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By Richard C. Haut, ODU and
Jerry B. Adcock, NASA, LRC

August 1976

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16. Abstract

The dependency of Mach number on the Prandtl-Meyer function was numerically determined by iterating the Prandtl-Meyer function and applying the Müller method to converge on the Mach number for flows in cryogenic parahydrogen and nitrogen at various total pressures and total temperatures. The results are compared with the ideal diatomic gas values and are presented in tabular form.

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By

Richard C. Haut
Old Dominion University, Norfolk, VA

and

Jerry B. Adcock
NASA Langley Research Center

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SUMMARY

The dependency of Mach number on the Prandtl-Meyer function was numerically determined by iterating the Prandtl-Meyer function and applying the Muller method to converge on the Mach number for flows in cryogenic parahydrogen and nitrogen at various total pressures and total temperatures. The results are compared with the ideal diatomic gas values and are presented in tabular form.

INTRODUCTION

For many decades, the primary tool for experimental aerodynamic research and development has been the wind-tunnel. Because of the recent increase in size and speed of aircrafts, a need has developed for greater ground testing capabilities in terms of Reynolds number. This necessity has been well documented, for example, in references 1 and 2. Programs aimed at the development of efficient transport

*Graduate Student, Department of Mechanical Engineering, Old Dominion University, Norfolk, Virginia.

aircraft and maneuvering fighter aircraft to operate at transonic speeds have demonstrated some deficiencies in the testing capability of present day wind tunnels, particularly with respect to adequate Reynolds number simulation. In the transonic region, one of the major problems is the inability to adequately determine the effect of Reynolds number on the shock boundary layer interactions, and in turn, on the performance, stability and trim characteristics of the aircraft.

It is possible to increase the test Reynolds number at a given Mach number by using a heavy gas rather than air as the test gas, increasing the size of the model and tunnel, increasing the operating pressure of the tunnel, and reducing the test temperature. The dynamic pressure, mass flow rate, and power consumption of the tunnel per unit run time will, in general, be affected by the method chosen to increase Reynolds number.

The use of a heavy gas, such as Freon-12, is a well-known method of achieving high Reynolds numbers. However, when compressibility effects become significant, the difference between the ratios of specific heats between the heavy gas and air leads to an improper flow simulation, thus making the use of heavy gases unsuitable for test gases at transonic speeds.

The more common approaches of increasing the size and increasing the stagnation pressure in order to increase Reynolds numbers involve serious problems in areas concerning construction and operating costs, model and support loads, and the difficulty of providing continuous-flow capability due to large power requirements.

The fourth method of increasing test Reynolds number, reducing the test temperature, offers an attractive solution to many of the preceding problems. However, as the test temperature is reduced, the properties of the test gas may begin to deviate significantly from the ideal gas properties. Real-gas effects may become appreciable at cryogenic temperatures and alter aerodynamic test results. Therefore, an analysis under these conditions must be performed to determine if a particular gas is acceptable as a wind-tunnel test gas.

A cryogenic wind-tunnel concept has evolved at the NASA-Langley Research Center in which liquid nitrogen is sprayed directly into the tunnel circuit to cool the tunnel structure, remove the heat input from the drive fan, and balance the heat conducted into the stream by the tunnel walls. Using this cooling procedure, nitrogen is the resulting test gas. Throughout the development of the concept, experimental and theoretical studies have been performed to assess the suitability of cryogenic nitrogen as a test gas. By analyzing real-gas isentropic and normal shock solutions, and performing two-dimensional airfoil pressure tests, Adcock, Kilgore and Ray, in reference 3, concluded that the real-gas effects of nitrogen at cryogenic temperatures pose no problem in its application in a cryogenic transonic wind tunnel operating at stagnation pressures up to 5 atmospheres.

Nitrogen is not the only gas that might be considered for use at cryogenic temperatures. However, to assure flow similarity between the model in the wind tunnel and the vehicle in flight, any candidate test gas must essentially behave like air, which for all practical

purposes under the conditions encountered in flight, behaves as an ideal diatomic gas.

Hydrogen is one of the most promising diatomic gases in addition to nitrogen. Higher test Reynolds numbers, at a given total pressure, can be obtained by using crogenic hydrogen rather than cryogenic nitrogen as the test gas because of the lower vapor temperature. Alternatively, in a given size tunnel, it is possible to achieve a desired test Reynolds number at a lower total pressure by using hydrogen instead of nitrogen, thereby reducing the model, sting, and balance loads.

As a part of a larger program aimed at determining the suitability as well as the practicality of using cryogenic hydrogen as a wind-tunnel test gas, the dependency of Mach number on the Prandtl-Meyer function was numerically determined for parahydrogen and compared with the corresponding values for an ideal diatomic gas. This is a continuation of the work reported by the present authors in references 4 and 5 which contain the isentropic expansion ratios, the corresponding transport properties, and the normal shock ratios for parahydrogen.

Also, as continuation of the work reported in reference 6 which contains the flow ratios for nitrogen, the dependency of Mach number on the Prandtl-Meyer function was numerically calculated for nitrogen and compared with an ideal diatomic gas.

The purpose of this report is to present, in tabular form, the Prandtl-Meyer function and corresponding Mach number values for parahydrogen and for nitrogen. These results are presented in tabular form without analysis.

SYMBOLS

C_p	specific heat at constant pressure
c	speed of sound
H	enthalpy
M	Mach number
P	Pressure
S	entropy
T	temperature
u	velocity
δ	small incremental value
θ	local flow angle, Prandtl-Meyer function
μ	Mach angle

Subscripts:

a	conditions upstream of expansion wave
b	conditions downstream of expansion wave
i	iteration value
n	normal component
T	total conditions
t	tangential component

Superscripts:

'	ideal gas value
*	condition at Mach 1

PRANDTL-MEYER FLOW SOLUTION

Consider the semi-infinite flow field above a convex wall as shown in figure 1 where the subscripts a and b are used to identify the upstream and downstream conditions of the expansion wave. Here a uniform parallel supersonic flow of Mach M_a is expanded to a higher speed, M_b, by an increase in the local flow angle, $\theta_b - \theta_a$. As in all Prandtl-Meyer flows, the Mach lines, which are inclined relative to the local flow direction at the Mach angle, μ, given by

$$\tan \mu = (M^2 - 1)^{-1/2} \tag{1}$$

form as straight lines from the wall. In addition, the flow parameters are constant along these lines. Therefore, the problem of determining the flow above the wall transforms into the determination of the velocity and the thermodynamic state as a function of the initial conditions and the change in the local flow direction imposed by the wall.

The governing differential equation for Prandtl-Meyer flow can be determined from the geometry of a differential velocity change across a Mach line, considered as a weak, discrete expansion wave, as shown in figure 2. Here the tangential components of the velocities on both sides of the Mach line are equal. That is,

$$u_t = (u + \delta u)_t \tag{2}$$

From the law of sines

$$\frac{u+\delta u}{u} = \frac{\sin(\frac{\pi}{2} + \mu)}{\sin(\frac{\pi}{2} - \mu - \delta\theta)} \tag{3}$$

or, using trigonometry

$$1 + \frac{\delta u}{u} = \frac{\cos(\mu)}{\cos(\mu)\cos(\delta\theta) - \sin(\mu)\sin(\delta\theta)} \tag{4}$$

So, for small $\delta\theta$

$$1 + \frac{du}{u} = \frac{\cos(\mu)}{\cos(\mu) - d\theta\sin(\mu)}$$

This equation reduces to

$$1 + \frac{du}{u} = \frac{1}{1 - d\theta\tan(\mu)} \tag{6}$$

or, neglecting higher order terms

$$1 + \frac{du}{u} = 1 + d\theta\ \tan(\mu) \tag{7}$$

Combining equation (7) with equation (1), the well-known differential equation for Prandtl-Meyer flow is obtained.

$$d\theta = \sqrt{M^2 - 1}\ \frac{du}{u} \tag{8}$$

In order to obtain a solution, two additional equations are needed, the adiabatic energy equation,

$$H_T = H_a + \frac{1}{2} u_a^2 = H_b + \frac{1}{2} u_b^2 \tag{9}$$

and the thermodynamic equation of state, given here in terms of the speed of sound, c, for an isentropic process,

$$c = c(H,S) = c(H,S_a) \tag{10}$$

With the initial conditions given, equations (8), (9), and (10) can be solved for any three of the four variables, θ, u, c, H, in terms of the fourth.

In the case of an ideal gas, equation (10) can be written in a simple form and the equations are then capable of being solved explicitly. For a real gas, the equation of state is more complex and an explicit solution of the system of equations is not as easily determined.

Computer programs were written to solve this system of equations for parahydrogen and for nitrogen. The main part of each program follows the generalized flow chart shown in figure 3. The local thermodynamic equilibrium state for parahydrogen was calculated by using subprogram THERMO discussed in reference 4, while Jacobson's equation

of state, discussed in reference 6, was used for nitrogen (subprogram CN2FLOW).

The only region under consideration for this flow situation is in the gaseous phase. Because of this, the calculations were stopped when the downstream static pressure was within 10% of the saturation pressure at the particular static temperature. The calculations were also stopped before saturation was reached if the static temperature was within 10% of the triple point temperature.

Now consider the generalized flow chart shown in Figure 3. Following along this chart, the total temperature and pressure are initialized in step 1. The resulting total conditions (enthalpy, entropy, specific heat at constant pressure) are then computed in step 2 using either subprogram THERMO or CN2FLOW, for parahydrogen or nitrogen respectfully. In step 3, the static conditions at Mach 1 are determined by using a slightly modified Muller method to converge on the static temperature. Then, in step 4, the velocity upstream of the Prandtl-Meyer expansion is set equal to the speed of sound at Mach 1.

Step 5 is the start of the Prandtl-Meyer function iteration and in step 6 the ideal gas values are found by using the Müller convergence method and the well-known equation for the Prandtl-Meyer function for an ideal diatomic gas

$$\theta_i' = 2.4495 \tan^{-1} (0.40825 \sqrt{M_i'^2 - 1}) - \tan^{-1} \sqrt{M_i'^2 - 1} \quad (11)$$

The real gas values are determined in steps 7 through 11 using the Muller method. For the initial assumption of the static temperature, the

ideal diatomic gas equation was utilized. That is

$$T_{b,i} = T_T \left(1 + 0.2\, M_i^{-2}\right)^{-1} - \left|T_T \left(1 + 0.2\, M_{i-1}^{-2}\right)^{-1} - T_{b,i-1}\right| \tag{12}$$

where the expression between the absolute value signs represents the deviation from the ideal diatomic gas value for the previous iteration. (Note, for i=1 this expression was set equal to zero.) In step 8, subprogram ISENT, which is discussed in reference 4, is utilized to determine the static enthapy, H_b, in order to find the velocity downstream of the expansion wave, u_b, in step 9.

Simpson's rule is used to carry out the integration in step 10. It should be mentioned that M_i is a function of u_i so the integral in step 10 is more complicated than it first appears. In order to find M_i a separate subprogram was written that employs the Müller method to converge on the static temperature given the velocity u_i. The initial assumed value of the temperature is determined by the equation

$$T_i = T_T - u_i^2/2(c_p)_T \tag{13}$$

which provided rapid convergence for both parahydrogen and nitrogen.

USE OF TABLES

The tables are grouped according to total pressure and are subdivided according to the value of total temperature. The divisions are as follows for parahydrogen:

Table Number	Total Pressures, atm	Subdivision	Total Temperature, K
I, II	1.0, 3.0	A	50
		B	75
		C	100
		D	200
		E	290
III, IV, V	5.0, 8.0, 10.0	A	60
		B	80
		C	100
		D	200
		E	290

The divisions for nitrogen are:

Table Number	Total Pressure, atm	Subdivision	Total Temperature, K
I	1.0	A	100
		B	110
		C	120
		D	130
		E	140
		F	150
		G	175
		H	200
		I	250
		J	300

Table Number	Total Pressure, atm	Subdivision	Total Temperature, K
II, III	3.0, 5.0	A	110
		B	120
		C	130
		D	140
		E	150
		F	175
		G	200
		H	250
		I	300
IV	8.0	A	120
		B	130
		C	140
		D	150
		E	175
		F	200
		G	250
		H	300
V	10.0	A	130
		B	140
		C	150
		D	175
		E	200
		F	250
		G	300

An explanation of the column headings used in the tables is given in the section entitled Computer Output Dictionary, which immediately precedes the tables.

The last two columns of each table give the Mach number and Mach angle at the particular Prandtl-Meyer function value relative to the ideal diatomic gas values. For example, for parahydrogen, table IA at a Prandtl-Meyer function value of 28.5 gives a value of 1.1272 for the

Mach number relative to the ideal diatomic gas. This means that the Mach number, increased by an expansion wave from Mach 1.0, differs by 12.72% from the ideal diatomic gas value.

Some tables for example, for parahydrogen, table IA, have the statement "triple point temperature boundary reached" printed on the last line. This indicates that the static temperature for the last entry is within 10% of the triple point temperature.

Other tables, for example, for parahydrogen table IIA, have the statement "saturation boundary reached" printed on the last line. This indicates that at the last entry the static pressure is within 10% of the saturation pressure at that particular static temperature.

CONCLUDING REMARKS

The dependency of Mach number on the Prandtl-Meyer function was numerically determined by iterating the Prandtl-Meyer function and applying the Muller method to converge on the Mach number for flows in cryogenic parahydrogen and nitrogen at various total pressures and total temperatures. These solutions and comparisons with the ideal diatomic gas solutions are presented in tabular form.

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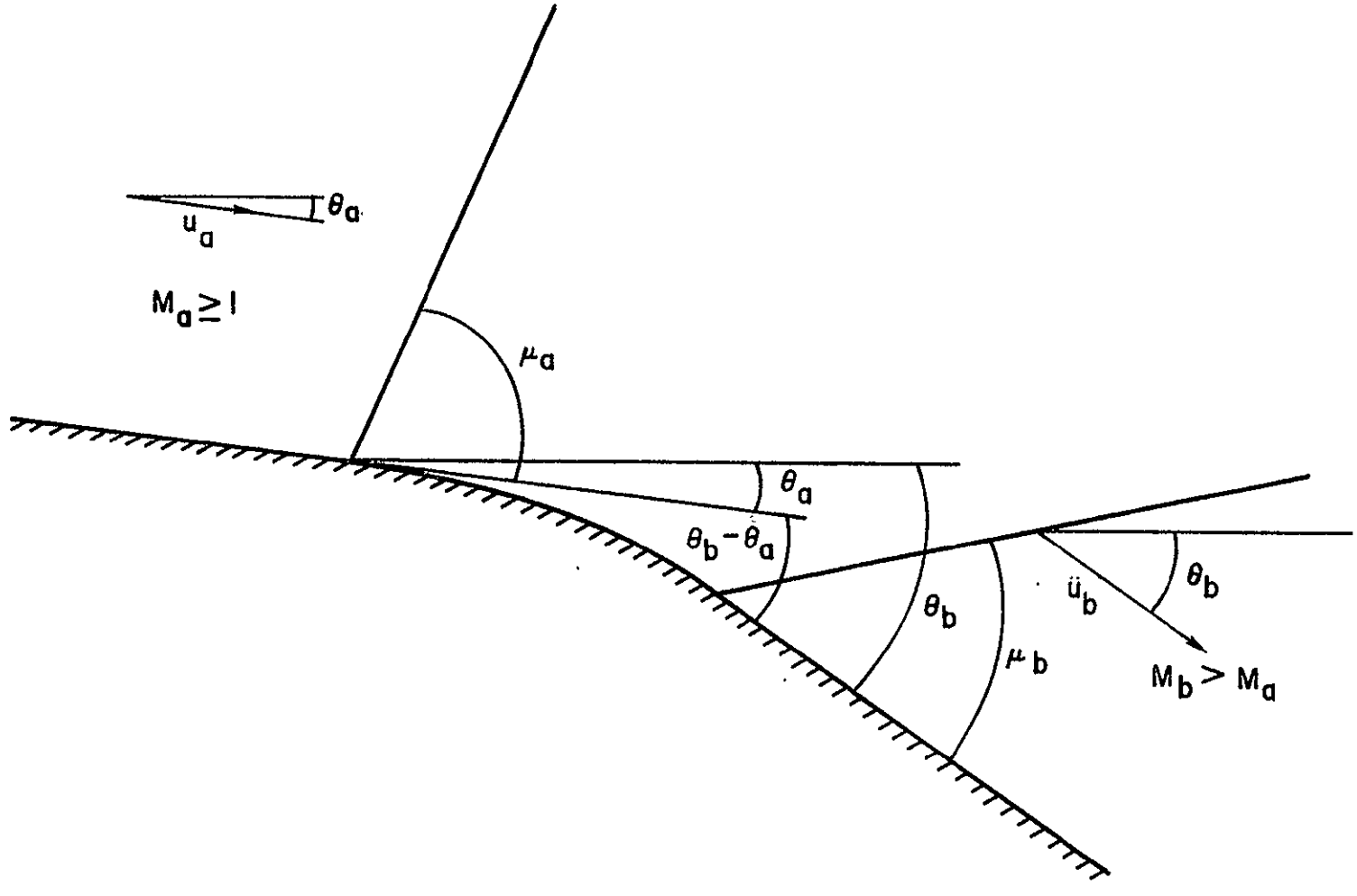

Figure 1.– Prandtl-Meyer flow over a convex wall.

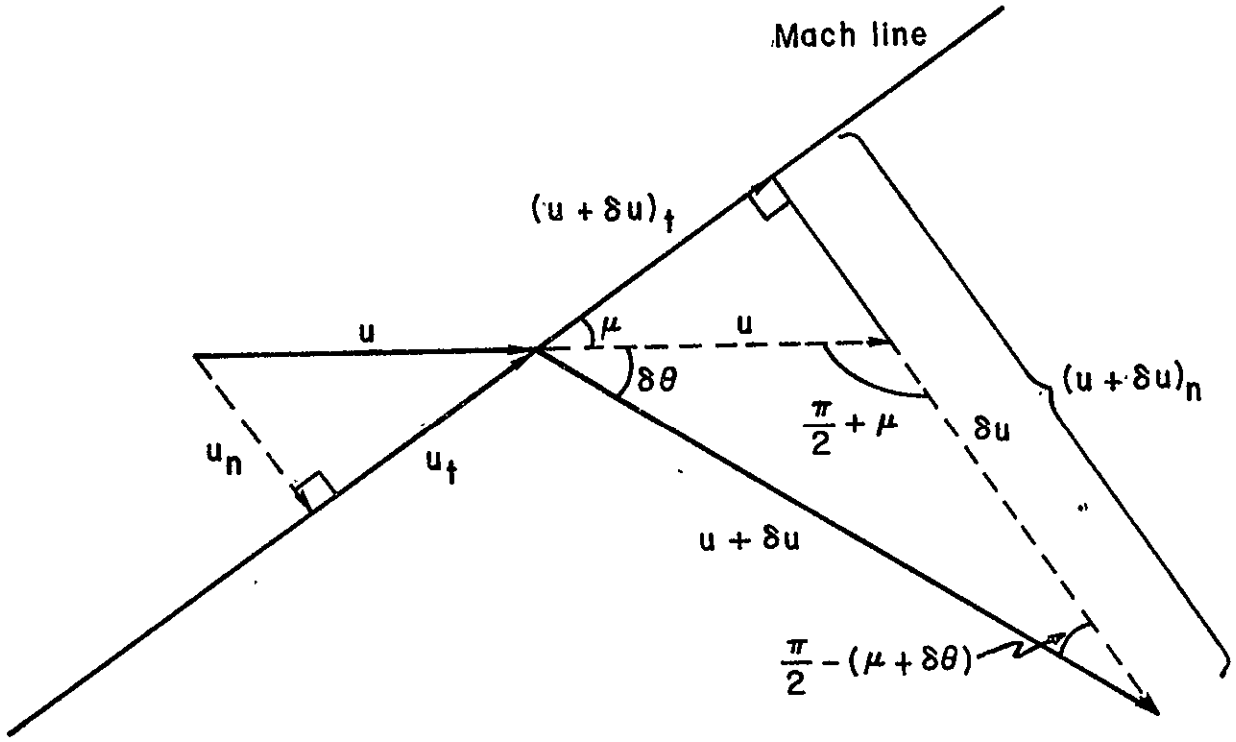

Figure 2.- Velocity change across a weak expansion wave (Mach line).

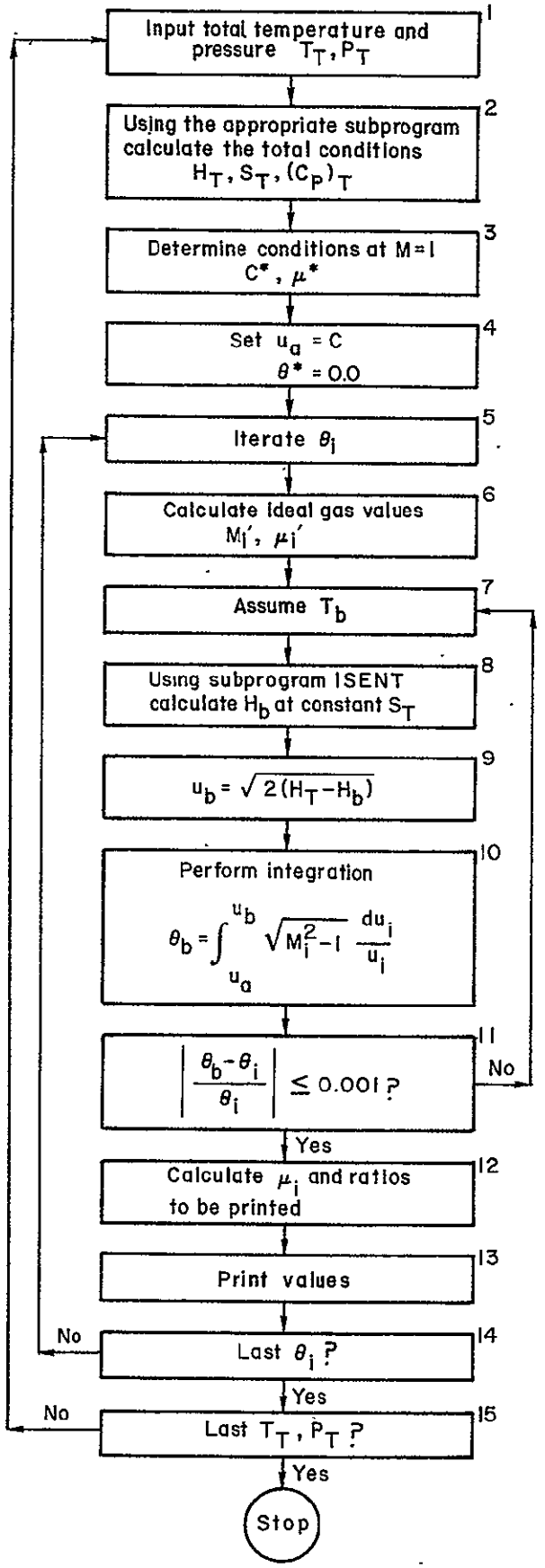

Figure 3.– Flow chart.

COMPUTER OUTPUT DICTIONARY

MACH	Mach number
MU	Mach angle, given by equation 1, degrees
PT	Total pressure, atm (1 atm = 101.3 x 10^3 N/m^2)
THETA	Prandtl-Meyer Function, degrees
TT	Total temperature, K

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION FOR PARAHYDROGEN

A. TT = 50.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0550	71.4218	1.0039	.9906
1.0	1.0887	66.7157	1.0063	.9873
1.5	1.1178	63.4593	1.0085	.9846
2.0	1.1445	60.8967	1.0105	.9823
2.5	1.1696	58.7551	1.0124	.9801
3.0	1.1937	56.9010	1.0143	.9780
3.5	1.2170	55.2574	1.0161	.9760
4.0	1.2396	53.7760	1.0180	.9741
4.5	1.2618	52.4241	1.0198	.9722
5.0	1.2835	51.1782	1.0215	.9704
5.5	1.3050	50.0211	1.0233	.9686
6.0	1.3262	48.9395	1.0251	.9668
6.5	1.3473	47.9230	1.0269	.9651
7.0	1.3681	46.9635	1.0287	.9633
7.5	1.3889	46.0540	1.0305	.9615
8.0	1.4096	45.1892	1.0323	.9598
8.5	1.4302	44.3645	1.0341	.9581
9.0	1.4507	43.5757	1.0359	.9563
9.5	1.4713	42.8197	1.0377	.9546
10.0	1.4918	42.0934	1.0396	.9528
10.5	1.5123	41.3944	1.0415	.9511
11.0	1.5329	40.7205	1.0433	.9493
11.5	1.5535	40.0697	1.0452	.9476
12.0	1.5741	39.4404	1.0472	.9458
12.5	1.5948	38.8310	1.0491	.9440
13.0	1.6156	38.2402	1.0511	.9422
13.5	1.6365	37.6668	1.0531	.9404
14.0	1.6574	37.1096	1.0551	.9386

TABLE - I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

A. TT = 50.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6785	36.5677	1.0571	.9368
15.0	1.6997	36.0402	1.0592	.9350
15.5	1.7209	35.5262	1.0612	.9331
16.0	1.7424	35.0249	1.0634	.9312
16.5	1.7639	34.5358	1.0655	.9294
17.0	1.7856	34.0580	1.0677	.9275
17.5	1.8075	33.5912	1.0699	.9256
18.0	1.8295	33.1346	1.0721	.9236
18.5	1.8516	32.6879	1.0743	.9217
19.0	1.8740	32.2505	1.0766	.9197
19.5	1.8965	31.8221	1.0789	.9178
20.0	1.9192	31.4022	1.0813	.9158
20.5	1.9421	30.9904	1.0837	.9138
[illegible]	1.9653	30.5864	1.0861	.9117
	1.9886	30.1899	1.0885	.9097
	2.0121	29.8005	1.0910	.9076
	2.0359	29.4179	1.0935	.9055
	2.0599	29.0420	1.0961	.9034
	2.0842	28.6724	1.0987	.9013
	2.1087	28.3088	1.1014	.8991
	2.1335	27.9511	1.1040	.8969
	2.1585	27.5990	1.1068	.8947
	2.1838	27.2524	1.1095	.8925
	2.2094	26.9110	1.1124	.8902
	2.2353	26.5748	1.1152	.8880
	2.2615	26.2433	1.1181	.8857
	2.2880	25.9166	1.1211	.8833
	2.3148	25.5945	1.1241	.8810

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

A. TT = 50.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.3420	25.2767	1.1272	.8786
29.0	2.3695	24.9632	1.1303	.8762
29.5	2.3973	24.6538	1.1334	.8738
30.0	2.4255	24.3484	1.1367	.8713
30.5	2.4541	24.0468	1.1399	.8688
31.0	2.4830	23.7490	1.1433	.8663
31.5	2.5124	23.4549	1.1467	.8637
32.0	2.5421	23.1642	1.1501	.8612
32.5	2.5723	22.8770	1.1536	.8585
33.0	2.6029	22.5932	1.1572	.8559
33.5	2.6340	22.3125	1.1609	.8532

TRIPLE POINT TEMPERATURE BOUNDARY REACHED.

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

B. TT = 75.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0539	71.6012	1.0029	.9931
1.0	1.0869	66.9332	1.0047	.9905
1.5	1.1155	63.6995	1.0064	.9883
2.0	1.1417	61.1518	1.0080	.9864
2.5	1.1664	59.0203	1.0096	.9845
3.0	1.1900	57.1735	1.0112	.9827
3.5	1.2129	55.5350	1.0128	.9809
4.0	1.2352	54.0565	1.0143	.9792
4.5	1.2570	52.7068	1.0159	.9775
5.0	1.2785	51.4614	1.0175	.9758
5.5	1.2996	50.3042	1.0191	.9741
6.0	1.3206	49.2218	1.0207	.9724
6.5	1.3413	48.2038	1.0224	.9707
7.0	1.3620	47.2424	1.0240	.9690
7.5	1.3825	46.3303	1.0257	.9673
8.0	1.4029	45.4630	1.0274	.9656
8.5	1.4233	44.6348	1.0291	.9639
9.0	1.4437	43.8429	1.0309	.9622
9.5	1.4640	43.0830	1.0326	.9605
10.0	1.4843	42.3531	1.0344	.9587
10.5	1.5047	41.6502	1.0362	.9570
11.0	1.5251	40.9724	1.0380	.9552
11.5	1.5455	40.3176	1.0399	.9534
12.0	1.5660	39.6844	1.0418	.9516
12.5	1.5866	39.0709	1.0437	.9498
13.0	1.6072	38.4762	1.0456	.9480
13.5	1.6280	37.8986	1.0476	.9462
14.0	1.6488	37.3375	1.0496	.9444

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

8. TT = 75.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6697	36.7916	1.0516	.9425
15.0	1.6908	36.2602	1.0536	.9407
15.5	1.7119	35.7422	1.0557	.9388
16.0	1.7332	35.2372	1.0578	.9369
16.5	1.7547	34.7442	1.0599	.9350
17.0	1.7762	34.2628	1.0620	.9331
17.5	1.7980	33.7923	1.0642	.9311
18.0	1.8199	33.3323	1.0664	.9292
18.5	1.8419	32.8821	1.0687	.9272
19.0	1.8642	32.4414	1.0710	.9252
19.5	1.8866	32.0098	1.0733	.9232
20.0	1.9092	31.5867	1.0756	.9212
20.5	1.9320	31.1718	1.0780	.9191
21.0	1.9550	30.7648	1.0804	.9170
21.5	1.9782	30.3653	1.0828	.9150
22.0	2.0016	29.9730	1.0853	.9129
22.5	2.0253	29.5877	1.0878	.9107
23.0	2.0492	29.2091	1.0904	.9086
23.5	2.0733	28.8368	1.0930	.9064
24.0	2.0977	28.4708	1.0956	.9042
24.5	2.1223	28.1107	1.0983	.9020
25.0	2.1473	27.7562	1.1010	.8998
25.5	2.1724	27.4073	1.1038	.8976
26.0	2.1979	27.0637	1.1066	.8953
26.5	2.2236	26.7252	1.1094	.8930
27.0	2.2497	26.3916	1.1123	.8907
27.5	2.2761	26.0628	1.1152	.8883
28.0	2.3027	25.7387	1.1182	.8859

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 75.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.3297	25.4189	1.1213	.8835
29.0	2.3571	25.1036	1.1244	.8811
29.5	2.3848	24.7923	1.1275	.8787
30.0	2.4128	24.4852	1.1307	.8762
30.5	2.4412	24.1819	1.1339	.8737
31.0	2.4700	23.8824	1.1373	.8711
31.5	2.4992	23.5867	1.1406	.8686
32.0	2.5287	23.2944	1.1440	.8660
32.5	2.5587	23.0057	1.1475	.8634
33.0	2.5891	22.7203	1.1511	.8607
33.5	2.6200	22.4381	1.1547	.8580
34.0	2.6512	22.1592	1.1584	.8553
34.5	2.6830	21.8833	1.1621	.8526
35.0	2.7152	21.6104	1.1660	.8498
35.5	2.7480	21.3404	1.1699	.8470
36.0	2.7812	21.0732	1.1738	.8441
36.5	2.8149	20.8087	1.1779	.8412
37.0	2.8492	20.5470	1.1820	.8383
37.5	2.8840	20.2878	1.1862	.8353
38.0	2.9194	20.0312	1.1905	.8324
38.5	2.9554	19.7770	1.1949	.8293
39.0	2.9920	19.5252	1.1993	.8262
39.5	3.0292	19.2758	1.2039	.8231
40.0	3.0671	19.0286	1.2086	.8200

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

C. TT = 100.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0790	1.0001	.9997
1.0	1.0821	67.5391	1.0003	.9995
1.5	1.1089	64.3958	1.0005	.9992
2.0	1.1334	61.9205	1.0007	.9988
2.5	1.1565	59.8500	1.0010	.9983
3.0	1.1785	58.0554	1.0014	.9979
3.5	1.1997	56.4621	1.0018	.9973
4.0	1.2204	55.0243	1.0022	.9967
4.5	1.2406	53.7104	1.0027	.9961
5.0	1.2605	52.4979	1.0032	.9954
5.5	1.2801	51.3696	1.0038	.9947
6.0	1.2995	50.3127	1.0044	.9940
6.5	1.3187	49.3179	1.0051	.9931
7.0	1.3377	48.3773	1.0058	.9923
7.5	1.3567	47.4834	1.0066	.9914
8.0	1.3756	46.6316	1.0074	.9904
8.5	1.3945	45.8177	1.0083	.9894
9.0	1.4133	45.0376	1.0092	.9884
9.5	1.4321	44.2877	1.0101	.9873
10.0	1.4510	43.5661	1.0112	.9862
10.5	1.4699	42.8701	1.0122	.9850
11.0	1.4888	42.1969	1.0133	.9838
11.5	1.5078	41.5458	1.0145	.9825
12.0	1.5269	40.9149	1.0157	.9812
12.5	1.5460	40.3019	1.0170	.9798
13.0	1.5653	39.7066	1.0183	.9784
13.5	1.5847	39.1277	1.0197	.9769
14.0	1.6042	38.5634	1.0212	.9754

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 100.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6238	38.0136	1.0226	.9738
15.0	1.6435	37.4776	1.0242	.9722
15.5	1.6634	36.9537	1.0258	.9706
16.0	1.6835	36.4421	1.0274	.9689
16.5	1.7037	35.9420	1.0291	.9672
17.0	1.7241	35.4523	1.0309	.9654
17.5	1.7446	34.9732	1.0327	.9636
18.0	1.7653	34.5039	1.0345	.9618
18.5	1.7863	34.0438	1.0364	.9599
19.0	1.8074	33.5929	1.0383	.9580
19.5	1.8287	33.1503	1.0403	.9561
20.0	1.8502	32.7161	1.0424	.9541
20.5	1.8719	32.2899	1.0445	.9521
21.0	1.8939	31.8711	1.0466	.9500
21.5	1.9161	31.4597	1.0488	.9479
22.0	1.9385	31.0554	1.0511	.9458
22.5	1.9611	30.6578	1.0534	.9437
23.0	1.9840	30.2670	1.0557	.9415
23.5	2.0071	29.8823	1.0581	.9393
24.0	2.0305	29.5039	1.0605	.9371
24.5	2.0542	29.1314	1.0630	.9348
25.0	2.0781	28.7646	1.0655	.9325
25.5	2.1023	28.4035	1.0681	.9302
26.0	2.1267	28.0477	1.0707	.9278
26.5	2.1515	27.6971	1.0734	.9255
27.0	2.1765	27.3516	1.0761	.9231
27.5	2.2019	27.0111	1.0789	.9206
28.0	2.2275	26.6753	1.0817	.9182

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 100.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.2535	26.3441	1.0846	.9157
29.0	2.2797	26.0175	1.0875	.9132
29.5	2.3064	25.6953	1.0904	.9107
30.0	2.3333	25.3773	1.0934	.9081
30.5	2.3606	25.0634	1.0965	.9055
31.0	2.3883	24.7535	1.0996	.9029
31.5	2.4163	24.4476	1.1028	.9003
32.0	2.4447	24.1454	1.1060	.8976
32.5	2.4734	23.8469	1.1093	.8949
33.0	2.5026	23.5520	1.1126	.8922
33.5	2.5322	23.2606	1.1160	.8895
34.0	2.5622	22.9725	1.1195	.8867
34.5	2.5926	22.6878	1.1230	.8839
35.0	2.6235	22.4063	1.1266	.8811
35.5	2.6548	22.1279	1.1302	.8782
36.0	2.6866	21.8525	1.1339	.8753
36.5	2.7189	21.5801	1.1377	.8724
37.0	2.7516	21.3105	1.1415	.8695
37.5	2.7849	21.0438	1.1454	.8665
38.0	2.8187	20.7798	1.1494	.8635
38.5	2.8530	20.5184	1.1535	.8604
39.0	2.8879	20.2596	1.1576	.8573
39.5	2.9233	20.0033	1.1618	.8542
40.0	2.9594	19.7495	1.1661	.8510

