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TESTS OF A NACA 65_1-213 AIRFOIL IN THE NASA LANGLEY 0.3-METER TRANSONIC CRYOGENIC TUNNEL

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ABSTRACT

A wind-tunnel investigation has been conducted to study the two-dimensional aerodynamic characteristics of the NACA 65_1-213 airfoil over a wide range of Reynolds numbers. Test temperature ranged from ambient to about 100K at pressures ranging from about 1.2 to 6.0 atm. Mach number was varied from 0.22 to 0.80 and Reynolds number (based on airfoil chord) from 3×10^6 to 40×10^6. Data are included which demonstrate the effects of fixed transition, Mach number, and Reynolds number on the aerodynamic characteristics of the airfoil. A sample of data showing the effects of angle of attack on the pressure distribution is also given. The data are presented in an uncorrected form with no analysis in order to expedite the release of the data.

SUMMARY

In cooperative efforts with both the U.S. manufacturers of large transport aircraft and a research establishment in Germany, NASA has recently undertaken an extensive program to provide a systematic study of both well-known conventional and advanced technology airfoils over a wide range of Reynolds numbers. This airfoil program, referred to as the Advanced Technology Airfoil Tests (ATAT) program, is being conducted in the two-dimensional test section of the Langley 0.3-Meter Transonic Cryogenic Tunnel (TCT).

The results presented in the report are for the NACA 65_1-213 correlation airfoil. The test temperatures ranged from ambient to about 100K at pressures ranging from about 1.2 to 6.0 atm. Mach number was varied from 0.22 to 0.80. These variables yielded Reynolds numbers (based on airfoil chord) from about 3×10^6 to 40×10^6. This test was primarily designed to test a NACA 65_1-213 airfoil over a wide range of Reynolds numbers and compare the data to that obtained on the same profile in other facilities.

All the objectives of the test were met. Data are included which demonstrate the effects of fixed transition, Mach number, and Reynolds number on the aerodynamic characteristics of the airfoil. A sample of data showing the effects of angle of attack on the pressure distribution is also provided. The data are presented in an uncorrected form with no analysis.

INTRODUCTION

To augment the commercial aircraft industry's research on energy efficient aircraft, the Langley Aircraft Energy Efficient (ACEE) Project Office has sponsored the Advanced Technology Airfoil Tests (ATAT) program to test airfoils in the 0.3-m TCT. The program is divided into four parts: (1) correlation airfoils, (2) an advanced NASA airfoil, (3) the U.S. industry program, with involvement by the Boeing Commercial Airplane Company (BCAC), the Lockheed Aircraft Company (LAC) and the Douglas Aircraft Company (DAC), and (4) a joint program with Deutsche Forschungs-und Versuchsanstalt für Luft- und Raumfahrt (DFVLR), Federal Republic of Germany. The purpose of the program is to allow industry to test their latest technology airfoils in the 0.3-m TCT where flight Reynolds numbers can be obtained at transonic speeds. Some data would then be made available for use by industry, both foreign and domestic, for comparison of current advanced technology. This program also serves the purpose of providing industry with experience in cryogenic model design and fabrication. A more complete description of the ATAT program is provided in references 1 and 2.

Results from tests of the Boeing BAC-I airfoil, the first airfoil of the NASA/U.S. industry phase, have been published in reference 3. The first test of the DFVLR CAST 10-2 airfoil is described in reference 4.

The correlation airfoils were chosen to establish a relationship between the data obtained in the 0.3-m TCT and that obtained at other facilities, such as, the Langley Low Turbulence Pressure Tunnel (LTPT), the Lockheed Aircraft Company Compressible Flow Facility (LAC CFF), and the Canadian National Aeronautical Establishment (NAE) High Reynolds Number 15- x 60-Inch Two-Dimensional Transonic Test Facility. The four airfoils chosen as the correlation airfoils were the NACA 0012, NACA 65_1-213 (description of these two designations can be found in reference 5), NASA SC(2)-0510 and NASA SC(2)-0714 (descripton of these designations is given in reference 6). Reported herein are the results of the test program for the NACA 65_1-213 airfoil. The model was tested in the NASA Langley 0.3-m TCT at Mach numbers from 0.22 to 0.80 and at Reynolds numbers (based on airfoil chord) from 3×10^6 to 40×10^6. The stagnation pressures and temperatures required to obtain these conditions varied from 1.2 to 6.0 atm and from ambient, 320K, to cryogenic, 100K, respectively. The data taken in this test consisted of model surface pressures, wake survey pressures, and tunnel floor and ceiling pressures. The aerodynamic results are presented in an uncorrected form as integrated forces and moments. Some sample tabulated pressure data and plots of pressure distributions are also included. Copies of the pressure data are available on microfiche.

SYMBOLS

a	mean-line designation; fraction of the chord from leading edge over which loading is uniform at the ideal angle of attack
b	airfoil model span, cm
c	airfoil model chord, cm
c_d	section drag-force coefficient from wake measurements
c_ℓ	section lift coefficient
c_m	section pitching-moment coefficient about quarter-chord point
c_n	section normal-force coefficient from airfoil pressures
C_p	pressure coefficient
M	freestream Mach number
p_t	tunnel stagnation pressure, atm (1 atm = 101.3kPa)
R_c	Reynolds number based on airfoil chord
T_t	tunnel stagnation temperature, K
x	chordwise distance from leading edge of airfoil, cm
y	spanwise distance along model from centerline of tunnel and model, cm
z	thickness from chordline of tunnel, cm
α	uncorrected angle of attack, deg

WIND TUNNEL

Tests of the NACA 65_1-213 airfoil were conducted in the Langley 20- by 60-cm two-dimensional test section insert of the 0.3-m TCT. A photograph of the tunnel is shown in figure 1(a) and a schematic drawing showing some physical characterictics is given in figure 1(b). A photograph of the 20- by 60- cm two dimensional test section is shown in figure 2. Here the plenum cover and the test section ceiling have been removed to show model installation. The 0.3-m TCT is a continuous flow, fan driven, transonic tunnel which uses nitrogen gas as the test medium. As detailed in reference 2, the tunnel with the two-dimensional test-section insert, is capable of operating at temperatures varying from about 78K to about 340K and stagnation pressures ranging from slightly greater than 1.0 atmosphere up to 6.0 atmospheres. Mach number can be varied from about 0.20 to 0.90. The ability to operate at cryogenic temperatures combined with the six-atmosphere pressure capability provides an extremely high Reynolds number capability at relatively low model loadings. For this test, slotted walls were installed for the floor and ceiling to help reduce model blockage. More information on the 0.3-m TCT's design and operational capabilities can be found in reference 7.

The two-dimensional test section contains computer driven angle-of-attack and momentum rake systems. The angle of attack system is capable of varying the angle of attack over a range of about 40°. The momentum rake, located just downstream of the airfoil (see figure 2), provides up to five total pressure measurements across the span of the model and can traverse vertically from about one chord above to about one-half chord below the model. Integration of these pressure measurements provides the wake drag coefficient. The comparison of these five spanwise pressure measurements provides a mechanism for determining the extent of two dimensionality in the flow. For this test, it was necessary to specify the upper and lower boundaries of the airfoil wake, and the number of pressure readings to be recorded within the wake for each set of conditions tested.

MODEL

The model tested was a two-dimensional airfoil with a NACA 65_1-213 profile and has a chord of 15.25 cm. Given in Table 1 are the design coordinates of the airfoil section as well as the coordinates measured along the model centerspan. The design coordinates were obtained using the equations programmed from reference 8. The coordinates for the NACA 65_1-213 were found by computing the coordinates for a 65-012, then scaling the thickness coordinates by multiplying by 13/12. To ensure the proper loading, the coordinates were then shifted about the camber line computed for $c_\ell = 0.2$ and $a = 0.5$. A schematic drawing of the model is shown in figure 3. Figure 2 shows the model installed in the 0.3-m TCT test section. The model has a total of 57 surface static-pressure orifices, each with a diameter of 0.025 cm. Table 2 provides a list of the spanwise and streamwise coordinates for each orifice.

Model Fabrication

The model was constructed from PH 13-8Mo stainless steel, heat treated to the condition H1150M. It was designed and fabricated in accordance with the NASA aerodynamic and structural requirements specified for the ATAT program. As shown in figure 4, the leading edge and trailing edge sections of the airfoil were connected by a tongue and groove joint. The joint was pinned together with a dowel, the surface was then machine finshed. After fabrication was completed, the model was cycled to cryogenic temperatures and back to ambient temperatures at a rate similar to that it would experience under 0.3-m TCT operating conditions. After the cryogenic cycling, a small discontinuity appeared at the joint line. The discontinuity was found to be less than a 0.0025-cm difference in height.

Model Accuracy

The airfoil was measured for final contour and orifice location with a Brown & Sharp Validator 200 probe. Plotted in figure 5 is the difference between the design and measured airfoil coordinates. Over much of the airfoil, the measured contour checked to within ±0.0025 cm (the design tolerance) of the design coordinates. At the leading edge, where the steep slope of the airfoil's surface made it difficult to accurately measure, the final contour appears to be more in error than in fact it most likely is. The errors at the trailing edge are most likely caused by the handworking required to form a sharp trailing edge. The airfoil was again validated at the completion of the test. The airfoil contour checked to be within 0.0025 cm of what it had read prior to the test. From the measurements, there appeared to have been a further increase in displacement at the joint during the test; however, the displacement was still less than 0.0025 cm.

TEST INSTRUMENTATION

A detailed discussion of the instrumentation and procedures selected for the calibration and control of the 0.3-m TCT can be found in reference 9. However, since the airfoil data are derived from (1) the pressure distributions around the airfoil, (2) the definition of the wake defect, and (3) the corresponding angle of attack, the details of relevant instrumentation are discussed herein.

Airfoil Pressures

The 0.3-m TCT is equipped to obtain up to 96 static-pressure measurements on the airfoil surface by the use of individual precision capacitive potentiometer pressure transducers. The pressure transducers are located adjacent to the test section in order to reduce response time. For increased accuracy, the transducers are mounted on thermostatically controlled heater bases to maintain a constant temperature and on "shock" mounts to reduce possible vibration effects. The electrical outputs from the transducers are reconnected to individual signal conditioners with autoranging capability that are located in the tunnel control room. As a result of the autoranging capability, the analog electrical output to the data acquisition system is kept at a high level, even though the pressure transducer may be operating at the low end of its range; however, the output is equally accurate on any of its ranges.

Wake Pressures

A vertically traversing probe is located on the sidewall of the two-dimensional test section downstream of the airfoil (see figure 2) and has a traversing range of 25.4 cm. For this test, the measurements were taken at a measurement plane which was about 1.1 chord lengths downstream of the airfoil trailing edge. The probe is driven by an electric stepper motor and is designed to operate at speeds from about 0.25 cm/sec to about 15 cm/sec. There are five wake total pressure probes at different spanwise locations y/(b/2). These locations are 0.125, 0.000, -0.125, -0.375, and -0.500. Tunnel sidewall static pressure taps positioned in the plane of the probes are used to provide an average static pressure in the airfoil wake for use in calculation of wake drag coefficients. Individual transducers are used on each tube on the probe assembly and for each of the wall taps.

Angle of Attack

The angle-of-attack mechanism has a traversing range of ±20° which can be offset from 0° in either direction at model installation. The mechanism is driven by an electric stepper motor which is connected through a yoke to the perimeter of both model mounting turntables. This arrangement drives both ends of the model through the angle-of-attack range to eliminate possible model twisting. The angular position of the turntable and, therefore, the angle of attack of the model are recorded using the output from a digital shaft encoder geared to the turntable.

TEST PROGRAM

Figure 6 shows the test program (R_c versus M) used in the investigation. The selection of test conditions was chosen to coincide with data from tests conducted in other facilities, such as LTPT and LAC CFF. The extent of the effort to establish transition effects (fixed and free), R_c effects and M effects can be seen in this figure.

Transition

The model was tested with both fixed and free transition. Reference 10 was used to determine the critical height needed for transition. Because of the range of Reynolds numbers over which the model was tested, two sizes of roughness particles were used. For Reynolds numbers from 3×10^6 to 9×10^6, glass spheres with an approximate diameter of 0.037 to 0.044 mm were used, and for Reynolds numbers from 12×10^6 to 20×10^6 glass microbeads were used which have an approximate diameter of 0.020 to 0.025 mm.

The thin transition strip (approximate 0.159 cm in width) was applied 0.660 cm aft of the leading edge on both the upper and lower surface.

DATA REDUCTION

In the data reduction process, the thermodynamic properties of the nitrogen gas are calculated using the Beattie-Bridgeman equation of state. This equation of state has been shown to give essentially the same thermodynamic properties and flow calculation results as the more complicated Jacobsen equation of state in the operational temperature and pressure regime of the 0.3-m TCT, reference 11. The test Mach number reflects the average of the longitudinal Mach number distributions, which were measured as a function of Reynolds number in the calibration of the "empty" test section.

As previously mentioned, the pressures on the surface of the airfoil were measured using individual pressure transducers. The raw data were reduced according to a process described in an unpublished in-house, data-reduction program. Normal force coefficients and pitching moment coefficients were then calculated from pressure integration around the airfoil.

The wake pressures were measured by individual transducers and were reduced according to the in-house program. The drag force was obtained as an integration of total pressure decrement across the airfoil wake corrected for a "threshold" decrement, which accounted for a nonzero pressure decrement outside the wake. This threshold decrement, in the form of incremental drag coefficient, was derived by looking at several runs early in the test. The compromise value for the entire test was 0.0008.

The results from the data reduction process are presented in Table 3.

Correction of Results

The aerodynamic results presented in this paper are in an uncorrected form so that any of several types of correction can easily be applied. The corrections to which the data are subject are: (1) an angle-of-attack correction due to lift interference, and (2) a Mach number correction due to solid blockage and sidewall boundary-layer effects. Based on the works of Davis and Moore (reference 12) and Barnwell (reference 13), the correction to angle of attack is about -1.72 c_n. As indicated in reference 13, the slotted wall was designed for zero blockage and the effects of sidewall boundary layer on Mach numbers are discussed in reference 14. Examples of the effects of these corrections on data from this facility are presented in references 14 and 15.

PRESENTATION OF RESULTS

The forces and moments are presented in Table 3. A representative sample of the pressure data is provided in Table 4. Copies of the pressure data from any run are available on microfiche from:

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Mail Stop 274
NASA Langley Research Center
Hampton, Virginia 23665
804/865-3225

(Please refer to Test 148, NACA 65_1-213 Airfoil Study.)

An outline of the plotted data follows.

Effect of fixing transition on aerodynamic characteristics of airfoil:

Effect of Mach number on aerodynamic characteristics of airfoil with free transition:

Effect of Mach number on aerodynamic characteristics of airfoil with fixed transition:

Effect of Reynolds number on aerodynamic characteristics of airfoil with free transition:

CONCLUDING REMARKS

The results presented in the report are for the NACA 65_1-213 correlation airfoil. The test temperatures ranged from ambient to about 100K at pressures ranging from about 1.2 to 6.0 atm. Mach number was varied from 0.22 to 0.80. These variables yielded Reynolds numbers (based on airfoil chord) from about 3 x 10^6 to 40 x 10^6. This test was primarily designed to test a NACA 65_1-213 airfoil over a wide range of Reynolds numbers and compare the data to that obtained on the same profile in other facilities.

All the objectives of the test were met. Data are included which demonstrate the effects of fixed transition, Mach number, and Reynolds number on the aerodynamic characteristics of the airfoil. A sample of data showing the effects of angle of attack on the pressure distribution is also provided.

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Table 1 : Coordinates of NACA 65_1-213 Airfoil Section

a. Upper Surface

x/c	z/c	
	Design	Measured
0.000000	0.000000	0.0000
0.001678	0.007443	0.0071
0.003410	0.009994	0.0098
0.005030	0.011758	0.0117
0.006700	0.013252	0.0133
0.008386	0.014567	0.0146
0.011059	0.016381	0.0165
0.033239	0.027097	0.0273
0.043164	0.030862	0.0310
0.050622	0.033447	0.0336
0.060583	0.036629	0.0367
0.073052	0.040277	0.0403
0.083039	0.042983	0.0430
0.095534	0.046135	0.0461
0.108041	0.049058	0.0491
0.138096	0.055279	0.0553
0.168190	0.060579	0.0606
0.248574	0.071175	0.0713
0.329093	0.077504	0.0777
0.409721	0.079916	0.0802
0.510809	0.076324	0.0764
0.591318	0.067696	0.0677
0.671361	0.055594	0.0555
0.751123	0.041353	0.0412
0.790936	0.033806	0.0336
0.840669	0.024292	0.0240
0.880450	0.016869	0.0165
0.920247	0.009910	0.0097
0.960084	0.003893	0.0038
0.970053	0.002644	0.0026
0.980028	0.001537	0.0016
0.990010	0.000619	0.0008
1.000000	0.000000	0.0005

b. Lower Surface

x/c	z/c	
	Design	Measured
0.000000	0.000000	0.0000
0.001838	-0.004839	-0.0041
0.003322	-0.006681	-0.0061
0.005031	-0.008288	-0.0077
0.00677	-0.009546	-0.0090
0.008257	-0.010597	-0.0102
0.011630	-0.012409	-0.0121
0.016498	-0.014435	-0.0141
0.026656	-0.017705	-0.0174
0.034238	-0.019749	-0.0194
0.041802	-0.021587	-0.0213
0.051865	-0.023792	-0.0235
0.061909	-0.025764	-0.0255
0.071938	-0.027560	-0.0273
0.084459	-0.029618	-0.0294
0.096966	-0.031501	-0.0313
0.111959	-0.033560	-0.0333
0.141904	-0.037127	-0.0369
0.171810	-0.040115	-0.0399
0.251426	-0.045921	-0.0457
0.330907	-0.049166	-0.0490
0.390446	-0.050093	-0.0500
0.489491	-0.048105	-0.0480
0.588682	-0.041596	-0.0414
0.668639	-0.033900	-0.0337
0.748877	-0.024841	-0.0246
0.789064	-0.020046	-0.0198
0.839331	-0.014024	-0.0138
0.879550	-0.009375	-0.0091
0.919753	-0.005108	-0.0048
0.959916	-0.001631	-0.0013
0.969947	-0.000980	-0.0007
0.979972	-0.000453	-0.0002
0.989990	-0.000091	+0.0002
1.000000	0.000000	-0.0014

Table 2 : Pressure Orifice Coordinates

a. Upper Surface

Orifice	x/c	y/(b/2)
1	0.0000	0.0120
2	0.0244	0.3892
3	0.0513	-0.0203
4	0.0765	-0.0203
5	0.1005	-0.0203
6	0.1508	-0.7429
7	0.1508	-0.2394
8	0.1506	-0.0203
9	0.1507	0.2628
10	0.1507	0.5112
11	0.1508	0.7620
12	0.2004	-0.0203
13	0.2500	-0.0240
14	0.2988	-0.0235
15	0.3492	-0.0235
16	0.3986	-0.0228
17	0.4479	-0.0235
18	0.4984	-0.7418
19	0.4984	-0.4910
20	0.4984	-0.2401
21	0.4983	-0.0235
22	0.4983	0.5122
23	0.4984	0.7630
24	0.5466	-0.0210
25	0.5962	-0.0208
26	0.6457	-0.0208
27	0.6957	-0.0213
28	0.7461	-0.0215
29	0.7950	-0.7423
30	0.7950	-0.4900
31	0.7952	-0.2404
32	0.7952	-0.0215
33	0.7952	0.2613
34	0.7952	0.5124
35	0.7952	0.7630
36	0.8457	-0.0213
37	0.0906	0.3892

b. Lower Surface

Orifice	x/c	y/(b/2)
38	0.0129	0.3782
39	0.0257	0.0319
40	0.0507	0.0319
41	0.0749	0.0319
42	0.1000	0.0319
43	0.1501	0.0319
44	0.1996	0.0319
45	0.2494	0.0319
46	0.2998	0.0319
47	0.3487	0.0319
48	0.3892	0.0319
49	0.4470	0.0319
50	0.4977	0.0319
51	0.5459	0.0319
52	0.5958	0.0319
53	0.6451	0.0319
54	0.6950	0.0319
55	0.7449	0.0319
56	0.7955	0.0319
57	0.8453	0.0319

TABLE 3. – NACA 65_1 – 213 TEST RESULTS

[The following results will be listed by ascending Mach number]

(a) Fixed transition

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 60						
2	.223	2.998	-3.01	-.157	-.015	.00909
3	.225	3.021	-1.97	-.060	-.018	.00881
4	.225	3.042	-.96	.026	-.020	.00855
5	.224	3.031	1.04	.200	-.024	.00819
6	.222	3.028	2.04	.294	-.027	.00757
7	.221	3.008	3.03	.384	-.029	.00787
8	.222	3.010	4.02	.474	-.031	.00789
9	.221	3.010	5.02	.568	-.033	.00842
10	.221	3.004	6.03	.658	-.035	.00895
11	.221	3.019	7.04	.747	-.035	.00960
12	.221	3.025	8.02	.834	-.038	.01027
13	.222	3.013	9.02	.916	-.037	.01130
14	.222	3.015	10.02	.997	-.039	.01220
15	.222	3.010	11.04	1.074	-.038	.01363
16	.221	3.006	12.03	1.147	-.039	.01492
17	.223	3.032	13.02	1.201	-.039	.01606
18	.222	3.016	14.03	1.235	-.045	.01787
20	.223	3.031	15.04	1.239	-.072	.04514
21	.223	3.073	.01	.125	-.025	.00828
RUN 59						
13	.224	6.051	-.01	.122	-.025	.00776
14	.225	6.078	-3.01	-.153	-.017	.00830
15	.224	6.116	-1.97	-.065	-.017	.00792
17	.224	6.073	-.99	.023	-.020	.00786
18	.224	6.073	1.03	.217	-.026	.00768
19	.225	6.083	2.02	.309	-.029	.00776
20	.226	6.106	3.01	.403	-.031	.00797
21	.224	6.080	4.01	.497	-.033	.00834
26	.225	6.090	5.01	.590	-.036	.00869
27	.224	6.053	6.01	.679	-.037	.00907
33	.224	6.070	6.99	.772	-.040	.00979
34	.225	6.072	8.02	.867	-.041	.01040
35	.223	6.044	9.02	.959	-.042	.01115
36	.223	6.050	10.01	1.038	-.042	.01225
37	.224	6.069	11.03	1.127	-.042	.01323
38	.223	6.058	12.03	1.207	-.043	.01463
39	.223	6.046	13.02	1.275	-.042	.01650
42	.224	6.086	14.03	1.340	-.042	.01841
44	.223	6.065	15.03	1.384	-.041	.01945
45	.224	6.083	16.03	1.377	-.055	.02776
46	.223	6.040	17.05	1.277	-.086	.11252

TABLE 3. – Continued.

(a) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 61						
23	.225	9.136	-3.00	-.152	-.019	.00750
24	.224	9.110	-2.00	-.057	-.021	.00748
25	.224	9.117	-.98	.034	-.024	.00739
26	.224	9.128	1.01	.222	-.028	.00754
27	.224	9.133	2.01	.317	-.032	.00759
28	.224	9.109	3.02	.412	-.034	.00777
29	.226	9.161	4.02	.506	-.036	.00805
30	.225	9.132	5.03	.599	-.038	.00837
31	.225	9.156	6.02	.691	-.040	.00879
32	.223	9.127	7.02	.780	-.040	.00926
33	.223	9.103	8.03	.880	-.044	.00974
34	.224	9.142	9.03	.968	-.045	.01047
35	.224	9.150	10.02	1.043	-.044	.01144
36	.223	9.095	11.03	1.136	-.046	.01223
37	.222	9.067	12.03	1.206	-.047	.01344
38	.223	9.081	13.01	1.264	-.050	.01467
39	.225	9.168	14.02	1.322	-.054	.01562
40	.227	9.262	15.03	1.350	-.060	.01664
41	.224	9.134	16.03	1.370	-.068	.02773
42	.225	9.171	17.03	1.298	-.087	.13423
43	.224	9.154	.00	.126	-.026	.00723
RUN 64						
12	.225	12.298	.01	.125	-.027	.00776
13	.225	12.210	-2.99	-.158	-.021	.00709
14	.226	12.223	-2.00	-.066	-.023	.00727
15	.226	12.252	-.99	.030	-.025	.00745
16	.226	12.292	1.01	.228	-.032	.00808
17	.225	12.232	3.02	.421	-.037	.00882
18	.225	12.238	5.02	.614	-.042	.00950
19	.225	12.211	7.04	.804	-.046	.01014
20	.225	12.262	9.03	.997	-.050	.01212
21	.224	12.156	11.03	1.163	-.049	.01511
22	.227	12.274	12.04	1.238	-.047	.01696
23	.227	12.260	13.03	1.292	-.047	.01788
24	.226	12.207	14.02	1.337	-.048	.01905
RUN 66						
18	.227	12.235	16.03	1.421	-.051	.02250
19	.227	12.240	17.03	1.355	-.098	.12931

TABLE 3. – Continued.

(a) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 67						
20	.225	15.282	.01	.138	-.028	.00661
21	.226	15.303	-2.99	-.150	-.021	.00700
22	.226	15.347	-2.00	-.055	-.024	.00675
23	.227	15.391	-.99	.048	-.028	.00663
24	.227	15.375	1.01	.241	-.033	.00657
25	.227	15.363	2.01	.339	-.036	.00639
26	.227	15.361	3.01	.430	-.036	.00679
27	.227	15.377	4.01	.537	-.042	.00685
28	.226	15.302	5.00	.625	-.042	.00714
29	.228	15.458	6.02	.726	-.045	.00757
31	.226	15.311	7.01	.819	-.046	.00808
32	.228	15.445	8.02	.910	-.047	.00883
RUN 62						
44	.600	2.995	-.05	.134	-.029	.00746
45	.601	2.990	-1.01	.024	-.026	.00781
46	.600	2.998	1.02	.251	-.032	.00766
47	.600	2.994	2.00	.362	-.034	.00814
48	.601	2.998	3.01	.477	-.037	.00858
49	.599	2.991	4.01	.589	-.039	.00932
50	.600	2.994	5.01	.701	-.040	.01028
51	.597	2.985	6.02	.794	-.039	.01183
52	.598	2.988	7.02	.877	-.035	.01371
53	.601	2.998	8.01	.987	-.030	.01579
RUN 58						
3	.604	6.023	-1.03	.014	-.025	.00810
4	.602	6.017	1.03	.233	-.030	.00810
5	.603	6.018	2.03	.343	-.033	.00831
6	.604	6.028	3.04	.447	-.035	.00852
7	.602	6.016	4.04	.556	-.037	.00909
8	.601	6.005	5.05	.667	-.038	.01008
9	.600	5.998	6.04	.779	-.038	.01115
10	.600	6.003	7.05	.874	-.035	.01248
11	.601	6.013	8.04	.979	-.029	.01584
12	.601	6.008	-.01	.129	-.028	.00841

TABLE 3. — Continued.

(a) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 57						
45	.603	9.032	-1.00	.028	-.026	.00782
46	.600	9.000	1.01	.254	-.032	.00791
47	.601	9.009	2.02	.363	-.035	.00811
48	.601	9.011	3.02	.473	-.037	.00841
49	.601	9.003	4.03	.576	-.038	.00894
50	.604	9.044	5.02	.688	-.039	.00965
51	.598	8.980	6.03	.799	-.038	.01061
52	.603	9.032	7.04	.912	-.035	.01264
54	.603	9.033	8.01	.998	-.029	.01602
55	.601	9.014	.00	.140	-.029	.00788
RUN 65						
1	.602	12.016	.00	.138	-.029	.00732
2	.604	12.029	-3.00	-.186	-.022	.00762
3	.601	12.010	-.97	.031	-.026	.00736
4	.602	12.030	1.03	.255	-.032	.00719
5	.602	12.025	2.03	.362	-.034	.00735
7	.603	12.030	3.01	.469	-.037	.00754
8	.604	12.031	4.05	.582	-.039	.00792
12	.604	12.024	5.01	.693	-.043	.00851
13	.603	12.001	6.03	.825	-.042	.00916
14	.602	11.974	7.05	.924	-.037	.01097
15	.605	12.025	8.05	.991	-.031	.01373
RUN 52						
1	.703	3.005	.01	.131	-.032	.00991
3	.703	3.005	-1.00	.019	-.030	.00967
4	.700	2.997	1.01	.243	-.034	.01019
5	.700	2.997	2.01	.349	-.036	.01068
6	.700	2.994	3.03	.458	-.037	.01133
7	.700	2.995	4.03	.565	-.038	.01215
8	.701	3.015	5.03	.680	-.040	.01430
9	.701	3.008	6.03	.778	-.040	.01682

TABLE 3. – Continued.

(a) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 53						
11	.701	6.015	.02	.146	-.034	.00887
12	.702	6.005	-1.01	.022	-.031	.00874
13	.701	6.002	1.02	.265	-.036	.00920
14	.699	5.999	2.02	.382	-.039	.00967
15	.704	6.016	3.02	.491	-.042	.01044
16	.704	6.017	4.02	.604	-.044	.01129
17	.700	5.995	5.03	.720	-.046	.01379
18	.704	6.005	6.03	.806	-.044	.02140
RUN 55						
27	.702	8.997	-1.00	.023	-.031	.00827
28	.700	9.009	1.02	.259	-.035	.00840
30	.699	9.001	2.03	.372	-.037	.00880
31	.700	9.000	3.03	.475	-.039	.00927
32	.701	9.016	4.03	.582	-.039	.00998
33	.705	9.020	5.03	.683	-.040	.01215
34	.703	9.004	6.03	.780	-.038	.01571
35	.701	9.017	.01	.140	-.032	.00824
RUN 63						
4	.701	12.016	-1.00	.018	-.030	.00841
5	.702	12.029	1.04	.268	-.037	.00887
6	.700	12.009	2.04	.393	-.041	.00927
7	.703	12.026	3.07	.520	-.045	.01028
8	.705	12.048	4.06	.624	-.045	.01182
9	.705	12.036	5.05	.714	-.045	.01444
10	.702	12.003	6.07	.811	-.045	.01862
11	.702	12.035	.00	.147	-.035	.00789

TABLE 3. – Continued.

(a) Concluded.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 54						
20	.758	6.008	.04	.135	-.042	.01294
21	.762	6.031	-1.02	.010	-.036	.01130
22	.762	6.006	1.03	.236	-.043	.01735
23	.764	6.008	2.03	.322	-.046	.02692
24	.761	6.019	3.03	.410	-.049	.03707
RUN 56						
36	.762	9.002	.01	.127	-.040	.01299
38	.764	9.022	-1.00	.014	-.038	.01123
39	.764	9.021	1.03	.239	-.044	.01703
41	.764	9.018	2.03	.332	-.048	.02489
42	.762	9.006	3.01	.413	-.049	.03483

TABLE 3. – Continued.

