



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

400 Seventh St. S.W.  
Washington, D.C. 20590

December 14, 1998

Refer to: HNG-14

Mr. Jan Miller  
Eastern Metal-USA Sign  
1430 Sullivan Street  
Elmira, New York 14901-1698

Dear Mr. Miller:

This is in reply to your letter of September 18 regarding the crashworthiness of your company's portable sign stands. You requested that the Federal Highway Administration (FHWA) consider these sign stands acceptable for use in work zones on the National Highway System (NHS) based on prior testing of nearly identical stands. Your letter referred to information you provided us earlier on the design details on a number of your company's sign stands.

Two portable sign stands for use in work zones were tested by the Texas Transportation Institute, under contract to the Texas Department of Transportation, and are included in our Acceptance Letter "WZ-3," copy enclosed, dated August 28, 1998, and titled Information: Crash Tested Work Zone Traffic Control Devices. They are listed in that memorandum's Attachment A, Table II.1 "Acceptable Crashworthy Category 2 Hardware," as item number 1 and number 2 under "TTI Report Note 1" and as item number 6 under "TTI Report Note 2." Illustrations of the tested sign stands are also included in Attachment A. A brief description of each of the tested sign stands is presented below. Common to all sign stands discussed in this letter are the following features:

- "X - Footprint" design
- Flexible fabric sign sheeting
- Square steel tube structure (Your letter requested acceptance of similar stands using square aluminum tubes. We do not know if the dynamic impact behavior of steel and aluminum are similar enough to conclude that like sized aluminum and steel sign stands will behave the same.)

The major difference between the two types of small sign stands described in the tables below are the manner in which the sign is elevated above the base. In the first table, the stands included a spring-mounted telescoping tubular steel support that continues to the top of the sign. In the second table the tubular metal uprights are rigidly attached to the "X" base. They are also much shorter, the sign being supported by a flexible fiberglass strap or rod that is inserted into the metal upright.

Feature	Tested Stand	Request for acceptance
Manufacturer	MDI / Windmaster (TTI Test #453580-1)	Eastern Metal
Model Number	50SM	X-550
Upright Dimensions, inches (mm) (telescoping square steel tubes)	1.50 (38.1) square steel lower tube 1.25 (31.75) square steel upper tube	16 ga wall 1.00 (25.4) square steel tube 13/16 (20.6) square steel tube
Base Legs Dimensions, inches (mm)	1.00 (25.4) square steel 42 (1067) long	1.00 (25.4) square steel 43.25 (1099) long
Base Connection	Dual vertical spring	Dual vertical spring
Roll-up sign spreader, or "cross brace," inches (mm)	1.25 x 3/16 x 68 (31.75 x 20.6 x 1727) fiberglass	1.25 x 3/16 x 64.5 (31.75 x 20.6 x 1638) fiberglass
Height to Bottom (1)	18 inches (457 mm)	12 inches (305 mm)
Height to Top of Sign	86 inches (2184 mm)	96 inches (2438mm)
Approximate Mass (2)	39 pounds (17.7 kg)	35 pounds (15.9 kg)

(1) Heights are measured from pavement to bottom of sign.

(2) Mass of stand, without sign or ballast.

Your company's "X-550" portable sign stand appears comparable to the tested support. The base legs, base connection, and sign spreader bar are virtually identical. The square steel tube upright support is a similar telescoping system, except that the steel tubes on your design are smaller. Also, the height is somewhat greater while the mass of your stand is somewhat less. We would expect it to perform in a similar manner to the tested stand.

Feature	Tested Stand	Request for acceptance
Manufacturer	TrafFix (TTI Test # 453790-1)	Eastern Metal
Model Number		C-102
Upright Dimensions inches (mm) (bar)	1.25 x 3/16 x 67 (31.75 x 4.8 x 1702) fiberglass	1.25 x 3/16 x 64.5 (31.75 x 4.8 x 1638) fiberglass
Base Legs, inches (mm)	1.25 (31.75) square steel 36.5 (927) long	1.25 (31.75) square steel 38.25 (972) long
Base Connection, height in inches (mm)	Fixed Steel Tube 14.625 (371) high	Fixed Steel Tube 27.75 (705) high
Roll-up sign spreader, or "cross brace," inches (mm)	1.25 x 3/16 x 67 (31.75 x 4.8 x 1702) fiberglass	1.25 x 3/16 x 64.5 (31.75 x 4.8 x 1638) fiberglass
Height to Bottom (1)	12 inches (305 mm)	24 inches (610 mm)
Height to Top of sign	80 inches (2032 mm)	98.5 inches (2502 mm)
Approximate Mass (2)	26 pounds (11.8 kg)	21.7 pounds (9.8 kg)

(1) Heights are measured from pavement to bottom of sign

(2) Mass of stand, without sign or ballast.

Your company's "C-102" portable sign stand is comparable to the tested support. The base legs, base connection, and sign uprights and spreader bars are virtually identical. The square steel tube rising from the fixed connection at the base, and the overall height of the sign are somewhat greater while the mass of your stand is somewhat less. We would expect it to perform in a similar manner to the tested stand.

