

2579

6-7-32

110011

1842

Serial No. 8

# Orange Fire Effect Tables

*Cancels Edition of June, 1932.*

DECLASSIFIED IAW DOD MEMO OF 3 MAY 1972, SUBJ:  
DECLASSIFICATION OF WWII RECORDS

**Naval War College**  
**Newport, R. I.**  
**Department of Operations**  
**June, 1933**

RESTRICTED  
**CONFIDENTIAL**  
RESTRICTED

*Not to pass out of hands of Officers of the U. S. Naval or Military Service*

INSTRUCTIONS GOVERNING THE CUSTODY AND DISPOSITION  
OF CONFIDENTIAL AND SERIAL NUMBERED PUBLICATIONS  
ISSUED IN CONNECTION WITH THE COURSE OF INSTRUCTION

The officer receiving this publication will note that it is marked CONFIDENTIAL and bears a serial number. Upon issue it is charged against the officer receiving it, either by signed receipt or record book entry. It must be safeguarded and accounted for at all times, and must be returned personally to the Publication Section, Room N-11, by the officer to whom issued, for file and cancellation of receipt.

The following procedure covers in general the return to file of all Confidential and serial numbered publications:

- (a) If issued in Strategy or Tactics Jackets it should be returned at end of Academic Year in the Jacket in which it was originally issued.
- (b) If an OPERATIONS PROBLEM it should be returned immediately after the Critique and Discussion of the Problem. The same procedure applies to TACTICAL PROBLEMS.
- (c) If a Publication of a general nature issued during the Academic year, and not included in (a) or (b) above, it should be returned as soon as practicable after it has served its purpose.

*S. A. Taffinder*  
S.A. TAFFINDER  
Captain, U.S. Navy  
Secretary.

NAVAL WAR COLLEGE  
Newport, R.I.  
1 June, 1933

2579  
6-19-33

ORANGE FIRE EFFECT TABLES

Naval War College  
Newport, R.I.  
June, 1933.

CONFIDENTIAL

Not to pass out of the hands of Officers of the U.S. Naval  
or Military Service.

EXPLANATION OF TABLES

1. These tables give the effect of single guns, under normal conditions, in terms of equivalent 14" penetrative hits per three minute move.

2. To use a table, in the case of the fire of a particular type of gun against a particular class of target ship, -

(1) determine whether shots are penetrative, for which purpose enter the armor penetration table for that gun with arguments:

- (a) armor of target ship
- (b) target angle, and
- (c) range.

(2) select appropriate fire effect for one gun from fire effect tables using as arguments:

- (a) size class of target
- (b) whether shots are penetrative
- (c) kind of spot, and
- (d) range.

(3) multiply this figure for the effect of one gun by the number of guns firing. The result is the aggregate normal fire effect of the battery with no allowance yet made for deck penetration.

3. Where a single set of figures are shown they apply to both plane spot and top spot.

4. When in fire, against armored vessels, with guns of 6" or larger caliber, there is either (1) deck penetration only, or (2) both side and deck penetration, the normal value of penetrative fire effect as given in the tables will be multiplied by the appropriate figure from the subjoined table:

Gun	Target size	Penetration	
		Deck	Deck & Side
12" plus	Large	1.2	1.3
12" plus	Int., Small	1.1	1.2
7.5 - 10"	Any	1.1	1.2
6"	Int., Small	1.1	1.2

No increase for deck penetration will be allowed for fire against unarmored vessels or for fire with guns smaller than 6".

5. Fire Effect Diagrams have been constructed from the Fire Effect Tables giving the normal effect of BLUE ships upon RED and ORANGE ships of similar type. These diagrams can be conveniently used in place of the Fire Effect Tables where applicable.

GUN DATA

The following data on ORANGE guns is based on the best available information or estimate.

Where two ranges are given, the first is the theoretical range - table range; the second, the figure used at the War College as representing the estimated practical range in thousands of yards.

