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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

TECHNICAL NOTE

No. 1143

CHARTS FOR DETERMINING THE CHARACTERISTICS OF SHARP-NOSE AIRFOILS IN TWO-DIMENSIONAL FLOW AT SUPERSONIC SPEEDS

By H. Reese Ivey, George W. Stickle,
and Alberta Schuettler

Langley Memorial Aeronautical Laboratory
Langley Field, Va.

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SUPPLEMENT

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Since Technical Note No. 1143 was completed, the need for a more extensive version of table I, "Values of Local Mach Number, Pressure Ratio, and Pressure Coefficient across Shock Waves," has become apparent. This table is now available in expanded form; and a copy of the expanded table is included in this supplement to supersede the original table I.

Errors in the original publication are as follows:

Page 11: The first sentence of the last paragraph should begin "Tables I and III . . ." instead of "Tables I and II . . . ."

Corrections in tables II and III are as follows:

Table II.-

M_b	$-\beta$	M_a
2.3	23°	3.4225
2.6	10°	3.0867
4.3	3°	4.5658
4.7	7°	5.4669
4.7	8°	5.5922
4.7	9°	5.7240
6.2	9°	7.9200

Table III.-

M_b	$-\beta$	p_a/p_b
1.4	14°	0.49071
4.7	24°	.02350

Figure 13.– Each vertical space along the scale label for pressure coefficient $\Delta p/q$ should represent 0.125 instead of 20; thus, the vertical scale should appear:

–.500
–.375
–.250
–.125
0
.125
.250
.375
.500
.625
.750
.875
1.000

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO,

AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
8	0	7.18546	7.18546	1.00000	0
	1	7.80125	7.57479	1.20854	.00490
	2	8.60430	8.07261	1.50622	.00977
9	0	6.39264	6.39264	1.00000	0
	1	6.87407	6.69357	1.18235	.00551
	2	7.48067	7.06779	1.43092	.01100
	3	8.27834	7.54385	1.78981	.01646
10	0	5.75871	5.75871	1.00000	0
	1	6.14639	5.99785	1.16236	.00614
	2	6.62119	6.28846	1.37565	.01224
	3	7.22344	6.64849	1.66896	.01832
	4	8.02263	7.10485	2.09762	.02436
11	0	5.24082	5.24082	1.00000	0
	1	5.55967	5.43448	1.14629	.00676
	2	5.94262	5.66634	1.33338	.01349
	3	6.42373	5.95318	1.58610	.02029
	4	7.01599	6.29392	1.92421	.02682
	5	7.83581	6.73948	2.44137	.03354
	6	8.98638	7.30617	3.26353	.04004
12	0	4.80977	4.80977	1.00000	0
	1	5.07739	4.96951	1.13344	.00739
	2	5.39281	5.15796	1.29999	.01474
	3	5.77302	5.38268	1.51411	.02204
	4	6.24375	5.65433	1.79936	.02929
	5	6.84911	5.98883	2.19908	.03652
	6	7.66903	6.41123	2.79939	.04371
	7	8.87172	6.96292	3.80262	.05087
13	0	4.44543	4.44543	1.00000	0
	1	4.67339	4.57891	1.12271	.00803
	2	4.93834	4.73465	1.27307	.01600
	3	5.24983	4.91619	1.46158	.02393
	4	5.63112	5.13596	1.70535	.03178
	5	6.10349	5.39892	2.03258	.03960
	6	6.71567	5.72228	2.49588	.04738
	7	7.55439	6.12986	3.20247	.05513
	8	8.80760	6.66172	4.41302	.06285
14	0	4.13360	4.13360	1.00000	0
	1	4.33044	4.24248	1.11376	.00867
	2	4.55638	4.37683	1.25087	.01726
	3	4.81978	4.52876	1.41949	.02580
	4	5.13240	4.70707	1.63192	.03427
	5	5.51261	4.91882	1.90826	.04270
	6	5.98884	5.17368	2.28225	.05107
	7	6.62228	5.49587	2.81769	.05921
	8	7.47450	5.88074	3.64800	.06771
	9	8.79126	6.39434	5.11042	.07598
15	0	3.86369	3.86369	1.00000	0
	1	4.03562	3.95993	1.10614	.00931
	2	4.14555	3.98829	1.23231	.01931
	3	4.45565	4.19791	1.38489	.02770
	4	4.71842	4.34601	1.57329	.03679
	5	5.03145	4.51957	1.81179	.04587
	6	5.41400	4.72539	2.12408	.05479
	7	5.89618	5.04264	2.55029	.06370
	8	6.53211	5.27618	3.16796	.07258
	9	7.42624	5.65781	4.14339	.08143
	10	8.82181	6.14628	5.91549	.09023
16	0	3.62792	3.62792	1.00000	0
	1	3.77964	3.71064	1.09962	.00996
	2	3.95037	3.80507	1.21661	.01983
	3	4.14479	3.91330	1.35610	.02961
	4	4.36900	4.03782	1.52531	.03931
	5	4.63202	4.18238	1.73515	.04895
	6	4.94653	4.35137	2.00221	.05851
	7	5.33290	4.55154	2.35426	.06803
	8	5.82325	4.79190	2.83915	.07748
	9	6.47624	5.08655	3.55104	.08689
	10	7.40814	5.45674	4.69797	.09626
	11	8.90088	5.93848	6.85594	.10559
17	0	3.42032	3.42032	1.00000	0
	1	3.55532	3.49188	1.09391	.01061
	2	3.70612	3.57318	1.20313	.02113
	3	3.87615	3.66580	1.33170	.03154
	4	4.07015	3.77171	1.48543	.04186
	5	4.29455	3.89345	1.67261	.05210
	6	4.55860	4.03450	1.90576	.06227
	7	4.87573	4.19924	2.20412	.07236
	8	5.26736	4.39418	2.60026	.08240
	9	5.76803	4.62799	3.15127	.09237
	10	6.44180	4.91440	3.97167	.10230
	11	7.41936	5.27398	5.32300	.11219
	12	9.03211	5.73979	7.96901	.12204
18	0	3.23604	3.23604	1.00000	0
	1	3.35720	3.29834	1.08900	.01128
	2	3.49146	3.36878	1.19145	.02244
	3	3.64174	3.44868	1.31087	.03349
	4	3.81150	3.53948	1.45184	.04443
	5	4.00564	3.64318	1.62091	.05528
	6	4.23083	3.76221	1.82753	.06604
	7	4.57062	3.89495	2.16071	.07937
	8	4.81743	4.05749	2.41888	.08734
	9	5.21582	4.25058	2.86418	.09789
	10	5.72912	4.47828	3.49010	.10838
	11	6.42781	4.75694	4.43641	.11882
	12	7.46024	5.10668	6.03381	.12921
	13	9.22255	5.56127	9.30925	.13956
19	0	3.07154	3.07154	1.00000	0
	1	3.18101	3.12594	1.08465	.01195
	2	3.30163	3.18741	1.18134	.02377
	3	3.43552	3.25671	1.29288	.03545
	4	3.58559	3.33514	1.42320	.04702
	5	3.75551	3.42421	1.57743	.05849
	6	3.95028	3.52573	1.76303	.06985
	7	4.17683	3.64210	1.99073	.08113
	8	4.44535	3.77664	2.27703	.09232
	9	4.77075	3.93351	2.64786	.10343
	10	5.17739	4.11880	3.14812	.11448
	11	5.70582	4.34078	3.85929	.12547
	12	6.43414	4.61223	4.95273	.13640
	13	7.53249	4.95273	6.84971	.14729
	14	9.48326	5.39507	10.95449	.15813
20	0	2.92381	2.92381	1.00000	0
	1	3.02334	2.97148	1.08078	.01263
	2	3.13239	3.02492	1.17239	.02510
	3	3.25271	3.08575	1.27725	.03744
	4	3.38650	3.15392	1.39847	.04964
	5	3.53676	3.23092	1.54042	.06172
	6	3.70716	3.31824	1.70890	.07369
	7	3.90296	3.41765	1.91224	.08555
	8	4.13158	3.53157	2.16293	.09732
	9	4.40349	3.66307	2.47965	.10901
	10	4.73461	3.81626	2.89260	.12061
	11	5.15114	3.99719	3.45455	.13215
	12	5.69739	4.21372	4.26333	.14362
	13	6.46071	4.47840	5.52986	.15503
	14	7.63854	4.81027	7.79624	.16640
	15	9.83090	5.24117	13.02305	.17772
21	0	2.79041	2.79041	1.00000	0
	1	2.88143	2.83236	1.07736	.01331
	2	2.98066	2.87953	1.16450	.02645
	3	3.08951	2.93252	1.26352	.03944
	4	3.20981	2.99660	1.37704	.05228
	5	3.34375	3.05910	1.50857	.06498
	6	3.47911	3.12563	1.64697	.07636
	7	3.66576	3.22034	1.84678	.09002
	8	3.86318	3.31777	2.06948	.10237
	9	4.09428	3.42921	2.34504	.11463
	10	4.37040	3.55785	2.69521	.12679
	11	4.70837	3.70760	3.15498	.13887
	12	5.13650	3.88429	3.78653	.15088
	13	5.70365	4.09575	4.70770	.16282
	14	6.50821	4.35408	6.17984	.17470
	15	7.78248	4.67780	8.90838	.18653
	16	10.29326	5.09813	15.70811	.19831
22	0	2.66944	2.66944	1.00000	0
	1	2.75318	2.70504	1.07435	.014012
	2	2.84397	2.74795	1.15755	.027827
	3	2.94308	2.79453	1.25145	.041472
	4	3.05197	2.84677	1.35832	.054956
	5	3.17242	2.90542	1.48108	.068287
	6	3.30680	2.97131	1.62361	.081470
	7	3.45826	3.04552	1.79138	.094530
	8	3.63087	3.12950	1.99170	.10746
	9	3.83033	3.22498	2.23535	.12029
	10	4.06462	3.33411	2.53821	.13301
	11	4.34571	3.45998	2.92528	.14564
	12	4.69181	3.60650	3.43734	.15817
	13	5.13349	3.77921	4.14788	.17065
	14	5.72501	3.98579	5.19945	.18304
	15	6.57835	4.23809	6.91836	.19538
	16	7.97050	4.55413	10.23418	.20765
	17	10.91166	4.96439	19.32636	.21989

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
23	0	2.55931	2.55931	1.00000	0
	1	2.63663	2.59191	1.07155	.014703
	2	2.72021	2.62854	1.15131	.029212
	3	2.81097	2.66964	1.24071	.043519
	4	2.91011	2.71559	1.34175	.057649
	5	3.01917	2.76708	1.45693	.071610
	6	3.14004	2.82478	1.58952	.085414
	7	3.27510	2.88954	1.74384	.099068
	8	3.42766	2.95435	1.92598	.11259
	9	3.60192	3.04481	2.14416	.12628
	10	3.80388	3.13837	2.41057	.13927
	11	4.04200	3.24533	2.74332	.15244
	12	4.32897	3.36862	3.17120	.16551
	13	4.68441	3.51192	3.74184	.17850
	14	5.14181	3.68084	4.54240	.19141
	15	5.76160	3.88284	5.74606	.20424
	16	6.67259	4.12943	7.76366	.21702
	17	8.21184	4.43824	11.84447	.22974
24	0	2.45857	2.45857	1.00000	0
	1	2.53038	2.48739	1.06915	.015428
	2	2.60761	2.51974	1.14573	.030617
	3	2.69120	2.55602	1.23122	.045607
	4	2.78202	2.59660	1.32717	.060389
	5	2.88137	2.64194	1.43578	.074985
	6	2.99085	2.69267	1.55985	.089410
	7	3.11233	2.74947	1.70294	.10367
	8	3.24831	2.81309	1.86990	.11778
	9	3.40126	2.88381	2.06753	.13183
	10	3.57857	2.96549	2.30507	.14559
	11	3.78354	3.05730	2.59633	.15930
	12	4.02611	3.16209	2.96196	.17291
	13	4.31993	3.28285	3.43525	.18642
	14	4.68616	3.42314	4.07188	.19984
	15	5.16169	3.58857	4.97574	.21317
	16	5.81451	3.78616	6.35862	.22643
	17	6.79454	4.02728	8.74365	.23962
	18	8.51947	4.32922	13.84205	.25276
25	0	2.36619	2.36619	1.00000	0
	1	2.43311	2.39158	1.06692	.016149
	2	2.50490	2.42023	1.14078	.032053
	3	2.58225	2.45239	1.22268	.047707
	4	2.66584	2.48815	1.31421	.063162
	5	2.75692	2.52825	1.41711	.078398
	6	2.85665	2.57296	1.53377	.093442
	7	2.96666	2.62291	1.66728	.10831
	8	3.08899	2.67881	1.82163	.12301
	9	3.22621	2.74136	2.00218	.13755
	10	3.38185	2.81164	2.21653	.15196
	11	3.56060	2.89100	2.47509	.16622
	12	3.76908	2.98103	2.79352	.18036
	13	4.01684	3.08381	3.19547	.19438
	14	4.31849	3.20211	3.71940	.20831
	15	4.69712	3.33960	4.43072	.22214
	16	5.19339	3.50148	5.45345	.23588
	17	5.88489	3.69496	7.04972	.24955
	18	6.94816	3.93093	9.89298	.26315
	19	8.91314	4.22633	16.38741	.27670
26	0	2.28118	2.28118	1.00000	0
	1	2.34380	2.30354	1.06492	.01688
	2	2.41071	2.32880	1.13624	.03349
	3	2.48254	2.35720	1.21505	.04985
	4	2.55994	2.38897	1.30255	.06595
	5	2.64389	2.42442	1.40051	.08185
	6	2.73534	2.46403	1.51078	.09752
	7	2.83560	2.50808	1.63601	.11300
	8	2.94639	2.55727	1.77964	.12830
	9	3.06978	2.61226	1.94606	.14342
	10	3.20843	2.64370	2.14123	.15838
	11	3.36613	2.74282	2.37366	.17319
	12	3.54771	2.82071	2.65513	.18786
	13	3.76027	2.90907	3.00338	.20241
	14	4.01396	3.00988	3.44555	.21684
	15	4.32457	3.12584	4.02623	.23116
	16	4.71747	3.26064	4.82275	.24539
	17	5.23773	3.41920	5.98393	.25953
	18	5.97457	3.60871	7.83617	.27359
	19	7.13932	3.83975	11.26064	.28758
	20	9.42386	4.12892	19.74410	.30152
27	0	2.20269	2.20269	1.00000	0
	1	2.26150	2.22239	1.06314	.01764
	2	2.32415	2.24468	1.13222	.03497
	3	2.39117	2.26979	1.20820	.05202
	4	2.46318	2.29795	1.29226	.06881
27	5	2.54085	2.32939	1.38571	.08535
	6	2.62517	2.36445	1.49044	.10167
	7	2.71711	2.40346	1.60857	.11776
	8	2.81810	2.44693	1.74297	.13365
	9	2.92984	2.49534	1.89742	.14935
	10	3.05449	2.54944	2.07680	.16488
	11	3.19487	2.60990	2.28776	.18023
	12	3.35498	2.67778	2.53991	.19544
	13	3.53985	2.75428	2.84643	.21051
	14	3.75706	2.84104	3.22752	.22544
	15	4.01751	2.93990	3.71441	.24025
	16	4.33830	3.05365	4.35896	.25496
	17	4.74742	3.18578	5.25280	.26956
	18	5.29553	3.34120	6.57644	.28408
	19	6.08598	3.52689	8.73972	.29851
	20	7.37622	3.75323	12.91636	.31288
	21	10.10296	4.03644	24.37689	.32718
28	0	2.13006	2.13006	1.00000	0
	1	2.18546	2.14729	1.06148	.01839
	2	2.24436	2.16698	1.12856	.03646
	3	2.30713	2.18917	1.20202	.05422
	4	2.37434	2.21407	1.28293	.07170
	5	2.44661	2.24198	1.37252	.08890
	6	2.52465	2.27308	1.47228	.10585
	7	2.60945	2.30767	1.58425	.12258
	8	2.70205	2.34617	1.71071	.13906
	9	2.89976	2.37065	1.85492	.14525
	10	2.91678	2.43671	2.02095	.17143
	11	3.04296	2.48992	2.21432	.18735
	12	3.18538	2.54937	2.44239	.20308
	13	3.34818	2.61606	2.71591	.21866
	14	3.53684	2.69124	3.04990	.23410
	15	3.75932	2.77640	3.46732	.24941
	16	4.02749	2.87344	4.00428	.26459
	17	4.35986	2.98504	4.72109	.27966
	18	4.78758	3.11464	5.72715	.29463
	19	5.36803	3.26703	7.24294	.30950
	20	6.22241	3.44906	9.78928	.32429
	21	7.67074	3.67090	14.96338	.33901
	22	11.04280	3.94841	31.18958	.35367
29	0	2.06266	2.06266	1.00000	0
	1	2.11505	2.07774	1.06001	.01916
	2	2.17054	2.09496	1.12523	.03797
	3	2.22957	2.11455	1.19647	.05646
	4	2.29236	2.13521	1.27431	.07457
	5	2.36005	2.16131	1.36067	.09251
	6	2.43270	2.18895	1.45616	.11011
	7	2.51121	2.21966	1.56258	.12744
	8	2.59664	2.25386	1.68225	.14455
	9	2.69398	2.29151	1.82347	.16209
	10	2.79292	2.33402	1.97234	.17808
	11	2.90717	2.38101	2.15090	.19454
	12	3.03508	2.43337	2.35935	.21081
	13	3.17984	2.49183	2.60602	.22690
	14	3.34576	2.55740	2.90292	.24285
	15	3.53866	2.63123	3.26710	.25864
	16	3.76717	2.71487	3.72486	.27429
	17	4.04402	2.81017	4.31785	.28982
	18	4.38959	2.91970	5.11702	.30524
	19	4.83865	3.04685	6.25337	.32055
	20	5.45687	3.19634	7.99871	.33576
	21	6.38835	3.37485	11.02428	.35090
	22	8.04043	3.59235	17.56086	.36595
30	0	2.00000	2.00000	1.00000	0
	1	2.04970	2.01309	1.05869	.01996
	2	2.10220	2.02817	1.12228	.03953
	3	2.15786	2.04536	1.19144	.05873
	4	2.21712	2.06489	1.26706	.07743
	5	2.28038	2.08676	1.35004	.09616
	6	2.34824	2.11124	1.44166	.11442
	7	2.42132	2.13857	1.54331	.13239
	8	2.50046	2.16931	1.65693	.15010
	9	2.58664	2.20269	1.78480	.16757
	10	2.68100	2.24016	1.92978	.18479
	11	2.78510	2.28175	2.09572	.20180
	12	2.90088	2.32799	2.28775	.21861
	13	3.03082	2.37953	2.51256	.23523
	14	3.17820	2.43701	2.77947	.25167
	15	3.34766	2.50149	3.10201	.26795
	16	3.54542	2.57407	3.49958	.28408
	17	3.78065	2.65620	4.00222	.30006
	18	4.06734	2.74978	4.65845	.31592
	19	4.42795	2.85731	5.55196	.33166

TABLE I.– VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
30	20	4.90159	3.00520	6.84081	0.34730
	21	5.56424	3.12879	8.86354	.36284
	22	6.58991	3.30392	12.49954	.37829
	23	8.51233	3.51725	20.96744	.39367
31	0	1.94160	1.94160	1.00000	0
	1	1.98886	1.95286	1.05748	.02076
	2	2.03868	1.96598	1.11958	.04110
	3	2.09138	1.98107	1.18694	.06106
	4	2.14730	1.99823	1.26029	.08064
	5	2.20684	2.01760	1.34052	.09989
	6	2.27049	2.03933	1.42871	.11880
	7	2.33880	2.06359	1.52616	.13741
	8	2.41247	2.09061	1.63449	.15574
	9	2.49232	2.12062	1.75569	.17379
	10	2.57936	2.15392	1.89230	.19160
	11	2.67484	2.19086	2.04755	.20916
	12	2.78034	2.23185	2.22567	.22651
	13	2.89789	2.27739	2.43223	.24364
	14	3.03011	2.32809	2.67480	.26058
	15	3.18052	2.38468	2.96390	.27735
	16	3.35393	2.44806	3.31456	.29394
	17	3.55709	2.51939	3.74909	.31038
	18	3.79995	2.60008	4.30204	.32668
	19	4.09778	2.69201	5.02997	.34285
	20	4.47555	2.79760	6.03228	.35890
	21	4.97767	2.92012	7.50125	.37484
	22	5.69302	3.06409	9.86355	.39068
	23	6.83565	3.23596	14.29389	.40644
	24	9.13076	3.44528	25.63452	.42212
32	0	1.88707	1.88707	1.00000	0
	1	1.93213	1.89664	1.05639	.02158
	2	1.97956	1.90799	1.11716	.04271
	3	2.02958	1.92112	1.18287	.06342
	4	2.08253	1.93620	1.25420	.08373
	5	2.13875	1.95330	1.33195	.10367
	6	2.19868	1.97256	1.41711	.12326
	7	2.26277	2.00680	1.51078	.14251
	8	2.33163	2.01807	1.61445	.16146
	9	2.40596	2.04478	1.72982	.18011
	10	2.48665	2.07445	1.85915	.19849
	11	2.57474	2.10730	2.00522	.21662
	12	2.67149	2.14373	2.17150	.23450
	13	2.77856	2.18409	2.36269	.25215
	14	2.89812	2.22897	2.58506	.26960
	15	3.03292	2.27884	2.84700	.28684
	16	3.18672	2.33454	3.16033	.30390
	17	3.36459	2.39688	3.54210	.32080
	18	3.57385	2.46700	4.01779	.33753
	19	3.82531	2.54630	4.62734	.35413
	20	4.13577	2.63661	5.43708	.37058
	21	4.53321	2.74033	6.56585	.38692
	22	5.06850	2.88280	8.24971	.40315
	23	5.84704	3.00200	11.03386	.41927
	24	7.13785	3.17071	16.52504	.43531
	25	9.97414	3.37616	32.42577	.45127
33	0	1.83608	1.83608	1.00000	0
	1	1.87918	1.84413	1.05541	.02242
	2	1.92442	1.85381	1.11497	.04435
	3	1.97206	1.86350	1.17920	.06583
	4	2.02235	1.87836	1.24872	.08688
	5	2.07561	1.89338	1.32426	.10752
	6	2.13221	1.91039	1.40668	.12779
	7	2.19258	1.92947	1.49703	.14770
	8	2.25722	1.95082	1.59657	.16727
	9	2.32674	1.97459	1.70686	.18653
	10	2.40188	2.00099	1.82982	.20796
	11	2.48351	2.03026	1.96784	.22417
	12	2.57274	2.06268	2.12398	.24259
	13	2.67094	2.09859	2.30217	.26076
	14	2.77983	2.13838	2.50757	.27870
	15	2.90165	2.18255	2.74709	.29643
	16	3.03936	2.23168	3.03020	.31396
	17	3.19689	2.28644	3.37020	.33131
	18	3.37977	2.34775	3.78644	.34848
	19	3.59589	2.41669	4.30816	.36549
	20	3.85704	2.49464	4.98175	.38235
	21	4.18188	2.58339	5.88545	.39908
	22	4.60196	2.68528	7.16241	.41569
	23	5.17619	2.80347	9.10556	.43218
	24	6.03149	2.94229	12.42298	.44857
	25	7.51479	3.10795	19.37661	.46487
	26	11.19767	3.53991	43.22636	.48109
34	0	1.78829	1.78829	1.00000	0
	1	1.82960	1.79493	1.05453	.023271
	2	1.87291	1.80309	1.11302	.046028
	3	1.91837	1.81285	1.17591	.060285
	4	1.96630	1.82427	1.24382	.090089
	5	2.01688	1.83741	1.31735	.11145
	6	2.07054	1.85237	1.39734	.13240
	7	2.12758	1.86926	1.48470	.15297
	8	2.18849	1.88824	1.58061	.17318
	9	2.25376	1.90935	1.68638	.19304
	10	2.32403	1.93285	1.80374	.21259
	11	2.40006	1.95894	1.93476	.23182
	12	2.48279	1.98784	2.08213	.25078
	13	2.57339	2.01986	2.24923	.26948
	14	2.67317	2.05523	2.44024	.28793
	15	2.78406	2.07055	2.66102	.30614
	16	2.90844	2.13794	2.91930	.32413
	17	3.04938	2.18628	3.22562	.34192
	18	3.21114	2.24018	3.59506	.35953
	19	3.39964	2.30049	4.04968	.37696
	20	3.62346	2.36828	4.62314	.39422
	21	3.89559	2.44492	5.36960	.41134
	22	4.23683	2.53215	6.38199	.42831
	23	4.68311	2.63228	7.83424	.44517
	24	5.30348	2.76967	10.09437	.46191
	25	6.25348	2.88475	14.09971	.47854
	26	7.99488	3.04745	23.15148	.49509
35	0	1.74345	1.74345	1.00000	0
	1	1.78316	1.74876	1.05375	.02415
	2	1.82468	1.75553	1.11126	.04774
	3	1.86822	1.76380	1.17296	.07079
	4	1.91398	1.77361	1.23939	.09336
	5	1.96221	1.78504	1.31116	.11545
	6	2.01321	1.79815	1.38897	.13710
	7	2.06730	1.81304	1.47368	.15834
	8	2.12487	1.82981	1.56632	.17918
	9	2.18638	1.84859	1.66810	.19966
	10	2.25238	1.86953	1.78054	.21979
	11	2.32352	1.89278	1.90548	.23960
	12	2.40058	1.91855	2.04521	.25910
	13	2.48453	1.94707	2.20263	.27832
	14	2.57658	1.97862	2.38143	.29727
	15	2.67822	2.01351	2.58644	.31596
	16	2.79139	2.05215	2.82401	.33442
	17	2.91858	2.09498	3.10277	.35266
	18	3.06314	2.14258	3.43466	.37069
	19	3.22962	2.19562	3.83675	.38853
	20	3.42442	2.25495	4.33427	.40619
	21	3.65692	2.32162	4.96621	.42369
	22	3.94150	2.39697	5.79616	.44103
	23	4.30153	2.48272	6.93526	.45824
	24	4.77837	2.58113	8.59705	.47532
	25	5.45400	2.69523	11.25052	.49229
	26	6.52305	2.82921	16.16503	.50915
	27	8.62546	2.98903	28.38910	.52591
36	0	1.70130	1.70130	1.00000	0
	1	1.73955	1.70539	1.05304	.025040
	2	1.77947	1.71085	1.10969	.049487
	3	1.82126	1.71772	1.17033	.073358
	4	1.86536	1.72606	1.23585	.096830
	5	1.91119	1.73654	1.30563	.11953
	6	1.95980	1.74734	1.38147	.14189
	7	2.01124	1.76042	1.46381	.16380
	8	2.06585	1.77522	1.55356	.18530
	9	2.12402	1.79185	1.65178	.20639
	10	2.18626	1.81048	1.75992	.22713
	11	2.25305	1.83118	1.87943	.24749
	12	2.32517	1.85418	2.01251	.26754
	13	2.40336	1.87960	2.16155	.28728
	14	2.48870	1.90778	2.32982	.30673
	15	2.58245	1.93889	2.52146	.32591
	16	2.68612	1.97330	2.74161	.34483
	17	2.80180	2.01136	2.99750	.36351
	18	2.93216	2.05355	3.29879	.38197
	19	3.08076	2.10040	3.65894	.40022
	20	3.25251	2.15260	4.09738	.41827
	21	3.45439	2.21098	4.64313	.43615
	22	3.69669	2.27656	5.34155	.45386
	23	3.99543	2.35065	6.26779	.47141
	24	4.37714	2.43496	7.55597	.48883
	25	4.88989	2.53169	9.47123	.50612
	26	5.63258	2.66431	12.62122	.52329

TABLE I – VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
36	27	6.85490	2.77549	18.77364	0.54035
	28	9.49197	2.93252	36.14927	.55732
37	0	1.66164	1.66164	1.00000	0
	1	1.69857	1.66458	1.05244	.02597
	2	1.73706	1.66883	1.10831	.05128
	3	1.77726	1.67443	1.16800	.07598
	4	1.81934	1.68140	1.23196	.10011
	5	1.86351	1.68980	1.30070	.12370
	6	1.91000	1.69967	1.37483	.14678
	7	1.95907	1.71107	1.45505	.16938
	8	2.01103	1.72408	1.54221	.19153
	9	2.06623	1.73879	1.63730	.21325
	10	2.12508	1.75530	1.74154	.23458
	11	2.18809	1.77373	1.85637	.25552
	12	2.25584	1.79422	1.98358	.27612
	13	2.32903	1.81694	2.12538	.29638
	14	2.40896	1.84205	2.28541	.31643
	15	2.49541	1.86986	2.46456	.33599
	16	2.59099	1.90054	2.66997	.35537
	17	2.69694	1.93445	2.90670	.37449
	18	2.81543	1.97195	3.18269	.39337
	19	2.94931	2.01350	3.50881	.41203
	20	3.10242	2.05963	3.90033	.43048
	21	3.28008	2.11101	4.37946	.44873
	22	3.48991	2.16844	4.97971	.46679
	23	3.74331	2.23295	5.75420	.48469
	24	4.05825	2.30583	6.79240	.50244
	25	4.46512	2.38873	8.25775	.52004
	26	5.02050	2.48383	10.48377	.53751
	27	5.84590	2.59406	14.27360	.55487
	28	7.27143	2.72345	22.17482	.57211
	29	10.76973	2.87776	48.84307	.58927
38	0	1.62427	1.62427	1.00000	0
	1	1.66000	1.62610	1.05191	.02691
	2	1.69720	1.62925	1.10711	.05312
	3	1.73595	1.63363	1.16595	.07867
	4	1.77646	1.63934	1.22888	.10361
	5	1.81891	1.64639	1.29635	.12796
	6	1.86348	1.65484	1.36892	.15177
	7	1.91042	1.66471	1.44727	.17507
	8	1.95999	1.67607	1.53211	.19788
	9	2.01254	1.68903	1.62441	.22023
	10	2.06839	1.70361	1.72524	.24217
	11	2.12800	1.71998	1.83585	.26369
	12	2.19194	1.73827	1.95797	.28484
	13	2.26069	1.75849	2.09337	.30562
	14	2.33512	1.77819	2.24461	.32607
	15	2.41604	1.80577	2.41463	.34621
	16	2.50464	1.83318	2.60744	.36605
	17	2.60229	1.86344	2.82795	.38562
	18	2.71076	1.89686	3.08280	.40492
	19	2.83237	1.93381	3.38091	.42398
	20	2.97018	1.97473	3.73452	.44281
	21	3.12834	2.02015	4.16104	.46143
	22	3.31262	2.07072	4.68594	.47985
	23	3.53143	2.12723	5.34815	.49809
	24	3.79744	2.19070	6.21029	.51616
	25	4.13102	2.26238	7.37982	.53407
	26	4.56731	2.34390	9.05803	.55184
	27	5.17392	2.43741	11.67110	.56947
	28	6.10326	2.56549	16.30565	.58699
	29	7.80868	2.67296	26.79741	.60440
	30	12.89714	2.82462	73.38925	.62171
39	0	1.58902	1.58902	1.00000	0
	1	1.62367	1.58985	1.05145	.02788
	2	1.65967	1.59190	1.10605	.05500
	3	1.69713	1.59517	1.16416	.08142
	4	1.73622	1.59970	1.22617	.10718
	5	1.77709	1.60550	1.29251	.13232
	6	1.81992	1.61261	1.36371	.15687
	7	1.86495	1.62107	1.44036	.18087
	8	1.91239	1.63094	1.52317	.20436
	9	1.96255	1.64227	1.61298	.22735
	10	2.01575	1.65514	1.71076	.24989
	11	2.07236	1.66963	1.81770	.27200
	12	2.13285	1.68584	1.93523	.29370
	13	2.19774	1.70390	2.06508	.31501
	14	2.26769	1.72394	2.20939	.33597
	15	2.34345	1.74612	2.37081	.35659
	16	2.42599	1.77061	2.55271	.37689
39	17	2.51649	1.79765	2.75938	0.39689
	18	2.61643	1.82749	2.99641	.41661
	19	2.72771	1.86043	3.27119	.43607
	20	2.85280	1.89684	3.59373	.45529
	21	2.99499	1.93714	3.97793	.47427
	22	3.15879	1.98185	4.44366	.49304
	23	3.35052	2.03163	5.02033	.51161
	24	3.68530	2.09759	6.03867	.52999
	25	3.85991	2.14968	6.71741	.54821
	26	4.21505	2.22019	8.04246	.56627
	27	4.68611	2.30037	9.97979	.58418
	28	5.35512	2.39231	13.08374	.60196
	29	6.41824	2.49885	18.86698	.61961
	30	8.52952	2.62389	33.44886	.63716
40	0	1.55572	1.55572	1.00000	0
	1	1.58940	1.55556	1.05106	.02887
	2	1.62431	1.55660	1.10515	.05693
	3	1.66120	1.55877	1.16355	.08467
	4	1.69841	1.56224	1.22384	.11085
	5	1.73791	1.56694	1.28916	.13677
	6	1.77912	1.57276	1.35914	.16209
	7	1.82243	1.57993	1.43431	.18681
	8	1.86797	1.58841	1.51532	.21098
	9	1.91599	1.59826	1.60291	.23462
	10	1.96679	1.60950	1.69799	.25777
	11	2.02072	1.62230	1.80165	.28046
	12	2.07818	1.63666	1.91519	.30272
	13	2.13960	1.65272	2.04007	.32456
	14	2.20564	1.67062	2.17838	.34603
	15	2.27684	1.69040	2.33224	.36713
	16	2.35412	1.71233	2.50474	.38789
	17	2.43844	1.73651	2.69953	.40833
	18	2.53106	1.76318	2.92139	.42846
	19	2.63355	1.79260	3.17655	.44832
	20	2.74794	1.82507	3.47330	.46791
	21	2.87691	1.86290	3.82297	.48726
	22	3.02399	1.90062	4.24135	.50637
	23	3.19412	1.94465	4.75127	.52527
	24	3.39425	1.99364	5.38688	.54396
	25	3.63476	2.04837	6.20177	.56247
	26	3.93174	2.10980	7.28497	.58081
	27	4.31206	2.17916	8.79627	.59899
	28	4.82461	2.25802	11.05366	.61702
	29	5.57095	2.34844	14.79363	.63492
	30	6.81144	2.47220	22.19783	.65270
	31	9.55562	2.57613	43.84821	.67037
41	0	1.52425	1.52425	1.00000	0
	1	1.55704	1.52319	1.05073	.02989
	2	1.59100	1.52328	1.10441	.05892
	3	1.62623	1.52450	1.16133	.08714
	4	1.66286	1.52688	1.22183	.11461
	5	1.70103	1.53043	1.28631	.14135
	6	1.74090	1.53516	1.35521	.16743
	7	1.78264	1.54110	1.42906	.19288
	8	1.82644	1.54829	1.50845	.21774
	9	1.87255	1.55677	1.59408	.24204
	10	1.92121	1.56658	1.68679	.26581
	11	1.97274	1.57780	1.78755	.28910
	12	2.02749	1.59049	1.89753	.31191
	13	2.08588	1.60474	2.01813	.33429
	14	2.14839	1.62064	2.15104	.35626
	15	2.21562	1.63831	2.29837	.37784
	16	2.28827	1.65788	2.46267	.39906
	17	2.36721	1.67951	2.64721	.41993
	18	2.45349	1.70337	2.85608	.44048
	19	2.54845	1.72968	3.09460	.46073
	20	2.65378	1.75868	3.36974	.48070
	21	2.77164	1.79068	3.69085	.50040
	22	2.90492	1.82601	4.07076	.51985
	23	3.05749	1.86509	4.52755	.53907
	24	3.23473	1.90844	5.08756	.55807
	25	3.44438	1.95667	5.79072	.57687
	26	3.69807	2.01053	6.70059	.59549
	27	4.01421	2.07098	7.92491	.61393
	28	4.42429	2.13921	9.66250	.63221
	29	4.98692	2.21677	12.32147	.65034
	30	5.83108	2.30570	16.90715	.66834
	31	7.31588	2.40871	26.70940	.68622
	32	11.16425	2.52958	62.42147	.70398

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
42	0	1.49448	1.49448	1.00000	0
	1	1.52646	1.49254	1.05047	.03094
	2	1.55953	1.49172	1.10379	.06096
	3	1.59084	1.48920	1.16026	.09046
	4	1.63013	1.49331	1.22140	.11902
	5	1.66642	1.49592	1.28389	.14604
	6	1.70602	1.50047	1.35186	.17270
	7	1.74533	1.50437	1.42453	.19909
	8	1.78759	1.51037	1.50251	.22465
	9	1.83196	1.51758	1.58642	.24962
	10	1.87871	1.52603	1.67703	.27402
	11	1.92809	1.53583	1.77522	.29790
	12	1.98043	1.54697	1.88207	.32128
	13	2.03608	1.55958	1.99882	.34419
	14	2.09550	1.57370	2.12706	.36667
	15	2.15919	1.58941	2.26861	.38873
	16	2.22779	1.60689	2.42582	.41041
	17	2.30202	1.62622	2.60146	.43172
	18	2.38280	1.64758	2.79914	.45268
	19	2.47126	1.67112	3.02345	.47332
	20	2.56883	1.69707	3.28032	.49366
	21	2.67731	1.72566	3.57758	.51371
	22	2.79904	1.75719	3.92581	.53350
	23	2.93714	1.79199	4.33962	.55303
	24	3.09586	1.83048	4.83980	.57233
	25	3.28113	1.87316	5.45696	.59142
	26	3.50161	1.92063	6.23811	.61030
	27	3.77045	1.97364	7.25935	.62899
	28	4.10893	2.03311	8.65247	.64751
	29	4.55417	2.10024	10.66728	.66587
	30	5.17863	2.17653	13.84204	.68408
	31	6.14967	2.26399	19.58813	.70216
	32	7.98864	2.38362	33.16941	.72011
	33	14.19485	2.48414	105.08535	.73795
43	0	1.46628	1.46628	1.00000	0
	1	1.49755	1.46349	1.05029	.03203
	2	1.52984	1.46179	1.10333	.06307
	3	1.56325	1.46118	1.15941	.09319
	4	1.59788	1.46165	1.21882	.12243
	5	1.63385	1.46320	1.28190	.15086
	6	1.67130	1.46584	1.34907	.17853
	7	1.71037	1.46959	1.42075	.20547
	8	1.75122	1.47447	1.49749	.23174
	9	1.79404	1.48050	1.57988	.25738
	10	1.83906	1.48772	1.66862	.28242
	11	1.88651	1.49617	1.76455	.30690
	12	1.93668	1.50591	1.86864	.33085
	13	1.98991	1.51698	1.98205	.35430
	14	2.04657	1.52947	2.10617	.37728
	15	2.10714	1.54345	2.24267	.39983
	16	2.17214	1.55902	2.39362	.42196
	17	2.24223	1.57629	2.56152	.44370
	18	2.31820	1.59539	2.74953	.46507
	19	2.40103	1.61646	2.96164	.48610
	20	2.49191	1.63969	3.20294	.50680
	21	2.59237	1.66528	3.48010	.52720
	22	2.70435	1.69346	3.80196	.54731
	23	2.83381	1.72502	4.18819	.56716
	24	2.97391	1.75881	4.63254	.58675
	25	3.13997	1.79676	5.18317	.60612
	26	3.33394	1.83873	5.86488	.62526
	27	3.56680	1.88545	6.73684	.64420
	28	3.85318	1.93762	7.88996	.66295
	29	4.21794	1.99614	9.48750	.68152
	30	4.70573	2.06218	11.84954	.69994
	31	5.40747	2.13722	15.70056	.71820
	32	6.54844	2.22324	23.10298	.73634
	33	8.93919	2.32287	43.19541	.75435
44	0	1.43955	1.43955	1.00000	0
	1	1.47017	1.43595	1.05016	.03315
	2	1.50175	1.43340	1.10300	.06524
	3	1.53439	1.43194	1.15878	.09634
	4	1.56816	1.43154	1.21777	.12651
	5	1.60320	1.43215	1.28033	.15581
	6	1.63960	1.43385	1.34680	.18429
	7	1.67754	1.43659	1.41765	.21202
	8	1.71712	1.44044	1.49329	.23900
	9	1.75855	1.44536	1.57435	.26532
	10	1.80201	1.45143	1.66148	.29101
	11	1.84775	1.45868	1.75542	.31608
	12	1.89597	1.46707	1.85710	.34062
	13	1.94702	1.47675	1.96754	.36461
	14	2.00123	1.48774	2.08804	.37474
44	15	2.05902	1.50014	2.22011	0.41113
	16	2.12085	1.51398	2.36559	.43372
	17	2.18729	1.52938	2.52675	.45589
	18	2.25905	1.54644	2.70637	.47767
	19	2.33696	1.56530	2.90795	.49908
	20	2.42205	1.58610	3.13593	.52014
	21	2.51562	1.60901	3.39602	.54088
	22	2.61929	1.63424	3.69573	.56132
	23	2.73518	1.66202	4.04507	.58147
	24	2.86606	1.69262	4.45777	.60135
	25	3.01565	1.72639	4.95312	.62098
	26	3.18913	1.76371	5.55910	.64038
	27	3.39390	1.80508	6.31798	.65956
	28	3.64100	1.85107	7.29665	.67853
	29	3.94787	1.90240	8.60767	.69731
	30	4.34390	1.95998	10.45639	.71592
	31	4.88378	2.02495	13.26101	.73437
	32	5.68455	2.09877	18.02541	.75267
	33	7.06275	2.18337	27.91591	.77084
	34	10.41342	2.29901	60.88204	.78888
45	0	1.41421	1.41421	1.00000	0
	1	1.44426	1.40982	1.05010	.03431
	2	1.47521	1.40648	1.10280	.06748
	3	1.50714	1.40419	1.15836	.09960
	4	1.54015	1.40293	1.21704	.13071
	5	1.57434	1.40269	1.27916	.16090
	6	1.60983	1.40348	1.34507	.19022
	7	1.64673	1.40529	1.41516	.21871
	8	1.68518	1.40814	1.48991	.24645
	9	1.72536	1.41205	1.56983	.27346
	10	1.76742	1.41703	1.65554	.29979
	11	1.81159	1.42311	1.74775	.32549
	12	1.85809	1.43032	1.84730	.35059
	13	1.90720	1.43872	1.95515	.37513
	14	1.95922	1.44834	2.07248	.39914
	15	2.01452	1.45925	2.20066	.42265
	16	2.07352	1.47151	2.34137	.44569
	17	2.13674	1.48521	2.49664	.46829
	18	2.20479	1.50043	2.66897	.49047
	19	2.27839	1.51729	2.86144	.51227
	20	2.35843	1.53591	3.07796	.53369
	21	2.44604	1.55643	3.32348	.55477
	22	2.54259	1.57903	3.60444	.57553
	23	2.64985	1.60390	3.92932	.59597
	24	2.77011	1.63127	4.30955	.61614
	25	2.90641	1.66142	4.76088	.63603
	26	3.06287	1.69468	5.30568	.65567
	27	3.24525	1.73143	5.97680	.67508
	28	3.46192	1.77215	6.82452	.69427
	29	3.72556	1.81741	7.92987	.71325
	30	4.05655	1.86793	9.43244	.73205
	31	4.49028	1.92458	11.59485	.75067
	32	5.09509	1.98849	14.97662	.76913
	33	6.02650	2.06110	21.01927	.78744
	34	7.75492	2.14431	34.91428	.80562
	35	13.13487	2.24066	100.47277	.82367
46	0	1.39016	1.39016	1.00000	0
	1	1.41969	1.38498	1.05010	.03551
	2	1.45008	1.38088	1.10274	.06980
	3	1.48138	1.37779	1.15813	.10294
	4	1.51372	1.37573	1.21661	.13505
	5	1.54715	1.37464	1.27839	.16615
	6	1.58181	1.37460	1.34384	.19631
	7	1.61778	1.37540	1.41334	.22562
	8	1.65521	1.37744	1.48728	.25408
	9	1.69426	1.38037	1.56626	.28181
	10	1.73507	1.38431	1.65076	.30881
	11	1.77783	1.38936	1.74144	.33512
	12	1.82279	1.39545	1.83915	.36080
	13	1.87015	1.40266	1.94474	.38589
	14	1.92023	1.41102	2.05931	.41041
	15	1.97330	1.42055	2.18408	.43441
	16	2.02982	1.43138	2.32064	.45790
	17	2.09018	1.44353	2.47077	.48093
	18	2.15495	1.45708	2.63675	.50351
	19	2.22476	1.47212	2.82133	.52568
	20	2.30039	1.48878	3.02795	.54746
	21	2.38282	1.50715	3.26098	.56888
	22	2.47321	1.52740	3.52598	.58994
	23	2.57309	1.54968	3.83023	.61068
	24	2.68435	1.57419	4.18338	.63112
	25	2.80952	1.60116	4.59851	.65127

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TABLE I.– VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND

PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
46	26	2.95193	1.63086	5.09384	0.67115
	27	3.11618	1.66361	5.69551	.69078
	28	3.30874	1.69980	6.44239	.71018
	29	3.53915	1.73988	7.39491	.72936
	30	3.82213	1.78442	8.65246	.74833
	31	4.18188	1.83413	10.39077	.76711
	32	4.66173	1.88987	12.95259	.78572
	33	5.34930	1.95274	17.10800	.80417
	34	6.45951	2.02416	25.02251	.82247
	35	8.74799	2.10599	46.03221	.84064
47	0	1.36733	1.36733	1.00000	0
	1	1.39641	1.36141	1.05016	.03675
	2	1.42630	1.35654	1.10280	.07219
	3	1.45706	1.35269	1.15815	.10642
	4	1.48878	1.34984	1.21646	.13951
	5	1.52154	1.34797	1.27800	.17155
	6	1.55544	1.34708	1.34310	.20259
	7	1.59060	1.34716	1.41211	.23270
	8	1.62712	1.34821	1.48545	.26195
	9	1.66516	1.35024	1.56359	.29037
	10	1.70485	1.35326	1.64707	.31804
	11	1.74637	1.35727	1.73650	.34498
	12	1.78993	1.36232	1.83261	.37125
	13	1.83573	1.36841	1.93624	.39689
	14	1.88405	1.37560	2.04839	.42193
	15	1.93516	1.38391	2.17022	.44641
	16	1.98943	1.39339	2.30313	.47036
	17	2.04726	1.40411	2.44879	.49381
	18	2.10912	1.41614	2.60925	.51680
	19	2.17560	1.42954	2.78698	.53934
	20	2.24736	1.44440	2.98505	.56147
	21	2.32526	1.46084	3.20733	.58321
	22	2.41032	1.47898	3.45870	.60458
	23	2.50383	1.49895	3.74545	.62561
	24	2.60741	1.52092	4.07583	.64632
	25	2.72317	1.54507	4.46089	.66671
	26	2.85386	1.57165	4.91572	.68683
	27	3.00320	1.60090	5.46154	.70667
	28	3.17632	1.63314	6.12913	.72627
	29	3.38059	1.66877	6.96494	.74563
	30	3.62700	1.70822	8.04246	.76477
	31	3.93285	1.75205	9.48532	.78371
	32	4.32733	1.80096	11.51871	.80246
	33	4.86465	1.85579	14.60078	.82104
	34	5.66067	1.91764	19.82908	.83945
	35	7.02769	1.98788	30.65294	.85772
	36	10.33190	2.06836	66.44672	.87585
48	0	1.34562	1.34562	1.00000	0
	1	1.37431	1.33897	1.05028	.03803
	2	1.40376	1.33334	1.10299	.07466
	3	1.43404	1.32876	1.15835	.11000
	4	1.46522	1.32515	1.21660	.14413
	5	1.49738	1.32253	1.27799	.17712
	6	1.53062	1.32084	1.34285	.20906
	7	1.56467	1.32016	1.41075	.23968
	8	1.60075	1.32034	1.48434	.27003
	9	1.63789	1.32151	1.56185	.29919
	10	1.67658	1.32364	1.64444	.32752
	11	1.71700	1.32672	1.73283	.35511
	12	1.75929	1.33077	1.82758	.38198
	13	1.80370	1.33585	1.92951	.40816
	14	1.85044	1.34190	2.03959	.43372
	15	1.89980	1.34908	2.15885	.45868
	16	1.95212	1.35736	2.28864	.48308
	17	2.00769	1.36677	2.43042	.50696
	18	2.06698	1.37739	2.58609	.53034
	19	2.13050	1.38929	2.75788	.55326
	20	2.19886	1.40253	2.94856	.57573
	21	2.27280	1.41722	3.16158	.59779
	22	2.35321	1.43345	3.40126	.61947
	23	2.44121	1.45134	3.67309	.64078
	24	2.53819	1.47103	3.98424	.66174
	25	2.64594	1.49269	4.34413	.68238
	26	2.76675	1.51649	4.76546	.70272
	27	2.90369	1.54266	5.26577	.72277
	28	3.06091	1.57147	5.86997	.74255
	29	3.24422	1.60322	6.61467	.76209
	30	3.46207	1.63828	7.55598	.78139
	31	3.72728	1.67711	8.78447	.80047
48	32	4.06049	1.72024	10.45639	0.81935
	33	4.49758	1.76836	12.86653	.83805
	34	5.10813	1.82230	16.64529	.85657
	35	6.05125	1.88312	23.42636	.87492
	36	7.81289	1.95221	39.16270	.89314
	37	13.43954	2.03135	116.20903	.91121
49	0	1.32501	1.32501	1.00000	0
	1	1.35337	1.31763	1.05048	.03937
	2	1.38245	1.31130	1.10333	.07724
	3	1.41230	1.30598	1.15878	.11372
	4	1.44301	1.30164	1.21704	.14891
	5	1.47465	1.29827	1.27839	.18288
	6	1.50731	1.29585	1.34310	.21573
	7	1.54108	1.29435	1.41151	.24753
	8	1.57607	1.29378	1.48399	.27835
	9	1.61239	1.29413	1.56096	.30824
	10	1.65019	1.29540	1.64290	.33727
	11	1.68960	1.29760	1.73037	.36549
	12	1.73080	1.30074	1.82401	.39295
	13	1.77397	1.30483	1.92455	.41970
	14	1.81933	1.30991	2.03286	.44578
	15	1.86712	1.31599	2.14994	.47123
	16	1.91764	1.32311	2.27699	.49609
	17	1.97121	1.33132	2.41543	.52038
	18	2.02822	1.34065	2.56696	.54416
	19	2.08914	1.35117	2.73362	.56744
	20	2.15449	1.36293	2.91792	.59026
	21	2.22495	1.37602	3.12296	.61264
	22	2.30130	1.39053	3.35260	.63461
	23	2.38451	1.40654	3.61170	.65619
	24	2.47579	1.42419	3.90652	.67740
	25	2.57667	1.44360	4.24521	.69828
	26	2.68909	1.46494	4.63861	.71883
	27	2.81562	1.48840	5.10146	.73908
	28	2.95967	1.51417	5.65428	.75904
	29	3.12592	1.54254	6.32660	.77875
	30	3.32102	1.57379	7.16241	.79820
	31	3.55475	1.60830	8.23036	.81742
	32	3.84229	1.64650	9.64375	.83642
	33	4.20868	1.68894	11.60395	.85522
	34	4.69905	1.73628	14.50661	.87383
	35	5.40551	1.78933	19.25024	.89227
	36	6.55748	1.84915	28.40795	.91055
	37	8.98915	1.89961	53.52952	.92869
50	0	1.30541	1.30541	1.00000	0
	1	1.33348	1.29731	1.05072	.04075
	2	1.36225	1.29028	1.10380	.07991
	3	1.39174	1.28425	1.15940	.11756
	4	1.42204	1.27920	1.21777	.15384
	5	1.45322	1.27510	1.27916	.18884
	6	1.48536	1.27194	1.34383	.22263
	7	1.51856	1.26972	1.41210	.25529
	8	1.55292	1.26837	1.48436	.28693
	9	1.58854	1.26795	1.56095	.31756
	10	1.62554	1.26843	1.64237	.34729
	11	1.66408	1.26977	1.72917	.37617
	12	1.70426	1.27204	1.82185	.40422
	13	1.74634	1.27525	1.92125	.43154
	14	1.79047	1.27937	2.02809	.45814
	15	1.83687	1.28445	2.14331	.48407
	16	1.88581	1.29052	2.26807	.50939
	17	1.93761	1.29760	2.40364	.53411
	18	1.99260	1.30574	2.55161	.55827
	19	2.05120	1.31499	2.71386	.58192
	20	2.11391	1.32540	2.89268	.60507
	21	2.18131	1.33703	3.09086	.62776
	22	2.25409	1.34997	3.31189	.65002
	23	2.33313	1.36428	3.56009	.67186
	24	2.41947	1.38009	3.84102	.69333
	25	2.51443	1.39749	4.16179	.71442
	26	2.61969	1.41662	4.53177	.73518
	27	2.73741	1.43765	4.96352	.75562
	28	2.87044	1.46075	5.47426	.77576
	29	3.02262	1.48613	6.08824	.79562
	30	3.19929	1.51406	6.84082	.81521
	31	3.40813	1.54482	7.78552	.83455
	32	3.66064	1.57878	9.00756	.85366
	33	3.97506	1.61636	10.65120	.87256
	34	4.38240	1.65811	12.98191	.89126

