LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SPECIFICATIONS

TRAFFIC CONTROL SIGNS

DESCRIPTION

This specification sets forth the material and production requirements for finished traffic control signs.

QUALITY CONTROL

Finished signs shall be fabricated in accordance with the sheeting manufacturer's processing, application and cleaning recommendations and the requirements specified herein. All sheeting, overlays, films, inks, coatings, etc. must be compatible. Mixing of manufacturer's products is strictly prohibited.

Final product shall be free of fabrication defects including but not limited to debris under the sheeting or clear coat, unfinished edges, surface scratches, chipping, peeling, warping, inferior ink adhesion, etc. Finished signs with defects and/or defect repairs via patching, taping, or marker concealment will not be accepted.

SHEETING MATERIALS

Retroreflective Sheeting

Finished signs shall be manufactured using a Type IV, VIII, or XI unmetalized microprismatic retroreflective element sign sheeting material with a Class 1 (pressure sensitive) adhesive; sheeting material and adhesive shall conform to ASTM D4956, except as modified herein.

Retroreflective sheeting must be listed as an approved product from the applicable Approved Materials List(s) (AML) specified herein.

All sheeting colors, except Fluorescent Orange, shall be an approved product listed on AML *1015M00135 Reflective Sheeting, Type IV, Permanent*, *1015M00139 Reflective Sheeting, Type VIII, Permanent*, or *1015M00241 Reflective Sheeting, Type XI, Permanent*.

Fluorescent Orange sheeting shall be an approved product listed on AML *1015M00090 ReflectSheet, T IV,TempSign,Barr,ChanDev* (Reflective Sheeting, Type IV, Temporary Signs, Barricades, and Channelizing Devices).

Accelerated Weathering & Performance Requirements

Retroreflective sheeting, when processed, applied and cleaned in accordance with the sheeting manufacturer's recommendations, shall perform in accordance with the accelerated weathering standards of ASTM D4956 and perform outdoors in accordance with the performance requirements specified in Table 1015-5.

Note: Workzone Signs are defined as warning construction signs using retroreflective fluorescent orange sheeting.

Table 1015-5

Retroreflectivity Sheeting Performance Requirements							
Type	Retroreflectivity[1] - Durability[2]						Daytime Colorfastness[3]
	Workzone Signs		Permanent Signs				
	Timeframe	Percent of Initial Specified Value	Timeframe	Percent of Initial Specified Value	Timeframe	Percent of Initial Specified Value	Timeframe
IV, VIII, & XI	3 years	80[4]	1-7 years	80[4]	8-10 years	70[4]	3 years

1. Percent retained retroreflectivity of referenced table after installation and acceptance and the field exposure time specified.
2. All sheeting shall maintain its structural integrity, adhesion and functionality after installation and the field exposure time specified.
3. All colors shall conform to the color specification limits of ASTM D4956 after installation and the field exposure time specified.
4. ASTM D4956, percent of the corresponding table for type used.

Non-Retroreflective Sheeting

Non-retroreflective sheeting film shall consist of an extensible, pigmented, weather-resistant plastic film with a pre-coated Class 1 (pressure sensitive) adhesive backing complying with ASTM D4956. Face side of film shall be supported and protected by a paper liner, which is readily removable after application without the necessity of soaking in water or other solvents. Color shall match visually and be within the Daytime Color limits specified in ASTM D4956.

Film shall be readily cut with a fabrication method that does not cause cracking, checking or flaking. Applied film shall be free from ragged edges, cracks, and blisters. The material shall have demonstrated its ability to withstand normal weathering without checking, cracking, or excessive color loss.

SIGN BLANKS

Sign blanks must be Aluminum Alloy 6061-T6 or Alloy 5052-H38, comply with ASTM B209, and have a thickness of 0.080 inches. Blanks shall be cut and punched in accordance with the charts provided in **Figures 1** through **14**.

Blanks must also be free of buckles, warps, dents and burrs, prior to and post fabrication. Prior to production, blanks shall be cleaned and free of grease, dirt and loose phosphate coating in accordance with the retroreflective sheeting manufacturer's recommendations and those specified herein.

Degreasing

Vapor Degreasing

Immerse panels in a saturated vapor of organic solvent. Remove trademark printing with lacquer thinner or a controlled alkaline cleaning system.

