



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

December 27, 2019

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

In Reply Refer To:  
HSST-1/WZ-382

Mr. Felipe Almanza  
TrafFix Devices Inc.  
160 Avenida La Pata  
San Clemente California 92673

Dear Mr. Almanza:

This letter is in response to your October 24, 2018 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-382 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:

- TrafFix Sign Stand

### **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: Traffix Sign Stand  
Type of system: Work Zone  
Test Level: MASH Test Level 3 (TL3)  
Testing conducted by: KARCO  
Date of request: October 30, 2018  
Date of completed Package: February 22, 2019

FHWA concurs with the recommendation of the accredited crash testing laboratory per the attached form for the above device using one (1) 4.0ft. x 4.0ft. vinyl roll-up sign.

### **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-382 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,



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:	October 24, 2018	<input checked="" type="radio"/> New <input type="radio"/> Resubmission
	Name:	Felipe Almanza	
	Company:	Traffix Devices Inc.	
	Address:	160 Avenida La Pata San Clemente California 92673	
	Country:	United States	
	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	Traffix 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:	Felipe Almanza	Same as Submitter <input checked="" type="checkbox"/>
Company Name:	Traffix Devices Inc.	Same as Submitter <input checked="" type="checkbox"/>
Address:	160 Avenida La Pata San Clemente California 92673	Same as Submitter <input checked="" type="checkbox"/>
Country:	United States	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.

Traffix Devices Inc. and Karco Engineering LLC share no financial interests between the two organizations. This includes no shared financial interest but not limited to:

- i. Compensation including wages, salaries, commissions, professional fees, or fees for business referrals
- iii. Research funding or other forms of research support;
- iv. Patents, copyrights, licenses, and other intellectual property interests;
- vi. Business ownership and investment interests;



## PRODUCT DESCRIPTION

- New Hardware or Significant Modification    
  Modification to Existing Hardware

The Traffix Sign Stand is a temporary work-zone device consisting of four major components: one steel base assembly, one steel latch bracket, (four) steel telescoping legs, and one roll up sign. The steel base assembly is the platform for bolting the four telescoping legs to the base creating an X-foot print. The base assembly is designed with a steel vertical mast. The mast is a tube which allows the latch bracket to be inserted and bolted to the steel base assembly.

The roll-up sign utilizes a flexible fiberglass frame which is inserted into corner pockets attached to the back side of the sign material.

The latch bracket is designed to allow the corner pocket to be inserted and locked into the latch bracket component of the base assembly. The sign is removed by disengaging the latch which unlocks the sign allowing it to be lifted and removed from the base.

The Traffix Sign Stand can be used with diamond, rectangular, octagon, and triangle shaped roll up signs. Other roll up sign shapes are available for use with the Traffix Sign Stand. The test was conducted with a diamond shaped sign. The Traffix Sign Stand can be use used on concrete, asphalt, gravel, or dirt surfaces. The test was conducted on a concrete surface. The Traffix Sign Stand can be used with or without flags. Flags were installed for these tests.

The Traffix Sign Stand legs are stored in a vertical position and when they are deployed the legs are dropped to the road surface creating an X-footprint that measures approx. 68.13 in (1.7 m) X 37.75 in (0.96 m) when the legs are extended in the telescoped position. The X-footprint measures 46.5 in (1.18 m) X 26.5 in (0.67 m) when the legs are not in the extended telescoped.

The overall dimensions of the Traffix Sign Stand with the roll up sign installed is approx. 68.13 in (1.7 m) X 37.75 in (0.96 m) X 79.13 in (2.0 m).

The MASH tested and passed Traffix Sign Stand, described above, is the same product as the previously tested and passed NCHRP-350 Traffix Sign Stand (Reference WZ-46 and WZ-73). The design, manufacturing process, and installation are identical between the MASH and NCHRP-350 tested products. Existing inventory is interchangeable as no design changes have been made since the inception of the Traffix Stand in July 2000.

