WATERTOWN ARSENAL LABORATORY

EXPERIMENTAL REPORT

NO. WAL. 640/89

WELDING OF ARMOR

Summary of Ballistic Shock Test Results on 1 Inch and 3/4 Inch Homogeneous Armor "H" Plates Welded with Austenitic Electrodes and Tested at Aberdeen Proving Ground during the Period from 1 October 1942 through 31 March 1943

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DATE 15 November 1943

WATERTOWN ARSENAL
WATERTOWN, MASS.

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OBJECT

To tabulate firing record data for subject plates and to present a comparison of ballistic shock performance of plates made with various materials and welding procedures.

SUMMARY

1. Data from Aberdeen Proving Ground firing records for 156 welded armor H plates have been tabulated on accompanying charts and tables.

2. Quality of armor plate appears to be the most important variable for all hand welded plates.

a. Steel cleanliness and directional properties affect the amount of weld cracking during ballistic shock testing of H plates assembled from 1 inch rolled homogeneous armor.

b. The proportion of plate to weld cracking for H plates assembled from 1 inch cast and 3/4 inch rolled homogeneous armor is too high to allow adequate comparisons between ordinary variations in the welding procedure.

Hence, the futility of welding H plates from armor plate which has not been adequately heat treated or does not have relatively good cleanliness and soundness characteristics is quite evident.

3. There is little difference in ballistic shock test results between plates welded with the manganese and with the molybdenum modified type of austenitic electrodes. Plates welded with a narrow included angle, a small number of passes, or a straight weave technique are indicated to be slightly inferior in resistance to weld metal cracking during ballistic test.

4. Five Unionmelt plates, included in the rolled 1 inch armor group, showed shock test results slightly inferior to the average for hand welded plates.

5. In general, failure to pass the radiographic inspection test is associated with slightly increased weld cracking during the ballistic test.

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INTRODUCTION

On the accompanying charts (Appendix A) are tabulated data taken from firing records representing qualification and development tests of 156 H plates. The tabulation includes all firing records received by this arsenal for H plates assembled from 1 inch and 3/4 inch thick homogeneous rolled or cast armor by welding with austenitic electrodes and fired at Aberdeen Proving Ground during the period from 1 October 1942 through 31 March 1943.

The purpose of these tabulations is to make available to persons concerned with welding of armored structures information as to ballistic performance of H plates made with various materials and procedures by commercial fabricators. Previous reports (W.A. 640/73 and 640/84) have given summaries of ballistic test results for all 1 inch and 1-1/2 inch thick homogeneous armor H plates welded with ferritic electrodes and tested at Aberdeen Proving Ground through 25 February 1943, and for all 1-1/2 inch thick homogeneous armor H plates welded with austenitic electrodes and tested at Aberdeen Proving Ground during the same period as that covered by this report (1 October 1942 through 31 March 1943).

An index to fabricators, armor manufacturers, and electrode manufacturers is given in Table I. A summary of ballistic shock test specification requirements for H plates welded with austenitic electrodes and a key to the tabulation method and symbols used in this report are included in Appendix A.

GENERAL COMMENTS

Ballistic performance of H plates is best evaluated by amount of cracking for each round, but the cracking is influenced by the variables in the ballistic test as well as those introduced by the materials and welding procedures used. It is desirable to make corrections or allowances for variations in projectile velocities and the effect of prior impacts when comparing various plates. However, tabulation of the average plate and weld cracking of the plates in this tabulation, grouped according to the severity of the ballistic test (Table II) does not provide a basis for such corrections. This is because there is an insufficient number of impacts at other than specification velocities to indicate the true effect of ballistic severity.

In the summary tables that follow, the number of rounds outside the specification limits for velocity and location will be listed and may be taken into consideration in comparing effects of armor and welding variables. Variation in thickness of the armor plate was compensated by increase in specified impact velocity of 6 f/s. for each .01 inch increase in plate thickness.

Firing record data show cracking as located in weld metal, fusion zone, heat-affected zone, or plate based only on surface appearance. Experience has shown that a crack in the vicinity of the weld may proceed

through portions of weld metal, fusion zone and heat-affected zone regardless of surface appearance. For the purpose of the tables of this report all cracking within 1/8 inch of edge of weld is included as weld cracking and the remainder as plate cracking. Inasmuch as most virgin rolled armor would not ordinarily develop cracking under the same testing conditions as those used for the welded plates and development of plate cracks materially decreases the severity of the test on the weld, it is necessary to consider plate cracking in evaluating the performance of welded H plates.

Decrease in temperature of the test plate at time of impact is known to have considerable effect in reducing the resistance to ballistic shock. Within the range of testing temperatures, 35° F. to 80° F., used for these plates it was not possible to establish the importance of this effect.

HAND WELDED, 1 INCH THICK ROLLED ARMOR H PLATES

Tables III through VIII show comparisons of average cracking per round for these plates in terms of welding fabricator, armor manufacturer and processing, electrode data, joint design, welding procedure, and radiographic soundness. The 57 mm. slug test is apparently less severe and not directly comparable to the 75 mm. slug test in the effect on the weld for these 1 inch rolled armor H plates.

The performance of H plates welded by any one fabricator (Table III) must be evaluated in terms of armor and electrodes as well as welding procedure and inspection control. Plates welded from Great Lakes and Youngstown armor show higher averages of both weld and plate cracking than plates welded from Jones and Laughlin armor (Table IV). Previous tabulations (WA. 640/84) have indicated that quality of steel (cleanliness and directional properties) has a greater influence upon ballistic efficiency than variations in chemical analysis or plate hardness within the ranges represented by these plates.

No correlation is shown between chemical composition of weld metal and amount of cracking. There is little difference between plates welded with Mn-Mo modified (weld analysis at least 1% Mn and 0.2% Mo) austenitic electrodes and Mn modified (weld analysis at least 1% Mn and less than 0.2% Mo) austenitic electrodes (Tables Va and Vb).

Double V joints with a 60° included angle were used on a large majority of the plates. Two plates welded with a single V, 40° included angle, and four plates welded with double V, less than 45° included angle, showed greater than average weld cracking on ballistic testing (Table VI).

Root gap varied from 1/8 to 1/2 inch, the majority of plates being welded with 3/16 inch root gap. Satisfactory plates were obtained at both extremes of root gap.

Number of passes used in completing weld varied from 4 to 45 (Table VII). The majority of plates were welded with 6 passes. There is a trend for slight improvement in ballistic performance with increase in number of passes up to 15. One plate with 4 passes was welded in vertical position and one with 45 passes in overhead position. Both failed the ballistic shock test.

A combination of beads and layers appeared more desirable than a full weave technique. A multiple bead surface layer was indicated as preferable to a single pass surface layer technique.

Two plates each were welded with mild steel backup strip and with no backup. These showed higher average weld cracking than the remaining plates welded with copper backup. The number of plates welded with preheat were insufficient to determine whether any benefit was obtained by this procedure.

In general, radiographic unsoundness is associated with increased cracking during ballistic shock test (Table VIII).

UNIONMELT WELDED, 1 INCH THICK ROLLED ARMOR H PLATES

Five Unionmelt plates are represented in this tabulation (Charts Nos. 44 - 46). The average weld and plate cracking were slightly higher for these plates than for either rolled or cast hand welded plates (Table IX).

Two plates were welded by Caterpillar Tractor Company, one with Great Lakes and the other with Youngstown armor plate of typical current chemical composition, with 75° included angle, single V, 3/16 inch root gap, 225° to 500° F. preheat, two passes of Unionmelt only. Both plates failed radiographic inspection due to crater cracking and there was an average of 15.6 inches of weld and 4.2 inches of plate cracking during ballistic shock test with 75 mm. test projectile.

Three plates were welded by General Motors Truck and Coach Division, all with a combination of Great Lakes and Jones and Laughlin armor plate of current chemical compositions, with 60° included angle, double V, 3/16° inch root gap, no preheat, two hand beads at root and two Unionmelt passes. These three plates passed radiographic inspection and there was an average of 6 inches of weld and 1.8 inches of plate cracking during ballistic shock test with 57 mm. test projectile.

HAND WELDED, 1 INCH THICK CAST ARMOR H PLATES

Ballistic performance was, in general, very poor for the cast armor H plates. In most instances, it was impossible to obtain a fair test of the weld because of excessive plate cracking. If armor plate has not been fully hardened during heat treatment, prior to welding, either

because of insufficient alloy or poor heat-treating practice, the plate metal will have very poor resistance to spreading of cracks initiated during ballistic testing of the welded H plate. Because of notches and residual stresses unavoidably introduced by welding, cracks are initiated under a ballistic shock which would not affect the virgin armor test plate. If armor is properly hardened during heat treatment and is of adequate steel quality (cleanliness and radiographic soundness), cracking during ballistic testing should be confined largely to the weld metal, fusion and heat-affected zones.

Table X shows a definite trend for improved ballistic performance in plates welded from armors known to have adequate hardenability for the given heat treatment.

Tabular comparison of welding variables does not seem justified for cast armor welded H plates so long as such a large proportion of the cracking is dependent upon the quality of the armor plate. Table XI indicates a slightly lower average weld cracking for plates which failed the radiographic inspection. Since radiographic unsoundness is usually associated with increased weld cracking, other factors seem to be of greater importance for these particular plates.

HAND WELDED, 3/4 INCH THICK ROLLED ARMOR H PLATES

The ballistic test for 3/4 inch plate was in the development stage during the period in which these plates were fired. The use of a 57 mm. projectile at a relatively low velocity resulted in a large number of impacts outside of the specified areas for fair testing of welds. Table XII shows a high ratio of plate to weld cracking for four of the six armor compositions involved, indicating inferior steel quality, inadequate heat treatment, or both. The one Republic plate, which did not show plate cracking during the ballistic shock test, was heat treated to a lower hardness level than the other plates and this would favor resistance to shock at the expense of resistance to ballistic penetration.

In view of the limited number of plates in this group and the large proportion of plate cracking, comparison of the electrodes or welding procedures on the basis of average cracking does not appear justified. Table XIII does, however, indicate a slightly lower average weld cracking, for plates which passed the radiographic inspection.

TABLE I

INDEX TO PLATES

Hand Welded, 1 Inch Rolled Homogeneous "H" Plates

Chart No.	No of Plates	Fabricator	Armor Mfgr.	Electrode Mfgr.
1 - 2	6	American Car & Foundry	Jones & Laughlin	McKay Crucible Steel
3 - 13	33	Cadillac	Great Lakes Jones & Laughlin Youngstown	McKay Page Steel & Wire Lincoln Electric
14	3	Caterpillar	Youngstown Great Lakes	McKay
15	1	Firestone	Great Lakes	McKay
16 - 19	7	General Motors	Great Lakes Youngstown Jones & Laughlin	McKay Harnischfeger Lincoln Electric
20	2	Gordon Mfg.	Great Lakes Jones & Laughlin	Crucible
21 - 22	7	Heil	Jones & Laughlin Great Lakes	A. O. Smith Lincoln Electric Harnischfeger
23	1	International Harvester	Jones & Laughlin	McKay
24	1	Kay Brunner	Great Lakes	McKay
25	1	Maremont	Great Lakes	Crucible
26 - 27	5	Pullman Standard	Great Lakes	McKay Hollup
28	3	So. Calif. Div. of G.M.	Great Lakes	McKay Alloy Rods
29 - 43	28	Ternstedt	Great Lakes Jones & Laughlin	Reid-Avery Alloy Rods Hollup McKay Crucible Allied Weldcraft

Unionmelt Welded, 1 Inch Thick Rolled Homogeneous "H" Plates

44	2	Caterpillar	Great Lakes Youngstown	Linde Air Products
45 - 46	3	General Motors	Jones & Laughlin Great Lakes	Union Carbide

TABLE I (Cont.)

Chart No.	No. of Plates	Fabricator	Armor Mfgr.	Electrode Mfgr.
		Hand Welded, 1 Inch Thick Cast Homogeneous "H" Plates		
47 - 53	15	Cadillac	Utility Electric Hughes Tool American McConway & Torley	McKay Lincoln Electric
54 - 55	6	Chevrolet	Kelsey Hayes	Harnischfeger McKay Alloy Rods
56	2	Ford	Ford	Crucible
57	1	General Motors	American Sivyer	McKay
58 - 61	7	Ternstedt	Hughes Tool Wehr Steel Great Lakes Jones & Laughlin	Reid Avery Lincoln Electric Hollup Alloy Rods McKay
		Hand Welded, 3/4 Inch Thick Rolled Homogeneous "H" Plates		
62	1	American Locomotive	Republic	Alloy Rods
63 - 69	16	Chevrolet	Chevrolet Forge Great Lakes E. C. Atkins	Alloy Rods McKay Harnischfeger Crucible
70	3	Ford	Ford	Crucible
71	2	Standard Railway Equip.	Carnegie-Illinois	Hollup

TABLE IIa

Ballistic Severity Table for Hand Welded 1 Inch Thick Rolled Homogeneous Armor "H" Plates

Vel. f/s	1st Round No.of Rds.	1st Round Av.Plate Cracking	1st Round Av.Weld Cracking	2nd Round No.of Rds.	2nd Round Av.Plate Cracking	2nd Round Av.Weld Cracking	3rd Round No.of Rds.	3rd Round Av.Plate Cracking	3rd Round Av.Weld Cracking	4th Round No.of Rds.	4th Round Av.Plate Cracking	4th Round Av.Weld Cracking
Projectile - 75 mm. T21												
0 - 2" **												
801 - 850	1	0	10.0"	3	0	23.1"						
*751 - 800	65	2.1"	15.3	29	3.64"	17.6	9	0	16.1"			
701 - 750	4	.5	23.1	3	0	10.4	2	0	20.0	1	0	1.0"
600 - 700				9	.4	11.1	2	0	8.4			
2 - 4" **												
801 - 850												
*751 - 800	11	1.4	5.4	9	6.4	7.9	2	0	8.8			
701 - 750	1	0	0	2	0	1.9						
600 - 700				5	2.1	0.9	1	0	0			
Projectile - 57 mm. T1												
0 - 2" **												
1200 - 1300												
1150 - 1200	2	0	13.5	1	3.8	5.3	2	8.1	3.8			
1100 - 1150	8	1.3	3.9	4	6.8	11.6	4	5.6	6.2	2	3.0	5.1
1050 - 1100												
1000 - 1050	1	0	6.5				1	0	0			
2 - 4" **												
1200 - 1300				1	0	0						
1150 - 1200				2	8.8	0				2	0	0
1100 - 1150				2	0	0				2	0	1.5
More than 4" **												
1150 - 1200							1	11.0	0			
1100 - 1150				1	0	0						

* Specified velocity range

** Distance from center of impact to center of weld

TABLE IIb

Ballistic Severity Table for 1.185 Inch Thick Rolled Homogeneous Armor "H" Plates

Vel. f/s	1st Round No.of Rds.	1st Round Av.Plate Cracking	1st Round Av.Weld Cracking	2nd Round No.of Rds.	2nd Round Av.Plate Cracking	2nd Round Av.Weld Cracking	3rd Round No.of Rds.	3rd Round Av.Plate Cracking	3rd Round Av.Weld Cracking	4th Round No.of Rds.	4th Round Av.Plate Cracking	4th Round Av.Weld Cracking
Projectile - 75 mm. T21												
0 - 2" **												
912 - 961							1	0	1.0"	1	9.5"	36"
862 - 911	1	1.0"	0.3"	2	1"	19.8"	2	0	10.5			
812 - 861	2	9.6	3.1	2	0	10.1						
2 - 4" **												
912 - 961										1	0	1.0
862 - 911	1	0	0									
812 - 861	1	0	0									

** Distance from center of impact to center of weld

TABLE IIc

Ballistic Severity Table for Unionmelt Welded 1 Inch Thick Rolled Homogeneous Armor "H" Plates

Vel. f/s	1st Round No.of Rds.	1st Round Av.Plate Cracking	1st Round Av.Weld Cracking	2nd Round No.of Rds.	2nd Round Av.Plate Cracking	2nd Round Av.Weld Cracking	3rd Round No.of Rds.	3rd Round Av.Plate Cracking	3rd Round Av.Weld Cracking	4th Round No.of Rds.	4th Round Av.Plate Cracking	4th Round Av.Weld Cracking
Projectile - 75 mm. T21												
0 - 2" **												
*750 - 800	2	2.3"	15.8"	1	8.0"	15.3"						
700 - 750												
Projectile - 57 mm. T1												
0 - 2" **												
1150-1200				2	0	4.4	1	13.3"	13.5"			
1100-1150	1	0	8.3	1	2.5	12.5						
1050-1100							1	0	0.3			
2 - 4" **												
1150-1200												
1100-1150	1	0	0									
1050-1100										1	0	0
4+" **												
1150-1200												
1100-1150	1	0	0									
1050-1100												

* Specified velocity range

** Distance from center of impact to center of weld

TABLE IId

Ballistic Severity Table for Hand Welded 1 Inch Thick Cast Homogeneous Armor "H" Plates

Vel. f/s	1st Round No.of Rds.	1st Round Av.Plate Cracking	1st Round Av.Weld Cracking	2nd Round No.of Rds.	2nd Round Av.Plate Cracking	2nd Round Av.Weld Cracking	3rd Round No.of Rds.	3rd Round Av.Plate Cracking	3rd Round Av.Weld Cracking	4th Round No.of Rds.	4th Round Av.Plate Cracking	4th Round Av.Weld Cracking
Projectile - 57 mm. T1												
C - 1-3/4"**												
1100-1200	1	37.8"	2.0"	1	0	3.0"	2	1.5"	10.8"			
1050-1100	1	1.3	4.8	3	5.9	11.8	2	7.5	3.9	2	0.9"	5.5"
1000-1050	5	7.3	4.8	7	11.7	4.0	2	1.8	5.4			
950-1000	18	11.9	3.5	8	12.2	4.4	3	6.0	4.8	2	8.5	1.8
800- 950							1	2.5	0			
1-3/4 - 3"**												
1050-1100				1	3.3	1.5						
1000-1050												
950-1000	5	8.5	.5	1	10.5	0	2	18.1	0			
3 - 6"**												
1000-1050				1	19.0	0						
950-1000				1	10.5	0	3	19.5	1.7	1	11.3	1.5
Projectile - 75 mm. T21												
0 - 2"**												
850 - 900	1	4.8	36.0									

** Distance from center of impact to center of weld

TABLE IIe

Ballistic Severity Table for 3/4 Inch Thick Rolled Homogeneous Armor "H" Plates

Vel. f/s	1st Round No.of Rds.	1st Round Av.Plate Cracking	1st Round Av.Weld Cracking	2nd Round No.of Rds.	2nd Round Av.Plate Cracking	2nd Round Av.Weld Cracking	3rd Round No.of Rds.	3rd Round Av.Plate Cracking	3rd Round Av.Weld Cracking
				Projectile - 57 mm. T1					
0 - 1-3/4"**									
700 - 775				2	0	6.5"	1	0	14.5"
775 - 825	6	4.1"	6.5"	5	3.0"	7.1	3	7.9"	11.3
825 - 875	2	5.0	13.0	4	7.9	10.4	4	1.4	4.4
1-3/4 - 3"**									
700 - 775	2	0	0				2	3.5	0
775 - 825	8	2.0	0.9	4	0	0	4	5.5	3.1
825 - 875							1	3.8	0
over 3"**									
700 - 775	1	0	0	1	0	0	1	0	0
775 - 825	3	4.0	0	3	0	0	2	0	0.9
825 - 875				3	0	0			

Vel. f/s	4th Round No.of Rds.	4th Round Av.Plate Cracking	4th Round Av.Weld Cracking	5th Round No.of Rds.	5th Round Av.Plate Cracking	5th Round Av.Weld Cracking	6th Round No.of Rds.	6th Round Av.Plate Cracking	6th Round Av.Weld Cracking
0 - 1-3/4"**									
700 - 775	1	19.3	9.3						
775 - 825	1	8.0	12.0	3	4.8	7.6	3	5.3	7.8
825 - 875				2	14.0	19.5			
1-3/4 - 3"**									
700 - 775									
775 - 825	3	0	0	1	0	0			
825 - 875	1	0	0	1	4.0	5.5			
over 3"**									
700 - 775									
775 - 825	2	4.0	0				1	0	13.5
825 - 875	1	0	0	1	0	0			

** Distance from center of impact to center of weld

TABLE III

Fabricators of Hand Welded 1 Inch Thick Rolled Homogeneous Armor "H" Plates

Armor Fabricator	Projectile	No. of Plates	No. of Rounds	Av. Weld Crkg./Rd.	Av. Plate Crkg./Rd.	Remarks
American Car & Foundry	75 mm. T21	6	8	22.7"	0.3"	1 rd. outside 2" limit
Cadillac	57 mm. T1	4	17	3.4	4.9	7 rds. outside 1-3/4" limit 2 " below specified velocity 5 " above " " 1 " velocity lost
	75 mm. T21	29	58	13.7	1.1	10 rds. outside 2" limit 10 " below specified velocity 1 " above " "
Caterpillar	75 mm. T21	3	6	9.0	0.9	1 rd. below specified velocity
Firestone	75 mm. T21	1	3	12.4	0.	1 rd. outside 2" limit 1 " below specified velocity
General Motors Truck	57 mm. T1	7	27	5.1	1.5	12 rds. outside 1-3/4" limit 1 " below specified velocity 9 " above " "
Gordon Mfg.	75 mm. T21	2	3	18.7	0.	
Heil	75 mm. T21	7	15	10.2	0.5	1 rd. outside 2" limit 3 " above specified velocity
International Harvester	75 mm. T21	1	2	13.3	0.	1 rd. outside 2" limit
Kay Brunner	75 mm. T21	1	3	10.1	0.	1 rd. outside 2" limit 2 " below specified velocity
Maremont	75 mm. T21	1	1	18.3	6.0	

TABLE III (Cont.)

Armor Fabricator	Projectile	No. of Plates	No. of Rounds	Av. Weld Crkg./Rd.	Av. Plate Crkg./Rd.	Remarks
Pullman Standard	75 mm. T21	5	14	9.1	2.2	3 rds. outside 2" limit 4 " below specified velocity 2 " above " "
So. California, Div. GMC	75 mm. T21	3	8	12.0	1.3	3 rds. outside 2" limit 3 " below specified velocity
Ternstedt	75 mm. T21	28	52	13.7	4.6	9 rds. outside 2" limit 10 " below specified velocity

TABLE IV

Armor Data for Hand Welded 1 Inch Thick Homogeneous Armor "H" Plates

Armor Mfgr.	Type	Chemical Composition	Heat Treatment °F	Heat Treatment Hold(Hrs.)	Heat Treatment Quench	BHN	No.of Plates	No.of Rds.	Av.Crkg./Rd. Weld	Av.Crkg./Rd. Plate	Remarks
Great Lakes	IV Mn-Cr-Mo-Si Above 30 C	.31 - .35 C .85 - .94 Mn .72 - .96 Si .60 - .74 Cr .10 - .16 Ni .16 - .23 Mo .08 - .10 Zr	1600-1650 800-1200	1/2 - 3-1/2 1-1/2 - 4-1/2	Water	262-341	1	4	1.8"	5.9"	2 rds. outside 1-3/4" limit 1 " above spec.vel. 1 " below " "
							Projectile - 57 mm. T1				
							12	20	7.8	3.3	5 rds. outside 2" limit 5 " below spec. vel.
							Projectile - 75 mm. T21				
	Below 31 C	.26 - .30 C .76 - .97 Mn .62 - .87 Si .58 - .67 Cr .10 - .12 Ni .15 - .22 Mo .07 - .10 Zr	1600-1800 800-1200	1/2 - 4 1-1/2 - 5	Water Air	292-361	1	3	7.8	17.8	
							Projectile - 57 mm. T1				
							46	98	12.4	2.6	15 rds. outside 2" limit 22 " below spec. vel. 5 " above " "
							Projectile 75 mm. T21				
	II Mn-Cr-Mo	.28 C .78 - 1.78 Mn .24 Si .63 Cr .11 Ni .12 - .22 Mo	1625-1630 1020-1030	2-1/2 4	Water Air	285-331	5	8	20.0	0.	1 rd. outside 2" limit
							Projectile - 75 mm. T21				
		AVERAGE 4 TYPES (57 mm. T1)					2	7	4.4	11.0	2 rds. outside 1-3/4" limit 1 " above spec. vel. 1 " below " "
		(75 mm. T21)					63	126	13.2	2.6	21 rds. outside 2" limit 27 " below spec. vel. 5 " above " "

TABLE IV (Cont.)

Mfgr.	Armor Type	Chemical Composition	Heat Treatment °F	Hold (Hrs.)	Quench	BHN	No. of Plates	No. of Rds.	Av. Crkg./Rd. Weld	Plate		Remarks
Jones & Laughlin	III Mn-Mo Above .30 C	.32 - .36 C 1.71 - 1.77 Mn .18 - .29 Si .43 - .54 Mo	1625-1650 970-1060	2 - 3-1/2 2 - 4	Water Air	302-341	2	10	2.7	0.5	5 rds. 1 " 4 " 1 "	outside 1-3/4" limit below spec. vel. above " " velocity lost
							Projectile - 57 mm. T1					
							1	2	12.6	0.	1 rd.	outside 2" limit
							Projectile - 75 mm. T21					
	Below .31 C	.23 - .26 C 1.16 - 1.75 Mn .19 - .24 Si .41 - .55 Mo	1600-1640 875-1060	1/2 - 3-3/4 1-1/2 - 3-1/2	Water Air	315-341	15	28	12.9	0.1	5 rds. 1 "	outside 2" limit below spec. vel.
							Projectile - 75 mm. T21					
			AVERAGE 2 TYPES (75 mm. T21)				16	30	12.9	0.09	6 rds. 5 "	outside 2" limit below spec. vel.
Youngstown Sheet & Tube	III Mn-Mo	.20 - .29 C 1.12 - 1.55 Mn .10 - .44 Si .26 - .64 Mo	1600-1625 875-1060	1 - 2-1/4 2-1/2 - 4	Water Air	285-334	7	15	13.4	2.4	2 rds. 4 "	outside 2" limit below spec. vel.
							Projectile - 75 mm. T21					

TABLE Va

Electrode Data for Hand Welded 1 Inch Thick Rolled Homogeneous Armor "H" Plates

Electrode Mfgr.	Brand	Weld Metal Composition	Coating	No. of Plates	No. of Rounds	Av. Cracking/Rd. Weld	Av. Cracking/Rd. Plate	Remarks
Alloy Rods	Armcrarc Type A?	.09 C 1.64 - 1.90 Mn .25 - .50 Si 18.7 -20.28 Cr 10.3 -10.9 Ni 2.5 Mo	Titania	2	5	16.3"	0."	1 rd. outside 2" limit 1 " below spec. vel.
				Projectile - 75 mm. T21				
	Armorarc Type B	.03 - .13 C 3.5 - 4.5 Mn .35 - .70 Si 19.8 -21. Cr 8.5 -10.5 Ni	Titania	1	1	23.3	7.3	
				Projectile - 75 mm. T21				
	AVERAGE 2 BRANDS			3	6	17.5	1.3	
Crucible	Armorize	.06 - .15 C 1.8 - 2.1 Mn .22 - .80 Si 18.2 -20.5 Cr 8.1 -10. Ni 1.61 - 2. Mo .2 V	Titania	3	4	18.5	1.5	
				Projectile - 75 mm. T21				
Harnischfeger	AW3	.1 C 1.5 - 1.75 Mn .45 - .58 Si 18.8 -19.4 Cr 10.4 -11.4 Ni 2.2 Mo	Lime	1	3	4.6	0.	1 rd. outside 1-3/4" limit
				Projectile - 57 mm. T1				
				1	3	9.9	0.	
				Projectile - 75 mm. T21				

TABLE Va (Cont.)

Electrode Mfgr.	Brand	Weld Metal Composition	Coating	No. of Plates	No. of Rounds	Av. Cracking/Rd. Weld	Av. Cracking/Rd. Plate	Remarks
Harnischfeger (Cont.)	AW3C	.11 - .12 C 3.8 Mn .45 - .50 Si 18.8 - 19. Cr 9.35 - 10.4 Ni .92 - 1.1 Mo	Lime	1	4	1.1"	3.6"	2 rds. outside 1-3/4" limit 2 " above spec. vel.
				Projectile - 57 mm. T1				
				1	2	9.0	3.6	
				Projectile - 75 mm. T21				
	AVERAGE 2 BRANDS	(57 mm. T1)		2	7	2.3	2.1	
		(75 mm. T21)		2	5	9.6	1.5	
Hollup	Armored	Not given		1	3	11.8	0.	1 rd. outside 2" limit
				Projectile - 75 mm. T21				1 " below spec. vel.
Lincoln	Armorweld	.08 - .10 C 3.5 - 4.5 Mn .45 - .80 Si 19. - 20.8 Cr 8. - 10.1 Ni .06 - .1 Mo	Lime	3	9	7.1	6.5	1 rd. outside 1-3/4" limit 1 " above spec. vel.
				Projectile - 57 mm. T1				
				3	5	17.0	0.	1 rd. below spec. vel.
				Projectile - 75 mm. T21				
McKay	Armorloy A-5	.10 - .13 C 3.6 - 4.2 Mn 1.0 - 1.1 Si 18.1 - 19.4 Cr 8.2 - 10.2 Ni .47 - .56 Mo	Lime	4	17	4.2	2.1	9 rds. outside 1-3/4" limit 4 " above spec. vel. 1 " below spec. vel.
				Projectile - 57 mm. T1				
				4	4	34.3	0.	
				Projectile - 75 mm. T21				
	Armorloy	.08 - .13 C 3.6 - 4.8 Mn .42 - .80 Si 17.9 - 20.6 Cr 9.6 - 10.6 Ni .06 - .18 Mo	—	31	64	13.5	1.2	13 rds. outside 2" limit 12 " below spec. vel. 5 " above spec. vel.
				Projectile - 75 mm. T21				

TABLE Va (Cont.)

Electrode Mfgr.	Brand	Weld Metal Composition	Coating	No. of Plates	No. of Rounds	Av. Cracking/Rd. Weld	Av. Cracking/Rd. Plate	Remarks
McKay (Cont.)	Armorloy	.22 C 3.43 Mn .55 Si 13.4 Cr 7.1 Ni .12 Mo	Lime	3	6	9.0"	0.9"	1 rd. below spec. vel.
				Projectile - 75 mm. T21				
	Armorloy	.08 - .11 C 4.25 - 4.60 Mn .45 - .70 Si 19.2 - 19.3 Cr 9.6 - 10.1 Ni .98 - 1. Mo	Lime	1	3	4.9	3.4	1 rd. outside 2" limit 2 " below spec. vel.
				Projectile - 75 mm. T21				
	AVERAGE 2 BRANDS (75 mm. T21)			39	77	13.9	1.2	
	(57 mm. T1)			4	17	4.9	1.5	
Page	---	.12 - .15 C 3.3 - 3.4 Mn .25 - .34 Si 19.2 - 19.5 Cr 11.3 - 12.2 Ni .10 Mo	—	1	5	3.1	1.1	2 rds. outside 1-3/4" limit 1 " below spec. vel. 2 " above spec. vel. 1 " velocity lost
				Projectile - 57 mm. T1				
Reid-Avery	18-8B	.07 - .15 C 3.5 - 4.5 Mn .75 Si 18. - 20. Cr 8.5 - 10.5 Ni 1.25 Mo	Titania	4	8	13.0	2.7	2 rds. outside 2" limit 1 " below spec. vel.
				Projectile - 75 mm. T21				

TABLE Va (Cont.)

