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| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | October 4, 2007 | Minor grammatical revision to section 2.12. |
| 3 | November 16, 2009 | Modified ‘Related Sections’ and approved suppliers |
| 4 | January 11, 2010 | Removal of mercury as acceptable material, minor editing |
| 5 | March 16, 2011 | Minor editing |
| 6 | September 22, 2014 | First draft review (AV) |
| 7 | June 8, 2015 | Second Draft for Review (AV) |
| 8 | September 16, 2015 | Updated, Finalized Specification – Reference eDOCS #5823606-v6 (AV) |
| 9 | May 31, 2016 | Name change from Hanson Pipe and Products Canada Ltd. to Forterra Pipe and Precast (AV) |
| 10 | November 11, 2016 | Updated NEMA MG-1 reference to 2016 new version and NFPA 70 to 2017 Edition (AV) |
| 11 | March 1, 2017 | Updated for references to NSF 372. (AV) |
| 12 | May 29, 2017 | Updated references to ASHRAE 90.1-2016, ASME Boiler and Pressure Vessel Code 2017, ASTM A48/A48M-03(2016), ASTM D4101-14e2, CSA B64 SERIES-11 (R2016) **(AAM)** |
| 13 | August 17, 2017 | Updated listed products. Those that were removed were replaced with performance specifications and standards.(CPD PMO, OMM) |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

**Notice:** This Document hardcopy must be used for reference purpose only.

**The on-line copy is the current version of the document.**

# GENERAL

## Related Sections

### [Under "Related Sections", identify other Sections that are related to, and/or dependent on, the work results or information specified elsewhere. The list should be limited to Sections with specific information that the reader might expect to find in this Section, but is specified elsewhere. For example, if hardware for aluminum entrances is specified in the aluminum entrance Section, a cross-reference would be appropriate in the finish hardware Section. The purpose of this cross-referencing is for information only, to aid in finding those other requirements—not to define the scope of the Section.

### Cross-referencing here may also be used to coordinate assemblies or systems whose components may span multiple Sections and which must meet certain performance requirements as an assembly or system.

### Contractor is responsible for coordination of the Work.

### This Section is to be completed/updated during the design development by the Consultant. If it is not applicable to the section for the specific project it may be deleted.]

### [List Sections specifying installation of products supplied but not installed under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Execution requirements for ...[item]... specified under this Section.

### [List Sections specifying products installed but not supplied under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Product requirements for ...[item]... for installation under this Section.

### [List Sections specifying related requirements.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: [Optional short phrase indicating relationship].

#### Section 01300 - Submittals

#### Section 01810 – Equipment Testing and Facility Commissioning

#### Section 15950 – HVAC Testing, Adjusting, and Balancing

#### Division 13 – SCADA and Instrumentation [insert applicable specifications]

#### Division 15 – Mechanical [insert applicable specifications]

#### Division 16 – Electrical [insert applicable specifications]

#### Product requirements for [item]... for installation under this Section.

## Standards

### [Consultant to identify and insert any additional local authorities having jurisdiction]

### American National Standards Institute (ANSI):

#### ANSI/ISEA Z358.1-2014, American National Standard for Emergency Eyewash and Shower Equipment

### American Society of Heating, Refrigerating & Air Conditioning Engineers, Inc. (ASHRAE):

#### ASHRAE 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

### American Society of Mechanical Engineers (ASME):

#### ASME Boiler and Pressure Vessel Code 2017 Section (BPVC) VIII - Rules for Construction of Pressure Vessels Division 1

### American Society for Testing and Materials (ASTM):

#### ASTM A48/A48M-03(2016), Standard Specification for Gray Iron Castings.

#### ASTM D4101-14e2, Standard Specification for Polypropylene Injection and Extrusion Materials

### American Water Works Association (AWWA):

#### AWWA C510-07, Double Check Valve Backflow Prevention Assembly.

#### AWWA C511-07, Reduced-Pressure Principle Backflow Prevention Assembly.

#### AWWA C550-13, Protective Interior Coatings for Valves and Hydrants

### Canadian Gas Association (CGA).

### Canadian Standards Association (CSA)

#### CSA/CSA Label on Fixtures and Equipment.

#### CSA B64 SERIES-11 (R2016), Backflow Preventers and Vacuum Breakers (Consists of B64.0, B64.1.1, B64.1.2, B64.1.3,B64.1.4 B64.2, B64.2.1, B64.2.1.1, B64.2.2, B64.3,B64.3.1, B64.4, B64.4.1, B64.5, B64.5.1, B64.6, B64.6.1, B64.7, B64.8 and B64.9)

### National Electrical Manufacturers Association, (NEMA):

#### NEMA MG 1-2016, Motors and Generators.

#### NEMA 1, 4 Enclosures

#### NEMA B

### National Fire Protection Association (NFPA)

#### National Electrical Code 2014 edition, NFPA 70, 2017 Edition (NEC).

### NSF International (NSF)

#### NSF 372-2011: Drinking Water System Components – Lead Content

#### NFS 60 Drinking Water Treatment Chemicals – Health Effects

#### NSF 61 Drinking Water System Components – Health Effects

### Ontario Building Code, O. Reg. 332/12

### Underwriters Laboratories Inc. (UL).

### Underwriters Laboratories of Canada (ULC).

## Measurement and Payment

*[Choose one of the following payment language provisions that best suits the individual project.*

*If this Section is not specifically referenced by an item in the Bid Form, please use the following language:*

.1 The work of this Section will not be measured separately for payment. All costs associated with the work of this Section shall be included in the Contract Price.

*OR If this Section is specifically referenced in the Bid Form, use the following language and identify the relevant item in the Bid Form:*

.1 All costs associated with the work of this Section shall be included in the price(s) for Item No(s). \_\_\_ in the Bid Form.

*If the work of this Section is to be measured and paid for by several different methods, please amend the standard wording given above to reflect the different methods of measurement and payment.*]

## Submittals

### Action Submittals, in accordance with Section 01300 - Submittals:

#### Shop Drawings: Manufacturer’s product data.

### Informational Submittals: [Performance test report for submersible pump.]

## Extended Guarantee

### Where noted below, provide the manufacturer’s extended guarantee in writing with the Region named as beneficiary. The extended guarantee shall provide for the correction, or at the option of the Region, the removal and replacement of any Products found to be defective during the stated guarantee period after the date of the Substantial Performance of the Work.

# PRODUCTS

## Water Heaters

### Instantaneous Electric Water Heater:

#### Description: UL listed, tank-less with removable cover, replaceable heating element, immersion type thermostat, replaceable inlet filter, and flow regulator.

#### Shall have a max flow of at least [2.5] litres per second.

#### Certified to ANSI/NSF372 by WQA (Water Quality Association) and complies with ANSI/ISEA Z358.1

#### Shall have an efficiency of at least [99] percent.

#### Shall not freeze at temperatures above [-25] ˚C.

#### Capacity: See Data Sheet 3.3.1.1 attached at the end of this Section.

### Electric Water Heater (Residential):

#### Description:

##### Automatic, vertical, electric storage type.

##### Regulatory Compliance: UL listed, ASHRAE 90.1-2013.

##### Tank: Steel, glass lined, 1,034 kPa working pressure.

##### Insulation: Foam or fibreglass type with minimum R value in accordance with ASHRAE 90.1-2013.

##### Thermal Trap: Factory installed on inlet and outlet.

##### Dip Tube: Required on inlet connection down to bottom section of tank.

##### Anode: Heavy duty, tank mounted screw in type.

##### Pressure/Temperature Relief Valve: ASME rated.

##### Connections: Inlet and outlet with factory installed dielectric unions and brass drain valve with hose thread.

##### Heating Elements:[Upper] [and] [lower] low watt density (maximum of 120 kW per square metre) incoloy (a type of metal alloy with high corrosion resistance) sheath; immersion type.

##### [Guarantee: 5 years.]

#### Capacity: See Data Sheet 3.3.1.2 attached at the end of this Section.

### Electric Water Heater (Commercial):

#### Description:

##### Automatic, vertical, electric storage type.

##### Regulatory Compliance: UL/ULC listed, ASME, ASHRAE 90.1-2013, and NSF.

##### Tank: Steel, glass lined, 1,034 kPa working pressure, and ASME rate [A: with 100 mm by 150 mm hand-hole cleanout].

##### Insulation: Foam or fibreglass type with minimum R value in accordance with ASHRAE 90.1-2013.

##### Dip Tube: Required on inlet connection down to bottom section of tank.

##### Anode: Heavy duty, tank mounted, screw in type.

##### Pressure/Temperature Relief Valve: ASME rated.

##### Connections: Inlet and outlet with factory installed dielectric unions and brass drain valve with hose thread.

##### Heating Element: Watt density (maximum of 120kW/m2) incoloy sheath; immersion type.

##### Controls: Fully automatic, house in hinged control panel, and including the following:

###### Terminal block.

###### Close differential immersion type thermostat.

###### Control transformer for 120 volt circuit and fusing.

###### Magnetic contactors for each stage.

###### Manual reset high limit switch.

###### Adjustable temperature range, 35 to 85 degrees Celsius.

###### Power circuit fusing as required by NEC and UL/ULC.

##### [Guarantee: 3 years.]

#### Capacity: See Data Sheet 3.3.1.3 at the end of this section.

### Gas Water Heater (Residential):

#### Description:

##### Type: Automatic, vertical, gas fired atmospheric burner, storage type.

##### Regulatory Compliance: CGA, ASME, ASHRAE 90.1-2013, and NSF.

##### Tank: Steel, glass lined, 1,034 kPa working pressure.

##### Insulation: Foam or fibreglass type with minimum R value per ASHRAE 90.1-2013.

##### Thermal Trap: Factory installed on inlet and outlet.

##### Dip Tube: Required on inlet connection down to bottom section of tank.

##### Anode: Heavy duty, tank mounted, screw in type.

##### Pressure/Temperature Relief Valve: ASME rated.

##### Connections: Inlet and outlet with factory installed dielectric unions and brass drain valve with hose thread.

##### Burner:[80] percent efficient, cast iron, with primary air injection.

##### Vent: Natural draft vent with baffle.

##### Controls: Fully automatic immersion type thermostat, push button pilot igniter, and self-closing door.

##### [Guarantee: 5 years.]

#### Capacity: See Data Sheet 3.3.1.4 at the end of this Section.

### Gas Water Heating System (Commercial):

#### Description: Complete packaged system, including skid mounted water heater, storage tank, circulation pump, controls, interconnecting piping, fittings, and valves.

