

Anti-corrosion treatments for heat exchangers

This Good Practice Guide looks at the efficiency and reliability advantages of chemical anti-corrosion treatments for heat exchangers and chillers



1. Introduction

Applying anti-corrosion coatings to heat exchangers such as chillers, AHUs, Air Conditioning can be used to:

- increase the life of coil blocks
- reduce energy consumption
- Improve efficiency of operation
- minimise service or maintenance costs
- prevent premature replacement when operating in specialist environments.

This is particularly effective when used on units where the environment can lead to excessive or early corrosion such as airports, ports, industrial areas, coastal areas and city centres.

2. How to recognise coated units



A plain aluminium coil (copper tube) will be an aluminium (silver) colour



A Copper / copper coil would be a copper colour (which will get darker as it gets dirtier)

An epoxy / polyvinyl (pre-coated) coil may be a bright gold colour, a blue colour or black as in the examples below.



A Tropic Coated coil will be a dark gold colour



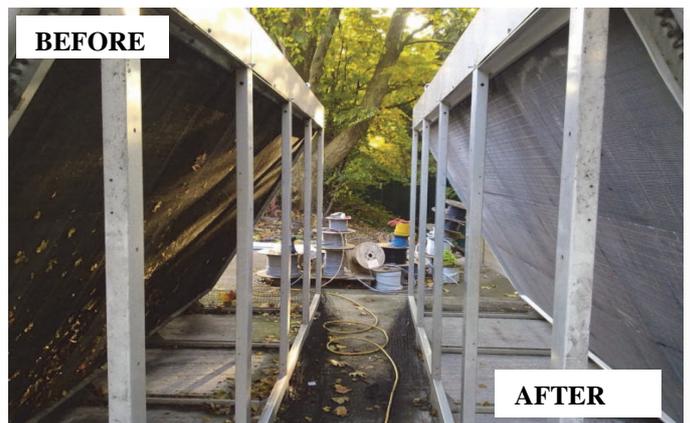
A PoluAl Coated coil will be a greenish silvery colour

3. How the coating works

Coatings can be applied to new units prior to installation or to existing units already installed on site.

The coating is a polyurethane impregnated with aluminium and is applied as a post coat treatment, effectively sealing off the dissimilar metals from the atmosphere. The aluminium in the coating ensures no degradation in heat transfer and will actually improve it.

The coating is water repellent and so keeps the coil cleaner for longer and maintains the efficiency of the coil.



4. Servicing and maintaining coatings

The following cleaning process should be used:

- 1) Vacuum the coil face to remove any debris or dust build up, firstly in opposite direction of airflow then in airflow direction.
- 2) Use low pressure. Jet wash with specialist detergent, mild coil cleaner (detergent) or plain water, firstly in the opposite

Anti-corrosion treatment continued

direction of airflow then in airflow direction.

3) Rinse detergent from coil with clean water and note condition of coating.

4) The coating will be inspected and can be topped up if required.

This process should be carried out at least once a year to ensure the warranty (5 years) on the coating is kept in place.

5. Other service and maintenance considerations

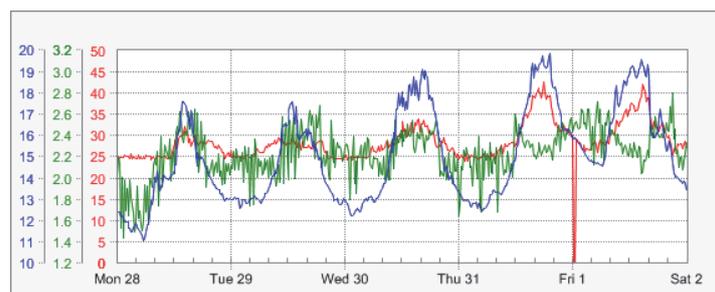
If the coating is damaged, or erosion has taken place, those areas affected can be treated and recoated (touched up).

6. Energy saving potential

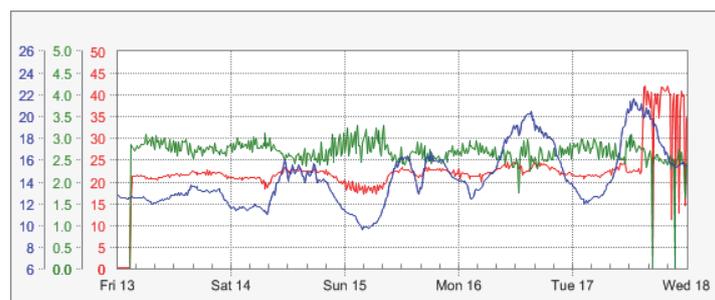
6.1 Coatings were used in a test study carried out at an R&D facility in Hertfordshire : 3 HT York chillers were treated on a building and their performance monitored before and after. The power usage dropped by 25 to 30 amps per phase which equated to a 10–15% power drop whilst running at full duty. Pay back was less than 6 months.

6.2 As part of an energy saving initiative a test was carried out at a production facility in Maidenhead to quantify savings where three chillers were deep cleaned and coated. Based on initial results the client is projecting energy savings on a Comp Chiller, York Chiller and Carrier chiller in excess of 108,695 kg of carbon dioxide @ 0.43 kgCO₂/KW. Taking into account the cost of carrying out the cleaning and coating work, the return on investment was less than 6 months in energy savings.

6.3 A client has measured energy savings of 20% following deep cleaning and treating of a York Chiller at a Facility in Dungarvan in Ireland with a saving of 265455 kWh at full load, the annual Carbon dioxide saving will be in excess of 114,146 kg @ 0.43 kgCO₂/KW.



OTC Chiller 4 **Pre** cleaning and coating process



OTC Chiller 4 **Post** cleaning and coating

Red trace = kWh (15 mins), Green Trace = COP, Blue Trace = Ambient Temp

With thanks to Blygold Ltd for use of material and illustrations on which this bulletin is based.

The information contained in the Bulletin should be seen as a guide to interpretation of relevant industry standards, legislation and statutory information which should be consulted by the relevant competent person responsible for servicing refrigeration equipment.

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