Electrode Mfgr.	Brand	Weld Metal Composition	Coating	No. of Plates	No. of Rounds	Av. Cracking/Rd. Weld	Av. Cracking/Rd. Plate	Remarks
A. O. Smith	SW-164	.08 C 3.5 Mn .35 Si 19. Cr 10. Ni 1. Mo	Lime	2	5	7.4"	0.	1 rd. outside 2" limit 1 " above spec. vel.
				Projectile - 75 mm. T21				

TABLE Vb

Electrode Type	Weld Analysis	No. of Plates	No. of Rounds	Av. Cracking/Rd. Weld	Av. Cracking/Rd. Plate	Remarks
Mn-Mo Mod. 18/8	At least 1% Mn and .2% Mo	18	34	14.6"	1.3"	5 rds. outside 2" limit 4 " below spec. vel.
		Projectile - 75 mm. T21				1 " above spec. vel.
		6	24	3.7	2.1	12 rds. outside 1-3/4" limit 6 " above spec. vel.
		Projectile - 57 mm. T1				1 " below spec. vel.
Mn Mod. 18/8	At least 1% Mn and less than .2% Mo	38	76	13.5	1.2	13 rds. outside 2" limit 14 " below spec. vel.
		Projectile - 75 mm. T21				5 " above spec. vel.
		4	14	5.7	4.6	3 rds. outside 1-3/4" limit 1 " below spec. vel. 3 " above spec. vel.
		Projectile - 57 mm. T1				1 " velocity lost

TABLE VI

Joint Design Data for Hand Welded 1 Inch Thick Rolled Homogeneous Armor "E" Plates

Angle of Bevel	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Av. Cracking/Round Plate	Remarks
24° DV	75 mm. T21	2	2	42.0"	0."	
40° SV	75 mm. T21	2	3	15.5	1.8	
DV	75 mm. T21	2	2	26.6		
45° DV	75 mm. T21	7	15	12.0	0.8	3 rds. outside 2" limit 2 " above specified velocity
	57 mm. T1	6	23	5.3	1.8	10 rds. outside 1-3/4" limit 7 " above specified velocity 2 " below specified velocity
50° DV	75 mm. T21	1	1	18.3	6.0	
60° DV	75 mm. T21	70	142	13.0	2.4	27 rds. outside 2" limit 26 " below specified velocity 2 " above specified velocity
	57 mm. T1	5	21	3.6	3.9	7 rds. outside 1-3/4" limit 3 " above specified velocity 2 " below specified velocity
70° DV	75 mm. T21	2	5	6.1		1 rd. outside 2" limit 1 " below specified velocity

TABLE VI (Cont.)

Root Gap	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Av. Cracking/Round Plate	Remarks
1/8"	75 mm. T21	6	14	7.5"	5.2"	1 rd. outside 2" limit 1 " below specified velocity 2 " above specified velocity
5/32	75 mm. T21	7	15	13.2	1.0	2 rds. outside 2" limit 3 " below specified velocity
3/16	75 mm. T21	40	73	13.7	3.5	14 rds. outside 2" limit 11 " below specified velocity
	57 mm. T1	9	36	4.4	1.8	16 rds. outside 1-3/4" limit 8 " above specified velocity 3 " below specified velocity
1/4	75 mm. T21	16	32	13.9	0.9	6 rds. outside 2" limit 8 " below specified velocity
5/16	75 mm. T21	2	4	12.9	0.	1 rd. outside 2" limit 1 " above specified velocity
3/8	75 mm. T21	7	19	9.1	1.7	6 rds. outside 2" limit 2 " above specified velocity 4 " below specified velocity
7/16	75 mm. T21	1	2	9.8	0.	1 rd. outside 2" limit 1 " below specified velocity
1/2	75 mm. T21	2	4	17.8	0.	1 rd. below specified velocity

TABLE VI (Cont.)

Plate Preparation	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Plate	Remarks
Flame cutting	57 mm. T1	7	27	5.1"	1.5"	11 rds. outside 1-3/4" limit 7 " above specified velocity 2 " below specified velocity
Flame cutting and grinding	75 mm. T21	70	135	14.0	2.3	27 rds. outside 2" limit 24 " below specified velocity 1 " above specified velocity
	57 mm. T1	4	17	3.4	4.9	7 rds. outside 1-3/4" limit 3 " above specified velocity 2 " below specified velocity
Flame cutting, grinding, and machining	75 mm. T21	4	7	8.6	3.5	2 rds. below specified velocity
Flame cutting, flame softening and planing	75 mm. T21	1	1	18.3	6.0	
Flame cutting, grinding machining and buttering	75 mm. T21	10	26	9.8	0.5	4 rds. outside 2" limit 4 " above specified velocity 3 " below specified velocity

TABLE VII

Welding Procedure for Hand Welded 1 Inch Thick Rolled Homogeneous Armor "H" Plates

No. of Passes	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Av. Cracking/Round Plate	Remarks
4	75 mm. T21	3	5	18.1"	3.3"	1 rd. outside 2" limit
6	75 mm. T21	46	85	14.3	2.15	16 rds. outside 2" limit 14 " below specified velocity
	57 mm. T1	1	2	13.6	0.6	
7	75 mm. T21	1	3	12.4	0.	1 rd. outside 2" limit
8	57 mm. T1	1	6	4.6	1.6	3 rds. outside 1-3/4" limit 1 " below specified velocity 2 " above specified velocity
10	75 mm. T21	15	30	12.6	1.4	5 rds. outside 2" limit 6 " below specified velocity 1 " above specified velocity
	57 mm. T1	5	21	4.7	3.6	9 rds. outside 1-3/4" limit 1 " below specified velocity 6 " above specified velocity
11	57 mm. T1	1	4	1.8	5.9	2 rds. outside 1-3/4" limit 1 " above specified velocity 1 " below specified velocity
12	75 mm. T21	2	5	11.3	0.	1 rd. outside 2" limit 2 " below specified velocity
13	75 mm. T21	3	8	12.9	2.3	1 rd. outside 2" limit 2 " above specified velocity
14	75 mm. T21	5	10	8.6	3.7	1 rd. outside 2" limit 3 " below specified velocity 2 " above specified velocity
9	57 mm. T1	1	4	1.1	0.	2 rds. outside 1-3/4" limit 1 " below specified velocity 1 " above specified velocity

TABLE VII (Cont.)

No. of Passes	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Plate	Remarks
15	75 mm. T21	3	8	10.3"	0."	3 rds. outside 2" limit 1 " below specified velocity
	57 mm. T1	1	4	4.4	0.	1 rd. outside 1-3/4" limit
16	75 mm. T21	4	11	7.5	6.2	2 rds. outside 2" limit 2 " below specified velocity
17	75 mm. T21	3	5	16.5	0.	1 rd. outside 2" limit
18	75 mm. T21	1	1	25.3	0.	
20	57 mm. T1	1	3	4.6	0.	1 rd. outside 1-3/4" limit
34	75 mm. T21	1	2	19.1	0.	1 rd. below specified velocity

Backing	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Plate	Remarks
Copper	75 mm. T21	45	93	12.6"	3.0"	19 rds. outside 2" limit 18 " below specified velocity 3 " above specified velocity
	57 mm. T1	2	9	2.1	2.6	5 rds. outside 1-3/4" limit 1 " below specified velocity 1 " above specified velocity
Mild Steel	75 mm. T21	2	2	42.0		
None	75 mm. T21	2	3	15.5	1.8	

TABLE VII (Cont.)

Root Deposition Type	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Av. Cracking/Round Plate	Remarks
I Single bead at root	75 mm. T21	11	24	13.4"	1.2"	3 rds. outside 2" limit 2 " above specified velocity 2 " below specified velocity
II Two beads at root	75 mm. T21	76	149	13.2	2.3	28 rds. outside 2" limit 26 " below specified velocity 3 " above specified velocity
	57 mm. T1	11	44	4.5	2.8	18 rds. outside 1-3/4" limit 10 " above specified velocity 4 " below specified velocity
Body Deposition Type						
I Layers only	75 mm. T21	68	134	13.5	1.8	24 rds. outside 2" limit 23 " below specified velocity 5 " above specified velocity
	57 mm. T1	9	37	4.5	3.4	16 rds. outside 1-3/4" limit 10 " above specified velocity 4 " below specified velocity
II Beads only	75 mm. T21	4	7	15.7	9.7	1 rd. outside 2" limit 1 " below specified velocity
	57 mm. T1	1	3	4.6	0	1 rd. outside 1-3/4" limit
III Layers and beads	75 mm. T21	12	27	9.9	1.3	6 rds. outside 2" limit 5 " below specified velocity
	57 mm. T1	1	4	4.4	0	1 rd. outside 1-3/4" limit
Crown Deposition Type						
I Single crown	75 mm. T21	47	88	14.3	2.1	18 rds. outside 2" limit 12 " below specified velocity
	57 mm. T1	2	8	6.8	1.4	3 rds. outside 1-3/4" limit 1 " below specified velocity 2 " above specified velocity

TABLE VII (Cont.)

Crown Deposition Type (Cont.)	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Av. Cracking/Round Plate	Remarks
II and III Multiple crown	75 mm. T21	37	80	11.7"	2.1"	14 rds. outside 2" limit 14 " below specified velocity 5 " above specified velocity
	57 mm. T1	9	36	3.9	3.1	15 rds. outside 1-3/4" limit 8 " above specified velocity 3 " below specified velocity
Preheat °F						
70 - 100	75 mm. T21	74	147	13.7	2.4	30 rds. outside 2" limit 26 " below specified velocity 3 " above specified velocity
	57 mm. T1	11	44	4.5	2.8	17 rds. outside 1-3/4" limit 10 " above specified velocity 4 " below specified velocity
115	75 mm. T21	2	4	9.9	1.8	1 rd. above specified velocity
120	75 mm. T21	4	7	14.4		1 rd. above specified velocity
150	75 mm. T21	2	5	6.5		1 rd. outside 2" limit
160	75 mm. T21	1	1	18.3	6.0	
200 - 500	75 mm. T21	3	6	9.0	0.9	1 rd. below specified velocity

TABLE VIII

Radiographic Data for Hand Welded 1 Inch Thick Rolled Homogeneous Armor "H" Plates

Radiographic Results	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Av. Cracking/Round Plate	Remarks
Passing	75 mm. T21	63	130	11.9"	1.8"	24 rds. outside 2" limit 20 " below specified velocity 5 " above specified velocity
	57 mm. T1	9	39	3.7	1.8	17 rds. outside 1-3/4" limit 10 " above specified velocity 4 " below specified velocity
Failing	75 mm. T21	24	43	17.2	2.9	8 rds. outside 2" limit 9 " below specified velocity
	57 mm. T1	2	5	10.2	11.0	

TABLE IX

Average Weld and Plate Cracking for 1 Inch "H" Plates

	No. of Plates	Projectile	Av. Cracking/Round Weld	Plate	Remarks
1 Inch Hand Welded Rolled Armor	11	57 mm. T1	4.5"	2.8"	19 rds. outside 1-3/4" limit 3 " below specified velocity 14 " above specified velocity 1 " velocity lost
	87	75 mm. T21	13.2	2.1	30 rds. outside 2" limit 31 " below specified velocity 6 " above specified velocity
1 Inch Unionmelt Welded Rolled Armor	3	57 mm. T1	6.0	1.8	4 rds. outside 1-3/4" limit 3 " above specified velocity 1 " below specified velocity
	2	75 mm. T21	15.6	4.2	3 rds. above specified velocity
1 Inch Hand Welded Cast Armor	30	57 mm. T21	3.6	10.3	19 rds. outside 1-3/4" limit 28 " above specified velocity 1 " below specified velocity
	1	75 mm. T21	36.0	4.7	

TABLE X

Armor Data for Hand Welded 1 Inch Thick Cast Homogeneous Armor "H" Plates

Armor Mfgr.	Type	Chemical Composition	Heat Treatment °F	Hold(Hrs.)	Quench	BHN	No. of Plates	No. of Rds.	Av. Crkg./Rd. Weld	Av. Crkg./Rd. Plate	Remarks
American Steel Foundries	II Mn-Cr-Mo	.33 C 1.53 Mn .42 Si .34 Cr .07 Mo	1650 1525 870-1180	2 .67 4	Air Water Water	277-321	2	5	1.3"	13.2"	2 rds. above spec. vel. 4 " outside 1-3/4" limit
							Projectile - 57 mm. T1				
Ford	II Mn-Cr-Mo	.30 C 1.10 - 1.20 Mn .47 - .50 Si .35 - .38 Mo	1800 1700 1020	5 3 6 - 8	Air Water Water	241-302	1	1	36.0	4.8	
							Projectile - 75 mm. T21				
							1	4	2.4	16.4	2 rds. outside 1-3/4" limit
							Projectile - 57 mm. T1				
Hughes Tool Co.	I Mn-Cr-Mo-Ni	.25 - .31 C .85 - 1.80 Mn .37 - .45 Si .28 - .70 Cr 1.00 - 1.23 Ni .38 - .53 Mo	1900 1200 1650 1000	10 2 1 4	--- Air Water Air	221-366	9	28	3.4	3.4	6 rds. outside 1-3/4" limit 15 " above spec. vel. 1 " below spec. vel.
							Projectile - 57 mm. T1				
Kelsey Hayes	II Mn-Cr-Mo	.28 - .31 C .90 - 1.28 Mn .37 - .47 Si .43 - .57 Cr .32 - .48 Mo	1950 1250 1650 1150 1800 1650 1075	10 4 5 10 5 3 6	Air Air Water Air Air Water Water	286-340	6	15	5.4	9.7	2 rds. outside 1-3/4" limit 4 " above spec. vel.
							Projectile - 57 mm. T1				
McConway & Torley	III Mn-Mo	.28 - .30 C 1.54 - 1.79 Mn .51 - .57 Si .06 - .12 Ni .50 - .67 Mo	1800 1600 1060	4 4 4	Air Water Water	286-321	6	16	1.8	2.3	5 rds. outside 1-3/4" limit
							Projectile - 57 mm. T1				

TABLE X (Cont.)

Armor Mfgr.	Armor Type	Chemical Composition	Heat Treatment °F	Heat Treatment Hold(Hrs.)	Heat Treatment Quench	BHN	No. of Plates	No. of Rds.	Av. Crkg./Rd. Weld	Av. Crkg./Rd. Plate	Remarks
Utility Steel	IV Mn-Mo-Si	.26 - .36 C 1.56 - 1.81 Mn 1.02 - 1.12 Si .13 - .30 Cr .10 - .21 Ni .08 - .51 Mo	1950 1250 1650 1100	10 5 6 3	Air Air Water Air	227-341	4	5	1.2"	49.1"	3 rds. above spec. vel.
							Projectile - 57 mm. T1				
Wehr Steel	I Mn-Cr-Mo-Ni	.27 C .85 Mn .49 Si .66 Cr .92 Ni .43 Mo	1600 1825 1575 1100	6 6 6 8	Furnace Air Water Air	321-326	1	3	5.3	7.9	2 rds. above spec. vel.

TABLE XI

Radiographic Data for Hand Welded 1 Inch Thick Cast Homogeneous Armor "H" Plates

Radiographic Results	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Av. Cracking/Round Plate	Remarks
Passing	57 mm. T1	22	53	3.9"	11.0"	12 rds. outside 1-3/4" limit 18 " above spec. vel.
	75 mm. T21	1	1	36.0	4.8	
Failing	57 mm. T1	8	25	3.0	8.9	7 rds. outside 1-3/4" limit 10 " above spec. vel. 1 " below spec. vel.

TABLE XII

Armor Data for Hard Welded 3/4 Inch Thick Rolled Homogeneous Armor "H" Plates

Armor Mfgr.	Type	Chemical Composition	Heat Treatment °F	Hold (Hrs.)	Quench	BHN	No. of Plates	No. of Rds.	Av. Crkg./Rd. Weld	Av. Crkg./Rd. Plate	Remarks
E. C. Atkins	IV Mn-Cr-Mo-Si	.29 - .32 C .77 - .94 Mn .57 - .81 Si .61 - .70 Cr .20 - .22 Mo 0 - .08 Zr	1610-1625 940-1030	1 70 min. to 2 hrs.	Water Air	360-364	5	22	4.4"	5.6"	10 rds. outside 1-3/4" limit 10 " above spec. vel. 2 " below spec. vel.
Carnegie-Illinois	I Mn-Ni-Cr-Mo	.26 C 1.06 Mn .19 Si .45 Cr .95 Ni .42 Mo	Not Given			332	2	5	7.4	3.3	1 rd. outside 1-3/4" limit 1 " above spec. vel. 2 " below spec. vel.
Chevrolet Forge	IV Mn-Cr-Mo-Si	.28 - .30 C .89 - .90 Mn .73 - .76 Si .61 - .65 Cr .19 - .23 Mo	1600 930	1½ - 1-2/3 hr. 6	Water Air	321-339	4	19	2.1	0.6	15 rds. outside 1-3/4" limit 5 " above spec. vel. 2 " below spec. vel.
Ford Motor	II Mn-Cr-Mo	.27 - .29 C 1.38 - 1.49 Mn .25 - .30 Si .55 - .72 Cr .42 - .47 Mo	1650 1000	2 - 4 4 - 6	Platen Air	Not Given	3	9	4.1	4.0	5 rds. outside 1-3/4" limit 2 rds. above spec. vel. 2 " below spec. vel.
Great Lakes	IV Mn-Cr-Mo-Si	.32 C .90 Mn .75 Si .68 Cr .21 Mo	1600-1625 860-1000	52 min. - 1-2/3 hrs. 70 min. - 6 hrs.	Water Air	341-363	6	25	5.2	3.9	13 rds. outside 1-3/4" limit 7 " above spec. vel.

TABLE XII (Cont.)

Armor Mfgr.	Type	Chemical Composition	°F	Heat Treatment Hold(Hrs.) Quench	BHN	No. of Plates	No. of Rds.	Av. Crkg./Rd. Weld	Av. Crkg./Rd. Plate		Remarks
Republic	V High Alloy	.23 - .25 C .48 - .54 Mn .17 Si .33 - .34 Cr 4.99 - 5.0 Ni .35 - .36 Mo		Not Given	268-272	1	3	8.4"	0."	1 rd. 1 " 1 "	outside 1-3/4" limit above spec. vel. below spec. vel.

TABLE XIII

Radiographic Data for Hand Welded 3/4 Inch Thick Rolled Homogeneous Armor "H" Plates

Radiographic Results	Projectile	No. of Plates	No. of Rounds	Av. Cracking/Round Weld	Av. Cracking/Round Plate	Remarks
Passing	57 mm. T1	15	61	4.1"	3.2"	37 rds. outside 1-3/4" limit 20 " above spec. vel. 5 " below spec. vel.
Failing	57 mm. T1	7	22	5.2	3.8	9 rds. outside 1-3/4" limit 6 " above spec. vel. 4 " below spec. vel.

KEY TO TABULATION METHOD AND SYMBOLS

Figure 2 is a sample tabulation of firing record data and gives a key to symbols and method of tabulation. A brief explanation of the items in the tabulation follows:

1. Identification of Test

Information in the first column identifies the test.

2. Armor Data

A. Plate Thickness

Plates in this tabulation are of 1 and 3/4 inch thick homogeneous armor.

B. Type Armor

The following types are used:

R (Rolled)

Typical Analysis

	Type	C	Mn	Si	Cr	Mo	Ni	Zr	
I	Mn-Ni-Cr-Mo	.26	1.15	.20	.60	.20	1.00		B added
II	Mn-Cr-Mo	.27	1.30	.25	.55	.42			
III	Mn-Mo	.25	1.60	.22	--	.37			Grainal
IV	Mn-Cr-Mo-Si	.27	.86	.79	.62	.17		.09	
V	High Alloy	(Compositions noted in tabulation)							
VI	Special	"		"	"	"			

C (Cast)

I	Mn-Cr-Mo-Ni	.29	1.00	.35	.55	.40	1.00	
II	Mn-Cr-Mo	.28	1.55	.45	.40	.30		
III	Mn-Mo	.30	1.58	.40	--	.50		
IV	Special	(Compositions noted in tabulation)						

C. Carbon Content

Carbon content is listed whenever given.

D. Brinell Hardness Number (BHN)

Brinell hardness number on both the front and back of plates is tabulated when given.

E. Process

This refers to the melting practice and is tabulated as open hearth, electric, basic or acid.

F. Heat Treatment

The temperature, time of hold, and type of quench and draw are recorded as given.

3. Electrode Data

These data, often incomplete, are listed as given in each firing record.

A. Type

Since alloys are sometimes added in the coating, electrodes are typed according to the chemical analysis of the weld metal when given.

The electrodes are typed as follows:

(1) (Austenitic)

I Mn-Mo Modified 18/8 (Cr-Ni-Fe Alloy)
Weld Analysis - at least 1% Mn and .3% Mo

II Mn Modified 18/8 (Cr-Ni-Fe Alloy)
Weld Analysis - at least 1% Mn and less than .3% Mo

III Mo Modified 18/8 (Cr-Ni-Fe Alloy)
Weld Analysis - at least .3% Mo and less than 1% Mn

IV Special

B. and C. Trade Name and Coating

Trade names and types of coating are listed when given.

D. Current and Polarity

These data are tabulated as DC straight (str.), DC reversed (rev.), or AC.

4. Joint Design

A. Groove, etc.

This item includes the type of groove (Single V bevel or double V bevel), the included angle, and the width of the root face whenever given.

B. Root Gap

This is the distance between the plates as set up for welding.

C. Plate Preparation

This indicates whether the plate edges to be welded together were flame cut, ground, machined, buttered, etc.

5. Welding Procedure

A. Backing

Backing if used, i.e. back-up bar, chill, filler and spacer strips, is noted.

B. Deposition

Figure 3 shows how the weld deposition is broken up into the root, body, and crown types. The size electrode is noted with the number of passes, type of passes, and the current and voltage. Passes are divided into two kinds: (1) layer, if the pass bridges the gap; and (2), bead, if the pass does not bridge the gap. Seal beads, when used, are noted with size electrode, current and voltage.

C. Total Welding Time and Interpass Temperature

These are listed as given.

D. Remarks

Any comments on chipping, grinding, and other special techniques used and not noted above which affect the ballistic results are listed under "remarks."

6. Heat

Preheat and postheat are tabulated when given.

7. Ballistic Results

Unless otherwise specified, the 75 mm. Proof Projectile T21 was used in the tests tabulated. Hits, velocity and location of each, cracking and remarks on cracking are listed. The types of weld and plate cracking are as follows:

Type I Cracking in fusion or heat-affected zones on front and back of plate.

Type II Cracking in fusion or heat-affected zones on one side of plate and weld metal on the other.

Type III Cracking in weld metal on both front and back of plate.

Type IV Star plate cracking.

Type V Linear plate cracks.

The remarks on cracking and results of radiographic examination are recorded in the last column.

SPECIFICATION REQUIREMENTS FOR "H" WELDED PLATES

The following extracts from Specification AXS-497, Rev. 3, describes the present ballistic shock test.

Paragraph F-3a. (2) "Shock Tests. The welded plate shown in Fig. 1 shall be tested as shown below. Fig. 1 shows the areas designated for shock impacts. For the purpose of description these are divided in four 'specified areas' one above and one below the crossbar on each of the two vertical leg welds. Aiming points are indicated in Fig. 1.

"If the first round falls outside of the one of the four specified areas, another round shall be fired at a second specified area. If the second impact falls outside of the specified area and no cracking occurs in the weld, another round will be fired at a third specified area. This shall be continued until an impact is obtained within one of the four specified areas, but no more than four rounds will be fired at one plate. If the plate withstands all four rounds, all of which fall outside the specified areas, and the weld is not cracked, the plate will be considered acceptable."

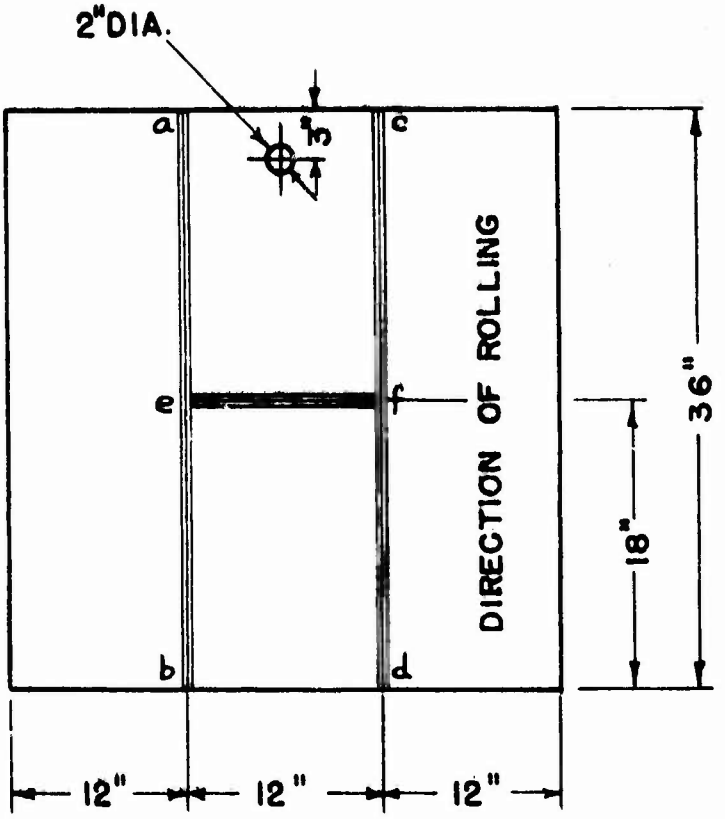
BALLISTIC SHOCK TEST*

Plate Thickness	Type	Projectile	Striking Velocity f/s	Allowable Distance, Center of impact to center of weld	Maximum Allowable Cracking	
					Weld	Plate
1"	R.H.	75 mm. T21	775	2"	18"	8"
1"**	C.H.	57 mm. T1	975 ± 6 f/s per .01"	1-3/4"	8"	6"
3/4"**	R.H.	57 mm. T1	800	1-3/4"	12"	8"

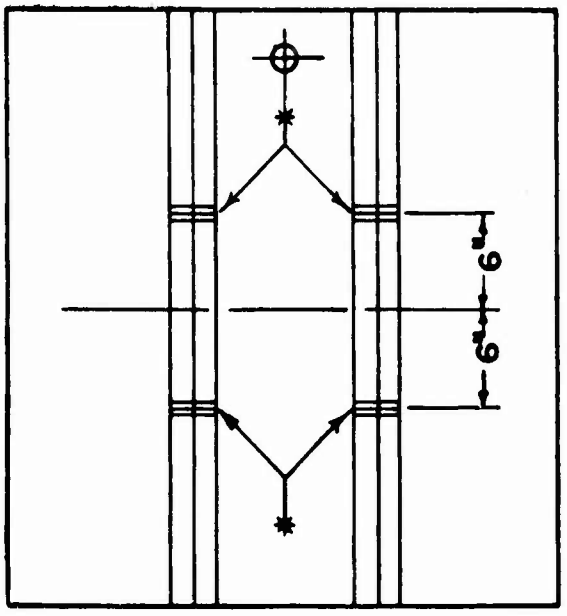
* Effective during the period in which the plates in this tabulation were tested.

** Specifications in a development stage.

WELD SEQUENCE:
ab, cd, fe.



QUALIFICATION SHOCK TEST PLATE

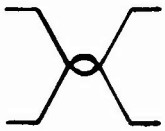
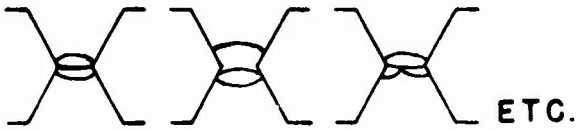
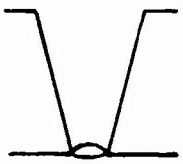
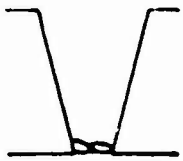


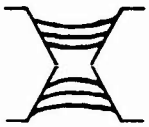
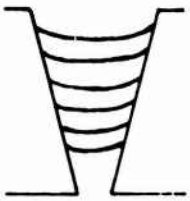
* INTENDED AIMING POINTS

FIG. 1

IDENTIFICATION A. FIRING RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE SPEC. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP V. PASSES 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS H	VEL. F/S	LOCATION OF H L.L.	R.L.	C.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON FIRING RADIOGRAPHIC RESULTS, ETC.
---- indicates that information not given in firing record.	Armor Types R (Rolled) I (Mn-Ni-Cr-Mo) II (Mn-Cr-Mo) III (Mn-Mo) IV (Mn-Cr-Mo-Si) V (High Alloy) VI (Special) C (Cast) I (Mn-Cr-Mo-Ni) II (Mn-Cr-Mo) III (Mn-Mo) IV (Special) B.O.H. - basic open hearth A.O.H. - acid open hearth B.Elec. - basic electric A.Elec. - acid electric	Electrode Types A (Austenitic) I (Mn-Mo Mod. 18-8) II (Mn Mod. 18-8) III (Mo Mod. 18-8) IV (Special) F (Ferritic)	Double V (DV) Bevel Included Angle Root Face (RF) Root Gap Single V (SV) Bevel Included Angle Root Gap	KEY TO SYMBOLS a - layer b - bead SB - seal bead Types of deposition illustrated by Figure 3			H - Hit F/S - Feet per second L.L. - Left leg R.L. - Right leg CB - Crossbar LOC. - Location R - Right of L - Left of X - On weld U - Above D - Below Imp - Running from or through impact O - Not running from or through impact Type of cracking - refer to text Left Leg, Right Leg, Crossbar							
EXAMPLE---SAMPLE TABULATION OF DATA FROM ABERDEEN FIRING RECORD NO. AD-22																
A. AD-22 B. 9/23/42 C. W-10 D. Ford E. Hollup Armor F. Ford	A. 1-1/2" B. C-II C. .27 D. --- E. --- F. ---	A. A-III B. Armored C. --- D. ---	A. 45°DV, 0"RF B. 5/32" C. ---	A. --- B. 1. I 5/32" 1a 160 - 53 2. I 1/8" 1a 110 - 50 5/32" 1a 160 - 53 3/16" 1a 200 - 53 1/4" 2a 220 - 55 3. II 1/4" 2b 220 - 55 3/16" 2b 200 - 53 C. --- not more than 120°F. D. Chipping after each pass.		A. None B. None	1 2	1058 1100	3/4" R X		4" U 5 1/2" D	Imp Imp	I II III V	5 1/2" 1" 5 1/2" 2 1/2" 14 1/2"	Passed radiograph Area of incomplete fusion; repair weld in casting near upper left leg on face of plate.

FIGURE 2. SAMPLE CHART FOR TABULATION OF FIRING RECORD DATA ON WELDED H PLATES.

