



National Research Council  
Canada

Conseil national de recherches  
Canada

Administrative Services  
and Property Management  
Branch

Direction des services  
administratifs et  
gestion de l'immobilier

**NRC · CNRC**

**Addendum / Addenda**

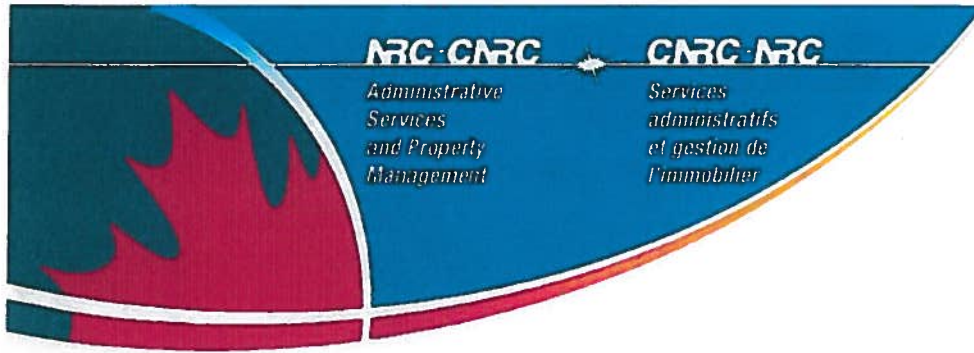
No./N<sup>o</sup>

1

Project Description / Description de projet		
M-20 Washroom Renovation		
Solicitation No./ No de sollicitation	Project No./N <sup>o</sup> de projet	W.O. No./N <sup>o</sup> d'ordre de travail
13-22090		
Project Engineer / Ingénieur de projet		Date
John Goodwin		December 5 <sup>th</sup> , 2013
<b>Notice:</b> This addendum shall form part of the tender documents and all conditions shall apply and be read in conjunction with the original plans and specifications.	<b>Nota:</b> Cet addenda fait partie intégrale des dossiers d'appel d'offres; toutes les conditions énoncées doivent être lues et appliquées en conjonction avec les plans et les devis originaux.	

Please **delete** tender package and **replace** with the attached

END / FIN



## SPECIFICATION

**SOLICITATION #: 13-22090**

**BUILDING:** M-20  
1200 Montreal Road Campus  
Ottawa, ON

**PROJECT:** Washroom Renovation

**PROJECT #:** M20-3841

**Date:** December 2013



National Research Council Canada  
Conseil national de recherches Canada

Canada

# **SPECIFICATION**

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<b>Tender Address</b>	<b>Tender Closing Date &amp; Time</b>
National Research Council Canada Procurement Services, M-22 1200 Montreal Road Ottawa, Ontario K1A 0R6	Hour: 2:00 p.m.  Date: December 23 <sup>rd</sup> , 2013

Contract Officer: Marc Bédard	
Telephone: (613) 993-2274	Facsimile: (613) 991-3297

**Description of Works:**

Provide all labour, equipment, tools and accessories require for washroom renovation at Building U-20 located at 1200 Montreal Road Campus of the National Research Council.

**Mandatory Site Visit:**

All Parties tendering must view the site with the Engineer and only with the Engineer. Please meet Mr. John Goodwin, telephone (613) 993-4937, in Main Entrance of Building M-20 on December 10<sup>th</sup> or 12<sup>th</sup>, 2013 at 9:00 a.m. in order to attend the site meeting.

**Site visits at other times will not be arranged for Contractors who missed the site meeting and their tenders will not be opened.**

1. **Offer**  
(06/05/2003)

The undersigned tenderer (hereinafter called the "Contractor") hereby offers to Her Majesty the Queen in right of Canada (hereinafter called "Her Majesty") as represented by the National Research Council Canada (hereinafter called the "Minister") to furnish all necessary tools, plant, services, materials and labour to execute and complete in a careful and proper manner the work set out under the "Description of Works" hereon, which more particularly described in the Plans and Specification number M20-3841, Sections 01000 through Section 265000 and drawing number: D-3841-A01, E01, M01.

2. **General Agreement**  
(06/05/2003)

The Contractor agrees

- 1 to complete the work within twelve(12) weeks from the date of notification of acceptance of this tender.



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- .2 that this Tender, the Instructions to Tenderers, the plans and Specifications referred to in Clause 1 above, and the General Conditions and the Labour Conditions (if applicable) attached to the Specifications or Scope of the Work shall be and are the complete tender and this offer is made subject to the provisions contained therein,
- .3 that this tender supersedes and cancels all communications, negotiations and agreements relating to the work other than contained in the completed tender.
- .4 that this tender may not be withdrawn for a period of 30 days following the tender closing date and time.
- .5 that the complete tender together with and subject to all provisions contained therein shall, when accepted and executed on behalf of Her Majesty, constitute a binding contract between the Contractor and Her Majesty.

3. **Lump Sum**  
(06/05/2003)

The Contractor agrees that the following is the lump sum referred to in Clause 1:

\$\_\_\_\_\_ (GST/HST extra)  
(amount to be in numbers only)

4. **T4-A Supplementary Slip Requirement**  
**(to be provided by successful bidder**  
**only)**  
(06/05/2003)

Pursuant to paragraph 221(1)(d) of the Income Tax Act, payments made by departments and agencies to contractors under applicable services contracts (including contracts involving a mix of goods and services) must be reported on a T4A Supplementary slip. To enable client departments and agencies to comply with this requirement, contractors are required to provide information as to their legal name and status, business number, and/or Social Insurance Number or other identifying supplier information as applicable, along with a certification as to the completeness and accuracy of the information



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## SIGNATURES

<b>CONTRACTOR'S FULL BUSINESS NAME</b> (Print or Type)	<b>CONTRACTOR'S BUSINESS ADDRESS</b> (For contract Purposes)
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ATTESTED TO AND DELIVERED ON BEHALF OF THE CONTRACTOR  
THIS \_\_\_\_\_ DAY OF \_\_\_\_\_ 2013 IN PRESENCE

<b>SIGNATURE(S)</b>	<b>TITLE</b>	<b>WITNESS SIGNATURE(S)</b>

National Research Council Canada

Special Instructions to Tenderers

1. TENDER RESULTS

- 1.1 Following the Tender closing, the tender results will be sent by facsimile to all Contractors who submitted a tender.

2. SECURITY REQUIREMENT FOR CANADIAN CONTRACTORS

2.1 MANDATORY SECURITY REQUIREMENT:

This procurement contains a mandatory security requirement as follows:

- .1 The Contractor must, at all times during the performance of the Contract, hold a valid Designated Organization Screening (DOS), issued by the Canadian Industrial Security Director (CISD), Public Works Government Services Canada.
- .2 The Contractor personnel requiring access to sensitive work site(s) must EACH hold a valid RELIABILITY STATUS, granted or approved by CISD/PWGSC.
- .3 The Contractor must comply with the provisions of the:
  - a. Security Requirements Checklist attached at Appendix "D"
  - b. Industrial Security Manual (Latest Edition) available at: <http://ssi-iss.tpsgc-pwgsc.gc.ca/msi-ism/msi-ism-eng.html>

2.2 VERIFICATION OF SECURITY CLEARANCE AT BID CLOSING

- .1 The Bidder must hold a valid Designated Organization Screening (DOS) issued by the Canadian Industrial Security Directorate (CISD), Public Works and Government Services Canada (PWGSC), **TO BE INCLUDED WITH THEIR TENDER OR PROVIDED WITHIN 48 HOURS FROM THE DATE AND TIME OF TENDER CLOSING.** Verifications will be made through CISD to confirm the security clearance status of the Bidder. Failure to comply with this requirement will render the bid non-compliant and no further consideration will be given to the bid.
- .2 Within 72 hours of tender closing, the General Contractor must name all of his sub-contractors, each of whom **must hold a valid RELIABILITY STATUS**, granted or approved by CISD/PWGSC, or any other Federal Department or Agency along with the names and birthdates or security clearance certificate numbers of all personnel who will be assigned to the project.

- .3 It is to be noted that any subcontractor required to perform any part of the work during the performance of the subsequent contract must also adhere to the mandatory security requirement of the contract. As well, no personnel without the required level of security will be allowed on site. It will be the responsibility of the successful bidder to ensure that the security requirement is met throughout the performance of the contract. The Crown will not be held liable or accountable for any delays or additional costs associated with the contractor's non-compliance to the mandatory security requirement. Failure to comply with the mandatory security requirement will be grounds for being declared in default of contract.**
- .4 For any enquiries concerning the project security requirement during the bidding period, the Bidder/Tenderer must contact the Security Officer @ 613-993-8956.**



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**1. SCOPE OF WORK**

- .1 Work under this contract covers the renovations to Room 58 Men's Washroom in the Council's Building M-20 of the National Research Council.

**2. WORK & MATERIALS SUPPLIED BY OWNER**

- .1 Work and materials not included in this contract are described on drawings and in this specification.
- .2 Deliver to a storage place, as directed by the Departmental Representative, all materials returned to the Owner.
- .3 Unless otherwise specified, accept owner-supplied materials at their storage location and provide all transportation as required.
- .4 Contractor's duties:
- .1 Unload at site.
  - .2 Promptly inspect products and report damaged or defective items.
  - .3 Give written notification to the Departmental Representative for items accepted in good order.
  - .4 Handle at site, including uncrating and storage.
  - .5 Repair or replace items damaged on site.
  - .6 Install, connect finished products as specified.

**3. LABOUR CONDITIONS AND FAIR WAGE SCHEDULE**

- .1 Comply with all labour conditions as specified by the Human Resources Development Canada, Labour Program, including those outlined in Appendix "D", Labour Conditions and Fair Wage Schedule.

**4. WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS)**

- .1 The contractor shall comply with Federal and Provincial legislation regarding the WHMIS. The contractor's responsibilities include, but are not limited to the following:
- .1 To ensure that any controlled product brought on site by the contractor or sub-contractor is labeled;
  - .2 To make available to the workers and the Departmental Representative, Material Safety Data Sheets (MSDS) for these controlled products;
  - .3 To train own workers about WHMIS, and about the controlled products that they use on site;
  - .4 To inform other contractors, sub-contractors the Departmental Representative, authorized visitors and outside inspection agency personnel about the presence and use of such products on the site; and
  - .5 The site foreman or superintendent must be able to demonstrate, to the satisfaction of the Departmental Representative, that he/she has had WHMIS training and is knowledgeable in its requirements. The Departmental Representative can require

replacement of this person if this condition or implementation of WHMIS is not satisfactory.

**5. EXAMINATION REQUIREMENTS OF BILL 208, SECTION 18(a)**

- .1 Under the requirements of Bill 208 of the Ministry of Labour Occupational Health & Safety Act, the following designated substances may be encountered while performing the work described in these contract documents:
  - .1 Lead, Asbestos, Silica
    - .1 It is the responsibility of the general contractor to ensure that each prospective subcontractor for this project has received a copy of the above list.
    - .2 The contractor is advised to take the following precautions when dealing with the above substances: Hire a certified Hazardous Materials removal company to remove hazardous material (Asbestos and Lead) and wear all required protective equipment.

**6. GENERAL**

- .1 The word "provide" indicated in this Specification means to supply and install. Site Examination

**7. COMPLETION**

- .1 All work is to be completed within 12 week(s) upon receipt of notification of acceptance of tender.

**8. COST BREAKDOWN**

- .1 Submit, for approval by the Departmental Representative, a breakdown of tender before submitting the first request for progress payment.
- .2 Use the approved cost breakdown as the basis for submitting all claims.
- .3 Request Departmental Representative's verbal approval to amount of claim prior to preparing and submitting the claim in its final form.

**9. MATERIALS AND WORKMANSHIP**

- .1 Install only new materials on this project unless specifically noted otherwise.
- .2 Only first class workmanship will be accepted, not only with regard to safety, efficiency, durability, but also with regard to neatness of detail and performance. Security Deposit.

**10. SUB-TRADES**

- .1 Submit no later than 72 hours after tender closing, a complete list of sub trades for the Departmental Representative's review.

**11. SITE VISITS**

- .1 For tendering purposes, the site visit(s) must be attended in the presence of the Departmental Representative.

**12. MINIMUM STANDARDS**

- .1 Conform to or exceed minimum acceptable standards of the various applicable federal, provincial and municipal codes such as The National Building Code, The National Fire Code, Canadian Plumbing Code, Canadian Electrical Code, Canadian Code for Construction Safety and the Provincial Construction Safety Act.
- .2 Work to conform to referenced standards and codes as reaffirmed or revised to date of specification.

**13. FIRE AND GENERAL SAFETY**

- .1 Comply with the requirements of Fire Commissioner of Canada Standards No. 301 and 302.
- .2 Comply with the requirements of the National Research Council, Fire Prevention Officer including those outlined in Section 01545.
- .3 Comply with safety related instructions from the Departmental Representative or the National Research Council, Fire Prevention Officer.
- .4 Comply with the National Building Code (Part 8, Construction Safety Measures) and the Provincial Construction Safety Act.

**14. PROTECTION AND WARNING NOTICES**

- .1 Provide all materials required to protect existing equipment.
- .2 Erect dust barriers to prevent dust and debris from spreading through the building.
- .3 Place dust protection in the form of cover sheets over equipment and furniture and tape these sheets to floors, to ensure no dust infiltration.
- .4 Repair or replace any and all damage to Owner's property caused during construction, at no cost to the Owner and to the satisfaction of the Departmental Representative.
- .5 Protect the buildings, roads, lawns, services, etc. from damage which might occur as a result of this work.
- .6 Plan and co-ordinate the work to protect the buildings from the leakage of water, dust, etc.
- .7 Ensure that all doors, windows, etc., that could allow transfer of dust, noise, fumes, etc., to other areas of the building are kept closed.
- .8 Secure working area at the end of each day's work and be responsible for the same.

- .9 Provide and maintain adequate safety barricades around the work sites to protect NRC personnel and the public from injury during the carrying out of work.
- .10 Post warnings in all instances where possible injury could occur such as Work Overhead, Hard Hat Areas, etc. or as required by the Departmental Representative.
- .11 Provide temporary protective enclosures over building entrances and exits to protect pedestrians. All enclosures to be structurally sound against weather and falling debris.

**15. FASTENING DEVICES**

- .1 Do not use explosive actuated tools, unless permitted expressly by the Departmental Representative.
- .2 Comply with the requirements of CSA A-166 (Safety Code for Explosive Actuated Tools).
- .3 Do not use any kind of impact or percussion tool without first obtaining permission from the Departmental Representative.

**16. BILINGUALISM**

- .1 Ensure that all signs, notices, etc. are posted in both official languages.
- .2 Ensure that all identification of services called for by this contract are bilingual.

**17. TEMPORARY HEATING AND VENTILATING**

- .1 Bear the costs of temporary heat and ventilation during construction including costs of installation, fuel, operation, maintenance, and removal of equipment.
- .2 Use of direct-fired heaters discharging waste products into the work areas will not be permitted unless prior approval is given by the Departmental Representative.
- .3 Furnish and install temporary heat and ventilation in enclosed areas as required to:
  - .1 Facilitate progress of work.
  - .2 Protect work and products against dampness and cold.
  - .3 Reduce moisture condensation on surfaces to an acceptable level.
  - .4 Provide ambient temperature and humidity levels for storage, installation and curing of materials.
  - .5 Provide adequate ventilation to meet health regulations for a safe working environment.
- .4 Maintain minimum temperature of 10 °C (50 °F) or higher where specified as soon as finishing work is commenced and maintain until acceptance of the structure by the Departmental Representative. Maintain ambient temperature and humidity levels as required for comfort of NRC personnel.
- .5 Prevent hazardous or unhealthy accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction including also, storage areas and sanitary facilities.

- .1 Dispose of exhaust materials in a manner that will not result in a harmful or unhealthy exposure to persons.
- .6 Maintain strict supervision of operation of temporary heating and ventilating equipment.
  - .1 Enforce conformance with applicable codes and standards.
  - .2 Comply with instructions of NRC Fire Prevention Officer including provision of full-time watchmen services when directed.
  - .3 Enforce safe practices.
  - .4 Vent direct-fired combustion units to outside.
- .7 After award of contract, Departmental Representative may permit use of the permanent system providing agreement can be reached on:
  - .1 Conditions of use, special equipment, protection and maintenance, replacement of filters.
  - .2 Methods of ensuring that heating medium will not be wasted and in the case of steam, agreement on what is to be done with the condensate.
  - .3 Saving on contract price.
  - .4 Provisions relating to guarantees on equipment.

**18. DISCREPANCIES & INTERFERENCES**

- .1 Before tender closing, examine drawings and specifications. Report at once to the Departmental Representative, any defects, discrepancies, omissions or interferences affecting the work.
- .2 Provide items mentioned in either the drawings or the specification.
- .3 Contractor to immediately inform the Departmental Representative in writing, of any discrepancies between the plans and the physical conditions so the Departmental Representative may promptly verify same.
- .4 Any work done after such a discovery, until authorized, is at the contractor's risk.
- .5 Where special interferences are encountered on the job and they have not been pointed out on the original tender or on the plans and specifications, provide offsets, bends or reroute the services to suit job conditions at no extra cost.
- .6 Arrange all work so as not to interfere in any way with other work being carried out.
- .7 Commencement of work will imply an acceptance of existing conditions.

**19. CO-OPERATION**

- .1 Co-operate with NRC staff in order to keep disruption of normal research work to an absolute minimum.
- .2 Work out in advance, a schedule for all work which might disrupt normal work in the building.

- .3 Have schedule approved by the Departmental Representative.
- .4 Notify the Departmental Representative in writing, 72 hours prior to any intended interruption of facilities, areas, corridors, mechanical or electrical services and obtain requisite permission.

**20. GENERAL REVIEW**

- .1 Periodic review of the contractor's work by the Departmental Representative, does not relieve the contractor of the responsibility of making the work in accordance with contract documents. Contractor shall carry out his own quality control to ensure that the construction work is in accordance with contract documents.

**21. INSPECTION OF BURIED OR CONCEALED SERVICES**

- .1 Prior to concealing any services that are installed, ensure that all inspection bodies concerned, including NRC, have inspected the work and have witnessed all tests. Failure to do so may result in exposing the services again at the contractor's expense.

**22. TESTING**

- .1 On completion, or as required by local authority inspectors and/or Departmental Representative during progress of work and before any services are covered up and flushing is complete, test all installations in the presence of the Departmental Representative.
- .2 Obtain and hand to the Departmental Representative all acceptance certificates or test reports from authority having jurisdiction. The project will be considered incomplete without the same.

**23. WORKING HOURS AND SECURITY**

- .1 Normal working hours on the NRC property are from 8:00 a.m. until 4:30 p.m., Monday to Friday inclusive except statutory holidays.
- .2 At all other times, special written passes are required for access to the building site.
- .3 Obtain permission from the Departmental Representative to perform the specific tasks before scheduling any work outside normal working hours.
- .4 An escort may be required whenever working outside normal hours. Contractor to bear the associated costs.
- .5 All persons employed by the contractor, or by any subcontractor, and working on the site must wear and keep visible identification badges issued by the Council.

**24. SCHEDULE**

- .1 The contractor shall prepare a detailed schedule, fixing the date for commencement and completion of the various parts of the work and update the said schedule. Such schedule



shall be made available to the Departmental Representative not later than two weeks after the award of the contract and prior to commencement of any work on site.

- .2 Notify Departmental Representative in writing of any changes in schedule 7 day(s) before the scheduled completion date arrange to do an interim inspection with the Departmental Representative.

**25. SERVICE INTERRUPTIONS**

- .1 Arrange for all service interruptions with the Departmental Representative. Do not operate any NRC equipment or plant.
- .2 Allow 72 hours notice prior to cutting into any existing service.
- .3 All service interruptions are to be of minimum duration.
- .4 Protect existing services as required and immediately make repairs if damage occurs.
- .5 Provide detours, bridges, alternate feeds, etc., as required to minimize disruptions.
- .6 Plan and perform work in advance in order to minimize disruption and service interruption.

**26. SHOP DRAWINGS**

- .1 Submit to Departmental Representative for review, shop drawings, product data and samples specified within 2 week(s) after contract award.
- .2 Submit to Departmental Representative for review a complete list of all shop drawings, product data and samples specified and written confirmation of corresponding delivery dates within one (1) week after shop drawings, product data and samples approval date. This list shall be updated on a weekly basis and any changes to the list shall be immediately notified in writing to the Departmental Representative.
- .3 Review shop drawings, data sheets and samples prior to submission.
- .4 Submit 5 copies of all shop drawings and product data and samples for review, unless otherwise specified.
- .5 Review of shop drawings and product data by the Departmental Representative does not relieve the contractor of the responsibility for errors and omissions and for the conformity with contract documents.

**27. SAMPLES AND MOCK-UPS**

- .1 Submit samples in sizes and quantities specified.
- .2 Where colour, pattern or texture is criterion, submit full range of samples.
- .3 Construct field samples and mock-ups at locations acceptable to Departmental Representative.

- .4 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on project.

**28. MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .2 Notify the Departmental Representative in writing of any conflict between these specifications and manufacturer's instruction. Departmental Representative will designate which document is to be followed.

**29. SPECIFICATIONS, "AS BUILTS"**

- .1 The contractor shall keep on the site, one (1) up-to-date copy of all specifications, drawings and bulletins pertaining to the work, in good order, available to the Departmental Representative and to his representatives at all times.
- .2 At least one (1) copy of such specifications and drawings shall be marked by the contractor to show all work "As Built" and shall be handed over to the Departmental Representative with the Application for Payment and for the Final Certificate of Completion.

**30. ACCEPTANCE OF SITE**

- .1 Inspect the site before commencing work, review any unexpected conditions with the Departmental Representative.
- .2 Commencement of work will imply acceptance of existing conditions.

**31. PARTIAL OCCUPANCY**

- .1 NRC may request partial occupancy of the facility if the contract extends beyond the expected completion date.

**32. USE OF SITE**

- .1 Restrict operations on site to the areas approved by the Departmental Representative at the time of tendering.
- .2 Locate all temporary structures, equipment, storage, etc., to the designated areas.
- .3 Restrict parking to the designated areas.
- .4 Do not restrict access to the building, routes, and services.
- .5 Do not encumber the site with materials or equipment.

**33. SITE ACCESS**

- .1 Make prior arrangements with the Departmental Representative before starting work or moving materials and equipment on site.
- .2 Obtain approval of Departmental Representative for regular means of access during the construction period.
- .3 Obtain approval of Departmental Representative before temporarily suspending operations on site; before returning to the site and before leaving the site at the end of the job.
- .4 Provide and maintain access to site.
- .5 Build and maintain temporary roads and provide snow removal during period of work.
- .6 Make good any damage and clean up dirt, debris, etc., resulting from contractor's use of existing roads.

**34. OVERLOADING**

- .1 Ensure that no part of the building or work is subjected to a load which will endanger safety or cause permanent deformation or structural damage.

**35. TEMPORARY SERVICES**

- .1 A source of temporary power will be made available in the area. Bear all costs to make connections to the power source and perform distribution on site.
- .2 Provide all load centres, breakers, conduit, wiring, disconnects, extension cords, transformers, as required from the source of power.
- .3 Power is to be used only for power tools, lighting, controls, motors, and not for space heating.
- .4 A source of temporary water will be made available if required.
- .5 Bear all costs associated with distributing the water to the required locations.
- .6 Comply with NRC requirements when connecting to existing systems in accordance with the articles entitled "Co-operation" and "Service Interruptions" of this section.

**36. SITE OFFICE & TELEPHONE**

- .1 Contractor to erect a temporary site office at his own expense.
- .2 Install and maintain a telephone, if necessary.
- .3 Use of NRC phones not permitted unless in the case of an emergency.

**37. SANITARY FACILITIES**

- .1 Obtain permission from the Departmental Representative to use the existing washroom facilities in the building.
- .2 The contractor is responsible for keeping facilities clean at all times. [OR]
- .3 Provide sanitary facility, and bear all associated costs.

**38. PROJECT MEETINGS**

- .1 Hold regular project meetings at times and locations approved by the Departmental Representative.
- .2 Notify all parties concerned of meetings to ensure proper coordination of work.
- .3 Departmental Representative will set times for project meetings and assume responsibility for recording and distributing minutes.

**39. STORAGE**

- .1 Provide storage as required to protect all tools, materials, etc., from damage or theft and be responsible for the same.
- .2 Do not store flammable or explosive materials on site without the authorization of the NRC Fire Prevention Officer.

**40. DRAINAGE**

- .1 Provide temporary drainage and pumping as required to keep excavations and site free of water.

**41. ENCLOSURE OF STRUCTURES**

- .1 Construct and maintain all temporary enclosures as required to protect foundations, sub-soil, concrete, masonry, etc., from frost penetration or damage.
- .2 Maintain in place until all chances of damage are over and proper curing has taken place.
- .3 Provide temporary weathertight enclosures for exterior openings until permanent sash and glazing and exterior doors are installed.
- .4 Provide lockable enclosures as required to maintain the security of NRC facilities and be responsible for the same.
- .5 Provide keys to NRC security personnel when required.

**42. LAYOUT OF WORK**

- .1 Lay out the work carefully and accurately.
- .2 Verify all dimensions and be responsible for them.

- .3 Locate and preserve general reference points.
- .4 Employ competent person to lay out work in accordance with control lines and grades provided by the Departmental Representative.
  
- 43. CONCEALING**
  - .1 Conceal all services, piping, wiring, ductwork, etc., in floors, walls or ceilings except where indicated otherwise.
  
- 44. SPACE CONFLICT**
  - .1 Maintain an awareness of responsibility to avoid space conflict with other trades.
  - .2 Throughout the course of construction, keep continuously acquainted with field conditions, and the work being developed by all trades involved in the project.
  