<u>Caliber</u>	<u>Weight of Projectile</u>	<u>M.V.</u>	<u>Maximum Elevation</u>	<u>Maximum Range</u>	
				<u>Tables</u>	<u>Practical</u>
16"/45	2205	2591	30	34300	33
14"/45	1400	2559	25	28700	28
			30 (a)	31500	30
8"/50	254	2900	30	27900	27
			45 (b)	31700	31
6"/50	100	2788	25	21500	20
			45 (e)	26000	25
5"5/50	84	2788	25 (c)	19700	19
			30 (d)	21400	20
5"1/50	63	2900	25	19000	18
4"7/45	45	2772	85 A.A.	19900	19
			25	15900	15
4"7/40	45	2165	20	10800	10
3"/40	12.5	2321	20	6000	5
			85 A.A.	8000	7
3"/25	12.5	1492	85 A.A.	7000	6

(a) Assuming ORANGE modernized BBs and CCs to have 30° elevation.

(b) Assuming 70° gun elevation in MYOKO Class.

(c) In BBs.

(d) In all other vessels.

(e) CLs and CMs.

2579  
6-31

-3-

ORANGE 16"/45

FIRE EFFECT TABLE - ORANGE 16"/45

Muzzle Velocity 2591 f.s.  
Weight of Projectile 2205 lbs.

Maximum Range 33.

LIMITING RANGES FOR ARMOR PENETRATION

Penetration of VERTICAL ARMOR at Target Angles of					DECK ARMOR	
Armor Thick- ness	90° or 0°	75° or 15°	60° or 30°	45°	Thick- ness	Range
5"	---	---	---	---	1'00	4
6"	---	---	---	29	1'50	8
7"	---	---	---	26	2'00	12
8"	---	---	31	22	2'25	14
9"	33	32	27	19	2'40	15
10"	30	29	23	15	2'75	17
11"	27	26	21	12	3'00	18
12"	25	23	18	X	3'65	21
13"	23	21	16	X	3'68	21
13'5	22	20	15	X	3'75	22
14"	22	19	X	X	4'00	22
15"	20	18	X	X	4'13	23
16"	19	X	X	X	4'39	24
					4'57	25
					4'82	26
					5'18	27
					6'25	31

Penetration of INCLINED ARMOR

7"	32	31	29	24
----	----	----	----	----

Inclined 10°

- (---) No limit within maximum range of gun.  
 ( X ) No penetration at any range within maximum range of gun.

Limiting ranges for penetration of vertical armor are outer, or maximum, ranges at which penetration will occur.

Limiting ranges for penetration of deck armor are inner, or minimum, ranges at which penetration will occur.

LARGE TARGET

PENETRATIVE

NON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	5.930		3.925	
2	5.770		3.821	
3	4.669		3.088	
4	3.550		2.350	
5	2.701		1.787	
6	2.087		1.381	
7	1.640		1.084	
8	1.310		.866	
9	1.071		.709	
10	.888		.587	
11	.750		.496	
12	.635		.420	
13	.534		.354	
14	.450		.298	
15	.381		.252	
16	.324		.214	
17	.284		.188	
18	.248		.164	
19	.219		.145	
20	.193		.128	
21	.163	.170	.109	.113
22	.138	.152	.092	.101
23	.116	.136	.076	.090
24	.094	.122	.062	.081
25	.074	.111	.049	.073
26	.055	.101	.036	.067
27	.036	.091	.024	.060
28	.023	.083	.015	.055
29	.013	.075	.009	.050
30	.006	.070	.004	.046
31	.000	.064	.000	.041
32		.058		.038
33		.054		.036



INTERMEDIATE TARGET

PENETRATIVE

NON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	5.929		4.760	
2	5.524		4.435	
3	3.817		3.064	
4	2.551		2.050	
5	1.875		1.505	
6	1.427		1.145	
7	1.103		.886	
8	.881		.707	
9	.738		.593	
10	.618		.496	
11	.517		.415	
12	.433		.348	
13	.364		.292	
14	.305		.245	
15	.257		.206	
16	.218		.175	
17	.185		.148	
18	.162		.130	
19	.143		.115	
20	.128		.103	
21	.108	.114	.086	.091
22	.091	.101	.073	.081
23	.075	.089	.060	.072
24	.060	.080	.048	.064
25	.045	.071	.036	.057
26	.031	.064	.024	.051
27	.020	.058	.016	.047
28	.011	.053	.008	.042
29	.005	.048	.004	.039
30	.000	.045	.000	.036
31		.041		.033
32		.038		.031
33		.035		.028

