22 11 16 HYDRONIC PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes piping, fittings, valves, and specialties within the building for hydronic piping systems.

B. Execute work and provide materials and equipment as shown on the drawings and as specified or indicated in this section of the specifications. All work associated with this section shall be completely coordinated with work of all other trades. Provide a complete and fully functional system.

1.2 REFERENCE DOCUMENTS

A. ASTM F 412 - 17 – Standard Terminology Relating to Plastic Piping Systems

B. ASTM F 2389-17 – Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems

C. CSA B137.11 – Polypropylene (PP-R) Pipe and Fittings for Pressure Applications

D. NSF/ANSI 14 – Plastic Piping System Components and Related Materials

E. DIN 8077 – Polypropylene (PP) pipes – Dimensions

F. DIN 8078 – Polypropylene (PP) pipes – PP-H, PP-B, PP-R, PP-RCT – General quality requirements and testing

G. DIN EN ISO 15874 – Plastics piping systems for hot and cold water installations – Polypropylene (PP) – Parts 1-4

H. ISO 4427-3 – Fittings – Plastics piping systems – Polyethylene (PE) pipes and fittings for water supply – Part 3: Fittings

1.3 DEFINITIONS

A. Definitions of terms used herein shall have the meaning set forth by ASTM F 2389-17, ASTM F 412-17, and local plumbing codes.

1.4 SUBMITTALS

A. Each product to be used, shall be identified by the manufacturer and product number, on a material list in accordance with Section XX XX XX

1.5 QUALITY ASSURANCE

A. Material shall be certified by NSF International as complying with NSF 14-Plastic Piping System Components and Related Materials, and ASTM F2389 or CSA B137.11

B. Material shall comply with manufacturer’s specifications. The manufacturer’s product complies with the latest DIN 8077, DIN 8078, and DIN EN ISO 15874.

C. Special Engineered products shall be certified by NSF International as complying with NSF-14.

PART 2 - PRODUCTS

2.1 PIPE AND PIPING PRODUCTS

A. Pipe shall be manufactured from a PP-RCT resin meeting the short-term properties and long-term strength requirements of ASTM F 2389 or CSA B137.11. The pipe shall contain no rework or recycled materials except that generated in the manufacturer’s own plant from resin of the same specification from the same raw material. All pipe shall be made in an extrusion process. Domestic hot water and heating piping shall contain a fiberglass reinforced middle layer (Fibercore™) to restrict thermal expansion. All pipe shall comply with the rated pressure requirements of ASTM F 2389. All pipe shall be certified by NSF International as complying with NSF 14/61, and ASTM F 2389 or CSA B137.11.

B. Pipe installations at ambient temperature shall be solid wall PP-RCT piping provided by Asahi/America. Domestic hot water and heating piping shall be Climatec or Watertec, and be provided by Asahi/America. Piping Specifications and ordering information are available at www.asahi-america.com.

2.2 FITTINGS

A. Fittings shall be manufactured from a PP-RCT resin meeting the short-term and long-term strength requirements of ASTM F 2389. The fittings shall contain no rework or recycled material. All fittings shall be injection molded, except where a molded fitting is unavailable. All fittings shall be certified by NSF International as complying with NSF 14, NSF 61, ASTM F 2389 or CSA B137.11.

B. Fittings, sizes 4-1/2” nominal (125mm) and below shall be of the socket fusion type and shall be injection molded.

C. Fittings, sizes 6” nominal (160mm) and above shall be of the plain end type and shall be injection molded, except where a molded fitting is unavailable. All standard tees, 90 elbows, and 45 elbows shall be molded.

D. Fabricated fittings, made from pipes, are to have a pressure derating in accordance to ISO4427-3.

1. Segmented bends - For pipe cut angles less than or equal to 7.5° have a derating factor of 1.0. Pipe cut angles greater than 7.5° and less than or equal to 15° have a derating factor of 0.8. No pipe cut angle shall be greater than 15°.

2. Segmented tees’ pressure rating shall be dereated by half.

2.3 WARRANTY

A. Asahi/America shall warrant pipe and fittings for 10 years to be free of defects in materials or manufacturing.

B. Warranty shall cover labor and material costs of repairing or replacing the defective material.

C. Warranty shall be in effect upon the submission of a valid pressure/leak test to Asahi/America.

D. Visit http://asahi-america.com/ acquire the latest warranty.

2.4 VALVES

A. Valves shall be manufactured in accordance with the manufacturer’s specifications and shall comply with the performance requirements of ASTM F 2389 or CSA B137.11. The valves shall contain no rework or recycled thermoplastic materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material.

2.5 SMOKE AND FIRE RATINGS

A. Where indicated on the drawings that a Plenum-rate Piping System is required; the pipe wrap and/or insulation shall meet the requirements of CAN/ULC-S102.2-03, ASTM E84 or UL 723. The system shall have a Flame Spread Classification of less than 25 and Smoke Development rating of less than 50.

2.6 UV PROTECTION

A. If piping will be exposed to direct UV light for more than 30 days, it shall be indicated on the drawings and the necessary measures shall be taken. A UV-resistant coating shall be applied or an alternative UV-protection method employed to protect the pipe. Asahi/America recommends a heavy duty, water-based, elastomeric acrylic coating that has a high elasticity (200% or greater) to accommodate for the pipes growth and movement, without cracking the paint.

