
Part 1 General

1.1 RELATED REQUIREMENTS

- .1 This section covers items common to all Sections of Divisions 20 through 25
- .2 This Section shall apply to all trades in all Sections.

1.2 REFERENCES

- .1 All codes and standards to be of latest addition.
- .2 Contractors are advised that coordination with other trades is required. Contractors are required to review with other sub-contractors the work indicated on Architectural and Electrical drawings.

1.3 SCOPE OF WORK

- .1 This work includes, but is not limited to, the supply and installation of all supervision, labour, permits, equipment, materials and consumables necessary to provide this building with complete and operational systems listed below, as indicated on the drawings and as described in the specifications:
 - .1 Fire Protection work consists of connection into existing fire protection system, modifications of the existing piping and supply and install of new sprinkler heads to accommodate the wall modifications/additions complete with all associated piping, fittings and valves.
 - .2 Plumbing work consists of the HRV condensate drain, and intake plenum drains.
 - .3 HVAC work consists of the supply and install of a new HRV, ductwork, diffusers and all accessories and ancillaries.
 - .4 Controls work consists of modifications to the existing DDC system to create a new heating zone using an existing unit heater.

1.4 INTERPRETATION OF PLANS AND SPECIFICATIONS

- .1 These specifications are to be considered as an integral part of the plans which accompany them and neither the plans nor the specifications shall be used alone.
- .2 Any item which is omitted in one, but which is reasonably implied in the other shall be considered properly and sufficiently specified and must, therefore, be provided by this Contractor.
- .3 Misinterpretations of the plans or specifications shall not relieve this Contractor of responsibility; final interpretation of details and clauses remains with the Departmental Representative.
- .4 Where uncertainly exists in the passing of pipes and location of equipment, the General Contractor and/or Departmental Representative shall be consulted before work is started. Where such materials and equipment have been installed to cause interference with the inside treatment of the building, they shall be removed and relocated without additional cost to the Departmental Representative.

- .5 The plans do not necessary show all valves, duct offsets, access panels, connections, balancing fittings, bases, isolators, flexible connections, drains, etc., and this Contractor shall not avail himself of these obvious omissions, but shall install the work complete in essential details so that it will function properly, can be easily balanced and so that repairs and removal of equipment can easily be made.
- .6 Building dimensions shall not be scaled from the Mechanical plans but shall be obtained from on-site dimensions of the building. Any discrepancy between the drawings and the building shall be questioned before proceeding with any installation. The Contractor shall be responsible to confirm on-site dimensions. In existing buildings, confirm dimensions prior to Tender.

1.5 CO-OPERATION OF CONTRACTORS

- .1 This Contractor shall become familiar with the work of other contractors and in laying out and installing the work shall co-operate with the other Contractors, to facilitate the progress of the work as a whole and avoid interference or delays. Where interference exists, this Contractor shall notify the General Contractor and/or Departmental Representative before installing the work. Any changes in the work or alterations of the Mechanical Contractor's schedule of procedure required for such co-operation will not be considered as a claim for extra compensation.
- .2 Due to the complexities of many sub-trades, and the restrictive space available in this project, it is required that all trades co-operate closely to install all systems in their allotted locations as indicated on the drawings, or coordination on site.
- .3 The drawings are not intended to show all elbows, fittings and offsets required to perform the installation of the work where indicated on drawings. Contractor shall coordinate with all other trades and General Contractor on site. It is the responsibility of the Contractor to review site conditions prior to execution of work. Where services are shown to cross other building services, Contractor shall coordinate with other trades and determine best routing on-site prior to execution of work.
- .4 The Contractor shall review all Structural, Mechanical, Electrical and Architectural drawings to determine possible conflicts.
- .5 Contractor shall coordinate location of all hangers to avoid interference with other trades.
- .6 No extras will be allowed for lack of coordination or if additional fittings are required to perform the work as shown on the drawings.