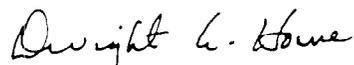
The tested sign stands met the crashworthiness requirements of the National Cooperative Highway Research Program Report 350. They were tested as part of a State department of transportation study and not tested at a 90 degree angle of impact as per our current guidelines. However, they do not have tubular metal crossbraces nor other substantial lateral elements that could penetrate the windshield. Based on a review of the crash testing and a comparison of the relevant data in the tables above, we believe that the performance of the

Eastern Metal sign stands, using "roll-up signs" (mass of signs approximately 7.8 pounds) will be comparable to the tested stands. Therefore, they are acceptable for use on the NHS within the range of conditions tested, when requested by a State. To prevent misunderstanding by others, this letter of acceptance shall not be reproduced except in full.

Our acceptance is limited to the breakaway characteristics of the devices and does not cover the structural features nor the devices' conformity with the Manual on Uniform Traffic Control Devices. Presumably, you will provide users with sufficient information on structural design and installation requirements to ensure proper performance of your hardware and provide certification to transportation agencies that the hardware furnished will have essentially the same chemistry, mechanical properties, and geometry as those used in the tests and that they will meet FHWA change in velocity and/or trajectory requirements.

Some features of your company's work zone traffic control devices may be proprietary. The use of proprietary products in Federal-aid projects is generally of a temporary nature. They are selected by the contractor for use as needed and removed upon completion of the project. Under such conditions they can be presumed to meet requirement "a" given below for the use of proprietary products on Federal-aid projects. On the other hand, if proprietary devices are specified for use on Federal-aid projects, except exempt, non-NHS projects, they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists or; (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

Sincerely yours,

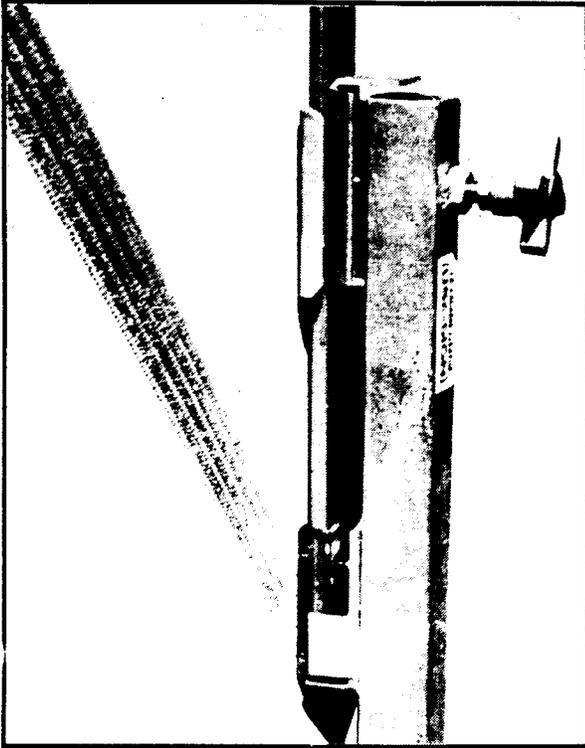


Dwight A. Horne  
Chief, Federal-Aid and Design Division

2 Enclosures

# Compact C-Stands™

## for a variety of roll-up sign types



- ◆ Works for Roll-up Signs with:
  - ✓ Two-rivet, pointed plastic pockets
  - ✓ Most sewn or stitched pockets
  - ✓ Fixed-vertical cross-brace
- ◆ The Stand of Choice for Roll-up Sign Compatibility
- ◆ Pressure plate and short half-mast hold Roll-up Signs more secure
- ◆ Best sign display in windy conditions

Take advantage of all the features of **Eastern Metal-USA/SIGN®** Compact C-Sign Stands™ including the ability to display a large variety of roll-up signs made by other manufacturers.

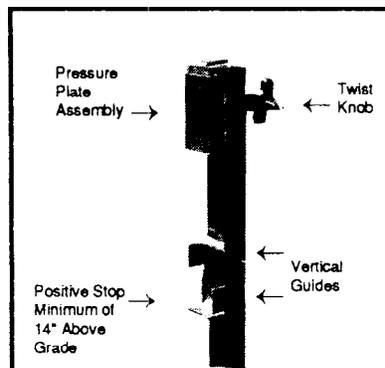
The sign is held on to the sign stand by more than just the bottom corner pocket. The twist-knob with pressure plate assembly holds the vertical brace securely to the stand. Two vertical guides to prevent the sign from "kicking out". The cross-brace stop positions the sign at the correct height.

The C-Stand™ half-mast creates a higher "flex-point" which holds the roll-up sign firmly in the wind, presenting a more visible target to oncoming traffic.

C-Stands™ set-up fast and you'll always know when your roll-up sign is securely mounted to the stand.

### Simple To Use:

1. Slide the vertical cross-brace, just above the bottom pocket, into the opened pressure-plate assembly.
2. Let the vertical cross-brace slide down until the pocket meets the positive stop and is between the two vertical guides.
3. Hand tighten the twist-knob.



