U.S. Department of Transportation
Federal Highway Administration

1200 New Jersey Ave., SE
Washington, D.C. 20590

April 27, 2020

In Reply Refer To:
HSST-1 / B-326

Mr. John Annison
Valmont Highway International Pty. Ltd.
57-65 Airds Road, Minto, NSW, 2566
Australia

Dear Mr. Annison:

This letter is in response to your April 4, 2019 request for the Federal Highway Administration (FHWA) to review a roadside safety device, hardware, or system for eligibility for reimbursement under the Federal-aid highway program. This FHWA letter of eligibility is assigned FHWA control number B-326 and is valid until a subsequent letter is issued by FHWA that expressly references this device.

Decision

The following device is eligible within the length-of-need, with details provided in the form which is attached as an integral part of this letter:

- ArmorZone MASH TL2 Water Filled Temporary Safety Barrier

Scope of this Letter

To be found eligible for Federal-aid funding, new roadside safety devices should meet the crash test and evaluation criteria contained in the American Association of State Highway and Transportation Officials'(AASHTO) Manual for Assessing Safety Hardware (MASH). However, the FHWA, the Department of Transportation, and the United States Government do not regulate the manufacture of roadside safety devices. Eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use.

This letter is not a determination by the FHWA, the Department of Transportation, or the United States Government that a vehicle crash involving the device will result in any particular outcome, nor is it a guarantee of the in-service performance of this device. Proper manufacturing, installation, and maintenance are required in order for this device to function as tested.

This finding of eligibility is limited to the crashworthiness of the system and does not cover other structural features, nor conformity with the Manual on Uniform Traffic Control Devices.

Eligibility for Reimbursement

Based solely on a review of crash test results and certifications submitted by the manufacturer, and the crash test laboratory, FHWA agrees that the device described herein meets the crash test and evaluation criteria of the AASHTO's MASH. Therefore, the device is eligible for reimbursement under the Federal-aid highway program if installed under the range of tested conditions.

Name of system: ArmorZone MASH TL2 Water Filled Temporary Safety Barrier
Type of system: Longitudinal Barrier
Test Level: MASH Test Level 2 (TL2)
Testing conducted by: Holmes & Safe Technologies Inc.
Date of request: April 4, 2019
Date of final package: April 20, 2020

FHWA concurs with the recommendation of the accredited crash testing laboratory on the attached form.

Full Description of the Eligible Device

The device and supporting documentation, including reports of the crash tests or other testing done, videos of any crash testing, and/or drawings of the device, are described in the attached form.

Notice

This eligibility letter is issued for the subject device as tested. Modifications made to the device are not covered by this letter. Any modifications to this device should be submitted to the user (i.e., state DOT) as per their requirements.

You are expected to supply potential users with sufficient information on design, installation and maintenance requirements to ensure proper performance.

You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the test and evaluation criteria of AASHTO's MASH.

Issuance of this letter does not convey property rights of any sort or any exclusive privilege. This letter is based on the premise that information and reports submitted by you are accurate and correct. We reserve the right to modify or revoke this letter if: (1) there are any inaccuracies in the information submitted in support of your request for this letter, (2) the qualification testing was flawed, (3) in-service performance or other information reveals safety problems, (4) the system is significantly different from the version that was crash tested, or (5) any other information indicates that the letter was issued in error or otherwise does not reflect full and complete information about the crashworthiness of the system.

Standard Provisions

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number B-326 shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed upon request.

- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder.

- This FHWA eligibility letter is not an expression of any Agency view, position, or determination of validity, scope, or ownership of any intellectual property rights to a specific device or design. Further, this letter does not impute any distribution or licensing rights to the requester. This FHWA eligibility letter determination is made based solely on the crash-testing information submitted by the requester. The FHWA reserves the right to review and revoke an earlier eligibility determination after receipt of subsequent information related to crash testing.

Sincerely,

Michael S. Griffith

Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	November 23, 2018	○ New ○ Resubmission
	Name:	John Annison	
	Company:	Valmont Highway International Pty. Ltd	
	Address:	57-65 Airds Rd, Minto, NSW, 2566	
	Country:	Australia	
	To:	Michael S. Griffith, Director FHWA, Office of Safety Technologies	

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

Device & Testing Criterion - Enter from right to left starting with Test Level

!-!-!

