



# SPECIFICATION

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**SOLICITATION #:13-22085**

**BUILDING:** M-7  
1200 Montreal Road Campus  
Ottawa, ON

**PROJECT:** Cooling Tower Replacement

**PROJECT #:** M-7-3861

**Date:** November 2013



# **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)

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## Construction Tender Form

Project Identification    **M-7 – Cooling Tower Replacement**

Tender No.:    13-22085

### 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)**

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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**

# BUYANDELL NOTICE

## M-7 – Cooling Tower Replacement

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

Replace the existing cooling tower on the roof of M7 with a new cooling tower. Existing Structural, Mechanical and Electrical infrastructural shall also be upgraded to suit the new cooling tower.

### **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 December 3<sup>rd</sup> and December 5<sup>th</sup>, 2013 at **9:00**. Meet Chris Day at Building M-7, 1200 Montreal Road Campus, 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 December 17<sup>th</sup>, 2013 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 subcontractors, 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](mailto: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](mailto: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](mailto: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](http://www.opo-boa.gc.ca).

The Departmental Representative or his designate for this project is: **Chris Day**  
Telephone: **613 993-3118**

Contracting Authority for this project is: **Marc Bédard**  
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](http://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



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## Articles of Agreement

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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



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## Articles of Agreement

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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



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## Articles of Agreement

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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,





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## Articles of Agreement

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**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.



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## Articles of Agreement

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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**

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**1. SCOPE OF WORK**

Without being limited to the following, work under this contract shall generally include:

Replace the existing Cooling Tower on the roof of M7 with a new Cooling Tower. Existing Structural, Mechanical and Electrical infrastructural shall also be upgraded to suit the new Cooling Tower.

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

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

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

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

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

- .1 The contractor shall comply with Federal and Provincial legislation regarding the WHMIS. The contractor's responsibilities include, but are not limited to the following:
    - .1 To ensure that any controlled product brought on site by the contractor or sub-contractor is labeled;
    - .2 To make available to the workers and the Departmental Representative, Material Safety Data Sheets (MSDS) for these controlled products;
    - .3 To train own workers about WHMIS, and about the controlled products that they use on site;
    - .4 To inform other contractors, sub-contractors the Departmental Representative, authorized visitors and outside inspection agency personnel about the presence and use of such products on the site; and
-

- .5 The site foreman or superintendent must be able to demonstrate, to the satisfaction of the Departmental Representative, that he/she has had WHMIS training and is knowledgeable in its requirements. The Departmental Representative can require replacement of this person if this condition or implementation of WHMIS is not satisfactory.

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

- .1 Under the requirements of Bill 208 of the Ministry of Labour Occupational Health & Safety Act, the following designated substances may be encountered while performing the work described in these contract documents:

- .1 Acrylonitrile, Isocyanates, Arsenic, Lead, Asbestos, Mercury, Benzene, Silica, Vinyl Chloride, and Ethylene Oxide
  - .1 It is the responsibility of the general contractor to ensure that each prospective subcontractor for this project has received a copy of the above list.
  - .2 The contractor is advised to take the following precautions when dealing with the above substances:

**6. GENERAL**

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

**7. COMPLETION**

- .1 All work to be completed by March 31, 2014.

**8. COST BREAKDOWN**

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

**9. MATERIALS AND WORKMANSHIP**

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

**10. SUB-TRADES**

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

**11. SITE VISITS**

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

**12. MINIMUM STANDARDS**

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

**13. FIRE AND GENERAL SAFETY**

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

**14. PROTECTION AND WARNING NOTICES**

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

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

**15. FASTENING DEVICES**

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

**16. BILINGUALISM**

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

**17. TEMPORARY HEATING AND VENTILATING**

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



- .1 Dispose of exhaust materials in a manner that will not result in a harmful or unhealthy exposure to persons.
- .6 Maintain strict supervision of operation of temporary heating and ventilating equipment.
  - .1 Enforce conformance with applicable codes and standards.
  - .2 Comply with instructions of NRC Fire Prevention Officer including provision of full-time watchmen services when directed.
  - .3 Enforce safe practices.
  - .4 Vent direct-fired combustion units to outside.
- .7 Submit tenders assuming existing or new equipment and systems will not be used for temporary heating and ventilating.

**18. DISCREPANCIES & INTERFERENCES**

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

**19. CO-OPERATION**

- .1 Co-operate with NRC staff in order to keep disruption of normal research work to an absolute minimum.
  - .2 Work out in advance, a schedule for all work which might disrupt normal work in the building.
  - .3 Have schedule approved by the Departmental Representative.
  - .4 Notify the Departmental Representative in writing, 72 hours prior to any intended interruption of facilities, areas, corridors, mechanical or electrical services and obtain requisite permission.
-

**20. GENERAL REVIEW**

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

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

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

**22. TESTING**

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

**23. WORKING HOURS AND SECURITY**

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

**24. SCHEDULE**

- .1 The contractor shall prepare a detailed schedule, fixing the date for commencement and completion of the various parts of the work and update the said schedule. Such schedule shall be made available to the Departmental Representative not later than two weeks after the award of the contract and prior to commencement of any work on site.
  - .2 Notify Departmental Representative in writing of any changes in schedule.
  - .3 5 day(s) before the scheduled completion date arrange to do an interim inspection with the Departmental Representative.
-

**25. SERVICE INTERRUPTIONS**

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

**26. SHOP DRAWINGS**

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

**27. SAMPLES AND MOCK-UPS**

- .1 Submit samples in sizes and quantities specified.
  - .2 Where colour, pattern or texture is criterion, submit full range of samples.
  - .3 Construct field samples and mock-ups at locations acceptable to Departmental Representative.
  - .4 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on project.
-

**28. MANUFACTURER'S INSTRUCTIONS**

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

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

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

**30. ACCEPTANCE OF SITE**

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

**31. PARTIAL OCCUPANCY**

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

**32. USE OF SITE**

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

**33. SITE ACCESS**

- .1 Make prior arrangements with the Departmental Representative before starting work or moving materials and equipment on site.
-

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

**34. OVERLOADING**

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

**35. TEMPORARY SERVICES**

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

**36. SITE OFFICE & TELEPHONE**

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

**37. SANITARY FACILITIES**

- .1 Obtain permission from the Departmental Representative to use the existing washroom facilities in the building.
  - .2 The contractor is responsible for keeping facilities clean at all times.
-

- .3 Provide sanitary facility, and bear all associated costs.

**38. PROJECT MEETINGS**

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

**39. STORAGE**

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

**40. DRAINAGE**

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

**41. ENCLOSURE OF STRUCTURES**

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

**42. LAYOUT OF WORK**

- .1 Lay out the work carefully and accurately.
  - .2 Verify all dimensions and be responsible for them.
  - .3 Locate and preserve general reference points.
  - .4 Employ competent person to lay out work in accordance with control lines and grades provided by the Departmental Representative.
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**43. CONCEALING**

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

**44. SPACE CONFLICT**

- .1 Maintain an awareness of responsibility to avoid space conflict with other trades.
- .2 Throughout the course of construction, keep continuously acquainted with field conditions, and the work being developed by all trades involved in the project.

**45. CUTTING AND PATCHING**

- .1 Cut existing surfaces as required to accommodate new work.
- .2 Remove all items as shown or specified.
- .3 Patch and make good with identical materials, the surfaces that have been disturbed, cut or damaged, to the Departmental Representative's satisfaction.
- .4 Where new pipes pass through existing construction, core drill an opening. Size openings to leave 12mm (1/2") clearance around the pipes or pipe insulation. Do not drill or cut any surface without the approval of the Departmental Representative.
- .5 Obtain written approval of the Departmental Representative before cutting openings through existing or new structural members.
- .6 Seal all openings where cables, conduits or pipes pass through walls with an acoustic sealant conforming to CAN/CGSB-19.21-M87.
- .7 Where cables, conduits and pipes pass through fire rated walls and floors, pack space between with compressed glass fibres and seal with caulking in accordance with CAN/CGSB-19.13-M87 AND NBC 3.1.7.

**46. CLEAN-UP DURING CONSTRUCTION**

- .1 On a daily basis, maintain project site and adjacent area of campus including roofs, free from debris and waste materials.
- .2 Provide on-site dump containers for collection of waste materials and rubbish.

**47. FINAL CLEAN-UP**

- .1 Upon completion do a final clean-up to the satisfaction of the Departmental Representative.
  - .2 Clean all new surfaces, lights, existing surfaces affected by this work, replace filters, etc.
  - .3 Clean all resilient flooring and prepare to receive protective finish. Protective finish applied by NRC
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**48. DISPOSAL OF WASTES**

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

**49. WARRANTY**

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

**50. MAINTENANCE MANUALS**

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

**51. IDENTIFICATION BADGES**

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

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

- .1 Materials and equipment scheduled and/or specified on the drawings or in the specifications have been selected to establish a performance and quality standard. In most cases, acceptable manufacturers are stated for any material or equipment specified by manufacturer's name and model number. Contractors may base their tender price on materials and equipment supplied by any of the manufacturers' names as acceptable for the particular material or equipment.
  - .2 In addition to the manufacturers specified or named as acceptable, you may propose alternative manufacturers of materials or equipment to the Departmental Representative for acceptance. For a product to be considered as an alternative product substitute, make a written application to the Departmental Representative during the tender period, not later than seven (7) working days before tender closing.
  - .3 Certify in writing that the alternative meets all requirements of the specified material or equipment. In addition, it shall be understood that all costs required by or as a result of acceptance or proposed alternatives, will be borne by the contractor.
  - .4 Approval of alternatives will be signified by issue of an Addendum to the Tender Documents.
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.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.

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

Drawings No.	Drawing Type
3861-M01	Demolition and New Layout of Cooling Tower
3861-M02	Schedules, Sections and Details
3861-E01	Electrical Layout
3861-S01	Structural Steel Layout

**END OF SECTION**

**Part 1            General**

**1.1                AUTHORITIES**

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

**1.2                Hot Work**

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

**1.3                REPORTING FIRES**

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

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

**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 (C02) 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.
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**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.
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- .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**

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**Part 1            GENERAL**

**1.1            Related Work Specified Elsewhere**

- .1            Modified Bitumen Membrane Roofing - Section 07 55 35

**1.2            General**

- .1            Provide wood blocking and sheathing for roofing and sheet metal work as indicated on the drawings or as required to complete the roof installation.
- .2            Be responsible for the safe disposal of all debris caused by these operations, from the job site.

**1.3            References**

- .1            CAN/CSA B111-1974(R2003) wire, Nails, Spikes and Staples.
- .2            CAN/CSA O80 Series-97(R2002) Wood Preservation
- .3            NLGA National Lumber Grades Authority, Standard Grading Rules for Canadian Lumber, 1987
- .4            ULC underwriters' Laboratories of Canada.

**1.4            Anchors and Fasteners**

- .1            Co-ordinate the location and installation of anchors and fasteners. Confirm types of fasteners to be utilized with Consultant.
- .2            Do not use metals in combination that will set up electrolytic action.
- .3            Use non-corrosive or galvanized steel fastenings, as approved by Consultant, or as otherwise specified.
- .4            Space anchors within load bearing or shear capacity.

**1.5            Quality Assurance**

- .1            Lumber shall bear the grading stamp of an agency certified by the Canadian Lumber Standards Administration Board.

**1.6            Precautions**

- .1            Provide temporary protection, to the satisfaction of the Consultant, to render all wood blocking watertight, if for any reason permanent membrane protection cannot be provided within the same day.

- .2 Ensure the base of any curbs are temporarily sealed to prevent water from entering below the curb assembly, or behind sheathing, should the roof assembly not be completed on the same day as the carpentry work.

## **Part 2 PRODUCTS**

### **2.1 Dimension Lumber**

- .1 TO CAN/CSA 0141-91 and CAN3-086-M84 and to National Lumber Grades Authority Standard Grading Rules 1987-grade Category as follows:
  - .1 Light framing and blocking: species group spruce - "Construction" grade.

### **2.2 Fasteners**

- .1 Nails, spikes and staples: to CSA B111-1974; galvanized for exterior work. For sheathing, use #9 screws with Robertson or Philips head, complete with discs or specified adhesives. For blocking, use screws of sufficient length to penetrate second member a minimum of 38mm. Use expansion shields, friction fit pins or lag bolts in concrete.

### **2.3 Cement Board**

- .1 On verticals: 12mm Cement Board shall be a polymer modified concrete board, reinforced with alkali resistant mesh. Board to have a compressive strength of greater than 8Mpa and water absorption characteristics of less than 5% of its mass.

### **2.4 Pressure Treatment of Wood**

- .1 All wood blocking to be treated in accordance with CAN/CSA-080-1-M89

### **2.5 Wood Preservative**

- .1 Wood preservative: copper naphthenate or penta-chlorophenol base, water repellent wood preservative to CSA 080-M89, coloured.

## **Part 3 APPLICATION**

### **3.1 Securement of Blocking**

- .1 Secure to substrate with specified fasteners, galvanized, minimum 9mm diameter of a suitable length, placed in 2 rows, with each row spaced at 600mm on centres or as otherwise detailed. In concrete, fastener shall penetrate a minimum of 38mm and drill hole shall be 13mm deeper than fastener penetration.
- .2 Double the amount of fasteners required for a distance of 2.4m from all outside corners.



**3.2 Wood Preservative**

- .1 Cut all members to fit prior to installation and treat all faces and cuts with preservative prior to site fabrication of curbs.

**3.3 Nailing**

- .1 All nails shall be long enough so that not less than half their length penetrates into the second member. Splitting of wood members shall be minimized by staggering the nails in the direction of the grain and by keeping nails well in from the edges.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED Work Specified Elsewhere**

- .1        Instructions to Bidders.
- .2        General Conditions of Contract
- .3        Rough Carpentry - Section 06 10 00
- .4        Metal Flashing and trim - Section 07 62 00
- .5        Mechanical - Section 15 40 00

**1.2                GENERAL**

- .1        Provide the necessary labour and materials to complete the removal of the existing roofing system, sheet metal flashings and membrane down to the existing structural deck and install new roofing system as specified herein.
- .2        Do roofing work in accordance with applicable standards in the Canadian Roofing Contractors Association (CRCA) roofing specifications manual.
- .3        Remove and reinstate existing lightning protection to facilitate new roofing operations and submit certification that revisions comply with CAN/CSA-B72.

**1.3                REFERENCES**

- .1        ASTM C79/C79M-01 CGSB 37-GP-9Ma Primer, Asphalt, Unfilled for Asphalt Roofing, Dampproofing and Waterproofing
- .2        CGSB 37-GP-56M Membrane, Modified Bituminous, Prefabricated and Reinforced for Roofing
- .3        CAN/CGSB 37.29-M89 Rubber-Asphalt Sealing compound.
- .4        CSA B111-1974(R1998) Wire Nails, Spikes and Staples
- .5        CAN/ULC-S704-2001 Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.(supersedes CN/CGSB 51.26)
- .6        CRCA Canadian Roofing Contractors' Association Metric Specification Manual

**1.4                PREPARATION**

- .1        All materials that may be reused on the new roof system, salvage and store for inspection by the Departmental Representative. Credits for such materials may be requested.
- .2        The Contractor is solely responsible for the disconnection, relocation and re-

installation of all existing mechanical and electrical services as required.

