

SUBMITTAL



Submittal number	011.0	Date	01/13/2021
Project	TRAILS AT CROWFOOT F9	6454 N. Crowfoot Valley Road Parker, CO	
Project number	202103		
Spec section			
Subsection		Status	Open
Current action	Submitted	Ball in court	
Topic	Trench Drain and Appurtenances		

Submitter	MICHAEL TOMAS SNYDER
Reviewer	
Cc	

Date submitted	01/13/2021	Submission due date	01/13/2021
Released for review	01/13/2021	Review due date	01/20/2021
Date returned		Required on site date	
Date closed			

Notes
Please see attached JBS Transmittal NO. A-010 for Trench Drain Material and Appurtenances



LETTER OF TRANSMITTAL

JBS PIPELINE CONTRACTORS

8600 Verbena St.
Commerce City, CO 80022
Office 303-289-4355
Fax 303-289-4353

ISSUED TO:

Owner ATTN: Con Cockrum and Mike Snyder

DATE:

REGARDING:

TRANSMITTAL NO.:

Project JBS Job No 0245

We are issuing you under separate cover the following (via):

- Blue Prints
- Submittals
- Change Order
- Request for Information
- Copy of a letter
- Shop Drawings

#	Copies	Item Dated	Item #	Description
	1-Electronic		A-010	Trench Drain

- For your bid
- For Approval
- As Requested
- Returned for Correction
- For Review and Comment
- For Pricing

Prints are loaned to you and are to be returned to us by: Date: _____

Bids are due on or before: Date: _____

COMMENTS

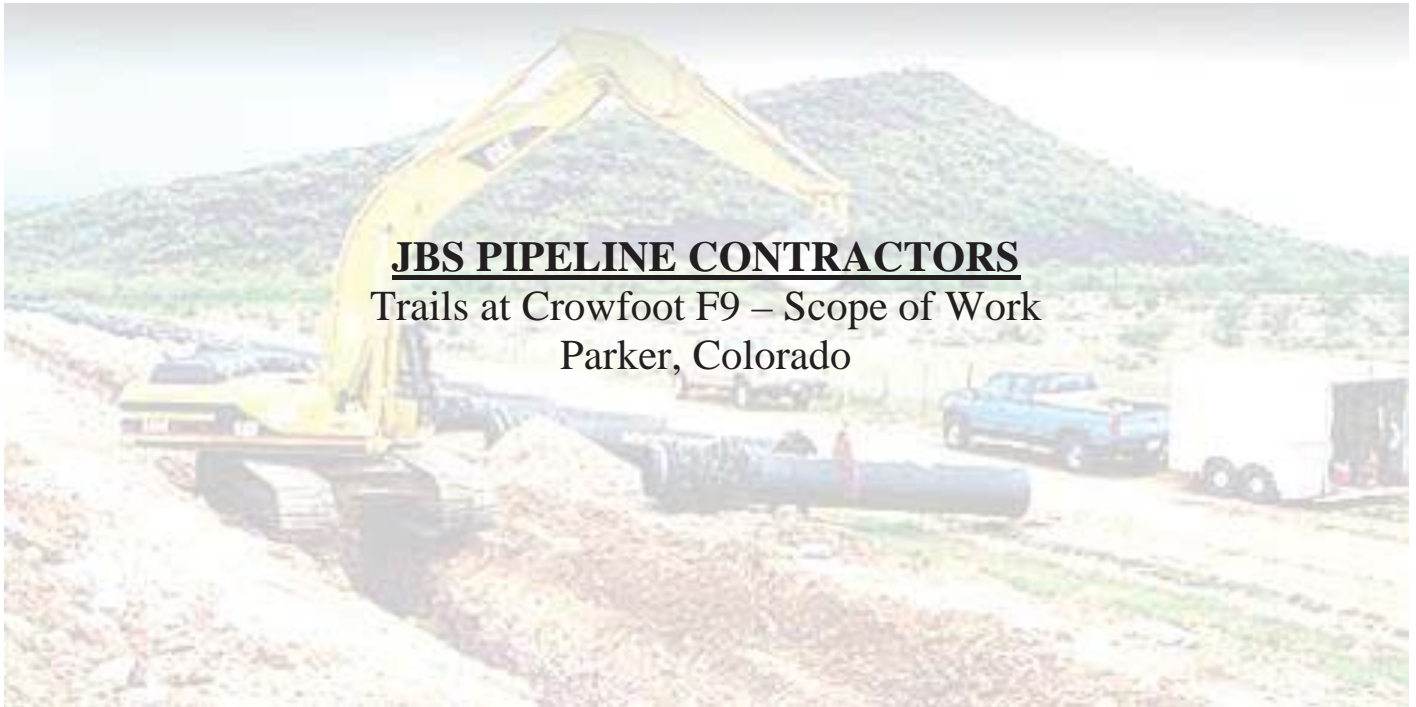
CC:

Amie Parent

Amie Parent
JBS Pipeline Contractors



We are proud to provide submittals for the following project:

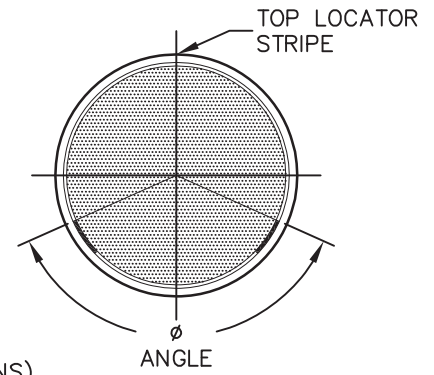
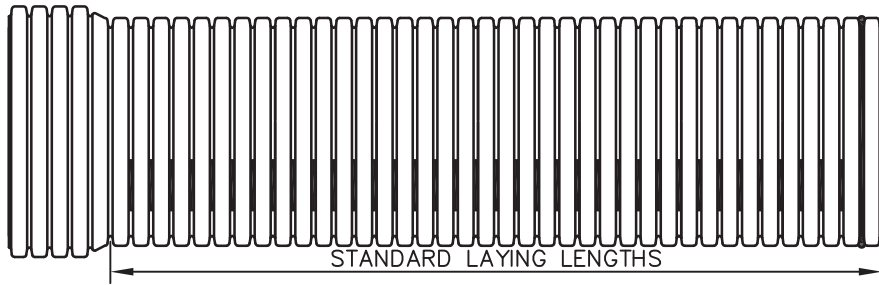


JBS PIPELINE CONTRACTORS
Trails at Crowfoot F9 – Scope of Work
Parker, Colorado

1788 Helena Street
Aurora, CO 80011
Phone: (720) 859-3060

ROADWAY

Pipe



4" THRU 10" DIAMETERS = 12'-6"
 12" THRU 18" DIAMETERS = 14'-0" (SLOTTED PERFORATIONS)
 15" THRU 36" DIAMETERS = 14'-0" AND 22'-0" (ROUND PERFORATIONS)

NOMINAL DIAMETERS (IN.)	AVERAGE O.D. (SPIGOT) (IN.)	AVERAGE I.D. (IN.)	SLOT LENGTH (IN.)	SLOT WIDTH (IN.)	SLOT CENTERS (IN.)	ANGLE (DEG.)	PIPE STIFFNESS (PSI)	STANDARD PERFORATION OPEN AREA PER FOOT (IN ²)	STANDARD ROUND HOLE OPEN AREA PER FOOT (IN ²)	FULLY PERFORATED OPEN AREA PER FOOT (IN ²)
4	4.3	3.9	1.062	0.031	0.413	152	46	1.92		
6	6.4	5.9	1.375	0.031	0.516	134	46	1.99		
8	8.6	7.9	1.800	0.031	0.689	132	46	1.90		3.80
10	10.8	9.8	2.188	0.031	0.826	114	46	1.98		3.96
12	12.8	11.7	1.688	0.051	1.033	122	46	2.00		4.00
15	15.7	14.3	2.250	0.051	1.377	124	46	2.00	1.71	4.00/3.42
18	19.2	17.6	2.250	0.051	1.377	120	46	2.00	1.71	4.00/3.42
21	22.6	20.7					46		2.70	5.40
24	25.6	23.5					46		2.70	5.40
30	32.2	29.5					46		2.20	4.40
36	38.7	35.5					46		2.00	4.00

SCOPE:
 THIS SPECIFICATION INCLUDES MATERIALS, TEST METHODS AND INSTALLATION REQUIREMENTS FOR 4 TO 36-INCH DIAMETER POLYVINYL CHLORIDE (PVC) CORRUGATED PIPE WITH A SMOOTH INTERIOR. THE REQUIREMENTS OF THIS SPECIFICATION ARE INTENDED TO PROVIDE PIPE AND FITTINGS SUITABLE FOR UNDERGROUND USE IN NON-PRESSURE APPLICATIONS SUCH AS SANITARY SEWERS, STORM SEWERS, DRAINAGE AND UNDERDRAINS.

PIPE:
 PVC CORRUGATED PIPE WITH A SMOOTH INTERIOR SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION F949. PIPE AND FITTINGS SHALL BE HOMOGENEOUS THROUGHOUT AND FREE FROM VISIBLE CRACKS, HOLES, FOREIGN INCLUSIONS OR OTHER INJURIOUS DEFECTS. PIPE SHALL BE MANUFACTURED TO 46 PSI STIFFNESS WHEN TESTED IN ACCORDANCE WITH ASTM TEST METHOD D2412. THERE SHALL BE NO EVIDENCE OF SPLITTING, CRACKING OR BREAKING WHEN THE PIPE IS TESTED PER ASTM TEST METHOD D2412 IN ACCORDANCE WITH ASTM F949 SECTION 7.5 AND ASTM F794 SECTION 8.5. THE PIPE SHALL BE MADE OF PVC COMPOUND HAVING A MINIMUM CELL CLASSIFICATION OF 12454 AS DEFINED IN ASTM SPECIFICATION D1784.