##### Water Heater: Automatic, gas fired, instantaneous type with the following features:

###### Direct vent.

###### Sealed combustion chamber.

###### [Copper] [Cupro Nickel]finned heat exchanger.

###### Ceramic lined combustion chamber.

###### ASME rated for 1,103 kPa working pressure and 85 degrees C temperature.

##### Regulatory Compliance: CGA, ASME, ASHRAE 90.1-2013, and NSF.

##### Tank: Steel, glass lined, 1,134 kPa working pressure.

##### Insulation: Foam or fibreglass type with minimum R value per ASHRAE 90.1-2013.

##### Pressure/Temperature Relief Valve: ASME rated.

##### Connections: Inlet and outlet with factory installed dielectric unions and brass drain valve with hose thread.

##### Burner: Stainless steel, [85] percent efficient, [9.9 ppm Nox] and cast iron [with primary air injection]**.**

##### Vent: [Direct] [Vent] through [wall] [roof] [conventional].

##### Controls: Fully automatic with the following:

###### Pre-mounted and wired pump and starter.

###### Diagnostic controls.

###### Hot surface ignition control.

###### Terminal strip.

###### Diagnostics control panel.

###### Flow switch.

##### Recirculation Pump: Bronze fitted, in line circulator, suitable for the circulated fluid.

##### [Guarantee: 5 years.]

#### Capacity: See Data Sheet 3.3.1.5 attached at the end of this Section.

## Heat Exchanger (Hot Water and Steam)

### Description:

#### Type: Semi instantaneous, shell and tube type, domestic water heater, constructed with double wall tube bundle,

#### Approvals: UL/ULC listed for potable water service.

#### Materials: Carbon steel shell, brass tube sheet, double wall copper tubing, and compressed fibre gasket.

#### Design Pressure: 1,134 kPa.

#### Code: ASME, BPVC Section VIII, Division 1.

### Capacity: See Data Sheet 3.3.1.6 attached at the end of this Section.

## Domestic Water Storage Tank

### Stainless Steel:

#### Description:

##### Materials: Type 304L stainless steel.

##### Fabrication: All welded construction with adjustable pipe support legs.

##### Pressure: 862 kPa design pressure, 517 kPa working pressure.

##### Temperature: [80 degrees Celsius maximum, 2 degrees Celsius minimum design temperature; 65 degrees Celsius maximum, 65 degrees Fahrenheit minimum working temperature to be verified by the Consultant].

##### Code: ASME BPVC Section VIII Division 1.

##### Connections: Flanged connections and 275 mm by 375 mm hand-hole. See data sheet at end of section.

##### Solenoid Valve:

###### 20 mm brass valve, normally closed, 24V dc

###### CSA certified and UL listed

##### Timer:

###### Single circuit programmable timer control.

###### Adjustable on and off times.

###### 7 Days per week scheduling.

###### 24V ac power, 24V dc output.

###### 120/24V ac control transformer.

###### Clock accuracy: within [5 seconds over a week at 20˚C]

###### UL listed

#### Capacity: See Data Sheet 3.3.1.7 attached at the end of this Section.

### Glass Lined Steel:

#### Description:

##### Regulatory Compliance: ASHRAE 90.1-2013 [ASME] *[Consultant to amend with detailed ASME reference as required*] and NSF 60, 61 and 372 (as applicable).

##### Tank: Steel, glass lined, [862] [1,134] kPa working pressure.

##### Jacket: 16 gauge steel, galvanized, acrylic finish, with sealed drain pan.

##### Insulation: Foam or fibreglass type with minimum R value in accordance with ASHRAE 90.1-2013.

##### Pressure/Temperature Relief Valve: ASME rated.

##### Connections: Inlet and outlet with factory installed dielectric unions and brass drain valve with hose thread.

##### [Guarantee: 5 years.]

#### Capacity: See Data Sheet 3.3.1.7 attached at the end of this Section.

## Domestic Water Expansion Tank

### Description:

#### Type: Pre-pressurized diaphragm type, horizontal or vertical in accordance with the expansion tank data sheet (Data Sheet 3.3.1.8) attached at the end of this Section.

#### Shell: Welded steel.

#### Diaphragm: FDA approved, heavy duty butyl with polypropylene liner. *[Consultant to determine Canadian equivalent to US FDA approved products and amend specifications with such]*

#### Connection Size: In accordance with expansion tank Data Sheet 3.3.1.8 attached at the end of this Section.

#### Maximum Operating Pressure: In accordance with expansion tank Data Sheet 3.3.1.8 attached at the end of this Section.

#### Maximum Operating Temperature: In accordance with expansion tank Data Sheet 3.3.1.8 attached at the end of this Section.

#### Finish: Manufacturer’s standard air dry enamel.

### Capacity: See Data Sheet 3.3.1.8 attached at the end of this Section.

## Domestic Hot Water Circulating Pump

### Description:

#### Type: In line, direct drive, close coupled centrifugal pump.

#### Construction: Bronze body, stainless steel face plate, glass filled noryl (registered trademark product from SABIC Innovative Plastics IP B.V.) impeller, carbon steel shaft, mechanical carbon on ceramic seals, and bronze oil lubricated motor bearings.

#### Motor: Permanent split capacitor with thermal overload protection.

#### Automatic timer kit:

##### Operating temperature range: [ ]˚C to [ ]˚C

##### Pressure rating: [ ] kPa

##### Underwriters Laboratories listed

### Capacity: See Data Sheet 3.3.1.9 atttached at the end of this Section.

## Domestic Water Booster Pump System

### Description:

#### General: Complete packaged triplex booster pump system, including pumps, hydromatic tank, controls, control panel, piping, valves, and appurtenances, factory assembled, skid mounted, pre-wired, and tested.

#### Pumps: End suction, [close coupled,] [base mounted,] centrifugal. See Data Sheet 3.3.1.10 attached at the end of this Section.

#### Hydromatic Tank:

##### Pre-pressurized diaphragm type in accordance with Data Sheet 3.3.1.10 attached at the end of this Section.

##### Shell: Welded steel, ASME rated and stamped.

##### Diaphragm: FDA approved, replaceable heavy duty butyl with polypropylene liner with complete separation between water and shell. *[Consultant to determine Canadian equivalent to US FDA approved products and amend specifications with such]*

##### Maximum Operating Pressure: 862 kPa.

##### Maximum Operating Temperature: 52 degrees Celsius.

##### Finish: Manufacturer’s standard air dry enamel.

##### Accessories: Supports, bladder access flange, drain, air charging valve, and lifting lug.

#### Piping:

##### Material: Schedule 40 stainless steel.

##### Fittings: Screwed or flanged for 50 mm and smaller, flanged and welded for 65 mm and larger.

##### Gasket Material: Free from corrosive alkali or acid ingredients and suitable for use in potable water lines.

##### Isolation Valves: Full port ball or butterfly type.

##### Pump Check Valves: Combination pressure reducing and non-slam type, epoxy coated, field adjustable pressure setting.

##### Pressure Gauges: 115 mm dial, 2 percent accuracy, stainless steel bourdon tube with snubber and gauge cock valve.

##### Flow Gauge: Pipeline mounted flow sensor with visual indication. *[Consultant to define whether the flow gauge is a flow meter with telemetry to SCADA or by local indication or a flow switch with telemetry to SCADA or a local indicator of flow with approval from the Region]*

#### Controls:

##### Control Panel: UL/ULC listed, NEMA 1 enclosure, single point electrical connection.

##### Starter: Magnetic, across the line with thermal overload.

##### Control Switch: ON/OFF/AUTO switch for each pump with indicating lights.

##### Alarms: Audio and visual.

##### Pump Alternation: Automatic lead/lag control based on pressure transducer, including automatic transfer on pump failure.

##### Safety Controls: Thermal resets, low suction pressure cutout.

##### Flow Sequencing: Automatic, 5 step control.

##### Pressure Monitoring and Control System: Completely redundant for failure of primary system.

##### [Lockout Relay: Prevent simultaneous operation of jockey and lead pump upon power failure.]

### Capacity: See Data Sheet 3.3.1.10 attached at the end of this Section.

### Manufacturers:

#### *[Consultant to provide names of three approved products]*

#### Approved Equivalent

## Submersible Centrifugal Sump Pumps

### Simplex, Submersible Sump Pump:

#### Description:

##### Type: Simplex, heavy duty, non-clog, close coupled submersible centrifugal sewage ejector pump.

##### Volute: Cast iron, foot mounted.

##### Impeller: Cast iron, [double shroud, fully enclosed] [Chenault] [vortex].

##### Wear Plates: [Brass.] [Stainless steel.]

##### Motor Enclosure: Cast iron, Buna N “O” ring seals with corrosion resistant exterior finish.

##### Motor: Continuous duty, built in thermal overload protection.

##### Shaft Seals: Tandem, mechanical type.

##### Shaft: Stainless steel.

##### Bearings: Permanently lubricated, ball bearing with B 10 bearing life of 17,500 hours.

##### Electrical: Inner seal chamber with two moisture sensing probes and attached power and control cables, with length, voltage, and power requirements as indicated on Data Sheet 3.3.1.11 attached at the end of this Section.

##### Controls:

###### Circuit Breakers: Motor rated.

###### Motor Starters: Magnetic with thermal overload protection device.

###### Level Control: Polypropylene encapsulated non-mercury float switch.

###### Leak Detection: Pump seal alarm circuit.

##### Refer to Division 13 – SCADA and Instrumentation for details of instruments and installations.

#### Capacity: See Data Sheet 3.3.1.11 attached at the end of this Section.

#### Manufacturers:

##### ITT Corporation (Flygt Canada).

##### KSB Pumps Inc.

##### Pentair, Inc. (Myers).

##### Approved Equivalent

### Duplex, Submersible Sump Pump:

#### Construction:

##### Impeller and Volute: Non-clog design, ASTM A48/A48M-03(2012), Class 30, cast iron capable of passing 50 mm spherical solid.

