



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

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

May 30, 2018

In Reply Refer To:
HSST-1/B-291

Mr. John Lee
ETI USA, Inc.
500 N Broadway, Suite 225
Jericho, NY 11753

Dear Mr. Lee:

This letter is in response to your September 26, 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-291 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:

- Road Safety Barrier Roller System Model ETI-GR02-TL4

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: Road Safety Barrier Roller System Model ETI-GR02-TL4

Type of system: Longitudinal Barrier

Test Level: MASH Test Level 4 (TL4)

Testing conducted by: AISICO

Date of request: September 26, 2017

Date initially acknowledged: October 1, 2017

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.

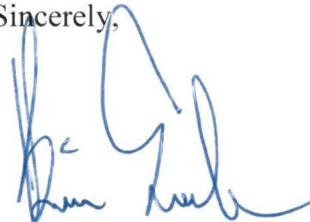

You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the test and evaluation criteria of AASHTO's MASH.

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-291 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 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:	August 08, 2017	<input checked="" type="radio"/> New <input type="radio"/> Resubmission
	Name:	John Lee	
	Company:	ETI USA, Inc.	
	Address:	500 N Broadway, Suite 225, Jericho, NY 11753	
	Country:	USA	
	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

I - I - I

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	Road Safety Barrier Roller System model ETI-GR02-TL4	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:	John Lee	Same as Submitter <input checked="" type="checkbox"/>
Company Name:	ETI USA, Inc.	Same as Submitter <input checked="" type="checkbox"/>
Address:	500 N Broadway, Suite 225, Jericho, NY 11753	Same as Submitter <input checked="" type="checkbox"/>
Country:	USA	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.		
ETI and AISICO Test Center share no financial interests between the two organizations. This includes no shared financial interests but not limited to:		
i. Compensation included wages, salaries, commissions, professional fees, or fees for business referrals		
iii. Research funding or other forms of research support;		
iv. Patents, copyrights, licenses, and other intellectual property interests;		
vi. Business ownership and investment interests;		

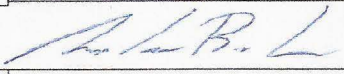
PRODUCT DESCRIPTION

☒ New Hardware or
 Significant Modification
 ☐ Modification to
 Existing Hardware

The Road Safety Barrier Roller System model ETI-GR02-TL4 is a longitudinal barrier designed to contain, redirect and shield vehicles from roadside barriers. The system consisted of alternating long and short posts spaced 1.6 ft. (0.5 m) apart. The system consisted of two sets of frame rails. The bottom and top frame rails were mounted at a height of 13.8 in. (350mm) and 37.4 in. (950 mm) above grade, respectively. The frame rails were mounted to the posts by a support and locker assembly. Each assembly was bolted to the posts with four (4) 19x60 bolts. The frame rails were 26.2 ft. (8.0 m) long and the splices were placed mid-span between posts. The short posts were 720 mm long and were attached to the frame rails by the same support and locker assembly as the long posts. Placed over the long and short posts were PVC rollers. The rollers were 18.9 in. (480 mm) tall and had an outside diameter of 13.6 in. (345 mm).

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:	Andrea Bianchi	
Engineer Signature:		
Address:	Sp 27 del Cavaliere km 2+500-67064 Pereto (Aq)	Same as Submitter <input type="checkbox"/>
Country:	Italy	Same as Submitter <input type="checkbox"/>

A brief description of each crash test and its result:

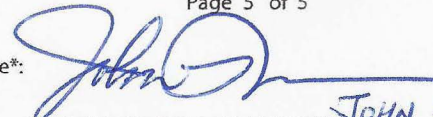
Required Test Number	Narrative Description	Evaluation Results
4-10 (1100C)	<p>AISICO test report no. MASH009. An 1100C (2,425 lb) passenger car impacting the barrier at a nominal impact speed and angle of 100 km/h (62.2 mph) and 25 degrees, respectively.</p> <p>The test vehicle, a 2010 BMW 3 4-door sedan with a test inertial weight of 2,425.3 lb (1,100.1 kg), impacted the Road Safety Barrier Roller System at a speed and angle of 62.32 mph (100.3 km/h) and 25°, respectively. The vehicle was redirected in a controlled manner and remained upright through the impact event. The vehicle exited the barrier at a speed and angle of 38.15 mph (61.4 km/h) and 11°, respectively. The barrier had a maximum working width of 1.31 ft (0.4 m) and had a damaged region of 18.0 ft (5.5 m). The Occupant Impact Velocities (OIV) and Ridedown accelerations are within the recommended limits. The Road Safety Roller System model ETI-GR02-TL4 passed all evaluation criteria for Test 4-10.</p>	PASS
4-11 (2270P)	<p>AISICO test report no. MASH008. A 2270P (5,000 lb) pickup truck impacting the barrier at a nominal impact speed and angle of 100 km/h (62.2 mph) and 25 degrees, respectively.</p> <p>The test vehicle, a 2006 Dodge Ram 1500 4-door pickup truck, with a test inertial mass weighing 4,913.9 lb (2,228.9 kg). Impacted the Road Safety Roller System at a speed and angle of 62.51 mph (100.6 km/h) and 25.1 degrees, respectively. The vehicle was redirected in a controlled manner and remained upright through the impact event. The vehicle exited the barrier at a speed and angle of 38.15 mph (61.4 km/h) and 11 degrees, respectively. The barrier had a maximum working width of 1.96 ft (0.6 m) and had a damaged region of 21.3 ft (6.5 m). The Occupant Impact Velocities (OIV) and Ridedown accelerations are within the recommended limits. The Road Safety Roller System model ETI-GR02-TL4 passed all evaluation criteria for Test 4-11.</p>	PASS

Required Test Number	Narrative Description	Evaluation Results
4-12 (10000S)	<p>AISICO test report no. MASH007 a 10000S (22,046.2 lb) single-unit truck impacting the barrier at a nominal speed and angle of 56 mph (90 km/h) and 15 degrees, respectively.</p> <p>The test vehicle, a 2004 MAN 12.232 FL single-unit truck, with a test inertial mass weighing 22,041.8 lbs (9,998.0 kg), impacted the Road Safety Roller System at a speed and angle of 56.17 mph (90.4 km/h) and 15.1 degrees, respectively. The vehicle did not penetrate, underide, or override the article. The vehicle exited the barrier at a speed and angle of 34.29 mph (55.2 km/h) and 6 degrees, respectively. No detached elements, fragments or other debris were present to penetrate or show potential for penetrating to occupant compartment, or to present hazard others in the area. The 10000S vehicle remained upright throughout the impact event. The Road Safety Roller System model ETI-GR02-TL4 passed all evaluation criteria for Test 4-12.</p>	PASS
4-20 (1100C)	Test for transition is not applicable for the Road Safety Roller System Model ETI-GR02-TL4	Non-Relevant Test, not conducted
4-21 (2270P)	Test for transition is not applicable for the Road Safety Roller System Model ETI-GR02-TL4	Non-Relevant Test, not conducted
4-22 (10000S)	Test for transition is not applicable for the Road Safety Roller System Model ETI-GR02-TL4	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:	AISICO srl Centro prove SP 27 del Cavaliere Km 2+500 Loc. Salone - 67064 PERETO (AC) P. IVA 10186871009	
Laboratory Signature:		
Address:	Sp 27 del Cavaliere km 2+500-67064 Pereto (Aq)	Same as Submitter <input type="checkbox"/>
Country:	Italy	Same as Submitter <input type="checkbox"/>
Accreditation Certificate Number and Dates of current Accreditation period :	ACCREDIA 0424 - Rev.5. Expiring date 2018-10-17	

Submitter Signature*:


JOHN LEE
Submit Form

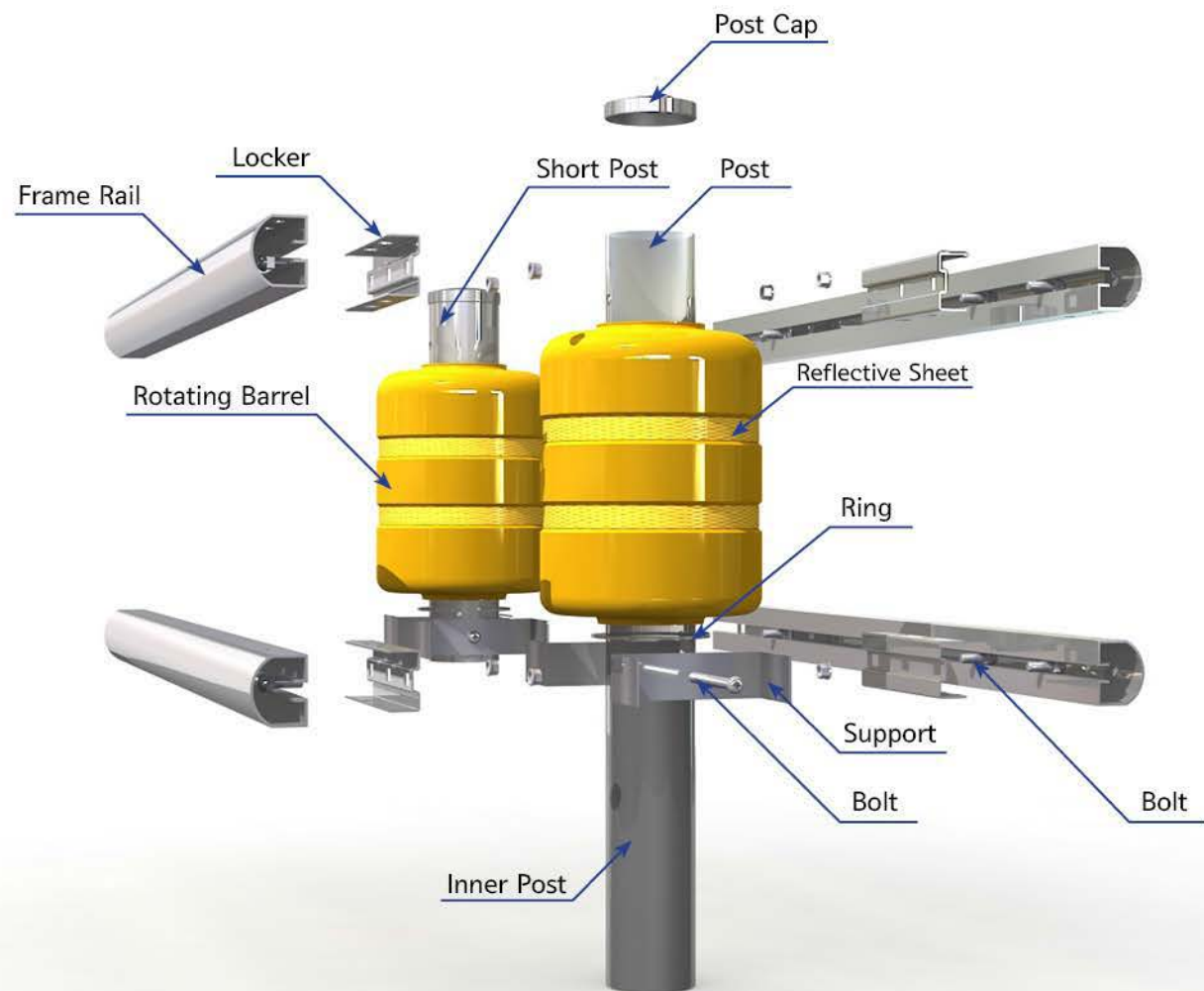
ATTACHMENTS

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