NACA

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
50	35	4.94092	1.70467	16.54698	0.90977
	36	5.77744	1.75684	22.68537	.92811
	37	7.24492	1.81567	35.76868	.94629
	38	11.02198	1.88247	83.00475	.96432
51	0	1.28676	1.28676	1.00000	0
	1	1.31461	1.27794	1.05105	.04220
	2	1.34310	1.27020	1.10441	.08268
	3	1.37229	1.26347	1.16026	.12157
	4	1.40225	1.25773	1.21882	.15898
	5	1.43304	1.25294	1.28033	.19501
	6	1.46474	1.24908	1.34507	.22976
	7	1.49745	1.24613	1.41333	.26333
	8	1.53125	1.24408	1.48545	.29577
	9	1.56624	1.24290	1.56183	.32718
	10	1.60255	1.24260	1.64290	.35762
	11	1.64030	1.24317	1.72916	.38715
	12	1.67964	1.24463	1.82118	.41582
	13	1.72072	1.24696	1.91962	.44370
	14	1.76374	1.25020	2.02525	.47082
	15	1.80891	1.25434	2.13895	.49725
	16	1.85646	1.25943	2.26176	.52301
	17	1.90668	1.26547	2.39492	.54814
	18	1.95988	1.27251	2.53987	.57270
	19	2.01645	1.28059	2.69835	.59670
	20	2.07682	1.28975	2.87247	.62018
	21	2.14152	1.30005	3.06478	.64318
	22	2.21119	1.31155	3.27844	.66572
	23	2.28657	1.32432	3.51734	.68782
	24	2.36861	1.33845	3.78644	.70952
	25	2.45845	1.35403	4.09202	.73084
	26	2.55756	1.37119	4.44229	.75179
	27	2.66777	1.39005	4.84808	.77241
	28	2.79151	1.41076	5.32406	.79271
	29	2.93197	1.43350	5.89051	.81271
	30	3.09353	1.45850	6.57643	.83244
	31	3.28233	1.48598	7.42463	.85190
	32	3.50735	1.51625	8.50117	.87111
	33	3.78233	1.54966	9.91359	.89009
	34	4.12960	1.58664	11.84954	.90886
	35	4.58848	1.62770	14.66843	.92743
	36	5.23674	1.67349	19.15633	.94582
	37	6.25775	1.72479	27.42567	.96403
	38	8.24709	1.78263	47.75734	.98209
52	0	1.26902	1.26902	1.00000	0
	1	1.29670	1.25948	1.05144	.04370
	2	1.32498	1.25103	1.10516	.08557
	3	1.35392	1.24364	1.16131	.12571
	4	1.38359	1.23720	1.22017	.16430
	5	1.41404	1.23173	1.28189	.20140
	6	1.44538	1.22720	1.34680	.23715
	7	1.47766	1.22354	1.41517	.27163
	8	1.51097	1.22079	1.48728	.30491
	9	1.54543	1.21891	1.56357	.33709
	10	1.58114	1.21788	1.64446	.36826
	11	1.61820	1.21769	1.73036	.39845
	12	1.65677	1.21837	1.82188	.42775
	13	1.69700	1.21989	1.91963	.45620
	14	1.73905	1.22229	2.02429	.48384
	15	1.78314	1.22557	2.13679	.51075
	16	1.82945	1.22972	2.25801	.53696
	17	1.87828	1.23480	2.38915	.56251
	18	1.92990	1.24082	2.53157	.58745
	19	1.98467	1.24781	2.68688	.61180
	20	2.04298	1.25582	2.85703	.63561
	21	2.10531	1.26489	3.04435	.65891
	22	2.17223	1.27507	3.25173	.68172
	23	2.24442	1.28643	3.48272	.70408
	24	2.32271	1.29904	3.74176	.72601
	25	2.40812	1.31298	4.03448	.74753
	26	2.50192	1.32835	4.36812	.76868
	27	2.60571	1.34526	4.75217	.78947
	28	2.72156	1.36383	5.19927	.80992
	29	2.85217	1.38423	5.72668	.83006
	30	3.00119	1.40663	6.35861	.84990
	31	3.17365	1.43123	7.13007	.86946
	32	3.37670	1.45827	8.09364	.88876
	33	3.62101	1.48806	9.33218	.90782
	34	3.92327	1.52092	10.98415	.92665
52	35	4.31141	1.55729	13.29968	0.94527
	36	4.83682	1.59767	16.78182	.96369
	37	5.60756	1.64269	22.61361	.98193
	38	6.90708	1.69313	34.39544	1.00000
	39	9.89463	1.74999	70.76017	1.01791
53	0	1.25214	1.25214	1.00000	0
	1	1.27969	1.24189	1.05190	.04528
	2	1.30781	1.23275	1.10605	.08858
	3	1.33656	1.22465	1.16262	.13005
	4	1.36600	1.21756	1.22183	.16983
	5	1.39619	1.21142	1.28389	.20805
	6	1.42721	1.20621	1.34907	.24481
	7	1.45914	1.20190	1.41763	.28022
	8	1.49205	1.19846	1.48991	.31438
	9	1.52604	1.19589	1.56625	.34736
	10	1.56122	1.19415	1.64707	.37925
	11	1.59770	1.19325	1.73281	.41011
	12	1.63560	1.19319	1.82401	.44003
	13	1.67508	1.19395	1.92126	.46904
	14	1.71629	1.19555	2.02525	.49722
	15	1.75941	1.19800	2.13677	.52462
	16	1.80465	1.20130	2.25676	.55127
	17	1.85225	1.20547	2.38629	.57724
	18	1.90248	1.21053	2.52664	.60255
	19	1.95566	1.21652	2.67932	.62726
	20	2.01216	1.22346	2.84613	.65139
	21	2.07241	1.23140	3.02926	.67497
	22	2.13693	1.24037	3.23135	.69805
	23	2.20633	1.25044	3.45565	.72065
	24	2.28136	1.26166	3.70619	.74280
	25	2.36292	1.27410	3.98804	.76453
	26	2.45212	1.28784	4.30767	.78585
	27	2.55039	1.30299	4.67348	.80680
	28	2.65951	1.31965	5.09652	.82739
	29	2.78180	1.33795	5.59167	.84766
	30	2.92034	1.35803	6.17951	.86761
	31	3.07931	1.38008	6.88921	.88726
	32	3.26455	1.40429	7.76366	.90664
	33	3.48454	1.43090	8.86847	.92577
	34	3.75215	1.46019	10.30955	.94465
	35	4.08807	1.49252	12.26935	.96330
	36	4.52825	1.52828	15.09156	.98175
	37	5.14217	1.56798	19.50936	1.00000
	38	6.08831	1.61224	27.41609	1.01807
	39	7.84757	1.66183	45.65954	1.03597
	40	13.37365	1.71693	132.92279	1.05371
54	0	1.23606	1.23606	1.00000	0
	1	1.26353	1.22509	1.05243	.04691
	2	1.29155	1.21520	1.10710	.09172
	3	1.32016	1.20650	1.16416	.13456
	4	1.34943	1.19873	1.22383	.17560
	5	1.37942	1.19194	1.28631	.21495
	6	1.41018	1.18607	1.35186	.25277
	7	1.44181	1.18109	1.42075	.28914
	8	1.47440	1.17701	1.49329	.32417
	9	1.50801	1.17379	1.56982	.35796
	10	1.54274	1.17135	1.65074	.39059
	11	1.57871	1.16978	1.73648	.42214
	12	1.61605	1.16899	1.82758	.45269
	13	1.65487	1.16904	1.92455	.48229
	14	1.69536	1.17087	2.02809	.51099
	15	1.73765	1.17155	2.13897	.53888
	16	1.78195	1.17404	2.25801	.56597
	17	1.82848	1.17737	2.38629	.59234
	18	1.87750	1.18154	2.52500	.61803
	19	1.92929	1.18659	2.67556	.64308
	20	1.98421	1.19254	2.83966	.66752
	21	2.04264	1.19943	3.01932	.69139
	22	2.10505	1.20729	3.21701	.71473
	23	2.17202	1.21616	3.43570	.73756
	24	2.24420	1.22610	3.67910	.75992
	25	2.32241	1.23718	3.95183	.78184
	26	2.40765	1.24945	4.25971	.80333
	27	2.50117	1.26300	4.61025	.82443
	28	2.60453	1.27793	5.01322	.84516
	29	2.71975	1.29434	5.48166	.86553
	30	2.84947	1.31236	6.03330	.88558

TABLE I.– VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND

PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
54	31	2.99721	1.33213	6.69290	0.90532
	32	3.16784	1.35382	7.49613	.92477
	33	3.36824	1.37764	8.49634	.94394
	34	3.60863	1.40381	9.77698	.96286
	35	3.90484	1.43262	11.47643	.98154
	36	4.28320	1.46441	13.84205	1.00000
	37	4.79140	1.49957	17.36357	1.01825
	38	5.52791	1.53859	23.16703	1.03631
	39	6.74212	1.58209	34.54341	1.05418
	40	9.37684	1.63082	66.97239	1.07189
55	0	1.22077	1.22077	1.00000	0
	1	1.24822	1.20908	1.05305	.04864
	2	1.27618	1.19855	1.10831	.09501
	3	1.30471	1.18909	1.16595	.13927
	4	1.33386	1.18067	1.22617	.18160
	5	1.36370	1.17322	1.28917	.22214
	6	1.39429	1.16672	1.35521	.26103
	7	1.42570	1.16111	1.42455	.29839
	8	1.45800	1.15638	1.49749	.33432
	9	1.49130	1.15249	1.57436	.36894
	10	1.52567	1.14943	1.65554	.40233
	11	1.56123	1.14719	1.74146	.43457
	12	1.59808	1.14574	1.83261	.46574
	13	1.63636	1.14509	1.92953	.49592
	14	1.67620	1.14522	2.03286	.52516
	15	1.71778	1.14615	2.14332	.55352
	16	1.76127	1.14787	2.26176	.58107
	17	1.80687	1.15039	2.38915	.60785
	18	1.85483	1.15373	2.52664	.63391
	19	1.90542	1.15791	2.67556	.65929
	20	1.95896	1.16294	2.83751	.68404
	21	2.01580	1.16885	3.01438	.70819
	22	2.07639	1.17567	3.20848	.73178
	23	2.14123	1.18345	3.42257	.75483
	24	2.21094	1.19222	3.66007	.77740
	25	2.28625	1.20204	3.92521	.79949
	26	2.36806	1.21297	4.22330	.82114
	27	2.45748	1.22508	4.56111	.84238
	28	2.55591	1.23843	4.94742	.86322
	29	2.66511	1.25313	5.39374	.88370
	30	2.78737	1.26929	5.91560	.90383
	31	2.92572	1.28703	6.53435	.92364
	32	3.08425	1.30648	7.28025	.94314
	33	3.26870	1.32782	8.19757	.96236
	34	3.48734	1.35125	9.35393	.98131
	35	3.75267	1.37698	10.85776	1.00000
	36	4.08469	1.40531	12.89486	1.01846
	37	4.51787	1.43656	15.81213	1.03670
	38	5.11821	1.47111	20.34079	1.05473
	39	6.03358	1.50947	28.33208	1.07257
	40	7.69872	1.55221	46.23275	1.09023
	41	12.52648	1.60009	122.67166	1.10773
56	0	1.20621	1.20621	1.00000	0
	1	1.23369	1.19378	1.05375	.05045
	2	1.26164	1.18252	1.10969	.09845
	3	1.29013	1.17238	1.16799	.14419
	4	1.31923	1.16331	1.22887	.18787
	5	1.34896	1.15521	1.29250	.22963
	6	1.37943	1.14807	1.35916	.26964
	7	1.41067	1.14184	1.42906	.30801
	8	1.44280	1.13650	1.50253	.34487
	9	1.47583	1.13198	1.57987	.38033
	10	1.50992	1.12828	1.66148	.41449
	11	1.54513	1.12540	1.74774	.44743
	12	1.58159	1.12331	1.83915	.47924
	13	1.61925	1.12200	1.93582	.50988
	14	1.65874	1.12144	2.03961	.53978
	15	1.69971	1.12167	2.14992	.56862
	16	1.74252	1.12268	2.26807	.59661
	17	1.78734	1.12446	2.39492	.62379
	18	1.83439	1.12701	2.53157	.65021
	19	1.88395	1.13036	2.67932	.67592
	20	1.93629	1.13453	2.83966	.70097
	21	1.99176	1.13954	3.01438	.72539
	22	2.05077	1.14540	3.20565	.74921
	23	2.11377	1.15216	3.41605	.77249
	24	2.18134	1.15986	3.64877	.79524
56	25	2.25415	1.16852	3.90771	0.81750
	26	2.33300	1.17822	4.19775	.83930
	27	2.41891	1.18899	4.52508	.86066
	28	2.51311	1.20092	4.89763	.88161
	29	2.61718	1.21408	5.32572	.90218
	30	2.73312	1.22856	5.82313	.92239
	31	2.86357	1.24447	6.40854	.94225
	32	3.01204	1.26192	7.10806	.96180
	33	3.18337	1.28106	7.95920	.98104
	34	3.38442	1.30205	9.01802	1.00000
	35	3.62531	1.32508	10.37199	1.01869
	36	3.92173	1.35038	12.16581	1.03714
	37	4.29964	1.37822	14.65711	1.05535
	38	4.80594	1.40893	18.35382	1.07335
	39	5.53675	1.44289	24.41461	1.09114
	40	6.73301	1.48057	36.18410	1.10874
	41	9.28385	1.52256	68.94509	1.12617
57	0	1.19236	1.19236	1.00000	0
	1	1.21991	1.17918	1.05453	.05235
	2	1.24792	1.16722	1.11126	.10206
	3	1.27644	1.15640	1.17033	.14935
	4	1.30553	1.14665	1.23196	.19442
	5	1.33524	1.13792	1.29634	.23745
	6	1.36563	1.13015	1.36371	.27860
	7	1.39678	1.12330	1.43431	.31802
	8	1.42875	1.11733	1.50845	.35582
	9	1.46163	1.11221	1.58643	.39214
	10	1.49550	1.10791	1.66862	.42708
	11	1.53046	1.10441	1.75543	.46073
	12	1.56661	1.10169	1.84730	.49319
	13	1.60407	1.09973	1.94475	.52454
	14	1.64296	1.09854	2.04839	.55484
	15	1.68344	1.09810	2.15888	.58418
	16	1.72566	1.09841	2.27699	.61260
	17	1.76982	1.09947	2.40364	.64018
	18	1.81611	1.10128	2.53987	.66696
	19	1.86478	1.10387	2.68688	.69300
	20	1.91611	1.10723	2.84613	.71833
	21	1.97041	1.11138	3.01932	.74301
	22	2.02806	1.11636	3.20848	.76707
	23	2.08950	1.12218	3.41605	.79054
	24	2.15523	1.12887	3.64502	.81347
	25	2.22588	1.13647	3.89903	.83589
	26	2.30220	1.14503	4.18260	.85782
	27	2.38509	1.15459	4.50144	.87930
	28	2.47569	1.16522	4.86278	.90035
	29	2.57538	1.17697	5.27601	.92100
	30	2.68597	1.18993	5.75347	.94126
	31	2.80977	1.20419	6.31177	.96117
	32	2.94984	1.21984	6.97378	.98074
	33	3.11033	1.23700	7.77189	1.00000
	34	3.29703	1.25582	8.75357	1.01896
	35	3.51833	1.27646	9.99121	1.03764
	36	3.78688	1.29910	11.60109	1.05606
	37	4.12294	1.32397	13.78232	1.07423
	38	4.56142	1.35132	16.90714	1.09218
	39	5.16924	1.38149	21.76052	1.10991
	40	6.09646	1.41485	30.33227	1.12744
	41	7.78514	1.45186	49.56835	1.14478
	42	12.70348	1.49310	132.25979	1.16195
58	0	1.17918	1.17918	1.00000	0
	1	1.20686	1.16522	1.05542	.05436
	2	1.23498	1.15255	1.11302	.10586
	3	1.26357	1.14102	1.17297	.15476
	4	1.29271	1.13061	1.23547	.20130
	5	1.32244	1.12122	1.30071	.24564
	6	1.35284	1.11285	1.36892	.28796
	7	1.38394	1.10538	1.44036	.32846
	8	1.41585	1.09881	1.51533	.36724
	9	1.44863	1.09309	1.59409	.40443
	10	1.48236	1.08819	1.67705	.44017
	11	1.51713	1.08408	1.76457	.47454
	12	1.55305	1.08076	1.85710	.50765
	13	1.59024	1.07821	1.95517	.53958
	14	1.62880	1.07640	2.05932	.57042
	15	1.66888	1.07531	2.17022	.60023
	16	1.71064	1.07496	2.28864	.62909

NACA

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND

PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
58	17	1.75425	1.07535	2.41543	0.65706
	18	1.79992	1.07647	2.55161	.68419
	19	1.84786	1.07832	2.69835	.71054
	20	1.89834	1.08093	2.85702	.73616
	21	1.95166	1.08429	3.02926	.76108
	22	2.00817	1.08843	3.21701	.78536
	23	2.06827	1.09337	3.42257	.80903
	24	2.13245	1.09914	3.64877	.83213
	25	2.20127	1.10576	3.89903	.85469
	26	2.27543	1.11327	4.17758	.87674
	27	2.35576	1.12172	4.48973	.89832
	28	2.44329	1.13115	4.84216	.91945
	29	2.53928	1.14162	5.24346	.94016
	30	2.64534	1.15319	5.70487	.96047
	31	2.76355	1.16595	6.24133	.98041
	32	2.89660	1.17998	6.87320	1.00000
	33	3.04811	1.19537	7.62890	1.01926
	34	3.22305	1.21225	8.54944	1.03820
	35	3.42852	1.23075	9.69613	1.05686
	36	3.67496	1.25103	11.16500	1.07523
	37	3.97868	1.27328	13.11538	1.09336
	38	4.36671	1.29771	15.83248	1.11124
	39	4.88820	1.32458	19.88200	1.12889
	40	5.64473	1.35421	26.56793	1.14634
	41	6.89470	1.38696	39.71914	1.16358
	42	9.62343	1.42330	77.53810	1.18065
59	0	1.16663	1.16663	1.00000	0
	1	1.19450	1.15189	1.05639	.05646
	2	1.22277	1.13845	1.11497	.10985
	3	1.25150	1.12623	1.17591	.16045
	4	1.28075	1.11515	1.23939	.20849
	5	1.31056	1.10513	1.30562	.25420
	6	1.34101	1.09611	1.37482	.29776
	7	1.37215	1.08804	1.44725	.33935
	8	1.40405	1.08087	1.52317	.37912
	9	1.43680	1.07457	1.60290	.41722
	10	1.47046	1.06909	1.68679	.45376
	11	1.50513	1.06440	1.77523	.48886
	12	1.54091	1.06050	1.86864	.52263
	13	1.57790	1.05735	1.96754	.55515
	14	1.61623	1.05493	2.07248	.58652
	15	1.65602	1.05324	2.18409	.61682
	16	1.69743	1.05228	2.30313	.64611
	17	1.74062	1.05202	2.43042	.67446
	18	1.78579	1.05248	2.56696	.70194
	19	1.83315	1.05365	2.71386	.72859
	20	1.88294	1.05554	2.87247	.75447
	21	1.93545	1.05816	3.04435	.77964
	22	1.99101	1.06152	3.23135	.80412
	23	2.05001	1.06564	3.43570	.82797
	24	2.11288	1.07055	3.66007	.85122
	25	2.18018	1.07625	3.90771	.87392
	26	2.25252	1.08280	4.18260	.89608
	27	2.33070	1.09022	4.48973	.91774
	28	2.41564	1.09855	4.83533	.93894
	29	2.50852	1.10117	5.22736	.95970
	30	2.61079	1.11816	5.67616	.98005
	31	2.72432	1.12274	6.19535	1.00000
	32	2.85152	1.14210	6.80332	1.01959
	33	2.99559	1.15590	7.52541	1.03883
	34	3.16089	1.16397	8.39771	1.05775
	35	3.35349	1.18762	9.47325	1.07636
	36	3.58227	1.20580	10.83337	1.09468
	37	3.86065	1.21834	12.60945	1.11274
	38	4.21032	1.24758	15.02857	1.13054
	39	4.66898	1.27157	18.51961	1.14810
	40	5.30993	1.29796	24.00218	1.16545
	41	6.30127	1.32704	33.86900	1.18258
	42	8.15969	1.35920	56.90567	1.19953
60	0	1.15470	1.15470	1.00000	0
	1	1.18281	1.13913	1.05748	.05869
	2	1.21128	1.12492	1.11715	.11407
	3	1.24021	1.11200	1.17919	.16643
	4	1.26963	1.10024	1.24379	.21606
	5	1.29959	1.08956	1.31115	.26318
	6	1.33016	1.07991	1.38149	.30802
	7	1.36139	1.07123	1.45505	.35075
	8	1.39336	1.06349	1.53211	.39149
	9	1.42614	1.05661	1.61296	.43053
60	10	1.45981	1.05056	1.69801	0.46792
	11	1.49446	1.04530	1.78756	.50375
	12	1.53015	1.04083	1.88204	.53817
	13	1.56705	1.03711	1.98204	.57130
	14	1.60524	1.03411	2.08804	.60321
	15	1.64485	1.03183	2.20066	.63397
	16	1.68601	1.03028	2.32064	.66369
	17	1.72890	1.02941	2.44879	.69242
	18	1.77370	1.02924	2.58609	.72023
	19	1.82061	1.02976	2.73362	.74718
	20	1.86986	1.03098	2.89268	.77332
	21	1.92174	1.03290	3.06478	.79871
	22	1.97655	1.03553	3.25173	.82339
	23	2.03465	1.03889	3.45565	.84740
	24	2.09647	1.04299	3.67910	.87080
	25	2.16251	1.04785	3.92521	.89360
	26	2.23336	1.05350	4.19775	.91586
	27	2.30976	1.05996	4.50144	.93760
	28	2.39257	1.06728	4.84216	.95885
	29	2.48286	1.07550	5.22736	.97964
	30	2.58199	1.08465	5.66667	1.00000
	31	2.69164	1.09480	6.17265	1.01995
	32	2.81401	1.10602	6.76214	1.03953
	33	2.95196	1.11836	7.45813	1.05874
	34	3.10935	1.13192	8.29290	1.07761
	35	3.29153	1.14680	9.31323	1.09617
	36	3.50613	1.16310	10.58965	1.11442
	37	3.76452	1.18095	12.23349	1.13239
	38	4.08459	1.20052	14.43171	1.15010
	39	4.49641	1.22197	17.52384	1.16756
	40	5.05564	1.24552	22.19785	1.18479
	41	5.88053	1.27142	30.09140	1.20180
	42	7.28682	1.29997	46.29381	1.21861
	43	10.62250	1.33152	98.56617	1.23523
61	0	1.14335	1.14335	1.00000	0
	1	1.17176	1.12694	1.05868	.06106
	2	1.20052	1.11195	1.11958	.11853
	3	1.22970	1.09828	1.18287	.17276
	4	1.25935	1.08582	1.24872	.22404
	5	1.28951	1.07449	1.31735	.27264
	6	1.32026	1.06422	1.38897	.31878
	7	1.35166	1.05494	1.46383	.36268
	8	1.38376	1.04660	1.54221	.40452
	9	1.41665	1.03914	1.62440	.44447
	10	1.45040	1.03253	1.71076	.48267
	11	1.48510	1.02672	1.80166	.51925
	12	1.52084	1.02170	1.89753	.55435
	13	1.55772	1.01742	1.99885	.58807
	14	1.59585	1.01388	2.10617	.62050
	15	1.63536	1.01104	2.22011	.65174
	16	1.67639	1.00890	2.34137	.68187
	17	1.71909	1.00745	2.47077	.71097
	18	1.76364	1.00668	2.60925	.73910
	19	1.81024	1.00659	2.75788	.76633
	20	1.85911	1.00717	2.91792	.79272
	21	1.91052	1.00843	3.09086	.81832
	22	1.96476	1.01038	3.27844	.84318
	23	2.02217	1.01302	3.48272	.86735
	24	2.08316	1.01636	3.70619	.89087
	25	2.14821	1.02043	3.95183	.91378
	26	2.21788	1.02525	4.22330	.93611
	27	2.29285	1.03083	4.52508	.95790
	28	2.37393	1.03722	4.86278	.97919
	29	2.46213	1.04444	5.24346	1.00000
	30	2.55870	1.05253	5.67616	1.02036
	31	2.66519	1.06154	6.17265	1.04030
	32	2.78362	1.07153	6.74855	1.05984
	33	2.91659	1.08256	7.42498	1.07900
	34	3.06758	1.09469	8.23136	1.09782
	35	3.24135	1.10802	9.20976	1.11630
	36	3.44462	1.12263	10.42262	1.13447
	37	3.68722	1.13863	11.96675	1.15234
	38	3.98431	1.15617	14.00080	1.16994
	39	4.36069	1.17537	16.80389	1.18729
	40	4.86049	1.19643	20.91698	1.20438
	41	5.57221	1.21953	27.54355	1.22125
	42	6.70976	1.24494	40.01234	1.23791
	43	9.00334	1.27294	72.17563	1.25437
62	0	1.13257	1.13257	1.00000	0
	1	1.16134	1.11527	1.06001	.06356
	2	1.19044	1.09945	1.12228	.12326

TABLE I.– VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
62	3	1.21994	1.08503	1.18693	0.17943
	4	1.24988	1.07187	1.25420	.23246
	5	1.28033	1.05987	1.32425	.28258
	6	1.31132	1.04897	1.39734	.33010
	7	1.34294	1.03907	1.47368	.37521
	8	1.37527	1.03015	1.55357	.41812
	9	1.40834	1.02212	1.63730	.45902
	10	1.44225	1.01497	1.72524	.49808
	11	1.48051	1.01097	1.81770	.53293
	12	1.51292	1.00303	1.91519	.57190
	13	1.54988	.99818	2.01813	.60549
	14	1.58806	.99416	2.12710	.63846
	15	1.62757	.99077	2.24268	.67016
	16	1.66858	.98809	2.36559	.70070
	17	1.71121	.98608	2.49664	.73016
	18	1.75564	.98474	2.63675	.75860
	19	1.80207	.98406	2.78698	.78610
	20	1.85070	.98404	2.94856	.81272
	21	1.90180	.98467	3.12296	.83852
	22	1.95565	.98597	3.31189	.86355
	23	2.01258	.98794	3.51734	.88785
	24	2.07297	.99058	3.74176	.91148
	25	2.13728	.99391	3.98804	.93447
	26	2.20605	.99795	4.25971	.95686
	27	2.27992	1.00272	4.56111	.97869
	28	2.35967	1.00824	4.89763	1.00000
	29	2.44623	1.01454	5.27601	1.02081
	30	2.54078	1.02165	5.70487	1.04115
	31	2.64478	1.02962	6.19535	1.06106
	32	2.76008	1.03849	6.76214	1.08055
	33	2.88908	1.04831	7.42498	1.09965
	34	3.03498	1.05914	8.21107	1.11839
	35	3.20207	1.07107	9.15895	1.13678
	36	3.39638	1.08415	10.32510	1.15484
	37	3.62660	1.09850	11.79568	1.17261
	38	3.90591	1.11421	13.70921	1.19008
	39	4.25535	1.13141	16.30313	1.20729
	40	4.71130	1.15025	20.02154	1.22424
	41	5.34344	1.17090	25.80256	1.24096
	42	6.30846	1.19357	36.02961	1.25745
	43	8.06950	1.21848	59.05900	1.27373
63	0	1.12233	1.12233	1.00000	0
	1	1.15152	1.10410	1.06149	.06625
	2	1.18103	1.08726	1.12523	.12826
	3	1.21092	1.07223	1.19146	.18653
	4	1.24123	1.05835	1.26029	.24135
	5	1.27201	1.04567	1.33195	.29309
	6	1.30334	1.03413	1.40668	.34201
	7	1.33527	1.02363	1.48471	.38837
	8	1.36786	1.01412	1.56632	.43239
	9	1.40120	1.00553	1.65181	.47427
	10	1.43535	.99781	1.74154	.51418
	11	1.47040	.99093	1.83587	.55229
	12	1.50644	.98483	1.93523	.58873
	13	1.54357	.97949	2.04011	.62364
	14	1.58189	.97488	2.15104	.65712
	15	1.62152	.97098	2.26865	.68928
	16	1.66261	.96777	2.39362	.72022
	17	1.70529	.96522	2.52675	.75002
	18	1.74973	.96334	2.66897	.77877
	19	1.79612	.96210	2.82133	.80653
	20	1.84467	.96151	2.98505	.83336
	21	1.89563	.96155	3.16158	.85934
	22	1.94927	.96224	3.35260	.88452
	23	2.00591	.96357	3.56009	.90894
	24	2.06593	.96555	3.78644	.93266
	25	2.12976	.96819	4.03448	.95571
	26	2.19791	.97151	4.30767	.97815
	27	2.27101	.97551	4.61025	1.00000
	28	2.34979	.98023	4.94742	1.02131
	29	2.43515	.98567	5.32572	1.04210
	30	2.52820	.99188	5.75347	1.06240
	31	2.63031	.99889	6.24133	1.08226
	32	2.74323	1.00673	6.80332	1.10168
	33	2.86919	1.01545	7.45813	1.12070
	34	3.01116	1.02510	8.23136	1.13934
	35	3.17311	1.03575	9.15895	1.15762
	36	3.36051	1.04745	10.29303	1.17557
	37	3.58122	1.06030	11.71209	1.19320
	38	3.84695	1.07437	13.54033	1.21053
	39	4.17610	1.08978	15.98624	1.22759
63	40	4.50533	1.10545	18.68088	1.24438
	41	5.17503	1.12513	24.63807	1.26092
	42	6.02443	1.14538	33.44890	1.27723
	43	7.47513	1.16759	51.58764	1.29333
	44	10.93593	1.19201	110.60283	1.30922
64	0	1.11260	1.11260	1.00000	0
	1	1.14230	1.09339	1.06311	.06909
	2	1.17229	1.07586	1.12854	.13362
	3	1.20263	1.05981	1.19646	.19405
	4	1.23329	1.04513	1.26705	.25082
	5	1.26458	1.03183	1.34052	.30420
	6	1.29631	1.01963	1.41710	.35459
	7	1.32862	1.00852	1.49702	.40223
	8	1.36159	.99844	1.58060	.44739
	9	1.39526	.98927	1.66809	.49026
	10	1.42974	.98100	1.75989	.53105
	11	1.46509	.97358	1.85635	.56993
	12	1.50142	.96697	1.95793	.60706
	13	1.53881	.96113	2.06507	.64255
	14	1.57739	.95602	2.17835	.67655
	15	1.61725	.95161	2.29836	.70916
	16	1.65854	.94788	2.42582	.74189
	17	1.70139	.94482	2.56152	.77062
	18	1.74597	.94241	2.70637	.79965
	19	1.79247	.94064	2.86144	.82765
	20	1.84109	.93951	3.02795	.85469
	21	1.89208	.93899	3.20733	.88083
	22	1.94569	.93910	3.40126	.90613
	23	2.00225	.93984	3.61170	.93065
	24	2.06212	.94120	3.84102	.95444
	25	2.12571	.94319	4.09202	.97754
	26	2.19354	.94583	4.36812	1.00000
	27	2.26619	.94912	4.67348	1.02185
	28	2.34437	.95308	5.01322	1.04314
	29	2.42896	.95774	5.39374	1.06389
	30	2.52100	.96311	5.82313	1.08414
	31	2.62181	.96923	6.31177	1.10392
	32	2.73306	.97612	6.87320	1.12326
	33	2.85686	.98383	7.52541	1.14218
	34	2.99599	.99240	8.29290	1.16070
	35	3.15417	1.00188	9.20976	1.17886
	36	3.33650	1.01233	10.32509	1.19667
	37	3.55019	1.02382	11.71209	1.21415
	38	3.80592	1.03642	13.48501	1.23132
	39	4.12018	1.05022	15.83259	1.24821
	40	4.52027	1.06533	19.09064	1.26482
	41	5.05539	1.08187	23.91996	1.28117
	42	5.82618	1.09997	31.82475	1.29728
	43	7.08398	1.11981	47.12911	1.31317
	44	9.74915	1.14157	89.41118	1.32885
65	0	1.10338	1.10338	1.00000	0
	1	1.13366	1.08314	1.06492	.07216
	2	1.16422	1.06468	1.13220	.13934
	3	1.19510	1.04782	1.20202	.20207
	4	1.22634	1.03224	1.27451	.26076
	5	1.25807	1.01833	1.35006	.31596
	6	1.29028	1.00547	1.42871	.36788
	7	1.32305	.99374	1.51079	.41686
	8	1.35646	.98305	1.59657	.46318
	9	1.39057	.97333	1.68638	.50708
	10	1.42547	.96453	1.78054	.54876
	11	1.46123	.95659	1.87947	.58842
	12	1.49794	.94946	1.98358	.62621
	13	1.53571	.94311	2.09337	.66230
	14	1.57463	.93749	2.20939	.69680
	15	1.61483	.93259	2.33225	.72985
	16	1.65643	.92837	2.46267	.76155
	17	1.69959	.92482	2.60146	.79201
	18	1.74445	.92191	2.74953	.82131
	19	1.79121	.91963	2.90795	.84953
	20	1.84006	.91797	3.07796	.87674
	21	1.89125	.91693	3.26098	.90303
	22	1.94503	.91649	3.45870	.92844
	23	2.00172	.91666	3.67309	.95304
	24	2.06166	.91743	3.90652	.97688
	25	2.12529	.91882	4.16179	1.00000
	26	2.19307	.92082	4.44229	1.02246
	27	2.26559	.92345	4.75217	1.04429
	28	2.34356	.92671	5.09652	1.06553
	29	2.42779	.93063	5.48166	1.08622
	30	2.51932	.93523	5.91560	1.10640

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
65	31	2.61942	0.94052	6.40854	1.12608
	32	2.72969	.94655	6.97378	1.14531
	33	2.85217	.95332	7.62890	1.16411
	34	2.98950	.96090	8.39771	1.18250
	35	3.14523	.96931	9.31323	1.20051
	36	3.32418	.97862	10.42262	1.21816
	37	3.53313	.98887	11.79568	1.23547
	38	3.78200	1.00013	13.54033	1.25247
	39	4.08602	1.01248	15.83259	1.26916
	40	4.46996	1.02600	18.98054	1.28558
	41	4.97763	1.04081	23.57679	1.30172
	42	5.69607	1.05701	30.92529	1.31762
	43	6.83227	1.07474	44.56640	1.33329
	44	9.07019	1.09416	78.67052	1.34873
66	0	1.09463	1.09463	1.00000	0
	1	1.12559	1.07331	1.06691	.07545
	2	1.15678	1.05388	1.13626	.14547
	3	1.18829	1.03613	1.20818	.21062
	4	1.21761	1.01850	1.27689	.26680
	5	1.25245	1.00511	1.36067	.32847
	6	1.28523	.99157	1.44166	.38197
	7	1.31856	.97920	1.52616	.43233
	8	1.35250	.96785	1.61445	.47986
	9	1.38715	.95764	1.70686	.52374
	10	1.42256	.94829	1.80374	.56738
	11	1.45577	.94000	1.89681	.60453
	12	1.49604	.93219	2.01255	.64630
	13	1.53428	.92535	2.12537	.68296
	14	1.57368	.92268	2.24461	.71796
	15	1.61434	.91388	2.37080	.75142
	16	1.65641	.90917	2.50474	.78349
	17	1.70000	.90514	2.64721	.81424
	18	1.74529	.90175	2.79914	.84378
	19	1.79247	.89898	2.96164	.87221
	20	1.84172	.89683	3.13593	.89958
	21	1.89329	.89528	3.32348	.92599
	22	1.94745	.89432	3.52598	.95148
	23	2.00448	.89396	3.74545	.97614
	24	2.06475	.89418	3.98424	1.00000
	25	2.12867	.89499	4.24521	1.02312
	26	2.19671	.89640	4.53177	1.04556
	27	2.26945	.89840	4.84808	1.06734
	28	2.34757	.90102	5.19927	1.08852
	29	2.43190	.90425	5.59167	1.10913
	30	2.52343	.90813	6.03330	1.12920
	31	2.62341	.91266	6.53435	1.14878
	32	2.73341	.91787	7.10806	1.16787
	33	2.85540	.92379	7.77189	1.18653
	34	2.99197	.93046	8.54944	1.20476
	35	3.14654	.93789	9.47325	1.22260
	36	3.32375	.94615	10.58964	1.24008
	37	3.53011	.95527	11.96675	1.25720
	38	3.77508	.96532	13.70921	1.27399
	39	4.07307	.97635	15.98624	1.29048
	40	4.44728	.98845	19.09064	1.30667
	41	4.93820	1.00170	23.57679	1.32260
	42	5.62467	1.01619	30.63690	1.33826
	43	6.68829	1.03204	43.38830	1.35368
	44	8.69172	1.04940	73.38936	1.36888
67	0	1.08636	1.08636	1.00000	0
	1	1.11808	1.06387	1.06913	.07899
	2	1.15002	1.04340	1.14075	.15203
	3	1.18225	1.02474	1.21505	.21979
	4	1.21482	1.00770	1.29222	.28287
	5	1.24780	.99213	1.37250	.34178
	6	1.28120	.97773	1.45602	.39687
	7	1.31523	.96487	1.54335	.44873
	8	1.34982	.95298	1.63449	.49748
	9	1.38509	.94213	1.72985	.54347
	10	1.42113	.93225	1.82982	.58697
	11	1.45801	.92327	1.93479	.62819
	12	1.49583	.91514	2.04521	.66733
	13	1.53468	.90781	2.16160	.70457
	14	1.57467	.90123	2.28454	.74006
	15	1.61593	.89538	2.41466	.77395
	16	1.65858	.89022	2.55271	.80635
	17	1.70276	.88573	2.69953	.83738
	18	1.74864	.88187	2.85608	.86715
	19	1.79640	.87864	3.02345	.89575
	20	1.84625	.87602	3.20294	.92326
	21	1.89841	.87398	3.39602	.94976
	22	1.95315	.87254	3.60444	.97532
67	23	2.01077	0.87166	3.83024	1.00000
	24	2.07163	.87136	4.07583	1.02386
	25	2.13613	.87164	4.34413	1.04696
	26	2.20475	.87248	4.63861	1.06935
	27	2.27807	.87390	4.96352	1.09106
	28	2.35676	.87591	5.32406	1.11215
	29	2.44164	.87851	5.72668	1.13265
	30	2.53371	.88171	6.17951	1.15260
	31	2.63420	.88553	6.69290	1.17203
	32	2.74466	.89000	7.28024	1.19097
	33	2.86705	.89513	7.95920	1.20946
	34	3.00392	.90094	8.75357	1.22751
	35	3.15864	.90748	9.69613	1.24516
	36	3.33578	.91478	10.83337	1.26244
	37	3.66703	.92888	13.12645	1.28827
	38	3.78570	.93181	14.00080	1.29592
	39	4.08173	.94165	16.30312	1.31218
	40	4.45226	.95245	19.42902	1.32814
	41	4.93615	.96429	23.91996	1.34381
	42	5.60821	.97725	30.92528	1.35922
	43	6.63773	.99143	43.38829	1.37439
	44	8.53138	1.00694	71.78450	1.38932
68	0	1.07854	1.07854	1.00000	0
	1	1.11113	1.05481	1.07157	.08281
	2	1.14392	1.03325	1.14574	.15911
	3	1.17698	1.01361	1.22268	.22964
	4	1.21035	.99570	1.30259	.29508
	5	1.24412	.97935	1.38571	.35599
	6	1.27834	.96440	1.47229	.41287
	7	1.31308	.95070	1.56259	.46613
	8	1.34843	.93821	1.65696	.51616
	9	1.38446	.92678	1.75568	.56322
	10	1.42122	.91635	1.85916	.60765
	11	1.45885	.90685	1.96784	.64966
	12	1.49741	.89825	2.08216	.68946
	13	1.53698	.89042	2.20262	.72727
	14	1.57772	.88338	2.32987	.76322
	15	1.61972	.87707	2.46455	.79749
	16	1.66311	.87146	2.60744	.83022
	17	1.70805	.86652	2.75938	.86151
	18	1.75470	.86222	2.92139	.89148
	19	1.80324	.85854	3.09460	.92023
	20	1.85387	.85546	3.28032	.94784
	21	1.90684	.85297	3.48010	.97441
	22	1.96241	.85105	3.69573	1.00000
	23	2.02088	.84970	3.92932	1.02468
	24	2.08261	.84891	4.18338	1.04852
	25	2.14801	.84867	4.46089	1.07156
	26	2.21757	.84899	4.76546	1.09387
	27	2.29186	.84987	5.10146	1.11548
	28	2.37157	.85130	5.47426	1.13645
	29	2.45751	.85330	5.89051	1.15682
	30	2.55070	.85588	6.35861	1.17661
	31	2.65238	.85905	6.88921	1.19588
	32	2.76410	.86282	7.49614	1.21464
	33	2.88785	.86721	8.19757	1.23293
	34	3.02617	.87225	9.01802	1.25079
	35	3.18245	.87796	9.99121	1.26822
	36	3.36130	.88437	11.16501	1.28527
	37	3.56911	.89152	12.60945	1.30195
	38	3.81516	.89944	14.43171	1.31828
	39	4.11348	.90820	16.80390	1.33428
	40	4.48652	.91782	20.02153	1.34998
	41	4.97311	.92839	24.63806	1.36539
	42	5.64778	.93997	31.82475	1.38053
	43	6.67844	.95264	44.56641	1.39542
	44	8.56387	.96650	73.38937	1.41006
69	0	1.07115	1.07115	1.00000	0
	1	1.10473	1.04607	1.07431	.08699
	2	1.13849	1.02334	1.15131	.16677
	3	1.17248	1.00268	1.23120	.24025
	4	1.20678	.98385	1.31418	.30819
	5	1.24146	.96667	1.40050	.37122
	6	1.27658	.95098	1.49041	.42990
	7	1.31221	.93662	1.58421	.48469
	8	1.34837	.92334	1.68204	.53591
	9	1.38533	.91149	1.78478	.58418
	10	1.42298	.90052	1.89230	.62952
	11	1.46147	.89051	2.00520	.67231
	12	1.50091	.88139	2.12398	.71277
	13	1.54138	.87311	2.24918	.75112
	14	1.58301	.86562	2.38143	.78753

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
69	15	1.62591	0.85887	2.52143	0.82217
	16	1.67023	.85282	2.66997	.85518
	17	1.71611	.84745	2.82795	.88670
	18	1.76372	.84272	2.99641	.91684
	19	1.81325	.83861	3.17655	.94571
	20	1.86490	.83510	3.36974	.97340
	21	1.91892	.83217	3.57758	1.00000
	22	1.97558	.82981	3.80196	1.02559
	23	2.03519	.82800	4.04507	1.05024
	24	2.09812	.82674	4.30955	1.07401
	25	2.16478	.82603	4.59851	1.09697
	26	2.23568	.82585	4.91572	1.11917
	27	2.31139	.82621	5.26577	1.14066
	28	2.39261	.82711	5.65428	1.16148
	29	2.48019	.82855	6.08824	1.18168
	30	2.57516	.83054	6.57643	1.20129
	31	2.67879	.83310	7.13007	1.22036
	32	2.79267	.83622	7.76366	1.23892
	33	2.91883	.83993	8.49634	1.25699
	34	3.05990	.84425	9.35393	1.27461
	35	3.21935	.84920	10.37199	1.29181
	36	3.40190	.85480	11.60108	1.30861
	37	3.61416	.86108	13.11538	1.32503
	38	3.86570	.86808	15.02857	1.34109
	39	4.17105	.87583	17.52384	1.35682
	40	4.55352	.88439	20.91698	1.37224
	41	5.05364	.89380	25.80256	1.38736
	42	5.74970	.90413	33.44889	1.40221
	43	6.82003	.91544	47.12910	1.41679
	44	8.80523	.92782	78.67054	1.43112
70	0	1.06418	1.06418	1.00000	0
	1	1.09890	1.03765	1.07737	.09153
	2	1.13406	1.01384	1.15827	.17580
	3	1.16883	.99194	1.24074	.25174
	4	1.20418	.97213	1.32717	.32233
	5	1.23990	.95409	1.41710	.38759
	6	1.27606	.93764	1.51080	.44814
	7	1.31270	.92400	1.60854	.50450
	8	1.34994	.90880	1.71071	.55714
	9	1.38786	.89621	1.81765	.60643
	10	1.42754	.88510	1.93274	.65386
	11	1.46606	.87417	2.04755	.69626
	12	1.50653	.86458	2.17147	.73736
	13	1.54805	.85582	2.30216	.77624
	14	1.59076	.84788	2.44024	.81307
	15	1.63475	.84069	2.58643	.84805
	16	1.68019	.83423	2.74161	.88132
	17	1.72722	.82844	2.90670	.91304
	18	1.77602	.82330	3.08280	.94331
	19	1.82677	.81877	3.27119	.97227
	20	1.87971	.81485	3.47330	1.00000
	21	1.93506	.81150	3.69085	1.02660
	22	1.99312	.80872	3.92581	1.05216
	23	2.05421	.80648	4.18053	1.07674
	24	2.11870	.80478	4.45777	1.10042
	25	2.18704	.80361	4.76088	1.12326
	26	2.25972	.80297	5.09384	1.14531
	27	2.33736	.80284	5.46154	1.16664
	28	2.42069	.80324	5.86997	1.18728
	29	2.51057	.80416	6.32660	1.20728
	30	2.60809	.80561	6.84082	1.22668
	31	2.71456	.80759	7.42463	1.24553
	32	2.83165	.81012	8.09364	1.26384
	33	2.96148	.81320	8.86847	1.28167
	34	3.10680	.81685	9.77698	1.29903
	35	3.27129	.82109	10.85776	1.31596
	36	3.45992	.82594	12.16581	1.33248
	37	3.67970	.83142	13.78232	1.34861
	38	3.94084	.83756	15.83248	1.36439
	39	4.25895	.84441	18.51961	1.37982
	40	4.65930	.85199	22.19785	1.39493
	41	5.18634	.86035	27.54355	1.40974
	42	5.92752	.86954	36.02962	1.42427
	43	7.08784	.87962	51.58763	1.43853
	44	9.32483	.89066	89.41117	1.45254
71	0	1.05762	1.05762	1.00000	0
	1	1.09363	1.02952	1.08079	.09649
	2	1.12974	1.00419	1.16453	.18416
71	3	1.16604	0.98128	1.25145	0.26420
	4	1.20260	.96047	1.34178	.33760
	5	1.23951	.94154	1.43579	.40521
	6	1.27684	.92427	1.53378	.46772
	7	1.31468	.90850	1.63605	.52572
	8	1.35311	.89409	1.74297	.57971
	9	1.39220	.88089	1.85492	.63012
	10	1.43197	.86869	1.97206	.67722
	11	1.47280	.85779	2.09576	.72165
	12	1.51449	.84770	2.22567	.76338
	13	1.55727	.83849	2.36271	.80275
	14	1.60124	.83011	2.50757	.83998
	15	1.64655	.82250	2.66104	.87525
	16	1.69333	.81562	2.82401	.90876
	17	1.74175	.80942	2.99750	.94063
	18	1.79200	.80388	3.18269	.97100
	19	1.84426	.79896	3.38091	1.00000
	20	1.89877	.79464	3.59373	1.02773
	21	1.95579	.79089	3.82297	1.05429
	22	2.01562	.78771	4.07076	1.07977
	23	2.07858	.78506	4.33962	1.10425
	24	2.14507	.78295	4.63254	1.12779
	25	2.21556	.78135	4.95312	1.15047
	26	2.29057	.78027	5.30568	1.17235
	27	2.37075	.77969	5.69551	1.19347
	28	2.45687	.77962	6.12913	1.21390
	29	2.54985	.78005	6.61467	1.23367
	30	2.65083	.78099	7.16241	1.25282
	31	2.76121	.78244	7.78552	1.27141
	32	2.88278	.78441	8.50117	1.28946
	33	3.01781	.78690	9.33218	1.30700
	34	3.16927	.78993	10.30955	1.32408
	35	3.34111	.79352	11.47643	1.34071
	36	3.53878	.79758	12.89486	1.35692
	37	3.76995	.80242	14.65711	1.37274
	38	4.04596	.80778	16.90714	1.38820
	39	4.38429	.81379	19.88200	1.40330
	40	4.81376	.82047	24.00217	1.41808
	41	5.38613	.82787	30.09139	1.43256
	42	6.20663	.83646	40.01235	1.44674
	43	7.53549	.84499	59.05905	1.46066
	44	10.30545	.85482	110.60291	1.47432
72	0	1.05146	1.05146	1.00000	0
	1	1.08893	1.02164	1.08464	.10196
	2	1.12648	.99485	1.17240	.19409
	3	1.16418	.97069	1.26354	.27778
	4	1.20213	.94880	1.35830	.35420
	5	1.24041	.92893	1.45696	.42428
	6	1.27910	.91083	1.55984	.48883
	7	1.31830	.89432	1.66728	.54851
	8	1.35809	.87923	1.77966	.60388
	9	1.39856	.86543	1.89739	.65542
	10	1.43982	.85281	2.02096	.70355
	11	1.48183	.84112	2.15050	.74850
	12	1.52509	.83068	2.28775	.79094
	13	1.56933	.82102	2.43223	.83078
	14	1.61482	.81221	2.58506	.86836
	15	1.66168	.80418	2.74709	.90391
	16	1.71008	.79690	2.91930	.93759
	17	1.76018	.79031	3.10277	.96957
	18	1.81218	.78439	3.29879	1.00000
	19	1.86628	.77909	3.50881	1.02900
	20	1.92273	.77439	3.73452	1.05669
	21	1.98181	.77026	3.97793	1.08316
	22	2.04382	.76670	4.24135	1.10852
	23	2.10912	.76367	4.52755	1.13285
	24	2.17814	.76116	4.83980	1.15622
	25	2.25136	.75916	5.18206	1.17869
	26	2.32936	.75766	5.55910	1.20035
	27	2.41283	.75666	5.97680	1.22123
	28	2.50259	.75615	6.44239	1.24140
	29	2.59964	.75613	6.96494	1.26090
	30	2.70523	.75659	7.55598	1.27977
	31	2.82087	.75754	8.23036	1.29806
	32	2.94853	.75899	9.00756	1.31581
	33	3.09069	.76094	9.91359	1.33304
	34	3.25068	.76339	10.98415	1.34979

