



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

June 23, 2021

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

In Reply Refer To:
HSST-1/WZ-421

Mr. Bret R. Eckert
Trinity Highway Products, LLC
3617 Cincinnati Ave.,
Rocklin, CA 95765

Dear Mr. Eckert:

This letter is in response to your July 28, 2020 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-421 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:

YODOCK 2001MB

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: YODOCK 2001MB
Type of system: Work Zone
Test Level: Test Level 2
Testing conducted by: Karco Engineering
Date of request: July 28, 2020

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-421 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,

A handwritten signature in blue ink that reads "Michael S. Griffith". The signature is written in a cursive style with a large initial "M" and "G".

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:	April 29, 2021	<input checked="" type="radio"/> New <input type="radio"/> Resubmission
	Name:	Bret R. Eckert, P.E.	
	Company:	Trinity Highway Products, LLC	
	Address:	3617 Cincinnati Ave., Rocklin, CA 95765	
	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

!-!-!

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'WZ': Crash Worthy Work Zone Traffic Control Devices	<input checked="" type="radio"/> Physical Crash Testing <input type="radio"/> Engineering Analysis	YODOCK 2001MB	AASHTO MASH	TL2

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:	Jonathan Pisanelli	Same as Submitter <input type="checkbox"/>
Company Name:	Trinity Highway Rentals	Same as Submitter <input type="checkbox"/>
Address:	900 Patterson Drive, Bloomsburg, PA 17815	Same as Submitter <input 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.

The Yodock' 2001MB Longitudinal Channelizer (Yodock' 2001MB) system technology is the commercial embodiment of intellectual property that is protected by patents owned by Trinity Highway Products, LLC ("THP"). THP does not pay royalties for sales of the Yodock' 2001MB. The Yodock' 2001MB system was designed and developed by engineers and employees at Yodock Wall Co. The patent holders of record for the 2001MB are Leo J. Yodock III, Leo J. Yodock Jr. and Guy C. Yodock; all of whom were employed by Yodock Wall Co. The associated United States patent number D596,062 (Dated July 14, 2009), is assigned to Trinity Highway, LLC.

Applus IDIADA Karco Engineering, LLC (KARCO) conducted the certification tests of the Yodock' 2001MB system. KARCO is an internationally accredited third party crash testing laboratory. Physical crash testing of the Yodock' 2001MB system was performed in accordance with testing criteria, as set forth by the American Association of State Highway and Transportation Officials (AASHTO) in the Manual for Assessing Safety Hardware ("MASH") (2016). Other than fees paid to KARCO to conduct the tests and then analyze and report the test results, KARCO and THP do not share financial interests. The fees paid to KARCO were not dependent or contingent on the results of the tests.

PRODUCT DESCRIPTION

- New Hardware or Significant Modification
 Modification to Existing Hardware

The Yodock® 2001MB Longitudinal Channelizer is a plastic, water-filled Longitudinal Channelizing Device (LCD) used for traffic and pedestrian channelization, road and street closures, or perimeter fencing for vertical construction. The Yodock® 2001MB is not designed as a positive barrier; rather, it is meant to provide a clear visual indication of the intended vehicle path through construction zones. When assembled as an LCD, the units are attached end-to-end using a plastic coupler and deployed with the water fill level at the bottom of the forklift ports.

The Yodock® 2001MB Longitudinal Channelizer modules are 6.0 ft. long by 18 in. wide by 32 in tall. The modules are manufactured from natural and orange colored high density polyethylene plastic. Orange and white were the as-tested colors, the product may be produced in other colors. The modules weigh approximately 85 lbs. empty and approximately 583 lbs. when filled to the bottom of the fork lift ports with water. When assembled as an LCD, the Yodock® 2001MB modules are attached end-to-end using a plastic coupler. The modules incorporate fork lift access ports for maneuverability and features for vertical stacking during transport and storage.

The Yodock® 2001MB may be placed on concrete, asphalt, or other smooth level substrates. The surfaces used for testing were concrete and dirt. Alternate Yodock® 2001MB modules within the impact region in the attached test reports were tested with hazard lights.

