

NATIONAL INSTITUTE OF JUSTICE HARD ARMOR COMPLIANCE TEST REPORT



Report Identification Number: OBL-CTR-RMA-1155
Issue/Revision Number: Initial
Report Date: 5/22/2017

200826-0
NVLAP Lab Code

Test Laboratory Name: Oregon Ballistic Laboratories
Address: 2873 22nd St SE
Salem OR 97302

Customer: RMA Armament, Inc.
22800 Dewey Rd.
Address: Centerville, Iowa USA

Conditioning Laboratory Name: Oregon Ballistic Laboratories
Address: 2873 22nd St SE
Salem OR 97302

Prospective Model Designation: 1155

This test report and the results herein are to be used solely for the purpose of determining compliance to the NIJ 0101.06 Body Armor Standard. The test data should not be used to compare the relative performance characteristics between different models of body armor.

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This test report may not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the Federal Government.

Test results relate only to the items tested.

Authorized Signatory: Brandon Bertsch
Function/Position: Test Director

Signature: *Brandon Bertsch*

Date: 5/22/17

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	Report Identification Number: <u>OBL-CTR-RMA-1155</u>						
	Issue / Revision Number: <u>Initial</u>						
COMPLIANCE TESTING INFORMATION							
Test Start Date: <u>05/19/17</u>	Report Date: <u>05/22/17</u>						
End Date: <u>05/19/17</u>							
RANGE INFORMATION:							
Range Length: <u>50</u> ft	Velocity 1: <u>5</u> ft. <u>1.524</u> m						
	Velocity 2: <u>5</u> ft. <u>1.524</u> m						
ARMOR DESCRIPTION:	Velocity Measurement Units: <u>time</u> Chronographs will report the time of flight. Data should be entered in µs (10 ⁻⁶ s).						
Manufacturer: <u>RMA Armament, Inc.</u>							
Date Rec'd: <u>05/04/17</u>	Test ID: <u>MC02864</u> NIJ Armor Type: <u>4</u>						
	Style: <u>Plate</u>						
SHOT-TO-EDGE REQUIREMENTS:							
Threat 1: <u>2.5</u> Inches	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Labels legible and adhered after wear tests?: <u>Yes</u></td> <td style="width: 20%;">(Yes/No)</td> </tr> <tr> <td>Labels legible and adhered after conditioning protocol?: <u>Yes</u></td> <td>(Yes/No)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Labels meet the requirements of 4.1.5.3</td> </tr> </table>	Labels legible and adhered after wear tests?: <u>Yes</u>	(Yes/No)	Labels legible and adhered after conditioning protocol?: <u>Yes</u>	(Yes/No)	Labels meet the requirements of 4.1.5.3	
Labels legible and adhered after wear tests?: <u>Yes</u>	(Yes/No)						
Labels legible and adhered after conditioning protocol?: <u>Yes</u>	(Yes/No)						
Labels meet the requirements of 4.1.5.3							
Threat 2: <u> </u> Inches							
ARMOR CONSTRUCTION:							
Armor Test Configuration: <u>Non-Planar</u>							
Individual Layer Description:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Plate</td> <td style="width: 50%; text-align: center;">In Conjunction With Panel (if applicable)</td> </tr> <tr> <td style="text-align: center;">Number of Layers: <u>3</u></td> <td style="text-align: center;">Front Closure (Y/N): <u>No</u></td> </tr> <tr> <td colspan="2" style="text-align: center;">Number of Layers: <u> </u></td> </tr> </table>	Plate	In Conjunction With Panel (if applicable)	Number of Layers: <u>3</u>	Front Closure (Y/N): <u>No</u>	Number of Layers: <u> </u>	
	Plate	In Conjunction With Panel (if applicable)					
Number of Layers: <u>3</u>	Front Closure (Y/N): <u>No</u>						
Number of Layers: <u> </u>							
Layer 1: Approx. 6mm foam. Layer 2: Approx 10mm ceramic. Layer 3: Approx. 7.5mm E-Glass. Approx. 1.5mm foam edge band. Nylon outer wrap.							
Description of Stitching:							
Remarks and Revision History:							

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	Report Identification Number: <u>OBL-CTR-RMA-1155</u>
	Issue / Revision Number: <u>Initial</u>

Test ID: <u>MC02864</u> Manufacturer: <u>RMA Armament, Inc.</u> Ammunition: <u>.30 Caliber</u> <u>166/M2 AP</u>	Penetration and BFS Summary Data	Report Date: <u>05/22/17</u>						
	<table border="1" style="margin: auto;"> <tr> <td>Test Velocity:</td> <td>877.8</td> <td>±9.1 m/s</td> </tr> <tr> <td></td> <td>(2880)</td> <td>±30 ft/s</td> </tr> </table>	Test Velocity:	877.8	±9.1 m/s		(2880)	±30 ft/s	
Test Velocity:	877.8	±9.1 m/s						
	(2880)	±30 ft/s						