- .3 Ensure that the Departmental Representative is aware of any such work that may effect the interior environment of the building, prior to disconnection or shut down.
- .4 Disconnection and reconnection of all electrical services to meet latest regulations of Canadian Electrical Code and applicable Municipal and Provincial Codes and Regulations. In each and every instance of application, Code, Regulation, Statute, By-Law or Specification, the most stringent requirements shall apply.
- .5 Provide the Departmental Representative with a schedule indicating time and dates, for any work creating a disruption to the interior environment and obtain the Owner's written approval.

## **Part 2 Products**

### **2.1 PERFORMANCE CRITERIA**

- .1 Compatibility between components of roofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.
- .2 Roofing System: to CSA A123.21 for wind uplift resistance.

### **2.2 ROOF ASSEMBLY**

- .1 Supply all labour and materials necessary to complete the new Modified Bitumen Membrane Roofing, as specified in the areas indicated on the drawings.

#### **The Typical Roof Assembly shall be:**

Vapour Barrier  
75mm Rigid Insulation  
6mm Asphalt Core Board  
2 Ply Modified Bitumen Membrane

### **2.3 MEMBRANE FLASHING**

- .1 Supply all labour and materials necessary to complete the new two ply Modified Bitumen Membrane Flashings, as specified and detailed in the areas indicated on the drawings.

### **2.4 INSPECTION AND TESTING**

- .1 Inspection of membrane roofing and associated work will be done by the Departmental Representative. Notify the Departmental Representative at least 48 hours before commencement of any roofing work.
- .2 The Departmental Representative reserves the right to have cut tests made in the presence of the Contractor. Costs of tests and subsequent repairs shall be borne by the Contractor.

- .3 The Departmental Representative shall be notified in the event that the specifications conflict with the Manufacturer's recommendations or CRCA guidelines.
- .4 The inspection and testing service does not relieve the Contractor of his responsibility for quality control of production and for errors made by him.

## 2.5 PRECAUTIONS

- .1 Roofing shall not be carried out when materials are damp, or when ambient temperatures are less than minus ten (-10) degrees Celsius. (Postpone roofing work when inclement weather appears imminent.) Base sheet membranes shall be stored at above 10 degrees Celsius prior to use and shall be unrolled to relax prior to torching applications.
- .2 Apply each part of roofing system only when surfaces are clean and dry.
- .3 All adjacent parts of the building shall be protected from damage caused by roofing operations. Cover walls and other surfaces in the vicinity of hoisting apparatus with heavy canvas or other suitable protective material. Any damage caused by this contract shall be repaired to match the original materials and appearance.
- .4 Locate equipment and materials in areas designated by the Departmental Representative.
- .5 Conduct operations so as to leave deck exposed for minimum period of time. Protect, as required, to prevent water infiltration or environmental damage to building interior.
- .6 Provide temporary membrane to render deck watertight, if for some unforeseen reason work cannot be completed as specified. All temporary membranes shall be removed completely prior to any further roofing work.
- .7 Where work must continue over finished roofing membrane, protect surface with minimum 12.5mm thick plywood sheets.
- .8 Any sharp projections, that in the opinion of the Departmental Representative may penetrate the membrane, shall be ground smooth and flush.
- .9 All aspects of the re-roofing operation shall follow in close sequence. No part of the operation shall be so far ahead of the succeeding part that the latter cannot be finished that working day.
- .10 During roofing maintain a clean Site and keep 2 foam or dry type fire extinguishers on roof within easy access of torching application and in any open flame location while roofing is in progress. Verify no vent pipes venting flammable fumes (i.e. fuel storage tanks) are located in area of work. Do not have gasoline or other flammable solvents on roof while torching. Be vigilant against self-starting fires at end of roofing operations for day. Use a heat detector gun to spot any smouldering or concealed fire. Examine roof for hot spots 2 hour after completion of roofing operations, especially at flashings and around roof penetrations. Alert watchman of such possibilities.

## **2.6 STORAGE**

- .1 Store membrane and other materials susceptible to damage from moisture, on dry base off ground and protected from damp, wet, freezing or contact with non-compatible materials. Membrane rolls shall be stored in an upright position.
- .2 Deliver and store all materials in their original packaging; bearing the manufacturer's name, the grade, weight and standards pertaining thereto, as well as any other reference or markings considered standard.
- .3 Any materials damaged and/or exposed to the elements and/or moisture, shall be removed from the work site at the discretion of the Departmental Representative.
- .4 Stockpiling of materials on the roof will not be allowed. Distribute material as directed by the Departmental Representative.

## **2.7 COMPATIBILITY**

- .1 Compatibility between all components of roofing system is essential.
- .2 The Contractor shall be responsible for ensuring that all items he elects to use are compatible with each other.

## **2.8 CUTTING, PATCHING AND MAKING GOOD**

- .1 Cut and modify existing surfaces, as required, to accommodate new work.
- .2 Remove all items as shown or specified.
- .3 Patch and make good all surfaces cut, damaged or disturbed, to Departmental Representative's satisfaction.

## **2.9 EXAMINATION**

- .1 Examine all surfaces to receive new roof assembly, and if corrective measures are necessary, report items to Departmental Representative in writing. Substrate shall be smooth, clean, dry and free from depressions or sharp edges. All required wood blocking and curbs shall be securely in place prior to start of roofing work.
- .2 Inspect the substrates and all roof mounted mechanical equipment being affected by the work, to ensure they are in good repair and working order. Notify the Departmental Representative, in writing, prior to commencing contracted work, should corrective measures be required.
- .3 Examine drawings and existing conditions, provide for all vents, curbs, stacks roof mounted equipment curbs, and other openings through membrane roofing.

## **2.10 CLEAN-UP**

- .1 Clean up as work progresses.
- .2 Upon completion, remove scaffolding, temporary protections and surplus materials. Make good any defects noted at this stage.
- .3 Clean areas affected under contract, to a condition at least equal to that previously existing and to satisfaction of the Departmental Representative.
- .4 At the end of each work period, and more often if ordered by the Departmental Representative, remove debris from site and neatly stack material.

## **2.11 CO-ORDINATION**

- .1 Study all documents which describe, or are related to any operation before commencement of that operation. Report discrepancies discovered between existing conditions and documentation. Obtain ruling on required interpretation before commencing work.
- .2 Ensure that materials, equipment, services and operatives are brought to site in sufficient quantity and in accordance with requirements of the work schedule.

## **2.12 WARRANTY**

- .1 **The warranty shall be a period of two (2) years from the date of final completion. Repair of any actual leaks shall also include the removal and replacement of all related moisture damage materials.**
- .2 Make all necessary repairs and replacements within 48 hours of receipt of written notification.
- .3 Nothing contained in this Article shall be construed as in any way restricting or limiting the liability in common law and statutory liability of the Contractor.
- .4 Provide a manufacturers warranty, which shall guarantee the membranes and membrane flashing performance, for a period of ten years against manufacturing defects and premature deterioration.
- .5 Provide these written warranties, confirming above, issued on the corporate letterhead, signed and sealed by an authorized signing officer. The warranties will specifically reference the name of the Building, location and Owner.

## **Part 3 Products**

### **3.1 SHEATHING**

- .1 See Section 06 10 0 for product and application requirements.

### **3.2 PRIMER**

- .1 Primer shall be dark brown or black bituminous emulsified primer (water based) shall be non-flammable, as recommended by the membrane manufacturer.

### 3.3 VAPOUR BARRIER

- .1 Modified Bitumen Base Sheet Membrane: (Torch Application): to Class C, Grade 1 , material, reinforced with a minimum 180 gram/m sq non-woven polyester mat with minimum thickness 3mm to CGSB 37-GP-56M + Amdt. Dec. 85.

### 3.4 INSULATION

- .1 Rigid closed cell polyisocyanurate insulation bonded on upper and lower surfaces to an organic \ inorganic facer. Material shall meet CAN/CGSB-51.26-M86 and CAN\UL-S126-M. The boards shall be distributed in **1200mm x 1200mm** panels, pre-wrapped to prevent moisture ingress. Standard of acceptance shall be Johns Manville E'NRG'Y 3,IKO Therm polyisocyanurate insulation or Atlas Roofing Corp AC FOAM II.
- .2 Fibrous glass batts, friction fit, unfaced to CSA A101 latest edition.

### 3.5 ADHESIVES

- .1 Adhesive for securing insulation, tapered insulation and overlay board shall be
  - .1 an asphalt extended vulcanized adhesive.
  - .2 a single component urethane adhesive, dispensed from a portable pre-pressurized container requiring no external power source.
  - .3 a single component solvent free moisture curing adhesive.
  - .4 a two component, elastomeric, moisture cured; low rise urethane foam adhesive that contains no solvents.
- .2 Standard of Acceptance shall be Fas-n-free by Tremco, Cold Gold by IKO or Duotack by Soprema.

### 3.6 JOINT TAPE

- .1 Joint tape for all vertical joints in cement board at parapets and curbs and all joints and transitions in protection board, shall be a self adhering modified bitumen membrane, as distributed by the membrane manufacturer. Tape shall be 150mm wide and a minimum of 1.2mm thick.

### 3.7 OVERLAY BOARD

- .1 Approved Overlay Board shall be a minimum of 6mm thick, asphalt based recovery board with non-woven glass facers, as distributed by the membrane manufacturer.

### 3.8 MODIFIED BITUMEN MEMBRANE

- .1 Two (2) ply system made from prefabricated modified bitumen membranes containing minimum 15% of elastomer Styrene Butadiene Styrene (SBS) and reinforced with non-flammable, fireproof and stress resistant insert of glass fibre or polyester.
  - .1 Cap Sheet And Flashing (Torch Application): to be Class A, Grade 2 material, reinforced with 250 gram/m. sq. non-woven polyester mat with a minimum membrane thickness of 4mm to CGSB 37-GP-56M + Amdt. - Dec. 85. Granule colour to be selected by Owner and/or Consultant.
  - .2 Base Sheet and Flashing (Torch Application): to Class C, Grade 1 , material, reinforced with a minimum 180 gram/m sq non-woven polyester mat with minimum thickness 3mm to CGSB 37-GP-56M + Amdt. Dec. 85.
- .2 Low Temperature Requirements: Grade 2 material to pass low temperature requirements at -30C to CGSB 37-GP-56M + Amdt. Dec. 85.
- .3 Test Results: Test results from a certified independent laboratory showing conformance to above requirements shall be submitted with tender documents or within 48 hours of tender closing.
- .4 Standard Of Acceptance: S.B.S. Modified Bitumen Membranes as manufactured by Soprema Waterproofing Inc., Monsey Bakor. or IKO.

### 3.9 ACCESSORIES

- .1 Install insulation to meet thickness as required in scope of work and indicated on the drawings. Ensure polyethylene film on base sheet vapour barrier is completely removed prior to applying adhesives.
- .2 Stagger all joints in the boards, for all layers, and adhere with continuous 12mm wide beads of adhesive spaced at 300mm O.C. Alternatively, adhesive may be applied by trowel 3mm thick and 40mm wide bands, 150mm apart. Follow Manufacturers printed instructions for the use of Tremco and IKO adhesives.
- .3 In the sump area around the drain, reduce base insulation by 25mm and install sloped insulation as detailed.
- .4 Cap all insulation, as detailed, with the overlay board, secured with the specified adhesives.
- .5 Unless specifically stated otherwise, strictly follow the adhesives Manufacturers printed instructions for the application of the adhesives, including spread patterns and requirements for walking over the boards.
- .6 Stagger all joints in the insulation boards, for all layers, and adhere with continuous 12mm wide beads of adhesive spaced at 300mm O.C. Alternatively, adhesive may be applied by trowel 3mm thick and 40mm wide



bands, 150mm apart. Follow Manufacturers printed instructions for the use of Tremco and IKO adhesives.

#### **Part 4 Application**

##### **4.1 ASPHALT PRIMER**

- .1 Apply by brush, roller or spray, at a rate of 10m sq. per 4 litres over existing vapour barrier and new sheathing and allow to dry. Consult sheathing manufacturer for specific written instructions for primer applications.

##### **4.2 VAPOUR BARRIER**

- .1 Install under new wood blocking as detailed on the drawings and lap over parapets.
- .2 Commencing at the lowest point of the roof, apply vapour barrier by torching application. Apply membrane with 75mm side laps and 150mm end laps. Supplement adhesion where necessary with additional membrane strips to ensure waterproof protection until application of roof assembly.
- .3 Ensure membrane is unrolled to enable membrane to relax prior to installation. Time required for relaxation will vary with weather conditions.
- .4 Torch weld all lap joints by heat softening the membrane and pressing the edge of the membrane firmly with a roofing trowel. Ensure consistent adhesion has been achieved between the substrate and base sheet membrane.

##### **4.3 INSULATION**

- .1 Install insulation to meet thickness as required in scope of work and indicated on the drawings. Ensure polyethylene film on base sheet vapour barrier is completely removed prior to applying adhesives.
- .2 Stagger all joints in the boards, for all layers, and adhere with continuous 12mm wide beads of adhesive spaced at 300mm O.C. Alternatively, adhesive may be applied by trowel 3mm thick and 40mm wide bands, 150mm apart. Follow Manufacturers printed instructions for the use of Tremco and IKO adhesives.
- .3 In the sump area around the drain, reduce base insulation by 25mm and install sloped insulation as detailed.
- .4 Cap all insulation, as detailed, with the overlay board, secured with the specified adhesives.
- .5 Unless specifically stated otherwise, strictly follow the adhesives Manufacturers printed instructions for the application of the adhesives, including spread patterns and requirements for walking over the boards.
- .6 Stagger all joints in the insulation boards, for all layers, and adhere with continuous 12mm wide beads of adhesive spaced at 300mm O.C.

Alternatively, adhesive may be applied by trowel 3mm thick and 40mm wide bands, 150mm apart. Follow Manufacturers printed instructions for the use of Tremco and IKO adhesives.

#### **4.4 BASE SHEET**

- .1 Commencing at the lowest point of the roof, apply the base sheet by torching application, ensuring full adhesion to the substrate. Apply base sheet with 75mm side laps and 150mm end laps. Apply consistent pressure to ensure full adhesion and pressure roll all laps.
- .2 Apply additional strips of membrane at deficient seams, where required to ensure protection, until cap sheet can be torch applied.
- .3 Ensure base sheet is unrolled to enable membrane to fully relax prior to installation. Relaxation time will vary with weather conditions.
- .4 All wrinkles and application deficiencies shall be cut out and repaired prior to cap sheet application.

