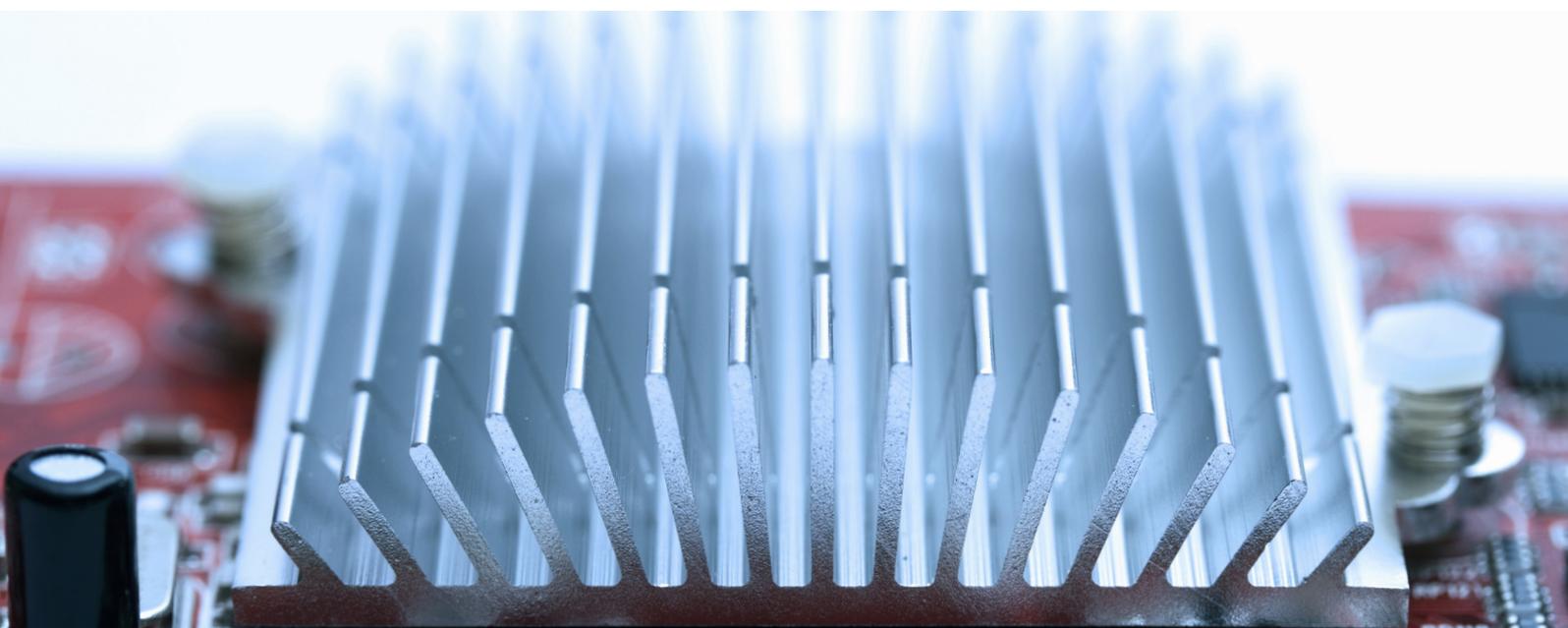


## HeBoFill® COOL LINE

Boron Nitride Powder for Thermal Management Applications



Our HeBoFill® COOL LINE powders are boron nitride qualities that, with high thermal conductivity, have been optimised especially for plastics technology, in addition to possessing excellent electrical insulating properties.

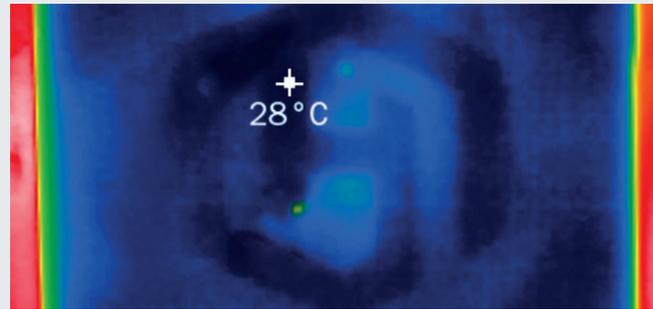


# HeBoFill® COOL LINE powder

- for effective heat dissipation and electrical insulation in plastics

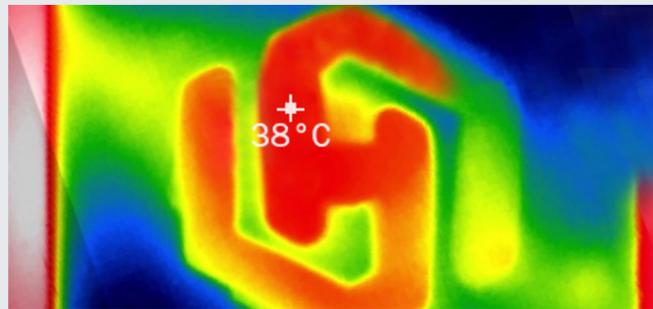
## HeBoFill® COOL LINE – increases thermal conductivity

**Without HeBoFill®**  
After 9 seconds of contact with a 100 °C heat source, a temperature of 28 °C is reached in the reference sample without boron nitride.



