



U.S. Department
of Transportation
**Federal Highway
Administration**

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

January 30, 2017

In Reply Refer To:
HSST-1/B-273

Mr. Luke Gallagher
Valmont Highway Technology
157-65 Airs Rd,
Minto, NSW 2566
Australia

Dear Mr. Gallagher:

This letter is in response to your October 29, 2016 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-273 and is valid until a subsequent letter is issued by FHWA that expressly references this device.

Decision

The following devices are eligible, with details provided in the form which is attached as an integral part of this letter:

- Ezy-Guard High Containment (HC) 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' 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 American Association of State Highway and Transportation Officials' Manual for Assessing Safety Hardware (MASH). Therefore, the device is eligible for reimbursement under the Federal-aid highway program if installed under the range of tested conditions as Length of Need (LON) barrier.

Name of system: Ezy-Guard High Containment (HC)

Type of system: Longitudinal Barrier

Test Level: MASH Test Level 4 (TL4)

Testing conducted by: Holmes Solutions

Date of request: October 29, 2016

Date initially acknowledged: November 2, 2016

Date of completed package: October 29, 2016

FHWA concurs with the recommendation of the accredited crash testing laboratory as stated within 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

If a manufacturer makes any modification to any of their roadside safety hardware that has an existing eligibility letter from FHWA, the manufacturer must notify FHWA of such modification with a request for continued eligibility for reimbursement. The notice of all modifications to a device must be accompanied by:

- Significant modifications – For these modifications, crash test results must be submitted with accompanying documentation and videos.
- Non-signification modifications – For these modifications, a statement from the crash test laboratory on the potential effect of the modification on the ability of the device to meet the relevant crash test criteria.

FHWA's determination of continued eligibility for the modified hardware will be based on whether the modified hardware will continue to meet the relevant crash test criteria.

Any user or agency relying on this eligibility letter is expected to use the same designs, specifications, drawings, installation and maintenance instructions as those submitted for review.

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 the 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-273 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.
- If the subject device is a patented product it may be considered to be proprietary. If proprietary systems are specified by a highway agency for use on Federal-aid projects: (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.

Sincerely yours,



Scott Johnson
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	October 19, 2016	<input checked="" type="radio"/> New <input type="radio"/> Resubmission
	Name:	Luke Gallagher	<i>Luke Gallagher</i>
	Company:	Valmont Highway Technology	
	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)	<input checked="" type="radio"/> Physical Crash Testing <input type="radio"/> Engineering Analysis	Ezy-Guard High Containment (HC)	AASHTO MASH	TL4

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:	Luke Gallagher	Same as Submitter <input checked="" type="checkbox"/>
Company Name:	Valmont Highway Technology	Same as Submitter <input type="checkbox"/>
Address:	57-65 Airds Rd, Minto, NSW 2566	Same as Submitter <input checked="" type="checkbox"/>
Country:	Australia	Same as Submitter <input checked="" type="checkbox"/>

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 Ingal Civil Products and Valmont Highway Technology. 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 Ingal Civil Products or Valmont Highway Technology or any of the products that they sell. Holmes Solutions does not receive any research funding (or other forms of research support) from Ingal Civil Products or Valmont Highway Technology. Holmes Solutions have no patents, copyrights or other intellectual property rights on any of the Ingal Civil Products or Valmont Highway Technology products. Holmes Solutions have no business ownership or investment interest in Ingal Civil Products or Valmont Highway Technology. No licencing agreements exist between Holmes Solutions and Ingal Civil Products or Valmont Highway Technology.

