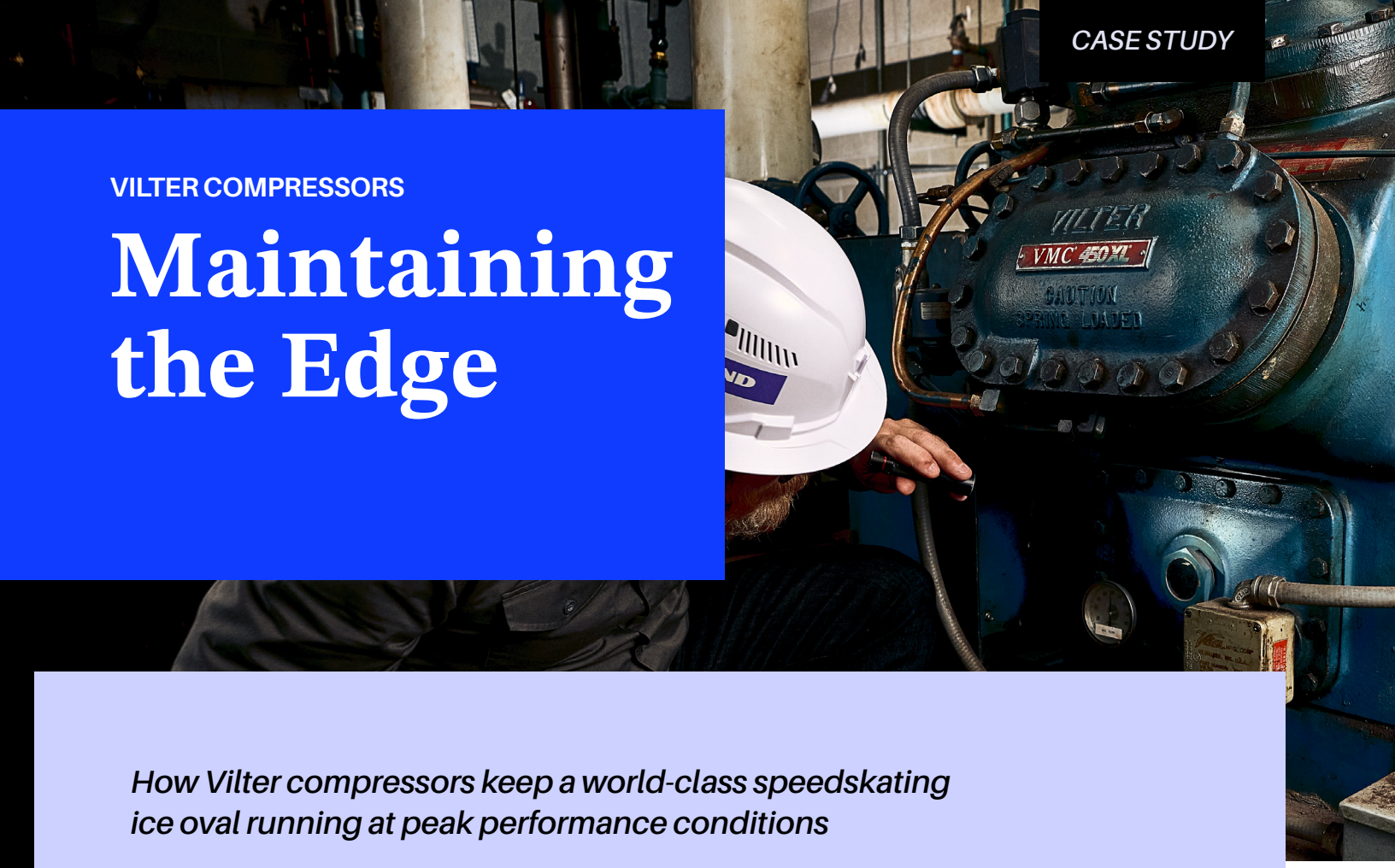
CASE STUDY

VILTER COMPRESSORS

Maintaining the Edge



How Vilter compressors keep a world-class speedskating ice oval running at peak performance conditions

Background: Building a global legacy of excellence

Built in 1992, the Pettit National Ice Center (PNIC) in Milwaukee, WI, is the fifth oldest speedskating oval and one of roughly 40 such venues worldwide. The facility supports a massive 97,000 square feet of ice surface across an Olympic-sized 400-meter oval and two interior hockey rinks — the equivalent of 5.5 NHL sheets of ice.

Designed initially with six Vilter reciprocating compressors, the PNIC's 800-ton refrigeration plant now operates with eight. Two units were reallocated from an air conditioning (cold water) chiller and piped into the central system, creating one integrated suction line dedicated to maintaining temperatures for ideal ice conditions.

The PNIC operates nearly year-round and hosts elite speedskating competitions, including the recent International Skating Union (ISU) Speedskating World Cup, which took place during the 2025 speedskating season. For Paul Golomski, the facility's general manager, supporting these events is a labor of love and requires understanding what elite athletes need to achieve world-record speeds.