## 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:	Robert Ramirez	
Engineer Signature:	<b>Robert Ramirez</b>	Digitally signed by Robert Ramirez DN: cn=Robert Ramirez, o=KARCO Engineering, ou=Project Engineer, email=rramirez@karco.com, c=US Date: 2018.10.18 09:50:23 -07'00'
Address:	9270 Holly Rd. Adelanto, CA 92301	Same as Submitter <input type="checkbox"/>
Country:	United States	Same as Submitter <input 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 weighting less than 220 lbs (100 kg)	Non-Relevant Test, not conducted

Required Test Number	Narrative Description	Evaluation Results
3-71 (1100C)	<p>For this test, two Traffix Sign Stands were impacted. The first test article was aligned at 90° and the second test article was aligned to 0° to the impacting vehicle's direction of travel. This test is intended to evaluate the sign stand's behavior when impacted. The primary evaluation is based on intrusion into the occupant compartment, windshield damage, and vehicle stability. Lightweight devices such as the Traffix Sign Stand cannot cause sufficient velocity change that would result in exceeding occupant risk criteria limits. Therefore Test 71 was conducted without instrumentation for evaluating occupant risk values OIV and RA per MASH test description.</p> <p>The test was conducted using a commercially available 2013 Kia Rio 4 door sedan with a test inertia mass of 2,442.7 lbs (1108.0 kg).</p> <p>The test vehicle impacted the first sign stand (orientated at 90°) at a velocity of 62.29 mph (100.25 km/hr). Upon impact the roll up sign released from the Latch Bracket and folded over the front end of the vehicle. The top of the vertical cross frame impacted the top of the windshield. The test vehicle continued along its path and impacted the second sign stand (oriented at 0°) at a velocity of 59.86 mph (96.34 km/hr). Upon impact the roll up sign released from the Latch Bracket and folded over the front end of the vehicle. The top of the vertical cross frame impacted the top of the windshield. The test vehicle's occupant compartment was not penetrated by the test articles and there was no in cab deformation beyond allowable limits. Debris from the test articles did not block the driver's vision. The vehicle remained upright and did not exceed 75° roll and pitch throughout the test. The vehicle did not leave its lane and its trajectory was stable after both sign stands were impacted.</p>	PASS

3-72 (2270P)	<p>For this test two Traffix Signs Stands were impacted. The first test article was aligned at 90° and the second test article was aligned at 0° to the test vehicle's direction of travel. This test is intended to evaluate the sign stand's behavior when impacted. The primary evaluation is based on intrusion into the occupant compartment, windshield damage, and vehicle stability. Lightweight devices such as the Traffix Sign Stand cannot cause sufficient velocity change that would result in exceeding occupant risk criteria limits. Therefore Test 72 was conducted without instrumentation for evaluating occupant risk values OIV and RA per MASH test description.</p> <p>The test was conducted using a commercially available 2010 Ram 1500 Pickup Truck with a test inertia mass of 4984.6 lbs (2,261.0 kg).</p> <p>The test vehicle impacted the first sign stand (oriented at 90°) at a velocity of 62.12 mph (99.97 km/hr). Upon impact the roll up sign released from the Latch Bracket and folded over the front end of the vehicle. The top of the vertical cross frame impacted the top of the windshield. The test vehicle continued along its path and impacted the second sign stand (oriented at 0°) at a velocity of 60.82 mph (97.88 km/hr). Upon impact the roll up sign released from the Latch Bracket and folded over the front end of the vehicle. The top of the vertical cross frame impacted the top of the windshield. The test vehicle's occupant compartment was not penetrated by the test articles and there was no measurable in cab deformation. Debris from the test articles did not block the driver's vision. The vehicle remained upright and did not exceed 75° roll and pitch throughout the test. The vehicle did not leave its lane and its trajectory was stable after both sign stands were impacted.</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	
Laboratory Signature:		Digitally signed by Alex Beltran DN: cn=Alex Beltran, o=KARCO Engineering, ou=Testing Laboratory, email=abeltran@karco.com, c=US Date: 2018.10.25 11:40:51 -0700
Address:	9270 Holly Rd. Adelanto, CA 92301	Same as Submitter <input type="checkbox"/>
Country:	United States	Same as Submitter <input type="checkbox"/>
Accreditation Certificate Number and Dates of current Accreditation period :	TL-371 valid until July 1, 2019	

