USA Coil & Air , Inc. August 2013

Coil Failures 101

HVAC and industrial coils fail for a variety of reasons. Since USA Coil & Air has made a business of replacing failed coils, we have in depth reasons why many of them don't make it to "old age".

The number one reason is simply the coils design, arrangement and construction didn't meet the criteria of the operating conditions. The design coil process must take into consideration the environment, pressures and temperatures that could require special design of the coil. Many times this isn't reviewed at all. Sometimes, the design of standard duty HVAC coils into systems needs something a bit more special. The duty, performance or design needs a little special engineering.

The environment issue is a major one because it covers both what is on the outside of the fin surface, but also what is going through the tubes and headers of the coil. To create longevity in an adverse environment, you must have materials that are corrosion resistant to the corrosive environment. The biggest mistake that we see is providing a coil that isn't corrosion resistant and thinking that if the materials are just thicker, that will suffice. If a material isn't corrosion resistant, it is just a matter of time for a heavier material to fail versus the lighter material. If it is an airside problem, a qualified coating would be appropriate since the cost is in line with most budgets, but it also doesn't destroy heat transfer. If the contaminant is inside the tubes, then you must clean up the fluid side or provide materials of construction on the coil that will provide longevity against the corrosive agent.

Steam condensate over a period of years can start to produce corrosive agents that will destroy copper. This usually happens over many years of steam treatment and coils failures happen quickly after the condensate becomes corrosive. Most owners don't realize the problems exist and they replace the coils with the same coil design. They have failures sometime within the first year or two. The system changed over the years and the same coil installed today probably will not last through its warranty period.

Another internal problem is untreated water and the arrangement and construction of the coil to last in this environment. Untreated water has impurities that require materials of construction other than copper. These materials usually are cupro-nickel or stainless steel. The coils arrangement also must be "cleanable".

Did You Know?

Did you know?

USA Coil & Air central station units offer tremendous flexibility in sizing, component options, and unit arrangements to meet almost any requirement.

Did you know?

USA Coil & Air can offer these central station units on quick ships of 4 weeks.

Did you know?

USA Coil & Air can ship as a completely assembled unit, in modules or by component sections for new or retro-fit applications that require smaller sections for passage through the building.

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By cleanable, we mean that the tubes and headers must have a way for the owner to clean out the inside surface so there is a clean unobstructed path for water to flow through the coil.

Adverse pressure is another huge culprit in coil failures. Freezing of a coil comes under the adverse pressure heading. When a coil goes into a freezing event, it actually is building up pressure within the tube area. The pressure builds to a point where the tube or bend starts to expand, bloat and finally a crack appears at the expansion of the tube or return bend. We all know that standing fluid and below freezing temperatures can cause freeze damage, but many systems do not have built in controls and safe-guards to prevent coils damage before it happens. Preheat steam coils also go into freeze events often and that is a system flaw whereby the condensate isn't removed as quickly as it's formed, and standing condensate with cold temperatures creates a freeze event. In this case, all trap types and locations, external piping, vacuum breakers, and back pressures may be backing up condensate in coils.

Other coils failures are due to a variety of reasons that may include coils plugging and adverse vibration. Many coils will not perform if they are plugged from lack of air side cleaning. A 6 row chilled water coil can lose as much as 40% of it's heat transfer if plugged. To be specific, the system air flow is reduced because there is an increase in coil resistance and because dirt acts like an insulator preventing heat transfer. Vibration is an issue because many coils installations are at or near a moving vibrating piece of equipment. You will know this is your problem when leaks appear at or near the tube sheets or intermediate tube sheets. These are "wear type holes" and they look like something is cutting through the tube.

On a new installation or replacing an existing coil, it is very important that the designer examine those problems that may cause premature failure of the coil. Aligning yourself with a quality manufacturer that understands the dynamics surrounding coil failures and can offer realistic and qualified coil designs is imperative to having problem free installations.

Contact Us

Thank you for allowing us to share with you. We'd be happy to answer any questions you may have from the services we offer to general product info.

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Did you Know ?

We fabricate coils in our standard 4 to 5 weeks year-round and then also offer our 5 and 10 working day shipment program. We can also build coils in 2 or 3 working days as well as expedite coatings for environmental condition.

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