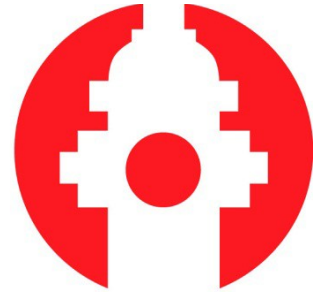


# FORTILINE

## WATERWORKS



### Kat Excavation Inc – Woodglen 2<sup>nd</sup> Plat – Lee’s Summit, MO

- A. National C900 DR 18 Pipe
- B. National SDR26 CL 160 Pipe
- C. Mueller Fire Hydrant
- D. Mueller Gate Valve
- E. Star Pipe MJ Fittings – Fusion Bonded
- F. Star Pipe PVC Megalugs
- G. Star Pipe Valve Box
- H. Copperhead Tracer Wire
- I. National SDR26 Heavy Wall Pipe
- J. GPK SDR26 & SDR35 Fittings
- K. Sigma Lamphole
- L. Copperhead Anode & Test Station
- M. Copperhead 3 Way Splices
- N. Manhole Boot
- O. ADS AASHTO N12 Pipe
- P. ADS Flared End Sections


<input type="checkbox"/> REVIEWED
<input checked="" type="checkbox"/> REVIEWED AS NOTED
<input type="checkbox"/> REVISE AND RESUBMIT
<input type="checkbox"/> REJECTED
<input type="checkbox"/> FOR INFORMATION ONLY
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BY rmcginnis
DATE 4/23/2021

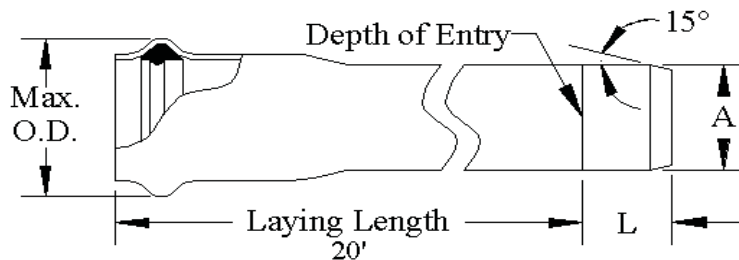
American-made products since 1970

## PVC MUNICIPAL WATER DISTRIBUTION PIPE (4 - 12")

**Scope:** This submittal designates the general requirements for Unplasticized Polyvinyl Chloride Municipal Water Pipe from compound with a cell classification 12454 as defined in ASTM Standard D-1784.

**Pipe:** All pipe shall meet the requirements of AWWA C900, UL 1285, FM 1612, CSA B137.3 and BNQ NQ3624-250 Standards, as indicated in the table below, for potable water transmission mains and fire protection systems. Our pipe meets National Sanitation Foundation Standards NSF® 61-G, NSF® 14, NSF® pw-G (Potable Water), and NSF® fs (Underground Fire Service per UL1285 Standard). The gasketed joint shall meet the requirements of ASTM D-3139, and the joint gasket shall conform to ASTM F-477. Pipe shall be furnished in laying lengths of 20' (+/- 1"). Other lengths may be available upon request.

This product is manufactured in alternative colors for specific applications. **Purple** for Reclaimed Water application. Print legend will include the marking "Reclaimed Water". **Green** for Sanitary Sewer Force Main applications. Print legend will include "Force Main". Although manufactured in accordance with the same industrial standards and testing requirements, these products do not bear the NSF, CSA & BNQ Listing Mark, as they are used for different applications.



## C-900 Water Pipe Size and Dimensions

Nominal Size (in)	Metric (mm)	Dimension Ratio (DR)	Approvals	Pressure Class (psi)	"A" Average (OD) Outside Diameter	Minimum Wall	Max OD Reference	"L" Dimension (Min/Max)
4	100	25	NSF, CSA	165	4.800	0.192	5.920	4.375
		18	NSF, FM, CSA, BNQ	235		0.267	6.055	-
		14	NSF, FM	305		0.343	6.220	4.625
6	150	25	NSF, CSA	165	6.900	0.276	8.300	5.375
		18	NSF, FM, CSA, BNQ	235		0.383	8.450	-
		14	NSF, FM, CSA, BNQ	305		0.493	8.560	5.875
8	200	25	NSF, CSA	165	9.050	0.362	10.730	6.375
		18	NSF, FM, CSA, BNQ	235		0.503	10.920	-
		14	NSF, FM, CSA, BNQ	305		0.646	11.110	6.875
10	250	25	NSF, CSA	165	11.100	0.444	13.105	7.375
		18	NSF, FM, CSA, BNQ	235		0.617	13.360	-
		14	NSF, FM, CSA, BNQ	305		0.793	13.510	7.875
12	300	25	NSF, CSA	165	13.200	0.528	15.465	7.375
		18	NSF, FM, CSA, BNQ	235		0.733	15.790	-
		14	NSF, FM, CSA, BNQ	305		0.943	16.010	7.875

\* FM Approved pipe available upon request.



UL1285

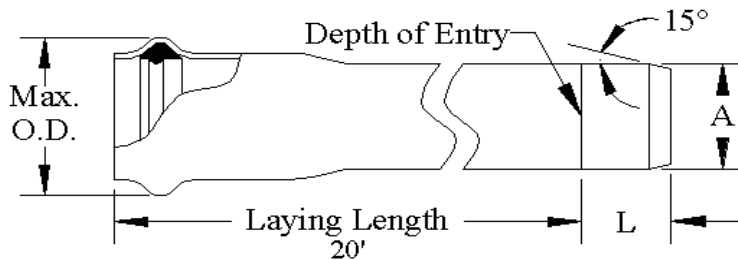
American-made products since 1970

## PVC PRESSURE RATED WATER PIPE (4 - 12")

**Scope:** This submittal designates the general requirements for Unplasticized Polyvinyl Chloride Pressure Rated Water Pipe from compound which equals or exceeds cell classification 12454, as defined in ASTM Standard D-1784.

**Pipe:** All pipe shall meet the requirements of ASTM Standard D-2241. Pipe supplied with a solvent cement joint shall meet the requirements of ASTM D-2672. Pipe supplied with a gasketed joint shall meet the requirements of ASTM D-3139, and the joint gasket shall conform to the requirements of ASTM F-477. All pipe shall meet the requirements of NSF Standard #14, "Plastic Piping Components and Related Materials," and Standard #61, "Drinking Water System Components-Health Effects". The pipe displays the "NSF-PW" listing mark signifying use in potable water applications. Pipe shall be furnished in laying lengths of 20'(+/- 1"). Other lengths and plain end finish may be available upon request.

This product is manufactured in alternative colors for specific applications. **Purple** for Reclaimed Water application. Print legend will include the marking "Reclaimed Water". **Green** for Sanitary Sewer Force Main applications. Print legend will include "Force Main". Although manufactured in accordance with the same industrial standards and testing requirements, these products do not bear the NSF, CSA & BNQ Listing Mark, as they are used for different applications.



## ASTM D-2241 Pressure Pipe

Nominal Size (in)	Metric (mm)	Std. Dimension Ratio (SDR)	Approvals	Pressure Class (psi)	"A" Average (OD) Outside Diameter	Minimum Wall	Max OD Reference	"L" Dimension (Min/Max)
4	100	26	NSF	160	4.500	0.173	5.900	3.875 - 4.125
		21	NSF	200		0.214	6.000	
		17	NSF	250		0.265	6.100	
		13.5*	NSF	315		0.333	6.230	
6	150	26	NSF	160	6.625	0.255	8.210	5.125 - 5.375
		21	NSF	200		0.316	8.340	
		17	NSF	250		0.390	8.510	
8	200	26	NSF	160	8.625	0.332	10.380	5.875 - 6.125
		21	NSF	200		0.410	10.560	
		17	NSF	250		0.508	10.780	
10	250	26	NSF	160	10.750	0.413	12.690	6.375 - 6.625
		21	NSF	200		0.511	12.910	
		17	NSF	250		0.632	13.180	
12	300	26	NSF	160	12.750	0.490	14.860	6.875 - 7.125
		21	NSF	200		0.606	15.120	
		17	NSF	250		0.750	15.450	

