

1. MECHANICAL GENERAL REQUIREMENTS

1.1 APPLICATION

1.1.1 In addition to the Instructions to Bidders, General Conditions of the Contract and Special Requirements, this section applies to and governs each mechanical section.

1.2 WORK EXCLUDED FROM MECHANICAL DIVISION

1.2.1 Painting and Color Coding - to City of Winnipeg's approval and as required by applicable codes.

1.2.2 Electrical wiring and connections (including between motors, equipment and controls and motor starting switches and alarm devices) by Electrical Section.

1.2.3 The Mechanical Subcontractor shall lay out all locations of proposed openings with the General Contractor (GC). The GC shall perform all cutting and patching required to accommodate mechanical equipment, piping, or ductwork. The GC shall confirm the location of existing precast floor reinforcement strands prior to coring openings through the existing floor system. All curbs and counterflashing for mechanical equipment to be provided by the GC. All concrete pads (interior and exterior) for mechanical equipment to be provided by the GC.

1.3 DOCUMENTS

1.3.1 Examine all drawings and specifications, Instructions to Bidders, General Conditions of Contract and Special Requirements for information affecting this section.

1.3.2 The Subcontractor shall obtain a ruling from the Contract Administrator in writing before submitting the tender if there is any discrepancy between the drawings and specifications which may result in the true intent and meaning of the plans to be unclear. If no ruling is requested it will be assumed that the most expensive alternative has been included in the tender price.

1.4 EXAMINATION

1.4.1 Examine work done under other sections. Notify Contract Administrator in writing of defects that would affect this section.

1.5 PERMITS, INSPECTION AND TESTING

1.5.1 File all necessary notices and approved layouts and pay for all local authority inspections, approvals and permits applicable to Mechanical Section. Make changes required to secure local authorities' approval without extra cost. Where conflicting requirements occur, comply with most stringent regulation. Note that requirements shown or specified may exceed minimum standards set by local authorities.

1.5.2 The Mechanical Subcontractor shall make the application to the Gas Utility on behalf of the City of Winnipeg for the new gas service and meter as located on the drawings.

1.6 DELIVERY AND STORAGE

1.6.1 Check and do not deliver finished equipment to job until weatherproof dry storage is available, location as determined by the City of Winnipeg or General Contractor.

1.7 GUARANTEES

1.7.1 Provide a written guarantee that materials, work and operation of all equipment provided under Mechanical Sections are first class in every respect, subject only to improper usage by City of Winnipeg, and make good forthwith when reported all defects which develop within one year from date of acceptance of the building by the City of Winnipeg.

1.8 FABRICATION AND WORKMANSHIP

1.8.1 Employ skilled mechanics in their respective trades under competent supervision, and where required by provincial or local regulations shall be holders of acceptable qualification certificates.

1.9 INSTALLATION AND ERECTION

1.9.1 The Mechanical Subcontractor shall perform all work in accordance with the Manitoba Building Code, 2010, the Manitoba Plumbing Code, 2010, and all authorities having jurisdiction. The mechanical drawings do not show all architectural, structural and electrical features. Take information involving dimensions of building from figured dimensions of architectural drawings and check the same by site measurement.

1.9.2 The drawings show the general location and route to be followed by pipes, ducts, and other services. Make the necessary changes or additions to runs to accommodate structural conditions as built. Locations of pipes and other equipment shall be altered without charge, provided the change is made before installation, and does not necessitate change in quantity of materials.

1.9.3 Assume full responsibility for layout of own work and for any damage caused to property of others through improper location or poor workmanship.

1.9.4 Be familiar with the work required of other sections, and the progress schedule. Cooperate with others whose work adjoins, to minimize delays and avoid conflicts.

1.9.5 Locate all openings in walls, partitions, beams, etc. required for installation of pipes and equipment, etc. specified in this section of the specifications.

1.9.6 The mechanical division shall be responsible for fire stopping with CUL or ULC approved systems for all openings around ducts, pipes, etc. to maintain integrity of fire rated assemblies. Submit with shop drawings the fire stopping systems to be used for each penetration. The mechanical division shall be responsible for sealing all other duct, pipe, etc. openings in all other assemblies to create airtight installation using non-combustible sealants.

