Mascoat PRODUCTS

Why Paint and then Insulate?

The Industry Leader in Thermal Insulation Coatings

Low E and other Reflective Roof Coatings

LOW E Coatings

So what is the difference on Low E or other reflective roof coatings? First we must look at a thorough definition of these terms.

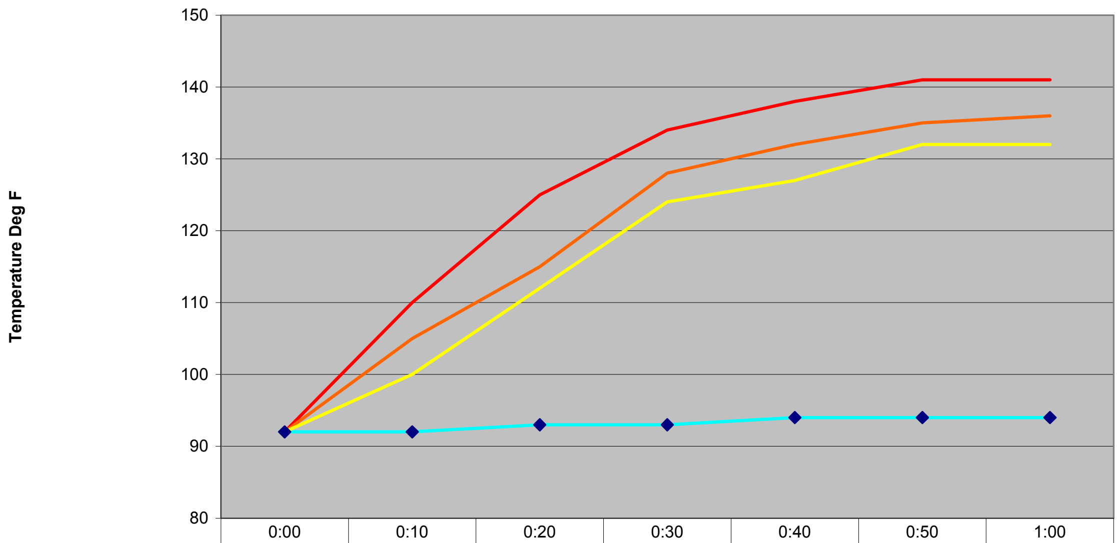
Low E coatings basically describe Low Emittance type coatings. These coatings are relatively new to the market in the form of silver type paints or coatings that exhibit low emittance values given off by the coating in a testing chamber. Although great in practicality they have one inherit problem. Thickness. Since the coatings usually have some type of small metal reflector type basis that migrates or floats to the surface when curing, a problem of coating thickness occurs. Normally Low E coatings are not applied more than 8-10 mils thick (0.025mm). From a reflectivity standpoint, the coatings perform fairly well on most of the light spectrums. However since they do have metal particles, some of the light wave spectrum is passed through to the next medium. This means that the coating will conduct heat flow through the coating efficiently and thus translating it into the next atmosphere. The below data was compiled based on testing in house on a Low E coating:

A testing substrate measuring 18” x 18” of 0.125” was made of carbon steel. Outside surface was prepared with conventional shop primer grey and inside was coated with Low E coating to a thickness of 10 mils in two applications. Surface was exposed to radiant heat lamps with an average ambient condition of 93°F.

Tested Area	TIME in MINUTES						
	0:00	**0:10**	**0:20**	**0:30**	**0:40**	**0:50**	**1:00**
Ambient	92	92	93	93	94	94	94
Steel Temp	92	110	125	134	138	141	141
Low E coating	92	105	115	128	132	135	136
1/4" Below coating	92	100	112	124	127	132	132

This shows that the coating does make some difference when applied to steel

Low E Coating Test



	0:00	0:10	0:20	0:30	0:40	0:50	1:00
Ambient	92	92	93	93	94	94	94
Steel Temp	92	110	125	134	138	141	141
Low E coating	92	105	115	128	132	135	136
1/4" Below coating	92	100	112	124	127	132	132

Time

One thing is evident, they LOW E coatings do work to dissipate radiant heat gain, but there are other coatings that can produce greater differentials.

One good thing about LOW E coatings is that can be applied into internal environments. But they do need a slight air gap to work more efficiently. It is best to gain data from the vendor of these coatings to fully understand where they work best.

Other Reflective Roof Coating

For the past 25 years, reflective roof coatings have been in the marketplace. Rooftops all over world have used this technology to help reduce temperatures into their environments and also to help protect/waterproof their substrates. This means that the technology is solid, but also has an inherit flaw.