NACA

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND

PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
72	35	3.43290	0.76637	12.26935	1.36609
	36	3.64351	.76988	13.84205	1.38197
	37	3.89128	.77395	15.81213	1.39745
	38	4.18935	.77859	18.35382	1.41255
	39	4.55839	.78383	21.76052	1.42730
	40	5.03335	.78969	26.56793	1.44173
	41	5.67920	.79621	33.86900	1.45584
	42	6.63532	.80342	46.29378	1.46966
	43	8.27973	.81137	72.17562	1.48320
73	0	1.04569	1.04569	1.00000	0
	1	1.08484	1.01397	1.08899	.10802
	2	1.12402	.98560	1.18132	.20502
	3	1.16333	.96009	1.27725	.29267
	4	1.20286	.93705	1.37706	.37229
	5	1.24271	.91618	1.48105	.44499
	6	1.28298	.89721	1.58955	.51166
	7	1.32375	.87993	1.70293	.57307
	8	1.36512	.86416	1.82162	.62984
	9	1.40719	.84974	1.94606	.68252
	10	1.45006	.83908	2.07677	.73156
	11	1.49385	.82448	2.21431	.77735
	12	1.53853	.81330	2.35884	.82009
	13	1.58466	.80333	2.51256	.86049
	14	1.63193	.79409	2.67480	.89838
	15	1.68065	.78566	2.84700	.93414
	16	1.73098	.77799	3.03020	.96796
	17	1.78310	.77102	3.22562	1.00000
	18	1.83722	.76473	3.43466	1.03043
	19	1.89357	.75907	3.65894	1.05937
	20	1.95239	.75401	3.90033	1.08696
	21	2.01400	.74953	4.16104	1.11330
	22	2.07872	.74560	4.44366	1.13849
	23	2.14695	.74220	4.75127	1.16262
	24	2.21914	.73932	5.08756	1.18576
	25	2.29582	.73695	5.45696	1.20799
	26	2.37763	.73507	5.86488	1.22938
	27	2.46532	.73366	6.31798	1.24998
	28	2.55980	.73274	6.82452	1.26984
	29	2.66217	.73229	7.39491	1.28903
	30	2.77382	.73231	8.04246	1.30758
	31	2.89647	.73280	8.78447	1.32554
	32	3.03231	.73376	9.64375	1.34294
	33	3.18421	.73520	10.65120	1.35982
	34	3.35594	.73713	11.84954	1.37621
	35	3.55267	.73954	13.29968	1.39215
	36	3.78166	.74246	15.09156	1.40766
	37	4.05344	.74590	17.36356	1.42276
	38	4.38416	.74988	20.34079	1.43749
	39	4.79990	.75441	24.41461	1.45186
	40	5.34654	.75951	30.33228	1.46589
	41	6.11420	.76523	39.71928	1.47962
	42	7.31380	.77158	56.90569	1.49304
	43	9.61969	.77860	98.56608	1.50619
74	0	1.04030	1.04030	1.00000	0
	1	1.08137	1.00647	1.09394	.11476
	2	1.12243	.97636	1.19148	.21712
	3	1.16358	.94940	1.29290	.30905
	4	1.20494	.92514	1.39851	.39211
	5	1.24661	.90321	1.50862	.46756
	6	1.28868	.88333	1.62362	.53645
	7	1.33127	.86525	1.74390	.59964
	8	1.37448	.84878	1.86994	.65783
	9	1.41841	.83373	2.00221	.71163
	10	1.46318	.81997	2.14129	.76155
	11	1.50891	.80738	2.28780	.80802
	12	1.55573	.79586	2.44246	.85141
	13	1.60358	.78518	2.60544	.89190
	14	1.65317	.77566	2.77956	.93021
	15	1.70411	.76684	2.96390	.96611
	16	1.75676	.75879	3.16033	1.00000
	17	1.81132	.75146	3.37020	1.03204
	18	1.86801	.74481	3.59506	1.06241
	19	1.92708	.73881	3.83675	1.09125
	20	1.98882	.73341	4.09738	1.11868
	21	2.05355	.72858	4.37946	1.14482
	22	2.12164	.72431	4.68594	1.16978
	23	2.19353	.72058	5.02033	1.19365
	24	2.26971	.71735	5.38688	1.21651
	25	2.35078	.71462	5.79072	1.23845
	26	2.43746	.71237	6.23811	1.25951
	27	2.53058	.71060	6.73684	1.27978
74	28	2.63118	0.70929	7.29665	1.29930
	29	2.74053	.70845	7.92987	1.31813
	30	2.86021	.70805	8.65246	1.33631
	31	2.99222	.70811	9.48532	1.35389
	32	3.13913	.70863	10.45639	1.37091
	33	3.30434	.70959	11.60395	1.38740
	34	3.49240	.71102	12.98191	1.40339
	35	3.70963	.71292	14.66843	1.41893
	36	3.96507	.71529	16.78182	1.43403
	37	4.27222	.71815	19.50936	1.44873
	38	4.65240	.72151	23.16702	1.46304
	39	5.14159	.72539	28.33207	1.47699
	40	5.80687	.72980	36.18410	1.49061
	41	6.79229	.73477	49.56836	1.50391
	42	8.49002	.74033	77.53807	1.51692
75	0	1.03528	1.03528	1.00000	0
	1	1.07856	.99910	1.09961	.12232
	2	1.12179	.96707	1.20313	.23060
	3	1.16508	.93853	1.31088	.32718
	4	1.20854	.91294	1.42319	.41392
	5	1.25231	.88990	1.54043	.49229
	6	1.29649	.86906	1.66300	.56348
	7	1.34120	.85016	1.79136	.62848
	8	1.38655	.83296	1.92601	.68810
	9	1.43266	.81727	2.06752	.74301
	10	1.47966	.80294	2.21651	.79377
	11	1.52767	.78984	2.37369	.84087
	12	1.57685	.77785	2.53987	.88472
	13	1.62733	.76686	2.71594	.92566
	14	1.67905	.75668	2.90209	.96384
	15	1.73288	.74760	3.10202	1.00000
	16	1.78834	.73919	3.31456	1.03389
	17	1.84585	.73151	3.54210	1.06586
	18	1.90569	.72453	3.78644	1.09609
	19	1.96812	.71820	4.04968	1.12475
	20	2.03345	.71247	4.33427	1.15195
	21	2.10206	.70733	4.64313	1.17783
	22	2.17437	.70274	4.97971	1.20250
	23	2.25086	.69868	5.34815	1.22605
	24	2.33211	.69513	5.75346	1.24858
	25	2.41880	.69207	6.20177	1.27015
	26	2.51174	.68949	6.70059	1.29084
	27	2.61193	.68737	7.25935	1.31072
	28	2.72057	.68570	7.88996	1.32984
	29	2.83916	.68449	8.60767	1.34826
	30	2.96960	.68371	9.43244	1.36603
	31	3.11431	.68337	10.39077	1.38318
	32	3.27645	.68347	11.51871	1.39977
	33	3.46026	.68400	12.86652	1.41582
	34	3.67152	.68497	14.50661	1.43138
	35	3.91849	.68639	16.54697	1.44648
	36	4.21328	.68825	19.15633	1.46113
	37	4.57470	.69057	22.61361	1.47538
	38	5.03387	.69337	27.41609	1.48925
	39	5.64691	.69664	34.54342	1.50275
	40	6.52889	.70042	46.23278	1.51592
	41	7.96818	.70471	68.94512	1.52877
76	0	1.03061	1.03061	1.00000	0
	1	1.07648	.99179	1.10615	.13086
	2	1.12221	.95764	1.21660	.24571
	3	1.16798	.92737	1.33171	.34738
	4	1.21390	.90036	1.45185	.43806
	5	1.26011	.87613	1.57743	.51950
	6	1.30675	.85428	1.70892	.59309
	7	1.35393	.83451	1.84682	.65993
	8	1.40180	.81657	1.99171	.72096
	9	1.45048	.80023	2.14422	.77694
	10	1.50012	.78532	2.30509	.82850
	11	1.55085	.77170	2.47511	.87616
	12	1.60284	.75924	2.65520	.92039
	13	1.65626	.74783	2.84642	.96156
	14	1.71128	.73738	3.04994	1.00000
	15	1.76783	.72770	3.26602	1.03583
	16	1.82698	.71906	3.49958	1.06980
	17	1.88812	.71106	3.74909	1.10162
	18	1.95183	.70376	4.01779	1.13164
	19	2.01842	.69711	4.30816	1.16002
	20	2.08825	.69109	4.62314	1.18693
	21	2.16174	.68565	4.96621	1.21247
	22	2.23938	.68076	5.34155	1.23678

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND

PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
76	23	2.32175	0.67640	5.75420	1.25994
	24	2.40951	.67255	6.21029	1.28205
	25	2.50349	.66919	6.71741	1.30320
	26	2.60464	.66629	7.28497	1.32345
	27	2.71418	.66385	7.92491	1.34288
	28	2.83358	.66186	8.65247	1.36155
	29	2.96469	.66030	9.48750	1.37950
	30	3.10991	.65916	10.45638	1.39680
	31	3.27231	.65846	11.59485	1.41348
	32	3.45603	.65817	12.95259	1.42958
	33	3.66670	.65830	14.60078	1.44516
	34	3.91229	.65885	16.64528	1.46023
	35	4.20448	.65982	19.25024	1.47484
	36	4.56126	.66121	22.68536	1.48901
	37	5.01207	.66304	27.42567	1.50278
	38	5.60948	.66531	34.39544	1.51616
	39	6.45921	.66803	45.65955	1.52918
	40	7.81826	.67122	66.97238	1.54186
	41	10.57522	.67488	122.67154	1.55422
77	0	1.02630	1.02630	1.00000	0
	1	1.07518	.98447	1.11376	.14058
	2	1.12385	.94795	1.23232	.26277
	3	1.17251	.91578	1.35608	.37001
	4	1.22130	.88723	1.48545	.46495
	5	1.27039	.86172	1.62092	.54963
	6	1.31992	.83882	1.76302	.62567
	7	1.37003	.81815	1.91234	.69438
	8	1.42088	.79944	2.06953	.75680
	9	1.47262	.78244	2.23535	.81379
	10	1.52541	.76696	2.41064	.86606
	11	1.57940	.75283	2.59634	.91420
	12	1.63479	.73991	2.79353	.95870
	13	1.69177	.72809	3.00345	1.00000
	14	1.75053	.71726	3.22752	1.03844
	15	1.81133	.70734	3.46736	1.07434
	16	1.87404	.69815	3.72334	1.10777
	17	1.94005	.68995	4.00223	1.13951
	18	2.00860	.68235	4.30203	1.16922
	19	2.08042	.67543	4.62734	1.19725
	20	2.15595	.66912	4.98175	1.22376
	21	2.23569	.66340	5.36960	1.24888
	22	2.32022	.65824	5.79616	1.27274
	23	2.41023	.65361	6.26779	1.29543
	24	2.50656	.64948	6.79240	1.31706
	25	2.61021	.64583	7.37982	1.33770
	26	2.72239	.64265	8.04246	1.35745
	27	2.84464	.63992	8.79627	1.37636
	28	2.97886	.63762	9.66203	1.39451
	29	3.12749	.63575	10.66728	1.41193
	30	3.29372	.63429	11.84954	1.42870
	31	3.48179	.63324	13.26101	1.44485
	32	3.69754	.63260	14.97662	1.46042
	33	3.94918	.63236	17.10800	1.47546
	34	4.24885	.63252	19.82909	1.49001
	35	4.61524	.63308	23.42636	1.50408
	36	5.07917	.63404	28.40796	1.51772
	37	5.69592	.63542	35.76868	1.53096
	38	6.57778	.63720	47.75735	1.54381
	39	8.00217	.63941	70.76019	1.55630
78	0	1.02234	1.02234	1.00000	0
	1	1.07477	.97704	1.12272	.15178
	2	1.12691	.93785	1.25087	.28221
	3	1.17898	.90359	1.38490	.39558
	4	1.23118	.87336	1.52531	.49509
	5	1.28367	.84649	1.67266	.58317
	6	1.33663	.82247	1.82757	66174
	7	1.39024	.80088	1.99075	.73230
	8	1.44466	.78138	2.16297	.79605
	9	1.50008	.76372	2.34513	.85396
	10	1.55668	.74766	2.53824	.90684
	11	1.61464	.73302	2.74344	.95533
	12	1.67419	.71966	2.96203	1.00000
	13	1.73554	.70744	3.19554	1.04130
	14	1.79894	.69626	3.44568	1.07961
	15	1.86467	.68601	3.71447	1.11528
	16	1.93303	.67662	4.00428	1.14859
	17	2.00390	.66792	4.31572	1.17958
	18	2.07910	.66016	4.65845	1.20906
	19	2.15766	.65692	5.02997	1.23662
	20	2.24058	.64641	5.43708	1.26263
	21	2.32850	.64044	5.88545	1.28723
78	22	2.42213	0.63503	6.38199	1.31053
	23	2.52238	.63015	6.93526	1.33267
	24	2.63030	.62577	7.55597	1.35372
	25	2.74721	.62187	8.25775	1.37379
	26	2.87474	.61842	9.05803	1.39295
	27	3.01495	.61542	9.97980	1.41127
	28	3.17048	.61285	11.05366	1.42882
	29	3.34481	.61069	12.32147	1.44565
	30	3.54259	.60893	13.84204	1.46182
	31	3.77027	.60758	15.70056	1.47737
	32	4.03704	.60661	18.02541	1.49236
	33	4.35658	.60603	21.01928	1.50681
	34	4.75039	.60583	25.02251	1.52076
	35	5.25455	.60602	30.65293	1.53426
	36	5.93582	.60659	39.16266	1.54732
	37	6.93576	.60754	53.52950	1.55997
	38	8.63195	.60889	83.00466	1.57225
79	0	1.01872	1.01872	1.00000	0
	1	1.07539	.96940	1.13341	.16480
	2	1.13167	.92718	1.27305	.30458
	3	1.18782	.89057	1.41947	.42472
	4	1.24407	.85852	1.57326	.52913
	5	1.30065	.83019	1.73511	.62078
	6	1.35775	.80499	1.90576	.70190
	7	1.41558	.78244	2.08607	.77426
	8	1.47435	.76214	2.27699	.83925
	9	1.53426	.74381	2.47964	.89796
	10	1.59554	.72718	2.69524	.95130
	11	1.65841	.71206	2.92524	1.00000
	12	1.72313	.69827	3.17127	1.04467
	13	1.78997	.68568	3.43524	1.08580
	14	1.85923	.67415	3.71937	1.12384
	15	1.93125	.66360	4.02626	1.15913
	16	2.00641	.65394	4.35896	1.19198
	17	2.08514	.64508	4.72109	1.22265
	18	2.16731	.63687	5.11390	1.25117
	19	2.25541	.62954	5.55196	1.27835
	20	2.34822	.62653	6.03228	1.30373
	21	2.44720	.61657	6.56585	1.32769
	22	2.55332	.61094	7.16241	1.35034
	23	2.66778	.60584	7.83424	1.37181
	24	2.79206	.60124	8.59705	1.39219
	25	2.92800	.59711	9.47123	1.41158
	26	3.07796	.59343	10.48376	1.43006
	27	3.24500	.59019	11.67110	1.44771
	28	3.43317	.58737	13.08374	1.46458
	29	3.64796	.58496	14.79364	1.48075
	30	3.89713	.58294	16.90716	1.49625
	31	4.19195	.58130	19.58812	1.51114
	32	4.54962	.58004	23.10298	1.52547
	33	4.99802	.57915	27.91590	1.53927
	34	5.58619	.57863	34.91428	1.55258
	35	6.41056	.57848	46.03221	1.56543
	36	7.69747	.57868	66.44284	1.57786
	37	10.17446	.57926	116.20905	1.58989
80	0	1.01543	1.01543	1.00000	0
	1	1.07723	.96137	1.14634	.18015
	2	1.13851	.91567	1.29998	.33061
	3	1.19961	.87645	1.46160	.45824
	4	1.26079	.84239	1.63194	.56792
	5	1.32234	.81250	1.81183	.66326
	6	1.38450	.78607	2.00222	.74693
	7	1.44753	.76251	2.20418	.82099
	8	1.51167	.74141	2.41895	.88706
	9	1.57718	.72241	2.64791	.94639
	10	1.64433	.70523	2.89268	1.00000
	11	1.71341	.68964	3.15512	1.04870
	12	1.78472	.67546	3.43739	1.09316
	13	1.85862	.66252	3.74202	1.13394
	14	1.93548	.65069	4.07199	1.17150
	15	2.01575	.63987	4.43083	1.20623
	16	2.09991	.62996	4.82275	1.23845
	17	2.18853	.62088	5.25280	1.26844
	18	2.28230	.61255	5.72715	1.29645
	19	2.38112	.60483	6.24855	1.32245
	20	2.48860	.59795	6.84081	1.34730
	21	2.60324	.59516	7.50125	1.37048
	22	2.72733	.58575	8.24971	1.39235
	23	2.86264	.58046	9.10556	1.41303
	24	3.01142	.57567	10.09437	1.43263
	25	3.17654	.57135	11.25052	1.45124

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
80	26	3.36182	0.56747	12.62123	1.46894
	27	3.57242	.56403	14.27360	1.48582
	28	3.81551	.56099	16.30565	1.50193
	29	4.10144	.55835	18.86699	1.51733
	30	4.44585	.55610	22.19784	1.53209
	31	4.87369	.55421	26.70940	1.54624
	32	5.42791	.55269	33.16942	1.55984
	33	6.19057	.55153	43.19544	1.57292
	34	7.34537	.55072	60.88209	1.58552
	35	9.43104	.55025	100.47298	1.59767
81	0	1.01247	1.01247	1.00000	0
	1	1.08059	.95273	1.16228	.19853
	2	1.14803	.90300	1.33333	.36130
	3	1.21520	.86083	1.51400	.49725
	4	1.28248	.82457	1.70525	.61256
	5	1.35020	.79307	1.90817	.71166
	6	1.41868	.76527	2.12398	.79779
	7	1.48824	.74071	2.35410	.87339
	8	1.55918	.71880	2.60016	.94031
	9	1.63184	.69915	2.86404	1.00000
	10	1.70656	.68144	3.14793	1.05361
	11	1.78371	.66542	3.45440	1.10204
	12	1.86370	.65087	3.78644	1.14604
	13	1.94698	.63763	4.14764	1.18621
	14	2.03408	.62554	4.54226	1.22306
	15	2.12558	.61449	4.97544	1.25699
	16	2.22218	.60438	5.45345	1.28837
	17	2.32469	.59511	5.98393	1.31748
	18	2.43409	.58662	6.57644	1.34458
	19	2.55155	.57883	7.24294	1.36988
	20	2.67718	.57161	7.99053	1.39334
	21	2.81680	.56517	8.86354	1.41582
	22	2.96867	.56259	9.86355	1.43677
	23	3.13708	.55376	11.03386	1.45653
	24	3.32593	.54882	12.42298	1.47521
	25	3.54049	.54434	14.09971	1.49292
	26	3.78811	.54030	16.16503	1.50973
	27	4.07944	.53668	18.77364	1.52573
	28	4.43060	.53346	22.17482	1.54098
	29	4.86743	.53063	26.79740	1.55553
	30	5.43471	.52817	33.44887	1.56945
	31	6.21880	.52607	43.84824	1.58278
	32	7.41570	.52433	62.42139	1.59557
	33	9.61661	.52292	105.08534	1.60786
82	0	1.00983	1.00983	1.00000	0
	1	1.08589	.94316	1.18238	.22096
	2	1.16106	.88869	1.37561	.39804
	3	1.23589	.84318	1.58082	.54323
	4	1.31088	.80449	1.79930	.66449
	5	1.38645	.77094	2.03252	.76734
	6	1.46304	.74207	2.28218	.85574
	7	1.54104	.71648	2.55026	.93257
	8	1.62087	.69379	2.83905	1.00000
	9	1.70297	.67352	3.15125	1.05969
	10	1.78780	.65533	3.49004	1.11294
	11	1.87587	.63893	3.85920	1.16075
	12	1.96776	.62407	4.26328	1.20395
	13	2.06412	.61058	4.70774	1.24320
	14	2.16569	.59829	5.19927	1.27904
	15	2.27337	.58706	5.74613	1.31190
	16	2.38822	.57680	6.35862	1.34217
	17	2.51150	.56740	7.04972	1.37016
	18	2.64482	.55879	7.83617	1.39612
	19	2.79013	.55089	8.73972	1.42029
	20	2.94995	.54365	9.78928	1.44286
	21	3.12533	.53694	11.00824	1.46375
	22	3.32734	.53095	12.49953	1.48384
	23	3.55522	.52859	14.29389	1.50252
	24	3.81965	.52035	16.52503	1.52015
	25	4.13307	.51575	19.37661	1.53682
	26	4.51462	.51158	23.15148	1.55261
	27	4.99598	.50783	28.38911	1.56761
	28	5.63407	.50447	36.14927	1.58188
	29	6.54508	.50149	48.84302	1.59548
	30	8.01831	.49887	73.38928	1.60846
83	0	1.00751	1.00751	1.00000	0
	1	1.09383	.93218	1.20849	.24893
	2	1.17898	.87206	1.43090	.44286
	3	1.26372	.82273	1.66883	.59829
	4	1.34874	.78138	1.92411	.72572
	5	1.43464	.74614	2.19890	.83214
	6	1.52198	.71570	2.49570	.92242
	7	1.61134	.68911	2.81748	1.00000
	8	1.70328	.66568	3.16775	1.06743
	9	1.79843	.64487	3.55072	1.12661
	10	1.89748	.62627	3.97144	1.17901
	11	2.00118	.60955	4.43611	1.22574
	12	2.11041	.59447	4.95229	1.26770
	13	2.22621	.58080	5.52947	1.30562
	14	2.34981	.56838	6.17952	1.34007
	15	2.48270	.55705	6.91764	1.37152
	16	2.62677	.54671	7.76366	1.40036
	17	2.78434	.53725	8.74365	1.42693
	18	2.95847	.52858	9.89298	1.45149
	19	3.15317	.52064	11.26064	1.47428
	20	3.37388	.51336	12.91636	1.49550
	21	3.62824	.50668	14.96338	1.51531
	22	3.92270	.50048	17.51892	1.53360
	23	4.28813	.49496	20.96744	1.55127
	24	4.73801	.49281	25.63451	1.56767
	25	5.32518	.48517	32.42573	1.58314
	26	6.14449	.48093	43.22632	1.59777
	27	7.41885	.47703	63.09215	1.61163
	28	9.86743	.47342	111.74018	1.62480
84	0	1.00551	1.00551	1.00000	0
	1	1.10555	.91901	1.24370	.28484
	2	1.20403	.85207	1.50615	.49878
	3	1.30210	.79835	1.78977	.66545
	4	1.40075	.75410	2.09743	.79902
	5	1.50083	.71689	2.43252	.90853
	6	1.60319	.68510	2.79915	1.00000
	7	1.70865	.65758	3.20220	1.07758
	8	1.81813	.63350	3.64771	1.14426
	9	1.93258	.61225	4.14307	1.20221
	10	2.05312	.59336	4.69748	1.25307
	11	2.18107	.57646	5.32259	1.29810
	12	2.31797	.56125	6.03330	1.33826
	13	2.46574	.54752	6.84903	1.37433
	14	2.62681	.53507	7.79553	1.40692
	15	2.80428	.52375	8.90771	1.43652
	16	3.00225	.51342	10.23417	1.46355
	17	3.22630	.50399	11.84448	1.48834
	18	3.48427	.49535	13.84205	1.51117
	19	3.78761	.48744	16.38741	1.53228
	20	4.15390	.48019	19.74410	1.55187
	21	4.61191	.47354	24.37688	1.57010
	22	5.21284	.46744	31.18958	1.58712
	23	6.04172	.46177	41.95408	1.60280
	24	7.40162	.45673	63.04960	1.61803
	25	10.10199	.45480	117.59103	1.63212
85	0	1.00382	1.00382	1.00000	0
	1	1.12309	.90238	1.29371	.33266
	2	1.24028	.82702	1.61438	.57056
	3	1.35724	.76828	1.96611	.74924
	4	1.47548	.72091	2.35391	.88844
	5	1.59637	.68174	2.78387	1.00000
	6	1.72126	.64870	3.26362	1.09147
	7	1.85157	.62041	3.80263	1.16786
	8	1.98885	.59586	4.41305	1.23265
	9	2.13493	.57436	5.11052	1.28834
	10	2.29200	.55535	5.91560	1.33674
	11	2.46281	.53843	6.85590	1.37922
	12	2.65087	.52328	7.96937	1.41683
	13	2.86089	.50964	9.30959	1.45037
	14	3.09929	.49731	10.95474	1.48050
	15	3.37530	.48612	13.02379	1.50771
	16	3.70268	.47594	15.70664	1.53244
	17	4.10319	.46666	19.32635	1.55501
	18	4.61399	.45817	24.48172	1.57572
	19	5.30513	.45040	32.41900	1.59479

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Concluded

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
85	20	6.33047	0.44327	46.23224	1.61242
	21	8.12762	.43674	76.31580	1.62878
86	0	1.00244	1.00244	1.00000	0
	1	1.15055	.87994	1.37020	.39951
	2	1.29591	.79401	1.78307	.66612
	3	1.44179	.72957	2.24675	.85680
	4	1.59085	.67901	2.77155	1.00000
	5	1.74555	.63805	3.37082	1.11156
	6	1.90850	.60405	4.06208	1.20098
	7	2.08259	.57529	4.86877	1.27428
	8	2.27139	.55060	5.82313	1.33551
	9	2.47941	.52914	6.97050	1.38744
	10	2.71274	.51031	8.37701	1.43208
	11	2.97992	.49365	10.14282	1.47087
	12	3.29358	.47880	12.42734	1.50491
	13	3.67355	.46548	15.50082	1.53505
	14	4.15329	.45349	19.86017	1.56194
	15	4.79538	.44264	26.53113	1.58608
	16	5.73559	.43279	38.02639	1.60789
	17	7.35053	.42382	62.56201	1.62771
	18	11.43133	.41564	151.54614	1.64580
87	0	1.00137	1.00137	1.00000	0
	1	1.19742	.84687	1.50153	.49969
	2	1.39022	.74753	2.08199	.79976
	3	1.58658	.67690	2.76207	1.00000
	4	1.79219	.62346	3.57035	1.14321
87	5	2.01291	0.58128	4.54750	1.25076
	6	2.25574	.54695	5.75347	1.33456
	7	2.52995	.51836	7.28029	1.40171
	8	2.84902	.49410	9.27715	1.45677
	9	3.23409	.47324	12.00248	1.50275
	10	3.72148	.45507	15.94670	1.54176
	11	4.38141	.43910	22.16816	1.57528
	12	5.37519	.42495	33.44909	1.60442
	13	7.20410	.41232	60.21636	1.62999
	14	13.26155	.40099	204.45147	1.65262
88	0	1.00061	1.00061	1.00000	0
	1	1.29222	.79143	1.77909	.66653
	2	1.58355	.67540	2.75534	1.00000
	3	1.89445	.59921	4.01532	1.20025
	4	2.24475	.54437	5.70487	1.33388
	5	2.66202	.50254	8.09068	1.42944
	6	3.19358	.46933	11.71764	1.50122
	7	3.93752	.44219	17.89940	1.55714
	8	5.15650	.41950	30.81660	1.60196
	9	8.01593	.40020	74.70644	1.63870
89	0	1.00015	1.00015	1.00000	0
	1	1.58174	.67450	2.75133	1.00000
	2	2.23822	.54284	5.67614	1.33347
	3	3.17002	.46702	11.55363	1.50031
	4	5.03780	.41629	29.43369	1.60049

NACA

SUPPLEMENT

NACA TECHNICAL NOTE NO. 1143

CHARTS FOR DETERMINING THE CHARACTERISTICS OF SHARP-NOSE AIRFOILS IN TWO-DIMENSIONAL FLOW AT SUPERSONIC SPEEDS

By H. Reese Ivey, George W. Stickle,
and Alberta Schuettler

September 1947

Since Technical Note No. 1143 was completed, the need for a more extensive version of table I, "Values of Local Mach Number, Pressure Ratio, and Pressure Coefficient across Shock Waves," has become apparent. This table is now available in expanded form; and a copy of the expanded table is included in this supplement to supersede the original table I.

Errors in the original publication are as follows:

Page 11: The first sentence of the last paragraph should begin "Tables I and III . . ." instead of "Tables I and II . . . ."

Corrections in tables II and III are as follows:

Table II.–

M_b	$-\beta$	M_a
2.3	23°	3.4225
2.6	10°	3.0867
4.3	3°	4.5658
4.7	7°	5.4669
4.7	8°	5.5922
4.7	9°	5.7240
6.2	9°	7.9200

Table III.--

M_b	$-\beta$	p_a/p_b
1.4	14°	0.49071
4.7	24°	.02350

Figure 13.– Each vertical space along the scale label for pressure coefficient $\Delta p/q$ should represent 0.125 instead of 20; thus, the vertical scale should appear:

−.500
−.375
−.250
−.125
0
.125
.250
.375
.500
.625
.750
.875
1.000

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO,

AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
8	0	7.18546	7.18546	1.00000	0
	1	7.80125	7.57479	1.20854	.00490
	2	8.60430	8.07261	1.50622	.00977
9	0	6.39264	6.39264	1.00000	0
	1	6.87407	6.69357	1.18235	.00551
	2	7.48067	7.06779	1.43092	.01100
	3	8.27834	7.54385	1.78981	.01646
10	0	5.75871	5.75871	1.00000	0
	1	6.14639	5.99785	1.16236	.00614
	2	6.62119	6.28846	1.37565	.01224
	3	7.22344	6.64849	1.66896	.01832
	4	8.02263	7.10485	2.09762	.02436
11	0	5.24082	5.24082	1.00000	0
	1	5.55967	5.43448	1.14629	.00676
	2	5.94262	5.66634	1.33338	.01349
	3	6.42373	5.95318	1.58610	.02029
	4	7.01599	6.29392	1.92421	.02682
	5	7.83581	6.73948	2.44137	.03354
	6	8.98638	7.30617	3.26353	.04004
12	0	4.80977	4.80977	1.00000	0
	1	5.07739	4.96951	1.13344	.00739
	2	5.39281	5.15796	1.29999	.01474
	3	5.77302	5.38268	1.51411	.02204
	4	6.24375	5.65433	1.79936	.02929
	5	6.84911	5.98883	2.19908	.03652
	6	7.66903	6.41123	2.79939	.04371
	7	8.87172	6.96292	3.80262	.05087
13	0	4.44543	4.44543	1.00000	0
	1	4.67339	4.57891	1.12271	.00803
	2	4.93834	4.73465	1.27307	.01600
	3	5.24983	4.91619	1.46158	.02393
	4	5.63112	5.13596	1.70535	.03178
	5	6.10349	5.39892	2.03258	.03960
	6	6.71567	5.72228	2.49588	.04738
	7	7.55439	6.12986	3.20247	.05513
	8	8.80760	6.66172	4.41302	.06285
14	0	4.13360	4.13360	1.00000	0
	1	4.33044	4.24248	1.11376	.00867
	2	4.55638	4.37683	1.25087	.01726
	3	4.81978	4.52876	1.41949	.02580
	4	5.13240	4.70707	1.63192	.03427
	5	5.51261	4.91882	1.90826	.04270
	6	5.98884	5.17368	2.28225	.05107
	7	6.62228	5.49587	2.81769	.05921
	8	7.47450	5.88074	3.64800	.06771
	9	8.79126	6.39434	5.11042	.07598
15	0	3.86369	3.86369	1.00000	0
	1	4.03562	3.95993	1.10614	.00931
	2	4.14555	3.98829	1.23231	.01931
	3	4.45565	4.19791	1.38489	.02770
	4	4.71842	4.34601	1.57329	.03679
	5	5.03145	4.51957	1.81179	.04587
	6	5.41400	4.72539	2.12408	.05479
	7	5.89618	5.04264	2.55029	.06370
	8	6.53211	5.27618	3.16796	.07258
	9	7.42624	5.65781	4.14339	.08143
	10	8.82181	6.14628	5.91549	.09023
16	0	3.62792	3.62792	1.00000	0
	1	3.77964	3.71064	1.09962	.00996
	2	3.95037	3.80507	1.21661	.01983
	3	4.14479	3.91330	1.35610	.02961
	4	4.36900	4.03782	1.52531	.03931
	5	4.63202	4.18238	1.73515	.04895
	6	4.94653	4.35137	2.00221	.05851
	7	5.33290	4.55154	2.35426	.06803
	8	5.82325	4.79190	2.83915	.07748
	9	6.47624	5.08655	3.55104	.08689
	10	7.40814	5.45674	4.69797	.09626
	11	8.90088	5.93848	6.85594	.10559
17	0	3.42032	3.42032	1.00000	0
	1	3.55532	3.49188	1.09391	.01061
	2	3.70612	3.57318	1.20313	.02113
	3	3.87615	3.66580	1.33170	.03154
	4	4.07015	3.77171	1.48543	.04186
	5	4.29455	3.89345	1.67261	.05210
	6	4.55860	4.03450	1.90576	.06227
	7	4.87573	4.19924	2.20412	.07236
	8	5.26736	4.39418	2.60026	.08240
	9	5.76803	4.62799	3.15127	.09237
	10	6.44180	4.91440	3.97167	.10230
	11	7.41936	5.27398	5.32300	.11219
	12	9.03211	5.73979	7.96901	.12204
18	0	3.23604	3.23604	1.00000	0
	1	3.35720	3.29834	1.08900	.01128
	2	3.49146	3.36878	1.19145	.02244
	3	3.64174	3.44868	1.31087	.03349
	4	3.81150	3.53948	1.45184	.04443
	5	4.00564	3.64318	1.62091	.05528
	6	4.23083	3.76221	1.82753	.06604
	7	4.57062	3.89495	2.16071	.07937
	8	4.81743	4.05749	2.41888	.08734
	9	5.21582	4.25058	2.86418	.09789
	10	5.72912	4.47828	3.49010	.10838
	11	6.42781	4.75694	4.43641	.11882
	12	7.46024	5.10668	6.03381	.12921
	13	9.22255	5.56127	9.30925	.13956
19	0	3.07154	3.07154	1.00000	0
	1	3.18101	3.12594	1.08465	.01195
	2	3.30163	3.18741	1.18134	.02377
	3	3.43552	3.25671	1.29288	.03545
	4	3.58559	3.33514	1.42320	.04702
	5	3.75551	3.42421	1.57743	.05849
	6	3.95028	3.52573	1.76303	.06985
	7	4.17683	3.64210	1.99073	.08113
	8	4.44535	3.77664	2.27703	.09232
	9	4.77075	3.93351	2.64786	.10343
	10	5.17739	4.11880	3.14812	.11448
	11	5.70582	4.34078	3.85929	.12547
	12	6.43414	4.61223	4.95273	.13640
	13	7.53249	4.95273	6.84971	.14729
	14	9.48326	5.39507	10.95449	.15813
20	0	2.92381	2.92381	1.00000	0
	1	3.02334	2.97148	1.08078	.01263
	2	3.13239	3.02492	1.17239	.02510
	3	3.25271	3.08575	1.27725	.03744
	4	3.38650	3.15392	1.39847	.04964
	5	3.53676	3.23092	1.54042	.06172
	6	3.70716	3.31824	1.70890	.07369
	7	3.90296	3.41765	1.91224	.08555
	8	4.13158	3.53157	2.16293	.09732
	9	4.40349	3.66307	2.47965	.10901
	10	4.73461	3.81626	2.89260	.12061
	11	5.15114	3.99719	3.45455	.13215
	12	5.69739	4.21372	4.26333	.14362
	13	6.46071	4.47840	5.52986	.15503
	14	7.63854	4.81027	7.79624	.16640
	15	9.83090	5.24117	13.02305	.17772
21	0	2.79041	2.79041	1.00000	0
	1	2.88143	2.83236	1.07736	.01331
	2	2.98066	2.87953	1.16450	.02645
	3	3.08951	2.93292	1.26352	.03944
	4	3.20981	2.99660	1.37704	.05228
	5	3.34375	3.05910	1.50857	.06498
	6	3.47911	3.12563	1.64697	.07636
	7	3.66576	3.22034	1.84678	.09002
	8	3.86318	3.31777	2.06948	.10237
	9	4.09428	3.42921	2.34504	.11463
	10	4.37040	3.55785	2.69521	.12679
	11	4.70837	3.70760	3.15498	.13887
	12	5.13650	3.88429	3.78653	.15088
	13	5.70365	4.09575	4.70770	.16282
	14	6.50821	4.35408	6.17984	.17470
	15	7.78248	4.67780	8.90838	.18653
	16	10.29326	5.09813	15.70811	.19831
22	0	2.66944	2.66944	1.00000	0
	1	2.75318	2.70504	1.07435	.014012
	2	2.84397	2.74795	1.15755	.027827
	3	2.94308	2.79453	1.25145	.041472
	4	3.05197	2.84677	1.35832	.054956
	5	3.17242	2.90542	1.48108	.068287
	6	3.30680	2.97131	1.62361	.081470
	7	3.45826	3.04552	1.79138	.094530
	8	3.63087	3.12950	1.99170	.10746
	9	3.83033	3.22498	2.23535	.12029
	10	4.06462	3.33411	2.53821	.13301
	11	4.34571	3.45998	2.92528	.14564
	12	4.69181	3.60650	3.43734	.15817
	13	5.13349	3.77921	4.14788	.17065
	14	5.72501	3.98579	5.19945	.18304
	15	6.57835	4.23809	6.91836	.19538
	16	7.97050	4.55413	10.23418	.20765
	17	10.91166	4.96439	19.32636	.21989

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
23	0	2.55931	2.55931	1.00000	0
	1	2.63663	2.59191	1.07155	.014703
	2	2.72021	2.62854	1.15131	.029212
	3	2.81097	2.66964	1.24071	.043519
	4	2.91011	2.71559	1.34175	.057649
	5	3.01917	2.76708	1.45693	.071610
	6	3.14004	2.82478	1.58952	.085414
	7	3.27510	2.88954	1.74384	.099068
	8	3.42766	2.95435	1.92598	.11259
	9	3.60192	3.04481	2.14416	.12628
	10	3.80388	3.13837	2.41057	.13927
	11	4.04200	3.24533	2.74332	.15244
	12	4.32897	3.36862	3.17120	.16551
	13	4.68441	3.51192	3.74184	.17850
	14	5.14181	3.68084	4.54240	.19141
	15	5.76160	3.88284	5.74606	.20424
	16	6.67259	4.12943	7.76366	.21702
	17	8.21184	4.43824	11.84447	.22974
24	0	2.45857	2.45857	1.00000	0
	1	2.53038	2.48739	1.06915	.015428
	2	2.60761	2.51974	1.14573	.030617
	3	2.69120	2.55602	1.23122	.045607
	4	2.78202	2.59660	1.32717	.060389
	5	2.88137	2.64194	1.43578	.074985
	6	2.99085	2.69267	1.55985	.089410
	7	3.11233	2.74947	1.70294	.10367
	8	3.24831	2.81309	1.86990	.11778
	9	3.40126	2.88381	2.06753	.13183
	10	3.57857	2.96549	2.30507	.14559
	11	3.78354	3.05730	2.59633	.15930
	12	4.02611	3.16209	2.96196	.17291
	13	4.31993	3.28285	3.43525	.18642
	14	4.68616	3.42314	4.07188	.19984
	15	5.16169	3.58857	4.97574	.21317
	16	5.81451	3.78616	6.35862	.22643
	17	6.79454	4.02728	8.74365	.23962
	18	8.51947	4.32922	13.84205	.25276
25	0	2.36619	2.36619	1.00000	0
	1	2.43311	2.39158	1.06692	.016149
	2	2.50490	2.42023	1.14078	.032053
	3	2.58225	2.45239	1.22268	.047707
	4	2.66584	2.48815	1.31421	.063162
	5	2.75692	2.52825	1.41711	.078398
	6	2.85665	2.57296	1.53377	.093442
	7	2.96666	2.62291	1.66728	.10831
	8	3.08899	2.67881	1.82163	.12301
	9	3.22621	2.74136	2.00218	.13755
	10	3.38185	2.81164	2.21653	.15196
	11	3.56060	2.89100	2.47509	.16622
	12	3.76908	2.98103	2.79352	.18036
	13	4.01684	3.08381	3.19547	.19438
	14	4.31849	3.20211	3.71940	.20831
	15	4.69712	3.33960	4.43072	.22214
	16	5.19339	3.50148	5.45345	.23588
	17	5.88489	3.69496	7.04972	.24955
	18	6.94816	3.93093	9.89298	.26315
	19	8.91314	4.22633	16.38741	.27670
26	0	2.28118	2.28118	1.00000	0
	1	2.34380	2.30354	1.06492	.01688
	2	2.41071	2.32880	1.13624	.03349
	3	2.48254	2.35720	1.21505	.04985
	4	2.55994	2.38897	1.30255	.06595
	5	2.64389	2.42442	1.40051	.08185
	6	2.73534	2.46403	1.51078	.09752
	7	2.83560	2.50808	1.63601	.11300
	8	2.94639	2.55727	1.77964	.12830
	9	3.06978	2.61226	1.94606	.14342
	10	3.20843	2.64370	2.14123	.15838
	11	3.36613	2.74282	2.37366	.17319
	12	3.54771	2.82071	2.65513	.18786
	13	3.76027	2.90907	3.00338	.20241
	14	4.01396	3.00988	3.44555	.21684
	15	4.32457	3.12584	4.02623	.23116
	16	4.71747	3.26064	4.82275	.24539
	17	5.23773	3.41920	5.98393	.25953
	18	5.97457	3.60871	7.83617	.27359
	19	7.13932	3.83975	11.26064	.28758
	20	9.42386	4.12892	19.74410	.30152
27	0	2.20269	2.20269	1.00000	0
	1	2.26150	2.22239	1.06314	.01764
	2	2.32415	2.24468	1.13222	.03497
	3	2.39117	2.26979	1.20820	.05202
	4	2.46318	2.29795	1.29226	.06881
27	5	2.54085	2.32939	1.38571	.08535
	6	2.62517	2.36445	1.49044	.10167
	7	2.71711	2.40346	1.60857	.11776
	8	2.81810	2.44693	1.74297	.13365
	9	2.92984	2.49534	1.89742	.14935
	10	3.05449	2.54944	2.07680	.16488
	11	3.19487	2.60990	2.28776	.18023
	12	3.35498	2.67778	2.53991	.19544
	13	3.53985	2.75428	2.84643	.21051
	14	3.75706	2.84104	3.22752	.22544
	15	4.01751	2.93990	3.71441	.24025
	16	4.33830	3.05365	4.35896	.25496
	17	4.74742	3.18578	5.25280	.26956
	18	5.29553	3.34120	6.57644	.28408
	19	6.08598	3.52689	8.73972	.29851
	20	7.37622	3.75323	12.91636	.31288
	21	10.10296	4.03644	24.37689	.32718
28	0	2.13006	2.13006	1.00000	0
	1	2.18546	2.14729	1.06148	.01839
	2	2.24436	2.16698	1.12856	.03646
	3	2.30713	2.18917	1.20202	.05422
	4	2.37434	2.21407	1.28293	.07170
	5	2.44661	2.24198	1.37252	.08890
	6	2.52465	2.27308	1.47228	.10585
	7	2.60945	2.30767	1.58425	.12258
	8	2.70205	2.34617	1.71071	.13906
	9	2.89976	2.37065	1.85492	.14525
	10	2.91678	2.43671	2.02095	.17143
	11	3.04296	2.48992	2.21432	.18735
	12	3.18538	2.54937	2.44239	.20308
	13	3.34818	2.61606	2.71591	.21866
	14	3.53684	2.69124	3.04990	.23410
	15	3.75932	2.77640	3.46732	.24941
	16	4.02749	2.87344	4.00428	.26459
	17	4.35986	2.98504	4.72109	.27966
	18	4.78758	3.11464	5.72715	.29463
	19	5.36803	3.26703	7.24294	.30950
	20	6.22241	3.44906	9.78928	.32429
	21	7.67074	3.67090	14.96338	.33901
	22	11.04280	3.94841	31.18958	.35367
29	0	2.06266	2.06266	1.00000	0
	1	2.11505	2.07774	1.06001	.01916
	2	2.17054	2.09496	1.12523	.03797
	3	2.22957	2.11455	1.19647	.05646
	4	2.29236	2.13521	1.27431	.07457
	5	2.36005	2.16131	1.36067	.09251
	6	2.43270	2.18895	1.45616	.11011
	7	2.51121	2.21966	1.56258	.12744
	8	2.59664	2.25386	1.68225	.14455
	9	2.69398	2.29151	1.82347	.16209
	10	2.79292	2.33402	1.97234	.17808
	11	2.90717	2.38101	2.15090	.19454
	12	3.03508	2.43337	2.35935	.21081
	13	3.17984	2.49183	2.60602	.22690
	14	3.34576	2.55740	2.90292	.24285
	15	3.53866	2.63123	3.26710	.25864
	16	3.76717	2.71487	3.72486	.27429
	17	4.04402	2.81017	4.31785	.28982
	18	4.38959	2.91970	5.11702	.30524
	19	4.83865	3.04685	6.25337	.32055
	20	5.45687	3.19634	7.99871	.33576
	21	6.38835	3.37485	11.02428	.35090
	22	8.04043	3.59235	17.56086	.36595
30	0	2.00000	2.00000	1.00000	0
	1	2.04970	2.01309	1.05869	.01996
	2	2.10220	2.02817	1.12228	.03953
	3	2.15786	2.04536	1.19144	.05873
	4	2.21712	2.06489	1.26706	.07743
	5	2.28038	2.08676	1.35004	.09616
	6	2.34824	2.11124	1.44166	.11442
	7	2.42132	2.13857	1.54331	.13239
	8	2.50046	2.16931	1.65693	.15010
	9	2.58664	2.20269	1.78480	.16757
	10	2.68100	2.24016	1.92978	.18479
	11	2.78510	2.28175	2.09572	.20180
	12	2.90088	2.32799	2.28775	.21861
	13	3.03082	2.37953	2.51256	.23523
	14	3.17820	2.43701	2.77947	.25167
	15	3.34766	2.50149	3.10201	.26795
	16	3.54542	2.57407	3.49958	.28408
	17	3.78065	2.65620	4.00222	.30006
	18	4.06734	2.74978	4.65845	.31592
	19	4.42795	2.85731	5.55196	.33166

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TABLE I.– VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
30	20	4.90159	3.00520	6.84081	0.34730
	21	5.56424	3.12879	8.86354	.36284
	22	6.58991	3.30392	12.49954	.37829
	23	8.51233	3.51725	20.96744	.39367
31	0	1.94160	1.94160	1.00000	0
	1	1.98886	1.95286	1.05748	.02076
	2	2.03868	1.96598	1.11958	.04110
	3	2.09138	1.98107	1.18694	.06106
	4	2.14730	1.99823	1.26029	.08064
	5	2.20684	2.01760	1.34052	.09989
	6	2.27049	2.03933	1.42871	.11880
	7	2.33880	2.06359	1.52616	.13741
	8	2.41247	2.09061	1.63449	.15574
	9	2.49232	2.12062	1.75569	.17379
	10	2.57936	2.15392	1.89230	.19160
	11	2.67484	2.19086	2.04755	.20916
	12	2.78034	2.23185	2.22567	.22651
	13	2.89789	2.27739	2.43223	.24364
	14	3.03011	2.32809	2.67480	.26058
	15	3.18052	2.38468	2.96390	.27735
	16	3.35393	2.44806	3.31456	.29394
	17	3.55709	2.51939	3.74909	.31038
	18	3.79995	2.60008	4.30204	.32668
	19	4.09778	2.69201	5.02997	.34285
	20	4.47555	2.79760	6.03228	.35890
	21	4.97767	2.92012	7.50125	.37484
	22	5.69302	3.06409	9.86355	.39068
	23	6.83565	3.23596	14.29389	.40644
	24	9.13076	3.44528	25.63452	.42212
32	0	1.88707	1.88707	1.00000	0
	1	1.93213	1.89664	1.05639	.02158
	2	1.97956	1.90799	1.11716	.04271
	3	2.02958	1.92112	1.18287	.06342
	4	2.08253	1.93620	1.25420	.08373
	5	2.13875	1.95330	1.33195	.10367
	6	2.19868	1.97256	1.41711	.12326
	7	2.26277	2.00680	1.51078	.14251
	8	2.33163	2.01807	1.61445	.16146
	9	2.40596	2.04478	1.72982	.18011
	10	2.48665	2.07445	1.85915	.19849
	11	2.57474	2.10730	2.00522	.21662
	12	2.67149	2.14373	2.17150	.23450
	13	2.77856	2.18409	2.36269	.25215
	14	2.89812	2.22897	2.58506	.26960
	15	3.03292	2.27884	2.84700	.28684
	16	3.18672	2.33454	3.16033	.30390
	17	3.36459	2.39688	3.54210	.32080
	18	3.57385	2.46700	4.01779	.33753
	19	3.82531	2.54630	4.62734	.35413
	20	4.13577	2.63661	5.43708	.37058
	21	4.53321	2.74033	6.56585	.38692
	22	5.06850	2.88280	8.24971	.40315
	23	5.84704	3.00200	11.03386	.41927
	24	7.13785	3.17071	16.52504	.43531
	25	9.97414	3.37616	32.42577	.45127
33	0	1.83608	1.83608	1.00000	0
	1	1.87918	1.84413	1.05541	.02242
	2	1.92442	1.85381	1.11497	.04435
	3	1.97206	1.86350	1.17920	.06583
	4	2.02235	1.87836	1.24872	.08688
	5	2.07561	1.89338	1.32426	.10752
	6	2.13221	1.91039	1.40668	.12779
	7	2.19258	1.92947	1.49703	.14770
	8	2.25722	1.95082	1.59657	.16727
	9	2.32674	1.97459	1.70686	.18653
	10	2.40188	2.00099	1.82982	.20796
	11	2.48351	2.03026	1.96784	.22417
	12	2.57274	2.06268	2.12398	.24259
	13	2.67094	2.09859	2.30217	.26076
	14	2.77983	2.13838	2.50757	.27870
	15	2.90165	2.18255	2.74709	.29643
	16	3.03936	2.23168	3.03020	.31396
	17	3.19689	2.28644	3.37020	.33131
	18	3.37977	2.34775	3.78644	.34848
	19	3.59589	2.41669	4.30816	.36549
	20	3.85704	2.49464	4.98175	.38235
	21	4.18188	2.58339	5.88545	.39908
	22	4.60196	2.68528	7.16241	.41569
	23	5.17619	2.80347	9.10556	.43218
	24	6.03149	2.94229	12.42298	.44857
	25	7.51479	3.10795	19.37661	.46487
	26	11.19767	3.53991	43.22636	.48109
34	0	1.78829	1.78829	1.00000	0
	1	1.82960	1.79493	1.05453	.023271
	2	1.87291	1.80309	1.11302	.046028
	3	1.91837	1.81285	1.17591	.060285
	4	1.96630	1.82427	1.24382	.090089
	5	2.01688	1.83741	1.31735	.11145
	6	2.07054	1.85237	1.39734	.13240
	7	2.12758	1.86926	1.48470	.15297
	8	2.18849	1.88824	1.58061	.17318
	9	2.25376	1.90935	1.68638	.19304
	10	2.32403	1.93285	1.80374	.21259
	11	2.40006	1.95894	1.93476	.23182
	12	2.48279	1.98784	2.08213	.25078
	13	2.57339	2.01986	2.24923	.26948
	14	2.67317	2.05523	2.44024	.28793
	15	2.78406	2.07055	2.66102	.30614
	16	2.90844	2.13794	2.91930	.32413
	17	3.04938	2.18628	3.22562	.34192
	18	3.21114	2.24018	3.59506	.35953
	19	3.39964	2.30049	4.04968	.37696
	20	3.62346	2.36828	4.62314	.39422
	21	3.89559	2.44492	5.36960	.41134
	22	4.23683	2.53215	6.38199	.42831
	23	4.68311	2.63228	7.83424	.44517
	24	5.30348	2.76967	10.09437	.46191
	25	6.25348	2.88475	14.09971	.47854
	26	7.99488	3.04745	23.15148	.49509
35	0	1.74345	1.74345	1.00000	0
	1	1.78316	1.74876	1.05375	.02415
	2	1.82468	1.75553	1.11126	.04774
	3	1.86822	1.76380	1.17296	.07079
	4	1.91398	1.77361	1.23939	.09336
	5	1.96221	1.78504	1.31116	.11545
	6	2.01321	1.79815	1.38897	.13710
	7	2.06730	1.81304	1.47368	.15834
	8	2.12487	1.82981	1.56632	.17918
	9	2.18638	1.84859	1.66810	.19966
	10	2.25238	1.86953	1.78054	.21979
	11	2.32352	1.89278	1.90548	.23960
	12	2.40058	1.91855	2.04521	.25910
	13	2.48453	1.94707	2.20263	.27832
	14	2.57658	1.97862	2.38143	.29727
	15	2.67822	2.01351	2.58644	.31596
	16	2.79139	2.05215	2.82401	.33442
	17	2.91858	2.09498	3.10277	.35266
	18	3.06314	2.14258	3.43466	.37069
	19	3.22962	2.19562	3.83675	.38853
	20	3.42442	2.25495	4.33427	.40619
	21	3.65692	2.32162	4.96621	.42369
	22	3.94150	2.39697	5.79616	.44103
	23	4.30153	2.48272	6.93526	.45824
	24	4.77837	2.58113	8.59705	.47532
	25	5.45400	2.69523	11.25052	.49229
	26	6.52305	2.82921	16.16503	.50915
	27	8.62546	2.98903	28.38910	.52591
36	0	1.70130	1.70130	1.00000	0
	1	1.73955	1.70539	1.05304	.025040
	2	1.77947	1.71085	1.10969	.049487
	3	1.82126	1.71772	1.17033	.073358
	4	1.86536	1.72606	1.23585	.096830
	5	1.91119	1.73654	1.30563	.11953
	6	1.95980	1.74734	1.38147	.14189
	7	2.01124	1.76042	1.46381	.16380
	8	2.06585	1.77522	1.55356	.18530
	9	2.12402	1.79185	1.65178	.20639
	10	2.18626	1.81048	1.75992	.22713
	11	2.25305	1.83118	1.87943	.24749
	12	2.32517	1.85418	2.01251	.26754
	13	2.40336	1.87960	2.16155	.28728
	14	2.48870	1.90778	2.32982	.30673
	15	2.58245	1.93889	2.52146	.32591
	16	2.68612	1.97330	2.74161	.34483
	17	2.80180	2.01136	2.99750	.36351
	18	2.93216	2.05355	3.29879	.38197
	19	3.08076	2.10040	3.65894	.40022
	20	3.25251	2.15260	4.09738	.41827
	21	3.45439	2.21098	4.64313	.43615
	22	3.69669	2.27656	5.34155	.45386
	23	3.99543	2.35065	6.26779	.47141
	24	4.37714	2.43496	7.55597	.48883
	25	4.88989	2.53169	9.47123	.50612
	26	5.63258	2.66431	12.62122	.52329