1.10 SHOP DRAWINGS

1.10.1 Within two weeks after award of contract provide and submit shop drawings which are clearly identified with references to recognized design standards used, indicating layouts, quantity, details of equipment, sizes, capacities and roughing in and exact requirements for concrete pits, bases, roof curbs, and other supporting members. Shop drawings shall be approved by the Contract Administrator before equipment is ordered or released for fabrication.

1.10.2 Each shop drawing must be certified by the manufacturer and as such shall indicate that all product engineering has been performed to ensure the project will meet the requirements of its intended installation.

1.10.3 Secure and verify all field dimensions, and where fabrication must proceed before these are available ensure that the field dimensions are followed to suit.

1.10.4 Each shop drawing shall include name of job, mechanical subcontractor, equipment supplier and clause under which equipment is specified. Clearly indicate the equipment mark number or symbol corresponding to the drawings and specifications.

1.10.5 Checking of shop drawings by the Contract Administrator does not constitute acceptance of responsibility. Such checking constitutes an assistance only to the Mechanical Division in the proper execution of their work.

1.10.6 Prior to submittal of shop drawings the Mechanical Subcontractor shall check and verify that all details have been included and then indicate so by signing each drawing to this effect.

1.10.7 Submittal Requirements: One copy only of each shop drawing shall be submitted to the Contract Administrator by fax, as a pdf document by email attachment, or delivered as a hard copy. This copy shall bear all the required marks of certification and approval by the manufacturer and subcontractor(s) as indicated above. The Contract Administrator will review and mark up one copy of the shop drawing, and return to the subcontractor by fax or email attachment. The subcontractor shall then make copies as required for ordering and documentation purposes. Multiple copies of shop drawings will not be returned.

1.11 MAINTENANCE AND OPERATING INSTRUCTIONS

1.11.1 Obtain from each Mechanical Section prior to the take-over date two sets of all brochures or literature supplied by manufacturers of each piece of equipment, bind into two sets in hard cover 3-ring binders, and deliver to the City of Winnipeg. The information provided should include:

- A complete list of mechanical equipment supplied and installed under each section including description, make, type, size, capacity, serial number and list of repair and replacement parts, with names and addresses of suppliers.
- The correct installation procedure.
- The manufacturer's recommended operating and maintenance instructions.
- A description of the Controls Sequences.

1.11.2 Instruct the City of Winnipeg's designated employees in proper care, operation, use and maintenance of all systems and equipment, and provide general explanatory literature required and start up supervision and instructions. Upon completion of instructions forward to Contract Administrator with a copy to the City of Winnipeg, as letter indicating person instructed and dates that the instruction took place, complete with the City of Winnipeg's signature upon completion. If in the Contract Administrator's opinion, this is not done satisfactorily, the Contract Administrator may direct such instruction, and charge all costs involved to relevant section.

1.12 PROVISION OF SPARE PARTS TO THE CITY OF WINNIPEG

1.12.1 The mechanical subcontractor shall supply and deliver to the City of Winnipeg upon completion of the project a complete set of spare parts required for maintenance of the mechanical equipment according to the manufacturer's recommendations.

1.13 AS-BUILT DRAWINGS

1.13.1 An extra set of clean prints will be issued to the Mechanical Section by the General Contractor. Mark up as the job progresses, and provide to the Contract Administrator a complete and accurate record "As-Built" of all mechanical work.

2. PLUMBING MATERIAL AND METHODS

2.1 All drainage piping shall be sloped at 1/50 unless otherwise shown.

2.2 The top of floor drains shall be located to suit the slope of the floor.

2.3 All plumbing piping shall be anchored at maximum 5' (1500 mm) intervals.

2.4 Piping shall have adequate clearance through each wall opening to permit unrestricted expansion.

2.5 When penetrating a fire separation, the separation must be returned to its original rating with a ULC listed firestop system in compliance with CAN-4S115-M.

2.6 Unless otherwise shown, the water supply to every group of fixtures in the same room shall be 3/4" (19mm) with a 1/2" (12mm) water supply and shut off to each fixture.

2.7 Where a vent pipe passes through the roof, it shall be insulated according to the insulation schedule, to a distance of 10' into the heated space.