FITTINGS:
 ALL FITTINGS FOR PVC CORRUGATED SEWER PIPE WITH A SMOOTH INTERIOR SHALL CONFORM TO ASTM F949, SECTION 5.2.3 OR F794, SECTION 7.2.4. TO INSURE COMPATIBILITY, THE PIPE MANUFACTURER SHALL PROVIDE ALL FITTINGS.

JOINTS:
 ALL JOINTS SHALL BE MADE WITH INTEGRALLY-FORMED BELL AND SPIGOT GASKETED CONNECTIONS. THE MANUFACTURER SHALL PROVIDE DOCUMENTATION SHOWING NO LEAKAGE WHEN GASKETED PIPE JOINTS ARE TESTED IN ACCORDANCE WITH ASTM TEST METHOD D3212. ELASTOMERIC SEALS (GASKETS) SHALL MEET THE REQUIREMENTS OF ASTM DESIGNATION F477.

PERFORATIONS:
 FOR SLOTTED, STANDARD PERFORATED PIPE, THE PERFORATION DIMENSIONS SHALL BE IN ACCORDANCE WITH ASTM F949 TABLE 5 AND SECTION 7.9. INSTEAD OF SLOTS, ROUND HOLES (MIN. 1/4"φ) MAY BE USED FOR 15"-18" DIAMETER PIPE AND (MIN. 3/8"φ) FOR 21"-36" DIAMETER PIPE.

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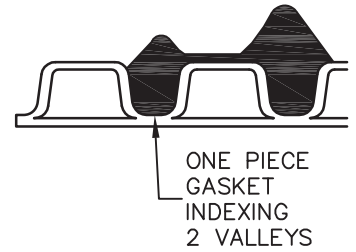
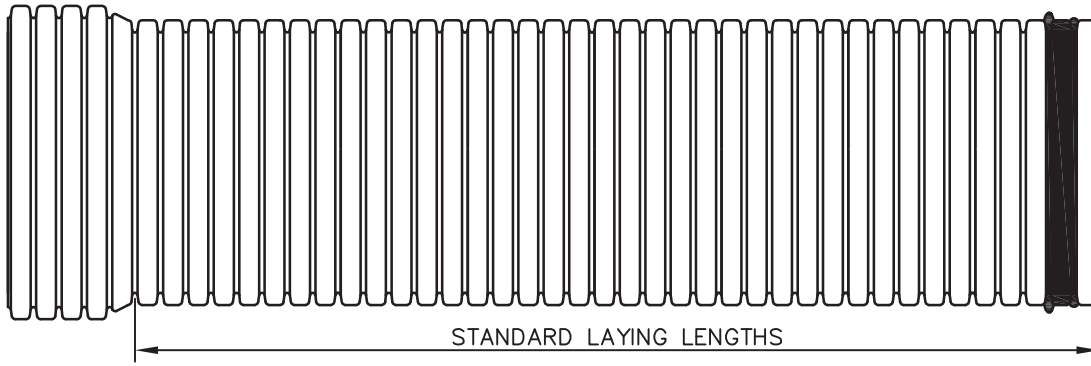


9025 CENTRE POINTE DRIVE, SUITE 400
 WEST CHESTER, OHIO 45069
 PH: 1.800.338.1122 FAX: 513.645.7399

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A-2000 PERFORATED PIPE
 PRODUCT SPECIFICATION
 FOR (F949) PVC PIPE
 (ENGLISH)

SCALE: N/A
 DRAWN BY: FAM
 DATE: 10/10/08
 REV. BY: —
 DATE: —
 SHEET: 1 of 1



4" THRU 10" DIAMETERS = 12'-6"
 12" THRU 36" DIAMETERS = 22'-0" OR 14'-0"

NOMINAL DIAMETERS (IN.)	AVERAGE O.D. (SPIGOT) (IN.)	AVERAGE O.D. (BELL) (IN.)	AVERAGE I.D. (IN.)	PIPE STIFFNESS (PSI)	MINIMUM FLATTENING (%)
4	4.3	4.9	3.9	46	40
6	6.4	6.9	5.9	46	40
8	8.6	9.3	7.9	46	40
10	10.8	11.7	9.8	46	40
12	12.8	13.9	11.7	46	40
15	15.7	16.9	14.3	46	40
18	19.2	20.6	17.6	46	40
21	22.6	24.6	20.7	46	40
24	25.6	27.9	23.5	46	40
30	32.2	35.1	29.5	46	40
36	38.7	42.3	35.5	46	40

SCOPE

THIS SPECIFICATION INCLUDES MATERIALS, TEST METHODS AND INSTALLATION REQUIREMENTS FOR 4 TO 36-INCH DIAMETER POLYVINYL CHLORIDE (PVC) CORRUGATED PIPE WITH A SMOOTH INTERIOR. THE REQUIREMENTS OF THIS SPECIFICATION ARE INTENDED TO PROVIDE PIPE AND FITTINGS SUITABLE FOR UNDERGROUND USE IN NON-PRESSURE APPLICATIONS SUCH AS SANITARY SEWERS, STORM SEWERS, DRAINAGE AND UNDERDRAINS.