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TABLE I – VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
36	27	6.85490	2.77549	18.77364	0.54035
	28	9.49197	2.93252	36.14927	.55732
37	0	1.66164	1.66164	1.00000	0
	1	1.69857	1.66458	1.05244	.02597
	2	1.73706	1.66883	1.10831	.05128
	3	1.77726	1.67443	1.16800	.07598
	4	1.81934	1.68140	1.23196	.10011
	5	1.86351	1.68980	1.30070	.12370
	6	1.91000	1.69967	1.37483	.14678
	7	1.95907	1.71107	1.45505	.16938
	8	2.01103	1.72408	1.54221	.19153
	9	2.06623	1.73879	1.63730	.21325
	10	2.12508	1.75530	1.74154	.23458
	11	2.18809	1.77373	1.85637	.25552
	12	2.25584	1.79422	1.98358	.27612
	13	2.32903	1.81694	2.12538	.29638
	14	2.40896	1.84205	2.28541	.31643
	15	2.49541	1.86986	2.46456	.33599
	16	2.59099	1.90054	2.66997	.35537
	17	2.69694	1.93445	2.90670	.37449
	18	2.81543	1.97195	3.18269	.39337
	19	2.94931	2.01350	3.50881	.41203
	20	3.10242	2.05963	3.90033	.43048
	21	3.28008	2.11101	4.37946	.44873
	22	3.48991	2.16844	4.97971	.46679
	23	3.74331	2.23295	5.75420	.48469
	24	4.05825	2.30583	6.79240	.50244
	25	4.46512	2.38873	8.25775	.52004
	26	5.02050	2.48383	10.48377	.53751
	27	5.84590	2.59406	14.27360	.55487
	28	7.27143	2.72345	22.17482	.57211
	29	10.76973	2.87776	48.84307	.58927
38	0	1.62427	1.62427	1.00000	0
	1	1.66000	1.62610	1.05191	.02691
	2	1.69720	1.62925	1.10711	.05312
	3	1.73595	1.63363	1.16595	.07867
	4	1.77646	1.63934	1.22888	.10361
	5	1.81891	1.64639	1.29635	.12796
	6	1.86348	1.65484	1.36892	.15177
	7	1.91042	1.66471	1.44727	.17507
	8	1.95999	1.67607	1.53211	.19788
	9	2.01254	1.68903	1.62441	.22023
	10	2.06839	1.70361	1.72524	.24217
	11	2.12800	1.71998	1.83585	.26369
	12	2.19194	1.73827	1.95797	.28484
	13	2.26069	1.75849	2.09337	.30562
	14	2.33512	1.77819	2.24461	.32607
	15	2.41604	1.80577	2.41463	.34621
	16	2.50464	1.83318	2.60744	.36605
	17	2.60229	1.86344	2.82795	.38562
	18	2.71076	1.89686	3.08280	.40492
	19	2.83237	1.93381	3.38091	.42398
	20	2.97018	1.97473	3.73452	.44281
	21	3.12834	2.02015	4.16104	.46143
	22	3.31262	2.07072	4.68594	.47985
	23	3.53143	2.12723	5.34815	.49809
	24	3.79744	2.19070	6.21029	.51616
	25	4.13102	2.26238	7.37982	.53407
	26	4.56731	2.34390	9.05803	.55184
	27	5.17392	2.43741	11.67110	.56947
	28	6.10326	2.56549	16.30565	.58699
	29	7.80868	2.67296	26.79741	.60440
	30	12.89714	2.82462	73.38925	.62171
39	0	1.58902	1.58902	1.00000	0
	1	1.62367	1.58985	1.05145	.02788
	2	1.65967	1.59190	1.10605	.05500
	3	1.69713	1.59517	1.16416	.08142
	4	1.73622	1.59970	1.22617	.10718
	5	1.77709	1.60550	1.29251	.13232
	6	1.81992	1.61261	1.36371	.15687
	7	1.86495	1.62107	1.44036	.18087
	8	1.91239	1.63094	1.52317	.20436
	9	1.96255	1.64227	1.61298	.22735
	10	2.01575	1.65514	1.71076	.24989
	11	2.07236	1.66963	1.81770	.27200
	12	2.13285	1.68584	1.93523	.29370
	13	2.19774	1.70390	2.06508	.31501
	14	2.26769	1.72394	2.20939	.33597
	15	2.34345	1.74612	2.37081	.35659
	16	2.42599	1.77061	2.55271	.37689
39	17	2.51649	1.79765	2.75938	0.39689
	18	2.61643	1.82749	2.99641	.41661
	19	2.72771	1.86043	3.27119	.43607
	20	2.85280	1.89684	3.59373	.45529
	21	2.99499	1.93714	3.97793	.47427
	22	3.15879	1.98185	4.44366	.49304
	23	3.35052	2.03163	5.02033	.51161
	24	3.68530	2.09759	6.03867	.52999
	25	3.85991	2.14968	6.71741	.54821
	26	4.21505	2.22019	8.04246	.56627
	27	4.68611	2.30037	9.97979	.58418
	28	5.35512	2.39231	13.08374	.60196
	29	6.41824	2.49885	18.86698	.61961
	30	8.52952	2.62389	33.44886	.63716
40	0	1.55572	1.55572	1.00000	0
	1	1.58940	1.55556	1.05106	.02887
	2	1.62431	1.55660	1.10515	.05693
	3	1.66120	1.55877	1.16355	.08467
	4	1.69841	1.56224	1.22384	.11085
	5	1.73791	1.56694	1.28916	.13677
	6	1.77912	1.57276	1.35914	.16209
	7	1.82243	1.57993	1.43431	.18681
	8	1.86797	1.58841	1.51532	.21098
	9	1.91599	1.59826	1.60291	.23462
	10	1.96679	1.60950	1.69799	.25777
	11	2.02072	1.62230	1.80165	.28046
	12	2.07818	1.63666	1.91519	.30272
	13	2.13960	1.65272	2.04007	.32456
	14	2.20564	1.67062	2.17838	.34603
	15	2.27684	1.69040	2.33224	.36713
	16	2.35412	1.71233	2.50474	.38789
	17	2.43844	1.73651	2.69953	.40833
	18	2.53106	1.76318	2.92139	.42846
	19	2.63355	1.79260	3.17655	.44832
	20	2.74794	1.82507	3.47330	.46791
	21	2.87691	1.86290	3.82297	.48726
	22	3.02399	1.90062	4.24135	.50637
	23	3.19412	1.94465	4.75127	.52527
	24	3.39425	1.99364	5.38688	.54396
	25	3.63476	2.04837	6.20177	.56247
	26	3.93174	2.10980	7.28497	.58081
	27	4.31206	2.17916	8.79627	.59899
	28	4.82461	2.25802	11.05366	.61702
	29	5.57095	2.34844	14.79363	.63492
	30	6.81144	2.47220	22.19783	.65270
	31	9.55562	2.57613	43.84821	.67037
41	0	1.52425	1.52425	1.00000	0
	1	1.55704	1.52319	1.05073	.02989
	2	1.59100	1.52328	1.10441	.05892
	3	1.62623	1.52450	1.16133	.08714
	4	1.66286	1.52688	1.22183	.11461
	5	1.70103	1.53043	1.28631	.14135
	6	1.74090	1.53516	1.35521	.16743
	7	1.78264	1.54110	1.42906	.19288
	8	1.82644	1.54829	1.50845	.21774
	9	1.87255	1.55677	1.59408	.24204
	10	1.92121	1.56658	1.68679	.26581
	11	1.97274	1.57780	1.78755	.28910
	12	2.02749	1.59049	1.89753	.31191
	13	2.08588	1.60474	2.01813	.33429
	14	2.14839	1.62064	2.15104	.35626
	15	2.21562	1.63831	2.29837	.37784
	16	2.28827	1.65788	2.46267	.39906
	17	2.36721	1.67951	2.64721	.41993
	18	2.45349	1.70337	2.85608	.44048
	19	2.54845	1.72968	3.09460	.46073
	20	2.65378	1.75868	3.36974	.48070
	21	2.77164	1.79068	3.69085	.50040
	22	2.90492	1.82601	4.07076	.51985
	23	3.05749	1.86509	4.52755	.53907
	24	3.23473	1.90844	5.08756	.55807
	25	3.44438	1.95667	5.79072	.57687
	26	3.69807	2.01053	6.70059	.59549
	27	4.01421	2.07098	7.92491	.61393
	28	4.42429	2.13921	9.66250	.63221
	29	4.98692	2.21677	12.32147	.65034
	30	5.83108	2.30570	16.90715	.66834
	31	7.31588	2.40871	26.70940	.68622
	32	11.16425	2.52958	62.42147	.70398

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
42	0	1.49448	1.49448	1.00000	0
	1	1.52646	1.49254	1.05047	.03094
	2	1.55953	1.49172	1.10379	.06096
	3	1.59084	1.48920	1.16026	.09046
	4	1.63013	1.49331	1.22140	.11902
	5	1.66642	1.49592	1.28389	.14604
	6	1.70602	1.50047	1.35186	.17270
	7	1.74533	1.50437	1.42453	.19909
	8	1.78759	1.51037	1.50251	.22465
	9	1.83196	1.51758	1.58642	.24962
	10	1.87871	1.52603	1.67703	.27402
	11	1.92809	1.53583	1.77522	.29790
	12	1.98043	1.54697	1.88207	.32128
	13	2.03608	1.55958	1.99882	.34419
	14	2.09550	1.57370	2.12706	.36667
	15	2.15919	1.58941	2.26861	.38873
	16	2.22779	1.60689	2.42582	.41041
	17	2.30202	1.62622	2.60146	.43172
	18	2.38280	1.64758	2.79914	.45268
	19	2.47126	1.67112	3.02345	.47332
	20	2.56883	1.69707	3.28032	.49366
	21	2.67731	1.72566	3.57758	.51371
	22	2.79904	1.75719	3.92581	.53350
	23	2.93714	1.79199	4.33962	.55303
	24	3.09586	1.83048	4.83980	.57233
	25	3.28113	1.87316	5.45696	.59142
	26	3.50161	1.92063	6.23811	.61030
	27	3.77045	1.97364	7.25935	.62899
	28	4.10893	2.03311	8.65247	.64751
	29	4.55417	2.10024	10.66728	.66587
	30	5.17863	2.17653	13.84204	.68408
	31	6.14967	2.26399	19.58813	.70216
	32	7.98864	2.38362	33.16941	.72011
	33	14.19485	2.48414	105.08535	.73795
43	0	1.46628	1.46628	1.00000	0
	1	1.49755	1.46349	1.05029	.03203
	2	1.52984	1.46179	1.10333	.06307
	3	1.56325	1.46118	1.15941	.09319
	4	1.59788	1.46165	1.21882	.12243
	5	1.63385	1.46320	1.28190	.15086
	6	1.67130	1.46584	1.34907	.17853
	7	1.71037	1.46959	1.42075	.20547
	8	1.75122	1.47447	1.49749	.23174
	9	1.79404	1.48050	1.57988	.25738
	10	1.83906	1.48772	1.66862	.28242
	11	1.88651	1.49617	1.76455	.30690
	12	1.93668	1.50591	1.86864	.33085
	13	1.98991	1.51698	1.98205	.35430
	14	2.04657	1.52947	2.10617	.37728
	15	2.10714	1.54345	2.24267	.39983
	16	2.17214	1.55902	2.39362	.42196
	17	2.24223	1.57629	2.56152	.44370
	18	2.31820	1.59539	2.74953	.46507
	19	2.40103	1.61646	2.96164	.48610
	20	2.49191	1.63969	3.20294	.50680
	21	2.59237	1.66528	3.48010	.52720
	22	2.70435	1.69346	3.80196	.54731
	23	2.83381	1.72502	4.18819	.56716
	24	2.97391	1.75881	4.63254	.58675
	25	3.13997	1.79676	5.18317	.60612
	26	3.33394	1.83873	5.86488	.62526
	27	3.56680	1.88545	6.73684	.64420
	28	3.85318	1.93762	7.88996	.66295
	29	4.21794	1.99614	9.48750	.68152
	30	4.70573	2.06218	11.84954	.69994
	31	5.40747	2.13722	15.70056	.71820
	32	6.54844	2.22324	23.10298	.73634
	33	8.93919	2.32287	43.19541	.75435
44	0	1.43955	1.43955	1.00000	0
	1	1.47017	1.43595	1.05016	.03315
	2	1.50175	1.43340	1.10300	.06524
	3	1.53439	1.43194	1.15878	.09634
	4	1.56816	1.43154	1.21777	.12651
	5	1.60320	1.43215	1.28033	.15581
	6	1.63960	1.43385	1.34680	.18429
	7	1.67754	1.43659	1.41765	.21202
	8	1.71712	1.44044	1.49329	.23900
	9	1.75855	1.44536	1.57435	.26532
	10	1.80201	1.45143	1.66148	.29101
	11	1.84775	1.45868	1.75542	.31608
	12	1.89597	1.46707	1.85710	.34062
	13	1.94702	1.47675	1.96754	.36461
	14	2.00123	1.48774	2.08804	.37474
44	15	2.05902	1.50014	2.22011	0.41113
	16	2.12085	1.51398	2.36559	.43372
	17	2.18729	1.52938	2.52675	.45589
	18	2.25905	1.54644	2.70637	.47767
	19	2.33696	1.56530	2.90795	.49908
	20	2.42205	1.58610	3.13593	.52014
	21	2.51562	1.60901	3.39602	.54088
	22	2.61929	1.63424	3.69573	.56132
	23	2.73518	1.66202	4.04507	.58147
	24	2.86606	1.69262	4.45777	.60135
	25	3.01565	1.72639	4.95312	.62098
	26	3.18913	1.76371	5.55910	.64038
	27	3.39390	1.80508	6.31798	.65956
	28	3.64100	1.85107	7.29665	.67853
	29	3.94787	1.90240	8.60767	.69731
	30	4.34390	1.95998	10.45639	.71592
	31	4.88378	2.02495	13.26101	.73437
	32	5.68455	2.09877	18.02541	.75267
	33	7.06275	2.18337	27.91591	.77084
	34	10.41342	2.29901	60.88204	.78888
45	0	1.41421	1.41421	1.00000	0
	1	1.44426	1.40982	1.05010	.03431
	2	1.47521	1.40648	1.10280	.06748
	3	1.50714	1.40419	1.15836	.09960
	4	1.54015	1.40293	1.21704	.13071
	5	1.57434	1.40269	1.27916	.16090
	6	1.60983	1.40348	1.34507	.19022
	7	1.64673	1.40529	1.41516	.21871
	8	1.68518	1.40814	1.48991	.24645
	9	1.72536	1.41205	1.56983	.27346
	10	1.76742	1.41703	1.65554	.29979
	11	1.81159	1.42311	1.74775	.32549
	12	1.85809	1.43032	1.84730	.35059
	13	1.90720	1.43872	1.95515	.37513
	14	1.95922	1.44834	2.07248	.39914
	15	2.01452	1.45925	2.20066	.42265
	16	2.07352	1.47151	2.34137	.44569
	17	2.13674	1.48521	2.49664	.46829
	18	2.20479	1.50043	2.66897	.49047
	19	2.27839	1.51729	2.86144	.51227
	20	2.35843	1.53591	3.07796	.53369
	21	2.44604	1.55643	3.32348	.55477
	22	2.54259	1.57903	3.60444	.57553
	23	2.64985	1.60390	3.92932	.59597
	24	2.77011	1.63127	4.30955	.61614
	25	2.90641	1.66142	4.76088	.63603
	26	3.06287	1.69468	5.30568	.65567
	27	3.24525	1.73143	5.97680	.67508
	28	3.46192	1.77215	6.82452	.69427
	29	3.72556	1.81741	7.92987	.71325
	30	4.05655	1.86793	9.43244	.73205
	31	4.49028	1.92458	11.59485	.75067
	32	5.09509	1.98849	14.97662	.76913
	33	6.02650	2.06110	21.01927	.78744
	34	7.75492	2.14431	34.91428	.80562
	35	13.13487	2.24066	100.47277	.82367
46	0	1.39016	1.39016	1.00000	0
	1	1.41969	1.38498	1.05010	.03551
	2	1.45008	1.38088	1.10274	.06980
	3	1.48138	1.37779	1.15813	.10294
	4	1.51372	1.37573	1.21661	.13505
	5	1.54715	1.37464	1.27839	.16615
	6	1.58181	1.37460	1.34384	.19631
	7	1.61778	1.37540	1.41334	.22562
	8	1.65521	1.37744	1.48728	.25408
	9	1.69426	1.38037	1.56626	.28181
	10	1.73507	1.38431	1.65076	.30881
	11	1.77783	1.38936	1.74144	.33512
	12	1.82279	1.39545	1.83915	.36080
	13	1.87015	1.40266	1.94474	.38589
	14	1.92023	1.41102	2.05931	.41041
	15	1.97330	1.42055	2.18408	.43441
	16	2.02982	1.43138	2.32064	.45790
	17	2.09018	1.44353	2.47077	.48093
	18	2.15495	1.45708	2.63675	.50351
	19	2.22476	1.47212	2.82133	.52568
	20	2.30039	1.48878	3.02795	.54746
	21	2.38282	1.50715	3.26098	.56888
	22	2.47321	1.52740	3.52598	.58994
	23	2.57309	1.54968	3.83023	.61068
	24	2.68435	1.57419	4.18338	.63112
	25	2.80952	1.60116	4.59851	.65127

TABLE I.– VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
46	26	2.95193	1.63086	5.09384	0.67115
	27	3.11618	1.66361	5.69551	.69078
	28	3.30874	1.69980	6.44239	.71018
	29	3.53915	1.73988	7.39491	.72936
	30	3.82213	1.78442	8.65246	.74833
	31	4.18188	1.83413	10.39077	.76711
	32	4.66173	1.88987	12.95259	.78572
	33	5.34930	1.95274	17.10800	.80417
	34	6.45951	2.02416	25.02251	.82247
	35	8.74799	2.10599	46.03221	.84064
47	0	1.36733	1.36733	1.00000	0
	1	1.39641	1.36141	1.05016	.03675
	2	1.42630	1.35654	1.10280	.07219
	3	1.45706	1.35269	1.15815	.10642
	4	1.48878	1.34984	1.21646	.13951
	5	1.52154	1.34797	1.27800	.17155
	6	1.55544	1.34708	1.34310	.20259
	7	1.59060	1.34716	1.41211	.23270
	8	1.62712	1.34821	1.48545	.26195
	9	1.66516	1.35024	1.56359	.29037
	10	1.70485	1.35326	1.64707	.31804
	11	1.74637	1.35727	1.73650	.34498
	12	1.78993	1.36232	1.83261	.37125
	13	1.83573	1.36841	1.93624	.39689
	14	1.88405	1.37560	2.04839	.42193
	15	1.93516	1.38391	2.17022	.44641
	16	1.98943	1.39339	2.30313	.47036
	17	2.04726	1.40411	2.44879	.49381
	18	2.10912	1.41614	2.60925	.51680
	19	2.17560	1.42954	2.78698	.53934
	20	2.24736	1.44440	2.98505	.56147
	21	2.32526	1.46084	3.20733	.58321
	22	2.41032	1.47898	3.45870	.60458
	23	2.50383	1.49895	3.74545	.62561
	24	2.60741	1.52092	4.07583	.64632
	25	2.72317	1.54507	4.46089	.66671
	26	2.85386	1.57165	4.91572	.68683
	27	3.00320	1.60090	5.46154	.70667
	28	3.17632	1.63314	6.12913	.72627
	29	3.38059	1.66877	6.96494	.74563
	30	3.62700	1.70822	8.04246	.76477
	31	3.93285	1.75205	9.48532	.78371
	32	4.32733	1.80096	11.51871	.80246
	33	4.86465	1.85579	14.60078	.82104
	34	5.66067	1.91764	19.82908	.83945
	35	7.02769	1.98788	30.65294	.85772
	36	10.33190	2.06836	66.44672	.87585
48	0	1.34562	1.34562	1.00000	0
	1	1.37431	1.33897	1.05028	.03803
	2	1.40376	1.33334	1.10299	.07466
	3	1.43404	1.32876	1.15835	.11000
	4	1.46522	1.32515	1.21660	.14413
	5	1.49738	1.32253	1.27799	.17712
	6	1.53062	1.32084	1.34285	.20906
	7	1.56467	1.32016	1.41075	.23968
	8	1.60075	1.32034	1.48434	.27003
	9	1.63789	1.32151	1.56185	.29919
	10	1.67658	1.32364	1.64444	.32752
	11	1.71700	1.32672	1.73283	.35511
	12	1.75929	1.33077	1.82758	.38198
	13	1.80370	1.33585	1.92951	.40816
	14	1.85044	1.34190	2.03959	.43372
	15	1.89980	1.34908	2.15885	.45868
	16	1.95212	1.35736	2.28864	.48308
	17	2.00769	1.36677	2.43042	.50696
	18	2.06698	1.37739	2.58609	.53034
	19	2.13050	1.38929	2.75788	.55326
	20	2.19886	1.40253	2.94856	.57573
	21	2.27280	1.41722	3.16158	.59779
	22	2.35321	1.43345	3.40126	.61947
	23	2.44121	1.45134	3.67309	.64078
	24	2.53819	1.47103	3.98424	.66174
	25	2.64594	1.49269	4.34413	.68238
	26	2.76675	1.51649	4.76546	.70272
	27	2.90369	1.54266	5.26577	.72277
	28	3.06091	1.57147	5.86997	.74255
	29	3.24422	1.60322	6.61467	.76209
	30	3.46207	1.63828	7.55598	.78139
	31	3.72728	1.67711	8.78447	.80047
48	32	4.06049	1.72024	10.45639	0.81935
	33	4.49758	1.76836	12.86653	.83805
	34	5.10813	1.82230	16.64529	.85657
	35	6.05125	1.88312	23.42636	.87492
	36	7.81289	1.95221	39.16270	.89314
	37	13.43954	2.03135	116.20903	.91121
49	0	1.32501	1.32501	1.00000	0
	1	1.35337	1.31763	1.05048	.03937
	2	1.38245	1.31130	1.10333	.07724
	3	1.41230	1.30598	1.15878	.11372
	4	1.44301	1.30164	1.21704	.14891
	5	1.47465	1.29827	1.27839	.18288
	6	1.50731	1.29585	1.34310	.21573
	7	1.54108	1.29435	1.41151	.24753
	8	1.57607	1.29378	1.48399	.27835
	9	1.61239	1.29413	1.56096	.30824
	10	1.65019	1.29540	1.64290	.33727
	11	1.68960	1.29760	1.73037	.36549
	12	1.73080	1.30074	1.82401	.39295
	13	1.77397	1.30483	1.92455	.41970
	14	1.81933	1.30991	2.03286	.44578
	15	1.86712	1.31599	2.14994	.47123
	16	1.91764	1.32311	2.27699	.49609
	17	1.97121	1.33132	2.41543	.52038
	18	2.02822	1.34065	2.56696	.54416
	19	2.08914	1.35117	2.73362	.56744
	20	2.15449	1.36293	2.91792	.59026
	21	2.22495	1.37602	3.12296	.61264
	22	2.30130	1.39053	3.35260	.63461
	23	2.38451	1.40654	3.61170	.65619
	24	2.47579	1.42419	3.90652	.67740
	25	2.57667	1.44360	4.24521	.69828
	26	2.68909	1.46494	4.63861	.71883
	27	2.81562	1.48840	5.10146	.73908
	28	2.95967	1.51417	5.65428	.75904
	29	3.12592	1.54254	6.32660	.77875
	30	3.32102	1.57379	7.16241	.79820
	31	3.55475	1.60830	8.23036	.81742
	32	3.84229	1.64650	9.64375	.83642
	33	4.20868	1.68894	11.60395	.85522
	34	4.69905	1.73628	14.50661	.87383
	35	5.40551	1.78933	19.25024	.89227
	36	6.55748	1.84915	28.40795	.91055
	37	8.98915	1.89961	53.52952	.92869
50	0	1.30541	1.30541	1.00000	0
	1	1.33348	1.29731	1.05072	.04075
	2	1.36225	1.29028	1.10380	.07991
	3	1.39174	1.28425	1.15940	.11756
	4	1.42204	1.27920	1.21777	.15384
	5	1.45322	1.27510	1.27916	.18884
	6	1.48536	1.27194	1.34383	.22263
	7	1.51856	1.26972	1.41210	.25529
	8	1.55292	1.26837	1.48436	.28693
	9	1.58854	1.26795	1.56095	.31756
	10	1.62554	1.26843	1.64237	.34729
	11	1.66408	1.26977	1.72917	.37617
	12	1.70426	1.27204	1.82185	.40422
	13	1.74634	1.27525	1.92125	.43154
	14	1.79047	1.27937	2.02809	.45814
	15	1.83687	1.28445	2.14331	.48407
	16	1.88581	1.29052	2.26807	.50939
	17	1.93761	1.29760	2.40364	.53411
	18	1.99260	1.30574	2.55161	.55827
	19	2.05120	1.31499	2.71386	.58192
	20	2.11391	1.32540	2.89268	.60507
	21	2.18131	1.33703	3.09086	.62776
	22	2.25409	1.34997	3.31189	.65002
	23	2.33313	1.36428	3.56009	.67186
	24	2.41947	1.38009	3.84102	.69333
	25	2.51443	1.39749	4.16179	.71442
	26	2.61969	1.41662	4.53177	.73518
	27	2.73741	1.43765	4.96352	.75562
	28	2.87044	1.46075	5.47426	.77576
	29	3.02262	1.48613	6.08824	.79562
	30	3.19929	1.51406	6.84082	.81521
	31	3.40813	1.54482	7.78552	.83455
	32	3.66064	1.57878	9.00756	.85366
	33	3.97506	1.61636	10.65120	.87256
	34	4.38240	1.65811	12.98191	.89126

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND

PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
50	35	4.94092	1.70467	16.54698	0.90977
	36	5.77744	1.75684	22.68537	.92811
	37	7.24492	1.81567	35.76868	.94629
	38	11.02198	1.88247	83.00475	.96432
51	0	1.28676	1.28676	1.00000	0
	1	1.31461	1.27794	1.05105	.04220
	2	1.34310	1.27020	1.10441	.08268
	3	1.37229	1.26347	1.16026	.12157
	4	1.40225	1.25773	1.21882	.15898
	5	1.43304	1.25294	1.28033	.19501
	6	1.46474	1.24908	1.34507	.22976
	7	1.49745	1.24613	1.41333	.26333
	8	1.53125	1.24408	1.48545	.29577
	9	1.56624	1.24290	1.56183	.32718
	10	1.60255	1.24260	1.64290	.35762
	11	1.64030	1.24317	1.72916	.38715
	12	1.67964	1.24463	1.82118	.41582
	13	1.72072	1.24696	1.91962	.44370
	14	1.76374	1.25020	2.02525	.47082
	15	1.80891	1.25434	2.13895	.49725
	16	1.85646	1.25943	2.26176	.52301
	17	1.90668	1.26547	2.39492	.54814
	18	1.95988	1.27251	2.53987	.57270
	19	2.01645	1.28059	2.69835	.59670
	20	2.07682	1.28975	2.87247	.62018
	21	2.14152	1.30005	3.06478	.64318
	22	2.21119	1.31155	3.27844	.66572
	23	2.28657	1.32432	3.51734	.68782
	24	2.36861	1.33845	3.78644	.70952
	25	2.45845	1.35403	4.09202	.73084
	26	2.55756	1.37119	4.44229	.75179
	27	2.66777	1.39005	4.84808	.77241
	28	2.79151	1.41076	5.32406	.79271
	29	2.93197	1.43350	5.89051	.81271
	30	3.09353	1.45850	6.57643	.83244
	31	3.28233	1.48598	7.42463	.85190
	32	3.50735	1.51625	8.50117	.87111
	33	3.78233	1.54966	9.91359	.89009
	34	4.12960	1.58664	11.84954	.90886
	35	4.58848	1.62770	14.66843	.92743
	36	5.23674	1.67349	19.15633	.94582
	37	6.25775	1.72479	27.42567	.96403
	38	8.24709	1.78263	47.75734	.98209
52	0	1.26902	1.26902	1.00000	0
	1	1.29670	1.25948	1.05144	.04370
	2	1.32498	1.25103	1.10516	.08557
	3	1.35392	1.24364	1.16131	.12571
	4	1.38359	1.23720	1.22017	.16430
	5	1.41404	1.23173	1.28189	.20140
	6	1.44538	1.22720	1.34680	.23715
	7	1.47766	1.22354	1.41517	.27163
	8	1.51097	1.22079	1.48728	.30491
	9	1.54543	1.21891	1.56357	.33709
	10	1.58114	1.21788	1.64446	.36826
	11	1.61820	1.21769	1.73036	.39845
	12	1.65677	1.21837	1.82188	.42775
	13	1.69700	1.21989	1.91963	.45620
	14	1.73905	1.22229	2.02429	.48384
	15	1.78314	1.22557	2.13679	.51075
	16	1.82945	1.22972	2.25801	.53696
	17	1.87828	1.23480	2.38915	.56251
	18	1.92990	1.24082	2.53157	.58745
	19	1.98467	1.24781	2.68688	.61180
	20	2.04298	1.25582	2.85703	.63561
	21	2.10531	1.26489	3.04435	.65891
	22	2.17223	1.27507	3.25173	.68172
	23	2.24442	1.28643	3.48272	.70408
	24	2.32271	1.29904	3.74176	.72601
	25	2.40812	1.31298	4.03448	.74753
	26	2.50192	1.32835	4.36812	.76868
	27	2.60571	1.34526	4.75217	.78947
	28	2.72156	1.36383	5.19927	.80992
	29	2.85217	1.38423	5.72668	.83006
	30	3.00119	1.40663	6.35861	.84990
	31	3.17365	1.43123	7.13007	.86946
	32	3.37670	1.45827	8.09364	.88876
	33	3.62101	1.48806	9.33218	.90782
	34	3.92327	1.52092	10.98415	.92665
52	35	4.31141	1.55729	13.29968	0.94527
	36	4.83682	1.59767	16.78182	.96369
	37	5.60756	1.64269	22.61361	.98193
	38	6.90708	1.69313	34.39544	1.00000
	39	9.89463	1.74999	70.76017	1.01791
53	0	1.25214	1.25214	1.00000	0
	1	1.27969	1.24189	1.05190	.04528
	2	1.30781	1.23275	1.10605	.08858
	3	1.33656	1.22465	1.16262	.13005
	4	1.36600	1.21756	1.22183	.16983
	5	1.39619	1.21142	1.28389	.20805
	6	1.42721	1.20621	1.34907	.24481
	7	1.45914	1.20190	1.41763	.28022
	8	1.49205	1.19846	1.48991	.31438
	9	1.52604	1.19589	1.56625	.34736
	10	1.56122	1.19415	1.64707	.37925
	11	1.59770	1.19325	1.73281	.41011
	12	1.63560	1.19319	1.82401	.44003
	13	1.67508	1.19395	1.92126	.46904
	14	1.71629	1.19555	2.02525	.49722
	15	1.75941	1.19800	2.13677	.52462
	16	1.80465	1.20130	2.25676	.55127
	17	1.85225	1.20547	2.38629	.57724
	18	1.90248	1.21053	2.52664	.60255
	19	1.95566	1.21652	2.67932	.62726
	20	2.01216	1.22346	2.84613	.65139
	21	2.07241	1.23140	3.02926	.67497
	22	2.13693	1.24037	3.23135	.69805
	23	2.20633	1.25044	3.45565	.72065
	24	2.28136	1.26166	3.70619	.74280
	25	2.36292	1.27410	3.98804	.76453
	26	2.45212	1.28784	4.30767	.78585
	27	2.55039	1.30299	4.67348	.80680
	28	2.65951	1.31965	5.09652	.82739
	29	2.78180	1.33795	5.59167	.84766
	30	2.92034	1.35803	6.17951	.86761
	31	3.07931	1.38008	6.88921	.88726
	32	3.26455	1.40429	7.76366	.90664
	33	3.48454	1.43090	8.86847	.92577
	34	3.75215	1.46019	10.30955	.94465
	35	4.08807	1.49252	12.26935	.96330
	36	4.52825	1.52828	15.09156	.98175
	37	5.14217	1.56798	19.50936	1.00000
	38	6.08831	1.61224	27.41609	1.01807
	39	7.84757	1.66183	45.65954	1.03597
	40	13.37365	1.71693	132.92279	1.05371
54	0	1.23606	1.23606	1.00000	0
	1	1.26353	1.22509	1.05243	.04691
	2	1.29155	1.21520	1.10710	.09172
	3	1.32016	1.20650	1.16416	.13456
	4	1.34943	1.19873	1.22383	.17560
	5	1.37942	1.19194	1.28631	.21495
	6	1.41018	1.18607	1.35186	.25277
	7	1.44181	1.18109	1.42075	.28914
	8	1.47440	1.17701	1.49329	.32417
	9	1.50801	1.17379	1.56982	.35796
	10	1.54274	1.17135	1.65074	.39059
	11	1.57871	1.16978	1.73648	.42214
	12	1.61605	1.16899	1.82758	.45269
	13	1.65487	1.16904	1.92455	.48229
	14	1.69536	1.17087	2.02809	.51099
	15	1.73765	1.17155	2.13897	.53888
	16	1.78195	1.17404	2.25801	.56597
	17	1.82848	1.17737	2.38629	.59234
	18	1.87750	1.18154	2.52500	.61803
	19	1.92929	1.18659	2.67556	.64308
	20	1.98421	1.19254	2.83966	.66752
	21	2.04264	1.19943	3.01932	.69139
	22	2.10505	1.20729	3.21701	.71473
	23	2.17202	1.21616	3.43570	.73756
	24	2.24420	1.22610	3.67910	.75992
	25	2.32241	1.23718	3.95183	.78184
	26	2.40765	1.24945	4.25971	.80333
	27	2.50117	1.26300	4.61025	.82443
	28	2.60453	1.27793	5.01322	.84516
	29	2.71975	1.29434	5.48166	.86553
	30	2.84947	1.31236	6.03330	.88558

TABLE I.– VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND

PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
54	31	2.99721	1.33213	6.69290	0.90532
	32	3.16784	1.35382	7.49613	.92477
	33	3.36824	1.37764	8.49634	.94394
	34	3.60863	1.40381	9.77698	.96286
	35	3.90484	1.43262	11.47643	.98154
	36	4.28320	1.46441	13.84205	1.00000
	37	4.79140	1.49957	17.36357	1.01825
	38	5.52791	1.53859	23.16703	1.03631
	39	6.74212	1.58209	34.54341	1.05418
	40	9.37684	1.63082	66.97239	1.07189
55	0	1.22077	1.22077	1.00000	0
	1	1.24822	1.20908	1.05305	.04864
	2	1.27618	1.19855	1.10831	.09501
	3	1.30471	1.18909	1.16595	.13927
	4	1.33386	1.18067	1.22617	.18160
	5	1.36370	1.17322	1.28917	.22214
	6	1.39429	1.16672	1.35521	.26103
	7	1.42570	1.16111	1.42455	.29839
	8	1.45800	1.15638	1.49749	.33432
	9	1.49130	1.15249	1.57436	.36894
	10	1.52567	1.14943	1.65554	.40233
	11	1.56123	1.14719	1.74146	.43457
	12	1.59808	1.14574	1.83261	.46574
	13	1.63636	1.14509	1.92953	.49592
	14	1.67620	1.14522	2.03286	.52516
	15	1.71778	1.14615	2.14332	.55352
	16	1.76127	1.14787	2.26176	.58107
	17	1.80687	1.15039	2.38915	.60785
	18	1.85483	1.15373	2.52664	.63391
	19	1.90542	1.15791	2.67556	.65929
	20	1.95896	1.16294	2.83751	.68404
	21	2.01580	1.16885	3.01438	.70819
	22	2.07639	1.17567	3.20848	.73178
	23	2.14123	1.18345	3.42257	.75483
	24	2.21094	1.19222	3.66007	.77740
	25	2.28625	1.20204	3.92521	.79949
	26	2.36806	1.21297	4.22330	.82114
	27	2.45748	1.22508	4.56111	.84238
	28	2.55591	1.23843	4.94742	.86322
	29	2.66511	1.25313	5.39374	.88370
	30	2.78737	1.26929	5.91560	.90383
	31	2.92572	1.28703	6.53435	.92364
	32	3.08425	1.30648	7.28025	.94314
	33	3.26870	1.32782	8.19757	.96236
	34	3.48734	1.35125	9.35393	.98131
	35	3.75267	1.37698	10.85776	1.00000
	36	4.08469	1.40531	12.89486	1.01846
	37	4.51787	1.43656	15.81213	1.03670
	38	5.11821	1.47111	20.34079	1.05473
	39	6.03358	1.50947	28.33208	1.07257
	40	7.69872	1.55221	46.23275	1.09023
	41	12.52648	1.60009	122.67166	1.10773
56	0	1.20621	1.20621	1.00000	0
	1	1.23369	1.19378	1.05375	.05045
	2	1.26164	1.18252	1.10969	.09845
	3	1.29013	1.17238	1.16799	.14419
	4	1.31923	1.16331	1.22887	.18787
	5	1.34896	1.15521	1.29250	.22963
	6	1.37943	1.14807	1.35916	.26964
	7	1.41067	1.14184	1.42906	.30801
	8	1.44280	1.13650	1.50253	.34487
	9	1.47583	1.13198	1.57987	.38033
	10	1.50992	1.12828	1.66148	.41449
	11	1.54513	1.12540	1.74774	.44743
	12	1.58159	1.12331	1.83915	.47924
	13	1.61925	1.12200	1.93582	.50988
	14	1.65874	1.12144	2.03961	.53978
	15	1.69971	1.12167	2.14992	.56862
	16	1.74252	1.12268	2.26807	.59661
	17	1.78734	1.12446	2.39492	.62379
	18	1.83439	1.12701	2.53157	.65021
	19	1.88395	1.13036	2.67932	.67592
	20	1.93629	1.13453	2.83966	.70097
	21	1.99176	1.13954	3.01438	.72539
	22	2.05077	1.14540	3.20565	.74921
	23	2.11377	1.15216	3.41605	.77249
	24	2.18134	1.15986	3.64877	.79524
56	25	2.25415	1.16852	3.90771	0.81750
	26	2.33300	1.17822	4.19775	.83930
	27	2.41891	1.18899	4.52508	.86066
	28	2.51311	1.20092	4.89763	.88161
	29	2.61718	1.21408	5.32572	.90218
	30	2.73312	1.22856	5.82313	.92239
	31	2.86357	1.24447	6.40854	.94225
	32	3.01204	1.26192	7.10806	.96180
	33	3.18337	1.28106	7.95920	.98104
	34	3.38442	1.30205	9.01802	1.00000
	35	3.62531	1.32508	10.37199	1.01869
	36	3.92173	1.35038	12.16581	1.03714
	37	4.29964	1.37822	14.65711	1.05535
	38	4.80594	1.40893	18.35382	1.07335
	39	5.53675	1.44289	24.41461	1.09114
	40	6.73301	1.48057	36.18410	1.10874
	41	9.28385	1.52256	68.94509	1.12617
57	0	1.19236	1.19236	1.00000	0
	1	1.21991	1.17918	1.05453	.05235
	2	1.24792	1.16722	1.11126	.10206
	3	1.27644	1.15640	1.17033	.14935
	4	1.30553	1.14665	1.23196	.19442
	5	1.33524	1.13792	1.29634	.23745
	6	1.36563	1.13015	1.36371	.27860
	7	1.39678	1.12330	1.43431	.31802
	8	1.42875	1.11733	1.50845	.35582
	9	1.46163	1.11221	1.58643	.39214
	10	1.49550	1.10791	1.66862	.42708
	11	1.53046	1.10441	1.75543	.46073
	12	1.56661	1.10169	1.84730	.49319
	13	1.60407	1.09973	1.94475	.52454
	14	1.64296	1.09854	2.04839	.55484
	15	1.68344	1.09810	2.15888	.58418
	16	1.72566	1.09841	2.27699	.61260
	17	1.76982	1.09947	2.40364	.64018
	18	1.81611	1.10128	2.53987	.66696
	19	1.86478	1.10387	2.68688	.69300
	20	1.91611	1.10723	2.84613	.71833
	21	1.97041	1.11138	3.01932	.74301
	22	2.02806	1.11636	3.20848	.76707
	23	2.08950	1.12218	3.41605	.79054
	24	2.15523	1.12887	3.64502	.81347
	25	2.22588	1.13647	3.89903	.83589
	26	2.30220	1.14503	4.18260	.85782
	27	2.38509	1.15459	4.50144	.87930
	28	2.47569	1.16522	4.86278	.90035
	29	2.57538	1.17697	5.27601	.92100
	30	2.68597	1.18993	5.75347	.94126
	31	2.80977	1.20419	6.31177	.96117
	32	2.94984	1.21984	6.97378	.98074
	33	3.11033	1.23700	7.77189	1.00000
	34	3.29703	1.25582	8.75357	1.01896
	35	3.51833	1.27646	9.99121	1.03764
	36	3.78688	1.29910	11.60109	1.05606
	37	4.12294	1.32397	13.78232	1.07423
	38	4.56142	1.35132	16.90714	1.09218
	39	5.16924	1.38149	21.76052	1.10991
	40	6.09646	1.41485	30.33227	1.12744
	41	7.78514	1.45186	49.56835	1.14478
	42	12.70348	1.49310	132.25979	1.16195
58	0	1.17918	1.17918	1.00000	0
	1	1.20686	1.16522	1.05542	.05436
	2	1.23498	1.15255	1.11302	.10586
	3	1.26357	1.14102	1.17297	.15476
	4	1.29271	1.13061	1.23547	.20130
	5	1.32244	1.12122	1.30071	.24564
	6	1.35284	1.11285	1.36892	.28796
	7	1.38394	1.10538	1.44036	.32846
	8	1.41585	1.09881	1.51533	.36724
	9	1.44863	1.09309	1.59409	.40443
	10	1.48236	1.08819	1.67705	.44017
	11	1.51713	1.08408	1.76457	.47454
	12	1.55305	1.08076	1.85710	.50765
	13	1.59024	1.07821	1.95517	.53958
	14	1.62880	1.07640	2.05932	.57042
	15	1.66888	1.07531	2.17022	.60023
	16	1.71064	1.07496	2.28864	.62909

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
58	17	1.75425	1.07535	2.41543	0.65706
	18	1.79992	1.07647	2.55161	.68419
	19	1.84786	1.07832	2.69835	.71054
	20	1.89834	1.08093	2.85702	.73616
	21	1.95166	1.08429	3.02926	.76108
	22	2.00817	1.08843	3.21701	.78536
	23	2.06827	1.09337	3.42257	.80903
	24	2.13245	1.09914	3.64877	.83213
	25	2.20127	1.10576	3.89903	.85469
	26	2.27543	1.11327	4.17758	.87674
	27	2.35576	1.12172	4.48973	.89832
	28	2.44329	1.13115	4.84216	.91945
	29	2.53928	1.14162	5.24346	.94016
	30	2.64534	1.15319	5.70487	.96047
	31	2.76355	1.16595	6.24133	.98041
	32	2.89660	1.17998	6.87320	1.00000
	33	3.04811	1.19537	7.62890	1.01926
	34	3.22305	1.21225	8.54944	1.03820
	35	3.42852	1.23075	9.69613	1.05686
	36	3.67496	1.25103	11.16500	1.07523
	37	3.97868	1.27328	13.11538	1.09336
	38	4.36671	1.29771	15.83248	1.11124
	39	4.88820	1.32458	19.88200	1.12889
	40	5.64473	1.35421	26.56793	1.14634
	41	6.89470	1.38696	39.71914	1.16358
	42	9.62343	1.42330	77.53810	1.18065
59	0	1.16663	1.16663	1.00000	0
	1	1.19450	1.15189	1.05639	.05646
	2	1.22277	1.13845	1.11497	.10985
	3	1.25150	1.12623	1.17591	.16045
	4	1.28075	1.11515	1.23939	.20849
	5	1.31056	1.10513	1.30562	.25420
	6	1.34101	1.09611	1.37482	.29776
	7	1.37215	1.08804	1.44725	.33935
	8	1.40405	1.08087	1.52317	.37912
	9	1.43680	1.07457	1.60290	.41722
	10	1.47046	1.06909	1.68679	.45376
	11	1.50513	1.06440	1.77523	.48886
	12	1.54091	1.06050	1.86864	.52263
	13	1.57790	1.05735	1.96754	.55515
	14	1.61623	1.05493	2.07248	.58652
	15	1.65602	1.05324	2.18409	.61682
	16	1.69743	1.05228	2.30313	.64611
	17	1.74062	1.05202	2.43042	.67446
	18	1.78579	1.05248	2.56696	.70194
	19	1.83315	1.05365	2.71386	.72859
	20	1.88294	1.05554	2.87247	.75447
	21	1.93545	1.05816	3.04435	.77964
	22	1.99101	1.06152	3.23135	.80412
	23	2.05001	1.06564	3.43570	.82797
	24	2.11288	1.07055	3.66007	.85122
	25	2.18018	1.07625	3.90771	.87392
	26	2.25252	1.08280	4.18260	.89608
	27	2.33070	1.09022	4.48973	.91774
	28	2.41564	1.09855	4.83533	.93894
	29	2.50852	1.10117	5.22736	.95970
	30	2.61079	1.11816	5.67616	.98005
	31	2.72432	1.12274	6.19535	1.00000
	32	2.85152	1.14210	6.80332	1.01959
	33	2.99559	1.15590	7.52541	1.03883
	34	3.16089	1.16397	8.39771	1.05775
	35	3.35349	1.18762	9.47325	1.07636
	36	3.58227	1.20580	10.83337	1.09468
	37	3.86065	1.21834	12.60945	1.11274
	38	4.21032	1.24758	15.02857	1.13054
	39	4.66898	1.27157	18.51961	1.14810
	40	5.30993	1.29796	24.00218	1.16545
	41	6.30127	1.32704	33.86900	1.18258
	42	8.15969	1.35920	56.90567	1.19953
60	0	1.15470	1.15470	1.00000	0
	1	1.18281	1.13913	1.05748	.05869
	2	1.21128	1.12492	1.11715	.11407
	3	1.24021	1.11200	1.17919	.16643
	4	1.26963	1.10024	1.24379	.21606
	5	1.29959	1.08956	1.31115	.26318
	6	1.33016	1.07991	1.38149	.30802
	7	1.36139	1.07123	1.45505	.35075
	8	1.39336	1.06349	1.53211	.39149
	9	1.42614	1.05661	1.61296	.43053
60	10	1.45981	1.05056	1.69801	0.46792
	11	1.49446	1.04530	1.78756	.50375
	12	1.53015	1.04083	1.88204	.53817
	13	1.56705	1.03711	1.98204	.57130
	14	1.60524	1.03411	2.08804	.60321
	15	1.64485	1.03183	2.20066	.63397
	16	1.68601	1.03028	2.32064	.66369
	17	1.72890	1.02941	2.44879	.69242
	18	1.77370	1.02924	2.58609	.72023
	19	1.82061	1.02976	2.73362	.74718
	20	1.86986	1.03098	2.89268	.77332
	21	1.92174	1.03290	3.06478	.79871
	22	1.97655	1.03553	3.25173	.82339
	23	2.03465	1.03889	3.45565	.84740
	24	2.09647	1.04299	3.67910	.87080
	25	2.16251	1.04785	3.92521	.89360
	26	2.23336	1.05350	4.19775	.91586
	27	2.30976	1.05996	4.50144	.93760
	28	2.39257	1.06728	4.84216	.95885
	29	2.48286	1.07550	5.22736	.97964
	30	2.58199	1.08465	5.66667	1.00000
	31	2.69164	1.09480	6.17265	1.01995
	32	2.81401	1.10602	6.76214	1.03953
	33	2.95196	1.11836	7.45813	1.05874
	34	3.10935	1.13192	8.29290	1.07761
	35	3.29153	1.14680	9.31323	1.09617
	36	3.50613	1.16310	10.58965	1.11442
	37	3.76452	1.18095	12.23349	1.13239
	38	4.08459	1.20052	14.43171	1.15010
	39	4.49641	1.22197	17.52384	1.16756
	40	5.05564	1.24552	22.19785	1.18479
	41	5.88053	1.27142	30.09140	1.20180
	42	7.28682	1.29997	46.29381	1.21861
	43	10.62250	1.33152	98.56617	1.23523
61	0	1.14335	1.14335	1.00000	0
	1	1.17176	1.12694	1.05868	.06106
	2	1.20052	1.11195	1.11958	.11853
	3	1.22970	1.09828	1.18287	.17276
	4	1.25935	1.08582	1.24872	.22404
	5	1.28951	1.07449	1.31735	.27264
	6	1.32026	1.06422	1.38897	.31878
	7	1.35166	1.05494	1.46383	.36268
	8	1.38376	1.04660	1.54221	.40452
	9	1.41665	1.03914	1.62440	.44447
	10	1.45040	1.03253	1.71076	.48267
	11	1.48510	1.02672	1.80166	.51925
	12	1.52084	1.02170	1.89753	.55435
	13	1.55772	1.01742	1.99885	.58807
	14	1.59585	1.01388	2.10617	.62050
	15	1.63536	1.01104	2.22011	.65174
	16	1.67639	1.00890	2.34137	.68187
	17	1.71909	1.00745	2.47077	.71097
	18	1.76364	1.00668	2.60925	.73910
	19	1.81024	1.00659	2.75788	.76633
	20	1.85911	1.00717	2.91792	.79272
	21	1.91052	1.00843	3.09086	.81832
	22	1.96476	1.01038	3.27844	.84318
	23	2.02217	1.01302	3.48272	.86735
	24	2.08316	1.01636	3.70619	.89087
	25	2.14821	1.02043	3.95183	.91378
	26	2.21788	1.02525	4.22330	.93611
	27	2.29285	1.03083	4.52508	.95790
	28	2.37393	1.03722	4.86278	.97919
	29	2.46213	1.04444	5.24346	1.00000
	30	2.55870	1.05253	5.67616	1.02036
	31	2.66519	1.06154	6.17265	1.04030
	32	2.78362	1.07153	6.74855	1.05984
	33	2.91659	1.08256	7.42498	1.07900
	34	3.06758	1.09469	8.23136	1.09782
	35	3.24135	1.10802	9.20976	1.11630
	36	3.44462	1.12263	10.42262	1.13447
	37	3.68722	1.13863	11.96675	1.15234
	38	3.98431	1.15617	14.00080	1.16994
	39	4.36069	1.17537	16.80389	1.18729
	40	4.86049	1.19643	20.91698	1.20438
	41	5.57221	1.21953	27.54355	1.22125
	42	6.70976	1.24494	40.01234	1.23791
	43	9.00334	1.27294	72.17563	1.25437
62	0	1.13257	1.13257	1.00000	0
	1	1.16134	1.11527	1.06001	.06356
	2	1.19044	1.09945	1.12228	.12326

