



Freon™ M099

Refrigerant

Phoenix Heat Is No Match for Freon™ M099 Refrigerant

Background

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Kirk Buscho, North Valley Mechanical, in Phoenix, Arizona, was researching R-22 alternatives over the last two years. Recent EPA activity made the search for a viable alternative more urgent. Kirk said, "We looked at a few products, several versions of R-22 replacements. We worked closely with our local distributor, American Refrigeration Supplies, so we were informed on all of the options available today. For me, it was a matter of testing the products in the field, so we could fully understand the best product in terms of performance similar to R-22."

When considering options to replace R-22, Kirk indicated there were several factors that were most important to him. He said, "I was looking at refrigerant compatibility in terms of performance and wanted a refrigerant that will perform. I wanted something that is easy—be able to take out the old refrigerant and add in the new refrigerant—without a lot of hassle. Mineral oil compatibility was huge for residential A/C systems. I wanted a refrigerant that was not going to be too picky about how you treat it and that lends itself to be compatible with mineral oil. I was looking for a design and performance parameter that mimics R-22, so my techs don't get nervous about using an alternative to R-22."



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Project Details

Kirk decided to try Freon™ MO99 on a retrofit of a residential package heat pump, a Goettl 2.5 ton with a leaking indoor coil, in May 2012.

Kirk explained, “The system was down, and several contractors had attempted to repair the unit but were unsuccessful. The unit had been charged with R-22 multiple times. Due to the number of attempts to fix the system, it appeared that the system would need to be replaced. The unit had a piston orifice going to the indoor coil and the inside coil was like Swiss cheese. Several previous attempts were made to repair the unit; unfortunately, the repairs did not include replacing the filter dryer, and leak detection dye and system sealant had been added to the unit. The oil spill in the drain pan did not look so hot. Even with his home warranty, the customer was looking at an out-of-pocket expense of \$2500–3000.”

The Goettl Model HP 305J was a 12 SEER unit dating back to the early 1990s, and locating parts was going to be difficult.

Kirk devised a plan to try to retrofit the unit to Freon™ MO99 refrigerant as a last attempt to salvage the unit. He knew it was going to be difficult, as Goettl closed their manufacturing facility and parts were no longer available for the unit. There were not many options available to fix the unit. The coil needed to be replaced, and a new coil was not available. A custom-created coil could be purchased, but it was cost-prohibitive to do so. Buscho identified another shape of coil that matched the size of the old coil in both volume and tonnage. Robert Forbes, field superintendent, then assembled the unit, including placing air baffles on each side so that air would flow through the coil. The new coil was equipped with an R-22 TXV versus an orifice.

Kirk evacuated the system to 500 microns, changed the filter dryer, and charged the unit with Freon™ MO99 refrigerant to original system specifications. He said, “The internal volume of the replacement coil was approximately the same as the old unit. In cooling, we got 21 degrees split with good air flow with the blower working to specification. We got both good air flow and good numbers on the subcooling on the liquid line and superheat on the suction line. Pressure-temperature

(PT) under conditions was matching stride for stride the temp that we should be seeing.”

In a conversion using Freon™ MO99, the steps to complete the process include recovering the R-22, replacing the critical seals, charging the refrigerant, and restarting and monitoring the system for potential leaks.

On a package or split system, you're only replacing valve cores and valve caps as they have elastomeric seals. We've discovered no need to replace Teflon™ or nylon rings.

Results

The day of the retrofit was hot; the ambient temperature was 106 °F (41 °C). Kirk felt this was the ultimate test for Freon™ MO99. He explained, “The day of the retrofit was a good indicator, and subsequent days have been over 110 °F (43 °C) as well; no problems with cooling performance. The usage of MO99 is running about 95% by weight of the original system capacity. We followed up with our customer on a couple occasions, basically going on a fishing expedition to see if there are any issues, and found he is extremely happy.”

Conclusion

Kirk said, “The homeowner was very satisfied with the results of the retrofit. He told us, ‘I'm thrilled because now I have cooling and my kids can sleep comfortably at night.’ Having a happy customer is gratifying for us—it's what we strive for.”

Kirk explained, “We've converted approximately 50 units to MO99 so far this year. We haven't had any problems or call-backs on any of them.”

Kirk added, “I know some people are concerned about MO99 and look at the capacity of MO99, thinking about capacity loss especially in Phoenix because of the heat. This is probably the largest hurdle to overcome. Many confuse the capacity of MO99 with the efficiency of MO99 vs. R-22. It takes a little longer to move the same amount of heat, but needs less power to do so; so, I see it as a net breakeven. Because a large number of equipment we run into is oversized for the home, a little longer run time is a positive result for the homeowner because it gives a more even comfort level throughout the home.”

For more information on the Freon™ family of refrigerants, or other refrigerant products, visit freon.com or call (800) 235-7882.

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