- 45. CUTTING AND PATCHING**
  - .1 Cut existing surfaces as required to accommodate new work.
  - .2 Remove all items as shown or specified.
  - .3 Patch and make good with identical materials, the surfaces that have been disturbed, cut or damaged, to the Departmental Representative's satisfaction.
  - .4 Where new pipes pass through existing construction, core drill an opening. Size openings to leave 12mm (1/2") clearance around the pipes or pipe insulation. Do not drill or cut any surface without the approval of the Departmental Representative.
  - .5 Obtain written approval of the Departmental Representative before cutting openings through existing or new structural members.
  - .6 Seal all openings where cables, conduits or pipes pass through walls with an acoustic sealant conforming to CAN/CGSB-19.21-M87.
  - .7 Where cables, conduits and pipes pass through fire rated walls and floors, pack space between with compressed glass fibres and seal with caulking in accordance with CAN/CGSB-19.13-M87 AND NBC 3.1.7.
  
- 46. CLEAN-UP DURING CONSTRUCTION**
  - .1 On a daily basis, maintain project site and adjacent area of campus including roofs, free from debris and waste materials.
  - .2 Provide on-site dump containers for collection of waste materials and rubbish.
  
- 47. FINAL CLEAN-UP**
  - .1 Upon completion do a final clean-up to the satisfaction of the Departmental Representative.

- .2 Clean all new surfaces, lights, existing surfaces affected by this work, replace filters, etc.
- .3 Clean all resilient flooring and prepare to receive protective finish. Protective finish applied by NRC

**48. DISPOSAL OF WASTES**

- .1 Dispose of waste materials including volatiles, safely off NRC property. Refer to the article entitled "Fire & General Safety" of this section.

**49. WARRANTY**

- .1 Refer to General Conditions "C", section GC32.
- .2 Ensure that all manufacturers' guarantees and warranties are issued in the name of the Contractor and the National Research Council.

**50. MAINTENANCE MANUALS**

- .1 Provide three (3) bilingual copies of maintenance manuals or two English and two French maintenance manuals immediately upon completion of the work and prior to release of holdbacks.
- .2 Manuals to be neatly bound in hard cover loose leaf binders.
- .3 Manuals to include operating and maintenance instructions, all guarantees and warranties, shop drawings, technical data, etc., for the material and apparatus supplied under this contract.

**51. IDENTIFICATION BADGES**

- .1 Use of Identification Badges is mandatory in NRC buildings.
- .2 Obtain all badges from the Security office.

**52. SPECIFIED ACCEPTABLE & ALTERNATIVE EQUIPMENT & MATERIALS**

- .1 Materials and equipment scheduled and/or specified on the drawings or in the specifications have been selected to establish a performance and quality standard. In most cases, acceptable manufacturers are stated for any material or equipment specified by manufacturer's name and model number. Contractors may base their tender price on materials and equipment supplied by any of the manufacturers' names as acceptable for the particular material or equipment.
- .2 In addition to the manufacturers specified or named as acceptable, you may propose alternative manufacturers of materials or equipment to the Departmental Representative for acceptance. For a product to be considered as an alternative product substitute, make a written application to the Departmental Representative during the tender period, not later than seven (7) working days before tender closing.

- .3 Certify in writing that the alternative meets all requirements of the specified material or equipment. In addition, it shall be understood that all costs required by or as a result of acceptance or proposed alternatives, will be borne by the contractor.
- .4 Approval of alternatives will be signified by issue of an Addendum to the Tender Documents.
- .5 Any alternative manufacturers or materials submitted which are incomplete and cannot be evaluated, or are later than seven (7) working days before tender closing date or after the tender period, will not be considered.

**53.**

**DRAWINGS**

- .1 The following drawings illustrate the work and form part of this contract: 3841-A01, 3841-E01 and 3841-M01

**END OF SECTION**

**Part 1            General**

**1.1                AUTHORITIES**

- .1     The Fire Commissioner of Canada (F.C.) is the authority for fire safety at NRC.
- .2     For the purpose of this document, "Departmental Representative" will be deemed as the NRC person in charge of the project.
- .3     The Departmental Representative will consult with the Fire Prevention Officer (FPO) as and when required.
- .4     The Departmental Representative will enforce these Fire Safety Requirements.
- .5     Comply with the following standards as published by the Office of the Fire Commissioner of Canada:
  - .1     Standard No. 301 - June 1982 "Standard for Construction Operations";
  - .2     Standard No. 302 - June 1982 "Standard for Welding and Cutting".

**1.2                Hot Work**

- .1     Permit:
  - .1     Prior to commencement of any "Hot Work" involving welding, soldering, burning, heating, use of torches or salamanders or any open flame, obtain a Hot Work Permit from the Departmental Representative.
- .2     Site Review:
  - .1     Prior to commencement of "Hot Work", review the area of hot work with the Departmental Representative to determine the level of fire safety precautions to be taken.

**1.3                REPORTING FIRES**

- .1     Know the exact location of the nearest Fire Alarm Pull Station and telephone, including the emergency phone number.
- .2     REPORT immediately, all fire incidents as follows
  - .1     Activate nearest fire alarm pull station and;
  - .2     Telephone the following emergency phone number:

<b>CELLULAR OR</b>		
<b><u>NRC LOCATION</u></b>	<b><u>NON-NRC PHONES</u></b>	<b><u>NRC PHONES</u></b>
<b>Montreal Road Campus</b>	<b>613-993-2411</b>	<b>333</b>
<b>Uplands</b>	<b>613-993-2411</b>	<b>333</b>
<b>Carleton Place</b>	<b>613-993-2411 OR</b>	<b>993-2411</b>
<b>Greenbank</b>	<b>613-993-2411 OR</b>	<b>993-2411</b>
<b>Sussex Drive</b>	<b>613-993-2411</b>	<b>333</b>



- .3 When reporting a fire by phone, give the location of fire, building number and be prepared to verify location.
- .4 The person activating fire alarm pull station must remain at the scene of fire to provide information and direction to the Fire Department personnel.

**1.4 INTERIOR AND EXTERIOR FIRE PROTECTION & ALARM SYSTEMS**

- .1 DO NOT OBSTRUCT OR SHUT OFF FIRE PROTECTION EQUIPMENT OR ALARM SYSTEMS WITHOUT AUTHORIZATION FROM THE DEPARTMENTAL REPRESENTATIVE.
- .2 WHEN ANY FIRE PROTECTION EQUIPMENT IS TEMPORARILY SHUT DOWN, ALTERNATIVE MEASURES AS PRESCRIBED BY THE DEPARTMENTAL REPRESENTATIVE SHALL BE TAKEN TO ENSURE THAT FIRE PROTECTION IS MAINTAINED.
- .3 DO NOT LEAVE FIRE PROTECTION OR ALARM SYSTEMS INACTIVE AT THE END OF A WORKING DAY WITHOUT NOTIFICATION AND AUTHORISATION FROM THE DEPARTMENTAL REPRESENTATIVE. THE DEPARTMENTAL REPRESENTATIVE WILL ADVISE THE (FPO) OF THE DETAILS OF ANY SUCH EVENT.
- .4 DO NOT USE FIRE HYDRANTS, STANDPIPES AND HOSE SYSTEMS FOR OTHER THAN FIRE FIGHTING PURPOSES UNLESS AUTHORISED BY DEPARTMENTAL REPRESENTATIVE.

**1.5 FIRE EXTINGUISHERS**

- .1 Provide a minimum of 1-20 lb. ABC Dry Chemical Fire Extinguisher for every hot work operation.
- .2 Provide fire extinguishers for hot asphalt and roofing operations as follows:
  - .1 Pot area - 1-20 lb. ABC Dry Chemical;
  - .2 Roof - 2-20 lb. ABC Dry Chemical.
- .3 Provide fire extinguishers equipped as below:
  - .1 Pinned and sealed;
  - .2 With a pressure gauge;
  - .3 With an extinguisher tag signed by a fire extinguisher servicing company.
- .4 Carbon Dioxide (CO<sub>2</sub>) extinguishers will not be considered as substitutes for the above.

**1.6 ROOFING**

- .1 Kettles:
  - .1 Arrange for the safe location of asphalt kettles and material storage with the Departmental Representative before moving them on site. Do not locate kettles on

- any roof or structure and keep them at least 10m away from a building and at a safe distance from parked automobiles.
- .2 Equip kettles with thermometers or gauges that are in good working order.
- .3 Do not operate kettles at temperatures in excess of 232°C.
- .4 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire. Provide fire extinguishers as required in article 12.
- .5 Advise the Departmental Representative of container capacities prior to start of work.
- .6 Keep compressed gas cylinders secured in an upright position and a minimum of 20 feet away from any kettle.
- .2 Mops:
  - .1 Use only glass fibre roofing mops.
  - .2 Remove used mops from the roof site at the end of each working day.
- .3 Torch Applied Systems:
  - .1 Do not use torches next to walls.
  - .2 Provide a fire watch as required by article 13 of this section.
- .4 Materials Storage:
  - .1 Store all combustible roofing materials at least 3m away from any structure and 6m from any kettle.

**1.7 FIRE WATCH**

- .1 Provide a fire watch for a minimum of one hour after the termination of a hot work operation.
- .2 Temporary heating, refer to General Instructions Section 01000.
- .3 Equip fire watch personnel with fire extinguishers as required by article 5.

**1.8 OBSTRUCT OF ACCESS/EGRESS ROUTES-ROADWAYS, HALLS, DOORS OR ELEVATORS**

- .1 Advise the Departmental Representative in advance of any work that would impede the response of the Fire Department personnel and their apparatus. This includes violation of minimum overhead clearance, erecting of barricades and the digging of trenches.
- .2 Building exit routes must not be obstructed in any way without special permission from the Departmental Representative, who will ensure that adequate alternative routes are maintained.
- .3 The Departmental Representative will advise the FPO of any obstruction that may warrant advanced planning and communication to ensure the safety of building occupants and the effectiveness of the Fire Department.

**1.9 SMOKING**

- .1 Smoking is prohibited inside all NRC buildings.
- .2 Obey all "NO SMOKING" signs.

**1.10 RUBBISH AND WASTE MATERIALS**

- .1 Keep rubbish and waste materials to a minimum and a minimum of 20 feet from any kettle or torches.
- .2 Do not burn rubbish on site.
- .3 Removal:
  - .1 Remove all rubbish from work site at the end of the work day or shift, or as directed.
- .4 Storage:
  - .1 Exercise extreme care when storing combustible waste materials in work areas. Ensure maximum possible cleanliness, ventilation and that all safety standards are adhered to when storing any combustible materials.
  - .2 Deposit greasy or oily rags or materials subject to spontaneous combustion in CSA or ULC approved receptacles and remove as required in 10.3.1.
- .5 Dumpsters:
  - .1 Consult the Departmental Representative to determine an acceptable safe location before bringing the dumpster on site.

**1.11 FLAMMABLE LIQUIDS**

- .1 The handling, storage and use of flammable liquids are governed by the current National Fire Code of Canada.
- .2 Flammable Liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 litres, provided they are stored in approved safety cans bearing the ULC seal of approval. Storage of quantities of flammable liquids exceeding 45 litres for work purposes, require the permission of the Departmental Representative.
- .3 Transfer of flammable liquids is prohibited within buildings.
- .4 Do not transfer flammable liquids in the vicinity of open flames or any type of heat producing device.
- .5 Do not use flammable liquids having a flash point below 38 °C such as naphtha or gasoline as solvents or cleaning agents.
- .6 Store flammable waste liquids for disposal in approved container located in a safe, ventilated area. Waste flammable liquids are to be removed from the site on a regular basis.

- .7 Where flammable liquids, such as lacquers or urethane are used, assure proper ventilation and eliminate all sources of ignition. Inform the Departmental Representative prior to, and at the cessation of such work.

**1.12 QUESTIONS AND/OR CLARIFICATION**

- .1 Direct any questions or clarification on Fire Safety, in addition to the above requirements, to the Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.2                PROJECT CLEANLINESS**

- .1      Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2      Remove waste materials from site at daily regularly scheduled times or dispose of as directed by NRC. Do not burn waste materials on site.
- .3      Clear snow and ice from access to building in affected work area.
- .4      Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5      Provide on-site containers for collection of waste materials and debris. Location of containers to be approved by NRC.
- .6      Provide and use marked separate bins for recycling.
- .7      Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .8      Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9      Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10     Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11     Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

**1.3                FINAL CLEANING**

- .1      When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2      Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3      Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4      Remove waste materials from site at regularly scheduled times or dispose of as directed by NRC. Do not burn waste materials on site.

- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors and has indicated.
- .8 Clean lighting reflectors, lenses, and other lighting surfaces.
- .9 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .10 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .12 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .13 Remove dirt and other disfiguration from exterior surfaces.
- .14 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .15 Sweep and wash clean paved areas.
- .16 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .17 Clean roofs, downspouts, and drainage systems.
- .18 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .19 Remove snow and ice from access to building.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance provincial and local regulation.

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**Part 2          Products**

**2.1            NOT USED**

**Part 3          Execution**

**3.1            NOT USED**

**END OF SECTION**

**Part 1            General**

**1.1                SUBMITTALS**

- .1        Submittals: in accordance with Section 00 10 00 – General Instructions.
- .2        Shop drawings to show:
  - .1        Mounting arrangements.
  - .2        Operating and maintenance clearances.
- .3        Shop 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        Closeout Submittals:
  - .1        Provide operation and maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.
  - .2        Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
  - .3        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.
    - .6        Valves schedule and flow diagram.
    - .7        Colour coding chart.
  - .4        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.
  - .5        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 for HVAC.
  - .6        Approvals:



- .1 Submit 2 copies 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.
- .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 1 set of reproducible mechanical drawings. 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 Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
  - .2 Identify each drawing in lower right hand corner in letters at least 12 mm 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 testing, adjusting and balancing for HVAC using as-built drawings.
  - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .10 Submit copies of as-built drawings for inclusion in final TAB report.

## 1.2 DEFINITIONS

- .1 For purposes of this the Mechanical Division the following:
  - .1 "Concealed" - mechanical services and equipment in suspended ceilings and in chases and furred spaces.
  - .2 "Exposed" - will mean not concealed as defined above.

## 1.3 EXAMINATION OF THE SITE

- .1 Carefully examine conditions at the site which the site will or may affect your work, and become familiar with both the new and existing construction, finishes, and other work associated with your work in order that your tender price includes for everything necessary for completion of your work within the proposed project schedule

**1.4 QUALITY ASSURANCE**

- .1 Quality Assurance: in accordance with Section 00 10 00 – General Instructions.
- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 10 00 – General Instructions and 00 15 45 – General Safety Section and Fire Instructions.

**1.5 MAINTENANCE**

- .1 Furnish spare parts in accordance with Section 00 10 00 – General Instructions.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section and Fire Instructions.

**1.7 COORDINATION & COOPERATION WITH OTHER TRADES**

- .1 Co-ordinate your work with the work of all trades to ensure a proper and complete installation. Notify all trades concerned of the requirement for openings, sleeves, inserts and other hardware necessary in their work for the installation of your work.
- .2 The exact locations and routing of mechanical and electrical services must be properly planned, coordinated and established with all affected trades prior to installation such that they will clear each other as well as any obstructions. Generally, piping requiring uniform pitch shall be given the right of way, with other services located and arranged to suit.

**1.8 PERMITS, CERTIFICATES & FEES**

- .1 Display all required permits on worksite and include copies of inspection certificates in operating and maintenance instruction manuals.
- .2 Obtain "Hot Work Permit" from the Engineer prior to commencement of soldering, welding or other high temperature work.
- .3 Comply with all requirements of Section 001000.

**1.9 FEDERAL HALOCARBON REGULATION**

- .1 Generate halocarbon records for work on equipment (cooling equipment with CFC's, HCFC's and HFC refrigerants; fire suppression systems; solvent cleaning systems) that may result in the release of a halocarbon.
- .2 Tag equipment with duplicate of halocarbon record.
- .3 Provide additional copy of halocarbon record to NRC for inclusion in the Zone Halocarbon Service File.

**1.10 CLEANING & FINAL ADJUSTMENT**

- .1 During construction, keep the site reasonably clear of rubbish and waste material resulting from your work on a daily basis to the satisfaction of the Engineer. Notify the general contractor of any requirements for a waste receptacle for disposal of waste materials.
- .2 Clean interior and exterior of all systems including strainers, and vacuum interior of air handling units.
- .3 Clean and refurbish all equipment and leave in first class operating condition including replacement of all filters in all air and piping systems.
- .4 Balance and adjust all systems and each piece of equipment to operate as designed.

**1.11 PROTECTION OF EQUIPMENT & MATERIALS** Properly protect all of your equipment and materials on site from damage due to the elements, your work and the work of other trades, to the approval of the Engineer.

- .2 Wherever possible, coordinate equipment deliveries with the manufacturers and/or suppliers such that equipment is delivered to the site when it is required, or so that it can be suitably stored within the building and protected from the elements.

**1.12 STORAGE OF EQUIPMENT & MATERIALS**

- .1 Arrange for sufficient storage facilities off the premises for the storage of equipment and materials which will not be allowed to stand in the open, nor to interfere with normal operations in the building.
- .2 Bring prefabricated materials on the job site as and when required to be installed.

**1.13 HOISTING & SCAFFOLDING**

- .1 Provide all necessary hoists and scaffolds required for your work.
- .2 Design and construction of scaffolding to be in accordance with CSA S269.2

**Part 2 Products**

**2.1 MATERIALS**

- .1 Materials and products in accordance with Section 00 10 00 – General Instructions.

**Part 3 Execution**

**3.1 PAINTING REPAIRS AND RESTORATION**

- .1 Do painting in accordance with Section 09 91 23 - Interior Painting.
- .2 Prime and touch up marred finished paintwork to match original.
- .3 Restore to new condition, finishes which have been damaged.

**3.2 CLEANING**

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

**3.3 FIELD QUALITY CONTROL**

- .1 Site Tests: conduct following tests in accordance with Section 00 10 00 – General Instructions and submit report as described in PART 1 - SUBMITTALS.
- .2 Manufacturer's Field Services:
  - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
  - .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.
  - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

**3.4 DEMONSTRATION (If Required)**

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Trial usage to apply to following equipment and systems:
  - .1 Fume hood and associated services.
- .3 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .5 Instruction duration time requirements as specified in appropriate sections.
- .6 Determination of whether or not demonstration is required will be decided by Departmental Representative in consultation with end user (client).

**3.5 PROTECTION**

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

**END OF SECTION**

- Part 1**
- 1.1 General**
- 1.1 SUMMARY**
- .1 Section Includes:
- .1 Thermal insulation for piping and piping accessories.
- 1.2 REFERENCES**
- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- .1 ASHRAE Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).
- .3 Manufacturer's Trade Associations
- .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).
- 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 SUBMITTALS**
- .1 Submittals: in accordance with Section 00 10 00 – General Instructions.
- .2 Product Data:
- .1 Submit manufacturer's printed product literature, specifications and datasheet. Include product characteristics, performance criteria, and limitations.
- .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).
- .3 Shop Drawings:
- .1 Submit shop drawings in accordance with Section 00 10 00 – General Instructions.
- .1 Shop drawings: submit drawings stamped for review by NRC.
- .4 Samples:
- .1 Samples: Not required.
- 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, member of TIAC.
- .3 Health and Safety:
- .1 Do construction occupational health and safety in accordance with Section 00 10 00 – General Instructions.
- 1.6 DELIVERY, STORAGE AND HANDLING**
- .1 Packing, shipping, handling and unloading:
- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Storage and Protection:
- .1 Protect from weather, theft, construction traffic.
- .2 Protect against damage.

- .3 Store at temperatures and conditions required by manufacturer.
- .3 Waste Management and Disposal:
  - .1 Remove all material from NRC property and dispose, reuse and recycle excel material as per local good waste management practices.
  - .2 Place excess or unused insulation and insulation accessory materials in designated containers.
  
- Part 2**
- 2.1 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 TIAC Code A-3: rigid moulded mineral fibre with factory applied vapour retarder jacket.
    - .1 Vapor retarder jacket includes a continuous longitudinal self-sealing closure lap.
    - .2 Jacket shall be suitable to be painted with future latex paint.
    - .3 Mineral fibre: CAN/ULC S102-M88
    - .4 Jacket: to CGSB 51-GP-9M, self-sealing lap.
    - .5 Temperature Range: 0 to 538 °C
    - .6 Maximum "k" factor: 0.033 W/m°C at 24°C to ASTM C 335.
  
- 2.3 INSULATION SECUREMENT**
  - .1 Tape: self-adhesive, aluminum 50 mm wide minimum.
  - .2 Contact adhesive: quick setting.
  - .3 Canvas adhesive: washable.
  - .4 Single/double bands: stainless steel, 19 mm wide, 0.5 mm thick.
  - .5 Wire mesh: 25 mm hexagonal type 304 stainless steel wire mesh, tightly laced together at horizontal and circumferential mesh joints.
  
- 2.4 VAPOUR RETARDER LAP ADHESIVE**
  - .1 Water based, fire retardant type, compatible with insulation.
  
- 2.5 INDOOR VAPOUR RETARDER FINISH**
  - .1 Vinyl emulsion type acrylic, compatible with insulation.
  
- 2.6 OUTDOOR VAPOUR RETARDER FINISH**
  - .1 Vinyl emulsion type acrylic, compatible with insulation.
  - .2 Reinforcing fabric: fibrous glass, untreated 305 g/m<sup>2</sup>.
  
- 2.7 JACKETS**
  - .1 Polyvinyl Chloride (PVC):
    - .1 One-piece moulded type to CAN/CGSB-51.53 with pre-formed shapes as required.
    - .2 Colours: As indicated
    - .3 Minimum service temperatures: -20 °C
    - .4 Maximum service temperature: 65 °C
    - .5 Moisture vapour transmission: 0.02 perm.
    - .6 Thickness: 0.3 mm.

- .7 Fastenings:
  - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
  - .2 Pressure sensitive vinyl tape of matching colour.
- .8 Special requirements:
  - .1 Indoor: As indicated.
  - .2 Outdoor: UV rated material at least 0.5 mm thick.
- .2 Canvas:
  - .1 220 gm/m<sup>2</sup> cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
  - .2 Lagging adhesive: compatible with insulation.
- .3 Aluminum:
  - .1 To ASTM B209.
  - .2 Thickness: 0.40 mm sheet.
  - .3 Finish: smooth.
  - .4 Joining: longitudinal and circumferential slip joints with 50 mm laps.
  - .5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.
  - .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5 mm thick at 300 mm spacing.
- .4 Interior / Exterior acoustic lagging
  - .1 Barrier shall be constructed of a 3-mm thick mass loaded, limp vinyl sheet bonded to a thin layer of reinforced aluminum foil on one side. The barrier shall have a nominal density of 4.9-kg/m<sup>2</sup> and shall have a minimum STC rating of 28. The barrier shall exhibit minimum flammability ratings of 0.0-seconds for flame-out and after-glow, and 5-mm for char length when tested in accordance with Federal Test Std. No. 191-5903. The barrier shall have a minimum thermal conductivity (K) value of 0.29 and a rated service temperature range of -40°C to 105°C. When tested for Surface Burning Characteristics per ASTM E84, the barrier will have a Flame Spread Index of no more than 10 and a Smoke Development Index of no more than 40.
  - .2 The decoupling layer shall be a combination of 25-mm fiber glass batting, non-woven porous scrim-coated glass cloth, quilted together in a matrix of 100-mm diamond stitch pattern which encapsulates the glass fibers.
  - .3 The composite material shall be fabricated to include a nominal 152-mm wide barrier overlap tab extending beyond the quilted fiber glass to facilitate a leak-tight seal around field joints. Nominal barrier width 1372-mm, nominal fiber glass batt decoupler width 1219-mm.
  - .4 Insertion Loss when tested to ASTM E1222-90:
 

Frequency, Hz	125	250	500	1000	2000	4000	STC
Loss	3	6	7	18	24	27	28
  - .5 Finish: stucco embossed
  - .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5 mm thick at 300 mm spacing.
- .5 Prefabricated, Self-Adhering, Sheet-Type Waterproofing Membrane:
  - .1 Description: Top Layer: Stucco-embossed, UV-resistant aluminum weathering surface. Middle Layer: Double layer of high-density polyethylene reinforcement.

- Bottom Layer: Uniform layer of rubberized asphalt adhesive, protected by disposable silicone release paper.
- .2 Color: Aluminum
- .6 Stainless steel:
  - .1 Type: 304.
  - .2 Thickness: 0.25 mm.
  - .3 Finish: smooth [corrugated] [stucco embossed].
  - .4 Joining: longitudinal and circumferential slip joints with 50 mm laps.
  - .5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.
  - .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5mm thick at 300 mm spacing.

### **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 NRC.
- .2 Piping to be inspected and approved by NRC.
- .3 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 Use two layers with staggered joints (minimal 400 mm) when required nominal wall thickness exceeds 50 mm.
- .4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
  - .1 Install hangers, supports outside vapour retarder jacket.
- .5 Supports, Hangers:
  - .1 Apply high temperature and compressive strength insulation between all hangers and piping where temperature of pipe exceeds 230 °C. Insulation to be sized to suit compressive loads at hanger. Where pipe surface temperature is less than 230°C, wood blocking may be used between pipe support hanger.

#### **3.4 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES**

- .1 Application: at expansion joints, valves, primary flow measuring elements, flanges, unions, equipment and where indicated.
- .2 Design: to permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.
- .3 Insulation:
  - .1 Insulation, fastenings and finishes: same as system.
  - .2 Jacket: aluminum, SS, PVC

#### **3.5 INSTALLATION OF ELASTOMERIC INSULATION**

- .1 Insulation to remain dry. Overlaps to manufacturers instructions. Ensure tight joints.



- .2 Provide vapour retarder as recommended by manufacturer.

