

# **1 GENERAL**

## **1.1 SCOPE OF WORK**

This Section of the Contract includes all Ice Rink Equipment work called for, or implied, together with all necessary incidentals, whether referred to or not, as will be required to complete the work to the full intent and meaning of the specifications. The work includes, but is not limited to the following:

1. Contractor must be T.S.S.A approved
2. Contractor is to remove two (2) Mechanical Dehumidifiers from existing stand locations.
3. Contractor is to remove the Freon from the mechanical units and dispose units in an environmentally sound manner.
4. Contractor is to supply and install one (1) SMART DRY Dry Solutions electric desiccant dehumidifier rated for 2,000 cfm. (no alternative accepted)
5. Contractor is to supply and install appropriately sized spiral ductwork from reactivation inlet/outlet to the outside.
6. Contractor is to supply and install appropriately sized silencer on the outlet of the new unit
7. Power and control wiring from the load side of the main disconnect to all equipment specified herein.
8. Contractor is responsible for installing a humidistat and wiring from the selected location to the unit.
9. Contractor is responsible for any platform/structural modifications for the new unit.
10. Any painting and identification labels.
11. Any ministry Inspections.
12. Start-up and testing.
13. Training.
14. Manuals and as-built drawings (2 copies).
15. Contractor is to provide detailed engineered calculations to illustrate the kWh saved from installing the electric desiccant dehumidifier.
16. Contractor must be an approved applicant representative to the OPA. This work cannot be outsourced to another company and must be submitted by the Contractor completing the work.
17. Contractors is to provide pre-approval amount applied for in the RFP
18. Contractor must include at least 10 previous incentive applications to the save on energy program illustrating the ability to receive incentive funding.

## **1.2 RELATED WORK**

The Ice Rink Contractor shall coordinate all phases of the above Scope of Work with their General Contractor, Electrical and Mechanical Contractors.

### **1.3 REFERENCED STANDARDS**

Comply with all codes and standards (latest versions) applicable to this type of work, including:

1. ANSI B31.5
2. ASHRAE 15 Safety Code for Mechanical Refrigeration.
3. ASME B31.5 Refrigeration Pressure Piping Code.
4. Mechanical Refrigeration Code - CSA-B52-99.
5. Boiler and Pressure Vessels Act.
6. Hydro Electrical Safety Code.
7. WCB Regulations.
8. Any other local or provincial requirements.

## **2 EQUIPMENT**

### **2.1 GENERAL**

- The unit shall be manufactured by Dry Solutions, Inc.
- The unit panel shall carry/have a ETL and ETL-c Label.
- The unit shall be completely factory assembled and tested and shall be shipped in sections (if necessary) to facilitate shipping and installation requirements.
- The unit shall be designed for indoor mounting. The unit will have the capabilities of filtering dehumidifying as required in the schedules and drawings.

### **2.2 MATERIALS AND CONSTRUCTION**

#### **2.2.1 Frame Construction**

All frames to be suitably reinforced and braced to permit the loading, shipping, unloading and rigging to the unit location and general handling of the completed sections without damage to external or internal components or misalignment of factory assembled components due to normal handling techniques. Unit is frameless, made with unitized construction consisting of bent and welded panels for strength, as is referred to highlighted “self-framing” construction note below.

Lifting lugs shall be provided on the base on the corners of each section of the air handling unit. For hanging if required. Actually, unit is equipped with a pair of permanently attached formed base channels, suitable for lifting, hanging or bolting in place.

### **2.2.2 Housing construction**

The casing shall be paint coated steel and the panels shall be fabricated into self-framing construction. The panels shall form a self-framing casing with no additional structural support required. All joints shall be airtight with welded construction.

Closures around all components, such as coils, dampers and filters, shall be provided and made airtight. Closures and profile plates shall be paint coated steel and shall provide solid close-off inside of the unit housing walls. No air bypass or leakage around the components will be allowed.

Housing wall penetrations shall be provided with a finished cover plate both on the interior and exterior of the unit casing.

### **2.2.3 Access Panel Construction**

Access doors in the unit housing shall be provided to permit ready access to all internal components. The access panels shall be constructed of paint coated steel. Blower, motor and drive shall have easy access panels. The wall panels shall form the door frames and have a replaceable gasket around the full perimeter of the panel, which shall provide an airtight seal.

## **2.3 FILTER SECTION**

Pre-filters shall be of a 2" 30% efficiency design, disposable type. Filters shall be held in paint coated steel. The velocity through the filters shall not exceed 525 feet per minute.

## **2.4 REACTIVATION FAN**

Reactivation air fan shall be single width, single inlet, direct drive forward curve, and fabricated of painted steel to minimize the potential for corrosion. Fan inlet cone shall be of painted steel construction. Fan and motor shall be dynamically balanced as an assembly.

## **2.5 ROTOR MEDIA**

The desiccant honeycomb rotor media shall be adsorbent, nontoxic, nonflammable, fully water washable. The substrate of the rotor shall not be made from asbestos or any synthetic material, and shall not have any toxic desiccants impregnated like lithium chloride, etc.

The desiccant media shall be pH natural.

The desiccant media shall have in-situ synthesized metal silicate desiccant on an inert inorganic fiber substrate.

The active desiccant material shall be at least 80% of the media weight, so as to ensure high performance and minimal heat carry over.

The net organics in the honeycomb media shall not exceed 2%.

