

ARC-CARC

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*Administrative
Services
and Property
Management*

*Services
administratifs
et gestion de
l'immobilier*

SPECIFICATION

SOLICITATION #: 14-22096

BUILDING: M-10
1200 Montreal Road
Ottawa, ON

PROJECT: M-10 Chiller Replacement

PROJECT #: M10-4045

Date: December 2014



National Research
Council Canada

Conseil national
de recherches Canada

Canada

SPECIFICATION

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National Research Council Conseil national de recherches
Canada Canada

Administrative Services Direction des services
& Property management administratif et gestion
Branch (ASPM) de l'immobilier (SAGI)

Construction Tender Form

Project Identification **M-10 Chiller Replacement**

Tender No.: **14-22096**

1.2 Business Name and Address of Tenderer

Name _____

Address _____

Contact Person(Print Name) _____

Telephone () _____ **Fax:** () _____

1.3 Offer

I/We the Tenderer, hereby offer to Her Majesty the Queen in Right of Canada (hereinafter referred to as "Her Majesty") represented by the National Research Council Canada to perform and complete the work for the above named project in accordance with the Plans and Specifications and other Tender Documents, at the place and in the manner set out therein for the Total Tender Amount (to be expressed in numbers only) of: \$ _____, _____ **in lawful money of Canada (excluding GST/HST)**

The above amount is inclusive of all applicable (*) Federal, Provincial and Municipal taxes except that in the event of a change in any tax imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act, the Customs Tariff or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property, that occurs

- .1 after the date this tender was mailed or delivered, or
- .2 if this tender is revised, after the date of the last revision

the amount of this offer shall be decreased or decreased in the manner provided for in GC22 of the General Conditions of the Contract Documents.

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1.3.1 **Offer** (continued)

(*) For the purpose of this tender, the Goods and Services Tax (GST) is not to be considered as an applicable tax.

In the province of Quebec, the Quebec Sales Tax is not to be included in the tender amount because the Federal Government is exempt from this tax. Tenderers shall make arrangements directly with the provincial Revenue Department to recover any tax they may pay on good and services acquired in the performance of this contract. However, tenderers should include in their tender amount Quebec Sales Tax for which an Input Tax Refund is not available.

1.4 **Acceptance and Entry into Contract**

I/We undertake, within fourteen (14) days of notification of acceptance of my/our offer, to sign a contract for the performance of the work provided I/we are notified, by the Department, of the acceptance of my/our offer within 30 days of the tender closing date.

1.5 **Construction Time**

I/We Agree to complete the work within the time stipulated in the specification from the date of notification of acceptance of my/our offer.

1.6 **Bid Security**

I/We herewith enclose tender security in accordance with Article 5 of the General Instruction to Tenderers.

I/We understand that if a security deposit is furnished as tender security and if I/we refuse to enter into a contract when called upon to do so, my/our security deposit shall be forfeited but the Minister may, if it is in the public interest, waive the right of Her Majesty to forfeit the security deposit.

I/We understand that if the security furnished is not in the approved form as described in Article 5 of the General Instructions to Tenderers, my/our tender is subject to disqualification.

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1.7 Contract Security

Within fourteen (14) days after receipt of written notification of the acceptance of my/our offer, I/we will furnish contract security in accordance with the Contract Conditions "F" of the Contract Documents.

I/We understand that the contract security referred to herein, if provided in the form of a bill of exchange, will be deposited into the Consolidated Revenue Fund of Canada.

1.8 Appendices

This Tender Form includes Appendix No. ____N/A____.

1.9 Addenda

The Total Tender Amount provides for the Work described in the following Addenda:

NUMBER	DATE	NUMBER	DATE

(Tenderers shall enter numbers and dates of addenda)

National Research Council Canada	Conseil national de recherches Canada
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Administrative Services & Property management Branch (ASPM)	Direction des services administratif et gestion de l'immobilier (SAGI)
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1.10 Execution of Tender

The Tenderer shall refer to Article 2 of the General Instructions to Tenderers.

SIGNED, ATTESTED TO AND DELIVERED on the _____ day of
_____ on behalf of

(Type or print the business name of the Tenderer)

AUTHORIZED SIGNATORY (IES)

(Signature of Signatory)

(Print name & Title of Signatory)

(Signature of Signatory)

(Print name & Title of Signatory)

SEAL

BUYANDSELL NOTICE

M-10 Chiller Replacement

The National Research Council Canada, 1200 Montreal Road, Ottawa, ON has a requirement for a project that includes:

The work is to replace the chiller, cooling tower and associated pumps at M-10 building at Montreal Road Campus.

1. GENERAL:

Questions regarding any aspect of the project are to be addressed to and answered only by the Departmental Representative (or his designate) or the Contracting Authority.

Any information received other than from the Departmental Representative (or his designate) or the Contracting Authority will be disregarded when awarding the contract and during construction.

Firms intending to submit tenders on this project should obtain tender documents through the Buyandsell.gc.ca TMA services provider. Addenda, when issued, will be available from the Buyandsell.gc.ca TMA service provider. Firms that elect to base their bids on tender documents obtained from other sources do so at their own risk and will be solely responsible to inform the tender calling authority of their intention to bid. Tender packages are not available for distribution on the actual day of tender closing.

2. MANDATORY SITE VISIT:

It is mandatory that the bidder attends one of the site visits at the designated date and time. At least one representative from proponents that intend to bid must attend.

The site visits will be held on January 6th and January 8th, 2015 at **9:00**. Meet Maurice Richard at Building M-10, Main Entrance, 1200 Montreal Road, Ottawa, ON. Bidders who, for any reason, cannot attend at the specified date and time will not be given an alternative appointment to view the site and their tenders, therefore, will be considered as non-responsive. **NO EXCEPTIONS WILL BE MADE.**

As proof of attendance, at the site visit, the Contracting Authority will have an Attendance Form which **MUST** be signed by the bidder's representative. It is the responsibility of all bidders to ensure they have signed the Mandatory Site Visit Attendance form prior to leaving the site. Proposals submitted by bidders who have not attended the site visit or failed to sign the Attendance Form will be deemed non-responsive.

3. TENDER CLOSING DATE:

Tender closing date is January 21st, 2015 at 14:00.

4. TENDER RESULTS

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

5. SECURITY REQUIREMENT FOR CANADIAN CONTRACTORS

5.1 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>

5.2 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.

6.0 WSIB (WORKPLACE SAFETY AND INSURANCE BOARD)

- .1 All Bidders must provide a valid WSIB certificate with their Tender or prior to contract award.

7.0 OFFICE OF THE PROCUREMENT OMBUDSMAN

.1 Dispute Resolution Services

The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will, on request or consent of the parties to participate in an alternative dispute resolution process to resolve any dispute between the parties respecting the interpretation or application of a term and condition of this contract and their consent to bear the cost of such process, provide to the parties a proposal for an alternative dispute resolution process to resolve their dispute. The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca.

.2 Contract Administration

The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will review a complaint filed by [*the supplier or the contractor or the name of the entity awarded this contract*] respecting administration of this contract if the requirements of Subsection 22.2(1) of the *Department of Public Works and Government Services Act* and Sections 15 and 16 of the *Procurement Ombudsman Regulations* have been met, and the interpretation and application of the terms and conditions and the scope of the work of this contract are not in dispute. The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca.

.3 The Office of the Procurement Ombudsman (OPO) was established by the Government of Canada to provide an independent avenue for suppliers to raise complaints regarding the award of contracts under \$25,000 for goods and under \$100,000 for services. You have the option of raising issues or concerns regarding the solicitation, or the award resulting from it, with the OPO by contacting them by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca. You can also obtain more information on the OPO services available to you at their website at www.opo-boa.gc.ca.

The Departmental Representative or his designate for this project is: **Maurice Richard**
Telephone: **613 993-9299**

Contracting Authority for this project is: **Marc Bédard** marc.bedard@nrc-cnrc.gc.ca
Telephone: **613 993-2274**

INSTRUCTIONS TO BIDDERS

Article 1 – Receipt of Tender

- 1a) Tenders must be received not later than the specified tender closing time. Tenders received after this time are invalid and shall not be considered, regardless of any reason for their late arrival.
- 1b) A letter of printed telecommunication from a bidder quoting a price shall not be considered as a valid tender unless a formal tender has been received on the prescribed Tender Form.
- 1c) Bidders may amend their tenders by letter or printed telecommunication provided that such amendments are received not later than the specified tender closing time.
- 1d) Any amendments to the tender which are transmitted by telefax must be signed and must clearly identify the tenderer.

All such amendments are to be addressed to:

National Research Council of Canada
Marc Bedard, Senior Contracting Officer
Building M-22
Montreal Road, Ottawa, Ontario
K1A 0R6

Fax: (613) 991-3297

Article 2 – Tender Form & Qualifications

- 1) All tenders must be submitted on the Construction Tender Form and the tender must be signed in compliance with the following requirements:
 - a) Limited Company: The full names of the Company and the name(s) and status of the authorized signing officer(s) must be printed in the space provided for that purpose. The signature(s) of the authorized officer(s) and the corporate seal must be affixed.
 - b) Partnership: The firm name and the name(s) of the person(s) signing must be printed in the space provided. One or more of the partners must sign in the presence of a witness who must also sign. An adhesive coloured seal must be affixed beside each signature.
 - c) Sole Proprietorship : The business name and the name of the sole proprietor must be printed in the space provided. The sole proprietor must sign in the presence of a witness who must also sign. An adhesive coloured seal must be affixed beside each signature.
- 2) Any alterations in the printed part of the Construction Tender Form or failure to provide the information requested therein, may render the tender invalid.
- 3) All space in the Construction Tender Form must be completed and any handwritten or typewritten corrections to the parts so completed must be initialed immediately to the side of the corrections by the person or persons executing the tender on behalf of the the tenderer.
- 4) Tenders must be based on the plans, specifications and tender documents provided.

Article 3 - Contract

- 1) The Contractor will be required to sign a contract similar to the Standard Contract Form for Fixed Price Construction Contracts, a blank specimen of which is enclosed in the package for reference purposes.

Article 4 – Tender Destination

- 1a) Tenders are to be submitted in sealed envelopes to:
National Research Council Canada
Administrative Services and Property Management Branch
1200 Montreal Road
Building M-22
Ottawa, ON
K1A 0R6

Endorsed "Tender for (insert title of work as it appears in the drawings and specifications)" and must bear the name and address of the tenderer.

- 1b) Unless otherwise specified, the only documents required to be submitted with the tender are the Tender form and the Bid Security.

Article 5 - Security

- 1a) Bid Security is required and must be submitted in one of the following forms:

- i) a certified cheque payable to the Receiver General for Canada and

drawn on a member of the Canadian Payments Association or a local cooperative credit society that is a member of a central cooperative credit society having membership in the Canadian Payments Association; **OR**

- ii) bonds of the Government of Canada, or bonds unconditionally guaranteed as to principal and interest by the Government of Canada; **OR**

- iii) a bid bond.

- 1b) Regardless of the Bid Security submitted, it should never be more than \$250,000 maximum, calculated at 10% of the first \$250,000 of the tendered price, plus 5% of any amount in excess of \$250,000.

- 2a) Bid Security shall accompany each tender or, if forwarded separately from the tender, shall be provided not later than the specified tender closing time. Bid Security must be in the ORIGINAL form. Fax or photocopies and NOT acceptable. FAILURE TO PROVIDE THE REQUIRED BID SECURITY SHALL INVALIDATE THE TENDER.

- 2b) If the tender is not accepted, the Bid Security submitted pursuant to Article 8 shall be returned to the tenderer.

- 3a) The successful tenderer is required to provide security within 14 days of receiving notice of tender acceptance. The tenderer must furnish EITHER:

- i) a Security Deposit as described in 1(b) above together with a Labour and Material Payment Bond in the amount of at least 50% of the amount payable under the contract, **OR**
- ii) a Performance Bond and a Labour and Material Payment Bond – each in the amount of 50% of the amount payable under the contract.

- 3b) Should it not be possible to obtain a Labour Material Payment Bond as required under 3(a) above, on making application thereof to at least two acceptable Bonding Companies, an additional Security Deposit of a straight 10% of the amount payable under the contract must be furnished.
- 3c) Where a tender has been accompanied by a Security Deposit, as described in 1(b) above, the amount of the Security Deposit required under 3(a) above may be reduced by the amount of the Security Deposit which accompanied the tender.
- 3d) Bonds must be in an approved form and from the companies whose

bonds are acceptable to the Government of Canada. Samples of the approved form of Bid Bond, Performance Bond and Labour and Material Payment Bond and a list of acceptable Bonding Companies may be obtained from the Contracting Officer, National Research Council, Building M-22, Montreal Road, Ottawa, Ontario, K1A 0R6.

Article 6 – Interest On Security Deposits

- 1) Tenderers are notified that they must make their own arrangements with their bankers as to the interest, if any, on the amount of the certified cheque accompanying their tender. The Council will not pay interest on said cheque pending the awarding of the contract nor be responsible for the payments of interest under any arrangement made by the tenderers.

Article 7 – Sales Tax

- 1) The amount of the tender shall include all taxes as levied under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act or the Customs Tariff, in force or applicable at the time.
- 2) In Quebec, the Provincial Sales Tax should not be included in the Tender Price as the Federal Government is exempt. Tenderers should contact the Provincial Revenue Minister to recover all taxes paid for goods and services rendered under this contract.

Tenderers must include in their Tender Price the amount of Provincial Sales Tax for which the exemption does not apply.

Article 8 – Examination of Site

- 1) All parties tendering shall examine the sites of the proposed work before sending in their tender and make themselves thoroughly acquainted with the same and obtain for themselves any and all information that may be necessary for the proper carrying out of the Contract. No after claim will be allowed or entertained for any work or material that may be requisite and necessary for the proper execution and completion of this Contract with the exception of that provided for under GC 35 in the General Conditions of the General Specification.

Article 9 – Discrepancies, Omissions, Etc.

- 1a) Bidders finding discrepancies in, or omissions from, drawings, specifications or other documents, or having any doubt as to the meaning or intent of any part thereof, should at once notify the Engineer who will

send written instructions or explanation to all bidders.

- 1b) Neither the Engineer nor the Council will be responsible for oral instructions.

- 1c) Addenda or corrections issued during the time of the bidding shall be covered in the proposal. However, the contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work and made prior to the date of the contract.

Article 10 – No additional Payments for Increased Costs

- 1) The only other adjustments in the contract price allowed are those specified in the General Conditions of the General Specification. The contract price will not be amended for change in freight rates, exchange rates, wage rates or cost of materials, plant or services.

Article 11 – Awards

- 1a) The Council reserves the power and right to reject tenders received from parties who cannot show a reasonable acquaintance with and preparation for the proper performance of the class of work herein specified and shown on plans. Evidence of such competence must be furnished by the tenderers if required to do so.
- 1b) A tenderer may be required to furnish to the Contracting Office, National Research Council of Canada, Building M-22, 1200 Montreal Road, Ottawa, Ontario, K1A 0R6, Canada, unsigned copies of the insurance requirements as covered by the Insurance Conditions of the General Specification.
- 1c) The Council does not bind itself to accept the lowest or any tender.

Article 12 – Harmonized Sales Tax

- 1) The Harmonized Sales Tax (HST) which is now in effect shall be considered an applicable tax for the purpose of this tender. However, the bidder shall NOT include any amount in the bid price for said HST. The successful contractor will indicate on each application for payment as a separate amount the appropriate HST the Owner is legally obliged to pay. This amount will be paid to the Contractor in addition to the amount certified for payment under the Contract in addition to the amount certified for payment under the Contract and will therefore not affect the Contract Price. The Contractor agrees to remit any HST collected or due to Revenue Canada.

Non-Resident Contractors

RST Guide 804

Published: August 2006

Content last reviewed: August 2010

ISBN: 1-4249-2007-8 (Print), 1-4249-2009-4 (PDF), 1-4249-2008-6 (HTML)

Publication Archived

Notice to the reader: For Retail Sales Tax (RST) – On July 1, 2010 the 13 per cent Harmonized Sales Tax (HST) took effect in Ontario replacing the existing provincial Retail Sales Tax (RST) and combining it with the federal Goods and Services Tax (GST). As a result, RST provisions described on this page and in other publications ended on June 30, 2010.

Effective July 1, 2010 this publication was archived for RST purposes **only**. Use caution when you refer to it, since it reflects the law in force for RST at the time it was released and may no longer apply.

- The information in this Guide explains the Retail Sales Tax (RST) responsibilities of a non-resident contractor who is awarded a construction contract to perform work in Ontario and their Ontario customers. Please note that this Guide replaces the previous version dated March 2001.

Non-Resident Contractor Defined

A non-resident contractor is a contractor located outside Ontario who has been awarded a construction contract to perform work in Ontario, and who has not maintained a permanent place of business in Ontario continuously for twelve months immediately prior to signing the contract, or which is not a company incorporated under the laws of Ontario. A construction contract is a contract for the erection, remodelling or repair of a building or other structure on land.

A contractor is a person who is in the business of constructing, altering, repairing or improving real property and includes, but is not limited to,

1. a general contractor and subcontractor,
2. a carpenter, bricklayer, stonemason, electrician, plasterer, plumber, painter, decorator, paver, and bridge builder,
3. a sheet metal, tile and terrazzo, heating, air conditioning, insulation, ventilating, papering, road, roofing and cement contractor,

who installs or incorporates items into real property. (See RST [Guide 206 - Real Property and Fixtures](#)).

Registration and Guarantee Deposit

Non-resident contractors who are awarded a construction contract in Ontario are required to register with the Ministry of Finance (ministry), Centralized Programs Unit and post a guarantee equal to 4 per cent of the total of each Ontario contract. The guarantee can be paid in cash, by certified cheque (payable to the Minister of Finance), letter of credit or by a guarantee bond.

To register with the ministry and to obtain further information on posting a guarantee, contractors should contact the ministry's Centralized Programs Unit, 33 King Street West, PO Box 623, Oshawa, Ontario, L1H 8H7, toll-free 1 866 ONT-TAXS (1 866 668-8297) or fax to 905 435-3617.

Non-resident contractors who sell taxable goods on a supply only basis to Ontario customers, or provide taxable services in Ontario, may obtain a regular Vendor Permit to collect and remit RST on their sales. Non-resident contractors who have been issued a regular Vendor Permit must still register separately with the ministry and post a guarantee if they are awarded a construction contract in Ontario.

Letter of Compliance

After receiving the guarantee, the ministry mails out two copies of a "letter of compliance" to the contractor certifying the Retail Sales Tax (RST) requirements have been met. Contractors must give a copy of the letter to their customers.

If a copy of the compliance letter is not provided, the customer must withhold 4 per cent of all amounts payable to the non resident contractor and pay the withheld amounts to the Minister of Finance (minister). Details relating to the contract should be sent along with the payments to the Centralized Programs Unit. Customers may give the minister a guarantee bond equal to 4 per cent of the total contract price instead of making the 4 per cent payments.

Note: Customers who do not follow these requirements may be held liable for 4 per cent of all amounts payable to the non resident contractor or any other amount that the Ministry deems to be the RST payable resulting from the performance of the contract.

Calculation of RST

Fair Value

RST is payable on the "fair value" of materials, purchased or brought into Ontario, to be used for work performed in Ontario. "Fair value" includes:

- the purchase price in Canadian funds;
- all charges by the supplier for handling and delivery, and
- any federal customs duties and excise taxes paid (but not the federal Goods and Services Tax (GST)).

Contractors are also required to pay RST to Ontario suppliers on the purchase, rental or lease of taxable services, materials, machinery, or equipment.

Machinery and Equipment - Leased

If machinery or equipment is leased from a supplier outside Ontario and brought into the province, RST is payable on the lease payments for the period the machinery or equipment is in Ontario.

Machinery and Equipment - Owned by Contractor

If machinery or equipment is owned by the contractor, RST may be calculated in one of the following ways:

- a. If a contractor brings machinery and equipment into Ontario for less than 12 months' use, RST is to be calculated using the following formula:

$$1/36 \times \text{net book value at date of import} \times \text{number of months in Ontario} \times \text{tax rate}$$

For the purpose of this formula, RST is payable for each month or part of a month that the goods are in Ontario. A month is considered 31 consecutive days and a part month is considered more than 12 days. The RST payable is based on the number of days the machinery and equipment are located in Ontario and not the number of days the items are actually used.

Example: Equipment is brought into Ontario on March 28 and taken out on May 8. The items were in the province for 41 days. RST is payable on the first 31 days' temporary stay in Ontario vs. use of the equipment. Since the remainder (10 days) is not considered part of a month, no RST is payable on this portion.

- b. If, at the time the goods are brought into Ontario, it is expected that the machinery or equipment will be in Ontario for more than twelve months, contractors must pay Retail Sales Tax (RST) on the following basis:

$$\text{net book value at date of import} \times \text{tax rate}$$

If, at the time of import, the length of time is not known, vendors may use the formula under (a). If they later find it necessary to keep the machinery and equipment in Ontario for more than 12 months, the RST paid under (a) may be deducted from the RST payable under (b).

Using formula (a) or (b) above, contractors will calculate and remit the RST payable on the return that is filed when the contract is finished.

(See Completion of Contract section)

Manufacturing for Own Use

Contractors may need to manufacture items, such as doors and windows, for their construction contracts. Manufacturing is work done in a factory away from a construction

site, or in a mobile unit or workshop that is on or near the construction site. Manufacturing occurs when raw materials are changed into manufactured goods for use in real property contracts.

Contractors are considered to be manufacturing contractors if they produce goods:

1. for their own use in real property contracts, and
2. the manufactured cost of the goods is more than \$50,000 a year.

(See RST Guide 401 - Manufacturing Contractors)

Contracts with the Federal Government

Where a non-resident contractor enters into a construction contract with the federal government, for the construction of a building and/or the installation of equipment, the nature of the equipment will determine whether the contract should be let on a tax-included or tax excluded basis.

Contracts for the construction of a building and the installation of equipment that directly services that building (i.e., elevators, escalators, light fixtures, central heating and air conditioning, etc.) should be tendered on a tax -included basis. Contractors are the consumers of the materials used in fulfilling these contracts and must pay or account for RST on the materials used to complete the contracts. There is NO exemption just because the contract is with the federal government.

Contracts for the installation of equipment that becomes a fixture and does not directly service a building (i.e., material handling equipment, production machinery, communication equipment, training equipment) may be tendered on a tax-excluded basis. Contractors engaged in contracts of this nature are permitted to make tax exempt purchases of such equipment by issuing a valid Purchase Exemption Certificate (PEC) to their supplier. Only non-resident contractors who have registered with the ministry and posted a guarantee may issue a PEC.

Exemptions

Contractors may supply and install equipment or materials for certain customers that may be entitled to an exemption from RST (e.g., manufacturers, Indian band councils, farmers and diplomatic organizations). The equipment or materials, when installed, becomes real property if it is permanently attached to land, or a fixture if it is permanently attached to a building or real property structure. Since contractors are liable for RST, they should contact the ministry to find out if the customer qualifies for exemption before tendering the contract on a tax-excluded basis.

Status Indians, Indian Bands and Band Councils

Non-resident contractors may purchase building materials exempt from Retail Sales Tax (RST) for certain buildings and structures situated on reserves. The cost of such projects must be paid by the band council, and the buildings must provide a community service for

the reserve. Contracts for the construction of an exempt community building project should be made on an RST-excluded basis. Non-resident contractors may purchase the materials exempt from RST by providing suppliers with a valid Purchase Exemption Certificate (PEC). As noted previously, only non-resident contractors who have registered with the ministry and posted a guarantee may issue a PEC. (See RST Guide 204 - Purchase Exemption Certificates).

Non-resident contractors must pay RST on items purchased for incorporation into a building or structure built for individual status Indians on a reserve. (See RST Guide 808 - Status Indians, Indian Bands and Band Councils).

Completion of Contract

When a contract is completed, non-resident contractors who were required to post a guarantee must complete a Non-Resident Contractor Retail Sales Tax Return [PDF - 92 KB] that is provided by the ministry.

If a contractor's guarantee was given in cash or by certified cheque, the amount of the deposit can be deducted from the RST liability owed by the contractor. If the liability is greater than the deposit, the amount remaining must be paid by the contractor. If the deposit is more than the liability, the contractor will receive a refund.

If a guarantee bond was posted instead of cash, the bond will be discharged once the RST liability is paid in full.

All returns are subject to audit.

Legislative References

- Retail Sales Tax Act, Subsections 19(2) and 39(3)(4) and (5)
- Regulation 1012 under the Act, Subsections 15.3(1)(2)(5)(6) and (7)
- Regulation 1013 under the Act, Sections 1 and 3

For More Information

The information contained in this publication is only a guideline. For more information, please contact the Ontario Ministry of Finance at 1 866 ONT-TAXS (1 866 668-8297) or visit our website at ontario.ca/finance.

Acceptable Bonding Companies

Published September 2010

The following is a list of insurance companies whose bonds may be accepted as security by the government.