Submitter Signature\*:

Digitally signed by Felipe Almanza  
DN: cn=Felipe Almanza, o=TraFFix Devices  
Inc, ou=Engineering,  
email=falmanza@traffixdevices.com, c=US  
Date: 2018.11.01 15:58:29 -0700

<b>Submit Form</b>
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## 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



**SECTION 4**

**MASH TEST 3-71 SUMMARY**

Test Article: TraFFix Devices TraFFix Sign Stand

Project No. P36285-03

Test Program: MASH 3-71

Test Date: 11/15/16

**SEQUENTIAL PHOTOGRAPHS**

**90° Orientation**



0.000 s

0.080 s

0.244 s

**0° Orientation**



0.000 s

0.053 s

0.216 s

**PLAN VIEW**



- Pre-Test
- Article
- Vehicle
- Post-Test
- Article
- Vehicle



**SECTION 4... (CONTINUED)**

**MASH TEST 3-71 SUMMARY**

Test Article: TraFFix Devices TraFFix Sign Stand

Project No. P36285-03

Test Program: MASH 3-71

Test Date: 11/15/16

**SUMMARY TABLE**

GENERAL INFORMATION		IMPACT CONDITIONS	
TEST AGENCY	KARCO Engineering, LLC.	IMPACT VELOCITY (0°)	59.86 mph (96.34 km/h)
TEST NUMBER	P36285-03	IMPACT VELOCITY (90°)	62.29 mph (100.25 km/h)
TEST DESIGNATION	3-71	IMPACT SEVERITY (0°)	292.6 kip-ft (396.7 kJ)
TEST DATE	11/15/16	IMPACT SEVERITY (90°)	316.8 kip-ft (429.6 kJ)
TEST ARTICLE		EXIT CONDITIONS	
NAME / MODEL	TraFFix Sign Stand	EXIT VELOCITY (0°)	59.24 mph (95.34 km/h)
TYPE	Work-Zone Traffic Control Device	EXIT VELOCITY (90°)	60.74 mph (97.75 km/h)
KEY ELEMENTS	Sign stand, roll-up sign, warning flag	FINAL RESTING POSITION	250.5 ft. (76.4 m) downstream, 2.7 ft. (0.8) left from first point of impact
OVERALL HEIGHT	78.8 in. (2002 mm)	VEHICLE STABILITY	Satisfactory
OVERALL WIDTH	66.0 in. (1676 mm)	VEHICLE SNAGGING	None
BASE WEIGHT	20.0 lbs (9.1 kg)	VEHICLE POCKETING	None
SIGN WEIGHT	5.8 lbs (2.6 kg)	OCCUPANT RISK VALUES	
ROAD SURFACE	Concrete	OCCUPANT IMPACT VELOCITY	Longitudinal
			Lateral
TEST VEHICLE		RIDEDOWN ACCELERATION	Longitudinal
TYPE / DESIGNATION	1100C		Lateral
YEAR, MAKE AND MODEL	2013 Kia Rio	TEST ARTICLE POST-IMPACT	
CURB MASS	2430.6 lbs (1102.5 kg)	ARTICLE DAMAGE	Base Deformation
TEST INERTIAL MASS	2442.7 lbs (1108.0 kg)	VEHICLE DAMAGE	
GROSS STATIC MASS	2613.5 lbs (1185.5 kg)	VEHICLE DAMAGE SCALE	N/A
		COLLISION DAMAGE CLASSIFICATION	N/A
		MAXIMUM DEFORMATION	Negligible