7 Summary of Results

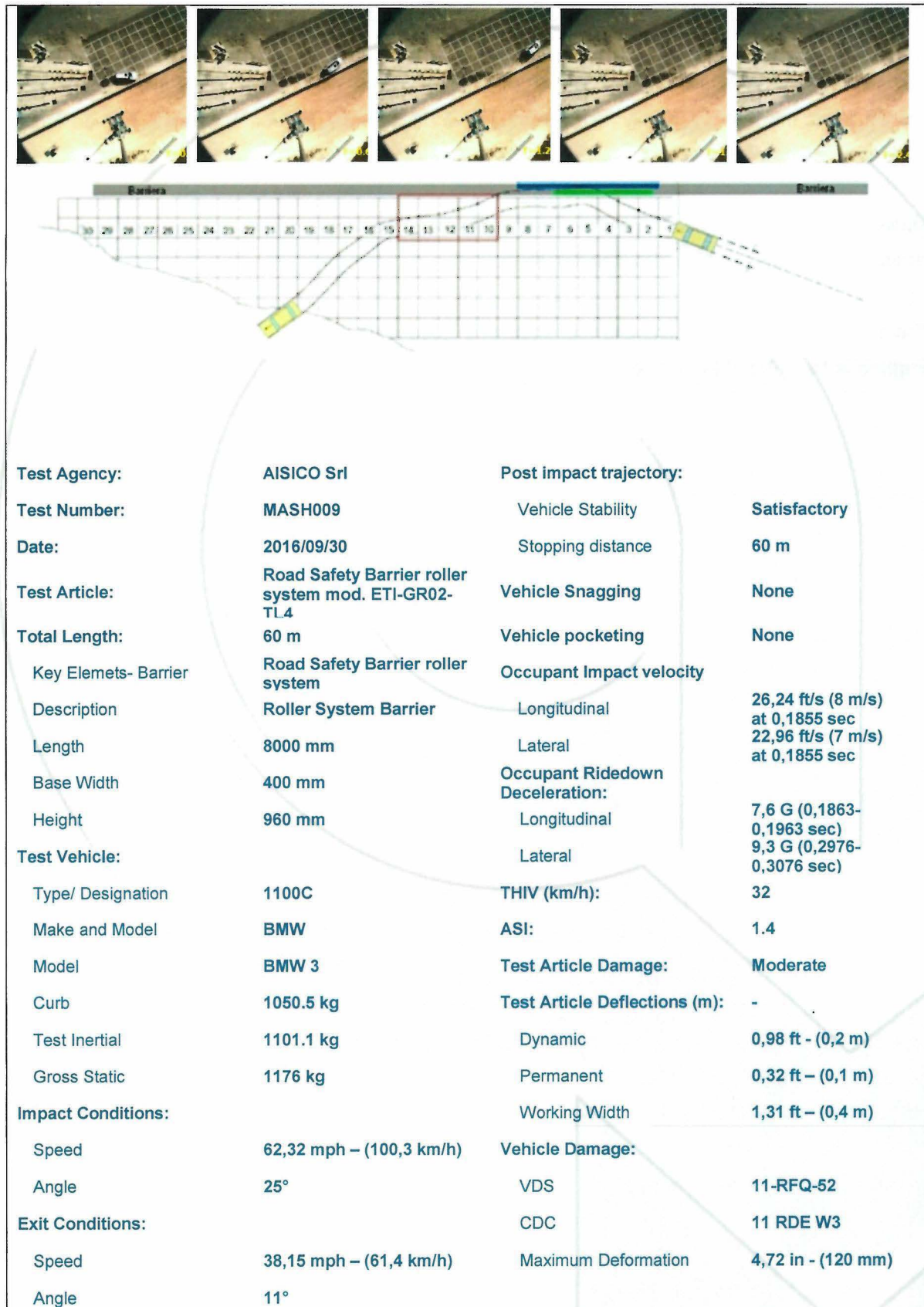
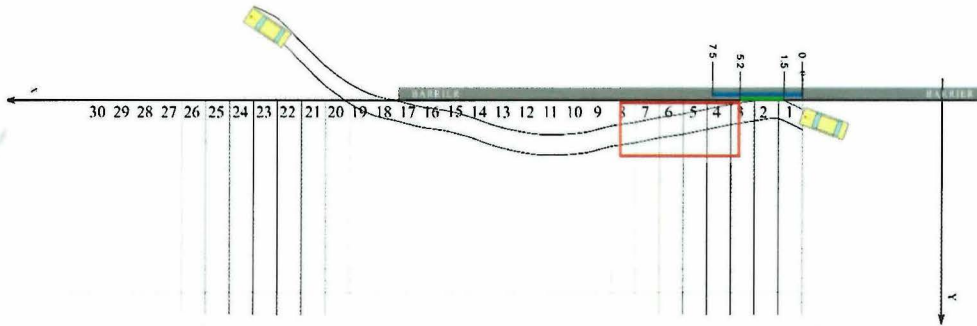


