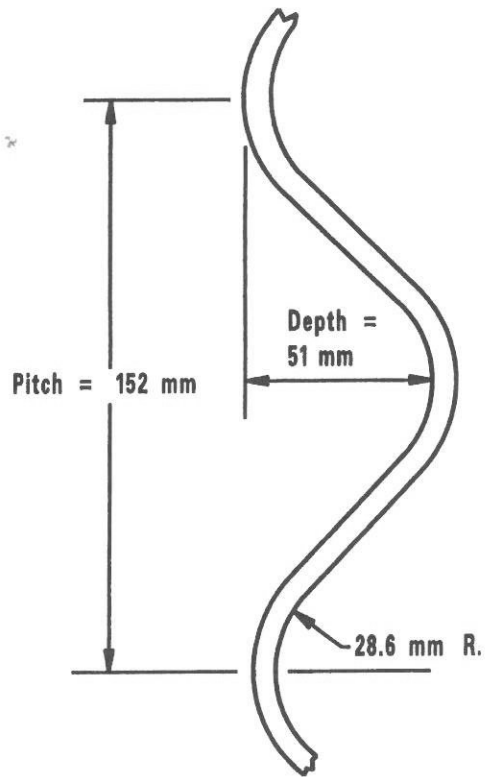


PART 3

STRUCTURAL PLATE DRAINAGE PRODUCTS (SP)

SECTION SPC—STANDARD CORRUGATIONS

Steel Structural Plate Standard Corrugations	SPCS-1-96	98
Aluminum Alloy Structural Plate Standard Corrugations	SPCA-2-96	99



152 mm X 51 mm Corrugation

APPLICABLE SPECIFICATIONS

Corrugated steel structural plate pipe shall conform to the requirements of:

AASHTO M 167M (galvanized steel)

AASHTO M 243 (bituminous coated)

AASHTO M 111 (hot dip galvanize after fabrication)

INTENDED USE

Culverts, short bridges, underpasses, storm sewers and bridge replacement.

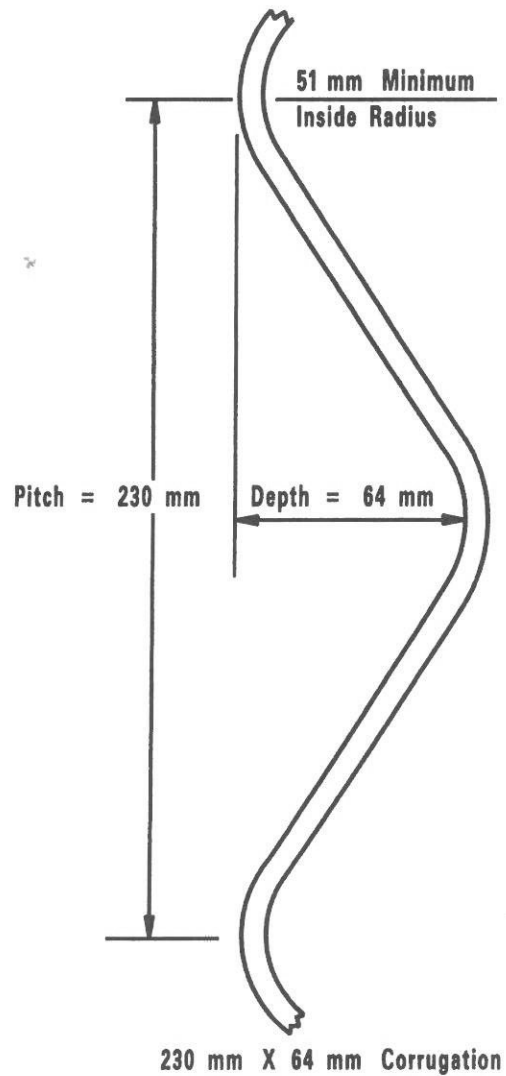
NOMINAL GALVANIZED THICKNESS

- 2.82 mm
- 3.56
- 4.32
- 4.79
- 5.54
- 6.32
- 7.11
- 7.87
- 9.65

**STEEL STRUCTURAL PLATE
STANDARD CORRUGATIONS**

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPCS-1-96



APPLICABLE SPECIFICATIONS

Corrugated aluminum alloy structural plate pipe shall conform to the requirements of:

AASHTO M 219M (aluminum)
AASHTO M 243 (bituminous coated)

INTENDED USE

Culverts, short bridges, bridge replacement, underpasses, and storm sewers.

STANDARD THICKNESS

2.54 mm
3.18
3.81
4.44
5.08
5.72
6.35

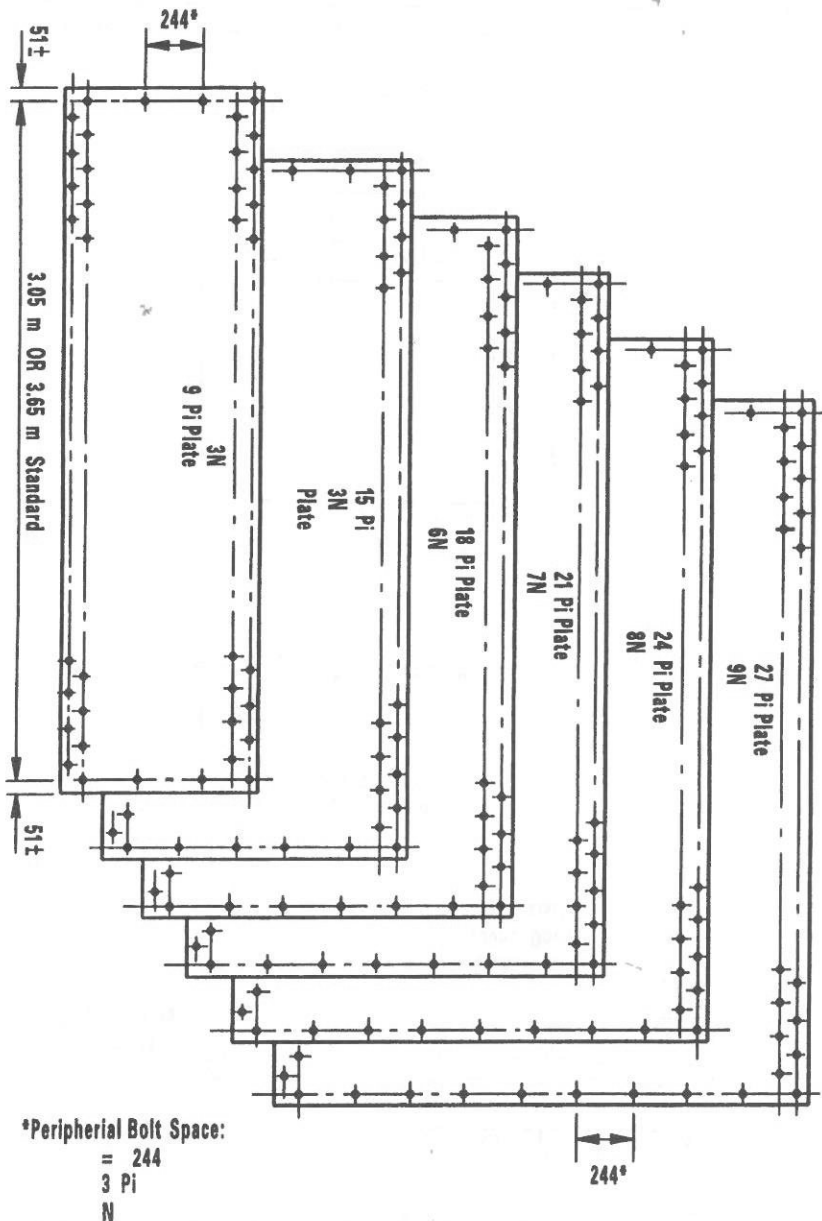
ALUMINUM ALLOY STRUCTURAL PLATE STANDARD CORRUGATIONS

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPCA-2-96

SECTION SPP—STANDARD PARTS

Steel Structural Plate Standard Plate Details	SPPS-1-96	101
Steel Structural Plate Unbalanced Channel Detail	SPPS-2-96	102
Steel Structural Plate Culvert Bolt and Nut	SPPS-3-96	103
Aluminum or Steel Structural Plate Anchor Bolts	SPP-4-96	104
Aluminum or Steel Structural Plate Joint Sealant Tape	SPP-5-96	105
Aluminum Structural Plate Standard Plate Details	SPPA-6-96	106
Aluminum Structural Plate Footing Connection Angle	SPPA-7-96	107
Aluminum Structural Plate Box Culvert Receiving Channel	SPPA-8-96	108
Aluminum Structural Plate Wale Beam	SPPA-9-96	109
Aluminum Structural Plate Connecting Plate for Wale Beam	SPPA-10-96	110
Aluminum Structural Plate Bolts and Nuts	SPPA-11-96	111
Aluminum Structural Plate Circumferential Stiffener	SPPA-12-96	112



Note: All dimensions are in millimeters unless otherwise noted.

