USA COIL & AIR NEWSLETTER

Hints on How to Replace Condenser Coils

This is the time of year when many DX systems are initially turned on, and contractors find that the condenser coil in the system no longer works. Condenser coils hardly ever freeze, so usually they fail because they have "died of old age" or they have suffered severe corrosion. Condenser coils often appear very easy to replace. They don't look terribly complicated to build and they are out in the open where you generally can see most of the coil. Condenser coils, however, can be very deceiving. There are no standards for condenser coils like there are for chilled water or hot water coils. Loads for condenser coils vary widely, because they have to match the load of the system they are designed for. Engineers often just make up the design of the coil for that particular system. Rows, fins/inch, circuiting arrangements and sub-cooling circuits all can be different for systems that appear identical. The point here is that even though condenser coils appear to be simple to build, most of the time they are hard to replace and there are things that you need to know that will help you duplicate an existing coil.

Rows/Fins

In order to build condenser coils cheaply, most companies design coils that are 3 or 4 rows deep, but with fin spacing that is very close – 14 fins/inch or sometimes 16 fins/inch. As we all know, it's cheaper to build coils with lots of fins and very few rows. There is a built-in problem with close fin spacing, however. Since condenser coils use outside air almost exclusively, a close fin spacing of 14-16 fins/inch will get dirty and cut down on performance. Condenser coils with close fin spacing need to be cleaned regularly. They don't work if they are clogged up. When replacing a coil, you need to take fin spacing into consideration. This will have a direct effect on performance.

Aluminum Fins

Any kind of salt laden or corrosive air just chews up condenser coils. Just think of all the condenser coils that are near the ocean, or chemical plants, paper mills, or any kind of corrosive activity. Copper tubes usually react OK to these environments, but aluminum fins can be eaten away in a year or two. Fins often need to be made of copper or need to be coated. Also, many coils require stainless steel casings because salt laden or corrosive air eats away galvanized casing as quickly as aluminum fins.

Tubesheets

Because coils are often installed near compressors, vibration is often a cause of premature coil failure. Tubes are inserted through tubesheets at the end of each coil (in the manufacturing process), and if there is excessive vibration, then these tubesheets cut right into the copper tubes. Over time there is a slice in the tube and leakage occurs. Tubesheet holes need to be oversized so that vibration can't adversely effect the tubes. In addition, many condenser coils should be isolated from the rest of the system to prevent vibration from causing damage. Some manufacturers even extrude the tubesheet holes so there are no sharp edges to cut the tube.

Heavier Fins

Because condenser coils require such frequent cleaning, cleaning agents often eat away the fins. Sometimes condenser coils require high pressure cleaning. It's often prudent to make the fins heavier to accommodate cleaning procedures.

Phosphorous Free Brazing

Often there is corrosive air that only attacks the phosphorous in the brazing. This causes severe leaks in the coil and can be a real problem. There are many different brazing procedures that are acceptable to use in condenser coils. Some of these use no phosphorous and sometimes this solves a corrosion problem.

Circuiting

Certain condenser coils are designed and circuited for just that specific job. This is not an uncommon practice in the HVAC industry. There are "jumper" circuits and sub-cooling circuits, and dropped tubes, etc. Some of these designs are really ridiculous! They are impossible to duplicate exactly, but that isn't really the point anyway. The object is to get the performance correct and circuiting is what gets this accomplished. USA can interpret an existing circuiting arrangement on a condenser coil and we get to the same point by building something that is commercially available today. One of the best ways to assist in building a condenser coil is to take a photograph of the coil from the headered side so we can see where connection locations are and see if there is a sub-cooling circuit. We can then redesign the coil to make it work the same way. When you need to replace an obsolete or difficult condenser coil, please give us a call. USA can build just about any coil, and we'll give you some ideas on how to build it better. Call Brian Cosgrove at 800-872-2645 and he'll fix you right up.