PRODUCT DESCRIPTION

<input checked="" type="radio"/> New Hardware or Significant Modification	<input type="radio"/> Modification to Existing Hardware	
<p>Ezy-Guard High Containment (HC) is a narrow, guardrail barrier system comprising standard thrie-beam rail supported by steel posts and sliding carriages.</p> <p>Ezy-Guard HC posts are cold formed into a Z cross section of approximately 60mm (2.36 inch) wide x 140mm (5.52 inch) deep. The HC Z-posts are 2000mm long (78.74 inch). The Z-posts are hot dip galvanized and are installed to an above-ground height of 970mm (38.2 inch) at 2m (6.6 feet) centres.</p> <p>The rail elements are standard 12 gauge, galvanized thrie-beam conforming to AASHTO M180 Class A rail. The height to top of rail is 980mm (38.6 inch). The rails are secured to a sliding carriage using a M16 (5/8") x 30mm (1.18 inch) long bolt with a hexagonal recess.</p> <p>In the safety performance evaluation of Ezy-Guard HC, three full-scale crash tests were conducted.</p> <p>MASH Test Designation 4-10: Ezy-Guard HC successfully contained and redirected the 1100C vehicle. The vehicle did not penetrate or underride the barrier. Maximum dynamic deflection of the barrier was 0.88m (34.65 inch).</p> <p>MASH Test Designation 4-11: Ezy-Guard HC contained and redirected the 2270P vehicle. The vehicle did not penetrate or underride the barrier. Maximum dynamic deflection of the barrier was 1.16m (45.67 inch).</p> <p>MASH Test Designation 4-12: Ezy-Guard HC contained and redirected the 10000S vehicle. The vehicle did not penetrate or underride the barrier. Maximum dynamic deflection of the barrier was 1.77m (69.69 inch).</p>		
CRASH TESTING		
<p>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.</p>		
Engineer Name:	Emerson Rysel	
Engineer Signature:		
Address:	7 CANTERBURY STREET, CHRISTCHURCH	Same as Submitter <input type="checkbox"/>
Country:	NEW ZEALAND	Same as Submitter <input type="checkbox"/>

A brief description of each crash test and its result:

Uma Galla

Required Test Number	Narrative Description	Evaluation Results
4-10 (1100C)	<p>As detailed in Holmes Solutions report for Test No. 131395.02, an 1100C passenger car impacted the barrier 12" (300mm) upstream of post 16 at a nominal impact speed and angle of 62 mph (100km/h) and 25 degrees, respectively. This test is primarily intended to evaluate occupant risk and vehicle trajectory criteria.</p> <p>The Ezy-Guard HC 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.</p> <p>No debris or detached elements penetrated or showed potential to penetrate the occupant compartment. No fragments were distributed outside of the vehicle trajectory. The Ezy-Guard HC barrier system was judged to have performed acceptably according to the evaluation criteria for the MASH Test 4-10.</p>	PASS
4-11 (2270P)	<p>As detailed in Holmes Solutions report for Test No. 131395.03, a 2270P pick-up truck impacted the barrier 17.72" (450mm) upstream of post 12 at a nominal impact speed and angle of 62 mph (100km/h) and 25 degrees, respectively. This test is primarily intended to evaluate occupant risk and vehicle trajectory criteria.</p> <p>The Ezy-Guard HC system contained and redirected the 2270P vehicle. The vehicle remained upright during and after the impact and vehicle stability was considered good. Occupant risk factors satisfied the test criteria. The trajectory of the vehicle was that it did not present any undue hazard to other traffic, pedestrians or work zone personnel.</p> <p>No debris or detached elements penetrated or showed potential to penetrate the occupant compartment. No fragments were distributed outside of the vehicle trajectory. The Ezy-Guard HC barrier system was judged to have performed acceptably according to the evaluation criteria for the MASH Test 4-11.</p>	PASS

