

January 29, 2012

Ms. Rebecca Dowling
 Mine Safety Appliances Co.
 1000 Cranberry Woods Drive
 Cranberry Twp, PA 16066
 USA

Intertek Test Report Number: G100617274CRT-001
 Proposal(s) #: 500353241

Dear Ms. Dowling:

Intertek has completed the evaluation of your MSA V-Gard Visors, manufactured by MSA. The Visors were evaluated to the client specified requirements of **American National Standard for Occupational and Educational Personal Eye and Face Protection Devices, ANSI/ISEA Z87.1-2010**. The test samples were received on January 13, 2012 and January 19, 2012 in new condition. The evaluations were performed at Intertek in Cortland, NY on January 15, 2012 through January 26, 2012. The results of these tests are as indicated below.

Tests Completed:	Test Date(s):	Section	Test	Results
General Requirements (All Protectors)	01/20-01/24/2012	5.1.1	9.1 (Optical)	PASS
	01/20-01/24/2012	5.1.2	9.2 (Transmittance)	PASS
	01/20-01/24/2012	5.1.3	9.3 (Haze)	PASS
	01/20-01/24/2012	5.1.4	9.4, 9.5 (Power)	PASS
	01/26/2012	5.2.3	9.7 (Ignition)	PASS
Impact Protector Requirements (Z87+)	01/23-01/24/2012	6.1.3	9.10 (Lateral)	PASS
	01/19-01/20/2012	6.2.2	9.11 (High Mass)	PASS
	01/24/2012	6.2.3	9.12 (High Velocity)	PASS
	01/16-01/21/2012	6.2.4	9.13 (Penetration)	PASS
Optical Radiation Protector	01/20-01/24/2012	7.1.2	9.2 (U Rating)	PASS
Droplet and Splash, Dust, and Fine Dust Protector Requirements	01/20-01/24/2012	8.1.2	9.16.2 (Splash)	PASS

NOTE: See Pages 2- 12 for the representative data sheets for the product evaluated.

This test report concludes the work for your project outlined under Intertek Quotes No: 500353241.

If there are any questions regarding this report please contact the undersigned at 607-753-6711.

Report Prepared by:


 Brian Bishop
 Project Engineer
 Performance Group

Report Reviewed by:


 Sara Ensign
 Technician I
 Performance Group



An independent organization testing for safety, performance, and certification.

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Intertek, Inc.

3933 US Route 11, Cortland, NY 13045 USA
 Telephone: +1 607-753-6711 Fax: +1 607-756-9891 Web: www.intertek.com

INTERTEK TEST DATA SHEETS

Client:	<u>MSA</u>	Engineer:	<u>Brian Bishop</u>
Job No.:	<u>G100617274</u>		
Product:	<u>Visors</u>	Reviewed By:	<u>Sara Ensign</u>
Model No.:	<u>Various</u>	Standard:	<u>ANSI/ISEA Z87.1-2010</u>
Description:	<u>V-Gard Visors</u>		
Sample Control Number: <u>2012-01-240862 thru 880, 241163, 241164</u>		TRANSCRIBED TEST DATA	

TEST SAMPLES: (per test matrix provided by MSA)

**** (Note: Each visor was individually tested with each frame as described in the test matrix (Phase 3 ANSI Visor Testing Matrix dated 12/20/2011 rev 0) provided by MSA) ****

Samples provided for Evaluation: Group A	
Product Name:	V-Gard Visor, PC, Clear, Short x Standard x Lightweight, Non CSA
Visor Type:	PC Sheet
Visor Thickness:	0.040"
Visor PN:	10117750
Visor Shape:	Short x Standard
Hat:	V-Gard
Frame (s) PN:	10121268 w/ DC, 10116627

Samples provided for Evaluation: Group B	
Product Name:	V-Gard Visor, PC, Clear, Short x Standard x Lightweight, for use with chin protector, Non CSA
Visor Type:	PC Sheet
Visor Thickness:	0.040"
Visor PN:	10117781
Visor Shape:	Short x Standard for use with chinguard
Hat:	V-Gard
Frame(s) PN:	10116628
Chinguard(s) PN:	10115828

Samples provided for Evaluation: Group C	
Product Name:	Visor, V-Gard, PC, Clear, Medium x Standard x Lightweight, Non CSA
Visor Type:	PC Sheet
Visor Thickness:	0.040"
Visor PN:	10118094
Visor Shape:	Medium x Standard
Hat:	V-Gard
Frame(s) PN:	10121268 w/ DC, 10116627 & 10116628

