



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

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

December 18, 2017

In Reply Refer To:
HSST-1/ B-293

Michael van der Vlist
Laura Metaal Road Safety
Rimburgerweg 40, 647 XX Kerkrade
Netherlands

Dear Mr. van der Vlist:

This letter is in response to your August 23, 2017 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-293 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:

- SafeZone MASH TL-3 Standard

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 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.

Name of system: SafeZone MASH TL-3 Standard
Type of system: Rigid/Semi-Rigid Barriers
Test Level: MASH Test Level 3
Testing conducted by: Crashtest-service.com GmbH
Date of request: August 23, 2017

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

This eligibility letter is issued for the subject device as tested.

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-293 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,

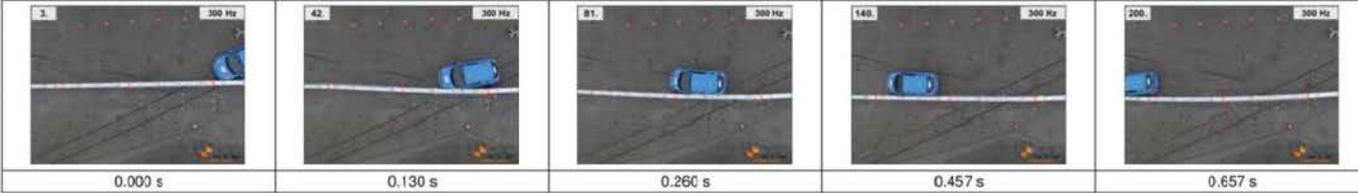


Michael Griffith
Director, Office of Safety Technologies
Office of Safety

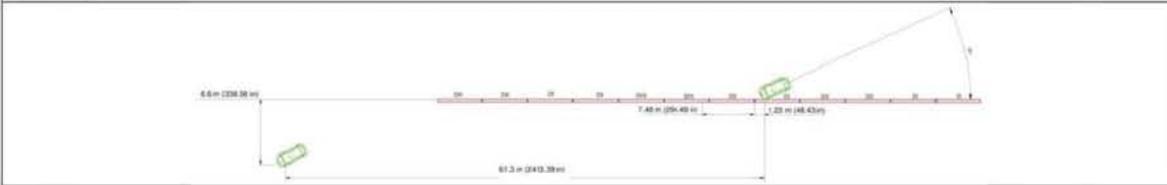
Enclosures

Summary of Crash Test Results

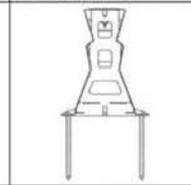
1. Sequential Photographs



2. Plan View



3. Cross-Sectional View



4. General Information

Test Agency	crashtest-service.com GmbH (CTS)
Test Standard	MASH Test TL 3-10
CTS-Test No.	18649
Date	April 21, 2017

5. Test Article

Type	Barrier
Name	SafeZone
Installation Length	69.63 m (2741.3 in)
Key Elements - Barrier	Length: 5.80 m (228.3 in) Base Width: 0.45 m (17.7 in) Height: 0.81 m (31.9 in)

6. Soil Type and Condition

Type of Soil	Asphalt
Soil strength	/
Condition	overcast, dry 14.9° C (58.82° F)

7. Test Vehicle

Type/Designation	1100C
Make and Model	2012 KIA Rio
Curb	1076 kg (2372 lb)
Test Inertial	1085 kg (2392 lb)
Dummy	75 kg (165 lb)
Gross Static	1160 kg (2557 lb)

8. Impact Conditions

Speed	101.6	km/h (63.1 mph)
Angle	25	degrees
Location/Orientation	1.23	m (48.4 in) before transition of barriers V & VI

9. Exit Conditions

Speed	84.3	km/h (52 mph)
Angle	not obtainable	degrees

10. Post-Impact Trajectory

Vehicle Stability	Satisfactory	
Stopping Distance	61.3	m (2413 in) downstream
	8.6	m (338 in) laterally behind
Vehicle Snagging	None	
Vehicle Pocketing	None	

11. Occupant Risk

Impact Velocity		
Longitudinal	3.77	m/s (12.37 ft/s)
Lateral	4.96	m/s (16.27 ft/s)
Ridedown Accelerations (10 msec avg.)		
Longitudinal	-3.17	g
Lateral	-10.83	g

THIV	7	m/s (22 ft/s)
PHD	22.32	g
ASI	1.2	

12. Test Article Damage

Classification	Moderate
particularities	None

13. Test Article Deflections

Dynamic Deflection	1.13	m (44.5 in)
Permanent Deflection	0.85	m (33.5 in)
Dynamic Working Width	1.52	m (59.8 in)
Permanent Working Width	1.30	m (51.2 in)

14. Vehicle Damage

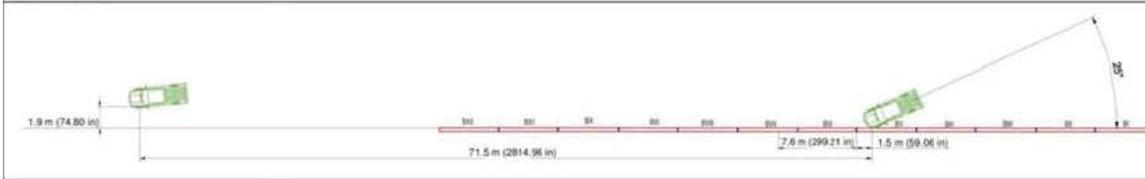
Classification	Moderate
VDS	11LFQ3
CDC	11FDEW3
Max. Exterior Deformation	69 mm (2.72 in)
Max. Interior Deformation	65 mm (2.56 in)
OCDI	LF0000011

