

ENGINEERING TRIPOS PART IIB

Friday 25 April 2008 9 to 10.30

Module 4A11

TURBOMACHINERY II

Answer not more than two questions.

All questions carry the same number of marks.

*The **approximate** percentage of marks allocated to each part of a question is indicated in the right margin.*

Attachment: Compressible Flow Data Book (38 pages).

STATIONERY

Single-sided script paper

SPECIAL REQUIREMENTS

Engineering Data Book

CUED approved calculator allowed

**You may not start to read the questions
printed on the subsequent pages of this
question paper until instructed that you
may do so by the Invigilator**

1 (a) What is the streamline curvature term in the Meridional Streamline Curvature equation which governs axisymmetric hub-to-tip flow distributions in turbomachines? Explain carefully under which conditions this term can be neglected in the equation. Give two practical examples when the streamline curvature term is significant and cannot be regarded as negligible. [30%]

(b) A low speed axial flow turbine stage has a cylindrical flow path with parallel hub and casing lines, with a casing diameter of 0.8 meters and a hub-to-tip ratio of 0.6. It is designed to have a forced vortex distribution at the stator exit, $V_\theta = Kr$, where K is a constant. The flow is uniform at the inlet to the turbine. Use the Simple Radial Equilibrium equation to find the radial distribution of V_x at the stator exit in terms of the axial velocity at the hub, $V_{x,hub}$, for a given uniform flow condition at the stage inlet. State clearly the assumptions you have used. Explain, without calculation, how the value of $V_{x,hub}$ can be determined by reference to the uniform inlet conditions. [40%]

(c) For a design which has $(V_\theta / V_x)_{hub} = 2.0$, discuss the validity of using the Simple Radial Equilibrium Equation for the turbine designed in (b). Comment on whether the radial distribution of the axial velocity at the stator exit would change if the streamline curvature effect is included and, if so, would the inclusion of the streamline curvature term make the axial velocity distribution more uniform or less uniform? [30%]

2 (a) (i) Show that the entropy increase in a compressor blade row operating in air with an inlet Mach number M_{in} can be expressed approximately in terms of the stagnation pressure loss coefficient Y_p by

$$\Delta S = RY_p \left(1 - \left(1 + \frac{\gamma-1}{2} M_{in}^2 \right)^{-\gamma/(\gamma-1)} \right)$$

where R is the gas constant and γ is the ratio of specific heat capacities. State any assumptions you make in deriving this expression. [20%]

(ii) For a compressor, derive the expression for isentropic efficiency in terms of the entropy increase. State carefully the approximations involved. What is the equivalent expression for a turbine? [10%]

(iii) A transonic air compressor rotor section has a stagnation pressure ratio of 1.8 and an isentropic efficiency of 0.90 when operating at a relative inlet Mach number $M_{rel,in} = 1.35$ and with a relative inlet stagnation temperature of 366K. The absolute stagnation temperature at the inlet is 288K. It is found that at this condition the section has a single passage shock wave normal to the flow with a shock upstream Mach number $M_{rel,shock} = 1.5$. Calculate the loss of efficiency due to the entropy generation across the shock wave and that due to viscous effects. What is the value of Y_p attributable to the viscous effects? Comment on your results. Take $\gamma = 1.4$ and $R = 287 \text{ J kg}^{-1} \text{ K}^{-1}$ for air. [30%]

(b) (i) Describe the mechanisms for entropy generation in shrouded and unshrouded turbine blade tips. Discuss why the stage reaction is an important parameter when determining whether to use a shrouded or an unshrouded blade. [15%]

(ii) Show that across an arbitrary shock wave in a compressor blade passage, the polytropic efficiency can be expressed in terms of the normal component of Mach number upstream of the shock wave M_n as:

$$\eta_p = \frac{\gamma-1}{\gamma} \frac{\ln \left(1 + \frac{2\gamma}{\gamma+1} (M_n^2 - 1) \right)}{\ln \left(\frac{\gamma-1}{(\gamma+1)^2} \frac{2}{M_n^2} \left(1 + \frac{\gamma-1}{2} M_n^2 \right) \left(\frac{2\gamma}{\gamma-1} M_n^2 - 1 \right) \right)}. \quad [25\%]$$

3 (a) A turbine blade at a sweep angle of 45° is shown in Fig.1. Explain, stating any assumptions, why this blade is expected to have a greater profile loss than an unswept design when both blades operate in the same annulus and produce the same turning. Why might a turbine designer need to use such a highly swept blade row?

[30%]

(b) (i) Contours of stagnation pressure loss coefficient at the exit of an unswept turbine blade between the hub and mid-span are shown in Fig.2 (a). Explain, using sketches where appropriate, why the distribution of loss takes this form. Sketch a plot showing the radial variation of the pitchwise-averaged yaw angle at this axial location.

[30%]

(ii) Figure 3 shows the mid-span blade surface pressure distribution for the swept blade of Fig.1. Sketch the expected blade surface pressure distributions close to the hub and close to the casing for this blade. Use your sketches to explain the differences between the exit loss distributions of Fig.2(a) and 2(b). Sketch the exit loss contours between mid-span and the casing for the swept blade.

[40%]

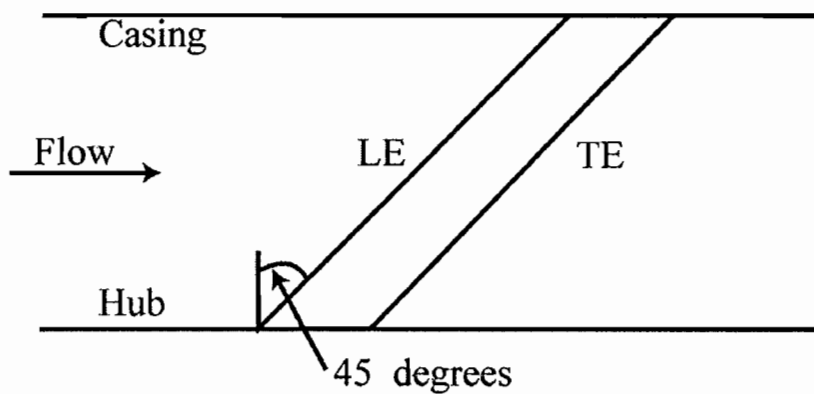
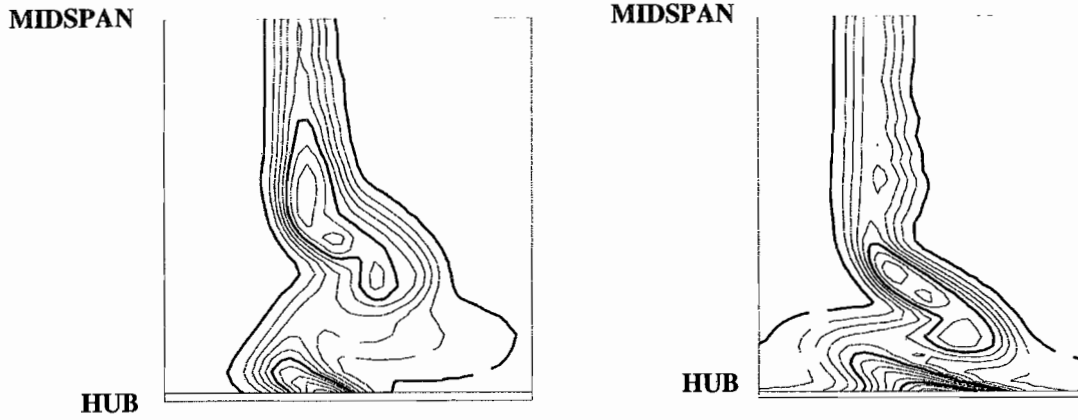


Fig.1: Blade swept at 45 degrees

(cont.)



(a) Unswept blade

(b) Swept blade

Fig. 2: Contours of stagnation pressure loss coefficient at row exit, between hub and mid-span

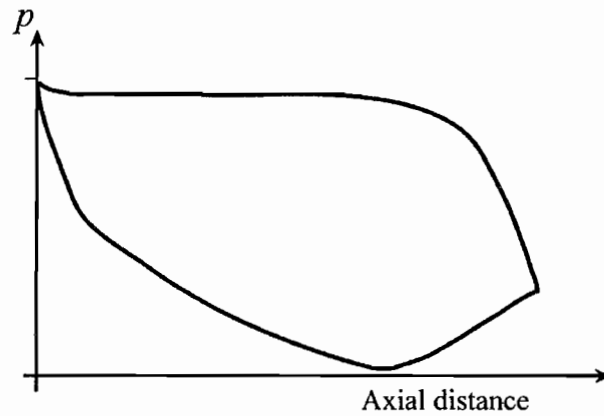


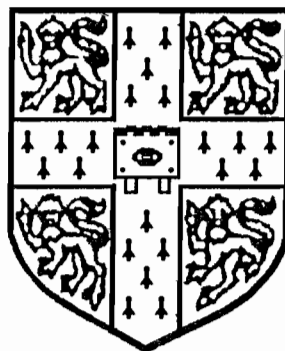
Fig. 3: Mid-span surface pressure distribution for the swept blade

END OF PAPER

Compressible Flow Data Book

for Part II of the
Engineering Tripos

2004 Edition



Cambridge University Engineering Department

PERFECT GAS RELATIONS FOR COMPRESSIBLE FLOW

Ratios of stagnation to static quantities

$$\frac{T}{T_0} = \left(1 + \frac{\gamma-1}{2} M^2\right)^{-1}$$

$$\frac{p}{p_0} = \left(1 + \frac{\gamma-1}{2} M^2\right)^{-\frac{\gamma}{\gamma-1}}$$

$$\frac{\rho}{\rho_0} = \left(1 + \frac{\gamma-1}{2} M^2\right)^{-\frac{1}{\gamma-1}}$$

Notes:

(1) $T_0 = \text{const.}$ in adiabatic flow with no shaft work

(2) If flow is isentropic, $p_0 = \text{const.}$ and $\rho_0 = \text{const.}$ when $T_0 = \text{const.}$

Mach number relations (see tables)

$$\frac{V}{\sqrt{c_p T_0}} = \sqrt{\gamma-1} M \left(1 + \frac{\gamma-1}{2} M^2\right)^{-\frac{1}{2}}$$

$$\frac{\dot{m} \sqrt{c_p T_0}}{A p_0} = \frac{\gamma}{\sqrt{\gamma-1}} M \left(1 + \frac{\gamma-1}{2} M^2\right)^{-\frac{1}{2} \left(\frac{\gamma+1}{\gamma-1}\right)}$$

$$\frac{\dot{m} \sqrt{c_p T_0}}{A p} = \frac{\gamma}{\sqrt{\gamma-1}} M \left(1 + \frac{\gamma-1}{2} M^2\right)^{\frac{1}{2}}$$

$$\frac{F}{\dot{m} \sqrt{c_p T_0}} = \frac{\sqrt{\gamma-1}}{\gamma} \frac{1 + \gamma M^2}{M} \left(1 + \frac{\gamma-1}{2} M^2\right)^{-\frac{1}{2}} \quad \text{where } F = (p + \rho V^2) A$$

$$\frac{\frac{1}{2} \rho V^2}{p_0} = \frac{1}{2} \gamma M^2 \left(1 + \frac{\gamma-1}{2} M^2\right)^{-\frac{\gamma}{\gamma-1}}$$

ONE-DIMENSIONAL FLOW OF A PERFECT GAS

Isentropic flow

$$\frac{A}{A^*} = \frac{1}{M} \left\{ \frac{2}{\gamma+1} \left(1 + \frac{\gamma-1}{2} M^2 \right) \right\}^{\frac{1}{2} \left(\frac{\gamma+1}{\gamma-1} \right)}$$

Adiabatic constant area flow

$$\frac{4c_f L_{\max}}{D} = \frac{1-M^2}{\gamma M^2} + \frac{\gamma+1}{2\gamma} \ln \left(\frac{(\gamma+1)M^2}{2 \left(1 + \frac{\gamma-1}{2} M^2 \right)} \right)$$

Normal shock waves in perfect gases

$$VV_s = a^{*2}$$

$$M_s = \left(\frac{1 + \frac{\gamma-1}{2} M^2}{\gamma M^2 - \frac{\gamma-1}{2}} \right)^{\frac{1}{2}}$$

$$\frac{p_{0s}}{p_0} = \left(\frac{\frac{\gamma+1}{2} M^2}{1 + \frac{\gamma-1}{2} M^2} \right)^{\frac{\gamma}{\gamma-1}} \left(\frac{2\gamma M^2 - \frac{\gamma-1}{\gamma+1}}{\frac{\gamma-1}{\gamma+1}} \right)^{\frac{1}{1-\gamma}}$$

$$\frac{p_s}{p} = 1 + \frac{2\gamma}{\gamma+1} (M^2 - 1)$$

$$\frac{p_{0s}}{p} = \left(\frac{\gamma+1}{2} M^2 \right)^{\frac{\gamma}{\gamma-1}} \left(\frac{2\gamma M^2 - \frac{\gamma-1}{\gamma+1}}{\frac{\gamma-1}{\gamma+1}} \right)^{\frac{1}{1-\gamma}}$$

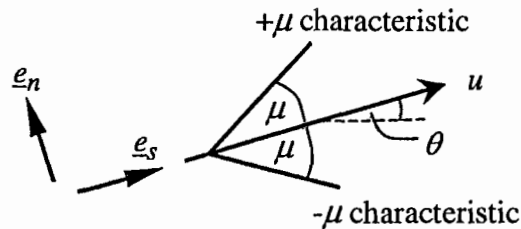
$$\frac{T_s}{T} = \frac{\gamma-1}{(\gamma+1)^2} \frac{2}{M^2} \left(1 + \frac{\gamma-1}{2} M^2 \right) \left(\frac{2\gamma M^2 - 1}{\gamma-1} \right)$$

$$\frac{\rho_s}{\rho} = \frac{(\gamma+1)M^2}{2 \left(1 + \frac{\gamma-1}{2} M^2 \right)}$$

TWO DIMENSIONAL SUPERSONIC FLOW

Method of Characteristics for 2-D supersonic flow

Applicable to adiabatic ($h_0 = \text{constant}$), isentropic flow



Mach Number

$$M = u/c$$

Mach angle

$$\mu = \sin^{-1}\left(\frac{1}{M}\right)$$

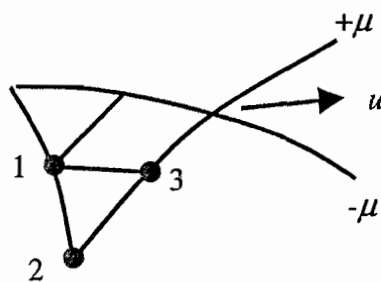
Prandtl-Meyer function

$$v = \int_1^M \sqrt{M^2 - 1} \frac{du}{u}$$

$$v = \sqrt{\frac{\gamma+1}{\gamma-1}} \tan^{-1} \sqrt{\frac{\gamma-1}{\gamma+1} (M^2 - 1)} - \tan^{-1} \sqrt{M^2 - 1} \quad \text{for a perfect gas}$$

Calculations

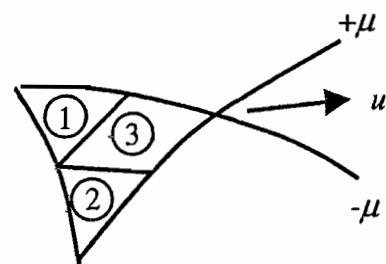
Lattice Method



$$v_3 - \theta_3 = v_2 - \theta_2 \quad \text{along } +\mu$$

$$v_3 + \theta_3 = v_1 + \theta_1 \quad \text{along } -\mu$$

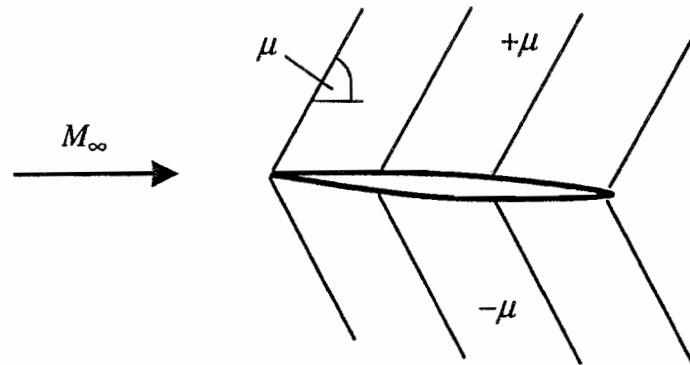
Field (or wave) method



$$v_3 + \theta_3 = v_1 + \theta_1 \quad \text{across } +\mu$$

$$v_3 - \theta_3 = v_2 - \theta_2 \quad \text{across } -\mu$$

Linearised Method of Characteristics (thin film theory)

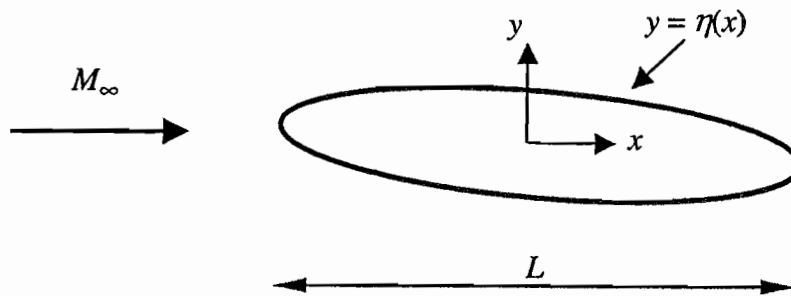


$$\mu \approx \sin^{-1}(1/M_\infty)$$

$$\Delta p \approx \pm \frac{\rho_\infty u_\infty^2 \Delta \theta}{\sqrt{M_\infty^2 - 1}} \quad \text{across } \pm \mu \text{ waves}$$

$$\text{Pressure coefficient } c_p = \frac{p - p_\infty}{\frac{1}{2} \rho_\infty u_\infty^2} = \pm \frac{2\theta}{\sqrt{M_\infty^2 - 1}} \quad \text{on upper/lower surface}$$

Prandtl-Glauert rule for linearised potential flow past geometrically similar bodies



$$\text{Pressure coefficient } c_p = \frac{p - p_\infty}{\frac{1}{2} \rho_\infty u_\infty^2}$$

For geometrically similar bodies with $\frac{\eta}{L} = f\left(\frac{x}{L}\right)$ and $c_p(M_\infty = 0) = c_{p0}$,

$$c_p = \frac{c_{p0}}{\sqrt{1 - M_\infty^2}} \quad \text{in subsonic flow}$$

$$c_p \propto \frac{1}{\sqrt{M_\infty^2 - 1}} \quad \text{in supersonic flow}$$

Oblique Shock Relations (see tables)

$$\frac{p_2}{p_1} = 1 + \frac{2\gamma}{\gamma+1} (M_1^2 \sin^2 \beta - 1)$$

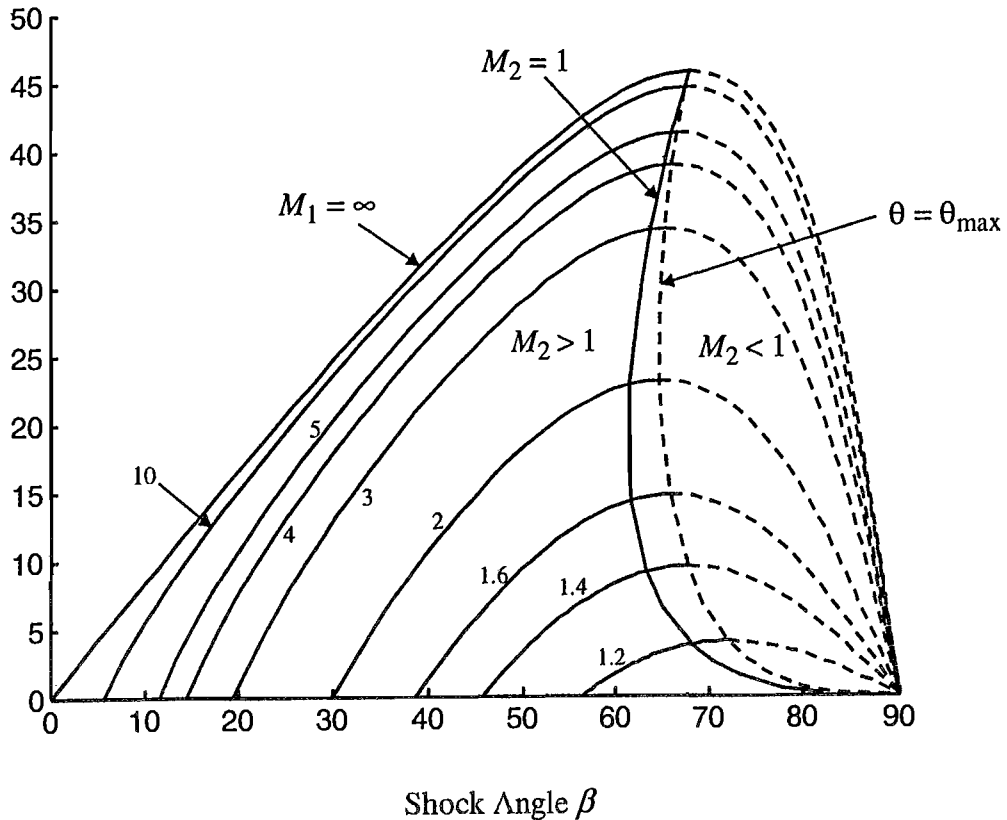
$$\frac{T_2}{T_1} = \frac{\gamma-1}{(\gamma+1)^2} \frac{2}{M_1^2 \sin^2 \beta} \left(1 + \frac{\gamma-1}{2} M_1^2 \sin^2 \beta \right) \left(\frac{2\gamma}{\gamma-1} M_1^2 \sin^2 \beta - 1 \right)$$

$$\frac{\rho_2}{\rho_1} = \frac{(\gamma+1)M_1^2 \sin^2 \beta}{2 \left[1 + \frac{\gamma-1}{2} M_1^2 \sin^2 \beta \right]}$$

$$M_2 \sin(\beta - \theta) = \left[\frac{1 + \frac{\gamma-1}{2} M_1^2 \sin^2 \beta}{\gamma M_1^2 \sin^2 \beta - \frac{\gamma-1}{2}} \right]^{\frac{1}{2}}$$

$$\frac{p_{02}}{p_{01}} = \left(\frac{\frac{\gamma+1}{2} M_1^2 \sin^2 \beta}{1 + \frac{\gamma-1}{2} M_1^2 \sin^2 \beta} \right)^{\frac{\gamma}{\gamma-1}} \left(\frac{2\gamma}{\gamma+1} M_1^2 \sin^2 \beta - \frac{\gamma-1}{\gamma+1} \right)^{\frac{1}{1-\gamma}}$$

$$\tan \theta = \frac{2 \cot \beta (M_1^2 \sin^2 \beta - 1)}{(\gamma+1)M_1^2 - 2(M_1^2 \sin^2 \beta - 1)}$$