Alkaline Degreasing

Immerse panels in a tank containing alkaline solutions, controlled and titrated to the solution manufacturer's specifications. Immersion time shall depend upon amount of contaminants present and thickness of metal.

Etching

Acid Etch

Etch the panels in a 6 to 8 percent phosphoric acid solution at 100°F. Rinse the panels thoroughly with running cold water followed by hot water tank rinse.

Alkaline Etch

Etch pre-cleaned aluminum surface in an alkaline etching material controlled by titration, using time, temperature, and concentration specified by solution manufacturer. Rinse thoroughly. Remove smut with an acidic, chromium compound solution specified by solution manufacturer and thoroughly rinse.

Drying Panels

Dry panels with a forced hot air drier. Handle panels with clean canvas gloves or other approved methods between cleaning and etching operations and sheeting application. Protect cleaned panels from grease, oil or other contaminants prior to application of retroreflective sheeting.

SHEETING AND LEGEND APPLICATION

Sheeting Application

Apply retroreflective sheeting in accordance with the accepted written recommendations of the sheeting manufacturer.

Carefully match sign faces comprised of two or more pieces of retroreflective sheeting for color at the time of sign fabrication to provide uniform appearance and brilliance, both day and night.

Legend Application

Legends (border strip, letters, numerals, and symbols that convey the message on the sign) may be applied to sign faces through one of the methods noted below. Fabrication methods must comply with the sheeting manufacturer's recommendations and those specified herein. After application, finished legend shall be uniform in color, have sharp straight edges, and be free of bubbles, debris, spotting, streaks and blemishes.

Direct Application

Direct application methods must be performed in a manner that provides a wrinkle-free surface that is void of bubbles and/or air pockets.

Screening

Applications using the screening method must be in accordance with the sheeting manufacturer's screening process recommendations. Screening may be applied either before or after application of the retroreflective sheeting to the sign blank panel.

Silkscreen paste shall be mixed at the factory, well ground to a uniform consistency and smooth texture, and shall be free from water and other foreign matter. It shall dry within 18 hours to a film that does not run, streak, or sag.

Paste shall have proper pigmentation and consistency for use in silkscreen equipment. The material shall produce the desired color and a minimum of 70% of the initial retroreflectivity values as required for retroreflective sheeting of the same type and color when applied on retroreflective sheeting background.

Overlay Film

When a transparent electronic cuttable overlay film method is used, the film shall produce the desired color and a minimum of 70% of the initial retroreflectivity values as required of the same type and color when applied on a retroreflective sheeting background. Overlay film must be compatible with the retroreflective sheeting.

Digital Printing

Digitally printed legends shall fabricated use a digital printing system with an integrated component system that is approved and supported by the sheeting manufacturer. Digitally printed signs shall include a sheeting manufacturer approved UV-protective clear overlay applied to the entire face of the sign. Overlay shall provide a smooth surface for retroreflectivity and protect the sign from fading and UV degradation.

Digitally printed signs shall produce the desired Daytime and Nighttime Color and attain a minimum of 70% of the initial retroreflectivity values as required for the retroreflective sheeting of the same type and color when applied on a retroreflective sheeting background.

Finished signs produced using digital imaging methods must be fabricated by Contractors personnel that have been certified by the retroreflective sheeting manufacturer to do so. Certified sign fabricators must undergo an audit process by the sheeting manufacturer to ensure they have the proper equipment, manufacturing capabilities, manufacturing application processes and the materials required to fulfill the finished sign warranty and guaranty. Sign fabricators must recertify annually with retroreflective sheeting manufacturers or utilize a 3rd party certifier approved by the retroreflective sheeting manufacturer. Proof of certification may be requested from the Contractor at any time during the contractual period.

SIGN IDENTIFICATION MARKINGS

Sign Face (Front) Markings

All sign faces, not including object markers, shall be labeled with ¼ inch lettering within the border of the sign. Markings shall not interfere with the image or message of the sign.

Sign face markings shall be of the same ink, vinyl letters, sheeting, or digital print as that used during the sign fabrication. Labeling must include the following information:

- Location shall be at the bottom left of the sign face.
  - Sheeting Manufacturer's Product ID (Brand & Model)
- Location shall be at the bottom right of the sign face.
  - Size of the Sign
  - Vendor Logo (Name or Initials)
  - Year of Fabrication

See **Figure 15** for additional sign face markings details.