(b) Free transition

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 41						
3	.228	2.790	-.01	.118	-.023	.00758
5	.223	2.764	-3.00	-.139	-.015	.00711
6	.223	2.772	-1.99	-.056	-.017	.00769
7	.223	2.767	-.98	.031	-.020	.00755
8	.223	2.769	1.02	.204	-.024	.00732
9	.223	2.770	2.01	.292	-.026	.00645
10	.222	2.753	3.02	.387	-.030	.00735
11	.222	2.757	4.02	.470	-.029	.00823
12	.221	2.746	5.02	.566	-.033	.00882
13	.223	2.773	6.03	.657	-.034	.00936
14	.222	2.758	7.04	.744	-.037	.00995
15	.222	2.752	8.03	.827	-.037	.01073
16	.222	2.761	9.03	.924	-.040	.01152
17	.222	2.756	10.02	.993	-.039	.01250
18	.222	2.756	11.04	1.085	-.042	.01367
19	.226	2.765	12.03	1.136	-.039	.01508
20	.224	2.745	13.01	1.198	-.039	.01609
21	.224	2.762	14.01	1.267	-.048	.01737
24	.224	2.766	15.02	1.206	-.084	.04064
RUN 49						
1	.224	6.094	.01	.120	-.023	.00771
2	.222	6.041	-2.99	-.147	-.016	.00807
3	.222	6.052	-2.00	-.056	-.019	.00788
4	.223	6.058	-.99	.032	-.021	.00787
5	.223	6.064	1.01	.219	-.027	.00773
6	.223	6.054	2.01	.312	-.029	.00779
7	.222	6.039	3.01	.406	-.031	.00785
8	.223	6.058	4.01	.499	-.034	.00776
9	.222	6.042	5.03	.590	-.035	.00817
10	.223	6.082	7.03	.777	-.040	.00910
11	.224	6.099	6.02	.681	-.038	.00865
12	.222	6.062	8.03	.864	-.041	.00977
13	.221	6.054	9.02	.964	-.044	.01043
14	.222	6.077	10.02	1.041	-.043	.01133
15	.223	6.083	11.03	1.126	-.044	.01234
16	.221	6.036	12.03	1.191	-.046	.01338
17	.224	6.119	13.02	1.268	-.051	.01417
18	.224	6.110	14.02	1.321	-.053	.01531
19	.223	6.092	15.03	1.365	-.055	.01696
21	.223	6.104	16.03	1.386	-.062	.02397
22	.221	6.045	17.02	1.368	-.082	.05361

TABLE 3. – Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 47						
28	.223	9.239	-2.99	-.147	-.020	.00754
30	.224	9.115	-2.00	-.054	-.022	.00731
31	.225	9.145	-.98	.041	-.025	.00731
32	.223	9.101	1.01	.229	-.030	.00729
33	.224	9.099	2.01	.324	-.033	.00743
34	.224	9.134	3.01	.417	-.035	.00757
35	.226	9.191	4.01	.510	-.037	.00772
36	.225	9.172	5.01	.606	-.040	.00800
37	.225	9.174	6.01	.701	-.042	.00845
38	.224	9.125	7.02	.799	-.044	.00883
39	.224	9.142	8.01	.897	-.046	.00941
40	.224	9.136	9.01	.980	-.046	.01016
41	.226	9.207	10.02	1.053	-.046	.01106
42	.224	9.131	11.02	1.157	-.048	.01205
43	.225	9.155	12.04	1.218	-.051	.01307
44	.224	9.137	13.01	1.292	-.055	.01398
45	.224	9.131	14.01	1.322	-.058	.01490
46	.223	9.103	15.02	1.367	-.060	.01684
47	.225	9.152	16.02	1.397	-.074	.02968
49	.224	9.209	.00	.129	-.027	.00727
RUN 50						
25	.225	12.207	.00	.131	-.028	.00692
26	.225	12.275	-2.99	-.155	-.019	.00737
27	.226	12.313	-2.00	-.055	-.022	.00716
28	.226	12.282	-.99	.037	-.025	.00702
29	.226	12.291	1.01	.229	-.030	.00709
30	.225	12.259	2.01	.323	-.033	.00720
31	.226	12.292	3.02	.419	-.036	.00727
32	.226	12.251	4.02	.517	-.038	.00757
33	.226	12.284	5.02	.617	-.041	.00780
34	.226	12.261	6.02	.709	-.043	.00830
35	.226	12.301	7.02	.803	-.044	.00862
36	.225	12.239	8.02	.894	-.044	.00924
37	.225	12.238	9.02	.990	-.047	.00988
38	.223	12.109	10.01	1.074	-.048	.01081
39	.224	12.155	11.03	1.155	-.049	.01166
40	.227	12.327	12.03	1.230	-.049	.01266
41	.225	12.220	13.02	1.292	-.054	.01372
42	.226	12.252	14.01	1.345	-.062	.01467
43	.226	12.303	15.03	1.378	-.064	.01746
44	.225	12.237	16.03	1.411	-.068	.03474
45	.226	12.288	17.04	1.282	-.095	.15650

TABLE 3. — Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 46						
7	.227	15.341	-2.99	-.149	-.021	.00732
8	.227	15.335	-1.99	-.060	-.022	.00705
9	.227	15.363	-.99	.036	-.026	.00707
10	.227	15.344	1.01	.228	-.031	.00701
11	.227	15.358	2.02	.325	-.034	.00696
12	.227	15.402	3.01	.423	-.037	.00730
13	.226	15.318	4.01	.521	-.040	.00747
14	.227	15.381	5.02	.620	-.042	.00770
15	.227	15.377	6.02	.711	-.044	.00814
16	.226	15.389	7.02	.811	-.046	.00855
17	.227	15.414	8.03	.908	-.047	.00905
18	.227	15.396	9.01	1.002	-.049	.00981
19	.225	15.316	10.02	1.088	-.049	.01078
20	.226	15.363	11.02	1.167	-.050	.01145
21	.226	15.400	12.03	1.241	-.053	.01269
22	.228	15.479	13.02	1.287	-.058	.01395
23	.228	15.517	14.03	1.352	-.061	.01498
24	.228	15.474	15.04	1.399	-.068	.01871
25	.226	15.384	16.03	1.386	-.075	.04986
26	.227	15.260	.01	.134	-.029	.00695
RUN 51						
47	.227	20.583	-.01	.134	-.029	.00656
48	.230	20.758	-2.99	-.156	-.021	.00691
49	.231	20.762	-2.00	-.059	-.024	.00680
50	.228	20.641	-.99	.036	-.026	.00669
51	.231	20.452	1.01	.230	-.032	.00659
52	.232	20.844	2.01	.327	-.034	.00673
53	.230	20.691	3.01	.430	-.038	.00685
54	.231	20.757	5.01	.625	-.042	.00743
55	.228	20.414	7.02	.823	-.047	.00820
56	.229	20.908	9.02	1.007	-.049	.00937
57	.229	20.692	11.03	1.197	-.052	.01100
58	.230	20.752	13.01	1.309	-.058	.01283
59	.229	20.654	14.01	1.351	-.063	.01417
60	.230	20.710	15.02	1.390	-.073	.01808
61	.229	20.562	16.03	1.342	-.086	.06671
62	.228	20.528	12.03	1.247	-.053	.01256
63	.228	20.452	10.02	1.104	-.051	.01023
64	.228	20.617	8.00	.916	-.048	.00933

TABLE 3. — Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 75						
29	.361	3.059	-2.99	-.154	-.019	.00733
30	.362	3.065	-2.15	-.082	-.018	.00806
31	.361	3.033	-.93	.026	-.020	.00653
32	.360	3.022	1.01	.208	-.024	.00624
33	.361	3.024	3.01	.416	-.032	.00725
34	.362	3.020	5.01	.608	-.038	.00835
35	.359	3.000	7.03	.783	-.039	.01031
36	.361	3.016	9.02	.965	-.042	.01328
37	.360	3.006	11.04	1.075	-.038	.01968
38	.362	3.027	13.02	1.047	-.042	.04375
39	.362	3.023	14.03	1.019	-.056	.09556
RUN 76						
44	.361	3.014	12.01	1.097	-.042	.02165
45	.363	3.029	10.00	1.022	-.040	.01589
46	.362	3.021	8.00	.873	-.041	.01145
47	.369	3.073	6.00	.698	-.037	.00923
48	.363	3.031	3.99	.512	-.036	.00724
49	.361	3.010	2.00	.313	-.029	.00625
50	.363	3.024	.00	.128	-.024	.00607
RUN 42						
27	.362	5.477	-2.99	-.161	-.017	.00795
28	.362	5.474	-2.00	-.061	-.020	.00784
29	.363	5.489	-.98	.035	-.023	.00769
30	.363	5.493	1.01	.219	-.026	.00757
31	.363	5.486	2.01	.322	-.030	.00773
32	.362	5.501	3.02	.417	-.032	.00784
33	.362	5.475	4.01	.510	-.033	.00817
34	.363	5.490	5.02	.603	-.035	.00856
35	.361	5.483	6.02	.705	-.040	.00877
36	.361	5.474	7.03	.790	-.039	.00942
37	.363	5.487	8.02	.889	-.041	.01009
38	.363	5.463	9.02	.977	-.042	.01105
39	.362	5.467	10.02	1.056	-.044	.01189
41	.364	6.009	11.03	1.111	-.048	.01294
42	.361	5.957	12.03	1.155	-.053	.01469
43	.360	6.022	13.02	1.159	-.051	.01966
44	.363	6.017	14.02	1.162	-.053	.03367
45	.361	5.986	15.02	1.177	-.052	.05630
46	.361	6.018	16.03	1.168	-.062	.08635
47	.359	5.991	16.03	1.171	-.057	.08141
48	.360	5.994	17.03	1.160	-.070	.12823
49	.362	6.030	.00	.123	-.024	.00766

TABLE 3. – Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 79						
16	.362	9.040	.00	.119	-.025	.00723
17	.363	9.054	-2.99	-.166	-.017	.00754
18	.362	9.047	-2.00	-.074	-.019	.00745
19	.362	9.033	-.98	.023	-.022	.00734
20	.363	9.076	1.01	.217	-.027	.00723
21	.362	9.058	2.01	.311	-.029	.00730
22	.362	9.044	3.01	.412	-.032	.00754
23	.363	9.075	4.01	.510	-.035	.00789
27	.362	9.049	5.07	.615	-.038	.00820
28	.362	9.052	6.01	.708	-.040	.00865
29	.360	9.005	7.03	.800	-.041	.00926
30	.363	9.081	8.00	.896	-.042	.00977
31	.363	9.060	9.02	.990	-.043	.01046
33	.362	9.043	10.02	1.075	-.046	.01135
34	.361	9.017	11.03	1.144	-.047	.01247
35	.364	9.101	12.03	1.166	-.051	.01621
36	.363	9.043	13.02	1.177	-.058	.02061
RUN 80						
43	.366	9.106	14.01	1.187	-.056	.03231
44	.363	9.044	15.03	1.188	-.063	.04963
45	.364	9.039	16.05	1.152	-.059	.07802
46	.364	9.045	.01	.121	-.025	.00728
RUN 45						
26	.364	15.190	-2.99	-.164	-.018	.00710
27	.363	15.133	-2.00	-.068	-.020	.00682
28	.363	15.117	-.98	.033	-.023	.00690
31	.365	15.228	1.01	.229	-.029	.00682
32	.365	15.162	2.01	.330	-.032	.00700
33	.363	15.106	3.01	.427	-.033	.00727
34	.363	15.141	4.01	.530	-.037	.00748
35	.364	15.157	5.01	.627	-.039	.00772
36	.362	15.083	6.02	.725	-.041	.00818
37	.363	15.135	7.02	.826	-.043	.00860
38	.364	15.147	8.01	.918	-.044	.00928
39	.362	15.054	9.02	1.014	-.045	.01023
40	.361	15.015	10.02	1.101	-.047	.01111
41	.364	15.134	11.02	1.152	-.048	.01250
42	.364	15.133	12.02	1.175	-.052	.01592
43	.363	15.090	13.02	1.193	-.056	.02214
44	.364	15.116	14.03	1.208	-.057	.03379
45	.363	15.069	15.03	1.184	-.052	.05721
46	.363	15.086	16.02	1.167	-.076	.12312
47	.364	15.118	.01	.132	-.026	.00683

TABLE 3. – Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 2						
4	.502	3.004	-1.00	.020	-.021	.00552
5	.500	3.001	1.01	.219	-.026	.00532
6	.502	3.012	2.02	.319	-.028	.00546
7	.502	3.001	3.02	.426	-.031	.00557
8	.500	3.002	4.02	.531	-.035	.00602
9	.501	3.006	5.01	.623	-.035	.00853
10	.500	3.002	6.01	.719	-.035	.00979
11	.503	3.009	7.02	.808	-.032	.01177
12	.499	3.001	8.01	.886	-.031	.01452
13	.498	2.993	10.01	.995	-.029	.02320
14	.501	3.004	.00	.129	-.024	.00536
RUN 29						
2	.502	6.002	-.98	.029	-.024	.00799
3	.502	5.995	1.02	.238	-.029	.00787
4	.500	5.980	2.02	.342	-.032	.00807
5	.500	5.992	3.02	.444	-.035	.00798
6	.500	5.990	4.01	.547	-.036	.00813
7	.502	6.012	5.02	.653	-.039	.00868
8	.503	6.027	6.01	.750	-.041	.00947
9	.503	6.022	7.02	.843	-.042	.01084
10	.505	6.045	8.02	.934	-.036	.01395
11	.500	5.992	.01	.138	-.027	.00779
RUN 11						
12	.504	15.079	.01	.134	-.026	.00719
14	.503	15.061	-.00	.029	-.024	.00711
15	.503	15.061	1.01	.241	-.029	.00714
16	.503	15.040	2.01	.345	-.033	.00732
18	.503	15.057	3.02	.448	-.035	.00751
20	.503	15.065	4.01	.554	-.037	.00777
22	.503	15.052	5.01	.660	-.040	.00818
24	.503	15.066	6.02	.761	-.041	.00858
25	.504	15.084	7.04	.855	-.043	.00967
26	.500	14.985	8.02	.925	-.039	.01231

TABLE 3. — Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 69						
1	.598	2.000	2.02	.345	-.034	.00613
2	.600	2.005	3.02	.454	-.036	.00645
3	.601	2.006	4.01	.568	-.039	.00678
RUN 5						
11	.601	3.008	.01	.140	-.029	.00491
16	.600	3.038	-.99	.029	-.026	.00493
21	.601	3.008	1.01	.238	-.031	.00532
22	.601	3.001	2.02	.347	-.033	.00556
23	.600	2.999	3.01	.456	-.036	.00576
25	.603	2.996	.01	.128	-.026	.00485
26	.602	3.015	4.02	.561	-.037	.00599
27	.602	3.012	5.01	.658	-.039	.00825
28	.600	3.000	6.02	.747	-.036	.01081
29	.600	2.999	7.02	.836	-.033	.01291
30	.602	3.010	8.01	.949	-.028	.01455
RUN 70						
4	.601	4.003	1.80	.319	-.033	.00683
5	.601	4.009	3.01	.450	-.037	.00716
6	.600	4.001	4.02	.556	-.038	.00763
RUN 13						
1	.604	6.062	-.01	.133	-.027	.00662
3	.603	5.990	-1.00	.029	-.026	.00776
4	.606	6.007	1.02	.252	-.032	.00712
5	.602	5.978	2.03	.356	-.034	.00675
6	.600	5.965	3.01	.461	-.036	.00724
7	.602	5.986	4.03	.568	-.038	.00758
8	.603	5.996	5.01	.680	-.040	.00852
9	.601	5.982	6.03	.787	-.039	.00954
10	.600	5.978	7.03	.891	-.036	.01125
11	.603	5.996	8.01	.995	-.031	.01436

TABLE 3. – Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 71						
7	.602	8.020	1.89	.324	-.033	.00811
8	.601	8.037	3.05	.454	-.036	.00849
9	.600	8.024	4.03	.557	-.037	.00881
RUN 37						
1	.606	9.039	.01	.133	-.028	.00785
2	.602	9.026	-1.00	.025	-.026	.00782
3	.601	9.012	1.01	.246	-.031	.00776
4	.604	9.071	2.02	.356	-.034	.00815
5	.600	8.949	3.02	.460	-.036	.00834
6	.604	9.006	4.01	.574	-.038	.00870
7	.600	8.992	5.02	.681	-.040	.00914
8	.602	9.010	6.02	.795	-.039	.00990
9	.601	8.998	7.02	.899	-.035	.01142
10	.603	9.051	8.02	1.011	-.029	.01504
11	.601	9.036	.01	.140	-.029	.00781
RUN 72						
10	.603	10.023	2.05	.348	-.034	.00800
11	.604	10.032	3.04	.460	-.037	.00819
12	.601	9.991	4.08	.563	-.038	.00845
RUN 40						
31	.601	12.053	-.99	.028	-.026	.00743
32	.501	12.037	1.02	.251	-.032	.00741
33	.603	12.016	2.01	.360	-.035	.00766
34	.606	12.016	3.02	.468	-.037	.00783
36	.603	11.989	4.01	.578	-.039	.00821
37	.601	11.980	5.02	.689	-.041	.00861
38	.603	12.018	6.01	.798	-.040	.00939
39	.602	11.997	7.02	.913	-.036	.01111
40	.605	12.053	8.01	1.030	-.030	.01507
41	.602	12.003	.01	.140	-.029	.00739

TABLE 3. — Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 43						
4	.606	15.068	-1.00	.029	-.026	.00714
5	.604	15.049	1.03	.248	-.031	.00723
6	.602	15.036	2.02	.359	-.035	.00734
7	.602	15.027	3.02	.469	-.038	.00760
8	.601	15.002	4.04	.578	-.039	.00791
9	.605	15.007	5.04	.689	-.040	.00838
10	.605	15.028	6.04	.804	-.040	.00914
11	.601	15.002	7.04	.916	-.038	.01091
12	.602	15.029	8.03	1.016	-.030	.01471
13	.601	15.013	.00	.136	-.028	.00718
RUN 23						
31	.605	20.124	.01	.130	-.031	.00694
33	.605	20.135	-1.00	.018	-.028	.00697
34	.603	20.100	1.02	.249	-.035	.00692
35	.603	20.092	2.02	.362	-.038	.00704
36	.603	20.091	3.02	.479	-.041	.00719
37	.607	20.078	4.01	.596	-.044	.00742
38	.606	20.038	5.03	.706	-.044	.00772
39	.602	20.000	6.03	.827	-.045	.00832
41	.604	20.040	7.02	.930	-.040	.00941
42	.605	20.069	8.02	1.022	-.034	.01178
RUN 73						
15	.609	30.294	2.03	.366	-.036	.00708
16	.608	30.198	3.05	.479	-.038	.00726
17	.604	30.088	4.06	.595	-.041	.00769
RUN 44						
14	.605	40.333	.02	.142	-.030	.00630
15	.606	40.410	-1.00	.028	-.026	.00633
16	.608	40.338	1.02	.259	-.033	.00632
17	.606	40.318	2.01	.369	-.036	.00647
18	.608	40.440	3.01	.481	-.039	.00668
19	.607	40.380	4.02	.594	-.041	.00695
20	.605	40.263	5.02	.708	-.043	.00738
21	.608	40.408	6.02	.826	-.043	.00812
22	.609	40.474	7.03	.943	-.036	.00988
23	.602	40.152	8.01	1.033	-.029	.01405

TABLE 3. – Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 3						
16	.641	2.879	.01	.143	-.029	.00553
17	.642	2.860	-1.00	.028	-.026	.00559
18	.642	2.880	1.01	.245	-.032	.00548
19	.643	2.882	2.02	.354	-.034	.00574
20	.640	2.874	3.01	.463	-.035	.00600
21	.643	2.885	4.01	.577	-.038	.00627
22	.642	2.883	5.01	.679	-.038	.00768
23	.644	2.886	6.02	.775	-.036	.01040
RUN 9						
51	.641	6.058	-.99	.029	-.027	.00641
52	.641	6.027	1.01	.250	-.032	.00660
53	.642	6.042	2.02	.356	-.034	.00682
54	.641	6.003	3.01	.465	-.037	.00711
55	.642	6.006	4.01	.574	-.039	.00667
56	.644	6.005	5.01	.677	-.039	.00839
58	.640	6.013	6.01	.789	-.037	.00943
59	.642	6.054	.01	.142	-.029	.00619
RUN 74						
18	.643	9.003	.06	.146	-.031	.00785
19	.643	9.021	-1.00	.029	-.028	.00782
20	.642	9.040	1.03	.261	-.034	.00794
21	.642	9.032	2.02	.376	-.037	.00817
22	.640	9.018	3.03	.492	-.040	.00850
23	.640	9.020	4.03	.596	-.042	.00893
24	.642	9.044	5.03	.719	-.042	.00972
25	.640	9.013	6.03	.825	-.041	.01042
26	.639	9.005	7.04	.927	-.034	.01230
RUN 17						
5	.644	15.053	-.99	.028	-.027	.00716
6	.642	15.010	1.02	.254	-.033	.00722
7	.642	15.017	2.02	.363	-.036	.00737
8	.644	15.032	3.01	.479	-.039	.00765
9	.640	15.053	4.02	.582	-.039	.00793
10	.643	15.000	5.02	.692	-.041	.00848
11	.643	15.008	6.02	.811	-.037	.00908
12	.642	15.161	.01	.140	-.030	.00712
13	.640	14.992	7.03	.928	-.033	.01095
14	.644	15.026	8.02	1.006	-.028	.01595

TABLE 3. – Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 18						
15	.646	40.370	.00	.145	-.031	.00633
16	.645	40.298	-1.00	.028	-.028	.00634
17	.647	40.385	1.03	.262	-.034	.00644
18	.645	40.277	2.03	.377	-.038	.00651
19	.645	40.295	3.01	.491	-.040	.00677
20	.648	40.405	4.01	.601	-.042	.00702
21	.646	40.313	5.01	.706	-.042	.00741
23	.650	40.526	6.02	.834	-.040	.00815
24	.644	40.129	7.02	.956	-.034	.01119
25	.644	40.103	8.01	1.030	-.031	.01755
RUN 6						
32	.680	2.998	.01	.139	-.031	.00517
33	.681	3.000	-.98	.027	-.029	.00515
34	.681	2.998	1.01	.244	-.034	.00546
35	.680	2.992	2.01	.354	-.036	.00575
36	.680	2.995	3.01	.466	-.037	.00590
37	.680	2.994	4.02	.580	-.039	.00621
38	.682	3.000	5.01	.685	-.039	.00692
39	.680	2.993	6.01	.792	-.038	.00776
RUN 7						
42	.682	6.026	-1.00	.025	-.029	.00644
43	.683	6.026	1.01	.250	-.034	.00698
44	.682	6.025	2.03	.361	-.036	.00685
45	.680	6.009	3.01	.469	-.039	.00707
46	.683	6.032	4.02	.578	-.039	.00671
47	.681	6.021	5.02	.690	-.040	.00791
48	.679	6.005	6.02	.790	-.036	.00831
49	.680	6.009	.01	.143	-.031	.00627
RUN 32						
24	.682	15.054	.01	.148	-.033	.00751
25	.685	15.143	-.99	.030	-.030	.00745
26	.681	15.052	1.01	.266	-.036	.00750
27	.681	15.027	2.01	.377	-.038	.00772
28	.683	15.018	3.02	.485	-.040	.00807
29	.684	15.038	4.01	.590	-.041	.00849
30	.681	15.031	5.02	.706	-.042	.00918
31	.683	15.074	6.02	.821	-.041	.01069

TABLE 3. – Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 4						
2	.693	3.008	.01	.133	-.031	.00527
3	.693	3.003	-.99	.023	-.029	.00522
4	.691	3.002	1.01	.240	-.034	.00553
5	.695	3.017	2.02	.346	-.036	.00575
7	.693	3.007	2.97	.457	-.039	.00599
8	.693	3.013	4.02	.577	-.040	.00638
9	.692	3.008	5.02	.685	-.040	.00701
RUN 19						
2	.703	6.007	.01	.137	-.033	.00674
3	.702	6.001	-.99	.023	-.031	.00789
4	.701	6.001	1.03	.254	-.037	.00678
5	.703	6.012	2.03	.364	-.040	.00729
6	.705	6.020	3.01	.457	-.041	.00826
7	.702	5.993	4.01	.570	-.043	.00882
8	.703	5.996	5.01	.690	-.045	.00990
9	.707	6.020	6.02	.793	-.047	.01464
RUN 26						
3	.705	9.012	-.99	.020	-.030	.00802
4	.703	9.006	1.04	.241	-.034	.00805
5	.702	9.025	2.02	.355	-.038	.00825
6	.702	8.973	3.02	.472	-.040	.00880
9	.703	9.012	4.03	.583	-.042	.00922
10	.705	9.016	5.02	.683	-.042	.01028
11	.701	9.001	6.02	.799	-.042	.01331
12	.701	9.032	.01	.135	-.032	.00796
RUN 27						
13	.701	12.020	.01	.135	-.032	.00758
14	.703	12.040	-1.00	.022	-.030	.00772
15	.699	11.996	1.01	.250	-.035	.00775
16	.702	12.030	2.01	.364	-.038	.00806
17	.704	12.018	3.01	.481	-.041	.00852
18	.703	12.016	4.01	.592	-.042	.00921
19	.703	11.998	5.02	.693	-.042	.01052
20	.706	12.060	6.02	.793	-.042	.01595

TABLE 3. – Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 38						
13	.703	14.991	-.99	.023	-.030	.00758
14	.702	15.036	1.01	.255	-.036	.00765
15	.703	15.031	2.02	.365	-.038	.00793
16	.706	15.064	3.01	.471	-.040	.00841
17	.702	15.054	4.01	.581	-.041	.00868
18	.701	15.039	5.02	.692	-.043	.01043
19	.705	15.046	6.02	.803	-.043	.01643
21	.700	15.046	.01	.146	-.033	.00748
RUN 22						
22	.706	20.049	-.98	.017	-.033	.00738
23	.703	20.031	1.01	.262	-.039	.00742
24	.703	20.035	2.01	.382	-.043	.00778
25	.705	20.076	3.01	.502	-.047	.00837
26	.705	20.085	4.01	.612	-.047	.00897
27	.703	20.032	5.02	.712	-.048	.01127
29	.706	20.094	6.01	.819	-.050	.01712
30	.703	20.064	.01	.142	-.036	.00721
RUN 36						
7	.708	40.240	.01	.153	-.035	.00662
9	.706	40.253	-1.00	.034	-.032	.00660
11	.707	40.194	1.01	.272	-.038	.00688
13	.704	40.162	2.01	.386	-.041	.00719
15	.706	40.146	3.01	.491	-.042	.00770
17	.705	40.140	4.01	.605	-.044	.00850
RUN 48						
51	.706	40.199	5.05	.707	-.045	.01145
52	.707	40.254	6.02	.807	-.046	.01745

TABLE 3. – Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 9						
61	.720	6.060	-1.00	.025	-.031	.00674
62	.721	6.070	1.01	.248	-.035	.00683
64	.721	6.067	2.02	.361	-.038	.00654
65	.722	6.041	3.01	.469	-.039	.00731
RUN 20						
12	.721	6.022	4.01	.588	-.048	.01180
RUN 14						
14	.723	9.010	-.99	.027	-.031	.00802
15	.723	9.019	1.02	.254	-.037	.00852
16	.720	8.996	2.02	.363	-.038	.00902
17	.722	9.007	3.01	.474	-.041	.01033
18	.722	9.007	4.03	.581	-.042	.01216
19	.719	8.985	.01	.142	-.033	.00803
RUN 32						
23	.722	15.069	-.99	.026	-.031	.00762
24	.723	15.028	1.01	.251	-.037	.00819
25	.724	15.030	2.01	.361	-.040	.00906
26	.724	15.021	3.01	.469	-.042	.00990
28	.724	15.068	4.01	.570	-.045	.01121
29	.723	15.006	.01	.142	-.035	.00779
RUN 29						
13	.741	6.008	-1.01	.017	-.033	.00891
14	.742	6.015	1.02	.247	-.039	.01103
15	.740	6.009	2.01	.356	-.041	.01246
16	.743	6.025	3.02	.458	-.045	.01706
17	.741	6.011	.01	.137	-.036	.00982

TABLE 3. – Continued.

(b) Continued.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 33						
35	.742	15.037	-.98	.022	-.033	.00826
36	.741	15.029	1.01	.253	-.040	.01024
37	.743	15.004	2.01	.362	-.044	.01295
38	.742	14.936	3.02	.461	-.046	.01639
39	.741	15.041	.01	.138	-.036	.00908
RUN 21						
14	.760	5.965	.02	.125	-.040	.01179
15	.759	5.973	-1.01	.009	-.038	.01042
17	.765	5.995	1.01	.235	-.045	.01397
18	.761	5.996	2.03	.343	-.052	.01763
19	.763	6.009	3.02	.434	-.060	.03270
RUN 77						
1	.765	9.021	.03	.094	-.035	.01174
4	.762	9.022	-.95	.001	-.034	.01000
5	.759	9.001	1.02	.222	-.040	.01283
6	.762	9.017	2.02	.322	-.044	.01794
7	.763	9.027	3.06	.419	-.052	.02843
8	.762	9.036	.36	.145	-.038	.01192
RUN 78						
9	.763	12.024	-.04	.096	-.036	.01101
10	.765	12.042	-.92	.003	-.034	.01032
11	.762	11.992	1.02	.220	-.039	.01298
12	.764	12.009	2.04	.323	-.041	.01862
13	.765	12.021	3.03	.410	-.049	.02924
RUN 34						
40	.760	15.037	.01	.131	-.039	.01181
41	.761	14.992	-1.00	.012	-.036	.00974
42	.761	14.974	1.02	.240	-.045	.01463
43	.763	15.000	2.03	.336	-.048	.02336
44	.764	15.008	3.02	.432	-.057	.03402

TABLE 3. — Concluded.

(b) Concluded.

Point	M	$R_c \times 10^{-6}$	α	c_n	c_m	c_d
RUN 30						
18	.783	6.015	.01	.103	-.043	.02111
19	.780	6.004	-.99	-.008	-.038	.01450
20	.782	6.011	1.01	.198	-.046	.02966
RUN 35						
1	.781	15.038	.01	.107	-.042	.01777
3	.782	15.051	-1.00	-.007	-.040	.01402
5	.782	15.032	1.01	.201	-.049	.02722
RUN 31						
21	.804	6.003	.01	.054	-.045	.03582
22	.805	6.007	-.99	-.057	-.040	.02969
23	.802	5.995	1.01	.155	-.049	.04187
RUN 15						
22	.804	9.043	.02	.049	-.045	.02863
23	.800	9.021	-1.00	-.041	-.040	.02106
25	.802	9.032	1.02	.143	-.048	.03601

SYMBOLS

This list of symbols is applicable only to Table 4.

ALPHA	angle of attack, deg.
C	airfoil model chord, cm
CC	section axial-force coefficient from airfoil pressures
CD1	drag coefficient from wake total pressure probe, Y/(b/2) = 0.125
CD2	drag coefficient from wake total pressure probe, Y/(b/2) = 0.000
CD3	drag coefficient from wake total pressure probe, Y/(b/2) = -0.125
CD4	drag coefficient from wake total pressure probe, Y/(b/2) = -0.375
CD5	drag coefficient from wake total pressure probe, Y/(b/2) = -0.500
CDCOR1	drag coefficient corrected for a "threshold" decrement, from wake total pressure probe, Y/(b/2) = 0.125
CDCOR2	drag coefficient corrected for a "threshold" decrement, from wake total pressure probe, Y/(b/2) = 0.000
CDCOR3	drag coefficient corrected for a "threshold" decrement, from wake total pressure probe, Y/(b/2) = -0.125
CDCOR4	drag coefficient corrected for a "threshold" decrement, from wake total pressure probe, Y/(b/2) = -0.375
CDCOR5	drag coefficient corrected for a "threshold" decrement, from wake total pressure probe, Y/(b/2) = -0.500
CM	section pitching-moment coefficient about quarter-chord point
CN	section normal-force coefficient from airfoil pressures
CP	pressure coefficient
MACH	freestream Mach number
MLOC	local Mach number
P,L	local static pressure, psi
PT	tunnel stagnation pressure, psi
RC	Reynolds number based on chord

TT	tunnel stagnation temperature, K
X	chordwise distance from leading edge of airfoil, cm
Y	spanwise distance from leading edge of airfoil, cm

TABLE 4.– NACA 65_1–213 SURFACE PRESSURE COEFFICIENTS

TEST	148	PT	20.2513	PSI	CN	.1308		CD1	.00652	CDCOR1	.00657
RUN	13	TT	153.2328	K	CM	-.0266		CD2	.00729	CDCOR2	.00737
POINT	1	RC	6.0620	MILLION	CC	.0053		CD3	.00654	CDCOR3	.00662
		MACH	.6039					CD4	.00737	CDCOR4	.00743
		ALPHA	-.0102	DEG				CD5	.00676	CDCOR5	.00676

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.1049	1.0020	0.0000
.0244	.0531	.7916	.5875
.0513	-.1355	.7539	.6482
.0765	-.2256	.7358	.6767
.1005	-.3076	.7195	.7022
.1506	-.4123	.6985	.7346
.2004	-.4843	.6841	.7568
.2500	-.5481	.6714	.7764
.2988	-.5799	.6650	.7862
.3492	-.6168	.6576	.7975
.3986	-.6581	.6494	.8102
.4479	-.6632	.6484	.8118
.4983	-.6350	.6540	.8031
.5466	-.5566	.6697	.7790
.5962	-.4461	.6918	.7450
.6457	-.3411	.7128	.7126
.6957	-.2380	.7334	.6805
.7461	-.1383	.7534	.6491
.7952	-.0434	.7723	.6186
.8457	.0508	.7912	.5882
.9006	.1331	.8076	.5609

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.1049	1.0020	0.0000
.0129	-.2108	.7389	.6720
.0260	-.1738	.7462	.6603
.0502	-.2124	.7385	.6725
.0742	-.2316	.7347	.6785
.0997	-.2452	.7320	.6827
.1495	-.2728	.7265	.6914
.1996	-.2915	.7227	.6972
.2490	-.2977	.7215	.6991
.2994	-.3148	.7180	.7044
.3481	-.3277	.7155	.7084
.3976	-.3451	.7120	.7138
.4467	-.3331	.7144	.7101
.4972	-.3177	.7175	.7053
.5452	-.2768	.7257	.6926
.5953	-.2264	.7357	.6769
.6442	-.1718	.7467	.6597
.6944	-.1120	.7586	.6408
.7442	-.0513	.7708	.6214
.7879	.0101	.7830	.6015
.8444	.0703	.7951	.5818

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.3945	.7021	.7291
.1508	.5033	-.4196	.6971	.7369
.1507	.8357	-.4242	.6962	.7383
.1507	1.0000	-.4289	.6952	.7397
.1508	1.1660	-.4125	.6985	.7347
.4984	.1708	-.5965	.6617	.7913
.4984	.3368	-.6193	.6571	.7983
.4984	.5028	-.6308	.6548	.8018
.4983	1.0007	-.6396	.6531	.8045
.4984	1.1667	-.6019	.6606	.7929
.7950	.1705	-.0643	.7681	.6255
.7950	.3375	-.0507	.7709	.6212
.7952	.5027	-.0447	.7721	.6192
.7952	.8347	-.0477	.7715	.6202
.7952	1.0008	-.0531	.7704	.6219
.7952	1.1667	-.0645	.7681	.6256

TABLE 4.— Continued.

TEST	148	PT	20.2378	PSI	CN	.0293	
RUN	13	TT	154.6044	K	CM	-.0262	
POINT	3	RC	5.9902	MILLION	CC	.0062	
		MACH	.6031				
		ALPHA	-.9979	DEG			

CD1	.00687	CDCOR1	.00693
CD2	.00778	CDCOR2	.00788
CD3	.00764	CDCOR3	.00776
CD4	.00800	CDCOR4	.00812
CD5	.00735	CDCOR5	.00741

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.0913	.9994	.0298
.0244	.2357	.8286	.5249
.0513	.0056	.7529	.5018
.0765	-.1014	.7615	.6361
.1005	-.1866	.7442	.6036
.1506	-.3135	.7192	.7026
.2004	-.3970	.7026	.7283
.2500	-.4700	.6880	.7508
.2988	-.5113	.6798	.7634
.3492	-.5551	.6711	.7769
.3986	-.6026	.6616	.7914
.4479	-.6153	.6591	.7953
.4983	-.5922	.6537	.7882
.5456	-.5269	.6767	.7682
.5962	-.4255	.6969	.7371
.6457	-.3266	.7166	.7067
.6957	-.2295	.7360	.6764
.7461	-.1337	.7551	.6463
.7952	-.0421	.7734	.6171
.8457	.0495	.7916	.5874
.9006	.1366	.8090	.5586

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.0913	.9994	.0298
.0129	-.5601	.6701	.7764
.0260	-.4027	.7015	.7301
.0502	-.3826	.7055	.7239
.0742	-.3722	.7075	.7207
.0997	-.3664	.7087	.7189
.1495	-.3721	.7076	.7207
.1996	-.3770	.7066	.7222
.2490	-.3720	.7076	.7207
.2994	-.3802	.7059	.7232
.3481	-.3863	.7047	.7250
.3976	-.3929	.7034	.7271
.4467	-.3843	.7051	.7244
.4972	-.3633	.7093	.7180
.5452	-.3072	.7205	.7006
.5953	-.2522	.7315	.6835
.6442	-.1929	.7433	.6650
.6944	-.1293	.7560	.6449
.7442	-.0655	.7687	.6246
.7879	-.0007	.7816	.6038
.8444	.0617	.7941	.5835

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.3113	.7197	.7019
.1508	.5033	-.3232	.7173	.7056
.1507	.8357	-.3203	.7179	.7047
.1507	1.0000	-.3201	.7179	.7046
.1508	1.1660	-.3061	.7207	.7003
.4984	.1708	-.5684	.6684	.7810
.4984	.3368	-.5843	.6652	.7858
.4984	.5028	-.5933	.6634	.7886
.4983	1.0007	-.5975	.6626	.7899
.4984	1.1667	-.5666	.6688	.7804
.7950	.1705	-.0568	.7704	.6218
.7950	.3375	-.0473	.7723	.6188
.7952	.5027	-.0427	.7732	.6173
.7952	.8347	-.0426	.7733	.6173
.7952	1.0008	-.0457	.7727	.6183
.7952	1.1667	-.0536	.7711	.6208

TABLE 4.– Continued.

