

## REFRIGERANT CHANGEOVER

### HCFC R22 TO HCF R422A/D



#### WARNING

Use only Emerson Climate Technologies approved refrigerants and lubricants in the manner prescribed by Emerson Climate Technologies.

In some circumstances, other refrigerants and lubricants may be dangerous and could cause fires, explosions or electrical shorting. Contact Emerson Climate Technologies Application Engineering for more information.

Emerson Climate Technologies does not advocate the wholesale changeover of HCFCs to HFCs. If a system is not leaking refrigerant to the atmosphere and is operating properly, there is no technical reason to replace the HCFC refrigerant. However, once the decision has been made to make the change from HCFC R22 to HFC R422A/D, the following guidelines are recommended.

The following guidelines apply to Copeland® brand compressors.

#### 1 Considerations when retrofitting

1. Retrofitting systems that employ compressors manufactured prior to 1980 is not recommended. This is due to the different materials used in motor insulation that have not been evaluated for compatibility with the new refrigerants and lubricants.
2. HFC refrigerants have generally required the use of polyolester (POE) lubricants in order to ensure oil return. However, R422A/D contains a small percentage of isobutene that promotes adequate oil return in most properly piped systems with oil separators and no change-out of the mineral oil or alkybenze is required. Minor equipment modifications such as replacement or adjustment of the expansion device may be required in some applications.

Oil return is determined by a number of design and operating conditions. In some systems a certain amount of POE may need to be added to assist in oil return.

While R422A/D will operate properly with an oil charge of 100% POE, the POE can dislodge debris in older systems requiring liquid line filter drier change-outs to keep the system free of this debris.

3. The system capacity and efficiency will be somewhat different with R422A/D than with R22. In most multiple compressor racks, there should still be adequate capacity. However, it is strongly recommended that system capacity verification be done using the refrigerant manufacturer published comparison factors.

The MOC (Maximum Operating Current) values for R422A/D are higher than those for R22. The values are similar for those of R404A. The sizing of wires, contactors and breakers should be checked to ensure that they are adequate.

4. R422A/D can be used in either low or medium temperature systems. **R422A/D should not be mixed with any other refrigerant!**
5. When retrofitting from R22 to R422A the expansion valves will need to be replaced with a valve suitable for R404A. In some cases only the power element of the expansion valve can be changed, but where this is not possible the entire valve must be replaced with the equivalent capacity R404A model.

When retrofitting from R22 to R422D the expansion valve capacities will be reduced by 30 to 35% and will need to be replaced.

6. Filter-driers must be changed at the time of conversion with filtration levels conforming to DIN8949 or with an equilibrium point of dryness (EPD) of 50 PPM or lower.
  - Solid core driers such as Emerson Climate Technologies ADK are compatible with either R22 or R422A/D.
  - Compacted bead type driers such as the Emerson Climate Technologies FDB series are also compatible.
  - Loose fill type driers are not recommended and should be replaced with the types referenced above.
7. Pressure regulators may have to be reset. Contact the manufacturer for the correct settings.
8. R422A/D exhibit higher pressures than R22 at normal condensing temperatures. This may require that the high-pressure safety controls be reset in order to operate as intended.
9. Systems that use a low-pressure controller to maintain space temperature may need to have the cut in and cut out points changed. Although R422A/D does exhibit "glide", the average evaporator or condenser temperature is within 0.27°C of the saturated vapour temperature; therefore no correction is required.
10. Systems using R422A/D should have approximately the same system pressure drop as with R22. Check with the manufacturer of any pressure regulators and pilot-operated solenoid valves used in the system to be sure that they will operate properly.
11. Some compressor seals and gaskets may be affected by the removal phase of R22 during the changeover to R422A/D. Experience has shown that sight glass and terminal plate rubber elastomers are the most sensitive and should be checked.

Many other system seals such as elastomeric seals, gaskets, and valve packing may be affected by the changeover from R22 to R422A/D. The part manufacturer should be contacted for their recommendations as to whether the seals need to be changed or replaced.

**NOTE: R422A/D is NOT compatible with the seal material used in the R22 Moduload Capacity Control system of D3D compressors. If your system has Moduload, the valve plate assembly MUST be changed. Consult your Emerson Climate Technologies wholesaler for the correct part numbers.**

## 2 Changeover procedure

Before starting the changeover, at least the following items should be readily available:

- Safety glasses
  - Gloves
  - Refrigerant service gauges
  - Electronic thermometer
  - Vacuum pump capable of pulling 0.3 mbar
  - Thermocouple micron gauge
  - Leak detector
  - Refrigerant recovery unit including refrigerant cylinder
  - Proper container for removed lubricant
  - New liquid control device
  - Replacement liquid line filter-drier(s)
  - New POE lubricant, when needed
  - R422A/D pressure temperature chart
  - R422A/D refrigerant
1. Before starting the conversion, the system should be thoroughly leak tested with the R22 refrigerant still in the system. All leaks should be repaired before the R422A/D refrigerant is added.
  2. It is advisable that the system operating conditions (particularly the suction and discharge absolute pressures (pressure ratio) and suction superheat at the compressor inlet) be recorded with the R22 still in the system. This will provide the base data for comparison when the system is put back into operation with the R422A/D.
  3. Disconnect electrical power to system.
  4. Properly remove the R22 from the compressor. Measure and note the amount removed.
  5. Replace the liquid line filter-drier with one that is compatible with R422A/D.

6. Replace the expansion valve or power element to a model approved for R404A (only required when retrofitting from R22 to R422A).
7. Evacuate the system to 0.3 mbar. A vacuum decay test is suggested to assure the system is dry and leak free.
8. Recharge the system with R422A/D.
9. Charge the system with R422A/D. Charge to 90% of the refrigerant removed in item 4. R422A/D must leave the charging cylinder in the liquid phase. It is suggested that a sight glass be connected between the charging hose and compressor suction service valve. This will permit adjustment of the cylinder valve to assure the refrigerant enters the compressor in the vapour state.
10. Operate the system. Record the data and compare to the data taken in item 2. Check and adjust the TEV superheat setting if necessary. Make adjustments to other controls as needed. Additional R422A/D may have to be added to obtain optimum system performance.
11. Properly label the components. Tag the compressor with the refrigerant used (R422A/D) and the lubricant used.

**CAUTION: These guidelines are intended for use with R422A/D only.** Other refrigerants may not be compatible with the materials used in our compressors or the lubricants recommended in this bulletin resulting in unacceptable reliability and durability of the compressor.

The information contained herein is based on technical data and tests which we believe to be reliable and is intended for use by persons having technical skill, at their own discretion and risk.

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