GAS FLOW TABLES ($\gamma=1.400$): SUBSONIC FLOW

M	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{max}}{D}$	$\frac{\frac{1}{2}\rho V^2}{p_0}$
0.010	1.0000	0.9999	1.0000	0.0063	0.0221	0.0221	45.1813	7134.405	0.0001
0.020	0.9999	0.9997	0.9998	0.0126	0.0443	0.0443	22.5994	1778.450	0.0003
0.030	0.9998	0.9994	0.9996	0.0190	0.0664	0.0664	15.0761	787.0814	0.0006
0.040	0.9997	0.9989	0.9992	0.0253	0.0885	0.0886	11.3173	440.3522	0.0011
0.050	0.9995	0.9983	0.9988	0.0316	0.1105	0.1107	9.0644	280.0203	0.0017
0.060	0.9993	0.9975	0.9982	0.0379	0.1325	0.1329	7.5645	193.0311	0.0025
0.070	0.9990	0.9966	0.9976	0.0443	0.1545	0.1550	6.4947	140.6550	0.0034
0.080	0.9987	0.9955	0.9968	0.0506	0.1764	0.1772	5.6939	106.7182	0.0045
0.090	0.9984	0.9944	0.9960	0.0569	0.1983	0.1994	5.0723	83.4961	0.0056
0.100	0.9980	0.9930	0.9950	0.0632	0.2200	0.2216	4.5762	66.9216	0.0070
0.110	0.9976	0.9916	0.9940	0.0695	0.2417	0.2438	4.1714	54.6879	0.0084
0.120	0.9971	0.9900	0.9928	0.0758	0.2633	0.2660	3.8350	45.4080	0.0100
0.130	0.9966	0.9883	0.9916	0.0821	0.2849	0.2883	3.5513	38.2070	0.0117
0.140	0.9961	0.9864	0.9903	0.0884	0.3063	0.3105	3.3089	32.5113	0.0135
0.150	0.9955	0.9844	0.9888	0.0947	0.3276	0.3328	3.0996	27.9320	0.0155
0.160	0.9949	0.9823	0.9873	0.1009	0.3488	0.3551	2.9172	24.1978	0.0176
0.170	0.9943	0.9800	0.9857	0.1072	0.3699	0.3774	2.7569	21.1152	0.0198
0.180	0.9936	0.9776	0.9840	0.1135	0.3908	0.3997	2.6151	18.5427	0.0222
0.190	0.9928	0.9751	0.9822	0.1197	0.4116	0.4221	2.4889	16.3752	0.0246
0.200	0.9921	0.9725	0.9803	0.1260	0.4323	0.4445	2.3758	14.5333	0.0272
0.210	0.9913	0.9697	0.9783	0.1322	0.4528	0.4669	2.2740	12.9560	0.0299
0.220	0.9904	0.9668	0.9762	0.1385	0.4731	0.4893	2.1820	11.5961	0.0328
0.230	0.9895	0.9638	0.9740	0.1447	0.4933	0.5118	2.0985	10.4161	0.0357
0.240	0.9886	0.9607	0.9718	0.1509	0.5133	0.5343	2.0225	9.3865	0.0387
0.250	0.9877	0.9575	0.9694	0.1571	0.5332	0.5568	1.9530	8.4834	0.0419
0.260	0.9867	0.9541	0.9670	0.1633	0.5528	0.5794	1.8892	7.6876	0.0451
0.270	0.9856	0.9506	0.9645	0.1695	0.5723	0.6020	1.8306	6.9832	0.0485
0.280	0.9846	0.9470	0.9619	0.1757	0.5915	0.6246	1.7766	6.3572	0.0520
0.290	0.9835	0.9433	0.9592	0.1819	0.6106	0.6473	1.7267	5.7989	0.0555
0.300	0.9823	0.9395	0.9564	0.1881	0.6295	0.6700	1.6805	5.2993	0.0592
0.310	0.9811	0.9355	0.9535	0.1942	0.6481	0.6928	1.6377	4.8507	0.0629
0.320	0.9799	0.9315	0.9506	0.2003	0.6666	0.7156	1.5978	4.4467	0.0668
0.330	0.9787	0.9274	0.9476	0.2065	0.6848	0.7384	1.5608	4.0821	0.0707
0.340	0.9774	0.9231	0.9445	0.2126	0.7027	0.7613	1.5262	3.7520	0.0747
0.350	0.9761	0.9188	0.9413	0.2187	0.7205	0.7842	1.4939	3.4525	0.0788
0.360	0.9747	0.9143	0.9380	0.2248	0.7380	0.8072	1.4637	3.1801	0.0829
0.370	0.9733	0.9098	0.9347	0.2309	0.7553	0.8302	1.4354	2.9320	0.0872
0.380	0.9719	0.9052	0.9313	0.2369	0.7723	0.8532	1.4090	2.7054	0.0915
0.390	0.9705	0.9004	0.9278	0.2430	0.7891	0.8763	1.3841	2.4983	0.0959
0.400	0.9690	0.8956	0.9243	0.2490	0.8056	0.8995	1.3608	2.3085	0.1003
0.410	0.9675	0.8907	0.9207	0.2551	0.8219	0.9227	1.3388	2.1344	0.1048
0.420	0.9659	0.8857	0.9170	0.2611	0.8379	0.9460	1.3182	1.9744	0.1094
0.430	0.9643	0.8807	0.9132	0.2671	0.8536	0.9693	1.2988	1.8272	0.1140
0.440	0.9627	0.8755	0.9094	0.2730	0.8691	0.9927	1.2804	1.6915	0.1186
0.450	0.9611	0.8703	0.9055	0.2790	0.8843	1.0161	1.2632	1.5664	0.1234
0.460	0.9594	0.8650	0.9016	0.2850	0.8992	1.0396	1.2469	1.4509	0.1281
0.470	0.9577	0.8596	0.8976	0.2909	0.9138	1.0631	1.2315	1.3441	0.1329
0.480	0.9559	0.8541	0.8935	0.2968	0.9282	1.0867	1.2170	1.2453	0.1378
0.490	0.9542	0.8486	0.8894	0.3027	0.9423	1.1104	1.2033	1.1539	0.1426
0.500	0.9524	0.8430	0.8852	0.3086	0.9561	1.1341	1.1903	1.0691	0.1475

$$\gamma=1.400$$

M	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{\max}}{D}$	$\frac{\frac{1}{2}\rho V^2}{p_0}$
0.510	0.9506	0.8374	0.8809	0.3145	0.9696	1.1579	1.1781	0.9904	0.1525
0.520	0.9487	0.8317	0.8766	0.3203	0.9828	1.1818	1.1665	0.9174	0.1574
0.530	0.9468	0.8259	0.8723	0.3262	0.9958	1.2057	1.1556	0.8496	0.1624
0.540	0.9449	0.8201	0.8679	0.3320	1.0084	1.2297	1.1452	0.7866	0.1674
0.550	0.9430	0.8142	0.8634	0.3378	1.0208	1.2538	1.1354	0.7281	0.1724
0.560	0.9410	0.8082	0.8589	0.3436	1.0328	1.2779	1.1261	0.6736	0.1774
0.570	0.9390	0.8022	0.8544	0.3493	1.0446	1.3021	1.1173	0.6229	0.1825
0.580	0.9370	0.7962	0.8498	0.3551	1.0561	1.3264	1.1090	0.5757	0.1875
0.590	0.9349	0.7901	0.8451	0.3608	1.0672	1.3507	1.1011	0.5317	0.1925
0.600	0.9328	0.7840	0.8405	0.3665	1.0781	1.3751	1.0937	0.4908	0.1976
0.610	0.9307	0.7778	0.8357	0.3722	1.0887	1.3996	1.0867	0.4527	0.2026
0.620	0.9286	0.7716	0.8310	0.3779	1.0990	1.4242	1.0800	0.4172	0.2076
0.630	0.9265	0.7654	0.8262	0.3835	1.1090	1.4489	1.0737	0.3841	0.2127
0.640	0.9243	0.7591	0.8213	0.3891	1.1186	1.4736	1.0678	0.3533	0.2177
0.650	0.9221	0.7528	0.8164	0.3948	1.1280	1.4984	1.0621	0.3246	0.2226
0.660	0.9199	0.7465	0.8115	0.4003	1.1371	1.5233	1.0568	0.2979	0.2276
0.670	0.9176	0.7401	0.8066	0.4059	1.1459	1.5483	1.0518	0.2730	0.2326
0.680	0.9153	0.7338	0.8016	0.4115	1.1544	1.5733	1.0471	0.2498	0.2375
0.690	0.9131	0.7274	0.7966	0.4170	1.1626	1.5984	1.0426	0.2282	0.2424
0.700	0.9107	0.7209	0.7916	0.4225	1.1705	1.6237	1.0384	0.2081	0.2473
0.710	0.9084	0.7145	0.7865	0.4280	1.1782	1.6490	1.0344	0.1895	0.2521
0.720	0.9061	0.7080	0.7814	0.4335	1.1855	1.6744	1.0307	0.1721	0.2569
0.730	0.9037	0.7016	0.7763	0.4389	1.1925	1.6999	1.0272	0.1561	0.2617
0.740	0.9013	0.6951	0.7712	0.4443	1.1993	1.7254	1.0239	0.1411	0.2664
0.750	0.8989	0.6886	0.7660	0.4497	1.2058	1.7511	1.0208	0.1273	0.2711
0.760	0.8964	0.6821	0.7609	0.4551	1.2119	1.7768	1.0179	0.1145	0.2758
0.770	0.8940	0.6756	0.7557	0.4605	1.2178	1.8027	1.0152	0.1026	0.2804
0.780	0.8915	0.6691	0.7505	0.4658	1.2234	1.8286	1.0126	0.0917	0.2849
0.790	0.8890	0.6625	0.7452	0.4711	1.2288	1.8547	1.0103	0.0816	0.2894
0.800	0.8865	0.6560	0.7400	0.4764	1.2338	1.8808	1.0081	0.0723	0.2939
0.810	0.8840	0.6495	0.7347	0.4817	1.2386	1.9070	1.0060	0.0638	0.2983
0.820	0.8815	0.6430	0.7295	0.4869	1.2431	1.9333	1.0041	0.0559	0.3026
0.830	0.8789	0.6365	0.7242	0.4921	1.2474	1.9598	1.0024	0.0488	0.3069
0.840	0.8763	0.6300	0.7189	0.4973	1.2514	1.9863	1.0008	0.0423	0.3112
0.850	0.8737	0.6235	0.7136	0.5025	1.2551	2.0129	0.9993	0.0363	0.3153
0.860	0.8711	0.6170	0.7083	0.5077	1.2585	2.0396	0.9979	0.0310	0.3195
0.870	0.8685	0.6106	0.7030	0.5128	1.2617	2.0665	0.9967	0.0261	0.3235
0.880	0.8659	0.6041	0.6977	0.5179	1.2646	2.0934	0.9956	0.0218	0.3275
0.890	0.8632	0.5977	0.6924	0.5230	1.2673	2.1204	0.9946	0.0179	0.3314
0.900	0.8606	0.5913	0.6870	0.5280	1.2698	2.1476	0.9937	0.0145	0.3352
0.910	0.8579	0.5849	0.6817	0.5331	1.2719	2.1748	0.9929	0.0115	0.3390
0.920	0.8552	0.5785	0.6764	0.5381	1.2739	2.2021	0.9922	0.0089	0.3427
0.930	0.8525	0.5721	0.6711	0.5431	1.2756	2.2296	0.9916	0.0067	0.3464
0.940	0.8498	0.5658	0.6658	0.5481	1.2770	2.2572	0.9911	0.0048	0.3499
0.950	0.8471	0.5595	0.6604	0.5530	1.2783	2.2848	0.9907	0.0033	0.3534
0.960	0.8444	0.5532	0.6551	0.5579	1.2793	2.3126	0.9903	0.0021	0.3569
0.970	0.8416	0.5469	0.6498	0.5628	1.2800	2.3405	0.9901	0.0011	0.3602
0.980	0.8389	0.5407	0.6445	0.5677	1.2806	2.3685	0.9899	0.0005	0.3635
0.990	0.8361	0.5345	0.6392	0.5725	1.2809	2.3966	0.9898	0.0001	0.3667
1.000	0.8333	0.5283	0.6339	0.5774	1.2810	2.4249	0.9897	0.0000	0.3698

GAS FLOW TABLES ($\gamma=1.400$): SUPERSONIC FLOW

M	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{m\sqrt{c_p T_0}}{A p_0}$	$\frac{m\sqrt{c_p T_0}}{A p}$	F	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	V	M
1.010	0.8306	0.5221	0.6287	0.5821	1.2809	2.4532	0.9898	0.0001	0.3728	0.9901	1.0000	1.0235	1.9152	1.0066	0.04	1.010
1.020	0.8278	0.5160	0.6234	0.5869	1.2806	2.4817	0.9899	0.0005	0.3758	0.9805	1.0000	1.0471	1.9379	1.0132	0.13	1.020
1.030	0.8250	0.5099	0.6181	0.5917	1.2801	2.5103	0.9900	0.0010	0.3787	0.9712	1.0000	1.0711	1.9610	1.0198	0.23	1.030
1.040	0.8222	0.5039	0.6129	0.5964	1.2793	2.5390	0.9903	0.0018	0.3815	0.9620	0.9999	1.0952	1.9844	1.0263	0.35	1.040
1.050	0.8193	0.4979	0.6077	0.6011	1.2784	2.5678	0.9905	0.0027	0.3842	0.9531	0.9999	1.1196	2.0083	1.0328	0.49	1.050
1.060	0.8165	0.4919	0.6024	0.6058	1.2773	2.5967	0.9909	0.0038	0.3869	0.9444	0.9998	1.1442	2.0325	1.0393	0.64	1.060
1.070	0.8137	0.4860	0.5972	0.6104	1.2760	2.6258	0.9913	0.0051	0.3895	0.9360	0.9996	1.1691	2.0570	1.0458	0.80	1.070
1.080	0.8108	0.4800	0.5920	0.6151	1.2745	2.6549	0.9917	0.0066	0.3919	0.9277	0.9994	1.1941	2.0819	1.0522	0.97	1.080
1.090	0.8080	0.4742	0.5869	0.6197	1.2728	2.6842	0.9922	0.0082	0.3944	0.9196	0.9992	1.2195	2.1072	1.0586	1.15	1.090
1.100	0.8052	0.4684	0.5817	0.6243	1.2709	2.7136	0.9928	0.0099	0.3967	0.9118	0.9989	1.2450	2.1328	1.0649	1.34	1.100
1.110	0.8023	0.4626	0.5766	0.6288	1.2689	2.7432	0.9934	0.0118	0.3990	0.9041	0.9986	1.2708	2.1588	1.0713	1.53	1.110
1.120	0.7994	0.4568	0.5714	0.6333	1.2667	2.7728	0.9940	0.0138	0.4011	0.8966	0.9982	1.2968	2.1851	1.0776	1.74	1.120
1.130	0.7966	0.4511	0.5663	0.6379	1.2643	2.8026	0.9947	0.0159	0.4032	0.8892	0.9978	1.3231	2.2118	1.0840	1.94	1.130
1.140	0.7937	0.4455	0.5612	0.6423	1.2618	2.8325	0.9954	0.0182	0.4052	0.8820	0.9973	1.3495	2.2388	1.0903	2.16	1.140
1.150	0.7908	0.4398	0.5562	0.6468	1.2590	2.8626	0.9961	0.0205	0.4072	0.8750	0.9967	1.3763	2.2661	1.0966	2.38	1.150
1.160	0.7879	0.4343	0.5511	0.6512	1.2562	2.8927	0.9969	0.0230	0.4090	0.8682	0.9961	1.4032	2.2937	1.1029	2.61	1.160
1.170	0.7851	0.4287	0.5461	0.6556	1.2531	2.9230	0.9978	0.0255	0.4108	0.8615	0.9953	1.4304	2.3217	1.1092	2.84	1.170
1.180	0.7822	0.4232	0.5411	0.6600	1.2500	2.9534	0.9986	0.0281	0.4125	0.8549	0.9946	1.4578	2.3500	1.1154	3.07	1.180
1.190	0.7793	0.4178	0.5361	0.6644	1.2466	2.9840	0.9995	0.0309	0.4141	0.8485	0.9937	1.4855	2.3786	1.1217	3.31	1.190
1.200	0.7764	0.4124	0.5311	0.6687	1.2432	3.0147	1.0004	0.0336	0.4157	0.8422	0.9928	1.5133	2.4075	1.1280	3.56	1.200
1.210	0.7735	0.4070	0.5262	0.6730	1.2396	3.0455	1.0014	0.0365	0.4171	0.8360	0.9918	1.5415	2.4367	1.1343	3.81	1.210
1.220	0.7706	0.4017	0.5213	0.6773	1.2358	3.0764	1.0024	0.0394	0.4185	0.8300	0.9907	1.5698	2.4663	1.1405	4.06	1.220
1.230	0.7677	0.3964	0.5164	0.6816	1.2319	3.1075	1.0034	0.0424	0.4198	0.8241	0.9896	1.5984	2.4961	1.1468	4.31	1.230
1.240	0.7648	0.3912	0.5115	0.6858	1.2279	3.1387	1.0045	0.0455	0.4211	0.8183	0.9884	1.6272	2.5263	1.1531	4.57	1.240
1.250	0.7619	0.3861	0.5067	0.6901	1.2238	3.1700	1.0055	0.0486	0.4223	0.8126	0.9871	1.6563	2.5568	1.1594	4.83	1.250

$\gamma=1.400$

M	$\frac{T}{T_0}$	$\frac{P}{P_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{m\sqrt{c_p T_0}}{A p_0}$	$\frac{m\sqrt{c_p T_0}}{A p}$	F	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	v	M
1.260	0.7590	0.3809	0.5019	0.6943	1.2195	3.2015	1.0066	0.0517	0.4233	0.8071	0.9857	1.6855	2.5875	1.1657	5.09	1.260
1.270	0.7561	0.3759	0.4971	0.6984	1.2152	3.2331	1.0077	0.0549	0.4244	0.8016	0.9842	1.7151	2.6186	1.1720	5.36	1.270
1.280	0.7532	0.3708	0.4923	0.7026	1.2107	3.2648	1.0089	0.0582	0.4253	0.7963	0.9827	1.7448	2.6500	1.1783	5.63	1.280
1.290	0.7503	0.3658	0.4876	0.7067	1.2061	3.2967	1.0100	0.0615	0.4262	0.7911	0.9811	1.7748	2.6816	1.1846	5.90	1.290
1.300	0.7474	0.3609	0.4829	0.7108	1.2014	3.3287	1.0112	0.0648	0.4270	0.7860	0.9794	1.8050	2.7136	1.1909	6.17	1.300
1.310	0.7445	0.3560	0.4782	0.7149	1.1965	3.3608	1.0124	0.0682	0.4277	0.7809	0.9776	1.8355	2.7459	1.1972	6.44	1.310
1.320	0.7416	0.3512	0.4736	0.7189	1.1916	3.3931	1.0136	0.0716	0.4283	0.7760	0.9758	1.8661	2.7784	1.2035	6.72	1.320
1.330	0.7387	0.3464	0.4690	0.7229	1.1866	3.4255	1.0149	0.0750	0.4289	0.7712	0.9738	1.8971	2.8112	1.2099	7.00	1.330
1.340	0.7358	0.3417	0.4644	0.7270	1.1815	3.4581	1.0161	0.0785	0.4294	0.7664	0.9718	1.9282	2.8444	1.2162	7.28	1.340
1.350	0.7329	0.3370	0.4598	0.7309	1.1763	3.4907	1.0174	0.0820	0.4299	0.7618	0.9697	1.9596	2.8778	1.2226	7.56	1.350
1.360	0.7300	0.3323	0.4553	0.7349	1.1710	3.5236	1.0187	0.0855	0.4303	0.7572	0.9676	1.9912	2.9115	1.2290	7.84	1.360
1.370	0.7271	0.3277	0.4508	0.7388	1.1656	3.5566	1.0200	0.0890	0.4306	0.7527	0.9653	2.0231	2.9455	1.2354	8.13	1.370
1.380	0.7242	0.3232	0.4463	0.7427	1.1601	3.5897	1.0213	0.0926	0.4308	0.7483	0.9630	2.0551	2.9798	1.2418	8.41	1.380
1.390	0.7213	0.3187	0.4418	0.7466	1.1546	3.6229	1.0226	0.0962	0.4310	0.7440	0.9607	2.0875	3.0144	1.2482	8.70	1.390
1.400	0.7184	0.3142	0.4374	0.7505	1.1490	3.6563	1.0240	0.0997	0.4311	0.7397	0.9582	2.1200	3.0492	1.2547	8.99	1.400
1.410	0.7155	0.3098	0.4330	0.7543	1.1433	3.6899	1.0253	0.1033	0.4312	0.7355	0.9557	2.1528	3.0844	1.2612	9.28	1.410
1.420	0.7126	0.3055	0.4287	0.7581	1.1375	3.7236	1.0267	0.1069	0.4312	0.7314	0.9531	2.1858	3.1198	1.2676	9.57	1.420
1.430	0.7097	0.3012	0.4244	0.7619	1.1317	3.7574	1.0281	0.1106	0.4311	0.7274	0.9504	2.2191	3.1555	1.2741	9.86	1.430
1.440	0.7069	0.2969	0.4201	0.7657	1.1258	3.7914	1.0295	0.1142	0.4310	0.7235	0.9476	2.2525	3.1915	1.2807	10.15	1.440
1.450	0.7040	0.2927	0.4158	0.7694	1.1198	3.8255	1.0308	0.1178	0.4308	0.7196	0.9448	2.2863	3.2278	1.2872	10.44	1.450
1.460	0.7011	0.2886	0.4116	0.7732	1.1138	3.8598	1.0323	0.1215	0.4306	0.7157	0.9420	2.3202	3.2643	1.2938	10.73	1.460
1.470	0.6982	0.2845	0.4074	0.7769	1.1077	3.8942	1.0337	0.1251	0.4303	0.7120	0.9390	2.3544	3.3011	1.3003	11.02	1.470
1.480	0.6954	0.2804	0.4032	0.7805	1.1016	3.9287	1.0351	0.1288	0.4299	0.7083	0.9360	2.3888	3.3382	1.3069	11.32	1.480
1.490	0.6925	0.2764	0.3991	0.7842	1.0954	3.9634	1.0365	0.1324	0.4295	0.7047	0.9329	2.4235	3.3756	1.3136	11.61	1.490
1.500	0.6897	0.2724	0.3950	0.7878	1.0891	3.9983	1.0379	0.1361	0.4290	0.7011	0.9298	2.4583	3.4133	1.3202	11.91	1.500

$\gamma=1.400$

M	$\frac{T}{T_0}$	$\frac{P}{P_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{m\sqrt{c_p T_0}}{A P_0}$	$\frac{m\sqrt{c_p T_0}}{A P}$	F	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	V	M
1.510	0.6868	0.2685	0.3909	0.7914	1.0829	4.0333	1.0394	0.1397	0.4285	0.6976	0.9266	2.4935	3.4512	1.3269	12.20	1.510
1.520	0.6840	0.2646	0.3869	0.7950	1.0765	4.0684	1.0408	0.1433	0.4279	0.6941	0.9233	2.5288	3.4894	1.3336	12.49	1.520
1.530	0.6811	0.2608	0.3829	0.7986	1.0702	4.1037	1.0423	0.1470	0.4273	0.6907	0.9200	2.5644	3.5279	1.3403	12.79	1.530
1.540	0.6783	0.2570	0.3789	0.8021	1.0638	4.1392	1.0437	0.1506	0.4266	0.6874	0.9166	2.6002	3.5667	1.3470	13.09	1.540
1.550	0.6754	0.2533	0.3750	0.8057	1.0573	4.1748	1.0452	0.1543	0.4259	0.6841	0.9132	2.6363	3.6057	1.3538	13.38	1.550
1.560	0.6726	0.2496	0.3710	0.8092	1.0508	4.2105	1.0467	0.1579	0.4252	0.6809	0.9097	2.6725	3.6450	1.3606	13.68	1.560
1.570	0.6698	0.2459	0.3672	0.8126	1.0443	4.2464	1.0481	0.1615	0.4243	0.6777	0.9062	2.7091	3.6846	1.3674	13.97	1.570
1.580	0.6670	0.2423	0.3633	0.8161	1.0378	4.2825	1.0496	0.1651	0.4235	0.6746	0.9026	2.7458	3.7244	1.3742	14.27	1.580
1.590	0.6642	0.2388	0.3595	0.8195	1.0312	4.3187	1.0511	0.1688	0.4226	0.6715	0.8989	2.7828	3.7646	1.3811	14.56	1.590
1.600	0.6614	0.2353	0.3557	0.8230	1.0246	4.3551	1.0526	0.1724	0.4216	0.6684	0.8952	2.8200	3.8050	1.3880	14.86	1.600
1.610	0.6586	0.2318	0.3520	0.8263	1.0180	4.3916	1.0541	0.1760	0.4206	0.6655	0.8915	2.8575	3.8456	1.3949	15.16	1.610
1.620	0.6558	0.2284	0.3483	0.8297	1.0114	4.4282	1.0555	0.1795	0.4196	0.6625	0.8877	2.8951	3.8866	1.4018	15.45	1.620
1.630	0.6530	0.2250	0.3446	0.8331	1.0047	4.4651	1.0570	0.1831	0.4185	0.6596	0.8838	2.9331	3.9278	1.4088	15.75	1.630
1.640	0.6502	0.2217	0.3409	0.8364	0.9980	4.5020	1.0585	0.1867	0.4174	0.6568	0.8799	2.9712	3.9693	1.4158	16.04	1.640
1.650	0.6475	0.2184	0.3373	0.8397	0.9913	4.5392	1.0600	0.1902	0.4162	0.6540	0.8760	3.0096	4.0110	1.4228	16.34	1.650
1.660	0.6447	0.2151	0.3337	0.8430	0.9846	4.5765	1.0615	0.1938	0.4150	0.6512	0.8720	3.0482	4.0531	1.4299	16.63	1.660
1.670	0.6419	0.2119	0.3302	0.8462	0.9779	4.6139	1.0630	0.1973	0.4138	0.6485	0.8680	3.0871	4.0953	1.4369	16.93	1.670
1.680	0.6392	0.2088	0.3266	0.8495	0.9712	4.6515	1.0645	0.2008	0.4125	0.6458	0.8639	3.1261	4.1379	1.4440	17.22	1.680
1.690	0.6364	0.2057	0.3232	0.8527	0.9644	4.6892	1.0660	0.2043	0.4112	0.6431	0.8599	3.1655	4.1807	1.4512	17.52	1.690
1.700	0.6337	0.2026	0.3197	0.8559	0.9577	4.7272	1.0674	0.2078	0.4098	0.6405	0.8557	3.2050	4.2238	1.4583	17.81	1.700
1.710	0.6310	0.1996	0.3163	0.8591	0.9509	4.7652	1.0689	0.2113	0.4085	0.6380	0.8516	3.2448	4.2672	1.4655	18.10	1.710
1.720	0.6283	0.1966	0.3129	0.8622	0.9442	4.8035	1.0704	0.2147	0.4071	0.6355	0.8474	3.2848	4.3108	1.4727	18.40	1.720
1.730	0.6256	0.1936	0.3095	0.8654	0.9374	4.8418	1.0719	0.2182	0.4056	0.6330	0.8431	3.3251	4.3547	1.4800	18.69	1.730
1.740	0.6229	0.1907	0.3062	0.8685	0.9307	4.8804	1.0734	0.2216	0.4041	0.6305	0.8389	3.3655	4.3989	1.4873	18.98	1.740
1.750	0.6202	0.1878	0.3029	0.8716	0.9239	4.9191	1.0749	0.2250	0.4026	0.6281	0.8346	3.4063	4.4433	1.4946	19.27	1.750

$$\gamma=1.400$$

M	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m} \sqrt{c_p T_0}}{A p_0}$	$\frac{\dot{m} \sqrt{c_p T_0}}{A p}$	F	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2} \rho V^2$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	ν	M
1.760	0.6175	0.1850	0.2996	0.8747	0.9172	4.9580	1.0764	0.2284	0.4011	0.6257	0.8302	3.4472	4.4880	1.5019	19.56	1.760
1.770	0.6148	0.1822	0.2964	0.8777	0.9104	4.9970	1.0779	0.2318	0.3996	0.6234	0.8259	3.4884	4.5330	1.5093	19.86	1.770
1.780	0.6121	0.1794	0.2931	0.8808	0.9037	5.0362	1.0793	0.2352	0.3980	0.6210	0.8215	3.5298	4.5782	1.5167	20.15	1.780
1.790	0.6095	0.1767	0.2900	0.8838	0.8970	5.0755	1.0808	0.2385	0.3964	0.6188	0.8171	3.5715	4.6237	1.5241	20.44	1.790
1.800	0.6068	0.1740	0.2868	0.8868	0.8902	5.1150	1.0823	0.2419	0.3947	0.6165	0.8127	3.6133	4.6695	1.5316	20.73	1.800
1.810	0.6041	0.1714	0.2837	0.8898	0.8835	5.1547	1.0838	0.2452	0.3931	0.6143	0.8082	3.6555	4.7155	1.5391	21.01	1.810
1.820	0.6015	0.1688	0.2806	0.8927	0.8768	5.1945	1.0852	0.2485	0.3914	0.6121	0.8038	3.6978	4.7618	1.5466	21.30	1.820
1.830	0.5989	0.1662	0.2776	0.8957	0.8701	5.2345	1.0867	0.2518	0.3897	0.6099	0.7993	3.7404	4.8084	1.5541	21.59	1.830
1.840	0.5963	0.1637	0.2745	0.8986	0.8634	5.2747	1.0882	0.2551	0.3879	0.6078	0.7948	3.7832	4.8552	1.5617	21.88	1.840
1.850	0.5936	0.1612	0.2715	0.9015	0.8568	5.3150	1.0896	0.2583	0.3862	0.6057	0.7902	3.8263	4.9023	1.5693	22.16	1.850
1.860	0.5910	0.1587	0.2686	0.9044	0.8501	5.3555	1.0911	0.2616	0.3844	0.6036	0.7857	3.8695	4.9497	1.5770	22.45	1.860
1.870	0.5884	0.1563	0.2656	0.9072	0.8435	5.3962	1.0926	0.2648	0.3826	0.6016	0.7811	3.9131	4.9973	1.5847	22.73	1.870
1.880	0.5859	0.1539	0.2627	0.9101	0.8368	5.4370	1.0940	0.2680	0.3808	0.5996	0.7765	3.9568	5.0452	1.5924	23.02	1.880
1.890	0.5833	0.1516	0.2598	0.9129	0.8302	5.4780	1.0955	0.2712	0.3790	0.5976	0.7720	4.0008	5.0934	1.6001	23.30	1.890
1.900	0.5807	0.1492	0.2570	0.9157	0.8237	5.5191	1.0969	0.2743	0.3771	0.5956	0.7674	4.0450	5.1418	1.6079	23.59	1.900
1.910	0.5782	0.1470	0.2542	0.9185	0.8171	5.5604	1.0984	0.2775	0.3753	0.5937	0.7627	4.0895	5.1905	1.6157	23.87	1.910
1.920	0.5756	0.1447	0.2514	0.9213	0.8106	5.6019	1.0998	0.2806	0.3734	0.5918	0.7581	4.1341	5.2394	1.6236	24.15	1.920
1.930	0.5731	0.1425	0.2486	0.9240	0.8041	5.6435	1.1012	0.2837	0.3715	0.5899	0.7535	4.1791	5.2886	1.6314	24.43	1.930
1.940	0.5705	0.1403	0.2459	0.9268	0.7976	5.6853	1.1027	0.2868	0.3696	0.5880	0.7488	4.2242	5.3381	1.6394	24.71	1.940
1.950	0.5680	0.1381	0.2432	0.9295	0.7911	5.7273	1.1041	0.2899	0.3677	0.5862	0.7442	4.2696	5.3878	1.6473	24.99	1.950
1.960	0.5655	0.1360	0.2405	0.9322	0.7846	5.7695	1.1055	0.2929	0.3657	0.5844	0.7395	4.3152	5.4378	1.6553	25.27	1.960
1.970	0.5630	0.1339	0.2378	0.9349	0.7782	5.8118	1.1069	0.2960	0.3638	0.5826	0.7349	4.3611	5.4881	1.6633	25.55	1.970
1.980	0.5605	0.1318	0.2352	0.9375	0.7718	5.8542	1.1084	0.2990	0.3618	0.5808	0.7302	4.4071	5.5386	1.6713	25.83	1.980
1.990	0.5580	0.1298	0.2326	0.9402	0.7655	5.8969	1.1098	0.3020	0.3598	0.5791	0.7255	4.4535	5.5894	1.6794	26.10	1.990
2.000	0.5556	0.1278	0.2300	0.9428	0.7591	5.9397	1.1112	0.3050	0.3579	0.5774	0.7209	4.5000	5.6404	1.6875	26.38	2.000