APPLICABLE SPECIFICATIONS

1. Corrugated steel structural plate pipe shall conform to the requirements of:

- AASHTO M 167M (Galvanized Steel)
- AASHTO M 243 (Bituminous Coated)
- AASHTO M 111 (Hot Dip Galvanized After Fabrication)

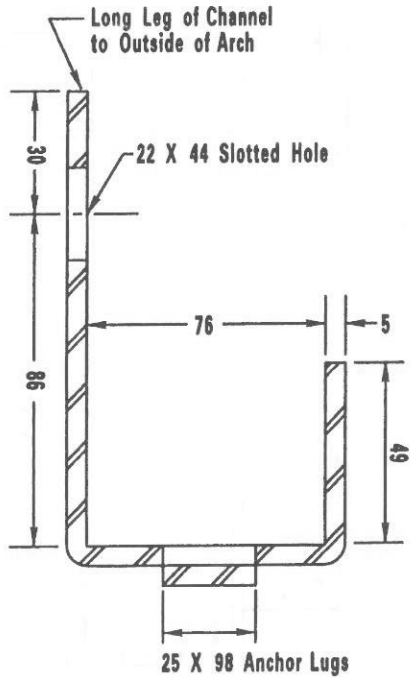
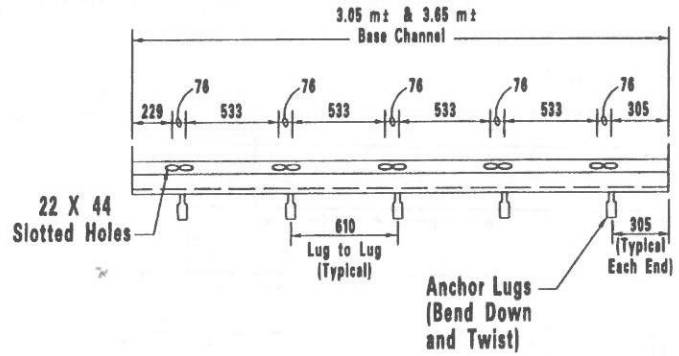
INTENDED USES

- Pipe
- Arch
- Pipe Arch
- Pedestrian Underpass
- Vehicular Underpass
- High-Profile Arch
- Horizontal Ellipse
- Low-Profile Arch
- Pear Shape
- Box Culvert

**STEEL STRUCTURAL PLATE
 STANDARD PLATE DETAILS**

AASHTO-AGC-ARTBA
 TF-13 DRAWING

SPPS-1-96



Cross Section

Note: All dimensions in millimeters unless otherwise noted

APPLICABLE SPECIFICATIONS

Structural quality steel - AASHTO M 111 (Galvanize after fabrication)

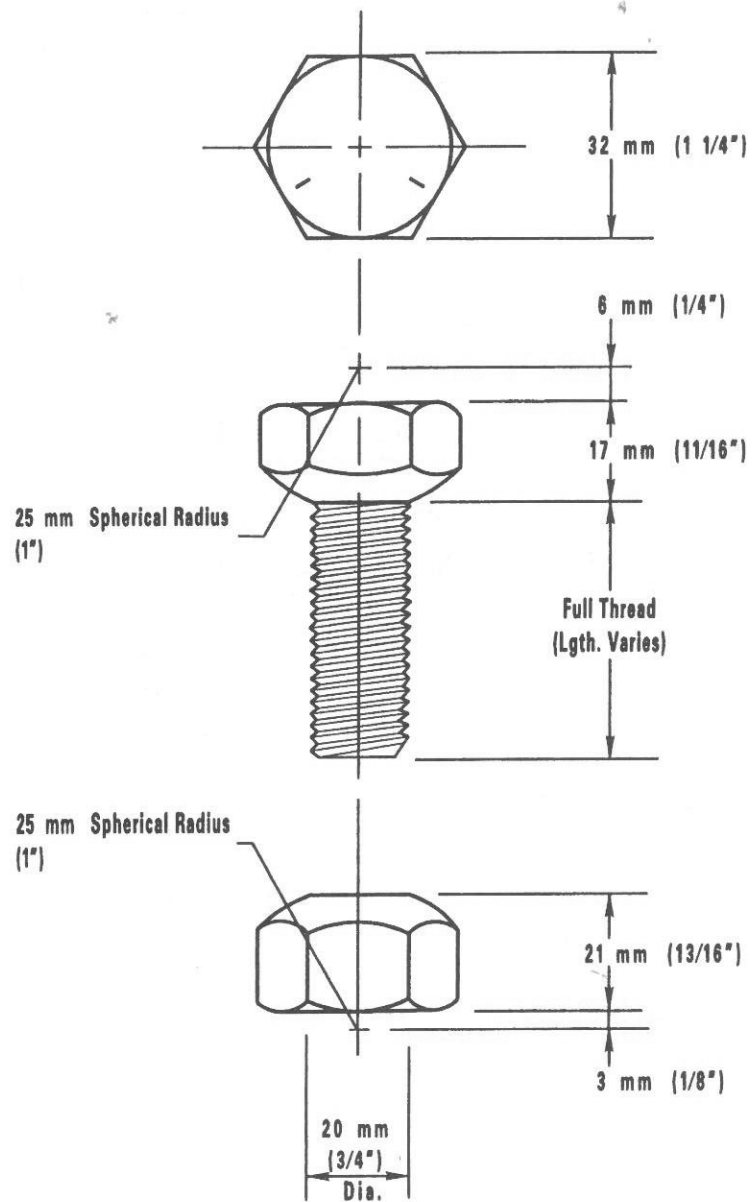
INTENDED USE

Arch shape steel structural plate structures, the connection of the corrugated plate to the footing.

**STEEL STRUCTURAL PLATE
UNBALANCED CHANNEL DETAIL**

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPPS-2-96



SPECIFICATIONS

1. Hex Bolts—ANSI B 18.2.3.5M
ASTM F 568M - Property Class 8.8
2. Nuts—ANSI B 18.2.4.2M
ANSI B 18.2.4.4M
ASTM A 563M - Class 9
3. Galvanize—AASHTO M 232

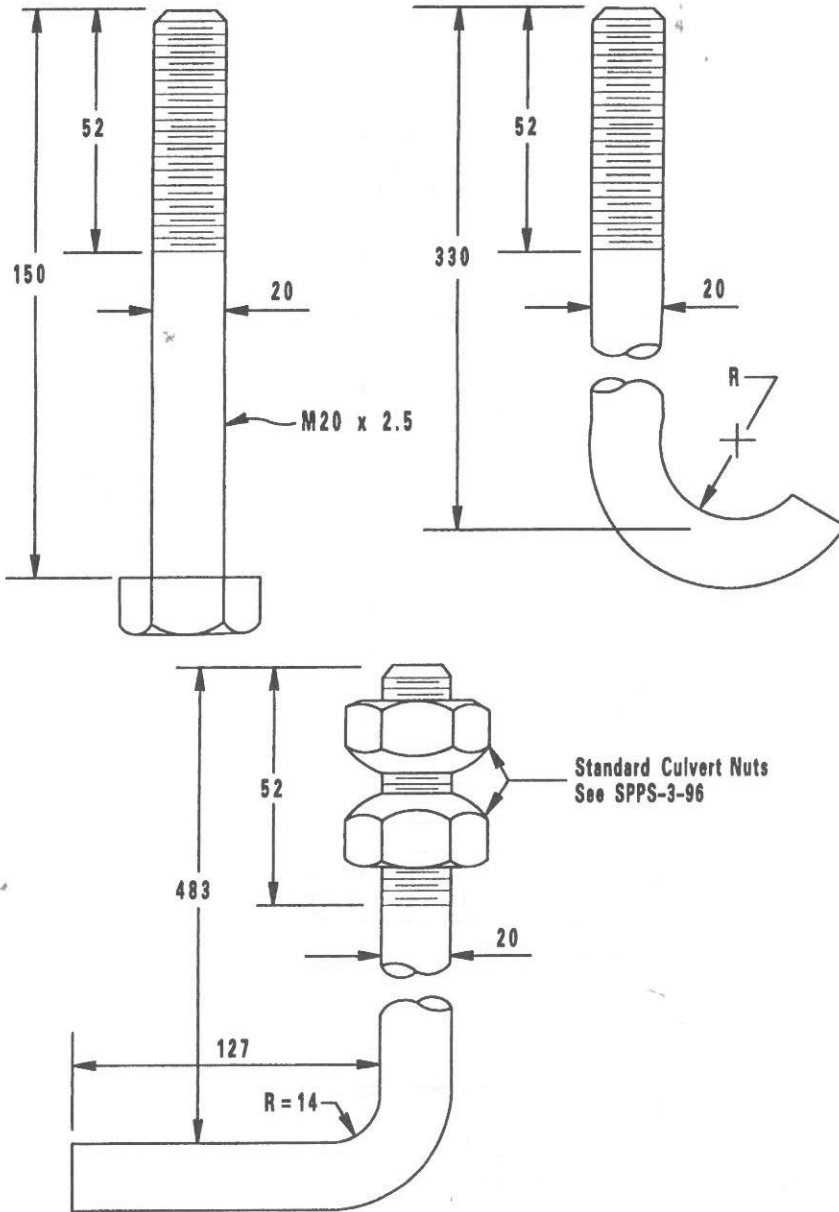
INTENDED USES

Connection of 152 mm x 51 mm corrugated galvanized steel plates.

STEEL STRUCTURAL PLATE
CULVERT BOLT AND NUT

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPPS-3-96



Note: All dimensions in millimeters

SPECIFICATIONS

1. Bolt—ANSI B 18.2.3.5M ASTM F 568M - Class 8.8
2. Nut—ANSI B 18.2.4.2M ASTM A 563M - Class 9
3. Galvanize—AASHTO M 232
4. Aluminum Bolt—ASTM B 211M Alloy 6061-T6

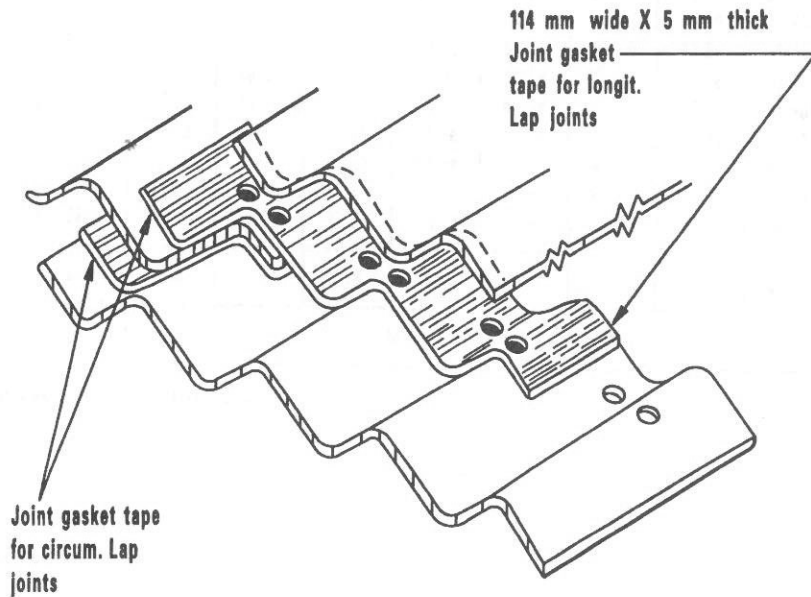
INTENDED USES

To anchor structural plate structure to concrete end treatments when they are specified.