Temperature distribution in the reference sample without boron nitride after 9 seconds

**With HeBoFill®**  
The sample filled with boron nitride shows a significantly higher thermal conductivity. After 9 seconds under the same conditions, 38 °C is reached.



Temperature distribution in the sample filled with boron nitride after 9 seconds

HeBoFill® COOL LINE powders are technically optimised to increase thermal conductivity in plastics or composites, whilst maintaining the electrical insulation effect.

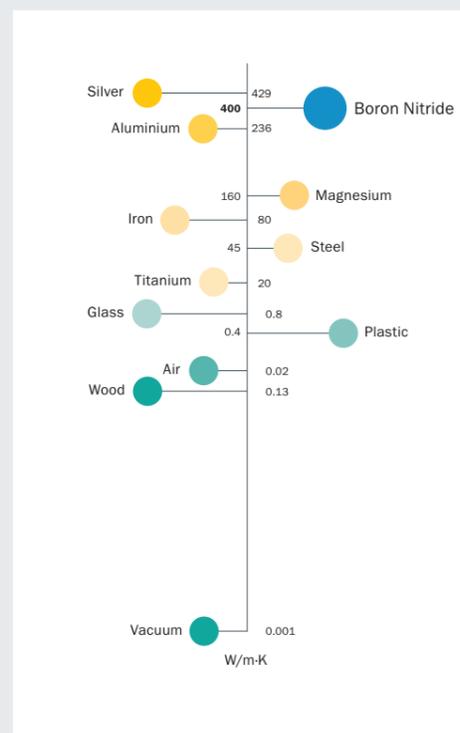
The continuous miniaturisation and weight reduction of electronic components, with simultaneously increasing power density calls for ever faster heat dissipation. This places increased demands on the plastics, especially with regard to their thermal conductivity, to extend the service life of the materials and components.

For use in E&E, automotive and entertainment, thermoplastics, silicones, duromers and TPE are used as heat sinks, housings, coilformers, potting compounds, TIM, and coatings. They have to provide high thermostability, with simultaneous electrical insulation and good thermal conductivity. At the same time, weight savings are of advantage.

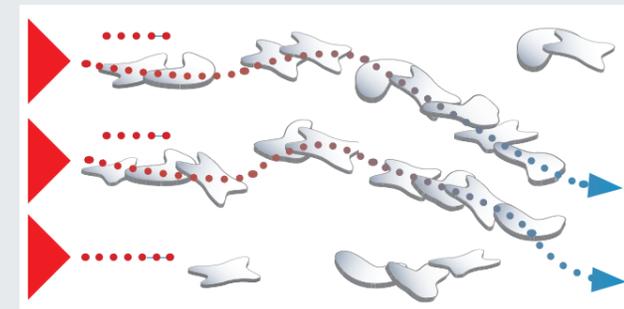
With Henze BNP AG and its wide portfolio of technically-optimised boron nitride powders, you have a competent counterpart and experts who will support you in the development of individual thermal management solutions.

## Thermal conductivity of materials

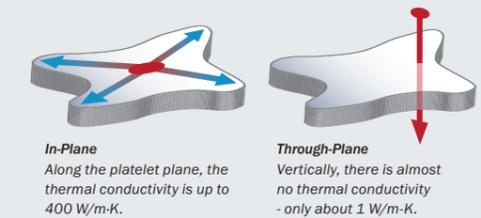
Different material classes, such as metals, ceramics and glasses, composites and polymers have different physical, thermal and chemical properties. As opposed to polymers, metals conduct electricity and heat very well. Thanks to its very good properties, such as its electrical insulation, high thermal conductivity and high thermal and chemical resistance, hexagonal boron nitride is ideally suited as a filler for thermal management tasks. The low density and Mohs hardness, as well as the low thermal expansion, provide additional benefits.



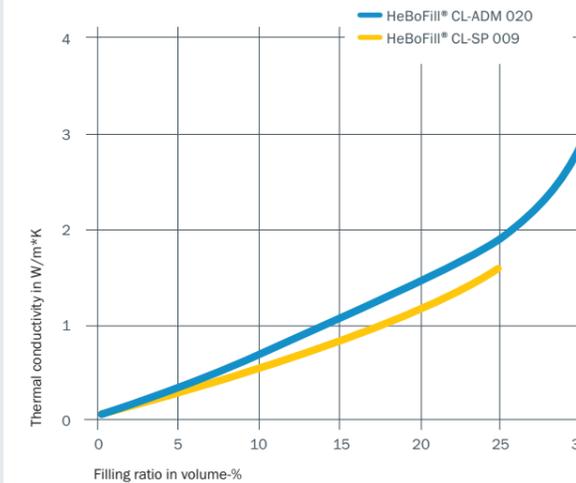
## HeBoFill® COOL LINE – the boron nitride thermal bridges



Thanks to its platelet structure, hexagonal boron nitride possesses anisotropic properties with regard to thermal conductivity. Depending on the processing of the respective system, the particles' orientation and, as such, the in-plane and through-plane thermal conductivity can be influenced.

