UNCLASSIFIED

REPORT NO. TED/

DEVELOPMENT OF [illegible] CAST ARMOR

BETWEEN FEBRUARY AND MAY, [illegible]

Report W.A. 710/426
(Ex.O. 51-A13)

May 13, 1942

Development of Low Alloy Cast Armor

Between February and May, 1942

INTRODUCTION

At the beginning of 1942, the following chemistries were being used for the production of cast armor:

	Maximum Chemistries					
	C	Mn	Ni	Cr	Mo	V
American Steel Foundries	.30	1.00	---	3.00	.40	-
Continental Roll and Steel Foundry Company	.33	.90	1.50	1.25	.55	-
General Steel Castings Co.	.30	.65	---	2.60	.60	-
Lebanon Steel Foundry	.25	.70	2.00	1.00	.55	.05
Scullin Steel Co.	.35	.85	---	1.50	.70	-
Sivyer Steel Castings Co.	.30	.85	---	1.60	.90	-
Symington-Gould Corp.	.30	.75	---	1.70	.75	-
Union Steel Castings Co.	.35	.90	2.50	1.10	.50	-
Wehr Steel Company	.32	.90	2.00	1.10	.80	-
Ford Motor Company	.26	.70	---	1.60	.70	-

On February 7, 1942 a special meeting of the Subcommittee for Cast Armor was called at the request of the Office, Chief of Ordnance at which time representatives of the War Production Board outlined the expected scarcities of nickel, chromium, and vanadium for use in cast and rolled armor.

The substance of the discussions on alloys indicated that cast armor must be developed containing a maximum of 0.60% nickel,

0.60% chromium, and no vanadium. Approximately one week later, the industrial members of the subcommittee held a meeting and decided upon the compositions to be investigated. The compositions chosen were based upon the alloy restrictions and the small amount of data on low alloy compositions which had been obtained at Watertown Arsenal and by the armor producers.

DEVELOPMENT PROCEDURE

As a result of the meeting of the industrial subcommittee members, five type compositions were chosen for investigation. The burden of preparing the test plates was distributed among the several companies then making cast armor, and each company in the initial stages concentrated on two or three compositions which were most adaptable to their processing conditions with special attention devoted to the conservation of alloys recharged into the furnaces as scrap for remelting.

The following type analyses were chosen for complete investigation:

	Maximum Chemistry						
Type	C	Mn	Si	Ni	Cr	Mo	Cu
AC-1a	.30	1.00	.60	.50	.50	.50	---
AC-1b	.25	1.00	.60	.50	.50	.50	1.00
AC-2a	.30	1.65	.60	-	.60	.60	---
AC-2b	.30	1.60	.60	-	-	.50	---
AC-3a	.25	1.00	1.00	-	-	.50	1.75
AC-3b	.25	1.10	.90	-	-	-	1.75
AC-4	.25	.50	.50	-	.50	.75	---
AC-5	.30	1.00	.50	-	.60	.50	.75

During the months March and April approximately two hundred and forty (240) cast armor test plates of the type compositions listed above as well as certain other compositions were cast, prepared, and heat treated for ballistic tests at the Aberdeen Proving Ground. Several test plates of Grade "B" cast steel were also prepared for ballistic tests as a base point on the effect of an absolute minimum of alloys.

The low alloy development plates were tested immediately upon receipt at the Aberdeen Proving Ground and reports forwarded

to Watertown Arsenal at two or three day intervals. A tabulation of the results obtained was kept continually and at intervals copies of the tabulations were made and furnished to the sub-committee members. In this way the producers were kept informed on the compositions which were giving the greatest success and could alter their plans accordingly.

Each test plate was given a complete test at the Aberdeen Proving Ground unless failure occurred on the shock test which in the majority of cases was applied first. In addition to the standard 75MM T12AP shock test at a 25° obliquity, plates which withstood this test in some cases were tested with the 75MM MK1 15-pound Proof Slug at normal impact. The latter test, especially when applied after the standard penetration and shock tests had been obtained, is an extremely severe but also informative test. It has the effect of producing an extensive bow in the test plate.

During the two month period referred to above several new firms qualified for production of cast armor on similar low alloy compositions and without apparent difficulty. These new companies include:

Buckeye Steel Castings Company	- Columbus, Ohio
Fort Pitt Steel Castings Company	- McKeesport, Pa.
Pittsburgh Steel Foundry Corporation	- Glassport, Pa.
McConway & Torley Corporation	- Chicago, Illinois
Pratt and Letchworth Co., Inc.	- Buffalo, New York
Ordnance Steel Foundry Company	- Bettendorf, Iowa
Utility Electric Steel Foundry	- Los Angeles, California
Texas Electric Steel Casting Company	- Houston, Texas

RESULTS

As a result of the ballistic tests of a large number of plates, the following compositions have been chosen for the production of armor castings by the several manufacturers:

Type	*Range of Mean Compositions C	Mn	Si	Ni	Cr	Mo	Cu	Manufacturer
AC-1a	.28/ .30	.70/ 1.00	.25/ .65	.50	.50	.40/ .50	—	Continental Roll & Steel Foundry Company Lebanon Steel Foundry Sivyer Steel Castings Co. Union Steel Castings Co. Pittsburgh Steel Foundry Corp. Wehr Steel Company
AC-2a	.28/ .30	1.50/ 1.55	.40	-	.35/ .40	.10/ .40	—	American Steel Foundries American Manganese Steel - Div. of American Brake Shoe and Foundry Co. General Steel Castings Corp.
AC-2b	.28/ .30	1.40/ 1.50	.35/ .40	-	-	.35/ .50	—	Symington-Gould Corp. Scullin Steel Company Texas Electric Steel Co.
AC-3a	.20	1.00	.85	-	-	.50	1.40	Pacific Car & Foundry Co.
AC-5	.27	.80	.25	-	.60	.50	.75	Ford Motor Company

*The mean compositions selected by the several companies appear as a range.

Three companies are now in total production on the new, low alloy analyses, and the majority of the balance of the producers will get into complete production during the month of May, 1942.

Each of the compositions originally proposed for investigation has proven successful in meeting the Specification AXS-492. Composition AC-4, although satisfactory, has been discontinued because later advice from the War Production Board indicated that the molybdenum content was excessive in light of the recent restrictions on this element. Composition AC-3b is not to be used because of its extremely low hardenability. It is not believed adequate for the thicknesses of castings which may be encountered.

Compositions AC-1a, AC-2a, and AC-5 have adequate hardenability in a water quench for casting thicknesses up to 2-1/4". In Composition AC-2b the manganese content must be at least 1.50% to provide adequate hardenability in this thickness. Composition AC-3a, although having low hardenability, is nevertheless successful in 2" plate thicknesses. The advantage of this steel lies in its low carbon content and superior weldability.

In general, the new compositions will withstand the slug shock test. Examination of the attached three charts, which contain the complete information on the tests of two hundred and thirteen (213) plates, will indicate the results obtained. Satisfactory ballistic results can be achieved with the new compositions with a considerably lesser degree of homogenization of the as-cast material. This is very important from the production standpoint especially in the case of new producers who by using a shorter and lower-temperature homogenizing cycle could get into greater production with existing facilities.

The ballistic results obtained on the Grade "B" steel plates were not satisfactory. Tempering to a sufficiently high temperature to provide adequate shock resistance produces a material too soft to meet the penetration requirements. In general, the ballistic limit runs approximately 100 f/s below the specification value.

In the use of the low alloy steels, the decreased hardenability is countered by a drastic quenching operation. In some cases caustic quenching is to be used to obtain the maximum effect from the contained alloys.

The low temperature ballistic properties of the low alloy compositions have not been explored. This is to be done at the earliest date possible.

CONCLUSIONS

1. Results on the experimental plates indicate that the shock resisting properties of the new low alloy compositions will be reasonably comparable to those of the old, higher alloy nickel-chrome-molybdenum and chrome-molybdenum steels.

2. Vanadium requirements for cast armor have been eliminated entirely.

3. Chromium contents have been reduced from a maximum of 3% to a maximum of .60%.

4. Nickel contents have been reduced from a maximum of 2.50% to a maximum of .60%. Of the five new compositions to be produced, only one type, AC-1a, contains nickel as an alloying element.

5. The molybdenum contents of the new analyses are in general less than in the old compositions.

6. The average manganese content of the new compositions is higher than in the case of the old compositions.

7. Present indications are that the margin of excess on ballistic limit will be adequate for the low alloy compositions although slightly inferior to the old analyses. This can only be substantiated by a correlation of results on acceptance test plates.

8. For satisfactory ballistic results, the time and temperature of homogenization may be reduced for the new alloys thus easing the extreme 'bottleneck' on heat treating facilities.

9. The low alloy analyses are easier to handle in production from several standpoints, but the quenching operation is critical and must be carefully controlled. The repair welding of the low alloy analyses may be performed with less or no preheat, and because of the lack of air hardening tendencies less trouble with cracking after homogenization is to be expected.

N. A. Matthews,
Capt., Ord. Dept.

E. L. Reed,
Research Metallurgist.

APPROVED:

H. H. ZORNIG,
Colonel, Ord. Dept.,
Director of Laboratory.

Date Tested	Producer	Heat No.	Plate No.	Thickness	Chemistry C	Mn	Si	S	P	Ni	Cr	Mo	V	Cu
2/24/42	American Steel Fdy.	9438	A89 A96	2 5/16" 2 3/16"	.28	.71	.43	.025	.016	–	.23	.03	–	–
2/18/42	" "	9214	A16 A15	2 1/4" 2 3/16"	.26	1.50	.37	.022	.018	–	.32	.11		
2/18/42	" "	"	A17 A18	2 1/4" 2 3/16"	.26	1.50	.37	.022	.018	–	.32	.11		
"	" " "	"	A13	2 3/16"	"	"	"	"	"	—	"	"		
"	" " "	"	A20	2 3/16"	"	"	"	"	"	–	"	"		
3/2/42	" "	665	665-1	2"	.30	1.56	.41	.034	.026	–	.31	.06	–	–
"	" "	665	665-4	1 15/16"	"	"	"	"	"		"	"		
2/26/42	" "	598	—	1 1/2"	.30	1.62	.51	.021	.025	–	.40	.16		
2/6/42	" "	HV-1/2	HV-1 HV-2	1 5/16" 1 5/16"	.30 .29	1.63 1.52	.44 .41	.035 "	.026 .034	–	–	–	.09	–
12/12/41	" "	509	883 882	2.18" 2.18"	.31	1.64	.41	.021	.013	–	–	–	–	
2/27/42	" "	9380	A65	2 1/16"	.29	1.76	.43	.019	.021	–	.44	.12	–	
"	" "	"	A67	2 3/16"	"	"	"	"	"		"	"		
"	" "	"	A71 A70	2 1/16" 2 1/16"	"	"	"	"	"		"	"		
3/6/42	" "	505	505-1	1 7/8"	.28	1.59	.41	.036	.033	–	.28	.05		
3/6/42	" "	505	505-2	1 7/8"	"	"	"	"	"		"	"		
3/30/42	" "	572	OA-1	1.86"	.28	1.64	.40	.034	.033	–	.26	.06		
3/31/42	" "	808	808-2	2.08"	.29	1.57	.40	.037	.029	–	–	–		
2/27/42	Wehr Steel Co.		W1-332	1.65"	.27	.78	.35	.033	.036	1.00	.51	.40		
2/27/42	" " "		W2-332	1.49"	"	"	"	"	"	"	"	"		
2/27/42	" " "		02-333	1.70"	"	"	"	"	"	"	–	"		
2/27/42	Continental Roll & St.	9948	1 2	2 3/16" 2 1/4"	.26	.72	.36	.028	.033	.81	.60	.29	–	–
2/21/42	" "	9910	1	2 5/16"	.29	.79	.33	.040	.033	1.06	–	.62		
"	" "	"	2	2 5/16"	"	"	"	"	"	"	"	"		
2/25/42	" "	3896	1 2	2 7/16 2 5/16	.34	.81	.33	.034	.036	.64	.59	.40	–	–
"	" "	"	3 4	2.36" 2.38"	"	"	"							
3/2/42	Scullin Steel Co.	5092A	X2	2.13"	.36	1.46	.45	.015	.030	–	–	.70		
2/26/42	" " "	5099A	X3	2.03"	.31	1.49	.47	.015	.022	–	–	.28		
3/7/42	" " "	3-421	X5	2.16"	.33	1.51	.68	.014	.026	–	–	.39		
3/10/42	" " "	"	X6	2.09"	"	"	"	"	"			"		
2/13/42	General Steel Cast.	5397M	582	2 3/16"	.28	.72	.39		.010	–	–	1.67		
2/27/42	" " "	"	586 588	2 1/16" 2 3/16"	"	"	"		"			"		
3/3/42	" " "	5522M	645 646	2 1/4"	.27	1.48	.40	.017	.022	–	–	.51		
3/5/42	" " "	5531MC	658	2.27"	.28	1.58	.40	.017	.020	–	.71	.52		
"	" " "	"	660	2.28"	"	"	"	"	"		"	"		
3/11/42	" " "	"	657	2.33"	"	"	"	"	"		"	"		
3/11/42	" " "	"	656	2.30"	"	"	"	"	"		"	"		
3/24/42	" " "	"	664	2.24"	"	"	"	"	"		"	"		

2 1 3 CAST A

HEAT

CU		DEOXIDATION	FURNACE	HOMOGENIZE TEMP.	HOMOGENIZE HRS RISE	HOMOGENIZE HRS SOAK	HOMOGENIZE COOLANT	SOFTENING ANNEAL TEMP.	SOFTENING ANNEAL HRS RISE	SOFTENING ANNEAL HRS SOAK	SOFTENING ANNEAL COOLANT	THRU
–			BASIC OH.									165
		5" HC FeTi 1" AL	BASIC OH.	1825	3	8	AIR	1200	2	4	AIR	165
		"	"	1826	3	8	AIR	1200	2	4	AIR	165
		"	"	"	"	"	"	"	"	"	"	"
		"	"	"	"	"	"					"
–		3" HC FeTi	ACID ELECTRIC	1825		8	AIR					152
		"	"	"		"	"					"
		5" HC FeTi	ACID ELECTRIC	1825		8	AIR	—				152
		2" HC FeTi 3" Ca Si	" "	1825		8	AIR	—				152
		5" HC FeTi	BASIC OH	1825	3	8	AIR	1200	2	4	AIR	165
		5" HC FeTi	BASIC OH	1825	3	8	AIR					165
		"	"	"	"	"	"					"
		"	"	"	"	"	"					"
		3" HC FeTi	ACID OH.	1825		8	AIR					15
		"	"	1825		8	AIR					155
			ACID OH	1650		2	AIR					158
			ACID ELECTRIC	1650		2	AIR					152
		2" AL	ELECTRIC	1825		6	AIR					157
		"	"	1825		6	AIR					157 156
		"	"	1825		6	AIR					157 155
–	–	2" AL	ELECTRIC	1825			AIR	1275			AIR	155
		2" AL	ELECTRIC	1650		8	FCE					155
		"	"	1825		8	AIR	1275		6	AIR	150
–	–	2" AL	ACID OH.	1650		8	FCE					155
		"	"	1825		8	AIR	1275			AIR	156
			BASIC OH	1750		5	AIR	1100		3	AIR	158
			"	1750		7	AIR	1150		3	AIR	158
			"									1600
			"	1750		7	AIR					1580
			BASIC OH	2000		10	AIR	1250		4	AIR	167
			"	2000		10	AIR	1250		4	AIR	1675
			BASIC OH	2000		10	AIR	1250		4	AIR	1675
			BASIC OH	2000		10	AIR	1250		4	AIR	1675
			"	"		"	"	"		"	"	"
			"	2000		10	AIR	1250		4	AIR	1675
			BASIC OH	2000		10	AIR	1250		4	AIR	1675
			" "	2000		10	AIR	1250		4	AIR	1675

CONFIDENTIAL

ST ARMOR LOW ALLOY DEVELOPMENT TESTS

4

EAT TREATMENT

HARDEN				TEMPER				PHYSICAL PR			
T TEMP	HRS RISE	HRS SOAK	COOLANT	TEMP	HRS RISE	HRS SOAK	COOLANT	BRINELL HARD.	TENSILE STR.	YIELD POINT	EL
1650	3	2	WATER	1000°F	3	2	AIR	215 - A89 211 - A86	97,000 99,000	62,000 63,500	2 2
1650	3	2	WATER	970	3	6	WATER	241 245	117,500 114,500	96,500 91,500	1 1
1650	3	2	WATER	1060	3	6	WATER	230 238	108,500 107,000	86,500 84,500	1 1
"	"	"	"	880	3	6	WATER	257-266	121,000	98,500	13
"	"	"	"	1150	3	6	WATER	211	99,000	76,500	19
1525		40 MIN	WATER	1130		6	WATER	269	125,150	103,000	17
"		"	"	1240		6	WATER	242	114,500	98,000	2
1525		40 MIN	WATER	1225		6	WATER	251	118,250	99,750	2
1525		2	WATER	1175		4	AIR	225 226	104,750	85,500	2
1650	3	2	WATER	1040	3	6	WATER	229 233	110,000 109,000	83,500 80,500	2
1650	3	2	WATER	1075 1200	3 3	6 6	WATER "	226	108,500	81 500	2
"	"	"	"	1125	3	6	WATER	261	122,000	103,000	1
"	"	"	"	1170	3	6	WATER	248-243	113,500	90,000 92,500	2 2
1550		40 MIN.	WATER	1150		6	WATER	248 - 256	117,250	98,750	19
1550		40 MIN.	WATER	1250		6	WATER	222 - 227	97,000	75,000	2
1525		40 MIN.	WATER	1225		4	WATER	209 - 215	93,250	72,000	2
1525		40 MIN	WATER	1050		4	WATER	256 - 262	116,000	94,900	1
1575		4	WATER	1100		6	AIR	269	124,000	105,000	1
1575 1550		4 4	WATER WATER	1100		6	AIR	277	131,500	114,000	1
1575 1550		4 4	OIL OIL	1000 1000		6	AIR	241 - 255	126,000	101,000	1
1550			WATER	1225			FCE	231 234	102,750 105,600	79,000 81,500	2 2
1550		6	WATER	1225		10	FCE	241 - 255	109,500	88,500	2
1500		8	WATER	1225		10	FCE to 1000 QUENCH	241 - 255	FLAW IN	TENSILE BAR.	
1550			WATER	1225		10	FCE	229 - 241 229 - 241	113650 118 850	90 000 92000	2 2
1560			WATER	1225		10	FCE to 1000 QUENCH	235 - 241 229 - 241	116,350 113,250	93 850 91 150	2 2
1580		3	WATER	1000		7	AIR	269	136,500	120,000	1
1580		3	WATER	1040		7	AIR	240 - 247	120,000	98,000	1
1600		4	WATER	1160		7	AIR	248	119,000	73,000	1
1580		3 ½	WATER	1220		7	AIR	235 - 240	109,000	87,000	2
1675		4	WATER	1200		4	AIR	278	139000	125 000	15
1675		4	WATER	1175 1200		4 8	AIR AIR	255	120,500	104,500	12
1675		4	WATER	1175		4	AIR	252	125,000	107,500	17
1675		4	WATER	1175 1225		4 4	AIR AIR	283	137,000	117,500	13
"		"	"	1175 1225		4 4	AIR AIR	283	"	"	
1675		4	WATER	1175 1250		4 4	AIR AIR	244	107,000	76,000	18
1675		4	WATER	1175 1250		4 4	AIR AIR	244	"	"	
1675		4	WATER	1150		4	AIR	321	146,500	128,000	13

