U.S. Department of Transportation
Federal Highway Administration

March 24, 2023

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

In Reply Refer To:
HSST-1/WZ-432

John Pasakarnis
Dicke Safety Products
1201 Warren Ave
Downers Grove, IL 60515

Dear Mr. Pasakarnis:

We received your correspondence of December 23, 2021 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 WZ-432.

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: DL1008 Sign Stand w/ 48in x 48in roll-up sign
Type of system: Work Zone
Test Level: TL-3
Testing conducted by: Applus IDIADA KARCO Engineering
Date of request: December 23, 2021

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 WZ-432 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.

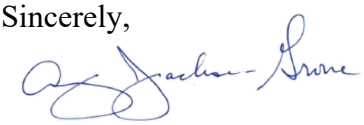
PUBLIC DISCLOSURE

To prevent any misunderstanding, and as discussed above, this eligibility letter is assigned FHWA control number WZ-432. 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,



Amy Jackson-Grove
Acting Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	December 23, 2021	◉ New ○ Resubmission
	Name:	John Pasakarnis	
	Company:	Dicke Safety Products	
	Address:	1201 Warren Avenue, Downers Grove, IL 60515	
	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

! - ! - !

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'WZ': Crash Worthy Work Zone Traffic Control Devices	◉ Physical Crash Testing ○ Engineering Analysis	DL1008 with 48" x 48" Roll-Up Sign	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:	John Pasakarnis	Same as Submitter ☒
Company Name:	Dicke Safety Products	Same as Submitter ☒
Address:	1201 Warren Avenue, Downers Grove, IL 60515	Same as Submitter ☒
Country:	United States of America	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.

Dicke Safety Products 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

Product Description of DL1008 with 48" x 48" Roll-Up Sign
(Reference Drawing: DL1008)
The DL1008 is a work-zone traffic control device used to display traffic control signs.
Further Description:
The DL1008 sign stand consists of a telescoping mast and base assembly. The telescoping mast consists of a top mast and bottom mast. The top mast is constructed of 1.0 in. (25 mm) aluminum tube and the bottom mast is constructed of 1.25 in. (32 mm) square aluminum tube. The as-tested device utilized a 48.0 in. (1.2 m) square vinyl roll-up sign mounted at a height of 18 in. (457 mm) measured to the bottom corner of the sign. The vinyl roll-up sign is mounted to the mast via a fiberglass crossbrace constructed of 65.0 in. (1.65 m) long segments of 1.25 in. (32 mm) wide fiberglass. The vertical crossbrace member is 0.25 in. (6 mm) thick and the horizontal member is 0.19 in. (5 mm) thick. The mast is mounted to the base assembly via two (2) 0.38 in. (10 mm) diameter bolts and nuts. The base assembly consists of a base top, and four (4) aluminum legs. The four (4) aluminum legs are constructed of 1.25 in. (32 mm) square aluminum tube with a wall thickness of 0.100 in. (2.5 mm). In the deployed state, the legs have a footprint that measures 77 in. (2.0 m) by 46.0 in. (1.2 m). The device has a total weight of 27.5 lbs (12.5 kg).

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:	Antonio Reyes	
Engineer Signature:	Antonio Reyes — Digitally signed by Antonio Reyes Date: 2021.12.23 12:21:32 -08'00'	
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter ☐
Country:	United States of America	Same as Submitter ☒

A brief description of each crash test and its result:

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 27.5 lbs (12.5 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 (100 km/h). The DL1008 with 48" x 48" Roll-Up Sign impact was oriented at 0° and 90°. The test vehicle impacted the 0° CIA device at a speed of 62.38 mph (100.39 km/h). The vehicle's wheels first contacted the DL1008 legs. The vehicle's bumper then contacted the DL1008 stand's base assembly. As the vehicle proceeded forward the upper mast began to deform around the vehicle's bumper and the 48" x 48" roll-up sign impacted the hood and windshield. The occupant compartment was not penetrated and the deformations 0.0 in. (0 mm) were within MASH limits. The test vehicle impacted the 90° CIA device at a velocity of 60.02 mph (96.59 km/h). The vehicle first contacted the 48" x 48" roll-up sign followed by the base assembly. The base assembly deformed around the vehicle's bumper and was stuck to the vehicle's front end as the vehicle proceeded forward. The sign remained intact throughout the impact. The occupant compartment was not penetrated and the deformations 0.0 in. (0 mm) were within MASH limits. The DL1008 with 48" x 48" Roll-Up Sign 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 (100 km/h). The DL1008 with 48" x 48" Roll-Up Sign impact was oriented at 0° and 90°. The test vehicle impacted the 0° CIA device at a velocity of 64.34 mph (103.55 km/h). Upon impact, the base assembly deformed around the vehicle's bumper as the left front wheel drove over one of the sign stand's legs. The sign stand's bottom mast and base assembly yielded. The bottom mast then broke away completely from the base assembly. The 48" x 48" roll-up sign impacted and stuck to the vehicles grill and hood as the vehicle proceeded forward. The occupant compartment was not penetrated and the deformations 0.0 in. (0 mm) were within MASH limits. The test vehicle impacted the 90° CIA device at a velocity of 62.88 mph (101.19 km/h). The vehicle first contacted the 48" x 48" roll-up sign followed by the base assembly. The sign stand deformed around the vehicle and was stuck to the front end as the vehicle proceeded forward. The sign remained mostly intact throughout the impact event with only one leg detaching from the base assembly. The occupant compartment was not penetrated and the deformations 0.0 in. (0 mm) were within MASH limits. The DL1008 with 48" x 48" Roll-Up Sign 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:	Antonio Reyes Digitally signed by Antonio Reyes Date: 2021.12.23 12:21:50 -08'00'	
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter ☐
Country:	United States of America	Same as Submitter ☒
Accreditation Certificate Number and Dates of current Accreditation period :	TL 371: July 1, 2019 - July 1, 2022	

Submitter Signature*: John Pasakarnis Digitally signed by John Pasakarnis Date: 2022.11.29 15:58:44 -06'00'

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.

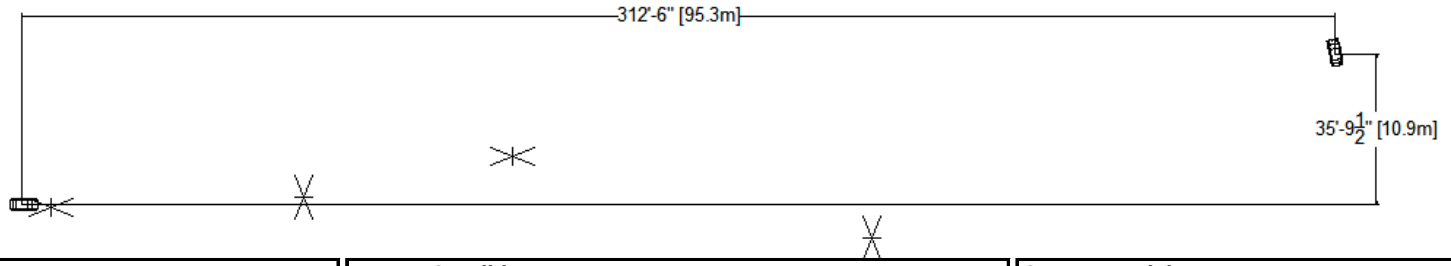
FHWA Official Business Only:

Eligibility Letter		
Number	Date	Key Words

MASH 2016 Test 3-71 Summary

0° CIA **90° CIA**

0.000 seconds 0.160 seconds 0.320 seconds 0.640 seconds 0.720 seconds 0.880 seconds



General Information

Test Agency	Applus IDIADA KARCO
Test Number	P40391-01
Test Designation	3-71
Test Date	12/16/20

Test Article

Name / Model	DL1008 with 48" x 48" Roll-Up Sign
Type	Work-Zone Traffic Control Device
Device Height	1.5 ft. (0.5 m)
Key Elements	DL1008 stand, vinyl roll-up sign
Road Surface	Smooth, clean concrete

