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Feature

Insulating Paint Powder Turns Every Color 'Green'

10.10.08

Remember that grade-school riddle, "What's black, white, and red all over?" Depending on who gave you the punch line, the answer was "a sunburned zebra" or "a newspaper."

Here's an updated version: What's every color in the world, but still always green?

The answer is paint that includes an insulating powder that originated at NASA. Widely used on commercial and residential structures, it transforms any color of paint into an environmentally friendly insulation barrier that saves energy and cost.

The solution is simple: mix the powder into any color of interior or exterior paint, then break out the brushes. When spread on walls, ceilings, and roofs, it creates a barrier that deflects the sun's heat away from the house, plus it helps keep heating and air conditioning where they belong. This reduced need for energy is not only cost-effective, but also a kindness to the environment -- an easy way to create your own "green house effect."

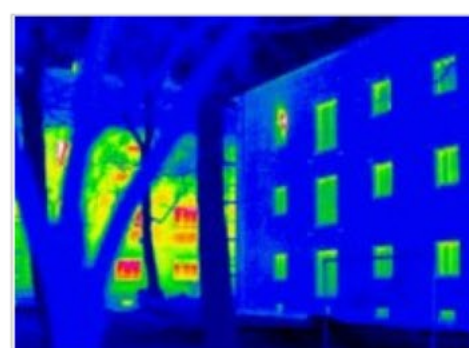
Many businesses use insulating paint to coat air-conditioning ducts, steam pipes and fittings, metal buildings, and cold storage facilities, such as walk-in coolers and freezers. For example, Purina Feeds uses a version of the insulating powder to cover storage silos, helping to prevent feed spoilage. The poultry industry uses it to help regulate the climate inside its hatcheries. Samsung applies it on military vehicles, and Hyundai Corporation's shipbuilding division paints it onto ships. It's even been used to insulate electrical switch boxes on the outside of fighters jets to prevent overheating.

This simple but powerful solution all began with space shuttle launches. During a launch, heat generated by wind resistance and engine exhaust can potentially be very damaging. In the 1980s, engineers at the Marshall Center developed a spray-on process to apply an insulating mixture to help protect the shuttle. The process involved mixing nine different chemicals into an adhesive that was applied to the boosters' forward assembly, systems tunnel covers, and aft skirt.

But there were challenges. Once the insulating material was mixed, it had to be applied within five hours. Any delay meant a batch of expensive materials was lost, requiring the time and cost to mix a new batch. The strength of the insulating material was also difficult to regulate, meaning it could chip during the shuttle's flight and splashdown of its reusable booster rockets. Adding to the downside, two of the nine ingredients in the insulating mix weren't environmentally friendly.



Thermographic image shows areas of high heat loss (red and yellow) from a home. The blue roof indicates good insulation and little heat loss. Image Credit: The Insuladd Company



Thermal image of an energy-efficient building that shows up in cool blues and greens. The building in the background glows yellow and red as

http://www.nasa.gov/topics/nasalife/green_paint_prt.htm

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In 1993, Marshall created a solution by atomizing epoxy and other filler materials to create a fine, environmentally friendly insulation powder. The material -- known as MCC-1, or Marshall Convergent Coating-1 -- contained tiny, hollow glass spheres and particles of cork and epoxy. The application process was also changed. Instead of mixing the insulating powder directly into the paint, it was shot from a spray gun at the same time the paint was applied. This change in process eliminated the five-hour "time clock" to complete the painting.

The improved, eco-friendly insulation powder was first flight tested in 1996 on the STS-79 mission. It was so successful that it was adopted for all subsequent shuttle flights, with virtually no observed missing or chipped paint on the spent boosters during post-flight inspections.

Bringing the NASA insulation powder to the public market resulted in an innovative partnership with Tech Traders, Inc. Months of testing and development created Insuladd®, a safe, non-toxic powder that can be added to any interior or exterior paint to transform it into a layer of insulation.

The powder contains hollow, microscopic ceramic spheres, and a unique process applies a coating to these "microspheres." When the paint dries, it forms a radiant heat barrier, converting ordinary house paint into heat-reflecting thermal paint.

You might say that NASA's contributions to insulating paint can keep green in your world AND in your wallet. That's a good reason to be tickled pink.

You can read the entire article on the insulating paint powder on page 72 in *Spinoff 2007*.

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Find this article at:

http://www.nasa.gov/topics/nasalife/green_paint.html

heat is being lost. Image Credit: The Insuladd Company



STS-79 shuttle launch. Image Credit: NASA