\* Manufactured by Special Order

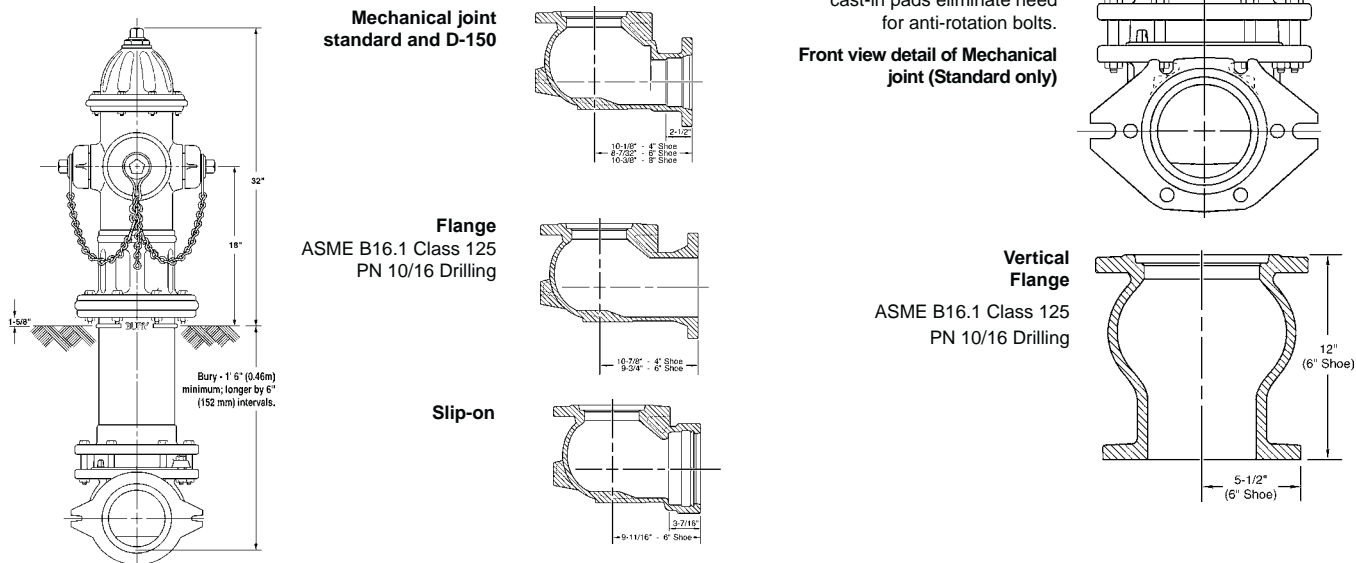


Rev. 6-15 Shaded area indicates changes

- **Super Centurion 250™ catalog numbers**
  - UL 246, FM 1510 ANSI/AWWA C502 250 psi rated
  - A421 4-1/2" main valve opening 3-way (2 hose nozzle / 1 pumper nozzle)
  - A423 5-1/4" main valve opening 3-way (2 hose nozzle / 1 pumper nozzle)
  - A454 5-1/4" main valve opening 3-way (3 hose nozzle) \*
  - A455 5-1/4" main valve opening 4-way (4 hose nozzle) \*
  - A458 5-1/4" main valve opening 4-way (3 hose nozzle / 1 pumper nozzle) \*
  - A459 5-1/4" main valve opening 4-way (2 hose nozzle / 2 pumper nozzle)\*\*
  - \* Hose Gate Valves required on FM Approved Models
  - \*\* A459 is UL Listed and ANSI/AWWA C502
- **Super Centurion 350™ catalog number**
  - UL 246, FM 1510 ANSI/AWWA C502 350 psi rated
  - A423 5-1/4" main valve opening 3-way (2 hose nozzle / 1 pumper nozzle)
  - A421 4-1/2" main valve opening 3-way (2 hose nozzle / 1 pumper nozzle)
- **Super Centurion 200™ catalog numbers**
  - UL 246, FM 1510 ANSI/AWWA C502 200 psi rated
  - A-433 4-1/2" main valve opening 2-way (2 hose nozzle)
  - A-435 5-1/4" main valve opening 2-way (2 hose nozzle)
- ANSI/AWWA C502 200 psi rated
  - A-420 4-1/2" main valve opening 2-way (2 hose nozzle)
  - A-424 4-1/2" main valve opening 1-way (1 pumper nozzle)
  - A-422 5-1/4" main valve opening 2-way (2 hose nozzle)
  - A-425 5-1/4" main valve opening 2-way (2 pumper nozzle)
  - A-423 5-1/4" main valve opening 3-way (1 hose nozzle / 2 pumper nozzle)
- 10 year limited warranty on material and workmanship
- Meets all applicable parts of ANSI/AWWA C502 Standard
- Post type dry barrel design
- Dry top design with O-ring sealed oil reservoir
- Traffic feature with stainless steel safety stem coupling
- Compression-type main valve closes with pressure for positive seal; it is made of rubber and is conveniently reversible providing a spare for long service life
- Operating nut available in wide variety of shapes and sizes—open left or right
- Field replaceable hose and pumper nozzles
- Hose and pumper nozzles have large radius, full flow openings for low friction loss
- Contoured shoe is designed for full flow
- Dual bronze drain valves provide effective barrel drainage
- 350 psig (2400 kPa/24 barg) maximum working pressure, 700 psig (4800 kPa/48 barg) static test pressure;  
250 psig (1725 kPa/17 barg) maximum working pressure, 500 psig (3450 kPa/35 barg) static test pressure;  
200 psig (1400 kPa/14 barg) maximum working pressure, 400 psig (2800 kPa/28 barg) static test pressure



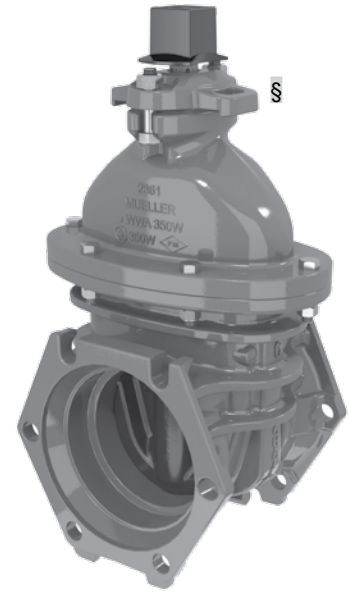
## Dimensions





Rev. 7-16 Shaded area indicates changes

- Catalog number–
  - A-2361-20** Mechanical joint ends (with accessories unassembled)
  - A-2361-23** Mechanical joint ends (less accessories)
  - A-2361-25** Mechanical joint ends (with transition gaskets accessories unassembled)
- Sizes – 4", 6", 8", 10", 12"
- Meets or exceeds all applicable requirements of ANSI/AWWA C515 Standard, UL 262 Listed, FM 1120/1130 Approved, and certified to ANSI/NSF 61 & 372
- Standard mechanical joint ends comply with ANSI/AWWA C111
- Iron body with nominal 10 mils MUELLER® Pro-Gard® Fusion Bonded Epoxy Coated interior and exterior surfaces
- Epoxy coating meets or exceeds all applicable requirements of ANSI/AWWA C550 Standard
- Iron wedge, symmetrical and fully encapsulated with molded rubber; no exposed iron
- Non-rising stem (NRS)
- Triple O-ring seal (2 above the thrust collar and 1 below)
- 2" square wrench nut - open left or open right
- 350 psig (2400 kPa/24 barg) maximum working pressure; 700 psig (4800 kPa/48 barg) static test pressure
- UL Listed, FM Approved: 350 psig (2400 kPa/24 barg)
- Mueller valves are designed for potable water applications



**A-2361-20**

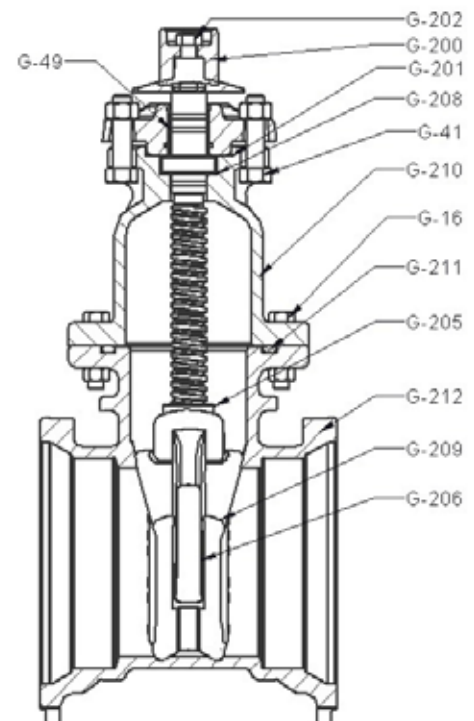
### Options

See page 10.46 for more information on Resilient Wedge Gate Valve options

- Position indicators
- Stainless steel fasteners: Type 316
- Stainless steel stem: Type 304, Type 316
- ASTM B98-C66100/H02 stem
- Handwheel
- EPDM Disc and o-rings

### Resilient wedge gate valve parts

Catalog Part No.	Description	Material	Material Standard
G-16	Bonnet Bolts & Nuts	304 Stainless Steel	ASTM F593 (bolt) ASTM F594 (nut)
G-41	Stuffing Box Bolts & Nuts	304 Stainless Steel	ASTM F593 (bolt) ASTM F594 (nut)
G-49	Stem O-rings (3)	Nitrile	ASTM D2000
G-200	Wrench Nut Cap Screw	304 Stainless Steel	ASTM F593
G-201	Stuffing Box O-ring	Nitrile	ASTM D2000
G-202	Wrench Nut	Ductile Iron	ASTMA536 ▼
G-203	Stem	Bronze	ASTM B138
G-204	Hand Wheel (not shown)	Cast Iron +	ASTMA126 CL.B
G-205	Stem Nut	Bronze	ASTM B584
G-206	Guide Cap Bearings	Acetal	-
G-207	Stuffing Box with dirt seal	Ductile Iron Nitrile	ASTMA536 ▼ ASTM D2000
G-208	Anti-friction Washers (2)	Acetal	-
G-209	Wedge, Rubber Encapsulation	Ductile Iron* SBR	ASTMA536 ▼ ASTM D2000
G-210**	Bonnet	Ductile Iron	ASTMA536 ▼
G-211**	Bonnet gasket	Nitrile	ASTM D2000
G-212**	Body	Ductile Iron	ASTMA536 ▼



\*Fully encapsulated in molded rubber with no iron exposed

▼ Material strength ASTM A536 65-45 minimum

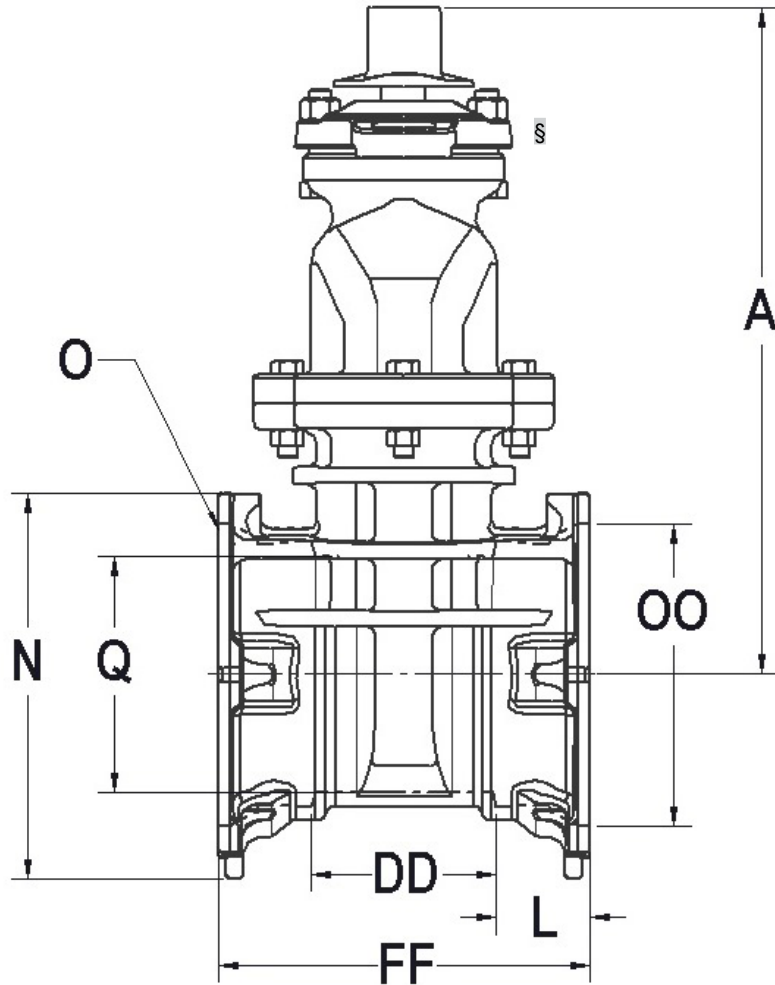
+ Manufacturer's option to upgrade material to ductile iron ASTM A536

**4" - 12" A-2361 RESILIENT WEDGE  
GATE VALVES - M.J. x M.J.**



**10.5**

Shaded area indicates change Rev. 7-16



**Dimensions**

Dimension	Nominal Size				
	4"	6"	8"	10"	12"
A	14.19	18.00	21.50	25.50	28.62
FF	9.50	10.00	10.50	11.50	12.00
L	2.50	2.50	2.50	2.50	2.50
N	8.40	10.41	12.68	15.24	18.024
O (number and size of holes)	4--.88	6--.88	6--.88	8--.88	8--.88
DD	4.50	5.00	5.50	6.50	7.00
Q	4.30	6.30	8.30	10.30	12.30
OO (bolt circle diameter)	7.50	9.50	11.75	14.00	16.25
Turns to open	14	20.5	26.5	33.0	38.5
Weight*	70	112	162	238	303

\*All dimensions are in inches. All weights include accessories are in pounds and are approximate.