Golomski has gained an international reputation throughout the speed skating community as an "ice master." However, achieving ideal performance conditions is equal parts art and science, and his long-term partnership with Copeland's Vilter industrial compression division has been instrumental in his success.

Challenge: Balancing ice and air temperatures

As elite competition requirements have evolved, so have the expectations placed on the host facilities. To achieve world-class ice conditions, the PNIC must maintain a goldilocks zone (i.e., just right) of perfect ice and air temperatures: maintaining ice temperatures as low as 15–18 °F, with air temperatures around 60 °F.

"The sport of speedskating has changed a lot since this rink was built. Professional ovals are pushing for higher air temperatures while maintaining their low-temperature ice conditions," Golomski said.

Golomski explained that the 15–18 °F temperature range prevents the edge of the skaters' blades from penetrating the ice, allowing them to slide better on the oval's surface and achieve maximum speeds. Ambient air temperatures are kept between 58 and 60 °F to achieve lower air resistance and athlete comfort.

"That big spread in temperatures is what gives skaters the fastest times," Golomski explains. It's also what places extreme loads on the refrigeration plant.

During competitions, the PNIC maintenance team constantly balances its thermal loads. A boiler and four air handlers heat the air while the refrigeration plant maintains ice temperatures. The competition schedules require the oval to be resurfaced every 40 minutes to an hour. Zamboni machines cut the ice, wash it and put down a new layer of hot ice-making water.

The ice resurfacing process adds significant heat to the ice, creating the highest heat load on the refrigeration plant. Golomski explained that the consistent reliability of Vilter compressors has been instrumental to maintaining ideal ice conditions.

"These units have been bulletproof for us over the years. They're the workhorses of our refrigeration plant," he said.

Solution: Keeping compressor "workhorses" running at peak condition

Golomski explained that compressor maintenance and sequencing are imperative to maintaining the PNIC's refrigeration plant at peak performance. His commitment to the art of ice-making and the fact that the center operates as a nonprofit have driven him to take a hands-on approach to compressor maintenance.

"I took the Vilter reciprocating compressor course, and Vilter has trained me how to service these compressors over the years. We've had a strong partnership since 2007," he said.

The eight Vilter reciprocating compressors have been in service for over 30 years and are strategically monitored, managed and maintained. Following Vilter's recommended maintenance intervals has been the standard operating procedure of the in-house maintenance team.

Top-end rebuilds are typically performed around the 10,000-hour mark. Internal inspections cover everything from connecting rod bearings and piston rings to cylinder liners. The close partnership and training through Vilter's programs have empowered the PNIC staff to manage rebuilds and everyday maintenance themselves.

"I have no formal compressor maintenance training other than through Vilter. But I've gained the skills and the knowledge to repair, rebuild and get them running like new machines," Golomski said.

Another key component of compressor optimization is runtime monitoring and sequencing. All eight compressors operate on a shared suction line and can be sequenced to balance run hours, limit wear and build redundancy into the refrigeration plant.

"I can sequence the compressors and pick how they run and in what order, alternating which compressors are running and when," Golomski said. He added that runtime logs are regularly reviewed to trigger proactive rebuilds.

The ice cooling system relies on piping embedded in concrete beneath the ice, through which a secondary refrigerant (glycol) is piped. Golomski explained that during major events such as a recent World Cup, the team ensures the system is ready to run at max loads.

"For seven days straight, we're running at suction pressures as low as 2–4 PSI, with glycol temperatures near 0 °F to achieve the 15–18 °F ice temperatures," he said. During normal operating conditions, the system runs at 13–18 PSI with glycol temperatures between 10–12 °F.

Another strategy Golomski employs is operating at lower head pressures to keep discharge temperatures in check when creating optimum ice conditions. Discharge pressures are managed with an extra condenser, water pumping and heat recovery to extract heat from the compressor discharge, which combine to protect against overheating.

This also allows the Center to maximize the tonnage cooling capacity per compressor and leverage heat recovery for other purposes, such as snow melt and underfloor (i.e., oval) heating to prevent permafrost formation..

Results: Fast ice delivers world-class results

For Golomski's team and PNIC operators, all their hard work drives toward one goal: creating fast ice conditions for world-class speed-skating athletes. It's why Wisconsin native and speed-skating world champion Jordan Stolz makes the PNIC his home rink.

At a recent World Cup event, skaters posted some of the fastest recorded times at sea level, breaking eight track records. Team USA earned an impressive 10 A-group medals, with Stoltz leading the way with four.

"We had some of the fastest ice in the world this season, and Vilter compressors ran flawlessly for seven straight days at peak demand," Golomski notes.

Through technical skill, hands-on experience, and strategic system design, Golomski and the PNIC team have created a model of excellence in ice facility operations. Vilter reciprocating compressors remain the backbone of this success, proving that reliability and commitment keep world records within reach.

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