Mine Safety Appliances Company · John T. Ryan Memorial Lab
1100 Cranberry Woods Drive, Cranberry Township, PA 16066

MSA Engineering Self Certification of Standard Compliance

IAC-23-002-Z04_r001

Statement of Compliance: This Diamond Energy Absorbing Lanyard meets the requirements of ANSI Z359.13-2009.

Tested part number(s) or IAC No.:	"Sold as" part number(s)/Market:
IAC 002	SEE ATTACHED COMPLIANCE REPORT

Test Lab Used:	Document #:
CSA Group	IAC002LD
Intertek	G101201362CRT-001

PERFORMANCE DETAILS

(May format as needed)

List standard(s) and referenced sections as applicable	Results	Pass / Fail
SEE ATTACHED COMPLIANCE REPORT		

For additional information about this product(s), please contact MSA Customer Service at 1-800-MSA-2222. When requesting information, please reference "sold as" part number(s).

Quality Assurance JAMES WONDERLING

Date: Sept 30, 2013

ANSI Z359.7 3rd Party Testing Compliance Report

Revision 2

IAC 002 - ENERGY ABSORBING LANYARDS, DIAMOND™

"Sold As" Part numbers	10088065, 10088066, 10088069, 10125910, 10125921, 10125922, ATO-DIA-A-XXX	
ANSI Z359.13-2009 Requirement	**Results**	**Pass/Fail**
3.1 Personal Energy Absorber Component. All personal energy absorbers bearing this standard number shall meet the design and testing requirements of this standard. See Figures 5.a, 5.b.	Diamond Lanyards meet all design and testing requirements put forth by ANSI Z359.13	**Pass**
3.1.1 Classifications. Personal energy absorbers shall be categorized as follows:		
3.1.1.1 "6 ft FF " personal energy absorbers shall be designed up to 6 foot free fall (FF indicates free fall) applications and users weighing between 130 and 310 pounds (59 -140 kg).	Diamond "6ft FF" Lanyards are designed for up to 6 foot free fall and accommodate users weighing between 130 and 310 pounds.	**Pass**
3.1.1.2 "12 ft FF " personal energy absorbers shall be designed up to 12 foot free fall applications (FF indicates free fall) and users weighing between 130 and 310 pounds. (59 – 140 kg).	**N/A**	**N/A**
3.1.2 Material. Material used in the construction of personal energy absorbers shall be made of virgin synthetic material having strength, aging, abrasion resistance and heat resistance characteristics equivalent or superior to polyamides.	All materials meet these requirements.	**Pass**
3.1.3 Terminations. Personal energy absorbers shall have end terminations which meet the following requirements.		
3.1.3.1 Spliced. Formed eye terminations in rope shall be made in accordance with the rope manufacturer's recommendation, subject to the following requirements. Eye splices in twisted rope having three or more strands shall have a minimum of four tucks. A properly sized thimble shall be part of a formed eye termination. Knots shall not be used to form energy absorbing lanyard end terminations. Terminations (including cut ends) and splices shall be seized, whipped, or otherwise integrally finished to prevent the termination or splice from unraveling or unsplicing. See Figure 1.	**N/A**	**N/A**