Back of Sign Markings

All sign backs, including object markers, shall be permanently labeled with the DOTD Product ID number. Label must be water and fade resistant and made of either ¾" black vinyl lettering or a 2" x 3" (approximate) vinyl decal with permanent lettering.

FINISHED SIGN GUARANTY

Contractor guarantees, beginning date of delivery, finished signs will perform in accordance with the standards and requirements specified herein for the period of time noted below:

- Three (3) years for all workzone sign sheeting.
- Ten (10) years for all permanent sign sheeting.

Contractor further guarantees, at no additional cost to the department, to replace any finished sign that shows performance defects within the above noted timeframes. Replacement signs shall carry the unexpired guaranty of the sign for which it replaces. Remaining guaranty shall begin on the date of delivery of the replacement sign.

PACKAGING

Purchase orders shall be for a minimum of 1,000 pounds.

Prior to packaging, signs shall be allowed to dry in accordance with the sheeting manufacturer's recommendations. Signs shall not be allowed to become wet during storage nor shipment. Slip sheeting and packaging materials shall be used in such a manner as to ensure the signs arrive at their destination in the same condition they left the manufacturing plant.

To prevent damage during shipment, each sign face shall be covered with slip sheeting and double taped on the center of two (2) opposite sides. Finished signs shall then be placed face to face in bundles of two (2) of the same sign. Signs shall then be bundled, securely banded to pallets and covered in cardboard.

Note: Contractor shall be aware of and act on any additional packaging requirements noted by the sheeting manufacturer.

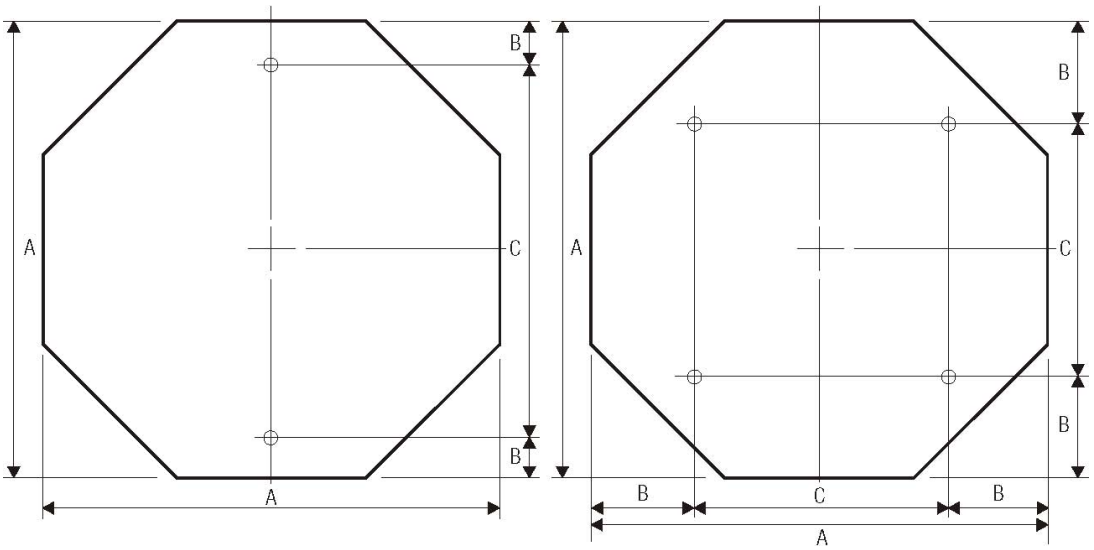
Delivery shall be via flatbed trailer; pallets must be covered with a tarp(s) during transport. Individual pallets must not exceed 2,000 pounds. Pallets shall be externally labeled with the associated Purchase Order No., sign code(s), sign size(s) and quantity of each type of sign.

Each shipment should be supplied with a freight bill and packaging list noting the Purchase Order No. and the quantity of signs shipped.

Failure to adhere to packaging and shipment directives will result in rejection of the order and materials will be returned to the vendor “FREIGHT COLLECT”.

