Industry Collaboration Leads to a Successful Conversion of an Aging R-22 Flooded System to a More Sustainable Ice Rink Solution

Hurst Mechanical, Young Supply and Chemours partner to upgrade Grand Rapids' Van Andel Arena with Opteon™ XP40 (R-449A) refrigerant.

HURST MECHANICAL

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Young Supply Company

Partnership Powers Change & Sustainability

As the American Hockey League's (AHL) Grand Rapids Griffins approached the 2022 season, their home arena for nearly 25 years was a growing source of concern for its facility managers. The Van Andel Arena in Grand Rapids, Michigan, continued to operate on its original R-22 flooded ice making chiller and building HVAC systems. Ice-making challenges were mounting, due to regulatory phaseouts that drove down the availability of R-22 and aging components that posed increased threats of operational disruptions, higher service costs, and potential leaks. Motivated by success stories of arenas of similar design, decisionmakers turned to a retrofit solution powered by the non-ozone-depleting, lower global warming potential (GWP) refrigerant by Chemours—Opteon™ XP40 (R-449A).

Quick Facts—Van Andel Arena

- **Opened:** October 1996
- **Capacity (Ice Rink):** 11,000
- **Home of the Grand Rapids Griffins,** AHL affiliate of the Detroit Red Wings
- **Additional Uses:** Ice shows and hockey tournaments; basketball and other sporting events; concerts, comedy shows, and family entertainment.
- **Owner:** Grand Rapids-Kent County Convention/Arena Authority
- **Management Company:** ASM Global

"Chemours, through collaborations with key players in the HVACR industry, has proudly deployed solutions from our Opteon™ portfolio to support the evolved sustainability, energy-efficiency, and performance objectives of more than 100 ice facilities in North America—and, in turn, the well-being and growth of the communities they serve."

Mark Love
The Chemours Company

Discovery to Discussion to Decision: *Retrofit*

Greg Doerr of Hurst Mechanical had recently discovered a Chemours-authored Purdue University case study titled "*Performance Evaluation of a Flooded Ice Rink Chiller Retrofit from R-22" by David Snyder, Charles Allgood et al**. In Doerr's meetings with Ron Rizzo and Shane Richards of Young Supply, as they focused on options for addressing the aging Van Andel system, mention of that paper and the prospect of a retrofit solution that didn't sacrifice energy performance led all three to the idea of approaching the Chemours technical team with whom Young Supply had previously worked.

Hurst Mechanical, who had been servicing the arena for nearly 25 years, focused on ensuring the arena avoided the mounting challenges of its aging R-22 flooded chiller ice-making system. Any potential solution had to help mitigate volatile pricing and supply risks caused by the R-22 phaseout, elevate the facility's sustainability commitments, meet budget needs, and optimize operations. Consulting with ice rink pioneers Michael Fitch and Justin Zembo, of Minnesota-based St. Cloud Refrigeration (SCR), they discovered it would cost approximately $300,000 to replace the system. As the two companies explored possibilities, they determined that a complete reengineering of the current flooded system to a direct expansion chiller would be cost prohibitive. Another option needed to be explored.

That option was found in the pages of the Chemours-authored Purdue study* which kicked-off further discussions between Hurst and Young Supply. This paper demonstrated the viability of retrofitting an R-22 flooded chiller system with Opteon™ XP40 (R-449A) and was further substantiated by a first-person account of the success of such retrofits by the SCR team two states over. In addition, a conversation with Chemours engineers further confirmed that Opteon™ XP40 (R-449A), a hydrofluoroolefin (HFO) blend offering zero ozone depletion potential (ODP) and a 23% reduction in GWP over R-22, was recommended for Van Andel Arena's specific system and rink application. Young Supply's Ron Rizzo and Shane Richards took the lead in coordinating discussions and next steps with Hurst Mechanical and Chemours, as well as made sure questions from all involved parties were answered, and that necessary support was in place for the retrofit. Driven by a true team effort—which included support throughout Young Supply's network, from its Detroit distribution center to branch employees—the retrofit solution was on its way to a successful outcome.

