

— Heating and Air Conditioning Heat Transfer Coils —

SECTION #1

INSTALLATION, OPERATION AND
MAINTENANCE INSTRUCTIONS
FOR:
HVAC, PROCESS and
SENTRY GUARD™ COILS

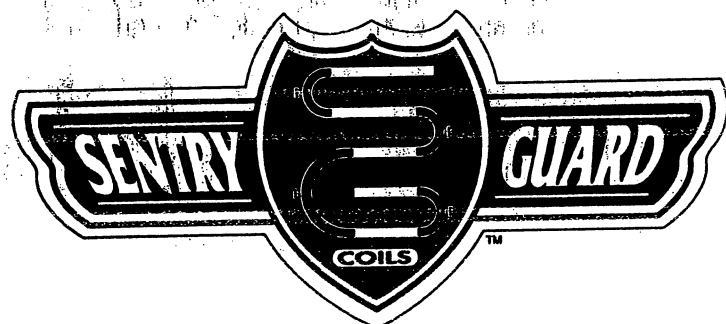
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HEAT EXCHANGER COILS

GENERAL

Heat Exchanger Coils are not very complex to install when you consider there are no movable parts. In fact, they usually are shipped intact and there is almost never any assembly at the coil installation site.

There are a number of points that need to be discussed so that the coil installation and the maintenance are performed in a manner to insure satisfactory life.

SHIPPING AND RECEIVING

There are many various sizes of coils, and crating methods are diverse based on coil dimensions and weight. Basically, there are two types of crates. One is the "vertical type" and the other is the "horizontal type".

Coils that weigh less than 2,000 lbs., or are not very large in either width or length, are crated vertically. Coils that are very wide get the flat horizontal crate.

Either way, all crates provide an area for forklift or mechanical lifting. Coils are very vulnerable to damage and must be handled with extreme care. Unless you specify it on your order, a crate is not built to be turned on end. Try not to uncrate a coil(s) until it has arrived at the unit or area of installation.

When uncrating a coil, try to disassemble the crate around the coil and don't drop the coil out of the crate.

INSTALLATION INTO UNIT

Always lift a coil into place around the casing and never lift by the return bends or headers and connections of the coil. These areas will rupture or distort and the coil can be severely damaged. All USA coils normally have bent over stacking flanges for mounting on top of each other. This flange is 1/2" on small coils and 3/4" on larger coils.

PIPING RECOMMENDATIONS - GENERAL

- A - Support all piping independently of the coil.
- B - All coil connections usually extend through the side wall of unit or area containing the coil. Usually vent and drain connections are still within the walls of the unit.
- C - All connections next to heating coils should have swing joints or flexible fittings to absorb expansion and contractions strains.
- D - Install all piping in accordance with local codes and accepted industry standards.

PIPING RECOMMENDATIONS - DX COILS

- A - The expansion valve (by others) should be externally equalized unless specified otherwise. Locate the DX valve bulb on a horizontal section of the suction line just below the valve.
- B - Suction lines should be sloped toward the compressor to allow good oil return.
- C - Suction risers of more than 5 feet should be trapped at the bottom.
- D - Evacuate the system to remove moisture and non-condensibles. Leak test all connections before charging the system.

PIPING RECOMMENDATIONS - WATER COILS

- A - Always use a back-up wrench when making coil connections to prevent damage to the coil. Excessive stress could break the weld joint at header or at adapter tubes.
- B - Any water coil should not have modulating design if coil air temperature might be below freezing (under 32 degrees F.) Water will be trapped in the coil and major freeze damage can occur.