SIGN BLANK DIMENSION AND HOLE PLACEMENT CHARTS

FIGURE 1 – Octagons

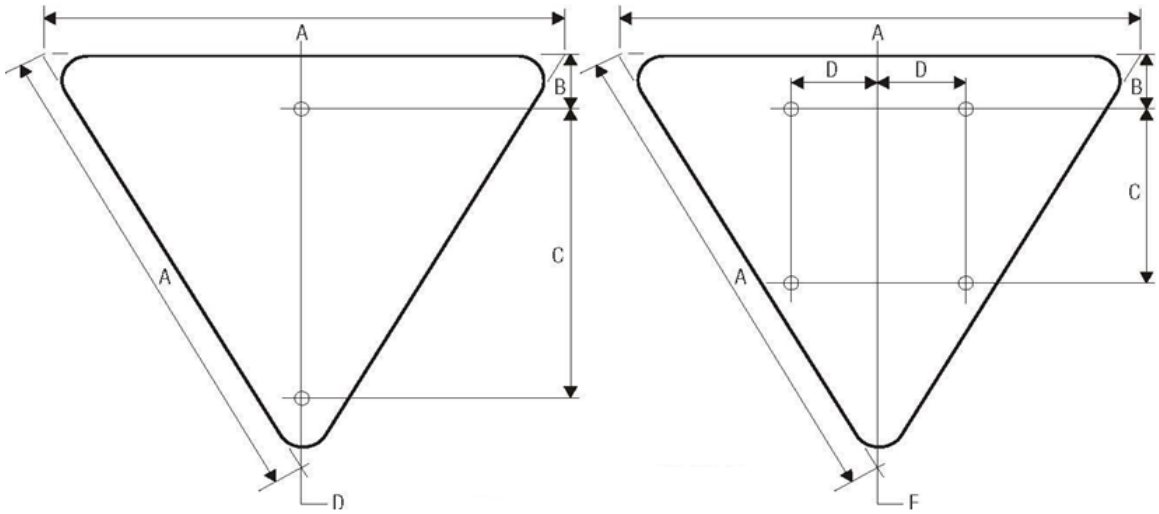


Column A = Blank Dimensions

A	B	C
24	3	18
30	3	24
36	3	30

A	B	C
48	9	30

FIGURE 2 – Equilateral Triangles

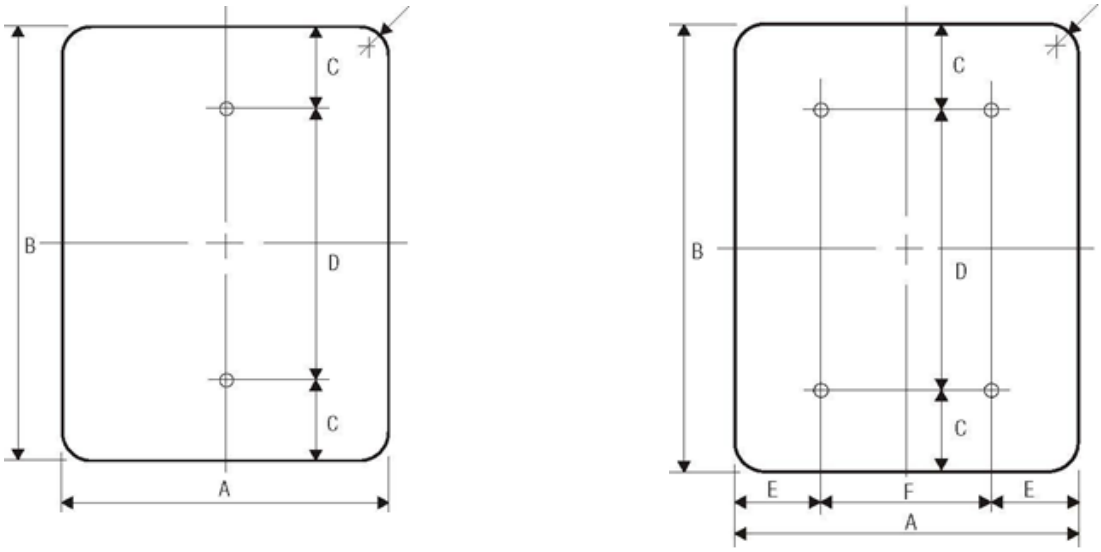


Column A = Blank Dimensions

A	B	C	D
30	3	18	1.5
36	3	21	2

A	B	C	D	E
48	3	12	12	3
60	3	18	15	4

FIGURE 3 – Vertical Rectangle

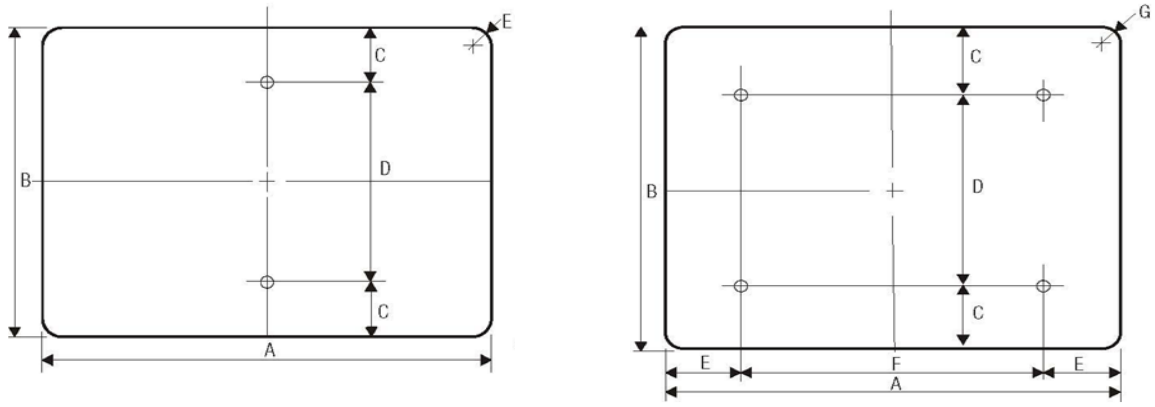


Columns A & B = Blank Dimensions

A	B	C	D	E
6	12	1.5	9	1.5
9	12	1.5	9	1.5
10	18	1.5	15	1.5
10	27	3	21	1.5
10	36	6	24	1.875
10	48	6	36	2.25
12	18	1.5	15	1.5
12	36	6	24	1.875
12	48	6	36	2.25
12	60	6	48	3
18	24	3	18	1.5
