U.S. Department of Transportation
Federal Highway Administration

May 29, 2020

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

In Reply Refer To:
HSST-1/WZ-395

Mr. Eric Willetts
MDI Worldwide
38271 W. Twelve Mile Road
Farmington Hills, MI 48331

Dear Mr. Willetts:

This letter is in response to your December 2, 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 WZ-395 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:

- MDI Worldwide 4814M-SL Sign Stand TL-3

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: MDI Worldwide 4814M-SL Sign Stand
Type of system: Work Zone
Test Level: MASH Test Level 3 (TL3)
Testing conducted by: Applus IDIADA KARCO Engineering, LLC.
Date of request: December 2, 2019

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 WZ-395 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
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	December 2, 2019	◉ New ○ Resubmission
	Name:	Eric Willetts	
	Company:	MDI Worldwide	
	Address:	38271 W. Twelve Mile Road, Farmington Hills, MI 48331	
	Country:	United States	
	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
'WZ': Crash Worthy Work Zon	◉ Physical Crash Testing ○ Engineering Analysis	4814M-SL	AASHTO MASH	TL3

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:	Eric Willetts	Same as Submitter ☒
Company Name:	MDI Worldwide	Same as Submitter ☒
Address:	38271 W. Twelve Mile Road, Farmington Hills, MI 48331	Same as Submitter ☒
Country:	United States	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.

Marketing Displays, Inc., doing business as MDI Worldwide ("MDI"), whose principal place of business is 38271 West Twelve Mile Road, Farmington Hills, Michigan 48331-3041, and Applus IDIADA KARCO Engineering, LLC., whose principal place of business is 9270 Holly Road, Adelanto, CA 92301 share no ($0.00) financial interests between the two organizations. This includes no ($0.00) financial interest but not limited to:

i. Compensation, including wages, salaries, commissions, professional fees, or fees for business referrals (dollar values are not needed);
ii. Consulting relationships;
iii. Research funding or other forms of research support;
iv. Patents, copyrights, and other intellectual property interests;
v. Licenses or contractual relationships; or
vi. Business ownership and investment interest.

PRODUCT DESCRIPTION

Help

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

Product Description of 4814M-SL
(Reference Drawing ZA-07923)
The 4814M-SL temporary sign stand is a work-zone traffic control device used to display traffic control signs.
Further Description:
The 4814M-SL temporary sign support is a portable/fold-up sign stand manufactured with two vertically mounted wind deflecting steel coil springs. The sign stand consists of a steel base assembly, four aluminum legs and an aluminum upright. The two piece telescoping legs are constructed of 1.25" square tube and 1.00" square tube. A roll up sign is attached to the upright with the use of a screw-lock bracket at a fixed height of 14".
The overall height of the stand is 29" [736.6mm]. The total weight of the stand is approximately 25 lbs (no sign).

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:	Nick V. Injev	
Engineer Signature:	Nick Injev — Digitally signed by Nick Injev DN: cn=Nick Injev, o=ApplusIDIADAKARCO, ou, email=nick.injev@idiada.com, c=US Date: 2019.12.31 14:08:43 -08'00'	
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter ☐
Country:	USA	Same as Submitter ☐

A brief description of each crash test and its result: Help

Required Test Number	Narrative Description	Evaluation Results
3-70 (1100C)	Designed to evaluate the ability of a small vehicle to activate any breakaway, fracture, or yielding mechanism. Is considered optional for work-zone traffic control devices weighing less than 220 lbs (100 kg). The as-tested device weighed 30.5 lbs (13.8 kg) and therefore Test 70 was not performed.	Non-Relevant Test, not conducted

Required Test Number	Narrative Description	Evaluation Results
3-71 (1100C)	An 1100C test vehicle approached the test article at a nominal speed of 62 mph. The first 4814M-SL sign stand impacted was oriented at 0° and the second test article at 90°. Upon impact the sign face on both devices flexed over the front of the hood causing it to release from the base. The top corner of the 0° sign face made contact with the windshield. The impact did not tear the plastic liner or cause excessive deformation. The occupant compartment was not penetrated and the deformation limits were not exceeded. The devices did not induce any vehicle instability. The 4814M-SL met all the requirements for MASH Test 3-71.	PASS
3-72 (2270P)	A 2270P test vehicle approached the test article at a nominal speed of 62 mph. The first 4814M-SL sign stand impacted was oriented at 0° and the second at 90°. Upon impact the sign face on both devices flexed over the front of the vehicle causing it to release from the base. There was no penetration into the test vehicles occupant compartment nor were the deformation limits exceeded. The devices did not induce any vehicle instability. The 4814M-SL met all the requirements for MASH Test 3-72.	PASS

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:	Applus IDIADA KARCO Engineering, LLC.	
Laboratory Signature:	Nick Injev email=nick.injev@idiada.com, c=US Digitally signed by Nick Injev DN: cn=Nick Injev, o=Applus IDIADA KARCO, ou, Date: 2019.12.31 14:09:04 -08'00'	
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter ☐
Country:	USA	Same as Submitter ☐
Accreditation Certificate Number and Dates of current Accreditation period :	TL-371: July 1, 2019 - July 1, 2022	

Submitter Signature*: Eric Willetts
Digitally signed by Eric Willetts
Date: 2019.07.16 08:33:37 -04'00'

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.