C-Stand™ Half-mast

### C-Stand™ Models

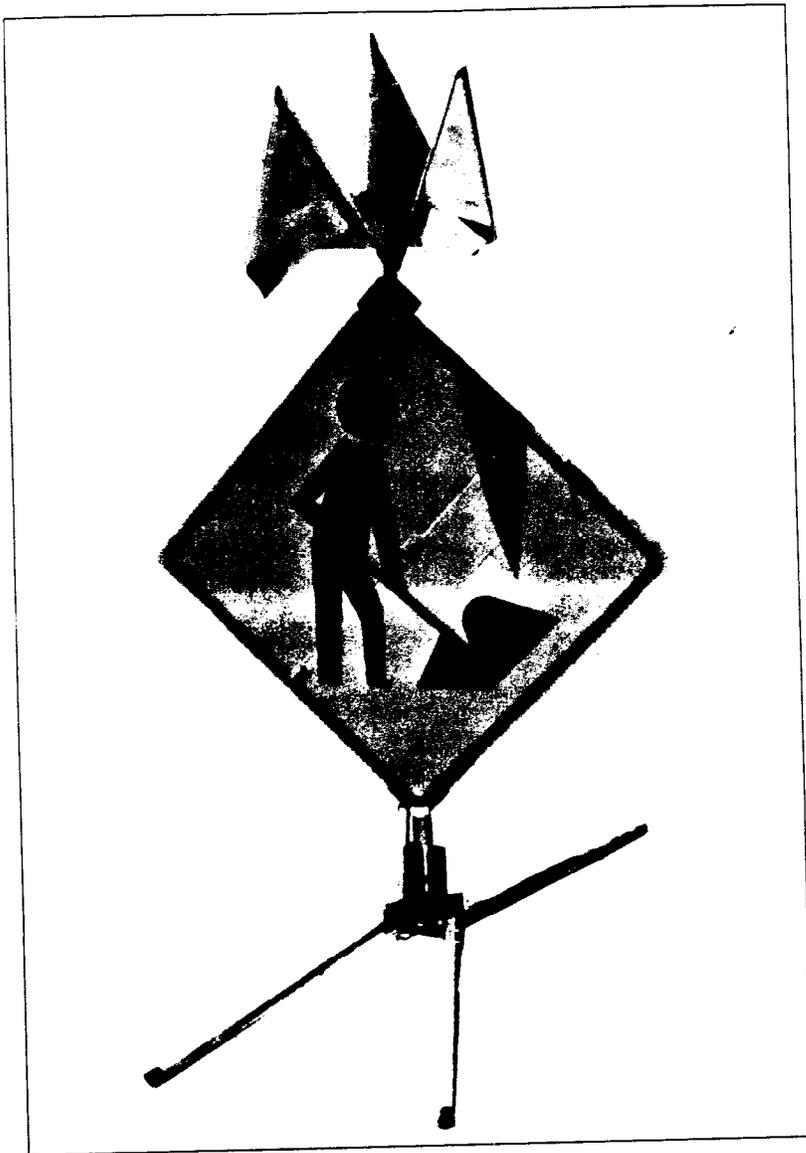
for C-Signs™      for other Roll-up Signs

C-102 = C-132  
 C-202 = C-232  
 C-902 = C-932



# X-550

## Interstate™ Series



- ◆ Superior Wind Resistance
- ◆ Holds 48" Sign 18" Above Grade
- ◆ Uses Rigid or Roll-up Signs
- ◆ New — Simplified Sign Mounting
- ◆ Galvanized Steel Legs & Mast

099-X

# X-550 Interstate™ Series



Interstate Stands™ display rigid or roll-up signs at a minimum of 18" above grade. X-550 Series Stands are sold with your choice of sign-holders.

Interstate X-Stands™ feature dual-spring wind-deflection using two heavy-duty steel coil-springs and galvanized steel legs.

The X-550 Series is rated for open road, two-lane and four-lane highways at 70 mph with a 36" or 48" sign — rigid or roll-up types.

*Stands can be ordered individually or as a complete Warning Kit™ with Mesh, Vinyl, or Reflective Roll-up Signs, or Aluminum or ABS Rigid or Center-Hinged Signs.*

## X-550 Galvanized Steel

### Folded:

9"W x 7-1/2"D x 59-3/4"H

### Legs Extended:

37"W x 84"D x 83-1/2"H

(with a 48" sign)

### Weight:

34 lbs

### Sign Display:

30", 36" & 48" Roll-up, Center-Hinged, Rigid Aluminum, and/or Rigid Plywood Signs, depending on sign-holders ordered.

## X-550 Models:

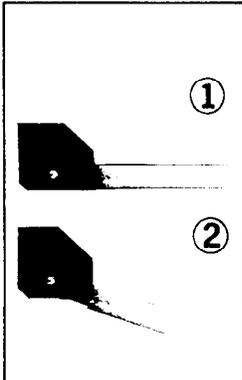
X-550 Stand only (no sign holders)

X-551 Stand w/ 1 Roll-up Sign-Holder

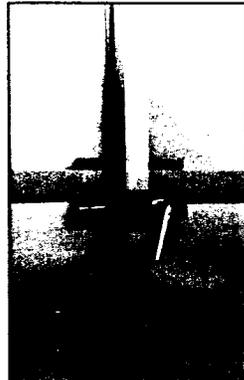
X-552 Stand w/ 2 Rigid Sign-Holders

X-553 Stand w/ all 3 Holders included

## Features:



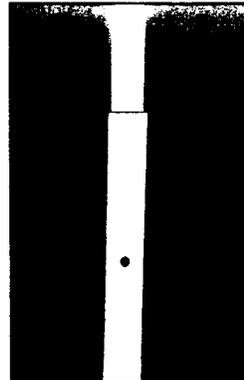
Two-position legs adjust for curb-side use or uneven terrain.