Figure 22 – Table of results

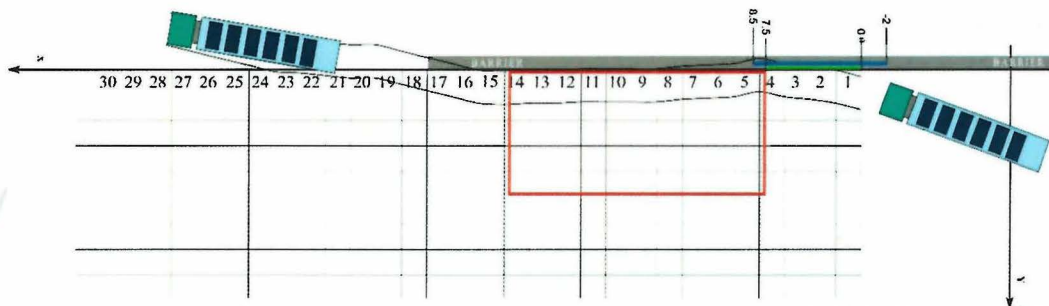
7 Summary of Results



Test Agency:	AISICO Srl	Post impact trajectory:	
Test Number:	MASH008	Vehicle Stability	Satisfactory
Date:	2016/09/29	Stopping distance	48 m
Test Article:	Road Safety Barrier roller system mod. ETI-GR02-TL4	Vehicle Snagging	None
Total Length:	60 m	Vehicle pocketing	None
Key Elements- Barrier	Road Safety Barrier roller system	Occupant Impact velocity	
Description	Roller System Barrier	Longitudinal	32,8 ft/s (10m/s) at 0,1577 sec
Length	8000 mm	Lateral	19,68 ft/s (6m/s) at 0,1577 sec
Base Width	400 mm	Occupant Ridedown Deceleration:	
Height	950 mm	Longitudinal	14,5 (0,1984-0,1994 sec)
Test Vehicle:		Lateral	8,3 (0,1799-0,1899 sec)
Type/ Designation	2270P	THIV (km/h):	7,4
Make and Model	DODGE	ASI:	1,4
Model	DODGE RAM 1500	Test Article Damage:	Moderate
Curb	2108.6kg	Test Article Deflections (m):	-
Test Inertial	2228.9 kg	Dynamic	1,31 ft - (0,4 m)
Gross Static	2228.9 kg	Permanent	0,98 ft - (0,3 m)
Impact Conditions:		Working Width	1,96 ft - (0,6 m)
Speed	62,51 mph - (100,6 km/h)	Vehicle Damage:	
Angle	25,1°	VDS	10-RFQ-2
Exit Conditions:		CDC	10 RYES-1
Speed	38,15 mph - (61,4 km/h)	Maximum Deformation	4,33 in - (110 mm)
Angle	11°		

Figure 22 – Table of results

7 Summary of Results



Test Agency:	AISICO Srl	Post impact trajectory:	
Test Number:	MASH007	Vehicle Stability	Satisfactory
Date:	2016/09/28	Stopping distance	56 m
Test Article:	Road Safety Barrier roller system mod. ETI-GR02-TL4	Vehicle Snagging	None
Total Length:	60 m	Vehicle pocketing	None
Key Elements- Barrier	Road Safety Barrier roller system	Occupant Impact velocity	
Description	Roller System Barrier	Longitudinal	-
Length	8000 mm	Lateral	-
Base Width	400 mm	Occupant Ridedown Deceleration:	
Height	960 mm	Longitudinal	-
Test Vehicle:		Lateral	-
Type/ Designation	10000S	THIV (km/h):	-
Make and Model	MAN 12-232 FL	PHD:	-
Model	12-232 FL	Test Article Damage:	Moderate
Curb	6379 kg	Test Article Deflections (m):	-
Test Inertial	9998 kg	Dynamic	1,31 ft - (0,4 m)
Gross Static	9998 kg	Permanent	0,98 ft - (0,3 m)
Impact Conditions:		Working Width	1,96 ft - (0,6 m)
Speed	56.17 mph - (90,4 km/h)	Vehicle Damage:	
Angle	15,1°	VDS	-
Exit Conditions:		CDC	-
Speed	34.29 - (55,2 km/h)	Maximum Deformation	-
Angle	6°		