3.1.3.2 Stitched. Stitched eye terminations on strap energy absorbing lanyards shall be sewn using lock stitches. Thread shall be of the same material type as the webbing and shall be of a contrasting color to facilitate inspection. Webbing shall be protected from concentrated wear at all interfaces with load bearing connector elements. Webbing ends shall be seared or otherwise prevented from unraveling. See Figure 2.	Stitched terminations meet these requirements.	**Pass**
3.1.3.3 Wire Rope. Formed eye terminations of wire rope shall have a minimum breaking strength of 80% of the wire rope when tested in accordance with *E8-89b, Test Methods of Tension Testing of Metallic Materials.* The following methods may be used for forming eyes in wire rope: (a) spliced eye with one swaged fitting, or (b) return eye with a minimum of two swaged fittings. All formed eyes shall incorporate a properly sized thimble. See Figure 3.	**N/A**	**N/A**
3.1.3.4 Terminations other than splicing, stitching, and swaging are permitted when it can be demonstrated by testing that the requirements of this standard can be met and additionally, that the durability, reliability, strength, and other properties pertinent to the intended uses have been evaluated and determined suitable by the manufacturer.		
3.1.4 Connectors. Personal energy absorbers will have integrally attached connectors or be integral to the energy absorbing lanyard. Connectors used on all personal energy absorbers shall meet the requirements of ANSI/ASSE Z359.1, Safety Requirements for Connecting Components for Personal Fall Arrest Systems (PFAS) Connectors or the most recent version of ANSI/ASSE Z359.12, Safety Requirements for Connecting Components for Personal Fall Arrest Systems (PFAS) Connectors. See Figures 4a, 4b, 4c.	All connectors meet ANSI / ASSE Z359.12.	**Pass**
3.1.5 Deployment Indicator. Personal energy absorbers shall be designed such that it is obvious if they have been activated or by a warning flag or label that indicates activation.	In the event of a fall, a warning flag will deploy to indicate activation.	**Pass**
3.1.6 Activation Force. 6 ft FF and 12 ft FF personal energy absorbers when subjected to a static force no less than 450 pounds (2 kN) in accordance with 4.2 shall not show signs of activation or exhibit permanent elongation greater than 2 inches (51 mm).	No Sign of Activation at 450 lbs	**Pass**
3.1.7 Static Strength. Personal energy absorbers, when statically tested in accordance with 4.3 shall have a minimum breaking strength no less than 5,000 pounds (22.2 kN).	**N/A**	**N/A**
3.1.8 Personal Energy Absorber Dynamic Performance - Ambient Dry Test. Personal energy absorbers tested in accordance with 4.4 shall meet the following requirements:		
3.1.8.1 6 ft FF personal energy absorbers and energy absorbing lanyards when tested in accordance with 4.4 and 4.5 shall have an average arrest force no greater than 900 pounds (4 kN) and a maximum deployment distance of 48 inches (122 cm) without exceeding 1,800 pounds (8 kN) maximum arrest force.	Avg. Arrest Force less than 900 lbs Deployment Distance less than 48 in Max. Arrest Force less than 1800 lbs	**Pass**
3.1.8.2 12 ft FF personal energy absorbers and energy absorbing lanyards when tested in accordance with 4.4 and 4.5 shall have an average arrest force no greater than 1,350 pounds. (6 kN) and a maximum deployment distance of 60 inches (152.4cm) without exceeding 1,800 pounds (8 kN) maximum arrest force.	**N/A**	**N/A**

