

ENGINEERING TRIPOS PART IIB

Wednesday 25 April 2007 2.30 to 4

Module 4A3

TURBOMACHINERY I

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 are the main advantages and disadvantages of radial flow turbomachines relative to axial devices? Explain why modern jet engines tend to use exclusively axial turbomachinery. [20%]

(b) A high-pressure axial compressor for a jet engine rotates at 15000 rpm with an overall stagnation pressure ratio of 8.5. The mass flow rate of air through the compressor is 16 kg s^{-1} and the stagnation conditions at inlet are 200 kPa and 450 K. The polytropic efficiency is 91%.

(i) The mean radius is 0.24 m and this is constant throughout the compressor. Calculate the total-to-total isentropic efficiency of the compressor and show that for the stage loading to be less than 0.4 in all stages, 8 stages are required. [25%]

(ii) The compressor is designed with repeating stages and zero inlet swirl. If the inlet axial Mach number is 0.52, calculate the mean flow coefficient and sketch the velocity triangles for one stage. Show that the blade height at exit from the compressor is about 7.8 mm. [30%]

(c) In order to avoid very small blades towards the rear of the compressor, a redesign is proposed in which a single centrifugal compressor stage replaces the last four stages of the axial compressor in part (b). The centrifugal compressor stage has radial blades at impeller exit (i.e. zero backsweep) and a slip factor of 0.86. To maintain an overall stagnation pressure ratio of 8.5, the exit radius required for the impeller is found to be 0.34 m. Calculate the stagnation temperature at the exit from the centrifugal compressor stage. Use this to find the new total-to-total isentropic efficiency of the combined axial and centrifugal compressor. [25%]

Assume that the flow conditions in the axial stages upstream of the centrifugal compressor are unchanged in the redesign and that all the compressor stages are on a single shaft that rotates at 15000 rpm.

2 (a) Sketch the relationship between exit flow angle and exit Mach number for a turbine cascade. Describe what causes the exit angle to reduce for supersonic exit flow and explain why there is an upper limit to the exit Mach number that can be achieved. [15%]

(b) A turbine cascade operates in air with an inlet angle of -45° from the axial direction. The ratio of inlet stagnation pressure to exit static pressure is 2.6 and the inlet Mach number is 0.3. The stagnation pressure loss coefficient is defined as

$$Y_p = \frac{P_{01} - P_{02}}{P_{02} - P_2}$$

where P_{01} is the inlet stagnation pressure, P_{02} is the exit stagnation pressure and P_2 is the exit static pressure. If Y_p is measured to be 0.098, calculate the exit Mach number and show that the exit angle is 67.7° . It can be assumed that the blade height is constant through the cascade and that the growth of sidewall boundary layers is negligible. [30%]

(c) The opening to pitch ratio of the cascade is 0.354. For the operating point described in part (b), show that approximately two-thirds of the total loss in stagnation pressure occurs downstream of the throat. [20%]

(d) The exit static pressure from the cascade is lowered until limit load is achieved. The exit Mach number at this condition is measured to be 1.77. Given that the stagnation pressure loss upstream of the throat is unchanged, determine the new overall stagnation pressure loss coefficient for the cascade. [25%]

(e) Explain what causes the high loss at the limit load condition. Why are turbine blade rows with supersonic exit flow preferred for some applications? [10%]

(TURN OVER

3 (a) Explain the difference between the gross thrust and net thrust of an aircraft engine. Prove that, if the mass flow rate of fuel supplied to an aircraft engine is considered to be negligible compared with the inlet mass flow rate of air, the propulsive efficiency of the engine in flight can be written as

$$\eta_p = \frac{2V}{V_j + V}$$

where V is the velocity of the aircraft and V_j is the jet velocity. [20%]

(b) A future turbofan engine is to be designed for an aircraft that cruises at Mach 0.85 at a height of 10000 m. The ambient pressure is 26.5 kPa and the ambient temperature of the inlet air is 223.3 K. Show that, if the fan is designed to have a polytropic efficiency of 90% and a pressure ratio of 1.23, a propulsive efficiency of 90% can be achieved. The flow in the inlet and the exit nozzle can be considered isentropic, and the velocity of the jet from the core is set to be the same as that from the fan. [30%]

(c) The turbofan engine described in part (b) has a low-pressure turbine that powers the fan and the low-pressure compressor. The ratio of the stagnation pressure at the exit of the low-pressure compressor to stagnation pressure at the inlet of the fan is 2.5. The fan and low-pressure compressor both have a polytropic efficiency of 90%.

(i) Calculate the stagnation temperature at the low-pressure compressor exit. [10%]

(ii) In the design process it is found that the stagnation temperature difference across the low-pressure turbine ΔT_{LP} is given by $\Delta T_{LP} = 390 - 0.9\Delta T_{Noz}$ where ΔT_{Noz} is the difference between the stagnation and static temperatures in the exit jet from the core. Calculate the bypass ratio of the engine. [20%]

Take $\gamma = 1.3$ and $c_p = 1250 \text{ Jkg}^{-1}\text{K}^{-1}$ for the products of combustion.

(d) At cruise the turbofan engine described in part (b) has a drag of 2.5 kN. The mass flow rate of air into the inlet of the engine is 600 kg s^{-1} . If the drag can be considered to reduce the net thrust the engine applies to the aircraft, calculate the new propulsive efficiency. The jet velocity V_j and the velocity of the aircraft V can be assumed to be unchanged from that described in part (b). Comment on whether this bypass ratio would be chosen in practice. [20%]

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)

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

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

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

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

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

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

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

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

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

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

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

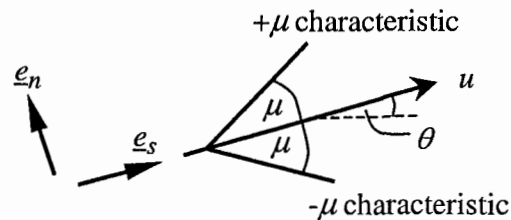
$$\frac{T_s}{T} = \frac{\gamma-1}{(\gamma+1)^2} \frac{2}{M^2} \left(1 + \frac{\gamma-1}{2} M^2 \right) \left(\frac{2\gamma}{\gamma-1} M^2 - 1 \right)$$

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

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

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

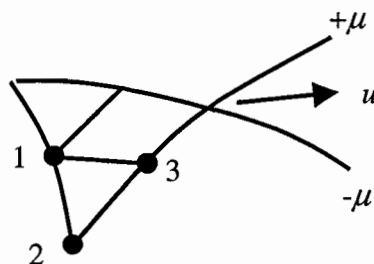
Prandtl-Meyer function

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

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

Calculations

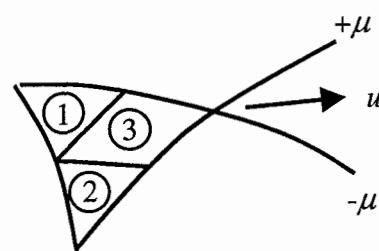
Lattice Method



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

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

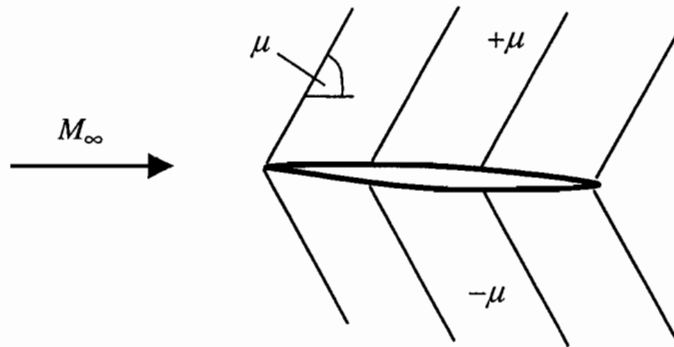
Field (or wave) method



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

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

Linearised Method of Characteristics (thin film theory)

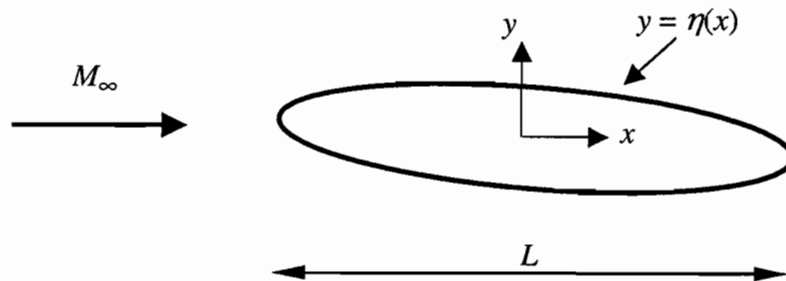


$$\mu \approx \sin^{-1}(1/M_\infty)$$

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

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

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)

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

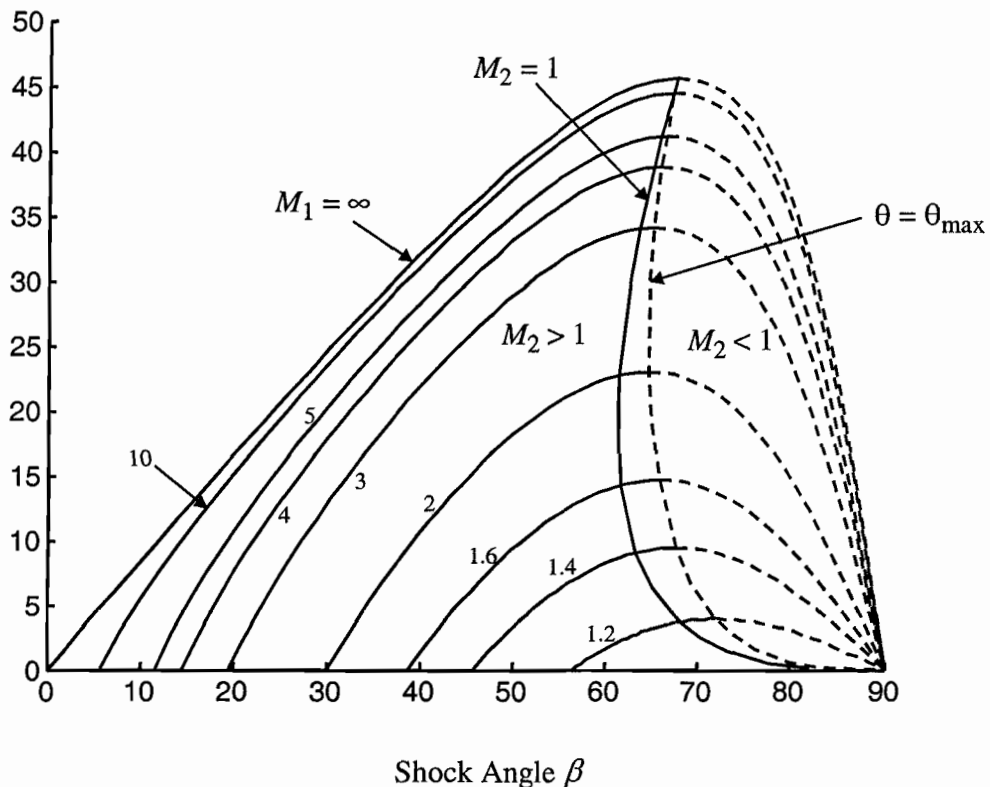
$$\frac{T_2}{T_1} = \frac{\gamma-1}{(\gamma+1)^2} \frac{2}{M_1^2 \sin^2 \beta} \left(1 + \frac{\gamma-1}{2} M_1^2 \sin^2 \beta \right) \left(\frac{2\gamma}{\gamma-1} M_1^2 \sin^2 \beta - 1 \right)$$

