of past efforts to use non-air test mediums, including Freon-12, is presented in references 1 to 4. Due to the high molecular weight of Freon-12, its speed of sound is approximately one-half that of air. For the same total pressure and stagnation temperature the Freon-12 density is roughly four times the air value, and the absolute viscosity is about 68 percent of that in air. Therefore, for equivalent stagnation temperature, Mach number and total pressure flow conditions, the Freon-12 Reynolds number is over 2.5 times as high and the power requirement one-half that of air. The lower speed of sound characteristic is beneficial from a model scaling standpoint, because all linear velocities are halved with respect to a model tested in air. Also, for correct mass ratio similitude, the use of Freon-12 provides greater flexibility in the design of aeroelastically scaled models. As shown in reference 3, Freon-12 is an acceptable wind-tunnel medium from the standpoint of compressibility effects which are accurately predicted by the perfect gas laws.

The major difficulty in substituting Freon-12 for air as a test medium stems from the inherent differences reflected by their respective ratios of specific heat. For diatomic air, the ratio of specific hear, γ, is equal to 1.4. For pure Freon-12, however, γ is approximately equal to 1.125, and an air-Freon-12 mixture has a value of γ between these two extremes. It has been demonstrated, as in references 1 and 2, that aerodynamic data measured on a model in a Freon-12 medium may differ from equivalent data as measured in air. Methods for the conversion of Freon-12 data to an equivalent air form have been reported. The most notable of these are the transonic and the area ratio similarity laws which are documented in references 1 and 2. In certain experimental programs, however, (for example, references 5 and 6), significant differences in data measured in air and Freon-12 have been observed.

This report presents results of an experimental program to collect and document a substantial amount of two-dimensional static aerodynamic data measured in air and Freon-12 for equivalent test conditions, to compare uncorrected air and Freon data, and to reexamine existing methods of conversion of Freon-12 data to equivalent air values. Reference to Freon-12 test mediums, as made in this report, includes air and Freon-12 mixtures with air comprising less than five percent by volume. A two-dimensional 65_1-213 wing was tested in air and in Freon-12 at the Langley Research Center transonic dynamics tunnel. Chordwise surface pressure distributions were measured at two spanwise stations. A complete listing of the parametric values (test medium, Mach number, Reynolds number and angle of attack) associated with data points used in comparing air and Freon-12 measured results is presented in Appendix A. The corresponding choarwise surface pressure distributions measured at the wing centerspan are tabulated in Appendix B. Representative data are presented graphically in the report for comparison of air and Freon-12 measured results.

SYMBOLS

a	airfoil mean line designation
c_m	airfoil section pitching moment coefficient about the quarter-chord
c_n	airfoil section normal force coefficient
C_p	pressure coefficient, $\frac{p-p_\infty}{q_\infty}$
M	Mach number
p	static pressure, newtons/meter^2
q	dynamic pressure, newtons/meter^2

R_N	Reynolds number based on airfoil chord
α	geometric angle of airfoil reference line, degrees
γ	ratio of specific heats

Subscripts:

A	air
CR	critical value for $M = 1.0$
F	Freon-12
∞	free-stream value

EXPERIMENTAL APPARATUS AND MEASUREMENTS

Wind Tunnel

The experimental program was conducted at the Langley transonic dynamics tunnel (TDT). The TDT is a continuous-flow tunnel capable of operation over a Mach number range from 0 to 1.20 at pressures ranging from near 1376 N/m^2 (0.2 psia) to atmospheric pressure. Either air or Freon-12 may be used as a test medium, depending upon the flow conditions to be simulated. (The test medium referred to as Freon-12 is actually composed of a mixture of air and Freon-12 with air comprising less than 5 percent by volume.) The tunnel test section is 4.9-meters (16-ft) square with cropped corners and a cross-sectional area of $23m^2$ (248 ft^2). Transonic flow in the test section is accommodated by means of three slots in both the ceiling and floor giving an open area of 2.1 percent. Model blockage effects are diminished by the two sidewall slots on each side representing an additional 2.3 percent open area.

Model

The two-dimensional model used in the experiment is shown in figure 1 mounted in the test section. The model was an NACA 65_1-213 section with a mean line, a = 0.5, and a chord length of 0.914 m (3 ft). The center span of the model is the same as that used in an earlier experiment at Langley Research Center to study shock-induced separation (ref. 7).

Extensions, shaped to match the center span, were added to each side to enable the model to be mounted in a sidewall-to-sidewall fashion as indicated in figure 1. One extension was attached to a turntable located in the sidewall which allowed angle of attack changes. The end of the other extension was free to pivot in the opposite sidewall. Both extension-sidewall interfaces were sealed to further simulate two-dimensional flow. Cable braces were added to the extensions to eliminate center span vertical vibrations brought about by flow conditions over the wing. Comparable data taken at low dynamic pressures for the wing with and without the cable braces show no discernible aerodynamic influence of the cables.

Boundary-layer transition strips were located at the 5-percent chord station on both upper and lower surfaces. The strips were 0.25-cm wide and extended across the span. The strips were composed of silicon carbide grains sparsely set in a plastic adhesive. The forward location of the strips were selected in lieu of that suggested by reference 7 to eliminate irregular and premature transition due to surface irregularities. Grit sizes in air and Freon-12 alike were No. 46 for Reynolds numbers equal or less than 3.0×10^6 and No. 120 otherwise, based on reference 8.

Data Measurements

Model upper- and lower-surface pressure measurements were made at two spanwise locations, model centerline and 59 cm (20 inches) from the centerline. At each spanwise spanwise station 28 upper- and 17 lower-surface pressure ports were used to determine aerodynamic pressure distributions. Pressure transducers recorded the differential pressure between each port and the free-stream static value. Orifice chordwise locations for both surfaces are listed in Table I and are the same for both wing spanwise stations. The pressure transducers were calibrated to be accurate within ± 5 percent.

The Freon-12 purity in the tunnel was determined by measuring the oxygen content of the test medium on a continual basis during the run. Relative amounts of air and Freon-12 were calculated by assuming air to contain 20-percent oxygen by volume. The tunnel stagnation temperature was determined by means of thermocouples located upstream of the test section. Total and static pressures were measured by means of mercury manometers. The total head tube was located immediately upstream of the test section. The static pressure tube was positioned in the plenum chamber below the test section floor. The flow Mach number, dynamic pressure and ratio of specific heats were calculated from the measured tunnel static and total pressures, stagnation temperature and purity. Calculated Mach numbers were correct with ± 0.005.

Data Corrections

The presence of the tunnel walls in the proximity of the model produces a small flow angularity at the wing mid-span area, thereby changing the actual aerodynamic angle of attack from the measured geometric angle. Based on the techniques of reference 9, the change in wing incidence, in degrees, is approximately 0.44 times the mean section lift coefficient. For the maximum lift coefficient encountered during the tests, 0.31, the associated change in angle of attack would be 0.14 degrees. In addition, the presence of the model in the flow causes a perturbation velocity in the free-stream direction and, thus, changes the incidence. Past experience at the transonic dynamics tunnel has shown this effect to be negligible due to sidewall slots. Due to the small magnitude of the flow angularity and blockage effects, the data presented in this report are not corrected for wall effects.

Intermittently during the tests, some of the wing surface ports developed leaks in the pressure lines. Since only an insignificant amount of data were thus compromised (i.e., typically 1 port per case), the data were faired by hand. When fairing was required to data measured at a port, the measurement at the corresponding station on the off-centerline-orifice row was used.

Data Parametric Ranges

The test program was conducted over a Mach number range from about 0.6 to 1.0. The values of Reynolds number, based on the model chord, ranged from 2×10^6 to 21×10^6. The upper range of Reynolds number is representative of full-scale or flight values for a small aircraft. However, due to tunnel power limitations, the range of Reynolds numbers in the air tests was limited to 3×10^6. The model was tested at angles of attack of 0° to 1° in both air and Freon-12. Only one transition strip location was used. All other tunnel flow characteristics were dependent upon the selected Mach and Reynolds numbers, the tunnel stagnation temperature and, when applicable, Freon-12 purity. A complete listing of the parametric values associated with the data points is presented in Appendix A. The corresponding measured pressure distributions are tabulated in Appendix B.

RESULTS AND DISCUSSION

Comparisons of Data Measured in Air and Freon-12 Test Mediums

The selection of the test Mach number range was based on the desirability of making measurements in air and Freon-12 in both subcritical and supercritical flows. Some of the phenomena occurring in this Mach number range and observed during the tests in air are depicted in figure 2. For clarity, only the wing upper-surface pressure distributions have been shown. The pressure coefficients on the wing upper surface become increasingly negative with free-stream Mach number until a sonic value is reached at the point of minimum pressure on the upper surface. Figure 2(a) shows the pressure distribution for a flow with subcritical free-stream Mach number, and figure 2(b) illustrates a distribution for a slightly supercritical Mach number. As the free-stream Mach number is further increased, a shock is formed (fig. 2(c)). The shock severely alters the shape of the pressure distribution, acting analogous to a normal shock in reducing local velocities from supersonic to subsonic levels. As illustrated in figure 2(d), the shock strength will increase until separation occurs downstream of the intersection of the shock and boundary layer. Figure 3 illustrates aerodynamic characteristics observed during tests conducted in Freon-12 within the same free-stream Mach number range as that of the preceding discussion. By comparing figures 2 and 3, it is readily seen that, qualitatively, results (i.e., pressure distribution shape, shock location, and trends with Mach number) in air are reproduced in Freon-12.

A closer comparison of pressure distributions measured in air and Freon-12 is offered in figure 4 for a subcritical case and in figure 5 for a supercritical free-stream Mach number. The air and Freon-12 Mach number and Reynolds number were both the same within experimental accuracy. Of significance is the fact that the air and Freon-12 data presented in these figures are both qualitatively and quantitatively very similar. However, as shown in figure 5, some differences in the magnitudes of the distributions and shock locations are perceptible at the supercritical conditions. These figures suggest the need for converting the Freon-12 data to equivalent air values as pointed out in reference (1). It is noteworthy, however, that these air and Freon-12 data are in substantial agreement prior to any conversion process.

The foregoing discussion has been concerned with comparing wind-tunnel data as measured in air and Freon-12. Due to power limitations for the air tests, the data previously shown were for Reynolds numbers of 3×10^6 or less. Qualitative comparisons of data measured in air and Freon-12 for Reynolds numbers on the order of full scale values are now shown. The Freon-12 data were generated during this test program. The air data were obtained from flight tests of a T-33 airplane (ref. 10). The wing of the test aircraft had a constant airfoil section, which was nominally the same as the wind-tunnel model with the 52-percent chord point of all sections lying in a plane perpendicular to the fuselage center line. The flight test data selected were measured at the 45-percent semi-span station for the condition of unaccelerated level flight. Figures 6 and 7 present the Freon-12 wind-tunnel data for full-scale Reynolds numbers and the air flight test data for both sub- and supercritical Mach numbers. Since knowledge of exact angles of attack for the flight tests is not available, normal force and pitching moment coefficients are given instead in the figures for both Freon and air data. The scatter associated with the data and a lack of knowledge of angle of attack for the flight tests prohibit detailed quantitative comparisons, so only the qualitative characteristics, such as the overall shape of the pressure distributions, can be considered. Within these constraints, the air and Freon test data can be considered to be in good agreement.

Similarity Laws for Converting Data Measured in Freon-12

Although data measured in air and Freon-12 exhibit similar characteristics, quantitative differences between such data were shown to exist. Figure 8 presents a further comparison of pressure distributions measured in air and Freon-12 for equal free-stream Mach numbers. The data of figure 8 were used to determine local Mach numbers based on the isentropic relationship

$$M = \left\{\frac{2}{\gamma-1}\left[\left(\frac{C_p\gamma M_\infty^2}{2} + 1\right)^{\frac{1-\gamma}{\gamma}}\left(1 + \frac{\gamma-1}{2} M_\infty^2\right) - 1\right]\right\}^{1/2}$$

For corresponding orifices the differences in air and Freon-12 local Mach numbers are compared in figure 9. These data point out the low magnitudes of the differences in local Mach number and show that there is a discernible trend between local Mach numbers occurring in air and Freon-12 for equal free-stream Mach numbers. The data of figure 9 suggest that a generalized correspondence between field point Mach numbers in air and Freon-12 flows which is based on Mach number might be found. Such a correspondence could then be used to convert data measured in Freon-12 to equivalent air values.

Two notable theories for converting Freon-12 data are the transonic and area ratio similarity laws. Both of these laws are based on flow similarity parameters which must be matched between flows for correspondence and which are functions of free-stream Mach number and ratio of specific heats. Thus, for two flows with different ratios of specific heats to be similar, the free-stream Mach numbers must differ in accordance with the particular similarity parameter. Details of how the transonic and area ratio similarity laws are applied to convert data measured in Freon-12 to an equivalent air basis are reported in references 1 and 2. The predicted correspondence between Mach numbers for both similarity laws is illustrated in figure 10. The trends and magnitudes of the data of figure 10 roughly resemble the experimentally derived data of figure 9.

These two conversion techniques have been applied to the experimental data collected during the test program. Local Mach numbers were calculated from the measured Freon-12 pressure distributions and converted, along with the free-stream Mach number, in accordance with each similarity law. Figures 11 and 12 illustrate Freon-12 data which have been converted by the area ratio similarity law. Application of the transonic similarity law is demonstrated in figures 13 and 14. The original Freon-12 free-stream Mach number associated with the converted data is shown in parentheses in figures 11 to 14. These four figures also present measured Freon-12 data which are unconverted. Figures 11 and 12 indicate that the area ratio conversion process does improve the agreement with the measured air results. Although the correlation with air data is improved by use of the area ratio similarity law, the formula is based on isentropic relationships and is thus limited by inviscid flow assumptions. Application of this law to cases where the flow characteristics are dominated by strong surface shocks and trailing surface separation may still result in a lack of correlation with equivalent air data. As with the area ratio law, the transonic similarity law provides improved correlation with the air data (figures 13 and 14). As depicted in figures 11 to 14, the degree of correlation between pressure distributions obtained by using the transonic and area ratio similarity laws is about the same within experimental accuracy. The transonic similarity law does provide a larger degree of change than the area ratio law as illustrated by figure 10. The transonic similarity law is based on potential flow theory and, like the area ratio similarity law, may fail to correct Freon-12 data to equivalent air values for flows characterized by surface shocks and separation. However, both theories should improve the correlation between air and Freon-12 data.

The measured surface pressure distributions were integrated by a special purpose digital computer program using a trapezoidal approximation to yield the normal force and pitching moment (about the quarter-chord) coefficients. Data obtained from measurements in air and Freon-12 are presented in figures 15 and 16. Figure 15 shows the comparison between normal force coefficients obtained from air and Freon-12 measured results and data obtained from the transonic similarity law conversion process. The primary difference between raw air and raw Freon-12 data is in the force-break Mach number which is higher for the Freon-12 data. By using the transonic similarity law the correlation is greatly improved. Figure 16 illustrates the Mach number trends for air and Freon-12 pitching moment coefficients, which are similar to the trends for normal force coefficients.

The use of area ratio and transonic similarity laws has been shown to improve the correlation between aerodynamic characteristics measured in air and Freon-12. However, these conversion processes may not fully account for differences in measured results when shock-induced separation is present. These observations were illustrated by presenting trends of aerodynamic coefficients with free-stream Mach number. As shown in reference 6, separation due to stall (high angle of attack) may also be a condition where the area ratio and transonic similarity laws fail to achieve correlation between measurements in air and Freon-12. The data of figure 17 were excerpted from reference 6 with the Freon-12 data being transformed using the transonic similarity law. At the lower angles of attack, the correlation between air and and converted Freon-12 data is very good. However, as the angle of attack is increased in excess of about 2 degrees, the correlation breaks down as stalled conditions are encountered. Thus, the correlation between air and Freon-12 measurements worsens with flow separation, whether shock or stall induced.

CONCLUDING REMARKS

Experiments have been conducted to measure a substantial amount of static aerodynamic data on a 65_1-213 airfoil for the purpose of making comparisons of corresponding aerodynamic data measured in air and Freon-12. Chordwise surface pressure distributions were measured on a two-dimensional airfoil model using pressure scanning valves. These data were collected at angles of attack of 0^o and 1^o, Mach numbers from 0.6 to 1.0 and Reynolds numbers (based on model chord) from 2×10^6 to 21×10^6. The resulting pressure distributions are tabulated in the appendix of this report.

As shown in this report two-dimensional static aerodynamic data measured in air and Freon-12 for corresponding test conditions are in substantial agreement. Detailed differences in the data obtained in air and

Freon-12 test mediums were observed. These differences could generally be reduced by application of the area ratio or transonic similarity laws. The area ratio and transonic similarity laws are limited, however, to conditions where the effects of strong surface shocks or stall are not dominant.

APPENDIX A

PARAMETRIC VALUES FOR DATA POINTS USED IN COMPARING AIR AND FREON-12 MEASURED RESULTS

CASE NUMBER	TEST MEDIUM	MACH NUMBER	REYNOLDS NUMBER (MILLIONS)	ANGLE OF ATTACK (DEGREES)
1	AIR	.599	2.0	0.0
2	AIR	.624	2.0	0.0
3	AIR	.648	2.0	0.0
4	AIR	.673	2.0	0.0
5	AIR	.697	2.0	0.0
6	AIR	.723	2.0	0.0
7	AIR	.749	2.0	0.0
8	AIR	.774	2.0	0.0
9	AIR	.799	2.0	0.0
10	AIR	.824	2.0	0.0
11	AIR	.849	2.0	0.0
12	AIR	.874	2.0	0.0
13	AIR	.899	2.0	0.0
14	AIR	.598	3.0	0.0
15	AIR	.622	3.0	0.0
16	AIR	.649	3.0	0.0
17	AIR	.673	3.0	0.0
18	AIR	.699	3.0	0.0
19	AIR	.724	3.0	0.0
20	AIR	.750	3.0	0.0
21	AIR	.773	3.0	0.0
22	AIR	.798	3.0	0.0
23	AIR	.824	3.0	0.0
24	AIR	.599	2.0	1.0
25	AIR	.625	2.0	1.0
26	AIR	.651	2.0	1.0
27	AIR	.674	2.0	1.0
28	AIR	.701	2.0	1.0
29	AIR	.726	2.0	1.0
30	AIR	.750	2.0	1.0

APPENDIX A - CONTINUED

PARAMETRIC VALUES FOR DATA POINTS

USED IN COMPARING AIR AND FREON-12 MEASURED RESULTS

CASE NUMBER	TEST MEDIUM	MACH NUMBER	REYNOLDS NUMBER (MILLIONS)	ANGLE OF ATTACK (DEGREES)
31	AIR	.775	2.0	1.0
32	AIR	.802	2.0	1.0
33	AIR	.826	2.0	1.0
34	AIR	.852	2.0	1.0
35	AIR	.877	2.0	1.0
36	AIR	.892	2.0	1.0
37	AIR	.598	3.0	1.0
38	AIR	.625	3.0	1.0
39	AIR	.648	3.0	1.0
40	AIR	.674	3.0	1.0
41	AIR	.697	3.0	1.0
42	AIR	.723	3.0	1.0
43	AIR	.748	3.0	1.0
44	AIR	.766	3.0	1.0
45	FREON-12	.593	2.0	0.0
46	FREON-12	.619	2.0	0.0
47	FREON-12	.646	2.0	0.0
48	FREON-12	.665	2.0	0.0
49	FREON-12	.697	2.0	0.0
50	FREON-12	.712	2.0	0.0
51	FREON-12	.746	2.0	0.0
52	FREON-12	.758	2.0	0.0
53	FREON-12	.793	2.0	0.0
54	FREON-12	.807	2.0	0.0
55	FREON-12	.845	2.0	0.0
56	FREON-12	.868	2.0	0.0
57	FREON-12	.897	2.0	0.0
58	FREON-12	.918	2.0	0.0
59	FREON-12	.946	2.0	0.0
60	FREON-12	.968	2.0	0.0