$\gamma=1.400$

M	$\frac{T}{T_0}$	$\frac{P}{P_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{m\sqrt{c_p T_0}}{A P_0}$	$\frac{m\sqrt{c_p T_0}}{A P}$	F	$\frac{4c_f L_{max}}{D}$	$\frac{1}{2}\rho V^2$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	V	M
2.010	0.5531	0.1258	0.2275	0.9454	0.7528	5.9827	1.1126	0.3080	0.3559	0.5757	0.7162	4.5488	5.6918	1.6956	26.66	2.010
2.020	0.5506	0.1239	0.2250	0.9480	0.7465	6.0258	1.1140	0.3109	0.3539	0.5740	0.7115	4.5938	5.7433	1.7038	26.93	2.020
2.030	0.5482	0.1220	0.2225	0.9506	0.7403	6.0692	1.1154	0.3138	0.3518	0.5723	0.7069	4.6411	5.7952	1.7120	27.20	2.030
2.040	0.5458	0.1201	0.2200	0.9531	0.7340	6.1126	1.1167	0.3168	0.3498	0.5707	0.7022	4.6885	5.8473	1.7203	27.48	2.040
2.050	0.5433	0.1182	0.2176	0.9557	0.7279	6.1563	1.1181	0.3197	0.3478	0.5691	0.6975	4.7363	5.8996	1.7285	27.75	2.050
2.060	0.5409	0.1164	0.2152	0.9582	0.7217	6.2001	1.1195	0.3225	0.3458	0.5675	0.6928	4.7842	5.9523	1.7369	28.02	2.060
2.070	0.5385	0.1146	0.2128	0.9607	0.7156	6.2441	1.1209	0.3254	0.3437	0.5659	0.6882	4.8324	6.0051	1.7452	28.29	2.070
2.080	0.5361	0.1128	0.2104	0.9632	0.7095	6.2883	1.1222	0.3282	0.3417	0.5643	0.6835	4.8808	6.0583	1.7536	28.56	2.080
2.090	0.5337	0.1111	0.2081	0.9657	0.7034	6.3326	1.1236	0.3310	0.3396	0.5628	0.6789	4.9295	6.1117	1.7620	28.83	2.090
2.100	0.5313	0.1094	0.2058	0.9681	0.6974	6.3772	1.1250	0.3339	0.3376	0.5613	0.6742	4.9783	6.1654	1.7705	29.10	2.100
2.110	0.5290	0.1077	0.2035	0.9706	0.6914	6.4218	1.1263	0.3366	0.3355	0.5598	0.6696	5.0275	6.2193	1.7789	29.36	2.110
2.120	0.5266	0.1060	0.2013	0.9730	0.6854	6.4667	1.1276	0.3394	0.3334	0.5583	0.6649	5.0768	6.2735	1.7875	29.63	2.120
2.130	0.5243	0.1043	0.1990	0.9754	0.6795	6.5117	1.1290	0.3422	0.3314	0.5568	0.6603	5.1264	6.3280	1.7960	29.90	2.130
2.140	0.5219	0.1027	0.1968	0.9778	0.6736	6.5569	1.1303	0.3449	0.3293	0.5554	0.6557	5.1762	6.3827	1.8046	30.16	2.140
2.150	0.5196	0.1011	0.1946	0.9802	0.6677	6.6023	1.1317	0.3476	0.3272	0.5540	0.6511	5.2263	6.4377	1.8132	30.43	2.150
2.160	0.5173	0.0996	0.1925	0.9825	0.6619	6.6478	1.1330	0.3503	0.3252	0.5525	0.6464	5.2765	6.4929	1.8219	30.69	2.160
2.170	0.5150	0.0980	0.1903	0.9849	0.6561	6.6936	1.1343	0.3530	0.3231	0.5511	0.6419	5.3271	6.5484	1.8306	30.95	2.170
2.180	0.5127	0.0965	0.1882	0.9872	0.6503	6.7395	1.1356	0.3556	0.3210	0.5498	0.6373	5.3778	6.6042	1.8393	31.21	2.180
2.190	0.5104	0.0950	0.1861	0.9895	0.6446	6.7855	1.1369	0.3583	0.3189	0.5484	0.6327	5.4288	6.6602	1.8481	31.47	2.190
2.200	0.5081	0.0935	0.1841	0.9918	0.6389	6.8318	1.1382	0.3609	0.3169	0.5471	0.6281	5.4800	6.7165	1.8569	31.73	2.200
2.210	0.5059	0.0921	0.1820	0.9941	0.6333	6.8782	1.1395	0.3635	0.3148	0.5457	0.6236	5.5315	6.7730	1.8657	31.99	2.210
2.220	0.5036	0.0906	0.1800	0.9964	0.6277	6.9248	1.1408	0.3661	0.3127	0.5444	0.6191	5.5831	6.8298	1.8746	32.25	2.220
2.230	0.5014	0.0892	0.1780	0.9986	0.6221	6.9715	1.1421	0.3687	0.3106	0.5431	0.6145	5.6351	6.8869	1.8835	32.51	2.230
2.240	0.4991	0.0878	0.1760	1.0009	0.6165	7.0185	1.1434	0.3712	0.3085	0.5418	0.6100	5.6872	6.9442	1.8924	32.76	2.240
2.250	0.4969	0.0865	0.1740	1.0031	0.6110	7.0656	1.1446	0.3738	0.3065	0.5406	0.6055	5.7396	7.0018	1.9014	33.02	2.250

$\gamma=1.400$

M	$\frac{T}{T_0}$	$\frac{P}{P_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{m\sqrt{c_p T_0}}{A P_0}$	$\frac{m\sqrt{c_p T_0}}{A P}$	F	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	V	M
2.260	0.4947	0.0851	0.1721	1.0053	0.6056	7.1129	1.1459	0.3763	0.3044	0.5393	0.6011	5.7922	7.0597	1.9104	33.27	2.260
2.270	0.4925	0.0838	0.1702	1.0075	0.6002	7.1603	1.1472	0.3788	0.3023	0.5381	0.5966	5.8451	7.1178	1.9194	33.53	2.270
2.280	0.4903	0.0825	0.1683	1.0097	0.5948	7.2080	1.1484	0.3813	0.3003	0.5368	0.5921	5.8981	7.1762	1.9285	33.78	2.280
2.290	0.4881	0.0812	0.1664	1.0118	0.5894	7.2558	1.1497	0.3838	0.2982	0.5356	0.5877	5.9515	7.2348	1.9376	34.03	2.290
2.300	0.4859	0.0800	0.1646	1.0140	0.5841	7.3038	1.1509	0.3862	0.2961	0.5344	0.5833	6.0050	7.2937	1.9468	34.28	2.300
2.310	0.4837	0.0787	0.1628	1.0161	0.5788	7.3520	1.1521	0.3887	0.2941	0.5332	0.5789	6.0588	7.3528	1.9560	34.53	2.310
2.320	0.4816	0.0775	0.1609	1.0182	0.5736	7.4003	1.1534	0.3911	0.2920	0.5321	0.5745	6.1128	7.4122	1.9652	34.78	2.320
2.330	0.4794	0.0763	0.1592	1.0204	0.5684	7.4488	1.1546	0.3935	0.2900	0.5309	0.5702	6.1671	7.4719	1.9745	35.03	2.330
2.340	0.4773	0.0751	0.1574	1.0224	0.5632	7.4975	1.1558	0.3959	0.2879	0.5297	0.5658	6.2215	7.5319	1.9838	35.28	2.340
2.350	0.4752	0.0740	0.1556	1.0245	0.5581	7.5464	1.1570	0.3983	0.2859	0.5286	0.5615	6.2763	7.5920	1.9931	35.53	2.350
2.360	0.4731	0.0728	0.1539	1.0266	0.5530	7.5955	1.1582	0.4006	0.2839	0.5275	0.5572	6.3312	7.6525	2.0025	35.77	2.360
2.370	0.4709	0.0717	0.1522	1.0286	0.5480	7.6447	1.1595	0.4030	0.2818	0.5264	0.5529	6.3864	7.7132	2.0119	36.02	2.370
2.380	0.4688	0.0706	0.1505	1.0307	0.5430	7.6941	1.1606	0.4053	0.2798	0.5253	0.5486	6.4418	7.7742	2.0213	36.26	2.380
2.390	0.4668	0.0695	0.1488	1.0327	0.5380	7.7437	1.1618	0.4076	0.2778	0.5242	0.5444	6.4975	7.8354	2.0308	36.50	2.390
2.400	0.4647	0.0684	0.1472	1.0347	0.5331	7.7935	1.1630	0.4099	0.2758	0.5231	0.5401	6.5533	7.8969	2.0403	36.75	2.400
2.410	0.4626	0.0673	0.1456	1.0367	0.5282	7.8434	1.1642	0.4122	0.2738	0.5221	0.5359	6.6095	7.9587	2.0499	36.99	2.410
2.420	0.4606	0.0663	0.1439	1.0387	0.5233	7.8935	1.1654	0.4144	0.2718	0.5210	0.5317	6.6658	8.0207	2.0595	37.23	2.420
2.430	0.4585	0.0653	0.1424	1.0407	0.5185	7.9438	1.1665	0.4167	0.2698	0.5200	0.5276	6.7224	8.0830	2.0691	37.47	2.430
2.440	0.4565	0.0643	0.1408	1.0426	0.5137	7.9943	1.1677	0.4189	0.2678	0.5189	0.5234	6.7792	8.1455	2.0788	37.71	2.440
2.450	0.4544	0.0633	0.1392	1.0446	0.5090	8.0450	1.1689	0.4211	0.2658	0.5179	0.5193	6.8363	8.2083	2.0885	37.95	2.450
2.460	0.4524	0.0623	0.1377	1.0465	0.5043	8.0958	1.1700	0.4233	0.2639	0.5169	0.5152	6.8935	8.2713	2.0982	38.18	2.460
2.470	0.4504	0.0613	0.1362	1.0484	0.4996	8.1468	1.1712	0.4255	0.2619	0.5159	0.5111	6.9511	8.3346	2.1080	38.42	2.470
2.480	0.4484	0.0604	0.1346	1.0503	0.4950	8.1980	1.1723	0.4277	0.2599	0.5149	0.5071	7.0088	8.3982	2.1178	38.66	2.480
2.490	0.4464	0.0594	0.1332	1.0522	0.4904	8.2494	1.1734	0.4298	0.2580	0.5140	0.5030	7.0668	8.4620	2.1276	38.89	2.490
2.500	0.4444	0.0585	0.1317	1.0541	0.4858	8.3010	1.1746	0.4320	0.2561	0.5130	0.4990	7.1250	8.5261	2.1375	39.12	2.500

$\gamma=1.400$

M	$\frac{T}{T_0}$	$\frac{P}{P_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{m\sqrt{c_p T_0}}{A p_0}$	$\frac{m\sqrt{c_p T_0}}{A p}$	F	$\frac{4c_f L_{max}}{D}$	$\frac{1}{2}\rho V^2$	M_s	$\frac{P_0 s}{P_0}$	$\frac{P_s}{P}$	$\frac{P_0 s}{P}$	$\frac{T_s}{T}$	V	M
2.510	0.4425	0.0576	0.1302	1.0560	0.4813	8.3527	1.1757	0.4341	0.2541	0.5120	0.4950	7.1835	8.5905	2.1474	39.36	2.510
2.520	0.4405	0.0567	0.1288	1.0578	0.4768	8.4046	1.1768	0.4362	0.2522	0.5111	0.4911	7.2421	8.6551	2.1574	39.59	2.520
2.530	0.4386	0.0559	0.1274	1.0597	0.4724	8.4567	1.1779	0.4383	0.2503	0.5102	0.4871	7.3011	8.7200	2.1674	39.82	2.530
2.540	0.4366	0.0550	0.1260	1.0615	0.4680	8.5090	1.1790	0.4404	0.2484	0.5092	0.4832	7.3602	8.7851	2.1774	40.05	2.540
2.550	0.4347	0.0542	0.1246	1.0633	0.4636	8.5615	1.1801	0.4425	0.2465	0.5083	0.4793	7.4196	8.8505	2.1875	40.28	2.550
2.560	0.4328	0.0533	0.1232	1.0651	0.4593	8.6141	1.1812	0.4445	0.2446	0.5074	0.4754	7.4792	8.9161	2.1976	40.51	2.560
2.570	0.4309	0.0525	0.1218	1.0669	0.4550	8.6670	1.1823	0.4466	0.2427	0.5065	0.4715	7.5391	8.9820	2.2077	40.74	2.570
2.580	0.4289	0.0517	0.1205	1.0687	0.4507	8.7200	1.1834	0.4486	0.2409	0.5056	0.4677	7.5991	9.0482	2.2179	40.96	2.580
2.590	0.4271	0.0509	0.1192	1.0705	0.4465	8.7732	1.1844	0.4506	0.2390	0.5047	0.4639	7.6595	9.1146	2.2281	41.19	2.590
2.600	0.4252	0.0501	0.1179	1.0722	0.4423	8.8265	1.1855	0.4526	0.2371	0.5039	0.4601	7.7200	9.1813	2.2383	41.41	2.600
2.610	0.4233	0.0493	0.1166	1.0740	0.4382	8.8801	1.1866	0.4546	0.2353	0.5030	0.4564	7.7808	9.2483	2.2486	41.64	2.610
2.620	0.4214	0.0486	0.1153	1.0757	0.4341	8.9338	1.1876	0.4565	0.2335	0.5022	0.4526	7.8418	9.3155	2.2590	41.86	2.620
2.630	0.4196	0.0478	0.1140	1.0774	0.4300	8.9877	1.1887	0.4585	0.2317	0.5013	0.4489	7.9031	9.3829	2.2693	42.09	2.630
2.640	0.4177	0.0471	0.1128	1.0791	0.4260	9.0418	1.1897	0.4604	0.2298	0.5005	0.4452	7.9645	9.4506	2.2797	42.31	2.640
2.650	0.4159	0.0464	0.1115	1.0808	0.4220	9.0961	1.1908	0.4624	0.2280	0.4996	0.4416	8.0263	9.5186	2.2902	42.53	2.650
2.660	0.4141	0.0457	0.1103	1.0825	0.4180	9.1506	1.1918	0.4643	0.2262	0.4988	0.4379	8.0882	9.5869	2.3006	42.75	2.660
2.670	0.4122	0.0450	0.1091	1.0842	0.4141	9.2052	1.1928	0.4662	0.2245	0.4980	0.4343	8.1504	9.6554	2.3111	42.97	2.670
2.680	0.4104	0.0443	0.1079	1.0859	0.4102	9.2601	1.1939	0.4681	0.2227	0.4972	0.4307	8.2128	9.7241	2.3217	43.19	2.680
2.690	0.4086	0.0436	0.1067	1.0875	0.4063	9.3151	1.1949	0.4700	0.2209	0.4964	0.4271	8.2755	9.7931	2.3323	43.40	2.690
2.700	0.4068	0.0430	0.1056	1.0892	0.4025	9.3703	1.1959	0.4718	0.2192	0.4956	0.4236	8.3383	9.8624	2.3429	43.62	2.700
2.710	0.4051	0.0423	0.1044	1.0908	0.3987	9.4257	1.1969	0.4737	0.2174	0.4949	0.4201	8.4015	9.9319	2.3536	43.84	2.710
2.720	0.4033	0.0417	0.1033	1.0924	0.3949	9.4812	1.1979	0.4755	0.2157	0.4941	0.4166	8.4648	10.0017	2.3642	44.05	2.720
2.730	0.4015	0.0410	0.1022	1.0941	0.3912	9.5370	1.1989	0.4773	0.2140	0.4933	0.4131	8.5284	10.0718	2.3750	44.27	2.730
2.740	0.3998	0.0404	0.1010	1.0957	0.3875	9.5929	1.1999	0.4791	0.2123	0.4926	0.4097	8.5922	10.1421	2.3858	44.48	2.740
2.750	0.3980	0.0398	0.0999	1.0973	0.3838	9.6490	1.2009	0.4809	0.2106	0.4918	0.4062	8.6563	10.2127	2.3966	44.69	2.750

$\gamma=1.400$

M	$\frac{T}{T_0}$	$\frac{P}{P_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{m\sqrt{c_p T_0}}{A p_0}$	$\frac{m\sqrt{c_p T_0}}{A p}$	F	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	V	M
2.760	0.3963	0.0392	0.0989	1.0988	0.3802	9.7053	1.2019	0.4827	0.2089	0.4911	0.4028	8.7205	10.2835	2.4074	44.91	2.760
2.770	0.3945	0.0386	0.0978	1.1004	0.3766	9.7618	1.2029	0.4845	0.2072	0.4903	0.3994	8.7851	10.3546	2.4183	45.12	2.770
2.780	0.3928	0.0380	0.0967	1.1020	0.3730	9.8185	1.2038	0.4863	0.2055	0.4896	0.3961	8.8498	10.4259	2.4292	45.33	2.780
2.790	0.3911	0.0374	0.0957	1.1035	0.3695	9.8753	1.2048	0.4880	0.2039	0.4889	0.3928	8.9148	10.4975	2.4402	45.54	2.790
2.800	0.3894	0.0368	0.0946	1.1051	0.3660	9.9324	1.2058	0.4898	0.2022	0.4882	0.3895	8.9800	10.5694	2.4512	45.75	2.800
2.810	0.3877	0.0363	0.0936	1.1066	0.3625	9.9896	1.2067	0.4915	0.2006	0.4875	0.3862	9.0455	10.6415	2.4622	45.95	2.810
2.820	0.3860	0.0357	0.0926	1.1081	0.3591	10.0470	1.2077	0.4932	0.1990	0.4868	0.3829	9.1111	10.7139	2.4733	46.16	2.820
2.830	0.3844	0.0352	0.0916	1.1096	0.3557	10.1046	1.2086	0.4949	0.1973	0.4861	0.3797	9.1771	10.7865	2.4844	46.37	2.830
2.840	0.3827	0.0347	0.0906	1.1111	0.3523	10.1624	1.2095	0.4966	0.1957	0.4854	0.3765	9.2432	10.8594	2.4955	46.57	2.840
2.850	0.3810	0.0341	0.0896	1.1126	0.3490	10.2204	1.2105	0.4983	0.1941	0.4847	0.3733	9.3096	10.9326	2.5067	46.78	2.850
2.860	0.3794	0.0336	0.0886	1.1141	0.3457	10.2785	1.2114	0.5000	0.1926	0.4840	0.3701	9.3762	11.0060	2.5179	46.98	2.860
2.870	0.3777	0.0331	0.0877	1.1156	0.3424	10.3368	1.2123	0.5016	0.1910	0.4833	0.3670	9.4431	11.0797	2.5292	47.19	2.870
2.880	0.3761	0.0326	0.0867	1.1171	0.3392	10.3954	1.2132	0.5033	0.1894	0.4827	0.3639	9.5101	11.1536	2.5405	47.39	2.880
2.890	0.3745	0.0321	0.0858	1.1185	0.3359	10.4541	1.2142	0.5049	0.1879	0.4820	0.3608	9.5775	11.2278	2.5518	47.59	2.890
2.900	0.3729	0.0317	0.0849	1.1199	0.3328	10.5130	1.2151	0.5065	0.1863	0.4814	0.3577	9.6450	11.3022	2.5632	47.79	2.900
2.910	0.3712	0.0312	0.0840	1.1214	0.3296	10.5720	1.2160	0.5081	0.1848	0.4807	0.3547	9.7128	11.3770	2.5746	47.99	2.910
2.920	0.3696	0.0307	0.0831	1.1228	0.3265	10.6313	1.2169	0.5097	0.1833	0.4801	0.3517	9.7808	11.4519	2.5861	48.19	2.920
2.930	0.3681	0.0302	0.0822	1.1242	0.3234	10.6908	1.2178	0.5113	0.1818	0.4795	0.3487	9.8491	11.5271	2.5976	48.39	2.930
2.940	0.3665	0.0298	0.0813	1.1256	0.3203	10.7504	1.2187	0.5129	0.1803	0.4788	0.3457	9.9175	11.6026	2.6091	48.59	2.940
2.950	0.3649	0.0293	0.0804	1.1270	0.3173	10.8102	1.2195	0.5145	0.1788	0.4782	0.3428	9.9863	11.6784	2.6206	48.78	2.950
2.960	0.3633	0.0289	0.0796	1.1284	0.3143	10.8702	1.2204	0.5160	0.1773	0.4776	0.3398	10.0552	11.7544	2.6322	48.98	2.960
2.970	0.3618	0.0285	0.0787	1.1298	0.3113	10.9304	1.2213	0.5176	0.1758	0.4770	0.3369	10.1244	11.8306	2.6439	49.18	2.970
2.980	0.3602	0.0281	0.0779	1.1312	0.3083	10.9908	1.2222	0.5191	0.1744	0.4764	0.3340	10.1938	11.9072	2.6555	49.37	2.980
2.990	0.3587	0.0276	0.0770	1.1325	0.3054	11.0514	1.2230	0.5206	0.1729	0.4758	0.3312	10.2635	11.9839	2.6673	49.56	2.990
3.000	0.3571	0.0272	0.0762	1.1339	0.3025	11.1122	1.2239	0.5222	0.1715	0.4752	0.3283	10.3333	12.0610	2.6790	49.76	3.000