1. Canadian Companies

ACE INA Insurance
Allstate Insurance Company of Canada
Ascentus Insurance Ltd. (Surety only)
Aviva Insurance Company of Canada
AXA Insurance (Canada)
AXA Pacific Insurance Company
Canadian Northern Shield Insurance Company
Certas Direct Insurance Company (Surety only)
Chartis Insurance Company of Canada (formerly AIG Commercial Insurance Company of Canada)
Chubb Insurance Company of Canada
Commonwealth Insurance Company
Co-operators General Insurance Company
CUMIS General Insurance Company
The Dominion of Canada General Insurance Company
Echelon General Insurance Company (Surety only)
Economical Mutual Insurance Company
Elite Insurance Company
Everest Insurance Company of Canada
Federated Insurance Company of Canada
Federation Insurance Company of Canada
Gore Mutual Insurance Company
Grain Insurance and Guarantee Company
The Guarantee Company of North America
Industrial Alliance Pacific General Insurance Corporation
Intact Insurance Company
Jevco Insurance Company (Surety only)
Lombard General Insurance Company of Canada
Lombard Insurance Company
Markel Insurance Company of Canada
The Missisquoi Insurance Company
The Nordic Insurance Company of Canada
The North Waterloo Farmers Mutual Insurance Company (Fidelity only)
Novex Insurance Company (Fidelity only)
The Personal Insurance Company
Pilot Insurance Company
Quebec Assurance Company
Royal & Sun Alliance Insurance Company of Canada
Saskatchewan Mutual Insurance Company
Scottish & York Insurance Co. Limited
The Sovereign General Insurance Company
TD General Insurance Company
Temple Insurance Company
Traders General Insurance Company
Travelers Guarantee Company of Canada
Trisura Guarantee Insurance Company
The Wawanesa Mutual Insurance Company
Waterloo Insurance Company

Western Assurance Company
Western Surety Company

2. Provincial Companies

- Surety bonds issued by the following companies may be accepted provided that the contract of suretyship was executed in a province in which the company is licensed to do business as indicated in brackets.
- AXA Boreal Insurance Company (P.E.I., N.B., Que., Ont., Man., B.C.)
AXA Boreal Insurance Company (P.E.I., N.B., Que., Ont., Man., B.C.)
ALPHA, Compagnie d'Assurances Inc. (Que.)
Canada West Insurance Company (Ont., Man., Sask, Alta., B.C., N.W.T.) (Surety only)
The Canadian Union Assurance Company (Que.)
La Capitale General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., Que.(Surety only), Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
Coachman Insurance Company (Ont.)
Continental Casualty Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
GCAN Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
The Insurance Company of Prince Edward Island (N.S., P.E.I., N.B.)
Kingsway General Insurance Company (N.S., N.B., Que., Ont., Man., Sask., Alta., and B.C.)
Liberty Mutual Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
Manitoba Public Insurance Corporation (Man.)
Norgroupe Assurance Générales Inc.
Orleans General Insurance Company (N.B., Que., Ont.)
Saskatchewan Government Insurance Office (Sask.)
SGI CANADA Insurance Services Ltd. (Ont., Man., Sask., Alta.)
L'Unique General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., N.B., Que.(Surety only), Ont.(Surety only), Man., Sask., Alta., B.C.(Surety only), Nun., N.W.T., Yuk.)

3. Foreign Companies

- Aspen Insurance UK Limited
Compagnie Française d'Assurance pour le Commerce Extérieur (Fidelity only)
Eagle Star Insurance Company Limited
Ecclesiastical Insurance Office Public Limited Company (Fidelity only)
Lloyd's Underwriters
Mitsui Sumitomo Insurance Company, Limited
NIPPONKOA Insurance Company, Limited
Sompo Japan Insurance Inc.
Tokio Marine & Nichido Fire Insurance Co., Ltd.
XL Insurance Company Limited (Surety only)
Zurich Insurance Company Ltd



Articles of Agreement

Standard Construction Contract – Articles of Agreement
(23/01/2002)

- A1 Contract Documents
- A2 Date of Completion of Work and Description of Work
- A3 Contract Amount
- A4 Contractor's Address
- A5 Unit Price Table



Articles of Agreement

These Articles of Agreement made in duplicate this day of .

Between

Her Majesty the Queen, in right of Canada (referred to in the contract documents as “ Her Majesty”) represented by the National Research Council Canada (referred to in the contract documents as the “Council”)

and

(referred to in the contract documents as the “Contractor”)

Witness that in consideration for the mutual promises and obligations contained in the contract, Her Majesty and the Contractor covenant and agree as follows:

A1 Contract Documents
(23/01/2002)

- 1.1 Subject to A1.4 and A1.5, the documents forming the contract between Her Majesty and the Contractor, referred to herein as the contract documents, are
- 1.1.1 these Articles of Agreement,
 - 1.1.2 the document attached hereto, marked “A” and entitled “Plans and Specifications”, referred to herein as the Plans and Specifications,
 - 1.1.3 the document attached hereto, marked “B” and entitled “Terms of Payment”, referred to herein as the Terms of Payment,
 - 1.1.4 the document attached hereto, marked “C” and entitled “General Conditions”, referred to herein as the General Conditions,
 - 1.1.5 the document attached hereto, marked “D” and entitled “Labour Conditions”, referred to herein as the Labour Conditions,
 - 1.1.6 the document attached hereto, marked “E” and entitled “Insurance Conditions”, referred to herein as the Insurance Conditions,
 - 1.1.7 the document attached hereto, marked “F” and entitled “Contract Security Conditions”, referred to herein as the Contract Security Conditions, and
 - 1.1.8 any amendment or variation of the contract documents that is made in accordance with the General Conditions.
 - 1.1.9 the document entitled Fair Wage Schedules for Federal Construction Contracts referred to herein as Fair Wage Schedules



Articles of Agreement

The Council hereby designates _____ of
of the Government of Canada as the Engineer for the purposes of the contract, and for all purposes of or
incidental to the contract, the Engineer's address shall be deemed to be:

1.2 In the contract

1.3.1 "Fixed Price Arrangement" means that part of the contract that prescribes a lump sum as payment for performance of the work to which it relates; and

1.3.2 "Unit Price Arrangement" means that part of the contract that prescribes the product of a price multiplied by a number of units of measurement of a class as payment for performance of the work to which it relates.

1.3 Any of the provisions of the contract that are expressly stipulated to be applicable only to a Unit Price Arrangement are not applicable to any part of the work to which a Fixed Price Arrangement is applicable.

1.4 Any of the provisions of the contract that are expressly stipulated to be applicable only to a Fixed Price Arrangement are not applicable to any part of the work to which a Unit Price Arrangement is applicable.

**A2 Date of Completion of Work and Description of Work
(23/01/2002)**

2.1 The contractor shall, between the date of these Articles of Agreement and the _____, in the careful and workmanlike manner, diligently perform and complete the following work:

which work is more particularly described in the Plans and Specifications,



Articles of Agreement

A3 Contract Amount
(23/01/2002)

- 3.1 Subject to any increase, decrease, deduction, reduction or set-off that may be made under the Contract, Her Majesty shall pay the Contractor at the times and in the manner that is set out or referred to in the Terms of Payment
- 3.1.1 the sum of _____ (GST/HST extra), in consideration for the performance of the work or the part thereof that is subject to Fixed Price Arrangement, and
- 3.1.2 a sum that is equal to the aggregate of the products of the number of units of Measurement of each class of labour, plant and material that is set out in a Final Certificate of Measurement referred to in GC44.8 multiplied in each case by the appropriate unit price that is set out in the Unit Price Table in consideration for the performance of the work or the part thereof that is subject to a Unit Price Arrangement.
- 3.2 For the information and guidance of the Contractor and the persons administering the contract on behalf of Her Majesty, but not so as to constitute a warranty, representation or undertaking of any nature by either party, it is estimated that the total amount payable by Her Majesty to the Contractor for the part of the work to which a Unit Price Arrangement is applicable will be approximately \$N/A
- 3.3 A3.1.1 is applicable only to a Fixed Price Arrangement.
- 3.4 A3.1.2 and A3.2 applicable only to a Unit Price Arrangement.

A4 Contractor's Address
(23/01/2002)

- 4.1 For all purposes of or incidental to the contract, the Contractor's address shall be deemed to be:



Articles of Agreement

A5 Unit Price Table
(23/01/2002)

5.1 Her Majesty and the Contractor agree that the following table is the Unit Price Table for the purposes of the contract.

Column 1 Item	Column 2 Class of Labour Plant Or Material	Column 3 Unit of Measurement	Column 4 Estimated Total Quantity	Column 5 Price per Unit	Column 6 Estimated Total Price
		N/A			

5.2 The Unit Price Table that is set out in A5.1 designates the part of the work to which a Unit Price Arrangement is applicable.

5.3 The part of the work that is not designated in the Unit Price Table referred to in A5.2 is the part of the work to which a Fixed Price Arrangement is applicable.



Articles of Agreement

Signed on behalf of Her Majesty by

as Senior Contracting Officer

and _____

as _____

of the National Research Council Canada

on the _____

day of _____

Signed, sealed and delivered by

as _____ and
Position

by _____

as _____
Position

of

on the _____

day of _____



Seal

Division 01 – General Requirements

- 00 10 00 General Instructions
- 00 15 45 General Safety and Fire Requirements

Division 23 – Heating, Ventilation, and Air-Conditioning (HVAC)

- 23 05 00 Common Work Results for HVAC
- 23 05 06 Installation of Pipework and Accessories
- 23 07 15 Thermal Insulation for Piping
- 23 57 00 Heat Exchangers
- 23 64 12 Scroll Compressor Water Chillers

Division 26 – Electrical

- 26 05 00 Common Work Results for Electrical
- 26 05 21 Wires and Cables (0-1000 V)
- 26 05 22 Connectors and Terminations
- 26 05 32 Outlet Boxes, Conduit Boxes and Fittings
- 26 05 33 Raceways for Electrical Systems
- 26 24 01 Service Equipment
- 26 29 10 Motor Starters to 600 V
- 26 29 23 Variable Frequency Drive

END OF SECTION

1. SCOPE OF WORK

- .1 Work under this contract covers the replacement of chiller, cooling tower, and associated pumps in the Council's Building M-10 of the National Research Council.

2. 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.

3. GENERAL

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

4. COMPLETION

- .1 All work is to be completed by March 31, 2015.

5. 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.

6. 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.

7. SUB-TRADES

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

8. SITE VISITS

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

9. 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.

10. 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 00 15 45.
- .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.

11. 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.

12. 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.

13. 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.

14. 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 Submit tenders assuming existing or new equipment and systems will not be used for temporary heating and ventilating.

15. 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.

16. 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.

17. 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.

18. 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.

19. 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.

20. 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.

21. 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.

Notify Departmental Representative in writing of any changes in schedule.

- .2 7 days before the scheduled completion date arrange to do an interim inspection with the Departmental Representative.

22. 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.

23. SHOP DRAWINGS

- .1 Submit to Departmental Representative for review, shop drawings, product data and samples specified within 1 week 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.

24. 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.

25. 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.

26. 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.

27. PARTIAL OCCUPANCY

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

28. 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.

29. 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.

30. 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.

31. 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.

32. 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.

33. 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.

34. 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.

35. 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.

36. DRAINAGE

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

37. 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.

38. 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.

39. CONCEALING

- .1 Conceal all services, piping, wiring, ductwork, etc., in floors, walls or ceilings except where indicated otherwise.

40. 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.

41. 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.

42. 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.

43. 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

44. 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.

45. 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.

46. 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.

47. IDENTIFICATION BADGES

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

48. 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.

49. DRAWINGS

- .1 The following drawings illustrate the work and form part of this contract.

4045-M01

4045-M02

4045-M03

4045-E01

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:

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

- .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 (CO₂) 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

1.1 RELATED SECTIONS

- .1 Section 00 10 00.

1.2 DEFINITIONS

- .1 For purposes of mechanical sections, the following definitions shall apply:
 - .1 “Concealed” – mechanical services and equipment is 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 will or may affect your work, and become familiar with both 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 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 slope shall be given the right of way, with other services located and arranged to suit.

1.5 PERMITS, CERTIFICATES & FEES

- .1 Display all required permits on worksite.
- .2 Obtain “Hot Work Permit” from Departmental Representative prior to commencement of soldering, welding or other high temperature work.

1.6 FEDERAL HALOCARBON REGULATION

- .1 Generate halocarbon records for work on equipment (cooling equipment with CFC’s, HCFC’s and HRC 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 the Departmental Representative for inclusion in Zone Halocarbon Service File.

1.7 SUBMITTALS

- .1 Shop drawings; submit drawings for review by Departmental Representative in accordance with Section 00 10 00.
- .2 Shop drawings to show:
 - .1 Name of project,

- .2 Name of contractor,
- .3 Name of component
- .4 Name of manufacturer and model number
- .5 Name of service or system
- .6 Date of delivery confirmed by the manufacturer
- .3 Shop drawings and product data accompanied by:
 - .1 Mounting arrangements
 - .2 Overall dimensions, roughing-in dimensions and operating and maintenance clearances
 - .3 Detailed drawings of bases, supports, and anchor bolts.
 - .4 Acoustical sound power data, where applicable.
 - .5 Points of operation on performance curves.
 - .6 Manufacturer to certify current model production.
 - .7 Certification of compliance to applicable codes.
- .4 Closeout Submittals:
 - .1 [3] Copies of operation and maintenance manual approved by, and final copies deposited with Departmental Representative.
 - .1 Each manual to be compiled in four basic parts:
 - .1 Part 1: System and Equipment Operation
 - .2 Part 2: System and Equipment Maintenance
 - .3 Part 3: System and Equipment Performance
 - .4 Part 4: System and Equipment Part List
 - .2 Operation data to include:
 - .1 Location: The location of major units and controls in the building.
 - .2 Equipment: Details of major equipment which make up the system.
 - .3 Start-up: Step-by-step instructions for the start-up of a system from the non-operating condition.
 - .4 Shut-down: Step-by-step instructions for the shut-down of a system to a non-operative state which will ensure the safety and maintainability of the equipment.
 - .5 Emergency Operation: Step-by-step instructions for the operation of systems which must continue to run despite equipment breakdown, power supply failure, etc.
 - .6 Charts and Diagrams: System schematics, control diagram, flow charts, etc.
 - .3 Maintenance data to include:
 - .1 System Maintenance: Information describing special maintenance requirements and instructions for draining, charging, filling, lubrication, inspection, access safety, etc.
 - .2 System Adjustment: Step-by-step instruction needed to maintain system within specified operative limits including manufacturer's recommended maintenance instructions.

- .3 Warranties: Listing of components of the systems which are covered by manufacturer extended warranties indicating effective dates and expiry dates.
- .4 Inspection Certificates: Include copies of all inspection certificates issued by governing authorities.
- .4 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
 - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .5 Part list to include:
 - .1 Equipment Part Lists: Manufacturer's parts lists, preceded by an index. Include names and addresses of local suppliers for all items included in maintenance manuals.
 - .2 Spare Parts: Receipts for maintenance spare parts turned-over to Departmental Representative.
- .6 Approvals:
 - .1 Submit [1] copy of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit as directed by Departmental Representative.
- .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 Pay particular attention to accurately dimensioning the exact location of all services terminated for future extension, all buried work and services, and work concealed within the building in concealed locations.
 - .3 Make available for reference purposes and inspection.
 - .4 Turn the marked-up white prints over to the Departmental Representative upon substantial completion of the work.
- .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 upper 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.

1.8 DELIVERY, STORAGE, AND HANDLING

- .1 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.
- .2 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.
- .3 Bring prefabricated materials on the job site as and when required to be installed.

1.9 EQUIPMENT LIST

- .1 Submit list of manufacturer's name and details of materials to be used on this project within 10 days after award of contract. Do not order equipment until list has been reviewed or approved.

1.10 WORK & MATERIALS SUPPLIED BY OWNER

- .1 Work and materials not included in this contract include the following:
 - .1 Cooling tower water treatment system.

1.11 METRIC & IMPERIAL MEASUREMENTS

- .1 Generally, both metric and imperial units of measurement are given in Sections of the Specification governed by this Section. Metric conversions are "soft" and have been rounded off.
- .2 Metric and Imperial Dimensions appearing on the drawings and in the specification shall conform to the following schedule:

<u>METRIC</u>	<u>IMPERIAL</u>
6 mm	1/4"
12 mm	1/2"
20 mm	3/4"
25 mm	1"
32 mm	1-1/4"
40 mm	1-1/2"
50 mm	2"
65 mm	2-1/2"
75 mm	3"
100 mm	4"
150 mm	6"
200 mm	8"
250 mm	10"

Part 2 Products

2.1 HOISTING & SCAFFOLDING

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

Part 3 Execution

3.1 CLEANING

- .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 Departmental Representative. 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.
- .3 Clean and refurbish all equipment and leave in first class operating condition including replacement of all filters in all air and piping systems.

3.2 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.
- .2 Properly protect all of your equipment and materials on site from damage due to the elements, your work and the work of other trades.

END OF SECTION

Part 1 General

1.1 REFERENCES

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit shop drawings in accordance with Section 23 05 00 – Common Work Results for HVAC.
- .2 Submit shop drawings for the following:
 - .1 Valves;
 - .2 Pressure gauges, thermometers and accessories;

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 23 05 00 – Common Work Results for HVAC.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

Part 2 Products

2.1 PIPE SLEEVES

- .1 Pipe sleeves: at points where pipes pass through masonry or concrete.
- .2 Schedule 40 steel pipe, galvanized, or galvanized steel sheet.
- .3 Sizes: 12 mm (½") clearance all around, between sleeve and un-insulated pipes or between sleeve and insulation.

2.2 PIPE ESCUTCHEON PLATES

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

2.3 FASTENING AND SECURING HARDWARE

- .1 Concrete inserts - Crane Canada Inc. #4M or equal for single or double pipe or duct runs and for equipment, Unistrut or equal inserts for multiple support systems.
- .2 Concrete fasteners - "WEJ-IT" or equal anchors, lead cinch anchors and/or "STARR" or "PHILLIPS" self-drilling anchors.
- .3 Masonry inserts - "WEJ-IT" or equal expansion shields and machine bolts, or, for light loads, fiber or lead plugs and screws.
- .4 Drywall or plaster wall and/or ceiling fasteners - two-wing spring toggles.
- .5 Structural steel fasteners - Grinnell or equal beam clamps.

2.4 PIPE, FITTINGS AND JOINTS

- .1 Copper:

- .1 For drainage and vent piping, use DWV grade hard temper copper to ASTM B306 with wrought copper solder type drainage fittings to C.S.A. B15.81 and ANSI B16.29 and 50% lead, 50% tin solder joints to ASTM B32, type 50A.
- .2 For DCW piping, use Type "L" hard drawn seamless copper tubing to ASTM B88M, with wrought copper and bronze fittings to ANSI B16.22, and 95% tin, 5% antimony solder joints to ASTM B32 for domestic hot and cold water piping, chilled water piping, heating water piping and condenser water piping and brazed joints made with "Sil-Fos" silver brazing alloy for fuel oil, compressed air and control air piping.
- .2 Steel:
 - .1 Black steel to ASTM A53, Grade A or B electric resistance weld or seamless, for pipe with screwed joints and mill or site bevelled for pipe with welded joints.
 - .2 Threaded fittings shall be Class 150 malleable iron threaded fittings to ANSI B16.3.
 - .3 Welding fittings shall be Class 150 cast or forged steel pipe flanges and flanged fittings to ANSI B16.5 and Schedule 40 or Schedule 80 butt welding fittings to ANSI B16.9.
 - .4 For chilled water and cooling tower water piping, use Grooved End Steel:
 - .1 Schedule 40 mild black carbon steel pipe, ASTM A53, with factory or site grooved ends square cut to requirements of CSA B242.
 - .2 Couplings shall be roll grooved end pipe couplings consisting of housing, gaskets, nuts and bolts. Housings shall be malleable iron to ASTM A47M or ductile iron to ASTM A536, cast in two (2) or more parts and secured together by heat treated carbon steel bolts and nuts to ANSI B18.2.1 and ANSI B18.2.2. Gaskets shall be rolled grooved coupling gaskets, type EPDM for temperature range minus 35°C (-31°F) to plus 100°C (212°F).
 - .3 Schedule 40 couplings for piping risers, mains, and in equipment rooms shall be rigid type to CSA B242.
 - .4 Acceptable manufacturers of grooved end piping systems are Victaulic, Gruvlock, Shurjoint and Couplox.

2.5 UNIONS

- .1 For use in copper piping, wrought copper unions to ANSI B16.22 with soldered or threaded ends.
- .2 For use in steel piping, malleable iron, ground joint, brass to iron ground seat screwed unions to ANSI B16.39 with a minimum pressure rating of 2070 kPa (300 psi) steam.

2.6 DIELECTRIC COUPLINGS

- .1 To be compatible with and to suit pressure rating of piping system.
- .2 Where pipes of dissimilar metals are joined.
- .3 Pipes 50mm (2") and under: isolating unions.
- .4 Pipes 65mm (2 1/2") and over: isolating flanges.

2.7 DRAIN VALVES

- .1 Minimum 20 mm (3/4") unless otherwise specified: straight pattern bronze ball valve with hose end male thread adapter and complete with cap and chain.
- .2 Acceptable products: Jenkins Fig. 901CJ and Toyo Red & White Fig. No. 5046.

2.8 AUTOMATIC AIR VENTS

- .1 Spirotherm Model Spirotop 1/2" high compression valve mechanism automatic air vent, with a non-ferrous metal body.
- .2 Provide isolation valve at air vent.

2.9 GATE, GLOBE & SWING-TYPE CHECK VALVES – GENERAL

- .1 All valves shall be, to the extent possible, the product of a single manufacturer and shall have the manufacturer's name, pressure rating and size clearly marked on the outside of the body.
- .2 Except for high pressure (equal to or greater than 110 kPa (16 psi)) steam service, valves 50mm (2") and smaller shall be constructed of bronze. Valves 65mm (2½") and larger shall have iron bodies and bronze mountings.
- .3 The bronze in bodies and bonnets of all bronze valves shall conform to ASTM B-62 for valves rated up to 1035 kPa (150 psi) steam pressure.
- .4 Bodies and bonnets of iron body valves shall conform to ASTM A-126, Class B.
- .5 Bodies and bonnets of forged steel valves shall conform to ASTM A105N.
- .6 Bodies and bonnets of cast steel valves shall conform to ASTM A216-WCB.
- .7 Generally, valves 50mm (2") and smaller shall be complete with screwed ends, except for bronze valves installed in copper piping which shall be complete with soldering ends. Generally, valves 65mm (2½") and larger shall be complete with flanged ends.
- .8 Wheels on bronze gate and globe valves, unless otherwise noted, shall be non-heating malleable iron finished in baked enamel. Wheels on iron body valves shall be cast iron substantially constructed wheels suitable for easy valve operation. Wheels in steel body valves shall be malleable iron or steel.

2.10 GATE VALVES BRONZE & IRON

- .1 For installation in domestic water, chilled water, cooling tower water piping.
- .2 50mm (2") and under, soldered ends:
 - .1 For all services identified above, except steam and condensate.
 - .2 Rising stem, solid wedge disc, 2070 kPa (300 psi) W.O.G. pressure rated.
 - .3 Acceptable product: Crane No. 1334, Jenkins Fig. 813J, Toyo Red & White Fig. 299, and Kitz No. 43.
- .3 50mm (2") and under, threaded ends:
 - .1 For all services identified above.
 - .2 Rising stem, solid wedge disc, 1035 kPa (150 psi) steam pressure rated.
 - .3 Acceptable product: Crane No. 431 UB, Jenkins Cat. 2810 J, Toyo Red & White Fig. 298, Kitz No. 42.
- .4 65mm (2-1/2") and over, flanged ends:

- .1 For all services identified above.
- .2 O.S. & Y., solid wedge disc, bronze trim, 860 kPa (125 psi) steam pressure rated.
- .3 Acceptable product: Crane No. 465 1/2, Jenkins Cat. 454J, Toyo Red & White Fig. 421A, Kitz No. 72.

2.11 CHECK VALVES BRONZE & IRON

- .1 For installation in domestic water, chilled water, cooling tower water piping.
- .2 50mm (2") and under, soldered ends:
 - .1 For all services identified above, except steam and condensate.
 - .2 Y-pattern bronze body design with integral seat, 2-piece hinge disc construction and free rotating disc, 2070 kPa (300 psi) W.O.G. pressure rated.
 - .3 Acceptable product: Crane No. 1342, Jenkins Cat. 4093J, Toyo Red & White No. 237 and Kitz No. 30.
- .3 50mm (2") and under, threaded ends:
 - .1 For all services identified above.
 - .2 Y-pattern bronze body design with integral seat, 2-piece hinge disc construction and free rotating disc, 2070 kPa (300 psi) W.O.G. pressure rated.
 - .3 Acceptable product: Crane No. 137, Jenkins Cat. 4092J, Toyo Red & White No. 238, and Kitz No. 29.
- .4 65mm (2-1/2") and over, flanged ends:
 - .1 For all services identified above.
 - .2 Cast iron body and cap, solid bronze discs, replaceable bronze seat rings, hinge-pin and bushings, 860 kPa (125 psi) steam pressure rated.
 - .3 Acceptable product: Crane No. 373, Jenkins Cat. 587J, Toyo Red & White No. 435A, and Kitz No. 78.