2.8 All piping exposed to public view shall be cleaned of all excess joining material. Piping shall be primed and painted to the City of Winnipeg's specifications.

2.9 All piping within ceiling return-air plenums to conform to the flame and smoke spread requirements of the Manitoba Plumbing Code.

2.10 All serviceable items shall be installed in such a manner that they may be serviced as specified by manufacturer. Mechanical Subcontractor shall be responsible for the coordination and installation of all access hatches that may be required in order to service items in otherwise inaccessible spaces.

2.11 Mark each pipe with contents and direction of flow using fabricated markings or stencils. Provide markings where pipe passes through barriers and to a maximum 50' from last marking.

2.10 SCHEDULE OF PIPE AND FITTINGS

2.10.1 Interior drain and vent piping below ground:

PVC drain, waste and vent pipe and fittings and shall be certified to CSA B181.2.

2.10.2 Interior drain and vent piping above ground:

Up to 62 mm (2 1/2") diameter
Type DWV copper tube with cast solder fittings and joints, drainage pattern, or 50 mm (2") Bibby-St. Croix class 4000 cast iron M.J.

75 mm (3") diameter and over
Bibby-St. Croix class 4000 cast iron mechanical joint soil pipe and fittings with stainless steel M.J. clamps as required to meet latest CSA B70 specifications in sizes up to and including 250 mm (10"). Bibby-St. Croix class 4000 hub and socket soil pipe and fittings in 300 mm (12") and 375 mm (15") sizes

2.10.3 Interior water piping (cold and hot):

Copper Tubing 50mm (2") and under: ASTM B88, Type L hard drawn, fittings: ASME B16.16, cast copper alloy or ASME B16.22, wrought copper and bronze, joints ASTM B32, solder, Grade 95TA.

Over 50 mm (2") diameter with silver braze fittings.

2.10.4 Vent, drain and overflow piping:

Sizes 13 mm (1/2") to 50 mm (2") inclusive shall be schedule 40 black, stretch reduced, continuous weld, steel pipe to A.S.T.M. specification A-53 with 150 lb. welding fittings and 150 lb. malleable iron ground joint screwed unions.

Sizes 63 mm (2 1/2") to 150 mm (6") inclusive shall be schedule 40 black, electric resistance weld, open hearth, steel pipe to A.S.T.M. specification A-53 with 150 lb. welding fittings and 150 lb. forged steel welding flanges.

2.10.5 Pipe hangers and supports:
All piping shall be suspended with clevis type hangers with hanger rods as required. Maximum 1500 mm (5') between hangers.

3. INSULATION MATERIALS AND METHODS

3.1 PIPING

Manufacturer: Johns Manville Micro-Lok or approved equal, ASTM C547; rigid moulded, non-combustible; 'kaif' (K) value: 0.035 at 24°C (0.24 at 75°F) per ASTM C335; Vapour Barrier Jacket per ASTM C921, White kraft paper reinforced with glass fibre yarn and bonded to aluminumized film, secure with self sealing longitudinal laps and butt strips, secure with outward clinch expanding staples and vapour barrier mastics.

Install materials to manufacturers written instructions. Finish insulation at supports, protrusions and interruptions, create seamless connection to existing insulation to remain. Pipe supports to not compromise the insulation. Insulate all fittings and valves.

Domestic Cold water up to 50mm (2") - minimum 25mm (1") thick, with jacket.

Domestic Cold water greater than 50mm (2") - minimum 38mm (1 1/2") thick, with jacket.

Domestic Hot water and recirculation lines up to 50mm (2") - minimum 25mm (1") thick, with jacket.

Domestic Hot and Cold water lines insulated full length.

Vent lines insulated a minimum 3m (10 feet) from penetration of envelope - 50mm (2") thick insulation, jacket required where exposed.

3.2 SHEET METAL

Manufacturer: Johns Manville Microclote XG or approved equal, 25mm (1") thickness, 'kaif' (K) value: 0.045 at 24°C (0.31 at 75°F) per ASTM C518 with FRK vapour barrier jacket, secure with vapour barrier tape. Install materials to manufacturers written instructions. Finish insulation at supports, protrusions and interruptions, create seamless connection to existing insulation to remain. Duct supports to not compromise the insulation.