GAS FLOW TABLES ($\gamma=1.333$): SUBSONIC FLOW

M	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$
									p_0
0.010	1.0000	0.9999	1.0000	0.0058	0.0231	0.0231	43.2958	7493.200	0.0001
0.020	0.9999	0.9997	0.9998	0.0115	0.0462	0.0462	21.6560	1868.007	0.0003
0.030	0.9999	0.9994	0.9996	0.0173	0.0693	0.0693	14.4464	826.7890	0.0006
0.040	0.9997	0.9989	0.9992	0.0231	0.0923	0.0924	10.8442	462.6179	0.0011
0.050	0.9996	0.9983	0.9988	0.0288	0.1153	0.1155	8.6851	294.2161	0.0017
0.060	0.9994	0.9976	0.9982	0.0346	0.1383	0.1386	7.2475	202.8455	0.0024
0.070	0.9992	0.9967	0.9976	0.0404	0.1612	0.1618	6.2222	147.8292	0.0033
0.080	0.9989	0.9957	0.9968	0.0461	0.1841	0.1849	5.4546	112.1800	0.0042
0.090	0.9987	0.9946	0.9960	0.0519	0.2069	0.2080	4.8587	87.7848	0.0054
0.100	0.9983	0.9934	0.9950	0.0577	0.2297	0.2312	4.3831	70.3719	0.0066
0.110	0.9980	0.9920	0.9940	0.0634	0.2523	0.2544	3.9949	57.5186	0.0080
0.120	0.9976	0.9905	0.9928	0.0692	0.2749	0.2775	3.6724	47.7680	0.0095
0.130	0.9972	0.9888	0.9916	0.0749	0.2974	0.3007	3.4003	40.2012	0.0111
0.140	0.9967	0.9870	0.9903	0.0807	0.3197	0.3239	3.1678	34.2155	0.0129
0.150	0.9963	0.9851	0.9888	0.0864	0.3420	0.3471	2.9670	29.4027	0.0148
0.160	0.9958	0.9831	0.9873	0.0921	0.3641	0.3704	2.7920	25.4777	0.0168
0.170	0.9952	0.9810	0.9857	0.0979	0.3861	0.3936	2.6383	22.2372	0.0189
0.180	0.9946	0.9787	0.9840	0.1036	0.4080	0.4169	2.5022	19.5326	0.0211
0.190	0.9940	0.9763	0.9822	0.1093	0.4298	0.4402	2.3809	17.2536	0.0235
0.200	0.9934	0.9738	0.9803	0.1150	0.4514	0.4635	2.2724	15.3166	0.0260
0.210	0.9927	0.9711	0.9783	0.1207	0.4728	0.4869	2.1747	13.6578	0.0285
0.220	0.9920	0.9684	0.9762	0.1264	0.4941	0.5102	2.0863	12.2273	0.0312
0.230	0.9913	0.9655	0.9740	0.1321	0.5152	0.5336	2.0061	10.9859	0.0340
0.240	0.9905	0.9625	0.9717	0.1378	0.5362	0.5570	1.9330	9.9026	0.0370
0.250	0.9897	0.9594	0.9694	0.1435	0.5569	0.5805	1.8662	8.9522	0.0400
0.260	0.9889	0.9562	0.9669	0.1492	0.5775	0.6040	1.8049	8.1146	0.0431
0.270	0.9880	0.9529	0.9644	0.1549	0.5979	0.6275	1.7486	7.3731	0.0463
0.280	0.9871	0.9494	0.9618	0.1605	0.6181	0.6510	1.6966	6.7140	0.0496
0.290	0.9862	0.9459	0.9591	0.1662	0.6380	0.6746	1.6486	6.1261	0.0530
0.300	0.9852	0.9422	0.9563	0.1718	0.6578	0.6982	1.6042	5.5998	0.0565
0.310	0.9843	0.9384	0.9534	0.1775	0.6774	0.7218	1.5629	5.1272	0.0601
0.320	0.9832	0.9346	0.9505	0.1831	0.6967	0.7455	1.5245	4.7016	0.0638
0.330	0.9822	0.9306	0.9475	0.1887	0.7158	0.7692	1.4888	4.3173	0.0675
0.340	0.9811	0.9265	0.9444	0.1943	0.7347	0.7929	1.4555	3.9693	0.0714
0.350	0.9800	0.9224	0.9412	0.1999	0.7533	0.8167	1.4244	3.6535	0.0753
0.360	0.9789	0.9181	0.9379	0.2055	0.7717	0.8405	1.3953	3.3663	0.0793
0.370	0.9777	0.9137	0.9346	0.2111	0.7898	0.8644	1.3680	3.1046	0.0834
0.380	0.9765	0.9093	0.9311	0.2167	0.8077	0.8883	1.3425	2.8655	0.0875
0.390	0.9753	0.9047	0.9276	0.2223	0.8253	0.9122	1.3185	2.6469	0.0917
0.400	0.9741	0.9001	0.9241	0.2278	0.8427	0.9362	1.2959	2.4466	0.0960
0.410	0.9728	0.8954	0.9204	0.2334	0.8598	0.9603	1.2747	2.2627	0.1003
0.420	0.9715	0.8906	0.9167	0.2389	0.8766	0.9843	1.2548	2.0937	0.1047
0.430	0.9701	0.8857	0.9130	0.2444	0.8932	1.0085	1.2360	1.9382	0.1091
0.440	0.9688	0.8807	0.9091	0.2499	0.9095	1.0326	1.2183	1.7949	0.1136
0.450	0.9674	0.8757	0.9052	0.2554	0.9255	1.0569	1.2016	1.6627	0.1182
0.460	0.9660	0.8706	0.9012	0.2609	0.9412	1.0811	1.1858	1.5405	0.1228
0.470	0.9645	0.8654	0.8972	0.2664	0.9567	1.1055	1.1710	1.4276	0.1274
0.480	0.9631	0.8601	0.8931	0.2718	0.9718	1.1299	1.1569	1.3231	0.1321
0.490	0.9616	0.8548	0.8890	0.2773	0.9867	1.1543	1.1436	1.2263	0.1368
0.500	0.9600	0.8494	0.8847	0.2827	1.0012	1.1788	1.1310	1.1365	0.1415

$$\gamma=1.333$$

M	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{max}}{D}$	$\frac{1}{2}\frac{\rho V^2}{p_0}$
0.510	0.9585	0.8439	0.8805	0.2881	1.0155	1.2033	1.1192	1.0532	0.1463
0.520	0.9569	0.8384	0.8761	0.2935	1.0295	1.2279	1.1079	0.9759	0.1511
0.530	0.9553	0.8328	0.8717	0.2989	1.0431	1.2526	1.0973	0.9041	0.1559
0.540	0.9537	0.8271	0.8673	0.3043	1.0565	1.2773	1.0872	0.8373	0.1608
0.550	0.9520	0.8214	0.8628	0.3097	1.0696	1.3021	1.0777	0.7752	0.1656
0.560	0.9504	0.8157	0.8583	0.3150	1.0823	1.3269	1.0687	0.7174	0.1705
0.570	0.9487	0.8099	0.8537	0.3204	1.0948	1.3518	1.0601	0.6636	0.1754
0.580	0.9470	0.8040	0.8490	0.3257	1.1069	1.3768	1.0520	0.6136	0.1803
0.590	0.9452	0.7981	0.8443	0.3310	1.1188	1.4018	1.0444	0.5669	0.1852
0.600	0.9434	0.7921	0.8396	0.3363	1.1303	1.4269	1.0371	0.5235	0.1901
0.610	0.9417	0.7861	0.8348	0.3416	1.1415	1.4521	1.0303	0.4830	0.1950
0.620	0.9398	0.7801	0.8300	0.3469	1.1524	1.4773	1.0238	0.4452	0.1999
0.630	0.9380	0.7740	0.8252	0.3521	1.1630	1.5026	1.0176	0.4101	0.2048
0.640	0.9362	0.7679	0.8203	0.3573	1.1733	1.5280	1.0118	0.3773	0.2096
0.650	0.9343	0.7618	0.8153	0.3626	1.1833	1.5534	1.0063	0.3467	0.2145
0.660	0.9324	0.7556	0.8104	0.3678	1.1930	1.5789	1.0011	0.3183	0.2194
0.670	0.9305	0.7494	0.8054	0.3729	1.2023	1.6045	0.9962	0.2918	0.2242
0.680	0.9285	0.7431	0.8003	0.3781	1.2114	1.6301	0.9916	0.2671	0.2290
0.690	0.9266	0.7368	0.7953	0.3833	1.2201	1.6559	0.9872	0.2441	0.2338
0.700	0.9246	0.7306	0.7902	0.3884	1.2285	1.6817	0.9831	0.2227	0.2386
0.710	0.9226	0.7242	0.7850	0.3935	1.2367	1.7075	0.9792	0.2028	0.2433
0.720	0.9205	0.7179	0.7799	0.3986	1.2445	1.7335	0.9755	0.1843	0.2480
0.730	0.9185	0.7116	0.7747	0.4037	1.2520	1.7595	0.9721	0.1671	0.2527
0.740	0.9164	0.7052	0.7695	0.4088	1.2592	1.7856	0.9688	0.1512	0.2574
0.750	0.9144	0.6988	0.7643	0.4139	1.2661	1.8118	0.9658	0.1364	0.2620
0.760	0.9123	0.6924	0.7590	0.4189	1.2727	1.8381	0.9629	0.1227	0.2666
0.770	0.9102	0.6860	0.7537	0.4239	1.2790	1.8644	0.9603	0.1100	0.2711
0.780	0.9080	0.6796	0.7484	0.4289	1.2850	1.8908	0.9578	0.0983	0.2756
0.790	0.9059	0.6732	0.7431	0.4339	1.2907	1.9174	0.9554	0.0875	0.2800
0.800	0.9037	0.6668	0.7378	0.4389	1.2961	1.9440	0.9533	0.0776	0.2844
0.810	0.9015	0.6603	0.7325	0.4438	1.3013	1.9706	0.9513	0.0685	0.2888
0.820	0.8993	0.6539	0.7271	0.4487	1.3061	1.9974	0.9494	0.0601	0.2930
0.830	0.8971	0.6475	0.7217	0.4536	1.3107	2.0243	0.9477	0.0524	0.2973
0.840	0.8949	0.6411	0.7164	0.4585	1.3149	2.0512	0.9461	0.0454	0.3015
0.850	0.8926	0.6346	0.7110	0.4634	1.3189	2.0782	0.9446	0.0391	0.3056
0.860	0.8904	0.6282	0.7056	0.4683	1.3226	2.1053	0.9433	0.0333	0.3097
0.870	0.8881	0.6218	0.7002	0.4731	1.3260	2.1326	0.9420	0.0281	0.3137
0.880	0.8858	0.6154	0.6948	0.4779	1.3292	2.1599	0.9409	0.0235	0.3176
0.890	0.8835	0.6090	0.6893	0.4827	1.3321	2.1873	0.9399	0.0193	0.3215
0.900	0.8812	0.6026	0.6839	0.4875	1.3347	2.2147	0.9390	0.0156	0.3253
0.910	0.8788	0.5963	0.6785	0.4923	1.3370	2.2423	0.9383	0.0124	0.3291
0.920	0.8765	0.5899	0.6731	0.4970	1.3391	2.2700	0.9376	0.0096	0.3328
0.930	0.8741	0.5836	0.6676	0.5018	1.3410	2.2978	0.9370	0.0072	0.3364
0.940	0.8717	0.5773	0.6622	0.5065	1.3425	2.3256	0.9365	0.0052	0.3400
0.950	0.8694	0.5710	0.6568	0.5111	1.3439	2.3536	0.9360	0.0035	0.3435
0.960	0.8670	0.5647	0.6514	0.5158	1.3449	2.3817	0.9357	0.0022	0.3469
0.970	0.8646	0.5585	0.6459	0.5205	1.3458	2.4098	0.9354	0.0012	0.3502
0.980	0.8621	0.5522	0.6405	0.5251	1.3464	2.4381	0.9353	0.0005	0.3535
0.990	0.8597	0.5460	0.6351	0.5297	1.3467	2.4664	0.9351	0.0001	0.3567
1.000	0.8573	0.5398	0.6297	0.5343	1.3468	2.4949	0.9351	0.0000	0.3598

GAS FLOW TABLES ($\gamma=1.333$): SUPERSONIC FLOW

M	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{max}}{D}$	$\frac{\frac{1}{2}\rho V^2}{p_0}$
1.010	0.8548	0.5337	0.6243	0.5389	1.3467	2.5234	0.9351	0.0001	0.3628
1.020	0.8524	0.5276	0.6189	0.5434	1.3464	2.5521	0.9352	0.0005	0.3658
1.030	0.8499	0.5215	0.6136	0.5479	1.3458	2.5809	0.9354	0.0011	0.3687
1.040	0.8474	0.5154	0.6082	0.5525	1.3450	2.6097	0.9356	0.0019	0.3715
1.050	0.8449	0.5093	0.6028	0.5569	1.3440	2.6387	0.9359	0.0029	0.3743
1.060	0.8424	0.5033	0.5975	0.5614	1.3428	2.6678	0.9363	0.0042	0.3769
1.070	0.8399	0.4974	0.5922	0.5659	1.3414	2.6970	0.9367	0.0056	0.3795
1.080	0.8374	0.4914	0.5869	0.5703	1.3397	2.7263	0.9371	0.0071	0.3820
1.090	0.8349	0.4855	0.5816	0.5747	1.3379	2.7557	0.9376	0.0089	0.3845
1.100	0.8323	0.4796	0.5763	0.5791	1.3359	2.7852	0.9381	0.0108	0.3868
1.110	0.8298	0.4738	0.5710	0.5835	1.3337	2.8148	0.9387	0.0128	0.3891
1.120	0.8272	0.4680	0.5658	0.5878	1.3313	2.8446	0.9394	0.0150	0.3913
1.130	0.8247	0.4622	0.5605	0.5922	1.3287	2.8744	0.9401	0.0173	0.3934
1.140	0.8221	0.4565	0.5553	0.5965	1.3259	2.9043	0.9408	0.0197	0.3954
1.150	0.8195	0.4508	0.5501	0.6008	1.3229	2.9344	0.9415	0.0223	0.3974
1.160	0.8170	0.4452	0.5449	0.6050	1.3198	2.9646	0.9424	0.0250	0.3993
1.170	0.8144	0.4396	0.5398	0.6093	1.3165	2.9949	0.9432	0.0277	0.4011
1.180	0.8118	0.4340	0.5347	0.6135	1.3131	3.0253	0.9441	0.0306	0.4028
1.190	0.8092	0.4285	0.5295	0.6177	1.3094	3.0558	0.9450	0.0335	0.4044
1.200	0.8066	0.4230	0.5245	0.6219	1.3057	3.0864	0.9459	0.0366	0.4060
1.210	0.8040	0.4176	0.5194	0.6261	1.3017	3.1172	0.9469	0.0397	0.4075
1.220	0.8014	0.4122	0.5143	0.6302	1.2976	3.1481	0.9479	0.0429	0.4089
1.230	0.7988	0.4068	0.5093	0.6344	1.2934	3.1791	0.9489	0.0462	0.4102
1.240	0.7962	0.4015	0.5043	0.6385	1.2890	3.2102	0.9500	0.0495	0.4115
1.250	0.7936	0.3963	0.4994	0.6426	1.2845	3.2414	0.9511	0.0529	0.4127
1.260	0.7909	0.3911	0.4944	0.6466	1.2798	3.2727	0.9522	0.0564	0.4138
1.270	0.7883	0.3859	0.4895	0.6507	1.2751	3.3042	0.9533	0.0599	0.4148
1.280	0.7857	0.3808	0.4846	0.6547	1.2701	3.3358	0.9545	0.0634	0.4158
1.290	0.7830	0.3757	0.4798	0.6587	1.2651	3.3675	0.9557	0.0670	0.4167
1.300	0.7804	0.3706	0.4749	0.6627	1.2599	3.3993	0.9569	0.0707	0.4175
1.310	0.7778	0.3657	0.4701	0.6667	1.2547	3.4313	0.9581	0.0744	0.4182
1.320	0.7751	0.3607	0.4654	0.6706	1.2493	3.4633	0.9594	0.0781	0.4189
1.330	0.7725	0.3558	0.4606	0.6746	1.2438	3.4955	0.9606	0.0819	0.4195
1.340	0.7698	0.3510	0.4559	0.6785	1.2382	3.5279	0.9619	0.0857	0.4200
1.350	0.7672	0.3462	0.4512	0.6824	1.2325	3.5603	0.9632	0.0895	0.4205
1.360	0.7646	0.3414	0.4465	0.6862	1.2266	3.5929	0.9645	0.0934	0.4209
1.370	0.7619	0.3367	0.4419	0.6901	1.2207	3.6256	0.9659	0.0973	0.4212
1.380	0.7593	0.3320	0.4373	0.6939	1.2147	3.6584	0.9672	0.1012	0.4215
1.390	0.7566	0.3274	0.4328	0.6977	1.2086	3.6914	0.9686	0.1051	0.4216
1.400	0.7540	0.3229	0.4282	0.7015	1.2025	3.7245	0.9700	0.1091	0.4218
1.410	0.7513	0.3183	0.4237	0.7053	1.1962	3.7577	0.9714	0.1130	0.4218
1.420	0.7487	0.3139	0.4192	0.7090	1.1899	3.7910	0.9728	0.1170	0.4218
1.430	0.7460	0.3094	0.4148	0.7127	1.1835	3.8245	0.9742	0.1210	0.4217
1.440	0.7434	0.3051	0.4104	0.7164	1.1770	3.8581	0.9756	0.1250	0.4216
1.450	0.7407	0.3007	0.4060	0.7201	1.1704	3.8918	0.9771	0.1290	0.4214
1.460	0.7381	0.2965	0.4017	0.7238	1.1638	3.9257	0.9785	0.1331	0.4212
1.470	0.7354	0.2922	0.3974	0.7275	1.1571	3.9597	0.9800	0.1371	0.4209
1.480	0.7328	0.2880	0.3931	0.7311	1.1504	3.9938	0.9815	0.1411	0.4205
1.490	0.7301	0.2839	0.3888	0.7347	1.1435	4.0281	0.9829	0.1452	0.4201
1.500	0.7275	0.2798	0.3846	0.7383	1.1367	4.0625	0.9844	0.1492	0.4196

$$\gamma=1.333$$

M	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$ p_0
1.510	0.7248	0.2758	0.3804	0.7419	1.1298	4.0970	0.9859	0.1532	0.4191
1.520	0.7222	0.2718	0.3763	0.7454	1.1228	4.1317	0.9874	0.1573	0.4185
1.530	0.7195	0.2678	0.3722	0.7489	1.1158	4.1665	0.9889	0.1613	0.4178
1.540	0.7169	0.2639	0.3681	0.7524	1.1087	4.2014	0.9905	0.1654	0.4171
1.550	0.7143	0.2600	0.3641	0.7559	1.1016	4.2365	0.9920	0.1694	0.4164
1.560	0.7116	0.2562	0.3600	0.7594	1.0945	4.2717	0.9935	0.1734	0.4156
1.570	0.7090	0.2524	0.3561	0.7629	1.0873	4.3070	0.9950	0.1775	0.4147
1.580	0.7064	0.2487	0.3521	0.7663	1.0801	4.3425	0.9966	0.1815	0.4138
1.590	0.7038	0.2450	0.3482	0.7697	1.0729	4.3782	0.9981	0.1855	0.4129
1.600	0.7011	0.2414	0.3443	0.7731	1.0656	4.4139	0.9997	0.1895	0.4119
1.610	0.6985	0.2378	0.3405	0.7765	1.0583	4.4498	1.0012	0.1935	0.4109
1.620	0.6959	0.2343	0.3367	0.7799	1.0510	4.4859	1.0028	0.1975	0.4098
1.630	0.6933	0.2308	0.3329	0.7832	1.0436	4.5220	1.0043	0.2015	0.4087
1.640	0.6907	0.2273	0.3291	0.7865	1.0363	4.5584	1.0059	0.2055	0.4075
1.650	0.6881	0.2239	0.3254	0.7898	1.0289	4.5948	1.0075	0.2094	0.4063
1.660	0.6855	0.2206	0.3217	0.7931	1.0215	4.6314	1.0090	0.2134	0.4051
1.670	0.6829	0.2172	0.3181	0.7964	1.0141	4.6682	1.0106	0.2173	0.4038
1.680	0.6803	0.2139	0.3145	0.7996	1.0066	4.7051	1.0122	0.2213	0.4025
1.690	0.6777	0.2107	0.3109	0.8028	0.9992	4.7421	1.0137	0.2252	0.4011
1.700	0.6751	0.2075	0.3074	0.8061	0.9918	4.7793	1.0153	0.2291	0.3997
1.710	0.6726	0.2044	0.3039	0.8093	0.9843	4.8166	1.0169	0.2330	0.3983
1.720	0.6700	0.2012	0.3004	0.8124	0.9769	4.8541	1.0184	0.2369	0.3968
1.730	0.6674	0.1982	0.2969	0.8156	0.9694	4.8917	1.0200	0.2407	0.3953
1.740	0.6649	0.1951	0.2935	0.8187	0.9620	4.9294	1.0216	0.2446	0.3938
1.750	0.6623	0.1922	0.2901	0.8218	0.9545	4.9673	1.0232	0.2484	0.3922
1.760	0.6597	0.1892	0.2868	0.8249	0.9471	5.0054	1.0247	0.2522	0.3906
1.770	0.6572	0.1863	0.2835	0.8280	0.9396	5.0435	1.0263	0.2560	0.3890
1.780	0.6546	0.1834	0.2802	0.8311	0.9322	5.0819	1.0279	0.2598	0.3874
1.790	0.6521	0.1806	0.2770	0.8341	0.9248	5.1204	1.0294	0.2636	0.3857
1.800	0.6496	0.1778	0.2737	0.8372	0.9173	5.1590	1.0310	0.2673	0.3840
1.810	0.6471	0.1751	0.2706	0.8402	0.9099	5.1978	1.0326	0.2711	0.3822
1.820	0.6445	0.1723	0.2674	0.8432	0.9025	5.2367	1.0341	0.2748	0.3805
1.830	0.6420	0.1697	0.2643	0.8461	0.8951	5.2758	1.0357	0.2785	0.3787
1.840	0.6395	0.1670	0.2612	0.8491	0.8878	5.3150	1.0373	0.2822	0.3769
1.850	0.6370	0.1644	0.2581	0.8521	0.8804	5.3544	1.0388	0.2858	0.3751
1.860	0.6345	0.1619	0.2551	0.8550	0.8731	5.3939	1.0404	0.2895	0.3732
1.870	0.6320	0.1593	0.2521	0.8579	0.8658	5.4336	1.0419	0.2931	0.3714
1.880	0.6295	0.1568	0.2491	0.8608	0.8585	5.4734	1.0435	0.2967	0.3695
1.890	0.6271	0.1544	0.2462	0.8636	0.8512	5.5134	1.0450	0.3003	0.3676
1.900	0.6246	0.1520	0.2433	0.8665	0.8439	5.5535	1.0466	0.3039	0.3656
1.910	0.6221	0.1496	0.2404	0.8693	0.8367	5.5938	1.0481	0.3074	0.3637
1.920	0.6197	0.1472	0.2376	0.8722	0.8295	5.6342	1.0497	0.3110	0.3617
1.930	0.6172	0.1449	0.2348	0.8750	0.8223	5.6748	1.0512	0.3145	0.3598
1.940	0.6148	0.1426	0.2320	0.8778	0.8152	5.7155	1.0527	0.3180	0.3578
1.950	0.6123	0.1404	0.2292	0.8805	0.8081	5.7564	1.0543	0.3215	0.3558
1.960	0.6099	0.1382	0.2265	0.8833	0.8010	5.7974	1.0558	0.3249	0.3537
1.970	0.6075	0.1360	0.2238	0.8860	0.7939	5.8386	1.0573	0.3284	0.3517
1.980	0.6051	0.1338	0.2212	0.8888	0.7869	5.8800	1.0588	0.3318	0.3497
1.990	0.6026	0.1317	0.2185	0.8915	0.7799	5.9215	1.0603	0.3352	0.3476
2.000	0.6002	0.1296	0.2159	0.8942	0.7729	5.9631	1.0619	0.3386	0.3455

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{p_2}{p_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{p_{02}}{p_{01}}$	M_1	θ	β	$\frac{p_2}{p_1}$	$\frac{T_2}{T_1}$	$\frac{p_2}{p_1}$	M_2	$\frac{p_{02}}{p_{01}}$
1.05	0.558	79.937	1.0803	1.0223	0.9845	0.99995	1.40	8.000	75.893	1.9842	1.6163	1.9842	0.8184	0.96806
1.10	1.515	76.297	1.1658	1.0449	0.9711	0.99963		6.000	80.485	2.0575	1.6562	2.0575	0.7762	0.96286
1.15	2.000	67.003	1.1408	1.0384	1.0434	0.99977	1.45	2.000	46.004	1.1028	1.0723	1.1028	1.3808	0.99990
	2.671	73.822	1.2565	1.0678	0.9598	0.99879	4.000	4.000	48.679	1.2169	1.1503	1.2169	1.3091	0.99923
	2.000	81.173	1.3399	1.0880	0.9007	0.99745	6.000	6.000	51.755	1.3463	1.2357	1.3463	1.2325	0.99733
1.20	2.000	61.050	1.1197	1.0329	1.1113	0.99985	10.000	10.000	55.517	1.5000	1.3333	1.5000	1.1460	0.99325
	3.944	71.977	1.3525	1.0910	0.9502	0.99720	10.785	67.097	1.7114	1.4613	1.1712	1.7114	1.0317	0.98440
	2.000	83.861	1.4941	1.1237	0.8551	0.99344	10.000	72.994	1.9147	1.5779	1.2135	1.9147	0.9235	0.97269
1.25	2.000	56.844	1.1110	1.0306	1.1696	0.99988	8.000	78.197	2.1836	1.7232	1.2672	2.1836	0.8366	0.96147
	4.000	61.986	1.2541	1.0672	1.0721	0.99882	6.000	81.733	2.2355	1.7501	1.2774	2.2355	0.7777	0.95324
	5.286	70.540	1.4539	1.1146	0.9423	0.99468	4.000	84.702	2.2653	1.7654	1.2832	2.2653	0.7316	0.94659
	4.000	79.385	1.5944	1.1459	0.8525	0.98975	2.000	87.406	2.2812	1.7736	1.2862	2.2812	0.7225	0.94526
	2.000	85.211	1.6435	1.1566	0.8209	0.98763								
1.30	2.000	53.474	1.1065	1.0294	1.2244	0.99989	1.50	2.000	44.065	1.1030	1.0725	1.1030	1.4316	0.99990
	4.000	57.423	1.2334	1.0621	1.1398	0.99906	4.000	4.000	46.543	1.2165	1.1500	1.2165	1.3615	0.99923
	6.000	63.459	1.4113	1.1048	1.0274	0.99585	6.000	49.326	1.3433	1.2337	1.0888	1.3433	1.2879	0.99739
	6.662	69.395	1.5608	1.1386	0.9359	0.99108	8.000	52.571	1.4887	1.3263	1.1224	1.4887	1.2079	0.99362
	6.000	75.372	1.6793	1.1643	0.8636	0.98598	10.000	56.679	1.6662	1.4345	1.1615	1.6662	1.1144	0.98660
	4.000	81.649	1.7634	1.1822	0.8118	0.98169	12.113	66.589	1.9668	1.6068	1.2241	1.9668	0.9607	0.96385
	2.000	86.058	1.7957	1.1889	0.7918	0.97990	12.000	68.790	2.0439	1.6489	1.2396	2.0439	0.8849	0.95860
1.35	2.000	50.634	1.1042	1.0287	1.2774	0.99990	10.000	75.995	2.1147	1.6869	1.2537	2.1147	0.8849	0.95860
	4.000	53.965	1.2238	1.0596	1.1994	0.99916	8.000	79.712	2.3746	1.8207	1.3042	2.3746	0.7476	0.93725
	6.000	58.232	1.3702	1.0952	1.1089	0.99682	6.000	82.662	2.4155	1.8410	1.3121	2.4155	0.7250	0.93363
	8.000	66.914	1.6327	1.1543	0.9543	0.98812	4.000	85.256	2.4404	1.8533	1.3168	2.4404	0.7112	0.93141
	8.048	68.470	1.6732	1.1630	0.9307	0.98627	2.000	87.668	2.4540	1.8599	1.3194	2.4540	0.7035	0.93018
	8.000	70.023	1.7114	1.1712	0.9085	0.98440								
	6.000	78.660	1.8774	1.2058	0.8111	0.97506	1.55	2.000	42.315	1.1036	1.0729	1.1036	1.4821	0.99990
	4.000	83.028	1.9283	1.2163	0.7807	0.97182	4.000	4.000	44.642	1.2173	1.1505	1.2173	1.4130	0.99923
	2.000	86.644	1.9523	1.2211	0.7662	0.97023	6.000	47.214	1.3430	1.2336	1.0887	1.3430	1.3414	0.99739
1.40	2.000	48.173	1.1030	1.0284	1.3295	0.99990	10.000	50.131	1.4845	1.3236	1.1215	1.4845	1.2651	0.99375
	4.000	51.117	1.2189	1.0584	1.2553	0.99921	10.000	53.598	1.6491	1.4243	1.1578	1.6491	1.1804	0.98738
	6.000	54.633	1.3539	1.0913	1.1737	0.99717	12.000	58.240	1.8597	1.5469	1.2022	1.8597	1.0758	0.97615
	8.000	59.367	1.5263	1.1309	1.0744	0.99235	13.403	66.171	2.1787	1.7206	1.2663	2.1787	0.9198	0.95362
9.427	67.716		1.7912	1.1880	0.9266	0.98016	12.000	73.688	2.4151	1.8408	1.3120	2.4151	0.8014	0.93367
							10.000	77.804	2.5112	1.8877	1.3302	2.5112	0.7515	0.92496
							8.000	80.825	2.5650	1.9136	1.3404	2.5650	0.7229	0.91995
							6.000	83.385	2.5991	1.9298	1.3468	2.5991	0.7045	0.91673
							4.000	85.699	2.6205	1.9399	1.3508	2.6205	0.6928	0.91470
							2.000	87.879	2.6324	1.9455	1.3531	2.6324	0.6862	0.91356

