RESTRICTED

ORDNANCE PAMPHLET NO. 757

CHANGE ENTERED

16-INCH RANGE TABLE

2,300 F.S. INITIAL VELOCITY
TO 36,900 YARDS

OCTOBER 1940

PREFACE

This Ordnance Pamphlet No. 757 replaces the issue previously furnished in blueprint form carrying a date of July, 1939. No change was made in reproducing this pamphlet.

OCTOBER, 1940

NAVY DEPARTMENT
BUREAU OF ORDNANCE
October, 1940.

W. R. FURLONG,
Chief of Bureau.

EXPLANATORY NOTES

1. Columns 1 to 8 give the elements of the standard trajectories and, with the exception of column 6, need no explanation. Column 6 gives the drift for guns rifled with a final twist of one turn in 25 calibers; to obtain the drift for guns rifled with a final twist of one turn in 32 calibers, multiply the figures in column 6 by 0.78.

2. Columns 10 to 19 give the differential effects due to variations from standard conditions. In these columns the effect is to be taken as proportional to the cause. For example, column 13 is tabulated for a 10-knot wind; in case of a 20-knot wind column 13 is to be multiplied by 2.

3. Column 10, although computed for a velocity loss, may be used to determine the change in range due to either plus or minus variations in initial velocity. It is listed as a positive effect in order to avoid minus tabulations.

4. Column 11 gives the effect on the range for a change of ± one pound in weight of projectile, the charge remaining the same.

5. The standard air density at the surface of 1.2034 kg/m^3, used in the computations for this range table, corresponds to a temperature of 59°F, a barometric pressure of 29"53 and a humidity of 78%. Standard density aloft is given on page III, Bulletin of Ordnance Information, O.P. No. 561-I of May, 1923.

6. In entering column 12, which gives the mean effect on the range of ± 10 per cent variation in the density of the air, a ballistic density should be used. A ballistic density is a single fictitious air density, constant in magnitude, which would have the same total effect on the projectile during flight as the actual densities at the various altitudes. A method of making up a ballistic density is given in Bulletin of Ordnance Information, O.P. No. 561-I of May, 1923.

7. When ballistic density is not available and surface conditions only are known use Plate 1, which gives results corresponding to an AVERAGE ballistic density.

8. Column 12 also gives the mean effect on the range of ± 10 per cent variation in the ballistic coefficient.

9. Columns 13 and 16 give the effects of a 10-knot ballistic wind, which is the combined weighted winds in the several vertical zones of the trajectory. When, however, no

measured or estimated upper air winds can be obtained, the surface true wind must necessarily be used in entering these columns. Methods of making up ballistic wind are given in Bulletin of Ordnance Information, O.P. No. 561-I of May, 1923, and in Method of Computing Range Tables, O.P. No. 500 of April, 1929.

10. Column 19 shows how much the point of impact is raised or lowered on a vertical screen by raising or lowering the sight bar 100 yards, the actual range remaining fixed.

11. The change in range due to a variation of ± 1 minute in the angle of elevation may be deduced from column 2b.

12. The powder is assumed to give normal velocity at 90°F. For each degree increase in temperature the initial velocity is increased approximately 2 f.s.; a decrease in temperature causes a corresponding decrease in velocity.

13. The firings upon which this range table is based are summarized below:

TARGET PROJECTILES TYPE C MARK IX, MODS.

Ranging Sheet	No. of Rds.	Elevation	I.V.	Fall of Shot, (Actual)		
				Range	Mean Error	Pattern
			F.S.	Yds.	Yds.	Yds.
	16"/45 Cal. Gun, Mark VI, Rifling 1/25					
168	2	15°	2286	20593	±28	56
170	5	16°	2244	21016	±40	122
170	5	40°	2249	35002	±126	405
171	5	40°	2244	34921	±163	437
171	5	16°	2230	20701	+90	279

PLATE 1

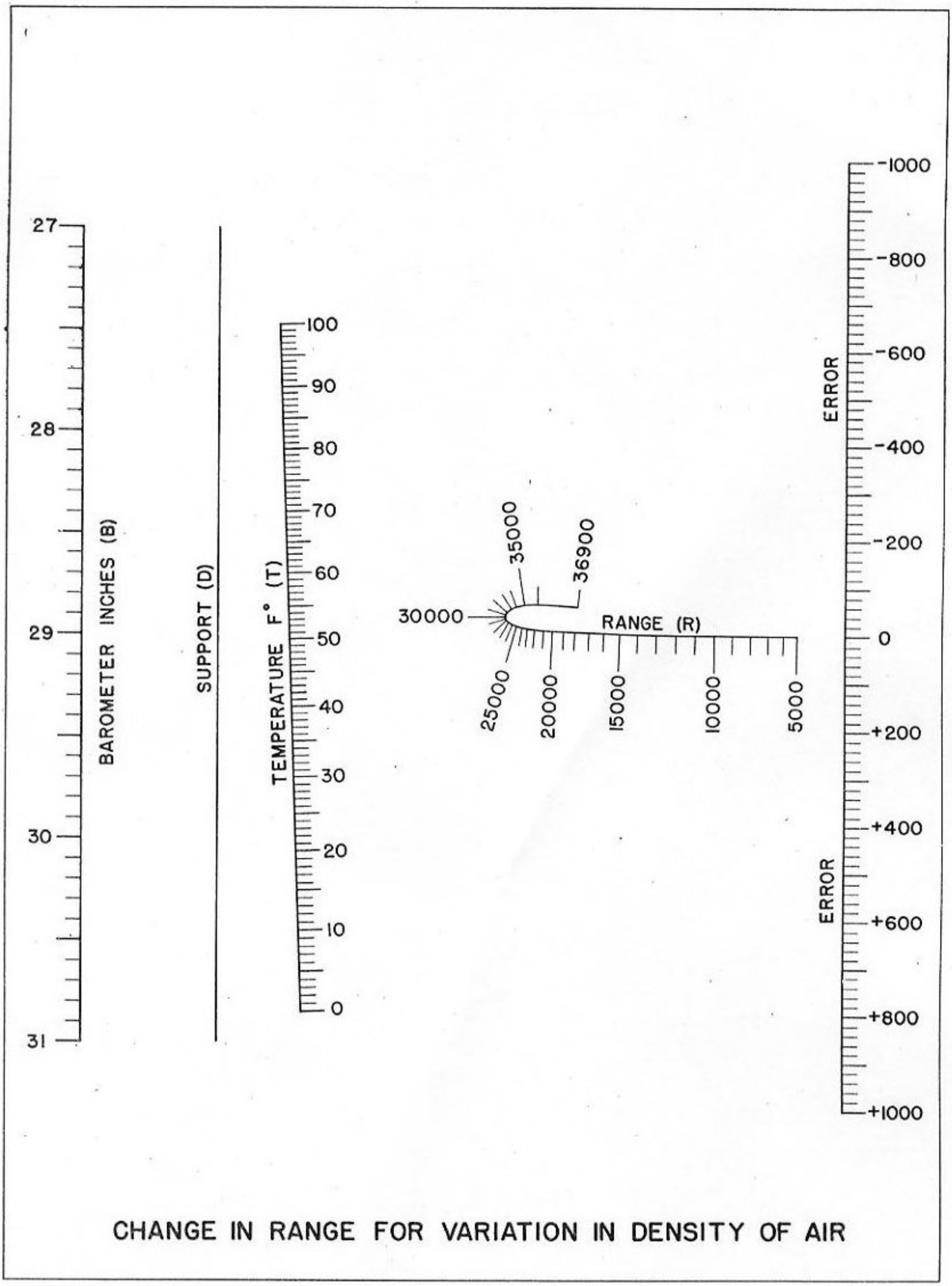
INSTRUCTIONS

Align B and T to get point on support D.
Align D with R to get error in yards due to change in density of air.

EXAMPLE:

Given--Barometer- - - - - - - -	inches	= 28.4
Temperature- - - - - - -	degrees F	= 85
Range - - - - - - - - - -	yards	= 20000
Result-Error- - - - - - - - - -	yards	= +330

NOTE: The best estimate of ballistic density to different altitudes is in very close, but not in exact agreement with standard density when surface conditions are standard. When surface density is not standard, the disagreement is usually greater and is a function of surface density and maximum ordinate. In O.P. 561-I of May, 1923, pp. 98-114, corrections for density are discussed. The use of Plate 1 will not give agreement with results obtained from column 12 and surface observations only, but should be a more accurate figure, in that it takes into account the ratio between mean measured and standard density for the actual maximum ordinate obtained.