ALUMINUM OR STEEL STRUCTURAL PLATE
ANCHOR BOLTS

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPP-4-96



APPLICABLE SPECIFICATIONS

Joint Sealant Tape shall be a tough, flow resistant, flexible, permanently elastic, adhesive tape made of a butyl-rubber or a vulcanized elastomeric rubber base. The tape may contain a cloth or fiber scrim insert. The tape, when applied in the specified thickness between the joining surfaces of structural plate structures shall, after assembly is completed, seal the joints from water. The tape shall be weather resistant and withstand temperatures (range to be specified) without loss of adhesion and without slipping and shall maintain joint water tightness through the range of plate movements anticipated from temperature variations and service loadings. The tape shall be supplied in rolls with a removable paper or cloth backing on the tape.

Note: Products known as 1202-T Sealant Tape, available from the 3M Company of St. Paul, Minnesota, and Elastomeric Resilient Tape 757-L3D-760, available from Tremco, Inc. of Cleveland, Ohio, have been used to seal structural plate joints.

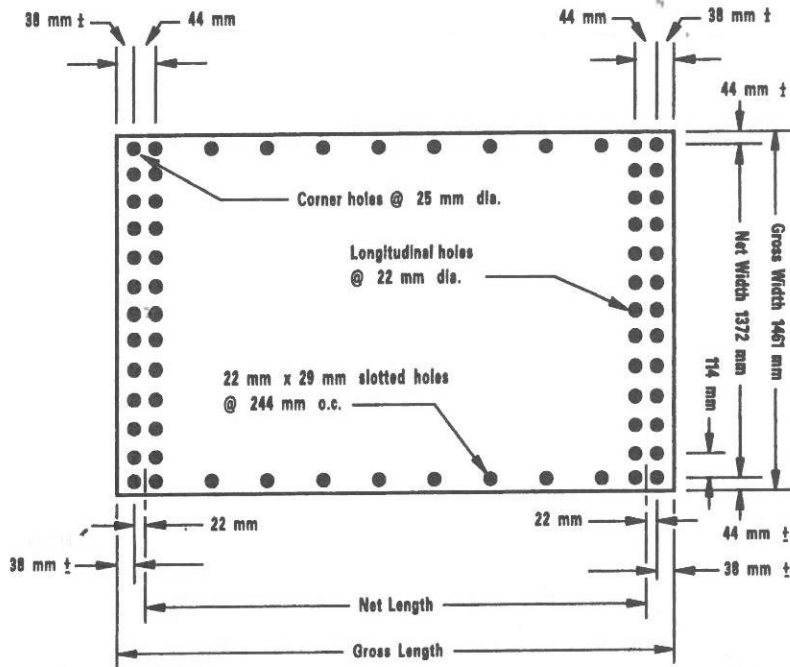
INTENDED USE

As a sealant tape between circumferential and longitudinal lap joints of structural plates when water infiltration or exfiltration is of concern.

ALUMINUM OR STEEL STRUCTURAL PLATE
JOINT SEALANT TAPE

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPP-5-96



Standard Sizes and Weights

Length *N	Net Length mm	Gross Length mm	Weight per Plate Thickness (kg)						
			2.54	3.18	3.81	4.44	5.08	5.72	6.35
9N	2199	2320	26.67	33.34	40.01	46.67	53.34	60.01	66.68
10N	2443	2564	29.48	36.85	44.23	51.60	58.97	66.34	73.71
11N	2688	2808	32.30	40.37	48.44	56.52	64.59	72.67	80.74
12N	2932	3053	35.11	43.88	52.66	61.44	70.22	78.99	87.77
13N	3177	3297	37.92	47.40	56.88	66.36	75.84	85.32	94.80
14N	3421	3542	40.73	50.92	61.10	71.28	81.46	91.65	101.83
15N	3665	3786	43.54	54.43	65.32	76.20	87.09	97.98	108.86
16N	3910	4030	46.36	57.95	69.54	81.12	92.71	104.30	115.89
17N	4154	4275	49.17	61.46	73.75	86.05	98.34	110.63	122.92
18N	4398	4519	51.98	64.98	77.97	90.97	103.96	116.96	129.95

Notes: (1) Weights based on nominal thickness. (2) Bolt holes have not been deducted.
*N=244 mm

SPECIFICATIONS

1. Corrugated aluminum structural plate shall conform to the requirements of AASHTO specifications M 219M and AASHTO M 243.

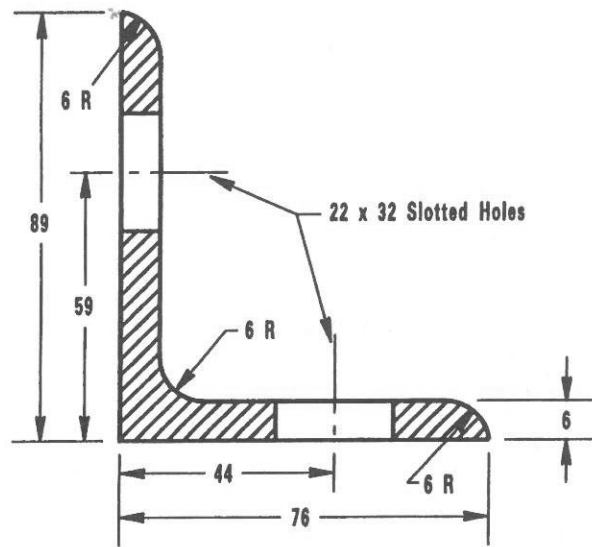
INTENDED USES

- Pipe Arch
- Pipe Arch
- Pedestrian Underpass
- Vehicular Underpass
- High-Profile Arch
- Horizontal Ellipse
- Low-Profile Arch
- Pear Shape
- Box Culvert

**ALUMINUM STRUCTURAL PLATE
STANDARD PLATE DETAILS**

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPPA-6-96



Included Angle 80° or 90°

NOTE: All Dimensions are in millimeters

SPECIFICATIONS

Material shall conform to the requirements of ASTM B 221M alloy 6063-T6.

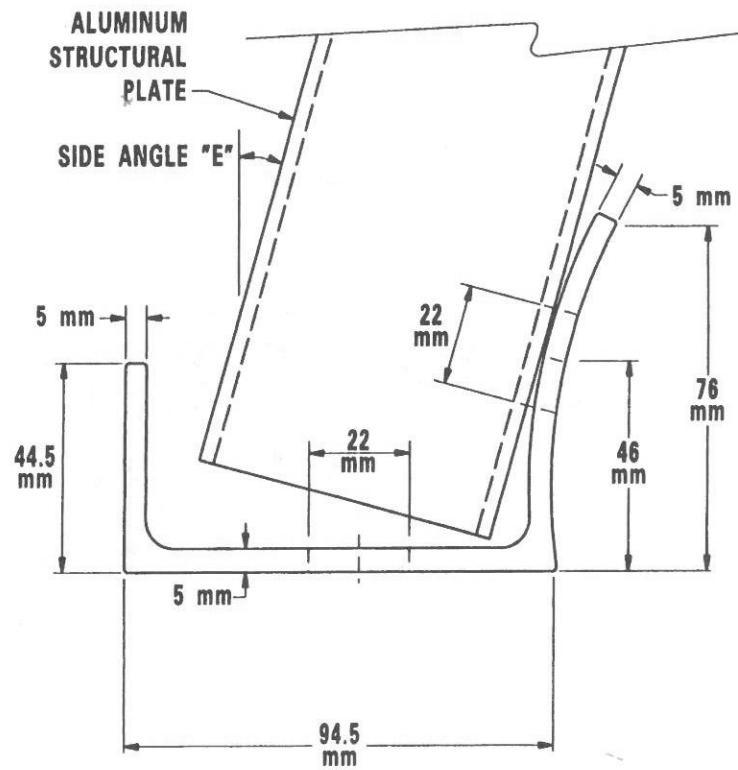
INTENDED USE

To connect the shell of arch to corrugated footing pads.

ALUMINUM STRUCTURAL PLATE
FOOTING CONNECTION ANGLE

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPPA-7-96

**SPECIFICATIONS**

Material shall conform to the requirements of ASTM B 221M, Alloy 6063-T6.