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

0. TT = 200.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0500	72.2449	.9992	1.0020
1.0	1.0803	67.7690	.9986	1.0029
1.5	1.1063	64.6809	.9981	1.0036
2.0	1.1299	62.2572	.9976	1.0042
2.5	1.1520	60.2371	.9971	1.0048
3.0	1.1729	58.4919	.9967	1.0054
3.5	1.1931	56.9486	.9962	1.0059
4.0	1.2125	55.5608	.9957	1.0064
4.5	1.2315	54.2964	.9953	1.0070
5.0	1.2499	53.1337	.9948	1.0075
5.5	1.2680	52.0562	.9943	1.0080
6.0	1.2858	51.0512	.9939	1.0085
6.5	1.3033	50.1087	.9934	1.0091
7.0	1.3206	49.2208	.9929	1.0096
7.5	1.3376	48.3812	.9924	1.0101
8.0	1.3545	47.5845	.9919	1.0107
8.5	1.3712	46.8264	.9914	1.0112
9.0	1.3878	46.1029	.9909	1.0118
9.5	1.4042	45.4104	.9904	1.0123
10.0	1.4205	44.7465	.9899	1.0129
10.5	1.4367	44.1089	.9894	1.0135
11.0	1.4529	43.4956	.9889	1.0140
11.5	1.4689	42.9046	.9883	1.0146
12.0	1.4849	42.3344	.9878	1.0152
12.5	1.5008	41.7832	.9873	1.0158
13.0	1.5167	41.2501	.9867	1.0164
13.5	1.5325	40.7337	.9861	1.0170
14.0	1.5482	40.2331	.9856	1.0176

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 200.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.5640	39.7474	.9850	1.0182
15.0	1.5797	39.2756	.9844	1.0189
15.5	1.5953	38.8167	.9838	1.0195
16.0	1.6110	38.3702	.9832	1.0202
16.5	1.6266	37.9354	.9826	1.0209
17.0	1.6422	37.5117	.9819	1.0215
17.5	1.6579	37.0986	.9813	1.0222
18.0	1.6735	36.6954	.9807	1.0229
18.5	1.6891	36.3017	.9800	1.0236
19.0	1.7047	35.9171	.9794	1.0243
19.5	1.7203	35.5411	.9787	1.0250
20.0	1.7360	35.1734	.9780	1.0257
20.5	1.7516	34.8136	.9773	1.0265
21.0	1.7673	34.4612	.9766	1.0272
21.5	1.7829	34.1161	.9760	1.0280
22.0	1.7986	33.7779	.9752	1.0287
22.5	1.8144	33.4462	.9745	1.0295
23.0	1.8301	33.1211	.9738	1.0303
23.5	1.8459	32.8021	.9731	1.0311
24.0	1.8617	32.4889	.9724	1.0319
24.5	1.8776	32.1814	.9716	1.0327
25.0	1.8935	31.8793	.9709	1.0335
25.5	1.9094	31.5824	.9701	1.0343
26.0	1.9254	31.2906	.9694	1.0351
26.5	1.9414	31.0037	.9686	1.0359
27.0	1.9575	30.7216	.9678	1.0368
27.5	1.9736	30.4439	.9670	1.0376
28.0	1.9897	30.1707	.9662	1.0385

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 200.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.0060	29.9017	.9654	1.0394
29.0	2.0222	29.6368	.9646	1.0402
29.5	2.0386	29.3759	.9638	1.0411
30.0	2.0550	29.1188	.9630	1.0420
30.5	2.0715	28.8653	.9622	1.0429
31.0	2.0880	28.6155	.9614	1.0438
31.5	2.1046	28.3691	.9605	1.0447
32.0	2.1213	28.1260	.9597	1.0456
32.5	2.1381	27.8859	.9589	1.0465
33.0	2.1549	27.6488	.9581	1.0474
33.5	2.1719	27.4147	.9572	1.0483
34.0	2.1890	27.1832	.9564	1.0492
34.5	2.2061	26.9545	.9556	1.0501
35.0	2.2234	26.7285	.9548	1.0510
35.5	2.2408	26.5051	.9539	1.0519
36.0	2.2582	26.2842	.9531	1.0528
36.5	2.2758	26.0656	.9523	1.0537
37.0	2.2936	25.8485	.9515	1.0546
37.5	2.3115	25.6342	.9507	1.0555
38.0	2.3295	25.4219	.9499	1.0564
38.5	2.3476	25.2114	.9492	1.0572
39.0	2.3660	25.0028	.9484	1.0580
39.5	2.3844	24.7958	.9476	1.0589
40.0	2.4031	24.5904	.9469	1.0597

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

E. TT = 290.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0508	72.1031	1.0000	1.0001
1.0	1.0817	67.5872	.9999	1.0002
1.5	1.1082	64.4696	.9998	1.0003
2.0	1.1323	62.0213	.9998	1.0004
2.5	1.1549	59.9793	.9997	1.0005
3.0	1.1764	58.2144	.9996	1.0006
3.5	1.1971	56.6532	.9996	1.0007
4.0	1.2171	55.2489	.9995	1.0008
4.5	1.2365	53.9697	.9994	1.0009
5.0	1.2556	52.7929	.9993	1.0010
5.5	1.2742	51.7019	.9992	1.0012
6.0	1.2926	50.6838	.9991	1.0013
6.5	1.3106	49.7288	.9990	1.0014
7.0	1.3285	48.8290	.9988	1.0016
7.5	1.3461	47.9780	.9987	1.0017
8.0	1.3636	47.1702	.9986	1.0019
8.5	1.3809	46.4011	.9984	1.0020
9.0	1.3980	45.6670	.9983	1.0022
9.5	1.4151	44.9646	.9981	1.0024
10.0	1.4320	44.2911	.9980	1.0026
10.5	1.4489	43.6442	.9978	1.0028
11.0	1.4657	43.0218	.9976	1.0030
11.5	1.4824	42.4219	.9974	1.0032
12.0	1.4990	41.8429	.9972	1.0034
12.5	1.5156	41.2834	.9970	1.0036
13.0	1.5322	40.7419	.9968	1.0039
13.5	1.5487	40.2174	.9966	1.0041
14.0	1.5652	39.7088	.9964	1.0044

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 290.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.5817	39.2151	.9961	1.0046
15.0	1.5981	38.7360	.9959	1.0049
15.5	1.6146	38.2700	.9956	1.0052
16.0	1.6310	37.8165	.9954	1.0055
16.5	1.6474	37.3750	.9951	1.0058
17.0	1.6638	36.9450	.9948	1.0061
17.5	1.6802	36.5258	.9945	1.0064
18.0	1.6965	36.1169	.9942	1.0068
18.5	1.7130	35.7174	.9939	1.0071
19.0	1.7294	35.3273	.9935	1.0075
19.5	1.7458	34.9460	.9932	1.0079
20.0	1.7622	34.5733	.9928	1.0082
20.5	1.7787	34.2087	.9925	1.0086
21.0	1.7952	33.8519	.9921	1.0091
21.5	1.8117	33.5025	.9917	1.0095
22.0	1.8282	33.1604	.9913	1.0099
22.5	1.8448	32.8252	.9909	1.0104
23.0	1.8613	32.4963	.9904	1.0108
23.5	1.8780	32.1740	.9900	1.0113
24.0	1.8946	31.8578	.9895	1.0118
24.5	1.9113	31.5475	.9891	1.0123
25.0	1.9280	31.2429	.9886	1.0128
25.5	1.9448	30.9438	.9881	1.0134
26.0	1.9616	30.6501	.9876	1.0139
26.5	1.9784	30.3616	.9871	1.0145
27.0	1.9953	30.0780	.9865	1.0151
27.5	2.0122	29.7991	.9860	1.0157
28.0	2.0292	29.5250	.9854	1.0163

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 290.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.0462	29.2553	.9848	1.0169
29.0	2.0633	28.9901	.9842	1.0175
29.5	2.0804	28.7291	.9836	1.0182
30.0	2.0976	28.4723	.9830	1.0189
30.5	2.1148	28.2196	.9823	1.0196
31.0	2.1321	27.9708	.9817	1.0203
31.5	2.1494	27.7257	.9810	1.0210
32.0	2.1668	27.4841	.9803	1.0217
32.5	2.1843	27.2461	.9796	1.0225
33.0	2.2018	27.0115	.9789	1.0233
33.5	2.2194	26.7803	.9782	1.0241
34.0	2.2371	26.5524	.9774	1.0249
34.5	2.2548	26.3277	.9767	1.0257
35.0	2.2725	26.1063	.9759	1.0266
35.5	2.2904	25.8878	.9751	1.0274
36.0	2.3083	25.6721	.9742	1.0283
36.5	2.3263	25.4592	.9734	1.0292
37.0	2.3444	25.2492	.9726	1.0302
37.5	2.3625	25.0418	.9717	1.0311
38.0	2.3807	24.8371	.9708	1.0321
38.5	2.3990	24.6350	.9699	1.0330
39.0	2.4174	24.4354	.9690	1.0340
39.5	2.4359	24.2384	.9681	1.0351
40.0	2.4544	24.0438	.9671	1.0361

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

A. TT = 50.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU/MU(0)
0.0	1.0000	90.0000	1.0000	1.0000
0.5	1.0551	71.3943	1.0041	.9902
1.0	1.0890	66.6736	1.0067	.9867
1.5	1.1183	63.4094	1.0089	.9838
2.0	1.1451	60.8414	1.0110	.9814
2.5	1.1704	58.6964	1.0131	.9791
3.0	1.1945	56.8389	1.0150	.9769
3.5	1.2179	55.1929	1.0169	.9749
4.0	1.2407	53.7089	1.0188	.9729
4.5	1.2629	52.3561	1.0207	.9710
5.0	1.2848	51.1091	1.0225	.9691
5.5	1.3064	49.9506	1.0244	.9672
6.0	1.3277	48.8674	1.0262	.9654
6.5	1.3488	47.8500	1.0281	.9636
7.0	1.3698	46.8895	1.0299	.9618
7.5	1.3906	45.9793	1.0318	.9600
8.0	1.4114	45.1136	1.0336	.9582
8.5	1.4321	44.2879	1.0355	.9564
9.0	1.4528	43.4972	1.0374	.9546
9.5	1.4735	42.7397	1.0393	.9528
10.0	1.4941	42.0121	1.0412	.9510
10.5	1.5148	41.3119	1.0432	.9492
11.0	1.5355	40.6369	1.0451	.9474
11.5	1.5562	39.9852	1.0471	.9456
12.0	1.5770	39.3552	1.0491	.9438
12.5	1.5978	38.7452	1.0511	.9419
13.0	1.6187	38.1539	1.0531	.9401
13.5	1.6397	37.5798	1.0551	.9383
14.0	1.6608	37.0223	1.0572	.9364

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

A. TT = 50.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6820	36.4800	1.0593	.9345
15.0	1.7033	35.9523	1.0614	.9327
15.5	1.7247	35.4380	1.0635	.9308
16.0	1.7462	34.9364	1.0657	.9289
16.5	1.7679	34.4471	1.0679	.9270
17.0	1.7897	33.9691	1.0701	.9251
17.5	1.8117	33.5022	1.0724	.9231
18.0	1.8338	33.0455	1.0746	.9212
18.5	1.8561	32.5989	1.0769	.9192
19.0	1.8786	32.1616	1.0793	.9172
19.5	1.9013	31.7333	1.0816	.9152
20.0	1.9241	31.3134	1.0840	.9132
20.5	1.9472	30.9015	1.0865	.9111
21.0	1.9704	30.4976	1.0889	.9091
21.5	1.9939	30.1011	1.0914	.9070
22.0	2.0176	29.7119	1.0940	.9049
22.5	2.0415	29.3296	1.0965	.9028
23.0	2.0657	28.9540	1.0991	.9007
23.5	2.0901	28.5845	1.1018	.8985
24.0	2.1147	28.2210	1.1045	.8963
24.5	2.1397	27.8634	1.1072	.8941
25.0	2.1648	27.5116	1.1100	.8919
25.5	2.1903	27.1656	1.1128	.8896
26.0	2.2160	26.8245	1.1157	.8874
26.5	2.2421	26.4879	1.1186	.8851
27.0	2.2685	26.1568	1.1216	.8827
27.5	2.2951	25.8303	1.1246	.8804
28.0	2.3221	25.5084	1.1276	.8780

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

A. TT = 50.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.3494	25.1910	1.1307	.8756
29.0	2.3771	24.8778	1.1339	.8732
29.5	2.4051	24.5688	1.1371	.8707
30.0	2.4334	24.2640	1.1404	.8683
30.5	2.4622	23.9630	1.1437	.8658
31.0	2.4913	23.6658	1.1471	.8632
31.5	2.5208	23.3724	1.1505	.8607
32.0	2.5507	23.0825	1.1540	.8581
32.5	2.5810	22.7961	1.1575	.8555

SATURATION BOUNDARY REACHED.

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

B. TT = 75.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0540	71.5767	1.0030	.9928
1.0	1.0872	66.9001	1.0049	.9900
1.5	1.1158	63.6610	1.0067	.9877
2.0	1.1421	61.1101	1.0084	.9857
2.5	1.1669	58.9760	1.0101	.9838
3.0	1.1907	57.1271	1.0117	.9819
3.5	1.2136	55.4873	1.0133	.9801
4.0	1.2360	54.0073	1.0150	.9783
4.5	1.2578	52.6561	1.0166	.9766
5.0	1.2794	51.4098	1.0182	.9748
5.5	1.3006	50.2513	1.0199	.9731
6.0	1.3216	49.1681	1.0216	.9713
6.5	1.3425	48.1489	1.0232	.9696
7.0	1.3632	47.1866	1.0249	.9679
7.5	1.3838	46.2736	1.0267	.9661
8.0	1.4043	45.4054	1.0284	.9644
8.5	1.4248	44.5766	1.0302	.9626
9.0	1.4452	43.7839	1.0320	.9609
9.5	1.4657	43.0224	1.0338	.9591
10.0	1.4861	42.2910	1.0356	.9573
10.5	1.5066	41.5869	1.0375	.9555
11.0	1.5271	40.9082	1.0394	.9537
11.5	1.5476	40.2526	1.0413	.9519
12.0	1.5682	39.6186	1.0432	.9501
12.5	1.5889	39.0046	1.0452	.9482
13.0	1.6096	38.4093	1.0472	.9464
13.5	1.6304	37.8313	1.0492	.9445
14.0	1.6513	37.2698	1.0512	.9427

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 75.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6724	36.7236	1.0532	.9408
15.0	1.6935	36.1920	1.0553	.9389
15.5	1.7148	35.6738	1.0574	.9370
16.0	1.7362	35.1686	1.0596	.9351
16.5	1.7577	34.6755	1.0617	.9331
17.0	1.7794	34.1940	1.0639	.9312
17.5	1.8012	33.7234	1.0661	.9292
18.0	1.8232	33.2633	1.0684	.9272
18.5	1.8454	32.8131	1.0707	.9252
19.0	1.8677	32.3724	1.0730	.9232
19.5	1.8902	31.9408	1.0753	.9212
20.0	1.9129	31.5177	1.0777	.9191
20.5	1.9358	31.1029	1.0801	.9171
21.0	1.9589	30.6960	1.0826	.9150
21.5	1.9823	30.2966	1.0851	.9129
22.0	2.0058	29.9045	1.0876	.9108
22.5	2.0296	29.5193	1.0901	.9086
23.0	2.0536	29.1408	1.0927	.9065
23.5	2.0778	28.7687	1.0953	.9043
24.0	2.1023	28.4028	1.0980	.9021
24.5	2.1271	28.0429	1.1007	.8999
25.0	2.1521	27.6886	1.1035	.8976
25.5	2.1774	27.3399	1.1063	.8953
26.0	2.2030	26.9965	1.1091	.8931
26.5	2.2288	26.6582	1.1120	.8907
27.0	2.2550	26.3248	1.1149	.8884
27.5	2.2815	25.9962	1.1179	.8860
28.0	2.3083	25.6723	1.1209	.8837

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 75.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.3354	25.3528	1.1240	.8812
29.0	2.3629	25.0377	1.1271	.8788
29.5	2.3907	24.7267	1.1303	.8763
30.0	2.4189	24.4197	1.1335	.8738
30.5	2.4474	24.1168	1.1368	.8713
31.0	2.4763	23.8176	1.1402	.8688
31.5	2.5056	23.5220	1.1436	.8662
32.0	2.5353	23.2301	1.1470	.8636
32.5	2.5655	22.9416	1.1506	.8610
33.0	2.5960	22.6565	1.1542	.8583
33.5	2.6270	22.3746	1.1578	.8556
34.0	2.6585	22.0959	1.1615	.8529
34.5	2.6904	21.8203	1.1653	.8501
35.0	2.7228	21.5477	1.1692	.8473
35.5	2.7556	21.2780	1.1731	.8445
36.0	2.7890	21.0111	1.1771	.8416
36.5	2.8229	20.7471	1.1812	.8387
37.0	2.8574	20.4855	1.1854	.8358
37.5	2.8924	20.2266	1.1896	.8328
38.0	2.9280	19.9703	1.1940	.8298
38.5	2.9642	19.7163	1.1984	.8268
39.0	3.0009	19.4650	1.2029	.8237
39.5	3.0383	19.2158	1.2075	.8206
40.0	3.0764	18.9690	1.2122	.8174

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

C. TT = 100.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0637	1.0002	.9995
1.0	1.0823	67.5181	1.0004	.9992
1.5	1.1091	64.3709	1.0007	.9988
2.0	1.1337	61.8930	1.0010	.9983
2.5	1.1568	59.8204	1.0013	.9978
3.0	1.1789	58.0243	1.0017	.9973
3.5	1.2002	56.4302	1.0021	.9967
4.0	1.2209	54.9912	1.0026	.9961
4.5	1.2412	53.6763	1.0031	.9955
5.0	1.2611	52.4627	1.0037	.9948
5.5	1.2807	51.3337	1.0043	.9940
6.0	1.3002	50.2759	1.0050	.9932
6.5	1.3194	49.2801	1.0057	.9924
7.0	1.3385	48.3385	1.0064	.9915
7.5	1.3576	47.4440	1.0072	.9906
8.0	1.3765	46.5914	1.0081	.9896
8.5	1.3954	45.7767	1.0090	.9886
9.0	1.4143	44.9961	1.0099	.9875
9.5	1.4332	44.2443	1.0109	.9863
10.0	1.4522	43.5210	1.0120	.9852
10.5	1.4711	42.8239	1.0131	.9839
11.0	1.4902	42.1497	1.0143	.9826
11.5	1.5092	41.4975	1.0155	.9813
12.0	1.5284	40.8658	1.0167	.9800
12.5	1.5476	40.2523	1.0181	.9786
13.0	1.5670	39.6563	1.0194	.9771
13.5	1.5864	39.0769	1.0208	.9756
14.0	1.6060	38.5123	1.0223	.9741

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 100.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6256	37.9621	1.0238	.9725
15.0	1.6455	37.4257	1.0254	.9709
15.5	1.6654	36.9016	1.0270	.9692
16.0	1.6856	36.3897	1.0287	.9675
16.5	1.7058	35.8894	1.0304	.9658
17.0	1.7263	35.3996	1.0322	.9640
17.5	1.7469	34.9202	1.0340	.9622
18.0	1.7677	34.4509	1.0359	.9603
18.5	1.7887	33.9905	1.0378	.9584
19.0	1.8099	33.5395	1.0398	.9565
19.5	1.8313	33.0970	1.0418	.9545
20.0	1.8529	32.6626	1.0439	.9525
20.5	1.8747	32.2364	1.0460	.9505
21.0	1.8968	31.8175	1.0482	.9484
21.5	1.9190	31.4061	1.0504	.9463
22.0	1.9415	31.0020	1.0527	.9442
22.5	1.9642	30.6043	1.0550	.9420
23.0	1.9872	30.2135	1.0574	.9398
23.5	2.0104	29.8289	1.0598	.9376
24.0	2.0339	29.4505	1.0623	.9354
24.5	2.0576	29.0782	1.0648	.9331
25.0	2.0816	28.7114	1.0673	.9308
25.5	2.1059	28.3503	1.0699	.9284
26.0	2.1304	27.9946	1.0726	.9261
26.5	2.1553	27.6442	1.0753	.9237
27.0	2.1804	27.2989	1.0780	.9213
27.5	2.2058	26.9584	1.0808	.9188
28.0	2.2316	26.6227	1.0837	.9164

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 100.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.2576	26.2917	1.0866	.9139
29.0	2.2840	25.9653	1.0895	.9114
29.5	2.3107	25.6432	1.0925	.9088
30.0	2.3378	25.3253	1.0955	.9063
30.5	2.3652	25.0117	1.0986	.9037
31.0	2.3929	24.7019	1.1018	.9010
31.5	2.4211	24.3962	1.1050	.8984
32.0	2.4496	24.0942	1.1082	.8957
32.5	2.4784	23.7959	1.1115	.8930
33.0	2.5077	23.5012	1.1149	.8903
33.5	2.5374	23.2100	1.1183	.8875
34.0	2.5675	22.9222	1.1218	.8848
34.5	2.5981	22.6377	1.1253	.8820
35.0	2.6290	22.3564	1.1290	.8791
35.5	2.6605	22.0782	1.1326	.8762
36.0	2.6924	21.8030	1.1364	.8734
36.5	2.7248	21.5309	1.1402	.8704
37.0	2.7577	21.2615	1.1440	.8675
37.5	2.7911	20.9950	1.1480	.8645
38.0	2.8250	20.7312	1.1520	.8614
38.5	2.8594	20.4701	1.1561	.8584
39.0	2.8945	20.2115	1.1602	.8553
39.5	2.9301	19.9554	1.1645	.8522
40.0	2.9663	19.7018	1.1688	.8490

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

D. TT = 200.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0501	72.2375	.9992	1.0019
1.0	1.0804	67.7589	.9987	1.0027
1.5	1.1064	64.6697	.9982	1.0034
2.0	1.1300	62.2459	.9977	1.0040
2.5	1.1521	60.2250	.9972	1.0046
3.0	1.1731	58.4791	.9968	1.0051
3.5	1.1932	56.9351	.9963	1.0057
4.0	1.2127	55.5468	.9959	1.0062
4.5	1.2317	54.2819	.9954	1.0067
5.0	1.2502	53.1174	.9950	1.0072
5.5	1.2683	52.0387	.9946	1.0077
6.0	1.2862	51.0330	.9941	1.0082
6.5	1.3037	50.0902	.9937	1.0087
7.0	1.3210	49.2021	.9932	1.0092
7.5	1.3380	48.3623	.9927	1.0097
8.0	1.3549	47.5655	.9922	1.0103
8.5	1.3716	46.8072	.9918	1.0108
9.0	1.3882	46.0836	.9913	1.0114
9.5	1.4047	45.3909	.9908	1.0119
10.0	1.4210	44.7270	.9903	1.0124
10.5	1.4372	44.0893	.9898	1.0130
11.0	1.4534	43.4758	.9892	1.0136
11.5	1.4695	42.8848	.9887	1.0141
12.0	1.4854	42.3145	.9882	1.0147
12.5	1.5014	41.7632	.9876	1.0153
13.0	1.5173	41.2300	.9871	1.0159
13.5	1.5331	40.7135	.9865	1.0165
14.0	1.5489	40.2128	.9860	1.0171

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 200.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.5646	39.7270	.9854	1.0177
15.0	1.5803	39.2550	.9848	1.0184
15.5	1.5960	38.7960	.9842	1.0190
16.0	1.6117	38.3494	.9836	1.0196
16.5	1.6274	37.9146	.9830	1.0203
17.0	1.6430	37.4908	.9824	1.0210
17.5	1.6587	37.0776	.9818	1.0216
18.0	1.6743	36.6743	.9811	1.0223
18.5	1.6899	36.2805	.9805	1.0230
19.0	1.7056	35.8958	.9799	1.0237
19.5	1.7212	35.5198	.9792	1.0244
20.0	1.7369	35.1521	.9785	1.0251
20.5	1.7525	34.7923	.9779	1.0259
21.0	1.7682	34.4398	.9772	1.0266
21.5	1.7839	34.0946	.9765	1.0273
22.0	1.7996	33.7565	.9758	1.0281
22.5	1.8154	33.4248	.9751	1.0288
23.0	1.8312	33.0998	.9744	1.0296
23.5	1.8470	32.7808	.9737	1.0304
24.0	1.8628	32.4676	.9729	1.0312
24.5	1.8787	32.1601	.9722	1.0320
25.0	1.8946	31.8581	.9714	1.0328
25.5	1.9106	31.5612	.9707	1.0336
26.0	1.9265	31.2695	.9699	1.0344
26.5	1.9426	30.9826	.9692	1.0352
27.0	1.9587	30.7005	.9684	1.0361
27.5	1.9748	30.4229	.9676	1.0369
28.0	1.9910	30.1497	.9668	1.0378

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 200.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.0072	29.8807	.9661	1.0386
29.0	2.0235	29.6159	.9653	1.0395
29.5	2.0399	29.3550	.9645	1.0404
30.0	2.0563	29.0979	.9636	1.0413
30.5	2.0728	28.8446	.9628	1.0421
31.0	2.0894	28.5948	.9620	1.0430
31.5	2.1060	28.3484	.9612	1.0439
32.0	2.1227	28.1053	.9604	1.0448
32.5	2.1395	27.8653	.9595	1.0457
33.0	2.1564	27.6283	.9587	1.0466
33.5	2.1734	27.3941	.9579	1.0475
34.0	2.1905	27.1628	.9571	1.0484
34.5	2.2077	26.9341	.9563	1.0493
35.0	2.2250	26.7081	.9554	1.0502
35.5	2.2424	26.4847	.9546	1.0511
36.0	2.2599	26.2638	.9538	1.0520
36.5	2.2775	26.0448	.9530	1.0529
37.0	2.2953	25.8283	.9522	1.0538
37.5	2.3132	25.6140	.9514	1.0547
38.0	2.3312	25.4017	.9506	1.0555
38.5	2.3494	25.1912	.9499	1.0564
39.0	2.3677	24.9826	.9491	1.0572
39.5	2.3863	24.7756	.9484	1.0580
40.0	2.4050	24.5702	.9476	1.0588

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

E. TT = 290.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0974	1.0000	1.0000
1.0	1.0818	67.5802	1.0000	1.0001
1.5	1.1083	64.4615	.9999	1.0002
2.0	1.1324	62.0144	.9998	1.0003
2.5	1.1550	59.9722	.9998	1.0004
3.0	1.1765	58.2068	.9997	1.0005
3.5	1.1972	56.6449	.9996	1.0005
4.0	1.2172	55.2400	.9996	1.0006
4.5	1.2367	53.9602	.9995	1.0007
5.0	1.2557	52.7830	.9994	1.0008
5.5	1.2744	51.6915	.9993	1.0010
6.0	1.2928	50.6731	.9992	1.0011
6.5	1.3108	49.7177	.9991	1.0012
7.0	1.3287	48.8164	.9990	1.0013
7.5	1.3464	47.9643	.9989	1.0014
8.0	1.3639	47.1557	.9988	1.0016
8.5	1.3812	46.3861	.9987	1.0017
9.0	1.3984	45.6516	.9985	1.0019
9.5	1.4155	44.9488	.9984	1.0020
10.0	1.4324	44.2751	.9982	1.0022
10.5	1.4493	43.6280	.9981	1.0024
11.0	1.4661	43.0055	.9979	1.0026
11.5	1.4829	42.4055	.9977	1.0028
12.0	1.4995	41.8264	.9975	1.0030
12.5	1.5161	41.2668	.9974	1.0032
13.0	1.5327	40.7254	.9972	1.0035
13.5	1.5493	40.2008	.9969	1.0037
14.0	1.5658	39.6922	.9967	1.0039

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 290.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.5823	39.1985	.9965	1.0042
15.0	1.5987	38.7193	.9963	1.0045
15.5	1.6151	38.2533	.9960	1.0047
16.0	1.6316	37.7997	.9957	1.0050
16.5	1.6480	37.3583	.9955	1.0053
17.0	1.6644	36.9282	.9952	1.0056
17.5	1.6808	36.5091	.9949	1.0060
18.0	1.6972	36.1001	.9946	1.0063
18.5	1.7136	35.7006	.9943	1.0066
19.0	1.7301	35.3106	.9939	1.0070
19.5	1.7465	34.9293	.9936	1.0074
20.0	1.7630	34.5566	.9932	1.0078
20.5	1.7795	34.1920	.9929	1.0082
21.0	1.7960	33.8352	.9925	1.0086
21.5	1.8125	33.4858	.9921	1.0090
22.0	1.8290	33.1437	.9917	1.0094
22.5	1.8456	32.8086	.9913	1.0099
23.0	1.8622	32.4797	.9909	1.0103
23.5	1.8788	32.1574	.9904	1.0108
24.0	1.8955	31.8412	.9900	1.0113
24.5	1.9122	31.5309	.9895	1.0118
25.0	1.9289	31.2264	.9891	1.0123
25.5	1.9457	30.9274	.9886	1.0128
26.0	1.9625	30.6337	.9881	1.0134
26.5	1.9794	30.3452	.9875	1.0139
27.0	1.9963	30.0617	.9870	1.0145
27.5	2.0132	29.7828	.9865	1.0151
28.0	2.0302	29.5086	.9859	1.0157

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 290.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.0473	29.2390	.9853	1.0163
29.0	2.0644	28.9738	.9847	1.0170
29.5	2.0815	28.7128	.9841	1.0176
30.0	2.0987	28.4561	.9835	1.0183
30.5	2.1159	28.2033	.9829	1.0190
31.0	2.1332	27.9548	.9822	1.0197
31.5	2.1506	27.7096	.9815	1.0204
32.0	2.1680	27.4680	.9809	1.0211
32.5	2.1855	27.2299	.9802	1.0219
33.0	2.2030	26.9953	.9794	1.0227
33.5	2.2207	26.7640	.9787	1.0235
34.0	2.2383	26.5360	.9780	1.0243
34.5	2.2561	26.3114	.9772	1.0251
35.0	2.2739	26.0899	.9764	1.0259
35.5	2.2917	25.8713	.9756	1.0268
36.0	2.3097	25.6555	.9748	1.0277
36.5	2.3277	25.4425	.9740	1.0286
37.0	2.3458	25.2323	.9732	1.0295
37.5	2.3640	25.0249	.9723	1.0304
38.0	2.3822	24.8203	.9714	1.0314
38.5	2.4006	24.6180	.9706	1.0323
39.0	2.4190	24.4183	.9696	1.0333
39.5	2.4375	24.2211	.9687	1.0343
40.0	2.4561	24.0263	.9678	1.0353

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

A. TT = 60.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0551	71.3943	1.0041	.9902
1.0	1.0890	66.6741	1.0067	.9867
1.5	1.1183	63.4077	1.0089	.9838
2.0	1.1451	60.8385	1.0111	.9813
2.5	1.1704	58.6914	1.0131	.9790
3.0	1.1946	56.8320	1.0151	.9768
3.5	1.2180	55.1835	1.0171	.9747
4.0	1.2408	53.6977	1.0190	.9727
4.5	1.2632	52.3417	1.0209	.9707
5.0	1.2851	51.0923	1.0228	.9688
5.5	1.3067	49.9315	1.0247	.9669
6.0	1.3281	48.8468	1.0265	.9650
6.5	1.3493	47.8274	1.0284	.9631
7.0	1.3703	46.8648	1.0303	.9613
7.5	1.3913	45.9524	1.0322	.9594
8.0	1.4121	45.0850	1.0341	.9576
8.5	1.4329	44.2575	1.0361	.9558
9.0	1.4537	43.4654	1.0380	.9539
9.5	1.4744	42.7060	1.0400	.9520
10.0	1.4951	41.9769	1.0419	.9502
10.5	1.5159	41.2753	1.0439	.9483
11.0	1.5367	40.5990	1.0459	.9465
11.5	1.5575	39.9462	1.0479	.9446
12.0	1.5783	39.3153	1.0500	.9428
12.5	1.5992	38.7045	1.0520	.9409
13.0	1.6202	38.1126	1.0541	.9391
13.5	1.6413	37.5380	1.0561	.9372
14.0	1.6624	36.9798	1.0582	.9353

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

A. TT = 60.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6837	36.4370	1.0604	.9334
15.0	1.7050	35.9086	1.0625	.9315
15.5	1.7265	35.3937	1.0647	.9296
16.0	1.7482	34.8918	1.0669	.9277
16.5	1.7699	34.4019	1.0691	.9258
17.0	1.7918	33.9236	1.0714	.9238
17.5	1.8139	33.4562	1.0737	.9218
18.0	1.8361	32.9992	1.0760	.9199
18.5	1.8585	32.5520	1.0783	.9179
19.0	1.8811	32.1141	1.0807	.9158
19.5	1.9038	31.6854	1.0831	.9138
20.0	1.9268	31.2651	1.0855	.9118
20.5	1.9499	30.8529	1.0880	.9097
21.0	1.9733	30.4487	1.0905	.9076
21.5	1.9969	30.0518	1.0931	.9055
22.0	2.0207	29.6621	1.0956	.9034
22.5	2.0447	29.2794	1.0983	.9012
23.0	2.0690	28.9033	1.1009	.8991
23.5	2.0935	28.5334	1.1036	.8969
24.0	2.1183	28.1698	1.1063	.8947
24.5	2.1433	27.8119	1.1091	.8924
25.0	2.1686	27.4598	1.1119	.8902
25.5	2.1942	27.1132	1.1148	.8879
26.0	2.2200	26.7720	1.1177	.8856
26.5	2.2462	26.4361	1.1206	.8833
27.0	2.2727	26.1046	1.1237	.8810
27.5	2.2995	25.7779	1.1267	.8786
28.0	2.3266	25.4558	1.1298	.8762

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

A. TT = 60.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.3540	25.1382	1.1330	.8738
29.0	2.3818	24.8250	1.1362	.8713
29.5	2.4100	24.5157	1.1394	.8689
30.0	2.4385	24.2105	1.1427	.8664
30.5	2.4674	23.9093	1.1461	.8638
31.0	2.4967	23.6117	1.1495	.8613
31.5	2.5263	23.3178	1.1530	.8587
32.0	2.5564	23.0276	1.1566	.8561
32.5	2.5869	22.7407	1.1602	.8534
33.0	2.6178	22.4573	1.1639	.8508
33.5	2.6492	22.1773	1.1676	.8481
34.0	2.6810	21.9004	1.1714	.8453
34.5	2.7133	21.6267	1.1753	.8426
35.0	2.7460	21.3560	1.1792	.8398
35.5	2.7793	21.0878	1.1832	.8369
36.0	2.8131	20.8225	1.1873	.8341
36.5	2.8475	20.5600	1.1915	.8312
37.0	2.8824	20.3001	1.1958	.8282
37.5	2.9178	20.0428	1.2001	.8253

SATURATION BOUNDARY REACHED.

