

## AIR TECH NOTES

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### **Subject: Noncondensable Gas in a Refrigeration System**

Following a new installation care must be taken to completely evacuate the system, removing noncondensables such as air and other gasses and moisture.

As the system continues to operate noncondensables continue to enter the system:

- Through vacuum leaks such as seals, packings and system leaks.
- When refrigerant is added to the system.
- When the system is opened for service.
- Chemical breakdown of the refrigerant or oil.

Noncondensable gasses in the system will typically collect in the high pressure side of the system. It will collect in areas with the lowest gas velocity and lowest temperature.

Typical locations will be:

- Condenser.
- High pressure receiver.
- Hot gas heat exchangers.

Non condensable gases affect refrigerant systems by:

- Reducing the overall capacity of the condenser by decreasing the heat exchange surface of the condenser.
- Increases the condensing pressure.
- Increases the power consumption of the compressors.
- Increases the power consumption of the condenser fans.
- Increases the consumption of condenser water and chemicals.
- Increases internal system corrosion.

Consider the following:

- A **10-psi** increase in condensing pressure will increase the power consumption of the compressors by **6%**.

To detect if air exists in a system you need the following information:

- Temperature of the liquid refrigerant leaving the condenser.
- Pressure of the refrigerant at that same location.

Convert the liquid temperature to a pressure using a pressure/temperature chart. Subtract the actual pressure reading from the converted pressure to achieve your additional discharge pressure due to noncondensables.

A formula is available to calculate your dollar savings potential if you remove noncondensables from your system. Please contact one of our offices for more information.