TEST	148	PT	20.2922	PSI	CN	.2510	CD1	.00751	CDCOR1 .00759
RUN	13	TT	154.6278	K	CM	-.0321	CD2	.00785	CDCOR2 .00796
POINT	4	RC	6.0072	MILLION	CC	.0034	CD3	.00699	CDCOR3 .00712
		MACH	.6055				CD4	.00735	CDCOR4 .00746
		ALPHA	1.0183	DEG			CD5	.00665	CDCOR5 .00670

UPPER SURFACE				LOWER SURFACE				SPANWISE				
X/C	CP	P,L/PT	MLOC	X/C	CP	P,L/PT	MLOC	X/C	Y/C	CP	P,L/PT	MLOC
0.0000	1.0700	.9948	.0863	0.0000	1.0700	.9948	.0863	.1508	.1702	-.5250	.6733	.7735
.0244	-.1504	.7488	.6563	.0129	.0778	.7948	.5823	.1508	.5033	-.5470	.6688	.7803
.0513	-.3084	.7169	.7061	.0260	.0246	.7841	.5998	.1507	.8357	-.5369	.6709	.7772
.0755	-.3813	.7022	.7289	.0502	-.0547	.7681	.6256	.1507	1.0000	-.5396	.6703	.7780
.1005	-.4454	.6893	.7488	.0742	-.0978	.7594	.6395	.1508	1.1660	-.5202	.6743	.7720
.1506	-.5379	.6707	.7775	.0997	-.1284	.7532	.6493	.4984	.1708	-.6518	.6477	.8128
.2004	-.5968	.6598	.7957	.1496	-.1679	.7453	.6619	.4984	.3368	-.6806	.6419	.8217
.2500	-.6506	.6480	.8124	.1996	-.2110	.7366	.6755	.4984	.5028	-.6925	.6395	.8254
.2988	-.5127	.6757	.7697	.2490	-.2285	.7330	.6810	.4983	1.0007	-.6795	.6421	.8213
.3492	-.7019	.6376	.8283	.2994	-.2532	.7281	.6888	.4984	1.1667	-.6477	.6485	.8115
.3986	-.7360	.6307	.8389	.3481	-.2727	.7241	.6949	.7950	.1705	-.0905	.7609	.6372
.4479	-.7319	.6316	.8376	.3976	-.2908	.7205	.7006	.7950	.3375	-.0748	.7640	.6321
.4983	-.6894	.6401	.8244	.4467	-.2956	.7195	.7021	.7952	.5027	-.0674	.7655	.6297
.5466	-.6055	.6571	.7984	.4972	-.2872	.7212	.6995	.7952	.8347	-.0666	.7657	.6295
.5962	-.4879	.6808	.7620	.5452	-.2405	.7306	.6848	.7952	1.0008	-.0734	.7643	.6317
.6457	-.3760	.7033	.7272	.5953	-.1960	.7396	.6708	.7952	1.1667	-.0905	.7609	.6372
.6957	-.2672	.7252	.6932	.6442	-.1463	.7496	.6550					
.7461	-.1633	.7462	.6604	.6944	-.0912	.7607	.6374					
.7952	-.0661	.7658	.6293	.7442	-.0347	.7721	.6192					
.8457	.0290	.7850	.5984	.7879	.0234	.7838	.6002					
.9006	.1173	.8028	.5690	.8444	.0804	.7953	.5814					

TABLE 4.— Continued.

TEST	148	PT	20.2910	PSI	CN	.3577		CD1	.00766	CDCOR1	.00772
RUN	13	TT	154.6578	K	CM	-.0343		CD2	.00742	CDCOR2	.00752
POINT	5	RC	5.9778	MILLION	CC	-.0023		CD3	.00665	CDCOR3	.00675
		MACH	.6018					CD4	.00745	CDCOR4	.00754
		ALPHA	2.0279	DEG				CD5	.00666	CDCOR5	.00669

UPPER SURFACE				LOWER SURFACE			
X/C	CP	P,L/PT	MLJC	X/C	CP	P,L/PT	MLOC
0.0000	.9688	.9752	.1895	0.0000	.9688	.9752	.1895
.0244	-.3854	.7067	.7220	.0129	.3160	.8458	.4949
.0513	-.4889	.6862	.7536	.0260	.2096	.8247	.5319
.0765	-.5357	.6769	.7679	.0502	.0885	.8007	.5724
.1005	-.5856	.6670	.7831	.0742	.0263	.7884	.5928
.1506	-.6530	.6537	.8036	.0997	-.0178	.7796	.6071
.2004	-.6946	.6454	.8163	.1495	-.0815	.7670	.6274
.2500	-.7365	.6371	.8291	.1996	-.1300	.7574	.6427
.2988	-.7462	.6352	.8320	.2490	-.1576	.7519	.6514
.3492	-.7657	.6313	.8380	.2994	-.1890	.7457	.6613
.3986	-.7917	.6262	.8459	.3481	-.2138	.7407	.6690
.4479	-.7787	.6287	.8419	.3976	-.2380	.7359	.6765
.4983	-.7277	.6388	.8264	.4467	-.2464	.7343	.6791
.5466	-.6347	.6573	.7980	.4972	-.2434	.7349	.6782
.5962	-.5099	.6820	.7600	.5452	-.2052	.7425	.6663
.6457	-.3934	.7051	.7244	.5953	-.1660	.7502	.6540
.6957	-.2806	.7275	.6897	.6442	-.1216	.7590	.6401
.7461	-.1738	.7487	.6565	.6944	-.0712	.7690	.6241
.7952	-.0747	.7683	.6252	.7442	-.0193	.7793	.6075
.8457	.0213	.7874	.5944	.7879	.0352	.7901	.5899
.9006	.1047	.8039	.5671	.8444	.0889	.8008	.5724

SPANWISE				
X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.6350	.6572	.7981
.1508	.5033	-.6536	.6535	.8039
.1507	.8357	-.6620	.6519	.8063
.1507	1.0000	-.6548	.6533	.8042
.1508	1.1660	-.6320	.6578	.7972
.4984	.1708	-.6737	.6496	.8099
.4984	.3368	-.7159	.6412	.8228
.4984	.5028	-.7282	.6388	.8265
.4983	1.0007	-.7119	.6420	.8216
.4984	1.1667	-.6691	.6505	.8085
.7950	.1705	-.1008	.7632	.6335
.7950	.3375	-.0840	.7665	.6282
.7952	.5027	-.0768	.7679	.6259
.7952	.8347	-.0774	.7678	.6261
.7952	1.0008	-.0876	.7658	.6293
.7952	1.1667	-.1194	.7595	.6394

TABLE 4.— Continued.

TEST	148	PT	20.2931	PSI	CN	.4614	CD1	.00773	CDCOR1	.00779
RUN	13	TT	154.6550	K	CM	-.0364	CD2	.00738	CDCOR2	.00749
POINT	6	RC	5.9653	MILLION	CC	-.0108	CD3	.00713	CDCOR3	.00724
		MACH	.5999				CD4	.00786	CDCOR4	.00796
		ALPHA	3.0141	DEG			CD5	.00731	CDCOR5	.00734

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.8013	.9423	.2925
.0244	-.6429	.6569	.7986
.0513	-.6783	.6499	.8093
.0765	-.6948	.6467	.8144
.1005	-.7281	.6401	.8245
.1506	-.7711	.6316	.8376
.2004	-.7949	.6269	.8448
.2500	-.8222	.6215	.8531
.2988	-.8178	.6223	.8518
.3492	-.8283	.6203	.8550
.3986	-.8454	.6169	.8602
.4479	-.8227	.6214	.8533
.4983	-.7615	.6335	.8347
.5466	-.6608	.6534	.8040
.5962	-.5291	.6794	.7641
.6457	-.4078	.7034	.7271
.6957	-.2912	.7264	.6914
.7451	-.1816	.7480	.6575
.7952	-.0811	.7679	.6259
.8457	.0152	.7870	.5951
.9006	.0950	.8027	.5691

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.8013	.9423	.2925
.0129	.5188	.8865	.4184
.0260	.3714	.8574	.4740
.0502	.2123	.8259	.5298
.0742	.1342	.8105	.5561
.0997	.0778	.7993	.5748
.1496	-.0060	.7828	.6019
.1996	-.0559	.7729	.6179
.2490	-.0919	.7658	.6293
.2994	-.1283	.7586	.6407
.3481	-.1571	.7529	.6498
.3976	-.1867	.7471	.6590
.4467	-.1987	.7447	.6628
.4972	-.2009	.7443	.6635
.5452	-.1689	.7506	.6535
.5953	-.1353	.7572	.6430
.6442	-.0948	.7652	.6302
.6944	-.0487	.7743	.6156
.7442	-.0007	.7838	.6002
.7879	.0495	.7937	.5840
.8444	.0999	.8037	.5675

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.7493	.6359	.8309
.1508	.5033	-.7718	.6314	.8378
.1507	.8357	-.7796	.6299	.8402
.1507	1.0000	-.7708	.6316	.8375
.1508	1.1660	-.7426	.6372	.8289
.4984	.1708	-.7016	.6453	.8164
.4984	.3368	-.7503	.6357	.8312
.4984	.5028	-.7620	.6334	.8348
.4983	1.0007	-.7419	.6373	.8287
.4984	1.1667	-.6872	.6482	.8121
.7950	.1705	-.1161	.7610	.6369
.7950	.3375	-.0933	.7655	.6297
.7952	.5027	-.0838	.7674	.6267
.7952	.8347	-.0843	.7673	.6269
.7952	1.0008	-.0974	.7647	.6310
.7952	1.1667	-.1468	.7550	.6466

TABLE 4.– Continued.

TEST	148	PT	20.3199	PSI	CN	.5766	CD1	.00800	CDCOR1	.00805
RUN	13	TT	154.6642	K	CM	-.0383	CD2	.00777	CDCOR2	.00787
POINT	7	RC	5.9863	MILLION	CC	-.0220	CD3	.00746	CDCOR3	.00758
		MACH	.6017				CD4	.00746	CDCOR4	.00756
		ALPHA	4.0327	DEG			CD5	.00760	CDCOR5	.00763

UPPER SURFACE				LOWER SURFACE			
X/C	CP	P,L/PT	MLOC	X/C	CP	P,L/PT	MLOC
0.0000	.5679	.8957	.3998	0.0000	.5679	.8957	.3998
.0244	-.9401	.5965	.8919	.0129	.6616	.9182	.3511
.0513	-.8991	.6046	.8792	.0260	.5140	.8850	.4214
.0765	-.8778	.6088	.8727	.0502	.3323	.8489	.4893
.1005	-.8921	.6060	.8771	.0742	.2403	.8307	.5216
.1506	-.9054	.6034	.8812	.0997	.1736	.8174	.5443
.2004	-.9082	.6028	.8820	.1496	.0709	.7971	.5785
.2500	-.9213	.6002	.8861	.1995	.0155	.7861	.5965
.2988	-.7161	.6409	.8232	.2490	-.0291	.7772	.6109
.3492	-.9011	.6042	.8798	.2994	-.0721	.7687	.6246
.3986	-.9083	.6028	.8821	.3481	-.1062	.7619	.6355
.4479	-.8738	.6097	.8714	.3976	-.1409	.7551	.6464
.4983	-.8015	.6240	.8493	.4467	-.1582	.7516	.6518
.5456	-.6916	.6458	.8157	.4972	-.1658	.7501	.6542
.5962	-.5536	.6731	.7737	.5452	-.1380	.7556	.6455
.6457	-.4269	.6983	.7349	.5953	-.1091	.7614	.6364
.6957	-.3062	.7223	.6979	.6442	-.0727	.7686	.6248
.7461	-.1942	.7445	.6631	.6944	-.0302	.7770	.6112
.7952	-.0924	.7647	.6311	.7442	.0145	.7859	.5969
.8457	.0035	.7837	.6004	.7879	.0603	.7950	.5819
.9006	.0808	.7990	.5752	.8444	.1073	.8043	.5665

SPANWISE				
X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.8809	.6082	.8736
.1508	.5033	-.9044	.6036	.8809
.1507	.8357	-.9013	.6042	.8799
.1507	1.0000	-.8869	.6071	.8755
.1508	1.1660	-.8537	.6136	.8653
.4984	.1708	-.7252	.6391	.8259
.4984	.3368	-.7861	.6271	.8445
.4984	.5028	-.8021	.6239	.8495
.4983	1.0007	-.7813	.6280	.8431
.4984	1.1667	-.7203	.6401	.8245
.7950	.1705	-.1478	.7537	.6486
.7950	.3375	-.1099	.7612	.6366
.7952	.5027	-.0964	.7639	.6324
.7952	.8347	-.0948	.7642	.6319
.7952	1.0008	-.1097	.7612	.6366
.7952	1.1667	-.1686	.7496	.6551

TABLE 4.– Continued.

TEST	148	PT	20.3216	PSI	CN	.6761	CD1	.00907	CDCOR1	.00914
RUN	13	TT	154.6597	K	CM	-.0399	CD2	.00862	CDCOR2	.00874
POINT	8	RC	5.9957	MILLION	CC	-.0348	CD3	.00839	CDCOR3	.00852
		MACH	.6030				CD4	.00806	CDCOR4	.00816
		ALPHA	5.0100	DEG			CD5	.00802	CDCOR5	.00804

JPPER SURFACE				LOWER SURFACE				SPANWISE				
X/C	CP	P,L/PT	MLOC	X/C	CP	P,L/PT	MLOC	X/C	Y/C	CP	P,L/PT	MLOC
0.0000	.3108	.8430	.4999	0.0000	.3108	.8430	.4999	.1508	.1702	-.9917	.5823	.9140
.0244	-1.2765	.5253	1.0049	.0129	.8120	.9434	.2897	.1508	.5033	-1.0382	.5730	.9286
.0513	-1.1203	.5566	.9546	.0260	.6323	.9074	.3751	.1507	.8357	-1.0334	.5740	.9271
.0765	-1.0554	.5696	.9341	.0502	.4406	.8690	.4522	.1507	1.0000	-1.0143	.5778	.9211
.1005	-1.0543	.5698	.9337	.0742	.3397	.8488	.4895	.1508	1.1660	-.9776	.5852	.9096
.1506	-1.0369	.5733	.9282	.0997	.2667	.8342	.5154	.4984	.1708	-.7405	.6326	.8360
.2004	-1.0166	.5773	.9218	.1496	.1482	.8105	.5561	.4984	.3368	-.8112	.6185	.8578
.2500	-1.0125	.5782	.9205	.1995	.0876	.7984	.5763	.4984	.5028	-.8317	.6144	.8641
.2938	-.9748	.5857	.9087	.2490	.0362	.7881	.5932	.4983	1.0007	-.8070	.6193	.8565
.3492	-.9627	.5881	.9049	.2994	-.0134	.7782	.6094	.4984	1.1667	-.7350	.6337	.8343
.3986	-.9596	.5887	.9040	.3481	-.0530	.7702	.6222	.7950	.1705	-.1706	.7467	.6596
.4479	-.9133	.5980	.8895	.3975	-.0902	.7628	.6341	.7950	.3375	-.1210	.7566	.6439
.4983	-.8299	.6147	.8636	.4467	-.1149	.7578	.6420	.7952	.5027	-.1051	.7598	.6389
.5466	-.7119	.6383	.8272	.4972	-.1280	.7552	.6462	.7952	.8347	-.1034	.7601	.6383
.5962	-.5684	.6671	.7830	.5452	-.1031	.7602	.6382	.7952	1.0008	-.1196	.7569	.6435
.6457	-.4372	.6933	.7426	.5953	-.0789	.7650	.6305	.7952	1.1667	-.1930	.7422	.6667
.6957	-.3136	.7180	.7044	.6442	-.0482	.7712	.6206					
.7461	-.2007	.7407	.6691	.6944	-.0105	.7787	.6085					
.7952	-.1001	.7608	.6373	.7442	.0305	.7869	.5951					
.8457	-.0075	.7793	.6075	.7879	.0731	.7955	.5811					
.9006	.0619	.7932	.5848	.8444	.1165	.8042	.5667					

TABLE 4.– Continued.

TEST	148	PT	20.3218	PSI	CN	.7832	CD1	.01029	CDCOR1	.01036
RUN	13	TT	154.6416	K	CM	-.0382	CD2	.00962	CDCOR2	.00973
POINT	9	RC	5.9819	MILLION	CC	-.0542	CD3	.00942	CDCOR3	.00954
		MACH	.6009				CD4	.00893	CDCOR4	.00901
		ALPHA	6.0258	DEG			CD5	.00880	CDCOR5	.00878

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.0129	.7654	.5976
.0244	-1.9602	.3938	1.2353
.0513	-1.2820	.5284	.9999
.0755	-1.2435	.5300	.9875
.1005	-1.2328	.5382	.9641
.1506	-1.1740	.5498	.9654
.2004	-1.1255	.5595	.9501
.2500	-1.1014	.5642	.9425
.2988	-1.0451	.5754	.9248
.3492	-1.0205	.5803	.9172
.3986	-1.0056	.5833	.9125
.4479	-.9473	.5948	.8944
.4983	-.8555	.6131	.8661
.5466	-.7286	.6383	.8273
.5952	-.5785	.6681	.7815
.6457	-.4432	.6949	.7402
.6957	-.3172	.7199	.7015
.7461	-.2042	.7423	.6665
.7952	-.1062	.7616	.6357
.8457	-.0193	.7791	.6079
.9006	.0402	.7909	.5867

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.0129	.7654	.5976
.0129	.9085	.9632	.2319
.0260	.7336	.9285	.3272
.0502	.5348	.8890	.4133
.0742	.4275	.8677	.4547
.0997	.3491	.8522	.4835
.1495	.2326	.8290	.5244
.1996	.1536	.8134	.5512
.2490	.0965	.8020	.5703
.2994	.0416	.7911	.5883
.3481	-.0022	.7824	.6025
.3976	-.0469	.7736	.6168
.4467	-.0706	.7689	.6244
.4972	-.0884	.7653	.6300
.5452	-.0739	.7682	.6254
.5953	-.0545	.7721	.6192
.6442	-.0286	.7772	.6109
.6944	.0042	.7837	.6004
.7442	.0414	.7911	.5883
.7879	.0797	.7987	.5758
.8444	.1190	.8065	.5628

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-1.1208	.5604	.9486
.1508	.5033	-1.1731	.5500	.9651
.1507	.8357	-1.1751	.5496	.9657
.1507	1.0000	-1.1536	.5539	.9589
.1508	1.1660	-1.1106	.5624	.9453
.4984	.1708	-.7558	.6329	.8356
.4984	.3368	-.8320	.6177	.8589
.4984	.5028	-.8537	.6134	.8656
.4983	1.0007	-.8320	.6177	.8589
.4984	1.1667	-.7585	.6323	.8364
.7950	.1705	-.1887	.7454	.6616
.7950	.3375	-.1301	.7571	.6432
.7952	.5027	-.1121	.7606	.6375
.7952	.8347	-.1107	.7609	.6371
.7952	1.0008	-.1295	.7572	.6430
.7952	1.1667	-.2119	.7408	.6689

TABLE 4.– Continued.

TEST	148	PT	20.3200	PSI	CN	.8934	CD1	.01222	CDCOR1	.01231
RUN	13	TT	154.6492	K	CM	-.0362	CD2	.01119	CDCOR2	.01132
POINT	10	RC	5.9779	MILLION	CC	-.0743	CD3	.01110	CDCOR3	.01125
		MACH	.6005				CD4	.01045	CDCOR4	.01055
		ALPHA	7.0312	DEG			CD5	.01019	CDCOR5	.01018

UPPER SURFACE				LOWER SURFACE			
X/C	CP	P,L/PT	MLOC	X/C	CP	P,L/PT	MLOC
0.0000	-.2369	.7368	.6752	0.0000	-.2369	.7368	.6752
.0244	-2.3767	.3133	1.4024	.0129	.9762	.9768	.1834
.0513	-2.2062	.3471	1.3289	.0260	.8094	.9438	.2886
.0765	-1.7159	.4441	1.1426	.0502	.6094	.9042	.3819
.1005	-1.1964	.5469	.9701	.0742	.4986	.8823	.4267
.1506	-1.2543	.5354	.9885	.0997	.4153	.8658	.4583
.2004	-1.2214	.5419	.9780	.1496	.2913	.8413	.5030
.2500	-1.1876	.5486	.9674	.1996	.2065	.8245	.5323
.2988	-1.0273	.5803	.9171	.2490	.1431	.8120	.5536
.3492	-1.0818	.5696	.9341	.2994	.0838	.8002	.5733
.3986	-1.0570	.5745	.9263	.3481	.0360	.7908	.5889
.4479	-.9877	.5882	.9049	.3976	-.0098	.7817	.6037
.4983	-.8835	.6088	.8728	.4467	-.0421	.7753	.6140
.5466	-.7503	.6352	.8320	.4972	-.0645	.7709	.6212
.5962	-.5931	.6663	.7843	.5452	-.0501	.7737	.6166
.6457	-.4539	.6938	.7419	.5953	-.0354	.7766	.6119
.6957	-.3260	.7191	.7027	.6442	-.0138	.7809	.6050
.7461	-.2143	.7412	.6682	.6944	.0148	.7866	.5958
.7952	-.1212	.7597	.6391	.7442	.0479	.7931	.5850
.8457	-.0427	.7752	.6142	.7879	.0824	.7999	.5737
.9006	.0048	.7846	.5990	.8444	.1182	.8070	.5619

SPANWISE				
X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-1.2305	.5401	.9809
.1508	.5033	-1.2568	.5349	.9893
.1507	.8357	-1.2482	.5366	.9866
.1507	1.0000	-1.2273	.5408	.9799
.1508	1.1660	-1.2048	.5452	.9728
.4984	.1708	-.7712	.6310	.8384
.4984	.3368	-.8553	.6144	.8641
.4984	.5028	-.8811	.6093	.8720
.4983	1.0007	-.8571	.6140	.8647
.4984	1.1667	-.7832	.6286	.8421
.7950	.1705	-.2237	.7394	.6711
.7950	.3375	-.1484	.7543	.6477
.7952	.5027	-.1284	.7582	.6414
.7952	.8347	-.1245	.7590	.6401
.7952	1.0008	-.1465	.7546	.6471
.7952	1.1667	-.2270	.7387	.6722

TABLE 4.– Continued.

TEST	148	PT	20.3210	PSI	CN	.9923	CD1	.01528	CDCOR1	.01524
RUN	13	TT	154.6251	K	CM	-.0305	CD2	.01419	CDCOR2	.01428
POINT	11	RC	5.9956	MILLION	CC	-.0928	CD3	.01426	CDCOR3	.01436
		MACH	.6027				CD4	.01326	CDCOR4	.01333
		ALPHA	8.0139	DEG			CD5	.01303	CDCOR5	.01299

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	-.4192	.6975	.7362
.0244	-2.5510	.2716	1.5025
.0513	-2.4473	.2923	1.4514
.0755	-2.3217	.3174	1.3932
.1005	-2.2381	.3341	1.3565
.1506	-1.3488	.5118	1.0271
.2004	-1.0854	.5644	.9422
.2500	-1.1543	.5506	.9641
.2988	-1.1222	.5570	.9539
.3492	-1.0967	.5622	.9458
.3986	-1.0720	.5671	.9380
.4479	-1.0000	.5815	.9153
.4983	-.8930	.6028	.8820
.5466	-.7615	.6291	.8414
.5962	-.6070	.6600	.7939
.6457	-.4681	.6877	.7512
.6957	-.3403	.7133	.7118
.7461	-.2265	.7360	.6764
.7952	-.1297	.7554	.6459
.8457	-.0457	.7722	.6191
.9006	.0093	.7831	.6013

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	-.4192	.6975	.7362
.0129	1.0227	.9856	.1439
.0260	.8680	.9547	.2561
.0502	.6740	.9159	.3563
.0742	.5615	.8935	.4043
.0997	.4757	.8763	.4383
.1495	.3476	.8507	.4861
.1996	.2589	.8330	.5175
.2490	.1917	.8196	.5407
.2994	.1289	.8070	.5619
.3481	.0782	.7969	.5788
.3976	.0306	.7874	.5944
.4467	-.0079	.7797	.6069
.4972	-.0347	.7743	.6156
.5452	-.0208	.7771	.6111
.5953	-.0099	.7793	.6076
.6442	.0078	.7828	.6018
.6944	.0324	.7878	.5938
.7442	.0624	.7937	.5840
.7879	.0938	.8000	.5736
.8444	.1269	.8066	.5626

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-1.1219	.5571	.9538
.1508	.5033	-1.1975	.5420	.9779
.1507	.8357	-1.3045	.5206	1.0126
.1507	1.0000	-1.1782	.5459	.9717
.1506	1.1660	-1.0667	.5681	.9363
.4984	.1708	-.7445	.6325	.8361
.4984	.3368	-.8550	.6104	.8702
.4984	.5028	-.8915	.6032	.8815
.4983	1.0007	-.8664	.6082	.8738
.4984	1.1667	-.7858	.6243	.8489
.7950	.1705	-.2963	.7221	.6981
.7950	.3375	-.1724	.7468	.6594
.7952	.5027	-.1403	.7532	.6493
.7952	.8347	-.1303	.7552	.6461
.7952	1.0008	-.1549	.7503	.6539
.7952	1.1667	-.2574	.7298	.6861

TABLE 4.— Continued.

TEST	148	PT	20.3247	PSI	CN	.1389	CD1	.00745	CDCOR1 .00752
RUN	13	TT	154.5309	K	CM	-.0284	CD2	.00748	CDCOR2 .00759
POINT	12	RC	6.0209	MILLION	CC	.0057	CD3	.00690	CDCOR3 .00701
		MACH	.6053				CD4	.00725	CDCOR4 .00736
		ALPHA	.0102	DEG			CD5	.00675	CDCOR5 .00680

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.1007	1.0011	0.0000
.0244	.0542	.7910	.5884
.0513	-.1431	.7514	.6521
.0765	-.2318	.7336	.6801
.1005	-.3083	.7183	.7041
.1506	-.4148	.6969	.7371
.2004	-.4868	.6825	.7594
.2500	-.5503	.6697	.7790
.2988	-.5815	.6634	.7886
.3492	-.6184	.6560	.8000
.3986	-.6587	.6479	.8124
.4479	-.6628	.6471	.8136
.4983	-.6307	.6536	.8038
.5466	-.5564	.6685	.7809
.5962	-.4487	.6901	.7476
.6457	-.3440	.7111	.7152
.6957	-.2409	.7318	.6830
.7461	-.1414	.7518	.6516
.7952	-.0474	.7706	.6215
.8457	.0456	.7893	.5913
.9006	.1341	.8071	.5618

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.1007	1.0011	0.0000
.0129	-.1976	.7405	.6694
.0260	-.1655	.7469	.6592
.0502	-.2037	.7393	.6713
.0742	-.2242	.7352	.6777
.0997	-.2377	.7325	.6820
.1496	-.2659	.7268	.6908
.1996	-.2850	.7230	.6968
.2490	-.2916	.7216	.6989
.2994	-.3082	.7183	.7040
.3481	-.3214	.7156	.7081
.3976	-.3350	.7129	.7124
.4467	-.3320	.7135	.7115
.4972	-.3180	.7163	.7071
.5452	-.2677	.7264	.6914
.5953	-.2182	.7364	.6758
.6442	-.1641	.7472	.6588
.6944	-.1048	.7591	.6399
.7442	-.0449	.7712	.6207
.7879	.0167	.7835	.6007
.8444	.0760	.7954	.5812

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.4065	.6986	.7346
.1508	.5033	-.4257	.6947	.7405
.1507	.8357	-.4143	.6970	.7370
.1507	1.0000	-.4221	.6954	.7394
.1508	1.1660	-.4052	.6988	.7341
.4984	.1708	-.6016	.6594	.7948
.4984	.3368	-.6230	.6551	.8014
.4984	.5028	-.6334	.6530	.8046
.4983	1.0007	-.6341	.6529	.8048
.4984	1.1667	-.5980	.6601	.7937
.7950	.1705	-.0656	.7670	.6274
.7950	.3375	-.0538	.7694	.6236
.7952	.5027	-.0480	.7705	.6217
.7952	.8347	-.0474	.7706	.6215
.7952	1.0008	-.0510	.7699	.6227
.7952	1.1667	-.0614	.7678	.6260

TABLE 4.– Continued.

TEST	148	PT	35.2668	PSI	CN	.1359	CD1	.00727	CDCOR1 .00735
RUN	43	TT	120.1061	K	CM	-.0283	CD2	.00704	CDCOR2 .00716
POINT	3	RC	15.0280	MILLION	CC	.0062	CD3	.00702	CDCOR3 .00716
		MACH	.6045				CD4	.00691	CDCOR4 .00704
		ALPHA	.0204	DEG			CD5	.00687	CDCOR5 .00692

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.0995	1.0008	0.0000
.0244	.0742	.7952	.5823
.0513	-.1253	.7552	.6470
.0765	-.2227	.7356	.6778
.1005	-.3035	.7194	.7031
.1506	-.4133	.6974	.7372
.2004	-.4858	.6828	.7596
.2500	-.5501	.6699	.7795
.2988	-.5831	.6633	.7896
.3492	-.6210	.6557	.8013
.3986	-.6598	.6479	.8133
.4479	-.6613	.6476	.8138
.4983	-.6327	.6534	.8049
.5466	-.5635	.6673	.7836
.5962	-.4530	.6894	.7495
.6457	-.3462	.7109	.7164
.6957	-.2448	.7312	.6847
.7461	-.1471	.7508	.6539
.7952	-.0489	.7705	.6225
.8457	.0437	.7891	.5923
.9006	.1320	.8068	.5630

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.0995	1.0008	0.0000
.0129	-.2032	.7395	.6716
.0260	-.1656	.7471	.6598
.0502	-.2049	.7392	.6722
.0742	-.2243	.7353	.6783
.0997	-.2382	.7325	.6826
.1496	-.2700	.7261	.6926
.1996	-.2868	.7228	.6979
.2490	-.2934	.7214	.6999
.2994	-.3071	.7187	.7042
.3481	-.3231	.7155	.7092
.3976	-.3413	.7118	.7148
.4467	-.3368	.7127	.7135
.4972	-.3226	.7156	.7090
.5452	-.2722	.7257	.6933
.5953	-.2247	.7352	.6784
.6442	-.1679	.7466	.6605
.6944	-.1121	.7578	.6428
.7442	-.0494	.7704	.6226
.7879	.0122	.7827	.6027
.8444	.0740	.7951	.5823

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.3878	.7025	.7293
.1508	.5033	-.4160	.6969	.7380
.1507	.8357	-.4128	.6975	.7370
.1507	1.0000	-.4068	.6987	.7352
.1508	1.1660	-.3881	.7024	.7294
.4984	.1708	-.5990	.6601	.7945
.4984	.3368	-.6276	.6544	.8034
.4984	.5028	-.6324	.6534	.8048
.4983	1.0007	-.6250	.6549	.8025
.4984	1.1667	-.6070	.6585	.7970
.7950	.1705	-.0718	.7659	.6298
.7950	.3375	-.0588	.7685	.6257
.7952	.5027	-.0499	.7703	.6228
.7952	.8347	-.0470	.7709	.6219
.7952	1.0008	-.0536	.7695	.6240
.7952	1.1667	-.0586	.7685	.6256

TABLE 4.— Continued.

TEST	148	PT	35.2057	PSI	CN	.0287	CD1	.00723	CDCOR1	.00729
RUN	43	TT	119.8700	K	CM	-.0258	CD2	.00708	CDCOR2	.00718
POINT	4	RC	15.0684	MILLION	CC	.0064	CD3	.00701	CDCOR3	.00714
		MACH	.6057				CD4	.00696	CDCOR4	.00708
		ALPHA	-.9979	DEG			CD5	.00698	CDCOR5	.00702

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.0916	.9992	.0333
.0244	.2487	.8301	.5232
.0513	.0239	.7850	.5990
.0765	-.0899	.7621	.6358
.1005	-.1804	.7440	.6647
.1506	-.3066	.7187	.7043
.2004	-.3907	.7018	.7304
.2500	-.4643	.6870	.7532
.2988	-.5065	.6785	.7663
.3492	-.5514	.6695	.7801
.3986	-.5962	.6605	.7939
.4479	-.6054	.6587	.7968
.4983	-.5851	.6628	.7905
.5466	-.5255	.6747	.7721
.5962	-.4227	.6954	.7403
.6457	-.3221	.7155	.7091
.6957	-.2259	.7348	.6790
.7461	-.1322	.7536	.6494
.7952	-.0371	.7727	.6189
.8457	.0531	.7908	.5894
.9006	.1401	.8083	.5605

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.0916	.9992	.0333
.0129	-.5394	.6719	.7764
.0260	-.3880	.7023	.7296
.0502	-.3733	.7053	.7250
.0742	-.3642	.7071	.7222
.0997	-.3593	.7081	.7207
.1496	-.3678	.7064	.7233
.1996	-.3695	.7060	.7239
.2490	-.3648	.7070	.7224
.2994	-.3697	.7060	.7239
.3481	-.3790	.7041	.7268
.3976	-.3912	.7017	.7306
.4467	-.3809	.7038	.7274
.4972	-.3605	.7078	.7211
.5452	-.3041	.7192	.7035
.5953	-.2495	.7301	.6864
.6442	-.1895	.7422	.6675
.6944	-.1295	.7542	.6485
.7442	-.0633	.7675	.6273
.7879	.0015	.7805	.6063
.8444	.0660	.7934	.5852

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.2936	.7213	.7002
.1508	.5033	-.3097	.7180	.7052
.1507	.8357	-.3060	.7188	.7041
.1507	1.0000	-.3018	.7196	.7028
.1508	1.1660	-.2851	.7230	.6976
.4984	.1708	-.5602	.6678	.7828
.4984	.3368	-.5823	.6633	.7896
.4984	.5028	-.5853	.6627	.7906
.4983	1.0007	-.5780	.6642	.7883
.4984	1.1667	-.5622	.6674	.7834
.7950	.1705	-.0551	.7691	.6247
.7950	.3375	-.0456	.7710	.6216
.7952	.5027	-.0379	.7726	.6191
.7952	.8347	-.0348	.7732	.6181
.7952	1.0008	-.0407	.7720	.6200
.7952	1.1667	-.0441	.7713	.6211

TABLE 4.– Continued.