To make these coatings manufacturers have used the latest in technology with resins, but as far as solids are concerned they are all pretty much the same. This means that the particles or solids that are used in coatings all have the same inherit thermal dynamics characteristics. Typical particle structures are:

Calcium Carbonate – this is used to help bulk the coating in its drying state as well as providing added physical characteristics.
Titanium Dioxide – this is to help whiten or brighten the coating as well as provide UV blocking ability

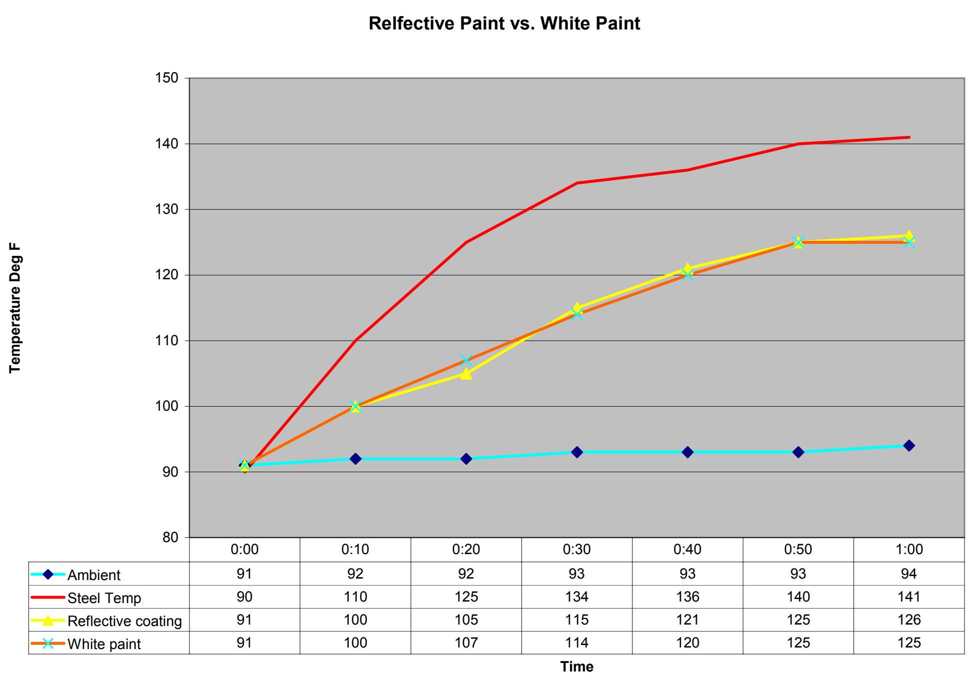
Zinc Oxide – also used to help brighten or whiten the coating, and help its reflectiveness.

Although these materials are well proven and do provide good aspects to reflective coatings they all have a major component flaw. *Conduction*. Calcium Carbonate and TiO2 are highly conductive and thereby absorb and translate some of the light wave spectrum directly through the coating. This equates to translating any gained heat directly though the coating quickly and therefore into the internal atmosphere.

Depending on the loading of solids, different dry film thicknesses can be achieved. This means that some reflective coatings will translate heat/cold better than others. The data below show a corollary between white paint and a reflective roof coating.

This test was similar to the above tests. Samples 18” x 18” x 0.125” were place into testing chamber coated with either a reflective roof coating or white paint. Samples were exposed to radiant heat lamps to simulate sun loading. Thermocouples were attached to the underside of the steel to see how much heat was translated through the substrates.

Tested Area	**TIME in MINUTES**						
	0:00	**0:10**	**0:20**	**0:30**	**0:40**	**0:50**	**1:00**
Ambient	91	92	92	93	93	93	94
Steel Temp	90	110	125	134	136	140	141
Reflective coating	91	100	105	115	121	125	126
White paint	91	100	107	114	120	125	125



This data explains that most tested reflective roof coating similar to white paint. Both show a dramatic differential, but prove that it is the white color that makes the product work.

So how do Reflective coatings work? Mainly due to their bright white color. If you take their reflective nature away by either application of the coating under roof or if it gets dirty over time, then the power is severely diminished.

More on Heat Transfer and Thermal Conductivity:

For more about R Values and insulation coatings please see:
www.mascoat.com/Rvalue.htm

For more about thermal conductivity and testing please see:
http://www.mascoat.com/how.htm

For more about units conversion and translation math please see:
http://www.ex.ac.uk/cimt/dictunit/ccthcony.htm