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'B': Rigid/Semi-Rigid Barriers (Roadside, Median, Bridge Railings)	◉ Physical Crash Testing ○ Engineering Analysis	Armorzone MASH TL2	AASHTO MASH	TL2

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the AASHTO Manual for Assessing Safety Hardware and that the evaluation results meet the appropriate evaluation criteria in the MASH.

Individual or Organization responsible for the product:

Contact Name:	John Annison	Same as Submitter ☐
Company Name:	Valmont Highway International Pty. Ltd	Same as Submitter ☐
Address:	57-65 Airds Rd, Minto, NSW, 2566	Same as Submitter ☐
Country:	Australia	Same as Submitter ☐

Enter below all disclosures of financial interests as required by the FHWA `Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.

Holmes Solutions completes testing activities for Valmont Highway International. For the completion of this service, Holmes Solutions receive payment in the form of professional fees. In no circumstances are the fees received linked to the performance of the product nor the outcome of the tests. In accordance with the requirements of their ISO 17025 accreditation, all testing activities are completed free from undue commercial influence.
Holmes Solutions does not have, nor ever had, any financial interest in Valmont Highway International or any of the products that they sell. Holmes Solutions does not receive any research funding (or other forms of research support) from Valmont Highway International. Holmes Solutions have no patents, copyrights or other intellectual property rights on any of the Valmont Highway International products. Holmes Solutions has no business ownership or investment interest in Valmont Highway International. No licensing agreements exist between Holmes Solutions and Valmont Highway International.

PRODUCT DESCRIPTION

(●) New Hardware or Significant Modification ( ) Modification to Existing Hardware

ArmorZone MASH TL2 is a fast to deploy and economical to transport MASH TL2 temporary longitudinal barrier with an integral end treatment, for use in work zone applications.
ArmorZone MASH TL2 is a freestanding barrier which does not require anchoring to the road. It can be deployed on asphalt, concrete, gravel and compacted soil surfaces.
ArmorZone MASH TL2 has been designed to be used with water ballast. Each ArmorZone MASH TL2 must be filled with 440 litres (116 gallons) of water. Each barrier is fitted with a Water Fill Level Indicator (WFLI) which comprises of a float which protrudes from the top of the barrier when it is completely filled with water. This WFLI enables one to verify if the barriers are filled with water for compliance.
ArmorZone MASH TL2 consists of a 2000mm (78-3/4") long, 450mm (17-3/4") wide and 860mm (33-7/8")high rotomolded HD stabilised PE (UV08) plastic barrier with an internal galvanised steel bar, measuring 2160mm (85") long, 75mm (3") wide and 6mm (1/4") thick. The bar spans the length of the barrier and links the proprietary twin pin coupling ends together. The barriers are pinned together by a removable, galvanised steel twin pin. The twin pin is inserted through the holes in the overlapping end sections of the barriers, thus providing an extremely strong and rigid joint, which holds the barriers together during impact and also helps to prevent vehicle pocketing. When deployed the barriers are filled with water and pinned together, forming a continuous line of barriers. The minimum Length of Need (LON) of the system is 23 barriers and an infinite number of barriers can be deployed in a continuous length.

CRASH TESTING

By signature below, the Engineer affiliated with the testing laboratory, agrees in support of this submission that all of the critical and relevant crash tests for this device listed above were conducted to meet the MASH test criteria. The Engineer has determined that no other crash tests are necessary to determine the device meets the MASH criteria.

Engineer Name:	Emerson Ryder	
Engineer Signature:	Emerson Ryder	Digitally signed by Emerson Ryder Date: 2019.08.07 16:11:27 +12'00'
Address:	254 Montreal Street, Christchurch	Same as Submitter ☐
Country:	New Zealand	Same as Submitter ☐

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
2-10 (1100C)	As detailed in Holmes Solutions report for Test No. 136310.01RP.0918(v1.2), a 1100C passenger car impacted the barrier 300mm (12") upstream of barrier joint 12B at an impact speed of 70.5km/h (43.8mph) and an angle of 25.0 degrees. Maximum dynamic deflection of the barrier was 2.02m (79.5"). Working Width was 2.47 m (97.2") The ArmorZone MASH TL2 barrier system contained and redirected the 1100C vehicle. The vehicle remained upright during and after the impact and vehicle stability was considered good. Occupant risk factors satisfied the test criteria. No debris or detached elements penetrated or showed potential to penetrate the occupant compartment. No fragments were distributed outside of the vehicle trajectory. The ArmorZone MASH TL2 barrier system was judged to have satisfied all of the evaluation criteria for the MASH Test 2-10.	PASS
2-11 (2270P)	Please refer to Safe Technologies Inc (STI) MASH Test Report for Successful 2-11 Test No.AZLB-01 completed on 30th November 2010. According to the STI Test No.AZLB-01 Report all evaluation criteria has been met for MASH Test 2-11. STI Report issue date of 21/1/2011. STI Testing Date of 30/11/2010.	PASS
2-20 (1100C)	n/a	Non-Relevant Test, not conducted
2-21 (2270P)	n/a	Non-Relevant Test, not conducted

