

## Conley Piping Specification

### 1.0 SCOPE

1.1 This piping specification covers the requirements for machine made reinforced thermosetting resin pipe and fittings, 1" - 30", manufactured according to ASTM D-2996, the standard specification for filament wound pipe. These specifications shall cover Series 50 Conductive heavy duty process pipe and fittings for use with a broad base of corrosive chemical environments including chemical sewers, acids, caustics, and a wide range of solvents.

**Both pipe and fittings shall be manufactured with a Nexus® synthetic veil reinforced Conductive premium E-Plus™ inner corrosion barrier, an Epoxy filament wound fiberglass reinforced cage with a conductive filament, and a Nexus® reinforced external corrosion / UV resistant barrier. See the *Conley Product Data* for pressure/temperature ratings and**

### 2.0 MATERIAL

2.1 Raw materials will meet or exceed specifications for E-Plus™ and Epoxy thermoset resin systems and fiberglass materials.

2.2 The resin, reinforcement, pigments, fillers and other materials, when combined as a composite structure shall produce a pipe that shall meet or exceed the requirements of the

classification system listed in ASTM D2310.

### 3.0 PIPE CONSTRUCTION

3.1 The pipe shall consist of three specific layers; the corrosion resistant conductive Furan liner; the filament wound aromatic amine cured Epoxy cage with conductive filament for structural reinforcement, and the corrosion / UV resistant external cover. This material shall then be post-cured to form an integral structure and provide optimum cross-linking density.

3.1a The 100 mil **internal corrosion barrier** (inner liner) shall consist of a minimum four layers of Nexus® synthetic veil saturated with conductive E-Plus™ resin, aromatic amine cured. This layer shall be a maximum of 90% resin and 10% reinforcement to increase impact and chemical resistance.

3.1b The reinforcement shall be continuous glass roving wound with a conductive filament at an angle of 54 3/4 degrees using amine cured premium Epoxy resin. This structural layer shall be not less than 65% glass for maximum strength and flexibility, and shall be conductive.

3.1c The external layer shall be Nexus® synthetic veil reinforced for corrosion resistance, for U.V. resistance, and to control the O.D. of the pipe, required for straight socket design.

## 4.0 FITTINGS

All fittings such as elbows, laterals, tees and reducers shall be equal or superior in strength to the adjacent pipe section and shall have the same internal diameter as the pipe. Fittings shall be filament wound, and have the same three layer construction as the pipe, i.e., 100 mil Nexus® synthetic veil reinforced Conductive Furan corrosion resistant barrier, filament wound and glass reinforced structural layer with a conductive filament, and a Nexus® synthetic veil reinforced external corrosion resistant U.V. barrier.

4.1 Elbows - Manufactured in standard configurations with straight socket ends designed for the controlled O.D. of the pipe.

4.2 Reducers - Designed as concentric or eccentric gradual changes in diameter to minimally affect the fluid flow, and manufactured with straight socket ends.

## 5.0 CONNECTIONS

5.1 Prefabrication - When requested by the customer, the manufacturer shall prefabricate into shippable sub-assemblies to minimize the use of field-fabricated connections.

5.2 Straight Cement Socket Joints - Shall be used with both pipe to fitting connections as well as pipe to pipe connections using a coupling. Tapering or machining of the pipe shall not be allowed.

5.3 Flange connections - Shall be used to join the fiberglass pipe and fittings to other equipment. Flanges shall be designed for the operating pressure per the line requirements as a minimum. Flange dimensions shall conform to ANSI 150 lb drilling. Where flanges connect to raised face surfaces (valves, etc.), a spacer ring shall be added to achieve a flat mating surface.

5.4 Gasket material - For flanged connections this shall be an elastomer which is compatible with the service. Teflon and Teflon envelope gaskets are not recommended. See 9.5.

5.5 Conductive adhesive (United States Patent #6482333) shall be used to fabricate all piping, fitting and flanged connections according to Conley fabrication procedures. The conductive adhesive includes both conductive graphite powder and filaments. The conductive adhesive is also used to bond any grounding stud/clamp to the pipe. ***See the Conley Installation and Fabrication Manual, Conductive Piping section.***

## 6.0 STRAIGHT SOCKET CEMENT JOINTS

This type of joint shall be the only means of joining pipe to pipe and fittings, with no tapering or machining of the pipe allowed. Pipe to pipe connections shall be made with straight socket cement couplings.

6.1 The exceptions to this specification shall be flanged connections as described in 5.3, and butt wrap or coupled in 24" and 30".

## 7.0 FLANGES

7.1 Flange Attachment - Flanges shall be attached to a pipe section only with straight socket cement joints.

7.2 Flange Face - Flanges through 12" diameter shall be grooved to allow use of a full face gasket, flanges larger than 12" shall be non-grooved. Full face gaskets are required.

## 8.0 PRESSURE AND VACUUM SERVICE

8.1 *Please refer to the Conley Product Data for specific rating of each size.*

## 9.0 RECOMMENDED INSTALLATION PRACTICE

9.1 Pipe hangers and spacing - Hangers shall be band type hangers contacting a minimum of 120 degrees of the pipe surface, and with a minimum width of 1" or pipe diameter divided by 6, whichever is greater.

9.2 Underground Installation - The pipe shall be designed for burial of 3 feet to 20 feet under standard soil and bedding conditions. Manufacturer shall design pipe for required burial conditions.

9.3 Expansion - The manufacturer shall specify thermal loads, expansion and contraction, and shall convey this design information to the end user or customer for consideration in the proper design of the piping system.

9.4 Bolts, Nuts, and Washers - Bolts, nuts, and washers shall be furnished by the customer. Metal SAE washers shall be used under all nut and bolt heads. All nuts, bolts and washers shall be of materials suitable for use in the exterior environment.

9.5 Gaskets - Gaskets shall be furnished by the customer. Recommended gasket materials shall be a minimum of 1/8 inch in thickness with a suitable chemical resistance to the service environment. Gaskets shall have a Shore A hardness of 50 to 70. **See the Conley Installation & Fabrication Manual for bolt torque requirements.**

9.6 Fabrication - Fabrication procedures and certification of fabricators shall be in accordance with the **Conley Installation & Fabrication Manual.**

## 10.0 QUALITY ASSURANCE AND INSPECTION

10.1 Conley's Quality Assurance program is in compliance with ISO 9001 and. Pipe and fittings shall be inspected and measured at each stage of manufacture, i.e. liner, reinforcement and external corrosion barrier. For optimum strength and corrosion resistance, all pipe and fittings shall be post cured.

This specification and recommendations it contains are based on data reasonably believed to be reliable. It is intended that this data be used by competent personnel having acceptable training in accordance with current industry practice and operating conditions. Variation in environment, application or installation, changes in operating procedures, or extrapolation of data may cause unsatisfactory results. Conley Composites makes no representation or warranty, express or implied, including warranties of merchantability or fitness for purpose, as to accuracy, adequacy or completeness of the recommendations or information contained herein. Conley Composites assumes no liability whatsoever in connection with this literature or the information or recommendations it contains.

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