Ductile Iron MJ Compact Fittings

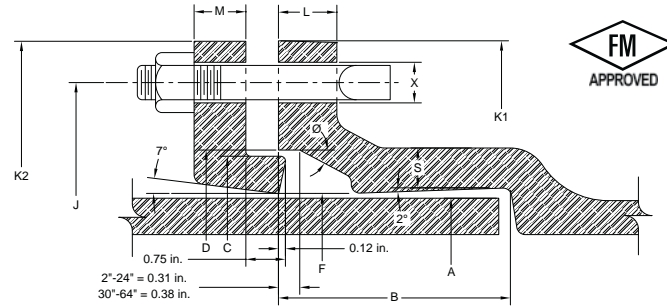
ANSI/AWWA C153/A21.53

GENERAL SPECIFICATIONS

- MATERIAL: Ductile Iron per ASTM A536
PRESSURE: 350 PSI rating for 2" - 24" sizes, 250 PSI rating for 30" - 48" sizes and 150 PSI rating for 54" - 64" sizes
TESTING: In accordance with ANSI/AWWA C153/A21.53 and UL requirements
LAYING LENGTH: In accordance with ANSI/AWWA C153/A21.53 (fittings not listed in ANSI/AWWA have dimensions per Star design as noted in the catalog)
DEFLECTION: 2"-4"=8° | 6"=7° | 8"-12"=5° | 14"-16"=3 1/2° | 18"-24"=3° | 30"-48"=2°
WEIGHTS: Are in pounds, unless noted otherwise and do not include accessories, cement lining and coating
FLANGES: Flanged ends on fittings match ANSI/AWWA C115/A21.15 and ANSI B16.1 class 125 flanges
CEMENT LINING: In accordance with ANSI/AWWA C104/A21.4 -- size 2" - 3" single thickness and sizes 4" - 64" double thickness
COATING: Asphaltic seal coat inside and out in accordance with ANSI/AWWA C104/A21.4 and referenced in ANSI/AWWA C153/A21.53
GASKETS: SBR in accordance with ANSI/AWWA C111/A21.11
T-BOLTS/NUTS: Low alloy steel in accordance with ANSI/AWWA C111/A21.11
APPROVALS: 3" - 12" UL/ULC Listed | 2" and greater are UL/ANSI/NSF Standards 61 and 372 | 3" - 16" FM APPROVED. Please consult factory for detail listing and approvals.
DIMENSIONS: All dimensions are in inches unless noted otherwise.
INSTALLATION: Per ANSI/AWWA C600 and C111 using DIP conforming to C150/C151 and PVC pipe conforming to C900/C905



SUBMITTAL INFORMATION
PROJECT NAME:
ENGINEER:
CONTRACTOR:
SPEC. SECTION:



MECHANICALJOINT DIMENSIONS

Table with columns: NOM. SIZE, A DIA., B, C DIA., D DIA., F DIA., J DIA., K1 DIA., K2 DIA., L, M, S, Ø, X DIA., BOLTS SIZE, BOLTS NO. Rows include sizes 2, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 24, 30, 36, 42, 48, 54, 60, 64.

{Fittings & Dimensions Available On Request }

SIZE RANGE (Please specify):
Size Range \_\_\_\_\_

- LINING OPTIONS (Please check one):
[checked] Standard: Cement-lined and asphalt seal coat per ANSI/AWWA C104/A21.4 and UL/NSF-61
[ ] Optional: FBE (Fusion Bonded Epoxy) per ANSI/AWWA C116/A21.15 and UL/NSF-61 - ID & OD Only
[ ] Optional: P401 (Protecto 401) Ceramic Epoxy - sewer applications only. Not NSF-61
[ ] Optional: Other (specify) \_\_\_\_\_

- COATING OPTIONS (Please check one):
[checked] Standard: Asphaltic seal coat per ANSI/AWWA C104/A21.4
[ ] Optional: FBE (Fusion Bonded Epoxy) per ANSI/AWWA C116/A21.15 and UL/NSF-61 - ID & OD Only
[ ] Optional: Other (specify) \_\_\_\_\_





# Nap-Gard®

## 7-2500

## Fusion Bonded Epoxy

Revised: 6 March 2014

### DESCRIPTION

Nap-Gard® Product No. 7-2500 is a thermosetting epoxy powder designed as a coating for underground and subsea pipeline service. In buried service, the coating is capable of withstanding continuous operating temperatures of 107°C (225°F). This product has been certified to meet the requirements of CSA Z245.20-10, NACE RP-0394-02 and NSF 61 for Potable Water Services.

For NSF 61 applications the maximum recommended film thickness is 14 mils.

This product is also recommended for use as a primer on multi-layer systems at a film thickness of 8-12 mils.



### TYPICAL POWDER PROPERTIES

<b>Color:</b>	Reddish Brown	<b>Theoretical Coverage:</b>	134 Ft <sup>2</sup> /lb/mil
<b>Specific Gravity:</b>	1.44 ± .05	<b>Typical Gel Time:</b>	22 ± 4 seconds
Cured Film	1.35 ± .05	CSA Z245.20-10	@ 205°C (401°F)
<b>Density:</b>	1440 ± 50 g/L	<b>Shelf Life*:</b>	12 months
CSA Z245.20-10		@ 25°C (77°F)	
		@ 50% RH	

\* Transportation: The material is stable during transportation at temperatures below 25°C (77°F) and 50% RH.

### TYPICAL PROPERTIES OF APPLIED FILM†

<b>Recommended Film Thickness</b>		Average	350µm (14 mils)
		Minimum	300µm (12 mils)
<b>TEST / REQUIREMENT</b>	<b>METHOD</b>	<b>CRITERIA</b>	<b>RESULT</b>
<b>Impact Resistance</b>	ASTM G14-72 CSA Z245.20-10	1/8"X5"X8" Steel Panels @25°C (77°F) @-30°C (-22°F)	160 in.lbs
<b>Bending</b>	CSA Z245.20-10 API-RP-5L7	3.0°/PD @-30° (-22°F)	Pass Pass
<b>Elongation</b>	Modified ASTM G10-72	@23°C (73°F)	10.96%
<b>Hardness</b>	ASTM D2583 ASTM D2240-74	Barcol Shore D	61 Average 90 Average
<b>Hot Water Resistance</b>	CSA Z245.20-10	75°C, 24 hours	Rating 1-2, Pass
<b>Cathodic Disbondment</b>	CSA Z245.20-10,	24 hours., 3.5 V <sub>dc.</sub> , 65°C 28 days, 1.5 V <sub>dc.</sub> , 23°C Strained C.D	2-4 mm radius Pass 3-5 mm radius Pass Pass
<b>Thermal Conductivity</b>	ASTM C177		0.19±0.02 BTU/hr./ft <sup>2</sup> /ft./°F



<b>Chemical Resistance Test*</b>	90 Day Immersion per CSA Z245.20-98	HCl in H <sub>2</sub> O**	No Blistering
		10% NaCl, H <sub>2</sub> SO <sub>4</sub> in H <sub>2</sub> O **	No Blistering
		10% NaCl in H <sub>2</sub> O **	No Blistering
		Distilled Water	No Blistering
		5% NaOH in H <sub>2</sub> O **	No Blistering
		MgCO <sub>3</sub> /CaCO <sub>3</sub> in H <sub>2</sub> O **	No Blistering

\*\* Distilled Water

\* For additional information refer to Nap-Gard® Products Catalog Chemical Resistance Chart.

† Performance depends on film thickness. Consult Nap-Gard® Specialist for specific recommendations.

**TYPICAL ELECTRICAL PROPERTIES OF FILM**

<b>Dielectric Strength</b> ASTM D149-97	1500 volts/mil @ 250µm (10 mils)	<b>Breakdown Voltage</b> ASTM D149-97	volts @ 450µm (18 mils) 20K
<b>Dielectric Constant</b> ASTM D150	2.15 @ 1 MHz	<b>Volume Resistivity</b> ASTM D257	3.3 X 10 <sup>15</sup> ohm-cm.

**GENERAL APPLICATION PARAMETERS**

- Grit blast to NACE Near-White specifications (Swedish Standard #Sa2½) and profile between 50µm (2 mils) and 112µm (4.5 mils).
- Use phosphoric acid/deionized water rinse if water soluble salt contamination is suspected.
- Preheat pipe to approximately 232°C (450°F) to 246°C (475°F)
- Apply Nap-Gard® 7-2500 powder to meet customer thickness specifications.
- Follow recommended cure schedule (see below).
- Cure should be verified by DSC or other methods.
- Electrically inspect for holidays. Repair with Nap-Gard® 7-1631 or 7-1861, NSF approved SP-7888
- If girth welds are being coated, refer to Axalta's "Nap-Gard® Field Girth Weld Application Procedure".

**CURE† SCHEDULE GUIDELINES**

The cure schedule for Nap-Gard® Product No. 7-2500 shows the minimum time at temperature required to achieve the typical performance properties of the coating. Because pipe cooling rates vary so widely with pipe wall thickness, no allowance has been made for heat loss from the pipe but this can be easily measured on the coating line and allowance made. Recommended powder application temperature range is listed below for single/dual layer FBE and post heating is not a normal requirement. The minimum post application curing temperature (as measured on the coated pipe) and the time to quench may conform to the following cure schedule.

7-2500	
Application Temperature	Min Time to Quench‡
232°C (450°F)	90 seconds
239°C (463°F)	60 seconds
246°C (475°F)	60 seconds

† Cure is by residual heat in the pipe, therefore very light wall pipe may require additional post heat to complete cure.

‡ Recommended time to quench is based on the assumption that the listed temperature is maintained without any cool down rate. Time to quench will vary with application parameters and pipe sizes. Therefore, the above information shall be used only as a guideline by the applicator to develop proper time to quench. Cure should be verified by DSC or other methods. For three layer, the optimum time for adhesive application is between 30-70% cure of the FBE. This has to be developed by the applicator based on the plant layout.

Always consult product Material Safety Data (MSDS) prior to handling.

**WARRANTY POLICY:** Axalta Powder Coating Systems USA, Inc. ("Seller") certifies that all coatings delivered to Customer in unopened factory filled containers meet all pertinent quality standards presented in Seller's current published literature. Since matters of surface preparation, application procedures, curing procedures and other local factors that affect coating performance are beyond Seller's control; Seller assumes no liability for coating failure other than to supply replacement material for coating material proven to be defective. Customer will determine suitability of this product for its use and thereby assumes all risks and liabilities in connection therewith. Seller will not be liable for any injuries, damages or other losses derived, directly or indirectly, from or as a consequence of Customer's use of the product. **SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, RELATING TO ITS PRODUCTS AND THEIR APPLICATION, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSES.**

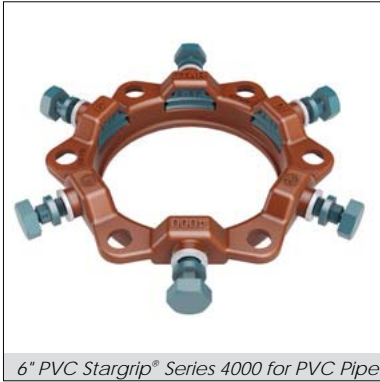






# PVC Stargrip® series 4000

Mechanical Joint Wedge Action Restraint for AWWA C900/C905 and IPS PVC Pipe



6" PVC Stargrip® Series 4000 for PVC Pipe

### SUBMITTAL INFORMATION

PROJECT NAME:

ENGINEER:

CONTRACTOR:

SPEC. SECTION:



### FEATURES & ADVANTAGES

- The design eliminates tie rods and thrust blocks and has been proven in the market since 1992.
- Can be used on 4"-12" AWWA C900, 14"-36" AWWA C905 PVC pipe or 3"-12" IPS PVC pipe\* (*\*transition gasket required on IPS PVC Pipe 12" and under*).
- Listed with Underwriters Laboratories in sizes 4"-12" for use on DR18 class 235 C900 PVC pipe at 150 PSI. Approved by Factory Mutual Research in sizes 4"-12" for use on DR18 class 235 at 150 PSI and for sizes 4"-10" DR14 class 305 C900 PVC pipe at 200 PSI.
- Tested to and meets the requirements of ASTM F1674 through 14" size for DR18 PVC pipe.
- The safety factor is twice (2:1) the standardized pressure rating listed on Page 18 of the catalog.
- Will fit any Mechanical Joint configuration, meaning compatibility with different types of installations.
- PVC Stargrip® offers 5° deflection through 12", 3° on 14"-24" and 2° on 30"-36".
- Larger ID allows easier installation on out-of-round pipe.
- All sizes have curved wedges that will not flatten pipe.
- For use on HDPE or C909 pipe, please contact Star Engineering.