BALLISTIC RESU

PROPERTIES				PENETRATION					PROJECTILE THRU PLATE			S
ELONGATION	RED AREA	IZOD	PROJ.	HIGH P	LOW C.	B.L.	SPEC	PROJ.	VELOCITY	RESULT	PROJ.	OBL
21.0	49.5	40-41	37mm M51	1800	1829	1815 (-10)	1919	37mm M51	2478	$2\frac{13}{16}$ x $2\frac{2}{16}$"	76mm T12AP	25
21.0	47.2	35-34										
15.0	30.2	32-33	"	1867	1906	1886	1875	"	—	PASSED	"	"
18.5	41.3	27-12				(+10)						
15.5	41.5	33-39	"	1905	1951	1928	1789	"		PASSED	"	"
17.5	41.9	34-38				(+25)						
13.5	33.4	23-24	"	1853	1901	1877	1832	"	—	PASSED	"	"
						(+59)						
19.5	45.4	39-41	"	1870	1913	1891	1832	"	—	PASSED	"	"
						(+120)						
17.0	50.0	29-30	"	1810	1831	1820	1700	"	—	PASSED	"	"
						(+119)						
20.0	50.3	47-47	"	1744	1794	1769	1650	"	—	PASSED	"	"
						(+361)						
20.0	54.9	49-52	"	1647	1675	1661	1500	"	—	PASSED	"	"
						(+142)						
21.5	52.8	44-45	"	1470	1509	1490	1340	"	2282	$2\frac{1}{2}$ x 2	"	"
21.0 21.0	50.3 48.6	55-60 59-60	"	1846	1872	(+58) 1859	1831	"	2547	2 x $2\frac{5}{8}$	"	"
						(+133)						
25.0	59.1	69-70	"	1906	1940	1923	1788	"	—	PASSED	"	"
						(+129)						
19.0	46.9	57-60	"	1838	1885	1861	1832	"	—	PASSED	"	"
23.5	55.0	68-69				(+164)						
23.5	54.7	66-69	"	2027	2052	2039	1975	"	—	PASSED	"	"
						(+107)						
19.0	51.7	27-32	"	1776	1798	1787	1600	"	—	PASSED	"	"
						+216						
25.0	60.3	60-61		1791	1829	1810	1600	"	—	PASSED	"	"
24.0	58.3	53-58		1735	1754	1745	1588 (+157)	"	2521	2 $\frac{7}{16}$" x 2 $\frac{1}{2}$"	76mm T12AP 76mm M61 Shot	25° Normal
18.5	46.2	17-19		1833	1876	1855	1756 (+99)	"	2521	2 $\frac{7}{16}$" x 2 $\frac{1}{2}$"	75mm T12AP 75mm M61 Shot	25° Normal
11.5	18.8	22.0	"	1462	1496	1479	1450 (+29)		2189	2 $\frac{1}{2}$ x 2 $\frac{1}{2}$"	75mm T12AP	25°
12.0	22.7	19.0	"	1439	1457	1448	1300 (+148)		2174	2 $\frac{3}{8}$ x 2 $\frac{3}{8}$	"	"
12.5	22.4	16.0	"	—					—		"	"
26.0	62.8	60				(+75)						
25.0	61.3	58	"	1974	2013	1994	1919	"	2516	2 $\frac{7}{16}$ x 2 $\frac{7}{8}$	75mm T12AP	25°
22.0	53.0	37				(+25)						
			"	1926	1963	1944	1919	"	2471	2 $\frac{7}{16}$ x 2 $\frac{7}{8}$	"	"
						(+77)						
			"	1917	2015	1996	1919	"	2594	2 $\frac{7}{16}$ x 2 $\frac{7}{16}$	"	"
24.0	59.8	48				(+94)						
24.0	57.5	50	"	2001	2024	2012	1919	"	2551	2 $\frac{1}{2}$" x 2 $\frac{1}{2}$"	"	"
22.0	54.1	49				(+184)						
26.0	57.3	56	"	2056	2079	2067	1963	"	2423	2 $\frac{1}{4}$ x 2 $\frac{3}{8}$	"	"
15.0	37.6	40.0	"	1921	1955	1938	1788 (+150)	"	2164	2 $\frac{3}{4}$ x 2 $\frac{3}{8}$	"	"
17.0	37.9	86.0	"	1788	1792	1773	1722 (+51)	"	2164	2 $\frac{1}{2}$ x 2 $\frac{5}{8}$	"	"
19.0	24.8	30.0	"	1806	1829	1818	1812 (+6)	"	2472	2 $\frac{3}{4}$ x 2 $\frac{3}{4}$	"	"
22.0	44.0	43-45	"	1752	1796	1774	1756 (+18)	"	2444	2 $\frac{1}{2}$ x 2 $\frac{1}{2}$"	"	"
15.0	39.1	35.0	—	—				—	—	—	75mm T12AP	25°
12.5	31.5	42.3	508 37mm M51			-9 1822	1831	37mm M51	2505	3 $\frac{1}{2}$ x 3 $\frac{1}{4}$	"	"
17.0	38.2	56.3	476 37mm M51	1916	1956	(+61) 1936	1875	"	2594	2 $\frac{3}{4}$ x 2 $\frac{7}{16}$	"	"
13.5	31.8	39.3	37mm M51	1997	2039	+139 2018	1889	"	2543	2" x 2 $\frac{1}{2}$°	"	"
"	"	"	"	1992	2048	+124 2020	1896	"	2567	2 $\frac{1}{2}$" x 2 $\frac{3}{4}$"	"	"
18.0	80.5	51.3	"	1967	1992	1979	1910 (+69)	"	2467	2 $\frac{3}{4}$ x 2 $\frac{3}{4}$	"	"
"	"	"	"	1948	1969	1956	1931 (+25)	"	2404	2" x 2 $\frac{1}{2}$°	75mm M61 Proof Shot	Norm
13.5	28.3	40.3	"	2072	2116	2094	1868 (+226)	"	2405	2" x 2 $\frac{3}{4}$°	"	"

BALLISTIC RESULTS

W.A. 3/15/42 Revised 3/20/42

Projectile Thru Plate				Shock Test				Plate Quality
Proj.	Velocity	Result	Proj.	Obl.	Velocity	Result	Type of Failure
37mm M51	2478	$2\frac{11}{16} \times 2\frac{2}{16}$"	76mm T1 AP	25°	1067	CP-SCRMB 18" Crack.	Grade "B" Steel. Failed Penetration & Shock
"	—	Passed	"	"	1042	A16 - Passed A-15 - 21" Crack	A-16 Satisfactory +12°F A-15 - Failed Shock (-12°F
"		Passed	"	"	1063	A-17 - Passed A-18 - 20" Crack	A-17 - Satisfactory A-18 - Failed Shock (-12°F)
"	—	Passed	"	"	—	Failed - 15" x 16" x 6" Crack	Failed - Shock - Cracking
"	—	Passed	"	"	—	Passed	Satisfactory
"	—	Passed	"	"	—	Passed	Satisfactory
"	—	Passed	"	"	—	Passed	Satisfactory
"	—	Passed	"	"	—	Passed	Satisfactory
"	2232	$2\frac{1}{2} \times 2\frac{1}{2}$	"	"	899	PP - Passed NVI	Satisfactory
"	2547	$2 \times 2\frac{5}{8}$	"	"	1086	882 - SB - PP	Satisfactory
"	—	Passed	"	"	—	Passed	Satisfactory
"	—	Passed	"	"	—	Passed	Satisfactory
"	—	Passed	"	"	1040	Passed Passed	Satisfactory
"	—	Passed	"	"		Passed	Satisfactory
"	—	Passed	"	"		Passed	Satisfactory
957) "	2521	$2\frac{1}{4}$" x $2\frac{1}{2}$"	76mm T1 AP 75mm M61 Shot	25° Normal	947 1166	PP-MB PP-MB Passed	Satisfactory
M) "	2521	$2\frac{3}{4}$" x $2\frac{3}{4}$"	75mm T1 AP 75mm M61 Shot	25° Normal	1083 1393	PP-MB. CP - Plate Broke - 3 Pieces	Satisfactory.
+29)	2169	$2\frac{1}{2} \times 2\frac{1}{2}$"	75mm T1 AP	25°	872	PP - Passed	Satisfactory
+148)	2174	$2\frac{3}{8} \times 2\frac{3}{8}$	"	"	954	PP - Passed	Satisfactory
	—		"	"	882	Failed Cracking	Failed - 19, 16, 15" Cracks
"	2516	$2\frac{3}{16} \times 2\frac{3}{8}$	75mm T1 AP	25°	1096	No1. PP. SB Passed	Satisfactory
"	2471	$2\frac{7}{8} \times 2\frac{7}{8}$	"	"	1144	PP - Passed	Satisfactory
"	2534	$2\frac{3}{16} \times 2\frac{3}{16}$	"	"	1118 1148	Hit on 2 81mm Rds. CP - Broke Plate	Satisfactory.
"	2551	$2\frac{1}{2}$" x $2\frac{1}{2}$"	"	"	1166	"1 - PP - Passed	Satisfactory.
"	2423	$2\frac{1}{4} \times 2\frac{3}{8}$	"	"	1155	"3 - PP - SB - Passed	Satisfactory
150) "	2164	$2\frac{3}{16} \times 2\frac{7}{8}$	"	"	1048	PP - SB - Passed	Satisfactory
51) "	2164	$2\frac{1}{2} \times 2\frac{5}{8}$	"	"	998	PP - Passed	Satisfactory.
46) "	2472	$2\frac{3}{4} \times 2\frac{3}{4}$	"	"	1057	CP - $\frac{1}{2}$" x 1" Crack on LE	Satisfactory.
"	2444	$2\frac{1}{2} \times 2\frac{1}{2}$"	"	"	1029	PP - SB - Passed	Satisfactory.
—	—	—	75mm T1 AP	25°	1093	CP - B.S. $5\frac{1}{2} \times 3\frac{1}{2}$ Plate Broke	Failed - Shock - Plate Broke
37mm M51	2505	$3\frac{1}{2} \times 3\frac{3}{4}$	"	"	1107	"586 - Plate Broke - 3 Pieces	Failed - B.L. & Shock.
"	2544	$2\frac{3}{4} \times 2\frac{3}{16}$	"	"	1092	"645 - PP - SB - Passed	Satisfactory.
"	2543	2" x $2\frac{1}{2}$"	"	"	1115	PP - SB - Passed	Satisfactory.
"	2567	$2\frac{1}{2}$" x $2\frac{3}{4}$"	"	"	1071	PP - SCRMB - Passed	Satisfactory
"	2467	$2\frac{1}{2} \times 2\frac{3}{4}$	"	"	1110	PP - SB - Passed	Satisfactory
35) "	2404	2" x $2\frac{1}{2}$"	75mm M61 Proof Shot	Normal	1342	PP - SB - Passed	Satisfactory
26) "	2405	2" x $2\frac{3}{4}$"	" "	5	1398	PP - SB - Passed	Satisfactory
2) "	2483	$2\frac{3}{4} \times 2\frac{3}{4}$"	75mm T1 AP	25° Normal	1079 1391	PP - SB - Passed PP - SB	Satisfactory.

4/42	" " "	"	664	2.24"	-	"	"	-	-		"	"			
24/42	" " "	"	662	2.21"	-	"	"	-	"		-	"			
8/42	LEBANON STEEL FDY.	HW1301	C1	2¼"	38	.71	.35	.025	.045	GRADE "B" STEEL					
	" "	"	C2	2 3/16"	"	"	"			GRADE "B" STEEL					
	" "	HE8935	A1	2⅛"	.19	.95	.48	.020	.035	.67	.66	.65	-	1.03	
	" "	"	A2	1 5/8"	"	"	"	"	"	"	"	"	-	"	
8/42	" "	"	A3 ✓	1"	"	"	"	"	"	"	"	"		"	
23/42	PACIFIC CAR & FOUNDRY	42B107	7 8	1¾" 2⅝"	.22	1.02	.82	.026	.024	-	-	-	-	1.64	
23/42	PACIFIC CAR & FOUNDRY	42B104	1 4	2⅝" 1⅝"	.21	.94	.75	.017	.021	-	-	-	-	1.42	
16/42	" " "	42B126	9 14	2.14" 1.48"	.20	1.02	.82	.024	.018					1.75	
15/42	" " "	42B127	10 15	2.20" 1.42"	.21	1.09	.82	.011	.019					1.61	
15/42	" " "	42B129	12 13	1.89" 1.45"	.24	1.08	.86	.023	.008	—	-	-	-	1.76	
23/42	" " "	42B106	3 6	2⅝" 1⅝"	.20	.93	.76	.015	.014	-	.61	-	-	1.41	
16/42	" " "	42B128	11 16	1.87" 1.35"	.20	1.05	.79	.019	.013	-	.65	-	-	1.62	
23/42	" " "	42B105	2 5	2 1/16" 1 9/16"	.20	.89	.70	.017	.019	-	-	.43	-	1.44	
17/42	UNION STEEL CASTING	267C	320	1.91"	.29	2.00	.54	.035	.041	-	-	-		-	
5/42	" " "	277C	338	2.01"	.36	1.48	.35	.017	.030	.63	.49	.35			
5/42	" " "	280C	649	2.08	.30	2.02	.43	.015	.028	.63	.58	.59			
5/42	" " "	282C	349	1.88"	.24	.96	.27	.016	.028	.59	.46	.80	-	1.18	
5/42	" " "	278C	339	2.20"	.38	1.92	.32	.014	.028	.61	.58	.40	-	1.43	
24/42	" " "	278C	647	2.38"	"	"	"	"	"	"	"	"		"	
26/42	" " "	277C	640	2.53"	.36	1.48	.35	.013	.030	.63	.49	.35		—	
24/42	" " "	280C	648	2.43"	.31	2.02	.43	.050	.028	.63	.58	.59	-	-	
15/42	FORD MOTOR CO.	T3068	100	2.08"	.28	.54	.42	.015	.018	-	-	1.22		.72	
7/42	" " "	-	A5	1.74"	.28	.79	.18	.016	.020	-	-	.52		.72	
7/42	" " "	-	A5	1.71"	"	"	"	"	"			"		"	
7/42	" " "	-	A5 ✓	2.19"	"	"	"	"	"			"		"	
7/42	" " "		740	1.70"	.32	.60	.21	-	-	-	.55	.76			
7/42	" " "		740	2.14"	"	"	"				"	"			
14/42	SILVER STEEL CASTING	X6	X6	2.04"	.35	1.14	.40	.040	.026	-	1.17	.51			
4/42	" " "	X6X	X6X	2.03"	.35	1.14	.40	"	"		"	"			
4/42	" " "	5596	99	2.22"	.31	1.06	.25	.039	.019	.47	.59	.49			
4/42	" " "	5596	99 Y	2.23"	"	"	"	"	"	"	"	"			
4/42	" " "	5577	90	2.14"	.23	.95	.23	.036	.018	.54	.71	.51		1.01	
4/42	" " "	"	90X	2.11"	"	"	"	"	"	"	"	"		"	
7/42	SYMINGTON GOULD	4552	2 ✓	1.49"	.24	1.24	.38	.014	.024	-	-	.40	✓	-	
"	" "	"	3-2	2"	"	"	"	"	"			"		—	
"	" "	"	4	1.55"	"	"	"	-	-			"		—	
"	" "	"	5-2 ✓	1.99"	"	"	"	"	"			"		—	
2/42	" "	2244	A B	1.46" 1.49"	.21	.44	.25	.024	.037	-	-	70		88	

		Basic OH	2000		10	Air	1250		4	Air	1675
		" "	2000		10	Air	1250		4	Air	1675
		" "	2000		10	Air	1250		4	Air	1675
		Acid Electric									1750
		" "	1900		5	Air					155
1.03		Acid Electric	1900		5	Air					157
"		"	"		"	"					170
"		"	1900		5	Air					157
											1700
											157
1.64		Basic	—	—	—	—					175
1.42			1850		7	Air					162
1.75			1850		6	Air	1000		2	Air	162
1.61			1850		6	Air	1000		2	Air	162
1.76			—		—	—					175
1.41			1850		7	Air					162
1.62			1850		6	Air	1000		2	Air	162
1.44			1850		7	Air					162
—	HC F_2T_i	Acid O.H.	1750		10	Fce					1550
		Acid O.H.	1750		10	Fce					1550
		Acid O.H.	1750		10	Fce					1550
1.18		Acid O.H.	1750		10	Fce					1475
1.43		Acid O.H.	1750		10	Fce					1475
"		Acid O.H.	1750		10	Air					1750
—		Acid O.H.	1750		10	Air					1475
—		Acid O.H.	1750		10	Air					1750
											1475
.72		Basic Elec.	1950		10	Air					1650
.72		Basic Elec.	1950		10	Air					1750
"		" "	1950		10	Air					1650
"		" "	1950		10	Air					1750
		Acid Electric	1950		10	Air					1750
		"	1950		10	Air					1750
											1750
		Acid Electric	1900	6	8	Air					157
		" "	1700	6	4	Air					157
		" "	1900	6	8	Air	1300	2	3	Air	155
		" "	1650	3	4	Air	1300	2	3	Air	155
1.01		" "	1900	6	8	Air	1300	2	3	Air	155
"		" "	1650	3	4	Air	1300	2	3	Air	155
—		Basic O.H.	1700		4	Air					160
—		"	1700		4	Air					160
—		"	1700		4	Air					160
—		"	1700		4	Air					160

