

APPENDIX A – MUNTERS ICE AIRE MODEL A20-1300G

IceAire™ Desiccant

Product description

The IceAire™ dehumidifier is installed in more ice rink applications than any other dehumidifier. It provides a low cost, low maintenance dehumidifier for the low humidity levels associated with ice rinks. It utilizes a direct fired gas burner or steam to reactivate a desiccant wheel. This allows the air stream to be dried to extremely low levels to provide maximum capacity.



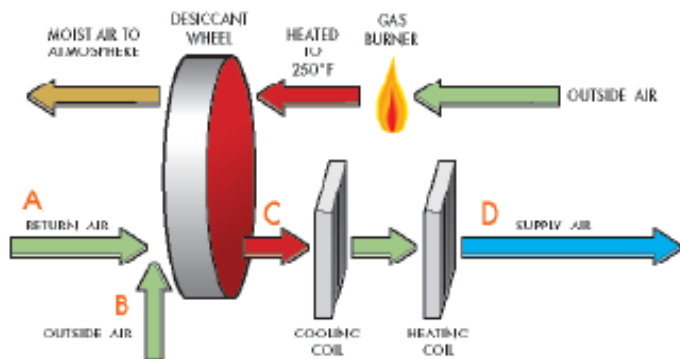
The system can be configured with optional energy recovery wheel, cooling coils, heating coils and burners, and packaged dx condensing sections. It can be configured to handle up to 100% outside air and can modulate the outside air quantity.

The high temperature reactivation allows for the delivery of supply air conditions as low as 10°F dewpoint.

The simple direct fired burner reactivation and slow turning desiccant wheel (0.1 RPM) provide a very simple, very reliable dehumidification system.

This low leaving air condition provides extremely large capacity in a small airflow and cabinet size.

IceAire™ DDS airflow & schematic



Features and benefits

- Foam injected 2" double wall casing
- High temperature desiccant cycle for low leaving dewpoints
- Optional DDC microprocessor controls
- Option for modulating outside air
- ETL listed
- Optional energy recovery wheel for high outside air applications
- Packaged DX, split system or chilled water options

State Point	No Outside Air			With Outside Air		
	CFM	°F	gr/lb	CFM	°F	gr/lb
A Outside Air	0	75	70	2,500	95	120
B Return Air	10,000	55	30	7,500	55	30
C Post Desiccant Wheel	10,000	83	4	10,000	100	17
D Supply Air	10,000	55	4	10,000	60	17

IceAire™ desiccant capacity chart

Unit	OA	Maximum CFM Return	Total	Dehumid lbs./hr.*	Dimensions LxWxH	Weight Pounds
DDS 20	12,000	12,000	12,000	250	219 x 80 x 70	6,500
DDS 30	24,000	24,000	24,000	300	219 x 96 x 101	8,500
DDS 40	36,000	36,000	36,000	550	280 x 134 x 101	10,500

\*At 100% OA (95F and 120 gr/lb)



NHL Preferred Supplier

#### BENEFITS OF DEHUMIDIFICATION

- Annual cost savings
- High-quality ice surface
- Fresh air without humidity
- Fast recovery from resurfacing
- No fog



## Munters is the NHL Preferred Supplier of Desiccant Dehumidification Systems

In order to run a successful ice arena, it is critical to improve efficiency and eliminate down time. Most recreational ice arenas operate year round and ice sports continue to gain popularity placing a greater demand for ice time. Constant and efficient humidity control is important. Uncontrolled humidity results in fog, condensation, mold and poor ice conditions – all of which compromise skater performance and safety and spectator enjoyment. Additionally, humidity causes an increased load on the ice refrigeration system resulting in higher energy costs than necessary.

### NHL Preferred Supplier

Munters, the world's largest manufacturer of desiccant dehumidification wheels and systems, has led the way in developing the most efficient and effective way to dehumidify ice arenas. Munters has more than 1,000 ice arena installations in North America.

NHL has named Munters the "Preferred Supplier" of desiccant dehumidification systems. The NHL recommended standard is 60°F and 40% Relative Humidity (RH) which equates to a 35°F dew point temperature. Speed skating venues require even more stringent conditions to create an ice surface worthy of world record times. Such conditions can be difficult if not impossible to achieve with cooling based dehumidification systems. Because sub-freezing dew points are efficiently and continuously achieved with desiccant dehumidification, today most ice arenas rely on Munters.



St Louis Blues practice arena.

