U.S. Department of Transportation
Federal Highway Administration

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

July 17, 2025

In Reply Refer To:
HSST-1/WZ-468

Henry A. Ross
Plasticade
100 Howard Avenue
Des Plaines, IL 60018

Dear Mr. Ross:

We received your initial correspondence on June 18, 2024, requesting issuance of a Federal-aid reimbursement eligibility letter under the Federal-aid highway program for the roadside safety system, device, design, product, or hardware (collectively "device") described below. On December 16, 2024, we received a complete set of files needed to complete our review. We write to inform you that the device SS-440 Sign Stand with 48"x48" Rigid Sign Mounted 18" Above Ground is eligible for Federal-aid reimbursement. This letter is assigned Federal Highway Administration (FHWA) control number WZ-468.

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: SS-440 Sign Stand with 48"x48" Rigid
Sign Mounted 18" Above Ground
Type of system: Work Zone
Test Level: Test Level 3
Testing conducted by: Applus IDIADA KARCO
Engineering Date of request: June 18, 2024

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-468 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

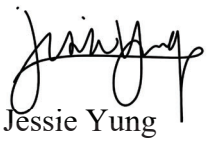
Issuance of this eligibility letter does not convey property rights of any sort nor any exclusive privilege. This letter is not authorization or consent by the government for the use, manufacture, or sale of any patented or proprietary system, device, design, product, or hardware for which the requester 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 Federal-aid eligibility letter is assigned FHWA control number WZ-468. It should only be reproduced in full with its attachment(s). This Federal-aid eligibility 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 Paul LaFleur at Paul LaFleur@dot.gov.

Sincerely,



Jessie Yung
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	June 18, 2024	◉ New ○ Resubmission
	Name:	Henry Ross	
	Company:	Plasticade	
	Address:	100 Howard Avenue, Des Plaines, IL 60018	
	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	SS440 with 18 in. Rigid	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:	Henry Ross	Same as Submitter ☒
Company Name:	Plasticade	Same as Submitter ☒
Address:	100 Howard Avenue, Des Plaines, IL 60018	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.

Plasticade 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

The Plasticade SS440 with Steel Legs and Aluminum Sign At 18" is a work-zone traffic control device. The as tested device utilized a 48.0 in. (1.2 m) aluminum sign mounted at a height of 18.0 in. (0.4 m) measured from the ground to the bottom corner of the sign. The device has a total weight of 63.0 lbs (28.5 kg).
The SS440 sign stand consists of four (4) steel legs, two (2) steel masts (upper mast and lower mast) and one (1) aluminum sign. Each two (2) legs are connected by one (1) SS440 leg cross over to make a SS440 steel leg assembly. The two (2) steel leg assemblies connect to each other using SS440 base assembly. The total footprint created by sign is 39.8 ± 1.0 in. (1,013 ± 305 mm) by 84.5 ± 1.0 in. (2,146 ± 305 mm). A total of four (4) 40lbs. (18.1 kg) sandbags, one for each leg, are used to secure the position of the sign.
The lower mast is a 50.0 in. (1270 mm) long, 1.0 in. (25 mm) square tube that is bolted to the (1) coil spring SS440 base assembly with two (2) brackets. The upper mast is a 47.2 in. (1200 mm) long, 0.79 in. (20 mm) square tube. The upper mast has three (3) flag holders connected in place with 2 x 3-16 steel pop rivets and one (1) mast snap button that pins to the hole in the lower mast. The aluminum sign is mounted to the upper mast and lower mast via a mast bracket. The total sign height measured 123.5 ± 1 in. (3,136 ± 25.4 mm)