ROOT TYPES	TYPE I	TYPE II
DOUBLE V BEVEL	 SINGLE ROOT BEAD AT CENTER OF ROOT	 ETC. MORE THAN ONE BEAD AT ROOT
SINGLE V BEVEL	 SINGLE BEAD BRIDGING ROOT GAP	 ETC. MORE THAN ONE BEAD BRIDGING ROOT GAP

BODY TYPES	TYPE I	TYPE II	TYPE III	TYPE IV	TYPE V
DOUBLE V BEVEL	 LAYERS ONLY	 BEADS ONLY	 LAYERS & BEADS	UNIONMELT	SPECIAL
SINGLE V BEVEL	 LAYERS ONLY	 BEADS ONLY	 LAYERS & BEADS	UNIONMELT	SPECIAL

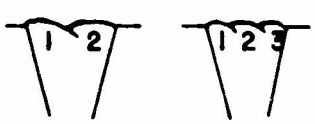
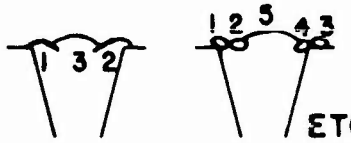
CROWN TYPES	TYPE I	TYPE II	TYPE III
DOUBLE V & SINGLE V BEVEL	 SINGLE CROWN SINGLE PASS BRIDGES GAP	 MULTIPLE CROWN LAST BEAD TOUCHES PARENT METAL	 ETC. MULTIPLE CROWN LAST BEAD DOES NOT TOUCH PARENT METAL

FIG. 3 WELD METAL DEPOSITION TYPES

IDENTIFICATION A. PLATE ARMOR OR B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE SPEC. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SEQUENCE NO. TYPE AMP. V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF H L.L.	R.L.	O.S.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-136 B. 12/15/42 C. 1721-1 D. Jones & Laughlin Steel Corp. E. McKay Company F. American Car & Foundry Co.	A. 1" B. R-III (1.57Mn,.2381, .41Mo) C. .26 D. Face 329-339 Back 319-335 E. O.H. F. 1625°F. 2hrs. 21" delay 975°F. 3hrs. Air.	A. A- --- B. A-5 C. --- D. DC REV	A. 40°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 170 - 32 2. I 1/4" 2a 220 - 32 3. I 1/4" 2a 250 - 32 C. 5-1/2 hrs. 70° - 350°F. D.	A. 70°F. B. None	1	775	1" L		6" D	Imp	I II III	3 3/4" 10" 12" 25 3/4"	Failed radiograph 4" and 4-1/2" weld cracks in crossbar
A. AD-136 B. 12/15/42 C. 1721-2 D. Jones & Laughlin Steel Corp. E. McKay Company F. American Car & Foundry Co.	A. 1" B. R-III (1.57Mn,.2381, .41Mo) C. .26 D. Face 329-337 Back 321-339 E. O.H. F. 1625°F. 2hrs. 30" delay 975°F. 3hrs. Air	A. A --- B. Armorloy A-5 C. --- D. DC REV	A. 40°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 160 - 32 2. I 1/4" 2a 200 - 32 3. I 1/4" 2a 195 - 32 C. 7 hrs. 70° - 240°F. D. Chipping and grinding after first pass. Time 10 mins.	A. 70°F. B. None	1	775	2" L		6 1/2" D	Imp	I II	9" 18 3/4" 27 3/4"	Failed radiograph Cracks and incomplete fusion along crossbar Some slag inclusions
A. AD-136 B. 12/15/42 C. 1721-3 D. Jones & Laughlin Steel Corp. E. McKay Company F. American Car & Foundry Co.	A. 1" B. R-III (1.57Mn,.2381, .41Mo) C. .26 D. Face 321-337 Back 321-335 E. O.H. F. 1625°F. 2hrs. 12" delay 975°F. 3hrs. Air	A. A --- B. Armorloy A-5 C. --- D. DC REV	A. 24°DV B. --- C. Flame Cutting Grinding	A. Mild Steel B. 1. II 3/16" 1a 170 - 32 1a 175 - 32 2. I 1/4" 2a 235 - 32 3. I 1/4" 1a 235 - 32 1a 255 - 32 C. 7 hrs. 70° - 230°F. D. Chipping and grinding after first pass. Time 10 mins.	A. 70°F. B. None	1	778	1 1/2" R		2 1/2" D	Imp	I II III	39 1/4" 6 3/4" 11 1/2" 18"	Failed radiograph General condition of incomplete fusion of a 3/8" wide spacer strip present throughout the welds

IDENTIFICATION A. Armor Record No. B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Supp. F. Armor Fabricator	ARMOR DATA A. Plate Thickness B. Type C. Carbon Content D. BHN E. Process F. Heat Treatment Temp Time Quench	ELECTRODE DATA A. Type B. Trade Name C. Coating D. Current & Polarity	JOINT DESIGN A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	WELDING PROCEDURE A. Backing Passes B. Deposition Size El. Amp. V. 1. Root Type 2. Body Type 3. Crown Type C. Total Welding Time & Inter Pass Temperature D. Remarks	HEAT A. Pre B. Post	H	VEL. F/S	BALLISTIC RESULTS LOCATION OF H L.L.	R.L.	C.G.	CRACKING LOC.	TYPE	Amt.	REMARKS ON CRACKING RADIOGRAPHING RESULTS, ETC.
A. AD-136 B. 12/15/42 C. 1721-4 D. Jones & Laughlin Steel Corp. E. McKay Company F. American Car & Foundry Co.	A. 1" B. R-III (1.57Mn,.23Si, .41Mo) C. .26 D. Face 323-337 Back 315-331 E. O.H. F. 1625°F. 2 hrs. 12" delay 975°F. 3 hrs. Air	A. A --- B. A-5 C. --- D. DC REV	A. 24°DV B. --- C. Flame Cutting Grinding	A. Mild steel B. 1. II 3/16" 1a 150 - 32 3/16" 1a 165 - 32 2. I 1/4" 2a 195 - 32 3. I 1/4" 1a 210 - 32 1/4" 1a 200 - 32 C. 5-1/2 hrs. 70° - 270°F. D.	A. 70°F. B. None	1	775	1" R		8 1/8" D	Imp	I	36"	Failed radiograph Incomplete fusion of 3/8" spacer stripa present throughout the welds
A. AD-186 B. 1/14/43 C. 1721-5 D. Jones & Laughlin Steel Corp. E. McKay Company Crucible So. F. American Car & Foundry Co.	A. 1" B. R-III (1.57Mn,.23Si, .41Mo) C. .26 D. Face 335-341 Back 335-341 E. O.H. F. 1625°F. 2 hrs. Full Watgr 975°F. 3 hrs.	A. A --- B. Armorloy A-5 Rezistal C. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 165 - 30 3/16" 1a 190 - 30 2. I 3/16" 2a 190 - 30 3. I 1/4" 2a 200 - 30 C. 5-1/2 hrs. 70° - 300°F. D. Rezistal was used in passes five and six. Chipping and grinding after first pass. Cracking after first pass.	A. 70°F. B. None	1	770	X		7 1/8" D	Imp	I III V	2 3/4" 9 1/2" 2 1/2"	Failed radiograph Excessive cracking and inocomplete fusion
						2	771		2 1/2" L	6" U	O	III	1 1/2"	
						3	780		1 1/2" L	4 1/2" D	Imp	I II III	6 3/8" 1 1/8" 3 1/2" 26 1/4"	
A. AD-186 B. 1/14/43 C. 1721-6 D. Jones & Laughlin Steel Corp. E. McKay Company Crucible Co. F. American Car & Foundry Co.	A. 1" B. R-III (1.57Mn,.23Si, .41Mo) C. .26 D. Face 337-341 Back 337-341 E. O.H. F. 1625°F. 2 hrs. Full Water 975°F. 3 hrs.	A. A --- B. Armorloy A-5 Rezistal C. --- D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 165 - 30 3/16" 1a 180 - 30 2. I 3/16" 2a 190 - 30 3. I 1/4" 2a 260 - 30 C. 5-1/2 hrs. 70° - 300°F. D. Rezistal was used in passes five and six.	A. 70° F. B. None	1	760	1" L		6 1/8" D	Imp	I II	8 3/4" 11 1/4" 20"	Passed radiograph Several small crater cracks

IDENTIFICATION A. PENDO RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. AG. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	H	BALLISTIC RESULTS YEL. F/S	LOCATION OF H L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-111 B. 10/28/42 C. 74 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.93Si, .65Cr,.16Ni, .20Mo) C. .33 D. Face 377 E. B.O.H. F. 1625°F.3-1/2 hrs. Water 1030°F. 4-1/2 hrs.	A. A-I (.13C,4.18 Mn,1.00Si, 19.35Cr, 8.23Ni, .56Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 160 - 3/16" 1a 165 - 2. I 1/4" 1a 185 - 1/4" 1a 190 - 1/4" 1a 195 - 3. III 3/16" 1b 160 - 3/16" 1b 170 - 1/4" 1b 210 - remainder not given C. 3:8 hrs. 75° - 150°F. D. One more pass in left leg.	A.None B.None	1 2 3 4	1125 1161 1046 1150	1" R 2" R	3" R 1" L	5⅜" D 5" U 6" U 6" D	Imp Imp	V I V	17½" 6" 30⅜"	Passed radiograph Slag at junction of left weld and cross weld
								57MM Tl projectile									
A. AD-111 B. 10/28/42 C. 76 D. Jones & Laughlin Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-III (1.76Mn,.19Si, .43Mo) C. .32 D. Face 331 E. --- F. 1625°F. 3hrs. 30 mins. 1060°F. 4hrs.	A. A --- B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 140 - 3/16" 1a 150 - 2. I 1/4" 1a 180 - 1/4" 1a 175 - 3. III 3/16" 2b 158 - 3/16" 1b 170 - 3/16" 2b 150 - remainder not given C. 2-3/4 hrs. 80° - 190°F. D. Little cracking, chipping and grinding after first two passes. Time 1 hr.	A.None B.None	1 2 3 4 5	1149 1152 1102 1154 1105	X 3" L 3" R	2½" R X	8" U 7⅛" D 1½" U 7" D 10" D	Imp 0	II III III II III	4" 1" 4½" 1" 1" 11½"	Passed radiograph Recommend that crossweld be ground and repaired
								57MM Tl projectile									
A. AD-113 B. 11/7/42 C. 80 D. Youngstown Sheet & Tube Company E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-III (1.52Mn,.19Si, .47Mo) C. .26 D. Face 285 Back 302 E. O.H. F. 1625°F.2-1/4 hrs. Water 1010°F. 4 hrs. Air	A. A-II (.11C,4.35 Mn,.60Si, 20.05Cr, 10.20Ni, .18Mo)* (.13C,3.60 Mn,20.10 Cr,.48Si, 10.60Ni, .11Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 140 - 25 3/16" 1a 180 - 25 2. I 3/16" 2a 190 - 26 3. III 5/32" 4b 160 - 25 remainder not given C. 2.71 hrs. 55° - 180°F. D.	A.None B.None	1 2 3	773 680 713	1½" L 2½" L 1½" R		7" D 4" U 5½" D	Imp Imp	I II III I	2" 7⅛" 3½" 36" 49½"	Passed radiograph Some incomplete fusion and scattered slag

*Weld Metal

IDENTIFICATION	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS						REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. Firms Record No. B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Manf'r. F. Armor Fabricator	A. Plate Thickness B. Type C. Carbon Content D. Ni% E. Process F. Heat Treatment Temp Time Quench	A. Type B. Trade Name C. Coating D. Current & Polarity	A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	A. Backing B. Deposition Size El. No Type Amp V. 1. Root Type 2. Body Type 3. Crown Type C. Total Welding Time & Inter Pass Temperature D. Remarks	A. Pre B. Post	No.	Vel. F/S	Location of H L.L.	R.L.	C.G.	Cracking Loc.	Type	Amt	
A. AD-235 B. 12/26/42 C. 83 D. Jones & Laughlin Steel Corp. E. Page Steel & Wire Company F. Cadillac Motor Car Company	A. 1" B. R-III (1.77Mn,.18Si, .05Cr,.03Ni, .54Mo) C. .34 D. Face 341 Back 302 E. O.H. F. 1625°F. 2-1/4 hrs. Water 1030°F. 4 hrs. Air	A. A-II (.12-.15C, 3.35-3.45 Mn,.25-.34 Si, 19.22-19.55Cr,11.35-12.25 Ni,.10Mo)* B. --- C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 1a 185 - 25 3/16" 1a 190 - 25 2. I 1/4" 1a 250 - 25 3/16" 120 - 25 5/16" 1a 300 - 25 3. III 3/16" 1b 200 - 25 3/16" 1b 300 - 25 5/16" 1b 300 - 25 remainder not given C. 2.26 hrs. 70° - 200°F. D. Some cracking after first pass. 10 mins. of chipping and grinding after first pass.	A. None B. None	1 2 1 2 3	761 --- 1133 1178 1197	4½" L 3" R Fired on 2/9/43 ¾" R ¾" L ½" R	7" D 3½" U 4½" D 5" D 6½" U	Imp Imp Imp	I II III V II III V II V	4" 3" 2½" 3¾" 6" 1½" 20¾"	Passed radiograph Large amount of incomplete fusion
						57MM T1 Projectile						
A. AD-235 B. 2/11/43 C. 86 D. Great Lakes Steel Corp. E. Lincoln Electric Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.94Mn,.86Si, .85Cr,.08Ni, .20Mo) C. .27 D. Face 277 Back 285 E. --- F. 1625°F 3-1/2 hrs. Water 1100°F 4hrs. Air	A. A-II (.10C,4.49 Mn,.52Si, 20.80Cr, 9.75Ni, .10Mo)* (.09C,4.47 Mn,.68Si, 20.60Cr, 10.10Ni, .06Mo)* B. Armorweld C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 140 - 25 3/16" 1a 180 - 25 2. I 3/16" 2a 180 - 25 3. III 5/32" 4b 130 - 25 C. remainder not given C. 2.73 hrs. 70° - 130°F. D. Some cracking after first two passes.	A. None B. None	1 2 3	1147 1145 1148	1¼" R ½" R ¼" L	5" D 6" U 7" U	Imp Imp Imp	I II III V I II III V I III V	¾" ¼" 2½" 10½" 4" 4½" 3½" 31" 3½" 4½" 22½" 77"	Failed radiograph Crossbar ground out and re-welded
						57MM T1 Projectile						
A. AD-161 B. 1/1/43 C. 102 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-V (.78Mn,.24Si, .63Cr,.11Ni, .22Mo) C. .28 D. Face 321 Back 321 E. --- F. 1625°F. 2-1/2 hrs. Water 1030°F. 4 hrs. Draw	A. A-II (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* (.12C,4.65 Mn,.65Si, 18.00Cr, 9.62Ni, .09Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 1a 140 - 25 3/16" 1a 190 - 25 2. I 1/4" 2a 260 - 25 3. I 5/16" 2a 350 - 25 C. 2.15 hrs. 70° - 200°F. D. Cracking after first two passes	A. None B. None	1 2 	761 782 	1" R X 	4½" U 4½" D 	Imp O Imp 	I II III II I II III	4½" 6½" 5½" 1" 10" 16½" 3" 47½"	Failed radiograph Excessive cross-bar cracking
		*Weld Metal										

IDENTIFICATION A. PLATE ORDERED ON B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES G. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. GROOVE TYPE G. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS H	V50 f/s	LOCATION OF H L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-161 B. 1/1/43 C. 103 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-V (.76Mn,.2451, .63Cr,.11Ni, .12Mo) C. .28 D. Face 331 Back 331 E. --- F. 1630°F. 3-1/4 hrs. Water 1020°F. 4 hrs. Draw	A. A-II (.09C,4.85 Mn,.5581, 21.00Cr, 10.20Ni, .15Mo)* (.12C,4.65 Mn,.6581, 18.00Cr, 9.62Ni, .07Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. ---	A. Not given B. 1. II 3/16" 1a 180 - 25 3/16" 1a 200 - 25 2. I 1/4" 2a 240 - 25 1/4" 1a 260 - 25 3. I 5/16" 2a 380 - 25 C. 1.77 hrs. 70° - 160°F. D. Some cracking after first pass.	A. None B. None	1	756	1½" L		2⅜" U	Imp	I II	7½" 10"	Passed radiograph
						2	785		1¼" L	5½" D	O Imp	II I II	1½" 18" 2"	
													38¾"	
A. AD-161 B. 1/2/43 C. 104 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-V (.78Mn,.2481, .63Cr,.11Ni, .12Mo) C. .28 D. Face 302 Back 293 E. --- F. 1625°F. 2-1/2 hrs. Water 1030°F. 4 hrs. Draw	A. A-II (.09C,4.85 Mn,.5581, 21.00Cr, 10.20Ni, .15Mo)* (.12C,4.65 Mn,.6581, 18.00Cr, 9.62Ni, .07Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 1a 125 - 25 3/16" 1a 140 - 25 2. I 1/4" 2a 200 - 25 3. I 5/16" 2a 340 - 25 C. 1.98 hrs. 70° - 175°F. D. Some cracking after first pass.	A. None B. None	1	758		1¼" L	2½" U	Imp	I II III	9" 5" 4½"	Failed radiograph Excessive cracking in crossbar
													18½"	
A. AD-161 B. 1/2/43 C. 105 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-V (.78Mn,.2431, .63Cr,.11Ni, .12Mo) C. .28 D. Face 285 Back 311 E. --- F. 1630°F. 3-1/4 hrs. Water 1020°F. Drew	A. A-II (.09C,4.85 Mn,.5581, 21.00Cr, 10.20Ni, .15Mo)* (.12C,4.65 Mn,.6581, 18.00Cr, 9.62Ni, .07Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 1a 140 - 25 3/16" 1a 190 - 25 2. I 1/4" 2a 260 - 25 3. I 5/16" 2a 340 - 25 C. 2.15 hrs. 70° - 200°F. D.	A. None B. None	1	763		2¼" L	5½" U				Passed radiograph Several small crater cracks throughout the crossbar
						2	785	1½" R		4½" D	Imp	I III	21⅜" 2	
													23¾"	
		*Weld Metal												

A. FIRMS RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	PLATE DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. AMP. TYPE ARC V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF H LL	RL	SD.	CRACKING LOC.	TYPE	AMT	REMARKS ON CRACKING RADIOGRAPHING RESULTS, ETC.
A. AD-161 B. 1/2/43 C. 106 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.90Mn,.72Si, .60Cr,.14Ni, .22Mo) C. .35 D. Face 285 Back 262 E. --- F. 1630°F. 3-1/4 hrs. Water 1020°F. 4hrs. Draw	A. A-II (.09C,4.85 Mn,.55Si, 21.00Cr, 10.20Ni, .15Mo)* (.12C,4.65 Mn,.65Si, 18.00Cr, 9.62Ni, .07Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 2a 185 - 25 2. I 1/4" 2a 240 - 25 3. I 5/16" 2a 300 - 25 C. 1.93 hrs. 100° - 185°F. D. Cracking after first pass.	A. None B. None	1	792		1½" L	8¾" U	Imp	I III V	15½" 3" 5" 23½"	Passed radiograph
A. AD-310 B. 2/4/43 C. 107 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-V (1.78Mn,.24Si, .63Cr,.12Mo) C. .28 D. Face 302 Back 302 E. ---- F. 1630°F. 3-1/4 hrs. Water 1020°F. 4hrs. Air	A. A-II (09C,4.85 Mn,.55Si, 21.00Cr, 10.20Ni, .15Mo)* (.12C,4.65 Mn,.65Si, 18.00Cr, 9.62Ni, .07Mo)* B. Armorloy C. --- D. AC	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 2a 190 - 25 2. I 1/4" 2a 240 - 25 3. I 5/16" 2a 300 - 25 C. 1.80 hrs. 70° - 190°F. D. Some cracking after first pass.	A. None B. None	1	767	½" R		3¼" U	Imp	I II	24½" 7½" 31½"	Failed radiograph Large amount of cracks throughout
A. AD-310 B. 2/26/43 C. 112 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. --- E. --- F. 1650°F. 4hrs. Water 1200°F. 5hrs. Air	A. A-II (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* (.08C,4.50 Mn,.42Si, 20.40Cr, 10.10Ni)* B. Armorloy C. --- D. AC	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 2a 180 - 25 2. I 1/4" 2a 240 - 25 3. I 5/16" 2a 360 - 25 C. 1.66 hrs. 70° - 195°F. D.	A. None B. None	1	752		1" R	5½" U	Imp	II III	11½" 4½" 2½"	Passed radiograph Some porosity and crater cracks
						2	689	1" R		9" D	Imp O	III I III	¾" 2¾" 23¾"	

*Weld Metal

IDENTIFICATION A. Press number B. Date of test C. Plate no. D. Armor manufacturer E. Electrode supp. F. Armor fabricator	ARMOR DATA A. Plate thickness B. Type C. Carbon content D. Side E. Process F. Heat treatment temp time cooling	ELECTRODE DATA A. Type B. Trade name C. Coating D. Current & polarity	JOINT DESIGN A. Groove, included angle, root face B. Root gap C. Plate preparation	WELDING PROCEDURE A. Backing B. Deposition sequence el. no. type amp v. 1. Root type 2. Body type 3. Crown type C. Total welding time & inter pass temperature D. Remarks	HEAT A. Pre B. Post	3-ALLISTE RESULTS H	Vel.	Location of H L.L.	R.L.	S.B.	Cracking Loc.	Type	Amt	REMARKS ON CRACKING, RADIOGRAPHIC RESULTS, ETC.
A. AD-239 B. 2/12/43 C. 119 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62 Cr,.17Mo) C. .27 D. Face 331 Back 352 E. --- F. 1800°F. 2 hrs. Water 970°F. 2 hrs. Air	A. A-II (.09C,4.85 Mn,.55Si, 21.00Cr, 10.20Ni, .15Mo)* (.12C,4.65 Mn,.64Si, 18.00Cr, 9.62Ni, .07Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 1e 70 - 25 3/16" 1a 100 - 25 2. I 1/4" 1a 180 - 25 1/4" 1a 240 - 25 3. I 5/16" 2a 360 - 25 C. 1.80 hrs. 70° - 180°F. D.	A. None B. None	1	779		1½" R	6¼" U	Imp	I III V	9⅝" 11" 3⅜" 24"	Passed radiograph
A. AD-239 B. 2/12/43 C. 120 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. Face 321 Back 302 E. --- F. 1800°F. 2 hrs. Water 970°F. 2 hrs. Air	A. A-II (.09C,4.85 Mn,.55Si, 21.00Cr, 10.20Ni, .15Mo)* (.12C,4.65 Mn,.64Si, 18.00Cr, 9.62Ni, .07Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 110 - 25 3/16" 1a 165 - 25 2. I 1/4" 2a 240 - 25 3. I 5/16" 2a 360 - 25 C. 2.24 hrs. 80° - 195°F. D.	A. None B. None	1	768	1¾" L		6¼" U	Imp	I V	16¼" 4" 22¼"	Passed radiograph
A. AD-273 B. 2/19/43 C. 122 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. Face 331 Back 352 E. --- F. 1650°F. 2 hrs. Water 970°F. 2 hrs. Air	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 3a 125 - 25 2. I 3/16" 3a 170 - 25 3. III 5/32" 2b 135 - 25 1/4" 1b 240 - 25 5/32" 2b 130 - 25 remaining bead not given C. 2.67 hrs. 70° - 195°F. D.	A. None B. None	1	779		X	5½" D	Imp	I III	28" 8" 36"	Passed radiograph 4-1/2" of incomplete fusion
		*Weld Metal												

IDENTIFICATION A. FIRMS RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. PASSES TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING & RADIOGRAPHIC RESULTS, ETC.
A. AD-273 B. 2/19/43 C. 123 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo, .07Zr) C. .27 D. Face 331 Back 352 E. --- F. 1650°F. 2 hrs. Water 970°F. 2 hrs. Air	A. A-II (.10C,4.80 Mn,.66Si, 17.40Cr, 9.75Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. ---- D. ----	A. 60°DV B. 5/16" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 1a 160 - 25 1/4" 1a 280 - 25 2. I 1/4" 1a 270 - 25 1/4" 1a 240 - 25 3. III 5/32" 4b 135 - 25 remaining 2 beads not given C. 2.16 hrs. 70° - 190°F. D. Several crater cracks appeared in the first root pass.	A. None B. None	1	763	X		3½" U				Passed radiograph
						2	811		X	5½" D	Imp	I III	23½" 1½" 25"	
A. AD-273 B. 2/19/43 C. 124 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo, .07Zr) C. .27 D. Face 331 Back 352 E. --- F. 1650°F. 2 hrs. Water 970°F. 2 hrs. Air	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. ---- D. ----	A. 60°DV B. 7/16" C. Flame Cutting Grinding	A. Not given B. 1. II 1/4" 1a 200 - 25 1/4" 1a 240 - 25 2. I 1/4" 1a 260 - 25 1/4" 1a 240 - 25 3. III 5/32" 2b 140 - 25 1/4" 1b 280 - 25 remaining 3 beads not given C. 2.36 hrs. 70° - 205°F. D.	A. None B. None	1	750	½" R		5½" D	Imp	I II	19" 19½"	Passed radiograph
						2	665		3¾" R	½" D				
A. AD-309 B. 2/23/43 C. 114 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.83Si, .71Cr,.10Ni, .23Mo) C. .34 D. Face 302 Back 302 E. --- F. 1630°F. 3-1/2 hrs. Water 1020°F. 4 hrs. Air	A. A-II (.09C,4.85 Mn,.55Si, 21.00Cr, 10.20Ni, .15Mo)* (.12C,4.65 Mn,.64Si, 18.00Cr, 9.62Ni, .07Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 2a 180 - 25 2. I 3/16" 2a 180 - 25 2. I 1/4" 2a 240 - 25 C. 1.70 hrs. 70° - 160°F. D.	A. None B. None	1	752	1⅝" R		7½" D	Imp	I II	11" 4⅜"	Passed radiograph Small orater cracks Small amount of incomplete fusion
						2	787		4½" L	7½" U	O	I	2⅜"	
						3	794		3½" L	4½" D	O	I	17½" 36"	
		*Weld Metal												

IDENTIFICATION A. Weld Record No. B. Date of Test C. Plate No. D. Steel Manufacturer E. Electrode Supp. F. Welder Designation	BASE METAL A. Plate Thickness B. Type C. Carbon Content D. Spec E. Process F. Heat Treatment Temp Time Cooling	ELECTRODE (OR) A. Type B. Trade Name C. Coating D. Current & Polarity	JOINT DESIGN A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	WELDING PROCEDURE A. Backing B. Deposition Sequence Electrode No. Type Amps V. 1. Root Type 2. Body Type 3. Groove Type C. Total Welding Time & Inter Pass Temperature D. Remarks	HEAT A. Pre B. Post	MAG-ETIC PARTICLE RESULTS No.	Vel. F/S	Location of Ind. L.L.	R.L.	S.L.	Cracking Loc.	Type	Amt.	REMARKS On Soaking Radiographic Results, Etc.
A. AD-297 B. 3/6/43 C. 125 D. Youngstown Sheet & Tube Company E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-III (1.12Mn,.19Si, .06Ni,.64Mo) C. .26 D. Face 286 Back 321 E. --- F. 1625°F. 1/2 hr. Water 1010°F. 4 hrs. Air	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .06Mo)* (.09C,4.85 Mn,.55Si, 10.20Ni, 20.10Cr, .15Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 2a 140 - 25 2. I 3/16" 2a 180 - 25 3. III 5/32" 2b 130 - 25 1/4" 1b 240 - 25 5/32" 2b 140 - 25 remaining bead not given C. 2.57 hrs. 70° - 150°F. D.	A. None B. None	1	760		¼" L	10½" D	Imp	I	17"	Passed radiograph Small amount of incomplete fusion
						2	655	1" R		1" U	O Imp	I I II III	1½" 6⅝" 1¾" 1½" 28⅜"	
A. AD-297 B. 3/6/43 C. 127 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo, .07Zr) C. .27 D. Face 331 Back 352 E. --- F. 1650°F. 2 hrs. Water 970°F. 2 hrs. Air	A. A-II (.09C,4.85 Mn,.66Si, 20.10Cr, 10.20Ni, .15Mo)* (.13C,4.85 Mn,.65Si, 16.00Cr, 9.62Ni, .06Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 1a 150 - 25 3/16" 1a 160 - 25 2. I 1/4" 2a 240 - 25 3. I 5/16" 2a 360 - 25 C. 1.77 hrs. 75° - 190°F. D.	A. None B. None	1	775	2½" R		5⅜" U	Imp	I V	16½" 3¾"	Passed radiograph
						2	760		¼" R	7" D	Imp O	I III I V	18" 3⅛" ⅞" ⅛" 42⅜"	
A. AD-329 B. 3/15/43 C. 131 D. Youngstown Sheet & Tube Company E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-III (1.16Mn,.18Si, .52Mo) C. .23 D. Face 331 Back 341 E. --- F. 1600°F. 1 hr. Water 975°F. 3 hrs. Air	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .06Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 135 - 25 5/32" 1a 140 - 25 2. I 3/16" 1a 180 - 25 3/16" 1a 195 - 25 3. III 5/32" 2b 140 - 25 1/4" 1b 260 - 25 5/32" 2b 140 - 25 remaining bead not given C. --- 70° - 145°F. D.	A. None B. None	1	779	2" L		4" U	Imp	II	1½"	Passed radiograph Some incomplete fusion
						2	767		⅜" R	5" D	Imp	I II III V	13½" 1⅜" 1" 17⅛" 33⅜"	
		*Weld Metal												

IDENTIFICATION A. WELD TESTED BY B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING CONDITIONS A. BACKING — PASSES B. DEPOSITION SEQUENCE — SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	RADIOGRAPH RESULTS N	VEL. V/S	LOCATION OF N L.I.	S.L.	S.E.	CRACKING LOC.	TYPE	AMT.	REMARKS ON LOCATION RADIOGRAPHS RESULTS, ETC.
A. AD-329 B. 3/15/43 C. 133 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.94Mn,.82Si, .58Cr,.10Ni, .16Mo) C. .27 D. Face 321 Back 332 E. --- F. 1650°F. 3 hrs. Water 970°F. 3 hrs. Air	A. A-I (.16C,3.73 Mn,.36Si, 19.50Cr, 10.10Ni, .36Mo)* A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 1/8" 1a 90 - 25 1/8" 1a 110 - 25 2. I 5/32" 2a 110 - 25 3. I 5/32" 2a 120 - 25 C. 5.86 hrs. 70° - 105°F. D.	A.None B.None	1 2	761 766	 $\frac{3}{8}$" L	$\frac{3}{8}$" L 8" U	8½" D Imp	Imp I	I III V I	10½" 1½" 5½" 23½"	Passed radiograph
A. AD-328 B. 3/23/43 C. 79 D. Youngstown Sheet & Tube Company E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-III (1.55Mn,.44Si, .10Ni,.42Mo) C. .26 D. Face 331 E. O.H. F. 1625°F. 2-1/4 hrs. Water 1010°F. 4 hrs. Air	A. A-II (.13C,3.60 Mn,.48Si, 20.10Cr, 10.60Ni, .11Mo)* (.12C,3.45 Mn,.46Si, 19.60Cr, 10.40Ni, .15Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. I 3/16" 1a 165 - 24 2.& 3. I 1/4" 1a 280 - 30 3/8" 1a 480 - 35 3/8" 1a 400 - 35 C. 92-1/2 mins. 80° - 285°F. D. Some cracking and 40 mins. of chipping and grinding after first pass.	A.None B.None	1 2	782 776	2" L $\frac{3}{4}$" L	 1¾"	6" U 2" D	Imp Imp	I II V II I III V	5" 6" 11½" 1½" 27" 2½" 1¾"	Failed radiograph Excessive crossbar cracking
A. AD-328 B. 3/23/43 C. 128 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.84Si, .59Cr,.12Ni, .16Mo) C. .30 D. Face 302 Back 302 E. --- F. 1650°F. 3 hrs. Water 970°F. 3 hrs. Air	A. A-II (.09C,4.85 Mn,.55Si, 22.05Cr, 10.55Ni, .10Mo)* (.08C,4.50 Mn,.42Si, 20.40Cr, 10.10Ni)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 1a 185 - 25 3/16" 1a 145 - 25 2. I 1/4" 2a 260 - 25 3. I 5/16" 2a 360 - 25 C. 1.68 hrs. 70° - 200°F. D.	A.None B.None	1 2	751 763	1½" R 2" L	 2"	5½" D 9" U	Imp Imp	I II III I II	11" 5" 1½" 9½" 4½"	Failed radiograph Exossive incomplets fusion
		*Weld Metal															

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IDENTIFICATION A. Armor record no. B. Date of test C. Plate no. D. Armor manufacturer E. Electrode supp. F. Armor fabricator	ARMOR DATA A. Plate thickness B. Type C. Carbon content D. Back E. Process F. Heat treatment temp time quench	ELECTRODE DATA A. Type B. Trade name C. Coating D. Current & polarity	JOINT DESIGN A. Groove, included angle, root face B. Root gap C. Plate preparation	WELDING PROCEDURE A. Backing B. Deposition size el. no. type amp v. 1. Root type 2. Body type 3. Crown type C. Total welding time & inter pass temperature D. Remarks	HEAT A. Pre B. Post	BALLISTIC RESULTS N	Vel. f/s	Location of N L.L.	R.L.	O.B.	CRACKING Loc.	Type	Amt.	REMARKS ON CRACKING RADIOGRAPHING RESULTS, ETC.
A. AD-338 B. 3/23/43 C. 129 D. Jones & Laughlin Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-III (1.71Mn,.21Si, .45Mo) C. .36 D. Face 321 Back 340 E. --- F. 1650°F. 2 hrs. Water 970°F. 2 hrs. Air	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* (.08C,4.50 Mn,.43Si, 20.40Cr, 10.10Ni)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 2a --- - 25 2. I 1/4" 2a --- - 25 3. III 5/32" 4b --- - 25 1/4" 1b --- - 25 remaining pass not given C. 2.54 hrs. 70° - 190°F. D. Some cracking after first pass.	A. None B. None	1	772	X		7" U	Imp	I II	1 1/8" 1 1/2"	Failed radiograph Excessive incomplete fusion
						2	715		2 1/2" R	9" D	O	I II	1 1/8" 1 1/8" 35 1/8"	
A. AD-339 B. 3/23/43 C. 135 D. Youngstown Sheet & Tube Company E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-III (1.44Mn,.21Si, .26Mo) C. .26 D. Face 321 Back 332 E. --- F. 1600°F. 1/2 hr. Water 875°F. 2-1/2 hrs. Air	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 135 - 25 3/16" 1a 165 - 25 2. I 1/4" 2a 240 - 25 3. III 5/32" 2b 140 - 25 1/4" 1b 240 - 25 remaining three passes not given C. 2.31 hrs. 70° - 150°F. D.	A. None B. None	1	774		4" L	7" U				Passed radiograph
						2	765	1" L		6 1/2" D	Imp	I III	21" 1" 22"	
A. AD-339 B. 3/23/43 C. 136 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. Face 340 Back 302 E. --- F. 1650°F. 1-1/2 hrs. Water 970°F. 1-1/2 hrs. Air	A. A-I (.16C,3.73 Mn,.36Si, 19.50Cr, 10.10Ni, .36Mo)* A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Not given B. 1. II 1/8" 2a 90 - 25 2. I 5/32" 2a 115 - 25 3. I 5/32" 2a 115 - 25 C. 8.70 hrs. 70° - 95°F. D.	A. None B. None	1	764		1" L	4 1/2" D	Imp	II III	8 1/2" 1 1/2"	Passed radiograph Small amount of slag inclusions
						2	661	2 1/2" R		X	O	III	1/2"	
						3	693	4" R		5 1/2" U				
						4	710	1 1/2" R		7" D	O	II	1"	
						5	702		1 1/2" L	5" U	Imp	II III	17 1/2" 3" 32"	
		*Weld Metal												

