

PART 5
PLASTIC DRAINAGE PRODUCTS (P)

**PART 5 PLASTIC DRAINAGE PRODUCTS (P)
DESIGN CONSIDERATIONS**

Plastic pipe for drainage applications is available in sizes through 1220 mm in both polyethylene (PE) and polyvinyl chloride (PVC) materials. These products are offered in a wide variety of wall configurations (ribbed, corrugated or solid) which often vary from manufacturer to manufacturer. These pipes must only be used with fittings, couplings, etc. provided by the pipe manufacturer.

The primary products available are tabulated below. Products made to ASTM specifications typically provide a constant pipe stiffness across the diameter range. Products covered by AASHTO specifications provide stiffness levels that are reduced as diameters increase. It is up to the engineer to determine an appropriate minimum stiffness level for the application.

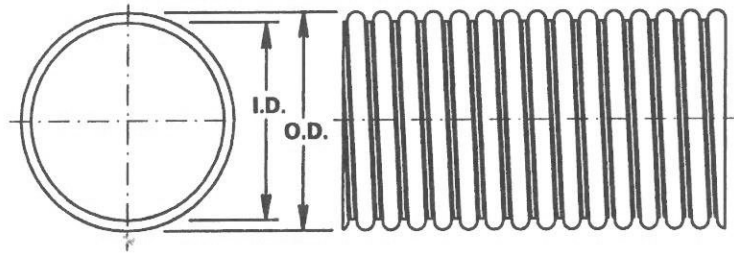
Installation shall be in accordance with ASTM D 2321. Section 18 of the *AASHTO Standard Specification for Highway Bridges* provides the appropriate design method, design properties, etc.

MATERIAL	SPECIFICATION	
	ASTM	AASHTO
PVC—Solid Wall	D 3034	M 278
PVC—Profile Wall	F 679 F 794 F 949	M 304M
PE—Solid Wall	F 714	M 252
PE—Corrugated or Ribbed	F 405 F 667 F 894	M 294

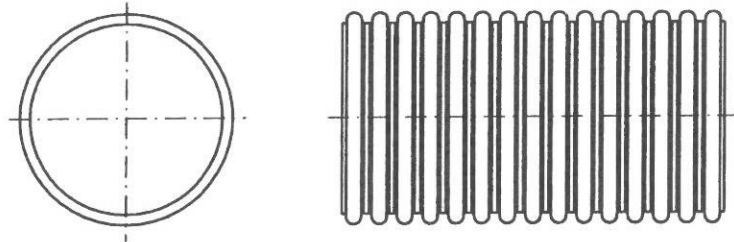
SECTION PE—POLYETHYLENE

Smooth Interior Corrugated Polyethylene Pipe	PE-1-96	178
Bell Couplers for SLCPP	PE-2-96	179
SLCPP Bends	PE-3-96	180
Split Couplers for SLCPP	PE-4-96	181
SLCPP 4-Piece 90° Bend	PE-5-96	182
SLCPP Tee Fittings	PE-6-96	183
SLCPP Lateral Fittings	PE-7-96	184
PE End Sections	PE-8-96	185

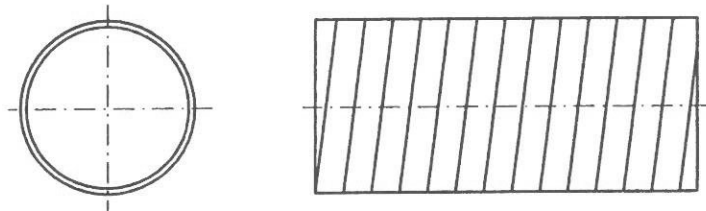
SPIRAL



ANNULAR



SMOOTH



APPLICABLE SPECIFICATIONS

1. Smooth Interior shall conform to the requirements of :

AASHTO M 294 (Type S & SP)
AASHTO M 294 (Type D & DP)

