

1 General

1.1 REFERENCES

- .1 American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE).
 - .1 Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .2 Electrical Equipment Manufacturers Advisory Council (EEMAC).
- .3 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-B214, Installation Code for Hydronic Heating Systems.
- .4 National Electrical Manufacturers Association (NEMA).
 - .1 NEMA MG 1, Motors and Generators.

1.2 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Submit manufacturer's detailed composite wiring diagrams for control systems showing factory installed wiring and equipment on packaged equipment or required for controlling devices or ancillaries, accessories and controllers.
- .4 Submit product data of pump curves for review showing point of operation. Including rated capacities, NPSHR, efficiency lined and BHP lines.
- .5 Indicate piping, valves and fittings shipped loose by packaged equipment supplier, showing their final location in field assembly.
- .6 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 HEALTH AND SAFETY

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse in accordance Section 01 74 00 - Cleaning.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for reuse and place in designated containers Steel waste in accordance with Waste Management Plan.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

1.5 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Furnish following spare parts:
 - .1 Mechanical seal for each pump.
 - .2 Packing for each pump.
 - .3 Set of gaskets for each pump.

2 Products

2.1 EQUIPMENT

- .1 Do component selection and sizing to: CAN/CSA-B214.
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2.2 IN-LINE WET ROTOR CIRCULATORS

- .1 Pump body: Cast iron
- .2 Impellor: Polypropylene (glass filled)
- .3 Shaft: Stainless steel
- .4 Bearings: Graphite
- .5 Gasket material: EPDM
- .6 Maximum fluid temperature: 110°C
- .7 Maximum working pressure: 1000 kPa
- .8 Capacity: as indicated.
- .9 Connections: union or flanged

3 Execution

3.1 INSTALLATION

- .1 Do Work in accordance with CAN/CSA-B214.
- .2 In line circulators: install as indicated by flow arrows. Support at inlet and outlet flanges or unions. Install with bearing lubrication points accessible.
- .3 Ensure that pump body does not support piping or equipment. Provide stanchions or hangers for this purpose. Refer to manufacturer's installation instructions for details.
- .4 Pipe drain tapping to floor drain.
- .5 Install volute venting pet cock in accessible location.
- .6 Check rotation prior to start-up.
- .7 Install pressure gauge ball valves.

3.2 START-UP

- .1 General
 - .1 In accordance with Section 01 91 13 - General Commissioning Requirements; supplemented as specified herein.
 - .2 In accordance with manufacturer's recommendations.
- .2 Procedures:
 - .1 Before starting pump, check that cooling water system over-temperature and other protective devices are installed and operative.
 - .2 After starting pump, check for proper, safe operation.
 - .3 Check installation, operation of mechanical seals, packing gland type seals. Adjust as necessary.
 - .4 Run-in pumps for 12 continuous hours.
 - .5 Verify operation of over-temperature and other protective devices under low- and no-flow condition.
 - .6 Eliminate air from scroll casing.
 - .7 Adjust water flow rate through water-cooled bearings.
 - .8 Adjust flow rate from pump shaft stuffing boxes to manufacturer's recommendation.
 - .9 Adjust alignment of piping and conduit to ensure true flexibility at all times.
 - .10 Eliminate cavitation, flashing and air entrainment.
 - .11 Adjust pump shaft seals, stuffing boxes, glands.
 - .12 Measure pressure drop across strainer when clean and with flow rates as finally set.
 - .13 Replace seals if pump used to degrease system or if pump used for temporary heat.
 - .14 Verify lubricating oil levels.

3.3 PERFORMANCE VERIFICATION (PV)

- .1 General
 - .1 In accordance with Section 01 91 13 - General Commissioning Requirements, supplemented as specified herein.
 - .2 In accordance with manufacturer's recommendations
- .2 Exclusions:
 - .1 This paragraph does not apply to small in-line circulators.
- .3 Assumptions: these PV procedures assume that:
 - .1 Manufacturer's performance curves are accurate.
 - .2 Valves on pump suction and discharge provide tight shut-off.
- .4 Net Positive Suction Head (NPSH):
 - .1 Application: measure NPSH for pumps which operate on open systems and with water at elevated temperatures.
 - .2 Measure using procedures prescribed in the Standard.
- .5 Mark points of design and actual performance at design conditions as finally set upon completion of TAB.
- .6 Commissioning Reports: In accordance with Section 01 91 13 - General Commissioning Requirements, supplemented as specified herein. Reports to include:
 - .1 Record of point(s) of actual performance at maximum and minimum conditions and for single and parallel operation as finally set at completion of commissioning on pump curves.
 - .2 Report forms as specified Section 01 91 13 - General Commissioning Requirements: Report Forms and Schematics.
 - .3 Pump performance curves (family of curves).

END OF SECTION
