

SUBMITTAL PROCEDURES

1. GENERAL

1.1 Shop Drawings, Product Data and Other Submittals

- .1 Arrange for the preparation of clearly identified Shop Drawings, Product data and other submittals as specified or as the Contract Administrator may reasonably request. Submittals are to clearly indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work. Where articles or equipment attach or connect to other articles or equipment, clearly indicate that all such attachments and connections have been properly coordinated, regardless of the trade under which the adjacent articles or equipment will be supplied and installed. Submittals are to indicate their relationship to design drawings and specifications. Notify the Contract Administrator in writing of any deviations in submittals from the requirements of the Contract.
- .2 Examine all submittals prior to submission to the Contract Administrator to ensure that all necessary requirements have been determined and verified and that each Shop Drawing has been checked and coordinated with the requirements of the Work and the Contract. Examination of each Shop Drawing shall be indicated by stamp, date and signature of a responsible person of the Subcontractor for supplied items and of the Contractor for fabricated items. Submittals not stamped, signed and dated will be returned without being reviewed.
- .3 Submit submittals with reasonable promptness and in an orderly sequence so as to cause no delay in the Work. Failure to submit submittals in ample time is not to be considered sufficient reason for a change to the work schedule and no claim for extension of time by reason of such default will be allowed. Jointly prepare a schedule fixing the dates for submission and return of submittals.
- .4 Submit three (3) copies of white prints and three (3) copies of all fixture cut sheets and brochures.
- .5 The Contract Administrator will review and return submittals in accordance with the schedule agreed upon or otherwise with reasonable promptness so as to cause no delay in the Work.
- .6 Review by the Contract Administrator is solely for general conformity with the Contract. The Contract Administrator does not warrant or represent that information is accurate or complete. Review by the Contract Administrator shall not relieve the Contractor of responsibility for errors or omissions in designs that are the Contractor's responsibility, and for conforming and correlating with all quantities and dimensions, performing the Work, selecting performance means and methods, coordinating with other parts of the Work and between trades, and performing the Work safely. Notwithstanding the review, the Contractor remains solely responsible for compliance with the Contract.
- .7 Responsibility for verification and correlation of field dimensions, fabrication processes, techniques of construction, installation and coordination of all parts of the Work rests with the Contractor.
- .8 Submittals will be returned to the Contractor with one of the following notations:
 - .1 When stamped "Reviewed – No Comment" or "Review by Consultant Not Required", distribute additional copies as required for execution of the Work.

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- .2 When stamped "Reviewed – As Noted", ensure that all copies for use are modified and distributed.
- .3 When stamped "Reviewed – Revise and Resubmit", make the necessary revisions, as indicated, consistent with the Contract and submit again for review.
- .9 Only submittals bearing "Reviewed – No Comment", "Review by Consultant Not Required", or "Reviewed – As Noted" shall be used on the Work unless otherwise authorized by the Contract Administrator.
- .10 After submittals are stamped "Reviewed – No Comment" or "Reviewed – As Noted", no further revisions are permitted unless re-submitted to the Contract Administrator for further review.
- .11 Any adjustments made on submittals by the Contract Administrator are not intended to change the Contract Price. If it is deemed that such adjustments affect the Contract Price, clearly state as such in writing prior to proceeding with fabrication and installation of Work.
- .12 Make changes in submittals which the Contract Administrator may require consistent with the Contract. When re-submitting, notify the Contract Administrator in writing of any revisions other than those requested by the Contract Administrator.
- .13 Submittals indicating design requirements not included in the Contract require the seal of a qualified Professional Engineer, registered in the province of the place of the Project. Engineering calculations shall be submitted for review, if requested, and sealed by a qualified Professional Engineer.