SMALL TARGET

PENETRATIVE

NON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	5.930		5.010	
2	5.318		4.494	
3	3.150		2.660	
4	1.992		1.684	
5	1.447		1.221	
6	1.120		.946	
7	.866		.732	
8	.690		.584	
9	.574		.485	
10	.480		.406	
11	.405		.342	
12	.339		.287	
13	.287		.242	
14	.246		.208	
15	.207		.175	
16	.173		.146	
17	.146		.124	
18	.128		.108	
19	.112		.095	
20	.099		.084	
21	.084	.088	.070	.074
22	.071	.080	.060	.067
23	.058	.071	.049	.060
24	.045	.064	.038	.054
25	.033	.058	.028	.049
26	.021	.053	.018	.044
27	.012	.048	.010	.041
28	.005	.044	.004	.037
29	.000	.040	.000	.034
30		.037		.031
31		.033		.028
32		.030		.025
33		.027		.023

PENETRATIVEDESTROYER TARGETSUBMARINE TARGET

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	5.929		1.650	
2	3.178		.789	
3	1.642		.443	
4	1.070		.280	
5	.775		.200	
6	.580		.147	
7	.450		.110	
8	.368		.084	
9	.298		.064	
10	.243		.050	
11	.197		.041	
12	.162		.033	
13	.131		.027	
14	.106		.023	
15	.085		.018	
16	.068		.014	.015
17	.055		.011	.012
18	.048		.009	.010
19	.041		.007	.009
20	.036		.006	.008
21	.029	.031	.005	.007
22	.025	.028	.004	.007
23	.020	.025	.003	.006
24	.015	.023	.002	.006
25	.010	.021	.001	.005
26	.006	.019	.000	.005
27	.002	.018		.005
28	.000	.016		.005
29		.015		.004
30		.013		.004
31		.012		.000
32		.011		
33		.009		

2579  
6-31

-9-

ORANGE 14"/45

FIRE EFFECT TABLE - ORANGE 14"/45

Muzzle Velocity 2559 f.s.  
Weight of Projectile 1400 lbs.

Maximum Range 30.

LIMITING RANGES FOR ARMOR PENETRATION

Penetration of VERTICAL ARMOR  
at Target Angles of

Armor Thick- ness	90° or 0°	75° or 15°	60° or 30°	45°
3"	---	---	---	---
4"	---	---	---	---
5"	---	---	---	27
5"75	---	---	---	23
6"	---	---	---	22
7"	---	---	26	19
8"	29	27	22	16
9"	26	24	20	X
10"	22	21	17	X
11"	20	18	X	X
12"	18	16	X	X
13"	17	16	X	X
13"5	16	14	X	X
14"	16	14	X	X
15"	14	X	X	X
16"	13	X	X	X

DECK ARMOR

Thick- ness	Range
1"00	6
1"50	10
2"00	14
2"25	15
2"40	16
2"75	18
3"00	20
3"65	23
3"68	23
3"75	23
4"00	24
4"13	25
4"39	26
4"57	26
4"82	28
5"18	29
6"25	X

Penetration of INCLINED ARMOR

7"	29	28	24	18
----	----	----	----	----

Inclined 10°

- (---) No limit within maximum range of gun.  
( X ) No penetration at any range within maximum range of gun.

Limiting ranges for penetration of vertical armor are outer, or maximum, ranges at which penetration will occur.

Limiting ranges for penetration of deck armor are inner, or minimum, ranges at which penetration will occur.











2579  
6-31

-15-

ORANGE 8"/50

FIRE EFFECT TABLE - ORANGE 8"/50

Muzzle Velocity 2900 f.s.  
Weight of Projectile 254 lbs.

Maximum Range 31

LIMITING RANGES FOR ARMOR PENETRATION

Penetration of VERTICAL ARMOR  
at Target Angles of

Armor Thick- ness	90° or 0°	75° or 15°	60° or 30°	45°
1"	---	---	---	---
2"	30	29	27	21
3"	24	23	19	13
3.5"	21	20	16	11
4"	19	17	14	10
5"	14	13	11	X
5.75"	12	12	10	X
6"	12	11	9	X
7"	11	9	X	X
8"	10	X	X	X
9"	9	X	X	X
10"	X	X	X	X

DECK ARMOR

Thick- ness	Range
1"00	13
1"40	16
1"50	16
2"00	20
2"25	21
2"40	22
2"75	24
3"00	25
3"65	27
3"68	28
3"75	29
4"00	30
4"13	31
4"39	31
4"57	X

Penetration of INCLINED ARMOR

7"	9	8	X	X
----	---	---	---	---

Inclined 10°

(---) No limit within maximum range of gun.