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:	Dominick Dieterle	
Engineer Signature:	Dominick Dieterle — Digitally signed by Dominick Dieterle DN: cn=Dominick Dieterle, o=Applus IDIADA, ou=Engineering, email=dominick.dieterle@idiada.com, c=US Date: 2024.06.18 12:16:00 -07'00'	
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)	Per MASH 2016, Test 70 is designed to evaluate the ability of small vehicles to activate any breakaway, fracture, or yielding mechanism associated with the work zone feature during low-speed impacts. For freestanding, lightweight features, velocity changes during low-speed impacts will be within acceptable limits, even when a breakaway, fracture, or yielding feature is not incorporated. Therefore, Test 70 is considered optional for work-zone traffic control devices weighing less than 220 lbs (100 kg). The as-tested device weight was 63.0 lbs (28.5 kg) and therefore Test 70 was not performed.	Non-Relevant Test, not conducted

Required Test Number	Narrative Description	Evaluation Results
3-71 (1100C)	Applus IDIADA Test No. P44021-02. Test Date March 22, 2024. Crash Test Report No. TR-P44021-02 for MASH 2016 Test 3-71 Crash Test of the plasticade SS440 with Steel Legs and Aluminum Sign At 18". Two (2) SS440 with Steel Legs and Aluminum Sign At 18" signs were impacted in a single test run. The devices were spaced 60.0 ft. (18.3 m) apart and set at two (2) critical impact angles (CIA), 0° and 90°. The first device was positioned at a CIA of 0° and was aligned 17.7 in. (450 mm) to the passenger side of the vehicle's centerline. The second device was positioned at a CIA of 90° and was aligned 13.8 in. (350 mm) to the driver side of the vehicle's centerline. An 1100C test vehicle approached the first sign oriented at 0° at a nominal speed of 62.00 mph (100.00 km/h). The first sign was impacted at a velocity of 64.57 mph (103.91 km/h). The impact location was 18.07 in. (459 mm) from the vehicle centerline on the passenger side. The test vehicle then impacted the 90° CIA device at a velocity of 63.27 mph (101.82 km/h). The impact location was 14.2 in. (360 mm) from the vehicle centerline on the driver side. The SS440 with Steel Legs and Aluminum Sign At 18" yielded and broke away in a predictable manner. There was no penetration into the occupant compartment and MASH deformation limits were not exceeded. The SS440 with Steel Legs and Aluminum Sign At 18" met all the requirements for MASH Test 3-71.	PASS

3-72 (2270P)	Applus IDIADA Test No. P44021-02. Test Date March 22, 2024. Crash Test Report No. TR-P44021-02-NC for MASH 2016 Test 3-72 Crash Test of Plasticade SS440 with Steel Legs and Aluminum Sign At 18". Two (2) SS440 with Steel Legs and Aluminum Sign At 18" signs were impacted in a single test run. The devices were spaced 60.0 ft. (18.3 m) apart and set at two (2) critical impact angles (CIA), 0° and 90°. The first device was positioned at a CIA of 0° and was aligned 19.7 in. (500 mm) to the passenger side of the vehicle's centerline. The second device was positioned at a CIA of 90° and was aligned 15.7 in. (400 mm) to the driver side of the vehicle's centerline. An 2270P test vehicle approached the first sign oriented at 0° at a nominal speed of 62.00 mph (100.00 km/h). The first sign was impacted at a velocity of 62.57 mph (100.69 km/h). The impact location was 22.0 in. (558.3 mm) from the vehicle centerline on the passenger side. The test vehicle then impacted the 90° CIA device at a velocity of 60.61 mph (97.54 km/h). The impact location was 13.78 in. (350 mm) from the vehicle centerline on the driver side. The SS440 with Steel Legs and Aluminum Sign At 18" yielded and broke away in a predictable manner. There was no penetration into the occupant compartment and MASH deformation limits were not exceeded. The SS440 with Steel Legs and Aluminum Sign At 18" 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:	Dominick Dieterle Digitally signed by Dominick Dieterle DN: cn=Dominick Dieterle, o=Applus IDIADA, ou=Engineering, email=dominick.dieterle@idiada.com, c=US Date: 2024.06.18 13:51:09 -07'00'	
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: April 27, 2022 - April 27, 2025	

Submitter Signature*: Henry A. Ross Digitally signed by Henry A. Ross Date: 2024.06.18 18:51:50 -05'00'

Submit Form

ATTACHMENTS

Attach to this form:

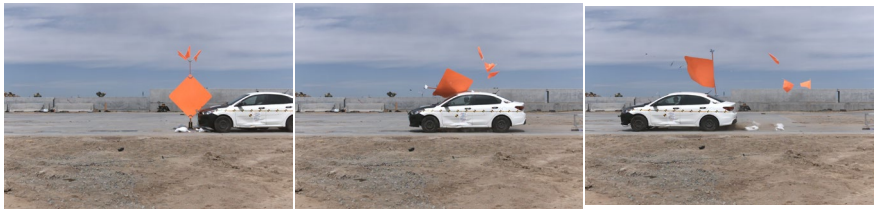
1) Additional disclosures of related financial interest as indicated above.
2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [Hardware 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

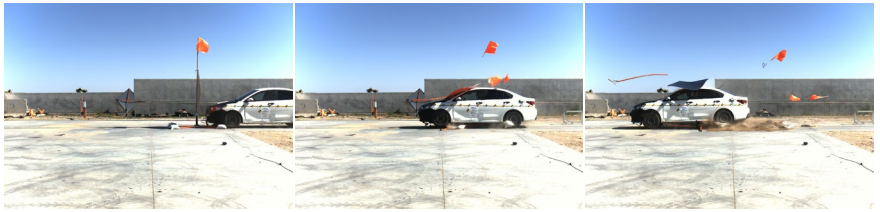
MASH 2016 Test 3-71 Summary

0° CIA



0.000 seconds | 0.105 seconds | 0.210 seconds

90° CIA



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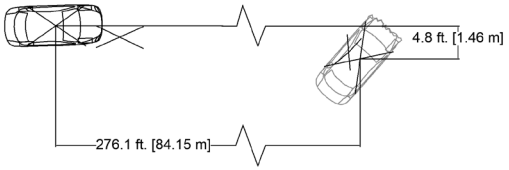
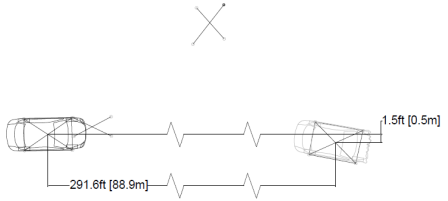




General Information

Test Agency	Applus IDIADA KARCO
Test No	P44020-02 & P44020-04
Test Designation	3-71
Test Date	3/22/24 & 5/02/2024

Test Article

Name / Model	SS440 with Steel Legs and Aluminum Sign At 18" "
Type	Work-Zone Device
Device Height	10.29 ft. (3.1 m)
Key Elements	Aluminum Sign at 18"
Road Surface	Smooth, clean concrete

Test Vehicle

Type / Designation	1100C
Year, Make, and Model	2018 Kia Rio
Curb Mass	2,551.8 lbs (1,157.5 kg)
Test Inertial Mass	2,440.5 lbs (1,107.0 kg)
Gross Static Mass	2,597.0 lbs (1,178.0 kg)

Impact Conditions

Impact Velocity Device 1	64.57 mph (103.91 km/h)
Impact Velocity Device 2	63.40 mph (102.03 km/h)
Device 1 Angle	0.0°
Device 2 Angle	90.0°
Location / Orientation (Target) D1	17.7 in. (450 mm) From veh. CL. on Pass.
Location / Orientation (Target) D2	13.8 in. (350 mm) From veh. CL. on Driv.
Location / Orientation (Actual) D1	18.0 in. (459 mm) From veh. CL. on Pass.
Location / Orientation (Actual) D2	14.2 in. (360 mm) From veh. CL. on Driv.
Device 1 Kinetic Energy	340.1 kip-ft (461.1 kilojoules)
Device 2 Kinetic Energy	327.9 kip-ft (444.6 kilojoules)
Minimum KE Required	288 kip-ft (390 kJ)