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:	Steven Matsusaka	
Engineer Signature:	Steven Matsusaka	Digitally signed by Steven Matsusaka DN: cn=Steven Matsusaka, email=steven.matsusaka@idiada.com, c=US Date: 2021.04.28 17:46:52 -0700
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter <input type="checkbox"/>
Country:	USA	Same as Submitter <input checked="" type="checkbox"/>

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
2-90 (1100C)	<p>Applus IDIADA KARCO Test No. P40090-01. Test Date March 5, 2020. Crash Test Report No. TR-P40090-01-NC for MASH 2016 Test 2-90 Crash Test of Trinity Highway Products TL-2 Yodock® 2001MB Longitudinal Channelizer.</p> <p>The system was impacted by a 2014 Kia Rio 4-door sedan. The test vehicle impacted the Trinity Highway Products Yodoc k® 2001MB Longitudinal Channelizer at a velocity of 45.79 mph (73.69 km/h) and an impact angle of 15.6°. The vehicle penetrated the system in a controlled fashion with a maximum Occupant Impact Velocity (OIV) of 18.4 ft/s (5.6 m/s) and a maximum ridedown acceleration of -5.1 g. The modules were damaged from module 8 through 12. The entire length of modules were shifted from their pre-test position. The test vehicle sustained deformation to its front and driver side. The driver side quarter panel was deformed and pushed rearward. The bumper fascia was deformed. The occupant compartment was not penetrated and the deformation limits were not exceeded.</p> <p>The Trinity Highway Products Yodoc k® 2001MB Longitudinal Channelizer met all of the requirements of MASH 2016 Test 2-90.</p>	PASS

Required Test Number	Narrative Description	Evaluation Results
2-91 (2270P)	<p>Applus IDIADA KARCO Test No. P40091-01. Test Date March 19, 2020. Crash Test Report No. TR-P40091-01-NC for MASH 2016 Test 2-91 Crash Test of Trinity Highway Products TL-2 Yodock® 2001MB Longitudinal Channelizer.</p> <p>The system was impacted by a 2014 Ram 1500 4-door pick-up truck. The test vehicle impacted the Trinity Highway Products Yodock® 2001MB Longitudinal Channelizer at a velocity of 43.95 mph (70.73 km/h) and an impact angle of 25.4°. The vehicle penetrated the system in a controlled fashion with a maximum Occupant Impact Velocity (OIV) of 14.8 ft/s (4.5 m/s) and a maximum ridedown acceleration of -14.1 g. The modules were damaged from module 9 through 12. The entire length of modules were shifted from their pre-test position. The test vehicle sustained deformation to its front and driver side. Both quarter panels were deformed and pushed rearward. The bumper fascia was deformed. The occupant compartment was not penetrated and the deformation limits were not exceeded.</p> <p>The Trinity Highway Products Yodock® 2001MB Longitudinal Channelizer met all of the requirements of MASH 2016 Test 2-91</p>	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:	KARCO Engineering, INC	
Laboratory Signature:	Steven Matsusaka <small>Digitally signed by Steven Matsusaka DN: cn=Steven Matsusaka, email=steven.matsusaka@idiada.com, c=US Date: 2021.04.28 17:46:59 -0700</small>	
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter <input type="checkbox"/>
Country:	USA	Same as Submitter <input checked="" type="checkbox"/>
Accreditation Certificate Number and Dates of current Accreditation period :	International Accreditation Services (IAS) ISO 17025 Accreditation Certificate #TL-371 Expires July 1, 2022	

Submitter Signature*: Bret Eckert, P.E.
Digitally signed by Bret Eckert, P.E.
DN: cn=Bret Eckert, P.E. o=Trinity Highway Products,
email=bret.eckert@trinity.net, c=US
Date: 2021.04.29 06:04:00 -0700