2. Standard I.D. in 300 mm, 375 mm, 450 mm, 600 mm, 750 mm,
900 mm, 1050 mm, and 1200 mm.

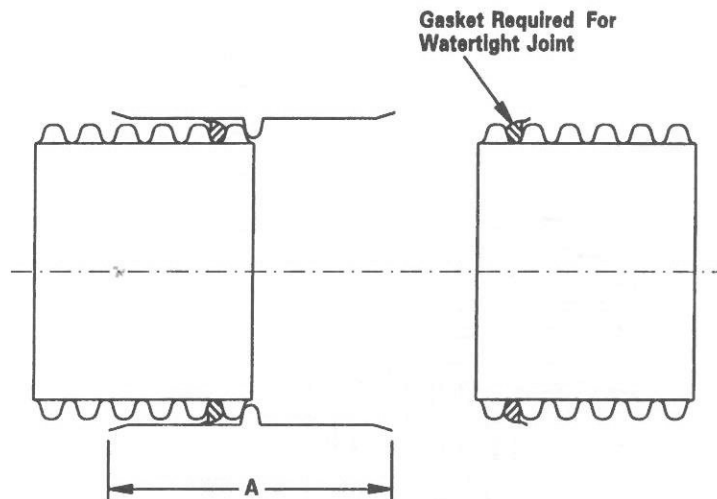
INTENDED USE

Pipe for surface and subsurface drainage uses
include culverts, storm sewers, and underdrains.

SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE

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

PE-1-96



DIA.	A
mm	
300	355
375	405
450	460
600	610

APPLICABLE SPECIFICATIONS

1. Coupling bands shown meet the performance requirements of the AASHTO *Standard Specifications for Highway Bridges*, Division 2 Section 26.
2. Watertight Joints shall meet AASHTO D 3212 performance requirements.

INTENDED USE

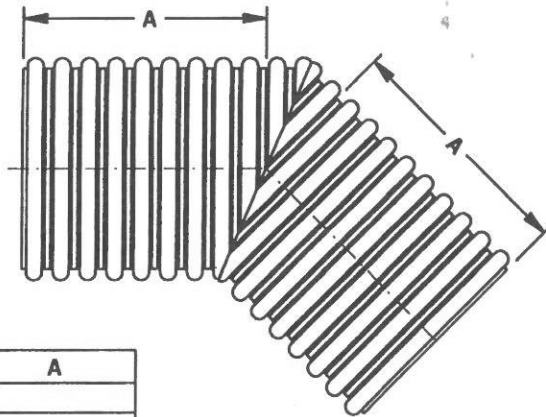
Coupling of SL CPP sections or appurtenances.

BELL COUPLERS FOR SL CPP

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

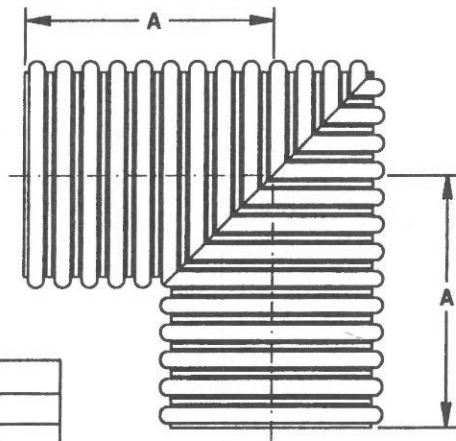
PE-2-96

10° - 45°



DIA.	A
mm	
300	310
375	420
450	415
600	500
750	545
900	600

46° - 90°



DIA.	A
mm	
300	425
375	515
450	560
600	770
750	940
900	980

APPLICABLE SPECIFICATIONS

1. Smooth Interior shall conform to the requirements of :
AASHTO M 294 (Type S & SP).
2. Welding shall be in accordance with drawings and specifications supplied by the manufacturer and approved by the purchaser.
3. Reducing Branches shall be stubbed first with solid wall HDPE where practical.