Exit Conditions

Device 1 Exit Velocity	63.27 mph (101.8 km/h)
Device 2 Exit Velocity	61.70 mph (99.30 km/h)
Vehicle Resting Position	291.3 ft. (88.8 m) Downstream 1.5 ft. (0.5 m) To Pass. Side
Vehicle Stability	Satisfactory
Maximum Roll Angle	Not Applicable*
Maximum Pitch Angle	Not Applicable*
Maximum Yaw Angle	Not Applicable*

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)	265. ft. 80.77 m)
0° Sign Debris Field (lateral)	2.2 ft. (0.68 m)
90° Sign Debris Field (longitudinal)	116.7 ft. (35.6 m)
90° Sign Debris Field (lateral)	14.1 ft. (4.3 m)

Vehicle Damage

Vehicle Damage Scale	12-LP-1
CDC	12FP
Maximum Deformation	2.7 in. (69.0 mm) Windshield

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

Figure 3: Summary of Test 3-71

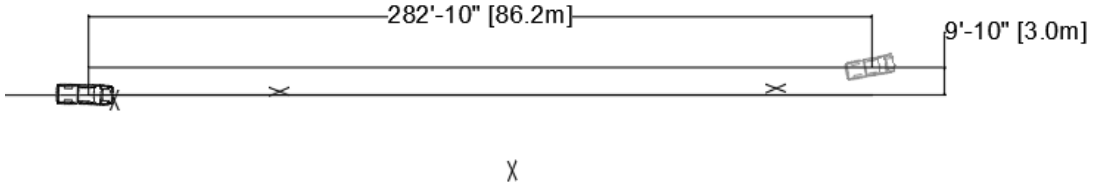
MASH 2016 Test 3-72 Summary

0° CIA

0.695 seconds | 0.800 seconds | 0.905 seconds

90° CIA

0.000 seconds | 0.105 seconds | 0.210 seconds



General Information

Test Agency	Applus IDIADA KARCO
Test No	P44021-02
Test Designation	3-72
Test Date	4/8/24

Test Article

Name / Model	SS440 with Steel Legs and Aluminum Sign At 18"
Type	Work-Zone Device
Device Height	10.3 ft. (3.1 m)
Key Elements	Aluminum Sign at 18"
Road Surface	Smooth, clean concrete

Test Vehicle

Type / Designation	2270P
Year, Make, and Model	2018 Ram 1500
Curb Mass	5,112.4 lbs (2,319.0 kg)
Test Inertial Mass	5,024.3 lbs (2,279.0 kg)

Impact Conditions

Impact Velocity Device 1	62.57 mph (100.69 km/h)
Impact Velocity Device 2	60.61 mph (97.54 km/h)
Device 1 Angle	0.0°
Device 2 Angle	90.0°
Location / Orientation (Target) D1	19.7 in. (500 mm) From veh. CL. on Pass.
Location / Orientation (Target) D2	15.7 in. (400 mm) From veh. CL. on Driv.
Location / Orientation (Actual) D1	22.0 in. (558 mm) From veh. CL. on Pass.
Location / Orientation (Actual) D2	13.7 in. (350 mm) From veh. CL. on Driv.
Device 1 Kinetic Energy	657.5 kip-ft (891.4 kilojoules)
Device 2 Kinetic Energy	617.0 kip-ft (836.5 kilojoules)
Minimum KE Required	594.0 kip-ft (806.0 kJ)

Exit Conditions

Device 1 Exit Velocity	61.50 mph (98.97 km/h)
Device 2 Exit Velocity	60.08 mph (96.69 km/h)
Vehicle Resting Position	282.8 ft. (86.2 m) Downstream 9.8 ft. (3.0 m) Dr. Side
Vehicle Stability	Satisfactory
Maximum Roll Angle	Not Applicable*
Maximum Pitch Angle	Not Applicable*

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)	168.0 ft. (51.21 m)
0° Sign Debris Field (lateral)	13.4 ft. (4.08 m)
90° Sign Debris Field (longitudinal)	150.3 ft. (45.81 m)
90° Sign Debris Field (lateral)	4.1 ft. (1.24 m)

Vehicle Damage

Vehicle Damage Scale	12-FD-1
CDC	12FRL
Maximum Deformation	0.0 in. (0 mm)