Linda Collier

Required Test Number	Narrative Description	Evaluation Results
4-12 (10000S)	<p>As detailed in Holmes Solutions report for Test No. 131395.01, a 10000S single-unit van truck impacted the barrier 19.69" (500mm) upstream of post 16 at a nominal impact speed and angle of 56 mph (90km/h) and 15 degrees, respectively. This test is primarily intended to evaluate containment capacity, occupant risk and vehicle trajectory criteria.</p> <p>The Ezy-Guard HC system contained and redirected the 10000S single-unit truck. The vehicle remained upright during and after the impact and vehicle stability was considered satisfactory. Occupant risk factors satisfied the test criteria. The trajectory of the vehicle was that it did not present any undue hazard to other traffic, pedestrians or work zone personnel. No debris or detached elements penetrated or showed potential to penetrate the occupant compartment. No fragments were distributed outside of the vehicle trajectory. The Ezy-Guard HC barrier system was judged to have performed acceptably according to the evaluation criteria for the MASH Test 4-12.</p>	PASS
4-20 (1100C)	<p>Given the bending moment capacity of the HC Z-Post is relatively similar to the W6x9 standard guardrail post section, this increase in stiffness was not deemed critical to the transition performance and requiring additional testing.</p>	Non-Critical, not conducted
4-21 (2270P)	<p>Given the bending moment capacity of the HC Z-Post is relatively similar to the W6x9 standard guardrail post section, this increase in stiffness was not deemed critical to the transition performance and requiring additional testing.</p>	Non-Critical, not conducted
4-22 (10000S)	<p>Given the bending moment capacity of the HC Z-Post is relatively similar to the W6x9 standard guardrail post section, this increase in stiffness was not deemed critical to the transition performance and requiring additional testing.</p>	Non-Critical, 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.):

Linda Galle

Laboratory Name:	Holmes Solutions	
Laboratory Signature:		
Address:	7 CANTERBURY STREET, CHRISTCHURCH	Same as Submitter <input type="checkbox"/>
Country:	New Zealand	Same as Submitter <input type="checkbox"/>
Accreditation Certificate Number and Dates of current Accreditation period :	1022 DATE 23 JULY 2009 TO PRESENT DAY	

Submitter Signature*:

Submit Form

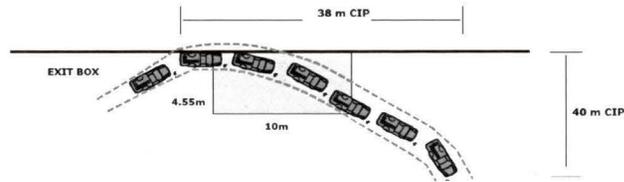
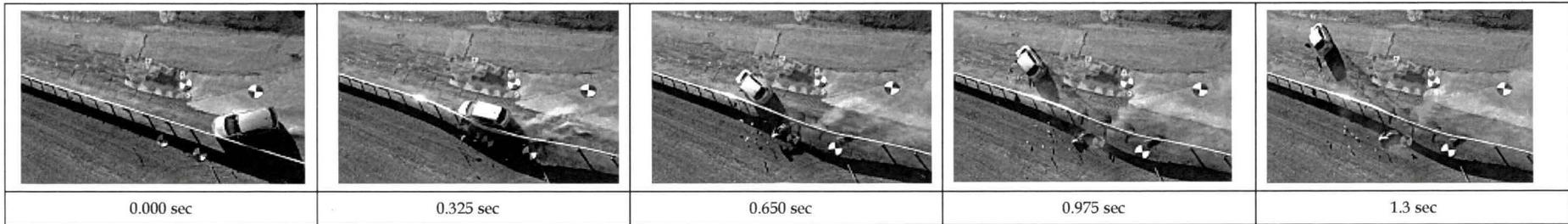
ATTACHMENTS

Attach to this form:

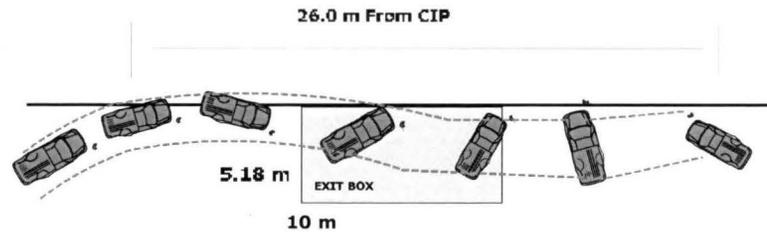
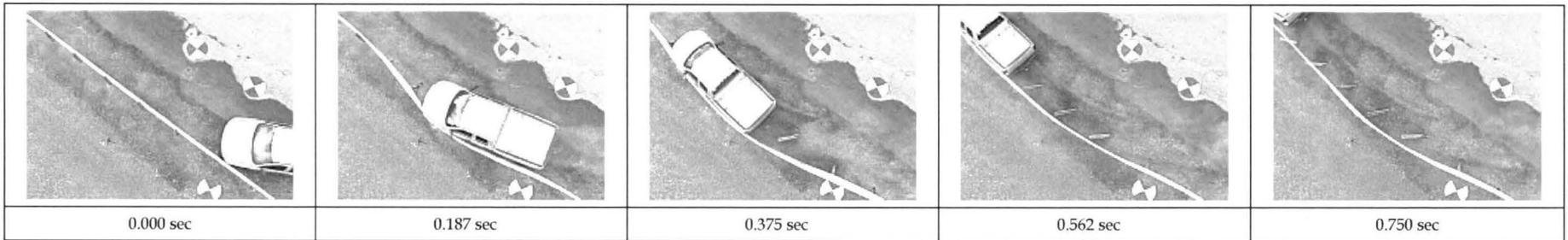
- 1) Additional disclosures of related financial interest as indicated above.
- 2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
- 3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [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:

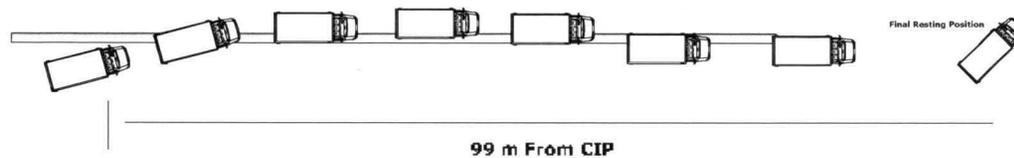
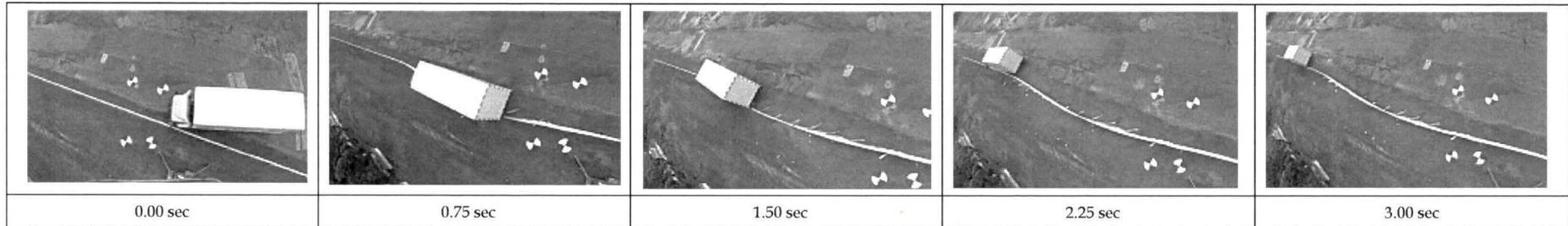
Eligibility Letter		Key Words
Number	Date	