AIR	1675		4	WATER	1175 1250		4	AIR	244	"		
AIR	1675		4	WATER	1150		4	AIR	321	146,500	12	
AIR	1675		4	WATER	1150		4	AIR	330	155,000	13	
	1750		5	AIR	1100		5	AIR	163	96,500	5	
	1550		4	WATER	1100		5	WATER	217-228	111,500	8	
	1575		4	WATER	1175		5	WATER	235-241	119,000	10	
	1700 1575		4	OIL WATER	1175		5	WATER	241-241	116,000	9	
	1700 1575		4	WATER WATER	1075		5	WATER	302	142,000	10	
	1750		4	AIR	950		1½	AIR	205 217	105,250	8	
	1625		2	WATER	1000		2½	FCE	205 217	89,850	7	
AIR	1625		2	WATER	925		2	AIR	252 257	118,750	10	
AIR	1625		2	WATER	1125		2	AIR	290 293	134,860	12	
	1750		4	AIR	925		1½	AIR	252 263	109,700	9	
	1625		2	WATER	1250		2½	FCE	217 217	94,350	7	
AIR	1625		2	WATER	1125		2	AIR	252 247	108,750	9	
	1625		2	WATER	1250		2½	FCE	217 217	102350	8	
	1550		4	WATER	1250		10	WATER	235-247	106,000	9	
	1550		4	WATER	1250		10	WATER	236-240	113,500	9	
	1550		4	WATER	1150		6	WATER	273-287	133,600	12	
	1475		6	WATER	1150 1250		10 10	WATER WATER	228-230	107,000	6	
	1475		6	WATER	1250		10	WATER	238-241	105,000	9	
	1750 1475		6 6	WATER WATER	1200		4	AIR	275-283	144,000	11	
	1750 1475		6 6	WATER WATER	1200		4	AIR	262-269	125,000	10	
	1750 1475		6 6	WATER WATER	1200		4	AIR	250-258	128,500	10	
	1650 1750		5 5	WATER WATER	1150		8	AIR	255	128,250	1	
	1650 1750		5 5	CAUSTIC CAUSTIC	1150		8	AIR	241	123,500	10	
	1650 1750		5 5	CAUSTIC CAUSTIC	1150		8	AIR	241	"		
	1650 1750		5 5	CAUSTIC CAUSTIC	1150		8	AIR	241	"		
①	1750 ⑧		5	CAUSTIC					255	130,000	7	
②	1750 1750		6 8 ⑧	" CAUSTIC			2					
	1750 1750 1650		6 6 8	CAUSTIC "					255	"		
	1575	4	4	WATER	1150 1200	6 6	4 4	AIR AIR	269	132,450	11	
	1576	4	4	WATER	1150 1200	6 6	4 4	AIR AIR	255	130,450	10	
3 AIR	1550	4	4	WATER	1200	6	8	AIR	248-255	118,350	9	
AIR	1550	4	4	WATER	1200	6	8	AIR	248-255	116,900	9	
AIR	1550	4	4	WATER	1175	6	8	AIR	262-269	125,050	1	
AIR	1550	4	4	WATER	1175	6	8	AIR	262-269	121,800	1	
	1600		4	WATER	1200		4	AIR	237-244	137,700		
	1600		4	WATER	1200		5	AIR	223-251	135,800	1	
	1600		4	WATER	1200		4	AIR	237-268	140,650	1	
	1600		4	WATER	1200		5	AIR	229-269	149,050	1	
	1700		5	WATER	1050		10	AIR	270-273	123,050		

97,000	76,000	18.0	30.5	51.3	"	1967	1992	1979	1910 (+69)	"	2467	2" x
"	"	"	"	"	"	1943	1969	1956	1931 (+25)	"	2404	2"x2
146,500	128,000	13.5	28.3	40.3	"	2072	2116	2094	1860 (+226)	"	2405	2"x2
155,000	130,000	9.0	20.6	16.0	"	1999	2038	2019	1947 (+162)	"	2383	2"x2
96,500	52,500	15.0	22.3	18.0	37mm M51	1748	1777	1763 (-112)	1875	"	2440	2¾x2
111,500	80,000	17.5	35.0	40.0	"	1787	1827	1907 (-24)	1831	"	2524	2¾x2
119,000	100,000	14.0	29.2	20.5	"	1731	1763	1747 (-41)	1788	"		2¾x2
116,000	98,000	14.0	25.0	20.0	"	1482	1534	1508 (+708)	1400	"	2497	2¾x2
142,000	105,000	9.0	32.1	12.0	Cal .50 API	2206	2289	2223	2180 (+43)	37mm M51 AP	1542	1 11/16 x1
105,250	88,500	21.0	33.4	—	37mm M51	1717	1733	1725	1788 (-73)		2482	2¾x
89,850	76,550	30.0	60.5	—	"	1609	1729	1714	1788 (-74)		2489	2¾x2
						1484	1519	1492 (+90)	1400 (+92)		—	2¾x2
118,750	105,850	20.0	36.3	—	37mm M51	1871	1907	1889	1799	37mm M51	2181	2¾"
134,860	127,450	16.0	36.9	—	"	1961	1996	1978	1840 (+138)		2192	2¾"
						1871	1906	1889 (+86)	1752 (+137)		2173	CF-PT
109,700	94,600	20.5	42.1	—	" #12	1649	1685	1667	1611	37mm M51	2204	2¾x2
94,350	78,400	26.0	58.5	—	" #3	1753	1794	1774	1788 (-14)		2465	2¾x
					" #6	1451	1479	1465	1400 (+65)		2492	2¾x
108,750	97,550	22.0	50.5	—	" #11	1588	1628	1608	1596 (+12)		2181	2¾x
					" #16	1894	1342	1318	1210 (+108)		2170	2¾x
102350	88520	24.0	56.0	—	" #2	1788	1801	1795	1744 (+61)		—	2¾x
					" #6	1466	1608	1487	1360 (+127)		2483	2¾x
106,000	90,000	14.5	32.5	35-42						37mm M51		
113,500	93,500	19.0	50.6	61-54								
133,600	125,000	7.5	11.5	21-22	37mm M51	2054	2093	2074	2050 (+24)	"	2572	B.S 3"
107,000	88,000	20.0	50.0	34-35	"	1564	1607	1586	1612 (-26)	"	2503	2¾x
105,000	95,000	15.2	20.6	27-27	"	1821	1847	1834	1840 (-6)	"	2204	B.S.2
144,000	118,000	12.5	29.9	28-30	"	—					—	
175,000	109,500	18.5	47.8	48-50	"	2124	2161	2143	2071 (+72)	"	2518	B.S.3
128,500	105,000	15.0	33.4	40-42		—					—	
128,250	114,500	18.0	46.1	33.5-36.0	37mm M51	1860	1880	1865	1722 (+143)	"	2191	2¾"
123,500	108,500	19.5	52.5	46.5	"	1495	1512	1499	1492 (+7)	"	2180	2¾"
"	"	"	"	"	"	1573	1615	1594	1468 (+126)	"	2412	2¾"
"	"	"	"	"	"	2025	2068	2047	1833 (+214)	"	2445	2"x
130,000	76,500	8.0	14.5	23.0	"	1460	1479	1465	1460 (+5)	"	2229	2¾"
"	"	"	"	"	"	1783	1820	1802	1799 (+3)	"	2156	2¾"
132,450	113,100	16.5	36.0	—	37mm M51	1757	1780	1769	1724 (+45)		2483	2¾"
130,450	108,500	16.0	26.5	-	"	1715	1757	1736	1718 (+18)		2487	2¾"
118,350	97,250	21.5	67.8	CHARPY 33.6	"	1927	1961	1944	1832 (+112)		2499	1¾"
116,900	96,650	23.0	57.8	"	"	1969	2007	1988	1838 (+150)		2504	1¾"
125,050	108,150	19.5	55.5	CHARPY 28.8	"	2010	2086	2048	1789 (+259)		2512	2"x
121,800	105,000	19.0	54.7	CHARPY 30.4	"	1893	1937	1910	1766 (+144)		2502	1¾"
137,700	99,500	18.0	36.6	48-50-58	"	1479	1511	1495	1294 (+201)		2173	2¾"
135,800	122,500	15.0	43.0	38-35	"	1836	1869	1853	1700 (+153)		2172	2¾"
140,650	126,200	14.0	37.2	—	"	1548	1595	1571	1342 (+229)		2170	2¾"
149,050	136,750	11.0	31.1	—	"	1829	1862	1846	1692 (+154)		2178	2¾"

992	1979	1910 (+69)	"	2467	2½" × 2⅞"	"	"	1110	PP-SB - PASSED	SATISFAC
1469	1456	1431 (+25)	"	2404	2" × 2 1/8"	75mm M1 Proof Shot	Normal 5	1342	PP-SB - PASSED	SATISFACT
2116	2094	1868 (+226)	"	2405	2" × 2¾"	" "		1398	PP-SB - PASSED	SATISFACT
1038	2019	1857 (+162)	"	2383	2⅞" × 2⅞"	75mm TIL AP 75mm M1 Shot	25° Normal	1077 1381	PP-SB - PASSED PP-SB	SATISFACTO
1777	1763 (-112)	1875	"	2440	2¾" × 2 3/16"	"	"	1076	PP-SB - PASSED	GRADE "B" ST
1827	1807 (-24)	1831	"	2524	2¾" × 2 11/16"	"	"	1086	PP-SB - PASSED	GRADE "B" STE
1763	1747 (-41)	1788	"		2¾" × 2⅞"	"	"	1065	PP-SC on MB - PASSED	FAILED - LO
1534	1508 (+108)	1400	"	2497	2¾" × 2 5/16"	"	"	882	CP - SC on MB - PASSED	SATISFA
2239	2223	2200 (+23)	37mm M61 AP	1542	1 11/16" × 1 5/16"	37mm M51 AP	25	1094	PP - SC on LB - PASSED	SATISFAC
1733	1725	1788 (-73)		2482	2¾" × 2 15/16"	#7 76mm TIL AP	25°	907	CP - PLATE BROKE 3 PIECES	FAILED ON SH
1729	1714	1788 (-74)		2489	2⅝" × 2 5/16"	"	"	874	PP - PASSED - #4	#1 - FAILED -
1519	1492	1400 (+92)		—	2¾" × 2 5/16"	"	"			#4 - SATIS
1907	1889 (+90)	1799	37mm M51	2181	2¾" × 3"	"	"	1063	PP - SB - PASSED	#9 - SATIS PA
1995	1978	1840 (+138)		2192	2⅝" × 2⅞"	"	"	R67	CP - BS - 4½ x 7" - CRACKED	#14 - FAILED
1406	1389	1252 (+137)		2173	CP - PTP	"	"	1073	PP - SB - PASSED	BOTH SATI
1685	1667 (+86)	1611	37mm M51	2204	2⅝" × 2¾"	"	"	789	PP - SB - PASSED	#12 SATIS FA
1994	1974	1788 (-14)		2465	2⅝" × 2 7/16"	"	"	952	PP - MB - PASSED	#13 - FAILED
1479	1465	1400 (+65)		2492	2 5/16" × 2 5/16"	#3 - 75mm	"	R27	CP - BS 2¾ x 3½ - CRACKED	#3 FAILED
1628	1608	1576 (+32)		2181	2¼" × 2⅝"	75mm TIL AP	"	1045	PP - PASSED	#2 SATISFAC
1342	1318	1210 (+108)		2170	2⅜" × 2⅞"		"	948	PP - MB - PASSED	BOTH SATI
1801	1795	1744 (+61)		—	2⅝" × 2⅝"	75mm TIL AP	"	780	PP - LB - PASSED	
1608	1487	1350 (+137)		2483	2¼" × 2 5/16"	—		1050	#2 PP - PASSED	BOTH SATISF
			37mm M51			75mm TIL AP	25°	985	CP - SC on LB - 16", 13", 5" Cracks	FAILED - SH
						"	"	992	CP - B.S. 3¼" x 7½", 11" x 10 Cracks	FAILED - B.S.
2093	2074	2050 (+24)	"	2572	B.S. 3" x 3¼"	"	"	1200	PP - SB - SHOCK OK.	B.S. on Low Ca
1607	1586	1612 (-26)	"	2503	2½" × 2 5/16"	"	"	956	PP - SB - PASSED	FAILED - L
1847	1834	1840 (-6)	"	2204	B.S. 2⅜" x 3 1/16"	"	"	1095	PP - SB - SHOCK SATISFACTORY	FAILED - E
				—		"	"	1182	PP - SB - 22" and 18" Cracks	FAILED - SA
2161	2143	2071 (+72)	"	2518	B.S. 3½" x 3⅜"	"	"	1202	PP - SB	FAILED - EX
				—		"	"	1153	PP - SB - BROKE 2 PIECES	FAILED - SH
1880	1865	1722 (+143)	"	2191	2 5/16" x 2⅞"	75mm TIL AP	25°	997	PP - SC on BULGE - PASSED	SATISFAC
1512	1499	1492 (+7)	"	2180	2⅜" x 2 7/16"	"	"	885	CP - PIA. ½ x 1½", LB. SC. - Pas	SATIS FA
1615	1594	1468 (+126)	"	2412	2⅜" x 2 5/16"	75mm M1 Proof Shot	Nor.	1104	PP - 5½" Cracks on MB. ½" Bow	SATISFAC
2068	2047	1833 (+214)	"	2445	2" x 2 5/16"	" "	Nor.	1400	PP - S.B. - ½" Bow. PASSED	SATIS FAC
1479	1465	1460 (+5)	"	2229	2 5/16" x 2 5/16"	" "	Nor.	1109	CP - PLATE BROKE - 5 PIECES	NO STANDARD AMMUNITION
1820	1802	1799 (+3)	"	2156	2⅜" x 3"	75mm AP T2 75mm M1 Shot	25° Nor.	1039 1407	PP - LB - PASSED CP - PLATE BROKE - 3 PIECES	SATIS FA
1780	1769	1724 (+45)		2483	2⅜" x 2⅜"	75mm TIL AP	25°	1013	PP - SC. PASSED	SATISFAC
1757	1736	1718 (+18)		2487	2 5/16" x 2 5/16"	"	"	1009	CP - B.S. 3½ x 4½" PASSED	SATIS FAC
1961	1944	1832 (+112)		2499	1½" x 2"	"	"	1101	PP - SB - PASSED	SATIS FAC
2007	1988	1838 (+150)		2504	1⅞" x 2 ⅛"	"	"	1105	PP - SB - PASSED	SATISFA
2086	2063	1784 (+279)		2522	2" x 2"	"	"	1061	PP - SB - PASSED	SATISFAC
1937	1910	1766 (+144)		2502	1½" x 2"	"	"	1042	PP - SB - PASSED	SATIS FAC
1511	1495	1294 (+201)		2173	2⅛" x 2 5/16"	"	"	849	PP - SB - PASSED	SATIS FAC
1869	1853	1700 (+153)		2172	2⅛" x 2⅛"	"	"	1001	PP - SB - PASSED	SATIS FAC
1595	1571	1342 (+229)		2170	2 5/16" x 2⅜"	"	"	967	PP - ½" CRACK on MB - PASSED	SATISFAC
1862	1846	1692 (+154)		2178	2⅛" x 2⅜"			1012	PP - SB - PASSED	SATISFAC

DATE TESTED	PRODUCER	HEAT NO.	PLATE NO.	THICK-NESS	CHEMISTRY C	MN	SI	S	P	NI	CR	MO	V	C
1/16/42	GENERAL STEEL CASTS	5504	640	2.26"	.28	.74	.41	.024	.017		GRADE B		STEEL	
3/23/42	" " "	5601	685	2.24"	.24	1.52	.39	.020	.017	—	.44	.26		
"	" " "	"	689	2.26"	"	"	"	"	"	—	"	"		
"	" " "	"	692	2.24"	"	"	"		"		"	"		
			693	2.20"										
3/31/42	" " "	5601	TURRET MED. TANK	2 1/8"	"	"	"	"	"	—				
4/11/42	" " "	5601	TURRET MED. TANK	2 1/4" 2 3/16"	.24	1.52	.39	.020	.017	—	.44	.26		
"	" " " "	5522MM	648	2.28"	.27	1.48	.40	.017	.022	—	—	.51		
"	" " " "	"	649	2.31"	"	"	"	"	"			"		
1/16/42	LEBANON STEEL FDY	HE9134	P-A5	1.64"	.27	.68	.40	.020	.029	.47	.48	.59		
"	" " "	"	P-A6	2.06"	"	"	"	"	"	"	"	"		
"	" " "	"	P-A4	1.0"	"	"	"	"	"	"	"	"		
3/28/42	" " "	HE9252	L-71	1.003"	.31	.71	.46	.023	.036	.67	.61	.54		
"	" " "	"	P-506	1.95"	"	"	"	"	"	"	"	"		
	" " "	HE9253	P-507	2.17"	.26	.72	.47	.035	.038	.60	.60	.50		
"	" "	HE9254	P-508	2.00"	.24	.75	.45	.015	.038	.63	.57	.46		
"	" "	HE9265	P-511	1.85"	.28	.70	.40	.022	.034	.69	.54	.55		
"	" " "	HE9269	P-510	1.90"	.30	.60	.46	.020	.030	.67	.54	.49		
3/17/42	FORD MOTOR CO.		167F	2.23"	.40	.65	.24			—	—	.51		.7
"	" " "		955	1.65"	.28	.53	.23				.42	.19		—
"	" " "		955	2.29"	"	"	"				"	"		
"	" " "		112F	1.69"	.38	.78	.23				—	—		1.0
"	" " "		731	1.65"	.23	.52	1.00				.06	.45		—
"	" " "		732	2.16"	"	"	"				"	"		
4/6/42	" " "	297-30087	297C	2.19"	.31	.86	.34	.015	.017	—	.60	.50	—	.7
"	" " "	284-36117	284B	1 1/2" 2.04"	.15	.32	.40	.016	.010	—	.72	.46		
"	" " "	291-30081	291C	2.09" 1 1/4"	.22	.93	.14	.014	.050	—	.68	.38		.2
"	" " "	309-30096	309C	2.17" 1 1/2"	.24	.93	.27	.011	.013	.41	.50	.37		.2
3/23/42	CONTINENTAL ROLLED STEEL	4009	4009-1	2.14"	.32	.90	.29	.035	.042			.55		
"	" " "	4009	4009-2	2.22"	"	"	"	"	"			"		
"	" " "	4009	4009-3	2.18"	"	"	"	"	"			"		
"	" " "	4009	4009-4	2.23"	"	"	"	"	"			"		
	" " "	4013	4013-1 4013-2	2.18" 2 1/4"	.34	.78	.35	.028	.050		.38	.50		

HEAT T

CU		DEOXIDATION	FURNACE	HOMOGENIZE TEMP.	HOMOGENIZE HRS. RISE	HOMOGENIZE HRS SOAK	HOMOGENIZE COOLANT	SOFTENING ANNEAL TEMP.	SOFTENING ANNEAL HRS. RISE	SOFTENING ANNEAL HRS. SOAK	SOFTENING ANNEAL COOLANT	TE
-			BASIC O.H.									16
			BASIC O.H.	2000		10	AIR	1250		4	AIR	157
			" "	2000		10	AIR	1250		4	AIR	157
			" "	2000		10	AIR	1250		4	AIR	157
			" "	2000		10	AIR	1250		4	AIR	157
			BASIC O.H.	2000		10	AIR	1250		4	AIR	157
			BASIC O.H.	2000		10	AIR	1250		4	AIR	157
			" "	2000		10	AIR	1250		4	AIR	157
			ACID ELECTRIC	2000		5	AIR TO 1550					155 162
			" "	2000		5	AIR TO 1550					155 162
			" "	2000		5	AIR TO 1550					155 162
			" "	2000		5	AIR TO 1550					155 164
			" "	2000		5	AIR TO 1550					155 164
			" "	2000		5	AIR TO 1550					155 164
			" "	2000		5	AIR TO 1560					155 164
			" "	2000		5	AIR TO 1550					155 164
			" "	2000		5	AIR TO 1650					155 164
71			ACID ELECTRIC	1950		10	AIR					175
—			" "	1950		10	AIR					166 176
			" "	1950		10	AIR					165 176
05			" "	1950		10	AIR					176
—			" "	1950		10	AIR					175 180
			" "	1950		10	AIR					175 180
75			BASIC ELEC.	1950		10	AIR					175
	BORON .003		BASIC ELEC.	1950		10	AIR					165 175
27			BASIC ELEC.	1950		10	AIR					165 175
28			BASIC ELEC.	1950		10	AIR					175
			ACID O.H.	1650		8	AIR					155
			ACID O.H.	1650		8	AIR					155
			" "	1650		8	AIR					155
			" "	1650		8	AIR					155
			" "	1650		8	AIR					155

...ION LOW ALLOY DEVELOPMENT TESTS

SHEET 2.