PIPING RECOMMENDATIONS - STEAM COILS

- A - Steam coils must always be pitched toward the condensate connection, at least 1/8" per linear foot of tubing. If this was not built into your coil design, then you must pitch it in the field.
- B - Always use a back-up wrench (See "A" in Water Coils).
- C - Insulate both steam and condensate piping.
- D - Proper piping methods must be used to remove condensate and to allow steam flow. It is very important that coils are vented properly, have full size piping, and have traps and vacuum breakers sized and located properly. It is very important to have traps located at least 12" below coil condensate outlets.
- E - When the entering air temperature is going to be near or below freezing (32 degrees F.) then the following is necessary:
 1. A minimum of 5 PSIG steam pressure must be maintained at all times.
 2. Face and bypass damper to control temperature should be used in lieu of modulating steam.
 3. Always feed coil with steam for 10 to 15 minutes before outside air is introduced.
 4. There must be controls in place for shutting down system if condensate is trapped in coil and air temperature is below freezing.

FREEZE PROTECTION METHODS FOR COILS

Coils subjected to freezing temperatures cannot be adequately protected by simply draining the coil. Low tubes in each circuit will remain filled with water and burst upon freezing.

Two generally accepted methods of protecting coils from freezing are:

1. Using an air blower.
2. Adding an adequate antifreeze solution.

Using an Air Blower

To use this method, a blower capable of producing 150 CFM at about 45 inches of water is required. The blower outlet will have to be field adapted to the threaded coil connection.

When blowing out a coil, use the following procedure and refer to Figure 1.

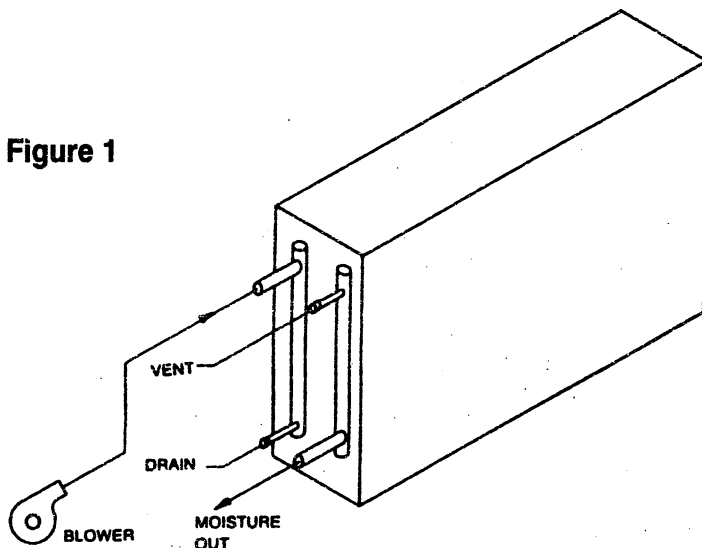


Figure 1

1. Turn off the water supply.
2. Remove the vent and drain caps and allow the coil to drain.
3. Replace the vent and drain caps and remove the supply and return piping from the coil connections.
4. Connect the blower outlet to the return (top) connection as shown. Care should be taken not to place excessive stress on the connection or damage to the coil may result.
5. Blow air through the coil for about 30 to 45 minutes. Tap the top or bottom of the air handler along the length of the coil area to help remove trapped water.
6. Place a mirror in front of the supply connections (bottom) to see if all the moisture is removed. Any moisture still being removed from the coil will fog the mirror.

7. Once the air appears to be moisture free, turn the blower off and allow the coil to stand about 10 minutes to permit any water remaining on the inside tube walls to drain down.
8. Start the blower again and if any moisture is being removed repeat the procedure again.
9. Do not reconnect the supply and return piping until the coil is ready to be returned to operation.

Addition of Antifreeze Solution

A corrosion inhibited antifreeze solution should be circulated through the coil for best results. Consult the manufacturer's information about freezing points of different concentrations to determine the best solution and the lowest cost.

For best results use a circulating pump and runaround loop between the coil and the solution container.