Samples provided for Evaluation: Group D	
Product Name:	Visor, V-Gard, PC, Clear, Short x Standard x Lightweight
Visor Type:	PC Sheet
Visor Thickness:	0.040"
Visor PN:	10115836
Visor Shape:	Short x Standard
Hat:	V-Gard
Frame(s) PN:	10116552, 10116627 & 10116628

INTERTEK TEST DATA SHEETS

Client:	<u>MSA</u>	Engineer:	<u>Brian Bishop</u>
Job No.:	<u>G100617274</u>		
Product:	<u>Visors</u>	Reviewed By:	<u>Sara Ensign</u>
Model No.:	<u>Various</u>	Standard:	<u>ANSI/ISEA Z87.1-2010</u>
Description:	<u>V-Gard Visors</u>		

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Samples provided for Evaluation: Group E	
Product Name:	Visor, V-Gard, PC, Clear, Short x Standard x Lightweight, for use with chin protector
Visor Type:	PC Sheet
Visor Thickness:	0.040"
Visor PN:	10115837
Visor Shape:	Short x Standard , for use with chinguard
Hat:	V-Gard
Frame(s) PN:	10121268 w/ DC, 10121266 w/DC & 10121267 w/DC
Chinguard(s) PN:	10115827 & 10115828

Samples provided for Evaluation: Group F	
Product Name:	Visor, V-Gard, PC, Clear, Medium x Standard x Lightweight
Visor Type:	PC Sheet
Visor Thickness:	0.040"
Visor PN:	10115863
Visor Shape:	Medium x Standard
Hat:	V-Gard
Frame(s) PN:	10121268 w/ DC, 10121266 w/ DC, 10121267 w/ DC, 10116552, 10116627 & 10116628

INTERTEK TEST DATA SHEETS

Client: MSA Engineer: Brian Bishop
 Job No.: G100617274
 Product: Visors Reviewed By: Sara Ensign
 Model No.: Various Standard: ANSI/ISEA Z87.1-2010
 Description: V-Gard Visors

Sample Control Number: 2012-01-240862 thru 880, 241163, 241164

TRANSCRIBED TEST DATA

Table of Contents:			
Required:	Page(s):	Section:	Test Description:
X	1-12	N/A	Intertek Report
X	2-3	N/A	Sample Description's
X	4	N/A	Table of Contents
X	4	N/A	Equipment List
X	5-8	5	General Requirements (all protectors)
X	8-10	6	Impact Protector Requirements (Z87+)
X	11-12	7	Optical Radiation Protector
X	12	8	Droplet and Splash, Dust, and Fine dust Protector Requirements

Equipment List:					
Used:	Equipment:	Manufacturer:	Model No.:	Control No.:	Cal. Due Date:
X	Headform	Inspec	EN 168:2001 Medium Head (50 th percentile adult male)	N/A	N/A
X	Temperature Recorder	Honeywell	DR4500	T679	05/26/12
X	Temperature Recorder	White Box	N/A	T563	07/6/12
X	Temperature Recorder	Honeywell	DR4500	T1255	05/03/12
X	6-inch scales	Fowler	6"	N1273	03/23/12
X	Gram Scale	Denver Inst	DI-4K	S132	11/11/12
X	Calipers	Mitu	0-6"	N460	12/06/12
X	Tape Measure	Craftsman	939392	N766	11/22/12
X	Thermocouple / Meter / Rod	Omega	HH21A	T1314	12/22/12
X	Stopwatch	VWR	N/A	N1346	07/22/12
X	Balance/Scale	Ohaus	N/A	S268	01/13/13
X	High Mass Impactor (pointed projectile)	Intertek	Z87-2010 High Mass	J143	12/14/12
X	Air Cannon	Basic Eng	HVIT	N740	11/11/12
X	Needle Penetrator	Intertek	Z87-2010 Penetrator	J174	Per use
X	Hazemeter	Gardner	XL211	N328	02/23/12
X	100 ft Goniometer	NA	NA	N060	08/12/12
X	Temp. Meter	Extech	445703	T1355	10/19/12
X	Temp Meter	Extech	445703	T1357	10/26/12
X	8x Telescope	NA	NA	NA	NA
X	Std. Diopter Set	NA	NA	NA	NA
X	NBS Test Chart	NA	NA	NA	NA

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Section 5, General Requirements (All Protectors)