<sup>1</sup>Values not calculated due to test article weight being less than 220 lbs (100 kg)

**SECTION 4**  
**MASH TEST 3-72 SUMMARY**

Test Article: TraFFix Devices TraFFix Sign Stand  
 Test Program: MASH 3-72

Project No. P36285-01  
 Test Date: 11/11/16

**SEQUENTIAL PHOTOGRAPHS**

**90° Orientation**



0.000 s

0.056 s

0.225 s

**0° Orientation**

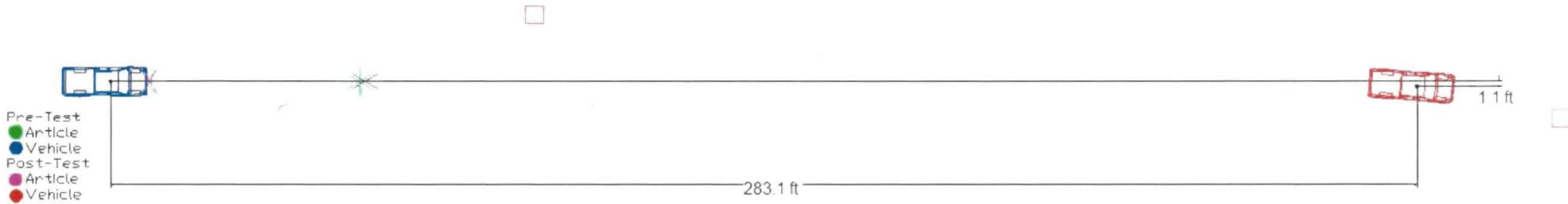


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**PLAN VIEW**





**SECTION 4... (CONTINUED)**  
**MASH TEST 3-72 SUMMARY**

Test Article: TraFFix Devices TraFFix Sign Stand  
 Test Program: MASH 3-72

Project No. P36285-01  
 Test Date: 11/11/16

**SUMMARY TABLE**

GENERAL INFORMATION		IMPACT CONDITIONS	
TEST AGENCY	KARCO Engineering, LLC.	IMPACT VELOCITY (0°)	60.82 mph (97.88 km/h)
TEST NUMBER	P36285-01	IMPACT VELOCITY (90°)	62.12 mph (99.97 km/h)
TEST DESIGNATION	3-72	IMPACT SEVERITY (0°)	616.4 kip-ft (835.7 kJ)
TEST DATE	11/11/16	IMPACT SEVERITY (90°)	643.0 kip-ft (871.8 kJ)
TEST ARTICLE		EXIT CONDITIONS	
NAME / MODEL	TraFFix Sign Stand	EXIT VELOCITY (0°)	59.87 mph (96.35 km/h)
TYPE	Work-Zone Traffic Control Device	EXIT VELOCITY (90°)	60.99 mph (98.15 km/h)
KEY ELEMENTS	Sign Stand, Roll Up Sign, Warning Flag	FINAL RESTING POSITION	283.1 ft. (86.3 m) downstream, 1.2 ft (0.4 m) left from first point of impact.
OVERALL HEIGHT	78.8 in. (2001 mm)	VEHICLE STABILITY	Satisfactory
OVERALL WIDTH	66.0 in. (1676 mm)	VEHICLE SNAGGING	None
BASE WEIGHT	20.0 lbs (9.1 kg)	VEHICLE POCKETING	None
SIGN WEIGHT	5.8 lbs (2.6 kg)	OCCUPANT RISK VALUES	
ROAD SURFACE	Concrete	OCCUPANT IMPACT VELOCITY	Longitudinal
			Lateral
		RIDEDOWN ACCELERATION	Longitudinal
			Lateral
		TEST ARTICLE POST-IMPACT	
		ARTICLE DAMAGE	Base Deformation
		VEHICLE DAMAGE	
		VEHICLE DAMAGE SCALE	N/A
		COLLISION DAMAGE CLASSIFICATION	N/A
		MAXIMUM DEFORMATION	Negligible
TEST VEHICLE			
TYPE / DESIGNATION	2270P		
YEAR, MAKE AND MODEL	2010 RAM 1500		
CURB MASS	5,004.4 lbs (2,270 kg)		
TEST INERTIAL MASS	4,984.6 lbs (2,261.0 kg)		
GROSS STATIC MASS	4,984.6 lbs (2,261.0 kg)		