**3.6 PIPING INSULATION SCHEDULES**

- .1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .2 TIAC Code: A-3.
  - .1 Securements: SS bands at 300 mm on centre.
  - .2 Seals: VR lap seal adhesive, VR lagging adhesive.
  - .3 Installation: TIAC Code: 1501-C.
- .3 Thickness of insulation as listed in following table.
  - .1 Run-outs to individual units and equipment not exceeding 4000 mm long.
  - .2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	MAX TEMP. °C	TIAC CODE	Pipe sizes (NPS) and insulation thickness (mm)				
			< 1	1 to <1-1/2	1-1/2 to < 4	4 to < 8	8 & over
Steam < 15 psig	125	A-3	38	38	50	50	50
Steam > 15 psig	180	A-3	38	50	75	75	75
Low pressure steam condensate	120	A-3	25	25	25	38	38
High pressure steam condensate	170	A-3	38	38	50	50	50
Heating Water/Glycol	100	A-3	25	25	25	38	38
Domestic hot water		A-3	25	25	25	25	25
Domestic cold water		A-3	25	25	25	25	25

- .4 Finishes:
  - .1 Exposed indoors: aluminum jacket.
  - .2 Installation: to appropriate TIAC code CRF/1 through CPF/5.

**3.7 CLEANING**

- .1 Proceed in accordance with Section 00 10 00 – General Instructions.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1**

**General**

**1.1**

**SUMMARY**

- .1 Section Includes:
  - .1 Selection of piping valves in domestic water system.

**1.2**

**RELATED SECTIONS**

- .1 Section 00 10 00 – General Instructions
- .2 Section 00 15 45 – General Safety Section and Fire Instructions
- .3 Section 21 05 01 – Common Work Results- Mechanical
- .4 Section 22 42 03 – Commercial Washroom Fixtures
- .5 Section 23 05 23.01 – Valves Bronze.
- .6 Section 23 05 01 - Installation of Pipework

**1.3**

**REFERENCES**

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)
  - .1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.
  - .2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.
- .2 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)
  - .1 ANSI/AWWA C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
  - .1 MSS-SP-67, Butterfly Valves.
  - .2 MSS-SP-70, Gray Iron Gate Valves, Flanged and Threaded Ends.
  - .3 MSS-SP-71, Gray Iron Swing Check Valves, Flanged and Threaded Ends.
  - .4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

- .6 National Research Council (NRC)/Institute for Research in Construction
  - .1 NRCC 38728, National Plumbing Code of Canada (NPC) .

#### 1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide manufacturer shop drawings for all valves, piping, fittings and as specified on drawings and in section 00 10 00 – General Instructions.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- .1 See section 00 10 00 – General Instructions

### Part 2 Products

#### 2.1 PIPING

- .1 Domestic hot, cold and recirculation systems, within building.
  - .1 Above ground: copper tube, hard drawn, type L: to ASTM B88M.
  - .2 Buried or embedded: copper tube, soft annealed, type K: to ASTM B88M. No buried joints.

#### 2.2 FITTINGS

- .1 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22. NPS 2 and larger: roll grooved to CSA B242.
- .3 Cast bronze threaded fittings, Class 150: to ANSI/ASME B16.15.
- .4 Cast copper, solder type: to ANSI/ASME B16.18.
- .5 Bronze pipe flanges and flanged fittings, Class 150 to ANSI/ASME B16.24.

#### 2.3 JOINTS

- .1 Solder: 95% tin / 5% copper alloy.
- .2 Teflon tape: for threaded joints.
- .3 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

#### 2.4 SWING CHECK VALVES

- .1 NPS 2 and under, soldered:

- .1 To MSS-SP-80, Class 150, bronze body, bronze swing disc, screw in cap, see Section 23 05 23.01 - Valves – Bronze.
- .2 NPS 2 and under, screwed:
  - .1 To MSS-SP-80, Class 150, bronze body, bronze swing disc, screw in cap, see Section 23 05 23.01 - Valves - Bronze.
- .3 NPS 2-1/2 to NPS 24, flanged:
  - .1 To MSS-SP-71, Class 125, cast iron body, flat flange faces, see Section 23 05 23.02 - Valves - Cast Iron:

**2.5 BALL VALVES**

- .1 NPS 2 and under, screwed:
  - .1 Threaded, 2-Piece, Std. Port, Bronze Ball Valve, 600 CWP, with extension, see Section 23 05 23.01 - Valves - Bronze
- .2 NPS 2 and under, soldered:
  - .1 Solder, 2-Piece, Std. Port, Bronze Ball Valve, 600 CWP, with extension, see Section 23 05 23.01 - Valves - Bronze.

**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 Install in accordance with Ontario Plumbing Code.
- .2 Install pipe work in accordance with Section 23 05 01 - Installation of Pipework, supplemented as specified herein.
- .3 Assemble piping using fittings manufactured to ANSI standards.
- .4 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.
- .5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
- .6 Buried tubing:
  - .1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.
  - .2 Bend tubing without crimping or constriction. Minimize use of fittings.
- .7 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance and equipment removal.

### 3.3 VALVES

- .1 Isolate equipment with unions, fixtures and branches with gate valves.
- .2 Provide valves as indicated on drawing and in specifications.
- .3 Balance recirculation system using balancing valve. Mark settings and record on as-built drawings on completion.
- .4 Provide line size check valve on discharge of all pumps.

### 3.4 PRESSURE TESTS

- .1 Test pressure: Hydrostatic test pressure (1.5 times maximum working pressure), Pneumatic test pressure (1.2 maximum working pressure pending NRC approval) for a minimum of 15 minutes. All tests must be witnessed and approved by NRC.
- .2 Provide NRC with a minimum of 48 hours notice in writing before all pressure tests.

### 3.5 FLUSHING AND CLEANING

- .1 Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean copper to Provincial potable water guidelines.

### 3.6 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 Ensure that pressure booster systems are operating properly.
- .4 Ensure that air chambers, expansion compensators are installed properly.

### 3.7 START-UP

- .1 Timing: Start up after:
  - .1 Pressure tests have been completed.
  - .2 Disinfection procedures have been completed.
  - .3 Certificate of static completion has been issued.
  - .4 Water treatment systems operational.
- .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.
  - .3 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.

- .4 Check control, limit, safety devices for normal and safe operation.

**3.8 PERFORMANCE VERIFICATION**

.1 Scheduling:

- .1 Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by authority having jurisdiction.

.2 Procedures:

- .1 Verify that flow rate and pressure meet Design Criteria.
- .2 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.
- .3 Verify performance of temperature controls.
- .4 Verify compliance with safety and health requirements.
- .5 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.
- .6 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning

**END OF SECTION**

**Part 1            General**

**1.1                SUMMARY**

- .1 Section Includes:
  - .1 Materials and installation for plumbing specialties and accessories.

**1.2                REFERENCES**

- .1 American Society for Testing and Materials International (ASTM).
  - .1 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
  - .2 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .2 American Water Works Association (AWWA).
  - .1 AWWA C700, Cold Water Meters-Displacement Type, Bronze Main Case.
  - .2 AWWA C701, Cold Water Meters-Turbine Type for Customer Service.
  - .3 AWWA C702-1, Cold Water Meters-Compound Type.
- .3 Canadian Standards Association (CSA International).
  - .1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.
  - .2 CSA-B79, Floor, Area and Shower Drains, and Cleanouts for Residential Construction.
  - .3 CSA-B356, Water Pressure Reducing Valves for Domestic Water Supply Systems.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .5 Plumbing and Drainage Institute (PDI).
  - .1 PDI-G101, Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data.
  - .2 PDI-WH201, Water Hammer Arresters Standard.

**1.3                SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.
  - .2 Indicate dimensions, construction details and materials for specified items.
- .2 Shop Drawings:
  - .1 Submit shop drawings to indicate ,materials, finishes, method of anchorage, number of anchors, dimensions, color, construction and assembly details.
- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4 Instructions: submit manufacturer's installation instructions.

**Part 2 Products**

**2.1 FLOOR DRAINS**

- .1 Type 1, General purpose: all duco coated cast iron body, reversible flashing clamp with seepage openings and adjustable 5" diameter nickel bronze 1/2" thick strainer, secured with S.S. screws, 4" throat on strainer. In quarry or mosaic tiled areas, provide 'BHD' - 5" x 5" square nickel bronze strainer. Provide trap primer connection 'P'.

**2.2 WATER HAMMER ARRESTORS**

- .1 Stainless steel construction, piston type: Normal operating pressure 35 to 250 PSIG. Spike pressure 1,500 PSIG.
- .2 Copper construction, piston type, working pressure, 150 psig from 33 to 180 deg F PDI-WH201.

**2.3 ACCESS DOORS**

- .1 General : 16 GA. stainless steel, continuous concealed hinge, with positive and self-opening screwdriver operated lock. Doors in tile walls shall be stainless steel and shall suit tile pattern. All other panels shall be prime painted steel. Acceptable Material: Jay R Smith model 4762 or approved equal

**2.5 VACUUM BREAKERS**

- .1 Breakers: to CSA-B64 Series, vacuum breaker hose connection.
- .2 Hose Connection Vacuum Breakers: chrome finish stainless steel working parts, a rubber diaphragm and disc, and a draining stem. Maximum Pressure:125psi

**2.6 PRESSURE REGULATORS**

- .1 Up to ¾ NPS: brass body, stainless steel internals, atmosphere vent/drain, temperature range 33 to 250 deg F, maximum working pressure 175 psig, CSA B64
- .2 Greater than ¾ NPS and for fire protection systems: Bronze body, stainless steel internals, test cocks bronze, c/w atmosphere vent/drain, temperature range 33 to 140 deg F, maximum working pressure 175 psig, CSA B64.4

**2.7 PIPE ESCUTCHEON**

- .1 Chrome plated brass solid type with set screws.
- .2 Outside diameter shall cover opening or sleeve.

**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 data sheet.

**3.2 INSTALLATION**

- .1 Install in accordance with latest version of Ontario Building Code.



- .2 Install in accordance with manufacturer's instructions and as specified.

### 3.3 ACCESS DOORS

- .1 Supply access doors to give access to all valves, cleanouts, strainers, duct access doors, and other similar mechanical work which may need maintenance or repair but which is concealed in inaccessible construction, except as otherwise specified herein or on the drawings.
- .2 Locate access doors in walls and partitions to the NRC representative's approval, and arrange mechanical work to suit.
- .3 Group piping and ductwork to ensure the minimum number of access doors is required. Access doors will be installed by the trades responsible for the particular type of construction in which the doors are required.
- .4 Access doors shall be, wherever possible, of a standard size for all applications. Confirm exact dimensions prior to ordering.

### 3.4 WATER HAMMER ARRESTORS

- .1 Install on branch supplies to fixtures or group of fixtures and where indicated.
- .2 All arrestors shall be accessible. Provide access panels has required.
- .3 Provide isolation ball valve.

### 3.5 INSTALLATION OF PIPE ESCUTCHEON

- .1 On pipes passing through walls, partitions, floors and ceilings in finished areas.
- .2 Install the plates so that they are tight against the building surface concerned, and ensure that the plates completely cover pipe sleeves and/or openings.
- .3 Where sleeve extends above finished floor, escutcheons or plates shall cover sleeve extension

### 3.6 START-UP

- .1 General:
- .1 In accordance with Section 00 10 00 – General Instructions: General Requirements, supplemented as specified herein.
- .2 Timing: start-up only after:
- .1 Pressure tests have been completed.
- .2 Certificate of static completion has been issued.
- .3 Water treatment systems operational.
- .3 Provide continuous supervision during start-up of all equipment.

### 3.7 TESTING AND ADJUSTING

- .1 General:

- .1 Contractor shall be responsible to verify that all equipment operates as per manufacturer specification to the satisfaction of NRC.
- .2 Contractor shall be responsible to train NRC staff in the use of all equipment. Exact training schedule to be coordinated with NRC.
- .2 Timing:
  - .1 After start-up deficiencies rectified.
  - .2 After certificate of completion has been issued by authority having jurisdiction.
- .3 Application tolerances:
  - .1 Pressure at fixtures: +/- 20 kPa.
  - .2 Flow rate at fixtures: +/- 20%.
- .4 Adjustments:
  - .1 Verify that flow rate and pressure meet design criteria.
  - .2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.
- .5 Floor drains:
  - .1 Verify operation of trap seal primer.
  - .2 Prime, using trap primer. Adjust flow rate to suit site conditions.
  - .3 Check operations of flushing features.
  - .4 Check security, accessibility, removability of strainer.
  - .5 Clean out baskets.
- .6 Vacuum breakers, backflow preventers, backwater valves:
  - .1 Test tightness, accessibility for O&M of cover and of valve.
  - .2 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.
  - .3 Verify visibility of discharge from open ports.
- .7 Access doors:
  - .1 Verify size and location relative to items to be accessed.
- .8 Cleanouts:
  - .1 Verify covers are gas-tight, secure, yet readily removable.
- .9 Water hammer arrestors:
  - .1 Verify proper installation of correct type of water hammer arrester.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1        Section 00 10 00 – General Instructions.
- .2        Section 00 15 45 – General Safety Section and Fire Instructions.
- .3        Section 21 05 01 – Common Work Results- Mechanical
- .4        Section 22 11 16 – Domestic Water Piping

**1.2            REFERENCES**

- .1        Canadian Standards Association (CSA International)
  - .1        CAN/CSA-B45 Series-02(R2008), Plumbing Fixtures.
  - .2        CAN/CSA-B125.3-05, Plumbing Fittings.
  - .3        CAN/CSA-B651-04, Accessible Design for the Built Environment.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Provide submittals in accordance with Section 00 10 00 – General Instructions.
- .2        Product Data:
  - .1        Provide manufacturer's printed product literature and datasheets for washroom fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3        Indicate fixtures and trim:
  - .1        Dimensions, construction details, roughing-in dimensions.
  - .2        Factory-set water consumption per flush at recommended pressure.
  - .3        (For water closets, urinals): minimum pressure required for flushing.

**1.4            CLOSEOUT SUBMITTALS**

- .1        Provide operation and maintenance data for washroom fixtures, for incorporation into manual specified in Section 00 10 00 – General Instructions.
- .2        Include:
  - .1        Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
  - .2        Details of operation, servicing, maintenance.
  - .3        List of recommended spare parts.

**1.5            DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.
- .2        Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

**Part 2      Products**

**2.1      MANUFACTURED UNITS**

- .1      Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2      Trim, fittings: manufacture in accordance with CAN/CSA-B125.3.
- .3      Exposed plumbing brass to be chrome plated.
- .4      Number, locations: as indicated on mechanical and architectural drawings.
- .5      Fixtures in any one location to be product of one manufacturer and of same type.
- .6      Trim in any one location to be product of one manufacturer and of same type.

.7      Water closets:

WC type	Mounting		Bowl		Flush valve		Flush tank	Handicapped
	Wall	Floor	Elong	Reg	Exp'd	Conc'd		
WC-1		X	X			X		X

- .1      WC-1 : floor-mounted, flush valve,
  - .1      Top of seat to be between 400 mm and 460 mm from finished floor.
  - .2      Bowl: vitreous china, floor mounted, syphon jet, elongated rim, top spud for flush valve, bolt caps.
  - .3      Acceptable Material: American Standard Madera ADA, Zurn Z5665-BWL, Crane, Kohler or approved equal
- .8      Water Closet Flush Valves:
  - .1      Flush valve: exposed, polished chrome, externally adjustable, diaphragm type with NPS 1 screwdriver angle stop, oscillating handle, flush connection and coupling for NPS 1 1/2 top spud, wall and spud escutcheons, seat bumper and vacuum breaker. Standard Flush flow rate of 13.2 L/min (3.5 u.s.g.p.m.) .  
 Acceptable Material: Zurn Z6000AV, American Standard 6047.161, Crane, Kohler or approved equal
- .9      Water Closet Seats.
  - .1      Seat: white, elongated, open front, moulded solid plastic, less cover, stainless steel check hinges, stainless steel insert post.
- .10     Urinals:
  - .1      UR-1: wall mounted, ultra-low flush, exposed flush valve, top spud.
    - .1      Urinal: vitreous china, washout type, integral flushing rim, extended shields, integral trap, removable stainless steel strainer, back outlet.
    - .2      Acceptable Material: American Standard Washbrook, Zurn Z5750, Crane, Kohler or approved equal.
- .11     Urinal Electronic Flush Valves:

- .1 Surface mounted, controlled by infra-red battery powered sensor.
  - .1 Complete with removable filter, 9 second time delay, flush time adjustable from 0-8 seconds, factory set at 4.5 seconds, 4.5 L flush/cycle maximum.
  - .2 Sensor adjustable from 50-1220 mm, factory set to 860 mm.
  - .3 Solenoid valve: 6 VDC slow-closing type for 60 kPa (minimum), 1000 kPa (maximum), 85 degrees C with manual over-ride, adjustable flow control.
  - .4 Acceptable Material: Zurn ZR6003AV, American Standard 6063.101, Crane, Kohler or approved equal.
- .12 Washroom Lavatories:
  - .1 LAV1: Oval-countertop, suitable for handicapped.
    - .1 Vitreous china, self-rimming, with rear overflow, gasket, swivel clamps, semi-oval or rectangular bowl, supply openings on 200mm centres. Sizes: 533x445 mm outside, 441 x 279mm, 133mm deep nominal inside.
    - .2 Acceptable Material: American Standard Cadet, Zurn, Crane, Kohler or approved equal
- .13 Washroom Lavatory Trim:
  - .1 Chrome plated brass, combination supply and waste fittings, mixing spout, washerless, pop-up waste, aerator, metal indexed 100mm nominal handles.
    - .1 Provide accessories to limit maximum flow rate to 8.35 l/minute at 413 kPa.
    - .2 Waste fitting: none
- .14 Washroom Lavatory Electronic Trim:
  - .1 Barrier-free electronic faucet:
    - .1 Infra-red motion sensor activated by hand motion in lavatory.
    - .2 Sensor: waterproof, incorporated in body of unit, with impact-resistant plastic lens and anti-scratch coating, inside spout, sensitivity adjustable from 100 mm to 450 mm.
    - .3 Water conservation: 0-60 second run time.
    - .4 Controls: vandal-proof, interchangeable receptacles for stainless steel sheathed sensor and modular plug-type solenoid connections, 6 VDC slow-closing commercial solenoids for 860 kPa, 85 degrees C.
    - .5 Spout: Chrome plated, with integral flow control aerator rated at 8.35 l/minute at 413 kPa maximum.
    - .6 Controls in body of unit.
- .15 Fixture piping:
  - .1 Hot and cold water supplies to fixtures:
    - .1 Chrome plated rigid supply pipes with handwheel stop, reducers, escutcheon.
    - .2 Domestic cold water (DCW) and domestic hot water piping (DHW) from building mains as per section 22 11 16 – Domestic Water Piping
  - .2 Waste:

- .1 Brass P trap with clean out on fixtures not having integral trap.
- .2 Chrome plated in exposed places.

**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 Mounting heights:
  - .1 Standard: as indicated on architectural plans,, measured from finished floor unless otherwise indicated.
  - .2 Wall-hung fixtures: as indicated on architectural plans, measured from finished floor unless otherwise indicated.
  - .3 Barrier free: to most stringent CAN/CSA B651.

**3.3 ADJUSTING**

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
  - .1 Adjust water flow rate to design flow rates.
  - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
  - .3 Adjust flush valves to suit actual site conditions.
  - .4 Adjust urinal flush timing mechanisms.
  - .5 Set controls of automatic flush valves for WCs and urinals to prevent unnecessary flush cycles.
- .3 Checks:
  - .1 Water closets, urinals: flushing action.
  - .2 Aerators: operation, cleanliness.
  - .3 Vacuum breakers, backflow preventers: operation under all conditions.
- .4 Thermostatic controls:
  - .1 Verify temperature settings, operation of control, limit and safety controls.

**3.4 CLEANING**

- .1 Clean in accordance with Section 00 10 00 – General Instructions.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1        Section 00 10 00 – General Instructions.
- .2        Section 00 15 45 – General Safety Section and Fire Instructions.
- .3        Section 21 05 01 – Common Work Results- Mechanical
- .4        Section 22 42 01 – Plumbing Specialties and Accessories

**1.2            REFERENCES**

- .1        Canadian Standards Association (CSA International)
  - .1        CAN/CSA-B45 Series-02 (R2008), Plumbing Fixtures.
  - .2        CAN/CSA-B125.3-05, Plumbing Fittings.
  - .3        CAN/CSA-B651-04, Accessible Design for the Built Environment.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Provide submittals in accordance with Section 00 10 00 – General Instructions.
- .2        Product Data:
  - .1        Provide manufacturer's printed product literature and datasheets for fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.

**1.4            CLOSEOUT SUBMITTALS**

- .1        Provide maintenance data including monitoring requirements for incorporation into manuals specified in Section 00 10 00 – General Instructions.
- .2        Include:
  - .1        Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
  - .2        Details of operation, servicing, maintenance.
  - .3        List of recommended spare parts.

**1.5            DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.
- .2        Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

**Part 2           Products**

**2.1            MANUFACTURED UNITS**

- .1        Fixtures: manufacture in accordance with CAN/CSA-B45 series.

- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.3.
- .3 Exposed plumbing brass to be chrome plated.
- .4 Number, locations: architectural drawings to govern.
- .5 Fixtures in any one location to be product of one manufacturer and of same type.
- .6 Trim in any one location to be product of one manufacturer and of same type.
- .7 Individual shower stall showerhead.
  - .1 SH-1 : individual showerhead.
    - .1 Chrome plated, non-clog, with adjustable spray, ball joint, standard chrome plated bent arm and escutcheon. Limit maximum flow rate to 9.5 l/minute at 550 kPa.
    - .2 Basis of Design: Delta Model 52635-PK or approved equal
  - .2 Shower supply valve:
    - .1 Pressure-balanced-actuated element, volume control, 40 degrees C maximum setting, strainer and check-stops on each inlet, lever handle.
    - .2 Basis of Design: Delta Monitor Model 132900 or approved equal
- .8 Fixture piping:
  - .1 Hot and cold water supplies to each fixture.
    - .1 Piping to Section 22 42 01- Plumbing Specialties and Accessories
  - .2 Waste:
    - .1 Common floor drain (FD1), refer to section 22 42 01 – Plumbing Specialties and Accessories

**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 Mounting heights:
  - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
  - .2 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA B651.

**3.3 ADJUSTING**

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:



- .1 Adjust water flow rate to design flow rates.
- .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
- .3 Checks:
  - .1 Aerators: operation, cleanliness.
  - .2 Vacuum breakers, backflow preventers: operation under all conditions.
- .4 Thermostatic controls:
  - .1 Verify temperature settings, operation of control, limit and safety controls.

**3.4 CLEANING**

- .1 Clean in accordance with Section 00 10 00 – General Instructions.
- .2 Waste Management: in accordance with Section 00 10 00 – General Instructions

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1        Section 00 10 00 – General Instructions
- .2        Section 00 15 45 – General Safety Section and Fire Instructions.
- .3        Section 22 42 01 – Plumbing Specialties

**1.2            REFERENCES**

- .1        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

**1.4            DELIVERY, STORAGE AND HANDLING**

- .1        Waste Management and Disposal:
  - .1        The contractor is responsibility to coordinate and dispose of all waste material to local provincial and municipality requirements.
  - .2        It is the full responsibility of the contractor to insure that all construction material, equipment, tools, etc. are stored and used in a safe and reasonable manor as per good industry standards.
  - .3        The contractor is responsible for all damaged and stolen material, tools or equipment on site.
  - .4        The contractor is responsible for the delivery of all material, tools or equipment.

**Part 2           Products**

**2.1            NOT USED**

**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            CONNECTIONS TO EQUIPMENT**

- .1        In accordance with manufacturer's instructions unless otherwise indicated.

- .2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.
- .3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement and when penetrating ceiling/roof and has indicated..

### **3.3 CLEARANCES**

- .1 Provide clearance around systems, equipment and components for observation of operation, inspection, testing (x-ray, servicing, maintenance and as recommended by manufacturer.
- .2 Provide space for disassembly, removal of equipment and components as recommended by manufacturer or as indicated (whichever is greater) without interrupting operation of other system, equipment, components.

### **3.4 DRAINS**

- .1 Install piping with grade in direction of flow except as indicated.
- .2 Install drain valve at low points in piping systems, at equipment and at section isolating valves.
- .3 Pipe each drain valve discharge separately to above floor drain. Discharge to be visible.
- .4 Drain valves: NPS 3/4 gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.

### **3.5 AIR VENTS**

- .1 Install air vents at high points in piping systems.
- .2 Install isolating valve at each air valve.
- .3 Install drain piping to approved location and terminate where discharge is visible.

### **3.6 DIELECTRIC COUPLINGS**

- .1 General: compatible with system, to suit pressure rating of system.
- .2 Locations: where dissimilar metals are joined.
- .3 NPS 2 and under: isolating unions or bronze valves.
- .4 Over NPS 2: isolating flanges.

### **3.7 PIPEWORK INSTALLATION**

- .1 Screwed fittings jointed with Teflon tape.

- .2 Protect openings against entry of foreign material.
- .3 Install to isolate equipment and allow removal without interrupting operation of other equipment or systems.
- .4 Assemble piping using fittings manufactured to ANSI standards.
- .5 Saddle type branch fittings may be used on mains if branch line is no larger than half size of main.
  - .1 Hole saw (or drill) and ream main to maintain full inside diameter of branch line prior to welding saddle.
- .6 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.
- .7 Install concealed pipework to minimize furring space, maximize headroom, conserve space.
- .8 Slope piping, except where indicated, in direction of flow for positive drainage and venting.
- .9 Install, except where indicated, to permit separate thermal insulation of each pipe.
- .10 Group piping wherever possible.
- .11 Ream pipes, remove scale and other foreign material before assembly.
- .12 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.
- .13 Provide for thermal expansion as indicated.
- .14 Valves:
  - .1 Install in accessible locations.
  - .2 Remove interior parts before soldering.
  - .3 Install with stems above horizontal position unless otherwise indicated.
  - .4 Valves accessible for maintenance without removing adjacent piping.
  - .5 Install globe valves in bypass around control valves.
  - .6 Use valves at branch take-offs for isolating purposes except where otherwise specified.
  - .7 Install butterfly valves between weld neck flanges to ensure full compression of liner.
  - .8 Install ball valves for glycol service and where indicated.
  - .9 Use chain operators on valves NPS 2 1/2 and larger where installed more than 2400 mm above floor in Mechanical Rooms.
- .15 Check Valves:

- .1 Install silent check valves on discharge of pumps in vertical pipes with downward flow and elsewhere as indicated.
- .2 Install swing check valves in horizontal lines on discharge of pumps and elsewhere as indicated.