Section (Test)	Requirement	Results	Compliance									
5	General Requirements (All Protectors)											
5.1.1 (9.1)	Optical Quality: Lenses shall be free of striae, bubbles, waves and other visible defects which would impair their optical quality.	Group's A, C, D, F	P									
		Defects: NO										
5.1.2 (9.2)	Luminous Transmission: Clear lenses shall have a luminous transmission of not less than 85%. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">Laboratory Conditions:</th> </tr> <tr> <th>Req'd:</th> <th>Temperature Range 18-28 °C (65-82 °F)</th> <th>Humidity Range 35-65 %</th> </tr> </thead> <tbody> <tr> <td>Actual:</td> <td>77 ° F</td> <td>18</td> </tr> </tbody> </table>	Laboratory Conditions:			Req'd:	Temperature Range 18-28 °C (65-82 °F)	Humidity Range 35-65 %	Actual:	77 ° F	18	Group A	P
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Left	Right											
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		Group F										
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Percent Transmittance												
Left	Right											
90.3	90.3											
5.1.3 (9.3)	Haze: Clear plano lenses shall not exhibit more than 3% haze. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">Laboratory Conditions:</th> </tr> <tr> <th>Req'd:</th> <th>Temperature Range 18-28 °C (65-82 °F)</th> <th>Humidity Range 35-65 %</th> </tr> </thead> <tbody> <tr> <td>Actual:</td> <td>77 ° F</td> <td>18</td> </tr> </tbody> </table>	Laboratory Conditions:			Req'd:	Temperature Range 18-28 °C (65-82 °F)	Humidity Range 35-65 %	Actual:	77 ° F	18	Group A	P
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INTERTEK TEST DATA SHEETS

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Section (Test)	Requirement	Results	Compliance																																																																																																																					
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5.1.4 (9.4, 9.5)	Refractive Power, Astigmatism, Resolving Power, Prism and Prism Imbalance for Plano Protectors: The tolerance on refractive power, astigmatism and resolving power shall be as indicated in Table 1. The tolerance on Prism and Prism Imbalance shall be as indicated in Table 2. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="2">Prism Imbalance*</th> </tr> <tr> <th>Left</th> <th>Right</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <p>* for calculation only</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="3">Laboratory Conditions:</th> </tr> <tr> <th>Req'd:</th> <th>Temperature Range 18-28 °C (65-82 °F)</th> <th>Humidity Range 35-65 %</th> </tr> </thead> <tbody> <tr> <td>Actual:</td> <td align="center">71.1° F</td> <td align="center">19</td> </tr> </tbody> </table>	Prism Imbalance*		Left	Right			Laboratory Conditions:			Req'd:	Temperature Range 18-28 °C (65-82 °F)	Humidity Range 35-65 %	Actual:	71.1° F	19	<p align="center"><u>Group A</u></p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Test</th> <th>Left</th> <th>Right</th> </tr> </thead> <tbody> <tr> <td>Refractive Power (D)</td> <td align="center">0.00</td> <td align="center">0.00</td> </tr> <tr> <td>Astigmatism (D)</td> <td align="center">0.05</td> <td align="center">0.03</td> </tr> <tr> <td>Resolving Power (>20)</td> <td align="center">48</td> <td align="center">48</td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="4">Prism</th> </tr> <tr> <th colspan="2">Left</th> <th colspan="2">Right</th> </tr> <tr> <th>Vertical</th> <th>Horizontal</th> <th>Vertical</th> <th>Horizontal</th> </tr> </thead> <tbody> <tr> <td align="center">0.00</td> <td align="center">-0.06</td> <td align="center">0.00</td> <td align="center">0.13</td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="2">Prism Imbalance</th> </tr> <tr> <th>Vertical</th> <th>Horizontal</th> </tr> </thead> <tbody> <tr> <td align="center">0.00</td> <td align="center">0.19 Base Out</td> </tr> </tbody> </table> <p align="center"><u>Group C</u></p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Test</th> <th>Left</th> <th>Right</th> </tr> </thead> <tbody> <tr> <td>Refractive Power (D)</td> <td align="center">0.00</td> <td align="center">0.00</td> </tr> <tr> <td>Astigmatism (D)</td> <td align="center">0.05</td> <td align="center">0.05</td> </tr> <tr> <td>Resolving Power (>20)</td> <td align="center">48</td> <td align="center">48</td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="4">Prism</th> </tr> <tr> <th colspan="2">Left</th> <th colspan="2">Right</th> </tr> <tr> <th>Vertical</th> <th>Horizontal</th> <th>Vertical</th> <th>Horizontal</th> </tr> </thead> <tbody> <tr> <td align="center">0.00</td> <td align="center">-0.06</td> <td align="center">0.00</td> <td align="center">0.13</td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="2">Prism Imbalance</th> </tr> <tr> <th>Vertical</th> <th>Horizontal</th> </tr> </thead> <tbody> <tr> <td align="center">0.00</td> <td align="center">0.19 Base Out</td> </tr> </tbody> </table> <p align="center"><u>Group D</u></p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Test</th> <th>Left</th> <th>Right</th> </tr> </thead> <tbody> <tr> <td>Refractive Power (D)</td> <td align="center">0.00</td> <td align="center">0.00</td> </tr> <tr> <td>Astigmatism (D)</td> <td align="center">0.05</td> <td align="center">0.05</td> </tr> <tr> <td>Resolving Power (>20)</td> <td align="center">48</td> <td align="center">48</td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="4">Prism</th> </tr> <tr> <th colspan="2">Left</th> <th colspan="2">Right</th> </tr> <tr> <th>Vertical</th> <th>Horizontal</th> <th>Vertical</th> <th>Horizontal</th> </tr> </thead> <tbody> <tr> <td align="center">0.00</td> <td align="center">-0.06</td> <td align="center">0.00</td> <td align="center">0.13</td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="2">Prism Imbalance</th> </tr> <tr> <th>Vertical</th> <th>Horizontal</th> </tr> </thead> <tbody> <tr> <td align="center">0.00</td> <td align="center">0.19 Base out</td> </tr> </tbody> </table>	Test	Left	Right	Refractive Power (D)	0.00	0.00	Astigmatism (D)	0.05	0.03	Resolving Power (>20)	48	48	Prism				Left		Right		Vertical	Horizontal	Vertical	Horizontal	0.00	-0.06	0.00	0.13	Prism Imbalance		Vertical	Horizontal	0.00	0.19 Base Out	Test	Left	Right	Refractive Power (D)	0.00	0.00	Astigmatism (D)	0.05	0.05	Resolving Power (>20)	48	48	Prism				Left		Right		Vertical	Horizontal	Vertical	Horizontal	0.00	-0.06	0.00	0.13	Prism Imbalance		Vertical	Horizontal	0.00	0.19 Base Out	Test	Left	Right	Refractive Power (D)	0.00	0.00	Astigmatism (D)	0.05	0.05	Resolving Power (>20)	48	48	Prism				Left		Right		Vertical	Horizontal	Vertical	Horizontal	0.00	-0.06	0.00	0.13	Prism Imbalance		Vertical	Horizontal	0.00	0.19 Base out	P
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 Product: Visors Reviewed By: Sara Ensign
 Model No.: Various Standard: ANSI/ISEA Z87.1-2010
 Description: V-Gard Visors