2.12 BALL VALVES

- .1 For installation in domestic water, chilled water, and cooling tower water piping.
- .2 50mm (2") and under, soldered ends:
 - .1 2-piece body, large bore, blowout-proof stem, 4140 kPa (600 psi) W.O.G. pressure rated.
 - .2 Acceptable product: Crane No. 9322, Jenkins Fig. No. 904J, Toyo Red & White Fig. 5049A, and Kitz No. 59.
- .3 50mm (2") and under, threaded ends:
 - .1 2-piece body, large bore, blowout-proof stem, 4140 kPa (600 psi) W.O.G. pressure rated.
 - .2 Acceptable product: Crane No. 9302, Jenkins Fig. No. 903J, Toyo Red & White Fig. 5044A and Kitz No. 58.

2.13 BUTTERFLY VALVES

- .1 For installation in chilled water and cooling tower water piping for shut-off service only.
- .2 Lug style with ductile iron body threaded for retaining bolts in both flanges, ANSI Class 150 rated, with extended neck for insulation.

- .3 Two-piece stainless steel stem sealed from service without a packing gland and engaging a bronze disc without bolting or pinning.
- .4 Resilient elastomer seat, bonded to a rigid backup ring and field replaceable, suitable for temperatures to 135 °C (275 °F) and pressures to 1965 kPa (285 psi).
- .5 Valves up to and including 150mm (6") shall be equipped with 10 position lever handle. Valves 200mm (8") and larger shall be equipped with wheels and gear operators.
- .6 Acceptable product: Demco Type NE-C, Crane.

2.14 CIRCUIT BALANCING VALVES

- .1 For balancing and shut-off service in chilled water and cooling tower water piping.
- .2 Sizes 12mm (1/2") and 20mm (3/4"), soldered ends:
 - .1 Y-pattern, bronze body c/w two brass metering ports, memory feature and capable of precise flow measurement, flow balancing and drip tight shut-off.
 - .2 Acceptable product: TA Hydronics TBV-S.
- .3 50mm (2") and under:
 - .1 Y-pattern, bronze body c/w two brass metering ports, memory feature and capable of precise flow measurement, flow balancing and drip tight shut-off.
 - .2 Provide c/w pre-formed insulated container to double as insulation after valve is installed.
 - .3 Acceptable product: TA Hydronics STAD.
- .4 65mm (2-1/2") and over, flanged ends:
 - .1 Y-pattern, cast iron body with industry standard grooved ends and flanged adaptor or flanged ends c/w two metering ports, memory feature and capable of precise flow measurement, flow balancing and drip tight shut-off.
 - .2 Acceptable product: TA Hydronics STAF.

2.15 PIPELINE STRAINERS

- .1 For installation in domestic water, chilled water, and cooling tower water piping.
 - .1 50mm (2") and under, soldered ends:
 - .1 Bronze "Y" strainer minimum 1380 kPa (200 psi) steam pressure rated, Type 304 20 mesh stainless steel screen.
 - .2 Acceptable product: Mueller #353-1/2M and Spirax Sarco TBT.
 - .2 50mm (2") and under, threaded ends:
 - .1 Bronze "Y" strainer, 1725 kPa (250 psi) steam pressure rated, Type 304 20 mesh stainless steel screen.
 - .2 Acceptable product: Armstrong F1SC, Spirax Sarco BT, Toyo Red & White No. 380 and Mueller #352M.
 - .3 65mm (2-1/2") and over, flanged ends:
 - .1 Cast iron "Y" strainer, 860 kPa (125 psi) steam pressure rated, Type 304 20 mesh stainless steel screen, bolted cap with blowdown connection, Class 125 flanges.
 - .2 Acceptable product: Armstrong A1FL, Mueller #751, Spirax Sarco CI-125 and Toyo Red & White No. 381A.

2.16 PIPE HANGERS & SUPPORTS

- .1 Fabricate hangers and supports in accordance with ANSI B31.1 and MSS-SP58.
- .2 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, suspend hangers from steel channels or angles. Provide all supplementary structural members as necessary.
- .3 Upper attachments for connecting to structural member shall be Grinnell or equal, suitable in all respects for the application.
- .4 For horizontal piping - adjustable steel clevis hangers and/or adjustable roller hangers as required.
- .5 For vertical piping - for steel or cast iron pipe: carbon steel to MSS-SP58-1983, type 42, ULC listed; for copper pipe: carbon steel copper finished to MSS-SP58-1983, type 42.
- .6 For groups of pipe having the same slope - black structural steel angle wall brackets and/or black steel channels or angles of proper dimension supported by hanger rods and/or Unistrut Ltd. or equal support assemblies.
- .7 Hanger rods shall be black steel, round, threaded, to ASTM A-36, sized to suit the loading, complete with captive machine nuts with washers at hangers.
- .8 Acceptable manufacturers of pipe hanger and support hardware are Grinnell, Crane Canada Ltd., Myatt and Apex.

2.17 PRESSURE GAUGES & THERMOMETERS

- .1 Pressure Gauges:
 - .1 Terrice 700LF Series or equal, 100mm (4") dial size with stainless steel or black phenol case, bayonet ring and glass window, stainless steel rotary type movement and Bourdon tube and socket to CGSB 91-GP-3.
 - .2 Dial face shall be white with black figures reading in both metric and imperial units; pointer shall be micrometer adjustable type. Accuracy to be no less than 1% of full scale.
 - .3 Gauge shall be filled with glycerin or silicone-according to ambient temperature requirements.
 - .4 Provide bronze stop cocks, iron coil siphon for steam service, snubber for pulsating service and diaphragm protection seals to protect pressure/vacuum-sensing devices.
- .2 Thermometers:
 - .1 Terrice BX9 Series or equal, universal, adjustable angle type 225mm (9") scale case, red reading mercury in-glass with cast aluminum case, clear acrylic window and separable well, to CGSB 14-GP-2a.
 - .2 For copper pipe use copper or bronze wells, for steel pipe use brass wells.
- .3 Pressure gauges and thermometer scale ranges shall be such that the working temperature or pressure of the system for which the instrument is provided is at the approximate mid-point of the instrument scale.
- .4 Acceptable manufacturers of pressure gauges and thermometers are Terrice, Weiss, Ashcroft and Winters.

2.18 FLEXIBLE CONNECTIONS

- .1 For pipe sizes 50mm (2") and under:
 - .1 Thread connection, flexible piping connector with stainless steel corrugated hose covered by stainless steel braid.
- .2 For pipe sizes 65mm (2 ½") and up:
 - .1 Flange connection, flexible piping connector with stainless steel corrugated hose covered by stainless steel braid.

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 OF PIPE SLEEVES

- .1 Where pipes pass through concrete and/or masonry floors, walls, the roof, and any other such construction, provide pipe sleeves.
- .2 Sleeves in concrete or masonry walls shall be Schedule 40 mild galvanized steel pipe.
- .3 Fill voids around pipes.
 - .1 Caulk between sleeve and pipe in below grade floors with waterproof fire retardant non-hardening mastic.
 - .2 Where sleeves pass through walls or floors, caulk space between insulation and sleeve or between un-insulated pipe and sleeve with waterproof fire retardant to full depth of sleeve. Where pipes pass through fire rated walls, floors and partitions, maintain fire rating integrity of surroundings.
 - .3 Ensure no contact between copper tube or pipe and ferrous sleeve.
 - .4 Fill future-use sleeves with lime plaster or easily removable filler.
 - .5 Coat exposed exterior surfaces of ferrous sleeves with heavy application of zinc rich paint.
- .4 Terminate sleeves flush with surface of concrete and masonry walls and concrete floors on grade.

3.3 INSTALLATION OF PIPE ESCUTCHEON PLATES

- .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.

3.4 INSTALLATION OF FASTENING & SECURING HARDWARE

- .1 Provide all fastening and securing hardware required for supporting and/or securing your work unless otherwise noted.

- .2 Where inserts are required in set concrete work, drill a neat hole of the proper diameter and depth in the concrete and insert an anchor into the hole to accept the hanger rod, bolt, etc., or where concrete mass permits, use self-drilling concrete anchors.
- .3 Fasten hanger and support provisions to masonry with expansion shields and machine bolts, or, for light loads, use lead plugs and screws.
- .4 In drywall or plaster walls and/or ceilings use two-wing toggles and for heavy loads, provide steel anchor plates with two (2) or more toggles to spread the load.
- .5 Provide beam clamps for attaching hanging and/or support provisions to structural steel, or where approved by the Engineer weld the hanging and support provisions to the structural steel.
- .6 Do not use explosive powder actuated fasteners.

3.5 GENERAL PIPING INSTALLATION REQUIREMENTS

- .1 Install concealed pipes close to building structure to keep furring space to minimum. Install to conserve headroom and space. Run exposed piping parallel to walls. Group piping wherever practical.
- .2 Provide unions or flanges in piping at all connections to valves, strainers, pressure reducing valve, backflow preventers and similar piping system components which may need maintenance or repair, and wherever else indicated on the drawings.
- .3 Carefully clean all pipe and fittings prior to installation. Temporarily cap or plug ends of pipe and equipment which are open and exposed during construction to prevent debris from entering the ductwork, piping or equipment.
- .4 Provide anchors to secure pipework to the structure. Anchors shall be of a size and type to securely anchor the pipe at the point shown.
- .5 Compensate for pipe expansion by the use of swing joints or expansion loops unless otherwise noted. Generally, expansion facilities are indicated on the drawings but exact expansion compensation facilities shall suit the piping as installed and exact detail drawings of expansion compensation facilities must be submitted for review.

3.6 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 or flexible connections when equipment mounted on vibration isolation and when piping subject to movement.

3.7 CLEARANCES

- .1 Provide clearance around systems, equipment and components for observation of operation, inspection, 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, and components.
- .3 Provide clearance for installation of insulation.

3.8 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.

3.9 AIR VENTS

- .1 Install automatic air vents as specified and properly sized piping air chamber at all high points in all water piping systems, at equipment connections, and wherever else shown and/or specified..
- .2 Install isolating valve at each automatic air valve.
- .3 Install drain piping to approved location and terminate where discharge is visible.

3.10 PIPE JOINT REQUIREMENTS

- .1 Ream pipes, clean scale and dirt, inside and outside, before and after assembly.
- .2 Threads in screwed steel piping shall be coated with Teflon tape or pulverized lead paste.
- .3 Steel pipe to be welded shall be site or mill bevelled. Remove all scale and oxide from the bevels and leave same smooth and clean. Ensure that personnel doing welding work are licensed welders, hold a valid certificate issued by the authorities having jurisdiction, and are qualified for the particular pressure application worked on.
- .4 Use welding tees or welding outlet fittings for piping branches off mains. The branch outlet shall be welded or socket type for pipes with welded fittings and threaded type for pipes with screwed fittings.
- .5 Saddle type branch fittings may be used on mains, if branch line is half size or smaller than main. Hole saw or drill and ream main to maintain full inside diameter of branch line prior to welding saddle.
- .6 Make all flanged joints with gaskets to suit the application to ANSI B16.21, ANSI B16.20 or ANSI A21.11. Gaskets to be by Garlock or Chesterton.
- .7 Bolts and nuts: to ANSI B-18.2 and ANSI B18.2.2.
- .8 Provide suitable washers between each bolt head and the flange and between each nut and the flange.
- .9 Make all soldered joints in copper piping using flux suitable for and compatible with the type of solder being used. Clean the outside of the pipe end and inside of the fitting, valve, etc., prior to soldering.
- .10 Install mechanical joint fittings and couplings in accordance with the manufacturer's recommendations. If Victaulic fittings and couplings are used, ensure that all valves and piping accessories are suitable. Grooves in Schedule 40 pipe shall be cut.
- .11 Adhere to the manufacturer's recommendations with respect to support, anchoring and guiding of the grooved piping system.

3.11 INSTALLATION OF GATE, GLOBE & SWING TYPE CHECK VALVES

- .1 Install valves with stems upright unless approved otherwise.

- .2 Install gate valves at all branch take-offs at connection to main and to isolate each piece of equipment, and as indicated. Gate valves shall not be used for throttling service.

3.12 INSTALLATION OF BALL VALVES

- .1 Provide ball valves where shown in piping in sizes under 50mm (2") associated with the following systems:
 - .1 domestic water systems;
 - .2 chilled water system;
 - .3 cooling tower water system;

3.13 INSTALLATION OF BUTTERFLY VALVES

- .1 Provide butterfly valves where shown in piping in sizes 65mm (2-1/2") and above associated with the following systems:
 - .1 chilled water system;
 - .2 cooling tower water system;

3.14 INSTALLATION OF CIRCUIT BALANCING VALVES

- .1 Provide circuit balancing valves where shown on the drawings and where specified herein.
- .2 Coordinate locations with the trade performing the balancing work.
- .3 Balance water systems to equipment flows indicated on drawings.

3.15 INSTALLATION OF PIPELINE STRAINERS

- .1 Provide strainers in piping where shown on the drawings and where specified herein.
- .2 Equip strainers 50mm (2") diameter and larger with valved blowdown piping. Terminate blowdown piping over the nearest funnel and floor drain unless otherwise noted.
- .3 Locate strainers so they are easily accessible for service.

3.16 INSTALLATION OF PIPE HANGERS & SUPPORTS

- .1 Provide all required hangers and supports unless otherwise noted. For insulated pipe, size the hanger or support to suit the insulated pipe and install the hanger or support on the outside of the insulation.
- .2 Hang and/or support horizontal steel and copper pipe above ground by means of hangers and/or supports specified hereinbefore in this Section, spaced in accordance with the following schedule:

PIPE SIZE:	ROD DIAMETER	MAXIMUM SPACING: STEEL	MAXIMUM SPACING: COPPER
Up to DN32	10 mm (3/8")	2.1 m (7')	1.8 m (6')
DN40	10 mm	2.7 m (9')	2.4 m (8')
DN50	10 mm	3.0 m (10')	2.7 m (9')

PIPE SIZE:	ROD DIAMETER	MAXIMUM SPACING: STEEL	MAXIMUM SPACING: COPPER
DN65	10 mm	3.6 m (12')	3.0 m (10')
DN75	10 mm	3.6 m (12')	3.0 m (10')
DN100	16 mm (5/8")	4.2 m (14')	3.6 m (12')

- .3 Support vertical pipes by means of supports specified hereinbefore in this Section at maximum 3.6m (12') intervals or at every floor whichever is lesser.
- .4 Provide roller hangers or supports for all suspended or bottom supported hot piping, 50mm (2") diameter and larger with horizontal movement in excess of 25mm (1") due to expansion and contraction. Equip the piping with steel protection saddle with insulation under the saddle.
- .5 Provide pipe covering shields, sized to suit insulated pipe, between insulated pipe and the pipe hanger or support for all piping. Ensure that on cold piping the insulation vapour barrier remains intact.
- .6 Support bare copper tubing using specially made copper or plastic coated copper tubing hangers, or provide proper plastic inserts or tape to isolate the ferrous hangers and supports from the bare copper tubing. Cloth backed rubber adhesive tapes (i.e. duct tape) are not acceptable.
- .7 Where pipes having the same slope are grouped and a common hanger or support is used, hanger or support spacing shall suit the spacing requirement of the smallest pipe in the group.
- .8 Where pipes change direction, either horizontally or vertically, provide a hanger or support on the horizontal pipe not more than 300mm (12") from the elbow. Where pipes drop from tee branches, support the tees in both directions not more than 50mm (2") on each side of the tee.
- .9 Provide all additional structural steel channels, angles, etc., required to support pipes. All materials shall be machine cut square and true and shall be prime coat painted as a minimum and finish painted if exposed.
- .10 Do not use perforated band, wire, chain or solid ring hangers.
- .11 Offset hanger so that rod is vertical in operating position.
- .12 Adjust hangers to equalize load.

3.17 INSTALLATION OF PRESSURE GAUGES & THERMOMETERS

- .1 Install a pressure gauge in piping at the following locations:
 - .1 Suction and discharge of pumps.
 - .2 Downstream of PRV's.
 - .3 Inlet and outlet of water side of coils and heat exchangers.
 - .4 In other locations as indicated.
- .2 Install thermometers in the following locations:
 - .1 Inlet and outlet of heat exchangers.

- .2 Inlet and outlet of evaporator and condenser of chiller.
- .3 In other locations as indicated.
- .3 Locate direct reading thermometers and gauges for reading from floor.
- .4 Use extensions where pressure gauges and thermometers are installed through insulation.

3.18 IDENTIFICATION

- .1 Provide pipe, duct and equipment identification as specified hereinafter.
- .2 Equipment:
 - .1 Manufacturer's nameplates:
 - .1 Provide metal nameplate on each piece of equipment, mechanically fastened with raised or recessed letters.
 - .2 Manufacturer's nameplate to indicate size, equipment model, manufacturer's name, serial number, voltage, cycle, phase and power of motors.
 - .3 Locate nameplates so that they are easily read. Do not insulate or paint over plates.
 - .2 System nameplates:
 - .1 Provide laminated plastic plates with black face and white centre of minimum size 90 x 40 x 2.5mm nominal thickness (3 1/2" x 1 1/2" x 3/32") engraved with 6mm (1/4") high lettering. Use 25mm (1") lettering for major equipment.
 - .2 Fasten nameplates securely in conspicuous place. Where nameplates cannot be mounted on cool surface, provide standoffs.
 - .3 Identify equipment type and number (eg. Pump No. 2), service and areas or zone of building served, (eg. South Zone Chilled Water).
 - .4 Submit list of nameplates for review prior to engraving.
- .3 Piping:
 - .1 Identify medium in piping with markers showing name and service including temperature, pressure and directional flow arrows in accordance with CGSB 24-GP-3a.
 - .2 Manufactured pipe markers and colour bands:
 - .1 Manufactured from mat vinyl 1mm (0.004") thick, industrial quality, chemical resistant, with waterproof contact adhesive, suitable for operating temperature of 120 °C (250 °F). Apply to prepared surfaces.
 - .2 Sticker shall be one piece and shall include the primary classification colour, the name of the material conveyed and directional flow arrows printed either in black or white to contrast with background colour.
 - .3 The label to be designed to completely surround the pipe to give full 360 degree visibility.
 - .4 Character size shall suit the pipe outside diameter.
 - .5 Acceptable manufacturer: Multiface 360 by Arkon, Inc. (available from Guillevin International).
 - .6 Location:

- .1 Locate markers and classifying colours on piping systems so they can be seen from floor.
- .2 Piping runs at least once in each room.
- .3 Maximum 15m (50') between identifications in open areas.
- .4 Both sides where piping passes through walls, partitions and floors.
- .5 At point of entry and leaving, where piping is concealed in pipe chase or other confined space, and at each access opening.
- .6 At start and end points of runs and at each piece of equipment.
- .7 At major manual and automatic valves immediately upstream of valves.

3.19 PIPE LEAKAGE TESTING

- .1 General for all pipe leakage testing:
 - .1 After piping has been placed in position and all branch piping installed, but before the piping has been concealed, and before equipment, fixtures and fittings have been connected, test all piping in the presence of the governing authorities, if required, and the Engineer or his qualified representative. Test results will be documented and co-signed by the Engineer or his representative and by the installer.
 - .2 Testing and witnessing procedures shall be in accordance with the Class of piping installation as specified hereinafter.
 - .3 Bear all costs required for inspection test fees, apparatus, equipment, testing medium, freeze protection, retesting and making good any damage.
 - .4 Remove and re-install materials, controls, or equipment that can be damaged from excessive pressure or test medium. Test piping in sections or install filler sections required to test piping in one network. Suitable precautions in the event of piping system rupture shall be taken to eliminate hazards to personnel in the proximity of piping being tested.
 - .5 Provide a test gauge and a valved connection point for owner's recorder or gauge in each test section of piping. Pressure range of gauge shall not exceed 150% of the specified test pressure. I.E., test pressure 690 kPa (100 psi) - maximum gauge range 1035 kPa (150 psi).
 - .6 Generally, pneumatic testing shall not be used unless the Departmental Representative specifically permits its use as an alternative to hydrostatic testing. Pneumatic testing will only be considered if the piping systems are designed so that they cannot be filled with water or if the piping systems are to be used in services where traces of water cannot be tolerated.
 - .7 Pneumatic testing, where permitted by the Departmental Representative, shall be done in strict accordance with the ASME Code for Power Piping, B31.1.
 - .8 When permitted by the Departmental Representative, test medium supplied from cylinders or other high pressure sources shall be introduced to the system by means of a mechanical pressure regulator. The gas used as the test medium shall be non-flammable and non-toxic.

- .9 Make tight leaks found during tests while the piping is under pressure, and if this is impossible, remove and refit the piping and reapply the test until satisfactory results are obtained.
- .10 Where leaks occur in threaded joints in steel piping, no caulking of these joints will be allowed under any conditions.
- .2 Piping Leakage Test Classification:
 - .1 Class "A" - Piping installations in new construction or renovation work which require witness and approval of the Departmental Representative, or the Departmental Representative's qualified representative and a representative of a recognized authority having jurisdiction as follows:
 - Plumbing - City of Ottawa
 - Fire Protection Systems - Regional Office of Fire Commission of Canada
 - Pressure Vessels, Steam, H.P. Gases, Power Piping - TSSA
 - Natural and Propane Gas - TSSA
 - Flammable or Combustible Liquids - Regional Fire Commissioner's Office
 - .2 Class "B" - Piping installations in new construction or renovation work which require witness and approval of the Departmental Representative, or the Departmental Representative's qualified representative only.
 - .3 Class "C" - Piping installations in renovation work only which are short in developed length, small in scope of work, or a valved part or section of an existing single pipe distribution system, which requires witness and approval by the Departmental Representative, or the Departmental Representative's qualified representative only.
- .3 Pipe Leakage Testing Procedures - Classes "A" & "B":
 - .1 Drainage & Vent Piping:
 - .1 Hydrostatically test new drainage and vent piping by securely closing all openings and pipe ends, and filling piping with water up to the highest level and ensuring the water stands at the same level for a minimum of four (4) hours.
 - .2 Domestic Water Piping:
 - .1 Test piping with cold water at a pressure of 1½ times normal working pressure but not less than 690 kPa (100 psi) and maintain the pressure for a minimum of four (4) hours.
 - .3 Chilled Water and Cooling Tower Water Piping:
 - .1 Test piping with cold water at a pressure of 1½ times normal working pressure but not less than 690 kPa (100 psi) for four (4) hours.
- .4 Identification of Piping Class:
 - .1 Testing and witnessing procedures for piping systems on this project shall conform to the following schedule:

SERVICE	CLASS OF TEST
Drainage & Vent	B
Domestic Water	B

SERVICE	CLASS OF TEST
Chilled Water	B
Cooling Tower Water	B

3.20 CUTTING & PATCHING

- .1 Refer to the article entitled "Cutting and Patching" of Section 00 10 00 for general requirements.
- .2 Accurately and carefully mark out the location and extent of cutting or drilling required and coordinate with the trade(s) performing the work.
- .3 Size openings to leave 12mm (1/2") clearance around the pipes or pipe insulation. Pack and seal the void between the opening for the length of the opening with material as described in Section 00 10 00.
- .4 Note that where drilling is required in water-proof slabs, size the openings to permit installation of pipe sleeves as described hereinbefore.

3.21 DISCONNECTING & REMOVAL WORK

- .1 Where indicated on the drawings, disconnect and remove items of existing mechanical work. Where piping, ductwork and other equipment are removed, disconnect at the point of supply, remove obsolete connecting services and make the system safe.
- .2 Unless otherwise noted, all materials which are not to be relocated or reused shall become your property and shall be removed from the site and disposed of.

3.22 INTERRUPTIONS TO & SHUT DOWNS OF MECHANICAL SERVICE & SYSTEMS

- .1 All shut-downs and interruptions to existing mechanical services and systems shall be coordinated fully with and performed at times acceptable to the owner.
- .2 Do not operate any NRC equipment or plant. Prior to each shut-down or service interruption, inform the Engineer in writing of this requirement and he will arrange to have the shut-down performed by the owner's personnel.
- .3 Note that work associated with shut-downs and interruptions shall be carried out as continuous operations to minimize the shut-down time and to reinstate the systems as soon as possible, and, prior to any shutdown, ensure that all materials and labour required to complete the work for which the shut-down is required are available at the site.

3.23 MECHANICAL CONNECTION FOR EQUIPMENT SUPPLIED BY OTHERS

- .1 Provide all the required mechanical trade connections to equipment provided and/or supplied by other trade sections and the owner.
- .2 Confirm exact locations of equipment prior to roughing-in.
- .3 Obtain accurately dimensioned rough-in drawings and connection details from the Engineer if applicable.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Thermal insulation for piping and piping.

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 (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM B209M, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
 - .2 ASTM C335, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
 - .3 ASTM C411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
 - .4 ASTM C449/C449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
 - .5 ASTM C533, Calcium Silicate Block and Pipe Thermal Insulation.
 - .6 ASTM C547, Mineral Fiber Pipe Insulation.
 - .7 ASTM C795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
 - .8 ASTM C921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 51-GP-52Ma-[89], Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
 - .2 CAN/CGSB-51.53-[95], Poly (Vinyl Chloride) Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts
- .4 Manufacturer's Trade Associations
 - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.
- .5 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .3 CAN/ULC-S702, Thermal Insulation, Mineral Fibre, for Buildings
 - .4 CAN/ULC-S702.2, Thermal Insulation, Mineral Fibre, for Buildings, Part 2: Application Guidelines.

1.3 DEFINITIONS

- .1 For purposes of this section:
 - .1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.
 - .2 "EXPOSED" - will mean "not concealed" as specified.
- .2 TIAC ss:
 - .1 CRF: Code Rectangular Finish.
 - .2 CPF: Code Piping Finish.