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

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

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

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



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

M	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$ p_0
0.010	1.0000	0.9999	1.0000	0.0063	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	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2} \frac{\rho V^2}{p_0}$	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	0.9998	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	0.9999	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	$\frac{T}{T_0}$	$\frac{P}{P_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{m\sqrt{c_p T_0}}{Ap_0}$	$\frac{m\sqrt{c_p T_0}}{Ap}$	F	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\frac{\rho V^2}{p_0}$	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	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2} \frac{\rho V^2}{P_0}$	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	4.0393	1.0394	0.1937	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	$\frac{T}{T_0}$	$\frac{P}{P_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{m\sqrt{c_p T_0}}{Ap_0}$	$\frac{m\sqrt{c_p T_0}}{Ap}$	F	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\frac{\rho V^2}{P_0}$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	v	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	$\frac{4c_f I_{\max}}{D}$	$\frac{1}{2}\rho V^2$	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	4.5468	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	$\frac{T}{T_0}$	$\frac{P}{P_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p}$	F	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	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	$\frac{T}{T_0}$	$\frac{P}{P_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m} \sqrt{c_p T_0}}{A p_0}$	$\frac{\dot{m} \sqrt{c_p T_0}}{A p}$	F	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2} \rho V^2$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	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	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2} \frac{\rho V^2}{P_0}$	M_s	$\frac{P_{0s}}{P_0}$	$\frac{P_s}{P}$	$\frac{P_{0s}}{P}$	$\frac{T_s}{T}$	ν	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	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\frac{\rho V^2}{p_0}$
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	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$ p_0
0.510	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	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{A p}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$ 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	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{\max}}{D}$	$\frac{\frac{1}{2}\rho V^2}{p_0}$
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	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	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	$\frac{P_{02}}{P_{01}}$
1.05	0.558	79.937	1.0803	1.0567	1.0223	0.9845	0.99995	1.40	8.000	75.893	1.9842	1.6163	1.2276	0.8184	0.96806
1.10	1.515	76.297	1.1658	1.1157	1.0449	0.9711	0.99963		6.000	80.485	2.0575	1.6562	1.2423	0.7762	0.96286
1.15	2.000	67.003	1.1408	1.0986	1.0384	1.0434	0.99977	1.45	2.000	46.004	1.1028	1.0723	1.0284	1.3808	0.99990
2.671	2.000	73.822	1.2565	1.1767	1.0678	0.9598	0.99879	4.000	4.000	48.679	1.2169	1.1503	1.0579	1.3091	0.99923
81.173	2.000	81.173	1.3399	1.2316	1.0880	0.9007	0.99745	6.000	6.000	51.755	1.3463	1.2357	1.0895	1.2325	0.99733
1.20	2.000	61.050	1.1197	1.0841	1.0329	1.1113	0.99985	8.000	8.000	55.517	1.5000	1.3333	1.1250	1.1460	0.99325
3.944	2.000	71.977	1.3525	1.2397	1.0910	0.9502	0.99720	10.000	10.785	61.046	1.7114	1.4613	1.1712	1.0317	0.98440
83.861	2.000	83.861	1.4941	1.3297	1.1237	0.8551	0.99344	10.000	67.097	67.097	1.9147	1.5779	1.2135	0.9235	0.97269
1.25	2.000	56.844	1.1110	1.0780	1.0306	1.1696	0.99988	10.000	72.994	72.994	2.0764	1.6664	1.2461	0.8366	0.96147
4.000	4.000	61.986	1.2541	1.1752	1.0672	1.0721	0.99882	6.000	78.197	78.197	2.1836	1.7232	1.2672	0.7777	0.95324
5.286	4.000	70.540	1.4539	1.3045	1.1146	0.9423	0.99468	4.000	81.733	81.733	2.2355	1.7501	1.2774	0.7485	0.94905
4.000	4.000	79.385	1.5944	1.3913	1.1459	0.8525	0.98975	4.000	84.702	84.702	2.2653	1.7654	1.2832	0.7316	0.94659
2.000	2.000	85.211	1.6435	1.4210	1.1566	0.8209	0.98763	2.000	87.406	87.406	2.2812	1.7736	1.2862	0.7225	0.94526
1.30	2.000	53.474	1.1065	1.0749	1.0294	1.2244	0.99989	1.50	2.000	44.065	1.1030	1.0725	1.0284	1.4316	0.99990
4.000	4.000	57.423	1.2334	1.1613	1.0621	1.1398	0.99906	4.000	46.543	46.543	1.2165	1.1500	1.0578	1.3615	0.99923
6.000	6.000	63.459	1.4113	1.2775	1.1048	1.0274	0.99585	6.000	49.326	49.326	1.3433	1.2337	1.0888	1.2879	0.99739
6.662	6.662	69.395	1.5608	1.3709	1.1386	0.9359	0.99108	8.000	52.571	52.571	1.4887	1.3263	1.1224	1.2079	0.99362
6.000	6.000	75.372	1.6793	1.4423	1.1643	0.8636	0.98598	10.000	56.679	56.679	1.6662	1.4345	1.1615	1.144	0.98660
4.000	4.000	81.649	1.7634	1.4917	1.1822	0.8118	0.98169	12.000	64.359	64.359	1.9668	1.6068	1.2241	0.9607	0.96925
2.000	2.000	86.058	1.7957	1.5103	1.1889	0.7918	0.97990	12.000	66.790	66.790	2.1147	1.6869	1.2537	0.8849	0.95385
1.35	2.000	50.634	1.1042	1.0733	1.0287	1.2774	0.99990	10.000	75.995	75.995	2.3046	1.7855	1.2908	0.7854	0.94329
4.000	4.000	53.965	1.2238	1.1549	1.0596	1.1994	0.99916	8.000	82.662	82.662	2.4155	1.8410	1.3042	0.7476	0.93725
6.000	6.000	58.232	1.3702	1.2512	1.0952	1.1089	0.99682	6.000	85.256	85.256	2.4404	1.8533	1.3168	0.7112	0.93141
8.000	8.000	66.914	1.6327	1.4145	1.1543	0.9543	0.98812	4.000	87.668	87.668	2.4540	1.8599	1.3194	0.7035	0.93018
8.048	8.048	68.470	1.6732	1.4387	1.1630	0.9307	0.98627	2.000	42.315	42.315	1.1036	1.0729	1.0286	1.4821	0.99990
8.000	8.000	70.023	1.7114	1.4613	1.1712	0.9085	0.98440	4.000	44.642	44.642	1.2173	1.1505	1.0580	1.4130	0.99923
6.000	6.000	78.660	1.8774	1.5569	1.2058	0.8111	0.97506	6.000	47.214	47.214	1.3430	1.2336	1.0887	1.3414	0.99739
4.000	4.000	83.028	1.9283	1.5854	1.2163	0.7807	0.97182	8.000	50.131	50.131	1.4845	1.3236	1.1215	1.2651	0.99375
2.000	2.000	86.644	1.9523	1.5988	1.2211	0.7662	0.97023	10.000	53.598	53.598	1.6491	1.4243	1.1578	1.1804	0.98738
1.40	2.000	48.173	1.1030	1.0725	1.0284	1.3295	0.99990	12.000	58.240	58.240	1.8597	1.5469	1.2022	1.0758	0.97615
4.000	4.000	51.117	1.2189	1.1516	1.0584	1.2533	0.99921	13.403	66.171	66.171	2.1787	1.7206	1.2663	0.9198	0.95362
6.000	6.000	54.633	1.3539	1.2406	1.0913	1.1737	0.99715	12.000	73.688	73.688	2.4151	1.8408	1.3120	0.8014	0.93367
8.000	8.000	59.367	1.5263	1.3496	1.1309	1.0744	0.99235	10.000	77.804	77.804	2.5112	1.8877	1.3302	0.7515	0.92496
9.427	9.427	67.716	1.7912	1.5077	1.1880	0.9266	0.98016	8.000	80.825	80.825	2.5650	1.9136	1.3404	0.7229	0.91995
								6.000	83.385	83.385	2.5991	1.9298	1.3468	0.7045	0.91673
								4.000	85.699	85.699	2.6205	1.9399	1.3508	0.6928	0.91470
								2.000	87.879	87.879	2.6324	1.9455	1.3531	0.6862	0.91356

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	$\frac{P_{02}}{P_{01}}$
1.60	2.000	40.724	1.1046	1.0736	1.0289	1.5323	0.99990	1.70	6.000	84.848	3.1778	2.1865	1.4534	0.6547	0.85856
	4.000	42.931	1.2189	1.1516	1.0584	1.4638	0.99921		4.000	86.619	3.1933	2.1929	1.4562	0.6467	0.85695
	6.000	45.344	1.3446	1.2346	1.0891	1.3934	0.99736		2.000	88.325	3.2021	2.1965	1.4578	0.6421	0.85602
	8.000	48.030	1.4843	1.3236	1.1215	1.3195	0.99376								
	10.000	51.116	1.6430	1.4207	1.1565	1.2397	0.98766								
	12.000	54.889	1.8320	1.5311	1.1965	1.1483	0.97781		1.75	2.000	36.689	1.1087	1.0765	1.0300	0.99989
	14.000	60.537	2.0974	1.6777	1.2502	1.0232	0.95990		4.000	38.651	1.2271	1.2271	1.1571	1.0605	0.99915
	14.652	65.828	2.3192	1.7929	1.2936	0.9188	0.94204		6.000	40.756	1.3561	1.3561	1.2421	1.0918	0.99713
	14.000	70.895	2.5000	1.8824	1.3281	0.8320	0.92598		8.000	43.034	1.4973	1.4973	1.3317	1.1244	0.99334
	12.000	75.900	2.6428	1.9504	1.3550	0.7611	0.91256		10.000	45.531	1.6529	1.6529	1.4266	1.1586	0.98721
10.000	79.102	2.7132	1.9831	1.3682	0.7018	0.90574		12.000	48.319	1.8263	1.8263	1.5279	1.1953	0.97814	
8.000	81.691	2.7576	2.0035	1.3764	0.6502	0.90139		14.000	51.547	2.0245	2.0245	1.6384	1.2357	0.96524	
6.000	83.967	2.7870	2.0168	1.3819	0.6062	0.89848		16.000	55.589	2.2652	2.2652	1.7654	1.2831	0.94660	
4.000	86.061	2.8059	2.0254	1.3854	0.5676	0.89660		18.000	62.944	2.6670	2.6670	1.9617	1.3595	0.91023	
2.000	88.054	2.8166	2.0302	1.3873	0.5302	0.89554		18.121	65.134	2.7745	2.7745	2.0112	1.3795	0.89972	
								18.000	67.269	2.8728	2.8728	2.0554	1.3977	0.89991	
								16.000	73.757	3.1267	3.1267	2.1651	1.4441	0.86389	
1.65	2.000	39.267	1.1058	1.0744	1.0292	1.5823	0.99990		12.000	76.988	3.2251	2.2060	1.4620	0.7175	0.85362
4.000	41.377	1.2212	1.1531	1.0590	1.5140	1.49919	0.99919		10.000	79.465	3.2858	2.2312	1.4731	0.6878	0.84714
6.000	43.665	1.3475	1.2365	1.0898	1.4444	1.4444	0.99730		8.000	81.570	3.3295	2.2484	1.4808	0.6669	0.84266
8.000	46.181	1.4869	1.3252	1.1221	1.3720	1.3720	0.99367		8.000	83.451	3.3598	2.2606	1.4862	0.6518	0.83947
10.000	49.007	1.6429	1.4206	1.1565	1.2952	1.2952	0.98766		6.000	85.190	3.3811	2.2691	1.4901	0.6409	0.83722
12.000	52.312	1.8224	1.5257	1.1945	1.2104	1.2104	0.97837		4.000	86.838	3.3954	2.2748	1.4926	0.6337	0.83571
14.000	56.541	2.0441	1.6490	1.2396	1.1090	1.1090	0.96384		2.000	88.432	3.4036	2.2780	1.4941	0.6295	0.83485
15.855	65.547	2.4653	1.8655	1.3215	0.9184	0.92915	0.92915								
14.000	73.864	2.7642	2.0065	1.3776	0.7782	0.90073	0.90073								
12.000	77.411	2.8587	2.0491	1.3951	0.7317	0.89132	0.89132	1.80	2.000	35.538	1.1104	1.0776	1.0304	0.99988	
10.000	80.102	2.9157	2.0744	1.4056	0.7029	0.88557	0.88557	4.000	37.444	37.444	1.2306	1.1594	1.0613	1.6624	0.99909
8.000	82.389	2.9539	2.0911	1.4126	0.6833	0.88169	0.88169	6.000	39.481	39.481	1.3615	1.2455	1.0931	1.5932	0.99701
6.000	84.446	2.9798	2.1024	1.4174	0.6697	0.87904	0.87904	8.000	41.673	41.673	1.5044	1.3360	1.1260	1.5225	0.99310
4.000	86.364	2.9968	2.1097	1.4205	0.6607	0.87730	0.87730	10.000	44.057	44.057	1.6611	1.4315	1.1604	1.4494	0.98683
2.000	88.200	3.0065	2.1139	1.4222	0.6556	0.87631	0.87631	12.000	46.686	46.686	1.8345	1.5326	1.1970	1.3725	0.97766
								14.000	49.661	49.661	2.0295	1.6411	1.2367	1.2896	0.96489
								16.000	53.198	53.198	2.2568	1.7611	1.2815	1.1958	0.94729
1.70	2.000	37.927	1.1072	1.0754	1.0295	1.6320	0.99989		18.000	57.995	2.5516	1.9072	1.3379	1.0766	0.92120
4.000	39.957	1.2239	1.1550	1.0597	1.5638	1.5638	0.99916		19.183	64.987	2.9376	2.0839	1.4096	0.9195	0.88335
6.000	42.145	1.3514	1.2390	1.0907	1.4946	1.4946	0.99722		18.000	71.424	3.2297	2.2079	1.4628	0.7956	0.85313
8.000	44.528	1.4914	1.3280	1.1231	1.4232	1.4232	0.99353		16.000	75.324	3.3707	2.2650	1.4882	0.7327	0.83832
10.000	47.167	1.6466	1.4228	1.1573	1.3482	1.3482	0.98750		14.000	78.020	3.4505	2.2965	1.5025	0.6958	0.82990
12.000	50.168	1.8216	1.5252	1.1943	1.2674	1.2674	0.97841		12.000	80.214	3.5041	2.3174	1.5121	0.6703	0.82423
14.000	53.771	2.0273	1.6399	1.2362	1.1757	1.1757	0.96504		10.000	82.128	3.5424	2.3322	1.5189	0.6518	0.82018
16.000	58.794	2.2999	1.7831	1.2898	1.0569	1.0569	0.94369		8.000	83.865	3.5702	2.3503	1.5239	0.6381	0.81725
17.012	65.319	2.6171	1.9383	1.3502	0.9185	0.9185	0.91502		6.000	85.485	3.5899	2.3628	1.5274	0.6283	0.81516
16.000	71.426	2.8629	2.0510	1.3959	0.8077	0.8077	0.89090		4.000	87.028	3.6032	2.3554	1.5298	0.6216	0.81376
14.000	75.670	2.9984	2.1104	1.4208	0.7439	0.7439	0.87713		2.000	88.525	3.6108	2.3583	1.5311	0.6178	0.81295
12.000	78.555	3.0722	2.1421	1.4342	0.7080	0.7080	0.86953								
10.000	80.906	3.1208	2.1626	1.4431	0.6838	0.6838	0.86450								
8.000	82.965	3.1544	2.1767	1.4492	0.6667	0.6667	0.86100								

