



Test Report

Client:	Essar Steel India Limited Attention: Mr. Sunil Patil 27th KM, Surat-Hazira Road Hazira, Surat-394270, Gujarat India
Report date:	10 May 2018
Job number:	000008110H
Test procedure and supporting documentation:	Per Customer Instructions MIL-A-12560H
Sample receipt, identification information, and disposition:	The sample(s) were received on 8 May 2018 . Sample item(s) were identified as steel armor plate(s). The test sample(s) were inspected prior to testing and no anomalies were discovered. Sample(s) will be returned, discarded, or held, per customer instructions.
Test date(s) and location:	Testing commenced on 10 May 2018 , at the H.P. White Laboratory, Inc. facilities located at 3114 Scarboro Road, Street, Maryland. Testing concluded on 10 May 2018 .
Report prepared by:	Ashley Gowland, Customer Operations Coordinator
Report reviewed by:	Chris D'Amario, Engineer
Revision number and date:	NA
Supplement to report:	NA
Test data transmittal method and storage location:	This test report and test data were transmitted via email in a manner compliant with ISO 17025 requirements. Permanent electronic and hardcopy files are maintained in accordance with HPWLI data storage policy on data storage systems, filed by job number.
Disclaimer:	Testing was performed on sample(s) provided by the client. H.P. White Laboratory, Inc. holds no responsibility for sample selection methods. This report is based on data obtained from testing only the sample(s) submitted, and should NOT be interpreted as an endorsement by H.P. White Laboratory, Inc. of the continuing quality or performance of any other items of the same, or similar, design. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. This testing was performed by H.P. White Laboratory, Inc. to client specification, and the test results are the property of the client, who holds all rights of reproduction or publication of this report and related test data.
Destination control statement:	This document may contain items controlled by the U.S. government and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. government or as otherwise authorized by U.S. law and regulations.

Test Procedures

Backspall Testing: All testing was conducted on an indoor range at ambient conditions in accordance with your instructions and the general provisions of MIL-A-12560H. Testing was conducted using caliber 20mm AP, M95, 1996 grain ammunition. The test sample(s) were positioned 45.0 feet from the muzzle of the barrel to produce zero (0°) degree obliquity impacts. Photoelectric infrared screens were located at 15.0 feet and 35.0 feet which, in conjunction with electronic chronographs, were used to compute bullet velocities at 25.0 feet forward of the muzzle. Penetrations were determined by visual examination of the 0.020-inch-thick 2024-T3 aluminum alloy witness plate, placed 6.0 inches behind and parallel to the test sample(s). Table I provides a summary of information on the attached data record(s).

Based on the data presented in Table I, the test sample(s) submitted for testing **satisfy** the Backspall requirements of MIL-A-12560H.

Table I: Backspall, Summary of Results

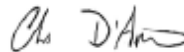
Test Sample				Set-Up				Results		
Sample No.	Thickness (in.) (a)	Ordered Thickness (mm.)	Weight (lbs.)	Caliber	Shots	Velocity (fps)		Penetrations	Backspall Diameter (in.) (b)	
						Shot 1	Shot 2		Shot 1	Shot 2
WJ0963 112H-3	0.588	15.0	73.4	20mm, AP M95	2	2533	2501	2	1.159	1.100
(a) Nominal four corner average thickness (b) Maximum exit diameter cannot exceed 1.625-inches										

Report prepared by:



Ashley Gowland
 Customer Operations Coordinator

Report reviewed by:



Chris D'Amario
 Engineer



TEST PANEL

Manufacturer : Essar Steel India Ltd.

Size : 12 x 36 in.

Thicknesses : 0.586, 0.584, 0.591, 0.591 in.

Avg. Thick : 0.588 in.

Description : WROUGHT HOMOGENEOUS ARMOR STEEL PLATE.

ORDERED THICKNESS- 15.0mm

Sample No. : WJ0963112H-3 (BACKSPALL)

Weight : 73.4 lbs.

Hardness : NA

Plies/Laminates : NA

Date Rec'd. : 5/8/18

Via :

Returned :

SET-UP

Shot Spacing : PER CUSTOMER REQUEST

Witness Panel : 0.020", 2024-T3 ALUMINUM

Obliquity : 0 deg.

Backing Material : NA

Conditioning : AMBIENT

Primary Vel. Screens : 15.0 ft., 35.0 ft.

Primary Vel. Location : 25.0 ft. From Muzzle

Residual Vel. Screens : NA

Residual Vel. Location : NA

Range to Target : 45.0 ft.

Target to Wit. : 6.0 in.

Range No. : 3

Temp. : 66 F

BP : 30.20 in. Hg

RH : 54%

Barrel No./Gun : R3/ 20MM

Gunner : Linkous

Recorder : Bonsall

AMMUNITION

(1) : 20mm AP, M95, 1996 gr.

(2) :

(3) :

(4) :

Lot No. : HPW-2001

Lot No. :

Lot No. :

Lot No. :

APPLICABLE STANDARDS OR PROCEDURES

(1) : MIL-A-12560H (BACKSPALL TEST)

(2) : REQUIRED VELOCITY: 2500-2550 FPS.

(3) :

Shot No.	Ammo.	Time 1 (usec)	Velocity 1 (ft/s)	Time 2 (usec)	Velocity 2 (ft/s)	Avg. Vel. (ft/s)	Vel. Loss (ft/s)	Strike Vel. (ft/s)	Penetration	Footnotes
1	1	7869	2542	7869	2542	2542	9	2533	Bullet	(a)
2	1	7968	2510	7968	2510	2510	9	2501	Bullet	(b)

REMARKS :	FOOTNOTES : (a) MAXIMUM EXIT DIAMETER : 1.159" (b) MAXIMUM EXIT DIAMETER : 1.100"
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