### 3.8 SLEEVES

- .1 General: install where pipes pass through masonry, concrete structures, fire rated assemblies, and elsewhere as indicated.
- .2 Material: schedule 40 black steel pipe.
- .3 Construction: foundation walls and where sleeves extend above finished floors to have annular fins continuously welded on at mid-point.
- .4 Sizes: 6 mm minimum clearance between sleeve and uninsulated pipe or between sleeve and insulation.
- .5 Installation:
  - .1 Concrete, masonry walls, concrete floors on grade: terminate flush with finished surface.
  - .2 Other floors: terminate 25 mm above finished floor.
  - .3 Before installation, paint exposed exterior surfaces with heavy application of zinc-rich paint to CAN/CGSB-1.181.
- .6 Sealing:
  - .1 Foundation walls and below grade floors: fire retardant, waterproof non-hardening mastic.
  - .2 Elsewhere: Provide space for firestopping. Maintain fire rating integrity.
  - .3 Sleeves installed for future use: fill with lime plaster or other easily removable filler.
  - .4 Ensure no contact between copper pipe or tube and sleeve.

### 3.9 ESCUTCHEONS

- .1 Install on pipes passing through walls, partitions, floors, and ceilings in finished areas.
- .2 Construction: one piece type with set screws. Chrome or nickel plated brass or type 302 stainless steel.
- .3 Sizes: outside diameter to cover opening or sleeve. Inside diameter to fit around pipe or outside of insulation if so provided.

### 3.10 PREPARATION FOR FIRE STOPPING

- .1 Uninsulated unheated pipes not subject to movement: No special preparation.

- .2 Uninsulated heated pipes subject to movement: wrap with non-combustible smooth material to permit pipe movement without damaging fires topping material or installation.
- .3 Insulated pipes and ducts: ensure integrity of insulation and vapour barriers.

**3.11 FLUSHING OUT OF PIPING SYSTEMS**

- .1 Flush system in accordance with good industry standards and as indicated.

**3.12 EXISTING SYSTEMS**

- .1 Connect into existing piping systems at times approved by NRC.
- .2 Request written approval 10 days minimum, prior to commencement of work.
- .3 Be responsible for damage to existing plant by this work.
- .4 Ensure daily clean-up of existing areas.

**3.13 CLEANING**

- .1 Clean in accordance with Section 00 10 00 – General Instructions
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1 General**

**1.1 SUMMARY**

- .1 Section Includes:
  - .1 Electrical motors, drives and guards for mechanical equipment and systems.
  - .2 Supplier and installer responsibility indicated in Motor, Control and Equipment Schedule on electrical drawings and related mechanical responsibility is indicated on Mechanical Equipment Schedule on mechanical drawings.
  - .3 Control wiring and conduit is specified in Division 26 except for conduit, wiring and connections below 50 V which are related to control systems specified in Division 22 and 23. Refer to Division 26 for quality of materials and workmanship.
- .2 Related Sections:
  - .1 Section 00 10 00 – General Instructions.
  - .2 Section 00 15 45 – General Safety Section and Fire Instructions.
  - .3 Section 23 33 05 - Air Duct and Duct Accessories.
  - .4 Section 23 34 00 – HVAC Fans

**1.2 REFERENCES**

- .1 American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)
  - .1 ASHRAE 90.1-01, Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA cosponsored; ANSI approved; Continuous Maintenance Standard).
- .2 Electrical Equipment Manufacturers' Association Council (EEMAC)
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

**1.3 SUBMITTALS**

- .1 Submittals: in accordance with Section 00 10 00 – General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.
- .3 Closeout Submittals
  - .1 Provide maintenance data for motors, drives and guards for incorporation into manual specified in Section 00 10 00 – General Instructions.

**1.4 QUALITY ASSURANCE**

- .1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section and Fire Instructions.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.
  - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
  - .1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions.

**Part 2 Products**

**2.1 GENERAL**

- .1 Motors: high efficiency, in accordance with local Hydro company standards and to ASHRAE 90.1.

**2.2 MOTORS**

- .1 Provide motors for mechanical equipment as specified.
- .2 Motors 1/2 HP and larger: EEMAC Class B, squirrel cage induction, speed as indicated, continuous duty, drip proof, ball bearing, maximum temperature rise 40 degrees C, 3 phase, 600 V, unless otherwise indicated.

**2.3 BELT DRIVES**

- .1 Fit reinforced belts in sheave matched to drive. Multiple belts to be matched sets.
- .2 Use cast iron or steel sheaves secured to shafts with removable keys unless otherwise indicated.
- .3 For motors under 10 HP : standard adjustable pitch drive sheaves, having plus or minus 10% range. Use mid-position of range for specified r/min.
- .4 Correct size of sheave determined during commissioning.
- .5 Minimum drive rating: 1.5 times nameplate rating on motor. Keep overhung loads within manufacturer's design requirements on prime mover shafts.
- .6 Motor slide rail adjustment plates to allow for centre line adjustment.

**2.4 DRIVE GUARDS**

- .1 Provide guards for unprotected drives.



- .2 Guards for belt drives;
  - .1 Expanded metal screen welded to steel frame.
  - .2 Minimum 1.2 mm thick sheet metal tops and bottoms.
  - .3 38 mm dia holes on both shaft centres for insertion of tachometer.
  - .4 Removable for servicing.
- .3 Provide means to permit lubrication and use of test instruments with guards in place.
- .4 Install belt guards to allow movement of motors for adjusting belt tension.-
- .5 Guard for flexible coupling:
  - .1 "U" shaped, minimum 1.6 mm thick galvanized mild steel.
  - .2 Securely fasten in place.
  - .3 Removable for servicing.
- .6 Unprotected fan inlets or outlets:
  - .1 Wire or expanded metal screen, galvanized, 19 mm mesh.
  - .2 Net free area of guard: not less than 80% of fan openings.
  - .3 Securely fasten in place.
  - .4 Removable for servicing.

**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 INSTALLATION**

- .1 Fasten securely in place.
- .2 Make removable for servicing, easily returned into, and positively in position.

**3.3 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 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.

**3.4 CLEANING**

- .1 Proceed in accordance with Section 00 10 00 – General Instructions.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1**

**General**

**1.1**

**SUMMARY**

- .1 Section Includes: Bronze valves that may be used for the following systems unless otherwise stated.
  - .1 Pressure less then 100 psig : domestic water, chilled water, heating water, glycol piping and compressed air piping
  - .2 Pressure less then 15 psig: saturated steam

**1.2**

**REFERENCES**

- .1 American National Standards Institute (ANSI)/ American Society of Mechanical Engineers (ASME).
  - .1 ANSI/ASME B1.20.1, Pipe Threads, General Purpose (Inch).
  - .2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
- .2 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A276, Specification for Stainless Steel Bars and Shapes.
  - .2 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
  - .3 ASTM B283, Specification for Copper and Copper Alloy Die Forgings (Hot-Pressed).
  - .4 ASTM B505/B505M, Specification for Copper-Base Alloy Continuous Castings.
- .3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).
  - .1 MSS-SP-25, Standard Marking System for Valves, Fittings, Flanges and Unions.
  - .2 MSS-SP-80, Bronze Gate Globe, Angle and Check Valves.
  - .3 MSS-SP-110, Ball Valves, Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

**1.3**

**SUBMITTALS**

- .1 Contractor shall submit detailed shop drawings for all valves for NRC review.
- .2 Shop drawings shall include but not limited to the following:
  - .1 Fitting type
  - .2 Material for valve body and internals
  - .3 ASME Class
- .3 Valve shall not be purchased until shop drawing has been approved by NRC.

**1.4**

**QUALITY ASSURANCE**

- .1 Health and Safety:
  - .1 See Section 00 15 45 – General Safety Section and Fire Instructions.

**1.5**

**DELIVERY STORAGE AND DISPOSAL**

- .1 See Section 00 10 00 – General Instructions

**Part 2**

**Products**

**2.1**

**MATERIALS**

- .1 Valves:
  - .1 Except for specialty valves, to be single manufacturer.
  - .2 All valves on steam and compressed air above at or above 15 psig shall have Canadian Registration Number (CRN#)
- .2 End Connections:
  - .1 Connection into adjacent piping/tubing:
    - .1 Steel pipe systems: Screwed ends to ANSI/ASME B1.20.1.
    - .2 Copper tube systems: Solder ends to ANSI/ASME B16.18.
- .3 Ball Valves:
  - .1 NPS 2 and under, threaded ends:
    - .1 Body and cap: cast high tensile bronze
    - .2 Chrome plated brass ball, RPTFE seat.
    - .3 Minimum pressure rating: 1000 kPa saturated steam, 4130 kPa WOG
    - .4 Valves to be complete with minimal 31 mm stem extension for all insulated pipes, see section 21 07 19 THERMAL INSULATION FOR PIPING
    - .5 Operator: steel lever handle with securely attached vinyl grip
    - .6 Connections: Screwed ends to ANSI B1.20.1 and with hexagonal shoulders
  - .2 NPS 2 and under, soldered ends:
    - .1 Body and cap: cast high tensile bronze
    - .2 Chrome plated brass ball, RPTFE seat.
    - .3 Minimum pressure rating: 1000 kPa saturated steam, 4130 kPa WOG
    - .4 Valves to be complete with minimal 31 mm stem extension for all insulated pipes, see section 21 07 19 THERMAL INSULATION FOR PIPING
    - .5 Operator: steel lever handle with securely attached vinyl grip
    - .6 All internals to be removed prior to soldering.
    - .7 Connections: solder ends to ANSI. Soldered ends to ANSI B16.18, solder ends to ANSI.

**Part 3**

**Execution**

**3.1**

**INSTALLATION**

- .1 Install rising stem valves in upright position with stem above horizontal.
- .2 Where soldered valves are used contractor shall remove internal parts before soldering. Before soldering, installation shall be inspected by NRC.

- .3 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance and equipment removal.
- .4 No valve shall be insulated until all pressure tests relating to valve are completed and approved by NRC.

**END OF SECTION**

**Part 1            General**

**1.1                SUMMARY**

.1            Section Includes:

.1            Concrete housekeeping pads, hangers and supports for mechanical piping, ducting and equipment.

.2

.3

**1.2                REFERENCES**

.1            American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)

.1            ANSI/ASME B31.1 / B31.3

.2            American Society for Testing and Materials International (ASTM)

.1            ASTM A125, Specification for Steel Springs, Helical, Heat-Treated.

.2            ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.3            ASTM A563, Specification for Carbon and Alloy Steel Nuts.

.3            Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)

.1            MSS SP58, Pipe Hangers and Supports - Materials, Design and Manufacture.

.2            ANSI/MSS SP69, Pipe Hangers and Supports - Selection and Application.

.3            MSS SP89, Pipe Hangers and Supports - Fabrication and Installation Practices.

**1.3                SYSTEM DESCRIPTION**

.1            Design Requirements:

.1            Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.

.2            Base maximum load ratings on allowable stresses prescribed by MSS SP58.ASME B31.1 or B31.3 as indicated.

.3            Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.

.4            Design hangers and supports to support systems under conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.

.5            Provide for vertical adjustments after erection and during commissioning. Amount of adjustment in accordance with MSS SP58.

.2            Performance Requirements:

- .1 Design supports, platforms, catwalks, hangers, to withstand seismic where indicated.

#### **1.4 SUBMITTALS**

- .1 Submit shop drawings and product data for following items:

- .1 Bases, hangers and supports.
- .2 Connections to equipment and structure.
- .3 Structural assemblies.
- .4 Installation instructions

- .2 Closeout Submittals:

- .1 Provide maintenance data for incorporation into manual.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Waste Management and Disposal:

- .1 The contractor is responsibility to coordinate and dispose of all waste material to local provincial and municipality requirements.

- .2 It is the full responsibility of the contractor to insure that all construction material, equipment, tools, etc. are stored and used in a safe and reasonable manor as per good industry standards.

- .3 The contractor is responsible for all damaged or stolen material, tools or equipment on site.

- .4 The contractor is responsible for the delivery of all material, tools or equipment.

### **Part 2 Products**

#### **2.1 GENERAL**

- .1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1 and MSS SP58.

- .2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

#### **2.2 PIPE HANGERS**

- .1 Finishes:

- .1 Pipe hangers and supports: galvanized-exterior and painted with zinc-rich paint – interior after manufacture.
- .2 Use hot dipped galvanizing process.
- .3 Ensure steel hangers in contact with copper piping are copper plated or epoxy coated.

- .2 Upper attachment structural: suspension from lower flange of I-Beam:
  - .1 Cold piping NPS 2 maximum: malleable iron C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip.
    - .1 Rod: 9 mm UL listed
  - .2 Cold piping NPS 2 1/2 or greater, hot piping: malleable iron beam clamp, eye rod, jaws and extension with carbon steel retaining clip, tie rod, nuts and washers, UL listed to MSS-SP58 and MSS-SP69.
- .3 Upper attachment structural: suspension from upper flange of I-Beam:
  - .1 Cold piping NPS 2 maximum: ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed to MSS SP69.
  - .2 Cold piping NPS 2 1/2 or greater, hot piping: malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer and nut UL listed.
- .4 Upper attachment to concrete:
  - .1 Ceiling: carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm minimum greater than rod diameter.
  - .2 Concrete inserts: wedge shaped body with knockout protector plate UL listed to MSS SP69.
- .5 Hanger rods: threaded rod material to MSS SP58:
  - .1 Ensure that hanger rods are subject to tensile loading only.
  - .2 Provide linkages where lateral or axial movement of pipework is anticipated. Pipe attachments: material to MSS SP58:
    - .1 Attachments for steel piping: carbon steel [black][galvanized].
    - .2 Attachments for copper piping: copper plated black steel.
    - .3 Use insulation shields for hot pipework.
    - .4 Oversize pipe hangers and supports.
- .7 Adjustable clevis: material to MSS SP69 UL listed, clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.
  - .1 Ensure "U" has hole in bottom for rivetting to insulation shields
- .8 Yoke style pipe roll: carbon steel yoke, rod and nuts with cast iron roll, to MSS SP69.
- .9 U-bolts: carbon steel to MSS SP69 with 2 nuts at each end to ASTM A563.
  - .1 Finishes for steel pipework: galvanized.
  - .2 Finishes for copper, glass, brass or aluminum pipework: black with formed portion plastic coated or epoxy coated.
- .10 Pipe rollers: cast iron roll and roll stand with carbon steel rod to MSS SP69. Shop and field-fabricated assemblies.
  - .1 Trapeze hanger assemblies: MSS SP-89.



- .2 Steel brackets: MSS SP-89.
- .3 Sway braces for seismic restraint systems: to MSS SP-89.

**2.3 RISER CLAMPS**

- .1 Steel or cast iron pipe: galvanized steel to MSS SP58, type 42, UL listed.
- .2 Copper pipe: carbon steel copper plated to MSS SP58, type 42.
- .3 Bolts: to ASTM A307.
- .4 Nuts: to ASTM A563.

**2.4 INSULATION PROTECTION SHIELDS**

- .1 Insulated cold piping:
  - .1 64 kg/m<sup>3</sup> density insulation plus insulation protection shield to: MSS SP69, galvanized sheet carbon steel. Length designed for maximum 3 m span.
- .2 Insulated hot piping:
  - .1 Curved plate 300 mm long, with edges turned up, welded-in centre plate for pipe sizes NPS 12 and over, carbon steel to comply with MSS SP69.

**2.5 CONSTANT SUPPORT SPRING HANGERS**

- .1 Springs: alloy steel to ASTM A125, shot peened, magnetic particle inspected, with +/-5% spring rate tolerance, tested for free height, spring rate, loaded height and provided with Certified Mill Test Report (CMTR).
- .2 Load adjustability: 10 % minimum adjustability each side of calibrated load. Adjustment without special tools. Adjustments not to affect travel capabilities.
- .3 Provide upper and lower factory set travel stops.
- .4 Provide load adjustment scale for field adjustments.
- .5 Total travel to be actual travel + 20%. Difference between total travel and actual travel 25 mm minimum.
- .6 Individually calibrated scales on each side of support calibrated prior to shipment, complete with calibration record.

**2.6 VARIABLE SUPPORT SPRING HANGERS**

- .1 Vertical movement: 13 mm minimum, 50 mm maximum, use single spring pre-compressed variable spring hangers.
- .2 Vertical movement greater than 50 mm: use double spring pre-compressed variable spring hanger with 2 springs in series in single casing.

- .3 Variable spring hanger complete with factory calibrated travel stops. Provide certificate of calibration for each hanger.
- .4 Steel alloy springs: to ASTM A125, shot peened, magnetic particle inspected, with +/-5 % spring rate tolerance, tested for free height, spring rate, loaded height and provided with CMTR.

## 2.7 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- .1 Provide templates to ensure accurate location of anchor bolts.

## 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 INSTALLATION

- .1 Install in accordance with:
  - .1 Manufacturer's instructions and recommendations.
- .2 Vibration Control Devices:
  - .1 Install on piping systems at pumps, boilers, chillers, cooling towers, and as indicated.
- .3 Clamps on riser piping:
  - .1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
  - .2 Bolt-tightening torques to industry standards.
  - .3 Steel pipes: install below coupling or shear lugs welded to pipe.
  - .4 Cast iron pipes: install below joint.
- .4 Clevis plates:
  - .1 Attach to concrete with 4 minimum concrete inserts, one at each corner.
- .5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.
- .6 Use approved constant support type hangers where:
  - .1 vertical movement of pipework is 13 mm or more,
  - .2 transfer of load to adjacent hangers or connected equipment is not permitted.
- .7 Use variable support spring hangers where:
  - .1 transfer of load to adjacent piping or to connected equipment is not critical.

- .2 variation in supporting effect does not exceed 25 % of total load.

**3.3 HANGER SPACING**

- .1 Plumbing piping: to Canadian Plumbing Code or authority having jurisdiction.
- .2 Fire protection: to applicable fire code.
- .3 Gas and fuel oil piping: up to NPS 1/2: every 1.8 m.
- .4 Copper piping: up to NPS 1/2: every 1.5 m.
- .5 Flexible joint roll groove pipe: in accordance with table below, but not less than one hanger at joints.
- .6 Within 300 mm of each elbow.
- .7 Pipework greater than NPS 12: to MSS SP69.
- .8 Hydronic, steam, steam condensate, compressed air, rigid, and flexible joint roll groove pipe: in accordance with table below, but not less than one hanger at joints.

MAXIMUM HANGER SPACING AND MINIMUM ROD SIZE

O.D		STEEL PIPE				COPPER TUBE		ROD SIZE	
INCHES	mm	WATER		STEAM / AIR		FT	METER	INCH	mm
		FT	METER	FT	METER				
<= 1/2	12.7	7	2.13	8	2.44	5	1.52	1/4'	6.4
3/4'	19.1	7	2.13	9	2.74	5	1.52	1/4'	6.4
1	25.4	7	2.13	9	2.74	6	1.83	1/4'	6.4
1-1/4'	31.7	8	2.44	10	3.05	7	2.13	1/4'	6.4
1-1/2'	38.1	9	2.74	12	3.66	8	2.44	3/8'	9.5
2	50.8	10	3.05	13	3.96	8	2.44	3/8'	9.5
2-1/2'	63.5	11	3.35	14	4.27	9	2.74	3/8'	9.5
3	76.2	12	3.66	15	4.57	10	3.05	3/8'	9.5
4	101.6	14	4.27	17	5.18	12	3.66	1/2'	12.7
6	152.4	17	5.18	21	6.40	14	4.27	1/2'	12.7
8	203.2	19	5.79	24	7.31	16	4.88	5/8'	15.8
10	254.0	20	6.10	26	7.92	18	5.49	3/4'	19.0
12	304.8	23	7.01	30	9.14	19	5.79	7/8'	22.2
14	355.6	25	7.62	32	9.75			1	25.4
16	406.4	27	8.23	35	10.67			1	25.4
18	457.2	28	8.53	37	11.28			1-1/4'	31.7
20	508.0	30	9.14	39	11.89			1-1/4'	31.7

**3.4 HANGER INSTALLATION**

- .1 Install hanger so that rod is vertical under operating conditions.
- .2 Adjust hangers to equalize load.
- .3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.

**3.5 HORIZONTAL MOVEMENT**

- .1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4 degrees from vertical.
- .2 Where horizontal pipe movement is less than 13 mm, offset pipe hanger and support so that rod hanger is vertical in the hot position.

**3.6 FINAL ADJUSTMENT**

- .1 Adjust hangers and supports:
  - .1 Ensure that rod is vertical under operating conditions.

- .2 Equalize loads.
  - .2 Adjustable clevis:
    - .1 Tighten hanger load nut securely to ensure proper hanger performance.
    - .2 Tighten upper nut after adjustment.
  - .3 C-clamps:
    - .1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.
  - .4 Beam clamps:
    - .1 Hammer jaw firmly against underside of beam.
- 3.7 FIELD QUALITY CONTROL (as required)**

**END OF SECTION**

**Part 1 General**

**1.1 SUMMARY**

- .1 TAB is used throughout this Section to describe the process, methods and requirements of testing, adjusting and balancing for HVAC.
- .2 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do other work as specified in this section.

**1.2 QUALIFICATIONS OF TAB PERSONNEL**

- .1 Submit names of personnel to perform TAB to Departmental Representative within 7 days of award of contract.
- .2 Provide documentation confirming qualifications, successful experience.
- .3 TAB: performed in accordance with the requirements of standard under which TAB Firm's qualifications are approved:
  - .1 Associated Air Balance Council, (AABC) National Standards for Total System Balance, MN-1-2002.
  - .2 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems - Testing, Adjusting and Balancing-2002.
- .4 Recommendations and suggested practices contained in the TAB Standard: mandatory.
- .5 Use TAB Standard provisions, including checklists, and report forms to satisfy Contract requirements.
- .6 Use TAB Standard for TAB, including qualifications for TAB Firm and Specialist and calibration of TAB instruments.
- .7 Where instrument manufacturer calibration recommendations are more stringent than those listed in TAB Standard, use manufacturer's recommendations.
- .8 TAB Standard quality assurance provisions such as performance guarantees form part of this contract.
  - .1 For systems or system components not covered in TAB Standard, use TAB procedures developed by TAB Specialist.
  - .2 Where new procedures, and requirements, are applicable to Contract requirements have been published or adopted by body responsible for TAB Standard used (AABC, NEBB, or TABB), requirements and recommendations contained in these procedures and requirements are mandatory.

**1.3 PURPOSE OF TAB**

- .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual or simulated loads

- .2 Adjust and regulate equipment and systems to meet specified performance requirements and to achieve specified interaction with other related systems under normal and emergency loads and operating conditions.
- .3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges.
- 1.4 EXCEPTIONS**
  - .1 TAB of systems and equipment regulated by codes, standards to satisfaction of authority having jurisdiction.
- 1.5 CO-ORDINATION**
  - .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule to ensure completion before acceptance of project.
  - .2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems.
- 1.6 PRE-TAB REVIEW**
  - .1 During construction, co-ordinate location and installation of TAB devices, equipment, accessories, measurement ports and fittings.
- 1.7 START-UP**
  - .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
  - .2 Follow special start-up procedures specified elsewhere in Division 23.
- 1.8 OPERATION OF SYSTEMS DURING TAB**
  - .1 Operate systems for length of time required for TAB and as required by Departmental Representative for verification of TAB reports.
- 1.9 START OF TAB**
  - .1 Notify Departmental Representative 2 days prior to start of TAB.
  - .2 Start TAB when building is essentially completed, including:
    - .3 Installation of ceilings, doors, windows, other construction affecting TAB.
    - .4 Application of weatherstripping, sealing, and caulking.
    - .5 Pressure, leakage, other tests specified elsewhere Division 23.
    - .6 Provisions for TAB installed and operational.
    - .7 Start-up, verification for proper, normal and safe operation of mechanical and associated electrical and control systems affecting TAB including but not limited to:

- .1 Proper thermal overload protection in place for electrical equipment.
- .2 Air systems:
  - .1 Duct systems clean.
  - .2 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.
  - .3 Correct fan rotation.
  - .4 Fire, smoke, volume control dampers installed and open.
  - .5 Access doors, installed, closed.

**1.10 ACCURACY TOLERANCES**

- .1 Measured values accurate to within plus or minus 2% of actual values.

**1.11 INSTRUMENTS**

- .1 Prior to TAB, submit to Departmental Representative list of instruments used together with serial numbers.
- .2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.
- .3 Calibrate within 3 months of TAB. Provide certificate of calibration to Departmental Representative.

**1.12 SUBMITTALS**

- .1 Submit, prior to commencement of TAB:
- .2 Proposed methodology and procedures for performing TAB if different from referenced standard.

**1.13 PRELIMINARY TAB REPORT**

- .1 Submit for checking and approval of Departmental Representative, prior to submission of formal TAB report, sample of rough TAB sheets. Include:
  - .1 Details of instruments used.
  - .2 Details of TAB procedures employed.
  - .3 Calculations procedures.
  - .4 Summaries.

**1.14 TAB REPORT**

- .1 Format in accordance with referenced standard.
- .2 TAB report to show results in SI units and to include:
  - .1 Project record drawings.
  - .2 System schematics.



- .3 Submit PDF copy of TAB Report to Departmental Representative for verification and approval, in English. Provide 3 copies of approved TAB reports to general contractor suitable for mounting in D-ring binders, complete with index tabs for O&M manuals.

**1.15 VERIFICATION**

- .1 Reported results subject to verification by Departmental Representative.
- .2 Pay costs to repeat TAB as required to satisfaction of Departmental Representative.

**1.16 SETTINGS**

- .1 After TAB is completed to satisfaction of Departmental Representative, replace drive guards, close access doors, lock devices in set positions, ensure sensors are at required settings.
- .2 Permanently mark settings to allow restoration at any time during life of facility. Do not eradicate or cover markings.

**1.17 COMPLETION OF TAB**

- .1 TAB considered complete when final TAB Report received and approved by Departmental Representative.