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	$\frac{P_{02}}{P_{01}}$	
1.85	2.000	34.466	1.1121	1.0788	1.0309	1.7805	0.99988	1.95	2.000	32.528	1.1160	1.0815	1.0319	1.8790	0.99987	
	4.000	36.323	1.2343	1.1619	1.0623	1.7114	0.99905		4.000	34.304	1.2424	1.1674	1.0643	1.8085	0.99896	
	6.000	38.302	1.3672	1.2492	1.0945	1.6418	0.99689		6.000	36.191	1.3801	1.2575	1.0975	1.7380	0.99660	
	8.000	40.424	1.5123	1.3409	1.1278	1.5711	0.99284		8.000	38.204	1.5302	1.3521	1.1318	1.6666	0.99221	
	10.000	42.717	1.6709	1.4373	1.1625	1.4983	0.98638		10.000	40.360	1.6938	1.4509	1.1674	1.5938	0.98528	
	12.000	45.223	1.8453	1.5388	1.1992	1.4224	0.97701		12.000	42.688	1.8726	1.5542	1.2049	1.5185	0.97535	
	14.000	48.014	2.0395	1.6465	1.2387	1.3415	0.96417		14.000	45.230	1.6625	1.6246	1.2446	1.4396	0.96200	
	16.000	51.232	2.2607	1.7631	1.2822	1.2524	0.94697		16.000	48.059	1.2879	1.7770	1.2875	1.3553	0.94470	
	18.000	55.227	2.5275	1.8956	1.3333	1.1476	0.92345		18.000	51.320	2.5368	1.9001	1.3351	1.2622	1.2622	0.92258
	20.000	62.099	2.9519	2.0902	1.4123	0.9818	0.88189		20.000	55.381	2.8378	2.0397	1.3913	1.1520	0.89342	
	20.198	64.872	3.1062	2.1565	1.4404	0.9205	0.86601		22.000	62.860	3.3464	2.2553	1.4838	0.9655	0.84087	
	20.000	67.544	3.2437	2.2136	1.4653	0.8648	0.85167		22.092	64.716	3.4603	2.3003	1.5043	0.9229	0.82885	
	18.000	73.440	3.5019	2.3165	1.5117	0.7560	0.82446		22.000	66.523	3.5655	2.3410	1.5231	0.8829	0.81774	
	16.000	76.511	3.6090	2.3576	1.5308	0.7085	0.81314		20.000	72.926	3.8872	2.4601	1.5801	0.7555	0.78384	
	14.000	78.861	3.6772	2.3833	1.5429	0.6773	0.80593		18.000	75.964	4.0086	2.5030	1.6015	0.7045	0.77114	
	12.000	80.844	3.7252	2.4011	1.5514	0.6548	0.80088		16.000	78.253	4.0857	2.5297	1.6151	0.6710	0.76313	
	10.000	82.606	3.7601	2.4140	1.5576	0.6381	0.79719		14.000	80.165	4.1401	2.5484	1.6246	0.6467	0.75750	
	8.000	84.222	3.7858	2.4234	1.5622	0.6257	0.79449		12.000	81.849	4.1804	2.5620	1.6317	0.6283	0.75395	
	6.000	85.740	3.8042	2.4301	1.5655	0.6166	0.79255		10.000	83.381	4.2106	2.5722	1.6370	0.6142	0.75024	
	4.000	87.193	3.8167	2.4346	1.5677	0.6105	0.79124		8.000	84.808	4.2333	2.5798	1.6409	0.6036	0.74791	
2.000	88.606	3.8239	2.4373	1.5689	0.6069	0.79048		6.000	86.163	4.2497	2.5853	1.6438	0.5957	0.74623		
								4.000	87.467	4.2609	2.5890	1.6458	0.5904	0.74508		
								2.000	88.741	4.2674	2.5912	1.6469	0.5872	0.74441		
1.90	2.000	33.466	1.1140	1.0801	1.0314	1.8298	0.99987	2.00	2.000	31.647	1.1180	1.0829	1.0324	1.9280	0.99986	
	4.000	35.279	1.2382	1.1646	1.0633	1.7600	0.99901		4.000	33.390	1.2468	1.1702	1.0654	1.8568	0.99891	
	6.000	37.209	1.3735	1.2533	1.0959	1.6901	0.99675		6.000	35.241	1.3871	1.2620	1.0991	1.7856	0.99644	
	8.000	39.272	1.5209	1.3463	1.1297	1.6191	0.99254		8.000	37.210	1.5400	1.3581	1.1339	1.7138	0.99186	
	10.000	41.490	1.6818	1.4438	1.1649	1.5464	0.98586		10.000	39.314	1.7066	1.4584	1.1702	1.6405	0.98464	
	12.000	43.898	1.8582	1.5460	1.2019	1.4709	0.97624		12.000	41.575	1.8884	1.5631	1.2081	1.5651	0.97437	
	14.000	46.550	2.0530	1.6538	1.2414	1.3913	0.96319		14.000	44.029	2.0876	1.6724	1.2483	1.4866	0.96064	
	16.000	49.544	2.2718	1.7688	1.2844	1.3052	0.94605		16.000	46.731	2.3076	1.7870	1.2913	1.4034	0.94304	
	18.000	53.095	2.5263	1.8951	1.3331	1.2077	0.92356		18.000	49.785	2.5546	1.9086	1.3384	1.3131	0.92092	
	20.000	57.900	2.8557	2.0477	1.3946	1.0835	0.89162		20.000	53.423	2.8429	2.0420	1.3922	1.2102	0.89291	
	21.167	64.783	3.2805	2.2286	1.4720	0.9216	0.84781		22.000	58.457	3.2228	2.2051	1.4616	1.0760	0.85385	
	20.000	71.057	3.6012	2.3546	1.5294	0.7935	0.81397		22.000	64.669	3.6458	2.3715	1.5373	0.9243	0.80926	
	18.000	74.861	3.7578	2.4131	1.5572	0.7274	0.78178		20.000	74.270	3.9714	2.4899	1.5950	0.8017	0.77503	
	16.000	77.463	3.8466	2.4671	1.5836	0.6611	0.76114		18.000	80.684	4.2589	2.5541	1.6276	0.7278	0.75576	
	14.000	79.565	3.9068	2.4455	1.5729	0.6884	0.78810		16.000	86.862	4.3777	2.6110	1.6574	0.6558	0.73827	
	12.000	81.383	3.9504	2.4826	1.5913	0.6409	0.81397		14.000	92.257	4.4153	2.6396	1.6662	0.6168	0.72939	
	10.000	83.020	3.9828	2.4940	1.5970	0.6257	0.77383		12.000	98.700	4.4438	2.6583	1.6454	0.6854	0.74529	
	8.000	84.534	4.0068	2.5024	1.6012	0.6142	0.77133		10.000	100.000	4.4533	2.6274	1.6274	0.6337	0.73319	
	6.000	85.965	4.0241	2.5084	1.6042	0.6058	0.76953		8.000	82.257	4.3777	2.6274	1.6662	0.6337	0.73827	
	4.000	87.338	4.0359	2.5125	1.6063	0.6001	0.76830		6.000	85.052	4.4153	2.6396	1.6777	0.6168	0.72939	
2.000	88.677	4.0428	2.5149	1.6075	0.5967	0.76759		4.000	86.339	4.4533	2.6556	1.6815	0.5937	0.72436		
								2.000	87.582	4.4917	2.6640	1.6842	0.5864	0.72278		
									88.798	4.4979	2.6660	1.6871	0.5813	0.72171		
													0.5783	0.72108		

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{p_2}{p_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	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	$\frac{p_{02}}{p_{01}}$
2.20	20.00	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
	18.00	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
	16.00	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
	14.00	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
	12.00	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
	10.00	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
	8.00	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
	6.00	86.883	5.4633	2.9468	1.8540	0.5545	0.62962		26.000	71.264	5.3682	2.9212	1.8377	0.7743	0.63813
	4.00	87.938	5.4727	2.9493	1.8556	0.5503	0.62879		24.000	74.512	5.5649	2.9736	1.8714	0.7060	0.62065
	2.00	88.973	5.4782	2.9507	1.8565	0.5479	0.62830		22.000	76.770	5.6817	3.0039	1.8915	0.6635	0.61049
2.25	20.00	27.926	1.1288	1.0903	1.0353	2.1725	0.99982		18.000	80.133	5.8238	3.0399	1.9158	0.6328	0.59838
	4.00	29.555	1.2703	1.1859	1.0712	2.0962	0.99861		16.000	81.509	5.8705	3.0515	1.9238	0.5906	0.59445
	6.00	31.277	1.4254	1.2864	1.1080	2.0203	0.99548		14.000	82.764	5.9071	3.0606	1.9301	0.5757	0.59139
	8.00	33.102	1.5949	1.3916	1.1461	1.9443	0.98973		12.000	83.928	5.9360	3.0677	1.9350	0.5638	0.58889
	10.00	35.034	1.7798	1.5011	1.1856	1.8674	0.98079		10.000	85.026	5.9586	3.0732	1.9389	0.5543	0.58712
	12.00	37.088	1.9812	1.6147	1.2270	1.7891	0.96827		8.000	86.074	5.9761	3.0775	1.9419	0.5469	0.58568
	14.00	39.277	2.2004	1.7319	1.2705	1.7088	0.95189		6.000	87.085	5.9890	3.0807	1.9441	0.5413	0.58461
	16.00	41.623	2.4392	1.8527	1.3166	1.6257	0.93152		4.000	88.070	5.9980	3.0828	1.9456	0.5374	0.58387
	18.00	44.161	2.7000	1.9770	1.3657	1.5388	0.90703		2.000	89.039	6.0033	3.0841	1.9465	0.5352	0.58344
	20.00	46.948	2.9871	2.1055	1.4187	1.4466	0.87829								
2.30	20.00	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
	24.00	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
	26.00	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
	26.00	69.627	5.0238	2.8250	1.7783	0.8115	0.66991		10.000	33.657	1.8124	1.5199	1.1924	1.9577	0.97895
	24.00	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
	22.00	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
	20.00	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
	18.00	79.744	5.5523	2.9703	1.8693	0.6189	0.62175		18.000	42.497	2.7736	2.0108	1.3794	1.6212	0.89981
	16.00	81.192	5.6011	2.9830	1.8776	0.5993	0.61749		20.000	45.140	3.0705	2.1413	1.4339	1.5291	0.86971
2.30	14.00	82.504	5.6391	2.9929	1.8842	0.5836	0.61418		22.000	48.059	3.3981	2.2759	1.4931	1.4308	0.83542
	12.00	84.856	5.6688	3.0006	1.8893	0.5711	0.61161		24.000	51.393	3.7677	2.4168	1.5590	1.3227	0.79639
	10.00	88.856	5.6921	3.0065	1.8932	0.5612	0.60960		26.000	55.500	4.2092	2.5717	1.6367	1.1954	0.75038
	8.00	85.942	5.7100	3.0111	1.8963	0.5535	0.60806		28.000	62.973	4.9459	2.8024	1.7648	0.9810	0.67729
	6.00	86.988	5.7233	3.0145	1.8986	0.5477	0.60692		28.082	64.679	5.0977	2.8462	1.7911	0.9354	0.66296
	4.00	88.007	5.7324	3.0168	1.9002	0.5437	0.60614		28.000	66.328	5.2377	2.8855	1.8152	0.8927	0.65000
	2.00	89.008	5.7378	3.0182	1.9011	0.5413	0.60568		26.000	72.454	5.8907	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	5.9657	3.0750	1.9401	0.6510	0.58653
									20.000	79.014	6.0423	3.0936	1.9532	0.6224	0.58024
2.30	4.00	27.294	1.1311	1.0919	1.0359	2.2212	0.99981		18.000	80.483	6.0423	3.0936	1.9532	0.6224	0.58024
	6.00	28.906	1.2753	1.1892	1.0724	2.1437	0.99854		16.000	81.798	6.1451	3.1075	1.9631	0.6002	0.57554
	8.00	30.611	1.4336	1.2916	1.1099	2.0667	0.99526		14.000	83.001	6.1806	3.1182	1.9707	0.5826	0.57191
	10.00	32.415	1.6068	1.3988	1.1487	1.9896	0.98923		12.000	84.122	6.2087	3.1266	1.9768	0.56907	0.56683
	12.00	34.326	1.7959	1.5104	1.1890	1.9117	0.97989		10.000	84.122	6.2087	3.1332	1.9816	0.55669	0.56683
	14.00	36.354	2.0019	1.6260	1.2311	1.8325	0.96684		8.000	85.182	6.2308	3.1384	1.9854	0.5478	0.56508
									8.000	86.195	6.2479	3.1424	1.9883	0.5406	0.56372