Roll-up Sign-Holder works with any manufacturer's roll-up sign.



Rigid Sign-Holders work with all rigid sign materials: aluminum, plywood, and ABS (full panel or center-hinged signs).



Second setting on mast makes it easy for one person to install rigid sign panels without "bending" the mast over, a real safety advantage.

For additional information, contact:



**Approved Model**      **EM/USA-SIGN**  
**Model C-102**

<b>Height:</b>		
To Top of Mast:	14-5/8"	27-3/4"
To Top of Sign:	80"	83-1/2"
To Top of Flag:	96"	98-1/2"
<b>Footprint:</b>		
<b>Opened</b>		
Wide:	26-1/4"	25-1/4"
Deep:	47"	45"
<b>Fully Extended</b>		
Wide:	37"	40-1/2"
Deep:	68-1/2"	71-1/2"
<b>Legs:</b>		
Tube:	1-1/4" x 1-1/4"	1-1/4" x 1-1/4"
Closed:	24"	24"
Extended:	36-1/2"	38-1/4"

<b>Roll-up Sign:</b>	48" Diamond	48" Diamond
<b>Cross- Strips</b>		
Horizontal:	3/16 x 1-1/4"	3/16 x 1-1/4"
Vertical:	3/16 x 1-1/4"	3/8" x 1-1/4"
Length:	67"	64-1/2"
<b>Weight:</b>	26 lbs.	21.7 lbs.*
<b>Material:</b>	Painted Steel	Galvanized Steel

**Notes:**

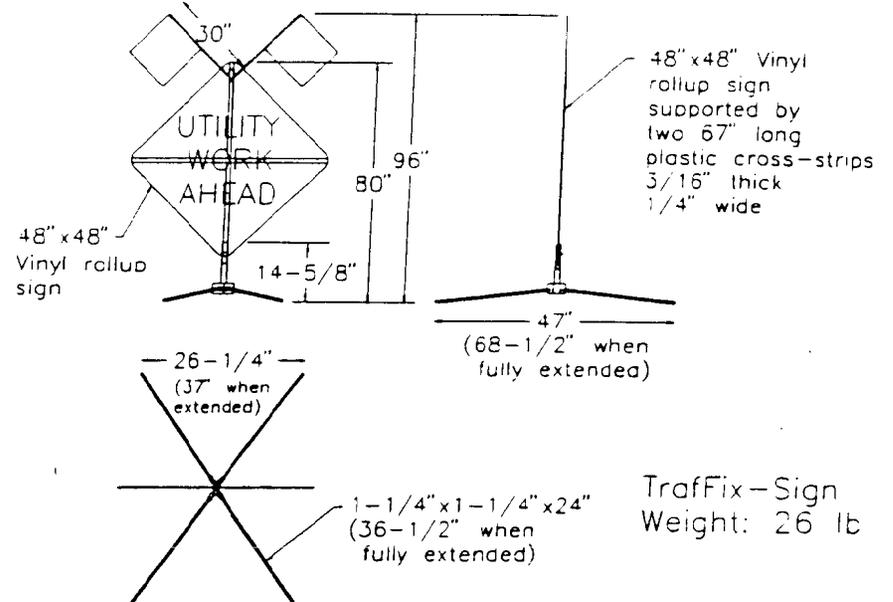
C-102 is the Standard Model of the Series

C-132 is identical except it is fixtured to accept all styles of roll-up signs.

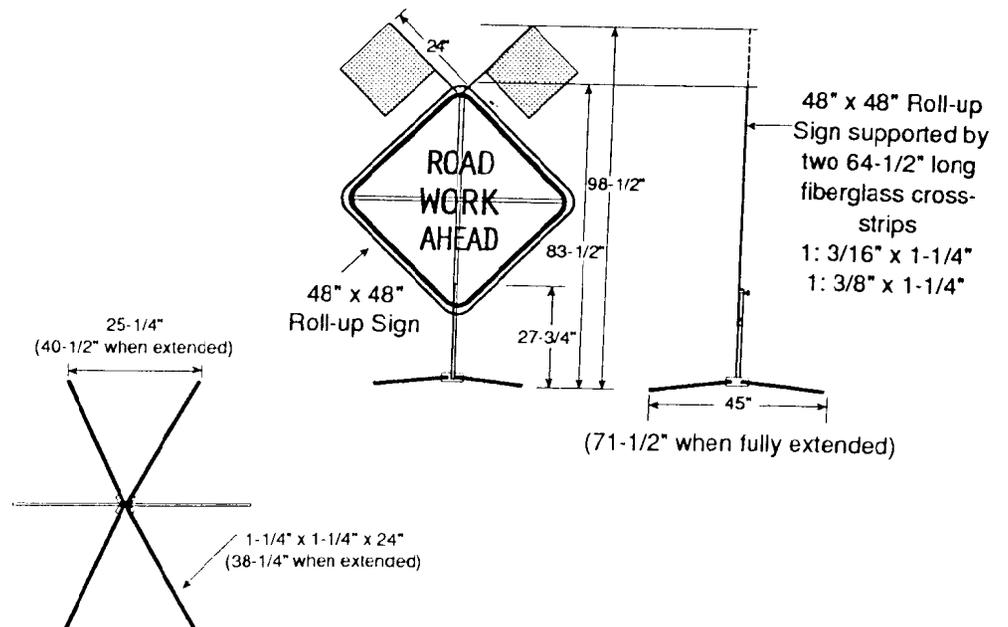
C-142 is identical except the legs are opened by a Foot Release instead of a Push-pin.

