

**PUBLIC WORKS AND GOVERNEMENT SERVICES CANADA**  
**QUAI DE LA REINE - RECONSTRUCTION OF WHARVES 93-94**  
**(PROJECT R.083401.001)**

**ADDENDUM N° 02**

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## 1. GENERAL

This addendum is part of the tender call documents in the same way as the plans and specifications and is applicable immediately; in case of conflict between plans and this addendum, the latter must prevail.

The contractor must, upon reception of this addendum, inform the sub-contractor immediately of its content, as the requirements or modifications contained therein remain under its full responsibility.

## 2. TECHNICAL SPECIFICATIONS (Inserted or modified sections, see Annex A)

### **Delete and replace :**

SECTION 00 01 10 – TABLE OF CONTENTS

### **Insert :**

SECTION 21 05 01 – COMMON WORK RESULTS FOR MECHANICAL

### **Insert :**

SECTION 22 05 00 – COMMON WORK RESULTS FOR PLUMBING

### **Insert :**

SECTION 22 11 16 – DOMESTIC WATER PIPING

### **Insert :**

SECTION 22 13 17 – DRAINAGE WASTE AND VENT PIPING – CAST IRON AND COPPER

### **Insert :**

SECTION 23 05 53.01 – MECHANICAL IDENTIFICATION

### **Insert :**

SECTION 23 07 15 – THERMAL INSULATION FOR PIPING

## 3. TECHNICAL DRAWINGS

### **Page M02, insert :**

Page M02-ES-BAT-R\_083401\_001.

### **Page G00, delete and replace by :**

Page G00-GL-AUT-R\_083401\_001.

### **Page C01, delete and replace by :**

Page C01-AX-EGO-R\_083401.001.

### **Page C02, delete and replace by :**

Page C02-AX-EGO-R\_083401.001.

### **Page C03, delete and replace by :**

Page C03-AX-EGO-R\_083401.001.

### **Page C05, delete and replace by :**

Page C05-DT-EGO-R\_083401.001.

**Page C08, add :**  
Sketch 0B-C-01.



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Michel Trudel, ing.  
Civil

**ANNEX A**  
**Inserted or modified sections**

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S51	INTEGRATED AUTOMATION-ELECTRICAL ROOM CONSTRUCTION AND DEMOLITION

**DRAWINGS (END)**

4. MÉCANICAL

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M01	INTEGRATED AUTOMATION VIEW ELECTRICAL ROOM CONSTRUCTION AND DEMOLITION

5. STRUCTURE

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6. CIVIL

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C06	PROPOSED CONDITIONS – SECTIONS AND DETAILS
C07	PROPOSED CONDITIONS – SECTIONS AND DETAILS

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 The present section deals with the common topics for all the sections 21 to 23 included.
- .2 Requirements and instructions described in General requirements (Divisions 00 and 01) and other pertinent clauses for the project (work sequence, maintaining services, specific requirements, etc.) Departmental Representative's documents must be strictly followed by the present Contractor, whether they are incorporated by reference or not.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 For adhesives, paint, coatings, sealers and cleaners, chemical products and other similar products, as well as for any hazardous material, submit MSDS required under the terms of the material information system dangerous used to work (WHMIS), which must conform to this system and must identify the VOC emission rate.
- .3 The contractor shall arrange for the preparation of shop drawings that require the contract documents or the departmental representative may reasonably request. To this end, it will prepare a list of those who will be annotated by the Departmental Representative.
- .4 Shop drawings must be clearly identified for this project using titles, the terminology and the symbols defined in the plans and specifications of the Departmental Representative.
  - .1 Identify the items on the documentation provided by the manufacturer, either: name and number of the quote section concerned.
- .5 Drawings must be laid out so that a minimum space of 75 mm x 75 mm will be available allowing the engineer to put a stamp of approval.
- .6 Shop drawings must be submitted in PDF format, at the rate of a file per device, named according to the name of the device, and according to the nomenclature indicated in the plans and specifications.
- .7 The transmission of shop drawings by fax is prohibited.
- .8 Once the drawings annotated, the Departmental Representative will return the drawing analyzed (in PDF format) to the general contractor that will perform the copies required according to the needs of the project.
- .9 Technical data from catalogues and manufacturers documentation must be reliable data, confirmed by tests made by the same manufacturers or on their behalf by independent laboratories, and certifying the conformity of the components to the requirements as to the physical characteristics, performance criteria and to the requirements of the codes and standards.
- .10 Shop drawings must be sufficiently complete and detailed to judge the quality and the effectiveness of the proposed systems.
- .11 Drawings to show:
  - .1 Manufacturing materials;