1.6 ERRORS AND OMISSIONS

- .1 The drawings are not intended to show every item of accessory equipment, but the Contractor shall tender on and install all essential details to provide for efficiency of operation and ease of maintenance.
- .2 Should this Contractor discover errors or discrepancies in the plans or specifications, they shall refer the matter to the Departmental Representative for change or clarification and shall not proceed with that portion of work until advised by the Departmental Representative to do so.

1.7 DEFINITIONS

- .1 As indicated: means that the item or items specified are shown on the drawings.
- .2 Standard of Acceptance: means that the item or items named and specified by manufacturer and/or catalogue number forms part of specification and sets standard regarding performance, quality of material and workmanship and when used in conjunction with a reference standard, shall be deemed to supplement the standard.

1.8 PERMITS

- .1 In accordance with the General Conditions, obtain and pay for permits, certificate, licenses and other permits including environmental permit as required by municipal, provincial and federal authorities.
- .2 Provide appropriate notifications of project to municipal and provincial inspection authorities.
- .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.
- .4 Submit to Departmental Representative, copy application forms and approval documents received from above referenced authorities.
- .5 Contractor shall carry all costs associated with permitting third party reviews, witnessing, and inspection.

1.9 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop drawings:
 - .1 Submit Fire Protection drawings stamped and signed by Professional Engineer registered or licensed in Newfoundland and Labrador, Canada.
 - .2 Drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
 - .3 Drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
 - .4 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

1.10 COSTS OF ALTERNATE MATERIALS

- .1 Contractor shall bear the cost of all changes required to connect, locate, install, support or integrate alternate equipment to that specified.

1.11 ENERGY CONSUMPTION

- .1 Departmental Representative may reject equipment submitted for approval or review on basis of performance or energy consumed/demanded.

1.12 LABOUR AND WORKMANSHIP

- .1 All tradesmen employed by this Contractor for this work shall be properly licensed journeymen and apprentices qualified to do work in each trade. The Departmental Representative shall have the right to examine each individual's credentials and order any unqualified personnel away from the project.
- .2 This Contractor shall be completely responsible for the proper execution of the work as outlined in the plans and specifications. This Contractor shall assume responsibility for workmanship and material defects whether or not they are discovered by the Departmental Representative.

1.13 MATERIALS

- .1 All materials installed shall be new, full weight, of the best quality with the same brand or manufacturer used for each class of material or equipment.
- .2 All materials and equipment shall be installed in a neat and workmanlike manner by competent specialists for each sub trade. The installation of any materials and equipment not meeting these standards may be condemned by the Departmental Representative and shall be removed and reinstalled at no additional cost to the Departmental Representative. This Contractor is responsible for the safety and good condition of the materials and equipment installed until final acceptance by the Departmental Representative.

1.14 LAWS AND ORDINANCES

- .1 All work performed under this Division shall comply with the requirements of the Authorities Having Jurisdiction, including, but not limited to, the following: Provincial Department of Labour, Provincial Department of Environment, Office of the Provincial Fire Marshall, Provincial Board of Insurance Underwriters, Provincial Department of Health, Plumbing Inspector, Building Inspector, National Building Code of Canada, Local and Municipal By-Laws and Canadian Standards Association.

1.15 SUPERVISION

- .1 This Contractor shall include the services of experienced superintendents, who shall be constantly in charge of the work, together with the qualified journeymen, helpers and labourers, required to properly unload, install, connect, adjust, start, operate and test the work involved.

1.16 CHANGES AND EXTRAS

- .1 No change to the drawings and specifications will be accepted, if not authorized in writing by the Departmental Representative.

- .2 All work carried out which does not conform to the plans and specifications shall be corrected at the Contractor's expenses.
- .3 The Departmental Representative reserves the right to change quantity, quality, or any kind of work or equipment described on the drawings or in the specifications without affecting the validity of the contract.
- .4 Monetary adjustments required by such changes shall be accepted in writing by the Departmental Representative before alterations are proceeded with by the Contractor.

