
HYDRONIC PIPING AND VALVES

1 GENERAL

1.1 Submittals

- .1 **Product Data:** Submit shop drawings/product data sheets for all products specified in this Section except piping and unions.

2 PRODUCTS

2.1 Pipe, Fittings and Joints

- .1 **Black Steel Schedule 40 - Screwed Joint:** Mild black carbon steel, Grade B, ERW, ASTM A53, complete with Class 125 cast iron threaded fittings to ANSI/ASME B16.4, and screwed joints.
- .2 **Black Steel Schedule 40 - Welded Joint:** Mild black carbon steel, Grade B, ERW, ASTM A53, mill or site bevelled, complete with factory made seamless carbon steel butt welding fittings to ASTM A234, Grade WPB, with long sweep pattern elbows unless otherwise specified, and welded joints.
- **Black Steel - Pressure Coupled Joint:** Schedule 40 black steel, ASTM A53, square cut, deburred **and clean**, complete with Viega "MegaPress" 2070 kPa (300 psi) rated, formed, cold drawn steel fittings and couplings with Grade "E" EDPM O-rings and "Smart Connect" feature, and pressure type crimped joints made by use of an electro-hydraulic crimping tool supplied by the fitting manufacturer. Install as per manufacturers guidelines and recommendation.

2.2 Piping Unions

- .1 **Screwed Piping:** Malleable iron, ground joint, bronze or brass to iron or bronze to bronze seat screwed unions and union elbows with a minimum pressure rating of 1725 kPa (250 psi) steam at 260° C (500° F).
- .2 **Flanged Piping:** forged carbon steel slip-on type raised faced welding flange unions to ASTM A105, 150 lb. Class for steel pipe, and slip-on type 150 lb. Class bronze flanges for copper pipe.

2.3 Piping Hangers and Supports

- .1 Refer to Part 2 of the mechanical work Section entitled Basic Mechanical Materials and Methods.

2.4 Shut-Off Valves

- .1 **Ball Type:** Class 600, 4140 kPa (600 psi) WOG rated full port ball valves, each complete with a forged brass or bronze body and cap, blowout-proof stem, solid forged brass chrome plated ball, "Teflon" or "PTFE" seat, ends to suit the piping being connected, and removable lever handle. Acceptable products are:
 - .1 Toyo Valve Co. Fig. 5044A
 - .2 Watts Industries (Canada) Inc. #FBV-3
 - .3 Kitz Corp. Code 58
 - .4 Victaulic Co. of Canada Ltd. Series 722
 - .5 Apollo Valve #77-100

2.5 Swing Check Valves

- .1 **Bronze - Screwed:** Class 125, 1380 kPa (200 psi) WOG rated horizontal swing check valves, each complete with a "Y" pattern bronze body, hinged brass disc, easy access screw-in cap, and screwed ends. Acceptable products are:
 - .1 Toyo Valve Co. Fig. 238
 - .2 Nibco #T-433
 - .3 Kitz Corp. Code No. 29

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- .2 **Cast Iron - Screwed and Flanged:** Cast iron, bronze trim, 1380 kPa (200 psi) rated swing check valves, each complete with a bronze disc and seat, malleable iron hinge, bolted cover, and screwed or flanged ends as required. Acceptable products are:
 - .1 Toyo Valve Co. Fig. 435A
 - .2 Watts Industries (Canada) Inc. #F-511
 - .3 Kitz Corp. Code No. 78

2.6 Vertical Lift Check Valves

- .1 Class 150, 1380 kPa (200 psi) WOG rated bronze vertical lift check valves, each complete with screwed ends and a bronze disc. Acceptable products are:
 - .1 Toyo Valve Co. Fig. 231
 - .2 Watts Industries (Canada) Inc. #600
 - .3 Kitz Corp. Code No. 36

2.7 Wafer Check Valves

- .1 Threaded lug body type, full bore, ANSI Series 150, 1965 kPa (285 psi) rated at 38° C (100° F), non-slam wafer check valves, each complete with a carbon steel body, stainless steel discs, a shaft, springs, disc stop and thrust bearings constructed of type 316 stainless steel, and seat materials to suit the application. The inside diameter of the valve must equal the inside diameter of the connecting pipe. Acceptable products are:
 - .1 Gulf Valve Co. "WAFER CHECK"
 - .2 Watts Industries (Canada) Inc. Series ICV-125
 - .3 The Metraflex Co. Style CVXX

2.8 Drain Valves

- .1 Refer to Part 2 of the mechanical work Section entitled Basic Mechanical Materials and Methods.

2.9 Circuit Balancing Valves

- .1 Screwed or flanged as required, globe style, non-ferrous circuit balancing valves designed to facilitate precise flow measurement, precision flow balancing, and positive shut-off, complete with capped and valved drain connection, and valved ports for connection to a differential pressure meter. Acceptable products are:
 - .1 Armstrong Fluid Technologies Series "CBVI" screwed or "CBVII" flanged
 - .2 Victaulic Co. of Canada Ltd. (Tour & Andersson) Series 787 screwed, Series 788 flanged, and 789 grooved end, and Series 78K "Koil Kit" valves
- .2 Equal to Armstrong Fluid Technologies ABV Series Y-pattern globe type balancing valves, each equipped with a handwheel adjustment, micrometer type position indicator, tamper-proof memory indicator, and valved ports for connection to a differential pressure meter.