APPENDIX A - CONTINUED

PARAMETRIC VALUES FOR DATA POINTS

USED IN COMPARING AIR AND FREON-12 MEASURED RESULTS

CASE NUMBER	TEST MEDIUM	MACH NUMBER	REYNOLDS NUMBER (MILLIONS)	ANGLE OF ATTACK (DEGREES)
61	FREON-12	.995	2.0	0.0
62	FREON-12	.595	3.0	0.0
63	FREON-12	.601	3.0	0.0
64	FREON-12	.617	3.0	0.0
65	FREON-12	.653	3.0	0.0
66	FREON-12	.664	3.0	0.0
67	FREON-12	.696	3.0	0.0
68	FREON-12	.703	3.0	0.0
69	FREON-12	.719	3.0	0.0
70	FREON-12	.752	3.0	0.0
71	FREON-12	.767	3.0	0.0
72	FREON-12	.796	3.0	0.0
73	FREON-12	.802	3.0	0.0
74	FREON-12	.813	3.0	0.0
75	FREON-12	.850	3.0	0.0
76	FREON-12	.876	3.0	0.0
77	FREON-12	.902	3.0	0.0
78	FREON-12	.902	3.0	0.0
79	FREON-12	.926	3.0	0.0
80	FREON-12	.952	3.0	0.0
81	FREON-12	.977	3.0	0.0
82	FREON-12	1.001	3.0	0.0
83	FREON-12	.596	2.0	1.0
84	FREON-12	.618	2.0	1.0
85	FREON-12	.647	2.0	1.0
86	FREON-12	.667	2.0	1.0
87	FREON-12	.698	2.0	1.0
88	FREON-12	.714	2.0	1.0
89	FREON-12	.743	2.0	1.0
90	FREON-12	.757	2.0	1.0

APPENDIX A - CONTINUED

PARAMETRIC VALUES FOR DATA POINTS

USED IN COMPARING AIR AND FREON-12 MEASURED RESULTS

CASE NUMBER	TEST MEDIUM	MACH NUMBER	REYNOLDS NUMBER (MILLIONS)	ANGLE OF ATTACK (DEGREES)
91	FREON-12	.796	2.0	1.0
92	FREON-12	.805	2.0	1.0
93	FREON-12	.848	2.0	1.0
94	FREON-12	.870	2.0	1.0
95	FREON-12	.898	2.0	1.0
96	FREON-12	.920	2.0	1.0
97	FREON-12	.946	2.0	1.0
98	FREON-12	1.004	2.0	1.0
99	FREON-12	.601	3.0	1.0
100	FREON-12	.624	3.0	1.0
101	FREON-12	.652	3.0	1.0
102	FREON-12	.671	3.0	1.0
103	FREON-12	.702	3.0	1.0
104	FREON-12	.717	3.0	1.0
105	FREON-12	.751	3.0	1.0
106	FREON-12	.765	3.0	1.0
107	FREON-12	.799	3.0	1.0
108	FREON-12	.812	3.0	1.0
109	FREON-12	.851	3.0	1.0
110	FREON-12	.874	3.0	1.0
111	FREON-12	.902	3.0	1.0
112	FREON-12	.925	3.0	1.0
113	FREON-12	.950	3.0	1.0
114	FREON-12	1.009	3.0	1.0
115	FREON-12	.600	12.0	0.0
116	FREON-12	.624	12.0	0.0
117	FREON-12	.651	12.0	0.0
118	FREON-12	.670	12.0	0.0
119	FREON-12	.700	12.0	0.0
120	FREON-12	.718	12.0	0.0

APPENDIX A - CONCLUDED

PARAMETRIC VALUES FOR DATA POINTS

USED IN COMPARING AIR AND FREON-12 MEASURED RESULTS

CASE NUMBER	TEST MEDIUM	MACH NUMBER	REYNOLDS NUMBER (MILLIONS)	ANGLE OF ATTACK (DEGREES)
121	FREON-12	.750	12.0	0.0
122	FREON-12	.764	12.0	0.0
123	FREON-12	.800	12.0	0.0
124	FREON-12	.814	12.0	0.0
125	FREON-12	.852	12.0	0.0
126	FREON-12	.875	12.0	0.0
127	FREON-12	.901	12.0	0.0
128	FREON-12	.926	12.0	0.0
129	FREON-12	.600	16.8	0.0
130	FREON-12	.622	16.8	0.0
131	FREON-12	.650	16.8	0.0
132	FREON-12	.670	16.8	0.0
133	FREON-12	.700	16.8	0.0
134	FREON-12	.716	16.8	0.0
135	FREON-12	.746	16.8	0.0
136	FREON-12	.765	16.8	0.0
137	FREON-12	.798	16.8	0.0
138	FREON-12	.815	16.8	0.0
139	FREON-12	.851	16.8	0.0
140	FREON-12	.875	16.8	0.0
141	FREON-12	.902	16.8	0.0
142	FREON-12	.595	21.0	0.0
143	FREON-12	.651	21.0	0.0
144	FREON-12	.699	21.0	0.0
145	FREON-12	.751	21.0	0.0
146	FREON-12	.803	21.0	0.0
147	FREON-12	.810	21.0	0.0

APPENDIX B

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	1	2	3	4	5	6	7
.000	.992	1.010	1.014	1.018	1.029	1.032	1.026
.010	.391	.404	.415	.438	.457	.477	.507
.020	.130	.164	.171	.178	.206	.211	.270
.050	-.039	-.025	-.024	-.012	0.000	.022	.043
.100	-.261	-.265	-.257	-.261	-.252	-.233	-.205
.150	-.391	-.391	-.379	-.379	-.377	-.422	-.335
.200	-.457	-.467	-.452	-.486	-.492	-.499	-.453
.250	-.509	-.530	-.525	-.545	-.572	-.588	-.561
.300	-.561	-.581	-.611	-.640	-.663	-.677	-.626
.350	-.626	-.656	-.672	-.722	-.777	-.799	-.745
.375	-.652	-.669	-.684	-.746	-.812	-.888	-.831
.400	-.652	-.681	-.684	-.746	-.812	-.943	-.918
.425	-.652	-.681	-.696	-.770	-.812	-.954	-.928
.450	-.652	-.681	-.708	-.758	-.823	-.977	-.972
.475	-.652	-.694	-.721	-.770	-.834	-1.021	-1.047
.500	-.652	-.669	-.696	-.746	-.812	-.977	-1.101
.525	-.600	-.631	-.635	-.687	-.720	-.744	-1.198
.550	-.548	-.568	-.586	-.616	-.629	-.622	-.972
.575	-.496	-.543	-.562	-.545	-.606	-.577	-.669
.600	-.444	-.517	-.476	-.545	-.572	-.488	-.497
.625	-.391	-.404	-.391	-.415	-.423	-.400	-.410
.650	-.339	-.341	-.342	-.355	-.354	-.344	-.335
.700	-.222	-.227	-.232	-.237	-.240	-.233	-.227
.750	-.130	-.139	-.134	-.130	-.126	-.122	-.140
.800	-.039	-.038	-.024	-.036	-.034	-.033	-.043
.850	.039	.038	.049	.036	.046	.044	.032
.900	.065	.114	.122	.107	.114	.111	.097
.950	.170	.177	.171	.166	.171	.167	.151
.010	-.183	-.177	-.195	-.166	-.171	-.178	-.205
.020	-.196	-.189	-.195	-.189	-.194	-.200	-.227
.050	-.196	-.189	-.195	-.201	-.206	-.211	-.227
.100	-.209	-.227	-.232	-.249	-.252	-.277	-.302
.200	-.261	-.278	-.281	-.308	-.320	-.333	-.367
.300	-.300	-.328	-.318	-.343	-.354	-.377	-.410
.350	-.326	-.328	-.342	-.367	-.377	-.400	-.443
.400	-.326	-.328	-.342	-.367	-.377	-.400	-.453
.450	-.326	-.328	-.342	-.367	-.377	-.400	-.443
.500	-.313	-.316	-.330	-.355	-.366	-.389	-.421
.550	-.274	-.278	-.293	-.308	-.309	-.333	-.345
.600	-.209	-.215	-.232	-.249	-.240	-.255	-.270
.650	-.157	-.164	-.171	-.178	-.183	-.178	-.194
.700	-.091	-.101	-.098	-.118	-.114	-.111	-.119
.800	.026	.025	.024	.012	0.000	.022	0.000
.900	.078	.126	.134	.142	.137	.144	.140
.950	.170	.189	.183	.189	.194	.200	.194

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	8	9	10	11	12	13	14
.000	1.019	1.008	1.022	1.029	1.053	1.061	1.006
.010	.567	.617	.661	.686	.708	.717	.372
.020	.336	.401	.441	.461	.479	.503	.118
.050	.095	.144	.200	.245	.287	.307	-.034
.100	-.158	-.103	-.050	-.020	.010	.047	-.271
.150	-.294	-.237	-.200	-.167	-.115	-.093	-.381
.200	-.410	-.350	-.301	-.274	-.220	-.186	-.448
.250	-.525	-.443	-.411	-.382	-.316	-.289	-.516
.300	-.599	-.545	-.501	-.480	-.402	-.382	-.558
.350	-.694	-.638	-.591	-.568	-.498	-.466	-.617
.375	-.767	-.720	-.661	-.608	-.574	-.531	-.643
.400	-.862	-.782	-.721	-.676	-.622	-.568	-.634
.425	-.872	-.823	-.792	-.745	-.660	-.614	-.643
.450	-.914	-.885	-.802	-.765	-.699	-.652	-.643
.475	-.998	-.957	-.872	-.833	-.766	-.708	-.643
.500	-1.051	-.977	-.912	-.863	-.842	-.791	-.634
.525	-1.051	-.823	-.601	-.715	-.871	-.838	-.592
.550	-.694	-.535	-.391	-.412	-.766	-.894	-.541
.575	-.546	-.473	-.351	-.392	-.479	-.903	-.507
.600	-.504	-.391	-.361	-.363	-.354	-.791	-.491
.625	-.368	-.340	-.331	-.343	-.335	-.466	-.381
.650	-.326	-.309	-.301	-.294	-.325	-.391	-.338
.700	-.263	-.278	-.251	-.274	-.316	-.372	-.220
.750	-.200	-.237	-.231	-.265	-.325	-.363	-.127
.800	-.137	-.196	-.210	-.255	-.325	-.354	-.034
.850	-.074	-.154	-.180	-.245	-.325	-.345	.042
.900	-.011	-.113	-.150	-.225	-.325	-.335	.118
.950	.052	-.062	-.110	-.196	-.316	-.335	.178
.010	-.273	-.288	-.301	-.245	-.172	-.140	-.186
.020	-.273	-.309	-.301	-.255	-.201	-.140	-.194
.050	-.263	-.288	-.271	-.235	-.182	-.130	-.194
.100	-.315	-.381	-.381	-.323	-.297	-.233	-.220
.200	-.410	-.473	-.461	-.441	-.393	-.345	-.271
.300	-.462	-.515	-.521	-.500	-.460	-.400	-.296
.350	-.525	-.587	-.601	-.568	-.526	-.466	-.321
.400	-.525	-.669	-.651	-.627	-.584	-.512	-.321
.450	-.525	-.720	-.721	-.686	-.641	-.568	-.321
.500	-.483	-.792	-.782	-.745	-.718	-.633	-.304
.550	-.389	-.638	-.862	-.814	-.766	-.698	-.262
.600	-.315	-.340	-.892	-.872	-.823	-.810	-.211
.650	-.231	-.247	-.802	-.892	-.842	-.819	-.152
.700	-.147	-.165	-.381	-.882	-.871	-.810	-.093
.800	-.011	-.041	-.200	-.363	-.814	-.819	.034
.900	.105	.051	-.060	-.265	-.354	-.791	.152
.950	.158	.093	-.010	-.206	-.297	-.568	.203

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	15	16	17	18	19	20	21
.000	1.012	1.017	1.028	1.031	1.035	1.036	1.026
.010	.384	.391	.414	.434	.463	.493	.547
.020	.147	.156	.192	.206	.232	.275	.328
.050	-.033	-.016	-.015	.007	.015	.063	.103
.100	-.269	-.274	-.276	-.294	-.239	-.211	-.164
.150	-.392	-.399	-.384	-.383	-.405	-.352	-.294
.200	-.457	-.469	-.476	-.479	-.492	-.458	-.410
.250	-.522	-.532	-.552	-.567	-.579	-.543	-.499
.300	-.579	-.610	-.637	-.663	-.666	-.634	-.609
.350	-.653	-.680	-.713	-.751	-.797	-.754	-.698
.375	-.661	-.704	-.744	-.810	-.869	-.839	-.780
.400	-.686	-.704	-.737	-.810	-.912	-.909	-.841
.425	-.661	-.704	-.737	-.810	-.956	-.930	-.896
.450	-.669	-.704	-.744	-.810	-.999	-.965	-.937
.475	-.677	-.712	-.752	-.825	-1.021	-1.036	-.991
.500	-.661	-.688	-.729	-.795	-.978	-1.106	-1.060
.525	-.620	-.641	-.675	-.707	-.731	-1.170	-1.115
.550	-.563	-.587	-.598	-.626	-.616	-1.050	-.718
.575	-.555	-.532	-.545	-.596	-.565	-.669	-.568
.600	-.498	-.508	-.483	-.523	-.514	-.515	-.417
.625	-.392	-.391	-.399	-.405	-.398	-.423	-.403
.650	-.335	-.344	-.353	-.346	-.355	-.352	-.362
.700	-.229	-.227	-.230	-.228	-.217	-.240	-.301
.750	-.131	-.125	-.123	-.118	-.116	-.141	-.232
.800	-.033	-.031	-.031	-.022	-.022	-.042	-.157
.850	.041	.047	.046	.052	.051	.035	-.089
.900	.114	.117	.115	.125	.123	.113	-.014
.950	.171	.180	.169	.177	.181	.176	.062
.010	-.180	-.180	-.184	-.199	-.217	-.233	-.260
.020	-.196	-.196	-.207	-.206	-.217	-.233	-.274
.050	-.204	-.196	-.207	-.213	-.224	-.233	-.274
.100	-.237	-.235	-.253	-.265	-.326	-.310	-.328
.200	-.286	-.297	-.315	-.346	-.362	-.395	-.444
.300	-.310	-.321	-.361	-.368	-.377	-.437	-.492
.350	-.335	-.352	-.368	-.405	-.434	-.458	-.581
.400	-.335	-.344	-.368	-.383	-.413	-.458	-.554
.450	-.335	-.344	-.361	-.383	-.405	-.444	-.533
.500	-.326	-.329	-.345	-.368	-.377	-.409	-.486
.550	-.269	-.282	-.292	-.302	-.319	-.338	-.383
.600	-.212	-.219	-.230	-.236	-.254	-.261	-.308
.650	-.163	-.164	-.169	-.177	-.181	-.190	-.226
.700	-.090	-.094	-.100	-.096	-.109	-.106	-.144
.800	.033	.031	.015	.029	.036	.028	0.000
.900	.147	.149	.146	.155	.159	.155	.116
.950	.196	.203	.199	.206	.210	.204	.157

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	22	23	24	25	26	27	28
.000	1.013	1.025	1.080	1.089	1.088	1.100	1.101
.010	.604	.644	.119	.139	.171	.189	.218
.020	.382	.420	-.092	-.076	-.061	-.036	0.000
.050	.161	.217	-.211	-.177	-.183	-.166	-.126
.100	-.107	-.066	-.422	-.431	-.428	-.426	-.413
.150	-.255	-.197	-.501	-.519	-.526	-.532	-.527
.200	-.355	-.302	-.553	-.582	-.575	-.603	-.608
.250	-.456	-.407	-.606	-.620	-.648	-.674	-.688
.300	-.543	-.486	-.659	-.709	-.697	-.733	-.768
.350	-.651	-.611	-.712	-.734	-.770	-.816	-.871
.375	-.731	-.670	-.738	-.760	-.807	-.852	-.940
.400	-.792	-.729	-.712	-.734	-.782	-.840	-.963
.425	-.825	-.768	-.698	-.734	-.856	-.828	-.906
.450	-.879	-.808	-.712	-.734	-.868	-.828	-.883
.475	-.933	-.874	-.712	-.747	-.880	-.840	-.894
.500	-1.000	-.920	-.685	-.722	-.819	-.792	-.837
.525	-.818	-.591	-.712	-.671	-.758	-.721	-.734
.550	-.490	-.374	-.659	-.620	-.685	-.639	-.642
.575	-.416	-.348	-.567	-.582	-.611	-.568	-.596
.600	-.376	-.342	-.474	-.544	-.526	-.497	-.539
.625	-.342	-.302	-.448	-.443	-.452	-.426	-.413
.650	-.322	-.282	-.356	-.354	-.391	-.355	-.321
.700	-.289	-.263	-.250	-.279	-.281	-.260	-.229
.750	-.242	-.237	-.145	-.152	-.196	-.154	-.138
.800	-.201	-.210	-.053	-.051	-.049	-.036	-.034
.850	-.161	-.184	.040	.038	.037	.036	.034
.900	-.107	-.151	.105	.101	.098	.106	.103
.950	-.054	-.112	.145	.152	.159	.142	.160
.010	-.309	-.302	.092	.089	.086	.083	.080
.020	-.309	-.296	.026	.013	.012	0.000	.023
.050	-.282	-.263	.026	.013	.012	.024	.023
.100	-.362	-.355	-.145	-.152	-.147	-.154	-.160
.200	-.483	-.466	-.224	-.228	-.245	-.248	-.264
.300	-.517	-.539	-.277	-.279	-.293	-.307	-.298
.350	-.617	-.624	-.290	-.304	-.318	-.331	-.321
.400	-.684	-.677	-.290	-.304	-.318	-.319	-.321
.450	-.745	-.736	-.303	-.304	-.318	-.331	-.332
.500	-.805	-.821	-.290	-.291	-.318	-.307	-.321
.550	-.711	-.874	-.250	-.253	-.269	-.272	-.275
.600	-.342	-.900	-.198	-.203	-.208	-.213	-.218
.650	-.242	-.900	-.145	-.152	-.147	-.154	-.160
.700	-.168	-.414	-.079	-.089	-.086	-.095	-.092
.800	-.040	-.250	.040	.038	.037	.036	.034
.900	.067	-.099	.132	.101	.122	.142	.149
.950	.101	-.020	.132	.177	.196	.177	.195

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	29	30	31	32	33	34	35
.000	1.101	1.096	1.088	1.082	1.066	1.103	1.093
.010	.256	.336	.412	.484	.543	.571	.604
.020	.033	.098	.180	.247	.292	.345	.374
.050	-.089	-.054	.021	.082	.131	.167	.201
.100	-.389	-.347	-.275	-.216	-.161	-.099	-.067
.150	-.512	-.466	-.401	-.340	-.292	-.236	-.211
.200	-.601	-.564	-.496	-.433	-.402	-.335	-.307
.250	-.678	-.651	-.602	-.546	-.503	-.433	-.412
.300	-.745	-.716	-.676	-.628	-.583	-.512	-.480
.350	-.868	-.825	-.856	-.721	-.664	-.601	-.576
.375	-.956	-.900	-.856	-.783	-.744	-.670	-.623
.400	-1.001	-.944	-.908	-.845	-.795	-.719	-.672
.425	-1.034	-.998	-.930	-.865	-.845	-.758	-.719
.450	-1.068	-1.041	-.972	-.917	-.905	-.798	-.758
.475	-1.135	-1.107	-1.035	-.968	-.956	-.837	-.815
.500	-1.301	-1.193	-1.035	-.886	-.754	-.571	-.815
.525	-.990	-1.128	-.655	-.494	-.443	-.473	-.451
.550	-.656	-.683	-.465	-.422	-.372	-.364	-.336
.575	-.556	-.542	-.433	-.422	-.362	-.325	-.326
.600	-.478	-.466	-.391	-.371	-.382	-.296	-.317
.625	-.400	-.401	-.349	-.330	-.372	-.266	-.307
.650	-.311	-.347	-.328	-.309	-.362	-.236	-.297
.700	-.222	-.282	-.275	-.278	-.352	-.217	-.288
.750	-.133	-.184	-.232	-.258	-.342	-.217	-.288
.800	-.033	-.119	-.201	-.227	-.292	-.207	-.278
.850	.033	-.032	-.158	-.216	-.261	-.197	-.278
.900	.100	.032	-.116	-.175	-.241	-.177	-.297
.950	.156	.087	-.063	-.144	-.211	-.158	-.249
.010	.067	.032	-.042	-.072	-.101	-.049	-.029
.020	.011	-.022	-.084	-.124	-.141	-.069	-.048
.050	.011	0.000	-.053	-.072	-.091	-.020	-.010
.100	-.167	-.195	-.254	-.278	-.292	-.226	-.192
.200	-.256	-.293	-.359	-.402	-.432	-.355	-.336
.300	-.311	-.347	-.433	-.474	-.473	-.404	-.393
.350	-.345	-.391	-.486	-.577	-.563	-.473	-.470
.400	-.356	-.391	-.496	-.628	-.644	-.552	-.528
.450	-.356	-.391	-.507	-.680	-.714	-.620	-.604
.500	-.345	-.391	-.486	-.752	-.795	-.680	-.652
.550	-.289	-.315	-.401	-.680	-.855	-.749	-.719
.600	-.234	-.250	-.328	-.391	-.895	-.808	-.758
.650	-.167	-.195	-.264	-.288	-.915	-.857	-.825
.700	-.100	-.119	-.180	-.196	-.422	-.867	-.834
.800	.033	.022	-.032	-.072	-.201	-.384	-.950
.900	.145	.130	.063	.031	-.070	-.226	-.384
.950	.200	.163	.095	.052	-.040	-.158	-.278