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	$\frac{P_{02}}{P_{01}}$
2.35	6.000	87.174	6.2606	3.1453	1.9904	0.5353	0.56272	2.45	26.000	53.045	4.3053	2.6037	1.6535	1.2861	0.74055
	4.000	88.129	6.2694	3.1474	1.9919	0.5315	0.56203		28.000	57.780	4.8455	2.7729	1.7475	1.1385	0.68691
	2.000	89.068	6.2745	3.1486	1.9928	0.5293	0.56162		29.253	64.744	5.5614	2.9727	1.8708	0.9386	0.62095
2.40	2.000	26.120	1.1358	1.0951	1.0371	2.3184	0.99979		26.000	74.185	6.3161	3.1582	1.9999	0.7082	0.55836
	4.000	27.702	1.2856	1.1960	1.0749	2.2383	0.99839		24.000	76.446	6.4516	3.1891	2.0230	0.6623	0.54787
	6.000	29.377	1.4505	1.3023	1.1138	2.1589	0.99478		22.000	78.236	6.5451	3.2101	2.0389	0.6294	0.54076
	8.000	31.149	1.6314	1.4137	1.1540	2.0794	0.98818		20.000	79.752	6.6146	3.2254	2.0508	0.6042	0.53555
	10.000	33.023	1.8292	1.5295	1.1959	1.9994	0.97797		18.000	81.089	6.6682	3.2372	2.0599	0.5842	0.53157
	12.000	35.007	2.0450	1.6495	1.2398	1.9181	0.96377		16.000	82.299	6.7105	3.2464	2.0671	0.5681	0.52845
	14.000	37.112	2.2798	1.7729	1.2860	1.8350	0.94538		14.000	83.416	6.7442	3.2536	2.0728	0.5550	0.52599
	16.000	39.351	2.5351	1.8993	1.3348	1.7497	0.92274		12.000	84.462	6.7710	3.2594	2.0774	0.5444	0.52403
	18.000	41.748	2.8128	2.0285	1.3866	1.6613	0.89592		10.000	85.455	6.7923	3.2640	2.0810	0.5359	0.52249
	20.000	44.336	3.1155	2.1604	1.4421	1.5689	0.86505		8.000	86.408	6.8088	3.2675	2.0838	0.5292	0.52129
	22.000	47.174	3.4480	2.2955	1.5021	1.4709	0.83015		6.000	87.331	6.8211	3.2701	2.0859	0.5242	0.52041
	24.000	50.371	3.8196	2.4357	1.5682	1.3644	0.79093		4.000	88.232	6.8296	3.2719	2.0873	0.5207	0.51979
	26.000	54.184	4.2521	2.5861	1.6442	1.2426	0.74598		2.000	89.119	6.8346	3.2730	2.0882	0.5207	0.51979
	28.000	59.656	4.8382	2.7707	1.7462	1.0779	0.68761								
	28.681	64.710	5.3269	2.9100	1.8305	0.9370	0.64187		2.50	2.000	25.050	1.1405	1.0984	1.0384	2.4155
28.000	69.291	5.7130	3.0119	1.8968	0.8201	0.60781		4.000	4.000	26.609	1.2961	1.2029	1.0775	2.3326	0.99822
26.000	73.400	6.0048	3.0845	1.9468	0.7260	0.58331		6.000	6.000	28.259	1.4679	1.3133	1.1177	2.2505	0.99427
24.000	75.889	6.1539	3.1203	1.9722	0.6751	0.57121		8.000	8.000	30.005	1.6568	1.4289	1.1595	2.1885	0.98703
22.000	77.803	6.2534	3.1436	1.9892	0.6397	0.56329		10.000	10.000	31.851	1.8639	1.5493	1.2031	2.0859	0.97589
20.000	79.402	6.3260	3.1605	2.0016	0.6129	0.55758		12.000	12.000	33.802	2.0900	1.6737	1.2488	2.0022	0.96046
18.000	80.800	6.3816	3.1732	2.0111	0.5919	0.55326		14.000	14.000	35.866	2.3364	1.8015	1.2969	1.9169	0.94057
16.000	82.059	6.4251	3.1831	2.0185	0.5751	0.54990		16.000	16.000	38.057	2.6042	1.9322	1.3478	1.8295	0.91625
14.000	83.217	6.4596	3.1909	2.0244	0.5615	0.54726		18.000	18.000	40.389	2.8949	2.0652	1.4018	1.7394	0.88767
12.000	84.299	6.4870	3.1971	2.0290	0.5505	0.54517		20.000	20.000	42.890	3.2109	2.2002	1.4594	1.6458	0.85510
10.000	85.324	6.5087	3.2019	2.0327	0.5416	0.54352		22.000	22.000	45.602	3.5558	2.3373	1.5213	1.5475	0.81877
8.000	86.306	6.5254	3.2057	2.0356	0.5348	0.54254		24.000	24.000	48.600	3.9361	2.4775	1.5887	1.4426	0.77871
6.000	87.255	6.5379	3.2085	2.0377	0.5296	0.54131		26.000	26.000	52.036	4.3657	2.6235	1.6641	1.3268	0.73441
4.000	88.182	6.5466	3.2104	2.0392	0.5260	0.54065		28.000	28.000	56.335	4.8844	2.7844	1.7542	1.1888	0.68317
2.000	89.094	6.5517	3.2115	2.0400	0.5238	0.54027		29.797	64.782	64.782	5.8014	3.0342	1.9120	0.9402	0.60027
2.45	2.000	25.572	1.1381	1.0968	1.0377	2.3670	0.99978		28.000	71.949	6.4249	3.1831	2.0185	0.7573	0.54992
	4.000	27.143	1.2908	1.1994	1.0762	2.2855	0.99831		26.000	74.856	6.6273	3.2282	2.0529	0.6928	0.53460
	6.000	28.805	1.4591	1.3078	1.1157	2.2048	0.99453		24.000	76.939	6.7526	3.2555	2.0742	0.6509	0.52537
	8.000	30.563	1.6440	1.4212	1.1567	2.1241	0.98761		22.000	78.625	6.8414	3.2744	2.0893	0.6201	0.51894
	10.000	32.422	1.8463	1.5393	1.1994	2.0428	0.97695		20.000	80.070	6.9082	3.2885	2.1007	0.5962	0.51417
	12.000	34.388	2.0672	1.6615	1.2442	1.9603	0.96215		18.000	81.353	6.9602	3.2994	2.1095	0.5770	0.51048
	14.000	36.472	2.3078	1.7871	1.2914	1.8762	0.94302		16.000	82.518	7.0014	3.3080	2.1165	0.5616	0.50759
	16.000	38.685	2.5692	1.9156	1.3412	1.7898	0.92155		14.000	83.598	7.0343	3.3148	2.1221	0.5489	0.50528
	18.000	41.047	2.8532	2.0466	1.3941	1.7006	0.89187		12.000	84.576	7.0607	3.3202	2.1266	0.5387	0.50345
	20.000	43.588	3.1623	2.1800	1.4506	1.6077	0.86018		10.000	85.576	7.0816	3.3245	2.1301	0.5304	0.50200
	22.000	46.358	3.5007	2.3160	1.5115	1.5097	0.82459		8.000	86.502	7.0979	3.3278	2.1329	0.5240	0.50088
	24.000	49.445	3.8759	2.4560	1.5781	1.4042	0.78502		6.000	87.400	7.1100	3.3303	2.1350	0.5191	0.50005
									4.000	88.277	7.1184	3.3320	2.1364	0.5157	0.49947
									2.000	89.142	7.1234	3.3330	2.1372	0.5137	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	30.000	69.778	6.7777	3.2609	2.0785	0.8111	0.52354
	6.000	27.739	1.4768	1.3189	1.1198	2.2961	0.99399	28.000	28.000	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	26.000	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	24.000	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	22.000	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	20.000	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	18.000	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	16.000	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	14.000	83.922	7.6316	3.4324	2.2234	0.5378	0.46566
	22.000	44.899	3.6130	2.3591	1.5315	1.5945	0.81272	12.000	12.000	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	10.000	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	8.000	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	6.000	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	4.000	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	2.000	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	6.9402	3.2952	2.1061	0.6793	0.51190									
24.000	77.380	7.0575	3.3195	2.1260	0.6405	0.50368	2.65	2.000	23.613	1.1479	1.1034	1.0403	2.5607	0.99973	
22.000	78.978	7.1423	3.3368	2.1404	0.6115	0.49783	4.000	4.000	25.144	1.3124	1.2136	1.0814	2.4734	0.99796	
20.000	80.360	7.2068	3.3499	2.1514	0.5887	0.49343	6.000	6.000	26.766	1.4950	1.3302	1.1239	2.3869	0.99341	
18.000	81.594	7.2575	3.3600	2.1608	0.5703	0.49002	8.000	8.000	28.482	1.6966	1.4525	1.1680	2.3007	0.98514	
16.000	82.720	7.2978	3.3680	2.1668	0.5554	0.48732	10.000	10.000	30.295	1.9182	1.5798	1.2142	2.2139	0.97247	
14.000	83.766	7.3301	3.3744	2.1723	0.5432	0.48517	12.000	12.000	32.210	2.1610	1.7113	1.2628	2.1262	0.95502	
12.000	84.750	7.3561	3.3795	2.1767	0.5333	0.48345	14.000	14.000	34.232	2.4260	1.8462	1.3141	2.0370	0.93270	
10.000	85.688	7.3767	3.3835	2.1802	0.5253	0.48209	16.000	16.000	36.368	2.7141	1.9835	1.3683	1.9459	0.90566	
8.000	86.590	7.3927	3.3866	2.1829	0.5190	0.48104	18.000	18.000	38.632	3.0267	2.1226	1.4259	1.8524	0.87423	
6.000	87.464	7.4047	3.3890	2.1849	0.5142	0.48025	20.000	20.000	41.043	3.3657	2.2630	1.4873	1.7560	0.83884	
4.000	88.320	7.4131	3.3906	2.1864	0.5109	0.47971	22.000	22.000	43.627	3.7335	2.4042	1.5529	1.6559	0.80000	
2.000	89.163	7.4180	3.3916	2.1872	0.5090	0.47939	24.000	24.000	46.433	4.1347	2.5465	1.6237	1.5507	0.75806	
2.60	2.000	24.071	1.1454	1.1017	1.0396	2.5123	0.99975	26.000	26.000	49.549	4.5776	2.6911	1.7010	1.4380	0.71313
	4.000	25.611	1.3070	1.2100	1.0801	2.4265	0.99805	28.000	28.000	53.164	5.0815	2.8416	1.7883	1.3126	0.66448
	6.000	27.241	1.4858	1.3245	1.1218	2.3416	0.99371	30.000	30.000	57.877	5.7097	3.0110	1.8963	1.1576	0.60809
	8.000	28.966	1.6831	1.4445	1.1651	2.2568	0.98579	31.288	31.288	64.910	6.5531	3.2118	2.0403	0.9447	0.54016
	10.000	30.789	1.8998	1.5695	1.2105	2.1715	0.97365	30.000	30.000	70.983	7.1564	3.3397	2.1428	0.7814	0.49687
	12.000	32.714	2.1369	1.6986	1.2580	2.0852	0.95690	28.000	28.000	74.230	7.4211	3.3922	2.1877	0.7039	0.47918
	14.000	34.749	2.3955	1.8311	1.3082	1.9973	0.93541	26.000	26.000	76.415	7.5742	3.4216	2.2137	0.6565	0.46930
	16.000	36.901	2.6767	1.9662	1.3613	1.9075	0.90930	24.000	24.000	78.138	7.6801	3.4415	2.2316	0.6224	0.46262
	18.000	39.185	2.9817	2.1032	1.4177	1.8152	0.87884	22.000	22.000	79.592	7.7589	3.4562	2.2449	0.5962	0.45711
	20.000	41.621	3.3126	2.2417	1.4778	1.7199	0.84443	20.000	20.000	80.870	7.8200	3.4674	2.2553	0.5752	0.45396
	22.000	44.242	3.6723	2.3814	1.5421	1.6205	0.80645	18.000	18.000	82.020	7.8684	3.4763	2.2634	0.5582	0.45101
	24.000	47.102	4.0658	2.5229	1.6116	1.5157	0.76520	16.000	16.000	83.079	7.9073	3.4833	2.2700	0.5442	0.44866
	26.000	50.305	4.5028	2.6675	1.6880	1.4025	0.72060	14.000	14.000	84.066	7.9387	3.4890	2.2753	0.5327	0.44677
	28.000	54.088	5.0067	2.8201	1.7754	1.2744	0.67151	12.000	12.000	84.998	7.9640	3.4935	2.2796	0.5234	0.44526
	30.000	59.352	5.6706	3.0010	1.8896	1.1062	0.61145	10.000	10.000	85.888	7.9841	3.4972	2.2830	0.5158	0.44406
							8.000	8.000	86.746	7.9999	3.5000	2.2857	0.5098	0.44312	
							6.000	6.000	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	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	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	3.2616	2.0791	1.0209	0.52329
	6.000	26.311	1.5042	1.3360	1.1260	2.4321	0.99311		32.173	65.002	7.0807	3.3243	2.1300	0.50207	
	8.000	28.019	1.7102	1.4605	1.1709	2.3444	0.98446		30.000	72.678	7.8741	3.4773	2.1748	0.8420	
	10.000	29.824	1.9369	1.5902	1.2180	2.2561	0.97125		28.000	75.285	8.0870	3.5154	2.2644	0.45066	
	12.000	31.728	2.1855	1.7241	1.2676	2.1689	0.95309		26.000	77.202	8.2233	3.5393	2.3004	0.43799	
	14.000	33.739	2.4569	1.8614	1.3199	2.0763	0.92991		24.000	78.766	8.3214	3.5561	2.3235	0.43010	
	16.000	35.862	2.7523	2.0010	1.3754	1.9838	0.90191		22.000	80.110	8.3960	3.5688	2.3526	0.42454	
	18.000	38.109	3.0727	2.1423	1.4343	1.8915	0.86948		20.000	81.303	8.4545	3.5786	2.3625	0.41714	
	20.000	40.496	3.4200	2.2845	1.4970	1.7915	0.83311		18.000	82.386	8.5014	3.5864	2.3704	0.41457	
	22.000	43.049	3.7964	2.4273	1.5641	1.6905	0.79337		16.000	83.387	8.5392	3.5927	2.3768	0.41251	
	24.000	45.809	4.2059	2.5706	1.6362	1.5848	0.75072		14.000	84.324	8.5699	3.5978	2.3820	0.5234	
	26.000	48.852	4.6560	2.7155	1.7146	1.4723	0.70538		12.000	85.212	8.5948	3.6019	2.3862	0.5145	
	28.000	52.334	5.1626	2.8645	1.8022	1.3488	0.65692		10.000	86.062	8.6146	3.6051	2.3895	0.5072	
	30.000	56.687	5.7730	3.0271	1.9071	1.2018	0.60268		8.000	86.882	8.6301	3.6077	2.3922	0.5015	
	31.741	64.956	6.8143	3.2687	2.0847	0.9462	0.52090		6.000	87.680	8.6418	3.6096	2.3941	0.40762	
	30.000	71.913	7.5186	3.4110	2.2042	0.7587	0.47286		4.000	88.462	8.6499	3.6109	2.3955	0.40700	
	28.000	74.790	7.7529	3.4551	2.2439	0.6907	0.45808		2.000	88.462	8.6499	3.6109	2.3955	0.40656	
26.000	76.828	7.8967	3.4814	2.2682	0.6468	0.44930			89.234	8.6547	3.6117	2.3963	0.4924		
24.000	78.466	7.9983	3.4997	2.2854	0.6145	0.44321							0.4924		
22.000	79.862	8.0748	3.5133	2.2984	0.5893	0.43870		2.80	22.344	22.344	1.1553	1.0422	2.7056	0.99969	
20.000	81.095	8.1345	3.5238	2.3085	0.5691	0.43522		4.000	23.854	23.854	1.3292	1.0854	2.6133	0.99766	
18.000	82.210	8.1821	3.5321	2.3165	0.5527	0.43247		6.000	25.455	25.455	1.5230	1.1302	2.5222	0.99246	
16.000	83.238	8.2204	3.5388	2.3230	0.5391	0.43027		8.000	27.150	27.150	1.7379	1.1768	2.4313	0.98304	
14.000	84.199	8.2515	3.5441	2.3282	0.5279	0.42850		10.000	28.940	28.940	1.9751	1.2257	2.3399	0.96869	
12.000	85.109	8.2765	3.5484	2.3324	0.5188	0.42708		12.000	30.830	30.830	2.2357	1.2774	2.2476	0.94903	
10.000	85.978	8.2965	3.5518	2.3358	0.5114	0.42595		14.000	32.822	32.822	2.5205	1.3320	2.1540	0.92409	
8.000	86.816	8.3121	3.5545	2.3385	0.5056	0.42506		16.000	34.923	34.923	2.8309	1.3900	2.0585	0.89411	
6.000	87.631	8.3238	3.5565	2.3404	0.5012	0.42441		18.000	37.141	37.141	3.1677	1.4516	1.9610	0.85962	
4.000	88.430	8.3319	3.5579	2.3418	0.4981	0.42395		20.000	39.490	39.490	3.5324	1.5172	1.8610	0.82123	
2.000	89.218	8.3367	3.5587	2.3426	0.4962	0.42368		22.000	41.990	41.990	3.9271	1.5872	1.7578	0.77965	
								24.000	44.676	44.676	4.3550	1.6622	1.6622	1.6506	0.73549
								26.000	47.604	47.604	4.8219	1.7434	1.5379	1.5379	0.68919
2.75	2.000	22.750	1.1528	1.1068	1.0415	2.6573	0.99971	28.000	50.887	50.887	5.3398	1.8328	1.4163	1.4163	0.64070
4.000	24.267	1.3236	1.2209	1.0841	1.0841	2.5667	0.99776	30.000	54.786	54.786	5.9387	1.9355	1.2783	1.2783	0.58877
6.000	25.873	1.5135	1.3417	1.1280	1.1280	2.4772	0.99279	32.000	60.433	60.433	6.7529	2.0743	1.0909	1.0909	0.52535
8.000	27.575	1.7239	1.4686	1.1738	1.1738	2.3879	0.98377	32.587	65.050	65.050	7.3524	2.1761	0.9490	0.9490	0.48369
10.000	29.372	1.9558	1.6007	1.2219	1.2219	2.2982	0.96999	32.000	69.211	69.211	7.8278	2.2566	0.8307	0.8307	0.45348
12.000	31.269	2.2104	1.7371	1.2724	1.2724	2.2074	0.95109	30.000	73.328	73.328	8.2272	2.3241	0.7243	0.7243	0.42988
14.000	33.269	2.4885	1.8768	1.3259	1.3259	2.1153	0.92704	28.000	75.728	75.728	8.4241	2.3574	0.6684	0.6684	0.41882
16.000	35.381	2.7912	2.0188	1.3826	1.3826	2.0213	0.89806	26.000	77.543	77.543	8.5544	2.3794	0.6296	0.6296	0.41169
18.000	37.612	3.1197	2.1622	1.4429	1.4429	1.9253	0.86461	24.000	79.042	79.042	8.6495	2.3954	0.6002	0.6002	0.40659
20.000	39.980	3.4757	2.3063	1.5070	1.5070	1.8265	0.82724	22.000	80.339	80.339	8.7224	2.4077	0.5769	0.5769	0.40273
22.000	42.504	3.8610	2.4506	1.5755	1.5755	1.7245	0.78659	20.000	81.496	81.496	8.7800	2.4174	0.5580	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	8.6637	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	10.000	28.129	2.0143	1.6328	1.2336	2.4229	0.96597
	12.000	85.308	8.9188	3.6540	2.4409	0.5103	0.39256	12.000	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	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	16.000	34.069	2.9123	2.0729	1.4050	2.1318	0.88591
	6.000	87.725	8.9656	3.6613	2.4487	0.4935	0.39019	18.000	18.000	36.264	3.2663	2.2229	1.4694	2.0313	0.84930
	4.000	88.492	8.9737	3.6626	2.4501	0.4905	0.38978	20.000	20.000	38.584	3.6496	2.3729	1.5380	1.9285	0.80886
	2.000	89.248	8.9784	3.6633	2.4509	0.4887	0.38954	22.000	22.000	41.044	4.0638	2.5222	1.6112	1.8229	0.76540
									24.000	24.000	43.672	4.5119	1.6896	1.7138	1.7199
2.85	2.000	21.954	1.1579	1.1103	1.0429	2.7537	0.99968	26.000	26.000	46.515	4.9984	1.7739	1.5999	1.5999	0.67230
	4.000	23.457	1.3349	1.2283	1.0868	2.6598	0.99755	28.000	28.000	49.655	5.5328	1.8659	1.4788	1.4788	0.62347
	6.000	25.052	1.5325	1.3535	1.1323	2.5670	0.99213	30.000	30.000	53.274	6.1364	1.9692	1.3453	1.3453	0.57262
	8.000	26.742	1.7520	1.4850	1.1798	2.4744	0.98230	32.000	32.000	57.931	6.8791	2.0957	1.1827	1.1827	0.51624
	10.000	28.526	1.9946	1.6220	1.2297	2.3815	0.96735	33.363	33.363	65.145	7.9116	2.2708	0.9516	0.9516	0.44840
	12.000	30.410	2.2613	1.7634	1.2824	2.2876	0.94692	32.000	32.000	71.287	8.6350	2.3930	0.7771	0.7771	0.40736
	14.000	32.394	2.5532	1.9080	1.3382	2.1923	0.92105	30.000	30.000	74.392	8.9347	2.4435	0.6985	0.6985	0.39175
	16.000	34.486	2.8712	2.0547	1.3974	2.0953	0.89006	28.000	28.000	78.490	9.1095	2.4730	0.6500	0.6500	0.38301
	18.000	36.692	3.2165	2.2025	1.4604	1.9964	0.85451	24.000	24.000	79.533	9.3212	2.5087	0.6149	0.6149	0.37709
	20.000	39.025	3.5904	2.3505	1.5275	1.8950	0.81511	22.000	22.000	80.750	9.3915	2.5205	0.5660	0.5660	0.36942
22.000	41.505	3.9948	2.4982	1.5991	1.7906	0.77258	20.000	20.000	82.845	9.4475	2.5300	0.5482	0.5482	0.36680	
24.000	44.160	4.4325	2.6451	1.6757	1.6825	0.72766	18.000	18.000	84.845	9.4928	2.5376	0.5335	0.5335	0.36469	
26.000	47.042	4.9089	2.7916	1.7585	1.5692	0.68081	16.000	16.000	83.775	9.5296	2.5438	0.5212	0.5212	0.36299	
28.000	50.247	5.4345	2.9391	1.8490	1.4481	0.63219	14.000	14.000	84.651	9.5597	2.5489	0.5111	0.5111	0.36161	
30.000	53.992	5.9377	3.0917	1.9518	1.3127	0.58089	12.000	12.000	85.484	9.5842	2.5530	0.5027	0.5027	0.36049	
32.000	59.037	6.8013	3.2659	2.0825	1.1407	0.46580	10.000	10.000	86.283	9.6038	2.5563	0.4959	0.4959	0.35960	
32.984	65.097	7.6294	3.4320	2.2230	0.9503	0.42903	8.000	8.000	87.055	9.6191	2.5588	0.4906	0.4906	0.35890	
32.000	70.389	8.2421	3.5425	2.3266	0.8001	0.42903	6.000	6.000	87.808	9.6306	2.5608	0.4865	0.4865	0.35838	
30.000	73.893	8.5802	3.5995	2.3837	0.7107	0.41030	4.000	4.000	88.546	9.6387	2.5621	0.4836	0.4836	0.35802	
28.000	76.127	8.7648	3.6295	2.4149	0.6588	0.40050	2.000	2.000	88.275	9.6434	2.5629	0.4819	0.4819	0.35780	
26.000	77.855	8.8902	3.6495	2.4360	0.6220	0.39402									
24.000	79.297	8.9827	3.6640	2.4516	0.5938	0.38933									
22.000	80.552	9.0543	3.6751	2.4637	0.5713	0.38574	2.95	2.000	21.216	1.1630	1.1138	1.0442	2.8500	0.99965	
20.000	81.676	9.1110	3.6838	2.4733	0.5530	0.38294	4.000	4.000	22.708	1.3464	1.2357	1.0895	2.7526	0.99732	
18.000	82.702	9.1567	3.6908	2.4810	0.5379	0.38069	6.000	6.000	24.294	1.5518	1.3654	1.1366	2.6563	0.99142	
16.000	83.655	9.1938	3.6964	2.4872	0.5253	0.37888	8.000	8.000	25.974	1.7807	1.5017	1.1858	2.5604	0.98074	
14.000	84.549	9.2241	3.7010	2.4923	0.5150	0.37741	10.000	10.000	27.749	2.0343	1.6437	1.2377	2.4640	0.96454	
12.000	85.399	9.2486	3.7047	2.4964	0.5064	0.37623	12.000	12.000	29.621	2.3137	1.7901	1.2925	2.3668	0.94252	
10.000	86.213	9.2683	3.7077	2.4998	0.4995	0.37528	14.000	14.000	31.593	2.6199	1.9396	1.3507	2.2682	0.91475	
8.000	87.001	9.2836	3.7100	2.5023	0.4940	0.37454	16.000	16.000	33.670	2.9540	2.0911	1.4126	2.1679	0.88168	
6.000	87.768	9.2952	3.7117	2.5043	0.4899	0.37399	18.000	18.000	35.856	3.3169	2.2434	1.4785	2.0658	0.84398	
4.000	88.520	9.3033	3.7129	2.5057	0.4870	0.37360	20.000	20.000	38.164	3.7098	2.3954	1.5487	1.9615	0.80249	
2.000	89.262	9.3080	3.7136	2.5065	0.4853	0.37338	22.000	22.000	40.607	4.1344	2.5464	1.6236	1.8546	0.75809	
							24.000	24.000	43.211	4.5930	2.6959	1.7037	1.7037	1.7444	0.71160
							26.000	26.000	46.018	5.0902	2.8441	1.7898	1.6297	1.6297	0.66366
2.90	2.000	21.578	1.1604	1.1120	1.0435	2.8019	0.99966	28.000	28.000	49.102	5.6343	2.9916	1.8833	1.5085	0.61460
4.000	23.076	1.3406	1.2320	1.0882	1.0882	2.7062	0.99744	30.000	30.000	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	0.38752		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	0.37416		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	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	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	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	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	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	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	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	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	3.4208	2.2848	1.4972	2.1338	0.83303	
									20.000	37.382	3.8338	3.4208	2.4408	1.5707	2.0263	0.78944
									22.000	39.797	4.2796	4.2796	2.5952	1.6490	1.9166	0.74317
								24.000	42.361	4.7607	4.7607	2.7474	1.7328	1.8039	0.69513	
								26.000	45.110	5.2806	5.2806	2.8973	1.8226	1.6874	0.64608	
								28.000	48.102	5.8462	5.8462	3.0455	1.9196	1.5654	0.59649	
								30.000	51.455	6.4722	6.4722	3.1938	2.0265	1.4345	0.54630	
								32.000	55.456	7.1967	7.1967	3.3478	2.1497	1.2858	0.49412	
								34.000	61.505	8.2161	8.2161	3.5380	2.3222	1.0765	0.43052	
								36.000	68.742	9.2596	9.2596	3.6335	2.4190	0.9552	0.39922	
								38.000	75.604	9.7779	9.7779	3.7064	2.4983	0.8514	0.37570	
								40.000	83.855	10.0154	10.0154	3.7817	2.5856	0.7291	0.35180	
								42.000	92.855	10.1703	10.1703	3.8146	2.6255	0.6689	0.34151	
								44.000	101.54	10.2825	10.2825	3.8355	2.6516	0.6276	0.33501	
								46.000	110.845	10.3683	10.3683	3.8505	2.6705	0.5965	0.33040	
								48.000	120.845	10.4361	10.4361	3.8617	2.6849	0.5719	0.32694	
								50.000	131.495	10.4906	10.4906	3.8705	2.6963	0.5518	0.32423	
								52.000	142.755	10.5350	10.5350	3.8776	2.7055	0.5353	0.32208	
								54.000	154.645	10.5714	10.5714	3.8833	2.7129	0.5215	0.32034	
								56.000	167.195	10.6012	10.6012	3.8879	2.7190	0.5100	0.31892	
								58.000	180.425	10.6255	10.6255	3.8917	2.7240	0.5005	0.31777	
								60.000	194.295	10.6450	10.6450	3.8948	2.7281	0.4926	0.31683	
								62.000	208.745	10.6603	10.6603	3.8973	2.7314	0.4861	0.31608	
								64.000	223.795	10.6719	10.6719	3.8992	2.7340	0.4810	0.31549	
								66.000	239.445	10.6799	10.6799	3.9007	2.7359	0.4772	0.31505	
								68.000	255.695	10.6847	10.6847	3.9017	2.7373	0.4744	0.31474	
								70.000	272.545	1.1707	1.1707	1.1190	1.0462	2.9942	0.99960	
								72.000	289.995	1.3640	1.3640	1.2471	1.0937	2.8911	0.99696	