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$		M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
						M_2	$\frac{P_{02}}{P_{01}}$							
1.60	2.000	40.724	1.1046	1.0289	1.5323	0.9990	1.70	6.000	84.848	3.1778	1.4534	0.6547	0.85856	
	4.000	42.931	1.2189	1.0584	1.4638	0.9921		4.000	86.619	3.1933	1.4562	0.6467	0.85695	
	6.000	45.344	1.3446	1.0891	1.3934	0.99736		2.000	88.325	3.2021	1.4578	0.6421	0.85602	
	8.000	48.030	1.4843	1.1215	1.3195	0.99376								
	10.000	51.116	1.6430	1.1565	1.2397	0.98766								
	12.000	54.889	1.8320	1.1965	1.1483	0.97781		1.75	36.689	1.1087	1.0765	1.0300	1.6816	0.99989
	14.000	60.537	2.0974	1.2502	1.0232	0.95990		4.000	38.651	1.2271	1.1571	1.0605	1.6133	0.99913
	14.652	65.828	2.3192	1.2936	0.9188	0.94204		6.000	40.756	1.3561	1.2421	1.0918	1.5441	0.99713
	14.000	70.895	2.5000	1.3281	0.8320	0.92598		8.000	43.034	1.4973	1.3317	1.1244	1.4733	0.99334
	12.000	75.900	2.6428	1.3550	0.7611	0.91256		10.000	45.531	1.6529	1.4266	1.1586	1.3995	0.98721
10.000	79.102	2.7132	1.3682	0.7250	0.90574		12.000	48.319	1.8263	1.5279	1.1953	1.3210	0.97814	
8.000	81.691	2.7576	1.3764	0.7018	0.90139		14.000	51.547	2.0245	1.6384	1.2357	1.2348	0.96524	
6.000	83.967	2.7870	1.3819	0.6862	0.89848		16.000	55.589	2.2652	1.7654	1.2831	1.1329	0.94660	
4.000	86.061	2.8059	1.3854	0.6761	0.89660		18.000	62.944	2.6670	1.9617	1.3595	0.9645	0.91023	
2.000	88.054	2.8166	1.3873	0.6703	0.89554		18.121	65.134	2.7745	2.0112	1.3795	0.9189	0.89972	
							18.000	67.269	2.8728	2.0554	1.3977	0.8766	0.88991	
							16.000	73.757	3.1267	2.1651	1.4441	0.7635	0.86389	
1.65	2.000	39.267	1.1058	1.0292	1.5823	0.9990		14.000	76.988	3.2251	1.4620	0.7175	0.85362	
4.000	41.377	1.2212	1.1531	1.0590	1.5140	0.9919		12.000	79.465	3.2868	1.4731	0.6878	0.84714	
6.000	43.665	1.2365	1.1898	1.0898	1.4444	0.99730		10.000	81.570	3.3295	1.4808	0.6669	0.84266	
8.000	46.181	1.4869	1.1221	1.1221	1.3720	0.99367		8.000	83.451	3.3598	1.4862	0.6518	0.83947	
10.000	49.007	1.6429	1.1565	1.1565	1.2952	0.98766		6.000	85.190	3.3811	1.4901	0.6409	0.83722	
12.000	52.312	1.8224	1.1945	1.1945	1.2104	0.97837		4.000	86.838	3.3954	1.4926	0.6307	0.83571	
14.000	56.541	2.0441	1.2396	1.2396	1.1090	0.96384		2.000	88.432	3.4036	1.4941	0.6295	0.83485	
15.855	65.547	2.4653	1.3215	1.3215	0.9184	0.92915								
14.000	73.864	2.7642	1.3776	1.3776	0.7782	0.90073								
12.000	77.411	2.8587	1.3951	1.3951	0.7317	0.89132	1.80	2.000	35.538	1.1104	1.0304	1.7312	0.99988	
10.000	80.102	2.9157	1.4056	1.4056	0.7029	0.88557		4.000	37.444	1.2306	1.0613	1.6624	0.99909	
8.000	82.389	2.9539	1.4126	1.4126	0.6833	0.88169		6.000	39.481	1.3615	1.0931	1.5932	0.99701	
6.000	84.446	2.9798	1.4174	1.4174	0.6697	0.87904		8.000	41.673	1.5044	1.1260	1.5225	0.99310	
4.000	86.364	2.9968	1.4205	1.4205	0.6607	0.87730		10.000	44.057	1.6611	1.1604	1.4494	0.98683	
2.000	88.200	3.0065	1.4222	1.4222	0.6556	0.87631		12.000	46.686	1.8345	1.1970	1.3725	0.97766	
								14.000	49.661	2.0295	1.2367	1.2896	0.96489	
								16.000	53.198	2.2568	1.3175	1.1958	0.94729	
1.70	2.000	37.927	1.1072	1.0295	1.6320	0.99989		18.000	57.995	2.5516	1.3379	1.0766	0.92120	
4.000	39.957	1.2239	1.1550	1.0597	1.5638	0.99916		19.183	64.987	2.9376	1.4096	0.9195	0.89335	
6.000	42.145	1.3514	1.2390	1.0907	1.4946	0.99722		18.000	71.424	3.2297	1.4628	0.7956	0.85313	
8.000	44.528	1.4914	1.3280	1.1231	1.4232	0.99353		16.000	75.324	3.3707	1.4882	0.7327	0.83832	
10.000	47.167	1.6466	1.4228	1.1573	1.3482	0.98750		14.000	78.020	3.4505	1.5025	0.6958	0.82990	
12.000	50.168	1.8216	1.5252	1.1943	1.2674	0.97841		12.000	80.214	3.5041	1.5121	0.6703	0.82423	
14.000	53.771	2.0273	1.6399	1.2362	1.1757	0.96504		10.000	82.128	3.5424	1.5189	0.6518	0.82018	
16.000	58.794	2.2999	1.7831	1.2898	1.0569	0.94369		8.000	83.865	3.5702	1.5239	0.6381	0.81725	
17.012	65.319	2.6171	1.9383	1.3502	0.9185	0.91502		6.000	85.485	3.5899	1.5274	0.6283	0.81516	
16.000	71.426	2.8629	2.0510	1.3959	0.8077	0.89090		4.000	87.028	3.6032	1.5298	0.6216	0.81376	
14.000	75.670	2.9984	2.1104	1.4208	0.7439	0.87713		2.000	88.525	3.6108	1.5311	0.6178	0.81295	
12.000	78.555	3.0722	2.1421	1.4342	0.7080	0.86953								
10.000	80.906	3.1208	2.1626	1.4431	0.6838	0.86450								
8.000	82.965	3.1544	2.1767	1.4492	0.6667	0.86100								

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
1.85	2.00	34.466	1.1121	1.0309	1.7805	0.99988	1.95	2.00	32.528	1.1160	1.0319	1.0815	1.0319	1.8790	0.99987
	4.00	36.323	1.2343	1.0623	1.7114	0.99905		4.00	34.304	1.2424	1.0643	1.1674	1.0643	1.8085	0.99896
	6.00	38.302	1.3672	1.0945	1.6418	0.99689		6.00	36.191	1.3801	1.0975	1.2575	1.0975	1.7380	0.99660
	8.00	40.424	1.5123	1.1278	1.5711	0.99284		8.00	38.204	1.5302	1.1318	1.3521	1.1318	1.6666	0.99221
	10.00	42.717	1.6709	1.1625	1.4983	0.98638		10.00	40.360	1.6938	1.1674	1.4509	1.1674	1.5938	0.98528
	12.00	45.223	1.8453	1.1992	1.4224	0.97701		12.00	42.688	1.8726	1.2049	1.5542	1.2049	1.5185	0.97535
	14.00	48.014	2.0395	1.2387	1.3415	0.96417		14.00	45.230	2.0693	1.2446	1.6625	1.4396	1.4396	0.96200
	16.00	51.232	2.2607	1.2822	1.2524	0.94697		16.00	48.059	2.2879	1.2770	1.7770	1.2770	1.3553	0.94470
	18.00	55.227	2.5275	1.3333	1.1476	0.92345		18.00	51.320	2.5368	1.3051	1.9001	1.9001	1.2622	0.92258
	20.00	62.099	2.9519	1.4123	0.9818	0.88189		20.00	55.381	2.8378	1.3913	2.0397	2.0397	1.1520	0.89342
	20.198	64.872	3.1062	1.4404	0.9205	0.86601		22.00	62.860	3.3464	1.4838	2.2553	2.2553	0.9655	0.84087
	20.000	67.544	3.2437	1.4653	0.8648	0.85167		22.092	64.716	3.4603	1.5043	2.3003	2.3003	0.9229	0.82885
	18.000	73.440	3.5019	1.5117	0.7560	0.82446		22.000	66.523	3.5655	1.5231	2.3410	2.3410	0.8829	0.81774
	16.000	76.511	3.6090	1.5308	0.7085	0.81314		20.000	72.926	3.8872	1.5801	2.4601	2.4601	0.7555	0.78384
	14.000	78.861	3.6772	1.5429	0.6773	0.80593		18.000	75.964	4.0086	1.6015	2.5030	2.5030	0.6710	0.77114
	12.000	80.844	3.7252	1.5514	0.6548	0.80088		16.000	78.253	4.0857	1.6151	2.5297	2.5297	0.6467	0.76313
	10.000	82.606	3.7601	1.5576	0.6381	0.79719		14.000	80.165	4.1401	1.6246	2.5484	2.5484	0.6283	0.75750
	8.000	84.222	3.7858	1.5622	0.6257	0.79449		12.000	81.849	4.1804	1.6317	2.5620	2.5620	0.6142	0.75335
	6.000	85.740	3.8042	1.5655	0.6166	0.79255		10.000	83.381	4.2106	1.6370	2.5722	2.5722	0.6036	0.74791
	4.000	87.193	3.8167	1.5677	0.6105	0.79124		8.000	84.808	4.2333	1.6438	2.5798	2.5798	0.5957	0.74423
2.000	88.606	3.8239	1.5689	0.6069	0.79048		4.000	86.163	4.2497	1.6458	2.5890	2.5890	0.5904	0.74508	
							2.000	88.741	4.2674	1.6469	2.5912	2.5912	1.6469	0.5872	0.74441
1.90	2.00	33.466	1.1140	1.0314	1.8298	0.99987	2.00	2.00	31.647	1.1180	1.0324	1.0829	1.0324	1.9280	0.99986
	4.00	35.279	1.2382	1.0633	1.7600	0.99901		4.00	33.390	1.2468	1.0654	1.1702	1.0654	1.8568	0.99891
	6.00	37.209	1.3735	1.0959	1.6901	0.99675		6.00	35.241	1.3871	1.0991	1.2620	1.0991	1.7856	0.99644
	8.00	39.272	1.5209	1.1297	1.6191	0.99254		8.00	37.210	1.5400	1.1339	1.3581	1.1339	1.7138	0.99186
	10.00	41.490	1.6818	1.1649	1.5464	0.98586		10.00	39.314	1.7066	1.1702	1.4584	1.1702	1.6405	0.98464
	12.00	43.898	1.8582	1.2019	1.4709	0.96319		12.00	41.575	1.8884	1.2081	1.5631	1.2081	1.5651	0.97437
	14.00	46.550	2.0530	1.2414	1.3913	0.94605		14.00	44.029	2.0876	1.2483	1.6724	1.2483	1.4866	0.96064
	16.00	49.544	2.2718	1.2844	1.3052	0.92356		16.00	46.731	2.3076	1.2913	1.7870	1.2913	1.4034	0.94304
	18.00	53.095	2.5263	1.3331	1.2077	0.89162		18.00	49.785	2.5546	1.3384	1.9086	1.3384	1.3131	0.92092
	20.00	57.900	2.8557	1.3946	1.0835	0.84781		20.00	53.423	2.8429	1.3922	2.0420	1.3922	1.2102	0.89291
	21.167	64.783	3.2805	1.4720	0.9216	0.81397		22.000	58.457	3.2228	1.4616	2.2051	1.4616	1.0760	0.85385
	20.000	71.057	3.6012	1.5294	0.7935	0.79744		22.974	64.669	3.6458	1.5373	2.3715	1.5373	0.9243	0.80926
	18.000	74.861	3.7578	1.5572	0.7274	0.78810		20.000	74.270	3.9714	1.5950	2.4899	1.5950	0.8017	0.77503
	16.000	77.463	3.8466	1.5729	0.6884	0.78178		18.000	76.862	4.1570	1.6276	2.5541	1.6276	0.7278	0.75576
	14.000	79.565	3.9088	1.5836	0.6611	0.77383		16.000	78.921	4.2589	1.6454	2.5883	1.6454	0.6854	0.74529
	12.000	81.383	3.9504	1.5913	0.6409	0.77133		14.000	80.684	4.3277	1.6574	2.6110	1.6574	0.6558	0.73827
	10.000	83.020	3.9828	1.5970	0.6257	0.76953		12.000	82.257	4.3777	1.6662	2.6274	1.6662	0.6337	0.73319
	8.000	84.534	4.0068	1.6012	0.6142	0.76830		10.000	83.700	4.4153	1.6727	2.6396	1.6727	0.6168	0.72939
	6.000	85.965	4.0241	1.6042	0.6058	0.76801		8.000	85.052	4.4388	1.6777	2.6487	1.6777	0.6037	0.72652
	4.000	87.338	4.0359	1.6063	0.6001	0.76830		4.000	86.339	4.4653	1.6815	2.6556	1.6815	0.5937	0.72436
2.000	88.677	4.0428	1.6075	0.5967	0.76759		2.000	87.582	4.4917	1.6842	2.6606	1.6842	0.5864	0.72278	
							2.000	88.798	4.4979	1.6871	2.6660	1.6871	0.5813	0.72171	
														0.5783	0.72108

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	$\frac{P_2}{P_1}$	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	
2.05	2.000	30.816	1.1200	1.0330	1.9771	0.99985	2.10	4.000	87.778	4.9706	1.7691	2.8097	1.7691	0.5648	0.67494		
	4.000	32.532	1.2512	1.0665	1.9050	0.99885	2.000	2.000	88.894	4.9764	1.7701	2.8113	1.7701	0.5622	0.67438		
	6.000	34.350	1.2666	1.1008	1.8330	0.99627	2.15	2.000	29.293	1.1243	1.0341	1.0872	1.0341	2.0749	0.99984		
	8.000	36.281	1.3644	1.1362	1.7605	0.99148		4.000	30.960	1.2606	1.1794	1.1794	1.0688	2.0008	0.99874		
	10.000	38.341	1.4664	1.1730	1.6868	0.98396		6.000	32.725	1.4094	1.2763	1.2763	1.1043	1.9271	0.99590		
	12.000	40.547	1.5726	1.2116	1.6111	0.97330		8.000	34.596	1.5719	1.3777	1.3777	1.1410	1.8529	0.99065		
	14.000	42.928	1.6831	1.2522	1.5326	0.95914		10.000	36.584	1.7490	1.4833	1.4833	1.1791	1.7778	0.98246		
	16.000	45.428	1.7983	1.2956	1.4500	0.94112		12.000	38.702	1.9417	1.5929	1.5929	1.2190	1.7011	0.97093		
	18.000	48.058	1.9195	1.3427	1.3614	0.91878		14.000	40.971	2.1518	1.7065	1.7065	1.2610	1.6221	0.95574		
	20.000	51.785	2.0497	1.3953	1.2630	0.89120		16.000	43.422	2.3813	1.8241	1.8241	1.3055	1.5397	0.93666		
	22.000	56.032	2.2419	1.5712	0.9257	0.78913		18.000	46.104	2.6337	1.9461	1.9461	1.3533	1.4527	0.91343		
	23.814	64.638	2.4277	1.6738	0.7626	0.74336		20.000	49.106	2.9150	2.0740	2.0740	1.4055	1.3588	0.88564		
	20.000	75.324	2.6416	1.6738	0.7056	0.7056		22.000	52.618	3.2384	2.2115	2.2115	1.4644	1.2534	0.85222		
	18.000	77.614	2.6700	1.6894	0.6688	0.71981		24.000	57.217	3.6452	2.3712	2.3712	1.5372	1.1223	0.80932		
	16.000	79.498	2.6898	1.7003	0.6422	0.71356		25.376	64.616	4.2352	2.5804	2.5804	1.6413	0.9289	0.74772		
	14.000	81.138	2.7043	1.7084	0.6219	0.70894		24.000	71.164	4.6641	2.7180	2.7180	1.7160	0.7794	0.70458		
	12.000	82.617	2.7152	1.7145	0.6062	0.70545		22.000	74.564	4.8442	2.7725	2.7725	1.7472	0.7122	0.68703		
	10.000	83.983	2.7236	1.7192	0.5939	0.70278		20.000	76.920	4.9500	2.8037	2.8037	1.7656	0.6709	0.67689		
	8.000	85.269	2.7299	1.7228	0.5846	0.70077		18.000	78.817	5.0234	2.8249	2.8249	1.7782	0.6413	0.66994		
	6.000	86.497	2.7344	1.7254	0.5776	0.69930		16.000	80.444	5.0776	2.8405	2.8405	1.7876	0.6188	0.66484		
4.000	87.685	2.7376	1.7272	0.5728	0.69829	14.000		81.896	5.1191	2.8523	2.8523	1.7947	0.6012	0.66097			
2.000	88.849	2.7394	1.7282	0.5700	0.69770	12.000		83.224	5.1512	2.8613	2.8613	1.8003	0.5874	0.65798			
2.10	2.000	30.033	1.1222	1.0335	2.0260	0.99984	2.20	2.000	28.592	1.1266	1.0347	1.0888	1.0347	2.1237	0.99983		
	4.000	31.723	1.2558	1.0676	1.9530	0.99880		4.000	30.238	1.2654	1.1826	1.1826	1.0700	2.0485	0.99867		
	6.000	33.513	1.4017	1.1025	1.8801	0.99609		6.000	31.981	1.4173	1.2813	1.2813	1.1061	1.9738	0.99569		
	8.000	35.412	1.5608	1.1386	1.8069	0.99108		8.000	33.827	1.5832	1.3845	1.3845	1.1435	1.8987	0.99020		
	10.000	37.433	1.7342	1.1760	1.7325	0.98324		10.000	35.785	1.7641	1.4921	1.4921	1.1823	1.8228	0.98165		
	12.000	39.592	1.9230	1.2152	1.6564	0.97216		12.000	37.869	1.9611	1.6036	1.6036	1.2229	1.7454	0.96964		
	14.000	41.912	2.1290	1.2565	1.5777	0.95750		14.000	40.095	2.1756	1.7190	1.7190	1.2656	1.6657	0.95387		
	16.000	44.430	2.3547	1.3004	1.4954	0.93899		16.000	42.489	2.4095	1.8380	1.8380	1.3109	1.5831	0.93417		
	18.000	47.210	2.6041	1.3478	1.4078	0.91626		18.000	45.092	2.6658	1.9611	1.9611	1.3593	1.4963	0.91035		
	20.000	50.365	2.8848	1.3999	1.3122	0.88870		20.000	47.975	2.9494	2.0891	2.0891	1.4118	1.4035	0.88215		
	22.000	54.169	3.2152	1.4602	1.2019	0.85466		22.000	51.277	3.2704	2.2245	2.2245	1.4701	1.3013	0.84887		
	24.000	59.767	3.6739	1.5424	1.0493	0.80628		24.000	55.356	3.6552	2.3750	2.3750	1.5390	1.1805	0.80826		
	24.614	64.621	4.0332	1.6058	0.9273	0.76858		26.000	62.695	4.2918	2.5992	2.5992	1.6512	0.9795	0.74193		
	24.000	69.104	4.3238	1.6568	0.8245	0.73867		26.103	64.620	4.4426	2.6484	2.6484	1.6775	0.9305	0.72663		
	22.000	73.521	4.5644	1.6987	0.7345	0.71445		26.000	66.480	4.5807	2.6921	2.6921	1.7015	0.8849	0.71283		
	20.000	76.189	4.6852	1.7197	0.6870	0.71445		24.000	72.560	4.9728	2.8103	2.8103	1.7695	0.7490	0.67473		
	18.000	78.257	4.7652	1.7336	0.6543	0.70251		22.000	75.420	5.1222	2.8531	2.8531	1.7953	0.66068			
	16.000	80.001	4.8232	1.7436	0.6299	0.69468		2.000									
	14.000	81.539	4.8669	1.7512	0.6111	0.68484											
	12.000	82.938	4.9006	1.7570	0.5964	0.68102											
10.000	84.237	4.9264	1.7615	0.5849	0.67914												
8.000	85.463	4.9461	1.7649	0.5760	0.67726												
6.000	86.638	4.9606	1.7674	0.5694	0.67598												

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
2.20	20.000	77.549	5.2175	2.8799	1.8117	0.6568	0.65185	2.30	16.000	40.816	2.4701	1.8678	1.3224	1.6676	0.92872
	18.000	79.308	5.2856	2.8987	1.8234	0.6296	0.64562		18.000	43.299	2.7360	1.9936	1.3724	1.5804	0.90351
	16.000	80.839	5.3369	2.9127	1.8323	0.6086	0.64096		20.000	46.007	3.0276	2.1230	1.4261	1.4885	0.87413
	14.000	82.216	5.3764	2.9235	1.8391	0.5921	0.63739		22.000	49.026	3.3514	2.2573	1.4847	1.3894	0.84035
	12.000	83.483	5.4073	2.9318	1.8444	0.5789	0.63462		24.000	52.536	3.7216	2.3998	1.5508	1.2788	0.80125
	10.000	84.670	5.4313	2.9382	1.8485	0.5686	0.63247		26.000	57.077	4.1819	2.5625	1.6319	1.1425	0.75319
	8.000	85.798	5.4497	2.9431	1.8517	0.5605	0.63083		27.454	64.653	4.8739	2.7813	1.7524	0.9338	0.68417
	6.000	86.883	5.4633	2.9468	1.8540	0.5545	0.62862		26.000	71.264	5.3682	2.9212	1.8377	0.7743	0.63813
	4.000	87.938	5.4727	2.9493	1.8556	0.5503	0.62879		24.000	74.512	5.6817	2.9736	1.8714	0.7060	0.62065
	2.000	88.973	5.4782	2.9507	1.8565	0.5479	0.62830		22.000	76.770	5.8238	3.0039	1.8915	0.6635	0.61049
2.25	20.000	27.926	1.1288	1.0903	1.0353	2.1725	0.99982		20.000	78.582	5.7631	3.0246	1.9054	0.6328	0.60352
	4.000	29.555	1.2703	1.1859	1.0712	2.0962	0.99861		18.000	80.133	5.8238	3.0399	1.9158	0.6092	0.59838
	6.000	31.277	1.4254	1.2864	1.1080	2.0203	0.99548		16.000	81.509	5.8705	3.0515	1.9238	0.5906	0.59445
	8.000	33.102	1.5949	1.3916	1.1461	1.9443	0.98973		14.000	82.764	5.9071	3.0606	1.9301	0.5757	0.59139
	10.000	35.034	1.7798	1.5011	1.1856	1.8674	0.98079		12.000	83.928	5.9360	3.0677	1.9350	0.5638	0.58899
	12.000	37.088	1.9812	1.6147	1.2270	1.7891	0.96827		10.000	85.026	5.9586	3.0732	1.9389	0.5543	0.58712
	14.000	39.277	2.2004	1.7319	1.2705	1.7088	0.95189		8.000	86.074	5.9761	3.0775	1.9419	0.5469	0.58568
	16.000	41.623	2.4392	1.8527	1.3166	1.6257	0.93152		6.000	87.085	5.9890	3.0807	1.9441	0.5413	0.58461
	18.000	44.161	2.7000	1.9770	1.3657	1.5388	0.90703		4.000	88.070	5.9980	3.0828	1.9456	0.5374	0.58387
	20.000	46.948	2.9871	2.1055	1.4187	1.4466	0.87829		2.000	89.039	6.0033	3.0841	1.9465	0.5352	0.58344
2.30	20.000	50.091	3.3085	2.2400	1.4770	1.3464	0.84486	2.35	2.000	26.692	1.1334	1.0935	1.0365	2.2698	0.99980
	24.000	53.837	3.6830	2.3854	1.5440	1.2318	0.80532		4.000	28.289	1.2804	1.1926	1.0736	2.1911	0.99846
	26.000	59.122	4.1839	2.5632	1.6323	1.0792	0.75298		6.000	29.979	1.4420	1.2970	1.1118	2.1129	0.99502
	26.795	64.633	4.6556	2.7153	1.7145	0.9321	0.70542		8.000	31.765	1.6189	1.4062	1.1513	2.0346	0.98872
	26.000	69.627	5.0238	2.8250	1.7783	0.8115	0.66991		10.000	33.657	1.8124	1.5199	1.1924	1.9557	0.97895
	24.000	73.634	5.2707	2.8946	1.8209	0.7254	0.64698		12.000	35.662	2.0232	1.6376	1.2354	1.8755	0.96534
	22.000	76.145	5.4009	2.9301	1.8433	0.6775	0.63519		14.000	37.790	2.2526	1.7589	1.2807	1.7934	0.94765
	20.000	78.098	5.4884	2.9534	1.8583	0.6441	0.62739		16.000	40.060	2.5021	1.8833	1.3285	1.7089	0.92580
	18.000	81.192	5.5523	2.9703	1.8693	0.6189	0.62175		18.000	42.497	2.7736	2.0108	1.3794	1.6212	0.89981
	14.000	82.504	5.6391	2.9929	1.8842	0.5836	0.61749		20.000	45.140	3.0705	2.1413	1.4339	1.5291	0.86971
2.30	10.000	83.716	5.6688	3.0006	1.8893	0.5711	0.61161		22.000	48.059	3.3981	2.2759	1.4931	1.4308	0.83542
	8.000	84.856	5.6921	1.8932	1.8932	0.5612	0.60960		24.000	51.393	3.7677	2.4168	1.5590	1.3227	0.79639
	8.000	85.942	5.7100	3.0111	1.8963	0.5535	0.60806		26.000	55.500	4.2092	2.5717	1.6367	1.1954	0.75038
	6.000	86.988	5.7233	3.0145	1.8986	0.5477	0.60692		28.000	62.973	4.9459	2.8024	1.7648	0.9810	0.67729
	4.000	88.007	5.7324	3.0168	1.8986	0.5437	0.60614		28.082	64.679	5.0977	2.8462	1.7911	0.9354	0.66296
	2.000	89.008	5.7378	3.0182	1.9002	0.5437	0.60614		28.000	66.328	5.2377	2.8855	1.8152	0.8927	0.65000
					1.9011	0.5413	0.60568		26.000	72.454	5.6907	3.0062	1.8930	0.7474	0.60972
									24.000	75.251	5.8587	3.0486	1.9218	0.6895	0.59544
									22.000	77.317	5.8587	3.0486	1.9218	0.6895	0.59544
									20.000	79.014	5.9657	3.0750	1.9401	0.6510	0.58653
								18.000	80.483	6.0423	3.0936	1.9532	0.6224	0.58024	
								16.000	81.798	6.1001	3.1075	1.9631	0.6002	0.57554	
								14.000	83.001	6.1451	3.1182	1.9707	0.5826	0.57191	
								12.000	84.122	6.1806	3.1266	1.9768	0.5683	0.56907	
								10.000	85.182	6.2087	3.1332	1.9816	0.5569	0.56683	
								8.000	85.182	6.2087	3.1332	1.9816	0.5569	0.56683	
								8.000	86.195	6.2479	3.1424	1.9883	0.5478	0.56508	
								8.000	86.195	6.2479	3.1424	1.9883	0.5478	0.56508	

