USCPS

U.S. COMPOSITE PIPE SOUTH, LLC.

PRODUCT GUIDE

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POLYMER CONCRETE PIPE

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Meyer Polymer Concrete Pipe

Combining the best – strength of reinforced concrete, corrosion resistance of clay and resilience of plastics – yields a superior microtunneling and jacking pipe.

With nearly a quarter century of experience, Meyer Germany is one of the leading suppliers of pipe in the world microtunneling and pipe jacking market. The high strength and corrosion resistance of Meyer's Polycrete pipe has made it the natural choice for this demanding application.

Today, this same technology is being utilized in a state-of-the-art plant in Zachary, Louisiana where Polycrete pipe in diameters from 8 inch to 102 inch can be produced. In addition, pipes with nominal diameters greater than 102 inches are available on special order. Please consult with your U.S. Composite Pipe South (USCPS) sales representative for lead times on all special order products.

Polycrete pipe is not new to the North American market. In fact, there is well over 150,000 feet of Meyer Polycrete pipe already in service in the U.S. and Canada. Highly successful microtunneling projects in California, Hawaii and British Columbia have awakened engineering and constructor's interest in this exceptional microtunneling and jacking pipe product.

Leading Global Pipe Technologist and Supplier

U.S. Composite Pipe South (USCPS) is one of the leading pipe technology and manufacturing companies in the United States. Our mission is to provide customers with pipe solutions for water, sewage, gas, oil and industrial applications as well as with pipe technologies and building materials of superior quality and value.

U.S. Composite Pipe South (USCPS) is now bringing directly to the American market Polycrete pipes manufactured in the U.S. In addition, USCPS is also producing **Flowtite** glass-fiber reinforced plastic pipes in our Zachary, Louisiana plant. With access to both technologies, USCPS is in the ideal position to offer their customers the best product for any application. Why settle for less?

As a leading supplier of complete solutions for pipe to the sewer, water, and industrial markets, USCPS can supply materials of the highest quality and performance. Our modern and effective production facilities all over the world offer cost effective high quality products combined with service and support.

Circular Pipe
Meyer Polycrete's standard circular pipe cross-section is designed for a variety of sanitary, storm, and industrial sewer applications. Depending on installation methods, the basis of structural design may vary. Installation methods include micro-tunneling, jacking, pipe bursting, auger boring, and direct burial.

Polycrete's Manning's "n" Flow Coefficient is a low 0.009; this provides an extremely smooth inside diameter with high flow rates. Combined with a dense wall structure that has an extremely high compressive strength, lighter weight and smooth, non-porous surface; Meyer Polycrete is the ideal choice for any of your circular piping needs.

Kite-Shaped Cross-Sections
Pipes with non-circular interiors can also be supplied by U.S. Composite Pipe South (USCPS) for jacking or direct bury applications. Developed for low flow applications, the pipe has been developed with a v-shaped invert which helps maintain a minimum scouring velocity during low flow periods, minimizing the settling of solids and sediment. This internal profile, illustrated to the right, is referred to as "kite-shaped".

In order to ensure that the v-shaped invert remains along the bottom during jacking, steel dowels are placed into sockets located at each pipe end. These dowels lock each pipe joint into its proper orientation and prevent independent axial rotation during tunneling activity. Please contact USCPS to obtain flow curves for this unique interior profile.

Specialty Profiles
USCPS's innovative manufacturing processes combined with the versatility of Polycrete enable us to deliver many different design profiles for specialty applications. These shapes include Egg Shaped Pipe, Box Culverts, and Tunnel Segments.

For more information on these unique product profiles, please contact U.S. Composite Pipe South.

Applications

Have a challenging or critically important installation? Chances are good that Meyer Polycrete will be the right product for your application. Here are some typical applications where Polycrete has been used:

Tunneling
Polycrete jacking pipe can be manufactured in diameters from 8 inch to 102 inch, with joint lengths of up to 10 feet. Given Polycrete's high strength, wall thicknesses are considerably less than a comparable concrete tunneling pipe. The strength classification of Polycrete is similar to reinforced concrete and is based on D-loads. D-loads range from 1200 lb/lineal ft., per foot of diameter, for Class I up to 3750 lb/ft/ft for Class V.