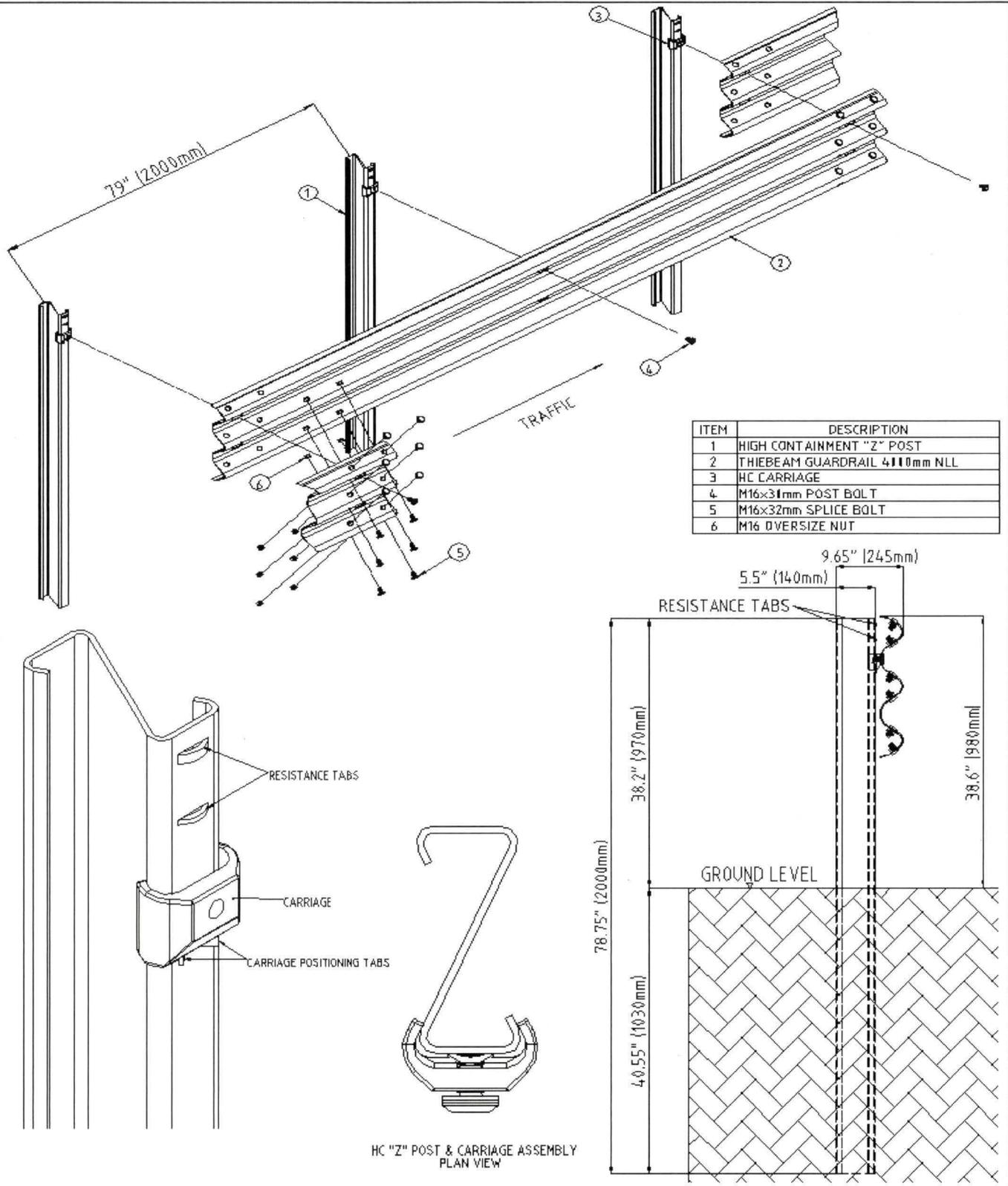
<ul style="list-style-type: none"> • Test Article 	Ingal Civil Products High Containment Thrie Beam	<ul style="list-style-type: none"> • Post Impact Vehicle Behaviour 	
<ul style="list-style-type: none"> • Total Length 	94.0 m	Vehicle Stability.....	Good
<ul style="list-style-type: none"> • Key Elements - Barrier 	Thrie Beam with Ezyguard HD Post	Stopping Distance.....	55 metres from CIP
Description.....	6.0 m terminal end sections with asymmetric transition	• Vehicle Snagging	None
Length	82.0 metres LON	• Vehicle Pocketing	None
Rail Height.....	980 mm (38.5")	• Occupant Impact Velocity	@ 0.1599 seconds on right side of interior
Post Spacing	2.0 meters nominal	Longitudinal	-7.8 m/s
• Test Vehicle		Lateral (optional).....	4.5 m/s
Designation.....	1100C	• Occupant Ridedown Deceleration	
Make/Model.....	Nissan Tiida	X-direction.....	8.7 (0.1914 - 0.2014 seconds)
Dimensions (lwh).....	4220 L x 1680 W x 1530 H	Y-direction.....	-5.8 (0.1912 - 0.2012 seconds)
Curb Wt.....	1133 kg	THIV (optional).....	33.1 km/h at 0.1635 seconds (9.2 m/s)
Test Inertial Wt.....	1108 kg	PHD (optional).....	10.5 (0.1914 - 0.2014 seconds)
Gross Static Wt.....	1183 kg	ASI (optional).....	0.80 (0.0448 - 0.0948 seconds)
• Impact Conditions		• Test Article Damage	Moderate
Speed	98.0 km/h	• Test Article Deflections	
Angle	25.5°	Dynamic.....	0.88 m
Impact Point	300 mm Upstream of line post 16	Permanent.....	0.70 m
• Exit Conditions		Working Width.....	1.02 m
Exit Speed	33.4 km/h	• Vehicle Damage - Exterior	
Exit Angle	24.5°	VDS	11FL-3
• Test Number	131395.02	CDC	11LFEE3
• Test Date	02 June 2016	Max. Deformation	150 mm