**1.18 AIR SYSTEMS**

- .1 Standard: TAB to most stringent of TAB standards of SMACNA.
- .2 Do TAB of following systems, equipment, components, controls:
  - .1 Washroom exhaust grilles (EG2s).
  - .2 New exhaust fan 19XAF07.
- .3 Qualifications: personnel performing TAB current member in good standing of AABC.
- .4 Measurements: to include as appropriate for systems, equipment, components, controls: air velocity, static pressure, flow rate, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power, voltage, noise, vibration.
- .5 Locations of systems measurements to include as appropriate: main ducts, main branch, sub-branch, run-out (or grille, register or diffuser).

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

<b>Part 3</b>	<b>Execution</b>
<b>3.1</b>	<b>NOT USED</b>
.1	Not used.

**END OF SECTION**

**Part 1            General**

**1.1                SUMMARY**

- .1 Section Includes:
  - .1 Materials and installation for duct accessories including flexible connections, access doors, vanes and collars.
- .2 Related Sections:
  - .1 Section 00 10 00 – General Instructions.
  - .2 Section 00 15 45 – General Safety Section and Fire Instructions.
  - .3 Section 23 05 29 – Testing, Adjusting and Balancing.

**1.2                REFERENCES**

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .2 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
  - .1 SMACNA - HVAC Duct Construction Standards - Metal and Flexible, 95.

**1.3                SUBMITTALS**

- .1 Submittals in accordance with Section 00 10 00 – General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:
    - .1 Balancing dampers.
    - .2 Back draft dampers.
    - .3 Duct access doors.
    - .4 Turning vanes.
    - .5 Instrument test ports.
  - .2 Submit WHMIS MSDS in accordance with Section 00 15 45 – General Safety Section and Fire Instructions. Indicate VOC's for adhesive and solvents during application and curing.
- .3 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
  - .1 Certification of ratings: catalogue or published ratings to be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Instructions: submit manufacturer's installation instructions.

- .6 Manufacturer's Field Reports: manufacturer's field reports specified.
- .7 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 00 10 00 – General Instructions.

#### 1.4 **QUALITY ASSURANCE**

- .1 Pre-Installation Meetings:
  - .1 Convene pre-installation meeting 1 week prior to beginning work of this Section.
    - .1 Verify project requirements.
    - .2 Review installation conditions.
    - .3 Co-ordination with other building sub-trades.
    - .4 Review manufacturer's installation instructions and warranty requirements.
- .2 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section and Fire Instruction.

#### 1.5 **DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 The contractor is responsibility to coordinate and dispose of all waste material to local provincial and municipality requirements. Refer to section [00 10 00 – General Instructions].
- .2 It is the full responsibility of the contractor to insure that all construction material, equipment, tools, etc. are stored and used in a safe and reasonable manor as per good industry standards.
- .3 The contractor is responsible for all damaged and stolen material, tools or equipment on site.
- .4 The contractor is responsible for all delivery of material, tools or equipment

### **Part 2 Products**

#### **2.1 GENERAL**

- .1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.

#### **2.2 STEEL DUCTWORK**

- .1 Prime quality galvanized sheet steel with metal gauges in accordance with SMACNA standards to suit the duct configuration and classification.

#### **2.3 ROUND TO RECTANGULAR DUCT CONNECTIONS**

- .1 Nailor-Hart Industries Inc. "Spin-In" galvanized steel round to rectangular duct take-off connection collars, Model #1801 where dampers are not required, Model #1802 with integral damper where dampers are required.

- .2 Acceptable manufacturers are Nailor-Hart Industries Inc., Controlled Air Manufacturing and Flexmaster Canada Ltd.

**2.4 SPIN-IN COLLARS**

- .1 Conical galvanized sheet metal spin-in collars with lockable butterfly damper.
- .2 Sheet metal thickness to co-responding round duct standards.

**2.5 BALANCING DAMPERS**

- .1 Nailor-Hart Industries Inc. opposed blade galvanized steel control damper, Model No. 1020 for rectangular ductwork, Model No. 1021 for round ductwork, each complete with No. 16 U.S.S. gauge frame, No. 18 U.S.S. gauge blades, nylon blade shaft bearings, linkage shaft extension, and a suitable and secure damper operator with locking device and visual indication of damper position from the duct exterior.
- .2 Acceptable manufacturers are Nailor-Hart Industries Inc., Controlled Air Manufacturing Ltd., Ruskin Ltd., and Air Specialties Manufacturing Ltd.

**2.6 BACK DRAFT DAMPERS**

- .1 Nailor-Hart Industries Inc. 1300 Series gravity type dampers each complete with a galvanized steel frame, aluminum damper blades with felt edges, and lifetime lubricated bearings.
- .2 Acceptable manufacturers are Nailor-Hart Industries Inc., Controlled Air Manufacturing Ltd., Ruskin Ltd., and Air Specialties Manufacturing Ltd.

**2.7 GRILLES, REGISTERS & DIFFUSERS**

- .1 Grilles, registers and diffusers of the type, size and arrangement as specified on the drawings.
- .2 Grilles, registers and diffusers shall be product of one manufacturer.
- .3 Catalogued or published ratings shall be those obtained from tests carried out by manufacturer or those ordered by him from independent testing agency signifying adherence to codes and standards.
- .4 Acceptable manufacturers are E.H. Price Ltd., Titus Ltd., Air Vector Ltd., Nailor Industries Inc., Krueger Manufacturing Co. and Carnes.

**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 data sheet.

**3.2 INSTALLATION**

- .1 DUCT, DAMPER & SIMILAR FORMED OPENINGS**

- .1 Duct openings, air inlet and outlet openings, fire damper openings, etc. will be provided in poured concrete work, masonry, drywall surfaces, etc., by the trade responsible for the particular construction in which the opening is required.
- .2 Ensure that openings for fire dampers to 350 mm (14") high are sized to suit the damper arrangement with folding blade out of the air stream.

**.2 FABRICATION & INSTALLATION OF STEEL DUCTWORK**

- .1 Provide all required steel ductwork. Unless otherwise noted, all ductwork shall be constructed of galvanized steel.
- .2 Unless specifically noted otherwise, all duct, bends, elbows, transformations, branch fittings, etc. shall be fabricated, sealed and installed in accordance with the 1" water gauge (0.25 kPa) pressure class of the latest edition of SMACNA Hvac Duct Construction Standards, except for duct upstream of VAV boxes, which shall comply with the requirements of the 2" water gauge (0.50 kPa) pressure class.

**.3 BALANCING DAMPERS**

- .1 Provide volume type dampers in all open end ductwork and wherever else shown.
- .2 Install the dampers such that the operating mechanism is positioned for easy operation, and such that the dampers cannot move or rattle.

**.4 BACK-DRAFT DAMPERS**

- .1 Provide back-draft dampers in the ductwork where shown.
- .2 Install and secure such that the dampers cannot move or rattle.

**.5 GRILLES, REGISTERS & DIFFUSERS**

- .1 Provide grilles and diffusers of the type, size and arrangement specified and shown on the drawings.
- .2 Exactly locate grilles and diffusers to conform to the final architectural reflected ceiling plans and detailed wall elevations, and to conform to the final lighting, ceiling layout, ornamental and other wall treatment.
- .3 Equip supply diffusers having a basic four-way or all round air pattern for operation in one (1), two (2) or three (3) way pattern where so directed on the drawings.
- .4 Confirm finish of grilles, registers and diffusers prior to ordering.

**.6 INSTRUMENT TEST PORTS:**

**.1 General:**

- .1 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
- .2 Locate to permit easy manipulation of instruments.
- .3 Install insulation port extensions as required.
- .4 Locations:
  - .1 For traverse readings:
    - .1 Ducted inlets to roof and wall exhausters.
    - .2 Inlets and outlets of other fan systems.

- .3 Main and sub main ducts.
- .4 And as indicated.

**3.3 CLEANING**

- .1 Perform cleaning operations as specified in Section 00 10 00 - General Instructions and in accordance with manufacturer's recommendations.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1            General**

**1.1                SUMMARY**

.1            Section Includes:

.1            Fans, motors, accessories and hardware for commercial use.

.2            Related Sections:

.1            Section 00 10 00 – General Instructions.

.2            Section 00 15 45 – General Safety Section and Fire Instructions.

.3            Section 23 05 29 – Hangers and Supports for HVAC Piping and Equipment

.4            Section 23 33 05 – Air Duct and Duct Accessories

**1.2                REFERENCES**

.1            Air Conditioning and Mechanical Contractors (AMCA)

.1            AMCA Publication 99-2003, Standards Handbook.

.2            AMCA 300-1996, Reverberant Room Method for Sound Testing of Fans.

.3            AMCA 301-1990, Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

.2            American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)

.1            ANSI/AMCA 210-1999, Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

.3            Canadian General Standards Board (CGSB)

.1            CAN/CGSB 1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.4            Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1            Material Safety Data Sheets (MSDS).

**1.3                SYSTEM DESCRIPTION**

.1            Performance Requirements:

.1            Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards in force.

.2            Capacity: flow rate, static pressure, bhp, efficiency, revolutions per minute, power, model, size, sound power data and as indicated on schedule.

.3            Fans: statically and dynamically balanced, constructed in conformity with AMCA 99.

.4            Sound ratings: comply with AMCA 301, tested to AMCA 300. Supply unit with AMCA certified sound rating seal.



**1.4 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.
- .2 Shop Drawings:
  - .1 Submit shop drawings and product data in accordance with Section 00 10 00 – General Instructions.
- .3 Provide :
  - .1 Fan performance curves showing point of operation, BHP and efficiency.
  - .2 Sound rating data at point of operation.
- .4 Indicate:
  - .1 Motors, sheaves, bearings, shaft details.
  - .2 Minimum performance achievable.
- .5 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.
- .6 Closeout Submittals:
  - .1 Provide operation and maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions

**1.5 QUALITY ASSURANCE**

- .1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section and Fire Instructions.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.
  - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
  - .1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions.

**Part 2 Products**

**2.1 FANS GENERAL**

- .1 Motors:

- .1 In accordance with Section 23 05 13 - Common Motors Requirements for HVAC Equipment supplemented as specified herein.
- .2 Sizes as indicated.
- .2 Accessories and hardware: matched sets of V-belt drives, adjustable motor bases, belt guards, coupling guards fan outlet safety screens and as specified in Section 23 05 13 - Common Motor Requirements for HVAC Equipment. Back-draft damper shall be supplied with fan to replace existing assembly in duct.
- .3 Factory primed before assembly in colour standard to manufacturer.
- .4 Scroll casing drains: as indicated.
- .5 Bearing lubrication systems plus extension lubrication tubes where bearings are not easily accessible.

## 2.2 CENTRIFUGAL FANS

- .1 Spun Aluminum, down-blast exhaust fan, belt driven.
- .2 Maximum continuous operating temperature shall be 82C
- .3 Fan shroud shall be one piece, with rolled bead for extra strength which direct exhaust air downwards.
- .4 Fan wheels:
  - .1 Welded aluminum construction.
  - .2 Backward inclined blades.
- .5 Bearings: Permanently lubricated, sealed, pillow block type and have a certified minimum rated life of 100,000 hours.
- .6 Acceptable Material: Greenheck, Delhi, Cook, Penn-Zyphr or approved equal.

## 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 FAN INSTALLATION

- .1 Install fans as indicated, complete with resilient mountings, flexible electrical leads and flexible connections in accordance with Section 23 33 00 - Air Duct Accessories.
- .2 Provide sheaves and belts required for final air balance.
- .3 Bearings and extension tubes to be easily accessible.
- .4 Access doors and access panels to be easily accessible.

**3.3**

**CLEANING**

- .1 Proceed in accordance with Section 00 10 00 – General Instructions.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**1 REFERENCES**

- .1 Perform all work to meet or exceed the requirements of the Canadian Electrical Code, CSA Standard C22.1 - (latest edition).
- .2 Consider CSA Electrical Bulletins in force at time of tender submission, while not identified and specified by number in this Division, to be forming part of related CSA Part II standard.
- .3 Do overhead and underground systems in accordance with CSA C22.3 except where specified otherwise.
- .4 Where requirements of this specification exceed those of above mentioned standards, this specification shall govern.
- .5 Notify the NRC Departmental Representative as soon as possible when requested to connect equipment supplied by NRC which is not CSA approved.
- .6 Refer to Sections 00 10 00 & 0015 45.

**2 PERMITS AND FEES**

- .1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay all fees required for the performance of the work.

**3 START-UP**

- .1 Instruct the NRC Departmental Representative and operating personnel in the operation, care and maintenance of equipment supplied under this contract.

**4 INSPECTION AND FEES**

- .1 Furnish a Certificate of Acceptance from the Authorized Electrical Inspection Department on completion of work.
- .2 Request and obtain Special Inspection approval from the Authorized Electrical Inspection Department for any non-CSA approved control panels or other equipment fabricated by the contractor as part of this contract.
- .3 Pay all fees required for inspections.

**5 FINISHES**

- .1 Shop finish metal enclosure surfaces by removal of rust and scale, cleaning, application of rust resistant primer inside and outside, and at least two coats of finish enamel.
  - .1 Outdoor electrical equipment "equipment green" finish to EEMAC Y1-1-1955.
  - .2 Indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1-1958.

- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

## 6 ACOUSTICAL PERFORMANCE

- .1 In general provide equipment producing minimal sound levels in accordance with the best and latest practices established by the electrical industry.
- .2 Do not install any device or equipment containing a magnetic flux path metallic core, such as gas discharge lamp ballasts, dimmers, solenoids, etc., which are found to produce a noise level exceeding that of comparable available equipment.

## 7 EQUIPMENT IDENTIFICATION

- .1 Identify with 3mm (1/8") Brother, P-Touch non-smearing tape, or an alternate approved by the NRC Departmental Representative, all electrical outlets shown on drawings and/or mentioned in the specifications. These are the recessed and surface mounted receptacles such as those in offices and service rooms and used to plug in office equipment, telecommunication equipment or small portable tools. Indicate only the source of power (Ex. for a receptacle fed from panel L32 circuit #1: "L32-1").
- .2 Light switches and light fixtures are the only exceptions for electrical equipment identification (except as noted in 7.13 below). They are not to be identified.
- .3 Identify with lamicoïd nameplates all electrical equipment shown on the drawings and/or mentioned in the specification such as motor control centers, switchgear, splitters, fused switches, isolation switches, motor starting switches, starters, panelboards, transformers, high voltage cables, industrial type receptacles, junction boxes, control panels, etc., regardless of whether or not the electrical equipment was furnished under this section of the specification.
- .4 Coordinate names of equipment and systems with other Divisions to ensure that names and numbers match.
- .5 Wording on lamicoïd nameplates to be approved by the NRC Departmental Representative prior to fabrication.
- .6 Provide two sets of lamicoïd nameplates for each piece of equipment; one in English and one in French.
- .7 Lamicoïd nameplates shall identify the equipment, the voltage characteristics and the power source for the equipment. Example: A new 120/240 volt single phase circuit breaker panelboard, L16, is fed from panelboard LD1 circuit 10.

"PANEL L16  
120/240 V  
FED FROM LD1-10"

PANNEAU L16  
120/240 V  
ALIMENTE PAR LD1-10

- .8 Provide warning labels for equipment fed from two or more sources - "DANGER MULTIPLE POWER FEED" black letters on a yellow background. These labels are available from NRC's Facilities Maintenance group in building M-19.
- .9 Lamicoïd nameplates shall be rigid lamicoïd, minimum 1.5 mm (1/16") thick with:
  - .1 Black letters engraved on a white background for normal power circuits.
  - .2 Black letters engraved on a yellow background for emergency power circuits.
  - .3 White letters engraved on a red background for fire alarm equipment.
- .10 For all interior lamicoïd nameplates, mount nameplates using two-sided tape.
- .11 For all exterior lamicoïd nameplates, mount nameplates using self-tapping 2.3 mm (3/32") dia. slot head screws - two per nameplate for nameplates under 75 mm (3") in height and a minimum of 4 for larger nameplates. Holes in lamicoïd nameplates to be 3.7 mm (3/16") diameter to allow for expansion of lamicoïd due to exterior conditions.
  - .1 No drilling is to be done on live equipment.
  - .2 Metal filings from drilling are to be vacuumed from the enclosure interiors.
- .12 All lamicoïd nameplates shall have a minimum border of 3 mm (1/8"). Characters shall be 9 mm (3/8") in size unless otherwise specified.
- .13 Identify lighting fixtures which are connected to emergency power with a label "EMERGENCY LIGHTING/ÉCLAIRAGE D'URGENCE", black letters on a yellow background. These labels are available from NRC's Facilities Maintenance group in building M-19.
- .14 Provide neatly typed updated circuit directories in a plastic holder on the inside door of new panelboards.
- .15 Carefully update panelboard circuit directories whenever adding, deleting, or modifying existing circuitry.

## **8 WIRING IDENTIFICATION**

- .1 Unless otherwise specified, identify wiring with permanent indelible identifying markings, using either numbered or coloured plastic tapes on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.

## **9 CONDUIT AND CABLE IDENTIFICATION**

- .1 Apply red paint to the covers of junction boxes and condulets of fire alarm conduits.
- .2 Apply yellow paint to the covers of junction boxes and condulets of emergency power circuits.
- .3 Apply blue paint to the covers of junction boxes and condulets of voice/data cables.

**10 MANUFACTURER'S & APPROVALS LABELS**

- .1 Ensure that manufacturer's registration plates are properly affixed to all apparatus showing the size, name of equipment, serial number, and all information usually provided, including voltage, cycle, phase and the name and address of the manufacturer.
- .2 Do not paint over registration plates or approval labels. Leave openings through insulation for viewing the plates. Contractor's or sub-contractor's nameplate not acceptable.

**11 WARNING SIGNS AND PROTECTION**

- .1 Provide warning signs, as specified or to meet requirements of Authorized Electrical Inspection Department and NRC Departmental Representative.
- .2 Accept the responsibility to protect those working on the project from any physical danger due to exposed live equipment such as panel mains, outlet wiring, etc. Shield and mark all live parts with the appropriate voltage. Caution notices shall be worded in both English and French.

**12 LOAD BALANCE**

- .1 Measure phase current to new panelboards with normal loads operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes, and revise panelboard schedules.
- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

**13 MOTOR ROTATION**

- .1 For new motors, ensure that motor rotation matches the requirements of the driven equipment.
- .2 For existing motors, check rotation before making wiring changes in order to ensure correct rotation upon completion of the job.

**14 GROUNDING**

- .1 Thoroughly ground all electrical equipment, cabinets, metal supporting frames, ventilating ducts and other apparatus where grounding is required in accordance with the requirements of the latest edition of the Canadian Electrical Code Part 1, C.S.A. C22.1 and corresponding Provincial and Municipal regulations. Do not depend upon conduits to provide the ground circuits.
- .2 Run separate green insulated stranded copper grounding conductors in all electrical conduits including those feeding toggle switches and receptacles.

**15 TESTS**

- .1 Provide any materials, equipment and labour required and make such tests deemed necessary to show proper execution of this work, in the presence of the NRC Departmental Representative.

- .2 Correct any defects or deficiencies discovered in the work in an approved manner at no additional expense to the Owner.
- .3 Megger all branch circuits and feeders using a 600V tester for 240V circuits and a 1000V tester for 600V circuits. If the resistance to ground is less than permitted by Table 24 of the Code, consider such circuits defective and do not energize.
- .4 The final approval of insulation between conductors and ground, and the efficiency of the grounding system is left to the discretion of the local Electrical Inspection Department.

**16 COORDINATION OF PROTECTIVE DEVICES**

- .1 Ensure circuit protective devices such as overcurrent trips, fuses, are installed to values and settings as indicated on the Drawings.

**17 WORK ON LIVE EQUIPMENT & PANELS**

- .1 NRC requires that work be performed on non-energized equipment, installation, conductors and power panels. For purposes of quotation assume that all work is to be done after normal working hours and that equipment, installation, conductors and power panels are to be de-energized when worked upon.

**END OF SECTION**



**Part 1            General**

**1.1                RELATED WORK SPECIFIED ELSEWHERE**

- .1        Common Work Results - Electrical Section 26 05 00

**1.2                MATERIALS**

- .1        Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.
- .2        After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

**Part 2            Products**

**2.1                BUILDING WIRES AND GENERAL REQUIREMENTS**

- .1        Conductor material for branch circuit wiring and grounding:
  - .1        Stranded copper.
  - .2        Neutral wire: continuous throughout its length without breaks.
  - .3        Separate insulated green grounding conductors in all electrical conduits.
  - .4        All wire and cable insulation shall meet the C.S.A. Standards for the types and services hereinafter specified. Colours as per section 4-036 of Electrical Code.
  - .5        Where otherwise specified, use wire and cable types as follows:
    - .1        Type R90 XLPE cross-link polyethylene stranded for applications using wires sized No. 8 and larger.
    - .2        Type TW stranded for applications using wires sized No. 10 and smaller.
    - .3        For fire alarm wiring refer to Section 283100.
    - .4        Approved heat resistant wire for wiring through and at lighting and heating fixtures. Where insulation types are shown on the drawings other types shall not be used unless the specification is more restrictive.
  - .6        Use BX cable only under the following conditions:
    - .1        Wiring from a junction box to a recessed lighting fixture in suspended ceilings. Cable length not to exceed 1.5 m (5'), or
    - .2        Wiring or switches or 15 amp receptacles in partitions having removable wall panels, or
    - .3        When specifically called for on drawings.
  - .7        Use stranded wire no smaller than No. 12 AWG for lighting and power and no smaller than No. 16 AWG for control wiring.
  - .8        Conductors shall be soft copper properly refined and tinned having a minimum conductivity of 98%.

**Part 3 Execution**

**3.1 BUILDING WIRES**

- .1 Install building wires as follows:
  - .1 Make joints, taps and splices in approved boxes with solderless connectors. Joints and/or splices are not acceptable inside a panelboard.
  - .2 Ensure the lugs accommodate all the strands of the conductor.
  - .3 Replace any wire or cable showing evidence of mechanical injury.
  - .4 Use No. 10 AWG for branch circuit wiring extending more than 30 m (100 ft.) to farthest outlet from panel.
  - .5 Circuit numbers indicated on the drawing are intended as a guide for the proper connection of multi-wire circuits at the panel.
  - .6 Take care to keep the conductors free from twisting.
  - .7 Use an approved lubricant for pulling in conduit.
  - .8 Leave sufficient slack on all runs to permit proper splicing and connection of electrical devices.
  - .9 Branch circuit wiring of 120 volt applications to be multi-wire utilizing common neutrals. Under no condition shall any switch break a neutral conductor.
  - .10 Provide and install an approved fire- retardant wrap or coating for PVC jacketed cables installed in a grouped configuration of two or more.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED WORK SPECIFIED ELSEWHERE**

- .1        Common Work Results - Electrical Section 26 05 00

**1.2            MATERIALS**

- .1        Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.
- .2        After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

**Part 2            Products**

**2.1            WIRE AND BOX CONNECTORS**

- .1        Pressure type wire connectors sized to fit conductors.

**2.2            WIRING TERMINATIONS**

- .1        Provide first grade wire and cable connectors suitable for the service on which they are used and install them in accordance with the latest trade practice.
- .2        Provide high quality extruded copper-free aluminium (0.4% or less) connectors for single and multi conductor cable. Steel and then zinc plated connectors for multi conductor cables.
- .3        When used in hazardous area, connectors should be certified for such location in Class, Division and Group.
- .4        For large conductor sizes, use bolted or compression solderless type connectors.
- .5        Use high temperature connectors and insulation on all connections of high temperature conductors.
- .6        Where connector types are called for on the drawings or in the specification, do not use other types.
- .7        Lugs, terminals, screws used for termination of wiring to be suitable for copper conductors.
- .8        For fire alarm wiring refer to Section 28 31 00.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Install stress cones, terminations, and splices in accordance with manufacturer's instructions.
- .2 Bond and ground as required [to CSA C22.2No.41].

**END OF SECTION**

**Part 1            General**

**1.1                RELATED WORK SPECIFIED ELSEWHERE**

- .1        Common Work Results - Electrical Section 26 05 00

**1.2                MATERIALS**

- .1        Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.
- .2        After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

**Part 2            Products**

**2.1                FITTINGS**

- .1        Fittings: manufactured for use with conduit specified. Coating: same as conduit.
- .2        Fittings for liquid-tight flexible conduits shall be liquid-tight connectors.
- .3        Provide expansion couplings for all conduits running in slabs through expansion joints. These shall be the type approved for use in concrete with a bonding conductor.

**2.2                OUTLET BOXES**

- .1        Size boxes in accordance with CSA-C22.
- .2        Unless otherwise specified, provide galvanized steel outlet boxes at least 40mm (1-1/2") deep, single or ganged style, of proper size to accommodate devices used and shall be equipped with covers as necessary of the type designed for the specified fittings. Pull boxes shall be steel and shall be galvanized or painted to prevent rusting. For lighting fixture outlets, use 100mm (4") octagon boxes.
- .3        Equip with plaster rings for flush mounting devices in finished walls.
- .4        Blank cover plates for boxes without wiring devices.
- .5        Equip with centre fixture studs for light fixtures.
- .6        Use cast boxes where indicated and for surface mounted wiring. In areas above hung ceilings where appearance is not significant, pressed steel surface boxes may be used.
- .7        Supply all outlet boxes and pull boxes sized according to code requirements unless specified otherwise on the drawings.

**2.3                SUPPORT HARDWARE**

- .1        Use 10mm (3/8") threaded rod for suspended unistrut and conduit.

- .2 Unless otherwise specified, use 41mm x 41mm (1-5/8" x 1-5/8") galvanized steel unistrut for conduit support systems.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Install outlet boxes as follows:
  - .1 Support boxes independently of connecting conduits.
  - .2 Make necessary mounting adjustments to the outlet to match interior finish.
  - .3 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of construction material.
  - .4 Where more than one conduit enters a switch or receptacle box on the same side, provide a 100mm (4") minimum square box with a suitable plaster ring.
  - .5 Location and appearance to be to the NRC Departmental Representative's approval.