\*Weight is Stand Only (Roll-up is 7.8 lbs)

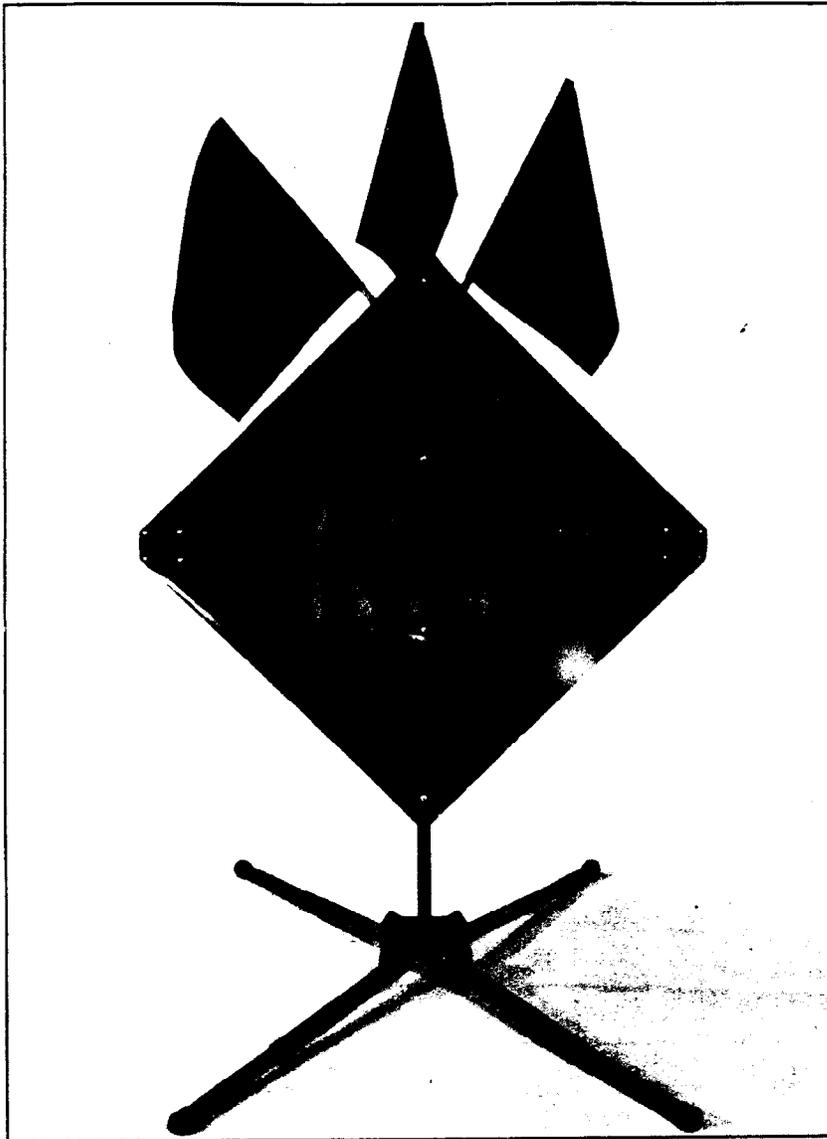
**Approved Model**



**EM/USA-SIGN Model C-102**



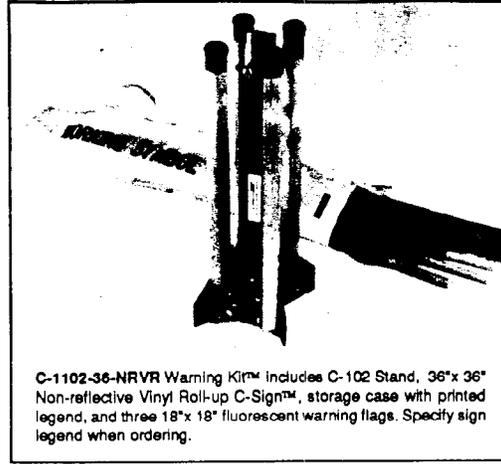
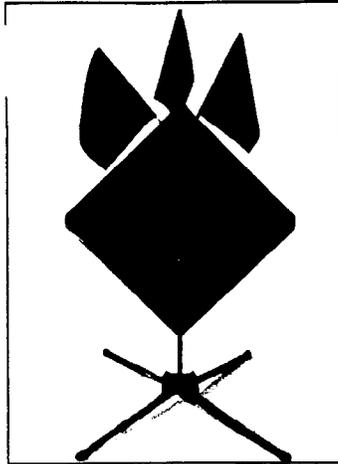
# High Performance Stand for Roll-up Signs