Polycrete can also be manufactured in segments (120 degree sections) for insertion immediately behind a driving shield. Tongue and groove joints are bonded with an epoxy resin, and the annular space between the outside of the pipe and the soil is filled with a grout.

Microtunneling/Jacking
Due to the ultra-high compressive strength of the polymer concrete (minimum of 13,000 psi); Polycrete pipe, even with thinner walls than traditional concrete jacking pipes, can safely withstand higher jacking loads. Polycrete's tight dimensional tolerances and smooth, non-porous exterior, combined with high compressive strength, make Polycrete the preferred pipe for demanding jacking applications.

Jack and Bore
Just as conventional concrete pipe is used for highway and railroad crossings, Polycrete jacking pipe is also suitable in this application, with the added benefit that steel casing is not required. Such installations are currently in service and performing successfully underneath railroads and interstate highways in the United States and Canada.

Guided Auger Boring
The guided auger boring method installs small diameter pipes, 8" to 24", with the ability to precisely control line and grade. The construction sequence starts with steerable pilot tubes being guided to a target reception shaft. Then, a reaming head and auger tubes enlarge the hole while following the path of the pilot hole. As each auger tube is added at the jacking shaft, a section of pilot tube is removed at the reception shaft. Once the auger tubes reach the reception shaft, sections of Polycrete pipe are jacked into place, displacing the auger tubes.

Pipe Bursting/Eating
The same features which make Polycrete the ideal jacking pipe also come into play when replacing or upsizing a pipeline using either a pipe bursting or pipe eating installation method.

Direct Burial
Many of the features that make Polycrete a good choice for a trenchless application, namely high strength and corrosion resistance are also important characteristics for direct burial. Polycrete's strength classes match those of reinforced concrete pipe, with the added benefit of an inherently corrosion resistant material. The matching glass-reinforced plastic coupling joint with a compression gasket makes for a leak-tight connection.

Manholes
Polycrete Manholes offer a corrosion resistant, leak-free, maintenance friendly and cost effective system suitable for any situation and any combination of connections. Polycrete manholes can be built to your specified dimensions with standard diameters available in 48" through 96". Specialty designs for structures are available on special order for sizes greater than 96". Please consult with your USCPS sales representative for lead times on all special order products. The intrinsic bond of resin and aggregate allows the manholes to withstand very high compressive and bending loads with thinner walls and reduced pipe weight compared to traditional concrete manholes. The result is lower freight and installation costs combined with a higher performing product.

Specialty Designs
USCPS's innovative manufacturing processes enable us to deliver many different designs from complex structures to prefabricated tunnel segments. Contact your local USCPS representative with your design data for a complete evaluation on your project.

Features and Benefits of Polycrete Polymer Concrete Pipe

There are many reasons why Polycrete pipe should be considered on your next tunneling or jacking project. Here are some of the features that have made Polycrete the top microtunneling pipe product in the world.

Features	Benefits
Corrosion Resistant Material	• Resists ph 1.0 to 10, projected 100 year plus service life • No need for linings, coatings, cathodic protection, wraps, or other corrosion protection • Low maintenance costs • Hydraulic characteristics essentially constant over time
Superior Strength Attributes	• High Compressive Strength – (minimum 13,000 psi) • Higher Jacking forces for longer drives & higher tolerance for start-ups • Strength Classes with corresponding D-loads
Excellent Hydraulic Characteristics	• Extremely Smooth Bore • 0.009 Manning's "n" flow coefficient • Low friction loss, high flow rates • Minimal slime build-up means lower cleaning costs • Excellent abrasion resistance
Superior Jointing System	• Water tight up to 35 psi • Tight, efficient joints designed to eliminate infiltration or exfiltration. • Ease of joining, reduces installation time
Advanced Technology Pipe Design	• Complies with stringent performance standards: ASTM, DIN. • High and consistent product quality worldwide which ensures reliable product performance
Microtunneling Advantages	• High Dimensional Accuracy – No ovality, tight joints stay tight, follows shield • Parallel (Square) Pipe Ends for straighter drives, uniform distribution of jacking forces. • Steel Guide Collar – Maximum durability during jacking • Reduced point loading and risk of local rupture • Smooth, Even, Non-Porous Outer Pipe Surface - Reduced skin friction and start-up jacking loads even after long stoppages