CHANGE IN RANGE FOR VARIATION IN DENSITY OF AIR

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation		Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2		2a	2b	3	4	5	6	7	8	
Yards	°	′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
1000		31.6	31.6	3.2	32	1.31	2257	.2	1000	7	
1100		34.8	34.8	3.2	35	1.45	2253	.3	1100		
1200		38.0	38.0	3.2	39	1.58	2248	.3	1200		
1300		41.2	41.2	3.2	42	1.71	2244	.4	1300		
1400		44.4	44.4	3.2	45	1.84	2240	.4	1400		
1500		47.6	47.6	3.3	49	1.98	2236	.5	1500	16	
1600		50.9	50.9	3.3	52	2.11	2232	.5	1600		
1700		54.2	54.2	3.3	55	2.24	2227	.6	755		
1800		57.5	57.5	3.3	59	2.38	2223	.6	572		
1900	1	00.8	60.8	3.3	1 02	2.51	2219	.7	500		
2000	1	04.1	64.1	3.3	1 05	2.65	2215	.7	448	28	
2100	1	07.4	67.4	3.3	1 09	2.78	2211	.8	410		
2200	1	10.7	70.7	3.3	1 12	2.92	2206	.9	380		
2300	1	14.0	74.0	3.3	1 16	3.06	2202	1.0	355		
2400	1	17.3	77.3	3.3	1 19	3.19	2198	1.1	334		
2500	1	20.6	80.6	3.3	1 23	3.33	2194	1.2	315	44	
2600	1	23.9	83.9	3.4	1 26	3.47	2190	1.3	298		
2700	1	27.3	87.3	3.4	1 30	3.61	2185	1.4	283		
2800	1	30.7	90.7	3.4	1 33	3.74	2181	1.5	269		
2900	1	34.1	94.1	3.4	1 37	3.88	2177	1.6	257		
3000	1	37.5	97.5	3.4	1 40	4.02	2173	1.7	246	65	

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INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	9	2	4	0	7	7.4	.2	7.3	7.4	3
	9	3	5	0	8	8.1	.2	7.9	8.1	4
	10	3	5	1	8	8.9	.3	8.5	8.9	4
	11	3	5	1	9	9.6	.4	9.2	9.6	4
	12	4	6	1	10	10.4	.4	10.0	10.4	5
	13	4	6	1	11	11.1	.4	10.8	11.1	5
	14	4	7	1	11	11.9	.4	11.5	11.9	5
	15	4	7	1	12	12.6	.4	12.2	12.6	5
	16	5	8	1	13	13.4	.5	12.9	13.4	6
	17	5	9	1	13	14.1	.5	13.6	14.1	6
	17	5	9	1	14	14.9	.5	14.3	14.9	6
	17	5	10	1	15	15.6	.5	15.1	15.6	7
	18	6	11	1	15	16.4	.6	15.8	16.4	7
	19	6	11	1	16	17.2	.6	16.5	17.2	7
	20	6	12	1	17	17.9	.6	17.3	17.9	7
	21	6	13	1	17	18.7	.7	18.0	18.7	8
	21	6	13	1	18	19.5	.7	18.8	19.5	8
	22	7	14	1	19	20.3	.8	19.5	20.3	8
	23	7	15	1	20	21.0	.8	20.2	21.0	9
	24	7	16	2	20	21.8	.8	21.0	21.8	9
	25	7	16	2	21	22.6	.8	21.8	22.6	9

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1	2	2a	2b	3	4	5	6	7	8	
Yards	° ′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
3000	1 37.5	97.5	3.4	1 40	4.02	2173	2	246	65	
3100	1 40.9	100.9	3.4	1 44	4.16	2169	2	236		
3200	1 44.3	104.3	3.4	1 47	4.29	2164	2	226		
3300	1 47.7	107.7	3.4	1 51	4.43	2160	2	217		
3400	1 51.1	111.1	3.4	1 55	4.57	2156	2	209		
3500	1 54.5	114.5	3.4	1 58	4.71	2152	3	202	90	
3600	1 57.9	117.9	3.4	2 02	4.85	2148	3	195		
3700	2 01.3	121.3	3.5	2 06	4.99	2144	3	188		
3800	2 04.8	124.8	3.5	2 09	5.13	2139	3	182		
3900	2 08.3	128.3	3.5	2 13	5.27	2135	3	177		
4000	2 11.8	131.8	3.5	2 17	5.41	2131	3	171	118	
4100	2 15.3	135.3	3.5	2 21	5.55	2127	3	166		
4200	2 18.8	138.8	3.5	2 25	5.69	2123	3	162		
4300	2 22.3	142.3	3.5	2 29	5.83	2119	4	157		
4400	2 25.8	145.8	3.5	2 33	5.97	2115	4	153		
4500	2 29.3	149.3	3.5	2 36	6.11	2110	4	149	150	
4600	2 32.8	152.8	3.5	2 40	6.25	2106	4	145		
4700	2 36.3	156.3	3.6	2 44	6.40	2102	4	142		
4800	2 39.9	159.9	3.6	2 48	6.54	2098	5	138		
4900	2 43.5	163.5	3.6	2 52	6.68	2094	5	135		
5000	2 47.1	167.1	3.6	2 56	6.83	2090	5	132	187	

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	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	25	7	16	2	21	23	1	22	23	9
	25	7	17	2	22	23	1	22	23	10
	26	8	18	2	22	23	1	23	23	10
	27	8	19	2	23	24	1	24	24	10
	28	8	20	2	24	25	1	25	25	10
	29	8	20	2	24	26	1	25	26	11
	30	8	21	2	25	27	1	26	27	11
	30	9	22	2	26	28	1	27	28	11
	31	9	23	3	26	29	1	28	29	12
	32	9	24	3	27	30	1	28	30	12
	33	9	25	3	28	30	1	29	30	12
	34	9	26	3	28	31	1	30	31	13
	34	10	27	3	29	32	2	30	32	13
	35	10	28	3	30	33	2	31	33	13
	36	10	29	3	30	34	2	32	34	13
	37	10	30	3	31	34	2	33	34	14
	38	10	31	3	32	35	2	33	35	14
	39	11	32	3	32	36	2	34	36	14
	39	11	33	4	33	37	2	35	37	15
	40	11	34	4	34	38	2	36	38	15
	41	11	35	4	34	38	2	36	38	15

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1	2	2a	2b	3	4	5	6	7	8	
Yards	° ′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
5000	2 47.1	167.1	3.6	2 56	6.83	2090	5	132	187	
5100	2 50.7	170.7	3.6	3 00	6.97	2086	5	129		
5200	2 54.3	174.3	3.6	3 04	7.11	2082	5	126		
5300	2 57.9	177.9	3.6	3 09	7.26	2078	6	123		
5400	3 01.5	181.5	3.6	3 13	7.40	2074	6	121		
5500	3 05.1	185.1	3.6	3 17	7.55	2070	6	118	229	
5600	3 08.7	188.7	3.6	3 21	7.69	2066	6	115		
5700	3 12.3	192.3	3.7	3 26	7.84	2062	6	113		
5800	3 16.0	196.0	3.7	3 30	7.99	2058	7	110		
5900	3 19.7	199.7	3.7	3 34	8.13	2054	7	108		
6000	3 23.4	203.4	3.7	3 38	8.28	2050	7	106	275	
6100	3 27.1	207.1	3.7	3 42	8.43	2046	7	104		
6200	3 30.8	210.8	3.7	3 47	8.58	2042	8	102		
6300	3 34.5	214.5	3.7	3 51	8.72	2038	8	100		
6400	3 38.2	218.2	3.7	3 55	8.87	2034	8	98		
6500	3 41.9	221.9	3.7	4 00	9.02	2030	8	97	326	
6600	3 45.6	225.6	3.7	4 04	9.17	2027	9	95		
6700	3 49.3	229.3	3.8	4 09	9.32	2023	9	93		
6800	3 53.1	233.1	3.8	4 13	9.47	2019	9	92		
6900	3 56.9	236.9	3.8	4 18	9.62	2015	10	90		
7000	4 00.7	240.7	3.8	4 22	9.77	2011	10	89	383	

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	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	41	11	35	4	34	38	2	36	38	15
	41	11	36	4	35	39	2	37	39	16
	42	12	37	4	36	40	2	38	40	16
	43	12	38	4	37	41	2	39	41	16
	44	12	39	4	37	42	2	39	42	17
	45	12	41	5	38	43	2	40	43	17
	45	12	42	5	38	43	2	41	43	17
	46	13	43	5	39	44	3	41	44	18
	47	13	44	5	40	45	3	42	45	19
	48	13	46	5	40	46	3	43	46	19
	49	13	47	5	41	47	3	44	47	19
	49	13	48	5	42	47	3	45	47	19
	50	14	50	6	42	48	3	45	48	20
	51	14	51	6	43	49	3	46	49	20
	52	14	52	6	44	50	3	47	50	20
	53	14	54	6	45	51	3	47	51	21
	53	14	55	6	45	52	3	48	52	21
	54	15	56	7	46	52	3	49	52	21
	55	15	58	7	46	53	3	50	53	22
	55	15	59	7	47	54	4	50	54	22
	56	15	61	7	48	55	4	51	55	23