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	
2.35	6.000	87.174	6.2606	1.9904	0.5353	0.56272	2.45	26.000	53.045	4.3053	1.6535	2.6037	1.6535	1.2861	0.74055	
	4.000	88.129	6.2694	1.9919	0.5315	0.56203		28.000	57.780	4.8455	1.7475	1.7475	2.7729	1.7475	1.1385	0.68691
	2.000	89.068	6.2745	1.9928	0.5293	0.56162		29.253	64.744	5.5614	1.8708	1.8708	2.9727	1.8708	0.9386	0.62095
2.40	2.000	26.120	1.1358	1.0371	2.3184	0.99979	26.000	70.828	70.828	6.0810	1.9598	3.1029	1.9598	0.7837	0.57709	
	4.000	27.702	1.2856	1.0749	2.2383	0.99639	24.000	76.446	76.446	6.3161	1.9999	3.1582	1.9999	0.7082	0.55836	
	6.000	29.377	1.4505	1.1138	2.1589	0.99478	22.000	78.236	78.236	6.5451	2.0389	3.2101	2.0389	0.6623	0.54787	
	8.000	31.149	1.6314	1.1540	2.0794	0.98818	20.000	79.752	79.752	6.8146	2.0508	3.2254	2.0508	0.6294	0.54076	
	10.000	33.023	1.8292	1.1959	1.9994	0.97797	18.000	81.089	81.089	7.1105	2.0599	3.2372	2.0599	0.5842	0.53555	
	12.000	35.007	2.0450	1.2398	1.9181	0.96377	16.000	82.299	82.299	7.4105	2.0671	3.2464	2.0671	0.5481	0.52845	
	14.000	37.112	2.2798	1.2860	1.8350	0.94538	14.000	83.416	83.416	7.7442	2.0728	3.2536	2.0728	0.5150	0.52599	
	16.000	39.351	2.5351	1.3348	1.7497	0.92274	12.000	84.462	84.462	8.0771	2.0774	3.2594	2.0774	0.4844	0.52403	
	18.000	41.748	2.8128	1.3866	1.6613	0.89592	10.000	85.455	85.455	8.4105	2.0810	3.2640	2.0810	0.4550	0.52249	
	20.000	44.336	3.1155	1.4421	1.5689	0.86505	8.000	86.408	86.408	8.7442	2.0838	3.2675	2.0838	0.4262	0.52129	
	22.000	47.174	3.4480	1.5021	1.4709	0.83015	6.000	87.331	87.331	9.0771	2.0859	3.2701	2.0859	0.3979	0.52041	
	24.000	50.371	3.8196	1.5682	1.3644	0.79093	4.000	88.232	88.232	9.4105	2.0873	3.2719	2.0873	0.3702	0.51979	
	26.000	54.184	4.2521	1.6442	1.2426	0.74598	2.000	89.119	89.119	9.7442	2.0882	3.2730	2.0882	0.3429	0.51943	
	28.000	59.656	4.8382	1.7462	1.0779	0.68761										
	28.681	64.710	5.3269	1.8305	0.9370	0.64187										
28.000	69.291	5.7130	1.8968	0.8201	0.60781	2.50	2.000	25.050	1.1405	1.0384	1.0984	1.0984	2.4155	0.99977		
26.000	73.400	6.0048	1.9468	0.7260	0.58331	4.000	26.609	26.609	1.2961	1.0775	1.2029	1.2029	2.3326	0.98822		
24.000	75.889	6.1539	1.9722	0.6751	0.57121	6.000	28.259	28.259	1.4679	1.1177	1.3133	1.3133	2.2505	0.97427		
22.000	77.803	6.2534	1.9892	0.6397	0.56329	8.000	30.005	30.005	1.6568	1.1595	1.4289	1.4289	2.1685	0.96703		
20.000	79.402	6.3260	2.0011	0.6129	0.55758	10.000	31.851	31.851	1.8639	1.2031	1.5493	1.5493	2.0859	0.95789		
18.000	80.800	6.3816	2.0111	0.5919	0.55260	12.000	33.802	33.802	2.0900	1.2488	1.6737	1.6737	2.0022	0.94507		
16.000	82.059	6.4251	2.0185	0.5751	0.54990	14.000	35.866	35.866	2.3664	1.2969	1.8015	1.8015	1.9169	0.93457		
14.000	83.217	6.4596	2.0244	0.5615	0.54726	16.000	38.057	38.057	2.6042	1.3478	1.9322	1.9322	1.8295	0.92465		
12.000	84.299	6.4870	2.0290	0.5505	0.54517	18.000	40.389	40.389	2.8949	1.4018	2.0652	2.0652	1.7394	0.91625		
10.000	85.324	6.5087	2.0327	0.5416	0.54352	20.000	42.890	42.890	3.2109	1.4594	2.2002	2.2002	1.6458	0.90967		
8.000	86.306	6.5254	2.0356	0.5348	0.54225	22.000	45.602	45.602	3.5558	1.5213	2.3373	2.3373	1.5475	0.90411		
6.000	87.255	6.5379	2.0377	0.5296	0.54131	24.000	48.600	48.600	3.9361	1.5887	2.4775	2.4775	1.4426	0.90000		
4.000	88.182	6.5466	2.0392	0.5260	0.54065	26.000	52.036	52.036	4.3657	1.6641	2.6235	2.6235	1.3268	0.89683		
2.000	89.094	6.5517	2.0400	0.5238	0.54027	28.000	56.335	56.335	4.8444	1.7542	2.7844	2.7844	1.1888	0.89441		
2.45	2.000	25.572	1.1381	1.0377	2.3670	0.99978	28.000	71.949	71.949	5.8014	1.9120	3.0342	1.9120	0.9402	0.60027	
	4.000	27.143	1.2908	1.0762	2.2855	0.99831	26.000	74.856	74.856	6.4249	2.0185	3.1831	2.0185	0.7573	0.54992	
	6.000	28.805	1.4591	1.1157	2.2048	0.99453	24.000	76.939	76.939	7.0672	2.0529	3.2282	2.0529	0.6928	0.53460	
	8.000	30.563	1.6440	1.1567	2.1241	0.98761	22.000	78.625	78.625	7.7526	2.0742	3.2555	2.0742	0.6509	0.52537	
	10.000	32.422	1.8463	1.1994	2.0428	0.97695	20.000	80.070	80.070	8.4144	2.0893	3.2744	2.0893	0.6201	0.51894	
	12.000	34.388	2.0672	1.2442	1.9603	0.96215	18.000	81.353	81.353	9.0822	2.1007	3.2885	2.1007	0.5962	0.51417	
	14.000	36.472	2.3078	1.2914	1.8762	0.94302	16.000	82.518	82.518	9.7607	2.1095	3.2994	2.1095	0.5710	0.51048	
	16.000	38.685	2.5692	1.3412	1.7898	0.92555	14.000	83.598	83.598	10.4413	2.1165	3.3080	2.1165	0.5475	0.50759	
	18.000	41.047	2.8532	1.3941	1.7006	0.90955	12.000	84.612	84.612	11.1266	2.1221	3.3148	2.1221	0.5240	0.50528	
	20.000	43.588	3.1623	1.4506	1.6077	0.89187	10.000	85.576	85.576	11.8179	2.1266	3.3202	2.1266	0.5037	0.50345	
	22.000	46.358	3.5007	1.5115	1.5097	0.86018	8.000	86.502	86.502	12.5144	2.1301	3.3245	2.1301	0.5000	0.50088	
	24.000	49.445	3.8759	1.5781	1.4042	0.82459	6.000	87.400	87.400	13.2179	2.1350	3.3278	2.1350	0.5240	0.50005	
						0.78502	4.000	88.277	88.277	13.9284	2.1364	3.3303	2.1364	0.5157	0.49947	
						1.4042	2.000	89.142	89.142	14.6452	2.1372	3.3330	2.1372	0.5186	0.49913	

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
2.55	2.000	24.550	1.1429	1.1001	1.0390	2.4639	0.99976	2.60	30.814	64.866	6.2972	3.1538	1.9967	0.9433	0.55984
	4.000	26.099	1.3015	1.2065	1.0788	2.3796	0.99814	30.000	0.000	69.778	6.7777	3.2609	2.0785	0.8111	0.52354
	6.000	27.739	1.4789	1.3189	1.1198	2.2961	0.99399	28.000	0.000	73.590	7.0906	3.3263	2.1317	0.7189	0.50138
	8.000	29.474	1.6699	1.4367	1.1623	2.2128	0.98642	26.000	0.000	75.955	7.2555	3.3596	2.1596	0.6673	0.49015
	10.000	31.307	1.8817	1.5593	1.2067	2.1288	0.97479	24.000	0.000	77.778	7.3665	3.3815	2.1785	0.6311	0.48276
	12.000	33.244	2.1133	1.6861	1.2534	2.0438	0.95871	22.000	0.000	79.299	7.4481	3.3974	2.1923	0.6035	0.47742
	14.000	35.293	2.3656	1.8162	1.3025	1.9573	0.93803	20.000	0.000	80.626	7.5108	3.4095	2.2029	0.5817	0.47336
	16.000	37.463	2.6399	1.9490	1.3545	1.8687	0.91283	18.000	0.000	81.815	7.5602	3.4189	2.2113	0.5641	0.47020
	18.000	39.770	2.9378	2.0840	1.4097	1.7776	0.88333	16.000	0.000	82.906	7.5997	3.4264	2.2180	0.5497	0.46768
	20.000	42.236	3.2611	2.2207	1.4685	1.6832	0.84985	14.000	0.000	83.922	7.6316	3.4324	2.2234	0.5378	0.46566
	22.000	44.899	3.6130	2.3591	1.5315	1.5845	0.81272	12.000	0.000	84.879	7.6572	3.4372	2.2277	0.5282	0.46405
	24.000	47.822	3.9995	2.4998	1.5999	1.4797	0.77209	10.000	0.000	85.792	7.6775	3.4411	2.2312	0.5204	0.46277
	26.000	51.130	4.4319	2.6449	1.6756	1.3655	0.72772	8.000	0.000	86.671	7.6934	3.4440	2.2338	0.5143	0.46178
	28.000	55.131	4.9401	2.8007	1.7638	1.2334	0.67784	6.000	0.000	87.524	7.7053	3.4462	2.2359	0.5096	0.46104
	30.000	61.449	5.6866	3.0051	1.8923	1.0385	0.61007	4.000	0.000	88.359	7.7135	3.4478	2.2372	0.5064	0.46053
30.317	64.823	6.0466	3.0946	1.9539	0.9418	0.57989	2.000	0.000	89.183	7.7184	3.4487	2.2381	0.5045	0.46022	
30.000	67.966	6.3519	3.1664	2.0060	0.8568	0.55557									
28.000	72.844	6.7595	3.2569	2.0754	0.7364	0.52487									
26.000	75.440	7.1402	3.2952	2.1061	0.6793	0.51190									
24.000	77.380	7.5075	3.3195	2.1260	0.6405	0.50368									
22.000	78.978	7.8423	3.3368	2.1404	0.6115	0.49783									
20.000	80.360	8.1499	3.3499	2.1514	0.5887	0.49343									
18.000	81.594	8.4275	3.3600	2.1600	0.5703	0.49002									
16.000	82.720	8.6680	3.3680	2.1668	0.5554	0.48732									
14.000	83.766	8.8766	3.3744	2.1723	0.5432	0.48517									
12.000	84.750	9.0561	3.3795	2.1767	0.5333	0.48345									
10.000	85.688	9.2097	3.3835	2.1802	0.5253	0.48209									
8.000	86.590	9.3427	3.3866	2.1829	0.5190	0.48104									
6.000	87.464	9.4588	3.3890	2.1849	0.5142	0.48025									
4.000	88.320	9.5588	3.3906	2.1864	0.5109	0.47971									
2.000	89.163	9.6463	3.3916	2.1872	0.5090	0.47939									
								2.65	2.000	23.613	1.1479	1.1034	1.0403	2.5607	0.99973
								4.000	4.000	25.144	1.3124	1.2136	1.0814	2.4734	0.99796
								6.000	6.000	26.766	1.4950	1.3302	1.1239	2.3869	0.99341
								8.000	8.000	28.482	1.6966	1.4525	1.1680	2.3007	0.98514
								10.000	10.000	30.295	1.9182	1.5798	1.2142	2.2139	0.97247
								12.000	12.000	32.210	2.1610	1.7113	1.2628	2.1262	0.95502
								14.000	14.000	34.232	2.4260	1.8462	1.3141	2.0370	0.93270
								16.000	16.000	36.368	2.7141	1.9835	1.3683	1.9459	0.90566
								18.000	18.000	38.632	3.0267	2.1226	1.4259	1.8524	0.87423
								20.000	20.000	41.043	3.3657	2.2630	1.4873	1.7560	0.83884
								22.000	22.000	43.627	3.7335	2.4042	1.5529	1.6559	0.80000
								24.000	24.000	46.433	4.1347	2.5465	1.6237	1.5507	0.75806
								26.000	26.000	49.549	4.5776	2.6911	1.7010	1.4380	0.71313
								30.000	30.000	53.164	5.0815	2.8416	1.7883	1.3126	0.66448
								31.288	31.288	57.877	5.7097	3.0110	1.8963	1.1576	0.60809
								30.000	30.000	64.910	6.5531	3.2118	2.0403	0.9447	0.54016
								28.000	28.000	70.983	7.1564	3.3397	2.1428	0.7814	0.49887
								26.000	26.000	74.230	7.4211	3.3922	2.1877	0.7039	0.47918
								24.000	24.000	76.415	7.5742	3.4216	2.2137	0.6565	0.46930
								22.000	22.000	78.138	7.6801	3.4415	2.2316	0.6224	0.46262
								20.000	20.000	79.592	7.7589	3.4562	2.2449	0.5962	0.45771
								18.000	18.000	80.870	7.8200	3.4674	2.2553	0.5752	0.45396
								16.000	16.000	82.020	7.8684	3.4763	2.2634	0.5582	0.45101
								14.000	14.000	83.079	7.9073	3.4833	2.2700	0.5442	0.44866
								12.000	12.000	84.066	7.9387	3.4890	2.2753	0.5327	0.44677
								10.000	10.000	84.998	7.9640	3.4935	2.2796	0.5234	0.44526
								8.000	8.000	85.888	7.9841	3.4972	2.2830	0.5158	0.44406
								6.000	6.000	86.746	7.9999	3.5000	2.2857	0.5098	0.44312
								2.000	2.000	87.579	8.0116	3.5021	2.2877	0.5053	0.44242

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	
2.65	4.000	88.396	8.0198	3.5035	2.2891	0.5021	0.44194	2.75	24.000	45.225	4.2794	2.5951	1.6490	1.6181	0.74319	
	2.000	89.200	8.0247	3.5044	2.2899	0.5003	0.44165		26.000	48.206	4.7375	4.7375	2.7404	1.7288	1.5056	0.69739
2.70	2.000	23.173	1.1503	1.1051	1.0409	2.6090	0.99972	30.000	55.674	5.8507	5.8507	3.0466	1.9204	1.2416	0.59611	
	4.000	24.696	1.3179	1.2172	1.0827	2.5201	0.99786	32.000	62.549	6.7812	6.7812	3.2616	2.0791	1.0209	0.52329	
	6.000	26.311	1.5042	1.3360	1.1260	2.4321	2.4321	0.99311	32.173	65.002	7.0807	3.3243	2.1300	0.9476	0.50207	
	8.000	28.019	1.7102	1.4605	1.1709	2.3444	2.3444	0.98446	32.000	67.323	7.3448	3.3773	2.1748	0.8812	0.48420	
	10.000	29.824	1.9369	1.5902	1.2180	2.2561	2.2561	0.97125	30.000	72.678	7.8741	3.4773	2.2644	0.7401	0.45066	
	12.000	31.728	2.1855	1.7241	1.2676	2.1669	2.1669	0.95309	28.000	75.285	8.0870	3.5154	2.3004	0.6789	0.43799	
	14.000	33.739	2.4569	1.8614	1.3199	2.0763	2.0763	0.92991	26.000	77.202	8.2333	3.5393	2.3235	0.6378	0.43010	
	16.000	35.862	2.7523	2.0010	1.3754	1.9838	1.9838	0.90191	24.000	78.766	8.3214	3.5561	2.3400	0.6071	0.42454	
	18.000	38.109	3.0727	2.1423	1.4343	1.8890	1.8890	0.86948	22.000	80.110	8.3960	3.5688	2.3526	0.5829	0.42037	
	20.000	40.496	3.4200	2.2845	1.4970	1.7915	1.7915	0.83311	20.000	81.303	8.4545	3.5786	2.3625	0.5634	0.41714	
	22.000	43.049	3.7964	2.4273	1.5641	1.6905	1.6905	0.79337	18.000	82.386	8.5014	3.5864	2.3704	0.5474	0.41457	
	24.000	45.809	4.2059	2.5706	1.6362	1.6362	1.6362	0.75072	16.000	83.387	8.5392	3.5927	2.3768	0.5343	0.41251	
	26.000	48.852	4.6560	2.7155	1.7146	1.5641	1.5641	0.70538	14.000	84.324	8.5699	3.5978	2.3820	0.5234	0.41085	
	28.000	52.334	5.1626	2.8645	1.8022	1.4970	1.4970	0.65692	12.000	85.212	8.5948	3.6019	2.3862	0.5145	0.40951	
	30.000	56.687	5.7730	3.0271	1.9071	1.4388	1.4388	0.60268	10.000	86.062	8.6146	3.6051	2.3895	0.5072	0.40845	
	31.741	64.956	6.8143	3.2687	2.0847	1.2018	1.2018	0.60268	8.000	86.882	8.6301	3.6077	2.3922	0.5015	0.40762	
	30.000	71.913	7.5186	3.4110	2.2042	0.9462	0.9462	0.52090	6.000	87.680	8.6418	3.6096	2.3941	0.4972	0.40700	
	28.000	74.790	7.7529	3.4551	2.2439	0.7587	0.7587	0.47286	4.000	88.462	8.6499	3.6109	2.3955	0.4942	0.40656	
26.000	76.828	7.8967	3.4814	2.2682	0.6468	0.6468	0.44930	2.000	89.234	8.6547	3.6117	2.3963	0.4924	0.40631		
24.000	78.466	7.9983	3.4997	2.2854	0.6145	0.6145	0.44321	2.80	22.344	22.344	1.1553	1.0422	2.7056	0.99969		
22.000	79.862	8.0748	3.5133	2.2984	0.5893	0.5893	0.43870		2.000	23.854	1.3292	1.2246	1.0854	2.6133	0.99766	
20.000	81.095	8.1345	3.5238	2.3085	0.5691	0.5691	0.43520		4.000	25.455	1.5230	1.3476	1.1302	2.5222	0.99246	
18.000	82.210	8.1821	3.5321	2.3165	0.5527	0.5527	0.43247		6.000	27.150	1.7379	1.4768	1.1768	2.4313	0.98304	
16.000	83.238	8.2204	3.5388	2.3230	0.5391	0.5391	0.43027		8.000	28.940	1.9751	1.6113	1.2257	2.3399	0.96869	
14.000	84.199	8.2515	3.5441	2.3282	0.5279	0.5279	0.42850		10.000	30.830	2.2357	1.7502	1.2774	2.2476	0.94903	
12.000	85.109	8.2765	3.5484	2.3324	0.5188	0.5188	0.42700		12.000	32.822	2.5205	1.8923	1.3320	2.1540	0.92409	
10.000	85.978	8.2965	3.5518	2.3358	0.5114	0.5114	0.42595		14.000	34.923	2.8309	2.0367	1.3900	2.0585	0.89411	
8.000	86.816	8.3121	3.5545	2.3385	0.5056	0.5056	0.42506		16.000	37.141	3.1677	2.1822	1.4516	1.9610	0.85962	
6.000	87.631	8.3238	3.5565	2.3404	0.5012	0.5012	0.42441		18.000	39.490	3.5324	2.3283	1.5172	1.8610	0.82123	
4.000	88.430	8.3319	3.5579	2.3418	0.4981	0.4981	0.42395		20.000	41.990	3.9271	2.4743	1.5872	1.7578	0.77965	
2.000	89.218	8.3367	3.5587	2.3426	0.4962	0.4962	0.42368		22.000	44.676	4.3550	2.6200	1.6622	1.6506	0.73549	
2.75	2.000	22.750	1.1528	1.1068	1.0415	2.6573	0.99971		26.000	47.604	4.8219	2.7658	1.7434	1.7434	1.5379	0.68919
	4.000	24.267	1.3236	1.2209	1.0841	2.5667	0.99776		28.000	50.887	5.3398	2.9135	1.8328	1.8328	1.4163	0.64070
	6.000	25.873	1.5135	1.3417	1.1280	2.4772	2.4772		0.99279	30.000	54.786	5.9387	3.0683	1.9355	1.2783	0.58877
	8.000	27.575	1.7239	1.4686	1.1738	2.3879	2.3879		0.98377	32.000	60.433	6.7529	3.2555	2.0743	1.0909	0.52535
	10.000	29.372	1.9558	1.6007	1.2219	2.2982	2.2982		0.96999	32.587	65.050	7.3524	3.3788	2.1761	0.9490	0.48369
	12.000	31.269	2.2104	1.7371	1.2724	2.2074	2.2074		0.95109	32.000	69.211	7.8278	3.4689	2.2566	0.8307	0.45348
	14.000	33.269	2.4885	1.8768	1.3259	2.1153	2.1153	0.92704	30.000	73.328	8.2272	3.5399	2.3241	0.7243	0.42988	
	16.000	35.381	2.7912	2.0188	1.3826	2.0213	2.0213	0.89806	28.000	75.728	8.4241	3.5735	2.3574	0.6684	0.41882	
	18.000	37.612	3.1197	2.1622	1.4429	1.9253	1.9253	0.86461	26.000	77.543	8.5544	3.5952	2.3794	0.6296	0.41169	
	20.000	39.980	3.4757	2.3063	1.5070	1.8265	1.8265	0.82724	24.000	79.042	8.6495	3.6108	2.3954	0.6002	0.40659	
	22.000	42.504	3.8610	2.4506	1.5755	1.7245	1.7245	0.78659	22.000	80.339	8.7224	3.6227	2.4077	0.5769	0.40273	
									20.000	81.496	8.7800	3.6319	2.4174	0.5580	0.39971	