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IDENTIFICATION A. FIRM RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. DNH E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. PASSES NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	G.B.	CRACKING LOC.	TYPE	AMT	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-339 B. 3/23/43 C. 139 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. Face 321 Back 302 E. --- F. 1650°F. 1-1/2 hrs. Water 970°F. 1-1/2 hrs. Air	A. A-I (.16C,3.73 Mn,.36Si, 19.50Cr, 10.10Ni, .36Mo)* II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 1/8" 2a 90 - 25 2. I 5/32" 2a 115 - 25 3. I 5/32" 2a 115 - 25 C. 4.29 hrs. 70° - 165°F. D.	A. None B. None	1 2	768 764	3/4" L	1" R	8½" D 6" U	Imp Imp	I III V II III	2" 5" 5¾" 3½" 7⅛" 23¾"	Passed radiograph
A. AD-339 B. 3/23/43 C. 141 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. Face 321 Back 302 E. --- F. 1650°F. 1-1/2 hrs. Water 970°F. 1-1/2 hrs. Air	A. A-II (.09C,4.85 Mn,.55Si, 22.05Cr, 10.55Ni, .10Mo)* (.08C,4.50 Mn,.42Si, 20.40Cr, 10.10Ni)* B. Armorloy C. --- D. AC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 3a 180 - 25 2. I 1/4" 2a 260 - 25 3. I 5/16" 2a 360 - 25 C. 1.97 hrs. 70° - 200°F. D.	A. None B. None	1 2 3	768 680 780	1½" L	2⅜" R ¼" R	5" U 6½" D 7" U	Imp	I II III	17½" 6½" ¾" 34½"	Passed radiograph Several inches of incomplete fusion
A. AD-339 B. 3/23/43 C. 142 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. Face 311 Back 302 E. --- F. 1650°F. 3 hrs. Water 970°F. 3 hrs. Air	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. --- F. AC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 135 - 25 5/32" 1a 140 - 25 2. I 3/16" 2a 180 - 25 3. III 5/32" 4b 140 - 25 1/4" 1b 240 - 25 remainder not given C. 2.64 hrs. 70° - 195°F. D. Some cracking after 7th and 8th passes.	A. None B. None	1 2	761 700	¼" R	1" L	4½" U 9" D	Imp O Imp	I III I II	7½" 3¾" 1½" 14⅝" 26¾"	Passed radiograph Some scattered slag inclusions
		*Weld Metal															

IDENTIFICATION A. PUBLISHED RESEARCH REPORT NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE SUPPLIER F. ARMOR FABRICATOR	BASE DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCESSING A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	B.L.	O.B.	CRACKING LOC.	TYPE	AMT	REMARKS ON CRACKING RADIOGRAPHING RESULTS, ETC.
A. AD-339 B. 3/23/43 C. 143 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. Face 321 Back 302 E. --- F. 1650°F. 1-1/2 hrs. Water 970°F. 1-1/2 hrs. Air	A. A-II (.09C,4.85 Mn,.55Si, 22.05Cr, 10.55Ni, .10Mo)* (.08C,4.50 Mn,.42Si, 20.40Cr, 10.10Ni)* B. Armorloy C. --- D. AC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 1a 105 - 25 1/4" 1a 260 - 25 2. I 5/16" 1a 360 - 25 1/4" 1a 260 - 25 3. III 3/16" 4b 160 - 25 5/16" 1b 360 - 25 remainder not given C. 2.03 hrs. 70° - 200°F. D. Some cracking after crown passes.	A. None B. None	1	756		1⅛" L	5½" U	Imp	II	½"	Passed radiograph
						2	783	1½" R		6½" D	Imp	I II III	10½" 6½" 1" 18"	
A. AD-339 B. 3/23/43 C. 144 D. Great Lakes Steel Corp. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. Face 341 Back 311 E. --- F. 1650°F. 1-1/2 hrs. Water 970°F. 1-1/2 hrs. Air	A. A-I (.16C,3.73 Mn,.36Si, 19.50Cr, 10.10Ni, .36Mo)* II (.10C,4.80 Mn,.68Si, 17.90Cr, 9.75Ni, .08Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 1/8" 2a 90 - 25 2. I 5/32" 2a 115 - 25 3. I 5/32" 2a 115 - 25 C. 5.38 hrs. 70° - 130°F. D.	A. None B. None	1	760		3" L	5" U				Passed radiograph
						2	763	½" R		5½" D	Imp	I II V	9" 3" 12½"	
A. AD-113 B. 11/7/42 C. 81 D. Youngstown Sheet & Tube Company E. McKay Company Lincoln Electric Company F. Cadillac Motor Car Company	A. 1" B. R-III (1.10Mn,.21Si, .09Ni,.46Mo) C. .29 D. Face 302 Back 302 E. O.H. F. 1625°F. 2-1/4 hrs. Water 1030°F. 4 hrs. Air	A. A-II (.09C,4.47 Mn,.68Si, 20.60Cr, 10.10Ni, .06Mo)* (.09C,4.50 Mn,.56Si, 21.15Cr, 10.10Ni, .10Mo)* B. Armorloy Armor-weld C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 150 - 25 3/16" 1a 200 - 25 2. I 3/16" 1a 200 - 25 3/16" 1a 180 - 25 3. III 5/32" 2b 110 - 25 1/4" 1b 280 - 30 5/32" 2b 130 - 25 remainder not given C. 2-3/4 hrs. 70° - 225°F. D.	A. None B. None	1	775		½" R	3½" U	Imp	I III	14½" 4½"	Passed radiograph Some incomplete fusion and slag
						2	684	2½" L		7" D	0	III	1½" 20½"	
		*Weld Metal												

IDENTIFICATION A. Piece welded no. B. Date of test C. Plate no. D. Armor manufacturer E. Electrode spec. F. Armor fabricator	ARMOR PLATE A. Plate thickness B. Type C. Carbon content D. Side E. Process F. Heat treatment: temp time quench	ELECTRODE AND A. Type B. Trade name C. Coating D. Current & polarity	JOINT DESIGN A. Groove, bevel angle, root face B. Root gap C. Plate preparation	WELDING PROCEDURE A. Backing B. Deposition: Size El. Pass No. Type Amp V. 1. Root type 2. Body type 3. Groove type C. Total welding time & inter pass temperature D. Remarks	HEAT A. Pre B. Post	BALLISTIC RESULTS No.	Vel. f/s	Location of H: L.L.	R.L.	B.L.	Cracking: Loc.	Type	Amt.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-33 B. 10/9/42 C. H-4 D. Youngstown Sheet & Tube Company E. McKay Company F. Caterpillar Tractor Co.	A. 1" B. P-III (1.30Mn,.158i, .04Cr,.50Mo) C. .20 D. Face 321 Back 331 E. B.O.H. F. 1625°F. 2-1/4 hrs. Water 1060°F. 4 hrs.	A. A-II (.22C,3.43 Mn,.658i, 13.4Cr, 7.1Ni, .12Mo)* B. Armorloy C. Heavy D. DC REV	A. 40°SV B. 5/32" C. Machining	A. None B. 1. I 5/32" 1a 170 - 25 2. I 5/32" 1a 175 - 26 1/4" 2a 280 - 26 3. I 1/4" 1a 280 - 26 5/32" 1SB 175 - 26 C. 3-3/4 hrs. 180° - 500°F. D. Ground root after first pass. Time 3 hrs.	A. 200°F. 500°F. B. None	1 2 3	775 778	1" L	3/4" L	8" D 2 1/2" U	Imp Imp	II V II III V O II	10 1/4" 7 1/2" 1 3/4" 1 1/2" 4" 38 1/4"	Passed radiograph
A. AD-74 B. 10/24/42 C. H-5 D. Great Lakes Steel Crop. E. McKay Company F. Caterpillar Tractor Co.	A. 1" B. R-IV (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .32 D. Face 393 E. B.O.H. F. 1650°F. 3 hrs. Water 1200°F. 4 hrs. Air 1050°F. 2 hrs.	A. A-II (.22C,3.43 Mn,.658i, 13.4Cr, 7.1Ni, .12Mo)* B. Armorloy C. Lime D. DC REV	A. 60°DV B. 1/8" C. Machining	A. Copper B. 1. II 5/32" 2a 160 - 24 2. I 3/16" 2a 220 - 24 3. I 1/4" 2a 280 - 24 C. 1.85 hrs. 150° - 300°F. D. Root side of first pass on crossweld cracked nearly full length. Ground out and rewelded. Small amount of chipping, time 4.50 hrs.	A. 300°F. 500°F.	1 2 3	758 701 767	3/4" L	1" R	8 1/2" D 8" U 2 1/2" D	Imp	I II III	1" 3 3/4" 2 3/4" 7 1/2"	Passed radiograph Small crack in crossbar
A. AD-33 B. 10/9/42 C. H-1 D. Great Lakes Steel Corp. E. McKay Company F. Caterpillar Tractor Co.	A. 1" B. R-IV (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) (.83Mn,.87Si, .67Cr,.09Ni, .16Mo,.L9Zr) C. .32 D. Face 393 Face 302 E. B.O.H. F. 1650°F. 3 hrs. Water 1200°F. 4 hrs. Air 1050°F. 2 hrs. Air	A. A-II (.22C,3.43 Mn,.658i, 13.4Cr, 7.1Ni, .12Mo)* B. Armorloy C. Heavy D. DC REV	A. 40°SV B. 5/32" C. Machining	A. None B. 1. I 5/32" 1a 160 - 22 2. I 5/32" 1a 170 - 25 1/4" 2a 290 - 27 3. I 1/4" 1a 290 - 27 5/32" 1SB 170 - 25 C. 3-1/2 hrs. 200°F. D. Small amount of chipping to remove weld spatter and slag. Time 2-1/2 hrs.	A. 225°F. 500°F. B. None	1	789		X	7 1/4" U	Imp	I II III	18" 4 1/2" 1 1/2" 23 1/2"	Passed radiograph
		*Weld Metal Analysis Questionable												

IDENTIFICATION	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS								REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. PERD RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	A. BACKING B. DEPOSITION SIZE EL. AMP V. PASSES NO. TYPE 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	A. PRE B. POST	N	VEL. F/S	LOCATION OF N L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	
A. AD-288 B. 3/3/43 C. 31 D. Great Lakes Steel Corp. E. McKay Company F. Firestone Tire & Rubber Co.	A. 1" B. R-IV (.88Mn,.74Si, .65Cr,.20Mo, .08Zr) C. .28 D. --- E. Elec. F. ---	A. A-II (.10C,4.49 Mn,.65Si, 19.10Cr, 9.10Ni)* B. Armorloy C. Lime D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. I 5/32" 1a 150 - 26 2. I 3/16" 1a 200 - 24 1/4" 3a 255 - 24 3. I 5/16" 2a 300 - 23 C. 2:31 hrs. 100°F. D. Some cracking, chipping and grinding after first pass.	A. 100° F. B. None	1	749		1" L	7" D	Imp	II	8"	Passed radiograph Several inches of incomplete penetration
						2	780		2¾" R	6¼" U	0	III	⅜"	
						3	775	X		4¾" D	0	II	1¾"	
											Imp	I	1"	
												II	20"	
													37¼"	

*Weld Metal

IDENTIFICATION A. PROOF RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE INFOR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. DHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. PASSES NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	N	VEL. F/S	LOCATION OF H L.I.	LOCATION OF H R.L.	LOCATION OF H C.E.	CRACKING LOC.	CRACKING TYPE	CRACKING AMT	REMARKS ON VISUAL RADIOGRAPHIC RESULTS, ETC.
A. AD-43 B. 10/3/42 C. 32 D. Great Lakes Steel Corp. Youngstown Sheet & Tube Company E. McKay Company F. General Motors Truck & Coach	A. 1" B. R-IV G L (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) R-III Y (1.35Mn,.17Si, .50Mo) C. .32 .24 D. Face 321 to 341 Back 321 to 341 E. B.O.H. Both F. 1625° G L 2-1/4 hrs. Water 1060°F. Draw 1625°F. Y 1/2 hr. Water 1000°F. 4-1/2 hrs. Draw	A. A-I (.10C,3.66 Mn,1.13Si, 18.1Cr, 10.2Ni, .47Mo)* B. Armorloy A-5 C. Lime D. DC REV	A. 45°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 95 - 5/32" 1a 135 - 2. I 1/4" 2a 225 - 3. III 5/32" 4b 95 - 3/16" 2b 165 - C. 10 hrs. 150° - 200°F. D. Grinding after first pass. Left and lower center sections by Great Lakes, [redacted], right and upper center sections by Youngstown. Total chipping and grinding time 3 hrs., details not given.	A. None B. None	1	1168		X	4¼" D	Imp	I II	3¼" 9⅝"	Passed radiograph 2-1/2" incomplete fusion
						2	1124	3½" L		10" D				
						3	1165	9¼" L		11¼" U	Imp	V	11"	
						4	1170	4" R		11¼" U				
						5	1115		4" R	5¼" U	O	II	3"	
						6	1118	¾" L		4¼" U	Imp	I II III	1¼" 4¼" 4" 37"	
								57MM T1 Projectile						
A. AD-43 B. 10/3/42 C. 35 D. Jones & Laughlin Steel Corp. Great Lakes Steel Corp. E. Harnischfeger Company F. General Motors Truck & Coach	A. 1" B. R-III J&L (1.75Mn,.24Si, .55Mo) R-IV G L (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .25 .32 D. Face 321 to 341 Back 321 to 341 E. B.O.H. Both F. 1625°F. J&L 2-1/4 hrs. Water 1075°F. 4 hrs. Draw 1625°F. G L 2-1/4 hrs. Water 1060°F. Draw	A. A-I (.13C,1.75 Mn,.58Si, 19.36Cr, 11.40Ni, 2.2Mo)* B. AW-3 C. Lime D. DC REV	A. 45°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 100 - 5/32" 1a 135 - 2. II 5/32" 12b 135 - 3. III 5/32" 6b 135 - C. 8 hrs. 200°F. D. Total chipping or grinding time 3 hrs., details not given	A. None B. None	1	1101		X	3¼" U	Imp	III	2¼"	Passed radiograph
						2	1135	2¼" L		6" D				
						3	1140	1" R		6¼" U	Imp	I II	3" 9¼" 13¼"	
								57MM T1 Projectile						

*Weld Metal

IDENTIFICATION A. FIRMS RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SEQ EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS H	VEL. F/S	LOCATION OF H L.L.	R.L.	C.G.	CRACKING LOC.	TYPE	Amt	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-223 B. 11/4/42 C. 39 D. Great Lakes Steel Corp. Jones & Laughlin Steel Corp. E. McKay Company Harnischfeger Company F. General Motors Truck & Coach	A. 1" B. R-IV G L (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) R-III J&L (1.75Mn,.24Si, .55Mo) C. .32 .25 D. Face 321 to 341 Back 321 to 341 E. B.O.H. Both F. 1625°F. G L 2-1/2 hrs. Water 1060°F. 4 hrs. Draw 1625°F. J&L 2-1/4 hrs. Water 1075°F. 4 hrs. Draw	A. A-I A-5 (.10C,3.66 Mn,1.13Si, 18.10Cr, 10.2Ni, .47Mo)* A-I AW-3 (.10C,1.58 Mn,.58Si, 19.36Cr, 11.4Ni, 2.2Mo)* B. Armorloy A-5 Smoothart AW-3 C. --- D. DC REV	A. 45°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 90 - 5/32" 1a 125 - 2. I 3/16" 4a 170 - 3. I 3/16" 2a 170 - C. 6 hrs. 300° - 300°F. D. Little grinding after all passes. Left and upper center sections by Jones & Laughlin, right and lower center sections by Great Lakes.	A. None B. None	1 2 3 4 5 6	1032 1145 1154 1109 1193 1192	4" R	5½" L 3½" L 4" R 1" L 4" R	7" D 5½" U 9" U 2¾" D 4½" D 4½" U	Imp O	I II I V I II V	1" 5⅝" 9" 7⅝" 10¼" 1⅜" 2" 37¼"	Passed radiograph Numerous small inclusions Undercutting on legs and crossbar
												57MM T1 Projectile					
A. AD-223 B. 11/4/42 C. 40 D. Jones & Laughlin Steel Corp. Great Lakes Steel Corp. E. Harnischfeger Corp. F. General Motors Truck & Coach	A. 1" B. R-III J&L (1.75Mn,.24Si, .55Mo) R-IV G L (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .25 .32 D. Face 321 to 341 Back 321 to 341 E. B.O.H. Both F. 1625°F. J&L 2-1/4 hrs. Water 1075°F. 4 hrs. Draw 1625°F. G L 2-1/2 hrs. Water 1075°F. 4 hrs. Draw	A. A-I (.11C,3.85 Mn,.45Si, 18.8Cr, 10.4Ni, 1.10Mo)* B. AW-3-C C. Lime D. DC STR	A. 45°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 90 - 5/32" 1a 125 - 2. I 5/32" 1a 125 - 3/16" 2a 175 - 3. II 3/16" 4b 175 - C. 6 hrs. 300° - 300°F. D. Full length crack after first pass. Grinding after all passes. Total chipping and grinding time 3 hrs.	A. None B. None	1 2 3 4	1101 1221 1173 1106	2½" L 1" R	1⅜" R 2" L	5½" D 4½" U 7⅜" U 5½" D	Imp O	I V I II Imp II	1½" 14⅛" 1⅝" 19"	Passed radiograph
												57MM T1 Projectile					
		*Weld Metal															

MISCELLANEOUS	BASE METAL	WELDING WIRE	GROOVE	BACKING	PRE & POST	H	VEL.	LOCATION OF H			CRACKING			RADIOGRAPHIC RESULTS, ETC.
A. Piece Record No. B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Spec. F. Armor Fabricator	A. Plate Thickness B. Type C. Carbon Content D. Ons E. Process F. Heat Treatment Temp Time Quench	A. Type B. Trade Name C. Coating D. Current & Polarity	A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	A. Backing B. Deposition Size El. No. Type Amp V. 1. Root Type 2. Body Type 3. Groove Type C. Total Welding Time & Inter Pass Temperature D. Remarks	A. Pre B. Post		F/S	L.L.	R.L.	C.L.	Loc.	Type	Amt.	
A. AD-223 B. 11/4/42 C. 42 D. Great Lakes Steel Corp. Jones & Laughlin Steel Corp. E. McKay Company F. General Motors Truck & Coach Division	A. 1" B. R-IV Q L (.94Mn,.81Si, .70Cr,.22Mo, .09ZR) R-III J&L (1.75Mn,.24Si, .55Mo) C. .32 .25 D. Face 321 to 341 Back 321 to 341 E. B.O.H. Both F. 1625°F Q L 2-1/2 hrs. Water 1060°F. 4 hrs. Draw 1625°F. J&L 2-1/4 hrs. Water 1075°F. 4 hrs. Draw	A. A-I (.10C,3.66 Mn,1.13Si 18.10Cr, 10.2Ni, .47Mo)* B. Armorloy A-5 C. Lime D. DC REV	A. 45°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 90 - 30 5/32" 1a 135 - 30 2. I 5/32" 3a 130 - 30 3. I 5/16" 2a 250 - 30 C. 5 hrs. 200° - 300°F. D. Little grinding after passes one and two. Left and lower center sections by Great Lakes. right and upper center sections by Jones & Laughlin.	A. None B. None	1 2	1104 1112	 3/4" R	1/2" L 4 1/2" D	5 3/4" U 57MM T1 Projectile	Imp O Imp	I II I V	4 1/2" 3 3/4" 1 1/2" 18" 1 1/2" 28 1/2"	Failed radiograph Large amount of incomplete fusion in right weld and lower left weld
A. AD-223 B. 11/4/42 C. 44 D. Great Lakes Steel Corp. Jones & Laughlin Steel Corp. E. Lincoln Electric Co. F. General Motors Truck & Coach Division	A. 1" B. R-IV Q L (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) R-III J&L (1.75Mn,.24Si, .55Mo) C. .32 .25 D. Face 321 to 341 Back 321 to 341 E. B.O.H. Both F. 1625°F. GL 2-1/4 hrs. Water 1030°F. 4 hrs. Draw 1625°F. J&L 2-1/4 hrs. Water 1075°F. 4 hrs. Draw	A. A-II (.10C,3.5 Mn,.55Si, 19.Cr, 8.5Ni)* B. Armor-weld C. Lime D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 90 - 5/32" 1a 140 - 2. III 3/16" 3a 4b 180 - 3. III 5/32" 4b 125 - 3/16" 2b 180 - C. 5 hrs. 200° - 300°F. D. Little grinding after first pass. Left and lower center sections by Great Lakes, right and upper center sections by Jones & Laughlin	A. None B. None	1 2 3 4	1121 1118 1140 1119	1" L 2 1/2" L	 3/4" L 1 1/2" L 57MM T1	5" U 4 1/2" D 6" U 2 1/2" D Projectile	Imp Imp O	I III II III III III	3 1/2" 4 1/2" 5 1/2" 1 1/2" 1 1/2" 1 1/2" 17 1/2"	Passed radiograph
		*Weld Metal												

IDENTIFICATION	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS							REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. Person Reqstd Ms. B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Spec. F. Armor Fabricator	A. Plate Thickness B. Type C. Carbon Content D. BHN E. Process F. Heat Treatment-Temp Time Quench	A. Type B. Trade Name C. Coating D. Current & Polarity	A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	A. Backing B. Deposition Size El. No. Type Amp V. 1. Root Type 2. Body Type 3. Groove Type C. Total Welding Time & Inter Pass Temperature D. Remarks	A. Pre B. Post	N	Vel. F/S	Location of N L.L.	R.L.	S.S.	Cracking Loc.	Type	Amt.	
A. AD-223 B. 11/4/42 C. 45 D. Great Lakes Steel Corp. Jones & Laughlin Steel Corp. E. Lincoln Electric Co. F. General Motors Truck & Coach Division	A. 1" B. R-IV G L (.94Mn, .81Si, .70Cr, .22Mo, .09Zr) R-III J&L (1.75Mn, .24Si, .55Mo) C. .32 .25 D. Face 321 to 341 Back 321 to 341 E. B.O.H. Both F. 1625°F. G L Water 1060°F. Draw 1625°F. J&L 2-1/4 hrs. Water 1075°F. 4 hrs. Draw	A. A-II (.10C, 3.5 Mn, .58i, 19.Cr, 8.5Ni)* B. Armor-weld C. Lime D. DC REV	A. 45°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 90 - 24 5/32" 1a 135 - 24 2. I 5/32" 2a 135 - 24 3/16" 2a 175 - 24 3. II 3/16" 4b 175 - 24 C. 6 hrs. 200°C - 300°F. D. Little grinding after first pass. Left and upper center sections by Great Lakes, right and lower center sections by Jones & Laughlin.	A. None B. None	1	1177		1 3/4" L	9 1/2" U	Imp	I II	12" 2"	Passed radiograph Scattered porosity
						2	1123	1 1/4" L		4" D	O Imp	II I II V	4" 2" 2 1/4" 5" 27 1/2"	
						57MM T1 Projectile								

*Weld Metal

SPECIMEN	BASE METAL	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS					CRACKING			REMARKS ON CRACKING RADIOGRAPHING RESULTS, ETC.
						N	VEL.	LOCATION OF H						
							F/S	L.L.	R.L.	C.R.	LOC.	TYPE	AMT.	
A. AD-77 B. 10/20/42 C. H-1 D. Great Lakes Steel Corp. E. Crucible Steel Company F. Gordon Mfg. Company	A. 1" B. R-IV (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .32 D. Face 341 Back 341 E. B.O.H. F. 1625°F. 2-1/4 hrs. Water 1030°F.	A. A-I (.06C,2.10 Mn,.22Si, 19.6Cr, 9.21Ni, 1.61Mo, .20V)* B. Armorize C. --- D. DC REV	A. 45°DV B. 1/4" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1b 135 - 5/32" 2b 140 - 2. II 3/16" 2b 185 - 5/32" 4b 140 - 5/32" 2b 145 - 3. III 5/32" 2b 145 - 3/16" 3b 180 - 3/16" 2b 185 - C. 7 hrs. 110° - 170°F. D. Grinding after first pass. Ground all craters on 2nd and 3rd passes. Three more passes in crossbar	A. 120° F. B. None	1	770	4" L		10" D	Imp	I	20"	Passed radiograph
					Total chipping and grinding time 11-1/2 hrs., details not given									
A. AD-117 B. 12/12/42 C. 2 D. Jones & Laughlin Steel Corp. E. Crucible Steel Company F. Gordon Mfg. Company	A. 1" B. R-III (1.75Mn,.24Si, .55Mo) C. .25 D. Face 332 Back 340 E. B.O.H. F. 1640°F. 3-3/4 hrs. Water 1060°F. 3-1/2 hrs. Air	A. A-II (.12C,1.80 Mn,.60Si, 20.5Cr, 10.0Ni)* B. Armorize Rezistal C. Titanium D. DC REV	A. 45°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. I 5/32" 1a 145 - 22 2. III 3/16" 2a 180 - 22 5/32" 4b 145 - 22 3/16" 4b 180 - 22 3. III 5/32" 4b 145 - 22 3/16" 2b 180 - 22 C. 269.9 mins. 100° - 200°F. D. Five crater cracks after first pass. Some chipping and grinding after first pass. Total chipping and grinding time 5-1/2 hrs.,	A. 100° F. B. None	1	765	1-1/4" R		9-1/4" D				Passed radiograph
					details not given.	2	772		1" L	3" U	Imp	I	36"	

*Weld Metal

IDENTIFICATION A. FIRING RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. PASSES TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-39 B. 10/8/42 C. H-12 D. Jones & Laughlin Steel Corp. E. A. O. Smith Corp. F. The Neil Co.	A. 1" B. R-III (1.75Mn,.24Si, .55Mo) C. .25 D. Face 321 Back 341 E. --- F. ---	A. A-I (.08C,3.5 Mn,.35Si, 19.Cr, 10.0Ni, 1.0Mo)* B. SW-164 C. Lime D. DC REV	A. 60°DV B. 1/8" C. Machining Buttering	A. Not given B. 1. II 5/32" 1a 135 - 25 5/32" 1a 150 - 30 2. III 3/16" 3a 195 - 30 5/32" 4b 150 - 30 3. III 5/32" 4b 150 - 30 3/16" 2b 195 - 30 C. 16 hrs. 120°F. D. Grinding after first pass.	A. 150° F. B. None	1 2 3	759 791 781	3½" L	1½" R 1¾" R	7½" D 5½" U 2⅜" U	Imp Imp	II I II III	3½" 2½" 5½" 1" 11½"	Passed radiograph
A. AD-39 B. 10/10/42 C. H-13 D. Jones & Laughlin Steel Corp. E. Lincoln Electric Co. F. The Neil Co.	A. 1" B. R-III (1.75Mn,.24Si, .55Mo) C. .25 D. Face 321 Back 341 E. --- F. ---	A. A- --- B. Armor-weld C. Lime D. DC REV	A. 60°DV B. 1/8" C. Machining Buttering	A. Not given B. 1. II 5/32" 1a 130 - 30 5/32" 1a 150 - 30 2. III 5/32" 2a 150 - 30 3/16" 2a 4b 200 - 30 3. III 5/32" 4b 150 - 30 3/16" 2b 200 - 30 C. 21 hrs. 120°F. D. Grinding after first five passes, ninth, 13th and 15th. Soles ground out.	A. 150° F. B. None	1 2	802 790	X	½" L	7" D 5½" U	Imp O Imp	II III III II III	3½" 6½" ½" 6½" 4" 21"	Passed radiograph
A. AD-131 B. 12/3/42 C. H-14 D. Great Lakes Steel Corp. E. Harnischfeger Corp. F. The Neil Co.	A. 1" B. R-IV (.83Mn,.82Si, .64Cr,.15Mo, .08Zr) C. .26 D. Face 321 Back 341 E. --- F. ---	A. A-I (.12C,1.50 Mn,.45Si, 18.0Cr, 10.4Ni, 2.35Mo)* B. AW-3 C. Lime D. DC REV	A. 60°DV B. 5/32" C. Machining Buttering	A. Not given B. 1. I 3/16" 1a 150 - 25 2. III 3/16" 5a 180 - 30 5/32" 4b 145 - 25 3. III 1/8" 4b 90 - 25 3/16" 2b 180 - 30 C. 15 hrs. 120°F. D. Grinding after all passes. Time 3-1/2 hrs.	A. 120° F. B. None	1 2 3	758 772 755	½" L	X ¾" L	4½" D 6" U 6½" D	Imp O Imp O Imp	I II III II II III II I II III	3" 3½" 3" ½" 1" ½" ½" 12¾" 5½" 1" 39¾"	Passed radiograph
A. AD-131 B. 12/3/42 C. H-15 D. Great Lakes Steel Corp. E. Lincoln Electric Co. F. The Neil Co.	A. 1" B. R --- C. --- D. --- E. --- F. ---	A. A --- B. Armor-weld C. Lime D. DC REV	A. 60°DV B. 5/32" C. Machining Buttering	A. Not given B. 1. I 5/32" 1a 145 - 25 2. III 5/32" 1a 8b 150 - 30 3/16" 2a 180 - 30 3. III 5/32" 4b 150 - 30 3/16" 2b 180 - 30 C. 16 hrs. 120°F. D. Grinding after first pass.	A. 120° F. B. None	1	756	¾" L		7½" D	Imp	I II	22" 3½" 25½"	Failed radiograph 2" crack
		*Weld Metal														

IDENTIFICATION A. FIRM ASSIGNED NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR AREA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. DIM E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP V. PASSES 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	S.S.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHING RESULTS, ETC.
A. AD-268 B. 2/16/43 C. H-17 D. Great Lakes Steel Corp. E. A. O. Smith Corp. F. The Heil Co.	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. --- E. --- F. ---	A. A-I (.08C,3.5 Mn,.35Si, 19.Cr, 10.0Ni, 1.0Mo)* B. SW-164 C. Lime D. DC REV	A. 60°DV B. 1/8" C. Machining Buttering	A. Not given B. 1. I 5/32" 1a 150 - 30 2. I 5/32" 3a 150 - 30 3/16" 4a 190 - 30 3. III 5/32" 4b 150 - 30 1/4" 2b 245 - 30 C. 19 hrs. 130°F. D. One bead buttered on tip of bevel	A.130° F. B.None	1 2	776 834	 1" R	3/4" R	5 1/2" D 8 3/4" U	Imp Imp	II I II III	1 1/2" 14 1/2" 9 1/2" 35 1/2"	Passed radiograph
A. AD-268 B. 2/16/43 C. H-18 D. Great Lakes Steel Corp. E. Harnischfeger Corp. A.O.Smith Corp. F. The Heil Co.	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. --- E. --- F. ---	A. A-I SW164 (.08C,3.5 Mn,.35Si, 19.Cr, 10.0Ni, 1.0Mo)* B. AW-3 SW-164 C. Lime D. DC REV	A. 60°DV B. 1/8" C. Machining Buttering	A. Not given B. 1. I 5/32" 1a 145 - 30 2. I 5/32" 3a 145 - 30 3/16" 4a 195 - 30 3. III 5/32" 4b 145 - 30 1/4" 2b 220 - 30 C. 17 hrs. 115°F. D. One bead buttered on tip of bevel	A.115° F. B.None	1 2	756 849	X 	 3/4" L	8 1/2" D 8 3/4" U	Imp Imp	II III	1 3/4" 20" 21 3/4"	Passed radiograph
A. AD-268 B. 2/16/43 C. H-19 D. Great Lakes Steel Corp. E. Harnischfeger Corp. F. The Heil Co.	A. 1" B. R-IV (.93Mn,.87Si, .62Cr,.17Mo) C. .27 D. --- E. --- F. ---	A. A-I (.12C,3.85 Mn,.50Si, 19.0Cr, 9.3Ni, .92Mo)* B. AW-3-C C. Lime D. DC REV	A. 60°DV B. 1/8" C. ---	A. Not given B. 1. II 5/32" 1a 140 - 30 5/32" 1a 150 - 30 2. I 5/32" 2a 150 - 30 3/16" 4a 190 - 30 3. III 5/32" 4b 150 - 30 1/4" 2a 240 - 30 C. 18 hrs. 115°F. D. One bead buttered on tip of bevel	A.115° F. B.None	1 2	757 781	2" L 	 3/4" L	5 1/2" D 9" U	 Imp	 II I III V	 3" 10" 5" 7 1/4" 35 1/4"	Passed radiograph Two small cracks