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1	2		2a	2b	3	4	5	6	7	8	
Yards	°	′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
7000	4	00.7	240.7	3.8	4 22	9.77	2011	10	89	383	
7100	4	04.5	244.5	3.8	4 27	9.92	2007	10	87		
7200	4	08.3	248.3	3.8	4 31	10.07	2004	11	86		
7300	4	12.1	252.1	3.8	4 36	10.23	2000	11	85		
7400	4	15.9	255.9	3.8	4 40	10.38	1996	11	83		
7500	4	19.7	259.7	3.8	4 45	10.53	1992	12	82	445	
7600	4	23.5	263.5	3.9	4 49	10.68	1988	12	81		
7700	4	27.4	267.4	3.9	4 54	10.84	1985	12	80		
7800	4	31.3	271.3	3.9	4 58	10.99	1981	13	78		
7900	4	35.2	275.2	3.9	5 03	11.14	1977	13	77		
8000	4	39.1	279.1	3.9	5 08	11.30	1973	13	76	513	
8100	4	43.0	283.0	3.9	5 13	11.45	1970	14	75		
8200	4	46.9	286.9	3.9	5 18	11.61	1966	14	74		
8300	4	50.8	290.8	3.9	5 23	11.76	1962	14	73		
8400	4	54.7	294.7	3.9	5 28	11.92	1958	15	72		
8500	4	58.6	298.6	4.0	5 32	12.08	1955	15	71	586	
8600	5	02.6	302.6	4.0	5 37	12.23	1951	15	70		
8700	5	06.6	306.6	4.0	5 42	12.39	1947	16	69		
8800	5	10.6	310.6	4.0	5 47	12.55	1944	16	68		
8900	5	14.6	314.6	4.0	5 52	12.71	1940	16	67		
9000	5	18.6	318.6	4.0	5 57	12.86	1936	17	66	665	

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	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	56	15	61	7	48	55	4	51	55	23
	57	15	62	7	49	56	4	52	56	23
	58	15	64	8	49	57	4	53	57	23
	59	16	65	8	50	58	4	54	58	24
	59	16	67	8	50	58	4	54	58	24
	60	16	68	8	51	59	4	55	59	25
	61	16	70	8	52	60	4	56	60	25
	61	16	72	9	52	61	4	57	61	25
	62	16	73	9	53	62	5	57	62	26
	63	16	75	9	54	63	5	58	63	26
	64	17	77	9	54	64	5	59	64	27
	65	17	79	9	55	64	5	59	64	27
	65	17	80	10	56	65	5	60	65	27
	66	17	82	10	56	66	5	61	66	28
	67	17	84	10	57	67	5	62	67	28
	68	17	86	10	58	68	5	63	68	29
	68	17	88	11	58	69	6	63	69	29
	69	18	90	11	59	70	6	64	70	29
	70	18	92	11	59	71	6	65	71	30
	71	18	94	11	60	72	6	65	72	30
	71	18	96	11	61	72	6	66	72	31

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation	Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2	2a	2b	3	4	5	6	7	8	
Yards	° ′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
9000	5 18.6	318.6	4.0	5 57	12.86	1936	17	66	665	
9100	5 22.6	322.6	4.0	6 02	13.02	1933	17	65		
9200	5 26.6	326.6	4.0	6 07	13.18	1929	18	64		
9300	5 30.6	330.6	4.1	6 12	13.34	1925	18	63		
9400	5 34.7	334.7	4.1	6 17	13.49	1922	19	62		
9500	5 38.8	338.8	4.1	6 23	13.65	1918	19	61	749	
9600	5 42.9	342.9	4.1	6 28	13.81	1914	20	60		
9700	5 47.0	347.0	4.1	6 33	13.97	1911	20	60		
9800	5 51.1	351.1	4.1	6 38	14.13	1907	21	59		
9900	5 55.2	355.2	4.1	6 43	14.29	1904	21	58		
10000	5 59.3	359.3	4.1	6 48	14.45	1900	22	57	839	
10100	6 03.4	363.4	4.2	6 53	14.61	1897	22	56		
10200	6 07.6	367.6	4.2	6 59	14.77	1893	23	55		
10300	6 11.8	371.8	4.2	7 04	14.93	1890	23	54		
10400	6 16.0	376.0	4.2	7 09	15.09	1886	24	54		
10500	6 20.2	380.2	4.2	7 15	15.26	1883	24	53	936	
10600	6 24.4	384.4	4.2	7 20	15.42	1879	25	52		
10700	6 28.6	388.6	4.2	7 25	15.58	1876	25	51		
10800	6 32.8	392.8	4.2	7 31	15.75	1872	26	50		
10900	6 37.0	397.0	4.3	7 36	15.91	1869	26	50		
11000	6 41.3	401.3	4.3	7 41	16.08	1865	27	49	1039	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	71	18	96	11	61	72	6	66	72	31
	72	18	98	12	61	73	6	67	73	31
	73	18	100	12	62	74	6	68	74	32
	73	19	102	12	63	75	6	69	75	32
	74	19	104	13	63	76	7	69	76	33
	75	19	106	13	64	77	7	70	77	33
	75	19	108	13	65	78	7	71	78	34
	76	19	111	13	65	79	7	71	79	34
	77	19	113	14	66	80	7	72	80	35
	77	19	115	14	67	80	7	73	80	35
	78	20	117	14	67	81	7	74	81	36
	79	20	120	14	68	82	7	75	82	36
	80	20	122	15	68	83	8	75	83	37
	81	20	124	15	69	84	8	76	84	37
	81	20	127	15	70	85	8	77	85	37
	82	20	129	15	71	86	8	78	86	38
	83	20	131	16	71	87	9	78	87	38
	83	20	134	16	72	88	9	79	88	39
	84	21	136	16	72	89	9	80	89	39
	85	21	139	16	73	90	9	81	90	39
	86	21	141	17	74	91	9	81	91	40

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RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation	Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2	2a	2b	3	4	5	6	7	8	
Yards	° ′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
11000	6 41.3	401.3	4.3	7 41	16.08	1865	27	49	1039	
11100	6 45.6	405.6	4.3	7 47	16.24	1862	27	48		
11200	6 49.9	409.9	4.3	7 52	16.41	1858	28	47		
11300	6 54.2	414.2	4.3	7 58	16.57	1855	29	47		
11400	6 58.5	418.5	4.3	8 03	16.74	1851	29	46		
11500	7 02.8	422.8	4.3	8 09	16.91	1848	30	45	1149	
11600	7 07.1	427.1	4.4	8 14	17.07	1844	31	45		
11700	7 11.5	431.5	4.4	8 20	17.24	1841	31	44		
11800	7 15.9	435.9	4.4	8 25	17.41	1838	32	44		
11900	7 20.3	440.3	4.4	8 31	17.58	1834	33	43		
12000	7 24.7	444.7	4.4	8 37	17.74	1831	33	43	1265	
12100	7 29.1	449.1	4.4	8 43	17.91	1827	34	42		
12200	7 33.5	453.5	4.5	8 49	18.08	1824	35	42		
12300	7 38.0	458.0	4.5	8 55	18.25	1821	35	41		
12400	7 42.5	462.5	4.5	9 01	18.41	1817	36	41		
12500	7 47.0	467.0	4.5	9 06	18.58	1814	37	40	1388	
12600	7 51.5	471.5	4.5	9 12	18.75	1811	37	40		
12700	7 56.0	476.0	4.5	9 18	18.92	1807	38	40		
12800	8 00.5	480.5	4.5	9 24	19.09	1804	39	39		
12900	8 05.0	485.0	4.5	9 30	19.26	1801	39	39		
13000	8 09.5	489.5	4.6	9 36	19.43	1797	40	39	1518	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	86	21	141	17	74	91	9	81	91	40
	86	21	144	17	74	91	9	82	91	40
	87	21	146	17	75	92	9	83	92	41
	88	21	149	18	76	93	9	84	93	41
	88	21	152	18	76	94	10	84	94	42
	89	21	154	18	77	95	10	85	95	42
	90	21	157	18	78	96	10	86	96	43
	90	22	160	19	78	97	10	87	97	43
	91	22	163	19	79	98	11	87	98	44
	92	22	165	19	79	99	11	88	99	44
	92	22	168	20	80	100	11	89	100	45
	93	22	171	20	81	101	11	90	101	45
	94	22	174	20	82	102	11	90	102	46
	95	22	177	21	82	103	12	91	103	46
	95	22	180	21	83	104	12	92	104	47
	96	22	183	21	83	105	12	93	105	48
	97	22	186	21	84	106	12	93	106	48
	97	23	189	22	85	107	12	94	107	49
	98	23	192	22	85	107	13	95	107	50
	99	23	195	22	86	108	13	95	108	50
	99	23	198	23	86	109	13	96	109	51

