

ENGINEERING TRIPOS PART IIB

Wednesday 22 April 2009 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 REQUIREMENTS

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) The *specific speed* of a turbomachine is given by

$$N_s = \phi^{1/2} \psi^{-3/4}$$

where ϕ is the flow coefficient and ψ the stage loading. Briefly describe how this parameter can be used in the preliminary design of a turbomachine. Explain why radial machines are suited to applications that require low values of specific speed. [20%]

(b) A centrifugal compressor design has a rotational speed of 50,000 rpm, a stagnation pressure ratio of 4.5 across the impeller and a mass flow rate of 1.2 kg s^{-1} . The working fluid is air, which enters the compressor axially with a stagnation temperature of 300 K and a stagnation pressure of 100 kPa. The impeller blades are backswept at 30° with a tip speed of 500 m s^{-1} and a slip factor of 0.85. The polytropic efficiency of the impeller based on stagnation conditions is 0.9.

- (i) Calculate the stagnation temperature at impeller exit. [10%]

- (ii) Calculate the ratio of radial velocity to blade speed at impeller exit. Hence show that the specific speed of the compressor based on conditions at impeller exit is 0.6. [15%]

- (iii) Determine the absolute and relative flow angles at impeller exit. Sketch the velocity triangle at this location. [15%]

- (iv) Calculate the absolute Mach number of the flow leaving the impeller and the axial width of the impeller trailing edge. [20%]

(c) The combined pressure recovery of the diffuser and vaneless space is given by the following expression

$$C_p = \frac{p_3 - p_2}{p_{02} - p_2} = 0.6$$

where p_{02} and p_2 are the stagnation pressure and static pressure at impeller exit and p_3 is the static pressure at exit from the diffuser. Determine the total-to-static isentropic efficiency of the complete compressor and comment on the value obtained. [20%]

2 (a) Describe how the blade loading in a turbine cascade varies with the blade pitch. Explain why there is an optimum value of pitch to chord ratio that gives minimum overall loss. [20%]

(b) A two-dimensional linear turbine cascade operates in air with an inlet flow angle of 22° and an inlet Mach number of 0.3. The exit Mach number is measured as 0.93 with an exit flow angle of -61.4° . Calculate the ratio of inlet stagnation pressure to exit static pressure and determine the cascade stagnation pressure loss coefficient. [20%]

(c) The Zweifel loading coefficient for a turbine blade is given by the following equation

$$Z = \frac{\dot{m}|V_{\theta 2} - V_{\theta 1}|}{(p_{01} - p_2)c_x h}$$

where \dot{m} is the mass flow rate through the blade passage, $V_{\theta 1}$ and $V_{\theta 2}$ are the tangential flow velocities at inlet and exit, p_{01} is the inlet stagnation pressure, p_2 is the exit static pressure, c_x is the blade axial chord and h is the blade height. If the Zweifel loading coefficient for the cascade is 0.6, determine the pitch to axial chord ratio for the blades. [30%]

(d) The blade design tested in the cascade is to be used for a rotor in an air turbine that rotates at 6000 rpm. At the design condition, the rotor flow angles and Mach numbers are matched to those in the cascade and the Zweifel loading coefficient is the same. The rotor inlet absolute stagnation temperature is 550 K and the absolute flow angle from the upstream stator is 70° . Calculate the rotor mean blade speed and determine the number of rotor blades required if the blade axial chord is 36 mm. Also calculate the rotor flow coefficient. [30%]

Note that all angles are measured with respect to the axial direction and they are positive in the direction of rotation. Use $\gamma = 1.4$, $R = 287.15 \text{ J kg}^{-1} \text{ K}^{-1}$ and $c_p = 1005 \text{ J kg}^{-1} \text{ K}^{-1}$ for air throughout the question.

(TURN OVER

3 (a) In a turbojet engine, both the turbine stator and the exhaust propulsive nozzle are choked. The mass flow rate of the fuel addition, the pressure loss in the combustor and the pressure loss in the exhaust nozzle are negligible.

(i) Describe, with mathematical expressions, a method for determining the operating line on the compressor map. If the specific heat capacity c_p the ratio of specific heats γ and the turbine polytropic efficiency $\eta_{p,t}$ can all be treated as constants, show that the compressor operating point is a function of the ratio of turbine entry temperature to compressor entry temperature T_{03}/T_{01} and the compressor polytropic efficiency $\eta_{p,c}$. [40%]

(ii) Sketch a typical high-speed compressor map showing an operating line assuming that $\eta_{p,c}$ has a constant value. Explain how the shape of this operating line will change if $\eta_{p,c}$ reduces with engine rotational speed. [20%]

(b) Consider the matching problem that arises for a high speed, high pressure ratio multistage compressor at part speed.

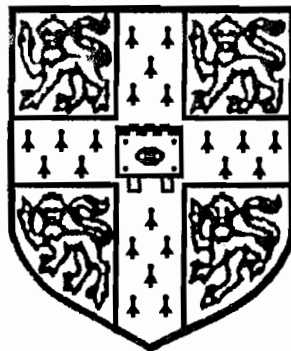
(i) With the aid of sketches, show the regions of a stage compressor characteristic where typical front, middle and rear stages operate at part speed. Hence state the aerodynamic problems facing the different sections of the compressor. [20%]

(ii) Name two practical engineering solutions to the compressor matching problem and comment on their relative advantages and disadvantages. [20%]

END OF PAPER

Compressible
Flow
Data Book
for Part II of the
Engineering Tripos

2006 Edition



Cambridge University Engineering Department

PERFECT GAS RELATIONS FOR COMPRESSIBLE FLOW

Ratios of stagnation to static quantities

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

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

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

Notes:

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

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

Mach number relations (see tables)

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

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

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

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

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

ONE-DIMENSIONAL FLOW OF A PERFECT GAS

Isentropic flow

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

Adiabatic constant area flow

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

Normal shock waves in perfect gases

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

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

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

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

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

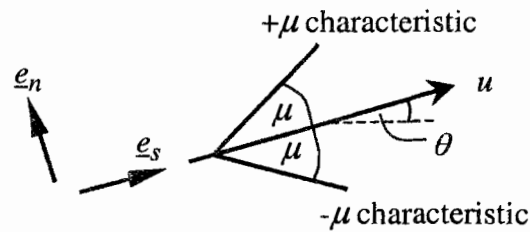
$$\frac{T_s}{T} = \frac{\gamma-1}{(\gamma+1)^2} \frac{2}{M^2} \left(1 + \frac{\gamma-1}{2} M^2 \right) \left(\frac{2\gamma M^2 - 1}{\gamma-1} \right)$$

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

TWO DIMENSIONAL SUPERSONIC FLOW

Method of Characteristics for 2-D supersonic flow

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



Mach Number $M = u/c$

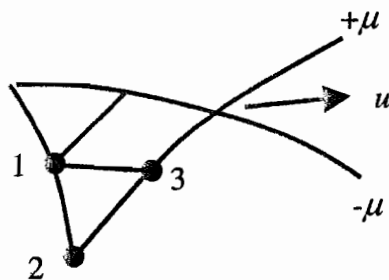
Mach angle $\mu = \sin^{-1}\left(\frac{1}{M}\right)$

Prandtl-Meyer function $\nu = \int_1^M \sqrt{M^2 - 1} \frac{du}{u}$

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

Calculations

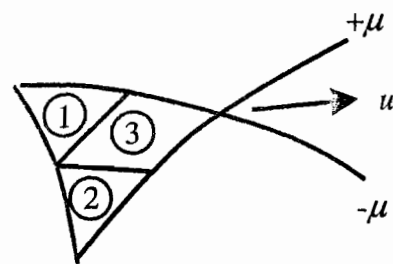
Lattice Method



$\nu_3 - \theta_3 = \nu_2 - \theta_2$ along $+\mu$

$\nu_3 + \theta_3 = \nu_1 + \theta_1$ along $-\mu$

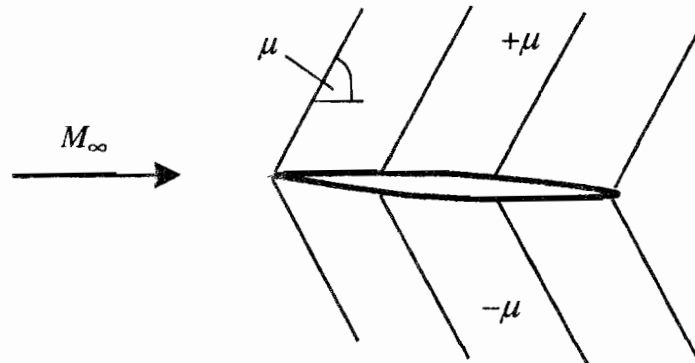
Field (or wave) method



$\nu_3 + \theta_3 = \nu_1 + \theta_1$ across $+\mu$

$\nu_3 - \theta_3 = \nu_2 - \theta_2$ across $-\mu$

Linearised Method of Characteristics (thin film theory)

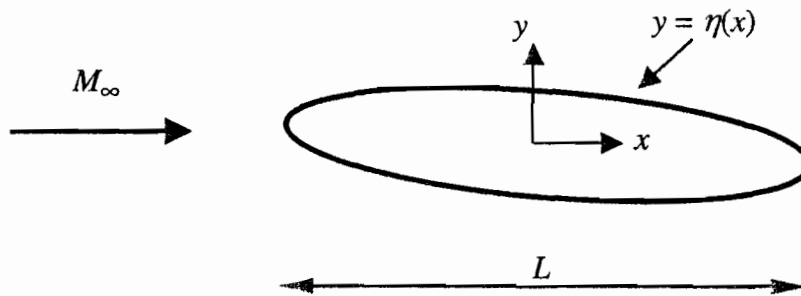


$$\mu \approx \sin^{-1}(1/M_\infty)$$

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

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

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



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)

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

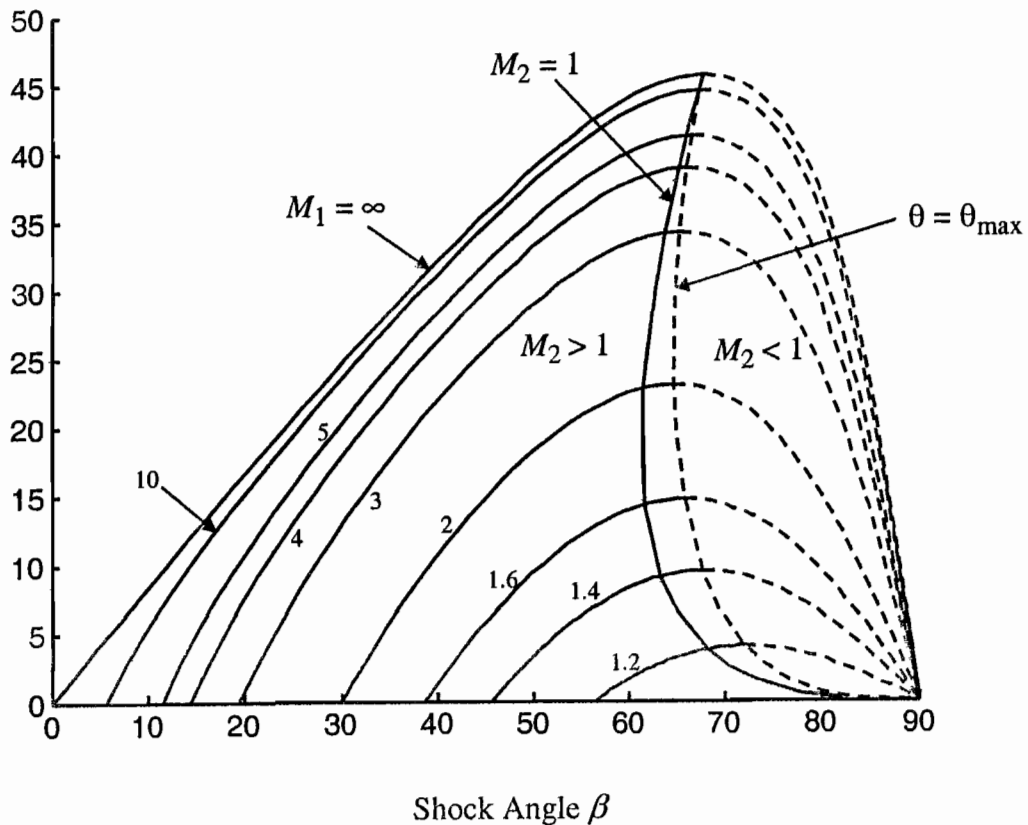
$$\frac{T_2}{T_1} = \frac{\gamma-1}{(\gamma+1)^2} \frac{2}{M_1^2 \sin^2 \beta} \left(1 + \frac{\gamma-1}{2} M_1^2 \sin^2 \beta \right) \left(\frac{2\gamma}{\gamma-1} M_1^2 \sin^2 \beta - 1 \right)$$