<sup>1</sup>Values not calculated due to test article weight being less than 220 lbs (100 kg)



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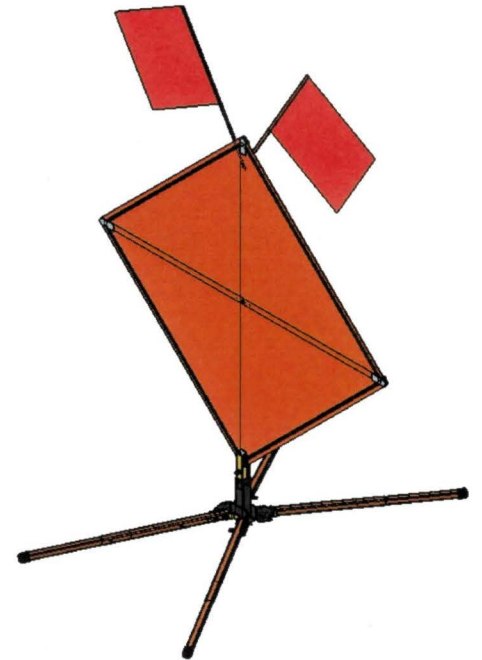
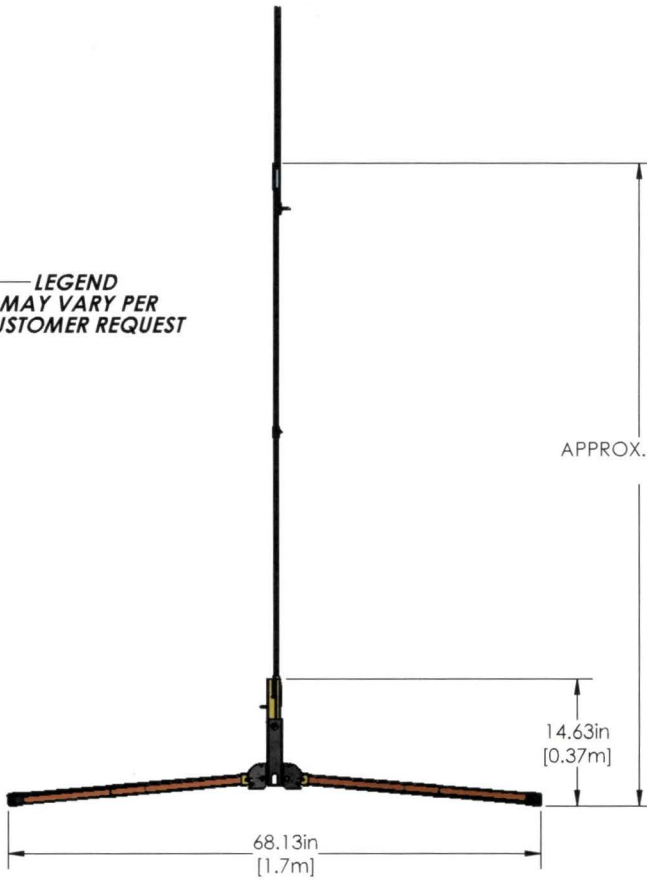
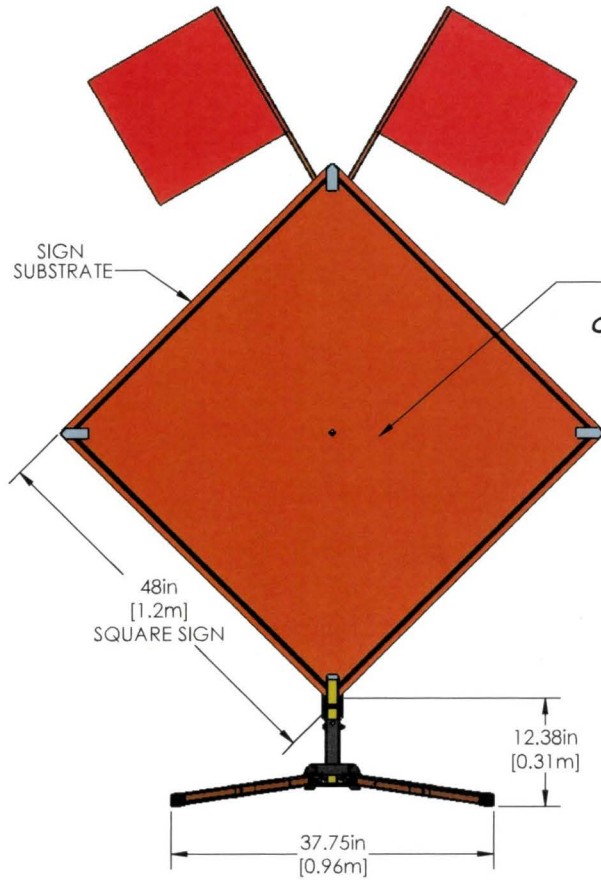
1