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	36	37	38	39	40	41	42
.000	1.116	1.082	1.094	1.C85	1.091	1.097	1.101
.010	.606	.069	.140	.135	.161	.209	.261
.020	.385	-.086	-.082	-.055	-.023	0.000	.022
.050	.212	-.189	-.181	-.166	-.138	-.127	-.087
.100	-.038	-.421	-.395	-.451	-.423	-.410	-.384
.150	-.183	-.498	-.510	-.523	-.515	-.515	-.500
.200	-.279	-.558	-.576	-.570	-.615	-.604	-.608
.250	-.375	-.601	-.617	-.649	-.684	-.686	-.681
.300	-.462	-.644	-.675	-.697	-.738	-.768	-.768
.350	-.539	-.696	-.732	-.768	-.807	-.858	-.855
.375	-.606	-.721	-.790	-.776	-.837	-.948	-.956
.400	-.654	-.704	-.782	-.776	-.830	-.940	-1.029
.425	-.683	-.704	-.782	-.768	-.822	-.955	-1.043
.450	-.721	-.704	-.749	-.768	-.822	-.940	-1.079
.475	-.779	-.713	-.724	-.776	-.822	-.925	-1.115
.500	-.827	-.696	-.699	-.736	-.791	-.851	-1.202
.525	-.885	-.678	-.666	-.681	-.715	-.739	-.956
.550	-.885	-.601	-.609	-.617	-.638	-.649	-.637
.575	-.529	-.601	-.551	-.578	-.622	-.619	-.558
.600	-.414	-.489	-.494	-.538	-.530	-.537	-.478
.625	-.385	-.447	-.453	-.420	-.423	-.425	-.406
.650	-.375	-.404	-.411	-.340	-.361	-.358	-.340
.700	-.375	-.232	-.280	-.261	-.246	-.239	-.232
.750	-.375	-.137	-.140	-.150	-.138	-.134	-.138
.800	-.375	-.043	-.041	-.055	-.054	-.045	-.044
.850	-.375	.043	.041	.032	.038	.037	.036
.900	-.385	.112	.115	.103	.100	.104	.109
.950	-.366	.172	.156	.166	.161	.157	.167
.010	.019	.095	.074	.079	.084	.067	.065
.020	0.000	.017	.016	0.000	.023	0.000	.007
.050	.019	.043	.041	.024	.038	.022	.022
.100	-.173	-.137	-.132	-.135	-.131	-.172	-.181
.200	-.298	-.215	-.222	-.222	-.246	-.239	-.254
.300	-.366	-.258	-.271	-.261	-.269	-.291	-.369
.350	-.433	-.283	-.296	-.293	-.307	-.321	-.362
.400	-.491	-.283	-.288	-.293	-.307	-.328	-.355
.450	-.587	-.283	-.296	-.301	-.315	-.328	-.355
.500	-.606	-.266	-.280	-.301	-.307	-.321	-.340
.550	-.673	-.223	-.239	-.253	-.261	-.276	-.290
.600	-.712	-.189	-.197	-.198	-.207	-.216	-.232
.650	-.760	-.137	-.140	-.150	-.154	-.164	-.167
.700	-.798	-.077	-.049	-.087	-.092	-.090	-.094
.800	-.808	.043	.041	.032	.038	.037	.036
.900	-.779	.086	.148	.143	.146	.149	.152
.950	-.558	.197	.197	.198	.200	.201	.203

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	43	44	45	46	47	48	49
.000	1.111	1.109	.966	.999	.997	1.001	.994
.010	.304	.389	.322	.346	.332	.393	.411
.020	.085	.151	.161	.154	.148	.143	.137
.050	-.042	.022	-.080	-.077	-.074	-.036	-.034
.100	-.340	-.281	-.282	-.307	-.295	-.286	-.309
.150	-.460	-.411	-.362	-.384	-.406	-.393	-.411
.200	-.545	-.497	-.443	-.461	-.443	-.465	-.480
.250	-.651	-.620	-.483	-.499	-.517	-.536	-.549
.300	-.715	-.677	-.523	-.576	-.590	-.608	-.617
.350	-.828	-.771	-.644	-.653	-.664	-.715	-.754
.375	-.906	-.843	-.644	-.653	-.701	-.751	-.788
.400	-.948	-.915	-.644	-.653	-.701	-.751	-.788
.425	-1.054	-.951	-.644	-.653	-.701	-.715	-.754
.450	-1.033	-.980	-.644	-.653	-.701	-.715	-.754
.475	-1.075	-1.052	-.684	-.691	-.701	-.715	-.788
.500	-1.160	-1.095	-.644	-.653	-.701	-.715	-.754
.525	-1.160	-.749	-.564	-.615	-.627	-.644	-.720
.550	-.722	-.519	-.523	-.538	-.590	-.608	-.617
.575	-.559	-.476	-.483	-.499	-.517	-.536	-.549
.600	-.474	-.425	-.443	-.461	-.443	-.465	-.480
.625	-.410	-.360	-.402	-.422	-.406	-.429	-.411
.650	-.361	-.331	-.322	-.346	-.332	-.358	-.377
.700	-.255	-.274	-.242	-.231	-.221	-.215	-.240
.750	-.163	-.223	-.121	-.115	-.148	-.143	-.137
.800	-.064	-.159	-.040	-.038	-.074	0.000	-.034
.850	.021	-.087	.040	.038	0.000	.071	.069
.900	.092	-.022	.121	.115	.111	.143	.137
.950	.149	.029	.161	.154	.148	.143	.171
.010	.057	.022	-.201	-.231	-.221	-.215	-.206
.020	.014	-.014	-.242	-.231	-.221	-.215	-.240
.050	.035	.007	-.201	-.231	-.221	-.215	-.240
.100	-.163	-.209	-.242	-.269	-.258	-.286	-.274
.200	-.248	-.324	-.282	-.269	-.295	-.322	-.343
.300	-.297	-.360	-.282	-.307	-.332	-.358	-.377
.350	-.361	-.447	-.322	-.307	-.369	-.393	-.377
.400	-.354	-.432	-.322	-.346	-.332	-.393	-.377
.450	-.347	-.425	-.322	-.307	-.369	-.358	-.377
.500	-.340	-.411	-.282	-.307	-.332	-.322	-.377
.550	-.283	-.339	-.242	-.269	-.295	-.286	-.274
.600	-.219	-.267	-.242	-.231	-.221	-.215	-.240
.650	-.149	-.202	-.161	-.154	-.184	-.179	-.206
.700	-.078	-.123	-.080	-.115	-.111	-.107	-.103
.800	.057	.007	.040	0.000	-.074	.036	.034
.900	.163	.115	.161	.115	.148	.143	.137
.950	.205	.159	.161	.154	.184	.215	.206

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	50	51	52	53	54	55	56
.000	.981	1.030	1.022	1.016	.994	.986	1.007
.010	.406	.451	.447	.554	.572	.667	.671
.020	.169	.225	.256	.339	.361	.406	.448
.050	-.102	.064	.064	.123	.151	.203	.224
.100	-.305	-.258	-.256	-.185	-.120	-.058	-.028
.150	-.406	-.386	-.383	-.308	-.301	-.203	-.196
.200	-.541	-.515	-.511	-.400	-.392	-.319	-.308
.250	-.575	-.612	-.607	-.523	-.512	-.435	-.392
.300	-.710	-.676	-.671	-.616	-.602	-.522	-.476
.350	-.778	-.837	-.767	-.739	-.693	-.609	-.559
.375	-.812	-.869	-.863	-.801	-.753	-.696	-.643
.400	-.812	-.934	-.927	-.831	-.813	-.754	-.727
.425	-.812	-.998	-.990	-.893	-.843	-.754	-.727
.450	-.812	-1.030	-1.022	-.955	-.873	-.812	-.755
.475	-.880	-1.063	-1.086	-1.016	-.964	-.899	-.811
.500	-.812	-1.159	-1.150	-1.109	-1.024	-.957	-.895
.525	-.710	-1.095	-1.214	-1.109	-.994	-.783	-.923
.550	-.643	-.676	-1.054	-.708	-.602	-.435	-.615
.575	-.609	-.579	-.767	-.554	-.482	-.377	-.420
.600	-.575	-.483	-.543	-.462	-.422	-.348	-.364
.625	-.406	-.419	-.415	-.400	-.392	-.319	-.336
.650	-.372	-.354	-.351	-.370	-.361	-.319	-.336
.700	-.237	-.225	-.224	-.339	-.331	-.290	-.336
.750	-.135	-.129	-.128	-.246	-.271	-.232	-.308
.800	-.068	0.000	-.032	-.216	-.241	-.232	-.308
.850	0.000	.064	.064	-.154	-.181	-.203	-.308
.900	.102	.129	.128	-.062	-.120	-.174	-.252
.950	.169	.193	.192	0.000	-.060	-.174	-.252
.010	-.203	-.225	-.224	-.277	-.301	-.261	-.196
.020	-.237	-.225	-.256	-.339	-.331	-.261	-.252
.050	-.203	-.225	-.256	-.308	-.301	-.261	-.224
.100	-.305	-.322	-.351	-.370	-.392	-.377	-.336
.200	-.372	-.386	-.415	-.493	-.512	-.493	-.448
.300	-.406	-.419	-.447	-.554	-.542	-.522	-.503
.350	-.406	-.451	-.511	-.647	-.632	-.609	-.587
.400	-.406	-.451	-.447	-.677	-.723	-.696	-.643
.450	-.406	-.451	-.447	-.647	-.783	-.754	-.699
.500	-.372	-.419	-.415	-.554	-.843	-.783	-.755
.550	-.305	-.354	-.351	-.431	-.632	-.870	-.811
.600	-.237	-.258	-.287	-.339	-.361	-.928	-.867
.650	-.203	-.193	-.192	-.246	-.271	-.957	-.895
.700	-.237	-.129	-.128	-.185	-.181	-.899	-.951
.800	-.068	0.000	.032	0.000	-.030	-.348	-.392
.900	.135	.129	.128	.092	.060	-.232	-.308
.950	.203	.193	.192	.123	.120	-.174	-.252

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	57	58	59	60	61	62	63
.000	1.036	1.055	1.093	1.084	1.124	.979	.974
.010	.709	.712	.737	.788	.796	.318	.325
.020	.463	.501	.534	.567	.609	.106	.081
.050	.300	.317	.356	.394	.445	-.053	-.054
.100	.027	.053	.102	.123	.211	-.318	-.297
.150	-.136	-.079	-.025	0.000	.070	-.370	-.406
.200	-.218	-.185	-.152	-.099	-.047	-.476	-.487
.250	-.327	-.290	-.254	-.172	-.141	-.529	-.541
.300	-.436	-.369	-.331	-.271	-.211	-.609	-.568
.350	-.518	-.475	-.407	-.370	-.281	-.635	-.649
.375	-.600	-.554	-.458	-.419	-.375	-.662	-.649
.400	-.627	-.580	-.534	-.468	-.398	-.662	-.676
.425	-.654	-.633	-.559	-.517	-.445	-.662	-.649
.450	-.709	-.633	-.585	-.542	-.492	-.662	-.649
.475	-.736	-.712	-.636	-.591	-.539	-.662	-.676
.500	-.818	-.765	-.686	-.640	-.609	-.662	-.649
.525	-.872	-.818	-.763	-.690	-.633	-.609	-.595
.550	-.954	-.844	-.788	-.739	-.679	-.582	-.541
.575	-.872	-.844	-.814	-.764	-.703	-.503	-.487
.600	-.573	-.818	-.864	-.788	-.656	-.450	-.433
.625	-.409	-.791	-.890	-.813	-.773	-.397	-.406
.650	-.382	-.501	-.941	-.887	-.796	-.344	-.352
.700	-.354	-.422	-.941	-.887	-.820	-.238	-.243
.750	-.354	-.396	-.941	-.887	-.843	-.132	-.162
.800	-.354	-.369	-.966	-.887	-.843	-.053	-.054
.850	-.327	-.369	-.864	-.912	-.843	.026	.027
.900	-.327	-.369	-.534	-.887	-.796	.106	.108
.950	-.327	-.343	-.432	-.764	-.703	.159	.135
.010	-.164	-.106	-.076	-.025	.023	-.212	-.216
.020	-.164	-.132	-.076	-.049	.023	-.212	-.216
.050	-.164	-.106	-.051	-.025	.047	-.212	-.216
.100	-.300	-.237	-.178	-.148	-.094	-.238	-.271
.200	-.382	-.317	-.280	-.246	-.164	-.291	-.297
.300	-.463	-.422	-.356	-.320	-.258	-.344	-.325
.350	-.518	-.448	-.432	-.370	-.305	-.344	-.352
.400	-.573	-.528	-.483	-.443	-.375	-.344	-.352
.450	-.627	-.580	-.534	-.493	-.422	-.344	-.325
.500	-.709	-.633	-.585	-.567	-.492	-.344	-.325
.550	-.763	-.712	-.661	-.591	-.562	-.291	-.271
.600	-.791	-.739	-.686	-.640	-.586	-.212	-.216
.650	-.845	-.791	-.712	-.665	-.633	-.159	-.162
.700	-.872	-.818	-.737	-.690	-.633	-.106	-.108
.800	-.900	-.844	-.788	-.714	-.656	.026	0.000
.900	-.845	-.818	-.737	-.690	-.609	.132	.135
.950	-.436	-.633	-.661	-.591	-.539	.185	.162

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	64	65	66	67	68	69	70
.000	1.024	.996	.996	1.026	1.023	1.026	1.026
.010	.384	.374	.379	.411	.442	.456	.480
.020	.128	.124	.142	.182	.186	.205	.240
.050	-.026	-.050	-.047	0.000	0.000	.023	.044
.100	-.307	-.299	-.308	-.296	-.279	-.251	-.240
.150	-.384	-.424	-.427	-.411	-.395	-.410	-.393
.200	-.461	-.498	-.522	-.502	-.488	-.501	-.502
.250	-.512	-.548	-.593	-.570	-.581	-.593	-.589
.300	-.589	-.623	-.664	-.661	-.674	-.661	-.677
.350	-.640	-.698	-.711	-.753	-.721	-.798	-.808
.375	-.665	-.698	-.783	-.775	-.790	-.820	-.873
.400	-.665	-.698	-.759	-.775	-.790	-.820	-.960
.425	-.640	-.698	-.735	-.775	-.790	-.798	-.982
.450	-.640	-.698	-.735	-.775	-.790	-.820	-1.004
.475	-.691	-.747	-.783	-.798	-.790	-.843	-1.069
.500	-.640	-.698	-.735	-.753	-.767	-.820	-1.157
.525	-.614	-.648	-.688	-.707	-.697	-.706	-1.157
.550	-.563	-.623	-.617	-.616	-.604	-.615	-.698
.575	-.486	-.548	-.569	-.547	-.535	-.547	-.546
.600	-.435	-.473	-.498	-.479	-.465	-.479	-.458
.625	-.384	-.399	-.427	-.411	-.395	-.410	-.393
.650	-.333	-.374	-.379	-.342	-.349	-.342	-.327
.700	-.205	-.249	-.261	-.228	-.232	-.228	-.218
.750	-.128	-.149	-.142	-.137	-.116	-.114	-.109
.800	-.026	-.050	-.047	-.023	-.023	-.023	-.022
.850	.051	.025	.024	.046	.046	.068	.066
.900	.128	.100	.119	.137	.139	.137	.131
.950	.179	.149	.166	.182	.186	.205	.196
.010	-.205	-.199	-.213	-.182	-.209	-.160	-.196
.020	-.179	-.224	-.213	-.205	-.209	-.205	-.218
.050	-.179	-.249	-.213	-.205	-.209	-.205	-.218
.100	-.230	-.274	-.261	-.274	-.256	-.274	-.306
.200	-.307	-.324	-.332	-.319	-.349	-.319	-.371
.300	-.307	-.349	-.379	-.365	-.349	-.387	-.415
.350	-.333	-.374	-.379	-.388	-.395	-.433	-.458
.400	-.333	-.374	-.379	-.388	-.372	-.387	-.437
.450	-.333	-.374	-.379	-.388	-.372	-.387	-.437
.500	-.307	-.349	-.356	-.342	-.349	-.365	-.480
.550	-.256	-.299	-.308	-.296	-.279	-.319	-.327
.600	-.205	-.249	-.237	-.228	-.232	-.251	-.262
.650	-.154	-.174	-.190	-.182	-.163	-.160	-.196
.700	-.077	-.100	-.119	-.091	-.093	-.091	-.109
.800	.051	0.000	.024	.046	.023	.023	.022
.900	.154	.124	.142	.160	.139	.160	.175
.950	.205	.199	.166	.205	.209	.228	.218

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	71	72	73	74	75	76	77
.000	1.031	1.020	1.009	1.016	1.013	1.043	1.041
.010	.515	.580	.576	.590	.663	.683	.688
.020	.258	.340	.350	.366	.429	.455	.483
.050	.064	.140	.144	.163	.214	.247	.297
.100	-.236	-.160	-.165	-.142	-.039	-.019	0.000
.150	-.365	-.300	-.288	-.285	-.195	-.171	-.112
.200	-.494	-.420	-.412	-.406	-.312	-.265	-.205
.250	-.580	-.520	-.515	-.508	-.429	-.379	-.335
.300	-.644	-.600	-.597	-.590	-.507	-.474	-.428
.350	-.795	-.740	-.721	-.691	-.604	-.569	-.521
.375	-.859	-.780	-.803	-.752	-.663	-.626	-.576
.400	-.945	-.860	-.844	-.813	-.760	-.702	-.651
.425	-.988	-.900	-.906	-.894	-.779	-.740	-.688
.450	-1.010	-.940	-.927	-.915	-.818	-.759	-.706
.475	-1.074	-1.020	-1.009	-.976	-.877	-.835	-.762
.500	-1.160	-1.100	-1.091	-1.077	-.955	-.892	-.837
.525	-1.224	-1.120	-1.132	-1.077	-.721	-.929	-.911
.550	-1.224	-.700	-.762	-.651	-.565	-.607	-.930
.575	-.795	-.640	-.659	-.529	-.468	-.455	-.892
.600	-.644	-.540	-.597	-.467	-.409	-.398	-.558
.625	-.430	-.440	-.412	-.406	-.312	-.360	-.446
.650	-.344	-.380	-.391	-.386	-.312	-.322	-.409
.700	-.236	-.340	-.329	-.325	-.292	-.322	-.390
.750	-.107	-.280	-.288	-.285	-.273	-.303	-.372
.800	-.021	-.220	-.206	-.203	-.234	-.303	-.372
.850	.064	-.160	-.123	-.142	-.195	-.284	-.353
.900	.129	-.080	-.062	-.081	-.175	-.265	-.353
.950	.193	-.020	.021	-.020	-.117	-.228	-.335
.010	-.215	-.300	-.288	-.305	-.273	-.228	-.167
.020	-.236	-.340	-.309	-.305	-.273	-.247	-.186
.050	-.236	-.300	-.288	-.285	-.234	-.209	-.130
.100	-.322	-.400	-.391	-.386	-.370	-.322	-.260
.200	-.408	-.500	-.494	-.508	-.487	-.436	-.390
.300	-.451	-.540	-.535	-.529	-.565	-.512	-.465
.350	-.473	-.640	-.618	-.610	-.604	-.569	-.539
.400	-.451	-.700	-.679	-.691	-.682	-.645	-.576
.450	-.451	-.760	-.679	-.732	-.741	-.702	-.632
.500	-.430	-.800	-.535	-.772	-.799	-.759	-.725
.550	-.322	-.440	-.432	-.427	-.877	-.835	-.762
.600	-.258	-.340	-.329	-.325	-.916	-.854	-.799
.650	-.193	-.260	-.247	-.244	-.974	-.929	-.855
.700	-.107	-.180	-.165	-.183	-.857	-.948	-.874
.800	.021	-.020	0.000	-.020	-.312	-.417	-.911
.900	.172	.080	.103	.081	-.175	-.303	-.874
.950	.215	.120	.123	.122	-.097	-.247	-.576