T	TREATMENT								PHYSICAL		
	HARDEN				TEMPER						
LANT	TEMP.	HRS. RISE	HRS. SOAK	COOLANT	TEMP.	HRS. RISE	HRS. SOAK	COOLANT	BRINELL HARD.	TENSILE	YIELD
	1675		4	WATER	1175		4	AIR	194	89,500	53,500
IR	1575		4	WATER	1100		4	AIR	270	131,000	116,500
IR	1575		4	WATER	1100		4	AIR	270	"	"
IR	1575		4	WATER	1050		4	AIR	288	137,500	116,500
IR	1575		4	WATER	1125		4	AIR	260	123,500	107,000
R	1575		4	WATER	1125		4	AIR	273	126,000	110,000
R	1575		4	WATER	1125		4	AIR	285	131,500	116,000
R	1575		4	WATER	1125		4	AIR	285	"	"
	1550 1625		2	WATER WATER	1125		5	WATER	248-265	117,000	98,000
	1550 1625		2	WATER WATER	1125		5	WATER	241-256	117,000	97,500
	1550 1625		2	WATER WATER	1040		5	WATER	321	154,000	143,000
	1550 1640		3	WATER WATER	1000		5	WATER	321	160,000	130,000
	1550 1640		3	WATER WATER	1160		3	WATER	286	138,000	121,000
	1550 1640		3	WATER WATER	1160		5	WATER	255-262	133,000	117,000
	1550 1640		3	WATER WATER	1160		5	WATER	269-277	133,500	117,000
	1550 1640		3	WATER WATER	1160		5	WATER	269	133,000	115,000
	1550 1640		3	WATER WATER	1160		5	WATER	262	128,000	110,000
	1950		5	CAUSTIC	1150		8	AIR	248-262	115,000	109,000
	1650 1760		5 5	CAUSTIC CAUSTIC	1150		8	AIR	241	114,500	97,000
	1650 1760		5 5	CAUSTIC CAUSTIC	1150		8	AIR	241	"	"
	1760		5	CAUSTIC	1150		8	AIR	217	105,000	87,500
	1750 1750 1750		5 5 5	CAUSTIC " "	—		—	—	207	103,500	68,500
	1750 1750 1750		5 5 8	CAUSTIC " "	—		—	—	207	"	"
	1750		5	WATER	1100		8	AIR	277	138,500	125,500
	1650 1750		5 5	WATER WATER	900-950		3	AIR	223	103,750	93,500
	1650 1750		5 5	WATER WATER	900-950		3	AIR	235	110,000	97,000
	1750		5	WATER	1125		8	AIR	217	104,500	87,500
	1550		8	WATER	1150		10	WATER	229-255	123,150	102,500
	1550		8	WATER	1150		10	WATER	217-248	118,500	99,500
	1550		8	WATER	1150		10	FCE	229-248	120,600	101,850
	1550		8	WATER	1150		10	FCE	235-248	104,700	104,700

BALLISTIC PROPERTIES

PROPERTIES			PENETRATION					PROJECTILE THRU PLATE			SA	
ELONGATION	RED. AREA	IZOD	PROJ.	HIGH P.	LOW C.	B.L.	SPEC.	PROJ.	VELOCITY	RESULT	PROJ.	OB
29.0	56.8	50.3	37MM M51APC.	1728	1783	1755	1882(-127)	37MM M51APC	2504	2 5/8" x 2 3/8"	75MM T12AP	25°
14.5	41.0	53.7	37MM M51APC	1968	2002	1985	1868(+117)	"	2537	2 1/2" x 2 3/8"	75MM T12AP 75MM M61 SLUG	" NORM
"	"	"	"	2016	2049	2033	1882(+151)	"	2520	2 5/8" x 2 3/8"	75MM M61 SLUG	"
14.5	41.0	37.7		—	—	—	—	—	—	—	75MM T12AP	25°
18.5	49.2	58.3	"	1900 1897	1910 1943	1905 1920	1788(+117) 1788(+132)	"	2545 2523	2" x 2 1/8" 2 1/2 x 2	75MM T12AP	25°
17.0	39.1	58.3	"	1934 1930	1971 1963	1953 1947	1788(+165) 1831(+116)	"	2505 2499	2 3/8 x 2 3/8" 2 1/4" x 2 3/8"	75MM T12AP	25°
15.0	31.2	52.7	"	2075	2127	2101	1896(+205)	"	2491	2 3/16" x 2 9/16"	75MM T12AP	25°
"	"	"	"	2049	2063	2066	1917(+149)	"	2532	2 1/2" x 2 9/16"	75MM M61 SLUG	NORMAL
17.0	43.3	36.0	37MM M51APC	1549	1566	1558	1412(+146)	"	2505	2 1/2" x 2 1/2"	75MM M61 SLUG	NORMAL
17.0	43.1	40.5	"	1727	1745	1736	1742(-6)	"	2505	2 5/8" x 2 7/8"	75MM T12AP 75MM M61 SLUG	25° NORMAL
11.0	35.3	23.5	CAL 50 M1AP.	2334 2338	2379 2383	2352 2361	2200(+152) 2200(+161)	"	1517	1 1/2" x 1 5/8"	37MM M51 A.P.C.	25°
8.0	28.9	18.0	"	2402 2311	2429 2332	2416 2322	2206(+210) 2206(+116)	" "	1578	2" x 2 1/4"	"	25°
14.0	36.6	30.0	37MM M51APC	1831	1878	1846	1660(+186)	"	2543	2 3/8" x 2 15/16"	75MM M61 SLUG 75MM T12AP	NORMAL 25°
14.0	35.3	37.0	"	1878	1905	1892	1819(+73)	"	2514	2 1/2" x 2 1/2"	75MM M61 SLUG 75MM T12AP	NORMAL 25°
13.0	32.4	34.0	"	1809	1854	1832	1700(+132)	"	2537	2 7/8" x 2 3/8"	75MM M61 SLUG 75MM T12AP	NORMAL 25°
10.5	22.3	30.0	"	1746	1790	1768	1580(+188)	"	2544	2 3/8" x 2 1/4"	75MM M61 SLUG 75MM T12AP	NORMAL 25°
15.0	38.5	33.0	"	1690	1735	1713	1612(+101)	"	2514	2 1/2" x 2 1/2"	75MM M61 SLUG 75MM T12AP	NORMAL 25°
		23.0	"	1868	1890	1879	1861(+18)	"	2193	2 3/8" x 2 3/8"	75MM T12AP 75MM M61 SLUG	25° NORMAL
13.0	27.0	29.0	"	1489	1542	1516	1419(+97)	"	2178	2" x 2 1/4"	75MM T12AP 75MM M61 SLUG	25° NORMAL
"	"	"	"	1864	1882	1873	1903(-30)	"	2220	2 3/8 x 2 3/8"	—	
9.0	16.0	24.0	"	1429	1451	1440	1452(-12)	"	2156	2 1/2" x 2 1/2"	75MM T12AP	25°
11.0	16.0	24.2	"	1330	1367	1349	1424(-75)	"	2176	2 3/8" x 2 7/8"	—	—
"	"	"	"	1951	1999	1975	1903(+38)	"	2173	2 3/8" x 3 3/8" FULL	75MM T12AP	25°
14.0	40.0	34.5	"	1959	1987	1973	1839(+134)	"	2503	2 5/16" x 2 3/8"	75MM M61 SLUG	NORMAL
14.5	43.0	28.0	"	1764	1780	1772	1728(+44)	"	2472	1 3/4" x 2 1/2"	75MM T12AP 75MM M61 SLUG	25° NORMAL
14.5	42.5	34.0	"	1752	1798	1775	1763(+12)	"	2481	2 1/4" x 2 1/16"	75MM T12AP 75MM M61 SLUG	25° NORMAL
22.0	52.0	55.0	"	1818	1923	1906	1820(+86)	"	2449	1 3/4" x 2 3/8"	75MM T12AP 75MM M61 SLUG	25° NORMAL
19.0	53.6	41		—	—	—	—				75MM T12AP	25°
20.5	53.6	40	"	1783	1838	1811	1654(+157)	"	2460	2 3/8" x 2 3/8"	75MM T12AP	25°
19.5	52.7	41	"	1944	1961	1953	1824(+129)	"	2548	2 1/4 x 2 3/8"	75MM T12AP 75MM M61 SLUG	25° NORMAL
19.0	53.3	42		—	—	—	—		—			

BALLISTIC PROPERTIES

	PROJECTILE THRU PLATE			SHOCK TEST				PLATE QUALITY
	PROJ.	VELOCITY	RESULT	PROJ.	OBL.	VELOCITY	RESULT	TYPE OF FAILURE
(-627)	37MM APC/HE	2504	2 5/8" x 2 3/8"	75MM TIZAP	26°	1085	CP-B.S 3 1/2 x 3 1/4" - CRACK 5 1/2"	FAILED - LOW B.L.
-117)	"	2597	2 1/2" x 2 5/8"	75MM TIZAP 75MM MK/SLUG	" NORMAL	1099 1417	PP-LB - PASSED CP - PLATE BROKE 5 PIECES	SATISFACTORY.
150)	"	2520	2 5/8" x 2 3/4"	75MM MK/SLUG	"	1386	CP-PLATE BROKE - 2 PIECES	SATISFACTORY.
	—	—	—	75MM TIZAP	25°	1066 1078	CP-B.S. 4 1/2" x 5 1/2" - 17" CRACK CP-B.S-5 1/4 x 5 1/2" - 25" CRACKS	FAILED - SHOCK-CRACKING FAILED - SHOCK CRACKING
-117) -132)	"	2645 2623	2" x 2 1/4" 2 1/2 x 2	75MM TIZAP	25°	1066	PP-SCON MB	SATISFACTORY.
165 186	"	2505 2499	2 1/2 x 2 3/8" 2 1/2" x 2 3/8"	75MM TIZAP	25°	1049 1100	PP-SB PP-SB	SATISFACTORY.
106)	"	2491	2 3/16" x 2 3/16"	75MM TIZAP	25°	1090	PP-SCON MB.	SATISFACTORY.
49)	"	2532	2 1/2" x 2 3/16"	75MM MK/SLUG	NORMAL	1501	PP-SCON SB	SATISFACTORY
149)	"	2505	2 1/2" x 2 1/2"	75MM MK/SLUG	NORMAL	1231	CP-6 1/2" SC ON LB	SATISFACTORY.
-6)	"	2505	2 5/8" x 2 7/8"	75MM TIZAP 75MM MK/SLUG	25° NORMAL	1010 1402	PP-MB PASSED PP-SB	FAILED - LOW B.L.
45Z) -161)	"	1517	1 1/2" x 1 5/8"	37MM M51 A.P.C.	26°	1102	PP-MB - PASSED	SATISFACTORY.
200) 160)	" "	1578	2" x 2 1/4"	"	25°	1107	CP-1 1/2" x 1 5/8" - PASSED	SATISFACTORY.
86)	"	2543	2 5/8" x 2 11/16"	75MM MK/SLUG 75MM TIZAP	NORMAL 25°	1317 982	PP-SCON MB. PP-SB. - PASSED	SATISFACTORY.
73)	"	2514	2 1/2" x 2 1/2"	75MM MK/SLUG 75MM TIZAP	NORMAL 26°	1395 1077	PP-SB PP-SB - PASSED	SATISFACTORY.
132)	"	2537	2 7/8" x 2 7/8"	75MM MK/SLUG 75MM TIZAP	NORMAL 25°	1892 1011	PP-SB. PP-SB - PASSED	SATISFACTORY.
188)	"	2544	2 3/16" x 2 3/4"	75MM MK/SLUG 75MM TIZAP	NORMAL 25°	1393 948	PP-SC-2 1/2" ON MB. PP-SB - PASSED	SATISFACTORY.
102)	"	2514	2 1/2 x 2 1/2"	75MM MK/SLUG 75MM TIZAP	NORMAL 25°	1150 960	PP-SC-2 SB CP-SC ON MB - PASSED	SATISFACTORY.
17)	"	2193	2 3/4" x 2 3/4"	75MM TIZAP 75MM MK/SLUG	25° NORMAL	1067 1417	CP - SC ON LB. - PASSED PP-SC ON LB - 7" CRACK ON FACE	SATISFACTORY
97)	"	2178	2" x 2 1/4"	75MM TIZAP 75MM MK/SLUG	25° NORMAL	882 1100	CP-SC ON MB PASSED PP-SB. - BOW 1 1/2"	SATISFACTORY.
30)	"	2220	2 3/4 x 2 3/4"	—		—	—	FAILED - LOW B.L.
12)	"	2156	2 1/2" x 2 1/2"	75MM TIZAP	25°	876	CP-SC ON LB - 3 1/2" CRACK	FAILED - LOW B.L.
71)	"	2176	2 3/4" x 2 7/8"	—	—	—	—	FAILED - LOW B.L.
8)	"	2173	2 3/4" x 3 1/2" - FULL	75MM TIZAP.	25°	1040	CP-B.S CRACKS 4" - 6 1/2"	FAILED - BL - PTP. SHOCK.
39)	"	2503	2 7/16" x 2 3/4"	75MM MK/SLUG	NORMAL	1404	PP-LB. - PASSED	SATISFACTORY
49)	"	2472	1 3/4" x 2 1/2"	75MM TIZAP 75MM MK/SLUG	26° NORMAL	1010 1156	CP-SC ON MB - PASSED P.W PLATE BROKE - 2 PIECES (1/2" PLATE)	SATISFACTORY
2)	"	2481	2 3/4" x 2 7/16"	75MM TIZAP 75MM MK/SLUG	25° NORMAL	1051 1143	PP-SB - PASSED - (2.04" PLATE) CP-PLATE BROKE - 3 PCS OF 1" PLATE	SATISFACTORY
6)	"	2449	1 3/4" x 2 3/4"	75MM TIZAP 75MM MK/SLUG	26° NORMAL	1058 1159	PP-SC ON SB - PASSED 2.17" PLATE CP-SC ON MB - 10" CRACK ON BACK OF	SATISFACTORY.
				75MM TIZAP	25°	1106	CP-MB - 21 x 18" CRACKS	FAILED - SHOCK - CRACKING
48)	"	2460	2 3/4" x 2 3/4"	75MM TIZAP	25°	1079	CP-B.S 3 1/2" x 5 1/4"	FAILED - LOW B.L.
29)	"	2548	2 1/4 x 2 1/2"	75MM TIZAP 75MM MK/SLUG	25° NORMAL	1063 1404	PP-SB - B.S - NONE CP-PLATE BROKE - 6 PIECES	SATISFACTORY
		—		75MM TIZAP	25°	1179	CP-B.S. 6" x 7 1/4" - 18" CRACK	FAILED - SHOCK - B.S CRACKING
		—		75MM TIZAP	25°	1085	"I" - CP - 28" CRACKS	FAILED - SHOCK - CRACKING

/42	" " "	4013	4013-1 4013-2	2.18" 2.18"	.34	.78	.35	.028	.050		.38	.50		2
6/42	SCULLIN STEEL CO.	5092A	X1	2.05"	.36	1.46	A5	015	.030	-	-	.70		
6/42	" " "	3460	X10	2.10"	28	.79	.45	.020	.018	-	-	-	GRADE B	
1/42	SIVYER STEEL CASTINGS	X8	X8	1 15/16"	23	1.40	49	041	018	-	48	.47		
	"	"	X8X	1 15/16"	"	"	"	"	"	-	"	"		
6/42	SIVYER STEEL CASTING	X7	X7	2.05"	27	1.24	33	036	022	-	-	49		
	" " "	X7	X7X	2.00"	"	"	"	"	"			"		
30/42	" " "	5970	OX	1 11/16"	.21	1.30	.22	.037	.029	-	.45	.39		
"	" " "	"	O	2 1/8"	"	"	"	"	"		"	"		
31/42	" " "	6018	A1	2.09"	23	1.00	33	039	026	.63	.55	44		
"	" " "	6018	A2	2.19"	"	"	"	"	"	"	"	"		
7/42	SYMINGTON GOULD CORP.	4552	2	1.01"	.24	1.24	.38	.014	.024	-	-	.40		
16/42	" " "	AA497		1.51"	26	.93	.79			-	-	.50		1.62
26/42	" " "	AA651		163"	28	.74	.35	.030	.036	-	.22	.80		
11/42	" " "	6683		.97	27	1.56	48	028	036	-	-	.66		
"	" " "	6683		1.35"	"	"	"	"	"	-	-	"		
"	" " "	6683		2.05"	"	"	"	"	"	-	-	"		
19/42	WEHR STEEL CO.		A1-335	1.51"	.30	98	.50	.032	.030	96	48	.34		
"	" " "		A2-336	162"	"	"	"	"	"	"	"	"		
"	" " "		A3-337	1.55"	"	"	"	"	"	"	"	"		
"	" " "		A4-338	1.64"	"	"	"	"	"	"	-	"		
2/42	UNION STEEL CASTINGS	283C	694	2.44"	23	1.57	42	.017	.028	-	44	.20		
3/42	" "	284C	360	1.92"	.18	.98	.50	.013	.038	-	-	.39		1.54
3/42	" " "	285C	361	2.17"	.20	.92	.60	.011	.034	-	-	.78		1.60
23/42	PRATT & LETCHWORTH CO. INC.	413	2	1.48"	.28	1.30	46	.016	020	-	-	.29		
"	" "	"	3	1.48"	"	"	"	"	"			"		
"	" "	"	1	1.88"	"	"	"	"	"			"		
"	" "	"	7	1.96"	"	"	"	"	"			"		
"	" "	"	5	0.97"	"	"	"	"	"			"		
"	" "	"	6	1.00"	"	"	"	"	"			"		