1.4 SUBMITTALS

- .1 Submittals: in accordance with Section 23 05 00 Common Work Results for HVAC.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 23 05 00 Common Work Results for HVAC. Include product characteristics, performance criteria, and limitations.
 - .1 Submit one electronic copy of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).
- .3 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 23 05 00 Common Work Results for HVAC.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 23 05 00 Common Work Results for HVAC.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .3 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Storage and Protection:
 - .1 Protect from weather, construction traffic.
 - .2 Protect against damage.
 - .3 Store at temperatures and conditions required by manufacturer.

Part 2 Products

2.1 FIRE AND SMOKE RATING

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

2.2 INSULATION

- .1 Fiberglass:
 - .1 Rigid, moulded sectional pipe insulation made from inorganic glass fibers to CGSB 51-GP-9M with a factory applied all-service jacket to CGSB 51-GP-52M and self-sealing lap.
 - .2 Acceptable product: Knauf ASJ-SSL, Johns Manville and Manson Alley K APT.
- .2 Fiberglass blanket for "cold" equipment:
 - .1 Flexible blanket type insulation made from inorganic glass fibers to CGSB 51-GP-11M with a factory-applied vapour barrier facing to CGSB 51-GP-52M.
 - .2 Acceptable products: Knauf Duct Wrap FSK, Johns Manville and Manson Alley-Wrap FSK.

2.3 INSULATION SECUREMENT

- .1 Tape: self-adhesive, aluminum, ULC listed for less than 25 flame spread and less than 50 smoke developed.
- .2 Contact adhesive: quick setting for seams and joints.
- .3 Canvas adhesive: washable .
- .4 Tie wire: 1.5 mm diameter stainless steel.
- .5 Twine: jute or fibrous glass twine.
- .6 Bands: stainless steel, 19 mm wide, 0.5 mm thick.

2.4 CEMENT

- .1 Thermal insulating cement to CGSB 51-GP-6M, and finishing cement to CGSB 51-GP-7MP.

2.5 VAPOUR RETARDER LAP ADHESIVE

- .1 Water based, fire retardant type, compatible with insulation.

2.6 INDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.

2.7 OUTDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.
- .2 Reinforcing fabric: fibrous glass, untreated 305 g/m².

2.8 JACKETS

- .1 Aluminum:
 - .1 To ASTM B209.
 - .2 Thickness: 0.50 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.

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.
- .2 Surfaces clean, dry, free from foreign material.

3.3 INSTALLATION

- .1 Apply materials in accordance with manufacturers instructions and this specification.
- .2 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.
- .3 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Install hangers, supports outside vapour retarder jacket.
- .4 Supports, Hangers:
 - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.4 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

- .1 Application: at [expansion joints], [valves], [primary flow measuring elements] [flanges and unions at equipment].
- .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] [ABS] [high temperature fabric].

3.5 PIPING INSULATION SCHEDULES

- .1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .2 Thickness of insulation as listed in following table.
 - .1 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	Temp ° C	Pipe sizes (NPS) and insulation thickness (mm)		
		to 1	1 1/4 to 2	2 1/2 to 4
Chilled Water	4 - 13	25	25	25
Chilled Water Pump Casing		25	25	25
Cooling Tower Water Outdoors		50	50	50
Cooling Tower Water Indoors		25	25	25
Domestic CWS		25	25	25

- .3 Finishes:
- .1 Indoors: aluminum jacket.
 - .2 Outdoors: water-proof aluminum jacket.

3.6 CLEANING

- .1 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 Materials and installation for piping and fittings used in the installation of a plate type heat exchanger including related appurtenances.

1.2 REFERENCES

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME Boiler and Pressure Vessel Code.
 - .1 BPVC-VIII B-2004, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 1.
 - .2 BPVC-VIII-2 B-2004, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 2 - Alternative Rules.
 - .3 BPVC-VIII-3 B-2004, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 3 - Alternative Rules High Press Vessels.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B51-2003, Boiler, Pressure Vessel, and Pressure Piping Code.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 PRODUCT DATA

- .1 Submit product data in accordance with Section 00 10 00 – General Instructions.
- .2 Submit data for heat exchanger specified in this section.

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 00 10 00 – General Instructions.
- .2 Contractor shall submit detailed shop drawings for heat exchanger for review. Shop drawings shall include but not limited to the following:
 - .1 Manufacturer's recommended clearances for maintenance and manipulation of cleaning tools.
 - .2 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
 - .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.

1.5 QUALITY ASSURANCE

- .1 All equipment or components of this specification section shall meet or exceed the requirements and quality of the items herein specified.

- .2 Ensure equipment pressure ratings are at least equal to system's maximum operating pressure at point where installed, but not less than specified.
- .3 Equipment manufacturer shall be a company specializing in manufacture, assembly, and field performance of provided equipment with a minimum of 5 years experience.
- .4 Equipment provider shall be responsible for providing certified equipment start-up and, when noted, an in the field certified training session. A copy of the start-up report shall be made and sent to both the Contractor and to the Departmental Representative.
- .5 Where applicable the manufacturer shall be listed by Underwriter's Laboratories as a manufacturer of packaged systems.
- .6 The manufacturer shall carry a minimum product liability insurance of \$5,000,000.00 per occurrence.

1.6 PRODUCT HANDLING

- .1 Protection: use all means necessary to protect equipment before, during, and after installation.
- .2 Replacement and Repair: all scratched, dented, and otherwise damaged units shall be repaired or replaced as directed by the Departmental Representative.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to the site in such a manner as to protect the materials from shipping and handling damage. Provide materials on factory provided shipping skids and lifting lugs if required for handling. Materials damaged by the elements should be packaged in such a manner that they could withstand short-term exposure to the elements during transportation.
- .2 Store materials in clean, dry place and protect from weather and construction traffic. Handle carefully to avoid damage.

Part 2 Products

2.1 PLATE HEAT EXCHANGER

- .1 Contractor shall furnish and install new plate and frame heat exchanger for the system as indicated on the drawings. Heat exchanger shall be model AP22 as manufactured by Bell & Gossett. Heat exchanger shall meet types, sizes, capacities, and characteristics as follows:
 - .1 Plate and frame water to water heat exchanger of the size and capacity as follows:
 - .1 Side 1 – Chilled Water:
 - .1 Entering Temperature: 12.8°C (55°F)
 - .2 Leaving Temperature: 10°C (50°F)
 - .3 Flow Rate: 9.1 L/s (144 USGPM)
 - .4 Pressure Drop: 26.5 kPa (3.8 PSIG)
 - .5 Design Pressure: 1034 kPa (150 PSIG)
 - .6 Connection Ends: 4 ANSI Class 150 Flange
 - .2 Side 2 – Cooling Tower Water:
 - .1 Entering Temperature: 6.7°C (44°F)

- .2 Leaving Temperature: 8.8°C (48°F)
- .3 Flow Rate: 11.4 L/s (180 USGPM)
- .4 Pressure Drop: 34.1 kPa (4.95 PSIG)
- .5 Design Pressure: 1034 kPa (150 PSIG)
- .6 Connection Ends: 4 ANSI Class 150 Flange
- .3 Capacity: 106 kW (361,725 BTU/h)
- .2 Heat exchanger shall consist of stainless steel heat transfer plates, steel end plates, and a carbon steel carrying bar, of single pass configuration. Unit shall be specifically designed for 1034 kPa (150 PSIG) working pressure at 110°C (230°F). Heat exchanger selection shall be optimized by the manufacturer to provide minimum heat transfer surface area requirements under specified capacity and pressure drops.
- .3 Heat exchanger shall be shipped to the site as completely assembled units. The heat exchanger shall be pressure tested and flushed clean at the factory prior to shipment. All nozzle connections shall be factory sealed prior to shipment to prevent the entrance of foreign matter into the heat exchanger during shipment, storage, and installation.
- .4 Corrugated channel steel plates shall be of type 304 or 316 SS. Channel plate ports shall be double gasketed to prevent cross contamination of hot and cold side fluids. Gaskets shall be of a one piece design formulated from Nitrile rubber. Plates shall be grooved to accept the gaskets and gasket clips to minimize movement.
- .5 Channel carrying bar shall be of carbon steel, aluminum or stainless steel with zinc yellow chromate finish.
- .6 Fixed frame plates and movable pressure plates shall be corrosion resistant epoxy painted carbon steel. Flow through the plates shall be of a counter flow design to maximize the heat transfer capability of the unit.
- .7 Connection 2" and smaller shall be carbon steel NPT tapings. Connections 4" and larger shall be studded port design to accept ANSI flange connection. Connection ports shall be integral to the frame or pressure plate.
- .8 Unit to be supplied with OSHA approved splash guard, enclosing exterior channel plate and gasketed surfaces. Heat exchanger shall be provided with the scheduled square footage of heat transfer area.
- .9 Unit shall be constructed in accordance with ASME Code Rules and shall have a manufacturer's data report for pressure vessels, form No. U-1. Form U-1 shall be furnished to the Departmental Representative for the Owner upon request. An authorized inspector, holding a National Board commission, certifying that construction conforms to the latest ASME Code for pressure vessels must sign this form. The ASME "U" symbol should also be stamped on the Heat Exchanger(s). In addition, each unit registered with the National Board of Boiler and Pressure Vessel Inspectors.
- .10 Heat exchanger manufacturer shall be ISO-9001 certified.

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 plate exchanger(s) level and firmly anchored to supports in accordance with manufacturer's recommendations.
- .2 Ensure proper access space around device for maintenance and service, in accordance with manufacturer's recommendations.
- .3 Provide adequate number of isolation valves for service and maintenance of the systems and components.
- .4 Proper component start-up procedures and practices shall be followed on all components. No less than the minimum recommended by the manufacturer shall be accepted.
- .5 All piping shall be brought to equipment connections in such a manner so as to prevent the possibility of any loads of stresses being applied to the connections.
- .6 Manufacturer's representative shall instruct maintenance personnel in the care of the equipment and provide an electronic copy of the report to the Departmental Representative.
- .7 Provide start-up reports outlining factory provided start-up and equipment performance

3.3 APPURTENANCES

- .1 Install heat exchanger(s) with safety relief valve, unions, isolation valves and other appurtenances recommended by manufacturer.
- .2 Provide pressure and temperature gauges where indicated or as directed by manufacturer.

3.4 CLEANING

- .1 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 RELATED REQUIREMENTS

1.2 REFERENCES

- .1 Air-Conditioning and Refrigeration Institute (ARI)
 - .1 ARI-550/590, Standard for Water Chilling Packages Using the Vapor Compression Cycle.
- .2 ASTM International Inc.
 - .1 ASTM C547, Standard Specification for Mineral Fiber Pipe Insulation.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA B52, Mechanical Refrigeration Code.
- .4 Environment Canada, EC/Environmental Protection Services (EPS)
 - .1 EPS 1/RA/2, Environmental Code of Practice for Elimination of Fluorocarbons Emissions from Refrigeration and Air Conditioning Systems.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 23 05 00 Common Work Results for HVAC.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for chillers, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Indicate:
 - .1 Equipment including connections, piping and fittings, valves, strainers, control assemblies and ancillaries, identifying factory and field assembled.
 - .2 Wiring as assembled and schematically.
 - .3 Dimensions, construction details, recommended installation and support, mounting bolt hole sizes and locations and point loads.
 - .4 Type of refrigerant used.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 23 05 00 Common Work Results for HVAC.
- .2 Data to include:
 - .1 Description of equipment giving manufacturers name, model type and year, capacity and serial numbers.
 - .2 Provide part load performance curves.
 - .3 Details on operation, servicing and maintenance.

.4 Recommended spare parts list.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 23 05 00 Common Work Results for HVAC.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

Part 2 Products

2.1 GENERAL

- .1 Provide complete water cooled scroll compressor chiller package including: compressors; evaporator; condenser, motor and motor starter; controls; control centre; piping; wiring; refrigeration and oil charge; ready for connection to chilled water circuit, condenser water circuit, and electric power source, installed in welded steel finished to manufacturers standard.

2.2 CAPACITY

- .1 Certified ratings based on ARI 550/590:
 - .1 216.0 kW, when cooling 9.3 L/s of water from 12.8 degrees C to 7.2 degrees C.
 - .2 Water cooled condenser supplied with 11.6 L/s of water at 29.4 degrees C, pressure drop not to exceed 38.9 kPa.
 - .3 Power input, including all electrical components: 46.6 kW.
 - .4 Refrigerant: R410A
- .2 Unit power input not to exceed 50 kW and capable of operating at line voltages of 575 V.

2.3 COMPRESSOR

- .1 Scroll compressor of hermetic design.
- .2 Capacity control is achieved by compressor cycling with a minimum of 4 stages of control. Compressors will automatically pump refrigerant down at the end of each cycle.
 - .1 Lead/lag automatically by compressor number of starts.
 - .2 Each refrigerant circuit to have a manual refrigerant pump down switch.
- .3 [Factory mounted hot gas bypass should allow chiller operation down to 10% of full load capacity, and includes a hot gas bypass valve, solenoid valve and manual shutoff valve.
- .4 Compressor to include suction and discharge shut-off valves; oil sight glass; separate circuit crankcase heater; and cylinder unloading device.
- .5 Provide nameplate to show capacity at design temperature, type of refrigerant used and total weight in system.

2.4 COMPRESSOR MOTOR

- .1 Hermetic type with overload protection and manual restart.

2.5 EVAPORATOR

- .1 Brazed-plate type heat exchanger consisting of parallel type 304 stainless steel plates.

- .2 Insulated to $R=0.53 \text{ m}^2 \cdot \text{degrees C/W}$ minimum.

2.6 CONDENSER

- .1 Water cooled:
 - .1 Steel shell and copper tube, removable heads, pressure relief device, purge and charge cock and liquid shut-off valve: to CSA B52.
 - .2 Water regulating valve: sensing condensing or head pressure to control water flow.

2.7 CONTROL CENTRE

- .1 To EEMAC standard and include:
 - .1 Control circuit ON/OFF switch.
 - .2 Oil pressure safety switch.
 - .3 High and low pressure safety switch.
 - .4 Water temperature controller.
 - .5 Suction and discharge pressure gauges and shut-off valves.
 - .6 Chilled water and cooling tower water flow switch.
 - .7 Compressor short cycling and restart delay timer.
 - .8 Compressor circuit breakers.
 - .9 Reset low water temperature cut-out switch.
 - .10 Motor contactors, control relays and indicator lights to include: "start-stop" switch; anti-recycle 10 minute time delay; low chilled water temperature cutout and automatic reset; oil heater signal light; manual reset power failure and signal light; chilled water flow interruption light, meter to indicate number of compressor starts and elapsed running time.
 - .11 Field power and control circuit terminal blocks.
 - .12 Alarm for refrigerant leakage.
 - .13 Interface for BAS integration.

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 GENERAL

- .1 Provide appropriate protection apparatus.
- .2 Install unit as indicated, to manufacturers recommendations, and in accordance with EPS 1/RA/2.
- .3 Ensure adequate clearances for servicing and maintenance.
- .4 Manufacturer to approve installation, to supervise startup and to instruct operators.
 - .1 Include 3 days per unit.

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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 light switches, 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 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 Lamicaid nameplates shall be rigid lamicaid, 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 lamicaid nameplates, mount nameplates using two-sided tape.
- .11 For all exterior lamicaid 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 lamicaid nameplates to be 3.7 mm (3/16") diameter to allow for expansion of lamicaid 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 lamicaid 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 T90 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 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 00 10 00.
- .2 Submit stamped engineered drawings for structures supporting transformers on walls or other structures other than the floor.
- .3 Prior to any installation of circuit breakers in either a new or existing installation, Contractor must submit three (3) copies of a certificate of origin, from the manufacturer, duly signed by the factory and the local manufacturer's representative, certifying that all circuit breakers come from this manufacturer, they are new and they meet standards and regulations. These certificates must be submitted to the Departmental Representative for approval.
 - .1 The above applies to all breakers rated above 240V.
 - .2 The above applied to all breakers rated up to 240V and 100A or more.
- .4 A delay in the production of the certificate of origin won't justify any extension of the contract and additional compensation.
- .5 Any work of manufacturing, assembly or installation should begin only after acceptance of the certificate of origin by Departmental Representative. Unless complying with this requirement, Departmental Representative reserves the right to mandate the manufacturer listed on circuit breakers to authenticate all new circuit breakers under the contract at the Contractor's expense.
- .6 In general, the certificate of origin must contain:
 - .1 The name and address of the manufacturer and the person responsible for authentication. The responsible person must sign and date the certificate;
 - .2 The name and address of the licensed dealer and the person of the distributor responsible for the Contractor's account.
 - .3 The name and address of the Contractor and the person responsible for the projet.
 - .4 The name and address of the local manufacturer's representative. The local representative must sign and date the certificate.
 - .5 The name and address of the building where circuit breakers will be installed:
 - .1 Project title.
 - .2 End user's reference number.
 - .3 The list of circuit breakers.
- .7

1.2 IDENTIFICATION

- .1 Identification as per Section 26 05 00.

Part 2 Products

2.1 DISCONNECT SWITCHES, FUSED AND NON-FUSED

- .1 Fusible and non-fusible disconnect switches in EEMAC Enclosure as indicated.
- .2 Provision for padlocking in "OFF" switch position.
- .3 Mechanical voidable door interlock in "ON" position.
- .4 Fuses: size and type as indicated.
- .5 Fuseholders in each switch to be suitable without adaptors, for type and size of fuse indicated.
- .6 Quick-make, quick-break action.
- .7 "ON-OFF" switch position indication on switch enclosure cover.
- .8 Standard of acceptance: Square D, Cutler-Hammer, Siemens, or approved equivalent.

2.2 GROUNDING

- .1 Insulated grounding conductors in accordance with Section 26 05 00.
- .2 Compression connectors for grounding to equipment provided with lugs.

2.3 DRY TYPE TRANSFORMER

- .1 Type ANN, C802.2.
- .2 Single or three phase, KVA rating, input and output voltage as indicated.
- .3 Class 220, 150°C temperature rise insulation system.
- .4 Copper windings.
- .5 Four 2.5% taps, 2-FCAN and 2-FCBN.
- .6 EEMAC 1 enclosure with lifting lugs, removable metal front and side panels.
- .7 Drip shield.
- .8 Standard of acceptance: Hammond or approved equal.

2.4 PANELBOARDS

- .1 600 volt panelboards: bus and breakers rated for 18,000 amp r.m.s. symmetrical interrupting capacity or as indicated.
- .2 250 volt branch circuit panelboards to have minimum interrupting capacity of 10,000 amp r.m.s. symmetrical.

- .3 Panelboards are to have a main breaker that shall be service entranced approved (i.e. barrier to separate main breaker from remainder of panels).
- .4 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .5 Panelboards: mains, number of circuits, number and size of branch circuit breakers as indicated.
- .6 Two keys for each panelboard and all panelboards to be keyed alike.
- .7 Copper bus, neutral and ground bar with neutral of same ampere rating as mains.
- .8 Suitable for: plug-in or bolt-on breakers.
- .9 Trim and door finish: baked grey enamel.
- .10 Drip shield.
- .11 Complete circuit directory with typewritten legend showing description of each circuit.
- .12 Manufacturer: Square D, Cutler-Hammer, Siemens.

2.5 MOULDED CASE CIRCUIT BREAKER

- .1 Thermal-magnetic moulded case circuit breakers, quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.
- .2 Common-trip breakers with single handle for multiple applications.
- .3 All new 120V to 600V circuit breakers installed on this project are to include the handle accessory, "Handle Padlock Attachment", which locks breakers on or off.
- .4 Magnetic instantaneous trip elements in circuit breakers, to operate only when the value of current reaches 10 times their setting.
- .5 Circuit breaker and panel to be of same manufacturer.
- .6 Circuit breakers minimum rating: 10K for 120/240V and 25K for 600/347V or greater if indicated.
- .7 Standard of acceptance: Square D, Cutler-Hammer, Siemens.

2.6 FUSES

- .1 250V and 600V time delay, rejection style, HRC-I, Class RK5.
- .2 Standard of acceptance: Gould-Shawmut.

Part 3 Execution

3.1 DISCONNECT SWITCHES

- .1 Install disconnect switches complete with fuses as indicated.

3.2 GROUNDING

- .1 Install complete permanent, continuous, system and circuit, equipment, grounding systems including, conductors, compression connectors, accessories, as indicated, to conform to requirements of Engineer, and local authority having jurisdiction over installation. Where EMT is used, run ground wire in conduit.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Soldered joints not permitted.

3.3 DRY TYPE TRANSFORMER

- .1 Transformers above 75 kVA mount on floor.
- .2 Provide adequate clearance around transformer for ventilation.
- .3 Install transformers in level upright position.
- .4 Remove shipping supports only after transformer is installed and just before putting into service.
- .5 Loosen isolation pad bolts until no compression is visible.
- .6 Make primary and secondary connections shown on wiring diagram.
- .7 Energize transformers immediately after installation is completed, where practicable.
- .8 Provide equipment identification in accordance with Section 26 05 00.
- .9 Connect transformer through side of housing.

3.4 PANELBOARDS

- .1 Locate panelboards as indicated and mount securely, plumb, and square, to adjoining surfaces.
- .2 Mount panels to height specified in section 26 27 26 or as indicated.
- .3 Connect loads to circuits as indicated.
- .4 Connect neutral conductors to common neutral bus.

3.5 MOULDED CASE CIRCUIT BREAKERS

- .1 Install circuit breakers as indicated.

3.6 FUSES

- .1 Install fuses in mounting devices immediately before energizing circuit.
- .2 Install fuses correctly sized to assigned electrical circuits.
- .3 Provide 3 spare fuses for each rating supplied.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 00 10 00.
- .2 Include schematic, wiring, interconnection diagrams.
- .3 Indicate:
 - .1 Mounting method and dimensions.
 - .2 Starter size and type.
 - .3 Layout of identified internal and front panel components.
 - .4 Enclosure types.
 - .5 Wiring diagram for each type of starter.
 - .6 Interconnection diagrams.
- .4 Motors specified and supplied with mechanical equipment. Refer to Division 23.

1.3 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for motor starters for incorporation into manual specified in Section 00 10 00.
- .2 Include operation and maintenance data for each type and style of starter.

Part 2 Products

2.1 MATERIALS

- .1 Starters:
 - .1 IEC rated starters not acceptable.

2.2 MANUAL MOTOR STARTERS

- .1 Single and three phase manual motor starters of size, type, rating, and enclosure type as indicated, with components as follows:
 - .1 Switching mechanism, quick make and break.
 - .2 One and three overload heaters as indicated, manual reset, trip indicating handle.
- .2 Accessories:
 - .1 Toggle switch, key switch or pushbutton as specified.
 - .2 Indicating light: type and colour as indicated.
 - .3 Locking tab to permit padlocking in "ON" or "OFF" position.

- .3 Standard of acceptance: Square D, Class 2510 or approved equal.

2.3 FULL VOLTAGE MAGNETIC STARTERS

- .1 Magnetic and combination magnetic starters of size, type, rating and enclosure type as indicated with components as follows:
 - .1 Contactor solenoid operated, rapid action type.
 - .2 Motor overload protective device in each phase, manually reset from outside enclosure.
 - .3 Power and control terminals.
 - .4 Wiring and schematic diagram inside starter enclosure in visible location.
 - .5 Identify each wire and terminal for external connections, within starter, with permanent number marking identical to diagram.
- .2 Combination type starters to include motor circuit interrupter or circuit breaker with operating lever on outside of enclosure to control motor circuit interrupter or circuit breaker and provision for:
 - .1 Locking in "OFF" position with up to 3 padlocks.
 - .2 Locking in "ON" position.
 - .3 Independent locking of enclosure door.
 - .4 Provision for preventing switching to "ON" position while enclosure door open.
- .3 Accessories:
 - .1 Pushbuttons and selector switches: type and labelled as indicated.
 - .2 Indicating lights: type and color as indicated.
 - .3 1-N/O and 1-N/C spare auxiliary contacts unless otherwise indicated.
- .4 Standard of acceptance: Square D, Class 8539 or approved equal.

2.4 MULTI-SPEED STARTERS

- .1 2-Speed starters of size, type, rating, and enclosure type as indicated. Starter suitable for constant torque and variable torque type motor with components as follows:
 - .1 One-3 pole contactor for each winding for separate winding motors.
 - .2 Three overload relays with 3 heater elements and manual reset for each speed.
- .2 Accessories:
 - .1 Selector switches: standard labelled as indicated.
 - .2 Indicating lights: standard type and color as indicated.
 - .3 Auxiliary control devices as indicated.

2.5 FINISHES

- .1 Apply finishes to enclosure in accordance with Section 26 05 00.

2.6 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 260500.

Part 3 Execution

3.1 INSTALLATION

- .1 Install starters, connect power and control as indicated.
- .2 Install control devices and relay panels and interconnect as indicated.
- .3 Install correct fuses and overload device elements.
- .4 Megger all motors. Dry out motor if dampness is present in accordance with manufacturer's recommendations.
- .5 For installation of motor with mechanical equipment refer to Division 23.
- .6 Make connection to motor as indicated. Use liquid-tight PVC jacketed flexible conduit between rigid conduit and motor.
- .7 Make flexible conduit long enough to permit movement of motor.