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	78	79	80	81	82	83	84
.000	1.041	1.096	1.108	1.130	1.132	1.021	1.024
.010	.688	.737	.769	.799	.811	.082	.118
.020	.483	.521	.572	.608	.625	-.163	-.118
.050	.297	.341	.375	.417	.439	-.204	-.197
.100	0.000	.054	.125	.174	.203	-.408	-.394
.150	-.112	-.054	-.018	.035	.051	-.490	-.512
.200	-.223	-.162	-.125	-.070	-.017	-.572	-.551
.250	-.353	-.270	-.215	-.156	-.118	-.612	-.591
.300	-.428	-.341	-.304	-.243	-.203	-.694	-.709
.350	-.502	-.431	-.393	-.313	-.287	-.735	-.748
.375	-.576	-.503	-.447	-.382	-.338	-.776	-.748
.400	-.651	-.575	-.500	-.434	-.388	-.735	-.748
.425	-.669	-.611	-.518	-.469	-.422	-.735	-.748
.450	-.725	-.647	-.572	-.504	-.473	-.735	-.748
.475	-.781	-.701	-.644	-.573	-.523	-.735	-.748
.500	-.837	-.755	-.679	-.626	-.574	-.735	-.748
.525	-.911	-.809	-.751	-.678	-.625	-.653	-.669
.550	-.892	-.881	-.769	-.730	-.675	-.612	-.630
.575	-.595	-.971	-.840	-.747	-.709	-.572	-.551
.600	-.446	-1.024	-.876	-.817	-.777	-.572	-.512
.625	-.372	-.935	-.876	-.817	-.777	-.408	-.433
.650	-.353	-.629	-.912	-.834	-.794	-.367	-.394
.700	-.353	-.431	-.930	-.852	-.794	-.245	-.276
.750	-.353	-.413	-.948	-.869	-.811	-.163	-.157
.800	-.335	-.413	-.948	-.886	-.828	-.082	-.079
.850	-.316	-.377	-.948	-.869	-.828	0.000	0.000
.900	-.297	-.377	-.626	-.852	-.794	.082	.079
.950	-.279	-.341	-.429	-.747	-.709	.163	.157
.010	-.167	-.090	-.054	0.000	.034	.082	.079
.020	-.186	-.108	-.054	-.017	.017	0.000	0.000
.050	-.130	-.072	-.018	.035	.051	0.000	0.000
.100	-.279	-.234	-.143	-.122	-.068	-.163	-.157
.200	-.390	-.323	-.250	-.208	-.169	-.204	-.197
.300	-.483	-.413	-.357	-.295	-.253	-.245	-.236
.350	-.539	-.467	-.411	-.365	-.321	-.286	-.315
.400	-.576	-.521	-.483	-.417	-.371	-.286	-.315
.450	-.651	-.575	-.518	-.469	-.405	-.286	-.315
.500	-.725	-.647	-.572	-.504	-.473	-.286	-.315
.550	-.762	-.701	-.661	-.573	-.540	-.245	-.236
.600	-.818	-.737	-.679	-.608	-.574	-.204	-.197
.650	-.855	-.791	-.715	-.643	-.625	-.163	-.157
.700	-.874	-.809	-.751	-.660	-.625	-.082	-.118
.800	-.911	-.827	-.751	-.695	-.642	0.000	0.000
.900	-.409	-.791	-.733	-.660	-.625	.123	.118
.950	-.297	-.647	-.626	-.573	-.540	.163	.197

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	85	86	87	88	89	90	91
.000	1.065	1.065	1.058	1.035	1.069	1.116	1.058
.010	.152	.184	.176	.207	.267	.328	.405
.020	-.076	-.073	-.071	-.034	.067	.099	.187
.050	-.190	-.184	-.176	-.173	-.134	-.099	0.000
.100	-.418	-.441	-.423	-.414	-.368	-.328	-.280
.150	-.533	-.514	-.529	-.552	-.568	-.492	-.436
.200	-.571	-.624	-.670	-.655	-.669	-.591	-.529
.250	-.685	-.698	-.705	-.724	-.735	-.689	-.622
.300	-.723	-.735	-.776	-.793	-.802	-.755	-.747
.350	-.761	-.808	-.846	-.862	-.902	-.854	-.778
.375	-.799	-.808	-.881	-.966	-.969	-.919	-.872
.400	-.799	-.808	-.881	-.966	-1.069	-1.018	-.934
.425	-.799	-.808	-.881	-.931	-1.103	-1.018	-.996
.450	-.761	-.808	-.881	-.931	-1.136	-1.083	-.996
.475	-.799	-.808	-.881	-.931	-1.170	-1.149	-1.089
.500	-.761	-.771	-.846	-.862	-1.303	-1.247	-1.120
.525	-.723	-.735	-.776	-.793	-1.270	-1.280	-.778
.550	-.647	-.661	-.705	-.690	-.802	-.919	-.529
.575	-.647	-.624	-.599	-.586	-.535	-.591	-.405
.600	-.533	-.477	-.388	-.483	-.468	-.361	-.373
.625	-.457	-.441	-.423	-.414	-.401	-.361	-.373
.650	-.380	-.367	-.388	-.379	-.368	-.361	-.373
.700	-.266	-.257	-.282	-.276	-.267	-.263	-.311
.750	-.152	-.147	-.176	-.173	-.167	-.131	-.280
.800	-.076	-.073	-.071	-.069	-.067	-.066	-.218
.850	0.000	0.000	0.000	0.000	.067	.033	-.187
.900	.076	.073	.071	.103	.100	.099	-.156
.950	.152	.147	.141	.138	.167	.164	-.124
.010	.076	.073	.071	.034	.067	.099	-.062
.020	0.000	0.000	-.035	-.034	-.033	0.000	-.124
.050	0.000	0.000	0.000	0.000	0.000	0.000	-.062
.100	-.152	-.147	-.176	-.173	-.167	-.164	-.249
.200	-.228	-.257	-.247	-.276	-.301	-.263	-.373
.300	-.266	-.257	-.317	-.310	-.334	-.295	-.467
.350	-.342	-.331	-.353	-.345	-.368	-.361	-.560
.400	-.342	-.331	-.353	-.379	-.368	-.361	-.560
.450	-.342	-.331	-.353	-.345	-.401	-.361	-.560
.500	-.304	-.331	-.317	-.345	-.368	-.361	-.529
.550	-.266	-.257	-.317	-.310	-.334	-.295	-.436
.600	-.190	-.220	-.247	-.241	-.267	-.230	-.342
.650	-.152	-.184	-.176	-.207	-.200	-.164	-.280
.700	-.114	-.110	-.141	-.138	-.134	-.099	-.187
.800	0.000	0.000	0.000	0.000	0.000	.033	-.062
.900	.152	.147	.141	.138	.134	.164	.062
.950	.190	.184	.176	.173	.167	.230	.062

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	92	93	94	95	96	97	98
.000	1.083	1.059	1.063	1.116	1.153	1.139	1.198
.010	.464	.500	.546	.586	.631	.662	.774
.020	.217	.294	.316	.390	.412	.450	.574
.050	.062	.147	.172	.195	.275	.318	.424
.100	-.247	-.177	-.144	-.084	0.000	.026	.150
.150	-.371	-.294	-.258	-.195	-.137	-.106	0.000
.200	-.495	-.412	-.345	-.279	-.220	-.212	-.075
.250	-.588	-.530	-.431	-.363	-.302	-.265	-.150
.300	-.681	-.618	-.546	-.474	-.412	-.344	-.200
.350	-.743	-.706	-.660	-.558	-.522	-.477	-.300
.375	-.835	-.736	-.718	-.642	-.577	-.530	-.374
.400	-.897	-.824	-.747	-.669	-.631	-.583	-.424
.425	-.959	-.883	-.775	-.697	-.659	-.609	-.474
.450	-.959	-.912	-.833	-.725	-.686	-.636	-.499
.475	-1.021	-.942	-.890	-.781	-.741	-.662	-.549
.500	-1.052	-.912	-.890	-.893	-.796	-.742	-.599
.525	-.712	-.559	-.517	-.837	-.879	-.821	-.674
.550	-.464	-.412	-.402	-.446	-.906	-.848	-.699
.575	-.247	-.294	-.373	-.474	-.796	-.874	-.724
.600	-.278	-.294	-.402	-.335	-.769	-.927	-.749
.625	-.340	-.294	-.316	-.307	-.714	-.954	-.774
.650	-.340	-.324	-.316	-.307	-.659	-.954	-.799
.700	-.309	-.324	-.316	-.307	-.494	-.980	-.824
.750	-.247	-.294	-.287	-.307	-.439	-1.007	-.849
.800	-.247	-.265	-.287	-.279	-.439	-.980	-.849
.850	-.186	-.265	-.287	-.279	-.412	-.609	-.824
.900	-.124	-.265	-.258	-.251	-.412	-.503	-.824
.950	-.093	-.206	-.258	-.251	-.412	-.477	-.724
.010	-.062	-.118	-.057	.028	.082	.106	.200
.020	-.124	-.118	-.115	-.028	.027	.079	.175
.050	-.093	-.118	-.029	.028	.082	.132	.200
.100	-.247	-.265	-.258	-.167	-.110	-.106	.050
.200	-.340	-.412	-.373	-.307	-.247	-.212	-.100
.300	-.433	-.500	-.488	-.418	-.302	-.291	-.200
.350	-.557	-.589	-.546	-.474	-.412	-.371	-.225
.400	-.588	-.647	-.603	-.530	-.494	-.450	-.325
.450	-.588	-.706	-.660	-.586	-.549	-.503	-.374
.500	-.588	-.795	-.747	-.669	-.631	-.556	-.424
.550	-.433	-.883	-.804	-.725	-.659	-.636	-.474
.600	-.340	-.912	-.861	-.781	-.686	-.662	-.499
.650	-.278	-.971	-.948	-.809	-.769	-.689	-.549
.700	-.186	-.500	-.976	-.865	-.796	-.715	-.574
.800	-.062	-.235	-.919	-.921	-.796	-.742	-.599
.900	.062	-.118	-.373	-.753	-.769	-.742	-.574
.950	.093	-.059	-.258	-.363	-.631	-.609	-.474

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	99	100	101	102	103	104	105
.000	1.077	1.086	1.087	1.100	1.105	1.104	1.117
.010	.108	.103	.173	.167	.207	.248	.301
.020	-.081	-.078	-.074	-.024	0.000	0.000	.043
.050	-.162	-.181	-.173	-.144	-.138	-.135	-.064
.100	-.404	-.414	-.395	-.406	-.437	-.428	-.387
.150	-.485	-.491	-.519	-.526	-.529	-.518	-.516
.200	-.565	-.569	-.568	-.622	-.599	-.631	-.602
.250	-.592	-.621	-.642	-.645	-.668	-.721	-.688
.300	-.646	-.672	-.692	-.693	-.760	-.766	-.773
.350	-.700	-.698	-.766	-.789	-.875	-.879	-.881
.375	-.700	-.724	-.790	-.813	-.898	-.947	-.945
.400	-.700	-.724	-.766	-.789	-.875	-.969	-1.010
.425	-.700	-.724	-.766	-.789	-.875	-.924	-1.074
.450	-.700	-.724	-.766	-.789	-.875	-.901	-1.117
.475	-.700	-.724	-.766	-.789	-.875	-.924	-1.203
.500	-.700	-.698	-.741	-.741	-.829	-.879	-1.246
.525	-.619	-.672	-.692	-.693	-.737	-.766	-1.332
.550	-.565	-.595	-.642	-.622	-.645	-.654	-.924
.575	-.512	-.569	-.568	-.550	-.576	-.563	-.773
.600	-.458	-.491	-.494	-.478	-.506	-.496	-.645
.625	-.404	-.414	-.420	-.430	-.437	-.428	-.451
.650	-.350	-.362	-.370	-.383	-.368	-.361	-.365
.700	-.215	-.233	-.247	-.239	-.253	-.248	-.236
.750	-.162	-.155	-.148	-.144	-.138	-.135	-.129
.800	-.054	-.052	-.049	-.048	-.046	-.045	-.043
.850	.054	.052	.049	.048	.046	.045	.043
.900	.108	.103	.099	.096	.092	.113	.107
.950	.188	.181	.173	.191	.184	.180	.172
.010	.108	.103	.099	.096	.092	.090	.064
.020	.054	.052	.025	0.000	.023	.022	0.000
.050	.054	.052	.049	.048	.023	.045	.043
.100	-.108	-.155	-.148	-.144	-.161	-.158	-.193
.200	-.188	-.207	-.198	-.215	-.253	-.248	-.301
.300	-.215	-.233	-.272	-.263	-.276	-.293	-.344
.350	-.269	-.284	-.296	-.287	-.322	-.316	-.408
.400	-.296	-.284	-.296	-.311	-.322	-.338	-.387
.450	-.296	-.284	-.296	-.311	-.322	-.361	-.387
.500	-.269	-.284	-.296	-.287	-.299	-.316	-.365
.550	-.215	-.233	-.247	-.263	-.276	-.270	-.301
.600	-.162	-.181	-.173	-.191	-.207	-.225	-.236
.650	-.135	-.129	-.148	-.144	-.161	-.158	-.172
.700	-.054	-.052	-.074	-.072	-.092	-.090	-.129
.800	.054	.052	.049	.048	.046	.045	.043
.900	.162	.155	.148	.144	.161	.158	.172
.950	.215	.207	.198	.191	.138	.203	.215

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	106	107	108	109	110	111	112
.000	1.117	1.111	1.087	1.095	1.108	1.136	1.141
.010	.295	.432	.483	.557	.601	.623	.642
.020	.084	.185	.242	.346	.376	.403	.428
.050	-.063	.021	.080	.173	.225	.238	.267
.100	-.358	-.267	-.221	-.135	-.113	-.055	0.000
.150	-.506	-.411	-.383	-.269	-.225	-.202	-.143
.200	-.569	-.514	-.463	-.384	-.338	-.293	-.232
.250	-.674	-.617	-.564	-.499	-.432	-.385	-.339
.300	-.759	-.679	-.664	-.576	-.507	-.476	-.428
.350	-.864	-.782	-.765	-.672	-.620	-.568	-.499
.375	-.948	-.864	-.825	-.730	-.676	-.623	-.570
.400	-1.012	-.905	-.886	-.788	-.733	-.678	-.642
.425	-1.054	-.967	-.946	-.826	-.789	-.714	-.660
.450	-1.096	-1.008	-.966	-.884	-.827	-.769	-.695
.475	-1.138	-1.069	-1.047	-.922	-.864	-.824	-.749
.500	-1.222	-1.131	-1.027	-.845	-.808	-.879	-.820
.525	-1.307	-.802	-.644	-.461	-.451	-.897	-.891
.550	-.906	-.535	-.463	-.365	-.338	-.531	-.909
.575	-.674	-.473	-.423	-.346	-.319	-.495	-.980
.600	-.548	-.432	-.383	-.346	-.319	-.403	-.909
.625	-.443	-.391	-.362	-.327	-.301	-.330	-.749
.650	-.358	-.350	-.342	-.307	-.282	-.330	-.499
.700	-.253	-.309	-.322	-.269	-.301	-.330	-.428
.750	-.147	-.267	-.262	-.269	-.263	-.330	-.428
.800	-.042	-.185	-.221	-.250	-.244	-.330	-.410
.850	.063	-.123	-.161	-.231	-.225	-.311	-.410
.900	.127	-.062	-.121	-.192	-.225	-.293	-.410
.950	.190	.021	-.060	-.154	-.188	-.330	-.374
.010	.084	.021	-.020	-.058	-.038	.018	.054
.020	.021	-.041	-.060	-.115	-.075	0.000	.036
.050	.042	0.000	-.020	-.019	.019	.055	.089
.100	-.147	-.226	-.242	-.231	-.207	-.165	-.107
.200	-.253	-.329	-.383	-.403	-.376	-.330	-.285
.300	-.295	-.411	-.463	-.442	-.451	-.403	-.357
.350	-.379	-.473	-.523	-.538	-.507	-.476	-.428
.400	-.379	-.452	-.564	-.615	-.582	-.513	-.463
.450	-.379	-.452	-.564	-.692	-.620	-.586	-.535
.500	-.337	-.452	-.564	-.749	-.714	-.659	-.606
.550	-.274	-.370	-.423	-.826	-.789	-.733	-.660
.600	-.211	-.288	-.322	-.884	-.845	-.769	-.713
.650	-.147	-.226	-.242	-.941	-.883	-.843	-.749
.700	-.084	-.144	-.161	-.538	-.921	-.843	-.784
.800	.063	0.000	-.020	-.211	-.808	-.879	-.838
.900	.190	.123	.080	-.038	-.319	-.824	-.784
.950	.253	.144	.121	0.000	-.225	-.421	-.642

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	113	114	115	116	117	118	119
.000	1.155	1.197	1.021	1.026	1.031	1.033	1.043
.010	.683	.742	.329	.335	.364	.366	.398
.020	.473	.556	.107	.110	.130	.138	.144
.050	.297	.405	-.047	-.045	-.031	-.024	-.012
.100	.035	.135	-.282	-.284	-.278	-.288	-.288
.150	-.105	0.000	-.370	-.374	-.383	-.390	-.398
.200	-.192	-.084	-.437	-.445	-.457	-.468	-.484
.250	-.280	-.169	-.497	-.503	-.519	-.534	-.570
.300	-.367	-.253	-.551	-.561	-.587	-.606	-.640
.350	-.455	-.337	-.598	-.613	-.654	-.684	-.732
.375	-.508	-.388	-.611	-.639	-.673	-.696	-.761
.400	-.560	-.438	-.605	-.626	-.661	-.696	-.749
.425	-.613	-.472	-.605	-.639	-.661	-.690	-.755
.450	-.648	-.489	-.611	-.639	-.679	-.696	-.749
.475	-.683	-.556	-.632	-.645	-.710	-.714	-.778
.500	-.735	-.624	-.598	-.619	-.648	-.684	-.749
.525	-.823	-.657	-.564	-.581	-.611	-.630	-.668
.550	-.823	-.691	-.517	-.529	-.549	-.576	-.605
.575	-.858	-.725	-.517	-.497	-.537	-.564	-.588
.600	-.892	-.742	-.444	-.464	-.463	-.492	-.547
.625	-.945	-.776	-.356	-.361	-.383	-.384	-.444
.650	-.997	-.792	-.336	-.323	-.352	-.336	-.340
.700	-.997	-.809	-.202	-.252	-.204	-.204	-.207
.750	-1.015	-.843	-.107	-.110	-.111	-.114	-.115
.800	-1.015	-.860	-.013	-.013	-.012	-.006	-.006
.850	-.648	-.843	.067	.071	.074	.078	.086
.900	-.525	-.809	.154	.161	.160	.168	.173
.950	-.473	-.725	.222	.226	.228	.234	.236
.010	.087	.186	-.168	-.161	-.173	-.180	-.190
.020	.070	.152	-.168	-.168	-.179	-.174	-.196
.050	.140	.236	-.148	-.155	-.154	-.162	-.173
.100	-.070	.051	-.195	-.194	-.204	-.210	-.231
.200	-.210	-.101	-.262	-.264	-.284	-.294	-.311
.300	-.315	-.186	-.296	-.290	-.303	-.324	-.340
.350	-.385	-.253	-.302	-.316	-.333	-.342	-.369
.400	-.420	-.320	-.296	-.297	-.309	-.324	-.346
.450	-.473	-.371	-.296	-.297	-.309	-.324	-.346
.500	-.560	-.438	-.269	-.277	-.290	-.300	-.317
.550	-.613	-.472	-.228	-.226	-.241	-.252	-.259
.600	-.648	-.523	-.175	-.174	-.185	-.192	-.202
.650	-.700	-.556	-.128	-.129	-.130	-.144	-.144
.700	-.718	-.573	-.060	-.064	-.062	-.066	-.092
.800	-.770	-.624	.054	.058	.062	.060	.063
.900	-.718	-.590	.175	.187	.185	.186	.196
.950	-.630	-.489	.235	.232	.241	.246	.254