*Weld Metal

INVESTIGATORS A. PERSONNEL RESPONSIBLE B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, BODY PASS B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SEQUENCE EL. NO. TYPE AMPS V. 1. ROOT TYPE 2. BODY TYPE 3. GROOVE TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	V&L. F/S	LOCATION OF N L.L.	R.L.	S.S.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-193 B. 1/13/43 C. 53 D. Jones & Laughlin Steel Corp. E. McKay Company F. International Harvester Co.	A. 1" B. *-III (1.16Mn,.19Si, .52Mo) C. .23 D. Face 331 Back 341 E. B.O.H. F. 1625°F. 2 hrs. Water 1050°F. 3 hrs. Air	A. A-II (.12C,4.0 Mn,.80Si, 20.0Cr, 9.7Ni)* B. Armorloy C. Lime D. DC REV	A. 45°DV B. 5/16" C. Flame Cutting Grinding	A. Copper B. 1. II 5/32" 1a 135 - 5/32" 1a 145 - 2. III 3/16" 1a 3b 175 - 5/32" 1b 140 - 3/16" 1b 180 - 5/32" 1b 145 - 5/32" 1b 140 - 1/4" 1b 250 - 3. III 3/16" 2b 175 - 5/32" 3b 140 - 1/4" 1b 250 - C. 2.93 hrs. 125° - 210°F. D. Grinding after first three passes and nineth, time 2.95 hrs.	A. 100° F. B. None	1 2	763 775	 X	3½" R	7" D 8" U	 Imp	 I II	 18" 8½" 26½"	Passed radiograph

*Weld Metal

IDENTIFICATION A. PLATE RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME COOLING	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.I.	R.L.	C.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHING RESULTS, ETC.
A. AD-319 B. 3/12/43 C. 6 D. Great Lakes Steel Co. E. McKay Rods Co. F. Kay Brunner Steel Products	A. 1" B. R-IV (.88Mn,.73Si, .66Cr,.21Mo) C. .27 D. Face 341 E. Elec. F. 1650°F. 2 hrs. Water 975°F. 2-1/4 hrs. Draw	A. A-II (.09-.105C 3.75-4.80 Mn,.53-.75 Si,19.10-19.95Cr, 9.10-10.40Ni)* B. Armorloy C. Lime D. DC REV	A. DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 5/32" 1a 150 - 25 3/16" 1a 160 - 25 2. I 1/4" 4a 210 - 25 3. III 3/16" 2b 210 - 25 5/16" 2b 225 - 25 3/16" 2b 225 - 25 C. 8:06 hrs. 100° - 175°F. D. Grinding after first pass.	A. Yes B. None	1	762	3/4" R		6 1/2" D	Imp	II III	11" 1 1/2"	Failed radiograph Excessive crossbar cracking
						2	674		3" L	2 1/2" D	O	II III	3/4" 1"	
						3	697		X	3 1/4" U	O Imp	II III I II	4 3/4" 1/2" 10" 3/4"	
													30 1/4"	

*Weld Wetel

SPECIMEN A. PLATE CHARGE NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE DESIG. F. ARMOR PREPARATION	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	N	VEL. V/M	BALLISTIC RESULTS LOCATION OF N LL	RL	GL	CRACKING LOC	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-109 B. 12/9/42 C. H-1000 D. Great Lakes Steel Corp. E. Crucible Steel Company F. Maremont Automotive Products, Inc.	A. 1" B. R-IV (.76Mn,.628i, .59Cr,.19Mo, .08Zr) C. .26 D. Face 321 to 341 Back 321 to 341 E. B.O.H. F. 1640°F. 1-1/2 hrs. Water 1020°F. 1-1/2 hrs.	A. A-I (.15C,3.0 Mn,.80Si, 18.20Cr, 8.10Ni, 1.85-2.00 Mo)* B. Armorize Rezistal C. Titanium D. DC REV *Weld Metal	A. 50°DV,1/8"RF B. 3/16" C. Flame Cutting Flame Softening Planing	A. Not given B. 1. II 5/32" 2a 150 - 44 2. III 3/16" 2a 4b 190 - 48 3. II 3/16" 5b 190 - 48 C. 7 hrs. 150° - 200°F. D.	A. 160° F. B. None	1	762		1¼" R	5¾" D	Imp	I II V	12" 6½" 6" 24¼"	Passed radiograph

IDENTIFICATION A. PLATE NUMBER OR B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP V. PASSES 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-208 B. 1/23/43 C. MCH-51 D. Great Lakes Steel Corp. Heat treated by - Detroit Steel Products E. McKay Company F. Pullman Standerd Car Mfg. Company	A. 1.185" B. R-IV (.91Mn,.75Si, .69Cr,.19Mo, .10Zr) C. .29 D. Face 335 Back 333 E. Acid-Elec. F. ---	A. A --- B. Armorloy A C. Lime D. DC REV	A. 45°DV B. 3/8" C. Flame Cutting Grinding Machined Buttering	A. Copper B. 1. II 3/16" 1a 180 - 22 1/4" 1a 250 - 24 2. III 1/4" 1b 250 - 26 1/4" 1b 220 - 24 1/4" 5a 260 - 26 3. III 1/4" 6b 260 - 26 C. 6 hrs. 190° - 310°F. D. Crater cracking after first pass. Chipping and grinding after first pass. Chipping after sixth and eleventh passes. Three passes buttered at root in crossbar.	A. 75°-100°F. B. None	1 2	881 884	2½" L	8" R	4" D 3½" U	Imp	I	36"	Passed radiograph
A. AD-208 B. 1/23/43 C. MCH-52 D. Great Lakes Steel Corp. Heat treated by - Detroit Steel Products E. McKay Company F. Pullman Standerd Car Mfg. Company	A. 1.185" B. R-IV (.90Mn,.74Si, .70Cr,.22Mo, .07Zr) C. .30 D. Face 341 Back 341 E. Acid-Eleo. F. ---	A. A --- B. Armorloy A C. Lime D. DC REV	A. 45°DV B. 3/8" C. Flame Cutting Grinding Machined Buttering	A. Copper B. 1. II 3/16" 1a 170 - 23 1/4" 1a 260 - 26 2. I 1/4" 1a 250 - 26 1/4" 4a 260 - 26 3. III 1/4" 2b 250 - 24 1/4" 4b 260 - 24 C. 6 hrs. 190° - 330°F. D. Crater cracking after first and fourth passes. Chipping and grinding after first and fourth passes and just chipping after second pass. Three passes buttered at root in crossbar.	A. 75°-100°F. B. None	1 2 3 4	874 882 919 1012	1" R ⅛" L	½" R 1" R	2" U 8½" D 5½" U 5" D	O Imp Imp Imp Imp	III V II III V II III I V	1" 2" 2" 1" 1" 36" 9" 54"	Passed radiograph
A. AD-315 B. 3/12/43 C. 60 D. Great Lakes Steel Corp. Heat treated by - Detroit Steel Products E. Hollup Corp. F. Pullman Standard Car Mfg. Company	A. 1.185" B. R-IV (.91Mn,.75Si, .69Cr,.19Mo) C. .29 D. Face 335 Back 333 E. B.O.H. F. ---	A. A --- B. Armorod C. --- D. DC REV	A. 60°DV B. 3/8" C. Flame Cutting Grinding Machined Buttering	A. Copper B. 1. II 3/16" 1a 160 - 20 1/4" 1a 330 - 29 2. III 1/4" 1a 330 - 29 1/4" 6b 300 - 27 3. III 1/4" 6b 300 - 27 C. 7 hrs. 150° - 370°F. D. Crater cracking after first pass. Chipping after all passes and grinding after first. Thres passes buttered at root in crossbar.	A. None B. None	1 2 3	849 857 868	2½" L ⅛" L	⅝" L	7" D 7" U 7½" U	Imp Imp	I II III I II III	9" 4" 2" 6½" 13½" 1½" 35½"	Passed radiograph Scattered porosity and slag inclusions thru-out plate

IDENTIFICATION A. Plate Ordered As B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Supp. F. Armor Fabricator	ARMOR DATA A. Plate Thickness B. Type C. Carbon Content D. Hrn E. Process F. Heat Treatment Temp Time Quench	ELECTRODE DATA A. Type B. Trade Name C. Coating D. Current & Polarity	JOINT DESIGN A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	WELDING PROCEDURE A. Backing Passes B. Deposition Size El. No. Type Amp V. 1. Root Type 2. Body Type 3. Groove Type C. Total Welding Time & Inter Pass Temperature D. Remarks	HEAT A. Pre B. Post	BALLISTIC RESULTS N	Vel. F/S	Location of N L.L.	R.L.	G.S.	CRACKING Loc.	Type	Amt.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-315 B. 3/12/43 C. MQH-61 D. Great Lakes Steel Corp. Heat treated by - Detroit Steel Products E. McKay Company F. Pullman Standard Car Mfg. Company	A. 1.185" B. R-IT (.91Mn,.75Si, .69Cr,.19Mo) C. .29 D. Face 335 Back 333 E. B.O.H. F. ---	A. A --- B. Armorloy A C. Lime D. DC REV	A. 60°DV B. 3/8" C. Flame Cutting Grinding Machined	A. Copper B. 1. II 3/16" 1a 160 - 20 3/16" 1a 170 - 23 2. III 1/4" 2a 4b 220 - 28 3. III 1/4" 6b 220 - 28 C. 6 hrs. 190° - 380°F. D. Crater cracking after first pass. Chipping and grinding after first pass. Chipping after all passes.	A. None B. None	1	843	1" L		6" D	Imp	I II V	5" 1½" 19½" 25½"	Passed radiograph Scattered porosity and slag inclusions
A. AD-315 B. 3/12/43 C. MQH-62 D. Great Lakes Steel Corp. Heat treated by - Detroit Steel Products E. McKay Company F. Pullman Standard Car Mfg. Company	A. 1.185" B. R-IV (.90Mn,.74Si, .70Cr,.22Mo) C. .30 D. Face 341 Back 341 E. B.O.H. F. ---	A. A --- B. Armorloy A C. Lime D. DC REV	A. 60°DV B. 3/8" C. Flame Cutting Grinding Machined Buttering	A. Copper B. 1. II 3/16" 1a 160 - 21 3/16" 1a 170 - 20 2. III 1/4" 2a 4b 290 - 29 3. III 1/4" 8b 280 - 27 C. 7-1/2 hrs. 170° - 390°F. D. Crater cracking after first and fifth passes. Grinding after first pass and chipping after all passes. Three passes buttered at root in cross-bar.	A. None B. None	1	833		2" R	8½" D				Passed radiograph Scattered porosity and slag inclusions
						2	847	½" L		7½" U	Imp	III	5½"	
						3	909		2" L	7" U	O	III	½"	
						4	892	2½" L		7" D	O	I	1" 6½"	

IDENTIFICATION A. FIRM RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS H	VEL. F/S	LOCATION OF H L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-92 B. 10/24/42 C. 33 D. Great Lakes Steel Corp. E. McKay Company F. So. California Division, G.M.	A. 1" B. R-IV (.85Mn,.74Si, .74Cr,.16Mo, .08Zr) C. .32 D. Face 335 Back 340 E. --- F. 1650°F. 2 hrs. Water 975°F. 3-1/2 hrs.	A. A-I (.08-.11C, 4.25-4.60 Mn,.45-.70Si, 19.2-19.30 Cr,9.6-10.15Ni, .98-1.00 Mo)* B. Armorloy C. Lime D. DC REV	A. 60°DV B. 5/32" C. Flame Cutting Grinding	A. Copper B. 1. I 5/32" 1a 140 - 25 2. III 5/32" 1a 140 - 25 3/16" 2a 4b 170 - 26 3. III 5/32" 4b 140 - 25 1/4" 2b 200 - 26 C. 3:30 hrs. 125° - 225°F. D. Four minutes of chipping after each pass.	A. 100° F. B. None	1	773	X		7½" U	Imp	II III	4" 8¾"	Passed radiograph
						2	677		3½" L	13½" D	O Imp	II III V	1" 1" 10½"	
						3	677		2" L	2" U	O	III	¾" 25¾"	
						Plate only 38" wide								
A. AD-177 B. 1/7/43 C. 38 D. Great Lakes Steel Corp. E. Alloy Rods Co. F. So. California Division, G.M.	A. 1" B. R-IV (.81Mn,.63Si, .62Cr,.21Mo, .09Zr) C. .28 D. --- E. --- F. ---	A. A-I (.09C,1.90 Mn,.50Si, 18.75Cr, 10.95Ni, 2.50Mo)* B. Armorarc C. Titanium D. DC REV	A. 60°DV B. 5/32" C. Flame Cutting Grinding	A. Copper B. 1. I 1/8" 1a 125 - 24 2. I 1/8" 6a 125 - 24 3. III 1/8" 6b 125 - 24 C. 4.:12 hrs. 105° - 150°F. D. Eight minutes of chipping after each pass. One more pass in crossbar.	A. 100° F. B. None	1	755		2" L	8" D	Imp	II	7"	Passed radiograph
						2	773	3½" R		5½" O	Imp	II	1½"	
						3	788	X		4½" D	Imp	I	34½" 43"	
A. AD-282 B. 2/26/43 C. 39 D. Great Lakes Steel Corp. E. Alloy Rods Co. F. So. California Division, G.M.	A. 1" B. R-IV (.88Mn,.73Si, .66Cr,.21Mo, .11Zr) C. .27 D. Face 341 Back 341 E. --- F. 1650°F. 2:5 hrs. Water 975°F. 3:15 hrs.	A. A-I (.09C,1.90 Mn,.50Si, 18.75Cr, 10.95Ni, 2.50Mo)* (.09C,1.64 Mn,.25Si, 20.28Cr, 10.29Ni, 2.50Mo)* B. Armorarc C. Titanium D. DC REV	A. 60°DV B. 5/32" C. Flame Cutting Grinding	A. Copper B. 1. II 5/32" 2b 125 - 22 2. II 1/8" 2b 110 - 22 5/32" 17b 125 - 22 3. II 5/32" 13b 125 - 22 C. 5:53 hrs. 100° - 160°F. D. Five minutes of chipping after each pass. Three more passes in left leg, and eleven more passes in crossbar. Plate welded in overhead position, welder standing.	A. 100° F. B. None	1	767		1½" L	7" U	Imp	I III	16½" 2¾"	Passed radiograph
						2	739	1½" R		3½" D	O Imp	III I II III	1" 12¾" 4" 2½" 38½"	

*Weld Metal

IDENTIFICATION A. Armor Designation B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Spec. F. Armor Fabricator	ARMOR DATA A. Plate Thickness B. Type C. Carbon Content D. Side E. Process F. Heat Treatment Temp Time Quench	ELECTRODE DATA A. Type B. Trade Name C. Coating D. Current & Polarity	JOINT DESIGN A. Groove, Unclosed Angle, Root Face B. Root Gap C. Plate Preparation	WELDING PROCEDURE A. Backing Passes B. Deposition Size El. Amp. Type Amps V. 1. Root Type 2. Body Type 3. Groove Type C. Total Welding Time & Inter Pass Temperature D. Remarks	HEAT A. Pre B. Post	BALLISTIC RESULTS N	Vel. F/S	Location of N L.L.	R.L.	C.B.	Cracking Loc.	Type	Amt.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-73 B. 10/20/42 C. TH-38 D. Great Lakes Steel Corp. Jones & Laughlin Steel Corp. E. Reid-Avery Co. Alloy Rods Co. F. Ternstedt Mfg. Division	A. 1" B. R-IV G L (.86Mn,.80Si, .62Cr,.22Mo, .09Zr) R-III J&L (1.75Mn,.24Si, .55Mo) C. .30 .25 D. Face 302 Back 302 Face 307 Back 311 E. B.O.H. F. 1625°F. GL 1-1/2 hrs. Water 1050°F. 4-1/2 hrs. Air	A. A-I R-A (.07-.15C, 3.50-4.50 Mn,.75Si, 18.00-20. Cr,8.50-10.50Ni, 1.25Mo)* A-II A R (.08-.13C, 3.5-4.5Mn .35-.70Si 19.0-20.0 Cr,8.5-10.5Ni)* B. 18-8-B Armoraro C. --- Titanium D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 310 - 27 2. I 5/16" 2a 450 - 32 3. I 5/16" 2a 450 - 32 C. 4 hrs. 70° - 340°F. D. Cracking after each pass.	A. None B. None	1	776		1-1/2" L	6-1/4" D	Imp	I II	4-1/2" 8-1/2"	Failed radiograph Crack in crossbar almost continuous
							2	763	X		2-1/2" U	O Imp	III I II III	1-1/2" 5-3/4" 1-1/2" 6-1/4" 29"	
A. AD-73 B. 10/30/42 C. TH-61 D. Great Lakes Steel Corp. E. Lincoln Electric Company F. Ternstedt Mfg. Division	A. 1" B. R-IV (.90Mn,.76Si, .65Cr,.21Mo, .09Zr) C. .30 D. Face 317 Back 311 E. B.O.H. F. 1525°F. 1-1/2 hrs. Water 1050°F. 4-1/2 hrs. Air	A. A-II (.08-.10C, 3.50-4.25 Mn,.45-.80Si, 19.0-20.5 Cr,8.5-10.0Ni)* B. Armor weld C. --- D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 1/4" 1a 350 - 25 1/4" 1a 300 - 27 2. I 5/16" 2a 400 - 30 3. I 5/16" 2a 400 - 30 C. 3 hrs. 70° - 360°F. D.	A. None B. None	1	760		1" L	1-1/8" U	Imp	I II III	6" 9-1/2" 1-1/2"	Passed radiograph Little slag inclusions in crossbar
							2	685	1-3/4" L		6" D	O Imp	III I II III	1" 17-1/2" 3-3/4" 1" 39"	

*Weld Metal

SPECIMEN A. Piece Welded No. B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Manf. F. Armor Fabricator	ARMOR DATA A. Plate Thickness B. Type C. Carbon Content D. Hrn E. Process F. Heat Treatment Temp Time Quench	ELECTRODE DATA A. Type B. Trade Name C. Coating D. Current & Polarity	JOINT DESIGN A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	WELDING PROCEDURE A. Backing B. Deposition Size El. No. Type Amp V. 1. Root Type 2. Body Type 3. Crown Type C. Total Welding Time & Inter Pass Temperature D. Remarks	HEAT A. Pre B. Post	BALLISTIC TESTS N	Vel. F/S	Location of N L.L.	R.L.	C.B.	Cracking Loc.	Type	Amt	RADIOGRAPHIC RESULTS, ETC.
A. AD-128 B. 11/25/42 C. TH-58 D. Great Lakes Steel Corp. E. Reid-Avery Company F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.89Mn,.96Si, .68Cr,.20Mo, .10Zr) C. .31 D. Face 302-293-300 E. B.O.H. F. 1625°F. 1-1/2 hrs. Water 1050°F. 4-1/2 hrs. Air	A. A-I (.07-.15C, 3.50-4.50 Mn,.75Si, 18.00-20.00Cr, 8.50-10.5 Ni,1.25Mo)* B. 18-8-B C. Titanium D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 200 - 25 2. I 1/4" 2a 300 - 27 3. I 5/16" 2a 400 - 30 C. 7 hrs. 70° - 230°F. D.	A. None B. None	1	735	1/4" L		5 1/8" D	Imp	I II III	18" 1" 1"	Passed radiograph Two small cracks in crossbar
						2	777		1/4" R	7" U	Imp	I V	12 1/2" 21 1/2" 53 1/2"	
A. AD-130 B. 12/1/42 C. TH-63 D. Great Lakes Steel Corp. E. Alloy Rods Co. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .32 D. Face 321-323-321 E. B.O.H. F. 1600°F. 1/2 hr. Water 900°F. 1-1/2 hrs. Air	A. A-II (.03-.13C, 3.5-4.5Mn, .35-.70Si, 19.0-21.0 Cr,8.5-10.5Ni)* B. Armorarc "B" C. Titanium D. AC	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 200 - 25 2. I 3/8" 2a 450 - 32 3. I 3/8" 2a 450 - 32 C. 5 hrs. 70° - 270°F. D.	A. None B. None	1	787	X		3" D	Imp	I II III V	17 3/4" 21" 3 1/2" 7 1/2" 30 1/2"	Failed radiograph 12" crossbar crack Slag filled crater crack at both junctions
A. AD-130 B. 12/1/42 C. TH-65 D. Great Lakes Steel Corp. E. Reid-Avery Company Hollup Corp. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.90Mn,.76Si, .65Cr,.21Mo, .09Zr) C. .30 D. Face 307-311-302 E. B.O.H. F. 1600°F. 1/2 hr. Water 900°F. 1-1/2 hrs. Air	A. A-I (.076C, 1.81Mn, .46Si, 17.6LCr, 10.33Ni, 1.03Mo)* B. Reid-Avery Armorod C. --- Ti 02 D. AC	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 190 - 25 2. I 3/8" 2a 400 - 30 3. I 3/8" 2a 400 - 30 C. 5 hrs. 80° - 260°F. D.	A. None B. None	1	779	3/4" L		5 3/4" D	Imp	I II V	10 1/2" 1" 18" 29 1/2"	Passed radiograph 2" crack and lack of fusion in cross-bar
		*Weld Metal												

IDENTIFICATION A. PRIOR RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	C.B.	CRACKING LOC.	TYPE	AM'T.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-119 B. 12/12/42 C. TH-76 D. Great Lakes Steel Corp. E. McKay Company Alloy Rods Co. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .32 D. Face 321-319-319 E. B.O.H. F. 1600°F. 1/2 hr. Water 900°F. 1-1/2 hrs. Air	A. A-II (.10-.12C, 3.9-4.5Mn, 19.2-21.Cr 10.2-11.5 Ni,.80Mo)* B. Armorloy A-5 Armorarc B C. Lime-Mn Ti Base D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 1/4" 2a 275 - 28 2. I 5/16" 2a 390 - 30 3. I 5/16" 2a 390 - 30 C. 5 hrs. 100° - 260°F. D.	A. To 100°F. B. None	1	768	2½" L		5⅜" D				Passed radiograph
						2	785		1½" L	7½" U	0 Imp	I V	7½" 18" 25½"	
A. AD-119 B. 12/12/42 C. TH-78 D. Great Lakes Steel Corp. E. McKay Company Alloy Rods Co. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .32 D. Face 325-321-319 E. B.O.H. F. 1600°F. 1/2 hr. Water 900°F. 1-1/2 hrs. Air	A. A-II (.10-.12C, 3.9-4.5Mn, 19.2-21.Cr 10.2-11.5 Ni,.80Mo)* B. Armorloy A-5 Armorarc B C. Lime-Mn Ti Base D. AC	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 1/4" 2a 290 - 28 2. I 3/8" 2a 450 - 32 3. I 3/8" 2a 450 - 32 C. 4 hrs. 80° - 280°F. D.	A. None B. None	1	746		¼" L	7½" U	Imp	I II V	36" 3" 2" 41"	Failed radiograph Crater cracks in both junctions 10" fusion zone crack in crossbar Some root pass cracks in crossbar and right leg weld
A. AD-119 B. 12/12/42 C. TH-80 D. Great Lakes Steel Corp. E. Reid-Avery Company F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .32 D. Face 331-329-321 E. B.O.H. F. 1600°F. 1/2 hr. Water 900°F. 1-1/2 hrs. Air	A. A-I (.07-.15C, 3.50-4.50 Mn,.75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* B. Reid-Avery C. Ti base D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 1/4" 2a 290 - 28 2. I 5/16" 2a 390 - 30 3. I 5/16" 2a 390 - 30 C. 5 hrs. 80° - 250°F. D.	A. None B. None	1	755		2½" R	5½" D	0	I II III	15½" 1½" 13⅜" 30⅓"	Failed radiograph Crossbar is entirely cracked

*Weld Metal

IDENTIFICATION A. FIRMS RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. PASSES NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS H	VEL. F/S	LOCATION OF H L.L.	R.L.	C.S.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-144 B. 12/23/42 C. TH-82 D. Great Lakes Steel Corp. E. Alloy Rods Co. McKay Company F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .32 D. Face 321-325-323 E. B.O.H. F. 1600°F. 1/2 hr. Water 800°F. 1-1/2 hrs. Air	A. A-II B (.08-.13C, 3.5-4.5Mn .35-.70Si 19.0-21.0 Cr,8.5-10.5Ni)* A-II A-5 (.12C,3.5-4.5Mn,.80 Si,19.00-21.00Cr, 9.20-10.20Ni)* B. Armorarc B Armorloy A-5 C. Titanium Lime-Mn D. AC	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 1/4" 2a 290 - 28 2.& 3. I 7/16" 1a 550 - 34 1/2" 1a 640 - 35 C. 3 hrs. 80° - 340°F. D.	A. None B. None	1	762		1 3/8" L	5" U	O Imp O	III I II V II	12" 11" 4" 3 1/2" 2" 32 1/2"	Failed radiograph Scattered porosity thru-out 25" incomplete fusion. Crater crack at left junction
A. AD-172 B. 1/5/43 C. TH-86 D. Great Lakes Steel Corp. E. McKay Company Cruc'ble Steel Company F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.90Mn,.75Si, .67Cr,.22Mo, .10Zr) C. .30 D. Face 352-350-341 E. B.O.H. F. 1600°F. 1/2 hr. Water 800°F. 1-1/2 hrs. Air	A. A-II McK. (.10C,1.5-2.0Mn,.70 Si,20.5-22.0Cr, 9.5-10.5 Ni,)* A-II Cru. (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* B. Armorloy A-5 Armorize Rezistal C. Lime-Mn D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 5/32" 2a 175 - 20 2. I 5/16" 2a 375 - 28 3. I 5/16" 2a 375 - 28 C. 7 hrs. 70° - 140°F. D.	A. None B. None	1	768		1 3/4" R	6 1/2" D	Imp	I V	14 1/2" 8 1/2" 23"	Passed radiograph Several small crater cracks
		*Weld Metal															

IDENTIFICATION A. Firms Record or B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Supp. F. Armor Fabricator	BASE MTL. A. Plate Thickness B. Type C. Carbon Content D. Ohn E. Process F. Heat Treatment Temp Time Quench	ELECTRODE (Fill) A. Type B. Trade Name C. Coating D. Current & Polarity	JOINT DESIGN A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	WELDING PROCEDURE A. Backing B. Deposition Sequence Size El. No. Type Amps V. 1. Root Type 2. Body Type 3. Groove Type C. Total Welding Time & Inter Pass Temperature D. Remarks	HEAT A. Pre B. Post	BALLISTIC RESULTS H	Vel. f/s	Location of H L.L.	R.L.	S.S.	Cracking Loc.	Type	Amt	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-172 B. 1/5/43 C. TH-87 D. Great Lakes Steel Corp. E. Hollup Corp. Crucible Steel Company F. Tornstedt Mfg. Div.	A. 1" B. R-IV (.90Mn,.75Si, .67Cr,.22Mo, .10Zr) C. .30 D. Face 326-328-306 E. B.O.H. F. 1/2 hr. Water 1-1/2 hrs. Air	A. A-I H (.08C,3.36 Mn,18.95 Cr,10.27 Ni,1.03Mo, .458i)* A-I Cru (.11C,3.56 Mn,19.60 Cr,9.78Ni, 1.19Mo, .345i)* B. Armorod Armorize-Rezistal C. Ti 02 D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 5/32° 2a 180 - 24 2. I 5/16° 2a 375 - 28 3. I 5/16° 2a 375 - 28 C. 7 hrs. 70° - 190°F. D.	A. None B. None	1	763	1½" R		10½" D	Imp	I II III V	9¾" 7½" 3 29"	Passed radiograph
A. AD-217 B. 1/26/43 C. TH-88 D. Great Lakes Steek Corp. E. Hollup Corp. Reid-Avery Co. F. Tornstedt Mfg. Div.	A. 1" B. R-IV (.77Mn,.71Si, .58Cr,.30Mo, .09Zr) C. .27 D. Face 339-341-345 E. B.O.H. F. 1600°F. 3-1/2 hrs. Water 910°F. 3-3/4 hrs. Air	A. A-I M. (.076C,1.81 Mn,.463i, 10.33Cr, 7.61Ni, 1.03Mo)* A-I R-A (.07C,3.50-4.50Mn, .758i, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* B. Armorod 18-8-B C. Ti Base D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16° 2a 220 - 25 2. I 1/4° 2a 320 - 28 3. I 1/4° 2a 320 - 28 C. 7-3/4 hrs. 70° - 160°F. D.	A. None B. None	1	776	½" R		5½" U	Imp	I II III V	16" 1" 4½" 2½"	Passed radiograph
						2	670	⅜" L		10⅜" D	O Imp	II III	2" 7½" 3 36½"	

*Weld Metal

IDENTIFICATION	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS							REMARKS ON CRACKING RADIOGRAPHING RESULTS, ETC.
A. PLATE RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	A. PRE B. POST	N	VEL. F/S	LOCATION OF H L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	
A. AD-217 B. 1/26/43 C. TH-89 D. Great Lakes Steel Corp. E. Hollup Corp. Reid-Avery Company F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.90Mn,.75Si, .67Cr,.22Mo, .10Zr) C. .30 D. Face 352-356-361 E. B.O.H. F. 1600°F. 1-1/2 hrs. Water 1018°F. 2 hrs. Air	A. A-I H. (.076C, 1.81Mn, .46Si, 10.23Cr, 7.61Ni, ? B. Armorod 18-8-B C. Mn-Mo Ti Base D. DC REV	A. 60°DV B. 3/8" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 200 - 25 2. I 1/4" 2a 300 - 28 3. I 1/4" 2a 300 - 28 C. 9 hrs. 70° - 160°F. D.	A. None B. None	1	750	3" L		6" U				Passed radiograph
						2	788		X	2" D	Imp	II I II III	4" 17" 6½" 3½" 31"	
A. AD-217 B. 1/26/43 C. TH-90 D. Great Lakes Steel Corp. E. Reid-Avery Company Hollun Corp. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.77Mn,.71Si, .58Cr,.20Mo, .09Zr) C. .27 D. Face 307-307-306 E. B.O.H. F. 1600°F. 3-1/2 hrs. Water 910°F. 3-3/4 hrs. Air	A. A-I R-A (.07-.15C, 3.50-4.50 Mn,.75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* A-I H. (.076C, 1.81Mn, .46Si, 10.33Cr, 7.61Ni, ? 1.03Mo)* B. 18-8-B Armorod C. Ti Base Mn-Mo D. DC REV	A. 60°DV B. 1/2" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 200 - 25 2. I 1/4" 2a 300 - 28 3. I 1/4" 2a 300 - 28 C. 10 hrs. 70° - 210°F. D.	A. None B. None	1	763		1" L	5½" D	Imp	I II	6" 6"	Passed radiograph Metal deposit irregular
						2	704	1½" R		4½" U	O Imp	II III I II III	2" 2" 2" 4½" 3½" 23½"	

*Weld Metal

IDENTIFICATION A. Weld Number B. Date of Test C. Plate No. D. Welder Identification E. Electrode Spec. F. Welder Procedure	BASE MET. A. Plate Thickness B. Type C. Carbon Content D. Spec E. Process F. Heat Treatment Temp Time Quench	FILLER MET. A. Type B. Trade Name C. Coating D. Current & Polarity	JOINT DESIGN A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	WELDING PROCEDURE A. Backing Passes B. Deposition Size El. Amp. Type Joint V. 1. Root Type 2. Body Type 3. Groove Type C. Total Welding Time & Inter Pass Temperature D. Remarks	HEAT A. Pre B. Post	BALLISTIC RESULTS No.	Vel. f/s	Location of H L.L.	R.L.	S.S.	Cracking Loc.	Type	Amt.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-203 B. 1/26/43 C. TH-91 D. Great Lakes Steel Corp. E. Reid-Avery Co Hollup Corp. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.90Mn,.75Si, .67Cr,.22Mo, .10Zr) C. .30 D. Face 329-331-337 E. B.O.H. F. 1600°F. 1-1/2 hrs. Water 1010°F. 2 hrs. Air	A. A-I R-A (.07-.15C, 3.50-4.50 Mn,.75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* A-I H Co (.076C,1.81 Mn,.465i, 10.33Cr, 7.61Ni, 1.03Mo)* B. 18-8-B Armorod C. Ti Base Mn-Mo D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 200 - 25 2. I 1/4" 2a 300 - 28 3. I 1/4" 2a 300 - 28 C. 9 hrs. 70° - 210°F. D.	A. None B. None	1	731		X	9" U	Imp	I II III	18½" ½" 1"	Failed radiograph Crossbar crack repaired; and plats failed second radiograph.
												O	III	3½"	
						2	687	X		10" D	Imp	I	10½"	Root pass crack in crossbar and cracks in both junctions
												II	3"		
												V	4"		
												O	I	8½"	
														50½"	
A. AD-247 B. 2/7/43 C. TH-95 D. Great Lakes Steel Corp. E. McKay Company Allied Weld-Craft, Inc. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.90Mn,.75Si, .67Cr,.22Mo, .10Zr) C. .30 D. Face 317-337-337 E. B.O.H. F. 1600°F. 1-1/2 hrs. Water 1010°F. 2 hrs. Air	A. A-II McK (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* A-II A W (.08C,1.8-2.1Mn,.40 Si,18.0-21.0Cr, 10.25-11.75Ni)* B. Armorloy A-5 Stain-craft K C. Lime+Mn Calcium carb, Ti Oz. Sod. Sil Grinder D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 200 - 25 2.& 3. I 5/32" 2a 150 - 20 C. 12 hrs. 70° - 180°F. D. Passes one and two are downhand; three and four vertical, welding from bottom to top.	A. None B. None	1	771	2½" L		5½" U	Imp	III	½"	Passed radiograph Some scattered slag and porosity
						2	760		1½" L	8½" D	Imp	I	1"	Small crack in crossbar	
												II	13½"		
												III	3½"		
												O	III	1"	
														19½"	
		*Weld Metal													

