Blygold®
CORROSION PROTECTION

PoluAl MC

- ✓ *Prevents early micro channel HX failure*
- ✓ *Heat conductive protective layer*
- ✓ *Highly flexible for coil bending*

Micro Channel Heat Exchanger Design

The Micro Channel Heat Exchanger (MCHE) development originates from the automotive industry where it is used since more than twenty years now. They have however only recently been introduced to the HVAC&R industry. Some of the big advantages are that they are lighter, more efficient and they lower the required refrigerant volume. Another advantage of an MCHE coil is that it's made out of aluminium only. This makes it less vulnerable to galvanic corrosion (caused by combining dissimilar metals) than the traditional RTPF coils . The MCHE coils not only bring the above mentioned advantages , they also bring with them extra challenges. In corrosive environments, not only the fins will corrode but also the aluminum tubes are at risk.

1 Pitting corrosion

aluminium has a protective oxide layer by nature that prevents an overall corrosion process as can be seen on steel substrates. In environments with high salt exposure aluminium tends to corrode very locally with high salt exposure, aluminium tends to corrod....

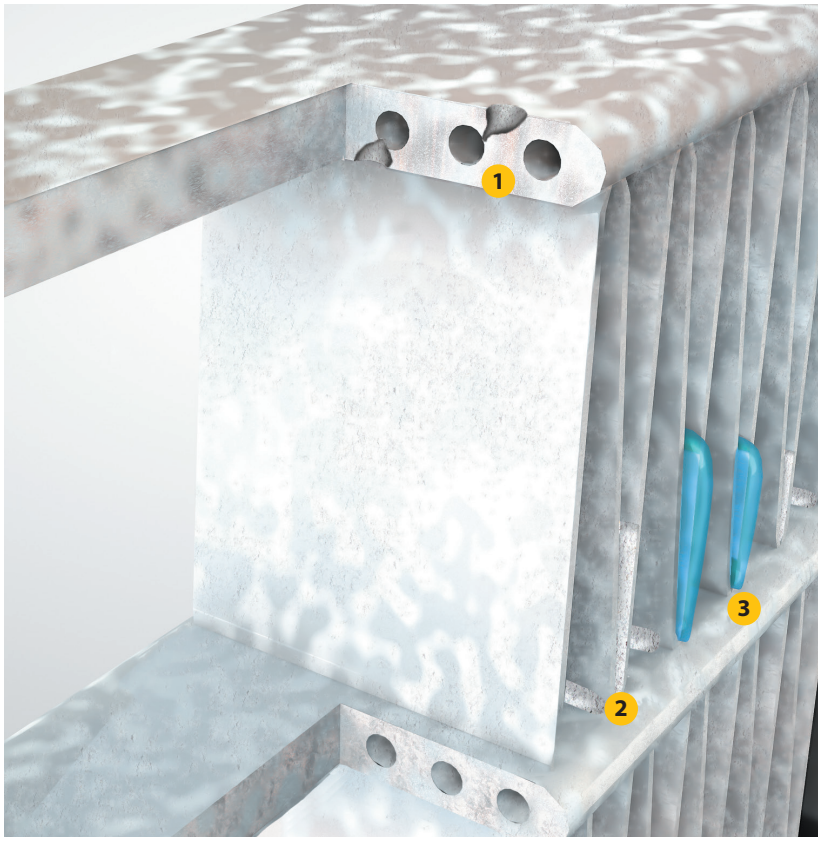
This results in local deep material loss also called pitting. On micro channel HX this may result into refrigerant leakages through the thin aluminium tube wall.

2 Salt accumulation

The high fin density combined with the extreme fin enhancement design results in highly efficient heat transfer. Down side of this design is the rapid salt and pollution accumulation due to the very narrow spacing. With salt accumulation occurs an increased corrosion risk.

3 Water drainage

Horizontal flat aluminium tubes combined with narrow fin spacing result in a perfect geometry for water retention after rain. This also means that accumulated pollution and salts between the fins are not washed out of the coil.



Uncoated MCHE

1 Micro channel tube protection

Blygold PoluAl MC completely seals off the vulnerable tubes from the environment. With a very thin single layer treatment the coating prevents possible pitting corrosion and refrigerant leakages.