Sample Control Number: 2012-01-240862 thru 880, 241163, 241164

TRANSCRIBED TEST DATA

Section (Test)	Requirement	Results	Compliance
5	General Requirements (All Protectors)	Group F	

Test			Left	Right
Refractive Power (D)			-0.01	0.00
Astigmatism (D)			0.05	0.05
Resolving Power (>20)			48	48

Prism			
Left		Right	
Vertical	Horizontal	Vertical	Horizontal
0.00	-0.03	0.00	0.13

Prism Imbalance	
Vertical	Horizontal
0.00	0.16 Base Out

Protector	Refractive Power	Astigmatism	Resolving Power
Spectacle	± 0.06 D	≤ 0.06 D	Pattern 20
Goggle	± 0.06 D	≤ 0.06 D	Pattern 20
Faceshield Windows	No Requirement	No Requirement	Pattern 20
Welding Helmet Lenses	± 0.06 D	≤ 0.06 D	Pattern 20

Protector	Prism	Vertical Imbalance	Base In Imbalance	Base Out Imbalance
Spectacle	≤ 0.50 Δ	≤ 0.25 Δ	≤ 0.25 Δ	≤ 0.50 Δ
Goggle	≤ 0.25 Δ	≤ 0.125 Δ	≤ 0.125 Δ	≤ 0.50 Δ
Faceshields	≤ 0.37 Δ	≤ 0.37 Δ	≤ 0.125 Δ	≤ 0.75 Δ
Welding Lenses	≤ 0.50 Δ	≤ 0.25 Δ	≤ 0.25 Δ	≤ 0.75 Δ

INTERTEK TEST DATA SHEETS

Client: MSA Engineer: Brian Bishop
 Job No.: G100617274
 Product: Visors Reviewed By: Sara Ensign
 Model No.: Various Standard: ANSI/ISEA Z87.1-2010
 Description: V-Gard Visors