(X) No penetration at any range within maximum range of gun.

Limiting ranges for penetration of vertical armor are outer, or maximum, ranges at which penetration will occur.

Limiting ranges for penetration of deck armor are inner, or minimum, ranges at which penetration will occur.

2579  
6-31

LARGE TARGET

PENETRATIVE

NON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	2.171		.668	
2	2.145		.661	
3	1.834		.565	
4	1.500		.462	
5	1.190		.366	
6	.931		.286	
7	.720		.222	
8	.559		.172	
9	.442		.136	
10	.359		.110	
11	.291		.090	
12	.234		.072	
13	.198		.061	
14	.164		.050	
15	.135		.042	
16	.111	.114	.034	.035
17	.090	.096	.028	.030
18	.073	.081	.023	.025
19	.057	.068	.018	.021
20	.046	.060	.014	.018
21	.034	.049	.010	.015
22	.025	.042	.008	.013
23	.017	.036	.005	.011
24	.011	.031	.003	.010
25	.005	.027	.002	.008
26	.002	.023	.001	.007
27	.000	.021	.000	.006
28		.018		.006
29		.016		.005
30		.013		.004
31		.011		.003

INTERMEDIATE TARGETPENETRATIVENON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	2.171		1.002	
2	2.064		.953	
3	1.506		.695	
4	1.098		.507	
5	.845		.390	
6	.650		.300	
7	.496		.229	
8	.379		.175	
9	.302		.139	
10	.244		.113	
11	.193		.091	
12	.160		.073	
13	.133		.061	
14	.112		.052	
15	.094		.043	
16	.073	.075	.034	.035
17	.061	.065	.028	.030
18	.049	.055	.022	.025
19	.037	.044	.018	.020
20	.028	.037	.013	.017
21	.021	.031	.010	.014
22	.015	.029	.008	.013
23	.011	.023	.005	.011
24	.007	.021	.003	.010
25	.004	.018	.002	.009
26	.002	.016	.001	.007
27	.000	.013	.000	.006
28		.011		.005
29		.010		.005
30		.009		.004
31		.008		.004

SMALL TARGET

PENETRATIVE

NON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	2.171		1.111	
2	1.975		1.011	
3	1.246		.638	
4	.842		.431	
5	.655		.335	
6	.501		.257	
7	.380		.194	
8	.296		.152	
9	.234		.120	
10	.190		.097	
11	.153		.078	
12	.125		.064	
13	.104		.053	
14	.087		.044	
15	.073		.037	
16	.058	.060	.030	.031
17	.047	.050	.023	.025
18	.037	.042	.019	.022
19	.029	.036	.015	.019
20	.023	.031	.012	.016
21	.017	.026	.009	.013
22	.011	.021	.006	.011
23	.007	.018	.003	.009
24	.004	.016	.002	.008
25	.002	.013	.001	.007
26	.000	.011	.000	.005
27		.010		.005
28		.009		.004
29		.008		.004
30		.007		.004
31		.006		.003

PENETRATIVE

DESTROYER TARGET

SUBMARINE TARGET

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	2.171		2.603	
2	1.483		1.241	
3	.806		.650	
4	.492		.403	
5	.328		.273	
6	.242		.195	
7	.192		.143	
8	.156		.105	
9	.127		.083	
10	.101		.065	
11	.078		.049	
12	.062		.036	.037
13	.049		.027	.029
14	.039		.021	.023
15	.031		.017	.019
16	.024	.025	.013	.016
17	.018	.020	.009	.012
18	.014	.016	.007	.010
19	.010	.013	.005	.008
20	.007	.010	.003	.007
21	.005	.009	.002	.006
22	.003	.008	.001	.005
23	.002	.007	.000	.004
24	.001	.006		.003
25	.000	.005		.003
26		.004		.002
27		.003		.002
28		.003		.002
29		.002		.001
30		.002		.001
31		.002		

2579  
6-31

-21-

ORANGE 6"/50

FIRE EFFECT TABLE - ORANGE 6"/50

Muzzle Velocity 2788 f.s.  
Weight of Projectile 100 lbs.