### MATERIAL SPECIFICATIONS:

- Gland: Ductile Iron per ASTM A536, Grade 65-45-12
- Wedges: Ductile Iron per ASTM A536, Grade 65-45-12
  - Wedge Finish: Thermally cured fluoropolymer epoxy coating

#### GLAND FINISH OPTIONS (Please check one):

- Standard: alkyd enamel coating
- Optional: Starbond™ TGIC polyester powder coating applied by an electrostatic spray process
- Optional: Other (specify) \_\_\_\_\_

#### COUNTRY OF ORIGIN OPTION (Please check one):

- Import
- 100% Domestic<sup>1</sup>
- Domestic gland with import components<sup>1</sup>  
(<sup>1</sup>Please see [Domestic Restraint Options Available](#) on our website.)

#### HARDWARE OPTIONS (Please check):

- Standard: T-bolts are high strength low alloy steel manufactured in accordance with ANSI/AWWA C111/A21.11-00
- Optional: T-bolts and nuts alloy SS 304 per ASTM F593
- Optional: T-bolts and nuts alloy SS 316 per ASTM F593
- Optional: T-bolts and nuts Fluoropolymer Star-Blue coated high strength low alloy steel manufactured in accordance with ANSI/AWWA C111/A21.11-00

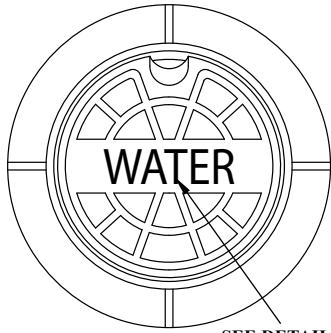
STAR® PIPE PRODUCTS





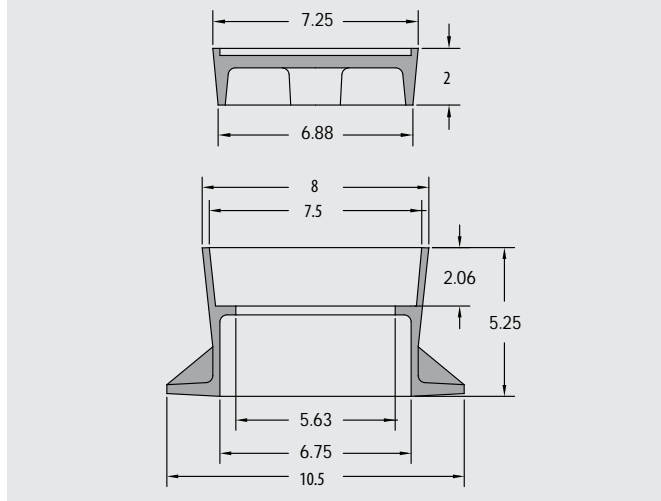
**2194 VALVE BOX**

**VB-0045**



SEE DETAILS FOR OPTIONAL LETTERING

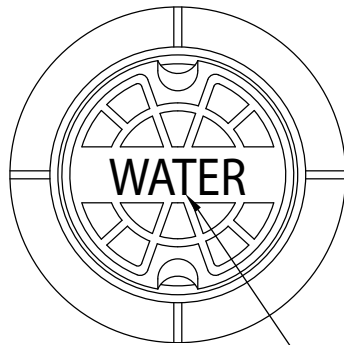
- Notes:**  
 - Material - Cast Iron  
 Per ASTM A48 Class 30B  
 - Dimensions in Inches



ITEM CODE	DETAILS
VB2194	WATER
VB2194S	SEWER
VB2194L	WATER LID
VB2194LS	SEWER LID
VB2194B	BOTTOM

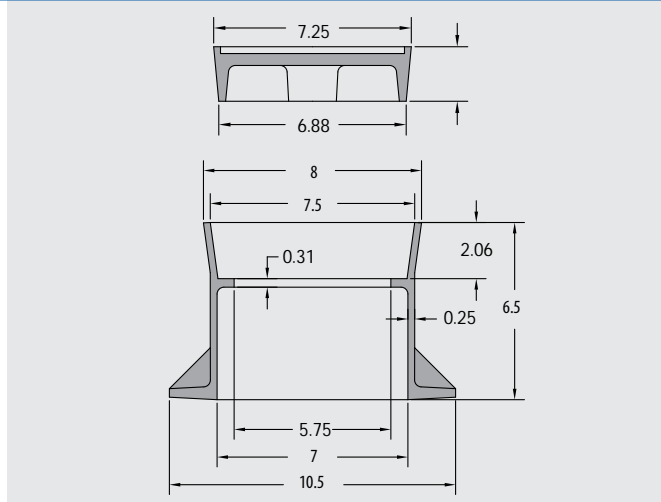
**2195 VALVE BOX**

**VB-0046**



SEE DETAILS FOR OPTIONAL LETTERING

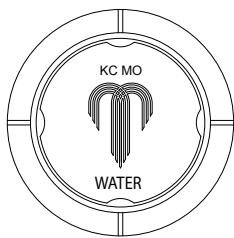
- Notes:**  
 - Material - Cast Iron  
 Per ASTM A48 Class 30B  
 - Dimensions in Inches



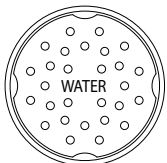
ITEM CODE	DETAILS
VB2195	COMPLETE
VB2195L	WATER LID
VB2195LLS	LS WATER LID
VB2195B	BOTTOM

**2196 VALVE BOX**

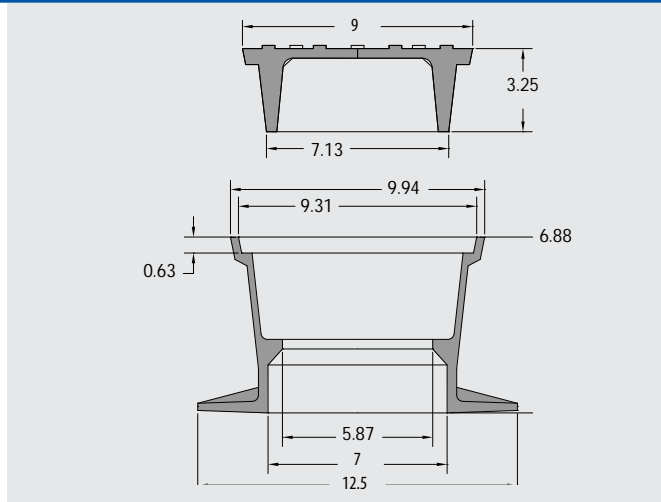
**VB-0047**



VB2193/96DL



- Notes:**  
 - Material - Cast Iron  
 Per ASTM A48 Class 30B  
 - Dimensions in Inches



ITEM CODE	DETAILS
VB2196	COMPLETE
VB2196L	LID
VB2193/96L	DIMPLE LID
VB2196B	BOTTOM



## **Copperhead® High Strength Tracer Wire Spec**

- Use Copperhead High Strength Tracer Wire
- Part # **1230\*-HS-\*\***
- \* = Color: **B=Blue Water**, **G=Green Sewer**, P=Purple Reclaim Water  
R=Red Electric, N=Orange Communications, K=Black
- \*\* = Spool Size: 500', 1000', 2500'

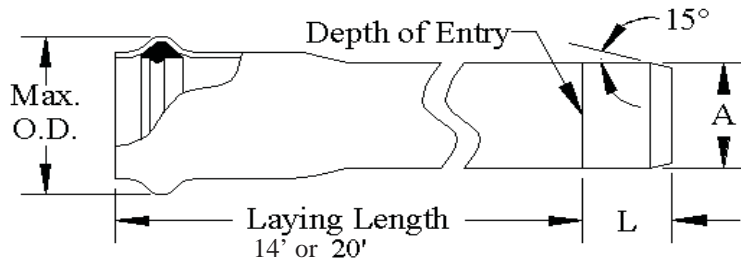
Tracer wire shall be a #12 AWG (0.0808" diameter) fully annealed, high carbon 1055 grade steel, high strength solid copper clad steel conductor (HS-CCS), insulated with a 30 mil, high-density, high molecular weight polyethylene (HDPE) insulation, and rated for direct burial use at 30 volts. HS-CCS conductor must be at 21% conductivity for locate purposes. Break load of 452 lbs. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Insulation color shall meet the APWA color code standard for identification of buried utilities. Manufacturers supplying copper clad steel tracer wire must have available detailed performance data including 5 years of underground testing in terms of durability related to damage of protective insulation and effects of potential corrosion of the specific copper clad steel used. Origin of copper clad steel manufacturer is required and steel core must be manufactured in the United States. If manufacturer has not completed 5 year corrosion testing, a 5 year warranty must be provided. Tracer wire shall be Copperhead® High Strength HS-CCS HDPE 30 mil or *district pre-approved equal* and made in the USA.

American-made products since 1970

## PVC SEWER & STORM DRAINAGE PIPE (4 - 15")

**Scope:** This submittal designates the general requirements for Unplasticized Polyvinyl Chloride (PVC) Plastic PSM Sewer Pipe from compound with a cell class 12454, as defined in ASTM Standard D-1784.

**Pipe:** Pipe in trade size diameters of 4" through 15" shall meet the requirements of the latest ASTM D-3034 Standard. If integral gasketed bell ends are provided on the pipe, the pipe joint must meet the requirements of ASTM Standard D-3212, and the sealing gasket must conform to the requirements of ASTM Standard F-477 for sizes 4"-15". Pipe in trade size diameters of 4 and 6 inch are available with solvent-weld bells. Pipe is manufactured to a standard laying length of 14 feet. Other lengths available upon request.



### ASTM D-3034 Sewer Pipe Size and Dimensions

Nominal Size (in)	Metric (mm)	Dimension Ratio (SDR)	Approvals	Min Stiffness (psi)	"A" Average (OD) Outside Diameter	Minimum Wall	Max OD Reference	"L" Dimension (Min/Max)
4	100	35	ASTM	46	4.215	.120	5.050	3.250
		28	ASTM	91		.151		-
		26	ASTM	115		.162		3.500
5	135	28	ASTM	91	5.640	.201	6.188	3.750 - 4.125
6	150	35	ASTM	46	6.275	.180	7.305	4.000
		28	ASTM	91		.224		-
		26	ASTM	115		.241		4.375
8	200	35	ASTM	46	8.400	.240	9.605	4.125 -
		26	ASTM	115		.323		4.375
10	250	35	ASTM	46	10.500	.300	12.030	5.750 -
		26	ASTM	115		.404		6.000
12	300	35	ASTM	46	12.500	.360	14.100	5.875 -
		26	ASTM	115		.481		6.125
15	375	35	ASTM	46	15.300	.437	17.200	6.125 -
		26	ASTM	115		.588		6.375



NOTE: Canadian PVC sewer pipe specifications are available upon request. This

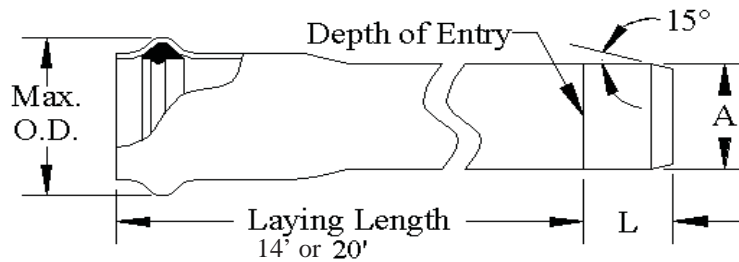


American-made products since 1970

## PVC SEWER & STORM DRAINAGE PIPE (18 - 48")

**Scope:** This submittal designates the general requirements for Unplasticized Polyvinyl Chloride (PVC) Plastic PSM Sewer Pipe from compound with a cell class 12454, as defined in ASTM Standard D-1784.