Full Scale Crash Testing was done in compliance with MASH by the following accredited crash test laboratory (cite the laboratory's accreditation status as noted in the crash test reports.):

Laboratory Name:	Holmes Solutions LP	
Laboratory Signature:	Emerson Ryder — Digitally signed by Emerson Ryder Date: 2019.08.07 16:18:10 +12'00'	
Address:	254 Montreal Street, Christchurch	Same as Submitter ☐
Country:	New Zealand	Same as Submitter ☐
Accreditation Certificate Number and Dates of current Accreditation period :	7559 1022 April 2018 to April 2019 NZS ISO/IEC 17052:2005	

Submitter Signature*: John Ranier 2014.08.08

Submit Form

ATTACHMENTS

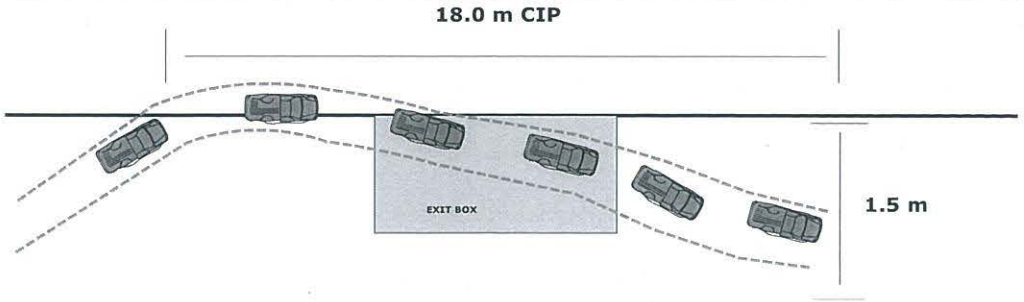
Attach to this form:

1) Additional disclosures of related financial interest as indicated above.
2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [Hardware Guide Drawing Standards]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