ANSI Z359.7 3rd Party Testing Compliance Report

Revision 2

IAC 002 - ENERGY ABSORBING LANYARDS, DIAMOND™

"Sold As" Part numbers	10088065, 10088066, 10088069, 10125910, 10125921, 10125922, ATO-DIA-A-XXX	
ANSI Z359.13-2009 Requirement	**Results**	**Pass/Fail**
3.1.9.1 Ambient Wet. 6 ft FF and 12 ft FF personal energy absorbers shall be immersed in water at 68 +/- 4°F (20 +/- 2°C) for a minimum of 8 h. Concluding the conditioning of the personal energy absorbers, they shall be dynamically tested according to 4.4.		
3.1.9.1.1 6 ft FF energy absorbers shall be allowed to have an average arrest force of 1,125 pounds (5 kN) without exceeding 1,800 pounds (8 kN) maximum arrest force.	Avg. Arrest Force less than 1125 lbs Max. Arrest Force less than 1800 lbs	**Pass**
3.1.9.1.2 12 ft FF energy absorbers shall be allowed to have an average arrest force of 1,575 pounds (7 kN) without exceeding 1,800 pounds (8 kN) maximum arrest force.	**N/A**	**N/A**
3.1.9.2 Cold Dry. 6 ft FF and 12 ft FF personal energy absorbers shall be conditioned at –31 +/- 4°F (–35 +/- 2°C) for a minimum of 8 h. Concluding the conditioning of the personal energy absorbers, they shall be dynamically tested according to 4.4 and meet their respective requirements set forth in 3.1.9.1.1 and 3.1.9.1.2 .	Avg. Arrest Force less than 1125 lbs Max. Arrest Force less than 1800 lbs	**Pass**
3.1.9.3 Hot Dry. 6 ft FF and 12 ft FF personal energy absorbers shall be conditioned at 113 +/- 4°F (45 +/- 2°C) for a minimum of 8 h. Concluding the conditioning of the personal energy absorbers, they shall be dynamically tested according to 4.4 and meet their respective requirements set forth in 3.1.8.1 and 3.1.8.2.	Avg. Arrest Force less than 900 lbs Deployment Distance less than 48 in Max. Arrest Force less than 1800 lbs	**Pass**
3.2.4 Dynamic Performance. Energy absorbing lanyards shall be tested as a complete system according to 4.5. The results of the tests shall meet the requirements of 3.1.8.1 and 3.1.8.2 respectively.	**(See 3.1.8.1)**	
3.2.5 Static Strength. Energy absorbing lanyards when statically tested in accordance with 4.6 shall have a minimum breaking strength no less than 5,000 pounds (22.2 kN). Energy absorbing lanyards that incorporate a means for length adjustment, shall maintain their adjusted length (disregarding elastic stretch) up to a load of 2,000 pounds (8.8 kN).	Minimum Breaking Strength greater than 5000 lbs	**Pass**
3.2.6 Abrasion Test. Wrap-around energy absorbing lanyards shall be additionally tested in accordance with 4.12. The energy absorbing lanyards shall be subjected to 2,500 cycles on the abrasion tester. The wrap-around energy absorbing lanyard shall have a minimum breaking strength no less than 3,600 pounds (16 kN) after being abraded.	Minimum Breaking Strength greater than 3600 lbs	**Pass**
3.2.7 Static Test – Wrap-Around Energy Absorbing Lanyards. Energy absorbing lanyards that are designed to wrap-around a structure and connect back onto themselves shall be tested in accordance with 4.11. The energy absorbing lanyard shall have a minimum breaking strength no less than 5,000 pounds (22.2 kN) when connected as designed and instructed for use.	**N/A**	**N/A**
3.2.8 Static Test – Y-Lanyards. Y-lanyards shall be statically tested in accordance with 4.7 and shall have a minimum breaking strength no less than 5,000 pounds (22.2 kN).	Cl. 4.7.1 - Minimum Breaking Strength greater than 5000 lbs Cl. 4.7.2 - Minimum Breaking Strength greater than 5000 lbs Cl. 4.7.3 - Minimum Breaking Strength greater than 5000 lbs	**Pass**
3.2.9 Dynamic Test – Dual Connection. Y-lanyards tested in accordance with 4.9 shall meet the following requirements:		
3.2.9.1. 6 ft FF personal energy absorbers will not at anytime exceed a force reading over 1,800 pounds (8 kN). Any force reading over 1,800 pounds (8 kN) will constitute a failure. See Figure 18c.	Force less than 1800 lbs	**Pass**
3.2.9.2. 12 ft FF personal energy absorbers will not at anytime exceed a force reading over 1,800 pounds (8 kN). Any force reading over 1,800 pounds (8 kN) will constitute a failure. See Figure 18c.	**N/A**	**N/A**
3.2.10 Dynamic Test – Hip Connection. Y-lanyards shall be tested in accordance with 4.10. The energy absorbing lanyard end connected to the hip location shall not break the nylon keeper (refer to Section 4.1.11) during the test. If the energy absorbing lanyard breaks the nylon keeper, the energy absorbing lanyard must include a warning label on each lanyard leg according to 5.2.2.	Nylon Keeper did not break	**N/A**