Copper Weathering and Patina Chart

During the initial weeks of exposure, particularly in a humid atmosphere or in areas of frequent rainfall, radical color changes often take place with iridescent pinks, oranges and reds interspersed with brassy yellows, blues, greens and purples. During continued exposure, these interference colors fade and are replaced by relatively uniform russet brown shades referred to as statuary or oxidized finishes.

In industrial and seacoast atmospheres, the natural patina generally forms in from five to seven years. In rural atmospheres, where the quantity of air-born sulfur dioxide is relatively low, patina formation may not reach a dominant stage for 10 to 14 years. In arid environments, the basic sulfate patina may never form due to the lack of sufficient moisture. Similarly, exposed horizontal surfaces develop the patina more rapidly than sloping surfaces which, in turn, patinate more rapidly than vertical surfaces. The critical variable, in all instances, is the dwell time of moisture on the exposed surfaces.

The progressive oxide, sulfide and sulfate films which develop on copper exposed to the atmosphere are quite thin two to three thousandths of an inch highly adherent, but with relatively low abrasion resistance. Neither the oxide nor sulfide films are particularly corrosion resistant. The sulfate patina, on the other hand, is highly resistant to all forms of atmospheric corrosion, once it has had an opportunity to form completely. It thus significantly increases the durability and, hence, the service life of copper roofing and flashing. The natural weathering cycle of copper is illustrated by the 12 sequential color plates in the **Weathering Chart** below.

Chart used with permission from the Copper Development Association


Unexposed

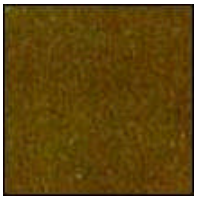

4 Months


8 Months


1 Year


2 Years


3 Years


4 Years


5 Years


7 Years


10 Years


15 Years


25 - 30 Years