Eligibility Letter		
Number	Date	Key Words

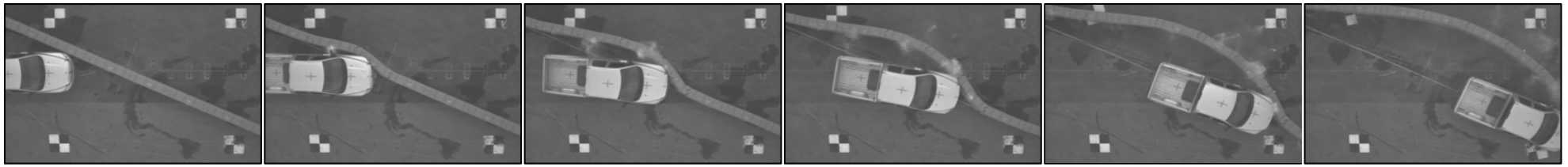
0.00 s	0.20 s	0.50 s	0.70 s	1.0 s



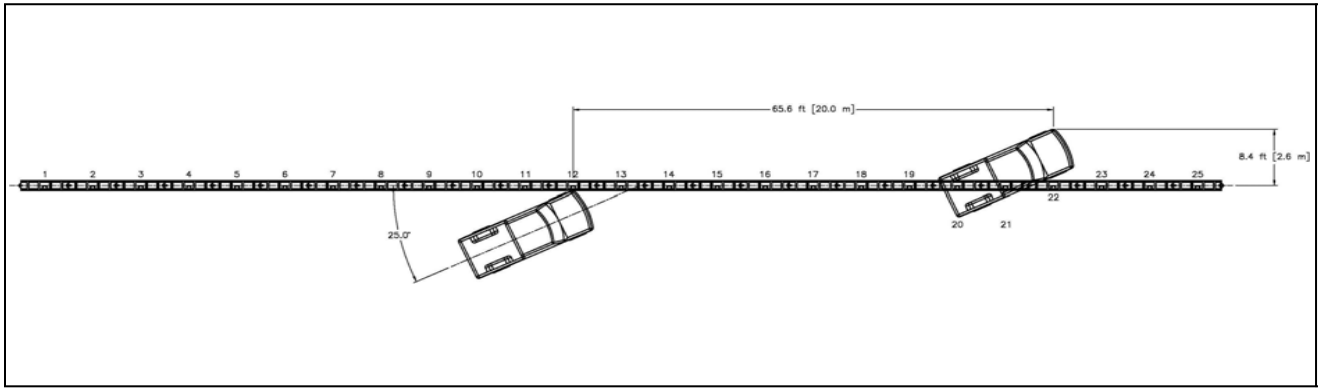
Test Article:	Valmont Highway International Armorzone
Total Length	50.0 m
Key Elements - Barrier	Mash TL2-10
Description	Plastic temporary barrier
Length of Barrier Installation	46.0 m length of need
Height	0.86 m
Length of Barrier Segments	2.0 m (2.0 m between pins)
Test Vehicle	
Designation	1100C
Make/Model	Nissan Tiida
Dimensions (LxWxH)	4190 mm x 1690 mm x 1540 mm
Curb Wt	1074.0 kg
Test Inertial Wt	1085.0 kg
Gross Static	1155.0 kg
Impact Conditions	
Speed	70.5 km /h
Angle	25.0 degrees
Impact Point	300 mm upstream of barrier joint 12B
Exit Conditions	
Exit Speed:	36.0 km/h
Exit Angle:	9.0°

Post Impact Vehicle Behaviour		
Vehicle Stability	Good	
Stopping Distance	18.0 m (brakes applied)	
Vehicle Snagging	None	
Vehicle Pocketing	None	
Occupant Impact Velocity (m/s)	0.1420 second front side of interior	
Longitudinal	4.8	
Lateral (optional)	-3.2	
Occupant Ride-down Deceleration		
X-direction (g)	-2.5	(0.1865 - 0.1965 seconds)
Y-direction (g)	2.6	(0.2158 - 0.2258 seconds)
THIV (optional) (m/s)	6.0	
PHD (optional) (g)	3.1	(0.2157 - 0.2257 seconds)
ASI (optional)	0.63	(0.0425 - 0.0925 seconds)
Test Article Damage	Moderate	
Test Article Deflections		
Dynamic	2.02 m	
Permanent	2.02 m	
Working Width	2.47 m	
Vehicle Damage Exterior		
VDS	11FL-1	
CDC	11LFEE1	
Maximum Deformation	80 mm	

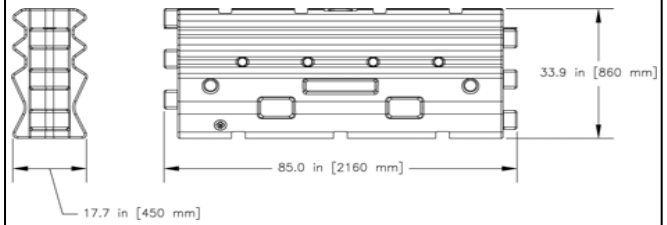
Safe Technologies, Inc.
CRASH TEST SERVICES



0.000 sec | 0.100 sec | 0.200 sec | 0.300 sec | 0.500 sec | 0.700 sec



Typical ArmorZone™ LB



General Information

Test Agency ..... Safe Technologies, Inc.
Test Number P2B04
Test Designation ..... MASH 2-11
Date 11/30/2010

Test Article

Name ..... ArmorZone
Type ..... Longitudinal Barrier
Installation Length ..... 164.0 ft (50.0 m)
Length ..... 85.0 in (2,160 mm)
Width ..... 17.7 in (450 mm)
Height ..... 33.9 in (860 mm)

Test Vehicle

Type/Designation 2270P
Make and Model ..... 2004 Dodge Ram 1500 Quad Cab Pickup
Curb Weight ..... 4,742 lbs (2,151 kg)
Test Inertial Weight ..... 5,053 lbs (2,292 kg)
Gross Static Weight ..... 5,053 lbs (2,292 kg)

Impact Conditions

Speed ..... 43.7 mph (70.3 kph)
Angle ..... 25.0 degrees
Location/Orientation ..... Middle of # 12 barrier

