



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

January 12, 2024

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

In Reply Refer To:
HSST-1/CC-177

Andrew Dameron
Hill & Smith
987 Buckeye Park Road
Columbus, OH 43207
USA

Dear Mr. Dameron:

We received your correspondence of January 6, 2023 requesting issuance of a reimbursement eligibility letter under the Federal-aid highway program for the roadside safety system, device, design, product, or hardware (collectively “device”) described below. This letter is assigned Federal Highway Administration (FHWA) control number CC-177.

ELIGIBILITY LETTERS

The FHWA issues Federal-aid reimbursement eligibility letters for new roadside safety devices that are crash tested in accordance with the industry standard of the American Association of State Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH).

FHWA, the Department of Transportation, and the United States (government) do not regulate roadside safety devices, crash test facilities, or the manufacturing industry. Issuance of eligibility letters is discretionary and provided only as a service to the states. FHWA may, at its discretion, decline to issue, revise, or rescind an eligibility letter. Eligibility letters are only issued by the FHWA headquarters Office of Safety.

Eligibility letters are issued only as notice to the states that a device is eligible for reimbursement under the Federal-aid highway program. They do not establish approval or certification for any other purpose. Issuance of an eligibility letter is not a prerequisite or requirement for state transportation agencies seeking to use Federal-aid funds for roadside safety devices. State agencies may use a device for which an eligibility letter has not been issued and seek Federal-aid reimbursement.

FEDERAL-AID REIMBURSEMENT

The request for issuance of this letter certified the device was crash tested in accordance with the industry standard of AASHTO’s MASH. This eligibility letter is based on that certification and the material offered in support of its issuance. The device described below is eligible for reimbursement under the Federal-aid highway program.

Name of system: SMARTPOD
Type of system: Crash Cushion
Test Level: Test Level 3
Testing conducted by: Applus IDIADA KARCO Engineering, LLC
Date of request: January 6, 2023

Information about the device, including material such as the eligibility request, crash test reports, drawings, or images are included in one or more attachment(s) to this letter.

Eligibility letter CC-177 is inapplicable to devices, optional equipment, alternate materials, or other features that were not crash tested in accordance with AASHTO's MASH.

This letter is issued only for the subject device as crash tested under AASHTO's MASH. Later modification(s) of the device are not eligible for Federal-aid reimbursement under this letter. Notice of later modification(s) should be given to transportation agencies, facility owners, and operators (collectively "agencies").

Agencies should be provided appropriate information about the device's design, installation, maintenance, materials, and mechanical properties.

Issuance of this letter is discretionary, and it may be revised or rescinded at FHWA's discretion. This letter is not a determination of compliance with the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) or ownership of any intellectual property rights.

This eligibility letter is not a determination by the government that a crash involving the subject device will result in any particular outcome. It is limited to only the device's eligibility for Federal-aid reimbursement.

INTELLECTUAL PROPERTY

Issuance of this eligibility letter does not convey property rights of any sort nor any exclusive privilege. This letter is not authorization or consent by the government for the use, manufacture, or sale of any patented or proprietary system, device, design, product, or hardware for which the requester is not the patent owner. Eligibility letters are not an expression of any view, position, or determination by the government as to the validity, scope, or ownership of any intellectual property rights to a specific device. These letters do not grant, impute, suggest, or otherwise establish any ownership, distribution, or licensing rights to the requester. The government expresses no opinion about the intellectual property rights relating to any device for which this or any other eligibility letter is issued.

PUBLIC DISCLOSURE

To prevent any misunderstanding, and as discussed above, this eligibility letter is assigned FHWA control number CC-177. It should only be reproduced in full with its attachment(s). This letter and the material offered by the requester supporting its issuance is public information. All eligibility letters and supporting material are subject to public disclosure under the Freedom

of Information Act (FOIA). Eligibility letters are available to the public at https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/.

If you have any questions please contact Aimee Zhang at Aimee.Zhang@dot.gov.

Sincerely,

A handwritten signature in black ink that reads "Robert Ritter". The signature is written in a cursive style with a large, prominent initial "R".

