COLMAC COIL
Manufacturing Inc.

Technical Bulletin

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COLD WEATHER STEAM COIL DESIGN

Introduction

Of all the different types of coils Colmac produces (water, steam, evaporators, condensers), steam coils seem to be the most challenging in terms of proper design and application.

During cold winter months the possibility exists for preheat steam coils exposed to outdoor air to freeze and burst, or experience severe water hammer leading to failure. This scenario can be avoided if preheat coils are correctly designed, piped, and trapped.

One type of steam coil built by Colmac and most other manufacturers is the "Steam Distributing" (Colmac type FS) coil. This design features inner distributing tubes having small orifices spaced along the length of the tube.

This type of coil is sometimes incorrectly called a "Non-Freeze" steam coil, which implies that the design will somehow prevent freeze-up in cold weather. Nothing could be further from the truth! The proper application of Steam Distributing type FS coils is for reheating air when a modulating steam supply valve is used. The entire face of the FS coil will heat more evenly in this case while the valve modulates. When exposed to freezing air temperatures the Steam Distributing design would very likely freeze up before a single tube Basic Steam (Colmac type BS) coil would!

Best System Design

The best system design to insure that preheat steam coils perform successfully in freezing conditions will include the following:

1. Coil design should be Basic Steam type BS (single tube, single pass). Do not use Steam Distributing type FS coils.
2. Coils must be properly pitched toward the condensate return.
3. Steam supply must be either on or off. Modulating steam supply valves should not be used. To control air temperature, use air bypass dampers.
4. Keep coil face velocities below 1000 fpm. Do not allow high velocity streams of low temperature air to hit the coil.
5. Trap and vent coil properly, and install vacuum breakers.

If these guidelines are followed, chances are excellent that your cold weather preheat system will operate successfully for many years.

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