- .2 Internal and external pieces construction details;
  - .3 Mounting arrangements;
  - .4 Accessories;
  - .5 Operating and maintenance clearances.
- .12 Submit required data sheets as well as the manufacturer's documentation for each product.:
- .1 Data sheets must indicate the products characteristics, performance criteria, dimensions, boundaries and finishing, including a description of the devices and materials, the name of the manufacturer, type, model, year of manufacturing, power and flow.
- .13 Submit the following documents with shop drawings and required data sheets:
- .1 Detailed drawings of bases, supports/suspensions, and anchor bolts.
  - .2 Manufacturer to certify current model production.
  - .3 Document signed by the manufacturer, certifying that the products, materials and equipment meet the requirements as to the physical characteristics and performance criteria
  - .4 Installation instructions provided by the manufacturer.
  - .5 Certification of compliance to applicable codes.

### **1.3 CLOSEOUT SUBMITTALS**

- .1 Operation and Maintenance Data: submit operation and maintenance data for the manual.
- .2 Provide four (4) copies of the manufacturers instructions booklets of for each device requiring maintenance to the Departmental Representative, each accompanied by a PDF on CD-Rom copy.
- .3 Manuals will be presented in a binder form. Each manual will be divided into sections by a separator sheet, with identified color indicator. A table of contents will be inserted at the beginning of the manual with each identified section title.
- .4 Manuals will be due upon provisional acceptance of the project, or at the request of the Departmental Representative.
- .5 All manuals must be written in French.
- .6 Operating and maintenance manuals (electronic and paper) must have been designed especially for the prescribed system and contain relevant information to the project only.
- .7 Instructions contain all graphs, curves, capacities and other data provided by the manufacturers concerning the functioning and the details of all mechanical equipment used.
- .8 Technical data catalogues and documentation of the manufacturer, including model number, type, and size for each item.
- .9 Approvals:
  - .1 Submit one (1 ) PDF copie 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.

.10 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

.1 Deliver, store and handle materials in accordance with Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.4 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.5 Store and protect nicks, scratches, and blemishes

.6 Replace defective or damaged materials with new.

#### **Part 2 Products**

##### **2.1 MATERIALS**

2.2 Products requirements must be followed in accordance with relevant sections and the requirements of the Departmental Representative.

#### **Part 3 Execution**

##### **3.1 EXAMINATION**

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable and allow to perform the work in accordance with the written instructions of the manufacturer.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

##### **3.2 PAINTING REPAIRS AND RESTORATION**

.1 All steel works will be cleaned carefully with a wire brush and left to condition for the application of paint.

.2 Apply at least one coat of corrosion resistant primer, devices supports and ferrous metal parts.

.3 Do not apply paint on the nameplates.

**3.3 SYSTEM CLEANING**

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

**3.4 CLEANING**

- .1 Progress Cleaning: clean working area.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for recycling or disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.5 PROTECTION**

- .1 Protect materials and installed elements from any damage during the construction work.
- .2 Repair damages caused to the land, construction and adjacent materials during installation of materials and equipment, to the satisfaction of the Departmental Representative and the Departmental Representative.
- .3 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

**END OF SECTION**

**Part 1           General**

**1.1               REFERENCE STANDARDS**

- .1       National Research Council (NRC)
  - .1       National Plumbing Code, including province of Quebec modifications.

**1.2               WORK DESCRIPTION**

- .1       All articles of the section 21 05 01 must be respected in this section.
- .2       Work involves among other things and not necessarily limited to:
  - .1       Supply and install drinkable water pipe including accessories.
  - .2       Supply and install drainage pipe.
  - .3       Supply and install required supports and suspensions.
  - .4       Supply and install the identification of networks and devices applicable to plumbing.
  - .5       Identification of accessories / devices according to the standardization of the Department, to coordinate with the Departmental Representative.