Maximum Range guns of CLs and CMs	25
Maximum Range guns of BBs and CCs	20



LIMITING RANGES FOR ARMOR PENETRATION

Penetration of VERTICAL ARMOR  
at Target Angles of

Armor Thick- ness	90° or 0°	75° or 15°	60° or 30°	45°
1"	---	---	---	---
2"	19	18	15	10
3"	13	12	9	4
3.5"	11	10	7	X
4"	9	8	5	X
5"	6	5	X	X
5.75"	4	X	X	X
6"	4	X	X	X
7"	3	X	X	X
8"	X	X	X	X

DECK ARMOR

Thick- ness	Range
1.00	13
1.40	17
1.50	18
2.00	21
2.25	22

- (---) No limit within maximum range of gun.  
( X ) No penetration at any range within maximum range of gun.

Limiting ranges for penetration of vertical armor are outer, or maximum, ranges at which penetration will occur.

Limiting ranges for penetration of deck armor are inner, or minimum, ranges at which penetration will occur.

LARGE TARGET

PENETRATIVE

NON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	2.237		.552	
2	2.212		.545	
3	1.830		.448	
4	1.456		.359	
5	1.111		.274	
6	.835		.206	
7	.629		.155	
8	.481		.117	
9	.387		.095	
10	.321		.079	
11	.269		.066	
12	.220	.227	.054	.056
13	.175	.188	.043	.046
14	.141	.158	.036	.039
15	.108	.129	.027	.032
16	.082	.106	.020	.026
17	.060	.087	.014	.021
18	.043	.072	.011	.018
19	.030	.059	.007	.014
20	.020	.050	.005	.012
21	.012	.042	.003	.010
22	.006	.035	.002	.009
23	.003	.029	.001	.007
24	.000	.024	.000	.006
25		.021		.004

INTERMEDIATE TARGET

PENETRATIVE

NON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	2.237		.850	
2	2.124		.807	
3	1.500		.570	
4	1.063		.404	
5	.790		.300	
6	.584		.222	
7	.434		.165	
8	.335		.124	
9	.263		.100	
10	.218		.083	
11	.183		.070	
12	.150	.152	.057	.059
13	.118	.127	.045	.048
14	.094	.106	.036	.040
15	.073	.087	.028	.033
16	.055	.071	.021	.027
17	.041	.059	.015	.022
18	.029	.048	.011	.018
19	.020	.039	.008	.015
20	.013	.032	.005	.013
21	.008	.027	.003	.010
22	.004	.023	.002	.009
23	.002	.020	.001	.007
24	.000	.016	.000	.006
25		.014		.004

SMALL TARGET

PENETRATIVE

NON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	2.240		.984	
2	2.033		.894	
3	1.245		.548	
4	.821		.361	
5	.612		.269	
6	.450		.198	
7	.333		.147	
8	.255		.112	
9	.206		.090	
10	.170		.075	
11	.143		.063	
12	.115	.120	.051	.053
13	.091	.099	.040	.044
14	.072	.083	.031	.036
15	.055	.068	.024	.030
16	.041	.056	.018	.024
17	.031	.047	.013	.020
18	.021	.038	.010	.017
19	.014	.032	.007	.014
20	.010	.027	.004	.012
21	.006	.023	.002	.010
22	.002	.018	.001	.008
23	.000	.015	.000	.007
24		.013		.006
25		.010		.004

PENETRATIVEDESTROYER TARGETSUBMARINE TARGET

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	2.240		3.698	
2	1.402		1.672	
3	.726		.870	
4	.436		.533	
5	.287		.357	
6	.212		.247	
7	.163		.181	
8	.136		.137	
9	.109		.106	.108
10	.089		.081	.085
11	.070		.063	.068
12	.055	.057	.046	.053
13	.041	.045	.032	.039
14	.031	.036	.022	.030
15	.023	.029	.016	.024
16	.016	.023	.010	.018
17	.011	.018	.006	.014
18	.007	.014	.004	.011
19	.004	.011	.002	.009
20	.002	.009	.001	.008
21	.001	.007	.000	.006
22	.000	.006		.005
23		.005		.004
24		.004		.003
25		.003		.002

FIRE EFFECT TABLE - ORANGE 5#5/50

Muzzle Velocity 2788 f.s.  
Weight of Projectile 84 lbs.

