



**CABOT** 

ENOVA<sup>®</sup> AEROGEL COATINGS  
FOR HIGH PERFORMANCE  
APPLICATIONS



Cabot's innovative products help customers meet a wide range of evolving needs, from environmental concerns and safety awareness to energy efficiency and matting. Technical expertise paired with industry insight enable Cabot to develop insulative coatings that address tomorrow's needs today. When compared to traditional insulating additives, Enova<sup>®</sup> aerogel offers a distinctive chemistry that outperforms the rest. With extremely high surface area and porosity paired with superior moisture resistance and coating clarity, Enova aerogel additives are enabling the next generation of high performance coatings.



# ENOVA<sup>®</sup> AEROGEL FOR INSULATIVE COATINGS FORMULATIONS

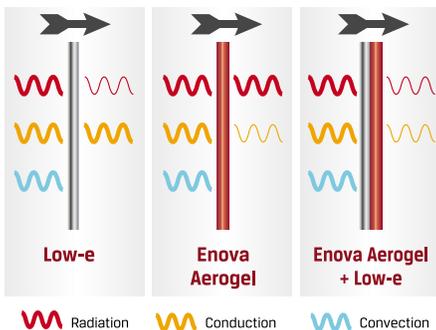
Insulative coatings are generating significant interest due to the increased focus on environmental and safety awareness and sensitivity to energy efficiency. Enova aerogel's thermal conductivity of 12mW/m-K is far superior to other additives, making it the best choice for coatings formulations.

When compared to traditional insulating additives, Enova aerogel far outperforms the rest.

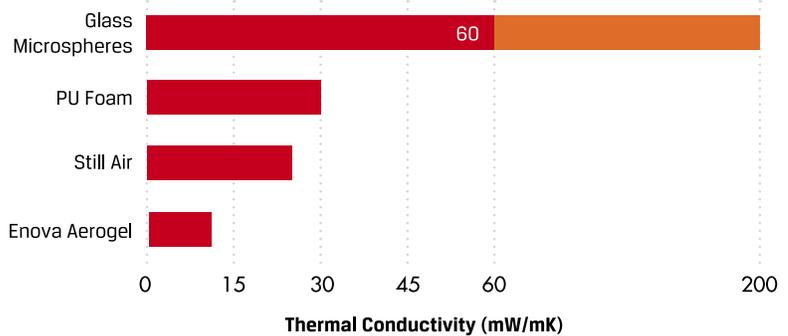
## Enova aerogel enables the lowest thermal conductivity possible in insulative coatings, delivering:

- Exceptional burn protection
- Class leading improvements in energy efficiency
- Dramatic reductions in condensation formation
- Insulation performance comparable to conventional forms, but without the CUI concerns
- Improved process stability
- Complementary performance to IR reflective and low-e coatings