1.2 Samples

- .1 Submit samples for the Contract Administrator's review as specified or as the Contract Administrator may reasonably request. Clearly label samples as to origin and intended use in the Work. Reference samples to Drawings and Specifications.
- .2 Submit samples with reasonable promptness and in orderly sequence so as to cause no delay in the Work. Failure to submit samples in ample time is not to be considered sufficient reason for a change to the work schedule and no claim for extension of time by reason of such default will be allowed. Jointly prepare a schedule fixing the dates for submission and return of samples.
- .3 Notify the Contract Administrator in writing, at the time of submission, of any deviations in samples from requirements of the Contract.
- .4 The Contract Administrator's review will be for conformity of design concept and general arrangement only. Such review is not to be considered relief of responsibility for errors or omissions in samples or of responsibility for meeting all requirements of the Contract.
- .5 Any adjustments made on samples by the Contract Administrator are not intended to change the Contract Price. If it is deemed that such adjustments affect the Contract Price, clearly state as such in writing prior to proceeding with fabrication and installation of the Work.
- .6 Make changes in samples which the Contract Administrator may require consistent with the Contract.

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1.3 Operating and Maintenance Manuals

- .1 Not less than two (2) weeks prior to Substantial Performance, submit to the Contract Administrator five (5) copies of operating and maintenance manuals which shall contain information required by the Specifications as well as operational information on equipment, cleaning and lubrication schedules, filters, overhaul and adjustment schedules. All instructions in these manuals shall be in simple language to guide the City in the proper operation and maintenance of his installation.
- .2 Bind contents in a three-ring, hard covered, plastic jacketed binder.
- .3 Index binder according to the following system:

Tab-1.0 Mechanical Systems:

Title page with clear plastic protection cover.

Tab-1.1 List of Mechanical Drawings:

Tab-1.2 System Descriptions:

Provide complete description of the operating sequence for all systems. Include detailed system description, with individual components described, explanation of how components interface with others and to the complete system, location of thermostats, controllers or operating variances, and controller operating setpoints.

Tab-1.3 Operating Division:

Provide complete and detailed operation of major components and systems. Provide information on location of components, how to energise switches and controls, how components interface with other components, operation of controls including operational sequence, operational changes for summer or winter operation, how to accomplish the changeover, complete trouble shooting sequence, emergency operating sequences in event of major component failure, and safeguards to indicate if equipment goes off-line.

Tab-1.4 Maintenance and Lubrication Division:

Provide general maintenance and lubrication schedule for major components to include daily, weekly, monthly, semi-annual and yearly checks and tasks. Explain how to execute maintenance tasks required for typical equipment such as bearings, drives, motors, and filters. Compile this information for equipment and separate from Shop Drawings.

Tab-1.5 List of Equipment Suppliers and Contractors:

Provide list of equipment suppliers and contractors, including address and telephone number. Outline procedures for purchasing parts and equipment.

Tab-Certification (2.0, 2.1, ...):

Include copy of test data on degreasing and flushing of heating system, analysis of system water taken at time system was put into operation, hydrostatic or air tests

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performed on piping systems, equipment alignment certificates, copy of balancing data for air and water systems, copy of valve tag identification and pipe colour code, inspection approval certificates for plumbing system, heating and ventilation systems.

Tab-Shop Drawings and Maintenance Bulletins (3.0, 3.1, ...):

Provide materials received in compliance with clause 1.1.

- .4 The divider tabs shall be laminated Mylar plastic and coloured according to Section. The colouring is as follows: Mechanical Systems - 1.0 - 1.5 Orange; Certification - 2.0 - 2.4 Green; Shop Drawings & Maintenance - 3.0 - 3.17 Yellow. Plastic tabs with typewritten card insertions will not be accepted.

1.4 Record Drawings

- .1 After award of Contract, the Contract Administrator will provide a complete set of Drawings for the purpose of maintaining Project Record Drawings.
- .2 Accurately record significant deviations from the Contract caused by Site conditions and changes ordered by the Contract Administrator. Update daily.
- .3 Record locations of concealed elements of mechanical and electrical services.
- .4 Identify Drawings as "Project Record Copy". Maintain in good condition and make available for inspection on-site by the Contract Administrator at all times.
- .5 On completion of the Work and prior to final inspection, submit Record Drawings to the Contract Administrator for review.
- .6 Within one (1) month after return of Record Drawings by the Contract Administrator, obtain and pay for a complete set of original reproducible sepias. Transfer all changes from Record Drawings to the sepias and certify accuracy by signing each. Deliver sepias to the Contract Administrator.