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	120	121	122	123	124	125	126
.000	1.049	1.059	1.063	1.056	1.045	1.060	1.075
.010	.410	.451	.471	.551	.589	.661	.681
.020	.180	.220	.238	.323	.366	.433	.459
.050	0.000	.032	.048	.076	.168	.238	.274
.100	-.281	-.253	-.238	-.162	-.124	-.048	-.009
.150	-.393	-.387	-.370	-.303	-.267	-.185	-.144
.200	-.488	-.484	-.476	-.414	-.376	-.290	-.255
.250	-.617	-.586	-.576	-.515	-.480	-.399	-.362
.300	-.662	-.672	-.661	-.606	-.574	-.494	-.450
.350	-.774	-.801	-.777	-.712	-.683	-.594	-.547
.375	-.825	-.881	-.867	-.788	-.753	-.666	-.617
.400	-.808	-.940	-.931	-.854	-.812	-.723	-.672
.425	-.797	-.973	-.968	-.894	-.857	-.765	-.714
.450	-.808	-1.000	-1.005	-.940	-.896	-.808	-.756
.475	-.847	-1.059	-1.068	-1.005	-.965	-.865	-.811
.500	-.808	-1.128	-1.142	-1.081	-1.035	-.937	-.881
.525	-.701	-1.112	-1.211	-1.147	-1.094	-.922	-.885
.550	-.662	-.613	-1.222	-1.192	-.946	-.513	-.496
.575	-.589	-.532	-.688	-.783	-.604	-.409	-.403
.600	-.505	-.462	-.550	-.591	-.490	-.475	-.445
.625	-.393	-.387	-.471	-.490	-.470	-.338	-.348
.650	-.342	-.322	-.301	-.450	-.500	-.342	-.287
.700	-.208	-.193	-.175	-.374	-.357	-.319	-.278
.750	-.107	-.091	-.074	-.253	-.317	-.261	-.250
.800	0.000	.011	.026	-.111	-.208	-.266	-.250
.850	.090	.102	.111	.015	-.094	-.228	-.195
.900	.174	.188	.190	.101	-.010	-.114	-.158
.950	.247	.258	.259	.167	.054	-.067	-.120
.010	-.191	-.193	-.206	-.263	-.297	-.290	-.236
.020	-.191	-.199	-.212	-.258	-.292	-.276	-.227
.050	-.168	-.177	-.185	-.217	-.233	-.195	-.181
.100	-.236	-.253	-.270	-.308	-.342	-.328	-.283
.200	-.320	-.349	-.365	-.424	-.480	-.471	-.422
.300	-.354	-.382	-.402	-.475	-.515	-.547	-.510
.350	-.376	-.414	-.434	-.551	-.589	-.608	-.570
.400	-.359	-.398	-.418	-.525	-.668	-.670	-.631
.450	-.359	-.387	-.412	-.505	-.733	-.732	-.723
.500	-.331	-.360	-.376	-.450	-.772	-.803	-.760
.550	-.269	-.290	-.301	-.359	-.530	-.870	-.825
.600	-.202	-.226	-.227	-.263	-.277	-.922	-.862
.650	-.140	-.156	-.159	-.283	-.258	-.965	-.909
.700	-.067	-.075	-.074	-.096	-.119	-.694	-.932
.800	.062	.070	.069	.050	.030	-.190	-.482
.900	.196	.210	.212	.187	.154	.028	-.232
.950	.252	.269	.270	.237	.203	.090	-.144

APPENDIX B - CONTINUED

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	127	128	129	130	131	132	133
.000	1.076	1.111	1.013	1.019	1.028	1.039	1.041
.010	.696	.732	.333	.349	.365	.383	.402
.020	.484	.525	.105	.115	.136	.149	.167
.050	.298	.340	-.048	-.046	-.031	-.021	-.004
.100	.023	.071	-.285	-.289	-.286	-.285	-.280
.150	-.104	-.057	-.380	-.390	-.417	-.400	-.402
.200	-.217	-.168	-.447	-.459	-.470	-.485	-.488
.250	-.321	-.269	-.556	-.523	-.545	-.562	-.569
.300	-.411	-.362	-.566	-.592	-.602	-.626	-.650
.350	-.502	-.450	-.623	-.643	-.672	-.698	-.748
.375	-.570	-.516	-.637	-.666	-.690	-.724	-.785
.400	-.624	-.569	-.637	-.652	-.690	-.719	-.776
.425	-.665	-.609	-.633	-.652	-.685	-.715	-.772
.450	-.701	-.648	-.637	-.656	-.685	-.719	-.780
.475	-.755	-.714	-.651	-.675	-.707	-.745	-.813
.500	-.823	-.759	-.628	-.647	-.677	-.711	-.772
.525	-.886	-.825	-.590	-.615	-.633	-.655	-.703
.550	-.836	-.864	-.542	-.555	-.571	-.596	-.626
.575	-.466	-.913	-.509	-.523	-.553	-.553	-.573
.600	-.380	-.913	-.471	-.454	-.492	-.498	-.488
.625	-.380	-.957	-.438	-.386	-.391	-.400	-.423
.650	-.316	-.675	-.366	-.367	-.360	-.379	-.378
.700	-.303	-.463	-.214	-.229	-.220	-.221	-.224
.750	-.289	-.415	-.128	-.133	-.127	-.175	-.122
.800	-.271	-.393	-.028	-.027	-.026	-.025	-.020
.850	-.258	-.406	.057	.060	.062	.064	.073
.900	-.240	-.406	.143	.142	.149	.153	.163
.950	-.213	-.437	.214	.211	.220	.226	.228
.010	-.176	-.119	-.209	-.211	-.215	-.217	-.224
.020	-.213	-.110	-.195	-.207	-.202	-.213	-.211
.050	-.113	-.053	-.152	-.156	-.158	-.170	-.163
.100	-.244	-.203	-.209	-.216	-.228	-.234	-.244
.200	-.362	-.304	-.285	-.298	-.307	-.319	-.333
.300	-.461	-.397	-.314	-.326	-.334	-.345	-.362
.350	-.543	-.472	-.338	-.344	-.356	-.370	-.386
.400	-.583	-.520	-.319	-.321	-.338	-.353	-.366
.450	-.637	-.582	-.319	-.331	-.338	-.358	-.366
.500	-.710	-.648	-.295	-.317	-.312	-.328	-.345
.550	-.759	-.710	-.247	-.257	-.264	-.277	-.284
.600	-.800	-.741	-.200	-.207	-.228	-.217	-.220
.650	-.850	-.785	-.147	-.165	-.158	-.157	-.179
.700	-.868	-.807	-.090	-.087	-.088	-.089	-.089
.800	-.900	-.838	.038	.037	.040	.043	.045
.900	-.827	-.803	.166	.165	.176	.175	.183
.950	-.393	-.706	.219	.225	.233	.238	.244

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	134	135	136	137	138	139	140
.000	1.059	1.066	1.059	1.059	1.049	1.060	1.079
.010	.414	.445	.472	.551	.598	.653	.676
.020	.183	.219	.238	.326	.374	.434	.459
.050	.008	.034	.060	.132	.178	.239	.271
.100	-.271	-.249	-.242	-.161	-.119	-.050	-.013
.150	-.394	-.384	-.372	-.300	-.259	-.185	-.149
.200	-.498	-.483	-.472	-.408	-.367	-.296	-.257
.250	-.574	-.575	-.561	-.508	-.472	-.404	-.360
.300	-.657	-.664	-.658	-.601	-.559	-.491	-.452
.350	-.765	-.790	-.769	-.705	-.664	-.592	-.544
.375	-.817	-.871	-.855	-.780	-.738	-.659	-.614
.400	-.797	-.928	-.918	-.841	-.801	-.720	-.673
.425	-.797	-.959	-.959	-.884	-.839	-.760	-.709
.450	-.797	-.986	-.996	-.930	-.885	-.804	-.749
.475	-.844	-1.039	-1.063	-.998	-.948	-.864	-.808
.500	-.797	-1.086	-1.137	-1.073	-1.021	-.935	-.878
.525	-.697	-.898	-1.212	-1.145	-1.094	-.959	-.894
.550	-.613	-.579	-1.252	-1.195	-.993	-.720	-.505
.575	-.554	-.514	-.736	-.919	-.591	-.417	-.409
.600	-.470	-.464	-.487	-.598	-.503	-.377	-.350
.625	-.398	-.387	-.386	-.479	-.434	-.350	-.303
.650	-.343	-.326	-.353	-.444	-.399	-.340	-.280
.700	-.199	-.196	-.167	-.336	-.350	-.326	-.257
.750	-.100	-.092	-.067	-.250	-.290	-.303	-.201
.800	.004	.015	.030	-.115	-.199	-.205	-.205
.850	.096	.104	.111	.025	-.094	-.188	-.191
.900	.183	.196	.201	.093	-.014	-.114	-.178
.950	.255	.261	.260	.175	.070	-.050	-.096
.010	-.183	-.192	-.212	-.265	-.308	-.289	-.241
.020	-.183	-.192	-.215	-.254	-.294	-.273	-.224
.050	-.143	-.153	-.160	-.193	-.213	-.182	-.165
.100	-.223	-.242	-.260	-.304	-.336	-.320	-.277
.200	-.315	-.338	-.364	-.429	-.486	-.468	-.426
.300	-.347	-.380	-.401	-.479	-.511	-.542	-.505
.350	-.374	-.407	-.438	-.558	-.608	-.612	-.574
.400	-.354	-.387	-.416	-.533	-.710	-.666	-.627
.450	-.354	-.384	-.412	-.515	-.734	-.723	-.683
.500	-.327	-.349	-.375	-.461	-.794	-.787	-.749
.550	-.267	-.326	-.297	-.344	-.399	-.854	-.815
.600	-.211	-.211	-.223	-.254	-.245	-.898	-.855
.650	-.155	-.188	-.156	-.179	-.185	-.955	-.904
.700	-.068	-.073	-.074	-.093	-.105	-.360	-.924
.800	.068	.073	.071	.054	.035	-.064	-.891
.900	.207	.211	.215	.193	.161	.111	-.231
.950	.263	.272	.271	.247	.206	.141	-.135

WING CENTERLINE PRESSURE COEFFICIENT MEASUREMENTS

STATION	CASE NO.						
	141	142	143	144	145	146	147
.000	1.110	1.012	1.030	1.051	1.058	1.047	1.047
.010	.699	.324	.363	.394	.461	.576	.592
.020	.487	.120	.150	.184	.242	.365	.380
.050	.310	-.012	.007	.033	.082	.195	.209
.100	.032	-.288	-.293	-.282	-.245	-.136	-.121
.150	-.098	-.380	-.398	-.407	-.382	-.278	-.262
.200	-.206	-.464	-.479	-.493	-.479	-.387	-.369
.250	-.316	-.504	-.545	-.581	-.579	-.490	-.474
.300	-.399	-.564	-.615	-.663	-.667	-.585	-.568
.350	-.487	-.616	-.685	-.759	-.791	-.688	-.672
.375	-.550	-.636	-.702	-.798	-.879	-.763	-.744
.400	-.607	-.632	-.698	-.785	-.939	-.827	-.810
.425	-.645	-.628	-.698	-.782	-.979	-.866	-.851
.450	-.686	-.628	-.702	-.791	-1.015	-.913	-.893
.475	-.740	-.648	-.727	-.828	-1.079	-.980	-.959
.500	-.806	-.620	-.692	-.782	-1.151	-1.055	-1.033
.525	-.870	-.584	-.646	-.706	-1.221	-1.127	-1.108
.550	-.914	-.576	-.590	-.631	-1.185	-1.144	-1.132
.575	-.819	-.512	-.538	-.588	-.579	-.805	-.714
.600	-.471	-.436	-.472	-.499	-.461	-.540	-.535
.625	-.376	-.388	-.398	-.417	-.376	-.473	-.457
.650	-.348	-.348	-.353	-.364	-.312	-.434	-.433
.700	-.319	-.220	-.223	-.227	-.194	-.370	-.369
.750	-.313	-.148	-.129	-.125	-.094	-.290	-.289
.800	-.288	-.032	-.028	-.020	.006	-.212	-.215
.850	-.285	.056	.063	.072	.094	-.097	-.110
.900	-.256	.144	.154	.164	.182	.017	-.028
.950	-.228	.212	.223	.233	.248	.089	.041
.010	-.152	-.208	-.210	-.220	-.242	-.315	-.325
.020	-.142	-.176	-.189	-.191	-.215	-.287	-.295
.050	-.088	-.100	-.105	-.115	-.146	-.189	-.165
.100	-.218	-.208	-.223	-.246	-.276	-.340	-.347
.200	-.348	-.284	-.307	-.338	-.379	-.487	-.504
.300	-.433	-.308	-.335	-.371	-.418	-.521	-.523
.350	-.503	-.336	-.360	-.394	-.455	-.618	-.623
.400	-.553	-.308	-.360	-.374	-.430	-.668	-.680
.450	-.617	-.316	-.346	-.374	-.430	-.724	-.749
.500	-.680	-.296	-.332	-.345	-.394	-.596	-.818
.550	-.740	-.244	-.283	-.302	-.318	-.365	-.584
.600	-.778	-.192	-.210	-.220	-.264	-.278	-.251
.650	-.828	-.148	-.154	-.171	-.179	-.206	-.196
.700	-.851	-.084	-.101	-.092	-.100	-.125	-.124
.800	-.886	.040	.038	.046	.052	.028	.016
.900	-.841	.164	.175	.184	.194	.164	.149
.950	-.674	.224	.231	.240	.255	.206	.187

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TABLE I.

LOCATION OF PRESSURE ORIFICES ON WING MODEL

(All locations are expressed as percent chord)

Chordwise Station	Upper-Surface Ordinate	Lower-Surface Ordinate
0.0	0.00	—
1.0	1.62	-1.20
2.0	2.22	-1.60
5.0	3.37	-2.37
10.0	4.78	-3.23
15.0	5.80	—
20.0	6.58	-4.28
25.0	7.18	—
30.0	7.62	-4.85
35.0	7.93	-5.00
37.5	8.02	—
40.0	8.05	-5.03
42.5	8.05	—
45.0	8.01	-4.96
47.5	7.93	—
50.0	7.80	-4.79
52.5	7.60	—
55.0	7.35	-4.49
57.5	7.06	—
60.0	6.73	-4.09
62.5	6.37	—
65.0	5.97	-3.62
70.0	5.13	-3.08
75.0	4.24	—
80.0	3.29	-1.91
85.0	2.35	—
90.0	1.43	-0.75
95.0	0.64	-0.28

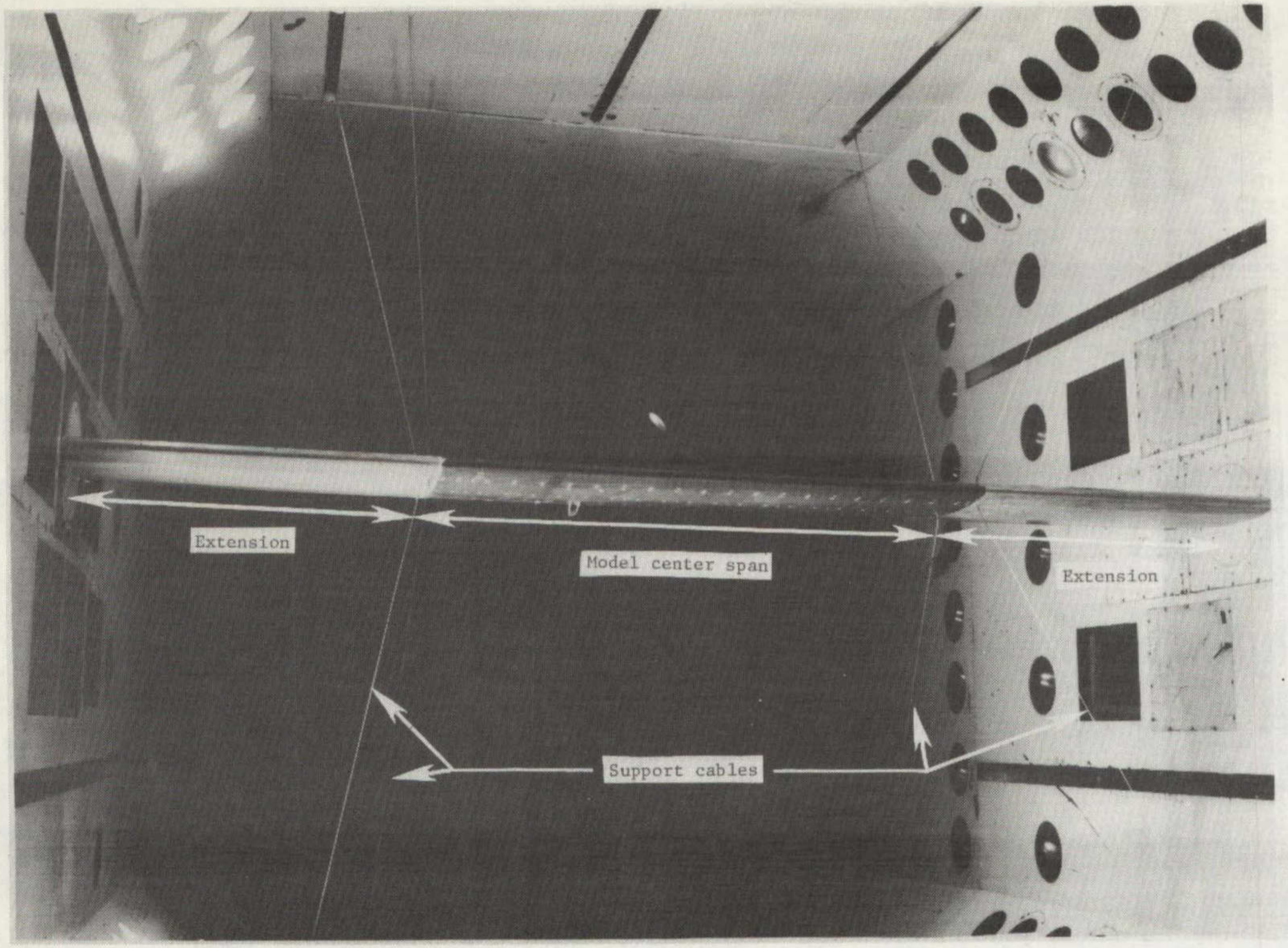
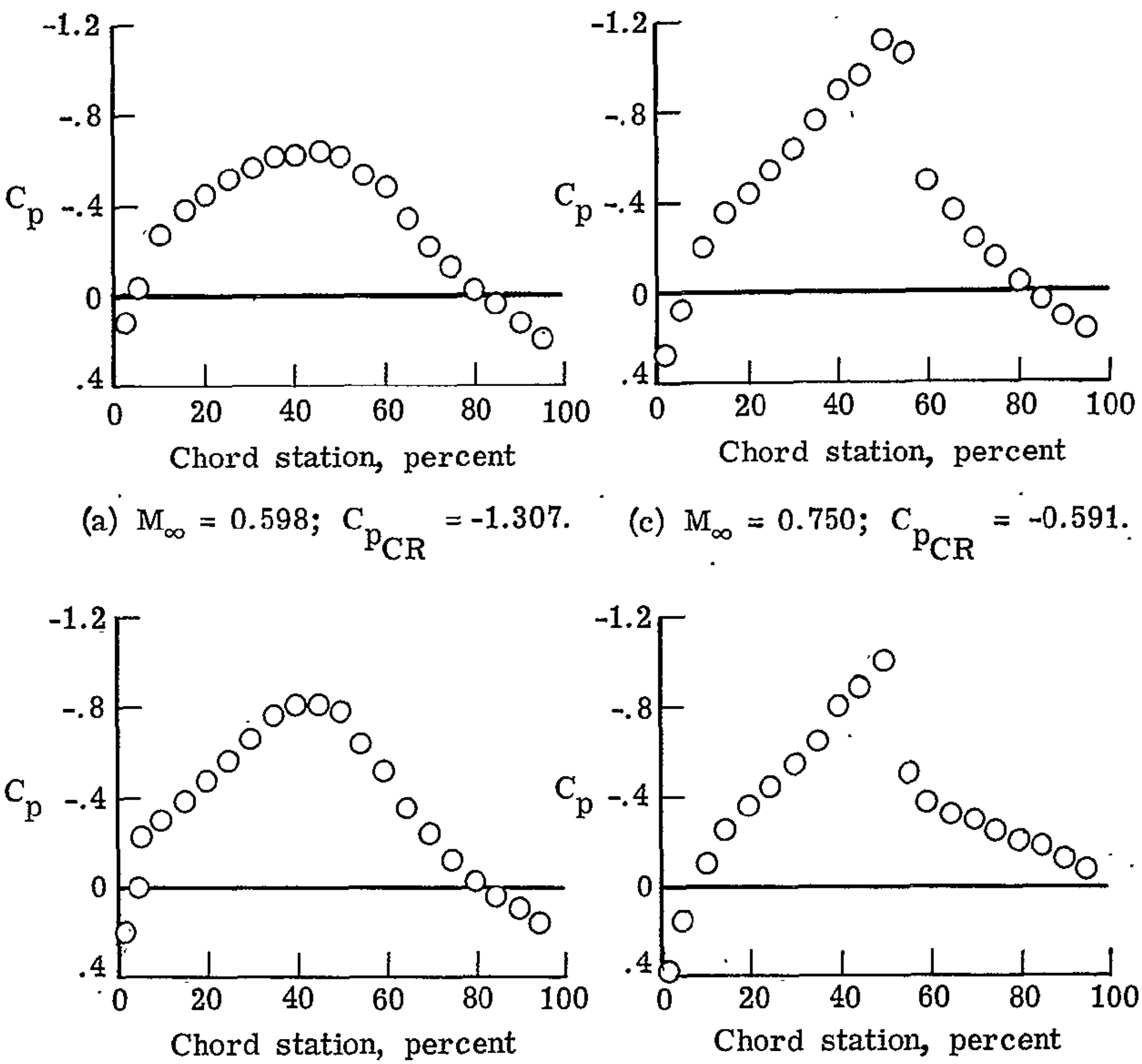


Figure 1. - Two-dimensional wing model as mounted in the wind-tunnel.