- ◆ Low Cost — Wind Resistant
- ◆ Compact & Light-weight
- ◆ Adaptable To Curb & Uneven Terrain
- ◆ Rugged Durability For Longer Life
- ◆ Fast Set-up & Take-down

C-102

# C-102 Compact Stand™



## C-102 Galvanized Steel Stand

### Folded:

8"W x 8-3/4"D x 25"H

### Open:

29"W x 51"D x 25-1/2"H

(Low leg setting, without sign)

### Legs Extended:

42"W x 73"D x 26"H

(Low leg setting, without sign)

### Legs Extended:

39"W 70"D x 35"H

(High leg setting, without sign)

### Weight:

~~25.00 lbs~~ 21.7 lbs.

### Sign Display:

30", 36" & 48" Roll-up C-Signs™

Our competitive value in a stand for 36" roll-up signs. We have combined many of our high performance features in this low cost model — galvanized steel, telescoping legs with non-skid tips, and a short half-mast for Roll-up C-Signs™.

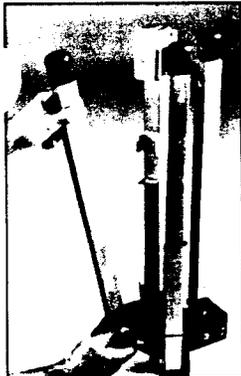
The C-102 folds up compact, is light-weight, and easy-to-use which makes it ideal for anyone who sets up and moves signs regularly.

The C-102 is typically used with a 36" Roll-up C-Sign™ on two-lane highways for up to 65 mph wind conditions. Also, the C-102 holds 48" Roll-up C-Signs™ up to 50 mph.

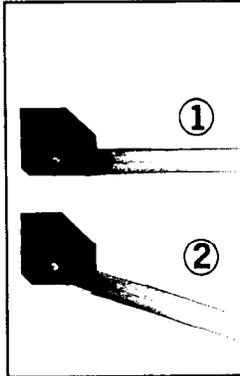
*Stands can be ordered individually or as a complete Warning Kit™ with Mesh, Vinyl, or Reflective Roll-up C-Signs™, sign storage cases with printed legend, and three 18" x 18" warning flags.*

*Inquire about additional model variations to meet specific standards.*

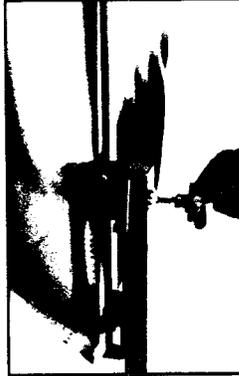
## Features:



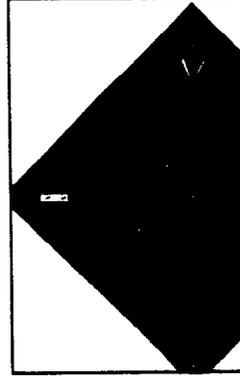
Easy-to-use Pull-pin Leg Release is reliable and gimmick free. No tools are required to set-up or take down.



Two-position legs adjust for curb-side use or uneven terrain.



Sign attachment holds a variety of roll-up signs. When ordering specify type of roll-up sign you use.

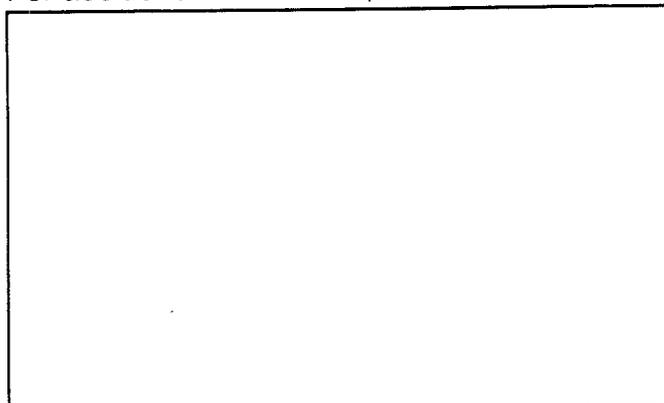


Our C-Sign™ comes fully assembled with the vertical batten riveted to the sign back, and two easy-to-use slide pockets. Sign and battens don't have to be put together for each use.



Optional three-flag-holder (3-FH) on C-Sign™ vertical batten uses economical flags with 3/4" diameter wooden staff.