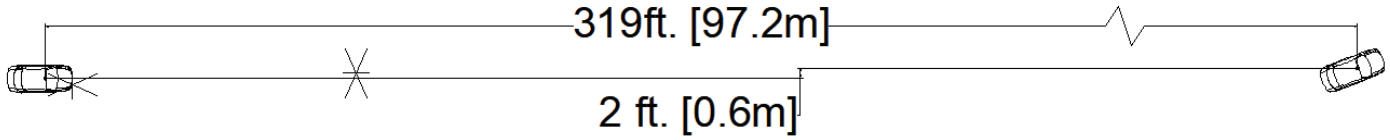
FHWA Official Business Only:

Eligibility Letter		
Number	Date	Key Words

MASH 2016 Test 3-71 Summary

0° CIA **90° CIA**

0.000 s 0.060 s 0.120 s 0.668 s 0.748 s 0.828 s



GENERAL INFORMATION

Test Agency	Applus IDIADA KARCO
Test No.	P39091-01
Test Designation	3-71
Test Date	3/29/19

TEST ARTICLE

Name / Model	4814M-SL with Vinyl-Roll Up Sign
Type	Work-Zone Device
Device Height	6.8 ft. (2.1 m)
Key Elements	Vinyl Roll-Up Sign, Steel Coil Springs
Road Surface	Concrete

TEST VEHICLE

Type / Designation	1100C
Year, Make, and Model	2009, KIA, Rio
Curb Mass	2,335.8 lbs (1,059.5 kg)
Test Inertial Mass	2,399.7 lbs (1,088.5 kg)
Gross Static Mass	2,565.0 lbs (1,163.5 kg)

Impact Conditions

Impact Velocity Device 1	61.60 mph (99.14 km/h)
Impact Velocity Device 2	60.05 mph (96.64 km/h)
Device 1 Angle	0.0°
Device 2 Angle	90.0°
Device 1 Kinetic Energy	304.4 kip-ft (412.8 kJ)
Device 2 Kinetic Energy	289.3 kip-ft (392.2 kJ)

Exit Conditions

Device 1 Exit Velocity	60.9 mph (98.1 km/h)
Device 2 Exit Velocity	58.2 mph (93.7 km/h)
Vehicle Resting Position	319.0 ft. (97.2 m) Downstream 2.0 ft. (0.6 m) Left
Vehicle Stability	Satisfactory
Maximum Roll Angle	N/A*
Maximum Pitch Angle	N/A*
Maximum Yaw Angle	N/A*

** Not Applicable, device weighs less than 220 lbs (100 kg)*

Occupant Risk

Longitudinal OIV	N/A*
Lateral OIV	N/A*
Longitudinal RA	N/A*
Lateral RA	N/A*
THIV	N/A*
PHD	N/A*
ASI	N/A*

Test Article Deflections
(From initial point of contact)

Debris Field (longitudinal)	238.6 ft. (72.7 m)
Debris Field (lateral)	18.9 ft. (5.8 m)

Vehicle Damage

Vehicle Damage Scale	12-FC-1
CDC	12FDAW1
Maximum Intrusion	N/A

Figure 2 Summary of Test 3-71

MASH 2016 Test 3-72 Summary

0° CIA | **90° CIA**

0.000 s | 0.060 s | 0.120 s | 0.641 s | 0.711 s | 0.781 s

GENERAL INFORMATION

Test Agency.....Applus IDIADA KARCO
Test No.....P39091-02
Test Designation.....3-72
Test Date..... 3/29/19

TEST ARTICLE

Name / Model.....4814M-SL
Type.....Work-Zone Device
Device Height .....6.8 ft. (2.1 m)
Key Elements.....Vinyl Roll-Up Sign, Steel Coil Springs
Road Surface.....Concrete

TEST VEHICLE

Type / Designation.....2270P
Year, Make, and Model.....2013, Ram, 1500
Curb Mass.....4,994.5 lbs (2,265.5 kg)
Test Inertial Mass.....5,012.1 lbs (2,273.5 kg)
Gross Static Mass.....5,012.1 lbs (2,273.5 kg)

Impact Conditions

Impact Velocity Device 1..... 62.53 mph (100.64 km/h)
Impact Velocity Device 2..... 61.00 mph (98.17 km/h)
Device 1 Angle..... 0.0°
Device 2 Angle..... 90.0°
Device 1 Kinetic Energy.....655.2 kip-ft (888.4 kJ)
Device 2 Kinetic Energy.....623.5 kip-ft (845.3 kJ)

