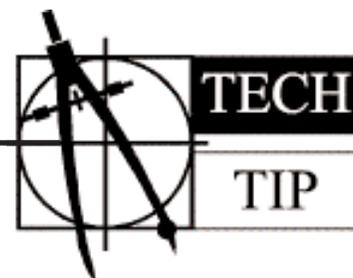


Understanding Copper



Bulletin 9

WEATHERING

The natural weathering of copper to the green patina is the result of mild corrosive attack of airborne sulfur compounds. Typically, copper weathers from its natural salmon pink color to a series of light and dark browns and finally to the ultimate blue-green or gray-green patina. The time in which copper will undergo this transition will vary depending upon the actual environment that the panels are installed in. A more aggressive environment of airborne pollutants will speed up the natural weathering of copper. In some areas the copper tends to remain a dark brown for extremely long periods of time due to the lack of an aggressive atmospheric environment. Typically in an industrial and seacoast environment copper will patina in about 5 to 7 years. In a relatively clean environment of a rural area it may take 10 to 20 years for copper to experience the green patina effect. Arid climates such as the Western United States, a green patina may take over 50 years or it may never experience this result.

GALVANIC CORROSION

Galvanic corrosion can occur when dissimilar metals are in contact in the presence of an electrolyte. An electrolyte is a liquid that will conduct an electric current, for example, rainwater.

Metals are rated according to their nobility, and the more noble metal will cause the less noble metal to corrode. Copper is one of the most noble metals, therefore, it must be separated from other metals with less nobility. Contact between dissimilar metals should be avoided. Avoid contact with uncoated aluminum, zinc, galvanized steel, and other non-compatible metals. If contact cannot be avoided, the adjacent metals should be treated. Some treatments include painting with bituminous or zinc chromate primers or paints, and taping with non-absorptive materials.

Care should also be taken to prevent the wash from copper surfaces onto adjacent materials, since the traces of copper salts carried in the wash can accelerate the corrosion of less noble metals. This is especially important in choosing gutters and fasteners. It is recommended that only copper, copper alloy or brass fasteners be used in order to prevent such corrosion.

STAINING OF MATERIALS

Copper has a propensity to stain light-colored materials such as stucco and stone. The natural weathering of copper results in copper salts on the surface of a copper sheet. When these salts are mixed with rainwater and allowed to run onto other materials, green stains may develop. To prevent such stains, the use of overhangs, sloping of copper surfaces away from other materials, gutters and drip edges is recommended. The use of a clear, silicon-based coating on cementitious surfaces is also helpful to protect the surface.

UNDERLAYMENTS

Copper when used in roofing and sidewall applications tend to generate higher temperature ranges than conventional steel and aluminum materials. This higher heat associated with copper should be addressed when selecting underlayment materials and primarily ice and water shield type waterproofing materials. Some manufacturers produce products specially designed for use in high temperature situations. In addition, the use of a slip sheet (red rosin paper) should be considered when standing seam copper panels are being installed over asphalt type felt materials to prevent adhesion of the copper to the felt underlayment.

RAINWATER RUN-OFF

Measurements taken over the years show that there is a material wash-off rate of only 0.012 mils per year, on average. During rainfall, this amount dilutes even more when the run-off enters sewer and filtration systems or soaks into the ground. Dissolved copper is precipitated out, leaving a harmless residue in the water, which is due to the higher pH-value of the surroundings. The remaining dissolved copper is biologically harmless.

ATAS PRODUCTS

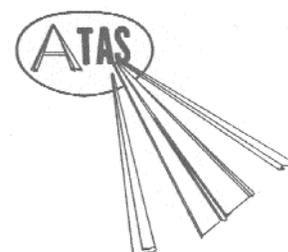
ATAS International, Inc. can produce most of its product line from copper. Consult your Technical Representative for specific details regarding our copper products.

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