TEST	148	PT	35.2069	PSI	CN	.2478	CD1	.00732	CDCOR1	.00740
RUN	43	TT	119.7876	K	CM	-.0313	CD2	.00702	CDCOR2	.00713
POINT	5	RC	15.0492	MILLION	CC	.0036	CD3	.00708	CDCOR3	.00723
		MACH	.6038				CD4	.00701	CDCOR4	.00714
		ALPHA	1.0285	DEG			CD5	.00699	CDCOR5	.00703

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.0709	.9954	.0817
.0244	-.1233	.7579	.6427
.0513	-.2946	.7238	.6963
.0765	-.3699	.7088	.7196
.1005	-.4384	.6952	.7406
.1506	-.5285	.6773	.7682
.2004	-.5869	.6657	.7861
.2500	-.6404	.6550	.8024
.2988	-.6627	.6506	.8092
.3492	-.6919	.6448	.8182
.3986	-.7234	.6385	.8278
.4479	-.7160	.6400	.8256
.4983	-.6779	.6476	.8139
.5466	-.5999	.6631	.7900
.5962	-.4811	.6867	.7537
.6457	-.3685	.7091	.7191
.6957	-.2622	.7302	.6862
.7461	-.1607	.7504	.6545
.7952	-.0597	.7705	.6225
.8457	.0351	.7894	.5919
.9006	.1226	.8068	.5630

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	1.0709	.9954	.0817
.0129	.0929	.8009	.5729
.0260	.0470	.7917	.5880
.0502	-.0446	.7735	.6176
.0742	-.0885	.7648	.6316
.0997	-.1193	.7587	.6414
.1496	-.1717	.7482	.6579
.1996	-.2020	.7422	.6674
.2490	-.2193	.7388	.6729
.2994	-.2407	.7345	.6795
.3481	-.2629	.7301	.6865
.3976	-.2867	.7254	.6938
.4467	-.2875	.7252	.6941
.4972	-.2791	.7269	.6915
.5452	-.2356	.7355	.6779
.5953	-.1936	.7439	.6648
.6442	-.1422	.7541	.6487
.6944	-.0910	.7643	.6325
.7442	-.0325	.7759	.6137
.7879	.0256	.7875	.5950
.8444	.0842	.7991	.5758

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.4968	.6836	.7585
.1508	.5033	-.5308	.6768	.7689
.1507	.8357	-.5290	.6772	.7684
.1507	1.0000	-.5217	.6786	.7661
.1508	1.1660	-.5026	.6824	.7603
.4984	.1708	-.6363	.6558	.8012
.4984	.3368	-.6704	.6491	.8116
.4984	.5028	-.6769	.6478	.8136
.4983	1.0007	-.6686	.6494	.8111
.4984	1.1667	-.6465	.6538	.8043
.7950	.1705	-.0853	.7654	.6306
.7950	.3375	-.0701	.7684	.6258
.7952	.5027	-.0608	.7703	.6228
.7952	.8347	-.0583	.7708	.6220
.7952	1.0008	-.0667	.7691	.6247
.7952	1.1667	-.0753	.7674	.6274

TABLE 4.— Continued.

TEST	148	PT	35.2244	PSI	CN	.3588	CD1	.00749	CDCOR1	.00756
RUN	43	TT	119.7519	K	CM	-.0350	CD2	.00711	CDCOR2	.00720
POINT	6	RC	15.0356	MILLION	CC	-.0012	CD3	.00721	CDCOR3	.00734
		MACH	.6023				CD4	.00710	CDCOR4	.00722
		ALPHA	2.0162	DEG			CD5	.00712	CDCOR5	.00715

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.9728	.9759	.1870
.0244	-.3331	.7167	.7073
.0513	-.4736	.6888	.7505
.0765	-.5240	.6788	.7659
.1005	-.5770	.6683	.7821
.1506	-.6476	.6543	.8036
.2004	-.6908	.6457	.8168
.2500	-.7329	.6373	.8296
.2988	-.7446	.6350	.8332
.3492	-.7646	.6310	.8393
.3986	-.7891	.6262	.8469
.4479	-.7737	.6292	.8421
.4983	-.7239	.6391	.8269
.5466	-.6386	.6560	.8008
.5962	-.5121	.6812	.7622
.6457	-.3935	.7047	.7259
.6957	-.2825	.7267	.6917
.7461	-.1773	.7476	.6589
.7952	-.0737	.7682	.6262
.8457	.0232	.7874	.5950
.9006	.1117	.8050	.5660

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.9728	.9759	.1870
.0129	.3272	.8478	.4920
.0260	.2263	.8277	.5273
.0502	.0983	.8023	.5704
.0742	.0341	.7896	.5915
.0997	-.0106	.7807	.6060
.1496	-.0755	.7678	.6268
.1996	-.1230	.7584	.6418
.2490	-.1504	.7529	.6505
.2994	-.1788	.7473	.6594
.3481	-.2069	.7417	.6682
.3976	-.2343	.7363	.6767
.4467	-.2439	.7344	.6797
.4972	-.2411	.7350	.6788
.5452	-.1999	.7431	.6660
.5953	-.1633	.7504	.6545
.6442	-.1168	.7596	.6399
.6944	-.0701	.7689	.6250
.7442	-.0156	.7797	.6076
.7879	.0391	.7906	.5899
.8444	.0944	.8015	.5717

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.6130	.6611	.7930
.1508	.5033	-.6506	.6537	.8045
.1507	.8357	-.6458	.6546	.8031
.1507	1.0000	-.6361	.6565	.8001
.1508	1.1660	-.6131	.6611	.7931
.4984	.1708	-.6755	.6487	.8121
.4984	.3368	-.7160	.6407	.8245
.4984	.5028	-.7248	.6389	.8272
.4983	1.0007	-.7100	.6419	.8227
.4984	1.1667	-.6798	.6479	.8134
.7950	.1705	-.1096	.7611	.6376
.7950	.3375	-.0868	.7656	.6304
.7952	.5027	-.0753	.7679	.6267
.7952	.8347	-.0712	.7687	.6254
.7952	1.0008	-.0812	.7667	.6286
.7952	1.1667	-.1000	.7630	.6346

TABLE 4.– Continued.

TEST	148	PT	35.2442	PSI	CN	.4688		CD1	.00779	CDCOR1	.00786
RUN	43	TT	119.8299	K	CM	-.0377		CD2	.00732	CDCOR2	.00742
POINT	7	RC	15.0270	MILLION	CC	-.0095		CD3	.00746	CDCOR3	.00760
		MACH	.6022					CD4	.00731	CDCOR4	.00742
		ALPHA	3.0243	DEG				CD5	.00724	CDCOR5	.00725

UPPER SURFACE				LOWER SURFACE			
X/C	CP	P,L/PT	MLOC	X/C	CP	P,L/PT	MLOC
0.0000	.8054	.9425	.2925	0.0000	.8054	.9425	.2925
.0244	-.5858	.6655	.7863	.0129	.5234	.8863	.4192
.0513	-.6712	.6485	.8125	.0260	.3827	.8583	.4728
.0765	-.6932	.6441	.8192	.0502	.2296	.8278	.5272
.1005	-.7292	.6369	.8303	.0742	.1494	.8119	.5544
.1506	-.7744	.6279	.8441	.0997	.0927	.8006	.5733
.2004	-.7996	.6229	.8519	.1496	.0026	.7826	.6028
.2500	-.8286	.6172	.8608	.1996	-.0460	.7730	.6185
.2988	-.8266	.6175	.8602	.2490	-.0823	.7657	.6301
.3492	-.8369	.6155	.8633	.2994	-.1175	.7587	.6413
.3986	-.8532	.6122	.8684	.3481	-.1512	.7520	.6520
.4479	-.8279	.6173	.8606	.3976	-.1835	.7456	.6621
.4983	-.7680	.6292	.8422	.4467	-.1984	.7426	.6668
.5466	-.6732	.6481	.8131	.4972	-.2010	.7421	.6676
.5962	-.5398	.6747	.7722	.5452	-.1655	.7492	.6565
.6457	-.4156	.6994	.7341	.5953	-.1341	.7554	.6466
.6957	-.2999	.7224	.6984	.6442	-.0926	.7637	.6334
.7461	-.1913	.7440	.6646	.6944	-.0504	.7721	.6199
.7952	-.0853	.7651	.6311	.7442	.0001	.7821	.6036
.8457	.0130	.7847	.5995	.7879	.0509	.7922	.5871
.9006	.1011	.8022	.5706	.8444	.1030	.8026	.5699

SPANWISE				
X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.7367	.6355	.8325
.1508	.5033	-.7785	.6271	.8454
.1507	.8357	-.7734	.6281	.8438
.1507	1.0000	-.7618	.6304	.8403
.1508	1.1660	-.7367	.6355	.8325
.4984	.1708	-.7069	.6414	.8234
.4984	.3368	-.7580	.6312	.8391
.4984	.5028	-.7695	.6289	.8426
.4983	1.0007	-.7530	.6322	.8375
.4984	1.1667	-.7122	.6403	.8250
.7950	.1705	-.1351	.7552	.6469
.7950	.3375	-.1030	.7616	.6367
.7952	.5027	-.0882	.7645	.6320
.7952	.8347	-.0831	.7656	.6304
.7952	1.0008	-.0947	.7633	.6341
.7952	1.1667	-.1251	.7572	.6437

TABLE 4.— Continued.

TEST	148	PT	35.3260	PSI	CN	.5777	
RUN	43	TT	120.0796	K	CM	-.0392	
POINT	8	RC	15.0016	MILLION	CC	-.0207	
		MACH	.6014				
		ALPHA	4.0381	DEG			

CD1	.00809	CDCOR1	.00818
CD2	.00766	CDCOR2	.00778
CD3	.00774	CDCOR3	.00791
CD4	.00753	CDCOR4	.00767
CD5	.00747	CDCOR5	.00751

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.5723	.8965	.3985
.0244	-.8795	.6085	.8742
.0513	-.8901	.6063	.8775
.0765	-.8757	.6092	.8731
.1005	-.8938	.6056	.8787
.1506	-.9072	.6030	.8828
.2004	-.9106	.6023	.8838
.2500	-.9236	.5997	.8879
.2988	-.9056	.6033	.8823
.3492	-.9051	.6034	.8821
.3986	-.9122	.6020	.8843
.4479	-.8764	.6091	.8733
.4983	-.8071	.6228	.8520
.5466	-.7034	.6434	.8203
.5962	-.5618	.6715	.7771
.6457	-.4322	.6972	.7375
.6957	-.3132	.7208	.7009
.7461	-.2020	.7429	.6664
.7952	-.0942	.7643	.6325
.8457	.0049	.7839	.6007
.9006	.0878	.8004	.5737

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.5723	.8965	.3985
.0129	.6882	.9195	.3486
.0260	.5217	.8865	.4189
.0502	.3521	.8528	.4829
.0742	.2570	.8339	.5165
.0997	.1901	.8207	.5395
.1496	.0910	.8010	.5726
.1996	.0279	.7885	.5933
.2490	-.0162	.7797	.6075
.2994	-.0580	.7714	.6210
.3481	-.0967	.7638	.6333
.3976	-.1351	.7561	.6454
.4467	-.1529	.7526	.6510
.4972	-.1609	.7510	.6535
.5452	-.1331	.7565	.6448
.5953	-.1070	.7617	.6365
.6442	-.0698	.7691	.6247
.6944	-.0323	.7765	.6127
.7442	.0146	.7858	.5976
.7879	.0612	.7951	.5824
.8444	.1101	.8048	.5663

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.8650	.6113	.8698
.1508	.5033	-.9093	.6025	.8834
.1507	.8357	-.9078	.6028	.8830
.1507	1.0000	-.8933	.6057	.8785
.1508	1.1660	-.8629	.6117	.8692
.4984	.1708	-.7282	.6385	.8279
.4984	.3368	-.7907	.6261	.8470
.4984	.5028	-.8058	.6231	.8516
.4983	1.0007	-.7875	.6267	.8460
.4984	1.1667	-.7349	.6371	.8299
.7950	.1705	-.1624	.7507	.6540
.7950	.3375	-.1172	.7597	.6398
.7952	.5027	-.0986	.7634	.6339
.7952	.8347	-.0931	.7645	.6321
.7952	1.0008	-.1090	.7613	.6372
.7952	1.1667	-.1551	.7522	.6517

TABLE 4.– Continued.

TEST	148	PT	35.4167	PSI	CN	.6893	CD1	.00858	CDCOR1	.00865
RUN	43	TT	120.5692	K	CM	-.0401	CD2	.00796	CDCOR2	.00807
POINT	9	RC	15.0073	MILLION	CC	-.0356	CD3	.00823	CDCOR3	.00838
		MACH	.6045				CD4	.00792	CDCOR4	.00806
		ALPHA	5.0352	DEG			CD5	.00784	CDCOR5	.00787

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.2627	.8334	.5174
.0244	-1.1882	.5431	.9771
.0513	-1.1243	.5559	.9567
.0765	-1.0657	.5676	.9381
.1005	-1.0662	.5675	.9382
.1506	-1.0422	.5723	.9307
.2004	-1.0212	.5765	.9240
.2500	-1.0172	.5773	.9228
.2988	-.9786	.5851	.9107
.3492	-.9677	.5872	.9073
.3986	-.9641	.5880	.9061
.4479	-.9154	.5977	.8909
.4983	-.8358	.6136	.8662
.5466	-.7210	.6366	.8307
.5962	-.5712	.6666	.7846
.6457	-.4359	.6937	.7430
.6957	-.3129	.7183	.7049
.7461	-.1988	.7411	.6692
.7952	-.0895	.7630	.6345
.8457	.0098	.7828	.6025
.9006	.0889	.7987	.5765

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.2627	.8334	.5174
.0129	.8289	.9467	.2809
.0260	.6542	.9118	.3659
.0502	.4715	.8752	.4409
.0742	.3670	.8543	.4801
.0997	.2920	.8393	.5071
.1496	.1824	.8174	.5451
.1996	.1102	.8029	.5694
.2490	.0598	.7928	.5861
.2994	.0118	.7832	.6018
.3481	-.0312	.7746	.6158
.3976	-.0761	.7656	.6302
.4467	-.0947	.7619	.6362
.4972	-.1081	.7593	.6404
.5452	-.0893	.7630	.6344
.5953	-.0676	.7674	.6275
.6442	-.0350	.7739	.6170
.6944	-.0021	.7804	.6064
.7442	.0413	.7891	.5922
.7879	.0842	.7977	.5780
.8444	.1295	.8068	.5629

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-.9975	.5813	.9166
.1508	.5033	-1.0446	.5719	.9314
.1507	.8357	-1.0464	.5715	.9320
.1507	1.0000	-1.0289	.5750	.9265
.1508	1.1660	-.9927	.5822	.9151
.4984	.1708	-.7476	.6313	.8389
.4984	.3368	-.8164	.6175	.8602
.4984	.5028	-.8329	.6142	.8653
.4983	1.0007	-.8140	.6180	.8594
.4984	1.1667	-.7534	.6301	.8407
.7950	.1705	-.1684	.7472	.6596
.7950	.3375	-.1147	.7579	.6426
.7952	.5027	-.0947	.7619	.6362
.7952	.8347	-.0904	.7628	.6348
.7952	1.0008	-.1091	.7590	.6408
.7952	1.1667	-.1701	.7468	.6601

TABLE 4.– Continued.

TEST	148	PT	35.4180	PSI	CN	.8035	CD1	.00943	CDCOR1	.00950
RUN	43	TT	120.5424	K	CM	-.0396	CD2	.00869	CDCOR2	.00881
POINT	10	RC	15.0276	MILLION	CC	-.0549	CD3	.00898	CDCOR3	.00914
		MACH	.6054				CD4	.00857	CDCOR4	.00871
		ALPHA	6.0362	DEG			CD5	.00846	CDCOR5	.00849

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.0405	.7889	.5925
.0244	-1.9846	.3837	1.2560
.0513	-1.3049	.5197	1.0151
.0765	-1.2638	.5279	1.0017
.1005	-1.2565	.5294	.9993
.1506	-1.1968	.5413	.9800
.2004	-1.1488	.5509	.9646
.2500	-1.1257	.5556	.9572
.2988	-1.0668	.5674	.9385
.3492	-1.0443	.5718	.9315
.3986	-1.0296	.5748	.9268
.4479	-.9681	.5871	.9075
.4983	-.8772	.6053	.8792
.5466	-.7545	.6298	.8412
.5962	-.6021	.6603	.7942
.6457	-.4622	.6884	.7511
.6957	-.3353	.7137	.7119
.7461	-.2192	.7370	.6757
.7952	-.1097	.7589	.6410
.8457	-.0118	.7785	.6096
.9006	.0642	.7937	.5847

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	.0405	.7889	.5925
.0129	.9124	.9634	.2315
.0260	.7417	.9293	.3257
.0502	.5534	.8916	.4086
.0742	.4430	.8695	.4519
.0997	.3618	.8533	.4820
.1496	.2435	.8296	.5241
.1996	.1641	.8137	.5513
.2490	.1076	.8024	.5703
.2994	.0549	.7918	.5878
.3481	.0074	.7823	.6033
.3976	-.0399	.7729	.6186
.4467	-.0656	.7677	.6269
.4972	-.0844	.7639	.6330
.5452	-.0672	.7674	.6274
.5953	-.0502	.7708	.6220
.6442	-.0220	.7764	.6129
.6944	.0064	.7821	.6037
.7442	.0461	.7901	.5907
.7879	.0848	.7978	.5779
.8444	.1265	.8061	.5640

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-1.1548	.5497	.9665
.1508	.5033	-1.2010	.5405	.9814
.1507	.8357	-1.1993	.5408	.9808
.1507	1.0000	-1.1767	.5453	.9736
.1508	1.1660	-1.1356	.5536	.9604
.4984	.1708	-.7867	.6234	.8511
.4984	.3368	-.8613	.6085	.8742
.4984	.5028	-.8793	.6049	.8798
.4983	1.0007	-.8561	.6095	.8726
.4984	1.1667	-.7843	.6239	.8504
.7950	.1705	-.2014	.7405	.6701
.7950	.3375	-.1380	.7532	.6500
.7952	.5027	-.1154	.7577	.6429
.7952	.8347	-.1103	.7588	.6412
.7952	1.0008	-.1297	.7549	.6474
.7952	1.1667	-.2086	.7391	.6723

TABLE 4.– Continued.

TEST	148	PT	35.5460	PSI	CN	.9156	CD1	.01141	CDCOR1	.01143
RUN	43	TT	120.5794	K	CM	-.0385	CD2	.01039	CDCOR2	.01049
POINT	11	RC	15.0023	MILLION	CC	-.0742	CD3	.01076	CDCOR3	.01091
		MACH	.6014				CD4	.01021	CDCOR4	.01032
		ALPHA	7.0433	DEG			CD5	.01004	CDCOR5	.01002

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	-.2104	.7416	.6684
.0244	-2.3254	.3226	1.3827
.0513	-2.2097	.3455	1.3332
.0765	-1.8055	.4256	1.1769
.1005	-1.2705	.5316	.9957
.1506	-1.2582	.5340	.9918
.2004	-1.2360	.5384	.9847
.2500	-1.2072	.5441	.9755
.2988	-1.1385	.5577	.9538
.3492	-1.1050	.5644	.9433
.3986	-1.0824	.5688	.9362
.4479	-1.0123	.5827	.9143
.4983	-.9071	.6036	.8818
.5466	-.7838	.6280	.8440
.5962	-.6225	.6600	.7948
.6457	-.4800	.6882	.7514
.6957	-.3515	.7137	.7120
.7461	-.2352	.7367	.6761
.7952	-.1275	.7580	.6424
.8457	-.0344	.7765	.6128
.9006	.0356	.7903	.5902

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	-.2104	.7416	.6684
.0129	.9832	.9781	.1784
.0260	.8151	.9448	.2863
.0502	.6251	.9071	.3761
.0742	.5126	.8849	.4221
.0997	.4279	.8681	.4546
.1496	.3025	.8432	.5001
.1996	.2173	.8264	.5297
.2490	.1553	.8141	.5507
.2994	.0981	.8027	.5697
.3481	.0469	.7926	.5865
.3976	-.0007	.7832	.6020
.4467	-.0374	.7759	.6138
.4972	-.0607	.7713	.6212
.5452	-.0412	.7751	.6150
.5953	-.0289	.7776	.6111
.6442	-.0051	.7823	.6034
.6944	.0188	.7870	.5957
.7442	.0545	.7941	.5840
.7879	.0897	.8011	.5725
.8444	.1281	.8087	.5598

SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-1.2457	.5365	.9878
.1508	.5033	-1.2657	.5325	.9942
.1507	.8357	-1.2535	.5350	.9903
.1507	1.0000	-1.2287	.5399	.9824
.1508	1.1660	-1.2108	.5434	.9767
.4984	.1708	-.7945	.6259	.8473
.4984	.3368	-.8822	.6085	.8741
.4984	.5028	-.9069	.6036	.8817
.4983	1.0007	-.8825	.6085	.8742
.4984	1.1667	-.8143	.6220	.8533
.7950	.1705	-.2549	.7328	.6822
.7950	.3375	-.1651	.7506	.6542
.7952	.5027	-.1362	.7563	.6451
.7952	.8347	-.1249	.7586	.6416
.7952	1.0008	-.1465	.7543	.6484
.7952	1.1667	-.2269	.7383	.6735

TABLE 4.– Continued.

TEST	148	PT	35.5456	PSI	CN	1.0162	CD1	.01548	CDCOR1	.01557
RUN	43	TT	120.5393	K	CM	-.0301	CD2	.01413	CDCOR2	.01433
POINT	12	RC	15.0294	MILLION	CC	-.0951	CD3	.01444	CDCOR3	.01471
		MACH	.6024				CD4	.01382	CDCOR4	.01406
		ALPHA	8.0343	DEG			CD5	.01377	CDCOR5	.01381

UPPER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	-.4030	.7027	.7289
.0244	-2.5256	.2813	1.4791
.0513	-2.4579	.2947	1.4466
.0765	-2.3409	.3180	1.3930
.1005	-2.2593	.3341	1.3574
.1506	-1.5121	.4825	1.0770
.2004	-1.1135	.5617	.9476
.2500	-1.1577	.5529	.9615
.2988	-1.1347	.5575	.9542
.3492	-1.1130	.5618	.9474
.3986	-1.0887	.5666	.9398
.4479	-1.0136	.5815	.9163
.4983	-.9093	.6022	.8839
.5466	-.7794	.6280	.8440
.5962	-.6183	.6600	.7948
.6457	-.4750	.6884	.7510
.6957	-.3462	.7140	.7115
.7461	-.2301	.7371	.6755
.7952	-.1229	.7584	.6419
.8457	-.0306	.7767	.6125
.9006	.0346	.7896	.5914

LOWER SURFACE

X/C	CP	P,L/PT	MLOC
0.0000	-.4030	.7027	.7289
.0129	1.0300	.9873	.1355
.0260	.8801	.9575	.2500
.0502	.6938	.9205	.3463
.0742	.5817	.8983	.3949
.0997	.4950	.8811	.4296
.1496	.3644	.8551	.4786
.1996	.2755	.8375	.5103
.2490	.2099	.8244	.5330
.2994	.1463	.8118	.5545
.3481	.0948	.8016	.5716
.3976	.0404	.7908	.5895
.4467	.0071	.7842	.6003
.4972	-.0200	.7788	.6091
.5452	-.0121	.7803	.6065
.5953	-.0035	.7821	.6037
.6442	.0164	.7860	.5973
.6944	.0366	.7900	.5908
.7442	.0691	.7965	.5801
.7879	.1008	.8028	.5697
.8444	.1359	.8097	.5580

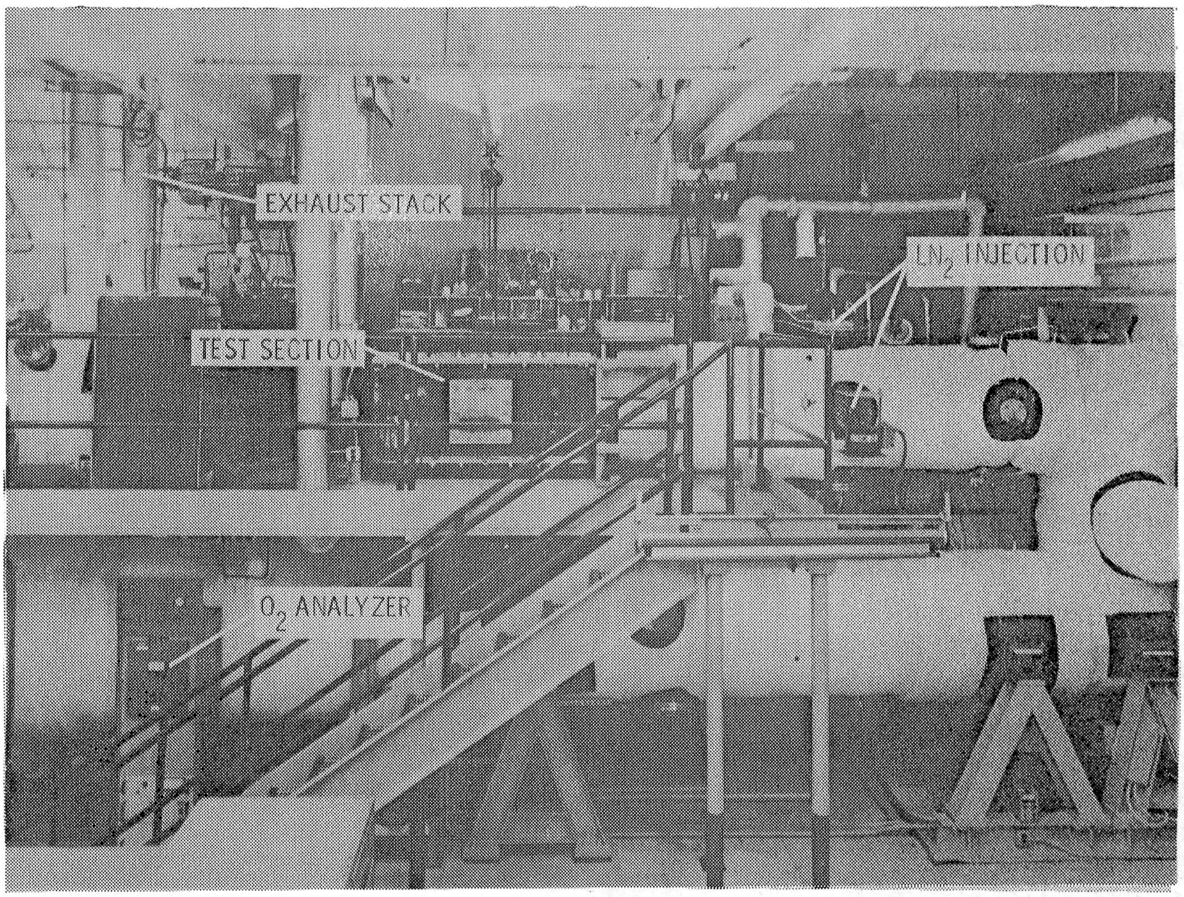
SPANWISE

X/C	Y/C	CP	P,L/PT	MLOC
.1508	.1702	-1.1896	.5466	.9716
.1508	.5033	-1.4104	.5027	1.0431
.1507	.8357	-1.4953	.4859	1.0714
.1507	1.0000	-1.4020	.5044	1.0403
.1508	1.1660	-1.2127	.5420	.9790
.4984	.1708	-.7762	.6286	.8430
.4984	.3368	-.8754	.6089	.8735
.4984	.5028	-.9038	.6033	.8822
.4983	1.0007	-.8821	.6076	.8755
.4984	1.1667	-.8095	.6220	.8532
.7950	.1705	-.2641	.7303	.6861
.7950	.3375	-.1659	.7498	.6554
.7952	.5027	-.1325	.7564	.6449
.7952	.8347	-.1224	.7584	.6417
.7952	1.0008	-.1481	.7534	.6498
.7952	1.1667	-.2485	.7334	.6812

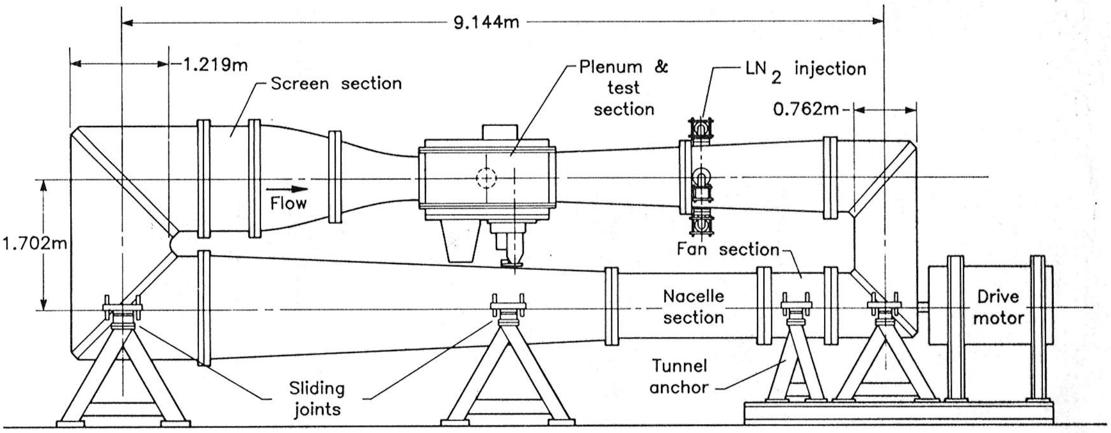
TABLE 4.– Concluded.

TEST	148	PT	35.2159	PSI	CN	.1357	CD1	.00721	CDCOR1	.00730
RUN	43	TT	119.7319	K	CM	-.0284	CD2	.00704	CDCOR2	.00715
POINT	13	RC	15.0132	MILLION	CC	.0061	CD3	.00702	CDCOR3	.00718
		MACH	.6011				CD4	.00698	CDCOR4	.00712
		ALPHA	.0000	DEG			CD5	.00698	CDCOR5	.00705

UPPER SURFACE				LOWER SURFACE				SPANWISE				
X/C	CP	P,L/PT	MLOC	X/C	CP	P,L/PT	MLOC	X/C	Y/C	CP	P,L/PT	MLOC
0.0000	1.0977	1.0009	0.0000	0.0000	1.0977	1.0009	0.0000	.1508	.1702	-.3912	.7070	.7224
.0244	.0792	.7998	.5746	.0129	-.2034	.7440	.5646	.1508	.5033	-.4150	.7023	.7297
.0513	-.1258	.7593	.6403	.0260	-.1664	.7513	.6530	.1507	.8357	-.4119	.7029	.7287
.0765	-.2227	.7402	.6706	.0502	-.2052	.7437	.6652	.1507	1.0000	-.4060	.7040	.7269
.1005	-.3041	.7242	.6957	.0742	-.2238	.7400	.6709	.1508	1.1660	-.3864	.7079	.7210
.1506	-.4123	.7028	.7289	.0997	-.2374	.7373	.6751	.4984	.1708	-.5917	.6674	.7834
.2004	-.4840	.6886	.7507	.1496	-.2687	.7312	.6848	.4984	.3368	-.6222	.6614	.7927
.2500	-.5473	.6762	.7699	.1996	-.2853	.7279	.6899	.4984	.5028	-.6272	.6604	.7942
.2988	-.5808	.6695	.7801	.2490	-.2916	.7266	.6919	.4983	1.0007	-.6200	.6618	.7920
.3492	-.6174	.6623	.7912	.2994	-.3080	.7234	.6969	.4984	1.1667	-.6026	.6652	.7867
.3986	-.6552	.6548	.8027	.3481	-.3199	.7210	.7006	.7950	.1705	-.0682	.7707	.6221
.4479	-.6563	.6546	.8030	.3976	-.3381	.7175	.7062	.7950	.3375	-.0570	.7729	.6186
.4983	-.6281	.6602	.7945	.4467	-.3331	.7184	.7046	.7952	.5027	-.0491	.7745	.6160
.5466	-.5601	.6736	.7738	.4972	-.3189	.7212	.7003	.7952	.8347	-.0470	.7749	.6154
.5962	-.4501	.6953	.7404	.5452	-.2693	.7310	.6850	.7952	1.0008	-.0539	.7736	.6176
.6457	-.3441	.7163	.7080	.5953	-.2223	.7403	.6705	.7952	1.1667	-.0589	.7726	.6192
.6957	-.2434	.7361	.6770	.6442	-.1658	.7515	.6529					
.7461	-.1463	.7553	.6468	.6944	-.1106	.7624	.6355					
.7952	-.0485	.7746	.6158	.7442	-.0481	.7747	.6157					
.8457	.0439	.7928	.5861	.7879	.0131	.7868	.5961					
.9006	.1309	.8100	.5576	.8444	.0745	.7989	.5762					



(a) Photograph.



(b) Schematic drawing.

Figure 1.– Elevation view of 0.3–m TCT with two-dimensional test section installed.

