

Part 1 General

1.1 SUMMARY

- .1 Division 01 – General Requirements.
- .2 Section 21 05 01 – Common Work Results for Mechanical.
- .3 Section 23 05 48 – Vibration Controls for HVAC Piping and Equipment.

1.2 REFERENCES

- .1 American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE):
 - .1 Standard 90.1-2001 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-B214-01, Installation Code for Hydronic Heating Systems.
- .4 National Electrical Manufacturers Association (NEMA):
 - .1 NEMA MG 1-2003, Motors and Generators.

1.3 SUBMITTALS

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Submit Manufacturer printed shop drawings and product data in accordance with Division 01 – General Requirements.
- .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.
- .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 in accordance with Division 01 – General Requirements.

1.4 HEALTH AND SAFETY

- .1 Do construction occupational health and safety in accordance with Division 01 – General Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.

1.6 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Division 01 – General Requirements.

Part 2 Products

2.1 SUSTAINABLE REQUIREMENTS

- .1 Materials and resources in accordance with Division 01 – General Requirements.

2.2 EQUIPMENT

- .1 Do component selection and sizing to: CAN/CSA-B214.

2.3 IN-LINE CIRCULATORS

- .1 Volute: cast iron radially split, with screwed or flanged design suction and discharge connections.
- .2 Impeller: 30% Glass-Fiber Reinforced Polyethersulfone.
- .3 Gasket: EPDM Rubber.
- .4 Coupling: rigid self-aligning.
- .5 Motor: to Section 21 05 01 – Common Work Results for Mechanical.
- .6 Capacity: 2.4 l/s @ 427 mm (38 gpm @ 1.4 feet) of head.
- .7 Electrical: 115 Volt/ 60 Hz.
- .8 Power: 120W.
- .9 Rated Current: 1.7 Amps.
- .10 Max Load: 7 Amps.
- .11 Max pressure: 1034 kPa (150 PSI).
- .12 Max Temp: 110°C (230°F).
- .13 Flange size: 38mm (1-1/2”).

Part 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, if required.
- .5 Install volute venting pet cock in accessible location.
- .6 Check rotation prior to start-up.
- .7 Install pressure gauge test cocks.

3.2 **START-UP**

- .1 General:
 - .1 In accordance with Division 01 – General 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 Check base for free-floating, no obstructions under base.
 - .5 Run-in pumps for 12 continuous hours.
 - .6 Verify operation of over-temperature and other protective devices under low- and no-flow condition.
 - .7 Eliminate air from scroll casing.
 - .8 Adjust water flow rate through water-cooled bearings.
 - .9 Adjust flow rate from pump shaft stuffing boxes to manufacturer's recommendation.
 - .10 Adjust alignment of piping and conduit to ensure true flexibility at all times.
 - .11 Eliminate cavitation, flashing and air entrainment.
 - .12 Adjust pump shaft seals, stuffing boxes, glands.
 - .13 Measure pressure drop across strainer when clean and with flow rates as finally set.
 - .14 Replace seals if pump used to degrease system or if pump used for temporary heat.
 - .15 Verify lubricating oil levels.

3.3 **PERFORMANCE VERIFICATION (PV)**

- .1 General:
 - .1 In accordance with Division 01 – General 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 Multiple Pump Installations - Series and Parallel:
 - .1 Repeat PV procedures specified above for pump performance and pump BHP for combinations of pump operations.
- .5 Mark points of design and actual performance at design conditions as finally set upon completion of TAB.
- .6 Start-up/Commissioning Reports: In accordance with Division 01 – General Requirements. Reports 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 Division 01 – General Requirements: Report Forms and Schematics.
 - .3 Pump performance curves (family of curves).

3.4 OPERATION REQUIREMENTS

- .1 Operational requirements in accordance with Division 01 – General Requirements.

END OF SECTION