



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

February 17, 2000

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

Refer to: HMHS-10

Mr. William M. Korman, Jr.
President, Korman Signs
3029 Lincoln Avenue
Richmond, Virginia 23228-4295

Dear Mr. Korman:

Thank you for your letter of October 19, 1999 requesting Federal Highway Administration (FHWA) acceptance of your company's portable sign stands as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter were copies of the crash test reports by General Testing Laboratories, Inc., and video documentation of the crash tests. You requested that we find the tested devices acceptable for use on the NHS under the provisions of National Cooperative Highway Research Program NCHRP Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

The FHWA guidance on crash testing of work zone traffic control devices is contained in two memoranda. The first, dated July 25, 1997, titled "Information: Identifying Acceptable Highway Safety Features," established four categories of work zone devices: Category I devices were those lightweight devices which could be self-certified by the vendor, Category II devices were other lightweight devices which needed individual crash testing, Category III devices were barriers and other fixed or massive devices also needing crash testing, and Category IV devices were trailer mounted lighted signs, arrow panels, etc. The second guidance memorandum was issued on August 28, 1999, and is titled "INFORMATION: Crash Tested Work Zone Traffic Control Devices." This recent memorandum lists devices that are acceptable under Categories I, II, and III.

Full-scale automobile testing was conducted on your company's portable sign supports. In most cases, two examples of each device were tested in tandem, one head-on and the next at 90 degrees, as called for in our guidance memoranda. A brief description of each tested stand follows.

SS560: X footprint stand with rigid steel legs. The sign support assembly consists of a pivoting steel upright with a telescopic steel mast and built in sign holders that is connected to the base via two extension springs. This stand supports either rigid aluminum, ALPOLIC, or roll-up signs at an operating height of 1530 mm above the pavement.

SS560A: Same as the SS560 except the legs are aluminum.

SS560UCA: Same as the SS560A except the telescopic mast is aluminum and supports only roll-up signs that mount via a clamping mechanism. The legs telescope.

SS548: Same as SS560 but reduced in size and weight accordingly for an operating height of 533 mm above the pavement. This stand supports either ALPOLIC or roll-up signs.

SS548A: Same as SS548 except that the legs and mast are aluminum.

SS548CA: Same as SS548 except that the legs are telescoping aluminum.

SS548C: Same as SS548 CA except that the legs are steel.

SS1: Tripod stand with rigid steel legs and telescopic mast that supports a roll-up sign at 326 mm above the pavement, or an ALPOLIC sign at 356 mm above the pavement.

SS548UCR X footprint stand with telescoping steel legs. A short steel mast is rigidly attached to the base and contains a clamping mechanism that holds a roll-up sign at a height of 343 mm above the pavement.

SS548UCRA: Same as SS548UCR except legs are aluminum.

SS548UC: X footprint stand with telescopic steel legs. A short steel mast that pivots is connected to the base via two vertical extension springs and contains a clamping mechanism that mounts a roll up sign at 533 mm above the pavement.

SS548UCA: Same as SS548UC except legs are aluminum.

Enclosure 1 is a summary of all sign stands tested and the results. This summary lists the pertinent details of each stand (materials and construction) and the signs and flags mounted on them (type of substrate, mounting height, etc.) It also gives the details of the tests including test vehicle mass, impact speeds, and a summary of the damage caused by the impacts. Enclosure 3 consists of drawings of the tested stands.

During the tests there were no windshield damage except in Test 10 where the Alpolic sign striking at 90 degrees caused a 1-inch depression in the center of an area of cracking. The windshield was not penetrated in that test. Two sign stands (Tests 12 and 16) caused short cuts in the roof of the test vehicles but there were no further intrusion. In Test 9 the fuel tank was leaking after the test, however there appeared to be nothing peculiar about the tested sign stands that would cause us to believe that they had a greater potential to penetrate the occupant compartment than any other tested stands.

You also asked us to permit the following extrapolations. These extrapolations are summarized in your chart which is included as Enclosure 2.

- 1) Testino was conducted on some stands with .080 aluminum sign blanks, some with Alpolic signs blanks, and others with roll up signs. You asked that stands tested with .080 aluminum blanks be found acceptable when used with Alpolic signs or with roll up signs. You also asked that stands tested with Alpolic signs be found acceptable when used with roll up signs. We concur in your assessment that the .080 aluminum is a "worst case" scenario and that the stands tested with .080 aluminum signs will perform in an acceptable manner when used with the Alpolic or roll up signs. Likewise, the Alpolic substrate is a "worse case" than roll up signs, and any stands tested with Alpolic will perform acceptably with roll up signs as well.
- 2) One test was conducted using an SS 560 hit head-on and an SS 560A hit at 90 degrees. The sign stands are identical except for the legs: the SS 560 legs are steel and the SS 560A legs are aluminum. We concur in your assessment that the single test (Test 3) adequately demonstrates that the SS 560/560A is acceptable whether steel or aluminum legs are used.

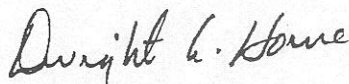
* These combinations are found acceptable based on extrapolations discussed above.

** These two stands are the same as SS548UCR and SS548UC respectively except the legs are aluminum.

Our acceptance is limited to the crashworthiness characteristics of the device and does not cover its structural features, nor conformity with the Manual on Uniform Traffic Control Devices. Presumably, you will supply potential users with sufficient information on design and installation requirements to ensure proper performance. We anticipate that the States will require certification from Korman Signs that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance. To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-29, shall not be reproduced except in full.

If components of your signs are patented they may be considered "proprietary." The use of proprietary work zone traffic control devices 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. Home
Director, Office of Highway Safety Infrastructure

4 Enclosures

- 3) Tests were conducted both with and without the use of flags to determine if conventional flags with wooden staffs had any influence on the outcome of the crash event. No damage was caused by the flags, nor did the presence of the flags increase or reduce potential damage in any tests. We concur in your assessment that your tested sign stands may be used with or without these flags.
- 4) Stands SS 548 UCR and SS 548 UC have been previously accepted by extrapolation (WZ-21) with either a turn/screw or spring loaded lever clamping mechanism. You tested these signs in the recent crash test program in order to have documentation to substantiate your earlier conclusions as well as proving the use of a different clamp, flags, and steel legs had no impact on the outcome. We accept these data.

In summary, there was no occupant compartment intrusion or deformation observed, nor did any test article debris show potential for penetrating the occupant compartment. The results of this testing met the FHWA requirements and, therefore, the devices listed in the table below are acceptable according to NCHRP Report 350 Test Level 3 criteria for use on the NHS under the range of conditions tested, when proposed by a State.

Stand Number	Signs stand is acceptable with:			Test Numbers
	,080 Alum.	Alpolic	Roll Up	
ss 560	YES	YES*	YES*	3
SS 560 A	YES	YES*	YES''	3 I
SS 560 UCA	NO	NO	YES	5
ss 548	NO	YES	YES''	14
SS 548 A	NO	YES''	YES	9
SS 548 CA	NO	YES	YES	12
SS 1	NO	YES	YES	4
SS 548 UCR	NO	NO	YES	16
SS 548 UC	NO	NO	YES	16
SS 548 C	NO	YES	YES*	*
SS 548 UCRA	NO	NO	YES	**
SS 548 UCA	NO	NO	YES	**