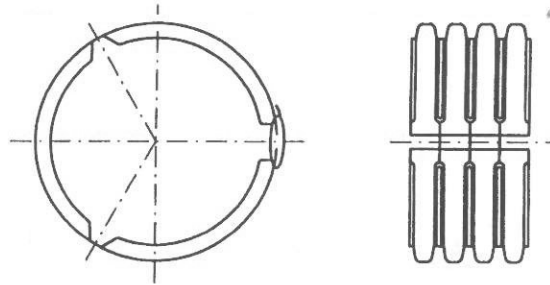
INTENDED USES

1. In culvert, storm sewer, or underdrains for making intersecting lines of pipe.
2. Underdrain and recharge patterns:
 - A. Highway
 - B. Airport
 - C. Railroad
 - D. Flood protection
 - E. Structures (Abutments, Walls, etc.)

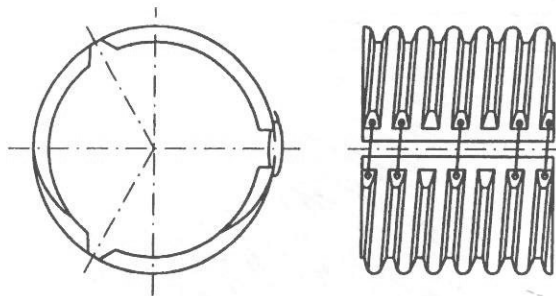
SLCPP BENDS

AASHTO-AGC-ARTBA
TF-13 DRAWING

PE-3-96



DIA	A	B
mm		
300	200	375
375	265	450
450	260	545
600	320	710



DIA	A	B
mm		
600	575	730
750	500	950
900	710	1130

APPLICABLE SPECIFICATIONS

1. Coupling bands shown meet the performance requirements of the AASHTO *Standard Specifications for Highway Bridges, Division 2 Section 26.*

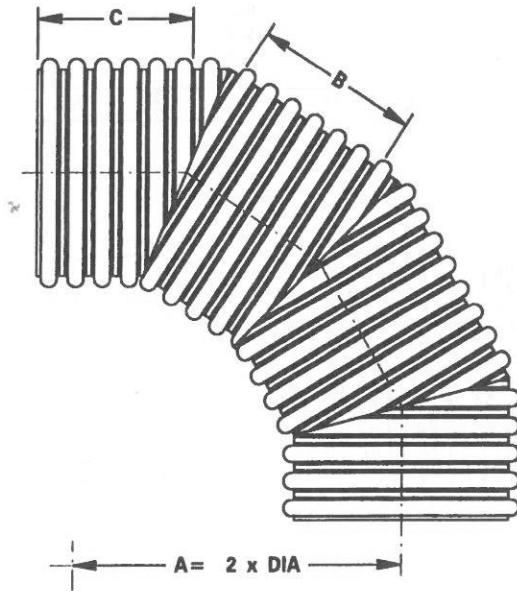
INTENDED USE

Coupling of SLCPP Sections or Appurtenances.

SPLIT COUPLERS FOR SLCPP

AASHTO-AGC-ARTBA
TF-13 DRAWING

PE-4-96



DIA	B	C
mm		
600	710	430
750	870	495
900	1060	870

APPLICABLE SPECIFICATIONS

1. Smooth interior shall conform to the requirements of :
AASHTO M 294 (Type S & SP).
2. Welding shall be in accordance with drawings and specifications supplied by the manufacturer and approved by the purchaser.
3. Reducing Branches shall be stubbed first with solid wall HDPE