IDENTIFICATION	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT TREAT	BALLISTIC RESULTS						REMARKS ON BACKING RADIOGRAPHIC RESULTS, ETC.
A. Press Record No. B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Spec. F. Armor Fabricator	A. Plate Thickness B. Type C. Carbon Content D. Size E. Process F. Heat Treatment Temp Time Quench	A. Type B. Trade Name C. Coating D. Current & Polarity	A. Groove, Inclined Angle, Root Face B. Root Gap C. Plate Preparation	A. Backing B. Deposition Sequence 1. Root Type 2. Body Type 3. Crown Type C. Total Welding Time & Inter Pass Temperature D. Remarks	A. Pre B. Post	N	Vel. f/s	Location of N L.L.	Location of N R.L.	Location of N Ob.	Cracking (Ang.)	Cracking Type	Cracking Amt.	
A. AD-237 B. 2/7/43 C. TH-98 D. Great Lakes Steel Corp. E. Reid-Avery Company F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.97Mn,.87Si, .62Cr,.17Mo, .07Zr) C. .27 D. Face 315-317-317 E. B.O.H. F. 1650°F. 1-1/2 hrs. Water 970°F. 1/2 hr. Air	A. A-I (.07-.15C, 3.50-4.50 Mn,.75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* B. 18-8-B C. Ti Base +Mn D. DC REV	A. 60°DV B. 3/3" C. Flame Cutting Grinding	A. Copper B. 1. II 1/4" 2a 275 - 28 2. I 1/4" 2a 300 - 30 3. I 1/4" 2a 300 - 30 C. 8 hrs. 70° - 200°F. D.	A. None B. None	1 2 3	755 759 746	1 3/8" R	3" R 2 3/8" R	7 1/8" D 7 1/8" U 2" D	Imp 0	I II III III	2" 6" 6 1/2" 1/2" 15"	Passed radiograph Crater crack in lower left leg
A. AD-237 B. 2/7/43 C. TH-99 D. Great Lakes Steel Corp. E. McKay Company Reid-Avery Co. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.97Mn,.87Si, .62Cr,.17Mo, .07Zr) C. .27 D. Face 306-302-306 E. B.O.H. F. 1650°F. 1-1/2 hrs. Water 970°F. Air	A. A-II McK (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* A-I R-A (.07-.15C, 3.5-4.5Mn, .75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* B. Armorloy A-5 18-8-B C. Lime+Mn Ti base +Mn D. DC REV	A. 60°DV B. 1/2" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 200 - 25 2. I 1/4" 2a 300 - 30 3. I 1/4" 2a 300 - 30 C. 8 hrs. 70° - 210°F. D.	A. None B. None	1 2	786 770	1 1/2" L 1" R		3 1/4" D 4" U	Imp 0 Imp	II III I III I II III	10 1/2" 13" 5" 1" 1/2" 9 1/2" 10" 48"	Passed radiograph Crater cracks at junctions

*Weld Metal

A. AD-237 B. 2/7/43 C. TH-100 D. Great Lakes Steel Corp. E. McKay Company Reid-Avery Co. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.97Mn,.878i, .62Cr,.17Mo, .07Zr) C. .27 D. Face 319-317 317 E. B.O.H. F. 1650°F. 1-1/2 hrs. Water 970° 1/2 hr. Air	A. A-II McK (.13C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* A-I R-A (.07-.15C, 3.5-4.5Mn .75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* B. Armorloy A-5 18-8-B C. Lime+Mn Ti Base +Mn D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 200 - 25 2. I 1/4" 2a 300 - 30 3. I 1/4" 2a 300 - 30 C. 8 hrs. 70° - 180°F. D.	A.None B.None	1	766		X	6½" D	Imp	II	5½"	Failed radiograph
													III	7"	4" crack and intermittant cracks in crossbar
							2	733	2⅜" R		7" U	0	II	1½"	Small crater cracks in both leg welds
							3	719		1½" R	5½" D	0	II	2⅜"	
													III	1½"	
														18"	
A. AD-270 B. 2/19/43 C. TH-94 D. Great Lakes Steel Corp. E. Reid-Avery Company F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.77Mn,.718i, .58Cr,.20Mo, .09Zr) C. .27 D. Face 292-285-285 E. B.O.H. F. 1600°F. 3-1/2 hrs. Water 910°F. 3-3/4 hrs. Air	A. A-I (.07-.15C, 3.5-4.5Mn .75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* B. 18-8-B C. Ti Base +Mn D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 180 - 25 2. II 3/16" 4b 170 - 25 3. III 3/16" 4b 170 - 25 1/4" 2b 300 - 30 C. 10 hrs. 70° - 105°F. D.	A.None B.None	1	775	½" R		5" U	Imp	III	8⅝"	Passed radiograph Two small crater cracks and some slag inclusions
							2	774		1½" R	6" D	Imp	II	14½"	
													III	3"	
														26½"	
		*Weld Metal													

IDENTIFICATION A. FIRING RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. PASSES NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	H	BALLISTIC RESULTS VEL. F/S	LOCATION OF H L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	REMARKS OR CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-274 B. 2/19/43 C. TH-96 D. Great Lakes Steel Corp. E. McKay Company Allied-Weldcraft, Inc. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.87Mn,1.87Si, .63Cr,1.0Ni, 1.7Mo†) C. .28 D. Face 323-317-300 E. B.O.H. F. 1600° 1/2 hr. Water 1030°F. 1 hr. Air	A. A-II McK (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* A-II A W (.08C,1.8-2.1Mn,.40 Si,18.0-21.0Cr, 10.25-11.75Ni)* B. Armorloy A-5 Stain craft K C. Lime+Mn Calcium Carb. Ti 02, Sod. Silicate Binder D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 175 - 27 3/16" 1a 200 - 27 2. II 5/32" 8b 150 - 25 3. III 5/32" 4b 150 - 25 3/16" 2b 190 - 28 C. 16 hrs. 70° - 150°F. D.	A. None B. None	1	775	1" L		4¾" D	Imp	II III V	7½" 8⅜" 17⅝"	Failed radiograph Excessive amount of incomplete penetration
						2	787		2½" R	6½" U	Imp	I II V	3½" 6½" 50½" 93⅜"	
A. AD-274 B. 2/19/43 C. TH-97 D. Great Lakes Steel Corp. E. Reid-Avery Co. McKay Company F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.87Mn,1.87Si, .63Cr,1.0Ni, 1.7Mo†) C. .28 D. Face 313-326-326 E. B.O.H. F. 1600°F. 1/3 hr. Water 1030°F. 1 hr. Air	A. A-I R-A (.08-.15C, 3.5-4.5Mn, .75Si, 18.0-20.0 Cr, 8.5-10.5Ni, 1.25Mo)* A-II McK (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* B. 18-8-B Armorloy A-5 C. Ti Base +Mn Lime+Mn D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 2a 200 - 25 2. I 1/4" 2a 300 - 30 3. I 5/16" 2a 385 - 30 C. 9 hrs. 70° - 210°F. D.	A. None B. None	1	780	X		9½" D	Imp	I II V	11½" 6½" 23½"	Passed radiograph Crater cracks at weld junctions
						2	771		2" R	6⅝" U	Imp	I II V	4" 2½" 36½" 84½"	
		*Weld Metal												

IDENTIFICATION A. PLATE NUMBER OR B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SEQ EL. NO. PASSES TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	G.L.	CRACKING LOC	TYPE	AMT	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-274 B. 2/19/43 C. TH-101 D. Great Lakes Steel Corp. E. McKay Company Reid-Avery Co. F. Ternstedt Mfg. Div.	A. 1" B. R-IV (.87Mn,1.87Si, .63Cr,1.0Ni, 1.7Mo?) C. .28 D. Face 302-309-309 E. B.O.H. F. 1600°F. 1/2 hr. Water 1030°F. 1 hr. Air	A. A-II McK (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* A-I R-A (.07-.15C, 3.5-4.5Mn, .75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* B. Armorloy A-5 18-8-B C. Lime+Mn Ti Base +Mn D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 180 - 25 3/16" 1a 200 - 23 2. I 5/16" 2a 385 - 30 3. III 3/16" 4b 140 - 22 1/4" 2b 280 - 30 C. 10 hrs. 70° - 180°F. D.	A.None B.None	1	780	1" L		8½" U	Imp	II III V	7⅜" 4½" 18½"	Failed radiograph 19" intermittent incomplete fusion 1/2" weld crack
						2	763		¼" L	5⅜" D	0	II V	3½" 1"	
											Imp	I II V	14" ⅜" 4⅜"	
													54¼"	
A. AD-303 B. 3/9/43 C. TH-102 D. Jones & Laughlin Steel Corp. E. McKay Company Alloy Rods Co. F. Ternstedt Mfg. Div.	A. 1" B. R-III (1.48Mn,.22Si, .42Mo) C. .24 D. Face 321-325-326 E. B.O.H. F. 1600°F. 1/2 hr. Water 875°F. 1-1/2 hrs. Air	A. A-II McK (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* A-I A.R. (.08-.13C, 1.6-2.0Mn, .35-.70Si 19.0-21.0 Cr,8.5-10.5Mo, 2.25-2.75 Mo)* B. Armorloy A-5 Armoraro B C. --- D. ---	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 190 - 22 3/16" 1a 200 - 25 2. I 5/16" 2a 400 - 30 3. III 5/32" 4b 375 - 30 5/16" 2b 375 - 30 C. 10 hrs. 70° - 180°F. D.	A.None B.None	1	775		1¼" L	3½" D	Imp	I II	10" 2"	Passed radiograph
						2	764	¼" L		7" U	Imp	I II	22" 2"	
													36"	
		*Weld Metal												

SPECIMEN	BASE MAT'L	ELECTRODE (OR) FLUX	JOINT DESIGN	WELDING PROCEDURE	HEAT	RADIOGRAPHIC REPORT							REMARKS (OR GRADING RADIOGRAPHS REFER TO, ETC.
						No.	Vol. P/S	Location of No. L.L.	R.L.	C.L.	Cracking Loc.	Type	Amt.	
A. Piece Welded By B. Date of Test C. Plate No. D. Welder Designation E. Electrode (Spec. F. Welding Procedure	A. Plate Thickness B. Type C. Carbon Content D. Size E. Process F. Heat Treatment Temp Time Quench	A. Type B. Trade Name C. Coating D. Current & Polarity	A. Groove Included Angle, R/T Face B. Root Gap C. Plate Preparation	A. Backing B. Deposition (See Sk. No. Type Amp V. 1. Root Type 2. Body Type 3. Crown Type C. Total Welding Time & Inter Pass Temperature D. Remarks	A. Pre B. Post									
A. AD-337 B. 3/23/43 C. TH-103 D. Jones & Laughlin Steel Corp. E. McKay Company Reid-Avery Co. Alloy Rods Co. F. Ternstedt Mfg. Div.	A. 1" B. R-III (1.48Mn,.22Si, .42Mo) C. .24 D. Face 337-335-323 E. B. O. H. F. 1600°F. 1/2 hr. Water 875°F. 1-1/2 hrs. Air	A. A-II McK (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* A-I R-A (.07-.15C, 3.5-4.5Mn, .75Si, 18.0-20.0 Cr,8.5-10.5Ni 1.25Mo)* A-II A.R. (.08-.13C, 3.5-4.5Mn, .35-.70Si, 19.0-21.0 Cr,8.5-10.5Ni)* B. Armorloy A-5 18-8-B Armorarc B C. Lime+Mn Titanium +Mn D. DC REV	A. 45°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 190 - 25 3/16" 1a 200 - 25 2. I 1/4" 2a 300 - 27 3. I 5/16" 2a 400 - 30 C. 9 hrs. 70° - 170°F. D.	A. None B. None	1	767	2 1/8" L		4" U			3"	Passed radiograph Some incomplete fusion
						2	757		X	7" D	Imp	I II III	9 1/4" 3 1/4" 15"	
		*Weld Metal												

IDENTIFICATION	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS							REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. Panel Number B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Manufr. F. Armor Fabricator	A. Plate Thickness B. Type C. Carbon Content D. Hardness E. Process F. Heat Treatment Temp Time Quench	A. Type B. Trade Name C. Coating D. Current & Polarity	A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	A. Backing B. Deposition Size El. Passes No. Type Amp V. 1. Root Type 2. Body Type 3. Crown Type C. Total Welding Time & Inter Pass Temperature D. Remarks	A. Pre B. Post	No.	Vel. f/s	Location of H L.L.	R.L.	S.S.	Cracking Loc.	Type	Amt.	
A. AD-337 B. 3/23/43 C. TH-104 D. Jones & Laughlin Steel Corp. E. McKay Company, Reid-Avery Co., Alloy Rods Co. F. Ternstedt Mfg. Co.	A. 1" B. R-III (1.48Mn,.22Si, .42Mo) C. .24 D. Face 333-323-321 A. B.O.H. 1600°F. 1/2 hr. Water 875°F. 1-1/2 hrs. Air	A. A-II McK (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* A-I R-A (.07-.15C, 3.5-4.5Mn, .75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* A-II A.R. (.06-.13C, 3.5-4.5Mn, .35-.70Si, 19.0-21.0 Cr,8.5-10.5Ni)* B. Armorloy A-5 18-8-B Armorarc B C. Lime+Mn Titanium +Mn D. DC REV	A. 70°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 190 - 25 3/16" 1a 300 - 25 2. I 1/4" 2a 290 - 27 3. I 5/16" 2a 400 - 30 C. 9 hrs. 70° - 170°F. D.	A. None B. None	1	753		3½" L	7½" D				Passed radiograph Some incomplete penetration Two small crater cracks
						2	772	¾" R		2½" U	Imp	II III	6½" 3" 9½"	
						3	762		1¾" L	2¾" U				
		*Weld Metal												

IDENTIFICATION	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS							REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. FIRING RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP. V. PASSES 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	A. PRE B. POST	H	VEL. F/S	LOCATION OF H L.L.	R.L.	G.B.	CRACKING LOC.	TYPE	AMT.	
A. AD-237 B. 3/23/43 C. TH-105 D. Jones & Laughlin Steel Corp. E. McKay Company Reid-Avery Co. Alloy Rods Co. F. Ternstedt Mfg. Div.	A. 1" B. R-III (1.48Mn,.22Si, .42Mo) C. .24 D. Face 321-337-339 E. B.O.H. F. 1600°F. 1/2 hr. Water 875°F. 1-1/2 hrs. Air	A. A-II McK (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* A-I R-A (.07-.15C, 3.5-4.5Mn .75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* A-II A.R. (.08-.13C 3.5-4.5Mn, .35-.70Si 19.0-21.0 Cr,8.5-10.5Ni)* B. Armorloy A-5 18-8-B Armcoarc B C. Lime+Mn Titanium Base+Mn D. DC REV	A. 45°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 190 - 25 3/16" 1a 200 - 25 2. I 1/4" 2a 290 - 27 3. III 3/16" 4b 200 - 25 5/16" 2b 390 - 30 C. 11 hrs. 70° - 170°F. D.	A. None B. None	1	792		1½" L	5½" D	Imp	II	1¾"	Passed radiograph Some incomplete penetration
						2	782	1½" R		8" U	Imp	II	3" 4¾"	Small weld crack in crossbar

*Weld Metal

IDENTIFICATION	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS							REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. FIRING RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	A. BACKING B. DEPOSITION SEQ EL. SIZE PASSES NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	A. PRE B. POST	N	VEL. F/S	LOCATION OF N L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT	
A. AD-337 B. 3/23/43 C. TH-106 D. Jones & Laughlin Steel Corp. E. McKay Company Reid-Avery Co. Alloy Rods Co. F. Ternstedt Mfg. Div.	A. 1" B. R-III (1.48Mn,.22Si, .42Mo) C. .24 D. Face 321-315-333 E. B. O. H. F. 1600°F. 1/2 hr. Water 875°F. 1-1/2 hrs.	A. A-II McK (.12C,3.5-4.5Mn,.80 Si,19.0-21.0Cr, 9.2-10.2 Ni)* A-I R-A (.07-.15C, 3.5-4.5Mn, .75Si, 18.0-20.0 Cr,8.5-10.5Ni, 1.25Mo)* A-II A.R. (.08-.13C, 3.5-4.5Mn, .35-.70Si, 19.0-21.0 Cr,8.5-10.5Ni)* B. Armorloy A-5 18-8-B Armorarc B C. Lime+Mn Titanium Base+Mn D. DC REV	A. 70°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 190 - 25 3/16" 1a 200 - 25 2. I 1/4" 2a 290 - 27 3. III 3/16" 4b 200 - 25 5/16" 2b 400 - 30 C. 11 hrs. 70° - 170°F. D.	A. None B. None	1	784	$\frac{1}{2}$" R		$7\frac{1}{2}$" U	Imp	II	$10\frac{3}{4}$"	Passed radiograph Some incomplete penetration
						2	695		X	$8\frac{1}{2}$" D	O Imp	II II	$\frac{3}{4}$" $9\frac{1}{2}$" 21"	
		*Weld Metal												

IDENTIFICATION A. FROM RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. PASSES TYPE AMP. V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS H	VEL. F/S	LOCATION OF H L.L.	R.L.	C.S.	CRACKING LOC.	TYPE	AMT	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-33 B. 10/9/42 C. H-2 D. Great Lakes Steel Corp. E. Linde Air Products Co. F. Caterpillar Tractor Co.	A. 1" B. R-IV (.84Mn,.82Si, .66Cr,.04Ni, .19Mo,.10Zr) C. .32 D. Face 302 Back 302 E. B.O.H. F. 1640°F. Water 1050°F.	A. A-II (.25C,3.95 Mn,.89Si, 7.85Cr, 7.4Ni, .15Mo)• B. Oxweld #42 C. #80 D. AC	A. 40°SV B. 3/16" C. Machining	A. Baked Sand Core B. 1. Unionmelt 1/4" 1160 - 35 C. 1-3/4 hrs. 200° - 500° D. Hand welded in low spots on root side. The postheat used in welding this plate consisted of passing OXY-ACETYLENE flames on either side of the weld bead about 12" behind the arc. This was used on Welds 1 and 3 only. Preheat for weld 3 was 500°F. for about 4" on either side of the cross-weld and correspondingly across the side plates.	A.235° F. 500°F. B.None	1	769		1/4" R	8" D	Imp	I III V	29 1/4" 2" 4 1/4" 36"	Failed radiograph Several crater cracks throughout Some incomplete fusion
A. AD-33 B. 10/9/42 C. H-3 D. Youngstown Sheet & Tube Company E. Linde Air Products Co. F. Caterpillar Tractor Co.	A. 1" B. R-III (1.30Mn,.15Si, .04Cr,.50Mo) C. .20 D. Face 321 Back 331 E. B.O.H. F. 1625°F. 2-1/4 hrs. Water 1060° 4 hrs.	A. A-II (.24C,3.95 Mn,.89Si, 7.85Cr, 7.4Ni, .15Mo)• B. Oxweld #42 C. #80 D. AC	A. 40°SV B. 3/16" C. Machining	A. Baked Sand Core B. 1. Unionmelt 1/4" 1160 - 35 C. 1-3/4 hrs. 200°F. D. The plates used in this test were rolled to 1-1/8" thick, planed down to 1". Due to excessive "burning in" of the back up core, weld #2 was shallow on the face so hand welding was used to build it up flush with the plate.	A.200° F. 500°F. B.None	1 2	777 785	1/4" L 1 3/4" L		4" U 6" D	Imp	I V	15 1/4" 8" 23 1/4"	Failed radiograph Small crater cracks in center of crossbar weld

•Weld Metal Questionable

IDENTIFICATION A. PLATE HEAT NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. PASSES TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	G.S.	CRACKING LOC.	TYPE	AMT	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-43 B. 10/3/42 C. 23 D. Jones & Laughlin Steel Corp. Great Lakes Steel Corp. E. McKay Company Linde Air Prod. F. General Motors Truck & Coach	A. 1" B. R-III J&L (1.75Mn,.24Si, .55Mo) R-IV G L (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .25 .32 D. Face 321 to 341 Back 321 to 341 E. B.O.H. Both F. 1625°F. J&L 2-1/4 hrs. Water 1075°F. 4 hrs. Draw 1625°F. G L 2-1/4 hrs. Water 1030°F. 4 hrs. Draw	A. A- --- B. Armorloy A-5 Oxweld #42 C. #80 (20XD) & (8X200) D. AC DC REV	A. 60°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 115 - 5/32" 1a 120 - 2. IV 3/16" 1UM 640 - 32 3/16" 1UM 680 - 30 C. 8 hrs. 150° - 200°F. D. Some cracking, chipping and grinding after first pass. Root passes were hand welded. Right and upper center sections by Jones & Laughlin, left and lower center sections by Great Lakes. Total chipping and grinding time 4 hrs., details not given.	A. None B. None	1 2 57MM T1 projectile	1109 1164	1/4" L	X	4 1/4" D 8" U	Imp	II III	2" 6 1/4" 2" 6 3/4" 17"	Passed radiograph
A. AD-43 B. 10/3/43 C. 24 D. Great Lakes Steel Corp. Jones & Laughlin Steel Corp. E. Herrlischfeger Linde Air Prod. F. General Motors Truck & Coach	A. 1" B. R-IV G L (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) R-III J&L (1.75Mn,.24Si, .55Mo) C. .32 .25 D. Face 321 to 341 Back 321 to 341 E. B.O.H. Both F. 1625°F. G L 2-1/4 hrs. Water 1075°F. 4 hrs. Draw 1625°F. J&L 2-1/4 hrs. Water 1030°F. 4 hrs. Draw	A. A --- B. AW-3 Oxweld # 42 C. #80 (20XD) & (8X200) D. AC DC REV	A. 60°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 100 - 5/32" 1a 135 - 2. IV 3/16" 1UM 640 - 3/16" 1UM 680 - C. 8 hrs. 150° - 200°F. D. Root passes were hand welded. Right and upper center sections by Great Lakes, left and lower center sections by Jones & Laughlin. Total chipping and grinding time 3 hrs., details not given.	A. None B. None	1 2 3 57MM T1 projectile	1106 1182 1177	2" L 1 1/2" L	2 1/2" L	6" D 9 1/2" U 1 1/2" D	Imp	I III V	3 1/4" 10" 13 1/4" 26 3/4"	Passed radiograph

IDENTIFICATION A. FIRING RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP. V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	O.B.	LOC.	CRACKING TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-43 B. 10/6/42 C. 34 D. Jones & Laughlin Steel Corp. Great Lakes Steel Corp. E. Harnischfeger Corp. Linde Air Prod. F. General Motors Truck & Coach	A. 1" B. R-III J&L (1.75Mn,.24Si, .55Mo) R-IV O L (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .25 .32 D. Face 321 to 341 Back 321 to 341 E. B.O.H Both F. 1625°F. J&L 2-1/4 hrs. Water 1075°F. 4 hrs. Draw 1625°F. O L 2-1/4 hrs. Water 1030°F. 4 hrs. Draw	A. A --- B. AW-3 Oxweld #42 C. #80 (20XD) & (8X200) D. AC DC REV	A. 60°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 100 - 5/32" 1a 135 - 2. IV 3/16" 1UM 640 - 3/16" 1UM 680 - C. 8 hrs. 150° - 200°F. D. Root passes hand welded. Right and lower center sections by Great Lakes, left and upper center sections by Jones & Laughlin. Total chipping and grinding time 3 hrs., details not given.	A. None B. None	1 2 3 4 5	1102 1147 1097 1083 1144	3½" R 1" L 3½" R 1½" R	½" L	5½" U 8½" D ½" D 11" U ½" U	Imp O Imp	II III V III I II III V	5" 7½" 2½" ½" 3" 8½" 5½" 2" 34"	Passed radiograph 57MM T1 projectile

IDENTIFICATION A. PLATE HEAT NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP V. PASSES 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-111 B. 10/28/42 C. 75 D. Utility Electric Co. E. McKay Company F. Cadillac Motor Car Company	A. 1" B. C-III (1.61Mn,1.02Si, .15Cr,.18Ni, .45Mo) C. .36 D. Face 269-277 E. Acid-Elec. F. Questionable	A. A --- B. Armorloy C. Gray Flux D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 155 - 3/16" 1a 170 - 2. I 1/4" 2a 180 - 3. III 3/16" 2b 160 - 3/16" 1b 160 - remaining three beads not given C. 2-1/2 hrs. 75° - 180°F. D. One more pass in crossbar. Little cracking, chipping and grinding after first pass. Time 10 mins.	A. None B. None	1	1133	57mm. T1 projectile	$\frac{3}{4}$" L	$5\frac{1}{2}$" D	Imp	III V	2" $37\frac{3}{4}$" $39\frac{3}{4}$"	Passed radiograph Small amount of piping in cast plate Two small crater cracks
A. AD-111 B. 10/28/42 C. 77 D. Hughes Tool Company E. McKay Company F. Cadillac Motor Car Company	A. 1" B. C-I (1.10Mn,.42Si, .28Cr,1.02Ni, .38Mo) C. .15 ? D. Face 269 E. Acid-Elec. F. 1900°F. 10 hrs. F.C. to 1650°F. A.C. 1200°F. 2hrs. 1650°F. 1 hr. Water 1000°F. 4 hrs. Air	A. A --- B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 3a 140 - 25 2. I 3/16" 2a 165 - 25 3. III 3/16" 2b 165 - 25 1/4" 2b 185 - 25 remaining two beads not given C. 2.49 hrs. 80° - 150°F. D. Little cracking, chipping and grinding after first pass. Time 1.31 hrs.	A. None B. None	1	1004	57mm. T1 projectile	$1\frac{1}{4}$" L	$5\frac{1}{2}$" U	Imp	II III V	$1\frac{1}{4}$" $2\frac{1}{4}$" 2"	Passed radiograph
							2	1020	$1\frac{1}{4}$" R		$6\frac{3}{4}$" D	Imp	II III V	$3\frac{3}{4}$" 1" $4\frac{1}{4}$" $14\frac{3}{4}$"	
A. AD-112 B. 10/28/42 C. 78 D. American Steel Foundries E. McKay Company F. Cadillac Motor Car Company	A. 1" B. C-II (1.53Mn,.42Si, .34Cr,.10Ni, .07Mo) C. .33 D. Face 277 Back 311 E. --- F. 1650°F. 2 hrs. Air 1535°F. .67 hrs. Water 850°F. 4 hrs. Water	A. A-II (.18C,4.75 Mn,.70Si, 20.45Cr, 8.60Ni, .12Mo)* (.17C,4.50 Mn,.53Si, 20.90Cr, 9.80Ni)* B. Armorloy C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 120 - 35 5/32" 1a 180 - 30 2. I 3/16" 2a 180 - 30 3. III 5/32" 2b 120 - 25 1/4" 1b 200 - 25 remaining three beads not given C. 3.04 hrs. 80° - 140°F. D. Some cracking after first and third passes. Little grinding after first and second passes. Total chipping and grinding time 3 hrs., details not given.	A. None B. None	1	1017	57mm. T1 projectile	$\frac{1}{8}$" L	$5\frac{3}{4}$" D	Imp	II V	$4\frac{1}{4}$" 5"	Passed radiograph Some incomplete fusion and penetration in legs Small cracks in crossbar
							2	1014		$6\frac{1}{4}$" R	$5\frac{1}{8}$" U	Imp	V	19" $28\frac{1}{8}$"	
		*Weld Metal													

IDENTIFICATION A. FIRM RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. PASSES NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-235 B. 2/3/43 C. B4 D. Hughes Tool Company E. McKay Company F. Cadillac Motor Car Division	A. .99" B. C-1 (1.80Mn,.37Si, .41Cr,1.12Ni, .53Mo) C. .31 D. Face 341 Back 321 E. Acid-Elec. F. 1900° 10 hrs. F.C. to 1650° A.C. 1200° 2 hrs. 1650° 1 hr. Water 1000° 4 hrs. Air	A. A-11 (.10C,4.45 Mn,.54Si, 19.40Cr, 10.15Ni, .08Mo)* (.09C,4.80 Mn,.62Si, 20.70Cr, 10.00Ni, .08Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 140 - 25 3/16" 1a 200 - 25 2. I 1/4" 2a 250 - 25 3. III 5/32" 4b 120 - 25 remaining two beads not given C. 2.29 hrs. 70° - 190°F. D.	A. None B. None	1	971	2" L		6½" D	Imp	V	5½"	Failed radiograph Incomplete fusion present along lower left leg. Some scattered slag inclusions
						2	992		3" L	7" U	Imp	V	20"	
						3	991		1" R	8" D	Imp	III V	1" 2"	
						4	1080	¼" R		3" U	Imp	II III V	1" 4" 1½" 35½"	
								57mm. Tl projectile						
A. AD-234 B. 2/4/43 C. 106 D. McConway & Torley E. McKay Company F. Cadillac Motor Car Division	A. .99" B. C-III (1.72Mn,.57Si, .11Ni,.67Mo) C. .29 D. Face 302 Back 302 E. --- F. 1800°F. 4 hrs. Air 1600°F. 4 hrs. Water 1060°F. 4 hrs. Water	A. A-II (.09C,4.95 Mn,.55Si, 21.00Cr, 10.30Ni, .15Mo)* (.12C,4.65 Mn,.65Si, 18.00Cr, 9.62Ni, .07Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. ---	A. Not given B. 1. II 3/16" 1a 185 - 25 3/16" 1a 210 - 25 2. I 1/4" 2a 280 - 25 3. I 5/16" 2a 360 - 25 C. 2.01 hrs. 70° - 190°F. D.	A. None B. None	1	970		1¾" L	11½" D	Imp	V	5"	Passed radiograph Several small cracks throughout thr welds
						2	973	1¾" R		3½" O	Imp	II V	1" 5½"	
						3	972	1¾" L		5½" D	Imp	II V	3½" 5½" 20½"	
								57mm. Tl projectile						
		*Weld Metal												

IDENTIFICATION A. Firing Record No. B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Mfgr. F. Armor Fabricator	Armor Data A. Plate Thickness B. Type C. Carbon Content D. BHN E. Process F. Heat Treatment Temp Time Quench	Electrode Data A. Type B. Trade Name C. Coating D. Current & Polarity	Joint Design A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	Welding Procedure A. Backing B. Deposition Size El. No. Type and V. Passes 1. Root Type 2. Body Type 3. Crown Type C. Total Welding Time & Inter Pass Temperature D. Remarks	Heat A. Pre B. Post	Ballistic Results N	Vel. f/s	Location of N L.L.	R.L.	G.B.	Cracking Log.	Type	Amt.	Remarks on Cracking Radiographic Results, Etc.
A. AD-234 B. 2/4/43 C. 109 D. McConway & Torley E. McKay Company F. Cadillac Motor Car Division	A. 1.13" B. C-III (1.65Mn,.56Si, .10Ni,.60Mo) C. .39 D. Face 321 Back 302 E. --- F. 1600°F. 4 hrs. Air 1600°F. 4 hrs. Water 1060°F. 4 hrs.	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 130 - 25 5/32" 1a 140 - 25 2. I 3/16" 2a 200 - 25 3. III 5/32" 4b 140 - 25 remainding two beads not given C. 2.70 hrs. 70° - 195°F. D. Some cracking after first and second passes.	A. None B. None	1 2 3 4 5	976 987 999 995 1002	 5½" R ½" R ⅜" R	2⅜" R 2½" R	18" U 9¾ U 3⅜ D 3⅛ D 9⅜ U	chipped small piece off top of plate Imp V 14½" Several cracks present in cross bar Imp V 11¾" Large amount of incomplete fusion scattered through out the welds Imp III 1" V 12" O V 5" Several inches of linear slag present Imp II 1⅛" III 2" V 3½" 49½" 57mm. Tl projectile		
A. AD-241 B. 2/9/43 C. 88 D. Utility Electric Co. E. McKay Company F. Cadillac Motor Car Division	A. 1.13" B. C-III (1.65Mn,1.12Si .30Cr,.21Ni, .46Mo) C. .38 D. Face 341 Back 262 E. --- F. 1950°F. 10 hrs. Air 1250°F. 5 hrs. Air 1650°F. 6 hrs. Water	A. A-II (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* (.12C,4.65 Mn,.65Si, 18.00Cr, 9.62Ni, .07Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 1a 120 - 25 3/16" 1a 200 - 25 2. I 1/4" 1a 280 - 25 1/4" 1a 270 - 25 3. III 5/32" 4b 120 - 25 1/4" 1b 280 - 25 remaining bead not given C. 2.03 hrs. 80° - 205°F. D. Some cracking after first and second passes.	A. None	1 2	1111 1093	½" R ¼" L	3¼" D 8¼" U	Imp III V Imp V 57mm. Tl projectile	3⅜" 21½" 46½" 71¾"		Failed radiograph Small crater cracks in cross-bar and at left junction Some slag inclusions