##### Electrical: Water resistant, UL/ULC and CSA approved electrical power cord.

##### Motor: Sealed, oil filled, NEMA B design with winding thermal sensors.

##### Bearings and Shaft: Upper and lower thrust bearings, solid Type 303 stainless steel shaft.

##### Seals: Two mechanical seals, carbon rotating seal face and ceramic stationary seal face, and lower seal failure sensor and warning device.

#### Controller:

##### Control Panel: Fabricated steel, NEMA 4 enclosure, door disconnect switch, and UL/ULC label. Components shall have UL/ULC label. Wiring, schematics, and workmanship shall comply with NFPA 70, 2017 Edition (NEC): NEC and UL/ULC.

##### Wiring and Conduit: Minimum of MTH, 600V rated, 18 gauge with 90 degrees Celsius rating, in accordance with NFPA 70, 2017 Edition: NEC standards. Wire sized in accordance with NFPA 70, 2017 Edition: NEC standards.

##### Motor Protection: Magnetic motor starter, across the line type, UL/ULC label, under voltage and over voltage protection with manual reset button mounted in panel door.

##### Level Sensors (Duplex): Automatic pump cycle and alternation. Sealed non-mercury level sensors . Additional level sensor shall activate audible visual panel mounted light and horn. Panel mount push to silence button shall be used for deactivating audible alarm.

##### Operator Controls and Indicators:

###### One ON/OFF/AUTO selector switch for each pump.

###### One 1/2/ALTERNATE selector switch.

###### One ON indicating light for each pump.

###### One HIGH HIGH LEVEL indicating light.

###### One control power ON indicating light.

###### One moisture leakage detection indicating light for each pump.

###### One high winding temperature indicating light for each pump.

###### One overload trip indicating light for each pump.

##### External Interfaces: The following discrete contact closure outputs shall be provided. Contacts shall be rated for 2 amps at 120V ac.

###### PANEL FAILURE ALARM.

###### HIGH HIGH LEVEL ALARM.

###### SUMP PUMP ON, for each pump.

##### Functional Requirements:

###### In ON, the corresponding pump shall run. In OFF, the corresponding pump shall not run. In AUTO, the corresponding pump shall operate based on sump level and position of 1/2/ALTERNATE switch.

###### When 1/2/ALTERNATE is in the 1 position, Pump No. 1 shall be lead and Pump No. 2 shall be lag. When 1/2/ALTERNATE is in the 2 position, Pump No. 2 shall be lead and Pump No. 1 shall be lag. When 1/2/ALTERNATE is in the ALTERNATE position, lead/lag status shall be alternated each time sump level falls to LOW LEVEL.

###### When sump level rises to MIDDLE LEVEL (LSM), start the lead pump. When sump level rises to HIGH LEVEL (LSH), start the lag pump. When sump level falls to LOW LEVEL (LSL), stop all pumps.

###### When sump level rises to HIGH HIGH LEVEL (LSHH), activate the HIGH LEVEL indicating light and HIGH HIGH LEVEL alarm output.

###### While a pump is on, activate the corresponding ON indicating light.

###### While control power is not present or while the thermal overload relay of any pump is tripped, close the PANEL FAILURE discrete output.

##### Power Requirements:

###### Power supply to panel shall be 575 volt, three-phase.

###### A combination motor starter shall be provided for each pump motor.

##### Special Requirements:

###### Float switches for HIGH HIGH LEVEL (LSHH), HIGH LEVEL (LSH), MIDDLE LEVEL (LSM), LOW LEVEL (LSL). Provide float switch cables to connect to the control panel.

###### Furnish an alternator within each control panel.

###### Control systems shall be intrinsically safe. Control systems include level switches, moisture switches, and temperature switches.

#### Sump:

##### Construction: [Cast iron] [Steel] [Fibreglass] basin with corresponding cover plate.

##### Cover Plate: With vapor tight gasket, hinged equipment doors with drop handles, accessory mounting plates, discharge and vent pipe openings, and sealed power and control cable openings.

#### Quick Removal System:

##### Fittings: Steel base plate with cast iron stationary fitting, removable discharge fitting, and gasket material for positive locking.

##### Rails: Galvanized steel guide rails and base plate with stainless steel lifting rope.

#### Capacity: See Data Sheet 3.3.1.12 attached at the end of this Section.

#### Manufacturers:

##### ITT Corporation (Flygt Canada).

##### KSB Pumps Inc.

##### Pentair, Inc. (Myers).

##### Approved Equivalent

### Duplex, Column Type, Sump Pump (Acid Resistant):

#### Construction:

##### Impeller and Volute: PVC construction with stainless steel inserts.

##### Motor Support Bracket: Cast iron, epoxy coated.

##### Shaft: Stainless steel with PVC sleeve.

##### Bearings: Lower and intermediate ceramic bearings with vapor seals. Upper bearing shall be external and allow shaft adjustment.

##### Column: Ribbed PVC construction.

##### Strainer: PVC construction with 6 mm diameter holes.

##### Motor: Vertical mounted, C face, open drip proof (ODP), premium efficiency, ball bearing design.

#### Sump and Cover Plate: Cylindrical design, PVC construction, vapor-tight with sub-plates and openings.

#### Controller:

##### Float: Adjustable, rising rod, PVC construction, fume tight design. High level indicator light, dry contacts for remote alarm, alarm horn, and alarm acknowledge.

##### Control Panel: NEMA 4 enclosure with fusible disconnect switch, HOA (HAND/OFF/AUTO) selector switch. Panel mounted indicator lights for “power on” and “pump off.”

##### Motor Protection: Magnetic motor starter with overload protection.

#### Capacity: See Data Sheet 3.3.1.13 attached at the end of this Section.

#### Manufacturer:

##### ITT Corporation (Flygt Canada).

##### KSB Pumps Inc.

##### Pentair, Inc. (Myers).

##### Approved Equivalent

## Oil Separator

### Description:

#### Separator Tank [with Integral Storage]: See Data Sheet 3.3.1.14 attached at the end of this Section.

#### All welded, 6 mm tapped inlet, outlet, and vent connections, internal fume vent, adjustable oil draw off, removable filter screen, and flow control fitting.

#### Cover: Non-skid diamond tread-plate cover for flush with floor installation,[rated for pedestrian duty] [reinforced for [light] [heavy] duty traffic], stainless steel bolts, and leak-proof gasket.

#### Coatings: Factory coating to resist oil, grease, and cutting oils on inside, and bituminous coating on outside.

#### Accessories: Removable sediment bucket, steel extension flange, and double wall construction.

#### Annunciator System:

##### Manufacturer: Pneumercator Company, Inc. or Approved Equivalent.

##### Alarm Control Panel Console: Model LC 1002 Pneumercator Company, Inc. or Approved Equivalent with audible alarm, reset button, warning lights and push button test c/w two independent NO (normally open) dry contacts to open in alarm situation

##### Leak Detector: Model LS 600LDBN Pneumercator Company, Inc. or Approved Equivalent.

##### High level sensor: Model LS 600 Pneumercator Company, Inc. or Approved Equivalent.

### Capacity: See Data Sheet 3.3.1.14 attached at the end of this section.

### Manufacturers:

#### Forterra Pipe and Precast

#### M-Con Products Inc.

#### Munro Concrete Products Ltd.

#### Approved Equivalent

## Acid Neutralization Tank

### Description:

#### Cylindrically shaped, bolted nonskid cover, drain inlet, drain outlet, and side vent connection.

#### Tank: Fabricated from polypropylene, ASTM D4101-14, rated for continuous use up to 100 degrees Celsius.

#### Tank Extension: Provide as required to allow cover to be flush with finished floor.

#### Options: Provide lid rated for [no load bearing (standard cover)] [light duty pedestrian traffic] [light duty vehicular traffic].

### Capacity: See Data Sheet 3.3.1.15 attached at the end of this Section.

### Manufacturers:

#### *[Consultant to provide names of three approved products]*

#### Approved Equivalent

## Air Compressors

### Air Compressor (General Use):

#### General: Air compressor package shall consist of [simplex] [duplex] receiver mounted compressor(s), horizontal receiver, refrigerant type air dryer, filter, automatic drain traps, and controls.

#### Manufacturers:

##### Thomas Industries, Inc.

##### Quincy Compressor

##### Approved Equivalent

#### Compressor:

##### Two cylinder, single stage, reciprocating, fan air cooled.

##### Provide two-ring oil-less piston with sealed ball bearings and fluorocarbon skirt and rings.

##### Direct drive compressor with electric motor.

##### Mount close coupled unit on steel base attached to the receiver.

##### Equip with combination air intake filter silencer, discharge cushion chamber, and three additional intake filter cartridges.

##### Unit to include internal thermal overload protection, pressure switch with unloader, and check valve with unloader port.

#### Motor:

##### Energy efficient, squirrel cage type, designed, manufactured, and tested in accordance with NEMA MG 1-2016.

##### Open drip-proof enclosure for indoor installation.

##### Rated continuous duty, compatible with horsepower required by driven equipment, with 1.15 service factor.

##### Connected load shall not exceed motor nameplate horsepower rating under anticipated operating conditions.

#### After-Cooler and Moisture Separator:

##### Receiver mounted, suitable for maximum pressure of 1,724 kPa and installed between compressor discharge and receiver.

##### Locate moisture separator downstream of after-cooler and include automatically trapped drain.

##### Provide solenoid valve in water supply to after-cooler to stop cooling water when compressors are off.

##### Capacity: See data sheet 3.3.1.16 attached at the end of this Section.

#### Receiver:

##### Horizontal welded steel tank provided with required inspection openings meeting ASME Code (Boiler and Pressure Vessel Code ) and bearing ASME Code (Boiler and Pressure Vessel Code) stamp, and suitable for 1,379 kPa minimum working pressure.

##### Provide suitable safety valve, pressure gauge with gauge cock, automatic condensate drain valve with isolation valve, and manual blowdown valve located at low point in receiver.

#### Control System:

##### Provide complete system for ON/OFF cyclic operation from pressure switch system.

##### Provide automatic low oil pressure shutdown with indicating light and oil pressure gauge.

##### Panel:

###### NEMA 1 for indoor installation.

###### House complete control system including control power transformer, HAND/OFF/AUTO switch, pressure switches, relays, system pressure indicator, indicating light(s), and combination motor starter (NEMA Size 1, minimum) with overload protection, in accordance with Division 16 - Electrical and Division 13 – SCADA and Instrumentation.

