



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-444

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 September 15, 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-444.

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 Springless Portable Sign Stand with 48" X 48"
Roll-Up Sign
Type of system: Work Zone
Test Level: Test Level 3
Testing conducted by: Appplus IDIADA KARCO Engineering, LLC
Date of request: September 15, 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-444 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-444. 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 "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:	September 15, 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 Springless Portable Sign Stand 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:	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, Cortina 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 QuadraFlex VI Springless Portable Sign Stand with 48" x 48" Roll-Up Sign
(Reference Drawing 07-819-1 Springless, C-Stand Assembly, Standard Roll-Up Sign)

The QuadraFlex VI Springless Portable Sign Stand is a work-zone traffic control device used to display traffic control signs.

Further Description:

The Cortina Companies Quadraflex VI Springless Portable Sign Stand with 48" x 48" Roll-Up Sign is a work-zone traffic control device. For this test, a 48" x 48" roll-up sign was installed on the sign stand. The as-tested device consisted of a base assembly, screw lock sign holder, and 48" x 48" roll-up sign. The assembled device had a total mass of 21 lbs (9.5 kg). The overall height of the stand is 6.9 ft. (2.1 m). The sign stand was tested with four (4) 30 lbs (13.6 kg) sandbags.

The base assembly is made up of the C-Center weldment, four (4) telescoping legs, and subassembly clamp with screw lock sign holder. The C-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. The telescoping legs are attached to the C-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 was constructed mainly of 1.0" x 1.0" x 0.065" steel tube and was inserted into the top of the C-Center Weldment.

The Quadraflex VI Springless Portable Sign Stand was tested with a 48" x 48" roll-up sign for this test. The roll-up sign is made up of the flexible substrate sign mounted to two (2) fiberglass crossbrace ribs measuring 1.25 in. wide by 65.0 in. 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:	Noah Partida	Digitally signed by Noah Partida DN: cn=Noah Partida, o, ou, email=noah.partida@idiada.com, c=US Date: 2022.05.31 16:08:01 -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 21 lbs (9.5 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. The first QuadraFlex VI Springless Portable Sign Stand with 48" x 48" Roll-Up Sign impacted was oriented at 90° and the second test article at 0°. Upon impact the sign face on both devices flexed over the front of the hood causing it to release from the base. The top corner of the 0° sign face made contact with the windshield. The impact did not tear the plastic liner or cause excessive deformation. The occupant compartment was not penetrated and the deformation limits were not exceeded. The devices did not induce any vehicle instability. The QuadraFlex VI Springless Portable Sign Stand 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. The first Quadraflex VI Springless Portable Sign Stand with 48" x 48" Roll-Up Sign impacted was oriented at 90° and the second at 0°. Upon impact the sign face on both devices flexed over the front of the vehicle causing it to release from the base. There was no penetration into the test vehicles occupant compartment and no deformation occurred to the test vehicle. The devices did not induce any vehicle instability. The QuadraFlex VI Springless Portable Sign Stand 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:	Noah Partida	<small>Digitally signed by Noah Partida DN: cn=Noah Partida, o, ou, email=noah.partida@idiada.com, c=US Date: 2022.05.31 16:07:48 -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: 2022.06.01 06:40:03
-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

90° CIA

0° CIA



0.000 seconds

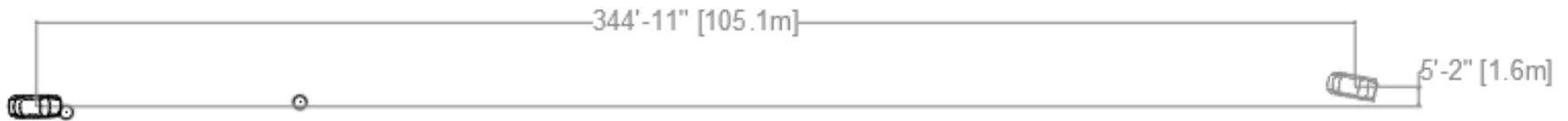
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GENERAL INFORMATION	
Test Agency.....	Applus IDIADA KARCO Engineering
Test Number.....	P40337-01
Test Designation.....	3-71
Test Date.....	4/6/21
TEST ARTICLE	
Name / Model.....	Cortina QuadraFlex VI Springless Portable Sign Stand
Type.....	Work-Zone Traffic Control Device
Device Height	6.9 ft. (2.1 m)
Key Elements.....	Base assembly, Subassembly Clamp, 48" x 48" roll-up sign
Road Surface.....	Smooth, clean concrete
TEST VEHICLE	
Type / Designation.....	1100C
Year, Make, and Model.....	2016 Kia Rio
Curb Mass.....	2,528.7 lbs (1,147.0 kg)
Test Inertial Mass.....	2,449.3 lbs (1,111.0 kg)
Gross Static Mass.....	2,622.4 lbs (1,189.5 kg)