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**TraFFix Sign Stand**

Overall Weight: 27 lbs. [12.2 kg] (WITH SIGN)

Overall Dimensions: Approximately 37.75" [0.96m] x 68.125" [1.7m] x 14.625" [0.37m]

Frame Material: Steel Tubing

**NOTES: UNLESS OTHERWISE SPECIFIED**

UNLESS OTHERWISE SPECIFIED:  
 ALL DIMENSIONS ARE IN INCHES (mm).  
 TOLERANCES:  
 DECIMAL: .XX ± .0025"  
 .XXX ± .03"  
 .XXXX ± .015"  
 DEGREES: ± 0.5°



160 Avenida La Pata  
 San Clemente, CA 92673  
 (949) 361-5663  
 FAX (949) 361-9205  
 www.traffixdevices.com

TITLE:		TraFFix Sign Stand	
SIZE	DWG. NO.	REV	
<b>B</b>	500-199	<b>A</b>	
DRAWN BY: Christopher Jaime		DATE: 11/09/16	
CHECKED BY: FA		DATE: 11/09/16	
APPROVED BY: FA		DATE: 11/09/16	

SHEET 1 OF 1

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STORED POSITION



DEPLOYED POSITION

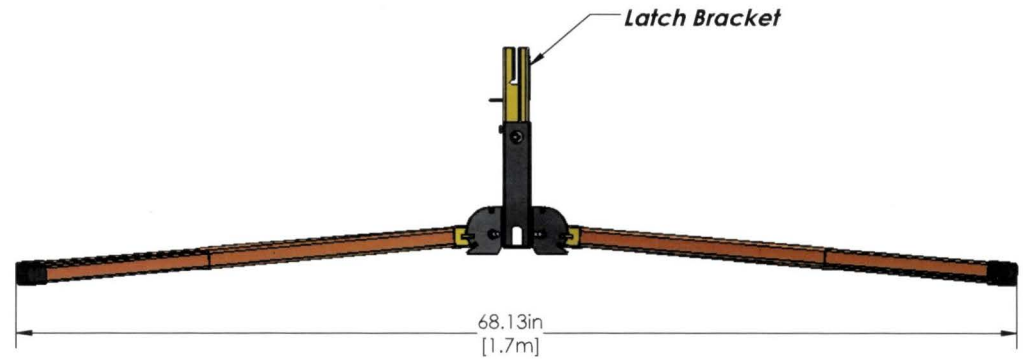
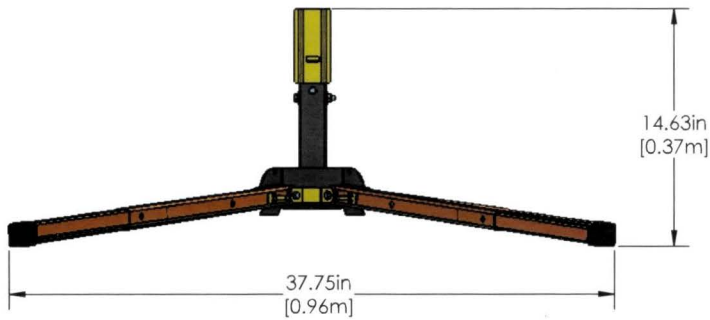
Aluminum Tubing