#### **4.5 CAP SHEET**

- .1 Plan the membrane application so that the laps are not superimposed over the laps of the base sheet. Mark a chalk line where the first course is to start. Unroll 2 - 3m of the membrane and line it up to the chalk line or to the selvage edge. Re-roll and commence application. If the roll goes out of line by more than 12mm, cut and re-align.
- .2 With a torch, adhere one ply of the membrane, granule side up. Carefully heat the underside of the membrane and slowly unroll. Constantly check the adhesion to be certain that proper bonding is achieved.
- .3 Side laps must cover the selvage edge and be a minimum of 75mm, end laps must be 150mm.
- .4 Using a torch and round nosed roofing trowel, embed the surface granules into heated and soft bitumen, from the chalk line to the edge of the cap sheet at the top of the horizontal surface. A minimum distance of 150mm from the edge of the cap sheet.

#### **4.6 MEMBRANE FLASHING**

- .1 Check sheathing manufacturers requirements for torching requirements. Ensure burning of scrim sheet does not interfere with adhesion of membranes. Cut testing of all curb detailing shall be requested during the flashing installation.
- .2 Plan 2 ply membrane flashing application so that laps are not superimposed over the laps on the underlying membrane.
- .3 Install membrane flashing with full roll widths perpendicular to the deck,

1.0m wide maximum.

- .4 Install reinforcing gussets at all inside and outside corners as per manufacturer's recommendations.
- .5 Install base sheet flashing prior to horizontal cap sheet application. Extend membrane 100mm onto horizontal surface and 400mm up any verticals, or as indicated on the detail drawings. Set base sheet and cap sheet membrane flashing by torch application.
- .6 Using a chalk line, lay out a straight line on the cap sheet surface. Set line parallel to the roof edge and 150mm from the base of the vertical. Install cap sheet flashing after application of horizontal cap sheet. Extend membrane 150mm onto horizontal surface and 400mm up verticals or as indicated on the Drawings.
- .7 Granules shall be embedded for the preparation of the selvage where the membrane will overlap on the mineral surface.
- .8 Using the propane torch, heat the back of the flashing strip until the coating flows and bonds to the roof and up to the vertical. Press in firmly for proper adhesion. Continue by bonding the upper portion to the wall, taking precautions not to stretch the membrane. Secure all membrane flashings to verticals with continuous securement strips installed along the top edge of membrane flashings and fastened at 300mm O.C. or as detailed. Lap all flashing strips to the selvage or a minimum of 75mm and seal the laps securely.
- .9 Use a wet sponge to tamp the membranes in place at the junction of the horizontal and vertical surfaces.
- .10 Torch application of membrane flashings shall be performed by skilled tradesmen in accordance with the manufacturer's recommendations.

#### **4.7 COMPLETION OF DAY'S WORK**

- .1 Install water cut-offs at the end of each day's work; remove completely prior to continuing further roofing applications.
- .2 Inspect all laps of the membrane application to ensure they are properly bonded. Repair any deficiencies prior to leaving the site for the day.
- .3 Base sheet applications should not be left exposed overnight unless all seams are torch welded prior to leaving the work site.
- .4 Provide a two (2) hour fire watch at the end of each day when torching membrane. Walk the day's entire production area to check for smoke and hot spots. The fire watch shall include use of a hand held digital infrared thermometer, which shall be scanned over the day's production area every 20 minutes.

#### **4.8 GENERAL**

- .1 Patching of the cap sheet membrane shall be carried out utilizing patches with a minimum size of 450mm by 1000mm. Minimum length of cap sheet on flat run of roof shall not be less than 1000mm.
- .2 Wrinkled or deformed ends of cap sheet rolls will not be tolerated and therefore must be discarded prior to application.
- .3 Following completion of new roofing, torch soften and apply a liberal application of approved bulk type mineral granules to cap sheet membrane edges where asphalt has extruded or flowed beyond clean lines and to all surface damage.
- .4 Splices in delivered rolls of membrane are to be removed. Cut back the roll 450mm on both sides of the splices and remove prior to installation.

**END OF SECTION**

**Part 1            General**

**1.1                SUBMITTALS**

- .1        Submittals: in accordance with Section 00 10 00 – General Instructions.
- .2        Shop drawings to show:
  - .1        Mounting arrangements.
  - .2        Operating and maintenance clearances.
- .3        Shop drawings and product data accompanied by:
  - .1        Detailed drawings of bases, supports, and anchor bolts.
  - .2        Acoustical sound power data, where applicable.
  - .3        Points of operation on performance curves.
  - .4        Manufacturer to certify current model production.
  - .5        Certification of compliance to applicable codes.
- .4        Closeout Submittals:
  - .1        Provide operation and maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.
  - .2        Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
  - .3        Operation data to include:
    - .1        Control schematics for systems including environmental controls.
    - .2        Description of systems and their controls.
    - .3        Description of operation of systems at various loads together with reset schedules and seasonal variances.
    - .4        Operation instruction for systems and component.
    - .5        Description of actions to be taken in event of equipment failure.
    - .6        Valves schedule and flow diagram.
    - .7        Colour coding chart.
  - .4        Maintenance data to include:
    - .1        Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
    - .2        Data to include schedules of tasks, frequency, tools required and task time.
  - .5        Performance data to include:
    - .1        Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
    - .2        Equipment performance verification test results.
    - .3        Special performance data as specified.
    - .4        Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
  - .6        Approvals:

- .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
- .2 Make changes as required and re-submit as directed by Departmental Representative.
- .7 Additional data:
  - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .8 Site records:
  - .1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
  - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
  - .3 Use different colour waterproof ink for each service.
  - .4 Make available for reference purposes and inspection.
- .9 As-built drawings:
  - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
  - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
  - .3 Submit to Departmental Representative for approval and make corrections as directed.
  - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
  - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .10 Submit copies of as-built drawings for inclusion in final TAB report.

## **1.2 DEFINITIONS**

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

## **1.3 EXAMINATION OF THE SITE**

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

#### **1.4 QUALITY ASSURANCE**

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

#### **1.5 MAINTENANCE**

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

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

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

#### **1.7 COORDINATION & COOPERATION WITH OTHER TRADES**

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

#### **1.8 PERMITS, CERTIFICATES & FEES**

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

#### **1.9 FEDERAL HALOCARBON REGULATION**

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

**1.10 CLEANING & FINAL ADJUSTMENT**

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

**1.11 PROTECTION OF EQUIPMENT & MATERIALS**

- .1 Properly protect all of your equipment and materials on site from damage due to the elements, your work and the work of other trades, to the approval of the Engineer.
- .2 Wherever possible, coordinate equipment deliveries with the manufacturers and/or suppliers such that equipment is delivered to the site when it is required, or so that it can be suitably stored within the building and protected from the elements.

**1.12 STORAGE OF EQUIPMENT & MATERIALS**

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

**1.13 HOISTING & SCAFFOLDING**

- .1 Provide all necessary hoists and scaffolds required for your work.
- .2 Design and construction of scaffolding to be in accordance with CSA S269.2
- .3

**Part 2 Products**

**2.1 MATERIALS**

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

**Part 3 Execution**

**3.1 PAINTING REPAIRS AND RESTORATION**

- .1 Do painting in accordance with Section 09 91 23 - Interior Painting.



- .2 Prime and touch up marred finished paintwork to match original.
- .3 Restore to new condition, finishes which have been damaged.

### **3.2 CLEANING**

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

### **3.3 FIELD QUALITY CONTROL**

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

### **3.4 DEMONSTRATION (If Required)**

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

### **3.5 PROTECTION**

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

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS SPEC**

**1.2                REFERENCES**

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

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

**1.4                DELIVERY, STORAGE AND HANDLING**

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

**Part 2            Products**

**2.1                NOT USED**

**Part 3            Execution**

**3.1                APPLICATION**

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

**3.2                CONNECTIONS TO EQUIPMENT**

- .1    In accordance with manufacturer's instructions unless otherwise indicated.
- .2    Use valves and either unions or flanges for isolation and ease of maintenance and assembly.

- .3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement and when penetrating ceiling/roof and has indicated..

### **3.3 CLEARANCES**

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

### **3.4 DRAINS**

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

### **3.5 AIR VENTS**

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

### **3.6 DIELECTRIC COUPLINGS**

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

### **3.7 PIPEWORK INSTALLATION**

- .1 Screwed fittings jointed with Teflon tape.
- .2 Protect openings against entry of foreign material.

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

- .2 Install swing check valves in horizontal lines on discharge of pumps and elsewhere as indicated.

### 3.8 SLEEVES

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

### 3.9 ESCUTCHEONS

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

### 3.10 PREPARATION FOR FIRE STOPPING

- .1 Material and installation within annular space between pipes, ducts, insulation and adjacent fire separation to [Section 07 84 00 - Fire Stopping](#).
- .2 Uninsulated unheated pipes not subject to movement: No special preparation.

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

### **3.11 FLUSHING OUT OF PIPING SYSTEMS**

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

### **3.12 PRESSURE TESTING OF EQUIPMENT AND PIPEWORK**

- .1 Advise NRC with 48 hours minimum prior to performance of pressure tests.
- .2 Pipework: test as specified in relevant sections.
- .3 Maintain specified test pressure without loss for 4 hours minimum unless specified for longer period of time in relevant mechanical sections.
- .4 Prior to tests, isolate equipment and other parts which are not designed to withstand test pressure or media.
- .5 Conduct tests in presence of NRC and has indicated in relevant mechanical sections.
- .6 Pay all costs for repairs or replacement, retesting, and making good. NRC to determine whether repair or replacement is appropriate.
- .7 Insulate or conceal work only after approval and certification of tests and approved by NRC.

### **3.13 EXISTING SYSTEMS**

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

### **3.14 CLEANING**

- .1 Clean in accordance with [Section 01 74 11 - Cleaning](#).
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1    American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
  - .1    ANSI/ASME B31.1-[2007], Power Piping.
  - .2    ANSI/ASME B31.3-[2006], Process Piping.
  - .3    ANSI/ASME Boiler and Pressure Vessel Code-[2007]:
    - .1    BPVC 2007 Section I: Power Boilers.
    - .2    BPVC 2007 Section V: Nondestructive Examination.
    - .3    BPVC 2007 Section IX: Welding and Brazing Qualifications.
- .2    American National Standards Institute/American Water Works Association (ANSI/AWWA)
  - .1    ANSI/AWWA C206-[03], Field Welding of Steel Water Pipe.
- .3    American Welding Society (AWS)
  - .1    AWS C1.1M/C1.1-[2000(R2006)], Recommended Practices for Resistance Welding.
  - .2    AWS Z49.1-[2005], Safety in Welding, Cutting and Allied Process.
  - .3    AWS W1-[2000], Welding Inspection Handbook..
- .4    Canadian Standards Association (CSA International)
  - .1    CSA W47.2-[M1987(R2008)], Certification of Companies for Fusion Welding of Aluminum.
  - .2    CSA W48-[06], Filler Metals and Allied Materials for Metal Arc Welding.
  - .3    CSA B51-[03(R2007)], Boiler, Pressure Vessel and Pressure Piping Code.
  - .4    CSA-W117.2-[2006], Safety in Welding, Cutting and Allied Processes.
  - .5    CSA W178.1-[2008], Certification of Welding Inspection Organizations.
  - .6    CSA W178.2-[2008], Certification of Welding Inspectors.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Provide shop drawing of all welding material.
- .2    Provide NRC with proposed welding procedure and all certificate approved by TSSA

**1.3                QUALITY ASSURANCE**

- .1    Qualifications:
    - .1    Welders:
      - .1    Welding qualifications in accordance with CSA B51.
      - .2    Use qualified and licensed welders possessing certificate for each procedure performed from authority having jurisdiction.
-

- .3 Submit welder's qualifications to NRC.
- .4 Each welder to possess identification symbol issued by authority having jurisdiction.
- .5 Certification of companies for fusion welding of aluminum in accordance with CSA W47.2.
- .2 Inspectors:
  - .1 Inspectors qualified to CSA W178.2 or equivalent.
- .3 Certifications:
  - .1 Registration of welding procedures in accordance with CSA B51.
  - .2 Copy of welding procedures available for inspection.
  - .3 Safety in welding, cutting and allied processes in accordance with CSA-W117.2.

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

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

#### **Part 2 Products**

##### **2.1 ELECTRODES**

- .1 Electrodes: in accordance with CSA W48 Series.

#### **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 QUALITY OF WORK**

- .1 Welding: in accordance with ANSI/ASME B31.1, ANSI/ASME Boiler and Pressure Vessel Code, Sections I and IX and ANSI/AWWA C206, using procedures conforming to AWS B3.0, AWS C1.1, applicable requirements of provincial authority having jurisdiction].
-



- .2 All welds shall be have clearly identified markings to indicate welder who completed weld. In the event that a weld is not clearly marked by welder, NRC has the right to reject the weld or require full gamma ray radiographic at contractor's expense.

### **3.3 INSTALLATION REQUIREMENTS**

- .1 Identify each weld with welder's identification symbol.
- .2 Backing rings:
  - .1 Where used, fit to minimize gaps between ring and pipe bore.
  - .2 Do not install at orifice flanges.
- .3 Fittings:
  - .1 NPS 2 and smaller: install welding type sockets unless otherwise indicated.
  - .2 Larger the NPS 2: butt welded fittings.
  - .3 Branch connections: install welding tees or forged branch outlet fittings.

### **3.4 INSPECTION AND TESTS - GENERAL REQUIREMENTS**

- .1 Review weld quality requirements and defect limits of applicable codes and standards with NRC before work is started.
- .2 Formulate "Inspection and Test Plan" in co-operation with NRC.
- .3 Do not conceal welds until they have been inspected, tested and approved by NRC.
- .4 Provide for inspector to visually inspect welds during early stages of welding procedures in accordance with Welding Inspection Handbook. Repair or replace defects as required by codes and as specified.

### **3.5 SPECIALIST EXAMINATIONS AND TESTS**

- .1 General:
    - .1 Perform examinations and tests by specialist qualified to CSA W178.1 and CSA W178.2 and approved by NRC or TSSA
    - .2 To ANSI/ASME Boiler and Pressure Vessels Code, Section V, CSA B51 and requirements of authority having jurisdiction.
    - .3 Inspect and test of welds in accordance with "Inspection and Test Plan" by non-destructive visual examination, magnetic particle (hereinafter referred to as "particle") tests, spot/full gamma ray radiographic (hereinafter referred to as "radiography") tests as per specifications
  - .2 Hydrostatically test welds to ANSI/ASME B31.1.
  - .3 Visual examinations: include entire circumference of weld externally and wherever possible internally.
  - .4 Failure of visual examinations:
-

- .1 Upon failure of welds by visual examination, perform additional testing as directed by NRC and/or TSSA, selected at random by NRC or TSSA by, radiographic and/or particle tests as directed by NRC.
  - .5 Magnetic particle tests for piping systems as per each piping specification and on drawing.
  - .6 In the event of a discrepancy between this section.
- 3.6 DEFECTS CAUSING REJECTION**
- .1 As described in ANSI/ASME B31.1.
  - .2 In the event of a dispute regarding welding quality, NRC as the right to have the weld radiography inspected at NRC's cost. Failure of the weld to meet the requirements of B31.1 as determined from the radiography examination. Will result in all welds being radiography inspected and repaired as required at the contractor expense.
- 3.7 REPAIR OF WELDS WHICH FAILED TESTS**
- .1 Re-inspect and re-test repaired or re-worked welds at Contractor's expense.
- 3.8 CLEANING**
- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

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**Part 1            General**

**1.1                SUMMARY**

.1            Section Includes:

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

**1.2                REFERENCES**

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

- .1            ANSI/ASME B31.1 / B31.3

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

- .1            ASTM A125, Specification for Steel Springs, Helical, Heat-Treated.
- .2            ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .3            ASTM A563, Specification for Carbon and Alloy Steel Nuts.