1.5 Photographs and Publicity

- .1 No photographs of the Site or of any portion of the Work will be permitted without prior approval of the Contract Administrator.
- .2 No press or publicity releases will be permitted without prior approval of the Contract Administrator.

END OF SECTION

HYDRONIC SPECIALTIES

1. GENERAL

1.1 Scope

- .1 Indirect water heater supply

1.2 Submittals

- .1 Provide Shop Drawings for all equipment in this Section.

2. PRODUCTS

2.1 Indirect water heater

- .1 Instantaneous indirect water heater shall be equipped with copper piping in the form of parallel helicoidal lines with a maximum operating pressure of 150 psi. All copper components will adhere to the NSF 61 standard from the NSF International Standard Drinking Water Systems Components Health Effects document. All copper components shall be welded with a lead-free solder compound. The water heater shall be equipped with a steel injector located on top of the tank to act as a boiler water inlet (primary circuit), and with a steel collector located at the bottom of the tank to act as a boiler water outlet. The tank shall be made of high-carbon steel with all joints arc-welded. The tank shall have a maximum operating pressure of 150 psi and shall undergo a 300 psi hydrostatic test. The boiler shall be wrapped in a glass fiber insulating jacket limiting thermal loss to 1/2°F per hour. The outer shell shall be epoxy-coated. The water-heater shall be equipped with a thermostat (aquastat) that closes the circuit at 9°F below the set point and opens it at the set point. The tank shall be equipped with a brass drain cock with a maximum operating pressure of 150 psi. Adjustable supports shall allow the leveling of the unit. The boiler shall be shipped from the plant equipped with a safety relief valve as per the ASME code, adjusted to a 30 psi setting, a thermomanometer and an automatic air bleeder.

HYDRONIC SPECIALTIES

2.2 Performance

.1 Indirect water heater Schedule – **Alternative 1**

| Tag | IWH-1 | IWH-2 |
|---|------------------|------------------|
| Manufacturer | THERMO 2000 Inc. | THERMO 2000 Inc. |
| Model | TURBOMAX® 65 | TURBOMAX® 65 |
| Dimensions | | |
| Capacity, L (USgal) | 272 (72) | 272 (72) |
| Height, mm (inch) | 1702 (67) | 1702 (67) |
| Diameter, mm (inch) | 610 (24) | 610 (24) |
| Boiler Input, kW (MBH) | 59 (200) | 59 (200) |
| Boiler Input Water Temperature, °C (°F) | 82.2 (180) | 82.2 (180) |
| Domestic Cold Water Temperature, °C (°F) | 4.4 (40) | 4.4 (40) |
| Domestic Hot Water Temperature, °C (°F) | 60 (140) | 60 (140) |
| First Hour Recovery Rate, L/hr (USgph) | 1022 (270) | 1022 (270) |
| Continuous Recovery Rate, L/hr (USgph) | 912 (241) | 912 (241) |
| Heat Transfer Area, m ² (ft ²) | 3.04 (32.7) | 3.04 (32.7) |
| Utility Connection | 1.5" Sweat M | 1.5" Sweat M |
| Boiler Connection | 1.5" NPT M | 1.5" NPT M |
| Shipping Weight, kg (lbs) | 113 (250) | 113 (250) |