**1.3               QUALITY ASSURANCE**

- .1       Qualification
  - .1       The installer must be an expert in his specialty, have at least three (3) years of proven experience in the realization of works of type and scope corresponding to those described herein, and possess the required skills.

**Part 2           Products**

**2.1               NOT USED**

- .1       Not used.

**Part 3           Execution**

**3.1               NOT USED**

- .1       Not used.

**END OF SECTION**

## **Part 1        General**

### **1.1        RELATED REQUIREMENTS**

- .1        Section 22 13 17- Drainage waste and vent piping – Cast iron and copper.
- .2        Section 23 05 53.01 – Mechanical identification.
- .3        Section 23 07 15 – Thermal insulation for piping.

### **1.2        REFERENCE STANDARDS**

- .1        Execute the work in accordance with the latest requirements in force of the codes and standards listed below.
- .2        American Society of Mechanical Engineers International (ASME)
  - .1        ANSI/ASME B16.15-13, Cast Cooper Alloy Threaded Fittings, Classes 125 and 250.
  - .2        ANSI/ASME B16.18-12, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3        ANSI/ASME B16.22-13, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4        ANSI/ASME B16.24-11, Cast Copper Alloy Pipe Flanges and Flanged Fittings: Class 150, 300, 400, 600, 900, 1500 and 2500.
- .3        ASTM International
  - .1        ASTM A307-14, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .2        ASTM A536-84(2014), Standard Specification for Ductile Iron Castings.
  - .3        ASTM B88M-14, Standard Specification for Seamless Copper Water Tube (Metric).
- .4        American National Standards Institute/American Water Works Association (ANSI)/(AWWA)
  - .1        ANSI/AWWA C111/A21.11-12, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - .2        ANSI/AWWA C151/A21.51-09, Ductile Iron Pipe, Centrifugally Cast, for Water.
  - .3        ANSI/AWWA-C104/A21.4, Cement–Mortar Lining for Ductile-Iron Pipe and Fittings
- .5        American Welding Society (AWS)
  - .1        AWS A5.8M, Specification for Filler Metals for Brazing and Braze Welding.
- .6        Association canadienne de normalisation (CSA)/CSA International :
  - .1        CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.
- .7        Bureau de Normalisation du Québec (BNQ) :
  - .1        BNQ 3623-085, Tuyaux en fonte ductile pour canalisations d'eau sous pression - Caractéristiques et méthodes d'essais.

- .8 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC S102.2-10, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.
- .9 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
  - .1 MSS-SP-67-02a, Butterfly Valves.
  - .2 MSS-SP-70-06, Grey Iron Gate Valves, Flanged and Threaded Ends.
  - .3 MSS-SP-71-05, Grey Iron Swing Check Valves, Flanged and Threaded Ends.
  - .4 MSS-SP-80-03, Bronze Gate, Globe, Angle and Check Valves.
- .10 National Sanitation Foundation, International (NSF)
  - .1 NSF 61, Drinking Water System Components - Health Effects

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.

## **Part 2 Products**

### **2.1 PIPING**

- .1 Stainless steel piping NPS 2-1/2 diameter and more.
  - .1 Stainless steel tube, ASTM A312, 304L serie, sch 10S.

### **2.2 FITTINGS**

- .1 Stainless steel piping ASTM A312, 304L serie, sch. 10S
  - .1 Flanges, fittings, accessories and brackets:
    - .1 Fittings (45° elbows, 90° elbows, laterals, reducer, tee, etc.).
      - .1 Material: stainless steel 304L (same thickness as piping)
  - .2 Flanges.
    - .1 Material: hot galvanized steel, unless otherwise stated.
    - .2 Lining: grade E (EPDM), unless otherwise stated.
    - .3 Bolts: carbon steel, electroplaque to zinc, unless otherwise stated.
    - .4 Template drilling: ANSI B16.5 class 150.
- .2 Soldered fittings:
  - .1 Same stainless steel schedule and grade fittings than the connection pipe.
  - .2 Qualification: welders qualification and welding procedures must be made in accordance with the latest edition of the standard ASME Boiler and Pressure

Vessel Code – SECTION IX - « Qualification Standard for Welding and Brazing Procedures, Welders, Brazers and Welding and Brazing Operators ».