3.2 TESTS

- .1 Perform tests in accordance with Section 26 05 00 and Manufacturer's instructions.
- .2 Operate switches, contactors to verify correct functioning.
- .3 Perform starting and stopping sequences of contactors and relays.
- .4 Check that sequence controls, interlocking with other separate related starters, equipment, control devices, operate as indicated.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

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

1.2 DESCRIPTION

- .1 This specification is to cover a complete Variable Frequency motor Drive (VFD) consisting of a pulse width modulated (PWM) inverter designed for use on a standard NEMA Design B induction motor.
- .2 The drive manufacturer shall supply the drive and all necessary controls as herein specified. The manufacturer shall have been engaged in the production of this type of equipment for a minimum of twenty years. All VFDs installed on this project shall be from the same manufacturer.

1.3 QUALITY ASSURANCE

- .1 Referenced Standards:
 - 1. Institute of Electrical and Electronic Engineers (IEEE)
 - .1 Standard 519-1992, IEEE Guide for Harmonic Content and Control.
 - .2 Underwriters laboratories
 - .1 UL508C
 - .3 National Electrical Manufacturer's Association (NEMA)
 - .1 ICS 7.0, AC Adjustable Speed Drives
 - .4 IEC 16800 Parts 1 and 2
 - .5 CSA 22.2
- .2 Qualifications:
 - .1 VFDs and options shall be UL listed and CSA approved as a complete assembly. VFDs that require the customer to supply external fuses for the VFD to be UL listed are not acceptable. VFDs requiring additional branch circuit protection are not acceptable. The base VFD shall be UL listed for 100 KAIC without the need for input fusing.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 00 10 00.
- .2 Include schematic, wiring, interconnection diagrams.
- .3 Indicate:
 - .1 Outline dimensions, conduit entry locations and weight.
 - .2 Customer connection and power wiring diagrams.
 - .3 Complete technical product description include a complete list of options provided. **Any portions of the specifications not complied with must be**

clearly indicated or the supplier and contractor shall be liable to provide all components required to meet the specification.

- .4 Compliance to IEEE 519 – harmonic analysis for particular jobsite including total harmonic voltage distortion and total harmonic current distortion (TDD).
 - .1 The VFD manufacturer shall provide calculations; specific to the installation, showing total harmonic voltage distortion is less than 5%. Input filters shall be sized and provided as required by the VFD manufacturer to ensure compliance with the IEEE electrical system standard 519.
- .4 Motors specified and supplied with mechanical equipment. Refer to Division 23.

1.5 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for motor starters for incorporation into manual specified in Section 00 10 00.
- .2 Include operation and maintenance data for each type and style of starter.
- .3 On completion of the installation, the supplier shall provide the following:
 - .1 Full commissioning report documenting all programmable settings, AC input voltage, DC Bus voltage, current draw at maximum speed, and a description of ambient conditions.
 - .2 One operator's manual for each VFD installed.
 - .3 One 8.5" x 11" wiring diagram for each VFD installed.

1.6 GENERAL DESIGN CHARACTERISTICS

- .1 The VFD shall be of the Pulse Width Modulated (PWM) type.
- .2 The VFD shall be rated for variable torque applications, with an overload rating of 110% for 60 seconds.
- .3 All VFD's shall be factory UL/cUL Listed.
- .4 All packaged drive systems shall be CSA Listed.
- .5 The VFD shall have the capability of operating multiple motors. The minimum VFD continuous current rating shall be the sum of the full load current ratings of the connected motors.
- .6 The VFD shall have a minimum displacement power factor of 0.96 or higher at all output frequencies.
- .7 The VFD manufacturer shall have a minimum of ten years experience in the Canadian Market.

Part 2 Products

2.1 VARIABLE FREQUENCY DRIVES

- .1 The VFD package as specified herein shall be enclosed in a NEMA rated enclosure, completely assembled and tested by the manufacturer in an ISO9001 facility. The VFD tolerated voltage window shall allow the VFD to operate from a line of +30% nominal, and -35% nominal voltage as a minimum.
 - .1 Environmental operating conditions: 0 – 40⁰ C continuous. Altitude 0 to 3300 feet above sea level, up to 95% humidity, non-condensing. All circuit boards shall have conformal coating.
 - .2 The VFD shall operate within the following rated values.
 - .1 Output Frequency Range: 0.1 to 400 Hz.
 - .2 Overload Rating: VT – 110% for 60 seconds
 - .3 Input Voltage: 3 phase + ground , 600V +10% / -20%
 - .4 Input Frequency: 48-62 Hz
 - .3 The VFD shall be designed to include the following protective functions and display for maintainability:
 - .1 *Instantaneous Over Current Protection*: The VFD output shall be turned off if the operating current exceeds the specified level.
 - .2 *Motor Overload Protection*: cUL/CSA approved electronic thermal overload protection.
 - .3 *External Trip Input*: Programmable for either N/O or N/C operation.
 - .4 *Over Voltage Protection*: The VFD output shall turned off if the DC Bus voltage exceeds the specified level.
 - .5 *Ground Fault Protection*: The VFD output shall turned off in the event of a ground fault.
 - .6 *Line or Load Phase Loss Protection*: Programmable for enable - disable
 - .7 *Software Lock*: The VFD shall include a software function that prevents changes to the user-defined settings.
 - .8 *CPU or EEPROM Error*: The VFD output shall turned off in the event of an error in the CPU or EEPROM.
- .2 All VFDs shall have the following features:
 - .1 All VFDs shall have the same customer interface, including digital display, and keypad, regardless of horsepower rating. The keypad shall be removable, capable of remote mounting and allow for uploading and downloading of parameter settings as an aid for start-up of multiple VFDs.
 - .2 The keypad shall include Hand-Off-Auto selections and manual speed control. There shall be fault reset and “Help” buttons on the keypad. The Help button shall include “on-line” assistance for programming and troubleshooting.
 - .3 There shall be a built-in time clock in the VFD keypad. The clock shall have a battery back up with 10 years minimum life span. The clock shall be used to date and time stamp faults and record operating parameters at the time of fault. If the battery fails, the VFD shall automatically revert to hours of operation since initial power up. The clock shall also be programmable to control start/stop functions, constant speeds, PID parameter sets and output relays. The VFD shall have a

- digital input that allows an override to the time clock (when in the off mode) for a programmable time frame. There shall be four (4) separate, independent timer functions that have both weekday and weekend settings. Capacitor backup is not acceptable.
- .4 The VFD shall be capable of starting into a coasting load (forward or reverse) up to full speed and accelerate or decelerate to setpoint without safety tripping or component damage (flying start).
 - .5 The overload rating of the drive shall be 110% of its normal duty current rating for 1 minute every 10 minutes, 130% overload for 2 seconds. The minimum FLA rating shall meet or exceed the values in the NEC/UL table 430-150 for 4-pole motors.
 - .6 The VFD shall have 5% equivalent impedance internal reactors to reduce the harmonics to the power line and to add protection from AC line transients. The 5% equivalent impedance may be from dual (positive and negative DC bus) reactors, or 5% AC line reactors. VFDs with only one DC reactor shall add an AC line reactor.
 - .7 The VFD shall include a coordinated AC transient protection system consisting of 4-120 joule rated MOV's (phase to phase and phase to ground), a capacitor clamp, and 5% equivalent impedance internal reactors.
 - .8 The VFD shall provide a programmable proof of flow Form-C relay output (broken belt / broken coupling). The drive shall be programmable to signal this condition via a keypad warning, relay output and/or over the serial communications bus. Relay outputs shall include programmable time delays that will allow for drive acceleration from zero speed without signaling a false underload condition.
- .3 All VFDs to have the following adjustments:
- .1 Three (3) programmable critical frequency lockout ranges to prevent the VFD from operating the load continuously at an unstable speed.
 - .2 Two (2) PID Setpoint controllers shall be standard in the drive, allowing pressure or flow signals to be connected to the VFD, using the microprocessor in the VFD for the closed loop control. The VFD shall have 250 ma of 24 VDC auxiliary power and be capable of loop powering a transmitter supplied by others. There shall be two parameter sets for the first PID that allow the sets to be switched via a digital input, serial communications or from the keypad for night setback, summer/winter setpoints, etc. There shall be an independent, second PID loop that can utilize the second analog input and modulate one of the analog outputs to maintain setpoint of an independent process (ie. valves, dampers, etc.). All setpoints, process variables, etc. to be accessible from the serial communication network.
 - .3 Two (2) programmable analog inputs shall accept current or voltage signals.
 - .4 Two (2) programmable analog outputs (0-20ma or 4-20 ma). The outputs may be programmed to output proportional to Frequency, Motor Speed, Output Voltage, Output Current, Motor Torque, Motor Power (kW), DC Bus voltage, Active Reference, and other data.
 - .5 Six (6) programmable digital inputs.
 - .6 Three (3) programmable digital Form-C relay outputs. The relays shall include programmable on and off delay times and adjustable hysteresis. The relays shall be rated for maximum switching current 8 amps at 24 VDC and 0.4 A at 250 VAC; Maximum voltage 300 VDC and 250 VAC; continuous current rating 2

- amps RMS. Outputs shall be true Form-C type contacts; open collector outputs are not acceptable.
- .7 Two separate safety interlock inputs shall be provided. When either safety is opened, the motor shall be commanded to coast to stop, and the damper shall be commanded to close.
 - .8 Two independently adjustable accel and decel ramps with 1 – 1800 seconds adjustable time ramps.
 - .9 The VFD shall include a motor flux optimization circuit that will automatically reduce applied motor voltage to the motor to optimize energy consumption and audible motor noise.
 - .10 The VFD shall include a carrier frequency control circuit that reduces the carrier frequency based on actual VFD temperature that allows higher carrier frequency without derating the VFD or operating at high carrier frequency only at low speeds.
 - .11 The VFD shall include password protection against parameter changes.
- .4 The Keypad shall include a backlit LCD display. The display shall be in complete English words for programming and fault diagnostics (LED and alpha-numeric codes are not acceptable). All VFD faults shall be displayed in English words.
 - .5 All applicable operating values shall be capable of being displayed in engineering (user) units. A minimum of three operating values from the list below shall be capable of being displayed at all times. The display shall be in complete English words (alpha-numeric codes are not acceptable):
 - .1 Output Frequency
 - .2 Motor Speed (RPM, %, or Engineering units)
 - .3 Motor Current
 - .4 Drive Temperature
 - .5 DC Bus Voltage
 - .6 Output Voltage
 - .6 The VFD shall include a fireman's override input. Upon receipt of a contact closure from the fireman's control station, the VFD shall operate in one of two modes: 1) Operate at a programmed predetermined fixed speed or operate in a specific fireman's override PID algorithm that automatically adjusts motor speed based on override set point and feedback. The mode shall override all other inputs (analog/digital, serial communication, and all keypad commands), except customer defined safety run interlock, and force the motor to run in one of the two modes above. "Override Mode" shall be displayed on the keypad. Upon removal of the override signal, the VFD shall resume normal operation.
 - .7 Serial Communications
 - .1 The VFD shall have an RS-485 port as standard. The standard protocols shall be Modbus, BACnet, Johnson Controls N2 bus, and Siemens Building Technologies FLN. Each individual drive shall have the protocol in the base VFD. The use of third party gateways and multiplexers is not acceptable. All protocols shall be "certified" by the governing authority (i.e. BTL Listing for BACnet). Use of non-certified protocols is not allowed.
 - .2 The BACnet connection shall be an RS485, MS/TP interface operating at 9.6, 19.2, 38.4, or 76.8 Kbps. The connection shall be tested by the BACnet Testing

Labs (BTL) and be BTL Listed. The BACnet interface shall conform to the BACnet standard device type of an Applications Specific Controller (B-ASC). The interface shall support all BIBBs defined by the BACnet standard profile for a B-ASC including, but not limited to:

- .1 Data Sharing – Read Property – B.
 - .2 Data Sharing – Write Property – B.
 - .3 Device Management – Dynamic Device Binding (Who-Is; I-AM).
 - .4 Device Management – Dynamic Object Binding (Who-Has; I-Have).
 - .5 Device Management – Communication Control – B.
- .3 Serial communication capabilities shall include, but not be limited to; run-stop control, speed set adjustment, proportional/integral/derivative PID control adjustments, current limit, accel/decel time adjustments, and lock and unlock the keypad. The drive shall have the capability of allowing the DDC to monitor feedback such as process variable feedback, output speed / frequency, current (in amps), % torque, power (kW), kilowatt hours (resettable), operating hours (resettable), and drive temperature. The DDC shall also be capable of monitoring the VFD relay output status, digital input status, and all analog input and analog output values. All diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote VFD fault reset shall be possible.
- .8 EMI / RFI filters. All VFDs shall include EMI/RFI filters. The VFD shall comply with standard EN 61800-3 for the First Environment, restricted level with up to 100' of motor cables. No Exceptions. Certified test lab test reports shall be provided with the submittals.
- .9 All VFDs through 60HP shall be protected from input and output power mis-wiring. The VFD shall sense this condition and display an alarm on the keypad. The VFD shall not be damaged by this condition.
- .10 OPTIONAL FEATURES – Optional features to be furnished and mounted by the drive manufacturer. All optional features shall be UL Listed by the drive manufacturer as a complete assembly and carry a UL508 label. The bypass enclosure door and VFD enclosure must be interlocked such that input power is turned off before either enclosure can be opened. The VFD and Bypass as a package shall have a UL listed short circuit rating of 100,000 amps and shall be indicated on the data label.
- .1 A complete factory wired and tested bypass system consisting of an output contactor and bypass contactor, service (isolation) switch and VFD input fuses are required. Bypass designs, which have no VFD only fuses, or that incorporate fuses common to both the VFD and the bypass will not be accepted
 - .2 Door interlocked padlockable disconnect switch that will disconnect all input power from the drive and all internally mounted options.
 - .3 If Drive is located outdoors, a cabinet with thermostatically controlled heater, suitable for operation at -40⁰ C continuous.
- .11 The following operators shall be provided:
- Bypass Hand-Off-Auto
 - Drive mode selector and light
 - Bypass mode selector and light
 - Bypass fault reset

Bypass LDC display, 2 lines, for programming and status / fault / warning indications

- .1 Motor protection from single phase power conditions - The Bypass system must be able to detect a single phase input power condition while running in bypass, disengage the motor in a controlled fashion, and give a single phase input power indication. Bypass systems not incorporating single phase protection in Bypass mode are not acceptable.
- .2 The systems (VFD and Bypass) tolerated voltage window shall allow the system to operate from a line of +30%, -35% nominal voltage as a minimum. The system shall incorporate circuitry that will allow the drive or bypass contactor to remain "sealed in" over this voltage tolerance at a minimum.
- .3 The Bypass system shall NOT depend on the VFD for bypass operation. The bypass shall be completely functional in both Hand and Automatic modes even if the VFD has been removed from the enclosure for repair / replacement.
- .4 Serial communications – the bypass and VFD shall be capable of being monitored and or controlled via serial communications. Provide communications protocols for ModBus; Johnson Controls N2; Siemens Building Technologies FLN (P1) and BACnet in the bypass controller.
- .5 BACnet Serial communication bypass capabilities shall include, but not be limited to; bypass run-stop control; the ability to force the unit to bypass; and the ability to lock and unlock the keypad. The bypass shall have the capability of allowing the DDC to monitor feedback such as, bypass current (in amps), bypass kilowatt hours (resettable), bypass operating hours (resettable), and bypass logic board temperature. The DDC shall also be capable of monitoring the bypass relays output status, and all digital input status. All bypass diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote bypass fault reset shall be possible. The following additional bypass status indications and settings shall be transmitted over the serial communications bus – keypad "Hand" or "Auto" selected, and bypass selected. The DDC system shall also be able to monitor if the motor is running under load in both VFD and bypass (proof of flow) in the VFD mode over serial communications or Form-C relay output. A minimum of 40 field parameters shall be capable of being monitored in the bypass mode.
- .6 Run permissive circuit - there shall be a run permissive circuit for damper or valve control. Regardless of the source of a run command (keypad, time-clock control, or serial communications) the VFD and bypass shall provide a dry contact closure that will signal the damper to open (VFD motor does not operate). When the damper is fully open, a normally open dry contact (end-switch) shall close. The closed end-switch is wired to a VFD system input and allows motor operation. Two separate safety interlock inputs shall be provided. When either safety is opened, the motor shall be commanded to coast to stop, and the damper shall be commanded to close.
- .7 The bypass control shall monitor the status of the VFD and bypass contactors and indicate when there is a welded contactor contact or open contactor coil. This failed contactor operation shall be indicated on the Bypass LCD display as well as over the serial communications protocol.
- .8 The bypass control shall include a programmable time delay for bypass start and keypad indication that this time delay is in process. This will allow VAV boxes to be driven open before the motor operates at full speed in the bypass mode. The time delay shall be field programmable from 0 – 120 seconds.

- .9 The bypass control shall be programmable for manual or automatic transfer to bypass. The user shall be able to select via keypad programming which drive faults will generate an automatic transfer to bypass and which faults require a manual transfer to bypass.
- .10 There shall be an adjustable motor current sensing circuit for the bypass and VFD mode to provide proof of flow indication. The condition shall be indicated on the keypad display, transmitted over the building automation protocol and on a relay output contact closure.
- .11 The bypass controller shall have six programmable digital inputs, and five programmable Form-C relay outputs.
- .12 The relay outputs from the bypass shall be programmable for any of the following indications.
 - .1 System started
 - .2 System running
 - .3 Bypass override enabled
 - .4 Drive fault
 - .5 Bypass fault
 - .6 Bypass H-O-A position
 - .7 Motor proof of flow (broken belt)
 - .8 Overload
 - .9 Bypass selected
 - .10 Bypass run
 - .11 System started (damper opening)
 - .12 Bypass alarm
 - .13 Over temperature
- .13 The digital inputs for the system shall accept 24VAC or 24VDC. The bypass shall incorporate internally sourced power supply and not require an external control power source. The bypass power board shall supply 250 ma of 24 VDC for use by others to power external devices.
- .14 Customer Interlock Terminal Strip – provide a separate terminal strip for connection of freeze, fire, smoke contacts, and external start command. All external safety interlocks shall remain fully functional whether the system is in VFD or Bypass mode. The remote start/stop contact shall operate in VFD and bypass modes. The terminal strip shall allow for independent connection of up to four (4) unique safety inputs.
- .15 The user shall be able to select the text to be displayed on the keypad when the safety opens. Example text display indications include “Firestat”, “Freezestat”, “Over pressure” and “Low pressure”. The user shall also be able to determine which of the four (4) safety contacts is open over the serial communications connection.
- .16 Class 10, 20, or 30 (selectable) electronic motor overload protection shall be included.
- .17 Standard of acceptance:
 - .1 ABB ACH Series or equivalent approved by NRC departmental representative. **Approval does not relieve supplier of specification requirements.**

Part 3 Execution

3.1 INSTALLATION

- .1 Installation shall be the responsibility of the electrical contractor. The contractor shall install the drive in accordance with the requirements of the VFD manufacturer's installation manual.
- .2 The contractor is to verify that the jobsite conditions for installation meet the factory recommendations and code required conditions for the VFD installation prior to installation. These shall include as a minimum:
 - .1 Clearance spacing.
 - .2 Compliance with environmental ratings of the VFD system.
 - .3 Separate conduit installation of the input wiring, the motor wiring, and control wiring. At no time does any of this wiring run in parallel with each other.
 - .4 All power and control wiring is complete.
- .3 The VFD is to be covered and protected from installation dust and contamination until the environment is cleaned and ready for operation. The VFD system shall not be operated while the unit is covered.

3.2 ON-SITE STARTUP

- .1 The manufacturer shall provide start-up and commissioning of the variable frequency drive and its optional circuits by a factory certified service technician who is experienced in start-up and repair services. The commissioning personnel shall be the same personnel that will provide the factory service and warranty repairs at the customer site. Sales personnel and other agents who are not factory certified technicians for drive repair shall not be acceptable as commissioning agents.
- .2 Start-up services shall include checking for verification of proper operation and installation of the VFD, its options and its interface wiring to the building automation system. Included in this service shall be as a minimum:
 - .1 Verification of contractor wire terminations and conduit runs to and from the VFD.
 - .2 Up to four hours of customer operator training on the operation and service diagnostics at the time of commissioning. On-site training is to be provided by the same factory trained application engineering and service personnel to demonstrate full programming and operating features and procedures. Date and time for this training is to be coordinated with the NRC Departmental Representative.
 - .3 Measurement for verification of proper operation of the following:
 - .1 Motor voltage and frequency. Verification of proper motor operation.
 - .2 Control input for proper building automation system interface and control calibration.
 - .3 Calibration check for the following set-points:
 - .1 minimum speed
 - .2 maximum speed
 - .3 acceleration and deceleration rates.

- .3 Commissioning agent to verify the programming of the VFD and to provide a written copy of the settings to the engineer.
- .4 Commissioning agent to lock out critical frequencies throughout the operating curve of the equipment as identified and required by the engineer. The agent shall record amperages at six (minimum) different frequencies from minimum to maximum speed.

3.3 PRODUCT SUPPORT

- .1 Factory trained application engineering and service personnel that are thoroughly familiar with the VFD products offered shall be locally available at both the specifying and installation locations. A toll free 24/365 technical support line shall be available.
- .2 A computer based training CD or 8-hour professionally generated video (VCR format) shall be provided to the owner at the time of project closeout. The training shall include installation, programming and operation of the VFD, bypass and serial communication.

3.4 WARRANTY

- .1 Warranty shall be 24 months from the date of certified start-up. The warranty shall include all parts, labor, travel time and expenses

END OF SECTION



TP1 Amount Payable – General

- 1.1 Subject to any other provisions of the contract, Her Majesty shall pay the Contractor, at the times and in the manner hereinafter set out, the amount by which
- 1.1.1 the aggregate of the amounts described in TP2 exceeds
 - 1.1.2 the aggregate of the amounts described in TP3
- and the Contractor shall accept that amount as payment in full satisfaction for everything furnished and done by him in respect of the work to which the payment relates.

TP2 Amounts Payable to the Contractor

- 2.1 The amounts referred to in TP1.1.1 are the aggregate of
- 2.1.1 the amounts referred to in the Articles of Agreement, and
 - 2.1.2 the amounts, if any, that are payable to the Contractor pursuant to the General Conditions.

TP3 Amounts Payable to Her Majesty

- 3.1 The amounts referred to in TP1.1.2 are the aggregate of the amounts, in any, that the Contractor is liable to pay Her Majesty pursuant to the contract.
- 3.2 When making any payments to the Contractor, the failure of Her Majesty to deduct an amount referred to in TP3.1 from an amount referred to in TP2 shall not constitute a waiver of the right to do so, or an admission of lack of entitlement to do so in any subsequent payment to the Contractor.

TP4 Time of Payment

- 4.1 In these Terms of Payment
- 4.1.1 The “payment period” means a period of 30 consecutive days or such other longer period as is agreed between the Contractor and the Departmental Representative.
 - 4.1.2 An amount is “due and payable” when it is due and payable by Her Majesty to the Contractor according to TP4.4, TP4.7 or TP4.10.
 - 4.1.3 An amount is overdue when it is unpaid on the first day following the day upon which it is due and payable.
 - 4.1.4 The “date of payment” means the date of the negotiable instrument of an amount due and payable by the Receiver General for Canada and given for payment.
 - 4.1.5 The “Bank Rate” means the discount rate of interest set by the Bank of Canada in effect at the opening of business on the date of payment.



- 4.2 The Contractor shall, on the expiration of a payment period, deliver to the Departmental Representative in respect of that payment period a written progress claim that fully describes any part of the work that has been completed, and any material that was delivered to the work site but not incorporated into the work during that payment period.
- 4.3 The Departmental Representative shall, not later than ten days after receipt by him of a progress claim referred to in TP4.2,
- 4.3.1 inspect the part of the work and the material described in the progress claim; and
- 4.3.2 issue a progress report, a copy of which the Departmental Representative will give to the Contractor, that indicates the value of the part of the work and the material described in the progress claim that, in the opinion of the Departmental Representative,
- 4.3.2.1 is in accordance with the contract, and
- 4.3.2.2 was not included in any other progress report relating to the contract.
- 4.4 Subject to TP1 and TP4.5 Her Majesty shall, not later than 30 days after receipt by the Departmental Representative of a progress claim referred to in TP4.2, pay the Contractor
- 4.4.1 an amount that is equal to 95% of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has been furnished by the Contractor, or
- 4.4.2 an amount that is equal to 90% of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has not been furnished by the Contractor.
- 4.5 It is a condition precedent to Her Majesty's obligation under TP4.4 that the Contractor has made and delivered to the Departmental Representative,
- 4.5.1 a statutory declaration described in TP4.6 in respect of a progress claim referred to in TP4.2,
- 4.5.2 in the case of the Contractor's first progress claim, a construction schedule in accordance with the relevant sections of the Specifications, and
- 4.5.3 if the requirement for a schedule is specified, an update of the said schedule at the times identified in the relevant sections of the Specifications.
- 4.6 A statutory declaration referred to in TP4.5 shall contain a deposition by the Contractor that
- 4.6.1 up to the date of the Contractor's progress claim, the Contractor has complied with all his lawful obligations with respect to the Labour Conditions; and
- 4.6.2 up to the date of the Contractor's immediately preceding progress claim, all lawful obligations of the Contractor to subcontractors and suppliers of material in respect of the



work under the contract have been fully discharged.

