

USask Master Specification Directions: The master specifications are intended to be incorporated into the Consultant's final, project specific specification package. The project specific specifications are expected to include any and all sections or portions of sections (Part 1, Part 2, Part 3) that are required to create a fully executable project specification. USask Master Specs only provide information that USask **requires** be a part of the final specification package. Components or sections not included in the Master USask Specifications may still be required for a complete, well-designed project. **It is the consultant's responsibility to ensure all specifications match USask requirements. Any deviations or revisions to any section included in the master specifications requires written consent from the USask Engineering department. The consultant is liable for any omissions, errors, or incorrect equipment or components supplied to site.**

The Master Specifications shall be used in conjunction with USask's Design Guidelines. Any conflicts shall be brought to the attention of USask Engineering staff for clarification.

Part 1 General

Part 2 Products

2.1 EQUIPMENT

- .1 Size and select components to: CAN/CSA-B214.
- .2 All starters and speed drives to be supplied by Electrical Division, unless specifically scheduled as part of the mechanical equipment package.
- .3 Sensorless speed control not permitted.

2.2 IN-LINE CIRCULATORS

- .1 Volute: cast iron radially split, with screwed or flanged design suction and discharge connections.
- .2 Impeller: cast bronze, unless specified otherwise.
- .3 Shaft: stainless steel with bronze sleeve bearing, integral thrust collar.
- .4 Seal assembly: mechanical for service to 135 degrees C.
- .5 Acceptable manufacturers: B&G, Armstrong, Taco.

2.3 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: cast bronze, trimmed to meet performance requirements for constant speed pumps.
- .3 Shaft: stainless steel with bronze or graphite sleeve bearing, integral thrust collar.
- .4 Seal assembly: mechanical for service to 135 degrees C.
- .5 Complete with suction diffuser with screen.
- .6 Coupling: rigid self-aligning.
- .7 Motor speed: 1800rpm. Overspeed not permitted.

- .8 Motor: resilient mounted, TEFC.
- .9 Acceptable manufacturers: B&G Series 80, Armstrong, Taco.

2.4 SINGLE SUCTION CENTRIFUGAL PUMP

- .1 General: bronze fitted pump complete with motor.
- .2 Base: common cast iron with drip rim and tapping for drain connection.
- .3 Volute: cast iron radially split, end suction, flanged suction and discharge, suction diffuser with screen, with drain plug and vent cock, suction and discharge pressure gauge tappings.
- .4 Impeller: bronze enclosed type, keyed drive with locking nut or screw.
- .5 Shaft: stainless steel with two point support, hardened wear rings at packing gland, machined shoulders for ball bearing mounting.
- .6 Seal assembly: mechanical seal, grease lubricated.
- .7 Motor speed: 1800rpm. Overspeed not permitted.
- .8 Coupling: flexible self-aligning.
- .9 Motor: continuous duty, drip proof, ball bearing, maximum temperature rise 50 degrees C.
- .10 Acceptable manufacturers: B&G, Armstrong, Taco.

Part 3 Execution

3.1 INSTALLATION

- .1 Install hydronic pumps to: CAN/CSA-B214.
- .2 In line circulators: install as indicated by flow arrows.
 - .1 Support at inlet and outlet flanges or unions.
 - .2 Install with bearing lubrication points accessible.
- .3 Base mounted type: supply templates for anchor bolt placement.
 - .1 Include anchor bolts with sleeves. Place level, shim unit and grout.
 - .2 Align coupling in accordance with manufacturer's recommended tolerance.
 - .3 Check oil level and lubricate.
- .4 Ensure that pump body does not support piping or equipment.
 - .1 Provide stanchions or hangers for this purpose.
 - .2 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 Section 01 91 13- General Commissioning Requirements: 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 minimum.
 - .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.
 - .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 Verify performance in accordance with Section 01 91 13- General Commissioning Requirements General Requirements, supplemented as specified herein.
- .2 Verify that manufacturer's performance curves are accurate.
- .3 Ensure 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 Section 01 91 13- General Commissioning Requirements.
- .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: in accordance with Section 01 91 13- General Commissioning Requirements reports supplemented as specified herein. Reports to include:
 - .1 Record of points 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 Use Report Forms specified in Section 01 91 13- General Commissioning Requirements: Report Forms and Schematics.
 - .3 Pump performance curves (family of curves).

END OF SECTION