- .3 Weld filler metal:
  - .1 The weld filler metal must be at least nuance E304 L. For plates, grade 304 L.
  - .2 The classification of the filler metal should be well indicated on used welding consumables products.
  - .3 The filler metal must be in accordance to the welding procedures used.
- .4 Soldering processes:
  - .1 The soldering with coated electrode (SMAW) process cannot be used without the written consent of the Departmental Representative.
  - .2 Other welding processes, such as welding arc under inert atmosphere with a non fusible tungsten electrode (GTAW) can be used. However, with the GTAW welding process must be served to the argon and the inside of the hose to the nitrogen to avoid oxidation.
- .5 Soldering joint preparation:
  - .1 The preparation and handling of pipes and related components in austenitic steel must be made in agreement with the "CSA STANDARD W59" standard. All equipment used in welding preparation and handling of stainless austenitic steel joints must be protected or covered in order not to contaminate, by particles of mild steel, the surfaces to be soldered.
  - .2 The cuts made with the electrode of carbon with jet of air ("air carbon arc gouping") are permitted with the approval in writing of the Departmental Representative. In such a case, the cut surface should be ground to a depth of 1.6 mm (1/16 in.) to avoid contamination by carbon.
  - .3 Because of the low thicknesses used, a maximum of 0.8 mm (1/32 in.) is permitted as tolerance of alignment between the two ends of the seal. However, penetration must be complete.
  - .4 Include in its welding procedure, the preparation of joints that he wants to use. Thus, the chamfer used, the opening of the root and plane must be established.
- .6 Crack detection test
  - .1 Apply the penetrating Weldco BRO-Chek on the surface of the pipe and let it penetrate for a few minutes.
- .7 Soldering
  - .1 Minimum thickness of weld must be 2.4 mm (3/32 in.). Maximum thickness should be, in practice, of 3.2 mm (1/8 in.).
  - .2 For pipes with thickness of 1.6 mm (1/16 in.) or higher, two layers or two passes are required to ensure water-resistance.
  - .3 The grinding must be done on solder joints. You must maintain a minimum thickness of 2.4 mm. All welds must be ground, perfectly smooth and polished. Joints and surfaces in contact with the handled product must be polished until the finish ANSI, no. 4 to avoid the risk of corrosion.
- .8 Passivation

- .1 Carry out passivation on pipes and welds to avoid risk of corrosion.
  - .2 All soldered joints must be cleaned by brushing with a solvent (alcohol or acetone) or painted with a solution of phosphoric acid to 15% to remove all traces of iron oxides, etc.
  - .3 This method can be replaced with the written consent of the Departmental Representative.
  - .4 After passivation, a complete rinse in clean warm water is immediately required.
- .9 Ferroxyl test (Detection of contamination by iron)
- .1 Make detection of contamination by iron tests on pipes and welds to avoid the risk of corrosion.
  - .2 On site, to identify and treat only the sections contaminated, a solution of Ferroxyl following composition must be applied on the surface. The presence of the slightest particle of iron is indicated by the dark blue color of the solution.
    - .1 Distilled water 1000 cm<sup>3</sup>
    - .2 Nitric acid 200 cm<sup>3</sup>
    - .3 Potassium ferricyanide 30 g
  - .3 It requires that 100% of surface and the welds show a negative reaction to this test, unless other instructions by the Departmental Representative.
  - .4 After the operations described above, in the Ferroxyl test, wash with plenty of water.
- .10 Quality and inspection
- .1 On visual examination, the weld must be free of porosity, crack, gutter and burr.
  - .2 Surface of welds inside pipes must be uniform and free of projection.
  - .3 All welds are inspected visually according to ANSI/ASME b.31.3 standard for category D, article 341.4 service and table 3. Any of the following defects is enough to reject a weld:
    - .1 Non-uniform welding in appearance (crack, porosity).
    - .2 Hammering marks
    - .3 Lack of fusion or incomplete penetration.
    - .4 An adjacent gutter to a finished welding or release by grinding.
    - .5 Alignment defect exceeding 2 mm.
    - .6 To control quality of the welds executed, the Departmental Representative may request an independent firm to make radiographic examinations. These reviews will be conducted in accordance with sections B31.1 and b.31.3 of the ANSI code. The welds that do not meet and that are not in accordance with the requirements will be corrected at the expense of the contractor. New radiographic examinations should be executed on any welding has been redone, at the expense of the contractor.