## Modes of heat transfer

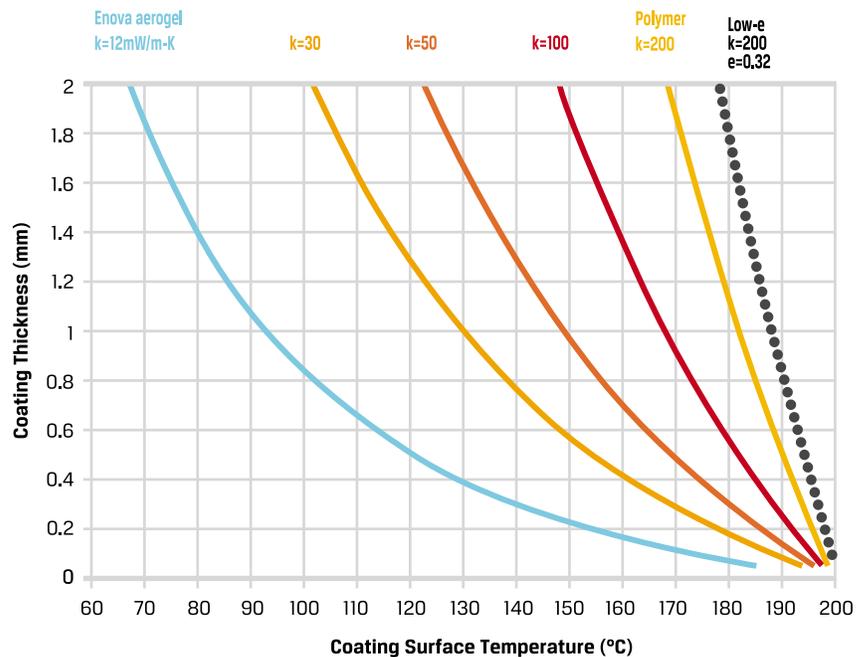


## Thermal Conductivity Comparison

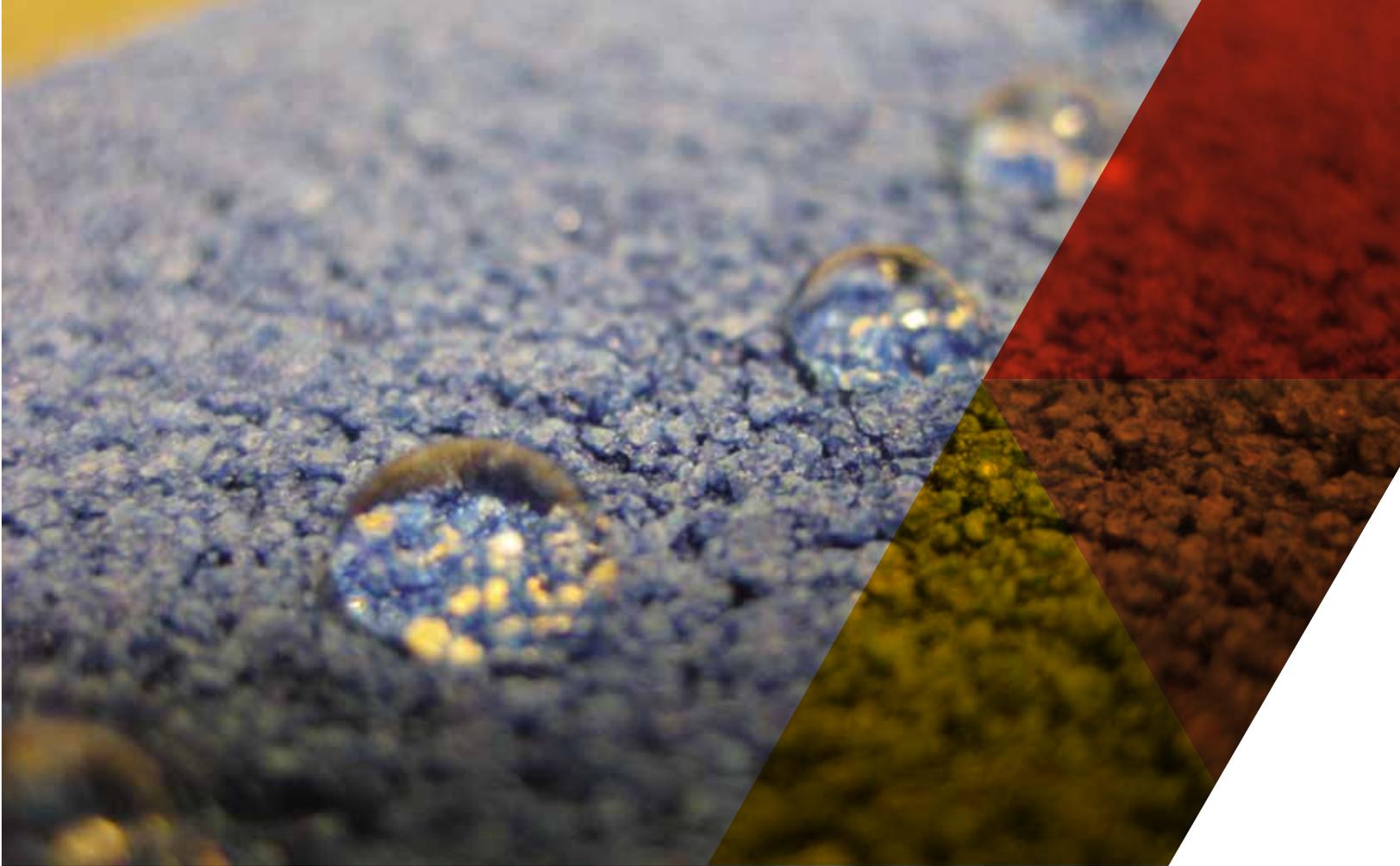


As part of an insulative coating formulation, Enova aerogel is proven to reduce temperatures by 60-100°C on 200°C substrates.

## Temperature reduction at varying coating thickness



That = 200°C, Tcold = 20°C, h=10, e=0.93, except for the black dotted line. Calculated values.



### Enova® aerogel attributes

|   |  |
|---|--|
| <b>PARTICLE SIZE</b>                        | Microns to millimeters   |
| <b>SURFACE CHEMISTRY</b>                    | Hydrophobic  |
| <b>POROSITY</b>                             | 90-95%   |
| <b>HIGH SURFACE AREA</b>                    | 700-800m <sup>2</sup> /g   |
| <b>PARTICLE DENSITY</b>                     | 120-150kg/m <sup>3</sup>   |
| <b>OPTICAL</b>                              | Translucent/opaque   |
| <b>THERMAL CONDUCTIVITY</b>                 | 12mW/m-K   |
| <b>CONTACT ANGLE</b>                        | 150°   |
| <b>OIL ABSORPTION (g DBP/100g PARTICLE)</b> | 540-650  |
| <b>OPERATING TEMPERATURE</b>                | To maintain hydrophobicity -196° to 300°C<br>To maintain insulation -196° to 800°C |



Depending on the application and performance needed, Enova® aerogel usage levels can be adjusted for desired attributes such as insulation, gloss level, and rheology modification.

Enova aerogel is safe for human and ecological systems, and is created through an innovative process with little to no impact on the environment. In addition, its physical properties provide the following benefits to coatings formulators:

- Unmatched resistance to conductive heat transfer
- Extreme gloss reduction at low loadings
- Efficient rheology modification
- Uniform dispersion without the use of additives
- High capacity carrier for functional additives
- Enables high single pass film building
- Long shelf life with consistent performance

Other attributes enabled in final form include:

- Moisture and corrosion resistance
- Coating clarity
- Delayed release of actives
- Burn protection

### **Incorporation and Dispersion**

As with traditional additives, Enova aerogel is intended for use as a post-additive in the coatings manufacturing process. Dispersion is typically carried out using standard equipment. Operating speeds and duration will vary with formulation type.

Unique combinations of Enova aerogel's standard characteristics create opportunities to improve performance in a variety of coatings applications.





Cabot's Enova® brand aerogel is pure aerogel in granular form, which can be used on its own or in conjunction with other materials to suit the specific needs of a wide range of systems. Each granule consists largely of air (>90%) contained in a nanostructure with pore sizes less than the mean free path of air molecules, which severely inhibits heat transfer through the material. Cabot produces Enova aerogel at its state-of-the-art manufacturing facility located near Frankfurt, Germany, where it began commercial production in 2003.



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