###### Mount in convenient location on receiver.

##### Furnish control components pre-wired and pre-piped.

##### Power Supply: 120 V, single phase, 60 Hz.

#### Paint equipment at the factory with manufacturer’s standard machinery enamel.

#### Capacity: See Data Sheet 3.3.1.16 attached at the end of this Section.

#### Refrigerant Type Air Dryer:

##### Components:

###### Air cooled refrigeration condenser, air to refrigerant, and air to air, tube in tube non-fouling heat exchangers.

###### Include combination separator/filter capable of removing 100 percent of solid particles 3 microns in size and larger.

###### Stainless steel separator with coalescing type filter.

###### Equip dryer with automatic drain trap for removing collected condensate.

###### House entire unit in 18 gauge steel case suitable for wall mounting.

##### Controls:

###### Provide power ON light and HIGH temperature air warning light.

###### Utilize hot gas bypass system to maintain constant dew point from no load to full load conditions.

###### Provide fan cutout switch for stopping fans during low ambient conditions.

###### Provide electrical system with thermal and overload protection with automatic reset.

##### Capacity: See Data Sheet 3.3.1.16 attached at the end of this Section.

##### Manufacturers:

###### *[Consultant to provide names of three approved products]*

###### Approved Equivalent

#### Accessories:

##### Flexible Discharge Connection:

###### Corrosion resistant, dampens vibration, dampens noise, and absorbs thermal expansion.

##### Automatic Drain Traps:

###### Solid state, electrically operated, self-cleaning drain valves.

###### Provide with solid state NEMA 1 panel with adjustment for both drain cycle and open period.

###### Manufacturers:

*[Consultant to provide names of three approved products]*

Approved Equivalent

##### Particulate Filter:

###### High flow capacity, 5 micron particulate filter, 1,050 kPa maximum supply pressure, 12 mm NPT, zinc body, quick disconnect plastic bowl with nitrile seal, and manual drain.

###### Manufacturers:

*[Consultant to provide names of three approved products]*

Approved Equivalent

##### Adjustable Pressure Regulator:

###### Adjustable pressure range from 0 to 862 kPa, 2,069 kPa maximum supply pressure, 12 mm NPT, zinc body with brass valve, nitrile/zinc diaphragm and stainless steel spring, and 40 mm dial face pressure gauge.

###### Manufacturers:

*[Consultant to provide names of three approved products]*

Approved Equivalent

##### Quick Disconnect:

###### Female NPT by male NPT quick connect hose adapter, coated carbon steel, stainless steel springs, viton “O” rings, and TFE backup rings and wiper.

###### Manufacturers:

*[Consultant to provide names of three approved products]*

Approved Equivalent

#### Capacity: See Data Sheet 3.3.1.16 attached at the end of this Section.

### Air Compressor (Laboratory):

#### Compressor:

##### [Simplex] [Duplex] receiver mounted compressor(s), horizontal receiver, refrigerant type air dryer, filter, automatic drain traps, and controls.

##### Two cylinder, single stage, reciprocating, fan air cooled.

##### Provide two ring oil-less piston with sealed ball bearings and fluorocarbon skirt and rings.

##### Direct drive compressor with electric motor.

##### Mount close coupled unit on steel base attached to the receiver.

##### Equip with combination air intake filter silencer, discharge cushion chamber, and three additional intake filter cartridges.

##### Unit to include internal thermal overload protection, pressure switch with unloader, and check valve with unloader port.

#### Motor:

##### Energy efficient, squirrel cage type, designed, manufactured, and tested in accordance with NEMA MG 1-2016.

##### Open drip proof enclosure for indoor installation.

##### Rated continuous duty, as specified, compatible with horsepower required by driven equipment, with 1.15 service factor.

##### Connected load shall not exceed motor nameplate horsepower rating under anticipated operating conditions.

#### After-Cooler and Moisture Separator:

##### Receiver mounted, suitable for maximum pressure of 1,724 kPa and installed between compressor discharge and receiver.

##### Locate moisture separator downstream of after-cooler and include automatically trapped drain.

##### Provide solenoid valve in water supply to after-cooler to stop cooling water when compressors are off.

##### Capacity: See data sheet 3.3.1.17 attached at the end of this Section.

#### Receiver:

##### Horizontal welded steel tank provided with required inspection openings meeting ASME Code (Boiler and Pressure Vessel Code Section VIII - Rules for Construction of Pressure Vessels Division 1)and bearing ASME Code (Boiler and Pressure Vessel Code Section VIII - Rules for Construction of Pressure Vessels Division 1)stamp, and suitable for 1,379 kPa minimum working pressure.

##### Provide suitable safety valve, pressure gauge with gauge cock, automatic condensate drain valve with isolation valve, and manual blowdown valve located at the low point in the receiver.

#### Control System:

##### Provide complete system for ON/OFF cyclic operation from pressure switch system.

##### Provide automatic low oil pressure shutdown with indicating light and oil pressure gauge.

##### Panel:

###### NEMA 1 for indoor installation.

###### House complete control system including control power transformer, HAND/OFF/AUTO switch, pressure switches, relays, system pressure indicator, indicating light(s), and combination motor starter (NEMA Size 1 minimum) with overload protection, in accordance with Division 16 – Electrical and Section 13 – SCADA and Instrumentation.

###### Mount in convenient location on receiver.

##### Furnish control components prewired and pre-piped.

##### Control Power Supply: 120 volts, single phase, 60 Hz.

#### Paint equipment at the factory with the manufacturer’s standard machinery enamel.

#### Capacity: See Data Sheet 3.3.1.17 attached at the end of this Section.

#### Manufacturers:

##### *[Consultant to provide names of three approved products]*

##### Approved Equivalent

#### Refrigerant Type Air Dryer:

##### Components:

###### Air cooled refrigeration condenser, air to refrigerant, and air to air, tube in tube non-fouling heat exchangers.

###### Include combination separator/filter capable of removing 100 percent of solids particles 3 microns in size and larger.

###### Stainless steel separator with coalescing type filter.

###### Equip dryer with an automatic drain trap for removing collected condensate.

###### House entire unit in 18 gauge steel case suitable for wall mounting.

##### Controls:

###### Provide power ON light and HIGH temperature air warning light.

###### Utilize hot gas bypass system to maintain constant dew point from no load to full load conditions.

###### Provide fan cutout switch for stopping fans during low ambient conditions.

###### Provide electrical system with thermal and overload protection with automatic reset.

##### Capacity: See Data Sheet 3.3.1.17 attached at the end of this Section.

##### Manufacturers:

###### *[Consultant to provide names of three approved products]*

###### Approved Equivalent

#### Accessories:

##### Flexible Discharge Connection:

###### Corrosion resistant, dampens vibration, dampens noise, and absorbs thermal expansion.

##### Filter:

###### Replaceable element, coalescing type for oil removal, suitable for eliminating 99.9% of oil entrained in air leaving compressor assemblies.

###### Provide automatic float drain for liquid removal and differential pressure indicator calibrated for 69 kPa differential.

##### Automatic Drain Traps:

###### Solid state, electrically operated, self-cleaning drain valves.

###### Provide with solid state NEMA 1 panel with adjustment for drain cycle and open period.

## Vacuum Pumps

### Vacuum package shall consist of [A: simplex] [B: duplex] tank mounted vacuum pump(s), horizontal tank, and controls.

### Pump:

#### [Single] [Two]cylinder, single stage, reciprocating, fan air cooled.

#### Provide two ring oil-less piston with sealed ball bearings and fluorocarbon skirt and rings.

#### Direct drive vacuum pump with electric motor.

#### Mount close coupled unit on steel base attached to receiver.

#### Provide with exhaust valve screen and muffler, integral pulsation chamber, factory installed centrifugal unloader and check valve, and intake filter trap to prevent oil and foreign material from entering vacuum pump.

### Motor:

#### Energy efficient, squirrel cage type, designed, manufactured, and tested in accordance with NEMA MG 1-2016.

#### Open drip proof enclosure for indoor installation.

#### Rated continuous duty, compatible with horsepower required by driven equipment, with 1.15 service factor.

#### Connected load shall not exceed motor nameplate horsepower rating under anticipated operating conditions.

### Vacuum Tank:

#### Horizontal welded steel tank provided with required inspection openings meeting ASME Code (Boiler and Pressure Vessel Code Section VIII - Rules for Construction of Pressure Vessels Division 1) and bearing ASME Code stamp, and suitable for 207 kPa minimum working pressure.

#### Provide suitable safety valve, pressure gauge with gauge cock, automatic condensate drain valve with isolation valve, and manual blowdown valve located at the low point in the receiver.

### Control System:

#### Provide complete system for ON/OFF cyclic operation from vacuum switch system.

#### Panel:

##### NEMA 1 for indoor installation.

##### House complete control system including control power transformer, HAND/OFF/AUTO switch, pressure switches, relays, system pressure indicator, indicating light(s), and combination motor starter (NEMA Size 1 minimum) with overload protection, in accordance with Division 16 – Electrical and Division 13 – SCADA and Instrumentation.

##### Mount in convenient location on tank.

#### Furnish control components pre-wired and pre-piped.

#### Control Power Supply: 120 volts, single phase, and 60 Hz.

### Paint equipment at factory with manufacturer’s standard machinery enamel.

### Capacity: See Data Sheet 3.3.1.18 attached at the end of this Section.

### Manufacturers:

#### *[Consultant to provide names of three approved products]*

#### Approved Equivalent

### Accessories:

#### Flexible Discharge Connection:

##### Manufacturers:

###### *[Consultant to provide names of three approved products]*

###### Approved Equivalent

## Backflow Preventers

### Double Check Backflow Preventer (20 mm through 50 mm):

#### Description:

##### Regulatory Compliance: AWWA C510-07, CSA B64 SERIES-11

##### Valve Body: Bronze.

##### End Connections: Threaded, NPT.

##### Maximum Working Pressure: 1,207 kPa (2,413 kPa test).

##### Temperature Range: 0 degrees to 60 degrees Celsius.

##### Shutoff Valve: Full port, resilient seated, bronze ball valve with bronze ball valve test cock.

##### [Inlet Strainer: Bronze wye strainer, 40 mesh perforated, Type 304 stainless steel.]

#### Sizes: See Data Sheet 3.3.1.19 attached at the end of this Section.

#### Manufacturers and Products:

##### Watts Water Technologies, Inc. - Series 007QT-S.

##### Conbraco Industries, Inc.

##### Approved Equivalent

### Double Check Backflow Preventer (65 mm through 250 mm):

#### Description:

##### Regulatory Compliance: AWWA C510-07, CSA B64 SERIES-11

##### Valve Body: Ductile or cast iron, Class 125, epoxy coated

##### End Connections: Flanged.

##### Maximum Working Pressure: 1,207 kPa (2,413 kPa test).

##### Temperature Range: 0 degrees to 60 degrees Celsius.

##### Shutoff Valve: Non-rising stem, resilient seated gate valve with bronze ball valve test cock.

##### [Inlet Strainer: Cast iron wye strainer, Class 125 flanged, fusion epoxy AWWA C550-13 coated, perforated stainless steel screen (1.5 mm perforations on 65 mm to 100 mm; 3 mm perforation on 150 mm to 250 mm), threaded cap plug blowout opening.]