**Pipe:** Pipe in trade sizes diameter of 18" and above shall meet the requirements of the latest ASTM Standard F-679. If integral gasketed bell ends are provided on the pipe, the pipe joint must meet the requirements of ASTM Standard D-3212. Pipe is manufactured to a standard laying length of 14 feet. Other lengths available upon request.



## ASTM F-679 Sewer Pipe Size and Dimensions

Nominal Size (in)	Metric (mm)	Approvals	Min Stiffness (psi)	"A" Average (OD) Outside Diameter	Minimum Wall	Max OD Reference	"L" Dimension (Min/Max)
18	450	ASTM	46	18.701	0.499	20.69	8.875 -
		ASTM	115		0.671		9.125
21	525	ASTM	46	22.047	0.588	24.26	9.875 -
		ASTM	115		0.791		10.125
24	600	ASTM	46	24.803	0.661	27.29	10.875 -
		ASTM	115		0.889		11.125
27	675	ASTM	46	27.953	0.745	32.5	10.125 -
		ASTM	115		1.002		11.125
30	750	ASTM	46	32.000	0.853	37.25	12.625 -
		ASTM	115		1.148		13.625
36	900	ASTM	46	38.300	1.021	43.25	12.875 -
		ASTM	115		1.373		13.875
42	1050	ASTM	46	44.500	1.187	53	15.750 -
		ASTM	115		1.596		16.75
48	1200	ASTM	46	50.800	1.355	60	15.875 -
		ASTM	115		1.822		16.875





## SDR 26 D-3034/PS115 F-679 "HWS" FITTING SPECIFICATIONS

- 1.0 **GPK PVC Heavy Wall Sewer Fittings** shall be manufactured in accordance with ASTM Standards D-3034 and F-1336 and F-679. Heavy Wall Sewer Fittings (HWS) are produced in sizes 4" through 36" diameter.
- 2.0 **The Purpose of GPK Heavy Wall Sewer Fittings** is to convey municipal sanitary and industrial wastes, storm water run-off and many other related applications. They are designed to be used in gravity flow and low pressure applications not to exceed 10.8 psi. Heavy Wall Sewer Fittings are typically used when a higher degree of strength is desired to give an added assurance of product reliability.
- 3.0 **Injection Molded Fittings** are produced in sizes 4" through 8" diameter. **Fabricated Fittings** are produced in sizes 4" through 36" diameter. A fabricated fitting is considered any fitting made from pipe or a combination of pipe and molded components.
- 4.0 **Chemical Resistance.** GPK fittings resist attack from certain alcohols, alkalies, salt solutions, acids and other types of chemicals. Refer to chemical resistance chart for suitability.
- 5.0 **Marking.** GPK fittings shall be marked with company name or logo, applicable size, "PVC", "PSM", the Heavy Wall Sewer designation "HWS" and the ASTM specification number (D-3034/F-1336/F-679). The fittings and/or packaging shall also include the manufacturer's date and shift code.
- 6.0 **Testing.** A test after installation of either low pressure air (Uni-B-6) or a water infiltration-exfiltration test is recommended.
- 7.0 **Backfilling and Tamping.** Backfilling should follow closely after assembly of pipe and fittings.
  - 7.1 **Backfilling** with proper material is important to achieve desired density in haunching area which enables pipe, fittings and soil to work together to meet designed load requirements. This eliminates excess deflection and shear breaks due to heavy loads. Approved material shall be used properly, compacted continuously above and around the pipe and fittings as well as between the fitting and trench wall. A cushion of approved material up to a minimum of 12" over the fittings and between the trench walls shall be done in accordance with the engineers' specifications.
  - 7.2 **Tamping.** This shall be done by hand tamping of the embedment material between the trench wall of the service line fitting and riser connection. Tamping can also be done by mechanical tampers or by using water to consolidate the embedment material. **Extreme unstable ground conditions** may require wider trenches to enable you to compact a larger area around the pipe and fittings to the density consistent of the original ground surface conditions.
- 8.0 **Service Lines.** Normally, service lines from the property line to the collection sewer should be a minimum depth of 3 feet at the property line and should be laid in straight alignment and uniform slope of not less than 1/4" per foot for 4" nominal pipe and 1/8" per foot for 6" pipe. Where collection sewers are deeper than 7 feet a vertical standpipe of stack is permitted but not recommended, consult the project engineer for proper installation details. Deep sewer chimney and risers necessitate extreme care during backfilling. Where surface loading is anticipated the final backfill must be compacted to a density compatible with those surface loads to be encountered.
  - 8.1 **Backfilling around pipe service laterals on slope.** Extra attention should be given on slopes to prevent the newly backfilled trench from becoming a "French Drain." Before backfilling completely there is a tendency for ground and surface water to follow the direction of the looser soil. This flow may wash out soil from under or around pipe and branch line fittings, reducing or eliminating the support needed. To avoid this problem the backfilling should be of greater compaction. Tamping should be done in 4" layers and continued in this manner all the way up to ground or surface line of the trench. Concrete collars or other concrete poured around the fitting to stabilize unwanted movement is recommended to prevent water from undercutting the underside of the pipe and fittings.

**SUMMARY:** Due to various ground conditions and different situations, installation techniques vary widely. We warranty our products to be free of manufacturer's defects. We will not replace the products that are installed or used incorrectly. The design of the systems that our product is used in is a factor that cannot be overlooked.

# GPK FITTING SUBMITTAL SHEET

**Intro:** GPK manufactures PVC HWS Fittings in accordance with ASTM D-3034 and F-1336 and F-679 to be used in gravity flow or low pressure applications. Fabricated fittings are produced in sizes 4" through 36" diameter. Injection molded fittings produced in sizes 4" through 8" diameter.

**Material:** Fabricated fittings are manufactured from PVC pipe and meeting all the requirements of ASTM D-3034, SDR 26 and F-679 PS115 for workmanship, extrusion quality, stiffness, impact resistance, dimensions and structural performance.

Extruded pipe components are made from PVC material with a minimum cell classification of 12454, 13343 or 12364 as defined in ASTM D-1784.

Injection molded fittings are made from PVC material with a minimum cell classification of 12454 or 13343 as defined in ASTM D1784.

**Extrusion Quality:** Extruded components are tested in accordance with and meet all requirements of ASTM D-2152 for properly fused PVC.

**Impact Resistance:** Extruded components are tested in accordance with ASTM D-2444 using a 20 lb. Tup A and a Flat Plate Holder B. The strength shall equal or exceed the values shown below:

4" - 5"	150 Ft-Lbf
6" - 8"	210 Ft-Lbf
10" - 36"	220 Ft-Lbf

**Impact Resistance:** Injection molded fittings are tested in accordance with ASTM D 2444 using a 20 lb. Tup A and a Flat Plate Holder B. The strength shall equal or exceed the values shown below:

4"	50 Ft-Lbf	6"	75 Ft-Lbf	8"	75 Ft-Lbf
----	-----------	----	-----------	----	-----------

**Pipe Stiffness:** Extruded components are tested in accordance with ASTM D-2412. The stiffness equals or exceeds the requirements of ASTM D-3034 and F-679.

**Pipe Flattening:** Extruded components are flattened as described in ASTM D-3034 and F-679 until the distance between the plates is 40% of the outside diameter of the pipe. There shall be no splitting, cracking or breaking.

**Pressure/Pressure Deflection:** Gasketed joints are tested in accordance with ASTM D-3212.  
 Pressure: 10 minutes @ 10.8 psi + 10 minutes deflected @ 10.8 psi.  
 Vacuum: 10 minutes @ 22" Hg + 10 minutes deflected @ 22" Hg.

**Branch Bending:** The chemically fused areas around the fabricated branches of tee, wye and tee-wye fittings are tested to ASTM F-1336 to verify their strength and integrity.

**Pipe Stop Support:** Tee and tee-wye fittings are tested to requirements of ASTM F1336 for pipe stop load support. No cracking or splitting shall occur and pipe spigot shall not protrude into waterway of the fitting.

**Joining Methods:** Chemically Fused Solvent Weld Joints  
 Solvent cement is handled and tested in accordance with ASTM D-2564 and D-2855. The Lap Shear Strength shall equal or exceed 900 psi @ 72 hours.

Heat Fusion Welded Joints (Butt Fusion Welds)

Elastomeric Seals (Gaskets)

Must meet all requirements of ASTM F-477 and D-3212.

Epoxy Reinforced Welds.



## SDR35 D 3034 / PS46 F 679 FITTING SPECIFICATIONS

- 1.0 **GPK PVC Sewer Fittings** shall be manufactured in accordance with either ASTM D 3034, F1336 or F 679. The PVC material shall have a minimum cell classification of 12454, 13343 or 12364 as defined in ASTM D 1784.
- 2.0 The **purpose** of GPK in-line fittings is to convey municipal sanitary and industrial wastes, storm water runoff and many other related applications. They are designed to be used in gravity flow and low pressure applications not to exceed 10.8 psi. (74.5 kPa).
- 3.0 **Injection Molded Fittings** are produced in sizes 4" (100mm) through 12" (300mm) diameter. **Fabricated Fittings** are produced in sizes 4" (100mm) through 36" (973mm) diameter. A fabricated fitting is considered any fitting made from pipe or a combination of pipe and molded components.
- 4.0 **Chemical Resistance** GPK fittings resist attack from certain alcohols, alkalies, salt solutions, acids and other types of chemicals. Refer to chemical resistant chart for suitability.
- 5.0 **Marking.** GPK fittings shall be marked with applicable size, "PVC", company name or logo, PSM and the ASTM specification number (D 3034, F 1336 or F679). The fittings and/or packaging shall include the manufacturer's date and shift code.
- 6.0 **Testing.** A test after installation of either low pressure air (Uni-B-6) or a water infiltration-exfiltration test is recommended.
- 7.0 **Deflection Test.** The maximum allowable pipe fitting deflection should be 7 ½% of base ID as shown in table X1.1 of D 3034, and X2.1 of F 679.
- 8.0 **Backfilling and Tamping.** Backfilling should follow closely after assembly of pipe and fittings.
  - 8.1 **Backfilling.** with proper material is important to achieve desired density in haunching area which enables pipe, fitting and soil to work together to meet designed load requirements. This eliminates excess deflection and shear breaks due to heavy loads. Approved material shall be used properly, compacted continuously above and around the pipe and fittings as well as between fitting and trench wall. A cushion of approved material up to a minimum of 12" (305mm) over the fittings and between the trench walls shall be applied in accordance with the engineers' specifications.
  - 8.2 **Tamping.** This shall be done by hand tamping of the embedment material between the trench wall of the service line fitting and riser connection. Tamping can also be done by mechanical tampers or by using water to consolidate the embedment material. **Extreme unstable ground conditions** may require wider trenches to enable you to compact a larger area around the pipe and fittings to the density consistent of the original ground surface conditions.
- 9.0 **Service Lines.** Normally, service lines from the property line to the collection sewer should be a minimum depth of 3 feet (1 meter) at the property line and should be laid in straight alignment and uniform slope of not less than ¼" per foot (20.8mm/meter) for 4" (100mm) nominal pipe and 1/8" (10.4mm/meter) per foot for 6" (150mm) pipe. Where collection sewers are deeper than 7 feet (2 meters) a vertical standpipe or stack is permitted but not recommended, consult the project engineer for proper installation details. Deep sewer chimney and risers necessitate extreme care during backfilling. Where surface loading is anticipated the final backfill must be compacted to a density compatible with those surface loads to be encountered.
  - 9.1 **Backfilling around pipe service laterals on slope.** Extra attention should be given on slopes to prevent the newly backfilled trench from becoming a "French Drain". Before backfilling completely there is a tendency for ground and surface water to follow the direction of the looser soil. This flow may wash out soil from under or around pipe and branch line fittings, reducing or eliminating the support needed. To avoid this problem the backfilling should be of greater compaction. Tamping should be done in 4" (100mm) layers and continued in this manner all the way up to the ground or surface line of the trench. Concrete collars or other concrete poured around the fitting to stabilize unwanted movement is recommended to prevent water from undercutting the underside of the pipe and fittings.

