



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

August 15, 2022

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

In Reply Refer To:  
HSST-1/WZ-440

Greg Spear  
The Cortina Companies, Cortina Safety Products  
10706 West Grand Ave,  
Franklin Park, IL 60131  
United States of America

Dear Mr. Spear:

We received your correspondence of December 29, 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-440.

#### **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: Cortina QuadraFlex VI Single Spring Portable Sign Stand  
Type of system: Work Zone  
Test Level: Test Level 3  
Testing conducted by: Applus IDIADA KARCO Engineering, LLC  
Date of request: December 29, 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-440 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-440. 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/](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](mailto:Aimee.Zhang@dot.gov).

Sincerely,

A handwritten signature in black ink that reads "Michael S. Griffith". The signature is written in a cursive style with a large, stylized "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

<b>Submitter</b>	Date of Request:	December 29, 2021	<input checked="" type="radio"/> New <input type="radio"/> Resubmission
	Name:	Greg Spear	
	Company:	The Cortina Companies, Cortina Safety Products	
	Address:	10706 West Grand Ave, Franklin Park, IL 60131	
	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	<input checked="" type="radio"/> Physical Crash Testing <input type="radio"/> Engineering Analysis	Cortina QuadraFlex VI Single Spring Portable Sign Stand	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:	Greg Spear	Same as Submitter <input checked="" type="checkbox"/>
Company Name:	The Cortina Companies, Cortina Safety Products	Same as Submitter <input checked="" type="checkbox"/>
Address:	10706 West Grand Ave, Franklin Park, IL 60131	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.		
The Cortina Companies is the manufacturer and marketer of device.		
<p>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.</p>		

## PRODUCT DESCRIPTION

- New Hardware or Significant Modification
  Modification to Existing Hardware

Product Description of The Cortina Companies QuadraFlex VI Single Spring Portable Sign Stand  
 The Cortina QuadraFlex VI Single Spring Portable Sign Stand is a work-zone traffic control device used to display traffic control signs.

Further Description:

The as-tested Cortina QuadraFlex VI Single Spring Portable Sign Stand consisted of a B Center Weldment, subassembly clamp, four (4) legs, and 48" x 48" vinyl roll-up sign. The assembled device had a total mass of 25.4 lbs (11.5 kg) and overall height of 6.9 ft. (2.1 m) from the ground. The barricade was tested with four (4) 30 lbs (13.6 kg) sandbag.

The B Center weldment consists of a mast constructed of 1.25" x 1.25" x 0.108" steel tube and two (2) V-brackets constructed of 0.172" thick steel plates. It also consists of a large spring with a diameter of 2.50 in. (63.5 mm) and length of 4.94 in. (125.5 mm). The telescoping legs are attached to the B Center weldment through the v-brackets and consist of two (2) parts: an inner leg constructed of 1.0" x 1.0" x 0.106" steel tube and an outer leg constructed of 1.26" x 1.26" x 0.106" steel tube. The subassembly clamp consists of a 1.00" x 1.00" x .065" steel tube, Z-Bracket, and clamping bracket.

The QuadraFlex VI Single Spring Portable Sign Stand was tested with a 48" x 48" vinyl roll-up sign for this test. The roll-up sign is mounted to two (2) fiberglass cross brace ribs measuring 1.25 in. (31.8 mm) wide by 65.0 in. (1.7 m) long each. The sign's vertical rib is inserted into the subassembly clamp and clamped with the screw lock sign holder.

## 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:	Noah Partida	
Engineer Signature:	<b>Noah Partida</b>	Digitally signed by Noah Partida DN: cn=Noah Partida, o, ou, email=noah.partida@idiada.com, c=US Date: 2022.05.04 18:35:51 -07'00'
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter <input 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
3-70 (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 25.4 lbs (11.5 kg) and therefore Test 70 was not performed.	Non-Relevant Test, not conducted