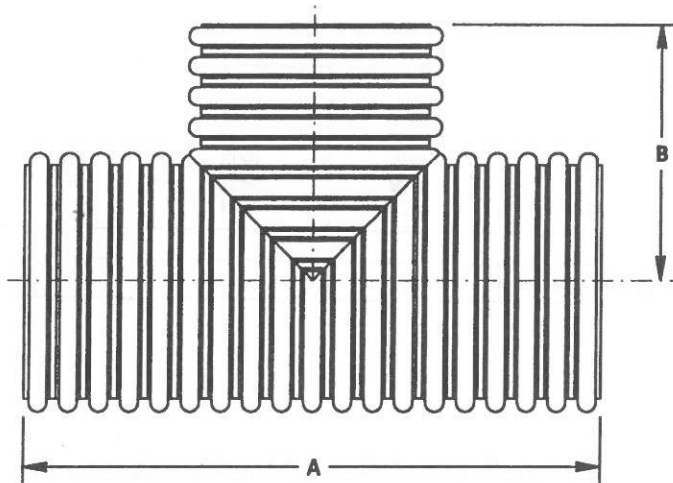
INTENDED USES

1. In culvert, storm sewer, or underdrains for making intersecting lines of pipe.
2. Underdrain and recharge patterns:
 - A. Highway
 - B. Airport
 - C. Railroad
 - D. Flood protection
 - E. Structures (Abutments, Walls, etc.)

SLCPP 4-PIECE 90° BEND

AASHTO-AGC-ARTBA
TF-13 DRAWING

PE-5-96



DIA	A	B
mm		
300	790	400
375	985	490
450	1050	555
600	1525	760
750	1980	985
900	2135	1065

BRANCH DIAMETER SAME AS MAIN RUN OR LESS

APPLICABLE SPECIFICATIONS

1. Smooth interior shall conform to the requirements of :
AASHTO M 294 (Type S & SP).
2. Welding shall be in accordance with drawings and specifications supplied by the manufacturer and approved by the purchaser.
3. Reducing Branches shall be stubbed first with solid wall HDPE

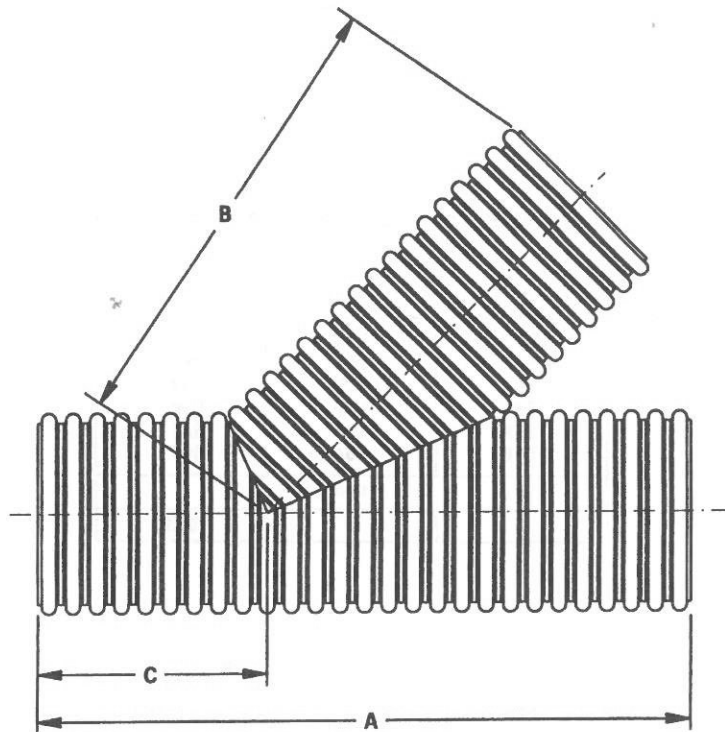
INTENDED USES

1. In culvert, storm sewer, or underdrains for making intersecting lines of pipe.
2. Underdrain and recharge patterns:
 - A. Highway
 - B. Airport
 - C. Railroad
 - D. Flood protection
 - E. Structures (Abutments, Walls, etc.)