*Weld Metal

IDENTIFICATION A. PANEL NUMBER NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE NUMBER. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE: D. REMARKS	HEAT A. PRE B. POST	H	VEL. F/S	BALLISTIC PROOF LOCATION OF H LL	RL	SS	CRACKING LOC	TYPE	AMT	RADIOGRAPHIC RESULTS, ETC.
A. AD-240 B. 2/11/43 C. 85 D. American Steel Foundries E. McKay Company Lincoln Electric Co. F. Cadillac Motor Car Company	A. 1.01" B. C-II B-67 (1.78Mn,.56Si, .23Cr,.18Ni, .09Mo) C-II 1575 (1.40Mn,.43Si, .20Cr,.20Ni, .07Mo) C-II B-55 (1.35Mn,.48Si, .21Cr,.06Ni, .09Mo)* C. .38 B-67 .30 1575 .28 B-55 D. Face 293 Back 321 E. --- F. 1650°F. B-67 3 hrs. Air 1525°F. 40 mins. Water 1160°F. 4 hrs. Water 1650°F. 1575 2 hrs. Air 1525°F. 40 mins. Water 900°F. 4 hrs. Water 1650°F. B-55 3 hrs. Air 1525°F. 40 mins Water 1180°F. 4 hrs. Water	A. A-II McK (.10C,4.45 Mn,19.47 Cr,10.15 Ni,.54Si, .08Mo)* (.09C,4.80 Mn,20.70 Cr,10.00 Ni,.62Si, .08Mo)* A-II Lin. (.10C,1.47 Mn,10.05 Ni,21.65 Cr,.45Si, .08Mo)* (.09C,4.47 Mn,10.10Ni 20.60Cr, .06Mo,.68 Si)* B. Armorloy Armor-weld C. --- D. DC REV *Weld Metal	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 2a 190 - 25 2. I 3/16" 2a 190 - 25 3. III 5/32" 4b 130 - 25 remainder not given C. 2.54 hrs 90° - 170°F. D.	A. None B. None	1	988	3" L		4" D	Imp	V	7"	Passed radiograph Some incomplete fusion and slag inclusions
						2	962		3⅛" L	5⅛" U	Imp	V	10⅛"	
						3	984		3⅛" R	7" D	Imp	I II V	1⅛" 3⅛" 24⅛"	
													46⅜"	
								57MM Tl projectile						

IDENTIFICATION	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS						REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. FIRING RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR PASSIVATOR	A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	A. PRE B. POST	N	VEL. F/S	LOCATION OF R L.L.	R.L.	S.S.	CRACKING LOC.	TYPE	AMT.	
A. AD-309 B. 2/23/43 C. 110 D. McConway & Torley E. McKay Company F. Cadillac Motor Car Division	A. 1.12" B. C-III (1.57Mn,.52Si, .11Ni,.48Mo) C. .30 D. Face 321 Back 302 E. --- F. 1800°F. 4 hrs. Water 1600°F. 4 hrs. Water 1060°F. 4 hrs. Water	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.11Cr, 10.30Ni, .15Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 130 - 25 5/32" 1a 150 - 25 2. I 3/16" 2a 180 - 25 3. III 5/32" 4b 130 - 25 remaining two beads not given C. 3.08 hrs. 70° - 200°F. D. Some cracking after first and second passes.	A. None B. None	1	1052		1¾" R	6¾" U	Imp	I II V	2⅜" 9½"	Passed radiograph Several inches of incomplete fusion in right leg Several small cracks in crossbar
						2	1054	2½" R		4½" D	Imp	II V	1⅛" 14¼" 28¾"	
								57mm. T1 projectile						
A. AD-309 B. 2/23/43 C. 111 D. McConway & Torley E. McKay Company F. Cadillac Motor Car Division	A. 1.05" B. C-III (1.58Mn,.51Si, .10Ni,.51Mo) C. .30 D. Face 302 Back 321 E. --- F. 1800°F. 4 hrs. Air 1600°F. 4 hrs. Water 1030°F. 4 hrs. Water	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.7Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.30Ni, .15Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 2a 130 - 25 2. I 5/32" 1a 150 - 25 3/16" 1a 180 - 25 3. III 1/4" 4b 260 - 25 3/16" 1b 180 - 25 remaining bead not given C. 2.66 hrs 70° - 190°F. D.	A. None B. None	1	998		1½" R	4½" D	Imp	I II V	3¾" 1⅛" 3"	Passed radiograph Some incomplete fusion 5¾" x 9" opening Several small crater cracks
						3	1009	2¾" R		8½" U	Imp	II V	¾" 15½" 33⅛"	
								57mm. T1 projectile						
		*Weld Metal												

IDENTIFICATION A. PLATE NUMBER OR B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. PASSES NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. GROOVE TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	N	VEL. F/S	BALLISTIC RESULTS LOCATION OF N L.L.	B.L.	S.S.	CRACKING LOC.	TYPE	AMT	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-309 B. 2/23/43 C. 115 D. McConway & Torley E. McKay Company F. Cadillac Motor Car Division	A. 1.02" B. C-III (1.61Mn,.51Si, .03Cr,.06Ni, .56Mo) C. .28 D. Face 286 Back 321 E. --- F. 1800°F. 4 hrs. Air 1600°F. 4 hrs. Water 1060°F. 4 hrs. Water	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .09Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. --- D. ---	A. 60°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 3a 140 - 25 2. I 3/16" 1a 180 - 25 5/32" 1a 140 - 25 3. III 1/4" 2b 240 - 25 5/32" 1b 140 - 25 remaining three beads not given C. 2.77 hrs. 70° - 190°F. D. Some cracking after first pass.	A. None B. None	1	997	1¼" L		10⅜" D	Imp	I II V	1¼" 1⅜" 4¼"	Passed radiograph
						2	993		1½" L	3¼" U	Imp	V	13¾" 21"	
								57mm. Tl projectile						
A. AD-295 B. 3/5/43 C. 116 D. McConway & Torley E. McKay Company F. Cadillac Motor Car Division	A. 1.25" B. C-III (1.54Mn,.56Si, .08Ni,.50Mo) C. .28 D. Face 302 Back 321 E. --- F. 1800°F. 4 hrs. Air 1600°F. 4 hrs. Water 1060°F. 4 hrs. Water	A. A-II (.09C,4.85 Mn,.55Si, 10.20Ni, 20.10Cr, .15Mo)* (.08C,4.50 Mn,.42Si, 20.40Cr, 10.10Ni)* B. Armorloy C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 3/16" 2a 180 - 25 2. I 1/4" 2a 240 - 25 3. I 5/16" 2a 360 - 25 C. 2.40 hrs. 70° - 190°F. D.	A. None B. None	1	1137		⅜" R	4½" D	Imp	II III VI	⅜" 1" 12¾"	Passed radiograph Some incomplete fusion Several small crater cracks in crossbar
						2	1133	⅜" L		7" U	Imp	I II V	⅛" 4⅜" 5" 24¾"	
								57mm. Tl projectile						

*Weld Metal

A. PLATE IDENTIFICATION A. PLATE NUMBER OR B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE SPEC. F. ARMOR FABRICATOR	B. PLATE DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	C. ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	D. JOINT DATA A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	E. WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	F. HEAT A. PRE B. POST	G. BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	H. REMARKS ON RADIOGRAPHIC RESULTS, ETC.
A. AD-297 B. 3/5/43 C. 126 D. Utility Steel E. McKay Company F. Cadillac Motor Car Division	A. 1.15" B. C-III (1.81Mn,1.06Si, .13Cr,.10Ni, .08Mo) C. .27 D. Face 302 Back 227 E. --- F. 1950°F. 10 hrs. Air 1650°F. 5 hrs. Water [illegible] Air	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 2a 135 - 25 2. I 3/16" 1a 175 - 25 3/16" 1a 165 - 25 3. III 5/32" 4b 135 - 25 3/16" 1b 165 - 25 remainder not given C. 2.80 hrs. 70° - 190°F. D.	A. None B. None	1	1065	1½" R		8½" U	Imp	V	81½"	Passed radiograph 57MM T1 projectile
A. AD-329 B. 3/15/43 C. 130 D. Hughes Tool Company E. McKay Company F. Cadillac Motor Car Division	A. 1" B. C-I (1.03Mn,.45Si, .70Cr,1.00Ni, .48Mo) C. .26 D. Face 311 Back 221 E. --- F. 1900°F. 10 hrs. 1650°F. Water	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 2a 135 - 25 2. I 3/16" 2a 165 - 25 3. III 5/32" 4b 135 - 25 1/4" 1b 260 - 25 remainder not given C. 3.06 hrs. 70° - 195°F. D.	A. None B. None	1 2	978 983	X	1¼" L	5½" U 5" D	Imp Imp	I II V II V	1½" 2½" 2" 2½" 5" 13"	Passed radiograph 57MM T1 projectile
A. AD-329 B. 3/15/43 C. 132 D. Utility Steel E. McKay Company F. Cadillac Motor Car Division	A. 1.14" B. C-III (1.56Mn,1.02Si .18Cr,.10Ni, .51Mo) C. .26 D. Face 241 Back 286 E. --- F. 1950°F. 10 hrs. Air 1650°F. 5 hrs. Water	A. A-II (.10C,4.80 Mn,.66Si, 17.90Cr, 9.75Ni, .08Mo)* (.09C,4.85 Mn,.55Si, 20.10Cr, 10.20Ni, .15Mo)* B. Armorloy C. --- D. DC REV	A. 60°DV B. --- C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 1a 135 - 25 3/16" 1a 165 - 25 2. I 1/4" 2a 260 - 25 3. III 5/32" 4b 135 - 25 1/4" 1b 260 - 25 remainder not given C. 2.70 hrs. 70° - 190°F. D.	A. None B. None	1	1051		1" L	10½" U	Imp	V	58½"	Passed radiograph 57MM T1 projectile

*Weld Metal

IDENTIFICATION A. FIRMS RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS H	VEL. F/S	LOCATION OF H L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-106 B. 11/19/42 C. XW-163-F D. Kelsey Hayes Wheel Corp. E. Harnischfeger Corp. F. Chevrolet Motor Co.	A. 1" B. C-11 (.90Mn,.37Si, .43Cr,.32Mo) C. .30 D. Face 293-340 E. B.Elec. F. 1950°F. 10 hrs. Air 1250°F. 4 hrs. Air 1650°F. 5 hrs. Water 1150°F. 10 hrs. Air	A. A-1 (.15C,4.47 Mn,.65Si, 19.5Cr, 9.5Ni, 1.07Mo)* (.14C,3.89 Mn,.61Si, 19.7Cr, 10.1Ni, .97Mo)* B. AW-3-C C. Lime D. DC REV	A. 48°DV,3/32" B. 3/16" RF C. Machining	A. Not given B. 1. I 5/32" 1a 110-140 - 24-25 2. I 3/16" 2a 140-175 - 25-26 5/32" 1a 110-140 - 24-25 3. II 3/16" 2b 140-175 - one side 25-26 III 5/32" 2b 110-140 - other side 24-25 3/16" 1b 140-175 - 25-26 C. 12 hrs. 80° - 180°F. D.	A.None B.None	1 2 3	982 965 984	¾" R	6½" L	8" D 1½" U 3½" R 8½" D	Imp Imp Imp	I II III V III V V	5" 1" 1½" 8" 7" 7" 22½" 53"	Passed radiograph Large amount of porosity present in cest plate Two small crecks near right weld junction
								57MM Tl projectile										
A. AD-106 B. 11/19/42 C. XW-164-F D. Kelsey Hayes Wheel Corp. E. McKay Company F. Chevrolet Motor Co.	A. 1" B. C-11 (.90Mn,.37Si, .43Cr,.32Mo) C. .30 D. Face 293-340 E. B.Elec. F. 1950°F. 10 hrs. Air 1250°F. 4 hrs. Air 1650°F. 5 hrs. Water	A. A-11 (.12C,4.28 Mn,.52Si, 19.1Cr, 9.4Ni)* (.07C,4.20 Mn,.63Si, 19.5Cr, 9.3Ni)* B. Armorloy AC-5 C. Lime D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 110-140 - 24-25 2. I 3/16" 3a 140-175 - 25-26 3. II 3/16" 2b 140-175 - one side 25-26 III 5/32" 2b 110-140 - other side 24-25 3/16" 1b 140-175 - 25-26 C. 15 hrs. 80° - 145°F. D.	A.None B.None	1 2	998 996	2" R	¾" L	10" D 2" D	Imp Imp	II V I II III V	2½" 18½" 2½" 3½" 3" 16" 46½"	Feiled radiograph General condition of incomplete fusion along left leg, some in right leg
								57MM Tl projectile										
A. AD-106 B. 11/19/42 C. XW-165-F D. Kelsey Hayes Wheel Corp. E. Alloy Rods Co F. Chevrolet Motor Co.	A. 15/16" B. C-11 (.90Mn,.37Si, .43Cr,.32Mo) C. .30 D. Face 293-340 E. Acid-O.H. F. 1950°F. 10 hrs. Air 1250°F. 4 hrs. Air 1650°F. 5 hrs. Water 1150°F. 10 hrs. Air	A. A-1 (.10C,1.25 Mn,.38Si, 17.6Cr, 8.9Ni, 2.43Mo)* A-11 (.12C,3.58 Mn,.26Si, 18.6Cr, 8.8Ni)* B. Armorard B C. Ti 02 D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 110-140 - 24-25 2. I 1/4" 2a 200-250 - 27-28 5/32" 1a 110-140 - 24-25 3. II 1/4" 2b 200-250 - one side 27-28 III 5/32" 2b 110-140 - other side 24-25 1/4" 1b 200-250 - 27-28 C. 10 hrs. 80° - 190°F. D.	A.None B.None	1 2 3	921 969 932	¼" R 1" R	2½" L	12" D 1" D 2½" D	Imp Imp O Imp	III V I III V I II III V	6½" 2½" 1" 8" 27½" 5" 3½" 2" 10½" 65½"	Passed radiograph Two small cracks in crossbar Scattered slag inclusions
								57MM Tl projectile										
		*Weld Metal																

IDENTIFICATION A. Firms Record No. B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Supp. F. Armor Fabricator	ARMOR DATA A. Plate Thickness B. Type C. Carbon Content D. Face E. Process F. Heat Treatment Temp Time Quench	ELECTRODE DATA A. Type B. Trade Name C. Coating D. Current & Polarity	JOINT DESIGN A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	WELDING PROCEDURE A. Backing Passes B. Deposition Size El. Amp. Type Amp V. 1. Root Type 2. Body Type 3. Groove Type C. Total Welding Time & Inter Pass Temperature D. Remarks	HEAT A. Pre B. Post	BALLISTIC RESULTS N	Vel. F/S	Location of H L.L.	R.L.	C.G.	Cracking Loc.	Type	Amt.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-206 B. 1/25/43 C. XW-177-F D. Kelsey Hayes Wheel Corp. E. Harnischfeger Corp. F. Chevrolet Motor Company	A. 1.03" B. C-II (1.12Mn,.47Si, .50Cr,.48Mo) C. .28 D. Face 286-311 E. Acid-O.H. F. 1800°F. 5 hrs. Air 1650°F. 3 hrs. Water 1075°F. 6 hrs. Water	A. A-I (.15C,4.47 Mn,.65Si, 19.5Cr, 9.5Ni, 1.07Mo)* A-II (.13C,4.20 Mn,.47Si, 19.0Cr, 10.7Ni)* B. AW-3-C C. Lime D. DC REV	A. 60°DV, 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 110-140 - 24-25 2. I 1/4" 2a 190-350 - 26-38 5/32" 1a 110-140 - 24-25 3. II 1/4" 2b 190-250 - 26-28 III 5/32" 2b 110-140 - 24-25 1/4" 1b 190-250 - 26-28 C. 12 hrs. 80° - 170°F. D.	A. None B. None	1 2	1016 1030	X 57MM T1	1½" R	5½" U 6" D	Imp Imp	II III V I II III V	1½" 3¾" 6¾" 1½" 1½" 1½" 14½" 29½	Passed radiograph Several inches of shallow incomplete fusion
A. AD-206 B. 1/25/43 C. XW-178-F D. Kelsey Hayes Wheel Corp. E. Alloy Rods Co F. Chevrolet Motor Company	A. 1.08" B. C-II (1.28Mn,.43Si, .57Cr,.47Mo) C. .31 D. Face 293-311 E. Acid-O.H. F. 1800°F. 5 hrs. Air 1650°F. 3 hrs. Water 1075°F. 6 hrs. Water	A. A-I (.10C,1.25 Mn,.38Si, 17.6Cr, 8.9Ni, 2.43Mo)* A-II (.12C,3.58 Mn,.26Si, 18.6Cr, 9.8Ni)* B. Armoroarc B C. T102 D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 110-140 - 24-25 2. I 1/4" 2a 190-140 - 26-38 5/32" 1a 110-140 - 24-25 3. II 1/4" 2b 190-240 - 26-28 III 5/32" 2b 110-140 - 24-25 1/4" 1b 190-250 - 26-28 C. 12-1/2 hrs. 80° - 220°F. D.	A. None B. None	1 2	1010 1074	1" R 57MM T1	X	4" U 6" D	Imp Imp	III III V	2½" 5" 2½" 10"	Passed radiograph Scattered areas of incomplete fusion
A. AD-206 B. 1/25/43 C. XW-179-F D. Kelsey-Hayes Wheel Corp. E. McKay Company F. Chevrolet Motor Co.	A. 1.09" B. C-II (1.28Mn,.43Si, .57Cr,.47Mo) C. .31 D. Face 302-321 E. Acid-O.H. F. 1800°F. 5 hrs. Air 1650°F. 3 hrs. Water 1075°F. 6 hrs. Water	A. A-II (.12C,4.26 Mn,.52Si, 19.1Cr, 9.4Ni)* (.09C,4.45 Mn,.56Si, 20.1Cr, 9.6Ni)* B. Armorloy AC-5 C. Lime D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 110-140 - 24-25 2. I 1/4" 2a 190-350 - 26-38 5/32" 1a 110-140 - 24-25 3. II 1/4" 2b 190-350 - 26-28 III 5/32" 2b 110-140 - 24-25 1/4" 1b 190-250 - 26-28 C. 14 hrs. 80° - 180°F. D.	A. None B. None	1 2 3	1028 1083 1077	1" R 1" R 57MM T1	1¼" R	6½" D 6½" U 4⅜" D	Imp Imp Imp	I II III V III V II III V	1⅜" 1" ⅜" 2" 4" 2⅜" 3⅜" 4" 3⅜" 22½"	Failed radiograph Large amount of incomplete fusion 2" of cracking near right junction of crossbar

*Weld Metal

IDENTIFICATION	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS							REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. PLATE NUMBER OR B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE DESIG. F. ARMOR FABRICATOR	A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	A. PRE B. POST	H	VEL. F/S	LOCATION OF H L.L.	R.L.	G.S.	CRACKING LOC.	TYPE	AMT.	
A. AD-228 B. 11/16/42 C. W-32 D. Ford Motor Co. E. Crucible Steel Corp. F. Ford Motor Co.	A. 1-3/16" B. C-II (1.10Mn,.50Si, .50Cr,.38Mo) C. .30 D. Face 241 Back 302 E. B.Elec. F. 1800°F. 5 hrs. Air 1700°F. 3 hrs. Water 1020°F. 6 hrs. Water	A. A-I (.07C,1.40 Mn,.27Si, 18.00Cr, 10.2Ni, 2.0Mo)* B. Armorize rezistal C. Titania D. DC REV	A. 45°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 5/32" 1a 130 - 30 5/32" 1a 125 - 30 2. I 3/16" 3a 180 - 22 3/16" 1a 190 - 22 1/4" 1a 215 - 22 3/16" 1a 175 - 22 3. I 1/4" 2a 215 - 22 C. 6 hrs. 98° - 155°F. D. Cracking and grinding after first pass. Cross-weld was not welded last. Each pass was completely welded throughout the entire H before the sub-sequent pass was made.	A.None B.None	1	872		¼" R	7" D	Imp	I V	36" 4¾" 40¾"	Passed radiograph
A. AD-166 B. 11/25/42 C. W-76 D. Ford Motor Co. E. Crucible Steel Corp. F. Ford Motor Co.	A. 1" B. C-II (1.20Mn,.47Si, .61Cr,.35Mo) C. .30 D. --- E. B.Elec. F. 1800°F. 5 hrs. Air 1700°F. 3 hrs. Water 1040°F. 8 hrs. Air	A. A-I (.07C,1.82 Mn,30.09 Cr,9.97Ni 2.00Mo)* B. Armorize rezistal C. Titania D. DC REV	A. 45°DV B. 1/4" C. Flame Cutting	A. Copper B. 1. II 5/32" 2a 135 - 22 2. I 3/16" 2a 175 - 22 3. I 1/4" 1a 218 - 22 1/4" 1a 240 - 22 C. 2-3/4 hrs. 138° - 235°F. D. Cracking and grinding after first pass. Bottom of root pass ground out.	A.None B.None	1	998	1" L		6½" D	Imp	I II III V	1½" 2½" ½" 11"	Passed radiograph
						2	999		8" L	1½" D	Imp	II III V	1" 2½" 17½"	
						3	988		3" L	8⅜" U	Imp	V	26¼"	
						4	988		7½" L	12" D	Imp	II III V	1" ½" 11½" 75½"	
								57MM Tl projectile						
		*Weld Metal												

IDENTIFICATION A. FIRING RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. PASSES NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS H	VEL. F/S	LOCATION OF H L.L.	R.L.	C.B.	CRACKING LOC.	TYPE	AMT	REMARKS OR CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-323 B. 11/4/43 C. 41 D. American Steel Foundries Sivyer Steel Casting E. McKay Company F. General Motors Truck & Coach Division	A. 1" B. C-II Am. (1.52Mn,.45Si, .32Cr,.06Mo) C. I Siv. (.87Mn,.36Si, .45Cr,.49Ni, .41Mo) C. .32 .23 D. Face 331-352 Back 341-363 E. B.O.H. F. 1650° Am. 2 hrs. Air 1525°F. 6 hrs. Water 930°F. 4 hrs. Water 1900°F. Siv. 4 hrs. Air 1600°F. 4 hrs. Water 1050°F. 6 hrs. Water	A. A-I (.10C,3.66 Mn,1.13Si, 18.10Cr, 10.20Ni, .47Mo)* B. Armorloy A-5 C. Lime D. DC REV	A. 45°DV B. 3/16" C. Flame Cutting	A. Not given B. 1. II 5/32" 1a 90 - 5/32" 1a 125 - 2. I 3/16" 3a 175 - 3. II 3/16" 4b 175 - C. 6-1/2 hrs. Under 200° & 300°F. D. Little grinding after each pass. Left and upper center sections by Sivyer Steel and the right and lower center sections by American Steel.	A. None B. None	1	1050	½" L		1½" D	Imp	II III V	5" ¾" 8"	Passed radiograph
							2	1054		½" R	7" U	0 Imp	V I V	¾" 28½" 15" 57¾"	
									57MM T1 projectile									
	*Weld Metal																	

IDENTIFICATION A. FORM REPORT NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SEQ. EL. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	PASSES NO. TYPE AMP V	HEAT A. PRE B. POST	N	VEL. F/S	LOCATION OF N L.I.	R.L.	C.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-158 B. 10/23/42 C. TH-59 D. Hughes Tool Company E. Reid-Avery Company F. Ternstedt Mfg. Div.	A. 1" B. C-I (.85Mn,.39Si, .43Cr,1.23Ni, .45Mo) C. .25 D. Face 359-361-363 E. Acid-Elec. F. 1900°F. 10 hrs. in furnace to 1650°F. Water 1200°F. 2 hrs. Air 1650°F. 1 hr. Water 1000°F. 4 hrs. Air	A. A-I (.07-15C, 3.50-4.50 Mn,.75Si, 18.00-20.00Cr, 8.50-10.5 Ni,1.25 Mo)* B. 18-8-B C. --- D. AC	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 5/16" 2. 3. I 3/8" 5/16" C. 5-1/2 hrs. D.	1a 200 - 27 1a 400 - 30 1a 450 - 30 1a 400 - 30 70° - 180°F.	A. None B. None	1	1074	X		5" U	Imp	III V	4½" 1¼"	Passed radiograph Slag in upper left leg
							2	1096		X	7" D	Imp	III	2½"	Incomplete fusion in crossbar
							3	1130		X	4¾" U	O Imp	III III V	½" 5¼" 2" 16¼"	
									57MM T1 projectile						
A. AD-158 B. 11/4/42 C. TH-62 D. Hughes Tool Company E. Lincoln Electric Co. F. Ternstedt Mfg. Div.	A. 1" B. C-I (.85Mn,.39Si, .43Cr,1.23Ni, .45Mo) C. .25 D. Face 341-350-345 E. Acid-Elec. F. 1900°F. 10 hrs. in furnace to 1650°F. Water 1200°F. 2 hrs. Air 1650°F. 1 hr. Water 1000°F. 4 hrs. Air	A. A-II (.08-10C, 3.50-4.25 Mn,.45-.80 Si,19.00-20.5Cr, 8.5-10.0 Ni)* B. Armorweld C. Lime D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. II 1/4" 2. I 5/16" 3. I 5/16" C. 3 hrs. D.	2a 300 - 25 2a 390 - 30 2a 390 - 30 70° - 280°F.	A. None B. None	1	1037		½" L	4½" U	Imp	II	6"	Passed radiograph
							2	1110	1½" L		1¼" D	Imp	II	3"	
							3	1037		½" L	11" D	Imp	III	3¼"	
							4	1066	X		3¾" U	Imp	I III	4¾" 1⅛" 18¼"	
									57MM T1 projectile						

*Weld Metal

A. FIRING RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP V 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	A. PRE B. POST	N	VEL. F/S	LOCATION OF H LI	RL	SE	CRACKING LOC	TYPE	AMT	RADIOGRAPHIC RESULTS, ETC.
A. AD-255 B. 2/3/43 C. TH-64 D. Hughes Tool Company E. Hollup Corp. Alloy Rods Co. F. Ternstedt Mfg. Div.	A. 1.015" B. C-I (.85Mn,.39Si, .43Cr,1.23Ni, .45Mo) C. .25 D. Face 347-341-345 E. Acid-Elec. F. 1900°F. 10 hrs. in furnace to 1650°F. Water 1200°F. 2 hrs. Air 1650°F. 1 hr. Water 1000°F. 4 hrs. Water	A. A-I Holl (.08C,3.36 Mn,.45Si, 18.95Cr, 10.27Ni, 1.03Mo)* A-II All (.08-.13C, 3.5-4.5Mn, .35-.70Si, 19.21Cr, 8.5-10.5 Ni)* B. Armorod Armoraro B C. Ti O2 Titanium D. AC	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16" 1a 190 - 25 3/16" 1a 200 - 25 2. I 3/8" 2a 400 - 30 3. I 3/8" 2a 400 - 30 C. 5 hrs. 80° - 180°F. D.	A. None B. None	1	1003	X		1" D	Imp	II III V	7½" 1½" 1"	Failed radiograph Crack in left leg in crossbar
						2	1063		2½" R	6¼" U	O Imp	II III V V	1½" ½" 1" 2½" 14½"	
						3	1058		1" R	6¼" D				
								57MM Ti projectile						
A. AD-255 B. 2/3/43 C. TH-75 D. Hughes Tool Company E. Lincoln Electric Co. Reid-Avery Company F. Ternstedt Mfg. Div.	A. 1.015" B. C-I (.85Mn,.39Si, .43Cr,1.23Ni, .45Mo) C. .25 D. Face 363-363-363 E. Acid-Elec. F. 1900°F. 10 hrs. in furnace to 1650°F. Water 1200°F. 2 hrs. Air 1650°F. 1 hr. Water 1000°F. 4 hrs. Air	A. A-II L.E. (.08-.10C, 3.5-4.25 Mn,.45-.80 Si,19.20.5 Cr,8.5-10. Ni)* A-I R-A (.07-.15C, 3.5-4.5Mn, .75Si, 18.20Cr, 8.5-10.5 Ni,1.25Mo)* B. Armor-weld 18-8-B C. Lime+Ti Ti-Mn.Mod. D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding Machining	A. Copper B. 1. II 1/4" 2a 275 - 28 2. I 5/16" 2a 390 - 30 3. I 5/16" 2a 390 - 30 C. 5 hrs. 90° - 260°F. D.	A. None B. None	1	1000		½" L	6½" U	Imp	I II III V	½" 2½" ¾" 3½"	Passed radiograph Crater crack at left junction
						2	1066	X		8½" D	Imp	II III V	2½" 2½" 2"	
						3	1127	½" L		6" U	Imp	I II V	5½" 9½" 1" 30½"	
								57MM Ti projectile						
		*Weld Metal												

IDENTIFICATION A. PLATE NUMBER OR NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE SPEC. F. ARMOR PREPARATION	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. DHN E. PROCESS F. HEAT TREATMENT TEMP TIME COOLING	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	N	VEL. F/S	RADIATED INDICATIONS LOCATION OF N L.L.	R.L.	S.S.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-255 B. 2/3/43 C. TM-79 D. Hughes Tool Company E. Reid-Avery Company F. Ternstedt Mfg. Div.	A. .99" B. C-I (.85Mn,.593i, .43Cr,1.23Ni, .45Mo) C. .25 D. Face 363-361-363 E. Acid-Elec. F. 1900°F. 10 hrs. in furnace to 1650°F. Water 1200°F. 2 hrs. Air 1650°F. 1 hr. Water 1000°F. 4 hrs. Air	A. A-I (.07C,3.5 Mn,.75Si, 18.0Cr, 8.5Ni, 1.25Mo)* A-II (.15C,4.5 Mn,20.0Cr, 10.5Ni)* B. 18-8-B C. Ti-Mn.Mod D. AC	A. 60°DV B. 1/4" C. Flame Cutting Grinding Machining	A. Copper B. 1. II 1/4" 2a 290 - 28 2. I 3/8" 2a 450 - 32 3. I 3/8" 2a 450 - 32 C. 5 hrs. 80° - 270°F. D.	A. None B. None	1	981		1½" R	7⅜" D	Imp	II V	1½" 2"	Failed radiograph Intermittant root pass crack in crossbar
							2	1044	3" R		6" U	Imp	I II V	5½" 2 3¾"	
							3	818		1½" L	3½" U	Imp	V	2½" 16⅝"	
									57MM Tl projectile						
A. AD-255 B. 2/3/43 C. TM-85 D. Wehr Steel Co. E. Reid-Avery Co. Holl up Company F. Ternstedt Mfg. Div.	A. 1" B. C-I (.85Mn,.498i, .66Cr,.92Ni, .43Mo) C. .27 D. Face 326-323-321 E. Acid-Elec. F. 1600°F. 6 hrs. Furnace 1825°F. 6 hrs. Air 1575°F. 6 hrs. Water 1100°F. 8 hrs. Air	A. A-I R-A (.07-.15C, 3.5-4.5Mn, .75Si,8.5-10.50Ni, 18.0-20.0 Cr,1.25Mo)* A-I Holl. (.076C,1.81 Mn,.46Si, 10.33Ni, 17.61Cr, 1.03Mo)* B. 18-8-B Armorod C. Ti+Mn Mod Mn-Mo D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Copper B. 1. II 3/16 2a 190 - 25 2. I 5/16" 2a 375 - 30 3. I 5/16" 2a 375 - 30 C. 5 hrs. 70° - 190°F. D.	A. None B. None	1	967		X	7⅜" D	Imp	III V	3" 1"	Failed radiograph Due to excessive crossbar cracking
							2	1014	2⅜" R		X	O Imp	III I	⅜" 1"	
													III V	4" 7⅜"	
							3	1067		1½" R	6½" U	Imp	I II III V	3½" 2½" 1½" 15"	
									57MM Tl projectile					39½"	
		*Weld Metal													