1.17 STAGING

- .1 This Contractor shall supply all staging and equipment necessary for the installation of his work.

1.18 CEILING COORDINATION

- .1 Contractor shall refer to ceiling plan drawings for final coordination of all ceiling installed components, such as diffusers, sprinklers, etc.
- .2 Lighting shall take precedence followed by sprinkler heads and then grilles and diffusers unless noted otherwise.

1.19 REMOVALS

- .1 Contractor is responsible for disposal off-site of all items being removed as part of this Contract.
- .2 Contractor shall provide Departmental Representative with option to keep items being removed as part of this Contract prior to disposal off-site.

1.20 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 52 00, Section 01 74 21 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

1.21 PACKAGING WASTE MANAGEMENT:

- .1 in accordance with Section 01 74 21 - Construction Demolition Waste Management and Disposal.
- .2 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.22 TEMPORARY STORAGE

- .1 This Contractor shall be responsible for materials temporarily stored on site.

1.23 OPENINGS, SLEEVES, CUTTING AND PATCHING

- .1 All openings in walls and floors necessary for the installation of equipment of the specification shall be provided by this Contractor.
- .2 Openings necessary in structural concrete floor, walls and beams shall be made with Schedule 40 steel sleeves installed prior to pouring of concrete. In floors, extend sleeve min. 50mm (2") above finished floor to permit waterproofing.
- .3 Where openings in poured concrete floors or walls are necessary core drilling only will be permitted.
- .4 This Contractor shall advise the Departmental Representative of all such openings, their size and location and shall obtain approval prior to cutting of openings.

1.24 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform General Contractor of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

1.25 EQUIPMENT INSTALLATION

- .1 In accordance with Manufacturer's instructions unless otherwise indicated.
- .2 Install isolation valves and either unions or flanges for isolation and service of each piece of equipment.
- .3 Provide unions and flanges to permit equipment maintenance and disassembly and to minimize disturbance to piping and duct systems and without interfering with building structure or other equipment.
- .4 Provide means of access for servicing equipment including permanently lubricated bearings.
- .5 Pipe equipment drains to floor drains.
- .6 Line up equipment and similar items with building walls wherever possible.

1.26 MINIMUM REQUIREMENTS

- .1 All equipment supplied shall conform to and be labelled by CSA.
- .2 All equipment supplied shall be new and first-rate production (no seconds).

1.27 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

1.28 CLEARANCES

- .1 Provide space for disassembly, removal of equipment and components as recommended by Manufacturer, Authority Having Jurisdiction, or as indicated (whichever is greater) without interrupting operation of other system, equipment or components.
- .2 Coordinate with Manufacturer's Agent and approved shop drawings to provide adequate service space.

1.29 OPENINGS FOR EQUIPMENT

- .1 This Contractor shall be responsible for providing openings to allow the installation of all apparatus and large equipment in this Contract. This Contractor shall make all necessary arrangements to ensure that the required openings are provided and properly located. The General Contractor shall be responsible for the tearing out and making good of any walls necessary for the passage of equipment.

1.30 SUPPORTS

- .1 This Contractor shall supply and erect all structural work necessary for the proper installation and support of all apparatus and equipment under these specifications unless specified in Structural Division. This Contractor shall submit for approval to the Departmental Representative shop drawings on all structural supports before installation of same.

1.31 ELECTRICAL

- .1 Electrical work to conform to Division 26. Supply and installation responsibility is indicated in the mechanical and electrical specifications and on the mechanical and electrical drawings as appropriate.
- .2 Control wiring and conduit, 120V and under, shall be supplied and installed by this trade. Refer to Division 25 for quality of materials and workmanship.

1.32 FIRESTOPPING

- .1 All fire stopping work is to be performed by General Contractor.
- .2 All Sub-Contractors shall coordinate all fire rated assembly penetrations with General Contractor.
- .3 Sub-Contractor shall provide required clearances between outside surface of pipe and inside surface of sleeve, core drilled hole or listed fire rated system.