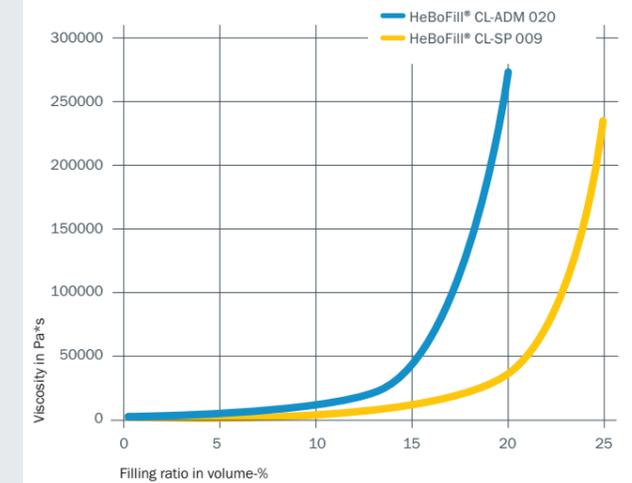


## Thermal conductivity to filling ratio



Thermal conductivity measurement via THB 100 in Araldit® casting resin epoxy system (Carl Roth)

## Viscosity to filling ratio



Viscosity measurement by Brookfield DV2-T at 23 °C and 10 RPM in Araldit® casting resin epoxy system (Carl Roth) Spindle 5/7

## Technical Data

	Agglomerates Density Medium		Single Platelet		
	HeBoFill® CL-ADM 020	HeBoFill® CL-SP 009	HeBoFill® CL-SP 015	HeBoFill® CL-SP 035	HeBoFill® CL-SP 045
Colour	White	White	White	White	White
Boron nitride	> 99.0 %	> 98.0 %	> 99.7 %	> 99.0 %	> 98.5 %
Oxygen	< 0.5 %	< 1.0 %	< 0.3 %	< 0.5 %	< 0.5 %
Boron oxide	< 0.1 %	< 0.5 %	< 0.1 %	< 0.1 %	< 0.1 %
Carbon	< 0.1 %	< 0.1 %	< 0.1 %	< 0.1 %	< 0.1 %
Specific surface area (BET)	~ 4 m <sup>2</sup> /g	2-7 m <sup>2</sup> /g	2-7 m <sup>2</sup> /g	~ 1 m <sup>2</sup> /g	~ 1 m <sup>2</sup> /g
Median grain size (D <sub>50</sub> )	20 µm	9 µm	15 µm	~ 35 µm	45 µm

Benefits of HeBoFill® COOL LINE powder



**Increases the thermal conductivity**  
 Finely dispersed boron nitride particles form thermal bridges that rapidly dissipate heat through the plastic.



**Electrical insulation**  
 Boron nitride powder has no free electron in its hexagonal platelet structure. Thus, it is an electrical insulator and has no influence on the basic properties of the plastics.



**Hardness**  
 With a Mohs hardness of 1, boron nitride, unlike other fillers, does not contribute to increased tool wear, but is characterised by particularly good lubricating properties.



**Tribology**  
 Because of its platelet structure and low friction coefficient, boron nitride is also used as a dry lubricant. Boron nitride can also reduce abrasion in plastics.



**Reduced weight**  
 With its low density of 2.2 g/cm<sup>3</sup>, hexagonal boron nitride is very light, compared to other mineral fillers. The advantage of the low density is the reduced amount of hBN used in the compound. The density of polymers is in the range of 0.9-2.3 g/cm<sup>3</sup>.



**Optical effects**  
 As “white graphite”, boron nitride exhibits a very high degree of whiteness, a property that is essential for LED technology. In addition, the surface of boron nitride has a reflectivity of > 95%.



**Temperature resistance**  
 Hexagonal boron nitride is thermally stable under air up to 900°C and non-flammable, thereby also displaying a positive influence on flame retardancy in thermoplastics and polymers.



**Safety in application**  
 Boron nitride powder is physiologically harmless and very well tolerated. Even under extreme conditions and high operating temperatures, the effect is maintained.

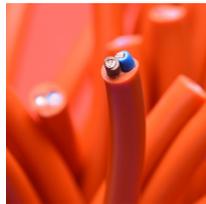
Applications



Thermally conductive pastes



Electric motors



Cable sheathing



Printed circuit boards



LED lamps



Films

If you have any questions about our products or their applications, please contact our experts and our sales partners.



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