#### Sizes: See Data Sheet 3.3.1.19 attached at the end of this Section.

#### Manufacturers and Products:

##### Watts Water Technologies, Inc. - Series 007QT-S.

##### Conbraco Industries, Inc.

##### Approved Equivalent .

### Reduced Pressure Backflow Preventers (6 mm through 12 mm):

#### Description:

##### Regulatory Compliance: AWWA C511-07, CSA B64 SERIES-11

##### Valve Body: Bronze.

##### End Connections: Threaded, NPT.

##### Maximum Working Pressure: 1,207 kPa (2,613 kPa test).

##### Temperature Range: 0 degrees to 60 degrees Celsius.

##### Shutoff Valve: Full port, resilient seated, bronze ball valve with bronze ball valve test cock.

##### Accessories: Drain line air gap fitting.

#### Sizes: See Data Sheet 3.3.1.19 attached at the end of this Section.

#### Manufacturer and Product:

##### Conbraco Industries; Series 20 400

##### Approved Equivalent.

### Reduced Pressure Backflow Preventers (20 mm through 50 mm):

#### Description:

##### Regulatory Compliance: AWWA C511-07, CSA B64 SERIES 11.

##### Valve Body: Bronze.

##### End Connections: Threaded, NPT.

##### Maximum Working Pressure: 1,207 kPa (2,413 kPa test).

##### Temperature Range: 0 degrees to 60 degrees C.

##### Shutoff Valve: Full port, resilient seated, bronze ball valve with bronze ball valve test cock.

##### [Inlet Strainer: Bronze wye strainer, 40 mesh perforated, Type 304 stainless steel.]

##### Accessories: Drain line air gap fitting.

#### Sizes: See Data Sheet 3.3.1.19 attached at the end of this Section.

#### Manufacturers and Products:

##### Watts Water Technologies, Inc. - Series 909QT-S.

##### Conbraco Industries, Inc.

##### Approved Equivalent

### Reduced Pressure Backflow Preventers (65 mm Through 250 mm):

#### Description:

##### Regulatory Compliance: AWWA C511-07, CSA B64 SERIES-11, FCCCHR of USC Section 10, ASSE 1013. *[Consultant to confirm applicability of FCCCHR of USC requirements and amend as required]*

##### Valve Body: Ductile or cast iron, Class 125, epoxy coated (FDA approved). *[Consultant to determine Canadian equivalent to US FDA approved products and amend specifications with such]*

##### End Connections: Flanged.

##### Maximum Working Pressure: 1,207 kPa (2,413 kPa test).

##### Temperature Range: 0 degrees to 60 degrees Celsius.

##### Shutoff Valve: Non-rising stem, resilient seated gate valve with bronze ball valve test cock.

##### [Inlet Strainer: Cast iron wye strainer, Class 125 flanged, fusion epoxy AWWA C550-13 coated, perforated stainless steel screen (1.5 mm perforations on 65 mm to 100 mm; 3 mm perforation on 150 mm to 250 mm), threaded cap plug blowout opening.]

##### Accessories: Drain line air gap fitting.

#### Sizes: See Data Sheet 3.3.1.19 attached at the end of this Section.

#### Manufacturers and Products:

##### Watts Water Technologies, Inc. - Series 009QT-S.

##### Conbraco Industries, Inc.

##### Approved Equivalent

# EXECUTION

## Installation

### Install, arrange, and connect equipment as shown on the Contract Drawings and in accordance with the manufacturer’s recommendations.

## Field Quality Control

### Pumps: Do not hydrostatic test pumps with mechanical seals.

### Startup:

#### In accordance with Section 01810 - Equipment Testing and Facility Commissioning, and Section 15950 - HVAC Systems Testing, Adjusting, and Balancing.

#### Piping Systems: Verify that flushing, cleaning, and testing has been completed prior to startup.

## Supplements

### The supplements listed below, attached following “End of Section,” form part of this Section:

#### Data Sheet: Instantaneous Water Heater.

#### Data Sheet: Electric Water heater (Residential).

#### Data Sheet: Electric Water Heater (Commercial).

#### Data Sheet: Gas Water Heater (Residential).

#### Data Sheet: Gas Water Heater (Commercial).

#### Data Sheet: Heat Exchanger (Hot Water and Steam).

#### Data Sheet: Domestic Water Storage Tank (Stainless Steel and Glass Lined).

#### Data Sheet: Domestic Water Expansion Tank.

#### Data Sheet: Domestic Hot Water Circulating Pump.

#### Data Sheet: Domestic Water Booster Pump System.

#### Data Sheet: Simplex, Submersible Sump Pump.

#### Data Sheet: Duplex, Submersible Sump Pump.

#### Data Sheet: Duplex, Column Type, Sump Pump (Acid Resistant).

#### Data Sheet: Oil Separator.

#### Data Sheet: Acid Neutralization Tank.

#### Data Sheet: Air Compressor (General Use).

#### Data Sheet: Air Compressor (Lab).

#### Data Sheet: Vacuum Pump.

#### Data Sheet: Backflow Preventers.

**END OF SECTION**

*[DESIGN NOTE: Consultant to review the contents of all Data Sheets (3.3.1.1 through 3.3.1.19) for accuracy of technical data, tag numbers and all other aspects to ensure alignment with technical requirements and Contract Documents. Consultant to delete Data Sheets that are not required for the project and re-number as appropriate]*

INSTANTANEOUS WATER HEATER – Data Sheet 3.1.1.1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tag Number (\*) | Flow Rate (L/s) | Temperature Rise (degrees C) | Power (kW) | Power Supply | Manufacturer and Model Number |
| WH-01 | 0.03 | 22.2 | 3.0 | 120V/1ph | . |
| WH-02 | 0.03 | 35.0 | 4.6 | 208V/1ph | . |
| WH-03 | 0.06 | 22.8 | 6.0 | 208V/1ph | . |
| WH-04 | 0.06 | 26.7 | 7.0 | 208V/1ph | . |
| WH-05 | 0.06 | 30.0 | 8.0 | 208V/1ph | . |
| WH-06 | 0.06 | 33.9 | 9.0 | 208V/1ph | . |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.

ELECTRIC WATER HEATER (RESIDENTIAL) – Data Sheet 3.1.1.2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tag Number (\*) | Storage Capacity (litre) | Upper Element (kW) | Lower Element (kW) | Simultaneous Element Operation | Power Supply | Diameter (mm) | Height (mm) | Manufacturer and Model No. |
| WH-01 | 7.6 | 1.5 | 0.0 | No | 120V/1ph | 250 | 300 |  |
| WH-02 | 22.7 | 1.5 | 0.0 | No | 120V/1ph | 350 | 400 |  |
| WH-03 | 45.5 | 1.5 | 0.0 | No | 120V/1ph | 350 | 700 |  |
| WH-04 | 72.0 | 1.5 | 0.0 | No | 120V/1ph | 450 | 600 |  |
| WH-05 | 113.7 | 1.5 | 0.0 | No | 120V/1ph | 500 | 750 |  |
| WH-06 | 113.7 | 3.0 | 3.0 | Yes | 208V/3ph | 400 | 1,150 |  |
| WH-07 | 151.6 | 0.0 | 0.0 | - | - | 450 | 1,150 |  |
| WH-08 | 189.5 | 0.0 | 0.0 | - | - | 500 | 1,150 |  |
| WH-09 | 246.4 | 0.0 | 0.0 | - | - | 500 | 1,475 |  |
| WH-10 | 303.2 | 0.0 | 0.0 | - | - | 550 | 1,475 |  |
| WH-11 | 451.0 | 0.0 | 0.0 | - | - | 700 | 1,550 |  |
| Notes:  1. Heating elements available are: 1.0, 1.25, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, and 6.0 kW.  2. Voltages available are: 120V/1ph, 208V/1ph, 208V/3ph, and 240V/1ph. | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| WH-01 | 9.55 | 1.5 | 0.0 | No | 120V/1ph | 275 | 350 | . |
| WH-02 | 18.9 | 1.5 | 0.0 | No | 120V/1ph | 275 | 500 |  |
| WH-03 | 37.9 | 1.5 | 0.0 | No | 120V/1ph | 450 | 25 |  |
| WH-04 | 56.9 | 1.5 | 0.0 | No | 120V/1ph | 450 | 650 |  |
| WH-05 | 75.4 | 2.5 | 0.0 | No | 120V/1ph | 550 | 550 |  |
| WH-06 | 113.7 | 4.5 | 0.0 | No | 240V/1ph | 550 | 775 |  |
| WH-07 | 151.6 | 4.5 | 0.0 | No | 240V/1ph | 575 | 800 |  |
| Notes:  1. Maximum element wattage of 3.0 kW for 120V and 6.0 kW for 240V units. | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| WH-08 | 113.7 | 4.5 | 4.5 | No | 240V/1ph | 500 | 875 |  |
| WH-09 | 151.6 | 4.5 | 4.5 | No | 240V/1ph | 500 | 1,100 |  |
| WH-10 | 197.1 | 4.5 | 4.5 | No | 240V/1ph | 500 | 1,350 |  |
| WH-11 | 250.1 | 4.5 | 4.5 | No | 240V/1ph | 550 | 1,500 |  |
| WH-12 | 303.2 | 4.5 | 4.5 | No | 240V/1ph | 600 | 1,475 |  |
| WH-13 | 454.80 | 4.5 | 4.5 | No | 240V/1ph | 750 | 1,575 |  |
| Notes:   1. Optional maximum element power of 6.0 kW for 151.6 through 454.8 L units. | | | | | | | | |
| (\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging. | | | | | | | | |