• Test Article	Ingal Civil Products High Containment Thrie Beam	• Post Impact Vehicle Behaviour	
• Total Length	55.8 m	Vehicle Stability.....	Good
• Key Elements - Barrier Description..... Length Rail Height..... Post Spacing	Thrie Beam with Ezyguard HD Post 6.0 m terminal end sections with asymmetric transition 43.8 metres LON 980 mm (38.5") 2.0 meters nominal	Stopping Distance.....	26 metres from CIP
		• Vehicle Snagging	None
		• Vehicle Pocketing	None
		• Occupant Impact Velocity	@ 0.1589 seconds on right side of interior
• Test Vehicle Designation..... Make/Model..... Dimensions (lwh)..... Curb Wt..... Test Inertial Wt..... Gross Static Wt.....	2270P Dodge Ram 1500 Quad Cab 5760 L x 2000 W x 1890 H 2234 kg 2229 kg 2229 kg	Longitudinal	-4.5 m/s
		Lateral (optional).....	4.4 m/s
		• Occupant Ridedown Deceleration	
		X-direction.....	6.4 (0.5002 - 0.5102 seconds)
Y-direction.....	-7.0 (0.2538 - 0.2638 seconds)		
THIV (optional).....	24 km/h at 0.1582 seconds (6.7 m/s)		
PHD (optional).....	7.1 (0.2538 - 0.2638 seconds)		
ASI (optional).....	0.64 (0.2330 - 0.2830 seconds)		
• Impact Conditions		• Test Article Damage	Moderate
Speed	97.0 km/h	• Test Article Deflections	
Angle	24.9°	Dynamic.....	1.16 m
Impact Point	450 mm Upstream of line post 12	Permanent.....	0.70 m
• Exit Conditions		Working Width.....	1.16 m
Exit Speed	36.0 km/h	• Vehicle Damage - Exterior	
Exit Angle	9.5 °	VDS	11FL-2
• Test Number	131395.03	CDC	11LFEE2
• Test Date	29 September 2016	Max. Deformation	200 mm