1.33 ACCESS DOORS

- .1 Supply access doors to concealed mechanical equipment for operating, inspecting, adjusting and servicing.
- .2 Flush mounted 610 mm x 610 mm (24" x 24") for body entry and 300 mm x 300 mm (12" x 12") for hand entry unless otherwise noted. Doors to open 180°, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps.
- .3 Material:
 - .1 Special areas such as tiled surfaces: use stainless steel with brushed satin or polished finish as directed by Departmental Representative.

- .2 Remaining areas: use prime coat steel.
- .3 Fire rated assemblies: use access doors with appropriate fire ratings.
- .4 Installation:
 - .1 Locate so that concealed items are accessible.
 - .2 Locate so that hand or body entry (as applicable) is achieved.
 - .3 Installation is specified in applicable sections.

1.34 DIELECTRIC COUPLINGS

- .1 General:
 - .1 To be compatible with and to suit pressure rating of piping system.
 - .2 Where pipes of dissimilar metals are joined.
- .2 Pipes 50mm (2") and under: isolating unions.
- .3 Pipes 63mm (2 1/2") and over: isolating flanges.

1.35 DRAIN VALVES

- .1 Locate at low points and at section isolating valves unless otherwise specified.
- .2 Minimum 19mm (3/4") unless otherwise specified: bronze, with hose end male thread and complete with cap and chain.

1.36 ESCUTCHEONS

- .1 On pipes passing through walls, partitions, floors, under cabinetry, and ceilings in finished areas.
- .2 Chrome plated plastic split ring, pressfit.
- .3 Outside diameter to cover opening or sleeve.
- .4 Inside diameter to fit around finished pipe.

1.37 TESTS

- .1 Give forty-eight (48) hours written notice of date for all tests.
- .2 Insulate or conceal work only after testing and approval by Departmental Representative.
- .3 Conduct tests in presence of Departmental Representative and local authority having jurisdiction where applicable.
- .4 Bear costs including retesting and making good.
- .5 Piping:
 - .1 General: maintain test pressure without loss for four (4) hours unless otherwise specified.
 - .2 Test drainage, waste and vent piping to National Plumbing Code and Authorities Having Jurisdiction.
 - .3 Test domestic hot, cold and recirculation water piping at 1 1/2 times system operating pressure or minimum 862 kPa (125 psi) whichever is greater.

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- .4 Test fire systems in accordance with the Authorities Having Jurisdiction and as specified elsewhere.
 - .6 Equipment: test as specified in relevant sections.
 - .7 Prior to tests, isolate all equipment or other parts which are not designed to withstand test pressures or test medium.
 - 1.38 CLEANING**
 - .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Leave work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.
 - 1.39 WASTE MANAGEMENT:**
 - .1 Separate waste materials for reuse or recycling in accordance with Section 01 74 21 - Construction Demolition Waste Management and Disposal.
 - 1.40 PAINTING REPAIRS AND RESTORATION**
 - .1 Apply at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work. Outdoor ferrous supports to be painted with two (2) coats of enamel paint in addition to the primer coat.
 - .2 Prime and touch up marred finished paintwork to match original.
 - .3 Restore to new condition, finishes which have been damaged.
 - 1.41 FIELD QUALITY CONTROL**
 - .1 Site Tests: conduct following test in accordance with Section 01 45 00 – Quality Control.
 - .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturers verifying compliance or work, in handling, installing applying protection and cleaning of product and submit Manufacturer's Field Report(s).
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - 1.42 EXISTING SERVICES**
 - .1 Where work involves connecting into existing services carry out work at times as directed by Departmental Representative with minimum disturbance to building operations.
 - .2 Before commencing work establish location and extent of service lines in area of work and notify Departmental Representative.
 - .3 Submit schedule to Departmental Representative including required shut down or closure of active services or facilities. This includes disconnection of electrical power and

communication services to tenant's operational areas. Adhere to schedule and provide notice to Departmental Representative of necessary adjustments.

