

Approved: 2011-12-31

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section [\_\_\_\_\_]

**1.2                PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION**

- .1            Insulation for floor depressions at "walk-in" type refrigerated boxes.
- .2            Electrical disconnect boxes [remote] and electrical breaker panels [remote] .

**1.3                REFERENCE STANDARDS**

- .1            American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
  - .1            ANSI/ASME B16.26- [2006] , Cast Copper Alloy Fittings for Flared Copper Tubes.
  - .2            ANSI/ASME B16.29- [2007] , Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings-DWV.
- .2            American National Standards Institute/National Fire Protection Association (ANSI/NFPA)
  - .1            ANSI/NFPA 255-[2006] , Standard Method of Test of Surface Burning Characteristics of Building Materials.
- .3            ASTM International (ASTM)
  - .1            ASTM A240/A240M-[11a] , Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - .2            ASTM A480/A480M- [11a] , Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
    - .1            Finish for sheet: No. 4 Finish-General purpose polished finish, one or both sides.
  - .3            ASTM A653/A653M-[10] , Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4            ASTM B88M- [09] , Standard Specification for Seamless Copper Water Tube [Metric] .
  - .5            ASTM B280-[08] , Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
  - .6            ASTM E84-[11a] , Standard Test Method for Surface Burning Characteristics of Building Materials.
  - .7            ASTM E162-[11a] , Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.

- .8 ASTM F2913, Standard Test Method For Measuring The Coefficient Of Friction For Evaluation Of Slip Performance Of Footwear And Test Surfaces/Flooring Using A Whole Shoe Tester
- .4 Canada Green Building Council (CaGBC)
  - .1 LEED Canada-NC-[2009] , LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations 2009.
  - .2 LEED Canada-EB: O&M-[2009] , LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Existing Buildings: Operations and Maintenance 2009.
- .5 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-19.13-[M87] , Sealing Compound, One-Component, Elastomeric, Chemical Curing.
- .6 CSA GROUP (CSA)
  - .1 CSA C22.2 No.120-13 , Refrigeration equipment – Electrical connections
- .7 Society of Automotive Engineers (SAE)
- .8 Underwriters' Laboratories of Canada
  - .1 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
  - .2 CAN/ULC-S138, Standard Method of Test for Fire Growth of Insulated Building Panels in a Full-Scale Room Configuration
  - .3 CAN/ULC-S705.1-[2001] , Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
- .9 Natural Resources Canada (NRCan)
  - .1 Energy Efficiency Regulations, Amendment 14 and 16, Walk in cooler and freezer components.
- .10 American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)
  - .1 ASHRAE 90.1 [2013], Energy Standard for Buildings Except Low-Rise Residential Buildings
- .11 U.S. Department of Energy (DOE)
  - .1 DOE CFR 10 Part 431, Energy Efficiency Program For Certain Commercial And Industrial Equipment
- .12 National Sanitation Foundation (NSF)
  - .1 NSF Standard 7, Commercial Refrigerators and Storage Freezers

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

- .1 Submit in accordance with Section [01 33 00- Submittal Procedures] .
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed or electronic product literature and data sheets for [walk-in freezers and coolers] and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Shop drawing shall be stamped by professional engineer registered or licensed in [Territory] [Province] , Canada when requested by authorities having jurisdiction where project is located.
  - .2 Indicate on drawings:
    - .1 Construction details of equipment by drawings and manufacturers' literature.
    - .2 Roughing-in requirements for mechanical and electrical services.
    - .3 Installation details.
- .4 Sustainable Design Submittals:
  - .1 LEED Canada submittals: in accordance with [Section 01 35 21- LEED Requirements] .
  - .2 Construction Waste Management:
    - .1 Submit project [Waste Reduction Workplan] [Waste Management Plan] highlighting recycling and salvage requirements.
    - .2 Submit a product specific, cradle-to-gate EPD (Environmental Product Declaration)
- .5 Recycled Content:
  - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of [post-consumer] [post-industrial] content, and total cost of materials for project.