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	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	0.27996		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	11.7784	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
									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	79.822	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	$\frac{P_{02}}{P_{01}}$	
3.35	24.000	40.264	5.3024	2.9033	1.8263	1.9704	0.64409	3.40	34.000	73.352	12.2131	4.0783	2.9946	0.7279	0.26279	
	26.000	42.898	5.8998	3.0588	1.9288	1.8468	0.59200		32.000	75.717	12.4992	4.1080	3.0426	0.6653	0.25440	
	28.000	45.716	6.5433	3.2097	2.0386	1.7198	0.54090		30.000	77.467	12.6849	4.1268	3.0738	0.6225	0.24914	
	30.000	48.782	7.2416	3.3568	2.1573	1.5874	0.49109		28.000	78.891	12.8193	4.1402	3.0963	0.5902	0.24542	
	32.000	52.225	8.0134	3.5024	2.2880	1.4458	0.44232		26.000	80.110	12.9221	4.1503	3.1135	0.5646	0.24263	
	34.000	56.375	8.9114	3.6528	2.4396	1.2844	0.39294		24.000	81.185	13.0033	4.1582	3.1271	0.5437	0.24046	
	36.000	63.380	10.2976	3.8524	2.6730	1.0339	0.32979		22.000	82.156	13.0688	4.1645	3.1381	0.5264	0.23872	
	36.143	65.562	10.6853	3.9023	2.7382	0.9616	0.31454		20.000	83.047	13.1224	4.1697	3.1471	0.5119	0.23732	
	36.000	67.623	11.0286	3.9446	2.7958	0.8957	0.30180		18.000	83.876	13.1665	4.1739	3.1545	0.4997	0.23617	
	32.000	72.950	12.0992	4.0338	2.9255	0.7384	0.27557		16.000	84.656	13.2030	4.1774	3.1606	0.4894	0.23522	
	30.000	77.255	12.2891	4.0863	2.9755	0.6723	0.26624		14.000	85.396	13.2331	4.1802	3.1657	0.4808	0.23445	
	28.000	78.719	12.4252	4.1004	3.0074	0.6279	0.26053		12.000	86.105	13.2578	4.1826	3.1698	0.4736	0.23381	
	26.000	79.965	12.5287	4.1110	3.0476	0.5946	0.25653		10.000	86.789	13.2777	4.1844	3.1731	0.4678	0.23330	
	24.000	81.062	12.6102	4.1193	3.0612	0.5684	0.25355		8.000	87.453	13.2934	4.1859	3.1757	0.4632	0.23290	
	22.000	82.050	12.6758	4.1259	3.0722	0.5471	0.25124		6.000	88.103	13.3052	4.1870	3.1777	0.4596	0.23260	
	20.000	82.956	12.7293	4.1313	3.0812	0.5295	0.24939		4.000	88.741	13.3135	4.1878	3.1791	0.4572	0.23239	
	18.000	83.798	12.7734	4.1357	3.0886	0.5148	0.24790		2.000	89.372	13.3184	4.1883	3.1799	0.4557	0.23227	
	16.000	84.588	12.8098	4.1393	3.0947	0.5024	0.24668									
	14.000	85.339	12.8398	4.1422	3.0997	0.4832	0.24486		3.45	2.000	18.209	1.1892	1.1316	1.0509	3.3292	0.99947
	12.000	86.057	12.8644	4.1446	3.1038	0.4760	0.24420		4.000	19.668	19.668	1.4063	1.2743	1.1036	3.2118	0.99597
10.000	86.750	12.8842	4.1466	3.1072	0.4701	0.24366		6.000	21.226	21.226	1.6536	1.4270	1.1588	3.0962	0.98718	
8.000	87.422	12.8998	4.1481	3.1098	0.4654	0.24324		8.000	22.884	22.884	1.9331	1.5881	1.2172	2.9809	0.97149	
6.000	88.080	12.9116	4.1493	3.1118	0.4618	0.24292		10.000	24.639	24.639	2.2468	1.7559	1.2796	2.8653	0.94812	
4.000	88.726	12.9198	4.1501	3.1131	0.4593	0.24270		12.000	26.491	26.491	2.5962	1.9284	1.3463	2.7486	0.91701	
2.000	89.365	12.9246	4.1506	3.1140	0.4578	0.24256		14.000	28.438	28.438	2.9823	2.1035	1.4178	2.6309	0.87878	
								16.000	30.481	30.481	3.4063	2.2791	1.4946	2.5118	0.83456	
								18.000	32.621	32.621	3.8688	2.4535	1.5769	2.3915	0.78577	
								20.000	34.863	34.863	4.3706	2.6251	1.6649	2.2698	0.73391	
								22.000	37.213	37.213	4.9123	2.7926	1.7590	2.1468	0.68049	
								24.000	39.683	39.683	5.4951	2.9552	1.8595	2.0224	0.62680	
								26.000	42.292	42.292	6.1211	3.1125	1.9666	1.8960	0.57385	
								28.000	45.073	45.073	6.7941	3.2644	2.0813	1.7667	0.52235	
								30.000	48.080	48.080	7.5215	3.4115	2.2047	1.6329	0.47267	
								32.000	51.420	51.420	8.3194	3.5558	2.3397	1.4914	0.42466	
								34.000	55.344	55.344	9.2294	3.7018	2.4932	1.3339	0.37715	
								36.000	60.903	60.903	10.4358	3.8705	2.6962	1.1265	0.32424	
								36.635	65.647	65.647	11.3584	3.9837	2.8512	0.9634	0.29020	
								36.000	68.851	68.851	12.0718	4.0633	2.9709	0.8302	0.26708	
								34.000	73.716	73.716	12.6278	4.1211	3.0642	0.7184	0.25074	
								32.000	75.970	75.970	12.9035	4.1485	3.1104	0.6589	0.24313	
								30.000	77.665	77.665	13.0858	4.1662	3.1410	0.6175	0.23828	
								28.000	79.054	79.054	13.2189	4.1789	3.1633	0.5860	0.23481	
								26.000	80.246	80.246	13.3210	4.1885	3.1804	0.5609	0.23220	
								24.000	81.302	81.302	13.4020	4.1961	3.1939	0.5404	0.23016	
								22.000	82.256	82.256	13.4675	4.2021	3.2049	0.5234	0.22852	
								20.000	83.134	83.134	13.5211	4.2071	3.2139	0.5091	0.22719	
								18.000	83.951	83.951	13.5654	4.2111	3.2213	0.4971	0.22611	
3.40	2.000	18.467	1.1866	1.1298	1.0502	3.2814	0.99949									
	4.000	19.928	1.4001	1.2704	1.1022	3.1662	0.99613									
	6.000	21.488	1.6430	1.4207	1.1565	3.0527	0.98766									
	8.000	23.147	1.9173	1.5793	1.2140	2.9395	0.97253									
	10.000	24.902	2.2245	1.7444	1.2752	2.8260	0.94995									
	12.000	26.755	2.5664	1.9143	1.3407	2.7115	0.91981									
	14.000	28.702	2.9440	2.0868	1.4108	2.5958	0.88269									
	16.000	30.746	3.3583	2.2600	1.4860	2.4788	0.83962									
	18.000	32.889	3.8100	2.4322	1.5665	2.3604	0.79194									
	20.000	35.133	4.2998	2.6019	1.6526	2.2407	0.74110									
	22.000	37.489	4.8289	2.7679	1.7446	2.1195	0.68851									
	24.000	39.967	5.3980	2.9293	1.8428	1.9966	0.63546									
	26.000	42.588	6.0096	3.0857	1.9476	1.8716	0.58292									
	28.000	45.386	6.6675	3.2370	2.0598	1.7435	0.53162									
	30.000	48.422	7.3802	3.3842	2.1808	1.6105	0.48186									
	32.000	51.810	8.1645	3.5290	2.3135	1.4690	0.43348									
	34.000	55.838	9.0673	3.6771	2.4659	1.3098	0.38509									
	36.000	61.914	10.3308	3.8568	2.6786	1.0874	0.32845									
	36.393	65.605	11.0193	3.9435	2.7943	0.9625	0.30214									
	36.000	68.960	11.5817	4.0093	2.8887	0.8560	0.28269									