**END OF SECTION**

**Part 1          General**

**1.1          RELATED WORK SPECIFIED ELSEWHERE**

- .1          Common Work Results - Electrical Section 26 05 00

**1.2          MATERIALS**

- .1          Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.
- .2          After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

**Part 2          Products**

**2.1          RACEWAYS**

- .1          Conduit:
  - .1          Each length of conduit to be new and bear the CSA Stamp of Approval.
  - .2          Conduit, unless otherwise noted, to be EMT, no smaller than 12mm (1/2").
- .2          Bushings and Connectors:
  - .1          Insulated type, with the insulation an integral part of the fitting.
- .3          Conduit Fastening:
  - .1          One hole malleable iron straps to secure surface conduits. Two hole straps for conduits larger than 50mm (2").
  - .2          Beam clamps to secure conduits to exposed steel work.
  - .3          Channel type supports for two or more conduits.
- .4          Pull Cord:
  - .1          Polypropylene cord in empty conduit.
- .5          Unless specifically called for on the drawings, do not use flexible conduits but it is recognized that there may be applications where this material will be useful, such as equipment connections, etc. In such cases, obtain permission for its use from the NRC Departmental Representative. For tender purposes, assume that flexible conduits will not be permitted unless specifically called for on the drawings or equipment specifications. All flexible conduits for vapour-tight applications shall be liquid-tight flexible conduits (seal-tight).
- .6          Provide expansion couplings for all conduits running in slabs through expansion joints. These shall be the type approved for use in concrete with a bonding conductor.

**2.2 SUPPORT HARDWARE**

- .1 Use 10mm (3/8") threaded rod for suspended unistrut and conduit.
- .2 Unless otherwise specified, use 41mm x 41mm (1-5/8" x 1-5/8") galvanized steel unistrut for conduit support systems.

**Part 3 Execution**

**3.1 RACEWAYS**

- .1 Install raceways as follows:
  - .1 Rigidly supported.
  - .2 Workmanlike manner.
  - .3 Maintain maximum headroom.
  - .4 Concealed in finished area.
  - .5 Surface-mounted in open area.
  - .6 Do not pass conduits through structural members except as indicated.
  - .7 Parallel to or at right angles to the building lines.
  - .8 Thoroughly ream all conduits at ends and terminate with appropriate locknuts and bushings.
  - .9 Cause minimum interference in spaces through which they pass.
  - .10 Plug or cap conduit during construction to protect from dust, dirt or water.
  - .11 Unless specifically indicated on drawings or with the permission of the NRC Departmental Representative, do not cast conduits in concrete.
  - .12 Dry conduits out before installing wire.
  - .13 Mechanically bend steel conduit larger than 22 mm (3/4") diameter. Bend conduit cold.
  - .14 Do not cut or modify prefabricated bends.
  - .15 PVC conduit as indicated.
  - .16 Function and appearance to be to the NRC Departmental Representative's approval.
  - .17 Seal conduit and cable openings in fire- rated walls and floors with an approved fire stop material.
  - .18 Seal conduit and cable openings in exterior walls with a weatherproof silicone sealant.
  - .19 Paint exposed conduits and boxes to match existing wall / ceiling.

**END OF SECTION**



**Part 1            General**

**1.1            RELATED WORK**

- .1    Motors and controls to Sections 26 22 19, 26 29 03 & 26 29 10.

**1.2            MATERIALS**

- .1    Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.
- .2    After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

**1.3            SHOP DRAWINGS AND PRODUCT DATA**

- .1    Submit shop drawings and product data in accordance with Section 00 10 00.

**1.4            IDENTIFICATION**

- .1    Identification as per Section 26 05 00.

**Part 2           Products**

**2.1            WIRING DEVICES**

- .1    Switches:
  - .1    Specification grade, shallow body, designed to withstand high inductive fluorescent loads CSA C22.2 No. 55.
  - .2    Number of poles as indicated.
  - .3    Captive mounting screws, quiet safe mechanical action with rust-proofed mounting strap and silver alloy contact points.
  - .4    Toggle actuated, colour white unless otherwise indicated.
  - .5    Brass screw terminals rated 20 AMP at 125 volt.
  - .6    Standard of acceptance: Hubbell, Leviton.
- .2    Cover Plates:
  - .1    Cover plates for wiring devices.
  - .2    Smooth white plastic for wiring devices mounted in flush-mounted outlet box.
  - .3    Sheet metal cover plates for wiring devices mounted in surface-mounted outlet box.
  - .4    Weatherproof covers as indicated.
  - .5    Multi-outlet covers as indicated.

**Part 3 Execution**

**3.1 LOCATION OF OUTLETS**

- .1 The number and general location of outlets for lighting, power, telephones, etc., are to be as shown on the drawings. Install all outlets accurately and uniformly with respect to building details. When centering outlets, make allowance for overhead pipes, ducts, etc. and for variations in wall or ceiling finish, window trim, etc. Reinstall incorrectly installed outlets at no cost to the Owner. Make field power and control connections as indicated.
- .2 The location of all outlets as shown on the plans are approximate and are subject to change, up to 3m (10') without extra cost or credit provided the information is given prior to the installation of the outlet.
- .3 Unless otherwise specified, locate light switches on latch side of doors. Determine the direction of all door swings from the architectural drawings or on site, not from the electrical drawings.

**3.2 MOUNTING HEIGHTS**

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not indicated verify before proceeding with installation.
- .3 Generally, locate outlets as follows: (except those otherwise shown on the drawings):
  - .1 Local switches 1.2m (3'-11") to centreline.
  - .2 Wall receptacles 400mm (1'-4") to centreline.
  - .3 Clock receptacles 2.4m (8'-0") to centreline.
  - .4 Lighting panels 1.8m (6'-0") to top.
  - .5 Telephone and data communications outlet 400mm (1'-4") to centreline.
  - .6 Fan coil speed control switch 1.2m (3'-11") to centreline.

**3.3 WIRING DEVICES**

- .1 Install wiring devices as follows:
  - .1 Where more than one local device is shown at one location, they are to be set under one cover plate.
  - .2 Install single throw switches with handle in "up" position when switch closed.
  - .3 Devices in gang type outlet box when more than one device is required in one location.
  - .4 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
  - .5 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.
  - .6 Install metal barriers where required.

- .7 Remove insulation carefully from ends of conductors and connect wiring as required.
- .8 Bond and ground as required.

**3.4 SPLITTERS AND DEVICES**

- .1 Installation of splitters, junction boxes, pull boxes & cabinets as follows:
  - .1 Mount plumb, true and square to the building lines.
  - .2 Install in inconspicuous but accessible locations.
  - .3 Install pull boxes so as not to exceed 30 m (100') of conduit run between boxes or as indicated.

**END OF SECTION**

**Part 1            General**

**1.1                MATERIALS**

- .1    Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.
- .2    After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

**1.2                SHOP DRAWINGS AND PRODUCT DATA**

- .1    Submit shop drawings and product data in accordance with Section 00 10 00.
- .2    Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by NRC Departmental Representative.

**Part 2            Products**

**2.1                FINISHES**

- .1    Baked enamel finish.
  - .1    Metal surfaces of luminaire housing and reflectors finished with high gloss powder coated baked enamel applied after fabrication to give smooth uniform appearance, free from pinholes or defects.

**2.2                METAL SURFACES**

- .1    Metal surfaces to be minimum 20 gauge steel.

**2.3                LIGHT CONTROL DEVICES**

- .1    All fluorescent luminaire lenses to be injection moulded clear virgin acrylic unless otherwise noted.

**2.4                LUMINAIRES**

- .1    Fluorescent T8:
- .2    LED:
  - .1    Type A:
    - .1    120V, 151.8mm round pot light.
    - .2    39W, LED, suitable for recessed mounting in drywall ceiling.
    - .3    4000k colour temperature.
    - .4    Suitable for use in shower.
    - .5    Rated to deliver L80 performance for 60,000 hours.

- .6 Standard of acceptance: Philips Omega OM6LED39120-R6LED40kSWR or equivalent approved by the NRC Departmental Representative.
- .2 Type B:
  - .1 120V, 305mm x 1219mm recessed light.
  - .2 40W, LED, suitable for recessed mounting in drywall ceiling.
  - .3 4000k colour temperature.
  - .4 Gasketed lens.
  - .5 Rated to deliver L80 performance for 50,000 hours.
  - .6 Standard of acceptance: Philips Lightolier QCE-14-G-OL-39-40-U-LAG or equivalent approved by the NRC Departmental Representative.
- .3 Type C:
  - .1 120V, 124mm x 1219mm.
  - .2 40W, LED, suitable for suspending from ceiling.
  - .3 4000k colour temperature.
  - .4 Suitable for use in damp location.
  - .5 Rated to deliver L80 performance for 50,000 hours.
  - .6 Standard of acceptance: CFI Fluxstream LFR-4-FL-SLD-37-40-U-LAG or equivalent approved by the NRC Departmental Representative.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Supply and install all lighting fixtures complete with lamps, switches, supports, etc., to provide a complete working lighting system.
- .2 Locate and install luminaires as indicated.

**3.2 LUMINAIRE SUPPORTS**

- .1 For suspended ceiling installations support each luminaire, including exit lights and pot lights, independently of the ceiling support system with separate chains at each end. No. 80 steel sash chain minimum.
- .2 Unless otherwise specified support fluorescent luminaires mounted in continuous rows once every 3.6 m (12').

**3.3 LUMINAIRE ALIGNMENT**

- .1 Align luminaires mounted in continuous rows to form a straight uninterrupted line.
- .2 Align luminaires mounted individually parallel or perpendicular to building grid lines as shown on drawing.

**END OF SECTION**

## **Arsenault, Jesse**

---

**From:** Pelletier, Dan  
**Sent:** Thursday, December 05, 2013 1:18 PM  
**To:** Arsenault, Jesse  
**Subject:** RE: PO 816321 - Michael D. Miles

This was completed 1 week ago.

Dan

---

**From:** Arsenault, Jesse  
**Sent:** December 5, 2013 11:18 AM  
**To:** Pelletier, Dan  
**Subject:** PO 816321 - Michael D. Miles

Hi Dan,

Can you please give me an update on this PO?

Thanks?

### ***Jesse Arsenault***

Procurement Officer | ASPM | Administrative Services and Property Management Branch  
Telephone: 613-993-0569 | [jesse.arsenault@nrc-cnrc.gc.ca](mailto:jesse.arsenault@nrc-cnrc.gc.ca) | Fax: 613-993-6867 or 613-998-9455  
National Research Council Canada | Building M-22, 1200 Montreal Road, Ottawa, Ontario K1A 0R6  
Government of Canada

Agent d'approvisionnement | SAGI | Direction des services administratifs et gestion de l'immobilier  
Téléphone: 613-993-0569 | | [jesse.arsenault@nrc-cnrc.gc.ca](mailto:jesse.arsenault@nrc-cnrc.gc.ca) | Télécopieur: 613-993-6867 ou 613-998-9455  
Conseil national de recherches Canada | Édifice M-22, 1200 chemin Montréal, Ottawa (Ontario) K1A 0R6  
Gouvernement du Canada

 Before printing, please think about the environment / Avant d'imprimer, pensez à l'environnement

**GI 01 Receipt of Tenders**  
(11/12/2001)

.1 Sealed tenders will be received at the tender address until the tender closing date and time shown on the face of the Tender Form.

**.2 Tenders by Facsimile will be accepted.**

.1 Tenderers shall complete their own tender envelope by clearly printing or typing in the appropriate spaces:

- Tender Number
- Name of Tenderer
- Closing date
- Closing time: 14:00

.2 Failure to complete the tender envelope properly may render the tender liable to disqualification.

**GI 03 Unacceptable Tenders**  
(11/12/2001)

.1 Tenders not submitted on the accompanying Tender Form will not be considered.

.2 Tenders received after the tender closing date and time will not be considered and will be returned unopened.

.3 Incomplete tenders may be rejected.

**GI 04 Revision of Tenders**  
(06/05/2003)

.1 A tender submitted in accordance with these instructions may be revised by letter or facsimile provided the revision is received at the office designated for the receipt of tenders, on or before the date and time set for the closing of tenders. The letter or facsimile shall

- i) be on the Tenderer's letterhead or bear a signature that identifies the Tenderer;
- ii) for the lump sum portion of a tender, clearly identify the amount of the current revision. The total aggregate sum of all revisions submitted, including the current revision, shall be shown separately.

.2 A letter or facsimile submitted to confirm an earlier revision shall be clearly identified as **"CONFIRMATION ONLY"**

.3 Failure to comply with any of the above provisions will result in the rejection of the non-compliant revision(s) only. The tender shall be evaluated based on the original tender submitted and all other compliant revision(s).

Facsimile Number: (613)991-3297

**GI 05 Acceptance of Offer**  
(06/05/2003)

- .1 Her majesty may accept any tender, whether it is the lowest or not, or may reject any and all tenders.
- .2 Without limiting the generality of clause GI 05.1, Her Majesty may reject any tender, based on unfavourable assessment as to:
  - (i) the adequacy of the tendered price to carry out the work and,
  - (ii) the Tenderer's performance on other contracts.
- .3 In assessing the Tenderer's performance on other contracts pursuant to clause GI 05.2.2, Her Majesty may consider, but not be limited to, such matters as;
  - (i) the efficiency and workmanship of the Tenderer in performing the work; and
  - (ii) the extent to which the tenderer executed the work in accordance with the terms and conditions of the contract
- .4 Her Majesty may reject a bid where any of the following circumstances is present:
  - (1) the Tenderer, or any employee or subcontractor included as part of the Tender, has been convicted under section 121 ("Frauds on the government" & "Contractor subscribing to election fund"), 124 ("Selling or purchasing office") or 418 ("Selling defective stores to Her Majesty") of the Criminal Code; or
  - (2) the Tenderer's bidding privileges are suspended or are in the process of being suspended;
  - (3) the bidding privileges of an employee or subcontractor included as part of the Tender have been suspended or are in the process of being suspended, which suspension or pending suspension would render that employee or subcontractor ineligible to bid on the Work, or the portion of the Work the employee or subcontractor is to perform
  - (4) with respect to current or prior transaction with the Government of Canada;
    - (i) the Tenderer is bankrupt or where, for whatever reason, its activities are rendered inoperable for an extended period;



- (ii) evidence, satisfactory to Her Majesty, of fraud, bribery, fraudulent misrepresentation or failure to comply with any law protecting individuals against any manner of discrimination, has been received with respect to the Tenderer, any of its employees or any subcontractor included as part of its Tender;
- (iii) the Minister has previously exercised or intends to exercise the contractual remedy of taking the work out of the contractor's hands with respect to a Contract with the Tenderer, any of its employees or any subcontractor included as part of its Tender; or
- (iv) Her Majesty determines that the Tenderer's performance on other contracts, including the efficiency and workmanship as well as the extent to which the Tenderer executed the work in accordance with contractual terms and conditions, is sufficiently poor to jeopardize the successful completion of the requirement being bid on.
- (v) Where Her Majesty intends to reject a Tender pursuant to a provision of clause GI 05.4, other than subclause GI 05.4.2, the Minister will so inform the Tenderer and provide the Tenderer ten (10) days within which to make representations prior to making a final decision on the Tender rejection.

**GI 06 Completion of Tender**  
(06/05/2003)

- .1 Insert the total amount of the tender in Clause 3.
- .2 Type or legibly print the tenderer's full business name and address under the spaces provided for Contractor's full Business name and Contractor's full Business address respectively.
- .3 The signature(s) of the authorized signatory(ies) shall be affixed to the Signature page of the Tender Form and the name(s) and title(s) typed or printed, each in the space provided.

In order to confirm the authority of the person or persons signing the tender to establish the legal capacity under which the Tenderer proposes to enter in Contract, any Tenderer who carries on business in other than its own personal name shall, if requested by Canada, provide satisfactory proof of

- (i) such signing authority; and

- (ii) the legal capacity under which it carries on business;

prior to contract award. Proof of signing authority may be in the form of a certified copy of a resolution naming the signatory(ies) that is (are) authorized to sign this tender on behalf of the corporation or partnership. Proof of legal capacity may be in the form of a copy of the articles of incorporation or the registration of the business name of a sole proprietor or partnership

**GI 07 Municipal Capital Development Charges**  
(06/05/2003)

Tenderers shall not include monies for any "Capital Development or Re-Development Charges" that may be associated with the work being tendered.

**GI 08 Goods and Services Tax and Harmonized Sales Tax**  
(06/05/2003)

Tenderers are not to include any amount for the Goods and Services Tax or the Harmonized Sales Tax. Any amount to be levied in respect of the Goods and Services Tax or Harmonized Sales Tax will be billed as a separate item on a request for progress payment submitted by the Contractor. The appropriate Goods and Services Tax or Harmonized Sales Tax levy will be paid to the Contractor in addition to the amount approved by the Engineer for work performed under the contract and will therefore not affect any of the individual amounts or the total amount of the contract. The Contractor will be required to remit the appropriate amount to Canada Customs and Revenue Agency in accordance with the applicable legislation.

**GI 09 Quebec Sales Tax**  
(06/05/2003)

The Federal Government is exempt from the Quebec Sales Tax. Tenderers shall not include in their prices any amount that is intended to cover the tax on Goods and Services performed in the execution of the work except for such amounts for which an Input Tax Refund is not available. The Contractor should make arrangements directly with the Province of Quebec to recover any Quebec Sales Tax paid in performing this contract.

**GI 10 Contractor's Performance Evaluation**  
(06/05/2003)

- .1 Tenderers shall take note that the performance of the Contractor during and upon completion of the work shall be evaluated by the Minister. The evaluation will be based on the quality of workmanship; timeliness of completion of the work; project management, contract management and management of health and safety. Should the Contractor's performance be considered unsatisfactory, the Contractor's bidding privileges on future work may be suspended indefinitely.

- .2 Where Her Majesty intends to review a Contractor's bidding privileges pursuant to Clause GI 10.1 the Minister will so inform the Contractor and provide the Contractor 10 days within which to make presentation prior to making a final decision on suspending the Contractor's bidding privileges.

**GI 11 Compliance with Applicable Law**  
(06/03/2003)

- .1 By submission of a tender, the Tenderer declares that the Tenderer has the legal capacity to enter into a contract and is in compliance with all federal, provincial and municipal laws and regulation applicable to the submission of the tender and entry into any ensuing contract for the performance of the work.
- 2 For the purpose of verifying the requirements expressed in paragraph GI 11.1, a Tenderer shall, if requested, provide a copy of every valid licence, permit, registration, certificate, declaration, filing or other authorization listed in the request, and shall provide such documentation within the time limit(s) set out in the said request.
- .3 Failure to comply with the requirements expressed herein shall result in disqualification of the tender.

**GI 12 Tender Results**  
(06/05/2003)

(613) 993-4180

**GI 13 Negotiations**  
(06/05/2003)

- .1 In the event that the lowest compliant tender exceeds the amount of funding Canada has allocated for the construction phase of the work
  - .1 by 15% or less, Canada, at its sole discretion shall either
    - (i)cancel the tender call; or
    - (ii)obtain additional funding and, subject to the provisions of clause GI 05 of the Instructions to Tenderers, award the Contract to the Tenderer submitting the lowest compliant tender; or
    - (iii) revise the scope of the work accordingly and negotiate, with the Tenderer submitting the lowest compliant tender, a corresponding reduction in it's tendered price.
  - .2 by more than 15%, Canada, at its sole discretion, shall either
    - (i)cancel the tender call, or
    - (ii)obtain additional funding and, subject to the provisions of clause GI 05 of the Instructions to Tenderers, award the Contract to the Tenderer submitting the lowest compliant tender; or
    - (iii)revise the scope of the work accordingly and invite those who submitted compliant tenders at the original tender call to re-tender the work.
- .3 If negotiations or a re-tender are undertaken as is contemplated in GI 13.1(iii) or GI 13.2(iii), Tenderers shall retain the same subcontractors and suppliers as they carried in their original tender submissions.
- .4 If Canada elects to negotiate a reduction in the tendered price as is contemplated in GI 13.1(iii) and the negotiations fail to reach an agreement, Canada shall then exercise either of the options referred to in GI 13.1(i) or GI 13.1(ii).

**GC 01 Definition of Terms**  
(11/12/2001)

In the Contract,

- .1 "the Architect/Engineer" means such person as may be specifically designated by or on behalf of the NRC upon the award of this contract and includes a person specially authorized by the Architect/Engineer to act on his behalf;
- .2 "NRC" includes a person appointed by the NRC to act for it for the purpose of the contract;
- .3 "Contracting Authority" is responsible for the administration of the contract.
- .4 "person" includes, unless there is an express stipulation in the contract to the contrary, any partnership, proprietorship, firm, joint venture, consortium, corporation
- .5 "work" includes the whole of the works, materials, matters and things to be done, furnished and performed by the Contractor under the contract.

**GC 02 Assignment and Subcontracting**  
(11/12/2001)

This contract may not be assigned without the written consent of the NRC and neither the whole nor any part of the work may be subcontracted by the Contractor without the consent of the Architect/Engineer. All the terms and conditions of this Contract that are of general application shall be incorporated in every other contract, excluding those contracts issued solely for the supply of plant or material, issued as a consequence of this Contract.

**GC 03 Members of the House of Commons**  
(11/12/2001)

- .1 No Member of the House of Commons shall be admitted to any share or part of the contract or to any benefit arising there from.
- .2 It is a term of this contract that no former public office holder who is not in compliance with the post-employment provisions of the Conflict of Interest and Post-Employment Code for Public Office Holders shall derive a direct benefit from this Contract.

**GC 04 Indemnification**  
(11/12/2001)

The Contractor shall indemnify and save harmless Her Majesty from and against all claims, losses, costs, damages, suits, proceedings, or actions arising out of or related to the Contractor's activities in executing the work, other than those arising from a defect in title to the site of the work or the infringement of a patent arising from a design supplied by Her Majesty, but including his omissions, improper acts or delays in executing the work under the contract

**GC 05 Property of Her Majesty**  
(11/12/2001)

The Contractor shall be responsible for any loss of or damage, excluding reasonable wear and tear, to any property of Her Majesty arising out of the performance of the work whether or not such loss arises from causes beyond his control. Such property shall only be used by the Contractor as may be directed by the Architect/Engineer and the Contractor shall, at any time when requested to do so, account to the Architect/Engineer for the use of such property.

**GC 06 Applicable laws**  
(11/12/2001)

- .1 The Contractor shall comply with all legislative and regulatory provisions whether federal, provincial or municipal applicable to the performance of the work
- .2 Unless otherwise provided in the contract, the Contractor shall obtain all permits and hold all certificates and licenses required for the performance of the work.
- .3 From time to time, the Architect/Engineer may request that the

Contractor provide evidence that it complies with all applicable legislative and regulatory provisions and that it holds all required permits, certificates and licenses. Such evidence shall be provided within the time set in the request or as stipulated in the contract.

**GC 07 Canadian Labour and Material**  
(11/12/2001)

In so far as is practicable the Contractor shall employ and use only Canadian Labour and materials in the execution of the work, employ local labour with a reasonable proportion of workers who have served on active service with the Canadian Armed Services, and utilize the services of the Canada Employment Centres in the recruitment of such labour.

**GC 08 Publicity**  
(11/12/2001)

The Contractor will neither permit any public ceremony nor erect or permit the erection of any sign or advertising, in connection with the work without the approval of the Architect/Engineer.

**GC 09 Materials, Equipment, etc. to become Property of Her Majesty**  
(11/12/2001)

All materials and plant used or provided for the work shall be the property of Her Majesty, shall not be removed from the site of the work and shall be used only for the purpose of the work, until the Architect/Engineer shall certify that they are, if not incorporated in the work, no longer required for the purpose of the work. The Contractor shall be liable for all loss or damage to material or plant that is the property of Her Majesty by Virtue of this section.

**GC 10 Contractor's Superintendent and Workers**  
(11/12/2001)

The Contractor will keep a competent superintendent on the site of the work at all times during the progress of the work unless otherwise authorized by the Architect/Engineer. The Superintendent must be acceptable to the Architect/Engineer and have the authority to receive on behalf of the Contractor any order or communication in respect of the contract. Any superintendent and workers not acceptable to the Architect/Engineer because of incompetence, improper conduct or security risk will be removed from the site of the work and replaced forthwith.

**GC 11 Co-operation with other Contractors**  
(11/12/2001)

The Contractor will co-operate fully with other contractors or workers sent onto the site of the work by the Architect/Engineer. If the sending onto the work of other contractors and workers could not have been reasonably foreseen by the Contractor when entering into the contract, and if, in the opinion of the Architect/Engineer the Contractor has incurred additional expense by such action, and if the Contractor has given written notice of claim within thirty days of such action, Her Majesty will pay the cost of such additional expense to the Contractor calculated in accordance with Section 20.