PIPE

PVC CORRUGATED PIPE WITH A SMOOTH INTERIOR SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION F949. PIPE AND FITTINGS SHALL BE HOMOGENEOUS THROUGHOUT AND FREE FROM VISIBLE CRACKS, HOLES, FOREIGN INCLUSIONS OR OTHER INJURIOUS DEFECTS. PIPE SHALL BE MANUFACTURED TO 46 PSI STIFFNESS WHEN TESTED IN ACCORDANCE WITH ASTM TEST METHOD D2412. THERE SHALL BE NO EVIDENCE OF SPLITTING, CRACKING OR BREAKING WHEN THE PIPE IS TESTED PER ASTM TEST METHOD D2412 IN ACCORDANCE WITH ASTM F949 SECTION 7.5 AND ASTM F794 SECTION 8.5. THE PIPE SHALL BE MADE OF PVC COMPOUND HAVING A MINIMUM CELL CLASSIFICATION OF 12454 AS DEFINED IN ASTM SPECIFICATION D1784.

FITTINGS:

ALL FITTINGS FOR PVC CORRUGATED SEWER PIPE WITH A SMOOTH INTERIOR SHALL CONFORM TO ASTM F949, SECTION 5.2.3 OR F794, SECTION 7.2.4. TO INSURE COMPATIBILITY, THE PIPE MANUFACTURER SHALL PROVIDE ALL FITTINGS.

JOINTS:

ALL JOINTS SHALL BE MADE WITH INTEGRALLY-FORMED BELL AND SPIGOT GASKETED CONNECTIONS. THE MANUFACTURER SHALL PROVIDE DOCUMENTATION SHOWING NO LEAKAGE WHEN GASKETED PIPE JOINTS ARE TESTED IN ACCORDANCE WITH ASTM TEST METHOD D3212. ELASTOMERIC SEALS (GASKETS) SHALL MEET THE REQUIREMENTS OF ASTM DESIGNATION F477.

CONTECH ID# 0000



9025 CENTRE POINTE DRIVE, SUITE 400
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A-2000 PVC SEWER PIPE

PRODUCT SPECIFICATION
 FOR (F949) PVC PIPE
 (ENGLISH)

SCALE: N/A
 DRAWN BY: FAM
 DATE: 10/10/08
 REV. BY: —
 DATE: —
 SHEET: 1 of 1

Fittings

A-2000[™] PVC Pipe
Fittings and Components



General Notes

1. * Indicates a fabricated part.
2. ** Indicates a molded part with bushing or adaptor.
3. All drawings herein are for illustrative purposes only and are not intended as true representations of actual parts.
4. This catalog contains the most commonly used A-2000™ fittings and components. Additional A-2000 parts not shown may be available from Contech Engineered Solutions LLC. Contact your local Contech Plastic Pipe Specialist about items not listed.
5. All saddles include templates and stainless steel bands. Adhesives or gaskets are not included and must be ordered separately.

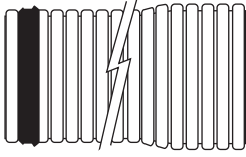
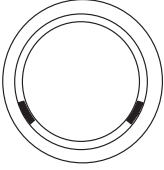
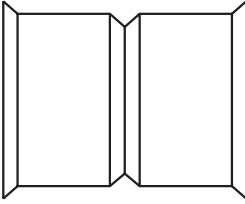


Joining A-2000 gasketed PVC pipe and fittings

(ASTM D3212)

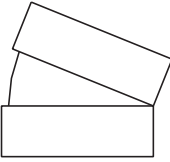
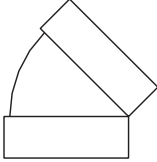
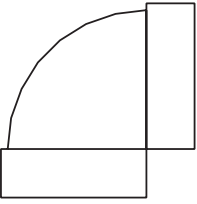
Lubrication Requirements (Joints per Gallon)	
Pipe Size (inches)	Lubricant
4	300
6	220
8	100
10	64
12	48
15	25
18	20
21	16
24	11
30	7
36	5




A-2000 Pipe

Type	Available Sizes (inches)	Part Number	
 <p>Pipe</p>	4	A2PG041250	
	6	A2PG061250	
	8	A2PG081250	
	10	A2PG101250	
	12	A2PG121250	
	15	A2PG151250	
	18	A2PG181250	
	21	A2PG211300	
	24	A2PG241300	
	30	A2PG301300	
	36	A2PG361300	
	 <p>Perforated Pipe</p> <p>Same as above. 4" thru 18" pipe is slotted. 21" through 36" pipe has 3/8" holes.</p>	4	A2PG041250P
		6	A2PG061250P
8		A2PG081250P	
10		A2PG101250P	
12		A2PG121250P	
15		A2PG151250P	
18		A2PG181250P	
21		A2PG211250P	
24		A2PG241300P	
30		A2PG301300P	
 <p>1/4 Bend (Bell-Bell)</p>	4	APG04CCS	
	6	APG06CCS	
	8	APG08CCS	
	10	APG10CCS	
	12	APG12CCS*	
	15	APG15CCS*	
	18	APG18CCS*	
	21	APG21CCS*	
	24	APG24CCS*	
	30	APG30CCS*	
 <p>Loose Coupling without Centerstop</p>	4	APG04C	
	6	APG06C	
	8	APG08C	
	10	APG10C	
	12	APG12C*	
	15	APG15C*	
	18	APG18C*	
	21	APG21C*	
	24	APG24C*	
	30	APG30C*	
 <p>Spigot Cap</p>	4	APG04SC	
	6	APG06SC	
	8	APG08SC	
	10	APG10SC	
	12	APG12SC*	
	15	APG15SC*	
	18	APG18SC*	
	21	APG21SC*	
	24	APG24SC*	
	30	APG30SC*	
36	APG36SC*		