Test Vehicle

Type / Designation	1100C
Year, Make, and Model	2015 Kia Rio
Curb Mass	2,556.2 lbs (1,159.5 kg)
Test Inertial Mass	2,436.1 lbs (1,105.0 kg)
Gross Static Mass	2,603.6 lbs (1,181.0 kg)

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

Impact Conditions

Impact Velocity Device 1	62.38 mph (100.39 km/h)
Impact Velocity Device 2	60.02 mph (96.59 km/h)
Device 1 Angle	0.0°
Device 2 Angle	90.0°
Location / Orientation Device 1	15.9 in. (403 mm) From Vehicle Centerline on Driver Side
Location / Orientation Device 2	17.3 in. (440 mm) From Vehicle Centerline on Passenger Side
Device 1 Kinetic Energy	316.9 kip-feet (429.6 Kilojoules)
Device 2 Kinetic Energy	293.3 kip-feet (397.7 Kilojoules)

Exit Conditions

Device 1 Exit Velocity	61.11 mph (98.4 km/h)
Device 2 Exit Velocity	57.76 mph (93.0 km/h)
Vehicle Resting Position	312.7 ft. (95.3 m) Downstream 35.8 ft. (10.9 m) Left
Vehicle Stability	Satisfactory
0° - Maximum Roll Angle	Did Not Exceed 75°
0° - Maximum Pitch Angle	Did Not Exceed 75°
90° - Maximum Roll Angle	Did Not Exceed 75°
90° - Maximum Pitch Angle	Did Not Exceed 75°

Occupant Risk

Longitudinal OIV	Not Applicable*
Lateral OIV	Not Applicable*
Longitudinal RA	Not Applicable*
Lateral RA	Not Applicable*
THIV	Not Applicable*
PHD	Not Applicable*
ASI	Not Applicable*

Test Article Deflections

0° Sign Debris Field (longitudinal)	109.9 ft. (33.5 m)
0° Sign Debris Field (lateral)	12.1 ft. (3.7 m)
90° Sign Debris Field (longitudinal)	135.5 ft. (41.3 m)
90° Sign Debris Field (lateral)	9.8 ft. (3.0 m)

Vehicle Damage

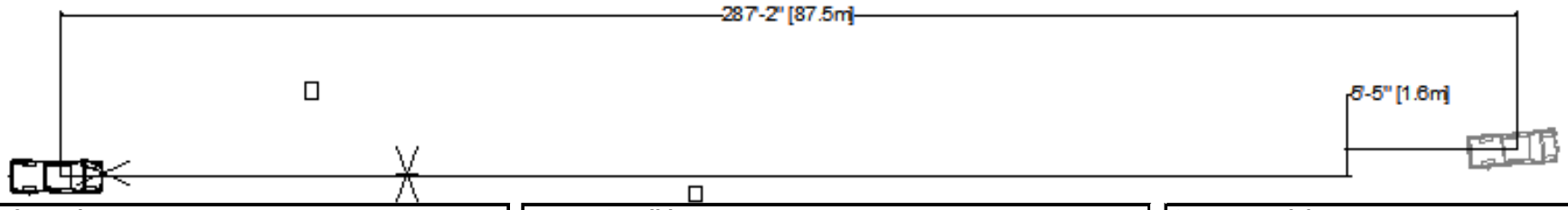
Vehicle Damage Scale	12-FC-1
CDC	12FDEN1
0°- Maximum Deformation	(0 in.) 0 mm
90° - Maximum Deformation	(0 in.) 0 mm

Figure 2: Summary of Test 3-71

MASH 2016 Test 3-72 Summary

0° CIA **90° CIA**

0.000 seconds 0.180 seconds 0.360 seconds 0.630 seconds 0.720 seconds 0.900 seconds



General Information

Test Agency	Applus IDIADA KARCO
Test Number	P40392-01
Test Designation	3-72
Test Date	12/16/21

Test Article

Name / Model	DL 1008 with 48" x 48" Roll-Up Sign
Type	Work-Zone Device
Device Height	7.8 ft. (2.4 m)
Key Elements	Stand with Vinyl Roll-Up Sign
Road Surface	Smooth, clean concrete