**ELECTRIC WATER HEATER (COMMERCIAL) – Data Sheet 3.1.1.3**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Storage  Capacity  (litre) | Upper  Element  (kW) | Lower  Element  (kW) | Simultaneous  Element  Operation | Voltage | Diameter  (mm) | Height  (mm) | Manufacturer, Model No. |
| WH-01 | 113.7 | 0.0 | 0.0 | \* | \* | 400 | 1,150 |  |
| WH-02 | 151.6 | 0.0 | 0.0 | \* | \* | 450 | 1,150 |  |
| WH-03 | 189.5 | 0.0 | 0.0 | \* | \* | 500 | 1,150 |  |
| WH-04 | 246.4 | 0.0 | 0.0 | \* | \* | 500 | 1,475 |  |
| WH-05 | 303.2 | 0.0 | 0.0 | \* | \* | 550 | 1,475 |  |
| WH-06 | 451.0 | 0.0 | 0.0 | \* | \* | 700 | 1,550 |  |
| Notes:  1. Heating elements available are; 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, and 6.0 kW.  2. Voltages available are; 208V/3ph, and 600V/3ph. | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (3) | Storage  Capacity  (litre) | Total  Input  (kW) | No. of  Elements | Simultaneous  Element  Operation | Voltage | Diameter  (mm) | Height  (mm) | Manufacturer, Model No. |
| WH-01 | 18.9 | 3.0 | 1 | Yes | \* | 400 | 525 |  |
| WH-02 | 37.9 | 6.0 | 1 | Yes | \* | 475 | 650 |  |
| WH-03 | 75.8 | 18.0 | 2 | Yes | \* | 525 | 675 |  |
| WH-04 | 113.7 | 24.0 | 2 | Yes | \* | 525 | 900 |  |
| WH-05 | 151.6 | 36.0 | 2 | Yes | \* | 525 | 1,150 |  |
| WH-06 | 189.5 | 45.0 | 3 | Yes | \* | 525 | 1,375 |  |
| WH-07 | 246.4 | 54.0 | 3 | Yes | \* | 700 | 1,400 |  |
| WH-08 | 303.2 | 54.0 | 3 | Yes | \* | 700 | 1,375 |  |
| WH-09 | 379.00 | 54.0 | 3 | Yes | \* | 700 | 1,600 |  |
| WH-10 | 454.8 | 54.0 | 3 | Yes | \* | 750 | 1,700 |  |
| Notes:  1. Voltages available are; 208V/1ph or 3ph, 240V/1ph, 575V/1ph or 3ph | | | | | | | | |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.

GAS WATER HEATER (RESIDENTIAL) – Data Sheet 3.1.1.4

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Storage  Capacity  (litre) | Recovery  @ 100F Rise  (L/s) | Heating  Capacity  Input  (kW) | Percent  Efficiency | Diameter  (mm) | Height  (mm) | Vent  Size  (mm) | Manufacturer, Model No. |
| WH-01 | 144.0 | 0.05 | 14.7 | 80% | 450 | 1,500 | 100 |  |
| WH-02 | 189.5 | 0.05 | 14.7 | 80% | 500 | 1,500 | 100 |  |
| WH-03 | 113.7 | 0.03 | 9.4 | 80% | 400 | 1,500 | 80 |  |
| WH-04 | 151.6 | 0.034 | 10.0 | 80% | 450 | 1,500 | 80 |  |
| WH-05 | 189.5 | 0.04 | 11.7 | 80% | 500 | 1,500 | 80 |  |
| WH-06 | 284.3 | 0.07 | 22.0 | 80% | 600 | 1,700 | 100 |  |
| WH-07 | 379.0 | 0.08 | 24.0 | 80% | 700 | 1,825 | 100 |  |
| WH-08 | 113.7 | 0.04 | 11.7 | 85% | 500 | 1,500 | 80 |  |
| WH-09 | 151.6 | 0.04 | 11.7 | 85% | 550 | 1,500 | 80 |  |
| Notes:  1. First two models are "high recovery" models, the next five are "energy saver" models, and the last two are “efficiency plus” models.  2. Minimum efficiency indicated in the specification is 80%. | | | | | | | | |
|  |  |  |  |  |  |  |  |  |
| WH-01 | 151.6 | 0.04 | 11.7 |  | 500 | 1,400 | 80 |  |
| WH-02 | 189.5 | 0.04 | 11.7 |  | 550 | 1,425 | 80 |  |
| WH-03 | 113.7 | 0.04 | 11.7 |  | 450 | 1,450 | 80 |  |
| WH-04 | 113.7 | 0.04 | 11.7 |  | 500 | 1,075 | 80 |  |
| WH-05 | 151.6 | 0.04 | 11.7 |  | 550 | 1,200 | 80 |  |
| WH-06 | 189.5 | 0.05 | 14.7 |  | 500 | 1,500 | 100 |  |
| WH-07 | 246.4 | 0.05 | 15.2 |  | 650 | 1,325 | 100 |  |
| WH-08 | 284.3 | 0.072 | 22.0 |  | 650 | 1,450 | 100 |  |
| WH-09 | 379.0 | 0.076 | 23.4 |  | 675 | 1,650 | 100 |  |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.GAS WATER HEATER (COMMERCIAL) – Data Sheet 3.1.1.5

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gas Water Heater: | | | | | | | | | |
| Tag  Number (\*) | Heating  Capacity  Input  (kW) | Recovery  @ 55.5°C (100F) Rise  (L/s) | Percent  Efficiency | Length  (mm) | Width  (mm) | Height  (mm) | Vent  Size  (mm) | Firing  Control  System | Manufacturer, Model No. |
| WH-01 | 26.4 | 0.09 | 85% | 450 | 625 | 675 | 125 | \* |  |
| WH-02 | 40 | 0.14 | 85% | 550 | 625 | 675 | 125 | \* |  |
| WH-03 | 52.7 | 0.19 | 85% | 650 | 625 | 675 | 150 | \* |  |
| WH-04 | 65.9 | 0.24 | 85% | 725 | 625 | 675 | 175 | \* |  |
| WH-05 | 79 | 0.28 | 85% | 800 | 625 | 675 | 175 | \* |  |
| WH-06 | 92.3 | 0.33 | 85% | 875 | 625 | 675 | 200 | \* |  |
| WH-07 | 105.5 | 0.38 | 85% | 950 | 625 | 675 | 200 | \* |  |
| Notes:  1. Firing Control Systems options; F-1 is standing pilot, F-9 is electronic pilot, M-9 is electronic pilot with modulating gas valve. | | | | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Storage Tank: | | | | | | |
| Tag  Number (3) | Configuration | Capacity  (litre) | Width  (mm) | Length  (mm) | Height  (mm) | Manufacturer, Model No. |
| ST-01 | Vertical | 450 | 850 | 750 | 1,700 |  |
| ST-02 | Vertical | 833 | 950 | 850 | 2,025 |  |
| ST-03 | Vertical | 1,204 | 1,150 | 1,150 | 2,025 |  |
| ST-04 | Vertical | 1,635 | 1,300 | 1,300 | 2,025 |  |
| ST-05 | Vertical | 1,908 | 1,300 | 1,300 | 2,325 |  |
|  |  |  |  |  |  |  |
| ST-01 | Horizontal | 1,135 | 1,050 | 1,950 | 1,125 |  |
| ST-01 | Horizontal | 1,514 | 1,050 | 2,590 | 1,125 |  |
| ST-01 | Horizontal | 1,892 | 1,200 | 2,250 | 1,275 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HW Circulation Pump: | | | | |
| Tag  Number (3) | Flow Rate  (L/s) | Pressure  (m head) | Motor  (kW) | Power Supply |
| P-01 | 1.9 | 2.5 | 0.12 | 120V/1ph |
| Notes:  1. Circulation pump is appropriate for water heater capacities from 26.4 kW to 104 kW. | | | | |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.

HEAT EXCHANGER (HOT WATER) – Data Sheet 3.1.1.6

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Heating  Capacity  (kW) | Flow  Rate  (L/s) | Entering  Cold Water  Temperature  (degrees C) | Leaving  Cold Water  Temperature  (degrees C) | Maximum  Pressure  Drop  (kPa) | Entering  Htg. Water  Temperature  (degrees C) | Leaving  Htg. Water  Temperature  (degrees C) | Maximum  Pressure  Drop  (kPa) | Manufacturer, Model No. |
| HX-01 | 26.4 | 1.9 | 7.2 | 60 | 21 | 7.2 | 60 | 21 |  |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging. HEAT EXCHANGER (STEAM) – Data Sheet 3.1.1.6

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Heating  Capacity  (kW) | Flow  Rate  (L/s) | Entering  Cold Water  Temperature  (degrees C) | Leaving  Cold Water  Temperature  (degrees C) | Maximum  Pressure  Drop  (kPa) | Steam  Flow  (kg/hr) | Steam  Pressure  (kPa) | Minimum  Heating  Surface  (m2) | Manufacturer, Model No. |
| HX-01 | 26.4 | 2.9 | 7.2 | 60 | 21 | 136 | 103.4 | 1.0 |  |

**(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.**

DOMESTIC WATER STORAGE TANK (STAINLESS STEEL (SS) AND GLASS-LINED) – Data Sheet 3.1.1.7

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Capacity  (litre) | Materials | Configuration  (horiz./ vert.) | Diameter  (mm) | Height  (mm) | Insulation  (yes / no) | Connections  (no/size) | Manufacturer; Model No. |
|  |  |  |  |  |  |  |  |  |
| ST-01 | 181.9 | SS | Vertical | 450 | 1,200 | no | 2 / 20 |  |
| ST-02 | 288.0 | SS | Vertical | 500 | 1,500 | no | 2 / 20 |  |
| ST-03 | 928.6 | SS | Vertical | 750 | 2,100 | no | 2 / 50 |  |
| ST-04 | 1,212.8 | SS | Vertical | 1,050 | 1,500 | no | 2 / 50 |  |
| ST-05 | 1,288.6 | SS | Vertical | 900 | 2,100 | no | 2 / 50 |  |
| ST-06 | 1,743.6 | SS | Vertical | 1,050 | 2,100 | no | 2 / 50 |  |
|  |  |  |  |  |  |  |  |  |
| ST-01 | 295.6 | Glass-Lined | Vertical | 600 | 1,450 | yes | 2 / 50 |  |
| ST-02 | 322.2 | Glass-Lined | Vertical | 700 | 1,200 | yes | 2 / 50 |  |
| ST-03 | 451.0 | Glass-Lined | Vertical | 700 | 1,550 | yes | 2 / 50 |  |
| ST-04 | 451.0 | Glass-Lined | Vertical | 700 | 1,550 | yes | 2 / 50 |  |
| ST-05 | 758.0 | Glass-Lined | Vertical | 800 | 1,925 | yes | 2 / 50 |  |