- 4.7 Subject to TP1 and TP4.8, Her Majesty shall, not later than 30 days after the date of issue of an Interim Certificate of Completion referred to in GC44.2, pay the Contractor the amount referred to in TP1 less the aggregate of
- 4.7.1 the sum of all payments that were made pursuant to TP4.4;
 - 4.7.2 an amount that is equal to the Departmental Representative's estimate of the cost to Her Majesty or rectifying defects described in the Interim Certificate of Completion; and
 - 4.7.3 an amount that is equal to the Departmental Representative's estimate of the cost to Her Majesty of completing the parts of the work described in the Interim Certificate of Completion other than the defects referred to in TP4.7.2.
- 4.8 It is a condition precedent to Her Majesty's obligation under TP4.7 that the Contractor has made and delivered to the Departmental Representative,
- 4.8.1 a statutory declaration described in TP4.9 in respect of an Interim Certificate of Completion referred to in GC44.2, and
 - 4.8.2 if so specified in the relevant sections of the Specifications, and update of the construction schedule referred to in TP4.5.2 and the updated schedule shall, in addition to the specified requirements, clearly show a detailed timetable that is acceptable to the Departmental Representative for the completion of any unfinished work and the correction of all defects.
- 4.9 A statutory declaration referred to in TP4.8 shall contain a deposition by the contractor that up to the date of the Interim Certificate of Completion the Contractor has
- 4.9.1 complied with all of the Contractor's lawful obligations with respect to the Labour Conditions;
 - 4.9.2 discharged all of the Contractor's lawful obligations to the subcontractors and suppliers of material in respect of the work under the contract; and
 - 4.9.3 discharged the Contractor's lawful obligations referred to in GC14.6.
- 4.10 Subject to TP1 and TP4.11, Her Majesty shall, not later than 60 days after the date of issue of a Final Certificate of Completion referred to in GC44.1, pay the Contractor the amount referred to in TP1 less the aggregate of
- 4.10.1 the sum of all payments that were made pursuant to TP4.4; and
 - 4.10.2 the sum of all payments that were made pursuant to TP4.7.
- 4.11 It is a condition precedent to Her Majesty's obligation under TP4.10 that the Contractor has made and delivered a statutory declaration described in TP4.12 to the Departmental Representative.



- 4.12 A statutory declaration referred to in TP4.11 shall, in addition to the depositions described in TP4.9, contain a deposition by the Contractor that all of the Contractor's lawful obligations and any lawful claims against the Contractor that arose out of the performance of the contract have been discharged and satisfied.

TP5 Progress Report and Payment Thereunder Not Binding on Her Majesty

- 5.1 Neither a progress report referred to in TP4.3 nor any payment made by Her Majesty pursuant to these Terms of Payment shall be construed as an admission by Her Majesty that the work, material or any part thereof is complete, is satisfactory or is in accordance with the contract.

TP6 Delay in Making Payment

- 6.1 Notwithstanding GC7 any delay by Her Majesty in making any payment when it is due pursuant to these Terms of Payment shall not be a breach of the contract by Her Majesty.

- 6.2 Her Majesty shall pay, without demand from the Contractor, simple interest at the Bank Rate plus 1 -1/4 per centum on any amount which is overdue pursuant to TP4.1.3, and the interest shall apply from and include the day such amount became overdue until the day prior to the date of payment except that

- 6.2.1 interest shall not be payable or paid unless the amount referred to in TP6.2 has been overdue for more than 15 days following

6.2.1.1 the date the said amount became due and payable, or

6.2.1.2 the receipt by the Departmental Representative of the Statutory Declaration referred to in TP4.5, TP4.8 or TP4.11,

whichever is the later, and

- 6.6.2 interest shall not be payable or paid on overdue advance payments if any.

TP7 Right of Set-off

- 7.1 Without limiting any right of set-off or deduction given or implied by law or elsewhere in the contract, Her Majesty may set off any amount payable to Her Majesty by the Contractor under this contract or under any current contract against any amount payable to the Contractor under this contract.

- 7.2 For the purposes of TP7.1, "current contract" means a contract between Her Majesty and the Contractor

7.2.1 under which the Contractor has an undischarged obligation to perform or supply work, labour or material, or

7.2.2 in respect of which Her Majesty has, since the date of which the Articles of Agreement were made, exercised any right to take the work that is the subject of the contract out of the Contractor's hands.



TP8 Payment in Event of Termination

- 8.1 If the contract is terminated pursuant to GC41, Her Majesty shall pay the Contractor any amount that is lawfully due and payable to the Contractor as soon as is practicable under the circumstances.

TP9 Interest on Settled Claims

- 9.1 Her Majesty shall pay to the Contractor simple interest on the amount of a settled claim at an average Bank Rate plus 1 ¼ per centum from the date the settled claim was outstanding until the day prior to the date of payment.
- 9.2 For the purposes of TP9.1,
- 9.2.1 a claim is deemed to have been settled when an agreement in writing is signed by the Departmental Representative and the Contractor setting out the amount of the claim to be paid by Her Majesty and the items or work for which the said amount is to be paid.
- 9.2.2 an "average Bank Rate" means the discount rate of interest set by the Bank of Canada in effect at the end of each calendar month averaged over the period the settled claim was outstanding.
- 9.2.3 a settled claim is deemed to be outstanding from the day immediately following the date the said claim would have been due and payable under the contract had it not been disputed.
- 9.3 For the purposes of TP9 a claim means a disputed amount subject to negotiation between Her Majesty and the Contractor under the contract.



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GC1 Interpretation

1.1 In the contract

- 1.1.1 where reference is made to a part of the contract by means of numbers preceded by letters, the reference shall be construed to be a reference to the particular part of the contract that is identified by that combination of letters and numbers and to any other part of the contract referred to therein;
- 1.1.2 “contract” means the contract document referred to in the Articles of Agreement;
- 1.1.3 “contract security” means any security given by the Contractor to Her Majesty in accordance with the contract;
- 1.1.4 “Departmental Representative” means the officer or employee of Her Majesty who is designated pursuant to the Articles of Agreement and includes a person specially authorized by him to perform, on his behalf, any of his functions under the contract and is so designated in writing to the Contractor;
- 1.1.5 “material” includes all commodities, articles and things required to be furnished by or for the Contractor under the contract for incorporation into the work;
- 1.1.6 “Minister” includes a person acting for, or if the office is vacant, in place of the Minister and his successors in the office, and his or their lawful deputy and any of his or their representatives appointed for the purposes of the contract;
- 1.1.7 “person” includes, unless the context otherwise requires, a partnership, proprietorship, firm, joint venture, consortium and a corporation;
- 1.1.8 “plant” includes all animals, tools, implements, machinery, vehicles, buildings, structures, equipment and commodities, articles and things other than material, that are necessary for the due performance of the contract;
- 1.1.9 “subcontractor” means a person to whom the Contractor has, subject to GC4, subcontracted the whole or any part of the work;
- 1.1.10 “superintendent” means the employee of the Contractor who is designated by the Contractor to act pursuant to GC19;
- 1.1.11 “work includes, subject only to any express stipulation in the contract to the contrary, everything that is necessary to be done, furnished or delivered by the Contractor to perform the contract.

1.2 The headings in the contract documents, other than in the Plans and Specifications, form no part of the contract but are inserted for convenience of reference only.

1.3 In interpreting the contract, in the event of discrepancies or conflicts between anything in the Plans and Specifications and the General Conditions, the General Conditions govern.



- 1.4 In interpreting the Plans and Specifications, in the event of discrepancies or conflicts between
- 1.4.1 the Plans and Specifications, the Specifications govern;
 - 1.4.2 the Plans, the Plans drawn with the largest scale govern; and
 - 1.4.3 figured dimensions and scaled dimensions, the figured dimensions govern.

GC2 Successors and Assigns

- 2.1 The contract shall inure to the benefit of and be binding upon the parties hereto and their lawful heirs, executors, administrators, successors and assigns.

GC3 Assignment of Contract

- 3.1 The contract may not be assigned by the Contractor, either in whole or in part, without the written consent of the Minister.

GC4 Subcontracting by Contractor

- 4.1 Subject to this General Condition, the Contractor may subcontract any part of the work.
- 4.2 The Contractor shall notify the Departmental Representative in writing of his intention to subcontract.
- 4.3 A notification referred to in GC4.2 shall identify the part of the work, and the subcontractor with whom it is intended to subcontract.
- 4.4 The Departmental Representative may object to the intended subcontracting by notifying the Contractor in writing within six days of receipt by the Departmental Representative of a notification referred to in GC4.2.
- 4.5 If the Departmental Representative objects to a subcontracting pursuant to GC4.4, the Contractor shall not enter into the intended subcontract.
- 4.6 The contractor shall not, without the written consent of the Departmental Representative, change a subcontractor who has been engaged by him in accordance with this General Condition.
- 4.7 Every subcontract entered into by the Contractor shall adopt all of the terms and conditions of this contract that are of general application.
- 4.8 Neither a subcontracting nor the Departmental Representative's consent to a subcontracting by the Contractor shall be construed to relieve the Contractor from any obligation under the contract or to impose any liability upon Her Majesty.

GC5 Amendments



- 5.1 No amendment or change in any of the provisions of the contract shall have any force or effect until it is reduced to writing.

GC6 No Implied Obligations

- 6.1 No implied terms or obligations of any kind by or on behalf of Her Majesty shall arise from anything in the contract and the express covenants and agreements therein contained and made by Her Majesty are the only covenants and agreements upon which any rights against Her Majesty are to be founded.
- 6.2 The contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work that were made prior to the date of the contract.

GC7 Time of Essence

- 7.1 Time is of the essence of the contract.

GC8 Indemnification by Contractor

- 8.1 The Contractor shall indemnify and save Her Majesty harmless from and against all claims, demand, losses, costs, damages, actions, suits, or proceedings by whomever made, brought or prosecuted and in any manner based upon, arising out of, related to, occasioned by or attributable to the activities of the Contractor, his servants, agents, subcontractors and sub-subcontractors in performing the work including an infringement or an alleged infringement of a patent of invention or any other kind of intellectual property.
- 8.2 For the purpose of GC8.1, "activities" includes any act improperly carried out, any omission to carry out an act and any delay in carrying out an act.

GC9 Indemnification by Her Majesty

- 9.1 Her Majesty shall, subject to the Crown Liability Act, the Patent Act, and any other law that affects Her Majesty's rights, powers, privileges or obligations, indemnify and save the Contractor harmless from and against all claims, demands, losses, costs, damage, actions, suits or proceedings arising out of his activities under the contract that are directly attributable to
- 9.1.1 lack of or a defect in Her Majesty's title to the work site whether real or alleged; or
- 9.1.2 an infringement or an alleged infringement by the Contractor of any patent of invention or any other kind of intellectual property occurring while the Contractor was performing any act for the purposes of the contract employing a model, plan or design or any other thing related to the work that was supplied by Her Majesty to the Contractor.

GC10 Members of House of Commons Not to Benefit



- 10.1 As required by the Parliament of Canada Act, it is an express condition of the contract that no member of the House of Commons shall be admitted to any share of part of the contract or to any benefit arising therefrom.

GC11 Notices

- 11.1 Any notice, consent, order, decision, direction or other communication, other than a notice referred to in GC11.4, that may be given to the Contractor pursuant to the contract may be given in any manner.
- 11.2 Any notice, consent, order, decision, direction or other communication required to be given in writing, to any party pursuant to the contract shall, subject to GC11.4, be deemed to have been effectively given
- 11.2.1 to the Contractor, if delivered personally to the Contractor or the Contractor's superintendent, or forwarded by mail, telex or facsimile to the Contractor at the address set out in A4.1, or
- 11.2.2 to Her Majesty, if delivered personally to the Departmental Representative, or forwarded by mail, telex or facsimile to the Departmental Representative at the address set out in A1.2.1.
- 11.3 Any such notice, consent, order, decision, direction or other communication given in accordance with GC11.2 shall be deemed to have been received by either party
- 11.3.1 if delivered personally, on the day that it was delivered,
- 11.3.2 if forwarded by mail, on the earlier of the day it was received and the sixth day after it was mailed, and
- 11.3.3 if forwarded by telex or facsimile, 24 hours after it was transmitted.
- 11.4 A notice given under GC38.1.1, GC40 and GC41, if delivered personally, shall be delivered to the Contractor if the Contractor is doing business as sole proprietor or, if the Contractor is a partnership or corporation, to an officer thereof.

GC12 Material, Plant and Real Property Supplied by Her Majesty

- 12.1 Subject to GC12.2, the Contractor is liable to Her Majesty for any loss of or damage to material, plant or real property that is supplied or placed in the care, custody and control of the Contractor by Her Majesty for use in connection with the contract, whether or not that loss or damage is attributable to causes beyond the Contractor's control.
- 12.2 The Contractor is not liable to Her Majesty for any loss or damage to material, plant or real property referred to in GC12.1 if that loss or damage results from and is directly attributable to reasonable wear and tear.
- 12.3 The Contractor shall not use any material, plant or real property referred to in GC12.1 except for



the purpose of performing this contract.

- 12.4 When the Contractor fails to make good any loss or damage for which he is liable under GC12.1 within a reasonable time after being required to do so by the Departmental Representative, the Departmental Representative may cause the loss or damage to be made good at the Contractor's expense, and the Contractor shall thereupon be liable to Her Majesty for the cost thereof and shall, on demand, pay to Her Majesty an amount equal to that cost.
- 12.5 The Contractor shall keep such records of all material, plant and real property referred to in GC12.1 as the Departmental Representative from time to time requires and shall satisfy the Departmental Representative, when requested, that such material, plant and real property are at the place and in the condition which they ought to be.

GC13 Material, Plant and Real Property Become Property of Her Majesty

- 13.1 Subject to GC14.7 all material and plant and the interest of the Contractor in all real property, licenses, powers and privileges purchased, used or consumed by the Contractor for the contract shall, after the time of their purchase, use or consumption be the property of Her Majesty for the purposes of the work and they shall continue to be the property of Her Majesty.
- 13.1.1 in the case of material, until the Departmental Representative indicates that he is satisfied that it will not be required for the work, and
- 13.1.2 in the case of plant, real property, licenses, powers and privileges, until the Departmental Representative indicates that he is satisfied that the interest vested in Her Majesty therein is no longer required for the purposes of the work.
- 13.2 Material or plant that is the property of Her Majesty by virtue of GC13.1 shall not be taken away from the work site or used or disposed of except for the purposes of the work without the written consent of the Departmental Representative.
- 13.3 Her Majesty is not liable for loss of or damage from any cause to the material or plant referred to in GC13.1 and the Contractor is liable for such loss or damage notwithstanding that the material or plant is the property of Her Majesty.

GC14 Permits and Taxes Payable

- 14.1 The Contractor shall, within 30 days after the date of the contract, tender to a municipal authority an amount equal to all fees and charges that would be lawfully payable to that municipal authority in respect of building permits as if the work were being performed for a person other than Her Majesty.
- 14.2 Within 10 days of making a tender pursuant to GC14.1, the Contractor shall notify the Departmental Representative of his action and of the amount tendered and whether or not the municipal authority has accepted that amount.
- 14.3 If the municipal authority does not accept the amount tendered pursuant to GC14.1 the Contractor shall pay that amount to Her Majesty within 6 days after the time stipulated in GC14.2.



- 14.4 For the purposes of GC14.1 to GC14.3 “municipal authority” means any authority that would have jurisdiction respecting permission to perform the work if the owner were not Her Majesty.
- 14.5 Notwithstanding the residency of the Contractor, the Contractor shall pay any applicable tax arising from or related to the performance of the work under the contract.
- 14.6 In accordance with the Statutory Declaration referred to in TP4.9, a Contractor who has neither residence nor place of business in the province in which work under the contract is being performed shall provide Her Majesty with proof of registration with the provincial sales tax authorities in the said province.
- 14.7 For the purpose of the payment of any applicable tax or the furnishing of security for the payment of any applicable tax arising from or related to the performance of the work under the contract, the Contractor shall, notwithstanding the fact that all material, plant and interest of the Contractor in all real property, licenses, powers and privileges, have become the property of Her Majesty after the time of purchase, be liable, as a user or consumer, for the payment or for the furnishing of security for the payment of any applicable tax payable, at the time of the use or consumption of that material, plant or interest of the Contractor in accordance with the relevant legislation.

GC15 Performance of Work under Direction of Departmental Representative

- 15.1 The Contractor shall
- 15.1.1 permit the Departmental Representative to have access to the work and its site at all times during the performance of the contract;
 - 15.1.2 furnish the Departmental Representative with such information respecting the performance of the contract as he may require; and
 - 15.1.3 give the Departmental Representative every possible assistance to enable the Departmental Representative to carry out his duty to see that the work is performed in accordance with the contract and to carry out any other duties and exercise any powers specially imposed or conferred on the Departmental Representative under the contract.

CG16 Cooperation with Other Contractors

- 16.1 Where, in the opinion of the Departmental Representative, it is necessary that other contractors or workers with or without plant and material, be sent onto the work or its site, the Contractor shall, to the satisfaction of the Departmental Representative, allow them access and cooperate with them in the carrying out of their duties and obligation.
- 16.2 If
- 16.2.1 the sending onto the work or its site of other contractors or workers pursuant to GC16.1 could not have been reasonably foreseen or anticipated by the Contractor when entering into the contract, and



16.2.2 the Contractor incurs, in the opinion of the Departmental Representative, extra expense in complying with GC16.1, and

16.2.3 The Contractor has given the Departmental Representative written notice of his claim for the extra expense referred to in GC16.2.2 within 30 days of the date that the other contractors or workers were sent onto the work or its site,

Her Majesty shall pay the Contractor the cost, calculated in accordance with GC48 to GC50, of the extra labour, plant and material that was necessarily incurred.

GC17 Examination of Work

17.1 If, at any time after the commencement of the work but prior to the expiry of the warranty or guarantee period, the Departmental Representative has reason to believe that the work or any part thereof has not been performed in accordance with the contract, the Departmental Representative may have that work examined by an expert of his choice.

17.2 If, as a result of an examination of the work referred to in GC17.1, it is established that the work was not performed in accordance with the contract, then, in addition to and without limiting or otherwise affecting any of Her Majesty's rights and remedies under the contract either at law or in equity, the Contractor shall pay Her Majesty, on demand, all reasonable costs and expenses that were incurred by Her Majesty in having that examination performed.

GC18 Clearing of Site

18.1 The Contractor shall maintain the work and its site in a tidy condition and free from the accumulation of waste material and debris, in accordance with any directions of the Departmental Representative.

18.2 Before the issue of an interim certificate referred to in GC44.2, the Contractor shall remove all the plant and material not required for the performance of the remaining work, and all waste material and other debris, and shall cause the work and its site to be clean and suitable for occupancy by Her Majesty's servants, unless otherwise stipulated in the contract.

18.3 Before the issue of a final certificate referred to in GC44.1, the Contractor, shall remove from the work and its site all of the surplus plant and material and any waste material and other debris.

18.4 The Contractor's obligations described in GC18.1 to GC18.3 do not extend to waste material and other debris caused by Her Majesty's servants or contractors and workers referred to in GC16.1.

GC19 Contractor's Superintendent

19.1 The Contractor shall, forthwith upon the award of the contract, designate a superintendent.

19.2 The Contractor shall forthwith notify the Departmental Representative of the name, address and telephone number of a superintendent designate pursuant to GC19.1.



- 19.3 A superintendent designated pursuant to GC19.1 shall be in full charge of the operations of the Contractor in the performance of the work and is authorized to accept any notice, consent, order, direction, decision or other communication on behalf of the Contractor that may be given to the superintendent under the contract.
- 19.4 The Contractor shall, until the work has been completed, keep a competent superintendent at the work site during working hours.
- 19.5 The Contractor shall, upon the request of the Departmental Representative, remove any superintendent who, in the opinion of the Departmental Representative, is incompetent or has been conducting himself improperly and shall forthwith designate another superintendent who is acceptable to the Departmental Representative.
- 19.6 Subject to GC19.5, the Contractor shall not substitute a superintendent without the written consent of the Departmental Representative.
- 19.7 A breach by the Contractor of GC19.6 entitles the Departmental Representative to refuse to issue any certificate referred to in GC44 until the superintendent has returned to the work site or another superintendent who is acceptable to the Departmental Representative has been substituted.

GC20 National Security

- 20.1 If the Minister is of the opinion that the work is of a class or kind that involves the national security, he may order the Contractor
- 20.1.1 to provide him with any information concerning persons employed or to be employed by him for purposes of the contract; and
 - 20.1.2 to remove any person from the work and its site if, in the opinion of the Minister, that person may be a risk to the national security.
- 20.2 The Contractor shall, in all contracts with persons who are to be employed in the performance of the contract, make provision for his performance of any obligation that may be imposed upon him under GC19 to GC21.
- 20.3 The Contractor shall comply with an order of the Minister under GC20.1

GC21 Unsuitable Workers

- 21.1 The Contractor shall, upon the request of the Departmental Representative, remove any person employed by him for purposes of the contract who, in the opinion of the Departmental Representative, is incompetent or has conducted himself improperly, and the Contractor shall not permit a person who has been removed to return to the work site.

GC22 Increased or Decreased Costs



- 22.1 The amount set out in the Articles of Agreement shall not be increased or decreased by reason of any increase or decrease in the cost of the work that is brought about by an increase or decrease in the cost of labour, plant or material or any wage adjustment arising pursuant to the Labour Conditions.
- 22.2 Notwithstanding GC22.1 and GC35, an amount set out in the Articles of Agreement shall be adjusted in the manner provided in GC22.3, if any change in a tax imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act, the Customs Tariff or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property
- 22.2.1 occurs after the date of the submission by the Contractor of his tender for the contract,
- 22.2.2 applies to material, and
- 22.2.3 affects the cost to the Contractor of that material.
- 22.3 If a change referred to in GC22.2 occurs, the appropriate amount set out in the Articles of Agreement shall be increased or decreased by an amount equal to the amount that is established by an examination of the relevant records of the Contractor referred to in GC51 to be the increase or decrease in the cost incurred that is directly attributable to that change.
- 22.4 For the purpose of GC22.2, where a tax is changed after the date of submission of the tender but public notice of the change has been given by the Minister of Finance before that date, the change shall be deemed to have occurred before the date of submission of the tender.

GC23 Canadian Labour and Material

- 23.1 The Contractor shall use Canadian labour and material in the performance of the work to the full extent to which they are procurable, consistent with proper economy and expeditious carrying out of the work.
- 23.2 Subject to GC23.1, the Contractor shall, in the performance of the work, employ labour from the locality where the work is being performed to the extent to which it is available, and shall use the offices of the Canada Employment Centres for the recruitment of workers wherever practicable.
- 23.3 Subject to GC23.1 and GC23.2, the Contractor shall, in the performance of the work, employ a reasonable proportion of persons who have been on active service with the armed forces of Canada and have been honourably discharged therefrom.

GC24 Protection of Work and Documents

- 24.1 The Contractor shall guard or otherwise protect the work and its site, and protect the contract, specifications, plans, drawings, information, material, plant and real property, whether or not they are supplied by Her Majesty to the Contractor, against loss or damage from any cause, and he shall not use, issue, disclose or dispose of them without the written consent of the Minister, except as may be essential for the performance of the work.



- 24.2 If any document or information given or disclosed to the Contractor is assigned a security rating by the person who gave or disclosed it, the Contractor shall take all measures directed by the Departmental Representative to be taken to ensure the maintenance of the degree of security that is ascribed to that rating.
- 24.3 The Contractor shall provide all facilities necessary for the purpose of maintaining security, and shall assist any person authorized by the Minister to inspect or to take security measures in respect of the work and its site.
- 24.4 The Departmental Representative may direct the Contractor to do such things and to perform such additional work as the Departmental Representative considers reasonable and necessary to ensure compliance with or to remedy a breach of GC24.1 to GC24.3.

GC25 Public Ceremonies and Signs

- 25.1 The Contractor shall not permit any public ceremony in connection with the work without the prior consent of the Minister.
- 25.2 The Contractor shall not erect or permit the erection of any sign or advertising on the work or its site without the prior consent of the Departmental Representative.

GC26 Precautions against Damage, Infringement of Rights, Fire, and Other Hazards

- 26.1 The Contractor shall, at his own expense, do whatever is necessary to ensure that
- 26.1.1 no person, property, right, easement or privilege is injured, damaged or infringed by reasons of the Contractor's activities in performing the contract;
 - 26.1.2 pedestrian and other traffic on any public or private road or waterway is not unduly impeded, interrupted or endangered by the performance or existence of the work or plant;
 - 26.1.3 fire hazards in or about the work or its site are eliminated and, subject to any direction that may be given by the Departmental Representative, any fire is promptly extinguished;
 - 26.1.4 the health and safety of all persons employed in the performance of the work is not endangered by the method or means of its performance;
 - 26.1.5 adequate medical services are available to all persons employed on the work or its site at all times during the performance of the work;
 - 26.1.6 adequate sanitation measures are taken in respect of the work and its site; and
 - 26.1.7 all stakes, buoys and marks placed on the work or its site by or under the authority of the Departmental Representative are protected and are not removed, defaced, altered or destroyed.
- 26.2 The Departmental Representative may direct the Contractor to do such things and to perform such additional work as the Departmental Representative considers reasonable and necessary to ensure



compliance with or to remedy a breach of GC26.1.