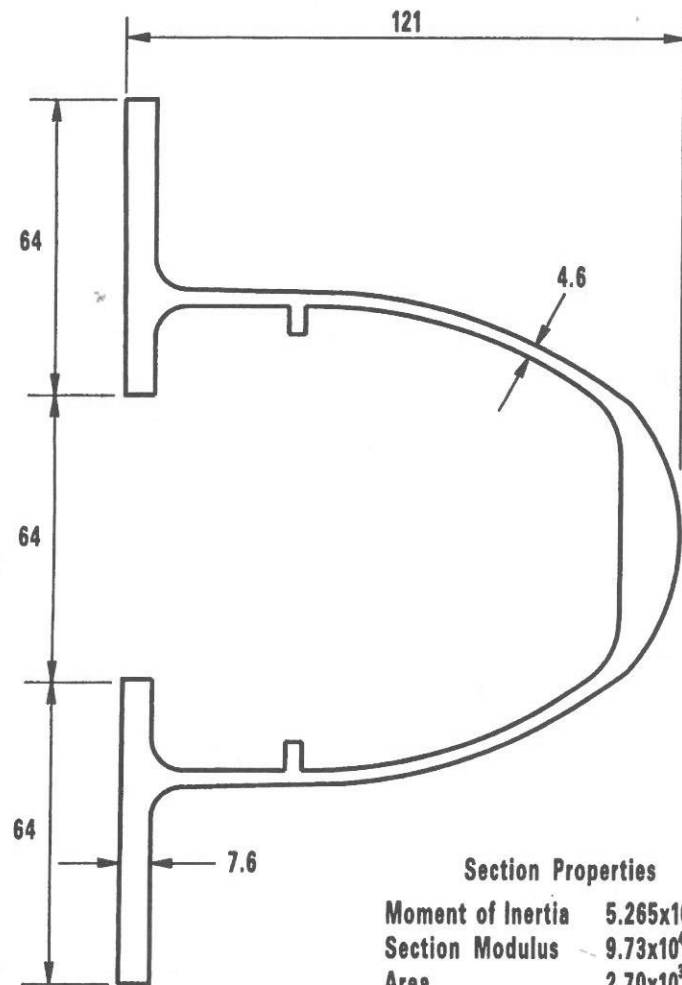
INTENDED USE

To connect the shell of box culverts to corrugated footing pads.

ALUMINUM STRUCTURAL PLATE
BOX CULVERT RECEIVING CHANNEL

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPPA-8-96



Section Properties

Moment of Inertia	$5.265 \times 10^6 \text{ mm}^4$
Section Modulus	$9.73 \times 10^4 \text{ mm}^3$
Area	$2.70 \times 10^3 \text{ mm}^2$
Weight	7.47 kg/m
Allow. Mom. Cap	12.74 N·m

1. All dimensions are in millimeters.

SPECIFICATIONS

The material used for aluminum wale beams shall conform to the requirements of ASTM B 221M. Alloy 6061-T6.

INTENDED USE

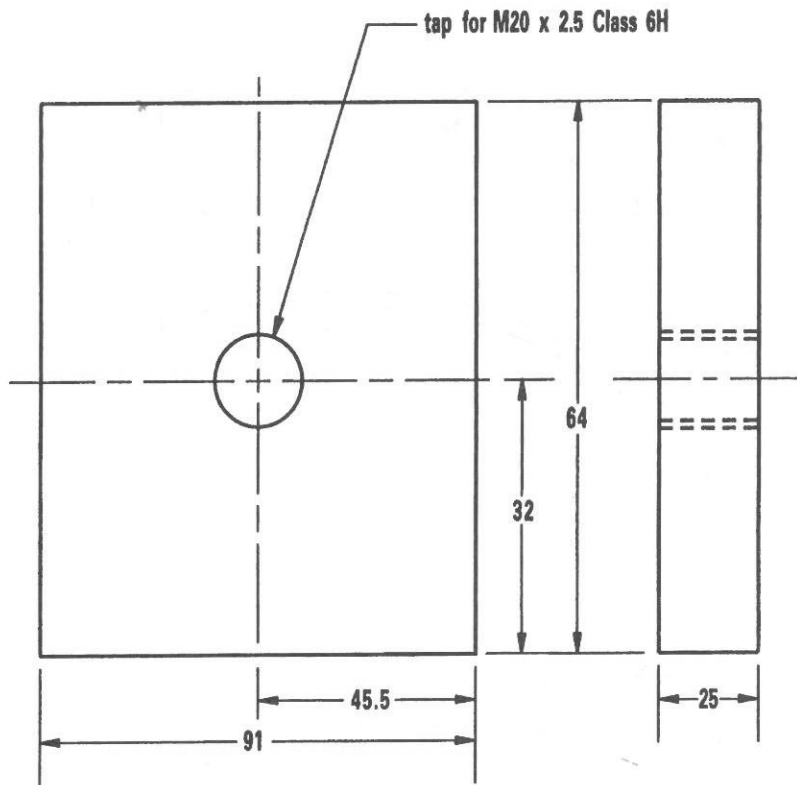
To reinforce, when connected to haunch plates, box culvert structures furnished with short footing pads.

ALUMINUM STRUCTURAL PLATE
WALE BEAM

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPPA-9-96

110



NOTE: All dimensions are in millimeters

APPLICABLE SPECIFICATIONS

Material shall conform to the requirements of ASTM B 221M Alloy 6061-T6.

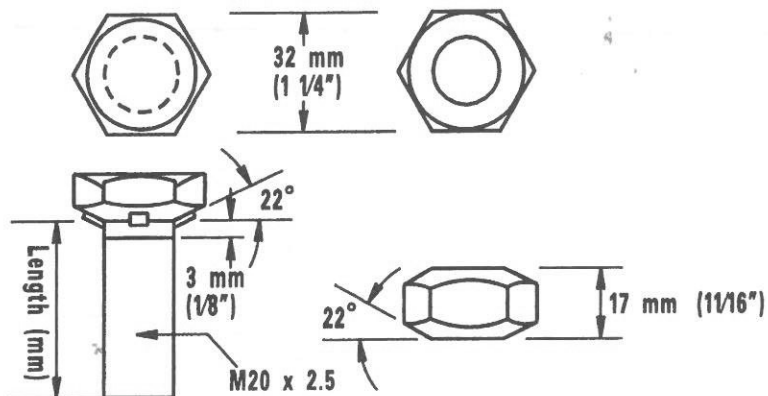
INTENDED USE

Connecting plate for use with wale beam part SPPA-9-96.

**ALUMINUM STRUCTURAL PLATE
CONNECTING PLATE FOR WALE BEAM**

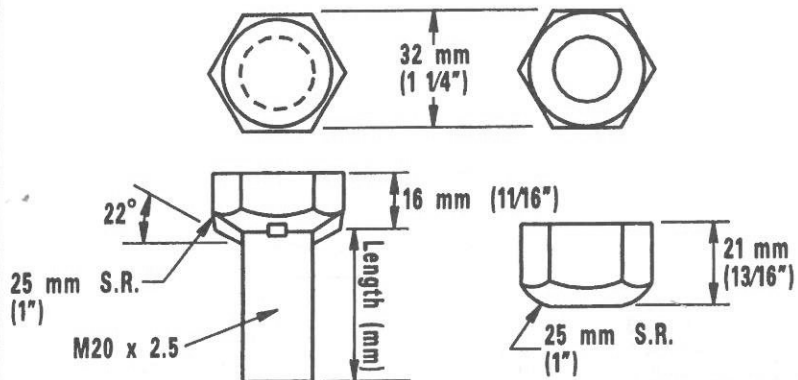
**AASHTO-AGC-ARTBA
TF-13 DRAWING**

SPPA-10-96



Aluminum

Length (mm)	Weight (kg 100 pcs.)	Allow. Plate Thickness	
		Two Plate	Three Plate
32	4.54	2.54-4.44	--
38	4.94	5.08-6.35	2.54-4.44
52	5.76	--	5.08-6.35



Aluminumized and Galvanized Steel

NOTE: All dimensions are in millimeters.

Length (mm)	Weight (kg 100 pcs.)	Allow. Plate Thickness	
		Two Plate	Three Plate
32	14.06	2.54-4.44	--
38	14.97	5.08-6.35	2.54-4.44
52	17.24	--	5.08-6.35

SPECIFICATIONS

Bolts and nuts for aluminum structural plate shall conform to the following specifications:

1. Bolt—ANSI B 18.2.3.5M ASTM F 568M - Class 8.8
2. Nut—ANSI B 18.2.4.2M ASTM A 563M - Class 9
3. Galvanize—AASHTO M 232
4. Aluminum—ASTM B 211M Alloy 6061-T6

INTENDED USE

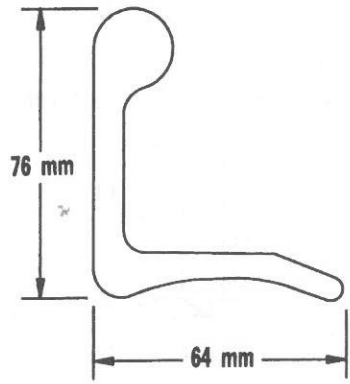
To connect 230 mm x 64 mm corrugated aluminum structural plate.

111

**ALUMINUM STRUCTURAL PLATE
BOLTS AND NUTS**

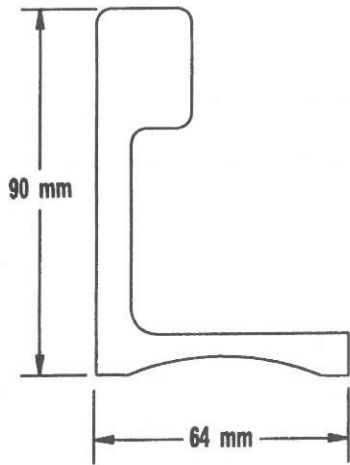
AASHTO-AGC-ARTBA
TF-13 DRAWING

SPPA-11-96



Type II Rib

Rib	Type II
Alloy	6061-T6
f_y min	240 MPa
f_u min	260 MPa
A	1116 mm ²
I	8.32x10 ⁵ mm ⁴



Type IV Rib

Rib	Type IV
Alloy	6061-T6
f_y min	240 MPa
f_u min	260 MPa
A	1510 mm ²
I	1.55x10 ⁶ mm ⁴

SPECIFICATIONS

1. Circumferential Stiffeners shall conform to the requirements of ASTM B 221M Alloy 6061-T6.
2. Location, spacing and length should be clearly noted on drawing.

INTENDED USE

To reinforce box culverts or to allow increased span of structural plate structures.
This stiffener may be applied to all shapes of structural plate structures.