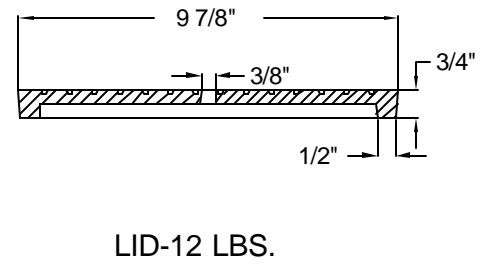
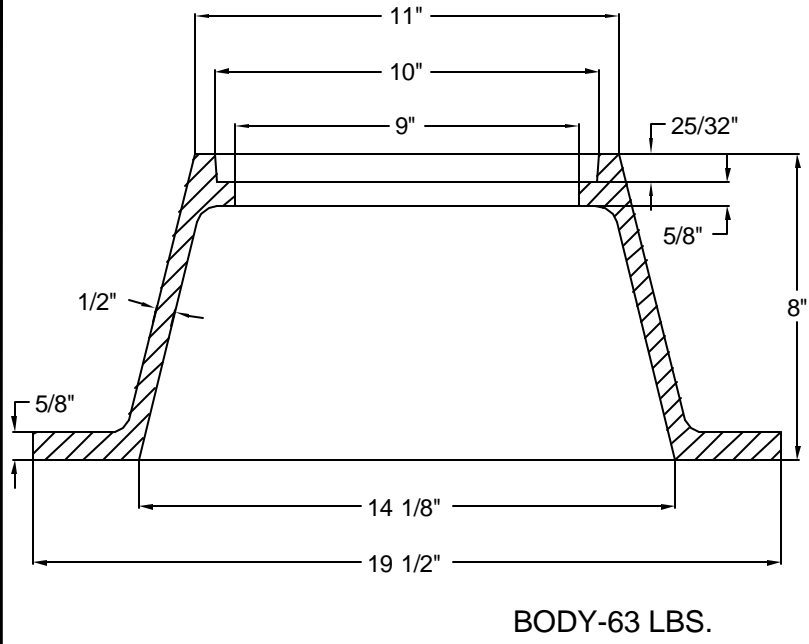
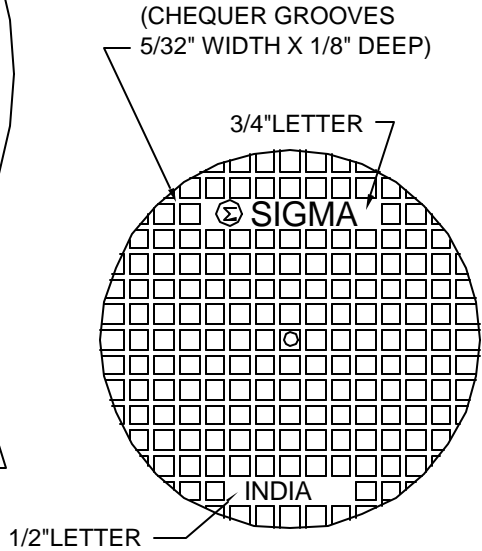
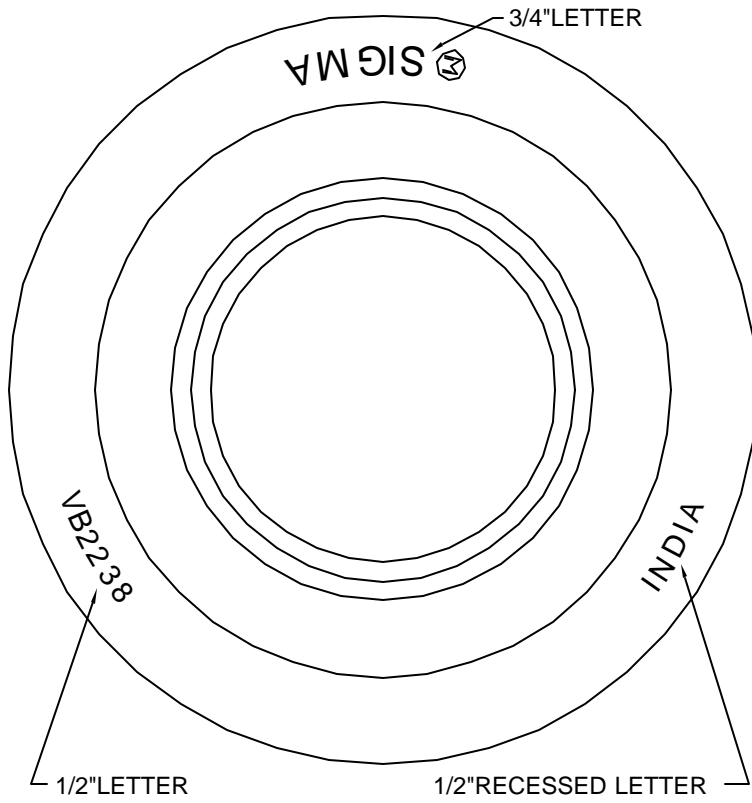
**Summary:** Due to various ground conditions and different situations, installation techniques vary widely. We warranty our products to be free of manufacturer's defects. We will not replace the products that are installed or used incorrectly. The design of the systems that our product is used in is a factor that cannot be overlooked.

# GPk FITTING SUBMITTAL SHEET

- Intro:** GPk manufactures PVC sewer fittings in accordance with either ASTM D 3034, F 1336 or F 679 to be used in gravity flow or low pressure applications. Injection molded fittings are produced in sizes 4" (100mm) through 12" (300mm) diameter. Fabricated fittings are produced in sizes 4" (100mm) through 36" (973mm) diameter.
- Material:** Fabricated fittings are manufactured from PVC pipe and molded components meeting the requirements of either ASTM D 3034, F 1336 or F 679 for workmanship, extrusion quality, stiffness, impact resistance, dimensions and structural performance.
- Extruded pipe components are made from PVC material with a minimum cell classification of 12454, 13343 or 12364 as defined in ASTM D1784.
- Injection molded fittings are made from PVC material with a minimum cell classification of 12454 or 13343 as defined in ASTM D 1784.
- Extrusion Quality:** Extruded components are tested in accordance with and meet the requirements of ASTM D 2152 for properly fused PVC.
- Impact Resistance:** Extruded Components are tested in accordance with ASTM D 2444 using a 20 lb (9.07kg). Top A and a Flat Plate Holder B. The strength shall equal or exceed the values shown below:
- |   |   |   |
|---|---|---|
| 4" – 5" 150 Ft-Lbs<br>(100mm – 125mm 203 J) | 6" – 8" 210 Ft-Lbs<br>(150mm – 200mm 284 J) | 10" – 36" 220 Ft-Lbs<br>(250mm – 973mm 299 J) |
|---|---|---|
- Impact Resistance:** Injection molded fittings are tested in accordance with ASTM D 2444 using a 20 lb (9.07kg). Top A and a Flat Plate Holder B. The strength shall equal or exceed the values shown below:
- |                              |  |  |
|------------------------------|--|--|
| 4" 50 Ft-Lbs<br>(100mm 68 J) | 6" – 8" 75 Ft-Lbs<br>(150mm – 200mm 102 J) | 10" – 12" 90 Ft-Lbs<br>(250mm – 300mm 122 J) |
|------------------------------|--|--|
- Pipe Stiffness:** Extruded Components are tested in accordance with ASTM D 2412. The stiffness equals or exceeds the requirements of ASTM D 3034 and F 679.
- Pipe Flattening:** Extruded components are flattened as described in ASTM D 3034 and F 679 until the distance between the plates is 40% of the outside diameter of the pipe. There shall be no splitting, cracking or breaking.
- Pressure/Pressure Deflection:** Gasketed joints are tested in accordance with ASTM D 3212.  
Pressure: 10 minutes @ 10.8 psi (74.5 kPa) + 10 minutes deflected @ 10.8 psi (74.5 kPa).  
Vacuum: 10 minutes @ 22 in. Hg (74 kPa) + 10 minutes deflected @ 22 in. Hg (74kPa).
- Branch Bending:** The chemically fused areas around the fabricated branches of tee, wye and tee-wye fittings are tested to ASTM F 1336 to verify their strength and integrity.
- Pipe Stop Support:** Tee and tee-wye fittings are tested to requirements of ASTM F 1336 for pipe stop load support. No cracking or splitting shall occur and pipe spigot shall not protrude into waterway of the fitting.
- Joining Methods:** Chemically Fused Solvent Weld Joints  
Solvent cement is handled and tested in accordance with ASTM D 2564 and D 2855. The Lap Shear Strength shall equal or exceed 900 psi (6205 kPa) @ 72 hours.
- Heat Fusion Welded Joints (Butt Fusion Welds)
- Elastomeric Seals (Gaskets)  
Must meet all requirements of ASTM F 477 and D 3212.
- Saddles:** Injection Molded saddle tees and saddle wyes shall have skirts with a minimum of 80 square inches (516 square cm) surface area which can be bonded to pipe.
- Fabricated saddle tees and saddle wyes shall have skirts with a minimum of 160 square inches (1032 square cm) surface area which can be bonded to pipe.
- The worm drive saddle straps used to fasten the saddles are manufactured with corrosion resistant 300 series AISI stainless steel.
- GPk does not recommend gasket skirts where air tests are required.
- Epoxy Reinforced Welds.



DRG. NO.  
**VB-2238**



**BODY-63 LBS.**

**LID-12 LBS.**

MATERIAL: Cast Iron ASTM A48 Class 30B  
 Meets H20 Loading Standards

COATING: Bitumastic Asphaltic Tar

DESCRIPTION:  
**KANSAS, MISSOURI, LAMPHOLE RING AND COVER**

DRN. BY. 21/08/99  
**BASANTA DAS.**

CHECKED BY:  
**ASHIS DEY.**

WEIGHT:  
**75 LBS.(SET)**

CODE NO.



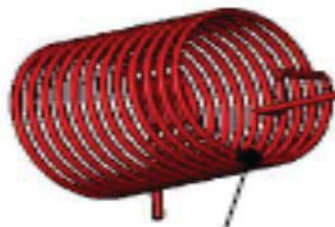
### Anode:

- Use Copperhead® Anode
- Part # **ANO-12**, 1.5# x 1.315"D x 18.5"L, Magnesium Drive in Anode.

Grounding a tracer wire system at all dead end points completes the needed electrical circuit for accurate locates. This will significantly enhance your signal strength and pinpoint your tracer wire to its target.

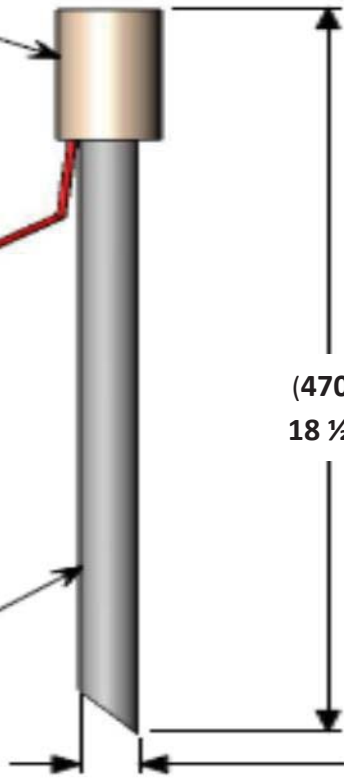
Your Copperhead Anode includes an HDPE cap and 20' of factory installed Copperhead red **12 AWG** copper clad steel tracer wire with minimum 452# break load and 30 mil high-density high molecular weight polyethylene (HDPE) insulation. The factory installed wire is also rated for direct burial use at 30 volts with 21% conductivity. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Package includes one Copperhead SnakeBite™ connector, part # SCB-01-SR, which is filled with non-hardening, dielectric, moisture displacement silicon for corrosion protection. The connector is provided to splice the factory installed anode tracer wire to the mainline tracer wire. The Copperhead Anode described above must be used or a **pre-approved equal** and made in the USA.