2 Solar radiation reflective

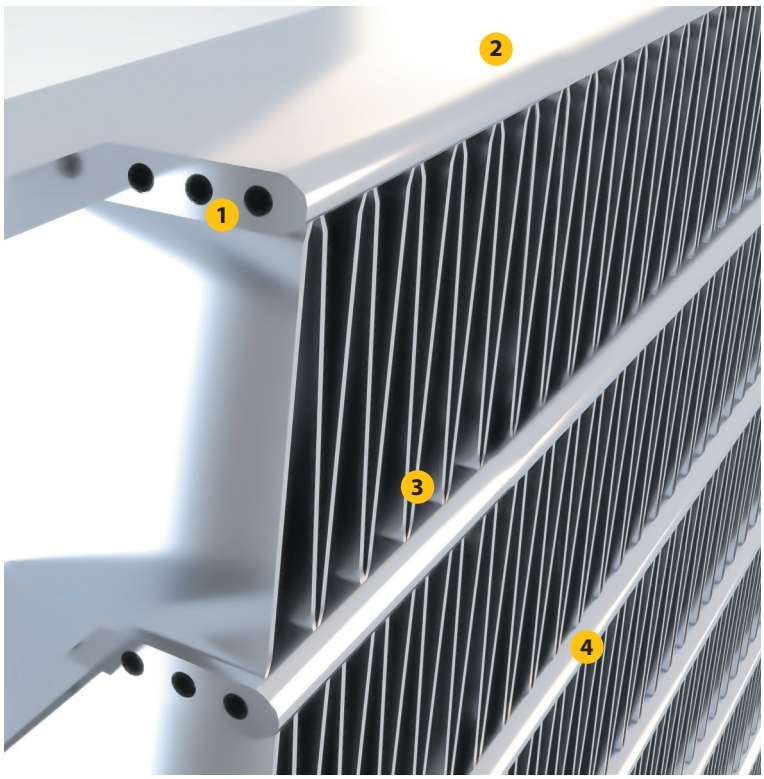
The sunlight radiation reflecting pigmentation does not only prevent coating breakdown due to UV, it also reduces sunlight radiation heat absorption compared to black surfaces.

3 Improved water drainage

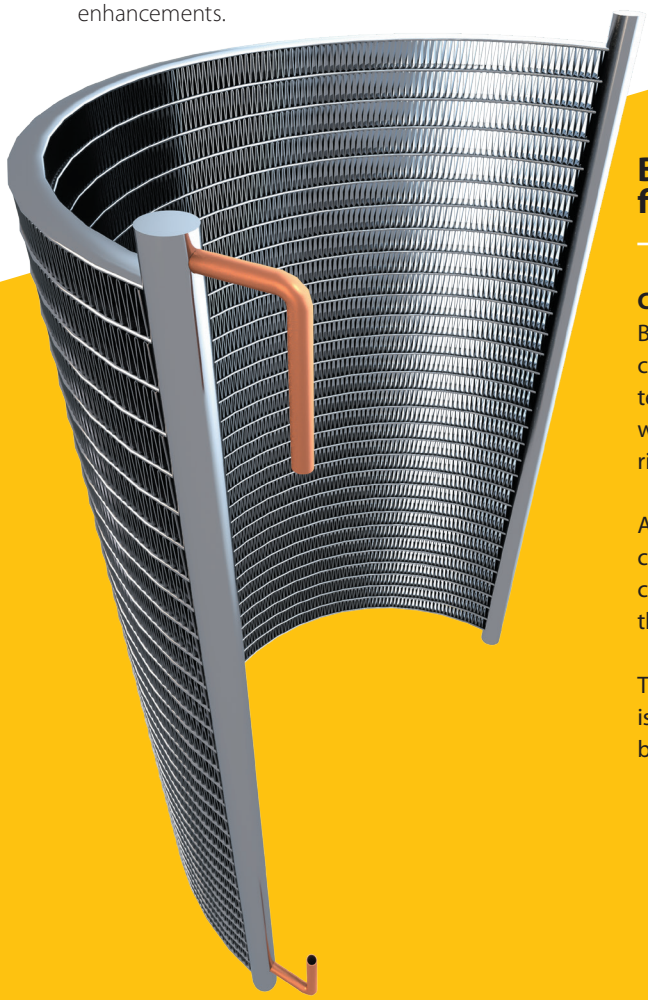
The coating surface creates improved water drainage properties for the microchannel coils. When water drains from the coil the risk for corrosion and accumulation of pollution is significantly reduced!

4 Spray applied technology

The proprietary Blygold spray technique results in 100% metal surface coverage without bridging of fin spacing between fins or fin enhancements.