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation	Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2	2a	2b	3	4	5	6	7	8	
Yards	° ′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
13000	8 09.5	489.5	4.6	9 36	19.43	1797	40	39	1520	
13100	8 14.1	494.1	4.6	9 42	19.60	1794	41	38		
13200	8 18.7	498.7	4.6	9 48	19.78	1791	42	38		
13300	8 23.3	503.3	4.6	9 54	19.95	1787	42	38		
13400	8 27.9	507.9	4.6	10 01	20.12	1784	43	37		
13500	8 32.5	512.5	4.6	10 07	20.29	1781	44	37	1655	
13600	8 37.1	517.1	4.6	10 13	20.47	1777	45	37		
13700	8 41.7	521.7	4.7	10 19	20.64	1774	45	36		
13800	8 46.4	526.4	4.7	10 26	20.81	1771	46	36		
13900	8 51.1	531.1	4.7	10 32	20.99	1768	47	36		
14000	8 55.8	535.8	4.7	10 38	21.16	1764	48	35	1800	
14100	9 00.5	540.5	4.7	10 45	21.34	1761	48	35		
14200	9 05.2	545.2	4.7	10 51	21.51	1758	49	35		
14300	9 09.9	549.9	4.8	10 58	21.69	1755	50	34		
14400	9 14.7	554.7	4.8	11 04	21.87	1751	51	34		
14500	9 19.5	559.5	4.8	11 11	22.04	1748	52	34	1955	
14600	9 24.3	564.3	4.8	11 17	22.22	1745	52	33		
14700	9 29.1	569.1	4.8	11 24	22.40	1742	53	33		
14800	9 33.9	573.9	4.9	11 30	22.58	1739	54	33		
14900	9 38.8	578.8	4.9	11 37	22.76	1736	55	32		
15000	9 43.7	583.7	4.9	11 43	22.94	1733	56	32	2115	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	99	23	198	23	86	109	13	96	109	51
	100	23	201	23	87	110	13	97	110	51
	100	23	204	23	88	111	13	98	111	52
	101	23	207	24	88	112	13	99	112	52
	102	23	210	24	89	113	14	99	113	53
	103	23	213	24	90	114	14	100	114	53
	103	24	217	25	90	115	14	101	115	54
	104	24	220	25	91	116	14	102	116	54
	104	24	223	25	92	117	15	102	117	55
	105	24	226	26	92	118	15	103	118	55
	106	24	230	26	93	119	15	104	119	56
	106	24	233	26	94	120	15	105	120	57
	107	24	236	27	94	121	15	106	121	57
	108	24	240	27	95	122	16	106	122	58
	108	24	243	27	96	123	16	107	123	58
	109	24	246	28	96	124	16	108	124	59
	110	25	250	28	97	125	16	109	125	60
	111	25	253	28	97	126	17	109	126	60
	111	25	257	29	98	127	17	110	127	61
	112	25	260	29	99	128	17	111	128	61
	112	25	264	30	99	129	17	112	129	62

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation		Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2		2a	2b	3	4	5	6	7	8	
Yards	°	′	*Minutes*	*Minutes*	°	′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*
15000	9	43.7	583.7	4.9	11	43	22.94	1733	56	32	2115
15100	9	48.6	588.6	4.9	11	50	23.12	1730	57	32	
15200	9	53.5	593.5	4.9	11	57	23.30	1727	58	31	
15300	9	58.4	598.4	4.9	12	03	23.48	1724	59	31	
15400	10	03.3	603.3	4.9	12	10	23.66	1721	60	31	
15500	10	08.2	608.2	5.0	12	17	23.84	1718	60	31	2285
15600	10	13.2	613.2	5.0	12	24	24.03	1715	61	30	
15700	10	18.2	618.2	5.0	12	30	24.21	1713	62	30	
15800	10	23.2	623.2	5.0	12	37	24.39	1710	63	30	
15900	10	28.2	628.2	5.0	12	44	24.57	1707	64	30	
16000	10	33.2	633.2	5.0	12	51	24.76	1704	65	29	2465
16100	10	38.2	638.2	5.1	12	58	24.94	1701	66	29	
16200	10	43.3	643.3	5.1	13	05	25.12	1698	67	29	
16300	10	48.4	648.4	5.1	13	12	25.31	1696	68	28	
16400	10	53.5	653.5	5.1	13	19	25.49	1693	69	28	
16500	10	58.6	658.6	5.1	13	26	25.68	1690	70	28	2655
16600	11	03.7	663.7	5.1	13	33	25.87	1687	71	28	
16700	11	08.8	668.8	5.2	13	41	26.06	1684	72	27	
16800	11	14.0	674.0	5.2	13	48	26.25	1682	73	27	
16900	11	19.2	679.2	5.2	13	55	26.44	1679	74	27	
17000	11	24.4	684.4	5.2	14	02	26.63	1676	75	27	2855

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	112	25	264	30	99	129	17	112	129	62
	113	25	267	30	100	130	18	112	130	63
	113	25	271	30	100	131	18	113	131	63
	114	25	274	31	101	132	18	114	132	64
	115	25	278	31	102	133	18	115	133	64
	116	25	281	31	103	134	19	115	134	65
	116	25	285	32	103	135	19	116	135	66
	117	25	288	32	104	136	19	117	136	66
	118	25	292	33	104	137	19	118	137	67
	118	25	295	33	105	138	20	119	138	67
	119	25	299	34	106	139	20	119	139	68
	119	26	303	34	106	140	20	120	140	69
	120	26	306	34	107	141	20	121	141	69
	121	26	310	35	108	142	21	122	142	70
	121	26	314	35	108	144	21	122	144	71
	122	26	317	36	109	145	22	123	145	71
	123	26	321	36	110	146	22	124	146	72
	123	26	325	36	110	147	22	125	147	73
	124	26	329	37	111	148	22	125	148	74
	125	26	332	37	112	149	23	126	149	74
	125	26	336	38	112	150	23	127	150	75

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation		Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2		2a	2b	3	4	5	6	7	8	
Yards	°	′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
17000	11	24.4	684.4	5.2	14 02	26.63	1676	75	27	2850	
17100	11	29.6	689.6	5.2	14 10	26.82	1673	76	26		
17200	11	34.8	694.8	5.2	14 17	27.01	1671	78	26		
17300	11	40.0	700.0	5.3	14 25	27.20	1668	79	26		
17400	11	45.3	705.3	5.3	14 32	27.39	1665	80	26		
17500	11	50.6	710.6	5.3	14 40	27.58	1663	81	25	3060	
17600	11	55.9	715.9	5.3	14 47	27.77	1660	82	25		
17700	12	01.2	721.2	5.4	14 55	27.97	1658	83	25		
17800	12	06.6	726.6	5.4	15 02	28.16	1655	84	25		
17900	12	12.0	732.0	5.4	15 10	28.35	1653	85	25		
18000	12	17.4	737.4	5.4	15 17	28.55	1650	86	24	3280	
18100	12	22.8	742.8	5.4	15 25	28.74	1648	87	24		
18200	12	28.2	748.2	5.4	15 33	28.94	1645	89	24		
18300	12	33.6	753.6	5.5	15 40	29.14	1643	90	24		
18400	12	39.1	759.1	5.5	15 48	29.33	1640	91	24		
18500	12	44.6	764.6	5.5	15 56	29.53	1638	92	23	3510	
18600	12	50.1	770.1	5.5	16 04	29.73	1636	93	23		
18700	12	55.6	775.6	5.5	16 11	29.93	1633	94	23		
18800	13	01.1	781.1	5.6	16 19	30.12	1631	95	23		
18900	13	06.7	786.7	5.6	16 27	30.32	1629	97	23		
19000	13	12.3	792.3	5.6	16 35	30.52	1626	98	22	3750	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	125	26	336	38	112	150	23	127	150	75
	126	26	340	38	113	151	23	128	151	76
	127	26	344	39	113	152	23	129	152	76
	127	26	348	39	114	153	24	129	153	77
	128	26	351	39	115	154	24	130	154	78
	129	26	355	40	115	155	24	131	155	78
	129	26	359	40	116	156	25	132	156	79
	130	26	363	41	117	157	25	133	157	80
	131	26	367	41	117	159	25	133	159	81
	131	27	371	42	118	160	26	134	160	81
	132	27	375	42	119	161	26	135	161	82
	133	27	379	43	119	162	26	136	162	83
	133	27	383	43	120	163	27	136	163	83
	134	27	387	44	120	164	27	137	164	84
	134	27	391	44	121	165	27	138	165	85
	135	27	395	44	122	166	27	139	166	85
	136	27	399	45	122	167	28	140	167	86
	136	27	403	46	123	169	28	140	169	87
	137	27	407	46	124	170	29	141	170	88
	137	27	411	47	124	171	29	142	171	88
	138	27	415	47	125	172	29	143	172	89