Required Test Number	Narrative Description	Evaluation Results
3-71 (1100C)	<p>An 1100C test vehicle approached the test articles at a nominal speed of 62 mph. The Cortina QuadraFlex VI Single Spring Portable Sign Stand impacted was oriented at 90° and at 0°. The test vehicle impacted the 90° CIA device at a speed of 59.61 mph (95.94 km/h). The vehicle's front bumper fascia contacted the lower mast's B Center Weldment causing it to yield in a predictable manner. The upper mast's roll-up sign detached from the lower mast. As the vehicle proceeded forward the roll-up sign overrode the vehicle's front end. The occupant compartment was not penetrated and the MASH deformation limits were not exceeded. The test vehicle impacted the 0° CIA device at a velocity of 63.97 mph (102.95 km/h). Upon impact, the vehicle's front bumper fascia contacted the upper mast's roll-up sign and lower mast's B Center Weldment. The upper mast's roll-up sign detached from the lower mast. As the vehicle proceeded forward, it overrode the base assembly and the roll up sign overrode the front end. The occupant compartment was not penetrated and the MASH deformation limits were not exceeded. The Cortina QuadraFlex VI Single Spring Portable Sign Stand met all the requirements for MASH Test 3-71.</p>	PASS

3-72 (2270P)	<p>A 2270P test vehicle approached the test article at a nominal speed of 62 mph. The Cortina QuadraFlex VI Single Spring Portable Sign Stand impacted was oriented at 90° and at 0°. The test vehicle impacted the 90° CIA device at a speed of 62.24 mph (100.17 km/h). The vehicle's hood first made contact with the roll-up sign and fiberglass cross brace. Upon impact, the roll-up sign and fiberglass cross brace deformed around the vehicle's front end. The bumper fascia began to deform the lower mast's B-Weldment. The upper mast's roll-up sign and fiberglass cross brace detached from the lower mast's subassembly clamp. The roll-up sign and fiberglass cross brace began overriding the vehicle as it proceeded forward. The occupant compartment was not penetrated and the MASH deformation limits were not exceeded. The test vehicle impacted the 0° CIA device at a velocity of 62.85 mph (101.14 km/h). The vehicle's front bumper made contact with the B-Weldment. The lower mast's large spring detached along with the subassembly clamp, roll-up sign, and fiberglass cross brace. The roll-up sign and fiberglass cross brace released from the subassembly clamp and began overriding the hood. The occupant compartment was not penetrated and the MASH deformation limits were not exceeded. The Cortina QuadraFlex VI Single Spring Portable Sign Stand met all the requirements for MASH Test 3-72.</p>	PASS
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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:	<b>Noah Partida</b>	<small>Digitally signed by Noah Partida  DN: cn=Noah Partida, o, ou, email=noah.partida@idiada.com, c=US  Date: 2022.05.04 18:35:34 -07'00'</small>
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter <input 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: July 1, 2019 - July 1, 2022	

Submitter Signature\*: **Greg Spear** Digitally signed by Greg Spear  
Date: 2022.05.05 09:20:31  
-05'00'

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.

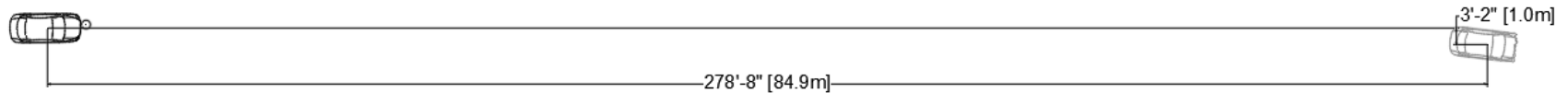
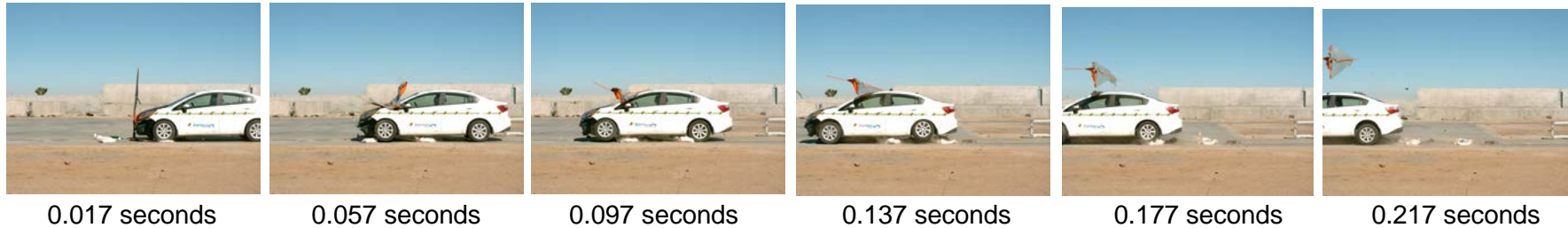
FHWA Official Business Only:

Eligibility Letter		
Number	Date	Key Words



# MASH 2016 Test 3-71 Summary (P41293-01, 0° CIA)

0° CIA



<b>GENERAL INFORMATION</b>	
Test Agency.....	Applus IDIADA KARCO Engineering
Test Number.....	P41293-01
Test Designation.....	3-71
Test Date.....	10/27/21
<b>TEST ARTICLE</b>	
Name / Model.....	Cortina QuadraFlex VI Single Spring Portable Sign Stand
Type.....	Work-Zone Traffic Control Device
Device Height .....	6.9 ft. (2.1 m)
Key Elements.....	B-Center Weldment, Legs, Roll-Up Sign
Road Surface.....	Smooth, clean Concrete
<b>TEST VEHICLE</b>	
Type / Designation.....	1100C
Year, Make, and Model.....	2016 Kia Rio
Curb Mass.....	2,528.5 lbs (1,147.0 kg)
Test Inertial Mass.....	2,448.2 lbs (1,110.5 kg)
Gross Static Mass.....	2,621.3 lbs (1,189.0 kg)

<b>Impact Conditions</b>	
Impact Velocity .....	63.97 mph (102.95 km/h)
Device Angle.....	0.0°
Location/ Orientation.....	8.1 in. (205 mm) From Vehicle Centerline on Driver Side
Device Kinetic Energy.....	334.9.5 kip-feet (454.1 Kilojoules)
Minimum KE Required.....	288 kip-feet (390 Kilojoules)
<b>Exit Conditions</b>	
Exit Velocity.....	63.56 mph (102.30 km/h)
Vehicle Resting Position.....	278.7 ft. (84.9 m) Downstream 3.2 ft. (1.0 m) Right
Vehicle Stability .....	Satisfactory
0° - Maximum Roll Angle.....	Did Not Exceed 75°
0° - Maximum Pitch Angle.....	Did Not Exceed 75°

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

<b>Occupant Risk</b>	
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*
<b>Test Article Deflections</b>	
0° - Sign Debris Field (longitudinal).....	142.6 ft. (43.5 m)
0° - Sign Debris Field (lateral).....	6.7 ft. (2.0 m)
<b>Vehicle Damage</b>	
Vehicle Damage Scale.....	12-FR-1
CDC.....	12FLAN1
Maximum Deformation.....	MASH Deformation Limits Not Exceeded (0.0 in.) 0 mm

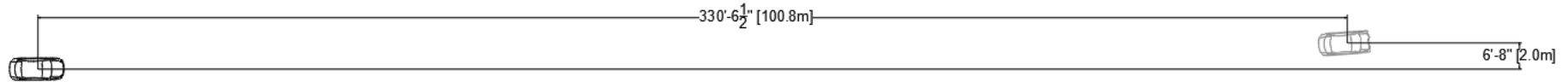
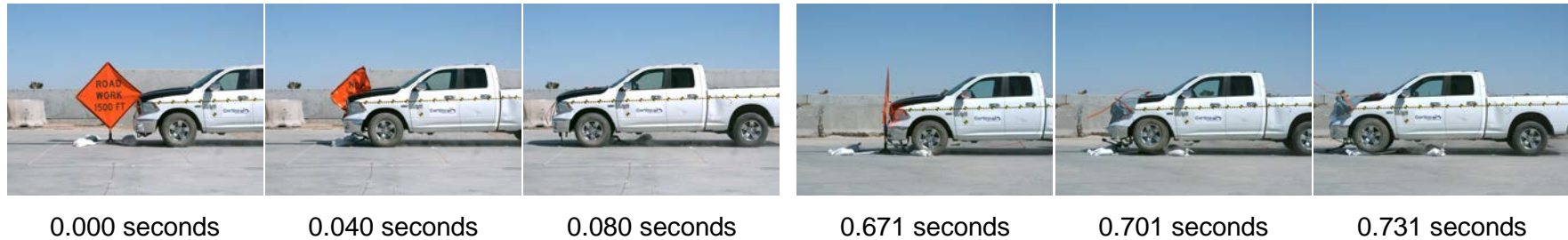
Figure 4 Summary of Test 3-71 (P41293-01, 0° CIA)