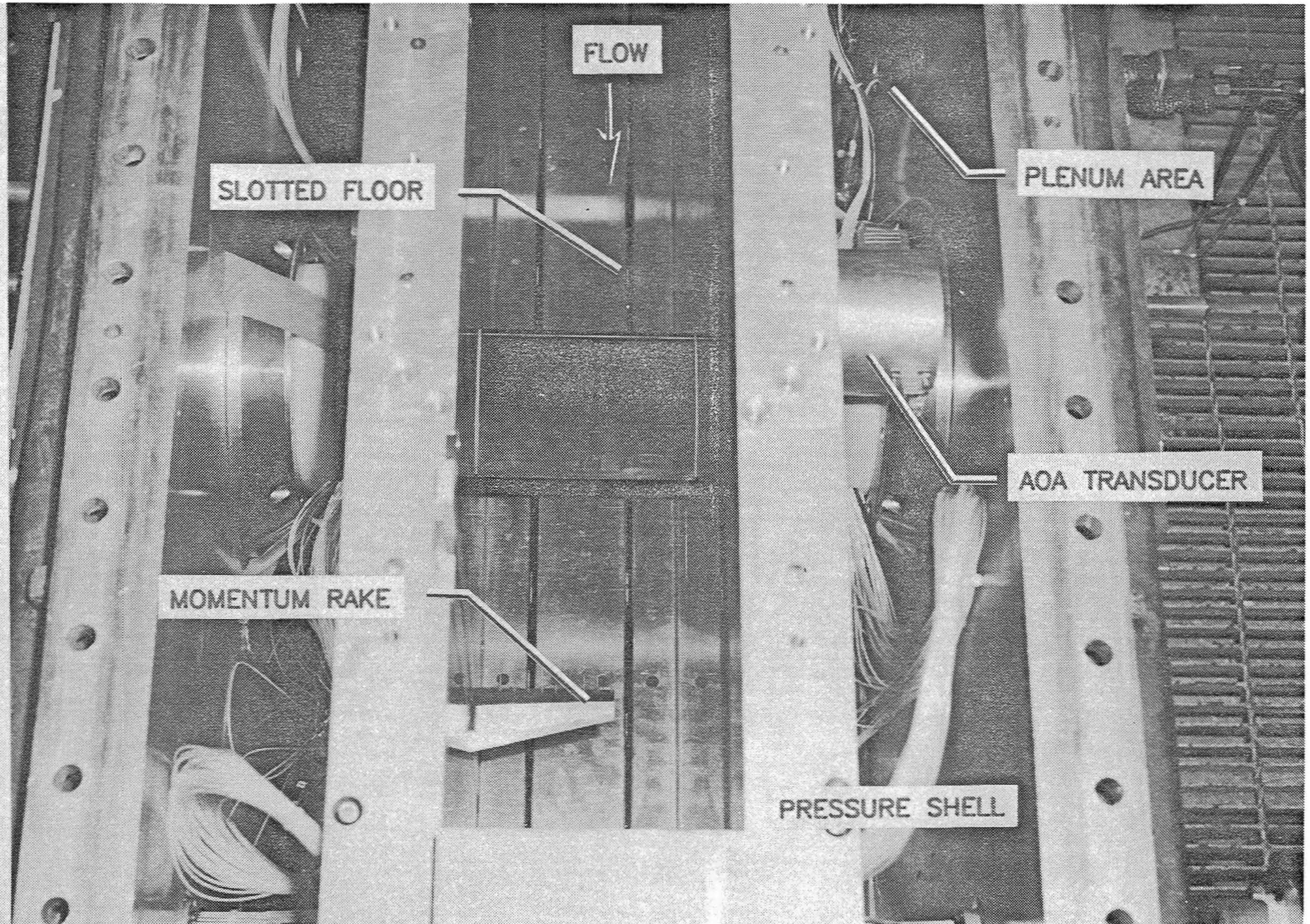


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Figure 2.– Photogragph of two-dimensional test section of the Langley 0.3-m TCT.

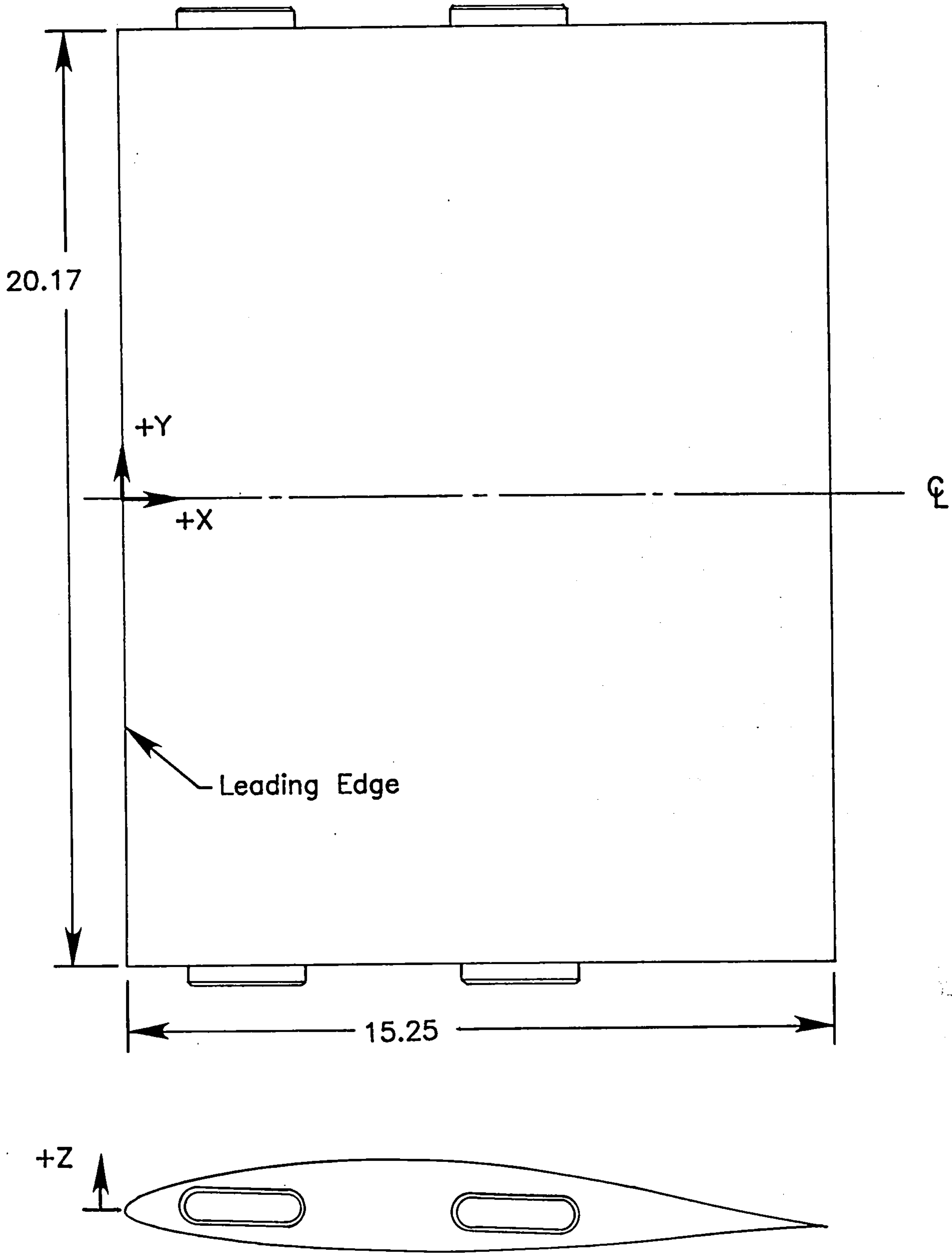

Figure 3.– Schematic drawing of NACA 65_1-213 model.
(All dimensions are in centimeters.)

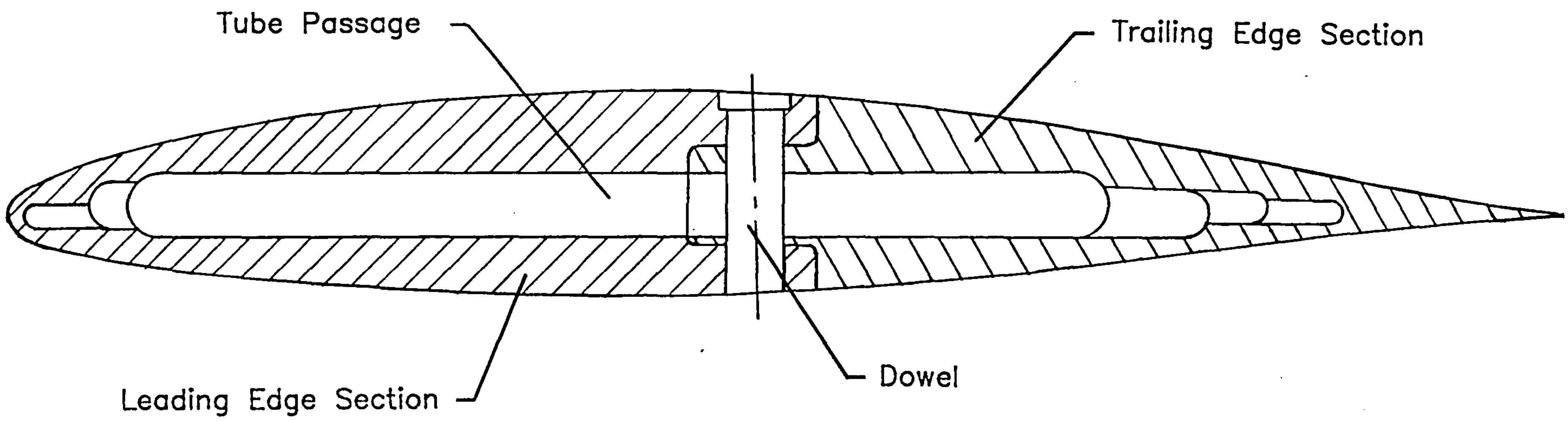

Figure 4.– Centerline section drawing showing model construction.

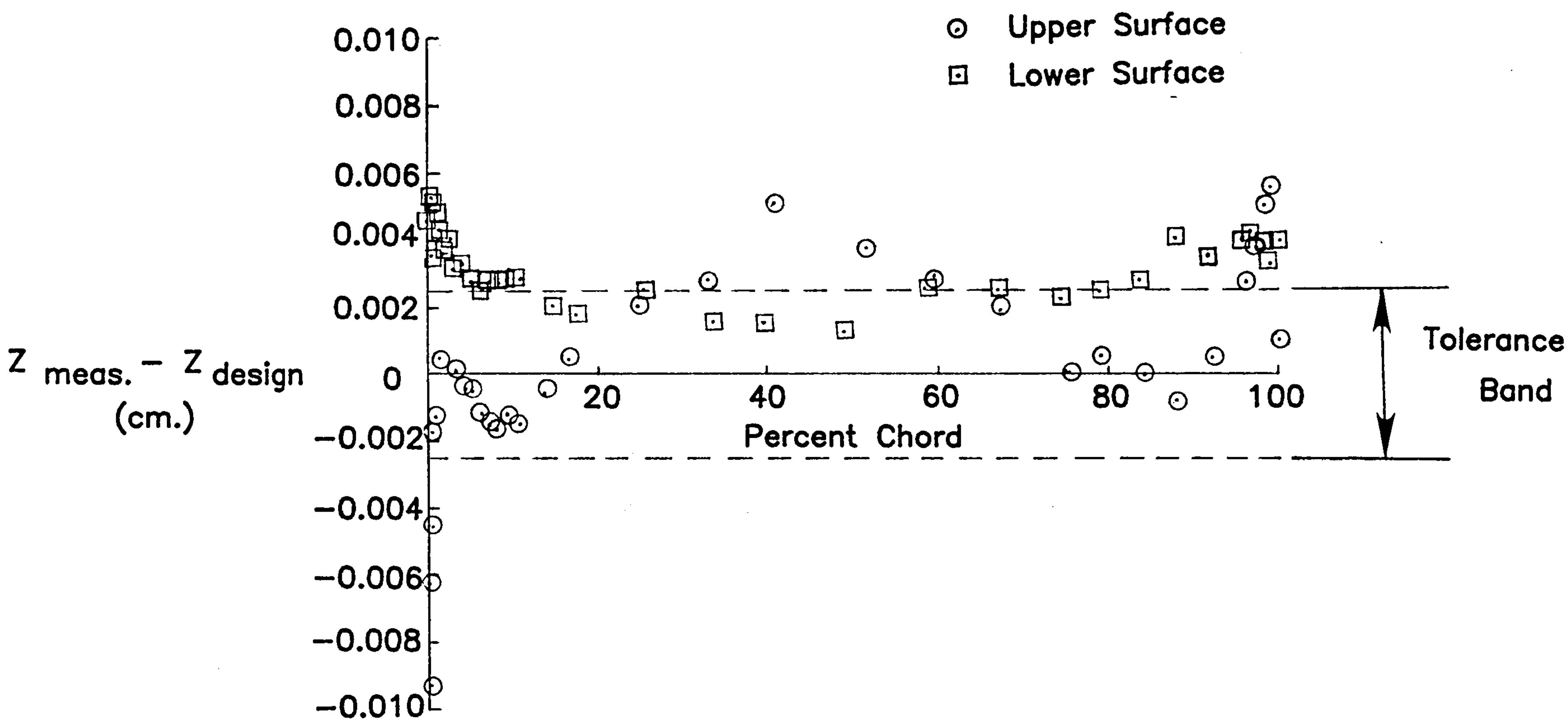

Figure 5.– Difference between measured and design thickness coordinates. Centerspan station.

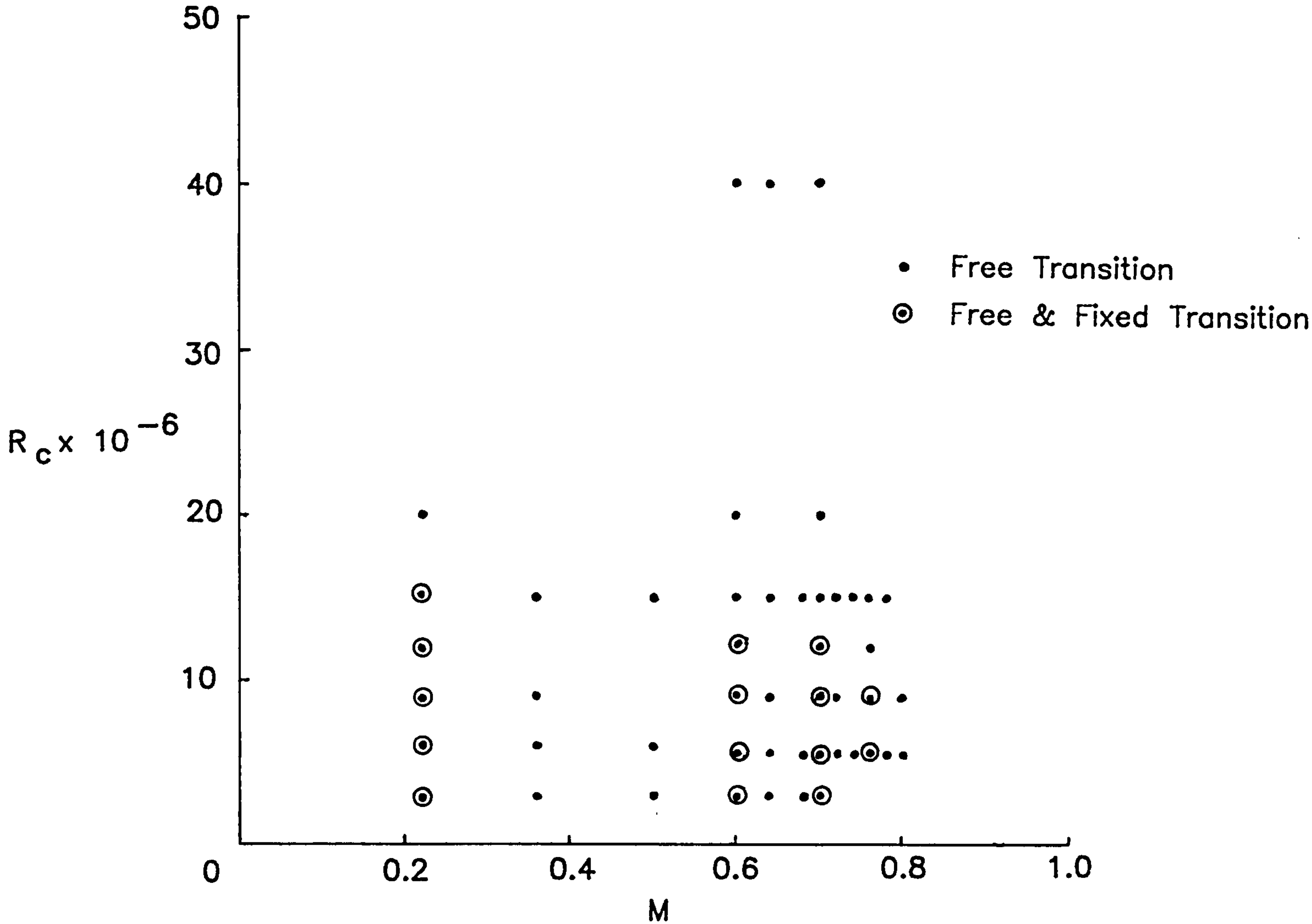

Figure 6.– Range of Reynolds number and Mach number used in test program.

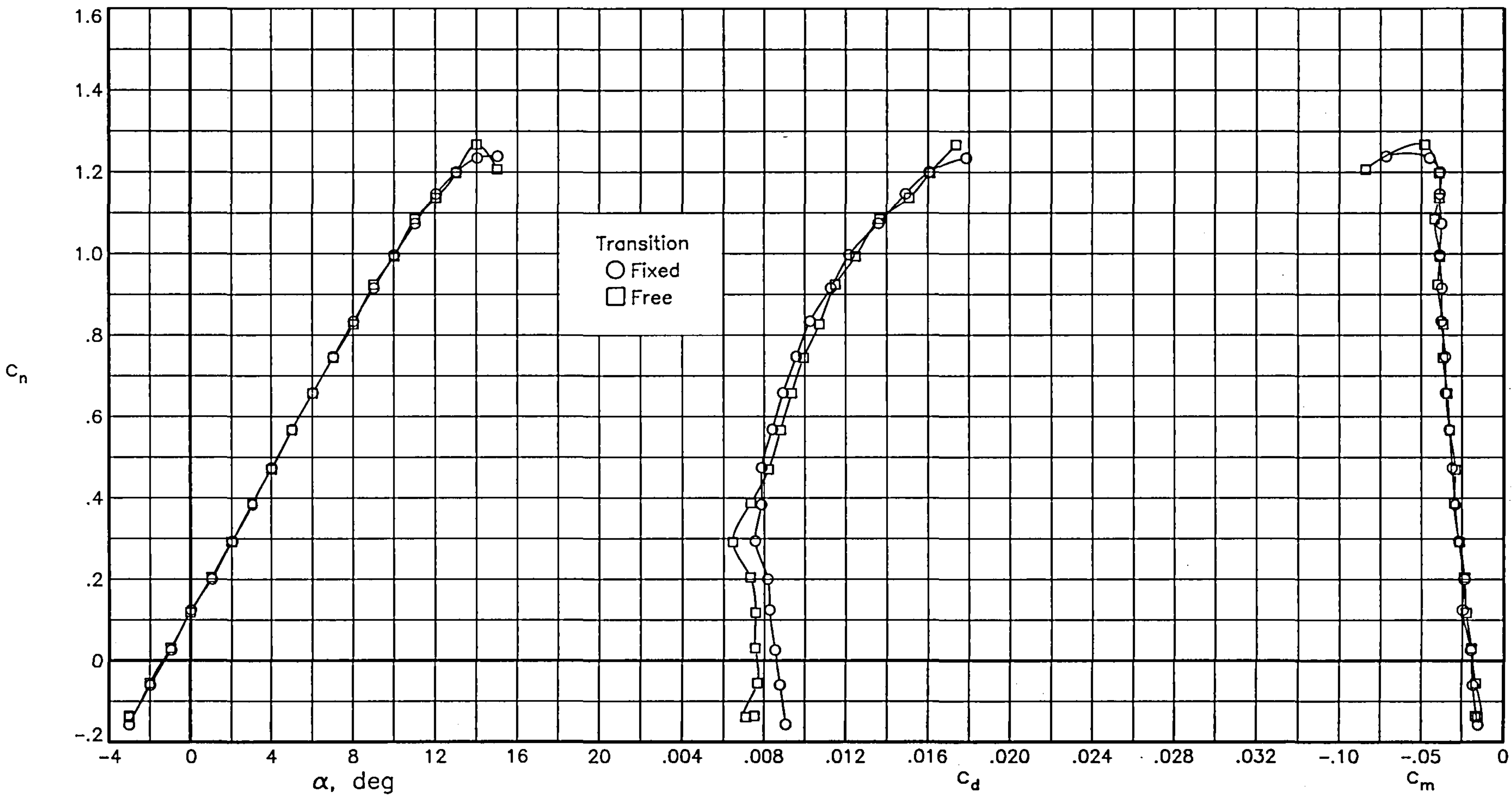

Figure 7.– Effect of fixing transition on aerodynamic characteristics of airfoil at $M = 0.22$ and $R_c = 3 \times 10^6$.

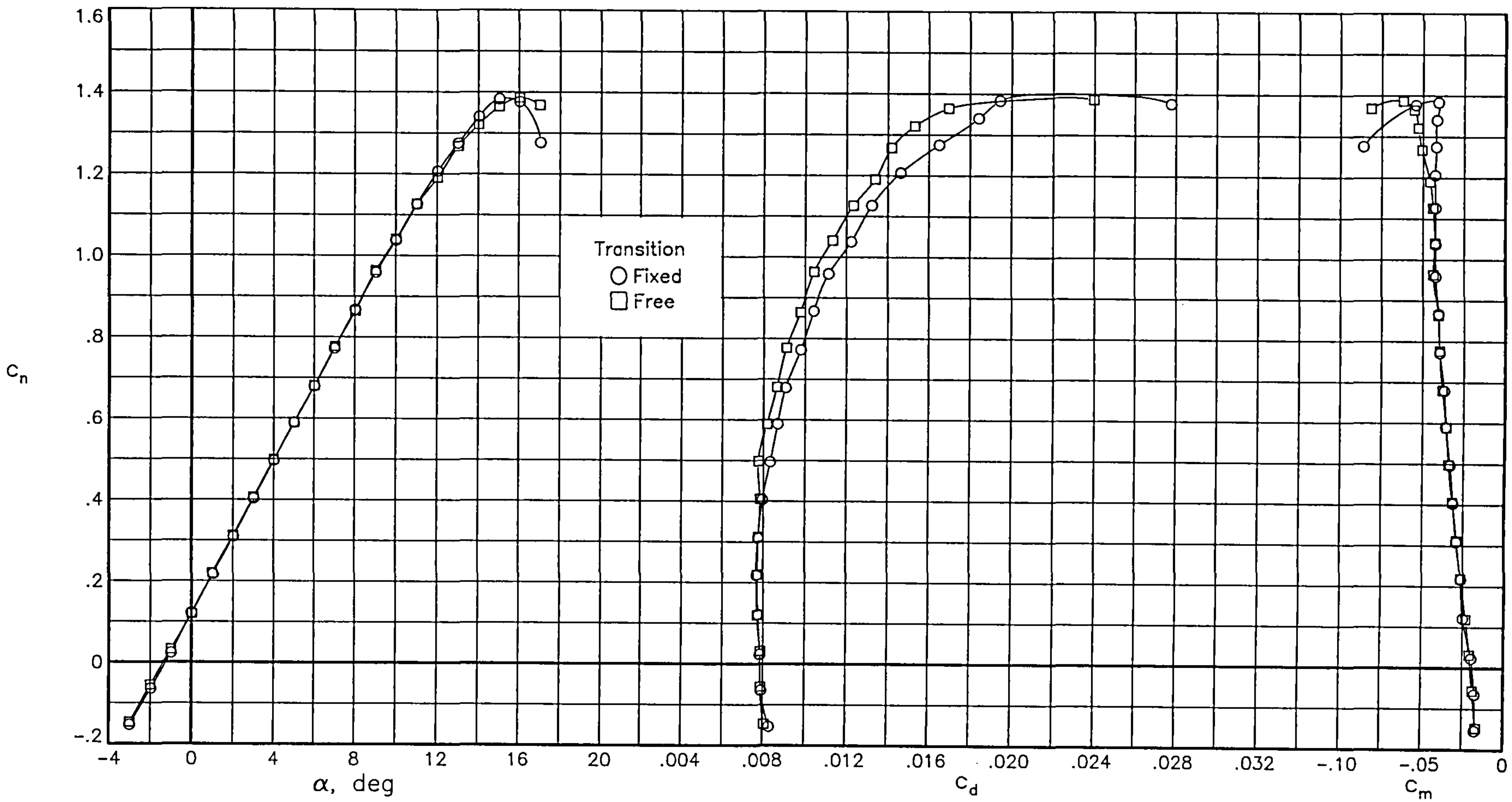

Figure 8.– Effect of fixing transition on aerodynamic characteristics of airfoil at M = 0.22 and $R_c = 6 \times 10^6$.

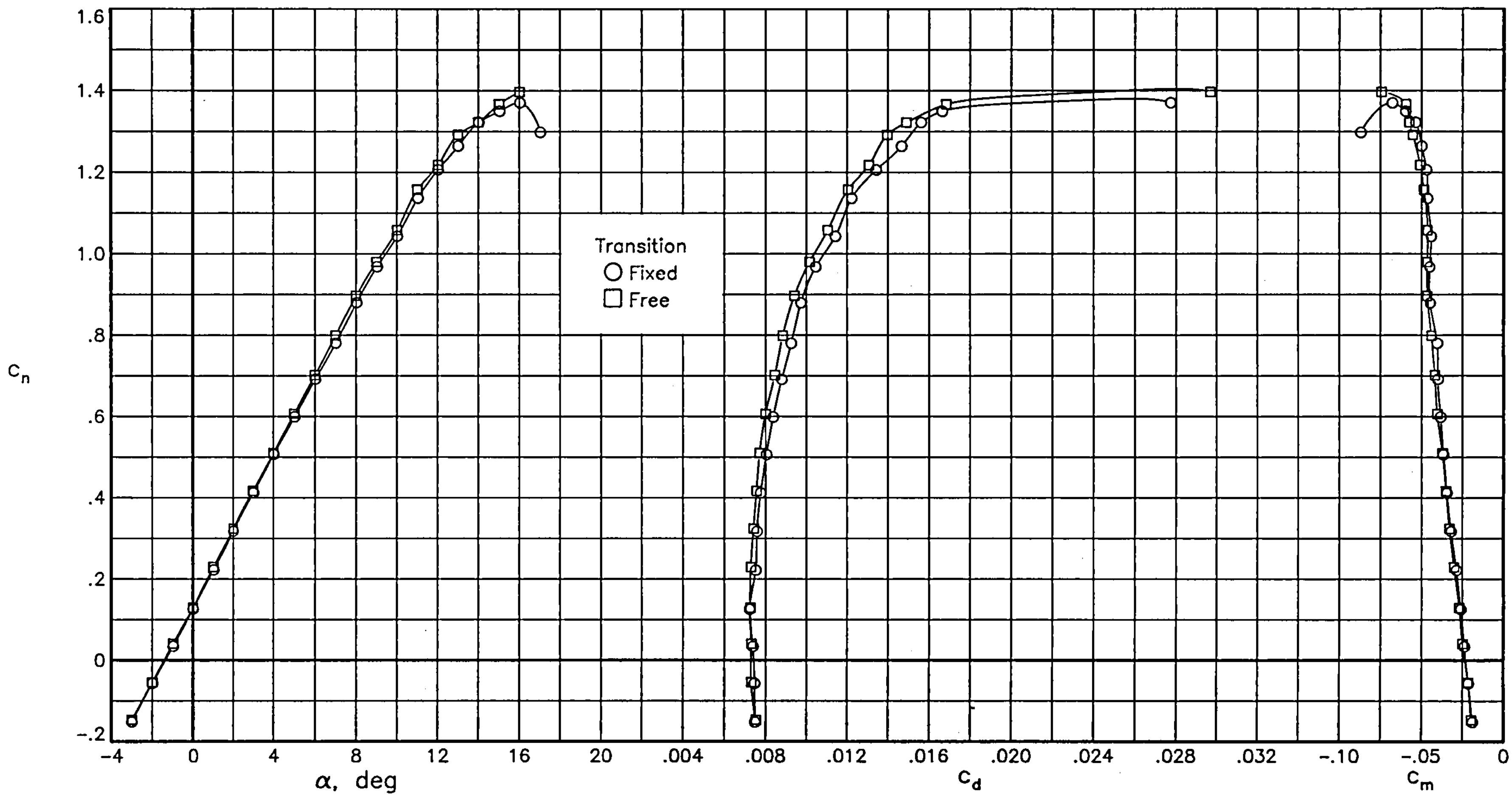

Figure 9.— Effect of fixing transition on aerodynamic characteristics of airfoil at $M = 0.22$ and $R_c = 9 \times 10^6$.

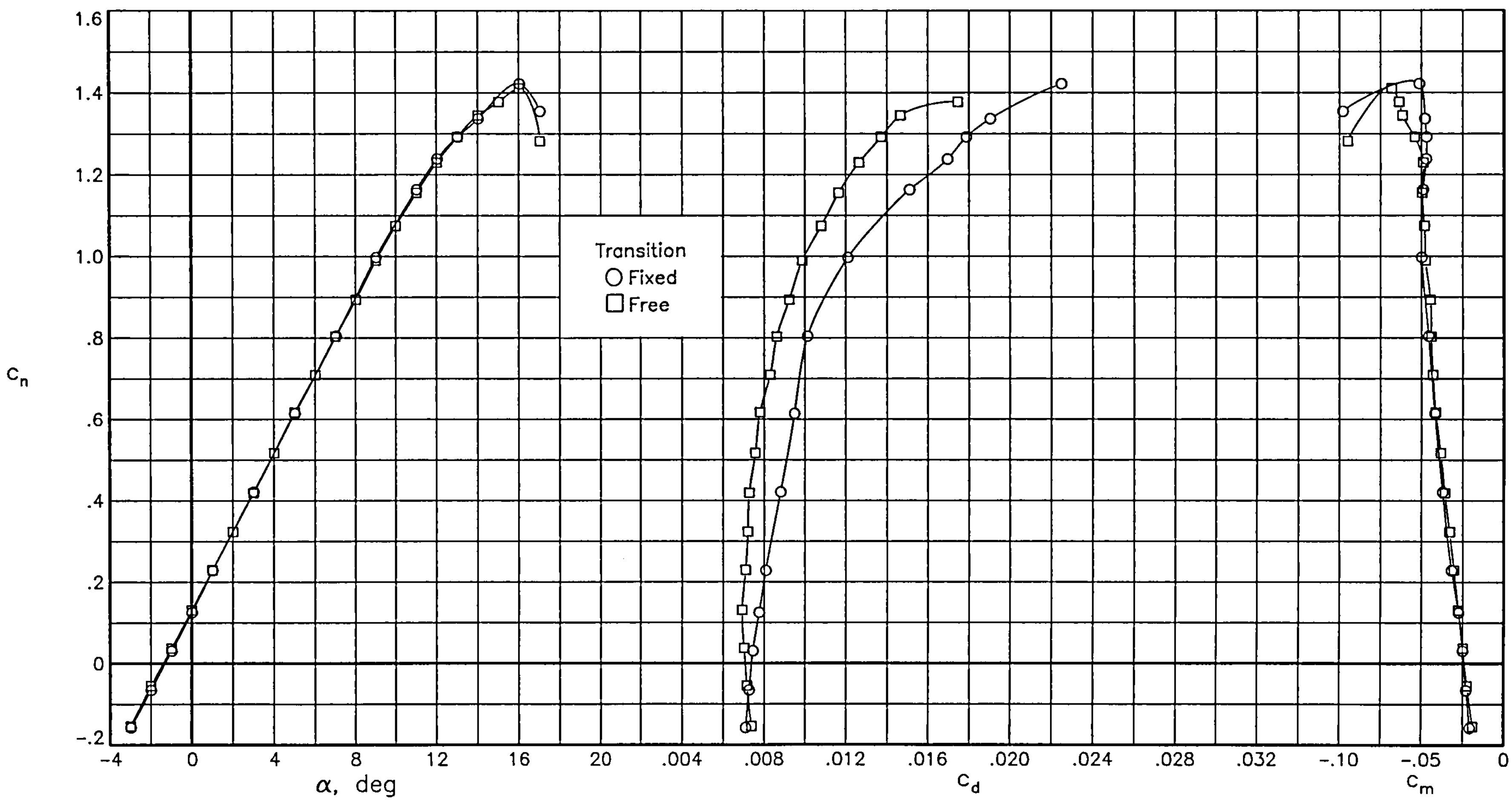

Figure 10.– Effect of fixing transition on aerodynamic characteristics of airfoil at $M = 0.22$ and $R_c = 12 \times 10^6$.

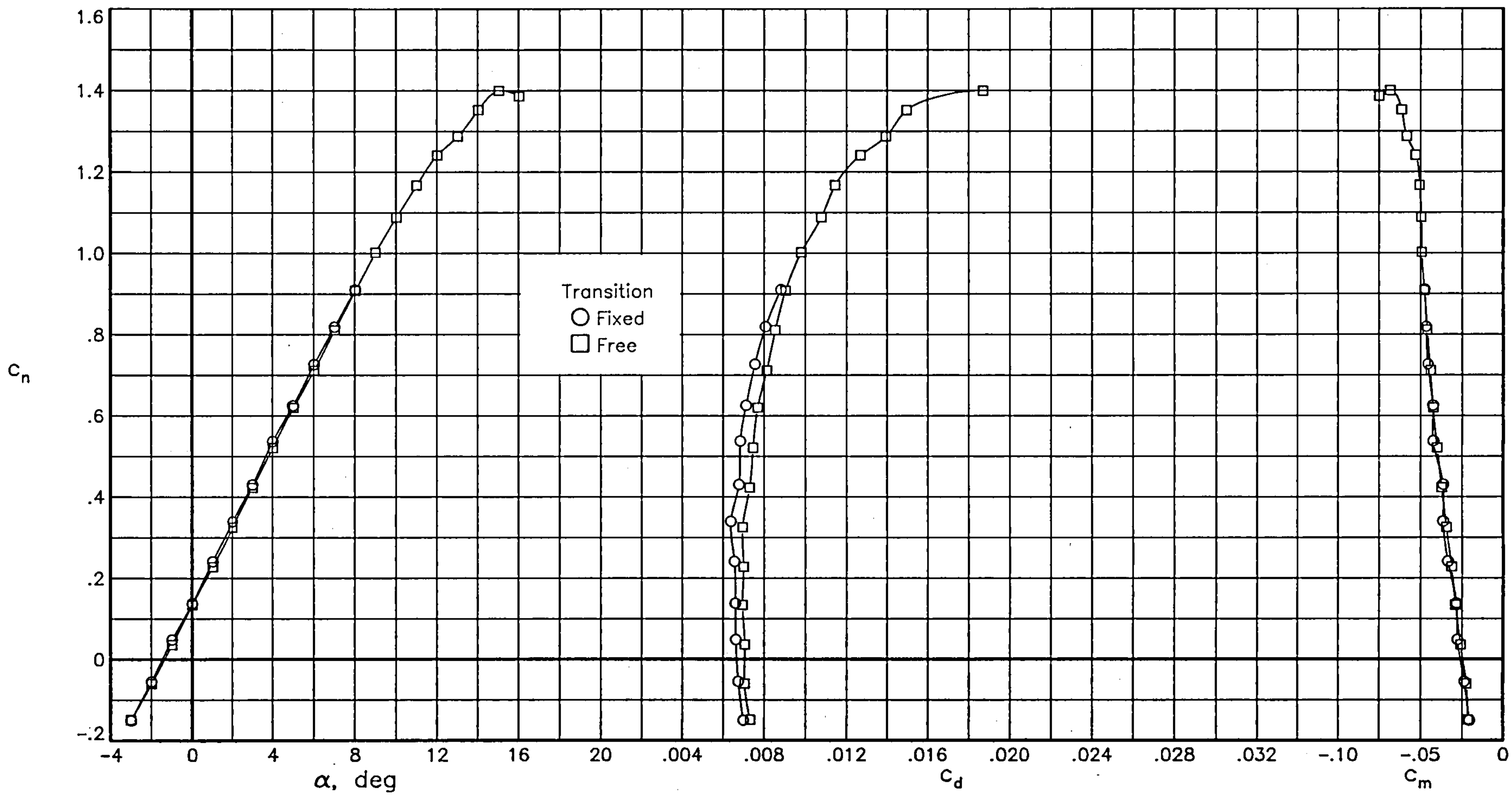

Figure 11.– Effect of fixing transition on aerodynamic characteristics of airfoil at M = 0.22 and R_c = 15 x 10^6.