- 26.3 The Contractor shall, at his own expense, comply with a direction of the Departmental Representative made under GC26.2.

GC27 Insurance

- 27.1 The Contractor shall, at his own expense, obtain and maintain insurance contracts in respect of the work and shall provide evidence thereof to the Departmental Representative in accordance with the requirements of the Insurance Conditions "E".

- 27.2 The insurance contracts referred to in GC27.1 shall

27.2.1 be in a form, of the nature, in the amounts, for the periods and containing the terms and conditions specified in Insurance Conditions "E", and

27.2.2 provide for the payment of claims under such insurance contracts in accordance with GC28.

GC28 Insurance Proceeds

- 28.1 In the case of a claim payable under a Builders Risk/Installation (All Risks) insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid directly to Her Majesty, and

28.1.1 the monies so paid shall be held by Her Majesty for the purposes of the contract, or

28.1.2 if Her Majesty elects, shall be retained by Her Majesty, in which event they vest in Her Majesty absolutely.

- 28.2 In the case of a claim payable under a General Liability insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid by the insurer directly to the claimant.

- 28.3 If an election is made pursuant to GC28.1, the Minister may cause an audit to be made of the accounts of the Contractor and of Her Majesty in respect of the part of the work that was lost, damaged or destroyed for the purpose of establishing the difference, if any, between

28.3.1 the aggregate of the amount of the loss or damage suffered or sustained by Her Majesty, including any cost incurred in respect of the clearing and cleaning of the work and its site and any other amount that is payable by the Contractor to Her Majesty under the contract, minus any monies retained pursuant to GC28.12, and

28.3.2 the aggregate of the amounts payable by Her Majesty to the Contractor pursuant to the contract up to the date of the loss or damage.

- 28.4 A difference that is established pursuant to GC28.3 shall be paid forthwith by the party who is determined by the audit to be the debtor to the party who is determined by the audit to be the



creditor.

- 28.5 When payment of a deficiency has been made pursuant to GC28.4, all rights and obligations of Her Majesty and the Contractor under the contract shall, with respect only to the part of the work that was the subject of the audit referred to in GC28.3, be deemed to have been expended and discharged.
- 28.6 If an election is not made pursuant to GC28.1.2 the Contractor shall, subject to GC28.7, clear and clean the work and its site and restore and replace the part of the work that was lost, damaged or destroyed at his own expense as if that part of the work had not yet been performed.
- 28.7 When the Contractor clears and cleans the work and its site and restores and replaces the work referred to in GC 28.6, Her Majesty shall pay him out of the monies referred to in GC28.1 so far as they will thereunto extend.
- 28.8 Subject to GC28.7, payment by Her Majesty pursuant to GC28.7 shall be made in accordance with the contract but the amount of each payment shall be 100% of the amount claimed notwithstanding TP4.4.1 and TP4.4.2.

GC29 Contract Security

- 29.1 The Contractor shall obtain and deliver contract security to the Departmental Representative in accordance with the provisions of the Contract Security Conditions.
- 29.2 If the whole or a part of the contract security referred to in GC29.1 is in the form of a security deposit, it shall be held and disposed of in accordance with GC43 and GC45.
- 29.3 If a part of the contract security referred to in GC29.1 is in the form of a labour and material payment bond, the Contractor shall post a copy of that bond on the work site.

GC30 Changes in the Work

- 30.1 Subject to GC5, the Departmental Representative may, at any time before he issues his Final Certificate of Completion,
- 30.1.1 order work or material in addition to that provided for in the Plans and Specifications;
and
- 30.1.2 delete or change the dimensions, character, quantity, quality, description, location or position of the whole or any part of the work or material provided for in the Plans and Specifications or in any order made pursuant to GC30.1.1,
- if that additional work or material, deletion, or change is, in his opinion, consistent with the general intent of the original contract.
- 30.2 The Contractor shall perform the work in accordance with such orders, deletions and changes that are made by the Departmental Representative pursuant to GC30.1 from time to time as if they had appeared in and been part of the Plans and Specifications.



- 30.3 The Departmental Representative shall determine whether or not anything done or omitted by the Contractor pursuant to an order, deletion or change referred to in GC30.1 increased or decreased the cost of the work to the Contractor.
- 30.4 If the Departmental Representative determines pursuant to GC30.3 that the cost of the work to the Contractor has been increased, Her Majesty shall pay the Contractor the increased cost that the Contractor necessarily incurred for the additional work calculated in accordance with GC49 or GC50.
- 30.5 If the Departmental Representative determines pursuant to GC30.3 that the cost of the work to the Contractor has been decreased, Her Majesty shall reduce the amount payable to the Contractor under the contract by an amount equal to the decrease in the cost caused by the deletion or change referred to in GC30.1.2 and calculated in accordance with GC49.
- 30.6 GC30.3 to GC30.5 are applicable only to a contract or a portion of a contract for which a Fixed Price Arrangement is stipulated in the contract.
- 30.7 An order, deletion or change referred to in GC30.1 shall be in writing, signed by the Departmental Representative and given to the Contractor in accordance with GC11.

GC31 Interpretation of Contract by Departmental Representative

- 31.1 If, at any time before the Departmental Representative has issued a Final Certificate of Completion referred to in GC44.1, any question arises between the parties about whether anything has been done as required by the contract or about what the Contractor is required by the contract to do, and, in particular but without limiting the generality of the foregoing, about
- 31.1.1 the meaning of anything in the Plans and Specification,
 - 31.1.2 the meaning to be given to the Plans and Specifications in case of any error therein, omission therefrom, or obscurity or discrepancy in their working or intention,
 - 31.1.3 whether or not the quality or quantity of any material or workmanship supplied or proposed to be supplied by the Contractor meets the requirements of the contract,
 - 31.1.4 whether or not the labour, plant or material provided by the Contractor for performing the work and carrying out the contract are adequate to ensure that the work will be performed in accordance with the contract and that the contract will be carried out in accordance with its terms,
 - 31.1.5 what quantity of any kind of work has been completed by the Contractor, or
 - 31.1.6 the timing and scheduling of the various phases of the performance of the work,
- the question shall be decided by the Departmental Representative whose decision shall be final and conclusive in respect of the work.
- 31.2 The Contractor shall perform the work in accordance with any decisions of the Departmental



Representative that are made under GC31.1 and in accordance with any consequential directions given by the Departmental Representative.

GC32 Warranty and Rectification of Defects in Work

32.1 Without restricting any warranty or guarantee implied or imposed by law or contained in the contract documents, the Contractor shall, at his own expense,

32.1.1 rectify and make good any defect or fault that appears in the work or comes to the attention of the Minister with respect to those parts of the work accepted in connection with the Interim Certificate of Completion referred to GC44.2 within 12 months from the date of the Interim Certificate of Completion;

32.1.2 rectify and make good any defect or fault that appears in or comes to the attention of the Minister in connection with those parts of the work described in the Interim Certificate of Completion referred to in GC44.2 within 12 months from the date of the Final Certificate of Completion referred to in GC44.1.

32.2 The Departmental Representative may direct the Contractor to rectify and make good any defect or fault referred to in GC32.1 or covered by any other expressed or implied warranty or guarantee.

32.3 A direction referred to in GC32.2 shall be in writing, may include a stipulation in respect of the time within which a defect or fault is required to be rectified and made good by the Contractor, and shall be given to the Contractor in accordance with GC11.

32.4 The Contractor shall rectify and make good any defect or fault described in a direction given pursuant to GC32.2 within the time stipulated therein.

GC33 Non-Compliance by Contractor

33.1 If the Contractor fails to comply with any decision or direction given by the Departmental Representative pursuant to GC18, GC24, GC26, GC31 or GC32, the Departmental Representative may employ such methods as he deems advisable to do that which the Contractor failed to do.

33.2 The Contractor shall, on demand, pay Her Majesty an amount that is equal to the aggregate of all cost, expenses and damage incurred or sustained by Her Majesty by reason of the Contractor's failure to comply with any decision or direction referred to in GC33.1, including the cost of any methods employed by the Departmental Representative pursuant to GC33.1.

GC34 Protesting Departmental Representative's Decisions

34.1 The Contractor may, within ten days after the communication to him of any decision or direction referred to in GC30.3 or GC33.1, protest that decision or direction.

34.2 A protest referred to in GC34.1 shall be in writing, contain full reasons for the protest, be signed



by the Contractor and be given to Her Majesty by delivery to the Departmental Representative.

- 34.3 If the Contractor gives a protest pursuant to GC34.2, any compliance by the Contractor with the decision or direction that was protested shall not be construed as an admission by the Contractor of the correctness of that decision or direction, or prevent the Contractor from taking whatever action he considers appropriate in the circumstances.
- 34.4 The giving of a protest by the Contractor pursuant to GC34.2 shall not relieve him from complying with the decision or direction that is the subject of the protest.
- 34.5 Subject to GC34.6, the Contractor shall take any action referred to in GC34.3 within three months after the date that a Final Certificate of Completion is issued under GC44.1 and not afterwards.
- 34.6 The Contractor shall take any action referred to in GC34.3 resulting from a direction under GC32 within three months after the expiry of a warranty or guarantee period and not afterwards.
- 34.7 Subject to GC34.8, if Her Majesty determines that the Contractor's protest is justified, Her Majesty shall pay the Contractor the cost of the additional labour, plant and material necessarily incurred by the Contractor in carrying out the protested decision or direction.
- 34.8 Costs referred to in GC34.7 shall be calculated in accordance with GC48 to GC50.

GC35 Changes in Soil Conditions and Neglect or Delay by Her Majesty

35.1 Subject to GC35.2 no payment, other than a payment that is expressly stipulated in the contract, shall be made by Her Majesty to the Contractor for any extra expense or any loss or damage incurred or sustained by the Contractor.

35.2 If the Contractor incurs or sustains any extra expense or any loss or damage that is directly attributable to

35.2.1 a substantial difference between the information relating to soil conditions at the work site that is contained in the Plans and Specifications or other documents supplied to the Contractor for his use in preparing his tender or a reasonable assumption of fact based thereon made by the Contractor, and the actual soil conditions encountered by the Contractor at the work site during the performance of the contract, or

35.2.2 any neglect or delay that occurs after the date of the contract on the part of Her Majesty in providing any information or in doing any act that the contract either expressly requires Her Majesty to do or that would ordinarily be done by an owner in accordance with the usage of the trade,

he shall, within ten days of the date the actual soil conditions described in GC35.2.1 were encountered or the neglect or delay described in GC35.2.2 occurred, give the Departmental Representative written notice of his intention to claim for that extra expense or that loss or damage.

35.3 When the Contractor has given a notice referred to in GC35.2, he shall give the Departmental Representative a written claim for extra expense or loss or damage within 30 days of the date that



a Final Certificate of Completion referred to in GC44.1 is issued and not afterwards.

- 35.4 A written claim referred to in GC35.3 shall contain a sufficient description of the facts and circumstances of the occurrence that is the subject of the claim to enable the Departmental Representative to determine whether or not the claim is justified and the Contractor shall supply such further and other information for that purpose as the Departmental Representative requires from time to time.
- 35.5 If the Departmental Representative determines that a claim referred to in GC35.3 is justified, Her Majesty shall make an extra payment to the Contractor in an amount that is calculated in accordance with GC47 to GC50.
- 35.6 If, in the opinion of the Departmental Representative, an occurrence described in GC35.2.1 results in a savings of expenditure by the Contractor in performing the contract, the amount set out in the Articles of Agreement shall, subject to GC35.7, be reduced by an amount that is equal to the saving.
- 35.7 The amount of the saving referred to in GC35.6 shall be determined in accordance with GC47 to GC49.
- 35.8 If the Contractor fails to give a notice referred to in GC35.2 and a claim referred to in GC35.3 within the times stipulated, an extra payment shall not be made to him in respect of the occurrence.

GC36 Extension of Time

- 36.1 Subject to GC36.2, the Departmental Representative may, on the application of the Contractor made before the day fixed by the Articles of Agreement for completion of the work or before any other date previously fixed under this General Condition, extend the time for its completion by fixing a new date if, in the opinion of the Departmental Representative, causes beyond the control of the Contractor have delayed its completion.
- 36.2 An application referred to in GC36.1 shall be accompanied by the written consent of the bonding company whose bond forms part of the contract security.

GC37 Assessments and Damages for Late Completion

- 37.1 For the purposes of this General Condition
- 37.1.1 the work shall be deemed to be completed on the date that an Interim Certificate of Completion referred to in GC44.2 is issued, and
- 37.1.2 "period of delay" means the number of days commencing on the day fixed by the Articles of Agreement for completion of the work and ending on the day immediately preceding the day on which the work is completed but does not include any day within a period of extension granted pursuant to GC36.1, and any other day on which, in the opinion of the Departmental Representative, completion of the work was delayed for reasons beyond the control of the Contractor.



- 37.2 If the Contractor does not complete the work by the day fixed for its completion by the Articles of Agreement but completes it thereafter, the Contractor shall pay Her Majesty an amount equal to the aggregate of
- 37.2.1 all salaries, wages and travelling expenses incurred by Her Majesty in respect of persons overseeing the performance of the work during the period of delay;
 - 37.2.2 the cost incurred by Her Majesty as a result of the inability to use the completed work for the period of delay; and
 - 37.2.3 all other expenses and damages incurred or sustained by Her Majesty during the period of delay as a result of the work not being completed by the day fixed for its completion.
- 37.3 The Minister may waive the right of Her Majesty to the whole or any part of the amount payable by the Contractor pursuant to GC37.2 I, in the opinion of the Minister, it is in the public interest to do so.

GC38 Taking the Work Out of the Contractor's Hands

- 38.1 The Minister may, at his sole discretion, by giving a notice in writing to the Contractor in accordance with GC11, take all or any part of the work out of the Contractor's hands, and may employ such means as he sees fit to have the work completed if the Contractor
- 38.1.1 Has not, within six days of the Minister or the Departmental Representative giving notice to the Contractor in writing in accordance with GC11, remedied any delay in the commencement or any default in the diligent performance of the work to the satisfaction of the Departmental Representative;
 - 38.1.2 has defaulted in the completion of any part of the work within the time fixed for its completion by the contract;
 - 38.1.3 has become insolvent;
 - 38.1.4 has committed an act of bankruptcy;
 - 38.1.5 has abandoned the work;
 - 38.1.6 has made an assignment of the contract without the consent required by GC3.1; or
 - 38.1.7 has otherwise failed to observe or perform any of the provisions of the contract.
- 38.2 If the whole or any part of the work is taken out of the Contractor's hands pursuant to GC38.1,
- 38.2.1 the Contractor's right to any further payment that is due or accruing due under the contract is, subject only to GC38.4, extinguished, and
 - 38.2.2 the Contractor is liable to pay Her Majesty, upon demand, an amount that is equal to the amount of all loss and damage incurred or sustained by Her Majesty in respect of the



Contractor's failure to complete the work.

- 38.3 If the whole or any part of the work that is taken out of the Contractor's hands pursuant to GC38.1 is completed by Her Majesty, the Departmental Representative shall determine the amount, if any, of the holdback or a progress claim that had accrued and was due prior to the date on which the work was taken out of the Contractor's hands and that is not required for the purposes of having the work performed or of compensating Her Majesty for any other loss or damage incurred or sustained by reason of the Contractor's default.
- 38.4 Her Majesty may pay the Contractor the amount determined not to be required pursuant to GC38.3.

GC39 Effect of Taking the Work Out of the Contractor's Hands

- 39.1 The taking of the work or any part thereof out of the Contractor's hands pursuant to GC38 does not operate so as to relieve or discharge him from any obligation under the contract or imposed upon him by law except the obligation to complete the performance of that part of the work that was taken out of his hands.
- 39.2 If the work or any part thereof is taken out of the Contractor's hands pursuant to GC38, all plant and material and the interest of the Contractor is all real property, licenses, powers and privileges acquired, used or provided by the Contractor under the contract shall continue to be the property of Her Majesty without compensation to the Contractor.
- 39.3 When the Departmental Representative certifies that any plant, material, or any interest of the Contractor referred to in GC39.2 is no longer required for the purposes of the work, or that it is not in the interest of Her Majesty to retain that plant, material or interest, it shall revert to the Contractor.

G40 Suspension of Work by Minister

- 40.1 The Minister may, when in his opinion it is in the public interest to do so, require the Contractor to suspend performance of the work either for a specified or an unspecified period by giving a notice of suspension in writing to the Contractor in accordance with GC11.
- 40.2 When a notice referred to in GC40.1 is received by the Contractor in accordance with GC11, he shall suspend all operations in respect of the work except those that, in the opinion of the Departmental Representative, are necessary for the care and preservation of the work, plant and material.
- 40.3 The Contractor shall not, during a period of suspension, remove any part of the work, plant or material from its site without the consent of the Departmental Representative.
- 40.4 If a period of suspension is 30 days or less, the Contractor shall, upon the expiration of that period, resume the performance of the work and he is entitled to be paid the extra cost, calculated in accordance with GC48 to GC50, of any labour, plant and material necessarily incurred by him as a result of the suspension.



- 40.5 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor agree that the performance of the work will be continued by the Contractor, the Contractor shall resume performance of the work subject to any terms and conditions agreed upon by the Minister and the Contractor.
- 40.6 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor do not agree that performance of the work will be continued by the Contractor or upon the terms and conditions under which the Contractor will continue the work, the notice of suspension shall be deemed to be a notice of termination pursuant to GC41.

GC41 Termination of Contract

- 41.1 The Minister may terminate the contract at any time by giving a notice of termination in writing to the Contractor in accordance with GC11.
- 41.2 When a notice referred to in GC41.1 is received by the Contractor in accordance with GC11, he shall, subject to any conditions stipulated in the notice, forthwith cease all operations in performance of the contract.
- 41.3 If the contract is terminated pursuant to GC41.1, Her Majesty shall pay the Contractor, subject to GC41.4, an amount equal to
- 41.3.1 the cost to the contractor of all labour, plant and material supplied by him under the contract up to the date of termination in respect of a contract or part thereof for which a Unit Price Arrangement is stipulated in the contract, or
 - 41.3.2 the lesser of
 - 41.3.2.1 an amount, calculated in accordance with the Terms and Payment, that would have been payable to the Contractor had he completed the work, and
 - 41.3.2.2 an amount that is determined to be due to the Contractor pursuant to GC49 in respect of a contract or part thereof for which a Fixed Price Arrangement is stipulated in the contract
- less the aggregate of all amounts that were paid to the Contractor by Her Majesty and all amounts that are due to Her Majesty from the Contractor pursuant to the contract.
- 41.4 If Her Majesty and the Contractor are unable to agree about an amount referred to in GC41.3 that amount shall be determined by the method referred to in GC50.

GC42 Claims Against and Obligations of the Contractor or Subcontractor

- 42.1 Her Majesty may, in order to discharge lawful obligations of and satisfy claims against the Contractor or a subcontractor arising out of the performance of the contract, pay any amount that is due and payable to the Contractor pursuant to the contract directly to the obligees of and the claimants against the Contractor or the subcontractor but such amount if any, as is paid by Her Majesty, shall not exceed 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 as might have been necessary to preserve or perfect any claim for lien or privilege which claimant might have had;

- 42.2 Her Majesty will not make any payment as described in GC42.1 unless and until that claimant shall have delivered to Her Majesty:
- 42.2.1 a binding and enforceable Judgment or Order of a court of competent jurisdiction setting forth such amount as would have been payable by the Contractor to the claimant pursuant to the provisions of the applicable Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, had such legislation been applicable to the work; or
 - 42.2.2 a final and enforceable award of an arbitrator setting forth such amount as would have been payable by the Contractor to the claimant pursuant to the provisions of the applicable Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, had such legislation been applicable to the work; or
 - 42.2.3 the consent of the Contractor authorizing a payment.
- For the purposes of determining the entitlement of a claimant pursuant to GC42.2.1 and GC42.2.2, the notice required by GC42.8 shall be deemed to replace the registration or provision of notice after the performance of work as required by any applicable legislation and no claim shall be deemed to have expired, become void or unenforceable by reason of the claimant not commencing any action within the time prescribed by any applicable legislation.
- 42.3 The Contractor shall, by the execution of his contract, be deemed to have consented to submit to binding arbitration at the request of any claimant those questions that need be answered to establish the entitlement of the claimant to payment pursuant to the provisions of GC42.1 and such arbitration shall have as parties to it any subcontractor to whom the claimant supplied material, performed work or rented equipment should such subcontractor wish to be adjoined and the Crown shall not be a party to such arbitration and, subject to any agreement between the Contractor and the claimant to the contrary, the arbitration shall be conducted in accordance with the Provincial or Territorial legislation governing arbitration applicable in the Province or Territory in which the work is located.
- 42.4 A payment made pursuant to GC42.1 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.
- 42.5 To the extent that the circumstances of the work being performed for Her Majesty permit, the Contractor shall comply with all laws in force in the Province or Territory where the work is being performed relating to payment period, mandatory holdbacks, and creation and enforcement of mechanics' liens, builders' liens or similar legislation or in the Province of Quebec, the law relating to privileges.
- 42.6 The Contractor shall discharge all his lawful obligations and shall satisfy all lawful claims against him arising out of the performance of the work at least as often as the contract requires Her



Majesty to pay the Contractor.

- 42.7 The Contractor shall, whenever requested to do so by the Departmental Representative, make a statutory declaration deposing to the existence and condition of any obligations and claims referred to in GC42.6.
- 42.8 GC42.1 shall only apply to claims and obligations
- 42.8.1 the notification of which has been received by the Departmental Representative in writing before payment is made to the Contractor pursuant to TP4.10 and within 120 days of the date on which the claimant
- 42.8.1.1 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
- 42.8.1.2 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 GC42.8.1.1, and
- 42.8.2 the proceedings to determine the right to payment of which, pursuant to GC42.2. shall have commenced within one year from the date that the notice referred to in GC42.8.1 was received by the Departmental Representative, and
- the notification required by GC42.8.1 shall set forth the amount claimed to be owing and the person who by contract is primarily liable.
- 42.9 Her Majesty may, upon receipt of a notice of claim under GC42.8.1, 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.
- 42.10 The Departmental Representative shall notify the Contractor in writing of receipt of any claim referred to in GC42.8.1 and of the intention of Her Majesty to withhold funds pursuant to GC42.9 and the Contractor may, at any time thereafter and until payment is made to the claimant, be entitled to post, with Her Majesty, security in a form acceptable to Her Majesty in an amount equal to the value of the claim, the notice of which is received by the Departmental Representative and upon receipt of such security Her Majesty shall release to the Contractor any funds which would be otherwise payable to the Contractor, that were withheld pursuant to the provisions of GC42.9 in respect of the claim of any claimant for whom the security stands.

GC43 Security Deposit – Forfeiture or Return

- 43.1 If
- 43.1.1 the work is taken out of the Contractor's hands pursuant to GC38,
- 43.1.2 the contract is terminated pursuant to GC41, or
- 43.1.3 the Contractor is in breach of or in default under the contract,



Her Majesty may convert the security deposit, if any, to Her own use.

- 43.2 If Her Majesty converts the contract security pursuant to GC43.1, the amount realized shall be deemed to be an amount due from Her Majesty to the Contractor under the contract.
- 43.3 Any balance of an amount referred to in GC43.2 that remains after payment of all losses, damage and claims of Her Majesty and others shall be paid by Her Majesty to the Contractor if, in the opinion of the Departmental Representative, it is not required for the purposes of the contract.

GC44 Departmental Representative's Certificates

44.1 On the date that

44.1.1 the work has been completed, and

44.1.2 the Contractor has complied with the contract and all orders and directions made pursuant thereto,

both to the satisfaction of the Departmental Representative, the Departmental Representative shall issue a Final Certificate of Completion to the Contractor.

44.2 If the Departmental Representative is satisfied that the work is substantially complete he shall, at any time before he issues a certificate referred to in GC44.1, issue an Interim Certificate of Completion to the Contractor, and

44.2.1 for the purposes of GC44.2 the work will be considered to be substantially complete,

44.2.1.1 when the work under the contract or a substantial part thereof is, in the opinion of the Departmental Representative, ready for use by Her Majesty or is being used for the purpose intended; and

44.2.1.2 when the work remaining to be done under the contract is, in the opinion of the Departmental Representative, capable of completion or correction at accost of not more than

44.2.1.2.1 -3% of the first \$500,000, and

44.2.1.2.2 -2% of the next \$500,000, and

44.2.1.2.3 -1% of the balance

of the value of the contract at the time this cost is calculated.

44.3 For the sole purpose of GC44.2.1.2, where the work or a substantial part thereof is ready for use or is being used for the purposes intended and the remainder of the work or a part thereof cannot be completed by the time specified in A2.1, or as amended pursuant to GC36, for reasons beyond the control of the Contractor or where the Departmental Representative and the Contractor agree not to complete a part of the work within the specified time, the cost of that part of the work



which was either beyond the control of the Contractor to complete or the Departmental Representative and the Contractor have agreed not to complete by the time specified shall be deducted from the value of the contract referred to GC44.2.1.2 and the said cost shall not form part of the cost of the work remaining to be done in determining substantial completion.

44.4 An Interim Certificate of Completion referred to in GC44.2 shall describe the parts of the work not completed to the satisfaction of the Departmental Representative and all things that must be done by the Contractor

44.4.1 before a Final Certificate of Completion referred to in GC44.1 will be issued, and

44.4.2 before the 12-month period referred to in GC32.1.2 shall commence for the said parts and all the said things.

