

Compressed Air Piping

PART 1 GENERAL

1.1 SUMMARY

- A. Furnish a complete compressed air piping system to include pipe, fittings, anchors, specialty fittings and valves.

1.2 References

- A. The following standards apply to products used within this section.
 - ASTM D 1598
 - ASTM D 1559
 - ASTM D 2122
 - ASTM D 2837-85
 - ASTM D 2637
 - ASTM D 3222-81
- B. The system shall meet the guidelines of Cal OSHA for a thermoplastic compressed air system.

1.3 Definitions

PE100: High density Polyethylene with a minimum cell classification of: PE445574E

1.4 System Description

- A. System shall be produced of PE100/PE100RC uniform pipe and fitting materials. System pressure ratings shall be based on continuous use of 50 years. Material must be colored coded blue for identification.

1.5 System Performance Requirements

- A. The system shall be designed to operate under the following conditions:
 - Operating Pressure
 - Operating Temperature
 - Test Pressure

All compressed air systems shall be designed taking into consideration the above parameters, end loads, thermal expansion and proper burial and/or hanging methods.

1.6 Submittals

Submit the Following:

- A. Product data for the system specified; relative to materials, dimensions of

individual components, profiles and finishes.

- B. Product certificates signed by manufacturer of the compressed air piping product stating compliance to stated requirements.
- C. Welder certificates, certifying that welders comply with the installation procedures as outlined by ASTM D-2657. All training should be scheduled and completed prior to job start-up.
- D. Qualification of firms supplying the compressed air piping. Firms must have a minimum of five years experience in design, installation and operation of thermoplastic piping systems.

1.7 Quality Assurance

Obtain components from a single source having responsibility and accountability to answer and resolve problems regarding proper installation, compatibility, performance, and acceptance.

1.8 Delivery, Storage and Handling

- A. Deliver all compressed air pipe to arrive on-site wrapped or protected to avoid damage in shipping.
- B. Deliver all compressed air fittings to arrive on-site in boxes.
- C. Store products on elevated platforms in a dry location with protection from the environment.
- D. Lift, support and transport compressed air piping per manufacturers' recommendations.

1.9 Warranty

- A. Warranty period is one year after date of substantial completion.

1.10 Extra Material

- A. Turn over to owner at end of construction, necessary welding equipment as suggested by manufacturer for repair, additions and maintenance of compressed air piping system.

PART 2 PRODUCTS

2.1 Acceptable Product

All product shall be the Air-Pro piping system as provided by Asahi/America of Malden, MA 02148 Phone: 781-321-5409

2.2 Material

- A. General
Pipe, valves and fittings shall be made from virgin resin produced by one supplier. The resin shall be PE100/PE100RC blue high density polyethylene material according to ASTM D-3350.
- B. Chemical Resistance and application of Air-Pro to be verified and approved by manufacturer.
- C. Engineering and Design criteria should be per Manufacturer's printed literature.
- D. All pipe systems shall have been tested for and meet the safety requirements of Cal OSHA thermoplastic pressure vessels for compressed air piping.

2.3 System Components

- A. Pipe
All pipe through 4" shall be extruded from PE100 resin as outline in section 2.2.A All piping is produced based on an SDR system and calculated utilizing a Hydrostatic Design Basis according to ASTM D 2837. Pipe shall have a pressure rating of 230 psi in all sizes. Pipe sizes in 6" and larger are available on request.
- B. Fittings
All fittings shall be injected molded. Fittings shall have same wall thickness and pressure rating as the pipe. Fittings shall be socket fusion style in 1/2" – 4" and butt fusion in 6" and above.

Pipe and fittings shall be 230 psi rated at 68 °F. Consult factory for reduction in pressure rating at higher temperatures.
- C. Valves
All valves shall be produced in the same manner as the fittings.

Ball Valves

Ball valves shall be true union style capable of being welded into the system using socket fusion. Valve shall have a manual self locking trigger on the handle. Valves shall be the same color blue as the pipe.

2.4 Specialty Fittings

Specialty fittings are to include restraint fittings, instrumentation fittings,

instrumentation donuts, etc. Specialty fittings shall be machined and are molded of the same PE 100 resin as the pipe.

Goose neck fittings shall be used at all drop locations to avoid moisture in the branch lines. All Goose neck fittings shall be made of pipe and shall be bent at the manufacturer. Goose necks shall be provided with a natural PP stay to hold the radius in place.

2.5 Joining Equipment

- A. Installers shall be pre-qualified through training on welding technique according to ASTM D-2657.
- B. Manufacturer shall provide on-site training in the assembly and installation of the compressed air piping system.
- C. Joining Equipment shall be socket fusion for 1/2" – 4" and butt-fusion for 6" and larger.

Part 3 Installation

3.1 Testing

- A. Prior to pressure testing, the system shall be examined for the following items:
 - 1. Pipe shall be completed per drawing layout with all pipe and valve supports in place.
 - 2. Pipe, valves and equipment shall be supported as specified, without any concentrated loads on the system.
 - 3. Pipe shall be in good condition, void of any cracks, gouges or deformation.
 - a. Pipe flanges shall be properly aligned. All flange bolts should be checked for correct torque by the installer.
 - b. All joints should be reviewed for appropriate welding technique.
 - c. Socket--to have two beads on the end of the fitting and on the outside of the pipe in contact. Refer to manufacturer's instructions for weld bead inspection
 - d. Butt--Joints should have two beads 360° around the joint. Refer to manufacturer's instructions for specific weld bead inspection.
- B. If any deficiencies appear, the quality control manager shall provide directions for repair.
- C. Pressure Test

1. Test fluid should be compressed air with quality level set by Quality Control Engineer. In all cases test must be done hydrostatically.
2. Begin pressurizing the system in increments of 10 PSI. Bring the system up to 100 PSI and hold. Allow the system to hold pressure for a minimum of two hours and up to a recommended 12 hours. Check pressure gauge after one hour. Due to natural creep effects on plastic piping the pressure will have decreased. If drop is less than 10% pump the pressure back up. At this time the system may be fully pressurized to desired test pressure.
3. If after one hour the pressure has decreased more than 10%, consider the test a failure. Note the 10% value may need to be greater for larger systems, or systems experiencing significant thermal changes.
4. Test is to be witnessed by Quality Control Engineer and certified by the contractor.
5. Obvious leaks can be found by individually checking each joint using a soapy water solution or an Ultrasonic leak detection gun. Leak detection guns should be available from the pipe manufacturer.

3.2 Hanging

Pipe shall be hung in accordance with manufacturer's recommendations to avoid damage to the pipe. Proper support spacing is required in order to avoid sagging of the material. Support spacing is temperature dependent and shall be based on manufacturer's recommendations.

Hangers shall be supplied or specified by the pipe manufacturer. U-bolt hangers are not allowed due to pin point loading effects.