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

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

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

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



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

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

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

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

$\gamma=1.400$

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

$\gamma=1.400$

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

$\gamma=1.400$

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

$\gamma=1.400$

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

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

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

$$\gamma=1.333$$

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

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

M	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\rho V^2$ p_0
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	$\frac{T}{T_0}$	$\frac{p}{p_0}$	$\frac{\rho}{\rho_0}$	$\frac{V}{\sqrt{c_p T_0}}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap_0}$	$\frac{\dot{m}\sqrt{c_p T_0}}{Ap}$	$\frac{F}{\dot{m}\sqrt{c_p T_0}}$	$\frac{4c_f L_{\max}}{D}$	$\frac{1}{2}\frac{\rho V^2}{p_0}$
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	0.99996	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	0.99590
	2.671	73.822	1.2565	1.1767	1.0678	0.9598	0.99879		4.000	48.679	1.2169	1.1503	1.0579	1.3091	0.99923
	2.000	81.173	1.3399	1.2316	1.0880	0.9007	0.99745		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	55.517	1.5000	1.3333	1.1250	1.1460	0.99325
	3.944	71.977	1.3525	1.2397	1.0910	0.9502	0.99720		10.000	61.046	1.7114	1.4613	1.1712	1.0317	0.98440
	2.000	83.861	1.4941	1.3297	1.1237	0.8551	0.99344		10.000	72.994	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		8.000	78.197	2.1836	1.7232	1.2672	0.7777	0.95324
	4.000	61.986	1.2541	1.1752	1.0672	1.0721	0.99882		6.000	81.733	2.2355	1.7501	1.2774	0.7485	0.94905
	5.286	70.540	1.4539	1.3045	1.1146	0.9423	0.99468		4.000	84.702	2.2653	1.7654	1.2832	0.7316	0.94659
	4.000	79.385	1.5944	1.3913	1.1459	0.8525	0.98975		2.000	87.406	2.2812	1.7736	1.2862	0.7225	0.94526
	2.000	85.211	1.6435	1.4210	1.1566	0.8209	0.98763								
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	57.423	1.2334	1.1613	1.0621	1.1398	0.99906		4.000	46.543	1.2165	1.1500	1.0578	1.3615	0.99923
	6.000	63.459	1.4113	1.2775	1.1048	1.0274	0.99585		6.000	49.326	1.3433	1.2337	1.0888	1.2879	0.99739
	6.662	69.395	1.5608	1.3709	1.1386	0.9359	0.99108		8.000	52.571	1.4887	1.3263	1.1224	1.2079	0.99362
	6.000	75.372	1.6793	1.4423	1.1643	0.8636	0.98598		10.000	56.679	1.6662	1.4345	1.1615	1.1144	0.98660
	4.000	81.649	1.7634	1.4917	1.1822	0.8118	0.98169		12.000	64.359	1.9668	1.6088	1.2241	0.9607	0.96385
	2.000	86.058	1.7957	1.5103	1.1889	0.7918	0.97990		12.113	66.589	2.0439	1.6489	1.2396	0.9213	0.95860
1.35	2.000	50.634	1.1042	1.0733	1.0287	1.2774	0.99990		12.000	68.790	2.1147	1.6869	1.2537	0.8849	0.95860
	4.000	53.965	1.2238	1.1549	1.0596	1.1994	0.99916		10.000	75.995	2.3046	1.7855	1.2908	0.7854	0.94329
	6.000	58.232	1.3702	1.2512	1.0952	1.0889	0.99682		8.000	79.712	2.3746	1.8207	1.3042	0.7476	0.93725
	8.000	66.914	1.6327	1.4145	1.1543	0.9543	0.98812		6.000	82.662	2.4155	1.8410	1.3121	0.7250	0.93363
	8.048	68.470	1.6327	1.4387	1.1630	0.9307	0.98627		4.000	85.256	2.4404	1.8533	1.3168	0.7112	0.93141
	8.000	70.023	1.6732	1.4613	1.1712	0.9085	0.98440		2.000	87.668	2.4540	1.8599	1.3194	0.7035	0.93018
	6.000	78.660	1.8774	1.5569	1.2058	0.8111	0.97506								
	4.000	83.028	1.9283	1.5854	1.2163	0.7807	0.97182		2.000	42.315	1.1036	1.0729	1.0286	1.4821	0.99990
	2.000	86.644	1.9523	1.5988	1.2211	0.7662	0.97023		4.000	44.642	1.2173	1.1505	1.0580	1.4130	0.99923
1.40	2.000	48.173	1.1030	1.0725	1.0284	1.3295	0.99990	1.55	2.000	42.315	1.1036	1.0729	1.0286	1.4821	0.99990
	4.000	51.117	1.2189	1.1516	1.0584	1.2553	0.99921		4.000	44.642	1.2173	1.1505	1.0580	1.4130	0.99923
	6.000	54.633	1.3539	1.2406	1.0913	1.1737	0.99717		6.000	47.214	1.3430	1.2336	1.0887	1.3414	0.99739
	8.000	59.367	1.5263	1.3496	1.1309	1.0744	0.99235		8.000	50.131	1.4845	1.3236	1.1215	1.2651	0.99375
9.427	67.716	1.7912	1.5077	1.1880	1.1880	0.9266	0.98016		10.000	53.598	1.6491	1.4243	1.1578	1.1804	0.98738
									12.000	58.240	1.8597	1.5469	1.2022	1.0758	0.97615
									13.403	66.171	2.1787	1.7206	1.2663	0.9198	0.95362
									12.000	73.688	2.4151	1.8408	1.3120	0.8014	0.93367
									10.000	77.804	2.5112	1.8877	1.3302	0.7515	0.92496
									8.000	80.825	2.5650	1.9136	1.3404	0.7229	0.91995
									6.000	83.385	2.5991	1.9298	1.3468	0.7045	0.91673
									4.000	85.699	2.6205	1.9399	1.3508	0.6928	0.91470
									2.000	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	0.85356	
	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	1.6816	0.99989
	14.000	60.537	2.0974	1.6777	1.2502	1.0232	0.95990		4.000	38.651		1.2271	1.1571	1.0605	1.6133	0.99913
	14.652	65.828	2.3192	1.7929	1.2936	0.9188	0.94204		6.000	40.756		1.3561	1.2421	1.0918	1.5441	0.99713
	14.000	70.895	2.5000	1.8824	1.3281	0.8320	0.92598		8.000	43.034		1.4973	1.3317	1.1244	1.4733	0.99334
	12.000	75.900	2.6428	1.9504	1.3550	0.7611	0.91256		10.000	45.531		1.6529	1.4266	1.1586	1.3995	0.98721
10.000	79.102	2.7132	1.9831	1.3682	0.7018	0.90139		14.000	51.547		1.8263	1.5279	1.1953	1.3210	0.97814	
8.000	81.691	2.7576	2.0035	1.3764	0.6862	0.89848		16.000	55.589		2.0245	1.6384	1.2357	1.2348	0.96524	
6.000	83.967	2.7870	2.0168	1.3819	0.6862	0.89848		18.000	62.944		2.2652	1.7654	1.2831	1.1329	0.94660	
4.000	86.061	2.8059	2.0254	1.3854	0.6761	0.89660		18.000	62.944		2.6670	1.9617	1.3595	0.9645	0.91023	
2.000	88.054	2.8166	2.0302	1.3873	0.6703	0.89554		18.121	65.134		2.7745	2.0112	1.3795	0.9189	0.89972	
1.65	2.000	39.267	1.1058	1.0744	1.0292	1.5823	0.99990		18.000	67.269	2.8728	2.0554	1.3977	0.8766	0.88991	
	4.000	41.377	1.2212	1.1531	1.0590	1.5140	0.99919		16.000	73.757	3.1267	2.1651	1.4441	0.7635	0.86389	
	6.000	43.665	1.3475	1.2365	1.0898	1.4444	0.99919		14.000	76.988	3.2251	2.2060	1.4620	0.7175	0.85362	
	8.000	46.181	1.4869	1.3252	1.1221	1.3720	0.99730		12.000	79.465	3.2868	2.2312	1.4731	0.6878	0.84714	
	10.000	49.007	1.6429	1.4206	1.1565	1.2952	0.99367		10.000	81.570	3.3295	2.2484	1.4808	0.6669	0.84266	
	12.000	52.312	1.8224	1.5257	1.1945	1.2104	0.98766		8.000	83.451	3.3598	2.2606	1.4862	0.6518	0.83947	
	14.000	56.541	2.0441	1.6490	1.2396	1.1090	0.97837		6.000	85.190	3.3811	2.2691	1.4901	0.6409	0.83722	
	15.855	65.547	2.4653	1.8655	1.3215	0.9184	0.96384		4.000	86.838	3.3954	2.2748	1.4926	0.6337	0.83571	
	14.000	73.864	2.7642	2.0065	1.3776	0.7782	0.90073		2.000	88.432	3.4036	2.2780	1.4941	0.6295	0.83485	
	12.000	77.411	2.8587	2.0491	1.3951	0.7317	0.89132	1.80	2.000	35.538		1.1104	1.0776	1.0304	1.7312	0.99988
10.000	80.102	2.9157	2.0744	1.4056	0.7029	0.88557		4.000	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		6.000	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		8.000	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		10.000	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		12.000	46.686		1.8345	1.5326	1.1970	1.3725	0.97766	
1.70	2.000	37.927	1.1072	1.0754	1.0295	1.6320	0.99989		14.000	49.661	2.0295	1.6411	1.2367	1.2896	0.96489	
	4.000	39.957	1.2239	1.1550	1.0597	1.5638	0.99916		16.000	53.198	2.2568	1.7611	1.2815	1.1958	0.94729	
	6.000	42.145	1.3514	1.2390	1.0907	1.4946	0.99722		18.000	57.995	2.5516	1.9072	1.3379	1.0766	0.92120	
	8.000	44.528	1.4914	1.3280	1.1231	1.4232	0.99353		19.183	64.987	2.9376	2.0839	1.4096	0.9195	0.88335	
	10.000	47.167	1.6466	1.4228	1.1573	1.3482	0.98750		18.000	71.424	3.2297	2.2079	1.4628	0.7956	0.85313	
	12.000	50.168	1.8216	1.5252	1.1943	1.2674	0.97841		16.000	75.324	3.4707	2.2650	1.4882	0.7327	0.83832	
	14.000	53.771	2.0273	1.6399	1.2362	1.1757	0.96504		14.000	80.214	3.4505	2.2965	1.5025	0.6958	0.82990	
	16.000	58.794	2.2999	1.7831	1.2898	1.0569	0.94369		12.000	82.128	3.5424	2.3322	1.5121	0.6703	0.82423	
	17.012	65.319	2.6171	1.9383	1.3502	0.9185	0.91502		10.000	83.865	3.5702	2.3428	1.5189	0.6518	0.82018	
	16.000	71.426	2.8629	2.0510	1.3959	0.8077	0.89090		8.000	85.485	3.5899	2.3503	1.5239	0.6381	0.81725	
14.000	75.670	2.9984	2.1104	1.4208	0.7439	0.87713		6.000	87.028	3.6032	2.3554	1.5274	0.6283	0.81516		
12.000	78.555	3.0722	2.1421	1.4342	0.7080	0.86953		4.000	88.525	3.6108	2.3583	1.5288	0.6216	0.81376		
8.000	82.965	3.1544	2.1767	1.4492	0.6838	0.86450		2.000					0.6178	0.81295		