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

B. TT = 80.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0536	71.6424	1.0026	.9937
1.0	1.0865	66.9802	1.0044	.9912
1.5	1.1150	63.7499	1.0060	.9891
2.0	1.1411	61.2058	1.0075	.9872
2.5	1.1657	59.0766	1.0090	.9854
3.0	1.1893	57.2313	1.0105	.9837
3.5	1.2120	55.5945	1.0120	.9820
4.0	1.2342	54.1167	1.0136	.9803
4.5	1.2560	52.7665	1.0151	.9786
5.0	1.2774	51.5215	1.0167	.9769
5.5	1.2985	50.3635	1.0182	.9752
6.0	1.3194	49.2799	1.0198	.9736
6.5	1.3402	48.2608	1.0215	.9719
7.0	1.3608	47.2974	1.0231	.9701
7.5	1.3813	46.3840	1.0248	.9684
8.0	1.4017	45.5144	1.0265	.9667
8.5	1.4221	44.6843	1.0282	.9650
9.0	1.4424	43.8901	1.0300	.9632
9.5	1.4628	43.1272	1.0318	.9614
10.0	1.4832	42.3942	1.0336	.9596
10.5	1.5036	41.6881	1.0354	.9578
11.0	1.5240	41.0074	1.0373	.9560
11.5	1.5445	40.3495	1.0392	.9542
12.0	1.5651	39.7137	1.0411	.9523
12.5	1.5857	39.0974	1.0431	.9505
13.0	1.6064	38.5001	1.0451	.9486
13.5	1.6272	37.9199	1.0471	.9467
14.0	1.6481	37.3560	1.0491	.9448

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 80.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6691	36.8075	1.0512	.9429
15.0	1.6902	36.2736	1.0533	.9410
15.5	1.7115	35.7533	1.0554	.9391
16.0	1.7328	35.2458	1.0575	.9371
16.5	1.7544	34.7506	1.0597	.9351
17.0	1.7760	34.2669	1.0619	.9332
17.5	1.7979	33.7942	1.0642	.9312
18.0	1.8199	33.3320	1.0665	.9291
18.5	1.8420	32.8797	1.0688	.9271
19.0	1.8644	32.4368	1.0711	.9251
19.5	1.8869	32.0031	1.0735	.9230
20.0	1.9096	31.5780	1.0759	.9209
20.5	1.9326	31.1612	1.0783	.9188
21.0	1.9557	30.7524	1.0808	.9167
21.5	1.9790	30.3511	1.0833	.9145
22.0	2.0026	29.9572	1.0858	.9124
22.5	2.0264	29.5703	1.0884	.9102
23.0	2.0504	29.1902	1.0910	.9080
23.5	2.0747	28.8163	1.0937	.9058
24.0	2.0992	28.4488	1.0964	.9035
24.5	2.1240	28.0874	1.0991	.9013
25.0	2.1490	27.7316	1.1019	.8990
25.5	2.1743	27.3815	1.1047	.8967
26.0	2.1999	27.0368	1.1076	.8944
26.5	2.2258	26.6972	1.1105	.8920
27.0	2.2520	26.3626	1.1134	.8897
27.5	2.2785	26.0329	1.1164	.8873
28.0	2.3053	25.7078	1.1195	.8849

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 80.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.3325	25.3872	1.1226	.8824
29.0	2.3599	25.0710	1.1257	.8800
29.5	2.3878	24.7590	1.1289	.8775
30.0	2.4160	24.4510	1.1322	.8750
30.5	2.4445	24.1471	1.1355	.8724
31.0	2.4734	23.8470	1.1388	.8699
31.5	2.5028	23.5506	1.1423	.8673
32.0	2.5325	23.2577	1.1458	.8646
32.5	2.5626	22.9684	1.1493	.8620
33.0	2.5932	22.6825	1.1529	.8593
33.5	2.6242	22.3998	1.1566	.8566
34.0	2.6557	22.1204	1.1603	.8538
34.5	2.6876	21.8441	1.1641	.8510
35.0	2.7200	21.5707	1.1680	.8482
35.5	2.7529	21.3003	1.1720	.8454
36.0	2.7863	21.0329	1.1760	.8425
36.5	2.8202	20.7681	1.1801	.8396
37.0	2.8546	20.5060	1.1843	.8366
37.5	2.8897	20.2466	1.1885	.8337
38.0	2.9253	19.9897	1.1929	.8306
38.5	2.9614	19.7354	1.1973	.8276
39.0	2.9982	19.4835	1.2018	.8245
39.5	3.0356	19.2338	1.2064	.8213
40.0	3.0737	18.9865	1.2111	.8182

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

C. TT = 100.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0512	72.0484	1.0003	.9993
1.0	1.0824	67.4987	1.0005	.9989
1.5	1.1093	64.3486	1.0009	.9984
2.0	1.1340	61.8683	1.0012	.9979
2.5	1.1571	59.7938	1.0016	.9974
3.0	1.1792	57.9962	1.0020	.9968
3.5	1.2006	56.4009	1.0025	.9962
4.0	1.2214	54.9604	1.0030	.9956
4.5	1.2417	53.6441	1.0035	.9949
5.0	1.2617	52.4293	1.0041	.9941
5.5	1.2814	51.2994	1.0048	.9934
6.0	1.3008	50.2406	1.0055	.9925
6.5	1.3201	49.2438	1.0062	.9917
7.0	1.3393	48.3010	1.0070	.9907
7.5	1.3584	47.4059	1.0078	.9898
8.0	1.3774	46.5522	1.0087	.9888
8.5	1.3964	45.7365	1.0096	.9877
9.0	1.4153	44.9550	1.0106	.9866
9.5	1.4343	44.2026	1.0117	.9854
10.0	1.4533	43.4786	1.0128	.9842
10.5	1.4723	42.7806	1.0139	.9829
11.0	1.4914	42.1060	1.0151	.9816
11.5	1.5106	41.4530	1.0164	.9803
12.0	1.5298	40.8206	1.0177	.9789
12.5	1.5491	40.2067	1.0190	.9775
13.0	1.5685	39.6100	1.0204	.9760
13.5	1.5880	39.0300	1.0219	.9745
14.0	1.6076	38.4651	1.0234	.9729

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 100.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6274	37.9143	1.0249	.9713
15.0	1.6473	37.3773	1.0265	.9696
15.5	1.6673	36.8529	1.0282	.9680
16.0	1.6875	36.3405	1.0299	.9662
16.5	1.7079	35.8398	1.0316	.9645
17.0	1.7284	35.3497	1.0335	.9626
17.5	1.7491	34.8699	1.0353	.9608
18.0	1.7700	34.4003	1.0372	.9589
18.5	1.7911	33.9397	1.0392	.9570
19.0	1.8124	33.4883	1.0412	.9550
19.5	1.8338	33.0456	1.0433	.9531
20.0	1.8555	32.6109	1.0454	.9510
20.5	1.8774	32.1845	1.0475	.9490
21.0	1.8995	31.7656	1.0497	.9469
21.5	1.9219	31.3539	1.0520	.9447
22.0	1.9445	30.9496	1.0543	.9426
22.5	1.9673	30.5519	1.0567	.9404
23.0	1.9903	30.1609	1.0591	.9382
23.5	2.0136	29.7763	1.0615	.9360
24.0	2.0372	29.3978	1.0640	.9337
24.5	2.0610	29.0253	1.0665	.9314
25.0	2.0851	28.6586	1.0691	.9291
25.5	2.1095	28.2974	1.0718	.9267
26.0	2.1341	27.9418	1.0745	.9243
26.5	2.1591	27.5913	1.0772	.9219
27.0	2.1843	27.2461	1.0800	.9195
27.5	2.2098	26.9056	1.0828	.9170
28.0	2.2357	26.5700	1.0857	.9146

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 100.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.2618	26.2391	1.0886	.9120
29.0	2.2883	25.9127	1.0916	.9095
29.5	2.3151	25.5908	1.0946	.9070
30.0	2.3423	25.2730	1.0977	.9044
30.5	2.3698	24.9594	1.1008	.9018
31.0	2.3977	24.6498	1.1040	.8991
31.5	2.4259	24.3442	1.1072	.8965
32.0	2.4545	24.0423	1.1105	.8938
32.5	2.4835	23.7442	1.1138	.8911
33.0	2.5129	23.4496	1.1172	.8883
33.5	2.5427	23.1586	1.1207	.8856
34.0	2.5730	22.8710	1.1242	.8828
34.5	2.6036	22.5866	1.1278	.8800
35.0	2.6347	22.3055	1.1314	.8771
35.5	2.6663	22.0275	1.1351	.8742
36.0	2.6983	21.7525	1.1389	.8713
36.5	2.7309	21.4805	1.1427	.8684
37.0	2.7639	21.2114	1.1466	.8654
37.5	2.7974	20.9450	1.1506	.8624
38.0	2.8315	20.6814	1.1546	.8594
38.5	2.8661	20.4205	1.1588	.8563
39.0	2.9013	20.1621	1.1630	.8532
39.5	2.9370	19.9062	1.1673	.8501
40.0	2.9734	19.6528	1.1716	.8469

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

D. TT = 200.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0501	72.2301	.9993	1.0018
1.0	1.0805	67.7496	.9987	1.0026
1.5	1.1065	64.6591	.9983	1.0032
2.0	1.1301	62.2344	.9978	1.0038
2.5	1.1522	60.2127	.9974	1.0044
3.0	1.1733	58.4660	.9969	1.0049
3.5	1.1934	56.9214	.9965	1.0054
4.0	1.2129	55.5323	.9961	1.0059
4.5	1.2319	54.2657	.9956	1.0064
5.0	1.2505	53.1009	.9952	1.0069
5.5	1.2686	52.0220	.9948	1.0074
6.0	1.2865	51.0159	.9944	1.0078
6.5	1.3040	50.0728	.9939	1.0083
7.0	1.3213	49.1845	.9935	1.0089
7.5	1.3384	48.3445	.9930	1.0094
8.0	1.3553	47.5474	.9925	1.0099
8.5	1.3721	46.7889	.9921	1.0104
9.0	1.3887	46.0644	.9916	1.0109
9.5	1.4051	45.3717	.9911	1.0115
10.0	1.4215	44.7076	.9906	1.0120
10.5	1.4377	44.0698	.9901	1.0126
11.0	1.4539	43.4564	.9896	1.0131
11.5	1.4700	42.8652	.9891	1.0137
12.0	1.4860	42.2948	.9885	1.0142
12.5	1.5020	41.7435	.9880	1.0148
13.0	1.5179	41.2102	.9875	1.0154
13.5	1.5337	40.6937	.9869	1.0160
14.0	1.5495	40.1929	.9864	1.0166

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 200.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.5653	39.7070	.9858	1.0172
15.0	1.5810	39.2348	.9852	1.0178
15.5	1.5967	38.7759	.9847	1.0185
16.0	1.6124	38.3293	.9841	1.0191
16.5	1.6281	37.8944	.9835	1.0197
17.0	1.6438	37.4706	.9829	1.0204
17.5	1.6594	37.0574	.9822	1.0211
18.0	1.6751	36.6541	.9816	1.0217
18.5	1.6907	36.2602	.9810	1.0224
19.0	1.7064	35.8755	.9803	1.0231
19.5	1.7221	35.4995	.9797	1.0238
20.0	1.7377	35.1318	.9790	1.0245
20.5	1.7534	34.7720	.9784	1.0253
21.0	1.7691	34.4195	.9777	1.0260
21.5	1.7849	34.0743	.9770	1.0267
22.0	1.8006	33.7362	.9763	1.0275
22.5	1.8164	33.4045	.9756	1.0282
23.0	1.8322	33.0793	.9749	1.0290
23.5	1.8480	32.7602	.9742	1.0297
24.0	1.8639	32.4470	.9735	1.0305
24.5	1.8798	32.1396	.9727	1.0313
25.0	1.8957	31.8376	.9720	1.0321
25.5	1.9117	31.5407	.9713	1.0329
26.0	1.9277	31.2491	.9705	1.0337
26.5	1.9437	30.9622	.9698	1.0346
27.0	1.9598	30.6801	.9690	1.0354
27.5	1.9760	30.4026	.9682	1.0362
28.0	1.9922	30.1293	.9674	1.0371

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 200.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.0085	29.8604	.9667	1.0379
29.0	2.0248	29.5957	.9659	1.0388
29.5	2.0412	29.3351	.9651	1.0397
30.0	2.0576	29.0780	.9642	1.0405
30.5	2.0741	28.8247	.9634	1.0414
31.0	2.0907	28.5749	.9626	1.0423
31.5	2.1074	28.3286	.9618	1.0432
32.0	2.1241	28.0856	.9610	1.0441
32.5	2.1409	27.8456	.9602	1.0450
33.0	2.1578	27.6086	.9593	1.0459
33.5	2.1748	27.3744	.9585	1.0468
34.0	2.1920	27.1431	.9577	1.0477
34.5	2.2092	26.9144	.9569	1.0486
35.0	2.2265	26.6885	.9561	1.0495
35.5	2.2439	26.4652	.9553	1.0504
36.0	2.2614	26.2443	.9545	1.0512
36.5	2.2791	26.0252	.9537	1.0521
37.0	2.2969	25.8089	.9529	1.0530
37.5	2.3148	25.5946	.9521	1.0539
38.0	2.3329	25.3822	.9513	1.0547
38.5	2.3511	25.1718	.9505	1.0555
39.0	2.3695	24.9632	.9498	1.0564
39.5	2.3880	24.7562	.9491	1.0572
40.0	2.4067	24.5508	.9484	1.0579

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

E. TT = 290.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0918	1.0000	.9999
1.0	1.0818	67.5731	1.0000	1.0000
1.5	1.1084	64.4535	1.0000	1.0000
2.0	1.1325	62.0056	.9999	1.0001
2.5	1.1551	59.9628	.9999	1.0002
3.0	1.1767	58.1968	.9998	1.0003
3.5	1.1973	56.6344	.9998	1.0004
4.0	1.2174	55.2291	.9997	1.0004
4.5	1.2369	53.9490	.9996	1.0005
5.0	1.2559	52.7713	.9996	1.0006
5.5	1.2746	51.6796	.9995	1.0007
6.0	1.2930	50.6609	.9994	1.0008
6.5	1.3111	49.7052	.9993	1.0009
7.0	1.3290	48.8037	.9992	1.0010
7.5	1.3467	47.9514	.9991	1.0012
8.0	1.3642	47.1426	.9990	1.0013
8.5	1.3815	46.3727	.9989	1.0014
9.0	1.3987	45.6380	.9988	1.0016
9.5	1.4158	44.9351	.9986	1.0017
10.0	1.4328	44.2613	.9985	1.0019
10.5	1.4497	43.6140	.9983	1.0021
11.0	1.4665	42.9913	.9982	1.0023
11.5	1.4833	42.3912	.9980	1.0025
12.0	1.4999	41.8120	.9978	1.0027
12.5	1.5166	41.2523	.9976	1.0029
13.0	1.5332	40.7108	.9974	1.0031
13.5	1.5497	40.1861	.9972	1.0033
14.0	1.5663	39.6774	.9970	1.0036

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 290.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.5828	39.1836	.9968	1.0038
15.0	1.5992	38.7044	.9966	1.0041
15.5	1.6157	38.2382	.9963	1.0043
16.0	1.6321	37.7847	.9961	1.0046
16.5	1.6486	37.3432	.9958	1.0049
17.0	1.6650	36.9131	.9955	1.0052
17.5	1.6814	36.4939	.9952	1.0055
18.0	1.6978	36.0849	.9949	1.0059
18.5	1.7143	35.6854	.9946	1.0062
19.0	1.7307	35.2953	.9943	1.0066
19.5	1.7472	34.9142	.9940	1.0069
20.0	1.7637	34.5414	.9936	1.0073
20.5	1.7802	34.1768	.9933	1.0077
21.0	1.7967	33.8200	.9929	1.0081
21.5	1.8132	33.4706	.9925	1.0085
22.0	1.8298	33.1285	.9921	1.0090
22.5	1.8463	32.7934	.9917	1.0094
23.0	1.8630	32.4645	.9913	1.0099
23.5	1.8796	32.1422	.9909	1.0103
24.0	1.8963	31.8260	.9904	1.0108
24.5	1.9130	31.5157	.9900	1.0113
25.0	1.9298	31.2111	.9895	1.0118
25.5	1.9466	30.9121	.9890	1.0123
26.0	1.9634	30.6185	.9885	1.0129
26.5	1.9803	30.3300	.9880	1.0134
27.0	1.9972	30.0465	.9875	1.0140
27.5	2.0142	29.7674	.9869	1.0146
28.0	2.0312	29.4933	.9864	1.0152

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 290.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.0483	29.2237	.9858	1.0158
29.0	2.0654	28.9585	.9852	1.0164
29.5	2.0825	28.6975	.9846	1.0171
30.0	2.0997	28.4409	.9840	1.0177
30.5	2.1170	28.1882	.9834	1.0184
31.0	2.1343	27.9396	.9827	1.0191
31.5	2.1517	27.6945	.9820	1.0199
32.0	2.1691	27.4530	.9813	1.0206
32.5	2.1866	27.2149	.9807	1.0213
33.0	2.2042	26.9803	.9799	1.0221
33.5	2.2218	26.7491	.9792	1.0229
34.0	2.2395	26.5212	.9785	1.0237
34.5	2.2572	26.2966	.9777	1.0245
35.0	2.2751	26.0750	.9769	1.0253
35.5	2.2929	25.8565	.9762	1.0262
36.0	2.3109	25.6408	.9754	1.0271
36.5	2.3290	25.4278	.9745	1.0280
37.0	2.3471	25.2177	.9737	1.0289
37.5	2.3653	25.0104	.9728	1.0298
38.0	2.3836	24.8056	.9720	1.0307
38.5	2.4019	24.6034	.9711	1.0317
39.0	2.4203	24.4037	.9702	1.0327
39.5	2.4389	24.2066	.9693	1.0337
40.0	2.4575	24.0119	.9683	1.0347

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

A. TT = 60.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0554	71.3471	1.0043	.9896
1.0	1.0895	66.6116	1.0071	.9858
1.5	1.1190	63.3354	1.0096	.9827
2.0	1.1461	60.7577	1.0119	.9800
2.5	1.1715	58.6041	1.0141	.9775
3.0	1.1959	56.7394	1.0162	.9752
3.5	1.2195	55.0872	1.0182	.9730
4.0	1.2424	53.5978	1.0203	.9709
4.5	1.2649	52.2381	1.0223	.9688
5.0	1.2870	50.9855	1.0243	.9668
5.5	1.3088	49.8222	1.0263	.9648
6.0	1.3304	48.7347	1.0283	.9628
6.5	1.3518	47.7127	1.0303	.9608
7.0	1.3730	46.7482	1.0323	.9589
7.5	1.3941	45.8339	1.0343	.9570
8.0	1.4151	44.9643	1.0363	.9550
8.5	1.4361	44.1348	1.0383	.9531
9.0	1.4570	43.3421	1.0404	.9512
9.5	1.4779	42.5812	1.0424	.9493
10.0	1.4988	41.8514	1.0445	.9474
10.5	1.5197	41.1483	1.0466	.9454
11.0	1.5407	40.4707	1.0487	.9435
11.5	1.5617	39.8166	1.0508	.9416
12.0	1.5827	39.1861	1.0529	.9397
12.5	1.6038	38.5746	1.0550	.9378
13.0	1.6249	37.9824	1.0571	.9359
13.5	1.6461	37.4075	1.0593	.9340
14.0	1.6675	36.8489	1.0615	.9320

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

A. TT = 60.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6889	36.3059	1.0637	.9301
15.0	1.7105	35.7774	1.0659	.9281
15.5	1.7322	35.2621	1.0682	.9262
16.0	1.7540	34.7599	1.0704	.9242
16.5	1.7759	34.2700	1.0727	.9222
17.0	1.7980	33.7916	1.0751	.9202
17.5	1.8202	33.3242	1.0774	.9182
18.0	1.8427	32.8670	1.0798	.9162
18.5	1.8653	32.4197	1.0822	.9141
19.0	1.8880	31.9817	1.0847	.9121
19.5	1.9110	31.5529	1.0872	.9100
20.0	1.9342	31.1326	1.0897	.9079
20.5	1.9575	30.7204	1.0922	.9058
21.0	1.9811	30.3160	1.0948	.9037
21.5	2.0049	29.9190	1.0975	.9015
22.0	2.0289	29.5293	1.1001	.8993
22.5	2.0532	29.1464	1.1028	.8971
23.0	2.0777	28.7704	1.1056	.8949
23.5	2.1024	28.4008	1.1083	.8927
24.0	2.1275	28.0371	1.1112	.8905
24.5	2.1528	27.6790	1.1140	.8882
25.0	2.1783	27.3267	1.1169	.8859
25.5	2.2042	26.9805	1.1199	.8836
26.0	2.2303	26.6392	1.1229	.8812
26.5	2.2568	26.3023	1.1259	.8789
27.0	2.2835	25.9710	1.1290	.8765
27.5	2.3106	25.6444	1.1322	.8741
28.0	2.3380	25.3226	1.1354	.8716

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

A. TT = 60.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.3658	25.0049	1.1386	.8691
29.0	2.3939	24.6918	1.1419	.8667
29.5	2.4223	24.3829	1.1452	.8642
30.0	2.4511	24.0780	1.1486	.8616
30.5	2.4803	23.7771	1.1521	.8591
31.0	2.5098	23.4801	1.1556	.8565
31.5	2.5398	23.1868	1.1592	.8539
32.0	2.5702	22.8972	1.1628	.8512
32.5	2.6010	22.6110	1.1665	.8486
33.0	2.6322	22.3279	1.1703	.8459
33.5	2.6639	22.0482	1.1741	.8431
34.0	2.6961	21.7717	1.1780	.8404

SATURATION BOUNDARY REACHED.

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

B. TT = 80.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0538	71.6085	1.0028	.9932
1.0	1.0869	66.9364	1.0047	.9906
1.5	1.1155	63.6992	1.0064	.9883
2.0	1.1417	61.1499	1.0080	.9863
2.5	1.1664	59.0173	1.0096	.9844
3.0	1.1901	57.1682	1.0112	.9826
3.	1.2130	55.5284	1.0128	.9808
4.	1.2353	54.0485	1.0144	.9791
4.	1.2572	52.6957	1.0161	.9773
5.	1.2787	51.4478	1.0177	.9755
5.	1.2999	50.2878	1.0194	.9738
6.	1.3210	49.2018	1.0210	.9720
6.	1.3418	48.1810	1.0227	.9703
7.	1.3625	47.2159	1.0245	.9685
7.	1.3832	46.3007	1.0262	.9667
8.	1.4037	45.4296	1.0280	.9649
8.	1.4242	44.5983	1.0298	.9631
9.	1.4447	43.8031	1.0316	.9613
9.	1.4652	43.0388	1.0335	.9595
10.0	1.4857	42.3049	1.0354	.9576
10.5	1.5063	41.5979	1.0373	.9558
11.0	1.5268	40.9164	1.0392	.9539
11.5	1.5474	40.2579	1.0412	.9520
12.0	1.5681	39.6210	1.0432	.9501
12.5	1.5889	39.0039	1.0452	.9482
13.0	1.6097	38.4056	1.0472	.9463
13.5	1.6307	37.8248	1.0493	.9444
14.0	1.6517	37.2604	1.0514	.9424

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 80.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE	MU
14.5	1.6728	36.7113	1.0536	.9405
15.0	1.6941	36.1767	1.0557	.9385
15.5	1.7155	35.6559	1.0579	.9365
16.0	1.7370	35.1479	1.0601	.9345
16.5	1.7587	34.6524	1.0624	.9325
17.0	1.7805	34.1682	1.0646	.9305
17.5	1.8025	33.6952	1.0669	.9284
18.0	1.8247	33.2326	1.0693	.9264
18.5	1.8470	32.7802	1.0716	.9243
19.0	1.8695	32.3371	1.0740	.9222
19.5	1.8922	31.9032	1.0765	.9201
20.0	1.9151	31.4780	1.0789	.9180
20.5	1.9382	31.0611	1.0814	.9158
21.0	1.9615	30.6522	1.0840	.9137
21.5	1.9850	30.2508	1.0865	.9115
22.0	2.0087	29.8569	1.0891	.9093
22.5	2.0327	29.4700	1.0918	.9071
23.0	2.0569	29.0898	1.0945	.9049
23.5	2.0813	28.7160	1.0972	.9026
24.0	2.1060	28.3487	1.0999	.9004
24.5	2.1309	27.9874	1.1027	.8981
25.0	2.1562	27.6319	1.1056	.8958
25.5	2.1816	27.2819	1.1084	.8934
26.0	2.2074	26.9374	1.1114	.8911
26.5	2.2335	26.5980	1.1143	.8887
27.0	2.2599	26.2636	1.1173	.8863
27.5	2.2866	25.9341	1.1204	.8839
28.0	2.3136	25.6093	1.1235	.8815

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 80.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE	MU
28.5	2.3409	25.2889	1.1266	.8790
29.0	2.3686	24.9729	1.1299	.8765
29.5	2.3966	24.6611	1.1331	.8740
30.0	2.4250	24.3534	1.1364	.8715
30.5	2.4538	24.0497	1.1398	.8689
31.0	2.4830	23.7498	1.1432	.8663
31.5	2.5125	23.4536	1.1467	.8637
32.0	2.5425	23.1611	1.1503	.8610
32.5	2.5728	22.8721	1.1539	.8584
33.0	2.6036	22.5864	1.1575	.8556
33.5	2.6349	22.3043	1.1613	.8529
34.0	2.6666	22.0251	1.1651	.8501
34.5	2.6987	21.7491	1.1690	.8473
35.0	2.7314	21.4760	1.1729	.8445
35.5	2.7646	21.2059	1.1769	.8416
36.0	2.7982	20.9388	1.1810	.8387
36.5	2.8324	20.6744	1.1852	.8358
37.0	2.8671	20.4127	1.1894	.8328
37.5	2.9024	20.1536	1.1938	.8298
38.0	2.9383	19.8971	1.1982	.8268
38.5	2.9748	19.6431	1.2027	.8237
39.0	3.0119	19.3915	1.2073	.8206
39.5	3.0496	19.1423	1.2120	.8174
40.0	3.0879	18.8955	1.2168	.8142

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

C. TT = 100.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0513	72.0254	1.0004	.9990
1.0	1.0826	67.4696	1.0008	.9984
1.5	1.1096	64.3151	1.0011	.9979
2.0	1.1344	61.8313	1.0015	.9973
2.5	1.1576	59.7537	1.0020	.9967
3.0	1.1798	57.9531	1.0025	.9961
3.5	1.2012	56.3555	1.0030	.9954
4.0	1.2221	54.9133	1.0036	.9947
4.5	1.2425	53.5947	1.0042	.9940
5.0	1.2625	52.3780	1.0048	.9932
5.5	1.2823	51.2461	1.0055	.9923
6.0	1.3019	50.1860	1.0063	.9915
6.5	1.3213	49.1873	1.0071	.9905
7.0	1.3405	48.2430	1.0079	.9895
7.5	1.3597	47.3465	1.0088	.9885
8.0	1.3788	46.4917	1.0097	.9875
8.5	1.3979	45.6745	1.0107	.9864
9.0	1.4169	44.8916	1.0117	.9852
9.5	1.4360	44.1385	1.0128	.9840
10.0	1.4551	43.4130	1.0140	.9827
10.5	1.4742	42.7137	1.0152	.9814
11.0	1.4934	42.0383	1.0165	.9801
11.5	1.5126	41.3842	1.0178	.9787
12.0	1.5319	40.7506	1.0191	.9772
12.5	1.5513	40.1361	1.0205	.9757
13.0	1.5709	39.5385	1.0220	.9742
13.5	1.5905	38.9575	1.0235	.9727
14.0	1.6102	38.3920	1.0250	.9711

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 100.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE	MU
14.5	1.6301	37.8403	1.0266	.9694
15.0	1.6501	37.3025	1.0283	.9677
15.5	1.6702	36.7778	1.0300	.9660
16.0	1.6906	36.2646	1.0317	.9642
16.5	1.7110	35.7632	1.0336	.9624
17.0	1.7317	35.2728	1.0354	.9606
17.5	1.7525	34.7924	1.0373	.9587
18.0	1.7735	34.3222	1.0393	.9567
18.5	1.7947	33.8614	1.0413	.9548
19.0	1.8161	33.4095	1.0434	.9528
19.5	1.8377	32.9665	1.0455	.9508
20.0	1.8596	32.5316	1.0476	.9487
20.5	1.8816	32.1046	1.0499	.9466
21.0	1.9038	31.6856	1.0521	.9445
21.5	1.9263	31.2736	1.0544	.9423
22.0	1.9490	30.8690	1.0568	.9401
22.5	1.9720	30.4712	1.0592	.9379
23.0	1.9952	30.0799	1.0616	.9357
23.5	2.0186	29.6953	1.0641	.9334
24.0	2.0423	29.3166	1.0667	.9311
24.5	2.0663	28.9441	1.0693	.9288
25.0	2.0905	28.5775	1.0719	.9264
25.5	2.1151	28.2163	1.0746	.9240
26.0	2.1399	27.8606	1.0773	.9216
26.5	2.1649	27.5102	1.0801	.9192
27.0	2.1903	27.1648	1.0829	.9168
27.5	2.2160	26.8245	1.0858	.9143
28.0	2.2420	26.4890	1.0887	.9118

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 100.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE	MU
28.5	2.2683	26.1582	1.0917	.9092
29.0	2.2950	25.8319	1.0947	.9067
29.5	2.3220	25.5100	1.0978	.9041
30.0	2.3493	25.1923	1.1009	.9015
30.5	2.3770	24.8789	1.1041	.8989
31.0	2.4050	24.5696	1.1073	.8962
31.5	2.4334	24.2641	1.1106	.8935
32.0	2.4622	23.9625	1.1140	.8908
32.5	2.4914	23.6645	1.1174	.8881
33.0	2.5210	23.3702	1.1208	.8853
33.5	2.5510	23.0794	1.1243	.8826
34.0	2.5814	22.7920	1.1279	.8797
34.5	2.6123	22.5079	1.1315	.8769
35.0	2.6436	22.2271	1.1352	.8740
35.5	2.6753	21.9493	1.1389	.8711
36.0	2.7076	21.6747	1.1428	.8682
36.5	2.7403	21.4029	1.1466	.8652
37.0	2.7735	21.1341	1.1506	.8623
37.5	2.8073	20.8681	1.1546	.8592
38.0	2.8416	20.6048	1.1587	.8562
38.5	2.8764	20.3441	1.1629	.8531
39.0	2.9118	20.0861	1.1672	.8500
39.5	2.9478	19.8305	1.1715	.8468
40.0	2.9844	19.5774	1.1760	.8436

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION FOR PARAHYDROGEN

D. TT = 200.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0502	72.2189	.9993	1.0017
1.0	1.0806	67.7356	.9988	1.0024
1.5	1.1066	64.6432	.9984	1.0030
2.0	1.1303	62.2170	.9980	1.0035
2.5	1.1525	60.1941	.9976	1.0041
3.0	1.1735	58.4477	.9971	1.0046
3.5	1.1937	56.9024	.9967	1.0051
4.0	1.2132	55.5120	.9963	1.0056
4.5	1.2323	54.2443	.9959	1.0060
5.0	1.2508	53.0795	.9955	1.0065
5.5	1.2690	52.0004	.9951	1.0069
6.0	1.2869	50.9938	.9947	1.0074
6.5	1.3045	50.0500	.9942	1.0079
7.0	1.3218	49.1611	.9938	1.0084
7.5	1.3389	48.3206	.9934	1.0089
8.0	1.3558	47.5231	.9929	1.0094
8.5	1.3726	46.7641	.9925	1.0099
9.0	1.3892	46.0400	.9920	1.0104
9.5	1.4057	45.3468	.9915	1.0109
10.0	1.4221	44.6824	.9910	1.0114
10.5	1.4384	44.0443	.9906	1.0120
11.0	1.4546	43.4304	.9901	1.0125
11.5	1.4707	42.8388	.9896	1.0131
12.0	1.4868	42.2682	.9891	1.0136
12.5	1.5027	41.7167	.9885	1.0142
13.0	1.5187	41.1831	.9880	1.0147
13.5	1.5346	40.6664	.9875	1.0153
14.0	1.5504	40.1655	.9869	1.0159

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 200.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE	MU
14.5	1.5662	39.6794	.9864	1.0165
15.0	1.5820	39.2071	.9858	1.0171
15.5	1.5977	38.7477	.9853	1.0177
16.0	1.6134	38.3010	.9847	1.0183
16.5	1.6292	37.8659	.9841	1.0190
17.0	1.6448	37.4421	.9835	1.0196
17.5	1.6605	37.0288	.9829	1.0203
18.0	1.6762	36.6254	.9823	1.0209
18.5	1.6919	36.2315	.9816	1.0216
19.0	1.7076	35.8467	.9810	1.0223
19.5	1.7233	35.4707	.9804	1.0230
20.0	1.7390	35.1029	.9797	1.0237
20.5	1.7547	34.7431	.9791	1.0244
21.0	1.7704	34.3906	.9784	1.0251
21.5	1.7862	34.0454	.9777	1.0258
22.0	1.8020	33.7072	.9770	1.0266
22.5	1.8178	33.3755	.9764	1.0273
23.0	1.8336	33.0503	.9757	1.0281
23.5	1.8495	32.7311	.9750	1.0288
24.0	1.8654	32.4180	.9743	1.0296
24.5	1.8813	32.1105	.9735	1.0304
25.0	1.8972	31.8085	.9728	1.0312
25.5	1.9132	31.5117	.9721	1.0320
26.0	1.9293	31.2201	.9713	1.0328
26.5	1.9454	30.9332	.9706	1.0336
27.0	1.9615	30.6511	.9698	1.0344
27.5	1.9777	30.3736	.9691	1.0352
28.0	1.9940	30.1004	.9683	1.0361

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 200.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS	MU VALUE
28.5	2.0102	29.8315	.9675	1.0369
29.0	2.0266	29.5667	.9667	1.0378
29.5	2.0430	29.3060	.9659	1.0386
30.0	2.0595	29.0490	.9651	1.0395
30.5	2.0760	28.7957	.9643	1.0404
31.0	2.0926	28.5460	.9635	1.0413
31.5	2.1093	28.2997	.9627	1.0421
32.0	2.1261	28.0567	.9619	1.0430
32.5	2.1430	27.8167	.9611	1.0439
33.0	2.1599	27.5797	.9603	1.0448
33.5	2.1770	27.3456	.9595	1.0457
34.0	2.1941	27.1143	.9587	1.0466
34.5	2.2114	26.8857	.9578	1.0475
35.0	2.2287	26.6598	.9570	1.0483
35.5	2.2462	26.4365	.9562	1.0492
36.0	2.2637	26.2156	.9554	1.0501
36.5	2.2815	25.9966	.9547	1.0510
37.0	2.2993	25.7804	.9539	1.0518
37.5	2.3172	25.5661	.9531	1.0527
38.0	2.3353	25.3538	.9523	1.0535
38.5	2.3536	25.1433	.9516	1.0543
39.0	2.3720	24.9347	.9508	1.0552
39.5	2.3906	24.7277	.9501	1.0559
40.0	2.4094	24.5222	.9494	1.0567