## **1.5 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section [01 78 00- Closeout Submittals] .
- .2 Operation and Maintenance Data: submit operation and maintenance data for [walk-in freezers and coolers] for incorporation into manual.

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

- .1 Deliver, store and handle materials in accordance with Section [01 61 00- Common Product Requirements] [with manufacturer's written instructions] .
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors (away from direct sunlight) in clean, dry, well-ventilated area where temperature won't exceed 30 Celsius [86 Fahrenheit].

- .2 Store and protect [walk-in freezers and coolers] from [nicks, scratches, and blemishes] .
- .3 Replace defective or damaged materials with new.
- .4 Develop [Construction Waste Management Plan] [Waste Reduction Workplan] related to Work of this Section and in accordance with Section [01 35 21- LEED Requirements] .
- .5 Packaging Waste Management: remove for reuse [by manufacturer] [and return] of [packaging materials] [pallets,] [crates,] [padding,] as specified in [Waste Reduction Workplan] [Construction Waste Management Plan] in accordance with Section [01 74 19- Waste Management and Disposal] [Section 01 35 21- LEED Requirements] .

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Stainless steel sheet: to [ASTM A240/A240M], type [304] [302] with [No. 4] finish.
- .2 Galvanized steel sheet: commercial grade to [ASTM A653/A653M] , with zinc coating (galvanized) to [ASTM A653/A653M] .
- .3 Mild steel sheet: cold rolled to Society of Automotive Engineers (SAE) 1010 to 1020 suitably prepared for specified finish.
- .4 Aluminum sheet: utility sheet with smooth finish
- .5 Sealant: to [CAN/CGSB-19.13] , colour to match panel.
- .6 Insulation for panels to [CAN/ULC-S705.1] , Class A, foamed-in-place type polyurethane (PUR), 101.6 mm thick. Insulation must meet Building code when tested to CAN/ULC-S102 and CAN/ULC-S138. Tests results “listings” must be available on an independent, third party certification body website. Insulation must meet thermal performances as described by NRCan Energy Efficiency Regulations (R25 coolers, R32 Freezer), Amendment 14, when tested to ASTM C518. Insulation system shall not contain HFC or CFC if manufactured after Jan 1st 2021.

### **2.2 FABRICATION**

- .1 Overall dimensions: [as per plan or itemized spec]
- .2 Panel sections: precision die formed metal pans accurately spaced and insulated Panel edges and corners to have tongue and grooves or flat faced nose, polyurethane formed-in-place, to assure airtight, vapour proof joints using gaskets or sealants.
- .3 Wall, ceiling and floor panels with ½ in increments.
- .4 Door panels: insulated and finished as per exterior and interior panels with 914 x 1980 mm clear door opening, reinforced to prevent door panels from twisting, racking or warping. Ensure that doors will close and seal opening. Equip each door panel with.
  - .1 One, in fitting flush mounted type, door (swing as indicated) to fit door opening, insulated and finished same as panels, having 1220 high x 1.6 mm thick stainless steel push/kick-plates on both exterior and interior and having soft thermoplastic gasket with magnetic steel core at top and both sides, adjustable rubber wiper gasket at bottom.