**GC 12 Claims Against and Obligations of the Contractor or Subcontractor**  
(11/12/2001)

- .1 The Contractor shall ensure that all its lawful obligations and any lawful claims against the Contractor arising out of the performance of the work are discharged and satisfied at least as often as the contract requires Her Majesty to discharge Her obligations to the Contractor. The Contractor shall provide the Architect/Engineer with a Statutory Declaration deposing to the existence and condition of such claims and obligations when called upon to do so.
- .2 Her Majesty may, in order to discharge lawful obligations of and satisfy lawful claims against the Contractor or a subcontractor arising out of the performance of the work, pay an amount, which is to be determined in accordance with GC 12.3, from money that is due and

- payable to the Contractor pursuant to the contract directly to the obligees of the claimants against the Contractor or the subcontractor.
- .3 the amount referred to in GC 12.2 shall be that amount which the Contractor would have been obliged to pay to such claimant had the provisions of the Provincial or Territorial lien legislation, or in the province of Quebec, the law relating to privileges, been applicable to the work. Any such claimant need not comply with the provisions of such legislation setting out the steps by way of notice, registration or otherwise and might have been necessary to preserve or perfect any claim for lien or privilege which the claimant might have had.
- .4 For the purposes of GC 12.2, a claim shall be considered lawful when it is so determined;
- .i by a court of competent jurisdiction, or
  - .ii by an arbitrator duly appointed to arbitrate the said claim, or
  - .iii by a written notice delivered to the Architect/Engineer and signed by the Contractor authorizing payment of said claim or claims.
- .5 A payment made pursuant to GC 12.2 is, to the extent of the payment, a discharge of Her Majesty's liability to the Contractor under the contract and may be deducted from any amount payable to the Contractor under the contract.
- .6 GC 12.2 shall only apply to claims and obligations:
- .1 The notification of which has set forth the amount claimed to be owing and the person who by contract is primarily liable. The notification must be received by the Architect/Engineer in writing before final payment is made to the Contractor and within 120 days of the date on which the claimant;
    - .i should have been paid in full under the claimant's contract with the Contractor or subcontractor where the claim is for money that was lawfully required to be held back from the claimant; or
    - .ii performed the last of the services, work or labour, or furnished the last of the material pursuant to the claimant's contract with the Contractor or subcontractor where the claim is not for money referred to in GC 12.6.1.i and
  - 2. The proceedings to determine the right to payment of the claim shall have commenced within one year from the date that the notice referred to in GC 12.6.1 was received by the Architect/Engineer.
- .7 Her Majesty may, upon receipt of a notification of claim referred to in GC12.6.1, withhold from any amount that is due and payable to the Contractor pursuant to the contract the full amount of the claim or any portion thereof.
- .8 The Architect/Engineer shall notify the Contractor in writing of receipt of any notification of claim and of the intention of Her Majesty to withhold funds pursuant to GC 12.7. The Contractor may, at any time thereafter and until payment is made to the claimant, post with Her Majesty, security in a form acceptable to Her Majesty in an amount equal to the value of the said claim. Upon receipt of such security Her Majesty shall release to the Contractor any funds which would be

otherwise payable to the Contract, that were withheld pursuant to the provisions of GC 12.7.

**GC 13 Architects/Engineer's Rights and Obligations**  
(11/12/2001)

The Architect/Engineer shall –

- .1 have access to the work at all times during its execution and the Contractor will provide the Architect/Engineer with full information and assistance in order that he may ensure that the work is executed in accordance with the contract;
- .2 decide any question as to whether anything has been done as required by the contract or as to what the Contractor is required by the contract to do, including questions as to the acceptability of, the quality or quantity of any labour, plant or material used in the execution of the work, and the timing and scheduling of the various phases of the work;
- .3 have the right to order additional work, dispense with, or change the whole or any part of the work provided for in the plans and specifications. The Architect/Engineer shall decide whether anything done or not done as a result of directions given under this sub-section has increased or decreased the cost of the work to the Contractor and the amount payable under the contract to the Contractor will be increased or decreased accordingly by an amount calculated in accordance with Section GC 20 hereof.

The Contractor shall comply with any decision or direction of the Architect/Engineer given under this section.

**GC 14 Delay, non-compliance, or Default by the Contractor**  
(11/12/2001)

If the Contractor delays in the commencement, execution or completion of the work, fails to comply with a direction or decision of the Architect/Engineer properly given, or is in default in any other manner under the contract, the Architect/Engineer may do such things as he deems necessary to correct the Contractor's default. The Contractor will reimburse Her Majesty for all costs, expenses and damage incurred or sustained by Her Majesty, by reason of the Contractor's default, or in correcting the default. If addition to the aforementioned remedies in this section, the NRC may, if the default continues for 6 days after notice in writing of default has been given to the Contractor by the Architect/Engineer, terminate the contract in accordance with Section GC 17.3.

**GC 15 Changes in Soil Conditions, Delay by Her Majesty, etc.**  
(11/12/2001)

1. No extra payment will be made to the Contractor for any extra expense, loss or damage for any reason unless the Architect/Engineer shall certify that such extra expense, loss or damage is directly attributable to:
  - .1 a substantial difference between the soil conditions at the site of the work indicated by the plans and specifications and the actual soil conditions found there;
  - .2 neglect or delay by Her Majesty, occurring after the date of contract, in providing information or doing any act which is required expressly by the contract or by usage of the trade, or suspension of the work by the NRC;



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and the Contractor has within 30 days of encountering such soil conditions or of the commencement of such neglect or delay, given written notice to the Architect/Engineer of a claim for such extra expense, loss or damage. The amount of any extra payment to be made under this Section will be calculated in accordance with Section 20.

2. If in the opinion of the Architect/Engineer any difference in soil conditions referred to in subsection GC 15.1.1 hereto results in saving of expenditure to the Contractor the amount of such saving shall be paid to Her Majesty by the Contractor.

**GC 16 Protesting  
Architect/Engineer's Decision**  
(11/12/2001)

If the Contractor, within 10 days of receiving any decision or direction of the Architect/Engineer, gives written notice to the Architect/Engineer that the decision or direction is accepted under protest, Her Majesty will pay to the Contractor the cost, calculated according to Section GC 20, of anything that the Contractor was required to do, as a result of the decision or direction, beyond what the contract correctly understood would have required him to do.

**GC 17 Suspension or Termination  
of the Contract**  
(11/12/2001)

1. The NRC may upon notice in writing to the Contractor suspend or terminate the contract at any time. The Contractor will comply with such notice immediately.
2. If the NRC suspends the work for 30 days or less the Contractor must, subject to his remedy under Section 15 hereof, complete the work when called upon to do so. If the NRC suspends the work for a period in excess of 30 days the Contractor may request the NRC to terminate the work under sub-section GC 17.4 hereof.
3. If the NRC terminates the contract because of default by the Contractor, the insolvency of or the commission of an act of bankruptcy by the Contractor, the obligation of Her Majesty to make payments to the Contractor shall cease and no further payments shall be made to the Contractor unless the Architect/Engineer shall certify that no financial prejudice will result to Her Majesty from such further payments. Termination under this sub-section shall not relieve the Contractor of any legal or contractual obligations other than the physical completion of the work. In such circumstances the Architect/Engineer may complete or have the work completed as he sees fit and all costs and damages incurred by Her Majesty due to the non-completion of the work by the Contractor shall be payable by the Contractor to Her Majesty.
4. If the NRC terminates the work other than in accordance with subsections hereof Her Majesty will pay to the Contractor an amount calculated in accordance with Section GC 20 hereof subject to any additions or deductions otherwise provided by the General Conditions or Labour Conditions less any payments made pursuant to Section GC 26.3 hereof. In no event, however, shall such amount be greater than the amount which would have been payable to the Contractor had the contract been completed.

**GC 18 Holdback**  
(19/11/2003)

- .1 A 10% holdback may be retained by NRC on invoices.
- .2 A 10% holdback shall be retained by NRC on all progress payments.

- .3 A final statutory declaration shall contain a disposition by the Contractor that all of the Contractor's lawful obligations and any lawful claims against the Contract that arose out of the performance of the contract have been discharged and satisfied before the holdback will be released.

**GC 19 No Additional Payments**  
(11/12/2001)

- .1 The amount payable to the Contractor under this contract will not be increased or decreased by reason of any increase or decrease in the cost of the work brought about by any increase or decrease in the cost of plant, labour or material, except that, in the event of a change in any tax, that affects the cost of any materials incorporated in to be incorporated in the work, imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act of Customs Tariff, made public after the date of the submission of the tender, an appropriate adjustment may be made.
- .2 If the Architect/Engineer and the Contractor fail to reach agreement on the price that the amount payable to the Contractor shall be all reasonable and proper costs paid or legally payable by the Contractor that are directly attributable to the change in the scope of the work plus and additional amount equal to 10% of such costs to cover overhead, finance and interest charges, and margin. The Contractor shall provide evidence of such costs to the Architect/Engineer with its progress claim or invoice.

**GC 20 Determination of Costs**  
(11/12/2001)

- .1 For the purposes of Sections GC11, GC13.3, GC15, GC16 and GC17.4 and subject to the provisions of Section 26.2.2, the amount payable to the Contractor for any change in the scope of work requested by the Architect/Engineer shall be based on the Unit Prices as set out in Clause 4 of the Tender and Acceptance.
- .2 If the Unit Prices referred to in GC 20.1 cannot be used to determine the amount payable to the Contractor due to a change in the scope of the work, then the Contractor shall submit to the Architect/Engineer a quotation of the Contractor's costs for all labour, plant and material required by the change. The Contractor shall include a mark-up in an amount equal to 20% of its costs for the labour, plant and material portion of the work to be done by its own forces and an additional mark-up in an amount equal to 15% of all quotations received from its subcontractors, The Contractor shall ensure that its subcontractors shall include a mark-up in an amount equal to 20% of its costs for the labour, plant and material portion of the work to be done by the subcontractors own forces and an additional mark-up in an amount equal to 15% of all quotations received from its subcontractors. The mark-up referred to herein shall be considered full compensation for all supervision, coordination, administration, overhead, margin, finance and interest charges, and the risk of undertaking the work within a stipulated amount. The Contractor's and subcontractor's costs shall be inclusive of all contractor and trade discounts. Quotations referred to herein shall be prepared and submitted in accordance with Section 01017 of the Specifications.
- .3 If the Architect/Engineer and the Contractor fail to reach agreement on

the prices quoted in GC 20.2, then the amount payable to the Contractor shall be all reasonable and proper costs paid or legally payable by the Contractor that are directly attributable to the change to the scope of the work plus an additional amount equal to 10% of such costs to cover overhead, finance and interest charges, and margin. The Contractor shall provide evidence of such costs to the Architect/Engineer with its progress claim or invoice.

**GC 21 Records to be kept**  
(11/12/2001)

The Contractor shall for a period of two years from the date of the Final Certificate of Completion, maintain and keep full records, vouchers, other writings and information in respect of his estimates and actual cost of the work and shall make them available for copy, audit or inspection by any persons acting on behalf of the NRC.

**GC 22 Extension of Time**  
(11/12/2001)

The NRC may, on the application of the Contractor made before the day fixed for the completion of the work, extend the time for the completion of the work. Whether or not the NRC grants an extension, the Contractor shall, except to the extent that the NRC is of the opinion that the need for an extension was due to causes beyond the control of the Contractor pay to Her Majesty

.1 An amount equal to Departmental inspection costs relating to the work incurred after the original completion date and

.2 compensation for any loss or damage resulting to Her Majesty from failure by the Contractor to complete the work by the original completion date.

**GC 23 Cleaning of Work**  
(11/12/2001)

The Contractor will upon completion of the work, clear and clean the work and its site to the satisfaction of and in accordance with any directions of the Architect/Engineer.

**GC 24 Architect/Engineer's Certificates**  
(11/12/2001)

On the day that the work has been completed and the Contractor has complied with the contract and all orders and directions pursuant thereto to the satisfaction of the Architect/Engineer, the Architect/Engineer will issue to the Contractor a Final Certificate of Completion. In the case of a unit price contract, the Architect/Engineer will at the same time issue a Final Certificate of Measurement setting out the final quantities used or employed in respect of the classes and units set out in the Unit Price Table, and any subsequent amendments thereto, under the Tender, such certificate to be binding upon the Contractor and Her Majesty.

**GC 25 Rectification of Defects**  
(11/12/2001)

The Contractor will, upon notice from the Architect/Engineer and within such time as specified in said notice, rectify at his own expense any defect or fault, however caused, which appears in the work within 12 months of the date of the Final Certificate of Completion.

**GC 26 Payment**  
(11/12.2001)

- .1 Her Majesty will pay and the Contractor will accept as full consideration for the work performed and executed an amount by which the amount referred to in the Tender together with the aggregate of the amounts payable by Her Majesty under Sections GC 11, GC 13.3, GC 15.1, GC 16 and GC 19 exceed the aggregate of any payments by Her Majesty under Section GC 12 and indemnification and amounts payable to or costs and damages incurred by Her Majesty under Sections GC 4, GC 5, GC 9, GC 13.3, GC 14, GC 15.2, GC 17.3, GC 19 and GC 22.
- .2 In the case of a unit price contract:
  - .1 The amount referred to in the Tender will be deemed to be the amount computed by totaling the products of the unit prices set out in the Tender, as amended pursuant to sub-paragraph 26.2.2 of this section.
  - .2 The Architect/Engineer and the Contractor may be agreement in writing add to the aforesaid Unit Price Table other classes of labour, etc., units of measure, estimated quantities and prices per unit, and may if the actual quantities as set out in the aforesaid Final Certificate of Measurement exceed or fall short of the estimated quantities in respect of any item(s) shown on the aforesaid Unit Price Table by more than 15% amend the unit prices shown in the Unit Price Table for such items, provided that in the event the actual quantities exceed the estimated quantities by more than 15% the aforementioned amendment to the unit prices shall apply only to the actual quantities in excess of 115% of the estimated quantities. Where the Architect/Engineer and the Contractor fail to agree on the amount of any adjustment as contemplated by this subsection the revised or new prices per unit shall be determined in accordance with Section GC 20 hereof.
- .3 If the amount of the Contract is in excess of \$5,000 the Contractor shall be entitled to receive progress payments upon submitting Progress Claims that must be approved by Progress Reports issued by the Architect/Engineer at monthly intervals. The amount to be paid to the Contractor for a progress payment shall be 90% of the value of the work certified by the Architect/Engineer in the Progress Report as having been completed since the date of the immediately preceding Progress Claim, if any.
- .4 Thirty days after receipt by the Architect/Engineer of the Progress Claim and if the Contractor has made and delivered to the Architect/Engineer his Statutory Declaration pursuant to Section GC 12 the amount of the Progress Claim, subject to subsections of this section, shall become due and payable.
- .5 Sixty days after the issue by the Architect/Engineer of the Final Certificate of Completion there shall become due and payable to the Contractor the amount described in subsection GC 26.1 of this section less the aggregate amounts, if any, paid pursuant to subsection GC 26.3 of this section.

- .6 Notwithstanding sections GC 26.3, GC 26.4 and GC 26.5 of this section, no payments shall be due or payable to the Contractor if has failed to supply and Statutory Declaration pursuant to Section GC 12 surety bond or security deposit pursuant to General Instructions to Tenderers Clause GC 4.2.3.
- .7 A payment by Her Majesty pursuant to this section shall not be construed as evidence that the work is satisfactory or in accordance with the contract.
- .8 Delay in making payment by Her Majesty under this section shall not be deemed to be a breach of the contract.
- .1 However, subject to GC 26.6 above and GC 26.8.2 below, Her Majesty shall pay the Contract simple interest on any amount overdue, at the Average Bank Rate plus 3% per year. The interest shall apply from and include the day such amount became overdue until the day prior to the date of payment.
- .2 Interest in accordance with GC 26.8.1 above shall be paid to the Contractor without demand, except that, in respect of amounts which are less than 15 days overdue, no interest shall be paid in respect of payment made within such 15 days unless the Contractor so demands after such amounts have become due.
- .9 Her Majesty may set-off against any amount payable or debt due by Her Majesty under this contract the amount of any debt due to Her Majesty under this contract or any other contract between the Contractor and Her Majesty.

**GC 27 Non-discrimination in Hiring  
& Employment of Labour**  
(11/12/2001)

- .1 For the purpose of this section and without restricting the provision of GC 1.1, "persons" include the Contractor, its subcontractors, its sub-subcontractors, and its respective employees, agents licensees or invitees, and any other individual granted access to the site of the work.
- .2 For contracts over \$30,000, refer to Section 9 of the Labour Conditions attached hereto which forms part of this contract.
- .3 For all contracts, the provision shall be that the Contractor shall not refuse to employ and will not discriminate in any manner against any person because
- .1 of that person's race, national origin, colour, religion, age, sex or marital status,
- .2 of the race, national origin, colour, religion, age, sex, or marital status of any person having any relationship or association with that person, or
- .3 a complaint has been made or information has been given by or in respect of that person relating to an alleged failure by the Contractor to comply with GC 27.3.1 and GC 27.3.2 above.
- .4 Without restricting the provisions of Section 9 of the Labour

## Conditions,

- .1 the Contractor shall, within two (2) working days immediately following receipt of a written complaint alleging a break of the Labour Conditions or pursuant to GC 27.3 above, at the site of the work,
  - i. cause to have issued a written direction to the person or persons named by the complainant to cease all actions that form the basis of the complaint; and
  - ii. for all contracts, forward a copy of the complaint to the Architect/Engineer by registered mail; and
  - iii. for contracts over \$30,000, forward another copy of the complaint to the federal Department of Human Resources Development, to the attention of the appropriate Director as described in the Labour Conditions;
- .2 the Contractor shall,
  - .i within twenty (24) hours immediately following receipt of a from the Architect/Engineer to do so, cause to have removed from the site of the work any person or persons whom the Architect/Engineer believes is in breach of the Labour Conditions or of GC 27.3 above, as applicable, and
  - .ii no later than thirty(30) days after receipt of the direction, caused to have the necessary action commenced to remedy the breach described in the direction;
- .3 if a direction is issued pursuant to GC 27.4.2 above, Her Majesty may withhold from monies that are due and payable to the Contractor or set-off pursuant to this contract, whichever is applicable, an amount representing the sum of the costs and payment referred to in GC 27.4.4 and 27.4.5 below;
- .4 if the Contractor fails to proceed in accordance with GC 27.4.2.ii above, the Architect/Engineer shall take the necessary action to:
  - i. have the breach remedied; and
  - ii. determine all supplementary costs incurred by Her Majesty;
- .5 Her Majesty may make a payment directly to the complainant from monies that are due and payable to the Contractor upon receipt from the complainant of:
  - i. a written award issued pursuant to the federal Commercial Arbitration Act, R.S., 1985, c. C-34.6; or
  - ii. a written award issued pursuant to the Canada Human Rights Act, R.S., 1985, c. H-6 or

iii. a written award issued pursuant to provincial or territorial human rights legislation; or

iv. a judgement issued by a court of competent jurisdiction.

.6 if the Architect/Engineer is of the opinion that the Contractor has breached any of the provisions of GC 27, the Minister may terminate the contract pursuant to the termination provisions of this contract.

.7 the Contractor shall ensure that the provisions of this General Condition are included in all contracts issued as a consequence of this work.

**GC 28 Certification – Contingency Fees**  
**(11/12/2001)**

.1 The Contractor certifies that it has not directly or indirectly paid or agreed to pay and covenants that it will not directly or indirectly pay or agree to pay a contingency fee for the solicitation, negotiation or obtaining of this contract to any person other than an employee acting in the normal course of the employee's duties.

.2 All accounts and records pertaining to payments of fees or other compensation for the solicitation, obtaining or negotiation of the Contract shall be subject to the accounts and audit provisions of the Contract.

.3 If the Contractor certifies falsely under this section or is in default of the obligations contained therein, the Minister may either take the work out of the Contractor's hands in accordance with the provisions of the Contract or recover from the Contractor by way of reduction to the Contract amount or otherwise the full amount of the contingency fee.

.4 In this section:

i. "contingency fee" means any payment or other compensation that is contingent upon or is calculated upon the basis of a degree of success in soliciting or obtaining a government contract or negotiating the whole or any part of its terms;

ii. "employee" means a person with whom the contractor has an employer/employee relationship;

iii. "person" includes an individual or a group of individuals, a corporation, a partnership, an organization and an association and, without restricting the generality of the foregoing, includes any individual who is required to file a return with the registrar pursuant to section 5 of the Lobbyist Registration Act, R.S. 1985 c.44 (4<sup>th</sup> supplement) as the same may be amended from time to time.



APPENDIX 'D'

**Fair Wages and Hours of Labour**

**Labour Conditions**

**Index**

- 01 Interpretation
- 02 General Fair Wage Clause
- 03 Hours of Work
- 04 Labour Conditions to be Posted
- 05 The Contractor to Keep Records which are to be Kept Open for Inspection
- 06 Departmental Requirements before Payment made to Contractor
- 07 Authority to pay Wages in the Event of Default by the Contractor
- 08 Conditions of Subcontracting
- 09 Non-discrimination in Hiring and Employment of Labour

**01 Interpretation**

In these Conditions

- (a) "Act" means the Fair Wages and Hours of Labour Act;
- (b) "Regulations" means the Fair Wages and Hours of Labour Regulations made pursuant to the Act;
- (c) "contract" means the contract of which these Labour Conditions are part;
- (d) "contracting authority" means the department of Government or a crown corporation with whom the contract is made;
- (e) "contractor" means the person who has entered into the contract with the contracting authority;
- (f) "regional director" means the director of a regional office of the Department of Human Resources Development or the director's designated representative;
- (g) "inspector" has the meaning assigned to the term by Part III of the Canada Labour Code.
- (h) "Minister" means the Minister of Labour of Canada;
- (i) "persons" means those workers employed by the contractor, subcontractor or any other person doing or contracting to do the whole or any part of the work contemplated by the contract;

ANNEXE 'D'

**Justes Salaires et Heures de Travail**

**Conditions de Travail**

**Table des Matières**

- 01 Interprétation
- 02 Clause générale de justes salaires
- 03 Durée du travail
- 04 Affichage des conditions de travail
- 05 L'entrepreneur s'engage à tenir des dossiers pour fins d'inspection
- 06 Exigences du ministère avant le versement des sommes dues à l'entrepreneur
- 07 Paiement des salaires par l'adjudicateur si l'entrepreneur omet de le faire
- 08 Conditions imposées à un sous-traitant
- 09 Non-discrimination dans l'embauchage et l'emploi de main-d'oeuvre

**01 Interprétation**

Dans ces conditions

- a) «Loi» désigne la Loi sur les justes salaires et les heures de travail;
- b) «Règlement» désigne le Règlement sur les justes salaires et les heures de travail établi en application de la Loi;
- c) «contrat» désigne le contrat auquel sont annexées les présentes Conditions de travail;
- d) «adjudicateur» désigne le ministère du gouvernement ou la société d'État avec lequel le contrat a été passé;
- e) «entrepreneur» désigne la personne qui a passé le contrat avec l'adjudicateur;
- f) «directeur régional» le responsable d'un bureau régional du ministère du Développement des ressources humaines ou son représentant désigné;
- g) «inspecteur» s'entend au sens de la partie III du Code canadien du travail;
- h) «Ministre» désigne le ministre du Travail du Canada;
- i) «personnes» désigne les travailleurs employés par l'entrepreneur, le sous-traitant ou toute autre personne exécutant ou s'engageant par contrat à exécuter la totalité ou une partie quelconque des travaux prévus dans le contrat;



<p><b>02 General Fair Wage Clause</b></p> <p>(a) All persons in the employ of the contractor, subcontractor, or any other person doing or contracting to do the whole or any part of the work contemplated by the contract, shall during the continuance of the work:</p> <p>i) be paid fair wages that is, such wages as are generally accepted as current for competent workers in the district in which the work is being performed for the character or class of work in which such workers are respectively engaged; and</p> <p>ii) in all cases, be paid no less than the minimum hourly rate of pay established by the Labour Program of the Department of Human Resources Development in the Fair Wage Schedules which form a part of this contract as Appendix A to these Labour Conditions; and</p> <p>iii) for contracts covering work performed in the province of Quebec, be paid at least the wage rates established by that province for the purposes of the Quebec "Construction Decree".</p> <p>(b) Where there is no wage rate in the schedules referred to in (a) for a particular character or class of work, the contractor shall pay wages for that character or class of work at a rate not less than the rate for an equivalent character or class of work.</p> <p>(c) Where during the term of the contract, the contractor receives notice from the contracting authority of any change in wage rates, the contractor shall pay not less than the changed wage rate beginning on the first day after receipt, by the contractor, of the notice of the change in wage rates.</p>	<p><b>02 Clause générale de justes salaires</b></p> <p>(a) Toutes les personnes employées par l'entrepreneur, le sous-traitant ou toute autre personne exécutant ou s'engageant par contrat à exécuter la totalité ou une partie quelconque des travaux prévus dans le contrat seront payées :</p> <p>i) des justes salaires tant que dureront les travaux, c'est-à-dire les salaires généralement reconnus comme salaires courants pour les travailleurs qualifiés dans la région où les travaux sont exécutés, selon la nature ou la catégorie du travail auquel ces travailleurs sont respectivement affectés; et</p> <p>ii) dans tous les cas, pas moins que les taux horaires minima fixés par le Programme du travail du ministère du Développement des ressources humaines dans les échelles de justes salaires qui deviennent partie de ce contrat en tant qu'Annexe A de ces Conditions de travail; et</p> <p>iii) pour les contrats concernant les travaux effectués dans la province de Québec, pas moins que les taux de salaires qui sont établis par cette province pour les fins du "Décret de la construction" du Québec.</p> <p>(b) Lorsqu'il n'y a aucun taux prévu dans l'échelle des taux de salaires à l'égard d'un travail d'une nature ou d'une catégorie données, l'entrepreneur verse à l'employé un taux de salaire qui n'est pas inférieur à celui établi pour un travail de nature ou de catégorie équivalente.</p> <p>(c) Lorsque pendant la durée du contrat, l'entrepreneur reçoit de l'adjudicateur un avis de modification à l'échelle de salaires, l'entrepreneur rémunère les employés touchés par cette modification à des taux qui ne sont pas inférieurs aux taux modifiés à compter de la journée qui suit la réception par lui, de l'avis.</p>
<p><b>03 Hours of Work</b></p> <p>(a) The hours of work in a day and in a week of persons employed in the execution of the contract, including the hours of work in excess of which a person shall be paid overtime at a rate at least equal to one and one half times the fair wage, are the hours of work for the province in which the work is being performed as set out from time to time in an Act of that province.</p> <p>(b) The daily or weekly hours of work referred to in paragraph (a) may be exceeded in accordance with the applicable provincial law.</p>	<p><b>03 Durée du travail</b></p> <p>(a) Les heures de travail quotidiennes et hebdomadaires des personnes employées à l'exécution du contrat, notamment les heures au-delà desquelles une personne doit être rétribuée selon le tarif pour heures supplémentaires, soit au moins le juste salaire majoré de 50 pour cent, sont celles fixées et éventuellement modifiées par la législation de la province dans laquelle le travail est effectué.</p> <p>(b) Les heures de travail quotidiennes ou hebdomadaires mentionnées à l'alinéa (a) peuvent être dépassées conformément à la législation provinciale applicable.</p>