			1650		8	AIR					155
		" "	1650		8	AIR				3	155
	8										
		BASIC OH.	1750		5	AIR	1100		3	AIR	158
E B STEEL		BASIC OH.									156
		ACID ELEC.	1900	6	4	AIR	1300	2	3	AIR	1575
		" "	1700	6	4	AIR	1300	2	3	AIR	1575
		ACID ELEC.	1900	6	8	AIR	1300	2	3	AIR	1575
		" "	1700	6	4	AIR	1300	2	3	AIR	1575
		ACID ELEC.	1650	4	4	AIR	1300	2	3	AIR	155
		"	1900	6	8	AIR	1300	2	3	AIR	1550
		ACID ELECTRIC	1900	6	8	AIR	1300	2	3	AIR	1550
		"	1650	4	4	AIR	1300	2	3	AIR	1550
		BASIC OH	1700		4	AIR					1600
1.62		ACID ELEC.	1900		15	AIR	1250		3	AIR	1700 1600
		ACID ELEC.	1900		15	AIR	1250		3	AIR	1700 1600
		BASIC ELEC.	1875		6	AIR					1700 1600
		" "	"		6	AIR					1700 1600
		" "	"		6	AIR					1700 1600
		ACID ELEC.	1825		6	AIR					1550
		" "	1825		6	AIR					1550
		" "	1825		6	AIR					1600 1560
		" "	1825		6	AIR					1650
		ACID OH	1825		8	AIR					1525
1.54		ACID OH	1825		8	AIR					1625
1.60		ACID OH	1825		8	AIR					1525
		BASIC O.H.	1725		4	AIR					1610
		"	1725		4	AIR					1610
		"	1725		4	AIR					1610
		"	1725		4	AIR					1610
		"	1725		4	AIR					1610
		"	1725		4	AIR					1610

50		8	WATER	1150		10	FCE	235-248	104,700	104,700	19.
50		8	WATER	1175		10	WATER	241-248 241-255	127,900 123,900	109,000 104,350	21. 22.
80		3	WATER	1100 1115		7 3	AIR WATER	237-243	113,500	97,000	18.
60		4	WATER	600		7	AIR	197-200	94,500	59,000	24.
75	4	4	WATER	1200	4	4	FCE	241-247	125,570	107,600	20.
75	4	4	WATER	1200	4	4	FCE	247-255	124,600	105,260	20.
775	4	4	WATER	1200	4	4	FCE	248	110,000	89,300	22.
75	4	4	WATER	1200	4	4	FCE	248	109,710	88,420	20.
50	4	4	WATER	1100	6	8	AIR	269-285	120,950	104,450	20.
50	4	4	WATER	1100	6	8	AIR	255-269	123,700	105,650	20.
50	4	4	WATER	1150	6	8	AIR	248-255	115,650	98,100	21.5
50	4	4	WATER	1150	6	8	AIR	255	"	"	"
00		4	WATER	1150		5	AIR	282-345	121,300	109,400	19.0
00 00		5 5	WATER WATER	1180 500		10 4	WATER AIR	243-248	120,550	109,950	15.5
00 00		5 5	WATER WATER	1180		10	AIR	253-255	108,200	89,450	13.5
10 0		6 5	WATER WATER	1050		10	WATER	305-315	153,150	142,700	12.0
0 0		6 5	WATER WATER	1180		10	WATER	253-256	116,500	98000	19.0
10 20		6 5	WATER WATER	1180		10	WATER	253-257	"	100,100	19.5
								T.S.	Y.P.	EL.	RA
50		6	WATER	1200		8	FCE	114,000	93,500	19.0	36.0
50		6	WATER	1200		8	WATER	114,000	93,250	17.5	30.0
10 50		4 6	AIR AIR	900		8	AIR	132,000	112,000	12.5	21.2
50		4	WATER	1200		8	FCE TO 1100 WATER	114,000	93,500	18.0	31.6
25		40M.M	WATER	1150		6	WATER	115,500	96,000	19.0	52.0
25		40M.M	WATER	1150		6	WATER	127,000	103,000	17.0	46.3
25		40M.M	WATER	1150		6	WATER	136,500	101,000	17.0	47.2
10		4	WATER	1025		5	AIR	121,150	106,050	20.0	52.0
10		4	WATER	1025		4	AIR.	122,500	102,800	18.5	38.5
10		4	WATER	1025		5	AIR	122,500	107,550	18.0	43.5
10		4	WATER	1025		5	AIR	116,550	96,400	20.0	50.6
10		3	WATER	1025		3	AIR	127,550	107,250	13.5	33.4
10		3	WATER	1025		3	AIR	125,850	107,550	16.0	37.0

0	53.3	42		—	—		—		—		75MM TIRAP	25°	1
0	59.9	46.0		—	—	—	—		—		75MM TRAP	25°	1
0	56.5	50.0											
					10								
5	47.8	33	"	1804	1840	1822	1736(+87)	"	2159	2⅝"×2⅝"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	10 18
5	46.3	52	"	1771	1816	1794	1790(+4)	"	2373	2¼"×2 5/16"	75MM TRAP 75MM MKI SLNG	25° NORMAL	111 145
0	51.9	—	"	1744	1784	1764	1650(+114)	"	2490	2¼"×2 5/16"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	91 13
0	52.8	—	"	1771	1784	1778	1650(+128)	"	2484	2½"×2½"	75MM MKI SLNG	NORMAL	13
5	55.5	—	"	1730	1940	1735	1735	"	2517	2½"×2½"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	100 14
5	52.1			1777	1778	1778	1700(+78)	"	2528	2¼"×2⅝"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	100 135
5	57.3	CHARPY 33.5	"	1391	1446	1419	1450(-31)	"	2483	2½"×2½"	75MM MKI SLNG	NORMAL	110
5	59.6	CHARPY 30.4	"	1787	1821	1804	1785(+19)	"	2502	2⅝"×2 1/16"	75MM APTIR 75MM MKI SLNG	25° NORMAL	105 13
5	57.1	CHARPY 34.3	"	1911	1952	1932	1763(+169)	"	2511	2½"×2¾"	75MM APTIR 75MM MKI SLNG	25° NORMAL	102 139
	"	CHARPY 36.6		1949	1983	1966	1831(+135)	"	2555	2⅞"×2⅝"	75MM APTIR 75MM MKI SLNG	25° NORMAL	109 139
0	48.5	34-40	CAL 50 APM1	2340	2376	2358	2220(+138)	"	1583	1 9/16"×1 9/16"	37MM M51 A.P.C.	25°	M1
5	36.3	23	—						—		75MM TIRAP	25°	85
	22.4	22	37MM M51 APC	1418	1450	1434	1404(+30)	"	2360	2¾"×3"	75MM MK1 SLNG 75MM TIRAP	NORMAL 25°	116 87
0	27.2	17-19	CAL 50 APM 2	2241 2307	2280 2326	2261 2317	2140(+121) 2140(+177)	"	1502	1½"×1 9/16"	37MM M51 APC	25°	10
0	47.2	38-40	37MM M51 APC	1271	1316	1294	1211(+83)	"	2378	2¼"×2½"	75MM TRAP 75MM MKI SLNG	25° NORMAL	77 93
	43.1	36-40	"	1797	1832	1815	1785(+30)	"	2455	2¾"×2¾"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	101 145
	IZOD	BRINELL											
0	33-43	248	"	1485	1522	1503	1300(+203)	"	2386	2¼"×2¾"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	98 117
0	37-40	255	"	1506	1542	1524	1396(+128)	"	2424	2⅝"×2¾"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	90 114
2	6-10	269		—					—		75MM TIRAP	25°	8
6	35-41	255	"	1591	1631	1611	1412(+199)	"	2434	2½"×2 15/16"	75MM TRAP 75MM MKI SLNG	25° NORMAL	86 115
0	52-54	228-238	"	2062	2084	2073	2008(+65)	"	2560	2⅜"×2½"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	116 139
3	46-48	255-268	"	1622	1667	1645	1636(+9)	"	2545	2¼"×2½"	75MM APTIR	25°	93
2	38-38	265-265	"	1679	1927	1903	1811(+64)	"	2522	2"×2½"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	105 134
0	54.5	252	"	1477	1504	1491	1288(+203)	"	2352	2¼"×2¼"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	85 110
5	50.0	247	"	1487	1478	1458	1288(+170)	"	2364	1½"×1 9/16"	75MM TRAP 75MM MKI SLNG	25° NORMAL	98 115
5	55.6	248	"	1739	1761	1750	1604(+146)	"	2362	2½"×2½"	75MM TRAP 75MM MKI SLNG	25° NORMAL	91 135
6	50.0	241		1776	1783	1780	1668(+112)		2375	2¾"×2 9/16"	75MM TIRAP 75MM MKI SLNG	25° NORMAL	100 135
4	54.0	276	CAL 50 APM1	2132 2183	2164 2191	2148 2174	2140(+8) 2140(+34)	"	1541	1¾"×2"	37MM M51 A.P.C.	25°	10
0	54.5	274	"	2312 2305	2353 2339	2338 2322	2200(+138) 2200(+122)		1532	1 9/16"×1 9/16"	"	"	11

		—		—		75MM TIZAP	25°	1179	CP-B.S.6"x7/8"-12"CRACK	FAILED-SH
	—	—		—		75MM TIZAP	25°	1085	"1-CP-23" CRACKS	FAILED-SH
40	1822	1735(+87)	"	2159	2 3/4" x 2 3/4"	76MM TIZAP 75MM MK1 SLUG	25° NORMAL	1013 1397	PP-SB- PASSED PP-MB "	SATISFA
16	1794	1770(+24)	"	2373	2 1/4" x 2 5/8"	75MM TIZAP 75MM MK1 SLUG	25° NORMAL	1112 1407	CP-SC ON MB CP-PLATE BROKE -4 PCS.	SATISFA
74	1764	1660(+114)	"	2490	2 1/4 x 2 5/16"	76MM TIZAP 75MM MK1 SLUG	25° NORMAL	982 1387	PP-SB PASSED PP-SB	SATISFAC
94	1778	1650(+128)	"	2484	2 1/4" x 2 1/4"	76MM MK1 SLUG	NORMAL	1384	PP-SC ON LB.-4" CRACKS	SATISFAC
40	1735	1735	"	2517	2 1/4" x 2 1/4"	75MM TIZAP 76MM MK1 SLUG	25° NORMAL	1003 1403	PP-MB-SATISFACTORY CP-SC ON LB-	SATISFA
18	1778	1700(+78)	"	2528	2 1/4" x 2 5/8"	75MM TIZAP 75MM MK1 SLUG	25° NORMAL	1006 1390	PP-MB- PASSED PP-SC ON LB- 1 1/16" BOW	SATISFAC
46	1419	1450(-31)	"	2483	2 1/4" x 2 1/4"	75MM MK1 SLUG	NORMAL	1166	PP-SC ON LB. B.S. 2 1/4" x 2" PLATE CRACKED IN 3 PLACES	FAILED-L
21	1804	1785(+16)	"	2502	2 1/4" x 2 1/16"	75MM APTIZ 75MM MK1 SLUG	25° NORMAL	1056 1397	CP-SC ON MB. CP-PLATE BROKE -2 PIECES	SATISFA
52	1932	1763(+169)	"	2511	2 1/4" x 2 1/4"	75MM APTIZ 76MM MK1 SLUG	25° NORMAL	1022 1393	PP-SC ON SB PP-SC ON MB PASSED	SATISF
83	1966	1831(+135)	"	2555	2 1/4" x 2 1/4"	75MM APTIZ 75MM MK1 SLUG	25° NORMAL	1092 1398	PP-SB. PASSED PP-SC ON SB.	SATISFA
175	2358	2220(+138)	"	1583	1 9/16" x 1 1/16"	37MM M51 A.P.C.	25°	M14	PP-MB-PS.	SATISFAC
				—		75MM TIZAP	25°	850	CP-B.S. 3 1/8" x 4 3/8"	FAILED-SH
50	1434	1404(+30	"	2360	2 3/4" x 3"	75MM MK1 SLUG 75MM TIZAP	NORMAL 25°	1163 873	B.S. CRACKS FROM 2ND PACT S.C.P. CP-SC ON MB PASSED.	SATISFAC
280 226	2261 2317	2140(+121) 2140(+177)	"	1502	1 1/2" x 1 3/4"	37MM M51 APC	25°	1094	PP-MB-2" CRACK ON BULGE	SATISFAC
316	1294	1211(+83)	"	2378	2 1/4 x 2 1/2"	75MM TIZAP 75MM MK1 SLUG	25° NORMAL	978 995	CP-2 1/2" x 2 3/4" B.S ON SB. CP-SC ON LB. -18 1/2" CRACK ON BACK	SATISFAC
232	1815	1785(+30)	"	2455	2 3/4 x 2 3/8"	75MM TIZAP 76MM MK1 SLUG	25° NORMAL	1017 1443	PP-SB PP-MB.	SATISFAC
522	1503	1300(+203)	"	2386	2 1/4" x 2 3/8"	76MM TIZAP 75MM MK1 SLUG	25° NORMAL	953 1175	CP-SC ON MB CP-10 1/2" CRACKS ON LB.	SATISFAC
542	1524	1396(+128)	"	2424	2 3/8" x 2 3/8"	76MM TIZAP 75MM MK1 SLUG	25° NORMAL	964 1143	PP-SC ON MB. CP-SC ON LB- 2 1/2" BOW	SATISFAC
				—		75MM TIZAP	25°	841	CP-B.S-3 1/2 x 5 5/8"- BROKE 4 PIECES	FAILED-SH
31	1611	1412(+199)	"	2434	2 1/4" x 2 15/16"	75MM TIZAP 75MM MK1 SLUG	25° NORMAL	867 1157	PP-SC ON MB - PASSED PP-SC ON MB	SATISFAC
2084	2073	2008(+65)	"	2560	2 3/8" x 2 1/4"	75MM TIZAP 75MM MK1 SLUG	25° NORMAL	1165 1394	PP-SB- PASSED) PP-SC ON SB	SATISFAC
667	1645	1636(+9)	"	2545	2 1/4" x 2 1/4"	75MM APTIZ	25°	950	CP-SC ON SB-7" CRACK IN BACK	FAILED-SH
927	1903	1819(+84)	"	2522	2" x 2 1/4"	75MM TIZAP 76MM MK1 SLUG	25° NORMAL	1058 1392	PP-MB PP-SC ON MB - PASSED	SATISFA
504	1491	1288(+203)	"	2352	2 1/4" x 2 1/4"	75MM TIZAP 75MM MK1 SLUG	25° NORMAL	887 1147	CP-4" CRACK ON LB. CP-BROKE - 2 PIECES.	SATISFAC
478	1458	1285(+170)	"	2364	1 3/4" x 1 7/8"	75MM TIZAP 75MM MK1 SLUG	25° NORMAL	845 1147	PP-SC ON MB. CP-8X12" SECTION FROM PLATE	SATISFAC
761	1750	1604(+146)	"	2362	2 1/4 x 2 3/8"	75MM TIZAP 75MM MK1 SLUG	25° NORMAL	961 1390	PP-MB CP-BROKE 2 PIECES	SATISFACT
783	1780	1668(+112)	"	2375	2 1/4 x 2 3/8"	75MM TIZAP 75MM MK1 SLUG	25° NORMAL	1002 1397	PP-SC ON MB CP-BROKE - 4 PIECES	SATISFA
2164 491	2148 2172	2140(+8) 2140(+32)	"	1541	1 3/4" x 2"	37MM M51 A.P.C.	25°	1073	PP-MB	SATISFAC
2353 2339	2339 2323	2200(+153) 2200(+139)		1532	1 3/8" x 1 9/16"	"	"	1104	PP-MB	SATISFAC

DATE TESTED	PRODUCER	HEAT No.	PLATE NO.	THICK-NESS	CHEMISTRY C	Mn	Si	S	P	Ni	Cr	Mo
4/17/42	AMERICAN STEEL FDYS	757	EA-2	.96"	29	1.61	48	036	.024	–	32	.06
4/14/42	" " "	954	EV-1	1.0"	.28	1.06	.36	.035	.030	–	.32	.32
4/15/42	" "	954	EV-2	1.02"	"	"	"	"	"			"
4/14/42	" "	593	00-2	1.69"	.28	1.64	.45	036	.033	–	25	.06
3/31/42	" " "	808	808-2	2.08"	29	1.57	40	037	.029	–	–	–
4/13/42	"	954	EV-1	1.59"	28	1.06	36	.035	.030	–	.32	.32
4/13/42	" " "	954	EV-2	1.74"	"	"	"	"	"		"	"
4/25/42	" " "	9852	G-794-A-201	2.16"	.26	1.56	.43	.021	.020	–	.36	.11
4/26/42	" " "	9852	G-794-A-202	2.23"	"	"	"	"	"	–	"	"
4/26/42	" " "	9852	G-794-A-203	2.19"	"	"	"	"	"	–	"	"
4/17/42	BUCKEYE STEEL CASTS	16834-1	S-7386-33	2.25"	28	1.54	.44	023	.011	–	–	.37
4/17/42	" "	16834-1	S-7386-28	2.24"	"	"	"	"	"		"	"
4/21/42	CONTINENTAL ROLL & STEEL FDY	4100	4100-1	2.36"	.33	.75	.35	.045	.041	.62	.47	.41
4/11/42	" " "	4100	4100-2	2.16"	"	"	"	"	"	"	"	"
4/13/42	" " "	4101	4101-2	2.07"	.28	.78	.39	.049	.042	.60	.54	.41
4/13/42	" " "	4104	4104-2	2.11"	.31	.82	.39	.045	.046	.60	.49	.39
4/13/42	" " "	4105	4106-2	2.19"	.28	.79	.37	.045	.041	.52	.47	.36
4/14/42	" " "	4108	4108-1	2.39"	.31	.78	.37	.033	.042	.53	.50	.39
4/15/42	" " "	4109	4109-2	2.13"	.28	.82	.37	.042	.041	.63	.52	.41
4/27/42	FORD MOTOR CO.	362	362C	2.19"	.28	.89	.28	.016	.009	–	.63	.55
4/27/42	" " "	383	383C	1.98"	.26	.68	.31	.009	.015	–	.57	.56
4/27/42	" " "	386	386C	1.38"	.24	.90	.35	.008	.029	.55	.60	.49
4/27/42	" "	36002	PA622X	2.14"	.20	.34	.06	.016	.030	–	.65	.54
4/27/42	" " "	381	678	1.91"	.29	.54	.18	.008	.012	–	.60	.47
4/27/42	" " "	"	381C	1.45"	"	"	"	"	"		"	"
4/27/42	" " "	385	676	1.92"	.26	1.19	1.40	.006	.017	–	.60	.49
4/27/42	" " "	386	670	2.00"	"	"	"	"	"		"	"
4/27/42	" " "	376	672	2.11"	.32	.73	.30	.015	.018	–	.61	.53
4/27/42	" " "	376	675	1.59"	"	"	"	"	"		"	"
4/27/42	" " "	391	391C	1.95"	.29	.92	.33	.015	.021	.53	.53	.45
4/27/42	" " "	391	391C	1.38"	.29	.92	"	"	"	"	"	"
4/27/42	" " "	364	364C	2.16"	.29	.84	.33	.012	.017	–	.62	.46
4/27/42	" " "	364	364C	1.54"	"	"	"	"	"		"	"
4/27/42	" " "	300	300C	2.23"	.30	.80	.34	.014	.010	–	.66	.50