Test Vehicle

Type / Designation	2270P
Year, Make, and Model	2016 RAM 1500
Curb Mass	5,147.8 lbs (2,335.0 kg)
Test Inertial Mass	5,005.5 lbs (2,270.5 kg)
Gross Static Mass	5,005.5 lbs (2,270.5 kg)

Impact Conditions

Impact Velocity Device 1	64.34 mph (103.55 km/h)
Impact Velocity Device 2	62.88 mph (101.19 km/h)
Device 1 Angle	0.0°
Device 2 Angle	90.0°
Location / Orientation Device 1	16.6 in. (422 mm) From Vehicle Centerline on Passenger Side
Location / Orientation Device 2	27.0 in. (687 mm) From Vehicle Centerline on Driver Side
Device 1 Kinetic Energy	692.8 kip-feet (939.3 Kilojoules)
Device 2 Kinetic Energy	661.5 kip-feet (896.9 Kilooules)
Minimum KE Required	594 kip-feet (806 Kilojoules)

Exit Conditions

Device 1 Exit Velocity	63.99 mph (103.0 km/h)
Device 2 Exit Velocity	62.67 mph (100.9 km/h)
Vehicle Resting Position	287.1 ft. (87.5 m) Downstream 5.3 ft. (1.6 m) Left
Vehicle Stability	Satisfactory
0° - Maximum Roll Angle	Did Not Exceed 75°
0° - Maximum Pitch Angle	Did Not Exceed 75°
90° - Maximum Roll Angle	Did Not Exceed 75°
90° - Maximum Pitch Angle	Did Not Exceed 75°

Occupant Risk

Longitudinal OIV	Not Applicable*
Lateral OIV	Not Applicable*
Longitudinal RA	Not Applicable*
Lateral RA	Not Applicable*
THIV	Not Applicable*
PHD	Not Applicable*
ASI	Not Applicable*

Test Article Deflections

0° Sign Debris Field (longitudinal)	41.0 ft. (12.5 m)
0° Sign Debris Field (lateral)	16.1 ft. (4.9 m)
90° Sign Debris Field (longitudinal)	56.8 ft. (17.3 m)
90° Sign Debris Field (lateral)	3.9 ft. (1.2 m)