Sample Control Number: 2012-01-240862 thru 880, 241163, 241164

TRANSCRIBED TEST DATA

Section (Test)	Requirement	Results	Compliance															
5	General Requirements (All Protectors)																	
5.2.3 (9.7)	Ignition: Protectors shall not ignite or continue to glow once the rod is removed. Each externally exposed material (exclusive of textiles or elastic bands) shall be tested. <table border="1"> <thead> <tr> <th colspan="3">Laboratory Conditions:</th> </tr> <tr> <th>Req'd:</th> <th>Temperature Range 18-28 °C (65-82 °F)</th> <th>Humidity Range 35-65 %</th> </tr> </thead> <tbody> <tr> <td>Actual:</td> <td align="center">70 ° F</td> <td align="center">63</td> </tr> </tbody> </table>	Laboratory Conditions:			Req'd:	Temperature Range 18-28 °C (65-82 °F)	Humidity Range 35-65 %	Actual:	70 ° F	63	<p><u>Group's A, C, D, F</u></p> <table border="1"> <thead> <tr> <th>Type</th> <th>Ignition</th> <th>Afterglow</th> </tr> </thead> <tbody> <tr> <td>Lens</td> <td align="center">No</td> <td align="center">No</td> </tr> </tbody> </table>	Type	Ignition	Afterglow	Lens	No	No	P
Laboratory Conditions:																		
Req'd:	Temperature Range 18-28 °C (65-82 °F)	Humidity Range 35-65 %																
Actual:	70 ° F	63																
Type	Ignition	Afterglow																
Lens	No	No																

Section 6, Impact Protector Requirements (Z87+)

Section (Test)	Requirement	Results	Compliance																
6	Impact Protector Requirements (Z87+)																		
6.1	General																		
6.1.3 (9.10)	Lateral (side) Coverage: Impact rated protectors shall provide continuous lateral coverage (i.e. no openings greater than 1.5 mm (.06 in.) in diameter) from the edge of the lens to a point not less than 10 mm (0.394 in.) posterior to the corneal plane and not less than 10 mm (0.394 in.) above and not less than 10 mm (0.394 in.) below the horizontal plane centered on the eyes of the headform.	<p><u>Group's A, C, D, F</u></p> <table border="1"> <thead> <tr> <th>Sample #:</th> <th>9.12</th> </tr> <tr> <th>Location</th> <th>Coverage</th> </tr> </thead> <tbody> <tr> <td>0° Right (random) 10 mm above</td> <td align="center">YES</td> </tr> <tr> <td>90° Right 10mm above</td> <td align="center">YES</td> </tr> <tr> <td>90° Left 10mm above</td> <td align="center">YES</td> </tr> <tr> <td>0° Left (random) 10mm below</td> <td align="center">YES</td> </tr> <tr> <td>90° Right 10mm below</td> <td align="center">YES</td> </tr> <tr> <td>90° Left 10mm below</td> <td align="center">YES</td> </tr> </tbody> </table>	Sample #:	9.12	Location	Coverage	0° Right (random) 10 mm above	YES	90° Right 10mm above	YES	90° Left 10mm above	YES	0° Left (random) 10mm below	YES	90° Right 10mm below	YES	90° Left 10mm below	YES	P
Sample #:	9.12																		
Location	Coverage																		
0° Right (random) 10 mm above	YES																		
90° Right 10mm above	YES																		
90° Left 10mm above	YES																		
0° Left (random) 10mm below	YES																		
90° Right 10mm below	YES																		
90° Left 10mm below	YES																		

Client: MSA Engineer: Brian Bishop
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Sample Control Number: 2012-01-240862 thru 880, 241163, 241164