TABLE I.— VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND
PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
62	3	1.21994	1.08503	1.18693	0.17943
	4	1.24988	1.07187	1.25420	.23246
	5	1.28033	1.05987	1.32425	.28258
	6	1.31132	1.04897	1.39734	.33010
	7	1.34294	1.03907	1.47368	.37521
	8	1.37527	1.03015	1.55357	.41812
	9	1.40834	1.02212	1.63730	.45902
	10	1.44225	1.01497	1.72524	.49808
	11	1.48051	1.01097	1.81770	.53293
	12	1.51292	1.00303	1.91519	.57190
	13	1.54988	.99818	2.01813	.60549
	14	1.58806	.99416	2.12710	.63846
	15	1.62757	.99077	2.24268	.67016
	16	1.66858	.98809	2.36559	.70070
	17	1.71121	.98608	2.49664	.73016
	18	1.75564	.98474	2.63675	.75860
	19	1.80207	.98406	2.78698	.78610
	20	1.85070	.98404	2.94856	.81272
	21	1.90180	.98467	3.12296	.83852
	22	1.95565	.98597	3.31189	.86355
	23	2.01258	.98794	3.51734	.88785
	24	2.07297	.99058	3.74176	.91148
	25	2.13728	.99391	3.98804	.93447
	26	2.20605	.99795	4.25971	.95686
	27	2.27992	1.00272	4.56111	.97869
	28	2.35967	1.00824	4.89763	1.00000
	29	2.44623	1.01454	5.27601	1.02081
	30	2.54078	1.02165	5.70487	1.04115
	31	2.64478	1.02962	6.19535	1.06106
	32	2.76008	1.03849	6.76214	1.08055
	33	2.88908	1.04831	7.42498	1.09965
	34	3.03498	1.05914	8.21107	1.11839
	35	3.20207	1.07107	9.15895	1.13678
	36	3.39638	1.08415	10.32510	1.15484
	37	3.62660	1.09850	11.79568	1.17261
	38	3.90591	1.11421	13.70921	1.19008
	39	4.25535	1.13141	16.30313	1.20729
	40	4.71130	1.15025	20.02154	1.22424
	41	5.34344	1.17090	25.80256	1.24096
	42	6.30846	1.19357	36.02961	1.25745
	43	8.06950	1.21848	59.05900	1.27373
63	0	1.12233	1.12233	1.00000	0
	1	1.15152	1.10410	1.06149	.06625
	2	1.18103	1.08726	1.12523	.12826
	3	1.21092	1.07223	1.19146	.18653
	4	1.24123	1.05835	1.26029	.24135
	5	1.27201	1.04567	1.33195	.29309
	6	1.30334	1.03413	1.40668	.34201
	7	1.33527	1.02363	1.48471	.38837
	8	1.36786	1.01412	1.56632	.43239
	9	1.40120	1.00553	1.65181	.47427
	10	1.43535	.99781	1.74154	.51418
	11	1.47040	.99093	1.83587	.55229
	12	1.50644	.98483	1.93523	.58873
	13	1.54357	.97949	2.04011	.62364
	14	1.58189	.97488	2.15104	.65712
	15	1.62152	.97098	2.26865	.68928
	16	1.66261	.96777	2.39362	.72022
	17	1.70529	.96522	2.52675	.75002
	18	1.74973	.96334	2.66897	.77877
	19	1.79612	.96210	2.82133	.80653
	20	1.84467	.96151	2.98505	.83336
	21	1.89563	.96155	3.16158	.85934
	22	1.94927	.96224	3.35260	.88452
	23	2.00591	.96357	3.56009	.90894
	24	2.06593	.96555	3.78644	.93266
	25	2.12976	.96819	4.03448	.95571
	26	2.19791	.97151	4.30767	.97815
	27	2.27101	.97551	4.61025	1.00000
	28	2.34979	.98023	4.94742	1.02131
	29	2.43515	.98567	5.32572	1.04210
	30	2.52820	.99188	5.75347	1.06240
	31	2.63031	.99889	6.24133	1.08226
	32	2.74323	1.00673	6.80332	1.10168
	33	2.86919	1.01545	7.45813	1.12070
	34	3.01116	1.02510	8.23136	1.13934
	35	3.17311	1.03575	9.15895	1.15762
	36	3.36051	1.04745	10.29303	1.17557
	37	3.58122	1.06030	11.71209	1.19320
	38	3.84695	1.07437	13.54033	1.21053
	39	4.17610	1.08978	15.98624	1.22759
63	40	4.50533	1.10545	18.68088	1.24438
	41	5.17503	1.12513	24.63807	1.26092
	42	6.02443	1.14538	33.44890	1.27723
	43	7.47513	1.16759	51.58764	1.29333
	44	10.93593	1.19201	110.60283	1.30922
64	0	1.11260	1.11260	1.00000	0
	1	1.14230	1.09339	1.06311	.06909
	2	1.17229	1.07586	1.12854	.13362
	3	1.20263	1.05981	1.19646	.19405
	4	1.23329	1.04513	1.26705	.25082
	5	1.26458	1.03183	1.34052	.30420
	6	1.29631	1.01963	1.41710	.35459
	7	1.32862	1.00852	1.49702	.40223
	8	1.36159	.99844	1.58060	.44739
	9	1.39526	.98927	1.66809	.49026
	10	1.42974	.98100	1.75989	.53105
	11	1.46509	.97358	1.85635	.56993
	12	1.50142	.96697	1.95793	.60706
	13	1.53881	.96113	2.06507	.64255
	14	1.57739	.95602	2.17835	.67655
	15	1.61725	.95161	2.29836	.70916
	16	1.65854	.94788	2.42582	.74189
	17	1.70139	.94482	2.56152	.77062
	18	1.74597	.94241	2.70637	.79965
	19	1.79247	.94064	2.86144	.82765
	20	1.84109	.93951	3.02795	.85469
	21	1.89208	.93899	3.20733	.88083
	22	1.94569	.93910	3.40126	.90613
	23	2.00225	.93984	3.61170	.93065
	24	2.06212	.94120	3.84102	.95444
	25	2.12571	.94319	4.09202	.97754
	26	2.19354	.94583	4.36812	1.00000
	27	2.26619	.94912	4.67348	1.02185
	28	2.34437	.95308	5.01322	1.04314
	29	2.42896	.95774	5.39374	1.06389
	30	2.52100	.96311	5.82313	1.08414
	31	2.62181	.96923	6.31177	1.10392
	32	2.73306	.97612	6.87320	1.12326
	33	2.85686	.98383	7.52541	1.14218
	34	2.99599	.99240	8.29290	1.16070
	35	3.15417	1.00188	9.20976	1.17886
	36	3.33650	1.01233	10.32509	1.19667
	37	3.55019	1.02382	11.71209	1.21415
	38	3.80592	1.03642	13.48501	1.23132
	39	4.12018	1.05022	15.83259	1.24821
	40	4.52027	1.06533	19.09064	1.26482
	41	5.05539	1.08187	23.91996	1.28117
	42	5.82618	1.09997	31.82475	1.29728
	43	7.08398	1.11981	47.12911	1.31317
	44	9.74915	1.14157	89.41118	1.32885
65	0	1.10338	1.10338	1.00000	0
	1	1.13366	1.08314	1.06492	.07216
	2	1.16422	1.06468	1.13220	.13934
	3	1.19510	1.04782	1.20202	.20207
	4	1.22634	1.03224	1.27451	.26076
	5	1.25807	1.01833	1.35006	.31596
	6	1.29028	1.00547	1.42871	.36788
	7	1.32305	.99374	1.51079	.41686
	8	1.35646	.98305	1.59657	.46318
	9	1.39057	.97333	1.68638	.50708
	10	1.42547	.96453	1.78054	.54876
	11	1.46123	.95659	1.87947	.58842
	12	1.49794	.94946	1.98358	.62621
	13	1.53571	.94311	2.09337	.66230
	14	1.57463	.93749	2.20939	.69680
	15	1.61483	.93259	2.33225	.72985
	16	1.65643	.92837	2.46267	.76155
	17	1.69959	.92482	2.60146	.79201
	18	1.74445	.92191	2.74953	.82131
	19	1.79121	.91963	2.90795	.84953
	20	1.84006	.91797	3.07796	.87674
	21	1.89125	.91693	3.26098	.90303
	22	1.94503	.91649	3.45870	.92844
	23	2.00172	.91666	3.67309	.95304
	24	2.06166	.91743	3.90652	.97688
	25	2.12529	.91882	4.16179	1.00000
	26	2.19307	.92082	4.44229	1.02246
	27	2.26559	.92345	4.75217	1.04429
	28	2.34356	.92671	5.09652	1.06553
	29	2.42779	.93063	5.48166	1.08622
	30	2.51932	.93523	5.91560	1.10640

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
65	31	2.61942	0.94052	6.40854	1.12608
	32	2.72969	.94655	6.97378	1.14531
	33	2.85217	.95332	7.62890	1.16411
	34	2.98950	.96090	8.39771	1.18250
	35	3.14523	.96931	9.31323	1.20051
	36	3.32418	.97862	10.42262	1.21816
	37	3.53313	.98887	11.79568	1.23547
	38	3.78200	1.00013	13.54033	1.25247
	39	4.08602	1.01248	15.83259	1.26916
	40	4.46996	1.02600	18.98054	1.28558
	41	4.97763	1.04081	23.57679	1.30172
	42	5.69607	1.05701	30.92529	1.31762
	43	6.83227	1.07474	44.56640	1.33329
	44	9.07019	1.09416	78.67052	1.34873
66	0	1.09463	1.09463	1.00000	0
	1	1.12559	1.07331	1.06691	.07545
	2	1.15678	1.05388	1.13626	.14547
	3	1.18829	1.03613	1.20818	.21062
	4	1.21761	1.01850	1.27689	.26680
	5	1.25245	1.00511	1.36067	.32847
	6	1.28523	.99157	1.44166	.38197
	7	1.31856	.97920	1.52616	.43233
	8	1.35250	.96785	1.61445	.47986
	9	1.38715	.95764	1.70686	.52374
	10	1.42256	.94829	1.80374	.56738
	11	1.45577	.94000	1.89681	.60453
	12	1.49604	.93219	2.01255	.64630
	13	1.53428	.92535	2.12537	.68296
	14	1.57368	.92268	2.24461	.71796
	15	1.61434	.91388	2.37080	.75142
	16	1.65641	.90917	2.50474	.78349
	17	1.70000	.90514	2.64721	.81424
	18	1.74529	.90175	2.79914	.84378
	19	1.79247	.89898	2.96164	.87221
	20	1.84172	.89683	3.13593	.89958
	21	1.89329	.89528	3.32348	.92599
	22	1.94745	.89432	3.52598	.95148
	23	2.00448	.89396	3.74545	.97614
	24	2.06475	.89418	3.98424	1.00000
	25	2.12867	.89499	4.24521	1.02312
	26	2.19671	.89640	4.53177	1.04556
	27	2.26945	.89840	4.84808	1.06734
	28	2.34757	.90102	5.19927	1.08852
	29	2.43190	.90425	5.59167	1.10913
	30	2.52343	.90813	6.03330	1.12920
	31	2.62341	.91266	6.53435	1.14878
	32	2.73341	.91787	7.10806	1.16787
	33	2.85540	.92379	7.77189	1.18653
	34	2.99197	.93046	8.54944	1.20476
	35	3.14654	.93789	9.47325	1.22260
	36	3.32375	.94615	10.58964	1.24008
	37	3.53011	.95527	11.96675	1.25720
	38	3.77508	.96532	13.70921	1.27399
	39	4.07307	.97635	15.98624	1.29048
	40	4.44728	.98845	19.09064	1.30667
	41	4.93820	1.00170	23.57679	1.32260
	42	5.62467	1.01619	30.63690	1.33826
	43	6.68829	1.03204	43.38830	1.35368
	44	8.69172	1.04940	73.38936	1.36888
67	0	1.08636	1.08636	1.00000	0
	1	1.11808	1.06387	1.06913	.07899
	2	1.15002	1.04340	1.14075	.15203
	3	1.18225	1.02474	1.21505	.21979
	4	1.21482	1.00770	1.29222	.28287
	5	1.24780	.99213	1.37250	.34178
	6	1.28120	.97773	1.45602	.39687
	7	1.31523	.96487	1.54335	.44873
	8	1.34982	.95298	1.63449	.49748
	9	1.38509	.94213	1.72985	.54347
	10	1.42113	.93225	1.82982	.58697
	11	1.45801	.92327	1.93479	.62819
	12	1.49583	.91514	2.04521	.66733
	13	1.53468	.90781	2.16160	.70457
	14	1.57467	.90123	2.28454	.74006
	15	1.61593	.89538	2.41466	.77395
	16	1.65858	.89022	2.55271	.80635
	17	1.70276	.88573	2.69953	.83738
	18	1.74864	.88187	2.85608	.86715
	19	1.79640	.87864	3.02345	.89575
	20	1.84625	.87602	3.20294	.92326
	21	1.89841	.87398	3.39602	.94976
	22	1.95315	.87254	3.60444	.97532
67	23	2.01077	0.87166	3.83024	1.00000
	24	2.07163	.87136	4.07583	1.02386
	25	2.13613	.87164	4.34413	1.04696
	26	2.20475	.87248	4.63861	1.06935
	27	2.27807	.87390	4.96352	1.09106
	28	2.35676	.87591	5.32406	1.11215
	29	2.44164	.87851	5.72668	1.13265
	30	2.53371	.88171	6.17951	1.15260
	31	2.63420	.88553	6.69290	1.17203
	32	2.74466	.89000	7.28024	1.19097
	33	2.86705	.89513	7.95920	1.20946
	34	3.00392	.90094	8.75357	1.22751
	35	3.15864	.90748	9.69613	1.24516
	36	3.33578	.91478	10.83337	1.26244
	37	3.66703	.92888	13.12645	1.28827
	38	3.78570	.93181	14.00080	1.29592
	39	4.08173	.94165	16.30312	1.31218
	40	4.45226	.95245	19.42902	1.32814
	41	4.93615	.96429	23.91996	1.34381
	42	5.60821	.97725	30.92528	1.35922
	43	6.63773	.99143	43.38829	1.37439
	44	8.53138	1.00694	71.78450	1.38932
68	0	1.07854	1.07854	1.00000	0
	1	1.11113	1.05481	1.07157	.08281
	2	1.14392	1.03325	1.14574	.15911
	3	1.17698	1.01361	1.22268	.22964
	4	1.21035	.99570	1.30259	.29508
	5	1.24412	.97935	1.38571	.35599
	6	1.27834	.96440	1.47229	.41287
	7	1.31308	.95070	1.56259	.46613
	8	1.34843	.93821	1.65696	.51616
	9	1.38446	.92678	1.75568	.56322
	10	1.42122	.91635	1.85916	.60765
	11	1.45885	.90685	1.96784	.64966
	12	1.49741	.89825	2.08216	.68946
	13	1.53698	.89042	2.20262	.72727
	14	1.57772	.88338	2.32987	.76322
	15	1.61972	.87707	2.46455	.79749
	16	1.66311	.87146	2.60744	.83022
	17	1.70805	.86652	2.75938	.86151
	18	1.75470	.86222	2.92139	.89148
	19	1.80324	.85854	3.09460	.92023
	20	1.85387	.85546	3.28032	.94784
	21	1.90684	.85297	3.48010	.97441
	22	1.96241	.85105	3.69573	1.00000
	23	2.02088	.84970	3.92932	1.02468
	24	2.08261	.84891	4.18338	1.04852
	25	2.14801	.84867	4.46089	1.07156
	26	2.21757	.84899	4.76546	1.09387
	27	2.29186	.84987	5.10146	1.11548
	28	2.37157	.85130	5.47426	1.13645
	29	2.45751	.85330	5.89051	1.15682
	30	2.55070	.85588	6.35861	1.17661
	31	2.65238	.85905	6.88921	1.19588
	32	2.76410	.86282	7.49614	1.21464
	33	2.88785	.86721	8.19757	1.23293
	34	3.02617	.87225	9.01802	1.25079
	35	3.18245	.87796	9.99121	1.26822
	36	3.36130	.88437	11.16501	1.28527
	37	3.56911	.89152	12.60945	1.30195
	38	3.81516	.89944	14.43171	1.31828
	39	4.11348	.90820	16.80390	1.33428
	40	4.48652	.91782	20.02153	1.34998
	41	4.97311	.92839	24.63806	1.36539
	42	5.64778	.93997	31.82475	1.38053
	43	6.67844	.95264	44.56641	1.39542
	44	8.56387	.96650	73.38937	1.41006
69	0	1.07115	1.07115	1.00000	0
	1	1.10473	1.04607	1.07431	.08699
	2	1.13849	1.02334	1.15131	.16677
	3	1.17248	1.00268	1.23120	.24025
	4	1.20678	.98385	1.31418	.30819
	5	1.24146	.96667	1.40050	.37122
	6	1.27658	.95098	1.49041	.42990
	7	1.31221	.93662	1.58421	.48469
	8	1.34837	.92334	1.68204	.53591
	9	1.38533	.91149	1.78478	.58418
	10	1.42298	.90052	1.89230	.62952
	11	1.46147	.89051	2.00520	.67231
	12	1.50091	.88139	2.12398	.71277
	13	1.54138	.87311	2.24918	.75112
	14	1.58301	.86562	2.38143	.78753

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
69	15	1.62591	0.85887	2.52143	0.82217
	16	1.67023	.85282	2.66997	.85518
	17	1.71611	.84745	2.82795	.88670
	18	1.76372	.84272	2.99641	.91684
	19	1.81325	.83861	3.17655	.94571
	20	1.86490	.83510	3.36974	.97340
	21	1.91892	.83217	3.57758	1.00000
	22	1.97558	.82981	3.80196	1.02559
	23	2.03519	.82800	4.04507	1.05024
	24	2.09812	.82674	4.30955	1.07401
	25	2.16478	.82603	4.59851	1.09697
	26	2.23568	.82585	4.91572	1.11917
	27	2.31139	.82621	5.26577	1.14066
	28	2.39261	.82711	5.65428	1.16148
	29	2.48019	.82855	6.08824	1.18168
	30	2.57516	.83054	6.57643	1.20129
	31	2.67879	.83310	7.13007	1.22036
	32	2.79267	.83622	7.76366	1.23892
	33	2.91883	.83993	8.49634	1.25699
	34	3.05990	.84425	9.35393	1.27461
	35	3.21935	.84920	10.37199	1.29181
	36	3.40190	.85480	11.60108	1.30861
	37	3.61416	.86108	13.11538	1.32503
	38	3.86570	.86808	15.02857	1.34109
	39	4.17105	.87583	17.52384	1.35682
	40	4.55352	.88439	20.91698	1.37224
	41	5.05364	.89380	25.80256	1.38736
	42	5.74970	.90413	33.44889	1.40221
	43	6.82003	.91544	47.12910	1.41679
	44	8.80523	.92782	78.67054	1.43112
70	0	1.06418	1.06418	1.00000	0
	1	1.09890	1.03765	1.07737	.09153
	2	1.13406	1.01384	1.15827	.17580
	3	1.16883	.99194	1.24074	.25174
	4	1.20418	.97213	1.32717	.32233
	5	1.23990	.95409	1.41710	.38759
	6	1.27606	.93764	1.51080	.44814
	7	1.31270	.92400	1.60854	.50450
	8	1.34994	.90880	1.71071	.55714
	9	1.38786	.89621	1.81765	.60643
	10	1.42754	.88510	1.93274	.65386
	11	1.46606	.87417	2.04755	.69626
	12	1.50653	.86458	2.17147	.73736
	13	1.54805	.85582	2.30216	.77624
	14	1.59076	.84788	2.44024	.81307
	15	1.63475	.84069	2.58643	.84805
	16	1.68019	.83423	2.74161	.88132
	17	1.72722	.82844	2.90670	.91304
	18	1.77602	.82330	3.08280	.94331
	19	1.82677	.81877	3.27119	.97227
	20	1.87971	.81485	3.47330	1.00000
	21	1.93506	.81150	3.69085	1.02660
	22	1.99312	.80872	3.92581	1.05216
	23	2.05421	.80648	4.18053	1.07674
	24	2.11870	.80478	4.45777	1.10042
	25	2.18704	.80361	4.76088	1.12326
	26	2.25972	.80297	5.09384	1.14531
	27	2.33736	.80284	5.46154	1.16664
	28	2.42069	.80324	5.86997	1.18728
	29	2.51057	.80416	6.32660	1.20728
	30	2.60809	.80561	6.84082	1.22668
	31	2.71456	.80759	7.42463	1.24553
	32	2.83165	.81012	8.09364	1.26384
	33	2.96148	.81320	8.86847	1.28167
	34	3.10680	.81685	9.77698	1.29903
	35	3.27129	.82109	10.85776	1.31596
	36	3.45992	.82594	12.16581	1.33248
	37	3.67970	.83142	13.78232	1.34861
	38	3.94084	.83756	15.83248	1.36439
	39	4.25895	.84441	18.51961	1.37982
	40	4.65930	.85199	22.19785	1.39493
	41	5.18634	.86035	27.54355	1.40974
	42	5.92752	.86954	36.02962	1.42427
	43	7.08784	.87962	51.58763	1.43853
	44	9.32483	.89066	89.41117	1.45254
71	0	1.05762	1.05762	1.00000	0
	1	1.09363	1.02952	1.08079	.09649
	2	1.12974	1.00419	1.16453	.18416
71	3	1.16604	0.98128	1.25145	0.26420
	4	1.20260	.96047	1.34178	.33760
	5	1.23951	.94154	1.43579	.40521
	6	1.27684	.92427	1.53378	.46772
	7	1.31468	.90850	1.63605	.52572
	8	1.35311	.89409	1.74297	.57971
	9	1.39220	.88089	1.85492	.63012
	10	1.43197	.86869	1.97206	.67722
	11	1.47280	.85779	2.09576	.72165
	12	1.51449	.84770	2.22567	.76338
	13	1.55727	.83849	2.36271	.80275
	14	1.60124	.83011	2.50757	.83998
	15	1.64655	.82250	2.66104	.87525
	16	1.69333	.81562	2.82401	.90876
	17	1.74175	.80942	2.99750	.94063
	18	1.79200	.80388	3.18269	.97100
	19	1.84426	.79896	3.38091	1.00000
	20	1.89877	.79464	3.59373	1.02773
	21	1.95579	.79089	3.82297	1.05429
	22	2.01562	.78771	4.07076	1.07977
	23	2.07858	.78506	4.33962	1.10425
	24	2.14507	.78295	4.63254	1.12779
	25	2.21556	.78135	4.95312	1.15047
	26	2.29057	.78027	5.30568	1.17235
	27	2.37075	.77969	5.69551	1.19347
	28	2.45687	.77962	6.12913	1.21390
	29	2.54985	.78005	6.61467	1.23367
	30	2.65083	.78099	7.16241	1.25282
	31	2.76121	.78244	7.78552	1.27141
	32	2.88278	.78441	8.50117	1.28946
	33	3.01781	.78690	9.33218	1.30700
	34	3.16927	.78993	10.30955	1.32408
	35	3.34111	.79352	11.47643	1.34071
	36	3.53878	.79758	12.89486	1.35692
	37	3.76995	.80242	14.65711	1.37274
	38	4.04596	.80778	16.90714	1.38820
	39	4.38429	.81379	19.88200	1.40330
	40	4.81376	.82047	24.00217	1.41808
	41	5.38613	.82787	30.09139	1.43256
	42	6.20663	.83646	40.01235	1.44674
	43	7.53549	.84499	59.05905	1.46066
	44	10.30545	.85482	110.60291	1.47432
72	0	1.05146	1.05146	1.00000	0
	1	1.08893	1.02164	1.08464	.10196
	2	1.12648	.99485	1.17240	.19409
	3	1.16418	.97069	1.26354	.27778
	4	1.20213	.94880	1.35830	.35420
	5	1.24041	.92893	1.45696	.42428
	6	1.27910	.91083	1.55984	.48883
	7	1.31830	.89432	1.66728	.54851
	8	1.35809	.87923	1.77966	.60388
	9	1.39856	.86543	1.89739	.65542
	10	1.43982	.85281	2.02096	.70355
	11	1.48183	.84112	2.15050	.74850
	12	1.52509	.83068	2.28775	.79094
	13	1.56933	.82102	2.43223	.83078
	14	1.61482	.81221	2.58506	.86836
	15	1.66168	.80418	2.74709	.90391
	16	1.71008	.79690	2.91930	.93759
	17	1.76018	.79031	3.10277	.96957
	18	1.81218	.78439	3.29879	1.00000
	19	1.86628	.77909	3.50881	1.02900
	20	1.92273	.77439	3.73452	1.05669
	21	1.98181	.77026	3.97793	1.08316
	22	2.04382	.76670	4.24135	1.10852
	23	2.10912	.76367	4.52755	1.13285
	24	2.17814	.76116	4.83980	1.15622
	25	2.25136	.75916	5.18206	1.17869
	26	2.32936	.75766	5.55910	1.20035
	27	2.41283	.75666	5.97680	1.22123
	28	2.50259	.75615	6.44239	1.24140
	29	2.59964	.75613	6.96494	1.26090
	30	2.70523	.75659	7.55598	1.27977
	31	2.82087	.75754	8.23036	1.29806
	32	2.94853	.75899	9.00756	1.31581
	33	3.09069	.76094	9.91359	1.33304
	34	3.25068	.76339	10.98415	1.34979

TABLE I.– VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND

PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
72	35	3.43290	0.76637	12.26935	1.36609
	36	3.64351	.76988	13.84205	1.38197
	37	3.89128	.77395	15.81213	1.39745
	38	4.18935	.77859	18.35382	1.41255
	39	4.55839	.78383	21.76052	1.42730
	40	5.03335	.78969	26.56793	1.44173
	41	5.67920	.79621	33.86900	1.45584
	42	6.63532	.80342	46.29378	1.46966
	43	8.27973	.81137	72.17562	1.48320
73	0	1.04569	1.04569	1.00000	0
	1	1.08484	1.01397	1.08899	.10802
	2	1.12402	.98560	1.18132	.20502
	3	1.16333	.96009	1.27725	.29267
	4	1.20286	.93705	1.37706	.37229
	5	1.24271	.91618	1.48105	.44499
	6	1.28298	.89721	1.58955	.51166
	7	1.32375	.87993	1.70293	.57307
	8	1.36512	.86416	1.82162	.62984
	9	1.40719	.84974	1.94606	.68252
	10	1.45006	.83908	2.07677	.73156
	11	1.49385	.82448	2.21431	.77735
	12	1.53853	.81330	2.35884	.82009
	13	1.58466	.80333	2.51256	.86049
	14	1.63193	.79409	2.67480	.89838
	15	1.68065	.78566	2.84700	.93414
	16	1.73098	.77799	3.03020	.96796
	17	1.78310	.77102	3.22562	1.00000
	18	1.83722	.76473	3.43466	1.03043
	19	1.89357	.75907	3.65894	1.05937
	20	1.95239	.75401	3.90033	1.08696
	21	2.01400	.74953	4.16104	1.11330
	22	2.07872	.74560	4.44366	1.13849
	23	2.14695	.74220	4.75127	1.16262
	24	2.21914	.73932	5.08756	1.18576
	25	2.29582	.73695	5.45696	1.20799
	26	2.37763	.73507	5.86488	1.22938
	27	2.46532	.73366	6.31798	1.24998
	28	2.55980	.73274	6.82452	1.26984
	29	2.66217	.73229	7.39491	1.28903
	30	2.77382	.73231	8.04246	1.30758
	31	2.89647	.73280	8.78447	1.32554
	32	3.03231	.73376	9.64375	1.34294
	33	3.18421	.73520	10.65120	1.35982
	34	3.35594	.73713	11.84954	1.37621
	35	3.55267	.73954	13.29968	1.39215
	36	3.78166	.74246	15.09156	1.40766
	37	4.05344	.74590	17.36356	1.42276
	38	4.38416	.74988	20.34079	1.43749
	39	4.79990	.75441	24.41461	1.45186
	40	5.34654	.75951	30.33228	1.46589
	41	6.11420	.76523	39.71928	1.47962
	42	7.31380	.77158	56.90569	1.49304
	43	9.61969	.77860	98.56608	1.50619
74	0	1.04030	1.04030	1.00000	0
	1	1.08137	1.00647	1.09394	.11476
	2	1.12243	.97636	1.19148	.21712
	3	1.16358	.94940	1.29290	.30905
	4	1.20494	.92514	1.39851	.39211
	5	1.24661	.90321	1.50862	.46756
	6	1.28868	.88333	1.62362	.53645
	7	1.33127	.86525	1.74390	.59964
	8	1.37448	.84878	1.86994	.65783
	9	1.41841	.83373	2.00221	.71163
	10	1.46318	.81997	2.14129	.76155
	11	1.50891	.80738	2.28780	.80802
	12	1.55573	.79586	2.44246	.85141
	13	1.60358	.78518	2.60544	.89190
	14	1.65317	.77566	2.77956	.93021
	15	1.70411	.76684	2.96390	.96611
	16	1.75676	.75879	3.16033	1.00000
	17	1.81132	.75146	3.37020	1.03204
	18	1.86801	.74481	3.59506	1.06241
	19	1.92708	.73881	3.83675	1.09125
	20	1.98882	.73341	4.09738	1.11868
	21	2.05355	.72858	4.37946	1.14482
	22	2.12164	.72431	4.68594	1.16978
	23	2.19353	.72058	5.02033	1.19365
	24	2.26971	.71735	5.38688	1.21651
	25	2.35078	.71462	5.79072	1.23845
	26	2.43746	.71237	6.23811	1.25951
	27	2.53058	.71060	6.73684	1.27978
74	28	2.63118	0.70929	7.29665	1.29930
	29	2.74053	.70845	7.92987	1.31813
	30	2.86021	.70805	8.65246	1.33631
	31	2.99222	.70811	9.48532	1.35389
	32	3.13913	.70863	10.45639	1.37091
	33	3.30434	.70959	11.60395	1.38740
	34	3.49240	.71102	12.98191	1.40339
	35	3.70963	.71292	14.66843	1.41893
	36	3.96507	.71529	16.78182	1.43403
	37	4.27222	.71815	19.50936	1.44873
	38	4.65240	.72151	23.16702	1.46304
	39	5.14159	.72539	28.33207	1.47699
	40	5.80687	.72980	36.18410	1.49061
	41	6.79229	.73477	49.56836	1.50391
	42	8.49002	.74033	77.53807	1.51692
75	0	1.03528	1.03528	1.00000	0
	1	1.07856	.99910	1.09961	.12232
	2	1.12179	.96707	1.20313	.23060
	3	1.16508	.93853	1.31088	.32718
	4	1.20854	.91294	1.42319	.41392
	5	1.25231	.88990	1.54043	.49229
	6	1.29649	.86906	1.66300	.56348
	7	1.34120	.85016	1.79136	.62848
	8	1.38655	.83296	1.92601	.68810
	9	1.43266	.81727	2.06752	.74301
	10	1.47966	.80294	2.21651	.79377
	11	1.52767	.78984	2.37369	.84087
	12	1.57685	.77785	2.53987	.88472
	13	1.62733	.76686	2.71594	.92566
	14	1.67905	.75668	2.90209	.96384
	15	1.73288	.74760	3.10202	1.00000
	16	1.78834	.73919	3.31456	1.03389
	17	1.84585	.73151	3.54210	1.06586
	18	1.90569	.72453	3.78644	1.09609
	19	1.96812	.71820	4.04968	1.12475
	20	2.03345	.71247	4.33427	1.15195
	21	2.10206	.70733	4.64313	1.17783
	22	2.17437	.70274	4.97971	1.20250
	23	2.25086	.69868	5.34815	1.22605
	24	2.33211	.69513	5.75346	1.24858
	25	2.41880	.69207	6.20177	1.27015
	26	2.51174	.68949	6.70059	1.29084
	27	2.61193	.68737	7.25935	1.31072
	28	2.72057	.68570	7.88996	1.32984
	29	2.83916	.68449	8.60767	1.34826
	30	2.96960	.68371	9.43244	1.36603
	31	3.11431	.68337	10.39077	1.38318
	32	3.27645	.68347	11.51871	1.39977
	33	3.46026	.68400	12.86652	1.41582
	34	3.67152	.68497	14.50661	1.43138
	35	3.91849	.68639	16.54697	1.44648
	36	4.21328	.68825	19.15633	1.46113
	37	4.57470	.69057	22.61361	1.47538
	38	5.03387	.69337	27.41609	1.48925
	39	5.64691	.69664	34.54342	1.50275
	40	6.52889	.70042	46.23278	1.51592
	41	7.96818	.70471	68.94512	1.52877
76	0	1.03061	1.03061	1.00000	0
	1	1.07648	.99179	1.10615	.13086
	2	1.12221	.95764	1.21660	.24571
	3	1.16798	.92737	1.33171	.34738
	4	1.21390	.90036	1.45185	.43806
	5	1.26011	.87613	1.57743	.51950
	6	1.30675	.85428	1.70892	.59309
	7	1.35393	.83451	1.84682	.65993
	8	1.40180	.81657	1.99171	.72096
	9	1.45048	.80023	2.14422	.77694
	10	1.50012	.78532	2.30509	.82850
	11	1.55085	.77170	2.47511	.87616
	12	1.60284	.75924	2.65520	.92039
	13	1.65626	.74783	2.84642	.96156
	14	1.71128	.73738	3.04994	1.00000
	15	1.76783	.72770	3.26602	1.03583
	16	1.82698	.71906	3.49958	1.06980
	17	1.88812	.71106	3.74909	1.10162
	18	1.95183	.70376	4.01779	1.13164
	19	2.01842	.69711	4.30816	1.16002
	20	2.08825	.69109	4.62314	1.18693
	21	2.16174	.68565	4.96621	1.21247
	22	2.23938	.68076	5.34155	1.23678

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
76	23	2.32175	0.67640	5.75420	1.25994
	24	2.40951	.67255	6.21029	1.28205
	25	2.50349	.66919	6.71741	1.30320
	26	2.60464	.66629	7.28497	1.32345
	27	2.71418	.66385	7.92491	1.34288
	28	2.83358	.66186	8.65247	1.36155
	29	2.96469	.66030	9.48750	1.37950
	30	3.10991	.65916	10.45638	1.39680
	31	3.27231	.65846	11.59485	1.41348
	32	3.45603	.65817	12.95259	1.42958
	33	3.66670	.65830	14.60078	1.44516
	34	3.91229	.65885	16.64528	1.46023
	35	4.20448	.65982	19.25024	1.47484
	36	4.56126	.66121	22.68536	1.48901
	37	5.01207	.66304	27.42567	1.50278
	38	5.60948	.66531	34.39544	1.51616
	39	6.45921	.66803	45.65955	1.52918
	40	7.81826	.67122	66.97238	1.54186
	41	10.57522	.67488	122.67154	1.55422
77	0	1.02630	1.02630	1.00000	0
	1	1.07518	.98447	1.11376	.14058
	2	1.12385	.94795	1.23232	.26277
	3	1.17251	.91578	1.35608	.37001
	4	1.22130	.88723	1.48545	.46495
	5	1.27039	.86172	1.62092	.54963
	6	1.31992	.83882	1.76302	.62567
	7	1.37003	.81815	1.91234	.69438
	8	1.42088	.79944	2.06953	.75680
	9	1.47262	.78244	2.23535	.81379
	10	1.52541	.76696	2.41064	.86606
	11	1.57940	.75283	2.59634	.91420
	12	1.63479	.73991	2.79353	.95870
	13	1.69177	.72809	3.00345	1.00000
	14	1.75053	.71726	3.22752	1.03844
	15	1.81133	.70734	3.46736	1.07434
	16	1.87404	.69815	3.72334	1.10777
	17	1.94005	.68995	4.00223	1.13951
	18	2.00860	.68235	4.30203	1.16922
	19	2.08042	.67543	4.62734	1.19725
	20	2.15595	.66912	4.98175	1.22376
	21	2.23569	.66340	5.36960	1.24888
	22	2.32022	.65824	5.79616	1.27274
	23	2.41023	.65361	6.26779	1.29543
	24	2.50656	.64948	6.79240	1.31706
	25	2.61021	.64583	7.37982	1.33770
	26	2.72239	.64265	8.04246	1.35745
	27	2.84464	.63992	8.79627	1.37636
	28	2.97886	.63762	9.66203	1.39451
	29	3.12749	.63575	10.66728	1.41193
	30	3.29372	.63429	11.84954	1.42870
	31	3.48179	.63324	13.26101	1.44485
	32	3.69754	.63260	14.97662	1.46042
	33	3.94918	.63236	17.10800	1.47546
	34	4.24885	.63252	19.82909	1.49001
	35	4.61524	.63308	23.42636	1.50408
	36	5.07917	.63404	28.40796	1.51772
	37	5.69592	.63542	35.76868	1.53096
	38	6.57778	.63720	47.75735	1.54381
	39	8.00217	.63941	70.76019	1.55630
78	0	1.02234	1.02234	1.00000	0
	1	1.07477	.97704	1.12272	.15178
	2	1.12691	.93785	1.25087	.28221
	3	1.17898	.90359	1.38490	.39558
	4	1.23118	.87336	1.52531	.49509
	5	1.28367	.84649	1.67266	.58317
	6	1.33663	.82247	1.82757	66174
	7	1.39024	.80088	1.99075	.73230
	8	1.44466	.78138	2.16297	.79605
	9	1.50008	.76372	2.34513	.85396
	10	1.55668	.74766	2.53824	.90684
	11	1.61464	.73302	2.74344	.95533
	12	1.67419	.71966	2.96203	1.00000
	13	1.73554	.70744	3.19554	1.04130
	14	1.79894	.69626	3.44568	1.07961
	15	1.86467	.68601	3.71447	1.11528
	16	1.93303	.67662	4.00428	1.14859
	17	2.00390	.66792	4.31572	1.17958
	18	2.07910	.66016	4.65845	1.20906
	19	2.15766	.65692	5.02997	1.23662
	20	2.24058	.64641	5.43708	1.26263
	21	2.32850	.64044	5.88545	1.28723
78	22	2.42213	0.63503	6.38199	1.31053
	23	2.52238	.63015	6.93526	1.33267
	24	2.63030	.62577	7.55597	1.35372
	25	2.74721	.62187	8.25775	1.37379
	26	2.87474	.61842	9.05803	1.39295
	27	3.01495	.61542	9.97980	1.41127
	28	3.17048	.61285	11.05366	1.42882
	29	3.34481	.61069	12.32147	1.44565
	30	3.54259	.60893	13.84204	1.46182
	31	3.77027	.60758	15.70056	1.47737
	32	4.03704	.60661	18.02541	1.49236
	33	4.35658	.60603	21.01928	1.50681
	34	4.75039	.60583	25.02251	1.52076
	35	5.25455	.60602	30.65293	1.53426
	36	5.93582	.60659	39.16266	1.54732
	37	6.93576	.60754	53.52950	1.55997
	38	8.63195	.60889	83.00466	1.57225
79	0	1.01872	1.01872	1.00000	0
	1	1.07539	.96940	1.13341	.16480
	2	1.13167	.92718	1.27305	.30458
	3	1.18782	.89057	1.41947	.42472
	4	1.24407	.85852	1.57326	.52913
	5	1.30065	.83019	1.73511	.62078
	6	1.35775	.80499	1.90576	.70190
	7	1.41558	.78244	2.08607	.77426
	8	1.47435	.76214	2.27699	.83925
	9	1.53426	.74381	2.47964	.89796
	10	1.59554	.72718	2.69524	.95130
	11	1.65841	.71206	2.92524	1.00000
	12	1.72313	.69827	3.17127	1.04467
	13	1.78997	.68568	3.43524	1.08580
	14	1.85923	.67415	3.71937	1.12384
	15	1.93125	.66360	4.02626	1.15913
	16	2.00641	.65394	4.35896	1.19198
	17	2.08514	.64508	4.72109	1.22265
	18	2.16731	.63687	5.11390	1.25117
	19	2.25541	.62954	5.55196	1.27835
	20	2.34822	.62653	6.03228	1.30373
	21	2.44720	.61657	6.56585	1.32769
	22	2.55332	.61094	7.16241	1.35034
	23	2.66778	.60584	7.83424	1.37181
	24	2.79206	.60124	8.59705	1.39219
	25	2.92800	.59711	9.47123	1.41158
	26	3.07796	.59343	10.48376	1.43006
	27	3.24500	.59019	11.67110	1.44771
	28	3.43317	.58737	13.08374	1.46458
	29	3.64796	.58496	14.79364	1.48075
	30	3.89713	.58294	16.90716	1.49625
	31	4.19195	.58130	19.58812	1.51114
	32	4.54962	.58004	23.10298	1.52547
	33	4.99802	.57915	27.91590	1.53927
	34	5.58619	.57863	34.91428	1.55258
	35	6.41056	.57848	46.03221	1.56543
	36	7.69747	.57868	66.44284	1.57786
	37	10.17446	.57926	116.20905	1.58989
80	0	1.01543	1.01543	1.00000	0
	1	1.07723	.96137	1.14634	.18015
	2	1.13851	.91567	1.29998	.33061
	3	1.19961	.87645	1.46160	.45824
	4	1.26079	.84239	1.63194	.56792
	5	1.32234	.81250	1.81183	.66326
	6	1.38450	.78607	2.00222	.74693
	7	1.44753	.76251	2.20418	.82099
	8	1.51167	.74141	2.41895	.88706
	9	1.57718	.72241	2.64791	.94639
	10	1.64433	.70523	2.89268	1.00000
	11	1.71341	.68964	3.15512	1.04870
	12	1.78472	.67546	3.43739	1.09316
	13	1.85862	.66252	3.74202	1.13394
	14	1.93548	.65069	4.07199	1.17150
	15	2.01575	.63987	4.43083	1.20623
	16	2.09991	.62996	4.82275	1.23845
	17	2.18853	.62088	5.25280	1.26844
	18	2.28230	.61255	5.72715	1.29645
	19	2.38112	.60483	6.24855	1.32245
	20	2.48860	.59795	6.84081	1.34730
	21	2.60324	.59516	7.50125	1.37048
	22	2.72733	.58575	8.24971	1.39235
	23	2.86264	.58046	9.10556	1.41303
	24	3.01142	.57567	10.09437	1.43263
	25	3.17654	.57135	11.25052	1.45124

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND

PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
80	26	3.36182	0.56747	12.62123	1.46894
	27	3.57242	.56403	14.27360	1.48582
	28	3.81551	.56099	16.30565	1.50193
	29	4.10144	.55835	18.86699	1.51733
	30	4.44585	.55610	22.19784	1.53209
	31	4.87369	.55421	26.70940	1.54624
	32	5.42791	.55269	33.16942	1.55984
	33	6.19057	.55153	43.19544	1.57292
	34	7.34537	.55072	60.88209	1.58552
	35	9.43104	.55025	100.47298	1.59767
81	0	1.01247	1.01247	1.00000	0
	1	1.08059	.95273	1.16228	.19853
	2	1.14803	.90300	1.33333	.36130
	3	1.21520	.86083	1.51400	.49725
	4	1.28248	.82457	1.70525	.61256
	5	1.35020	.79307	1.90817	.71166
	6	1.41868	.76527	2.12398	.79779
	7	1.48824	.74071	2.35410	.87339
	8	1.55918	.71880	2.60016	.94031
	9	1.63184	.69915	2.86404	1.00000
	10	1.70656	.68144	3.14793	1.05361
	11	1.78371	.66542	3.45440	1.10204
	12	1.86370	.65087	3.78644	1.14604
	13	1.94698	.63763	4.14764	1.18621
	14	2.03408	.62554	4.54226	1.22306
	15	2.12558	.61449	4.97544	1.25699
	16	2.22218	.60438	5.45345	1.28837
	17	2.32469	.59511	5.98393	1.31748
	18	2.43409	.58662	6.57644	1.34458
	19	2.55155	.57883	7.24294	1.36988
	20	2.67718	.57161	7.99053	1.39334
	21	2.81680	.56517	8.86354	1.41582
	22	2.96867	.56259	9.86355	1.43677
	23	3.13708	.55376	11.03386	1.45653
	24	3.32593	.54882	12.42298	1.47521
	25	3.54049	.54434	14.09971	1.49292
	26	3.78811	.54030	16.16503	1.50973
	27	4.07944	.53668	18.77364	1.52573
	28	4.43060	.53346	22.17482	1.54098
	29	4.86743	.53063	26.79740	1.55553
	30	5.43471	.52817	33.44887	1.56945
	31	6.21880	.52607	43.84824	1.58278
	32	7.41570	.52433	62.42139	1.59557
	33	9.61661	.52292	105.08534	1.60786
82	0	1.00983	1.00983	1.00000	0
	1	1.08589	.94316	1.18238	.22096
	2	1.16106	.88869	1.37561	.39804
	3	1.23589	.84318	1.58082	.54323
	4	1.31088	.80449	1.79930	.66449
	5	1.38645	.77094	2.03252	.76734
	6	1.46304	.74207	2.28218	.85574
	7	1.54104	.71648	2.55026	.93257
	8	1.62087	.69379	2.83905	1.00000
	9	1.70297	.67352	3.15125	1.05969
	10	1.78780	.65533	3.49004	1.11294
	11	1.87587	.63893	3.85920	1.16075
	12	1.96776	.62407	4.26328	1.20395
	13	2.06412	.61058	4.70774	1.24320
	14	2.16569	.59829	5.19927	1.27904
	15	2.27337	.58706	5.74613	1.31190
	16	2.38822	.57680	6.35862	1.34217
	17	2.51150	.56740	7.04972	1.37016
	18	2.64482	.55879	7.83617	1.39612
	19	2.79013	.55089	8.73972	1.42029
	20	2.94995	.54365	9.78928	1.44286
	21	3.12533	.53694	11.00824	1.46375
	22	3.32734	.53095	12.49953	1.48384
	23	3.55522	.52859	14.29389	1.50252
	24	3.81965	.52035	16.52503	1.52015
	25	4.13307	.51575	19.37661	1.53682
	26	4.51462	.51158	23.15148	1.55261
	27	4.99598	.50783	28.38911	1.56761
	28	5.63407	.50447	36.14927	1.58188
	29	6.54508	.50149	48.84302	1.59548
	30	8.01831	.49887	73.38928	1.60846
83	0	1.00751	1.00751	1.00000	0
	1	1.09383	.93218	1.20849	.24893
	2	1.17898	.87206	1.43090	.44286
	3	1.26372	.82273	1.66883	.59829
	4	1.34874	.78138	1.92411	.72572
	5	1.43464	.74614	2.19890	.83214
	6	1.52198	.71570	2.49570	.92242
	7	1.61134	.68911	2.81748	1.00000
	8	1.70328	.66568	3.16775	1.06743
	9	1.79843	.64487	3.55072	1.12661
	10	1.89748	.62627	3.97144	1.17901
	11	2.00118	.60955	4.43611	1.22574
	12	2.11041	.59447	4.95229	1.26770
	13	2.22621	.58080	5.52947	1.30562
	14	2.34981	.56838	6.17952	1.34007
	15	2.48270	.55705	6.91764	1.37152
	16	2.62677	.54671	7.76366	1.40036
	17	2.78434	.53725	8.74365	1.42693
	18	2.95847	.52858	9.89298	1.45149
	19	3.15317	.52064	11.26064	1.47428
	20	3.37388	.51336	12.91636	1.49550
	21	3.62824	.50668	14.96338	1.51531
	22	3.92270	.50048	17.51892	1.53360
	23	4.28813	.49496	20.96744	1.55127
	24	4.73801	.49281	25.63451	1.56767
	25	5.32518	.48517	32.42573	1.58314
	26	6.14449	.48093	43.22632	1.59777
	27	7.41885	.47703	63.09215	1.61163
	28	9.86743	.47342	111.74018	1.62480
84	0	1.00551	1.00551	1.00000	0
	1	1.10555	.91901	1.24370	.28484
	2	1.20403	.85207	1.50615	.49878
	3	1.30210	.79835	1.78977	.66545
	4	1.40075	.75410	2.09743	.79902
	5	1.50083	.71689	2.43252	.90853
	6	1.60319	.68510	2.79915	1.00000
	7	1.70865	.65758	3.20220	1.07758
	8	1.81813	.63350	3.64771	1.14426
	9	1.93258	.61225	4.14307	1.20221
	10	2.05312	.59336	4.69748	1.25307
	11	2.18107	.57646	5.32259	1.29810
	12	2.31797	.56125	6.03330	1.33826
	13	2.46574	.54752	6.84903	1.37433
	14	2.62681	.53507	7.79553	1.40692
	15	2.80428	.52375	8.90771	1.43652
	16	3.00225	.51342	10.23417	1.46355
	17	3.22630	.50399	11.84448	1.48834
	18	3.48427	.49535	13.84205	1.51117
	19	3.78761	.48744	16.38741	1.53228
	20	4.15390	.48019	19.74410	1.55187
	21	4.61191	.47354	24.37688	1.57010
	22	5.21284	.46744	31.18958	1.58712
	23	6.04172	.46177	41.95408	1.60280
	24	7.40162	.45673	63.04960	1.61803
	25	10.10199	.45480	117.59103	1.63212
85	0	1.00382	1.00382	1.00000	0
	1	1.12309	.90238	1.29371	.33266
	2	1.24028	.82702	1.61438	.57056
	3	1.35724	.76828	1.96611	.74924
	4	1.47548	.72091	2.35391	.88844
	5	1.59637	.68174	2.78387	1.00000
	6	1.72126	.64870	3.26362	1.09147
	7	1.85157	.62041	3.80263	1.16786
	8	1.98885	.59586	4.41305	1.23265
	9	2.13493	.57436	5.11052	1.28834
	10	2.29200	.55535	5.91560	1.33674
	11	2.46281	.53843	6.85590	1.37922
	12	2.65087	.52328	7.96937	1.41683
	13	2.86089	.50964	9.30959	1.45037
	14	3.09929	.49731	10.95474	1.48050
	15	3.37530	.48612	13.02379	1.50771
	16	3.70268	.47594	15.70664	1.53244
	17	4.10319	.46666	19.32635	1.55501
	18	4.61399	.45817	24.48172	1.57572
	19	5.30513	.45040	32.41900	1.59479

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND

PRESSURE COEFFICIENT ACROSS SHOCK WAVES – Concluded

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
85	20	6.33047	0.44327	46.23224	1.61242
	21	8.12762	.43674	76.31580	1.62878
86	0	1.00244	1.00244	1.00000	0
	1	1.15055	.87994	1.37020	.39951
	2	1.29591	.79401	1.78307	.66612
	3	1.44179	.72957	2.24675	.85680
	4	1.59085	.67901	2.77155	1.00000
	5	1.74555	.63805	3.37082	1.11156
	6	1.90850	.60405	4.06208	1.20098
	7	2.08259	.57529	4.86877	1.27428
	8	2.27139	.55060	5.82313	1.33551
	9	2.47941	.52914	6.97050	1.38744
	10	2.71274	.51031	8.37701	1.43208
	11	2.97992	.49365	10.14282	1.47087
	12	3.29358	.47880	12.42734	1.50491
	13	3.67355	.46548	15.50082	1.53505
	14	4.15329	.45349	19.86017	1.56194
	15	4.79538	.44264	26.53113	1.58608
	16	5.73559	.43279	38.02639	1.60789
	17	7.35053	.42382	62.56201	1.62771
	18	11.43133	.41564	151.54614	1.64580
87	0	1.00137	1.00137	1.00000	0
	1	1.19742	.84687	1.50153	.49969
	2	1.39022	.74753	2.08199	.79976
	3	1.58658	.67690	2.76207	1.00000
	4	1.79219	.62346	3.57035	1.14321
87	5	2.01291	0.58128	4.54750	1.25076
	6	2.25574	.54695	5.75347	1.33456
	7	2.52995	.51836	7.28029	1.40171
	8	2.84902	.49410	9.27715	1.45677
	9	3.23409	.47324	12.00248	1.50275
	10	3.72148	.45507	15.94670	1.54176
	11	4.38141	.43910	22.16816	1.57528
	12	5.37519	.42495	33.44909	1.60442
	13	7.20410	.41232	60.21636	1.62999
	14	13.26155	.40099	204.45147	1.65262
88	0	1.00061	1.00061	1.00000	0
	1	1.29222	.79143	1.77909	.66653
	2	1.58355	.67540	2.75534	1.00000
	3	1.89445	.59921	4.01532	1.20025
	4	2.24475	.54437	5.70487	1.33388
	5	2.66202	.50254	8.09068	1.42944
	6	3.19358	.46933	11.71764	1.50122
	7	3.93752	.44219	17.89940	1.55714
	8	5.15650	.41950	30.81660	1.60196
	9	8.01593	.40020	74.70644	1.63870
89	0	1.00015	1.00015	1.00000	0
	1	1.58174	.67450	2.75133	1.00000
	2	2.23822	.54284	5.67614	1.33347
	3	3.17002	.46702	11.55363	1.50031
	4	5.03780	.41629	29.43369	1.60049

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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

TECHNICAL NOTE No. 1143

CHARTS FOR DETERMINING THE CHARACTERISTICS OF SHARP-NOSE AIRFOILS IN TWO-DIMENSIONAL FLOW AT SUPERSONIC SPEEDS

By H. Reese Ivey, George W. Stickle,
and Alberta Schuettler

SUMMARY

Solutions of the Hugoniot shock equations and Meyer expansion equations are plotted in such a manner as to permit the pressure distribution, the local Mach number, and the angles of shock waves on arbitrary sharp-nose airfoils at supersonic speeds to be obtained directly.

