



## TECHNICAL BULLETIN

### **Overview:**

When a system is opened during installation or service, water vapor may enter the system. Water reacts with the refrigerant and creates acids which will shorten the life of the compressor. Removing this water from the system through evacuation is imperative.

HFC refrigerants such as R-410A and R-407C require the use of polyolester (POE) oil. POE oil absorbs 50 times more airborne water and much more quickly than does mineral oil formerly used with R-22 refrigerant. It is said to have a high hygroscopic characteristic.

EarthLinked® Heating and Cooling Systems utilize R-410A and R-407C refrigerants with POE oil. The following procedure will assure that the effects of moisture on the refrigerant system are minimized.

### **ETI Actions:**

During the ETI manufacturing process, the Copeland scroll compressor containing POE oil has the suction and discharge ports quickly connected and brazed to the closed system. This reduces the potential for water vapor to enter the compressor ports and be absorbed by the POE oil. After evacuation, the sealed compressor unit is pressurized to ~ 30 psig with a dry nitrogen holding charge and packaged for shipment.

### **Field Actions:**

1. Whether in a new system or as a service replacement, all peripheral equipment should be installed, brazed, and leak tested prior to the compressor unit installation. When piping is field-installed, sweeping dry nitrogen through the refrigerant lines can push the oxygen and water vapor out and keep the lines clean. The compressor unit should be the last component installed in the refrigeration system.

2. After releasing the nitrogen holding charge, install the compressor unit. The refrigerant connections at the compressor unit should be brazed (using the

nitrogen brazing technique) quickly to minimize the time the system is open to surrounding air. This will minimize the amount of moisture that the POE oil can absorb as well as shorten the evacuation time.

3. After leak checking the sealed refrigeration system, it must be evacuated to remove non-condensable gases, water vapor, and any water absorbed by the POE oil. Copeland, in their publication *Scroll Compressors for Air Conditioning (C6.2.2/1002-1103/E)*, states that the refrigeration system should be evacuated down to 225 microns or lower.

4. Based on this, ETI's procedure is to evacuate the entire installed system to 230 microns. After which, the vacuum pump is turned off. The sealed system pressure must not rise to more than 280 microns within 5 minutes. This will assure an acceptably low moisture level within the system.

5. To assist in the effective evacuation of the system to this level, the following actions will assist in reducing the time to reach the 230 microns:

- Use a good quality vacuum pump with at least 6 cfm capacity
- Use new vacuum pump oil
- Remove the valve cores from the access ports for quicker drawdown
- IMPORTANT: Use high quality deep vacuum hoses or ACR soft copper lines during evacuation

### **Service:**

If POE oil is required to replace the original POE oil supplied with a Copeland scroll compressor, the following are recommended by Copeland:

- Copeland 3MAF (32 cSt)
- ICI Emkarate RL 32 CF
- Mobil EAL Arctic 22 CC

### **Contact:**

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