TRANSCRIBED TEST DATA

Section (Test)	Requirement	Results	Compliance																																													
6	Impact Protector Requirements (Z87+)																																															
6.2.2 (9.11)	<p>High Mass Impact:</p> <p>The complete device shall be capable of resisting an impact from a pointed projectile.</p> <p>A complete device shall fail if any of the following occurs; piece fully detached from inner surface, fracture, penetration of the rear surface, lens not retained.</p> <table border="1"> <thead> <tr> <th colspan="3">Impactor- Pointed Projectile</th> </tr> <tr> <th></th> <th>Required</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>Weight, (grams)</td> <td>500</td> <td>502.17</td> </tr> <tr> <td>Drop Height, cm (inch)</td> <td>127 (50")</td> <td>50-inch</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="3">Laboratory Conditions:</th> </tr> <tr> <th>Req'd:</th> <th>Temperature Range 18-28 °C (65-82 °F)</th> <th>Humidity Range 35-65 %</th> </tr> </thead> <tbody> <tr> <td>Actual:</td> <td>70 ° F</td> <td>48-49</td> </tr> </tbody> </table>	Impactor- Pointed Projectile				Required	Actual	Weight, (grams)	500	502.17	Drop Height, cm (inch)	127 (50")	50-inch	Laboratory Conditions:			Req'd:	Temperature Range 18-28 °C (65-82 °F)	Humidity Range 35-65 %	Actual:	70 ° F	48-49	<p align="center"><u>Groups's A, B, C, D, E, F</u></p> <table border="1"> <thead> <tr> <th>Sample 9.11:</th> <th>Impact eye Location</th> <th>Fracture, penetration, etc</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>Left</td> <td>NO</td> </tr> <tr> <td>(2)</td> <td>Left</td> <td>NO</td> </tr> <tr> <td>(3)</td> <td>Right</td> <td>NO</td> </tr> <tr> <td>(4)</td> <td>Right</td> <td>NO</td> </tr> </tbody> </table>	Sample 9.11:	Impact eye Location	Fracture, penetration, etc	(1)	Left	NO	(2)	Left	NO	(3)	Right	NO	(4)	Right	NO	P									
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Sample 9.11:	Impact eye Location	Fracture, penetration, etc																																														
(1)	Left	NO																																														
(2)	Left	NO																																														
(3)	Right	NO																																														
(4)	Right	NO																																														
6.2.3 (9.12)	<p>High Velocity Impact:</p> <p>The complete device shall be capable of resisting impact from a 6.35 mm (0.25 in) diameter steel ball traveling at the velocity specified in Table 5 (see Appendix A). No contact with the eye of the headform is permitted as a result of the impact.</p> <p>A complete device shall fail if any of the following occurs; piece fully detached from inner surface, fracture, penetration of the rear surface, lens not retained. For the high-velocity test, the unaided eye observes any piece adhering to the contact paste, or observes contact paste on the projectile or complete device.</p> <p>**Complete APPENDIX A prior to testing **</p> <table border="1"> <thead> <tr> <th colspan="3">Steel Ball</th> </tr> <tr> <th></th> <th>Required</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>Diameter, mm</td> <td>6.35</td> <td>6.34 mm</td> </tr> <tr> <td>Weight, grams</td> <td>1.06</td> <td>1.04 g</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="3">Laboratory Conditions:</th> </tr> <tr> <th>Req'd:</th> <th>Temperature Range 18-28 °C (65-82 °F)</th> <th>Humidity Range 35-65 %</th> </tr> </thead> <tbody> <tr> <td>Actual:</td> <td>69 ° F</td> <td>43</td> </tr> </tbody> </table>	Steel Ball				Required	Actual	Diameter, mm	6.35	6.34 mm	Weight, grams	1.06	1.04 g	Laboratory Conditions:			Req'd:	Temperature Range 18-28 °C (65-82 °F)	Humidity Range 35-65 %	Actual:	69 ° F	43	<p align="center"><u>Groups's A, B, C, D, E, F</u></p> <p><u>"Client requested 3 impacts per 2 samples"</u></p> <table border="1"> <thead> <tr> <th>#</th> <th>Impact Location</th> <th>Contact w/ eye</th> </tr> </thead> <tbody> <tr> <td>9.12</td> <td></td> <td></td> </tr> <tr> <td>(1)</td> <td>0° Rt. Eye</td> <td>N</td> </tr> <tr> <td>(1)</td> <td>30° Rt. Eye</td> <td>N</td> </tr> <tr> <td>(1)</td> <td>*90° Rt. Eye (above)</td> <td>N</td> </tr> <tr> <td>(2)</td> <td>0° Lt. Eye</td> <td>N</td> </tr> <tr> <td>(2)</td> <td>30° Lt. Eye</td> <td>N</td> </tr> <tr> <td>(2)</td> <td>*90° Lt. Eye (below)</td> <td>N</td> </tr> </tbody> </table> <p>*10 mm above or below the plane of the eyes.</p>	#	Impact Location	Contact w/ eye	9.12			(1)	0° Rt. Eye	N	(1)	30° Rt. Eye	N	(1)	*90° Rt. Eye (above)	N	(2)	0° Lt. Eye	N	(2)	30° Lt. Eye	N	(2)	*90° Lt. Eye (below)	N	P
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(1)	*90° Rt. Eye (above)	N																																														
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INTERTEK TEST DATA SHEETS

Client: MSA Engineer: Brian Bishop
 Job No.: G100617274
 Product: Visors Reviewed By: Sara Ensign
 Model No.: Various Standard: ANSI/ISEA Z87.1-2010
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Sample Control Number: 2012-01-240862 thru 880, 241163, 241164