The desiccant rotor shall have integral long life bearings supported by a simple fixed shaft design to allow a simple slide out of the rotor/bed.

The desiccant dehumidification media shall have a perimeter flange which should encircle the entire perimeter so as to allow greater durability and to roll the rotor on the ground, without damage. The perimeter flange should be smooth and consistent to serve as a perimeter seal surface, thus ensuring long life for the perimeter seal, without being cut, torn or otherwise damaged.

The desiccant rotor shall have a perimeter flange, and shall have “teeth” located around the perimeter, to ensure a positive and slip free rotation with a chain drive mechanism.

The desiccant media shall not fracture due to repeated temperature and moisture cycling and all the materials of construction shall be nontoxic.

The surface of the media shall have a special edge hardening so as to ensure a smooth surface and long life of both the media and the seal contacting it.

The desiccant media shall not use any organic burn-off process, as this shall weaken the media structure.

The desiccant rotor shall have long life with adequate air filtration

## **2.6 ROTOR SEALS**

Rotor seals are made of a high temperature seal material extruded from a high temperature fluorocarbon polymer base or “Viton®” (a Dupont registered trade name). The extruded Viton® seal shall have a Teflon coating applied over the seal such that the coating is impregnated within the seal. Rotor seals are rated for lifetime use. Rotor seals shall be rated for 400°F+ continuous temperature rating. The perimeter of the rotor media on both flanges utilizes rotor seals to ensure no air bypasses the rotor cassette assembly. Dividing seals contact the face of the desiccant media to seal between the process and reactivation airstreams. The dividing seals shall be adjustable.

## **2.7 CASSETTE FRAME**

Cassette Frame shall be manufactured from welded paint coated steel panels integral to the unit. Panels shall include provisions to mount the desiccant wheel drive motor and belt.

## **2.8 ROTOR DRIVE**

Rotor Drive shall include a parallel shaft gear reducer with hardened steel gears and drive motor suitable for 50 or 60 Hz operation. Cast. Gear Reducer drive shall be equipped with a drive belt.

## **2.9 ELECTRIC REACTIVATION**

Heating elements shall be solid state silicon based positive temperature coefficient type, which automatically prevent overheating and are “fail safe” in design. Surface temperature of the heater shall not exceed 400 FDB.

## **2.10 SUPPLY BLOWER(S)**

Blowers shall have the capacity as indicated in the schedule.

The blowers shall be Class 1, FC DWDI (wheels and scrolls), The wheels shall be supported by two outboard bearings which shall be of a self-aligning, ball bearing; pillow block type the blower assembly shall be dynamically balanced.

Blower Shafts - Blower shafts shall be solid ground and polished. The shafts shall not pass through their first critical speed when the unit comes up to the rated RPM. Shaft shall be coated with a rust inhibitor.

V-Belt Drives - All V-belt drives shall be standard capacity, furnished in matched sets with reinforced rubber belts. The sheaves shall be of a cast iron type and shall be complete with companion type driver sheave on drives with three belts or more. All drives shall be complete with a split taper bushing.

Motors 7.5 horsepower and smaller shall have drive sheaves that are adjustable type with a plus or minus seven percent adjustability. The driver sheave shall be selected at the approximate mid-point of the adjustable range.

## **2.11 CONTROLS**

The unit shall be provided with a remote Dew-Point sensor for unit control, mounting and wiring by installing Contractor.

The unit shall be equipped with an "On/Off/Auto" switch for operation.

SMART Dry Control complete with BACnet compatible with optional remote user interface.

## **2.12 VOLTAGE**

Primary voltage is 208/230V or 480V, 600V and secondary voltage is 120V.

Thermostat can be used as the control for the unit.

## **2.13 MARKINGS**

Proper warning labels for high voltage and moving parts shall be permanently affixed to access doors.

Lifting points, supply air connections, shall be marked.

An electrical ladder diagram shall be permanently affixed inside of the electrical control panel. The schematic shall be specific to the project and not be a generic type encompassing features or options not present on the unit. The schematic shall include the fuse replacement values and types.

### **3 EXECUTION**

#### **3.1 ELECTRICAL**

Contractor is responsible for necessary wiring and controls.

#### **3.2 STRUCTURAL/ROOFING**

Contractors are responsible for completing any platform/structural modifications.

#### **3.3 TESTING AND INSTRUCTION**

The Ice Rink Contractor shall test run the equipment and provide supervision of the Owner's operating personnel. He shall also provide instruction to the Owner's operating personnel as to the operation, care and maintenance of the ice rink equipment.

#### **3.4 MANUALS**

Provide two copies of operating and maintenance manuals for all ice rink equipment covered under this contract, including as-built drawings. All equipment, drawings and details to be reviewed and stamped by a professional engineer licensed in Ontario.

### **4.0 Incentive Grant Application**

All document requirements below must be clearly marked and submitted along with the tender submission.

1. Provide detailed engineered calculations to illustrate the kWh saved from converting systems.
2. Provide grant application service to the Ontario Power Authority
3. Provide potential pre-approval amount to be received from OPA for this install.
  1. Provide detailed calculation where needed to prove amount.
4. Refrigeration contractor must provide with tender submission a minimum of five (5) previous arena installations approved by the Ontario Power Authority. Each example must include:
  1. Brief description of equipment that was installed
  2. Copy of customer pre-approval letter and dollar amount approved for by the Ontario Power Authority.
  3. Arena name and location of incentive grant installation
  4. Day time contact name and phone number