

HYDRONIC PUMPS

1. GENERAL

1.1 Section Includes

- .1 Materials, equipment selection, installation and start up for hydronic system pumps.

1.2 Related Sections

- .1 Section 23 06 00 – Schedules for HVAC.

1.3 References

- .1 American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE).
 - .1 Standard 90.1-2010 Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .2 Canadian Standards Association (CSA).
 - .1 CSA-B214-07, Installation Code for Hydronic Heating Systems.
- .3 National Electrical Manufacturers Association (NEMA).
 - .1 NEMA MG 1-2009(R2010), Motors and Generators.

1.4 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.
- .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 Operating and Maintenance Manual as specified in Section 01 33 00 - Submittal Procedures.

1.5 Extra Materials

- .1 Provide maintenance materials in accordance with Section 01 33 00 - Submittal Procedures..

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2. PRODUCTS

2.1 Equipment

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

2.2 Vertical In-Line Circulators

- .1 Volute: cast iron radially split, with tapped openings for venting, draining and gauge connections, with screwed or flanged suction and discharge connections.
- .2 Impeller: bronze.
- .3 Shaft: stainless steel with bronze sleeve bearing, integral thrust collar.
- .4 Seal assembly: mechanical for service to 135 degrees C.
- .5 Coupling: rigid self-aligning.
- .6 Motor: to NEMA MG 1 resilient mounted, drip proof, sleeve bearing.
- .7 Pump manufacturer integrated variable speed drive: where indicated in schedules

3. EXECUTION

3.1 Installation

- .1 Do work in accordance with 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 Base mounted type: supply templates for anchor bolt placement. Furnish anchor bolts with sleeves. Place level, shim unit and grout. Align coupling in accordance with manufacturer's recommended tolerance. Check oil level and lubricate..
- .4 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.
- .5 Pipe drain tapping to floor drain.
- .6 Install volute venting pet cock in accessible location.
- .7 Check rotation prior to start-up.
- .8 Install pressure gauge test cocks.

3.2 Start-Up

- .1 General
 - .1 In accordance with manufacturer's recommendations.

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- .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 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):

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- .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.
- .3 Where procedures do not exist, discontinue PV, report to Contract Administrator and await instructions.
- .5 Multiple Pump Installations - Series and Parallel:
 - .1 Repeat PV procedures specified above for pump performance and pump BHP for combinations of pump operations.
- .6 Mark points of design and actual performance at design conditions as finally set upon completion of TAB.
- .7 Commissioning Reports: 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 Pump performance curves (family of curves).

3.1 Performance

- .1 Refer to Section 23 06 00 – Schedules for HVAC.

END OF SECTION