Enclosure 1

Korman Signs Inc
 NCHRP 350
 Submittal No. 3
 October 19,1999

Korman Signs Inc. Summary Table of NCHRP Report 350 Test Results and basic product characteristics for Submittal Letter Number 3 dated October 19,1999														
Report Number	3	3	5	14	9	12	10	4	17	16	16	none	none	
Test Article	SS560	SS560A	SS560UCA	SS548	SS548A	SS548CA	SS548CA	SS1	SS1	SS548UCR	SS548UC	SS548C	SS548C	
Impact No.	40B	40A	42A, 42B	51A, 51B	45A, 45B	50A, 50B	49A, 49B	41A, 41B	46A, 46B	48A	48B	none	none	
Type of Stand	X Base	X Base	X Base	X Base	X Base	X Base	X Base	Tripod	Tripod	X Base	X Base	X Base	X Base	
Type of Sign	.080 Al	.080 Al	Roll Up	ALPOLIC	Roll Up	Roll Up	ALPOLIC	ALPOLIC	Roll Up	Roll Up	Roll Up	Roll Up	ALPOLIC	
Type of Fiberglass Ribs	n/a	n/a	3/16, 3/8	n/a	3/16, 3/16	3/16, 3/16	n/a	n/a	3/16, 3/16	3/16, 3/8	3/16, 3/8	3/16, 3/16	n/a	
Type of Base	Flexible	Flexible	Flexible	Flexible	Flexible	Flexible	Flexible	Rigid	Rigid	Rigid	Flexible	Flexible	Flexible	
Type of Legs	Rigid Stl	Rigid Al	Tel. Al	Rigid Stl	Rigid Al	Tel. Al	Tel. Al	Rigid Stl	Rigid Stl	Tel. Stl	Tel. Stl	Tel. Stl	Tel. Stl	
Type of Mast	Rigid Stl	Rigid Stl	Rigid Al	Rigid Stl	Rigid Al	Tel. Stl	Tel. Stl	Rigid Stl	Rigid Stl	Fiberglass	Fiberglass	Tel. Stl	Tel. Stl	
Type of Flags	none	none	none	wood	none	wood	none	none	wood	wood	none	n/a	n/a	
Method of Attaching Sign	V Clip	V Clip	Clamp	V Clip	Bracket	Bracket	V Clip	Clip	Bracket	Clamp	Clamp	Bracket	V Clip	
Test Article Mass (w/o sign)	22.9 kg	17.8 kg	13.4 kg	18.3 kg	13.9 kg	14.5 kg	14.5 kg	9.1 kg	9.1 kg	9.8 kg	12.2 kg	n/a	n/a	
Height of Mast (w/sign)	324 cm	324 cm	180 cm	223 cm	223 cm	223 cm	223 cm	188 cm	184 cm	58.4 cm	81.3 cm	223 cm	223 cm	
Height to bottom of sign	153 cm	153 cm	153cm	53.3 cm	53.3 cm	53.3 cm	53.3 cm	35.6 cm	32.6 cm	34.3 cm	53.3 cm	53.3 cm	53.3 cm	
Height to top of sign	323 cm	323 cm	323cm	223 cm	223 cm	223 cm	223 cm	188 cm	184 cm	204 cm	221 cm	223 cm	223 cm	
Length of Legs	153 cm	153 cm	165 cm	122 cm	122 cm	129.5 cm	129.5 cm	127/117 cm	127/117 cm	129.5 cm	129.5 cm	129.5 cm	129.5 cm	
Vehicle Inertia Mass	810 kg	810 kg	813 kg	845 kg	820 kg	845 kg	823 kg	823 kg	812 kg	812 kg	812 kg	n/a	n/a	
Speed(Radar Gun)	103 km/h	103 km/h	101 km/h	100 km/h	100 km/h	97 km/h	100 km/h	101 km/h	100 km/h	98 km/h	98 km/h	n/a	n/a	
Occupant Impact Speed	none	none	none	none	none	none	none	none	none	none	none	n/a	n/a	
Vehicle Crush	small dents on bumper, grill,hood and back of roof, grill cracked, scrapes on roof	same as 408	small dents on bumper, length of hood and scrape on roof	slight dents on bumper	dents on hood and bumper, some roof contact, grill broken out	slight dent on bumper	slight dent on hood front bent windshield depressed some cracking	slight dent on-bumper and grill hood front bent windshield depressed some cracking	dents and depressions to hood and roof and driver side fender	slight depression of the hood	minor dents on bumper hood grill and roof small cut roof from flag holder scrape on windshield header	same es 48A	n/a	n/a
Occupant Compartment Intrusion	none	none	none	none	none	none	none	none	none	none	none	none	n/a	n/a
Windshield Damage Head On	none	none	none	none	none	none	none	none	none	none	none	none	n/a	n/a
Windshield Damage90 degree	none	none	none	none	none	none	none	none	minor	none	none	none	n/a	n/a

Enclosure IA

Definition of Terms

suffix A	Indicates Head On Orientation
Suffix B	Indicates 90 degree Orientation
X Reg	Conventional 4 legged X Footprint Base Construction
X Ult Comp	4 Legged X Footprint Base w/telescopic components made as compact as possible roll up only
X Comp	4 Legged X Footprint Base w/telescopic components made as compact as possible roll up or rigid
Tripod	3 Legged Stand w/movable vertical mast
Flexible	Indicates a stand base that provides a swinging motion restrained by a 2 stage double vertical extension spring design
Rigid Stl	1 piece steel square tubing
Rigid Al	1 piece aluminum square tubing
Tel Al	2 pieces of aluminum square tubing where one telescopes inside the other
Tel Stl	2 pieces of steel square tubing where one telescopes inside the other
Wood	Type of flag consisting of vinyl coated nylon fabric fastened to 3/4 in (1.9cm diameter wooden staff
Clamp	Device that traps fiberglass rib on back side of roll up sign and draws it under controlled force to the upright
V Clip	V shaped formed metal bracket designed to hold rigid signs to sign stand
Clip	Small piece of angle to hold rigid signs on front legs of Tripod
Bracket	Indicates method to mount roll up signs.. consists of 2 mounting fingers to trap horizontal rib on both sides of its center
Report Number	Number that appears on GTL Report Cover Sheet and coincides with Run Number assigned to each impact
Impact Number	Number assigned to each device to document and keep track of outcome and quickly identify the orientation
3/16	Indicates a rectangular shaped fiberglass rib that is 3/16 in (.48cm) thick and 1.25 in (3.2cm) wide
3/8	Indicates a rectangular shaped fiberglass rib that is 3/8 in (.95cm) thick and 1.25 in (3.2cm) wide

Enclosure 2

Korman Signs
 NCHRP 350
 Submittal No. 3
 October 19, 1999

Korman Signs Inc. Chart showing basis for 350 acceptance by either the actual Impact Number and/or the relevant Impact Number(s) that justify the extrapolation.

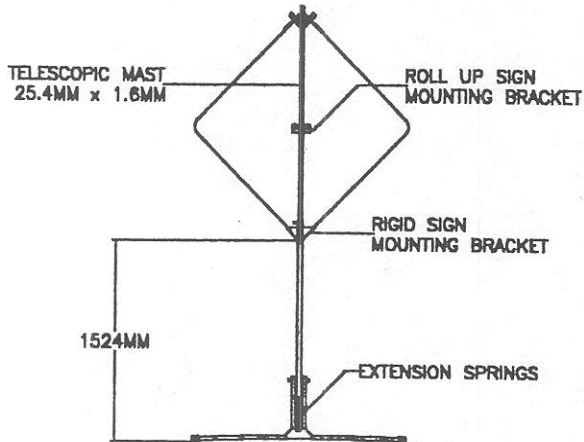
Model No.	SS560	SS560A	SS560UCA	SS548	SS548A	SS548CA	SS548CA	SS1	SS1	SS548UCR	SS548UC	SS548C
.080 Aluminum by Test	40B	40A										
2mm Alpolic by Test				51A,51B			49A,49B	41A,41B		48A	48B	
Roll Up Sign by Test			42A,42B		45A,45B	50A,50B			46A,46B			
Flags Used in Test	no	no	no	yes	no	yes	no	no	yes	yes	no	
.080 Aluminum by Extrapolation	40A	40B										
2mm Alpolic by Extrapolation	40A,40B 51A, 51B 49A, 49B	40A,40B 51A, 51B 49A, 49B			51A,51B 49A,49B							49A,49B 51A, 51B
Roll Up by Extrapolation	40A,40B 42A,42B 45A,45B 50A,50B	40A,40B 42A,42B 45A,45B 50A, 50B		45A,45B 50A,50B								50A,50B 45A, 45B

This Chart summarizes the request of Korman Signs Inc. as reported in Submittal No. 3 dated 10/19/99 and denotes the basis for crash worthy acceptance.

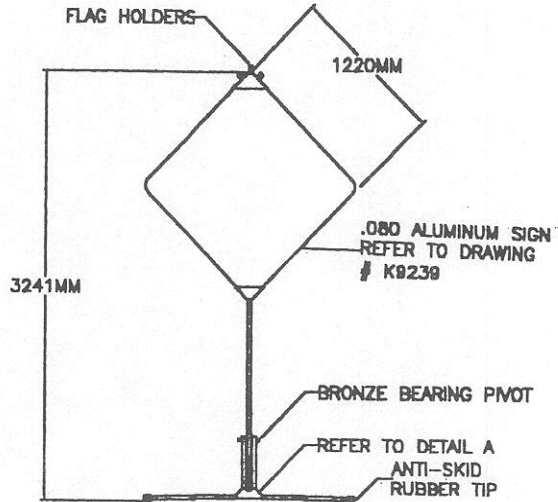
Model Number of Stand	.080 Alum	ALPOLIC	Roll Up	W/Flags	WO/Flags
SS560	T/E	E	E	E	T
SS560A	T/E	E	E	E	T
SS548		T	E	T	T
SS548A		E	T	E	E
SS548CA		T	T	T	T
SS548C		E	E	E	E
SS1		T	T	T	T
SS560UCA			T	E	T
SS548UCR			T	T	E
SS548UC			T	E	T
SS548UCRA			T (WZ-21)	E	T (WZ-21)
SS548UCA			T (WZ-21)	E	T (WZ-21)