SLCPP TEE FITTINGS

AASHTO-AGC-ARTBA
TF-13 DRAWING

PE-6-96



DIA	A	B	C
mm			
300	1030	725	330
375	1165	830	370
450	1320	950	380
600	1830	1290	550
750	2285	1815	700
900	2795	2050	885

APPLICABLE SPECIFICATIONS

1. Smooth interior shall conform to the requirements of :
AASHTO M 294 (Type S & SP).
2. Welding shall be in accordance with drawings and specifications supplied by the manufacturer and approved by the purchaser.
3. Reducing Branches shall be stubbed first with solid wall HDPE where practical.

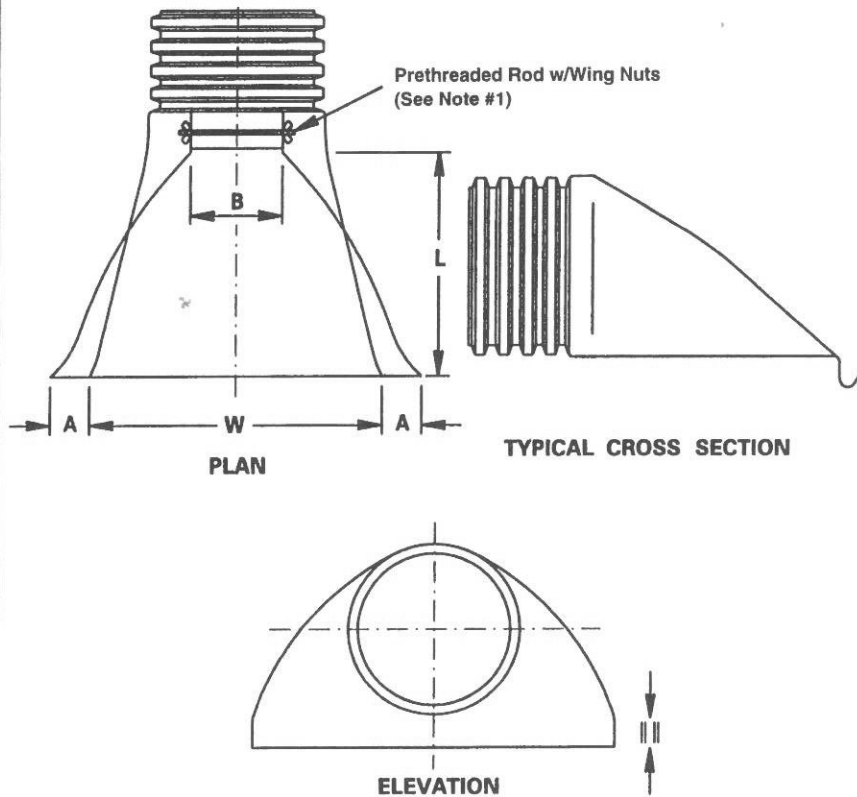
INTENDED USES

1. In culvert, storm sewer, or underdrains for making intersecting lines of pipe.
2. Underdrain and recharge patterns:
 - A. Highway
 - B. Airport
 - C. Railroad
 - D. Flood protection
 - E. Structures (Abutments, Walls, etc.)

SLCPP LATERAL FITTINGS

AASHTO-AGC-ARTBA
TF-13 DRAWING

PE-7-96



APPLICABLE SPECIFICATIONS

1. Prethreaded Rod w/wing nuts provided for End Sections 300 mm, 600 mm, 750 mm & 900 mm. End Sections to be welded to pipe per manufacturer's recommendations.

INTENDED USE

- End Sections attached to inlet and outlet of pipe:
1. Prevent scour and undermining
 2. Prevent piping and burrowing
 3. Facilitates slope maintenance
 4. Esthetically finishes ends of conduit

PIPE DIA	A, +25	B MAX	H, +25	L, +13	W, +50
millimeters					
300	165	254	165	635	735
375	185	254	165	635	735
450	190	380	165	812	890
600	190	450	165	900	1140
750	266	NA	178	1345	1725
900	266	NA	178	1345	1725