Exit Conditions

Device 1 Exit Velocity.....61.3 mph (98.6 km/h)
Device 2 Exit Velocity.....59.6 mph (95.9 km/h)
Vehicle Resting Position..... 306.0 ft. (93.3 m) Downstream
1.4 ft. (0.4 m) Left
Vehicle Stability .....Satisfactory
Maximum Roll Angle.....N/A*
Maximum Pitch Angle.....N/A*
Maximum Yaw Angle.....N/A*

** Not Applicable, device weighs less than 220 lbs (100 kg)*

Occupant Risk

Longitudinal OIV.....N/A*
Lateral OIV..... N/A*
Longitudinal RA..... N/A*
Lateral RA.....N/A*
THIV.....N/A*
PHD.....N/A*
ASI.....N/A*

Test Article Deflections

(From initial point of contact)

Debris Field (longitudinal) ..... 96.0 ft. (29.3 m)
Debris Field (lateral)..... 40.0 ft. (12.2 m)

Vehicle Damage

Vehicle Damage Scale..... 12-FC-1
CDC.....12FDAW1
Maximum Intrusion.....N/A

Figure 2 Summary of Test 3-72

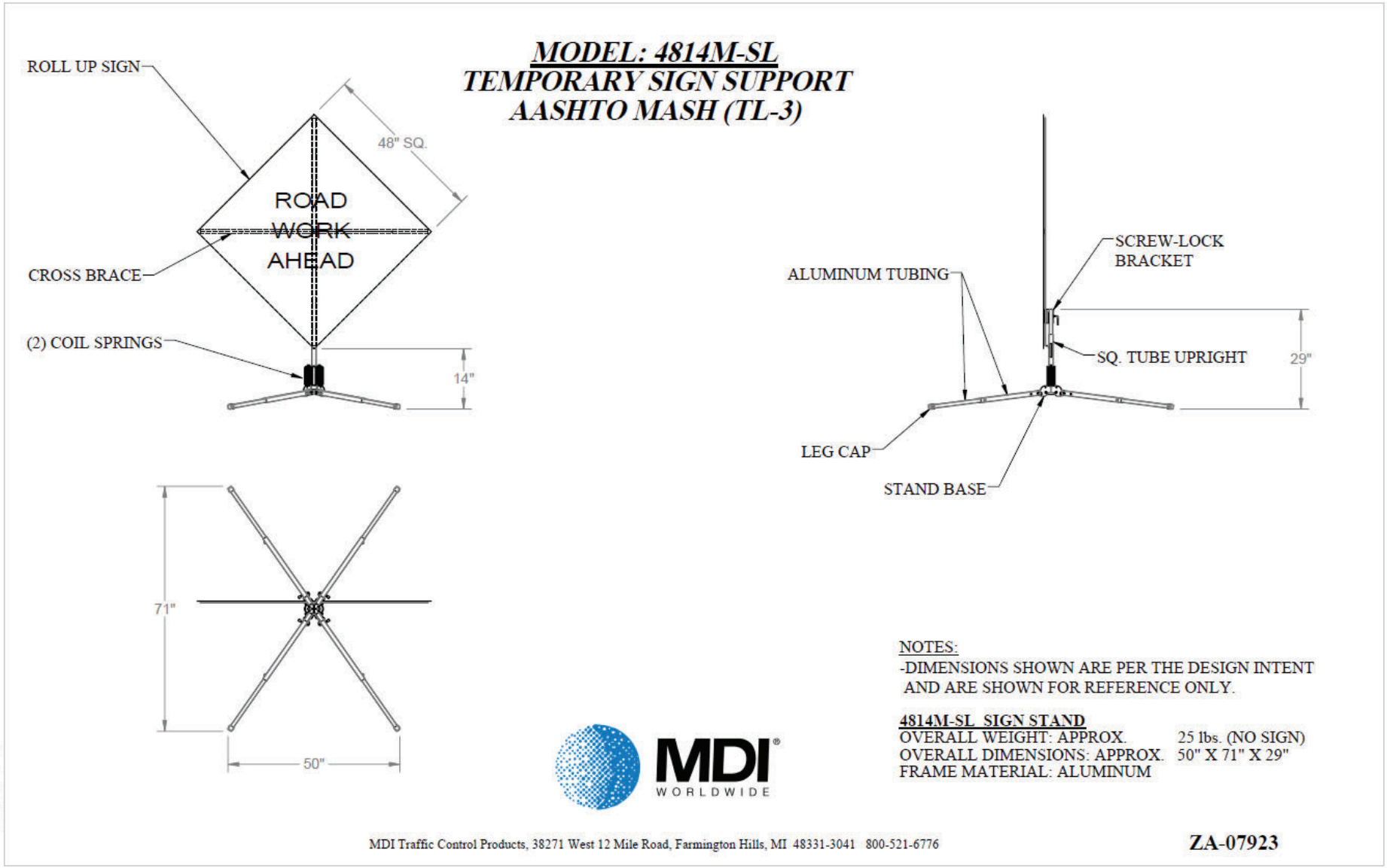


Figure 1: 4814M-SL Sign Stand