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

- .1            MSS SP58, Pipe Hangers and Supports - Materials, Design and Manufacture.
- .2            ANSI/MSS SP69, Pipe Hangers and Supports - Selection and Application.
- .3            MSS SP89, Pipe Hangers and Supports - Fabrication and Installation Practices.

**1.3                SYSTEM DESCRIPTION**

.1            Design Requirements:

- .1            Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.
- .2            Base maximum load ratings on allowable stresses prescribed by MSS SP58.ASME B31.1.
- .3            Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.
- .4            Design hangers and supports to support systems under conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.
- .5            Provide for vertical adjustments after erection and during commissioning. Amount of adjustment in accordance with MSS SP58.

.2            Performance Requirements:

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

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

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

.2 Closeout Submittals:

- .1 Provide maintenance data for incorporation into manual.

**1.5 DELIVERY, STORAGE, AND HANDLING**

.1 Waste Management and Disposal:

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

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

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

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

**Part 2 Products**

**2.1 GENERAL**

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

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

**2.2 PIPE HANGERS**

.1 Finishes:

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

.2 Upper attachment structural: suspension from lower flange of I-Beam:

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

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

**2.4 INSULATION PROTECTION SHIELDS**

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

**2.5 CONSTANT SUPPORT SPRING HANGERS**

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

**2.6 VARIABLE SUPPORT SPRING HANGERS**

- .1 Vertical movement: 13 mm minimum, 50 mm maximum, use single spring pre-compressed variable spring hangers.
  - .2 Vertical movement greater than 50 mm: use double spring pre-compressed variable spring hanger with 2 springs in series in single casing.
  - .3 Variable spring hanger complete with factory calibrated travel stops. Provide certificate of calibration for each hanger.
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- .4 Steel alloy springs: to ASTM A125, shot peened, magnetic particle inspected, with +/-5 % spring rate tolerance, tested for free height, spring rate, loaded height and provided with CMTR.

## **2.7 EQUIPMENT SUPPORTS**

- .1 Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of [Section 05 12 23 - Structural Steel for Buildings](#). Submit calculations with shop drawings.

## **2.8 EQUIPMENT ANCHOR BOLTS AND TEMPLATES**

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

## **2.9 OTHER EQUIPMENT SUPPORTS**

- .1 Fabricate equipment supports from structural grade steel meeting requirements of [Section 05 12 23 - Structural Steel for Buildings](#).
- .2 Submit structural calculations with shop drawings.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

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

### **3.2 INSTALLATION**

- .1 Install in accordance with:
  - .1 Manufacturer's instructions and recommendations.
- .2 Vibration Control Devices:
  - .1 Install on piping systems at pumps, boilers, chillers, cooling towers, and as indicated.
- .3 Clamps on riser piping:
  - .1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
  - .2 Bolt-tightening torques to industry standards.
  - .3 Steel pipes: install below coupling or shear lugs welded to pipe.
  - .4 Cast iron pipes: install below joint.
- .4 Clevis plates:
  - .1 Attach to concrete with 4 minimum concrete inserts, one at each corner.

- .5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.
- .6 Use approved constant support type hangers where:
  - .1 vertical movement of pipework is 13 mm or more,
  - .2 transfer of load to adjacent hangers or connected equipment is not permitted.
- .7 Use variable support spring hangers where:
  - .1 transfer of load to adjacent piping or to connected equipment is not critical.
  - .2 variation in supporting effect does not exceed 25 % of total load.

### **3.3 HANGER SPACING**

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



MAXIMUM HANGER SPACING AND MINIMUM ROD SIZE

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

**3.4 HANGER INSTALLATION**

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

**3.5 HORIZONTAL MOVEMENT**

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

**3.6 FINAL ADJUSTMENT**

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

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

**END OF SECTION**

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**Part 1            General**

**1.1                REFERENCES**

- .1        American Iron and Steel Institute (AISI)
- .2        American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)
  - .1        ANSI/ASME B1.20.1-, Pipe Threads, General Purpose (Inch).
  - .2        ASME B31.1-Power Piping.
- .3        American Society for Testing and Materials International (ASTM)
  - .1        ASTM A53/A53M-[02], Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
  - .2        ASTM A105/A105M-[03], Standard Specification for Carbon Steel Forgings for Piping Applications.
  - .3        ASTM A106/A106M-[04], Standard Specification for Seamless Carbon Steel Pipe for High Temperature Service.
  - .4        ASTM A181/A181M-[01], Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.
  - .5        ASTM A193/A193M-[04a], Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
  - .6        ASTM A194/A194M-[04], Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
  - .7        ASTM A216/A216M-[93(2003)], Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.
  - .8        ASTM A234/A234M-[04], Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
  - .9        ASTM A307-[03], Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .10      ASTM B61-[02], Standard Specification for Steam or Valve Bronze Castings.
- .4        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-14.5-[M88], Thermometers, Bimetallic, Self-Indicating, Commercial/Industrial Type.
- .5        Canadian Standards Association (CSA International)
  - .1        CSA B51-[03], Boiler, Pressure Vessel and Pressure Piping Code.
- .6        Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1        Material Safety Data Sheets (MSDS).
- .7        Public Works and Government Services Canada (PWGSC)
  - .1        Real Property Branch / Professional and Technical Services / Architecture and Engineering Resources / Mechanical and Maintenance Engineering / Utilities Engineering (RPB/PTS/AER/MME/Utilities Engineering).

- .2 Real Property Branch / Property and Facilities Management / Operational Support Services / Utilities Management Services (RPB/PFM/OSS/Utilities Management Services).

## **1.2 SUBMITTALS**

- .1 Submit shop drawings and product data in for all material and or equipment being supplied.

## **1.3 SYSTEM START-UP HYDRONIC SYSTEMS**

- .1 Establish circulation
- .2 Eliminate water hammer and other noises.
- .3 Perform Testing, Adjusting and Balancing (TAB) to flow rates specified.
- .4 Adjust pipe supports, hangers, springs as necessary.
- .5 Monitor pipe movement, performance of expansion joints, loops, guides, anchors.
- .6 During warm-up, check operation of expansion loops, joints, anchors and guides.
- .7 If sliding type bind, or if bellows type flex incorrectly, shut down system, re-align, repeat start-up sequence.
- .8 Verify adequacy of accessibility to expansion joints for servicing.
- .9 Re-tighten bolts, etc. using torque wrench, to compensate for heat-caused relaxation. Repeat several times during commissioning.
- .10 Check operation of drain valves.
- .11 Adjust valve stem packings as systems settle down.
- .12 Fully open balancing valves, except those that are factory-set.
- .13 Check operation of over-temperature protection devices on circulating pumps.
- .14 Adjust alignment of piping at pumps to ensure flexibility, adequacy of pipe movement, absence of noise or vibration transmission.
- .15 Test operation of operating, limit and safety controls.

## **1.4 SYSTEM START-UP STEAM SYSTEMS**

- .1 During warm-up, check operation of expansion loops, joints, anchors and guides.
  - .1 If sliding type bind, or if bellows type flex incorrectly, shut down system, re-align, repeat start-up sequence.
  - .2 Verify removal of condensate from balanced pressure type expansion joints.
- .2 Check adequacy of accessibility to expansion joints for monitoring, servicing.

- .3 Adjust pipe supports, hangers, springs as necessary.
- .4 Monitor pipe movement, performance of expansion joints, loops, anchors, guides.
- .5 Re-tighten bolts as systems settle down.
- .6 Adjust valve packings as systems settle down.
- .7 Check operation of drain valves.
- .8 Fasten any loose items of equipment to ensure quiet operation of system.

## **Part 2 Products**

### **2.1 GENERAL**

- .1 Valves to be repackable under full line pressure while fully open.

### **2.2 COOLING TOWER WATER UP TO 860 KPA AND 120 DEGREES C**

- .1 Piping:
  - .1 To ASTM A53/A53M, Grade B.
  - .2 NPS 1/2 to 1-1/2: Sch. 40, seamless, screwed or plain ends.
  - .3 NPS 2 to 18: Sch.40, Seamless, bevel ends.
- .2 Fittings:
  - .1 NPS 1/2 to 1-1/2: Class 3000, 20 MPa, forged steel screwed ends to ASTM A105/A105M.
  - .2 NPS 2-12: Sch. 40, bevel ends, to ASTM A234/A234M, Grade WPB.
  - .3 NPS 14 and over: To ASTM A234/A234M, Grade WPB.
- .3 Couplings, caps, plugs:
  - .1 NPS 1/2 to 1-1/2: Class 3000, 20 MPa, screwed ends to ASTM.
- .4 Nipples for drains, vents, pressure gauges, similar items:
  - .1 NPS 1/2 to 1-1/2: Sch. 40, screwed, to ASTM A53/A53M, Grade A.
- .5 Unions:
  - .1 NPS 1/2 to 1-1/2: Class 3000, 20 MPa, screwed ends, forged steel, steel-to-steel ground joints, to ASTM A105/A105M.
- .6 Flanges:
  - .1 Class 150:
    - .1 .
    - .2 NPS 2 and over: raised face, slip-on, bored to suit pipe, to ASTM A105/A105M.
- .7 Studs, bolts and nuts:

- .1 Stud bolts, carbon steel, semi-finished with heavy hex nuts, to ASTM A307, Grade B.
- .8 Gaskets:
  - .1 Spiral wound 304 stainless steel rated for pressure and temperature of system.
- .9 Drain valves:
  - .1 Gate valves, NPS 3/4, as per drawing.
- .10 Thermometer wells:
  - .1 Type 304 stainless steel; Lagging type.
  - .2 Where indicated on drawing/s.

### **2.3 EXPANSION JOINTS - BELLOWS TYPE**

- .1 Controlled flexing, packless, maintenance free, factory tested to 1-1/2 times maximum working pressure. Furnish test certificates.
- .2 Provide as indicated on drawing.

### **2.4 THERMOMETERS**

- .1 Provide as indicated on drawing.

### **2.5 PRESSURE GAUGES**

- .1 Provide as indicated on drawing.

### **2.6 FABRICATION**

- .1 Do work in accordance with ASME B31.1.
- .2 Joints:
  - .1 Accessible locations: screwed, flanged or welded to match piping specification.
  - .2 Elsewhere: welded throughout, except at flanged components.
- .3 Screwed joints:
  - .1 To ANSI/ASME B1.20.1.
  - .2 Provide clean machine-cut threads.
  - .3 Use PTFE tape or lead-free pipe dope or paste on male threads.
- .4 Branch connections:
  - .1 Use butt or socket-weld fittings.
  - .2 Mains NPS 2-1/2 and smaller: Use weldolets, threadolets, or 2 Mpa half couplings as reinforcements.
  - .3 Mains NPS 3 and larger: Welded branch connections can be used.

**Part 3 Execution**

**3.1 PREPARATION**

- .1 Lay out work in accordance with lines and grades as indicated.
- .2 Verify lines, levels, dimensions as indicated against established benchmarks. Report discrepancies to Departmental Representative and obtain written instruction.
- .3 When required by Departmental Representative, provide drawings showing relative locations of various services.

**3.2 WELDING**

- .1 Perform welding in accordance with Section 23 05 17 - Pipe Welding supplemented as specified herein.
- .2 Notwithstanding the requirements of referenced section, the following shall apply:
  - .1 Welding to be in accordance with ASME B31.1.
  - .2 Welding to be executed by certified pipe welders.
  - .3 Pipe fitting to be executed by certified pipe fitters.

**3.3 INSTALLATION**

- .1 Installation to be performed by certified fitters.
- .2 Install pipework in accordance with Section 23 05 01 - Installation of Pipework, as specified herein.
- .3 Clearances:
  - .1 Maintain clearance around systems, equipment and components and between pipes and structures for O&M as indicated and to manufacturer's recommendations, for greater of:
    - .1 Observation of operation, inspection, servicing, maintenance.
    - .2 Disassembly, removal of equipment and components without interrupting operation of other system, equipment, components.
  - .2 Except where indicated, install to permit separate thermal insulation of pipes.
- .4 Flanges: use suitable graphite lubricant on bolts and nuts.
- .5 Drain valves.
  - .1 Install as indicated.
  - .2 Weld couplings for drains into piping to ASME B31.1.
- .6 Seal piping passing through walls with approved firestopping compatible with surface
- .7 Connections to equipment:
  - .1 Use flanged valves for isolation and ease of maintenance and assembly.
  - .2 Use double swing joints and swing joints when equipment mounted on vibration isolation and when piping subject to movement.

- .8 Expansion Joints:
  - .1 Install to manufacturer's recommendations.
  - .2 Install lubrication facilities in locations for ease of servicing.

### **3.4 PIPE SUPPORTS**

- .1 In accordance with Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment, supplemented as specified herein.
- .2 Install to manufacturer's recommendations.
- .3 Expansion loops and expansion joints:
  - .1 Provide supports as indicated, to manufacturer's recommendations as required to maintain drainage.

### **3.5 VALVES**

- .1 Install in accordance with manufacturer's recommendations.

### **3.6 INSTALLATION OF THERMOWELLS**

- .1 In general, to be installed where indicated.

### **3.7 FIELD QUALITY CONTROL**

- .1 Inspections.
  - .1 Leave joints in piping systems uncovered until tests are completed and system inspected as directed by Departmental Representative.
  - .2 Inspections:
    - .1 Perform magnetic particle tests (DC Mode) on all exterior welds
    - .2 Provide Dye penetrant inspection of all interior welds to B31.1.
  - .3 Departmental Representative to inspect new piping prior to tests for compliance with approved drawings and specifications.
  - .4 Pay costs for all inspections and inspections.

### **3.8 PAINTING**

- .1 Paint piping and non-galvanized hangers, supports, exposed steelwork shall be painted with a minimum of 2 coats paint. See drawing.

END OF SECTION



## Part 1 PART I – GENERAL

### 1.1

#### PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION:

Anchor bolts: size anchor bolts to withstand seismic acceleration and velocity forces Seismic Restraint Systems (SRS) - Type P2 Buildings 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.