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

E. TT = 290.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0833	1.0001	.9998
1.0	1.0819	67.5625	1.0001	.9998
1.5	1.1084	64.4454	1.0000	.9999
2.0	1.1326	61.9955	1.0000	1.0000
2.5	1.1553	59.9512	1.0000	1.0000
3.0	1.1768	58.1841	1.0000	1.0001
3.5	1.1975	56.6208	.9999	1.0001
4.0	1.2176	55.2147	.9999	1.0002
4.5	1.2371	53.9338	.9998	1.0002
5.0	1.2562	52.7555	.9998	1.0003
5.5	1.2749	51.6631	.9997	1.0004
6.0	1.2933	50.6439	.9996	1.0005
6.5	1.3114	49.6878	.9996	1.0006
7.0	1.3293	48.7858	.9995	1.0007
7.5	1.3471	47.9331	.9994	1.0008
8.0	1.3646	47.1239	.9993	1.0009
8.5	1.3820	46.3537	.9992	1.0010
9.0	1.3992	45.6187	.9991	1.0012
9.5	1.4163	44.9155	.9990	1.0013
10.0	1.4333	44.2414	.9988	1.0015
10.5	1.4502	43.5938	.9987	1.0016
11.0	1.4671	42.9709	.9986	1.0018
11.5	1.4838	42.3706	.9984	1.0020
12.0	1.5006	41.7912	.9982	1.0022
12.5	1.5172	41.2313	.9981	1.0024
13.0	1.5338	40.6896	.9979	1.0026
13.5	1.5504	40.1648	.9977	1.0028
14.0	1.5670	39.6559	.9975	1.0030

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 290.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.5835	39.1620	.9973	1.0033
15.0	1.6000	38.6826	.9971	1.0035
15.5	1.6165	38.2163	.9968	1.0038
16.0	1.6329	37.7627	.9966	1.0040
16.5	1.6494	37.3211	.9963	1.0043
17.0	1.6659	36.8909	.9961	1.0046
17.5	1.6823	36.4716	.9958	1.0049
18.0	1.6988	36.0625	.9955	1.0053
18.5	1.7152	35.6629	.9952	1.0056
19.0	1.7317	35.2727	.9949	1.0059
19.5	1.7482	34.8914	.9945	1.0063
20.0	1.7647	34.5183	.9942	1.0066
20.5	1.7812	34.1537	.9939	1.0070
21.0	1.7978	33.7968	.9935	1.0074
21.5	1.8143	33.4475	.9931	1.0078
22.0	1.8309	33.1054	.9927	1.0083
22.5	1.8475	32.7702	.9923	1.0087
23.0	1.8642	32.4413	.9919	1.0091
23.5	1.8808	32.1190	.9915	1.0096
24.0	1.8975	31.8028	.9911	1.0101
24.5	1.9143	31.4925	.9906	1.0106
25.0	1.9311	31.1880	.9901	1.0111
25.5	1.9479	30.8891	.9897	1.0116
26.0	1.9647	30.5954	.9892	1.0121
26.5	1.9816	30.3069	.9887	1.0127
27.0	1.9986	30.0234	.9881	1.0132
27.5	2.0156	29.7446	.9876	1.0138
28.0	2.0326	29.4705	.9871	1.0144

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 290.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE	MU
28.5	2.0497	29.2010	.9865	1.0150
29.0	2.0668	28.9358	.9859	1.0156
29.5	2.0840	28.6749	.9853	1.0163
30.0	2.1013	28.4183	.9847	1.0169
30.5	2.1185	28.1658	.9841	1.0176
31.0	2.1359	27.9172	.9834	1.0183
31.5	2.1533	27.6721	.9828	1.0190
32.0	2.1707	27.4305	.9821	1.0198
32.5	2.1883	27.1926	.9814	1.0205
33.0	2.2059	26.9580	.9807	1.0213
33.5	2.2235	26.7269	.9800	1.0220
34.0	2.2412	26.4991	.9792	1.0228
34.5	2.2590	26.2745	.9785	1.0236
35.0	2.2769	26.0530	.9777	1.0245
35.5	2.2948	25.8346	.9769	1.0253
36.0	2.3128	25.6189	.9761	1.0262
36.5	2.3308	25.4060	.9753	1.0271
37.0	2.3490	25.1960	.9745	1.0280
37.5	2.3672	24.9888	.9736	1.0289
38.0	2.3855	24.7841	.9728	1.0299
38.5	2.4039	24.5820	.9719	1.0308
39.0	2.4223	24.3825	.9710	1.0318
39.5	2.4409	24.1854	.9701	1.0328
40.0	2.4595	23.9908	.9691	1.0338

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

A. TT = 60.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0557	71.3058	1.0046	.9890
1.0	1.0899	66.5630	1.0075	.9850
1.5	1.1195	63.2811	1.0101	.9819
2.0	1.1467	60.6994	1.0125	.9791
2.5	1.1723	58.5418	1.0147	.9765
3.0	1.1968	56.6736	1.0169	.9741
3.5	1.2205	55.0184	1.0191	.9718
4.0	1.2436	53.5247	1.0212	.9696
4.5	1.2662	52.1627	1.0234	.9674
5.0	1.2885	50.9071	1.0255	.9653
5.5	1.3104	49.7402	1.0276	.9632
6.0	1.3321	48.6503	1.0296	.9611
6.5	1.3536	47.6267	1.0317	.9591
7.0	1.3750	46.6597	1.0338	.9571
7.5	1.3962	45.7439	1.0359	.9551
8.0	1.4174	44.8733	1.0380	.9531
8.5	1.4385	44.0421	1.0401	.9511
9.0	1.4595	43.2480	1.0422	.9491
9.5	1.4805	42.4872	1.0443	.9472
10.0	1.5016	41.7563	1.0464	.9452
10.5	1.5226	41.0532	1.0486	.9432
11.0	1.5437	40.3754	1.0507	.9413
11.5	1.5648	39.7216	1.0529	.9393
12.0	1.5859	39.0917	1.0550	.9374
12.5	1.6071	38.4801	1.0572	.9355
13.0	1.6284	37.8878	1.0594	.9335
13.5	1.6497	37.3125	1.0616	.9316
14.0	1.6712	36.7536	1.0638	.9296

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

A. TT = 60.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6928	36.2104	1.0661	.9276
15.0	1.7144	35.6817	1.0684	.9257
15.5	1.7363	35.1664	1.0707	.9237
16.0	1.7582	34.6642	1.0730	.9217
16.5	1.7803	34.1742	1.0754	.9196
17.0	1.8025	33.6958	1.0778	.9176
17.5	1.8249	33.2279	1.0802	.9156
18.0	1.8475	32.7706	1.0826	.9135
18.5	1.8702	32.3231	1.0851	.9114
19.0	1.8932	31.8849	1.0876	.9093
19.5	1.9163	31.4558	1.0902	.9072
20.0	1.9396	31.0354	1.0928	.9051
20.5	1.9631	30.6230	1.0954	.9029
21.0	1.9869	30.2182	1.0980	.9007
21.5	2.0109	29.8212	1.1007	.8986
22.0	2.0351	29.4313	1.1034	.8964
22.5	2.0595	29.0484	1.1062	.8941
23.0	2.0842	28.6724	1.1090	.8919
23.5	2.1091	28.3027	1.1119	.8896
24.0	2.1344	27.9386	1.1147	.8873
24.5	2.1599	27.5803	1.1177	.8850
25.0	2.1856	27.2280	1.1207	.8827
25.5	2.2117	26.8811	1.1237	.8803
26.0	2.2381	26.5395	1.1268	.8779
26.5	2.2647	26.2031	1.1299	.8755
27.0	2.2917	25.8718	1.1331	.8731
27.5	2.3190	25.5451	1.1363	.8707
28.0	2.3466	25.2231	1.1395	.8682

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

A. TT = 60.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.3746	24.9057	1.1429	.8657
29.0	2.4029	24.5926	1.1462	.8632
29.5	2.4316	24.2839	1.1496	.8606
30.0	2.4606	23.9792	1.1531	.8581
30.5	2.4900	23.6785	1.1566	.8555
31.0	2.5198	23.3818	1.1602	.8529
31.5	2.5500	23.0889	1.1638	.8503
32.0	2.5806	22.7996	1.1675	.8476

SATURATION BOUNDARY REACHED.

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

8. TT = 80.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0540	71.5753	1.0030	.9927
1.0	1.0872	66.9011	1.0049	.9900
1.5	1.1158	63.6618	1.0067	.9878
2.0	1.1421	61.1101	1.0084	.9857
2.5	1.1669	58.9748	1.0101	.9837
3.0	1.1907	57.1230	1.0118	.9818
3.5	1.2137	55.4819	1.0134	.9800
4.0	1.2361	54.0002	1.0151	.9782
4.5	1.2580	52.6456	1.0167	.9764
5.0	1.2796	51.3964	1.0184	.9746
5.5	1.3009	50.2352	1.0201	.9728
6.0	1.3221	49.1478	1.0219	.9709
6.5	1.3430	48.1256	1.0236	.9691
7.0	1.3638	47.1595	1.0254	.9673
7.5	1.3845	46.2434	1.0272	.9655
8.0	1.4051	45.3716	1.0290	.9637
8.5	1.4257	44.5392	1.0309	.9618
9.0	1.4463	43.7430	1.0327	.9600
9.5	1.4669	42.9779	1.0347	.9581
10.0	1.4875	42.2430	1.0366	.9562
10.5	1.5081	41.5352	1.0386	.9543
11.0	1.5288	40.8530	1.0405	.9524
11.5	1.5495	40.1941	1.0426	.9505
12.0	1.5703	39.5563	1.0446	.9486
12.5	1.5911	38.9390	1.0467	.9466
13.0	1.6120	38.3403	1.0488	.9447
13.5	1.6331	37.7590	1.0509	.9427
14.0	1.6542	37.1940	1.0530	.9407

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 80.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6755	36.6446	1.0552	.9388
15.0	1.6968	36.1097	1.0574	.9368
15.5	1.7183	35.5888	1.0596	.9348
16.0	1.7400	35.0805	1.0619	.9327
16.5	1.7617	34.5846	1.0642	.9307
17.0	1.7837	34.1000	1.0665	.9286
17.5	1.8058	33.6268	1.0688	.9265
18.0	1.8280	33.1641	1.0712	.9245
18.5	1.8505	32.7114	1.0736	.9224
19.0	1.8731	32.2682	1.0761	.9202
19.5	1.8959	31.8342	1.0786	.9181
20.0	1.9189	31.4089	1.0811	.9160
20.5	1.9421	30.9919	1.0836	.9138
21.0	1.9655	30.5829	1.0862	.9116
21.5	1.9891	30.1816	1.0888	.9094
22.0	2.0129	29.7876	1.0914	.9072
22.5	2.0370	29.4006	1.0941	.9050
23.0	2.0613	29.0204	1.0968	.9027
23.5	2.0859	28.6468	1.0996	.9005
24.0	2.1107	28.2798	1.1024	.8982
24.5	2.1358	27.9186	1.1052	.8959
25.0	2.1611	27.5632	1.1081	.8935
25.5	2.1867	27.2134	1.1110	.8912
26.0	2.2126	26.8689	1.1140	.8888
26.5	2.2388	26.5296	1.1170	.8864
27.0	2.2653	26.1954	1.1200	.8840
27.5	2.2922	25.8660	1.1231	.8816
28.0	2.3193	25.5414	1.1263	.8791

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 80.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.3468	25.2211	1.1295	.8767
29.0	2.3746	24.9052	1.1327	.8742
29.5	2.4028	24.5937	1.1360	.8716
30.0	2.4313	24.2863	1.1394	.8691
30.5	2.4603	23.9826	1.1428	.8665
31.0	2.4896	23.6829	1.1463	.8639
31.5	2.5193	23.3870	1.1498	.8612
32.0	2.5494	23.0946	1.1534	.8586
32.5	2.5799	22.8057	1.1571	.8559
33.0	2.6109	22.5202	1.1608	.8531
33.5	2.6423	22.2383	1.1645	.8504
34.0	2.6742	21.9593	1.1684	.8476
34.5	2.7065	21.6834	1.1723	.8448
35.0	2.7394	21.4106	1.1763	.8419
35.5	2.7727	21.1407	1.1804	.8390
36.0	2.8066	20.8737	1.1845	.8361
36.5	2.8409	20.6095	1.1888	.8332
37.0	2.8759	20.3480	1.1931	.8302
37.5	2.9114	20.0890	1.1975	.8272
38.0	2.9475	19.8327	1.2019	.8241
38.5	2.9841	19.5789	1.2065	.8210
39.0	3.0214	19.3276	1.2111	.8179
39.5	3.0594	19.0787	1.2159	.8147
40.0	3.0979	18.8321	1.2207	.8115

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

C. TT = 100.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0514	72.0089	1.0005	.9988
1.0	1.0828	67.4492	1.0009	.9981
1.5	1.1099	64.2917	1.0013	.9975
2.0	1.1346	61.8057	1.0018	.9969
2.5	1.1579	59.7261	1.0023	.9963
3.0	1.1802	57.9237	1.0028	.9956
3.5	1.2016	56.3245	1.0034	.9949
4.0	1.2226	54.8809	1.0040	.9941
4.5	1.2430	53.5611	1.0046	.9933
5.0	1.2631	52.3431	1.0053	.9925
5.5	1.2830	51.2099	1.0060	.9916
6.0	1.3026	50.1490	1.0068	.9907
6.5	1.3220	49.1492	1.0076	.9897
7.0	1.3413	48.2038	1.0085	.9887
7.5	1.3606	47.3062	1.0094	.9877
8.0	1.3797	46.4507	1.0104	.9866
8.5	1.3989	45.6327	1.0114	.9855
9.0	1.4180	44.8490	1.0125	.9843
9.5	1.4371	44.0953	1.0136	.9830
10.0	1.4563	43.3691	1.0148	.9817
10.5	1.4754	42.6689	1.0161	.9804
11.0	1.4947	41.9929	1.0173	.9790
11.5	1.5140	41.3382	1.0187	.9776
12.0	1.5334	40.7039	1.0201	.9761
12.5	1.5529	40.0886	1.0215	.9746
13.0	1.5724	39.4906	1.0230	.9730
13.5	1.5921	38.9089	1.0245	.9714
14.0	1.6119	38.3430	1.0261	.9698

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 100.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.6319	37.7910	1.0278	.9681
15.0	1.6520	37.2526	1.0295	.9664
15.5	1.6722	36.7275	1.0312	.9647
16.0	1.6926	36.2141	1.0330	.9629
16.5	1.7132	35.7122	1.0348	.9610
17.0	1.7339	35.2215	1.0367	.9592
17.5	1.7548	34.7407	1.0387	.9572
18.0	1.7759	34.2701	1.0407	.9553
18.5	1.7972	33.8092	1.0427	.9533
19.0	1.8187	33.3568	1.0448	.9513
19.5	1.8404	32.9134	1.0470	.9492
20.0	1.8623	32.4784	1.0492	.9472
20.5	1.8844	32.0511	1.0514	.9450
21.0	1.9067	31.6319	1.0537	.9429
21.5	1.9293	31.2198	1.0561	.9407
22.0	1.9521	30.8150	1.0585	.9385
22.5	1.9751	30.4172	1.0609	.9363
23.0	1.9984	30.0258	1.0634	.9340
23.5	2.0220	29.6410	1.0659	.9317
24.0	2.0458	29.2624	1.0685	.9294
24.5	2.0699	28.8898	1.0711	.9270
25.0	2.0942	28.5230	1.0738	.9247
25.5	2.1188	28.1617	1.0765	.9223
26.0	2.1437	27.8061	1.0793	.9198
26.5	2.1689	27.4556	1.0821	.9174
27.0	2.1944	27.1103	1.0850	.9149
27.5	2.2202	26.7701	1.0879	.9124
28.0	2.2463	26.4345	1.0908	.9099

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 100.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.2727	26.1038	1.0938	.9073
29.0	2.2995	25.7776	1.0969	.9048
29.5	2.3266	25.4558	1.1000	.9022
30.0	2.3540	25.1382	1.1032	.8996
30.5	2.3818	24.8249	1.1064	.8969
31.0	2.4100	24.5156	1.1096	.8942
31.5	2.4385	24.2102	1.1129	.8915
32.0	2.4674	23.9088	1.1163	.8888
32.5	2.4967	23.6109	1.1197	.8861
33.0	2.5264	23.3167	1.1232	.8833
33.5	2.5566	23.0261	1.1268	.8805
34.0	2.5871	22.7388	1.1304	.8777
34.5	2.6181	22.4550	1.1340	.8748
35.0	2.6495	22.1743	1.1378	.8720
35.5	2.6814	21.8967	1.1415	.8690
36.0	2.7138	21.6222	1.1454	.8661
36.5	2.7467	21.3507	1.1493	.8631
37.0	2.7801	21.0821	1.1533	.8601
37.5	2.8140	20.8162	1.1574	.8571
38.0	2.8484	20.5531	1.1615	.8540
38.5	2.8834	20.2926	1.1658	.8509
39.0	2.9189	20.0348	1.1701	.8478
39.5	2.9551	19.7795	1.1744	.8446
40.0	2.9918	19.5266	1.1789	.8414

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

D. TT = 200.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0502	72.2114	.9994	1.0016
1.0	1.0806	67.7262	.9989	1.0022
1.5	1.1067	64.6325	.9985	1.0028
2.0	1.1304	62.2053	.9981	1.0034
2.5	1.1526	60.1816	.9977	1.0039
3.0	1.1737	58.4334	.9973	1.0043
3.5	1.1939	56.8873	.9969	1.0048
4.0	1.2135	55.4965	.9965	1.0053
4.5	1.2325	54.2283	.9961	1.0057
5.0	1.2511	53.0630	.9957	1.0062
5.5	1.2693	51.9836	.9953	1.0066
6.0	1.2872	50.9769	.9949	1.0071
6.5	1.3048	50.0328	.9945	1.0075
7.0	1.3221	49.1437	.9941	1.0080
7.5	1.3393	48.3029	.9936	1.0085
8.0	1.3562	47.5052	.9932	1.0090
8.5	1.3730	46.7460	.9928	1.0095
9.0	1.3897	46.0217	.9923	1.0100
9.5	1.4062	45.3283	.9918	1.0105
10.0	1.4226	44.6637	.9914	1.0110
10.5	1.4389	44.0255	.9909	1.0115
11.0	1.4551	43.4115	.9904	1.0121
11.5	1.4712	42.8199	.9899	1.0126
12.0	1.4873	42.2490	.9894	1.0131
12.5	1.5033	41.6973	.9889	1.0137
13.0	1.5193	41.1637	.9884	1.0143
13.5	1.5352	40.6469	.9879	1.0148
14.0	1.5510	40.1459	.9873	1.0154

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 200.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.5668	39.6597	.9868	1.0160
15.0	1.5826	39.1873	.9862	1.0166
15.5	1.5984	38.7281	.9857	1.0172
16.0	1.6141	38.2813	.9851	1.0178
16.5	1.6299	37.8462	.9845	1.0185
17.0	1.6456	37.4223	.9839	1.0191
17.5	1.6613	37.0090	.9833	1.0197
18.0	1.6770	36.6055	.9827	1.0204
18.5	1.6927	36.2116	.9821	1.0211
19.0	1.7084	35.8268	.9815	1.0217
19.5	1.7241	35.4507	.9809	1.0224
20.0	1.7399	35.0827	.9802	1.0231
20.5	1.7556	34.7229	.9796	1.0238
21.0	1.7714	34.3704	.9789	1.0245
21.5	1.7871	34.0252	.9782	1.0252
22.0	1.8029	33.6870	.9776	1.0260
22.5	1.8187	33.3553	.9769	1.0267
23.0	1.8346	33.0302	.9762	1.0274
23.5	1.8505	32.7110	.9755	1.0282
24.0	1.8664	32.3978	.9748	1.0290
24.5	1.8823	32.0903	.9741	1.0297
25.0	1.8983	31.7883	.9734	1.0305
25.5	1.9143	31.4915	.9726	1.0313
26.0	1.9304	31.1999	.9719	1.0321
26.5	1.9465	30.9131	.9711	1.0329
27.0	1.9627	30.6311	.9704	1.0337
27.5	1.9789	30.3536	.9696	1.0346
28.0	1.9952	30.0804	.9689	1.0354

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 200.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.0115	29.8116	.9681	1.0362
29.0	2.0278	29.5468	.9673	1.0371
29.5	2.0443	29.2859	.9665	1.0379
30.0	2.0608	29.0290	.9657	1.0388
30.5	2.0774	28.7757	.9649	1.0397
31.0	2.0940	28.5260	.9641	1.0405
31.5	2.1107	28.2798	.9633	1.0414
32.0	2.1275	28.0368	.9625	1.0423
32.5	2.1444	27.7968	.9617	1.0432
33.0	2.1613	27.5599	.9609	1.0441
33.5	2.1784	27.3258	.9601	1.0449
34.0	2.1956	27.0945	.9593	1.0458
34.5	2.2129	26.8660	.9585	1.0467
35.0	2.2302	26.6401	.9577	1.0476
35.5	2.2477	26.4168	.9569	1.0484
36.0	2.2653	26.1960	.9561	1.0493
36.5	2.2831	25.9769	.9553	1.0502
37.0	2.3009	25.7609	.9545	1.0510
37.5	2.3189	25.5466	.9538	1.0519
38.0	2.3370	25.3342	.9530	1.0527
38.5	2.3553	25.1238	.9522	1.0535
39.0	2.3737	24.9151	.9515	1.0543
39.5	2.3924	24.7081	.9508	1.0551
40.0	2.4112	24.5027	.9501	1.0559

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR PARAHYDROGEN

E. TT = 290.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0690	1.0002	.9996
1.0	1.0820	67.5501	1.0002	.9996
1.5	1.1085	64.4331	1.0001	.9997
2.0	1.1327	61.9832	1.0001	.9998
2.5	1.1554	59.9388	1.0001	.9998
3.0	1.1770	58.1715	1.0001	.9998
3.5	1.1977	56.6080	1.0001	.9999
4.0	1.2178	55.2016	1.0000	.9999
4.5	1.2373	53.9206	1.0000	1.0000
5.0	1.2564	52.7421	1.0000	1.0001
5.5	1.2751	51.6495	.9999	1.0001
6.0	1.2935	50.6301	.9998	1.0002
6.5	1.3117	49.6738	.9998	1.0003
7.0	1.3296	48.7717	.9997	1.0004
7.5	1.3474	47.9188	.9996	1.0005
8.0	1.3649	47.1095	.9995	1.0006
8.5	1.3823	46.3392	.9995	1.0007
9.0	1.3995	45.6040	.9993	1.0008
9.5	1.4167	44.9007	.9992	1.0010
10.0	1.4337	44.2264	.9991	1.0011
10.5	1.4506	43.5788	.9990	1.0013
11.0	1.4675	42.9558	.9988	1.0014
11.5	1.4843	42.3554	.9987	1.0016
12.0	1.5010	41.7759	.9985	1.0018
12.5	1.5177	41.2159	.9984	1.0020
13.0	1.5343	40.6741	.9982	1.0022
13.5	1.5509	40.1492	.9980	1.0024
14.0	1.5675	39.6402	.9978	1.0026

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 290.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
14.5	1.5840	39.1463	.9976	1.0028
15.0	1.6005	38.6668	.9974	1.0031
15.5	1.6170	38.2005	.9972	1.0034
16.0	1.6335	37.7468	.9969	1.0036
16.5	1.6500	37.3052	.9967	1.0039
17.0	1.6665	36.8749	.9964	1.0042
17.5	1.6829	36.4557	.9961	1.0045
18.0	1.6994	36.0465	.9959	1.0048
18.5	1.7159	35.6469	.9956	1.0051
19.0	1.7324	35.2567	.9953	1.0055
19.5	1.7489	34.8754	.9949	1.0058
20.0	1.7654	34.5026	.9946	1.0062
20.5	1.7819	34.1379	.9943	1.0066
21.0	1.7985	33.7810	.9939	1.0070
21.5	1.8151	33.4317	.9935	1.0074
22.0	1.8317	33.0896	.9932	1.0078
22.5	1.8483	32.7544	.9928	1.0082
23.0	1.8650	32.4256	.9924	1.0086
23.5	1.8817	32.1032	.9919	1.0091
24.0	1.8984	31.7870	.9915	1.0096
24.5	1.9151	31.4768	.9911	1.0100
25.0	1.9319	31.1723	.9906	1.0105
25.5	1.9488	30.8733	.9901	1.0111
26.0	1.9657	30.5797	.9896	1.0116
26.5	1.9826	30.2912	.9891	1.0121
27.0	1.9995	30.0076	.9886	1.0127
27.5	2.0166	29.7288	.9881	1.0133
28.0	2.0336	29.4548	.9875	1.0138

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 290.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
28.5	2.0507	29.1853	.9870	1.0145
29.0	2.0679	28.9201	.9864	1.0151
29.5	2.0851	28.6592	.9858	1.0157
30.0	2.1023	28.4027	.9852	1.0164
30.5	2.1196	28.1501	.9846	1.0171
31.0	2.1370	27.9015	.9839	1.0177
31.5	2.1544	27.6564	.9833	1.0185
32.0	2.1719	27.4149	.9826	1.0192
32.5	2.1894	27.1770	.9819	1.0199
33.0	2.2070	26.9425	.9812	1.0207
33.5	2.2247	26.7114	.9805	1.0214
34.0	2.2424	26.4836	.9798	1.0222
34.5	2.2602	26.2591	.9790	1.0230
35.0	2.2781	26.0377	.9783	1.0239
35.5	2.2960	25.8193	.9775	1.0247
36.0	2.3140	25.6037	.9767	1.0256
36.5	2.3321	25.3909	.9759	1.0265
37.0	2.3503	25.1809	.9750	1.0274
37.5	2.3685	24.9737	.9742	1.0283
38.0	2.3869	24.7691	.9733	1.0292
38.5	2.4052	24.5670	.9724	1.0302
39.0	2.4237	24.3675	.9715	1.0312
39.5	2.4423	24.1705	.9706	1.0322
40.0	2.4609	23.9762	.9697	1.0332

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

A. TT = 100.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALU	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0981	1.0000	1.0000
1.0	1.0818	67.5790	1.0000	1.0001
1.5	1.1083	64.4580	.9999	1.0001
2.0	1.1325	62.0066	.9999	1.0002
2.5	1.1552	59.9609	.9999	1.0002
3.0	1.1767	58.1928	.9999	1.0002
3.5	1.1974	56.6280	.9998	1.0002
4.0	1.2175	55.2195	.9998	1.0003
4.5	1.2371	53.9363	.9998	1.0003
5.0	1.2562	52.7554	.9998	1.0003
5.5	1.2749	51.6601	.9998	1.0003
6.0	1.2934	50.6377	.9997	1.0004
6.5	1.3116	49.6782	.9997	1.0004
7.0	1.3296	48.7736	.9997	1.0004
7.5	1.3474	47.9174	.9997	1.0005
8.0	1.3650	47.1044	.9996	1.0005
8.5	1.3825	46.3299	.9996	1.0005
9.0	1.3999	45.5902	.9996	1.0005
9.5	1.4171	44.8821	.9996	1.0006
10.0	1.4343	44.2028	.9995	1.0006
10.5	1.4514	43.5498	.9995	1.0006
11.0	1.4685	42.9206	.9995	1.0006
11.5	1.4855	42.3135	.9995	1.0006

TRIPLE POINT TEMPERATURE BOUNDARY REACHED.

C.2

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

B. TT = 110.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0945	1.0000	.9999
1.0	1.0818	67.5743	1.0000	1.0000
1.5	1.1084	64.4527	1.0000	1.0000
2.0	1.1326	62.0006	1.0000	1.0001
2.5	1.1552	59.9548	1.0000	1.0001
3.0	1.1768	58.1862	.9999	1.0001
3.5	1.1975	56.6210	.9999	1.0001
4.0	1.2176	55.2124	.9999	1.0001
4.5	1.2372	53.9284	.9999	1.0001
5.0	1.2563	52.7472	.9999	1.0002
5.5	1.2751	51.6516	.9999	1.0002
6.0	1.2936	50.6289	.9999	1.0002
6.5	1.3118	49.6691	.9998	1.0002
7.0	1.3298	48.7642	.9998	1.0002
7.5	1.3476	47.9078	.9998	1.0003
8.0	1.3652	47.0945	.9998	1.0003
8.5	1.3827	46.3198	.9998	1.0003
9.0	1.4001	45.5799	.9998	1.0003
9.5	1.4174	44.8716	.9997	1.0003
10.0	1.4346	44.1918	.9997	1.0003
10.5	1.4517	43.5387	.9997	1.0004
11.0	1.4688	42.9099	.9997	1.0004
11.5	1.4858	42.3035	.9997	1.0004
12.0	1.5027	41.7178	.9997	1.0004
12.5	1.5196	41.1515	.9996	1.0004
13.0	1.5365	40.6031	.9996	1.0004
13.5	1.5534	40.0715	.9996	1.0005
14.0	1.5703	39.5557	.9996	1.0005
14.5	1.5871	39.0547	.9996	1.0005
15.0	1.6040	38.5676	.9996	1.0005
15.5	1.6209	38.0936	.9995	1.0005
16.0	1.6378	37.6320	.9995	1.0006
16.5	1.6547	37.1821	.9995	1.0006
17.0	1.6716	36.7433	.9995	1.0006
17.5	1.6885	36.3151	.9995	1.0006
18.0	1.7055	35.8968	.9994	1.0006

TRIPLE POINT TEMPERATURE BOUNDARY REACHED.

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

C. TT = 120.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0920	1.0000	.9999
1.0	1.0818	67.5711	1.0000	1.0000
1.5	1.1084	64.4490	1.0000	1.0000
2.0	1.1326	61.9965	1.0000	1.0000
2.5	1.1553	59.9503	1.0000	1.0000
3.0	1.1769	58.1815	1.0000	1.0000
3.5	1.1976	56.6160	1.0000	1.0000
4.0	1.2177	55.2071	1.0000	1.0000
4.5	1.2373	53.9232	1.0000	1.0001
5.0	1.2564	52.7417	1.0000	1.0001
5.5	1.2752	51.6459	.9999	1.0001
6.0	1.2937	50.6230	.9999	1.0001
6.5	1.3119	49.6630	.9999	1.0001
7.0	1.3299	48.7580	.9999	1.0001
7.5	1.3477	47.9011	.9999	1.0001
8.0	1.3654	47.0876	.9999	1.0001
8.5	1.3829	46.3127	.9999	1.0001
9.0	1.4003	45.5727	.9999	1.0001
9.5	1.4176	44.8642	.9999	1.0002
10.0	1.4348	44.1846	.9999	1.0002
10.5	1.4519	43.5313	.9999	1.0002
11.0	1.4690	42.9023	.9998	1.0002
11.5	1.4860	42.2958	.9998	1.0002
12.0	1.5029	41.7099	.9998	1.0002
12.5	1.5199	41.1434	.9998	1.0002
13.0	1.5368	40.5949	.9998	1.0002
13.5	1.5537	40.0632	.9998	1.0003
14.0	1.5706	39.5473	.9998	1.0003
14.5	1.5874	39.0459	.9998	1.0003
15.0	1.6043	38.5587	.9998	1.0003
15.5	1.6212	38.0846	.9997	1.0003
16.0	1.6381	37.6229	.9997	1.0003
16.5	1.6550	37.1729	.9997	1.0003
17.0	1.6720	36.7341	.9997	1.0003
17.5	1.6889	36.3058	.9997	1.0004
18.0	1.7059	35.8875	.9997	1.0004
18.5	1.7229	35.4788	.9997	1.0004
19.0	1.7400	35.0791	.9996	1.0004

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 120.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7571	34.6882	.9996	1.0004
20.0	1.7743	34.3055	.9996	1.0004
20.5	1.7915	33.9308	.9996	1.0005
21.0	1.8088	33.5636	.9996	1.0005
21.5	1.8261	33.2038	.9996	1.0005
22.0	1.8435	32.8509	.9996	1.0005
22.5	1.8609	32.5047	.9995	1.0005
23.0	1.8784	32.1649	.9995	1.0005
23.5	1.8960	31.8313	.9995	1.0005
24.0	1.9137	31.5037	.9995	1.0006

TRIPLE POINT TEMPERATURE BOUNDARY REACHED.

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

D. TT = 130.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0902	1.0000	.9999
1.0	1.0819	67.5689	1.0000	.9999
1.5	1.1084	64.4464	1.0000	.9999
2.0	1.1326	61.9936	1.0000	.9999
2.5	1.1553	59.9472	1.0000	1.0000
3.0	1.1769	58.1781	1.0000	1.0000
3.5	1.1977	56.6124	1.0000	1.0000
4.0	1.2178	55.2034	1.0000	1.0000
4.5	1.2373	53.9193	1.0000	1.0000
5.0	1.2565	52.7376	1.0000	1.0000
5.5	1.2753	51.6417	1.0000	1.0000
6.0	1.2938	50.6186	1.0000	1.0000
6.5	1.3120	49.6585	1.0000	1.0000
7.0	1.3300	48.7533	1.0000	1.0000
7.5	1.3478	47.8966	1.0000	1.0000
8.0	1.3655	47.0830	1.0000	1.0000
8.5	1.3830	46.3080	1.0000	1.0000
9.0	1.4004	45.5678	1.0000	1.0000
9.5	1.4177	44.8592	1.0000	1.0000
10.0	1.4349	44.1795	1.0000	1.0001
10.5	1.4520	43.5261	.9999	1.0001
11.0	1.4691	42.8968	.9999	1.0001
11.5	1.4861	42.2901	.9999	1.0001
12.0	1.5031	41.7042	.9999	1.0001
12.5	1.5201	41.1376	.9999	1.0001
13.0	1.5370	40.5890	.9999	1.0001
13.5	1.5539	40.0572	.9999	1.0001
14.0	1.5708	39.5412	.9999	1.0001
14.5	1.5876	39.0400	.9999	1.0001
15.0	1.6045	38.5526	.9999	1.0001
15.5	1.6214	38.0785	.9999	1.0001
16.0	1.6383	37.6167	.9999	1.0002
16.5	1.6553	37.1666	.9999	1.0002
17.0	1.6722	36.7276	.9999	1.0002
17.5	1.6892	36.2992	.9998	1.0002
18.0	1.7062	35.8809	.9998	1.0002
18.5	1.7232	35.4718	.9998	1.0002
19.0	1.7403	35.0721	.9998	1.0002

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 130.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7574	34.6811	.9998	1.0002
20.0	1.7746	34.2984	.9998	1.0002
20.5	1.7918	33.9236	.9998	1.0002
21.0	1.8091	33.5564	.9998	1.0003
21.5	1.8264	33.1965	.9998	1.0003
22.0	1.8438	32.8436	.9998	1.0003
22.5	1.8613	32.4973	.9997	1.0003
23.0	1.8788	32.1575	.9997	1.0003
23.5	1.8964	31.8238	.9997	1.0003
24.0	1.9141	31.4962	.9997	1.0003
24.5	1.9318	31.1742	.9997	1.0003
25.0	1.9497	30.8578	.9997	1.0004
25.5	1.9676	30.5467	.9997	1.0004
26.0	1.9856	30.2407	.9997	1.0004
26.5	2.0037	29.9397	.9996	1.0004
27.0	2.0218	29.6435	.9996	1.0004
27.5	2.0401	29.3520	.9996	1.0004
28.0	2.0585	29.0649	.9996	1.0004
28.5	2.0769	28.7822	.9996	1.0004
29.0	2.0955	28.5036	.9996	1.0005

TRIPLE POINT TEMPERATURE BOUNDARY REACHED.