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	2.00	34.466	1.1121	1.0788	1.0309	1.7805	0.99988	1.95	2.00	32.528	1.1160	1.0815	1.0319	1.8790	0.99987
	4.00	36.323	1.2343	1.1619	1.0623	1.7114	0.99905		4.00	34.304	1.2424	1.1674	1.0643	1.8085	0.99896
	6.00	38.302	1.3672	1.2492	1.0945	1.6418	0.99689		6.00	36.191	1.3801	1.2575	1.0975	1.7380	0.99660
	8.00	40.424	1.5123	1.3409	1.1278	1.5711	0.99284		8.00	38.204	1.5302	1.3521	1.1318	1.6666	0.99221
	10.00	42.717	1.6709	1.4373	1.1625	1.4983	0.98638		10.00	40.360	1.6938	1.4509	1.1674	1.5938	0.98528
	12.00	45.223	1.8453	1.5388	1.1992	1.4224	0.97701		12.00	42.688	1.8726	1.5542	1.2049	1.5185	0.97535
	14.00	48.014	2.0395	1.6465	1.2387	1.3415	0.96417		14.00	45.230	2.0693	1.6625	1.2446	1.4396	0.96200
	16.00	51.232	2.2607	1.7631	1.2822	1.2524	0.94697		16.00	48.059	2.2879	1.7770	1.2875	1.3553	0.94470
	18.00	55.227	2.5275	1.8956	1.3333	1.1476	0.92345		18.00	51.320	2.5368	1.9001	1.3351	1.2622	0.92258
	20.00	62.099	2.9519	2.0902	1.4123	0.9818	0.88189		20.00	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	3.7333	2.3833	1.5429	0.6773	0.80593		18.000	75.964	4.0086	2.5030	1.5801	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	0.75335	
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	2.00	33.466	1.1140	1.0801	1.0314	1.8298	0.99987	2.00	2.00	31.647	1.1180	1.0829	1.0324	1.9280	0.99986
	4.00	35.279	1.2382	1.1646	1.0633	1.7600	0.99901		4.00	33.390	1.2468	1.1702	1.0654	1.8568	0.99891
	6.00	37.209	1.3735	1.2533	1.0959	1.6901	0.99675		6.00	35.241	1.3871	1.2620	1.0991	1.7856	0.99644
	8.00	39.272	1.5209	1.3463	1.1297	1.6191	0.99254		8.00	37.210	1.5400	1.3581	1.1339	1.7138	0.99186
	10.00	41.490	1.6818	1.4438	1.1649	1.5464	0.98586		10.00	39.314	1.7066	1.4584	1.1702	1.6405	0.98464
	12.00	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
	14.00	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
	16.00	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
	18.00	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
	20.00	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		22.974	64.669	3.6458	2.3715	1.5373	0.9243	0.80926
	18.000	74.861	3.7578	2.4131	1.5572	0.7274	0.79744		22.000	70.332	3.9714	2.4899	1.5950	0.8017	0.77503
	16.000	77.463	3.8466	2.4455	1.5729	0.6884	0.78810		20.000	74.270	4.1570	2.4899	1.5950	0.8017	0.77503
	14.000	79.565	3.9068	2.4671	1.5836	0.6611	0.78178		18.000	76.862	4.2589	2.5883	1.6454	0.6854	0.74529
	12.000	81.383	3.9504	2.4826	1.5913	0.6409	0.77721		16.000	78.921	4.3277	2.6110	1.6574	0.6558	0.73827
	10.000	83.020	3.9828	2.4940	1.5970	0.6257	0.77383		14.000	80.684	4.3777	2.6274	1.6662	0.63319	0.73319
8.000	84.534	4.0068	2.5024	1.6012	0.6142	0.77133		12.000	82.257	4.4153	2.6396	1.6727	0.6168	0.72939	
6.000	85.965	4.0241	2.5084	1.6042	0.6058	0.76953		10.000	83.700	4.4438	2.6487	1.6777	0.6037	0.72652	
4.000	87.338	4.0359	2.5125	1.6063	0.6001	0.76830		8.000	85.052	4.4653	2.6556	1.6815	0.5937	0.72436	
2.000	88.677	4.0428	2.5149	1.6075	0.5967	0.76759		6.000	86.339	4.4810	2.6606	1.6842	0.5864	0.72278	
								4.000	87.582	4.4917	2.6640	1.6861	0.5813	0.72171	
								2.000	88.798	4.4979	2.6660	1.6871	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	$\frac{P_{02}}{P_{01}}$
2.05	2.00	30.816	1.1200	1.0843	1.0330	1.9771	0.99985	2.10	4.000	87.778	4.9706	2.8097	1.7691	0.5648	0.67494
	4.00	32.532	1.2512	1.1732	1.0665	1.9050	0.99885	2.000	2.000	88.894	4.9764	2.8113	1.7701	0.5622	0.67438
	6.00	34.350	1.3943	1.2666	1.1008	1.8330	0.99627								
	8.00	36.281	1.5502	1.3644	1.1362	1.7605	0.99148								
	10.00	38.341	1.7201	1.4664	1.1730	1.6868	0.98396		2.15	29.293	1.1243	1.0872	1.0341	2.0749	0.99984
	12.00	40.547	1.9053	1.5726	1.2116	1.6111	0.97330		4.000	30.960	1.2606	1.1794	1.0688	2.0008	0.99874
	14.00	42.928	2.1076	1.6831	1.2522	1.5326	0.95914		6.000	32.725	1.4094	1.2763	1.1043	1.9271	0.99590
	16.00	45.528	2.3300	1.7983	1.2956	1.4500	0.94112		8.000	34.596	1.5719	1.3777	1.1410	1.8529	0.99065
	18.00	48.428	2.5774	1.9195	1.3427	1.3614	0.91878		10.000	36.584	1.7490	1.4833	1.1791	1.7778	0.98246
	20.00	51.785	2.8600	2.0497	1.3953	1.2630	0.89120		12.000	38.702	1.9417	1.5929	1.2190	1.7011	0.97093
	22.00	56.032	3.2057	2.1980	1.4585	1.1444	0.85565		14.000	40.971	2.1518	1.7065	1.2610	1.6221	0.95574
	23.814	64.638	3.8367	2.4419	1.5712	0.9257	0.78913		16.000	43.422	2.3813	1.8241	1.3055	1.5397	0.93666
22.000	72.193	4.2777	2.5946	1.6487	0.7626	0.74336		18.000	46.104	2.6337	1.9461	1.3533	1.4527	0.91343	
20.000	75.324	4.4215	2.6416	1.6738	0.7056	0.72876		20.000	49.106	2.9150	2.0740	1.4055	1.3588	0.88564	
18.000	77.614	4.5107	2.6700	1.6894	0.6688	0.71981		22.000	52.618	3.2384	2.2115	1.4644	1.2534	0.85222	
16.000	79.498	4.5734	2.6898	1.7003	0.6422	0.71356		24.000	57.217	3.6452	2.3712	1.5372	1.1223	0.80932	
14.000	81.138	4.6199	2.7043	1.7084	0.6219	0.70894		25.376	64.616	4.2352	2.5804	1.6413	0.9289	0.74772	
12.000	82.617	4.6553	2.7152	1.7145	0.6062	0.70545		24.000	71.164	4.6641	2.7180	1.7160	0.7794	0.70458	
10.000	83.983	4.6824	2.7236	1.7192	0.5939	0.70278		22.000	74.564	4.8442	2.7725	1.7472	0.7122	0.68703	
8.000	85.289	4.7029	2.7299	1.7228	0.5846	0.70077		20.000	76.920	4.9500	2.8037	1.7656	0.6709	0.67689	
6.000	86.497	4.7179	2.7344	1.7254	0.5776	0.69930		18.000	78.817	5.0234	2.8249	1.7782	0.65994	0.66994	
4.000	87.685	4.7283	2.7376	1.7272	0.5728	0.69829		16.000	80.444	5.0776	2.8405	1.7876	0.6488	0.66484	
2.000	88.849	4.7343	2.7394	1.7282	0.5700	0.69770		14.000	81.896	5.1191	2.8523	1.7947	0.6012	0.66097	
								12.000	83.224	5.1512	2.8613	1.8003	0.5874	0.65798	
								10.000	84.464	5.1761	2.8683	1.8046	0.5765	0.65568	
								8.000	85.639	5.1951	2.8736	1.8078	0.5680	0.65392	
								6.000	86.767	5.2091	2.8775	1.8103	0.5617	0.65263	
								4.000	87.862	5.2187	2.8802	1.8119	0.5574	0.65174	
								2.000	88.936	5.2244	2.8818	1.8129	0.5548	0.65122	
								2.20	2.000	28.592	1.1266	1.0888	1.0347	2.1237	0.99983
								4.000	30.238	30.238	1.2654	1.1826	1.0700	2.0485	0.99867
								6.000	31.981	31.981	1.4173	1.2813	1.1061	1.9738	0.99569
								8.000	33.827	33.827	1.5832	1.3845	1.1435	1.8987	0.99205
								10.000	35.785	35.785	1.7641	1.4921	1.1823	1.8228	0.98165
								12.000	37.869	37.869	1.9611	1.6036	1.2229	1.7454	0.96964
								14.000	40.095	40.095	2.1756	1.7190	1.2656	1.6657	0.95387
								16.000	42.489	42.489	2.4095	1.8380	1.3109	1.5831	0.93417
								18.000	45.092	45.092	2.6658	1.9611	1.3593	1.4963	0.91035
								20.000	47.975	47.975	2.9494	2.0891	1.4118	1.4035	0.88215
								22.000	51.277	51.277	3.2704	2.2245	1.4701	1.3013	0.84887
								24.000	55.356	55.356	3.6552	2.3750	1.5390	1.1805	0.80826
								26.000	62.695	62.695	4.2918	2.5992	1.6512	0.9795	0.74193
								26.103	64.620	64.620	4.4426	2.6484	1.6775	0.9305	0.72663
								26.000	66.480	66.480	4.5807	2.6921	1.7015	0.8849	0.71283
								24.000	72.560	72.560	4.9725	2.8103	1.7695	0.7490	0.67473
								22.000	75.420	75.420	5.1222	2.8531	1.7953	0.6936	0.66068