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C

B

B



Latch Bracket

A

A

**TrafFix Sign Stand**

Overall Weight: 20 lbs. [9.07 kg] (NO SIGN)

Overall Dimensions: Approximately 37.75" [0.96m] x 68.125" [1.7m] x 14.625" [0.37m]

Frame Material: Steel Tubing

**NOTES: UNLESS OTHERWISE SPECIFIED**

UNLESS OTHERWISE SPECIFIED,  
 ALL DIMENSIONS ARE IN INCHES(mm).  
 TOLERANCES:  
 DECIMAL: X.X ± .0425"  
 X.XX ± .032"  
 X.XXX ± .015"  
 DEGREES: ± 0.5°



160 Avenida La Pata  
 San Clemente, CA 92673  
 (949) 361-5663  
 FAX (949) 361-9205  
 www.traffixdevices.com

TITLE: <b>TrafFix Sign Stand w/ No Sign</b>		
SIZE <b>B</b>	DWG. NO. <b>500-200</b>	REV <b>A</b>
SHEET 1 OF 1		

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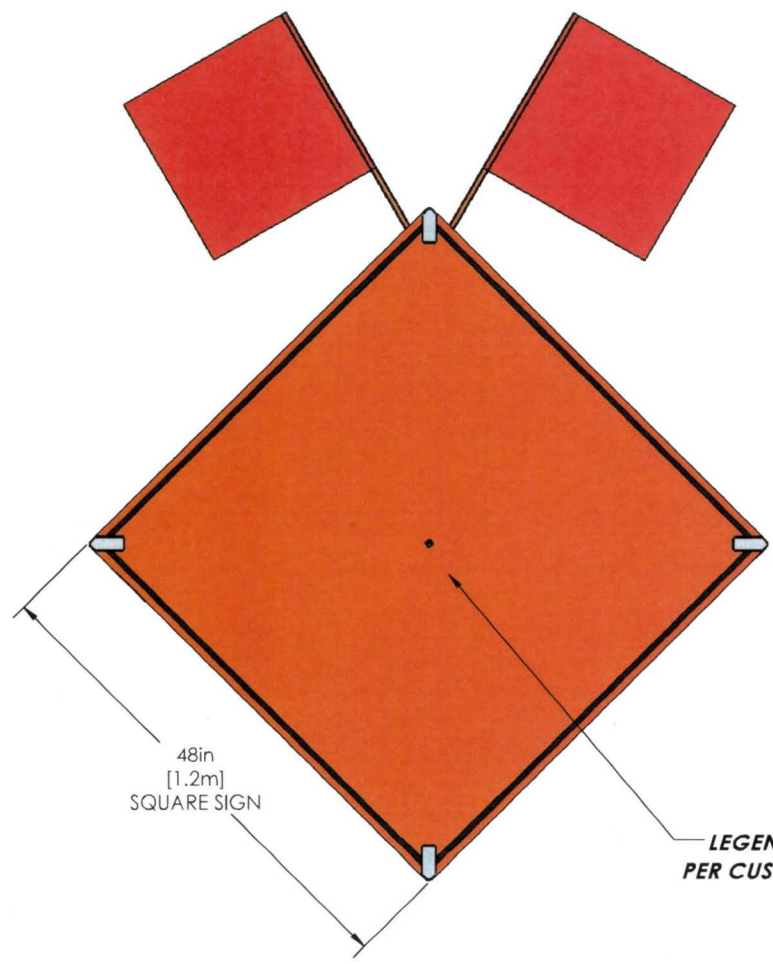
8 7 6 5 4 3 2 1