Summary of Crash Test Results

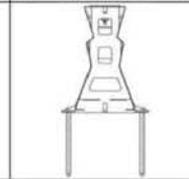
1. Sequential Photographs



2. Plan View



3. Cross-Sectional View



4. General Information

Test Agency	crashtest-service.com GmbH (CTS)
Test Standard	MASH Test TL 3-11
CTS-Test No.	18647
Date	April 24, 2017

5. Test Article

Type	Barrier
Name	SafeZone
Installation Length	69.63 m (2741.3 in)
Key Elements - Barrier	Length: 5.80 m (228.3 in) Base Width: 0.45 m (17.7 in) Height: 0.81 m (31.9 in)

6. Soil Type and Condition

Type of Soil	Asphalt
Soil Strength	/
Condition	cloudy, dry, 15.4° C (59.72° F)

7. Test Vehicle

Type/Designation	2270P
Make and Model	2013 Dodge Ram Pickup
Curb	2329 kg (5135 lb)
Test Inertial	2303 kg (5077 lb)
Dummy	/ kg (lb)
Gross Static	2303 kg (5077 lb)

8. Impact Conditions

Speed	104.3	km/h (64.8 mph)
Angle	25	degrees
Location/Orientation	1.50	m (59.1 in) before transition of elements V & VI

9. Exit Conditions

Speed	64	km/h (52 mph)
Angle	not obtainable	degrees

10. Post-Impact Trajectory

Vehicle Stability	Satisfactory	
Stopping Distance	71.5	m (2815 in) downstream
	1.9	m (75 in) laterally in front

Vehicle Snagging

None

Vehicle Pocketing

None

11. Occupant Risk

Impact Velocity		
Longitudinal	4.37	m/s (14.34 ft/s)
Lateral	4.11	m/s (13.48 ft/s)
Ridedown Accelerations (10 msec avg.)		
Longitudinal	-4.08	g
Lateral	-9.17	g

THIV	7	m/s (22 ft/s)
PHD	9.06	g
ASI	0.7	

12. Test Article Damage

Classification	Moderate
particularities	None

13. Test Article Deflections

Dynamic Deflection	1.70	m (66.9 in)
Permanent Deflection	1.17	m (46.1 in)
Dynamic Working Width	2.06	m (81.1 in)
Permanent Working Width	1.61	m (63.4 in)

14. Vehicle Damage

Classification	Moderate
VDS	11LFQ3
CDC	11FDEW3
Max. Exterior Deformation	279 mm (10.98 in)
Max. Interior Deformation	13 mm (0.51 in)
OCDI	LF0000000



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Vorgang / Reference:
A2887

Datum / Date:
12.12.2017

Statement MASH 2016 criteria (impact speed)

Dear Mrs. Yassin,

crashtest-service.com GmbH is an accredited testing laboratory for a many standard tests, for example DIN EN 1317 and MASH 2016.

On April 24, 2017 and April 19, 2017, two accredited impact tests on behalf of Laura Metaal Eyselshoven B.V. (Netherlands) took place on the test site of crashtest-service.com GmbH (test report no. 11775-2887/18647-2 and 11775-2887/18664-2). The impact speed for both tests was determined to 104.3 km/h.

This statement explains why from the point of view of crashtest-service.com GmbH both tests are to be regarded as compliant with the MASH 2016 standard.

The MASH 2016 standard describes the tolerances on impact conditions in chapter 2.1.2 as below:

“... Testing agencies have demonstrated an ability to control impact speed within a range of ± 2.5 mph (4.0 km/h) from the target condition and to obtain actual impact angles within ± 1.5 degrees of the desired value. Therefore, these limits are selected as the maximum tolerance for impact speed and angle. For crash tests with a target speed of 44 mph (70.0 km/h) or more, the actual impact speed should be no less than 2.5 mph (4 km/h) below the desired impact speed. For tests involving vehicle redirection, the impact angle should not be more than 1.5 degree below the target value. ...”

Thus, in this section there is only a lower limit of the impact velocity defined for a crash test with an impact speed of e.g. 100 km/h.

Furthermore, there is an inconsistent declaration for the exact tolerance. In the first passage of chapter 2.1.2 the maximum tolerance is declared to be 4.0 km/h, in the following text (for impact speeds of 70.0 km/h or more) the tolerance is given to be 4 km/h (without a decimal place). Therefore, the impact speed of 104.3 km/h can be considered to be compliant with the given tolerance.

Although a tolerance of ± 4.0 km/h should be considered as required, nevertheless the two tests carried out with an impact speed of 104.3 km/h comply from a technical point of view with the standard MASH 2016 for the following reasons:

In addition to the tolerance for the impact velocity, the standard MASH 2016 also specifies tolerances for the test inertial weight and the impact angle (max. impact angle 26.5° , max. test inertial weight 2320 kg).

Both mentioned tests have been performed with an impact angle of 25° . The weight of the vehicle in test 18647 (test report no. 11775-2887/18647-2) was determined to 2303 kg and in test 18664 (test report no. 11775-2887/18664-2) to 2264 kg. The permissible tolerances for both tests in terms of angle and weight were therefore not exploited.

Considering the upper permissible values the maximum impact severity to which the system under test can be exposed to is clearly higher than the impact severity in both impact tests. The impact severity in test number 18647 (173 kJ) and in test number 18664 (170 kJ) are between the minimum (144 kJ; see table 2-2A) and the maximum possible energy level (193 kJ).

Thus, the discussed speed surplus of 0.3 km/h does not lead to system-introduced energies that are not compatible with MASH 2016.

For the above reasons both tests (test report no. 11775-2887/18647-2 and test report no. 11775-2887/18664-2) are from the point of view of crashtest-service.com GmbH in accordance with Mash 2016.

Sincerely,

crashtest-service.com



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