HYDRONIC SPECIALTIES

.2 Indirect water heater Schedule – **Alternative 2**

| Tag | IWH-1 | IWH-2 |
|---|------------------|--|
| Manufacturer | THERMO 2000 Inc. | NOT APPLICABLE FOR ALTERNATIVE 2 |
| Model | TURBOMAX® 109 | |
| Dimensions | | |
| Capacity, L (USgal) | 450 (119) | |
| Height, mm (inch) | 1880 (74) | |
| Diameter, mm (inch) | 737 (29) | |
| Boiler Input, kW (MBH) | 117 (400) | |
| Boiler Input Water Temperature, °C (°F) | 82.2 (180) | |
| Domestic Cold Water Temperature, °C (°F) | 4.4 (40) | |
| Domestic Hot Water Temperature, °C (°F) | 60 (140) | |
| First Hour Recovery Rate, L/hr (USgph) | 2010 (531) | |
| Continuous Recovery Rate, L/hr (USgph) | 1828 (483) | |
| Heat Transfer Area, m ² (ft ²) | 5.47 (58.9) | |
| Utility Connection | 2.0" Sweat M | |
| Boiler Connection | 2.0" NPT M | |
| Shipping Weight, kg (lbs) | 252 (555) | |

END OF SECTION

HYDRONIC PUMPS

1. GENERAL

1.1 Scope

- .1 Equipment supply of hydronic pumps.

1.2 Submittals

- .1 Submit with Shop Drawings certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Show pump weights, motor and pump operating or efficiencies and electrical power characteristics.

1.3 Quality Assurance

- .1 Pumps shall be aligned by qualified millwright and alignment certified.
- .2 Ensure pumps operate at specified system fluid temperatures without vapour binding and cavitation, are non-overloading in parallel or individual operation, operate within 25% of midpoint of published maximum efficiency curve.
- .3 Motors shall be high efficiency only as per NEMA Standards.

2. PRODUCTS

2.1 General

- .1 Statically and dynamically balance rotating parts.

2.2 In-Line Circulator

- .1 Casing: Cast Iron rated for 1034 kPa (150 psi) working pressure.
- .2 Impeller: Silicon bronze
- .3 Shaft: Stainless Steel.
- .4 Seal: EPDM
- .5 Motor: TEFC

2.3 Vertical Multi-stage Pump

- .1 Type: Vertical multi-stage centrifugal
- .2 Casing: AISI 306 SS, rated for minimum of 1200 kPa (175 psi) working pressure complete with drain plug and flanged connections.
- .3 Impellers: AISI 306 SS

HYDRONIC PUMPS

- .4 Shaft: AISI 306 SS
- .5 Seals: Silicon carbide/carbon
- .6 Motor: TEFC

2.4 Performance

- .1 Pump Schedule – **Alternative 1**

| Tag | P-5 | P-6 | P-14 |
|------------------------------------|------------------|------------------|----------------------|
| Function | B-1 Circulator | B-2 Circulator | Building Loop |
| Location | Main Floor Mech. | Main Floor Mech. | Main Floor Mech. |
| Type | Inline | Inline | Vertical Multi-Stage |
| Impeller | Silicon Bronze | Silicon Bronze | AISI 306 SS |
| Casing | Cast Iron | Cast Iron | AISI 306 SS |
| Medium Pumped | Water | Water | Water |
| Design Pressure, kPa (psi) | 1034 (150) | 1034 (150) | 1034 (150) |
| Maximum Operating Temp., °C (°F) | 107 (225) | 107 (225) | 120 (250) |
| Pump Speed, RPM | 1750 | 1750 | 3500 |
| Design Flow Rate, L/s (gpm) | 5.58 (88.5) | 5.58 (88.5) | 3.15 (50) |
| Discharge Head, kPa (ft. water) | 80.6 (27) | 65.7 (22) | 388 (130) |
| Suction/Discharge Sizes, mm (inch) | 38 (1.5) | 38 (1.5) | 38/38 (1.5/1.5) |
| Motor Power, kW (hp) | 1.1 (1.5) | 0.75 (1.0) | 2.24 (3) |
| Power Supply, V/ph/Hz | 208/3/60 | 208/3/60 | 208/3/60 |
| Manufacturer | Patterson | Patterson | Wilo |
| Model | 5883-95 | 5885-95 | MVI 50-03 3~ |
| Weight, kg (lb) | 42 (91) | 40 (87) | 83 (182) |
| Remarks | TEFC | TEFC | TEFC |