- .4 All corrections on defective welds must be executed to the satisfaction of the Departmental Representative. These inspections must be made by a certified Inspector in accordance with the standard CSA W178.
- .3 Grooved couplings:
  - .1 Sleeve clamp in stainless steel for pipe sch 10s to grooved couplings by rolling.
  - .2 According to NSF 61, up to 82 ° C.
  - .3 Working pressure up to 2070 kPa.
  - .4 with angle bolt pads to provide rigid joint, complete with EPDM gasket.
  - .5 Stainless steel bolts and nuts.
  - .6 Acceptable product: Victaulic, style 489 or equivalent product.
- .4 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

## **2.3 JOINTS**

- .1 Rubber gaskets, latex-free 1.6 mm thick: to AWWA C111.
- .2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.
- .3 Material intake alloy Tin/antimony 95/5 according to the standard ASTM B32 and containing less than 0.2% of lead.
- .4 Teflon tape: for threaded joints.
- .5 Grooved couplings:
  - .1 Sleeve clamp in stainless steel for pipe sch 10s to grooved couplings by rolling.
  - .2 According to NSF 61, up to 82 ° C.
  - .3 Working pressure up to 2070 kPa.
  - .4 with angle bolt pads to provide rigid joint, complete with EPDM gasket.
  - .5 Stainless steel bolts and nuts.
  - .6 Acceptable product: Victaulic, style 489 or equivalent product.

## **2.4 BUTTERFLY VALVES**

- .1 NPS 2-1/2 and over, wafer style:
  - .1 To MSS-SP-67, Class 125.
  - .2 Ductile iron body, aluminium bronze disc, stainless steel stem with copper brushings, EPDM molded-in seat liner, Lever operated.
  - .3 Cold pressure up to 1380 kPa.
  - .4 According to NSF 6.
  - .5 Acceptable product: « Nibco » WD-2000 or equivalent approved

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### **3.2 INSTALLATION**

- .1 Install in accordance with local authority having jurisdiction, NPC, Province Plumbing Code.
- .2 Unless otherwise stated, connect piping to devices, sanitary and other, in accordance with the instructions of manufacturers.
- .3 Install pipe work in accordance with Section of installation of pipework, supplemented as specified herein.
- .4 Cut square tubes, get rid of any foreign body then finery and clean the ends; clean the interlocking of the fittings; join the elements without wedging them.
- .5 Cold water piping will have a slope of 25 mm by 9000 mm for draining the entire network.
- .6 Supply and install draining valves at the bottom of all the risers, low points of networks as well as to the locations shown on the plans.

### **3.3 FIELD QUALITY CONTROL**

- .1 Pressure Tests
  - .1 Test pressure: greater of 1.5 times maximum system operating pressure or 860 kPa. Pressure must be maintained without leak for a period of at least two hours in all the hot water and cold water pipes. This test shall be carried out with cold water.
  - .2 If it is impossible to experience the entire system at once, it can be divided into several parts and each must be tested in the manner described above.
  - .3 All joints must be subjected to mechanical impacts with appropriate tools.
  - .4 These tests, which are or meet the province of Quebec Plumbing Code requirements, or more demanding than the latter, must be conducted in the presence of plumbing inspectors or the Departmental Representative. In addition, return signed and dated test results to the Departmental Representative.

### **3.4 FLUSHING**

- .1 Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean copper to Federal and Provincial potable water guidelines. Let system flush for additional 2 hours, then draw off another sample for testing. Return signed and dated analyses results to the Departmental Representative.

### **3.5 PRE-START-UP INSPECTIONS**

- .1 Systems to be complete, prior to flushing, testing and start-up.

- .2 Verify that system can be completely drained.

### **3.6 START-UP**

- .1 Timing: start up after:
  - .1 Pressure tests have been completed.
  - .2 Certificate of static completion has been issued.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
  - .1 Establish circulation and ensure that air is eliminated.
  - .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
- .4 Rectify start-up deficiencies.