112

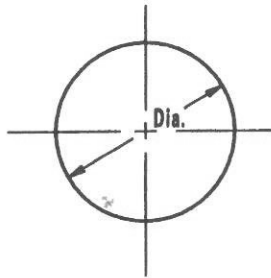
**ALUMINUM STRUCTURAL PLATE
CIRCUMFERENTIAL STIFFENER**

AASHTO-AGC-ARTBA
TF-13 DRAWING

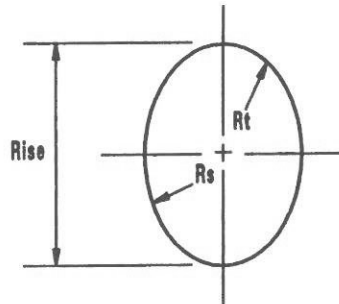
SPPA-12-96

SECTION SPC—STANDARD SHAPES

Aluminum or Steel Structural Plate Pipe	SPS-1-96	114
Steel Structural Plate Pipe Arch—Series I	SPSS-2-96	115
Steel Structural Plate Pipe Arch—Series II	SPSS-3-96	116
Aluminum or Steel Structural Plate Arch	SPS-4-96	117
Steel Structural Plate Pedestrian Underpass	SPSS-5-96	118
Steel Structural Plate Vehicular Underpass	SPSS-6-96	119
Aluminum Structural Plate Pipe Arch	SPSA-7-96	120
Aluminum Structural Plate Vehicular Underpass	SPSA-8-96	121
Aluminum Structural Plate Pedestrian Underpass	SPSA-9-96	122
Aluminum or Steel Structural Plate Box Culvert	SPS-10-96	123
Various Sections Thru Steel or Aluminum Structural Plate Box Culverts	SPS-11-96	124



Round Pipe



Elliptical Pipe

Round Pipe is available in standard sizes from 1500 mm to 7800 mm diameter in 150 mm increments providing flow areas from 1.86 m² to 49.33 m².

Elliptical pipe is available in the same nominal diameter specified above but with the radii adjusted to produce a rise greater than the nominal diameter. This adjustment of the radii has minimal effect on the flow area.

SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

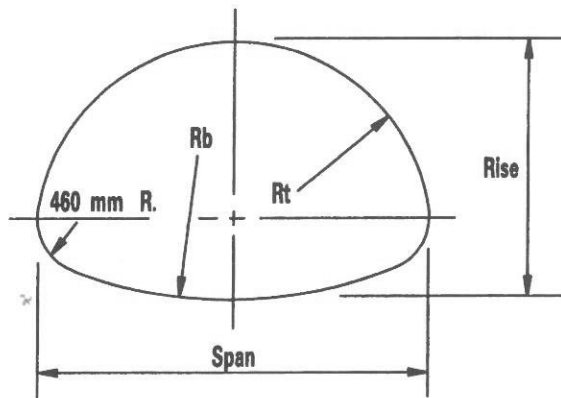
INTENDED USES

Provide a conduit within soil backfill for passage of fluids or other material. The round pipe shape is selected when the only criteria for shape selection is to provide a maximum flow area to periphery ratio.

**ALUMINUM OR STEEL
STRUCTURAL PLATE PIPE**

**AASHTO-AGC-ARTBA
TF-13 DRAWING**

SPS-1-96



Pipe Arch - Series I

Series I pipe arches are available in sizes ranging from 1850 mm span x 1400 mm rise to 5055 mm span x 3070 mm rise with increments in rise of 51 mm providing flow areas from 2 m² to 12 m².

115

SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USES

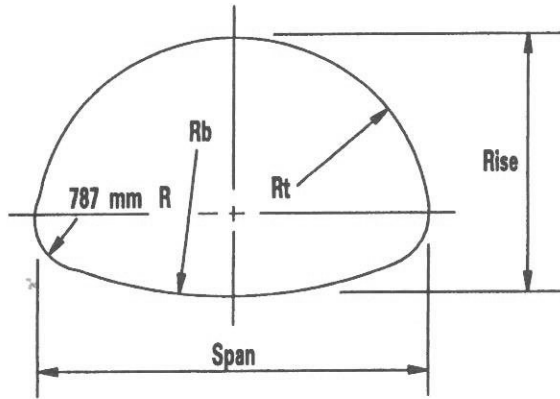
Provide a conduit within soil backfill for passage of fluids or other materials.

The series I pipe arch shape is selected when the consideration of headroom makes it necessary to maximize the flow area to rise ratio.

**STEEL STRUCTURAL PLATE
PIPE ARCH—SERIES I**

**AASHTO-AGC-ARTBA
TF-13 DRAWING**

SPSS-2-96



Pipe Arch - Series II

Series II pipe arch are available in sizes ranging from 4040 mm span x 2840 mm rise to 6270 mm span x 4010 mm rise with increments in rise of 51 mm providing flow areas from 9 m² to 19.9 m².

SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USES

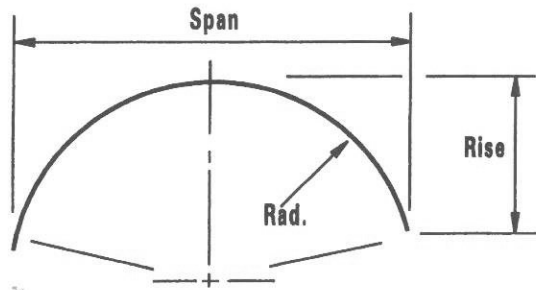
Provide a conduit within soil backfill for passage of fluids or other materials.

The series II pipe arch shape is selected when the consideration of headroom makes it necessary to maximize the flow area to rise ratio.

**STEEL STRUCTURAL PLATE
PIPE ARCH—SERIES II**

**AASHTO-AGC-ARTBA
TF-13 DRAWING**

SPSS-3-96



Arch

Arches are available in sizes from 1500 mm spans to 7920 mm spans in increments of 300 mm with variable rises providing flow areas from 0.60 m² to 25 m².

Note: Aluminum structural plate arches are limited to spans of 5790 mm.

APPLICABLE SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

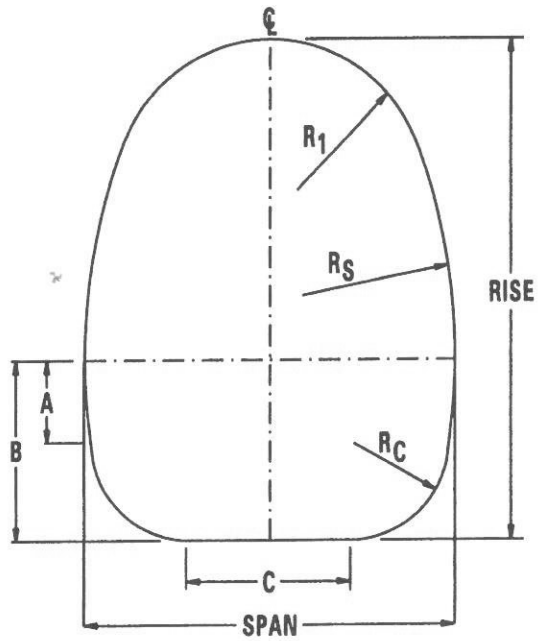
INTENDED USES

Provide a conduit within soil backfill for passage of fluids or other materials. An arch is selected when site conditions, aesthetic considerations or other criteria make it desirable and/or economical to place the structure on footings rather than use a closed conduit.

**ALUMINUM OR STEEL
STRUCTURAL PLATE ARCH**

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPS-4-96



TYPICAL SECTION

Structural Plate Steel Underpasses

Pedestrian Underpasses are available in sizes from 1730 mm span x 1750 mm rise to 1780 mm span x 2490 mm rise.

APPLICABLE SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USE

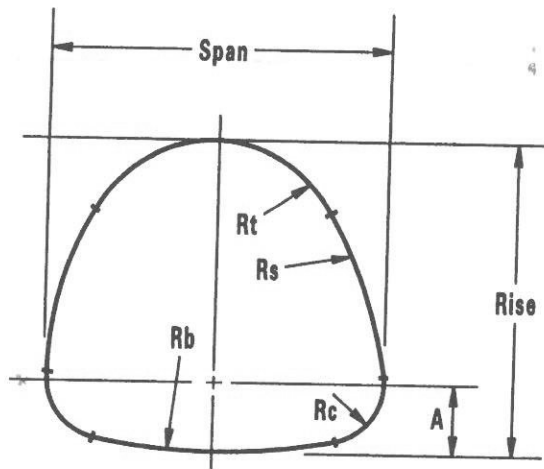
Provide a conduit within soil backfill for passage of fluids or other materials.

The pedestrian underpass is selected when the clearance configuration is of maximum concern.

**STEEL STRUCTURAL PLATE
PEDESTRAIN UNDERPASS**

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPSS-5-96



**Structural Plate Steel Underpasses
Sizes and Layout Details**

Vehicular underpasses are available in sizes from 3710 mm span to 3350 mm rise to 6200 mm span to 5440 mm rise.

APPLICABLE SPECIFICATIONS

AASHTO Standard Specifications for Highway Bridges, Section 12.

INTENDED USE

Provide a conduit within soil backfill for passage of vehicles and materials.