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	$\frac{P_{02}}{P_{01}}$
3.45	16.000	84.720	13.6020	4.2145	3.2275	0.4869	0.22521	3.55	2.000	17.715	1.1947	1.1353	1.0523	3.4246	0.99943
	14.000	85.451	13.6322	4.2172	3.2325	0.4784	0.22448		4.000	19.170	1.4187	1.2822	1.1065	3.3029	0.99566
	12.000	86.151	13.6570	4.2195	3.2367	0.4714	0.22388		6.000	20.726	1.6748	1.4396	1.1634	3.1829	0.98619
	10.000	86.826	13.6770	4.2213	3.2400	0.4656	0.22340		8.000	22.383	1.9653	1.6059	1.2238	3.0633	0.96935
	8.000	87.482	13.6928	4.2227	3.2427	0.4610	0.22302		10.000	24.138	2.2920	1.7791	1.2883	2.9433	0.94435
	6.000	88.125	13.7047	4.2238	3.2447	0.4575	0.22273		12.000	25.989	2.6566	1.9569	1.3576	2.8224	0.91123
	4.000	88.756	13.7130	4.2245	3.2461	0.4551	0.22253		14.000	27.936	3.0603	2.1370	1.4321	2.7003	0.87077
	2.000	89.379	13.7180	4.2250	3.2469	0.4536	0.22241		16.000	29.977	3.5040	2.3174	1.5121	2.5771	0.82424
									18.000	32.115	3.9887	2.4961	1.5980	2.4526	0.77322
									20.000	34.352	4.5148	2.6714	1.6901	2.3271	0.71939
3.50	2.000	17.958	1.1920	1.1335	1.0516	3.3769	0.99945		22.000	36.692	5.0827	2.8419	1.7885	2.2005	0.66437
	4.000	19.415	1.4125	1.2783	1.1050	3.2574	0.99582		24.000	39.149	5.6937	3.0069	1.8935	2.0727	0.60946
	6.000	20.972	1.6642	1.4333	1.1611	3.1396	0.98669		26.000	41.738	6.3495	3.1659	2.0056	1.9434	0.55575
	8.000	22.629	1.9491	1.5970	1.2205	3.0222	0.97044		28.000	44.488	7.0535	3.3187	2.1254	1.8117	0.50395
	10.000	24.384	2.2693	1.7675	1.2839	2.9044	0.94626		30.000	47.447	7.8120	3.4660	2.2539	1.6762	0.45445
	12.000	26.236	2.6262	1.9426	1.3519	2.7856	0.91415		32.000	50.705	8.6392	3.6092	2.3937	1.5342	0.40714
	14.000	28.182	3.0211	2.1202	1.4249	2.6657	0.87481		34.000	54.463	9.5691	3.7520	2.5504	1.3790	0.36118
	16.000	30.225	3.4549	2.2982	1.5033	2.5445	0.82942		36.000	59.399	10.7262	3.9075	2.7450	1.1885	0.31299
	18.000	32.363	3.9283	2.4747	1.5874	2.4222	0.77952		38.000	65.729	12.0520	4.0612	2.9676	0.9651	0.26788
	20.000	34.602	4.4421	2.6482	1.6774	2.2986	0.72668		36.000	71.121	12.9969	4.1576	3.1261	0.7943	0.24063
22.000	36.947	4.9969	2.8173	1.7737	2.1739	0.67245		34.000	74.353	13.4667	4.2021	3.2048	0.7018	0.22854	
24.000	39.410	5.5936	2.9811	1.8764	2.0478	0.61813		32.000	76.427	13.7265	4.2257	3.2483	0.6473	0.22221	
26.000	42.009	6.2345	3.1392	1.9860	1.9199	0.56478		30.000	78.025	13.9033	4.2415	3.2779	0.6083	0.21803	
28.000	44.774	6.9227	3.2916	2.1032	1.7894	0.51313		28.000	79.351	14.0342	4.2530	3.2998	0.5782	0.21501	
30.000	47.755	7.6654	3.4388	2.2291	1.6549	0.46353		26.000	80.497	14.1355	4.2618	3.3168	0.5541	0.21271	
32.000	51.053	8.4777	3.5825	2.3664	1.5131	0.41586		24.000	81.457	14.2163	4.2687	3.3303	0.5343	0.21090	
34.000	54.888	9.3968	3.7268	2.5214	1.3570	0.36917		22.000	82.442	14.2819	4.2743	3.3413	0.5178	0.20944	
36.000	60.090	10.5715	3.8879	2.7191	1.1594	0.31891		20.000	83.294	14.3358	4.2789	3.3503	0.5039	0.20826	
36.867	65.689	11.7027	4.0229	2.9090	0.9643	0.27872		18.000	84.090	14.3804	4.2827	3.3578	0.4922	0.20729	
36.000	70.545	12.5396	4.1121	3.0494	0.8105	0.25324		16.000	84.839	14.4173	4.2858	3.3640	0.4823	0.20649	
34.000	74.048	13.0455	4.1623	3.1342	0.7098	0.23934		14.000	85.552	14.4478	4.2883	3.3691	0.4740	0.20583	
32.000	76.207	13.126	4.1877	3.1790	0.6529	0.23241		12.000	86.235	14.4729	4.2904	3.3733	0.4671	0.20529	
30.000	77.851	13.4920	4.2044	3.2090	0.6128	0.22791		10.000	86.895	14.4931	4.2921	3.3767	0.4615	0.20485	
28.000	79.207	13.6238	4.2165	3.2311	0.5820	0.22468		8.000	87.537	14.5091	4.2934	3.3794	0.4570	0.20451	
26.000	80.375	13.7255	4.2256	3.2481	0.5574	0.22223		6.000	88.165	14.5212	4.2944	3.3814	0.4535	0.20425	
24.000	81.413	13.8064	4.2329	3.2617	0.5373	0.22031		4.000	88.782	14.5296	4.2951	3.3828	0.4511	0.20407	
22.000	82.352	13.8719	4.2387	3.2727	0.5205	0.21877		2.000	89.392	14.5346	4.2956	3.3836	0.4497	0.20397	
20.000	83.216	13.9256	4.2435	3.2817	0.5065	0.21751									
18.000	84.022	13.9700	4.2474	3.2891	0.4946	0.21649									
16.000	84.781	14.0067	4.2506	3.2952	0.4846	0.21564		3.60	17.479	1.1973	1.1371	1.0530	3.4722	0.99940	
14.000	85.503	14.0371	4.2532	3.3003	0.4762	0.21494		4.000	18.932	1.4250	1.2862	1.1079	3.3482	0.99549	
12.000	86.194	14.0620	4.2554	3.3045	0.4692	0.21438		6.000	20.488	1.6857	1.4461	1.1657	3.2260	0.98567	
10.000	86.862	14.0822	4.2572	3.3079	0.4635	0.21392		8.000	22.144	1.9816	1.6149	1.2271	3.1043	0.96824	
8.000	87.510	14.0980	4.2585	3.3105	0.4590	0.21356		10.000	23.899	2.3149	1.7907	1.2927	2.9821	0.94241	
6.000	88.145	14.1100	4.2596	3.3125	0.4555	0.21329		12.000	25.751	2.6873	1.9711	1.3633	2.8590	0.90827	
4.000	88.769	14.1184	4.2603	3.3139	0.4531	0.21310		14.000	27.698	3.0999	2.1538	1.4393	2.7347	0.86667	
2.000	89.386	14.1234	4.2607	3.3148	0.4516	0.21298		16.000	29.740	3.5540	2.3366	1.5210	2.6092	0.81895	
								18.000	31.876	4.0498	2.5174	1.6088	2.4827	0.76685	