- .1 Gaskets to be oil, fat, water and sunlight resistant and be replaceable.
- .2 Hinges, spring loaded, self-closing type, with stainless steel pin and nylon cam-type bearing, of satin finished zinc.
- .3 One latch, to match hinges, for opening door by breaking force of trigger-action door closer and magnetic gasket.
  - .1 Latch to [have cylinder type lock] , [be capable of being locked with padlock] and have inside safety release handle capable of opening door from within regardless of whether door is padlocked or not.
- .4 [One foot treadle to match hinges and latch, for opening door without use of hands.]
- .5 One trigger-action positive door closer, located on exterior, to assist in positive closing of door.
- .6 Built-in thermostatically controlled heater cables inside perimeter of door and beneath sill plate and jambs of door opening. Heater cables shall be easy to access and replace without having to remove fasteners or rivets.
- .7 Threshold: 6.0 mm Extruded aluminium with easy acces to replace heater cables
- .8 IM4 - Lighting, alarm and temperature monitor The IM4 monitor brings together the temperature display and alarm functions in addition to allowing control of cold room lighting. The unit must include the following:
  - .1 Power source failure alarm with adjustable set point for temperature.
  - .2 Jack for remote alarm telephone dialer and enunciator panel.
  - .3 Temperature display with minus 40 degrees C to plus 60 degrees C range.
  - .4 Built-in battery and charger.
- .5 Ceiling panels to be reinforced internally or externally as required, to support evaporator Supplied by Walk in manufacturer. Where external reinforcement is needed and through fasteners are used, fasteners to be of low heat conducting material such as teflon.
  - .1 Insert fasteners in teflon sleeves to prevent compressing of insulation.
- .6 Screeds: Made of non-conductive PVC. Cover shall be supplied to match wall panels color if necessary.
  - .1 Reinforcing and floor fastenings to form an integral part of panel locking devices system.
- .7 Interior floor panels: 1.2 mm minimum, core galvanized steel, with anti-slip pattern having a minimum friction coefficient of .3 when tested with oil and water contaminated surface as per (ASTM F2913) such as Nextgrip by Norbec.
- .8 Panel thickness[es] and finish[es] for exterior and interior panels [exposed to normal view] except floor panels: [galvanised steel with a minimal thickness of 0.55 mm, prepainted white with Silkline profile [Stainless Steel 304-2B with a minimal thickness of

.79mm], [galvanized steel with a minimal thickness of 0.70, coated with a 120 micron laminated PVC film (Advantica-L)].

- .9 Locking devices: panel sections to have cam-action locking devices, spaced at maximum 950 mm vertically, 600 mm horizontally. Male and female or hybrid lock pockets.
- .10 LED light fixture: to [CSA 22.2 No.137] Class III Hazardous Locations. controlled by item in 2.2.4.8 supplied by Walk in manufacturer to be terminating in vapour-tight junction box that light is mounted on.

.1 LED Fixture 1810 LCT

- .1 Energy-efficient lighting
- .2 Surface mounting brackets
- .3 Extremely durable polycarbonate housing and lens
- .4 Designed for walk-in coolers and/or freezers
- .5 Operating temp -40°F to 104°F (-40°C to 40°C)
- .6 Rated 50,000+ hours of life
- .7 Certifications: UL approved for wet location, NSF listed component, IP-65

.2 [LED Fixture K1809]

- .8 Compact size with up to the same lumens as the 1.5m Fixtures
- .9 Low profile high impact Lexan globe with anti-glare technology
- .10 Rated for 50,000+ hours of life
- .11 4000K color temperature
- .12 Designed for damp/wet/cooler/freezer environments
- .13 5 year limited warranty on the light engine
- .14 LM-79 tested, LM-80

.3 [LED Fixture K1808]

- .1 Low profile high impact Lexan globe with anti-glare technology
- .15 Rated for 50,000+ hours of life
- .16 4000K color temperature
- .17 Designed for damp/wet/cooler/freezer environments
- .18 5 year limited warranty on the light engine
- .19 LM-79 Tested

- .11 Removable closure panels: extend from lower edge of erected prefabricated ceiling panels to finished building ceiling.
  - .1 Extend cover strips or angles from building floor to ceiling closure panels between exposed ends of walk-in boxes and building wall.
  - .2 Closure panels, cover strips or angles to match exposed exterior wall panels.
- .12 Protection Bumper[s] : 19 x 200 white HDPE on exposed exterior [and/or interior] panels, mounted 300 mm from center of rail to finished building floor.