## Part 2 PART II – PRODUCTS

### 1.0 General Cooling Tower :

- 1 Provide an induced draft, crossflow type, factory assembled, film fill, industrial duty, galvanized steel cooling tower situated as shown on the plans. The limiting overall dimensions of the tower shall be nominal 22'-6" wide x 20' long x 16'-6" high, exact length to be determined by shop drawings. Total operating horsepower of all fans shall not exceed one 50 hp/575v/3phase 1speed/1 winding/premium efficiency invert duty rated motor. Single cell cooling tower with a maximum operating weight of 32,000 lbs. Tower shall be similar and equal in all respects to Marley Model NC8409UAS or equivalent.

### 2.0 Thermal Performance and Efficiency:

1. See drawing/s for cooling capable. Tower shall be Certified by the Cooling Technology Institute.
2. The tower shall be capable of a minimum 53.85 GPM/hp efficiency per ASHRAE Standard 90.1.

### 3.0 Performance Warranty:

1. CTI Certification notwithstanding, the cooling tower manufacturer shall guarantee that the tower supplied will meet the specified performance conditions when the tower is installed according to plan. If, because of a suspected thermal performance deficiency, the owner chooses to conduct an on-site thermal performance test under the supervision of a qualified, disinterested third party in accordance with CTI or ASME standards during the first year of operation; and if the tower fails to perform within the limits of test tolerance; then the cooling tower manufacturer will pay for the cost of the test and will make such corrections as are appropriate and agreeable to the owner to compensate for the performance deficiency.

### 4.0 Design Loading:

1. The tower structure, anchorage and all its components shall be designed by licensed professional engineers, employed by the manufacturer, per the International Building Code to withstand a wind load of 30 psf, as well as a .3g seismic load. The fan deck, hot-water basin covers and, where specified, maintenance platforms shall be designed for 60 psf live load or a 200 lb concentrated load. Guardrails, where specified, shall be capable of withstanding a 200 lb concentrated live load in any direction, and shall be designed in accordance with OSHA guidelines.
2. The tower shall be structurally capable of being supported at the four outer corners of the tower cell. Alternatively, the tower manufacturer shall provide supporting steel to adapt

tower to be supported at four outer corners.

#### 5.0 Construction:

1. Except where otherwise specified, all components of the cooling tower shall be fabricated of steel, protected against corrosion by G-235 galvanizing. The tower shall be capable of withstanding water having a pH of 6.5 to 8.0; a chloride content (NaCl) up to 300 ppm; a sulfate content (SO<sub>4</sub>) up to 250 ppm; a calcium content (CaCO<sub>3</sub>) up to 500 ppm; silica (SiO<sub>2</sub>) up to 150 ppm; and design hot water temperatures up to 130°F. The circulating water shall contain no oil, grease, fatty acids or organic solvents. Fiberglass casing, polyurethane barriers, and thermosetting hybrids and the components they are adhered to shall be considered non-recyclable and not allowed.
2. The specifications, as written, are intended to indicate those materials that will be capable of withstanding the above water quality in continuing service, as well as the loads described in paragraph 4.1. They are to be regarded as minimum requirements. Where component materials peculiar to individual tower designs are not specified, the manufacturers shall take the above water quality and load carrying capabilities into account in the selection of their materials of manufacture.

#### 6.0 Mechanical Equipment:

1. Fan(s) shall be propeller-type, incorporating aluminum alloy blades attached to galvanized hubs with U-bolts. Blades shall be individually adjustable. Maximum fan tip speed shall be 13,000 ft/min. Fan(s) shall be driven through a right angle, industrial duty, oil lubricated, geared speed reducer that requires no oil changes for the first five (5) years of operation. All gearbox bearings shall be rated at an L10A service life of 100,000 hours or greater and the gear sets shall have AGMA Quality Class of 9 or greater. The gearbox shall include any modifications to enable operation down to 10% of full speed. Fans driven through V-Belts will not be accepted.
2. The motor to gearbox close coupling shall be a tire-type, single piece, flexible element design to accommodate frequent speed changes that are inherent with VFD applications.
3. The complete mechanical equipment assembly for each cell shall be supported by two horizontal steel beams that resist misalignment between the motor and the gear reducer/belt drive system. The mechanical equipment assembly shall be warranted against any failure caused by defects in materials and workmanship for no less than five (5) years following the date of tower shipment. This warranty shall cover the fan, speed reducer, drive shaft and couplings, and the mechanical equipment support. The electric motor shall carry a manufacturer's warranty of at least one year.
4. A vibration limit switch in a NEMA 4 housing shall be installed on the mechanical equipment support and wired to the shutdown circuit of the fan motor starter or VFD. The purpose of this switch will be to interrupt control power voltage to a safety circuit in the event of excessive vibration causing the starter or VFD equipment to de-energize the motor. It shall be adjustable for sensitivity, and include a means to reset the switch.
5. An external oil level dipstick shall be located adjacent to the motor at the fan deck surface and shall be accessible from a portable maintenance ladder.

#### 7.0 Fill, Louvers and Drift Eliminators:

1. Fill shall be film type, thermoformed of 15 mil thick PVC before forming, with louvers and eliminators formed as part of each fill sheet. Fill shall be suspended from hot dip galvanized structural tubing supported from the tower structure, and shall be elevated above the floor of the cold-water basin to facilitate cleaning. Air inlet faces of the tower shall be free of water splash out. Fill shall be capable of withstanding a hot water temperature of 130°F.

2. Drift eliminators shall be PVC, triple-pass, and shall limit drift losses to 0.005% or less of the design water flow rate.

#### 8.0 Hot Water Distribution System:

1. Two open stainless steel (301L) basins (one above each bank of fill) shall receive hot water piped to each cell of the tower. These basin components shall be installed and sealed at the factory and assembled with bolted connections. Tap screws shall not be allowed. The basins shall be equipped with removable, galvanized steel covers capable of withstanding the loads described in paragraph 4.1. The water distribution system shall be accessible and maintainable during tower fan and water operation.
2. Each cell of the tower shall include a single hot-water flanged inlet connection (ASME Class 150) located as shown on the plans. An internal system of PVC piping shall deliver water equally to the distribution basins without the need for balancing valves. This internal piping system shall require no scheduled maintenance, and shall be located such that it does not interfere with normal maintenance access. The internal piping shall extend to the exterior surface of the tower.
3. The water distribution system shall be accessible and maintainable while tower is operating.
4. The water distribution system shall be equipped with a method to operate under variable flow conditions while maintaining a uniform air-side pressure drop through the fill to maximize cooling efficiency and minimize the risk of ice and scale formation in the fill.

#### 9.0 Casing, Fan Deck and Fan Guard:

1. The casing and fan deck shall be galvanized steel, and shall be capable of withstanding the loads described in paragraph 4.1. The top of the fan opening shall be equipped with a conical, non-sagging, removable fan guard, fabricated of welded 5/16" and 7 gauge rods, and hot dip galvanized after fabrication. Fan cylinders 5'-0" in height and over shall not be required to have a fan guard.

#### 10.0 Access:

1. A large galvanized, rectangular access door shall be located on one cased faces for entry into the cold-water basin. Doors shall provide convenient access to the fan plenum area to facilitate inspection and allow maintenance to the fan drive system. The access doors shall be at least 30" wide by 33" high.
2. The top of the tower shall be equipped with a guardrail complete with kneerail and toeboard, designed according to OSHA guidelines and factory welded into subassemblies for ease of field installation. Posts, top rails and kneerails shall be 1.5" square tubing. The guardrail assembly shall be hot dipped galvanized after welding and capable of withstanding a 200 pound concentrated live load in any direction. Posts shall be spaced on centers of 8'-0" or less. A 1'-6" wide aluminum ladder with 3" I-beam side rails and 1.25" diameter rungs shall be permanently attached to the endwall casing of the tower, rising from the base of the tower to the top of the guardrail. Provide a ladder extension for connection to the foot of the ladder attached to the tower casing. This extension shall be long enough to rise from the roof (grade) level to the base of the tower. The installing contractor shall be responsible for cutting the ladder to length; attaching it to the foot of the tower ladder; and anchoring it at its base.
3. A heavy gauge aluminum safety cage, welded into subassemblies for ease of field installation, shall surround the ladder, extending from a point approximately 7'-0" above the foot of the ladder to the top of the guardrail. Maximum weight of welded subassemblies shall not exceed 20 lb for ease of installation.

4. There shall be an access platform at the base of the tower extending from the vertical ladder to the access door. The platform shall be surrounded by an OSHA compliant guardrail system welded into subassemblies for ease of installation. The walking surface of the platform shall be perforated to provide a non-slip surface for personnel safety.
5. Provide a factory-installed, walkway extending from one cased-face access door to the other cased face. A steel framework shall support the walkway and the top of the walkway shall be at or above the cold-water basin overflow level. The walkway and framework to be equivalent material as the tower basin and have a minimum width of 36".
6. A factory-installed, elevated platform convenient for the care and maintenance of the tower's mechanical equipment shall be provided. The walkway and framework to be equivalent material as the tower basin.

#### 11.0 Cold Water Collection Basin:

1. The collection basin shall be stainless steel (301L) and assembled with bolted connections. Tap screws shall not be allowed. The basins shall include the number and type of suction connections required to accommodate the outflow piping system shown on the plans. Suction connections shall be equipped with debris screens. A factory installed, float operated, mechanical make-up valve shall be included. An overflow and drain connection shall be provided in each cell of the cooling tower. The basin floor shall slope toward the drain to allow complete flush out of debris and silt that may accumulate. Towers of more than one cell shall include a method for flow and equalization between cells. The basin shall be accessible and maintainable while water is circulating.

#### 12.0 Controls

1. Each tower shall come complete with variable frequency drive , complete with a NEMA 1 indoor enclosure. The VFD shall be programmed for variable torque applications and shall catch a fan spinning in the forward or reverse direction without tripping. VFD panel construction shall include a main disconnect with short circuit and thermal overload protection with external operating handle, lockable in the off position for lock-out tag-out safety procedures. The VFD system shall receive a speed reference signal from the building management system monitoring the tower cold-water temperature. The drive must have the capability to receive a 4-20 mA temperature signal from an RTD transmitter. The bypass shall include a complete magnetic bypass circuit with the capability to isolate the VFD when in the bypass mode. Transfer to the bypass mode shall be manual in the event of VFD failure. Once the motor is transferred to the bypass circuit the fan motor will run at constant full speed. VSDs Shall be complete with the Bacnet Interface (BacNet MS/TP). Variable frequency drive shall be shipped loose for installation and wiring on site by the contractor.
2. Tower shall come complete with following control contacts:
  - VFDs:
    - VFD enable: Available as a DI into the VFD from the BMS giving permission to VFD to operate when needed.
    - Fan motor speed feedback in RPM: Available as an AO from the VFD into BMS
    - VFD Speed control: Available as a AI into the VFD from the BMS
    - VFD fault: Available as a DO from the VFD into the BMS
    -

**1 REFERENCES**

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

**2 PERMITS AND FEES**

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

**3 START-UP**

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

**4 INSPECTION AND FEES**

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

**5 FINISHES**

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

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

**6 ACOUSTICAL PERFORMANCE**

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

**7 EQUIPMENT IDENTIFICATION**

- .1 Identify with 3mm (1/8") Brother, P-Touch non-smearing tape, or an alternate approved by the NRC Departmental Representative, all electrical outlets shown on drawings and/or mentioned in the specifications. These are the recessed and surface mounted receptacles such as those in offices and service rooms and used to plug in office equipment, telecommunication equipment or small portable tools. Indicate only the source of power (Ex. for a receptacle fed from panel L32 circuit #1: "L32-1").
- .2 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.
- .3 Coordinate names of equipment and systems with other Divisions to ensure that names and numbers match.
- .4 Wording on lamicoïd nameplates to be approved by the NRC Departmental Representative prior to fabrication.
- .5 Provide two sets of lamicoïd nameplates for each piece of equipment; one in English and one in French.
- .6 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

- .7 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.

- .8 Lamicoid 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.
- .9 For all interior lamicaid nameplates, mount nameplates using two-sided tape.
- .10 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.
- .11 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.
- .12 Provide neatly typed updated circuit directories in a plastic holder on the inside door of new panelboards.
- .13 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 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.

## **10 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.

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**11**                    **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.

**12**                    **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.

**13**                    **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.

**14**                    **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.

**15**                    **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.
-



**16                    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**

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**Part 1            General**

**1.1                RELATED WORK SPECIFIED ELSEWHERE**

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

**1.2                MATERIALS**

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

**Part 2            Products**

**2.1                BUILDING WIRES AND GENERAL REQUIREMENTS**

- .1            Conductor material for branch circuit wiring and grounding:
    - .1            Stranded copper.
    - .2            Neutral wire: continuous throughout its length without breaks.
    - .3            Separate insulated green grounding conductors in all electrical conduits.
    - .4            All wire and cable insulation shall meet the C.S.A. Standards for the types and services hereinafter specified. Colours as per section 4-036 of Electrical Code.
    - .5            Where otherwise specified, use wire and cable types as follows:
      - .1            Type R90 XLPE cross-link polyethylene stranded for applications using wires sized No. 8 and larger.
      - .2            Type TW stranded for applications using wires sized No. 10 and smaller.
      - .3            For fire alarm wiring refer to Section 283100.
      - .4            Approved heat resistant wire for wiring through and at lighting and heating fixtures. Where insulation types are shown on the drawings other types shall not be used unless the specification is more restrictive.
    - .6            Use BX cable only under the following conditions:
      - .1            Wiring from a junction box to a recessed lighting fixture in suspended ceilings. Cable length not to exceed 1.5 m (5'), or
      - .2            Wiring or switches or 15 amp receptacles in partitions having removable wall panels, or
      - .3            When specifically called for on drawings.
    - .7            Use stranded wire no smaller than No. 12 AWG for lighting and power and no smaller than No. 18 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**

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**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            For large conductor sizes, use bolted or compression solderless type connectors.
  - .4            Use high temperature connectors and insulation on all connections of high temperature conductors.
  - .5            Where connector types are called for on the drawings or in the specification, do not use other types.
  - .6            Lugs, terminals, screws used for termination of wiring to be suitable for copper conductors.
-

**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**

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**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**

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**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.
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**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**

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**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.
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**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.

**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                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.
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**3.3 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**

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**Part 1            General**

**1.1                RELATED WORK**

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

**1.2                MATERIALS**

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

**1.3                SHOP DRAWINGS AND PRODUCT DATA**

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

**1.4                IDENTIFICATION**

- .1            Identification as per Section 26 05 00.