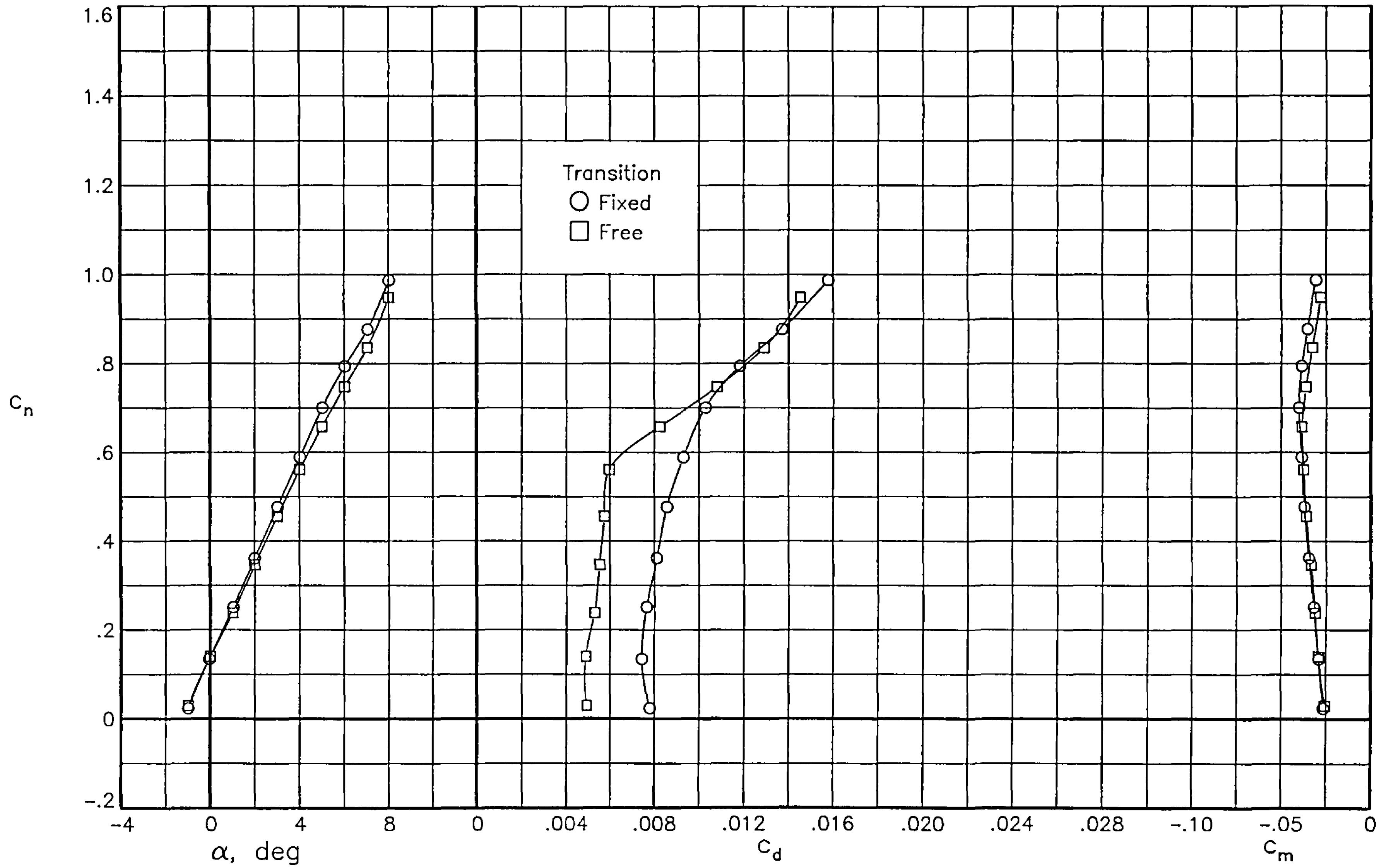

Figure 12.– Effect of fixing transition on aerodynamic characteristics of airfoil at M = 0.60 and $R_c = 3 \times 10^6$.

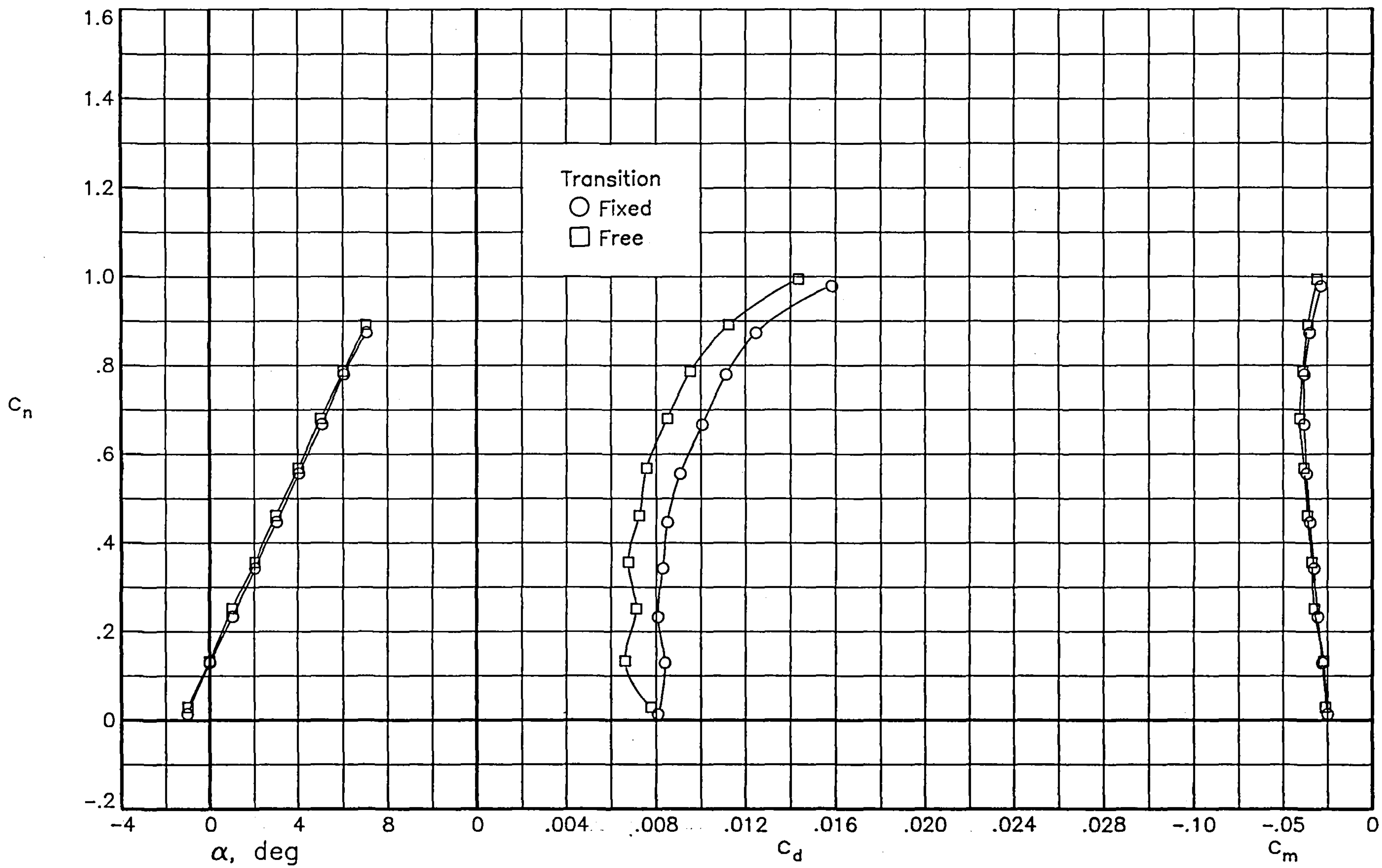

Figure 13.– Effect of fixing transition on aerodynamic characteristics of airfoil at M = 0.60 and $R_c = 6 \times 10^6$.

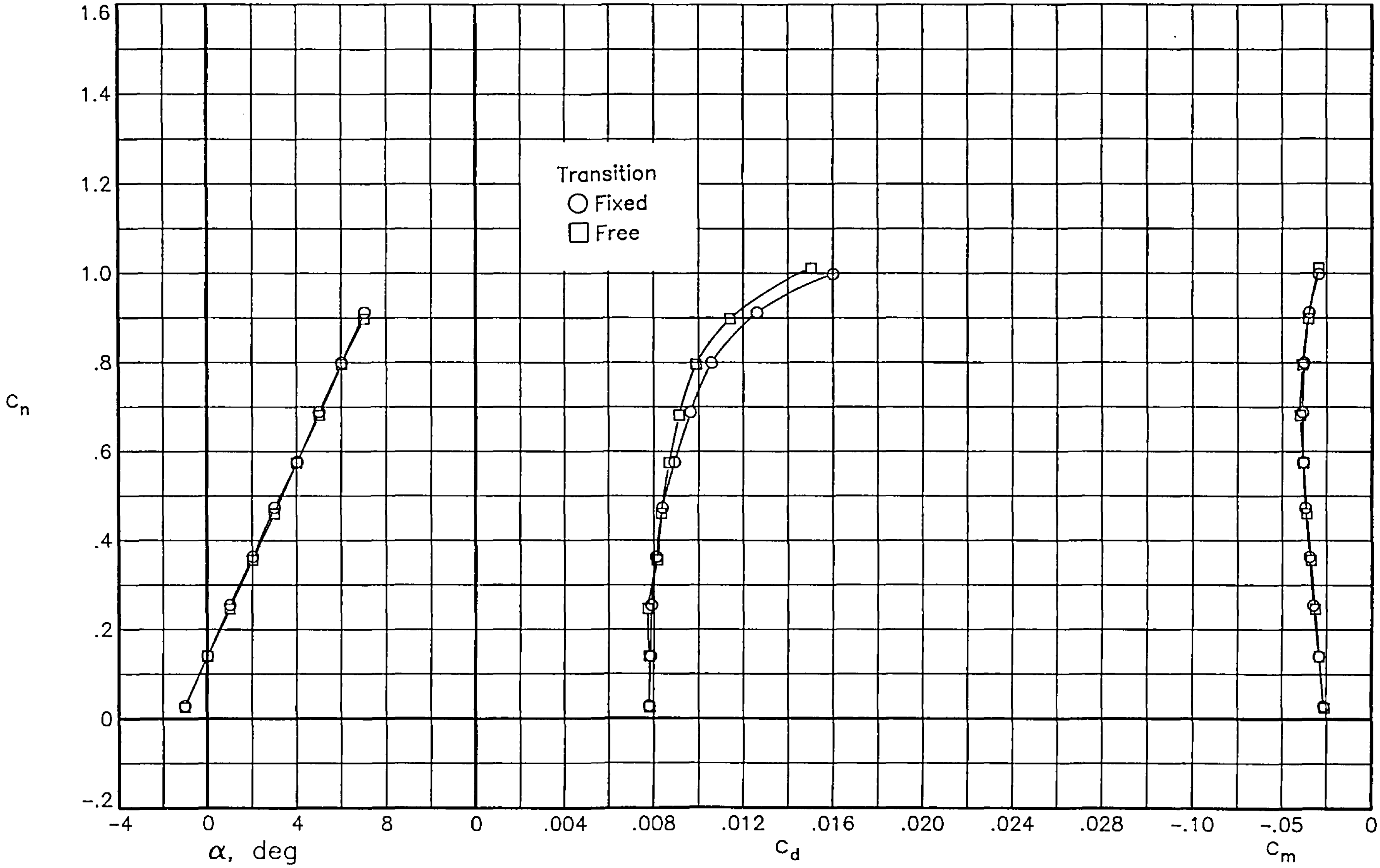

Figure 14.– Effect of fixing transition on aerodynamic characteristics of airfoil at M = 0.60 and $R_c = 9 \times 10^6$.

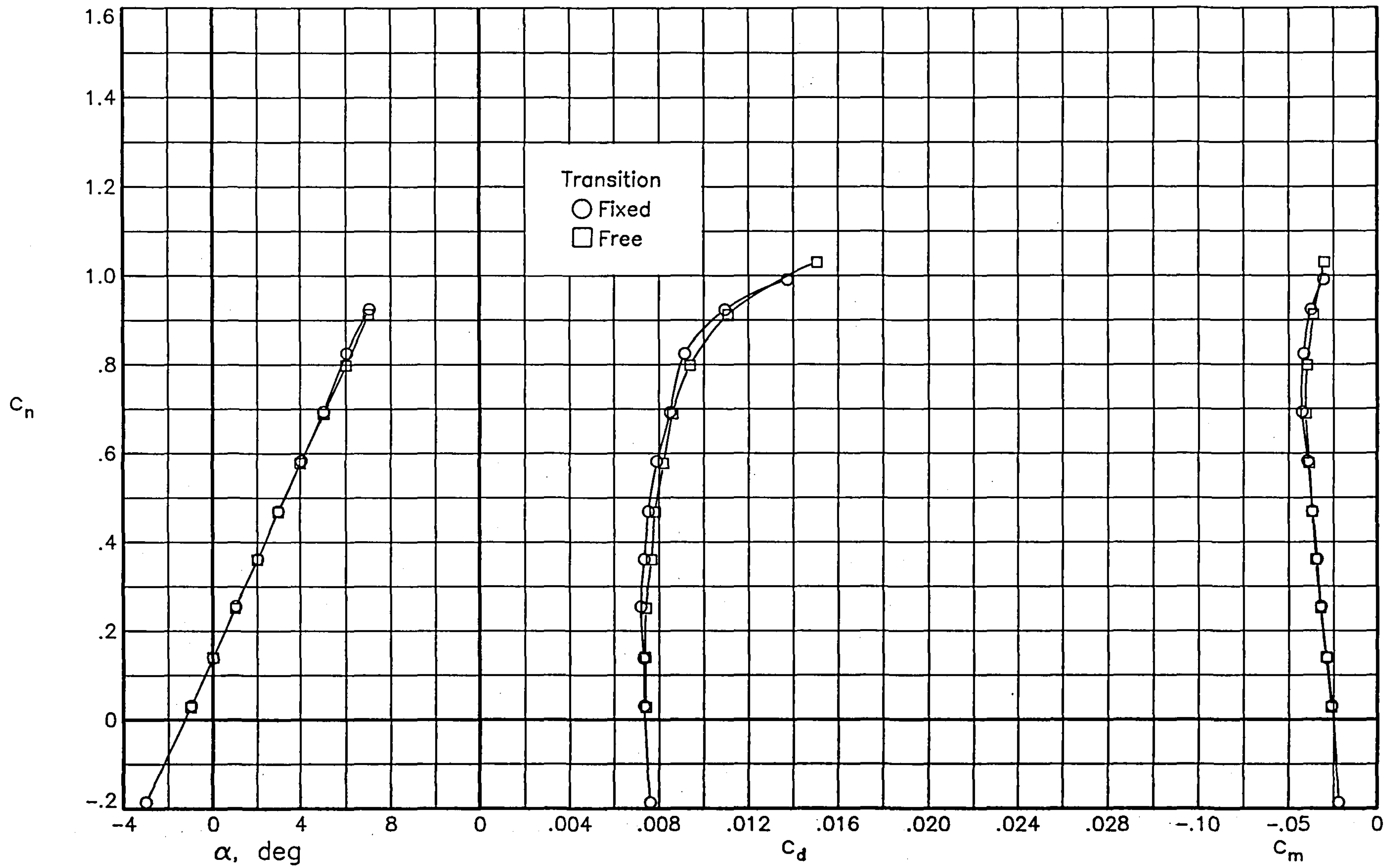

Figure 15.– Effect of fixing transition on aerodynamic characteristics of airfoil at $M = 0.60$ and $R_c = 12 \times 10^6$.

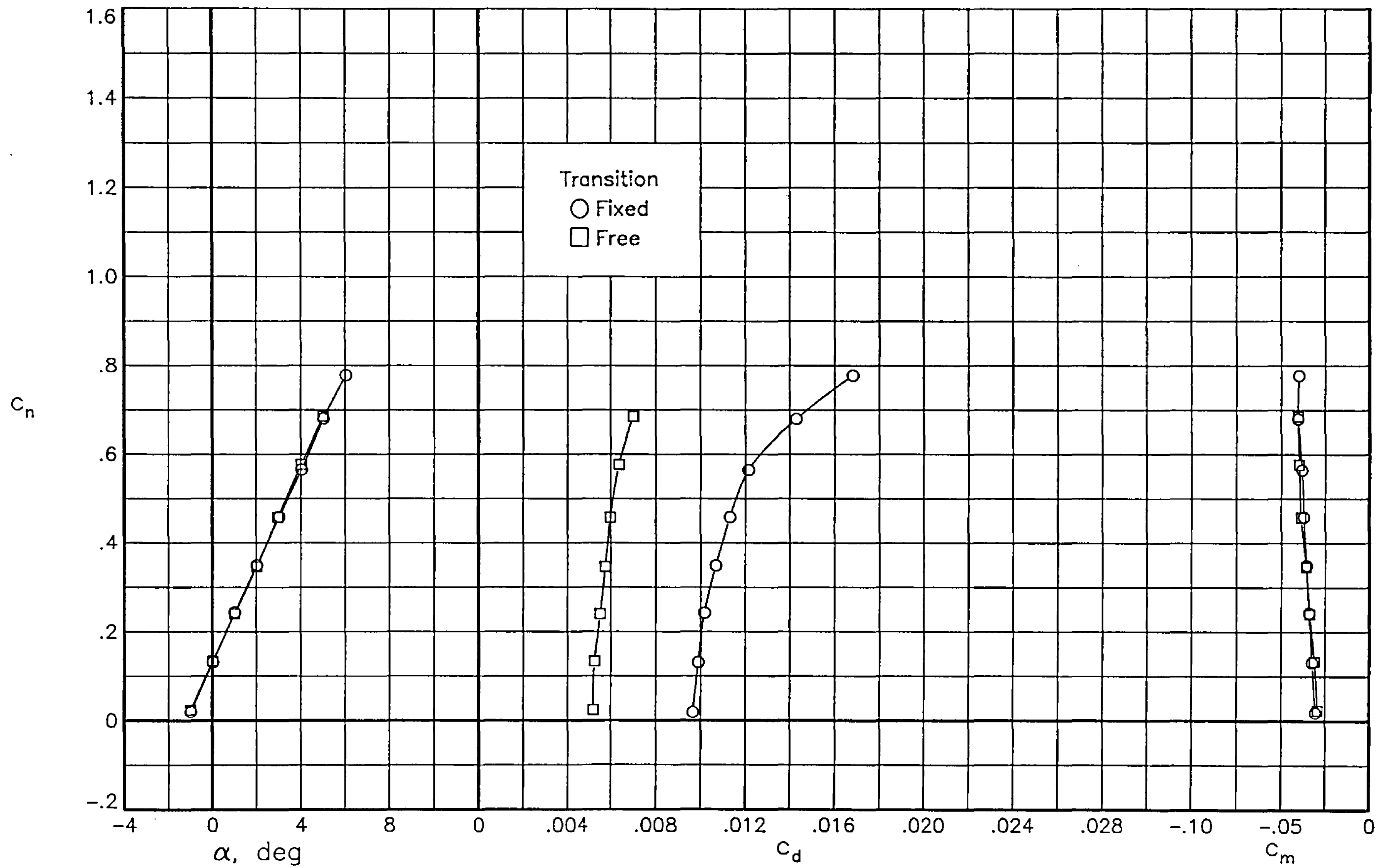

Figure 16.— Effect of fixing transition on aerodynamic characteristics of airfoil at $M = 0.70$ and $R_c = 3 \times 10^6$.

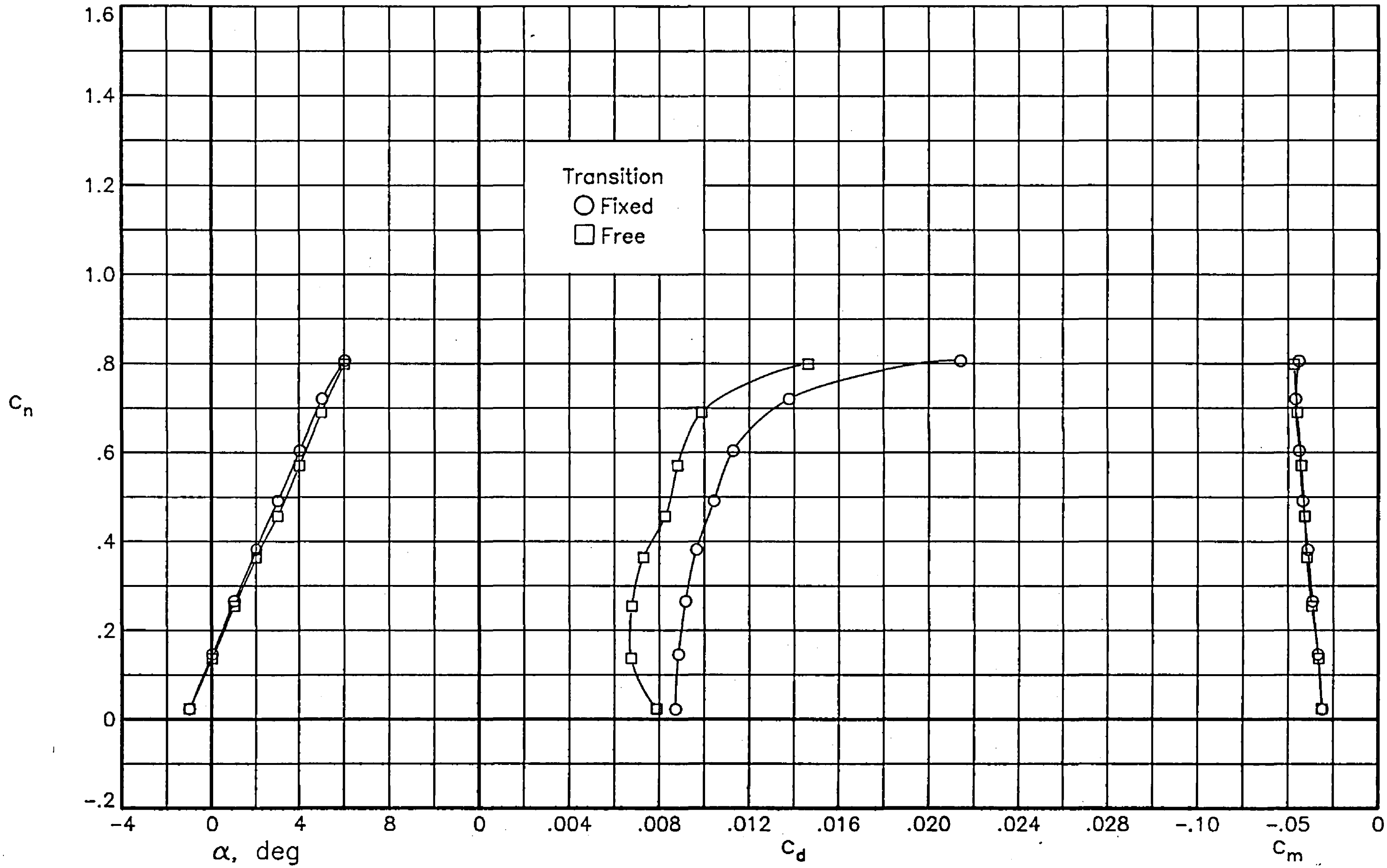

Figure 17.– Effect of fixing transition on aerodynamic characteristics of airfoil at $M = 0.70$ and $R_c = 6 \times 10^6$.

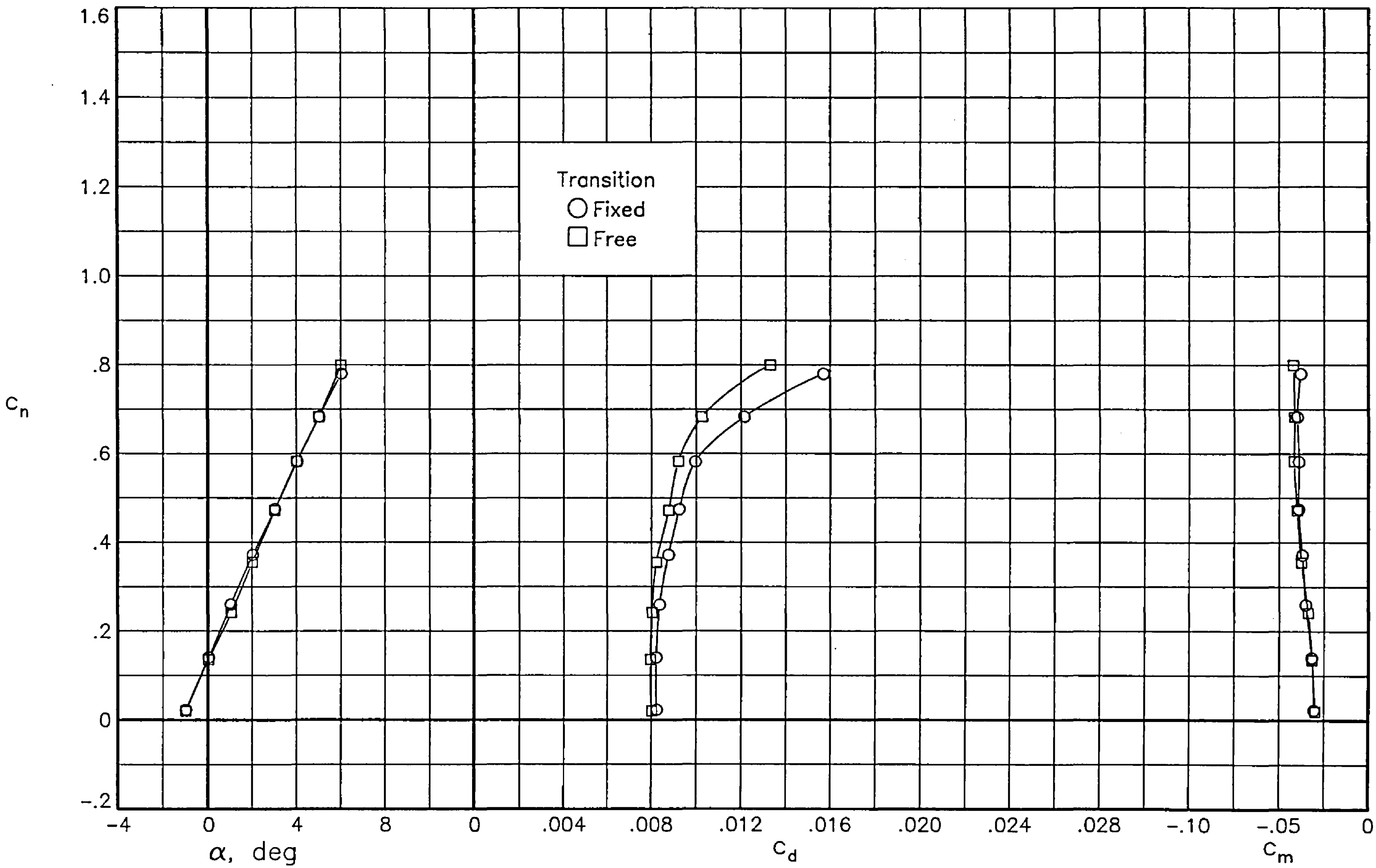

Figure 18.– Effect of fixing transition on aerodynamic characteristics of airfoil at M = 0.70 and $R_c = 9 \times 10^6$.

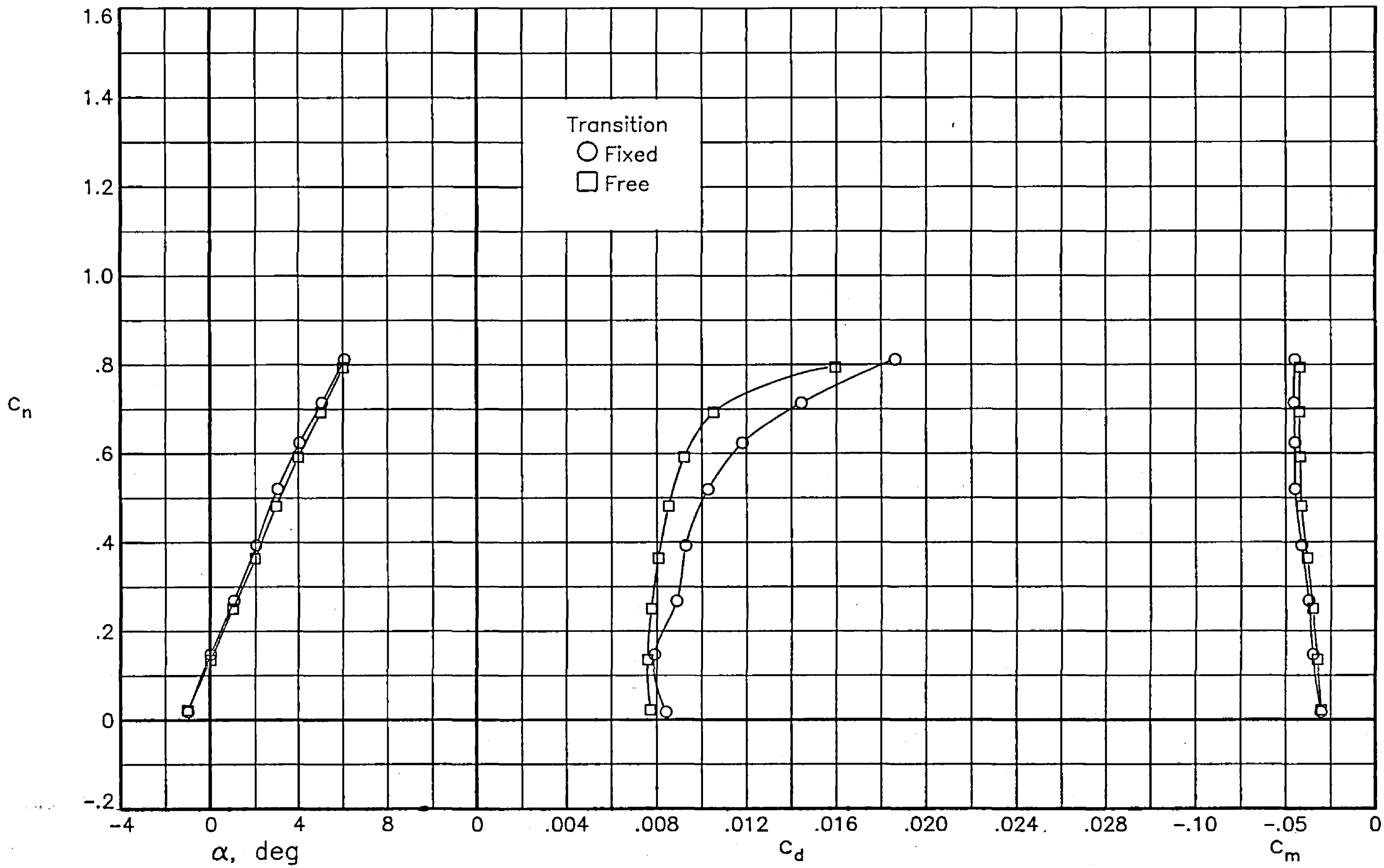

Figure 19.– Effect of fixing transition on aerodynamic characteristics of airfoil at $M = 0.70$ and $R_c = 12 \times 10^6$.

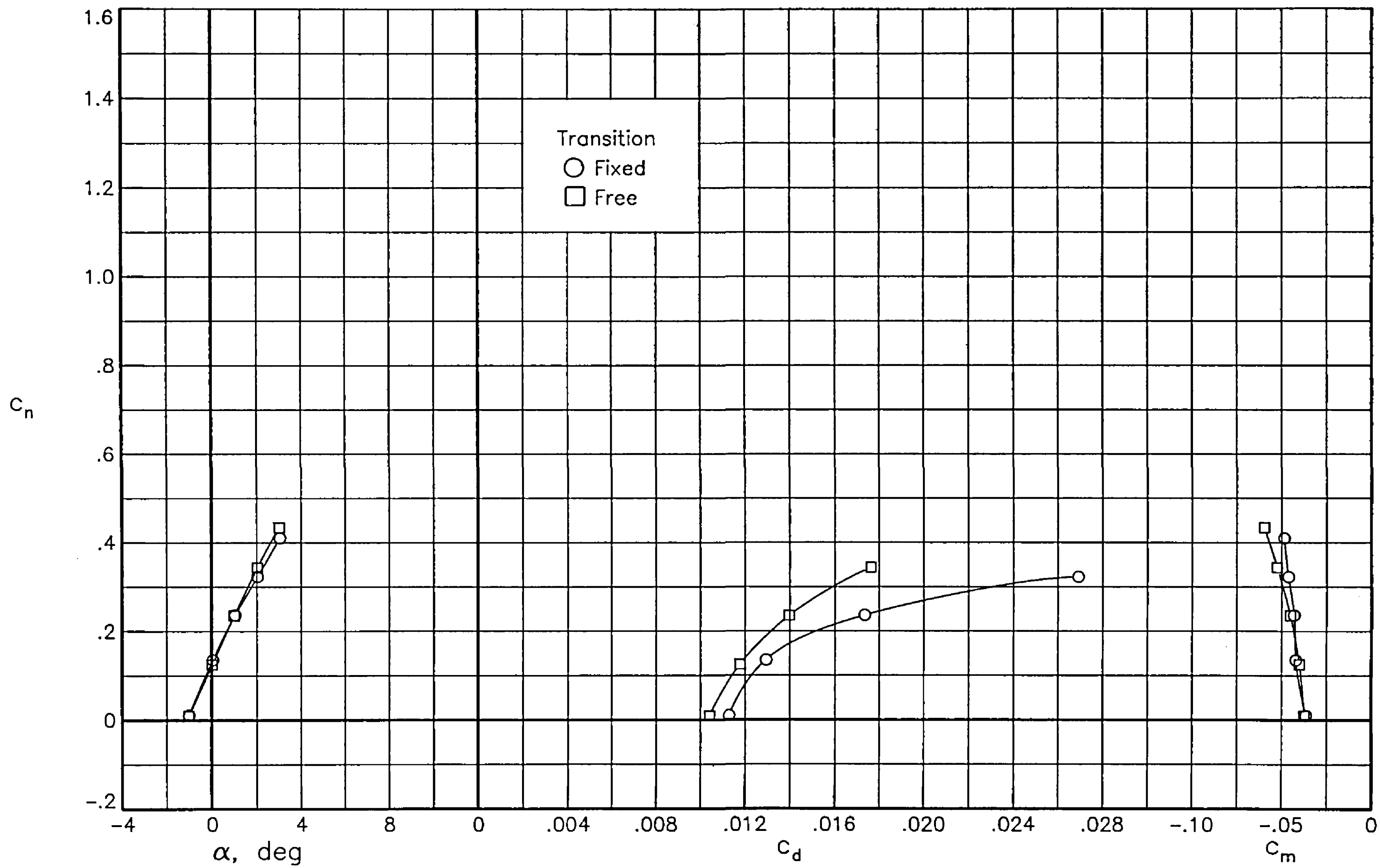

Figure 20.– Effect of fixing transition on aerodynamic characteristics of airfoil at $M = 0.76$ and $R_c = 6 \times 10^6$.