Elbows


Type	Available Sizes (inches)	Part Number
 <p>1/16 Bend (Bell-Bell)</p>	4	APG04L22B
	6	APG06L22B
	8	APG08L22B*
	10	APG10L22B*
	12	APG12L22B*
	15	APG15L22B*
	18	APG18L22B*
	21	APG21L22B*
	24	APG24L22B*
	30	APG30L22B*
 <p>1/8 Bend (Bell-Bell)</p>	4	APG04L45B
	6	APG06L45B
	8	APG08L45B
	10	APG10L45B*
	12	APG12L45B*
	15	APG15L45B*
	18	APG18L45B*
	21	APG21L45B*
	24	APG24L45B*
	30	APG30L45B*
 <p>1/4 Bend (Bell-Bell)</p>	4	APG04L90B
	6	APG06L90B
	8	APG08L90B
	10	APG10L90B*
	12	APG12L90B*
	15	APG15L90B*
	18	APG18L90B*
	21	APG21L90B*
	24	APG24L90B*
	30	APG30L90B*
36	APG36L90B*	

Gaskets and Manhole Connectors


Type	Available Sizes (inches)	Part Number
	4	APG04G
	6	APG06G
	8	APG08G
	10	APG10G
	12	APG12G
	15	APG15G
	18	APG18G
	21	APG21G
	24	APG24G
	30	APG30G
36	APG36G	

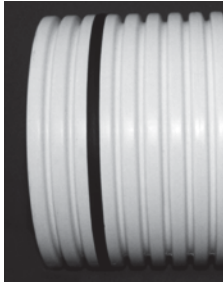
	4 PERF	APG04GO
	6 PERF	APG06GO

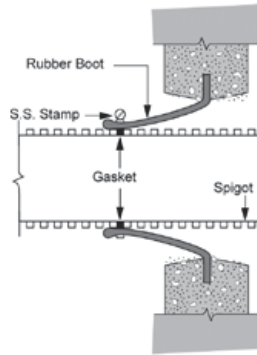
For 4" and 6" perforated pipe

	8 PERF	APG08GO
	10 PERF	APG10GO
	12 PERF	APG12GO
	15 PERF	APG15GO
	18 PERF	APG18GO
	21 PERF	APG21GO

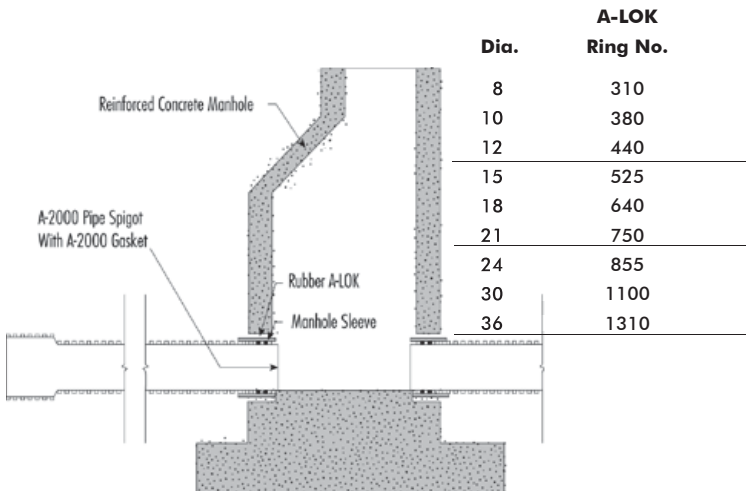
For 8" thru 36" perforated and drainage pipe

	8	APG08MHC
	10	APG10MHC
	12	APG12MHC
	15	APG15MHC
	18	APG18MHC
	21	APG21MHC
	24	APG24MHC
	30	APG30MHC
	36	APG36MHC

Type	Available Sizes (inches)		Part Number
	Diameter (inches)	Average Outside Diameter (inches)	
	4	4.30	APG04G
	6	6.42	APG06G
	8	8.60	APG08G
	10	10.79	APG10G
	12	12.80	PFAPG 12 GM
	15	15.66	PFAPG 15 GM
	18	19.15	PFAPG 18 GM
	21	22.59	PFAPG 21 GM
	24	25.58	PFAPG 24 GM
	30	32.15	PFAPG 30 GM
	36	38.74	PFAPG 36 GM

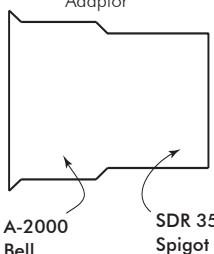


*For 21" diameter and larger pipe, the boot manufacturers recommend using two stainless steel clamp assemblies (with two screws per assembly) per boot. Clamps should be positioned evenly around the boot groove with the screws staggered so that the take-up pressure is equalized. Tighten screws of the outside clamp in an alternating pattern to the recommended torque on final screw. Check all screws again to ensure equal compression of both clamps.



