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WATERTOWN ARSENAL
LABORATORY

MEMORANDUM REPORT

NO. WAL 710/590

Preliminary Metallurgical Examination of Twelve (12) Samples
of Cast Homogeneous Armor to be Fired During
the 1943-44 Cold Test Program

BY

J. F. SULLIVAN

Jr. Engineer

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DATE 12 February 1944

WATERTOWN ARSENAL
WATERTOWN, MASS.



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Watertown Arsenal Laboratory

Memorandum Report No. WAL 710/590

Second Partial Report on Problem B-12.1

12 February 1944

Preliminary Metallurgical Examination of Twelve (12) Samples of
Cast Homogeneous Armor to Be Fired during
the 1943-44 Cold Test Program

1. In accordance with a directive from the Office, Chief of Ordnance, (1) twelve (12) samples of cast homogeneous armor were received from Aberdeen Proving Ground for metallurgical examinations preliminary to their being fired as part of the 1943-44 Cold Test program.

2. These samples had been cut at Aberdeen from ballistic test samples in sections of various lengths, but approximately 3" wide. From one end of each section, a six-inch fiber fracture sample was cut at this arsenal, as well as a two-inch hardness sample contiguous to it. The fiber fracture samples were then nicked in 1" on each side and broken uniformly fast with a steam forge hammer. The results appear in Table I.

3. One surface and a cross-section were prepared for Brinell impression by Blanchard grinding and belt grinding and a traverse of four readings on the cross-section and three readings on the surface were taken as nearly as possible to the edge cut at Aberdeen. The individual readings on the cross-sectional traverse and their average and the average of the surface readings are listed in Table I.

4. Additional examinations of ballistic test samples will be reported as soon as possible after receipt from Aberdeen.

APPROVED:

J. F. Sullivan
J. F. Sullivan
Jr. Engineer

S APR 18 1985

W. A. MATTHEWS
Major, Ord. Dept.

(1) O.O. 470.5/5139(r) - Wm 470.5/7578(r), dated 22 October 1943.

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TABLE I

Summary of Metallurgical Examinations Conducted Prior to Ballistic Testing
of Twelve Samples of Cast Homogeneous Armor to be Fired
During the 1943-44 Cold Test Program

Sample No.	Nominal Gauge	Fracture Rating	Brinell Hardness Number					Surface Ave.
			Cross Section				Ave.	
			1	2	3	4		
GC300K10	1"	C	269	277	277	285	277	285
GC301K10	1"	Fc	321	331	321	321	324	318
GC302K10	1"	FC	311	321	311	311	314	296
GC303K10	1"	Fc	311	321	321	321	319	321
GC304K10	1"	FC	302	302	321	302	307	302
GC305K10	1"	FC	321	321	321	321	321	318
21-43C P10	1"	C	269	277	285	269	275	272
21-45C P10	1"	C	269	277	269	277	273	269
21-46C P10	1"	FC	302	293	302	302	300	299
21-47C P10	1"	C	269	269	285	285	277	280
21-49C P10	1"	C	269	269	277	285	275	280
21-51C P10	1"	C	269	269	269	269	269	280

Key: C - Crystalline
 FC - Fibrous and crystalline
 Fc - Fibrous with small amount of crystallinity

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ALL COMMUNICATIONS SHOULD BE ADDRESSED TO "THE COMMANDING OFFICER"

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FREIGHT AND EXPRESS ADDRESS
ABERDEEN, MD.

PROVING GROUND, MD.

WAR DEPARTMENT
ORDNANCE RESEARCH CENTER,
ABERDEEN PROVING GROUND

MARYLAND
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BEYER/hlc
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A.P.G. 470.5/4550

16 February 1944

Subject: Identification of Metallurgical Samples of Cold Test Plates.
(Kelsey-Hayes Wheel Co.)

To: Commanding Officer
Watertown Arsenal
Watertown, Massachusetts

Attention: Laboratory (N M)

1. Reference is made to Bill of Lading WT5011880 pertaining to forty-four (44) pieces of armor shipped to your Arsenal from Aberdeen Proving Ground on 12 January 1944, via Laube Interstate Truck, and also to APG TT1630 SPOTZ/CARY, dated 19 January 1944 concerning the radiographic examination of a portion of this shipment.

2. Six samples in this shipment were removed from 1" cast homogeneous plates manufactured by the Kelsey Hayes Wheel Company. These samples were incorrectly stencilled, and the following list is provided to show the proper identification:

<u>Marked on Plate</u>	<u>Change To</u>
GC300K10	AC300K10
GC301K10	CC 301K10
GC302K10	DC302K10
GC303K10	EC303K10
GC304K10	FC304K10
GC305K10	No change

3. It is requested that all data pertaining to these samples be identified in accordance with the above change.

For the Commanding General

JOHN W. CAVE
Lt. Col., Ord. Dept.
Chief, Arms & Ammunition
Division

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