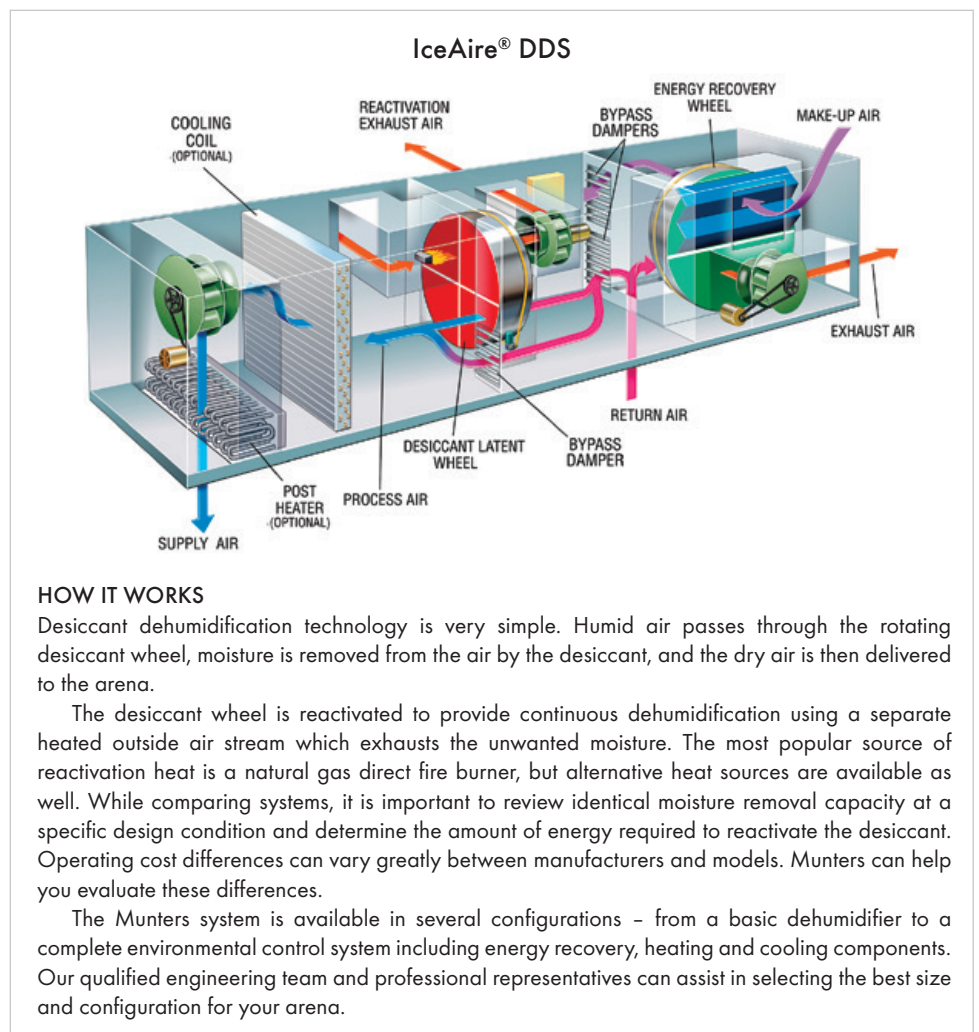
## THE PROBLEMS

Humidity from the air forms as frozen water vapor on the ice sheet surface. The ice softens and forms a "frosty" surface that may develop puddles. This affects the quality of the ice, which impacts skater performance and causes skaters to get wet when they fall. The ice refrigeration system works overtime to refreeze the ice. High humidity causes fog, which obscures the ice action and leads to safety problems. Excess moisture condenses on the glass, structure and cold surfaces causing drips which damage the ice. Floors, seats and stairs become wet leading to mold and deterioration of the building. High energy costs, indoor air quality, safety, mold, mildew and the competitive nature of the industry requires arena owners to focus attention on providing proper arena environmental conditions.

## THE DESICCANT SOLUTION

Munters HoneyCombe® desiccant wheel adsorbs moisture from the air, enabling arenas to achieve the desired humidity level. Munters uses titanium enhanced silica gel desiccant permanently impregnated throughout the Honeycombe structure; therefore the silica gel is never replaced. Munters manufactures the wheel and offers a wide range of diameters and depths to suit the moisture load requirements for arenas of all sizes, geographical locations and spectator capacities. Not all desiccant wheels are the same; Munters develops the most efficient wheel in the industry, using less energy and therefore costs less to operate than our competition. The Munters wheel requires very little attention throughout the life of the system.

Desiccant dehumidification technology allows facilities to conserve



energy. In order to maintain desired arena space conditions of 60°F and 40% RH, a cooling based system would need to sub-cool the air well below a 35°F dew point to address latent loads caused by air infiltration and people. Obviously, such cold air would need to be re-heated before being delivered into the arena to maintain a reasonable comfort level. Because cooling based systems condense moisture from the air onto the surface of a cold coil, ice will eventually accumulate and require some type of defrosting which interrupts the dehumidification process. This can be an energy consuming method of achieving

the desired conditions.

However, because desiccant dehumidification removes moisture in a vapor phase, sub-freezing dew points are easily achieved without interruption because defrost is never required. Post cooling is optional on the Munters systems for space temperature control. The post cooling coil would only provide sensible (dry) cooling and therefore never freeze or require a defrost cycle. The Munters system provides uninterrupted environmental control of the arena assuring arena operators a superior ice surface and a safe, comfortable facility.

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