

VII. SPECIFICATION

A. SPECIFICATION

Polypropylene Piping--General Grade

PART 1 GENERAL

1.1 SUMMARY

- A. Furnish a complete Polypropylene 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 1598-02
ASTM D 1559
ASTM D 2122
ASTM D 2837-04
ASTM D 2637

- B. The system design shall meet the requirements of ASME/ANSI B31.3 for design criteria where temperature and pressure fall within the limits of the code.

1.3 Definitions

PP: Polypropylene

1.4 System Description

- A. System shall be a PP system of uniform pipe and fitting materials. System pressure ratings shall be based on continuous use of 50 years.

1.5 System Performance Requirements

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

All PP 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 PP 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 PP. Firms must have a minimum of five years experience in design, installation and operation of a thermoplastic piping system.

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 PP pipe to arrive on-site wrapped or protected to avoid damage in shipping.
- B. Deliver all PP 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 PP 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 PP piping system.

PART 2 PRODUCTS

2.1 Acceptable Product

Product shall be Proline150/ Proline45 as supplied 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 meet or exceed the requirements outlined for in ASTM D4101 for polypropylene.
- B. Chemical Resistance and application of PP to be verified and approved by manufacturer.
- C. Engineering and Design criteria should be per Manufacturer's printed literature.

2.3 System Components

- A. **Pipe**
All Proline150/ Proline45 pipe shall be extruded from ASTM D 4101 Polypropylene resin. All piping is produced based on an SDR system and calculated utilizing a Hydrostatic Design Basis according to ASTM D 2837

Packaging
Pipe is supplied packaged in a manner to protect it from damage during shipment. Packaging style will vary based on quantity and shipment method
- B. **Fittings**
All Proline150/ Proline45 fittings fabricated and/or injection molded. Fittings shall have same wall thickness and pressure ratings as the pipe.

Packaging
All fittings are to be packaged in a single PE bag or boxed depending on size. All fittings are shipped in boxes.
- C. **Valves**
All valves shall be produced in the same manner as the molded fittings.

Spigot Diaphragm Valves:

Type 342:
1/2"-2" shall be of a PP body and a PTFE or EPDM diaphragm. Valves will be of spigot single body design. Valves shall be supplied with positive lock device on handle.

True Union Diaphragm Valves:

Type 14:

1/2"-2" shall be constructed of PP resin. The valves are to be by Asahi/America. The diaphragm is PTFE or EPDM. End connectors are for butt fusion style and gaskets are Viton.

Butterfly Valves:

All sizes 1-1/2"-12" shall be a class 150 lug style PVC or PVDF body. Seat liner and seals shall be Viton. Disc shall be PP.

Reduced Deadleg Valve:

All reduced dead leg valves shall be made of PP resin. Valves shall be either fabricated or molded depending on size availability.

Check Valves:

All sizes class 150, ball type PP body with Viton seat and seals. 230 PSI at 73.4°F for sizes 1/2" through 2-1/2" nominal 150 PSI at 73.4°F for sizes above 2-1/2" nominal.

Flow meters:

All meters shall be Vortex style by Asahi/America. Meters shall be wafer style and installed between two flanges. Meters must be wet calibrated at the factory prior to shipment. All meters shall be guaranteed to be 1% accurate at full scale. Paddle style meters shall not be allowed.

2.3 Pressure Rating

Proline 150 Pipe and fittings shall be 150 psi rated at 68 °F.
Proline 45 Pipe and fittings shall be 45 psi rated at 68 °F.
Consult manufacturer for pressure derating factor at higher temperatures.

2.4 Pressure Rating--Valves

Pressure rating of valves shall be per manufacturer's printed literature.

2.5 Specialty Fittings

Specialty fittings are to include restraint fittings, instrumentation fittings, instrumentation donuts, etc. Specialty fittings shall be machined or molded of the same PP resin as the pipe.

2.6 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 PP piping system.
- C. Joining Equipment shall be either butt-

fusion, socket fusion or electrofusion method.

test a failure. Note the 10% value may need to be greater for larger systems, or systems experiencing significant thermal changes.

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 pipes 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.
 - 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.
 - d. Butt--Joints should have two beads 360° around the joint.
- B. If any deficiencies appear, the quality control manager shall provide directions for repair.
- C. Pressure Test
1. Test fluid should be water with quality level set by Quality Control Engineer. In all cases test must be done hydrostatically. Air is not acceptable.
 2. Filling the system--Open all valves and vents to purge the system of air. Slowly inject the water into the system, making sure that air does not become trapped in the system.
 3. Begin pressurizing the system in increments of 10 PSI. Bring the system up to 100 psi for Pro150, and up to 30 PSI for Pro45 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.
 4. If after one hour the pressure has decreased more than 10%, consider the

5. Test is to be witnessed by Quality Control Engineer and certified by the contractor.
6. Obvious leaks can be found by emptying the system and placing a maximum of 10 PSI charge of clean, dry nitrogen on the system. Each joint should then be individually checked 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 manufacturers 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 recommendations.

Hangers shall be supplied by the pipe manufacturer or shall be a recommend style by the pipe manufacturer. U-bolt hangers are not allowed due to pin point loading affects.