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
	18.000	79.308	5.2856	2.8987	1.8234	0.6296	0.64562		18.000	43.299	2.7360	1.9936	1.3724	1.5804	0.90351
	16.000	80.839	5.3369	2.9127	1.8323	0.6086	0.64096		20.000	46.007	3.0276	2.1230	1.4261	1.4885	0.87413
	14.000	82.216	5.3764	2.9235	1.8391	0.5789	0.63739		22.000	49.026	3.3514	2.2573	1.4847	1.3894	0.84035
	12.000	83.483	5.4073	2.9318	1.8444	0.5686	0.63462		24.000	52.536	3.7216	2.3998	1.5508	1.2788	0.80125
	10.000	84.670	5.4313	2.9382	1.8485	0.5605	0.63247		26.000	57.077	4.1819	2.5625	1.6319	1.1425	0.75319
	8.000	85.798	5.4497	2.9431	1.8517	0.5545	0.63083		27.454	64.653	4.8739	2.7813	1.7524	0.9338	0.68417
	6.000	86.883	5.4633	2.9468	1.8540	0.5503	0.62962		28.000	71.264	5.3682	2.9212	1.8377	0.7743	0.63813
	4.000	87.938	5.4727	2.9493	1.8556	0.5479	0.62879		24.000	74.512	5.5649	2.9736	1.8714	0.7060	0.62065
	2.000	88.973	5.4782	2.9507	1.8565	0.5479	0.62830		22.000	76.770	5.6817	3.0039	1.8915	0.6635	0.61049
2.25	2.000	27.926	1.1288	1.0903	1.0353	2.1725	0.99982		20.000	78.582	5.7631	3.0246	1.9054	0.6328	0.60352
	4.000	29.555	1.2703	1.1859	1.0712	2.0962	0.99861		18.000	80.133	5.8238	3.0399	1.9158	0.6092	0.59838
	6.000	31.277	1.4254	1.2864	1.1080	2.0203	0.99548		16.000	81.509	5.8705	3.0515	1.9238	0.5906	0.59445
	8.000	33.102	1.5949	1.3916	1.1461	1.9443	0.98973		14.000	82.764	5.9071	3.0606	1.9301	0.5757	0.59139
	10.000	35.034	1.7798	1.5011	1.1856	1.8674	0.98079		12.000	83.928	5.9360	3.0677	1.9350	0.5638	0.58899
	12.000	37.088	1.9812	1.6147	1.2270	1.7891	0.96827		10.000	85.026	5.9586	3.0732	1.9389	0.5543	0.58712
	14.000	39.277	2.2004	1.7319	1.2705	1.7088	0.95189		8.000	86.074	5.9761	3.0775	1.9419	0.5469	0.58568
	16.000	41.623	2.4392	1.8527	1.3166	1.7088	0.95189		6.000	87.085	5.9980	3.0807	1.9441	0.5413	0.58461
	18.000	44.161	2.7000	1.9770	1.3657	1.6257	0.93152		4.000	88.070	5.9980	3.0828	1.9456	0.5374	0.58387
	20.000	46.948	2.9871	2.1055	1.4187	1.5388	0.90703		2.000	89.039	6.0033	3.0841	1.9465	0.5352	0.58344
2.30	2.000	27.294	1.1311	1.0919	1.0359	2.2212	0.99981	2.35	2.000	26.692	1.1334	1.0935	1.0365	2.2698	0.95980
	4.000	28.906	1.2753	1.1892	1.0724	2.1437	0.99854		4.000	28.289	1.2804	1.1926	1.0736	2.1911	0.99846
	6.000	30.611	1.4336	1.2916	1.1099	2.0667	0.99526		6.000	29.979	1.4420	1.2970	1.1118	2.1129	0.99502
	8.000	32.415	1.6068	1.3988	1.1487	1.9896	0.98923		8.000	31.765	1.6189	1.4062	1.1513	2.0346	0.98872
	10.000	34.326	1.7959	1.5104	1.1890	1.9117	0.97989		10.000	33.657	1.8124	1.5199	1.1924	1.9557	0.97895
	12.000	36.354	2.0019	1.6260	1.2311	1.8325	0.96684		12.000	35.662	2.0232	1.6376	1.2354	1.8755	0.96534
	14.000	38.510	2.2261	1.7452	1.2755	1.7514	0.94982		14.000	37.790	2.2526	1.7589	1.2807	1.7934	0.94765
									16.000	40.060	2.5021	1.8833	1.3285	1.7089	0.92580
									18.000	42.497	2.7736	2.0108	1.3794	1.6212	0.89981
									20.000	45.140	3.0705	2.1413	1.4339	1.5291	0.86971
2.30	2.000	27.294	1.1311	1.0919	1.0359	2.2212	0.99981		22.000	48.059	3.3981	2.2759	1.4931	1.4308	0.83542
	4.000	28.906	1.2753	1.1892	1.0724	2.1437	0.99854		24.000	51.393	3.7677	2.4168	1.5590	1.3227	0.79639
	6.000	30.611	1.4336	1.2916	1.1099	2.0667	0.99526		26.000	55.500	4.2092	2.5717	1.6367	1.1954	0.75038
	8.000	32.415	1.6068	1.3988	1.1487	1.9896	0.98923		28.000	62.973	4.9459	2.8024	1.7648	0.9810	0.67729
	10.000	34.326	1.7959	1.5104	1.1890	1.9117	0.97989		28.000	64.679	5.0977	2.8462	1.7911	0.9354	0.66296
	12.000	36.354	2.0019	1.6260	1.2311	1.8325	0.96684		28.000	66.328	5.2377	2.8855	1.8152	0.8927	0.65000
	14.000	38.510	2.2261	1.7452	1.2755	1.7514	0.94982		26.000	72.454	5.6907	3.0062	1.8930	0.7474	0.60972
									24.000	75.251	5.8587	3.0486	1.9218	0.6895	0.59544
									22.000	77.317	5.9657	3.0750	1.9401	0.6510	0.58653
									20.000	79.014	6.0423	3.0936	1.9532	0.6224	0.58024

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	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	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	26.000	70.828	6.0810	3.1029	1.9598	0.7837	0.57709	
	4.000	27.702	1.2856	1.1960	1.0749	2.2383	0.99838	24.000	24.000	74.185	6.3161	3.1582	1.9999	0.7082	0.55836	
	6.000	29.377	1.4505	1.3023	1.1138	2.1589	0.99479	22.000	22.000	78.236	6.5451	3.2101	2.0389	0.6623	0.54076	
	8.000	31.149	1.6314	1.4137	1.1540	2.0794	0.98818	20.000	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	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	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	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	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	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	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	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	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	2.000	89.119	6.8346	3.2730	2.0882	0.5186	0.51943	
	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	38.057	1.1405	1.0984	1.0384	2.4155	0.99977
	28.000	69.291	5.7130	3.0119	1.8968	0.8201	0.60781		4.000	26.609	42.890	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	28.259	46.502	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	30.005	48.600	1.6568	1.4289	1.1595	2.1685	0.98703
	22.000	77.803	6.2534	3.1436	1.9892	0.6397	0.56329		10.000	31.851	49.600	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	33.802	49.600	2.0900	1.6737	1.2488	2.0022	0.96046
	18.000	80.800	6.3816	3.1732	2.0111	0.5919	0.54990		14.000	35.866	48.600	2.3364	1.8015	1.2969	1.9169	0.94057
16.000	82.059	6.4251	3.1831	2.0185	0.5751	0.54266	16.000		38.057	45.602	2.6042	1.9322	1.3478	1.8295	0.91625	
14.000	83.217	6.4596	3.1909	2.0244	0.55615	0.54726	18.000		40.389	42.890	2.8949	2.0652	1.4018	1.7394	0.88767	
12.000	84.299	6.4870	3.1971	2.0290	0.5416	0.54352	20.000		42.890	40.389	3.2109	2.2002	1.4594	1.6458	0.85510	
10.000	85.324	6.5087	3.2019	2.0327	0.5348	0.54225	22.000		45.602	38.057	3.5558	2.3373	1.5213	1.5475	0.81877	
8.000	86.306	6.5254	3.2057	2.0356	0.5348	0.54225	24.000		48.600	35.866	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		52.036	32.673	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		56.335	28.259	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	24.000	5.8014	3.0342	1.9120	0.9402	0.60027	
							28.000		71.949	20.000	6.4249	3.1831	2.0185	0.7573	0.54992	
							26.000		74.856	16.000	6.6273	3.2282	2.0529	0.6928	0.53460	
							24.000		76.939	12.000	6.7526	3.2555	2.0742	0.6509	0.52537	
							22.000		78.625	8.000	6.8414	3.2744	2.0893	0.6201	0.51894	
							20.000		80.070	6.000	6.9082	3.2885	2.1007	0.5962	0.51417	
							18.000		81.353	4.000	6.9602	3.2994	2.1095	0.5770	0.51048	
							16.000	82.518	2.000	7.0014	3.3080	2.1165	0.5616	0.50759		
							14.000	83.598		7.0343	3.3148	2.1221	0.5489	0.50528		
							12.000	84.612		7.0607	3.3202	2.1266	0.5387	0.50345		
							10.000	85.576		7.0816	3.3245	2.1301	0.5304	0.50200		
							8.000	86.502		7.0979	3.3278	2.1329	0.5240	0.50088		
							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	$\frac{P_{02}}{P_{01}}$
2.65	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	48.200	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		28.000	51.579	5.2490	2.8886	1.8171	1.3832	0.64896
	4.000	24.696	1.3179	1.2172	1.0827	2.5201	0.99786		30.000	55.674	5.8507	3.0466	1.9204	1.2416	0.59611
	6.000	26.311	1.5042	1.3360	1.1260	2.4321	0.99311		32.000	62.549	6.7812	3.2616	2.0791	1.0209	0.52329
	8.000	28.019	1.7102	1.4605	1.1709	2.3444	0.98446		32.173	65.002	7.0807	3.3243	2.1300	0.9476	0.50207
	10.000	29.824	1.9369	1.5902	1.2180	2.2561	0.97125		32.000	67.323	7.3448	3.3773	2.1748	0.8812	0.48420
	12.000	31.728	2.1855	1.7241	1.2676	2.1669	0.95309		30.000	72.678	7.8741	3.4773	2.2644	0.7401	0.45066
	14.000	33.739	2.4569	1.8614	1.3199	2.0763	0.92991		28.000	75.285	8.0870	3.5154	2.3004	0.6789	0.43799
	16.000	35.862	2.7523	2.0010	1.3754	1.9838	0.90191		26.000	77.202	8.2233	3.5393	2.3235	0.6378	0.43010
	18.000	38.109	3.0727	2.1423	1.4343	1.8890	0.86948		24.000	78.766	8.3214	3.5561	2.3400	0.6071	0.42454
	20.000	40.496	3.4200	2.2845	1.4970	1.7915	0.83311		22.000	80.110	8.3960	3.5688	2.3526	0.5829	0.42037
	22.000	43.049	3.7964	2.4273	1.5641	1.6905	0.79337		20.000	81.303	8.4545	3.5786	2.3625	0.5634	0.41714
	24.000	45.809	4.2059	2.5706	1.6362	1.5848	0.75072		18.000	82.386	8.5014	3.5864	2.3704	0.5474	0.41457
	26.000	48.852	4.6560	2.7155	1.7146	1.4723	0.70538		16.000	83.387	8.5392	3.5927	2.3768	0.5343	0.41251
	28.000	52.334	5.1626	2.8645	1.8022	1.3488	0.65692		14.000	84.324	8.5699	3.5978	2.3820	0.5234	0.41085
	30.000	56.687	5.7730	3.0271	1.9071	1.2018	0.60268		12.000	85.212	8.5948	3.6019	2.3862	0.5145	0.40951
	31.741	64.956	6.8143	3.2687	2.0847	0.9462	0.47286		10.000	86.062	8.6146	3.6051	2.3895	0.5072	0.40845
	30.000	71.913	7.5186	3.4110	2.2042	0.7587	0.42986		8.000	86.882	8.6301	3.6077	2.3922	0.5015	0.40762
	28.000	74.790	7.7529	3.4551	2.2439	0.6907	0.45808		6.000	87.680	8.6418	3.6096	2.3941	0.4972	0.40700
	26.000	76.828	7.8967	3.4814	2.2682	0.6468	0.44990		4.000	88.462	8.6499	3.6109	2.3955	0.4942	0.40656
	24.000	78.466	7.9983	3.4997	2.2854	0.6145	0.44321		2.000	89.234	8.6547	3.6117	2.3963	0.4924	0.40631
	22.000	79.862	8.0748	3.5133	2.2984	0.5893	0.43870	2.80	2.000	22.344	1.1553	1.1085	1.0422	2.7056	0.99969
	20.000	81.095	8.1345	3.5238	2.3085	0.5691	0.43522		4.000	23.854	1.3292	1.2246	1.0854	2.6133	0.99766
	18.000	82.210	8.1821	3.5321	2.3165	0.5527	0.43247		6.000	25.455	1.5230	1.3476	1.1302	2.5222	0.99246
	16.000	83.238	8.2204	3.5388	2.3230	0.5391	0.43027		8.000	27.150	1.7379	1.4768	1.1768	2.4313	0.98304
	14.000	84.199	8.2515	3.5441	2.3282	0.5279	0.42850		10.000	28.940	1.9751	1.6113	1.2257	2.3399	0.96869
	12.000	85.109	8.2765	3.5484	2.3324	0.5188	0.42708		12.000	30.830	2.2357	1.7502	1.2774	2.2476	0.94903
	10.000	85.978	8.2965	3.5518	2.3358	0.5114	0.42595		14.000	32.822	2.5205	1.8923	1.3320	2.1540	0.92409
	8.000	86.816	8.3121	3.5545	2.3385	0.5056	0.42506		16.000	34.923	2.8309	2.0367	1.3900	2.0585	0.89411
	6.000	87.631	8.3238	3.5565	2.3404	0.5012	0.42441		18.000	37.141	3.1677	2.1822	1.4516	1.9610	0.85962
	4.000	88.430	8.3319	3.5579	2.3418	0.4981	0.42395		20.000	39.490	3.5324	2.3283	1.5172	1.8610	0.82123
	2.000	89.218	8.3367	3.5587	2.3426	0.4962	0.42368		22.000	41.990	3.9271	2.4743	1.5872	1.7578	0.77965
									24.000	44.676	4.3550	2.6200	1.6622	1.6506	0.73549
									26.000	47.604	4.8219	2.7658	1.7434	1.5379	0.68919
2.75	2.000	22.750	1.1528	1.1068	1.0415	2.6573	0.99971		28.000	50.887	5.3398	2.9135	1.8326	1.4163	0.64070
	4.000	24.267	1.3236	1.2209	1.0841	2.5673	0.99776		30.000	54.786	5.9387	3.0683	1.9355	1.2783	0.58877
	6.000	25.873	1.5135	1.3417	1.1280	2.4772	0.99279		32.000	60.433	6.7529	3.2555	2.0743	1.0909	0.52535
	8.000	27.575	1.7239	1.4686	1.1738	2.3879	0.98377		32.587	65.050	7.3524	3.3788	2.1761	0.9490	0.48369
	10.000	29.372	1.9558	1.6007	1.2219	2.2982	0.96999		32.000	69.211	7.8278	3.4689	2.2566	0.8307	0.45348
	12.000	31.269	2.2104	1.7371	1.2724	2.2074	0.95109		30.000	73.328	8.2272	3.5399	2.3241	0.7243	0.42988
	14.000	33.269	2.4885	1.8768	1.3259	2.1153	0.92704		28.000	75.728	8.4241	3.5735	2.3574	0.6684	0.41882
	16.000	35.381	2.7912	2.0188	1.3826	2.0213	0.89806		26.000	77.543	8.5544	3.5952	2.3794	0.6296	0.41169
	18.000	37.612	3.1197	2.1622	1.4429	1.9253	0.86461		24.000	79.042	8.6495	3.6108	2.3954	0.6002	0.40659
	20.000	39.980	3.4757	2.3063	1.5070	1.8265	0.82724		22.000	80.339	8.7224	3.6227	2.4077	0.5769	0.40273
	22.000	42.504	3.8610	2.4506	1.5755	1.7245	0.78659		20.000	81.496	8.7800	3.6319	2.4174	0.5580	0.39971

