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**Taking a closer look at the causes of metal roof and gutter deficiencies.**

## Up Close: Metal Roofing and Gutters

Deficiencies in existing metal roofing and gutters can be hard to see. That's why it is important to get down on your hands and knees to take a close look.

As the following photos reveal, common problems—such as cracked seams; open rivet heads; cracked solder around rivet heads; and holidays in lapped, riveted, and soldered seams—can be so severe as to let rainwater slip through. (We also think the photos are really interesting and wanted to share.) Typical

causes of the pictured problems include improper seam selection and design, inadequate accommodation of thermal movement, and poor workmanship (in most cases, failure to sweat the solder all the way through the seam) or some combination of the above.



*The two photos above show a cracked seam viewed from three or four feet up (top) and when viewed up close. The close-up view shows that not only is the solder cracked, but the metal has fatigued and cracked, too.*

*While surface tension might prevent this open rivet from leaking during a light rain, put a head of water in the gutter and this hole will allow water to pass.*

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Metal Roofing and Gutters (CONTINUED)



Although the holiday in this lapped, riveted, and soldered seam is only about 1/16" wide, it offers a direct path for significant water entry, especially if the gutter outlet tube should clog and a head of water form.



Contrary to industry standards, the locked and soldered seams in this flat seam lead-coated copper roof were soldered using a torch rather than an iron.



Many of the seams cracked.



When cut open, it was found that the solder was not sweat through at all. All of the layers (four typically, but six in the photo due to the presence of a cleat) should be completely filled with solder.