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation		Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2		2a	2b	3	4	5	6	7	8	
Yards	°	′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
19000	13	12.3	792.3	5.6	16 35	30.52	1626	98	22	3750	
19100	13	17.9	797.9	5.6	16 43	30.72	1624	99	22		
19200	13	23.5	803.5	5.6	16 51	30.92	1622	100	22		
19300	13	29.1	809.1	5.7	16 59	31.12	1620	102	22		
19400	13	34.8	814.8	5.7	17 07	31.32	1617	103	22		
19500	13	40.5	820.5	5.7	17 16	31.53	1615	104	21	4000	
19600	13	46.2	826.2	5.7	17 24	31.73	1613	106	21		
19700	13	51.9	831.9	5.8	17 32	31.93	1611	107	21		
19800	13	57.7	837.7	5.8	17 40	32.14	1609	109	21		
19900	14	03.5	843.5	5.8	17 48	32.34	1606	110	21		
20000	14	09.3	849.3	5.8	17 56	32.55	1604	112	21	4260	
20100	14	15.1	855.1	5.8	18 04	32.75	1602	113	20		
20200	14	20.9	860.9	5.9	18 13	32.96	1600	115	20		
20300	14	26.8	866.8	5.9	18 21	33.17	1598	116	20		
20400	14	32.7	872.7	5.9	18 29	33.38	1596	118	20		
20500	14	38.6	878.6	5.9	18 38	33.59	1594	119	20	4540	
20600	14	44.5	884.5	6.0	18 46	33.80	1592	121	20		
20700	14	50.5	890.5	6.0	18 55	34.01	1590	122	19		
20800	14	56.5	896.5	6.0	19 03	34.22	1588	124	19		
20900	15	02.5	902.5	6.0	19 12	34.43	1586	125	19		
21000	15	08.5	908.5	6.0	19 20	34.64	1584	127	19	4830	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	138	27	415	47	125	172	29	143	172	89
	139	27	419	48	125	173	30	143	173	90
	139	27	424	48	126	174	30	144	174	91
	140	27	428	49	127	175	30	145	175	91
	141	27	432	49	127	176	30	146	176	92
	141	27	436	50	128	178	31	147	178	93
	142	27	440	50	129	179	31	148	179	94
	143	27	444	51	129	180	32	148	180	95
	143	27	449	51	130	181	32	149	181	95
	144	27	453	52	130	182	32	150	182	96
	145	27	457	52	131	183	32	151	183	97
	145	27	461	53	131	184	33	152	184	98
	146	28	465	53	132	186	33	152	186	99
	146	28	470	54	133	187	34	153	187	99
	147	28	474	54	134	188	34	154	188	100
	147	28	478	55	134	189	34	155	189	101
	148	28	482	55	135	190	35	156	190	102
	149	28	487	56	136	191	35	157	191	103
	150	28	491	57	136	193	35	157	193	103
	150	28	495	57	137	194	36	158	194	104
	151	28	500	58	137	195	36	159	195	105

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation		Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2	2a	2b	3	4	5	6	7	8	
Yards	° ′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
21000	15 08	908	6	19 20	34.64	1584	127	19	4830	
21100	15 14	914	6	19 29	34.85	1582	128	19		
21200	15 20	920	6	19 37	35.06	1580	130	19		
21300	15 26	926	6	19 46	35.27	1578	131	19		
21400	15 32	932	6	19 55	35.48	1576	133	18		
21500	15 38	938	6	20 03	35.69	1574	135	18	5130	
21600	15 44	944	6	20 12	35.91	1572	136	18		
21700	15 50	950	6	20 21	36.13	1571	138	18		
21800	15 56	956	6	20 29	36.35	1569	140	18		
21900	16 02	962	7	20 38	36.57	1567	141	18		
22000	16 09	969	6	20 47	36.79	1565	143	18	5450	
22100	16 15	975	6	20 56	37.01	1564	145	17		
22200	16 21	981	6	21 05	37.23	1562	147	17		
22300	16 27	987	7	21 14	37.45	1560	148	17		
22400	16 34	994	6	21 23	37.67	1558	150	17		
22500	16 40	1000	6	21 31	37.89	1557	152	17	5780	
22600	16 46	1006	7	21 40	38.11	1555	154	17		
22700	16 53	1013	6	21 49	38.33	1553	155	17		
22800	16 59	1019	7	21 58	38.55	1552	157	17		
22900	17 06	1026	7	22 07	38.77	1550	159	16		
23000	17 13	1033	6	22 16	39.00	1548	161	16	6130	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	151	28	500	58	137	195	36	159	195	105
	151	28	504	58	138	196	36	160	196	106
	152	28	508	59	139	197	37	161	197	107
	153	28	513	59	139	199	37	162	199	108
	153	28	517	60	140	200	38	162	200	109
	154	28	521	61	140	201	38	163	201	109
	155	28	526	61	141	202	38	164	202	110
	155	28	530	62	142	203	39	165	203	111
	156	28	535	62	142	205	39	166	205	112
	157	28	539	63	143	206	39	167	206	113
	157	28	544	63	144	207	40	167	207	114
	158	28	548	64	144	208	40	168	208	115
	159	28	553	65	145	210	41	169	210	116
	159	28	557	65	146	211	41	170	211	116
	160	28	562	66	146	212	41	171	212	117
	161	28	566	67	147	213	42	172	213	118
	161	28	571	67	147	215	42	173	215	119
	162	28	575	68	148	216	42	173	216	120
	163	28	580	68	149	217	43	174	217	121
	163	28	584	69	149	218	43	175	218	122
	164	28	589	69	150	220	44	176	220	123

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation		Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2		2a	2b	3	4	5	6	7	8	
Yards	°	′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
23000	17	13	1033	6	22 16	39.00	1548	161	16	6130	
23100	17	19	1039	7	22 25	39.22	1547	163	16		
23200	17	26	1046	7	22 34	39.44	1545	164	16		
23300	17	33	1053	6	22 44	39.67	1544	166	16		
23400	17	39	1059	7	22 53	39.89	1542	168	16		
23500	17	46	1066	7	23 02	40.12	1541	170	16	6490	
23600	17	53	1073	7	23 11	40.35	1539	172	16		
23700	18	00	1080	6	23 21	40.58	1538	174	15		
23800	18	06	1086	7	23 30	40.81	1536	176	15		
23900	18	13	1093	7	23 39	41.04	1535	178	15		
24000	18	20	1100	7	23 48	41.27	1533	180	15	6870	
24100	18	27	1107	7	23 58	41.50	1532	182	15		
24200	18	34	1114	7	24 07	41.73	1530	184	15		
24300	18	41	1121	7	24 16	41.96	1529	186	15		
24400	18	48	1128	7	24 26	42.19	1528	188	15		
24500	18	55	1135	7	24 35	42.42	1526	191	15	7260	
24600	19	02	1142	7	24 45	42.65	1525	193	14		
24700	19	09	1149	7	24 54	42.89	1524	195	14		
24800	19	16	1156	7	25 04	43.13	1523	197	14		
24900	19	23	1163	7	25 13	43.37	1521	199	14		
25000	19	30	1170	7	25 23	43.61	1520	201	14	7670	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	164	28	589	69	150	220	44	176	220	123
	165	28	593	70	151	221	44	177	221	124
	165	28	598	71	151	222	44	178	222	124
	166	28	603	71	152	223	45	179	223	125
	166	28	607	72	153	225	45	180	225	126
	167	29	612	73	153	226	46	180	226	127
	167	29	617	73	154	227	46	181	227	128
	168	29	622	74	155	228	46	182	228	129
	169	29	626	75	155	230	47	183	230	130
	169	29	631	75	156	231	47	184	231	131
	170	29	636	76	156	232	47	185	232	132
	171	29	641	77	157	234	48	186	234	133
	171	29	646	77	158	235	48	187	235	134
	172	29	650	78	158	236	48	188	236	135
	173	29	655	79	159	238	49	189	238	136
	173	29	660	79	160	239	49	190	239	137
	174	29	665	80	160	240	50	190	240	138
	175	29	670	80	161	241	50	191	241	139
	175	29	675	81	162	243	50	192	243	140
	176	29	679	82	162	244	51	193	244	141
	177	29	684	82	163	245	51	194	245	142

