



# 2010 ReVISION House

Manufacturer: MBCI  
Product(s): BattenLok HS™ (Tundra)  
Category: Standing Seam Metal “Cool” Roofing

Roof surfaces are the hardest working assembly on most buildings. Subjected to intense heat, drastic thermal swings with expansion and contraction cycles, and assaulted by rain, hail, snow and ice, roofs usually have enough to do just keeping the weather out. In a hot-dry climate like Las Vegas with its extreme summer heat and relentless sun, the biggest enemy of roofs, ultra violet radiation (UV), is magnified even further causing shorter life spans, greater heat flux through the roof assembly, and increased cooling loads. When planning a low-energy building in these conditions a performance objective might be to ensure that, thermally speaking, what happens on the roof in Las Vegas, stays on the roof in Las Vegas.

Using this strategy the ReVision House project team devised a roofing solution that is compatible with the home's architecture, but also one which has the capability of reflecting solar energy and rejecting thermal heat before it has a chance to penetrate through the insulated roof assembly and into the house: a vented “cool” metal roof. The roofing selected is manufactured by MBCI® Metal Roof and Wall Systems, and uses its BattenLok™ configuration. What makes this choice effective for the heat rejection in hot climates are two basic principles: An EnergyStar rated factory applied paint coating with a solar reflectance (SR) of over .25 combined with a solar Reflectance Index (SRI) of 29 or higher; and a vent space below the standing seam metal but still above the roof decking to direct heated air out and away from the insulated assembly.

Modern coating technology has provided a wide range of color choices for metal roofing while still maintaining an Energy Star Cool Roof designation. Before these newer coatings became widely available choices were limited to white or galvanized if similar performance values were desired. Now colors ranging from red, blue and green to grey and tan can be specified while still meeting the minimum performance guidelines.

The color selected for the ReVision House is Tundra, a medium grey with an SR of 0.46 and an SRI of 53. These ratings mean that the roof surface has the capability of rejecting back to the atmosphere about half of the solar energy which impacts it. With the passively vented 1-1/2” space below the metal roof, even more unwanted heat energy will be collected and provided with a pathway out of the roof assembly. To investigate how far this heat-rejection strategy can be effectively pursued, Building America and Steven Winter Associates are monitoring two adjacent three-section roof panels, one with an additional radiant barrier placed on the roof decking underlayment and facing up into the vented space, the other with no additional radiant barrier. The test bays are isolated from the remainder of the roof to prevent cross-communication of air from the test bays to the rest of the roof. The thermo-couples are installed on top of the foam insulation below the roof decking and will collect temperature data at 15 minute intervals through the summer and into early fall. Comparing the two sets of data will give the researchers an insight into the potential additional heat rejection possible through this strategy.