2.7 INSULATION

A. Insulation shall be fibrous glass insulation. A factory-applied fire retardant vapor barrier jacket with a K factor meeting or exceeding the latest International Energy Conservation Code.

B. Insulation shall be listed and labeled as having a flame spread index of not more than 25 and a smoke-development index of not more than 50 when tested in accordance with ASTM E84 or UL 723

C. Apply insulation after systems have passed testing and the pressure test has been submitted. Remove all foreign matter on pipes and install insulation onto properly cleaned surfaces.

D. Leaks in vapor barrier or voids in the insulation are not acceptable.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS

A. All drawings (diagrams, plans, & schematics) indicate the general location and arrangement of the piping system. Deviations from the drawings are prohibited, unless the engineer approves and issues a new layout on a coordination drawing.

B. Installers shall be trained and certified to install the pipe, and do so with the appropriate tools, without any deviation from the manufacturer’s recommendations. Contact Asahi/America for certifiable training.

C. Underground piping shall be installed per manufacturer’s instructions and ASTM D2774.

D. Aboveground piping shall be installed per manufacturer’s instructions and ASTM F2389.

E. The installed system is to be level and plumb, and free of sags and bends, unless indicated otherwise by a slope. Install piping at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated.

3.2 DELIVERY AND STORAGE

A. The product shall be delivered in the manufacturer’s original packaging.

B. Inspect the delivered goods and verify that it is a complete delivery. Ensure that all goods are free of defects and are capable to deliver a fully functional system. Promptly notify Asahi/America, within a week of delivery, if there is a situation that adversely affects the installation.

C. Storage of the product shall be in accordance with Asahi/America’s instructions. All pipes shall be supported appropriately. All products shall be kept from extreme temperature swings and be kept out of direct sunlight. At temperatures lower than 32°F, pipes are less flexible and more prone to breakage, therefore extra care must be taken to prevent impacts, excessive loads, crushing or bending.

D. Do not install piping or fittings before they have finished cooling or if they have been damaged. Remove all damaged products from the jobsite immediately.

3.3 FUSION WELDING OF JOINTS

A. All joint preparation, setting and alignment, fusion process, cooling times and working pressure shall be in accordance to ASTM F 2389 and the manufacturer’s specifications

B. 4-1/2” nominal (125mm) and below shall be joined using socket fusion, while pipe and fittings of sizes 6” nominal (160mm) and greater shall be joined using butt fusion.

C. Pipe joining equipment shall be limited to Asahi/ America’s recommendations

3.4 PIPING INSTALLATIONS

A. Installation of hangers supports, guides and anchors shall comply with the applicable plumbing code or as recommended by Asahi/America.

B. Support vertical piping at each floor penetration as specified in the applicable plumbing code, using the appropriate riser clamps as recommended by Asahi/America.

C. Seismic-restraint devices must comply with Section XXXXXX “Vibration and Seismic Controls for Plumbing Piping and Equipment.”

D. Pipe hangers, supports, and installation shall comply with Section XXXXXX “Hangers and Supports for Plumbing Piping and Equipment.”

E. Bare metal shall not have direct contact with the piping system. Provide clamps and supports that are rubber coated or lined. Ensure that there are not any sharp surfaces that could potentially damage any part of the piping system.

F. Provide expansion loops, offsets, guides or other approved expansion and contraction components to absorb all of the stresses the system could experience between anchor points. Refer to www.asahi-america.com for the latest instructions and calculations.

G. Improvised pipe support systems are not allowed. All piping support materials shall be new and shall be installed as the manufacturer dictates. Do not over tighten clamps, as this can cause pipe deformation.

H. The piping system shall not have direct contact with the building structure. Necessary measures must be taken to isolate any potential contact.

I. Fire stopping shall meet ASTM E 814 or ULC S115. Where the pipe passes through a fire stop, the pipe insulation or fire resistive coatings shall be removed and shall meet all other requirements set forth by the firestop manufacturer.

J. Pipes shall be protected from heat generation of pumps that are larger than 7.5 HP. A temperature relief valve shall be installed and shall be set to 185°F, if there is a chance that the pump will operate with no flow.

K. Heat tracing must be suitable for use with plastic piping and be self-regulating. The surface temperature of the pipes and fittings shall not exceed 158°F.

3.5 INSPECTION AND CLEANING

A. Inspection, cleaning, and testing shall be carried out while the piping system is still fully accessible.

B. The entire piping system shall be flushed with cold water after the installation is complete. The system shall be inspected and tested in accordance with Asahi/America’s recommendations and shall also meet the requirements of all authorities having jurisdiction.

3.6 TESTING

A. Upon completion of the installation, inspection and cleaning, the piping system shall be tested according to Asahi/America’s recommendation. A hydrostatic pressure test of 1.5x the design pressure or 150 psi, whichever is higher shall be conducted.

B. Any leaks that are found will be repaired at the expense of the contractor. The section that failed shall be removed appropriately and replaced with new parts.

C. Visit http://asahi-america.com/ for the latest forms and test procedures.

END OF SECTION