TRANSCRIBED TEST DATA

Section (Test)	Requirement	Results	Compliance																																				
6	Impact Protector Requirements (Z87+)																																						
6.2.4 (9.13)	Penetration Test (lenses only): Lenses for all complete devises shall be capable of resisting penetration by a weighted needle. A complete device shall fail if any of the following occurs; piece fully detached from inner surface, fracture, penetration of the rear surface, lens not retained. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">Needle Penetrator</th> </tr> <tr> <th></th> <th>Required</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>Weight, grams</td> <td>44.2</td> <td>44.57 g</td> </tr> <tr> <td>Drop Height, cm (inch)</td> <td>127 (50")</td> <td>50-inch</td> </tr> </tbody> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">Laboratory Conditions:</th> </tr> <tr> <th>Req'd:</th> <th>Temperature Range 18-28 °C (65-82 °F)</th> <th>Humidity Range 35-65 %</th> </tr> </thead> <tbody> <tr> <td>Actual:</td> <td>69 ° F</td> <td>49</td> </tr> </tbody> </table>	Needle Penetrator				Required	Actual	Weight, grams	44.2	44.57 g	Drop Height, cm (inch)	127 (50")	50-inch	Laboratory Conditions:			Req'd:	Temperature Range 18-28 °C (65-82 °F)	Humidity Range 35-65 %	Actual:	69 ° F	49	<p align="center"><u>Groups's A, B, C, D, E, F</u></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Sample 9.13:</th> <th>Impact eye Location</th> <th>Penetration</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>Left</td> <td>NO</td> </tr> <tr> <td>(2)</td> <td>Left</td> <td>NO</td> </tr> <tr> <td>(3)</td> <td>Right</td> <td>NO</td> </tr> <tr> <td>(4)</td> <td>Right</td> <td>NO</td> </tr> </tbody> </table>	Sample 9.13:	Impact eye Location	Penetration	(1)	Left	NO	(2)	Left	NO	(3)	Right	NO	(4)	Right	NO	P
Needle Penetrator																																							
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Sample 9.13:	Impact eye Location	Penetration																																					
(1)	Left	NO																																					
(2)	Left	NO																																					
(3)	Right	NO																																					
(4)	Right	NO																																					

Client: MSA Engineer: Brian Bishop
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TRANSCRIBED TEST DATA

Section 7, Optical Radiation Requirements

Section (Test)	Requirement	Results	Compliance																																									
7	Optical Radiation Requirements																																											
7.1	Transmittance of Lenses																																											
7.1.2 (9.2)	Clear and Filter Lenses: Plano and prescription lenses shall comply with Tables 6 -10, and the notes that follow in the standard for clear and filter lenses. They shall be marked per Table 4a of the standard. Clear lenses shall have a luminous transmission of not less than 85%.		NA																																									
	<table border="1"> <caption>Transmittance for Ultraviolet Filters (Ref. Table 7 in Standard)</caption> <thead> <tr> <th>Group</th> <th>Maximum Far-Ultra-Violet Average Transmittance %</th> <th>Maximum Near-Ultra-Violet Average Transmittance %</th> <th>Scale</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>0.00</td> <td>0.00</td> <td>U 6</td> </tr> <tr> <td>C</td> <td>0.00</td> <td>0.00</td> <td>U 6</td> </tr> <tr> <td>D</td> <td>0.00</td> <td>0.00</td> <td>U 6</td> </tr> <tr> <td>F</td> <td>0.00</td> <td>0.00</td> <td>U 6</td> </tr> </tbody> </table> <table border="1"> <caption>Transmittance for Visible Light Filters (Ref. Table 9 in Standard)</caption> <thead> <tr> <th rowspan="2">Group</th> <th colspan="2">Transmittance %</th> <th rowspan="2">Scale</th> </tr> <tr> <th>Left:</th> <th>Right:</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>89.7</td> <td>89.8</td> <td>CLEAR</td> </tr> <tr> <td>C</td> <td>89.6</td> <td>89.7</td> <td>CLEAR</td> </tr> <tr> <td>D</td> <td>90.5</td> <td>90.6</td> <td>CLEAR</td> </tr> <tr> <td>F</td> <td>90.3</td> <td>90.3</td> <td>CLEAR</td> </tr> </tbody> </table>	Group		Maximum Far-Ultra-Violet Average Transmittance %	Maximum Near-Ultra-Violet Average Transmittance %	Scale	A	0.00	0.00	U 6	C	0.00	0.00	U 6	D	0.00	0.00	U 6	F	0.00	0.00	U 6	Group	Transmittance %		Scale	Left:	Right:	A	89.7	89.8	CLEAR	C	89.6	89.7	CLEAR	D	90.5	90.6	CLEAR	F	90.3	90.3	CLEAR
Group	Maximum Far-Ultra-Violet Average Transmittance %	Maximum Near-Ultra-Violet Average Transmittance %	Scale																																									
A	0.00	0.00	U 6																																									
C	0.00	0.00	U 6																																									
D	0.00	0.00	U 6																																									
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	Left:	Right:																																										
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TRANSCRIBED TEST DATA