Submit Form

ATTACHMENTS

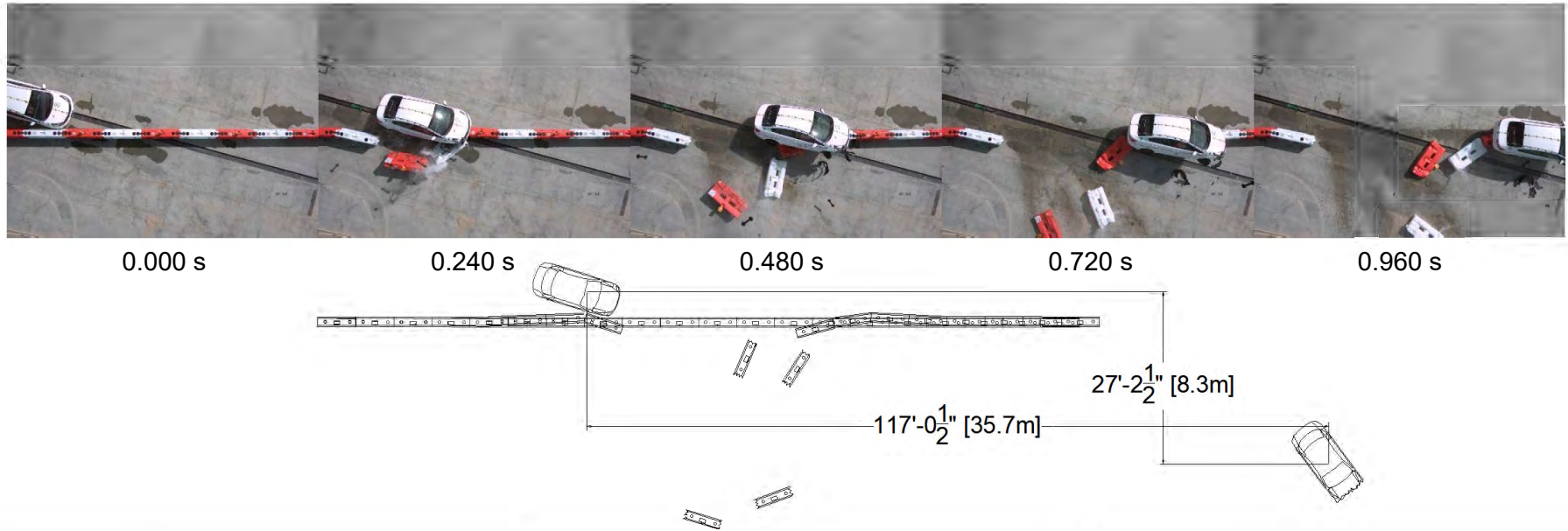
Attach to this form:

- 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 Test 2-90 Summary



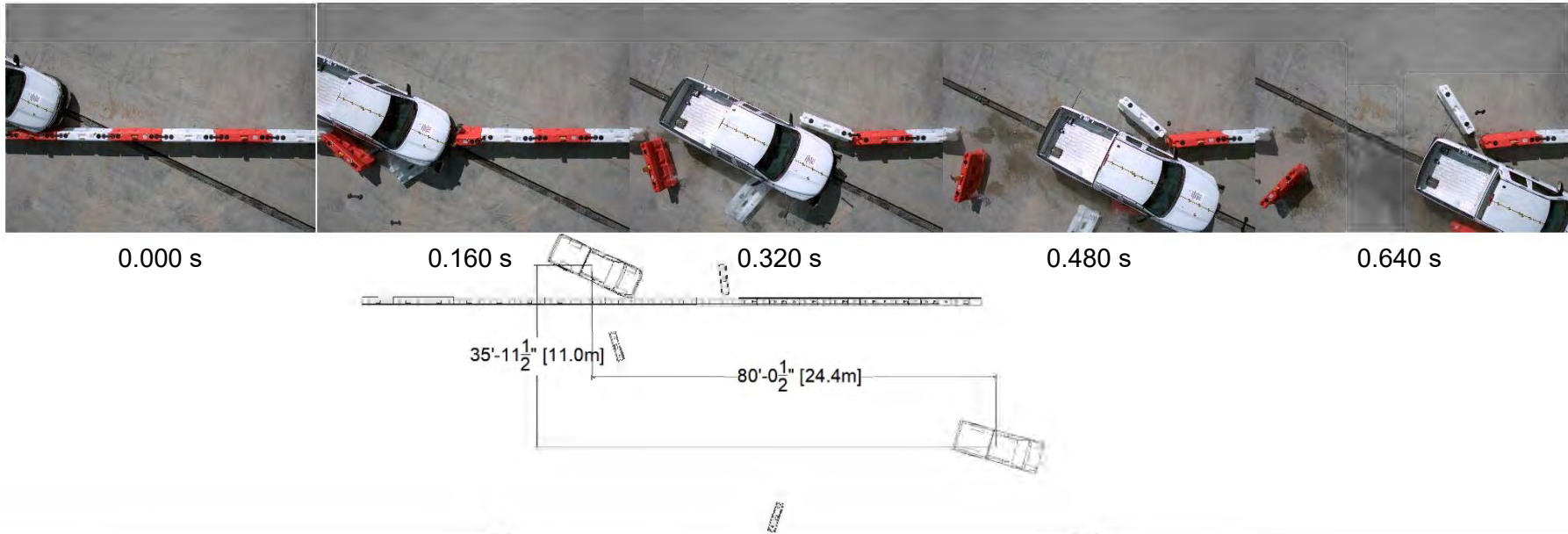
General Information	
Test Agency	Applus IDIADA KARCO
Test No	P40090-01
Test Designation	2-90
Test Date.....	03/05/20
Test Article	
Name / Model	Yodock 2001MB
Type	Longitudinal Channelizer
Installation Length	120.0 ft. (36.6 m)
Module Length.....	6.0 ft. (1.8 m)
Road Surface.....	Smooth, clean concrete and soil
Test Vehicle	
Type / Designation.....	1100C
Year, Make, and Model	2014 Kia Rio
Curb Mass	2,583.8 lbs (1,172.0 kg)
Test Inertial Mass	2,447.1 lbs (1,110.0 kg)
Gross Static Mass.....	2,621.3 lbs (1,189.0 kg)