- .4 Provide temporary services to maintain critical building and tenant systems.
- .5 Where unknown services are encountered immediately advise Departmental Representative. Confirm findings in writing.
- .6 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in a manner accepted by Authorities Having Jurisdiction over service. Record locations of maintained, re-routed and abandoned services.

1.43 REMOVALS

- .1 Contractor is responsible for disposal off-site of all items being removed as part of this Contract.
- .2 Contractor shall provide Departmental Representative with option to keep items being removed as part of this Contract prior to disposal off-site.

1.44 OPTIMIZATION

- .1 The noted Contractors will provide in his quotation for systems optimization.
- .2 The Departmental Representative's sequences and set points specified are intended as a guide designed to create safe, functional and comfortably operating mechanical systems. Each project has a unique set of site conditions which, during start-up and commissioning, will become evident. This Contractor shall allow time for optimizing of set points to improve the efficiency of the systems' operations, to lower overall energy use while maintaining the design objectives.
- .3 Optimization will require work on behalf of the EMCS and TAB Contractors and coordinated with the Heating and Ventilation Contractors. Each item will be reviewed with the Departmental Representative before trial and if beneficial, adopted to core operating strategies and incorporated to record documents.

1.45 DEFICIENCIES

- .1 The Departmental Representative will notify this Contractor at various intervals of defective workmanship or installation, deficiencies, etc. This Contractor shall not request revised or updated lists without first submitting a current detailed, item by item, report on the status of all deficiencies as reported to the Contractor on a previous list.
- .2 When this Contractor notifies the Departmental Representative that the contract is ready for interim deficiency review, a comprehensive deficiency list will be prepared. If such list exceeds twenty (20) items, the contract shall not be considered ready for final inspection and the Departmental Representative need not furnish the Contractor with such list.
- .3 Contractor shall sign, date, and return to Departmental Representative the provided formal deficiency review lists to ensure the items have all been corrected prior to next review.

1.46 DAMAGE BY LEAKS

- .1 This Contractor shall be responsible for damages to grounds, walks, roads, building, piping systems, electric system and their equipment and contents caused by leaks in the ventilation

system being installed. The Contractor shall repair at his expense all damage to incur. All work shall be done as directed by the Departmental Representative.

1.47 WARRANTY

- .1 All mechanical work and equipment shall be guaranteed to work satisfactorily for a minimum period of one (1) year from the date of acceptance of substantial completion of the contract, provided any failure is not due to neglect or improper use by the Departmental Representative.
- .2 Any certificate given, payment made, partial or entire use of the equipment by the Departmental Representative, shall not be construed as acceptance of defective work or improper materials.
- .3 This general guarantee shall not act as a waiver of any specified guarantee for any greater length of time.

1.48 DEMONSTRATION

- .1 Departmental Representative will use equipment and systems for test or commissioning purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, troubleshooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio-visual aids as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections and minimum as follows:
 - .1 Plumbing Systems: 4 hours (site time).
 - .2 Ventilation Systems: 4 hours (site time).
 - .3 Controls: 4 hours (site time).
- .5 Contractor may video record these demonstrations for future reference.

1.49 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 – Closeout Submittals.
- .2 Operation and Maintenance (O&M) Data: submit operation and maintenance data for incorporation into manual.
 - .1 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
 - .2 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and component.
 - .5 Description of actions to be taken in event of equipment failure.

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- .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.
 - .3 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
 - .4 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
 - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing (TAB).
 - .5 Approvals:
 - .1 Submit one (1) copy of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit as directed by Departmental Representative.
 - .6 Shop drawings:
 - .1 Provide all Mechanical Shop Drawings for project in O&M manual.
 - .7 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
 - .8 Site records:
 - .1 Departmental Representative will provide one (1) set of reproducible mechanical drawings. Contractor to provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.
 - .9 As-Built drawings:
 - .1 Prior to start of TAB, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12mm (1/2") high as follows: "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Departmental Representative for approval and make corrections as directed.