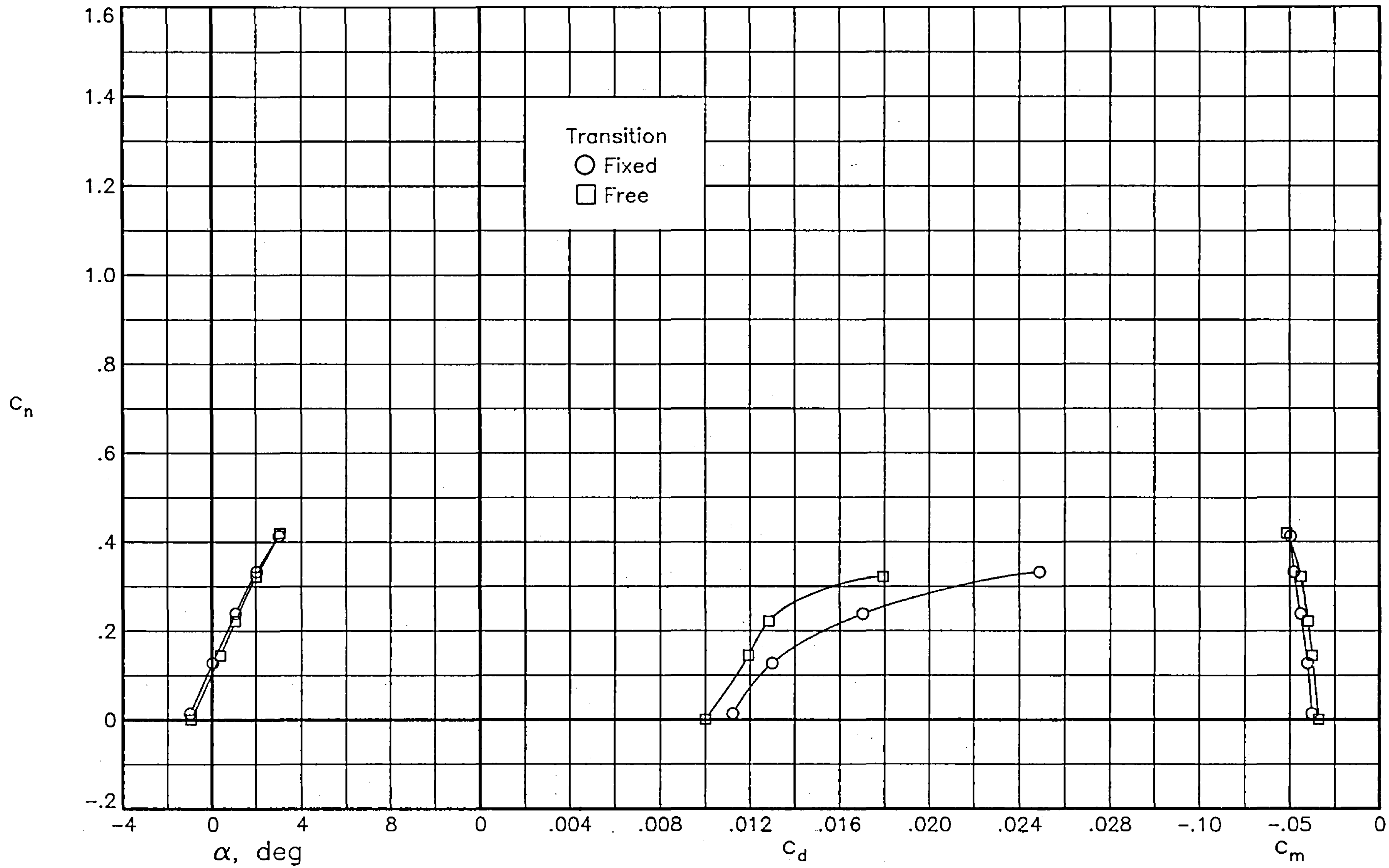

Figure 21.– Effect of fixing transition on aerodynamic characteristics of airfoil at M = 0.76 and $R_c = 9 \times 10^6$.

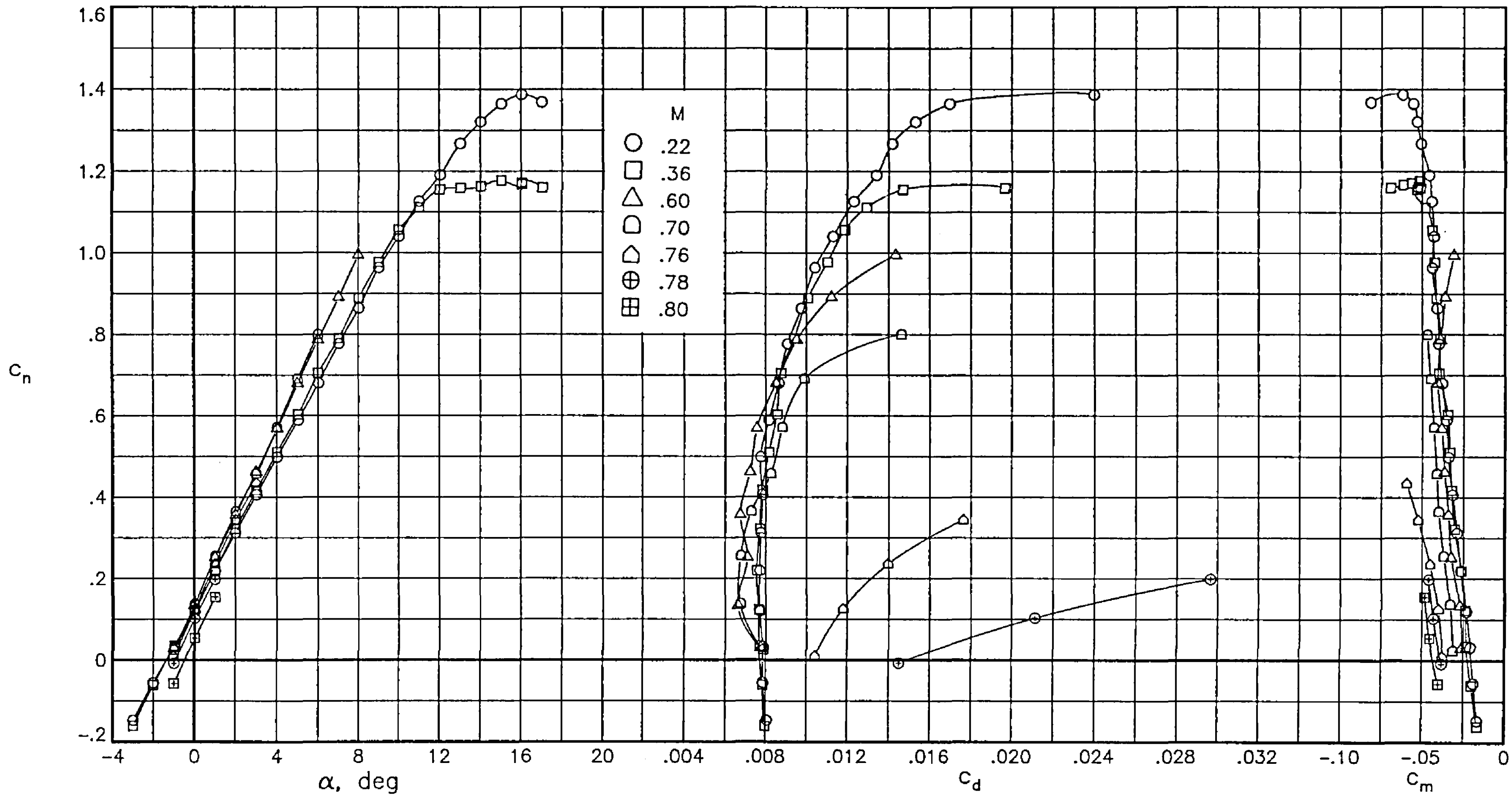

Figure 22.– Effect of Mach number on aerodynamic characteristics of airfoil with free transition at $R_c = 6 \times 10^6$.

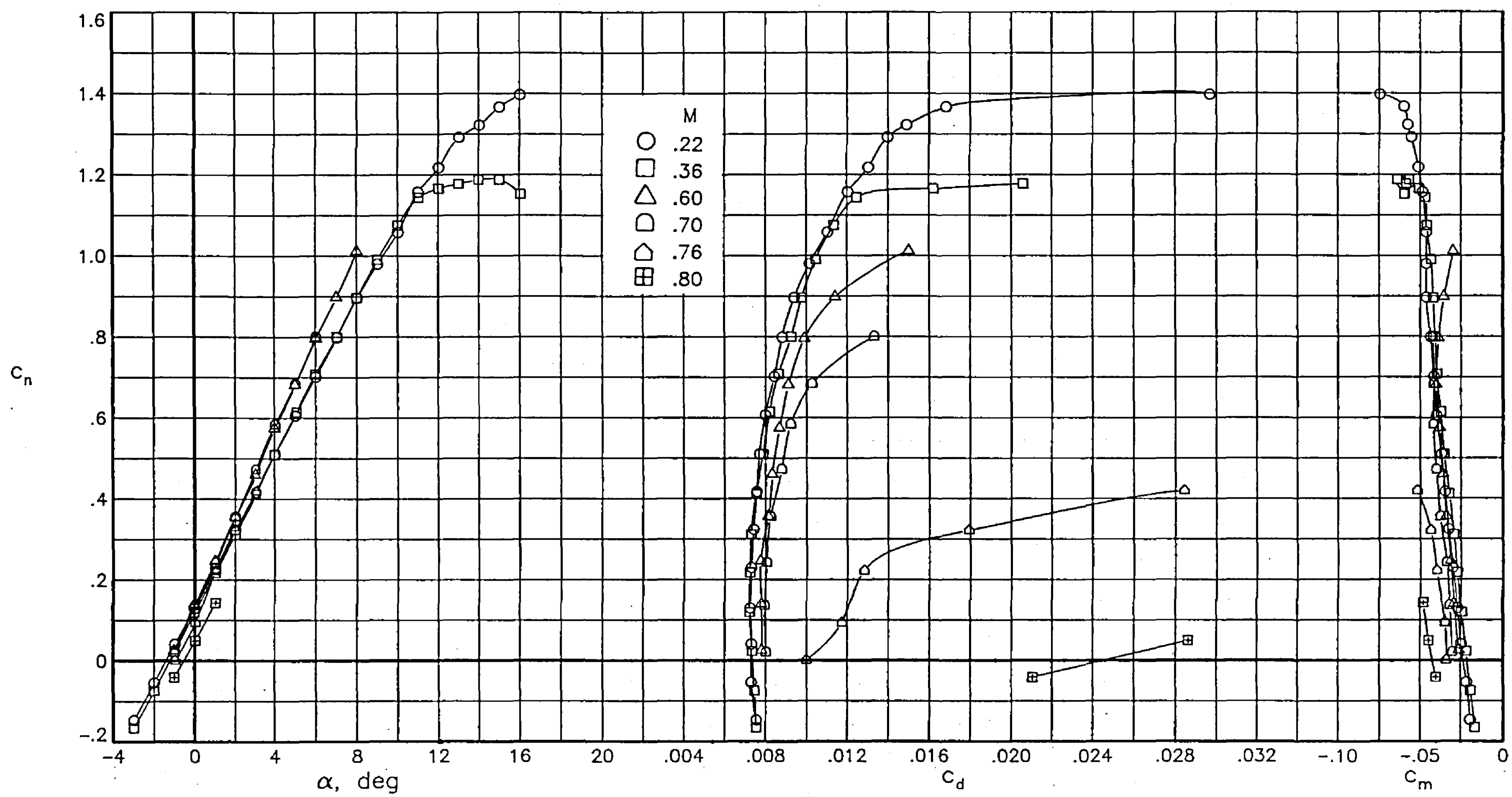

Figure 23.– Effect of Mach number on aerodynamic characteristics of airfoil with free transition at $R_c = 9 \times 10^6$.

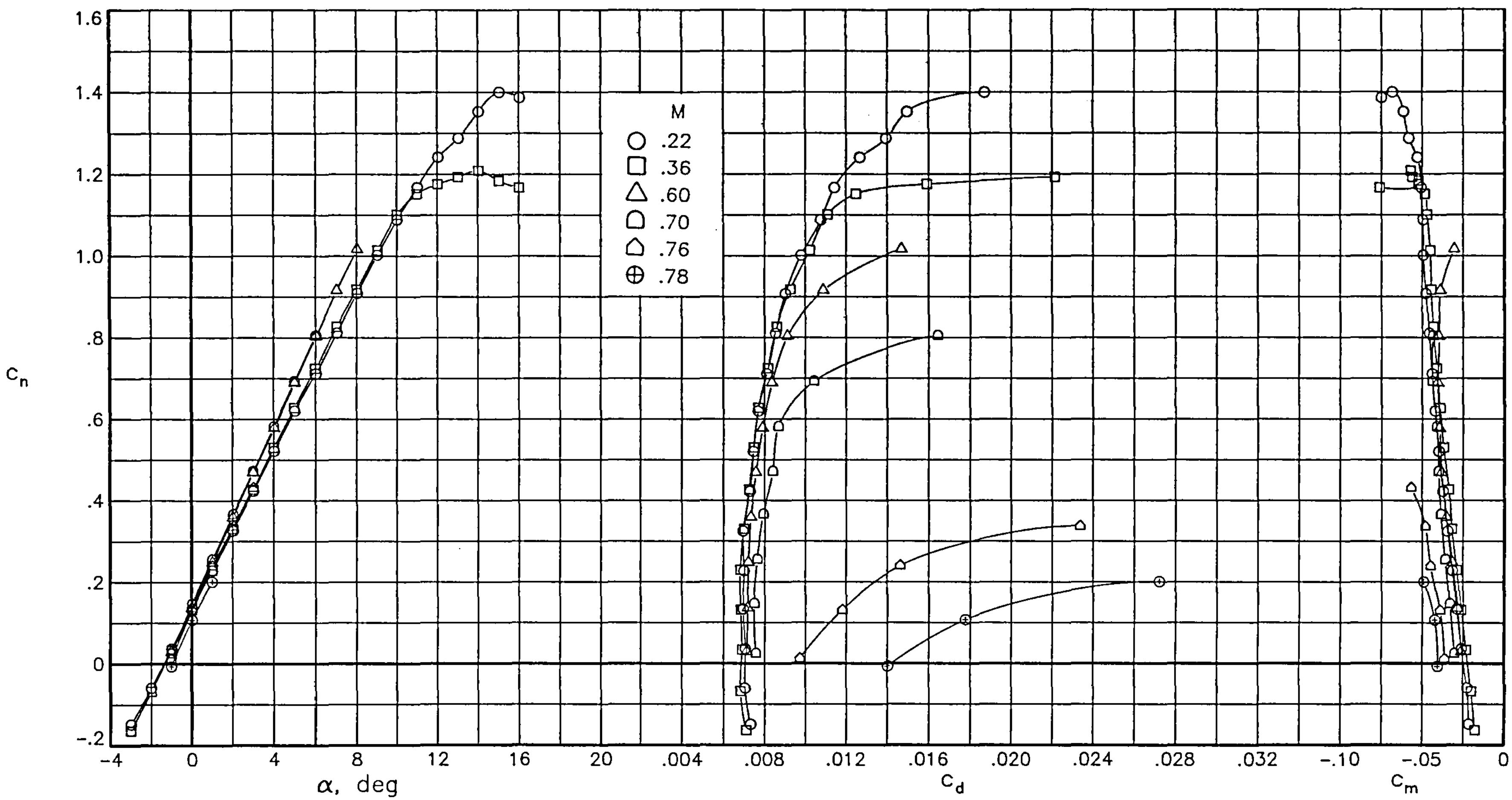

Figure 24.— Effect of Mach number on aerodynamic characteristics of airfoil with free transition at $R_c = 15 \times 10^6$.

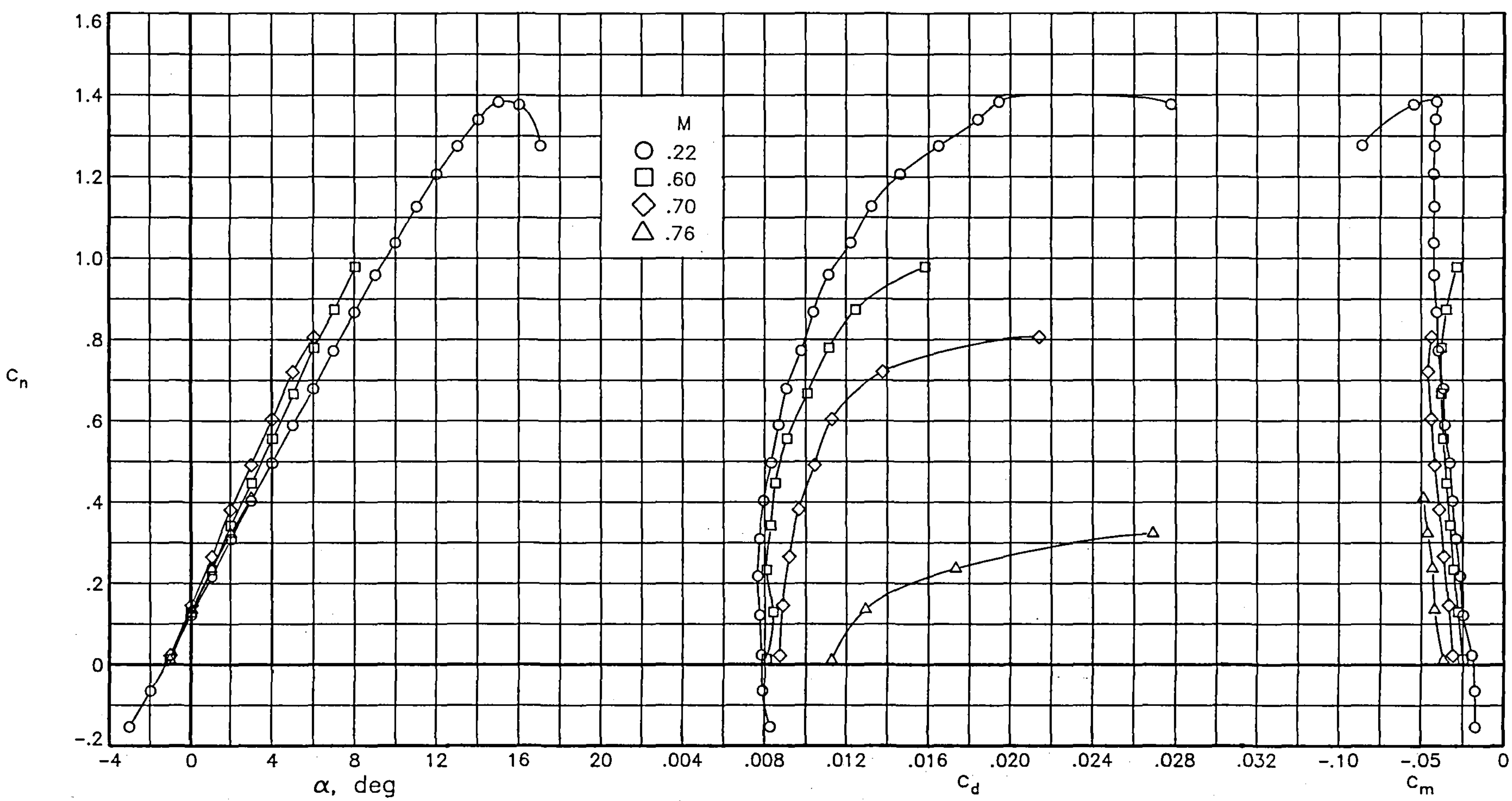

Figure 25.– Effect of Mach number on aerodynamic characteristics of airfoil with fixed transition at $R_c = 6 \times 10^6$.

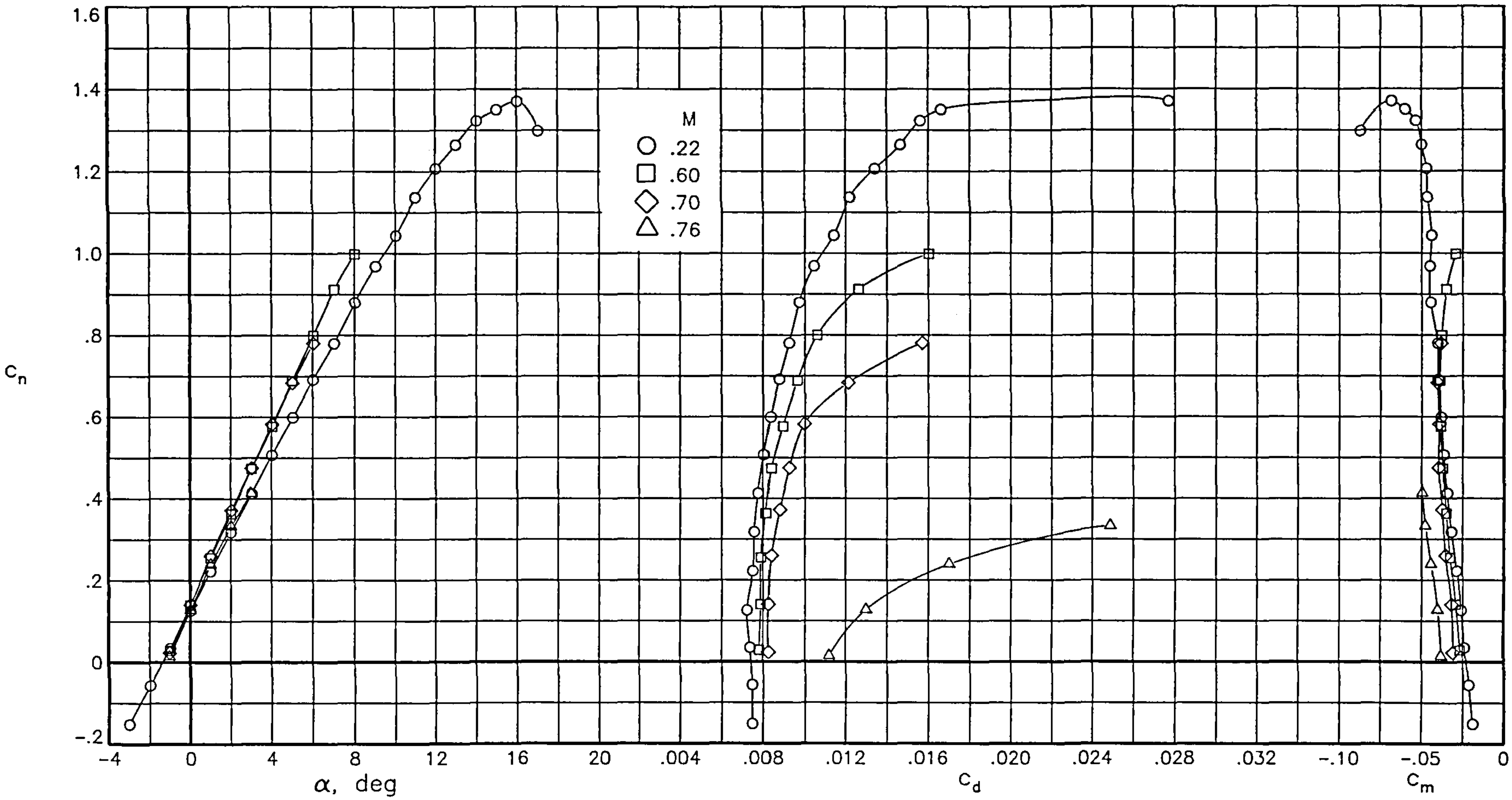

Figure 26.– Effect of Mach number on aerodynamic characteristics of airfoil with fixed transition at $R_c = 9 \times 10^6$.

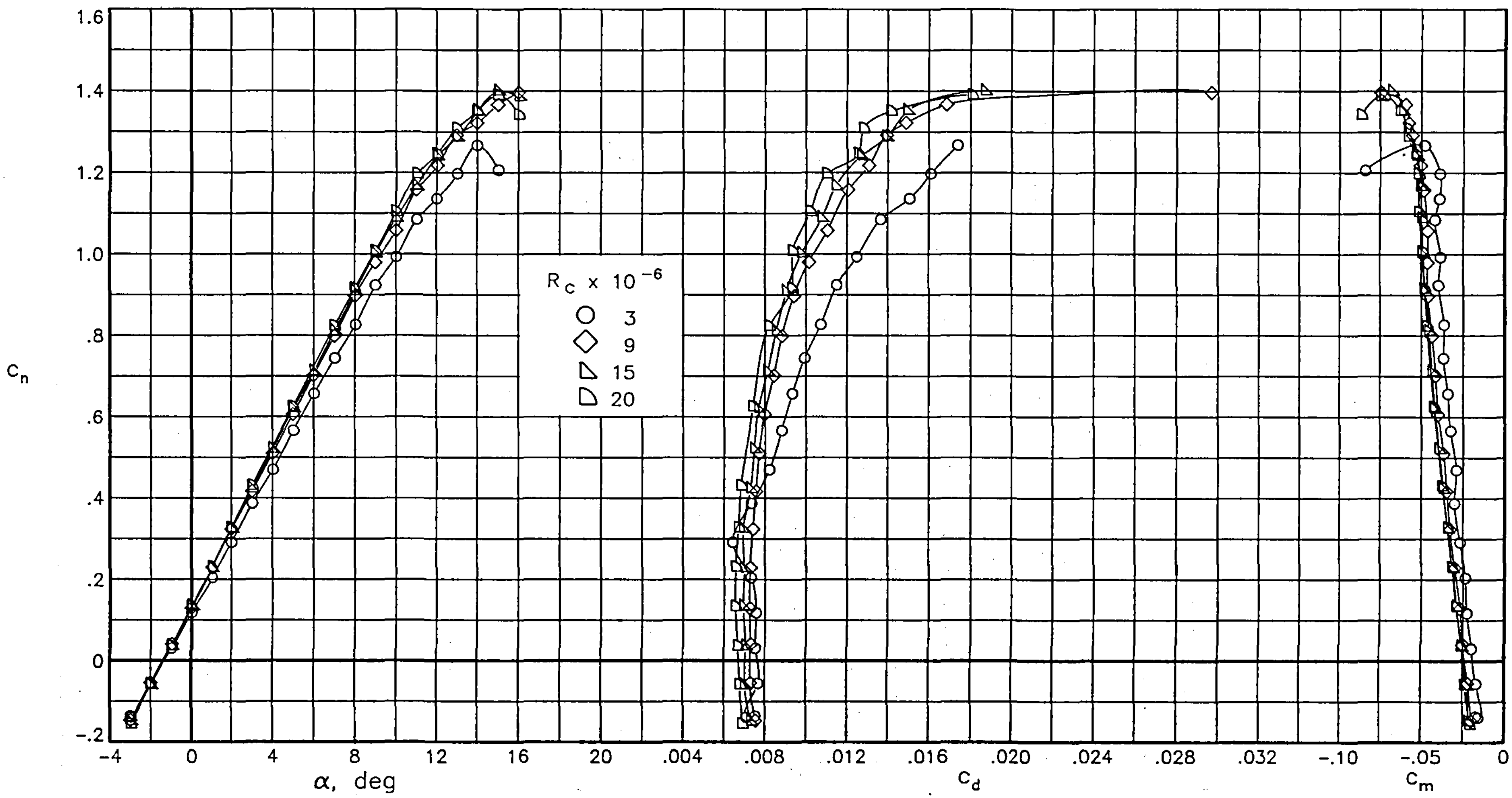

Figure 27.– Effect of Reynolds number on aerodynamic characteristics of airfoil with free transition at M = 0.22.

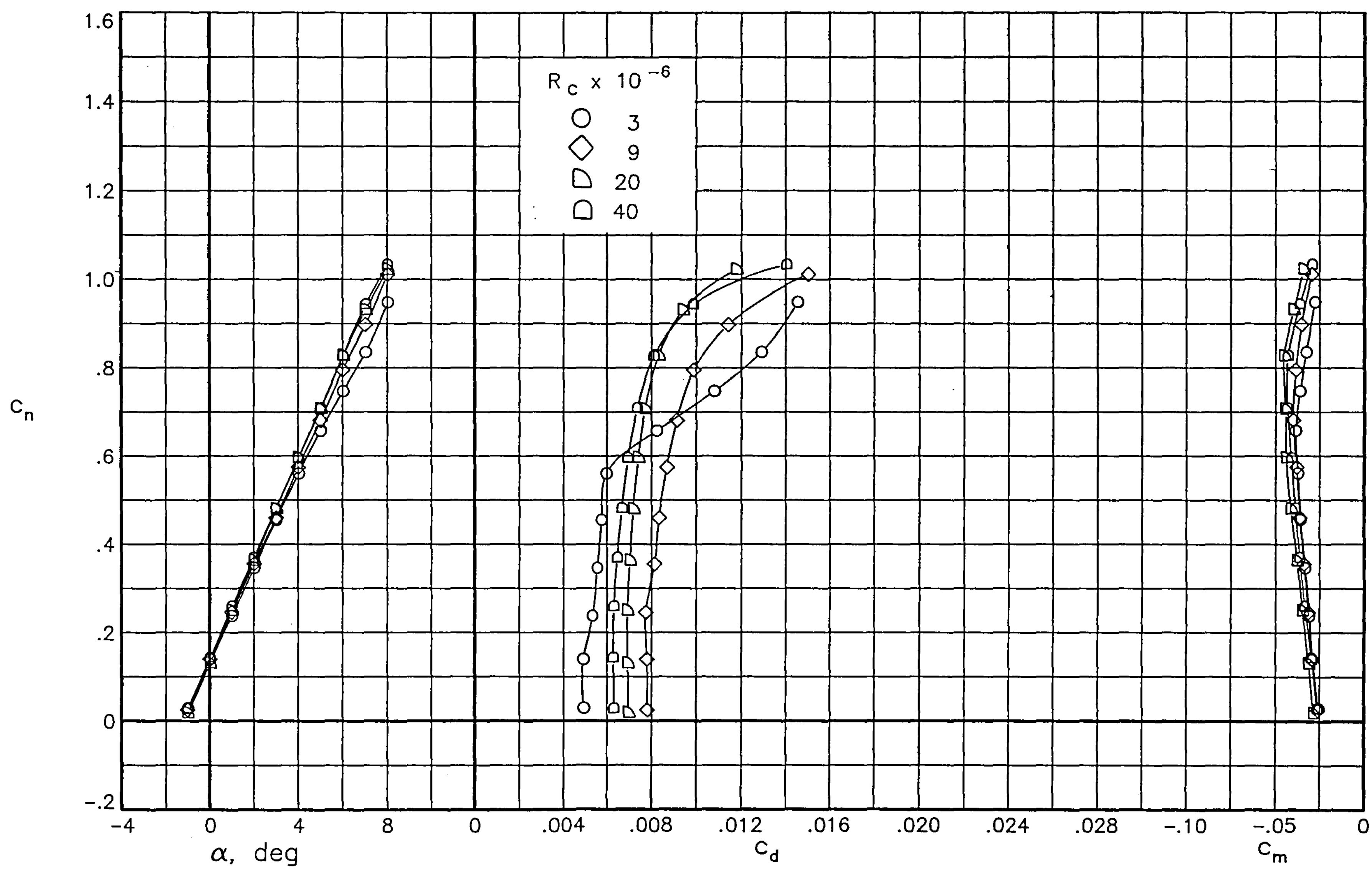

Figure 28.– Effect of Reynolds number on aerodynamic characteristics of airfoil with free transition at M = 0.60.