Impact Conditions	
Impact Velocity Device 1.....	63.50 mph (102.19 km/h)
Impact Velocity Device 2.....	61.91 mph (99.64 km/h)
Device 1 Location/ Orientation.....	17.5 in. (444 mm) From Vehicle Centerline on Passenger Side
Device 2 Location/ Orientation.....	16.0 in. (407 mm) From Vehicle Centerline on Driver Side
Device 1 Angle.....	90.0°
Device 2 Angle.....	0.0°
Device 1 Kinetic Energy.....	330.1 kip-feet (446.5 Kilojoules)
Device 2 Kinetic Energy.....	313.9 kip-feet (425.5 Kilojoules)
Minimum KE Required.....	288 kip-feet (390 Kilojoules)
Exit Conditions	
Device 1 Exit Velocity.....	62.96 mph (101.3 km/h)
Device 2 Exit Velocity.....	61.35 mph (98.7 km/h)
Vehicle Resting Position.....	344.9 ft. (105.1 m) Downstream 5.2 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	
90° Device Debris Field (longitudinal).....	150.3 ft. (45.8 m)
90° Device Debris Field (lateral).....	7.1 ft. (8.9 m)
0° Device Debris Field (longitudinal).....	66.5 ft. (56.7 m)
0° Sign Debris Field (lateral).....	7.7 ft. (2.4 m)
Vehicle Damage	
Vehicle Damage Scale.....	12-FD-1
CDC.....	12FDAW1
0° - Maximum Deformation.....	1.3 in. (33 mm) Windshield

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

Figure 2 Summary of Test 3-71

MASH 2016 Test 3-72 Summary

90° CIA

0° CIA



0.000 seconds

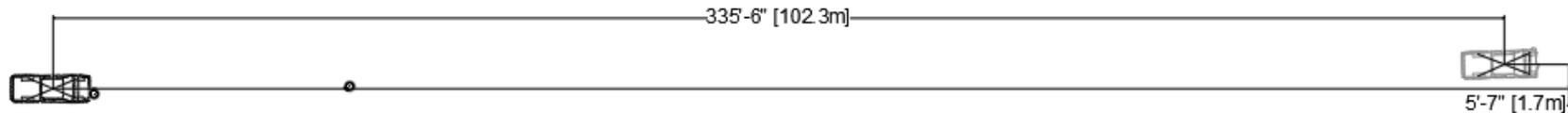
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GENERAL INFORMATION	
Test Agency.....	Applus IDIADA KARCO Engineering
Test Number.....	P40338-01
Test Designation.....	3-72
Test Date.....	4/2/21
TEST ARTICLE	
Name / Model.....	Cortina QuadraFlex VI Springless Portable Sign Stand
Type.....	Work-Zone Traffic Control Device
Device Height	6.9 ft. (2.1 m)
Key Elements.....	Base assembly, Subassembly Clamp, 48" x 48" roll-up sign
Road Surface.....	Smooth, clean concrete
TEST VEHICLE	
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 (2,272.5 kg)
Gross Static Mass.....	5,009.9 lbs (2,272.5 kg)

