How Reflective Insulation is Tested

Reflective Insulation manufacturers claim higher R-values than conventional blanket insulation. How can this be? Let's take a look at how they test reflective insulation. Below is directly from a reflective insulation manufacturer's own literature:

(***) System R-Values per ASTM C976/C1363, Air to Air with a 30 degree Fahrenheit temperature differential. These tests were conducted using a Calibrated Hot Box apparatus. The reflective insulation tested was .25" thick fiberglass insulation with foil facing on one side and a reinforced foil scrim facing on the other side. ***The test sample was installed in the middle of a 2 x 4 wood stud cavity, the wood framing was 16" o.c. with 3/4" thick plywood on each side.*** All R-Values are in hr-sq. ft.-degree F/BTU.

What does this mean?

In order to get the represented R-values, the product MUST be installed INSIDE a 2x4 wood frame and have ¾" plywood on BOTH sides. It is the ENTIRE assembly or "system" that achieves the claimed R-valve in a heat flow down test. This requires over 3" of "dead" air (Dead air is an air space that is sealed without ventilation). The entire system is then tested for downward heat flow.

Most of the time, reflective insulations are not installed in the above manner. Therefore, the R-values represented will most likely not be the true R-values when installed in your application.

Reflective insulations do have a purpose. They work by reducing radiant heat gain. When the sun heats a roof, it's primarily the sun's radiant energy that makes the roof hot. Much of this heat travels by conduction through the roofing materials to the attic side of the roof. The hot roof material then radiates its gained heat energy onto the cooler attic surfaces, including the air ducts and attic floor. A radiant barrier reduces the radiant heat transfer from the underside of the roof to the other surfaces in the attic.