THICKNESS	CHEMISTRY												DESIGNATION	FURNACE
	C	MN	SI	S	P	NI	CR	MO	V	CU				
.96"	29	1.61	48	.036	.024	–	32	.06						ACID ELECTRIC
1.0"	.28	106	.36	.035	.030	–	32	.32						ACID ELECTRIC
102"	"	"	"	"	"			"	"					ACID ELECTRIC
1.69"	28	164	45	036	.033	–	25	.06						ACID OH
2.08"	29	157	40	037	.029	–	–	–						ACID ELECTRIC
1.59"	28	106	36	035	.030	–	32	.32						ACID ELECTRIC
174"	"	"	"	"	"		"	"						ACID ELECTRIC
2.16"	.26	156	43	021	020	–	36	.11						BASIC OH
2.23"	"	"	"	"	"	–	"	"						" "
2.19"	"	"	"	"	"	–	"	"						" "
2.25"	28	154	44	023	.011	–	–	37						BASIC OH
2.24"	"	"	"	"	"			"						" "
2.36"	33	75	35	045	.041	62	47	41						ACID OH
2.16"	"	"	"	"	"	"	"	"						" "
2.07"	29	78	39	049	.042	60	54	41						ACID OH
2.11"	31	82	39	045	.046	60	49	39						ACID OH
2.19"	28	79	37	045	.041	52	47	36						ACID OH
2.39"	31	78	37	033	.042	53	50	39						ACID OH
2.13"	28	82	37	042	.041	63	52	41						ACID OH
2.19"	28	88	28	016	.009	–	63	55		66				BASIC ELEC
198"	26	68	31	009	015	–	57	56		60				BASIC ELEC
138"	24	90	35	008	029	55	60	49		38				BASIC ELEC
2.14"	20	34	06	016	030	–	65	54		72				ACID ELECTRIC
191"	29	54	18	008	012	–	60	47		69				ACID ELECTRIC
1.45"	"	"	"	"	"		"	"		"				" "
192"	26	119	140	006	017	–	60	49		32				BASIC ELEC
2.00"	"	"	"	"	"		"	"		"				" "
2.11"	32	73	30	015	018	–	61	53		69				ACID ELECTRIC
1.59"	"	"	"	"	"		"	"		"				" "
1.95"	29	92	33	015	021	53	53	45		23				ACID ELECTRIC
138"	29	92	"	"	"	"	"	"		–				" "
2.16"	29	84	33	012	017	–	62	46		84				BASIC ELEC
1.59"	"	"	"	"	"		"	"		"				" "

						HEAT 1						
						HOMOGENIZE				SOFTENING AN		
%	V	Cu		Oxidation	Furnace	Temp	Hrs Rise	Hrs Soak	Coolant	Temp	Hrs Rise	Hrs
6					Acid Electric	—	—	—	—	—		
2					Acid Electric	1650	"	2	Air	—		
					Acid Electric	1650		2	Air	—		
6					Acid OH	—				—		
					Acid Electric	1650		2	Air	—		
					Acid Electric	1650		2	Air	—		
					Acid Electric	1650		2	Air	—		
					Basic OH	1825	3	9	Air	—		
					" "	1750	3	3	Air	—		
					" "	1650	3	3	Air	—		
					Basic OH	1825	2½	8	Air	—		
					" "	1825	2½	8	Air	—		
					Acid OH							Not Given
					" "	1650			Furnace	—		
					Acid OH	1650			Furnace	—		
					Acid OH	1650			Air	—		
					Acid OH	1650			Air	—		
					Acid OH	1825			Air	1225		
					Acid OH	1825			Air	1225		
		.66			Basic Elec	1950		10	Air	—		
		.60			Basic Elec.	1950		10	Air	—		
		.38			Basic Elec.	1950		10	Air	—		
		.72			Acid Electric	1950		10	Air	—		
		.69			Acid Electric	1950		10	Air			
					" "	1950		10	Air			
		.32			Basic Elec.	1950		10	Air			
					" "	1950		10	Air			
		.69			Acid Electric	1950		10	Air			
		"			" "	1950		10	Air			
		.23			Acid Electric	1950		10	Air			
		—			" "	1950		10	Air			
		.84			Basic Elec	1950		10	Air			

CAST ARMOR LOW ALLOY DEVELOPMENT TESTS
SHEET 3.

HEAT TREATMENT

SOFTENING ANNEAL				HARDEN				TEMPER			
TEMP	HRS RISE	HRS SOAK	COOLANT	TEMP	HRS RISE	HRS SOAK	COOLANT	TEMP	HRS RISE	HRS SOAK	COOLANT
–				1650		2	WATER	950		4	WATER
				1525		2/3	WATER	950		4	WATER
				1525		2/3	WATER	875		4	WATER
–				1650		2	WATER	1200		4	WATER
–				1525		2/3	WATER	1050		4	WATER
–				1525		2/3	WATER	1150		4	WATER
–				1525		2/3	WATER	1230		4	WATER
–				1600	5 3/4	1	WATER	1200	4 3/4	4	WATER
–				1600	5 3/4	1	WATER	1200	4 3/4	4	WATER
–				1600	5 3/4	1	WATER	1200	4 3/4	4	WATER
–				1625	1 1/2	3	WATER	1200	1 1/2	6	WATER
–				1625	1 1/2	3	WATER	1200	1 1/2	6	WATER
	NOT GIVEN										
–				1550			WATER	1225			FUR TO 1000°F WATER
–				1550			WATER	1225			FUR TO 1000°F WATER
–				1550			WATER	1225			FUR TO 1000°F WATER
–				1550			WATER	1225			FUR TO 1000°F WATER
1225				1550			WATER	1225			FUR TO 1000°F WATER
1225				1550			WATER	1225			FUR TO 1000°F WATER
–				1650		.5	CAUSTIC	1150		8	AIR
–				1650		5	CAUSTIC	1150		8	AIR
–				1650		5	CAUSTIC	1150		8	AIR
–				1750		5	CAUSTIC	1150		8	AIR
				1650		5	CAUSTIC	1150		8	AIR
				1650		5	CAUSTIC	1150		8	AIR
				1650		5	CAUSTIC	1150		8	AIR
				1650		5	CAUSTIC	1150		8	AIR
				1650		5	CAUSTIC	1150		8	AIR
				1650		5	CAUSTIC	1150		8	AIR
				1650		5	CAUSTIC	1150		8	AIR
				1650		5	CAUSTIC	1150		8	AIR
				1650		5	CAUSTIC	1150		8	AIR
				1650		5	CAUSTIC	1150		8	AIR

NTIAL

DY DEVELOPMENT TESTS

3

	TEMPER				PHYSICAL PROPERTIES					
ANT	TEMP	HRS RISE	HRS SOAK	COOLANT	BRINELL HARD.	TENSILE	YIELD	ELONGATION	RED AREA	IZ
TER	950		4	WATER	317-318	152,500	139,500	15.0	43.7	7-
TER	950		4	WATER	315-318	152,500	125,500	11.5	31.9	20
TER	875		4	WATER	335-341	153,250	130,000	14.0	43.4	20
TER	1200		4	WATER	219-226	115,750	100,250	19.5	44.5	35
ER	1050		4	WATER	256-262	116,000	99,900	18.5	46.2	17-
ER	1150		4	WATER	255-269	118,500	100,000	18.0	44.2	42-
ER	1230		4	WATER	229	110,250	61,500	21.5	56.7	50-
ER	1200	4 3/4	4	WATER	224-231	103,500	79,500	24.0	59.6	72-
ER	1200	4 3/4	4	WATER	217-230	104,000	80,000	25.0	61.4	70-
ER	1200	4 3/4	4	WATER	217-225	104,000	82,000	22.0	55.5	66-
R	1200	1 1/2	6	WATER	212-217	100,800	81,800	22.5	53.8	75
ER	1200	1 1/2	6	WATER	217-229	100,150	79,800	24.0	60.6	77
					235-241	114,250	91,750	21.0	48.0	40
R	1225			FUR TO 1000°F WATER	229-241	114,550	94,750	23.0	55.4	54
	1225			FUR TO 1000°F WATER	229-241	116,850	93,900	21.5	56.2	56
R	1225			FUR TO 1000°F WATER	229-255	114,750	91,200	23.0	55.2	55
R	1225			FUR TO 1000°F WATER	229-248	110,250	88,650	24.5	61.6	61
R	1225			FUR TO 1000°F WATER	235 241	116,000	92,000	22.5	52.5	56
	1225			FUR TO 1000°F WATER	228-255	115,700	92,500	23.0	54.9	55
R	1150		8	AIR	255	129,000	114,500	15.0	38.5	45.2
R	1150		8	AIR	248	122,500	102,500	16.0	39.5	33.7
	1150		8	AIR	241	116,500	97,500	11.0	24.5	28.7
	1150		8	AIR	217	105,500	88,500	17.0	46.5	43.0
	1150		8	AIR	212	107,000	86,000	16.0	31.5	24.5
	1150		8	AIR	207	111,000	92,000	15.0	34.0	26.2
	1150		8	AIR	248	125,000	105,000	16.5	27.0	33.0
	1150		8	AIR	285	134,000	115,600	12.0	22.5	36.5
	1150		8	AIR	269	131,500	117,000	18.0	32.5	24.5
	1150		8	AIR	285	139,000	125,000	-	-	28.0
	1150		8	AIR	255	126,000	111,000	14.0	25.5	22.0
	1150		8	AIR	255	"	"	"	"	"
	1150		8	-	277	132,000	117,500	9.5	18.0	

PERTIES			BALLISTIC PROPERTIES								
			PENETRATION					PROJECTILE THRU PLATE			
ELONGATION	NLD AREA	T200	PROJ	HIGH P	LOW-C	BL.	SPEC.	PROJ	VELOCITY	RESULT	PROJE
15.0	43.7	7-8	CAL 50 APMI	2264 2261	2310 2296	2287 2274	2120(+167) 2124(+150)	37MM MSIAPC	1599	1 3/4" x 2"	37MM M
11.5	31.9	20	"	2305 2298	2338 2337	2321 2318	2200(+121) 2200(+118)	"	1534	1 1/2" x 1 3/8"	"
14.0	43.4	20 21	"	2470 2336	2478 2372	2474 2354	2240(+234) 2240(+118)	"	1590	1 3/8" x 1 7/8"	"
19.5	44.5	30-33	37MM MSIAPC	1598	1647	1623	1452 (+171)	37MM MSIAPC	2464	2 1/8" x 2 1/8"	75MM T 75MM M
18.5	46.2	17-19	"	1833	1876	1855	1706 (+99)	"	2521	2 3/4" x 2 3/4"	76MM T 75MM M
18.0	44.2	42-45	"	1567	1584	1576	1372 (+204)	"	2457	2 1/8" x 2 3/8"	75MM T 75MM M
21.5	56.7	50-52	"	1570	1620	1595	1492 (+103)	"	2444	2 3/8" x 2 1/8"	75MM T 75MM M
24.0	59.6	72-72	"	1899	1925	1912	1812 (+100	"	2507	2 3/8" x 2 3/8"	75MM T 75MM M
25.0	61.4	70-70	"	1973	2001	1986	1861 (+125)	"	2423	1 3/8" x 2 1/4"	75MM T 75MM M
22.0	55.5	66-71	"	1869	1903	1886	1833 (+53)	"	2455	2" x 2 1/8"	75MM T 75MM M
22.5	53.8	75	"	1940	1974	1957	1875 (+82)	"	2460	2 1/8" x 2 1/8"	75MM T 75MM M
24.0	60.6	77	"	1986	2016	2001	1868 (+133)	"	2432	2" x 2 1/4"	75MM M
21.0	48.0	40	"	2038	2069	2054	1953 (+101)	"	2561	2 3/8" x 2 1/8"	75MM M 75MM M
23.0	55.4	54	"	1749	1788	1770	1812 (-42)	"	2434	2 1/8" x 2 5/8"	75MM T
21.5	56.2	54	"	1895	1942	1919	1749 (+170)	"	2496	2" x 2 1/8"	75MM T 75MM M
23.0	55.2	55	"	1862	1914	1888	1777 (+111)	"	2451	1 7/8" x 2"	75MM T 75MM M
24.5	61.6	61	"	1934	1967	1951	1832 (+119)	"	2509	1 7/8" x 2 1/4"	75MM T 75MM M
22.5	52.5	56	"	2122	2163	2142	1974 (+168)	"	2504	2 1/4" x 2 5/8"	75MM T 75MM M
23.0	54.9	55	"	1888	1928	1908	1792 (+116)	"	2496	2 1/8" x 2 1/8"	76MM T 75MM M
15.0	38.5	45.2	"	1925	1974	1950	1833 (+117)	"	2438	2 1/4" x 2 3/8"	76MM T 75MM M
16.0	39.5	33.7	"	1745	1776	1761	1684 (+77)	"	2397	2 3/8" x 2 1/8"	75MM 75MM M
11.0	24.5	28.7	"	1275	1290	1283	1228 (+53)	"	2417	2 7/16" x 2 7/16"	76MM T 75MM M
17.0	46.5	43.0	"	—					—		75MM
15.0	31.5	24.5	"	1684	1796	1737	1628 (+109)	"	2399	2 1/4" x 2 13/16"	75MM T 75MM M
15.0	37.0	26.2	"	—					—		75MM
16.5	27.0	33.0	"	1755	1794	1775	(+139) 1636	"	2416	2 3/8" x 2 3/8"	75MM T 75MM M
12.0	22.5	36.5	"	1736	1763	1750	1700 (+50)	"	2451	2 1/8" x 2 3/16"	75MM T 75MM M
18.0	32.5	24.5	"	1883	1914	1901	1777 (+124)	"	2431	2 1/4" x 2 3/8"	75MM T 75MM M
—	—	28.0	"	1494	1535	1515	1372 (+143)	"	2434	2 3/16" x 2 9/16"	75MM T 75MM M
14.0	25.5	22.0	"	1687	1721	1704	1660 (+44)	"	2395	2 3/8" x 2 3/8"	75MM T 75MM M
..		..	"	1296	1312	1304	1228 (+76)	"	2397	2 7/16" x 2 7/16"	75MM T 75MM M
9.5	18.3	33.5	"	1966	2007	1987	1812 (+175)	"	2382	2 1/8" x 2 5/8"	75MM T 75MM M
14.0	38.8	35.2	"	1587	1627	1607	1332 (+265)	"	2388	2 3/8" x 2 3/8"	75MM T 75MM M

RTIES					WA 5/6/42 NAM.
ATE	SHOCK			PROPERTIES	PLATE QUALITY
SULT	PROJECTILE	OBL.	VELOCITY	RESULT	TYPE OF FAILURE
"x2"	37mm M51APC	25°	1116	CP-LB-SC - PASSED	SATISFACTORY.
x1	"	25°	1121	CP ¾" CRACK ON LB	SATISFACTORY
x1	"	25°	1108	PP-MB	SATISFACTORY.
x2	75mm TILAP	25°	876	PP-MB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1253	CP-SC ON MB - PASSED	
x2	75mm TILAP	25°	1033	PP-MB - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1393	CP-PLATE BROKE - 3 PIECES	
x2	75mm TILAP	25°	866	PP-SC ON LB - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1193	CP-PLATE BROKE - 3 PIECES	
x2	75mm TILAP	25°	844	PP-4" CRACK ON LB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1262	CP-65 CRACKING ON BACK.	
x2	75mm TILAP	25°	1052	PP-MB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1432	PP-MB - PASSED	
x2	75mm TILAP	25°	1072	PP-MB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1519	PP-MB - PASSED	
x2	75mm TILAP	25°	1063	PP-LB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1512	PP-MB - PASSED	
x2	75mm TILAP	25°	1093	PP-MB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1381	PP-MB - PASSED	
x2	75mm M61 SLUG	NORMAL	1393	PP-SC ON MB - PASSED	SATISFACTORY
x2	75mm TILAP	25°	1156	PP-MB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1551	PP-SC ON MB - PASSED	
x2	75mm TILAP	25°	1048	PP-SC ON MB - PASSED	FAILED - LOW B.L.
x2	75mm TILAP	25°	1016	CP-SC ON MB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1409	CP-B.S. 11"x6½"	
x2	75mm TILAP	25°	1041	PP-MB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1459	PP-4" CRACK-MB - PASSED	
x2	75mm TILAP	25°	1071	PP-LB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1489	CP-7" x13" SECTION OUT 17" CRACKING	
x2	75mm TILAP	25°	1144	PP-SB - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1664	PP-MB - PASSED	
x2	75mm TILAP	25°	1046	CP-3½" CRACK ON LB - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1441	PP-SB - PASSED	
x2	75mm TILAP	25°	1063	PP-MB - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1466	PP-SC ON MB - 41" CRACKING ON BACK	
x2	75mm TILAP	25°	991	PP-MB - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1401	PP-CRACK ON LB 15" CRACKING ON BACK	
x2	76mm TILAP	25°	777	PP-MB PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1092	PP-CRACK ON LB - 10" BACK CRACK	
	75mm TILAP	25°	1051	PP-MB - 16" x 15" CRACKS ON BACK	FAILED - SHOCK.
x2	75mm TILAP	25°	950	PP-LB - 6" CRACK - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1350	CP-BS 11½ x 12¾"	
	75mm TILAP	25°	800	CP 20" x 15 CRACKS ON BACK	FAILED - SHOCK
"x2	75mm TILAP	25°	951	CP-INC B.S. 2½ x 3½" - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1349	CP-47" CRACKING ON BACK	
x2	75mm TILAP	25°	956	PP-SB - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1381	CP-PLATE BROKE - 3 PIECES	
x2	75mm TILAP	25°	1036	PP-SB - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1450	PP-SC ON MB - PASSED	
x2	76mm TILAP	25°	864	~~PP-MB - PASSED~~	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1194	PP-SC ON MB - 1" BACK CRACK	
x2	75mm TILAP	25°	973	CP-SC ON MB. - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1343	CP-SC ON MB - 14" BACK CRACK	
x2	75mm TILAP	25°	772	CP-SC-MB - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1093	CP - 24" CRACKING ON BACKS	
x2	75mm TILAP	25°	1062	PP-SB - PASSED	SATISFACTORY
	75mm M61 SLUG	NORMAL	1479	PP-SB - PASSED	
x2	75mm TILAP	25°	943	PP-MB - PASSED	SATISFACTORY.
	75mm M61 SLUG	NORMAL	1166	PP-LB - 5" CRACKING	
			992	PP-MB - PASSED	