Robert Ritter
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	January 06, 2023	<input checked="" type="radio"/> New <input type="radio"/> Resubmission
	Name:	Andrew Dameron	
	Company:	Hill & Smith	
	Address:	987 Buckeye Park Road, Columbus, OH 43207	
	Country:	United States of America	
	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

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System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'CC': Crash Cushions, Attenuators, & Terminals	<input checked="" type="radio"/> Physical Crash Testing <input type="radio"/> Engineering Analysis	SMARTPOD	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:	Andrew Dameron	Same as Submitter <input checked="" type="checkbox"/>
Company Name:	Hill & Smith	Same as Submitter <input checked="" type="checkbox"/>
Address:	987 Buckeye Park Road, Columbus, OH 43207	Same as Submitter <input checked="" type="checkbox"/>
Country:	United States of America	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.		
Hill & Smith is the manufacturer and marketer of device.		
Applus IDIADA KARCO Engineering, LLC (IDIADA KARCO) is an independent research and testing laboratory having no affiliation with any other entity. IDIADA KARCO is actively Involved In data acquisition and compliance/certification testing for a variety of government agencies and equipment manufacturers. The principals and staff of IDIADA KARCO have no past or present financial, contractual or organizational interest in any company or entity directly or indirectly related to the products that KARCO tests. If any financial interest should arise, other than receiving fees for testing, reporting, etc., with respect to any project, the company will provide, In writing, a full and immediate disclosure to the FHWA.		

PRODUCT DESCRIPTION

- New Hardware or Significant Modification
 Modification to Existing Hardware

The SMARTPOD™ is a redirective, non-gating crash cushion. The SMARTPOD utilizes a rigid dual track base frame, telescoping quad formed panels, and energy absorbing pods (Pods) to absorb kinetic energy and safely contain or redirect impacting vehicles. The system is comprised of Pods, a baseframe, backstop, middle support assemblies (bulkheads), a front support with delineation panel, bulkhead feet, sliding panels, two end sliding panels, and panel keeper bolts. The system has a nominal 33 1/2" height and 37 7/16" width at the front and 31 13/16" at the rear. The bulkhead widths decrease in width from front to rear to ensure efficient collapse upon impact and ease of refurbishment. The test level 3 system measures approximately 270 1/2" (7 Bays) in length. The SMARTPOD has anchorage configurations for Concrete foundations or existing roadways. For concrete applications a total of 38 anchors are utilized in specifically marked anchor locations.

SMARTPOD utilizes the proven quad formed panel shape of the Smart Cushion which enables the application and interchangeability of several commonly used Smart Cushion transitions to various roadside hardware and barrier systems.

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:	Brandon Ubina	
Engineer Signature:	Brandon Ubina	Digitally signed by Brandon Ubina DN: cn=Brandon Ubina, o, ou, email=Brandon.ubina@idiada.com, c=US Date: 2023.06.01 15:12:57 -07'00'
Address:	987 Buckeye Park Road, Columbus, OH 43207	Same as Submitter <input checked="" type="checkbox"/>
Country:	United States of America	Same as Submitter <input checked="" type="checkbox"/>

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-30 (1100C)	<p>Applus IDIADA KARCO Test No. P42014-01. Test Date February 17, 2022. Crash Test Report No. TR-P42014-01-NC for MASH 2016 Test 3-30 Crash Test of Hill & Smith SMARTPOD.</p> <p>An 1100C test vehicle approached the test article at a nominal speed of 62 mph (100 km/h). The SMARTPOD was oriented at 0° and the vehicle's quarter width was positioned to the center of the SMARTPOD. The SMARTPOD was impacted at a velocity of 61.53 mph (99.02 km/h) and an angle of 0.1°. Upon impact, the 1100C vehicle proceeded downstream activating all of the attenuating stages on the SMARTPOD. The occupant compartment was not penetrated and deformation into the occupant compartment did not exceed MASH 2016 recommended limits. The SMARTPOD crash cushion met all the requirements for MASH Test 3-30.</p>	PASS
3-31 (2270P)	<p>Applus IDIADA KARCO Test No. P42013-02. Test Date February 17, 2022. Crash Test Report No. TR-P42013-02-NC for MASH 2016 Test 3-31 Crash Test of Hill & Smith SMARTPOD.</p> <p>An 2270P test vehicle approached the test article at a nominal speed of 62 mph (100 km/h). The SMARTPOD was oriented at 0° and the vehicle's centerline was positioned to the center of the SMARTPOD. The SMARTPOD was impacted at a velocity of 64.06 mph (103.09 km/h) and an angle of 0.2°. Upon impact, the 2270P vehicle proceeded downstream activating all of the attenuating stages on the SMARTPOD. The occupant compartment was not penetrated and deformation into the occupant compartment did not exceed MASH 2016 recommended limits. The SMARTPOD crash cushion met all the requirements for MASH Test 3-31.</p>	PASS