(a) $M_\infty = 0.598$; $C_{p_{CR}} = -1.307$.

(c) $M_\infty = 0.750$; $C_{p_{CR}} = -0.591$.

(b) $M_\infty = 0.699$; $C_{p_{CR}} = -0.783$.

(d) $M_\infty = 0.798$; $C_{p_{CR}} = -0.440$.

Figure 2.- Measured upper-surface pressure coefficient distributions in air. $\alpha = 0^{\circ}$; $R_N = 3 \times 10^{6}$.

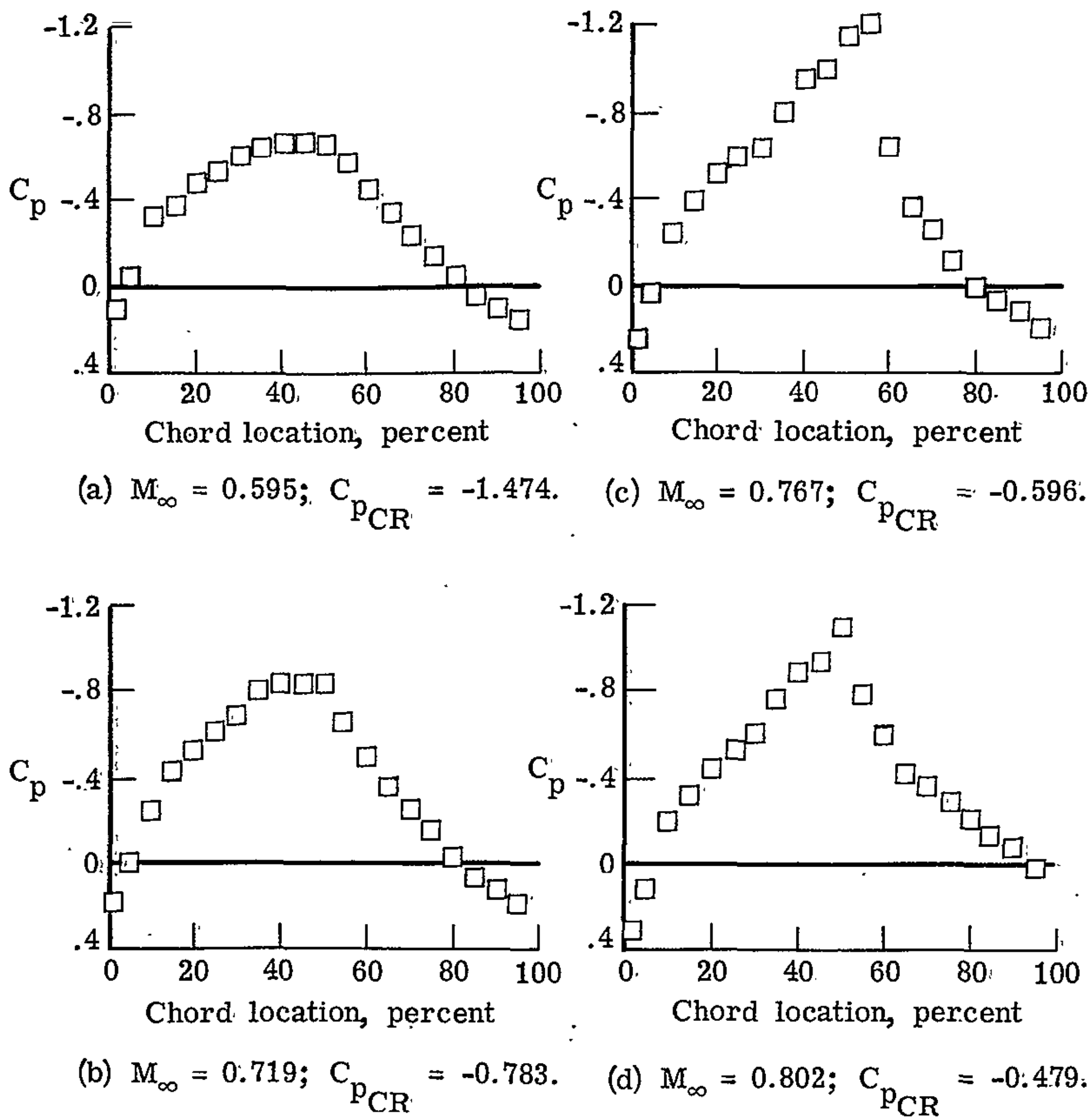


Figure 3.- Measured upper-surface pressure coefficient distributions in Freon-12. $\alpha = 0^o$; $R_N = 3 \times 10^6$.

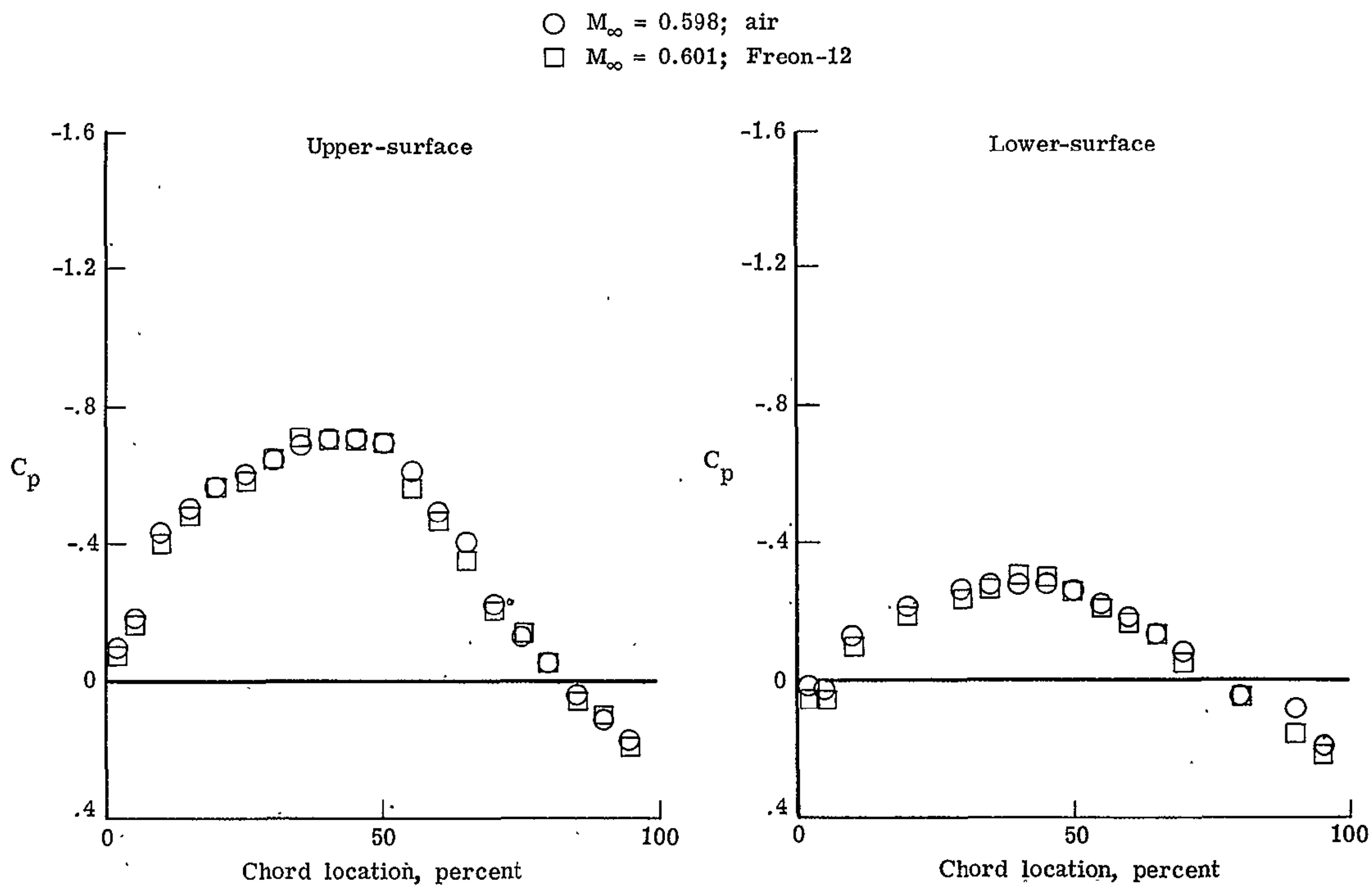


Figure 4.- Pressure distributions measured in air and Freon-12 for a subcritical Mach number. $\alpha = 1^{\circ}$; $R_N = 3 \times 10^6$.

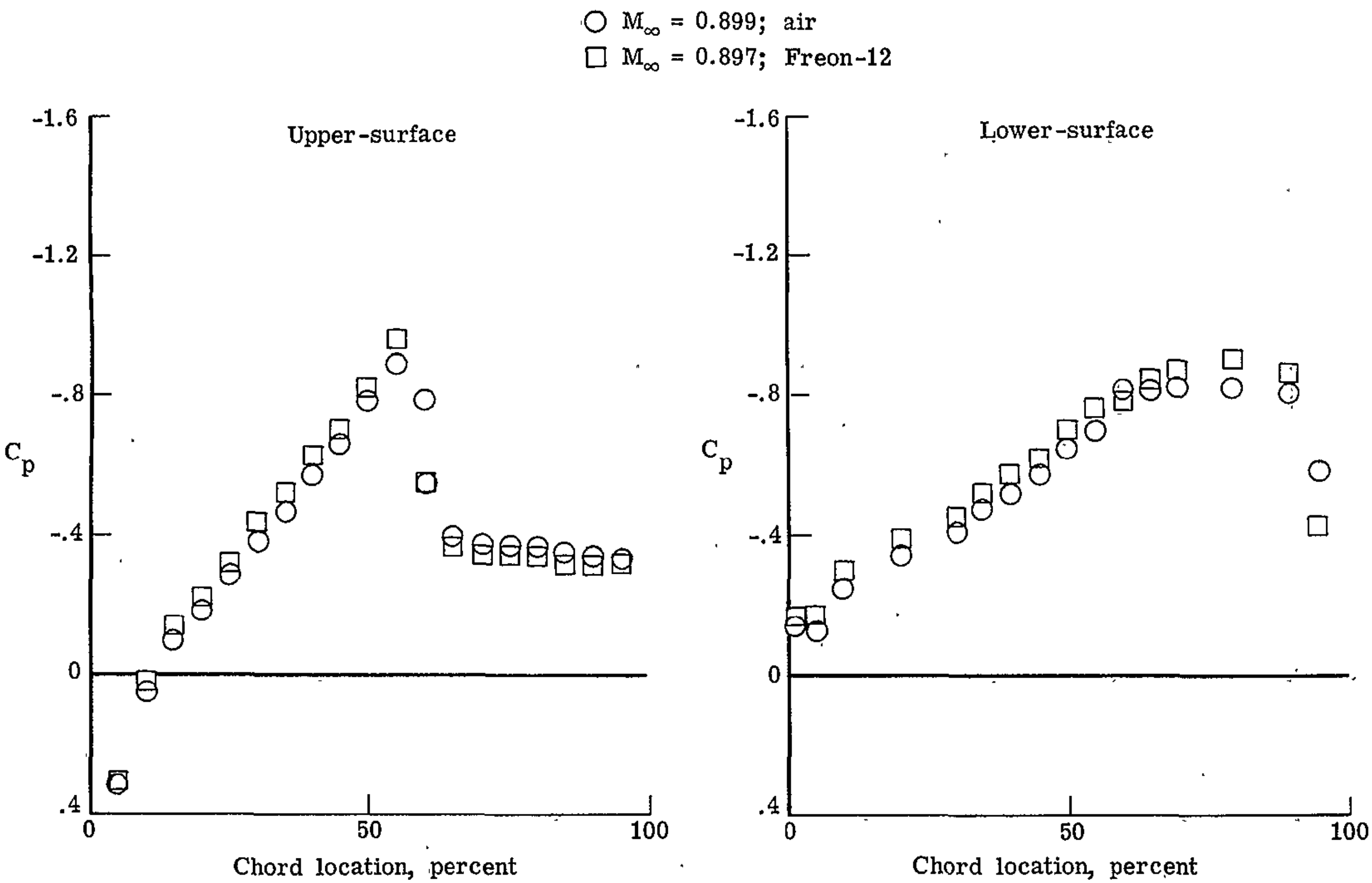


Figure 5.- Pressure distributions measured in air and Freon-12 for a supercritical Mach number. $\alpha = 0^{\circ}$; $R_N = 2 \times 10^6$.

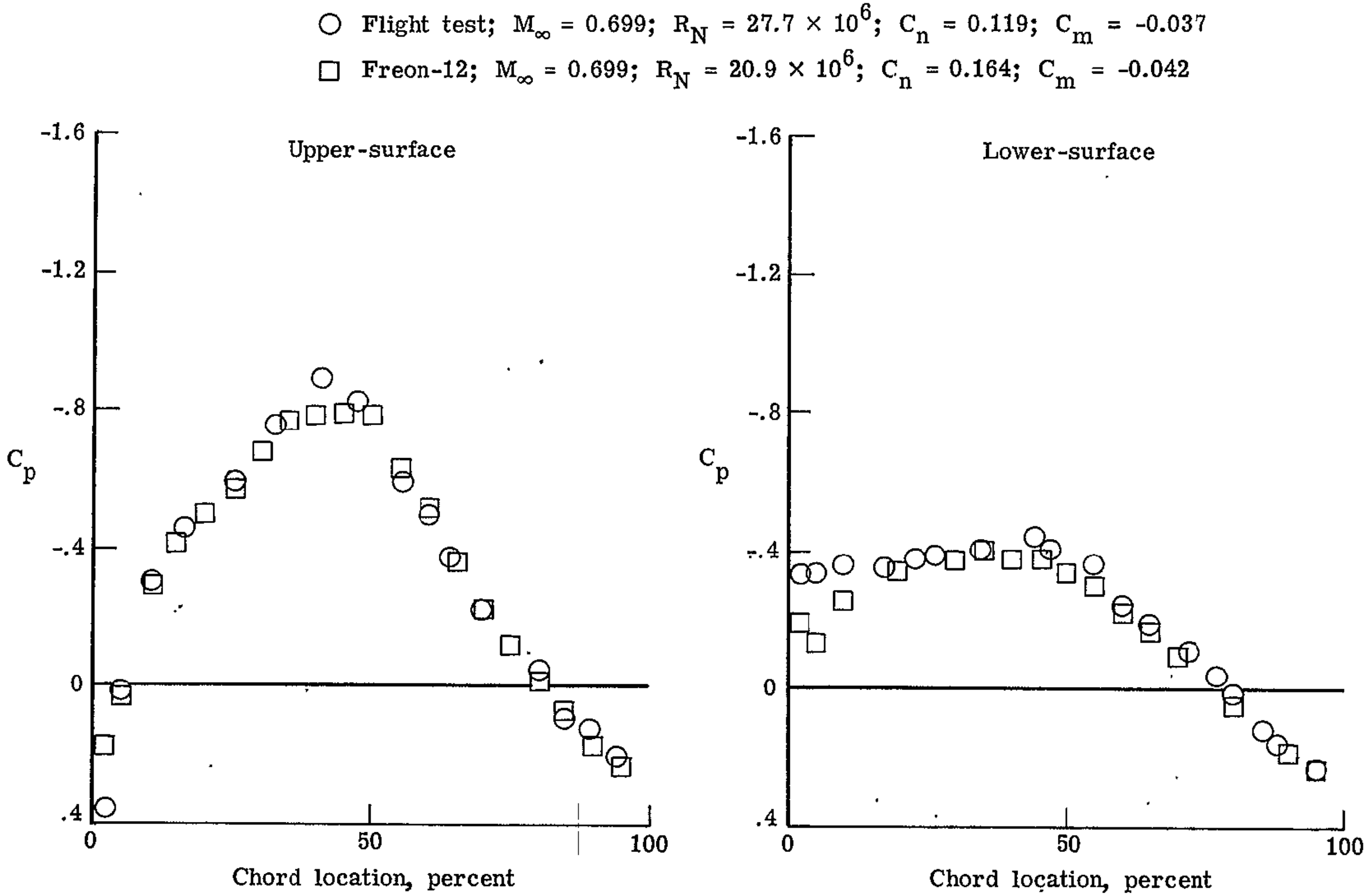


Figure 6.- Comparison of data measured in Freon-12 with flight test results for a subcritical Mach number.

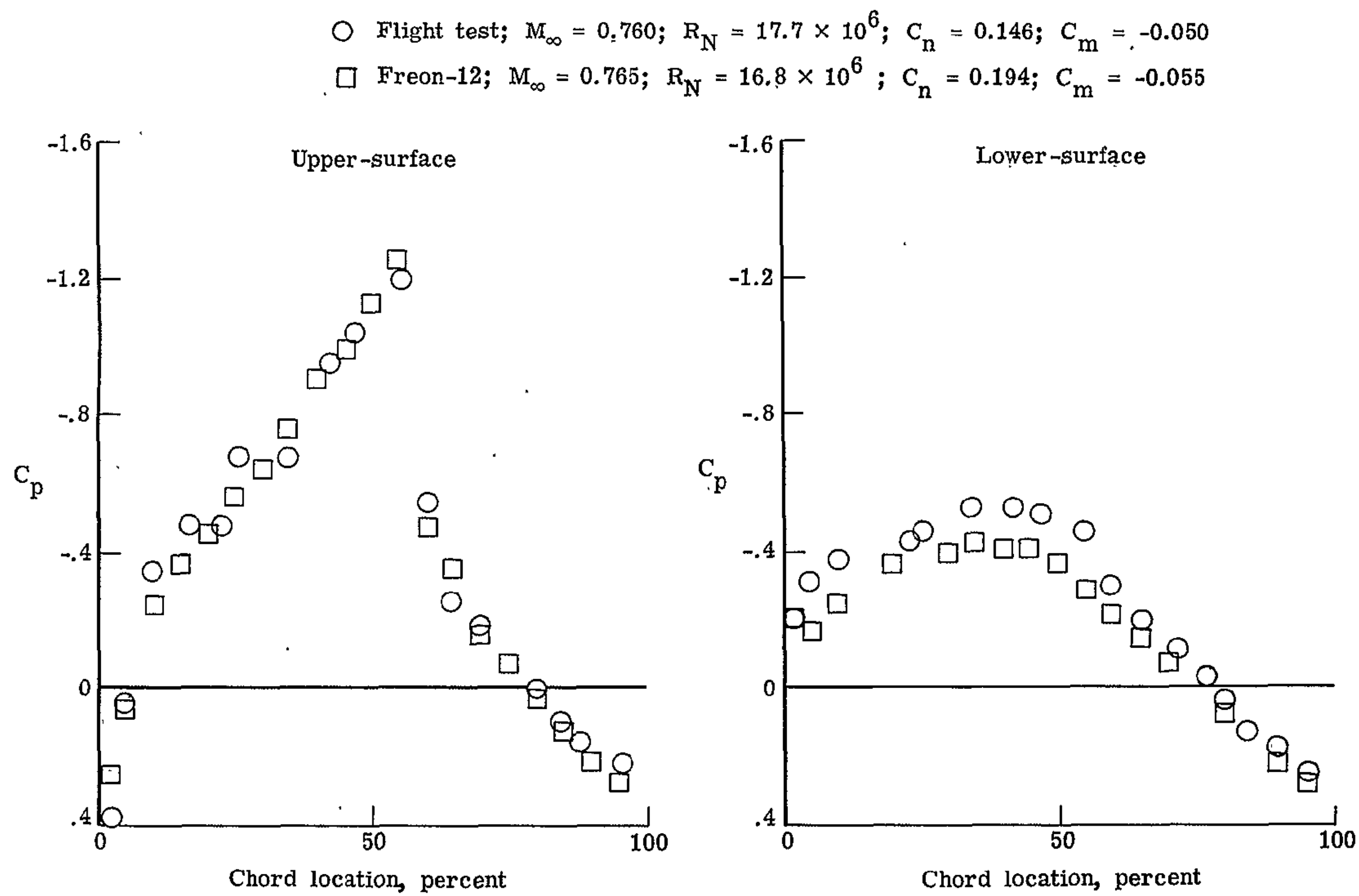


Figure 7.- Comparison of data measured in Freon-12 with flight test results for a supercritical Mach number.

