

## Conley Piping Specification

### 1.0 SCOPE

1.1 This piping specification covers the requirements for Double Containment machine made reinforced thermosetting resin pipe and fittings, 1" - 30", manufactured according to ASTM D2996, the standard specification for filament wound pipe. These specifications shall cover Schedule 50 Carrier and Schedule 30 Containment pressure process piping, and drain, waste and vent pipe and fittings for use with a broad base of corrosive chemical environments including acids, caustics, various waste solutions, brines and a wide range of solvents. The Epoxy system meets the requirements for FDA.

**Both pipe and fittings (tees, elbows, laterals, reducers, and crosses) shall be manufactured with a Nexus® (synthetic veil) reinforced Epoxy internal corrosion barrier, an Epoxy filament wound fiberglass reinforced cage, and a standard Nexus® reinforced external corrosion barrier. Pipe and fittings have a 25 year guarantee against ultraviolet (UV) degradation (fiber blooming). Conley D.C. (Double Containment) Piping systems are available in a wide range of size, grade and resin combinations, starting with 1 inch carrier pipe. Containment size selection must consider the detection system to be used. See the *Conley Product Data* for pressure/temperature ratings and span dimensions of each schedule.**

### 2.0 MATERIAL

2.1 Raw materials will meet or exceed specifications for Epoxy 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 CARRIER / CONTAINMENT PIPE CONSTRUCTION

3.1 The **carrier** pipe shall consist of three specific layers; the **Nexus®** synthetic veil reinforced **internal corrosion barrier**, the filament wound reinforcement or **cage**, and the Nexus® synthetic veil reinforced **external corrosion** / UV barrier. 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 aromatic amine cured premium Epoxy resin. This layer shall be a maximum of 90% resin and 10% reinforcement to increase impact and chemical resistance.

3.1b The glass reinforcement, or cage, shall be continuous glass roving wound at an angle 54 3/4 degrees to the longitudinal axis of the pipe, using aromatic amine cured premium Epoxy resin, and shall be not less than 65% glass for maximum strength and flexibility.

3.1c The external corrosion barrier will be Nexus® synthetic veil reinforced for corrosion resistance and UV resistance. This is required to control the OD for straight socket design connections.

#### 4.0 CARRIER PIPE FITTINGS

4.1 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 internal corrosion resistant barrier, filament wound and glass reinforced structural cage, and a Nexus® synthetic veil reinforced external corrosion barrier with standard 25 year guarantee against UV degradation (fiber blooming).***

4.2 Elbows – Manufactured in standard configurations with straight socket ends designed for the controlled OD of the pipe.

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

4.4 Carrier Fittings shall be held concentric in the Containment Fittings by means of “spiders” at each opening. These spiders may ***not*** be designed to restrict thermal expansion or other loads imposed on the Carrier fittings.

4.5 Connections to carrier pipe shall be straight socket adhesive bonded using the adhesive formulation recommended for the corrosion service. ***Clam shell type fittings, tapered socket fittings not allowed.***

#### 5.0 CONTAINMENT PIPE

5.1 Containment Pipe ***shall be filament wound, and have the same three layer construction as the carrier pipe, i.e., 60 mil Nexus® synthetic veil reinforced internal corrosion resistant barrier, filament wound and glass reinforced structural cage, and a Nexus® synthetic veil reinforced external corrosion barrier with standard 25 year guarantee against UV degradation (fiber blooming).***

5.2 Containment Pipe shall be rated for burial service under H-20 Highway loading, according to the American Water Works Association (AWWA) Specification C950 Appendix A.

5.3 Carrier Pipe shall be held concentric with the Containment Pipe by means of 2 "spiders" for each 20 foot section.

5.4 Thermal Expansion - ***Differential thermal expansion and/or contraction of the CARRIER AND CONTAINMENT PIPE shall be controlled by means of an INTERLOCKING UNION, PATENTED BY CONLEY CORPORATION, NUMBERS 5,419,593.***

#### 6.0 CONTAINMENT PIPE FITTINGS

6.1 Containment Fittings ***shall be filament wound, and have the same three layer construction as the pipe, i.e., 60 mil Nexus® synthetic veil reinforced internal corrosion resistant barrier, filament wound and glass reinforced structural cage, and a Nexus® synthetic veil reinforced external corrosion barrier with standard 25 year guarantee against UV degradation (fiber blooming).*** All fittings will be designed for inspection of field fabricated carrier pipe joints during hydro-test.

6.2 The "Closure Joint" for the containment piping shall also be suitable as a "Pull point" for any leak detection system that may be required.

## 7.0 CONNECTIONS

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

7.2 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; nor shall butt wrap joints.

7.3 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/ASME B16.5 150 lb drilling. Where flanges connect to raised face surfaces (valves, etc.), a full face spacer ring shall be added to achieve a flat mating surface.

7.4 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 11.5.

## 8.0 STRAIGHT SOCKET CEMENT JOINTS

8.1 This type of joint shall be the only means of joining pipe to pipe and fittings. Tapering or machining of the pipe shall not be allowed, nor shall butt wrap joints. Pipe to pipe connections shall be made with straight socket cement couplings. The only exception to this specification shall be flanged connections as described in 7.3.

## 9.0 FLANGES

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

9.2 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.

## 10.0 PRESSURE AND VACUUM SERVICE

10.1 *Please refer to the Conley Product Data for specific ratings of each size.*

## 11.0 RECOMMENDED INSTALLATION PRACTICE

11.1 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.

11.2 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.

11.3 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. For double containment piping see **Conley Double Containment Piping Systems** for the application of **Interlocking Unions** to restrain thermal expansion.

11.4 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.

11.5 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. Gaskets shall have a Shore A hardness of 50 to 70. **See the Conley Installation & Fabrication Manual for bolt torque requirements.**

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

## 12.0 QUALITY ASSURANCE AND INSPECTION

12.1 Conley's Quality Assurance program is in compliance with ISO 9001. 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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