OCC
Passion for Excellence

MAY 2022

HVAC COIL CORROSION AND HOW TO COMBAT IT

Volume 3

The Problem

Corrosion of HVAC coils is a common issue that adversely affects HVAC system performance and significantly reduces equipment lifespan, often resulting in total breakdown. In addition to common corrosion (H2O +O2) environments, heat exchange equipment is often under attack in ever more complicated corrosive environs such as those referred to as Environmental (corrosive conditions where sea salt and seawater are present) and/or Chemical (corrosive conditions where the presence of man-made chemicals contribute to corrosion such as water treatment, food processing, and rendering facilities). The problem is further exacerbated in harsh environments such as coastal or marine climates where an abundance of sodium chloride, moisture and temperature fluctuations contribute to excessive rust and corrosion of HVAC coils as far as five miles from the coast.

The ISO (International Standards Organization) classifies atmospheric corrosivity categories from C1 (very low corrosivity) to C5 (very high corrosivity) as below:

C1 – Very Low: Example environments include heated buildings with clean atmospheres such as schools or offices.

C2 – Low: Example exterior environments include atmospheres with low levels of pollution, mostly rural areas. Example interior environments include unheated buildings where condensation may occur such as depots or sports halls.

C3 – Medium: Example exterior environments include urban and industrial atmospheres, moderate sulphur dioxide pollution, or coastal areas with low salinity. Example interior environments include production rooms with high humidity and some air pollution such as food processing plants, laundries, breweries, or dairies.

C4 – High: Example exterior environments include industrial areas and coastal areas with moderate salinity. Example interior environments include chemical plants, swimming pools, coastal ship and boat yards.

C5-I – Very High (Industrial): Example exterior environments include industrial areas with high humidity and aggressive atmospheres. Example interior environments include buildings or areas with almost permanent condensation and high pollution.

C5-M – Very High (Marine): Example exterior environments include: coastal and offshore areas with high salinity. Example interior environments include: buildings or areas with almost permanent condensation and with high pollution.

The Solution

HVAC-R coil corrosion is costly. However, corrosion can be delayed if the coil is protected with an effective coating proven to provide protection in the unit's operating environment.

HVAC-R coil coatings can be applied in several ways that directly impact its effectiveness. The two most common methods of coating coils seen in the Middle East markets include spraying the coating on the coil or fully immersing the coil in a coating solution. The full immersion (or dipping) method is ideal for coils in high corrosivity environments, such as marine and industrial environments which offers complete, uniform coverage of all areas of the coil, including the centre. Spray coatings are typically more economically priced as the application equipment needed is relatively limited. For severe offshore marine environments, baked coatings are also highly recommended.

It is important to review test results when selecting a coating. Results can be easily obtained by reviewing the supplier's technical data sheet. Be sure to review the tests that were used and the specifications of each test. Potential tests can include salt spray: ASTM B-117. ASTM B-117 was the first internationally recognized salt spray standard.

Anti-corrosive coatings by Bronze Glow

Anti-corrosive coatings by Heresite

Conclusion

An evaluation of the level of protection a coating provides, its application method, as well as testing procedures are crucial factors to consider for ensuring the longevity of HVAC-R equipment. Equally important to consider, is the planned equipment lifespan, particularly for marine environments, which are changing.

As the leading HVAC coil manufacturing and coating company in the region, Oasis Coils & Coatings provides the highest quality protective coatings for HVAC coils and heatpipes that operate in moderate to severely corrosive environments, including both coastal and industrial applications. Designated as the exclusive and authorised applicator for Heresite (USA-based) and Bronz Glow (USA-based) anti-corrosive coatings, OCC's offering include Heresite's VR 514 (salt spray ASTM B-117: 2,000 hours), and Hereshield (salt spray ASTM B-117: 15,000 hours, a water-based low VOC product) and Bronz-Glow's Husky Gold coating (salt spray ASTM B-117: 15,000 hours) which is an excellent product offering for C 5 M conditions.

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