Referring to Figure 2, use the following procedure:

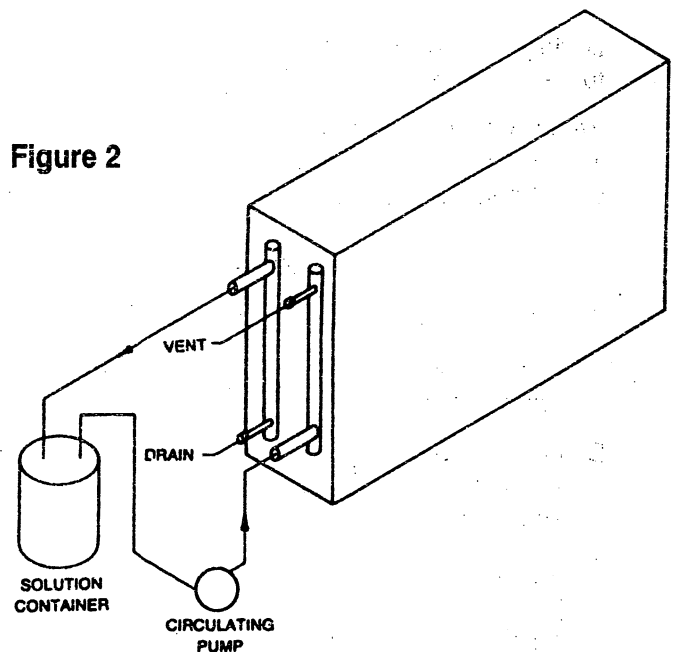


Figure 2

1. Repeat steps 1-3 above.
2. Connect the circulating pump to the supply (bottom) connection and the return line to the return (top) connection.
3. Circulate the solution for about 20 minutes.
4. Check the solution with a hydrometer. If the freezing point is not as low as desired, add additional antifreeze to the solution container and repeat the procedure.
5. The antifreeze may be left in the coil or removed to be used on another coil.

SENTRY GUARD™ COILS

GENERAL

The new Sentry Guard™ coil series was developed to prevent coil damage when a "freeze cycle" develops, and without protection, the freeze causes severe damage to principal parts of coil.

There are no movable parts to a coil furnished with the Sentry Guard™ option. As a result, there is no difference in installation procedures. The "freeze relief plugs" (patent pending) extend out on the perimeter of the coil and proper care must be taken so that they are not damaged during installation.

A user can now elect not to use antifreeze solutions for non-operating (format) fluid coils in winter applications and instead just drain the coil(s). Try to drain as much fluid out of the coil as possible, and then make sure water or steam is not being supplied to coil(s) and is fully shutdown. The special "freeze relief plugs" in a Sentry Guard™ coil will protect the coil if any moisture is still present in the coil and if it should form ice during winter. At the end of winter when the system is being put back into operation, check if any inserts have ruptured. Follow the procedure shown for "insert" replacement prior to start-up.

SENTRY GUARD™ OPERATION

During a freeze cycle, the pressure inside a coil builds and finally distorts and/or ruptures the coil tubes, headers/bends.

With Sentry Guard™, there is a removable insert inside all types of freeze relief plugs furnished. This insert will rupture (burst open) and will stay open until maintenance personnel arrive at the coil and change or replace it.

SENTRY GUARD™ COIL INSERT REPLACEMENT

It is fairly simple to put a Sentry Guard™ coil back in operation. Here is a specific step-by-step list:

- A - Check to see if coil is defrosted inside. Remember, coil may still be filled with ice. Also remember that water during the defrost cycle must be removed (drained).
- B - Check every "freeze relief plug" on coil return bends, headers, steam coil stubs and look directly at the insert in the center of plug. If it is burst or even distorted, unscrew the plug from threaded stud. Replace with new threaded plug. Extra plug shipped with coils (attached to headers).
- C - If you require new plugs, please call USA Coil & Air, Inc., Attn: Sentry Guard Maintenance, at 1-800-872-2645. Messages can be left at USA 24 hours a day. (Fax at 1-610-296-9763.) USA will charge a minimum of \$25.00, which includes standard U.S. Mail or UPS charges. If customer requests Overnight or Special Delivery, this will be considered an extra cost and will be invoiced. We require billing address, purchase number and shipping address for all orders. USA is not responsible for downtime or expenses incurred from placing a coil back into operation after a "freeze condition".