- .4 Perform TAB, using as-built drawings.
- .5 Submit completed reproducible as-built drawings with Operation and Maintenance Manuals.
- .10 Submit copies of as-built drawings for inclusion in final TAB report.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

.1

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and requirements for the identification of piping systems, duct work, valves and controllers, including the installation and location of identification systems.
 - .2 Sustainable requirements for construction and verification.
- .2 Related Requirements
- .3 Section 21, 22, 23, & 25.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI/ASME A13.1-2015, Standard for the identification of Pipes
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.60-97, Interior Alkyd Gloss Enamel.
- .3 National Fire Protection Association (NFPA).
 - .1 NFPA 13-2013, Standard for the Installation of Sprinkler Systems.

1.3 SUBMITTALS

- .1 Product Data: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data to include paint colour chips, other products specified in this section.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Samples to include nameplates, labels, tags, lists of proposed legends.

1.4 QUALITY ASSURANCE

- .1 Quality assurance submittals: submit following in accordance with Section 01 45 00 – Quality Control
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with Section 01 52 00, Section 01 74 21 and with manufacturer's written instructions.
- .2 Waste Management and Disposal:

- .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction Demolition Waste Management and Disposal.
- .2 Dispose of unused paint and coating material at official hazardous material collections site approved by Departmental Representative.
- .3 Do not dispose of unused paint and coating material into sewer system, into streams, lakes, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

- .1 Metal or plastic laminate nameplate mechanically fastened to each piece of equipment by manufacturer.
- .2 Lettering and numbers raised or recessed.
- .3 Information to include, as appropriate:
 - .1 Equipment: manufacturer's name, model, size, serial number, capacity.
 - .2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 SYSTEM NAMEPLATES

- .1 Colours:
 - .1 Hazardous: red letters, white background.
 - .2 Elsewhere: black letters, white background (except where required otherwise by applicable codes).
- .2 Construction:
 - .1 3mm (1/8") thick laminated plastic white anodized aluminum, matte finish, with square corners, letters accurately aligned, and machine engraved into core.
- .3 Sizes: Conform to following table:

Size #	Sizes (mm)	No. of Lines	Height of Letters (mm)
1	10 x 50	1	3
2	13 x 75	1	5
3	13 x 75	2	3
4	20 x 100	1	8
5	20 x 100	2	5
6	20 x 200	1	8
7	25 x 125	1	12
8	25 x 125	2	8
9	35 x 200	1	20

- .1 Use maximum of 25 letters/numbers per line.
- .4 Locations:

- .1 Terminal cabinets, control panels: use size #5.
- .2 Equipment in Mechanical Rooms: use size #9.
- .5 Identification for PWGSC Preventive Maintenance Support System (PMSS):
 - .1 Use arrangement of Main identifier, Source identifier, Destination identifier.
 - .2 Equipment in Mechanical Room:
 - .1 Main identifier: size #9.
 - .2 Source and Destination identifiers: size #6.
 - .3 Terminal cabinets, control panels: size #5.
 - .3 Equipment elsewhere: sizes as appropriate.

2.3 EXISTING IDENTIFICATION SYSTEMS

- .1 Apply existing identification system to new work.
 - .1 Where existing identification system does not cover for new work, use identification system specified this section.
 - .2 Before starting work, obtain written approval of identification system from Departmental Representative.

2.4 PIPING SYSTEMS GOVERNED BY CODES

- .1 Identification:
- .2 Sprinklers: to NFPA 13.
- .3 Note all systems shall be governed by Authorities Having Jurisdiction.