4. SHEET METAL - VENTILATION

4.1 All ductwork shall be fabricated and installed to the requirements of SMACNA.

4.2 All ducts shall be minimum of 26 gauge.

4.3 Provide flexible duct connection at outlet of exhaust fans.

4.4 Provide cradles with stand-offs at support points for externally insulated ducts. Stand-offs equal to duct thickness.

4.5 Install balance dampers on each branch duct.

4.6 Duct access panels shall be constructed such that doors and frames shall be rigid and close-fitting, constructed of No. 22 gauge materials with flat iron or angle iron stiffening frame, with rubber gaskets, suitable galvanized hinges with brass pins, and at least two galvanized cam locks. Secure frame and hardware to ducts by riveting. Doors in insulated ductwork to be double panel construction with a 25mm (1") insulating filler.

4.7 All exhaust and return air ductwork and all supply ductwork shall have Duro-Dyne S-2 duct sealer applied to all joints and seams to provide an airtight installation and FT-2 Fiberglass duct tape where required. All ductwork installed outdoors shall be sealed with Tremco Mono black acrylic sealant.

4.8 Provide Type B fire dampers where indicated. Fire stop penetrations based on specified materials and methods. Install inspection access doors as required, for access, minimum 300x300 size.

4.9 Air balance report for all H.V.A.C systems to be conducted by AABC certified testing company. Testing shall include fire damper verification. Provide (1) one copy of the report to the Contract Administrator for review. On completion of the air balance, mechanically fix the adjusted dampers to prevent unauthorized tampering and mark setpoint location.

4.10 All serviceable items, including but not limited to balancing dampers and HVAC equipment, shall be installed in such a manner that they may be serviced as specified by the manufacturer. Mechanical Subcontractor shall be responsible for the coordination and installation of all access hatches that may be required in order to service items in otherwise inaccessible spaces.

5. CONTROLS

5.1 GENERAL

5.1.1 Mechanical Subcontractor shall supply all necessary control components (i.e. operators, switches, timers, relays, transformers, dampers, valves, etc.) for the complete system.

5.1.2 Mechanical Subcontractor shall supply the control and wiring shop drawings to the Contract Administrator and Electrical Subcontractor for review.

5.1.3 Electrical Subcontractor shall provide all necessary control wiring and conduit (including low voltage) for mechanical systems. Wiring materials and installation to conform to local electrical code. All wiring and conduit to meet the requirements of the Electrical Code and the Electrical Subcontractor specifications.

5.2 MATERIALS

- See HVAC EQUIPMENT

5.3 SEQUENCE OF OPERATION:

5.3.1 EF-1:

- Interlock operation of both exhaust fans with MAU-1 schedule operation. Connect digital timer to schedule MAU-1 operation. Request operation schedule from City of Winnipeg.
- Operate exhaust fans individually on activation of room occupancy sensor. Room occupancy sensor by Electrical Division.

6. PLUMBING FIXTURES AND EQUIPMENT

6.1 Lavatories

LAV-1:
Kohler K-1722, wall hung, vitreous china, overflow, drilled for concealed arm carrier, single hole, ADA compliant, nominal 490 x 440 mm (LxW).
1-1/4" P-trap, SS braided supply with stops.
Delta 59170250 lavatory faucet, electronic hardwired, ASME A112.18.1; chrome finished cast brass body with waterproof handsfree sensor, all metal faucet construction, includes factory electrical converter, metal holddown trim. 5 1/4" long rigid spout, no lift rod hole, vandal resistant 1.9 L/min flow control outlet, supplied with open grid strainer, chrome finish, solenoid and controller in plastic surface mount housing.
Plate concealed arm carrier, MIFAB Series MC-54 wall mounted concealed arm lavatory carrier with lacquered, adjustable, ductile iron concealed support arms. Complete with lacquered cast iron wall plate, welded steel nipples with set screws, and fixture leveling and locking hardware.