For additional information, contact:



**Eastern Metal**®  
**USA-SIGN**

Approved Model	EM/USA-SIGN Model X-500
<b>Mast:</b>	
To Top of Mast: 87-1/4"	96
Lower Mast: 1-1/2" x 1-1/2"	1-1/2" x 1-1/2"
Upper Mast: 1-1/4" x 1-1/4"	1-1/4" x 1-1/4"
Material: Tubular Steel	Aluminum Tube
<b>Footprint:</b>	
Extended	
Wide: 37	36
Deep: 78	81
<b>Legs:</b>	
Tube: 1" x 1"	1-1/4" x 1-1/4"
Extended: 42"	43-1/4"
Tubular Steel	Aluminum Tube
<b>Roll-up Sign:</b>	
48" Diamond	48" Diamond
Above Grade: 12"	12"
Weight: N/A	34 lbs.*

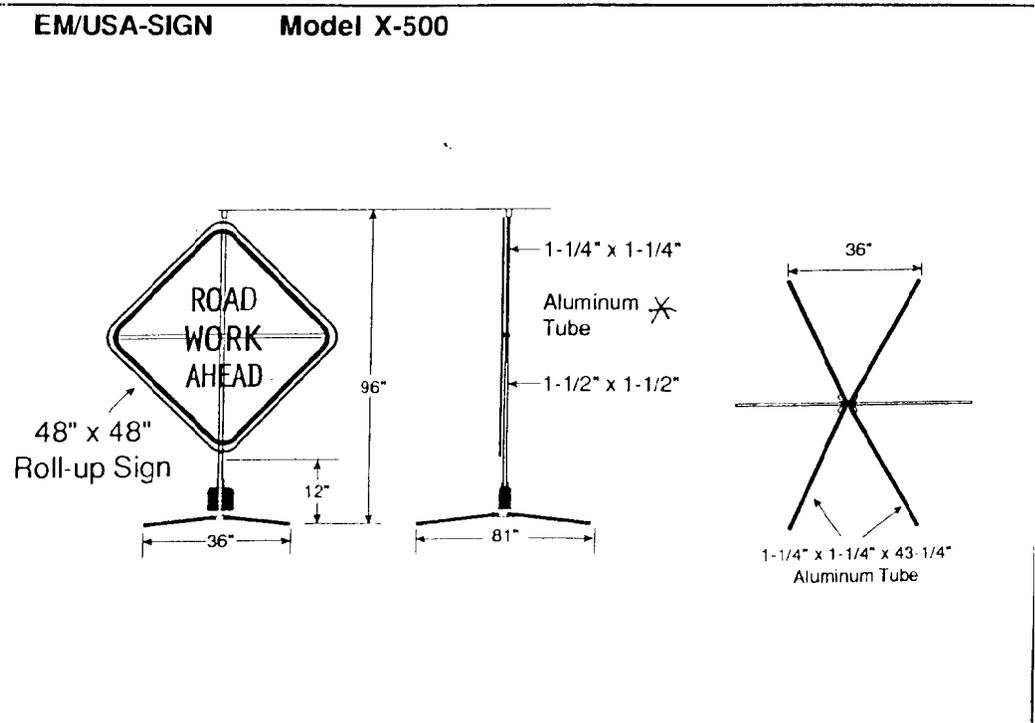
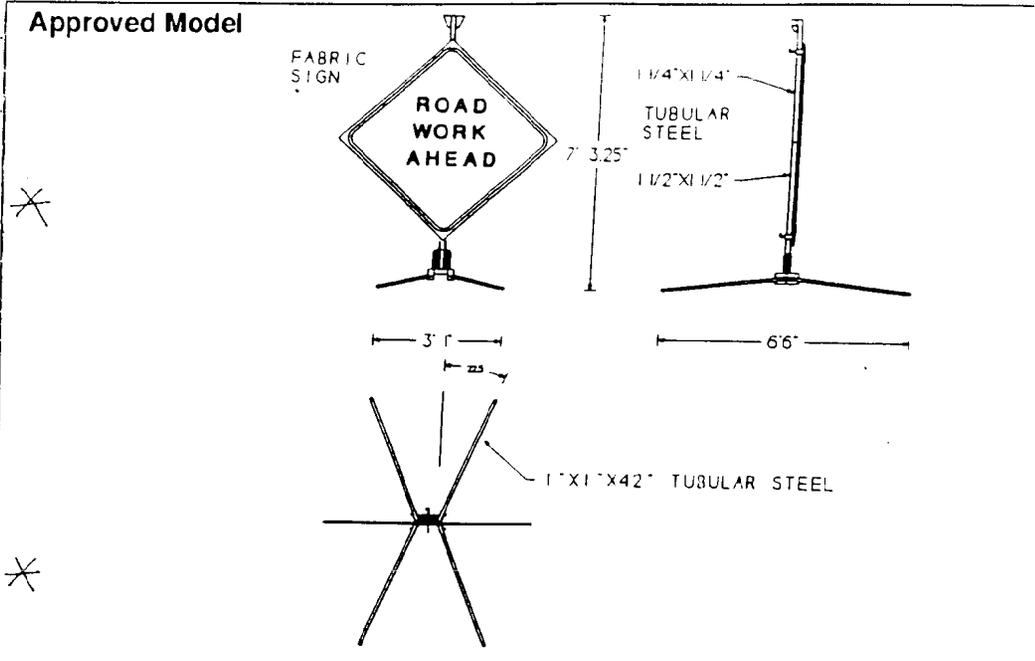
**Notes:**

X-500 is the Standard Model of the Series  
 X-550 Legs and mast fabricated with galvanized tubing  
 X-580 Identical to the X-550 using unique pull-spring leg-release setup

NOTE THAT THIS ACCEPTANCE IS ONLY FOR THE STEEL FRAMED SIGN STAND. THE ALUMINUM VERSION HAS NOT BEEN TESTED AND ACCEPTED TO DATE.