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
2.80	18.000	82.550	8.8262	3.6393	2.4252	0.5425	0.39731	2.90	6.000	24.666	1.5421	1.3594	1.1344	2.6117	0.99178
	16.000	83.525	8.8637	3.6453	2.4316	0.5297	0.39538		8.000	26.350	1.7663	1.4933	1.1828	2.5175	0.98153
	14.000	84.440	8.8942	3.6501	2.4367	0.5191	0.39382		10.000	28.129	2.0143	1.6328	1.2396	2.4229	0.96597
	12.000	85.308	8.9188	3.6540	2.4409	0.5103	0.39256		12.000	30.007	2.2873	1.7767	1.2874	2.3273	0.94475
	10.000	86.140	8.9385	3.6571	2.4442	0.5033	0.39156		14.000	31.985	2.5863	1.9238	1.3444	2.2304	0.91794
	8.000	86.943	8.9540	3.6595	2.4468	0.4977	0.39078		16.000	34.069	3.0469	2.9123	1.4050	2.1318	0.88591
	6.000	87.725	8.9656	3.6613	2.4487	0.4935	0.39019		18.000	36.264	3.6496	3.2663	1.4694	2.0313	0.84930
	4.000	88.492	8.9737	3.6626	2.4501	0.4905	0.38978		20.000	38.584	4.0638	3.3729	1.5380	1.9225	0.80886
	2.000	89.248	8.9784	3.6633	2.4509	0.4887	0.38954		22.000	41.044	4.5222	3.5222	1.6112	1.8259	0.76540
									24.000	43.672	4.5119	2.6704	1.6896	1.7138	0.71969
2.85	2.000	21.954	1.1579	1.1103	1.0429	2.7537	0.99968		26.000	46.515	2.8177	1.7739	1.5999	0.67230	
	4.000	23.457	1.3349	1.2283	1.0868	2.6598	0.99755		28.000	49.655	3.2952	1.8652	1.4788	0.62347	
	6.000	25.052	1.5325	1.3535	1.1323	2.5670	0.99213		30.000	53.274	3.1161	1.9692	1.3453	0.57262	
	8.000	26.742	1.7520	1.4850	1.1798	2.4744	0.98230		32.000	57.931	3.2824	2.0957	1.1827	0.51624	
	10.000	28.526	1.9946	1.6220	1.2297	2.3815	0.96735		33.363	65.145	3.4841	2.2708	0.9516	0.44840	
	12.000	30.410	2.2613	1.7634	1.2824	2.2876	0.94692		32.000	71.287	3.6085	2.3930	0.7771	0.40736	
	14.000	32.394	2.5532	1.9080	1.3382	2.1923	0.92105		30.000	76.490	3.6836	3.7020	2.4730	0.6500	0.38301
	16.000	34.486	2.8712	2.0547	1.3974	2.0953	0.89006		28.000	78.142	3.7260	3.7156	2.5087	0.5878	0.37709
	18.000	36.692	3.2165	2.2505	1.4604	1.9964	0.85451		26.000	79.533	3.7409	3.7260	2.5205	0.5660	0.36942
	20.000	39.025	3.5904	2.3505	1.5275	1.8950	0.81511		24.000	80.750	3.7343	3.7343	2.5300	0.5482	0.36680
22.000	41.505	3.9948	2.4982	1.5991	1.7906	0.77258		22.000	81.843	3.7409	3.7409	2.5376	0.5335	0.36469	
24.000	44.160	4.4325	2.6451	1.6757	1.6825	0.72766		20.000	82.845	3.7409	3.7409	2.5376	0.5335	0.36469	
26.000	47.042	4.9089	2.7916	1.7585	1.5692	0.68081		18.000	83.775	3.7462	3.7462	2.5438	0.5212	0.36299	
28.000	50.247	5.4345	2.9391	1.8490	1.4481	0.63219		16.000	84.651	3.7506	3.7506	2.5489	0.5111	0.36161	
30.000	53.992	5.9392	3.0917	1.9518	1.3127	0.58089		14.000	85.484	3.7541	3.7541	2.5530	0.5027	0.36049	
32.000	59.037	6.8013	3.2659	2.0825	1.1407	0.52183		12.000	86.283	3.7570	3.7570	2.5563	0.4959	0.35960	
32.984	65.097	7.8294	3.4320	2.2230	0.9503	0.46580		10.000	86.283	3.7570	3.7570	2.5563	0.4906	0.35890	
30.000	70.389	8.2421	3.5425	2.3266	0.8001	0.42903		8.000	87.055	3.7592	3.7592	2.5588	0.4865	0.35838	
28.000	73.893	8.5802	3.5995	2.3837	0.7107	0.41030		6.000	87.808	3.7608	3.7608	2.5608	0.4836	0.35802	
26.000	76.127	8.7648	3.6295	2.4149	0.6588	0.40050		4.000	88.546	3.7620	3.7620	2.5621	0.4819	0.35780	
24.000	77.855	8.8902	3.6495	2.4360	0.6220	0.39402									
22.000	79.297	8.9827	3.6640	2.4516	0.5938	0.38933									
20.000	80.552	9.0543	3.6751	2.4637	0.5713	0.38574		2.95	21.216	21.216	1.1630	1.1138	1.0442	2.8500	0.99965
18.000	81.676	9.1110	3.6838	2.4733	0.5530	0.38294		4.000	22.708	22.708	1.3464	1.2357	1.0895	2.7526	0.99732
16.000	82.702	9.1567	3.6908	2.4810	0.5379	0.38069		6.000	24.294	24.294	1.5518	1.3654	1.1366	2.6563	0.99142
14.000	83.655	9.1938	3.6964	2.4872	0.5253	0.37888		8.000	25.974	25.974	1.7807	1.5017	1.1858	2.5604	0.98074
12.000	84.549	9.2241	3.7010	2.4923	0.5150	0.37741		10.000	27.749	27.749	2.0343	1.6437	1.2377	2.4640	0.96454
10.000	85.399	9.2486	3.7047	2.4964	0.5064	0.37623		12.000	29.621	29.621	2.3137	1.7901	1.2925	2.3668	0.94252
8.000	86.213	9.2683	3.7077	2.4998	0.4995	0.37528		14.000	31.593	31.593	2.6199	1.9396	1.3507	2.2682	0.91475
6.000	87.001	9.2836	3.7100	2.5023	0.4940	0.37454		16.000	33.670	33.670	2.9540	2.0911	1.4126	2.1679	0.88168
4.000	87.768	9.2952	3.7117	2.5043	0.4899	0.37399		18.000	35.856	35.856	3.3169	2.2434	1.4785	2.0658	0.84398
2.000	88.520	9.3033	3.7129	2.5057	0.4870	0.37360		20.000	38.164	38.164	3.7098	2.3954	1.5487	1.9615	0.80249
								22.000	40.607	40.607	4.1344	2.5464	1.6236	1.8546	0.75809
								24.000	43.211	43.211	4.5930	2.6959	1.7037	1.7444	0.71160
2.90	2.000	21.578	1.1604	1.1120	1.0435	2.8019	0.99966		26.000	46.018	5.0902	2.8441	1.7898	1.6297	0.66966
4.000	23.076	1.3406	1.2320	1.0882	1.0882	2.7062	0.99744		28.000	49.102	5.6343	2.9916	1.8833	1.5085	0.61460
								30.000	52.618	52.618	6.2438	3.1414	1.9876	1.3762	0.56404

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	
2.95	32.000	56.997	6.9741	3.3023	2.1119	1.2199	0.50950	3.00	14.000	84.837	10.2483	3.8459	2.6647	0.5038	0.33180	
	33.726	65.193	8.1990	3.5350	2.3194	0.9528	0.43150		12.000	85.638	10.2726	3.8491	2.6688	0.4958	0.33081	
	32.000	72.020	9.0188	3.6696	2.4577	0.7585	0.37416		10.000	86.408	10.2921	3.8517	2.6721	0.4892	0.33001	
	30.000	74.838	9.2917	3.7112	2.5037	0.6877	0.34759		8.000	87.154	10.3074	3.8537	2.6747	0.4841	0.32939	
	28.000	76.821	9.4585	3.7359	2.5318	0.6420	0.36628		6.000	87.881	10.3190	3.8553	2.6766	0.4801	0.32892	
	26.000	78.407	9.5762	3.7530	2.5516	0.6084	0.36086		4.000	88.594	10.3270	3.8563	2.6779	0.4774	0.32860	
	24.000	79.752	9.6649	3.7657	2.5666	0.5821	0.35684		2.000	89.299	10.3318	3.8569	2.6787	0.4757	0.32841	
	22.000	80.935	9.7342	3.7755	2.5782	0.5610	0.35374									
	20.000	82.000	9.7896	3.7834	2.5875	0.5437	0.35128									
	18.000	82.978	9.8345	3.7896	2.5951	0.5293	0.34931		3.05	2.000	20.530	1.1681	1.1173	1.0455	2.9462	0.99962
16.000	83.889	9.8712	3.7947	2.6013	0.5173	0.34771		4.000	22.014	22.014	1.3581	1.2433	1.0923	2.8450	0.99708	
14.000	84.747	9.9012	3.7989	2.6063	0.5074	0.34641		6.000	23.591	23.591	1.5716	1.3774	1.1409	2.7451	0.99066	
12.000	85.563	9.9255	3.8023	2.6104	0.4992	0.34536		8.000	25.263	25.263	1.8100	1.5186	1.1919	2.6457	0.97909	
10.000	86.348	9.9450	3.8050	2.6137	0.4925	0.34452		10.000	27.031	27.031	2.0749	1.6656	1.2458	2.5458	0.96158	
8.000	87.106	9.9604	3.8071	2.6163	0.4872	0.34386		12.000	28.895	28.895	2.3674	1.8171	1.3029	2.4450	0.93788	
6.000	87.845	9.9719	3.8087	2.6182	0.4832	0.34336		14.000	30.859	30.859	2.6886	1.9717	1.3636	2.3429	0.90814	
4.000	88.571	9.9799	3.8098	2.6196	0.4804	0.34302		16.000	32.923	32.923	3.0394	2.1281	1.4282	2.2392	0.87292	
2.000	89.288	9.9847	3.8104	2.6204	0.4788	0.34282		18.000	35.095	35.095	3.4208	2.2848	1.4972	2.1338	0.83303	
3.00	2.000	20.867	1.1656	1.1155	1.0449	2.8981	0.99963	20.000	37.382	37.382	3.8338	2.4408	1.5707	2.0263	0.78944	
	4.000	22.355	1.3522	1.2395	1.0909	2.7988	0.99721	22.000	39.797	39.797	4.2796	2.5952	1.6490	1.9166	0.74317	
	6.000	23.936	1.5616	1.3714	1.1387	2.7008	0.99105	24.000	42.361	42.361	4.7607	2.7474	1.7328	1.8039	0.69513	
	8.000	25.611	1.7953	1.5101	1.1888	2.6031	0.97993	26.000	45.110	45.110	5.2806	2.8973	1.8226	1.6874	0.64608	
	10.000	27.383	2.0545	1.6546	1.2417	2.5050	0.96308	28.000	48.102	48.102	5.8462	3.0455	1.9196	1.5654	0.59649	
	12.000	29.251	2.3404	1.8036	1.2977	2.4060	0.94022	30.000	51.455	51.455	6.4722	3.1938	2.0265	1.4345	0.54630	
	14.000	31.218	2.6540	1.9556	1.3571	2.3056	0.91148	32.000	55.456	55.456	7.1967	3.3478	2.1497	1.2858	0.49412	
	16.000	33.288	2.9964	2.1095	1.4204	2.2037	0.87734	34.000	61.505	61.505	8.0161	3.5380	2.3222	1.0765	0.39522	
	18.000	35.467	3.3685	2.2641	1.4878	2.1000	0.83855	36.000	68.742	68.742	9.2596	3.7064	2.4983	0.8514	0.35750	
	20.000	37.764	3.7713	2.4181	1.5596	1.9941	0.79602	38.000	77.406	77.406	10.7779	3.8146	2.6255	0.6689	0.34151	
22.000	40.192	4.2064	2.5708	1.6362	1.8858	0.75068	40.000	88.880	88.880	12.6154	3.8355	2.6705	0.5276	0.33501		
24.000	42.775	4.6761	2.7216	1.7181	1.7744	0.70340	42.000	101.54	101.54	14.9103	3.8505	2.6705	0.4266	0.33040		
26.000	45.552	5.1844	2.8706	1.8060	1.6589	0.65491	44.000	118.80	118.80	17.6883	3.8617	2.6849	0.3518	0.32694		
28.000	48.586	5.7388	3.0184	1.9012	1.5374	0.60560	46.000	140.145	140.145	20.3683	3.8705	2.6963	0.2823	0.32423		
30.000	52.014	6.3559	3.1673	2.0067	1.4059	0.55526	48.000	166.284	166.284	23.6284	3.8776	2.7055	0.2208	0.32208		
32.000	56.182	7.0810	3.3244	2.1300	1.2541	0.50205	50.000	198.221	198.221	27.5350	3.8833	2.7129	0.1515	0.32034		
34.000	63.673	8.2682	3.5470	2.3310	1.0029	0.42755	52.000	240.095	240.095	32.2129	3.8879	2.7190	0.0892	0.31892		
34.073	65.241	8.4917	3.5848	2.3688	0.9540	0.41510	54.000	284.921	284.921	36.9174	3.8917	2.7240	0.0505	0.31777		
34.000	66.749	8.6971	3.6186	2.4035	0.9083	0.40406	56.000	340.709	340.709	42.6012	3.8948	2.7281	0.0426	0.31683		
32.000	72.642	9.3988	3.7271	2.5217	0.7428	0.36908	58.000	414.466	414.466	50.6255	3.8973	2.7314	0.0481	0.31608		
30.000	75.239	9.6517	3.7638	2.5643	0.6779	0.35743	60.000	500.229	500.229	60.6603	3.8992	2.7340	0.0359	0.31549		
28.000	77.126	9.8121	3.7865	2.5913	0.6345	0.35029	62.000	607.914	607.914	72.6719	3.9007	2.7359	0.0272	0.31505		
26.000	78.652	9.9268	3.8024	2.6106	0.6022	0.34530	64.000	739.617	739.617	86.617	3.9017	2.7373	0.0244	0.31474		
24.000	79.956	10.0139	3.8144	2.6253	0.5768	0.34157	66.000	893.310	893.310	102.6847	3.9023	2.7381	0.0238	0.31456		
22.000	81.106	10.0824	3.8237	2.6368	0.5563	0.33868										
20.000	82.147	10.1373	3.8311	2.6460	0.5394	0.33638										
18.000	83.103	10.1819	3.8371	2.6536	0.5253	0.33453	3.10	2.000	20.205	20.205	1.1707	1.1190	1.0462	2.9942	0.99960	
16.000	83.996	10.2184	3.8420	2.6597	0.5136	0.33302	4.000	4.000	21.684	21.684	1.3640	1.2471	1.0937	2.8911	0.99696	

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
3.10	6.000	23.258	1.5815	1.1431	2.7894	0.99027	3.15	28.000	47.216	6.0888	3.1000	1.9577	1.6194	0.57808
	8.000	24.927	1.8249	1.1950	2.6881	0.97822		30.000	50.449	6.7158	3.2475	2.0680	1.4886	0.52806
	10.000	26.692	2.0956	1.2499	2.5864	0.96004		32.000	54.201	7.4487	3.3975	2.3489	1.3441	0.47738
	12.000	28.554	2.3949	1.3081	2.4837	0.93546		34.000	59.196	8.3736	3.5650	2.6478	1.1632	0.42162
	14.000	30.513	2.7236	1.3701	2.3798	0.90473		35.033	65.382	9.4008	3.7274	2.9271	0.9575	0.36898
	16.000	32.574	3.0831	1.4362	2.2743	0.86841		34.000	70.719	10.1474	3.8325	3.2152	0.7974	0.33596
	18.000	34.739	3.4740	1.5067	2.1672	0.82741		32.000	74.089	10.5396	3.8839	3.5111	2.6478	0.7064
	20.000	37.017	3.8973	1.5819	2.0581	0.78278		30.000	76.244	10.7550	3.9111	3.7499	2.1737	0.6531
	22.000	39.421	4.3543	1.6621	1.9468	0.73556		28.000	77.906	10.9014	3.9292	3.9292	1.7499	0.6152
	24.000	41.968	4.8470	1.7477	1.8329	0.68676		26.000	79.289	11.0097	3.9424	2.7927	1.5221	0.5860
	26.000	44.692	5.3788	1.8395	1.7154	0.63718		24.000	80.490	11.0936	3.9524	2.8068	1.3441	0.5627
	28.000	47.646	5.9563	1.9385	1.5928	0.58731		22.000	81.560	11.1602	3.9604	2.8180	1.1632	0.5436
	30.000	50.935	6.5922	2.0470	1.4620	0.53722		20.000	82.535	11.2142	3.9668	2.8270	0.9575	0.5278
	32.000	54.800	7.3197	2.1705	1.3157	0.48586		18.000	83.436	11.2583	3.9720	2.8344	0.7974	0.5145
	34.000	60.205	8.2768	2.3325	1.1241	0.42706		16.000	84.279	11.2945	3.9762	2.8405	0.6478	0.5035
	34.726	65.335	9.0925	2.4701	0.9564	0.38389		14.000	85.076	11.3243	3.9797	2.8455	0.5278	0.4942
	34.000	69.872	9.7174	2.5754	0.8203	0.35449		12.000	85.838	11.3486	3.9825	2.8496	0.4774	0.4865
	32.000	73.661	10.1577	2.6495	0.7171	0.33553		10.000	86.571	11.3682	3.9848	2.8529	0.42162	0.4803
	30.000	75.938	10.3831	2.6874	0.6607	0.32634		8.000	87.281	11.3835	3.9866	2.8555	0.36898	0.4754
	28.000	77.666	10.5334	2.7126	0.6212	0.32040		6.000	87.976	11.3951	3.9879	2.8574	0.33596	0.4716
26.000	79.091	10.6435	2.7311	0.5911	0.31614		4.000	88.657	11.4032	3.9889	2.8588	0.3091	0.4690	
24.000	80.324	10.7282	2.7454	0.5671	0.31291		2.000	89.330	11.4080	3.9894	2.8596	0.29240	0.4674	
22.000	81.419	10.7954	2.7567	0.5476	0.31038							0.28366	0.4650	
20.000	82.413	10.8496	2.7658	0.5314	0.30836							0.28240	0.4635	
18.000	83.331	10.8938	2.7732	0.5179	0.30672							0.28138	0.4620	
16.000	84.189	10.9301	2.7793	0.5067	0.30539							0.28048	0.4605	
14.000	85.001	10.9599	2.7843	0.4973	0.30430							0.27966	0.4590	
12.000	85.775	10.9842	2.7884	0.4895	0.30341							0.27891	0.4575	
10.000	86.520	11.0037	2.7917	0.4832	0.30270							0.27821	0.4560	
8.000	87.242	11.0190	2.7942	0.4781	0.30215							0.27756	0.4545	
6.000	87.945	11.0306	2.7962	0.4743	0.30173							0.27695	0.4530	
4.000	88.637	11.0387	2.7975	0.4716	0.30144							0.27638	0.4515	
2.000	89.321	11.0434	2.7983	0.4701	0.30127							0.27584	0.4500	
3.15	2.000	19.891	1.1734	1.0469	3.0421	0.99958	3.20	2.000	19.587	1.1760	1.1226	1.0475	3.0901	0.99957
	4.000	21.366	1.3699	1.0951	2.9371	0.99683		4.000	21.059	1.3759	1.2548	1.0965	2.9831	0.99670
	6.000	22.937	1.5915	1.1453	2.8336	0.99886		6.000	22.628	1.6017	1.3958	1.1475	2.8776	0.98944
	8.000	24.603	1.8399	1.1981	2.7304	0.99863		8.000	24.292	1.8552	1.5443	1.2013	2.7725	0.97642
	10.000	26.366	2.1166	1.2540	2.6267	0.97734		10.000	26.052	2.1377	1.6990	1.2582	2.6670	0.95684
	12.000	28.225	2.4226	1.3134	2.5222	0.95846		12.000	27.909	2.4507	1.8583	1.3188	2.5605	0.93048
	14.000	30.181	2.7592	1.3767	2.4165	0.93300		14.000	29.863	2.7952	2.0206	1.3834	2.4528	0.89766
	16.000	32.238	3.1273	1.4443	2.3092	0.90123		16.000	31.915	3.1723	2.1842	1.4524	2.3437	0.85914
	18.000	34.398	3.5279	1.5163	2.2003	0.86382		18.000	34.071	3.5828	2.3476	1.5261	2.2329	0.81591
	20.000	36.668	3.9617	1.5933	2.0895	0.82172		20.000	36.335	4.0273	2.5095	1.6048	2.1205	0.76919
	22.000	39.061	4.4302	1.6753	1.9767	0.77603		22.000	38.718	4.5073	2.6690	1.6888	2.0061	0.72014
	24.000	41.594	4.9349	1.7629	1.8613	0.72789		24.000	43.238	5.0245	2.8252	1.7784	1.8893	0.66984
	26.000	44.296	5.4793	1.8567	1.7427	0.68280		26.000	46.810	5.5816	2.9780	1.8743	1.7695	0.61919
								28.000	49.994	6.1840	3.1274	1.9774	1.6454	0.56880
								30.000	53.651	6.8427	3.2747	2.0895	1.5144	0.51885
								32.000	58.350	7.5832	3.4233	2.2152	1.3711	0.46873
								34.000	65.428	8.4906	3.5846	2.3686	1.1976	0.41516
								35.327	74.475	9.7141	3.7727	2.5748	0.9585	0.35463
								34.000	79.475	10.5657	3.8872	2.7181	0.7791	0.30560
								32.000	86.526	10.9242	3.9320	2.7783	0.6967	0.29812
							30.000	91.131	11.1314	3.9570	2.8131	0.6461	0.29310	
							28.000	98.657	11.2746	3.9739	2.8372	0.6096	0.28942	
							26.000	11.3814	11.3814	3.9864	2.8551	0.5812	0.28660	
							24.000	80.646	11.4644	3.9959	2.8690	0.5585	0.28366	

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
3.20	22.000	81.694	11.5307	4.0035	2.8802	0.5398	0.28438	3.30	2.000	19.009	1.1812	1.1262	1.0489	3.1858	0.99953
	20.000	82.649	11.5844	4.0096	2.8892	0.5243	0.28260		4.000	20.475	1.3880	1.2626	1.0993	3.0748	0.99642
	18.000	83.533	11.6285	4.0146	2.8966	0.5113	0.28115		6.000	22.039	1.6222	1.4082	1.1520	2.9653	0.98858
	16.000	84.363	11.6647	4.0187	2.9026	0.5004	0.27986		8.000	23.699	1.8859	1.5617	1.2076	2.8563	0.97453
	14.000	85.147	11.6945	4.0220	2.9076	0.4913	0.27899		10.000	25.457	2.1807	1.7216	1.2666	2.7468	0.95347
	12.000	85.897	11.7188	4.0247	2.9117	0.4837	0.27820		12.000	27.310	2.5078	1.8861	1.3296	2.6364	0.92526
	10.000	86.619	11.7385	4.0269	2.9150	0.4776	0.27757		14.000	29.261	2.8688	2.0536	1.3970	2.5248	0.89031
	8.000	87.320	11.7539	4.0286	2.9176	0.4727	0.27707		16.000	31.308	3.2640	2.2219	1.4690	2.4118	0.84954
	6.000	88.003	11.7655	4.0299	2.9196	0.4690	0.27669		18.000	33.456	3.6947	2.3898	1.5460	2.2974	0.80409
	4.000	88.675	11.7736	4.0308	2.9209	0.4664	0.27643		20.000	35.710	4.1617	2.5557	1.6284	2.1813	0.75527
2.000	89.340		4.0313	2.9217	0.4649	0.27628		22.000	38.077	4.6655	2.7184	1.7163	2.0636	0.70444	
								24.000	40.573	5.2081	2.8773	1.8101	1.9439	0.65272	
								26.000	43.222	5.7918	3.0318	1.9103	1.8215	0.60108	
3.25	2.000	19.293	1.1244	1.1244	1.0482	3.1380	0.99955	3.30	2.000	19.009	1.1812	1.1262	1.0489	3.1858	0.99953
	4.000	20.762	1.3818	1.2586	1.0979	3.0290	0.99656		4.000	20.475	1.3880	1.2626	1.0993	3.0748	0.99642
	6.000	22.328	1.6119	1.4019	1.1498	2.9215	0.98902		6.000	22.039	1.6222	1.4082	1.1520	2.9653	0.98858
	8.000	23.990	1.8704	1.5530	1.2044	2.8145	0.97549		8.000	23.699	1.8859	1.5617	1.2076	2.8563	0.97453
	10.000	25.749	2.1590	1.7103	1.2624	2.7070	0.95518		10.000	25.457	2.1807	1.7216	1.2666	2.7468	0.95347
	12.000	27.604	2.4791	1.8722	1.3242	2.5986	0.92789		12.000	27.310	2.5078	1.8861	1.3296	2.6364	0.92526
	14.000	29.556	2.8318	2.0370	1.3901	2.4889	0.89402		14.000	29.261	2.8688	2.0536	1.3970	2.5248	0.89031
	16.000	31.606	3.2179	2.2030	1.4607	2.3779	0.85437		16.000	31.308	3.2640	2.2219	1.4690	2.4118	0.84954
	18.000	33.757	3.6384	2.3687	1.5360	2.2653	0.81004		18.000	33.456	3.6947	2.3898	1.5460	2.2974	0.80409
	20.000	36.016	4.0940	2.5326	1.6165	2.1511	0.76227		20.000	35.710	4.1617	2.5557	1.6284	2.1813	0.75527
								22.000	38.077	4.6655	2.7184	1.7163	2.0636	0.70444	
								24.000	40.573	5.2081	2.8773	1.8101	1.9439	0.65272	
								26.000	43.222	5.7918	3.0318	1.9103	1.8215	0.60108	
								28.000	46.062	6.4212	3.1822	2.0178	1.6955	0.55020	
								30.000	49.163	7.1057	3.3294	2.1342	1.5638	0.50034	
								32.000	52.667	7.8658	3.4758	2.2630	1.4218	0.45116	
								34.000	56.963	8.7622	3.6291	2.4144	1.2575	0.40064	
								35.882	65.518	10.3564	3.8602	2.6829	0.9606	0.32741	
								34.000	72.501	11.3896	3.9873	2.8565	0.7502	0.28914	
								32.000	75.148	11.7036	4.0230	2.9092	0.6797	0.27869	
								30.000	77.029	11.8983	4.0445	2.9418	0.6336	0.27247	
								28.000	78.535	12.0364	4.0595	2.9650	0.5993	0.26817	
								26.000	79.812	12.1408	4.0706	2.9825	0.5725	0.26497	
								24.000	80.932	12.2227	4.0793	2.9963	0.5507	0.26251	
								22.000	81.938	12.2884	4.0862	3.0073	0.5328	0.26055	
								20.000	82.859	12.3420	4.0918	3.0163	0.5178	0.25896	
								18.000	83.714	12.3860	4.0964	3.0236	0.5052	0.25767	
								16.000	84.517	12.4223	4.1001	3.0297	0.4946	0.25662	
								14.000	85.278	12.4523	4.1032	3.0348	0.4858	0.25575	
								12.000	86.007	12.4767	4.1057	3.0389	0.4785	0.25504	
								10.000	86.708	12.4964	4.1077	3.0422	0.4725	0.25448	
								8.000	87.390	12.5120	4.1093	3.0448	0.4677	0.25403	
								6.000	88.056	12.5237	4.1105	3.0467	0.4641	0.25369	
								4.000	88.710	12.5319	4.1114	3.0481	0.4616	0.25346	
								2.000	89.357	12.5367	4.1119	3.0489	0.4601	0.25332	
								3.35	2.000	18.734	1.1839	1.1280	1.0496	3.2336	0.99951
									4.000	20.197	1.3940	1.2664	1.1007	3.1206	0.99628
									6.000	21.759	1.6326	1.4144	1.1543	3.0090	0.98812
									8.000	23.418	1.9015	1.5704	1.2108	2.8980	0.97354
									10.000	25.175	2.2025	1.7330	1.2709	2.7865	0.95172
									12.000	27.028	2.5370	1.9002	1.3351	2.6741	0.92257
									14.000	28.976	2.9061	2.0701	1.4038	2.5604	0.88654
									16.000	31.022	3.3109	2.2410	1.4774	2.4454	0.84462
									18.000	33.167	3.7520	2.4110	1.5562	2.3290	0.79804
									20.000	35.416	4.2303	2.5788	1.6404	2.2112	0.74822
									22.000	37.776	4.7466	2.7431	1.7303	2.0917	0.69650