HYDRONIC PUMPS

.2 Pump Schedule – **Alternative 2**

| Tag | P-5 | P-6 | P-14 |
|------------------------------------|------------------|------------------|----------------------|
| Function | B-1 Circulator | B-2 Circulator | Building Loop |
| Location | Main Floor Mech. | Main Floor Mech. | Main Floor Mech. |
| Type | Inline | Inline | Vertical Multi-Stage |
| Impeller | Silicon Bronze | Silicon Bronze | AISI 306 SS |
| Casing | Cast Iron | Cast Iron | AISI 306 SS |
| Medium Pumped | Water | Water | Water |
| Design Pressure, kPa (psi) | 1034 (150) | 1034 (150) | 1034 (150) |
| Maximum Operating Temp., °C (°F) | 107 (225) | 107 (225) | 120 (250) |
| Pump Speed, RPM | 1750 | 1750 | 3500 |
| Design Flow Rate, L/s (gpm) | 4.78 (75.8) | 4.78 (75.8) | 3.15 (50) |
| Discharge Head, kPa (ft. water) | 74.7 (25) | 56.7 (19) | 388 (130) |
| Suction/Discharge Sizes, mm (inch) | 38 (1.5) | 38 (1.5) | 38/38 (1.5/1.5) |
| Motor Power, kW (hp) | 0.75 (1.0) | 0.56 (0.75) | 2.24 (3) |
| Power Supply, V/ph/Hz | 208/3/60 | 208/3/60 | 208/3/60 |
| Manufacturer | Patterson | Patterson | Wilo |
| Model | 5885-95 | 5887-95 | MVI 50-03 3~ |
| Weight, Kg (lb) | 40 (87) | 38 (82) | 83 (182) |
| Remarks | TEFC | TEFC | TEFC |

END OF SECTION

CONDENSING BOILERS

1. GENERAL

1.1 Scope

- .1 Equipment supply of boilers, controls and trim.
- .2 Provide the services of a factory trained representative to start up the boiler(s), test the efficiency and train the operators.

1.2 Quality Assurance

- .1 Boilers to comply with Provincial Regulations and bear the CSA Approval Stamp/Seal.
- .2 Boilers shall each have a Canadian Registration Number (CRN) and shall be approved and labelled by the UL/ULC.

1.3 Submittals

- .1 Submit Shop Drawings indicating capacity rating, physical dimensions, wiring diagrams, materials of construction, code compliance, etc.

2. PRODUCTS

2.1 Boiler Construction

- .1 Boiler shall be natural gas fired high efficiency (95%+) condensing boiler with lower NOx emission not exceeds of 10 ppm.
- .2 The burner design is capable of modulation down to 20% of full fire (5:1 turndown) without loss of combustion efficiency.
- .3 Stainless steel heat exchanger with welded construction shall be ASME "H" stamped for a working pressure not less than 1103 kPa (160 psig). The boiler shall have an ASME approved relief valve with a setting of 1034 kPa (150 psig).
- .4 Exhaust manifold shall be of corrosion resistant.

2.2 Boiler Trim

- .1 The boiler shall be supplied safeguard system utilising spark ignition, temperature and pressure gauge, water flow switch, low water cut-off and burner site glass.

2.3 Boiler Controls

- .1 Standard on-board controls shall include a microprocessor based touch-screen display providing readouts of boiler target, differential and inlet/outlet temperatures as well as accumulated runtime and full diagnostics including real time data logging and an on/off switch shall be provided. Support for up to eight (8) boilers in sequencing application. The complete control package shall be mounted on the front panel with a hinged door for easy access to all control modules. A flow switch shall be provided loose.

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- .2 The boiler shall allow external (4-20 mA) BMS on/off control.
- .3 The boiler shall be equipped to send a general alarm to building BMS in event of boiler faults.

2.4 Condensate Neutralization

- .1 Provide a neutralization kit for each boiler sized for average life of one year.