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	0.8377	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	0.19302
	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
	34.000	74.634	13.8916	4.2005	3.2019	0.7805	0.22897		18.000	84.215	15.2184	4.3505	3.4981	0.4877	0.19009
	32.000	76.633	14.1452	4.2405	3.2760	0.6945	0.21831		16.000	84.947	15.2557	4.3534	3.5043	0.4781	0.18937
	30.000	78.190	14.3199	4.2776	3.3184	0.6420	0.21249		14.000	85.644	15.2866	4.3558	3.5095	0.4699	0.18878
	28.000	79.487	14.4500	4.2885	3.3477	0.6041	0.20861		12.000	86.313	15.3120	4.3577	3.5137	0.4632	0.18829
	26.000	80.614	14.5512	4.2969	3.3695	0.5746	0.20578		10.000	86.959	15.3325	4.3593	3.5172	0.4576	0.18790
	24.000	81.617	14.6320	4.3036	3.3864	0.5510	0.20362		8.000	87.587	15.3487	4.3606	3.5199	0.4532	0.18756
	22.000	82.528	14.6976	4.3090	3.3999	0.5315	0.20191		6.000	88.201	15.3609	4.3615	3.5219	0.4499	0.18736
	20.000	83.369	14.7517	4.3134	3.4109	0.5152	0.20054		4.000	88.807	15.3695	4.3622	3.5234	0.4475	0.18720
	18.000	84.154	14.7965	4.3170	3.4200	0.5015	0.19942		2.000	89.405	15.3746	4.3625	3.5242	0.4461	0.18710
	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	3.5674	0.99936
	12.000	86.275	14.8895	4.3245	3.4430	0.4651	0.19660		4.000	18.478	1.4377	1.2942	1.1108	3.4388	0.99515
	10.000	86.928	14.9099	4.3262	3.4465	0.4595	0.19619		6.000	20.032	1.7073	1.4589	1.1703	3.3121	0.98461
	8.000	87.562	14.9260	4.3274	3.4491	0.4551	0.19586		8.000	21.688	2.0146	1.6330	1.2337	3.1858	0.96594
	6.000	88.184	14.9381	4.3284	3.4512	0.4517	0.19562		10.000	23.444	2.3615	1.8141	1.3017	3.0591	0.93840
	4.000	88.794	14.9466	4.3291	3.4526	0.4493	0.19545		12.000	25.297	2.7496	1.9998	1.3749	2.9315	0.90218
	2.000	89.398	14.9517	4.3295	3.4534	0.4479	0.19535		14.000	27.246	3.1808	2.1877	1.4539	2.8026	0.85825
						0.4801	0.19774		16.000	29.287	3.6554	2.3751	1.5391	2.6728	0.80824
						0.4719	0.19711		18.000	31.423	4.1745	2.5600	1.6306	2.5420	0.75395
						0.4651	0.19660		20.000	33.653	4.7382	2.7406	1.7289	2.4105	0.69731
						0.4595	0.19619		22.000	35.985	5.3474	2.9156	1.8341	2.2783	0.64001
						0.4551	0.19586		24.000	38.426	6.0027	3.0840	1.9464	2.1453	0.58349
						0.4517	0.19562		26.000	40.991	6.7053	3.2452	2.0662	2.0114	0.52883
						0.4493	0.19545		28.000	43.704	7.4580	3.3993	2.1940	1.8758	0.47677
						0.4479	0.19535		30.000	46.605	8.2664	3.5467	2.3307	1.7375	0.42765
						0.4801	0.19774		32.000	49.768	9.1422	3.6886	2.4785	1.5940	0.38140
						0.4719	0.19711		34.000	53.344	10.1123	3.8277	2.6418	1.4404	0.33742
						0.4651	0.19660		36.000	57.760	11.2596	3.9721	2.8346	1.2623	0.29362
						0.4595	0.19619		37.313	65.847	13.1309	4.1705	3.1485	0.9675	0.23710
						0.4551	0.19586		36.000	72.443	14.3517	4.2802	3.3530	0.7577	0.20791
						0.4517	0.19562		34.000	75.135	14.7539	4.3136	3.4203	0.6814	0.19937
						0.4493	0.19545		32.000	77.009	14.9979	4.3332	3.4612	0.6324	0.19442
						0.4479	0.19535		30.000	78.492	15.1693	4.3467	3.4899	0.5862	0.18855
						0.4801	0.19774		28.000	79.740	15.2983	4.3567	3.5115	0.5680	0.18564
						0.4719	0.19711		26.000	80.828	15.3992	4.3644	3.5283	0.5451	0.18664
						0.4651	0.19660		24.000	81.802	15.4802	4.3706	3.5419	0.5261	0.18512
						0.4595	0.19619		22.000	82.688	15.5463	4.3756	3.5530	0.5103	0.18389
						0.4551	0.19586								
						0.4517	0.19562								
						0.4493	0.19545								
						0.4479	0.19535								
3.65	2.000	17.250	1.2001	1.1390	1.0537	3.5198	0.99938		2.000	17.027	1.2029	1.1408	1.0544	3.5674	0.99936
	4.000	18.701	1.4312	1.2902	1.1094	3.3936	0.99532		4.000	18.478	1.4377	1.2942	1.1108	3.4388	0.99515
	6.000	20.256	1.6964	1.4524	1.1680	3.2891	0.98515		6.000	20.032	1.7073	1.4589	1.1703	3.3121	0.98461
	8.000	21.913	1.9980	1.6239	1.2304	3.1451	0.96710		8.000	21.688	2.0146	1.6330	1.2337	3.1858	0.96594
	10.000	23.668	2.3381	1.8024	1.2972	3.0207	0.94042		10.000	23.444	2.3615	1.8141	1.3017	3.0591	0.93840
	12.000	25.520	2.7183	1.9854	1.3691	2.8953	0.90525		12.000	25.297	2.7496	1.9998	1.3749	2.9315	0.90218
	14.000	27.468	3.1402	2.1707	1.4466	2.7688	0.86248		14.000	27.246	3.1808	2.1877	1.4539	2.8026	0.85825
	16.000	29.509	3.6043	2.3558	1.5300	2.6412	0.81364		16.000	29.287	3.6554	2.3751	1.5391	2.6728	0.80824
	18.000	31.645	4.1117	2.5387	1.6196	2.5125	0.76044		18.000	31.423	4.1745	2.5600	1.6306	2.5420	0.75395
	20.000	33.878	4.6628	2.7176	1.7158	2.3830	0.70470		20.000	33.653	4.7382	2.7406	1.7289	2.4105	0.69731
	22.000	36.212	5.2580	2.8911	1.8187	2.2527	0.64814		22.000	35.985	5.3474	2.9156	1.8341	2.2783	0.64001
	24.000	38.658	5.8984	3.0584	1.9286	2.1215	0.59212		24.000	38.426	6.0027	3.0840	1.9464	2.1453	0.58349
	26.000	41.230	6.5849	3.2189	2.0457	1.9891	0.53777		26.000	40.991	6.7053	3.2452	2.0662	2.0114	0.52883
	28.000	43.954	7.3210	3.3726	2.1707	1.8549	0.48578		28.000	43.704	7.4580	3.3993	2.1940	1.8758	0.47677
	30.000	46.873	8.1124	3.5199	2.3047	1.7176	0.43650		30.000	46.605	8.2664	3.5467	2.3307	1.7375	0.42765
	32.000	50.064	8.9714	3.6622	2.4497	1.5746	0.38990		32.000	49.768	9.1422	3.6886	2.4785	1.5940	0.38140
	34.000	53.694	9.9271	3.8025	2.6107	1.4207	0.34529		34.000	53.344	10.1123	3.8277	2.6418	1.4404	0.33742
	36.000	58.251	11.0727	3.9499	2.8033	1.2394	0.30022		36.000	57.760	11.2596	3.9721	2.8346	1.2623	0.29362