Coated MCHE



Blygold PoluAl MC: flexible coating & flexible application process

Coating flexibility

Blygold PoluAL MC is a flexible coating. Even after thermal cycle testing the coating is able to withstand fin bending without risk of cracking or delaminating.

Another major advantage of this coating flexibility is that flat micro channel coils can be bent after the coating has been applied.

Tests have shown that the coating is still in perfect condition on the bended areas.

Application flexibility

PoluAl MC is applied through Blygold's special spray techniques. This makes the application very flexible. It can be applied to any size of micro channel heat exchanger without any restriction.

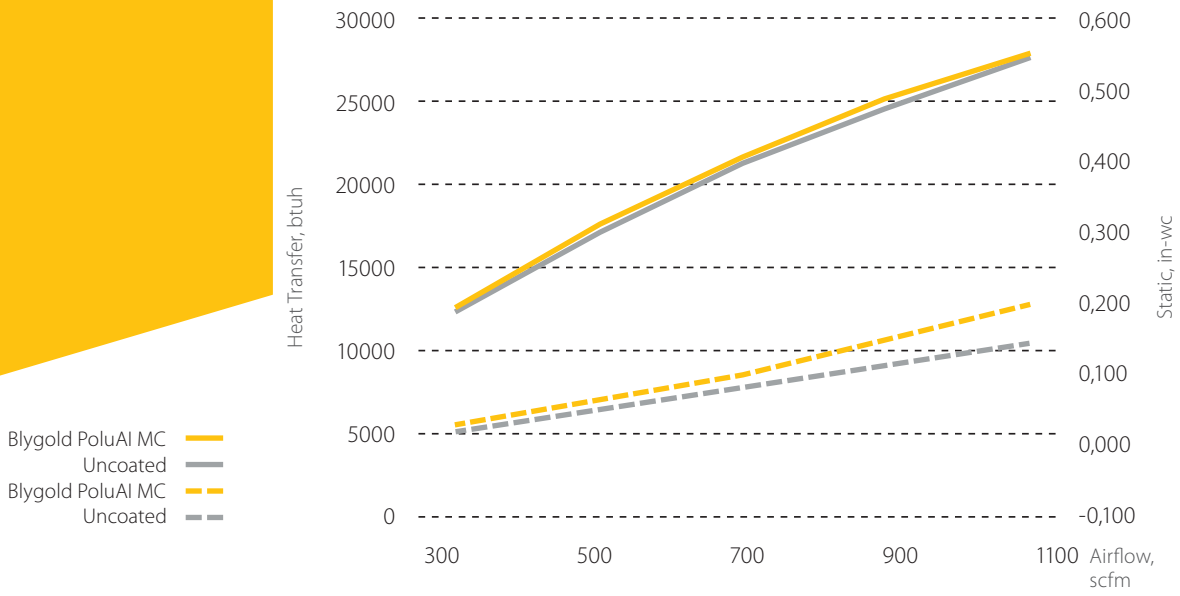
When coils are already bent they can also be treated with PoluAl MC.

Technical information

Treatment:	**Blygold PoluAl MC**
Coating type:	Aluminium Impregnated Polyurethane
Colour/pigment	Sunlight radiation reflective silver, sacrificial to substrate
Pre-treatment:	Blygold Aluprep HX
Substrates:	All aluminium heat exchangers like MCHE and radiators
Layer Thickness:	20-40 µm
Pressure Drop:	0- 20 % (depending on fin geometry)
Thermal Resistance:	0-3 % (depending on fin geometry)
Application:	Qualified Blygold Applicator
UV Resistance:	Excellent
Temperature Range (dry):	-30 °C to 150°C

Test results:	
SWAAT (test until leakage) :	3-5 times longer compared to uncoated coil
ASTM B117 :	4000+ hours (heat exchanger) 11.000 hours (aluminium plate)
ASTM B-287 :	4000+ hours (acid-salt spray test)
Kesternich (2.0 ltr SO2) :	80 cycles
Electrochemical impedance :	6,78E +07 Ω* cm2
HX water drainage :	up to 30% improvement compared to uncoated MCHE coil
Adhesion (cross hatch) :	0 (European) 5b (USA)

Coating Performance Testing



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P.O. box 44 3990 DA Houten
The Netherlvands
www.blygold.com

T. +31 30 634 43 44
F. +31 30 634 43 00
E. info@blygold.com

Your local Blygold applicator