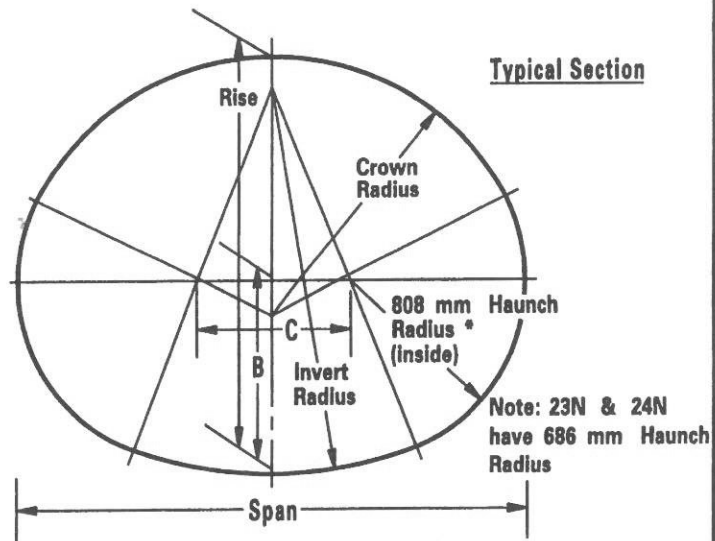
The vehicular underpass is selected when the clearance configuration is of maximum concern.

119

**STEEL STRUCTURAL PLATE
VEHICULAR UNDERPASS**

**AASHTO-AGC-ARTBA
TF-13 DRAWING**

SPSS-6-96



Series III pipe is available in sizes from 2010 mm span x 1730 mm rise to 4980 mm span x 3050 mm rise; from 2.8 m² to 12.5 m².

SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USE

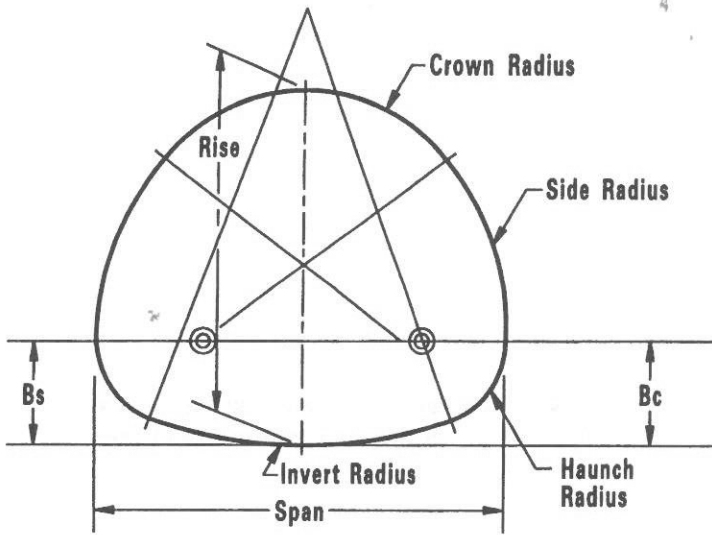
To provide a conduit within soil backfill for passage of fluids or other materials.

The Series III pipe arch is selected when the consideration of headroom makes it necessary to maximize the flow area to rise ratio.

ALUMINUM STRUCTURAL PLATE
PIPE ARCH

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPSA-7-96



Vehicular underpasses are available in sizes from 3710 mm span x 3350 mm rise to 6200 mm span x 5440 mm rise.

SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USE

Provide a conduit within soil backfill for passage of vehicles or other materials.

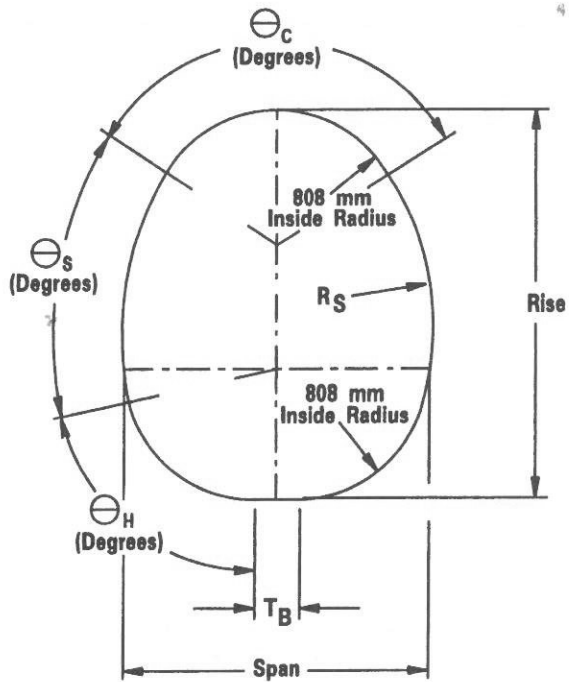
The vehicular underpass is selected when the clearance consideration is of greater concern than the flow area.

121

ALUMINUM STRUCTURAL PLATE
VEHICULAR UNDERPASS

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPSA-8-96



Typical Section

Pedestrian Underpasses are available in sizes from 1850 mm span x 1750 mm rise to 1960 mm span x 2460 mm rise.

SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USE

To Provide a conduit within soil backfill for passage of pedestrians.

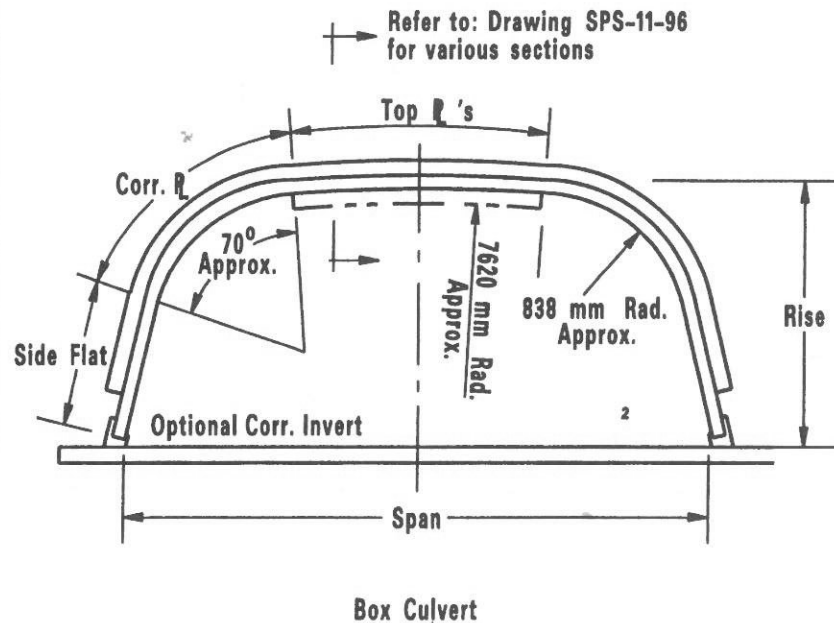
The pedestrian underpass is selected when the clearance configuration is of greater concern than the flow area.

122

ALUMINUM STRUCTURAL PLATE
PEDESTRAIN UNDERPASS

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPSA-9-96



Metal Box Culverts are available in sizes ranging from 2515 mm span x 686 mm rise to 7747 mm span x 3099 mm rise; from 1.5 m² to 20.7 m².

SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.8.

INTENDED USES

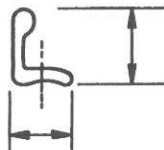
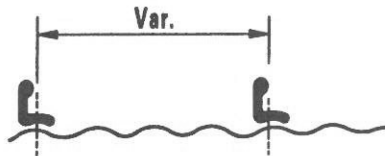
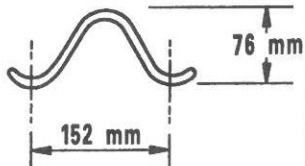
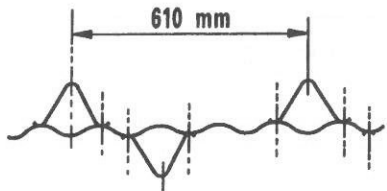
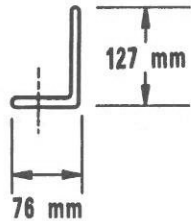
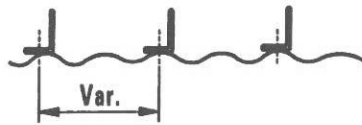
To provide a conduit within soil backfill for passage of fluids or other materials.

Box culvert is selected when the consideration of headroom makes it necessary to maximize the flow area to rise ratio. Footing plates or concrete footings can be used in lieu of optional invert.

ALUMINUM OR STEEL STRUCTURAL PLATE
BOX CULVERT

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPS-10-96



See SPPA-12-96 for aluminum reinforcing ribs available

SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.8.

INTENDED USE

To reinforce corrugated structural plates for use on box culverts.

**VARIOUS SECTIONS THRU STEEL OR ALUMINUM
STRUCTURAL PLATE BOX CULVERTS**

**AASHTO-AGC-ARTBA
TF-13 DRAWING**

SPS-11-96

SECTION SPL—LONG SPANS

Aluminum or Steel Structural Plate Horizontal Ellipse	SPL-2-96	126
Aluminum or Steel Structural Plate Low-Profile Arch	SPL-3-96	127
Aluminum or Steel Structural Plate High-Profile Arch	SPL-4-96	128
Steel Structural Plate Pear Shape	SPL-5-96	129
Section Thru Steel and Aluminum Structural Plate Long Span Structures	SPL-6-96	130

Comments on Long Span Structural Plate Structures

Long span structural plate structures are short span bridges and are defined in the AASHTO Standard Specifications for Highway Bridges (revised through 1996) as:

- (1) Structural plate structures (pipe, pipe arch, and arch) which exceed maximum sizes imposed by the design requirements for structural plate pipe structures.
- (2) Special shapes of any size which involve a relatively large radius of curvature in crown or side plates. Vertical ellipses, horizontal ellipses, underpasses, low profile arches, high profile arches, and inverted pear shapes are the terms describing these special shapes.

Long span structures shall include acceptable special features.