INTRODUCTION

Ackeret, in reference 1, gives a method for calculating the pressure distribution over thin, sharp, two-dimensional airfoils at supersonic speeds. This method, based on the theory of small disturbances, is only a first approximation and therefore is most accurate for thin airfoils.

The exact relationship for the pressure rise through a normal shock wave, as given by Hugoniot, is discussed in reference 2. According to reference 3, the corresponding relations which apply directly to the pressures on a straight surface of an airfoil immediately behind an oblique shock were obtained by Meyer as early as 1908. A discussion of Meyer's equations for the expansion of supersonic flow around an infinite corner is also given in reference 3. Frequently, interference exists between shock and expansion waves caused by the intersection of two or more of these waves. When this intersection is close to the airfoil, as, for instance, when the airfoil has considerable curvature, the calculations yielded by the aforementioned equations are not exact.

It has been shown by Ferri (reference 4) that the equations for an oblique shock combined with the expansion equations give a close approximation to experimental results as reviewed in the section "Presentation of Figures" in this report. The use of the equations, however, involves long and difficult computations. The purpose of this paper is to give graphic solutions of these equations in a form suitable for rapid calculation. Because the size of the graphs limits their accuracy, tables are given from which computational graphs of much greater accuracy may be plotted. The relations given herein apply directly to a two-dimensional, or cylindrical, flow in which the transverse velocity is supersonic. As pointed out by Busemann (reference 5) they may be adapted to the case of oblique motion of the cylindrical airfoil by the addition of an arbitrary axial velocity. Thus, as in reference 5, the relations may be applied to the case of a swept-back airfoil lying ahead of the Mach lines, in which case the velocities and Mach numbers used in the calculation are those corresponding to the transverse component of the flight velocity. In case the airfoil is swept behind the Mach lines the flow will be of a different type as discussed in reference 6.

SYMBOLS

M	Mach number
p	static pressure
q	dynamic pressure
β	change in direction of flow (see fig. 1)
γ	ratio of specific heat at constant pressure to specific heat at constant volume = 1.4 for air
θ	angle of shock wave relative to direction of flow before shock

ν angle around which the flow would have to expand from $M = 1$ to the given local Mach number

ρ density of gas

Subscripts:

a for conditions after a disturbance

b for conditions before a disturbance

n for local condition under consideration

o free stream

PRESENTATION OF FIGURES

A supersonic two-dimensional air flow around an airfoil may change its direction either by deflection or by expansion around a corner. In case the change in air-flow direction occurs by deflection, a shock wave is set up, and in case the change is by expansion, an expansion wave is set up. In either case, the change of state of the gas can be presented as a function of the local Mach number before the disturbance and the change in direction of the gas.

The equations from which the charts presented herein are derived are given in the appendix. Values of local Mach number, pressure ratio, and pressure coefficient across shock waves are given in table I. The local Mach numbers before and after expansions are presented in table II and the static relations across expansion waves, in table III. Table IV gives the pressure ratios based on free-stream dynamic pressure for various Mach numbers.

Before the method of determining pressure distribution, lift, drag, and moments may be discussed, a method of measuring the angles that cause expansions and shocks must be selected. Figure 1 shows the method used in the present paper for measuring angles causing expansions; figure 2 shows that for measuring angles causing shocks. The angle causing the disturbance is designated β in both cases; β is considered negative if the disturbance set up is an expansion wave and positive if it is a shock wave.

Figure 3 shows the manner in which the flow changes when the angles are made too large for the given speeds. If the angle causing the shock is too great, the shock wave separates from the airfoil surface. In figure 4 are given the maximum angles that may exist before the shock wave separates, calculated as the boundary condition between the region giving two solutions and the region for which no solution exists. If the trailing portion of the airfoil is too blunt, the flow may separate from the airfoil and leave a turbulent wake. Figure 3(b) shows that the expansion of the flow outside the wake is actually less than it would have been had it followed the surface. The pressure on the back of the airfoil does not decrease so much as it would if the flow failed to separate. The drags calculated if no separation is assumed will therefore be higher than those actually experienced.

The local Mach number after a disturbance (shock or expansion) is shown in figure 5 to be a function of the local Mach number before the disturbance and the angle causing the disturbance. For example, if a flow at a Mach number of 4.0 impinges on a surface set at 5° to that flow, a shock wave is set up behind which the local Mach number is 3.64, while the flow behind the shock wave is parallel to the surface. On the other hand, the same flow expanding around a 5° corner produces a local Mach number equal to 4.4 on the surface behind the expansion.

Figure 6 gives the ratio of static pressures across shock and expansion waves. For example, assume that a flow at a local Mach number of 4.0 is shocked by a surface slope change of $\beta = 5^\circ$. From figure 6 the pressure ratio across the shock is 1.61, which means that the pressure is much higher on the surface behind the shock than on the surface before it. If the flow at $M = 4.0$ had expanded 5°, then the pressure would have dropped to 0.588. From this example it is seen that the 5° shock increased the pressure by 61 percent, whereas the 5° expansion decreased the pressure only 41 percent. Ackeret's method in reference 1 predicts equal changes in pressure for both the shock and the expansion, since it is based on small disturbances. Present results indicate, therefore, that angles as large as 5° require a more accurate approximation than that given by Ackeret.

The use of figures 5 and 6 can be demonstrated by solving for the local Mach numbers and pressures on the simple airfoil shown in figure 7. The coordinates of figures 5 and 6 are based on conditions before the disturbance and conditions after the disturbance. In figure 7 the conditions after one disturbance are noted to be the conditions before another disturbance. The numerical subscripts found in the symbols of figure 7 are to be associated, therefore, for use in the charts of figures 5 and 6, with the subscripts a and b, according to their relative positions with respect to the disturbance. The airfoil of figure 7 is a symmetrical, double-wedge airfoil having a 2° included angle at the leading and trailing edges. For use in this example the airfoil is at a positive angle of attack of 3° and is moving at a free-stream Mach number of 4.0. The pertinent angles as well as the conditions to be determined are shown on figure 7.

Enter figure 5 at $M_o = 4.0$ and $\beta_1 = -2^\circ$, and read off $M_1 = 4.16$. This Mach number is used to obtain $M_2 = 4.33$. Values for the lower surface of the airfoil are obtained in a similar manner. At coordinates of $M_o = 4.0$ and $\beta_3 = 4^\circ$, $M_3 = 3.70$; and, similarly, when the flow at M_3 is expanded 2°, M_4 is found to be 3.84. A shock wave and an expansion wave are shown at the trailing edge; however, since these disturbances do not affect the pressures on the airfoil, they will be neglected, and M_1, M_2, M_3, and M_4 are the only Mach numbers which are discussed.

The pressure ratios across the shock and expansion waves can be determined from figure 6. Enter figure 6 at $M_o = 4.0$ and an expansion angle of 2° and read $\frac{p_1}{p_o} = 0.817$. At coordinates of $M_1 = 4.16$ and $\beta_2 = -2^\circ$, $\frac{p_2}{p_1}$ is found to be 0.809. Then

$$\frac{p_2}{p_o} = \frac{p_1}{p_o}\frac{p_2}{p_1} = 0.817 \times 0.809 = 0.661$$

For the lower surface of the airfoil, p_3/p_0 is found at coordinates $M_0 = 4.0$, $\beta_3 = 4^\circ$ to be $\frac{p_3}{p_0} = 1.47$. At $M_3 = 3.70$, $\beta_4 = -2^\circ$, $\frac{p_4}{p_3} = 0.829$. Then

$$\frac{p_4}{p_0} = \frac{p_4}{p_3} \times \frac{p_3}{p_0} = 1.219$$

The pressure ratios $\frac{p_a}{p_b}$ may be converted to local pressure coefficients $\frac{\Delta p}{q_0}$ by the use of the plot given in figure 8. The results obtained for the local Mach numbers, pressure ratios, and pressure coefficients are illustrated in figure 9.

Once the pressure distribution is determined, the lift, drag, and moment coefficients can be obtained by integrating plots of the types given in figures 10, 11, and 12. The lift coefficient is obtained by integrating the projection of the airfoil pressure distribution on a plane parallel to free-stream direction. For the example airfoil at Mach number 4.0 and angle of attack 3°, the lift coefficient is 0.0540. The drag coefficient is found in the same manner except that the integration is over the projection of the airfoil pressure distribution on a plane perpendicular to free stream. The pressure drag coefficient for the example airfoil is 0.00315. The total section drag coefficient is the sum of the viscous and pressure-drag coefficients; for instance, if the viscous-drag coefficient is 0.0060, then the total drag coefficient is 0.0060 + 0.00315 = 0.00915. The moment coefficient, obtained by integrating the elemental moments about the point desired, becomes 0.001112 when taken about the center for the example airfoil.

In the preceding examples step-by-step calculations were made along the airfoil, in which case the results obtained at any point are dependent on the accuracy of those at the preceding points. The results thus obtained on the rear of the airfoil may be subject to greater inaccuracies than are necessary. A method is consequently given for determining the conditions behind each of a series of expansions independently of the conditions existing at intermediate points. For the example airfoil of figure 7, the free-stream flow was expanded around a 2° corner to obtain the conditions on the front of the upper surface and these conditions were then expanded around the second 2° corner to give the conditions on the rear of the upper surface. These last conditions, however, could have been found directly by referring the rear of the upper surface to the free-stream conditions and expanding through the total angle (4°) at once. Theoretically the results obtained are exactly the same regardless of which method is used, provided no shock waves are present between the end-points of the calculation. This method of adding angles does not apply when these are intermediate shock waves because of loss of total head in the shock wave.

If it is desired to calculate only the pressure distribution, it is not necessary to find M_1, M_2, M_4, or p_2/p_1 for an airfoil similar to the type in the example given.

Figure 13 is taken from reference 4 to compare the experimental pressure distribution on an airfoil with the calculated distribution. Even though the wind-tunnel tests were of a very small model and although the airfoil is not of a type particularly suitable for calculations, the calculated and experimental values seem to compare favorably except for the region of separated flow near the upper trailing edge of the airfoil. The method of the present report is not exact for an airfoil of this type, which has considerable curvature along its entire length. The inaccuracy caused by the curvature, however, seems to be small. The thickness ratio and angle of attack of the example airfoil are somewhat higher than those for which the method is recommended. Reference 4 explains the separated region of flow.

Langley Memorial Aeronautical Laboratory
National Advisory Committee for Aeronautics
Langley Field, Va., April 4, 1946

APPENDIX

METHOD OF ANALYSIS

Shock Waves

Supersonic air flow about an airfoil may be said to consist of expansions and shocks. Reference 2 mentions the fact that a change in entropy occurs through a shock wave. Three conditions are shown, however, to apply to the velocities, pressures, and densities at the two sides of the shock wave, namely:

(a) Continuity of mass

(b) Balance between pressure difference and change of momentum

(c) Conservation of energy

These conditions lead to the three basic equations:

$$\left.\begin{aligned} \frac{\rho_a}{\rho_b} &= \frac{\tan\theta}{\tan(\theta - \beta)} \\ \text{or} \qquad & \\ \frac{\Delta\rho}{\rho_a} &= \frac{\sin\beta}{\sin\theta \times \cos(\theta - \beta)} \end{aligned}\right\} \qquad (1)$$

$$\left.\begin{aligned} \frac{\Delta p}{q_b} &= 2\sin^2\theta\,\frac{\Delta\rho}{\rho_a} \\ &= \frac{2\sin\beta \times \sin\theta}{\cos(\theta - \beta)} \end{aligned}\right\} \qquad (2)$$

$$\frac{\Delta p}{\Delta \rho} = \gamma \frac{p_b + \frac{\Delta p}{2}}{\rho_b + \frac{\Delta \rho}{2}} \tag{3}$$

Then, by use of the relation

$$\frac{\Delta p}{q_b} = \frac{2}{\gamma M_b{}^2}\left(\frac{p_a}{p_b} - 1\right) \tag{4}$$

it follows that

$$\frac{p_a}{p_b} = \frac{\gamma M_b{}^2 \sin \beta \sin \theta}{\cos (\theta - \beta)} + 1 \tag{5}$$

$$\frac{1}{M_b{}^2} = \sin^2\theta - \frac{\gamma + 1}{2} \frac{\sin \beta \sin \theta}{\cos (\theta - \beta)} \tag{6}$$

$$M_a = M_b \frac{\cos \theta}{\cos (\theta - \beta)}\sqrt{\frac{p_b}{p_a} \frac{\rho_a}{\rho_b}} \tag{7}$$

By substitution of arbitrary values of θ and β in equations (1) and (6), the corresponding values of density ratio across the shock and Mach number before the shock are obtained. If the simultaneous values of θ, β, and M_b are used with equations (5) and (7), the pressure ratio across the shock and the Mach number after the shock are obtained.

Figure 14 shows the angle of the shock wave as a function of the Mach number before the shock M_b and the angle defining the change in direction of the flow β.

The pressure ratios and the Mach numbers after the shock have already been discussed for figures 5 and 6. Use of the ratio of pressure after any shock wave to free-stream static pressure, together with free-stream Mach number in equation (4), makes possible the determination of the pressure coefficient behind that shock wave. Figure 8 has shown the graph for converting pressure ratios to pressure coefficients.

Expansion Waves

The flow after the shock wave may be considered adiabatic as long as the flow is expanding. By the use of such flow conditions, the velocities, densities, and pressures may be calculated. Experimentally some trouble is encountered when extremely large angles of expansion are used. The flow may break down and form a turbulent wake of somewhat higher static pressure than might be expected if the flow had continued to expand around the corner.

Reference 3 considers that a flow at a Mach number of 1 expands around some angle υ and reaches a higher Mach number M defined by the relation

$$\upsilon = \sqrt{\frac{\gamma + 1}{\gamma - 1}} \tan^{-1}\left(\sqrt{M^2 - 1}\sqrt{\frac{\gamma - 1}{\gamma + 1}}\right) - \cos^{-1}\frac{1}{M} \tag{8}$$

By expanding around an angle υ_b, the flow reaches a Mach number M_b; and by expanding around some larger angle υ_a, the flow reaches some higher Mach number M_a. A flow at the first Mach number M_b can then reach the higher Mach number M_a by expanding around the small angle,

$$-\beta = \upsilon_a - \upsilon_b \tag{9}$$

Equations (8) and (9) serve as the basis for calculating the expansion lines in figure 5 showing the variation of local Mach number with change in surface slope.

Another equation derived from the work of reference 3 gives the pressure ratio across expansion waves as

$$\frac{p_a}{p_b} = \left[\frac{2 + (\gamma - 1)\ M_b^{\,2}}{2 + (\gamma - 1)\ M_a^{\,2}}\right]^{\frac{\gamma}{\gamma - 1}} \tag{10}$$

From equations (8), (9), and (10), it is possible to calculate the part of figure 6 that gives the pressure ratio across expansion waves as a function of the local Mach number before the expansion and the change in surface slopes.

The figures shown in this report, because of their limited size, may not be accurate enough for routine calculations. It may be desirable to plot the graphs to a larger scale before using them. For this reason the values are listed in tabular form for the main graphs.

Tables I and III should be accurate to all the figures shown, but table II may not be exact in the last figure since the expansion calculations required graphical interpolation between very close computed points.

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See supplement table

TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO,
AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_b}$
8	0	7.18546	7.18546	1.00000	0
	1	7.80125	7.54749	1.20854	.00490
↓	2	8.60430	8.07261	1.50622	.00977
9	0	6.39264	6.39264	1.00000	0
	1	6.87407	6.69357	1.18235	.00551
	2	7.48067	7.06779	1.43092	.01100
↓	3	8.27834	7.54385	1.78981	.01646
10	0	5.75876	5.75876	1.00000	0
	1	6.14639	5.99875	1.16236	.00614
	2	6.62119	6.28846	1.37565	.01224
	3	7.22344	6.64849	1.66896	.01832
↓	4	8.02263	7.10485	2.09762	.02436
11	0	5.24082	5.24082	1.00000	0
	1	5.55967	5.43448	1.14629	.00676
	2	5.94262	5.66634	1.33338	.01349
	3	6.42373	5.95318	1.58610	.02029
	4	7.01599	6.29392	1.92421	.02682
	5	7.83581	6.73948	2.44137	.03354
↓	6	8.98638	7.30617	3.26353	.04004
12	0	9.80977	4.80977	1.00000	0
	1	5.07739	4.96951	1.13344	.00739
	2	5.39281	5.15796	1.29999	.01474
	3	5.77302	5.38268	1.51411	.02204
	4	6.24375	5.65433	1.79936	.02929
	5	6.84911	5.98883	2.19908	.03652
	6	7.66903	6.41123	2.79939	.04371
↓	7	8.87172	6.96292	3.80262	.05087
13	0	4.44543	4.44543	1.00000	0
	1	4.67339	4.57891	1.12271	.00803
	2	4.93834	4.73465	1.27307	.01600
	3	5.24983	4.91619	1.46158	.02393
	4	5.63112	5.13596	1.70535	.03178
	5	6.10349	5.39892	2.03258	.03960
	6	6.71567	5.72228	2.49588	.04738
	7	7.55439	6.12986	3.20247	.05513
↓	8	8.80760	6.66172	4.41302	.06285
14	0	4.13360	4.13360	1.00000	0
	1	4.33044	4.24248	1.11376	.00867
	2	4.55638	4.37683	1.25087	.01726
	3	4.81978	4.52876	1.41949	.02580
	4	5.13240	4.70707	1.63192	.03427
	5	5.51261	4.91882	1.90826	.04270
	6	5.98884	5.17368	2.28225	.05107
	7	6.62228	5.49587	2.81769	.05921
	8	7.47450	5.88074	3.64800	.06771
↓	9	8.79126	6.39434	5.11042	.07598
15	0	3.86369	3.86369	1.00000	0
	1	4.03562	3.95993	1.10614	.00931
	2	4.14555	3.98829	1.23231	.01931
	3	4.45565	4.19791	1.38489	.02770
	4	4.71842	4.34601	1.57329	.03679
	5	5.03145	4.51957	1.81179	.04587
	6	5.41400	4.72539	2.12408	.05479
	7	5.89618	5.04264	2.55029	.06370
	8	6.53211	5.27618	3.16796	.07258
	9	7.42624	5.65781	4.14339	.08143
↓	10	8.82181	6.14628	5.91549	.09023
16	0	3.62792	3.62792	1.00000	0
	1	3.77964	3.71064	1.09962	.00996
	2	3.95037	3.80507	1.21661	.01983
	3	4.14479	3.91330	1.35610	.02961
	4	4.36900	4.03782	1.52531	.03931
↓	5	4.63202	4.18238	1.73515	.04895

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_o}$
16	6	4.94653	4.35137	2.00221	0.05851
	7	5.33290	4.55154	2.35426	.06803
	8	5.82325	4.79190	2.83915	.07748
	9	6.47624	5.08655	3.55104	.08689
	10	7.40814	5.45674	4.69797	.09626
↓	11	8.90088	5.93848	6.85594	.10559
17	0	3.42032	3.42032	1.00000	0
	1	3.55532	3.49188	1.09391	.01061
	2	3.70612	3.57318	1.20313	.02113
	3	3.87615	3.66580	1.33170	.03154
	4	4.07015	3.77171	1.48543	.04186
	5	4.29455	3.89345	1.67261	.05210
	6	4.55860	4.03450	1.90576	.06227
	7	4.87573	4.19924	2.20412	.07236
	8	5.26736	4.39418	2.60026	.08240
	9	5.76803	4.62799	3.15127	.09237
	10	6.44180	4.91440	3.97167	.10230
	11	7.41936	5.27398	5.32300	.11219
↓	12	9.03211	5.73979	7.96900	.12204
18	0	3.23604	3.23604	1.00000	0
	1	3.35720	3.29834	1.08900	.01128
	2	3.49146	3.36878	1.19145	.02244
	3	3.64174	3.44868	1.31087	.03349
	4	3.81150	3.53948	1.45184	.04443
	5	4.00564	3.64318	1.62091	.05528
	6	4.23083	3.76221	1.82753	.06604
	7	4.57062	3.89495	2.16071	.07937
	8	4.81743	4.05749	2.41888	.08734
	9	5.21582	4.25058	2.86418	.09789
	10	5.72912	4.47828	3.49010	.10838
	11	6.42781	4.75694	4.43641	.11882
	12	7.46024	5.10668	6.03381	.12921
↓	13	9.22255	5.56127	9.30925	.13956
19	0	3.07154	3.07154	1.00000	0
	1	3.18101	3.12594	1.08465	.01195
	2	3.30163	3.18741	1.18134	.02377
	3	3.43552	3.25671	1.29288	.03545
	4	3.58559	3.33514	1.42320	.04702
	5	3.75551	3.42421	1.57743	.05849
	6	3.95028	3.52573	1.76303	.06985
	7	4.17683	3.64210	1.99073	.08113
	8	4.44535	3.77664	2.27703	.09232
	9	4.77075	3.93351	2.64786	.03430
	10	5.17739	4.11880	3.14812	.11448
	11	5.70582	4.34078	3.85929	.12547
	12	6.43414	4.61223	4.95273	.13640
	13	7.53249	4.95273	6.84971	.14729
↓	14	9.48326	5.39507	10.95449	.15813
20	0	2.92381	2.92381	1.00000	0
	1	3.02334	2.97148	1.08078	.01263
	2	3.13239	3.02492	1.17239	.02510
	3	3.25271	3.08575	1.27725	.03744
	4	3.38650	3.15392	1.39847	.04964
	5	3.53676	3.23092	1.54042	.06172
	6	3.70716	3.31824	1.70890	.07369
	7	3.90296	3.41765	1.91224	.08555
	8	4.13158	3.53157	2.16293	.09732
	9	4.40349	3.66307	2.47965	.10901
	10	4.73461	3.81626	2.89260	.12061
	11	5.15114	3.99719	3.45455	.13215
	12	5.69739	4.21372	4.26333	.14362
	13	6.46071	4.47840	5.52986	.15503
	14	7.63854	4.81027	7.79624	.16640
↓	15	9.83090	5.24117	13.02305	.17772

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TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO,

AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_o}$	θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_o}$
21	0	2.79041	2.79041	1.00000	0	25	0	2.36619	2.36619	1.00000	0
	1	2.88143	2.83236	1.07736	.01331		1	2.43311	2.39158	1.06692	.016149
	2	2.98066	2.87953	1.16450	.02645		2	2.50490	2.42023	1.14078	.032053
	3	3.08951	2.93252	1.26352	.03944		3	2.58225	2.45239	1.22268	.047707
	4	3.20981	2.99660	1.37704	.05228		4	2.66584	2.48815	1.31421	.063162
	5	3.34375	3.05910	1.50857	.06498		5	2.75692	2.52825	1.41711	.078398
	6	3.47911	3.12563	1.64697	.07636		6	2.85665	2.57296	1.53377	.093442
	7	3.66576	3.22034	1.84678	.09002		7	2.96666	2.62291	1.66728	.10831
	8	3.86318	3.31777	2.06948	.10237		8	3.08899	2.67881	1.82163	.12301
	9	4.09428	3.42921	2.34504	.11463		9	3.22162	2.74136	2.00218	.13755
	10	4.37040	3.55785	2.69520	.12679		10	3.38185	2.81164	2.21653	.15196
	11	4.70837	3.70460	3.15498	.13887		11	3.56060	2.89100	2.47509	.16622
	12	5.13650	3.88429	3.78653	.15088		12	3.76908	2.98103	2.79352	.18036
	13	5.70365	4.09575	4.70770	.16282		13	4.01684	3.08381	3.19547	.19438
	14	6.50821	4.35408	6.17984	.17470		14	4.31849	3.20211	3.71940	.20831
	15	7.78248	4.6778	8.90838	.18653		15	4.69712	3.33960	4.43072	.22214
22	0	2.66944	2.66944	1.00000	0	26	0	2.28118	2.28118	1.00000	0
	1	2.75318	2.70503	1.07435	.014012		1	2.34464	2.30339	1.06582	.01710
	2	2.84397	2.74795	1.15755	.027827		2	2.41071	2.32880	1.13624	.03349
	3	2.94308	2.79453	1.25145	.041472		3	2.48254	2.35720	1.21505	.04985
	4	3.05197	2.84677	1.35832	.054956		4	2.55994	2.38897	1.30255	.06595
	5	3.17242	2.90542	1.48108	.068287		5	2.64389	2.42442	1.40051	.08185
	6	3.30680	2.97131	1.62361	.081470		6	2.73534	2.46403	1.51078	.09752
	7	3.45826	3.04552	1.79138	.094530		7	2.83560	2.50808	1.63601	.11300
	8	3.63087	3.12950	1.99170	.10746		8	2.94639	2.55727	1.77964	.12830
	9	3.83033	3.22498	2.23535	.12029		9	3.06978	2.61226	1.94606	.14342
	10	4.06462	3.33411	2.53821	.13301		10	3.20843	2.64370	2.14123	.15838
	11	4.34571	3.45998	2.92528	.14564		11	3.36613	2.74282	2.37366	.17319
	12	4.69181	3.60650	3.43734	.15817		12	3.54771	2.82071	2.65513	.18786
	13	5.13349	3.77921	4.14788	.17065		13	3.76027	2.90907	3.00338	.20241
	14	5.72501	3.98579	5.19945	.18304		14	4.00005	2.99945	3.44555	.21835
	15	6.57835	4.23809	6.91836	.19538		15	4.32457	3.10529	4.02623	.23116
23	0	2.55931	2.55931	1.00000	0	27	0	2.20269	2.20269	1.00000	0
	1	2.63663	2.59191	1.07155	.014703		1	2.34209	2.30158	1.06314	.01644
	2	2.72021	2.62854	1.15131	.029212		2	2.40696	2.32466	1.13222	.03260
	3	2.81097	2.66964	1.24071	.043519		3	2.48322	2.35717	1.20820	.04823
	4	2.91011	2.71559	1.34175	.057649		4	2.55095	2.37983	1.29226	.06416
	5	3.01917	2.76708	1.45693	.071610		5	2.63139	2.41239	1.38571	.07958
	6	3.14004	2.82478	1.58952	.085414		6	2.71871	2.44871	1.49044	.09479
	7	3.27510	2.88954	1.74384	.099068		7	2.81393	2.48911	1.60857	.10980
	8	3.42766	2.95435	1.92598	.11259		8	2.91852	2.53412	1.74297	.12461
	9	3.60192	3.04481	2.14416	.12628		9	3.03424	2.58426	1.89742	.13925
	10	3.80388	3.13837	2.41057	.13927		10	3.16334	2.64029	2.07680	.15373
	11	4.04200	3.24533	2.74332	.15244		11	3.30871	2.70290	2.28776	.16804
	12	4.32897	3.36862	3.17120	.16551		12	3.47453	2.77291	2.53991	.18222
	13	4.68441	3.51192	3.74184	.17850		13	3.66599	2.85242	2.84643	.19627
	14	5.14181	3.68084	4.54240	.19141		14	3.89094	2.94227	3.22752	.21019
	15	5.76160	3.88284	5.74606	.20424		15	4.16067	3.04466	3.71441	.22400
24	0	2.45857	2.45857	1.00000	0	28	0	2.13006	2.13006	1.00000	0
	1	2.53038	2.48739	1.06915	.015428		1	2.18546	2.14729	1.06148	.01839
	2	2.60761	2.51974	1.14573	.030617		2	2.24436	2.16698	1.12856	.03646
	3	2.69120	2.55602	1.23122	.045607		3	2.30713	2.18917	1.20202	.05422
	4	2.78202	2.59660	1.32717	.060389		4	2.37434	2.21407	1.28293	.07170
	5	2.88137	2.64194	1.43578	.074985		5	2.44661	2.24198	1.37252	.08890
	6	2.99085	2.69267	1.55985	.089410		6	2.52465	2.27308	1.47228	.10585
	7	3.11233	2.74947	1.70294	.10367		7	2.60945	2.30767	1.58425	.12258
	8	3.24831	2.81309	1.86990	.11778		8	2.70205	2.34617	1.71071	.13906
	9	3.40126	2.88381	2.06753	.13183		9	2.89976	2.37065	1.85492	.14525
	10	3.57857	2.96549	2.30507	.14559		10	2.91678	2.43671	2.02095	.17143
	11	3.78354	3.05730	2.59633	.15930		11	3.04296	2.48992	2.21432	.18735
	12	4.02611	3.16209	2.96196	.17291		12	3.18538	2.54937	2.44239	.20308
	13	4.31993	3.28285	3.43525	.18642		13	3.34818	2.61606	2.71591	.21866
	14	4.68616	3.42314	4.07188	.19984		14	3.53684	2.69124	3.04990	.23410
	15	5.16169	3.58857	4.97574	.21317		15	3.75932	2.77640	3.46732	.24941

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TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO,
AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_o}$	θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_o}$
29	0	2.06266	2.06266	1.00000	0.	36	0	1.70130	1.70130	1.00000	0
	1	2.11505	2.07774	1.06001	.01910		1	1.73955	1.70539	1.05304	.025040
	2	2.17054	2.09496	1.12523	.03797		2	1.77947	1.71085	1.10969	.049487
	3	2.22957	2.11455	1.19647	.05646		3	1.82126	1.71772	1.17033	.073358
	4	2.29236	2.13521	1.27431	.07457		4	1.86536	1.72606	1.23585	.096830
	5	2.36005	2.16131	1.36067	.09251		5	1.91119	1.73654	1.30563	.11953
	6	2.43270	2.18895	1.45616	.11011		6	1.95980	1.74734	1.38147	.14189
	7	2.51121	2.21966	1.56258	.12744		7	2.01124	1.76042	1.46381	.16380
	8	2.59664	2.25386	1.68225	.14455		8	2.06585	1.77522	1.55356	.18530
	9	2.69398	2.29151	1.82347	.16209		9	2.12402	1.79185	1.65178	.20639
	10	2.79292	2.33402	1.97234	.17808		10	2.18626	1.81048	1.75992	.22713
	11	2.90717	2.38101	2.15090	.19454		11	2.25305	1.83118	1.87943	.24749
	12	3.03508	2.43337	2.35935	.21081		12	2.32517	1.85418	2.01251	.26754
	13	3.17984	2.49183	2.60602	.22690		13	2.40336	1.87960	2.16155	.28728
	14	3.34576	2.55740	2.90292	.24285		14	2.48870	1.90778	2.32982	.30673
	15	3.53866	2.63123	3.26710	.25864		15	2.58245	1.93889	2.52146	.32591
30	0	2.00000	2.00000	1.00000	0	38	0	1.62427	1.62427	1.00000	0
	1	2.04970	2.01309	1.05869	.01996		1	1.66000	1.62610	1.05191	.02691
	2	2.10220	2.02817	1.2228	.03953		2	1.69720	1.62925	1.10711	.05312
	3	2.15786	2.04536	1.19144	.05873		3	1.73595	1.63363	1.16595	.07867
	4	2.21712	2.06489	1.26706	.07743		4	1.77646	1.63934	1.22888	.10361
	5	2.28038	2.08676	1.35004	.09616		5	1.81891	1.64639	1.29635	.12796
	6	2.34824	2.11124	1.44166	.11442		6	1.86348	1.65484	1.36892	.15177
	7	2.42132	2.13857	1.54331	.13239		7	1.91042	1.66471	1.44727	.17507
	8	2.50046	2.16931	1.65693	.15010		8	1.95999	1.67607	1.53211	.19788
	9	2.58664	2.20269	1.78480	.16757		9	2.01254	1.68903	1.62441	.22023
	10	2.68100	2.24016	1.92978	.18479		10	2.06839	1.70361	1.72524	.24217
	11	2.78510	2.28175	2.09572	.20180		11	2.12800	1.71998	1.83585	.26369
	12	2.90088	2.32799	2.28775	.21861		12	2.19194	1.73827	1.95797	.28484
	13	3.03082	2.37953	2.51256	.23523		13	2.26069	1.75849	2.09337	.30562
	14	3.17820	2.43701	2.77947	.25167		14	2.33512	1.77819	2.24461	.32607
	15	3.34766	2.50149	3.10201	.26795		15	2.41604	1.80577	2.41463	.34621
32	0	1.88707	1.88707	1.00000	0	40	0	1.55572	1.55572	1.00000	0
	1	1.93213	1.89664	1.05639	.02158		1	1.58940	1.55556	1.05106	.02887
	2	1.97956	1.90799	1.11716	.04271		2	1.62431	1.55660	1.10515	.05693
	3	2.02958	1.92112	1.18287	.06342		3	1.66120	1.55877	1.16355	.08467
	4	2.08253	1.93620	1.25420	.08373		4	1.69841	1.56224	1.22384	.11085
	5	2.13875	1.95330	1.33195	.10367		5	1.73791	1.56694	1.28916	.13677
	6	2.19868	1.97256	1.41711	.12326		6	1.77912	1.57276	1.35914	.16209
	7	2.26277	2.00680	1.51078	.14251		7	1.82243	1.57993	1.43431	.18681
	8	2.33163	2.01807	1.61445	.16146		8	1.86797	1.58841	1.51532	.21098
	9	2.40596	2.04478	1.72982	.18011		9	1.91577	1.59826	1.60291	.23462
	10	2.48665	2.07445	1.85915	.19849		10	1.96679	1.60950	1.69799	.25777
	11	2.57474	2.10730	2.00522	.21662		11	2.02072	1.62230	1.80165	.28046
	12	2.67149	2.14373	2.17150	.23450		12	2.07818	1.63666	1.91519	.30272
	13	2.77856	2.18409	2.36269	.25215		13	2.13960	1.65272	2.04007	.32456
	14	2.89812	2.22897	2.58506	.26960		14	2.20564	1.67062	2.17838	.34603
	15	3.03292	2.27884	2.84700	.28684		15	2.27684	1.69040	2.33224	.36713
34	0	1.78829	1.78829	1.00000	0	42	0	1.49448	1.49448	1.00000	0
	1	1.82960	1.79493	1.05453	.023271		1	1.52646	1.49254	1.05047	.03094
	2	1.87291	1.80309	1.11302	.046028		2	1.55953	1.49172	1.10379	.06096
	3	1.91837	1.81285	1.17591	.060285		3	1.59084	1.48920	1.16026	.09046
	4	1.96630	1.82427	1.24382	.090089		4	1.63013	1.49331	1.22140	.11902
	5	2.01688	1.83741	1.31735	.11145		5	1.66642	1.49592	1.28389	.14604
	6	2.07054	1.85237	1.39734	.13240		6	1.70602	1.50047	1.35186	.17270
	7	2.12758	1.86926	1.48470	.15297		7	1.74533	1.50437	1.42453	.19909
	8	2.18849	1.88824	1.58061	.17318		8	1.78759	1.51037	1.50251	.22465
	9	2.25376	1.90935	1.68638	.19304		9	1.83196	1.51758	1.58642	.24962
	10	2.32403	1.93285	1.80374	.21259		10	1.87871	1.52603	1.67703	.27402
	11	2.40006	1.95894	1.93476	.23182		11	1.92809	1.53583	1.77522	.29790
	12	2.48279	1.98784	2.08213	.25078		12	1.98043	1.54697	1.88207	.32128
	13	2.57339	2.01986	2.24923	.26948		13	2.03608	1.55958	1.99882	.34419
	14	2.67317	2.05523	2.44024	.28793		14	2.09550	1.57370	2.12706	.36667
	15	2.78406	2.07055	2.66102	.30614		15	2.15919	1.58941	2.26861	.38873

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TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO, AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Continued

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_o}$	θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_o}$
44	0	1.43955	1.43955	1.00000	0	52	0	1.26902	1.26902	1.00000	0
	1	1.47017	1.43595	1.05016	.03315		1	1.29670	1.25948	1.05144	.04370
	2	1.50175	1.43340	1.10300	.06524		2	1.32498	1.25103	1.10516	.08557
	3	1.53439	1.43194	1.15878	.09634		3	1.35392	1.24364	1.16131	.12571
	4	1.56816	1.43154	1.21777	.12651		4	1.38359	1.23720	1.22017	.16430
	5	1.60320	1.43215	1.28033	.15581		5	1.41404	1.23173	1.28189	.20140
	6	1.63960	1.43385	1.34680	.18429		6	1.44538	1.22720	1.34680	.23715
	7	1.67754	1.43659	1.41765	.21202		7	1.47766	1.22354	1.41517	.27163
	8	1.71712	1.44044	1.49329	.23900		8	1.51097	1.22079	1.48728	.30491
	9	1.75855	1.44536	1.57435	.26532		9	1.54543	1.21981	1.56357	.33709
	10	1.80201	1.45143	1.66148	.29101		10	1.58114	1.21788	1.64446	.36826
	11	1.84775	1.45868	1.75542	.31608		11	1.61819	1.21844	1.73036	.39845
	12	1.89597	1.46707	1.85710	.34062		12	1.65677	1.21836	1.82188	.42775
	13	1.94702	1.47675	1.96754	.36461		13	1.69700	1.21989	1.91963	.45620
	14	2.00123	1.48774	2.08804	.37474		14	1.73905	1.22229	2.02439	.48384
	15	2.05902	1.50014	2.22011	.41113		15	1.78314	1.22557	2.13679	.51075
46	0	1.39016	1.39016	1.00000	0	54	0	1.23606	1.23606	1.00000	0
	1	1.41969	1.38498	1.05010	.03551		1	1.26353	1.22509	1.05243	.04691
	2	1.45008	1.38088	1.10274	.06980		2	1.29155	1.21520	1.10710	.09172
	3	1.48138	1.37779	1.15813	.10294		3	1.32016	1.20650	1.16416	.13456
	4	1.51372	1.37573	1.21661	.13505		4	1.34943	1.19873	1.22383	.17560
	5	1.54715	1.37464	1.27839	.16615		5	1.37942	1.19194	1.28631	.21495
	6	1.58181	1.37460	1.34384	.19631		6	1.41018	1.18607	1.35186	.25277
	7	1.61778	1.37540	1.41334	.22562		7	1.44181	1.18109	1.42075	.28914
	8	1.65521	1.37744	1.48728	.25408		8	1.47440	1.17701	1.49329	.32417
	9	1.69426	1.38037	1.56626	.28181		9	1.50801	1.17379	1.56982	.35796
	10	1.73507	1.38431	1.65076	.30881		10	1.54274	1.17135	1.65074	.39059
	11	1.77783	1.38936	1.74144	.33512		11	1.57871	1.16978	1.73648	.42214
	12	1.82279	1.39545	1.83915	.36080		12	1.61605	1.16899	1.82758	.45269
	13	1.87015	1.40266	1.94474	.38589		13	1.65487	1.16904	1.92455	.48229
	14	1.92023	1.41102	2.05931	.41041		14	1.69536	1.17087	2.02809	.51099
	15	1.97330	1.42055	2.18408	.43441		15	1.73765	1.17155	2.13897	.53888
48	0	1.34562	1.34562	1.00000	0	56	0	1.20621	1.20621	1.00000	0
	1	1.37431	1.33897	1.05028	.03803		1	1.23369	1.19378	1.05375	.05045
	2	1.40376	1.33334	1.10299	.07466		2	1.26164	1.18252	1.10969	.09845
	3	1.43404	1.32876	1.15835	.11000		3	1.29013	1.17238	1.16799	.14419
	4	1.46522	1.32515	1.21660	.14413		4	1.31923	1.16331	1.22887	.18787
	5	1.49738	1.32253	1.27799	.17712		5	1.34896	1.15521	1.29250	.22963
	6	1.53062	1.32084	1.34285	.20906		6	1.37943	1.14807	1.35916	.26964
	7	1.56467	1.32016	1.41075	.23968		7	1.41067	1.14184	1.42906	.30601
	8	1.60075	1.32034	1.48434	.27003		8	1.44280	1.13650	1.50253	.34487
	9	1.63789	1.32151	1.56185	.29919		9	1.47583	1.13198	1.57987	.38033
	10	1.67658	1.32364	1.64444	.32752		10	1.50992	1.12828	1.66148	.41449
	11	1.71700	1.32672	1.73283	.35511		11	1.54513	1.12540	1.74774	.44743
	12	1.75929	1.33077	1.82758	.38198		12	1.58159	1.12331	1.83915	.47924
	13	1.80370	1.33585	1.92951	.40816		13	1.61925	1.12200	1.93582	.50988
	14	1.85044	1.34190	2.03959	.43372		14	1.65874	1.12144	2.03961	.53978
	15	1.89980	1.34908	2.15885	.45868		15	1.69971	1.12167	2.14992	.56862
50	0	1.30541	1.30541	1.00000	0	58	0	1.17918	1.17918	1.00000	0
	1	1.33348	1.29731	1.05072	.04075		1	1.20686	1.16522	1.05542	.05436
	2	1.36225	1.29028	1.10380	.07991		2	1.23498	1.15255	1.11302	.10586
	3	1.39174	1.28425	1.15940	.11756		3	1.26357	1.14102	1.17297	.15476
	4	1.42204	1.27920	1.21777	.15384		4	1.29271	1.13061	1.23547	.20130
	5	1.45322	1.27510	1.27916	.18884		5	1.32244	1.12122	1.30071	.24564
	6	1.48536	1.27194	1.34383	.22263		6	1.35284	1.11285	1.36892	.28796
	7	1.51856	1.26972	1.41210	.25529		7	1.38394	1.10538	1.44036	.32846
	8	1.55292	1.26837	1.48436	.28693		8	1.41585	1.09881	1.51533	.36724
	9	1.58854	1.26795	1.56095	.31756		9	1.44863	1.09309	1.59409	.40443
	10	1.62554	1.26843	1.64237	.34729		10	1.48236	1.08819	1.67705	.44017
	11	1.66408	1.27385	1.72917	.37617		11	1.51713	1.08408	1.76457	.47454
	12	1.70426	1.27204	1.82185	.40422		12	1.55305	1.08076	1.85710	.50765
	13	1.74634	1.27525	1.92125	.43154		13	1.59024	1.07821	1.95517	.53958
	14	1.79047	1.27937	2.02809	.45814		14	1.62880	1.07640	2.05932	.57042
	15	1.83687	1.27004	2.14331	.48407		15	1.66888	1.07531	2.17022	.60023

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TABLE I.- VALUES OF LOCAL MACH NUMBER, PRESSURE RATIO,
AND PRESSURE COEFFICIENT ACROSS SHOCK WAVES - Concluded

θ (deg)	β (deg)	M_b	M_a	$\frac{p_a}{p_b}$	$\frac{\Delta p_{a,b}}{q_o}$
60	0	1.15470	1.15470	1.00000	0
	1	1.18281	1.13913	1.05748	.05869
	2	1.21128	1.12492	1.11715	.11407
	3	1.24021	1.11200	1.17919	.16643
	4	1.26963	1.10024	1.24379	.21606
	5	1.29959	1.08956	1.31115	.26318
	6	1.33016	1.07991	1.38199	.30802
	7	1.36139	1.07123	1.45505	.35075
	8	1.39336	1.06349	1.53211	.39149
	9	1.42614	1.05661	1.61296	.43053
	10	1.45981	1.05056	1.69801	.46792
	11	1.49446	1.04530	1.78756	.50375
	12	1.53015	1.04083	1.88204	.53817
	13	1.56705	1.03711	1.98204	.57130
	14	1.60524	1.03411	2.08804	.60321
	15	1.64485	1.03183	2.20066	.63397
62	0	1.13257	1.13257	1.00000	0
	1	1.16134	1.11527	1.06001	.06356
	2	1.19044	1.09945	1.12228	.12326
	3	1.21994	1.08503	1.18693	.17943
	4	1.24988	1.07187	1.25420	.23246
	5	1.28033	1.05987	1.32425	.28258
	6	1.31132	1.04897	1.39734	.33010
	7	1.34294	1.03907	1.47368	.37521
	8	1.37527	1.03015	1.55357	.41812
	9	1.40834	1.02212	1.63730	.45902
	10	1.44225	1.01497	1.72524	.49808
	11	1.48051	1.01097	1.81770	.53293
	12	1.51292	1.00303	1.91519	.57190
	13	1.54988	.99818	2.01813	.60549
	14	1.58806	.99416	2.12710	.63846
	15	1.62757	.99077	2.24268	.67016
64	0	1.11260	1.11260	1.00000	0
	1	1.14230	1.09339	1.06311	.06909
	2	1.17229	1.07586	1.12854	.13362
	3	1.20263	1.05981	1.19646	.19405
	4	1.23329	1.04513	1.26705	.25082
	5	1.26458	1.03183	1.34052	.30420
	6	1.29631	1.01963	1.41710	.35459
	7	1.32862	1.00852	1.49702	.40223
	8	1.36159	.99844	1.58060	.44739
	9	1.39526	.98927	1.66809	.49026
	10	1.42974	.98100	1.75989	.53105
	11	1.46509	.97358	1.85635	.56993
	12	1.50142	.96697	1.95793	.60706
	13	1.53881	.96113	2.06507	.64255
	14	1.57739	.95602	2.17835	.67655
	15	1.61725	.95161	2.29836	.70916
66	0	1.09463	1.09463	1.00000	0
	1	1.12559	1.07331	1.06691	.07545
	2	1.15678	1.05388	1.13626	.14547
	3	1.18829	1.03613	1.20818	.21062
	4	1.21761	1.01850	1.27689	.26680
	5	1.25245	1.00511	1.36067	.32847
	6	1.28523	.99157	1.44166	.38197
	7	1.31856	.97920	1.52616	.43233
	8	1.35250	.96785	1.61445	.47986
	9	1.38715	.95764	1.70686	.52374
	10	1.42256	.94829	1.80374	.56738
	11	1.45577	.94000	1.89687	.60453
	12	1.49604	.93219	2.01255	.64630
	13	1.53428	.92535	2.12537	.68296
	14	1.57368	.92268	2.24461	.71796
	15	1.61434	.91388	2.37080	.75142
68	0	1.07854	1.07854	1.00000	0
	1	1.11113	1.05481	1.07157	.08281
	2	1.14392	1.03325	1.14574	.15911
	3	1.17698	1.01361	1.22268	.22964
	4	1.21035	.99570	1.30259	.29508
	5	1.24412	.97935	1.38571	.35599
	6	1.27834	.96440	1.47229	.41287
	7	1.31308	.95070	1.56259	.46613
	8	1.34843	.93821	1.65696	.51616
	9	1.38446	.92678	1.75568	.56322
	10	1.42122	.91635	1.85916	.60756
	11	1.45885	.90685	1.96784	.64966
	12	1.49741	.89825	2.08216	.06895
	13	1.53698	.89042	2.20262	.72727
	14	1.57772	.88338	2.32987	.76322
	15	1.61972	.87707	2.46455	.79749
70	0	1.06418	1.06418	1.00000	0
	1	1.09890	1.03765	1.07737	.09153
	2	1.13406	1.01384	1.15827	.17580
	3	1.16883	.99194	1.24074	.25174
	4	1.20418	.97213	1.32717	.32233
	5	1.23990	.95409	1.41710	.38759
	6	1.27606	.93764	1.51080	.44814
	7	1.31270	.92400	1.60854	.50450
	8	1.34994	.90880	1.71071	.55714
	9	1.38786	.89621	1.81765	.60643
	10	1.42754	.88510	1.93274	.65386
	11	1.46606	.87417	2.04755	.69626
	12	1.50653	.86458	2.17147	.73736
	13	1.54805	.85582	2.30216	.77624
	14	1.59076	.84788	2.44024	.81307
	15	1.63475	.84069	2.58643	.84805