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
<h1>SS560</h1>				

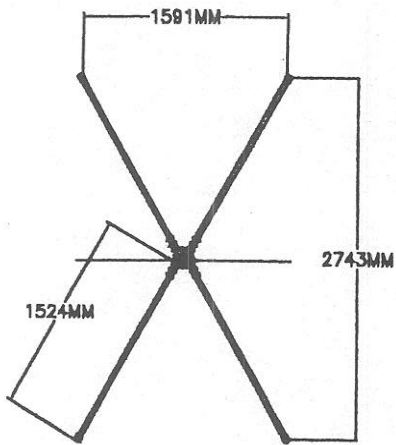
BACK VIEW



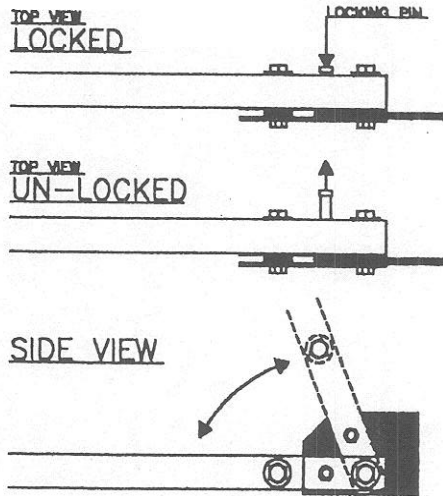
FRONT VIEW



TOP VIEW



DETAIL -A-



BASE
31.75MM X 2.1MM SQUARE STEEL TUBING WITH
4.91MM STEEL LEG MTG.FLANGES

LEGS
31.75MM X 1.6mm SQUARE STEEL TUBING

TELESCOPIC MAST 25.4MM X 1.8MM SQUARE STEEL TUBING
SPRINGS - EXTENSION

FINISH - ZINC



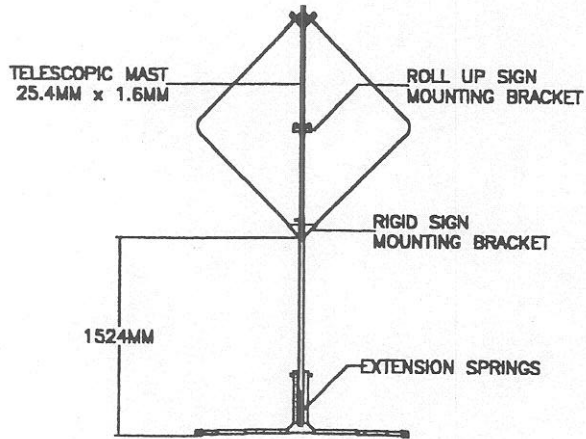
Korman Signs

SCHEMATIC DRAWING FOR MODEL SS560
HEAVY DUTY FLEXIBLE SIGN STAND WITH
A/N .080 ALUMINUM SIGN

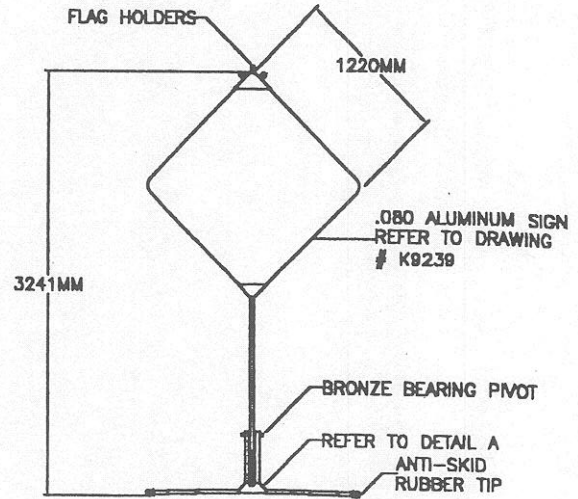
SIZE	FSCM NO.	DWG NO.	REV
		C9219C	
SCALE-NOT TO SCALE		9/23/99	SHEET
			DSC

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
<h1>SS560A</h1>				

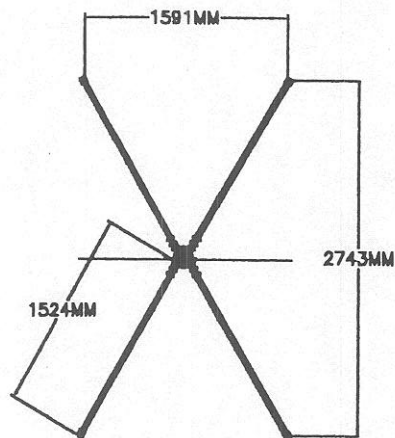
BACK VIEW



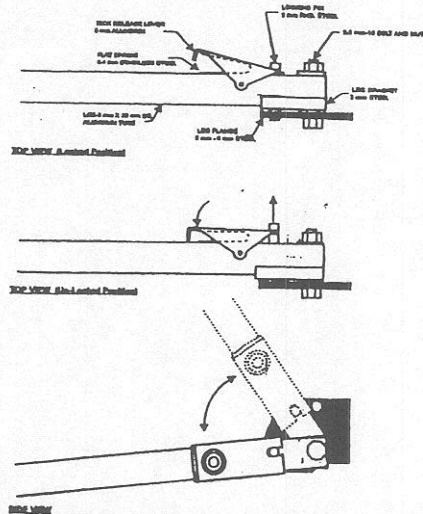
FRONT VIEW



TOP VIEW



DETAIL -A-



BASE
31.75MM X 2.1MM SQUARE STEEL TUBING WITH
4.91MM STEEL LEG MTG. FLANGES

LEGS
31.75MM X .256MM SQUARE ALUMINUM TUBING

TELESCOPIC MAST 25.4MM X 1.8MM SQUARE STEEL TBG.

SPRINGS - EXTENSION TYPE

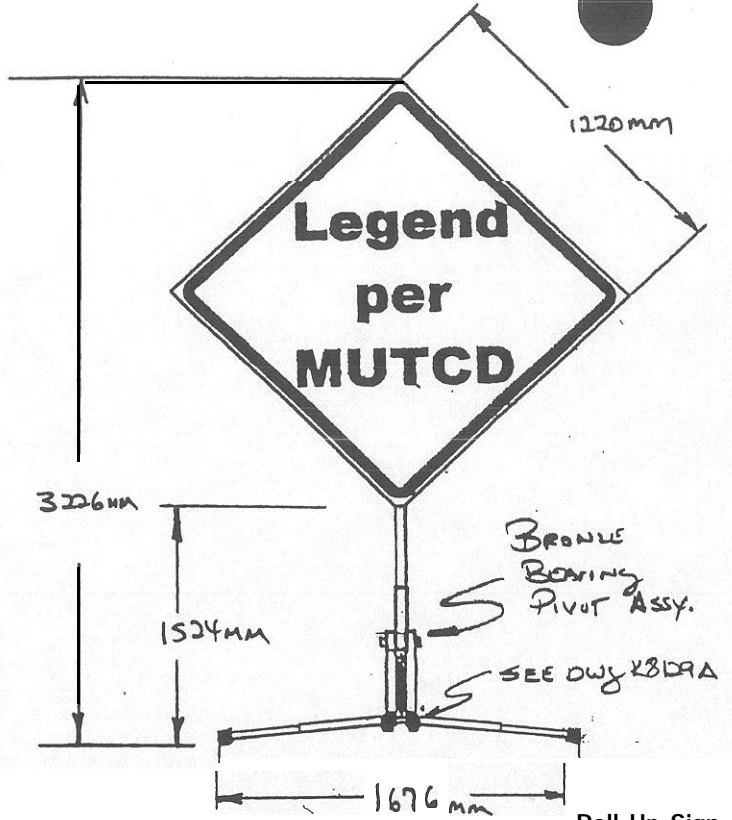
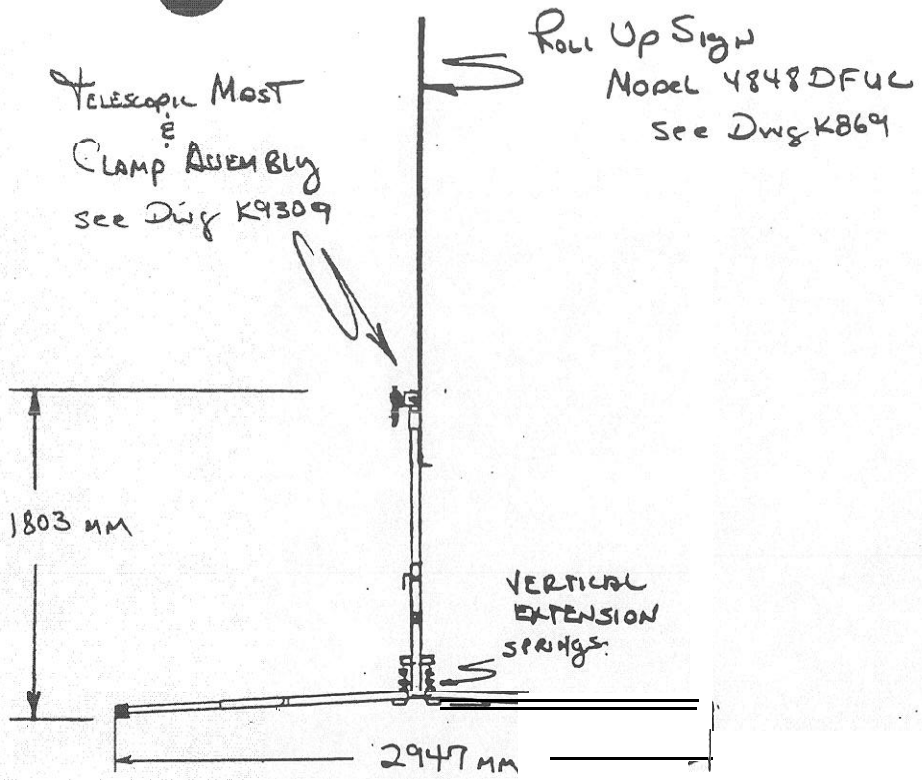
FINISH - ZINC