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

E. TT = 140.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0889	1.0001	.9999
1.0	1.0819	67.5673	1.0001	.9999
1.5	1.1084	64.4445	1.0001	.9999
2.0	1.1327	61.9916	1.0001	.9999
2.5	1.1553	59.9449	1.0001	.9999
3.0	1.1769	58.1757	1.0001	.9999
3.5	1.1977	56.6098	1.0001	.9999
4.0	1.2178	55.2007	1.0001	.9999
4.5	1.2374	53.9165	1.0001	.9999
5.0	1.2565	52.7347	1.0000	.9999
5.5	1.2753	51.6386	1.0000	.9999
6.0	1.2938	50.6155	1.0000	.9999
6.5	1.3121	49.6552	1.0000	.9999
7.0	1.3301	48.7500	1.0000	.9999
7.5	1.3479	47.8931	1.0000	.9999
8.0	1.3656	47.0794	1.0000	1.0000
8.5	1.3831	46.3043	1.0000	1.0000
9.0	1.4005	45.5641	1.0000	1.0000
9.5	1.4178	44.8554	1.0000	1.0000
10.0	1.4350	44.1756	1.0000	1.0000
10.5	1.4521	43.5221	1.0000	1.0000
11.0	1.4692	42.8930	1.0000	1.0000
11.5	1.4862	42.2862	1.0000	1.0000
12.0	1.5032	41.7002	1.0000	1.0000
12.5	1.5202	41.1335	1.0000	1.0000
13.0	1.5371	40.5849	1.0000	1.0000
13.5	1.5540	40.0530	1.0000	1.0000
14.0	1.5709	39.5369	1.0000	1.0000
14.5	1.5878	39.0356	1.0000	1.0000
15.0	1.6047	38.5481	1.0000	1.0000
15.5	1.6216	38.0738	1.0000	1.0000
16.0	1.6385	37.6120	1.0000	1.0000
16.5	1.6554	37.1618	1.0000	1.0000
17.0	1.6724	36.7228	1.0000	1.0000
17.5	1.6894	36.2944	1.0000	1.0000
18.0	1.7064	35.8760	1.0000	1.0001
18.5	1.7234	35.4671	.9999	1.0001
19.0	1.7405	35.0673	.9999	1.0001

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 140.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7577	34.6762	.9999	1.0001
20.0	1.7748	34.2934	.9999	1.0001
20.5	1.7921	33.9186	.9999	1.0001
21.0	1.8094	33.5513	.9999	1.0001
21.5	1.8267	33.1910	.9999	1.0001
22.0	1.8441	32.8380	.9999	1.0001
22.5	1.8616	32.4918	.9999	1.0001
23.0	1.8791	32.1519	.9999	1.0001
23.5	1.8967	31.8182	.9999	1.0001
24.0	1.9144	31.4905	.9999	1.0001
24.5	1.9322	31.1685	.9999	1.0002
25.0	1.9500	30.8521	.9998	1.0002
25.5	1.9679	30.5410	.9998	1.0002
26.0	1.9859	30.2350	.9998	1.0002
26.5	2.0040	29.9339	.9998	1.0002
27.0	2.0222	29.6377	.9998	1.0002
27.5	2.0405	29.3461	.9998	1.0002
28.0	2.0588	29.0590	.9998	1.0002
28.5	2.0773	28.7762	.9998	1.0002
29.0	2.0959	28.4977	.9998	1.0002
29.5	2.1146	28.2232	.9998	1.0003
30.0	2.1334	27.9526	.9998	1.0003
30.5	2.1523	27.6859	.9997	1.0003
31.0	2.1713	27.4229	.9997	1.0003
31.5	2.1904	27.1635	.9997	1.0003
32.0	2.2097	26.9076	.9997	1.0003
32.5	2.2291	26.6550	.9997	1.0003
33.0	2.2486	26.4058	.9997	1.0003
33.5	2.2682	26.1598	.9997	1.0003

TRIPLE POINT TEMPERATURE BOUNDARY REACHED.

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

F. TT = 150.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0880	1.0001	.9998
1.0	1.0819	67.5661	1.0001	.9999
1.5	1.1085	64.4431	1.0001	.9999
2.0	1.1327	61.9900	1.0001	.9999
2.5	1.1554	59.9433	1.0001	.9999
3.0	1.1770	58.1739	1.0001	.9999
3.5	1.1977	56.6080	1.0001	.9999
4.0	1.2178	55.1987	1.0001	.9999
4.5	1.2374	53.9144	1.0001	.9999
5.0	1.2566	52.7325	1.0001	.9999
5.5	1.2754	51.6364	1.0001	.9999
6.0	1.2939	50.6131	1.0001	.9999
6.5	1.3121	49.6528	1.0001	.9999
7.0	1.3301	48.7475	1.0001	.9999
7.5	1.3480	47.8906	1.0001	.9999
8.0	1.3656	47.0768	1.0001	.9999
8.5	1.3832	46.3017	1.0001	.9999
9.0	1.4006	45.5613	1.0001	.9999
9.5	1.4179	44.8526	1.0001	.9999
10.0	1.4351	44.1727	1.0001	.9999
10.5	1.4522	43.5192	1.0001	.9999
11.0	1.4693	42.8900	1.0001	.9999
11.5	1.4863	42.2832	1.0001	.9999
12.0	1.5033	41.6971	1.0001	.9999
12.5	1.5203	41.1304	1.0001	.9999
13.0	1.5372	40.5817	1.0001	.9999
13.5	1.5541	40.0498	1.0001	.9999
14.0	1.5710	39.5336	1.0001	.9999
14.5	1.5879	39.0322	1.0001	.9999
15.0	1.6048	38.5448	1.0001	.9999
15.5	1.6217	38.0705	1.0001	.9999
16.0	1.6386	37.6086	1.0001	.9999
16.5	1.6556	37.1584	1.0000	.9999
17.0	1.6725	36.7194	1.0000	.9999
17.5	1.6895	36.2909	1.0000	1.0000
18.0	1.7065	35.8724	1.0000	1.0000
18.5	1.7236	35.4635	1.0000	1.0000
19.0	1.7407	35.0637	1.0000	1.0000

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

F. TT = 150.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7578	34.6725	1.0000	1.0000
20.0	1.7750	34.2896	1.0000	1.0000
20.5	1.7922	33.9147	1.0000	1.0000
21.0	1.8095	33.5474	1.0000	1.0000
21.5	1.8269	33.1874	1.0000	1.0000
22.0	1.8443	32.8343	1.0000	1.0000
22.5	1.8618	32.4879	1.0000	1.0000
23.0	1.8793	32.1480	1.0000	1.0000
23.5	1.8969	31.8143	1.0000	1.0000
24.0	1.9146	31.4862	1.0000	1.0000
24.5	1.9324	31.1642	1.0000	1.0000
25.0	1.9502	30.8477	1.0000	1.0000
25.5	1.9682	30.5366	1.0000	1.0000
26.0	1.9862	30.2306	1.0000	1.0000
26.5	2.0043	29.9295	1.0000	1.0000
27.0	2.0225	29.6333	.9999	1.0001
27.5	2.0407	29.3416	.9999	1.0001
28.0	2.0591	29.0545	.9999	1.0001
28.5	2.0776	28.7717	.9999	1.0001
29.0	2.0962	28.4931	.9999	1.0001
29.5	2.1149	28.2186	.9999	1.0001
30.0	2.1337	27.9480	.9999	1.0001
30.5	2.1526	27.6813	.9999	1.0001
31.0	2.1716	27.4182	.9999	1.0001
31.5	2.1908	27.1588	.9999	1.0001
32.0	2.2100	26.9029	.9999	1.0001
32.5	2.2294	26.6503	.9999	1.0001
33.0	2.2489	26.4011	.9999	1.0002
33.5	2.2686	26.1551	.9998	1.0002
34.0	2.2884	25.9122	.9998	1.0002
34.5	2.3083	25.6723	.9998	1.0002
35.0	2.3283	25.4354	.9998	1.0002
35.5	2.3485	25.2013	.9998	1.0002
36.0	2.3689	24.9701	.9998	1.0002
36.5	2.3893	24.7416	.9998	1.0002
37.0	2.4100	24.5158	.9998	1.0002

TRIPLE POINT TEMPERATURE BOUNDARY REACHED.

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

G. TT = 175.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0866	1.0001	.9998
1.0	1.0819	67.5643	1.0001	.9999
1.5	1.1085	64.4411	1.0001	.9999
2.0	1.1327	61.9878	1.0001	.9999
2.5	1.1554	59.9409	1.0001	.9998
3.0	1.1770	58.1713	1.0001	.9998
3.5	1.1978	56.6052	1.0001	.9998
4.0	1.2179	55.1958	1.0001	.9998
4.5	1.2375	53.9113	1.0001	.9998
5.0	1.2566	52.7293	1.0001	.9998
5.5	1.2754	51.6330	1.0001	.9998
6.0	1.2939	50.6097	1.0001	.9998
6.5	1.3122	49.6492	1.0001	.9998
7.0	1.3302	48.7438	1.0001	.9998
7.5	1.3480	47.8868	1.0001	.9998
8.0	1.3657	47.0729	1.0001	.9998
8.5	1.3832	46.2976	1.0001	.9998
9.0	1.4007	45.5572	1.0002	.9998
9.5	1.4180	44.8484	1.0002	.9998
10.0	1.4352	44.1684	1.0002	.9998
10.5	1.4523	43.5147	1.0002	.9998
11.0	1.4694	42.8854	1.0002	.9998
11.5	1.4865	42.2785	1.0002	.9998
12.0	1.5035	41.6924	1.0002	.9998
12.5	1.5204	41.1256	1.0002	.9998
13.0	1.5374	40.5767	1.0002	.9998
13.5	1.5543	40.0447	1.0002	.9998
14.0	1.5712	39.5285	1.0002	.9998
14.5	1.5881	39.0271	1.0002	.9998
15.0	1.6050	38.5395	1.0002	.9998
15.5	1.6219	38.0652	1.0002	.9998
16.0	1.6388	37.6032	1.0002	.9998
16.5	1.6558	37.1529	1.0002	.9998
17.0	1.6728	36.7138	1.0002	.9998
17.5	1.6897	36.2852	1.0002	.9998
18.0	1.7068	35.8667	1.0002	.9998
18.5	1.7238	35.4577	1.0002	.9998
19.0	1.7409	35.0578	1.0002	.9998

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

G. TT = 175.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7581	34.6666	1.0002	.9998
20.0	1.7753	34.2837	1.0002	.9998
20.5	1.7925	33.9087	1.0002	.9998
21.0	1.8098	33.5413	1.0002	.9998
21.5	1.8272	33.1812	1.0002	.9998
22.0	1.8446	32.8281	1.0002	.9998
22.5	1.8621	32.4817	1.0002	.9998
23.0	1.8796	32.1417	1.0002	.9998
23.5	1.8973	31.8079	1.0002	.9998
24.0	1.9150	31.4800	1.0002	.9998
24.5	1.9327	31.1579	1.0002	.9998
25.0	1.9506	30.8414	1.0002	.9998
25.5	1.9685	30.5301	1.0002	.9998
26.0	1.9866	30.2240	1.0002	.9998
26.5	2.0047	29.9229	1.0002	.9998
27.0	2.0229	29.6265	1.0002	.9998
27.5	2.0412	29.3348	1.0002	.9998
28.0	2.0596	29.0476	1.0001	.9998
28.5	2.0781	28.7648	1.0001	.9998
29.0	2.0967	28.4861	1.0001	.9998
29.5	2.1154	28.2115	1.0001	.9998
30.0	2.1342	27.9405	1.0002	.9998
30.5	2.1531	27.6737	1.0001	.9998
31.0	2.1722	27.4107	1.0001	.9998
31.5	2.1913	27.1512	1.0001	.9999
32.0	2.2106	26.8953	1.0001	.9999
32.5	2.2300	26.6427	1.0001	.9999
33.0	2.2496	26.3934	1.0001	.9999
33.5	2.2692	26.1474	1.0001	.9999
34.0	2.2890	25.9044	1.0001	.9999
34.5	2.3089	25.6645	1.0001	.9999
35.0	2.3290	25.4275	1.0001	.9999
35.5	2.3492	25.1935	1.0001	.9999
36.0	2.3696	24.9622	1.0001	.9999
36.5	2.3901	24.7337	1.0001	.9999
37.0	2.4107	24.5078	1.0001	.9999
37.5	2.4315	24.2845	1.0001	.9999
38.0	2.4525	24.0637	1.0001	.9999

TABLE T. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

G. TT = 175.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4736	23.8454	1.0001	.9999
39.0	2.4949	23.6295	1.0001	.9999
39.5	2.5163	23.4159	1.0001	.9999
40.0	2.5380	23.2047	1.0001	.9999

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

H. TT = 200.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0860	1.0001	.9998
1.0	1.0819	67.5635	1.0001	.9998
1.5	1.1085	64.4402	1.0001	.9998
2.0	1.1327	61.9868	1.0001	.9998
2.5	1.1554	59.9398	1.0001	.9998
3.0	1.1770	58.1701	1.0001	.9998
3.5	1.1978	56.6039	1.0001	.9998
4.0	1.2179	55.1944	1.0001	.9998
4.5	1.2375	53.9099	1.0001	.9998
5.0	1.2566	52.7278	1.0001	.9998
5.5	1.2755	51.6315	1.0001	.9998
6.0	1.2940	50.6080	1.0002	.9998
6.5	1.3122	49.6475	1.0002	.9998
7.0	1.3302	48.7420	1.0002	.9998
7.5	1.3481	47.8849	1.0002	.9998
8.0	1.3658	47.0710	1.0002	.9998
8.5	1.3833	46.2957	1.0002	.9998
9.0	1.4007	45.5552	1.0002	.9998
9.5	1.4180	44.8463	1.0002	.9998
10.0	1.4353	44.1662	1.0002	.9998
10.5	1.4524	43.5126	1.0002	.9998
11.0	1.4695	42.8832	1.0002	.9997
11.5	1.4865	42.2762	1.0002	.9997
12.0	1.5035	41.6900	1.0002	.9997
12.5	1.5205	41.1232	1.0002	.9997
13.0	1.5374	40.5743	1.0002	.9997
13.5	1.5544	40.0422	1.0002	.9997
14.0	1.5713	39.5259	1.0002	.9997
14.5	1.5882	39.0244	1.0002	.9997
15.0	1.6051	38.5369	1.0002	.9997
15.5	1.6220	38.0624	1.0002	.9997
16.0	1.6389	37.6004	1.0002	.9997
16.5	1.6559	37.1501	1.0002	.9997
17.0	1.6729	36.7109	1.0002	.9997
17.5	1.6899	36.2823	1.0002	.9997
18.0	1.7069	35.8637	1.0002	.9997
18.5	1.7240	35.4547	1.0002	.9997
19.0	1.7411	35.0547	1.0003	.9997

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

H. TT = 200.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7582	34.6635	1.0003	.9997
20.0	1.7754	34.2805	1.0003	.9997
20.5	1.7927	33.9055	1.0003	.9997
21.0	1.8100	33.5381	1.0003	.9997
21.5	1.8273	33.1780	1.0003	.9997
22.0	1.8448	32.8248	1.0003	.9997
22.5	1.8623	32.4783	1.0003	.9997
23.0	1.8798	32.1383	1.0003	.9997
23.5	1.8975	31.8045	1.0003	.9997
24.0	1.9152	31.4766	1.0003	.9997
24.5	1.9329	31.1544	1.0003	.9997
25.0	1.9508	30.8378	1.0003	.9997
25.5	1.9687	30.5265	1.0003	.9997
26.0	1.9868	30.2204	1.0003	.9997
26.5	2.0049	29.9192	1.0003	.9997
27.0	2.0231	29.6229	1.0003	.9997
27.5	2.0414	29.3311	1.0003	.9997
28.0	2.0598	29.0439	1.0003	.9997
28.5	2.0783	28.7610	1.0003	.9997
29.0	2.0969	28.4823	1.0003	.9997
29.5	2.1156	28.2077	1.0003	.9997
30.0	2.1345	27.9370	1.0003	.9997
30.5	2.1534	27.6701	1.0003	.9997
31.0	2.1725	27.4070	1.0003	.9997
31.5	2.1916	27.1475	1.0003	.9997
32.0	2.2109	26.8914	1.0003	.9997
32.5	2.2303	26.6388	1.0003	.9997
33.0	2.2499	26.3895	1.0003	.9997
33.5	2.2695	26.1434	1.0003	.9997
34.0	2.2893	25.9004	1.0003	.9997
34.5	2.3093	25.6600	1.0003	.9997
35.0	2.3294	25.4231	1.0003	.9997
35.5	2.3496	25.1890	1.0003	.9997
36.0	2.3700	24.9577	1.0003	.9997
36.5	2.3905	24.7292	1.0003	.9997
37.0	2.4111	24.5033	1.0003	.9997
37.5	2.4319	24.2800	1.0003	.9997
38.0	2.4529	24.0592	1.0003	.9997

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

H. TT = 200.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4740	23.8409	1.0003	.9997
39.0	2.4953	23.6250	1.0002	.9997
39.5	2.5168	23.4114	1.0002	.9997
40.0	2.5384	23.2001	1.0002	.9997

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

I. TT = 250.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0857	1.0001	.9998
1.0	1.0819	67.5632	1.0001	.9998
1.5	1.1085	64.4398	1.0001	.9998
2.0	1.1327	61.9863	1.0001	.9998
2.5	1.1554	59.9392	1.0001	.9998
3.0	1.1770	58.1695	1.0001	.9998
3.5	1.1978	56.6032	1.0001	.9998
4.0	1.2179	55.1937	1.0001	.9998
4.5	1.2375	53.9091	1.0001	.9998
5.0	1.2567	52.7270	1.0002	.9998
5.5	1.2755	51.6305	1.0002	.9998
6.0	1.2940	50.6070	1.0002	.9998
6.5	1.3122	49.6465	1.0002	.9998
7.0	1.3303	48.7409	1.0002	.9998
7.5	1.3481	47.8838	1.0002	.9998
8.0	1.3658	47.0698	1.0002	.9997
8.5	1.3833	46.2944	1.0002	.9997
9.0	1.4007	45.5538	1.0002	.9997
9.5	1.4181	44.8449	1.0002	.9997
10.0	1.4353	44.1648	1.0002	.9997
10.5	1.4524	43.5111	1.0002	.9997
11.0	1.4695	42.8816	1.0002	.9997
11.5	1.4866	42.2746	1.0002	.9997
12.0	1.5036	41.6884	1.0002	.9997
12.5	1.5205	41.1215	1.0002	.9997
13.0	1.5375	40.5725	1.0003	.9997
13.5	1.5544	40.0404	1.0003	.9997
14.0	1.5713	39.5241	1.0003	.9997
14.5	1.5882	39.0226	1.0003	.9997
15.0	1.6052	38.5349	1.0003	.9997
15.5	1.6221	38.0604	1.0003	.9997
16.0	1.6390	37.5984	1.0003	.9997
16.5	1.6560	37.1480	1.0003	.9997
17.0	1.6729	36.7088	1.0003	.9997
17.5	1.6900	36.2801	1.0003	.9997
18.0	1.7070	35.8615	1.0003	.9997
18.5	1.7241	35.4524	1.0003	.9996
19.0	1.7412	35.0524	1.0003	.9996

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

I. TT = 250.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7583	34.6611	1.0003	.9996
20.0	1.7755	34.2781	1.0003	.9996
20.5	1.7928	33.9030	1.0003	.9996
21.0	1.8101	33.5356	1.0003	.9996
21.5	1.8275	33.1754	1.0003	.9996
22.0	1.8449	32.8222	1.0003	.9996
22.5	1.8624	32.4757	1.0003	.9996
23.0	1.8800	32.1356	1.0003	.9996
23.5	1.8976	31.8017	1.0003	.9996
24.0	1.9153	31.4738	1.0003	.9996
24.5	1.9331	31.1516	1.0003	.9996
25.0	1.9510	30.8349	1.0004	.9996
25.5	1.9689	30.5236	1.0004	.9996
26.0	1.9870	30.2174	1.0004	.9996
26.5	2.0051	29.9162	1.0004	.9996
27.0	2.0233	29.6198	1.0004	.9996
27.5	2.0416	29.3280	1.0004	.9996
28.0	2.0600	29.0407	1.0004	.9996
28.5	2.0785	28.7578	1.0004	.9996
29.0	2.0972	28.4790	1.0004	.9996
29.5	2.1159	28.2044	1.0004	.9996
30.0	2.1347	27.9337	1.0004	.9996
30.5	2.1536	27.6668	1.0004	.9996
31.0	2.1727	27.4036	1.0004	.9996
31.5	2.1919	27.1440	1.0004	.9996
32.0	2.2112	26.8880	1.0004	.9996
32.5	2.2306	26.6353	1.0004	.9996
33.0	2.2501	26.3859	1.0004	.9996
33.5	2.2698	26.1398	1.0004	.9996
34.0	2.2896	25.8967	1.0004	.9996
34.5	2.3096	25.6568	1.0004	.9996
35.0	2.3297	25.4197	1.0004	.9996
35.5	2.3499	25.1856	1.0004	.9996
36.0	2.3703	24.9542	1.0004	.9996
36.5	2.3908	24.7256	1.0004	.9996
37.0	2.4115	24.4996	1.0004	.9996
37.5	2.4323	24.2763	1.0004	.9996
38.0	2.4533	24.0554	1.0004	.9996

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

I. TT = 250.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4744	23.8371	1.0004	.9996
39.0	2.4957	23.6211	1.0004	.9996
39.5	2.5172	23.4075	1.0004	.9996
40.0	2.5388	23.1961	1.0004	.9996

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

J. TT = 300.0 K PT = 1.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0861	1.0001	.9998
1.0	1.0819	67.5637	1.0001	.9998
1.5	1.1085	64.4404	1.0001	.9998
2.0	1.1327	61.9870	1.0001	.9998
2.5	1.1554	59.9399	1.0001	.9998
3.0	1.1770	58.1702	1.0001	.9998
3.5	1.1978	56.6039	1.0001	.9998
4.0	1.2179	55.1943	1.0001	.9998
4.5	1.2375	53.9098	1.0001	.9998
5.0	1.2567	52.7276	1.0001	.9998
5.5	1.2755	51.6312	1.0002	.9998
6.0	1.2940	50.6076	1.0002	.9998
6.5	1.3122	49.6471	1.0002	.9998
7.0	1.3302	48.7415	1.0002	.9998
7.5	1.3481	47.8843	1.0002	.9998
8.0	1.3658	47.0703	1.0002	.9998
8.5	1.3833	46.2949	1.0002	.9998
9.0	1.4007	45.5543	1.0002	.9997
9.5	1.4180	44.8453	1.0002	.9997
10.0	1.4353	44.1652	1.0002	.9997
10.5	1.4524	43.5114	1.0002	.9997
11.0	1.4695	42.8820	1.0002	.9997
11.5	1.4866	42.2749	1.0002	.9997
12.0	1.5036	41.6887	1.0002	.9997
12.5	1.5205	41.1217	1.0002	.9997
13.0	1.5375	40.5728	1.0002	.9997
13.5	1.5544	40.0406	1.0003	.9997
14.0	1.5713	39.5243	1.0003	.9997
14.5	1.5882	39.0227	1.0003	.9997
15.0	1.6052	38.5350	1.0003	.9997
15.5	1.6221	38.0605	1.0003	.9997
16.0	1.6390	37.5984	1.0003	.9997
16.5	1.6560	37.1480	1.0003	.9997
17.0	1.6729	36.7088	1.0003	.9997
17.5	1.6900	36.2801	1.0003	.9997
18.0	1.7070	35.8614	1.0003	.9997
18.5	1.7241	35.4523	1.0003	.9996
19.0	1.7412	35.0523	1.0003	.9996

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

J. TT = 300.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7583	34.6610	1.0003	.9996
20.0	1.7755	34.2779	1.0003	.9996
20.5	1.7928	33.9028	1.0003	.9996
21.0	1.8101	33.5353	1.0003	.9996
21.5	1.8275	33.1751	1.0003	.9996
22.0	1.8449	32.8219	1.0003	.9996
22.5	1.8624	32.4753	1.0003	.9996
23.0	1.8800	32.1352	1.0003	.9996
23.5	1.8976	31.8013	1.0004	.9996
24.0	1.9153	31.4734	1.0004	.9996
24.5	1.9331	31.1511	1.0004	.9996
25.0	1.9510	30.8345	1.0004	.9996
25.5	1.9689	30.5231	1.0004	.9996
26.0	1.9870	30.2169	1.0004	.9996
26.5	2.0051	29.9156	1.0004	.9996
27.0	2.0233	29.6192	1.0004	.9996
27.5	2.0417	29.3274	1.0004	.9996
28.0	2.0601	29.0401	1.0004	.9996
28.5	2.0786	28.7571	1.0004	.9996
29.0	2.0972	28.4783	1.0004	.9996
29.5	2.1159	28.2037	1.0004	.9996
30.0	2.1348	27.9329	1.0004	.9996
30.5	2.1537	27.6660	1.0004	.9996
31.0	2.1728	27.4028	1.0004	.9996
31.5	2.1919	27.1432	1.0004	.9996
32.0	2.2112	26.8871	1.0004	.9996
32.5	2.2307	26.6344	1.0004	.9996
33.0	2.2502	26.3850	1.0004	.9995
33.5	2.2699	26.1389	1.0004	.9995
34.0	2.2897	25.8958	1.0004	.9995
34.5	2.3097	25.6558	1.0004	.9995
35.0	2.3298	25.4187	1.0004	.9995
35.5	2.3500	25.1846	1.0004	.9995
36.0	2.3704	24.9532	1.0004	.9995
36.5	2.3909	24.7245	1.0004	.9995
37.0	2.4116	24.4986	1.0004	.9995
37.5	2.4324	24.2752	1.0004	.9995
38.0	2.4534	24.0543	1.0004	.9995

TABLE I. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

J. TT = 300.0 K PT = 1.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4745	23.8359	1.0004	.9995
39.0	2.4958	23.6199	1.0005	.9995
39.5	2.5173	23.4063	1.0005	.9995
40.0	2.5390	23.1949	1.0005	.9995

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

A. TT = 110.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0508	72.1038	1.0000	1.0001
1.0	1.0817	67.5859	.9999	1.0002
1.5	1.1082	64.4658	.9999	1.0002
2.0	1.1324	62.0159	.9998	1.0003
2.5	1.1550	59.9709	.9998	1.0003
3.0	1.1766	58.2032	.9998	1.0004
3.5	1.1973	56.6392	.9997	1.0004
4.0	1.2173	55.2320	.9997	1.0005
4.5	1.2369	53.9498	.9996	1.0005
5.0	1.2559	52.7699	.9996	1.0006
5.5	1.2747	51.6756	.9995	1.0006
6.0	1.2931	50.6542	.9995	1.0007
6.5	1.3113	49.6957	.9994	1.0008
7.0	1.3292	48.7921	.9994	1.0008
7.5	1.3470	47.9357	.9994	1.0008
8.0	1.3646	47.1237	.9993	1.0009
8.5	1.3820	46.3503	.9993	1.0009
9.0	1.3994	45.6116	.9992	1.0010
9.5	1.4166	44.9046	.9992	1.0011
10.0	1.4337	44.2263	.9991	1.0011
10.5	1.4508	43.5741	.9991	1.0012

SATURATION BOUNDARY REACHED.

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

B. TT = 120.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0933	1.0000	.9999
1.0	1.0818	67.5741	1.0000	1.0000
1.5	1.1084	64.4529	1.0000	1.0000
2.0	1.1326	62.0013	1.0000	1.0001
2.5	1.1552	59.9560	.9999	1.0001
3.0	1.1768	58.1881	.9999	1.0001
3.5	1.1975	56.6230	.9999	1.0002
4.0	1.2176	55.2152	.9999	1.0002
4.5	1.2371	53.9321	.9999	1.0002
5.0	1.2563	52.7513	.9998	1.0002
5.5	1.2750	51.6564	.9998	1.0003
6.0	1.2935	50.6344	.9998	1.0003
6.5	1.3117	49.6753	.9997	1.0003
7.0	1.3296	48.7711	.9997	1.0004
7.5	1.3474	47.9154	.9997	1.0004
8.0	1.3650	47.1027	.9997	1.0004
8.5	1.3825	46.3287	.9996	1.0005
9.0	1.3999	45.5894	.9996	1.0005
9.5	1.4171	44.8818	.9996	1.0006
10.0	1.4343	44.2030	.9995	1.0006
10.5	1.4514	43.5505	.9995	1.0006
11.0	1.4684	42.9223	.9995	1.0007
11.5	1.4854	42.3166	.9994	1.0007
12.0	1.5023	41.7309	.9994	1.0007
12.5	1.5192	41.1652	.9994	1.0008
13.0	1.5361	40.6176	.9993	1.0008
13.5	1.5529	40.0867	.9993	1.0008
14.0	1.5698	39.5716	.9993	1.0009
14.5	1.5866	39.0711	.9992	1.0009
15.0	1.6034	38.5846	.9992	1.0010
15.5	1.6202	38.1112	.9991	1.0010
16.0	1.6371	37.6502	.9991	1.0010
16.5	1.6540	37.2009	.9991	1.0011
17.0	1.6708	36.7629	.9990	1.0011
17.5	1.6877	36.3358	.9990	1.0012
18.0	1.7047	35.9182	.9989	1.0012
18.5	1.7216	35.5103	.9989	1.0013
19.0	1.7386	35.1114	.9988	1.0013

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 120.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7557	34.7212	.9988	1.0014
20.0	1.7728	34.3393	.9988	1.0014

SATURATION BOUNDARY REACHED.

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

C. TT = 130.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG).	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0898	1.0001	.9999
1.0	1.0819	67.5680	1.0000	.9999
1.5	1.1084	64.4454	1.0000	.9999
2.0	1.1326	61.9928	1.0000	.9999
2.5	1.1553	59.9467	1.0000	.9999
3.0	1.1769	58.1779	1.0000	1.0000
3.5	1.1976	56.6127	1.0000	1.0000
4.0	1.2177	55.2041	1.0000	1.0000
4.5	1.2373	53.9205	1.0000	1.0000
5.0	1.2565	52.7394	1.0000	1.0000
5.5	1.2752	51.6440	1.0000	1.0000
6.0	1.2937	50.6209	1.0000	1.0000
6.5	1.3119	49.6614	1.0000	1.0001
7.0	1.3299	48.7569	.9999	1.0001
7.5	1.3477	47.9007	.9999	1.0001
8.0	1.3654	47.0876	.9999	1.0001
8.5	1.3829	46.3132	.9999	1.0001
9.0	1.4003	45.5736	.9999	1.0002
9.5	1.4175	44.8656	.9999	1.0002
10.0	1.4347	44.1864	.9998	1.0002
10.5	1.4518	43.5337	.9998	1.0002
11.0	1.4689	42.9052	.9998	1.0003
11.5	1.4859	42.2991	.9998	1.0003
12.0	1.5028	41.7138	.9997	1.0003
12.5	1.5197	41.1478	.9997	1.0003
13.0	1.5366	40.5998	.9997	1.0004
13.5	1.5535	40.0686	.9997	1.0004
14.0	1.5704	39.5531	.9996	1.0004
14.5	1.5872	39.0525	.9996	1.0004
15.0	1.6041	38.5658	.9996	1.0005
15.5	1.6209	38.0922	.9996	1.0005
16.0	1.6378	37.6310	.9995	1.0005
16.5	1.6547	37.1815	.9995	1.0006
17.0	1.6716	36.7431	.9995	1.0006
17.5	1.6886	36.3149	.9995	1.0006
18.0	1.7055	35.8972	.9994	1.0006
18.5	1.7225	35.4890	.9994	1.0007
19.0	1.7396	35.0899	.9994	1.0007

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 130.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7566	34.6994	.9993	1.0007
20.0	1.7738	34.3172	.9993	1.0008
20.5	1.7909	33.9430	.9993	1.0008
21.0	1.8082	33.5764	.9993	1.0008
21.5	1.8254	33.2170	.9992	1.0009
22.0	1.8428	32.8644	.9992	1.0009
22.5	1.8602	32.5185	.9992	1.0009
23.0	1.8777	32.1791	.9991	1.0010
23.5	1.8952	31.8459	.9991	1.0010
24.0	1.9129	31.5185	.9991	1.0010
24.5	1.9306	31.1970	.9990	1.0011
25.0	1.9483	30.8810	.9990	1.0011
25.5	1.9662	30.5705	.9990	1.0011
26.0	1.9841	30.2653	.9989	1.0012
26.5	2.0021	29.9653	.9989	1.0012
27.0	2.0202	29.6697	.9988	1.0013
27.5	2.0384	29.3787	.9988	1.0013
28.0	2.0567	29.0922	.9987	1.0014

SATURATION BOUNDARY REACHED.

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

D. TT = 140.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0860	1.0001	.9998
1.0	1.0819	67.5635	1.0001	.9998
1.5	1.1085	64.4402	1.0001	.9998
2.0	1.1327	61.9870	1.0001	.9998
2.5	1.1554	59.9403	1.0001	.9998
3.0	1.1770	58.1709	1.0001	.9998
3.5	1.1978	56.6052	1.0001	.9998
4.0	1.2179	55.1961	1.0001	.9998
4.5	1.2374	53.9122	1.0001	.9998
5.0	1.2566	52.7307	1.0001	.9999
5.5	1.2754	51.6349	1.0001	.9999
6.0	1.2939	50.6121	1.0001	.9999
6.5	1.3121	49.6522	1.0001	.9999
7.0	1.3301	48.7472	1.0001	.9999
7.5	1.3479	47.8908	1.0001	.9999
8.0	1.3656	47.0775	1.0001	.9999
8.5	1.3831	46.3027	1.0001	.9999
9.0	1.4005	45.5629	1.0001	.9999
9.5	1.4178	44.8542	1.0001	.9999
10.0	1.4350	44.1748	1.0000	.9999
10.5	1.4522	43.5218	1.0000	1.0000
11.0	1.4692	42.8930	1.0000	1.0000
11.5	1.4862	42.2867	1.0000	1.0000
12.0	1.5032	41.7011	1.0000	1.0000
12.5	1.5201	41.1349	1.0000	1.0000
13.0	1.5370	40.5867	1.0000	1.0000
13.5	1.5539	40.0553	1.0000	1.0001
14.0	1.5708	39.5396	.9999	1.0001
14.5	1.5877	39.0388	.9999	1.0001
15.0	1.6046	38.5518	.9999	1.0001
15.5	1.6214	38.0780	.9999	1.0001
16.0	1.6383	37.6167	.9999	1.0002
16.5	1.6552	37.1670	.9999	1.0002
17.0	1.6722	36.7285	.9998	1.0002
17.5	1.6891	36.3005	.9998	1.0002
18.0	1.7061	35.8825	.9998	1.0002
18.5	1.7231	35.4741	.9998	1.0003
19.0	1.7402	35.0748	.9998	1.0003

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 140.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7573	34.6842	.9997	1.0003
20.0	1.7745	34.3019	.9997	1.0003
20.5	1.7917	33.9275	.9997	1.0004
21.0	1.8089	33.5607	.9997	1.0004
21.5	1.8262	33.2012	.9996	1.0004
22.0	1.8436	32.8487	.9996	1.0004
22.5	1.8610	32.5029	.9996	1.0005
23.0	1.8785	32.1635	.9996	1.0005
23.5	1.8961	31.8302	.9995	1.0005
24.0	1.9137	31.5027	.9995	1.0005
24.5	1.9314	31.1812	.9995	1.0006
25.0	1.9492	30.8652	.9995	1.0006
25.5	1.9671	30.5546	.9994	1.0006
26.0	1.9851	30.2490	.9994	1.0007
26.5	2.0031	29.9483	.9994	1.0007
27.0	2.0213	29.6525	.9994	1.0007
27.5	2.0395	29.3611	.9993	1.0007
28.0	2.0578	29.0744	.9993	1.0008
28.5	2.0763	28.7922	.9993	1.0008
29.0	2.0948	28.5141	.9992	1.0008
29.5	2.1134	28.2401	.9992	1.0009
30.0	2.1322	27.9700	.9992	1.0009
30.5	2.1510	27.7038	.9991	1.0009
31.0	2.1700	27.4413	.9991	1.0010
31.5	2.1890	27.1824	.9991	1.0010
32.0	2.2082	26.9269	.9990	1.0010
32.5	2.2275	26.6749	.9990	1.0011
33.0	2.2470	26.4262	.9990	1.0011

TRIPLE POINT TEMPERATURE BOUNDARY REACHED.

