

R&D Lab Solves Excess-Oil Problem With Help of Oil-Purging System

New technology returns chillers to maximum efficiency

At the 3M research-and-development facility in Maplewood, Minn., the refrigerant side of each of seven centrifugal chillers, which ranged in age from 5 to 40 years and in tonnage from 3,500 to 5,500, was found to contain excess oil from the compressor.

According to Tom Erickson, 3M's plant engineering specialist, the excess oil ran an average of 5 percent per chiller.

"Based on performance data that we had, that much excess oil could degrade chiller performance by as much as 11 percent," Erickson said.

PROACTIVE SOLUTION

"An average of 5 percent excess oil isn't a big problem for most facilities," Erickson said. "Many chillers are being run with 15 to 30 percent oil on the refrigerant side. But the cost in degraded performance and increased energy costs was unacceptable to us. Our chillers provide comfort cooling to 50 buildings. But, just as important, they are used in our labs to provide cold conditions to develop new products, and our research scientists demand precise and consistent temperature control."

For help, Erickson turned to Dave Holmquist, technical manager, central chillers, for Owens Service.

"We did the standard decontamination at 3M by pulling the refrigerant into tanks, distilling the refrigerant off from the oil and a little moisture



An OAM Purger installed at a 3M facility in Buffalo, N.Y.

and acid, then running it through charcoal filters," Holmquist said. "Now we had good decontaminated refrigerant to reinstall. But Tom didn't want to go through this procedure every year. He wanted his chillers running at peak performance through the entire season."

Fortunately, Holmquist recently had heard of a new technology that was just what Erickson was looking for: the Oil, Acid, and Moisture (OAM) Purger from Redi Controls Inc.

"There were several things that were appealing about the purger from an oil-removal aspect," Holmquist said. "For one, the OAM Purger didn't reach equilibrium when it got the oil content down to 3 to 6 percent, like skimmers that come on modern chillers. Redi Controls claimed that they reduced oil levels to 0.5 percent and maintained them at that level, which is the oil level that chiller OEMs recommend to keep internal gaskets and O-rings properly lubricated."

HOW THE PURGER WORKS

"The OAM Purger uses most of the technology of the old distillation process with some innovative additions," Holmquist explained. "It attaches to the refrigerant-charging valve at the base of the evaporator and uses heat to vaporize the refrigerant, routing the refrigerant through an easy-change filter dryer and back to the evaporator. The separated oil is itself filtered, removing any moisture and acids, and returned to the sump."



"But the most important thing," Holmquist continued, "is that it operates constantly, even when the chiller is shut down. It pulls out refrigerant, removes oil and other contaminants, returns clean refrigerant to the evaporator and clean oil to the sump around the clock all year long."

Mark Key, vice president of sales and marketing for Redi Controls, explained how the purger works when first put online: "Say we have a 500-lb charge with an oil content of 12 percent. In the first two weeks, the purger would remove 80 percent of the oil. The final 20 percent takes about the same time: two weeks. By that time, the oil content on the refrigerant side will be right at 0.5 percent, and the purger will maintain that level from then on, with a predictable increase in efficiency and drop in energy use."

EASY INSTALLATION

According to Holmquist, installation was simple: "The OAM Purger comes with

adaptors to attach to the oil-charging valve and the refrigerant-charging valve, and they provide a 'T' to provide for the vapor return line at the top of the evaporator. They even provide insulation for the inlet line. All we had to do was mount the purger up to the liquid level in the evaporator and provide soft 1/4-in. copper tubing and a 110/120-v electrical service and 15-amps fuse circuit. The purger itself only draws 4 amps."

SIGNIFICANT SAVINGS/FAST PAYBACK

"Leaning heavily to the conservative side of savings," Erickson said, "our calculations show this facility saving \$65,000 in energy costs in a year. That means that the OAM purgers will have paid for themselves well before the first year is out."

Information and photograph courtesy of Redi Controls Inc.

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OAM-Purgers installed by Greg Beyer, Service Technician and David Holmquist, Technical Manager Central Chillers, from Owens Service Company, on a 5,500 ton chiller and on a 3,500 ton chiller at 3M facility Minnesota

Improved OAM-Purger is Easier to Install, Saves More Energy

The OAM-Purger from Redi-Controls, Greenwood, IN, is now easier to install, and provides improved energy savings over the previous model.

The unit is no longer liquid level sensitive, and three sight glasses have been added to observe operation and assist in determining liquid level in a chiller, while continuing to regain chiller capacity.

Redi Controls says the improvements will save users thousands of dollars per year in energy savings, by removing oil from refrigerant and returning it to the oil sump.

Redi Controls manufactures equipment for use with:

- industrial process cooling chillers
- commercial and industrial HVACR chillers
- cascade systems
- environmental test chambers.

For more information, visit www.RediControls.com — Redi Controls