Materials

Polycrete polymer concrete pipe is a composite material consisting of polyester resin, quartz sand, silicate aggregate and quartz filler. As portland cement performs poorly in an acidic environment, it is not used as a binding agent. Polycrete polymer concrete pipe uses a polyester resin to bond the kiln-dried silicate aggregate, thereby creating a dense, corrosion-resistant matrix. For special industrial applications where added chemical resistance may be required, Polycrete can be produced using a vinyl ester resin.

Manufacturing

Polymer concrete pipe is produced using a vertical casting process, very similar to concrete pipe.

Exact amounts of the materials are pre-mixed, with the raw material quantities, mixing sequence and material feeds controlled by a computer. Then, the mixed material is loaded into vertical molds where vibratory compaction is used to ensure a dense, void-free composite structure.

The polymer concrete pipe is initially cured in the molds. Once a rigid structure has set, the molds are stripped and the pipe is post-cured in a tunnel kiln.

Manufacturing in dimensionally accurate steel casting molds produces pipe with very tight dimensional tolerances, circular over the entire length. Using this same process, USCPS can also produce non-circular pipes and special structures (e.g. manholes and wet-wells). Elliptical, semi-elliptical and egg-shaped pipes are now produced in Germany, and can be custom made in the U.S. on special order. Pipes with circular outside diameters to aid tunneling, but with non-circular interiors, can also be produced using this process.

Product Data

Product Description

Nominal Diameters - Circular Pipe
U.S. Composite Pipe South produces Polycrete polymer concrete jacking pipe in the following nominal diameters:

8, 10, 12, 15, 18, 21, 24, 27, 30, 36,
42, 45, 48, 54, 60, 66, 72, 78, 84, 90, 96, 102

In addition, pipes with nominal diameters greater than 102 inches are available on special order. Please consult with your USCPS sales representative for lead times on all special order products.

Circular Pipe Dimensions

Nominal Diameter (in.)	Internal Diameter (in.)	Outside Diameter (in.)	Wall Thickness (in.)	Length (ft.)	Permitted Compressive Force (tons)	Pipe Weight (lbs / ft)
8	8.00	10.75	1.375	8	24	40
10	10.25	13.40	1.550	8	44	56
12	12.30	15.70	1.700	8	67	74
15	15.50	19.50	2.000	8	114	107
18	18.00	22.50	2.250	8	144	141
21	21.50	26.50	2.500	8	210	185
24	24.40	30.00	2.800	10	285	234
27	27.30	33.50	3.100	10	379	291
30	30.00	37.10	3.550	10	525	365
36	36.70	44.10	3.700	10	606	460
42	42.00	51.00	4.500	10	972	642
45	45.00	55.20	5.100	10	1262	723
48	47.25	58.00	5.375	10	1321	869
54	53.40	66.00	6.300	10	1873	1156
60	61.00	75.40	7.200	10	2523	1511
66	64.60	79.80	7.600	10	2785	1687
72	72.00	89.00	8.500	10	3545	2106
78	76.40	94.40	9.000	10	4047	2363
84	82.20	101.60	9.700	10	4746	2743
90	88.00	108.80	10.400	10	5515	3152
96	93.90	116.00	11.050	10	6272	3564
102	104.80	129.50	12.350	10	7924	4447

Strength Classes
The design and classification of Polycrete is similar to ordinary concrete pipe. Strength classes are based on D-loads (three-edge bearing resistance). The classes are identical to the ultimate D-loads found in ASTM C76 for reinforced concrete pipe. Standard Polycrete pipe is produced to the requirements of Strength Class V.

Lengths
Polycrete is produced in standard 8-ft. and 10-ft. lengths depending upon diameters. Shorter lengths are available upon request.