18	54	6	42	2.25
18	60	6	48	3
24	30	3	24	1.5
24	36	6	24	1.875
30	36	6	24	1.875
36	48	6	36	2.25

A	B	C	D	E	F	G
48	60	6	48	9	30	3

FIGURE 4 – Horizontal Rectangle

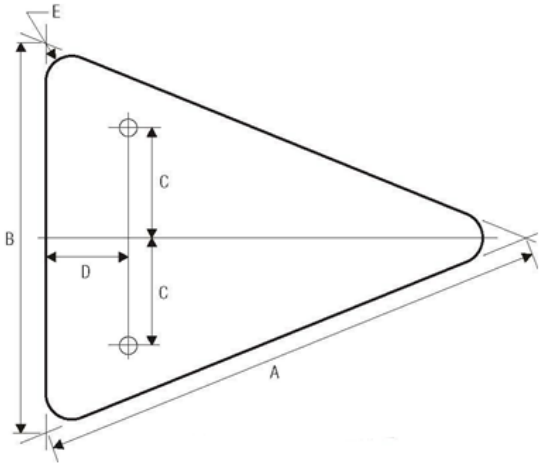


Columns A & B = Blank Dimensions

A	B	C	D	E
21	15	1.5	12	1.5
24	8	1.5	5	1.5
24	10	1.5	7	1.5
24	12	1.5	9	1.5
24	18	3	12	1.5
30	15	1.5	12	1.5
30	18	3	12	1.5
30	21	3	15	1.5
30	24	3	18	1.5
36	12	1.5	9	1.5
36	18	3	12	1.5
36	24	3	18	1.5

A	B	C	D	E	F	G
42	30	3	24	9	24	2.25
45	36	6	24	9	27	2.25
48	18	3	12	9	30	1.5
48	24	3	18	9	30	1.875
48	30	3	24	9	30	2.25
48	36	6	24	9	30	2.25
54	18	3	12	9	36	1.5
60	24	3	18	12	36	1.5
60	30	3	24	12	36	2.25
60	36	6	24	12	36	2.25