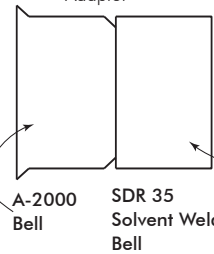
Adaptors

Type	Available Sizes (inches)	Part Number
A-2000 Bell/SDR35 Spigot Adaptor	4	APG0435S*
	6	APG0635S*
	8	APG0835S*
	10	APG1035S*
	12	APG1235S*
	15	APG1535S*
	18	APG1835S*
	21	APG2135S*
	24	APG2435S*
	30	APG3035S*
	36	APG3635S*



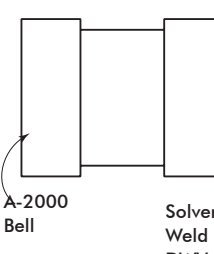
A-2000 Bell SDR 35 Spigot

A-2000 Bell/SDR35 Bell Adaptor	4	APB0435BS*
	6	APB0635BS*



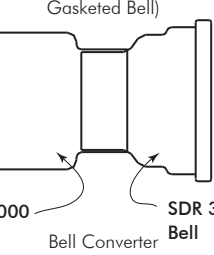
A-2000 Bell SDR 35 Solvent Weld Bell

A-2000 Bell/DWV Bell Adaptor	4	APG04DWW*
	6	APG06DWW*



A-2000 Bell Solvent Weld DWV Bell

A-2000 Bell Adaptor (to SDR35 Gasketed Bell)	4	APG04AD35BG*
	6	APG06AD35BG*

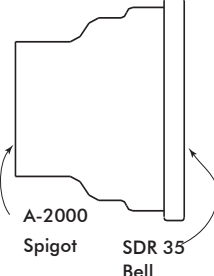


A-2000 Bell SDR 35 Bell

Bell Converter

(Converts A-2000 Bell to SDR35 Gasketed Bell)

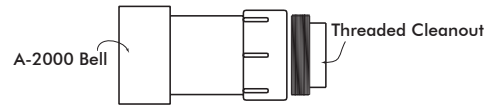
A-2000 Spigot Adaptor (to SDR35 Bell)	4	APS04BC35BG*
	6	APS06BC35BG*



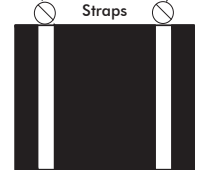
A-2000 Spigot SDR 35 Bell

Coupling/Caps

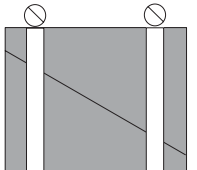
Type	Available Sizes (inches)	Part Number
Cleanout and Cap	4	APG04CLN**
	6	APG06CLN**



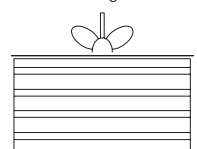
Repair Coupling (Fernco Type 1056) with Stainless Steel Straps	4	004FCA
	6	006FCA
	8	008FCA
	10	010FCA
	12	012FCA
	15	015FCA
	18	018FCA
	21	021FCA
Note: 12" and larger Fernco couplings are not inventoried and are available on special order.	24	024FCA
	30	030FCA
	36	036FCA



Shear Stop for Repair Coupling	4	004CRP*
	6	006CRP*
	8	008CRP*
	10	010CRP*
	12	012CRP*
	15	015CRP*
	18	P18CRP*



Mechanical Plug	4	04MP
	6	06MP



Contech A-2000™ products

A2™ Liner Pipe for rehabilitating aging structures

Using the proven double wall A-2000 design, Contech developed A2 Liner Pipe for sliplining deteriorating pipelines, eliminating the need for disruptive open trench replacement.

A2™ Casing Liner Pipe for crossing under highways/railroads

Crossing under a highway or railroad is common with new sanitary or storm sewer construction. Typically, crossings are accomplished by boring and installing a casing pipe. The sewer (carrier) pipe is then installed inside the casing.

By using the “no-bell,” constant outside diameter design of A2 Liner Pipe for the carrier pipe, downsizing of the casing can result in a significant cost saving. In addition, A2 Liner Pipe can be supplied with runners (spacers) already attached, eliminating the need and cost to attach them in the field.

A-2000™ perforated pipe for subdrainage systems

Contech A-2000 perforated pipe (4”-36” diameters) has several important features that make it the designer’s first choice for subsurface drainage systems:

- 46 psi pipe stiffness for deflection control.
- Smooth interior for improved hydraulic capacity.
- Double wall design that provides essential beam strength for improved alignment and installation grade control.
- Positive gasketed jointing system.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech’s portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treatment products.