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

E. TT = 150.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0833	1.0001	.9998
1.0	1.0819	67.5600	1.0001	.9998
1.5	1.1085	64.4362	1.0001	.9998
2.0	1.1328	61.9825	1.0001	.9998
2.5	1.1555	59.9354	1.0001	.9998
3.0	1.1771	58.1658	1.0002	.9997
3.5	1.1978	56.5997	1.0002	.9997
4.0	1.2179	55.1904	1.0002	.9997
4.5	1.2375	53.9062	1.0002	.9997
5.0	1.2567	52.7244	1.0002	.9997
5.5	1.2755	51.6281	1.0002	.9997
6.0	1.2940	50.6050	1.0002	.9997
6.5	1.3123	49.6449	1.0002	.9997
7.0	1.3303	48.7398	1.0002	.9997
7.5	1.3481	47.8831	1.0002	.9997
8.0	1.3658	47.0695	1.0002	.9997
8.5	1.3833	46.2946	1.0002	.9997
9.0	1.4007	45.5546	1.0002	.9998
9.5	1.4180	44.8461	1.0002	.9998
10.0	1.4352	44.1665	1.0002	.9998
10.5	1.4524	43.5133	1.0002	.9998
11.0	1.4695	42.8843	1.0002	.9998
11.5	1.4865	42.2778	1.0002	.9998
12.0	1.5035	41.6921	1.0002	.9998
12.5	1.5204	41.1257	1.0002	.9998
13.0	1.5373	40.5773	1.0002	.9998
13.5	1.5542	40.0457	1.0001	.9998
14.0	1.5711	39.5297	1.0001	.9998
14.5	1.5880	39.0286	1.0001	.9998
15.0	1.6049	38.5416	1.0001	.9998
15.5	1.6218	38.0676	1.0001	.9999
16.0	1.6387	37.6061	1.0001	.9999
16.5	1.6557	37.1563	1.0001	.9999
17.0	1.6726	36.7176	1.0001	.9999
17.5	1.6896	36.2895	1.0001	.9999
18.0	1.7066	35.8714	1.0001	.9999
18.5	1.7236	35.4628	1.0000	.9999
19.0	1.7407	35.0634	1.0000	1.0000

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 150.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7578	34.6727	1.0000	1.0000
20.0	1.7750	34.2902	1.0000	1.0000
20.5	1.7922	33.9157	1.0000	1.0000
21.0	1.8095	33.5488	1.0000	1.0000
21.5	1.8268	33.1892	1.0000	1.0000
22.0	1.8442	32.8365	.9999	1.0001
22.5	1.8616	32.4906	.9999	1.0001
23.0	1.8792	32.1511	.9999	1.0001
23.5	1.8967	31.8177	.9999	1.0001
24.0	1.9144	31.4904	.9999	1.0001
24.5	1.9321	31.1687	.9999	1.0002
25.0	1.9500	30.8526	.9998	1.0002
25.5	1.9679	30.5418	.9998	1.0002
26.0	1.9858	30.2362	.9998	1.0002
26.5	2.0039	29.9356	.9998	1.0003
27.0	2.0221	29.6397	.9998	1.0003
27.5	2.0403	29.3485	.9997	1.0003
28.0	2.0587	29.0617	.9997	1.0003
28.5	2.0771	28.7793	.9997	1.0003
29.0	2.0957	28.5011	.9997	1.0004
29.5	2.1143	28.2270	.9996	1.0004
30.0	2.1331	27.9568	.9996	1.0004
30.5	2.1520	27.6903	.9996	1.0004
31.0	2.1709	27.4277	.9996	1.0005
31.5	2.1900	27.1687	.9995	1.0005
32.0	2.2093	26.9130	.9995	1.0005
32.5	2.2286	26.6609	.9995	1.0005
33.0	2.2481	26.4121	.9995	1.0006
33.5	2.2677	26.1664	.9994	1.0006
34.0	2.2874	25.9239	.9994	1.0006
34.5	2.3073	25.6845	.9994	1.0007
35.0	2.3273	25.4480	.9994	1.0007
35.5	2.3474	25.2143	.9993	1.0007
36.0	2.3677	24.9835	.9993	1.0007
36.5	2.3881	24.7554	.9993	1.0008
37.0	2.4087	24.5299	.9992	1.0008

TRIPLE POINT TEMPERATURE BOUNDARY REACHED.

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

F. TT = 175.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0799	1.0001	.9997
1.0	1.0820	67.5554	1.0001	.9997
1.5	1.1086	64.4307	1.0002	.9997
2.0	1.1328	61.9764	1.0002	.9997
2.5	1.1555	59.9286	1.0002	.9996
3.0	1.1771	58.1585	1.0002	.9996
3.5	1.1979	56.5919	1.0003	.9996
4.0	1.2181	55.1821	1.0003	.9996
4.5	1.2377	53.8974	1.0003	.9996
5.0	1.2569	52.7152	1.0003	.9996
5.5	1.2757	51.6187	1.0003	.9995
6.0	1.2942	50.5953	1.0003	.9995
6.5	1.3125	49.6348	1.0003	.9995
7.0	1.3305	48.7292	1.0004	.9995
7.5	1.3483	47.8722	1.0004	.9995
8.0	1.3660	47.0583	1.0004	.9995
8.5	1.3836	46.2831	1.0004	.9995
9.0	1.4010	45.5427	1.0004	.9995
9.5	1.4183	44.8339	1.0004	.9995
10.0	1.4356	44.1540	1.0004	.9995
10.5	1.4527	43.5004	1.0004	.9995
11.0	1.4698	42.8712	1.0004	.9995
11.5	1.4869	42.2644	1.0004	.9995
12.0	1.5039	41.6784	1.0004	.9995
12.5	1.5208	41.1117	1.0004	.9995
13.0	1.5378	40.5630	1.0004	.9995
13.5	1.5547	40.0312	1.0005	.9995
14.0	1.5716	39.5151	1.0005	.9995
14.5	1.5885	39.0137	1.0005	.9995
15.0	1.6055	38.5263	1.0005	.9995
15.5	1.6224	38.0521	1.0005	.9995
16.0	1.6393	37.5903	1.0005	.9995
16.5	1.6563	37.1403	1.0005	.9995
17.0	1.6732	36.7013	1.0005	.9995
17.5	1.6902	36.2730	1.0005	.9995
18.0	1.7073	35.8547	1.0005	.9995
18.5	1.7243	35.4459	1.0005	.9995
19.0	1.7414	35.0462	1.0005	.9995

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

F. TT = 175.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7586	34.6553	1.0005	.9995
20.0	1.7758	34.2726	1.0005	.9995
20.5	1.7930	33.8979	1.0005	.9995
21.0	1.8103	33.5307	1.0005	.9995
21.5	1.8277	33.1709	1.0004	.9995
22.0	1.8451	32.8180	1.0004	.9995
22.5	1.8626	32.4718	1.0004	.9995
23.0	1.8801	32.1321	1.0004	.9995
23.5	1.8978	31.7986	1.0004	.9995
24.0	1.9155	31.4710	1.0004	.9995
24.5	1.9332	31.1492	1.0004	.9995
25.0	1.9511	30.8329	1.0004	.9995
25.5	1.9690	30.5219	1.0004	.9996
26.0	1.9870	30.2161	1.0004	.9996
26.5	2.0051	29.9152	1.0004	.9996
27.0	2.0233	29.6191	1.0004	.9996
27.5	2.0416	29.3277	1.0004	.9996
28.0	2.0600	29.0407	1.0004	.9996
28.5	2.0785	28.7582	1.0004	.9996
29.0	2.0971	28.4798	1.0003	.9996
29.5	2.1158	28.2055	1.0003	.9996
30.0	2.1346	27.9351	1.0003	.9996
30.5	2.1535	27.6686	1.0003	.9997
31.0	2.1725	27.4058	1.0003	.9997
31.5	2.1917	27.1466	1.0003	.9997
32.0	2.2110	26.8909	1.0003	.9997
32.5	2.2303	26.6386	1.0003	.9997
33.0	2.2499	26.3896	1.0003	.9997
33.5	2.2695	26.1439	1.0002	.9997
34.0	2.2893	25.9012	1.0002	.9998
34.5	2.3092	25.6616	1.0002	.9998
35.0	2.3292	25.4249	1.0002	.9998
35.5	2.3494	25.1911	1.0002	.9998
36.0	2.3697	24.9601	1.0002	.9998
36.5	2.3902	24.7317	1.0002	.9998
37.0	2.4109	24.5061	1.0002	.9998
37.5	2.4316	24.2831	1.0001	.9999
38.0	2.4526	24.0627	1.0001	.9999

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

F. TT = 175.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4737	23.8447	1.0001	.9999
39.0	2.4949	23.6291	1.0001	.9999
39.5	2.5163	23.4158	1.0001	.9999
40.0	2.5379	23.2048	1.0001	.9999

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

G. TT = 200.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0776	1.0001	.9997
1.0	1.0820	67.5529	1.0002	.9997
1.5	1.1086	64.4280	1.0002	.9997
2.0	1.1328	61.9735	1.0002	.9996
2.5	1.1556	59.9255	1.0002	.9996
3.0	1.1772	58.1554	1.0003	.9996
3.5	1.1980	56.5885	1.0003	.9995
4.0	1.2181	55.1785	1.0003	.9995
4.5	1.2377	53.8936	1.0003	.9995
5.0	1.2569	52.7111	1.0004	.9995
5.5	1.2758	51.6145	1.0004	.9995
6.0	1.2943	50.5908	1.0004	.9994
6.5	1.3125	49.6301	1.0004	.9994
7.0	1.3306	48.7244	1.0004	.9994
7.5	1.3485	47.8671	1.0005	.9994
8.0	1.3661	47.0531	1.0005	.9994
8.5	1.3837	46.2776	1.0005	.9994
9.0	1.4011	45.5371	1.0005	.9994
9.5	1.4185	44.8281	1.0005	.9994
10.0	1.4357	44.1480	1.0005	.9993
10.5	1.4529	43.4943	1.0005	.9993
11.0	1.4700	42.8649	1.0005	.9993
11.5	1.4871	42.2579	1.0006	.9993
12.0	1.5041	41.6718	1.0006	.9993
12.5	1.5211	41.1049	1.0006	.9993
13.0	1.5380	40.5561	1.0006	.9993
13.5	1.5549	40.0241	1.0006	.9993
14.0	1.5719	39.5078	1.0006	.9993
14.5	1.5888	39.0064	1.0006	.9993
15.0	1.6057	38.5189	1.0006	.9993
15.5	1.6227	38.0446	1.0006	.9993
16.0	1.6396	37.5826	1.0006	.9992
16.5	1.6566	37.1324	1.0006	.9992
17.0	1.6736	36.6933	1.0007	.9992
17.5	1.6906	36.2648	1.0007	.9992
18.0	1.7076	35.8464	1.0007	.9992
18.5	1.7247	35.4375	1.0007	.9992
19.0	1.7418	35.0377	1.0007	.9992

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

G. TT = 200.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7590	34.6466	1.0007	.9992
20.0	1.7762	34.2637	1.0007	.9992
20.5	1.7935	33.8889	1.0007	.9992
21.0	1.8108	33.5216	1.0007	.9992
21.5	1.8281	33.1616	1.0007	.9992
22.0	1.8456	32.8086	1.0007	.9992
22.5	1.8631	32.4623	1.0007	.9992
23.0	1.8806	32.1225	1.0007	.9992
23.5	1.8983	31.7888	1.0007	.9992
24.0	1.9160	31.4611	1.0007	.9992
24.5	1.9338	31.1392	1.0007	.9992
25.0	1.9517	30.8228	1.0007	.9992
25.5	1.9696	30.5117	1.0007	.9992
26.0	1.9877	30.2057	1.0007	.9992
26.5	2.0058	29.9048	1.0007	.9992
27.0	2.0240	29.6085	1.0007	.9992
27.5	2.0423	29.3170	1.0007	.9992
28.0	2.0607	29.0300	1.0007	.9992
28.5	2.0792	28.7473	1.0007	.9992
29.0	2.0978	28.4688	1.0007	.9992
29.5	2.1166	28.1944	1.0007	.9992
30.0	2.1354	27.9239	1.0007	.9992
30.5	2.1543	27.6573	1.0007	.9992
31.0	2.1734	27.3944	1.0007	.9993
31.5	2.1926	27.1351	1.0007	.9993
32.0	2.2118	26.8793	1.0007	.9993
32.5	2.2313	26.6269	1.0007	.9993
33.0	2.2508	26.3778	1.0007	.9993
33.5	2.2705	26.1319	1.0007	.9993
34.0	2.2903	25.8891	1.0007	.9993
34.5	2.3102	25.6494	1.0007	.9993
35.0	2.3303	25.4127	1.0007	.9993
35.5	2.3505	25.1788	1.0006	.9993
36.0	2.3708	24.9477	1.0006	.9993
36.5	2.3914	24.7193	1.0006	.9993
37.0	2.4120	24.4937	1.0006	.9993
37.5	2.4328	24.2706	1.0006	.9993
38.0	2.4538	24.0500	1.0006	.9993

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

G. TT = 200.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4749	23.8319	1.0006	.9994
39.0	2.4962	23.6162	1.0006	.9994
39.5	2.5177	23.4028	1.0006	.9994
40.0	2.5393	23.1918	1.0006	.9994

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

H. TT = 250.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0771	1.0001	.9997
1.0	1.0820	67.5522	1.0002	.9997
1.5	1.1086	64.4271	1.0002	.9996
2.0	1.1329	61.9724	1.0002	.9996
2.5	1.1556	59.9243	1.0003	.9996
3.0	1.1772	58.1538	1.0003	.9995
3.5	1.1980	56.5868	1.0003	.9995
4.0	1.2182	55.1767	1.0003	.9995
4.5	1.2378	53.8916	1.0004	.9995
5.0	1.2570	52.7090	1.0004	.9994
5.5	1.2758	51.6122	1.0004	.9994
6.0	1.2943	50.5884	1.0004	.9994
6.5	1.3126	49.6275	1.0005	.9994
7.0	1.3306	48.7216	1.0005	.9994
7.5	1.3485	47.8643	1.0005	.9993
8.0	1.3662	47.0500	1.0005	.9993
8.5	1.3838	46.2744	1.0005	.9993
9.0	1.4012	45.5337	1.0006	.9993
9.5	1.4186	44.8246	1.0006	.9993
10.0	1.4358	44.1444	1.0006	.9993
10.5	1.4530	43.4905	1.0006	.9992
11.0	1.4701	42.8610	1.0006	.9992
11.5	1.4872	42.2539	1.0006	.9992
12.0	1.5042	41.6675	1.0007	.9992
12.5	1.5212	41.1005	1.0007	.9992
13.0	1.5381	40.5515	1.0007	.9992
13.5	1.5551	40.0194	1.0007	.9992
14.0	1.5720	39.5030	1.0007	.9992
14.5	1.5890	39.0015	1.0007	.9991
15.0	1.6059	38.5138	1.0007	.9991
15.5	1.6228	38.0393	1.0007	.9991
16.0	1.6398	37.5772	1.0008	.9991
16.5	1.6568	37.1269	1.0008	.9991
17.0	1.6738	36.6877	1.0008	.9991
17.5	1.6908	36.2590	1.0008	.9991
18.0	1.7079	35.8404	1.0008	.9991
18.5	1.7249	35.4313	1.0008	.9991
19.0	1.7421	35.0314	1.0008	.9990

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

H. TT = 250.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7593	34.6401	1.0008	.9990
20.0	1.7765	34.2572	1.0009	.9990
20.5	1.7938	33.8822	1.0009	.9990
21.0	1.8111	33.5148	1.0009	.9990
21.5	1.8285	33.1547	1.0009	.9990
22.0	1.8459	32.8015	1.0009	.9990
22.5	1.8635	32.4551	1.0009	.9990
23.0	1.8810	32.1151	1.0009	.9990
23.5	1.8987	31.7813	1.0009	.9990
24.0	1.9164	31.4535	1.0009	.9990
24.5	1.9342	31.1314	1.0009	.9990
25.0	1.9521	30.8148	1.0009	.9990
25.5	1.9701	30.5036	1.0009	.9990
26.0	1.9881	30.1975	1.0010	.9989
26.5	2.0063	29.8964	1.0010	.9989
27.0	2.0245	29.6001	1.0010	.9989
27.5	2.0429	29.3085	1.0010	.9989
28.0	2.0613	29.0213	1.0010	.9989
28.5	2.0798	28.7385	1.0010	.9989
29.0	2.0984	28.4599	1.0010	.9989
29.5	2.1172	28.1853	1.0010	.9989
30.0	2.1360	27.9147	1.0010	.9989
30.5	2.1550	27.6480	1.0010	.9989
31.0	2.1741	27.3850	1.0010	.9989
31.5	2.1933	27.1255	1.0010	.9989
32.0	2.2126	26.8696	1.0010	.9989
32.5	2.2320	26.6171	1.0010	.9989
33.0	2.2516	26.3679	1.0010	.9989
33.5	2.2713	26.1219	1.0010	.9989
34.0	2.2911	25.8790	1.0010	.9989
34.5	2.3111	25.6392	1.0010	.9989
35.0	2.3312	25.4023	1.0010	.9989
35.5	2.3514	25.1683	1.0010	.9989
36.0	2.3718	24.9371	1.0010	.9989
36.5	2.3923	24.7086	1.0010	.9989
37.0	2.4130	24.4828	1.0010	.9989
37.5	2.4338	24.2596	1.0010	.9989
38.0	2.4548	24.0389	1.0010	.9989

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

H. TT = 250.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4760	23.8207	1.0010	.9989
39.0	2.4973	23.6049	1.0011	.9989
39.5	2.5188	23.3915	1.0011	.9989
40.0	2.5405	23.1803	1.0011	.9989

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

I. TT = 300.0 K PT = 3.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0779	1.0001	.9997
1.0	1.0820	67.5533	1.0002	.9997
1.5	1.1086	64.4285	1.0002	.9997
2.0	1.1328	61.9738	1.0002	.9996
2.5	1.1556	59.9258	1.0002	.9996
3.0	1.1772	58.1553	1.0003	.9996
3.5	1.1980	56.5884	1.0003	.9995
4.0	1.2181	55.1782	1.0003	.9995
4.5	1.2377	53.8931	1.0003	.9995
5.0	1.2569	52.7105	1.0004	.9995
5.5	1.2758	51.6136	1.0004	.9994
6.0	1.2943	50.5898	1.0004	.9994
6.5	1.3126	49.6289	1.0004	.9994
7.0	1.3306	48.7230	1.0005	.9994
7.5	1.3485	47.8657	1.0005	.9994
8.0	1.3662	47.0514	1.0005	.9994
8.5	1.3837	46.2757	1.0005	.9993
9.0	1.4012	45.5350	1.0005	.9993
9.5	1.4185	44.8258	1.0005	.9993
10.0	1.4358	44.1455	1.0006	.9993
10.5	1.4530	43.4915	1.0006	.9993
11.0	1.4701	42.8619	1.0006	.9993
11.5	1.4871	42.2547	1.0006	.9992
12.0	1.5042	41.6684	1.0006	.9992
12.5	1.5212	41.1013	1.0007	.9992
13.0	1.5381	40.5522	1.0007	.9992
13.5	1.5551	40.0200	1.0007	.9992
14.0	1.5720	39.5035	1.0007	.9992
14.5	1.5890	39.0019	1.0007	.9992
15.0	1.6059	38.5142	1.0007	.9991
15.5	1.6228	38.0396	1.0007	.9991
16.0	1.6398	37.5775	1.0008	.9991
16.5	1.6568	37.1270	1.0008	.9991
17.0	1.6738	36.6877	1.0008	.9991
17.5	1.6908	36.2590	1.0008	.9991
18.0	1.7079	35.8403	1.0008	.9991
18.5	1.7250	35.4312	1.0008	.9991
19.0	1.7421	35.0312	1.0008	.9990

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

I. TT = 300.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7593	34.6399	1.0008	.9990
20.0	1.7765	34.2568	1.0009	.9990
20.5	1.7938	33.8818	1.0009	.9990
21.0	1.8111	33.5143	1.0009	.9990
21.5	1.8285	33.1541	1.0009	.9990
22.0	1.8460	32.8009	1.0009	.9990
22.5	1.8635	32.4544	1.0009	.9990
23.0	1.8811	32.1143	1.0009	.9990
23.5	1.8987	31.7804	1.0009	.9990
24.0	1.9165	31.4525	1.0010	.9989
24.5	1.9343	31.1304	1.0010	.9989
25.0	1.9522	30.8137	1.0010	.9989
25.5	1.9702	30.5024	1.0010	.9989
26.0	1.9882	30.1963	1.0010	.9989
26.5	2.0064	29.8951	1.0010	.9989
27.0	2.0246	29.5987	1.0010	.9989
27.5	2.0429	29.3070	1.0010	.9989
28.0	2.0614	29.0198	1.0010	.9989
28.5	2.0799	28.7369	1.0010	.9989
29.0	2.0986	28.4582	1.0010	.9989
29.5	2.1173	28.1836	1.0011	.9989
30.0	2.1362	27.9129	1.0011	.9988
30.5	2.1551	27.6461	1.0011	.9988
31.0	2.1742	27.3830	1.0011	.9988
31.5	2.1934	27.1235	1.0011	.9988
32.0	2.2127	26.8675	1.0011	.9988
32.5	2.2322	26.6149	1.0011	.9988
33.0	2.2518	26.3656	1.0011	.9988
33.5	2.2715	26.1196	1.0011	.9988
34.0	2.2913	25.8766	1.0011	.9988
34.5	2.3113	25.6367	1.0011	.9988
35.0	2.3314	25.3998	1.0011	.9988
35.5	2.3516	25.1657	1.0011	.9988
36.0	2.3720	24.9344	1.0011	.9988
36.5	2.3926	24.7059	1.0011	.9988
37.0	2.4133	24.4800	1.0012	.9988
37.5	2.4341	24.2568	1.0012	.9988
38.0	2.4551	24.0360	1.0012	.9988

TABLE II. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

I. TT = 300.0 K PT = 3.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4763	23.8178	1.0012	.9988
39.0	2.4976	23.6019	1.0012	.9988
39.5	2.5191	23.3884	1.0012	.9988
40.0	2.5408	23.1771	1.0012	.9988

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

A. TT = 110.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0508	72.1120	.9999	1.0002
1.0	1.0817	67.5894	.9999	1.0002
1.5	1.1082	64.4754	.9998	1.0004
2.0	1.1323	62.0287	.9997	1.0005
2.5	1.1548	59.9873	.9996	1.0006
3.0	1.1763	58.2227	.9995	1.0007
3.5	1.1971	56.6555	.9995	1.0007

SATURATION BOUNDARY REACHED.

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

B. TT = 120.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0508	72.1048	1.0000	1.0001
1.0	1.0817	67.5853	.9999	1.0002
1.5	1.1083	64.4604	.9999	1.0002
2.0	1.1325	62.0072	.9999	1.0002
2.5	1.1551	59.9624	.9999	1.0002
3.0	1.1767	58.1948	.9998	1.0002
3.5	1.1974	56.6313	.9998	1.0003
4.0	1.2174	55.2245	.9998	1.0004
4.5	1.2370	53.9425	.9997	1.0004
5.0	1.2561	52.7626	.9997	1.0005
5.5	1.2748	51.6677	.9996	1.0005
6.0	1.2933	50.6460	.9996	1.0005
6.5	1.3114	49.6878	.9996	1.0006
7.0	1.3294	48.7831	.9995	1.0006
7.5	1.3471	47.9285	.9995	1.0007
8.0	1.3647	47.1170	.9994	1.0007
8.5	1.3822	46.3440	.9994	1.0008
9.0	1.3995	45.6053	.9993	1.0009
9.5	1.4167	44.8987	.9993	1.0009
10.0	1.4338	44.2211	.9992	1.0010
10.5	1.4509	43.5697	.9991	1.0011
11.0	1.4679	42.9426	.9991	1.0011
11.5	1.4848	42.3360	.9991	1.0012
12.0	1.5017	41.7520	.9990	1.0012
12.5	1.5186	41.1873	.9989	1.0013
13.0	1.5354	40.6406	.9989	1.0014
13.5	1.5522	40.1107	.9988	1.0014

SATURATION BOUNDARY REACHED.

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

C. TT = 130.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0858	1.0001	.9998
1.0	1.0819	67.5654	1.0001	.9999
1.5	1.1085	64.4433	1.0001	.9999
2.0	1.1327	61.9913	1.0001	.9999
2.5	1.1553	59.9458	1.0000	.9999
3.0	1.1769	58.1771	1.0000	.9999
3.5	1.1977	56.6116	1.0000	1.0000
4.0	1.2178	55.2030	1.0000	1.0000
4.5	1.2373	53.9201	1.0000	1.0000
5.0	1.2565	52.7396	1.0000	1.0000
5.5	1.2752	51.6438	1.0000	1.0000
6.0	1.2937	50.6221	1.0000	1.0001
6.5	1.3119	49.6634	.9999	1.0001
7.0	1.3299	48.7595	.9999	1.0001
7.5	1.3477	47.9039	.9999	1.0002
8.0	1.3653	47.0912	.9998	1.0002
8.5	1.3828	46.3171	.9998	1.0002
9.0	1.4002	45.5781	.9998	1.0003
9.5	1.4174	44.8708	.9998	1.0003
10.0	1.4346	44.1923	.9997	1.0003
10.5	1.4517	43.5402	.9997	1.0004
11.0	1.4687	42.9114	.9997	1.0004
11.5	1.4857	42.3061	.9996	1.0005
12.0	1.5026	41.7215	.9996	1.0005
12.5	1.5195	41.1563	.9996	1.0005
13.0	1.5364	40.6090	.9995	1.0006
13.5	1.5532	40.0785	.9995	1.0006
14.0	1.5700	39.5634	.9994	1.0007
14.5	1.5869	39.0630	.9994	1.0007
15.0	1.6037	38.5772	.9993	1.0008
15.5	1.6205	38.1042	.9993	1.0008
16.0	1.6373	37.6437	.9993	1.0009
16.5	1.6542	37.1941	.9992	1.0009
17.0	1.6711	36.7565	.9992	1.0010
17.5	1.6880	36.3295	.9991	1.0010
18.0	1.7049	35.9125	.9991	1.0011
18.5	1.7218	35.5051	.9990	1.0011
19.0	1.7388	35.1069	.9990	1.0012

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 130.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7558	34.7174	.9989	1.0013
20.0	1.7729	34.3363	.9988	1.0013
20.5	1.7900	33.9631	.9988	1.0014
21.0	1.8072	33.5976	.9987	1.0015
21.5	1.8244	33.2389	.9986	1.0015
22.0	1.8417	32.8872	.9986	1.0016
22.5	1.8590	32.5423	.9985	1.0017

SATURATION BOUNDARY REACHED.

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

D. TT = 140.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0837	1.0001	.9998
1.0	1.0819	67.5587	1.0001	.9998
1.5	1.1085	64.4347	1.0001	.9998
2.0	1.1328	61.9811	1.0001	.9997
2.5	1.1555	59.9342	1.0002	.9997
3.0	1.1771	58.1649	1.0002	.9997
3.5	1.1978	56.5993	1.0002	.9997
4.0	1.2180	55.1900	1.0002	.9997
4.5	1.2375	53.9064	1.0002	.9997
5.0	1.2567	52.7253	1.0002	.9998
5.5	1.2755	51.6297	1.0002	.9998
6.0	1.2940	50.6070	1.0002	.9998
6.5	1.3122	49.6473	1.0002	.9998
7.0	1.3302	48.7428	1.0002	.9998
7.5	1.3480	47.8867	1.0001	.9998
8.0	1.3657	47.0738	1.0001	.9998
8.5	1.3832	46.2988	1.0001	.9998
9.0	1.4006	45.5594	1.0001	.9999
9.5	1.4179	44.8517	1.0001	.9999
10.0	1.4351	44.1727	1.0001	.9999
10.5	1.4522	43.5202	1.0001	.9999
11.0	1.4693	42.8918	1.0000	.9999
11.5	1.4863	42.2858	1.0000	1.0000
12.0	1.5032	41.7007	1.0000	1.0000
12.5	1.5201	41.1349	1.0000	1.0000
13.0	1.5370	40.5872	1.0000	1.0001
13.5	1.5539	40.0563	.9999	1.0001
14.0	1.5708	39.5411	.9999	1.0001
14.5	1.5876	39.0408	.9999	1.0001
15.0	1.6045	38.5543	.9998	1.0002
15.5	1.6213	38.0811	.9998	1.0002
16.0	1.6382	37.6196	.9998	1.0002
16.5	1.6551	37.1705	.9998	1.0003
17.0	1.6720	36.7325	.9997	1.0003
17.5	1.6889	36.3051	.9997	1.0003
18.0	1.7059	35.8877	.9997	1.0004
18.5	1.7229	35.4798	.9996	1.0004
19.0	1.7399	35.0810	.9996	1.0005

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 140.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7570	34.6907	.9996	1.0005
20.0	1.7741	34.3089	.9995	1.0005
20.5	1.7913	33.9352	.9995	1.0006
21.0	1.8085	33.5693	.9994	1.0006
21.5	1.8258	33.2103	.9994	1.0007
22.0	1.8431	32.8583	.9994	1.0007
22.5	1.8605	32.5125	.9993	1.0008
23.0	1.8780	32.1736	.9993	1.0008
23.5	1.8955	31.8409	.9992	1.0009
24.0	1.9131	31.5142	.9992	1.0009
24.5	1.9308	31.1932	.9991	1.0010
25.0	1.9485	30.8778	.9991	1.0010
25.5	1.9664	30.5677	.9990	1.0011
26.0	1.9843	30.2628	.9990	1.0011
26.5	2.0023	29.9627	.9989	1.0012
27.0	2.0203	29.6676	.9989	1.0012
27.5	2.0385	29.3770	.9988	1.0013
28.0	2.0568	29.0910	.9988	1.0013
28.5	2.0751	28.8093	.9987	1.0014
29.0	2.0936	28.5318	.9987	1.0014
29.5	2.1122	28.2584	.9986	1.0015
30.0	2.1308	27.9890	.9986	1.0016

SATURATION BOUNDARY REACHED.

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

E. TT = 150.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0778	1.0001	.9997
1.0	1.0820	67.5532	1.0002	.9997
1.5	1.1086	64.4288	1.0002	.9997
2.0	1.1328	61.9741	1.0002	.9996
2.5	1.1556	59.9264	1.0002	.9996
3.0	1.1772	58.1564	1.0003	.9996
3.5	1.1980	56.5902	1.0003	.9996
4.0	1.2181	55.1808	1.0003	.9996
4.5	1.2377	53.8965	1.0003	.9996
5.0	1.2569	52.7148	1.0003	.9996
5.5	1.2757	51.6189	1.0003	.9996
6.0	1.2942	50.5959	1.0003	.9996
6.5	1.3124	49.6360	1.0003	.9996
7.0	1.3305	48.7305	1.0003	.9995
7.5	1.3483	47.8741	1.0003	.9996
8.0	1.3660	47.0609	1.0003	.9996
8.5	1.3835	46.2862	1.0003	.9996
9.0	1.4009	45.5463	1.0003	.9996
9.5	1.4182	44.8381	1.0003	.9996
10.0	1.4354	44.1588	1.0003	.9996
10.5	1.4526	43.5058	1.0003	.9996
11.0	1.4697	42.8772	1.0003	.9996
11.5	1.4867	42.2711	1.0003	.9996
12.0	1.5037	41.6857	1.0003	.9996
12.5	1.5206	41.1191	1.0003	.9996
13.0	1.5375	40.5711	1.0003	.9997
13.5	1.5544	40.0399	1.0003	.9997
14.0	1.5713	39.5245	1.0003	.9997
14.5	1.5882	39.0239	1.0002	.9997
15.0	1.6051	38.5371	1.0002	.9997
15.5	1.6220	38.0635	1.0002	.9998
16.0	1.6389	37.6023	1.0002	.9998
16.5	1.6558	37.1529	1.0002	.9998
17.0	1.6727	36.7147	1.0002	.9998
17.5	1.6897	36.2869	1.0001	.9998
18.0	1.7067	35.8693	1.0001	.9999
18.5	1.7237	35.4612	1.0001	.9999
19.0	1.7408	35.0621	1.0001	.9999

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 150.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7579	34.6718	1.0000	1.0000
20.0	1.7750	34.2898	1.0000	1.0000
20.5	1.7922	33.9157	1.0000	1.0000
21.0	1.8095	33.5492	1.0000	1.0000
21.5	1.8268	33.1900	.9999	1.0001
22.0	1.8441	32.8374	.9999	1.0001
22.5	1.8616	32.4919	.9999	1.0001
23.0	1.8791	32.1529	.9999	1.0002
23.5	1.8966	31.8200	.9998	1.0002
24.0	1.9143	31.4931	.9998	1.0002
24.5	1.9320	31.1719	.9998	1.0003
25.0	1.9498	30.8563	.9997	1.0003
25.5	1.9676	30.5460	.9997	1.0003
26.0	1.9855	30.2411	.9996	1.0004
26.5	2.0036	29.9411	.9996	1.0004
27.0	2.0217	29.6460	.9996	1.0005
27.5	2.0399	29.3554	.9995	1.0005
28.0	2.0582	29.0694	.9995	1.0006
28.5	2.0766	28.7876	.9994	1.0006
29.0	2.0951	28.5098	.9994	1.0007
29.5	2.1137	28.2358	.9994	1.0007
30.0	2.1324	27.9661	.9993	1.0008
30.5	2.1513	27.7002	.9993	1.0008
31.0	2.1702	27.4379	.9992	1.0008
31.5	2.1893	27.1793	.9992	1.0009
32.0	2.2084	26.9243	.9991	1.0009
32.5	2.2277	26.6726	.9991	1.0010
33.0	2.2471	26.4242	.9990	1.0010
33.5	2.2667	26.1790	.9990	1.0011
34.0	2.2863	25.9369	.9989	1.0011
34.5	2.3061	25.6979	.9989	1.0012
35.0	2.3261	25.4619	.9988	1.0012
35.5	2.3461	25.2287	.9988	1.0013
36.0	2.3664	24.9983	.9987	1.0013

SATURATION BOUNDARY REACHED.