4/27/42	80 of 20	391	391C	1.95"	.29	.92	.33	.015	.021	.53	.53	
4/27/42	" " "	391	391C	1.38"	.29	.92	"	"	"	"	"	
4/27/42	" " "	364	364C	2.16"	.29	.84	.33	.012	.017	—	.62	
4/27/42	" "	364	364C	1.59"	"	"	"	"	"		"	
4/27/42	" "	300	300C	2.13"	.30	.80	.34	.014	.010	—	.66	
4/27/42	" " "	300	300C	1.56"	"	"	"	"	"		"	
4/27/42	" " "	315	315C	2.06"	.26	.85	.74	.014	.016	—	.57	
4/27/42	" " "	315	315C	1.54"	"	"	"	"	"		"	
4/27/42	" " "	358	358C	2.29"	.31	.88	1.40	.015	.038	—	.55	
4/27/42	" " "	358	358C	1.44"	"	"	"	"	"	—	"	
4/6/42	Fort Pitt Steel Cast.	1276	1276	1½"	.28	1.42	.51	.046	.042	.30	.38	
3/31/42	General Steel Cast	5601	D38630 Turret	2⅛"	.24	1.52	.39	.020	.017	—	.44	
4/22/42	" " "	5693E	734	2.23"	.27	1.48	.41	.019	.013	—	.43	
4/27/42	" " "	5744	757	2.16"	.25	1.44	.42	.017	.014	—	.51	
4/27/42	" " "	5744	760	2.20"	"	"	"	"	"	—	"	
4/21/42	Locomotive Finished Material Company	10344	LFM-2	1.65"	.28	1.41	.41	.049	.083	—	.32	
4/21/42	" " "	10344	LFM-3	1.51"	"	"	"	"	"		"	
4/21/42	" " "	10344	LFM-4	2.24"	"	"	"	"	"		"	
4/21/42	" " "	10344	LFM-5	2.02"	"	"	"	"	"		"	
4/25/42	McConway Torley Co.		AL1136-3	.99"	.22	1.61	1.15	.037	.028	—	—	
4/15/42	Scullin Steel Co.	5-278	X13	2.04"	.30	1.34	.33	.012	.020	—	.18	
4/25/42	" " "	"	X14	2.14"	"	"	"	"	"	—	"	
4/20/42	" " "	"	X15	2.14"	"	"	"	"	"	—	"	
3/31/42	Smyser Steel Castings	6018	A1	2.09"	.23	1.00	.33	.039	.026	.63	.55	
"	" " "	6018	A2	2.19"	"	"	"	—	"	"	"	
4/14/42	" " "	X9	X9	1.88"	.29	.79	.27	.043	.018	.63	.52	
4/10/42	" " "	X9	X9X	1.94"	"	"	"	"	"	"	"	
4/20/42	Union Steel Castings	278C	341	2.23"	.38	1.92	.32	.014	.028	.61	.58	
4/24/42	" " "	282C	657	2.24"	.24	.96	.27	.016	.028	.59	.46	
4/2/42	" " "	293C	694	2.44"	.23	1.57	.42	.017	.028	—	.44	
4/24/42	" " "	296C	698	2.10"	.17	.76	.26	.012	.031	.63	.61	
4/24/42	" " "	322C	425	2.18"	.30	1.37	.35	.015	.030	—	.30	
4/20/42	" " "	322C	427	2.06"	"	"	"	"	"		"	
4/24/42	" " "	324C	428	1.96"	.37	1.17	.29	.031	.044	—	—	
4/20/42	" " "	326C	430	2.09"	.30	1.01	.33	.016	.028	.53	.46	
4/13/42	Utility Elec Steel Fdy	081	4081	1.46"	.29	1.12	.83	.036	.040	.26	.13	

														195
.29	.92	.33	.015	.021	.53	.53	.45		.23				Acid Electr.	195
29	92								-					195
29	.84	33	012	017	-	62	46		84				Basic Elec	195
														195
30	80	34	014	010	-	66	50		75				Basic Elec	195
														195
26	85	74	014	016	-	57	42		Bl .25				Basic Elec	195
														195
31	88	140	015	038	-	55	43		18				Basic Elec	195
				-	-									195
28	142	51	046	042	30	38	45		-				Acid Elec.	1700 1700
24	152	39	020	017	-	44	26						Basic OH.	200
27	148	41	019	013	-	43	31						Basic OH.	200
25	144	42	017	014	-	51	37						Basic OH	200
					-									200
28	141	41	049	033	-	32	15	05					Acid Elec.	165 1675
														165 167
														165 167
														165 167
22	161	115	037	028	-	-	46						Acid Elec.	195
30	134	33	012	020	-	Bl .18	56						Basic OH	180
					-									180
					-									180
23	100	33	039	026	63	55	44						Acid Elec.	190
														165
29	79	27	043	018	63	52	53						Acid Elec	190
														170
38	192	32	014	028	61	58	40						Acid OH.	190
24	96	27	016	028	59	46	80		116				Acid OH	190
23	157	42	017	028	-	44	20						Acid OH.	182
17	76	26	012	031	63	61	59						Acid OH.	185
30	137	35	015	030	-	30	17						Acid OH.	—
														185
37	117	29	031	044	-	-	-	05					Acid OH.	182
30	101	33	015	028	53	46	51						Acid OH	182
29	112	83	036	040	26	13	50						Acid Elec.	195

	Acid Electr.	1950		10	Air				
	" "	1950		10	Air				
	Ba... Elec	1950		10	Air				
	" "	1950		10	Air				
	Basic Elec.	1950		10	Air				
	" "	1950		10	Air				
	Basic Elec.	1950		10	Air				
	" "	1950		10	Air				
	Basic Elec	1950		10	Air				
	" "	1950		10	Air				
		1700	3	5	Air				
	Acid Elec.	1700	3	5	Furnace				
	Basic OH.	2000		10	Air	1250		4	Air
	Basic OH.	2000		10	Air	1250		4	Air
	Basic OH	2000		10	Air	1250		4	Air
	" "	2000		10	Air	1250		4	Air
	Acid Elec.	1650		2	Fur	—			
		1675		3	Air				
	"	1650		2	Fur.				
		1675		3	Air	—			
	"	1650		2	Fur				
		1675		3	Air	—			
	"	1650		2	Fur.				
		1675		3	Air	—			
	Acid Elec.	1950	6	10	Air	1250	5	2½	Air
	Basic OH	1800	6		Air	1240	3		Air
	" "	1800	6		Air	1240	3		Air
	" "	1800	5		Air	1200	3		Air
	Acid Elec.	1900	6	8	Air	1300	2	3	Air
	" "	1650	4	4	Air	1300	2	3	Air
	Acid Elec.	1900	6	8	Air	1300	2	3	Air
	" "	1700	6	4	Air	1300	2	3	Air
	Acid OH.	1900		4	Air	—			
	Acid OH	1900		8	Air				
	Acid OH.	1825		8	Air				
	Acid OH.	1850		8	Air				
	Acid OH.	—							
	" "	1850		8	Air				
	Acid OH.	1825		8	Air				
	Acid OH	1825		8	Air				
	Acid Elec.	1950	6	10	Air	1250	2½	5	Air

				1650		5	Caustic	1150		8	Air
				1650		5	Caustic	1150		8	Air
				1650		5	Caustic	1150		8	Air
				1650		5	Caustic	1150		8	Air
				1750		5	Caustic	1150		8	Air
				1750		5	Caustic	1150		8	Air
				1750		5	Caustic	1150		8	Air
				1750		5	Caustic	1150		8	Air
				1750		5	Caustic	1150		8	Air
				1750		5	Caustic	1150		8	Air
				1575	3	5	Oil	1175	3	6	Air
1250		4	Air	1575		4	Water	1125		4	Air
1250		4	Air	1575		4	Water	1150		4	Air
1250		4	Air	1575		4	Water	1125		4	Air
1250		4	Air	1575		4	Water	1125		4	Air
—				1565		1¼	Water	1150		4	Water
—				1525		1¼	Water	1150		4	Water
—				1525		1¼	Water	1150		4	Water
—				1525		1¼	Water	1150		4	Water
1250	5	2½	Air	1650	5	1	Water	1050	3	6	Air
1240	3		Air	1570	3		Water	1200	4		Air
1240	3		Air	1560	3		Water	1200	7		For to 100 Water
1200	3		Air	1570	3		Water	1200	6		For to 100 Water.
1300	2	3	Air	1560	4	4	Water	1150	6	8	Air
1300	2	3	Air	1550	4	4	Water	1150	6	8	Air
1300	2	3	Air	1575	4	4	Water	1200	4	4	Furnace
1300	2	3	Air	1575	4	4	Water	1200	4	4	"
—				1550		4	Water	1250		4	Water
				1550		4	Water	1225		6	Water
				1525		⅔	Water	1150		6	Water
				1650		2	Water	1175		4	Water
				1650		4	Water	1200		4	Water
				1525		⅔	Water	1150		6	Water
				1525		2	Water	1200		6	Water
				1550		4	Water	1200 1250		6 6	Water
1250	2½	5	Air	1650	5	⅔	Water	1100	3	6	Air

0		8	AIR				-	-	28.0
50	12 of 20	8	AIR	255	126,000	111,000	14.0	25.5	22.0
50		8	AIR	255	"	"	"		"
50		8	AIR	277	132,000	117,500	9.5	18.3	33.5
50		8	AIR	277	140,000	127,500	14.0	38.8	35.2
50		8	AIR	269	135,000	120,000	14.0	34.0	30.0
50		8	AIR	269	127,000	113,000	11.0	24.8	34.0
50		8	AIR	262	128,000	110,000	10.5	20.0	28.5
50		8	AIR	262	130,000	109,000	12.0	20.0	30.5
50		8	AIR	277	136,000	115,000	15.0	29.0	27.0
50		8	AIR	285	132,500	116,000	-	-	27.2
75	3	6	AIR	241	126,000	108,000	20.0	35.5	-
25		4	AIR	260	123,500	107,000	18.5	49.2	58.3
50		4	AIR	317	141,500	125,000	12.0	22.0	25.0
25		4	AIR	256	128,500	112,500	16.0	36.6	62.0
25		4	AIR	256	"	"	"	"	"
50		4	WATER	-	128,750	113,800	17	44.2	28.0
50		4	WATER	-	"	"	"	"	"
50		4	WATER	-	—				
50		4	WATER	-	—				
50	3	6	AIR	305-321	142,000	126,500	16	35.0	-
00	4		AIR	250-257	112,000	94,500	23.0	66.2	62-66
00	7		FURTO100 WATER	240-245	106,500	87,500	25.0	61.1	62-63
00	6		FURTO100 WATER.	240-247	104,000	86,000	25.0	61.3	75-78
50	6	8	AIR	248-256	115,650	98,100	21.5	57.1	34.3
50	6	8	AIR	255	"	"	"	"	36.6
00	4	4	FURNACE	241-248	125,050	105,250	19.5	51.7	-
00	4	4	"	269	117,700	99,100	22.0	53.8	-
50		4	WATER	245-255	126,000	106,000	17.0	30.2	38-40
25		6	WATER	255-262	133,500	114,000	15.0	44.6	33-35
50		6	WATER	228-238	115,500	96,000	19.0	62.0	52-54
25		4	WATER	240-248	116,000	97,000	20.0	60.3	46-48
00		4	WATER	237-248	111,500	98,000	21.5	59.1	46
50		6	WATER	228-234	117,000	101,000	20.0	51.4	60-62
00		6	WATER	240-266	113,500	99,000	20.0	47.8	47-48
00 50		6 6	WATER	245-250	108,500	93,000	22.0	54.7	57-58
00	3	6	AIR	295					

—	28.0		141[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	2[illegible]	75mm Mk1 Slug	Normal	[illegible]
55	22.0	13 of 17	1687	1721	1704	1660 (+44)	"	2395	2 5/8 x 2 3/4"	75mm T12 AP 75mm Mk1 Slug	25° Normal	9 13
	.		1296	1312	1304	1228 (+76)	"	2397	2 7/16 x 2 7/16	75mm T12 AP 75mm Mk1 Slug	25° Normal	77 16
83	33.5	"	1966	2007	1987	1812 (+175)	"	2382	2 1/2 x 2 5/8"	75mm T12 AP 75mm Mk1 Slug	25° Normal	106 14
88	35.2	"	1587	1627	1607	1332 (+265)	"	2388	2 5/8" x 2 3/4"	75mm T12 AP 75mm Mk1 Slug	25° Normal	9 116
40	30.0	"	1781	1781	1781	1721 (+60)	"	2400	2 5/8 x 2 7/8	75mm T12 AP 75mm Mk1 Slug	25° Normal	9 13
248	34.0	"	1417	1442	1430	1348 (+82)	"	2392	2 7/16 x 2 3/4"	75mm T12 AP 75mm Mk1 Slug	25° Normal	9 11
00	28.5	"	1779	1802	1791	1742 (+49)	"	2392	2 1/16 x 3"	75mm T12 AP 75mm Mk1 Slug	25° Normal	10 14
00	30.5	"	1433	1483	1458	1332 (+126)	"	2392	2 3/8 x 2 5/16"	75mm T12 AP 75mm Mk1 Slug	25° Normal	8 11
290	27.0	"	1947	1991	1969	1903 (+66)	"	2460	2 3/4 x 2 13/16"	75mm T12 AP 75mm Mk1 Slug	25° Normal	11 15
—	27.2	"	1393	1414	1404	1264 (+140)	"	2410	2 1/8 x 2 1/4"	75mm T12 AP 75mm Mk1 Slug	25° Normal	8 11
5.5	—	"	1382	1438	1410	1300 (+110)	"	2478	2 1/2 x 2 1/2"	75mm T12 AP 75mm Mk1 Slug	25° Normal	8 11
92	58.3	"	1900 1897	1910 1943	1905 1920	1788 (+117) (+132)	"	2545 2523	2" x 2 1/4" 2 1/2" x 2"	75mm T12 AP	25°	10
2.0	25.0	"	—					—		75mm T12 AP	25°	11
6.6	52.0	"	1906	1948	1927	1812 (+115)	"	2500	2 1/2 x 2 1/2"	75mm T12 AP	25°	10
..	..	..	1890	1937	1914	1840 (+174)	"	2492	2 1/2 x 2 1/2"	75mm Mk1 Slug	Normal	1
4.2	28.0	"	1552	1570	1561	1420 (+141)	"	2506	2 1/16 x 2 3/4"	75mm Mk1 Slug	"	12
..	"	"	1410	1451	1431	1308 (+123)	"	2491	2 1/4 x 2 5/8"	75mm T12 AP	25°	8
		"	2005	2047	2026	1858 (+168)	"	2548	B.S. 2 1/2 x 2 3/4"	75mm Mk1 Slug	Normal	1
		"	1973	2004	1989	1714 (+175)	"	2513	2 1/2 x 2 5/8"	75mm T12 AP	25°	9
5.0	—	Calso APM2	2239	2277	2258	2188 (+70)	"	1662	1 3/4" x 2"	37mm M51 APC	25°	1
56.2	62-66	37mm M51APC	1777	1821	1799	1728 (+71)	"	2465	2 1/4 x 2 5/8"	75mm T12 AP 75mm Mk1 Slug	25° Normal	1 1
1.1	62-63	"	1923	1952	1938	1798 (+140)	"	2567	2 1/4 x 2 1/2"	75mm T12 AP	25°	1
1.3	75-78	"	1801	1828	1815	1799 (+16)	"	2433	2 3/4 x 2 3/4"	75mm T12 AP	25°	1
57.1	34.3	"	1911	1952	1932	1763 (+169)	"	2511	2 1/2 x 2 3/4"	75mm AP T12 75mm Mk1 Slug	25° Normal	1 1
"	36.6	"	1949	1983	1966	1831 (+135)	"	2555	2 1/4" x 2 1/2"	75mm T12 AP 75mm Mk1 Slug	25° Normal	1 1
51.7	—	"	1734	1783	1759	1604 (+155)	"	2432	2 1/2 x 2 1/2"	75mm AP T12 75mm Mk1 Slug	25° Normal	1
53.8	—	"	1747	1796	1772	1652 (+120)	"	2428	2 1/4 x 2 3/8"	75mm T12 AP 75mm Mk1 Slug	25° Normal	1
30.2	38-40	"	1888	1923	1906	1861 (+45)	"	2496	2 11/16 x 2 11/16"	75mm T12 AP 75mm Mk1 Slug	25° Normal	1
44.6	33-35		—					—		75mm T12 AP	25°	1
52.0	52-54	"	2062	2084	2073	2008 (+65)	"	2560	2 3/8 x 2 1/2"	75mm T12 AP 75mm Mk1 Slug	25° Normal	1
60.3	46-48	"	1786	1831	1809	1770 (+39)	"	2523	2 1/4" x 3"	75mm T12 AP 75mm Mk1 Slug	26° Normal	1
59.1	46	"	1875	1918	1897	1826 (+71)	"	2561	2 1/2 x 2 3/4"	75mm T12 AP 75mm Mk1 Slug	25° Normal	
51.4	60-62	"	—					—		75mm T12 AP	25°	
47.8	47-48	"	1679	1690	1685	1668 (+17)	"	2509	2 3/8 x 2 5/16"	75mm T12 AP 75mm Mk1 Slug	25° Normal	
54.7	58-58	"	1752	1781	1767	1763 (+4)	"	2500	1 3/8 x 1 7/16"	75mm T12 AP 75mm Mk1 Slug	26° Normal	
		"	1338	1379	1368	1676 (+82)	"	2468	2 1/4 x 2 [illegible]"	75mm T12 AP 75mm Mk1 Slug	25° Normal	