• Test Article	Ingal Civil Products High Containment Thrie Beam	• Post Impact Vehicle Behaviour	
• Total Length	94.0 m	Vehicle Stability.....	Good
• Key Elements – Barrier Description..... Length Rail Height..... Post Spacing	Thrie Beam with Ezyguard HD Post	Stopping Distance.....	99 metres from CIP
	6.0 m terminal end sections with asymmetric transition	• Vehicle Snagging	None
	82.0 metres LON	• Vehicle Pocketing	None
	980 mm (38.5")	• Occupant Impact Velocity	@ 0.3731 seconds on right side of interior
2.0 meters nominal	2.0 meters nominal	Longitudinal	-2.1 m/s
• Test Vehicle Designation..... Make/Model..... Dimensions (lwh)..... Curb Wt..... Test Inertial Wt..... Gross Static Wt.....	10000S	Lateral (optional).....	1.8 m/s
	Iveco Euro Cargo	• Occupant Ridedown Deceleration	
	9355 L x 2400 W x 3830 H	X-direction.....	3.3 (0.5694 - 0.5794 seconds)
	6960 kg	Y-direction.....	-2.4 (0.4605 - 0.4705 seconds)
	10180 kg	THIV (optional).....	10.5 km/h at 0.3715 seconds (2.9 m/s)
10180 kg	PHD (optional).....	3.7 (0.5693 - 0.5793 seconds)	
• Impact Conditions Speed Angle Impact Point	88.9 km/h	ASI (optional).....	0.19 (0.5665 - 0.6165 seconds)
	14.9°	• Test Article Damage	Moderate
	500 mm Upstream of line post 16	• Test Article Deflections	
• Exit Conditions Exit Speed Exit Angle	37.8 km/h	Dynamic.....	1.77 m
	0 °	Permanent.....	1.30 m
• Test Number	131395.01	Working Width.....	2.46 m
• Test Date	31 May 2016	• Vehicle Damage - Exterior	
		VDS	11FL-2
		CDC	11LFEE2
		Max. Deformation	130 mm



ITEM	DESCRIPTION
1	HIGH CONTAINMENT "Z" POST
2	THIEBEAM GUARDRAIL 4110mm NLL
3	HC CARRIAGE
4	M16x31mm POST BOLT
5	M16x32mm SPLICE BOLT
6	M16 OVERSIZE NUT

EZY-GUARD HIGH CONTAINMENT

EZY-HC-100



INGAL

CIVIL PRODUCTS

A **valmont** COMPANY

SHEET NO.

DATE

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10-28-2016

INTENDED USE

Ezy-Guard High Containment, a member of the Ezy-Guard family, is a fully compliant MASH TL4 longitudinal guardrail barrier system. It can be used in TL4 design locations where maximum dynamic deflections of 70 inches [1770mm] or less is acceptable. This system must be anchored with a suitable terminal system, ideally a TL3 crashworthy terminal system. The Ezy-Guard HC Thrie-beam longitudinal barrier system consists of Thrie-beam guardrail attached to Ezy-Guard HC Z-section line post via a guardrail carriage system and attachment bolt. The standard post spacing is 79 inches [2000mm], with 75 inches [1905mm] post spacing an optional alternative.

COMPONENTS

Unit length = 157 inches [4000 mm]

Designator	Component	Quantity
10000837	Thrie-Beam 4000mm NLL	1
10004119	2000mm HC Z-POST GALV	2
10004115	HC CARRIAGE	2
10001832	M16 x 30mm Ezy-Guard Carriage Bolt	2
10001248	M16 x 32 Splice Bolt Grade 8.8	12
10001239	M16 Oversize Nut	12

APPROVALS

CONTACT INFORMATION

Ingal Civil Products
57-65 Airs Road
Minto
NSW 2566
Australia
+61 2 9827 3333



EZY-GUARD HIGH CONTAINMENT

EZY-HC-100

SHEET NO.

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DATE

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