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation	Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2	2a	2b	3	4	5	6	7	8	
Yards	° ′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
25000	19 30	1170	7	25 23	43.61	1520	201	14	7670	
25100	19 37	1177	7	25 33	43.85	1519	204	14		
25200	19 44	1184	8	25 43	44.09	1518	206	14		
25300	19 52	1192	7	25 52	44.33	1517	208	14		
25400	19 59	1199	7	26 02	44.57	1515	210	14		
25500	20 06	1206	7	26 12	44.81	1514	213	14	8100	
25600	20 13	1213	8	26 22	45.05	1513	215	13		
25700	20 21	1221	7	26 32	45.29	1512	217	13		
25800	20 28	1228	7	26 41	45.53	1511	220	13		
25900	20 35	1235	8	26 51	45.78	1510	222	13		
26000	20 43	1243	7	27 01	46.03	1509	224	13	8550	
26100	20 50	1250	8	27 11	46.28	1508	227	13		
26200	20 58	1258	7	27 21	46.53	1507	229	13		
26300	21 05	1265	8	27 31	46.78	1506	232	13		
26400	21 13	1273	8	27 41	47.03	1506	234	13		
26500	21 21	1281	7	27 52	47.28	1505	237	13	9020	
26600	21 28	1288	8	28 02	47.53	1504	239	13		
26700	21 36	1296	8	28 12	47.78	1503	242	12		
26800	21 44	1304	8	28 22	48.03	1503	244	12		
26900	21 52	1312	7	28 32	48.28	1502	247	12		
27000	21 59	1319	8	28 42	48.53	1501	249	12	9510	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	177	29	684	82	163	245	51	194	245	142
	177	29	689	83	164	247	52	195	247	143
	178	29	694	84	164	248	52	196	248	144
	179	29	699	85	165	250	53	197	250	145
	179	29	704	85	166	251	53	198	251	146
	180	29	709	86	167	252	53	199	252	148
	181	29	713	86	167	254	54	200	254	149
	181	29	718	87	168	255	54	201	255	150
	182	29	723	88	168	256	54	202	256	151
	183	29	728	89	169	258	55	203	258	152
	184	29	733	89	170	259	55	204	259	153
	184	29	738	90	171	261	56	205	261	154
	185	29	743	91	171	262	56	206	262	155
	185	29	748	91	172	263	56	207	263	156
	186	29	753	92	173	265	57	208	265	157
	187	29	758	93	173	266	57	209	266	158
	187	29	763	94	174	268	58	210	268	160
	188	29	768	94	175	269	58	211	269	161
	189	29	774	95	176	270	59	212	270	162
	189	29	779	96	176	272	59	213	272	163
	190	29	784	96	177	273	59	214	273	164

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation		Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2		2a	2b	3	4	5	6	7	8	
Yards	°	′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
27000	21	59	1319	8	28 42	48.53	1501	249	12	9510	
27100	22	07	1327	8	28 52	48.78	1501	252	12		
27200	22	15	1335	8	29 03	49.04	1500	254	12		
27300	22	23	1343	8	29 13	49.30	1499	257	12		
27400	22	31	1351	8	29 23	49.56	1499	259	12		
27500	22	39	1359	8	29 34	49.82	1498	262	12	10020	
27600	22	47	1367	8	29 44	50.08	1497	264	12		
27700	22	55	1375	8	29 55	50.34	1497	267	12		
27800	23	03	1383	8	30 05	50.60	1496	270	12		
27900	23	11	1391	8	30 16	50.86	1496	273	11		
28000	23	19	1399	9	30 26	51.12	1495	276	11	10550	
28100	23	28	1408	8	30 37	51.39	1495	279	11		
28200	23	36	1416	8	30 47	51.66	1494	282	11		
28300	23	44	1424	9	30 58	51.93	1494	285	11		
28400	23	53	1433	8	31 09	52.20	1493	288	11		
28500	24	01	1441	9	31 19	52.47	1493	291	11	11110	
28600	24	10	1450	8	31 30	52.74	1492	294	11		
28700	24	18	1458	9	31 41	53.01	1492	297	11		
28800	24	27	1467	9	31 51	53.28	1492	300	11		
28900	24	36	1476	8	32 02	53.55	1491	303	11		
29000	24	44	1484	9	32 13	53.82	1491	306	11	11700	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	190	29	784	96	177	273	59	214	273	164
	191	29	789	97	178	275	60	215	275	165
	192	29	794	98	178	276	60	216	276	166
	192	29	799	99	179	278	61	217	278	168
	193	29	805	99	180	279	61	218	279	169
	194	29	810	100	181	280	62	219	280	170
	194	29	815	101	181	282	62	220	282	171
	195	29	820	101	182	283	63	221	283	172
	196	29	825	102	183	285	63	222	285	173
	196	29	831	103	184	286	63	223	286	175
	197	29	836	104	184	288	64	224	288	176
	198	29	841	104	185	289	64	225	289	177
	198	29	846	105	186	291	65	226	291	178
	199	30	852	106	187	292	65	227	292	180
	200	30	857	107	187	294	66	228	294	181
	200	30	862	107	188	295	66	229	295	182
	201	30	868	108	189	297	67	230	297	184
	202	30	873	109	190	298	67	231	298	185
	202	30	879	110	190	300	68	232	300	186
	203	30	884	110	191	301	68	233	301	188
	204	30	890	111	192	303	69	234	303	189

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation		Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2		2a	2b	3	4	5	6	7	8	
Yards	°	′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
29000	24	44	1484	9	32 13	53.82	1491	306	11	11700	
29100	24	53	1493	9	32 24	54.10	1491	310	11		
29200	25	02	1502	9	32 35	54.38	1491	313	10		
29300	25	11	1511	9	32 46	54.66	1491	316	10		
29400	25	20	1520	9	32 57	54.94	1490	319	10		
29500	25	29	1529	9	33 09	55.22	1490	322	10	12320	
29600	25	38	1538	9	33 20	55.50	1490	326	10		
29700	25	47	1547	9	33 31	55.78	1490	329	10		
29800	25	56	1556	9	33 42	56.06	1490	332	10		
29900	26	05	1565	9	33 53	56.35	1490	335	10		
30000	26	14	1574	10	34 04	56.64	1490	339	10	12970	
30100	26	24	1584	9	34 16	56.93	1490	342	10		
30200	26	33	1593	9	34 27	57.22	1490	345	10		
30300	26	42	1602	10	34 39	57.51	1490	349	10		
30400	26	52	1612	9	34 50	57.80	1490	352	10		
30500	27	01	1621	10	35 02	58.10	1490	356	10	13650	
30600	27	11	1631	10	35 13	58.40	1491	359	9		
30700	27	21	1641	9	35 25	58.70	1491	363	9		
30800	27	30	1650	10	35 36	59.00	1491	367	9		
30900	27	40	1660	10	35 48	59.30	1491	371	9		
31000	27	50	1670	10	35 59	59.61	1491	375	9	14370	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	204	30	890	111	192	303	69	234	303	189
	205	30	895	112	193	305	69	236	305	191
	205	30	901	113	193	306	69	237	306	192
	206	30	906	114	194	308	70	238	308	193
	206	30	912	114	195	309	70	239	309	195
	207	30	917	115	196	311	71	240	311	196
	208	30	923	116	197	312	71	241	312	197
	209	30	928	117	197	314	72	242	314	199
	209	30	934	117	198	316	72	243	316	200
	210	30	939	118	199	317	73	244	317	202
	211	30	945	119	200	319	73	245	319	203
	211	30	950	120	201	321	74	247	321	205
	212	30	956	120	202	322	74	248	322	206
	213	30	961	121	202	324	75	249	324	208
	214	30	967	122	203	325	75	250	325	209
	215	30	972	123	204	327	76	251	327	211
	215	30	978	124	205	329	76	253	329	212
	216	30	983	124	206	330	77	254	330	214
	217	30	989	125	207	332	77	255	332	215
	217	30	994	126	208	334	78	256	334	217
	218	30	1000	127	209	336	78	257	336	218

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation		Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2		2a	2b	3	4	5	6	7	8	
Yards	°	′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
31000	27	50	1670	10	35 59	59.61	1491	375	9	14370	
31100	28	00	1680	10	36 11	59.92	1491	379	9		
31200	28	10	1690	10	36 23	60.23	1492	383	9		
31300	28	20	1700	11	36 35	60.54	1492	387	9		
31400	28	31	1711	10	36 47	60.86	1492	391	9		
31500	28	41	1721	10	36 59	61.18	1492	396	9	15130	
31600	28	51	1731	11	37 11	61.50	1493	400	9		
31700	29	02	1742	10	37 23	61.82	1493	404	9		
31800	29	12	1752	11	37 35	62.14	1493	408	9		
31900	29	23	1763	11	37 47	62.47	1494	412	9		
32000	29	34	1774	11	37 59	62.80	1494	416	9	15940	
32100	29	45	1785	11	38 12	63.13	1495	421	8		
32200	29	56	1796	11	38 24	63.47	1495	426	8		
32300	30	07	1807	12	38 37	63.81	1496	430	8		
32400	30	19	1819	11	38 50	64.15	1496	435	8		
32500	30	30	1830	11	39 02	64.49	1497	440	8	16810	
32600	30	41	1841	12	39 15	64.84	1498	445	8		
32700	30	53	1853	11	39 28	65.19	1498	449	8		
32800	31	04	1864	12	39 40	65.55	1499	454	8		
32900	31	16	1876	12	39 53	65.91	1500	459	8		
33000	31	28	1888	11	40 06	66.27	1501	464	8	17750	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	218	30	1000	127	209	336	78	257	336	218
	219	30	1005	128	209	337	79	259	337	220
	219	30	1011	129	210	339	79	260	339	221
	220	30	1016	130	211	341	80	261	341	223
	221	30	1021	131	212	343	80	262	343	224
	222	30	1027	131	213	344	81	264	344	226
	222	30	1032	132	214	346	81	265	346	227
	223	30	1037	133	215	348	82	266	348	229
	224	30	1042	134	216	350	82	268	350	231
	224	30	1048	135	217	352	83	269	352	232
	225	30	1053	136	218	354	84	270	354	234
	226	30	1058	137	219	355	84	272	355	236
	227	30	1063	138	219	357	84	273	357	238
	227	30	1068	139	220	359	85	274	359	239
	228	30	1074	140	221	361	86	276	361	241
	229	30	1079	141	222	363	86	277	363	243
	230	30	1084	142	223	365	87	278	365	245
	230	30	1089	143	224	367	87	280	367	247
	231	30	1094	144	225	369	88	281	369	248
	232	31	1099	145	226	371	88	283	371	250
	233	31	1104	146	227	373	89	284	373	252

