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Mr. Osei Headley
Deputy Director of DGS CCD Capital Construction
Washington, D.C.

RE: Ice Rink Dehumidification System Summary
Fort Dupont Ice Arena
(ME Job Number KC14008.00)

Dear Mr. Headley:

The ice rink air-handling system designed and installed at the Fort Dupont Ice Arena (FDIA) is specific to ice rink applications and controls humidity with an active desiccant rotor. The dehumidification (DH) unit is a specialized piece of equipment that delivers cool and very dry air into the ice rink to provide a low dew point environment critical to controlling humidity and preventing condensation in the rink itself. Properly designed ice rinks have a dew point of 40°F to 45°F so that condensation does not form on the surfaces of materials in the space (like concrete, steel, etc.) and so that fogging does not occur at or near the ice sheet surface. Therefore, it is critical to keep the interior ambient conditions dry enough to prevent these occurrences from happening. The desiccant dehumidification unit designed, specified, and installed at FDIA provides exactly that type of environment in the ice rink and has been confirmed via commissioning to be performing at its designed capacity for this purpose.

In larger collegiate and professional arenas with ice rinks, the use of desiccant dehumidification is somewhat less common (or at least less of an absolute requirement) since they require much larger quantities of airflow in the arena for space conditioning and for occupant ventilation. The larger airflow requirements allow for the option to utilize central plants (i.e. chillers, boilers and pumps) to provide the required utilities to the arena/rink air handling units (AHU's) to maintain the ice rink at the condition needed without the use of active desiccants. Cold temperature chilled water (i.e. ~36°F) can provide enough cooling and resultant dehumidification that, with larger airflows, can maintain the arena at the required dew point to prevent condensation and fogging. However, in smaller ice rinks (like FDIA), the airflow quantity required for space conditioning and occupant ventilation is not high enough to make chilled water cooling (or DX cooling, for that matter) alone a practical way to dehumidify the ice rink. Therefore, active desiccant dehumidification becomes the mode of choice for smaller ice venues to maintain their spaces at the low dew point condition required.

In contrast to a typical packaged rooftop unit that supplies 55°F air at approximately 100% relative humidity and a dew point temperature of 52°-54°F, the desiccant dehumidification (DH) unit can deliver 55°F air with only 20% relative humidity and a dew point temperature just under 16°F. Typically, ice rinks are maintained around 55°F to 60°F with 45% to 50% relative humidity. Standard packaged rooftop equipment could not meet these performance parameters.

This method of conditioning ice rinks with desiccant air handling units has been utilized successfully by ME in numerous arenas of similar scale. The most recent examples of successful desiccant unit installations include Fifth Third Arena in Chicago, IL (official practice home of the NHL Chicago Blackhawks) and Tulsa Twin Ice (WeStreet Ice Center) in Tulsa, OK. The desiccant air handling unit specified and installed at FDIA is made specifically for these applications. See below for related building codes and industry standards with which the ice rink system design and installation complies. The ASHRAE Journal article listed further below is noted for reference because it provides an objective summary of why the desiccant unit is appropriate for ice rinks of a scale similar to FDIA.

- District of Columbia Building Codes
  - 2017 DC Mechanical Code (based on the 2015 International Mechanical Code)
  - 2017 DC Energy Conservation Code (based on ASHRAE 90.1-2013 and the 2015 International Energy Conservation Code)
  - 2017 DC Building Code (based on the 2015 International Building Code)
  - 2017 DC Fire Code, Plumbing Code, and Property Maintenance Code also apply depending on the facility design
- ASHRAE Standards for Ice Rinks
  - ASHRAE Handbook—Refrigeration, Chapter 44: Ice Rinks
  - ASHRAE Standard 62.1: Ventilation requirements for sports arenas
- Related Article
  - ASHRAE Journal (Feb 2020): “Hockey in Florida: Fighting Florida’s Humidity to Create Energy-Efficient Ice Rinks”
    - “Wescott said ice arenas’ humidity and refrigeration systems can handle the heat load. The moisture load is the challenge to creating good ice conditions. He said desiccant dehumidification is the best way to achieve ice’s ideal dew point of 35–40°F (2–4.4°C).”

Sincerely,

ME ENGINEERS

Jeffrey L. Ewens, PE
Principal

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