# MASH 2016 Test 3-72 Summary

90° CIA

0° CIA

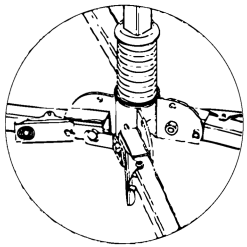
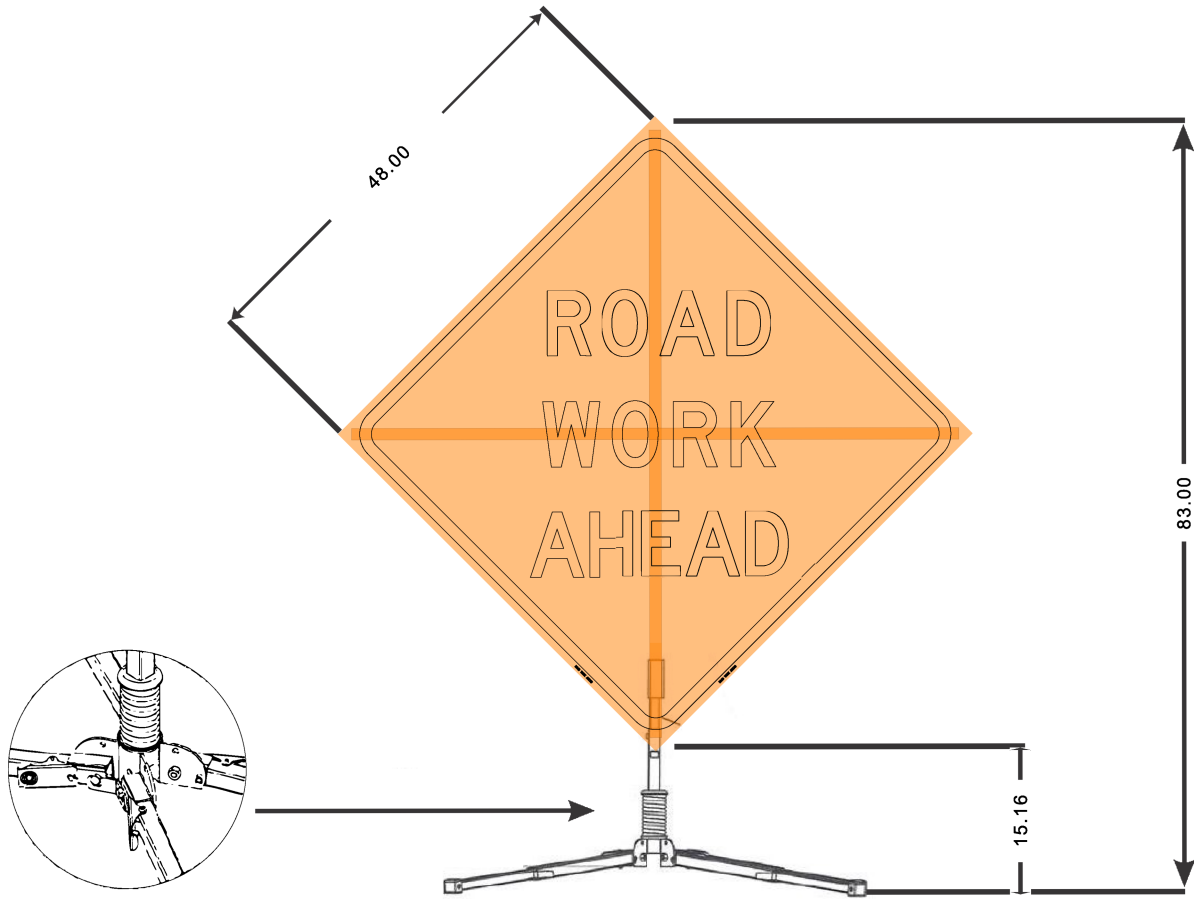