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
2.80	18.000	82.550	8.8262	3.6393	2.4252	0.5425	0.39731	2.90	6.000	24.666	1.5421	1.3594	1.1344	2.6117	0.99178
	16.000	83.525	8.8637	3.6453	2.4316	0.5297	0.39538		8.000	26.350	1.7663	1.4933	1.1828	2.5175	0.98153
	14.000	84.440	8.8942	3.6501	2.4367	0.5191	0.39382		10.000	28.129	2.0143	1.6328	1.2336	2.4229	0.96597
	12.000	85.308	8.9188	3.6540	2.4409	0.5103	0.39256		12.000	30.007	2.2873	1.7767	1.2874	2.3273	0.94475
	10.000	86.140	8.9385	3.6571	2.4442	0.5033	0.39156		14.000	31.985	2.5863	1.9238	1.3444	2.2304	0.91794
	8.000	86.943	8.9540	3.6595	2.4468	0.4977	0.39078		16.000	34.069	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	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	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	41.044	4.0638	2.5222	1.6112	1.8229	0.76540
									24.000	43.672	4.5119	2.6704	1.6896	1.7138	0.71969
2.85	2.000	21.954	1.1579	1.1103	1.0429	2.7537	0.99968		26.000	46.515	2.8177	1.7739	1.5999	1.5999	0.67230
	4.000	23.457	1.3349	1.2283	1.0868	2.6598	0.99755		28.000	49.655	5.5328	1.9659	1.8659	1.4788	0.62347
	6.000	25.052	1.5325	1.3535	1.1323	2.5670	0.99213		30.000	53.274	6.1364	3.1161	1.9692	1.3453	0.57262
	8.000	26.742	1.7520	1.4850	1.1798	2.4744	0.98230		32.000	57.931	6.8791	3.2824	2.0957	1.1827	0.51624
	10.000	28.526	1.9946	1.6220	1.2297	2.3815	0.96735		33.363	65.145	7.9116	3.4841	2.2708	0.9516	0.44840
	12.000	30.410	2.2613	1.7634	1.2824	2.2876	0.94692		32.000	71.287	8.6350	3.6085	2.3930	0.7771	0.40736
	14.000	32.394	2.5532	1.9080	1.3382	2.1923	0.92105		30.000	74.392	8.9347	3.6565	2.4435	0.6985	0.39175
	16.000	34.486	2.8712	2.0547	1.3974	2.0953	0.89006		28.000	76.490	9.1095	3.6836	2.4730	0.6500	0.38301
	18.000	36.692	3.2165	2.2025	1.4604	1.9964	0.85451		26.000	78.142	9.2307	3.7020	2.4934	0.6149	0.37709
	20.000	39.025	3.5904	2.3504	1.5275	1.8950	0.81511		24.000	79.533	9.3212	3.7156	2.5087	0.5878	0.37275
2.90	2.000	41.505	3.9948	2.4982	1.5991	1.7906	0.77258		22.000	80.750	9.3915	3.7260	2.5205	0.5660	0.36942
	4.000	44.160	4.4325	2.6451	1.6757	1.6825	0.72766		20.000	81.843	9.4475	3.7343	2.5300	0.5482	0.36680
	6.000	47.042	4.9089	2.7916	1.7585	1.5692	0.68081		18.000	82.845	9.4928	3.7409	2.5376	0.5335	0.36469
	8.000	50.247	5.4345	2.9391	1.8490	1.4481	0.63219		16.000	83.775	9.5296	3.7462	2.5438	0.5212	0.36299
	10.000	53.992	6.0344	3.0917	1.9518	1.3127	0.58089		14.000	84.651	9.5597	3.7506	2.5489	0.5111	0.36161
	12.000	59.037	6.8013	3.2659	2.0825	1.1407	0.52183		12.000	85.484	9.5842	3.7541	2.5530	0.5027	0.36049
	14.000	65.097	7.6294	3.4320	2.2230	0.9503	0.46580		10.000	86.283	9.6038	3.7570	2.5563	0.4959	0.35950
	16.000	73.893	8.2421	3.5425	2.3266	0.8001	0.42903		8.000	87.055	9.6191	3.7592	2.5588	0.4906	0.35890
	18.000	77.127	8.5802	3.5995	2.3837	0.7107	0.41030		6.000	87.808	9.6306	3.7608	2.5608	0.4865	0.35838
	20.000	79.297	8.8902	3.6495	2.4149	0.6588	0.40050		4.000	88.546	9.6387	3.7620	2.5621	0.4836	0.35802
2.95	2.000	82.550	8.8262	3.6393	2.4252	0.5425	0.39731		2.000	89.275	9.6434	3.7626	2.5629	0.4819	0.35780
	4.000	83.525	8.8637	3.6453	2.4316	0.5297	0.39538		2.000	21.216	1.1630	1.1138	1.0442	2.8500	0.99965
	6.000	84.440	8.8942	3.6501	2.4367	0.5191	0.39382		4.000	22.708	1.3464	1.2357	1.0895	2.7526	0.99732
	8.000	85.308	8.9188	3.6540	2.4409	0.5103	0.39256		6.000	24.294	1.5518	1.3654	1.1366	2.6563	0.99142
	10.000	86.140	8.9385	3.6571	2.4442	0.5033	0.39156		8.000	25.974	1.7807	1.5017	1.1858	2.5604	0.98074
	12.000	86.943	8.9540	3.6595	2.4468	0.4977	0.39078		10.000	27.749	2.0343	1.6437	1.2377	2.4640	0.96454
	14.000	87.725	8.9656	3.6613	2.4487	0.4935	0.39019		12.000	29.621	2.3137	1.7901	1.2925	2.3668	0.94252
	16.000	88.492	8.9737	3.6626	2.4501	0.4905	0.38978		14.000	31.593	2.6199	1.9396	1.3507	2.2682	0.91475
	18.000	89.248	8.9784	3.6633	2.4509	0.4887	0.38954		16.000	33.670	2.9540	2.0911	1.4126	2.1679	0.88168
	20.000								18.000	35.856	3.3169	2.2434	1.4785	2.0658	0.84398
2.90	2.000	21.954	1.1579	1.1103	1.0429	2.7537	0.99968		20.000	38.164	3.7098	2.3954	1.5487	1.9615	0.80249
	4.000	23.457	1.3349	1.2283	1.0868	2.6598	0.99755		22.000	40.607	4.1344	2.5464	1.6236	1.8546	0.75609
	6.000	25.052	1.5325	1.3535	1.1323	2.5670	0.99213		24.000	43.211	4.5930	2.6959	1.7037	1.7444	0.71160
	8.000	26.742	1.7520	1.4850	1.1798	2.4744	0.98230		26.000	46.018	5.0902	2.8441	1.7898	1.6297	0.66366
	10.000	28.526	1.9946	1.6220	1.2297	2.3815	0.96735		28.000	49.102	5.6343	2.9916	1.8833	1.5085	0.61460
	12.000	30.410	2.2613	1.7634	1.2824	2.2876	0.94692		30.000	52.618	6.2438	3.1414	1.9876	1.3762	0.56404
	14.000	32.394	2.5532	1.9080	1.3382	2.1923	0.92105								
	16.000	34.486	2.8712	2.0547	1.3974	2.0953	0.89006								
	18.000	36.692	3.2165	2.2025	1.4604	1.9964	0.85451								
	20.000	39.025	3.5904	2.3504	1.5275	1.8950	0.81511								

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	
	3.00	2.000	20.667	1.1656	1.1155	1.0449	2.8981	0.99963	22.000	37.382	3.8338	3.8338	2.4408	1.5707	2.0263	0.78944
		4.000	22.355	1.3522	1.2395	1.0909	2.7988	0.99721	24.000	39.797	4.2796	4.2796	2.5952	1.6490	1.9166	0.74317
6.000		23.936	1.5616	1.3714	1.1387	2.7008	0.99105	26.000	42.361	4.7607	4.7607	2.7474	1.7328	1.8039	0.69513	
8.000		25.611	1.7953	1.5101	1.1888	2.6031	0.97993	28.000	45.110	5.2806	5.2806	2.8973	1.8226	1.6874	0.64608	
10.000		27.383	2.0545	1.6546	1.2417	2.5050	0.96308	30.000	48.102	5.8462	5.8462	3.0455	1.9196	1.5654	0.59649	
12.000		29.251	2.3404	1.8036	1.2977	2.4060	0.94202	32.000	51.455	6.4722	6.4722	3.1938	2.0265	1.4345	0.54630	
14.000		31.218	2.6540	1.9556	1.3571	2.3056	0.91148	34.000	55.456	7.1967	7.1967	3.3478	2.1497	1.2858	0.49412	
16.000		33.288	2.9964	2.1095	1.4204	2.2037	0.87734	36.000	60.288	8.0785	8.0785	3.5380	2.3222	1.0765	0.43052	
18.000		35.467	3.3685	2.2641	1.4878	2.1000	0.83855	38.000	67.742	9.2596	9.2596	3.7064	2.4983	0.8514	0.37570	
20.000		37.764	3.7713	2.4181	1.5596	1.9941	0.79602	40.000	73.184	9.7779	9.7779	3.7817	2.5856	0.7291	0.35180	
22.000		40.192	4.2064	2.5708	1.6362	1.8858	0.75068	42.000	75.604	10.0154	10.0154	3.8146	2.6255	0.6689	0.34151	
24.000		42.775	4.6761	2.7216	1.7181	1.7744	0.70340	44.000	77.406	10.1703	10.1703	3.8355	2.6516	0.6276	0.33501	
26.000		45.552	5.1844	2.8706	1.8060	1.6589	0.65491	46.000	78.880	10.2825	10.2825	3.8505	2.6705	0.5965	0.33040	
28.000		48.586	5.7388	3.0184	1.9012	1.5374	0.60560	48.000	80.145	10.4361	10.4361	3.8617	2.6849	0.5719	0.32694	
30.000		52.014	6.3559	3.1673	2.0067	1.4059	0.55526	50.000	81.267	10.5956	10.5956	3.8705	2.6963	0.5518	0.32423	
32.000		56.182	7.0810	3.3244	2.1300	1.2541	0.50205	52.000	82.284	10.4906	10.4906	3.8776	2.7055	0.5353	0.32208	
34.000		63.673	8.2682	3.5470	2.3310	1.0029	0.42755	54.000	83.221	10.5350	10.5350	3.8833	2.7129	0.5215	0.32034	
34.073		65.241	8.4917	3.5848	2.3688	0.9540	0.41510	56.000	84.095	10.5714	10.5714	3.8879	2.7190	0.5100	0.31892	
34.000		66.749	8.6971	3.6186	2.4035	0.9083	0.40406	58.000	84.921	10.6012	10.6012	3.8917	2.7240	0.5005	0.31777	
32.000		72.642	9.3988	3.7271	2.5217	0.7428	0.36908	60.000	85.709	10.6255	10.6255	3.8943	2.7281	0.4926	0.31683	
30.000	75.239	9.6517	3.7638	2.5643	0.6779	0.35743	62.000	86.466	10.6450	10.6450	3.8973	2.7314	0.4861	0.31608		
28.000	77.126	9.8121	3.7865	2.5913	0.6345	0.35029	64.000	87.199	10.6603	10.6603	3.8992	2.7340	0.4810	0.31549		
26.000	78.652	9.9268	3.8024	2.6106	0.6022	0.34530	66.000	87.914	10.6719	10.6719	3.9007	2.7359	0.4772	0.31505		
24.000	79.956	10.0139	3.8144	2.6253	0.5768	0.34157	68.000	88.617	10.6799	10.6799	3.9017	2.7373	0.4744	0.31474		
22.000	81.106	10.0824	3.8237	2.6368	0.5563	0.33868	70.000	89.310	10.6847	10.6847	3.9023	2.7381	0.4728	0.31456		
20.000	82.147	10.1373	3.8311	2.6460	0.5394	0.33638										
18.000	83.103	10.1819	3.8371	2.6536	0.5253	0.33453	3.10	2.000	20.205	1.1707	1.1190	1.0462	2.9942	0.95960		
16.000	83.996	10.2184	3.8420	2.6597	0.5136	0.33302	4.000	4.000	21.684	1.3640	1.2471	1.0937	2.8911	0.95696		