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	$\frac{P_{02}}{P_{01}}$
3.70	20.000	83.507	15.6008	4.3797	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	4.3831	3.5696	0.4856	0.18206								
	16.000	84.998	15.6836	4.3859	3.5759	0.4760	0.18138	3.80	2.000	16.600	1.2083	1.1445	1.0558	3.6624	0.99931
	14.000	85.687	15.7147	4.3882	3.5811	0.4680	0.18082		4.000	18.048	1.4503	1.3022	1.1137	3.5291	0.99479
	12.000	86.348	15.7402	4.3901	3.5854	0.4613	0.18035		6.000	19.602	1.7294	1.4718	1.1750	3.3978	0.98349
	10.000	86.988	15.7609	4.3916	3.5889	0.4558	0.17998		8.000	21.258	2.0480	1.6511	1.2404	3.2669	0.96355
	8.000	87.610	15.7772	4.3928	3.5916	0.4515	0.17969		10.000	23.016	2.4088	1.8377	1.3108	3.1354	0.93423
	6.000	88.219	15.7896	4.3937	3.5937	0.4481	0.17947		12.000	24.872	2.8134	2.0288	1.3867	3.0031	0.89586
	4.000	88.817	15.7982	4.3944	3.5951	0.4458	0.17932		14.000	26.821	3.2631	2.2216	1.4688	2.8697	0.84963
	2.000	89.411	15.8033	4.3947	3.5960	0.4444	0.17922		16.000	28.864	3.7592	2.4137	1.5575	2.7353	0.79728
3.75	2.000	16.810	1.2055	1.1426	1.0551	3.6149	0.99933		18.000	31.000	4.3021	2.6026	1.6530	2.6001	0.74088
	4.000	18.260	1.4440	1.2982	1.1123	3.4840	0.99497		20.000	33.229	4.8923	2.7867	1.7556	2.4644	0.68241
	6.000	19.814	1.7184	1.4654	1.1727	3.3550	0.98405		22.000	35.556	5.5299	2.9644	1.8654	2.3283	0.62373
	8.000	21.470	2.0312	1.6420	1.2370	3.2264	0.96476		24.000	37.989	6.2157	3.1348	1.9828	2.1919	0.56627
	10.000	23.227	2.3849	1.8258	1.3062	3.0974	0.93634		26.000	40.542	6.9510	3.2975	2.1080	2.0548	0.51113
	12.000	25.081	2.7813	2.0142	1.3808	2.9674	0.89905		28.000	43.234	7.7378	3.4523	2.2414	1.9166	0.45902
	14.000	27.030	3.2217	2.2046	1.4614	2.8363	0.85397		30.000	46.105	8.5816	3.5997	2.3840	1.7761	0.41022
	16.000	29.072	3.7069	2.3943	1.5482	2.7042	0.80280		32.000	49.218	9.4923	3.7408	2.5375	1.6313	0.36471
	18.000	31.207	4.2379	2.5813	1.6417	2.5712	0.74744		34.000	52.702	10.4940	3.8780	2.7060	1.4778	0.32194
	20.000	33.438	4.8148	2.7637	1.7422	2.4376	0.68987		36.000	56.894	11.6543	4.0175	2.9009	1.3044	0.28030
3.80	2.000	16.810	1.2055	1.1426	1.0551	3.6149	0.99933		38.000	61.192	13.0871	4.2039	3.2082	1.0293	0.22804
	4.000	18.260	1.4440	1.2982	1.1123	3.4840	0.99497		40.000	65.921	14.7269	4.3900	3.4733	0.9690	0.21868
	6.000	19.814	1.7184	1.4654	1.1727	3.3550	0.98405		42.000	71.114	16.5886	4.5836	3.7394	0.9133	0.21066
	8.000	21.470	2.0312	1.6420	1.2370	3.2264	0.96476		44.000	77.572	18.6341	4.8222	4.0175	0.8592	0.18228
	10.000	23.227	2.3849	1.8258	1.3062	3.0974	0.93634		46.000	84.383	20.8822	5.1186	4.3676	0.8071	0.17802
	12.000	25.081	2.7813	2.0142	1.3808	2.9674	0.89905		48.000	91.629	23.3410	5.4824	4.7284	0.75619	0.17286
	14.000	27.030	3.2217	2.2046	1.4614	2.8363	0.85397		50.000	99.319	26.0000	5.9397	5.1116	0.70680	0.16680
	16.000	29.072	3.7069	2.3943	1.5482	2.7042	0.80280		52.000	107.458	28.8428	6.4426	5.5058	0.65870	0.16070
	18.000	31.207	4.2379	2.5813	1.6417	2.5712	0.74744		54.000	116.062	31.8718	7.0000	5.9397	0.61280	0.15444
	20.000	33.438	4.8148	2.7637	1.7422	2.4376	0.68987		56.000	125.141	35.0000	7.6156	6.3656	0.56820	0.14780
3.85	2.000	16.810	1.2055	1.1426	1.0551	3.6149	0.99933		58.000	134.702	38.3112	8.2884	6.7400	0.52420	0.14080
	4.000	18.260	1.4440	1.2982	1.1123	3.4840	0.99497		60.000	144.757	41.7000	9.0222	7.1560	0.48160	0.13340
	6.000	19.814	1.7184	1.4654	1.1727	3.3550	0.98405		62.000	155.317	45.1832	9.8112	7.5156	0.44020	0.12560
	8.000	21.470	2.0312	1.6420	1.2370	3.2264	0.96476		64.000	166.392	48.7600	10.6512	7.9184	0.40000	0.11740
	10.000	23.227	2.3849	1.8258	1.3062	3.0974	0.93634		66.000	177.982	52.4368	11.5312	8.3568	0.36120	0.10880
	12.000	25.081	2.7813	2.0142	1.3808	2.9674	0.89905		68.000	189.997	56.2160	12.4512	8.8312	0.32360	0.10000
	14.000	27.030	3.2217	2.2046	1.4614	2.8363	0.85397		70.000	202.437	60.0960	13.4064	9.3408	0.28640	0.09120
	16.000	29.072	3.7069	2.3943	1.5482	2.7042	0.80280		72.000	215.302	64.0704	14.4000	9.8832	0.25040	0.08240
	18.000	31.207	4.2379	2.5813	1.6417	2.5712	0.74744		74.000	228.592	68.1344	15.4336	10.4464	0.21560	0.07360
	20.000	33.438	4.8148	2.7637	1.7422	2.4376	0.68987		76.000	242.307	72.2912	16.5072	11.0304	0.18160	0.06480

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	12.0723	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		38.501	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	
	38.000	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	83.966	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	0.4880	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	0.4788	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	17.5133	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	0.4465	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	0.4433	0.15783		6.000	19.001	1.7630	1.4915	1.1821	3.5255	0.98171	
	4.000	88.849	17.1193	4.4861	3.8161	0.4410	0.15770		8.000	20.660	2.0992	1.6786	1.2506	3.3874	0.95977	
	2.000	89.426	17.1245	4.4865	3.8169	0.4397	0.15762		10.000	22.422	2.4815	1.8734	1.3246	3.2486	0.92768	
									12.000	24.280	2.9112	2.0724	1.4048	3.1090	0.88602	
									14.000	26.234	3.3902	2.2727	1.4917	2.9684	0.83626	
									16.000	28.281	3.9194	2.4716	1.5858	2.8270	0.78046	
									18.000	30.417	4.4992	2.6664	1.6874	2.6851	0.72095	
									20.000	32.646	5.1304	2.8554	1.7967	2.5430	0.65992	
									22.000	34.969	5.8125	3.0370	1.9139	2.4010	0.59933	
									24.000	37.393	6.5462	3.2103	2.0391	2.2591	0.54068	
									26.000	39.929	7.3323	3.3748	2.1727	2.1172	0.48503	
									28.000	42.598	8.1726	3.5304	2.3149	1.9748	0.43302	
									30.000	45.431	9.0717	3.6778	2.4666	1.8310	0.38488	
									32.000	48.483	10.0386	3.8178	2.6294	1.6838	0.34053	
									34.000	51.859	11.0931	3.9524	2.8067	1.5299	0.29949	
									36.000	55.812	12.2888	4.0863	3.0073	1.3604	0.26054	
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								