



## FREQUENTLY ASKED QUESTIONS ON ARCHITECTURAL COPPER PRODUCTS

### ■ Can the naturally occurring green patina of copper be accelerated by artificial chemicals?

Due to the precise temperature, humidity and chemical requirements, it is generally not recommended that copper be artificially patinated in the field. However, there are field applied pre-patination systems that, with proper training, have proven successful. Currently there are sheet copper fabricators who may provide factory and field applied pre-patination systems under controlled environments. The patina is produced using patented chemical processes result in true patina chemical conversion coatings. Please ask Austral Wright Metals for details of these companies.

### ■ How can the original copper colour be protected from weathering after installation?

There is no permanent protection system that will protect copper from weathering. There are clear coatings that will provide short term protection for exterior applications and longer term protection for interior applications. CDA has completed an extensive test program for various clear coatings meeting low VOC (USA) Federal requirements. Please ask Austral Wright Metals for details of the findings in the report.

### ■ Can I get copper or copper alloy samples?

Austral Wright Metals can supply samples of different alloys for consideration for architectural projects.

### ■ How can the staining of materials by copper be prevented?

The natural weathering of copper results in the formation of copper salts at the surface of a copper sheet. These salts are then mixed with rain water and if allowed to run on to other materials will cause the characteristic green stains. To prevent such stains, the use of overhangs, sloping of copper surfaces away from other materials, gutters and drip edges are all recommended. The use of a clear silicone-based coating on cement surfaces is also useful to help protect the surface during the initial and most aggressive weathering of the copper.

### ■ What is galvanic corrosion and how can it be prevented?

All metals have an inherent tendency to corrode: they can be rated on a scale from noble to active. When dissimilar metals are in contact with each other in the presence of oxygen and moisture the more noble metal will accelerate the corrosion of the less noble. Copper is one of the most noble of metals and must be separated from other less noble metals. Contact between dissimilar metals should always be avoided – they should be insulated from each other. If contact cannot be avoided, the adjacent surfaces should be painted with bituminous or zinc chromate primers or paints. Tapes or gaskets with non-absorptive and non conductive materials is also effective.

Care should be taken to prevent the wash from copper surfaces onto adjacent, exposed surfaces of less noble metals, since the traces of copper salts carried in the wash can accelerate the corrosion of less noble metals.

■ **Are sealants required with copper systems?**

Most copper installations depend on self-flashed details requiring no sealants. Under some conditions, such as low roof slope situations, the use of sealants is recommended as a secondary waterproofing material. However it should be noted that copper will outlast most sealants and that in any details using sealants a regular maintenance and inspection program will become necessary. In general, butyl, polysulfide and polyurethane sealants are reasonably compatible with copper. Acrylic, neoprene and nitrile based sealants actively corrode copper. Silicone sealants have a variety of success with copper and their suitability should be verified with the manufacturer.

■ **What is the role of solder in a copper system?**

In roof and wall systems where water-tight seams are required, soldering is specified. A soldered seam will join two pieces of copper into a cohesive, watertight unit that will expand and contract as one piece. Well soldered seams are, in many cases, stronger than the original base material and will provide many years of satisfactory service.

■ **What are the typical sizes for architectural copper products?**

Copper products are available in three distinct forms: Strip, Sheet, Coil. Austral Wright Metals can supply these products in the sizes detailed in the Product Catalogue, and other sizes on application.

The maximum width is 1200 mm for half hard copper, and 900 mm for soft (annealed) copper.

■ **Why does copper change colour?**

The natural weathering of copper is a direct consequence of the corrosive attack of airborne sulphur compounds. This leads to a gradual change in the surface colour until equilibrium is reached and the change is stabilized. The final colour is different and depends on the location and local weather. Salt, moisture, sunlight, orientation all can affect the final colour. In general copper changes in hue from the natural salmon through a progression of russet browns, grays and finally to the blue-green or gray-green patina.

■ **What are the advantages of using copper flashing?**

Copper flashing offers beauty, low maintenance and a long service life. Unlike most other flashing materials, copper doesn't need to be replaced when the roof is replaced.

■ **What is the service life of copper flashing?**

Copper flashing, when correctly installed, can outlast the life of a house and far outlast the life of most roof systems. A service life of over 80 years has been common to copper flashing.

**■ Is copper flashing expensive?**

Copper is about equal in cost to galvanized steel and is initially somewhat more expensive than other shorter-lived materials. Copper flashing is well matched to high performance roof systems and will not need replacement for the life of the roof. On a life cycle cost basis copper flashing is the best choice.

**■ What is the purpose of the lead in lead-coated copper?**

Lead-coated copper is the copper industry's response for a strong, lightweight, durable, easy-to-install gray metal finish on a copper substrate. The material has been available since the early 1900's.

Lead coated copper does not extend the life of a copper roof. Its purpose is to provide an alternative colour to architectural copper applications. In addition the runoff from lead coated copper gives staining more compatible with light coloured materials such as masonry, marble, limestone, stucco and light painted woodwork. The stains produced range from light to dark gray and resemble the natural atmospheric weathering of masonry or paint. In instances where the lead coating is porous, under exterior conditions, incomplete or pitted, rapid pitting corrosion of the underlying copper can occur due to galvanic action.