For more information, call one of Contech’s Regional Offices located in the following cities:

Ohio (Corporate Office)	513-645-7000
Colorado (Denver)	720-587-2700
Florida (Orlando)	321-348-3520
Maine (Scarborough)	207-885-9830
Maryland (Baltimore)	410-740-8490
Oregon (Portland)	503-258-3180
Texas (Dallas)	972-590-2000

**Visit our web site: www.ContechES.com
800.338.1122**

A-2000™ Drainage Pipe

Contech PVC double-wall pipe is the latest in drainage pipe technology and engineering design. A-2000 Drainage Pipe, available in 12”-36” diameters, combines the proven durability and corrosion resistance of PVC, plus a smoother interior for improved hydraulics, tight rubber gasketed joints, light weight and long lengths (20’) for easier handling and less costly installation.

Contech A-2000 Storm Sewer Pipe is manufactured per ASTM F949, F794 and AASHTO M304. When designed in accordance with AASHTO LRFD Section 12 methodology and using 50-year material properties with Class I or Class II backfill per ASTM D2321 compacted to 95% standard Proctor density, the maximum allowable heights of cover for A-2000 exceed 50’ while the minimum cover for highway loading is 12”.

Contech products can solve most sewer or drainage problems. Their strength, durability and economy are proven with nearly a century of research and field performance.

A-2000™ PVC Pipe for Sanitary Sewers

A-2000 is a seamless profile wall pipe extruded with a smooth interior and corrugated exterior. Made from polyvinyl chloride (PVC) compound, 12454, the most widely accepted sewer pipe material, A-2000 provides excellent durability and resistance to abrasion and scour. It withstands corrosive attack from both acidic and alkaline soils and is unaffected by chemicals found in normal sewage.

Engineered for gravity flow applications to installed depths exceeding 30 feet*, A-2000 should be specified whenever you consider using PVC sewer pipe. It has passed rigorous testing and meets the requirements of ASTM Specifications F949 and F794.

Your Local Sales Office is:

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS AN EXPRESSED WARRANTY OR AN IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. SEE THE CONTECH STANDARD CONDITIONS OF SALE (VIEWABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.

A-2000 is manufactured under U.S. patent numbers 4,702,502; 4,846,660 and 5,124,109



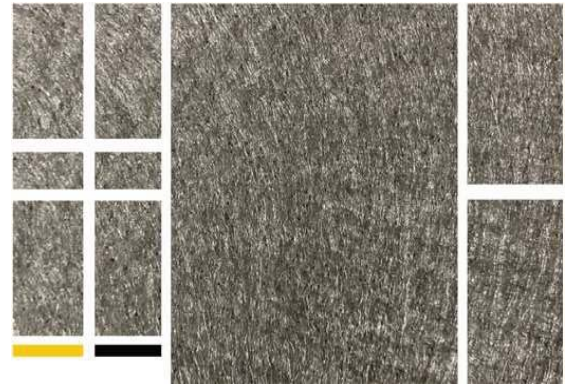
Miscellaneous

NON-WOVEN GEOTEXTILE

GT - 142



SKAPS GT-142 is a needle-punched nonwoven geotextile made of 100% virgin polypropylene staple fibers, which are formed into a random network for dimensional stability. SKAPS GT-142 resists ultraviolet deterioration, rotting, biological degradation, naturally encountered alkalis and acids. Polypropylene is stable within the pH range of 2 to 13. SKAPS GT-142 is NTPEP certified and meets requirements as per AASHTO Standards and/or D.O.T. Standards.



SKAPS GT-142 conforms to the Minimum Average Roll Values (MARV) listed below:

Property	Method	English (MARV ²)	Metric (MARV ²)
Grab Tensile Strength	ASTM D 4632	120 lbs.	0.553 kN
Grab Elongation	ASTM D 4632	50%	50%
Trapezoid Tear Strength	ASTM D 4533	50 lbs.	0.222 kN
CBR Puncture Resistance	ASTM D 6241	340 lbs	1.512 kN
Permittivity ⁴	ASTM D 4491	1.70 sec ⁻¹	1.70 sec ⁻¹
Water Flow ⁴	ASTM D 4491	135 gpm/ft ²	5500 l/min/m ²
Apparent Opening Size (AOS) ^{3&4}	ASTM D 4751	70 Std. U.S. Sieve	0.212 mm
UV Resistance	ASTM D 4355	70%/500 hrs.	70%/500 hrs.

Packaging

Roll Dimensions (W x L)	12.5 x 360 ft. 15 x 360 ft.	3.81 m x 109.8 m 4.6 m x 109.8 m
Area Per Roll	500 sq. yards 600 sq. yards	418.3 sq. meters 505.1 sq. meters
Estimated Roll Weight	152 lbs. 180 lbs.	69 kg 82 kg

Note

1. The property values listed above are subject to change without notice.
2. Minimum Average Roll Values (MARV) is calculated as the average minus two standard deviations. Statistically, it yields approximately 97.5% degree of confidence that any samples taken from quality assurance testing will meet or exceed the values described above.
3. Maximum Average Roll Value (MaxARV)
4. At time of manufacturing. Handling may change these properties.