GENERAL INFORMATION	Impact Conditions	Occupant Risk
Test Agency.....Applus IDIADA KARCO Engineering Test Number.....P40336-01 Test Designation.....3-72 Test Date.....4/2/21	Impact Velocity Device 1..... 64.01 mph (103.01 km/h) Impact Velocity Device 2..... 62.85 mph (101.14 km/h) Device 1 Location/ Orientation.....21.2 in. (539 mm) From Vehicle Centerline on Passenger Side Device 2 Location/ Orientation.....22.8 in. (579 mm) From Vehicle Centerline on Driver Side Device 1 Angle.....90.0° Device 2 Angle.....0.0° Device 1 Kinetic Energy.....686.1 kip-feet (930.3 Kilojoules) Device 2 Kinetic Energy.....661.5 kip-feet (896.8 Kilojoules) Minimum KE Required..... 594 kip-feet (806 Kilojoules)	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*
<b>TEST ARTICLE</b> Name / Model..... Cortina QuadraFlex VI Single Spring Portable Sign Stand Type..... Work-Zone Traffic Control Device Device Height .....6.9 ft. (2.1 m) Key Elements..... B Center Weldment, Legs, Roll-Up Sign Road Surface..... Smooth, clean concrete	<b>Exit Conditions</b> Device 1 Exit Velocity.....63.85 mph (102.8 km/h) Device 2 Exit Velocity.....55.92 mph (90.0 km/h) Vehicle Resting Position.....330.5 ft. (100.7 m) Downstream 6.7 ft. (2.0 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°	<b>Test Article Deflections</b> 90° Sign Debris Field (longitudinal)....36.0 ft. (11.0 m) 90° Sign Debris Field (lateral)... 16.7 ft. (5.1 m) 0° Sign Debris Field (longitudinal).. 101.4 ft. (30.9 m) 0° Sign Debris Field (lateral)..... 18.5 ft. (5.7 m)
<b>TEST VEHICLE</b> Type / Designation.....2270P Year, Make, and Model.....2015 RAM 1500 Curb Mass.....5,044.1 lbs (2,288.0 kg) Test Inertial Mass.....5,009.9 lbs (2272.5 kg) Gross Static Mass..... 5,009.9 lbs (2272.5 kg)		<b>Vehicle Damage</b> Vehicle Damage Scale.....12-FD-1 CDC.....12FDAW1 Maximum Deformation..... MASH Deformation Limits Not Exceeded (0.0 in.) 0 mm

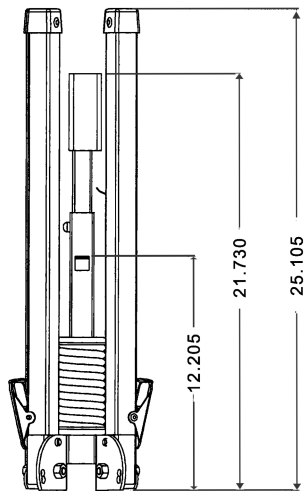
\* Not Applicable, device weighs less than 220 lbs (100 kg)

Figure 2 Summary of Test 3-72

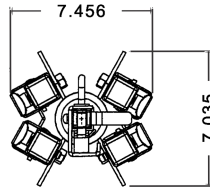
# CORTINA SAFETY PRODUCTS QUADRAFLEX VI SINGLE SPRING PORTABLE SIGN STAND



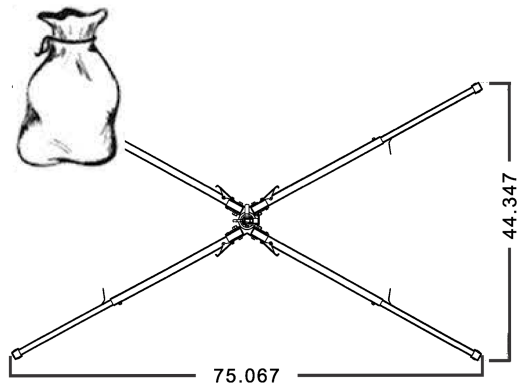
**BASE  
ASSEMBLY**



**STORAGE DIMENSIONS**



**OPTIONAL SAND BAGS  
MAY BE USED (ONE PER LEG)**



**OPEN FOOTPRINT**