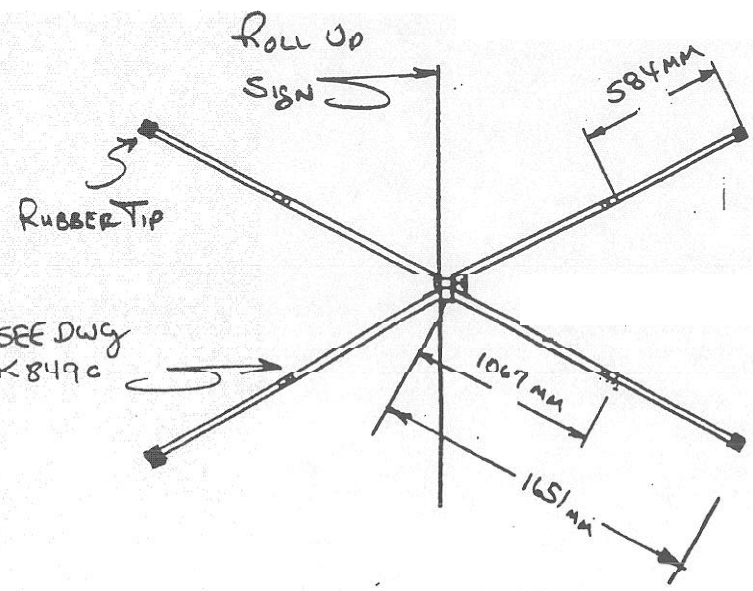
Korman Signs

SCHMATIC DRAWING FOR MODEL SS560A
HEAVY DUTY FLEXIBLE SIGN STAND WITH
A .080 ALUMINUM SIGN

SIZE	FSCM NO.	DWG NO.	REV
		C9209A	
SCALE - NOT TO SCALE		9/23/99	SHEET
			DSC



Roll Up Sign Model 4848DFUC



Ultra Compact Sign Stand SS560UCA

Base
31.75mm x 2.1mm square steel tubing with 4.91mm steel leg mtg flanges

Legs
Telescopic 31.70mm and 25.42mm square aluminum tubing with 2.56mm and 2.46mm wall thickness respectively

Mast
Telescopic 25.42 x 2.56 wall thickness square aluminum tubing with lever clamp

Springs...Vertical extension type

Finish...Zinc/Aluminum

Fabric
3M Diamond Grads Roll Up Sign Reflective Sheeting #RS-24

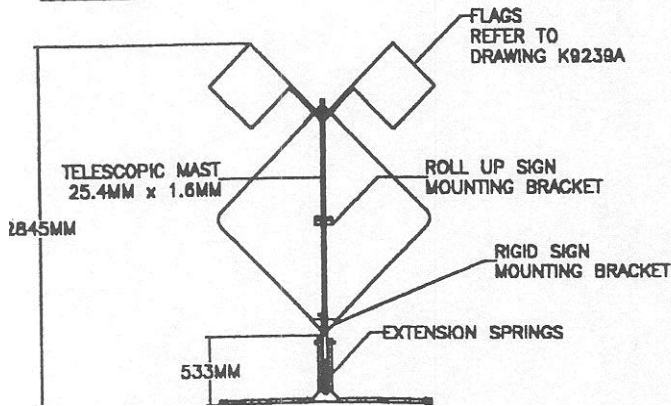
Crossbraces (Ribs)
Vertical 9.53mm tick, 31.75mm wide, 1645mm long
Horizontal 4.66mm thick, 31.75mm wide, 1645mm long
Pultruded Fiberglass

Pockets
Lexan or Heavy Duty Triangular Mesh Fabric

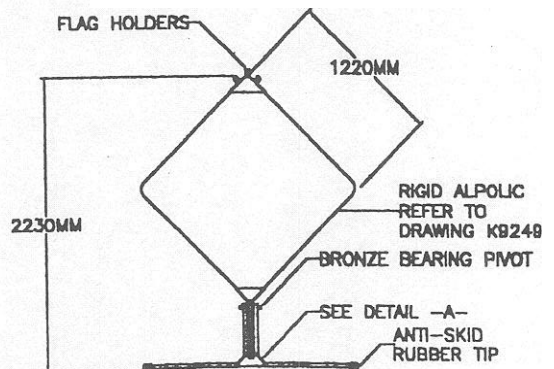
SCHEMATIC DRAWING MODEL SS560UCA SIGN STAND WITH ROLL-UP SIGN 4848	
NO SCALE	
10/17/99	DWG. NO. K1089

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
<h1>SS548</h1>				

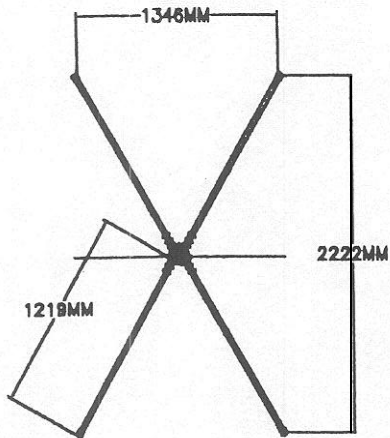
BACK VIEW



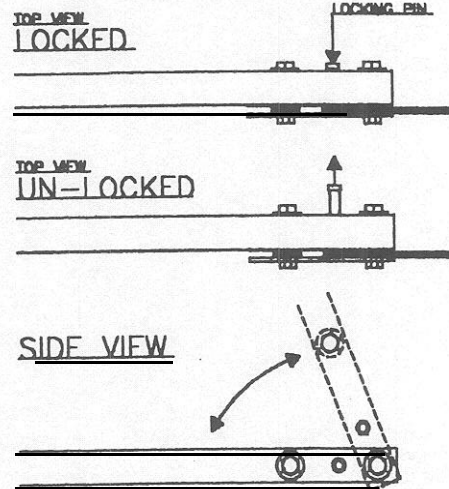
FRONT VIEW



TOP VIEW



DETAIL -A-



BASE
31.75MM x 2mm SQUARE STEEL TUBING WITH
4.91MM STEEL LEG MTG.Flanges

LEGS
31.75MM x 2.1mm SQUARE STEEL TUBING

MAST 25.4MM x 1.6mm SQUARE STEEL TBG.

SPRINGS - EXTENSION TYPE

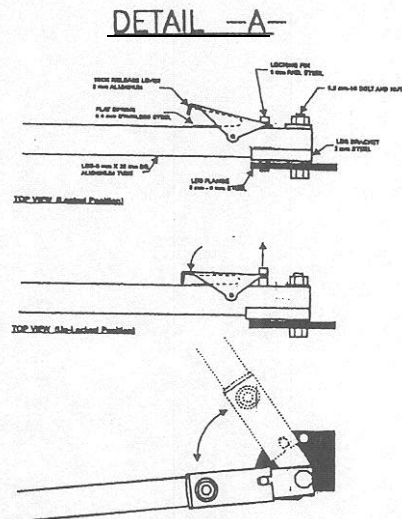
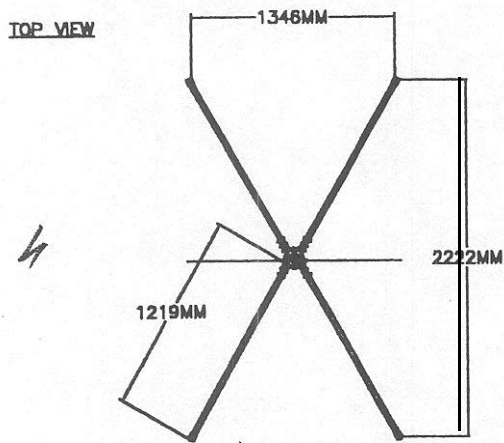
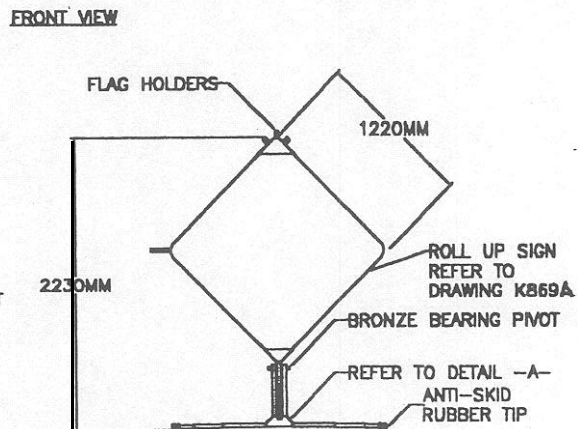
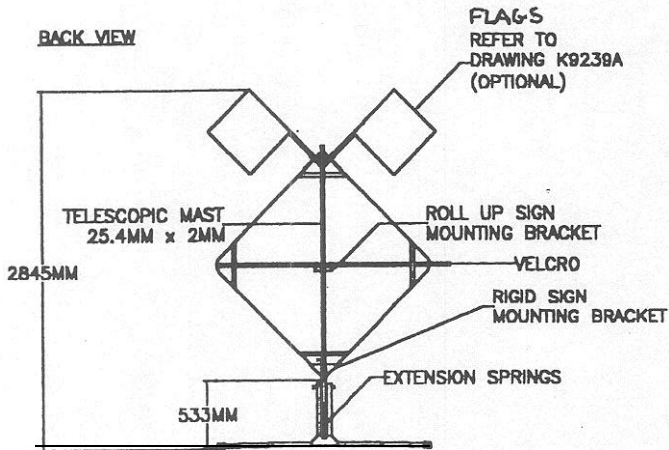
FINISH - ZINC