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	$\frac{P_{02}}{P_{01}}$	
3.10	6.000	23.258	1.5815	1.3835	1.1431	2.7894	0.99027	3.15	28.000	47.216	6.0688	3.1000	1.9577	1.6194	0.57808	
	8.000	24.927	1.8249	1.5271	1.1950	2.6881	0.97822		30.000	50.449	6.7158	3.2475	2.0680	1.4886	0.52806	
	10.000	26.692	2.0956	1.6767	1.2499	2.5864	0.96004		32.000	54.201	7.4487	3.3975	2.1924	1.3441	0.47738	
	12.000	28.554	2.3949	1.8308	1.3081	2.4837	0.93546		34.000	59.196	8.3736	3.5650	2.3489	1.1632	0.42162	
	14.000	30.513	2.7236	1.9879	1.3701	2.3798	0.90473		35.033	65.382	9.4008	3.7274	2.5221	0.9575	0.36898	
	16.000	32.574	3.0831	2.1467	1.4362	2.2743	0.86841		34.000	70.719	10.1474	3.8325	2.6478	0.7974	0.33596	
	18.000	34.739	3.4740	2.3057	1.5067	2.1672	0.82741		32.000	74.089	10.5396	3.8839	2.7137	0.7064	0.32016	
	20.000	37.017	3.8973	2.4637	1.5819	2.0581	0.78278		30.000	76.244	10.7550	3.9111	2.7499	0.6531	0.31190	
	22.000	39.421	4.3543	2.6198	1.6621	1.9468	0.73556		28.000	77.906	10.9014	3.9292	2.7745	0.6152	0.30644	
	24.000	41.968	4.8470	2.7733	1.7477	1.8329	0.68676		26.000	79.289	11.0097	3.9424	2.7927	0.5860	0.30248	
	26.000	44.692	5.3788	2.9241	1.8395	1.7154	0.63718		24.000	80.490	11.0936	3.9524	2.8068	0.5627	0.29947	
	28.000	47.646	5.9563	3.0727	1.9385	1.5928	0.58731		22.000	81.560	11.1602	3.9604	2.8180	0.5436	0.29710	
	30.000	50.935	6.5922	3.2205	2.0470	1.4620	0.53722		20.000	82.535	11.2142	3.9668	2.8270	0.5278	0.29520	
	32.000	54.800	7.3197	3.3723	2.1705	1.3157	0.48586		18.000	83.436	11.2583	3.9720	2.8344	0.5145	0.29366	
	34.000	60.205	8.2768	3.5485	2.3325	1.1241	0.42706		16.000	84.279	11.2945	3.9762	2.8405	0.5035	0.29240	
	34.726	65.335	9.0925	3.6810	2.4701	0.9564	0.38385		14.000	85.076	11.3243	3.9797	2.8455	0.4942	0.29138	
	36.000	69.872	9.7174	3.7732	2.5754	0.8203	0.35449		12.000	85.838	11.3486	3.9825	2.8496	0.4865	0.29054	
	38.000	73.661	10.1577	3.8339	2.6495	0.7171	0.33553		10.000	86.571	11.3682	3.9848	2.8529	0.4803	0.28987	
	40.000	75.938	10.3831	3.8636	2.6874	0.6607	0.32634		8.000	87.281	11.3835	3.9866	2.8555	0.4754	0.28935	
	42.000	77.666	10.5334	3.8831	2.7126	0.6212	0.32040		6.000	87.976	11.3951	3.9879	2.8574	0.4716	0.28895	
44.000	79.091	10.6435	3.8971	2.7311	0.5911	0.31614		4.000	88.657	11.4032	3.9889	2.8588	0.4690	0.28867		
46.000	80.324	10.7282	3.9077	2.7454	0.5671	0.31291		2.000	89.330	11.4080	3.9894	2.8596	0.4674	0.28851		
48.000	81.419	10.7954	3.9161	2.7567	0.5476	0.31038										
50.000	82.413	10.8496	3.9228	2.7658	0.5314	0.30836										
52.000	83.331	10.8938	3.9282	2.7732	0.5179	0.30672		3.20	2.000	19.587	1.1760	1.1226	1.0475	3.0901	0.99957	
54.000	84.189	10.9301	3.9327	2.7793	0.5067	0.30539			4.000	21.059	1.3759	1.2548	1.0965	2.9831	0.99670	
56.000	85.001	10.9599	3.9363	2.7843	0.4973	0.30430			6.000	22.628	1.6017	1.3958	1.1475	2.8776	0.98944	
58.000	85.775	10.9842	3.9393	2.7884	0.4895	0.30341			8.000	24.292	1.8552	1.5443	1.2013	2.7725	0.97642	
60.000	86.520	11.0037	3.9416	2.7917	0.4832	0.30270			10.000	26.052	2.1377	1.6990	1.2582	2.6670	0.96684	
62.000	87.242	11.0190	3.9435	2.7942	0.4781	0.30215			12.000	27.909	2.4507	1.8583	1.3188	2.5605	0.93048	
64.000	87.945	11.0306	3.9449	2.7962	0.4743	0.30173			14.000	29.863	2.7952	2.0206	1.3834	2.4528	0.89766	
66.000	88.637	11.0387	3.9458	2.7975	0.4716	0.30144			16.000	31.915	3.1723	2.1842	1.4524	2.3437	0.85914	
68.000	89.321	11.0434	3.9464	2.7983	0.4701	0.30127			18.000	34.071	3.5828	2.3476	1.5261	2.2329	0.81591	
70.000									20.000	36.335	4.0273	2.5095	1.6048	2.1205	0.76919	
72.000									22.000	38.718	4.5073	2.6690	1.6888	2.0061	0.72014	
74.000									24.000	41.238	5.0245	2.8252	1.7784	1.8893	0.66984	
76.000									26.000	43.920	5.5816	2.9780	1.8743	1.7695	0.61919	
78.000									28.000	46.811	6.1840	3.1274	1.9774	1.6454	0.56880	
80.000									30.000	49.994	6.8427	3.2747	2.0895	1.5144	0.51885	
82.000									32.000	53.651	7.5832	3.4233	2.2152	1.3711	0.46873	
84.000									34.000	58.350	8.4906	3.5846	2.3686	1.1976	0.41516	
86.000									35.327	65.428	9.7141	3.7727	2.5748	0.9585	0.35463	
88.000									34.000	71.408	10.5657	3.8872	2.7181	0.7791	0.31914	
90.000									32.000	74.475	10.9242	3.9320	2.7783	0.6967	0.30560	
92.000									30.000	76.526	11.1314	3.9570	2.8131	0.6451	0.29812	
94.000									28.000	78.130	11.2746	3.9739	2.8372	0.6096	0.29310	
96.000									26.000	79.475	11.3814	3.9864	2.8551	0.5812	0.28642	
98.000									24.000	80.646	11.4644	3.9959	2.8690	0.5585	0.28660	
100.000																

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	2.8922	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	79.812	12.1408	4.0706	2.9825	0.5725	0.26497	
								24.000	80.932	12.2227	4.0793	2.9963	0.5507	0.26251	
								22.000	81.938	12.2884	4.0862	3.0073	0.5328	0.26055	
								20.000	82.859	12.3420	4.0918	3.0163	0.5178	0.25896	
								18.000	83.714	12.3860	4.0964	3.0236	0.5052	0.25767	
								16.000	84.517	12.4223	4.1001	3.0297	0.4946	0.25662	
								14.000	85.278	12.4523	4.1032	3.0348	0.4858	0.25575	
								12.000	86.007	12.4767	4.1057	3.0389	0.4785	0.25504	
								10.000	86.708	12.4964	4.1077	3.0422	0.4725	0.25448	
								8.000	87.390	12.5120	4.1093	3.0448	0.4677	0.25403	
								6.000	88.056	12.5237	4.1105	3.0467	0.4641	0.25369	
								4.000	88.710	12.5319	4.1114	3.0481	0.4616	0.25346	
								2.000	89.357	12.5367	4.1119	3.0489	0.4601	0.25332	
								3.35	2.000	18.734	1.1839	1.1280	1.0496	3.2336	0.99951
									4.000	20.197	1.3940	1.2664	1.1007	3.1206	0.99628
									6.000	21.759	1.6326	1.4144	1.1543	3.0090	0.98812
									8.000	23.418	1.9015	1.5704	1.2108	2.8980	0.97354
									10.000	25.175	2.2025	1.7330	1.2709	2.7865	0.95172
									12.000	27.028	2.5370	1.9002	1.3351	2.6741	0.92257
									14.000	28.976	2.9061	2.0701	1.4038	2.5604	0.88654
									16.000	31.022	3.3109	2.2410	1.4774	2.4454	0.84462
									18.000	33.167	3.7520	2.4110	1.5562	2.3290	0.79804
									20.000	35.416	4.2303	2.5788	1.6404	2.2112	0.74824
									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	2.9846	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	3.0798	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	
	34.000	72.950	11.8006	4.0338	2.9255	0.7384	0.27557		16.000	84.656	13.2030	4.1774	3.1606	0.4894	0.23522	
	32.000	75.444	12.0992	4.0662	2.9755	0.6723	0.26624		14.000	85.396	13.2331	4.1802	3.1657	0.4808	0.23445	
	30.000	77.255	12.2891	4.0863	3.0074	0.6279	0.26053		12.000	86.105	13.2578	4.1826	3.1698	0.4736	0.23381	
	28.000	78.719	12.4252	4.1004	3.0302	0.5946	0.25653		10.000	86.789	13.2777	4.1844	3.1731	0.4678	0.23330	
	26.000	79.965	12.5287	4.1110	3.0476	0.5684	0.25355		8.000	87.453	13.2934	4.1859	3.1757	0.4632	0.23290	
	24.000	81.062	12.6158	4.1193	3.0612	0.5471	0.25124		6.000	88.103	13.3052	4.1870	3.1777	0.4596	0.23260	
	22.000	82.050	12.6752	4.1259	3.0722	0.5295	0.24939		4.000	88.741	13.3135	4.1878	3.1791	0.4572	0.23239	
	20.000	82.956	12.7293	4.1313	3.0812	0.5148	0.24790		2.000	89.372	13.3184	4.1883	3.1799	0.4557	0.23227	
	18.000	83.798	12.7734	4.1357	3.0886	0.5024	0.24668									
16.000	84.588	12.8098	4.1393	3.0947	0.4920	0.24568										
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	4.000	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	6.000	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	8.000	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	10.000	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	12.000	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	14.000	28.438	2.9823	2.1035	1.4178	2.6309	0.87878	
								16.000	16.000	30.481	3.4063	2.2791	1.4746	2.5118	0.83456	
								18.000	18.000	32.621	3.8688	2.4535	1.5769	2.3915	0.78577	
								20.000	20.000	34.863	4.3706	2.6251	1.6649	2.2698	0.73391	
								22.000	22.000	37.213	4.9123	2.7926	1.7590	2.1468	0.68049	
								24.000	24.000	39.683	5.4951	2.9552	1.8595	2.0224	0.62680	
								26.000	26.000	42.292	6.1211	3.1125	1.9666	1.8960	0.57385	
								28.000	28.000	45.073	6.7941	3.2644	2.0813	1.7667	0.52235	
								30.000	30.000	48.080	7.5215	3.4115	2.2047	1.6329	0.47267	
								32.000	32.000	51.420	8.3194	3.5558	2.3397	1.4914	0.42466	
								34.000	34.000	55.344	9.2294	3.7018	2.4932	1.3339	0.37715	
								36.000	36.000	60.903	10.4358	3.8705	2.6962	1.1265	0.32424	
								36.635	36.635	65.647	11.3584	3.9637	2.8512	0.9634	0.29020	
								38.000	38.000	69.850	12.0718	4.0633	3.0709	0.8302	0.26708	
								40.000	40.000	73.716	12.6278	4.1211	3.0642	0.7184	0.25074	
								42.000	42.000	75.970	12.9035	4.1485	3.1104	0.6589	0.24313	
								44.000	44.000	77.665	13.0858	4.1662	3.1410	0.6175	0.23828	
								46.000	46.000	79.054	13.2189	4.1789	3.1633	0.5860	0.23481	
								48.000	48.000	80.246	13.3210	4.1885	3.1804	0.5609	0.23220	
								50.000	50.000	81.302	13.4020	4.1961	3.1939	0.5404	0.23016	
								52.000	52.000	82.256	13.4675	4.2021	3.2049	0.5234	0.22852	
								54.000	54.000	83.134	13.5211	4.2071	3.2139	0.5091	0.22719	
								56.000	56.000	83.951	13.5654	4.2111	3.2213	0.4971	0.22611	
								58.000	58.000							
								60.000	60.000							
								62.000	62.000							
								64.000	64.000							
								66.000	66.000							
								68.000	68.000							
								70.000	70.000							
								72.000	72.000							
								74.000	74.000							
								76.000	76.000							
								78.000	78.000							
								80.000	80.000							
								82.000	82.000							
								84.000	84.000							
								86.000	86.000							
								88.000	88.000							
								90.000	90.000							