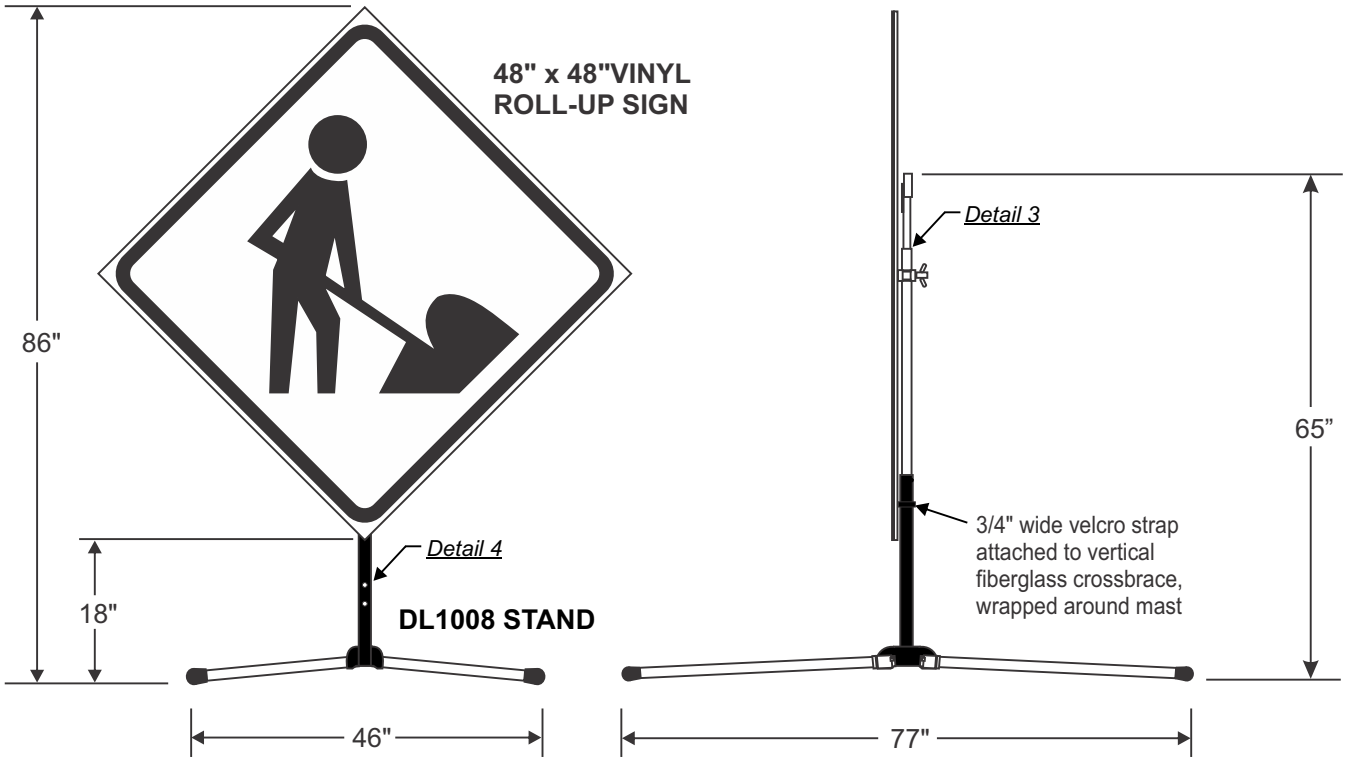
Vehicle Damage

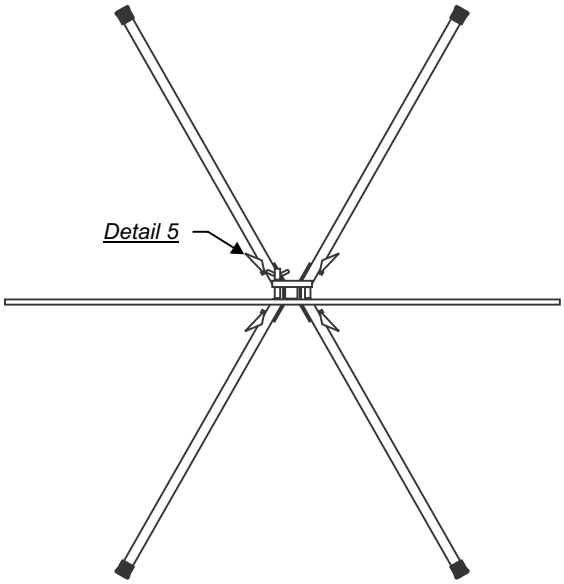
Vehicle Damage Scale	12-FC-1
CDC	12FDEN1
0° - Maximum Deformation	(0.0 in.) 0 mm
90° - Maximum Deformation	(0.0 in.) 0 mm

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

Figure 2: Summary of Test 3-72

DL1008





DL1008 STAND

- Base- Steel, no spring
- Mast- Telescoping 1-1/4" and 1" square aluminum tubing
- Legs- 1-1/4" sq. aluminum legs

VINYL ROLL-UP SIGN

- Panel- Reflective vinyl, 48" x 48"
- Crossbrace- Vertical member is 1-1/4" wide x 65" long fiberglass
- Crossbrace - Horizontal member is 1-1/4" wide x 65" long fiberglass

Weight: DL1008

Sign	8.00 lb.
Sign Stand	19.50 lb.
Total	27.50 lb.

DICKE Since 1886

DICKE SAFETY PRODUCTS

www.dicketool.com

Illinois - 1201 Warren Avenue • Downers Grove, IL 60515 • Ph: 630.969.0050 • Fax: 630.969.3973

Oregon - 1845 Anunsen Street, N.E. • Salem, OR 97301 • Ph: 800.333.5641 • Fax: 503.364.0340