SCHMATIC DRAWING FOR MODEL SS548
FLEXIBLE SIGN STAND WITH A 2MM ALPOLIC SIGN

SIZE	FSCM No.	DWG No.	REV
		082183	
SCALE - NOT TO SCALE	9/2/99	SHEET	DSC

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
<h1>SS548A</h1>				



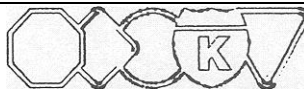
BASE
1.75MM X 2.1MM SQUARE STEEL TUBING WITH
.91MM STEEL LEG MTG.FLANGES

EGS
3.75mm x .256mm SQUARE ALUMINUM TUBING

TELESCOPIC Mast - 25.4MM X .256MM Aluminum TBG.

SPRINGS - EXTENSION TYPE

FINISH - ZINC



Korman Signs
INC

SCHMATIC DRAWING FOR MODEL SS548A
FLEXIBLE SIGN STAND WITH A 4848DF ROLL UP SIGN

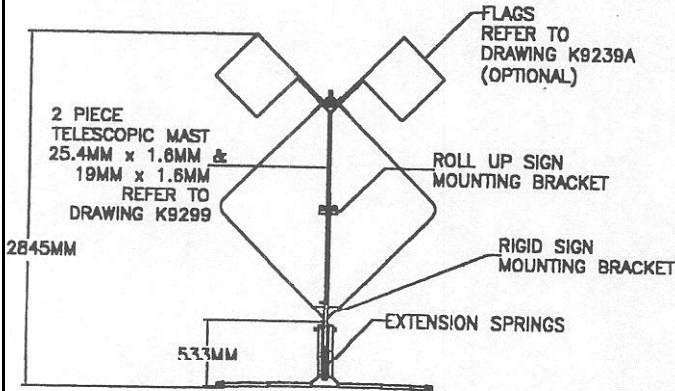
SIZE FSCM N O	DWG No. c9219c	REV
SCALE-NOT TO SCALE	9/29/99	SHEET
		DSC

REVISIONS

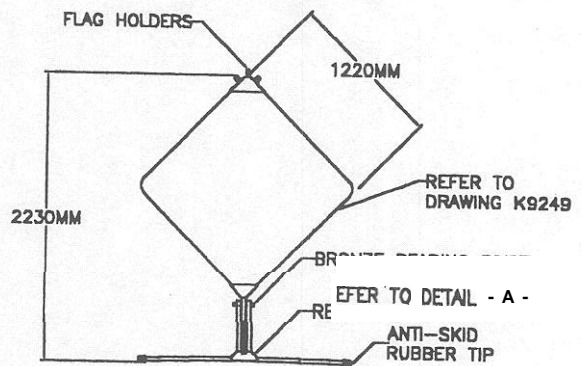
ZONE	REV	DESCRIPTION	DATE	APPROVED
------	-----	-------------	------	----------

SS548CA

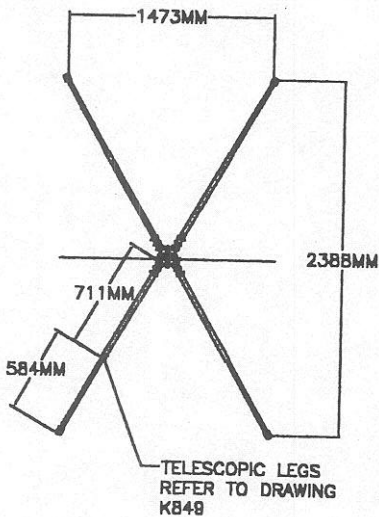
BACK VIEW



FRONT VIEW



TOP VIEW



DETAIL - A -

BASE
31.75MM X 2.1MM SQUARE STEEL TUBING WITH
4.91MM STEEL LEG MTG.FLANGES

LEGS
TELESCOPIC 31.75MM AND 25.42MM SQUARE ALUMINUM
TUBING WITH 2.58MM AND 2.46MM WALL THICKNESS.
RESPECTIVELY

TELESCOPIC MAST WITH 25.4MM AND 19MM SQUARE
STEEL TUBING WITH 1.6MM AND 1.6MM WALL
THICKNESS, RESPECTIVELY

SPRINGS = EXTENSION TYPE

FINISH = ZINC



Korman Signs
INC.

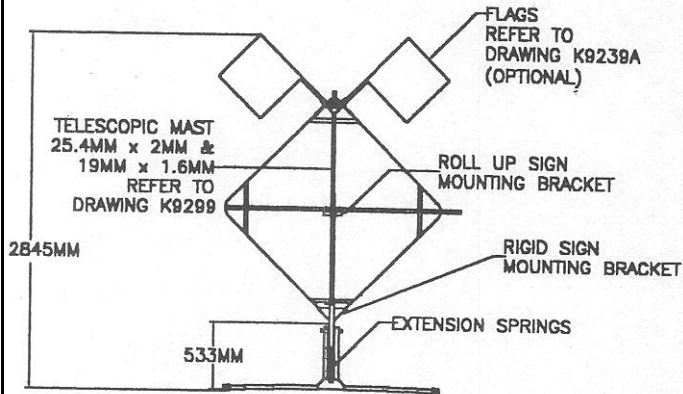
SCHEMATIC DRAWING FOR MODEL SS548CA
FLEXIBLE SIGN STAND WITH A 2MM ALPOLIC SIGN

SIZE FSCM N O .	DWG NO.	REV
	C9229B	
SCALE - NOT TO SW	9/29/99	SHEET
		DSC

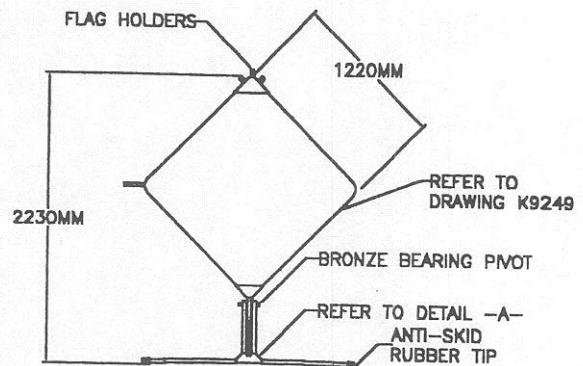
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

SS548CA

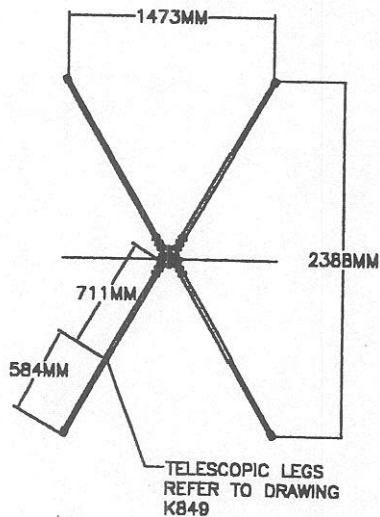
BACK VIEW



FRONT VIEW



TOP VIEW



DETAIL -A-

BASE
31.75MM X 2.1MM SQUARE STEEL TUBING WITH
4.91MM STEEL LEG MTG.FLANGES

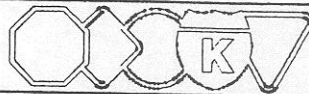
LEGS

TELESCOPIC 31.75MM AND 25.42MM SQUARE ALUMINUM
TUBING WITH 2.56MM AND 2.46MM WALL THICKNESS,
RESPECTIVELY

2 PC. TELESCOPIC MAST WITH 25.4MM AND 19MM
SQUARE STEEL TUBING WITH 1.6MM AND 1.6MM WALL
THICKNESS, RESPECTIVELY

SPRINGS - EXTENSION TYPE

FINISH - ZINC



Korman Signs
INC.