This information is provided for reference purposes only and is not intended as a warranty or guarantee. SKAPS assumes no liability in connection with the use of this information.



3M™ Electronic Marker System (EMS) Ball Markers

The 3M™ Ball Marker makes the job of precisely locating underground facilities easier. Other buried markers can be disturbed by backfill dirt or installed improperly so they don't stay positioned correctly. The 3M ball marker's unique self-leveling design ensures the marker is always in an accurate, horizontal position regardless of how it is placed into the ground.

The addition of the new 3M-iD markers provides additional functionality by enabling facility data to be stored in the marker to ensure positive identification of facilities. The pre-programmed unique serial number integrates with back office mapping and GIS systems when used for mapping new and legacy assets and points of special interest for construction and maintenance applications.

The ball marker is buried over key facilities during construction or maintenance. Later, the marker is easily and accurately located using a 3M™ Dynatel™ Locator. The locator transmits a signal to the buried marker. The marker returns the signal to the locator, indicating the marker's exact position. The compact electronic locator gives both a visual reading and an audible tone.

**Second Generation
iD Markers providing
4X Memory**



3M™ Electronic Marker System (EMS)
XR/iD Ball Markers

Features	Benefits
Accurate even in congested areas	Helps eliminate mislocates
Underground marker	Protected from damage from above-ground environment
Durable	Long-lasting passive antenna encased in waterproof shell helps identify underground facilities for years to come
Frequency- and color-coded	Helps identify specific utility
Easy to Use	Minimal training
RFID capability	Positive identification using facility information
Physical Specifications	
Size	4" diameter sphere (10.4 cm diameter)
Weight	Net: 0.7 lb. (0.35 kg)/ Shipping: 24 lb. (10.4 kg)
Packaging	30 per carton
3M iD Markers Read Range	With a 'U' model (U.S.) locator: 5 ft. (1.5 m) With a 'E' model (Export, CE) locator: 1.2 m (Tel, Gas, WW, Comm)/1.0 m (Pwr, Wtr)
3M Passive Markers Detection Range	5 ft (1.5 m)
Environmental Specifications	
Operating Temperature	-4°F to 122°F (-20°C to 50°C)
Storage Temperature	-40°F to 158°F (-40°C to 70°C)



3M™ Ball Markers

Image	Product	Application	Stock Number
	3M™ EMS Ball Marker 1401-XR	Telecommunications industry	80611161136
	3M™ iD Ball Marker 1421-XR/iD	Telecommunications industry	80611142193
	3M™ EMS Ball Marker 1402-XR	Power industry	80611161144
	3M™ iD Ball Marker 1422-XR/iD	Power industry	80611142201
	3M™ EMS Ball Marker 1403-XR	Water industry	80630000323
	3M™ iD Ball Marker 1423-XR/iD	Water industry	80611143225
	3M™ EMS Ball Marker 1404-XR	Wastewater industry	80630000331
	3M™ iD Ball Marker 1424-XR/iD	Wastewater industry	80611143233
	3M™ EMS Ball Marker 1405-XR	Gas industry	80630000257
	3M™ iD Ball Marker 1425-XR/iD	Gas industry	80611143241
	3M™ EMS Ball Marker 1407-XR	Cable TV and communications	80611161151
	3M™ EMS Ball Marker 1427-XR/iD	Cable TV and communications	80611142219
	3M™ EMS Ball Marker 1408-XR	General purpose and reclaimed water	80611168354
	3M™ iD Ball Marker 1428-XR/iD	General purpose and reclaimed water	80611142227

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Conditional Limited Warranty

3M provides the following Conditional Limited Warranty for its iD Electronic Marker Products: When installed in accordance with 3M's installation instructions, 3M warrants iD Electronic Markers for a period of ten (10) years from the date of purchase of the product, to be free from defects in material and manufacture, provided iD Electronic Markers are located with 3M™ Dynatel™ Locators or other brand locators as may be designated by 3M in writing. This warranty does not extend to iD Electronic Markers that have been subjected to misuse or improper application or that have been repaired or altered by others. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE.** If the iD Marker is found to be defective within the warranty period, your exclusive remedy shall be, at 3M's options, to repair or replace the iD Markers or refund the purchase price. **Except where prohibited by law, 3M will not be liable for any indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.**

Conditional Lifetime Warranty

3M provides the following Conditional Limited Warranty for its Electronic Marker Products (non-iD versions only): When installed in accordance with 3M's installation instructions, 3M warrants Electronic Markers for the lifetime of the product, to be free from defects in material and manufacture, provided the Electronic Markers are located with 3M™ Dynatel™ Locators or other brand locators as may be designated by 3M in writing. This warranty does not extend to Electronic Markers that have been subjected to misuse or improper application or that have been repaired or altered by others. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE.** If the Electronic Marker is found to be defective during the normal lifetime of the product, your exclusive remedy shall be, at 3M's options, to repair or replace the Electronic Markers or refund the purchase price. **Except where prohibited by law, 3M will not be liable for any indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.**



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