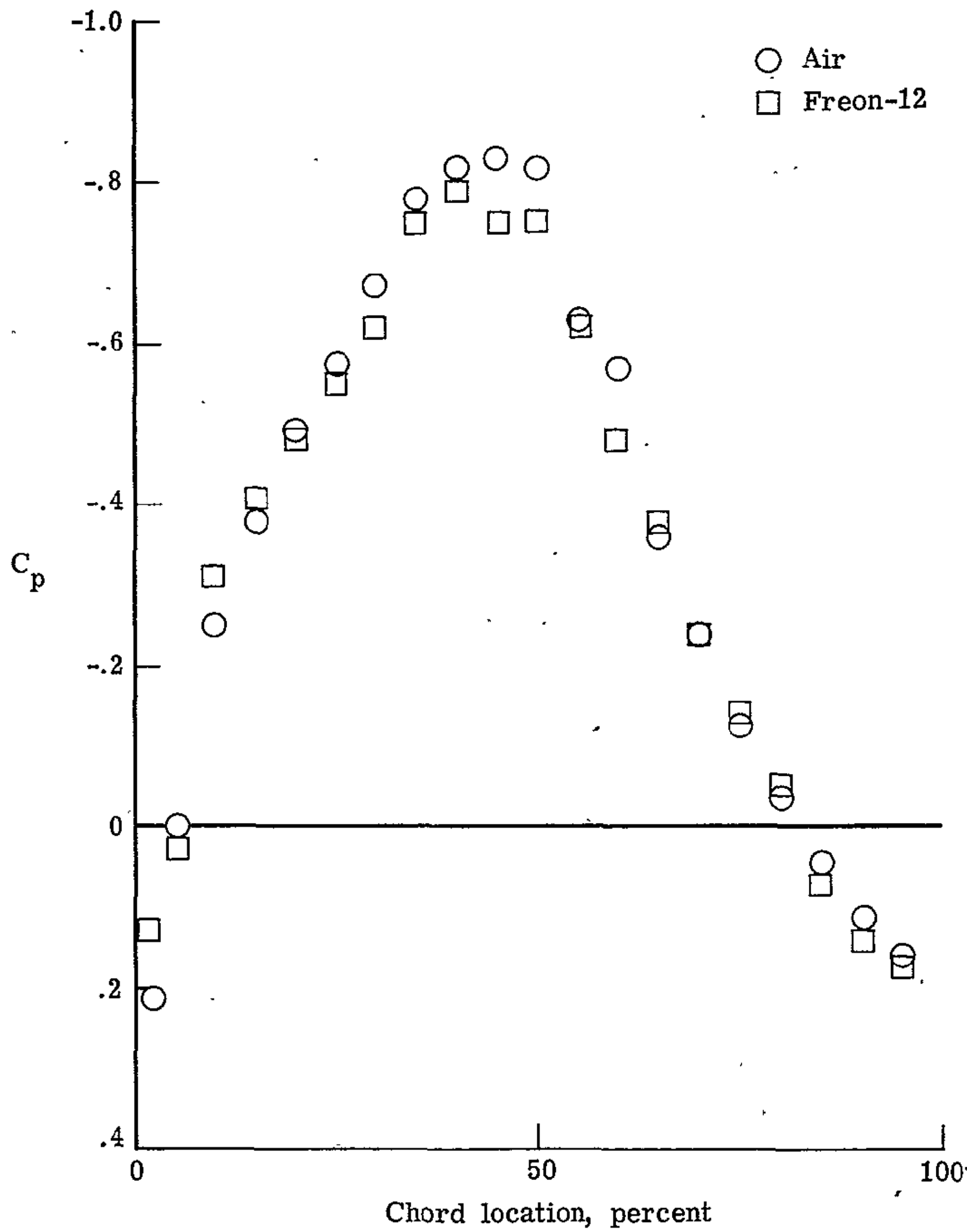


Figure 8.- Upper-surface pressure distributions used to compare local Mach numbers in air and Freon-12: $\alpha = 0^{\circ}$; $R_N = 2 \times 10^6$; $M_\infty = 0.697$.

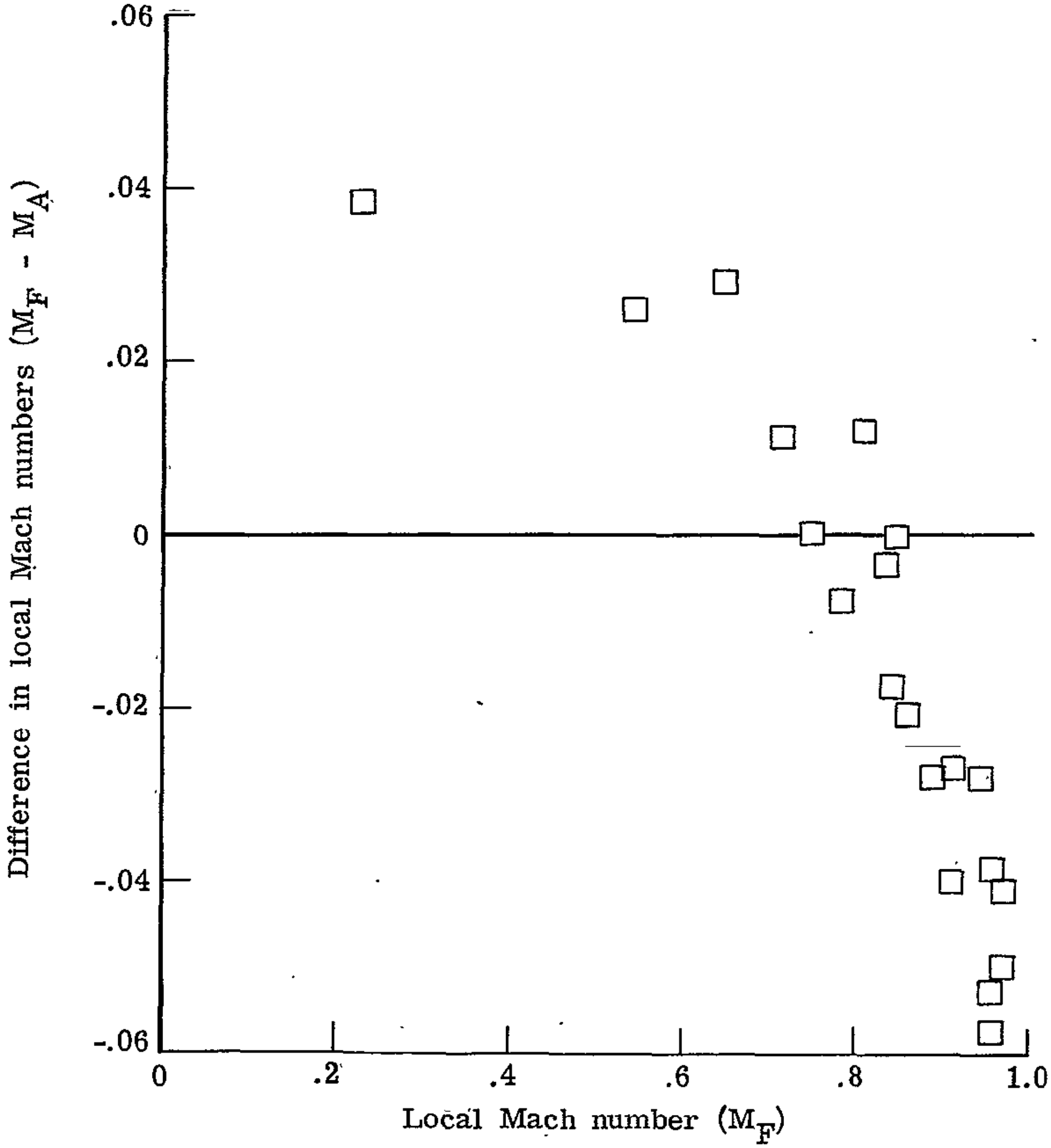


Figure 9.- Calculated differences in local Mach numbers based on pressure distributions measured in air and Freon-12. $\alpha = 0^{\circ}$; $R_N = 2 \times 10^6$; $M_\infty = 0.697$.

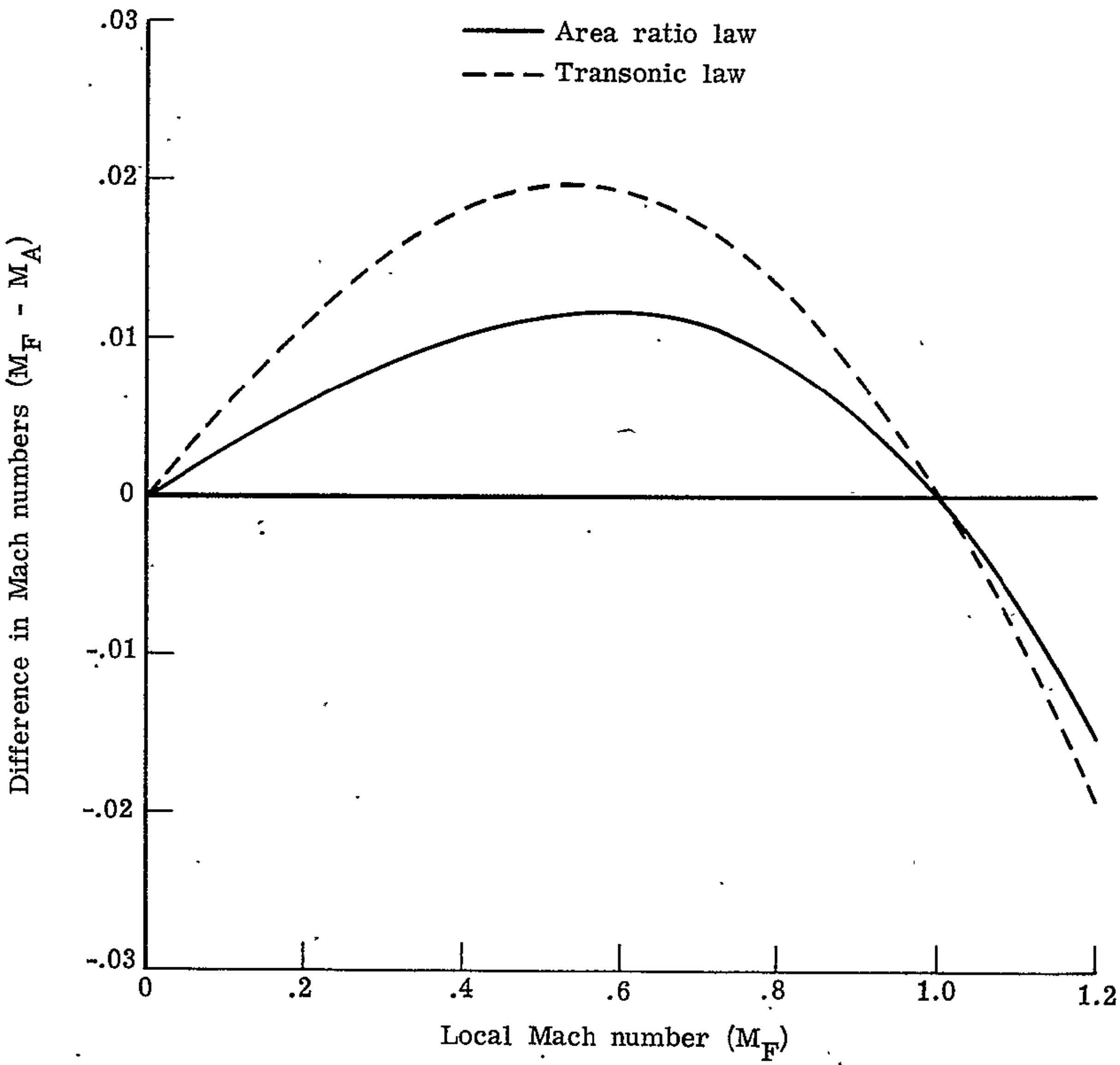


Figure 10.- Predicted correspondence between air and Freon-12 Mach numbers based on similarity laws. $\gamma_A = 1.4$; $\gamma_F = 1.135$.

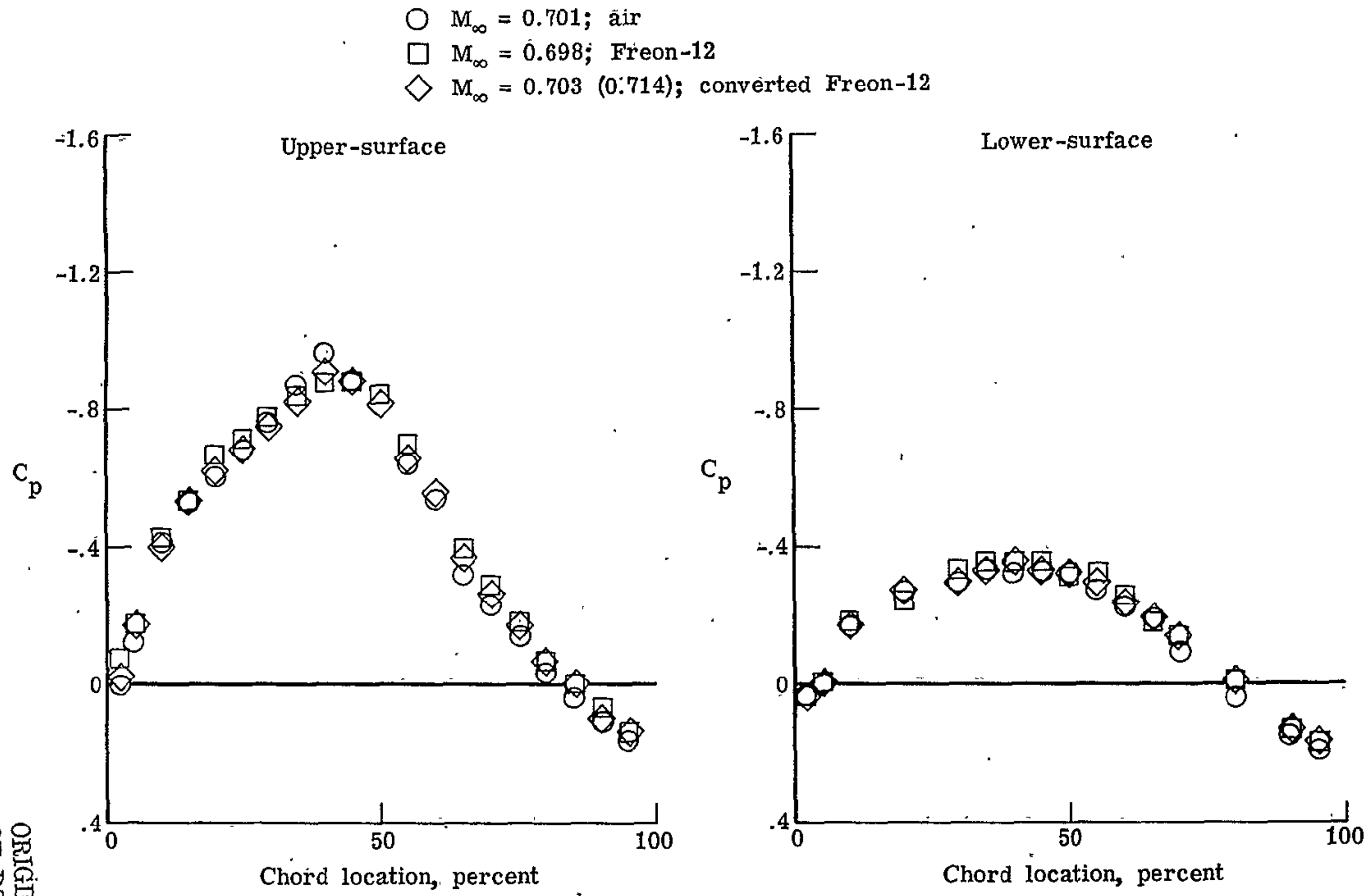


Figure 11.- Use of area ratio similarity law to improve correlation between air and Freon-12 data for subcritical flow. $\alpha = 1^{o}$; $R_N = 2 \times 10^6$.

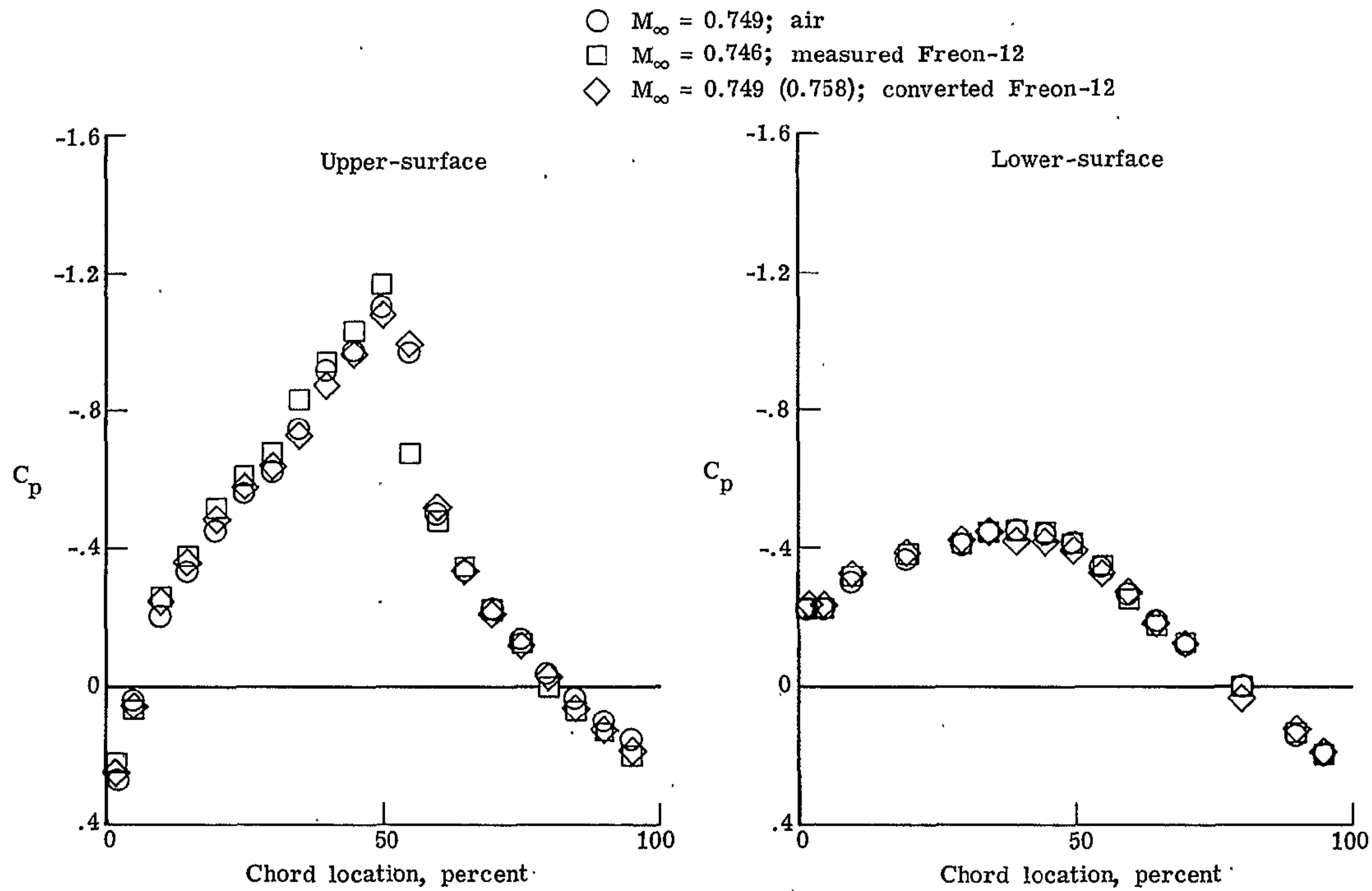


Figure 12.- Use of area ratio similarity law to improve correlation between air and Freon-12 data for supercritical flow. $\alpha = 0^{o}$; $R_N = 2 \times 10^6$.