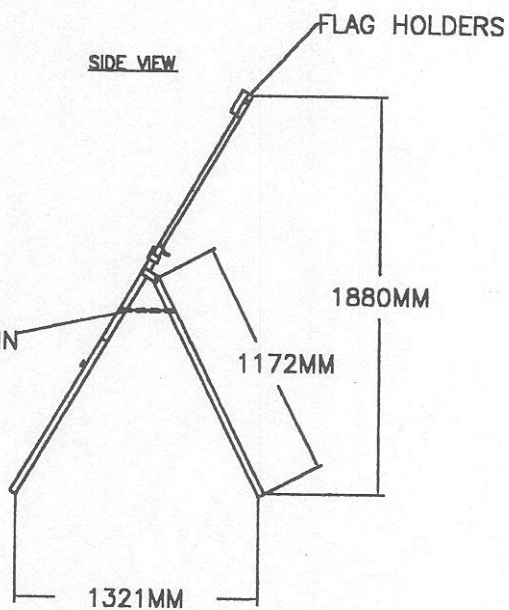
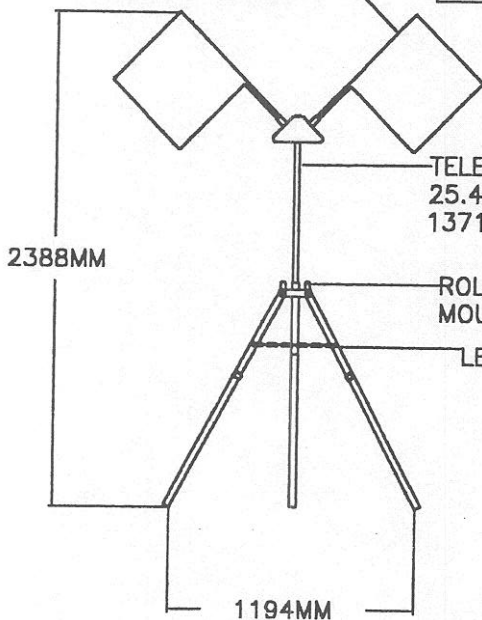
SCHMATIC DRAWING FOR MODEL SS548CA
FLEXIBLE SIGN STAND WITH A 4848DF ROLL UP SIGN

SIZE	FSCM NO.	DWG NO.	REV
		C9228A	
SCALE - NOT TO SCALE	8/29/99	SHEET	DSC

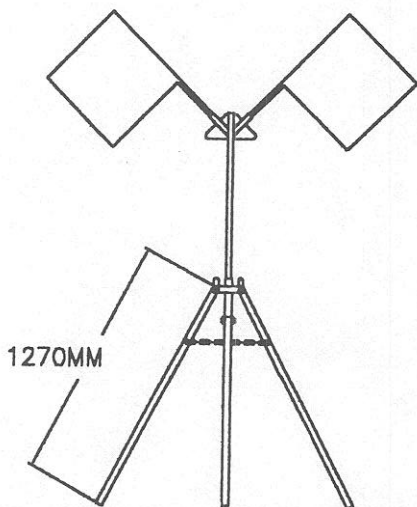
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

SS1

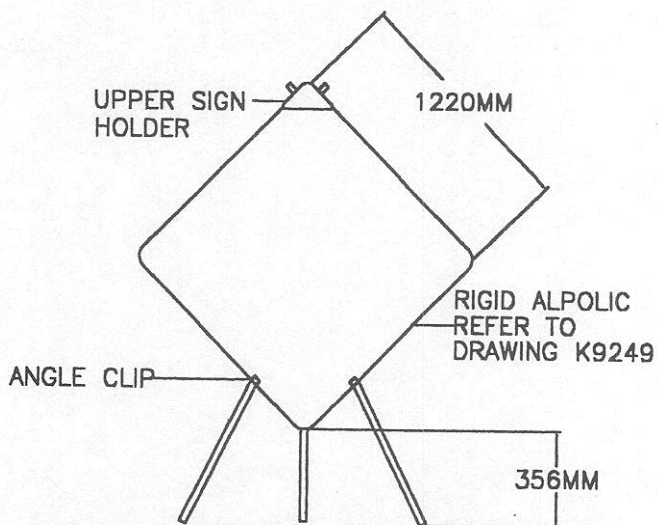
FLAGS (OPTIONAL)
REFER TO
DRAWING K9239A



BACK VIEW



FRONT VIEW



MASTER BRACKET
31.75MM X 2.1MM SQUARE STEEL TUBING WITH
31.75MM X 6.35MM STEEL LEG MTG.FLANGES

LEGS
31.75MM X 1.6MM SQUARE STEEL TUBING

TELESCOPIC MAST
25.4MM X 1.6MM SQUARE STEEL TUBING

FINISH - ZINC



Korman Signs
INC.

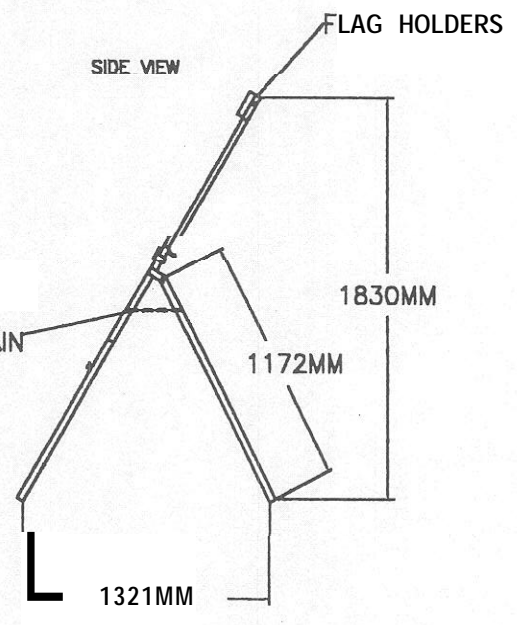
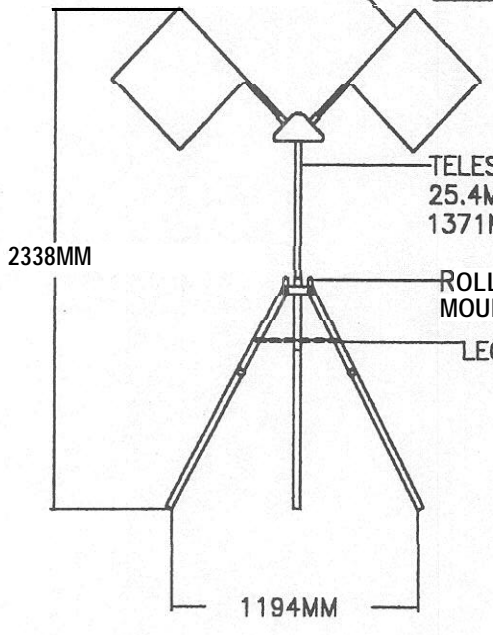
SCHMATIC DRAWING FOR MODEL SS-1
WITH A 2MM ALPOLIC SIGN

SIZE	FSCM NO.	DWG NO. C9289B	REV
SCALE-NOT TO SCALE		9/29/99	SHEET
			DSC

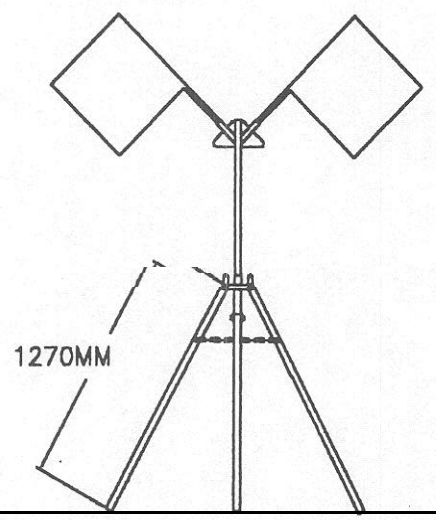
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

SS1

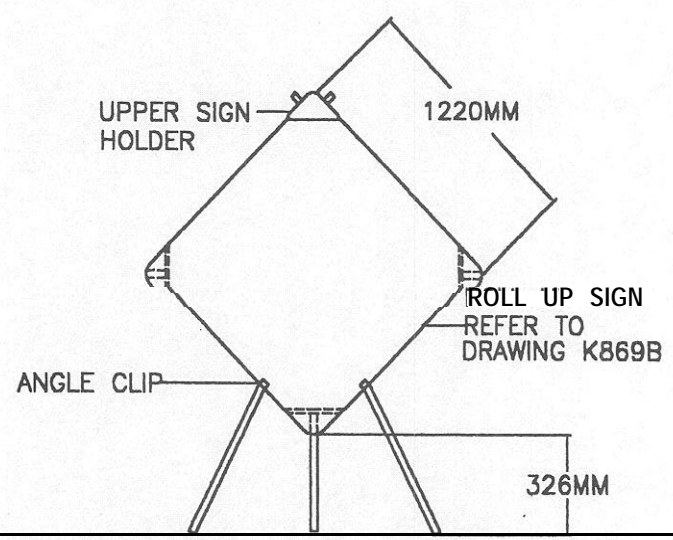
FLAGS (OPTIONAL)
REFER TO
DRAWING K9239A