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

F. TT = 175.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0714	1.0002	.9996
1.0	1.0820	67.5451	1.0002	.9996
1.5	1.1087	64.4195	1.0003	.9995
2.0	1.1329	61.9640	1.0003	.9995
2.5	1.1557	59.9154	1.0003	.9994
3.0	1.1773	58.1446	1.0004	.9994
3.5	1.1981	56.5775	1.0004	.9994
4.0	1.2183	55.1674	1.0005	.9993
4.5	1.2379	53.8824	1.0005	.9993
5.0	1.2571	52.6999	1.0005	.9993
5.5	1.2760	51.6033	1.0005	.9992
6.0	1.2945	50.5797	1.0006	.9992
6.5	1.3128	49.6190	1.0006	.9992
7.0	1.3308	48.7134	1.0006	.9992
7.5	1.3487	47.8563	1.0006	.9992
8.0	1.3664	47.0424	1.0006	.9992
8.5	1.3839	46.2672	1.0007	.9992
9.0	1.4014	45.5269	1.0007	.9991
9.5	1.4187	44.8181	1.0007	.9991
10.0	1.4360	44.1383	1.0007	.9991
10.5	1.4531	43.4848	1.0007	.9991
11.0	1.4703	42.8557	1.0007	.9991
11.5	1.4873	42.2490	1.0007	.9991
12.0	1.5043	41.6631	1.0007	.9991
12.5	1.5213	41.0965	1.0007	.9991
13.0	1.5383	40.5480	1.0008	.9991
13.5	1.5552	40.0163	1.0008	.9991
14.0	1.5721	39.5004	1.0008	.9991
14.5	1.5890	38.9993	1.0008	.9991
15.0	1.6060	38.5121	1.0008	.9991
15.5	1.6229	38.0381	1.0008	.9991
16.0	1.6398	37.5765	1.0008	.9991
16.5	1.6568	37.1267	1.0008	.9991
17.0	1.6738	36.6880	1.0008	.9991
17.5	1.6908	36.2596	1.0008	.9991
18.0	1.7078	35.8415	1.0008	.9991
18.5	1.7249	35.4330	1.0008	.9991
19.0	1.7420	35.0336	1.0008	.9991

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

F. TT = 175.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7591	34.6428	1.0008	.9991
20.0	1.7763	34.2604	1.0008	.9991
20.5	1.7936	33.8859	1.0008	.9991
21.0	1.8109	33.5190	1.0008	.9991
21.5	1.8283	33.1595	1.0008	.9992
22.0	1.8457	32.8069	1.0007	.9992
22.5	1.8632	32.4610	1.0007	.9992
23.0	1.8807	32.1215	1.0007	.9992
23.5	1.8983	31.7883	1.0007	.9992
24.0	1.9160	31.4610	1.0007	.9992
24.5	1.9338	31.1394	1.0007	.9992
25.0	1.9516	30.8234	1.0007	.9992
25.5	1.9696	30.5126	1.0007	.9992
26.0	1.9876	30.2070	1.0007	.9993
26.5	2.0057	29.9065	1.0007	.9993
27.0	2.0239	29.6108	1.0006	.9993
27.5	2.0421	29.3196	1.0006	.9993
28.0	2.0605	29.0330	1.0006	.9993
28.5	2.0790	28.7507	1.0006	.9994
29.0	2.0976	28.4727	1.0006	.9994
29.5	2.1163	28.1987	1.0006	.9994
30.0	2.1351	27.9286	1.0005	.9994
30.5	2.1540	27.6624	1.0005	.9994
31.0	2.1730	27.3999	1.0005	.9995
31.5	2.1921	27.1411	1.0005	.9995
32.0	2.2114	26.8857	1.0005	.9995
32.5	2.2307	26.6337	1.0004	.9995
33.0	2.2502	26.3850	1.0004	.9995
33.5	2.2698	26.1396	1.0004	.9996
34.0	2.2896	25.8972	1.0004	.9996
34.5	2.3095	25.6577	1.0004	.9996
35.0	2.3295	25.4211	1.0003	.9996
35.5	2.3497	25.1877	1.0003	.9997
36.0	2.3700	24.9570	1.0003	.9997
36.5	2.3905	24.7290	1.0003	.9997
37.0	2.4111	24.5038	1.0002	.9997
37.5	2.4318	24.2811	1.0002	.9998
38.0	2.4527	24.0609	1.0002	.9998

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

F. TT = 175.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4738	23.8431	1.0002	.9998
39.0	2.4950	23.6278	1.0001	.9999
39.5	2.5164	23.4149	1.0001	.9999
40.0	2.5380	23.2042	1.0001	.9999

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

G. TT = 200.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0688	1.0002	.9996
1.0	1.0821	67.5417	1.0002	.9995
1.5	1.1087	64.4152	1.0003	.9995
2.0	1.1330	61.9594	1.0004	.9994
2.5	1.1557	59.9105	1.0004	.9993
3.0	1.1774	58.1393	1.0004	.9993
3.5	1.1982	56.5719	1.0005	.9993
4.0	1.2184	55.1614	1.0005	.9992
4.5	1.2380	53.8761	1.0006	.9992
5.0	1.2572	52.6933	1.0006	.9991
5.5	1.2761	51.5964	1.0006	.9991
6.0	1.2946	50.5724	1.0007	.9991
6.5	1.3129	49.6115	1.0007	.9991
7.0	1.3310	48.7057	1.0007	.9990
7.5	1.3489	47.8483	1.0007	.9990
8.0	1.3666	47.0341	1.0008	.9990
8.5	1.3841	46.2586	1.0008	.9990
9.0	1.4016	45.5179	1.0008	.9989
9.5	1.4190	44.8089	1.0008	.9989
10.0	1.4362	44.1287	1.0009	.9989
10.5	1.4534	43.4750	1.0009	.9989
11.0	1.4705	42.8456	1.0009	.9989
11.5	1.4876	42.2386	1.0009	.9989
12.0	1.5046	41.6525	1.0009	.9988
12.5	1.5216	41.0857	1.0010	.9988
13.0	1.5386	40.5369	1.0010	.9988
13.5	1.5556	40.0049	1.0010	.9988
14.0	1.5725	39.4887	1.0010	.9988
14.5	1.5895	38.9873	1.0010	.9988
15.0	1.6064	38.4999	1.0010	.9988
15.5	1.6233	38.0256	1.0011	.9988
16.0	1.6403	37.5638	1.0011	.9987
16.5	1.6573	37.1137	1.0011	.9987
17.0	1.6743	36.6747	1.0011	.9987
17.5	1.6913	36.2463	1.0011	.9987
18.0	1.7084	35.8280	1.0011	.9987
18.5	1.7255	35.4192	1.0011	.9987
19.0	1.7426	35.0196	1.0011	.9987

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

G. TT = 200.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7598	34.6286	1.0011	.9987
20.0	1.7770	34.2460	1.0011	.9987
20.5	1.7943	33.8713	1.0011	.9987
21.0	1.8116	33.5042	1.0012	.9987
21.5	1.8290	33.1443	1.0012	.9987
22.0	1.8464	32.7915	1.0012	.9987
22.5	1.8639	32.4454	1.0012	.9987
23.0	1.8815	32.1057	1.0012	.9987
23.5	1.8992	31.7723	1.0012	.9987
24.0	1.9169	31.4448	1.0012	.9987
24.5	1.9347	31.1230	1.0012	.9987
25.0	1.9526	30.8068	1.0012	.9987
25.5	1.9705	30.4959	1.0012	.9987
26.0	1.9886	30.1902	1.0012	.9987
26.5	2.0067	29.8894	1.0012	.9987
27.0	2.0249	29.5935	1.0012	.9987
27.5	2.0433	29.3022	1.0012	.9987
28.0	2.0617	29.0153	1.0012	.9987
28.5	2.0802	28.7329	1.0012	.9987
29.0	2.0988	28.4546	1.0012	.9987
29.5	2.1175	28.1804	1.0012	.9987
30.0	2.1364	27.9102	1.0011	.9988
30.5	2.1553	27.6438	1.0011	.9988
31.0	2.1744	27.3811	1.0011	.9988
31.5	2.1935	27.1219	1.0011	.9988
32.0	2.2128	26.8664	1.0011	.9988
32.5	2.2322	26.6142	1.0011	.9988
33.0	2.2518	26.3654	1.0011	.9988
33.5	2.2714	26.1197	1.0011	.9988
34.0	2.2912	25.8772	1.0011	.9988
34.5	2.3112	25.6377	1.0011	.9988
35.0	2.3313	25.4012	1.0011	.9988
35.5	2.3515	25.1675	1.0011	.9989
36.0	2.3718	24.9367	1.0011	.9989
36.5	2.3923	24.7086	1.0010	.9989
37.0	2.4130	24.4832	1.0010	.9989
37.5	2.4338	24.2603	1.0010	.9989
38.0	2.4547	24.0400	1.0010	.9989

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

G. TT = 200.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4759	23.8221	1.0010	.9989
39.0	2.4972	23.6067	1.0010	.9990
39.5	2.5186	23.3936	1.0010	.9990
40.0	2.5402	23.1827	1.0010	.9990

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

H. TT = 250.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0681	1.0002	.9996
1.0	1.0821	67.5408	1.0002	.9995
1.5	1.1087	64.4141	1.0003	.9994
2.0	1.1330	61.9581	1.0004	.9994
2.5	1.1558	59.9097	1.0004	.9993
3.0	1.1774	58.1382	1.0005	.9993
3.5	1.1982	56.5705	1.0005	.9992
4.0	1.2184	55.1596	1.0005	.9992
4.5	1.2380	53.8740	1.0006	.9991
5.0	1.2573	52.6909	1.0006	.9991
5.5	1.2761	51.5937	1.0007	.9991
6.0	1.2947	50.5695	1.0007	.9990
6.5	1.3130	49.6083	1.0007	.9990
7.0	1.3310	48.7021	1.0008	.9990
7.5	1.3489	47.8445	1.0008	.9989
8.0	1.3667	47.0300	1.0008	.9989
8.5	1.3842	46.2542	1.0009	.9989
9.0	1.4017	45.5133	1.0009	.9988
9.5	1.4191	44.8040	1.0009	.9988
10.0	1.4364	44.1236	1.0010	.9988
10.5	1.4536	43.4696	1.0010	.9988
11.0	1.4707	42.8399	1.0010	.9987
11.5	1.4878	42.2327	1.0010	.9987
12.0	1.5048	41.6463	1.0011	.9987
12.5	1.5218	41.0792	1.0011	.9987
13.0	1.5388	40.5302	1.0011	.9986
13.5	1.5558	39.9979	1.0011	.9986
14.0	1.5727	39.4815	1.0012	.9986
14.5	1.5897	38.9799	1.0012	.9986
15.0	1.6067	38.4922	1.0012	.9986
15.5	1.6236	38.0177	1.0012	.9986
16.0	1.6406	37.5556	1.0013	.9985
16.5	1.6576	37.1053	1.0013	.9985
17.0	1.6746	36.6661	1.0013	.9985
17.5	1.6917	36.2375	1.0013	.9985
18.0	1.7087	35.8189	1.0013	.9985
18.5	1.7259	35.4099	1.0013	.9985
19.0	1.7430	35.0100	1.0014	.9984

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

H. TT = 250.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7602	34.6188	1.0014	.9984
20.0	1.7775	34.2359	1.0014	.9984
20.5	1.7948	33.8609	1.0014	.9984
21.0	1.8121	33.4936	1.0014	.9984
21.5	1.8295	33.1335	1.0014	.9984
22.0	1.8470	32.7805	1.0015	.9984
22.5	1.8645	32.4341	1.0015	.9983
23.0	1.8821	32.0942	1.0015	.9983
23.5	1.8998	31.7605	1.0015	.9983
24.0	1.9176	31.4328	1.0015	.9983
24.5	1.9354	31.1108	1.0015	.9983
25.0	1.9533	30.7943	1.0015	.9983
25.5	1.9713	30.4832	1.0016	.9983
26.0	1.9894	30.1772	1.0016	.9983
26.5	2.0075	29.8763	1.0016	.9983
27.0	2.0258	29.5801	1.0016	.9983
27.5	2.0441	29.2885	1.0016	.9983
28.0	2.0626	29.0015	1.0016	.9982
28.5	2.0811	28.7188	1.0016	.9982
29.0	2.0998	28.4403	1.0016	.9982
29.5	2.1185	28.1659	1.0016	.9982
30.0	2.1374	27.8955	1.0016	.9982
30.5	2.1564	27.6289	1.0016	.9982
31.0	2.1755	27.3660	1.0016	.9982
31.5	2.1947	27.1067	1.0017	.9982
32.0	2.2140	26.8509	1.0017	.9982
32.5	2.2335	26.5985	1.0017	.9982
33.0	2.2530	26.3495	1.0017	.9982
33.5	2.2727	26.1036	1.0017	.9982
34.0	2.2926	25.8609	1.0017	.9982
34.5	2.3126	25.6212	1.0017	.9982
35.0	2.3327	25.3845	1.0017	.9982
35.5	2.3529	25.1507	1.0017	.9982
36.0	2.3733	24.9196	1.0017	.9982
36.5	2.3939	24.6913	1.0017	.9982
37.0	2.4146	24.4657	1.0017	.9982
37.5	2.4354	24.2426	1.0017	.9982
38.0	2.4565	24.0221	1.0017	.9982

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

H. TT = 250.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4776	23.8040	1.0017	.9982
39.0	2.4990	23.5884	1.0017	.9982
39.5	2.5205	23.3751	1.0017	.9982
40.0	2.5422	23.1641	1.0017	.9982

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

I. TT = 300.0 K PT = 5.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0696	1.0002	.9996
1.0	1.0821	67.5427	1.0002	.9995
1.5	1.1087	64.4162	1.0003	.9995
2.0	1.1330	61.9604	1.0003	.9994
2.5	1.1557	59.9114	1.0004	.9994
3.0	1.1774	58.1401	1.0004	.9993
3.5	1.1982	56.5725	1.0005	.9993
4.0	1.2184	55.1617	1.0005	.9992
4.5	1.2380	53.8761	1.0006	.9992
5.0	1.2572	52.6930	1.0006	.9991
5.5	1.2761	51.5958	1.0006	.9991
6.0	1.2946	50.5715	1.0007	.9991
6.5	1.3129	49.6103	1.0007	.9990
7.0	1.3310	48.7041	1.0007	.9990
7.5	1.3489	47.8464	1.0008	.9990
8.0	1.3666	47.0318	1.0008	.9989
8.5	1.3842	46.2560	1.0008	.9989
9.0	1.4017	45.5150	1.0009	.9989
9.5	1.4190	44.8056	1.0009	.9989
10.0	1.4363	44.1251	1.0009	.9988
10.5	1.4535	43.4711	1.0010	.9988
11.0	1.4707	42.8413	1.0010	.9988
11.5	1.4877	42.2341	1.0010	.9988
12.0	1.5048	41.6476	1.0010	.9987
12.5	1.5218	41.0804	1.0011	.9987
13.0	1.5388	40.5313	1.0011	.9987
13.5	1.5558	39.9990	1.0011	.9987
14.0	1.5727	39.4824	1.0011	.9986
14.5	1.5897	38.9807	1.0012	.9986
15.0	1.6066	38.4929	1.0012	.9986
15.5	1.6236	38.0183	1.0012	.9986
16.0	1.6406	37.5561	1.0012	.9985
16.5	1.6576	37.1056	1.0013	.9985
17.0	1.6746	36.6663	1.0013	.9985
17.5	1.6917	36.2376	1.0013	.9985
18.0	1.7087	35.8189	1.0013	.9985
18.5	1.7259	35.4097	1.0014	.9984
19.0	1.7430	35.0097	1.0014	.9984

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

I. TT = 300.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7602	34.6184	1.0014	.9984
20.0	1.7775	34.2354	1.0014	.9984
20.5	1.7948	33.8603	1.0014	.9984
21.0	1.8121	33.4929	1.0015	.9984
21.5	1.8296	33.1327	1.0015	.9983
22.0	1.8470	32.7795	1.0015	.9983
22.5	1.8646	32.4330	1.0015	.9983
23.0	1.8822	32.0930	1.0015	.9983
23.5	1.8999	31.7592	1.0015	.9983
24.0	1.9176	31.4313	1.0016	.9983
24.5	1.9355	31.1092	1.0016	.9983
25.0	1.9534	30.7927	1.0016	.9982
25.5	1.9714	30.4814	1.0016	.9982
26.0	1.9895	30.1753	1.0016	.9982
26.5	2.0076	29.8742	1.0016	.9982
27.0	2.0259	29.5779	1.0016	.9982
27.5	2.0443	29.2863	1.0017	.9982
28.0	2.0627	28.9991	1.0017	.9982
28.5	2.0813	28.7163	1.0017	.9982
29.0	2.0999	28.4377	1.0017	.9981
29.5	2.1187	28.1632	1.0017	.9981
30.0	2.1376	27.8926	1.0017	.9981
30.5	2.1566	27.6259	1.0017	.9981
31.0	2.1757	27.3629	1.0018	.9981
31.5	2.1949	27.1035	1.0018	.9981
32.0	2.2143	26.8476	1.0018	.9981
32.5	2.2337	26.5951	1.0018	.9981
33.0	2.2533	26.3459	1.0018	.9981
33.5	2.2730	26.1000	1.0018	.9981
34.0	2.2929	25.8571	1.0018	.9981
34.5	2.3129	25.6173	1.0018	.9980
35.0	2.3330	25.3805	1.0018	.9980
35.5	2.3533	25.1466	1.0018	.9980
36.0	2.3737	24.9154	1.0019	.9980
36.5	2.3943	24.6870	1.0019	.9980
37.0	2.4150	24.4613	1.0019	.9980
37.5	2.4359	24.2381	1.0019	.9980
38.0	2.4569	24.0175	1.0019	.9980

TABLE III. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

I. TT = 300.0 K PT = 5.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4781	23.7993	1.0019	.9980
39.0	2.4995	23.5836	1.0019	.9980
39.5	2.5210	23.3702	1.0019	.9980
40.0	2.5427	23.1591	1.0019	.9980

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

A: TT = 120.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0614	1.0002	.9995
1.0	1.0819	67.5684	1.0000	.9999
1.5	1.1084	64.4540	1.0000	1.0001
2.0	1.1326	62.0005	1.0000	1.0001
2.5	1.1552	59.9530	1.0000	1.0000
3.0	1.1768	58.1893	.9999	1.0002
3.5	1.1974	56.6285	.9998	1.0003
4.0	1.2174	55.2257	.9997	1.0004
4.5	1.2369	53.9456	.9997	1.0005
5.0	1.2560	52.7653	.9996	1.0005
5.5	1.2747	51.6731	.9996	1.0006
6.0	1.2931	50.6539	.9995	1.0007
6.5	1.3112	49.6976	.9994	1.0008

SATURATION BOUNDARY REACHED.

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

B. TT = 130.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0509	72.0911	1.0000	.9999
1.0	1.0819	67.5603	1.0001	.9998
1.5	1.1085	64.4405	1.0001	.9998
2.0	1.1327	61.9895	1.0001	.9999
2.5	1.1554	59.9441	1.0001	.9999
3.0	1.1770	58.1737	1.0001	.9999
3.5	1.1977	56.6075	1.0001	.9999
4.0	1.2178	55.1997	1.0001	.9999
4.5	1.2374	53.9181	1.0000	1.0000
5.0	1.2565	52.7372	1.0000	1.0000
5.5	1.2752	51.6439	1.0000	1.0000
6.0	1.2937	50.6226	.9999	1.0001
6.5	1.3119	49.6636	.9999	1.0001
7.0	1.3299	48.7597	.9999	1.0001
7.5	1.3476	47.9054	.9998	1.0002
8.0	1.3653	47.0927	.9998	1.0002
8.5	1.3827	46.3204	.9998	1.0003
9.0	1.4000	45.5829	.9997	1.0004
9.5	1.4173	44.8770	.9997	1.0004
10.0	1.4344	44.1995	.9996	1.0005
10.5	1.4514	43.5484	.9995	1.0006
11.0	1.4684	42.9216	.9995	1.0006
11.5	1.4854	42.3159	.9994	1.0007
12.0	1.5023	41.7325	.9994	1.0008
12.5	1.5191	41.1681	.9993	1.0008
13.0	1.5359	40.6222	.9992	1.0009
13.5	1.5527	40.0930	.9992	1.0010
14.0	1.5695	39.5793	.9991	1.0011
14.5	1.5863	39.0804	.9990	1.0012
15.0	1.6031	38.5940	.9990	1.0012
15.5	1.6198	38.1225	.9989	1.0013
16.0	1.6366	37.6635	.9988	1.0014

SATURATION BOUNDARY REACHED.

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

C. TT = 140.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0774	1.0001	.9997
1.0	1.0820	67.5535	1.0002	.9997
1.5	1.1086	64.4250	1.0002	.9996
2.0	1.1329	61.9686	1.0003	.9995
2.5	1.1556	59.9217	1.0003	.9995
3.0	1.1772	58.1529	1.0003	.9995
3.5	1.1980	56.5876	1.0003	.9995
4.0	1.2181	55.1794	1.0003	.9995
4.5	1.2377	53.8959	1.0003	.9995
5.0	1.2569	52.7131	1.0003	.9995
5.5	1.2757	51.6175	1.0003	.9995
6.0	1.2942	50.5956	1.0003	.9995
6.5	1.3124	49.6369	1.0003	.9996
7.0	1.3304	48.7331	1.0003	.9996
7.5	1.3482	47.8779	1.0003	.9996
8.0	1.3659	47.0657	1.0003	.9997
8.5	1.3834	46.2903	1.0003	.9997
9.0	1.4008	45.5511	1.0003	.9997
9.5	1.4181	44.8439	1.0002	.9997
10.0	1.4353	44.1658	1.0002	.9997
10.5	1.4524	43.5141	1.0002	.9998
11.0	1.4694	42.8867	1.0001	.9998
11.5	1.4864	42.2818	1.0001	.9999
12.0	1.5033	41.6965	1.0001	.9999
12.5	1.5202	41.1317	1.0000	.9999
13.0	1.5371	40.5845	1.0000	1.0000
13.5	1.5540	40.0541	1.0000	1.0000
14.0	1.5708	39.5395	.9999	1.0001
14.5	1.5876	39.0401	.9999	1.0001
15.0	1.6045	38.5546	.9998	1.0002
15.5	1.6213	38.0823	.9998	1.0002
16.0	1.6381	37.6223	.9997	1.0003
16.5	1.6550	37.1731	.9997	1.0003
17.0	1.6719	36.7360	.9997	1.0004
17.5	1.6888	36.3092	.9996	1.0005
18.0	1.7057	35.8925	.9996	1.0005
18.5	1.7227	35.4854	.9995	1.0006
19.0	1.7397	35.0874	.9994	1.0006

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 140.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7567	34.6981	.9994	1.0007
20.0	1.7738	34.3172	.9993	1.0008
20.5	1.7909	33.9435	.9993	1.0008
21.0	1.8081	33.5782	.9992	1.0009
21.5	1.8253	33.2202	.9991	1.0010
22.0	1.8426	32.8692	.9991	1.0011
22.5	1.8599	32.5249	.9990	1.0011
23.0	1.8773	32.1869	.9989	1.0012
23.5	1.8947	31.8552	.9988	1.0013
24.0	1.9123	31.5294	.9988	1.0014
24.5	1.9299	31.2094	.9987	1.0015

SATURATION BOUNDARY REACHED.

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

D. TT = 150.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0724	1.0001	.9996
1.0	1.0821	67.5421	1.0002	.9995
1.5	1.1087	64.4160	1.0003	.9995
2.0	1.1330	61.9607	1.0003	.9994
2.5	1.1557	59.9124	1.0004	.9994
3.0	1.1774	58.1408	1.0004	.9993
3.5	1.1982	56.5733	1.0005	.9993
4.0	1.2183	55.1638	1.0005	.9993
4.5	1.2380	53.8795	1.0005	.9992
5.0	1.2572	52.6974	1.0005	.9992
5.5	1.2760	51.6018	1.0006	.9992
6.0	1.2945	50.5792	1.0006	.9992
6.5	1.3127	49.6196	1.0006	.9992
7.0	1.3308	48.7149	1.0006	.9992
7.5	1.3486	47.8584	1.0006	.9992
8.0	1.3663	47.0443	1.0006	.9992
8.5	1.3839	46.2701	1.0006	.9992
9.0	1.4013	45.5308	1.0006	.9992
9.5	1.4186	44.8232	1.0006	.9992
10.0	1.4358	44.1444	1.0006	.9993
10.5	1.4530	43.4921	1.0006	.9993
11.0	1.4700	42.8639	1.0006	.9993
11.5	1.4871	42.2580	1.0006	.9993
12.0	1.5040	41.6729	1.0005	.9993
12.5	1.5210	41.1065	1.0005	.9993
13.0	1.5379	40.5592	1.0005	.9994
13.5	1.5548	40.0286	1.0005	.9994
14.0	1.5717	39.5138	1.0005	.9994
14.5	1.5885	39.0139	1.0005	.9995
15.0	1.6054	38.5279	1.0004	.9995
15.5	1.6223	38.0550	1.0004	.9995
16.0	1.6392	37.5945	1.0004	.9996
16.5	1.6561	37.1450	1.0004	.9996
17.0	1.6730	36.7072	1.0003	.9996
17.5	1.6900	36.2800	1.0003	.9997
18.0	1.7069	35.8629	1.0003	.9997
18.5	1.7239	35.4556	1.0002	.9997
19.0	1.7410	35.0573	1.0002	.9998

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION.

D. TT = 150.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7580	34.6677	1.0001	.9998
20.0	1.7752	34.2865	1.0001	.9999
20.5	1.7923	33.9131	1.0001	.9999
21.0	1.8095	33.5474	1.0000	1.0000
21.5	1.8268	33.1887	1.0000	1.0000
22.0	1.8442	32.8370	.9999	1.0001
22.5	1.8616	32.4914	.9999	1.0001
23.0	1.8791	32.1531	.9999	1.0002
23.5	1.8966	31.8210	.9998	1.0002
24.0	1.9142	31.4949	.9997	1.0003
24.5	1.9318	31.1745	.9997	1.0003
25.0	1.9496	30.8597	.9996	1.0004
25.5	1.9674	30.5502	.9996	1.0005
26.0	1.9853	30.2458	.9995	1.0005
26.5	2.0032	29.9464	.9994	1.0006
27.0	2.0213	29.6518	.9994	1.0007
27.5	2.0395	29.3613	.9993	1.0007
28.0	2.0578	29.0758	.9993	1.0008
28.5	2.0761	28.7947	.9992	1.0009
29.0	2.0945	28.5178	.9991	1.0010
29.5	2.1131	28.2449	.9991	1.0010
30.0	2.1317	27.9760	.9990	1.0011
30.5	2.1505	27.7109	.9989	1.0012
31.0	2.1694	27.4496	.9988	1.0013
31.5	2.1883	27.1918	.9988	1.0013

SATURATION BOUNDARY REACHED.

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

E. TT = 175.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0568	1.0002	.9994
1.0	1.0822	67.5273	1.0003	.9993
1.5	1.1089	64.3991	1.0004	.9992
2.0	1.1332	61.9421	1.0005	.9991
2.5	1.1560	59.8925	1.0006	.9990
3.0	1.1776	58.1209	1.0006	.9990
3.5	1.1985	56.5536	1.0007	.9989
4.0	1.2187	55.1428	1.0008	.9989
4.5	1.2383	53.8572	1.0008	.9988
5.0	1.2575	52.6743	1.0009	.9988
5.5	1.2764	51.5774	1.0009	.9987
6.0	1.2950	50.5536	1.0009	.9987
6.5	1.3133	49.5929	1.0010	.9987
7.0	1.3314	48.6870	1.0010	.9987
7.5	1.3492	47.8300	1.0010	.9986
8.0	1.3670	47.0161	1.0011	.9986
8.5	1.3846	46.2409	1.0011	.9986
9.0	1.4020	45.5005	1.0011	.9986
9.5	1.4194	44.7918	1.0011	.9985
10.0	1.4367	44.1120	1.0012	.9985
10.5	1.4538	43.4587	1.0012	.9985
11.0	1.4710	42.8297	1.0012	.9985
11.5	1.4880	42.2232	1.0012	.9985
12.0	1.5051	41.6376	1.0012	.9985
12.5	1.5221	41.0712	1.0013	.9985
13.0	1.5390	40.5230	1.0013	.9985
13.5	1.5560	39.9912	1.0013	.9985
14.0	1.5729	39.4756	1.0013	.9985
14.5	1.5899	38.9748	1.0013	.9985
15.0	1.6068	38.4880	1.0013	.9985
15.5	1.6238	38.0142	1.0013	.9985
16.0	1.6407	37.5529	1.0013	.9985
16.5	1.6577	37.1033	1.0013	.9985
17.0	1.6747	36.6650	1.0013	.9985
17.5	1.6917	36.2372	1.0013	.9985
18.0	1.7087	35.8191	1.0013	.9985
18.5	1.7258	35.4110	1.0013	.9985
19.0	1.7429	35.0120	1.0013	.9985

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 175.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7601	34.6217	1.0013	.9985
20.0	1.7773	34.2397	1.0013	.9985
20.5	1.7945	33.8657	1.0013	.9985
21.0	1.8118	33.4992	1.0013	.9985
21.5	1.8292	33.1400	1.0013	.9986
22.0	1.8466	32.7878	1.0013	.9986
22.5	1.8641	32.4423	1.0012	.9986
23.0	1.8817	32.1034	1.0012	.9986
23.5	1.8993	31.7706	1.0012	.9986
24.0	1.9170	31.4437	1.0012	.9987
24.5	1.9347	31.1227	1.0012	.9987
25.0	1.9526	30.8071	1.0012	.9987
25.5	1.9705	30.4969	1.0011	.9987
26.0	1.9885	30.1916	1.0011	.9988
26.5	2.0066	29.8915	1.0011	.9988
27.0	2.0248	29.5962	1.0011	.9988
27.5	2.0430	29.3056	1.0011	.9988
28.0	2.0614	29.0195	1.0010	.9989
28.5	2.0799	28.7378	1.0010	.9989
29.0	2.0984	28.4602	1.0010	.9989
29.5	2.1171	28.1867	1.0009	.9990
30.0	2.1359	27.9171	1.0009	.9990
30.5	2.1548	27.6513	1.0009	.9990
31.0	2.1737	27.3893	1.0009	.9991
31.5	2.1929	27.1310	1.0008	.9991
32.0	2.2121	26.8761	1.0008	.9991
32.5	2.2315	26.6243	1.0008	.9992
33.0	2.2509	26.3762	1.0007	.9992
33.5	2.2705	26.1312	1.0007	.9993
34.0	2.2902	25.8894	1.0007	.9993
34.5	2.3101	25.6506	1.0006	.9993
35.0	2.3301	25.4148	1.0006	.9994
35.5	2.3502	25.1818	1.0005	.9994
36.0	2.3705	24.9517	1.0005	.9995
36.5	2.3909	24.7242	1.0005	.9995
37.0	2.4115	24.4993	1.0004	.9996
37.5	2.4322	24.2770	1.0004	.9996
38.0	2.4531	24.0573	1.0003	.9996

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 175.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4741	23.8399	1.0003	.9997
39.0	2.4953	23.6250	1.0003	.9997
39.5	2.5167	23.4123	1.0002	.9998
40.0	2.5382	23.2021	1.0002	.9998

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

F. TT = 200.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0554	1.0002	.9994
1.0	1.0822	67.5242	1.0004	.9993
1.5	1.1089	64.3950	1.0005	.9991
2.0	1.1332	61.9373	1.0006	.9990
2.5	1.1560	59.8877	1.0006	.9990
3.0	1.1777	58.1151	1.0007	.9989
3.5	1.1986	56.5466	1.0008	.9988
4.0	1.2188	55.1351	1.0008	.9987
4.5	1.2384	53.8490	1.0009	.9987
5.0	1.2577	52.6656	1.0010	.9986
5.5	1.2766	51.5682	1.0010	.9986
6.0	1.2952	50.5438	1.0011	.9985
6.5	1.3135	49.5825	1.0011	.9985
7.0	1.3316	48.6763	1.0012	.9984
7.5	1.3495	47.8187	1.0012	.9984
8.0	1.3672	47.0043	1.0013	.9984
8.5	1.3848	46.2285	1.0013	.9983
9.0	1.4023	45.4877	1.0013	.9983
9.5	1.4197	44.7786	1.0014	.9983
10.0	1.4370	44.0984	1.0014	.9982
10.5	1.4542	43.4446	1.0015	.9982
11.0	1.4714	42.8151	1.0015	.9982
11.5	1.4885	42.2081	1.0015	.9981
12.0	1.5055	41.6220	1.0015	.9981
12.5	1.5226	41.0552	1.0016	.9981
13.0	1.5396	40.5064	1.0016	.9981
13.5	1.5565	39.9745	1.0016	.9980
14.0	1.5735	39.4585	1.0017	.9980
14.5	1.5905	38.9572	1.0017	.9980
15.0	1.6074	38.4699	1.0017	.9980
15.5	1.6244	37.9957	1.0017	.9980
16.0	1.6414	37.5340	1.0017	.9980
16.5	1.6584	37.0841	1.0018	.9979
17.0	1.6754	36.6453	1.0018	.9979
17.5	1.6925	36.2171	1.0018	.9979
18.0	1.7096	35.7989	1.0018	.9979
18.5	1.7267	35.3904	1.0018	.9979
19.0	1.7438	34.9909	1.0018	.9979

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

F. TT = 200.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7610	34.6002	1.0019	.9979
20.0	1.7783	34.2178	1.0019	.9979
20.5	1.7956	33.8434	1.0019	.9979
21.0	1.8129	33.4765	1.0019	.9979
21.5	1.8303	33.1170	1.0019	.9979
22.0	1.8478	32.7644	1.0019	.9979
22.5	1.8653	32.4186	1.0019	.9979
23.0	1.8829	32.0792	1.0019	.9979
23.5	1.9006	31.7461	1.0019	.9979
24.0	1.9183	31.4189	1.0019	.9979
24.5	1.9361	31.0974	1.0019	.9979
25.0	1.9540	30.7813	1.0019	.9979
25.5	1.9720	30.4708	1.0019	.9979
26.0	1.9901	30.1654	1.0019	.9979
26.5	2.0082	29.8650	1.0019	.9979
27.0	2.0264	29.5694	1.0019	.9979
27.5	2.0448	29.2784	1.0019	.9979
28.0	2.0632	28.9919	1.0019	.9979
28.5	2.0817	28.7097	1.0019	.9979
29.0	2.1003	28.4318	1.0019	.9979
29.5	2.1191	28.1580	1.0019	.9979
30.0	2.1379	27.8882	1.0019	.9980
30.5	2.1569	27.6221	1.0019	.9980
31.0	2.1759	27.3598	1.0019	.9980
31.5	2.1951	27.1011	1.0018	.9980
32.0	2.2144	26.8457	1.0018	.9980
32.5	2.2338	26.5940	1.0018	.9980
33.0	2.2534	26.3455	1.0018	.9980
33.5	2.2730	26.1002	1.0018	.9981
34.0	2.2928	25.8581	1.0018	.9981
34.5	2.3128	25.6190	1.0018	.9981
35.0	2.3328	25.3828	1.0018	.9981
35.5	2.3530	25.1496	1.0017	.9981
36.0	2.3734	24.9191	1.0017	.9982
36.5	2.3939	24.6914	1.0017	.9982
37.0	2.4145	24.4663	1.0017	.9982
37.5	2.4353	24.2438	1.0017	.9982
38.0	2.4563	24.0239	1.0016	.9983

