

## MEMORANDUM

**DATE:** October 2, 2001

**COPY:**

**TO:** File

**FROM:** Allen Pirro

**SUBJECT:** DX Coils in Direct Fired Heaters

Manufacturers have inquired about the use of Direct Expansion Refrigeration coils to be used in conjunction with Direct Gas-Fired Heaters. A review of the subject was conducted and the following conclusions reached:

**A. Coils located upstream of (before) the burner –**

1. The coil must be constructed and tested in accordance with the requirements of UL207 (Standard for Refrigerant-containing Components and Accessories).
2. The only refrigerant containing part of a coil in the airstream of the heater is the seamless tubing which may be finned. Brazed fittings and other elements (like threaded fasteners) are prohibited from the airstream.
3. The coil must be located sufficiently upstream of the burner to prevent damage to the coil from burner operation.
4. Bird screen or other protective means will be required at the air inlet of the heater upstream of the coil.
5. The only refrigerant that may be used in the coil is Class A1 as defined in ASHRAE 15. A label stating that restriction will be placed on the heater.
6. A purge cycle (four air changes) that precedes the firing of the direct fired burner must be incorporated into the controls to vent the chamber of any refrigerant that may have leaked.



Intertek Testing Services NA Inc.  
24 Groton Avenue, Cortland, NY 13045-2014  
Telephone 607-753-6711 Fax 607-756-6699 <http://www.etlsemko.com>



**B. Coils located between the burner and blower (for draw through units) –**

1. The coil must be located such that the flame, when it is at the longest extension, cannot contact the surface of the coil.
2. The coil must be constructed and tested in accordance with the requirements of UL207 (Standard for Refrigerant-containing Components and Accessories) for the anticipated temperatures that may be seen during the heating cycle.
3. The only refrigerant containing part of a coil in the airstream of the heater is the seamless tubing which may be finned. Brazed fittings and other elements (like threaded fasteners) are prohibited from the airstream.
4. The only refrigerant that may be used in the coil is Class A1 as defined in ASHRAE 15. A label stating that restriction will be placed on the heater.
5. The burner performance (combustion/ignition) are not adversely affected by the placement of the coil. A test must be conducted to confirm this.
6. A purge cycle (four air changes) that precedes the firing of the direct fired burner must be incorporated into the controls to vent the chamber of any refrigerant that may have leaked.

**C. Test Program –**

When the manufacturer requests the option of placing the coil between the burner and blower, the following additional tests must be conducted on the sample.

1. During the firing mode that results in the longest flame (most likely this will be the max temperature rise at the lowest airflow), the flame will be observed to verify that it does not contact the coil surface.
2. The coil will be fitted with thermocouples in the area which would see the highest radiant and convective temperature. The temperatures cannot exceed the maximum allowable temperatures for the materials used and the temperatures noted will be used as a basis for the pressure rating of the coil (see B.2 above).