Engineering Properties
Due to the beneficial combination of polyester resin and aggregate in a very dense and homogeneous matrix, Polycrete pipe has excellent mechanical properties. These properties are instrumental in making a premiere tunneling and jacking pipe. The following table highlights some of the more important design properties of Polycrete. Please contact your USCPS sales representative if additional design data is required for your project.

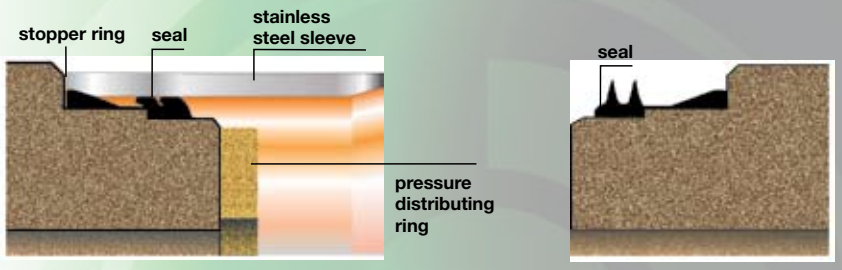
Property	Value	Test Method
Compressive Strength	13,000 psi min.	ASTM C579, Method B
Flexural Modulus Of Elasticity	4.0×10^{6} psi	ASTM D790
Tensile Strength	870 psi	ASTM D638
Flexural Strength	2,900 psi	ASTM D790
Coefficient of Linear Thermal Expansion	10 to 20 x 10^{-6} in/in/°C	DIN 53752
Absolute Roughness	0.39×10^{-4} ft.	
Abrasion Resistance	0.2mm after 100,000 cycles	Darmstadt Procedure

Joint Systems

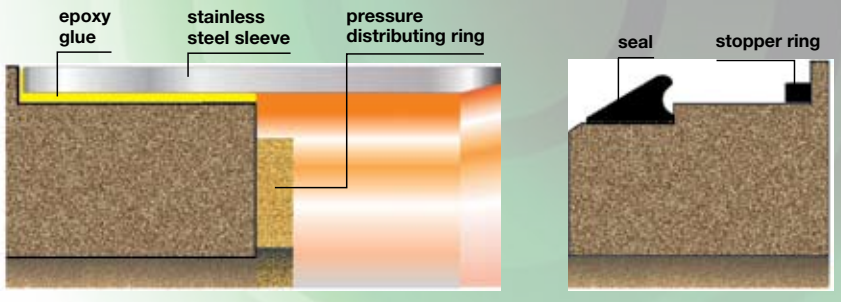
Tunneling and Jacking Installations
The standard joint for tunneling and jacking installations incorporates a push-on stainless steel collar which is mounted integral to the pipe wall. For special applications, such as a saline environment, stainless steel with a titanium alloy may be used. The steel collar mates against an EPDM or SBR rubber gasket firmly joined to the pipe wall. The detail design of the joint varies with diameter. The following illustrations show the specific joint utilized for each diameter range.

In order to ensure a uniform pressure transfer between the ends of the pipe, a ring made of chipboard or knot-free soft wood is fitted at the plant. The thickness of the wood ring is between 0.4 and 1 inch. Compression of the ring in high stress areas tends to redistribute any point load concentrations. For curved sections, asymmetrical jacking transfer rings are provided.

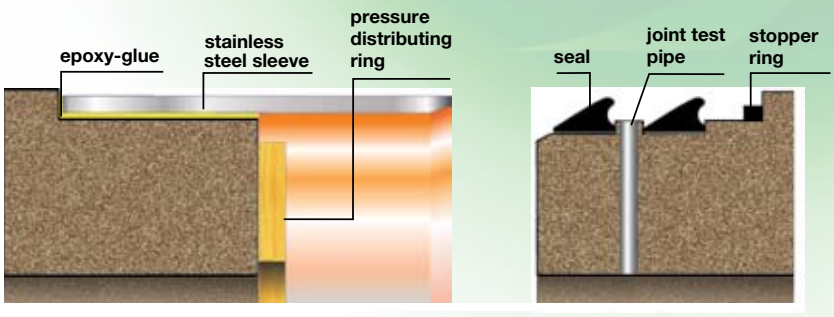
In all cases the joint is designed to meet the same performance requirements as specified for fiberglass pipe in ASTM D4161. The requirements in ASTM D4161 are some of the most stringent for any piping systems in the world.