Exit Conditions

Speed ..... N/A
Angle ..... N/A
Exit Box Criterion ..... N/A

Post-Impact Trajectory

Vehicle Stability ..... Satisfactory
Stopping Distance ..... 65.6 ft (20.0 m) downstream
8.4 ft (2.6 m) laterally behind

Occupant Risk

Longitudinal OIV ..... 13.8 ft/s (4.2 m/s)
Lateral OIV ..... 9.5 ft/s (2.9 m/s)
Longitudinal RA ..... 2.9 G
Lateral RA ..... 2.0 G
THIV ..... 16.1 ft/s (4.9 m/s)
PHD ..... 3.3 G

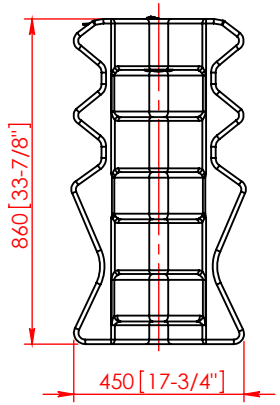
Test Article Damage: Moderate

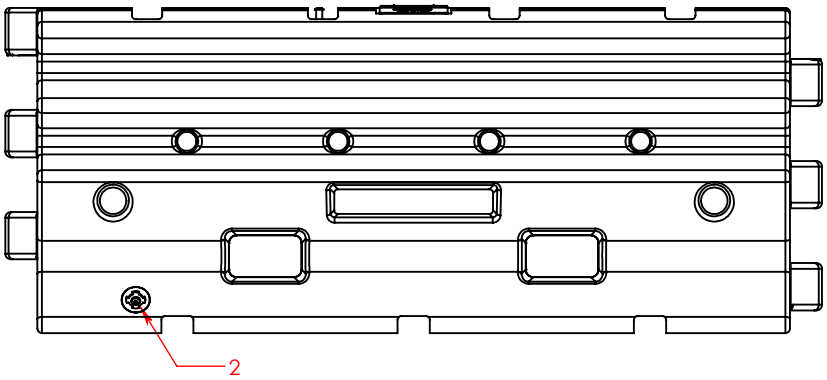
Test Article Deflections

Permanent Set ..... 13.5 ft (4.1 m)
Dynamic ..... 13.5 ft (4.1 m)
Working Width ..... 15.1 ft (4.6 m)

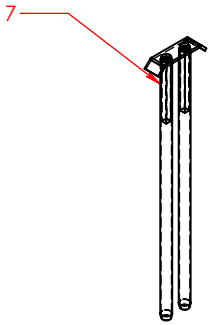
Vehicle Damage

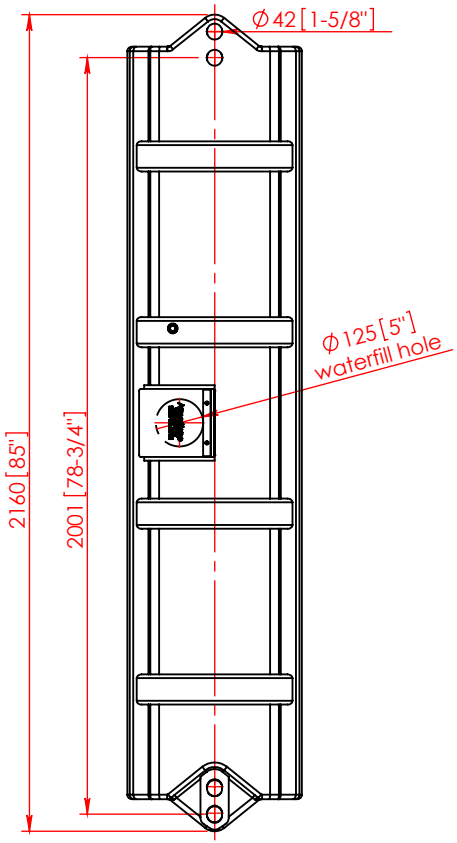
VDS 11-LFQ-1
CDC 11FLEN1
Maximum Deformation ..... 4.3 in (110.0 mm) at front left bumper