Maximum Range BBs 19  
Maximum Range all Others 20

LIMITING RANGES FOR ARMOR PENETRATION

Penetration of VERTICAL ARMOR  
at Target Angles of

Armor Thick- ness	90° or 0°	75° or 15°	60° or 30°	45°
1"	---	---	---	18
2"	12	12	10	8
3"	8	7	5	X
3 1/2"	6	4	X	X
4"	5	5	X	X
5"	X	X	X	X

DECK ARMOR

Thick- ness	Range
1"00	19
1"40	21
1"50	22
2"00	X
2"25	X

Penetration of INCLINED ARMOR

7"	X	X	X	X
----	---	---	---	---

Inclined 10°

- (---) No limit within maximum range of gun.  
( X ) No penetration at any range within maximum range of gun.

Limiting ranges for penetration of vertical armor are outer, or maximum, ranges at which penetration will occur.

Limiting ranges for penetration of deck armor are inner, or minimum, ranges at which penetration will occur.

LARGE TARGETPENETRATIVENON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	1.938		.462	
2	1.925		.459	
3	1.558		.371	
4	1.195		.285	
5	.851		.203	
6	.617		.147	
7	.465		.111	
8	.364		.087	
9	.286		.068	
10	.237		.056	
11	.195		.047	
12	.160	.165	.038	.039
13	.129	.139	.031	.033
14	.104	.117	.026	.028
15	.080	.095	.019	.023
16	.061	.079	.015	.019
17	.045	.065	.010	.015
18	.033	.055	.008	.013
19	.022	.044	.006	.011
20	.014	.035	.003	.008



INTERMEDIATE TARGETPENETRATIVENON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	1.938		.716	
2	1.846		.682	
3	1.275		.471	
4	.874		.323	
5	.604		.223	
6	.433		.160	
7	.321		.118	
8	.247		.091	
9	.194		.072	
10	.160		.059	
11	.133		.049	
12	.110	.113	.041	.042
13	.088	.095	.033	.035
14	.070	.079	.026	.029
15	.055	.065	.020	.024
16	.041	.053	.015	.020
17	.030	.044	.011	.016
18	.022	.036	.008	.013
19	.015	.030	.006	.011
20	.009	.023	.004	.009

SMALL TARGET

PENETRATIVE

NON-PENETRATIVE

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	1.938		.834	
2	1.768		.762	
3	1.044		.450	
4	.670		.288	
5	.456		.196	
6	.334		.144	
7	.247		.106	
8	.193		.083	
9	.151		.065	
10	.125		.054	
11	.104		.045	
12	.083	.087	.037	.038
13	.068	.074	.030	.032
14	.053	.061	.023	.026
15	.041	.051	.018	.022
16	.031	.042	.013	.018
17	.023	.035	.010	.015
18	.016	.029	.007	.012
19	.010	.023	.004	.010
20	.006	.018	.003	.008

PENETRATIVE

DESTROYER TARGET

SUBMARINE TARGET

Range	Top Spot	Plane Spot	Top Spot	Plane Spot
1	1.940		3.440	
2	1.209		1.388	
3	.584		.728	
4	.370		.447	
5	.243		.302	
6	.167		.218	
7	.120		.161	
8	.092		.120	
9	.073		.086	.088
10	.056		.063	.066
11	.044		.046	.050
12	.034	.035	.035	.040
13	.025	.027	.025	.031
14	.019	.022	.018	.024
15	.015	.018	.013	.019
16	.011	.015	.009	.015
17	.007	.012	.005	.011
18	.005	.009	.003	.009
19	.003	.007	.002	.007
20	.002	.005	.001	.005

FIRE EFFECT TABLE - ORANGE 5W1/50

(Tentative)

Muzzle Velocity 2900 f.s.  
Weight of Projectile 63 lbs.

Maximum Range 18

LIMITING RANGES FOR ARMOR PENETRATION

Penetration of VERTICAL ARMOR  
at Target Angles of

Armor Thick- ness	90° or 0°	75° or 15°	60° or 30°	45°
1"	---	---	---	15
2"	13	12	10	6
3"	8	8	6	X
3.5"	7	7	5	X
4"	6	5	4	X
5"	4	4	X	X
5.75"	4	X	X	X
6"	X	X	X	X

Penetration of INCLINED ARMOR

7"	X	X	X	X	Inclined 10°
----	---	---	---	---	--------------

- (---) No limit within maximum range of gun.  
 ( X ) No penetration at any range within maximum range of gun.

Limiting ranges for penetration of vertical armor are outer, or maximum, ranges at which penetration will occur.