Diameter 8 in. to 45 in.



Diameter 48 in. to 72 in.



Diameter 78 in. and Greater

Intermediate Jacking Stations and Bentonite Injection Nipples (Lubrication)

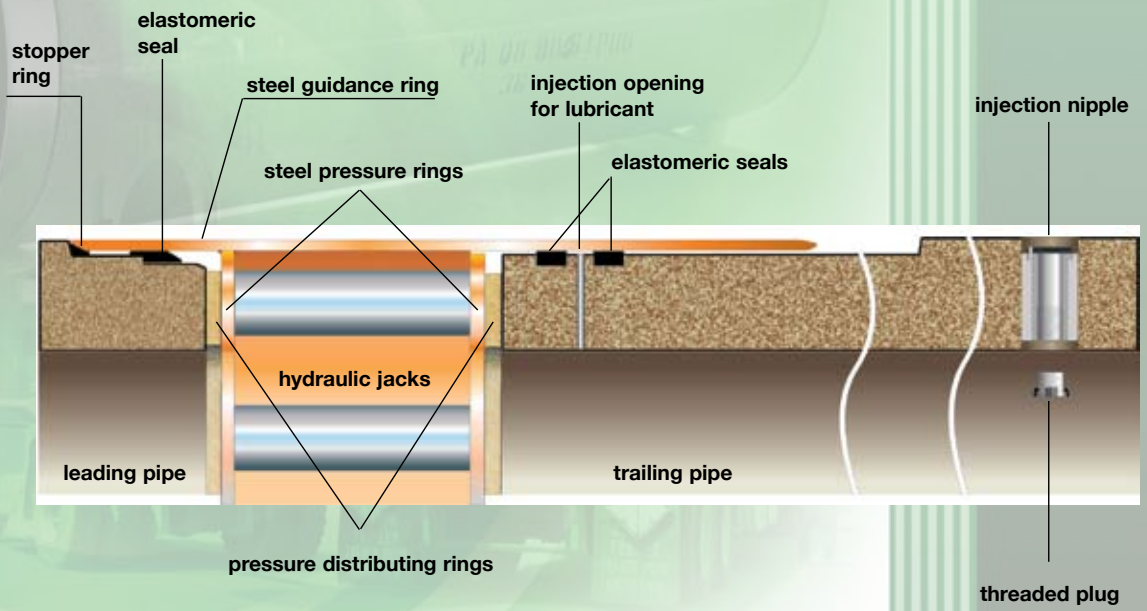
Despite the fact that Polycrete pipe safely handles some of the highest axial loads of any jacking pipe, USCPS also has available intermediate jacking stations. The inclusion of intermediate jacking stations will allow Polycrete jacking pipe to handle any drive length. When intermediate jacking stations are needed, special Polycrete "interjack" pipe can be manufactured with extra deep joints to accommodate this type of jacking technique. The installing contractor need only supply the hydraulic jacking rams and energizing medium. Also, to facilitate the installation process, Polycrete pipe can be supplied with threaded injection ports for the introduction of an external bentonite lubricant. These stainless steel ports are normally cast into the wall during manufacturing and include a check valve to prevent backflow of lubricant. After completion of the drive, a threaded plug is inserted into the port.

The illustration below shows the intermediate jacking station, special "interjack" pipe and a bentonite injection port.

The use of a bentonite or polymer slurry to lubricate the bore hole can reduce the needed jacking force by up to 50%. Unless there are environmental reasons for not using lubricant, USCPS recommends its use on long drives and can provide Polycrete pipe with threaded injection ports and check valves. Stainless steel plugs are installed in the threaded sockets when tunneling is completed.