**Part 2            Products**

**2.1                WIRING DEVICES**

- .1            Receptacles:
    - .1            Duplex type, CSA type 5-15R, 125 volt, 15A, U ground, specification grade with the following features:
      - .1            Flush type with parallel blade slots.
      - .2            Double-wiping contacts.
      - .3            Double-grounding terminals.
      - .4            Break-off feature for separate feeds.
      - .5            One piece body, colour white unless otherwise indicated.
    - .2            Special receptacles with ampacity and voltage as indicated.
    - .3            Receptacles of one manufacturer throughout the project.
  - .2            Splitters, Junction Boxes & Cabinets:
    - .1            Sheet metal enclosure, welded corners and formed cover, provided as required.
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**Part 3 Execution**

**3.1 LOCATION OF OUTLETS**

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

**3.2 MOUNTING HEIGHTS**

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

**3.3 WIRING DEVICES**

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

**3.4 SPLITTERS AND DEVICES**

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

**END OF SECTION**

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**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**
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**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. All VFDs shall include a minimum of 5% equivalent impedance reactors, **no exceptions**.
- .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.
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**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 – 40<sup>0</sup> 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.
    - .4
  - .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
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- 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.
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- .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
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- 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.
  - .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.

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- .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.
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- .17 Standard of acceptance:
- .1 ABB ACH550 Series. **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.



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- .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**

---



## APPENDIX A

### EXISTING COOLING TOWER SHOP DRAWING



# CERTIFIED DATA FORM

65 VILLIERS ST., TORONTO, ONTARIO M5A 3S1 • 416-497-7551

Research Council Canada  
 Administrative Services & Property Management  
 REVISION No. 1  
 DATE: Dec 20/89  
 OTTAWA, ONTARIO

**CUSTOMER:**  
 Turpin & Sons  
 5330 Canotech Road, Unit #19  
 Ottawa, Ontario

**ATTENTION:**

**AGENT:**  
 - REVIEWED -  
 Breck-Mar Sales Ltd.  
 1550 Laperriere Avenue  
 Ottawa, Ontario W.O. 807015  
 K1Z 7T7  
 Reviewed by M. GALABAGA  
 Date Received 2/5/90

**PROJECT:**  
 Bldg.-M7-N.R.C.

**ORDER STATUS:**  
 Date Reviewed 2/5/90  
 ( ) VERBAL ( ) PER ORDER NO.

**CONTRACT NO.** 15857 Evapco #89-0291

**EVAPCO SALESMAN:**

**EVAPCO MODEL NO:** AT 8-242 ( ) CONDENSER ( ) COOLER (X) TOWER

**QUANTITY:** 1 **CAPACITY:** 1200 USGPM **FLUID:** Water

**TEMP. COND./SUCTION:** **TEMP. IN/OUT** 125°F/85°F **W.B.** 75

**FAN MOTOR(S):** (2) 20 HP 1800/900 RPM, 3460 HZ/ 575 VOLTS  
 CW TEFC, 1.15 S.F. ENCLOSURE. FAN DRIVES SET FOR "H<sub>2</sub>O ESP

**PUMP MOTOR(S):** HP, φ/60 HZ VOLTS OR (X) PROVIDED BY OTHERS

10 SETS OF ENCLOSED SUBMITTALS FOR (X) APPROVAL ( ) REFERENCE

- ( ) SPECIFICATIONS
- ( ) OPERATION AND MAINT. MANUALS
- ( ) CERTIFIED DWGS. AS FOLLOWS

DWG. NO.	DESCRIPTION
1) 103-AT9-15857	General Assembly
2) 103-VR34-15857 Rev. 1	Recommended Steel Support c/w Vibration Isolators
3) 103-EW-15857 Rev. 1	Wiring Diagram Two Speed Fan Motor
4) 103-A-VSA-15857	Vibration Switch Location

**CLAUDE TURPIN & SONS LTD.**  
 JAN 3 1990  
 ITEM: \_\_\_\_\_ SPEC. NO. 15712  
 BY: \_\_\_\_\_

( ) OTHERS \_\_\_\_\_

\* Caution: Care must be taken to prevent water temperature from exceeding 130°F or the cooling media will be damaged.

- OPTIONAL FEATURES:**
- ( ) SPECIAL UNIT ARRANGEMENT \_\_\_\_\_
  - ( ) SPECIAL PAN CONNS.
  - ( ) PUMP(S), PIPING, STRAINERS & FLOAT ASSY.
  - ( ) REMOTE SUMP LESS PUMP & ACCESSORIES
  - ( ) ELECT. HEATER PKG. \_\_\_\_\_ KW, \_\_\_\_\_ φ/60 HZ/ \_\_\_\_\_ V
  - ( ) PIPE COIL HEATER
  - ( ) ELECT. WATER LEVEL CONTROL PKG.
  - ( ) PUMP SHUTDOWN SWITCH
  - ( ) CAP CONTROL DAMPERS C/W ( ) ELECT. CONTROLS
  - ( ) SOLID BOTTOM PANEL ( ) BOTTOM SCREENS
  - ( ) SPLIT CIRCUIT COILS C/W ( ) CROSSOVER PIPES
  - ( ) SPECIAL COIL CONNS. \_\_\_\_\_
  - (X) SPECIAL MOTOR two speed, double wind
  - (X) VIBRATION ISOLATION RAILS
  - ( ) DISCH. HOOD C/W ( ) DAMPERS ( ) ELECT. CONTROLS
  - ( ) SAFETY LADDER ( ) CAGE ( ) RAILINGS
  - ( ) SPECIAL FILL \_\_\_\_\_
  - (X) OTHERS 1 Sets Spare Fan Belts
  - (X) Vibration Switches

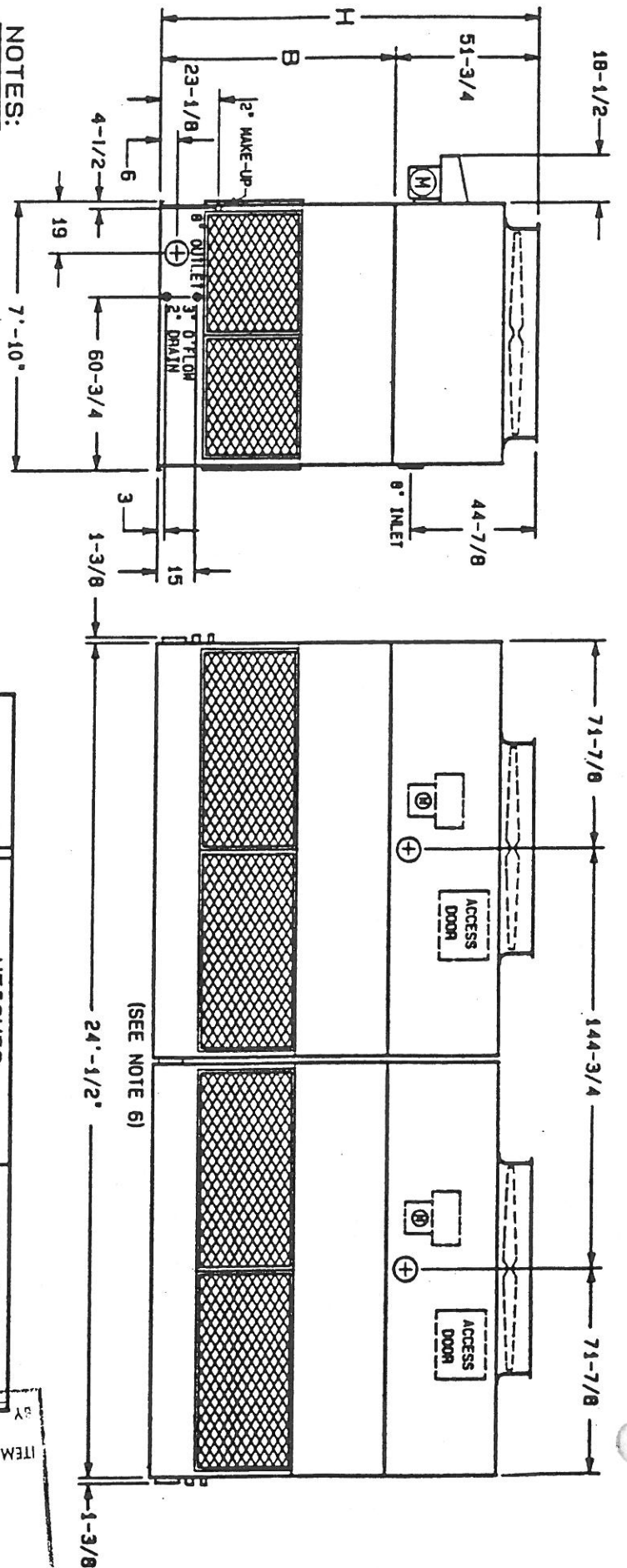
- ( ) MAY WE PLEASE HAVE CONFIRMATION OF YOUR PURCHASE ORDER SO THAT WE CAN PROCEED WITH FABRICATION.
- ( ) YOUR ORDER WILL BE FABRICATED ACCORDING TO ABOVE SPECIFICATIONS. PLEASE ADVISE US AS SOON AS POSSIBLE OF ANY CHANGES.
- ( ) THIS IS REVISED DATA. PLEASE TAKE NOTE OF THE CHANGES.
- ( ) YOUR ORDER IS SCHEDULED TO SHIP FROM OUR PLANT APPROXIMATELY \_\_\_\_\_



# cooling tower

REV: 1 DWG: 103-A19-15857  
 DATE: 04/16/89 BY: A.S.

REV. 1. TYPE WAS ODP 12/15/89



1. ALL CONNECTIONS 4" AND SMALLER ARE H.P.T.
2. MAKE-UP WATER PRESSURE 20 PSI MIN. 50 PSI MAX.
3. 3/4" MOUNTING HOLES. REFER TO RECOMMENDED STEEL SUPPORT DWG.
4. (M) - FAN MOTOR LOCATION (ONE EACH FAN)
5. CONNECTIONS LOCATED AT BOTH ENDS OF UNIT
6. PAN EQUALIZER SUPPLIED BY EVAPCO. TO BE INSTALLED AT TIME OF RIGGING

MODEL	WEIGHTS			DIMENSIONS	
	SHIPPING	OPER.	HEAVIEST SECTION	H	B
AT 8-241	9570	16140	2510	12'-4-3/8"	8'-5/8"
AT 8-242	9860	16430	2510	12'-4-3/8"	8'-5/8"

CERTIFIED FOR: TURPIN & SONS

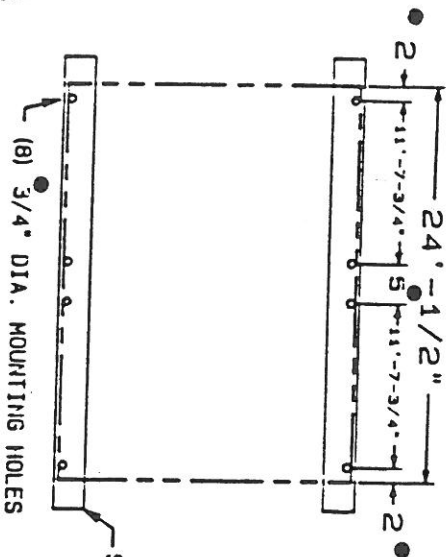
CUSTOMERS ORDER NO: 1200 U.S.G.P.M. 125°F IN 85°F OUT 75°F • EWB.  
 CAPACITY: (2)20 H.P. ELEC. SPEC. 575V, 3Ø, 60HZ, 1800/900RPM, JEFF.  
 FAN MOTOR INLET PRESSURE .77 P.S.I.G.

REMARKS: TWO SPEED, DOUBLE WINDING, FAN MOTOR, VIBRATION ISOLATORS, \* CAUTION: CARE MUST BE TAKEN TO PREVENT WATER TEMPERATURE FROM EXCEEDING 130°F OR THE COOLING MEDIA WILL BE DAMAGED, 1 SET SPARE FAN BELTS, & VIBRATION SWITCHES

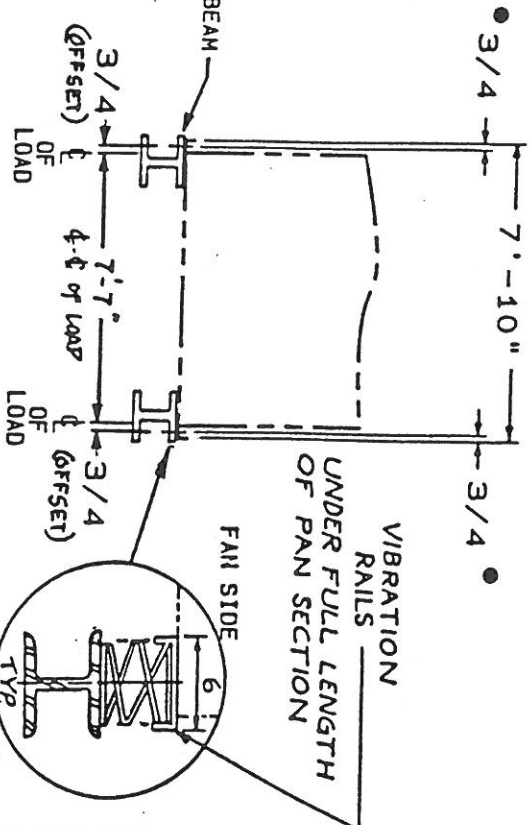
CLAUDE TURPIN & SONS LTD.  
 JAN 23 1990  
 SPEC. NO. 15712

SP 1578

PLAN VIEW



END ELEVATION



ITEM: \_\_\_\_\_  
 BY: \_\_\_\_\_  
 JAN 31 1990  
 CLAUDE TURNER & SONS LTD.  
 15772

- NOTES:
1. BEAMS SHOULD BE SIZED IN ACCORDANCE WITH ACCEPTED STRUCTURAL PRACTICES. MAXIMUM DEFLECTION OF BEAM UNDER UNIT TO BE 1/360 OF UNIT LENGTH NOT TO EXCEED 1/2".
  2. DEFLECTION MAY BE CALCULATED BY USING 55% OF THE OPERATING WEIGHT AS A UNIFORM LOAD ON EACH BEAM. SEE CERTIFIED PRINT FOR OPERATING WEIGHT. ADD WEIGHTS OF OPTIONAL ACCESSORIES, IF ANY.
  3. SUPPORT BEAMS AND ANCHOR BOLTS ARE TO BE FURNISHED BY OTHERS.
  4. BEAMS MUST BE LOCATED UNDER THE FULL LENGTH OF THE PAN SECTION.
  5. BEAMS SHOULD BE LEVEL TO WITHIN 1/8" IN 6' BEFORE SETTING THE UNIT IN PLACE. DO NOT LEVEL THE UNIT BY SHIMMING BETWEEN IT AND THE "I" BEAMS.
  6. MODELS AT 8-241 THRU AT 8-242 ARE MULTIPLE CELL UNITS. CELLS MUST BE PLACED ON COMMON STEEL BEAMS SIZED IN ACCORDANCE WITH NOTES 1 AND 2. OPERATING WEIGHT OF EACH CELL IS FOUND BY DIVIDING TOTAL OPERATING WEIGHT BY THE NUMBER OF CELLS.

MODEL: <u>AT 8-242</u>	
CONTRACT: <u>15857</u>	
<b>EVAPCO</b>	
RECOMMENDED STEEL SUPPORT	
AT 8-241 THRU AT 8-242	
SCALE:	N.T.S.
DWG. BY:	<u>RS</u>
DATE:	<u>02/26/89</u>
	DWG. 103-VR34-15857
REV.	