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	22.363	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	27.977	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	2.4526	0.77322
									20.000	34.352	4.5148	2.6714	1.6901	2.3271	2.3271	0.71935
3.50	4.000	19.415	1.4125	1.2783	1.0516	3.3769	0.99945		22.000	36.692	5.0827	2.8419	1.7885	2.2005	2.2005	0.66437
	6.000	20.972	1.6642	1.4333	1.1611	3.2574	0.99582		24.000	39.149	5.6937	3.0069	1.8935	2.0727	2.0727	0.60946
	8.000	22.629	1.9491	1.5970	1.2205	3.1396	0.98669		26.000	41.738	6.3495	3.1659	2.0056	1.9434	1.9434	0.55575
	10.000	24.384	2.2693	1.7675	1.2839	3.0222	0.97044		28.000	44.488	7.0535	3.3187	2.1254	1.8117	1.8117	0.50395
	12.000	26.236	2.6262	1.9426	1.3519	2.7856	0.94626		30.000	47.447	7.8120	3.4660	2.2539	1.6762	1.6762	0.45445
	14.000	28.182	3.0211	2.1202	1.4249	2.6657	0.91415		32.000	50.705	8.6392	3.6092	2.3937	1.5342	1.5342	0.40714
	16.000	30.225	3.4549	2.2982	1.5033	2.5445	0.87481		34.000	54.463	9.5691	3.7520	2.5504	1.3790	1.3790	0.36118
	18.000	32.363	3.9283	2.4747	1.5874	2.4222	0.82942		36.000	59.399	10.7262	3.9075	2.7450	1.1885	1.1885	0.31299
	20.000	34.602	4.4421	2.6482	1.6774	2.2986	0.77952		37.091	65.729	12.0520	4.0612	2.9676	0.9651	0.9651	0.26768
	24.000	39.410	5.5936	2.8173	1.7737	2.0478	0.72668		36.000	74.353	13.4667	4.2251	3.2048	0.7018	0.7018	0.24063
3.60	26.000	42.009	6.2345	3.1392	1.8764	1.9199	0.67245		32.000	76.427	13.7265	4.1576	3.2483	0.6473	0.6473	0.22254
	28.000	44.774	6.9227	3.2916	1.9860	1.7894	0.61813		30.000	78.025	13.9033	4.2415	3.2779	0.6083	0.6083	0.21603
	30.000	47.755	7.6654	3.4388	2.2291	1.6549	0.56478		28.000	79.351	14.0342	4.2530	3.2998	0.5782	0.5782	0.21501
	32.000	51.053	8.4777	3.5825	2.3664	1.5131	0.46353		26.000	80.497	14.1355	4.2618	3.3168	0.5541	0.5541	0.21271
	34.000	54.888	9.3968	3.7268	2.5214	1.3570	0.41586		24.000	81.517	14.2163	4.2687	3.3303	0.5343	0.5343	0.21090
	36.000	60.090	11.7027	3.8879	2.7191	1.1594	0.36917		22.000	82.442	14.2819	4.2743	3.3413	0.5178	0.5178	0.20944
	36.867	65.689	15.7015	4.0229	2.9090	1.0090	0.31891		20.000	83.294	14.3358	4.2789	3.3503	0.5039	0.5039	0.20826
	36.000	70.545	22.5396	4.1121	3.0494	0.8105	0.27872		18.000	84.090	14.3804	4.2827	3.3578	0.4922	0.4922	0.20729
	34.000	74.048	33.0455	4.1623	3.1342	0.7098	0.25324		16.000	84.839	14.4173	4.2858	3.3640	0.4823	0.4823	0.20649
	32.000	76.207	41.877	4.1877	3.1790	0.6529	0.23241		14.000	85.552	14.4478	4.2883	3.3691	0.4740	0.4740	0.20583
3.70	30.000	77.851	43.4920	4.2044	3.2090	0.6128	0.22791		12.000	86.235	14.4729	4.2904	3.3733	0.4671	0.4671	0.20529
	28.000	79.207	43.6238	4.2165	3.2311	0.5820	0.22468		10.000	86.895	14.4931	4.2921	3.3767	0.4615	0.4615	0.20485
	26.000	80.375	43.7255	4.2256	3.2481	0.5574	0.22223		8.000	87.537	14.5091	4.2934	3.3794	0.4570	0.4570	0.20451
	24.000	81.413	43.8064	4.2329	3.2617	0.5373	0.22031		6.000	88.165	14.5212	4.2944	3.3814	0.4535	0.4535	0.20425
	22.000	82.352	43.8719	4.2387	3.2727	0.5205	0.21877		4.000	88.782	14.5296	4.2951	3.3828	0.4511	0.4511	0.20407
	20.000	83.216	43.9256	4.2435	3.2817	0.5065	0.21751		2.000	89.392	14.5346	4.2956	3.3836	0.4497	0.4497	0.20397
	18.000	84.022	43.9700	4.2474	3.2891	0.4946	0.21649									
	16.000	84.781	44.0067	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	44.0371	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	44.0620	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	44.0822	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	44.0980	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	44.1100	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	44.1184	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	44.1234	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	0.6877	0.20859	
	26.000	41.478	6.4663	3.1924	2.0255	1.9664	0.54674		32.000	76.827	14.5690	4.2984	3.3894	0.6371	0.20324	
	28.000	44.215	7.1862	3.3457	2.1479	1.8335	0.49483		30.000	78.345	14.7420	4.3126	3.4183	0.6000	0.19962	
	30.000	47.153	7.9610	3.4930	2.2791	1.6971	0.44543		28.000	79.617	14.8713	4.3231	3.4400	0.5712	0.19697	
	32.000	50.376	8.8038	3.6357	2.4215	1.5547	0.39847		26.000	80.723	14.9723	4.3311	3.4569	0.5480	0.19493	
	34.000	54.066	9.7460	3.7772	2.5802	1.4002	0.35321		24.000	81.712	15.0533	4.3376	3.4705	0.5287	0.19332	
	36.000	58.793	10.8943	3.9283	2.7733	1.2149	0.30670		22.000	82.610	15.1191	4.3427	3.4815	0.5127	0.19202	
	37.306	65.769	12.4065	4.0985	3.0271	0.9660	0.25708		20.000	83.440	15.1734	4.3470	3.4906	0.4992	0.19096	
	36.000	71.617	13.4496	4.2005	3.2019	0.7805	0.22897		18.000	84.215	15.2184	4.3505	3.4981	0.4877	0.19009	
	34.000	74.634	13.8916	4.2405	3.2760	0.6945	0.21831		16.000	84.947	15.2557	4.3534	3.5043	0.4781	0.18937	
	32.000	76.633	14.1452	4.2626	3.3184	0.6420	0.21249		14.000	85.644	15.2866	4.3558	3.5095	0.4699	0.18878	
	30.000	78.190	14.3199	4.2776	3.3477	0.6041	0.20861		12.000	86.313	15.3120	4.3577	3.5137	0.4632	0.18829	
	28.000	79.487	14.4500	4.2885	3.3695	0.5746	0.20578		10.000	86.959	15.3325	4.3593	3.5172	0.4576	0.18790	
	26.000	80.614	14.5512	4.2969	3.3864	0.5510	0.20362		8.000	87.587	15.3487	4.3606	3.5199	0.4532	0.18759	
	24.000	81.617	14.6320	4.3036	3.3999	0.5315	0.20191		6.000	88.201	15.3609	4.3615	3.5219	0.4499	0.18736	
	22.000	82.528	14.6976	4.3090	3.4109	0.5152	0.20054		4.000	88.807	15.3695	4.3622	3.5234	0.4475	0.18720	
	20.000	83.369	14.7517	4.3134	3.4200	0.5015	0.19942		2.000	89.405	15.3746	4.3625	3.5242	0.4461	0.18710	
	18.000	84.154	14.7965	4.3170	3.4275	0.4899	0.19849									
	16.000	84.894	14.8336	4.3200	3.4337	0.4801	0.19774									
	14.000	85.599	14.8643	4.3225	3.4388	0.4719	0.19711		3.70	2.000	17.027	1.2029	1.1408	1.0544	3.5674	0.95936
	12.000	86.275	14.8895	4.3245	3.4430	3.4388	0.4719	0.19711		4.000	18.478	1.4377	1.2942	1.1108	3.4388	0.95915
	10.000	86.928	14.9099	4.3262	3.4465	3.4430	0.4651	0.19660		6.000	20.032	1.7073	1.4589	1.1703	3.3121	0.98461
	8.000	87.562	14.9260	4.3274	3.4491	3.4465	0.4595	0.19619		8.000	21.688	2.0146	1.6330	1.2337	3.1858	0.96594
6.000	88.184	14.9381	4.3284	3.4512	3.4491	0.4551	0.19586		10.000	23.444	2.3615	1.8141	1.3017	3.0591	0.93840	
4.000	88.794	14.9466	4.3291	3.4526	3.4512	0.4517	0.19562		12.000	25.297	2.7496	1.9998	1.3749	2.9315	0.90218	
2.000	89.398	14.9517	4.3295	3.4534	3.4526	0.4493	0.19545		14.000	27.246	3.1808	2.1877	1.4539	2.8026	0.85825	
									16.000	29.287	3.6554	2.3751	1.5391	2.6728	0.80824	
									18.000	31.423	4.1745	2.5600	1.6306	2.5420	0.75395	
									20.000	33.653	4.7382	2.7406	1.7239	2.4105	0.69731	
									22.000	35.985	5.3474	2.9156	1.8341	2.2783	0.64001	
									24.000	38.426	6.0027	3.0840	1.9464	2.1453	0.58349	
									26.000	40.991	6.7053	3.2452	2.0662	2.0114	0.52883	
									28.000	43.704	7.4580	3.3993	2.1940	1.8758	0.47677	
									30.000	46.605	8.2664	3.5467	2.3307	1.7375	0.42765	
									32.000	49.768	9.1422	3.6886	2.4785	1.5940	0.38140	
									34.000	53.344	10.1123	3.8277	2.6418	1.4404	0.33742	
									36.000	57.760	11.2596	3.9721	2.8346	1.2623	0.29362	
									37.713	65.847	13.1309	4.1705	3.1485	0.9675	0.23710	
									36.000	72.443	14.3517	4.2802	3.3530	0.7577	0.20791	
									34.000	75.135	14.7539	4.3136	3.4203	0.6814	0.19337	
									32.000	77.009	14.9979	4.3332	3.4612	0.6324	0.19442	
									30.000	78.492	15.1693	4.3467	3.4899	0.5962	0.19104	
									28.000	79.740	15.2983	4.3567	3.5115	0.5680	0.18855	
									26.000	80.828	15.3992	4.3644	3.5283	0.5451	0.18664	
									24.000	81.802	15.4802	4.3706	3.5419	0.5261	0.18512	
									22.000	82.688	15.5463	4.3756	3.5530	0.5103	0.18389	

