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ICOR International, Inc. Technical Document

*Technical/Service Document*

*R-22 to NU-22B (R-422B) Comparison Information*

R-422B is a blended HFC refrigerant that is comprised of R-125, R-134a, and R-600a with an A1 (non toxic, non flammable) ASHRAE safety designation. It is also on the EPA SNAP List. NU-22B (R-422B) is manufactured by ICOR International, Inc.

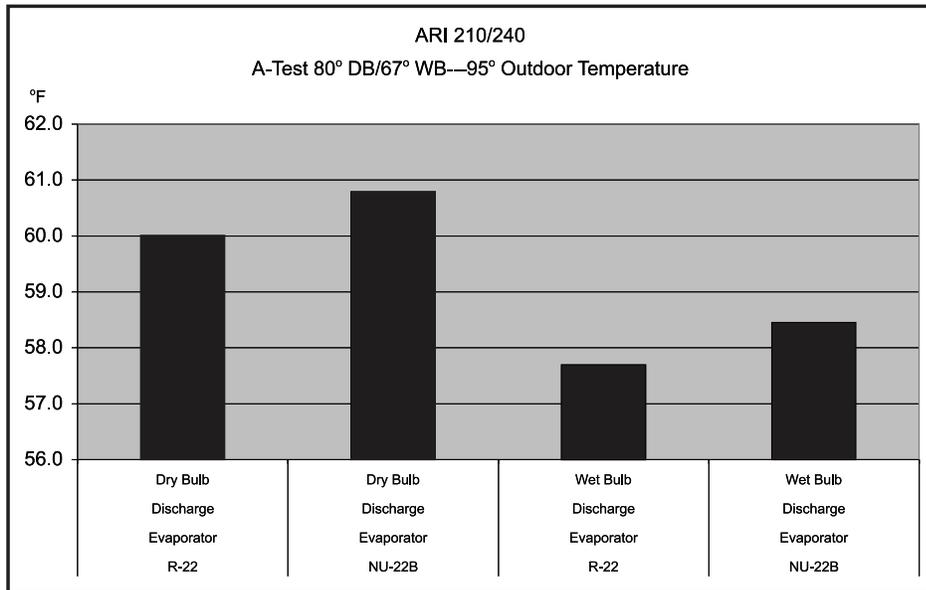
This information is being provided to contractors, wholesalers and equipment owners that are involved, or will be involved in the phase out of HCFC 22. We are aware that there are a variety of R-22 retrofit refrigerants available on the market, and they all have their advantages and disadvantages. This particular document is focused on comparing R-22 to NU-22B (R-422B) refrigerant after a retrofit has been performed.

The comparison data in this test has been provided to ICOR International, Inc. by Intertek, a third party, independent testing laboratory in Columbus, Oh. The testing was completed on 1/11/2006. There were six different tests performed under different conditions in the cooling and heat pump mode. All tests were performed to ARI Standard 210/240-2005. The equipment used for testing was a York 13 SEER 3 ton heat pump designed to operate with R-22. It is important to note that the equipment was not modified to operate with a different refrigerant.

**The results of the tests are as follows;**

In test “A” the test conditions were set at 80 deg. DB entering air, with 67 deg. WB, and a condenser ambient of 95 deg. In the cooling mode we see that R-422B has 5% less EER than R-22 and operates with 5% less compressor amp draw. We also see that the compressor operates at 6% less dome temperature with R-422B, which means the compressor runs slightly cooler than with R-22.

In test “B” the test conditions were set at 80 deg. DB entering air, with 67 deg. WB, and a condenser ambient of 82 deg. In the cooling mode we see that R-422B has 11% less capacity, 2% less compressor amp draw, and a 10% lower discharge gas temperature than R-22. In this condition, we see that there is a slight drop in capacity but the compressor is running slightly lower in amp draw and is running cooler.



In test “C” the test conditions were set at 80 deg. DB entering air, with 57 deg. WB, and a condenser ambient of 82 deg. This is considered a “Dry Coil” test due to the low WB temperature. In the cooling mode we see that R-422B has 7% less capacity, 6% less EER, and 3% less compressor amp draw than R-22. We also saw 15% less discharge gas temperature than R-22.

In test “D” the same conditions were used as in test “C” for SEER testing. The end result showed that R-422B had a 1.1 less SEER than R-22 with 1% less compressor amp draw.

**The next two tests were performed with the equipment in the heat pump mode.**

For “Defrost Heating” test, the indoor temperature conditions were set at 70 deg. DB, 60 deg. WB and the outdoor conditions were set at 35 deg. DB, and 33 deg. WB. In these conditions R-422B has a 2% lower discharge air temperature.

For “Standard Heating Rating” test, the indoor temperature conditions were set at 70 deg. DB, 60 deg. WB and the outdoor conditions were set at 47 deg DB and 43 deg. WB. In these conditions we see that R-422B produced 10% less heating capacity and has a 7% less COP that R-22. The results also showed that R-422B has a 3% lower discharge air temperature and drew 4% less compressor amps than R-22.

Prior to making our summary on the test information provided, we would like to mention again that ICOR did not have any input on the ARI Test Standard, the testing equipment, or test results.

In summary ICOR feels this test shows that R-422B is a proven R-22 replacement refrigerant with similar operating characteristics. If you examine the information provided in test “A”, this is a perfect example of an actual field application set up in laboratory conditions. With a 95 deg. ambient you can see that R-422B only loses 5% efficiency. This loss would typically not be noticed by the equipment owner. This loss could actually be an advantage in some comfort cooling applications, by allowing the equipment to run slightly longer which would remove more humidity from the space. We all know that less humidity on a hot summer day is a good thing. You will also notice that the compressor amp draw was slightly lower which equates to less work on the compressor.

Since this test completion, scores of R-22 equipment in a variety of applications has been retrofitted to NU-22B. We have found during these retrofits that by modifying the metering device to an adjustable TXV, we can get even closer to R-22 performance. Sporlan and Danfoss have TXV retrofit kits available. In some cases, simply modifying the refrigerant charge can improve equipment performance.

ICOR has actual field conversion data available upon request. This data provides positive proof that R-422B is a viable replacement refrigerant for R-22.

David L. Callender CM  
 Technical Support Supervisor  
 ICOR International, Inc.