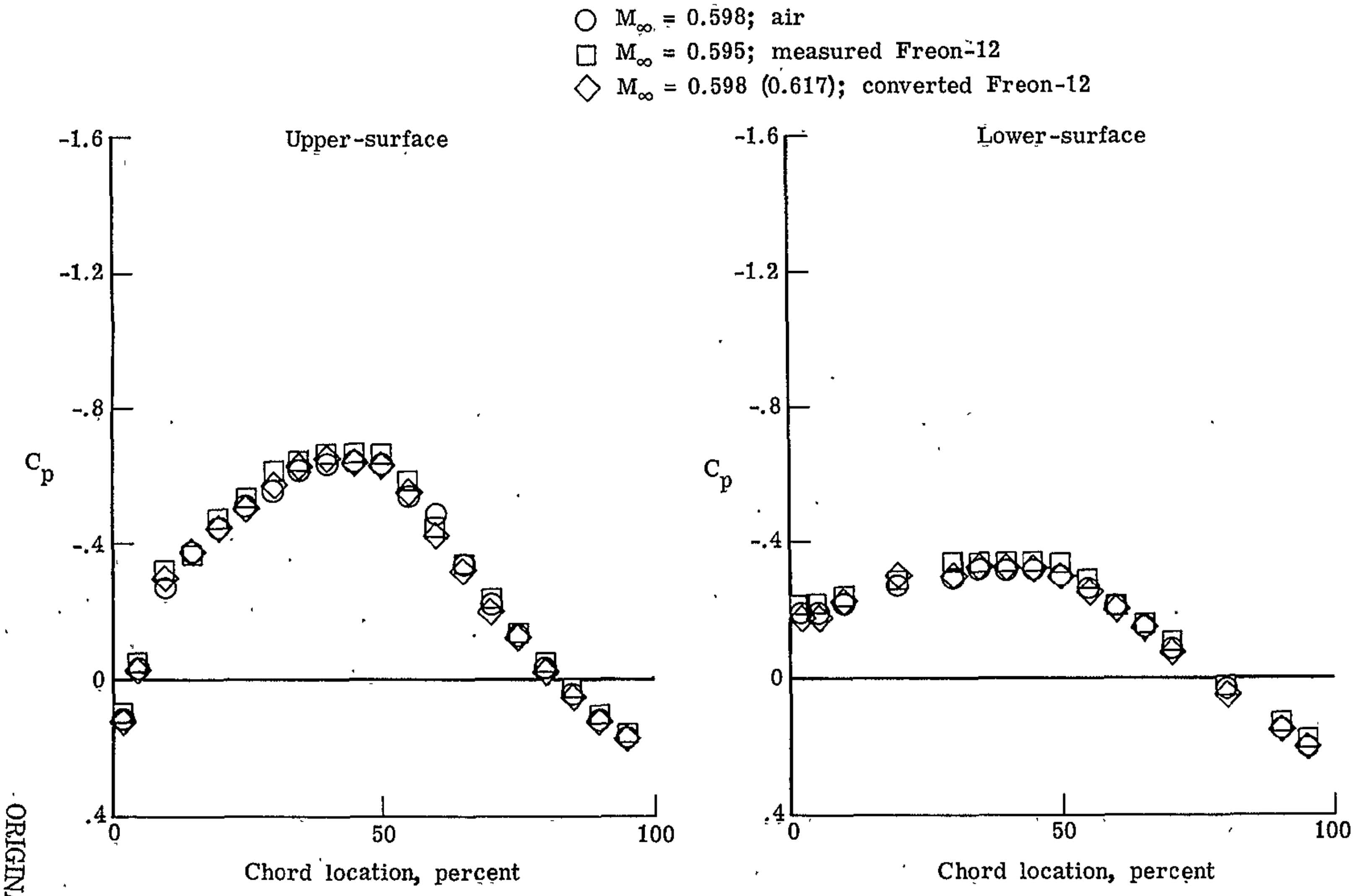


Figure 13.- Use of transonic similarity law to improve correlation between air and Freon-12 data for subcritical flow. $\alpha = 0^{\circ}$; $R_N = 3 \times 10^{6}$.

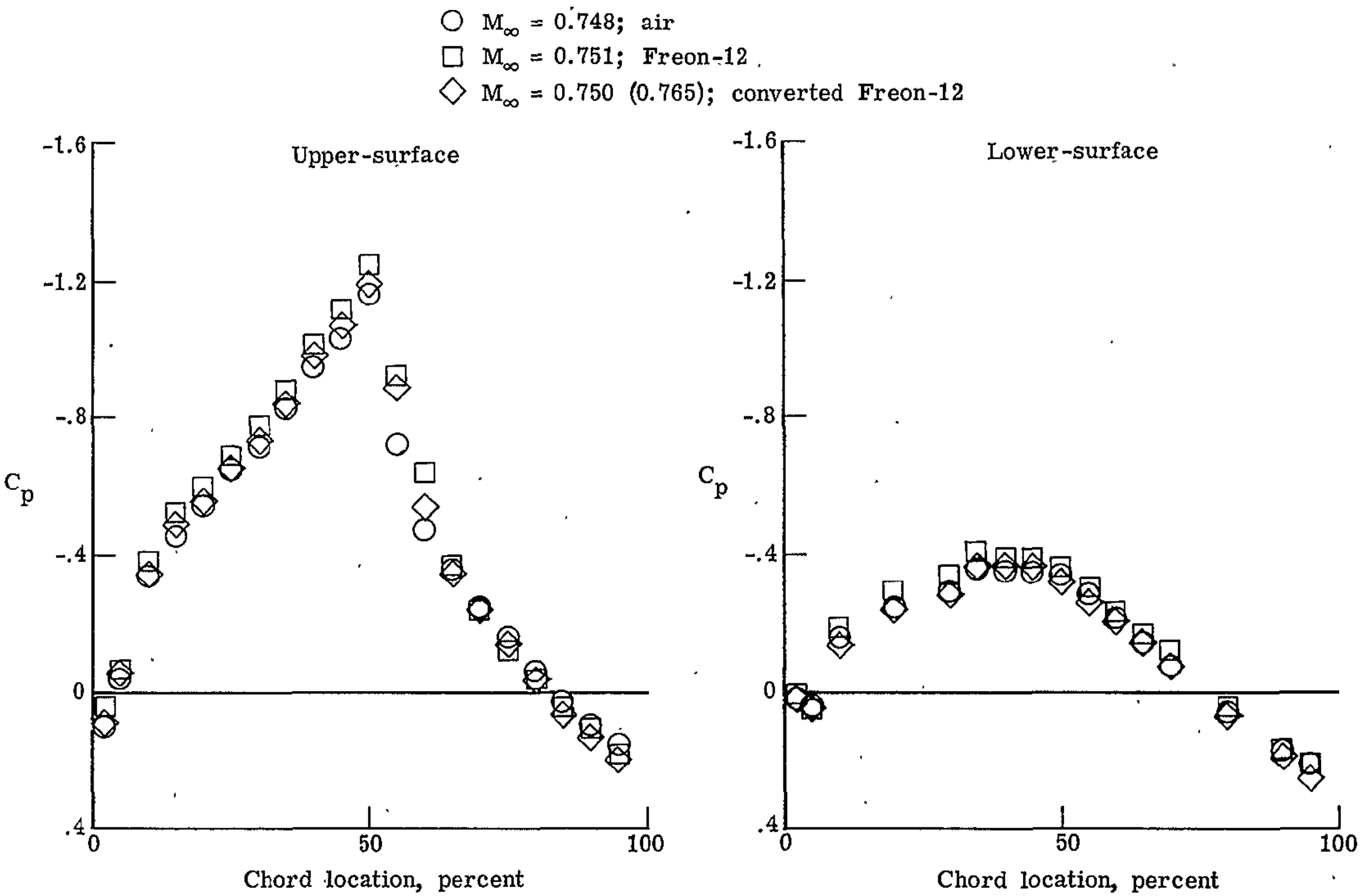
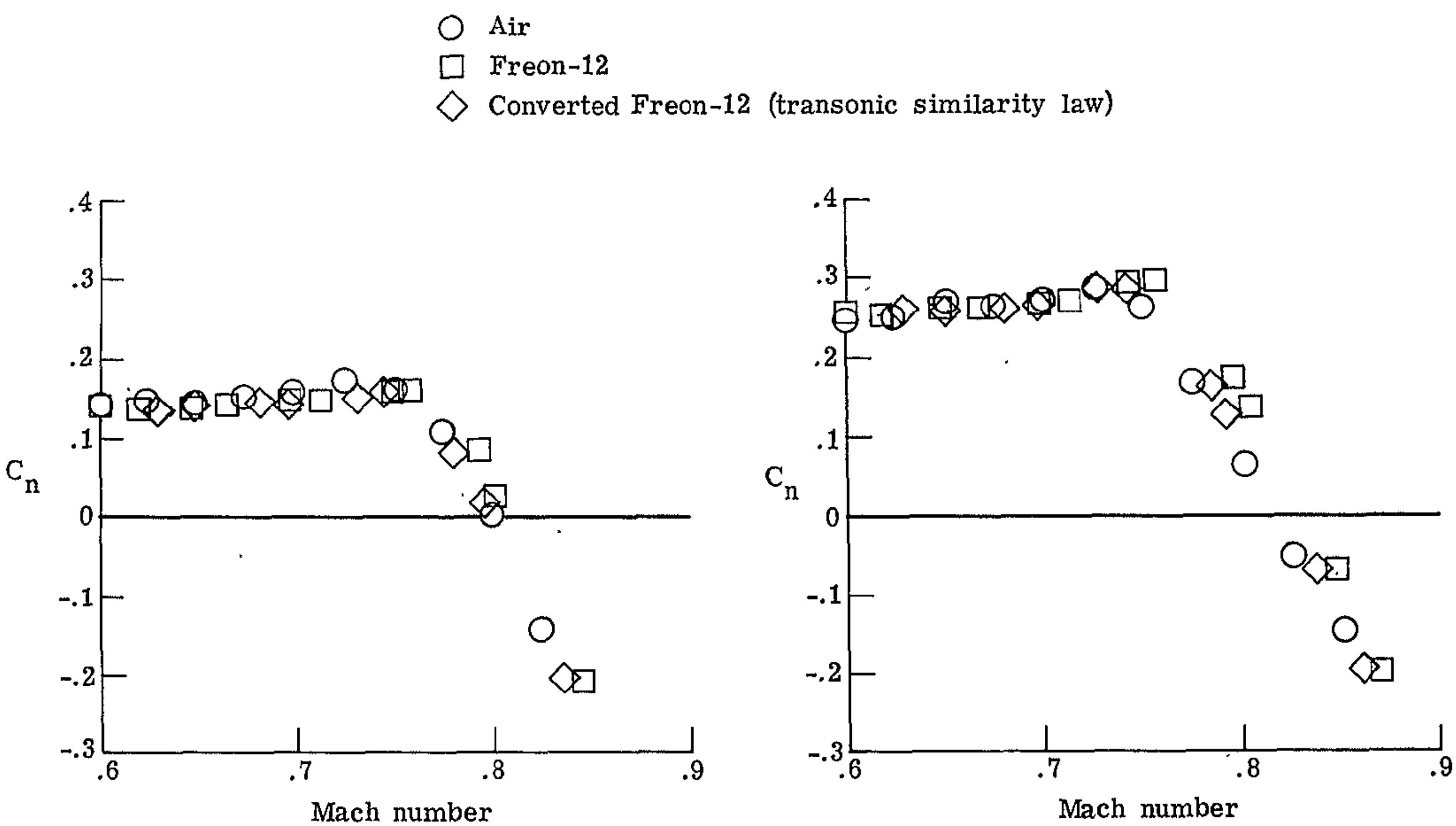


Figure 14.- Use of transonic similarity law to improve correlation between air and Freon-12 data for supercritical flow. $\alpha = 1^{o}$; $R_N = 3 \times 10^6$.



(a) $\alpha = 0^{\circ}$.

(b) $\alpha = 1^{\circ}$.

Figure 15.- Normal force coefficients derived from pressure distributions measured in air and Freon-12. $R_N = 2 \times 10^6$.

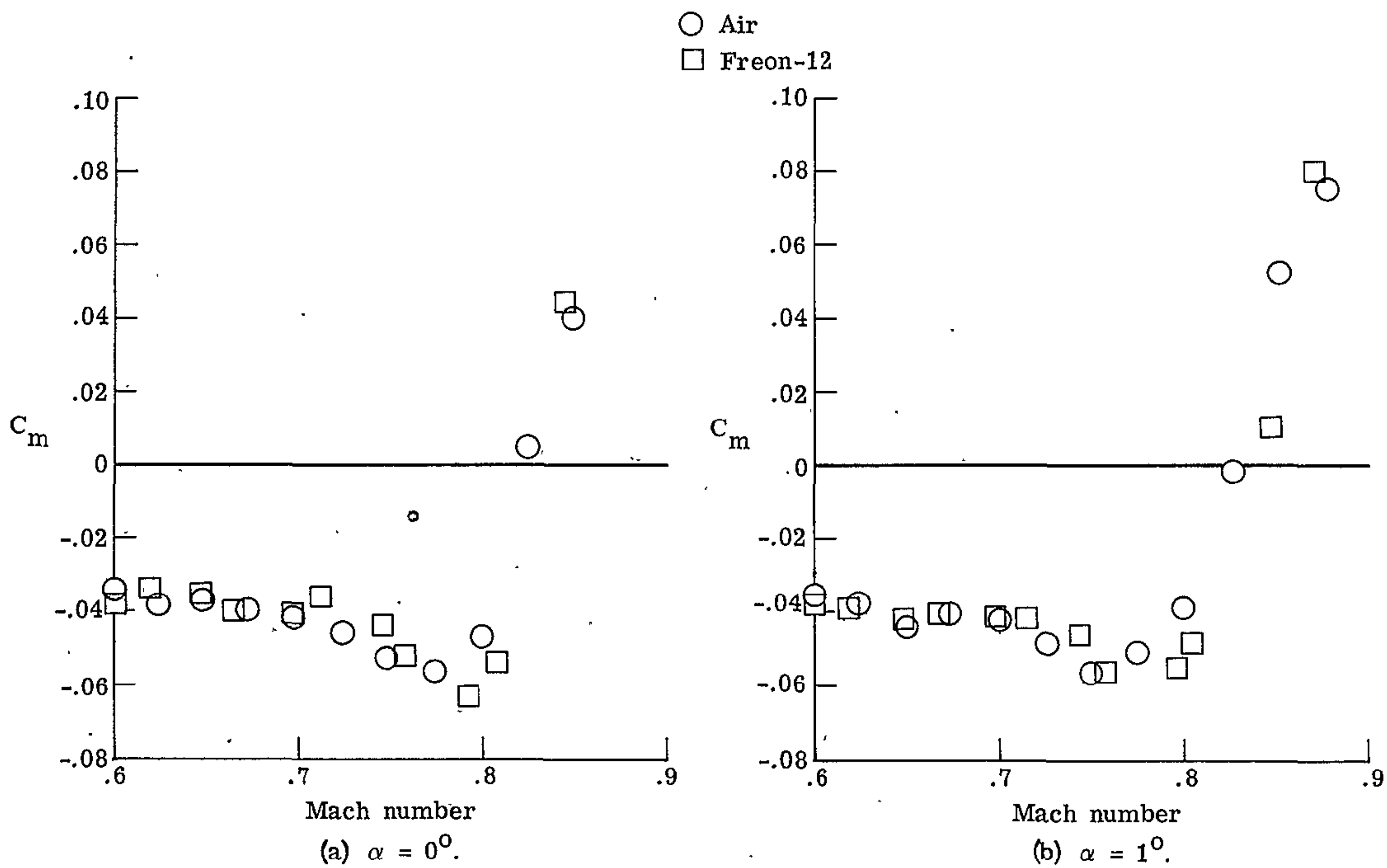


Figure 16.- Pitching moment coefficients derived from pressure distributions measured in air and Freon-12. $R_N = 2 \times 10^6$.

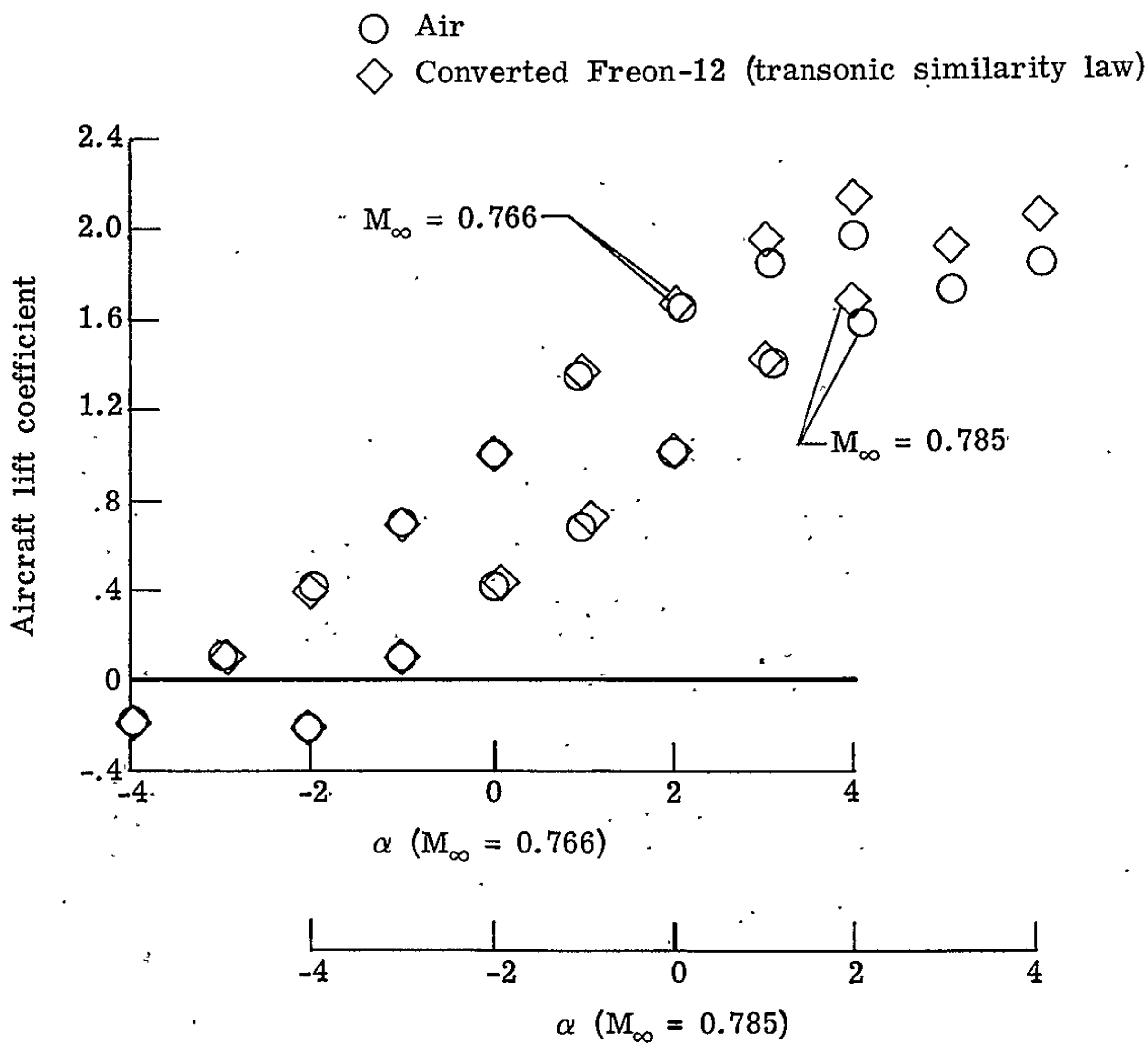


Figure 17.- Comparison of three-dimensional aerodynamic characteristics measured in air and Freon-12 using a model of a large logistics aircraft. $R_N = 3.28 \times 10^6$/m.

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15 Supplementary Notes

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16. Abstract

An experimental investigation has been carried out to measure two-dimensional static aerodynamic characteristics of a 65_1-213 airfoil in air and Freon-12 (dichlorodifluoromethane) test mediums at corresponding test conditions. The purpose of the tests was to compare measurements in the two test mediums and to evaluate reported methods of converting Freon-12 data to equivalent air values. The test article was a two-dimensional wing instrumented to measure chordwise surface pressure distributions. The parameters considered were Mach numbers from 0.6 to 1.0, angles of attack of 0° and 1°, and Reynolds numbers based on model chord from 2×10^6 to 21×10^6.

Test results are presented in this report. Aerodynamic data measured in air and Freon-12 are generally in good agreement. The agreement between data measured in the two test mediums is further improved by application of the transonic or area ratio similarity laws. Where flow conditions are characterized by surface shocks or stall, the effects of flow separation may not be identically reflected in the Freon-12 data, even when converted in accordance with existing similarity laws.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
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