



## Thermophysical Properties Research Laboratory, Inc. Perdue University

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Insulated paint or ceramic paint type products that claim wild insulation values.

TPRL Inc. would like to counter mis-information concerning various claims about insulated paint products that our company has tested. TPRL, Inc has measured the thermal conductivity of thin layers of insulated paint products and obtained thermal conductivity values. These thermal conductivity values are not **R insulation values** and we did not claim our results as R-values.

Our company did provide a memo that stated that a R19 value was possible under **certain conditions** which included how the HotBox test was done. The HotBox test performed by another company used a coating of insulated paint on top of a insulating media to get a R19 value. In real world conditions you will not get a R value of 19 from these insulated paints. A lot of people are believing that if they just paint their building it will add R19 to their insulation value. Other people are believing that if they leave off the insulation on a new construction and paint it with one of these insulation type paints the building will have a R19 insulation value. This will not be the case in either application. Be very careful of the data being presented and the claims being made. Much of the R value being presented is being done out of context with the intent to mislead. Will these type of insulating or ceramic paints help insulate ? Yes, to some degree much like a good thick coat of paint but nothing like the R-value claims being made.

As usual, if it sounds too good to be true it probably is. **Buyer beware !!**

Now on to how you can calculate R-value for yourself.

We typically do not report R factor values in the reports that are issued. To calculate a R value from a thermal conductivity value you would need to do the following.

Lets say you have a thin layer (.010 inch) of insulated paint that has a thermal conductivity value of .006 W/cm\*K. In order to calculate a R insulation value you will need to convert to BTU units so you would multiple the 0.006 W/cm\*K value by 693.81 to convert it to BTU inch /(hr ft<sup>2</sup> F) which gives you 4.1628 BTU inch /( hr ft<sup>2</sup> F).



You would then take the reciprocal of the result because the thermal resistance is the reciprocal of thermal conductance. The equation would be  $1.0 / 4.1628 \text{ BTU inch / (hr ft}^2 \text{ F)}$  to get a value of .240 which you would then multiply by the thickness of material being used, in this case 0.010 inches, to get an R insulation value of .0024 thermal resistance. A ONE INCH thick layer of this material would have a R insulation value of 0.24 thermal resistance. A TEN INCH thick layer of this material would have a R insulation value of 2.40 thermal resistance. This is very different from the 15.0+ R insulation values common for a foam block or insulation batting.

The REFLECTION of the heat is not used to calculate a R value as defined by the United States Department of Commerce. The reflection of heat has nothing to do with the real insulation (R) value. An example of reflection, if you paint a house in the hot desert with a thin layer of white paint it will reflect the heat from the direct sun by reflecting the sun's energy but that thin layer of paint will not insulate the house from the cold at night. If you expect to paint your building with a thin coat of insulating paint and cut your heating bill in the winter you will be very surprised if your bill remains roughly the same. In the summer it will reflect some of the direct sun's rays away from the building making it easier to cool but other white paints will also do this.

## Energy Seal Coatings

**“A ONE INCH thick layer of this material would have a R insulation value of 0.24 thermal resistance. A TEN INCH thick layer of this material would have a R insulation value of 2.40 thermal resistance.”**

**In other words, to have an R-value of .24 (25% of R-1) a ceramic coating would have to be one inch (2.5cm) thick. How thick do you think a ceramic coating would have to be to have an R-value of R-22?**

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**Buyer beware !!”**