- .1 Where rub rail is at external corner, mitre joint.
  - .2 Top and vertical ends where rail makes contact with wall panels are to be sealed.
  - .3 Include [2] rub rails on interior of garbage refrigerator mounted 600 and 300 mm from respective centers to refrigerator floor.
  - .4 Rub rails are not required at doors, door panels or within 200 mm of internal angles of walls.
- .13 Two-way pressure relief port: in freezer wall panel away from direct air stream flowing from coil.
  - .1 Embed anti-sweat heater cables in frame of port so intake and exhaust ports will not freeze.
  - .2 Terminate wiring in junction box on interior panel over top of port.
- .14 If required, Walk-in Cooler and Freezer construction shall be engineered in accordance to provided seismic lateral loads, including:
  - .1 Fastening to the concrete slab
  - .2 Bracing and other lateral elements
  - .3 Seismic resistant suspension system
- .15 If required, provide for the integration of an air ventilation system between the building partitions and the walk-in cooler and freezer partitions. This system must be calculated by the walk-in manufacturer to ensure the constant flow of air is directed to maximize ventilation of the entire cavity. The system shall include:
  - .1 Layout and calculation of the number of centrifugal fans of approx. 320 CFM above the walk-in cooler to allow 2 air changes per hour
  - .2 Fans must be fitted with sensors to detect when they stop. These sensors will send an alarm signal via the temperature and alarm monitor, located near the door
  - .3 Fans must be CSA 22.2 certified to ensure safe operation
  - .4 Closing mouldings and ventilated mouldings around the junction between the walk-in cooler and the building walls to create an overpressure system
  - .5 Positioning of air outlets to evacuate air from the system
  - .6 Inspection hatches located in the center of each wall section above the walk-in cooler
  - .7 The air entering the system must be above 20 degrees Celsius (mechanical)
  - .8 Air leaving the system must be evacuated so that it does not flow back into the system (mechanically)

## **2.3 SELF-CONTAINED REFRIGERATION SYSTEM**

- .1 Refrigeration system: for top ceiling mounting, completely self-contained, consisting of single unit with condensing unit mounted and evaporator coil within the same enclosure. Unit is mounted on top of ceiling with forced-air evaporator flush mounted to the interior of the ceiling.
  - .1 Capacities, air-delivery and dimensions in accordance with manufacturer's recommendations and as indicated.

- .2 Type of refrigerant: R448 / R449: [\_\_\_\_\_]
- .3 Condensing unit: Dual speed EC motor.
- .4 Forced-air evaporator: to discharge cooled air down.
  - .1 Assemble air circulation motor, multi-fin tube-type coil, and heat exchanger within protective housing complete with drip pan and drain.
- .5 Self-contained systems used for freezing temperatures with automatic system for defrosting evaporator, including heaters and time control.
  - .1 Factory-assemble system and thoroughly test to meet manufacturer's standards.

## 2.4 REFRIGERATION EQUIPMENT (FOR REMOTE INSTALLATION)

- .1 Refrigeration equipment: with refrigerant, fully automatic in operation, and to conform to following minimum requirements:
  - .1 Condensing units: complete with EC motor, [water-cooled] [air-cooled] condenser, safety screen, receiver, hermetic or scroll type compressor, and other necessary components mounted in flexible manner on common base.
    - .1 Design unit for 16 hours to 18 hours operation at specified evaporating temperature, in 32.2 degrees C ambient temperature.
  - .2 Evaporator: forced-convection, unit-cooler type, suspended from ceiling panels, with forced-air discharged parallel to ceiling.
    - .1 Assemble air circulating motor, multifin and tube type coil [and grille] within protective housing also, contain expansion valve, with strainer, heat exchanger and inlet and outlet connections within same housing complete with safety screen.
    - .2 Air circulation motors: lifetime sealed.
    - .3 Entire unit-cooler assembly readily accessible for cleaning. Provide drip pan and drain connection.
    - .4 Equip unit coolers with mounting brackets for installation and controls for safe and satisfactory operation.
    - .5 When walk-in is used for freezer applications, provide an automatic system for defrosting cooler unit, including heaters and electronic time control.
    - .6 Include disconnect switch within 600 mm of evaporator motor.
  - .3 Communication and Data:
    - .1 Refrigeration system shall allow to be connected to a network for remote alarm (High temp / Low temp / defective sensors) monitoring and control, as per LDA from KE2. Alarm shall be programmed in order to be received via email or text messages.
    - .2 Refrigeration system temperature and status monitoring shall be automatically and continuously recorded for a one-year period. Data shall be available easily by accessing a networked computer or via a USB stick, as per Data Logging from KE2.
- .2 Refrigerant tubing:

- .1 Conform to [ASTM B280] [ASTM B88M] requirements.
- .2 Shall be copper tube type "L" with brazed joints.
- .3 Fittings:
  - .1 Conform to [ANSI/ASME B16.29] [ANSI/ASME B16.26].
  - .2 Long radius type for elbows and return bends.

## **2.5 PRE-ASSEMBLED REMOTE REFRIGERATION SYSTEMS**

- .1 Provide pre-assembled remote refrigeration equipment complete with electrical and refrigeration connections including necessary components factory-installed on both evaporator and condensing unit assemblies, prewired, ready for site connections.
- .2 Evaporator assembly in addition to evaporator, to include heat exchanger, temperature control and expansion valve.
- .3 Equipped with an electronic controller for temperature and defrost, with communication options.
- .4 Condensing unit assembly, in addition to condensing unit, to include sight glass, drier, time clock [and vibration eliminator and suction accumulator] .

## **2.6 DRAIN LINES AND HEATER CABLES**

- .1 Provide necessary drain lines to funnel drains and heater cables as required.

## **2.7 SOURCE QUALITY CONTROL**

- .1 Ensure equipment is manufactured and installed by company having personnel skilled in manufacturing and installing of prefabricated walk-in freezers and coolers and has continuous proven experience within last five years.
- .2 [Departmental Representative] [DCC Representative] [Consultant] will conduct shop inspection of equipment fabrication prior to delivery to site [in accordance with Section [01 45 00- Quality Control]] .

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for walk-in freezers and coolers installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of [Consultant] [DCC Representative] [Departmental Representative] .
  - .2 Inform [Departmental Representative] [Consultant] [DCC Representative] of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from [Departmental Representative] [Consultant] [DCC Representative]] .

### 3.2 INSTALLATION

- .1 Supply appropriate protection apparatus.
- .2 Install in accordance with manufacturer's installation manual and specific installation drawing set.
- .3 Erect work true-to-line, plumb, square and level with joints aligned. Fit joints and intersecting members accurately and in true planes adequately fastened.
- .4 Unless otherwise indicated, install units within 51 mm to 76 mm of building walls, with 914 mm minimum clearance between top of unit and room ceiling.
  - .1 Fasten screeds to building and/or wearing floor in accordance with manufacturer's instructions.
- .5 Caulk around perimeter of screeds after installation on [floor slab] [building floor] .
- .6 Fill space between perimeter of floor panels and edge of floor depression with concrete or non-shrink grout and trowel flush with [building floor] [floor slab] .
- .7 Cut or drill holes in panels, as required, to accommodate electrical and mechanical services, runs or connections as per walk in manufacturer's instructions.
  - .1 Only non-metallic conduits or wire harness sleeves are to be use into holes.
  - .2 After installation of services, fill remaining space with insulation and seal.
- .8 Fill allen key access holes with silicone and cap with in-fitting, flush, color matched pvc removable plug.
- .9 Install removable closure panels, cover strips, and angles.

### 3.3 ADJUSTING

- .1 Remove protective coverings and test and adjust operating equipment.

### 3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section [01 74 00- Cleaning] .
  - .1 Leave Work area clean at end of each day.
  - .2 Clean equipment and apparatus [in accordance with Section [01 45 00- Quality Control]] .
  - .3 Re-finish damaged coatings and finishes.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section [01 74 00- Cleaning] .
- .3 Waste Management: separate waste materials for [reuse] [recycling] in accordance with Section [01 74 19- Waste Management and Disposal] [01 35 21- LEED Requirements] .
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.5 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by walk-in freezer and cooler installation.

**END OF SECTION**