### **3.7 PERFORMANCE VERIFICATION**

- .1 Scheduling:
  - .1 Verify system performance after pressure and leakage tests and disinfection are completed, and
  - .2 Make quality control in accordance with the General requirements.
- .2 Procedures:
  - .1 Verify that flow rate and pressure meet Design Criteria.
  - .2 Perform the test, adjustment and balancing of the circuit of recirculation of hot water in accordance with the section on the test, adjustment and balancing of HVAC systems.
  - .3 Verify compliance with safety and health requirements.
  - .4 Submit certificates for pressure and flow tests conducted on the piping, stating that these parameters are consistent with the requirements.
- .3 Reports:
  - .1 At the end of the work, produce proof of consistency of the work done at the office of piping inspection service of the Régie du Bâtiment du Québec. Make a letter to the owner, with a copy to the Departmental Representative, attesting that the plumbing work were subject to the requirements of the Plumbing Code.
  - .2 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

### **3.8 CLEANING**

- .1 Waste Management: separate waste materials for recycling or disposal.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 23 05 53.01 – Mechanical identification

**1.2 REFERENCE STANDARDS**

- .1 ASTM International Inc.
  - .1 ASTM B32-08, Standard Specification for Solder Metal.
  - .2 ASTM B306-02, Standard Specification for Copper Drainage Tube (DWV).
  - .3 ASTM C564-03a, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- .2 Canadian Standards Association (CSA International).
  - .1 CSA B67, Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.
  - .2 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
  - .3 CAN/CSA-B125.3, Plumbing Fittings.
  - .4 CAN/CSA-B127.1, Asbestos cement drain, waste and vent pipe fittings.
  - .5 CAN/CSA-B602, Mechanical couplings for drain, waste, and vent pipe and sewer

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.

**Part 2 Products**

**2.1 COPPER TUBE AND FITTINGS**

- .1 Above ground sanitary Type DWV to:
  - .1 DN 2 ½ or less
  - .2 In accordance with ASTM B306.
  - .3 Fittings.
    - .1 Cast brass: to CAN/CSA-B125.3.
    - .2 Wrought copper: to CAN/CSA-B125.3.
  - .4 Solder: Tin-antimony, 95/5, according to the standard ASTM B 32.

**Part 3 Execution**

**3.1 APPLICATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

**3.2 INSTALLATION**

- .1 In accordance with Quebec Plumbing Code.
- .2 In accordance with Section 23 05 05- Installation of Pipework.
- .3 When the piping slope is not provided, the piping slope must be in accordance with Quebec plumbing code.
- .4 Install copper tube in a way that there is no contact with any other kind of metal. Moreover, they must not be embossed or flattened.
- .5 No copper tube must be in contact with concrete surfaces. Always let out a cast iron pipe above the concrete surface before any copper tube connection.
- .6 Make the watertight connection of the drainage piping to the piping of the external services brought by another discipline. Provide all necessary accessories such as: gasket, reducer, transition flange, anchor, threaded anchor rod for gasket, etc. Be aware of the materials and the diameter of the services provided by the other division.

**3.3 TESTING**

- .1 Pressure test buried systems before backfilling.
- .2 Hydraulically test to verify grades and freedom from obstructions.
- .3 Comply, in accordance of the Plumbing code, to every test required by providing necessary workforce and equipment.

**3.4 PERFORMANCE VERIFICATION**

- .1 Affix applicable label (storm, sanitary, vent, pump discharge etc.) c/w directional arrows every floor or 4.5 m (whichever is less).

**3.5 CLEANING**

- .1 Waste Management: separate waste materials for recycling or disposal.

**END OF SECTION**

**Part 1 General**

**1.1 SUMMARY**

- .1 Materials and requirements for the identification of piping systems, duct work, valves and controllers, including the installation and location of identification systems.

**1.2 REFERENCE STANDARDS**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.60, Interior Alkyd Gloss Enamel.
  - .2 CAN/CGSB-24.3, Identification of Piping Systems.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00- Submittal Procedures.
- .2 Samples:
  - .1 Samples to include nameplates, labels, tags, lists of proposed legends.