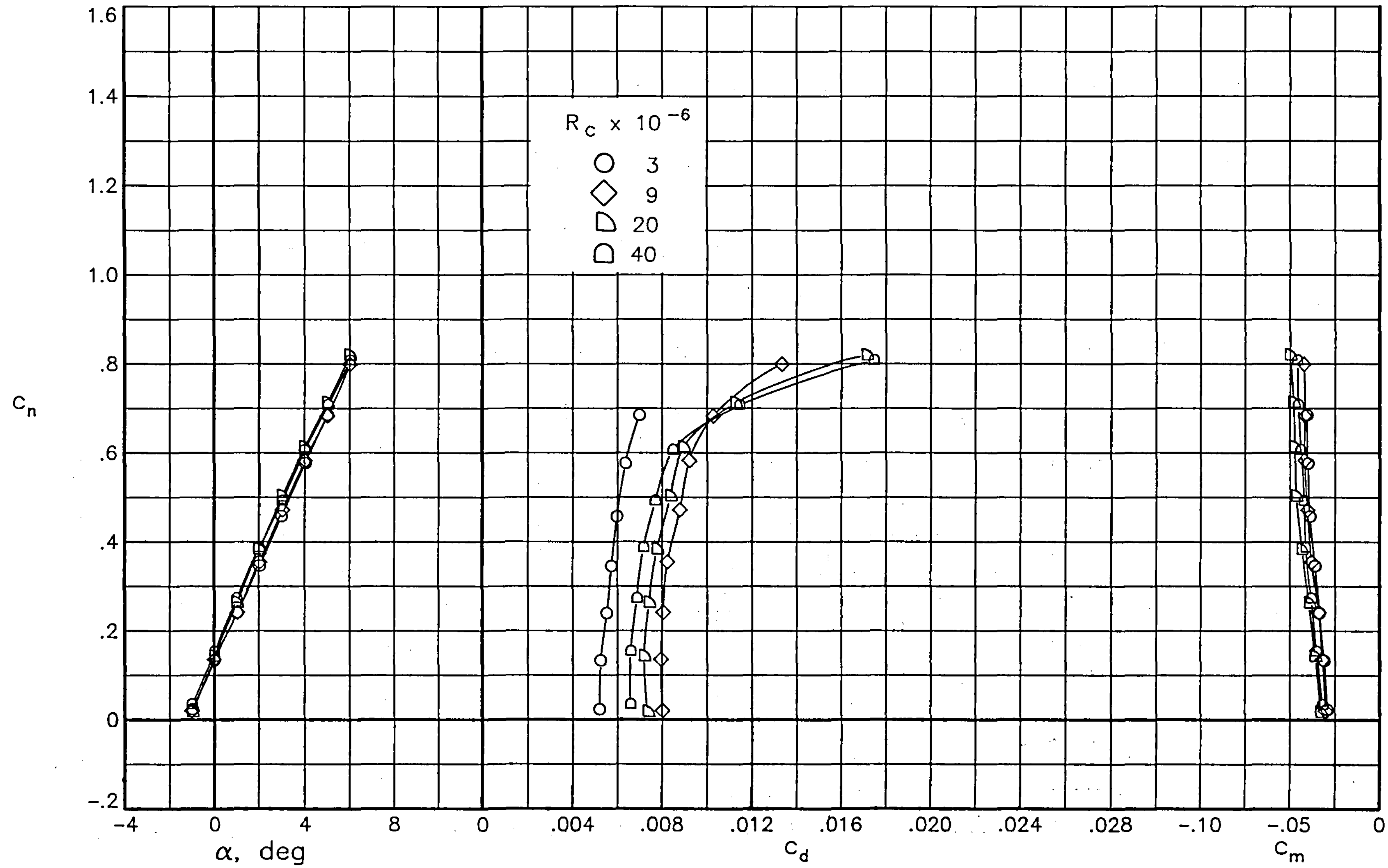

Figure 29.– Effect of Reynolds number on aerodynamic characteristics of airfoil with free transition at M = 0.70.

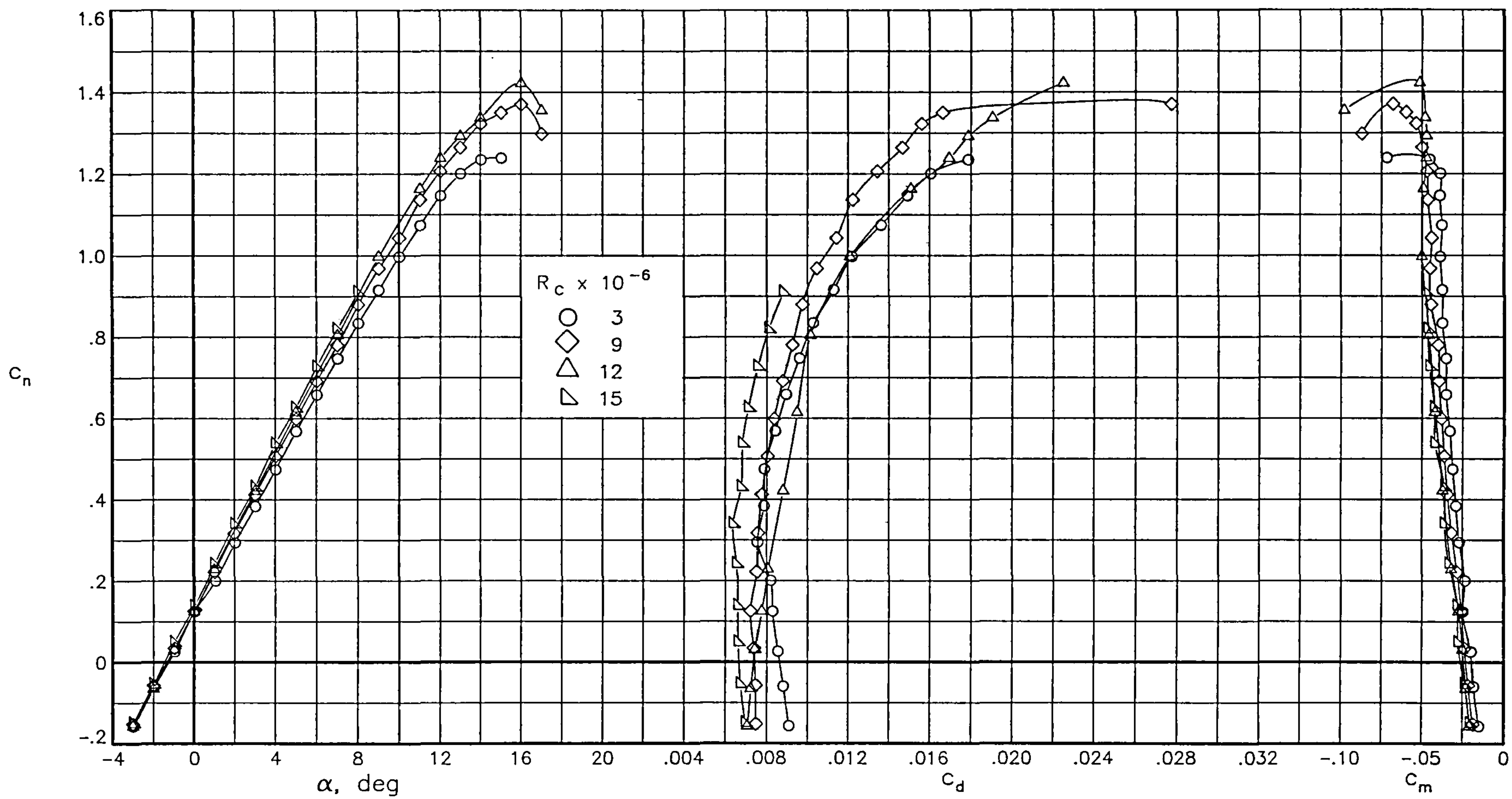

Figure 30.– Effect of Reynolds number on aerodynamic characteristics of airfoil with fixed transition at M = 0.22.

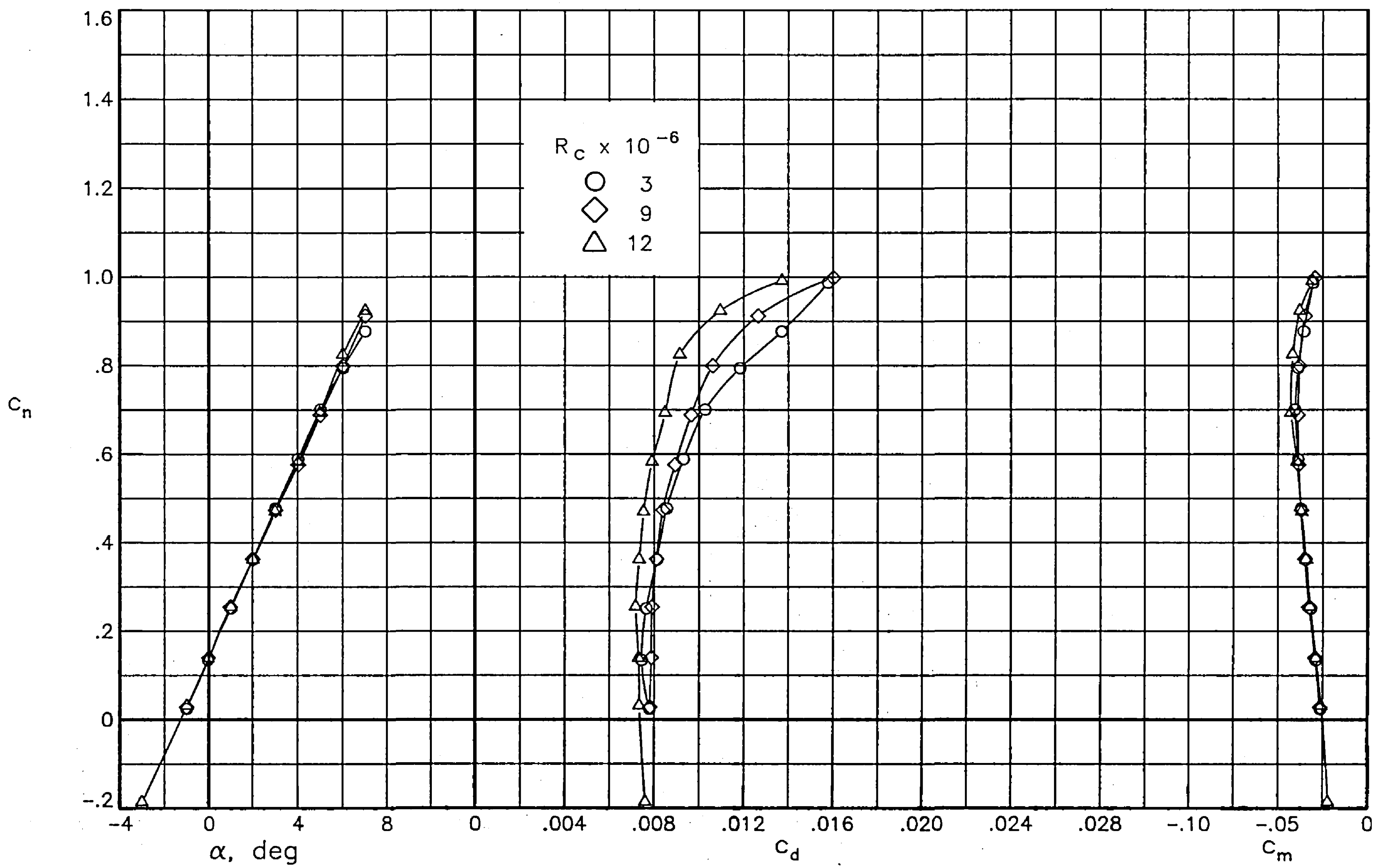

Figure 31.– Effect of Reynolds number on aerodynamic characteristics of airfoil with fixed transition at M = 0.60.

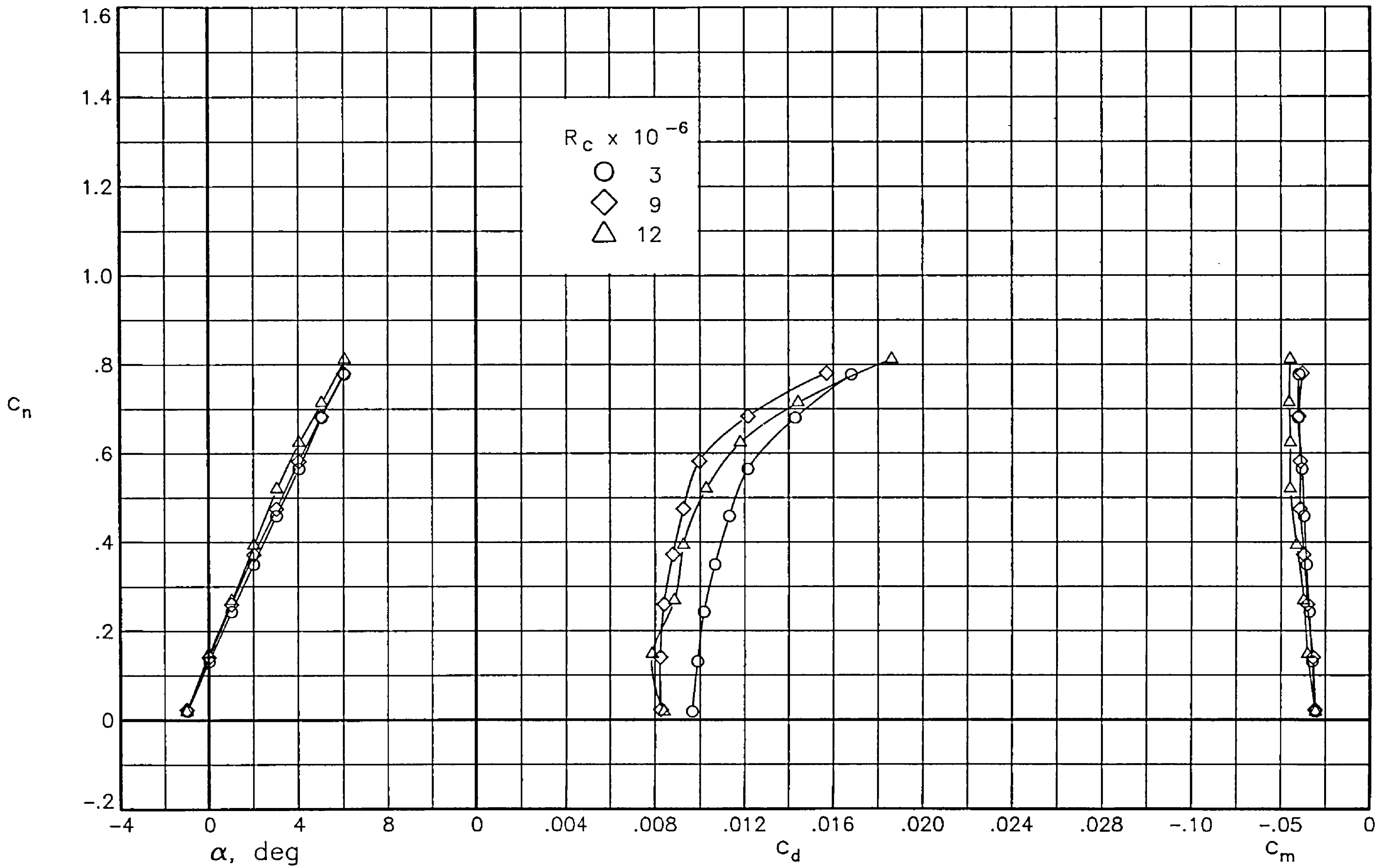

Figure 32.– Effect of Reynolds number on aerodynamic characteristics of airfoil with fixed transition at M = 0.70.

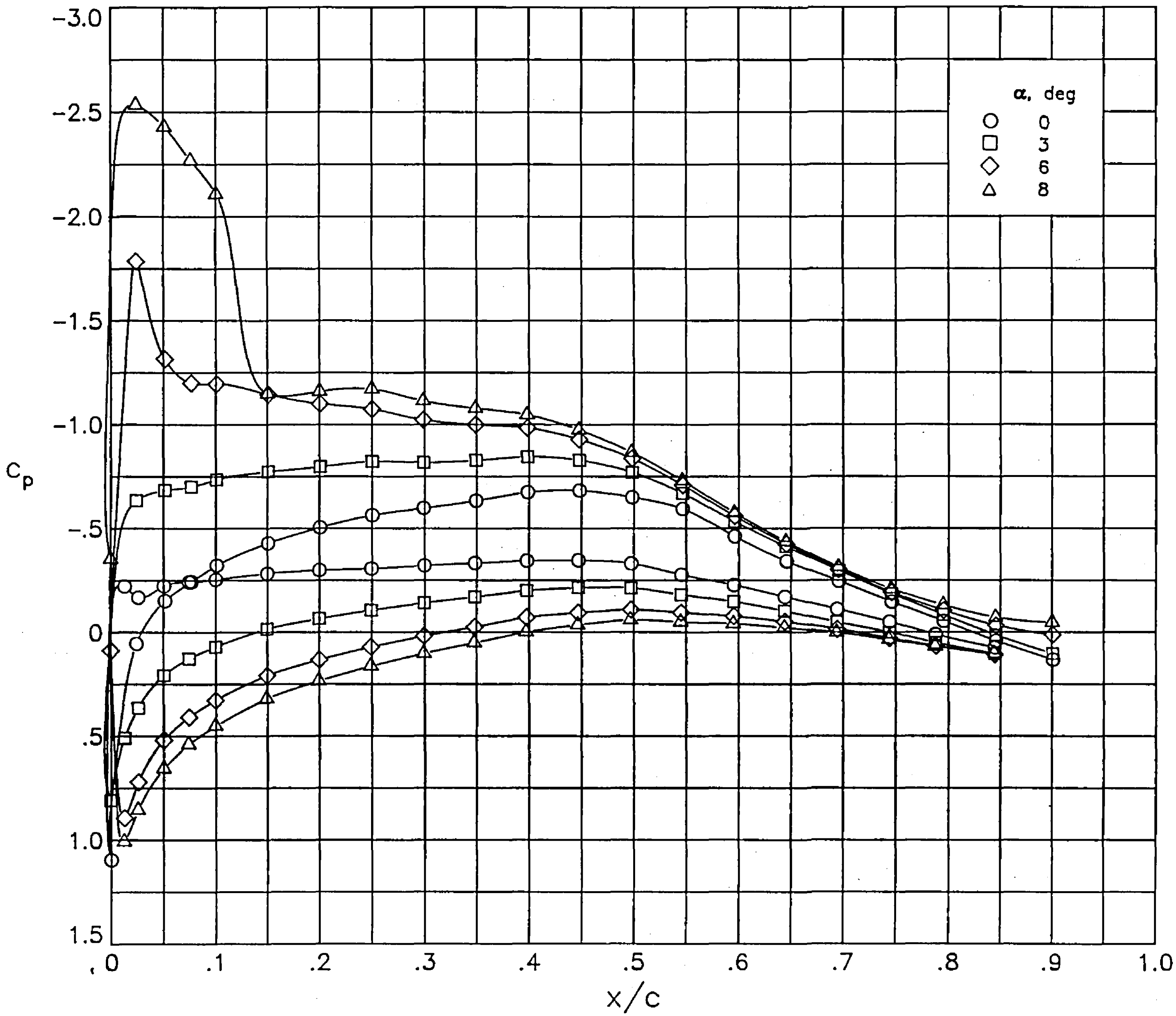

Figure 33.– Effect of angle of attack on pressure distribution of airfoil with free transition at $M = 0.60$ and $R_c = 3 \times 10^6$.

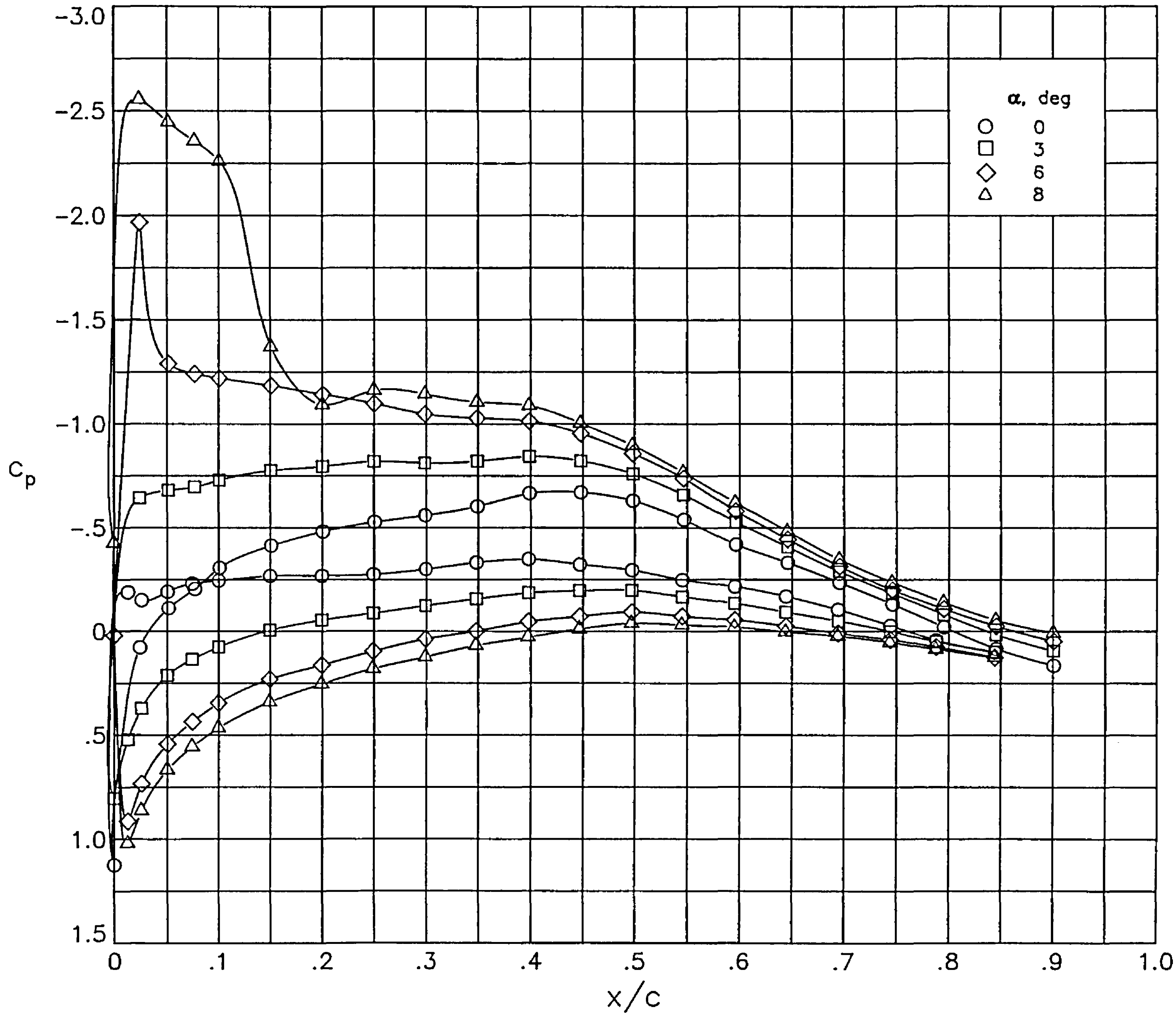

Figure 34.– Effect of angle of attack on pressure distribution of airfoil with free transition at $M = 0.60$ and $R_c = 6 \times 10^6$.

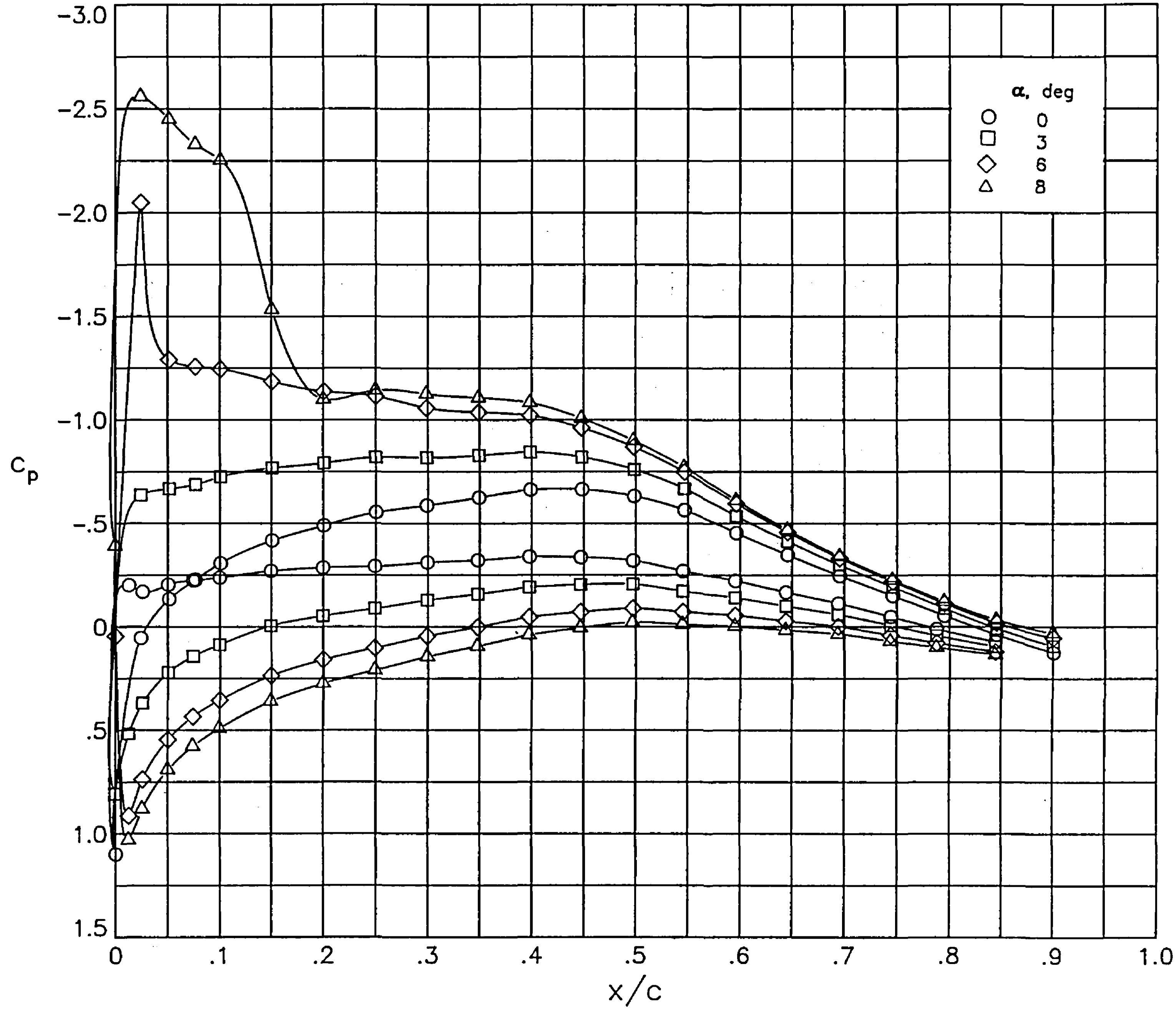

Figure 35.— Effect of angle of attack on pressure distribution of airfoil with free transition at M = 0.60 and $R_c = 9 \times 10^6$.

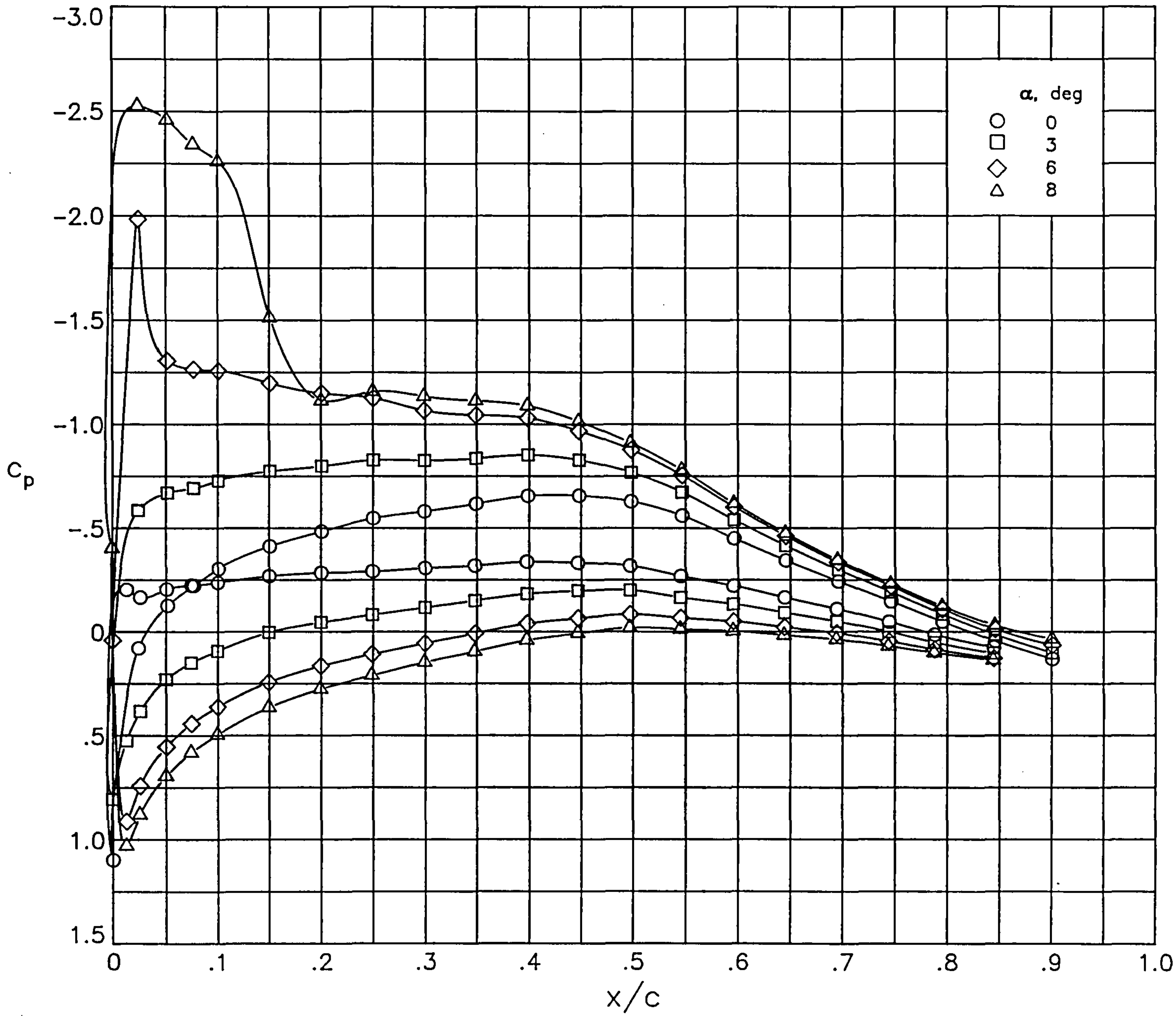

Figure 36.— Effect of angle of attack on pressure distribution of airfoil with free transition at M = 0.60 and $R_c = 15 \times 10^6$.

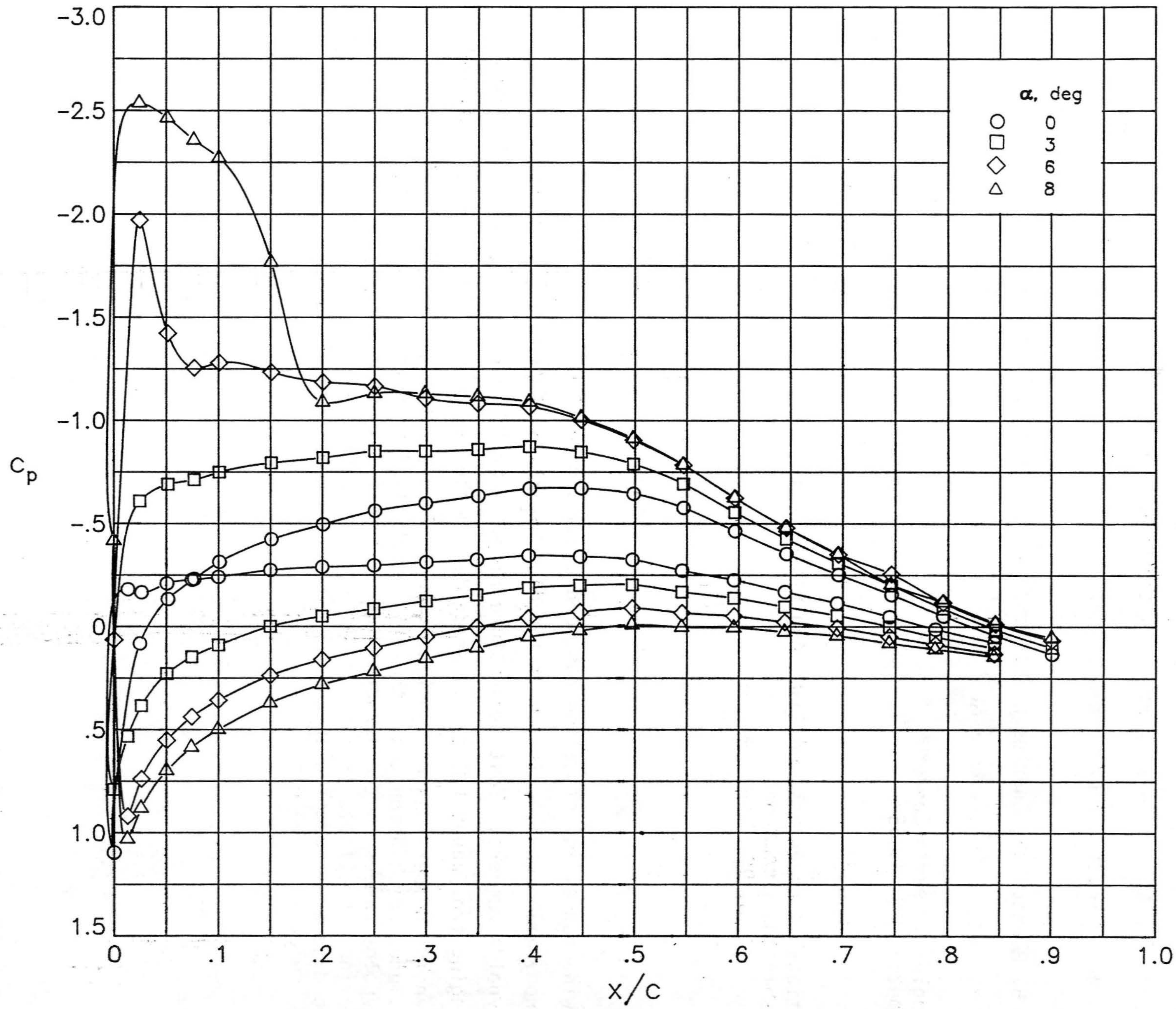

Figure 37.— Effect of angle of attack on pressure distribution of airfoil with free transition at M = 0.60 and $R_c = 40 \times 10^6$.

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16. Abstract

A wind-tunnel investigation has been conducted to study the two-dimensional aerodynamic characteristics of the NACA 65_1-213 airfoil over a wide range of Reynolds numbers. Test temperature ranged from ambient to about 100K at pressures ranging from about 1.2 to 6.0 atm. Mach number was varied from 0.22 to 0.80 and Reynolds number (based on airfoil chord) from 3×10^6 to 40×10^6. Data are included which demonstrate the effects of fixed transition, Mach number, and Reynolds number on the aerodynamic characteristics of the airfoil. A sample of data showing the effects of angle of attack on the pressure distribution is also given. The data are presented in an uncorrected form with no analysis in order to expedite the release of the data.

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