

PART 1 - GENERAL

<u>1.1 Related Sections</u>	.1 Section 26 05 01 Electrical General Requirements
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| <u>1.2 References</u> | .1 Canadian Standards Association (CSA International)
.1 CSA C22.1-06, Canadian Electrical Code, Part 1 (20th Edition), Safety Standard for Electrical Installations.
.2 CSA C22.2 No.
.3 CAN/CSA-C22.3 No. 1-01 (Update March 2005), Overhead Systems.
.4 CAN3-C235-83 (R2000), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
.2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
.1 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.
.3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
.1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition. |
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| <u>1.3 Definitions</u> | .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122. |
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| <u>1.4 Design Requirements</u> | .1 Operating voltages: to CAN3-C235.
.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
.3 Language operating requirements: provide identification nameplates and labels for control items in English and French.
.4 Use one nameplate or label for each language both languages. |
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1.5 Submittals

- .1 Product Data: submit WHMIS MSDS.
- .2 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province s Territory ies of, Canada.
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
 - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .5 Submit number of copies of 600 x 600 mm minimum size drawings and product data to authority having jurisdiction inspection authorities.
 - .6 If changes are required, notify Departmental Representative Engineer Consultant of these changes before they are made.
- .3 Manufacturer's Field Reports: submit to Department Representative manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.6 Quality Assurance

- .1 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Territorial Act respecting manpower vocational training and qualification.
 - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
 - .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .2 Site Meetings:
 - .1 Site Meetings: as part of Manufacturer's Field Services described in Part 3 - FIELD QUALITY CONTROL,

in appropriate NMS Section, schedule site visits, to review Work, at stages listed.

.1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

.3 Upon completion of Work, after cleaning is carried out.

1.7 Delivery,
Storage and
handling

- .1 Material Delivery Schedule: provide Department Representative with schedule within 1 weeks after award of Contract.

1.8 System Startup

- .1 Instruct Department Representative in operation, care and maintenance of systems, system equipment and components.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

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| <u>1.9 Operating Instructions</u> | .1 | Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel. |
| | .2 | Operating instructions to include following:
.1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
.2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
.3 Safety precautions.
.4 Procedures to be followed in event of equipment failure.
.5 Other items of instruction as recommended by manufacturer of each system or item of equipment. |
| | .3 | Print or engrave operating instructions and frame under glass or in approved laminated plastic. |
| | .4 | Post instructions where directed. |
| | .5 | For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures. |
| | .6 | Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling. |

PART 2 - PRODUCTS

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| <u>2.1 Materials and Equipment</u> | .1 | There is an existing chiller system presently installed in the building. All materials must be selected to ensure compatibility with the existing chiller system. |
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- .2 The material is for:

Chiller Motor for York chiller model YK THVBJ3DBES

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| <u>2.2 Electric Motors, Equipment and Controls</u> | .1 | Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated. |
| | .2 | Verify control wiring and conduit: wiring and connections below 50 V which are control systems. |

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| <u>2.3 Warning Signs</u> | .1 | Warning Signs: in accordance with requirements of authority having jurisdiction inspection authorities Project Mnager. |
| | .2 | Porcelain enamel decal signs, minimum size 175 x 250 mm. |

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| <u>2.4 Wiring Terminations</u> | .1 | Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors. |
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| <u>2.5 Equipment Identification</u> | .1 | Identify electrical equipment with nameplates and labels as follows: |
| | .1 | Nameplates: plastic laminate lamicaid 3 mm thick plastic engraving sheet melamine, black matt white finish face, black white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws. |
| | .2 | Sizes as follows: |

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

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| .2 | Labels: embossed plastic labels with 6 mm high letters unless specified otherwise. |
| .3 | Wording on nameplates and labels to be approved by Departmental Representative Engineer Consultant prior to manufacture. |
| .4 | Allow for minimum of twenty-five (25) letters per nameplate and label. |
| .5 | Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics. |

- .6 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO. " as directed by Departmental Representative Engineer Consultant.
- .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .8 Terminal cabinets and pull boxes: indicate system and voltage.
- .9 Transformers: indicate capacity, primary and secondary voltages.

2.6 Wiring Identification

- .1 Identify wiring with permanent indelible identifying markings, numbered coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.7 Conduit and Cable Identification

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other	Green	Blue
Communication Systems		
Fire Alarm	Red	
Emergency	Red	Blue
Voice		
Other	Red	Yellow
Security Systems		

- 2.8 Finishes
- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint outdoor electrical equipment "equipment green" finish to.
 - .2 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

3.0 Description of New Work

- .1 New Work:
 - 1. As indicated on the drawings including:
 - 1. Supply and install a new chiller motor.

PART 3 - EXECUTION

- 3.1 Installation
- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise and as recommended by the manufacturer.

- .2 Test equipment and verify operation.

3.2 Name Plates and Labels

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 Field Quality Control

- .1 Carry out tests in presence of Department Representative.
- .2 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .3 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work.
 - .2 Provide testing report.

3.4 Cleaning

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