Direct Bury Installations

A glass-reinforced plastic (GRP) coupling is used for direct burial applications to form a bell and spigot joint system. The pre-assembled couplings are made to connect the pipe easily and quickly. Pipes can be cut to any length and joined with these couplings.



Installation, Transportation and Storage

Installation

Joint Assembly - Jacking Pipe

The pre-assembled guide collars are positioned toward the trailing end of the pipe. Before assembling the joint, the elastomeric sealing element should be cleaned and lubricated. Normally, the pipe can be held horizontal while the jacking station is used to push home the joint. For the first few pipes, the lead pipe may have to be restrained until sufficient weight is available to resist the movement while trailing pipe is joined. Pre-cast lifting anchors are available for most pipe diameters to ensure proper and safe handling practices.

Joint Assembly - Direct Bury

The pipe will arrive on the jobsite with the GRP coupling mounted on one end to form a bell and spigot joint system. Before assembling the joint make certain both the bell and spigot are clean and contain no foreign matter that could prevent an effective seal between the gasket and the spigot surface. The pipe should be assembled so that the homing mark is just visible at the edge of the bell entrance. Pre-cast lifting anchors are available for most pipe diameters to ensure proper and safe handling practices.

Field Cutting

Polycrete pipe can be field cut using a carbide-tipped masonry cutting saw. Suitable eye protection must be worn.

Lateral Connections

Openings for laterals can be core drilled using carbide or diamond-tipped circular shell cutters. A variety of products are readily available to provide a water-tight seal. These include strap-on or glued-on saddles and rubber boot connections such as Inserta Tee®.

Laterals or service connections may also be reinstated from inside jacked pipe (≥ 48") using various trenchless methods (e.g. Bohrtec). This method allows for a completely trenchless installation.

Manhole Connections
There are three acceptable methods of connecting Polycrete to a manhole-type structure:

1. A Polycrete joint coupling can be cast into the manhole's cored opening; the Polycrete gasketed spigot is later inserted.

2. A compression gasket, such as A-Lok, can be pre-cast into the manhole wall. When the pipe is placed into the manhole opening,the gasket is compressed, thereby sealing against the pipe.

3. A rubber boot seal, such as Kor-N-Seal or Press-Seal PSX, can be pre-installed in the cored opening of the manhole. The pipe is placed inside the protruding boot. By tightening steel bands around the boot's exterior, the boot will seal against the exterior of the pipe.

Transportation and Storage
Pipes are usually delivered with the pipe coupling and jacking pressure transfer rings pre-assembled. Safeguard the pipe and joint from accidental shifting or dropping during transport and unloading at site. Pipes should be stored on an even surface, and securely choked to prevent unexpected rolling and injury to personnel. Do not stack pipes at the site higher than their arrival on the delivery truck.

Polycrete pipe is designed for jacking and microtunneling and direct bury installations, and although lighter than a concrete pipe, the pipe is still relatively heavy and requires suitable slings for safe handling.

Standard Specifications

Standard Specifications for Polymer Concrete Pipe

ASTM D6783
Standard specification for polymer concrete pipe

ASTM D4161
Standard specification for "fiberglass" pipe joints using flexible elastomeric seals

ASTM F477
Specification for elastomeric seals (gaskets) for joining plastic pipe

ASTM C579
Standard test method for compressive strength of chemical resistant mortars, grouts, monolithic surfacing and polymer concretes

ASTM C33
Standard specification for concrete aggregates

ASTM A276
Standard for stainless and heat-resisting steel bars and shapes

Product
Polycrete pipe is manufactured to meet the requirements of ASTM D6783-02 Standard Specification for Polymer Concrete Pipe. This specification was developed using the German DIN Standard 54815-1,2 Pipes Made of Filled Polyester Resin Molding Materials, as a guide. Like many of ASTM's product standards, this specification for polymer concrete pipe adopted some of the performance requirements and test methods established for reinforced concrete sewer pipe (e.g. D-loads and three-edge bearing tests) as well as glass-reinforced plastic pipes (e.g. chemical resistance under load).