Impact Conditions	
Impact Velocity	45.79 mph (73.69 km/h)
Impact Angle.....	15.6°
Location / Orientation	0.9 ft. (0.3 m) upstream from splice
Kinetic Energy	171.5 kip-ft (232.5 kJ)
Exit Conditions	
Exit Velocity	N/A
Exit Angle	N/A
Final Vehicle Position	117.0 ft. (35.7 m) downstream 27.2 ft. (8.3 m) right
Vehicle Snagging.....	None
Vehicle Pocketing.....	None
Vehicle Stability	Satisfactory
Maximum Roll Angle	48.3 °
Maximum Pitch Angle	16.3 °
Maximum Yaw Angle	34.2 °

Occupant Risk	
Longitudinal OIV.....	18.4 ft/s (5.6 m/s)
Lateral OIV.....	6.2 ft/s (1.9 m/s)
Longitudinal RA.....	5.1 g
Lateral RA.....	5.1 g
THIV.....	19.7 ft/s (6.0 m/s)
PHD	5.2 g
ASI	0.42
Test Article Deflections	
Static	N/A
Dynamic	N/A
Working Width.....	N/A
Debris Field (lateral).....	33.6 ft. (10.2 m)
Debris Field (longitudinal).....	27.2 ft. (8.3 m)
Vehicle Damage	
Vehicle Damage Scale.....	01-FR-2
CDC01FREW1
Maximum Intrusion.....	0.1 in. (3 mm) at floor pan

Figure 2 Summary of Test 2-90

MASH Test 2-91 Summary



General Information	
Test Agency.....	Applus IDIADA KARCO
Test No.....	P40091-01
Test Designation.....	2-91
Test Date.....	03/19/20
Test Article	
Name / Model.....	Yodock 2001MB
Type.....	Longitudinal Barrier
Installation Length.....	120.0 ft. (36.6 m)
Module Length.....	6.0 ft. (1.8 m)
Road Surface.....	Smooth, clean concrete and soil
Test Vehicle	
Type / Designation.....	2270P
Year, Make, and Model.....	2014 RAM 1500
Curb Mass.....	4,865.5 lbs (2,207.0 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.....	43.95 mph (70.73 km/h)
Impact Angle.....	25.4°
Location / Orientation.....	2.1 ft upstream from splice
Kinetic Energy.....	323.6 kip-ft (438.8 kJ)
Exit Conditions	
Exit Velocity.....	N/A
Exit Angle.....	N/A°
Final Vehicle Position.....	80.0 ft. (24.4 m) downstream
	36.0 ft. (11.0 m) right
Exit Box Criteria Met.....	N/A
Vehicle Snagging.....	None
Vehicle Pocketing.....	None
Vehicle Stability.....	Satisfactory
Maximum Roll Angle.....	16.3°
Maximum Pitch Angle.....	12.3°
Maximum Yaw Angle.....	5.9°

Occupant Risk	
Longitudinal OIV.....	14.8 ft/s (4.5 m/s)
Lateral OIV.....	0.0 ft/s (0.0 m/s)
Longitudinal RA.....	14.1 g
Lateral RA.....	6.8 g
THIV.....	14.8 ft/s (4.5 m/s)
PHD.....	15.6 g
ASI.....	1.11
Test Article Deflections	
Static.....	N/A
Dynamic.....	N/A
Working Width.....	N/A
Debris Field (longitudinal)...	68.4 ft. (20.8 m)
Debris Field (lateral)...	64.6 ft. (19.7 m)
Vehicle Damage	
Vehicle Damage Scale.....	01-FR-2
CDC.....	01FREW1
Maximum Intrusion.....	0.3 in. (7 mm) at floor pan

Figure 2 Summary of Test 2-91

