

# MICRONAL<sup>®</sup> 5528 X



## Description

Micronal 5528 X is a purified paraffin, microencapsulated with highly crosslinked polymethylmethacrylate polymer wall. It is primarily used as a functional component in textiles, foams, building materials, and thermal management systems, for temperature regulation.

## Properties

Physical form	Powder; >98% SC
Particle size	ca. 50 – 400 µm
Bulk density	ca. 0.3-0.4 g/cm <sup>3</sup>
Solubility in water	Insoluble- Dispersable in water
Phase Change (Melting)	28 °C ± 1°C (main peak)
Phase Change (Crystallization)	25 °C ± 1°C (main peak)
Heat of Fusion (Int. 10-35 °C)	≥ 160 J/g

## Applications

Phase Change Materials (PCMs) are widely used in building and construction, textiles, medical applications, transport containers, coatings, and in flexible and rigid foams. The different types of PCMs available vary considerably, but all work on the same principle of latent heat storage and release. Latent heat storage and release occurs when there is an absorption and release of energy, in the form of heat, during a change in phase (solid <-> liquid) of the PCM material. The use of phase change materials for passive thermal energy storage is particularly attractive due to their ability to provide high storage density of energy and thermal regulation at a constant temperature around the phase transition temperature of the material.

Microtek's Micronal 5528 X material consists of polymer microspheres that create a secure containment system for the high-purity paraffin wax core. This makes the direct use of microencapsulated PCMs in materials, such as foams or building materials, possible. The distinguishing features of Micronal 5528 X are that it is acrylic based and free of formaldehyde\*, making it favorable for a wide-range of applications.

A flexible foam mattress, for example, modified with Micronal 5528 X, is designed for interaction with human body temperatures, where it will prolong a more constant temperature in the range of ~ 25°C to 28 °C. This leads to a significant increase in comfort for the user as it regulates temperature fluctuations during sleep.

## Processing

Because Micronal 5528 X is a dry powder, it can be handled like most solids in process.

The easiest way to incorporate Micronal PCM is to premix it with system components or to add it directly to the product stream. It is suggested that 40 wt.% be the maximum loading of Micronal particles in formulations (40 wt.% loading is realistic, but up to 70 wt.% has been observed). One way to achieve even higher loading is to feed system components separately, using a three-way nozzle, for example. Thickeners may be added to formulations to help with structural viscosity.

Micronal 5528 X can be added to normal and viscoelastic PU foams to provide an additional cooling effect and enhanced comfort in bedding applications. When foam containing Micronal 5528 X is submitted to a temperature mapping test, it can be observed that the Micronal 5528 X treated foam takes longer to warm to the average human body temperature than untreated foams. The magnitude of this effect is dependent on the loading of the Micronal material.

In addition to using Micronal in PU systems, favorable results can also be achieved in thermoplastic applications like PP, PE, POM, EVA, and TPU used in injection molding and extrusion processes.



Micronal 5528 X Dry powder



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## Packaging

Micronal 5528X is available in bottles (1 kg), paper bags (12.5 kg) or super sacks (300 kg)

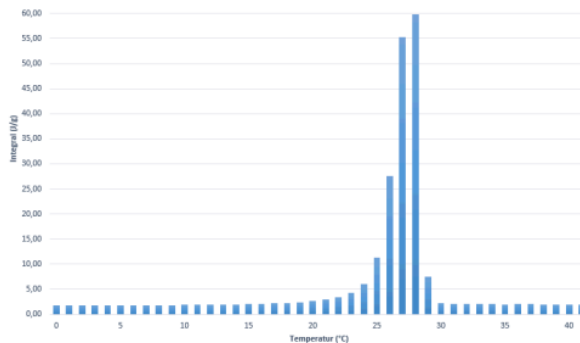
## Health and Safety

When using this product, the information and advice given in our Safety Data Sheet should be observed. Due attention should also be given to the precautions necessary for handling chemicals.

All of our Micronal PCM grades possess a highly durable, plasticizer free acrylic polymer shell. The core consists of highly purified n-alkanes. Chemical and mechanical aging of the material is limited.

## Testing and Quality

The melting enthalpy of Micronal 5528X has been measured according to the RAL Quality and testing specifications. Micronal PCM was proven and certified by RAL quality label with the highest possible cycling stability Class "A" = 10.000 cycles.



*Example of the melting enthalpy of Micronal 5528 X measured according to the RAL Quality Mark PCM.*