ASTM D6783 covers polymer concrete pipe, 6" through 144", intended for use in gravity flow systems conveying sanitary sewerage, storm water and industrial wastes. Pipes under this specification are manufactured in strength classes I, II, III, IV, or V. These are the same ultimate D-load strength classifications as used for reinforced concrete sewer pipe in ASTM C76.

Pipes are supplied in 8-ft. and 10-ft. standard lengths; however, shorter lengths are available upon request. All pipes are designed to withstand an internal pressure of 35 psi with no signs of leakage.

As required by ASTM D6783, minimum unconfined compressive strength shall be 10,000 psi. Polycrete easily exceeds this with a minimum of 13,000 psi.

One of the more challenging requirements is long-term chemical resistance, which requires the pipe to sustain without failure, for 50 years, a minimum load of 50% of the initial three-edge bearing strength when exposed to two different chemical environments. One environment is acidic with a 1.0N (pH 0.5) solution of sulfuric acid, exceeding acid concentrations found in sanitary sewers; the other is an alkali environment of water and sodium hydroxide at a pH of 10. For both cases, a minimum series of 18 tests is conducted, with at least one test lasting beyond 10,000 hours (1.14 years). The data is analyzed using the method of log-log linear least squares analysis to predict the 50 year performance level.

Design
Polymer concrete pipe behaves as a rigid pipe when it comes to trench load resistance, thus the same analysis methods for determining vertical soil loads on a tunneled concrete pipe also apply to Polycrete.

For the more analytical, the German Technical Wastewater Federation (ATV) has published a standard ATV A161 (January 1990) titled "Static Calculation of Driven Pipes". Copies of this standard can be obtained by contacting your local USCPS technical sales representative.

Quality Control

In order to ensure compliance with ASTM D6783, one pipe is selected at random from each manufacturing lot and subjected to the following inspections and tests:

1. Workmanship

2. Dimensions
    a. Pipe diameter
    b. Lengths
    c. Wall thickness
    d. Straightness of Pipe
    e. Roundness of Pipe
    f. Squareness of Pipe Ends

3. Three-Edge Bearing (D-load)

4. Compressive Strength

The chemical resistance of Polycrete is verified by subjecting at least six pipe samples to a load equal to 60% of the initial three-edge bearing strength while exposed to two test solutions [1.0 N (pH 0.5) sulfuric acid and water and sodium hydroxide at a pH of 10.0] for 1,000 hours without failure.

Specification for Polymer Concrete Pipe For Gravity and Low-Head Service

Part 1 : General

1.01 Scope
This specification designates the manufacturing, design and installation requirements of gravity-flow and low-head polymer concrete jacking pipe. Polymer concrete pipe shall be manufactured in accordance with ASTM D6783 (latest edition).

1.02 References
A. **ASTM D6783** Standard specification for polymer concrete pipe

B. **ASTM D4161** Standard specification for "fiberglass" pipe joints using flexible elastomeric seals

C. **ASTM F477** Specification for elastomeric seals (gaskets) for joining plastic pipe

D. **ASTM C579** Standard test method for compressive strength of chemical resistant mortars, grouts, monolithic surfacing and polymer concretes

E. **ASTM C33** Standard specification for concrete aggregates

F. **ASTM A276** Standard for stainless and heat-resisting steel bars and shapes

Part 2 : Product

2.01 Materials
A. **Resin:** The manufacturer shall use only polyester or vinyl ester resin systems designed for the service intended. Pipe shall not contain Portland cement or other corrodible elements.

B. **Filler:** All aggregate, sand and quartz powder shall meet the requirements of ASTM C33, where applicable.

C. **Additives:** Resin additives, such as curing agents, pigments, dyes, fillers and thixotropic agents, when used, shall not be detrimental to the pipe.

D. **Elastomeric Gaskets:** Gaskets shall be EPDM or SBR rubber and suitable for the service intended. All gaskets shall meet the requirement of ASTM F477.

E. **Stainless Steel Sleeve Coupling:** Stainless steel joint sleeves/couplings shall meet the requirements of ASTM A276.

2.02 Manufacturing and Product Construction
A. **Pipes:** Pipe shall be manufactured by the vibratory vertical casting process resulting in a dense, non-porous, corrosion-resistant, homogeneous, composite structure.

