

# MICRONAL<sup>®</sup> 5428 X



## Description

Micronal 5428 X is a purified paraffin, microencapsulated in a 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	43 ±1 wt.% emulsion in water
Mean Particle Size	1-5 µm
pH value	8.5 ± 0.5
Viscosity	≤ 4500 mPas
Density	ca. 0.98 g/cm <sup>3</sup>
Phase Change (Melting)	28 °C ± 1°C (main peak)
Phase Change (Crystallization)	25 °C ± 1°C (main peak)
Heat of Fusion (Solid Content, 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 5428 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 feature of Micronal 5428 X is 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 5428 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 5428 X is an emulsion, it can be handled like most emulsions in processes. The user can add to the slurry to vary the amount of Micronal 5428 X as desired.

The easiest way to incorporate Micronal PCM is to premix it with latex or other system materials and directly add it to the product stream. It is suggested that 40 wt.% be the maximum loading of Micronal particles in formulations. Since Micronal 5428X contains ~57 wt.% water, the overall water content of the system should be considered when formulating. Thickeners may be added to formulations to help with structural viscosity.

Micronal 5428 X can be added to foams to provide an additional cooling effect for enhanced comfort in bedding applications. When foam containing Micronal 5428 X is submitted to temperature mapping tests, it can be observed that the Micronal 5428 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.



Micronal 5428 X emulsion



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## Packaging

Micronal 5428 X is available in sample bottles (1 kg), drums (140 kg) or tote containers (950 kg).

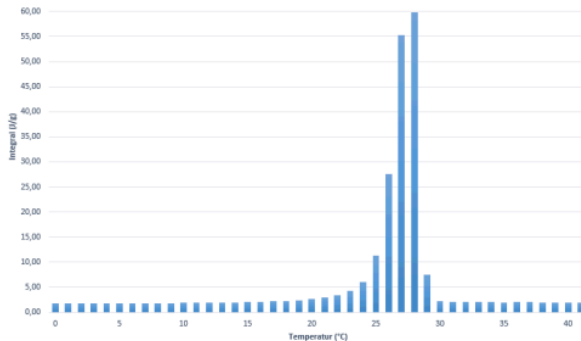
## Health and Safety

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 5428X 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 5428 X measured according to the RAL Quality Mark PCM.*