2.5 Performance

- .1 Condensing Boiler Schedule – **Alternative 1**

| Tag | B-1 | B-2 |
|------------------------------------|--|--|
| Manufacturer | CAMUS | CAMUS |
| Model | DynaForce 1400 | DynaForce 1400 |
| Heating Input, kW (MBH) | 410 (1400) | 410 (1400) |
| Rated Heating Output, kW (MBH) | 400 (1358) | 400 (1358) |
| Operating Pressure, kPa (psi) | 1034 (150) | 1034 (150) |
| EWT, °C (°F) | 24 (75) | 24 (75) |
| LWT, °C (°F) | 41 (106) | 41 (106) |
| Flow Rate, L/s (gpm) | 5.6 (88.5) | 5.6 (88.5) |
| Pressure drop, kPa (Ft Hd) | 19.4 (6.5) | 19.4 (6.5) |
| Fuel Source | Natural Gas | Natural Gas |
| Turn Down Ratio | 5:1 | 5:1 |
| Gas Connections (NPT), mm (inch) | 32 (1.25) | 32 (1.25) |
| Water Connections (NPT), mm (inch) | 65 (2.5) | 65 (2.5) |
| Air Intake Size, mm (inch) | 200 (8) | 200 (8) |
| Vent Size, mm (inch) | 200 (8) | 200 (8) |
| Electrical, V/ph/Hz | 120/1/60 | 120/1/60 |
| Electrical Circuit Required | MOCP = 12A, FLA = 7A | MOCP = 12A, FLA = 7A |
| Gross Weight, kg (lbs) | 308 (679) | 308 (679) |
| WxDxH, mm (inch) | 750x865x1855 (29.5x34x73) | 750x865x1855 (29.5x34x73) |
| Remarks | ASME Approved, Supplied with boiler pump, 150 psi pressure relief valve, water flow switch, low water cutoff and neutralization kit. | ASME Approved, Supplied with boiler pump, 150 psi pressure relief valve, water flow switch, low water cutoff and neutralization kit. |

CONDENSING BOILERS

.2 Condensing Boiler Schedule – **Alternative 2**

| Tag | B-1 | B-2 |
|------------------------------------|--|--|
| Manufacturer | CAMUS | CAMUS |
| Model | DynaForce 1200 | DynaForce 1200 |
| Heating Input, kW (MBH) | 352 (1200) | 352 (1200) |
| Rated Heating Output, kW (MBH) | 341 (1164) | 341 (1164) |
| Operating Pressure, kPa (psi) | 1034 (150) | 1034 (150) |
| EWT, °C (°F) | 24 (75) | 24 (75) |
| LWT, °C (°F) | 41 (106) | 41 (106) |
| Flow Rate, L/s (gpm) | 47 (75) | 47 (75) |
| Pressure drop, kPa (Ft Hd) | 14 (4.7) | 14 (4.7) |
| Fuel Source | Natural Gas | Natural Gas |
| Turn Down Ratio | 5:1 | 5:1 |
| Gas Connections (NPT), mm (inch) | 32 (1.25) | 32 (1.25) |
| Water Connections (NPT), mm (inch) | 65 (2.5) | 65 (2.5) |
| Air Intake Size, mm (inch) | 200 (8) | 200 (8) |
| Vent Size, mm (inch) | 175 or 200? (7 or 8?) | 175 or 200? (7 or 8?) |
| Electrical, V/ph/Hz | 120/1/60 | 120/1/60 |
| Electrical Circuit Required | MOCP = 12A, FLA = 7A | MOCP = 12A, FLA = 7A |
| Gross Weight, kg (lbs) | 264 (582) | 264 (582) |
| WxDxH, mm (inch) | 750x865x1780 (29.5x34x70) | 750x865x1780 (29.5x34x70) |
| Remarks | ASME Approved, Supplied with boiler pump, 150 psi pressure relief valve, water flow switch, low water cutoff and neutralization kit. | ASME Approved, Supplied with boiler pump, 150 psi pressure relief valve, water flow switch, low water cutoff and neutralization kit. |

END OF SECTION