6.2 Sinks

SK-1:

Sink: Franke LRX 610-18/1 18-8 stainless steel utility sink, 20 gauge, satin finished bowl, nominal bowl dimensions 18"x16"x10", ASME A112.19.3, Faucet ledge, three hole, 8" centres. Fully undercoated sink, self rimming, 3-1/2" (89mm) basket strainer waste filling and installation kit.
Trim: 1-1/4" P-trap, SS braided supply with stops.
Faucet: Delta Model 100-WFELHDF faucet. ASME A112.18.1, Single-control brass deckmount faucet, 3-hole 203mm (8"), cast brass body, 203mm (8") tubular swing spout with 360 degree rotation, 2.2 gpm (8.3L/min) aerator.

6.3 Water Closets

WC-1:

WC: Kohler Highline K-4405, ASME A112.19.2 / CSA B45.1, floor mounted, flush valve, elongated bowl, 435 mm bowl rim height (17-1/8"), ADA compliant. Vitreous china, 57 mm (2-1/4 inch) glazed trapway, maximum 6 lpf operation, 38mm (1-1/2") top spud, china bolt caps, colour: white
Manual Exposed Flush Valve - Barrier Free: Delta Model 81T221, ASME A112.19.2 / CSA B45.1; Exposed chrome plated, Diaphragm type with oscillating handle, escutcheon, seat bumper, Integral screwdriver stop and vacuum breaker, Metal "non hold down" ADA compliant handle. Pressure loss check angle stop with cap. Valve outlet tube: 610 mm (24 inches), Factory-set to 4.8L (1.28 gal) flush volume, suitable for 1-1/2" top spud water closets.
Seat: Kohler K4670-CA, Elongated open front seat with check hinge, less cover, with anti-microbial agent toilet seat agent.
Back Rest: Franke CM-16104, Stainless steel bar uses #4 gloss with flanges and covers. Antique white solid core plastic laminate 10"x4" panel back. Concealed snap flanges and mounting hardware included. Provide adequate backing in wall for support and comply to local codes for barrier free requirements.

6.4 Floor Drains

FD-1:

Floor Drain by Mifab, Zum or Watts., ANSI A112.21.1. Lacquered cast iron two piece body, Double drainage flange, weep-seepage holes, Reversible clamping collar, Round, adjustable nickel-bronze strainer with removable perforated sediment bucket.

6.5 Cleanout Covers

Manufacturers: Zum, Mifab or Watts

Interior Finished Floor Areas: Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.
Interior Finished Wall Areas: Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

6.6 Drinking Fountain

DF-1 - Elkay EZ2 wall-hung refrigerated drinking fountain, 30 lph (8.0 gph) of 10°C (50°F) water at 32°C (90°F) ambient and 27°C (80°F) inlet water, 115V/60Hz/1ph, antimicrobial protected plastic components, front pushbar activation, ADA compliant for frontal or parallel approach.
- 1-1/4" P-trap, SS braided supply with stops.

7. HVAC EQUIPMENT

7.1 EF-1, EF-2

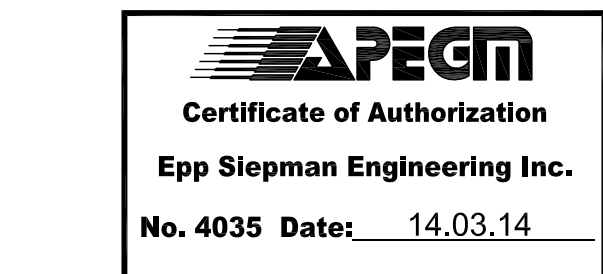
- Greenheck Model SQ-85-VG direct drive backward inclined centrifugal fan, 250 cfm @ 0.3" S.P., 1290 rpm, 1/8 hp electronically commutated motor, 115V/60, manufacturer's speed controller on fan, discharge configuration as noted on drawings, galvanized steel housing, c/w back-draft damper, insulated cabinet, external isolators, AMCA certified air performance.

7.2 Digital Timer

- digital, 7 day programmable timer with temporary manual override. Two on/off periods per day.

7.3 Grilles, Registers, Diffusers

R-1: EH Price model 53SD, 6"x6", 1.25" flat surface mount, steel grille with damper, white, countersunk screwholes for drywall ceiling mounting.
R-2: EH Price model 53SD, 10"x6", 1.25" flat surface mount, steel grille with damper, white, front blades parallel to long direction, countersunk screwholes for drywall ceiling mounting.



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SPECIFICATIONS

Project No. Sheet

1327

Date

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M3.1