Required Test Number	Narrative Description	Evaluation Results
3-32 (1100C)	<p>Applus IDIADA KARCO Test No. P42022-02. Test Date MARCH 16, 2022. Crash Test Report No. TR-P42022-02-NC for MASH 2016 Test 3-32 Crash Test of Hill & Smith SMARTPOD.</p> <p>An 1100C test vehicle approached the test article at a nominal speed of 62 mph (100 km/h). The SMARTPOD was oriented at 15° and the vehicle's centerline was positioned to the center of the SMARTPOD. The SMARTPOD was impacted at a velocity of 61.66 mph (99.23 km/h) and an angle of 15.6°. Upon impact, the 1100C vehicle proceeded downstream activating all of the attenuating stages on the SMARTPOD. The occupant compartment was not penetrated and deformation into the occupant compartment did not exceed MASH 2016 recommended limits. The SMARTPOD crash cushion met all the requirements for MASH Test 3-32.</p>	PASS
3-33 (2270P)	<p>Applus IDIADA KARCO Test No. P42094-01. Test Date April 28, 2022. Crash Test Report No. TR-P42094-01-NC for MASH 2016 Test 3-33 Crash Test of Hill & Smith SMARTPOD.</p> <p>An 2270P test vehicle approached the test article at a nominal speed of 62 mph (100 km/h). The SMARTPOD was oriented at 15° and the vehicle's centerline was positioned to the center of the SMARTPOD. The SMARTPOD was impacted at a velocity of 62.01 mph (99.80 km/h) and an angle of 14.4°. Upon impact, the 2270P vehicle proceeded downstream activating all of the attenuating stages on the SMARTPOD. The occupant compartment was not penetrated and deformation into the occupant compartment did not exceed MASH 2016 recommended limits. The SMARTPOD crash cushion met all the requirements for MASH Test 3-33.</p>	PASS