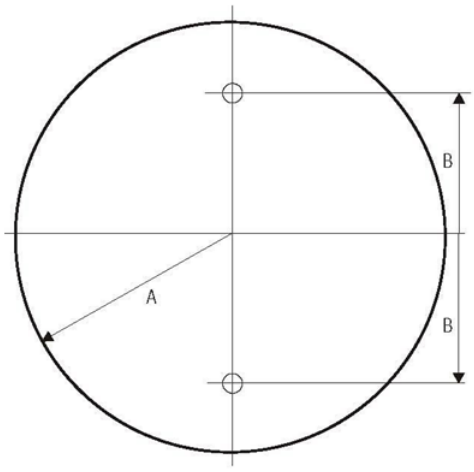
FIGURE 5 – Isosceles Triangle



Columns A & B = Blank Dimensions

A	B	C	D	E
40	30	7.5	12	1.875
48	36	9	15	2.25

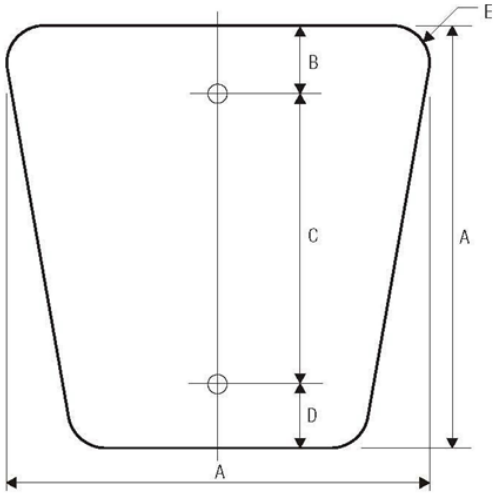
FIGURE 6 – Circle



Column C = Blank Dimensions

A	B	C
15	12	30
18	15	36

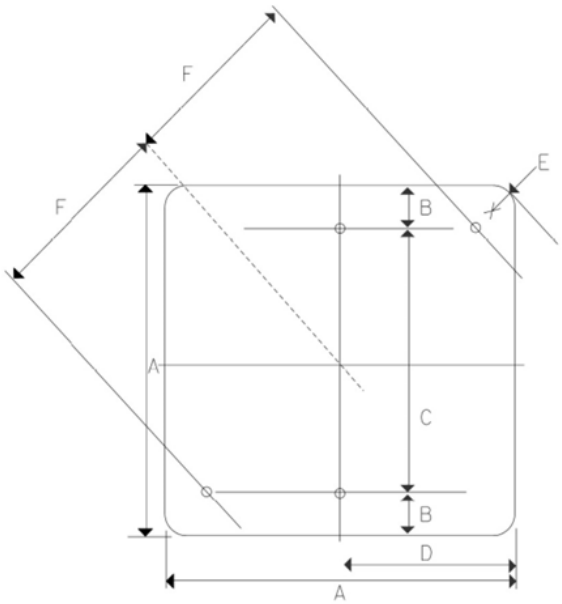
FIGURE 7 – National Forest Shield



Column A = Blank Dimensions

A	B	C	D	E
18	2	15	1	2
24	2.5	20	1.5	2.5

FIGURE 8 – Square/Diamond (Single Post)



Column A = Blank Dimensions

A	B	C	D	E	F
18	3	12	9	1.5	9
24	3	18	12	1.5	12
30	3	24	15	1.875	15
36	3	30	18	2.25	18
48	3	42	24	3	24

FIGURE 9 – Square (Two Post)

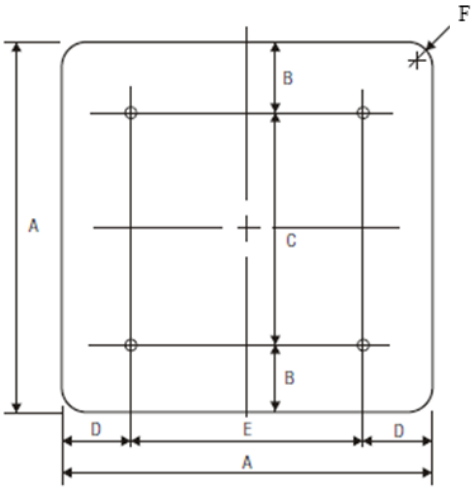
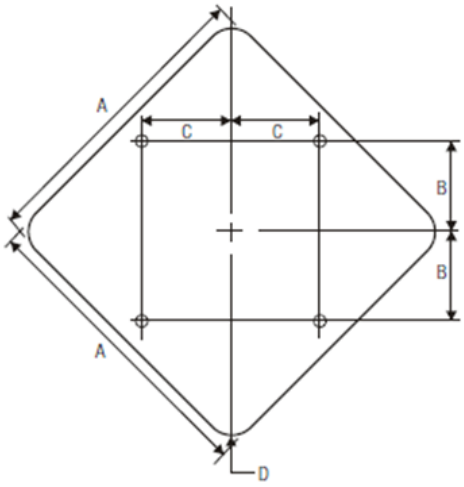