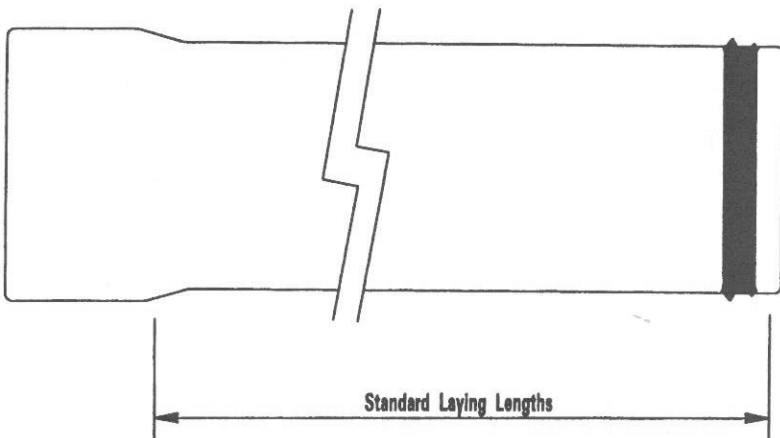
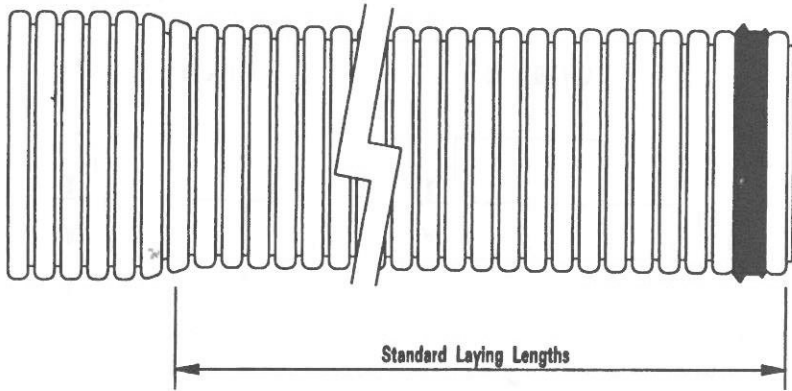
PE END SECTIONS

AASHTO-AGC-ARTBA
TF-13 DRAWING

PE-8-96

SECTION PVC—POLYVINYL CHLORIDE PIPE

Smooth Interior Polyvinyl Chloride (PVC) Pipe	PVC-1-96	187
Polyvinyl Chloride (PVC) Bends	PVC-2-96	188
Polyvinyl Chloride (PVC) Tees	PVC-3-96	189
Polyvinyl Chloride (PVC) Wyes	PVC-4-95	190

**APPLICABLE SPECIFICATIONS**

Polyvinyl Chloride (PVC) pipe (solid or profile wall) shall meet the requirements of one of the following specifications:

AASHTO M 278
AASHTO M 304M
ASTM D 3034
ASTM F 679
ASTM F 794
ASTM F 949

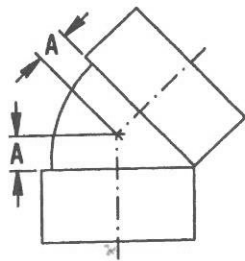
INTENDED USE

Pipe for culverts underdrains, storm and sanitary sewers.

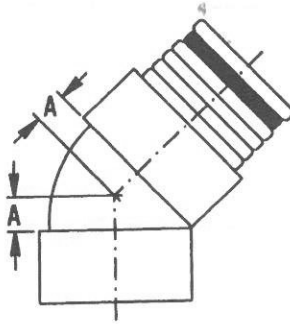
SMOOTH INTERIOR POLYVINYL CHLORIDE (PVC) PIPE