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

F. TT = 200.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4774	23.8064	1.0016	.9983
39.0	2.4987	23.5914	1.0016	.9983
39.5	2.5201	23.3786	1.0016	.9983
40.0	2.5417	23.1681	1.0015	.9984

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

G. TT = 250.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0542	1.0003	.9994
1.0	1.0822	67.5232	1.0004	.9992
1.5	1.1089	64.3939	1.0005	.9991
2.0	1.1332	61.9360	1.0006	.9990
2.5	1.1560	59.8853	1.0007	.9989
3.0	1.1777	58.1126	1.0007	.9988
3.5	1.1986	56.5439	1.0008	.9988
4.0	1.2188	55.1322	1.0009	.9987
4.5	1.2385	53.8458	1.0010	.9986
5.0	1.2577	52.6621	1.0010	.9986
5.5	1.2766	51.5643	1.0011	.9985
6.0	1.2952	50.5396	1.0011	.9984
6.5	1.3136	49.5779	1.0012	.9984
7.0	1.3317	48.6717	1.0012	.9983
7.5	1.3496	47.8137	1.0013	.9983
8.0	1.3674	46.9988	1.0013	.9982
8.5	1.3850	46.2227	1.0014	.9982
9.0	1.4025	45.4815	1.0014	.9981
9.5	1.4199	44.7720	1.0015	.9981
10.0	1.4372	44.0913	1.0015	.9981
10.5	1.4544	43.4371	1.0016	.9980
11.0	1.4716	42.8073	1.0016	.9980
11.5	1.4887	42.1999	1.0017	.9979
12.0	1.5058	41.6133	1.0017	.9979
12.5	1.5228	41.0461	1.0018	.9979
13.0	1.5399	40.4970	1.0018	.9978
13.5	1.5569	39.9647	1.0018	.9978
14.0	1.5739	39.4482	1.0019	.9978
14.5	1.5908	38.9467	1.0019	.9977
15.0	1.6078	38.4590	1.0019	.9977
15.5	1.6248	37.9844	1.0020	.9977
16.0	1.6418	37.5223	1.0020	.9976
16.5	1.6589	37.0720	1.0020	.9976
17.0	1.6759	36.6328	1.0021	.9976
17.5	1.6930	36.2042	1.0021	.9976
18.0	1.7101	35.7856	1.0021	.9975
18.5	1.7273	35.3767	1.0022	.9975
19.0	1.7445	34.9768	1.0022	.9975

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

G. TT = 250.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7617	34.5857	1.0022	.9975
20.0	1.7790	34.2029	1.0022	.9974
20.5	1.7963	33.8280	1.0023	.9974
21.0	1.8137	33.4608	1.0023	.9974
21.5	1.8311	33.1009	1.0023	.9974
22.0	1.8486	32.7479	1.0023	.9974
22.5	1.8662	32.4017	1.0024	.9973
23.0	1.8838	32.0619	1.0024	.9973
23.5	1.9015	31.7284	1.0024	.9973
24.0	1.9193	31.4008	1.0024	.9973
24.5	1.9372	31.0789	1.0025	.9973
25.0	1.9551	30.7626	1.0025	.9973
25.5	1.9731	30.4517	1.0025	.9973
26.0	1.9912	30.1459	1.0025	.9972
26.5	2.0094	29.8451	1.0025	.9972
27.0	2.0277	29.5491	1.0025	.9972
27.5	2.0461	29.2578	1.0026	.9972
28.0	2.0646	28.9709	1.0026	.9972
28.5	2.0831	28.6884	1.0026	.9972
29.0	2.1018	28.4102	1.0026	.9972
29.5	2.1206	28.1360	1.0026	.9972
30.0	2.1395	27.8657	1.0026	.9972
30.5	2.1585	27.5993	1.0026	.9972
31.0	2.1776	27.3366	1.0026	.9971
31.5	2.1969	27.0776	1.0027	.9971
32.0	2.2162	26.8220	1.0027	.9971
32.5	2.2357	26.5699	1.0027	.9971
33.0	2.2553	26.3210	1.0027	.9971
33.5	2.2750	26.0754	1.0027	.9971
34.0	2.2949	25.8329	1.0027	.9971
34.5	2.3149	25.5935	1.0027	.9971
35.0	2.3350	25.3570	1.0027	.9971
35.5	2.3553	25.1234	1.0027	.9971
36.0	2.3758	24.8927	1.0027	.9971
36.5	2.3963	24.6646	1.0027	.9971
37.0	2.4170	24.4392	1.0027	.9971
37.5	2.4379	24.2164	1.0027	.9971
38.0	2.4590	23.9962	1.0027	.9971

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

G. TT = 250.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4802	23.7784	1.0027	.9971
39.0	2.5015	23.5630	1.0027	.9971
39.5	2.5230	23.3500	1.0027	.9971
40.0	2.5447	23.1392	1.0027	.9971

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

H. TT = 300.0 K PT = 8.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0568	1.0002	.9994
1.0	1.0822	67.5265	1.0003	.9993
1.5	1.1089	64.3977	1.0004	.9992
2.0	1.1332	61.9412	1.0005	.9991
2.5	1.1560	59.8905	1.0006	.9990
3.0	1.1777	58.1178	1.0007	.9989
3.5	1.1985	56.5490	1.0008	.9988
4.0	1.2187	55.1373	1.0008	.9988
4.5	1.2384	53.8508	1.0009	.9987
5.0	1.2577	52.6670	1.0010	.9986
5.5	1.2766	51.5690	1.0010	.9986
6.0	1.2951	50.5442	1.0011	.9985
6.5	1.3135	49.5824	1.0011	.9985
7.0	1.3316	48.6757	1.0012	.9984
7.5	1.3495	47.8176	1.0012	.9984
8.0	1.3673	47.0026	1.0013	.9983
8.5	1.3849	46.2264	1.0013	.9983
9.0	1.4024	45.4850	1.0014	.9982
9.5	1.4198	44.7754	1.0014	.9982
10.0	1.4371	44.0946	1.0015	.9981
10.5	1.4543	43.4403	1.0015	.9981
11.0	1.4715	42.8103	1.0016	.9980
11.5	1.4886	42.2027	1.0016	.9980
12.0	1.5057	41.6160	1.0017	.9980
12.5	1.5228	41.0487	1.0017	.9979
13.0	1.5398	40.4994	1.0017	.9979
13.5	1.5568	39.9669	1.0018	.9979
14.0	1.5738	39.4503	1.0018	.9978
14.5	1.5908	38.9484	1.0019	.9978
15.0	1.6078	38.4606	1.0019	.9977
15.5	1.6248	37.9859	1.0019	.9977
16.0	1.6418	37.5236	1.0020	.9977
16.5	1.6588	37.0731	1.0020	.9976
17.0	1.6759	36.6337	1.0021	.9976
17.5	1.6930	36.2050	1.0021	.9976
18.0	1.7101	35.7862	1.0021	.9976
18.5	1.7272	35.3771	1.0022	.9975
19.0	1.7444	34.9771	1.0022	.9975

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

H. TT = 300.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7617	34.5858	1.0022	.9975
20.0	1.7790	34.2028	1.0023	.9974
20.5	1.7963	33.8278	1.0023	.9974
21.0	1.8137	33.4603	1.0023	.9974
21.5	1.8311	33.1003	1.0023	.9974
22.0	1.8487	32.7471	1.0024	.9973
22.5	1.8662	32.4007	1.0024	.9973
23.0	1.8839	32.0608	1.0024	.9973
23.5	1.9016	31.7270	1.0024	.9973
24.0	1.9194	31.3992	1.0025	.9972
24.5	1.9373	31.0772	1.0025	.9972
25.0	1.9552	30.7607	1.0025	.9972
25.5	1.9732	30.4496	1.0026	.9972
26.0	1.9914	30.1436	1.0026	.9972
26.5	2.0096	29.8426	1.0026	.9971
27.0	2.0279	29.5464	1.0026	.9971
27.5	2.0463	29.2549	1.0026	.9971
28.0	2.0648	28.9678	1.0027	.9971
28.5	2.0834	28.6851	1.0027	.9971
29.0	2.1020	28.4067	1.0027	.9971
29.5	2.1209	28.1323	1.0027	.9970
30.0	2.1398	27.8619	1.0027	.9970
30.5	2.1588	27.5953	1.0028	.9970
31.0	2.1779	27.3324	1.0028	.9970
31.5	2.1972	27.0732	1.0028	.9970
32.0	2.2166	26.8174	1.0028	.9970
32.5	2.2361	26.5651	1.0028	.9969
33.0	2.2557	26.3161	1.0029	.9969
33.5	2.2755	26.0703	1.0029	.9969
34.0	2.2953	25.8276	1.0029	.9969
34.5	2.3154	25.5880	1.0029	.9969
35.0	2.3355	25.3513	1.0029	.9969
35.5	2.3558	25.1175	1.0029	.9969
36.0	2.3763	24.8866	1.0029	.9969
36.5	2.3969	24.6583	1.0030	.9969
37.0	2.4176	24.4328	1.0030	.9968
37.5	2.4386	24.2098	1.0030	.9968
38.0	2.4596	23.9894	1.0030	.9968

TABLE IV. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

H. TT = 300.0 K PT = 8.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4808	23.7714	1.0030	.9968
39.0	2.5022	23.5558	1.0030	.9968
39.5	2.5238	23.3426	1.0030	.9968
40.0	2.5455	23.1317	1.0030	.9968

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

A. TT = 130.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0506	72.1404	.9998	1.0006
1.0	1.0817	67.5842	.9999	1.0001
1.5	1.1084	64.4506	1.0000	1.0000
2.0	1.1326	61.9998	1.0000	1.0000
2.5	1.1552	59.9537	1.0000	1.0001
3.0	1.1769	58.1794	1.0000	1.0000
3.5	1.1977	56.6113	1.0000	.9999
4.0	1.2178	55.2027	1.0000	1.0000
4.5	1.2373	53.9202	1.0000	1.0000
5.0	1.2565	52.7381	1.0000	1.0000
5.5	1.2752	51.6441	1.0000	1.0000
6.0	1.2937	50.6232	.9999	1.0001
6.5	1.3119	49.6656	.9999	1.0001
7.0	1.3298	48.7631	.9998	1.0002
7.5	1.3476	47.9065	.9998	1.0002
8.0	1.3652	47.0951	.9998	1.0003
8.5	1.3827	46.3229	.9997	1.0004
9.0	1.4000	45.5857	.9997	1.0004
9.5	1.4172	44.8800	.9996	1.0005
10.0	1.4344	44.2006	.9996	1.0005
10.5	1.4514	43.5502	.9995	1.0006
11.0	1.4684	42.9245	.9994	1.0007
11.5	1.4852	42.3216	.9993	1.0008
12.0	1.5021	41.7387	.9993	1.0009
12.5	1.5189	41.1751	.9992	1.0010

SATURATION BOUNDARY REACHED.

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

B. TT = 140.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0585	1.0002	.9994
1.0	1.0821	67.5404	1.0002	.9995
1.5	1.1087	64.4140	1.0003	.9994
2.0	1.1330	61.9562	1.0004	.9993
2.5	1.1558	59.9086	1.0004	.9993
3.0	1.1774	58.1406	1.0004	.9993
3.5	1.1982	56.5758	1.0004	.9993
4.0	1.2183	55.1670	1.0005	.9993
4.5	1.2379	53.8827	1.0005	.9993
5.0	1.2571	52.7012	1.0005	.9993
5.5	1.2759	51.6055	1.0005	.9993
6.0	1.2944	50.5846	1.0005	.9993
6.5	1.3126	49.6267	1.0005	.9994
7.0	1.3306	48.7236	1.0004	.9994
7.5	1.3484	47.8678	1.0004	.9994
8.0	1.3661	47.0553	1.0004	.9994
8.5	1.3836	46.2802	1.0004	.9994
9.0	1.4010	45.5425	1.0004	.9995
9.5	1.4183	44.8364	1.0004	.9995
10.0	1.4354	44.1591	1.0003	.9996
10.5	1.4525	43.5080	1.0003	.9996
11.0	1.4696	42.8810	1.0002	.9997
11.5	1.4866	42.2750	1.0002	.9997
12.0	1.5035	41.6915	1.0002	.9998
12.5	1.5204	41.1274	1.0001	.9998
13.0	1.5372	40.5814	1.0001	.9999
13.5	1.5540	40.0520	1.0000	1.0000
14.0	1.5709	39.5383	1.0000	1.0000
14.5	1.5877	39.0379	.9999	1.0001
15.0	1.6045	38.5528	.9999	1.0001
15.5	1.6213	38.0808	.9998	1.0002
16.0	1.6382	37.6217	.9998	1.0003
16.5	1.6550	37.1743	.9997	1.0004
17.0	1.6718	36.7380	.9996	1.0005
17.5	1.6887	36.3124	.9995	1.0005
18.0	1.7056	35.8948	.9995	1.0006
18.5	1.7225	35.4885	.9994	1.0007
19.0	1.7395	35.0914	.9993	1.0008

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

B. TT = 140.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7565	34.7030	.9993	1.0009
20.0	1.7735	34.3231	.9992	1.0010
20.5	1.7906	33.9512	.9991	1.0011
21.0	1.8077	33.5866	.9990	1.0012
21.5	1.8248	33.2293	.9989	1.0013

SATURATION BOUNDARY REACHED.

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

C. TT = 150.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0510	72.0694	1.0002	.9996
1.0	1.0821	67.5317	1.0003	.9994
1.5	1.1088	64.4049	1.0004	.9993
2.0	1.1331	61.9489	1.0004	.9992
2.5	1.1559	59.9005	1.0005	.9992
3.0	1.1775	58.1283	1.0006	.9991
3.5	1.1984	56.5602	1.0006	.9990
4.0	1.2185	55.1500	1.0007	.9990
4.5	1.2382	53.8659	1.0007	.9990
5.0	1.2574	52.6847	1.0007	.9990
5.5	1.2762	51.5893	1.0007	.9990
6.0	1.2948	50.5651	1.0008	.9989
6.5	1.3130	49.6050	1.0008	.9989
7.0	1.3311	48.7001	1.0008	.9989
7.5	1.3489	47.8445	1.0008	.9989
8.0	1.3666	47.0321	1.0008	.9989
8.5	1.3842	46.2583	1.0008	.9990
9.0	1.4016	45.5184	1.0008	.9990
9.5	1.4189	44.8112	1.0008	.9990
10.0	1.4361	44.1322	1.0008	.9990
10.5	1.4533	43.4797	1.0008	.9990
11.0	1.4704	42.8517	1.0008	.9990
11.5	1.4874	42.2467	1.0008	.9990
12.0	1.5043	41.6624	1.0008	.9991
12.5	1.5213	41.0964	1.0007	.9991
13.0	1.5382	40.5496	1.0007	.9991
13.5	1.5551	40.0191	1.0007	.9992
14.0	1.5720	39.5043	1.0007	.9992
14.5	1.5889	39.0044	1.0007	.9992
15.0	1.6057	38.5190	1.0006	.9993
15.5	1.6226	38.0467	1.0006	.9993
16.0	1.6395	37.5858	1.0006	.9993
16.5	1.6564	37.1377	1.0005	.9994
17.0	1.6733	36.7007	1.0005	.9994
17.5	1.6902	36.2743	1.0004	.9995
18.0	1.7071	35.8578	1.0004	.9995
18.5	1.7241	35.4508	1.0003	.9996
19.0	1.7412	35.0529	1.0003	.9997

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

C. TT = 150.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7582	34.6638	1.0002	.9997
20.0	1.7753	34.2822	1.0002	.9998
20.5	1.7925	33.9094	1.0002	.9998
21.0	1.8097	33.5443	1.0001	.9999
21.5	1.8269	33.1864	1.0000	1.0000
22.0	1.8442	32.8354	1.0000	1.0000
22.5	1.8616	32.4911	.9999	1.0001
23.0	1.8790	32.1532	.9998	1.0002
23.5	1.8965	31.8216	.9998	1.0002
24.0	1.9141	31.4952	.9997	1.0003
24.5	1.9318	31.1754	.9997	1.0004
25.0	1.9495	30.8611	.9996	1.0005
25.5	1.9673	30.5521	.9995	1.0005
26.0	1.9851	30.2482	.9994	1.0006
26.5	2.0031	29.9496	.9993	1.0007
27.0	2.0211	29.6555	.9993	1.0008
27.5	2.0392	29.3661	.9992	1.0009
28.0	2.0574	29.0813	.9991	1.0010
28.5	2.0757	28.8007	.9990	1.0011
29.0	2.0941	28.5243	.9989	1.0012

SATURATION BOUNDARY REACHED.

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

D. TT = 175.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0511	72.0530	1.0003	.9994
1.0	1.0823	67.5179	1.0004	.9992
1.5	1.1090	64.3868	1.0005	.9990
2.0	1.1333	61.9285	1.0006	.9989
2.5	1.1561	59.8786	1.0007	.9988
3.0	1.1778	58.1061	1.0008	.9987
3.5	1.1987	56.5375	1.0009	.9986
4.0	1.2189	55.1258	1.0010	.9986
4.5	1.2386	53.8396	1.0010	.9985
5.0	1.2578	52.6564	1.0011	.9984
5.5	1.2767	51.5593	1.0011	.9984
6.0	1.2953	50.5354	1.0012	.9984
6.5	1.3136	49.5743	1.0012	.9983
7.0	1.3317	48.6686	1.0013	.9983
7.5	1.3496	47.8115	1.0013	.9982
8.0	1.3674	46.9976	1.0014	.9982
8.5	1.3850	46.2223	1.0014	.9982
9.0	1.4025	45.4819	1.0014	.9982
9.5	1.4198	44.7731	1.0015	.9981
10.0	1.4371	44.0931	1.0015	.9981
10.5	1.4543	43.4399	1.0015	.9981
11.0	1.4715	42.8111	1.0016	.9981
11.5	1.4886	42.2048	1.0016	.9981
12.0	1.5056	41.6193	1.0016	.9980
12.5	1.5226	41.0530	1.0016	.9980
13.0	1.5396	40.5047	1.0016	.9980
13.5	1.5566	39.9733	1.0017	.9980
14.0	1.5735	39.4579	1.0017	.9980
14.5	1.5905	38.9573	1.0017	.9980
15.0	1.6074	38.4706	1.0017	.9980
15.5	1.6244	37.9968	1.0017	.9980
16.0	1.6413	37.5358	1.0017	.9980
16.5	1.6583	37.0865	1.0017	.9980
17.0	1.6753	36.6485	1.0017	.9980
17.5	1.6923	36.2210	1.0017	.9980
18.0	1.7094	35.8035	1.0017	.9980
18.5	1.7265	35.3956	1.0017	.9980
19.0	1.7436	34.9967	1.0017	.9981

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 175.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7608	34.6061	1.0017	.9981
20.0	1.7780	34.2245	1.0017	.9981
20.5	1.7952	33.8507	1.0017	.9981
21.0	1.8125	33.4846	1.0017	.9981
21.5	1.8299	33.1258	1.0017	.9981
22.0	1.8473	32.7740	1.0016	.9982
22.5	1.8648	32.4289	1.0016	.9982
23.0	1.8823	32.0902	1.0016	.9982
23.5	1.9000	31.7576	1.0016	.9982
24.0	1.9177	31.4310	1.0016	.9983
24.5	1.9354	31.1102	1.0015	.9983
25.0	1.9532	30.7950	1.0015	.9983
25.5	1.9712	30.4848	1.0015	.9983
26.0	1.9892	30.1801	1.0015	.9984
26.5	2.0073	29.8804	1.0014	.9984
27.0	2.0254	29.5855	1.0014	.9984
27.5	2.0437	29.2952	1.0014	.9985
28.0	2.0620	29.0095	1.0014	.9985
28.5	2.0805	28.7281	1.0013	.9986
29.0	2.0991	28.4509	1.0013	.9986
29.5	2.1177	28.1776	1.0012	.9986
30.0	2.1365	27.9082	1.0012	.9987
30.5	2.1554	27.6424	1.0012	.9987
31.0	2.1744	27.3807	1.0012	.9988
31.5	2.1935	27.1226	1.0011	.9988
32.0	2.2127	26.8681	1.0011	.9988
32.5	2.2320	26.6170	1.0010	.9989
33.0	2.2515	26.3692	1.0010	.9989
33.5	2.2710	26.1246	1.0009	.9990
34.0	2.2908	25.8832	1.0009	.9991
34.5	2.3106	25.6448	1.0008	.9991
35.0	2.3306	25.4093	1.0008	.9992
35.5	2.3507	25.1767	1.0007	.9992
36.0	2.3709	24.9469	1.0007	.9993
36.5	2.3913	24.7199	1.0006	.9993
37.0	2.4118	24.4955	1.0006	.9994
37.5	2.4325	24.2737	1.0005	.9995
38.0	2.4534	24.0545	1.0004	.9995

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

D. TT = 175.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4743	23.8377	1.0004	.9996
39.0	2.4955	23.6230	1.0003	.9997
39.5	2.5168	23.4110	1.0003	.9997
40.0	2.5383	23.2013	1.0002	.9998

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

E. TT = 200.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0512	72.0455	1.0003	.9993
1.0	1.0823	67.5115	1.0005	.9991
1.5	1.1090	64.3804	1.0006	.9989
2.0	1.1334	61.9212	1.0007	.9988
2.5	1.1562	59.8697	1.0008	.9987
3.0	1.1779	58.0964	1.0009	.9986
3.5	1.1988	56.5274	1.0010	.9985
4.0	1.2191	55.1155	1.0011	.9984
4.5	1.2388	53.8296	1.0012	.9983
5.0	1.2580	52.6458	1.0012	.9982
5.5	1.2769	51.5479	1.0013	.9982
6.0	1.2955	50.5232	1.0014	.9981
6.5	1.3139	49.5617	1.0014	.9981
7.0	1.3320	48.6552	1.0015	.9980
7.5	1.3499	47.7975	1.0016	.9979
8.0	1.3677	46.9829	1.0016	.9979
8.5	1.3853	46.2072	1.0017	.9979
9.0	1.4028	45.4663	1.0017	.9978
9.5	1.4202	44.7571	1.0018	.9978
10.0	1.4376	44.0767	1.0018	.9977
10.5	1.4548	43.4228	1.0019	.9977
11.0	1.4720	42.7934	1.0019	.9977
11.5	1.4891	42.1864	1.0019	.9976
12.0	1.5062	41.6003	1.0020	.9976
12.5	1.5232	41.0335	1.0020	.9976
13.0	1.5402	40.4848	1.0020	.9975
13.5	1.5572	39.9530	1.0021	.9975
14.0	1.5742	39.4370	1.0021	.9975
14.5	1.5912	38.9358	1.0021	.9975
15.0	1.6082	38.4485	1.0022	.9974
15.5	1.6252	37.9744	1.0022	.9974
16.0	1.6422	37.5129	1.0022	.9974
16.5	1.6592	37.0631	1.0022	.9974
17.0	1.6763	36.6244	1.0023	.9974
17.5	1.6933	36.1963	1.0023	.9973
18.0	1.7104	35.7783	1.0023	.9973
18.5	1.7276	35.3699	1.0023	.9973
19.0	1.7447	34.9706	1.0023	.9973

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 200.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7619	34.5800	1.0024	.9973
20.0	1.7792	34.1976	1.0024	.9973
20.5	1.7965	33.8234	1.0024	.9973
21.0	1.8139	33.4567	1.0024	.9973
21.5	1.8313	33.0974	1.0024	.9973
22.0	1.8488	32.7450	1.0024	.9973
22.5	1.8663	32.3994	1.0024	.9973
23.0	1.8839	32.0602	1.0024	.9973
23.5	1.9016	31.7272	1.0024	.9973
24.0	1.9193	31.4002	1.0024	.9973
24.5	1.9372	31.0790	1.0024	.9973
25.0	1.9551	30.7633	1.0024	.9973
25.5	1.9730	30.4530	1.0024	.9973
26.0	1.9911	30.1478	1.0024	.9973
26.5	2.0093	29.8476	1.0024	.9973
27.0	2.0275	29.5523	1.0024	.9973
27.5	2.0458	29.2615	1.0024	.9973
28.0	2.0643	28.9751	1.0024	.9973
28.5	2.0828	28.6932	1.0024	.9974
29.0	2.1014	28.4156	1.0024	.9974
29.5	2.1202	28.1420	1.0024	.9974
30.0	2.1390	27.8724	1.0024	.9974
30.5	2.1580	27.6067	1.0024	.9974
31.0	2.1770	27.3446	1.0024	.9974
31.5	2.1962	27.0861	1.0024	.9975
32.0	2.2155	26.8311	1.0023	.9975
32.5	2.2349	26.5796	1.0023	.9975
33.0	2.2545	26.3314	1.0023	.9975
33.5	2.2741	26.0864	1.0023	.9975
34.0	2.2940	25.8443	1.0023	.9976
34.5	2.3139	25.6055	1.0023	.9976
35.0	2.3340	25.3696	1.0022	.9976
35.5	2.3542	25.1366	1.0022	.9976
36.0	2.3745	24.9065	1.0022	.9977
36.5	2.3950	24.6790	1.0022	.9977
37.0	2.4157	24.4541	1.0021	.9977
37.5	2.4365	24.2317	1.0021	.9977
38.0	2.4574	24.0120	1.0021	.9978

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

E. TT = 200.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4786	23.7948	1.0021	.9978
39.0	2.4998	23.5800	1.0021	.9978
39.5	2.5213	23.3675	1.0020	.9979
40.0	2.5429	23.1574	1.0020	.9979

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

F. TT = 250.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0512	72.0447	1.0003	.9992
1.0	1.0823	67.5112	1.0005	.9991
1.5	1.1090	64.3802	1.0006	.9989
2.0	1.1334	61.9210	1.0007	.9988
2.5	1.1562	59.8705	1.0008	.9987
3.0	1.1779	58.0968	1.0009	.9986
3.5	1.1988	56.5271	1.0010	.9985
4.0	1.2191	55.1147	1.0011	.9984
4.5	1.2388	53.8276	1.0012	.9983
5.0	1.2581	52.6433	1.0013	.9982
5.5	1.2770	51.5450	1.0013	.9981
6.0	1.2956	50.5199	1.0014	.9980
6.5	1.3140	49.5579	1.0015	.9980
7.0	1.3321	48.6510	1.0016	.9979
7.5	1.3500	47.7926	1.0016	.9978
8.0	1.3678	46.9780	1.0017	.9978
8.5	1.3855	46.2016	1.0018	.9977
9.0	1.4030	45.4601	1.0018	.9977
9.5	1.4204	44.7504	1.0019	.9976
10.0	1.4378	44.0696	1.0019	.9976
10.5	1.4550	43.4152	1.0020	.9975
11.0	1.4722	42.7852	1.0020	.9975
11.5	1.4894	42.1777	1.0021	.9974
12.0	1.5065	41.5911	1.0022	.9974
12.5	1.5235	41.0238	1.0022	.9973
13.0	1.5406	40.4745	1.0023	.9973
13.5	1.5576	39.9422	1.0023	.9972
14.0	1.5746	39.4256	1.0024	.9972
14.5	1.5916	38.9239	1.0024	.9972
15.0	1.6086	38.4362	1.0024	.9971
15.5	1.6257	37.9617	1.0025	.9971
16.0	1.6427	37.4995	1.0025	.9970
16.5	1.6597	37.0492	1.0026	.9970
17.0	1.6768	36.6100	1.0026	.9970
17.5	1.6939	36.1815	1.0026	.9969
18.0	1.7111	35.7630	1.0027	.9969
18.5	1.7282	35.3540	1.0027	.9969
19.0	1.7454	34.9543	1.0028	.9968

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

F. TT = 250.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7627	34.5632	1.0028	.9968
20.0	1.7800	34.1805	1.0028	.9968
20.5	1.7973	33.8057	1.0029	.9968
21.0	1.8147	33.4385	1.0029	.9967
21.5	1.8322	33.0786	1.0029	.9967
22.0	1.8497	32.7258	1.0029	.9967
22.5	1.8673	32.3796	1.0030	.9967
23.0	1.8850	32.0399	1.0030	.9966
23.5	1.9027	31.7065	1.0030	.9966
24.0	1.9205	31.3790	1.0031	.9966
24.5	1.9384	31.0573	1.0031	.9966
25.0	1.9563	30.7411	1.0031	.9966
25.5	1.9744	30.4302	1.0031	.9966
26.0	1.9925	30.1245	1.0031	.9965
26.5	2.0107	29.8239	1.0032	.9965
27.0	2.0290	29.5280	1.0032	.9965
27.5	2.0474	29.2368	1.0032	.9965
28.0	2.0659	28.9501	1.0032	.9965
28.5	2.0845	28.6677	1.0032	.9965
29.0	2.1032	28.3896	1.0033	.9965
29.5	2.1220	28.1155	1.0033	.9964
30.0	2.1409	27.8454	1.0033	.9964
30.5	2.1599	27.5792	1.0033	.9964
31.0	2.1791	27.3167	1.0033	.9964
31.5	2.1983	27.0578	1.0033	.9964
32.0	2.2177	26.8024	1.0033	.9964
32.5	2.2372	26.5504	1.0034	.9964
33.0	2.2568	26.3017	1.0034	.9964
33.5	2.2766	26.0563	1.0034	.9964
34.0	2.2965	25.8139	1.0034	.9964
34.5	2.3165	25.5747	1.0034	.9964
35.0	2.3367	25.3383	1.0034	.9964
35.5	2.3569	25.1049	1.0034	.9964
36.0	2.3774	24.8743	1.0034	.9964
36.5	2.3980	24.6464	1.0034	.9964
37.0	2.4187	24.4212	1.0034	.9964
37.5	2.4396	24.1986	1.0034	.9964
38.0	2.4607	23.9785	1.0034	.9964

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

F. TT = 250.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4819	23.7609	1.0034	.9964
39.0	2.5033	23.5457	1.0034	.9964
39.5	2.5248	23.3328	1.0034	.9964
40.0	2.5465	23.1223	1.0034	.9964

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

FOR NITROGEN

G. TT = 300.0 K PT = 10.0 ATM

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
0.0	1.0000	90.0000	1.0000	1.0000
.5	1.0512	72.0482	1.0003	.9993
1.0	1.0823	67.5155	1.0004	.9991
1.5	1.1090	64.3850	1.0005	.9990
2.0	1.1333	61.9261	1.0007	.9989
2.5	1.1562	59.8746	1.0008	.9987
3.0	1.1779	58.1012	1.0009	.9986
3.5	1.1988	56.5318	1.0010	.9985
4.0	1.2190	55.1195	1.0010	.9985
4.5	1.2387	53.8326	1.0011	.9984
5.0	1.2580	52.6483	1.0012	.9983
5.5	1.2769	51.5500	1.0013	.9982
6.0	1.2955	50.5248	1.0013	.9981
6.5	1.3139	49.5627	1.0014	.9981
7.0	1.3320	48.6558	1.0015	.9980
7.5	1.3499	47.7974	1.0016	.9979
8.0	1.3677	46.9822	1.0016	.9979
8.5	1.3854	46.2057	1.0017	.9978
9.0	1.4029	45.4642	1.0017	.9978
9.5	1.4203	44.7543	1.0018	.9977
10.0	1.4377	44.0734	1.0019	.9977
10.5	1.4549	43.4189	1.0019	.9976
11.0	1.4721	42.7888	1.0020	.9975
11.5	1.4893	42.1811	1.0020	.9975
12.0	1.5064	41.5943	1.0021	.9974
12.5	1.5234	41.0269	1.0021	.9974
13.0	1.5405	40.4778	1.0022	.9974
13.5	1.5575	39.9452	1.0022	.9973
14.0	1.5745	39.4285	1.0023	.9973
14.5	1.5915	38.9266	1.0023	.9972
15.0	1.6086	38.4386	1.0024	.9972
15.5	1.6256	37.9639	1.0024	.9971
16.0	1.6426	37.5016	1.0025	.9971
16.5	1.6597	37.0510	1.0025	.9971
17.0	1.6768	36.6116	1.0026	.9970
17.5	1.6939	36.1828	1.0026	.9970
18.0	1.7110	35.7641	1.0027	.9969
18.5	1.7282	35.3549	1.0027	.9969
19.0	1.7454	34.9549	1.0027	.9969

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

G. TT = 300.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
19.5	1.7627	34.5636	1.0028	.9968
20.0	1.7800	34.1806	1.0028	.9968
20.5	1.7973	33.8056	1.0029	.9968
21.0	1.8148	33.4382	1.0029	.9967
21.5	1.8322	33.0781	1.0029	.9967
22.0	1.8498	32.7251	1.0030	.9967
22.5	1.8674	32.3787	1.0030	.9966
23.0	1.8850	32.0388	1.0030	.9966
23.5	1.9028	31.7051	1.0031	.9966
24.0	1.9206	31.3774	1.0031	.9966
24.5	1.9385	31.0554	1.0031	.9965
25.0	1.9565	30.7390	1.0032	.9965
25.5	1.9745	30.4279	1.0032	.9965
26.0	1.9927	30.1220	1.0032	.9964
26.5	2.0109	29.8211	1.0033	.9964
27.0	2.0292	29.5249	1.0033	.9964
27.5	2.0476	29.2335	1.0033	.9964
28.0	2.0661	28.9465	1.0033	.9964
28.5	2.0848	28.6639	1.0034	.9963
29.0	2.1035	28.3856	1.0034	.9963
29.5	2.1223	28.1113	1.0034	.9963
30.0	2.1412	27.8409	1.0034	.9963
30.5	2.1603	27.5744	1.0035	.9963
31.0	2.1795	27.3117	1.0035	.9962
31.5	2.1987	27.0525	1.0035	.9962
32.0	2.2181	26.7969	1.0035	.9962
32.5	2.2377	26.5447	1.0036	.9962
33.0	2.2573	26.2958	1.0036	.9962
33.5	2.2771	26.0501	1.0036	.9962
34.0	2.2970	25.8075	1.0036	.9961
34.5	2.3171	25.5680	1.0036	.9961
35.0	2.3372	25.3315	1.0036	.9961
35.5	2.3576	25.0978	1.0037	.9961
36.0	2.3780	24.8670	1.0037	.9961
36.5	2.3987	24.6389	1.0037	.9961
37.0	2.4194	24.4134	1.0037	.9961
37.5	2.4404	24.1906	1.0037	.9960
38.0	2.4615	23.9703	1.0037	.9960

TABLE V. MACH NUMBER AND MACH ANGLE VERSUS PRANDTL-MEYER FUNCTION

G. TT = 300.0 K PT = 10.0 ATM

(CONTINUED)

THETA (DEG)	MACH	MU (DEG)	MACH (RELATIVE TO IDEAL DIATOMIC GAS VALUE)	MU
38.5	2.4827	23.7524	1.0038	.9960
39.0	2.5041	23.5370	1.0038	.9960
39.5	2.5257	23.3239	1.0038	.9960
40.0	2.5475	23.1131	1.0038	.9960