Cap  
High Density  
Polyethylene



20' Red 12AWG  
Copperhead®  
CCS

Super Rod  
Magnesium Anode



(470)  
18 1/2"

(33.4)  
01.35"

# SnakePit's exclusive Encapsulated Magnet System makes locating your access boxes easier by magnifying the ferromagnetic signal!

## Copperhead SnakePit and Cobra Test Stations

Product Name	Part Number	Application	Description	Case Quantity	Color
Lite Duty	LD14*TP	Non-roadway applications	Light duty box, 14" length	20	YEL, BLU, GRN, PUR, ORN, RED, BLK
Lite Duty - Adjustable	LD14*TP-ADJ	Non-roadway applications	Light duty adjustable, 18 5/8" - 24"	20	YEL, BLU, GRN, PUR, ORN, RED, BLK
Lite Duty -XL	LDXL36*TP	Non-roadway applications	Light duty box, 36" length	10	YEL, BLU, GRN, PUR, ORN, RED, BLK
Concrete/Driveway	CD14*TP	Low traffic drives and driveways	Concrete/driveway box, 14" length	10	YEL, BLU, GRN, PUR, ORN, RED, BLK
Roadway	RB14*TP	High traffic roadways	Roadway box, 14" length	5	YEL, BLU, GRN, PUR, ORN, RED, BLK
Cobra T3	T1-*01	Above grade	One terminal; 1" conduit	5	YEL, BLU, GRN, PUR, ORN, RED, BLK
Cobra T3	T1-*75	Above grade	One terminal; 3/4" conduit	5	YEL, BLU, GRN, PUR, ORN, RED, BLK
Cobra T3	T2-*01	Above grade	Two terminals with jumper; 1" conduit	5	YEL, BLU, GRN, PUR, ORN, RED, BLK
Cobra T3	T2-*75	Above grade	Two terminals with jumper; 3/4" conduit	5	YEL, BLU, GRN, PUR, ORN, RED, BLK
Cobra T3	T3-*01	Above grade	Three terminals with jumper; 1" conduit	5	YEL, BLU, GRN, PUR, ORN, RED, BLK
Cobra T3	T3-*75	Above grade	Three terminals with jumper; 3/4" conduit	5	YEL, BLU, GRN, PUR, ORN, RED, BLK

\*Denotes Color: B=Blue, G=Green, P=Purple, N=Orange, R=Red, W=White, Y=Yellow, K=Black

**Distributed By:**

**Copperhead Industries, LLC**

111 Thomas Park Drive

Monticello, MN 55362

Ph: 877-726-5644 • Fx: 763-271-3694

www.copperheadwire.com



Copperhead tracer wire conforms to the APWA Uniform Color Code for sewer, potable water, reclaimed water, electric, communication and gas pipes.  
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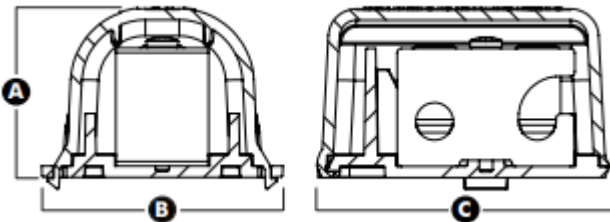


# MAINLINE-TO-SERVICE CONNECTOR

## APPLICATION

Connects service lateral tracer wire to mainline tracer wire without having to cut the main line. Outer lid locks down in three places, keeping connection free from contaminants. Comes prefilled with dielectric silicone sealant.

## SPECIFICATIONS



A - 1.138", B - 1.617", C - 1.929"

Max voltage: 50V

Size: 1.138" x 1.617"

Wire Type: copper-clad steel; solid copper

Wire Range: min 14-AWG / max 10-AWG

Sealant Temp: -45°F to 400°F

Lug: tin plated high conductivity aluminum

Screws: zinc plated steel

Housing: high impact polypropylene

Sealant: non-hardening viscous dielectric silicone

## INSTALLATION INSTRUCTIONS

1. Strip mainline and service tracer wires 1/8"
  2. Place mainline tracer wire into open throat A
  3. Tighten set screw until contact is made with wire; after contact is made, tighten set screw ¼ turn
  4. Place service tracer wire into hole B
  5. Tighten set screw until contact is made with wire; after contact is made, tighten set screw ¼ turn
  6. Remove sealant cover and discard
  7. Close housing, aligning conductors until housing lid is fully latched
  8. Wipe excess sealant around wires
- Do not reuse.



**3WB-01** – Mainline-to-Service Connector

**Color:** blue only

**Package quantity:** 10



## FEATURES AND BENEFITS

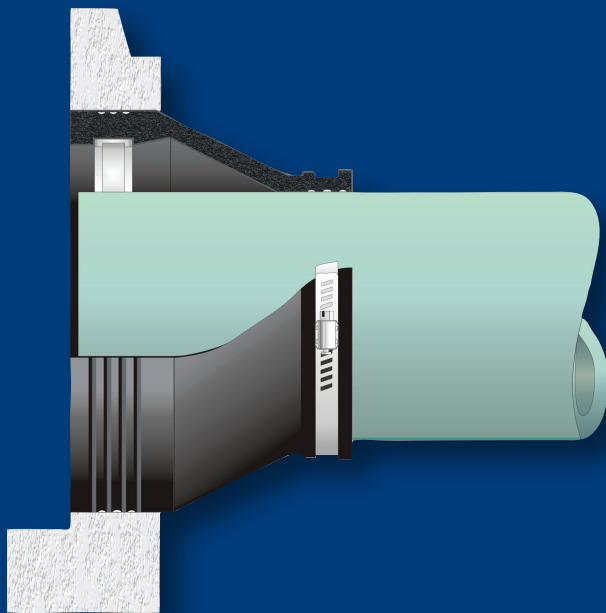
- No need to cut the main line
- **3-way connection**
- Designed for direct bury
- Pre-filled dielectric silicone sealant protects wire and never hardens
- Waterproof, corrosion resistant
- Easy installation



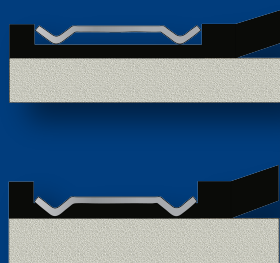


# Kor-N-Seal® I

## 106/406 Series Pipe-to-Manhole Connector



- *Most widely used flexible connector in sanitary sewer applications throughout the world*
- *Easy-to-Install*
- *Meets the specifications of ASTM C923*



*Patented Waveband technology creates a more effective seal by concentrating the compressive force of the expansion band. The rubber is “captured” between the band and the concrete.*

# Kor-N-Seal I

## 106/406 Series Pipe-to-Manhole Connector

### Wedge Style Connectors EX Series Plastic or Stainless Steel

Installation requires a ½" socket wrench & preset torque limiter.



PIPE O.D. RANGE	MODEL NUMBER	NOMINAL HOLE SIZE
1.50 - 4.80	S106-7MW	7"
3.50 - 4.80	S106-7W	7"
4.20 - 6.40	S106-8SRW	8"
1.50 - 4.80	S106-8MW	8"
6.00 - 6.75	S406-10AW	10"
7.50 - 8.20	S406-10W	10"
6.00 - 6.75	S406-10.5AW	10½"
7.50 - 8.70	S406-10.5W	10½"
6.00 - 7.00	S406-11BW	11"
7.50 - 9.00	S406-11AW	11"
3.50 - 6.90	S106-12M	12"
6.00 - 7.00	S406-12CW	12"
6.25 - 7.50	S406-12BW	12"
7.50 - 9.00	S406-12AW	12"
9.00 - 10.20	S406-12W	12"
5.75 - 7.00	S106-12BW	12"
7.00 - 8.50	S106-12AW	12"
8.25 - 9.75	S106-12W	12"
9.50 - 11.25	S106-14AW	14"
9.50 - 11.25	S106-16BW	16"
11.25 - 13.00	S106-16AW	16"
13.00 - 14.20	S106-16W	16"
14.00 - 15.50	S106-20BWS	20"
15.50 - 17.00	S106-20AWS	20"
17.00 - 18.15	S106-20WS	20"

Refer to Recommended Installation Instructions.

### Toggle Style Connectors (Jack-In Style)

Installation requires a hydraulic jack assembly



PIPE O.D. RANGE	MODEL NUMBER	NOMINAL HOLE SIZE
1.50 - 4.80	S106-7MT	7"
3.50 - 4.50	S106-7T	7"
4.20 - 6.40	S106-8SRT	8"
1.50 - 4.80	S106-8MT	8"
6.00 - 6.75	S406-10AT	10"
7.50 - 8.40	S406-10T	10"
6.00 - 6.75	S406-10.5AT	10½"
7.50 - 8.90	S406-10.5T	10½"
6.00 - 7.00	S406-11BT	11"
7.50 - 9.00	S406-11AT	11"
3.50 - 6.90	S106-12MT	12"
6.00 - 7.00	S406-12CT	12"
6.25 - 7.50	S406-12BT	12"
7.50 - 9.00	S406-12AT	12"
9.00 - 10.50	S406-12T	12"
5.75 - 7.00	S106-12BT	12"
7.00 - 8.50	S106-12AT	12"
8.25 - 9.75	S106-12T	12"
9.50 - 11.25	S106-14AT	14"
9.50 - 11.25	S106-16BT	16"
11.25 - 13.00	S106-16AT	16"
13.00 - 14.50	S106-16T	16"

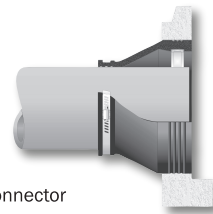
Refer to Recommended Installation Instructions.

To Install 7" & 8" Toggle Style Connectors:

Expander Assembly (p/n 90225)  
8" Extension (p/n 13808)

### Ordering Information

Kor-N-Seal I:  
106/406 Series  
Pipe-to-Manhole Connector



The 106 Series connector is 8 inches long, the 406 Series connector is 6 inches long. The number following the hyphen in our model numbers is the required hole size. The S106-20 Series is available in Stainless Steel Wedge only.

### Recommended Torque Values:

Connectors with 8" hole size and smaller:

Plastic Wedge - 3/16" Hex Head Torque Wrench - 5 ft. lbs.

Steel Wedge - 1/2" Socket Wrench - 8 ft. lbs.

Connectors with 10 - 20" hole sizes:

EX Series - 1/2" Socket Wrench - 12 - 20 ft. lbs.

Steel Wedge - 1/2" Socket Wrench - 12 ft. lbs.

Preset torque limiters are available.

Contact Customer Service at 1-800-626-2180 for more information.

### For larger pipe sizes refer to Kor-N-Seal II Series Connectors

206 Series - For pipe sizes 15" - 51" in diameter.

306 Series - To fit larger pipe into smaller diameter manholes.

506 Series - Designed specifically for stormwater applications.

### Using Corrugated Pipe

Adapters are required when using Corrugated Pipe. Refer to the Corrugated Pipe Adapter Data Sheet for details.

Covered under U.S. Patent No. 5,738,359



Trelleborg Pipe Seals Milford, Inc.

P.O. Box 301, 250 Elm Street, Milford, New Hampshire 03055 U.S.A.