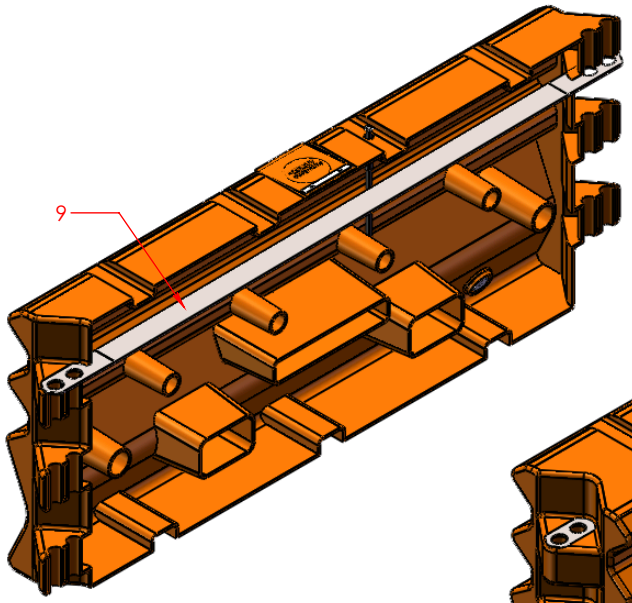


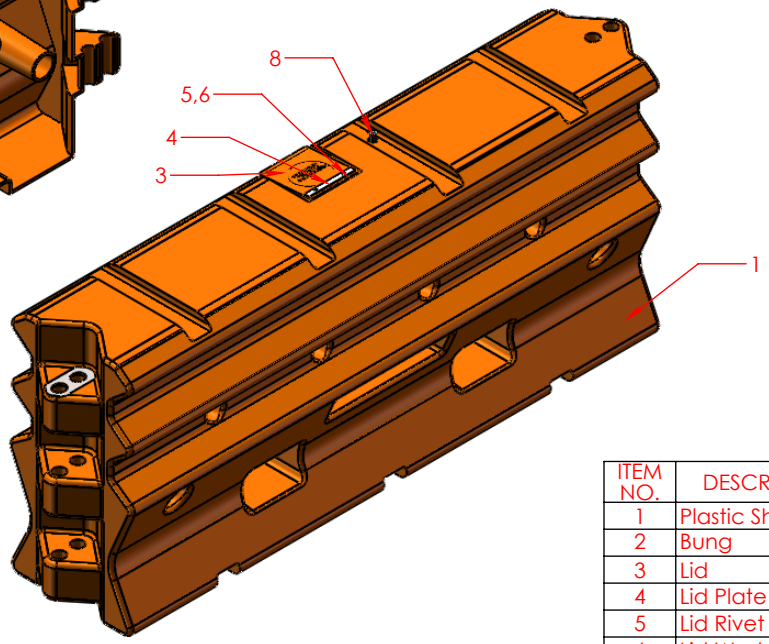


Note:
Steel Connector installed
Empty weight 56kg
Water volume 440 l
Full weight 496kg









ITEM NO.	DESCRIPTION	QTY.
1	Plastic Shell	1
2	Bung	1
3	Lid	1
4	Lid Plate	1
5	Lid Rivet	2
6	Lid Washer	2
7	Reinforced Pin	1
8	Full Indicator	1
9	Steel Connector	1

REV.	CHANGES	DATE

SCALE: 1:20

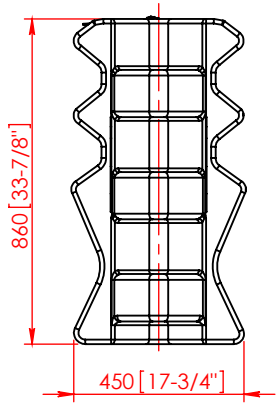
	DATE	INIT.
DRAWN BY	20/12/2010	AD
APPR'D BY	20/12/2010	DJ