PENETRATIVETOP SPOT

Range	Large Target	Int. Target	Small Target	Destroyer Target	Submarine Target
1	1.492	1.492	1.492	1.488	2.996
2	1.479	1.418	1.359	.907	1.289
3	1.174	.962	.790	.427	.657
4	.880	.643	.493	.266	.399
5	.619	.439	.334	.174	.265
6	.445	.312	.240	.117	.183
7	.332	.229	.177	.085	.133
8	.258	.175	.137	.064	.098
9	.202	.137	.107	.050	.071
10	.165	.112	.087	.039	.053
11	.135	.092	.072	.030	.039
12	.110	.075	.057	.023	.029
13	.087	.060	.046	.017	.021
14	.069	.047	.036	.013	.016
15	.054	.037	.028	.010	.012
16	.041	.027	.021	.007	.009
17	.030	.020	.016	.005	.006
18	.022	.015	.011	.003	.004

NON-PENETRATIVE

TOP SPOT

Range	Large Target	Int. Target	Small Target
1	.358	.545	.634
2	.355	.518	.588
3	.282	.352	.338
4	.211	.235	.210
5	.149	.161	.142
6	.107	.114	.103
7	.080	.084	.075
8	.062	.064	.058
9	.048	.051	.046
10	.040	.041	.037
11	.033	.034	.031
12	.026	.028	.025
13	.021	.022	.020
14	.017	.018	.016
15	.013	.014	.012
16	.010	.010	.009
17	.007	.007	.007
18	.006	.005	.005

*gun*

.10  
3  
—  
.30

2579  
6-31

-37-

ORANGE 4W7/45 AA

FIRE EFFECT TABLE - ORANGE 4W7/45 AA

Muzzle Velocity 2772 f.s.  
Weight of Projectile 45 lbs.

Maximum Range 19



LIMITING RANGES FOR ARMOR PENETRATION

Penetration of VERTICAL ARMOR  
at Target Angles of

Armor Thick- ness	90° or 0°	75° or 15°	60° or 30°	45°
1"	17	17	14	9
2"	8	7	5	3
3"	4	4	3	X
4"	3	2	1	X
5"	X	X	X	X

( X ) No penetration at any range within maximum  
range of gun.

Limiting ranges for penetration of vertical armor are  
outer, or maximum, ranges at which penetration will occur.

PENETRATIVETOP SPOT

Range	Large Target	Int. Target	Small Target	Destroyer Target	Submarine Target
1	1.672	1.672	1.672	1.672	4.086
2	1.652	1.585	1.520	.970	1.905
3	1.263	1.034	.858	.432	.925
4	.901	.659	.505	.257	.558
5	.626	.438	.339	.167	.366
6	.435	.304	.235	.108	.237
7	.319	.220	.169	.078	.166
8	.242	.164	.127	.057	.122
9	.188	.127	.100	.043	.091
10	.149	.101	.079	.033	.068
11	.119	.080	.063	.026	.050
12	.096	.065	.050	.020	.037
13	.073	.050	.038	.015	.027
14	.055	.037	.029	.011	.020
15	.042	.029	.022	.008	.015
16	.032	.021	.017	.005	.012
17	.024	.016	.012	.003	.009
18	.016	.011	.009	.002	.007
19	.010	.007	.006	.001	.005

NON-PENETRATIVE

TOP SPOT

Range	Large Target	Int. Target	Small Target
1	.406	.597	.692
2	.401	.566	.629
3	.307	.370	.356
4	.219	.235	.209
5	.152	.157	.141
6	.106	.109	.098
7	.077	.079	.070
8	.059	.059	.053
9	.046	.046	.041
10	.036	.036	.033
11	.029	.029	.026
12	.023	.023	.021
13	.018	.018	.016
14	.013	.013	.012
15	.010	.010	.009
16	.008	.008	.007
17	.006	.006	.005
18	.004	.004	.004
19	.002	.002	.002

2579  
6-31

-41-

ORANGE 4#7/45  
ORANGE 4#7/40

FIRE EFFECT TABLE - ORANGE 4#7/45

Muzzle Velocity 2772 f.s.  
Weight of Projectile 45 lbs.

Maximum Range 15

FIRE EFFECT TABLE - ORANGE 4#7/40

Muzzle Velocity 2165 f.s.  
Weight of Projectile 45 lbs.