BACK VIEW



FRONT VIEW

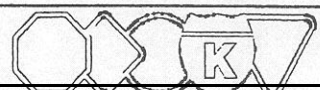


MASTER BRACKET
31.75MM X 2.1MM SQUARE STEEL TUBING WITH
31.75MM X 8.35MM STEEL LEG MTG. FLANGES

LEGS
31.75MM X 1.6MM SQUARE STEEL TUBING

TELESCOPIC MAST
25.4MM X 1.6MM SQUARE STEEL TUBING

FINISH - ZINC

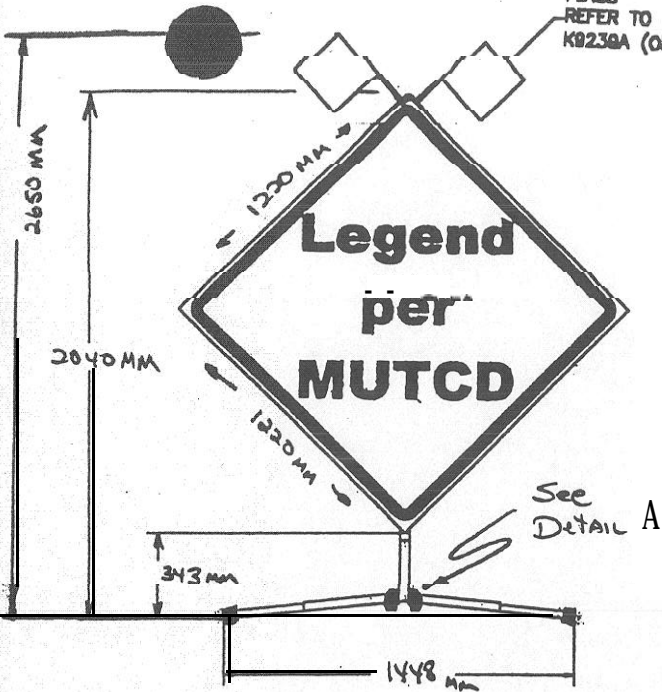


Korman Signs
INC.

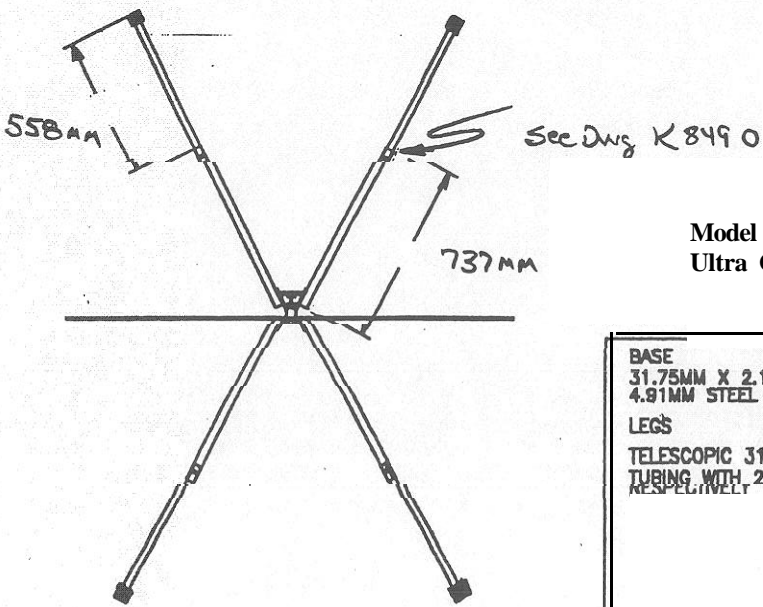
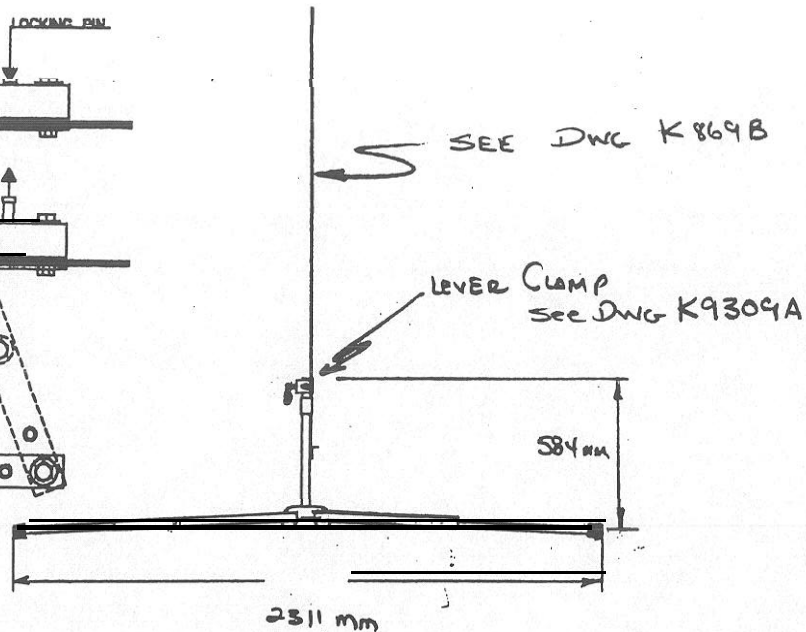
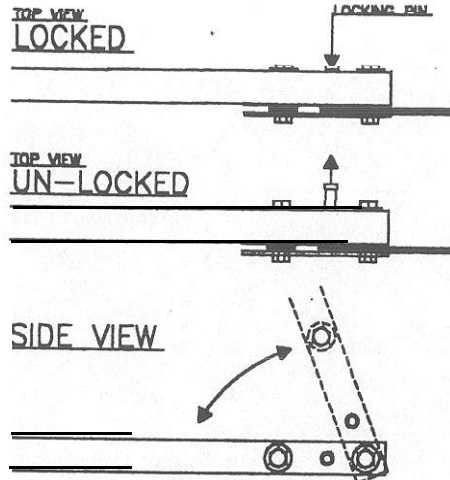
SCHMATIC DRAWING FOR MODEL SS-1
WITH A 4848MF ROLL UP SIGN

SIZE	FSCM N O .	DWG NO.	REV
		C92B9B	
SCALE-NOT TO SCALE		9/29/99	SHEET
			DSC

FLAGS
REFER TO DRAWING
K9239A (OPTIONAL)



DETAIL - A -



Model SS548UCR
Ultra Compact Sign Stand

BASE
31.75MM X 2.1MM SQUARE STEEL TUBING WITH
4.81MM STEEL LEG MTG.FLANGES


LEGS
TELESCOPIC 31.75MM AND 25.42MM SQUARE STEEL
TUBING WITH 2MM AND 1.8MM WALL THICKNESS.
RESPECTIVELY

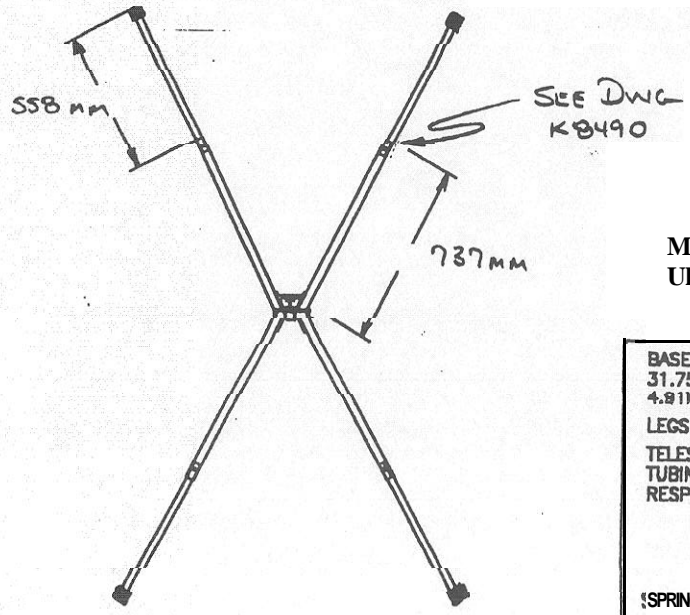
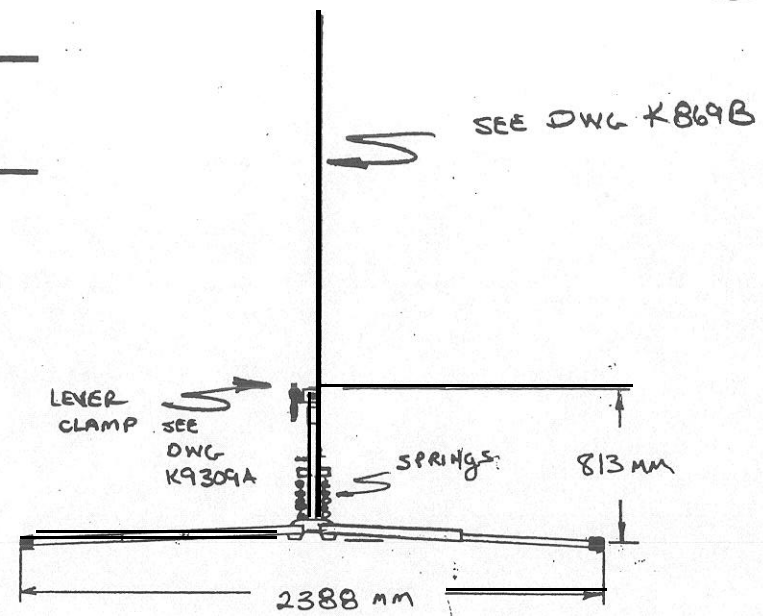
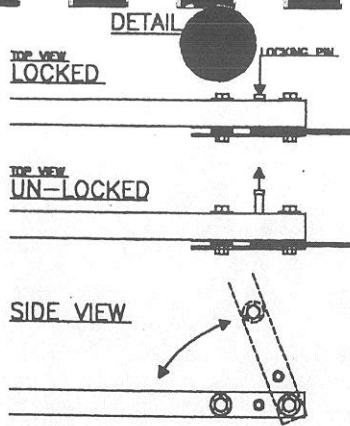
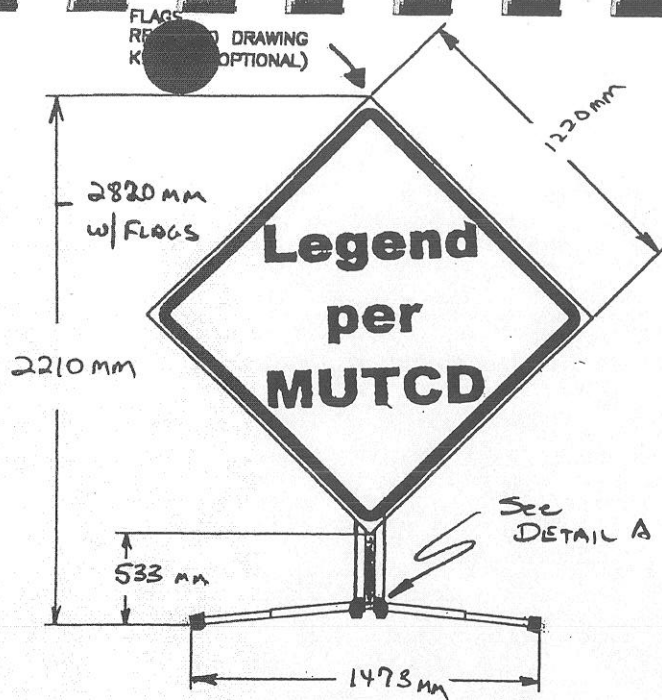
FINISH - ZINC

