



The Myth about “Ceramic Microspheres” in Coatings

Throughout the years there have been numerous companies making claims that their coatings contain ceramic micro-spheres or “nanotechnology” that are heat reflective and can provide energy savings by lowering surface temperatures.^[4,7] Some companies go so far as to claim that these ceramic-based, field applied coatings provide enough resistance from thermal heat transfer that an effective R-value can be realized.^[1,6,7] While this may all sound intriguing at face value, science does not support these claims.

The Federal Trade Commission (FTC) has been targeting these companies because they have been misleading the public due to a lack of “solid verifiable evidence” according to J. Howard Beales, Director of the FTCs Bureau of Consumer Protection.^[1] In 2002 the FTC charged Kryton Coatings International, Inc. for unsubstantiated claims that their ceramic containing product could reduce energy costs up to 40 percent.^[1,6] The full report from the Kryton ruling can be viewed at www.ftc.gov/os/2002/04/krytoncmlnt.htm.

One of the first ceramic-based coatings was introduced in the late 1970's and was tested on Monolithic Domes in Florida comprised of three inch concrete and no interior insulation. One of two domes was coated with a white ceramic containing coating and the other was coated with a white non-ceramic coating. Both the interior temperature and the exterior surface temperature of the two structures were monitored for several months. The results from this study showed that the exterior surface temperature difference was one degree (105⁰F -106⁰F) and the interior temperatures of the two domes were identical. This study concluded that the ceramic-based coating was neither reflective nor did it insulate the structure.^[2]

The marketing ploys these companies are using are based on the principle that the ceramic beads are hollow and by incorporating them into a coating, an air barrier is formed that will act like a thermos, reducing the amount of heat from transferring through the building or home.^[2,7] These are false statements and the reason is quite simple. The science of thermal conductivity and insulation as it relates to the R-value is expressed in R-value per inch. The application of field applied ceramic-based coatings typically yields a dry film thickness of around 10 dry mils (0.01 inches). For comparison purposes fiberglass batting only has an R-value per inch of about 3. Therefore adding a ceramic coating of 0.01 inches to the exterior structure cannot offer the reduction of energy consumption these companies are claiming, nor is there any evidence available to otherwise dispute this.

Other companies market their ceramic-based coating as being heat reflective and reducing surface temperatures ^[4,7]; however, the data they use is based on a white coating which is reflective based on its color alone. Nowhere in their data or testing do they offer evidence proving that ceramic spheres add any increase in reflectivity or surface temperature reduction when compared to a non-ceramic coating of the same color.

This has been realized by both the Department of Energy (DOE) and the Federal Trade Commission (FTC) through both investigations and scientific studies.^[1,6,] Andre Desjarlais, Building Envelopes Group Leader at the Department of Energy’s Oak Ridge National Laboratory (ORNL), stated at a 2009 conference that “There are many manufacturers out there deceiving the public with these fictitious paints containing

magical fu fu dust ceramic beads and nano-particles that reflect the energy away – this is all craziness. These coatings companies are unethical, but unfortunately the FTC cannot allocate the money and resources to shut all of them down at one time because they are so small.” He goes on to say “reality is that these companies are bad apples in the industry and affect the industry as a whole.”[5] In February of 2011 Andre presented a webinar entitled *The Value of Reflective Wall Coatings* and was quoted as follows when asked about whether ceramic-based coatings could increase reflectivity and reduce surface temperatures: “Our data suggests that the addition of ceramic microspheres has no impact on performance and there isn’t any benefit from their addition.” Andre’s statement is based on a recent study performed at ORNL where coatings with and without ceramic beads were compared for differences in solar reflectivity, thermal conductivity, and emissivity. The coatings were also exposed on roofs in Tennessee where heat flux was studied quarterly for one year. The study concluded that there were no differences observed between ceramic and non-ceramic coatings for any of these properties [9].

In contrast, a lengthy study performed by the Department of Energy (DOE) in cooperation with Textured Coatings of America has proven that “solar radiation control is an effective means to decrease energy needs for cooling,”[8] and that the use of COOLWALL® coatings can reduce energy demands depending upon the color chosen and climatic conditions of the region for which they are applied.[5]

Solar heat is comprised of 42% visible, 5% ultraviolet and 53% Infrared energy. The ability of COOLWALL® to keep the wall surface cooler is based on its ability to reflect a much greater percentage of the non-visible IR portion of sunlight away, leaving the visible portion of the spectrum unaffected. The human eye cannot see the infrared portion of light, so colors remain visually identical to traditional paint colors. COOLWALL® does not have nor claim to have an R-value associated with it. Instead, it reflects the infrared energy from the sun so that the wall does not get as hot in the first place. This can, in turn, help keep out the amount of heat that the insulation is trying to resist from the exterior surface.[5] COOLWALL® is offered in a wide array of heat reflecting colors other than white, giving it a true energy saving advantage.

The companies that are misleading the public with false claims of reduced energy consumption through the use of ceramic coatings do not have the data to support their argument. The COOLWALL® system works to reduce energy consumption as verified by the U.S. Department of Energy. To view the DOE full report on cool colors, visit www.texcote.com.

Bibliography:

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