Maximum Range 10

LIMITING RANGES FOR ARMOR PENETRATION

Penetration of VERTICAL ARMOR  
at Target Angles of

Armor Thick- ness	90° or 0°	75° or 15°	60° or 30°	45°
1"	---	---	14	8
2"	8	7	5	3
3"	5	4	3	X
4"	3	2	2	X
5"	X	X	X	X

- (---) No limit within maximum range of gun.  
( X ) No penetration at any range within maximum range of gun.

Limiting ranges for penetration of vertical armor are outer, or maximum, ranges at which penetration will occur.

LIMITING RANGES FOR ARMOR PENETRATION

Penetration of VERTICAL ARMOR  
at Target Angles of

Armor Thick- ness	90° or 0°	75° or 15°	60° or 30°	45°
1"	---	---	---	6
2"	7	7	5	3
3"	4	4	3	X
4"	2	2	1	X
5"	X	X	X	X

- (---) No limit within maximum range of gun.
- ( X ) No penetration at any range within maximum range of gun.

Limiting ranges for penetration of vertical armor are outer, or maximum, ranges at which penetration will occur.

PENETRATIVETOP SPOT

Range	Large Target	Int. Target	Small Target	Destroyer Target	Submarine Target
1	1.045	1.045	1.045	1.035	2.552
2	1.033	.990	.950	.605	1.190
3	.790	.648	.536	.270	.585
4	.564	.412	.315	.161	.350
5	.386	.274	.212	.104	.228
6	.272	.190	.146	.067	.148
7	.199	.137	.106	.049	.104
8	.151	.102	.080	.035	.076
9	.117	.080	.062	.027	.056
10	.093	.063	.049	.021	.043
11	.074	.050	.039	.016	.031
12	.059	.040	.031	.012	.023
13	.045	.031	.024	.009	.017
14	.034	.023	.018	.007	.013
15	.027	.018	.014	.005	.010

NON-PENETRATIVE

TOP SPOT

Range	Large Target	Int. Target	Small Target
1	.254	.373	.433
2	.251	.354	.394
3	.192	.232	.226
4	.137	.147	.131
5	.094	.098	.088
6	.066	.068	.061
7	.048	.049	.044
8	.037	.037	.032
9	.028	.029	.026
10	.023	.023	.020
11	.018	.018	.016
12	.014	.014	.013
13	.011	.011	.010
14	.008	.009	.008
15	.006	.007	.006



FIRE EFFECT TABLE - ORANGE 3"/40

Muzzle Velocity 2321 f.s.  
Weight of Projectile 12.5 lbs.  
Maximum Range 5

FIRE EFFECT TABLE - ORANGE 3"/40 AA

Muzzle Velocity 2321 f.s.  
Weight of Projectile 12.5 lbs.  
Maximum Range 7

FIRE EFFECT TABLE - ORANGE 3"/25 AA

Muzzle Velocity 1492 f.s.  
Weight of Projectile 12.5 lbs.  
Maximum Range 6

LIMITING RANGES FOR ARMOR PENETRATION

Penetration of VERTICAL ARMOR  
at Target Angles of

Armor Thick- ness	90° or 0°	75° or 15°	60° or 30°	45°
1"	3	3	2	X
2"	X	X	X	X

(X) No penetration at any range within maximum range of gun.

Limiting ranges for penetration of vertical armor are outer, or maximum, ranges at which penetration will occur.

2579  
6-31

-48-

ORANGE 3"/40  
ORANGE 3"/40 AA  
ORANGE 3"/25 AA

PENETRATIVE

TOP SPOT

Range	Large Target	Int. Target	Small Target	Destroyer Target	Submarine Target
1	.636	.636	.636	.572	1.552
2	.529	.508	.487	.206	.737
3	.260	.213	.176	.076	.304
4	.178	.131	.100	.038	.156
5	.125	.088	.068	.022	.098
6	.091	.064	.049	.017	.066
7	.068	.046	.036	.013	.047

2579  
6-31

-49-

ORANGE 3"/40  
ORANGE 3"/40 AA  
ORANGE 3"/25 AA

NON-PENETRATIVE

TOP SPOT

Range	Large Target	Int. Target	Small Target
1	.111	.175	.207
2	.093	.140	.158
3	.045	.059	.057
4	.031	.036	.032
5	.022	.024	.022
6	.016	.018	.016
7	.012	.013	.012