> *"Van Andel Arena continues to be a hub of athleticism, community, family, and culture. By collaborating with Young Supply and Chemours, we were able to come up with a more sustainable, cost-effective solution by recycling approximately 3,200 pounds of R-22 refrigerant that paid for half the cost of the overall project. The cost and availability of R-22 were certainly factored into the decision for Van Andel Arena to retrofit the existing system to Opteon™ XP40 (R-449A) refrigerant. Through this proactive upgrade, we delivered a reliable, flexible solution to meet the unique needs of this historical sports and entertainment center."*
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> **Greg Doerr**
> Hurst Mechanical

* Purdue Case Study: "Performance Evaluation of a Flooded Ice Rink Chiller Retrofit from R-22" by David Snyder, Charles Allgood et al.

Skates Off for Summer

Hurst Mechanical brought the retrofit plan to the Van Andel team in the spring of 2022 and planning soon followed. Hurst Mechanical, Young Supply, Chemours, and facility teams formulated a schedule to complete the Opteon™-based system retrofit in the off-ice season, between May and the Griffins' home opener on October 14, 2022.

Early in the summer of 2022, lead technician Jason Vollink from Hurst Mechanical began recovering the R-22 and drained the system's secondary coolant, glycol. Next, they overhauled and rebuilt the equipment, which consisted of three 75 HP Vilter™ compressors used for ice creation, second-stage cooling, and backup. The system's mineral oil was drained and replaced with polyolester (POE) oil. The work maintained the refrigeration system's use of city water for its condenser's cooling tower design.

After all rubber and neoprene seals and gaskets were replaced, nitrogen pressure checks were performed, and corrections were made; shortly after it was time to introduce the new refrigerant. Young Supply delivered 3,000 pounds of Chemours Opteon™ XP40 (R-449A) in late September for the retrofit. In addition, they delivered 857 pounds of Freon™ R-407C—an R-22 replacement offering equivalent performance with better environmental benefits—for the arena's air handler retrofit. Throughout the process, experts from Young Supply were on-site to provide the arena team with technical and safety literature, answer their questions, and address operating concerns about the upgraded system and its refrigerant.

"The project at Van Andel Arena epitomizes what can be achieved when you bring all the right resources together to uncover, then implement, the best solution for a specific application. Through Young Supply's relationship with Hurst Mechanical and Chemours, plus our understanding of what each of these partners can bring to the table, we were able to support Hurst Mechanical in satisfying their client and giving the people of the Grand Rapids community and beyond an environmentally sound, enjoyable experience every time they visit the venue."

Ron Rizzo
Young Supply Company

Outstanding Results

The first hockey game on Van Andel Arena's new Opteon™ XP40 (R-449A)-based ice system was played on October 9, 2022. In the first full season of operation, everyone from facility managers to players expressed that results were at or above expectations on several levels. These included:

Cost-Effectiveness
Cost savings were realized on the retrofit compared with re-engineering, as well as upfront savings from needing to buy less R-22 refrigerant.

Environmental Impact
The zero-ODP, lower-GWP performance of Opteon™ XP40 offers strong support for the arena's commitment to a healthier planet.

Sustainability
Due to system flexibility and the use of a zero-ODP, low-GWP refrigerant—the arena can adapt for future needs and achieve regulatory longevity without total overhauls and significant financial outlay.

Ease of Use
Operating temperatures, pressures, and maintenance are similar to what staff was used to with the R-22 system.

Performance
Ice quality and consistency are enabling stellar skater performance.

Peace of Mind
The system is reliable and eliminates worries about ozone depleting or high-GWP refrigerant leaks into the environment.

"We are thrilled to have a low-cost, environmentally sound ice-making solution that upholds the spirit of athleticism and community-building that Van Andel Arena stands for. The collaboration of Hurst Mechanical, Young Supply, and Chemours has resulted in a venue we can be confident is equipped for today's demands of the teams that play here, the skaters who perform here, and the spectators who come here for safe, quality entertainment."

Chris Anderson
Van Andel Arena

The Chemours Company continues to work with customers to help educate owners, operators, and the broader sports community about the long-term benefits of using an innovative refrigerant solution that has environmental advantages compared to the legacy refrigerants like HCFC-22, R-507, and HFC-134a. Professional and community ice rinks across North America choose Opteon™ refrigerants to achieve the highest levels of performance, reliability, and safety.

For more information on the Opteon™ family of low-GWP products, visit opteon.com.

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