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation	Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2	2a	2b	3	4	5	6	7	8	
Yards	° ′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
33000	31 28	1888	11	40 06	66.27	1501	464	8	17750	
33100	31 39	1899	12	40 20	66.64	1502	469	8		
33200	31 51	1911	12	40 33	67.01	1503	474	8		
33300	32 03	1923	13	40 47	67.38	1504	479	8		
33400	32 16	1936	13	41 00	67.76	1505	484	8		
33500	32 29	1949	13	41 14	68.14	1506	490	8	18770	
33600	32 42	1962	13	41 27	68.52	1507	496	8		
33700	32 55	1975	14	41 41	68.91	1508	502	7		
33800	33 09	1989	14	41 54	69.30	1510	508	7		
33900	33 23	2003	14	42 08	69.69	1511	514	7		
34000	33 37	2017	15	42 22	70.09	1512	520	7	19870	
34100	33 52	2032	15	42 36	70.49	1514	526	7		
34200	34 07	2047	15	42 50	70.90	1515	532	7		
34300	34 22	2062	15	43 04	71.32	1517	538	7		
34400	34 37	2077	15	43 19	71.74	1518	544	7		
34500	34 52	2092	15	43 34	72.17	1520	550	7	21060	
34600	35 07	2107	15	43 49	72.60	1521	557	7		
34700	35 22	2122	16	44 05	73.04	1523	564	7		
34800	35 38	2138	16	44 21	73.49	1525	571	7		
34900	35 54	2154	17	44 37	73.95	1526	578	7		
35000	36 11	2171	17	44 53	74.42	1528	585	7	22380	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	233	31	1104	146	227	373	89	284	373	252
	233	31	1109	147	228	375	90	286	375	254
	234	31	1114	148	229	377	90	287	377	256
	235	31	1119	149	230	379	91	288	379	258
	235	31	1124	150	232	381	91	290	381	260
	236	31	1129	151	233	384	92	292	384	262
	237	31	1134	152	234	386	93	293	386	264
	238	31	1139	153	235	388	93	295	388	266
	238	31	1143	154	236	390	94	296	390	269
	239	31	1148	155	237	392	94	298	392	271
	240	31	1153	156	238	394	95	299	394	273
	241	31	1158	157	240	397	96	301	397	276
	241	31	1162	158	241	399	96	303	399	278
	242	31	1167	159	242	401	97	305	401	281
	243	31	1172	160	243	404	97	306	404	283
	244	31	1177	161	245	406	98	308	406	286
	244	31	1181	163	246	409	99	310	409	288
	245	31	1186	164	247	411	99	312	411	291
	246	31	1191	165	249	414	100	314	414	294
	247	31	1195	166	250	416	100	316	416	296
	247	31	1200	168	251	419	101	318	419	299

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

Range	Angle of elevation	Increase in angle of elevation for 100 yards increase in range	Angle of fall	Time of flight	Striking velocity	Drift	Danger space for a target 20 feet high	Maximum ordinate	
1	2	2a	2b	3	4	5	6	7	8	
Yards	° ′	*Minutes*	*Minutes*	° ′	*Seconds*	*F. S.*	*Yards*	*Yards*	*Feet*	
35000	36 11	2171	17	44 53	74.42	1528	585	7	22380	
35100	36 28	2188	17	45 10	74.90	1530	592	7		
35200	36 45	2205	18	45 27	75.39	1532	600	7		
35300	37 03	2223	19	45 44	75.88	1534	608	7		
35400	37 22	2242	19	46 02	76.38	1536	616	6		
35500	37 41	2261	19	46 20	76.90	1538	624	6	23900	
35600	38 00	2280	20	46 38	77.44	1540	633	6		
35700	38 20	2300	21	46 56	78.00	1543	642	6		
35800	38 41	2321	22	47 15	78.58	1545	652	6		
35900	39 03	2343	22	47 34	79.18	1548	662	6		
36000	39 25	2365	23	47 54	79.80	1551	672	6	25730	
36100	39 48	2388	25	48 14	80.45	1555	683	6		
36200	40 13	2413	27	48 35	81.13	1558	695	6		
36300	40 40	.2440	29	48 58	81.85	1562	708	6		
36400	41 09	2469	31	49. 23	82.61	1566	721	6		
36500	41 40	2500	35	49 51	83.44	1570	735	6	28120	
36600	42 15	2535	41	50 24	84.35	1575	751	5		
36700	42 56	2576	52	51 03	85.40	1581	770	5		
36800	43 48	2628	94	51 51	86.72	1588	794	5		
36900	45 22	2722		53 06	89.16	1600	839	5	32070	

RANGE TABLE FOR 16 -INCH GUN

INITIAL VELOCITY = 2300 F. S. WEIGHT OF PROJECTILE = 2700 POUNDS. LENGTH OF PROJECTILE = 4.5 CALIBERS. RADIUS OF OGIVE = 9 CALIBERS

	Change of range for variation of +10 feet per second initial velocity	Change of range for variation of −10 pounds in weight of projectile	Change of range for variation in density of air of −10 per cent	Change of range for wind component in plane of fire of 10 knots	Change of range for motion of gun in plane of fire of 10 knots	Change of range for motion of target in plane of fire of 10 knots	Deviation for lateral wind component of 10 knots	Deviation for lateral motion of gun perpendicular to line of fire, speed of 10 knots	Deviation for lateral motion of target perpendicular to line of fire, speed of 10 knots	Change in height of impact for variation of 100 yards in sight bar
	10	11	12	13	14	15	16	17	18	19
	Yards	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Yards*	*Feet*
	247	31	1200	168	251	419	101	318	419	299
	248	31	1205	169	253	422	102	320	422	302
	249	31	1209	170	254	424	103	321	424	305
	250	32	1214	171	256	427	103	323	427	308
	250	32	1218	172	258	430	104	326	430	311
	251	32	1223	174	259	433	105	328	433	315
	252	32	1227	175	261	436	105	331	436	318
	253	32	1232	176	263	439	106	333	439	321
	253	32	1236	178	264	442	106	336	442	325
	254	32	1241	179	266	446	107	339	446	328
	255	32	1245	181	268	449	107	341	449	332
	256	32	1250	182	271	453	108	344	453	336
	256	32	1254	184	273	457	109	348	457	340
	257	32	1258	186	275	461	109	352	461	345
	258	32	1263	187	278	465	110	356	465	350
	259	32	1267	189	282	470	110	360	470	356
	259	33	1271	191	285	475	111	365	475	363
	260	33	1275	193	289	481	111	370	481	371
	261	33	1279	195	294	488	112	376	488	382
	262	33	1283	199	303	502	113	389	502	400

16- INCH, 2700 LB. RANGE TABLE

I.V. = 2300 F.S.

*EFFECT IN YARDS OF RANGE DUE TO ROTATION OF THE EARTH.