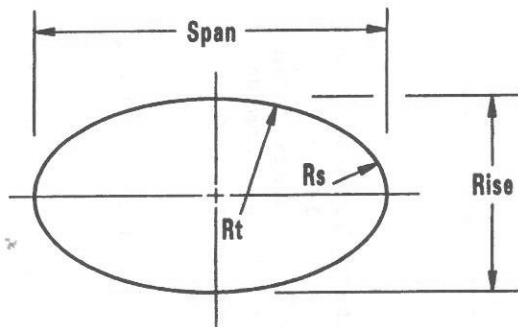
Acceptable special features (are):

- (1) Continuous longitudinal structural stiffeners (reinforced concrete) connected to the corrugated plates at each side of the top arc.
- (2) Reinforcing ribs formed from structural shapes curved to conform to the curvature of the plates, fastened to the structure as required to insure integral action with the corrugated plates, and spaced at such intervals as necessary to increase the moment of inertia of the section to that required by the design.

Drawings SPS-1-96, SPSS-3-96, and SPS-4-96 and SP-7-96 show structure shapes (round and elliptical aluminum or steel or aluminum structural plate arch, respectively) that can be designed either as structural plate pipe structures or as long span structures, the latter requiring special features. Drawings SPL-2-96, SPL-3-96, SPL-4-96, and SPL-5-96 show structure shapes (horizontal ellipse, low-profile arch, high-profile arch and inverted pear, respectively) that are normally designed as long span structural plate structures requiring special features.

Drawing SPL-6-96 and SPPA-11-96 show the special features applicable for steel and aluminum long span structures respectively.

Upon special request to the manufacturers, any of the long span shapes may be available in sizes larger or smaller than the ranges shown in this guide.



Horizontal Ellipse

The horizontal ellipse is available in sizes ranging in size from 5890 mm span x 3890 mm rise to 11 330 mm span x 6760 mm rise providing flow areas of 18.1 m² thru 58.6 m².

APPLICABLE SPECIFICATION

AASHTO Standard Specifications for Highway Bridges. Section 12.

INTENDED USE

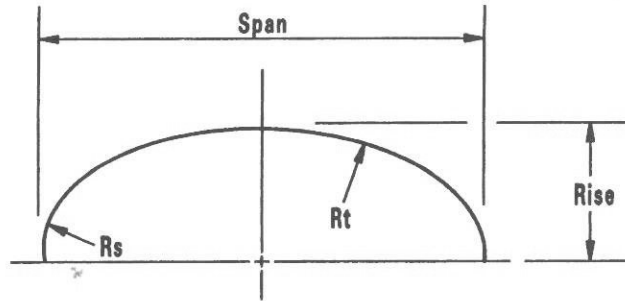
Provide a conduit within soil backfill for passage of fluids or other materials.

The horizontal ellipse is selected when the consideration of headroom makes it necessary to maximize the flow area to rise ratio.

**ALUMINUM OR STEEL STRUCTURAL PLATE
HORIZONTAL ELLIPSE**

**AASHTO-AGC-ARTBA
TF-13 DRAWING**

SPL-2-96



Low Profile Arch

The low profile arch in sizes ranging from 6120 mm span x 2290 mm rise to a maximum of 11 790 mm span x 4800 mm rise providing a flow area of 11.1 m² to 45.5 m².

APPLICABLE SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USES

Provide a conduit within soil backfill for passage of fluids or other materials.

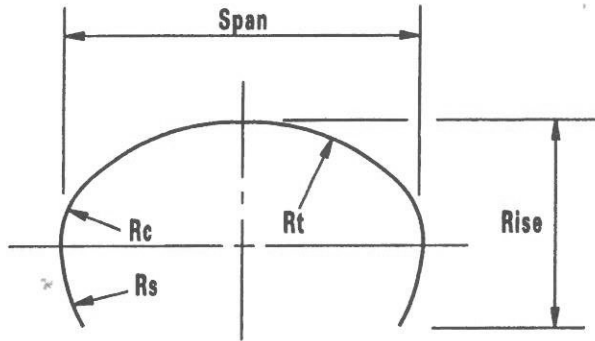
An arch shape is selected when site conditions, aesthetic considerations or other criteria make it desirable and/or economical to place the structure on footings rather than use a closed conduit.

A low profile arch is selected when the consideration of head room makes it necessary to maximize the flow area to rise ratio.

ALUMINUM OR STEEL STRUCTURAL PLATE
LOW-PROFILE ARCH

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPL-3-96



High Profile Arch

High profile arch are available in sizes ranging from 6120 mm span x 2770 mm rise to 10 720 mm span x 6100 mm rise providing a flow areas from 14.1 m² to 56.4 m².

APPLICABLE SPECIFICATION

AASHTO Standard Specifications for Highway Bridges. Section 12.

INTENDED USES

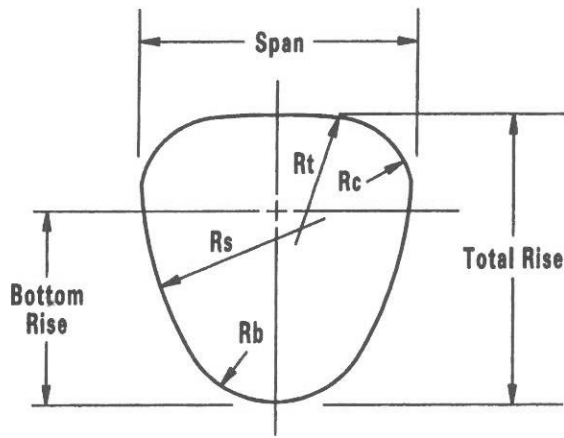
Provide a conduit within soil backfill for passage of fluids or other materials.

An arch shape is selected when site conditions, aesthetic considerations or other criteria make it desirable and/or economical to place the structure on footings rather than use a closed conduit.

**ALUMINUM OR STEEL STRUCTURAL PLATE
HIGH-PROFILE ARCH**

**AASHTO-AGC-ARTBA
TF-13 DRAWING**

SPL-4-96



Pear Shape

Pear shapes are available in sizes from 7210 mm span x 7820 mm rise to 9140 mm span x 9500 mm rise.

APPLICABLE SPECIFICATION

AASHTO *Standard Specifications for Highway Bridges*, Section 12.

INTENDED USES

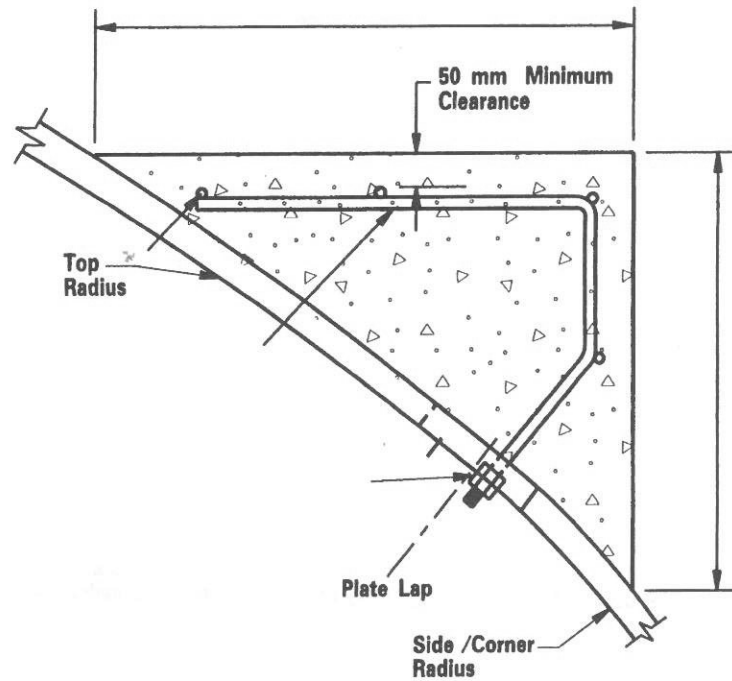
Provide a conduit within soil backfill for passage of fluids or other materials.

The pear shape is selected when the clearance configuration is of greater concern than the flow area.

**STEEL STRUCTURAL PLATE
PEAR SHAPE**

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPL-5-96



LONGITUDINAL STIFFENER

SPECIFICATIONS

AASHTO *Standard Specifications for Highway Bridges*. Section 12.8.

INTENDED USE

To provide the "Special Feature" requirement of a long span structure. The special feature reinforces the structural plate structures, allowing it to be designed and function as a long span structure.

Note: On aluminum structures, black steel bars must not be in contact with aluminum.

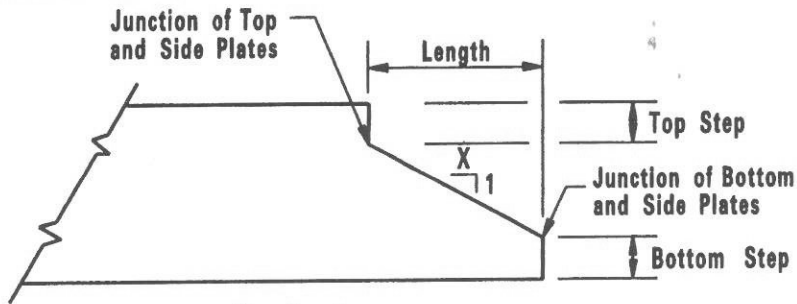
SECTION THRU STEEL AND ALUMINUM STRUCTURAL
PLATE LONG SPAN STRUCTURES

AASHTO-AGC-ARTBA
TF-13 DRAWING

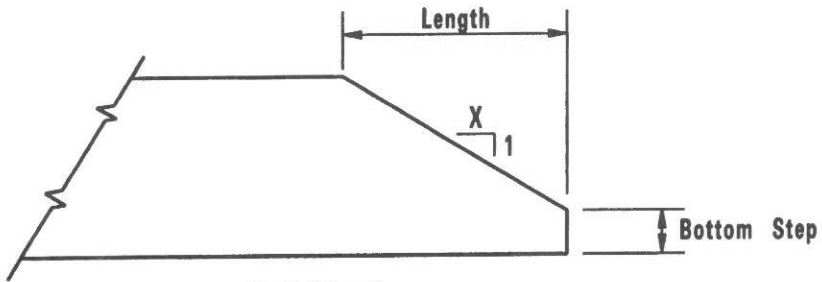
SPL-6-96

SECTION SPE—END TREATMENTS
AND SPECIAL FABRICATION

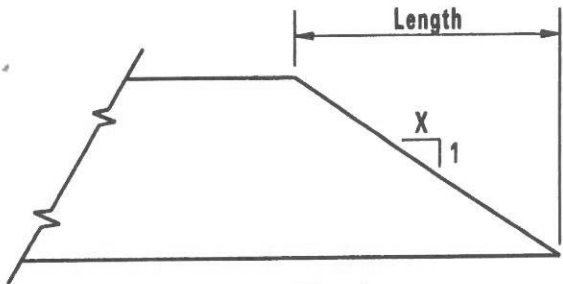
Aluminum or Steel Structural Plate End Conditions—Bevel	SPE-1-96	132
Aluminum or Steel Structural Plate End Conditions—Skews	SPE-2-96	133
Aluminum or Steel Structural Plate End Conditions— Skew Bevel	SPE-3-96	134
Aluminum or Steel Structural Plate Special Fabrications	SPE-4-96	135