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

Figure 4: Summary of Test 3-72

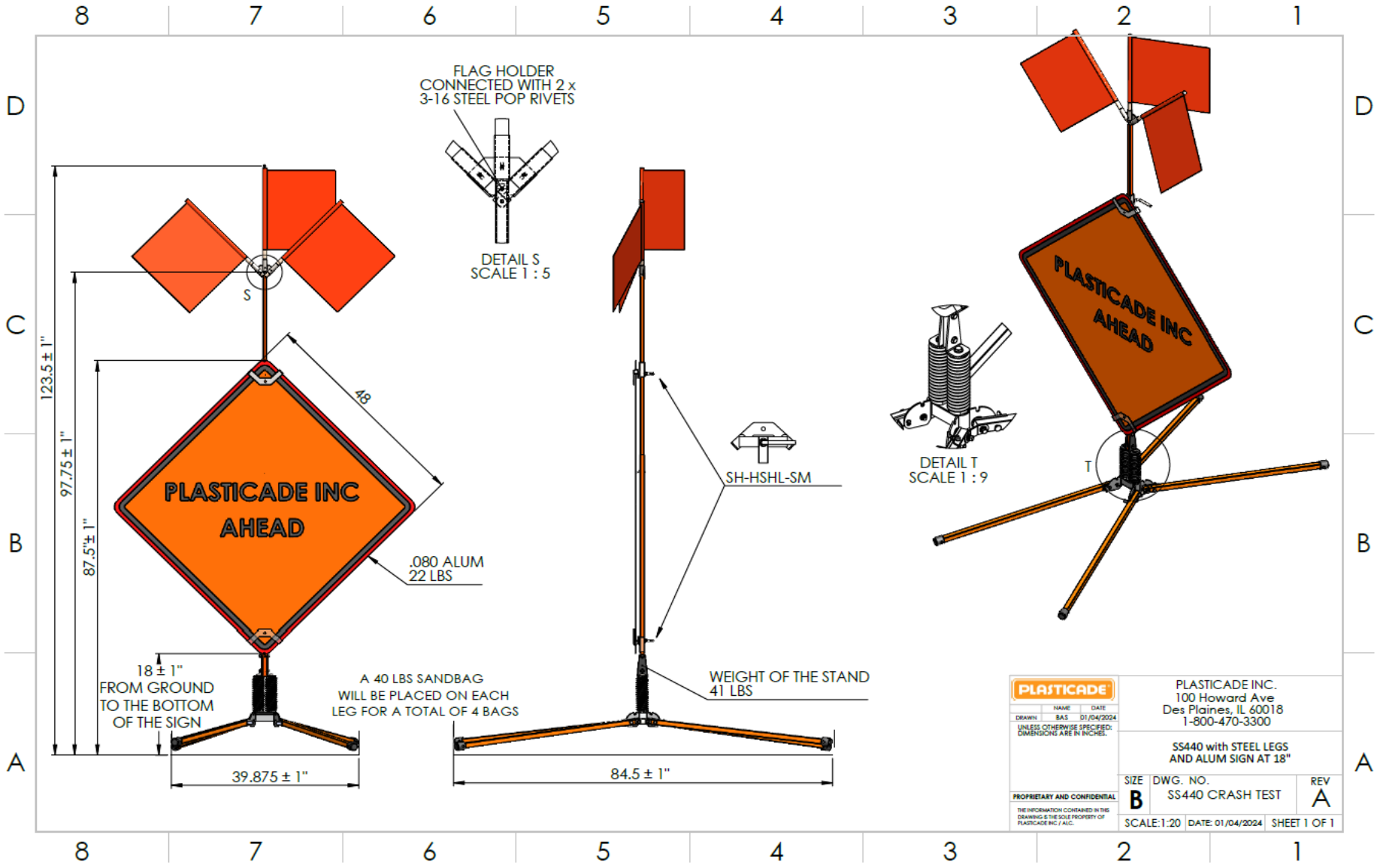


Figure 1: Plasticade SS440 with Steel Legs and Aluminum Sign At 18"