**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.

**2.2 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 3 mm thick laminated plastic, matte finish, with square corners, letters accurately aligned and machine engraved into core.
- .3 Sizes:
  - .1 Conform to following table:

Size # mm	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

.2 Use maximum of 25 letters/numbers per line.

.4 Identification for PSPC 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 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 Legend:

.1 Block capitals to sizes listed in the following table.

Overall pipe diameter or insulation (mm)	Lettering dimension (mm)
19 to 32	13
38 to 51	19
64 to 150	32
200 to 250	64
More than 250	89

.3 Arrows showing direction of flow:

.1 Outside diameter of pipe or insulation less than 75 mm: 100 mm long x 50 mm high.

.2 Outside diameter of pipe or insulation 75 mm and greater: 150 mm long x 50 mm high.

.3 Use double-headed arrows where flow is reversible.

.4 Extent of background colour marking:

.1 Height: To full circumference of pipe or insulation.

- .2 Length: accommodate pictogram, full length of legend and arrows.
- .5 Materials for background colour marking, legend, arrows:
  - .1 Other pipes: pressure sensitive plastic-coated cloth with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150 degrees C and intermittent temperature of 200 degrees C.

.6 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
Chilled drinking water	Green	CH. DRINK WTR
Sanitary	Green	SAN

**2.4 VALVE IDENTIFICATION**

- .1 3 mm thick laminated plastic or white anodized aluminium, matte finish, with square corners, letters accurately aligned and machine engraved into core.
- .2 The color of the writing will be black, except for the fire protection systems where it will be red.
- .3 Inscriptions to include function and control purposes.

**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 CAN/CGSB-24.3 except as specified otherwise.
- .2 Provide ULC and CSA registration plates as required by respective agency.
- .3 Ask the tape or bands on surfaces clean and free of fats and dust. Wrap the tape around the pipe by overlapping the ends to a length equal to the pipe diameter.
- .4 Identify systems, equipment to conform to PSPC 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 17 m 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 On both sides of visual obstruction or where run is difficult to follow.
- .4 At beginning and end points of each run and at each piece of equipment in run.
- .5 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.
- .6 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 Verification requirements in accordance with general recommendations.
- .2 Before completion of the work, verify that the identification has been completed in accordance with this section.

### **3.7 CLEANING**

- .1 Waste management: Sorting waste for recycling or disposal.

**END OF SECTION**

**Part 1            General**

**1.1                SUMMARY**

- .1    Section Includes:
  - .1    Thermal insulation for piping and piping accessories in commercial type applications.

**1.2                REFERENCE STANDARDS**

- .1    American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
  - .1    ASHRAE Standard 90.1-01, Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).
- .2    American Society for Testing and Materials International (ASTM)
  - .1    ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
  - .2    ASTM B 209M, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate Metric.
  - .3    ASTM C 335, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
  - .4    ASTM C 411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
  - .5    ASTM C 449/C 449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
  - .6    ASTM C 533, Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
  - .7    ASTM C 534, Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
  - .8    ASTM C 547, Standard Specification for Mineral Fiber Pipe Insulation.
  - .9    ASTM C 795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
  - .10   ASTM C 921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .3    Canadian General Standards Board (CGSB)
  - .1    CGSB 51-GP-52Ma-89, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
  - .2    CAN/CGSB-51.53-95, Poly (Vinyl Chloride) Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts
- .4    Department of Justice Canada (Jus)
  - .1    Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
  - .2    Canadian Environmental Protection Act (CEPA), 1999, c. 33.

- .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .6 Manufacturer's Trade Associations
  - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).
- .7 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-[03], Surface Burning Characteristics of Building Materials and Assemblies.
  - .2 CAN/ULC-S701-[01], Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  - .3 CAN/ULC-S702-[1997], Thermal Insulation, Mineral Fibre, for Buildings
  - .4 CAN/ULC-S702.2-[03], Thermal Insulation, Mineral Fibre, for Buildings, Part 2: Application Guidelines.

### **1.3 DEFINITIONS**

- .1 For purposes of this section:
  - .1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.
  - .2 "EXPOSED" - will mean "not concealed" as specified.

### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00- Submittal Procedures.
- .2 Samples:
  - .1 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed.
  - .2 Mount sample on 12 mm plywood board.
  - .3 Affix label beneath sample indicating service.
- .3 Manufacturer's installation instructions:
  - .1 Submit the manufacturer's written recommendations for the grouting of insulating elements, as well as any indication of specific handling, implementation and cleaning methods.

### **1.5 QUALITY ASSURANCE**

- .1 Qualifications:
- .2 Installer: specialist in performing work of this Section, and have at least 3 years successful experience in this size and type of project in accordance with this section's work description and be an active member of AIQ.

### **1.6 WORK DESCRIPTION**

- .1 The insulation contractor must drop its price to bid directly to the general contractor.

- .2 Supply and install the applicable to plumbing insulation.

## **Part 2 Products**

### **2.1 FIRE AND SMOKE RATING**

- .1 In accordance with CAN/ULC-S102.
  - .1 Maximum flame spread rating: 25.
  - .2 Maximum smoke developed rating: 50.

### **2.2 INSULATION**

- .1 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C335.

### **2.3 INSULATION BEARING CODE NUMBER TIAC A-6: FLEXIBLE TUBULAR ELEMENT, UNICELLULAR ELASTOMER**

- .1 Description:
  - .1 Flexible insulation, elastomer, UniCellular, on fireIlle et Tubulaire.
  - .2 Insulation: Complies with ASTM C 534.
  - .3 Vapour barrier: Complies with CGSB standard 51-GP-52Ma.
  - .4 In operation temperature -40 °C and 100 °C
  - .5 Coefficient « k » max.: 0,036 W/M °C.
  - .6 Insulation certified by the manufacturer as being free of agents liable to cause corrosion cracking under stress.
- .2 Acceptable products: "Armstrong", "Armaflex" type AP or equivalent approved. Must be glued for all the length.

### **2.4 ACCESSORIES**

- .1 Contact Glue: Quick plug for insulation A-6.
  - .1 Acceptable products: "Armstrong" n° 520 or equivalent approved.
- .2 Painting: Paint for insulation A-6, minimum 2 layers.
- .3 Acceptable Products: Armstrong « WB ».

## **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 PRE-INSTALLATION REQUIREMENT**

- .1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified by competent authority.
- .2 Surfaces clean, dry, free from foreign material.

### **3.3 INSTALLATION**

- .1 Install in accordance with TIAC National Standards.
- .2 Apply materials in accordance with manufacturers instructions and this specification.
- .3 Place the insulation material in such a way that it achieves a smooth and uniform surface.
- .4 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.
- .5 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
  - .1 The tape must completely cover all joints.
  - .2 The glue should cover the entire surface.
  - .3 The brackets and suspensions must not pierce the insulation or the vapour barrier.
  - .4 The insulation and the vapour barrier should not be interrupted by sleeves and fittings.
- .6 Supports, Hangers:
  - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

### **3.4 INSTALLATION OF ELASTOMERIC INSULATION**

- .1 Insulation to remain dry. Overlaps to manufacturers instructions. Ensure tight joints.
- .2 Provide vapour retarder as recommended by manufacturer.

### **3.5 PIPING INSULATION SCHEDULES**

- .1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .2 TIAC Code: A-6.
  - .1 Fixation :
    - .1 Install the flexible insulation, making sure that it perfectly marries any forms without leaving Air flow between the hose and the insulation.
  - .2 Sealing:
    - .1 Fit all joints together and stick with a quick-plug contact glue by quenching all joints.
    - .2 The Assembly will have to produce a perfect seal between the pipe and the surrounding environment.
    - .3 Painting: Paint in 2 coats of Armstrong's WB paint.
- .3 Installation: According to the code number TIAC 1501-HA or 1501-CA, as applicable.

Piping	Temp. °C	Code ACIT	Piping nominal diameter (DN) and thickness of insulation (mm)				
			Up to	from 1 ¼ to 2	from 2 ½ to 4	from 5 to 6	8 and more
Dom. Cold water supply. - Tunnel	10	A-6	25	25	25	25	25

### 3.6 CLEANING

- .1 Waste management: Sorting waste for recycling or disposal.

**END OF SECTION**