Step Bevel



Partial Bevel



Full Bevel

Partial Elevations Views

APPLICABLE SPECIFICATION

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USES

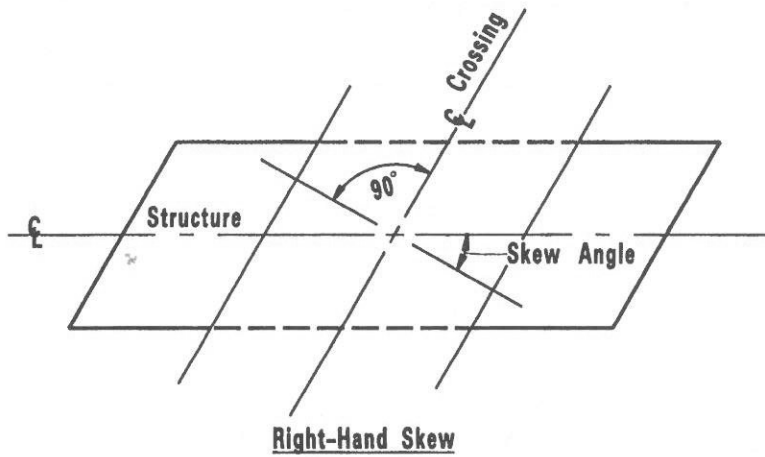
Beveled ends are specified to conform to the slope of the fill.

A beveled end should be reinforced & stabilized with concrete or rip-rap headwall and in no case should the bevel slope be greater than 1 V. to 2 H.

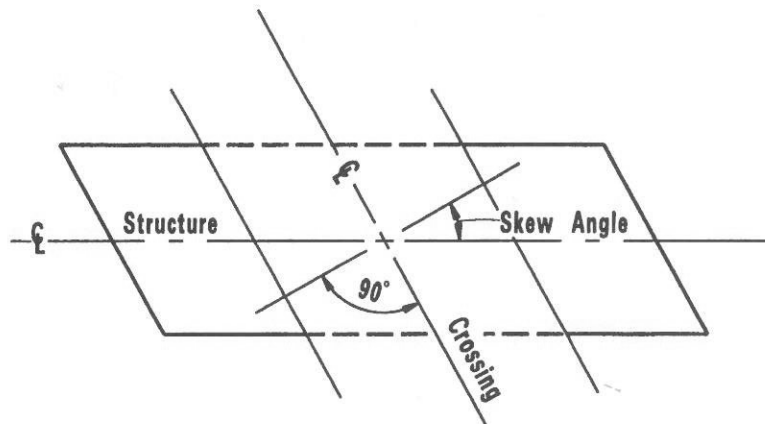
**ALUMINUM OR STEEL STRUCTURAL PLATE
END CONDITIONS—BEVEL**

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPE-1-96



Right-Hand Skew



Left-Hand Skew

Plan Views

APPLICABLE SPECIFICATION

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USES

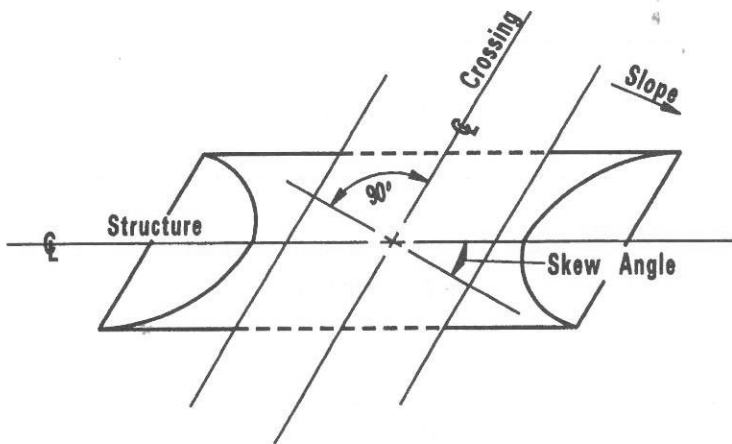
Skewed ends are specified to conform to the alignment of the fill.

Skewed and Beveled ends should be avoided. If absolutely necessary, careful attention must be given to their design.

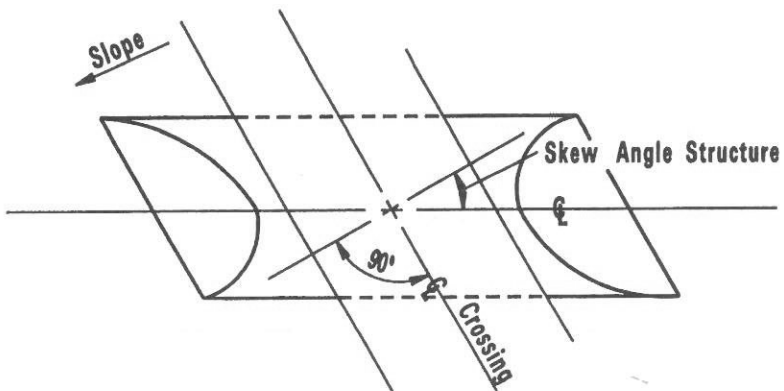
**ALUMINUM OR STEEL STRUCTURAL PLATE
END CONDITIONS—SKEWS**

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPE-2-96



Right Hand Skew - Bevel



Left Hand Skew - Bevel

Plan Views

Drawings show a skew combined with a partial bevel. Skews can also be combined with step bevels or full bevels.

APPLICABLE SPECIFICATION

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USES

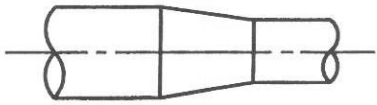
Skew-beveled ends are specified to conform to both the slope and alignment of the fill. Cutting the ends of a corrugated metal drainage structure to a skew or a bevel to conform to the embankment slope, destroys the ability of the end portion of the structure to act as a ring in compression. Headwalls, rip-rap slopes, slope paving, or stiffening of the pipe may be required to stabilize these ends. In general, the end of a pipe should not be cut to a skew greater than 35 degrees or beveled to a slope greater than 1 V. to 2 H.

Skewed and beveled ends should be avoided. If absolutely necessary, careful attention must be given to their design.

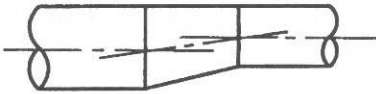
**ALUMINUM OR STEEL STRUCTURAL PLATE
END CONDITIONS—SKEW BEVEL**

AASHTO-AGC-ARTBA
TF-13 DRAWING

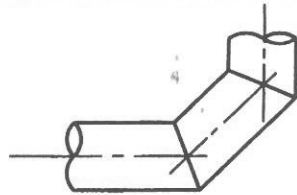
SPE-3-96



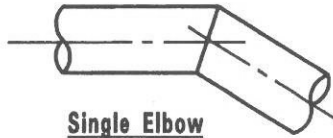
Concentric Reducer



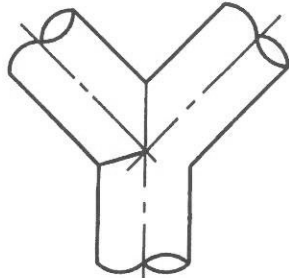
Eccentric Reducer



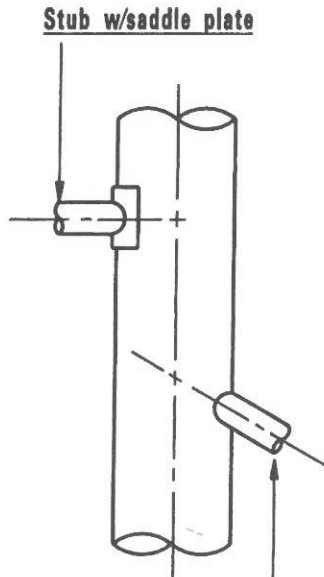
Multiple Elbow



Single Elbow

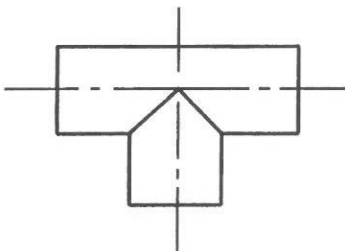


Wye



Stub w/saddle plate

Welded Stub



Tee

APPLICABLE SPECIFICATION

AASHTO *Standard Specifications for Highway Bridges*. Section 12.

INTENDED USES

When site and design requirements necessitate special structure adaptations they can often be met with the use of special shop fabricated items such as:

- Reducers
- Vertical Elbows
- Horizontal Elbows
- Risers (Stub)
- Inlets
- Wyes
- Tees
- Etc.

ALUMINUM OR STEEL STRUCTURAL PLATE
SPECIAL FABRICATIONS

AASHTO-AGC-ARTBA
TF-13 DRAWING

SPE-4-96