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White Paint, Reflective or Cool Roof Coatings or Heat Blocking Coating! ... Isn't it all the same? **NO**

Heat energy from Sun arrives and reaches the earth as solar radiation. Solar radiation (Electromagnetic Waves) loads on to external surfaces (like Roofs, Tanks, Equipment, etc..) in three (3) main ways:

1. Infrared (53% of the Sun's Heat load is Infrared)
2. Visible Light (44% of the Sun's Heat load is Visible Light)
3. Ultraviolet (3% of the Sun's Heat load is Ultraviolet)

For a paint or a coating to be effective, it must be able effectively handle all 3 aspects of Solar (Sun Heat) loading. Lets briefly discuss the options.

White Paint

My personal opinion when asked about the real world performance ability of white paint to keep surfaces cool, is that " If solving the world's energy crisis, heat island build up and Carbon (CO₂) emissions was as simple as painting surfaces white or using white colored materials that depending merely on reflection as a byproduct of being white in color, then the world would have painted every external surface white a long time ago and thus would have avoided the reported Global Warming & Heat Island crisis".

When you consider using white colored paint or white coatings that depend only on their whiteness (meaning being white in color) for reflectivity, these products are only able to impact one (1) of the three (3) ways that solar (sun) heat loads and that is the Visual Light wave. As shown above, Visual Light is only about 44% of the total heat that comes from the sun. White paint doesn't deal with the other important aspects of sun heat loading, which is infrared or ultraviolet (which is 56% of the sun heat load). So, whilst white paint will offer some initial benefits to reducing the heat build-up on say your metal, Asphalt or Concrete roof system, Equipment, Tank, or whatever the external surface item is, for a short period of time, White paint typically will lose any long-term effectiveness once the surface gets dirty and thus the long-term benefits are significantly reduced and as time goes by, our experience is that they provide very little value. Infrared waves cannot be reflected with white paint and thus with paint you can only impact 44% of the heat that is trying to load and the surface must be white and clean for white paint to provide lasting benefit.

Reflective or 'Cool Roof' Coatings

These coating systems whilst also being mostly white or very glossy colored surfaces, are very similar to white paint in that they typically impact just the visible light waves coming from the sun, which again is only 44% of the total heat that loads from the sun. The reflection / reflectivity of sunlight is important, as it will reduce some heat load, but typically, the reflective coating will only work when they are shiny or nice and clean. The problem is, however, external surfaces like roofs, tanks, equipment, warehouse, do not stay clean, they get dirty or etched from UV degradation or acid rain, etc... When this happens, like white paint, they immediately start to lose performance effectiveness, until basically they stop working.

For example, a white coated / painted car that is new and shiny is highly reflective, and initially cooler on the surface than a black car, because the shiny white reflective car can initially bounce or reflect 44% of the solar (Sun) heat that tries to load. But, in a short period of time, after the white car (used in this example), becomes etched from UV and acid rain, **you can touch the surface of the white car and it is as hot as a black car**. IM sure that you have

touched a white car in the summer and noticed that the surface is as hot as a black car. Typically, this is what happens when a reflective white coating is say applied on a metal roof or any other external surface, in any application where solar (sun) heat loading is a problem. Reflective Coatings basically lose performance ability on even on Visual Light, after a short time, thus the building heats up significantly, even though it has a white reflective coating or membrane applied on it.

Heat Blocking (Sunshield)

Sunshield is more than a mere white reflective coating. Yes, Sunshield is white in color and does reflect some, but there is significantly more with Sunshield. Sunshield is designed to impact all three (3) way that Solar (Sun) heat loads, not just one. Sunshield blocks and reflects all three forms of solar heat loading (Infrared, Visual Light and UV). Sunshield is part of a unique Ceramic Spray on Insulation Technology platform, where on the lower end of the technology platform, we have Sunshield, which was specifically designed to minimize / block Solar (Sun) heat from loading. And, on the higher end of the technology platform is a product called HPC which is used to insulate heated assets (Steam lines, tanks, boilers, heat exchangers, etc..) with internal operating temperatures up to 1200F. No other Spray On Insulation Technology Platform can even begin to come close to this range of performance. White paint certainly cannot scale up to insulate 1200F surfaces, and reflective coatings that depend only on their ability to reflect while clean cannot provide this range of performance either as a technology platform. All of our spray on insulation products uses very specific nano sized ceramic particles that lack the density to easily load heat. For example, if you went outside on a 90F degree day and picked up a piece of paper, the paper will always be physically cool to the touch and at an ambient temperature because, the paper lacks the physical density to load and hold the heat. The specific nano materials used in Sunshield's formula are 50 times lighter than paper and thus, like a piece of paper, lack the physical density to easily load solar (sun heat). Loading is the first step in heat transfer. If a product can significantly control the amount of heat energy that loads, then you are able to reduce the amount of heat energy that is available to transfer to the cooler side, or say into your house, building, equipment, ect.. **The Second Law of thermodynamics states that "Heat moves to cold if it is not blocked or redirected"** and that's the point. Sunshield is designed to prevent the amount of Solar (Sun) heat available to load. So, when applied for example, to a metal, asphalt, or even a concrete roof, once dried, you can go outside and sunbathe on a metal roof painted with Sunshield because, the surface of the roof once painted with Sunshield, will be at or near ambient temperature, even on bare metal structures. Likewise, previously we mentioned that a new white highly reflective painted idle metal car is initially cooler than a new painted idle black car, but as time goes by the white car becomes just as hot on the surface as the black car. Why, because once it cannot effectively reflect Visual light, there is a problem. In this same example, if the idle metal car was painted with Sunshield, it will remain cool to the touch and at a near ambient temperature, when it is hot outside, because the nano particles used in Sunshield formula are very low in density and like a piece of paper, cannot easily load & hold Solar (Sun) heat. It only takes a small application of Sunshield say on a metal surface for you to prove o yourself, that Sunshield is more than just a reflective coating. I suggest trying Sunshield on a metal surface if you need further validation, because metal conducts heat and everyone knows you can't fake it on metal. Try Sunshield instead of white paint or reflective coatings and membrane products that depend only on their ability to reflect sun heat, when they are clean and shiny white, which is not real world, because as previously mentioned, external surfaces always get dirty. Sunshield will work even when dirty