APPENDIX B  
SAFETY DATA SHEETS





## SAFETY DATA SHEET

PRODUCT

**OMNITROL 300CW**

EMERGENCY TELEPHONE NUMBER(S)

(800)463-3216 (24 Hours)

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **OMNITROL 300CW**

APPLICATION : INDUSTRIAL LIQUID MICROBIOCIDE NON-FOAMING

SUPPLIER IDENTIFICATION :  
Nalco Canada Co.  
1055 Truman Street  
Burlington, Ontario  
L7R 3Y9

EMERGENCY TELEPHONE NUMBER(S) : (800)463-3216 (24 Hours)  
For Transportation Emergencies call CANUTEC 613-996-6666  
(24 hours)

#### NFPA 704M/HMIS RATING

HEALTH : 1 / 2    FLAMMABILITY : 1 / 1    INSTABILITY : 0 / 0    OTHER :  
0 = Insignificant    1 = Slight    2 = Moderate    3 = High    4 = Extreme    \* = Chronic Health Hazard

Prepared By : SHE Department; (905) 632-8791

Date issued : 2011/11/28

Version Number : 1.10

### 2. HAZARDS IDENTIFICATION

#### \*\*EMERGENCY OVERVIEW\*\*

#### WARNING

Irritating to eyes and skin. Harmful if swallowed.

Do not get in eyes, on skin, on clothing. Do not take internally. Keep container tightly closed. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Avoid breathing vapours. Avoid contact with skin, eyes or clothing.

Wear suitable protective clothing, gloves and eye/face protection.

May evolve oxides of sulfur (SO<sub>x</sub>) under fire conditions. HCl

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Can cause moderate irritation.

SKIN CONTACT :

Can cause moderate irritation.

INGESTION :

Not a likely route of exposure. May be harmful if swallowed.



## SAFETY DATA SHEET

PRODUCT

**OMNITROL 300CW**

EMERGENCY TELEPHONE NUMBER(S)

**(800)463-3216 (24 Hours)**

### INHALATION :

Not a likely route of exposure. Aerosols or product mist may irritate the upper respiratory tract.

### HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Refer to Section 15 for more information.

Hazardous Substance(s)	CAS NO	% (w/w)	LD50's and LC50's Route & Species
Sodium Hydroxide	1310-73-2	1.0 - 5.0	No data available.
Poly(Oxyethylene(Dimethylimino)Ethylene (Dimethyliminio) Ethylene Dichloride)	31075-24-8	1.0 - 5.0	No data available.
Sodium Tolytriazole	64665-57-2	0.1 - 1.0	No data available.

## 4. FIRST AID MEASURES

### SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

### INHALATION :

Remove to fresh air, treat symptomatically. Get medical attention.

IF IN EYES: Hold eyelids open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Call poison control center or doctor for treatment advice.

IF SWALLOWED: Call a Poison Control Center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor.

Take container, label or product name and Pest Control Product registration number with you when seeking medical attention.

### NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

## 5. FIRE FIGHTING MEASURES

Flash Point : None  
LOWER EXPLOSION LIMIT : Not flammable  
UPPER EXPLOSION LIMIT : Not flammable

AUTOIGNITION TEMPERATURE : Not flammable



## SAFETY DATA SHEET

PRODUCT

**OMNITROL 300CW**

EMERGENCY TELEPHONE NUMBER(S)

**(800)463-3216 (24 Hours)**

### EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.

### FIRE AND EXPLOSION HAZARD :

May evolve oxides of sulfur (SO<sub>x</sub>) under fire conditions. HCl

### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

### SENSITIVITY TO MECHANICAL IMPACT :

Not expected to be sensitive to mechanical impact.

### SENSITIVITY TO STATIC DISCHARGE :

Not expected to be sensitive to static discharge.

## 6. ACCIDENTAL RELEASE MEASURES

### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

### ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water. ^This pesticide is toxic to fish. Do not discharge effluent containing this active ingredient into lakes, streams, ponds estuaries, oceans, or public waters. Do not reuse empty containers.^

## 7. HANDLING AND STORAGE

### HANDLING :

Avoid eye and skin contact. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Keep the containers closed when not in use. Use with adequate ventilation.

### STORAGE CONDITIONS :

Store the containers tightly closed. Store in suitable labeled containers.



## SAFETY DATA SHEET

PRODUCT

**OMNITROL 300CW**

EMERGENCY TELEPHONE NUMBER(S)

(800)463-3216 (24 Hours)

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Category:	ppm	mg/m <sup>3</sup>	Non-Standard Unit
Sodium Hydroxide	ACGIH/Ceiling OSHA Z1/PEL		2 2	

#### ENGINEERING MEASURES :

General ventilation is recommended.

#### RESPIRATORY PROTECTION :

Respiratory protection is not normally needed. Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. Consider the use of filter type: Multi-contaminant cartridge. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

#### HAND PROTECTION :

When handling this product, the use of chemical gloves is recommended. The choice of work glove depends on work conditions and what chemicals are handled, but we have positive experience under light handling conditions using gloves made from NEOPRENE, Nitrile, or PVC. Gloves should be replaced immediately if signs of degradation are observed. Breakthrough time not determined as preparation, consult PPE manufacturers.

#### SKIN PROTECTION :

Wear standard protective clothing.

#### EYE PROTECTION :

Wear chemical splash goggles.

#### HYGIENE RECOMMENDATIONS :

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Amber
ODOR	Slight
ODOR THRESHOLD	No data available.
SPECIFIC GRAVITY	1.04
SOLUBILITY IN WATER	Complete



## SAFETY DATA SHEET

PRODUCT

**OMNITROL 300CW**

EMERGENCY TELEPHONE NUMBER(S)

**(800)463-3216 (24 Hours)**

pH	8.2 (100 %)
FREEZING POINT	0 °C
BOILING POINT	100 °C
VAPOR PRESSURE	Same as water
EVAPORATION RATE	No data available.
VAPOR DENSITY	No data available.
COEFFICIENT OF WATER/OIL DISTRIBUTION	No data available.

Note: These physical properties are typical values for this product and are subject to change.

### 10. STABILITY AND REACTIVITY

**STABILITY :**

Stable under normal conditions.

**HAZARDOUS POLYMERIZATION :**

Hazardous polymerization will not occur.

**CONDITIONS TO AVOID :**

Freezing temperatures.

**MATERIALS TO AVOID :**

None known

**HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: Oxides of sulfur, HCl

### 11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

**SENSITIZATION :**

This product is not expected to be a sensitizer.

**CARCINOGENICITY :**

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

**REPRODUCTIVE EFFECTS :**

No quantitative data available.

**TERATOGENICITY AND EMBRYOTOXICITY :**

No quantitative data available.

**MUTAGENICITY :**

No quantitative data available.



## SAFETY DATA SHEET

PRODUCT

**OMNITROL 300CW**

EMERGENCY TELEPHONE NUMBER(S)

**(800)463-3216 (24 Hours)**

### OTHER TOXICITY INFORMATION :

Toxicologically Synergistic Products: None known

## 12. ECOLOGICAL INFORMATION

### ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

## 13. DISPOSAL CONSIDERATIONS

In Ontario, the waste class under Regulation 347 is: 242L

For Porta-Feed System: 1. Close valve. 2. Arrange for return of Porta-Feed. For Other Containers: 1. Triple- or pressure-rinse the empty container. Add the rinsings to the treatment site. 2. Follow provincial instructions for any required additional cleaning of the container prior to its disposal. 3. Make the empty container unsuitable for further use. 4. Dispose of the container in accordance with provincial requirements. 5. For information on the disposal of unused, unwanted product, contact the Manufacturer or Provincial Regulatory Agency. Contact the Manufacturer and the Provincial Regulatory Agency in case of a spill, and for clean-up of spills.

## 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

### TRANSPORTATION OF DANGEROUS GOODS (TDG) CLASSIFICATION:

PRODUCT IS NOT REGULATED DURING TRANSPORTATION

For Transportation Emergencies call CANUTEC 613-996-6666 (24 hours)

## 15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

### NATIONAL REGULATIONS, CANADA :

### WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

### WHMIS CLASSIFICATION :

Pesticide controlled products are not regulated under WHMIS.



## SAFETY DATA SHEET

PRODUCT

**OMNITROL 300CW**

EMERGENCY TELEPHONE NUMBER(S)

**(800)463-3216 (24 Hours)**

### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

Substances regulated under the Pest Control Products Act are exempt from CEPA New Substance Notification requirements.

### NATIONAL POLLUTANT RELEASE INVENTORY (NPRI) :

This product does not contain any substances listed in Part 1A (Core Substances) of the NPRI at a concentration of one percent or more by weight. For a complete NPRI listing (Parts 1 - 5) please consult Environment Canada's NPRI web site.

### PEST CONTROL PRODUCTS ACT (PCP) :

Registration Number 21729

**NOTICE TO USER:** This pest control product is to be used only in accordance with the directions on the label. It is an offence under the Pest Control Products Act to use this product in a way that is inconsistent with the directions on the label. The user assumes the risk to persons or property that arises from any such use of this product.

### NATIONAL REGULATIONS, USA :

### TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

## 16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.



## SAFETY DATA SHEET

PRODUCT

**STABREX® ST70**

EMERGENCY TELEPHONE NUMBER(S)

(800)463-3216 (24 Hours)

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **STABREX® ST70**

APPLICATION : MICROORGANISM CONTROL CHEMICAL

SUPPLIER IDENTIFICATION :  
Nalco Canada Co.  
1055 Truman Street  
Burlington, Ontario  
L7R 3Y9

EMERGENCY TELEPHONE NUMBER(S) : (800)463-3216 (24 Hours)  
For Transportation Emergencies call CANUTEC 613-996-6666  
(24 hours)

#### NFPA 704M/HMIS RATING

HEALTH : 3 / 3    FLAMMABILITY : 0 / 0    INSTABILITY : 0 / 0    OTHER :  
0 = Insignificant    1 = Slight    2 = Moderate    3 = High    4 = Extreme    \* = Chronic Health Hazard

Prepared By : SHE Department; (905) 632-8791  
Date issued : 2011/03/31  
Version Number : 1.2

### 2. HAZARDS IDENTIFICATION

#### \*\*EMERGENCY OVERVIEW\*\*

#### DANGER

KEEP OUT OF REACH OF CHILDREN. Corrosive to eyes and skin. Do not get in eyes, on skin or clothing. May be fatal if swallowed or inhaled. Do not swallow. Do not breathe vapour or mist.

Wear goggles and a face shield, chemical-resistant gloves, long pants, a long-sleeved shirt, shoes and socks when handling this product. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NO<sub>x</sub>) and sulfur (SO<sub>x</sub>) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

PRIMARY ROUTES OF EXPOSURE :  
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :  
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :  
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.





## SAFETY DATA SHEET

PRODUCT

**STABREX® ST70**

EMERGENCY TELEPHONE NUMBER(S)

**(800)463-3216 (24 Hours)**

### INGESTION :

Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach.

### INHALATION :

Not a likely route of exposure. Irritating, in high concentrations, to the eyes, nose, throat and lungs.

### SYMPTOMS OF EXPOSURE :

#### Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

#### Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

### AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

### HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Refer to Section 15 for more information.

Hazardous Substance(s)	CAS NO	% (w/w)	LD50's and LC50's Route & Species
Sodium Bromide	7647-15-6	5.0 - 10.0	No data available.
Sodium Hypochlorite	7681-52-9	5.0 - 10.0	No data available.
Sodium Hydroxide	1310-73-2	1.0 - 5.0	No data available.

## 4. FIRST AID MEASURES

**IF IN EYES:** Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Call a poison control center or doctor for treatment advice.

**IF ON SKIN OR CLOTHING:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

**IF INHALED:** Move person to fresh air. If person is not breathing, call 911 or ambulances, then give artificial respiration, preferably mouth-to-mouth, if possible. Call a poison control center or doctor for treatment advise.

**IF SWALLOWED:** Call a poison control center or doctor immediately for treatment advice. Have a person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Do not give anything by mouth to an unconscious person., Take container, label or product name and Pest Control Product registration number with you when seeking medical attention.

### NOTE TO PHYSICIAN :

Aspiration may cause lung damage. Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed.



## SAFETY DATA SHEET

PRODUCT

**STABREX® ST70**

EMERGENCY TELEPHONE NUMBER(S)

(800)463-3216 (24 Hours)

### 5. FIRE FIGHTING MEASURES

Flash Point : None  
LOWER EXPLOSION LIMIT : Not flammable  
UPPER EXPLOSION LIMIT : Not flammable

AUTOIGNITION TEMPERATURE : Not flammable

EXTINGUISHING MEDIA :  
Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :  
May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :  
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

SENSITIVITY TO MECHANICAL IMPACT :  
Not expected to be sensitive to mechanical impact.

SENSITIVITY TO STATIC DISCHARGE :  
Not expected to be sensitive to static discharge.

### 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :  
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :  
SMALL SPILLS: Contain and absorb with sand or vermiculite and mix well. Collect up and remove to a safe place until disposal. Wash site of spillage thoroughly with water. Assistance can be obtained from waste disposal companies.  
LARGE SPILLS: Dike to prevent further movement. Recover by pumping or by using a suitable absorbent. Reclaim into recovery or salvage drums. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :  
This product is toxic to fish and other aquatic organisms. It is not to be used in circumstances that would cause or allow it to enter lakes, streams, ponds, estuaries, oceans or other waters in contravention of federal or provincial regulatory requirements. DO NOT discharge effluent containing this product into sewer systems without previously notifying the sewage treatment plant authority. The requirements of applicable laws should be determined before using the product., Do not contaminate water by cleaning of equipment or disposal of wastes.



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### 7. HANDLING AND STORAGE

#### HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

#### STORAGE CONDITIONS :

Store the containers tightly closed. Store separately from acids. Store in a cool well ventilated area away from direct sunlight.

#### SUITABLE CONSTRUCTION MATERIAL :

Polyethylene, Polypropylene, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use., HDPE (high density polyethylene), Neoprene, PVC, Polyurethane, Chlorosulfonated polyethylene rubber, Fluoroelastomer

#### UNSUITABLE CONSTRUCTION MATERIAL :

Brass, Buna-N, EPDM, Stainless Steel 316L, Stainless Steel 304, Mild steel, 100% phenolic resin liner, Epoxy phenolic resin

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Category:	ppm	mg/m <sup>3</sup>	Non-Standard Unit
Sodium Hydroxide	ACGIH/Ceiling		2	
	OSHA Z1/PEL		2	

#### ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

#### RESPIRATORY PROTECTION :

If significant mists, vapors or aerosols are generated an approved respirator is recommended. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: Multi-contaminant cartridge. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

#### HAND PROTECTION :

When handling this product, the use of chemical gauntlets is recommended. The choice of work glove depends on work conditions and what chemicals are handled, but we have positive experience under light handling conditions using gloves made from PVC or Nitrile . Gloves should be replaced immediately if signs of degradation are observed. Breakthrough time not determined as preparation, consult PPE manufacturers.