3-34 (1100C)	<p>Applus IDIADA KARCO Test No. P42098-01. Test Date May 04, 2022. Crash Test Report No. TR-P42098-01-NC for MASH 2016 Test 3-34 Crash Test of Hill & Smith SMARTPOD.</p> <p>An 1100C test vehicle approached the test article at a nominal speed of 62 mph (100 km/h). The SMARTPOD was oriented at 15° and the vehicle was aligned to the CIP of the SMARTPOD. The SMARTPOD was impacted at a velocity of 61.83 mph (99.51 km/h) and an angle of 15.6°. Upon impact, the SMARTPOD redirected the vehicle downstream within the MASH 2016 exit box criteria. The occupant compartment was not penetrated and deformation into the occupant compartment did not exceed MASH 2016 recommended limits. The SMARTPOD crash cushion met all the requirements for MASH Test 3-34.</p>	PASS
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3-35 (2270P)	<p>Applus IDIADA KARCO Test No. P42099-03. Test Date October 07, 2022. Crash Test Report No. TR-P42099-03-NC for MASH 2016 Test 3-35 Crash Test of Hill & Smith SMARTPOD.</p> <p>An 2270P test vehicle approached the test article at a nominal speed of 62 mph (100 km/h). The SMARTPOD was oriented at 25° and the vehicle was aligned to the CIP of the SMARTPOD. The SMARTPOD was impacted at a velocity of 60.61 mph (97.55 km/h) and an angle of 25.1°. Upon impact, the SMARTPOD redirected the vehicle downstream within the MASH 2016 exit box criteria. The occupant compartment was not penetrated and deformation into the occupant compartment did not exceed MASH 2016 recommended limits. The SMARTPOD crash cushion met all the requirements for MASH Test 3-35.</p> <p>Test 35 was conducted again with the SMARTPOD anchored to an asphalt surface. Applus IDIADA KARCO Test No. P42234-01. Test Date October 21, 2022. Crash Test Report No. TR-P42234-01-NC for MASH 2016 Test 3-35 Crash Test of Hill & Smith SMARTPOD.</p> <p>An 2270P test vehicle approached the test article at a nominal speed of 62.00 mph (100.00 km/h). The SMARTPOD was oriented at 25.0° and the vehicle was aligned to the CIP of the SMARTPOD. The SMARTPOD was impacted at a velocity of 62.11 mph (99.96 km/h) and an angle of 25.2°. Upon impact, the SMARTPOD redirected the vehicle downstream within the MASH 2016 exit box criteria. The occupant compartment was not penetrated and deformation into the occupant compartment did not exceed MASH 2016 recommended limits. The SMARTPOD crash cushion met all the requirements for MASH Test 3-35.</p>	PASS
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3-36 (2270P)	<p>Applus IDIADA KARCO Test No. P42051-03. Test Date April 20, 2022. Crash Test Report No. TR-P42051-03-NC for MASH 2016 Test 3-36 Crash Test of Hill & Smith SMARTPOD.</p> <p>An 2270P test vehicle approached the test article at a nominal speed of 62 mph (100 km/h). The SMARTPOD was oriented at 25° and the vehicle's centerline was aligned with the centerline of the backup structure. The SMARTPOD was impacted at a velocity of 63.24 mph (101.78 km/h) and an angle of 25.4°. Upon impact, the SMARTPOD redirected the vehicle downstream within the MASH 2016 exit box criteria. The occupant compartment was not penetrated and deformation into the occupant compartment did not exceed MASH 2016 recommended limits. The SMARTPOD crash cushion met all the requirements for MASH Test 3-36.</p>	PASS
3-37 (2270P)	<p>Applus IDIADA KARCO Test No. P42097-03. Test Date September 26, 2022. Crash Test Report No. TR-P42097-03-NC for MASH 2016 Test 3-37a Crash Test of Hill & Smith SMARTPOD.</p> <p>An 2270P test vehicle approached the test article at a nominal speed of 62 mph (100 km/h). The SMARTPOD was oriented at 25° and the vehicle was aligned to the CIP of the SMARTPOD. The SMARTPOD was impacted at a velocity of 61.96 mph (99.72 km/h) and an angle of 25.1°. Upon impact, the SMARTPOD redirected the vehicle downstream within the MASH 2016 exit box criteria. The occupant compartment was not penetrated and deformation into the occupant compartment did not exceed MASH 2016 recommended limits. The SMARTPOD crash cushion met all the requirements for MASH Test 3-37.</p>	PASS
3-38 (1500A)	<p>Designed to examine the performance of crash cushions and end terminals during impacts by mid-size vehicles. This test is conducted based off the results of Test 3-31. Using a force v. deflection diagram the estimated value for Occupant Impact Velocity (OIV) and Ridedown Acceleration (RA) can be found for Test 38. The estimated OIV and RA was -11.78 m/s and -13.21 G. Therefore, Test 38 was not conducted.</p>	Non-Relevant Test, not conducted
3-40 (1100C)	<p>Test 3-40 is intended for a staged attenuation system and is not applicable for this system, therefore it was not performed.</p>	Non-Relevant Test, not conducted
3-41 (2270P)	<p>Test 3-41 is intended for a staged attenuation system and is not applicable for this system, therefore it was not performed.</p>	Non-Relevant Test, not conducted

3-42 (1100C)	Test 3-42 is intended for a staged attenuation system and is not applicable for this system, therefore it was not performed.	Non-Relevant Test, not conducted
3-43 (2270P)	Test 3-43 is intended for a staged attenuation system and is not applicable for this system, therefore it was not performed.	Non-Relevant Test, not conducted
3-44 (2270P)	Test 3-44 is intended for a staged attenuation system and is not applicable for this system, therefore it was not performed.	Non-Relevant Test, not conducted
3-45 (1500A)	Test 3-45 is intended for a staged attenuation system and is not applicable for this system, therefore it was not performed.	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:	Applus IDIADA KARCO Engineering, LLC.	
Laboratory Signature:	Brandon Ubina <small>Digitally signed by Brandon Ubina DN: cn=Brandon Ubina, o, ou, email=Brandon.ubina@idiada.com, c=US Date: 2023.06.01 15:42:08 -07'00'</small>	
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter <input checked="" type="checkbox"/>
Country:	United States of America	Same as Submitter <input checked="" type="checkbox"/>
Accreditation Certificate Number and Dates of current Accreditation period :	TL 371: April 27, 2022 - April 27, 2025	

Submitter Signature*: **Andrew Dameron**

Digitally signed by Andrew Dameron
DN: cn=Andrew Dameron, o=Hill & Smith, Inc., ou, email=andrew.dameron@hillandsmith.com, c=US
Date: 2023.09.19 17:08:19 -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