Model 4848DFUC
Roll up Sign

Fabric
1220mm x1220mm Reflective Roll up Sign Sheeting

Crossbraces
vertical 9.53mm thick, 31.75 mm wide, 1645
mm long Horizontal 4.66 mm thick, 31.75 mm
wide, 1645 mm long pultruded fiberglass

 Korman Signs INC.	
Schematic Drawing for Model SS548UCR Ultra Compact Sign Stand w/ 48x48 Roll up Sign	
NOT FOR SCALE	
8/4/99	DWG. NO. K 849 K



Model SS548UC
Ultra Compact Sign Stand

BASE
 31.75MM X 2.1MM SQUARE STEEL TUBING WITH 4.81MM STEEL LEG MIG.FLANGES
LEGS
 TELESCOPIC 31.75MM AND 25.42MM SQUARE STEEL TUBING WITH 2MM AND 1.8MM WALL THICKNESS, RESPECTIVELY
 SPRINGS - EXTENSION TYPE
 FINISH - ZINC

Model 4848DFUC
Roll Up Sign

Fabric
3M Diamond Grade Reflective Roll up Sign Sheeting #RS-24

Crossbraces(Ribs)
 Vertical 9.53mm thick 31.75mm wide, 1645mm long
 Horizontal 4.66mm thick, 31.75mm wide, 1645mm long pultruded fiberglass

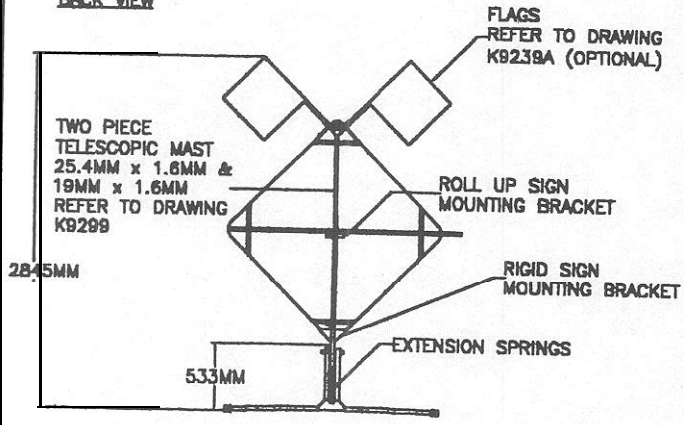
Pockets
 Lexan or Heavy Duty Triangular Fabric

Korman Signs INC.
 Schematic Drawing for Model SS548UC
 Ultra Compact Sign Stand w/ 48x48 Roll Up Sign
 NOT FOR SCALE
 814195
 DWG.NOK8129X

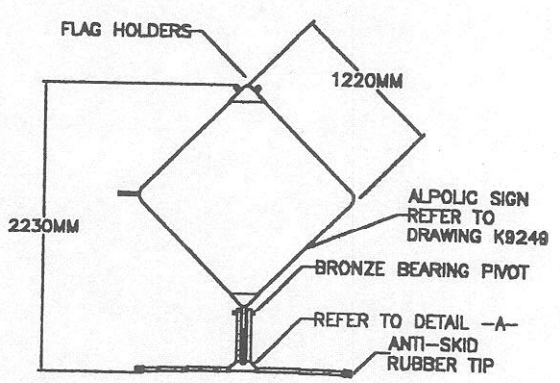
SS548UC

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
SS548C				

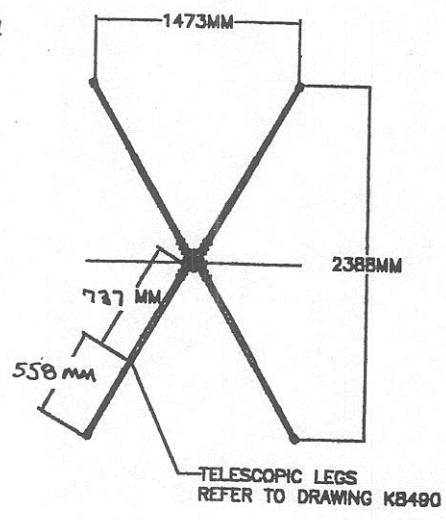
BACK VIEW



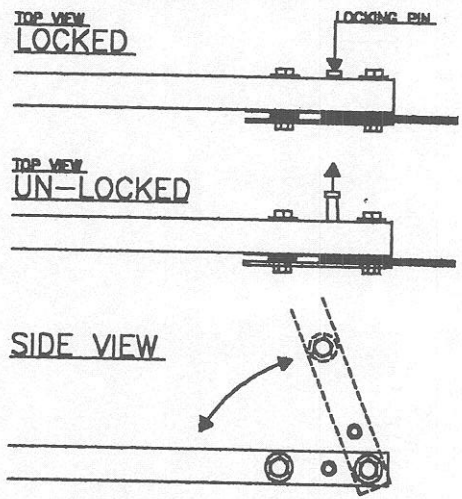
FRONT VIEW



TOP VIEW



DETAIL -A-



BASE
1.75MM X 2.1MM SQUARE STEEL TUBING WITH
4.91 IN STEEL LEG MTG.FLANGES

LEGS
TELESCOPIC 31.75MM AND 25.42MM SQUARE STEEL
TUBING WITH 2MM AND 1.6MM WALL THICKNESS,
RESPECTIVELY

TELESCOPIC MAST WITH 25.4MM AND 19MM SQUARE
STEEL TUBING WITH 1.6MM AND 1.6MM WALL
THICKNESS, RESPECTIVELY

Springs - EXTENSION TYPE

Finish - ZINC



SCHEMATIC DRAWING FOR MODEL SS548CC
FLEXIBLE SIGN STAND WITH A 4848DF ROLL UP SIGN

SIZE	FSCM NO.	DWG NO.	REV
		C9228D	
SCALE - NOT TO SCALE		10/28/99	SHEET
			DSC

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

(3) Requests for waiver 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 a "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) I" 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 "onpatented, non-Proprietary 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 "umber 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 Nations, Highway System (NHS) construction contract as 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 a "due 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 4274, 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 materials have been":

(1) Produced by convicts who are 0" 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 "se in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for "se in Federal-aid highway construction during the U-month period ending July 1, 1997.

(b) Qualified prison facility means any prison facility in which convicts, during the L-month period ending July 1, 1987, produced materials for "se in Federal-aid highway construction projects.

[53 FR 1923; Jan. 25, 1988, as amended at 58 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. ¹		X			Statewide	Any AASHTO-approved material. ²
Other cross-drain installations.	X		3 minimum	M-170 and M-190.	do	Do. ²
Side-drain installations	X		do	M-36	do	Do. ²
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.

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

² Types not included in currently approved AASHTO specifications may be specified if recommended by the State with adequate justification.

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.