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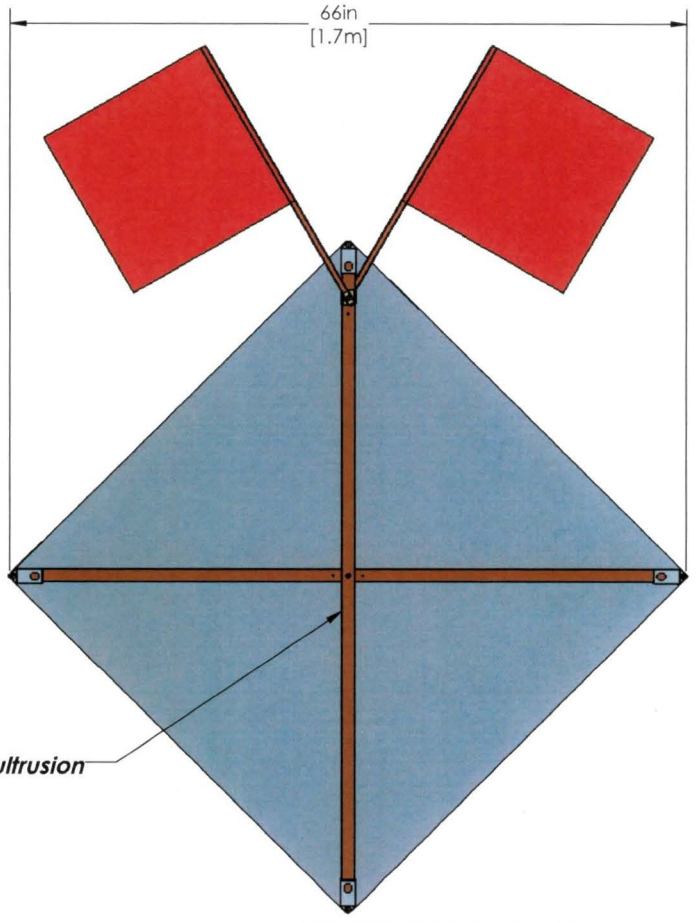
B

A



Crossbeam Pulfrusion

LEGEND MAY VARY  
PER CUSTOMER REQUEST



UNLESS OTHERWISE SPECIFIED:  
ALL DIMENSIONS ARE IN INCHES(mm).

**Roll-Up Sign w/Flag Assembly**  
 Overall Weight: 5.8 lbs. [2.6 kg]  
 Overall Sign Dimensions: 48" [1.2m] x 48" [1.2m]  
**NOTES: UNLESS OTHERWISE SPECIFIED**

**Traffix  
Devices Inc.**



160 Avenida La Pata  
 San Clemente, CA 92673  
 (949) 361-5663  
 FAX (949) 361-9205  
 www.traffixdevices.com

TITLE:  
 Roll-Up Sign Substrate  
 w/Flags

DRAWN BY:  
 Christopher Jaime  
 CHECKED BY:  
 FA  
 APPROVED BY:  
 FA

DATE:  
 9/2/16  
 DATE:  
 9/2/16  
 DATE:  
 9/2/16

SIZE  
**B**

DWG. NO.  
500-198

REV  
**A**

SHEET 1 OF 1

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