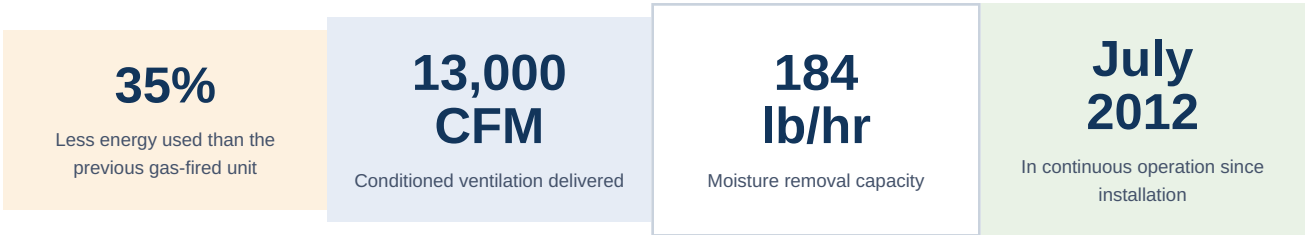


CASE STUDY

Plymouth Cultural Center Ice Arena

Plymouth, MI - Ice Arena Dehumidification & Ventilation Upgrade

Return on Air™ (ROA)



Background

Plymouth Cultural Center Ice Arena, located at 525 Farmer Street in Plymouth, Michigan, is owned and operated by the City of Plymouth Recreation Department. The single-sheet community arena serves as home ice for local youth hockey programs and hosts adult leagues, drop-in hockey, learn-to-skate and figure skating freestyle sessions, and public open skate throughout the season, alongside the Cultural Center's banquet and meeting facilities.

In 2012 the City completed a facility-wide energy efficiency revamp that converted the arena to a geothermal ice-making and building conditioning system - the first geothermal ice arena in Michigan. Because the arena's roof deck, ice slab, and spectator areas are highly sensitive to latent load, the City paired that investment with a dehumidification upgrade, replacing an aging gas-fired desiccant unit with a NovelAire PrecisionDRY-ICE 10000.



Conditioned supply and return ductwork serving the ice sheet and spectator areas.



PrecisionDRY-ICE 10000 installed on the arena roof, July 2012.

The Problem

The arena's original gas-fired desiccant dehumidifier produced the energy, maintenance, and recovery challenges common to legacy ice rink humidity control, and could not hold space conditions through high-dew-point weather.

Key deficiencies included:

- High operating cost driven by natural gas regeneration of the desiccant wheel
- Desiccant wheel continuously exposed to products of combustion, increasing maintenance scope
- Slow recovery whenever space humidity climbed above set point during events
- Fog, condensation on structure and boards, and soft ice risk during humid weather
- A dedicated gas connection and associated venting required for dehumidifier operation

The Solution

As part of the arena revamp, the City of Plymouth installed a NovelAire PrecisionDRY-ICE 10000 - a purpose-built ice arena unit that combines refrigeration-based dehumidification with desiccant technology and reactivates the wheel using waste condenser heat instead of natural gas. Learn more at www.novelaire.com.

System capabilities:

- Up to 13,000 CFM of conditioned ventilation air delivered to the occupied space
- Up to 184 lb/hr of moisture removal capacity for low dew point control
- Waste condenser heat used for desiccant reactivation - no gas connection required
- Lower temperature supply air for faster pull-down and stable ice conditions
- Single packaged rooftop unit replacing the legacy gas-fired system, reducing maintenance scope

Before vs. After Comparison

Metric	Legacy Gas-Fired Dehumidifier	NovelAire PrecisionDRY-ICE 10000
Energy consumption	Baseline	35% reduction on high-humidity days
Regeneration method	Gas-fired desiccant regeneration	Waste condenser heat reactivation
Gas connection	Required	Not required
Ventilation capacity	Limited	Up to 13,000 CFM conditioned ventilation
Moisture removal	Insufficient at peak dew point	Up to 184 lb/hr
Humidity recovery	Slow return to set point	Rapid return to set point
Space conditions	Fogging and condensation	Resolved - clear sightlines and stable ice

"The difference was immediate. The unit pulls the humidity down quickly and holds it, so we no longer fight fog over the ice or condensation on the structure - and we're doing it without burning gas."

- Facility Manager, Plymouth Cultural Center Ice Arena

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info@novelaire.com

800.762.1320

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