Section (Test)	Requirement	Results	Compliance																																																						
7	Optical Radiation Requirements																																																								
7.1.5 (9.2)	Variations in Luminous Transmittance: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Shade</th> <th>Ratio</th> </tr> </thead> <tbody> <tr> <td>1.3 - 3.0</td> <td>0.90 - 1.11</td> </tr> <tr> <td>4.0 - 14</td> <td>0.80 - 1.25</td> </tr> </tbody> </table> Measured in the darkest state.	Shade	Ratio	1.3 - 3.0	0.90 - 1.11	4.0 - 14	0.80 - 1.25	<p style="text-align: center;"><u>Group A</u></p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Sample #</th> <th colspan="3">7750-L</th> </tr> <tr> <th>Shade</th> <th>Right Lens</th> <th>Left Lens</th> <th>Ratio</th> </tr> </thead> <tbody> <tr> <td>Clear</td> <td>89.8</td> <td>89.7</td> <td>1.00</td> </tr> </tbody> </table> <p style="text-align: center;"><u>Group C</u></p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Sample #</th> <th colspan="3">8094-L</th> </tr> <tr> <th>Shade</th> <th>Right Lens</th> <th>Left Lens</th> <th>Ratio</th> </tr> </thead> <tbody> <tr> <td>Clear</td> <td>89.7</td> <td>89.6</td> <td>1.00</td> </tr> </tbody> </table> <p style="text-align: center;"><u>Group D</u></p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Sample #</th> <th colspan="3">5836-L</th> </tr> <tr> <th>Shade</th> <th>Right Lens</th> <th>Left Lens</th> <th>Ratio</th> </tr> </thead> <tbody> <tr> <td>Clear</td> <td>90.6</td> <td>90.5</td> <td>1.00</td> </tr> </tbody> </table> <p style="text-align: center;"><u>Group F</u></p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Sample #</th> <th colspan="3">5863-L</th> </tr> <tr> <th>Shade</th> <th>Right Lens</th> <th>Left Lens</th> <th>Ratio</th> </tr> </thead> <tbody> <tr> <td>Clear</td> <td>90.3</td> <td>90.3</td> <td>1.00</td> </tr> </tbody> </table>	Sample #	7750-L			Shade	Right Lens	Left Lens	Ratio	Clear	89.8	89.7	1.00	Sample #	8094-L			Shade	Right Lens	Left Lens	Ratio	Clear	89.7	89.6	1.00	Sample #	5836-L			Shade	Right Lens	Left Lens	Ratio	Clear	90.6	90.5	1.00	Sample #	5863-L			Shade	Right Lens	Left Lens	Ratio	Clear	90.3	90.3	1.00	
Shade	Ratio																																																								
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Section 8, Droplet and Splash, Dust, and Fine Dust Protector Requirements

Section (Test)	Requirement	Results	Compliance											
8	Droplet and Splash, Dust, and Fine Dust Protector Requirements													
8.1	Droplet and Splash:													
8.1.2 (9.16.2)	Faceshields: The laser beam shall not make direct contact with any point on the eye-region rectangle without first being interrupted by the faceshield. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="3">Laboratory Conditions:</th> </tr> <tr> <th>Req'd:</th> <th>Temperature Range 18-28 °C (65-82 °F)</th> <th>Humidity Range 35-65 %</th> </tr> </thead> <tbody> <tr> <td>Actual:</td> <td>72 ° F</td> <td>43</td> </tr> </tbody> </table>	Laboratory Conditions:			Req'd:	Temperature Range 18-28 °C (65-82 °F)	Humidity Range 35-65 %	Actual:	72 ° F	43	<p style="text-align: center;"><u>Groups' A, C, D, F</u></p> <table border="1" style="margin-left: 20px;"> <tr> <td>Laser beam contact within the eye-region rectangle:</td> <td style="text-align: center;">NO</td> </tr> </table>	Laser beam contact within the eye-region rectangle:	NO	P
Laboratory Conditions:														
Req'd:	Temperature Range 18-28 °C (65-82 °F)	Humidity Range 35-65 %												
Actual:	72 ° F	43												
Laser beam contact within the eye-region rectangle:	NO													