FIGURE 10 – Diamond (Two Post)



Columns A & B = Blank Dimensions

A	B	C	D	E	F
36	6	24	6	24	2.25
48	6	36	9	30	3

A	B	C	D
48	15	15	3
60	18	18	3.75

FIGURE 11 – Interstate Shield

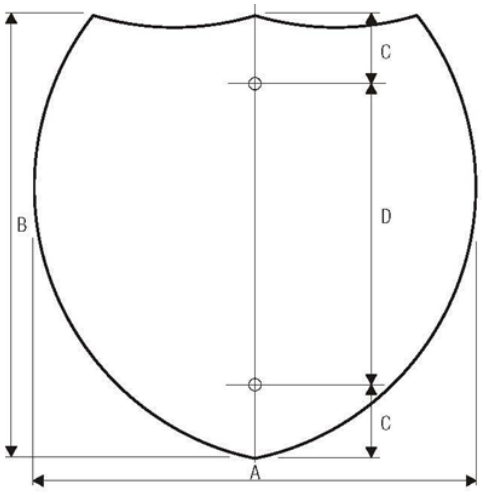
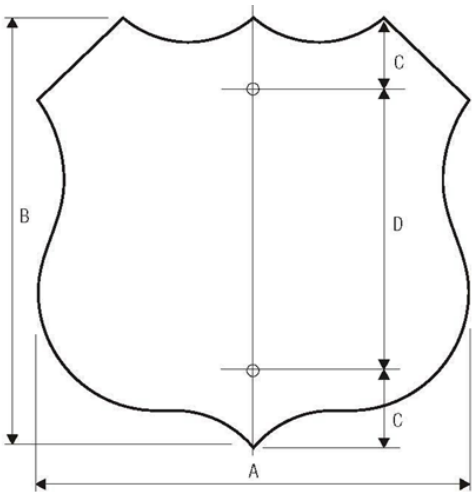


FIGURE 12 – U.S. Shield



Columns A & B = Blank Dimensions

A	B	C	D
24	24	3	18
30	24	3	18
36	36	6	24
45	36	6	24

A	B	C	D
24	24	3	18
30	24	3	18
36	36	6	24
45	36	6	24

FIGURE 13 – Pentagon (School)

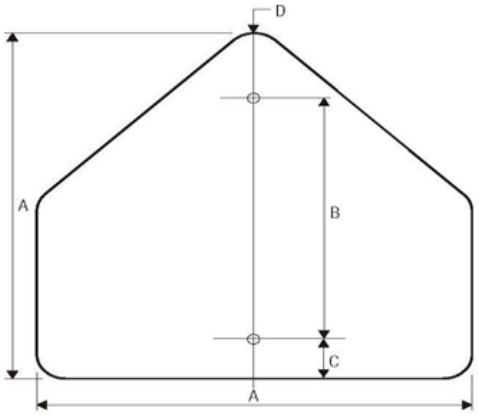
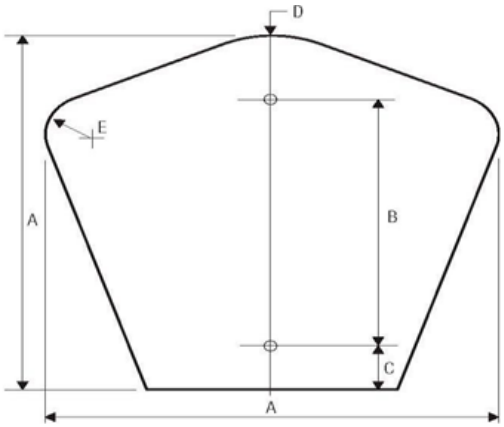


FIGURE 14 – Parish Shield



Columns A & B = Blank Dimensions

A	B	C	D
30	21	3	1.875
36	24	3	2.25

A	B	C	D	E
18	15	1	5	2
24	18	2	5.313	2.688
30	24	2	6.625	3.375

SIGN IDENTIFICATION PLACEMENT DETAILS

FIGURE 15 – Front or Sign Face