2.10 Radiator Shut-Off and Balancing Valves

- .1 Heavy pattern, straight, 1750 kPa (250 psi) rated at 120° C (250° F) bronze radiator valves, each complete with composition disc, spring loaded packing, and union. Inlet valves are to be equipped with a handle for shut-off. Outlet valves are to be equipped with a lockshield for shut-off and balancing. Acceptable products are:
 - .1 Dahl Brothers Canada Ltd. #11042 and #13013
 - .2 Spirax Sarco Ltd. Type R
 - .3 Watts Canada Series 65

2.11 Air Vents

- .1 Refer to Part 2 of the mechanical work Section entitled Hydronic Piping Specialties.

2.12 Pressure Gauges and Thermometers

- .1 Refer to Part 2 of the mechanical work Section entitled Basic Mechanical Materials and Methods.

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2.13 Pre-Operational Chemical treatment

- .1 Refer to the mechanical work Section entitled HVAC Water Treatment.

3 EXECUTION

3.1 Demolition

- .1 Do all required hydronic piping system demolition/revision work. Refer to demolition requirements specified in the mechanical work Section entitled Demolition and Revision Work.

3.2 Piping Installation Requirements

- .1 Provide all required hydronic piping. Pipe, unless otherwise specified, is to be:
 - .1 For pipe to and including 65 mm (2½") diameter, Schedule 40 black steel, screwed, or type "L" hard copper with solder joints or pressure coupled joints, or, for runout piping from mains and risers to terminal equipment,
 - .2 For pipe 65 mm (2½") diameter and larger, Schedule 40 black steel with welding fittings and welded joints
 - .3 For short branch connections to heating equipment where structural obstructions occur and site bending of pipe is advantageous, a single length of type "L" soft copper is acceptable.
- .2 Slope horizontal piping mains to provide a minimum continuous up-grade of 25 mm (1") in 6 m (20') to high points. Slope branch supply and return piping connections to equipment a minimum of 25 mm (1") in 1.2 m (4'). Leave sufficient room at high points for installation and maintenance of air vents.
- .3 Install automatic control valves, piping wells and similar piping and/or equipment mounted control components required for automatic temperature control systems supplied as part of the control. Refer to drawing control diagrams and details.
- .4 Connect equipment provided as part of the work of other Sections of the Specification with piping as indicated and/or required. Refer to pipe connection details on drawings.
- .5 Do not install heating water piping in exterior walls or unheated areas of the building.
- .6 **Unions:** Provide screwed unions, removable mechanical joint couplings, or weld-on or solder-on flanges in piping at all connections to valves, strainers and similar piping system components which may need maintenance or repair, at all equipment connections, in runs of piping exceeding 9 m (30') at 4.5 m (15') regular intervals to permit removal of sections of piping, and wherever else indicated on the drawings.
- .7 **Shut-off Valves:** Provide shut-off valves in piping connections to equipment, to isolate piping risers, to isolate other sections of systems as shown, and wherever else indicated on the drawings. Valves in piping to and including 50 mm (2") diameter are to be ball type. All other shut-off valves are to be ball or butterfly type unless otherwise specified. Locate all valves so that they are easily accessible. Wherever possible, install valves at uniform height. Provide chain operators for valves which are inaccessible for operation from floor level.
- .8 **Check Valves:** Provide a check valve in the discharge piping of every pump, and elsewhere in piping where shown on the drawings. Where check valves are required in vertical piping, ensure that they are suitable in all respects for the application. Note that check valves for vertical in-line and/or base mounted circulating pumps are integral with the discharge accessory.
- .9 **Drain Valves:** Refer to Part 3 of the mechanical work Section entitled Basic Mechanical Materials and Methods.
- .10 **Balancing Valves:** Provide circuit balancing valves in piping generally where shown on the drawings but with exact locations in accordance with instructions of personnel doing system

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flow balancing work. Confirm locations prior to installation but in any case, include balancing valves in return piping in the following locations:

- .1 Boiler primary circuits
- .2 Heating secondary circuits
- .3 Air handling unit heating coils
- .4 Unit ventilator heating coils
- .5 Reheat coils
- .6 Motorized heaters

3.3 Flushing and Cleaning Piping

- .1 Flush and clean new piping in accordance with requirements specified in the mechanical work Section entitled HVAC Water Treatment.

3.4 Testing, Adjusting and Balancing

- .1 Leakage test piping as specified in the mechanical work Section entitled Basic Mechanical Materials and Requirements.
- .2 When work is complete and equipment is operating as intended, test, adjust and balance water flows in accordance with requirements specified in the mechanical work Section entitled Testing, Adjusting, and Balancing.

END OF SECTION