

Metal Roofing

General Description

Metal roofing is mostly steel or aluminum, although copper and other metals are sometimes used. Steel is invariably galvanized by the application of a zinc or zinc/aluminum coating, which greatly reduces the rate of corrosion. As may be seen from the table, bare aluminum and steel may have a solar reflectance of roughly 60 %, and a low emittance. The reflectance and emittance of bare metals are very sensitive to the smoothness of the surface and the presence or absence of surface oxides, oil film, etc. Usually, bare metals are not very cool in the sun. For example, in one outdoor experiment (LBNL1), a bare clean sheet of galvanized steel with a solar reflectance of about 0.38 reached temperatures nearly as high as a reference black surface.

Metal roofing is available with pigmented polymeric coatings, similar to paint, that are factory applied. These coatings are used to protect the metal panels, and for appearance's sake; they can also keep the roof cooler.. The third and fourth entries below are examples of metal roofing with cool white coatings. Even a thin white coating "hides" the low emittance of the metal underneath, and produces a solar reflectance nearly as high as the thicker white coatings applied on site.

Table 6. Solar Reflectance and Thermal Performance of Metal Roofing

Product	Solar Reflectance	Infrared Emittance	Temperature Rise	Solar Reflectance Index	Reference
New, bare galvanized steel	0.61	0.04	55 F	46	FSEC1
Aluminum	0.61	0.25	48 F	56	FSEC 1
MBCI Siliconized Polyester White	0.59	0.85	37 F	71	FSEC1
Atlanta Metal Products Kynar Snow White	0.67	0.85	28 F	82	FSEC1

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