7/8 x 2 3/4"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	[illegible] 1343	CP-SC ON MB-14" BACK [illegible]	SATISFACTORY.
7/16 x 2 7/16	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	772 1093	CP-SC-MB-PASSED CP-24" CRACKING ON BACK	SATISFACTORY.
1/2 x 2 5/8"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	1062 1479	PP-SB-PASSED PP-SB-PASSED	SATISFACTORY
5/8 x 2 3/4"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	843 1166	PP-MB-PASSED PP-LB-5" CRACKING	SATISFACTORY.
5/8 x 2 7/8	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	992 1390	PP-MB-PASSED CP-SC ON MB-2 1/2" CRACKING	SATISFACTORY
7/16 x 2 3/4"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	861 1173	PP-MB-PASSED CP-16" CRACKING ON BACK	SATISFACTORY.
1 1/16 x 3"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	1007 1431	PP-SC-MB-PASSED CP-PLATE BROKE-3 PIECES	SATISFACTORY
3/8 x 2 5/16"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	853 1173	CP-SC-LB-PASSED CP-45" CRACKING ON BACK	SATISFACTORY.
3/4 x 2 13/16"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	1111 1518	PP-SB-PASSED CP-SC-MB-21" CRACKING ON BACK	SATISFACTORY
2 1/2 x 2 1/4"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	814 1118	PP-MB-PASSED PP-MB-PASSED	SATISFACTORY
2 1/2 x 2 1/2"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	888 1160	CP-SC-MB-PASSED CP-SC ON LB-9" BACK CRACK	SATISFACTORY
5" x 2 1/2" 1 5/8" x 2"	75MM TI2AP	25°	1066	PP-SC ON MB	SATISFACTORY
	75MM TI2AP	25°	1110	CP-B.S. 6"x7"	FAILED-SHOCK
2 1/2 x 2 1/2"	75MM TI2AP	25°	1063	PP-MB-PASSED	SATISFACTORY
2 1/2 x 2 1/2"	75MM MK1 SLUG	NORMAL	1482	PP-MB-28" CRACKING BACK	SATISFACTORY
2 1/16 x 2 3/4"	75MM MK1 SLUG	"	1222	PP-SC ON MB-PASSED	SATISFACTORY
2 1/4 x 2 3/4"	75MM TI2AP	25°	850	CP-B.S. 1 1/2 x 2"	SATISFACTORY.
2 1/4 x 2 3/4"	75MM MK1 SLUG	NORMAL	1498	PP-SC ON MB-PASSED	SATISFACTORY.
2 1/2 x 2 3/4"	75MM TI2AP	25°	999	PP-LB-PASSED	SATISFACTORY
1 3/4" x 2"	37MM M51AP	25°	1082	PP-SB-PASSED	SATISFACTORY
2 1/2 x 2 3/4"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	1015 1420	PP-MB- PP-MB PASSED	SATISFACTORY.
2 1/2 x 2 1/2"	75MM TI2AP	25°	1055	PP-LB-PASSED	SATISFACTORY
2 3/8 x 2 3/4"	75MM TI2AP	25°	1014	CP-MB-24" CRACKS	FAILED-SHOCK
2 1/2 x 2 3/4"	75MM APT12 75MM MK1 SLUG	25° NORMAL	1022 1393	PP-SC ON SB-PASSED PP-SC ON MB-PASSED	SATISFACTORY
2 1/4" x 2 1/2"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	1092 1398	PP-SB-PASSED PP-SC ON SB-PASSED	SATISFACTORY
2 1/2 x 2 1/2"	75MM APT12 75MM MK1 SLUG	25° NORMAL	943 1272	PP-SB PP-SB -PASSED	SATISFACTORY
2 1/4 x 2 3/4"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	981 1328	PP-SB-PASSED CP-SC-LB-10 3/4 x 3" B.S.	SATISFACTORY
1 7/16 x 2 13/16"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	1087 1499	PP-SC ON SB-PASSED CP-PLATE BROKE-4 PIECES	SATISFACTORY.
	75MM TI2AP	25°	1084	CP-10", 11 1/2", & 26" CRACKS	FAILED-SHOCK.
2 3/8 x 2 1/2"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	1165 1394	PP-SB-PASSED PP-SC ON SB-PASSED	SATISFACTORY.
2 1/4" x 3"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	1036 1469	PP-SB-PASSED CP-PLATE BROKE-9 PIECES.	SATISFACTORY.
2 1/2 x 2 3/4"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	1074 1491	CP-SC-LB-PASSED CP-PLATE BROKE-2 PIECES	SATISFACTORY.
	75MM TI2AP	25°	1018	CP-SC ON LB-23" & 40" CRACKS ON BACK	FAILED-SHOCK
2 3/8 x 2 5/8"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	991 1400	PP-MB-PASSED CP-PLATE BROKE-2 PIECES	SATISFACTORY
1 3/8 x 1 7/16"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	1019 1437	PP-SB-PASSED CP-50" CRACKING ON BACK.	SATISFACTORY.
2 1/4 x 2 3/4"	75MM TI2AP 75MM MK1 SLUG	25° NORMAL	825 1176	CP-SC-LB-PASSED CP-PLATE BROKE-4 PIECES.	SATISFACTORY.
2 1/2 x 2 9/16	75MM MK1 SLUG	NORMAL	[illegible]	CP-PLATE BROKE-5 PIECES	SATISFACTORY

		PRODUCED AT GOVERNMENT EXPENSE										
4/21/42	"	10344	LFM-4	2.24"	"	"	"	"	"		"	"
4/21/42	"	10344	LFM-5	2.02"	"	"	"	"	"		"	"
4/25/42	McCormick Forney Co.		AL1136-3	.99"	.22	1.61	1.15	.037	.028	-	-	.46
4/13/42	Scullin Steel Co.	S-278	X13	2.04"	.30	1.34	.33	.012	.020	-	Pa. .18	.56
4/25/42	" " "	"	X14	2.14"	"	"	"	"	"	-	"	"
4/20/42	" " "	"	X15	2.14"	"	"	"	"	"	-	"	"
3/31/42	Sawyer Steel Castings	6018	A1	2.09"	.23	1.00	.33	.039	.026	.63	.55	.44
"	" "	6018	A2	2.19"	"	"	"	"	"	"	"	"
4/14/42	" " "	X9	X9	1.88"	.29	.79	.27	.043	.018	.63	.52	.53
4/10/42	" " "	X9	X9X	1.94"	"	"	"	"	"	"	"	"
4/20/42	Union Steel Castings	278C	341	2.23"	.38	1.92	.32	.014	.028	.61	.58	.40
4/24/42	" " "	282C	657	2.24"	.24	.96	.27	.016	.028	.59	.46	.80
4/2/42	" " "	293C	694	2.44"	.23	1.57	.42	.017	.028	-	.44	.20
4/24/42	" " "	296C	698	2.10"	.17	.76	.26	.012	.031	.63	.61	.59
4/24/42	" " "	322C	425	2.18"	.30	1.37	.35	.015	.030	-	.30	.17
4/20/42	" " "	322C	427	2.06"								
4/24/42	" " "	324C	428	1.96"	.37	1.17	.29	.031	.044	-	-	-
4/20/42	" " "	326C	430	2.09"	.30	1.01	.33	.015	.028	.53	.46	.51
4/13/42	Utility Electric Steel Foundry	4081	4081	1.46"	.29	1.12	.83	.036	.040	.26	.13	.50
4/13/42	" "	4081	4081-1	1 3/16"	"	-	"	"	"	"	"	"
4/27/42	" "	4094	1	1"	.27	1.92	1.04	.03	.027	-	.18	.41
"	" "	"	2	1"	"	"	"	"	"	-	"	"
"	" "	"	3	1"	"	"	"	"	"	-	"	"
"	" "	"	4	1"	"	"	-	"	"	-	"	"
5/1/42	Wehr Steel Co	B2-343	B2-343	1.52"	.30	1.12	.54	.029	.026	-	.53	.31
"	" " "	B1-342	B1-342	1.50"	"	"	"	"	"		"	"
"	" " "	E1-351	E1-351	1.58"	.35	1.63	.55	.026	.031	-	.63	.51

15 of 20

										1625		3	AIR
"								"		1650 1625		2 3	FUR AIR
								"		1650 1675		2 3	FUR. AIR
128	-	-	.46					ACID ELEC.		1950	6	10	AIR
120	-	Re .18	.56					BASIC OH		1800	6		AIR
"	-	"	"					" "		1800	6		AIR
"	-	"	"					" "		1800	5		AIR
026	63	55	44					ACID ELEC.		1900	6	8	AIR
"	"	"	"					" "		1650	4	4	AIR
018	63	52	53					ACID ELEC.		1900	6	8	AIR
"	"	"	"							1700	6	4	AIR
028	61	58	40					ACID OH.		1900		4	AIR
028	59	46	80		116			ACID OH		1900		8	AIR
028	-	44	20					ACID OH.		1825		8	AIR
031	63	61	59					ACID OH.		1850		8	AIR
030	-	30	17					ACID OH.		—			
		"	"					" "		1850		8	AIR
041	-	-	-	05				ACID OH.		1825		8	AIR
028	53	46	51					ACID OH		1825		8	AIR
040	26	13	50					ACID ELEC.		1950	6	10	AIR
	"	"	"					" "		1950	6	10	AIR
027	-	18	41					ACID ELEC.		1950	6	10	AIR
"	-	"	.					" "		1950	6	10	AIR
"	-	"	"					" "		1950	6	10	AIR
"	-	"	"					" "		1950	6	10	AIR
026	-	53	36					ACID ELEC.		1825	6		AIR
"		"	"		—			" "		1825	6		AIR
031	-	63	55					ACID ELEC.		1825	6		AIR

	AIR					1525		1¼	WATER	1150		4
	AIR					1525		1¼	WATER	1150		4
	AIR	1250	5	2½	AIR	1650	5	1	WATER	1050	3	6
	AIR	1240	3		AIR	1570	3		WATER	1200	4	
	AIR	1240	3		AIR	1560	3		WATER	1200	7	
	AIR	1200	3		AIR	1570	3		WATER	1200	6	
	AIR	1300	2	3	AIR	1560	4	4	WATER	1150	6	8
	AIR	1300	2	3	AIR	1550	4	4	WATER	1150	6	8
	AIR	1300	2	3	AIR	1575	4	4	WATER	1200	4	4
	AIR	1300	2	3	AIR	1575	4	4	WATER	1200	4	4
	AIR	—				1550		4	WATER	1250		4
	AIR					1550		4	WATER	1225		6
	AIR					1525		⅔	WATER	1150		6
	AIR					1650		2	WATER	1175		4
						1650		4	WATER	1200		4
8	AIR					1525		⅔	WATER	1150		6
8	AIR					1525		2	WATER	1200		6
8	AIR					1550		4	WATER	1200 1260		6 6
0	AIR	1250	2½	5	AIR	1650	5	⅓	WATER	1100	3	6
0	AIR	1250	2½	5	AIR	1650	5	⅓	WATER	1100	3	6
10	AIR	1250	2½	5	AIR	1650	5	⅓	WATER	1050	3	6
0	AIR	1250	2½	5	AIR	1650	5	⅓	WATER	1100	3	6
10	AIR	1250	2½	5	AIR	1650	5	⅓	WATER	1140	3	6
10	AIR	1250	2½	5	AIR	1650	5	⅓	WATER	1175	3	6
	AIR					1650	4		WATER	1200	8	
	AIR					1550	8		WATER	1200	8	
	AIR					1550	6		WATER	1260	6	

WATER	1150		4	WATER		--			
WATER	1150		4	WATER		--			
WATER	1050	3	6	AIR	305-321	142,000	126,500	16	35.0
WATER	1200	4		AIR	250-257	112,000	94,500	23.0	66.2
WATER	1200	7		FURTO100 WATER	240-245	106,500	87,500	25.0	61.1
WATER	1200	6		FURTO100 WATER.	240-247	104,000	86,000	25.0	61.3
WATER	1150	6	8	AIR	248-256	115,650	98,100	21.5	57.
WATER	1150	6	8	AIR	255	"	"	"	"
WATER	1200	4	4	FURNACE	241-248	125,050	105,250	19.5	51.7
WATER	1200	4	4	"	269	117,700	99,100	22.0	53.8
WATER	1250		4	WATER	245-256	126,000	106,000	17.0	30.2
WATER	1225		6	WATER	256-262	133,500	114,000	15.0	44.6
WATER	1150		6	WATER	228-238	115,500	96,000	19.0	52.(
WATER	1175		4	WATER	240-248	116,000	97,000	20.0	60.3
WATER	1200		4	WATER	237-248	111,500	93,000	21.5	59.1
WATER	1150		6	WATER	228-234	117,000	101,000	20.0	51.(
WATER	1200		6	WATER	240-266	113,500	98,000	20.0	47.
WATER	1200 1250		6 6	WATER	245-250	108,500	93,000	22.0	54.
WATER	1100	3	6	AIR	295				
WATER	1100	3	6	AIR	287				
WATER	1050	3	6	AIR	341-341				
WATER	1100	3	6	AIR	311-321				
WATER	1140	3	6	AIR	302-302				
WATER	1175	3	6	AIR	269-269				
WATER	1200	8		FUR TO 1100 WATER	255-269	119,000	99,500	18.0	19
WATER	1200	8		FURNACE	269	117,000	96,500	20.5	43
WATER	1250	6		FURNACE	255-269	114,000	94,500	14.0	21

					1973	2004	1989	1714 (+175)	"	2513	2"x2"	75mm
2	16	35.0	–	Cal 50 APM2	2239	2277	2258	2188 (+70)	"	1662	1"x2"	37mm
	23.0	56.2	62-66	37mm MSIAPC	1777	1821	1799	1728 (+71)	"	2465	2"x2"	75mm 75mm
	25.0	61.1	62-63	"	1923	1952	1938	1798 (+140)	"	2567	2½"x2½"	75mm
0	25.0	61.3	75-78	"	1801	1828	1815	1799 (+16)	"	2433	2"x2"	75mm
0	21.5	57.1	34.3	"	1911	1952	1932	1763 (+169)	"	2511	2½"x2"	75m 75m
	"	"	36.6	"	1949	1983	1966	1831 (+135)	"	2555	2½"x2½"	75m 75m
0	19.5	51.7	–	"	1734	1783	1759	1604 (+155)	"	2432	2½"x2½"	75m 75m
0	22.0	53.8	–	"	1147	1796	1772	1652 (+120)	"	2428	2½"x2"	75m 75m
0	17.0	30.2	38-40	"	1858	1923	1906	1861 (+45)	"	2496	2"x2"	75m 75m
0	15.0	44.6	33-35		–					–		75m
0	19.0	52.0	52-54	"	2062	2084	2073	2008 (+65)	"	2560	2"x2½"	75m 75m
0	20.0	60.3	46-48	"	1786	1831	1809	1770 (+39)	"	2523	2½"x3"	75m 75m
0	21.5	59.1	46	"	1875	1918	1897	1826 (+71)	"	2561	2½"x2"	75m 75m
00	20.0	57.9	60-62	"	–					–		75m
00	20.0	47.8	47-48	"	1679	1690	1685	1668 (+17)	"	2509	2"x2"	75m
00	22.0	54.7	58-58	"	1752	1781	1767	1763 (+4)	"	2500	1"x1"	75m
				"	1338	1379	1358	1676 (+82)	"	2468	2½"x2"	
				"	1287	1335	1311	1262 (+49)	"	2461	2½"x2"	
				Cal 50 APM2	2363 2382	2390 2394	2377 2388	2200 (+177) (+188)	"	1675	2"x2½"	
				"	2210 2226	2244 2252	2227 2239	2200 (+17) (+26)	"	1668	1"x2½"	
				"	2288 2271	2310 2300	2299 2286	2200 (+99) (+86)	"	1679	2½"x2½"	
				"	2118 2079	2157 2129	2138 2104	2200 (-62) (-96)	"	1674	2"x2½"	
500	18.0	19.5	24	37mm MSIAPC	1370	1420	1395	1316 (+79)	"	2421	2"x2"	
500	20.5	43.4	49	"	1457	1481	1469	1300 (+169)	"	2410	1½"x3" BS	
500	14.0	29.5	26	"	1470	1507	1489	1364 (+125)	"	2448	2"x2"	

8	8 5 2 1/4 x 2 7/8"	75MM Mk1 Slug	[illegible]	[illegible]	[illegible] PASSED	SATISFACTORY
13	2 1/4 x 2 5/8"	75MM T12 AP	25°	999	PP-LB-PASSED	SATISFACTORY
2	1 7/8" x 2"	37MM M51 APC	25°	1082	PP-SB-PASSED	SATISFACTORY
65	2 1/2 x 2 3/8"	75MM T12 AP 75MM Mk1 Slug	25° Normal	1015 1420	PP-MB - PASSED PP-MB	SATISFACTORY
67	2 1/4 x 2 1/4"	75MM T12 AP	25°	1055	PP-LB-PASSED	SATISFACTORY
133	2 3/8 x 2 1/8"	75MM T12 AP	25°	1014	CP-MB-2 & 11" CRACKS	FAILED-SHOCK
11	2 1/2 x 2 3/4"	75MM AP T12 75MM Mk1 Slug	25° Normal	1022 1393	PP-SC on SB-PASSED PP-SC on MB-PASSED	SATISFACTORY
555	2 1/4" x 2 1/2"	75MM T12 AP 75MM Mk1 Slug	25° Normal	1092 1398	PP-SB-PASSED PP-SC on SB-PASSED	SATISFACTORY
32	2 1/2 x 2 1/2"	75MM AP T12 75MM Mk1 Slug	25° Normal	943 1272	PP-SB - PASSED PP-SB	SATISFACTORY
128	2 1/4 x 2 7/8"	75MM T12 AP 75MM Mk1 Slug	25° Normal	981 1368	PP-SB-PASSED CP-SC-LB-10 3/16 x 3" B.S.	SATISFACTORY
196	2 11/16 x 2 13/16"	75MM T12 AP 75MM Mk1 Slug	25° Normal	1087 1499	PP-SC on SB-PASSED CP-PLATE BROKE - 4 PIECES	SATISFACTORY
—		75MM T12 AP	25°	1084	CP-10", 11 1/2", & 26" CRACKS	FAILED-SHOCK
560	2 3/8 x 1 1/2"	75MM T12 AP 75MM Mk1 Slug	25° Normal	1165 1394	PP-SB-PASSED PP-SC on SB.-PASSED	SATISFACTORY
523	2 1/4" x 3"	75MM T12 AP 75MM Mk1 Slug	25° Normal	1036 1469	PP-SB-PASSED CP PLATE BROKE - 9 PIECES	SATISFACTORY
561	2 1/2 x 2 3/4"	75MM T12 AP 75MM Mk1 Slug	25° Normal	1074 1491	CP-SC-LB-PASSED CP-PLATE BROKE - 2 PIECES	SATISFACTORY
—		75MM T12 AP	25°	1018	CP-SC on LB - 23" & 18" CRACKS ON BACK	FAILED-SHOCK
509	2 3/8 x 2 5/8"	75MM T12 AP 75MM Mk1 Slug	25° Normal	991 1400	PP-MB-PASSED CP-PLATE BROKE - 2 PIECES	SATISFACTORY
2500	1 7/8 x 1 3/16"	75MM T12 AP 75MM Mk1 Slug	25° Normal	1019 1437	PP-SB-PASSED CP-50" CRACKING ON BACK.	SATISFACTORY
2468	2 1/4 x 2 5/8"	75MM T12 AP 75MM Mk1 Slug	25° Normal	825 1126	CP-SC-LB-PASSED CP-PLATE BROKE - 4 PIECES.	SATISFACTORY
2461	2 1/2 x 2 9/16	75MM Mk1 Slug	Normal	1124	CP-PLATE BROKE - 5 PIECES	SATISFACTORY
1675	2" x 2 1/8"	37MM M51 APC	25°	1098	CP-SC on MB-PASSED	SATISFACTORY
1668	1 7/8 x 2 1/8"	"	25°	1075	CP-B.S. 1 1/16 x 1 3/8" - PASSED	SATISFACTORY
1679	2 1/4 x 2 1/2"	"	25°	1087	PP-MB-PASSED	SATISFACTORY
1674	2" x 2 1/4"	"	25°	1096	CP-INC. B.S. 1" x 1 5/8"	FAILED-LOW B.L.
2421	2 9/16 x 2 9/16	75MM T12 AP	25°	859	CP-B.S. 2" x 2 5/8" - PASSED	SATISFACTORY
2410	1 1/2" x 3" B.S	"	25°	849	CP-7/8 x 2" P.S.-PASSED	SATISFACTORY
2448	2 1/4 x 2 7/8"	75MM T12 AP COMPANION PLATE FAILED ON PTP TEST.	25°	858	CP-4" x 4 1/2" - PASSED	SATISFACTORY