**■ Why does lead-coated copper sometimes form an orange/red finish?**

In some cases a lead coated copper roof will exhibit red or orange discoloration on the surface of the lead-coating.

On atmospheric exposure, moisture and sulphur compounds react with the lead coating to create a dark gray sulphate patina. As the atmospheric sulphur levels are being reduced due to environmental restrictions and regulations, lead oxides PbO and Pb<sub>3</sub>O<sub>4</sub> are beginning to appear in the lead patinas, not only in remote locations but also in urban areas. Unlike lead sulphates and carbonates which are gray, lead oxides are red or orange. This colour is a natural occurrence - it has nothing to do with how the lead coating was produced or installed. The oxides are generally stable and insoluble in water. While they can be removed by mechanical and/or chemical means, it is likely that the red/orange colour will return (to become a permanent part of the finish surface).

**■ What is the availability of copper specifications?**

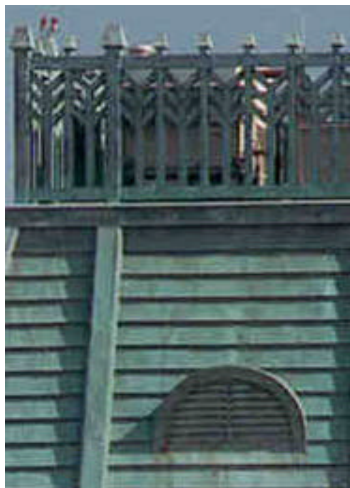
CDA has published five architectural copper specification sections in the AIA Masterspec format, which is used in USA. Please ask Austral Wright Metals for "Copper in Architecture Specifications".

**■ Is there further information available on copper in roofing?**

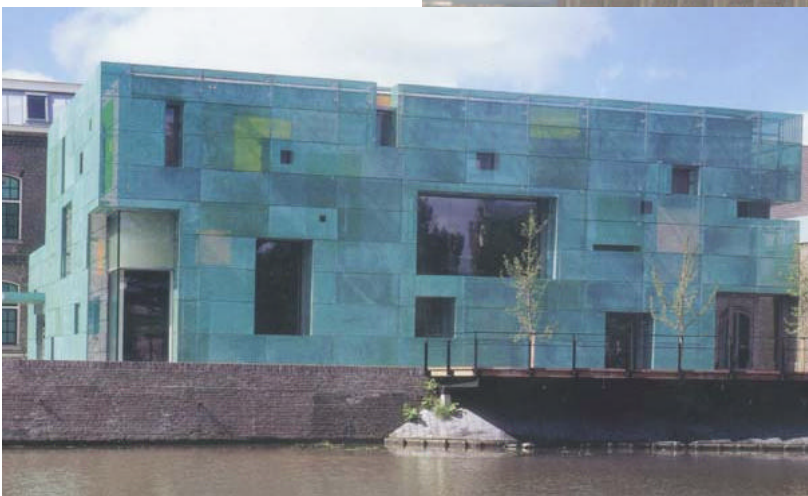
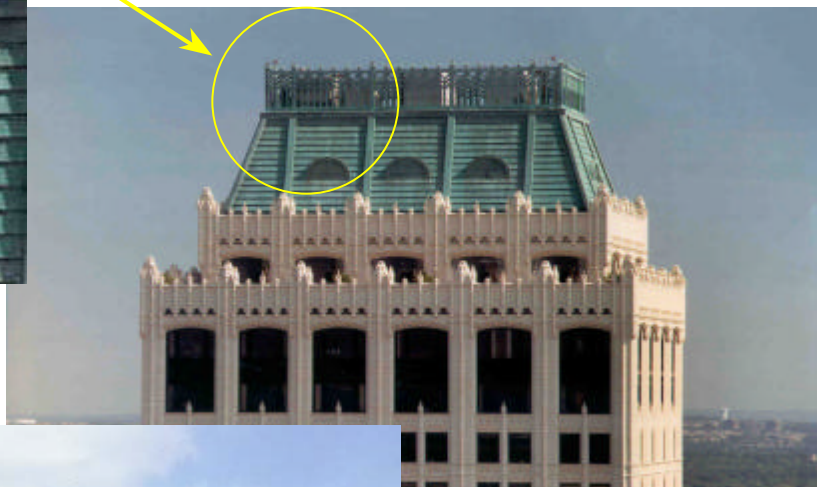
Please ask Austral Wright Metals for a copy of TN32 Copper in Roofing - Design and Installation, No 93 Copper in Roofing - Pocket Book, or the CDRom - Imagine Building with Copper.



San Angelo Museum of Fine Arts ,  
Texas, USA  
Hardy, Holzman, Pfeiffer Architects  
Standing seam multi curved copper  
roof



Mid-Continent Office Tower, Tulsa, Oklahoma, USA.  
Architect: Dewberry Design Group, Inc.  
Horizontal seam, 0.35 mm copper panels on a steel tube  
support structure.



Het Oosten Office Pavillion, Amsterdam  
Steven Holl Architects  
Pre-patinated, perforated copper panel  
screen system.