SPECIMEN A. PLATE IDENTIFICATION B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME COOLING	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE ANGLE(S) ANGLE, INSET FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SEQ EL. DIA TYPE AMP V 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	H	VEL. F/M	BALLISTIC RESULTS LOCATION OF H L.L.	R.L.	S.S.	CRACKING LOC	TYPE	AMT	REMARKS ON PENETRATION RADIOGRAPHING RESULTS, ETC.
A. AD-243 B. 2/11/43 C. TM-77 D. Hughes Tool Company E. McKay Company Alloy Rods Co. F. Tornstedt Mfg. Div.	A. 1.03" B. C-I (.85Mn,.39Si, .43Cr,1.23Ni, .45Mo) C. .25 D. Face 363-3[illegible]-366 E. Acid-Elec. F. 1900°F. 10 hrs. in Furnace to 1650°F. Water 1200°F. 2 hrs. Air 1650°F. 1 hr. Water 1000°F. 4 hrs. Water	A. A-II McK (.12C,3.5-4 4.5Mn,19.0-21.0Cr,9.2-10.2Ni, .80Si)* A-II A.R. (.10C,3.9 Mn,19.2Cr, 11.5Ni, .41Si)* B. Armorloy A-5 Armoraro B C. Lime+Mn Ti+Mn D. DC REV	A. 60°DV B. 1/4" C. Flame Cutting Grinding Machining	A. Copper B. 1. II 1/4" 2a 275 - 28 2. I 5/16" 2a 390 - 30 3. I 5/16" 2a 390 - 30 C. 5 hrs. 100° - 260°F. D.	A.None B.None	1 2 3 4	992 997 993 998	2" R 3" R	2¾" R X	8" D 5½" U 3½" D 9½" U	Imp O Imp Imp	V III V III	11" ¾" 9½" 10" 2½" 34"	Passed radiograph Two crater cracks present in crossbar Little cracking in lower right leg
									57MM Tl projectile								

*Weld Metal

IDENTIFICATION	BASE DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT TREAT	BALLISTIC RESULTS					REMARKS ON CRACKING RADIOGRAPHING RESULTS, ETC.
A. PLATE NUMBER OR NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	A. BACKING B. DEPOSITION SIZE EL. AMPS TYPE ARC V. 1. ROOT TYPE 2. BODY TYPE 3. GROOVE TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	A. PRE B. POST	N	VEL. F/S	LOCATION OF N L.L.	R.L.	S.S.	CRACKING LOC.	TYPE	AMT.	
A. AD-102 B. 10/23/42 C. 346 D. Republic Steel Corp. Heat treated by - American Car & Foundry E. Alloy Rods Co. F. American Locomotive Co.	A. 3/4" B. R-V (.48-.54Mn,.17 Si,.33-.34Cr, 4.99-5.0Ni, .35-.36Mo* C. .23-.25 D. Face 268 Back 272 E. --- F. ---	A. A-III (.10C,.50 Mn,.50Si, 20.00Cr, 9.5Ni, 2.50Mo)* A-II (.10C,4.0 Mn,.50Si, 20.00Cr, 9.5Ni)* B. Armorarc "B" C. Titanium D. DC REV	A. DV B. 3/16" C. Flame Cutting Grinding Buttering	A. Not given B. 1. I 3/16" 1a 160 - 28 2. I 3/16" 1a 180 - 28 1/4" 1a 230 - 28 3/16" 2a 170 - 30 1/4" 2a 220 - 30 3. I 1/4" 1a 210 - 30 1/4" 1a 220 - 30 C. 18 hrs. --- D. Two nose beads in crossbar. Chipping after fifth and sixth passes.	A. None B. None	1	769		2 1/2" L	7 1/2" D				Failed radiograph 2-1/4" crack in crossbar Some incomplete fusion
						2	824	1" R		6 3/4" U	Imp	I II	16 1/2" 1 1/2"	
						3	865		3/4" L	4 3/4" U	Imp	I II	3" 4 1/4" 25 1/2"	

*Weld Metal

A. AD-46 B. 10/1/42 C. XW-117-F D. Chevrolet Forge E. Alloy Rods Co F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.90Mn,.73Si, .61Cr,.19Mo) C. .30 D. Face 321 Back 321 E. B.O.H. F. 1600°F. 1-2/3 hrs. Water 930°F. 6 hrs. Air	A. A-I (.10C,1.25 Mn,.38Si, 17.6Cr, 8.9Ni, 2.43Mo)* A-II (.08C,3.16 Mn,.26Si, 19.9Cr, 10.0Ni)* B. Armorarc "B" C. T102 D. DC REV	A. 48°DV, 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 140 - 25 2. I 3/16" 2a 175 - 26 3. III 3/16" 3b 175 - 26 5/32" 2b 140 - 25 C. 10-1/2 hrs. 75° - 180°F. D. Peening - first, second and fifth passes.	A.None B.None	1 2 3	783 828 830	3½" L	2½" L 1" L	4½" D 6" D 8" U	Imp	II III V	3½" 7" 5½" 16"	Passed radiograph
															57MM T1 projectile	
A. AD-46 B. 10/1/42 C. XW-118-F D. Chevrolet Forge E. McKay Company F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.89Mn,.76Si, .65Cr,.23Mo) C. .28 D. Face 339 Back 331 E. B.O.H. F. 1600°F. 1-1/2 hrs. 930°F. 6 hrs. Air	A. A-II (.12C,4.26 Mn,.52Si, 19.1Cr, 9.4Ni)* (.07C,4.2 Mn,.63Si, 19.5Cr, 9.3Ni)* B. AC-5 C. Lime D. DC REV	A. 48°DV 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 140 - 25 2. I 3/16" 2a 175 - 26 3. III 3/16" 3b 175 - 26 5/32" 2b 140 - 25 C. 10-1/2 hrs. 80° - 180°F. D. Peening - first, second and fifth passes.	A.None B.None	1 2 3 4 5	760 835 831 779 794	4" L 5" R 1" R	8" R 2" R	6½" D 4" D 4" U 6" U 4" U	Imp	II III	8½" 9½"	Failed radiograph Large amount of incomplete fusion
															57MM T1 projectile	
A. AD-46 B. 10/1/42 C. XW-119-F D. Chevrolet Forge E. Harnischfeger F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.89Mn,.76Si, .65Cr,.23Mo) C. .28 D. Face 331 Back 321 E. B.O.H. F. 1600°F. 1-2/3 hrs. Water 930°F. 6 hrs. Air	A. A-I (.15C,4.47 Mn,.65Si, 19.5Cr, 9.5Ni, 1.07Mo)* (.14C,3.89 Mn,.61Si, 19.7Cr, 10.1Ni, .97Mo)* B. AW-3-C C. Lime D. DC REV	A. 48°DV 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 140 - 25 2. I 3/16" 2a 175 - 26 3. III 3/16" 3b 175 - 26 5/32" 2b 140 - 25 C. 10-1/2 hrs. 80° - 180°F. D. Peening - first, second and fifth passes.	A.None B.None	1 2 3 4 5	791 790 799 789 807	2" L 2½" R	2½" R 2½" L 1½" L	12" D 16" U 6½" D 9½" D 3½" U	Imp	II III V	1¾" 5½" 5½" 12½"	Passed radiograph
															57MM T1 projectile	
		*Weld Metal														

IDENTIFICATION A. PRIME NUMBER NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	N	VEL. F/S	LOCATION OF N L.L.	E.L.	S.S.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-60 B. 10/16/42 C. XW-103-F D. Great Lakes Steel Corp. E. Alloy Rods Co F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.90Mn,.75Si, .68Cr,.21Mo) C. .32 D. Face 363 Back 363 E. B.O.H. F. 1600°F. 52 mins. Water 860°F. 4 hrs. Air	A. A-I (.10C,1.25 Mn,.38Si, 17.6Cr, 8.9Ni, 2.43Mo)* A-II (.12C,3.58 Mn,.26Si, 18.6Cr, 9.8Ni)* B. Armorarc "B" C. T102 D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 140 - 25 2.& 3. Three layers 1/4" 2a 240 - 38 5/32' 1a 140 - 25 C. 11-1/2 hrs. 80° - 160°F. D. Peening - first and third passes.	A. None B. None	1	827		4" L	5" U				Passed radiograph Several areas of incomplete weld fusion. Crater cracks in crossbar
						2	832		1¼" R	8" D	Imp	I II III	3½" 1½" 10"	
						3	825	3½" R		4½" U	O	II	1½"	
						4	805	1½" L		7⅛" D	Imp	I II III V	2½" 1½" 8½" 8"	
						5	835	X		6" U	O Imp	I III V III V	1½" 5½" 4" 22" 17⅜" 85⅜"	
								57MM T1 projectile						
A. AD-60 B. 10/16-42 C. XW-105-F D. E.C.Atkins E. McKay Corp. F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.77Mn,.57Si, .61Cr,.20Mo, .08Zr) C. .29 D. Face 351 Back 351 E. B.O.H. F. 1625°F. Water 940°F. 70 mins. Air	A. A-II (.12C,4.25 Mn,.52Si, 19.1Cr, 9.4Ni)* (.09C,4.45 Mn,.56Si, 20.1Cr, 9.6Ni)* B. AC-5 C. Lime D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 140 - 25 2.& 3. Three layers 1/4" 2a 240 - 38 5/32" 1a 140 - 25 C. 8 hrs. 80° - 130°F. D. Peening - first and third passes.	A. None B. None	1	742		2" L	6½" D				Passed radiograph Some scattered areas of incomplete fusion
						2	843	1" L		2" U	Imp	I II III V	2" 2¾" 5½" 5½"	
						3	820	4" L		2" U	O Imp	II V V	1" 8¾" 5½"	
						4	803		6" L	14⅛" U	Imp	V	8"	
						5	843		2½" L	17⅛" U	Imp O	I V V	5½" 1½" 2½" 46⅜"	
								57MM T1 projectile						
		*Weld Metal												

SPECIMEN	ARMOR DATA	ELECTRODE DATA	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS							REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. Armor Designation No. B. Date of Test C. Plate No. D. Armor Manufacturer E. Electrode Supplier F. Armor Fabricator	A. Plate Thickness B. Type C. Carbon Content D. Size E. Process F. Heat Treatment Temp Time Quench	A. Type B. Trade Name C. Coating D. Current & Polarity	A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	A. Backing B. Deposition Size El. Amp. Volt. Type Pass 1. Root Type 2. Body Type 3. Crown Type C. Total Welding Time & Inter Pass Temperature D. Remarks	A. Pre B. Post	N	Vel. f/s	Location of N L.L.	R.L.	S.S.	Cracking Loc.	Type	Amt.	
A. AD-115 B. 10/28/42 C. 1-57-M D. Great Lakes Steel Corp. E. Harnischfeger Corp. F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.90Mn,.75Si, .68Cr,.21Mo) C. .32 D. Face 363 Back 363 E. B.O.H. F. 1600°F. 1-2/3 hrs. Water 860°F. 6 hrs. Air	A. A-I (.15C,4.47 Mn,.65Si, 19.5Cr, 9.5Ni, 1.07Mo)* (.14C,3.89 Mn,.61Si, 19.7Cr, 10.1Ni, .97Mo)* B. AW-3-C C. Lime D. DC REV	A. 48°DV 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 140 - 35 2. I 3/16" 2a 175 - 36 3. III 3/16" 3b 175 - 36 5/32" 2b 140 - 35 C. --- 80° - 200°F. D. Peening - first, second and fifth passes.	A. None B. None	1	789		1/4" R	10" D	Imp	II V	8" 14 3/4"	Passed radiograph Scattered areas of incomplete fusion
						2	831	1 3/4" L		9 1/4" U	Imp	I II V	1 1/2" 10 1/4" 13" 46 1/4"	
						57MM T1 projectile								
A. AD-115 B. 10/28/42 C. 2-57-M D. Great Lakes Steel Corp. E. McKay Company F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.90Mn,.75Si, .68Cr,.21Mo) C. .32 D. Face 363 Back 363 E. B.O.H. F. 1600°F. 1-2/3 hrs. Water 860°F. 6 hrs. Air	A. A-II (.12C,4.26 Mn,.52Si, 19.1Cr, 9.4Ni)* (.07C,4.20 Mn,.63Si, 19.5Cr, 9.3Ni)* B. Ac-5 C. Lime D. DC REV	A. 48°DV 3/32"RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 140 - 35 2. I 3/16" 2a 175 - 36 3. III 3/16" 3b 175 - 36 5/32" 2b 140 - 35 C. 8 hrs. 80° - 155°F. D. Peening - first, second and fifth passes.	A. None B. None	1	780	2" L		8 3/4" D				Failed radiograph General condition of incomplete fusion
						2	818		5 1/2" L	5 1/2" U				
						3	811		2 1/2" L	3/4" U	Imp	I II III V	2" 10 3/4" 4 3/4" 9 1/4" 27"	
						57MM T1 projectile								
A. AD-227 B. 11/19/42 C. XW-150-F D. E.C.Atkins E. McKay Company F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.94Mn,.81Si, .72Cr,.22Mo, .09Ni) C. .32 D. Face 360 Back 360 E. B.O.H. F. 1610°F. 1 hr. Water 1030°F. 2 hrs. Air	A. A-I (.14C,3.81 Mn,.76Si, 19.9Cr, 9.41Ni, 1.19Mo)* (.10C,3.68 Mn,1.18Si, 18.9Cr, 10.6Ni, .63Mo) B. A-5 C. Lime D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Grinding	A. Not given B. 1. I 5/32" 1a 140 - 35 2.& 3. Three layers 1/4" 2a 250 - 28 5/32" 1a 140 - 35 C. 6-1/2 hrs. 90° - 195°F. D. Peening - first and third passes.	A. None B. None	1	835		1" R	3 1/4" U	Imp	I III V	2 1/2" 8" 10"	Failed radiograph General condition of incomplete fusion Some slag inclusions
						2	831	3/4" R		4" D	Imp	III V	6" 14 1/2" 41"	
						57MM T1 projectile								
		*Weld Metal												

ELECTRODE DATA A. Filler Metal Spec. No. B. Date of Test C. Plate No. D. Arcos Designation E. Electrode Supp. F. Arcos Designation	BASE DATA A. Plate Thickness B. Type C. Carbon Content D. Size E. Process F. Heat Treatment Temp Time Cooling	ELECTRODE DATA A. Type B. Trade Name C. Coating D. Current & Polarity	JOINT DESIGN A. Groove, Included Angle, Root Face B. Root Gap C. Plate Preparation	WELDING PROCEDURE A. Backing B. Deposition Sequence Electrode Size Type and/or Class 1. Root Type 2. Body Type 3. Crown Type C. Total Welding Time & Inter Pass Temperature D. Remarks	HEAT TREAT A. Pre B. Post	BALLISTIC RESULTS No.	Vel. f/s	Location of Hit L.L.	R.L.	S.S.	Cracking Lgth	Type	Amt.	REMARKS or Testing Radiographic Results, etc.
A. AD-227 B. 11/19/42 C. XW-151-F D. E.C.Atkins E. Alloy Rods Co F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .32 D. Face 360 Back 360 E. B.O.H. F. 1610°F. 1 hr. Water 1030°F. 2 hrs. Air	A. A-I (.10C,1.25 Mn,.38Si, 17.6Cr, 8.9Ni, 2.43)* A-II (.12C,3.58 Mn,.26Si, 18.6Cr, 9.8Ni)* B. Armoraro "B" C. T103 D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Grinding	A. Not given B. 1. I 5/32" 1a 140 - 25 2.& 3. Three layers 5/32" 1a 140 - 25 1/4" 2a 250 - 28 C. 6 hrs. 90° - 180°F. D. Peening - first and third passes.	A. None B. None	1	779	1⅛" L		4½" D				Failed radiograph Several weld cracks along crossbar
						2	741		1⅜" L	1½" D	Imp	II III	2" 10"	
						3	825	¼" L		4⅜" U	0 Imp	II III II III V	1" 1½" 1" 4½" 13"	
								57MM T1 projectile					33½"	
A. AD-227 B. 11/19/42 C. XW-152-F D. E.C.Atkins E. Alloy Rods Co F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.77Mn,.57Si, .61Cr,.20Mo, .08Zr) C. .29 D. Face 364 Back 364 E. B.O.H. F. 1625°F. 1 hr. Water 940°F. 70 mins. Air	A. A-I (.10C,1.25 Mn,.38Si, 17.6Cr, 8.9Ni, 2.43Mo)* A-II (.12C,3.58 Mn,.26Si, 18.6Cr, 9.8Ni)* B. Armoraro "B" C. T103 D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Grinding	A. Not given B. 1. I 5/32" 1a 140 - 25 2.& 3. Three layers 5/32" 1a 140 - 25 1/4" 2a 250 - 28 C. 10 hrs. 80° - 120°F. D. Peening - first and third passes.	A. None B. None	1	836	5½" R		1½" D	Imp	II III V	3½" 7½" 3½"	Failed radiograph General condition of incomplete weld fusion, also some scattered slag inclusions
						2	802	5½" L		1" U				
						3	832		1" R	13" U	Imp	I II III V	1½" 1½" 5½"	
								57MM T1 projectile					22½"	
		*Weld Metal												

SPECIFICATION A. PLATE NUMBER NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP. V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	R.L.	S.S.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-227 B. 11/19/42 C. XW-153-F D. E.C.Atkins E. Alloy Rods Co F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.94Mn,.81Si, .70Cr,.22Mo, .09Zr) C. .32 D. Face 360 Back 360 E. B.O.H. F. 1610°F. 1 hr. Water 1030°F. 2 hrs. Air	A. A-I (.10C,1.25 Mn,.38Si, 17.6Cr, 8.9Ni, 2.43Mo)* A-II (.12C,3.58 Mn,.26Si, 18.6Cr, 9.8Ni)* B. Armoraro "B" C. TiO2 D. DC REV	A. 60°DV, 3/32" RF B. 3/16" C. Grinding	A. Not given B. 1. I 5/32" 1a 140 - 25 2.& 3. Three layers 5/32" 1a 140 - 25 1/4" 2a 250 - 28 C. 10 hrs. 80° - 140°F. D. Peening - first and third passes.	A. None B. None	1	833	3" L		2 1/2" U				Passed radiograph Several small cracks in crossbar
						2	810		2 1/8" L	6 1/2" D				
						3	827		2 3/8" L	14 1/2" U	Imp	V	3 1/4"	
						4	837	5" L		5 1/2" D				
						5	833		1 1/8" L	11 1/2" D	Imp	I II III V	1" 2 3/4" 4" 9 1/2"	
											O	V	3/4"	
						6	804	1/8" L		11" D	Imp	III V	12 1/2" 1 1/2"	
													35 1/2"	
								57MM T1 projectile						
A. AD-227 B. 11/19/42 C. XW-158-F D. E.C.Atkins E. Harnischfeger Corp. F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.77Mn,.57Si, .61Cr,.20Mo, .08Zr) C. .29 D. Face 364 Back 364 E. B.O.H. F. 1625°F. 1 hr. Water 940°F. 70 mins. Air	A. A-I (.15C,4.47 Mn,.65Si, 19.5Cr, 9.5Ni, 1.07Mo)* A-II (.13C,4.20 Mn,.47Si, 19.0Cr, 10.7Ni)* B. AW-3-C C. Lime D. DC REV	A. 60°DV, 3/32" RF B. 3/16" C. Grinding	A. Not given B. 1. I 5/32" 1a 140 - 25 2.& 3. Three layers 5/32" 1a 140 - 25 1/4" 2a 250 - 28 C. 8 hrs. 75° - 140°F. D. Peening - first and third passes.	A. None B. None	1	831	4 1/2" L		5" D	Imp	V	12"	Failed radiograph Moderate amounts of incomplete fusion and slag throughout
						2	792		1" L	3 1/2" D	Imp	II III V	1 1/2" 3" 15"	
						3	756	2 3/4" L		4 1/2" U	Imp	V	7" 38 1/2"	
								57MM T1 projectile						
		*Weld Metal												

IDENTIFICATION A. PLATE NUMBER OR B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING PASSES B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. GROOVE TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	VEL. F/S	LOCATION OF N L.L.	B.L.	G.B.	CRACKING LOC.	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. AD-46 B. 10/1/42 C. XW-120-F D. Chevrolet Forge E. Crucible Steel Company F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.90Mn,.73Si, .61Cr,.19Mo) C. .30 D. Face 331 Back 321 E. B.O.H. F. 1600°F. 1-2/3 hrs. Water 930°F. 6 hrs. Air	A. A-I (.14C,3.58 Mn,.31Si, 19.7Cr, 10.4Ni, 1.17Mo)* (.10C,3.56 Mn,.33Si, 20.2Cr, 10.4Ni, 1.10Mo)* B. Armorize "A" C. T102 D. DC REV	A. 48°DV 3/32" RF B. 3/16" C. Machining	A. Not given B. 1. I 5/32" 1a 140 - 25 2. I 3/16" 2a 175 - 26 3. III 3/16" 3b 175 - 26 5/32" 2b 140 - 25 C. 11 hrs. 80° - 180°F. D. Peening - first, second and fifth passes.	A. None B. None	1	776		3" R	1 2/3" U				Passed radiograph Some scattered areas of incomplete fusion
						2	827		6" L	5 1/3" D				
						3	755	4 2/3" R		13" D				
						4	788	4 1/2" R		2 1/2" U				
						5	804	3" R		7 1/2" U				
						6	782	3 1/2" R		3 1/2" U	O	II III	1 1/2" 12 1/2" 13 1/2"	
						57MM T1 projectile								
A. AD-132 B. 12/2/42 C. XW-166-F D. Great Lakes Steel Corp. E. Harnischfeger Corp. F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.90Mn,.75Si, .68Cr,.21Mo) C. .32 D. Face 341 Back 341 E. B.O.H. F. 1600°F. 52 mins. Water 1000°F. 4 hrs. Air	A. A-I (.15C,4.47 Mn,.65Si, 19.5Cr, 9.5Ni, 1.07Mo)* A-II (.13C,4.20 Mn,.47Si, 19.0Cr, 10.7Ni)* B. AW-3-C C. Lime D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Grinding	A. Not given B. 1. I 5/32" 1a 140 - 25 2.& 3. Three layers 1/4" 2a 250 - 28 5/32" 1a 140 - 25 C. 9 hrs. 90° - 120°F. D. Peening - first and third passes.	A. None B. None	1	807		2 1/2" L	6" D				Passed radiograph
						2	805	7" L		3 2/3" U				
						3	829	6 1/2" L		1" U				
						4	813	3" R		7 1/2" U				
						5	830		6 1/2" L	8 1/2" U				
						6	804		1 1/2" L	1 1/2" U	Imp	III V	4 2/3" 13 1/2" 18 1/2"	
						57MM T1 projectile								
		*Weld Metal												

IDENTIFICATION	ARMOR PLATE	ELECTRODE USED	JOINT DESIGN	WELDING PROCEDURE	HEAT	BALLISTIC RESULTS						REMARKS ON CRACKING RADIOGRAPHIC RESULTS, ETC.
A. FIRING RECORD NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP V. 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	A. PRE B. POST	N	VEL. F/S	LOCATION OF H L.L.	R.L.	O.B.	CRACKING LOC.	TYPE	AMT.	
A. AD-132 B. 12/2/42 C. XW-167-F D. Great Lakes Steel Corp. E. McKay Corp. F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.30Mn,.75Si, .68Cr,.21Mo) C. .32 D. Face 341 Back 341 E. B.O.H. F. 1600°F. 52 mins. Water 1000°F. 4 hrs. Air	A. A-II (.12C,4.26 Mn,.52Si, 19.1Cr, 9.4Ni)* (.09C,4.45 Mn,.56Si, 20.1Cr, 9.6Ni)* B. AC-5 C. Lime D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Grinding	A. Not given B. 1. I 5/32" 1a 140 - 25 2.& 3. Three layers 1/4" 2a 250 - 28 5/32" 1a 140 - 25 C. 9 hrs. 80° - 130°F. D. Peening - first and third passes.	A. None B. None	1	797		1½" L	8¾" U	Imp	I II	3½" 4½"	Passed radiograph Small amount of incomplete fusion
						2	792	3½" L		5" D				
						3	819	3½" L		10½" U	O	II	½"	
						4	830		2¾" L	6½" D				
						5	779	1" L		7" U	O Imp	II I II III V	½" 2½" 2¾" 1" 9"	
						6	796	1¾" L		¾" D	O Imp O	II I III V	½" 4" 2" ½"	
								57MM T1 projectile					29"	
A. AD-132 B. 12/2/42 C. XW-168-F D. Great Lakes Steel Corp. E. Alloy Rods Co. F. Chevrolet Motor Co.	A. 3/4" B. R-IV (.30Mn,.75Si, .68Cr,.21Mo) C. .32 D. Face 341 Back 341 E. B.O.H. F. 1600°F. 52 mins. Water 1000°F. 4 hrs. Air	A. A-I (.10C,1.25 Mn,.38Si, 17.6Cr, 8.9Ni, 2.43Mo)* A-II (.12C,3.58 Mn,.26Si, 18.6Cr, 9.8Ni)* 3. Armoraro "B" C. TiO2 D. DC REV	A. 60°DV 3/32" RF B. 3/16" C. Grinding	A. Not given B. 1. I 5/32" 1a 140 - 25 2.& 3. Three layers 1/4" 2a 250 - 28 5/32" 1a 140 - 25 C. 9 hrs. 80° - 130°F. D. Peening - first and third passes.	A. None B. None	1	786	2" R		6¼" D				Passed radiograph Large amount of incomplete fusion and slag inclusions Cracks in crossweld
						2	818		2½" L	13½" U				
						3	807		1½" L	½" U	Imp	III V	11½" 7½"	
								57MM T1 projectile					19"	
		*Weld Metal												

IDENTIFICATION A. PLATE ASSIGNED NO. B. DATE OF TEST C. PLATE NO. D. ARMOR MANUFACTURER E. ELECTRODE MFGR. F. ARMOR FABRICATOR	ARMOR DATA A. PLATE THICKNESS B. TYPE C. CARBON CONTENT D. BHN E. PROCESS F. HEAT TREATMENT TEMP TIME QUENCH	ELECTRODE DATA A. TYPE B. TRADE NAME C. COATING D. CURRENT & POLARITY	JOINT DESIGN A. GROOVE, INCLUDED ANGLE, ROOT FACE B. ROOT GAP C. PLATE PREPARATION	WELDING PROCEDURE A. BACKING B. DEPOSITION SIZE EL. NO. TYPE AMP V. PASSES 1. ROOT TYPE 2. BODY TYPE 3. CROWN TYPE C. TOTAL WELDING TIME & INTER PASS TEMPERATURE D. REMARKS	HEAT A. PRE B. POST	BALLISTIC RESULTS N	V/L F/S	LOCATION OF N L.L.	R.L.	G.B.	CRACKING LENGTH	TYPE	AMT.	REMARKS ON CRACKING RADIOGRAPHING RESULTS, ETC.
A. AD-228 B. 11/11/42 C. W-32 D. Ford Motor Co. E. Crucible Steel Corp. F. Ford Motor Co.	A. 3/4" B. R-II (1.38Mn,.258i, .55Cr,.47Mo) C. .28 D. --- E. B.O.H. F. 1650°F. 4 hrs. Platen 1000°F. 6 hrs. Air	A. A-I (.07C,1.40 Mn,.278i, 18.00Cr, 10.2Ni, 2.0Mo)* B. Armorize rezistal C. Titania D. DC REV	A. 45°SV B. 1/8" C. Flame Cutting Grinding	A. Copper B. 1. I 1/8" 1a 95 - 22 2. I 5/32" 1a 130 - 22 3/16" 1a 175 - 22 3/16" 1a 180 - 24 1/4" 1a 210 - 26 3. I 1/4" 1a 210 - 26 3/16" 1SB 180 - 22 C. 6 hrs. 100° - 170°F. D. Grinding of craters after first pass.	A. None B. None	1 2 3 4	826 750 759 750	 4" L 4½" L 1½" L	½" L 57mm. T1	6½" D 6½" U 2" D 8½" U	Imp Imp	I II III V I II V	7" 5" 2½" 7½" 9" 4½" 4⅝" 19½" 59¾"	section displaced projectile	Passed radiograph
A. AD-166 B. 11/25/42 C. W-72 D. Ford Motor Co. E. Crucible Steel Corp. F. Ford Motor Co.	A. 3/4" B. R-II (1.43Mn,.298i, .56Cr,.10Ni, .44Mo) C. .29 D. --- E. B.O.H. F. 1650°F. 2 hrs. Platen 1000°F. 4 hrs. Air	A. A-I (.07C,1.82 Mn,20.09 Cr,9.97Ni 2.00Mo)* B. Armorize rezistal C. Titania D. DC REV	A. 45°SV B. 3/16" C. Grinding	A. Copper B. 1. I 5/32" 1a 145 - 22 2. III 3/16" 1a 190 - 22 5/32" 2b 155 - 22 1/4" 1a 250 - 22 3. I 1/4" 1a 250 - 22 3/16" 1SB 200 - 22 C. 5-3/4 hrs. 142° - 252°F. D. Grinding of craters after first pass.	A. None B. None	1 2	779 776	2⅜" L 57mm. T1	 ½" R projectile	10" D 7½" U	 Imp	 I III	 11" 2" 13"		Passed radiograph
A. AD-264 B. 2/17/43 C. W-3 D. Ford Motor Co. E. Crucible Steel Corp. F. Ford Motor Co.	A. 3/4" B. R-II (1.49Mn,.308i, .72Cr,.07Ni, .42Mo) C. .27 D. Back 331 E. --- F. 1650°F. 3-1/2 hrs. Spray 1030°F. 4-1/2 hrs. Air	A. A --- B. Armorize C. --- D. DC REV	A. 45°SV B. 1/4" C. Flame Cutting Grinding	A. Copper B. 1. I 3/16" 1a 205 - 24 2. I 1/4" 3a 320 - 25 3. II 3/16" 2b 220 - 24 3/16" 1SB 220 - 24 C. 5 hrs. 70° - 240°F. D. Two more passes in crossbar.	A. None B. None	1 2 3	805 806 808	 1⅜" L 57mm. T1	5" L 3½" L projectile	4⅜" D 2½" U 2½" U					Passed radiograph Small crack in crossbar
		*Weld Metal															

					HEAT A. PRE B. POST	BALLISTIC RESULTS #	VEL. FPS	LOCATION OF # LL	RL	SL	CRACKING LOC	TYPE	AMT	REMARKS ON CRACKING, RADIOGRAPHIC RESULTS, ...
A. AD-204 B. 1/20/43 C. 1 D. Carnegie-Illinois Steel Corp. E. Hollup Corp. F. Standard Railway Equip. Mfgr. Co.	A. 3/4" B. R-I (1.06Mn,.195Si, .45Cr,.95Ni, .42Mo) C. .26C D. Face 332 Back 332 E. Acid-Elec. F. ---	A. A-I (.079C,3.41 Mn,.325Si, 17.7Cr, 12.6Ni, 1.64Mo)e B. Armored C. Mineral D. DC REV	A. 45°DV B. 5/32" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 2a 150 - 26 2. I 5/32" 2a 150 - 26 3. I 5/32" 2a 150 - 26 C. 8 hrs. --- D. One more pass in right leg and crossbar. Grinding after first and third passes.	A. 70°F B. None	1	846		2" L	4½" D	0	I II III	3½" 1½" 2½"	Passed radiograph Some incomplete fusion in the penetration zone
						2	802	2½" L		4½" U	Imp	V	16½"	
						3	771	1½" L		9½" D	Imp	I II	3½" 11"	
								75mm. T1 projectile					36½"	
A. AD-296 B. 3/5/43 C. 2 D. Carnegie-Illinois Steel Corp. E. Hollup Corp. F. Standard Railway Equip. Mfgr. Co.	A. 3/4" B. R-I (1.06Mn,.198Si, .45Cr,.96Ni, .42Mo) C. .26 D. Face 332 Back 332 E. Acid-Elec. F. ---	A. A-I (.079C,3.4 Mn,.328Si, 17.7Cr, 12.6Ni, 1.64Mo)e B. Armored C. Mineral D. DC REV	A. 60°DV B. 3/16" C. Flame Cutting Grinding	A. Not given B. 1. II 5/32" 2a 150 - 23 2. I 5/32" 2a 150 - 23 3. II 5/32" 4b 150 - 23 C. 10 hrs. --- D. Grinding after first pass.	A. 70°F B. None	1	817		X	5½" D	Imp	I II	4½" 9½"	Passed radiograph Small transverse weld cracks at junctions of crossbar
						2	713	3" L		⅜" U	0	I	1" 14½"	
								57mm. T1 projectile						

eWeld Metal

RESTRICTED

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ABSTRACT:

Tests were conducted to obtain firing record data for subject plates and to present a comparison of ballistic shock performance of plates made with various materials and welding procedures. After a series of tests and investigations the following data were derived: steel cleanliness and directional properties affect the amount of weld cracking during ballistic shock testing of H plates assembled from one-inch rolled homogeneous armor. There is little difference in ballistic shock test results of plates welded with the manganese and with the molybdenum modified type of austenitic electrodes. Plates welded with a narrow included angle, a small number of passes, or straight weave techique are indicated to be slightly inferior in resistance to weld metal cracking during ballistic test. Five Unionmelt plates, included in the rolled 1-inch armor group, showed shock test results slightly inferior to the average for hand-welded plates.

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