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{p_2}{p_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{p_{02}}{p_{01}}$	M_1	θ	β	$\frac{p_2}{p_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{p_{02}}{p_{01}}$
3.60	20.000	34.110	4.5883	2.6945	1.7029	2.3552	0.71207	3.65	37.513	65.808	12.7662	4.1349	3.0874	0.9668	0.24688
	22.000	36.448	5.1699	2.8666	1.8035	2.2267	0.65625		36.000	72.054	13.9006	4.2413	3.2775	0.7684	0.21810
	24.000	38.898	5.7953	3.0327	1.9109	2.0973	0.60079		34.000	74.894	14.3206	4.2776	3.3478	0.6877	0.20859
	26.000	41.478	6.4663	3.1924	2.0255	1.9664	0.54674		32.000	76.827	14.5690	4.2984	3.3894	0.6371	0.20324
	28.000	44.215	7.1862	3.3457	2.1479	1.8335	0.49483		30.000	78.345	14.7420	4.3126	3.4183	0.6000	0.19962
	30.000	47.153	7.9610	3.4930	2.2791	1.6971	0.44543		28.000	79.617	14.8713	4.3231	3.4400	0.5712	0.19697
	32.000	50.376	8.8038	3.6357	2.4215	1.5547	0.39847		26.000	80.723	14.9723	4.3311	3.4569	0.5480	0.19493
	34.000	54.066	9.7460	3.7772	2.5802	1.4002	0.35321		24.000	81.712	15.0533	4.3376	3.4705	0.5287	0.19332
	36.000	58.793	10.8943	3.9283	2.7733	1.2149	0.30670		22.000	82.610	15.1191	4.3427	3.4815	0.5127	0.19202
	37.306	65.769	12.4065	4.0985	3.0271	0.9660	0.25708		20.000	83.440	15.1734	4.3470	3.4906	0.4992	0.19096
	36.000	71.617	13.4496	4.2005	3.2019	0.7805	0.22897		18.000	84.215	15.2184	4.3505	3.4981	0.4877	0.19009
	34.000	74.634	13.8916	4.2405	3.2760	0.6945	0.21831		16.000	84.947	15.2557	4.3534	3.5043	0.4781	0.18937
	32.000	76.633	14.1452	4.2626	3.3184	0.6420	0.21249		14.000	85.644	15.2866	4.3558	3.5095	0.4699	0.18878
	30.000	78.190	14.3199	4.2776	3.3477	0.6041	0.20861		12.000	86.313	15.3120	4.3577	3.5137	0.4632	0.18829
	28.000	79.487	14.4500	4.2885	3.3695	0.5746	0.20578		10.000	86.959	15.3325	4.3593	3.5172	0.4576	0.18790
	26.000	80.614	14.5512	4.2969	3.3864	0.5510	0.20362		8.000	87.587	15.3487	4.3606	3.5199	0.4532	0.18759
	24.000	81.617	14.6320	4.3036	3.3999	0.5315	0.20191		6.000	88.201	15.3609	4.3615	3.5219	0.4499	0.18736
	22.000	82.528	14.6976	4.3090	3.4109	0.5152	0.20054		4.000	88.807	15.3695	4.3622	3.5234	0.4475	0.18720
20.000	83.369	14.7517	4.3134	3.4200	0.5015	0.19942		2.000	89.405	15.3746	4.3625	3.5242	0.4461	0.18710	
18.000	84.154	14.7965	4.3170	3.4275	0.4899	0.19849									
16.000	84.894	14.8336	4.3200	3.4337	0.4801	0.19774									
14.000	85.599	14.8643	4.3225	3.4388	0.4719	0.19711		3.70	2.000	17.027	1.2029	1.1408	1.0544	0.99936	
12.000	86.275	14.8895	4.3245	3.4430	0.4651	0.19660		4.000	18.478	18.478	1.4377	1.2942	1.1108	3.5674	0.99515
10.000	86.928	14.9099	4.3262	3.4465	0.4595	0.19619		6.000	20.032	20.032	1.7073	1.4589	1.17289	3.4388	0.99151
8.000	87.562	14.9260	4.3274	3.4491	0.4551	0.19586		8.000	21.688	21.688	2.0146	1.6330	1.2337	3.3121	0.98461
6.000	88.184	14.9381	4.3284	3.4512	0.4517	0.19562		10.000	23.444	23.444	2.3615	1.8141	1.3017	3.1858	0.96594
4.000	88.794	14.9466	4.3291	3.4526	0.4493	0.19545		12.000	25.297	25.297	2.7496	1.9998	1.3749	3.0591	0.93840
2.000	89.398	14.9517	4.3295	3.4534	0.4479	0.19535		14.000	27.246	27.246	3.1808	2.1877	1.4539	2.9315	0.90218
								16.000	29.287	29.287	3.6554	2.4751	1.5391	2.8026	0.85825
								18.000	31.423	31.423	4.1745	2.8600	1.6306	2.6728	0.80824
								20.000	33.653	33.653	4.7382	3.3474	1.7382	2.5420	0.75395
								22.000	35.985	35.985	5.3474	3.8406	1.8341	2.4105	0.69731
								24.000	38.426	38.426	6.0027	4.3474	1.9341	2.2783	0.64001
								26.000	40.991	40.991	6.7053	4.8602	2.0464	2.1453	0.58349
								28.000	43.704	43.704	7.4580	5.3893	2.1662	2.0114	0.52883
								30.000	46.605	46.605	8.2664	5.9367	2.2940	1.8758	0.47677
								32.000	49.768	49.768	9.1422	6.5067	2.4307	1.7375	0.42765
								34.000	53.344	53.344	10.1123	7.1022	2.5748	1.5940	0.38140
								36.000	57.760	57.760	11.2596	7.7310	2.7261	1.4404	0.33742
								37.713	65.847	65.847	13.1309	8.3921	2.8946	1.2623	0.29362
								36.000	72.443	72.443	14.3517	9.0721	3.0710	0.9675	0.23710
								34.000	77.009	77.009	14.7539	9.7713	3.2502	0.7577	0.20791
								32.000	80.828	80.828	15.1693	10.4822	3.4303	0.6814	0.19937
								30.000	84.922	84.922	15.5983	11.2135	3.6122	0.6324	0.19442
								28.000	89.300	89.300	16.0422	11.9611	3.7979	0.5962	0.19104
								26.000	93.990	93.990	16.4999	12.7243	3.9879	0.5680	0.18855
								32.000	100.000	100.000	16.9746	13.5022	4.1705	0.5451	0.18664
								34.000	107.222	107.222	17.4629	14.2922	4.3529	0.5261	0.18512
								36.000	115.777	115.777	17.9633	15.0922	4.5369	0.5103	0.18389

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{P_2}{P_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
3.70	20.000	83.507	15.6008	3.5621	0.4969	0.18289	3.75	2.000	89.416	16.2379	4.4261	3.6687	0.4428	0.17169
	18.000	84.274	15.6460	3.5696	0.4856	0.18206								
	16.000	84.998	15.6836	3.5759	0.4760	0.18138								
	14.000	85.687	15.7147	3.5811	0.4680	0.18082	3.80	2.000	16.600	1.2083	1.1445	1.0558	3.6624	0.99931
	12.000	86.348	15.7402	3.5854	0.4613	0.18035		4.000	18.048	1.4503	1.3022	1.1137	3.5291	0.99479
	10.000	86.988	15.7609	3.5899	0.4558	0.17998		6.000	19.602	1.7294	1.4718	1.1750	3.3978	0.98349
	8.000	87.610	15.7772	3.5916	0.4515	0.17969		8.000	21.258	2.0480	1.6511	1.2404	3.2669	0.96355
	6.000	88.219	15.7896	3.5937	0.4481	0.17947		10.000	23.016	2.4088	1.8377	1.3108	3.1354	0.93423
	4.000	88.817	15.7982	3.5951	0.4458	0.17932		12.000	24.872	2.8134	2.0288	1.3867	3.0031	0.89586
	2.000	89.411	15.8033	3.5960	0.4444	0.17922		14.000	26.821	3.2631	2.2216	1.4688	2.8697	0.84963
3.75	2.000	16.810	1.2055	1.0551	3.6149	0.99933	18.000	28.864	3.7592	2.4137	2.4137	1.5575	2.7353	0.79728
	4.000	18.260	1.4440	1.1123	3.4840	0.99497	20.000	31.000	4.3021	2.6026	2.6026	1.6530	2.6001	0.74088
	6.000	19.814	1.7184	1.1727	3.3550	0.98405	22.000	33.229	4.8923	2.7867	2.7867	1.7556	2.4644	0.68241
	8.000	21.470	2.0312	1.2370	3.2264	0.96476	24.000	35.556	5.5299	2.9644	2.9644	1.8654	2.3283	0.62373
	10.000	23.227	2.3849	1.3062	3.0974	0.93634	26.000	37.989	6.2157	3.1348	3.1348	1.9828	2.1919	0.56627
	12.000	25.081	2.7813	1.3808	2.9674	0.89905	28.000	40.542	6.9510	3.2975	3.2975	2.1080	2.0548	0.51113
	14.000	27.030	3.2217	1.4614	2.8363	0.85397	30.000	43.234	7.7378	3.4523	3.4523	2.2414	1.9166	0.45902
	16.000	29.072	3.7069	1.5482	2.7042	0.80280	32.000	46.105	8.5816	3.5997	3.5997	2.3840	1.7761	0.41022
	18.000	31.207	4.2379	1.6417	2.5712	0.74744	34.000	49.218	9.4923	3.7408	3.7408	2.5375	1.6313	0.36471
	20.000	33.438	4.8148	1.7422	2.4376	0.68987	36.000	52.702	10.4940	3.8780	3.8780	2.7060	1.4778	0.32194
37.906	22.000	35.767	5.4382	1.8497	2.3034	0.63185	38.092	56.894	11.6543	4.0175	4.0175	2.9009	1.3044	0.28030
	24.000	38.204	6.1086	1.9645	2.1688	0.57486	38.000	64.192	13.4871	4.2039	4.2039	3.2082	1.0293	0.22804
	26.000	40.762	6.8272	2.0869	2.0333	0.51996	38.000	65.921	13.8756	4.2390	4.2390	3.2733	0.9690	0.21868
	28.000	43.464	7.5969	2.2175	1.8964	0.46786	36.000	73.114	15.2586	4.3536	4.3536	3.3921	0.9133	0.21066
	30.000	46.350	8.4228	2.3572	1.7570	0.41888	34.000	75.572	15.6341	4.3822	4.3822	3.5048	0.7394	0.18932
	32.000	49.486	9.3159	2.5078	1.6129	0.37300	32.000	77.342	15.8710	4.3997	4.3997	3.6073	0.6701	0.18228
	34.000	53.014	10.3013	2.6736	1.4594	0.32964	30.000	78.762	16.0402	4.4120	4.4120	3.6356	0.5892	0.17506
	36.000	57.310	11.4538	2.8672	1.2839	0.28696	28.000	79.967	16.1687	4.4212	4.4212	3.6571	0.5619	0.17286
	37.906	65.884	13.5007	3.2105	1.0961	0.22770	26.000	81.022	16.2697	4.4284	4.4284	3.6740	0.5397	0.17116
	34.000	72.794	14.8041	3.4287	0.9683	0.19834	24.000	81.969	16.3512	4.4341	4.4341	3.6876	0.5213	0.16980
32.000	36.000	75.361	15.1917	3.4936	0.8755	0.19061	22.000	82.833	16.4178	4.4387	4.4387	3.6988	0.5058	0.16870
	32.000	77.180	15.4318	3.5338	0.6280	0.18602	20.000	83.634	16.4729	4.4426	4.4426	3.7080	0.4927	0.16706
	30.000	78.631	15.6021	3.5623	0.5926	0.18286	18.000	84.383	16.5186	4.4457	4.4457	3.7156	0.4816	0.16644
	28.000	79.856	15.7307	3.5838	0.5649	0.18053	16.000	85.092	16.5672	4.4484	4.4484	3.7220	0.4723	0.16644
	26.000	80.927	15.8316	3.6007	0.5423	0.17872	14.000	85.767	16.5882	4.4505	4.4505	3.7273	0.4644	0.16594
	24.000	81.887	15.9128	3.6143	0.5237	0.17728	12.000	86.415	16.6141	4.4523	4.4523	3.7316	0.4578	0.16552
	22.000	82.782	15.9792	3.6254	0.5080	0.17612	10.000	87.043	16.6352	4.4537	4.4537	3.7351	0.4524	0.16518
	20.000	83.572	16.0339	3.6294	0.4948	0.17517	8.000	87.653	16.6518	4.4549	4.4549	3.7379	0.4481	0.16492
	18.000	84.330	16.0794	3.6422	0.4836	0.17439	6.000	88.251	16.6643	4.4557	4.4557	3.7400	0.4448	0.16472
	16.000	85.045	16.1172	3.6485	0.4741	0.17374	4.000	88.839	16.6731	4.4563	4.4563	3.7414	0.4426	0.16458
14.000	85.727	16.1485	3.6537	0.4662	0.17321	2.000	89.421	16.6783	4.4567	4.4567	3.7423	0.4412	0.16450	
12.000	12.000	86.382	16.1743	3.6580	0.4595	0.17277								
	10.000	87.016	16.1951	3.6615	0.4541	0.17242	3.85	2.000	16.395	1.2110	1.1463	1.0564	3.7099	0.99928
	8.000	87.632	16.2116	3.6643	0.4498	0.17214	4.000	4.000	17.843	1.4568	1.3063	1.1152	3.5741	0.99460
	6.000	88.235	16.2240	3.6663	0.4465	0.17193	6.000	6.000	19.396	1.7405	1.4783	1.1773	3.4404	0.98291
	4.000	88.829	16.2327	3.6678	0.4441	0.17178	8.000	8.000	21.053	2.0650	1.6603	1.2438	3.3071	0.96231

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
3.85	10.000	22.812	2.4328	1.8495	1.3153	3.1734	0.93209	3.90	24.000	37.584	6.4345	3.1853	2.0201	2.2371	0.54918
	12.000	24.668	2.8456	2.0432	1.3927	3.0386	0.89264		26.000	40.126	7.2035	3.3492	2.1508	2.0968	0.49366
	14.000	26.619	3.3050	2.2386	1.4764	2.9028	0.84523		28.000	42.802	8.0258	3.5046	2.2901	1.9558	0.44158
	16.000	28.664	3.8121	2.4330	1.5668	2.7661	0.79172		30.000	45.646	8.9059	3.6519	2.4387	1.8131	0.39322
	18.000	30.799	4.3670	2.6239	1.6643	2.6287	0.73428		32.000	48.716	9.8536	3.7923	2.5983	1.6668	0.34848
	20.000	33.028	4.9706	2.8097	1.7691	2.4909	0.67493		34.000	52.126	10.8901	3.9278	2.7726	1.5130	0.30686
	22.000	35.353	5.6230	2.9887	1.8814	2.3529	0.61558		36.000	56.149	12.0223	4.0633	2.9710	1.3425	0.26706
	24.000	37.783	6.3245	3.1601	2.0013	2.2146	0.55770		38.000	62.087	13.6897	4.2224	3.2421	1.1106	0.22309
	26.000	40.330	7.0764	3.3234	2.1293	2.0760	0.50236		38.445	65.991	14.6407	4.3043	3.4014	0.9704	0.20173
	28.000	43.014	7.8808	3.4785	2.2656	1.9364	0.45026		38.000	69.501	15.4023	4.3647	3.5289	0.8527	0.18658
	30.000	45.871	8.7425	3.6259	2.4111	1.7948	0.40167		36.000	73.678	16.1768	4.4218	3.6584	0.7240	0.17273
	32.000	48.961	9.6715	3.7666	2.5677	1.6493	0.35654		34.000	75.956	16.5334	4.4468	3.7181	0.6600	0.16682
	34.000	52.407	10.6904	3.9030	2.7390	1.4957	0.31434		32.000	77.640	16.7653	4.4626	3.7569	0.6160	0.16313
	36.000	56.508	11.8605	4.0404	2.9355	1.3239	0.27366		30.000	79.006	16.9330	4.4738	3.7849	0.5828	0.16052
	38.000	62.939	13.5472	4.2095	3.2183	1.0767	0.22655		28.000	80.172	17.0613	4.4823	3.8064	0.5563	0.15857
	38.272	65.956	14.2556	4.2721	3.3369	0.9697	0.21003		26.000	81.199	17.1629	4.4890	3.8234	0.5347	0.15705
	36.000	68.733	14.8512	4.3214	3.4366	0.8764	0.19738		24.000	82.121	17.2449	4.4943	3.8371	0.5168	0.15583
	36.000	73.407	15.7160	4.3883	3.5814	0.7314	0.18079		22.000	82.966	17.3122	4.4986	3.8483	0.5016	0.15485
	34.000	75.770	16.0813	4.4150	3.6425	0.6649	0.17436		20.000	83.749	17.3680	4.5022	3.8576	0.4888	0.15404
	32.000	77.495	16.3155	4.4316	3.6816	0.6198	0.17039		18.000	84.483	17.4143	4.5052	3.8654	0.4780	0.15337
	30.000	78.888	16.4839	4.4433	3.7098	0.5859	0.16762		16.000	85.177	17.4529	4.5076	3.8718	0.4688	0.15281
	28.000	80.072	16.6122	4.4522	3.7313	0.5591	0.16555		14.000	85.840	17.4850	4.5097	3.8772	0.4610	0.15235
	26.000	81.112	16.7135	4.4591	3.7482	0.5372	0.16394		12.000	86.477	17.5113	4.5114	3.8816	0.4545	0.15198
	24.000	82.047	16.7952	4.4646	3.7619	0.5190	0.16266		10.000	87.093	17.5327	4.5127	3.8852	0.4492	0.15167
	22.000	82.901	16.8622	4.4691	3.7731	0.5037	0.16162		8.000	87.693	17.5496	4.5138	3.8880	0.4450	0.15143
	20.000	83.692	16.9175	4.4728	3.7823	0.4907	0.16076		6.000	88.280	17.5623	4.5146	3.8901	0.4418	0.15125
	18.000	84.434	16.9636	4.4758	3.7900	0.4798	0.16006		4.000	88.858	17.5713	4.5151	3.8916	0.4395	0.15113
	16.000	85.136	17.0019	4.4784	3.7964	0.4705	0.15947		2.000	89.430	17.5766	4.5155	3.8925	0.4382	0.15105
	14.000	85.804	17.0337	4.4805	3.8017	0.4627	0.15899								
	12.000	86.447	17.0598	4.4822	3.8061	0.4561	0.15859								
	10.000	87.068	17.0810	4.4836	3.8097	0.4508	0.15827	3.95	2.000	16.001	1.2166	1.1500	1.0578	3.8047	0.99923
	8.000	87.674	17.0978	4.4847	3.8125	0.4508	0.15802		4.000	17.447	1.4697	1.3144	1.1182	3.6641	0.99421
	6.000	88.266	17.1104	4.4855	3.8146	0.4465	0.15802		6.000	19.001	1.7630	1.4915	1.1921	3.5255	0.98171
	4.000	88.849	17.1193	4.4861	3.8161	0.4433	0.15783		8.000	20.660	2.0992	1.6786	1.2506	3.3874	0.95977
	2.000	89.426	17.1245	4.4865	3.8169	0.4410	0.15770		10.000	22.422	2.4815	1.8734	1.3246	3.2486	0.92768
						0.4397	0.15762		12.000	24.280	2.9112	2.0724	1.4048	3.1090	0.88602
						0.4561	0.15859		14.000	26.234	3.3902	2.2727	1.4917	2.9684	0.83626
						0.4508	0.15827		16.000	28.281	3.9194	2.4716	1.5858	2.8270	0.78046
						0.4465	0.15802		18.000	30.417	4.4992	2.6664	1.6874	2.6851	0.72095
						0.4433	0.15783		20.000	32.646	5.1304	2.8554	1.7967	2.5430	0.65992
						0.4410	0.15770		22.000	34.969	5.8125	3.0370	1.9139	2.4010	0.59833
						0.4397	0.15762		24.000	37.393	6.5462	3.2103	2.0391	2.2591	0.54068
						0.4561	0.15859		26.000	39.929	7.3323	3.3748	2.1727	2.1172	0.48503
						0.4508	0.15827		28.000	42.598	8.1726	3.5304	2.3149	1.9748	0.43302
						0.4465	0.15802		30.000	45.431	9.0717	3.6778	2.4666	1.8310	0.38488
						0.4433	0.15783		32.000	48.483	10.0386	3.8178	2.6294	1.6838	0.34053
						0.4410	0.15770		34.000	51.859	11.0931	3.9524	2.8067	1.5299	0.29949
						0.4397	0.15762		36.000	55.812	12.2888	4.0863	3.0073	1.3604	0.26054
						0.4561	0.15859								
						0.4508	0.15827								
						0.4465	0.15802								
						0.4433	0.15783								
						0.4410	0.15770								
						0.4397	0.15762								
						0.4561	0.15859								
						0.4508	0.15827								
						0.4465	0.15802								
						0.4433	0.15783								
						0.4410	0.15770								
						0.4397	0.15762								
3.90	2.000	16.196	1.2138	1.1482	1.0571	3.7573	0.99926								
	4.000	17.642	1.4633	1.3104	1.1167	3.6191	0.99441								
	6.000	19.196	1.7517	1.4849	1.1797	3.4830	0.98232								
	8.000	20.854	2.0821	1.6694	1.2472	3.3473	0.96105								
	10.000	22.614	2.4570	1.8614	1.3200	3.2111	0.92990								
	12.000	24.472	2.8783	2.0578	1.3987	3.0739	0.88935								
	14.000	26.424	3.3474	2.2557	1.4840	2.9357	0.84077								
	16.000	28.469	3.8655	2.4523	1.5763	2.7967	0.78611								
	18.000	30.605	4.4329	2.6452	1.6758	2.6570	0.72761								
	20.000	32.834	5.0501	2.8326	1.7828	2.5171	0.66743								
	22.000	35.157	5.7171	3.0129	1.8975	2.3771	0.60746								

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
3.95	38.000	61.406	13.8667	4.2383	3.2718	1.1389	0.21889	4.00	28.000	80.359	17.9765	4.5402	3.9594	0.5513	0.14555
	38.612	66.026	15.0309	4.3358	3.4667	0.9711	0.19376		26.000	81.359	18.0787	4.5464	3.9765	0.5302	0.14419
	38.000	70.101	15.9275	4.4038	3.6167	0.8345	0.17703		24.000	82.261	18.1615	4.5514	3.9903	0.5126	0.14310
	36.000	73.928	16.6412	4.4541	3.7361	0.7172	0.16509		22.000	83.087	18.2296	4.5555	4.0017	0.4978	0.14221
	34.000	76.131	16.9904	4.4776	3.7945	0.6554	0.15965		20.000	83.854	18.2861	4.5588	4.0111	0.4852	0.14148
	32.000	77.777	17.2203	4.4927	3.8330	0.6125	0.15620		18.000	84.574	18.3331	4.5616	4.0190	0.4746	0.14087
	30.000	79.120	17.3877	4.5035	3.8609	0.5798	0.15375		16.000	85.256	18.3723	4.5639	4.0255	0.4655	0.14037
	28.000	80.268	17.5161	4.5117	3.8824	0.5537	0.15191		14.000	85.907	18.4049	4.5659	4.0310	0.4579	0.13996
	26.000	81.281	17.6179	4.5181	3.8994	0.5324	0.15047		12.000	86.533	18.4317	4.5674	4.0355	0.4515	0.13962
	24.000	82.192	17.7003	4.5232	3.9132	0.5147	0.14932		10.000	87.139	18.4535	4.5687	4.0391	0.4463	0.13934
	22.000	83.028	17.7680	4.5274	3.9245	0.4997	0.14838		8.000	87.730	18.4707	4.5697	4.0420	0.4421	0.13912
	20.000	83.803	17.8241	4.5309	3.9339	0.4870	0.14761		6.000	88.307	18.4837	4.5705	4.0442	0.4390	0.13896
	18.000	84.529	17.8708	4.5338	3.9417	0.4762	0.14698		4.000	88.876	18.4928	4.5710	4.0457	0.4367	0.13885
	16.000	85.218	17.9097	4.5362	3.9482	0.4671	0.14645		2.000	89.439	18.4982	4.5713	4.0466	0.4354	0.13878
	14.000	85.874	17.9420	4.5381	3.9536	0.4594	0.14601								
	12.000	86.505	17.9686	4.5398	3.9581	0.4530	0.14566								
	10.000	87.116	17.9902	4.5411	3.9617	0.4477	0.14537								
	8.000	87.711	18.0072	4.5421	3.9645	0.4435	0.14514								
	6.000	88.294	18.0201	4.5429	3.9667	0.4404	0.14497								
	4.000	88.868	18.0291	4.5434	3.9682	0.4381	0.14485								
	2.000	89.435	18.0345	4.5438	3.9691	0.4368	0.14478								
4.00	2.000	15.813	1.2194	1.1519	1.0586	3.8521	0.99920								
	4.000	17.258	1.4763	1.3185	1.1196	3.7089	0.99401								
	6.000	18.812	1.7743	1.4980	1.1844	3.5679	0.98110								
	8.000	20.471	2.1166	1.6879	1.2540	3.4273	0.95845								
	10.000	22.234	2.5061	1.8853	1.3293	3.2860	0.92542								
	12.000	24.095	2.9445	2.0870	1.4109	3.1439	0.88264								
	14.000	26.050	3.4334	2.2898	1.4994	3.0009	0.83170								
	16.000	28.098	3.9741	2.4909	1.5954	2.8570	0.77474								
	18.000	30.236	4.5667	2.6877	1.6991	2.7128	0.71422								
	20.000	32.464	5.2116	2.8782	1.8107	2.5686	0.65240								
	22.000	34.786	5.9090	3.0611	1.9304	2.4246	0.59123								
	24.000	37.208	6.6592	3.2352	2.0583	2.2809	0.53224								
	26.000	39.740	7.4625	3.4002	2.1947	2.1374	0.47648								
	28.000	42.402	8.3215	3.5561	2.3401	1.9935	0.42453								
	30.000	45.224	9.2397	3.7034	2.4949	1.8485	0.37666								
	32.000	48.258	10.2259	3.8430	2.6609	1.7006	0.33272								
	34.000	51.605	11.2995	3.9768	2.8413	1.5463	0.29223								
	36.000	55.495	12.5100	4.1091	3.0444	1.3776	0.25409								
	38.000	60.827	14.0647	4.2556	3.3049	1.1637	0.21432								
	38.774	66.059	15.4261	4.3665	3.5329	0.9717	0.18613								
	38.000	70.601	16.4407	4.4403	3.7026	0.8196	0.16833								
	36.000	74.161	17.1095	4.4855	3.8144	0.7109	0.15785								
	34.000	76.297	17.4525	4.5076	3.8718	0.6511	0.15282								
	32.000	77.908	17.6808	4.5220	3.9099	0.6090	0.14959								
	30.000	79.227	17.8479	4.5324	3.9379	0.5769	0.14729								