**(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.**

DOMESTIC WATER EXPANSION TANK– Data Sheet 3.1.1.8

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Configuration  (horiz./ vert.) | Total  Volume  (litre) | Acceptance  Volume  (litre) | Air  Pre-charge  (kPa) | Diameter  (mm) | Height  (mm) | Manufacturer, Model No. |
| ET-01 | Vertical | 7.96 | 3.4 | 83 | 250 | 225 |  |
| ET-02 | Vertical | 17.8 | 9.1 | 83 | 300 | 300 |  |
| ET-03 | Vertical | 28.8 | 9.1 | 83 | 300 | 500 |  |
| ET-04 | Vertical | 47.4 | 37.9 | 83 | 400 | 425 |  |

**(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.**

DOMESTIC HOT WATER CIRCULATNG PUMP– Data Sheet 3.1.1.9

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Flow Rate  (L/s) | Pressure  (m head) | Motor  (kW) | Power Supply  (Volts/phase) | Manufacturer, Model No. |
| CP-01 | 0.63 | 3.05 | 0.06 | 120V/1ph |  |
| CP-02 | 0.63 | 2.44 | 0.04 | 120V/1ph |  |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.DOMESTIC WATER BOOSTER PUMP SYSTEM– Data Sheet 3.1.1.10

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Flow Rate  (L/s) | Pressure  (m head) | Motor  (kW) | Pump  Speed  (rpm) | Power Supply  (Volts/phase) |
|  |  |  |  |  |  |
| BP-01-01 | 0.63 | 10.7 | 0.2 | 1750 | 120V/1ph |
| BP-02-01 |  |  |  |  |  |
|  |  |  |  |  |  |
| Pump #2 and #3 (Lead and Lag Pumps): | | |  |  |  |
| BP-01-02 | 3.15 | 10.7 | 0.75 | 1750 | 575V/3ph |
| BP-01-03 | 3.15 | 10.7 | 0.75 | 1750 | 575V/3ph |
|  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Hydro-Pneumatic Tank: | |  |  |  |  |  |
| Tag  Number (\*) | Configuration  (horiz / vert) | Total  Volume  (litre) | Acceptance  Volume  (litre) | Air  Pre-charge  (kPa) | Diameter  (mm) | Height  (mm) |
|  |  |  |  |  |  |  |
| BP-01-ET | Vertical | 7.95 | 3.4 | 83 | 250 | 225 |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging. SIMPLEX, SUBMERSIBLE SUMP PUMP – Data Sheet 3.1.1.11

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Flow Rate  (L/s) | Pressure  (m head) | Motor  (kW) | Motor  Speed  (rpm) | Power Supply  (Volts/phase) | Manufacturer, Model No. |
| SP-01 | 2.0 | 6.4 | 0.25 | 1750 | 120V/1ph |  |
| SP-02 | 3.15 | 7.6 | 0.37 | 1750 | 120V/1ph |  |
| SP-03 | 2.2 | 3.05 | 0.20 | 1550 | 120V/1ph |  |
| SP-04 | 2.0 | 4.3 | 0.25 | 1550 | 120V/1ph |  |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.DUPLEX, SUBMERSIBLE SUMP PUMP – Data Sheet 3.1.1.12

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sump Pump: | | | | | | |
| Tag  Number (\*) | Flow Rate  (L/s) | Pressure  (m head) | Motor  (kW) | Motor Speed  (rpm) | Power Supply  (Volts/phase) | Manufacturer, Model No. |
| SP-01 |  |  |  | 1750 | 120V/1ph |  |
| SP-02 |  |  |  | 1750 | 120V/1ph |  |
| SP-03 |  |  |  | 1750 | 120V/1ph |  |
| SP-04 |  |  |  | 1750 | 120V/1ph |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sump: | | | | | | | | | |
| Tag  Number (\*) | Sump | | Elevation of | | | | | | |
| Config  (sq/rd) | Size (m)  (L x W or dia.) | Finished  Floor  (m) | Inlet  Pipe  (m) | Water  Alarm  (m) | Override  (m) | Pump  On  (m) | Pump  Off  (m) | Bottom  of Sump  (m) |
| SP-01 | round | 1.20 | 30.5 | 30 | 29.4 | 29.3 | 29.1 | 28.2 | 28 |
| SP-02 | round | 1.50 |  |  |  |  |  |  |  |
| SP-03 | square | 1.2 x 1.2 |  |  |  |  |  |  |  |
| SP-04 | square | 1.5 x 1.5 |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Brake Horsepower Calculator: | | | |
| Flow = | 0.63 | L/s | Note:  Brake horsepower calculator should be deleted from the final equipment schedule. |
| Pressure = | 10.7 | m head |
| Fluid Specific Gravity = | 1.00 |  |
| Pump Efficiency = | 70% |  |
| Motor Efficiency = | 90% |  |
| kW Brake Horsepower = | 0.10 | kW |

**(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.**

DUPLEX, COLUMN TYPE, SUMP PUMP (ACID RESISTANT) – Data Sheet 3.1.1.13

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sump Pump: | | | | | | |
| Tag  Number (\*) | Flow Rate  (L/s) | Pressure  (m head) | Motor  (kW) | Motor Speed  (rpm) | Power Supply  (Volts/phase) | Manufacturer, Model No. |
| SP-01 | 1.3 | 4.6 | 0.335 | 1750 | 120V/1ph |  |
| SP-02 | 3.8 | 9.14 | 1.34 | 1750 | 120V/1ph |  |
| SP-03 | 6.3 | 3.05 | 0.67 | 1750 | 120V/1ph |  |
| SP-04 | 6.3 | 9.14 | 2.01 | 1750 | 120V/1ph |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sump: | | | | | | | | |
| Tag  Number (\*) | Sump | | Elevation of | | | | | |
|  | Config  (sq/rd) | Size (m)  (L x W or dia.) | Finished  Floor  (m) | Inlet  Pipe  (m) | Water  Alarm  (m) | Pump  On  (m) | Pump  Off  (m) | Bottom  of Sump  (m) |
| SP-01 | round | 1.2 m | 30.5 | 30 | 29.4 | 29.1 | 28.2 | 28.0 |
| SP-02 | round | 1.5 m |  |  |  |  |  |  |
| SP-03 | square | 1.2 x 1.2 m |  |  |  |  |  |  |
| SP-04 | square | 1.5 x 1.5 m |  |  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| Brake Horsepower Calculator: | | Note:  1. Brake horsepower calculator should be deleted from the final  equipment schedule.  2. Add a Pump Override column to the Sump Schedule is a  duplex system is used. |
| Flow = | 6.3L/s |
| Pressure = | 9.14m head |
| Fluid Specific Gravity = | 1.00 |
| Pump Efficiency = | 70% |
| Motor Efficiency = | 90% |
| kW Brake Horsepower = | 0.89kW |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.OIL SEPARATOR – Data Sheet 3.1.1.14

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Intermittent  Flow  (L/s) | Static  Holding  Capacity  (litre) | Inlet /  Outlet  (mm) | Vent  (mm) | Integral  Storage  Capacity  (litre) | Length  (mm) | Width  (mm) | Height  (mm) | Manufacturer, Model No. |
| OS-01 | 1.6 | 170.6 | 50 | 80 | 189.5 | 600 | 1,150 | 750 |  |
| OS-02 | 2.2 | 242.6 | 80 | 80 | 189.5 | 750 | 1,100 | 775 |  |
| OS-03 | 3.15 | 284.3 | 80 | 80 | 379.0 | 900 | 1,625 | 800 |  |
| OS-04 | 4.7 | 568.5 | 100 | 100 | 379.0 | 1,000 | 1,625 | 900 |  |
| OS-05 | 6.3 | 651.9 | 100 | 100 | 758.0 | 1,225 | 2,250 | 900 |  |
| OS-06 | 9.5 | 795.9 | 100 | 100 | 758.0 | 1,425 | 1,700 | 1,100 |  |
| OS-07 | 12.6 | 1080.2 | 100 | 100 | 1137.0 | 1,600 | 2,275 | 1,200 |  |
| OS-07 | 15.8 | 1504.6 | 100 | 100 | 1137.0 | 1,600 | 2,300 | 1,275 |  |
| OS-09 | 18.9 | 1845.7 | 150 | 100 | 1137.0 | 1,750 | 2,200 | 1,300 |  |
| OS-10 | 22.1 | 1989.8 | 150 | 100 | 1895.0 | 1,900 | 2,375 | 1,500 |  |
| OS-11 | 25.2 | 2266.4 | 150 | 100 | 1895.0 | 2,075 | 2,275 | 1,500 |  |
| OS-12 | 28.4 | 2387.7 | 150 | 100 | 1895.0 | 2,350 | 2,000 | 1,500 |  |
| OS-13 | 31.0 | 2785.7 | 150 | 100 | 1895.0 | 2,350 | 2,000 | 1,500 |  |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.