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

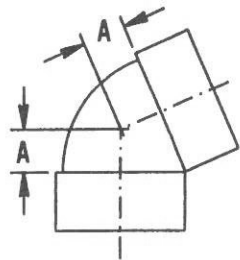
PVC-1-96



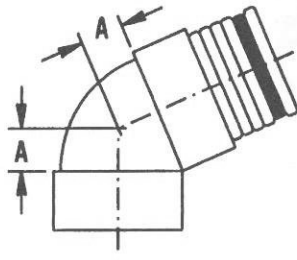
22.5° BEND



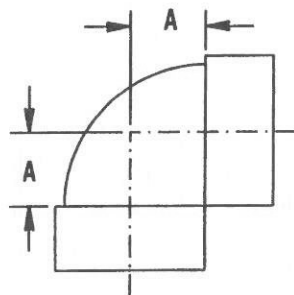
22.5° BEND



45° BEND

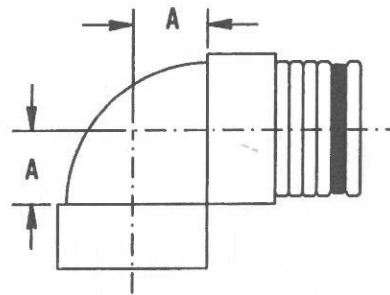


45° BEND



90° BEND

(BELL-BELL)



90° BEND

(BELL-SPIGOT)

APPLICABLE SPECIFICATIONS

Only fittings meeting the pipe specification and recommended by the manufacturer can be used. Outside diameters vary and fittings may not be compatible.

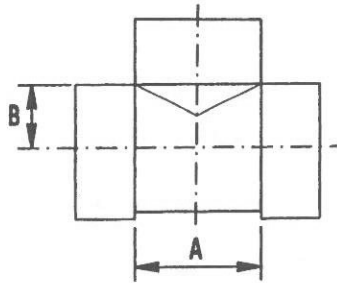
INTENDED USE

Culvert, storm or sanitary sewer where change in alignment or grade occur or for intersecting lines of pipe.

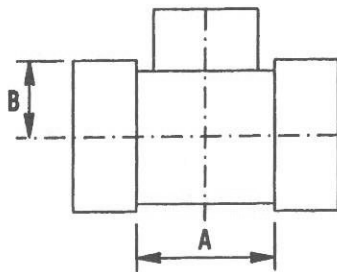
POLYVINYL CHLORIDE (PVC) BENDS

AASHTO-AGC-ARTBA
TF-13 DRAWING

PVC-2-96



**NON-REDUCING
INLINE TEE**



**REDUCING
INLINE TEE**

APPLICABLE SPECIFICATIONS

Only fittings meeting the pipe specification and recommended by the manufacturer can be used. Outside diameters vary and fittings may not be compatible.

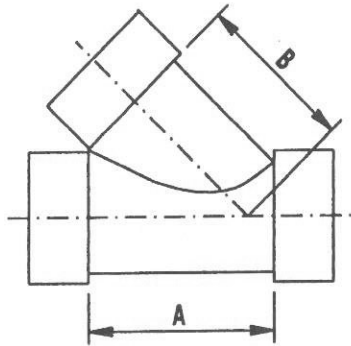
INTENDED USE

Culvert, storm or sanitary sewer where change in alignment or grade occur or for intersecting lines of pipe.

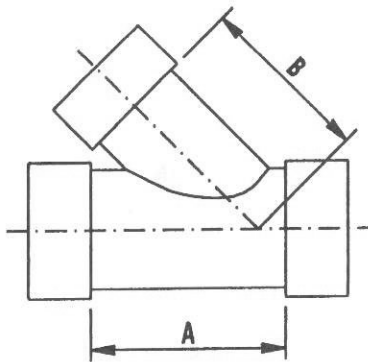
POLYVINYL CHLORIDE (PVC) TEES

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

PVC-3-96



**NON-REDUCING
INLINE WYE**



**REDUCING
INLINE WYE**

APPLICABLE SPECIFICATIONS

Only fittings meeting the pipe specification and recommended by the manufacturer can be used. Outside diameters vary and fittings may not be compatible.

INTENDED USE

Culvert, storm or sanitary sewer where change in alignment or grade occur or for intersecting lines of pipe.

POLYVINYL CHLORIDE (PVC) WYES

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

PVC-4-96