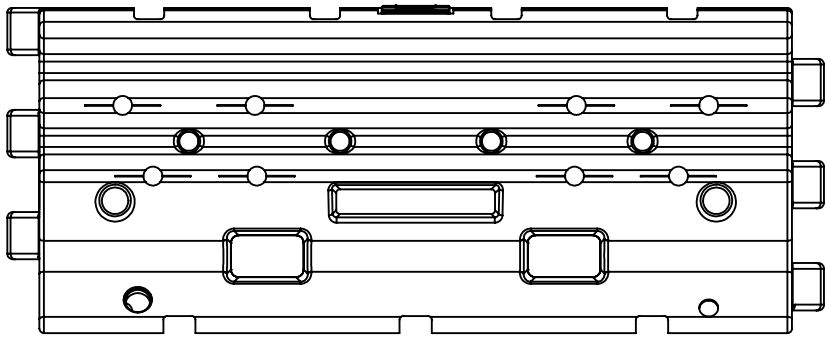
Standard Tolerance

ArmorZone™ MASH TL-2

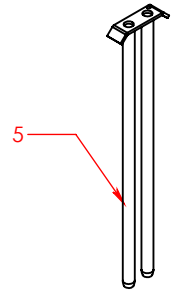
valmont HIGHWAY
57-65 Airds Road,
Minto, NSW, 2566,
Australia
tel. 61 2 9827 3333
fax. 61 2 9827 3300
www.ingalcivil.com.au

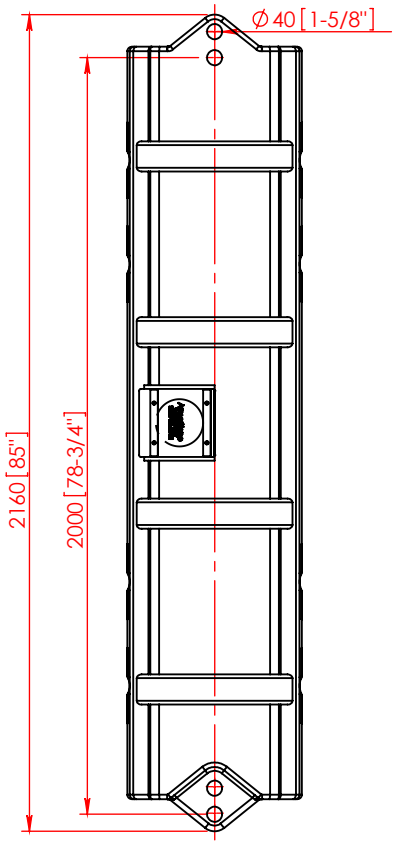
SHEET	DRAWING NUMBER	REV.
1 OF 1	P-AZ-A1S	

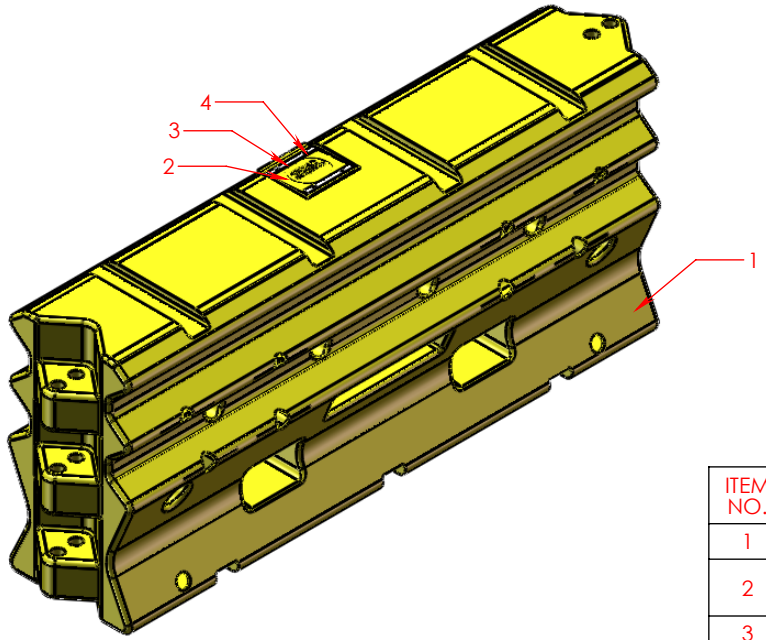




Note:
No Steel Connector inside
Weight 50kg







ITEM NO.	DESCRIPTION	QTY.
1	Plastic Shell	1
2	Lid	1
3	Lid Plate	2
4	Lid Screw	4
5	Standard Pin	1

REV.	CHANGES	DATE
A	INITIAL ISSUE	11/11/2010

SCALE: 1:20

	DATE	INIT.
DRAWN BY	11/11/2010	LW
APPR'D BY	11/11/2010	BM

Standard Tolerance

ArmorZone™ End Treatment

valmont HIGHWAY
57-65 Airds Road,
Minto, NSW, 2566,
Australia
tel. 61 2 9827 3333
fax. 61 2 9827 3300
www.ingalcivil.com.au

SHEET	DRAWING NUMBER	REV.
1 OF 1	AI0274	A