FHWA

\*Weight is Stand Only (Roll-up is 7.8 lbs)



the request. The RFHWA will have approval authority on the request.

(3) Requests for waivers may be made for specific projects, or for certain materials or products in specific geographic areas, or for combinations of both, depending on the circumstances.

(4) The denial of the request by the RFHWA may be appealed by the State to the Federal Highway Administrator (Administrator), whose action on the request shall be considered administratively final.

(5) A request for a waiver which involves nationwide public interest or availability issues or more than one FHWA region may be submitted by the RFHWA to the Administrator for action.

(6) A request for waiver and an appeal from a denial of a request must include facts and justification to support the granting of the waiver. The FHWA response to a request or appeal will be in writing and made available to the public upon request. Any request for a nationwide waiver and FHWA's action on such a request may be published in the FEDERAL REGISTER for public comment.

(7) In determining whether the waivers described in paragraph (c)(1) of this section will be granted, the FHWA will consider all appropriate factors including, but not limited to, cost, administrative burden, and delay that would be imposed if the provision were not waived.

(d) Standard State and Federal-aid contract procedures may be used to assure compliance with the requirements of this section.

[48 FR 53104, Nov. 25, 1983, as amended at 49 FR 18821, May 3, 1984; 58 FR 38975, July 21, 1993]

EDITORIAL NOTE: For a waiver document affecting § 635.410, see 60 FR 15478, Mar. 24, 1995.

**§ 635.411 Material or product selection.**

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through com-

petitive bidding with equally suitable unpatented items; or

(2) The State highway agency certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for the related item(s) of work are estimated to be approximately the same, the PS&E for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute some other acceptable material or product for the material or product designated by the successful bidder or bid as the lowest alternate, and such substitution results in an increase in costs, there will not be Federal-aid participation in any increase in costs.

(c) A State highway agency may require a specific material or product when there are other acceptable materials and products, when such specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the unit price of each acceptable alternative. In this case Federal-aid participation will be based on the lowest price so established.

(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.

**§ 635.413 Warranty clauses.**

The SHA may include warranty provisions in National Highway System (NHS) construction contracts in accordance with the following:

(a) Warranty provisions shall be for a specific construction product or feature. Items of maintenance not eligible for Federal participation shall not be covered.

(b) All warranty requirements and subsequent revisions shall be submitted to the Division Administrator for advance approval.

(c) No warranty requirement shall be approved which, in the judgment of the Division Administrator, may place an undue obligation on the contractor for items over which the contractor has no control.

(d) A SHA may follow its own procedures regarding the inclusion of war-

ranty provisions in non-NHS Federal aid contracts.

[60 FR 44274, Aug. 25, 1995]

**§ 635.417 Convict produced materials.**

(a) Materials produced after July 1, 1991, by convict labor may only be incorporated in a Federal-aid highway construction project if such material have been:

(1) Produced by convicts who are on parole, supervised release, or probation from a prison or

(2) Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.

(b) *Qualified prison facility* means a prison facility in which convicts, during the 12-month period ending July 1, 1987, produced materials for use in Federal-aid highway construction project

[53 FR 1923, Jan. 25, 1988, as amended at FR 38975, July 21, 1993]

APPENDIX A TO SUBPART D—SUMMARY OF ACCEPTABLE CRITERIA FOR SPECIFYING TYPES OF CULVERT PIPES

Type of drainage installation	Alternatives required			AASHTO designations to be included with alternatives	Application	Remarks
	Yes	No	Number			
Cross drains under high-type pavement <sup>1</sup>		X			Statewide	Any AASHTO approved material Do. <sup>2</sup>
Other cross-drain installations	X		3 minimum	M-170 and M-190	do	
Side-drain installations	X		do	M-36	do	Do. <sup>2</sup>
Special installation conditions		X			Individual installation	Specified to meet special conditions
Special drainage systems (storm sewers, inverted siphons, etc.)		X			do	Specified to meet site requirements

<sup>1</sup> High-type pavement is generally described as FHWA construction type codes I, J, K, L, and plant mix and penetration m and madam segments, respectively shown in the right-hand columns of type codes G and H having a combined thickness of surf and base of 7 in or more (or equivalent) or that are constructed on rigid bases

<sup>2</sup> Types not included in currently approved AASHTO specifications may be specified if recommended by the State with a quote justification and approved by FHWA.

**Subpart E—Interstate Maintenance Guidelines**

SOURCE: 45 FR 20793, Mar. 31, 1980, unless otherwise noted.

**§ 635.501 Purpose.**

To prescribe Interstate maintenance guidelines and establish the policy and procedures to insure that the condition of Interstate routes is maintained at the level required by the purposes for which they were designed.