44.5 The Departmental Representative may, in addition to the parts of the work described in an Interim Certificate of Completion referred to in GC44.2, require the Contractor to rectify any other parts of the work not completed to his satisfaction and to do any other things that are necessary for the satisfactory completion of the work.

44.6 If the contract or a part thereof is subject to a Unit Price Arrangement, the Departmental Representative shall measure and record the quantities of labour, plant and material, performed, used and supplied by the Contractor in performing the work and shall, at the request of the Contractor, inform him of those measurements.

44.7 The Contractor shall assist and co-operate with the Departmental Representative in the performance of his duties referred to in GC44.6 and shall be entitled to inspect any record made by the Departmental Representative pursuant to GC44.6.

44.8 After the Departmental Representative has issued a Final Certificate of Completion referred to in GC44.1, he shall, if GC44.6 applies, issue a Final Certificate of Measurement.

44.9 A Final Certificate of Measurement referred to in GC44.8 shall

44.9.1 contain the aggregate of all measurements of quantities referred to in GC44.6, and

44.9.2 be binding upon and conclusive between Her Majesty and the Contractor as to the quantities referred to therein.

GC45 Return of Security Deposit

45.1 After an Interim Certificate of Completion referred to in GC44.2 has been issued, Her Majesty shall, if the Contractor is not in breach of or in default under the contract, return to the Contractor all or any part of the security deposit that, in the opinion of the Departmental Representative, is not required for the purposes of the contract.

45.2 After a Final Certificate of Completion referred to in GC44.1 has been issued, Her Majesty shall return to the Contractor the remainder of any security deposit unless the contract stipulates otherwise.



- 45.3 If the security deposit was paid into the Consolidated Revenue Fund of Canada, Her Majesty shall pay interest thereon to the Contractor at a rate established from time to time pursuant to section 21(2) of the Financial Administration Act.

GC46 Clarification of Terms in GC47 to GC50

- 46.1 For the purposes of GC47 to GC50,
- 46.1.1 "Unit Price Table" means the table set out in the Articles of Agreement, and
- 46.1.2 "plant" does not include tools customarily provided by a tradesman in practicing his trade.

GC47 Additions or Amendments to Unit Price Table

- 47.1 Where a Unit Price Arrangement applies to the contract or a part thereof the Departmental Representative and the Contractor may, by an agreement in writing,
- 47.1.1 add classes of labour or material, and units of measurement, prices per unit and estimated quantities to the Unit Price Table if any labour, plant or material that is to be included in the Final Certificate of Measurement referred to in GC44.8 is not included in any class of labour, plant or material set out in the Unit Price Table; or
- 47.1.2 subject to GC47.2 and GC47.3, amend a price set out in the Unit Price Table for any class of labour, plant or material included therein if the Final Certificate of Measurement referred to in GC44.8 shows or is expected to show that the total quantity of that class of labour, plant or material actually performed, used or supplied by the Contractor in performing the work is
- 47.1.2.1 less than 85% of that estimated total quantity, or
- 47.1.2.2 in excess of 115% of that estimated total quantity.
- 47.2 In no event shall the total cost of an item set out in the Unit Price Table that has been amended pursuant to GC47.1.2.1 exceed the amount that would have been payable to the Contractor had the estimated total quantity actually been performed, used or supplied.
- 47.3 An amendment that is made necessary by GC47.1.2.2 shall apply only to the quantities that are in excess of 115%.
- 47.4 If the Departmental Representative and the Contractor do not agree as contemplated in GC47.1, the Departmental Representative shall determine the class and the unit of measurement of the labour, plant or material and, subject to GC47.2 and GC47.3, the price per unit therefore shall be determined in accordance with GC50.

GC48 Determination of Cost – Unit Price Table



- 48.1 Whenever, for the purposes of the contract, it is necessary to determine the cost of labour, plant or material, it shall be determined by multiplying the quantity of that labour, plant or material expressed in the unit set out in column 3 of the Unit Price Table by the price of that unit set out in column 5 of the Unit Price Table.

GC49 Determination of Cost – Negotiation

- 49.1 If the method described in GC48 cannot be used because the labour, plant or material is of a kind or class that is not set out in the Unit Price Table, the cost of that labour, plant or material for the purposes of the contract shall be the amount agreed upon from time to time by the Contractor and the Departmental Representative.
- 49.2 For the purposes of GC49.1, the Contractor shall submit to the Departmental Representative any necessary cost information requested by the Departmental Representative in respect of the labour, plant and material referred to in GC49.1

GC50 Determination of Cost – Failing Negotiation

- 50.1 If the methods described in GC47, GC48 or GC49 fail for any reason to achieve a determination of the cost of labour, plant and material for the purposes referred to therein, that cost shall be equal to the aggregate of
- 50.1.1 all reasonable and proper amounts actually expended or legally payable by the Contractor in respect of the labour, plant and material that falls within one of the classes of expenditure described in GC50.2 that are directly attributable to the performance of the contract,
 - 50.1.2 an allowance for profit and all other expenditures or costs, including overhead, general administration cost, financing and interest charges, and every other cost, charge and expenses, but not including those referred to in GC50.1.1 or GC50.1.3 or a class referred to in GC50.2, in an amount that is equal to 10% of the sum of the expenses referred to in GC50.1.1, and
 - 50.1.3 interest on the cost determined under GC50.1.1 and GC50.1.2, which interest shall be calculated in accordance with TP9,

provide that the total cost of an item set out in the Unit Price Table that is subject to the provisions of GC47.1.2.1 does not exceed the amount that would have been payable to the Contractor had the estimated total quantity of the said item actually be performed, used or supplied.

- 50.2 For purposes of GC50.1.1 the classes of expenditure that may be taken into account in determining the cost of labour, plant and material are,
- 50.2.1 payments to subcontractors;
 - 50.2.2 wages, salaries and travelling expenses of employees of the Contractor while they are actually and properly engaged on the work, other than wages, salaries, bonuses, living



and travelling expenses of personnel of the Contractor generally employed at the head office or at a general office of the Contractor unless they are engaged at the work site with the approval of the Departmental Representative,

- 50.2.3 assessments payable under any statutory authority relating to workmen's compensation, unemployment insurance, pension plan or holidays with pay;
- 50.2.4 rent that is paid for plant or an amount equivalent of the said rent if the plant is owned by the Contractor that is necessary for and used in the performance of the work, if the rent of the equivalent amount is reasonable and use of that plant has been approved by the Departmental Representative;
- 50.2.5 payments for maintaining and operating plant necessary for and used in the performance of the work, and payments for effecting such repairs thereto as, in the opinion of the Departmental Representative, are necessary to the proper performance of the contract other than payments for any repairs to the plant arising out of defects existing before its allocation to the work;
- 50.2.6 payments for material that is necessary for and incorporated in the work, or that is necessary for and consumed in the performance of the contract;
- 50.2.7 payments for preparation, delivery, handling, erection, installation, inspection protection and removal of the plant and material necessary for and used in the performance of the contract; and
- 50.2.8 any other payments made by the Contractor with the approval of the Departmental Representative that are necessary for the performance of the contract.

GC51 Records to be kept by Contractor

51.1 The Contractor shall

- 51.1.1 maintain full records of his estimated and actual cost of the work together with all tender calls, quotations, contracts, correspondence, invoices, receipts and vouchers relating thereto.
- 51.1.2 make all records and material referred to in GC5.1.1 available to audit and inspection by the Minister and the Deputy Receiver General for Canada or by persons acting on behalf of either of both of them, when requested;
- 51.1.3 allow any of the person referred to in GC51.1.2 to make copies of and to take extracts from any of the records and material referred to in GC51.1.1; and
- 51.1.4 furnish any person referred to in GC51.1.2 with any information he may require from time to time in connection with such records and material.

51.2 The records maintained by the Contractor pursuant to GC51.1.1 shall be kept intact by the Contractor until the expiration of two years after the date that a Final Certificate of Completion referred to in GC44.1 was issued or until the expiration of such other period of time as the



Minister may direct.

- 51.3 The Contractor shall cause all subcontractors and all other persons directly or indirectly controlled by or affiliated with the Contractor and all persons directly or indirectly having control of the Contractor to comply with GC51.1 and GC51.2 as if they were the Contractor.

GC52 Conflict of Interest

- 52.1 It is a term of this contract that no former public office holder who is not in compliance with the Conflict of Interest and Post-Employment Code for Public Office Holders shall derive a direct benefit from this contract.

GC53 Contractor Status

- 53.1 The Contractor shall be engaged under the contract as an independent contractor.
- 53.2 The Contractor and any employee of the said Contractor is not engaged by the contract as an employee, servant or agent of Her Majesty.
- 53.3 For the purposes of GC53.1 and GC53.2 the Contractor shall be solely responsible for any and all payments and deductions required to be made by law including those required for Canada or Quebec Pension Plans, Unemployment Insurance, Worker's Compensation or Income Tax.



GENERAL CONDITONS

- IC 1 Proof of Insurance**
- IC 2 Risk Management**
- IC 3 Payment of Deductible**
- IC 4 Insurance Coverage**

GENERAL INSUANCE COVERAGES

- GCI 1 Insured**
- GIC 2 Period of Insurance**
- GIC 3 Proof of Insurance**
- GIC 4 Notification**

COMMERCIAL GENERAL LIABILITY

- CGL 1 Scope of Policy**
- CGL 2 Coverages/Provisions**
- CGL 3 Additional Exposures**
- CGL 4 Insurance Proceeds**
- CGL 5 Deductible**

BUILDER'S RISK – INSTALLATION FLOATER – ALL RISKS

- BR 1 Scope of Policy**
- BR 2 Property Insured**
- BR 3 Insurance Proceeds**
- BR 4 Amount of Insurance**
- BR 5 Deductible**
- BR 6 Subrogation**
- BR 7 Exclusion Qualifications**

INSURER'S CERTIFICATE OF INSURANCE



General Conditions

IC 1 Proof of Insurance (02/12/03)

Within thirty (30) days after acceptance of the Contractor's tender, the Contractor shall, unless otherwise directed in writing by the Contracting Officer, deposit with the Contracting Officer an Insurer's Certificate of Insurance in the form displayed in this document and, if requested by the Contracting Officer, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Insurance Coverage Requirements shown hereunder.

IC 2 Risk Management (01/10/94)

The provisions of the Insurance Coverage Requirements contained hereunder are not intended to cover all of the Contractor's obligations under GC8 of the General Conditions "C" of the contract. Any additional risk management measures or additional insurance coverages the Contractor may deem necessary to fulfill its obligations under GC8 shall be at its own discretion and expense.

IC 3 Payment of Deductible (01/10/94)

The payment of monies up to the deductible amount made in satisfaction of a claim shall be borne by the Contractor.

IC 4 Insurance Coverage (02/12/03)

The Contractor has represented that it has in place and effect the appropriate and usual liability insurance coverage as required by these Insurance Conditions and the Contractor has warranted that it shall obtain, in a timely manner and prior to commencement of the Work, the appropriate and usual property insurance coverage as required by these Insurance Conditions and, further, that it shall maintain all required insurance policies in place and effect as required by these Insurance Conditions.



INSURANCE COVERAGE REQUIREMENTS

PART I GENERAL INSURANCE COVERAGES (GIC)

GCI 1 Insured (02/12/03)

Each insurance policy shall insure the Contractor, and shall include, as an Additional Named Insured, Her Majesty the Queen in right of Canada, represented by the National Research Council Canada.

GIC 2 Period of Insurance (02/12/03)

Unless otherwise directed in writing by the Contracting Officer or otherwise stipulated elsewhere in these Insurance Conditions, the policies required hereunder shall be in force and be maintained from the date of the contract award until the day of issue of the Departmental Representative's Final Certificate of Completion.

GIC 3 Proof of Insurance (01/10/94)

Within twenty five (25) days after acceptance of the Contractor's tender, the Insurer shall, unless otherwise directed by the Contractor, deposit with the Contractor an Insurer's Certificate of Insurance in the form displayed in the document and, if requested, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the requirements of these Insurance Coverages.

GIC 4 Notification (01/10/94)

Each Insurance policy shall contain a provision that (30) days prior written notice shall be given by the Insurer to Her Majesty in the event of any material change in or cancellation of coverage. Any such notice received by the Contractor shall be transmitted forthwith to Her Majesty.

PART II COMMERCIAL GENERAL LIABILITY

CGL 1 Scope of Policy (01/10/94)

The policy shall be written on a form similar to that known and referred to in the insurance industry as IBC 2100 – Commercial General Liability policy (Occurrence form) and shall provide for limit of liability of not less than \$2,000,000 inclusive for Bodily Injury and Property Damage for any one occurrence or series of occurrences arising out of one cause. Legal or defence cost incurred in respect of a claim or claims shall not operate to decrease the limit of liability.

CGL 2 Coverages/Provisions (01/10/94)



The policy shall include but not necessarily be limited to the following coverages/provisions.

- 2.1 Liability arising out of or resulting from the ownership, existence, maintenance or use of premises by the Contractor and operations necessary or incidental to the performance of this contract.
- 2.2 "Broad Form" Property Damage including the loss of use of property.
- 2.3 Removal or weakening of support of any building or land whether such support be natural or otherwise.
- 2.4 Elevator liability (including escalators, hoists and similar devices).
- 2.5 Contractor's Protective Liability
- 2.6 Contractual and Assumed Liabilities un this contact.
- 2.7 Completed Operations Liability – The insurance, including all aspects of this Part II of these Insurance Conditions shall continue for a period of at least one (1) year beyond the date of the Departmental Representative's Final Certificate of Completion for the Completed Operations.
- 2.8 Cross Liability – The Clause shall be written as follows:

Cross Liability – The insurance as is afforded by this policy shall apply in respect to any claim or action brought against any one Insured by any other Insured. The coverage shall apply in the same manner and to the same extent as though a separate policy had been issued to each Insured. The inclusion herein of more than one Insured shall not increase the limit of the Insurer's liability.

- 2.9 Severability of Interests – The Clause shall be written as follows:

Severability of Interests – This policy, subject to the limits of liability stated herein, shall apply separately to each Insured in the same manner and to the same extent as if a separate policy had been issued to each. The inclusion herein of more than one insured shall not increase the limit of the Insurer's liability.

CGL 3 Additional Exposures (02/12/03)

The policy shall either include or be endorsed to include the following exposures of hazards if the Work is subject thereto:

- 3.1 Blasting
- 3.2 Pile driving and calsson work
- 3.3 Underpinning
- 3.4 Risks associated with the activities of the Contractor on an active airport



- 3.5 Radioactive contamination resulting from the use of commercial isotopes
- 3.6 Damage to the portion of an existing building beyond that directly associated with an addition, renovation or installation contract.
- 3.7 Marine risks associated with the contraction of piers, wharves and docks.

**CGL 4 Insurance Proceeds
(01/10/94)**

Insurance Proceeds from this policy are usually payable directly to a Claimant/Third Party.

**CGL 5 Deductible
(02/12/03)**

This policy shall be issued with a deductible amount of not more than \$10,000 per occurrence applying to Property Damage claims only.

**PART III
BUILDER'S RISK – INSTALLATION FLOATER – ALL RISKS**

**BR 1 Scope of Policy
(01/10/94)**

The policy shall be written on an "All Risks" basis granting coverages similar to those provided by the forms known and referred to in the insurance industry as "Builder's Risk Comprehensive Form" or "Installation Floater – All Risks".

**BR 2 Property Insured
(01/10/94)**

The property insured shall include:

- 2.1 The Work and all property, equipment and materials intended to become part of the finished Work at the site of the project while awaiting, during and after installation, erection or construction including testing.
- 2.2 Expenses incurred in the removal from the construction site of debris of the property insured, including demolition of damaged property, de-icing and dewatering, occasioned by loss, destruction or damage to such property and in respect of which insurance is provided by this policy.

**BR 3 Insurance Proceeds
(01/10/94)**

- 3.1 Insurance proceeds from this policy are payable in accordance with GC28 of the General Conditions "C" of the contract.
- 3.2 This policy shall provide that the proceeds thereof are payable to Her Majesty or as the Minister may direct.



- 3.3 The Contractor shall do such things and execute such documents as are necessary to effect payment of the proceeds.

BR 4 Amount of Insurance
(01/10/94)

The amount of insurance shall not be less than the sum of the contract value plus the declared value (if any) set forth in the contract documents of all material and equipment supplied by Her Majesty at the site of the project to be incorporated into and form part of the finished Work.

BR 5 Deductible
(02/12/03)

The Policy shall be issued with a deductible amount of not more than \$10,000.

BR 6 Subrogation
(01/10/94)

The following Clause shall be included in the policy:

"All rights of subrogation or transfer of rights are hereby waived against any corporation, firm, individual or other interest, with respect to which, insurance is provided by this policy".

BR 7 Exclusion Qualifications
(01/10/94)

The policy may be subject to the standard exclusions but the following qualifications shall apply:

- 7.1 Faulty materials, workmanship or design may be excluded only to the extent of the cost of making good thereof and shall not apply to loss or damage resulting therefrom.
- 7.2 Loss or damage caused by contamination by radioactive material may be excluded except for loss or damage resulting from commercial isotopes used for industrial measurements, inspection, quality control radiographic or photographic use.
- 7.3 Use and occupancy of the project or any part of section thereof shall be permitted where such use and occupancy is for the purpose for which the project is intended upon completion.



INSURER'S CERTIFICATE OF INSURANCE

(TO BE COMPLETED BY INSURER (NOT BOKER) AND DELIVERD TO NATIONAL RESEARCH COUNCIL CANADA WITH 30 DAYS FOLLOWING ACCEPTANCE OF TENDER)

CONTRACT

DESCRIPTION OF WORK	CONTRACT NUMBER	AWARD DATE
LOCATION		

INSURER

NAME
ADDRESS

BROKER

NAME
ADDRESS

INSURED

NAME OF CONTRACTOR
ADDRESS

ADDITIONAL INSURED

HER MAJESTY THE QUEEN IN RIGHT OF CANADA AS REPRESENTED BY THE NATIONAL RESEARCH COUNCIL CANADA

THIS DOCUENT CERTIFIES THAT THE FOLLOWING POLICES OF INSURANCE ARE AT PRESENT IN FORCE COVERING ALL OPERATIONS OF THE INSURE IN CONNECTION WITH THE CONTRACT MADE BETWEEN THE NAMED INSURED AND THE NATIONAL RESEARCH COUNCIL CANADA AND IN ACCORDANCE WITH THE INSURANCE CONDITIONS "E"

POLICY					
TYPE	NUMBER	INCEPTION DATE	EXPIRY DATE	LIMITS OF LIABILITY	DEDUCTIBLE
COMMERCIAL GENERAL LIABILITY					
BUILDERS RISK "AL RISKS"					
INSTALLATION FLOATER "ALL RISKS"					

THE INSURER AGREES TO NOTIFY THE NATIONAL RESEARCH COUNCIL CANADA IN WRITING 30 DAYS PRIOR TO ANY MATERIAL CHANGE IN OR CANCELLATION OF ANY POLICY OR COVERAGE SPECIFICALLY RELATED TO THE CONTRACT

NAME OF INSURER'S OFFICER OR AUTHORIZED EMPLOYEE	SIGNATURE	DATE:
		TELEPHONE NUMBER:

ISSUANCE OF THIS CERTIFIATE SHALL NOT LIMIT OR RESTRICT THE RIGHT OF THE NATIONAL RESEARCH COUNCIL CANADA TO REQUEST AT ANY TIME DUPLICATE COPIES OF SAID INSURANCE POLICIES



CS1 Obligation to provide Contract Security

- 1.1 The Contractor shall, at the Contractor's own expense, provide one or more of the forms of contract security prescribed in CS2.
- 1.2 The Contractor shall deliver to the Departmental Representative the contract security referred to in CS1.1 within 14 days after the date that the Contractor receives notice that the Contractor's tender or offer was accepted by Her Majesty.

CS2 Prescribed Types and Amounts of Contract Security

- 2.1 The Contractor shall deliver to the Departmental Representative pursuant to CS1
 - 2.1.1 a performance bond and a labour and material payment bond each in an amount that is equal to not less than 50% of the contract amount referred to in the Articles of Agreement, or
 - 2.1.2 a labour and material payment bond in an amount that is equal to not less than 50% of the contract amount referred to in the Articles of Agreement, and a security deposit in an amount that is equal to
 - 2.1.2.1 not less than 10% of the contract amount referred to in the Articles of Agreement where that amount does not exceed \$250,000, or
 - 2.1.2.2 \$25,000 plus 5% of the part of the contract amount referred to in the Articles of Agreement that exceeds \$250,000, or
 - 2.1.3 a security deposit in an amount prescribed by CS2.12 plus an additional amount that is equal to 10% of the contract amount referred to in the Articles of Agreement.
- 2.2 A performance bond and a labour and material payment bond referred to in CS2.1 shall be in a form and be issued by a bonding or surety company that is approved by Her Majesty.
- 2.3 The amount of a security deposit referred to in CS2.1.2 shall not exceed \$250,000 regardless of the contract amount referred to in the Articles of Agreement.
- 2.4 A security deposit referred to in CS2.1.2 and CS2.1.3 shall be in the form of
 - 2.4.1 a bill of exchange made payable to the Receiver General of Canada and certified by an approved financial institution or drawn by an approved financial institution on itself, or
 - 2.4.2 bonds of or unconditionally guaranteed as to principal and interest by the Government of Canada.
- 2.5 For the purposes of CS2.4
 - 2.5.1 a bill of exchange is an unconditional order in writing signed by the Contractor and addressed to an approved financial institution, requiring the said institution to pay, on demand, at a fixed or determinable future time a sum certain of money to, or to the order



of, the Receiver General for Canada, and

- 2.5.2 If a bill of exchange is certified by a financial institution other than a chartered bank then it must be accompanied by a letter or stamped certification confirming that the financial institution is in at least one of the categories referred to in CS2.5.3
- 2.5.3 an approved financial institution is
- 2.5.3.1 any corporation or institution that is a member of the Canadian Payments Association,
 - 2.5.3.2 a corporation that accepts deposits that are insured by the Canada Deposit Insurance Corporation or the Régie de l'assurance-dépôts du Québec to the maximum permitted by law,
 - 2.5.3.3 a credit union as defined in paragraph 137(6)(b) of the *Income Tax Act*,
 - 2.5.3.4 a corporation that accepts deposits from the public, if repayment of the deposit is guaranteed by Her Majesty in right of a province, or
 - 2.5.3.5 The Canada Post Corporation.
- 2.5.4 the bonds referred to in CS2.4.2 shall be
- 2.5.4.1 made payable to bearer, or
 - 2.5.4.2 accompanied by a duly executed instrument of transfer of the bonds to the Receiver General for Canada in the form prescribed by the Domestic Bonds of Canada Regulations, or
 - 2.5.4.3 registered, as to principal or as to principal and interest in the name of the Receiver General for Canada pursuant to the Domestic Bonds of Canada Regulations, and
 - 2.5.4.4 provided on the basis of their market value current at the date of the contract.



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	National Research Council	2. Branch or Directorate / Direction générale ou Direction	ASPM/SAGI
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3. a) Subcontract Number / Numéro du contrat de sous-traitance	3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant
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4. Brief Description of Work / Brève description du travail
M10 Chiller Replacement

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? / 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"/>



PART A (continued) / PARTIE A (suite)

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC Information or assets? No Yes
 Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS? Non 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? No Yes
 Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate? Non 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
COTE DE FIABILITÉ | <input type="checkbox"/> CONFIDENTIAL
CONFIDENTIEL | <input type="checkbox"/> SECRET
SECRET | <input type="checkbox"/> TOP SECRET
TRÈS SECRET |
| <input type="checkbox"/> TOP SECRET- SIGINT
TRÈS SECRET - SIGINT | <input type="checkbox"/> NATO CONFIDENTIAL
NATO CONFIDENTIEL | <input type="checkbox"/> NATO SECRET
NATO SECRET | <input type="checkbox"/> COSMIC TOP SECRET
COSMIC TRÈS SECRET |
| <input type="checkbox"/> SITE ACCESS
ACCÈS AUX EMPLACEMENTS | | | |

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? No Yes
 Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail? Non Oui

If Yes, will unscreened personnel be escorted?

Dans l'affirmative, le personnel en question sera-t-il escorté? No Yes
 Non 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? No Yes
 Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS? Non Oui

11. b) Will the supplier be required to safeguard COMSEC Information or assets? No Yes
 Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC? Non 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? No Yes
 Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ? Non 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? No Yes
 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? Non Oui

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



Government of Canada

Gouvernement du Canada

Contract Number / Numéro du contrat
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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	SECRET	TOP SECRET	NATO RESTRICTED	NATO CONFIDENTIAL	NATO SECRET	COSMIC TOP SECRET	PROTECTED / PROTÉGÉ			CONFIDENTIAL	SECRET	TOP SECRET
				CONFIDENTIEL		TRÈS SECRET	NATO DIFFUSION RESTREINTE	NATO CONFIDENTIEL			A	B	C	CONFIDENTIEL		TRÈS SECRET
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 indiquer 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 (613)991-5586	Facsimile No. - N° de télécopieur (613)957-9828	E-mail address - Adresse courriel Bruno.Vallieres@nrc-cnrc.gc.ca	Date Dec. 2, 2014
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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 3 Dec 2014
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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 BÉDARD	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 9/12/14
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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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