ACID NEUTRALIZATION TANK – Data Sheet 3.1.1.15

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | Tank  Capacity  (litre) | Approx.  Usable  Capacity  (litre) | Inlet /  Outlet  (mm) | Vent  (mm) | Diameter  (mm) | Height  (mm) | Manufacturer, Model No. |
| ANT-01 | 19 | 3.8 | 50 | 50 | 275 | 350 |  |
| ANT-02 | 56.9 | 7.6 | 50 | 50 | 450 | 375 |  |
| ANT-03 | 113.6 | 22.7 | 80 | 80 | 450 | 725 |  |
| ANT-04 | 208.5 | 45.5 | 100 | 100 | 550 | 900 |  |
| ANT-05 | 379.0 | 98.5 | 100 | 100 | 700 | 1050 |  |
| ANT-06 | 568.5 | 132.7 | 100 | 100 | 775 | 1200 |  |
| ANT-07 | 663.3 | 170.6 | 100 | 100 | 750 | 1425 |  |
| ANT-08 | 758.0 | 174.3 | 100 | 100 | 900 | 1200 |  |
| ANT-09 | 1042.3 | 235.0 | 100 | 100 | 1050 | 1200 |  |
| ANT-10 | 1137.0 | 216.0 | 100 | 100 | 900 | 1850 |  |
| ANT-11 | 1326.5 | 307.0 | 150 | 150 | 1200 | 1200 |  |
| ANT-12 | 1895.0 | 500.3 | 150 | 150 | 1300 | 1500 |  |
| ANT-13 | 2084.5 | 564.7 | 150 | 150 | 1200 | 1800 |  |
| ANT-14 | 2463.5 | 693.6 | 150 | 150 | 1200 | 2100 |  |
| ANT-15 | 4548 | 1320.3 | 150 | 150 | 1725 | 2100 |  |
| ANT-16 | 7580 | 1974.6 | 150 | 150 | 2100 | 2100 |  |
| ANT-17 | 11370 | 2785.7 | 150 | 150 | 2100 | 3000 |  |
| Notes:  1. Approximate usable capacity is based on tank with limestone.  2. Vent connection located on side of acid neutralization tank. | | | | | | | |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.

AIR COMPRESSOR (GENERAL USE) – Data Sheet 3.1.1.16

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Air Compressor: | | | | | | | |
| Tag  Number (\*) | Capacity  (L/s) | Design  Pressure  (kPa) | Operating Pressure | | Motor  (kW) | Power Supply  (Volts/Phase) | Manufacturer, Model No. |
| Start  (kPa) | Stop  (kPa) |
| AC-01 |  |  |  |  |  |  |  |
| AC-02 |  |  |  |  |  |  |  |
| AC-03 |  |  |  |  |  |  |  |
| AC-04 |  |  |  |  |  |  |  |
| AC-05 |  |  |  |  |  |  |  |
| AC-06 |  |  |  |  |  |  |  |
| AC-07 |  |  |  |  |  |  |  |
| AC-08 |  |  |  |  |  |  |  |
| AC-09 |  |  |  |  |  |  |  |
| AC-10 |  |  |  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Air Receiver: | | | | |
| Tag  Number (\*) | Capacity  (litre) | Configuration  (horiz./vert.) | Diameter  (mm) | Length  or Height  (mm) |
| AC-01-AR | 113.7 | Horizontal | 400 | 975 |
| AC-02-AR | 227.4 | Horizontal | 500 | 1225 |
| AC-03-AR | 303.2 | Horizontal | 500 | 1575 |
| AC-04-AR | 454.8 | Horizontal | 600 | 1625 |
| AC-05-AR | 758.0 | Horizontal | 750 | 1800 |
| AC-06-AR | 900.6 | Horizontal | 750 | 2100 |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.AIR COMPRESSOR (LAB) – Data Sheet 3.1.1.17

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Air Compressor: | | | | | | | |
| Tag  Number (\*) | Capacity  (L/s) | Design Pressure  (kPa) | Operating Pressure | | Motor  (kW) | Power Supply | Manufacturer, Model No. |
| Start  (kPa) | Stop  (kPa) |
| AC-01 | 0.21 | 689.5 | 551.6 | 758.5 | 1.34 | 575V/3ph |  |
| AC-02 | 0.3 | 689.5 | 551.6 | 758.5 | 2 | 575V/3ph |  |
| AC-03 | 0.4 | 689.5 | 551.6 | 758.5 | 2.7 | 575V/3ph |  |
| AC-04 | 0.66 | 689.5 | 551.6 | 758.5 | 4 | 575V/3ph |  |
| AC-05 | 1.1 | 689.5 | 551.6 | 758.5 | 6.7 | 575V/3ph |  |
| AC-06 | 1.64 | 689.5 | 551.6 | 758.5 | 10 | 575V/3ph |  |
| AC-07 | 2.1 | 689.5 | 551.6 | 758.5 | 13.4 | 575V/3ph |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Air Receiver: | | | | |
| Tag  Number (\*) | Capacity  (litre) | Configuration  (horiz/vert) | Diameter  (mm) | Length or Height  (mm) |
|  |  |  |  |  |
| AC-01-AR | 113.7 | Horizontal | 400 | 975 |
| AC-02-AR | 227.4 | Horizontal | 500 | 1225 |
| AC-03-AR | 303.2 | Horizontal | 500 | 1575 |
| AC-04-AR | 454.8 | Horizontal | 600 | 1625 |
| AC-05-AR | 758.0 | Horizontal | 750 | 1800 |
| AC-06-AR | 900.6 | Horizontal | 750 | 2100 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Refrigerated Type Air Dryer: | | | | | | |
| Tag  Number (\*) | Capacity  (L/s) | Design  Pressure  (kPa) | Dew Point  Temperature  (degrees C) | Motor  (kW) | Power Supply | Manufacturer, Model No |
| AC-01-AD | 0.63 | 689.5 | 3.3 | 0.3 | 120V/1ph |  |
| AC-02-AD | 1.14 | 689.5 | 3.3 | 0.3 | 120V/1ph |  |
| AC-03-AD | 1.51 | 689.5 | 3.3 | 0.45 | 120V/1ph |  |
| AC-04-AD | 2.2 | 689.5 | 3.3 | 0.45 | 120V/1ph |  |
| AC-05-AD | 3.15 | 689.5 | 3.3 | 0.7 | 120V/1ph |  |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.

VACUUM PUMP – Data Sheet 3.1.1.18

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Vacuum Pump: | | | | | | | |
| Tag  Number (\*) | Capacity  (L/s) | Design  Vacuum  (mm Hg vac) | Operating Pressure | | Motor  (kW) | Power Supply | Manufacturer, Model No. |
| Start  (mm Hg vac) | Stop  (mm Hg vac) |
| VP-01 | 0.24 | 381 | 381 | 635 | 0.1 | 120V/1ph |  |
| VP-02 | 0.36 | 381 | 381 | 635 | 0.3 | 120V/1ph |  |
| VP-03 | 0.40 | 381 | 381 | 635 | 0.22 | 120V/1ph |  |
| VP-04 | 0.59 | 381 | 381 | 635 | 0.3 | 120V/1ph |  |
| VP-05 | 0.68 | 381 | 381 | 635 | 0.45 | 120V/1ph |  |
| VP-06 | 0.83 | 381 | 381 | 635 | 0.67 | 120V/1ph |  |
| VP-07 | 1.35 | 381 | 381 | 635 | 1.34 | 575V/3ph |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Vacuum Tank: | | | | |
| Tag  Number (\*) | Capacity  (litre) | Configuration  (horiz./vert.) | Diameter  (mm) | Length  or Height  (mm) |
| VP-01-AR | 114.7 | Horizontal | 400 | 975 |
| VP-02-AR | 227.4 | Horizontal | 500 | 1225 |
| VP-03-AR | 303.2 | Horizontal | 600 | 1575 |
| VP-04-AR | 454.8 | Horizontal | 600 | 1625 |
| VP-05-AR | 758.0 | Horizontal | 750 | 1800 |
| VP-06-AR | 909.6 | Horizontal | 750 | 2100 |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.

BACKFLOW PREVENTERS – Data Sheet 3.1.1.19

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Tag  Number (\*) | | Valve  Type (note 1) | Size  (mm) | Flow  Stream | Maximum  Operating Flow (L/s) | Maximum  Pressure Drop  (kPa) | Manufacturer, Model No. |
| BFP-01 | DC | | 12 | W1 | 0.2 | 34.5 |  |
| BFP-02 | DC | | 5 | W1 | 0.5 | 41.4 |  |
| BFP-03 | DC | | 25 | W1 | 1.07 | 48.3 |  |
| BFP-04 | DC | | 40 | W1 | 2.8 | 41.4 |  |
| BFP-05 | DC | | 50 | W1 | 4.7 | 41.4 |  |
| BFP-06 | DC | | 65 | W1 | 7.6 | 34.5 |  |
| BFP-07 | DC | | 80 | W1 | 11.04 | 34.5 |  |
| BFP-08 | DC | | 100 | W1 | 20.2 | 20.7 |  |
| BFP-09 | DC | | 150 | W1 | 44.16 | 20.7 |  |
| BFP-10 | DC | | 200 | W1 | 75.7 | 20.7 |  |
| BFP-11 | DC | | 250 | W1 | 119.9 | 34.5 |  |
| BFP-01 | RP | | 6 | W1 | 0.05 | 69.0 |  |
| BFP-02 | RP | | 10 | W1 | 0.095 | 69.0 |  |
| BFP-01 | RP | | 12 | W1 | 0.2 | 75.8 |  |
| BFP-02 | RP | | 5 | W1 | 0.5 | 96.5 |  |
| BFP-03 | RP | | 25 | W1 | 1.07 | 96.5 |  |
| BFP-04 | RP | | 40 | W1 | 2.8 | 82.7 |  |
| BFP-05 | RP | | 50 | W1 | 4.7 | 82.7 |  |
| BFP-06 | RP | | 65 | W1 | 7.6 | 75.8 |  |
| BFP-07 | RP | | 80 | W1 | 11.04 | 82.7 |  |
| BFP-08 | RP | | 100 | W1 | 20.2 | 62.1 |  |
| BFP-09 | RP | | 150 | W1 | 44.16 | 69.0 |  |
| BFP-10 | RP | | 200 | W1 | 75.7 | 75.8 |  |
| BFP-11 | RP | | 250 | W1 | 119.9 | 82.7 |  |
| Notes:  1. Valve Type: RP - Reduced Pressure, DC - Double Check  2. Flow Streams: DIW - Deionized Water, FP - Fire Protection, IRR - Irrigation Water, LCW - Laboratory Cold Water, TWS - Tempered Water Supply, W1 - Potable Water, W2 – Non-potable Water, W3 - Plant Water. | | | | | | | |

(\*) Consultant to ensure tag names are in accordance with Design Guidelines Section 21 – Development and Maintenance of Asset Inventory and Tagging.