Tel: 800-626-2180 603-673-8680 Fax: 603-673-7271 www.trelleborg.com/npc



January 1, 2014

To All Trelleborg Pipe Seal Customers

Re: Buy America Act

We certify that all materials comply with the "Buy America Act" and meets the requirements of 49 U.S.C. 5323 (j)(1) and the applicable regulations in 49 C.F.R. Part 661.5.

All of our rubber EPDM polymer compounds used in Kor-N-Seal products are manufactured by two different suppliers near Akron, Ohio. .

The 304 Stainless Steel used in our expansion bands comes from two different mills, Allegheny Ludlum Steel primarily from their Coatesville, PA mill and one of two A.K. Steel works in Butler, PA or Mansfield, OH.

The rubber compounds are extruded and spliced here in Milford, NH and the stainless steel from our two suppliers is also rolled, cut, and assembled in our New Hampshire factory. All final assembly, testing and shipping is from Milford, NH.

Should you need further details please do not hesitate to contact me or anyone in our customer service department.

Sincerely,

Randy L. Snyder  
Managing Director  
Trelleborg Pipe Seals Milford, Inc.

## ADS N-12® ST IB PIPE (per AASHTO) SPECIFICATION

### Scope

This specification describes 4- through 60-inch (100 to 1500 mm) ADS N-12 ST IB pipe (per AASHTO) for use in gravity-flow drainage applications.

### Pipe Requirements

ADS N-12 ST IB pipe (per AASHTO) shall have a smooth interior and annular exterior corrugations.

- 4- through 10-inch (100 to 250 mm) shall meet AASHTO M252, Type S or SP.
- 12- through 60-inch (300 to 1500 mm) shall meet AASHTO M294, Type S or SP or ASTM F2306.
- Manning’s “n” value for use in design shall be 0.012.

### Joint Performance

Pipe shall be joined using a bell & spigot joint meeting AASHTO M252, AASHTO M294 or ASTM F2306. The joint shall be soil-tight and gaskets, when applicable, shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

### Fittings

Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the soil-tight joint performance requirements of AASHTO M252, AASHTO M294 or ASTM F2306.

### Material Properties

Virgin material for pipe and fitting production shall be high density polyethylene conforming with the minimum requirements of cell classification 424420C for 4- through 10-inch (100 to 250 mm) diameters, or 435400C for 12- through 60-inch (300 to 1500 mm) diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%. The 12- through 60-inch (300 to 1500 mm) virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Sections 9.5 and 5.1 of AASHTO M294 and ASTM F2306, respectively.

### Installation

Installation shall be in accordance with ASTM D2321 and ADS recommended installation guidelines, with the exception that minimum cover in trafficked areas for 4- through 48-inch (100 to 1200 mm) diameters shall be one foot. (0.3 m) and for 54- and 60-inch (1350 and 1500 mm) diameters, the minimum cover shall be 2 ft. (0.6 m) in single run applications. Backfill for minimum cover situations shall consist of Class 1, Class 2 (minimum 90% SPD) or Class 3 (minimum 90%) material. Maximum fill heights depend on embedment material and compaction level; please refer to Technical Note 2.01. Contact your local ADS representative or visit our website at [www.ads-pipe.com](http://www.ads-pipe.com) for a copy of the latest installation guidelines.

### Pipe Dimensions

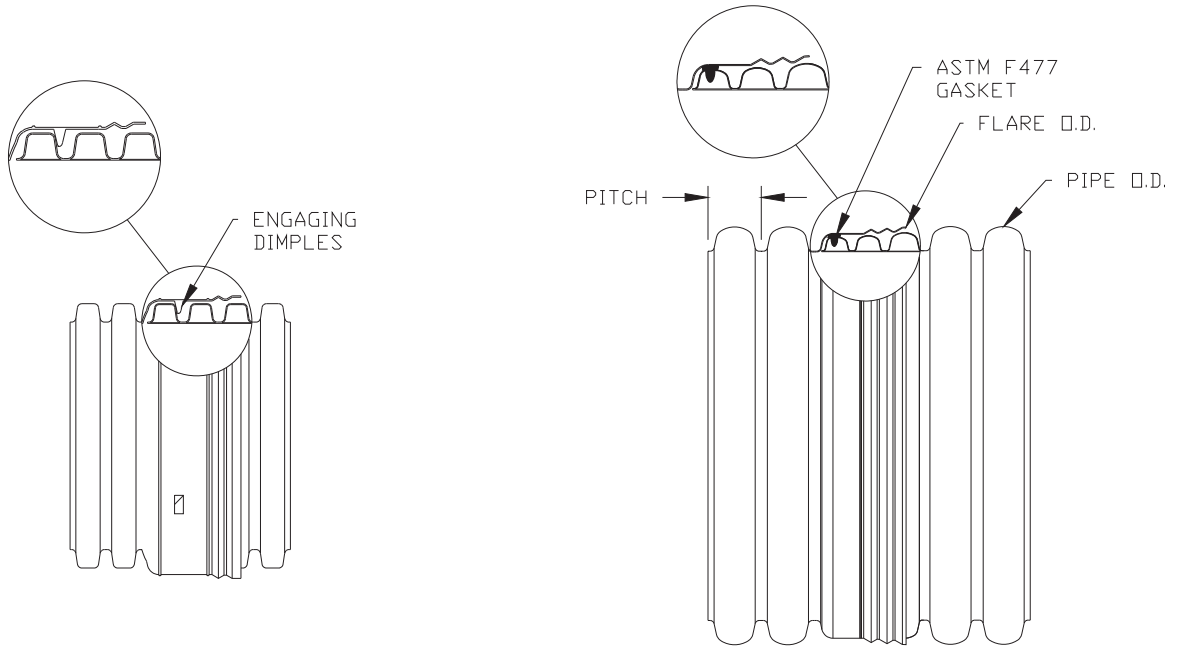
	Nominal Diameter, in (mm)													
Pipe I.D. in (mm)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	15 (375)	18 (450)	24 (600)	30 (750)	36 (900)	42 (1050)	48 (1200)	54* (1350)	60 (1500)
Pipe O.D.** in (mm)	4.8 (122)	6.9 (175)	9.1 (231)	11.4 (290)	14.5 (368)	18 (457)	22 (559)	28 (711)	36 (914)	42 (1067)	48 (1219)	54 (1372)	61 (1549)	67 (1702)
Perforations	All diameters available with or without perforations													

\*Check with sales representative for availability by region.

\*\*Pipe O.D. values are provided for reference purposes only, values stated for 12- through 60-inch are ± 1 inch. Contact a sales representative for exact values.

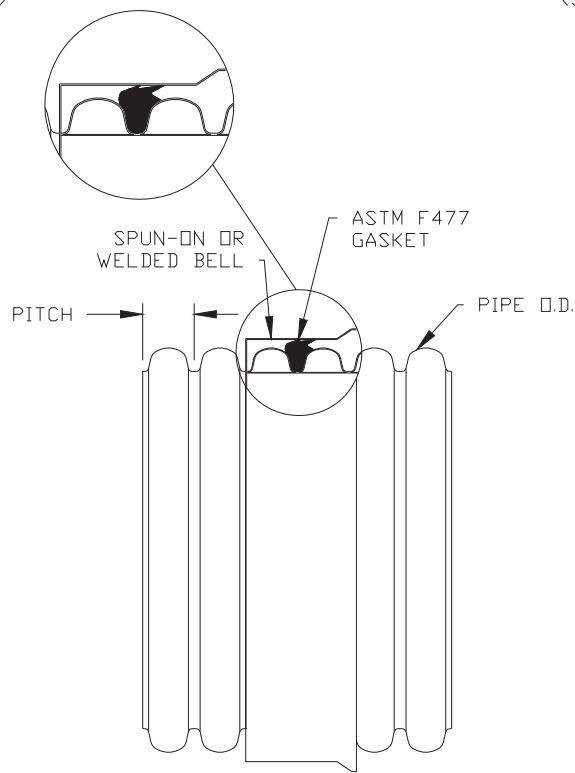
## N-12® ST IB (per AASHTO) JOINT SYSTEM

(Joint configuration & availability subject to change without notice. Product detail may differ slightly from actual product appearance.)



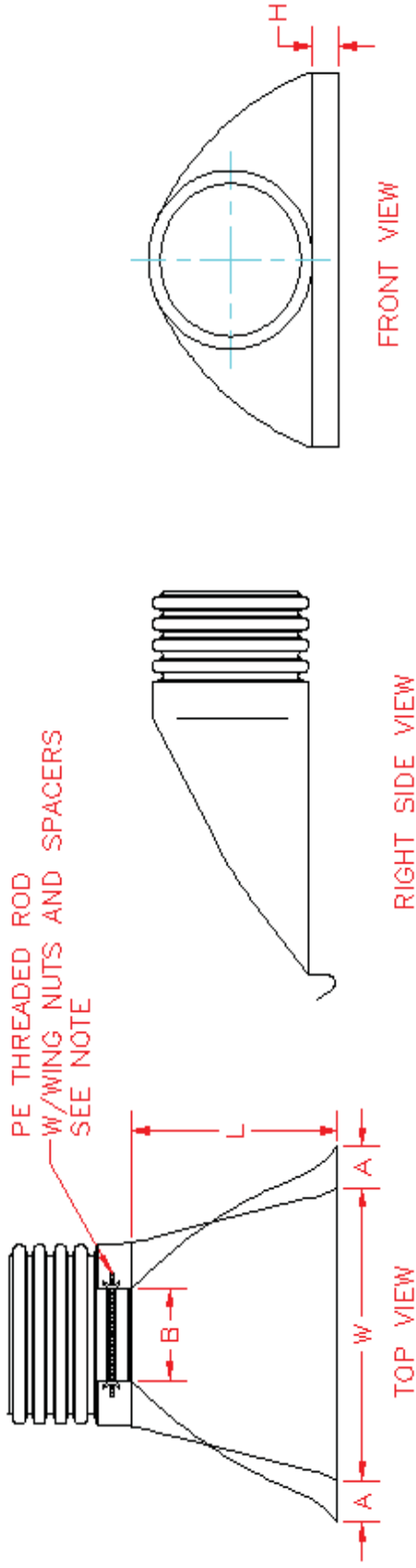
4" - 10"  
(100-250 MM)

12" - 60"  
(300-1500 MM)



4" - 60"  
(100-1500 MM)

# FLARED END SECTIONS



PART #	PIPE SIZE	A	B(MAX)	H	L	W
1210NP	12 in (300 mm)	6.5 in (165 mm)	10.0 in (254 mm)	6.5 in (165 mm)	25.0 in (635 mm)	29.0 in (737 mm)
1510NP	15 in (375 mm)	6.5 in (165 mm)	10.0 in (254 mm)	6.5 in (165 mm)	25.0 in (635 mm)	29.0 in (737 mm)
1810NP	18 in (450 mm)	7.5 in (191 mm)	15.0 in (381 mm)	6.5 in (165 mm)	32.0 in (813 mm)	35.0 in (889 mm)
2410NP	24 in (600 mm)	7.5 in (191 mm)	18.0 in (457 mm)	6.5 in (165 mm)	36.0 in (914 mm)	45.0 in (1143 mm)
3015NP	30 in (750 mm)	7.5 in (191 mm)	12.0 in (305 mm)	8.6 in (218 mm)	58.0 in (1473 mm)	63.0 in (1600 mm)
3615NP	36 in (900 mm)	7.5 in (191 mm)	25.0 in (635 mm)	8.6 in (218 mm)	58.0 in (1473 mm)	63.0 in (1600 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



DRAWING #:	6070
DRAWN BY:	JCB
APPROVED BY:	JCB
REVISIONS:	NJP