<p><b>04 Labour Conditions to be Posted</b></p> <p>For the information and the protection of all persons, the contractor agrees to post and keep posted, in a conspicuous place on the premises where work contemplated by the contract is being carried out or on premises occupied or used by persons engaged in carrying out such work, a copy of these Labour Conditions, and a copy of the applicable Fair Wage Schedules along with any subsequent changes.</p>	<p><b>04 Affichage des conditions de travail</b></p> <p>Pour l'information et la protection de toutes les personnes, l'entrepreneur convient d'afficher et de tenir affichés, bien à la vue, à l'endroit où les travaux prévus dans le contrat sont exécutés, ou dans les locaux occupés ou fréquentés par les personnes employées à l'exécution desdits travaux, un exemplaire des présentes Conditions de travail, un exemplaire de l'échelle de justes salaires applicable et toutes modifications subséquentes.</p>
<p><b>05 The Contractor to Keep Records which are to be Kept Open for Inspection</b></p> <p>(a) The contractor agrees to keep books and records showing the names, addresses, classifications of employment and work of all workers employed under the contract, the rate of wages to be paid, the wages paid and the daily hours worked by the workers.</p> <p>(b) The contractor also agrees that the contractor's books, records and premises will be open at all reasonable times for inspection by an inspector.</p> <p>(c) The contractor also agrees to furnish the inspector and the contracting authority, on request, with such further information as is required to ascertain that the requirements of the Act, the Regulations and the contract with respect to wages, hours of work and other labour conditions have been complied with.</p>	<p><b>05 L'entrepreneur tient des dossiers pour fins d'inspection</b></p> <p>(a) L'entrepreneur convient de tenir les registres et dossiers où sont consignés le nom, l'adresse et la catégorie d'emploi et de travail de tous les travailleurs employés à des travaux exécutés en vertu du contrat, de même que le taux de salaire, le salaire payé et la durée journalière du travail pour chacun de ces travailleurs.</p> <p>(b) L'entrepreneur convient également à faire en sorte que ses registres, ses dossiers et ses locaux soient accessibles en tout temps opportun, pour fins d'inspection par un inspecteur.</p> <p>(c) L'entrepreneur convient en outre de fournir, sur demande, à l'inspecteur et à l'adjudicateur tous les autres renseignements requis pour permettre de constater qu'on a satisfait aux exigences de la Loi, des règlements et du contrat en ce qui concerne les salaires, la durée du travail et les autres conditions de travail.</p>
<p><b>06 Departmental Requirements before Payment made to Contractor</b></p> <p>(a) The contractor agrees that the contractor will not be entitled to payment of any money otherwise payable under the contract until the contractor has filed with the contracting authority in support of a claim for payment a sworn statement:</p> <p>(i) that the contractor has kept the books and records required by these Regulations,</p> <p>(ii) that there are no wages in arrears in respect of work performed under the contract, and</p> <p>(iii) that to the contractor's knowledge, all the conditions in the contract required by the Act and the Regulations have been complied with.</p> <p>(b) The contractor also agrees that, where fair wages have not been paid by the contractor to persons employed under the contract, the contracting authority shall withhold from any money otherwise payable under the contract to the contractor the amount necessary to ensure that fair wages are paid to all employees until fair wages are paid.</p>	<p><b>06 Exigences du ministère avant le versement des sommes dues à l'entrepreneur</b></p> <p>(a) L'entrepreneur convient qu'il n'aura droit au paiement d'aucune somme qui autrement devrait lui être versée en vertu du contrat tant qu'il n'aura pas déposé auprès de l'adjudicateur, à l'appui de sa réclamation de paiement, une déclaration sous serment indiquant:</p> <p>(i) qu'il a tenu les registres et dossiers requis par les présents règlements,</p> <p>(ii) qu'il n'y a pas d'arriérés de salaires à l'égard des travaux exécutés en vertu du contrat, et</p> <p>(iii) qu'à sa connaissance, toutes les conditions du contrat exigées par la Loi et les règlements ont été observées.</p> <p>(b) L'entrepreneur convient en outre que lorsqu'il n'a pas versé un juste salaire à une personne employée en vertu du contrat, l'adjudicateur sera autorisé à retenir de toute somme autrement payable à l'entrepreneur en vertu du contrat la somme requise pour assurer le paiement de justes salaires à tous les employés jusqu'à ce qu'ils aient touché leur juste salaire.</p>

<p><b>07 Authority to pay Wages in the Event of Default by the Contractor</b></p> <p>(a) The contractor agrees that where the contractor is in default of payment of fair wages to an employee, the contractor will pay the Minister the amount the contractor is in default.</p> <p>(b) The contractor agrees that where the contractor fails to comply with paragraph (a), the contracting authority will pay to the Receiver General, out of any money otherwise payable to the contractor, the amount for which the contractor is in default.</p>	<p><b>07 Paiement des salaires par l'adjudicateur si l'entrepreneur omet de le faire</b></p> <p>(a) L'entrepreneur convient qu'à défaut du paiement par ce dernier d'un juste salaire à un travailleur, l'entrepreneur devra verser au ministre le montant qu'il a omis de payer.</p> <p>(b) L'entrepreneur convient que s'il omet de se conformer au paragraphe (a), l'adjudicateur paiera au Receveur général, à même les sommes autrement payables à l'entrepreneur, le montant qu'il a omis de payer.</p>
<p><b>08 Conditions of Subcontracting</b></p> <p>The contractor and the subcontractor agree that in subcontracting any part of the work contemplated by the contract, they will place in the subcontract the conditions respecting fair wages, hours of work and other labour conditions set out in the contract and the requirements set out in Section 4. The contractor further agrees that the contractor will be responsible for carrying out these conditions in the event the subcontractor fails to carry them out.</p>	<p><b>08 Conditions imposées à un sous-traitant</b></p> <p>L'entrepreneur et le sous-traitant conviennent, dans l'adjudication à un sous-traitant de toute partie des travaux prévus par le contrat, d'insérer dans le sous-contrat les conditions relatives aux justes salaires, à la durée du travail et autres conditions de travail indiquées dans le contrat ainsi que les obligations énoncées à l'article 4. L'entrepreneur convient en outre qu'il sera responsable du respect de ces conditions si elles ne sont pas respectées par le sous-traitant.</p>
<p><b>09 Non-discrimination in Hiring and Employment of Labour</b></p> <p>The contractor agrees that in the hiring and employment of workers to perform any work under the contract, the contractor will not refuse to employ and will not discriminate in any manner against any person because</p> <p>(a) of that person's race, national or ethnic origin, colour, religion, age, sex, sexual orientation, marital status, disability, conviction for which a pardon has been granted, or family status;</p> <p>(b) of the race, national or ethnic origin, colour, religion, age, sex, sexual orientation, marital status, disability, conviction for which a pardon has been granted, or family status of any person having a relationship or association with that person, or</p> <p>(c) a complaint has been made or information has been given in respect of that person relating to an alleged failure by the contractor to comply with subparagraph (a) or (b).</p>	<p><b>09 Non-discrimination dans l'embauchage et l'emploi de main-d'oeuvre</b></p> <p>L'entrepreneur convient que dans l'embauchage et l'emploi des travailleurs aux fins de l'exécution de tout travail en vertu du contrat, l'entrepreneur ne refusera pas d'employer une personne ou d'exercer de quelque façon que ce soit des distinctions injustes à l'endroit d'une personne en raison</p> <p>(a) de la race, de l'origine nationale ou ethnique, de la couleur, de la religion, de l'âge, du sexe, de l'orientation sexuelle, de l'état matrimonial, de la situation de famille, de l'état de personne graciée ou d'une déficience de la personne;</p> <p>(b) de la race, de l'origine nationale ou ethnique, de la couleur, de la religion, de l'âge, du sexe, de l'orientation sexuelle, de l'état matrimonial, de la situation de famille, de l'état de personne graciée ou d'une déficience de toute personne ayant un lien avec elle;</p> <p>(c) du fait que cette personne a porté plainte ou a fourni des renseignements ou parce qu'une plainte a été portée ou des renseignements ont été fournis en son nom relativement à toute prétendue omission de la part de l'entrepreneur de se conformer aux sous-alinéas (a) ou (b).</p>



**FAIR WAGE SCHEDULE**  
FOR FEDERAL CONSTRUCTION CONTRACTS

**ÉCHELLE DE JUSTES SALAIRES**  
POUR LES CONTRATS FÉDÉRAUX DE CONSTRUCTION

**Ontario – Ottawa Zone / Ontario – Zone d'Ottawa**  
**Effective August 15, 2011 / En vigueur le 15 août 2011**

<p>Construction trades workers on the federal government construction contract listed in this appendix must be paid a regular hourly wage rate no less than the rate on this schedule for the type of work they are doing under the contract.</p> <p>The apprentice wage rates are included into this schedule by reference to the Ontario <i>Trades Qualification and Apprenticeship Act</i> and its Regulations. Thus, where the Regulations refer to a percentage of a corresponding journeyman's wage for a specific occupation, that percentage shall be applied against the wages listed below.</p>	<p>Les travailleurs de métiers de la construction, sur un contrat fédéral de construction, doivent être payés à un taux de salaires non moindre que le taux de cette échelle pour le type de travail effectué en vertu du contrat en question.</p> <p>Le salaire des apprentis est inclus dans cette échelle en faisant référence à la Loi sur la qualification professionnelle et l'apprentissage des gens de métier de l'Ontario et ses Règlements. Ainsi, là où les Règlements prescrivent que le salaire d'un apprenti doit correspondre au pourcentage du salaire d'un ouvrier qualifié de la même occupation, le calcul sera effectué en utilisant les taux ci-dessous.</p>
<p>*Denotes a compulsory trade: a trade license or apprenticeship registration valid in Ontario is required to work in the occupation.</p>	<p>*Dénote un métier obligatoire : un métier qui exige une licence ou un enregistrement d'apprentissage valide en Ontario.</p>
<p><b>CLASSIFICATION OF LABOUR</b> <b>CATÉGORIES DE MAIN-D'OEUVRE</b></p>	<p><b>FAIR WAGE RATE PER HOUR NOT LESS THAN</b> <b>TAUX DE JUSTE SALAIRE NON INFÉRIEUR À</b></p>
<p>*Electricians *Electriciens</p>	<p><b>33.19</b></p>
<p>*Plumbers *Plombiers</p>	<p><b>30.99</b></p>
<p>Sprinkler System Installers Poseurs de gicleurs</p>	<p><b>36.14</b></p>
<p>*Pipefitters, Steamfitters *Tuyauteurs, monteurs d'appareils de chauffage</p>	<p><b>34.57</b></p>
<p>*Sheet Metal Workers *Toliers (ouvriers de feuilles de métal)</p>	<p><b>31.06</b></p>
<p>Boilermakers Chaudronnier</p>	<p><b>33.26</b></p>
<p>Ironworkers (except Reinforcing Ironworkers (Rebar/Rodman)) Monteurs de charpentes métalliques (sauf ferrailleurs et placeurs de tiges métalliques dans le béton)</p>	<p><b>30.17</b></p>
<p>Reinforcing Ironworkers (Rebar/Rodman) Placeurs de tiges métalliques dans le béton</p>	<p><b>29.50</b></p>
<p>Carpenters Charpentiers-menuisiers</p>	<p><b>24.43</b></p>
<p>Bricklayers Briqueurs-maçons</p>	<p><b>32.15</b></p>
<p>Cement Finishers Finisseurs de béton ou ciment</p>	<p><b>26.98</b></p>

Tilesetters (including terrazo, marble setters) Poseurs de carrelage (de céramique, de marbre, etc.)	31.65
Plasterers and Drywall Tapers Pâtriers et jointoyeurs de cloisons sèches	29.19
Drywall Installers, Finishers and Lathers Latteurs et poseurs de cloisons sèches, finisseurs	31.67
Interior System Mechanics (including steel stud) Mécaniciens de systèmes intérieurs (incluant structure d'acier)	32.38
Roofers Couvreur de revêtement de toiture	21.50
Glaziers Vitriers	29.20
Insulators Calorifugeurs	32.35
Painters Peintres	18.44
Flooring Installers Poseurs de revêtements d'intérieur	30.22
Construction Millwrights Mécaniciens de chantier	34.60
*Heavy-Duty Equipment Mechanics *Mécaniciens d'équipement lourd	23.29
*Refrigeration and Air Conditioning Mechanics *Mécaniciens en réfrigération et climatisation	36.65
Elevator Constructors Constructeurs d'ascenseurs	43.53
*Mobile Crane Operators *Conducteurs/opérateurs de grue mobile	33.82
*Tower Crane Operators *Conducteurs/opérateurs de grue à tour	34.78
Straight Truck Drivers Conducteurs de camions unitaires	19.45
Road Tractor Drivers for Semi-Trailers and Trailers Conducteurs de tracteurs routiers pour semi-remorques ou remorques	19.57
Operators-Heavy Equipment (ex. Cranes, Graders) Conducteurs de machinerie lourdes (sauf grues, niveleuses)	22.10
Grader Operators Conducteurs de niveleuse (grader)	27.47
Asphalt Plant Operators Opérateurs de machinerie de pavage	22.01
Scraper Operators Conducteurs de scraper	29.16
Packer (road roller) Operators Conducteurs de rouleau compresseur (Packer)	18.06
Pressure Vessel Welder	33.61

Soudeur de réservoirs pour fluides sous-pression	
Traffic Accommodation/Control Persons Ouvriers chargé de diriger la circulation	<b>15.54</b>
Labourers (Except Traffic Accommodation/Control Persons) Manoeuvres (sauf ouvriers chargé de diriger la circulation)	<b>19.29</b>
<p>Fair wage schedule prepared by:          Labour Standards and Workplace Equity Division          Labour Program, Human Resources and Skills Development Canada</p> <p>L'échelle des justes salaires est préparée par :          Division des normes du travail et équité en milieu de travail          Programme du travail, Ressources humaines et Développement des compétences Canada</p> <p>Based on The National Construction Industry Wage Rate Survey (2009) conducted by the Small Business and Special Surveys Division, Statistics Canada.</p> <p>Besée sur l'Enquête nationale sur les taux salariaux dans le secteur de la construction (2009) faite par la Division des petites entreprises et enquêtes spéciales, Statistique Canada.</p>	

<b>CONTRACTORS SHOULD NOTE:</b>	<b>L'ENTREPRENEUR DOIT NOTER :</b>
<p>a) that during the term of this contract, the rates listed herein may be revised in accordance with the labour conditions; and</p> <p>b) that in carrying out any of the work contemplated by this contract, the contractor is also subject to any applicable provincial laws and regulations; and</p> <p>c) overtime must be paid according to provincial legislation concerning hours of work at a rate equal to at least one and one-half times the fair wage rate; and</p> <p>d) schedule rates are 'straight' wages and do not include compensation in the form of benefits (for example, medical, dental or pension plans); and</p> <p>e) in the event of a complaint under the Fair Wages and Hours of Labour Act, if the occupation of the complainant is not on the posted schedule, the Labour Program inspector will assign the most similar occupation from the schedule by comparing the national occupational classification (NOC) code and the job description that best defines the work actually done by the complainant.</p>	<p>a) que pendant la durée de ce contrat, les taux de salaires énumérés dans l'annexe peuvent être révisés en conformité avec les conditions de travail, et</p> <p>b) que dans l'exécution de tout travail prévu par le contrat, l'entrepreneur est aussi assujéti aux lois et règlements provinciaux, et</p> <p>c) le temps supplémentaire doit être rémunéré conformément aux lois provinciales relatives aux heures de travail à un taux équivalent au moins une fois et demi le taux des justes salaires, et</p> <p>d) les taux de l'échelle fait référence à la rémunération en salaire et ne comprennent pas la rémunération sous forme d'avantages sociaux (par exemple, les plans d'assurance médicale ou dentaire, ou les régimes de pension), et</p> <p>e) dans le cas d'une plainte sous la Loi sur les justes salaires et les heures de travail, si le métier du plaignant ne figure pas dans l'échelle affichée, l'inspecteur du Programme du travail déterminera le métier le plus semblable dans l'échelle en comparant le code et la description de tâches de la Classification nationale des professions (CNP) qui décrivent le mieux le travail effectué par le plaignant.</p>

<p>FOR INFORMATION CONCERNING THESE SCHEDULES AND THE <i>FAIR WAGES AND HOURS OF LABOUR ACT</i> UNDER WHICH THEY ARE DEVELOPED, OR TO LODGE A COMPLAINT, CONTACT YOUR NEAREST LABOUR PROGRAM DISTRICT OFFICE LISTED IN THE BLUE PAGES OF YOUR TELEPHONE DIRECTORY UNDER <b>GOVERNMENT OF CANADA, HUMAN RESOURCES AND SKILLS DEVELOPMENT CANADA</b> OR CALL <b>1-800-OCANADA</b>.</p>	<p>POUR OBTENIR DE L'INFORMATION SUR LES ÉCHELLES ET LA <i>LOI SUR LES JUSTES SALAIRES ET LES HEURES DE TRAVAIL</i> SOUS LAQUELLE ELLES ONT ÉTÉ DÉVELOPPÉES, OU POUR DÉPOSER UNE PLAINTE, CONTACTEZ LE BUREAU LOCAL DU PROGRAMME DU TRAVAIL LE PLUS PRÈS DE CHEZ VOUS EN CHERCHANT DANS LES PAGES BLEUES DE VOTRE ANNUAIRE SOUS <b>GOUVERNEMENT DU CANADA, RESSOURCES HUMAINES ET DÉVELOPPEMENT DES COMPÉTENCES CANADA</b>. VOUS POUVEZ ÉGALEMENT TÉLÉPHONER AU <b>1-800-OCANADA</b>.</p>
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Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

**SECURITY REQUIREMENTS CHECK LIST (SRCL)  
LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)**

**PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE**

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine <b>National Research Council</b>	2. Branch or Directorate / Direction générale ou Direction <b>ASPM/SAGI</b>
3. a) Subcontract Number / Numéro du contrat de sous-traitance	3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant

4. Brief Description of Work / Brève description du travail  
**M-20 Room 58- Renovations of the men's washroom**

5. a) Will the supplier require access to Controlled Goods? / Le fournisseur aura-t-il accès à des marchandises contrôlées?  
 No / Non  Yes / Oui

5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? / Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques?  
 No / Non  Yes / Oui

6. Indicate the type of access required / Indiquer le type d'accès requis

6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? / Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS? (Specify the level of access using the chart in Question 7. c) / Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c)  
 No / Non  Yes / Oui

6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. / Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.  
 No / Non  Yes / Oui

6. c) Is this a commercial courier or delivery requirement with no overnight storage? / S'agit-il d'un contrat de messagerie ou de livraison commerciale sans entreposage de nuit?  
 No / Non  Yes / Oui

7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès

Canada <input checked="" type="checkbox"/>	NATO / OTAN <input type="checkbox"/>	Foreign / Étranger <input type="checkbox"/>
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7. b) Release restrictions / Restrictions relatives à la diffusion

No release restrictions / Aucune restriction relative à la diffusion <input checked="" type="checkbox"/>	All NATO countries / Tous les pays de l'OTAN <input type="checkbox"/>	No release restrictions / Aucune restriction relative à la diffusion <input type="checkbox"/>
Not releasable / À ne pas diffuser <input type="checkbox"/>		
Restricted to: / Limité à: Specify country(ies): / Préciser le(s) pays: <input type="checkbox"/>	Restricted to: / Limité à: Specify country(ies): / Préciser le(s) pays: <input type="checkbox"/>	Restricted to: / Limité à: Specify country(ies): / Préciser le(s) pays: <input type="checkbox"/>

7. c) Level of information / Niveau d'information

PROTECTED A / PROTÉGÉ A <input type="checkbox"/>	NATO UNCLASSIFIED / NATO NON CLASSIFIÉ <input type="checkbox"/>	PROTECTED A / PROTÉGÉ A <input type="checkbox"/>
PROTECTED B / PROTÉGÉ B <input type="checkbox"/>	NATO RESTRICTED / NATO DIFFUSION RESTREINTE <input type="checkbox"/>	PROTECTED B / PROTÉGÉ B <input type="checkbox"/>
PROTECTED C / PROTÉGÉ C <input type="checkbox"/>	NATO CONFIDENTIAL / NATO CONFIDENTIEL <input type="checkbox"/>	PROTECTED C / PROTÉGÉ C <input type="checkbox"/>
CONFIDENTIAL / CONFIDENTIEL <input type="checkbox"/>	NATO SECRET / NATO SECRET <input type="checkbox"/>	CONFIDENTIAL / CONFIDENTIEL <input type="checkbox"/>
SECRET / SECRET <input type="checkbox"/>	COSMIC TOP SECRET / COSMIC TRÈS SECRET <input type="checkbox"/>	SECRET / SECRET <input type="checkbox"/>
TOP SECRET / TRÈS SECRET <input type="checkbox"/>		TOP SECRET / TRÈS SECRET <input type="checkbox"/>
TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) <input type="checkbox"/>		TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) <input type="checkbox"/>



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**PART A (continued) / PARTIE A (suite)**

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC Information or assets?  
 Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS?  No / Non  Yes / Oui  
 If Yes, Indicate the level of sensitivity:  
 Dans l'affirmative, Indiquer le niveau de sensibilité :

9. Will the supplier require access to extremely sensitive INFOSEC information or assets?  
 Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate?  No / Non  Yes / Oui

Short Title(s) of material / Titre(s) abrégé(s) du matériel :  
 Document Number / Numéro du document :

**PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)**

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis

- |   |   |   |  |
|---|---|---|--|
| <input checked="" type="checkbox"/> RELIABILITY STATUS<br>COTE DE FIABILITÉ | <input type="checkbox"/> CONFIDENTIAL<br>CONFIDENTIEL           | <input type="checkbox"/> SECRET<br>SECRET           | <input type="checkbox"/> TOP SECRET<br>TRÈS SECRET               |
| <input type="checkbox"/> TOP SECRET-SIGINT<br>TRÈS SECRET - SIGINT          | <input type="checkbox"/> NATO CONFIDENTIAL<br>NATO CONFIDENTIEL | <input type="checkbox"/> NATO SECRET<br>NATO SECRET | <input type="checkbox"/> COSMIC TOP SECRET<br>COSMIC TRÈS SECRET |
| <input type="checkbox"/> SITE ACCESS<br>ACCÈS AUX EMBLEMES                  |   |   |  |

Special comments:  
 Commentaires spéciaux :

NOTE: If multiple levels of screening are identified, a Security Classification Guide must be provided.  
 REMARQUE : Si plusieurs niveaux de contrôle de sécurité sont requis, un guide de classification de la sécurité doit être fourni.

10. b) May unscreened personnel be used for portions of the work?  
 Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail?  No / Non  Yes / Oui  
 If Yes, will unscreened personnel be escorted?  
 Dans l'affirmative, le personnel en question sera-t-il escorté?  No / Non  Yes / Oui

**PART C - SAFEGUARDS (SUPPLIER) / PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)**

**INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS**

11. a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED Information or assets on its site or premises?  
 Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS?  No / Non  Yes / Oui

11. b) Will the supplier be required to safeguard COMSEC information or assets?  
 Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC?  No / Non  Yes / Oui

**PRODUCTION**

11. c) Will the production (manufacture, and/or repair and/or modification) of PROTECTED and/or CLASSIFIED material or equipment occur at the supplier's site or premises?  
 Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ?  No / Non  Yes / Oui

**INFORMATION TECHNOLOGY (IT) MEDIA / SUPPORT RELATIF À LA TECHNOLOGIE DE L'INFORMATION (TI)**

11. d) Will the supplier be required to use its IT systems to electronically process, produce or store PROTECTED and/or CLASSIFIED information or data?  
 Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS?  No / Non  Yes / Oui

11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency?  
 Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale?  No / Non  Yes / Oui





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**PART C - (continued) / PARTIE C - (suite)**

For users completing the form manually use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.  
 Les utilisateurs qui remplissent le formulaire manuellement doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form online (via the Internet), the summary chart is automatically populated by your responses to previous questions.  
 Dans le cas des utilisateurs qui remplissent le formulaire en ligne (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

**SUMMARY CHART / TABLEAU RÉCAPITULATIF**

Category / Catégorie	PROTECTED / PROTÉGÉ			CLASSIFIED / CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET	NATO RESTRICTED / NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL / NATO CONFIDENTIEL	NATO SECRET	COSMIC TOP SECRET / COSMIC TRÈS SECRET	PROTECTED / PROTÉGÉ			CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET
											A	B	C			
Information / Assets / Renseignements / Biens																
Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT Media / Support TI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT Link / Lien électronique	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?  
 La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?  No / Non  Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".  
 Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?  
 La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?  No / Non  Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).  
 Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquez qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).



Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

**PART D - AUTHORIZATION / PARTIE D - AUTORISATION**

13. Organization Project Authority / Chargé de projet de l'organisme

Name (print) - Nom (en lettres moulées) Bruno Vallieres	Title - Titre Manager Facilities Engineering Unit	Signature 
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Telephone No. - N° de téléphone 991-5586	Facsimile No. - N° de télécopieur 613-957-9828	E-mail address - Adresse courriel bruno.vallieres@nrc-cnrc.gc.ca	Date Dec 2nd / 2013
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14. Organization Security Authority / Responsable de la sécurité de l'organisme

Name (print) - Nom (en lettres moulées) Charlotte Carrier	Title - Titre Controlled Goods and Contracts Security Coordinator	Signature 
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Telephone No. - N° de téléphone (613) 993-8956	Facsimile No. - N° de télécopieur (613) 990-0946	E-mail address - Adresse courriel Charlotte.Carrier@nrc-cnrc.gc.ca	Date 02 Dec 2013
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15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached? / Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?

No / Non  Yes / Oui

16. Procurement Officer / Agent d'approvisionnement

Name (print) - Nom (en lettres moulées) MARC BEDARD	Title - Titre Senior Contracting Officer	Signature 
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Telephone No. - N° de téléphone 613 993-2274	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date 2/12/13
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17. Contracting Security Authority / Autorité contractante en matière de sécurité

Name (print) - Nom (en lettres moulées)	Title - Titre	Signature
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Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
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