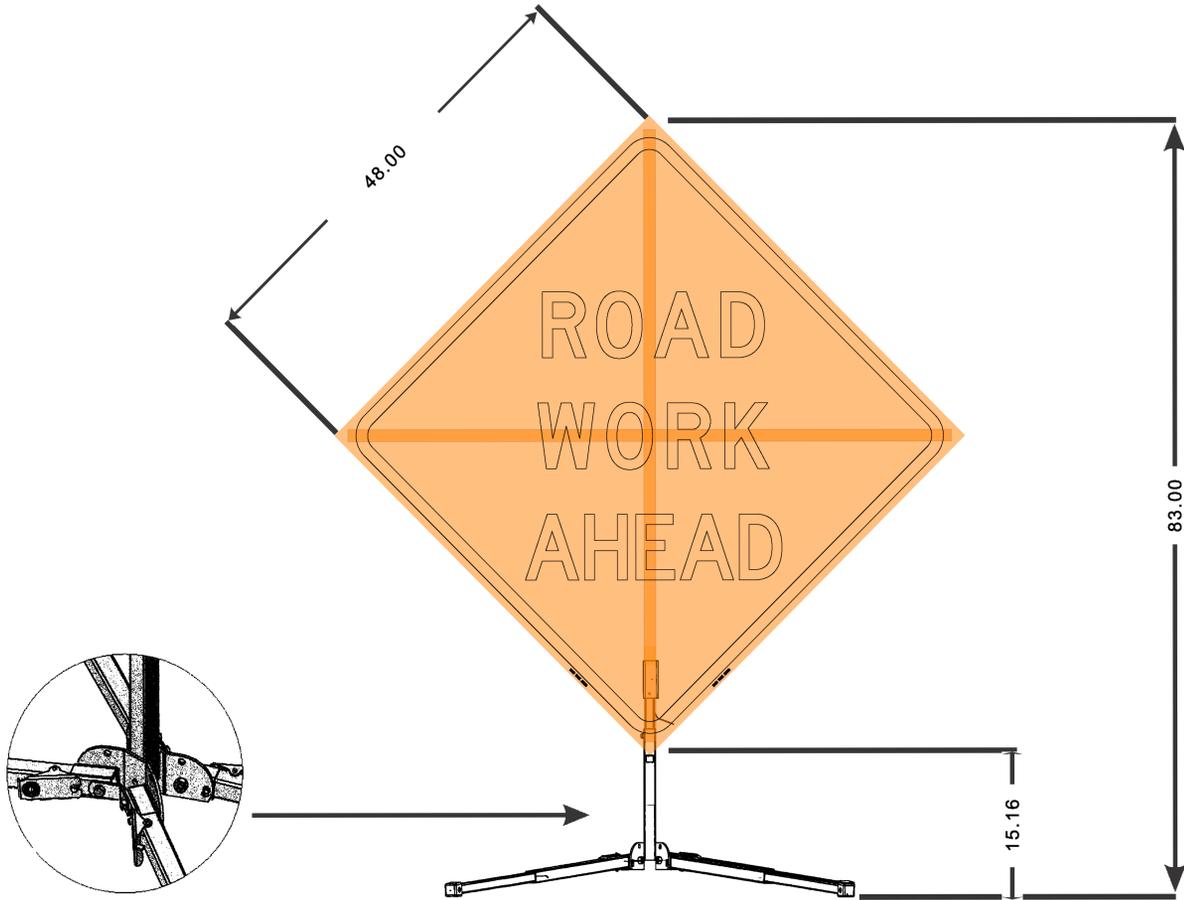
Impact Conditions	
Impact Velocity Device 1.....	63.16 mph (101.65 km/h)
Impact Velocity Device 2.....	61.99 mph (99.76 km/h)
Device 1 Location/ Orientation.....	23.6 in. (599 mm) From Vehicle Centerline on Passenger Side
Device 2 Location/ Orientation.....	19.4 in. (492 mm) From Vehicle Centerline on Driver Side
Device 1 Angle.....	90.0°
Device 2 Angle.....	0.0°
Device 1 Kinetic Energy.....	668.2 kip-feet (905.9 Kilojoules)
Device 2 Kinetic Energy.....	643.5 kip-feet (872.5 Kilojoules)
Minimum KE Required.....	594 kip-feet (806 Kilojoules)
Exit Conditions	
Device 1 Exit Velocity.....	62.98 mph (101.4 km/h)
Device 2 Exit Velocity.....	61.79 mph (99.4 km/h)
Vehicle Resting Position.....	335.5 ft. (102.3 m) Downstream 5.6 ft. (1.7 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° Device Debris Field (longitudinal)...	155.9 ft. (47.5 m)
0° Device Debris Field (lateral).....	19.4 ft. (5.9 m)
90° Device Debris Field (longitudinal)	82.1 ft. (25.0 m)
90° Sign Debris Field (lateral)...	17.9 ft. (5.5 m)
Vehicle Damage	
Vehicle Damage Scale.....	12-FC-1
CDC.....	12FDEN1
Maximum Deformation.....	MASH Deformation Limits Not Exceeded (0.0 in.) 0 mm

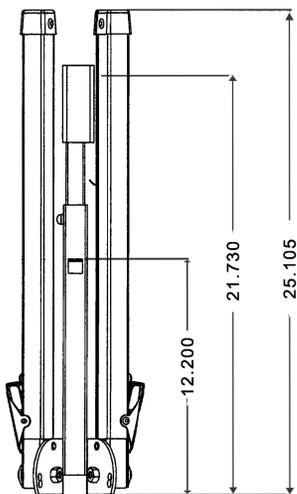
* Not Applicable, device weighs less than 220 lbs (100 kg)

Figure 2 Summary of Test 3-72

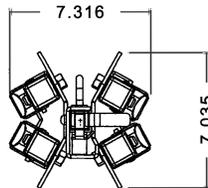
CORTINA SAFETY PRODUCTS QUADRAFLEX VI SPRINGLESS PORTABLE SIGN STAND



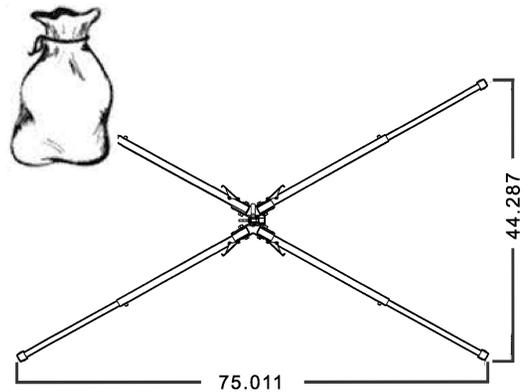
BASE
ASSEMBLY



STORAGE DIMENSIONS



OPTIONAL SAND BAGS
MAY BE USED (ONE PER LEG)



OPEN FOOTPRINT