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TABLE II.- LOCAL MACH NUMBERS BEFORE AND AFTER EXPANSION

	Local Mach number after expansion, M_a														
M_b \ $-\beta$	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°
1.0	1.0	1.0813	1.1327	1.1764	1.2185	1.2577	1.2938	1.3298	1.3648	1.4000	1.4350	1.4690	1.5032	1.5368	1.5706
1.1	1.1	1.1474	1.1908	1.2313	1.2694	1.3056	1.3413	1.3772	1.4124	1.4467	1.4806	1.5142	1.5480	1.5822	1.6160
1.2	1.2	1.2403	1.2780	1.3141	1.3497	1.3850	1.4200	1.4544	1.4882	1.5228	1.5566	1.5896	1.6234	1.6572	1.6912
1.3	1.3	1.3363	1.3714	1.4064	1.4406	1.4747	1.5090	1.5433	1.5768	1.6107	1.6444	1.6782	1.7126	1.7467	1.7808
1.4	1.4	1.4345	1.4686	1.5026	1.5368	1.5708	1.6044	1.6388	1.6727	1.7062	1.7408	1.7747	1.8092	1.8442	1.8788
1.5	1.5	1.5338	1.5675	1.6016	1.6361	1.6698	1.7036	1.7388	1.7725	1.8066	1.8420	1.8762	1.9113	1.9420	1.9827
1.6	1.6	1.6335	1.6675	1.7020	1.7359	1.7703	1.8045	1.8386	1.8739	1.9096	1.9453	1.9808	2.0175	2.0540	2.0912
1.7	1.7	1.7339	1.7684	1.8026	1.8371	1.8727	1.9082	1.9435	1.9790	2.0156	2.0527	2.0893	2.1272	2.1650	2.2030
1.8	1.8	1.8329	1.8688	1.9048	1.9398	1.9763	2.0125	2.0487	2.0858	2.1236	2.1613	2.1998	2.2388	2.2780	2.3179
1.9	1.9	1.9361	1.9720	2.0077	2.0449	2.0819	2.1186	2.1568	2.1944	2.2324	2.2713	2.3122	2.3522	2.3933	2.4348
2.0	2.0	2.0363	2.0732	2.1105	2.1493	2.1869	2.2256	2.2644	2.3038	2.3428	2.3845	2.4260	2.4680	2.5107	2.5542
2.1	2.1	2.1372	2.1753	2.2142	2.2525	2.2924	2.3324	2.3731	2.4146	2.4564	2.4988	2.5420	2.5858	2.6308	2.6761
2.2	2.2	2.2384	2.2778	2.3181	2.3583	2.3997	2.4410	2.4829	2.5258	2.5698	2.6136	2.6587	2.7053	2.7524	2.7996
2.3	2.3	2.3392	2.3805	2.4218	2.4640	2.5064	2.5486	2.5937	2.6385	2.6840	2.7308	2.7783	2.8263	2.8748	2.9250
2.4	2.4	2.4415	2.4832	2.5264	2.5702	2.6146	2.6596	2.7059	2.7528	2.8004	2.8477	2.8980	2.9482	2.9996	3.0520
2.5	2.5	2.5429	2.5868	2.6319	2.6775	2.7235	2.7702	2.8190	2.8677	2.9167	2.9665	3.0193	3.0724	3.1263	3.1812
2.6	2.6	2.6447	2.6902	2.7372	2.7842	2.8324	2.8812	2.9319	2.9828	3.0338	3.0867	3.1415	3.1968	3.2530	3.3112
2.7	2.7	2.7470	2.7943	2.8424	2.8915	2.9412	2.9929	3.0450	3.0985	3.1513	3.2092	3.2660	3.3232	3.3823	3.4432
2.8	2.8	2.8484	2.8976	2.9480	2.9994	3.0510	3.1055	3.1602	3.2148	3.2710	3.3316	3.3905	3.4507	3.5137	3.5783
2.9	2.9	2.9500	3.0020	3.0532	3.1078	3.1625	3.2175	3.2744	3.3337	3.3930	3.4527	3.5163	3.5804	3.6460	3.7130
3.0	3.0	3.0527	3.1060	3.1593	3.2163	3.2728	3.3305	3.3907	3.4527	3.5142	3.5778	3.6440	3.7107	3.7792	3.8510
3.1	3.1	3.1546	3.2098	3.2660	3.3248	3.3844	3.4444	3.5074	3.5714	3.6365	3.7040	3.7725	3.8422	3.9157	3.9897
3.2	3.2	3.2568	3.3143	3.3730	3.4344	3.4965	3.5602	3.6244	3.6920	3.7597	3.8302	3.9024	3.9762	4.0532	4.1305
3.3	3.3	3.3588	3.4188	3.4798	3.5441	3.6084	3.6754	3.7424	3.8124	3.8840	3.9568	4.0328	4.1108	4.1910	4.2730
3.4	3.4	3.4614	3.5236	3.5876	3.6537	3.7208	3.7904	3.8620	3.9348	4.0089	4.0858	4.1662	4.2468	4.3316	4.4173
3.5	3.5	3.5642	3.6380	3.6957	3.7645	3.8335	3.9067	3.9814	4.0564	4.1348	4.2164	4.2992	4.3847	4.4730	4.5635
3.6	3.6	3.6666	3.7333	3.8035	3.8750	3.9474	4.0240	4.1008	4.1804	4.2624	4.3483	4.4334	4.5240	4.6165	4.7118
3.7	3.7	3.7693	3.8385	3.9116	3.9859	4.0611	4.1407	4.2213	4.3044	4.3904	4.4786	4.5698	4.6642	4.7609	4.8617
3.8	3.8	3.8717	3.9437	4.0200	4.0973	4.1762	4.2594	4.3418	4.4300	4.5193	4.6114	4.7070	4.8063	4.9080	5.0132
3.9	3.9	3.9742	4.0491	4.1293	4.2084	4.2913	4.3766	4.4644	4.5552	4.6484	4.7484	4.8452	4.9493	5.0557	5.1672
4.0	4.0	4.0768	4.1547	4.2372	4.3202	4.4072	4.4960	4.5874	4.6820	4.7808	4.8803	4.9860	5.0945	5.2064	5.3219
4.1	4.1	4.1800	4.2670	4.3462	4.4326	4.5228	4.6152	4.7112	4.8100	4.9120	5.0179	5.1264	5.2408	5.3575	5.4797
4.2	4.2	4.2823	4.3668	4.4562	4.5460	4.6384	4.7360	4.8321	4.9378	5.0442	5.1562	5.2692	5.3878	5.5111	5.6393
4.3	4.3	4.3860	4.4739	4.5658	4.6582	4.7569	4.8558	4.9608	5.0664	5.1785	5.2925	5.4132	5.5374	5.6659	5.8004
4.4	4.4	4.4896	4.5800	4.6756	4.7720	4.8733	4.9771	5.0855	5.1971	5.3133	5.4333	5.5588	5.6886	5.8216	5.9637
4.5	4.5	4.5922	4.6864	4.7851	4.8857	4.9900	5.0993	5.2108	5.3278	5.4490	5.5730	5.7048	5.8398	5.9828	6.1300
4.6	4.6	4.6951	4.7927	4.8951	5.0001	5.1085	5.2220	5.3376	5.4601	5.5858	5.7164	5.8530	5.9943	6.1427	6.2980
4.7	4.7	4.7989	4.9005	5.0060	5.1146	5.2275	5.3440	5.4669	5.5922	5.7240	5.8594	6.0022	6.1524	6.3053	6.4670
4.8	4.8	4.9004	5.0072	5.1161	5.2296	5.3460	5.4683	5.5940	5.7250	5.8624	6.0047	6.1526	6.3080	6.4698	6.6382
4.9	4.9	5.0054	5.1147	5.2264	5.3442	5.4650	5.5921	5.7234	5.8592	6.0010	6.1500	6.3052	6.4665	6.6362	6.8133
5.0	5.0	5.1081	5.2220	5.3382	5.4600	5.5859	5.7168	5.8522	5.9951	6.1440	6.2979	6.4586	6.6275	6.8088	6.9902
5.1	5.1	5.2121	5.3293	5.4490	5.5760	5.7062	5.8410	5.9823	6.1314	6.2840	6.4453	6.6136	6.7900	6.9750	7.1686
5.2	5.2	5.3160	5.4370	5.5621	5.6913	5.8262	5.9677	6.1157	6.2677	6.4280	6.5958	6.7707	6.9542	7.1470	7.3488
5.3	5.3	5.4196	5.5443	5.6731	5.8080	5.9489	6.0946	6.2460	6.4058	6.5720	6.7462	6.9290	7.1214	7.3213	7.5335
5.4	5.4	5.5238	5.6522	5.7853	5.9248	6.0702	6.2220	6.3792	6.5437	6.7178	6.8983	7.0885	7.2884	7.5000	7.7194
5.5	5.5	5.6271	5.7610	5.8982	6.0418	6.1920	6.3489	6.5127	6.6844	6.8632	7.0513	7.2563	7.4576	7.6772	7.9086
5.6	5.6	5.7315	5.8688	6.0111	6.1597	6.3147	6.4774	6.6472	6.8243	7.0117	7.2072	7.4125	7.6296	7.8584	8.1000
5.7	5.7	5.8349	5.9772	6.1248	6.2780	6.4382	6.6068	6.7819	6.9668	7.1600	7.3634	7.5774	7.8026	8.0420	8.2937
5.8	5.8	5.9391	6.0858	6.2382	6.3960	6.5612	6.7355	6.9170	7.1088	7.3093	7.5218	7.7443	7.9780	8.2262	8.4910
5.9	5.9	6.0434	6.1942	6.3519	6.5157	6.6864	6.8653	7.0535	7.2519	7.4600	7.6798	7.9117	8.1564	8.4156	8.6896
6.0	6.0	6.1480	6.3030	6.4652	6.6338	6.8115	6.9970	7.1920	7.3970	7.6127	7.8396	8.0815	8.3360	8.6055	8.8920
6.1	6.1	6.2522	6.4120	6.5800	6.7532	6.9360	7.1290	7.3309	7.5421	7.7660	8.0029	8.2515	8.5173	8.7988	9.0967
6.2	6.2	6.3561	6.5216	6.6932	6.8732	7.0620	7.2593	7.4682	7.6889	7.9200	8.1648	8.4250	8.6998	8.9924	9.3044
6.3	6.3	6.4608	6.6300	6.8070	6.9939	7.1880	7.3920	7.6081	7.8350	8.0760	8.3313	8.6012	8.8867	9.1934	9.5166
6.4	6.4	6.5657	6.7400	6.9229	7.1146	7.3147	7.5260	7.7500	7.9842	8.2326	8.4968	8.7780	9.0725	9.3910	9.7287
6.5	6.5	6.6710	6.8500	7.0381	7.2348	7.4421	7.6600	7.8914	8.1334	8.3913	8.6634	8.9547	9.2630	9.5932	9.9443
6.6	6.6	6.7755	6.9600	7.1532	7.3560	7.5698	7.7952	8.0324	8.2846	8.5520	8.8329	9.1350	9.4554	9.7995	10.1650
6.7	6.7	6.8797	7.0680	7.2672	7.4764	7.6970	7.9306	8.1764	8.4346	8.7120	9.0052	9.3166	9.6500	10.0062	10.3888
6.8	6.8	6.9847	7.1789	7.3838	7.5996	7.8262	8.0660	8.3195	8.5887	8.8741	9.1774	9.5020	9.8463	10.2177	10.6158
6.9	6.9	7.0898	7.2898	7.5009	7.7224	7.9561	8.2030	8.4638	8.7430	9.0360	9.3528	9.6877	10.0468	10.4313	10.8452
7.0	7.0	7.1949	7.4000	7.6158	7.8431	8.0840	8.3405	8.6092	8.8968	9.2030	9.5286	9.8747	10.2482	10.6467	11.0778
7.1	7.1	7.3006	7.5109	7.7336	7.9690	8.2146	8.4778	8.7565	9.0528	9.3679	9.7044	10.0653	10.4492	10.8658	11.3155
7.2	7.2	7.4052	7.6210	7.8507	8.0909	8.3461	8.6160	8.9038	9.2095	9.5360	9.8844	10.2570	10.6567	11.0880	11.5550
7.3	7.3	7.5110	7.7334	7.9669	8.2152	8.4769	8.7560	9.0520	9.3661	9.7052	10.0656	10.4510	10.8657	11.3135	11.7998
7.4	7.4	7.6172	7.8440	8.0852	8.8339	8.6097	8.8963	9.2012	9.5260	9.8740	10.2485	10.6460	11.0765	11.5420	12.0473
7.5	7.5	7.7210	7.9545	8.2031	8.4644	8.7420	9.0360	9.3508	9.6860	10.0460	10.4283	10.8434	11.2900	11.7748	
7.6	7.6	7.8267	8.0663	8.3212	8.5885	8.8740	9.1780	9.5030	9.8481	10.2190	10.6152	11.0448	11.5092	12.0092	
7.7	7.7	7.9327	8.1780	8.4391	8.7152	9.0083	9.3200	9.6540	10.0107	10.3923	10.8047	11.2453	11.7250		
7.8	7.8	8.0391	8.2913	8.5582	8.8410	9.1420	9.4620	9.8070	10.1750	10.5680	10.9942	11.4508	11.9493		
7.9	7.9	8.1444	8.4022	8.6757	8.9652	9.2760	9.6062	9.9590	10.3382	10.7460	11.1840	11.6570			
8.0	8.0	8.2506	8.5140	8.7953	9.0938	9.4110	9.7520	10.1146	10.5050	10.9260	11.3762	11.8676			

NATIONAL ADVISORY
COMMITTEE FOR AERONAUTICS

TABLE II.- LOCAL MACH NUMBERS BEFORE AND AFTER EXPANSIONS - Concluded

	Local Mach number after expansion, M_a															
M_b \ $-\beta$	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°
1.0	1.6046	1.6382	1.6721	1.7064	1.7408	1.7753	1.8098	1.8446	1.8796	1.9148	1.9503	1.9860	2.0235	2.0600	2.0968	2.1320
1.1	1.6498	1.6837	1.7179	1.7522	1.7867	1.8208	1.8560	1.8905	1.9268	1.9621	1.9978	2.0340	2.0712	2.1092	2.1465	2.1852
1.2	1.7256	1.7598	1.7941	1.8292	1.8644	1.8990	1.9352	1.9705	2.0065	2.0431	2.0800	2.1179	2.1560	2.1938	2.2322	2.2709
1.3	1.8158	1.8509	1.8861	1.9213	1.9570	1.9928	2.0288	2.0655	2.1025	2.1402	2.1781	2.2164	2.2557	2.2960	2.3361	2.3769
1.4	1.9140	1.9498	1.9859	2.0223	2.0590	2.0958	2.1338	2.1715	2.2100	2.2491	2.2886	2.3287	2.3689	2.4100	2.4506	2.4940
1.5	2.0192	2.0558	2.0927	2.1308	2.1686	2.2064	2.2455	2.2855	2.3250	2.3610	2.4065	2.4484	2.4900	2.5325	2.5765	2.6238
1.6	2.1288	2.1667	2.2047	2.2438	2.2830	2.3232	2.3630	2.4042	2.4460	2.4882	2.5320	2.5759	2.6200	2.6655	2.7108	2.7570
1.7	2.2418	2.2812	2.3213	2.3628	2.4027	2.4433	2.4860	2.5296	2.5735	2.6182	2.6635	2.7092	2.7561	2.8032	2.8510	2.9015
1.8	2.3582	2.3988	2.4408	2.4828	2.5253	2.5688	2.6140	2.6590	2.7052	2.7515	2.7989	2.8480	2.8970	2.9470	2.9985	3.0495
1.9	2.4768	2.5193	2.5627	2.6072	2.6528	2.6980	2.7460	2.7926	2.8401	2.8899	2.9401	2.9912	3.0422	3.0959	3.1497	3.2069
2.0	2.5984	2.6436	2.6892	2.7357	2.7823	2.8305	2.8795	2.9292	2.9801	3.0320	3.0850	3.1395	3.1945	3.2515	3.3090	3.3702
2.1	2.7220	2.7690	2.8164	2.8648	2.9155	2.9659	3.0182	3.0715	3.1240	3.1788	3.2359	3.2935	3.3510	3.4118	3.4725	3.5349
2.2	2.8473	2.8972	2.9472	2.9987	3.0504	3.1050	3.1582	3.2150	3.2720	3.3296	3.3895	3.4506	3.5128	3.5762	3.6424	3.7085
2.3	2.9752	3.0281	3.0804	3.1335	3.1890	3.2450	3.3036	3.3619	3.4225	3.4842	3.5470	3.6130	3.6795	3.7470	3.8170	3.8875
2.4	3.1056	3.1601	3.2155	3.2720	3.3305	3.3908	3.4501	3.5135	3.5775	3.6421	3.7105	3.7795	3.8495	3.9225	3.9972	4.0730
2.5	3.2368	3.2947	3.3537	3.4140	3.4752	3.5370	3.6030	3.6692	3.7362	3.8070	3.8778	3.9518	4.0262	4.1042	4.1838	4.2652
2.6	3.3703	3.4312	3.4930	3.5561	3.6210	3.6880	3.7560	3.8260	3.8985	3.9725	4.0480	4.1260	4.2066	4.2900	4.3750	4.4630
2.7	3.5056	3.5690	3.6350	3.7018	3.7702	3.8408	3.9139	3.9879	4.0635	4.1425	4.2239	4.3075	4.3922	4.4805	4.5725	4.6650
2.8	3.6425	3.7102	3.7794	3.8493	3.9222	3.9970	4.0704	4.1518	4.2335	4.3180	4.4035	4.4921	4.5855	4.6780	4.7750	4.8768
2.9	3.7818	3.8536	3.9262	4.0050	4.0767	4.1565	4.2375	4.3220	4.4080	4.4962	4.5880	4.6835	4.7804	4.8821	4.9860	5.0995
3.0	3.9235	3.9977	4.0752	4.1534	4.2352	4.3180	4.4050	4.4940	4.5845	4.6800	4.7765	4.8785	4.9822	5.0900	5.2030	5.3179
3.1	4.0657	4.1457	4.2258	4.3092	4.3948	4.4832	4.5738	4.6680	4.7662	4.8680	4.9710	5.0792	5.1900	5.3052	5.4252	5.5520
3.2	4.2118	4.2942	4.3792	4.4681	4.5578	4.6515	4.7485	4.8485	4.9530	5.0590	5.1700	5.2840	5.4040	5.5280	5.6570	5.7890
3.3	4.3573	4.4450	4.5354	4.6288	4.7240	4.8240	4.9260	5.0320	5.1425	5.2561	5.3740	5.4970	5.6240	5.7569	5.8958	6.0390
3.4	4.5071	4.5990	4.6935	4.7920	4.8937	4.9990	5.1080	5.2196	5.3370	5.4581	5.5838	5.7150	5.8502	5.9931	6.1400	6.2993
3.5	4.6575	4.7546	4.8557	4.9586	5.0662	5.1768	5.2918	5.4115	5.5352	5.6645	5.7995	5.9385	6.0840	6.2365	6.3955	6.5600
3.6	4.8105	4.9129	5.0183	5.1279	5.2410	5.3580	5.4809	5.6085	5.7380	5.8770	6.0205	6.1680	6.3245	6.4880	6.6567	6.8350
3.7	4.9649	5.0733	5.1840	5.3000	5.4200	5.5435	5.6730	5.8080	5.9468	6.0945	6.2460	6.4059	6.5720	6.7460	6.9285	7.1220
3.8	5.1223	5.2365	5.3528	5.4750	5.6015	5.7325	5.8700	6.0130	6.1619	6.3175	6.4780	6.6485	6.8275	7.1025	7.2100	7.4160
3.9	5.2810	5.4007	5.5248	5.6521	5.7870	5.9255	6.0710	6.2220	6.3800	6.5455	6.7190	6.8985	7.0900	7.2895	7.5000	7.7200
4.0	5.4432	5.5682	5.6983	5.8349	5.9747	6.1225	6.2753	6.4360	6.6040	6.7800	6.9650	7.1575	7.3600	7.5755	7.8000	8.0400
4.1	5.6066	5.7380	5.8760	6.0184	6.1672	6.3230	6.4860	6.6565	6.8345	7.0200	7.2185	7.4245	7.6412	7.8700	8.1120	8.3695
4.2	5.7718	5.9105	6.0560	6.2058	6.3628	6.5270	6.6990	6.8800	7.0700	7.2680	7.4775	7.6985	7.9300	8.1760	8.4350	8.7120
4.3	5.9407	6.0855	6.2373	6.3964	6.5622	6.7375	6.9180	7.1100	7.3095	7.5210	7.7439	7.9795	8.2265	8.4900	8.7718	9.0695
4.4	6.1106	6.2638	6.4245	6.5913	6.7657	6.9490	7.1410	7.3440	7.5575	7.7830	8.0210	8.2710	8.5360	8.8195	9.1218	9.4385
4.5	6.2830	6.4440	6.6125	6.7880	6.9725	7.1667	7.3700	7.5850	7.8120	8.0500	8.3025	8.5705	8.8545	9.1580	9.4820	9.8260
4.6	6.4580	6.6282	6.8044	6.9895	7.1845	7.3887	7.6043	7.8300	8.0730	8.3235	8.5955	8.8800	9.1845	9.5095	9.8550	10.2373
4.7	6.6355	6.8134	6.9995	7.1950	7.3998	7.6161	7.8440	8.0820	8.3400	8.6085	8.8965	9.2020	9.5270	9.8740	10.2465	10.6480
4.8	6.8158	7.0026	7.1972	7.4028	7.6189	7.8471	8.0875	8.3420	8.6135	8.9020	9.2035	9.5298	9.8805	10.2500	10.6530	11.0850
4.9	6.9997	7.1940	7.3998	7.6170	7.8445	8.0845	8.3395	8.6060	8.8960	9.2025	9.5240	9.8745	10.2465	10.6465	11.0770	11.5400
5.0	7.1850	7.3895	7.6037	7.8313	8.0722	8.3257	8.5960	8.8800	9.1840	9.5100	9.8542	10.2270	10.6265	11.0560	11.5160	12.0220
5.1	7.3751	7.5872	7.8130	8.0416	8.3053	8.5740	8.8550	9.1600	9.4820	9.8250	10.1964	10.5940	11.0180	11.4760	11.978	
5.2	7.5640	7.7886	8.0250	8.2767	8.5428	8.8250	9.1270	9.4470	9.7890	10.1580	10.5472	10.9680	11.4260	11.9220		
5.3	7.7576	7.9930	8.2409	8.5068	8.7868	8.0850	9.4010	9.7385	10.1040	10.4920	10.9108	11.3620	11.8515			
5.4	7.9545	8.2006	8.4620	8.7395	9.0345	9.3490	9.6820	10.0420	10.4280	10.8400	11.2893	11.7680				
5.5	8.1532	8.4115	8.6867	8.9772	9.2893	9.6190	9.9760	10.3530	10.7600	11.2040	11.6763					
5.6	8.3550	8.6270	8.9150	9.2207	9.5480	9.8950	10.2707	10.6700	11.1040	11.5740						
5.7	8.5620	8.8447	9.1468	9.4682	9.8123	10.1800	10.5740	10.9980	11.4570	11.9550						
5.8	8.7695	9.0664	9.3827	9.7218	10.0824	10.4687	10.8860	11.3340	11.8200							
5.9	8.9793	9.2930	9.6235	9.9784	10.3580	10.7670	11.2060	11.6820								
6.0	9.1966	9.5212	9.8690	10.2410	10.6410	11.0710	11.5340									
6.1	9.4152	9.7552	10.1188	10.5085	10.9297	11.3820	11.8714									
6.2	9.6356	9.9920	10.3732	10.7820	11.2232	11.7025										
6.3	9.8628	10.2340	10.6314	11.0648	11.5272	12.0292										
6.4	10.0896	10.4790	10.8990	11.3462	11.8354											
6.5	10.3226	10.7288	11.1668	11.6397												
6.6	10.5590	10.9825	11.4413	11.9380												
6.7	10.7995	11.2410	11.7214													
6.8	11.0450	11.5067	12.0092													
6.9	11.2938	11.7748														
7.0	11.5424	12.0465														
7.1	11.8010															
7.2	12.0600															

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TABLE III.- STATIC PRESSURE RATIO ACROSS EXPANSION WAVES

$-\beta$ / M_b	Ratio of static pressure after to static pressure before expansion, p_a/p_b														
	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°
1.0	1	0.90724	0.85100	0.80486	0.76192	0.72329	0.68896	0.65588	0.62488	0.59484	0.56608	0.53921	0.51325	0.48875	0.46512
1.1	1	.94222	.89109	.84500	.80315	.76474	.72819	.69275	.65930	.62796	.59815	.56975	.54234	.51571	.49054
1.2	1	.94939	.90167	.85851	.81749	.77827	.74080	.70538	.67194	.63907	.60823	.57938	.55105	.52394	.49784
1.3	1	.95151	.90630	.86285	.82202	.78284	.74496	.70863	.67461	.64159	.61019	.58005	.55075	.52301	.49658
1.4	1	.95232	.90701	.86361	.82165	.78169	.74383	.70671	.67176	.63872	.60612	.57570	.54610	.51755	.49071
1.5	1	.95205	.90613	.86205	.81855	.77832	.73967	.70135	.66630	.63249	.59908	.56706	.53837	.50922	.48197
1.6	1	.95145	.90424	.85851	.81561	.77403	.73469	.69726	.66041	.62498	.59139	.55966	.52863	.49939	.47123
1.7	1	.95003	.90151	.85563	.81159	.76833	.72739	.68869	.65180	.61572	.58111	.54886	.51731	.48762	.45947
1.8	1	.95084	.89979	.85116	.80630	.76189	.72019	.68068	.64241	.60556	.57090	.53752	.50571	.47560	.44681
1.9	1	.94568	.89444	.84615	.79856	.75373	.71173	.67047	.63216	.59566	.56048	.52573	.49387	.46314	.43408
2.0	1	.94504	.89218	.84172	.79217	.74692	.70301	.66159	.62203	.58523	.54831	.51391	.48134	.44600	.42098
2.1	1	.94353	.88893	.83644	.78776	.74007	.69517	.65234	.61140	.57282	.53622	.50140	.46847	.43698	.40748
2.2	1	.94169	.88533	.83124	.78061	.73172	.68604	.64269	.60121	.56152	.52471	.48940	.45553	.42376	.39425
2.3	1	.94051	.88174	.82668	.77403	.72460	.67861	.63279	.59045	.55043	.51223	.47630	.44265	.41117	.38111
2.4	1	.93730	.87832	.82126	.76729	.71632	.66824	.62225	.57905	.53839	.50097	.46415	.43026	.39824	.36823
2.5	1	.93553	.87396	.81507	.75970	.70781	.65891	.61160	.56795	.52732	.48915	.45188	.41744	.38531	.35531
2.6	1	.93326	.87003	.80943	.75322	.69983	.64981	.60185	.55743	.51641	.47724	.43999	.40553	.37347	.34311
2.7	1	.93040	.86544	.80426	.74649	.69245	.64063	.59257	.54717	.50601	.46463	.42756	.39342	.36123	.33099
2.8	1	.92891	.86210	.79888	.73947	.68452	.63118	.58209	.53716	.49476	.45304	.41610	.38170	.34897	.31853
2.9	1	.92725	.85754	.79430	.73230	.67538	.62285	.57313	.52582	.48269	.44310	.40476	.36972	.33728	.30726
3.0	1	.92417	.85269	.78891	.72544	.66790	.61419	.56305	.51517	.47200	.43145	.39323	.35841	.32612	.29566
3.1	1	.92232	.85032	.78316	.71897	.65964	.60524	.55329	.50543	.46134	.41998	.38213	.34740	.31448	.28476
3.2	1	.92014	.84624	.77736	.71173	.65139	.59522	.54390	.49504	.45083	.40936	.37115	.33610	.30338	.27400
3.3	1	.91833	.84237	.77205	.70478	.64379	.58631	.53438	.48544	.44040	.39926	.36075	.32543	.29305	.26357
3.4	1	.91582	.83832	.76596	.69828	.63618	.57808	.52429	.47528	.43031	.38863	.34974	.31502	.28254	.25342
3.5	1	.91317	.83493	.75984	.69097	.62874	.56930	.51495	.46607	.42036	.37797	.33972	.30465	.27259	.24355
3.6	1	.91113	.83069	.75433	.68436	.62068	.56032	.50620	.45613	.41025	.36744	.32991	.29456	.26275	.23390
3.7	1	.90881	.82674	.74877	.67771	.61325	.55226	.49724	.44679	.40044	.35836	.31994	.28493	.25340	.22461
3.8	1	.90695	.82299	.74320	.67094	.60509	.54325	.48882	.43714	.39091	.34883	.31040	.27538	.24402	.21569
3.9	1	.90506	.81916	.73702	.66478	.59735	.53577	.47962	.42832	.38192	.33887	.30117	.26628	.23520	.20691
4.0	1	.90314	.81531	.73244	.65834	.58945	.52725	.47074	.41923	.37201	.33036	.29171	.25720	.22630	.19869
4.1	1	.90057	.81090	.72705	.65172	.58216	.51932	.46191	.41008	.36326	.32086	.28305	.24848	.21801	.19049
4.2	1	.89917	.80717	.72102	.64463	.57525	.51084	.45517	.40159	.35466	.31140	.27425	.24023	.20982	.18261
4.3	1	.89622	.80232	.71563	.63879	.56671	.50343	.44472	.39324	.34578	.30060	.26574	.23192	.20192	.17510
4.4	1	.89351	.79861	.71027	.63205	.55989	.49552	.43644	.38449	.33726	.29518	.25736	.22384	.19449	.16781
4.5	1	.89199	.79481	.70543	.62568	.55343	.48754	.42920	.37624	.32879	.28733	.24945	.21636	.18657	.16062
4.6	1	.89018	.79125	.70037	.61909	.54603	.47970	.42124	.36783	.32078	.27891	.24155	.20871	.17950	.15377
4.7	1	.88755	.78643	.69482	.61275	.53871	.47264	.41259	.3600	.31265	.27114	.23395	.20088	.17251	.14731
4.8	1	.88735	.78281	.69011	.60634	.53206	.46477	.40538	.35236	.30495	.26326	.22659	.19411	.16576	.14109
4.9	1	.88360	.77862	.68548	.60051	.52542	.45755	.39757	.34465	.29765	.25590	.21926	.18731	.15923	.13488
5.0	1	.88232	.77476	.67988	.59414	.51803	.45026	.39045	.33680	.28954	.24859	.21226	.18055	.15288	.12895
5.1	1	.87976	.77103	.67527	.58794	.51132	.44357	.38317	.32662	.28274	.24143	.20543	.17404	.14681	.12333
5.2	1	.87740	.76714	.66916	.58242	.50508	.43609	.37504	.32215	.27527	.23426	.19867	.16774	.14096	.11798
5.3	1	.87542	.76370	.66480	.57631	.49659	.42890	.36849	.31488	.26826	.22755	.19216	.16145	.13529	.11262
5.4	1	.87294	.75993	.65977	.57052	.49144	.42487	.36123	.30810	.26122	.22099	.18588	.15565	.12955	.10758
5.5	1	.87136	.75556	.65448	.56463	.48519	.41536	.35428	.30087	.25470	.21455	.17966	.14997	.12441	.10268
5.6	1	.86885	.75213	.64936	.55861	.47879	.40855	.34735	.29429	.24786	.20803	.17380	.14435	.11926	.09798
5.7	1	.86733	.74837	.64397	.55260	.47233	.40172	.34070	.28736	.24146	.20187	.16794	.13901	.11428	.09350
5.8	1	.86512	.74459	.63897	.54701	.46638	.39548	.33429	.28152	.23524	.19573	.16220	.13379	.10962	.08913
5.9	1	.86292	.74111	.63395	.54076	.45961	.38913	.32778	.27463	.22910	.19003	.15677	.12862	.10488	.08502
6.0	1	.86052	.73744	.62939	.53445	.45339	.38243	.32103	.26819	.22294	.18442	.15142	.12372	.10046	.08101
6.1	1	.85855	.73377	.62410	.52998	.44757	.37595	.31450	.26209	.21702	.17863	.14639	.11899	.09613	.07720
6.2	1	.85688	.72976	.61999	.52429	.44145	.37031	.30875	.25595	.21091	.17340	.14131	.11450	.09211	.07353
6.3	1	.85460	.72674	.61557	.51851	.43559	.36418	.30259	.24916	.20563	.16789	.13628	.10996	.08791	.06993
6.4	1	.85222	.72277	.61019	.51297	.42970	.35792	.29620	.24430	.20016	.16284	.13153	.10583	.08424	.06664
6.5	1	.84960	.71889	.60548	.50786	.42379	.35196	.29033	.23864	.19464	.15796	.12709	.10164	.08059	.06345
6.6	1	.84770	.71516	.60082	.50297	.41804	.34594	.28484	.23291	.18922	.15305	.12262	.09761	.07700	.06031
6.7	1	.84603	.71282	.59702	.49771	.41270	.34012	.27892	.22770	.18419	.14814	.11834	.09373	.07364	.05731
6.8	1	.84463	.70874	.59197	.49191	.40691	.33456	.27349	.22205	.17914	.14357	.11403	.09001	.07032	.05445
6.9	1	.84168	.70478	.58686	.48763	.40112	.32884	.26805	.21668	.17441	.13896	.11036	.08631	.06715	.05173
7.0	1	.83952	.70135	.58302	.48215	.39612	.32324	.26267	.21166	.16931	.13449	.10610	.08283	.06416	.04914
7.1	1	.83705	.69763	.57789	.47594	.39066	.32052	.25718	.20657	.16475	.13036	.10222	.07961	.06125	.04663
7.2	1	.83539	.69477	.57327	.47145	.38506	.31267	.25194	.20164	.16009	.12612	.09854	.07629	.05844	.04426
7.3	1	.83296	.69014	.56923	.46625	.37990	.30719	.24679	.19697	.15557	.12182	.09493	.07313	.05574	.04196
7.4	1	.83026	.68692	.56438	.46118	.37437	.30189	.24171	.19210	.15135	.11806	.09153	.07013	.05314	.03979
7.5	1	.83125	.68388	.55986	.45621	.36920	.29695	.23681	.18747	.14704	.11456	.08818	.06723	.05062	
7.6	1	.82714	.68020	.55541	.45059	.36442	.29175	.23171	.18281	.14287	.11055	.08486	.06431	.04825	
7.7	1	.82479	.67668	.55118	.44633	.35902	.28676	.22705	.17834	.13891	.10702	.08180	.06172		
7.8	1	.82223	.67242	.54658	.44153	.35408	.28198	.22229	.17389	.13496	.10350	.07870	.05902		
7.9	1	.82043	.66952	.54279	.43741	.34926	.27700	.21790	.16979	.13103	.10018	.07578			
8.0	1	.81816	.66627	.53827	.43204	.34439	.27192	.21322	.16551	.12717	.09691	.07285			

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TABLE III.- STATIC PRESSURE RATIO ACROSS EXPANSION WAVES - Concluded

	Ratio of static pressure after to static pressure before expansion, p_a/p_b															
M_b \ $-\beta$	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°
1.0	0.44233	0.42075	0.39995	0.37981	0.36053	0.34210	0.32450	0.30768	0.29152	0.27610	0.26136	0.24727	0.23324	0.22034	0.20805	0.19690
1.1	.46646	.44333	.42102	.39970	.37923	.35996	.34101	.32335	.30572	.28941	.27384	.25882	.24421	.23017	.21711	.20436
1.2	.47264	.44874	.42587	.40358	.38232	.36246	.34272	.32446	.30680	.28978	.27359	.25786	.24293	.22898	.21563	.20297
1.3	.47071	.44602	.42247	.40011	.37858	.35814	.33858	.31975	.30180	.28453	.26818	.25256	.23750	.22299	.20941	.19649
1.4	.46477	.43970	.41572	.39283	.37099	.35021	.33009	.31119	.29300	.27559	.25909	.24323	.22850	.21430	.20114	.18800
1.5	.45535	.42962	.40604	.38257	.36062	.33989	.31972	.30032	.28234	.26522	.24860	.23285	.21823	.20427	.19078	.17732
1.6	.44433	.41877	.39459	.37117	.34908	.32778	.30802	.28883	.27059	.25338	.23670	.22110	.20651	.19251	.17955	.16688
1.7	.43239	.40652	.38181	.35782	.33620	.31564	.29525	.27590	.25773	.24050	.22427	.20900	.19452	.18099	.16830	.15588
1.8	.41953	.39375	.36878	.34542	.32332	.30233	.28179	.26287	.24482	.22801	.21206	.19680	.18123	.16939	.15677	.14525
1.9	.40659	.38058	.35578	.33209	.30950	.28869	.26818	.24971	.23228	.21535	.19963	.18483	.17125	.15808	.14596	.13417
2.0	.39310	.36657	.34170	.31813	.29622	.27521	.25546	.23696	.21947	.20305	.18764	.17304	.15955	.14675	.13497	.12354
2.1	.38067	.35331	.32865	.30531	.28274	.26204	.24225	.22372	.20693	.19082	.17548	.16134	.14844	.13598	.12467	.11411
2.2	.36662	.33988	.31514	.29166	.26996	.24888	.23003	.21158	.19465	.17902	.16419	.15041	.13766	.12588	.11473	.10465
2.3	.35333	.32638	.30188	.27901	.25707	.23679	.21739	.19979	.18311	.16767	.15339	.13978	.12741	.11604	.10542	.09579
2.4	.33998	.31363	.28907	.26614	.24445	.22407	.20581	.18804	.17180	.15691	.14269	.12975	.11792	.10682	.09665	.08740
2.5	.32745	.30091	.27624	.25328	.23206	.21256	.19370	.17660	.16095	.14604	.13261	.12003	.10867	.09802	.08833	.07950
2.6	.31499	.28858	.26423	.24165	.22059	.20092	.18289	.16617	.15059	.13633	.12329	.11124	.10014	.08993	.08069	.07221
2.7	.30285	.27687	.25240	.22999	.20928	.19003	.17210	.15584	.14094	.12703	.11426	.10261	.09212	.08243	.07352	.06563
2.8	.29113	.26498	.24088	.21895	.19838	.17945	.16202	.14627	.13154	.11800	.10584	.094699	.08433	.07530	.06696	.05929
2.9	.27951	.25341	.22971	.20670	.18795	.16925	.15235	.13668	.12253	.10969	.09788	.08708	.07745	.06859	.06070	.05321
3.0	.26804	.24267	.21895	.19758	.17765	.15972	.14300	.12787	.11429	.10167	.09047	.08009	.07088	.06255	.05496	.04828
3.1	.25741	.23171	.20878	.18710	.16817	.15048	.13446	.11977	.10634	.09415	.08338	.07352	.06476	.05686	.04976	.04332
3.2	.24646	.22161	.19884	.17777	.15898	.14167	.12593	.11171	.09872	.08725	.07680	.06750	.05905	.05154	.04484	.03898
3.3	.23669	.21180	.18918	.16859	.15013	.13312	.11795	.10419	.09172	.08062	.07065	.06170	.05377	.04667	.04035	.03482
3.4	.22643	.20208	.18002	.15982	.14159	.12511	.11027	.09708	.08507	.07440	.06488	.05637	.04889	.04217	.03633	.03100
3.5	.21697	.19286	.17087	.15131	.13348	.11757	.10323	.09035	.07890	.06863	.05948	.05146	.04435	.03805	.03254	.02776
3.6	.20768	.18388	.16251	.14319	.12589	.11041	.09640	.08393	.07309	.06317	.05448	.04692	.04017	.03425	.02916	.02468
3.7	.19885	.17528	.15438	.13542	.11850	.10351	.09004	.07805	.06755	.05809	.04990	.04264	.03633	.03082	.02603	.02185
3.8	.19012	.16693	.14651	.12802	.11157	.09699	.08335	.07243	.06229	.05336	.04563	.03877	.03279	.02768	.02319	.01936
3.9	.18189	.15916	.13889	.12106	.10490	.09079	.07821	.06719	.05750	.04899	.04156	.03518	.02957	.02477	.02064	.01713
4.0	.17368	.15153	.13178	.11409	.09870	.08491	.07288	.06226	.05298	.04490	.03786	.03183	.02663	.02213	.01833	.01506
4.1	.16597	.14424	.12478	.10774	.09267	.07938	.06773	.05755	.04873	.04112	.03443	.02875	.02389	.01975	.01622	.01323
4.2	.15861	.13721	.11817	.10161	.08700	.07420	.06301	.05325	.04479	.03756	.03130	.02595	.02142	.01756	.01433	.01160
4.3	.15130	.13047	.11203	.09578	.08162	.06915	.05850	.04917	.04130	.03431	.02842	.02341	.01920	.01562	.01261	.01012
4.4	.14447	.12393	.10585	.09016	.07649	.06459	.05431	.04540	.03775	.03125	.02570	.02105	.01713	.01382	.01107	.008831
4.5	.13787	.11776	.10018	.08494	.07168	.06018	.05033	.04184	.03459	.02847	.02328	.01891	.01527	.01223	.009713	.007665
4.6	.13150	.11172	.09469	.07989	.06705	.05605	.04659	.03857	.03163	.02592	.02100	.01696	.01358	.01079	.008508	.006601
4.7	.12538	.10612	.08946	.07507	.06273	.05212	.04308	.03549	.02892	.02250	.01893	.01515	.01204	.009492	.007414	.005733
4.8	.11946	.10065	.08453	.07059	.05866	.04848	.03986	.03257	.02641	.02127	.01708	.01356	.01066	.008346	.006447	.004937
4.9	.11367	.09549	.07972	.06619	.05473	.04501	.03676	.02992	.02407	.01925	.01533	.01206	.009423	.007292	.005588	.004241
5.0	.10825	.09046	.07528	.06222	.05112	.04179	.03391	.02739	.02194	.01741	.01375	.01073	.008304	.006365	.004837	.003617
5.1	.10301	.08572	.07093	.05884	.04769	.03872	.03133	.02506	.01994	.01575	.01230	.009519	.007315	.005560	.004164	
5.2	.09802	.08116	.06686	.05468	.04446	.03592	.02878	.02291	.01809	.01414	.01099	.008455	.006420	.004819		
5.3	.09323	.07681	.06297	.05117	.04138	.03321	.02649	.02096	.01640	.01275	.009804	.007465	.005615			
5.4	.08860	.07267	.05921	.04792	.03852	.03072	.02416	.01910	.01485	.01145	.008712	.006584				
5.5	.08424	.06873	.05566	.04483	.03577	.02839	.02228	.01739	.01343	.01023	.007748					
5.6	.08006	.06491	.05231	.04188	.03324	.02622	.02045	.01584	.01212	.009164						
5.7	.07592	.06134	.04916	.03911	.03086	.02415	.01873	.01439	.01092	.008195						
5.8	.07212	.05792	.04617	.03648	.02862	.02226	.01713	.01306	.009837							
5.9	.06852	.05462	.04332	.03405	.02653	.02047	.01665	.01182								
6.0	.06487	.05156	.04062	.03174	.02456	.01882	.01428									
6.1	.06148	.04858	.03807	.02957	.02272	.01729	.01302									
6.2	.05831	.04579	.03566	.02752	.02102	.01586										
6.3	.05515	.04310	.03340	.02554	.01939	.01454										
6.4	.05228	.04059	.03119	.02379	.01790											
6.5	.04945	.03819	.02918	.02207												
6.6	.04677	.03592	.02727	.02047												
6.7	.04463	.03376	.02546													
6.8	.04173	.03167	.02373													
6.9	.03939	.02973														
7.0	.03727	.02792														
7.1	.03511															
7.2	.03315															

.0235

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TABLE IV.- PRESSURE COEFFICIENT BASED ON FREE-STREAM DYNAMIC PRESSURE

	Pressure coefficient, $\Delta p_n/q_o$							
M_o / p_n/p_o	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5
0	-1.42857	-0.91429	-0.63492	-0.47579	-0.35714	-0.22857	-0.15873	-0.11662
.05	-1.35714	-.86857	-.60317	-.45200	-.33929	-.21714	-.15079	-.11079
.1	-1.28571	-.82286	-.57143	-.42821	-.32143	-.20571	-.14286	-.10496
.2	-1.14286	-.73143	-.50794	-.38064	-.28571	-.18286	-.12698	-.093294
.3	-1.00000	-.64000	-.44444	-.33306	-.25000	-.16000	-.11111	-.081633
.4	-.85714	-.54857	-.38095	-.28548	-.21429	-.13714	-.095238	-.069971
.5	-.71429	-.45714	-.31746	-.23790	-.17857	-.11429	-.079365	-.058309
.6	-.57143	-.36571	-.25397	-.19032	-.14286	-.091429	-.063492	-.046647
.7	-.42857	-.27429	-.19048	-.14274	-.10714	-.068571	-.047619	-.034985
.8	-.28571	-.18286	-.12698	-.095159	-.071429	-.045714	-.031746	-.023324
.9	-.14286	-.091429	-.063492	-.047579	-.035714	-.022857	-.015873	-.011662
1.0	0	0	0	0	0	0	0	0
1.1	.14286	.091429	.063492	.047579	.035714	.022857	.015873	.011662
1.2	.28571	.18286	.12698	.095159	.071429	.045714	.031746	.023324
1.3	.42857	.27429	.19048	.14274	.10714	.068571	.047619	.034985
1.4	.57143	.36571	.25397	.19032	.14286	.091429	.063492	.046647
1.5	.71429	.45714	.31746	.23790	.17857	.11429	.079365	.058309
1.6	.85714	.54857	.38095	.28548	.21429	.13714	.095238	.069971
1.7	1.00000	.64000	.44444	.33306	.25000	.16000	.11111	.081633
1.8	1.14286	.73143	.50794	.38064	.28571	.18286	.12698	.093294
1.9	1.28571	.82286	.57143	.42821	.32143	.20571	.14286	.10496
2.0	1.42857	.91429	.63492	.47579	.35714	.22857	.15873	.11662
2.2	1.71429	1.09714	.76190	.57095	.42857	.27429	.19048	.13994
2.4	2.00000	1.28000	.88889	.66611	.50000	.32000	.22222	.16327
2.6	2.28571	1.46286	1.01587	.76127	.57143	.36571	.25397	.18659
2.8	2.57143	1.64571	1.14286	.85643	.64286	.41143	.28571	.20991
3.0	2.85714	1.82857	1.26984	.95159	.71429	.45714	.31746	.23324
3.2	3.14286	2.01143	1.39683	1.04675	.78571	.50286	.34921	.25656
3.4	3.42857	2.19429	1.52381	1.14191	.85714	.54857	.38095	.27988
3.6	3.71429	2.37714	1.65079	1.23706	.92857	.59429	.41270	.30321
3.8	4.00000	2.56000	1.77778	1.33222	1.00000	.64000	.44444	.32653
4.0	4.28571	2.74286	1.90476	1.42738	1.07143	.68571	.47619	.34985
4.2	4.57143	2.92571	2.03175	1.52254	1.14286	.73143	.50794	.37318
4.4	4.85714	3.10857	2.15873	1.61770	1.21429	.77714	.53968	.39650
4.6	5.14286	3.29143	2.28571	1.71286	1.28571	.82286	.57143	.41983
4.8	5.42857	3.47429	2.41270	1.80802	1.35714	.86857	.60317	.44315
5.0	5.71429	3.65714	2.53968	1.90318	1.42857	.91429	.63492	.46647
5.2	6.00000	3.84000	2.66667	1.99833	1.50000	.96000	.66667	.48980
5.4	6.28511	4.02286	2.79365	2.09349	1.57143	1.00571	.69841	.51312
5.6	6.57143	4.20571	2.92063	2.18865	1.64286	1.05143	.73016	.53644
5.8	6.85714	4.38857	3.04762	2.28381	1.71429	1.09714	.76190	.55977
6.0	7.14286	4.57143	3.17460	2.37897	1.78571	1.14286	.79365	.58309
6.2	7.42857	4.75429	3.30159	2.47413	1.85714	1.18857	.82540	.60641
6.4	7.71429	4.93714	3.42857	2.56929	1.92857	1.23429	.85714	.62974
6.6	8.00000	5.12000	3.55556	2.66445	2.00000	1.28000	.88889	.65306
6.8	8.28571	5.30286	3.68254	2.75960	2.07143	1.32571	.92063	.67638
7.0	8.57143	5.48571	3.80952	2.85476	2.14286	1.37143	.95238	.69971
7.2	8.85714	5.66857	3.93651	2.94992	2.21429	1.41714	.98413	.72303
7.4	9.14286	5.85143	4.06349	3.04508	2.28571	1.46286	1.01587	.74636
7.6	9.42857	6.03428	4.19048	3.14024	2.35714	1.50857	1.04762	.76968
7.8	9.71429	6.21714	4.31746	3.23540	2.42857	1.55429	1.07936	.79300
8.0	10.00000	6.40000	4.44444	3.33056	2.50000	1.60000	1.11111	.81633
8.2	10.28571	6.58286	4.57143	3.42572	2.57143	1.64571	1.14286	.83965
8.4	10.57143	6.76571	4.69841	3.52087	2.64286	1.69143	1.17460	.86297
8.6	10.85714	6.94857	4.82541	3.61603	2.71429	1.73714	1.20635	.88630
8.8	11.14286	7.13143	4.95238	3.71119	2.78571	1.78286	1.23809	.90962
9.0	11.42857	7.31428	5.07936	3.80635	2.85714	1.82857	1.26984	.93294
9.2	11.71429	7.49714	5.20635	3.90151	2.92857	1.87429	1.30159	.95627
9.4	12.00000	7.68000	5.33333	3.99667	3.00000	1.92000	1.33333	.97959
9.6	12.28571	7.86286	5.46032	4.09183	3.07143	1.96571	1.36508	1.00292
9.8	12.57143	8.04571	5.58730	4.18699	3.14286	2.01143	1.39682	1.02624
10.0	12.85714	8.22857	5.71429	4.28215	3.21429	2.05714	1.42857	1.04956

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TABLE IV.- PRESSURE COEFFICIENT BASED ON FREE-STREAM DYNAMIC PRESSURE - Concluded

	Pressure coefficient, $\Delta p_n/q_o$								
M_o p_n/p_o	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
0	-0.089286	-0.070547	-0.057143	-0.047226	-0.039683	-0.033812	-0.029155	-0.025397	-0.022321
.05	-.084821	-.067019	-.054286	-.044864	-.037698	-.032122	-.027697	-.024127	-.021205
.1	-.080357	-.063492	-.051429	-.042503	-.035714	-.030431	-.026239	-.022857	-.020089
.2	-.071429	-.056437	-.045714	-.037780	-.031746	-.027050	-.023324	-.020317	-.017857
.3	-.062500	-.049383	-.040000	-.033058	-.027778	-.023669	-.020408	-.017778	-.015625
.4	-.053571	-.042328	-.034286	-.028335	-.023810	-.020287	-.017493	-.015238	-.013393
.5	-.044643	-.035273	-.028571	-.023613	-.019841	-.016906	-.014577	-.012698	-.011161
.6	-.035714	-.028219	-.022857	-.018890	-.015873	-.013525	-.011662	-.010159	-.0089286
.7	-.026786	-.021164	-.017143	-.014168	-.011905	-.010144	-.0087464	-.0076190	-.0066964
.8	-.017857	-.014109	-.011429	-.0094451	-.0079365	-.0067625	-.0058309	-.0050794	-.0044643
.9	-.0089286	-.0070547	-.0057143	-.0047226	-.0039683	-.0033812	-.0029155	-.0025397	-.0022321
1.0	0	0	0	0	0	0	0	0	0
1.1	.0089286	.0070547	.0057143	.0047226	.0039683	.0033812	.0029155	.0025397	.0022321
1.2	.017857	.014109	.011429	.0094451	.0079365	.0067625	.0058309	.0050794	.0044643
1.3	.026786	.021164	.017143	.014168	.011905	.010144	.0087464	.0076190	.0066964
1.4	.035714	.028219	.022857	.018890	.015873	.013525	.011662	.010159	.0089286
1.5	.044643	.035273	.028571	.023613	.019841	.016906	.014577	.012698	.011161
1.6	.053571	.042328	.034286	.028335	.023810	.020287	.017493	.015238	.013393
1.7	.062500	.049383	.040000	.033058	.027778	.023669	.020408	.017778	.015625
1.8	.071429	.056437	.045714	.037780	.031746	.027050	.023324	.020317	.017857
1.9	.080357	.063492	.051429	.042503	.035714	.030431	.026239	.022857	.020089
2.0	.089286	.070547	.057143	.047226	.039683	.033812	.029155	.025397	.022321
2.2	.10714	.084656	.068571	.056671	.047619	.040575	.034985	.030476	.026786
2.4	.12500	.098765	.080000	.066116	.055556	.047337	.040816	.035556	.031250
2.6	.14286	.11287	.091429	.075561	.063492	.054100	.046647	.040635	.035714
2.8	.16071	.12698	.10286	.085006	.071429	.060862	.052478	.045714	.040179
3.0	.17857	.14109	.11429	.094451	.079365	.067625	.058309	.050794	.044643
3.2	.19653	.15520	.12571	.10390	.087302	.074387	.064140	.055873	.049107
3.4	.21429	.16931	.13714	.11334	.095238	.081150	.069971	.060952	.053571
3.6	.23214	.18342	.14857	.12279	.10317	.087912	.075802	.066032	.058036
3.8	.25000	.19753	.16000	.13223	.11111	.094674	.081633	.071111	.062500
4.0	.26786	.21164	.17143	.14168	.11905	.10144	.087464	.076190	.066964
4.2	.28571	.22575	.18286	.15112	.12698	.10820	.093294	.081270	.071429
4.4	.30357	.23986	.19429	.16057	.13492	.11496	.099125	.086349	.075893
4.6	.32143	.25397	.20571	.17001	.14286	.12172	.10494	.091429	.080357
4.8	.33929	.26808	.21714	.17946	.15079	.12849	.11075	.096508	.084821
5.0	.35714	.28219	.22857	.18890	.15873	.13525	.11656	.10159	.089286
5.2	.37500	.29630	.24000	.19835	.16667	.14201	.12237	.10667	.093750
5.4	.39286	.31041	.25143	.20779	.17460	.14877	.12818	.11175	.098214
5.6	.41071	.32451	.26286	.21724	.18254	.15554	.13399	.11683	.10268
5.8	.42857	.33862	.27429	.22668	.19048	.16230	.13980	.12190	.10714
6.0	.44643	.35273	.28571	.23613	.19841	.16906	.14561	.12698	.11161
6.2	.46429	.36684	.29714	.24557	.20635	.17582	.15142	.13206	.11607
6.4	.48214	.38095	.30857	.25502	.21429	.18259	.15723	.13714	.12054
6.6	.50000	.39506	.32000	.26446	.22222	.18935	.16305	.14222	.12500
6.8	.51786	.40907	.33143	.27391	.23016	.19611	.16886	.14730	.12946
7.0	.53571	.42308	.34286	.28335	.23810	.20287	.17467	.15238	.13393
7.2	.55357	.43709	.35429	.29280	.24603	.20964	.18048	.15746	.13839
7.4	.57143	.45110	.36571	.30224	.25397	.21640	.18629	.16254	.14286
7.6	.58929	.46511	.37714	.31169	.26190	.22316	.19210	.16762	.14732
7.8	.60714	.47912	.38857	.32113	.26984	.22992	.19791	.17270	.15178
8.0	.62500	.49313	.40000	.33058	.27778	.23669	.20372	.17778	.15625
8.2	.64286	.50714	.41143	.34002	.28571	.24345	.20953	.18286	.16071
8.4	.66071	.52115	.42286	.34947	.29365	.25021	.21534	.18794	.16518
8.6	.67857	.53515	.43429	.35891	.30159	.25697	.22115	.19302	.16964
8.8	.69643	.54916	.44571	.36836	.30952	.26374	.22697	.19810	.17411
9.0	.71429	.56317	.45714	.37780	.31746	.27050	.23278	.20317	.17857
9.2	.73214	.57718	.46857	.38725	.32540	.27726	.23859	.20825	.18304
9.4	.75000	.59119	.48000	.39669	.33333	.28402	.24440	.21333	.18750
9.6	.76786	.60520	.49142	.40614	.34127	.29079	.25021	.21841	.19196
9.8	.78571	.61921	.50284	.41558	.34921	.29755	.25602	.22349	.19643
10.0	.80357	.63322	.51426	.42503	.35714	.30431	.26183	.22857	.20089

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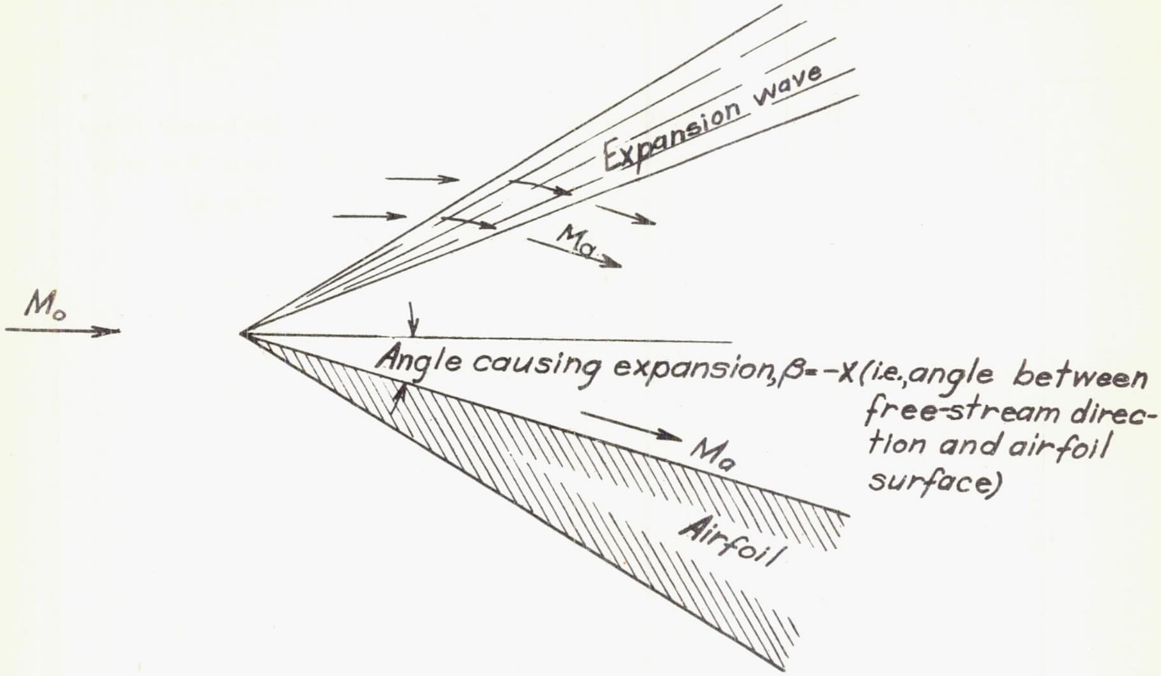
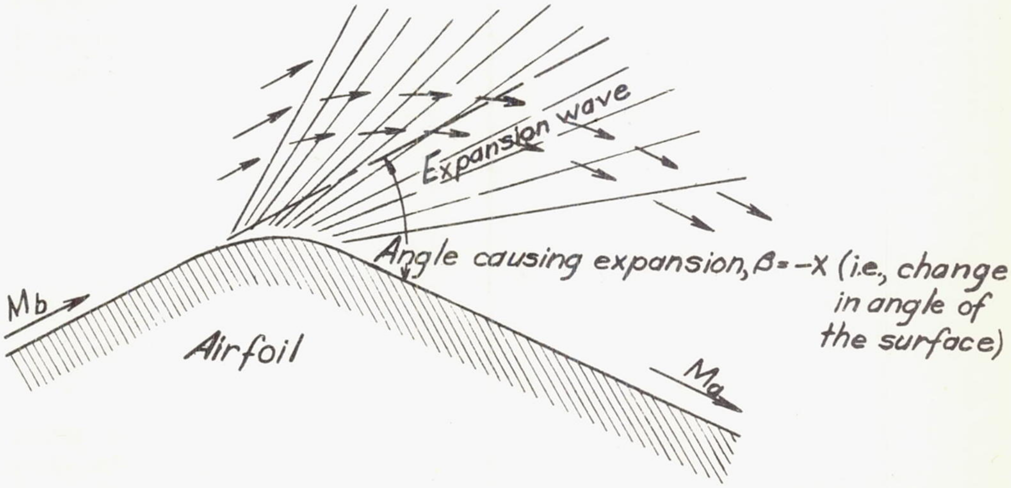


(a) Expansion at leading edge of airfoil.