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### SKIN PROTECTION :

Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

### EYE PROTECTION :

Wear a face shield with chemical splash goggles.

### HYGIENE RECOMMENDATIONS :

Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

### HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

## 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light yellow Clear
ODOR	None
ODOR THRESHOLD	No data available.
SPECIFIC GRAVITY	1.32 - 1.36 @ 25 °C
SOLUBILITY IN WATER	Complete
pH (100.0 %)	13.0
FREEZING POINT	-8.3 °C
BOILING POINT	No data available.
VAPOR PRESSURE	7.7 mm Hg @ 25 °C 27 mm Hg @ 46 °C
EVAPORATION RATE	No data available.
VAPOR DENSITY	No data available.
COEFFICIENT OF WATER/OIL DISTRIBUTION	No data available.
VOC CONTENT	0.00 %

Note: These physical properties are typical values for this product and are subject to change.

## 10. STABILITY AND REACTIVITY

### STABILITY :

Stable under normal conditions.

### HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

### CONDITIONS TO AVOID :

High temperatures Direct sunlight



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### MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Contact with organic materials (e.g. rags, sawdust, hydrocarbon oils or solvents) and avoid reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) which can generate heat, fires, explosions and the release of toxic fumes. Do not mix with any sodium hypochlorite or bleach product. Resulting mixture will result in a violent exothermic reaction releasing large amounts of nitrogen gas and liquid sulfuric acid. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

### HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Chlorine gas, HCl, Bromine, Hydrogen bromide, Oxides of nitrogen, Oxides of sulfur

## 11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.

### ACUTE ORAL TOXICITY :

Species: Rat  
LD50: > 5,000 mg/kg  
Test Descriptor: Similar Product

### PRIMARY SKIN IRRITATION :

Species: Rabbit  
Draize Score: 7.9 /8.0  
Test Descriptor: Similar Product

### SENSITIZATION :

This product is not expected to be a sensitizer.

### CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

### REPRODUCTIVE EFFECTS :

No quantitative data available.

### TERATOGENICITY AND EMBRYOTOXICITY :

No quantitative data available.

### MUTAGENICITY :

No quantitative data available.

### OTHER TOXICITY INFORMATION :

Toxicologically Synergistic Products: None known

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## HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

**12. ECOLOGICAL INFORMATION**

## ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

## ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	4.5 mg/l	Product
Fathead Minnow	96 hrs	8.3 mg/l	Product
Sheepshead Minnow	96 hrs	16 mg/l	Product

## ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	4.3 mg/l	4.2 mg/l	Product
Ceriodaphnia dubia	48 hrs	1.6 mg/l		Product
Mysid Shrimp (Mysidopsis bahia)	96 hrs	27 mg/l		Product

## AQUATIC PLANT RESULTS :

Species	Exposure	EC50/LC50	Test Descriptor
Green Algae (Pseudokirchneriella subcapitata, previously Selenastrum capricornutum)	72 hrs	3.66 mg/l	Product

## CHRONIC FISH RESULTS :

Species	Exposure	NOEC / LOEC	End Point	Test Descriptor
Fathead Minnow	7 Days	2.5 mg/l / 5 mg/l	Growth	Product

## CHRONIC INVERTEBRATE RESULTS :

Species	Test Type	NOEC / LOEC	End Point	Test Descriptor
Ceriodaphnia dubia	3 Brood	10.0 mg/l /	Reproduction	Product

## PERSISTENCY AND DEGRADATION :

Biological Oxygen Demand (BOD) : This material is an oxidizing biocide and is not expected to persist in the environment.

## MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is



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intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	30 - 50%

The portion in water is expected to be soluble or dispersible.

### BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

### ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Moderate

## 13. DISPOSAL CONSIDERATIONS

In Ontario, the waste class under Regulation 347 is: 135C

For Porta-Feed System: 1. Close valve. 2. The Porta-Feed System may be returned to the point of purchase (distributor/dealer). It must be refilled by the distributor/dealer with the same product. Do not reuse the Porta-Feed System for any other purpose. For Other Containers: 1. Triple- or pressure-rinse the empty container. Add the rinsings to the treatment site. 2. Follow provincial instructions for any required additional cleaning of the container prior to its disposal. 3. Make the empty container unsuitable for further use. 4. Dispose of the container in accordance with provincial requirements. 5. For information on the disposal of unused, unwanted product, contact the Manufacturer or Provincial Regulatory Agency. Contact the Manufacturer and the Provincial Regulatory Agency in case of a spill, and for clean-up of spills.

## 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

TRANSPORTATION OF DANGEROUS GOODS (TDG) CLASSIFICATION:

CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL), Class 8, UN3266, PG II

For Transportation Emergencies call CANUTEC 613-996-6666 (24 hours)



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### 15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

Pesticide controlled products are not regulated under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

Substances regulated under the Pest Control Products Act are exempt from CEPA New Substance Notification requirements.

NATIONAL POLLUTANT RELEASE INVENTORY (NPRI) :

This product does not contain any substances listed in Part 1A (Core Substances) of the NPRI at a concentration of one percent or more by weight. For a complete NPRI listing (Parts 1 - 5) please consult Environment Canada's NPRI web site.

CANADIAN FOOD INSPECTION AGENCY (CFIA) :

Authorized use is under category: : W2

PEST CONTROL PRODUCTS ACT (PCP) :

Registration Number 25478

NOTICE TO USER: This pest control product is to be used only in accordance with the directions on the label. It is an offence under the Pest Control Products Act to use this product in a way that is inconsistent with the directions on the label. The user assumes the risk to persons or property that arises from any such use of this product.

NATIONAL REGULATIONS, USA :

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

This product is exempted under TSCA and regulated under FIFRA. The inerts are on the Inventory List.

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :

When use situations necessitate compliance with FDA regulations, this product is acceptable under : the following use conditions.

This product may be employed in the treatment of papermill influent water systems in plants where paper or paperboard destined for food contact purposes is manufactured as long as the bromide ion concentration in the water is no greater than 22 ppm.

### 16. OTHER INFORMATION

Nalco: EHS2818, F105047/104688





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Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

\* The human risk is: Low

\* The environmental risk is: Moderate

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.





**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 or 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 a cost 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.



APPENDIX 'D'

**Fair Wages and Hours of Labour**

**Labour Conditions**

ANNEXE 'D'

**Justes Salaires et Heures de Travail**

**Conditions de Travail**

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**01 Interpretation**

**In these Conditions**

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

**01 Interprétation**

**Dans ces conditions**

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

## 02 General Fair Wage Clause

(a) All persons in the employ of the contractor, subcontractor, or any other person doing or contracting to do the whole or any part of the work contemplated by the contract, shall during the continuance of the work:

i) be paid fair wages that is, such wages as are generally accepted as current for competent workers in the district in which the work is being performed for the character or class of work in which such workers are respectively engaged; and

ii) in all cases, be paid no less than the minimum hourly rate of pay established by the Labour Program of the Department of Human Resources Development in the Fair Wage Schedules which form a part of this contract as Appendix A to these Labour Conditions; and

iii) for contracts covering work performed in the province of Quebec, be paid at least the wage rates established by that province for the purposes of the Quebec "Construction Decree".

(b) Where there is no wage rate in the schedules referred to in (a) for a particular character or class of work, the contractor shall pay wages for that character or class of work at a rate not less than the rate for an equivalent character or class of work.

(c) Where during the term of the contract, the contractor receives notice from the contracting authority of any change in wage rates, the contractor shall pay not less than the changed wage rate beginning on the first day after receipt, by the contractor, of the notice of the change in wage rates.

## 03 Hours of Work

(a) The hours of work in a day and in a week of persons employed in the execution of the contract, including the hours of work in excess of which a person shall be paid overtime at a rate at least equal to one and one half times the fair wage, are the hours of work for the province in which the work is being performed as set out from time to time in an Act of that province.

(b) The daily or weekly hours of work referred to in paragraph (a) may be exceeded in accordance with the applicable provincial law.

## 02 Clause générale de justes salaires

(a) Toutes les personnes employées par l'entrepreneur, le sous-traitant ou toute autre personne exécutant ou s'engageant par contrat à exécuter la totalité ou une partie quelconque des travaux prévus dans le contrat seront payées :

i) des justes salaires tant que dureront les travaux, c'est-à-dire les salaires généralement reconnus comme salaires courants pour les travailleurs qualifiés dans la région où les travaux sont exécutés, selon la nature ou la catégorie du travail auquel ces travailleurs sont respectivement affectés; et

ii) dans tous les cas, pas moins que les taux horaires minima fixés par le Programme du travail du ministère du Développement des ressources humaines dans les échelles de justes salaires qui deviennent partie de ce contrat en tant qu'Annexe A de ces Conditions de travail; et

iii) pour les contrats concernant les travaux effectués dans la province de Québec, pas moins que les taux de salaires qui sont établis par cette province pour les fins du "Décret de la construction" du Québec.

(b) Lorsqu'il n'y a aucun taux prévu dans l'échelle des taux de salaires à l'égard d'un travail d'une nature ou d'une catégorie données, l'entrepreneur verse à l'employé un taux de salaire qui n'est pas inférieur à celui établi pour un travail de nature ou de catégorie équivalente.

(c) Lorsque pendant la durée du contrat, l'entrepreneur reçoit de l'adjudicateur un avis de modification à l'échelle de salaires, l'entrepreneur rémunère les employés touchés par cette modification à des taux qui ne sont pas inférieurs aux taux modifiés à compter de la journée qui suit la réception par lui, de l'avis.

## 03 Durée du travail

(a) Les heures de travail quotidiennes et hebdomadaires des personnes employées à l'exécution du contrat, notamment les heures au-delà desquelles une personne doit être rétribuée selon le tarif pour heures supplémentaires, soit au moins le juste salaire majoré de 50 pour cent, sont celles fixées et éventuellement modifiées par la législation de la province dans laquelle le travail est effectué.

(b) Les heures de travail quotidiennes ou hebdomadaires mentionnées à l'alinéa (a) peuvent être dépassées conformément à la législation provinciale applicable.

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

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



**FAIR WAGE SCHEDULE**  
FOR FEDERAL CONSTRUCTION CONTRACTS

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

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

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



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

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

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

<p><b>FOR INFORMATION CONCERNING THESE SCHEDULES AND THE FAIR WAGES AND HOURS OF LABOUR ACT UNDER WHICH THEY ARE DEVELOPED, OR TO LODGE A COMPLAINT, CONTACT YOUR NEAREST LABOUR PROGRAM DISTRICT OFFICE LISTED IN THE BLUE PAGES OF YOUR TELEPHONE DIRECTORY UNDER GOVERNMENT OF CANADA, HUMAN RESOURCES AND SKILLS DEVELOPMENT CANADA OR CALL 1-800-OCANADA.</b></p>	<p><b>POUR OBTENIR DE L'INFORMATION SUR LES ÉCHELLES ET LA LOI SUR LES JUSTES SALAIRES ET LES HEURES DE TRAVAIL SOUS LAQUELLE ELLES ONT ÉTÉ DÉVELOPPÉES, OU POUR DÉPOSER UNE PLAINTÉ, CONTACTEZ LE BUREAU LOCAL DU PROGRAMME DU TRAVAIL LE PLUS PRÈS DE CHEZ VOUS EN CHERCHANT DANS LES PAGES BLEUES DE VOTRE ANNUAIRE SOUS GOUVERNEMENT DU CANADA, RESSOURCES HUMAINES ET DÉVELOPPEMENT DES COMPÉTENCES CANADA. VOUS POUVEZ ÉGALEMENT TÉLÉPHONER AU 1-800-OCANADA.</b></p>
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## **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
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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 CS2.1.2 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
3. a) Subcontract Number / Numéro du contrat de sous-traitance	3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant		

4. Brief Description of Work / Brève description du travail  
 Replace the existing Cooling Tower on the roof of M7 with a new Cooling Tower. Existing Structural, Mechanical and Electrical infrastructural shall also be upgraded to suit the new Cooling Tower./ Remplacer la tour de refroidissement existante sur le toit de M-7 par une nouvelle tour de refroidissement. L'infrastructure existante mécanique, électrique et structurale devra aussi être améliorée pour en fonction de la nouvelle tour de refroidissement

5. a) Will the supplier require access to Controlled Goods? / Le fournisseur aura-t-il accès à des marchandises contrôlées?	<input checked="" type="checkbox"/> No / Non	<input type="checkbox"/> 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?	<input checked="" type="checkbox"/> No / Non	<input type="checkbox"/> 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)	<input checked="" type="checkbox"/> No / Non	<input type="checkbox"/> Yes / Oui
6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. / Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.	<input type="checkbox"/> No / Non	<input checked="" type="checkbox"/> 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?	<input checked="" type="checkbox"/> No / Non	<input type="checkbox"/> 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"/>
--	--------------------------------------	---

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"/>



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

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

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

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

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

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

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

- |   |   |   |  |
|---|---|---|--|
| <input checked="" type="checkbox"/> RELIABILITY STATUS<br>COTE DE FIABILITÉ | <input type="checkbox"/> CONFIDENTIAL<br>CONFIDENTIEL           | <input type="checkbox"/> SECRET<br>SECRET           | <input type="checkbox"/> TOP SECRET<br>TRÈS SECRET               |
| <input type="checkbox"/> TOP SECRET- SIGINT<br>TRÈS SECRET - SIGINT         | <input type="checkbox"/> NATO CONFIDENTIAL<br>NATO CONFIDENTIEL | <input type="checkbox"/> NATO SECRET<br>NATO SECRET | <input type="checkbox"/> COSMIC TOP SECRET<br>COSMIC TRÈS SECRET |
| <input type="checkbox"/> SITE ACCESS<br>ACCÈS AUX 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?  
 Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail?  No / Non  Yes / Oui  
 If Yes, will unscreened personnel be escorted?  
 Dans l'affirmative, le personnel en question sera-t-il escorté?  No / Non  Yes / Oui

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

**INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS**

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

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

**PRODUCTION**

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

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

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

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



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

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

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

**SUMMARY CHART / TABLEAU RÉCAPITULATIF**

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

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

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

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

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



Contract Number / Numéro du contrat

Security Classification / Classification de sécurité

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

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

Name (print) - Nom (en lettres moulées) Bruno Vallieres		Title - Titre Manager, Administrative Services and Property Management	Signature 
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 Nov 19 <sup>th</sup> / 2013

**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 
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 19 Nov 2013

15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached?  
Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?  No / Non  Yes / Oui

**16. Procurement Officer / Agent d'approvisionnement**

Name (print) - Nom (en lettres moulées) MARC BEDARD		Title - Titre Senior Contractors Officer	Signature 
Telephone No. - N° de téléphone 613 993-2274	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date 19/11/13

**17. Contracting Security Authority / Autorité contractante en matière de sécurité**

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