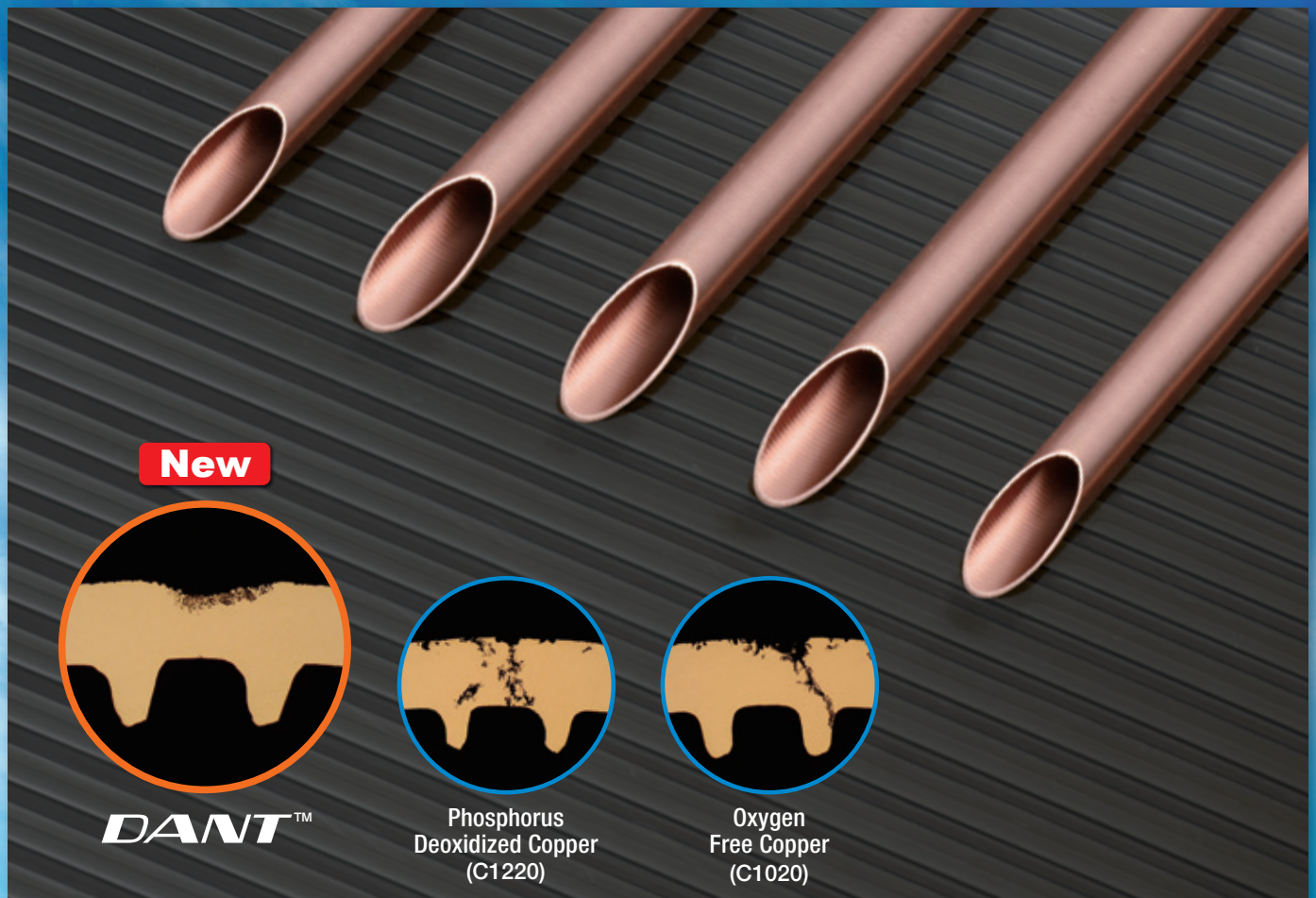


Suppress Formicary Corrosion of Heat Exchanger Tubes



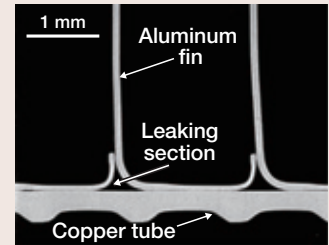
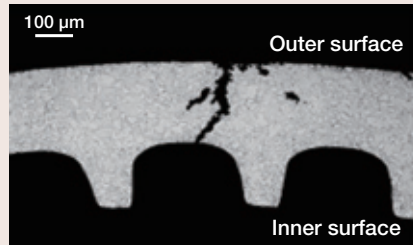
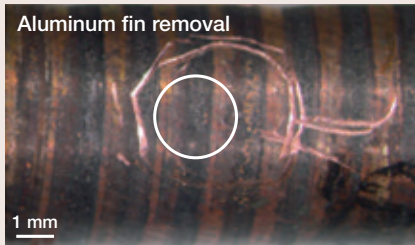
Excellent resistance to formicary corrosion significantly improves the lifetime of heat exchangers and connecting pipes (UNS C12600).

A wide range of tubes including inner-grooved tubes are available.

Easy hairpin bending, expanding, and brazing.

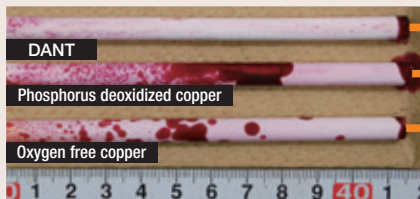
Formicary-corrosion on Copper Tubes

Formicary corrosion is a form of localized copper corrosion that can be initiated on the surface of copper tubes in the presence of copper, water, oxygen, and organic acids. This corrosion first appears as tiny surface pits and then grows inwards in an ant-nest-like shape. An initial pit can corrode through the tube resulting in loss of refrigerant. Organic acids such as formic acid and acetic acid often arise from the hydrolysis of formaldehydes released from building materials, household chemicals and personal care products. Formicary corrosion mainly occurs in the gaps in the flare sections of fin collars where organic acids can accelerate the corrosion.



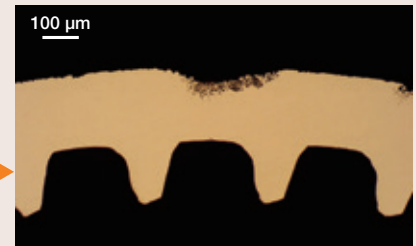
Formicary Corrosion Resistance

Accelerated test condition
0.1% formic acid environment, for 80 days



Dye penetrant test results

The dye penetrant inspection method is capable of detecting and highlighting tiny surface pits or defects. The penetrant is applied and followed by application of a developer. The number and size of the dye spots indicates the location and degree of formicary corrosion sites on the tube. DANT shows exceptionally high resistance to formicary corrosion.



Corrosion Protection Mechanism

- 1 Optimized phosphorus content effectively changes the corrosion morphology to be shallow pitting.
- 2 Shallow pitting that is altered from ant-nest-like morphology dramatically suppresses penetration of the tube wall.

Material Properties

The material properties of DANT tube are equal to or higher than that of phosphorous deoxidized copper tube. This means that DANT tubes can be processed using existing manufacturing equipment and processes, and can be applied to existing heat exchanger designs with very minor modifications, if any.

	DANT	Phosphorus deoxidized copper C1220	Oxygen free copper C1020
Pressure resistance strength	Excellent	Good	Fair
Malleability	Good	Good	Good
Salt water resistance	Good	Good	Good
Formicary corrosion resistance	Excellent	Fair	Good

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