True Target Bearing, Degrees							Range, Yards	True Target Bearing, Degrees						
0 180	15 165	30 150	45 135	60 120	75 105	90 90		0 180	15 165	30 150	45 135	60 120	75 105	90 90
Latitude 0°								Latitude 10° (North or South)						
0	10	18	26	32	36	37	4,000	0	9.	18	26	31	35	36
0	18	34	48	59	66	68	8,000	0	17	34	48	58	65	67
0	25	48	67	83	92	95	12,000	0	24	47	66	81	91	94
0	30	59	83	102	114	118	16,000	0	30	58	82	100	112	116
0	35	68	96	117	131	135	20,000	0	34	66	94	115	128	133
0	38	74	105	128	143	148	24,000	0	38	73	103	126	141	146
0	41	79	112	137	153	158	28,000	0	40	78	110	135	150	156
0	42	80	114	139	155	161	32,000	0	41	79	112	137	153	158
0	40	77	109	134	149	154	34,000	0	39	76	107	132	147	152
0	29	56	79	97	108	112	36,900	0	29	55	78	95	106	110
Latitude 20° (North or South)								Latitude 30° (North or South)						
0	9	17	24	30	33	35	4,000	0	8	16	23	28	31	32
0	17	32	45	56	62	64	8,000	0	15	30	42	51	57	59
0	23	45	63	78	87	90	12,000	0	21	41	58	71	80	83
0	29	55	78	96	107	111	16,000	0	26	51	72	88	98	102
0	33	63	90	110	123	127	20,000	0	30	58	83	101	113	117
0	36	70	98	120	134	139	24,000	0	33	64	91	111	124	128
0	38	74	105	129	144	149	28,000	0	35	69	97	119	132	137
0	39	76	107	131	146	151	32,000	0	36	70	98	121	135	139
0	38	73	103	126	140	145	34,000	0	35	67	94	116	129	134
0	27	53	74	91	102	105	36,900	0	25	48	68	84	94	97
180 360	195 345	210 330	225 315	240 300	255 285	270 270		180 360	195 345	210 330	225 315	240 300	255 285	270 270
True Target Bearing, Degrees								True Target Bearing, Degrees						

*For bearing at top of table the range is increased.

For bearing at bottom of table the range is decreased.

16-INCH, 2700 LB. RANGE TABLE

I.V. = 2300 F.S.

*EFFECT IN YARDS OF RANGE DUE TO ROTATION OF THE EARTH.

True Target Bearing, Degrees							Range, Yards	True Target Bearing, Degrees						
0 180	15 165	30 150	45 135	60 120	75 105	90 90		0 180	15 165	30 150	45 135	60 120	75 105	90 90
Latitude 40° (North or South)								Latitude 50° (North or South)						
0	7	14	20	24	27	28	4,000	0	6	12	17	20	23	24
0	14	26	37	45	51	52	8,000	0	11	22	31	38	42	44
0	19	36	52	63	71	73	12,000	0	16	31	43	53	59	61
0	23	45	64	78	87	90	16,000	0	20	38	54	66	73	76
0	27	52	73	90	100	103	20,000	0	22	43	61	75	84	87
0	29	57	80	98	109	113	24,000	0	25	47	67	82	92	95
0	31	61	86	105	117	121	28,000	0	26	51	72	88	98	102
0	32	62	87	107	119	123	32,000	0	27	52	73	90	100	103
0	31	59	84	102	114	118	34,000	0	26	50	70	86	96	99
0	22	43	61	74	83	86	36,900	0	19	36	51	62	69	72
Latitude 60° (North or South)								Latitude 70° (North or South)						
0	5	9	13	16	18	18	4,000	0	3	6	9	11	12	13
0	9	17	24	30	33	34	8,000	0	6	12	17	20	23	23
0	12	24	34	41	46	48	12,000	0	8	16	23	28	31	33
0	15	29	42	51	57	59	16,000	0	10	20	28	35	39	40
0	17	34	48	58	65	68	20,000	0	12	23	33	40	45	46
0	19	37	52	64	71	74	24,000	0	13	25	36	44	49	51
0	20	40	56	69	76	79	28,000	0	14	27	38	47	52	54
0	21	40	57	70	78	80	32,000	0	14	27	39	48	53	55
0	20	39	55	67	75	77	34,000	0	14	26	37	46	51	53
0	14	28	40	48	54	56	36,900	0	10	19	27	33	37	38
180 360	195 345	210 330	225 315	240 300	255 285	270 270		180 360	195 345	210 330	225 315	240 300	255 285	270 270
True Target Bearing, Degrees								True Target Bearing, Degrees						

*For bearing at top of table the range is increased.

For bearing at bottom of table the range is decreased.

16-INCH, 2700 LB. RANGE TABLE

I.V. = 2300 F.S.

*DEFLECTION IN YARDS DUE TO ROTATION OF THE EARTH.

True Target Bearing, Degrees							Range, Yards	True Target Bearing, Degrees						
0 360	30 330	60 300	90 270	120 240	150 210	180 180		0 360	30 330	60 300	90 270	120 240	150 210	180 180
Latitude 0°								Latitude 10°						
0	0	0	0	0	0	0	4,000	0	0	0	0	0	0	0
0	0	0	0	0	0	0	8,000	1	1	1	1	1	1	1
-1	-1	0	0	0	1	1	12,000	2	2	2	3	3	3	3
-2	-1	-1	0	1	1	2	16,000	3	3	4	5	6	6	6
-4	-3	-2	0	2	3	4	20,000	4	5	6	8	10	11	11
-7	-6	-4	0	4	6	7	24,000	4	5	8	12	15	18	19
-14	-12	-7	0	7	12	14	28,000	3	5	10	17	24	28	30
-25	-22	-13	0	13	22	25	32,000	-2	2	11	23	36	45	48
-35	-31	-18	0	18	31	35	34,000	-7	-2	10	28	45	58	63
-75	-65	-38	0	38	65	75	36,900	-35	-25	2	39	76	103	113
Latitude 20°								Latitude 30°						
1	1	1	1	1	1	1	4,000	1	1	1	1	1	1	1
2	2	2	2	2	2	2	8,000	3	3	3	3	3	3	3
4	5	5	5	5	6	6	12,000	7	7	7	7	8	8	8
8	8	9	9	10	11	11	16,000	12	12	13	14	14	15	15
12	12	13	15	17	18	19	20,000	19	19	21	22	24	25	26
16	17	19	23	26	29	30	24,000	27	28	30	34	37	39	40
20	22	26	33	39	44	46	28,000	36	38	42	48	54	59	60
22	25	34	46	58	67	70	32,000	45	48	56	67	78	86	89
22	26	38	55	71	83	88	34,000	49	54	65	80	95	107	111
6	15	41	76	112	138	147	36,900	47	55	79	112	144	168	177
180 180	150 210	120 240	90 270	60 300	30 330	0 360		180 180	150 210	120 240	90 270	60 300	30 330	0 360
True Target Bearing, Degrees								True Target Bearing, Degrees						

*Deflections to the right are positive.

Deflections to the left are negative.

Deflections are tabulated for north latitude, for south latitude use opposite sign.

For north latitude use bearing at top of table.

For south latitude use bearing at bottom of table.

16-INCH, 2700 LB. RANGE TABLE

I.V. = 2300 F.S.

*DEFLECTION IN YARDS DUE TO ROTATION OF THE EARTH.

True Target Bearing, Degrees							Range, Yards	True Target Bearing, Degrees						
0 360	30 330	60 300	90 270	120 240	150 210	180 180		0 360	30 330	60 300	90 270	120 240	150 210	180 180
Latitude 40°								Latitude 50°						
1	1	1	1	1	1	1	4,000	1	1	1	1	1	1	1
4	4	4	4	4	4	4	8,000	5	5	5	5	5	5	5
9	9	9	10	10	10	10	12,000	11	11	11	11	12	12	12
16	17	17	18	18	19	19	16,000	20	20	20	21	22	22	22
26	26	27	29	30	31	31	20,000	32	32	33	34	35	36	37
37	38	40	43	46	48	49	24,000	47	47	49	51	54	55	56
52	53	57	62	67	71	72	28,000	65	66	69	74	78	81	83
67	70	77	87	96	104	106	32,000	87	89	95	103	111	117	120
76	80	89	103	116	126	130	34,000	100	103	111	123	134	142	145
86	94	115	144	172	194	201	36,900	123	129	147	171	195	213	220
Latitude 60°								Latitude 70°						
1	1	1	1	1	1	1	4,000	1	1	1	1	1	1	1
5	5	5	6	6	6	6	8,000	6	6	6	6	6	6	6
13	13	13	13	13	13	13	12,000	14	14	14	14	14	14	14
23	23	23	24	24	24	25	16,000	25	25	25	26	26	26	26
37	37	38	39	39	[illegible]	40	20,000	41	41	41	42	42	43	43
54	55	56	58	60	61	62	24,000	61	61	62	63	64	65	66
77	77	80	83	87	89	90	28,000	86	86	88	91	93	95	95
104	106	110	117	123	128	129	32,000	118	119	122	127	131	134	135
121	123	130	139	148	154	156	34,000	138	140	144	150	156	161	162
156	161	175	194	212	226	231	36,900	184	188	197	210	223	232	236
180 180	150 210	120 240	90 270	60 300	30 330	0 360		180 180	150 210	120 240	90 270	60 300	30 330	0 360
True Target Bearing, Degrees								True Target Bearing, Degrees						

*Deflections to the right are positive.

Deflections to the left are negative.

Deflections are tabulated for north latitude, for south latitude use opposite sign.

For north latitude use bearing at top of table.

For south latitude use bearing at bottom of table.

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