

BATTELLE HEATCOAT™ TECHNOLOGY

A Flexible, Spray-Applied Carbon Nanotube Heater Coating

What could you do with a flexible, spray-on heater coating that conforms to nearly any substrate—including bendable materials and foams?

Battelle HeatCoat™ technology is a revolutionary heater coating made with carbon nanotube (CNT) technology. Originally designed for the aviation industry, the HeatCoat system can be custom engineered for a wide variety of commercial applications, including medical, automotive, oil & gas and more.

Our CNT technology delivers a unique blend of performance characteristics, including flexibility, uniform heating, excellent durability and optional transparency. In addition, it is:

- Cost competitive with competing thermal technologies, including thin film and fabric heaters
- Adaptable for a broad range of applications
- Ready for market now

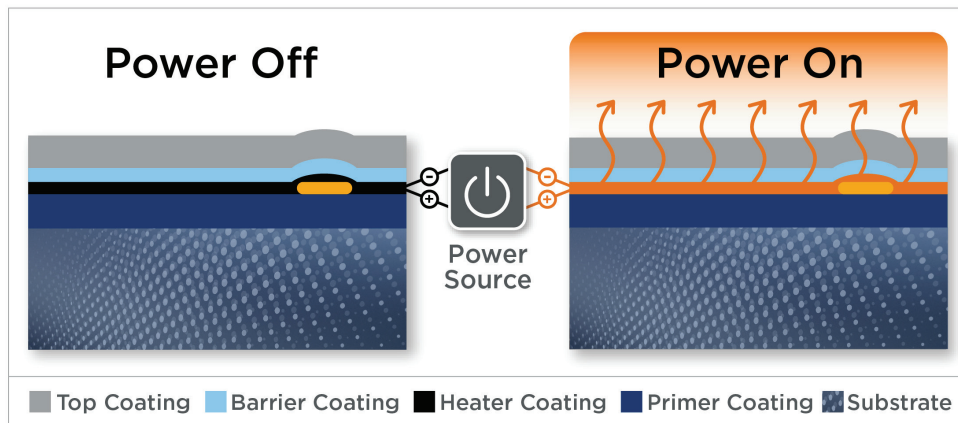
HOW IT WORKS

Battelle's HeatCoat technology uses a high-conductivity, CNT heater coating that conforms to the surface it is applied. When connected to a power source, the coating delivers uniform heat over the entire surface. Intelligent sensors and controls can be used to cycle the power source on and off to maintain a consistent temperature or respond to external conditions. The CNT coating can be direct sprayed or laminate applied.

THE DIFFERENCE

Our technology delivers a unique blend of performance characteristics that is unmatched by competing technologies.

- Thin coating (>2 μm) for low weight and high flexibility
- Maintains conductivity during flexing and bending
- Low power requirements
- Can be applied to foams and fabrics without changing their material properties
- Excellent temperature uniformity
- High durability under harsh conditions (vibration, bending, thermal cycling, humidity, corrosion)
- Suitable for roll-to-roll processing
- High-elasticity formulations available
- Optical, NIR and radar transparent formulations available



Battelle HeatCoat technology applies evenly to any substrate to deliver consistent, uniform heat when powered.

BATTELLE

IS HEATCOAT TECHNOLOGY RIGHT FOR YOU?

If traditional thin film or fabric heater technologies aren't working for your application, HeatCoat technology may be the answer you need. Its unique characteristics make it ideal for challenging or innovative applications.

Is the Power Budget Limited?	When used with our closed-loop temperature control system, HeatCoat technology delivers only the heat needed, minimizing the power required.
Is Flexibility or Repeated Bending Needed?	HeatCoat technology moves with the substrate and maintains conductivity during bending and flexing. It can be applied to substrates like memory foam with minimal effect to the material properties of the foam.
Is the Form Factor of Your Product a Challenge?	HeatCoat technology can be spray-applied as a paint to irregular or curved shapes, providing excellent thermal contact without hot spots.
Is Overheating the Substrate a Concern?	Because HeatCoat technology delivers power to the surface, we can often eliminate unintentional overheating of the underlying substrate, making it highly suitable for sensitive composites.
Is Optical, NIR or Radar Transparency Needed?	HeatCoat technology can be formulated as a transparent conductor and has no effect on RF communications.

An Active, In-Flight Aircraft Deicing System

HeatCoat technology has been applied in the aviation industry to deice airplane wings and drones in flight. It can be easily retrofitted to existing aircraft to provide continuous in-flight icing protection without adding excess weight or compromising aerodynamic performance. The low-power system uses sensors to detect icing conditions and heat the coated surfaces to prevent ice from forming. HeatCoat technology improves safety and performance for aircraft in light-to-moderate icing conditions without increasing fuel demands.

WHAT WOULD YOU LIKE TO HEAT UP TODAY?

There are many potential applications for our HeatCoat technology. Our development team can work with you to custom engineer a solution for your application and get you to market quickly.

- Medical: thermoregulation therapy, equipment sterilization, heated medical devices
- Automotive and Vehicles: windshield deicing, heated seats, deicing/defogging sensors, out-of-autoclave processing
- Oil & Gas: paraffin wax removal, anti-biofouling
- Energy: wind turbine deicing
- Textiles: heated clothing, heated underwater textiles
- Building: radiant heaters, window heaters, heated flooring, roof or gutter heating/deicing
- Food and Beverage: food warming, delivery containers

READY TO GET STARTED?

Contact us to find out how you can put HeatCoat technology to work for you.

Every day, the people of Battelle apply science and technology to solving what matters most. At major technology centers and national laboratories around the world, Battelle conducts research and development, designs and manufactures products, and delivers critical services for government and commercial customers. Headquartered in Columbus, Ohio since its founding in 1929, Battelle serves the national security, health and life sciences, and energy and environmental industries. For more information, visit www.battelle.org.

800.201.2011 | solutions@battelle.org | www.battelle.org