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	20.00	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	0.17109
	18.000	84.274	15.6436	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	0.99631
	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
									18.000	31.000	4.3021	2.6026	1.6530	2.6001	0.74088
3.75	2.000	16.810	1.2055	1.1426	1.0551	3.6149	0.99933		20.000	33.229	4.8923	2.7867	1.7556	2.4644	0.68241
	4.000	18.260	1.4440	1.2982	1.1123	3.4840	0.99497		22.000	35.556	5.5299	2.9644	1.8654	2.3283	0.62373
	6.000	19.814	1.7184	1.4654	1.1727	3.3550	0.98405		24.000	37.989	6.2157	3.1348	1.9828	2.1919	0.56627
	8.000	21.470	2.0312	1.6420	1.2370	3.2264	0.96476		26.000	40.542	6.9510	3.2975	2.1080	2.0548	0.51113
	10.000	23.227	2.3849	1.8258	1.3062	3.0974	0.93634		28.000	43.234	7.7378	3.4523	2.2414	1.9166	0.45902
	12.000	25.081	2.7813	2.0142	1.3808	2.9674	0.89905		30.000	46.105	8.5816	3.5997	2.3840	1.7761	0.41022
	14.000	27.030	3.2217	2.2046	1.4614	2.8363	0.85397		32.000	49.218	9.4923	3.7408	2.5375	1.6313	0.36471
	16.000	29.072	3.7069	2.3943	1.5482	2.7042	0.80280		34.000	52.702	10.4940	3.8780	2.7060	1.4778	0.32194
	18.000	31.207	4.2379	2.5813	1.6417	2.5712	0.74744		36.000	56.894	11.6543	4.0175	2.9009	1.3044	0.28030
	20.000	33.438	4.8148	2.7637	1.7422	2.4376	0.68987		38.000	64.192	13.4871	4.2039	3.2082	1.0293	0.22804
	22.000	35.767	5.4382	2.9401	1.8497	2.3034	0.63185		38.092	65.921	13.8756	4.2390	3.2733	0.9690	0.21868
	24.000	38.204	6.1086	3.1095	1.9645	2.1688	0.57486		38.000	67.568	14.2269	4.2696	3.3321	0.9133	0.21066
	26.000	40.762	6.8272	3.2714	2.0869	2.0333	0.51996		36.000	73.114	15.2586	4.3536	3.5048	0.7394	0.18932
	28.000	43.464	7.5969	3.4259	2.2175	1.8964	0.46786		34.000	75.572	15.6341	4.3822	3.5676	0.6701	0.18228
	30.000	46.350	8.4228	3.5733	2.3572	1.7570	0.41888		32.000	77.342	16.0402	4.3997	3.6073	0.6238	0.17802
	32.000	49.486	9.3159	3.7148	2.5078	1.6129	0.37300		30.000	78.762	16.4042	4.4120	3.6356	0.5892	0.17506
	34.000	53.014	10.3013	3.8529	2.6736	1.4594	0.32964		28.000	79.967	16.1687	4.4212	3.6571	0.5619	0.17286
	36.000	57.310	11.4538	3.9947	2.8672	1.2839	0.28696		26.000	81.022	16.2697	4.4284	3.6740	0.5397	0.17116
	37.906	65.884	13.5007	4.2052	3.2105	0.9683	0.22770		24.000	81.969	16.3512	4.4341	3.6876	0.5213	0.16980
	36.000	72.794	14.8041	4.3176	3.4287	0.7481	0.19834		22.000	82.833	16.4178	4.4387	3.6988	0.5058	0.16870
	34.000	75.361	15.1917	4.3484	3.4936	0.6755	0.19061		20.000	83.634	16.4729	4.4426	3.7080	0.4927	0.16760
	32.000	77.180	15.4318	4.3669	3.5338	0.6280	0.18602		18.000	84.383	16.5186	4.4457	3.7156	0.4816	0.16706
	30.000	79.856	15.7307	4.3894	3.5838	0.5926	0.18286		16.000	85.092	16.5567	4.4484	3.7220	0.4723	0.16644
	28.000	80.927	15.8316	4.3968	3.6007	0.5649	0.18053		14.000	85.767	16.5882	4.4505	3.7273	0.4644	0.16594
	26.000	81.887	15.9128	4.4028	3.6143	0.5423	0.17872		12.000	86.415	16.6141	4.4523	3.7316	0.4578	0.16552
	24.000	82.762	15.9792	4.4076	3.6254	0.5237	0.17728		10.000	87.043	16.6352	4.4537	3.7351	0.4524	0.16518
	22.000	83.572	16.0339	4.4115	3.6345	0.5080	0.17612		8.000	87.653	16.6518	4.4549	3.7379	0.4481	0.16492
	18.000	84.330	16.0794	4.4148	3.6422	0.4948	0.17517		6.000	88.251	16.6643	4.4557	3.7400	0.4448	0.16472
	16.000	85.045	16.1172	4.4175	3.6485	0.4836	0.17439		4.000	88.839	16.6731	4.4563	3.7414	0.4426	0.16458
	14.000	85.727	16.1485	4.4198	3.6537	0.4741	0.17374		2.000	89.421	16.6783	4.4567	3.7423	0.4412	0.16450
	12.000	86.382	16.1743	4.4216	3.6580	0.4662	0.17321								
	10.000	87.016	16.1951	4.4231	3.6615	0.4595	0.17277	3.85	2.000	16.395	1.2110	1.1463	1.0564	3.7099	0.99328
	8.000	87.632	16.2116	4.4242	3.6643	0.4541	0.17242		4.000	17.843	1.4568	1.3063	1.1152	3.5741	0.99460
	6.000	88.235	16.2240	4.4251	3.6663	0.4498	0.17214		6.000	19.396	1.7405	1.4783	1.1773	3.4404	0.98291
	4.000	88.829	16.2327	4.4257	3.6678	0.4465	0.17193		8.000	21.053	2.0650	1.6603	1.2438	3.3071	0.96231

Oblique Shock Tables ($\gamma = 1.4$)

M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$	M_1	θ	β	$\frac{P_2}{P_1}$	$\frac{\rho_2}{\rho_1}$	$\frac{T_2}{T_1}$	M_2	$\frac{P_{02}}{P_{01}}$
3.85	10.00	22.812	2.4328	1.8495	1.3153	3.1734	0.93204	3.90	24.000	37.584	6.4345	3.1853	2.0201	2.2371	0.54918
	12.00	24.668	2.8456	2.0432	1.3927	3.0386	0.89269		26.000	40.126	7.2035	3.3492	2.1508	2.0968	0.49366
	14.00	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
	16.00	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
	18.00	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
	20.00	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
	22.00	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
	24.00	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
	26.00	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
	28.00	43.014	7.8808	3.4785	2.2656	1.9364	0.45026		38.000	69.501	15.4023	4.3647	3.5289	0.8527	0.18658
	30.00	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
	32.00	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
	34.00	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
	36.00	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
	38.272	65.956	13.5472	4.2095	3.2183	1.0767	0.22655		28.000	80.172	17.0613	4.4823	3.8064	0.5563	0.15857
	38.000	68.733	14.2556	4.2721	3.3669	0.9697	0.21003		26.000	81.199	17.1629	4.4890	3.8234	0.5347	0.15705
	36.000	73.407	15.7160	4.3883	3.4966	0.8764	0.19738		24.000	82.121	17.2449	4.4943	3.8371	0.5168	0.15583
	34.000	75.770	16.0813	4.4150	3.5814	0.7314	0.18079		22.000	82.966	17.3122	4.4986	3.8483	0.5016	0.15485
	32.000	77.495	16.3155	4.4316	3.6425	0.6198	0.17039		20.000	83.749	17.3680	4.5022	3.8576	0.4888	0.15404
	30.000	78.888	16.4839	4.4433	3.7098	0.5859	0.16762		18.000	84.483	17.4143	4.5052	3.8654	0.4780	0.15337
	28.000	80.072	16.6122	4.4522	3.7313	0.5591	0.16555		16.000	85.177	17.4529	4.5076	3.8718	0.4688	0.15281
	26.000	81.112	16.7135	4.4591	3.7482	0.5372	0.16394		14.000	85.840	17.4850	4.5097	3.8772	0.4610	0.15235
	24.000	82.047	16.7952	4.4646	3.7619	0.5190	0.16266		12.000	86.477	17.5113	4.5114	3.8816	0.4545	0.15198
	22.000	82.901	16.8622	4.4691	3.7731	0.5037	0.16162		10.000	87.093	17.5327	4.5127	3.8852	0.4492	0.15167
	20.000	83.692	16.9175	4.4728	3.7823	0.4907	0.16076		8.000	87.693	17.5496	4.5138	3.8880	0.4450	0.15143
	18.000	84.434	16.9636	4.4758	3.7900	0.4798	0.16006		6.000	88.280	17.5623	4.5146	3.8901	0.4418	0.15125
	16.000	85.136	17.0019	4.4784	3.7964	0.4705	0.15947		4.000	88.858	17.5713	4.5151	3.8916	0.4395	0.15113
	14.000	85.804	17.0337	4.4805	3.8017	0.4627	0.15899		2.000	89.430	17.5766	4.5155	3.8925	0.4382	0.15105
	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
3.50	2.000	16.196	1.2138	1.1482	1.0571	3.7573	0.99926		16.000	28.281	3.9194	2.4716	1.5858	2.8270	0.78046
	4.000	17.642	1.4633	1.3104	1.1167	3.6191	0.99441		18.000	30.417	4.4992	2.6664	1.6874	2.6851	0.72095
	6.000	19.196	1.7517	1.4849	1.1797	3.4830	0.98232		20.000	32.646	5.1304	2.8554	1.7967	2.5430	0.65992
	8.000	20.854	2.0821	1.6694	1.2472	3.3473	0.96105		22.000	34.969	5.8125	3.0370	1.9139	2.4010	0.59933
	10.000	22.614	2.4570	1.8614	1.3200	3.2111	0.92990		24.000	37.393	6.5462	3.2103	2.0391	2.2591	0.54068
	12.000	24.472	2.8783	2.0578	1.3987	3.0739	0.88935		26.000	39.929	7.3323	3.3748	2.1727	2.1172	0.48503
	14.000	26.424	3.3474	2.2557	1.4840	2.9357	0.84077		28.000	42.598	8.1726	3.5304	2.3149	1.9748	0.43302
	16.000	28.469	3.8655	2.4523	1.5763	2.7967	0.78611		30.000	45.431	9.0717	3.6778	2.4666	1.8310	0.38488
	18.000	30.605	4.4329	2.6452	1.6758	2.6570	0.72761		32.000	48.483	10.0386	3.8178	2.6294	1.6838	0.34053
	20.000	32.834	5.0501	2.8326	1.7828	2.5171	0.66743		34.000	51.859	11.0931	3.9524	2.8067	1.5299	0.29949
	22.000	35.157	5.7171	3.0129	1.8975	2.3771	0.60746		36.000	55.812	12.2888	4.0863	3.0073	1.3604	0.26054

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								

1.

(b) (i) 483.6 K (ii) 0.228 (iii) 72.83° -48.97° (iv) 0.952 8.21 mm
(c) 74.1 %

2.

(b) 1.829 0.0973 (or 0.1078)
(c) 0.851
(d) 288 m/s 94 blades 0.427

3.

None