Sample Information										
Sample Number	Soft Armor Panel		Hard Armor Plate		Gross Weight (lbs)	Shot Number	Avg. Vel. (ft/s)	Perf (Y=1/N=0)	BFS (mm)	Note
	Lot Number	Serial Number	Lot Number	Serial Number						
1			231708	1	8.38	1	2850	0	30.09	
2			231708	2	8.39	2	2861	0	32.38	
3			231708	3	8.36	3	2857	0	31.79	
4			231708	4	8.35	4	2862	0	27.2	
5			231708	5	8.37	5	2903	0	19.76	
6			231708	6	8.38	6	2879	0	28.87	
7			231708	7	8.37	7	2907	0	33.35	
8			231708	8	8.35	8	2881	0	31.72	
9			231708	9	8.38	9	2899	0	37.26	
10			231708	10	8.35	10	2916	0	33.38	
11			231708	11	8.43	11	2907	0	27.43	
12			231708	12	8.38	12	2894	0	28.5	
13			231708	13	8.38	13	2870	0	29.41	
14			231708	14	8.36	14	2888	0	30.17	
15			231708	15	8.31	15	2873	0	32.35	
16			231708	16	8.36	16	2899	0	27.28	
17			231708	17	8.41	17	2886	0	32.49	
18			231708	18	8.39	18	2869	0	36.97	
19			231708	19	8.35	19	2869	0	35.61	
20			231708	37	8.38	20	2869	0	34.89	
21			231708	21	8.36	21	2899	0	30.86	
22			231708	22	8.28	22	2872	0	29.16	
23			231708	23	8.36	23	2874	0	28.45	
24			231708	24	8.34	24	2869	0	30.8	
25			231708	20	8.36	25				Insufficient Velocity <<Error
26						26				
27						27				
28						28				
29						29				
30						30				

Armor Information	
Plate Subjected to hard armor conditioning	
Soft armor Panel Size (If used) C-2	Plate Size 4
NIJ Armor Type:	
Shots Per Plate (Type IV only):	

Summary:	Perforations: <u>0</u> (Pass)	BFS Statistics: Count: <u>24</u>			
	Maximum BFS: <u>37.26</u> mm				
Pass - No BFS greater than 44 mm					

Overall P-BFS Summary	
Perforations:	<u>0</u> This requirement is for all P-BFS tested samples
	This armor model meets the perforation performance requirements of NIJ Standard-0101.06 Section 7.8.8.
Backface Signature:	This requirement is for all hard armor plate models
Maximum BFS:	<u>37.26</u> mm
	This armor model meets the BFS performance requirements of NIJ Standard-0101.06 Section 7.8.8 Item a.

Compliance Test Report revision Hard Armor 1-11 (2012-03-30) / MS Excel version 16.0 / Operating System version Windows (32-bit) NT 10.00

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										Report Date: 5/22/2017					
Ballistic Limit Summary Data															
Test ID: MC02864			Manufacturer: RMA Armament, Inc.			Ammunition: .30 Caliber 166M2 AP			Test Velocity: 877.8 ±9.1 m/s (2880) ±30 ft/s						
Sample Information															
Sample Number	Soft Armor Panel		Hard Armor Plate		Gross Weight (lbs)	Shot Number	Avg. Vel. (ft/s)	Perf (Y=1/N=0)	Remarks	Key to Remarks: a - Too close to edge b - Too close to prior impact c - Impact on seam					
	Lot Number	Serial Number	Lot Number	Serial Number											
1			231708	25	8.33	1	2879	0							
2			231708	26	8.38	2	2982	0							
3			231708	27	8.35	3	3081	0							
4			231708	28	8.4	4	3190	0							
5			231708	29	8.39	5	3265	0							
6			231709	30	8.4	6	3321	1							
7			231708	31	8.36	7	3235	0							
8			231708	32	8.37	8	3341	1							
9			231708	33	8.39	9	3246	0							
10			231708	34	8.36	10	3265	1							
11			231708	35	8.31	11	3251	0							
12			231708	36	8.35	12	3283	1							
13						13									
14						14									
15						15									
16						16									
17						17									
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27						27									
28						28									
29						29									
30						30									

Armor Information	
Plate Subjected to hard armor conditioning	
Soft armor Panel Size (if used)	
C-2	
Plate Size	
NJ Armor Type: 4	
Shots Per Plate (Type IV only):	
Regression Analysis	
Estimated V05:	991.6 m/s (3253) ft/s
Estimated V50:	995.3 m/s (3265) ft/s
Probability of perforation at NJ reference velocity: 877.8 m/sec (2880 ft/s)	
0.0% Acceptable	
NJ Reference Velocity:	877.8 m/s (2880 ft/s)
Offset:	+ 9.1 m/s (+ 30 ft/s)
	886.9 m/s (2910 ft/s)
Perforations below 886.9 m/s (2910 ft/s):	
0 Acceptable	
Total Usable Shots:	12 Acceptable
Perforations (Complete Penetrations):	4
Stops (Partial Penetrations):	8

Regression Model
Logistic

Overall Ballistic Limit Summary			
Perforations below Vref + 9.1 m/sec:	0		
This armor model meets the low perforation velocity performance requirements of NJ Standard-0101.06 Section 7.9.5.			
Probability of perforation at the P-BFS reference velocity	0.0%		
This armor model meets the estimated V05 performance requirements of NJ Standard-0101.06 Section 7.9.5.			