B. **Joints:** The pipe shall be connected with a stainless steel or fiberglass reinforced sleeve/coupling utilizing an elastomeric sealing gasket as the sole means to maintain joint water-tightness. The joint shall meet the performance requirements of ASTM D4161. The joint shall have an outside diameter equal to or slightly lesser than the outside diameter of the pipe. When pipe is assembled, the joints shall be essentially flush with the outside diameter of the pipe. Joints at tie-ins may use couplings that extend beyond the outside diameter of the pipe.

C. **Fittings:** Elbows, reducers, tees, wyes, laterals and other fittings shall be of the same structural design as adjoining pipe. Fittings shall be manufactured from mitered sections of pipe and joined by epoxy bonding or fiberglass overlay.

D. **Acceptable manufacturer:** Manufacturer of pipe and fittings shall employ manufacturing methods and material formulations used in the manufacture of polymer concrete pipe for a minimum of fifteen years. Manufacturer shall provide a list of references demonstrating that a minimum of 50,000 feet of the proposed product has been installed in the United States over the last five years. Manufacturer shall be U.S. Composite Pipe South.

2.03 Dimensions

A. **Diameters:** The outside diameter of pipe and joints shall be per the manufacturer's literature.

B. **Lengths:** Pipe shall be supplied in nominal lengths of 8 or 10 feet. Actual lay length shall be nominal ±1 inch. Special short lengths may be used where surface geography or installation conditions require shorter lengths.

C. **Wall Thickness:** The minimum wall thickness, measured at the narrowest point along the pipe, shall provide sufficient axial compressive strength to withstand anticipated loads. Minimum factor of safety against ultimate jacking load shall be 2.5:1.

D. **End Squareness:** Pipe ends shall be perpendicular to the pipe axis with a tolerance of 0.125 degrees.

2.04 Testing

A. **Pipes:** Pipe shall be manufactured in accordance with ASTM D6783.

B. **Joints:** Joints shall meet the requirements of ASTM D4161.

C. **Three-edge bearing strength:** Pipe shall be designed to meet D-load requirements of external soil and hydrostatic loads. Design strength shall be tested in accordance with the three-edge bearing test method of ASTM D6783.

D. **Compressive strength:** Pipe shall have a minimum unconfined compressive strength of 13,000 psi when measured in accordance with ASTM C579.

2.05 Customer Inspection

The Owner or other designated representative shall be entitled to inspect pipes and witness the manufacturing process.

2.06 Packaging, Handling and Shipping

Packaging, handling and shipping shall be performed in accordance with the Manufacturer's instructions.

Part 3 : Execution

3.01 Installation

A. **Installation:** The installation of pipe and fittings shall be in accordance with the project plans and specifications and the manufacturer's recommended practices.

B. **Pipe Handling:** Textile slings, anchor lifting devices and/or a forklift are recommended.

C. **Jointing:**

1. Pipe end, gasket and sealing surfaces shall be inspected for damage and cleaned of all debris.

2. Apply joint lubricant to the sleeve coupling interior and the elastomeric gasket. Use only lubricants approved by the pipe manufacturer.

3. Use suitable equipment and end protection to push the pipes together.

4. Do not exceed joining or pushing forces recommended by the manufacturer.

D. **Field Tests:**

1. Infiltration / Exfiltration Test: Maximum allowable leakage shall be per local specification requirements.

2. Low-Pressure Air Test: Each run may be tested with air pressure (5 psi max). After allowing the pressure to stabilize, the system passes the test if the pressure drop, due to leakage, is equal to or lesser than that specified.

3. Individual Joint Testing: Where pipe is large enough for man-entry, individual joints may be pressure tested with a portable tester (5 psi max) with air or water, in lieu of infiltration, exfiltration or complete system testing.

Although the utmost care has been taken to ensure the accuracy of the contents of this brochure, **US Composite Pipe South** does not accept liability for errors or omissions in this publication. Customers must satisfy themselves of the suitability of a given product supplied or manufactured by **US Composite Pipe South**.

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