(b) Expansion along the airfoil.

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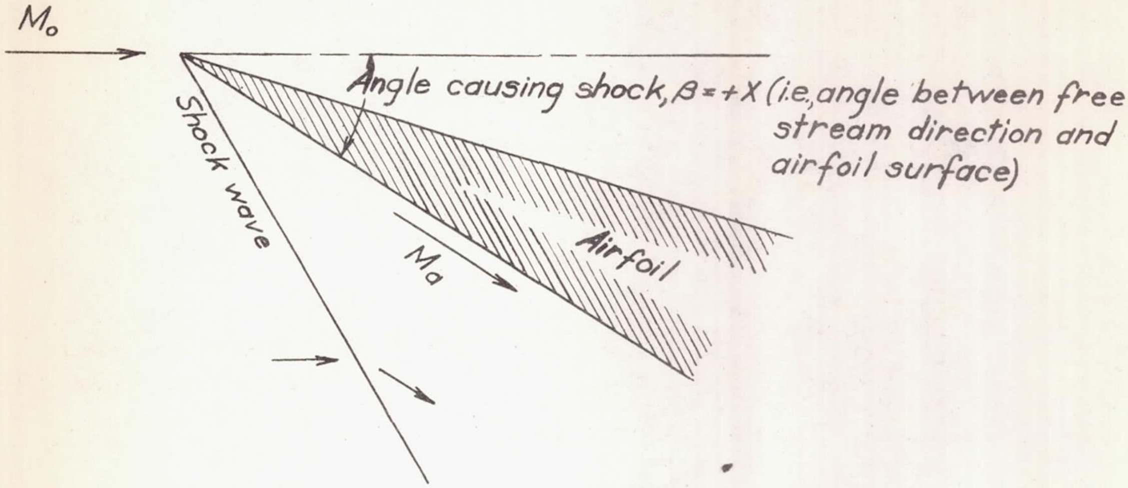
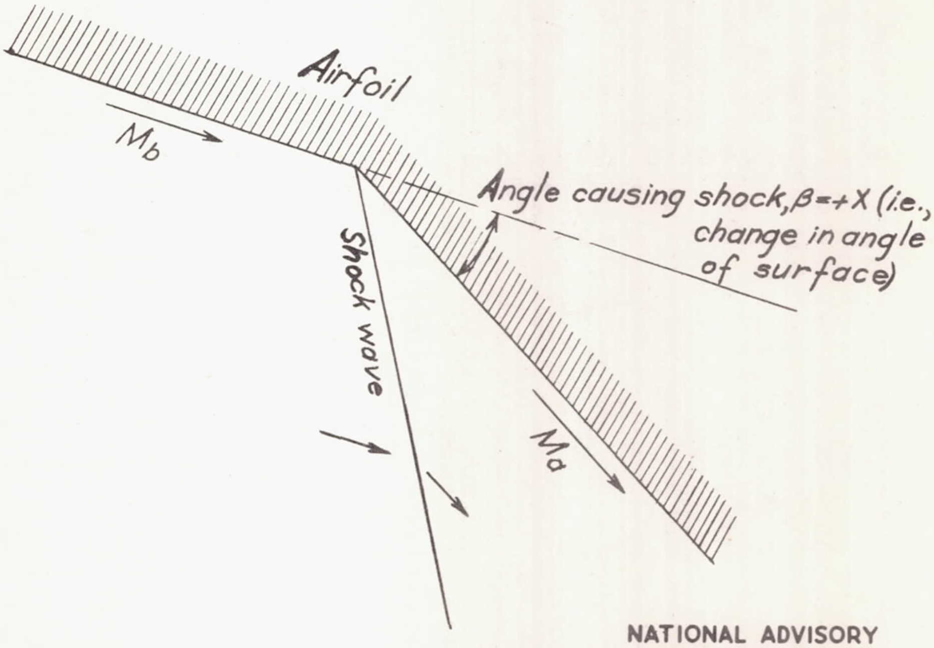
Figure 1.- Method of measuring angle causing expansion. The angle causing expansion is always considered negative.



(a) Shock at leading edge of airfoil.



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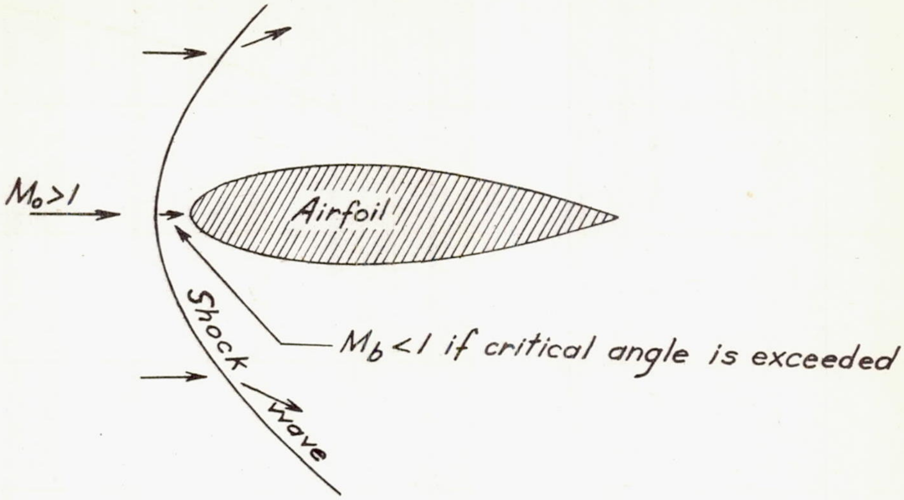
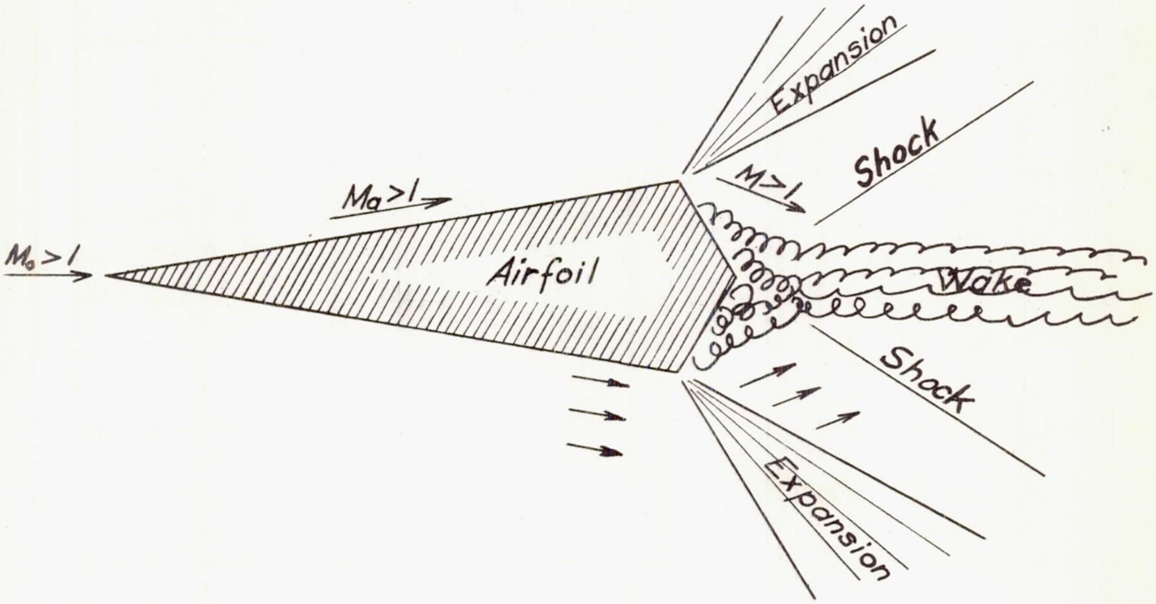
(b) Shock at intermediate point along airfoil.

Figure 2.- Method of measuring angle causing shock. The angle causing shock is always considered positive.



(a) Shock limitation exceeded.



(b) Expansion limitations exceeded. (Turbulent wake set up.)

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Figure 3.- Effect of exceeding the limitation on angles.

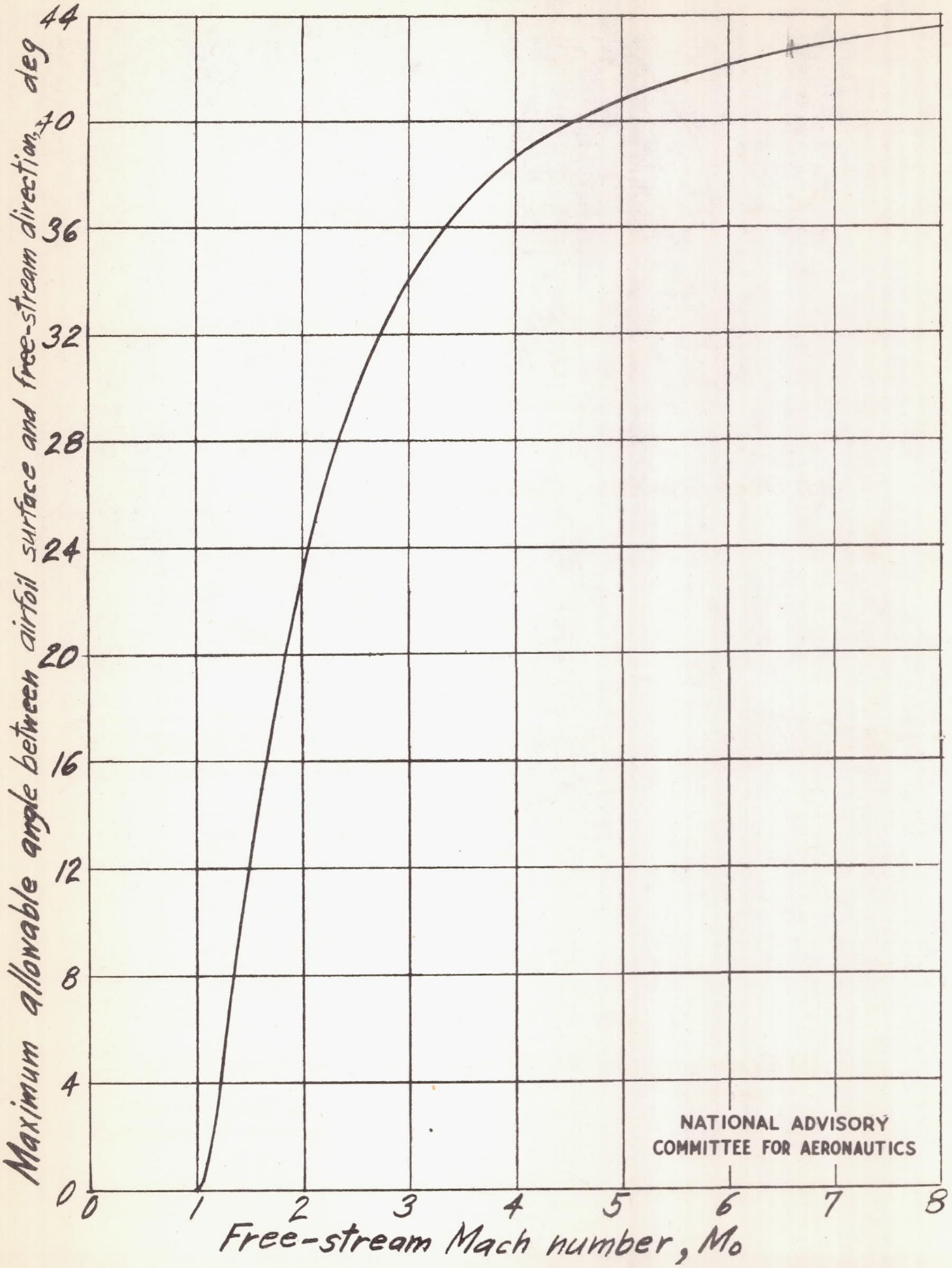

Figure 4.- Surface-angle limitation for attached shock wave.

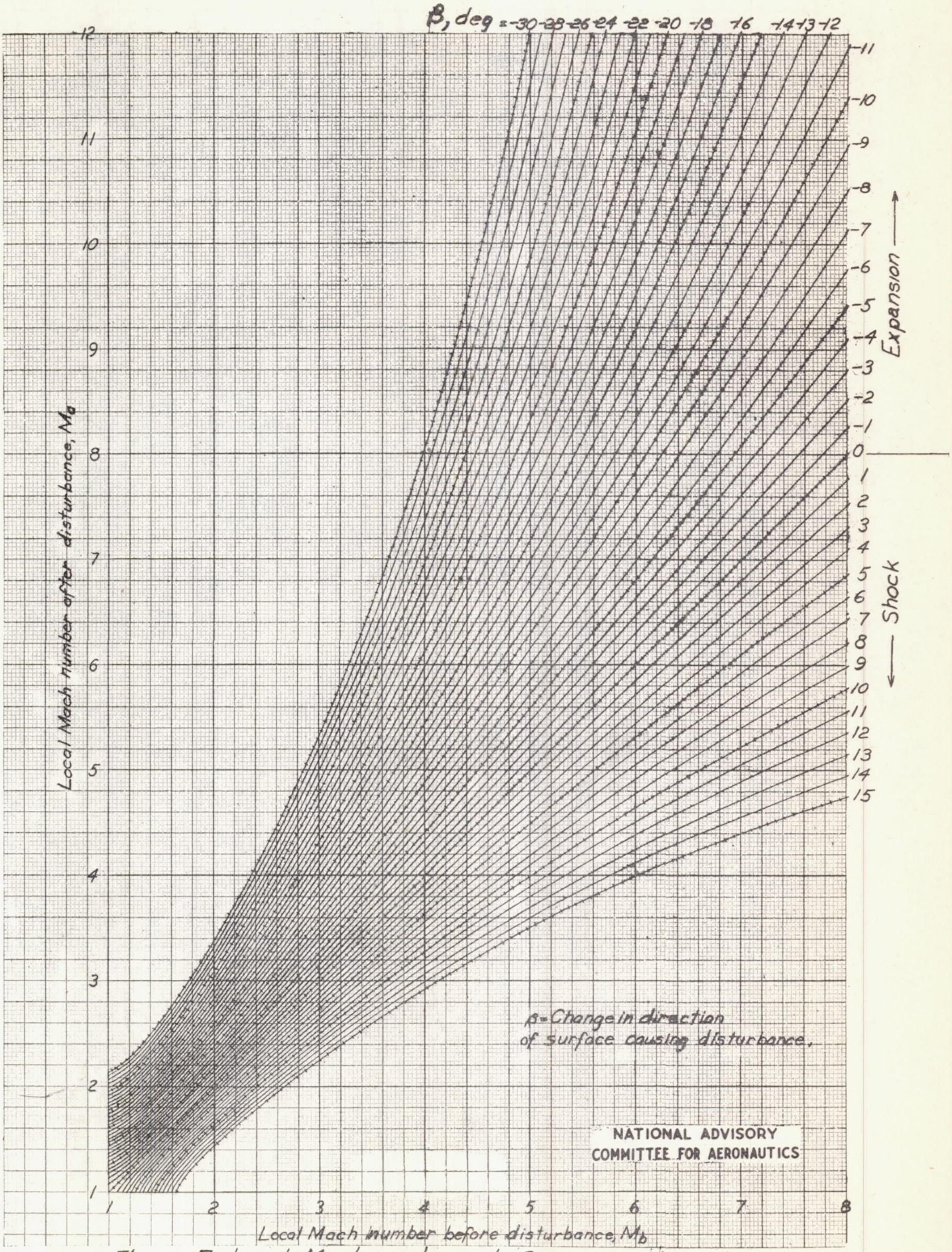

Figure 5.- Local Mach numbers before and after shocks and expansions.

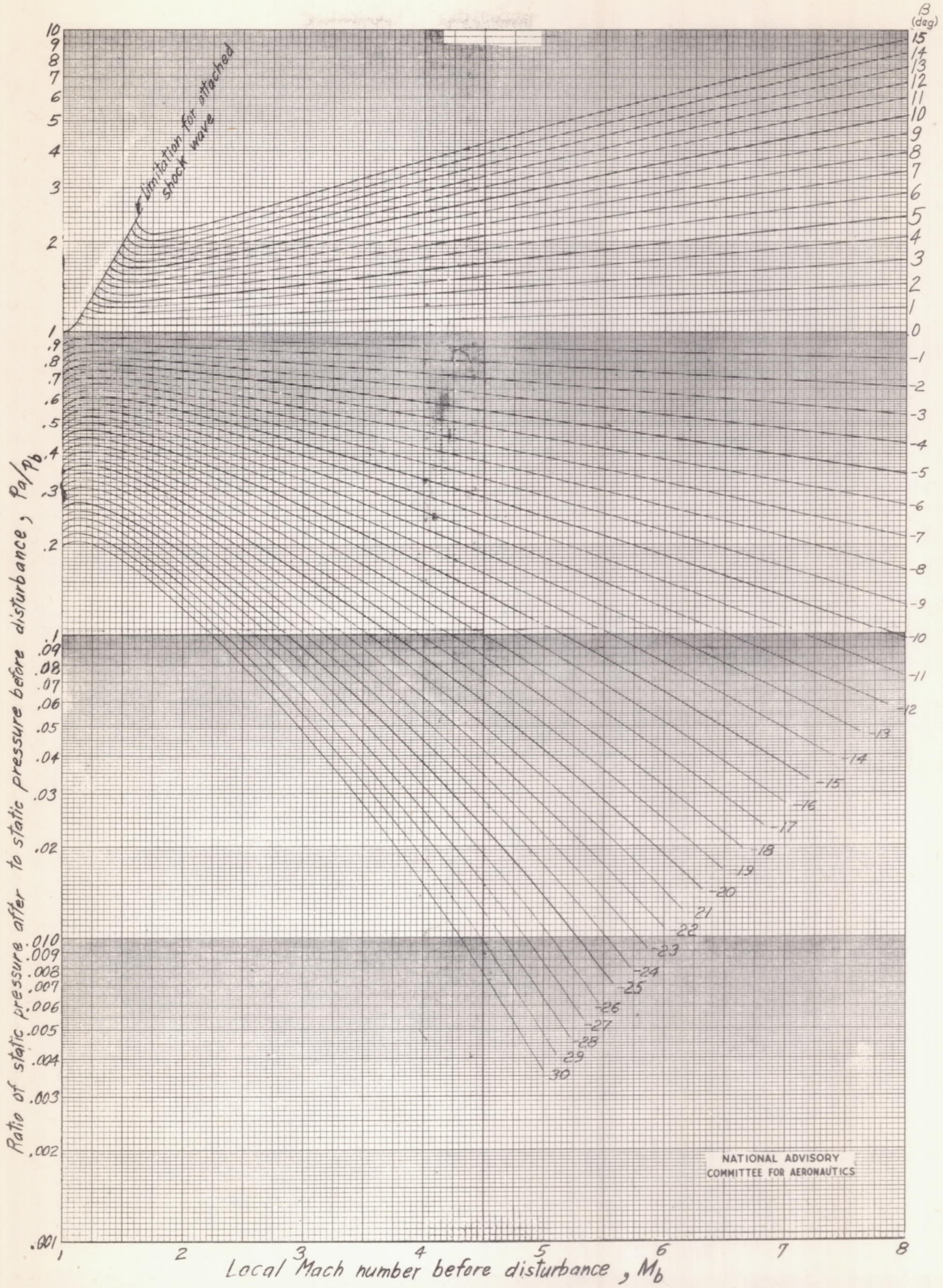

Figure 6.- Static pressure ratio across shock and expansion waves.

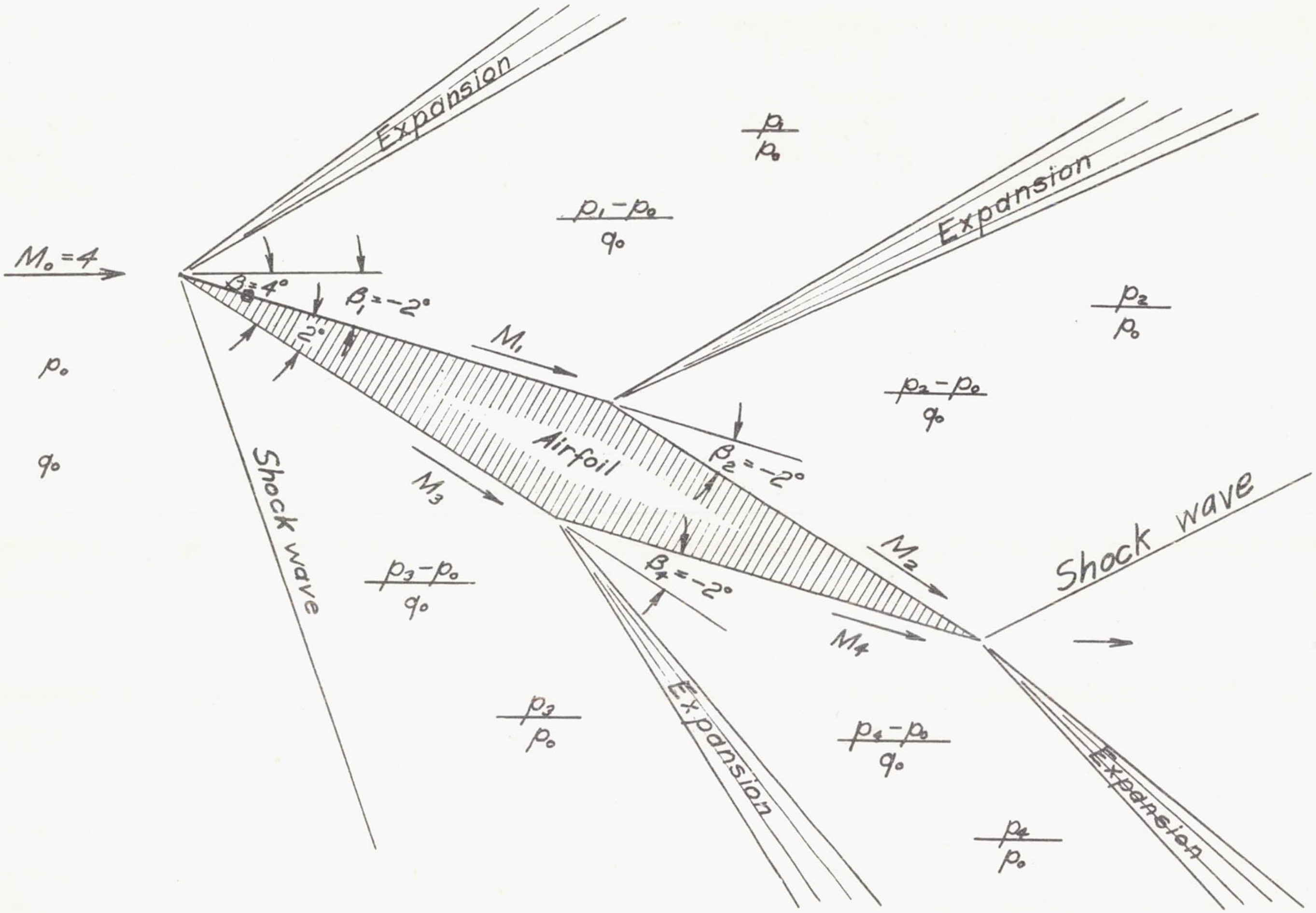

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Figure 7.- Example airfoil (showing conditions to be determined).

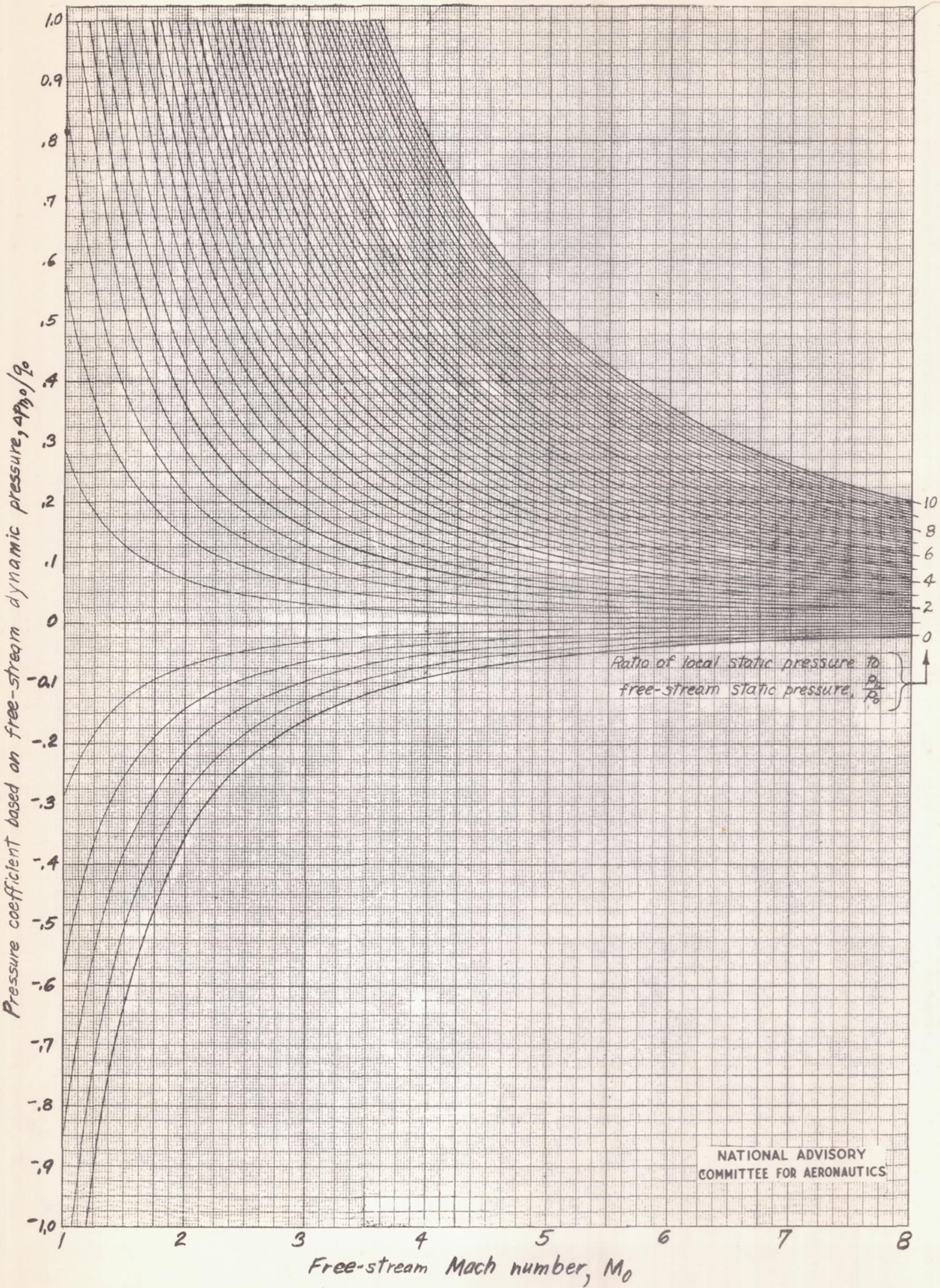

Figure 8.- Determination of pressure coefficients.

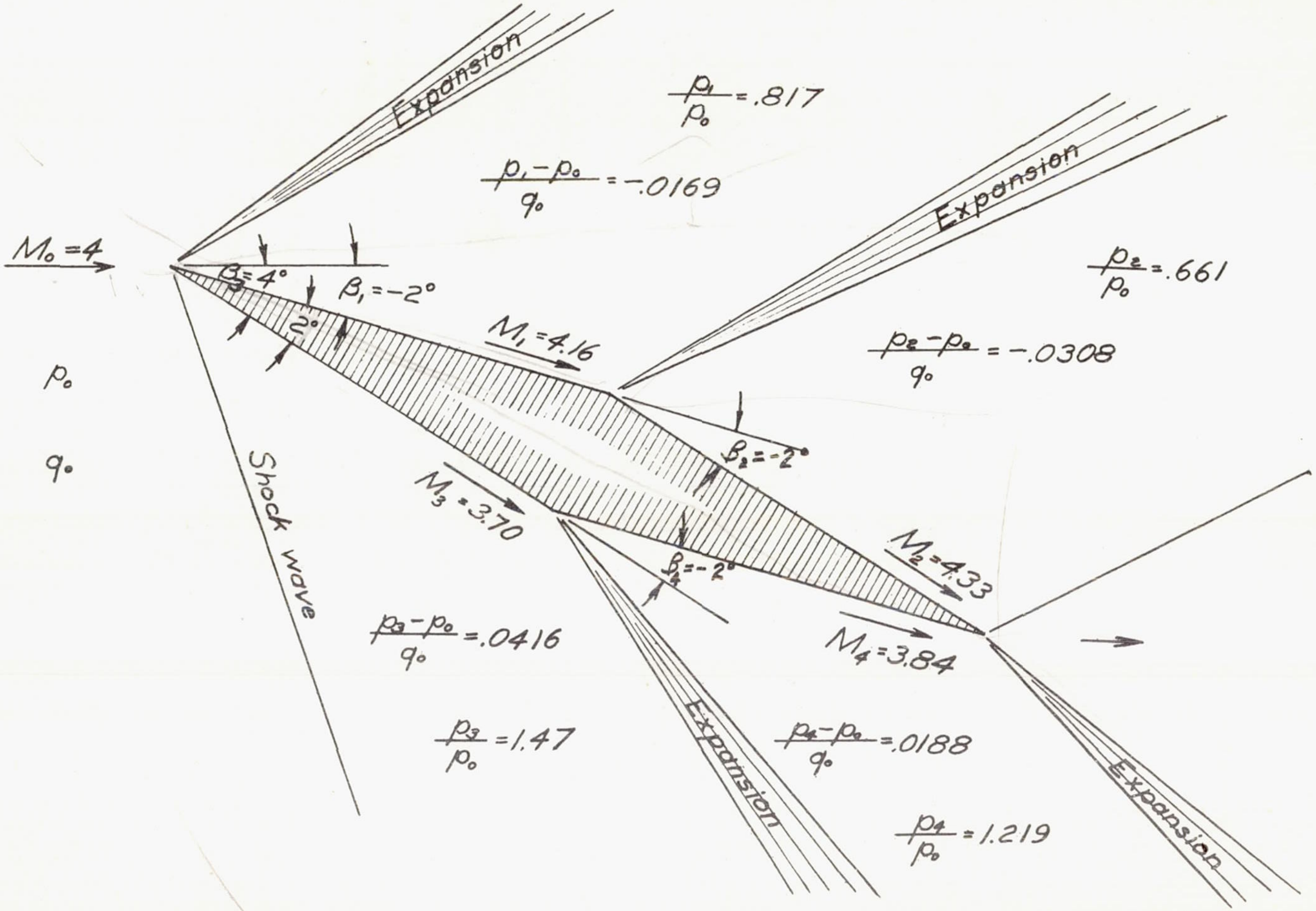

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Figure 9.- Example airfoil (showing results obtained).

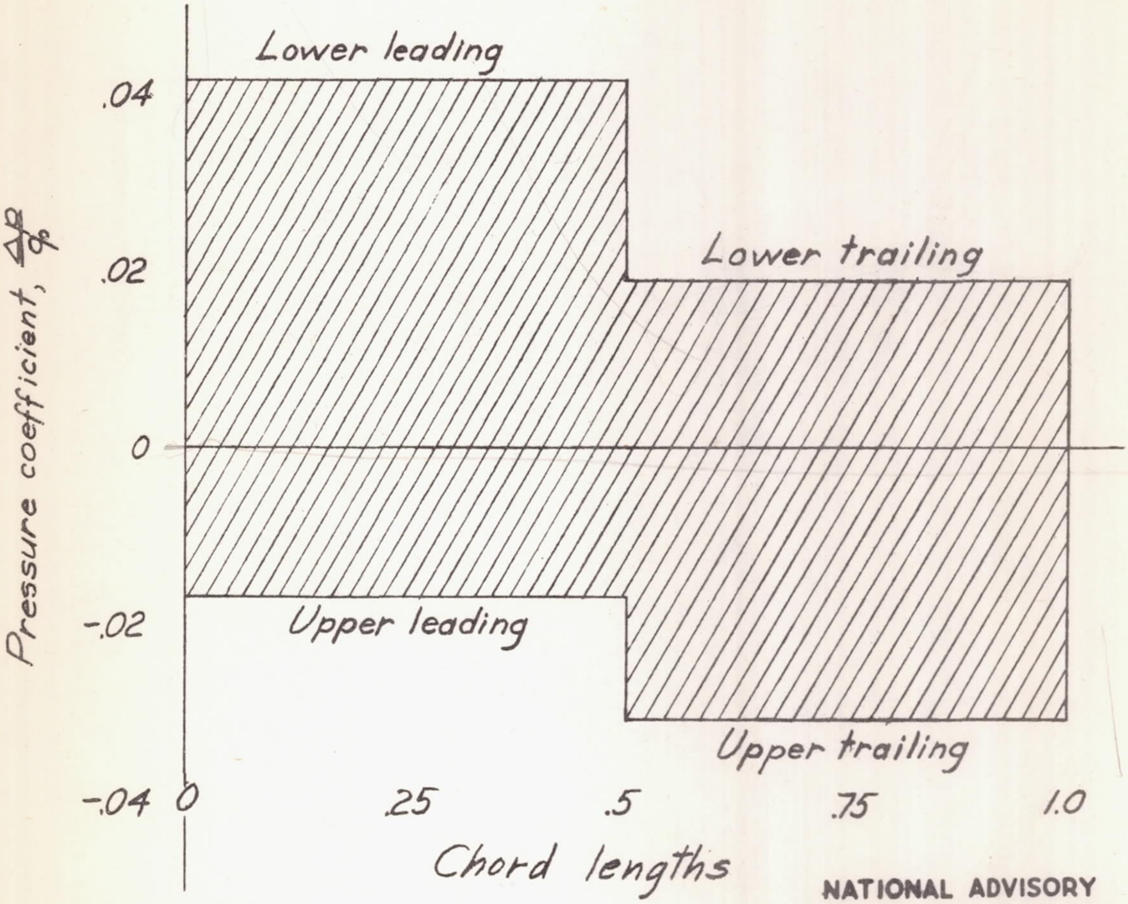

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Figure 10.- Determination of lift coefficient from pressure distribution for example airfoil of figures 7 and 9. Value obtained by integrating shaded area gives lift coefficient, 0.0540.

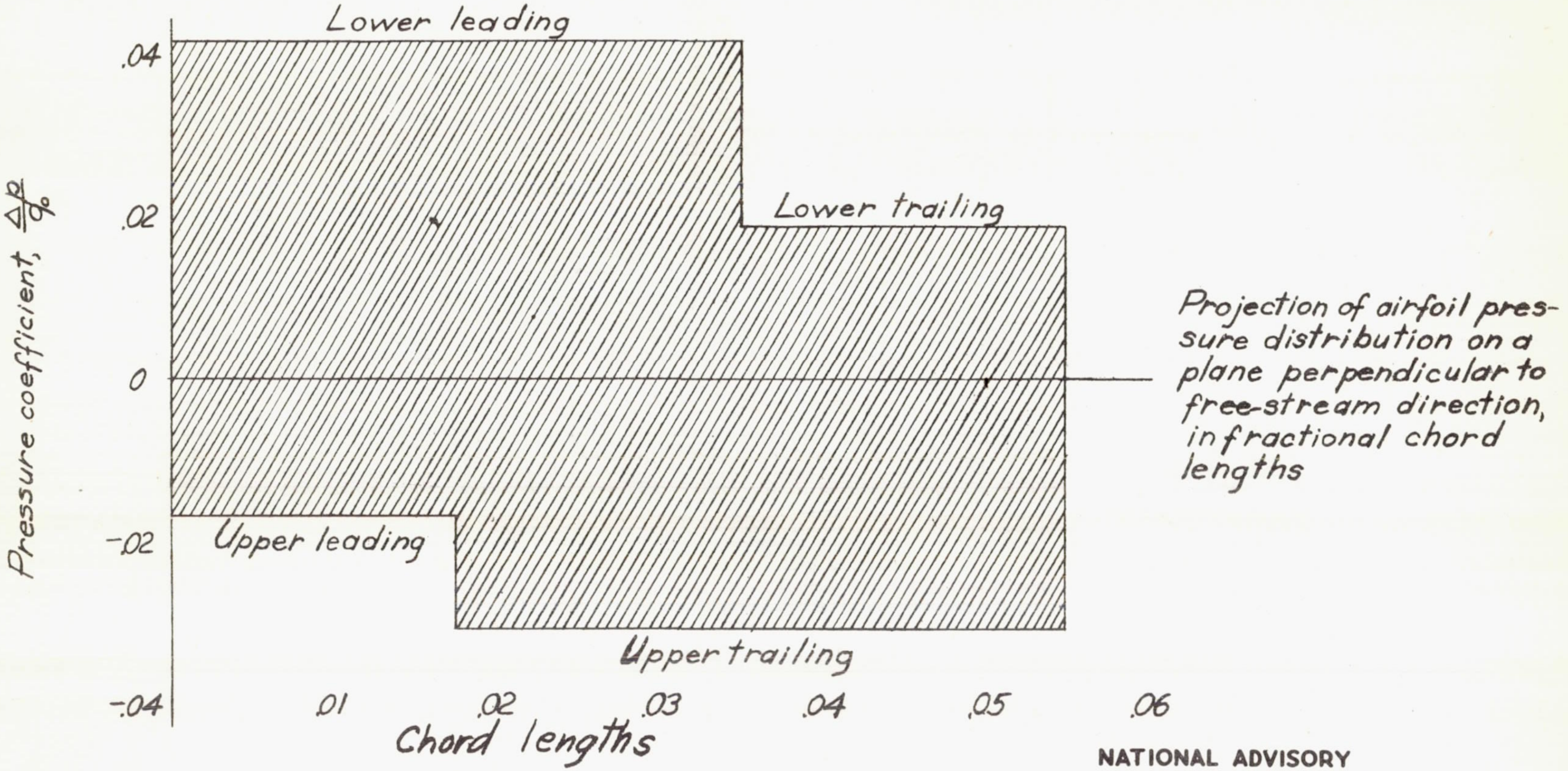

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Figure 11.- Determination of drag coefficient from pressure distribution for example airfoil of figures 7 and 9. Value obtained by integrating shaded area gives pressure drag coefficient, 0.00315.

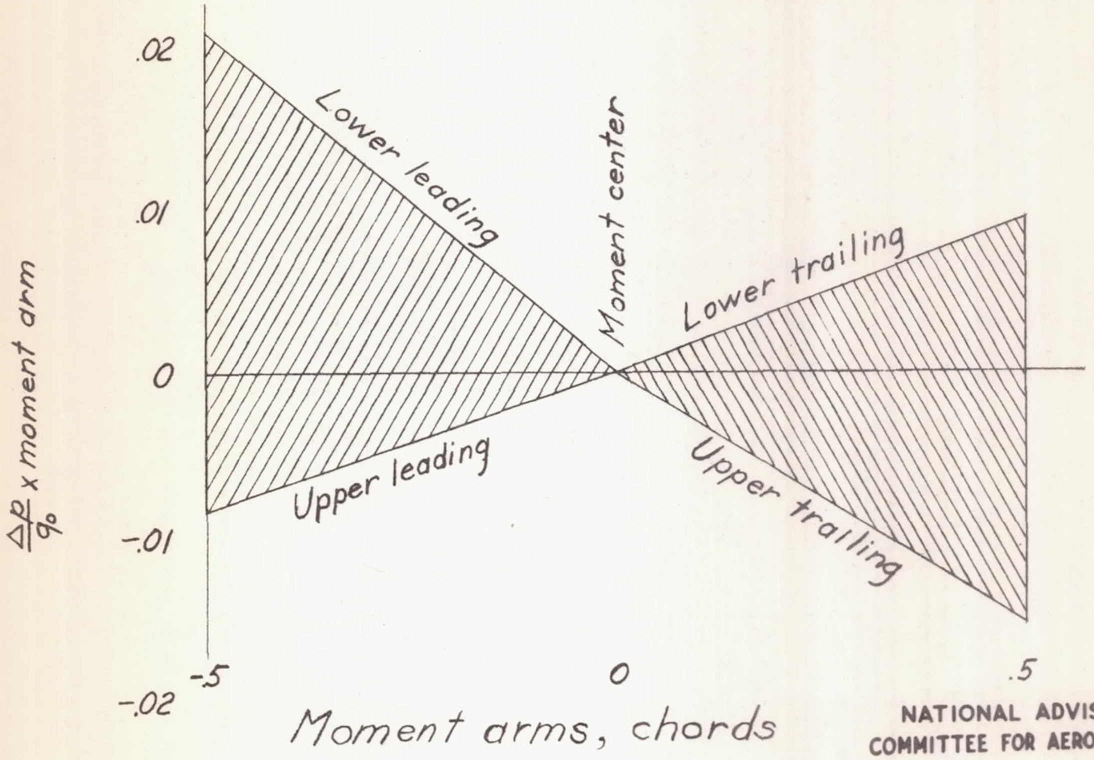

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Figure 12.- Determination of moment coefficient from pressure distribution for example airfoil of figures 7 and 9. If leading and trailing surfaces give moments in the same sense add the area between "upper leading" and "lower leading" to that between "upper trailing" and "lower trailing" lines. The value obtained by integrating shaded area gives the moment coefficient about 0.50 chord, 0.0001112.

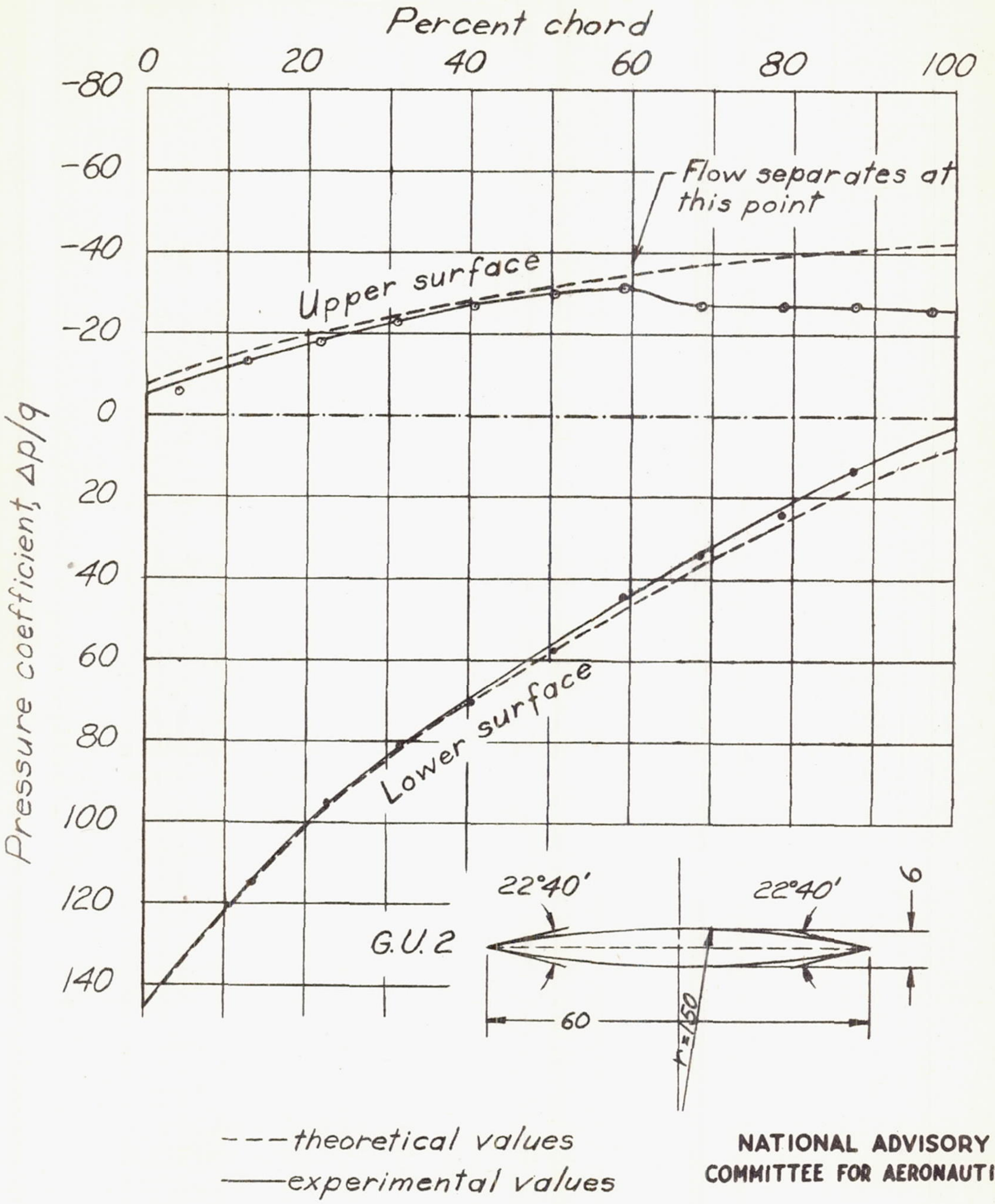

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Figure 13.- Comparison of calculated and experimental results from NACA TM No.946. $\alpha = 14^\circ$; $M_0 = 2.13$; $R = 640,000$; thickness = 0.10 chord.

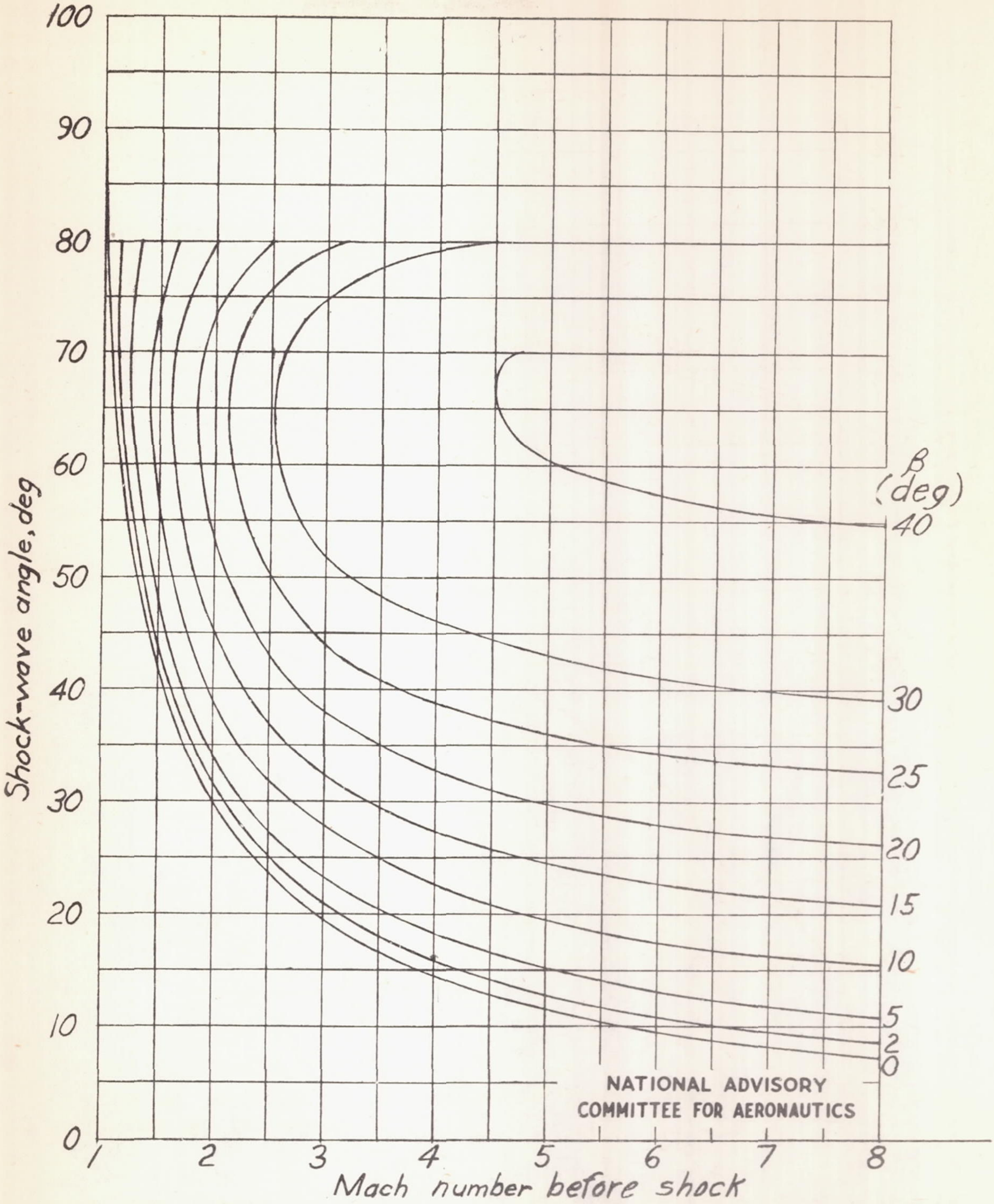

Figure 14.- Shock-wave angle for air.