2.5 IDENTIFICATION OF PIPING SYSTEMS

- .1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.
- .2 Pictograms:
 - .1 Where required: Workplace Hazardous Materials Information System (WHMIS) regulations.
- .3 Legend:
 - .1 Block capitals to sizes and colours listed in CAN/CGSB 24.3.
- .4 Arrows showing direction of flow:
 - .1 Outside diameter of pipe or insulation less than 75mm (3"): 100mm (4") long x 50mm (2") high.
- .5 Extent of background colour marking:
 - .1 To full circumference of pipe or insulation.
 - .2 Length to accommodate pictogram, full length of legend and arrows.
- .6 Materials for background colour marking, legend, arrows:

- .1 Pipes and tubing 19mm (3/4") and smaller: waterproof and heat-resistant pressure sensitive plastic marker tags.

.7 Colours and Legends:

- .1 Where not listed, obtain direction from Departmental Representative.

- .2 Colours for legends, arrows: to following table:

Background colour	Legend, arrows
Yellow	BLACK
Green	WHITE
Red	WHITE

- .3 Background colour marking and legends for piping systems:

Contents	Background colour marking	Legend
Sanitary	Green	SAN
Plumbing vent	Green	SAN. VENT
Fire Protection Water	Red	FIRE PROT. WTR

2.6 IDENTIFICATION DUCTWORK SYSTEMS

- .1 50mm (2") high stencilled letters and directional arrows 150mm (6") long x 50mm (2") high.
- .2 Colours: back, or co-ordinated with base colour to ensure strong contrast.
- .3 Each stencil to indicate system # ie "AHU-1" and "Supply", or "Return".

2.7 CONTROLS COMPONENTS IDENTIFICATION

- .1 Identify all systems, equipment, components, controls, sensors with system nameplates specified in this section.
- .2 Inscriptions to include function and (where appropriate) fail-safe position.
- .3 All controls conduit shall be identified on minimum 3m (10'-0") c/c with one 25mm (1") orange and one 25mm (1") brown stripe.

2.8 LANGUAGE

- .1 Identification in English. Contractor shall submit proposed list for Departmental Representative review prior to producing and/or installing identification.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 TIMING

- .1 Provide identification only after painting has been completed.

3.3 INSTALLATION

- .1 Perform work in accordance with ANSI/ASME A13.1-2015 except as specified otherwise.
- .2 Provide ULC CSA registration plates as required by respective agency.
- .3 Identify systems, equipment to conform to PWGSC PMSS.

3.4 NAMEPLATES

- .1 Locations:
 - .1 In conspicuous location to facilitate easy reading and identification from operating floor.
- .2 Standoffs:
 - .1 Provide for nameplates on hot and/or insulated surfaces.
- .3 Protection:
 - .1 Do not paint, insulate or cover.

3.5 LOCATION OF IDENTIFICATION ON PIPING AND DUCTWORK SYSTEMS

- .1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels: at not more than 10m (33') intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.
- .2 Adjacent to each change in direction.
- .3 At least once in each small room through which piping or ductwork passes.
- .4 On both sides of visual obstruction or where run is difficult to follow.
- .5 On both sides of separations such as walls, floors, partitions.
- .6 Where system is installed in pipe chases, ceiling spaces, galleries, confined spaces, at entry and exit points, and at access openings.
- .7 At beginning and end points of each run and at each piece of equipment in run.
- .8 At point immediately upstream of major manually operated or automatically controlled valves, and dampers. Where this is not possible, place identification as close as possible, preferably on upstream side.
- .9 Identification easily and accurately readable from usual operating areas and from access points.
 - .1 Position of identification approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.6 FIELD QUALITY CONTROL

- .1 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 21 - Construction Demolition Waste Management. Contractor's Verification, include:
 - .1 Materials and resources.
 - .2 Storage and collection of recyclables.
 - .3 Construction waste management.
 - .4 Resource reuse.
 - .5 Recycled content.
 - .6 Local/regional materials.
 - .7 Certified wood.
 - .8 Low-emitting materials.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 00 – Cleaning.
- .2 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 21 - Construction Demolition Waste Management and Disposal.

END OF SECTION