COATING PRODUCTS
POLYMER ADDITIVES

POLYPEARL™

LIGHT DIFFUSING ADDITIVES

FOR PLASTICS AND COATINGS

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DEFINITION

Light scattering refers to the physical process by which light is deflected from its original direction by micro-structures or particles within a medium.

In transparent or translucent polymers as well as in functional coatings, this principle can be used in a targeted manner to achieve desired optical properties such as anti-glare effects, opacity or homogeneous light distribution.

The scattering effect is largely based on differences in the refractive index between matrix and embedded particles:

The greater the difference in the refractive indices, the more intense the light scattering.

FUNCTION & EFFECT

Light diffusing additives are functional additives that are incorporated into polymer systems or coatings in the form of finely dispersed, high-purity particles.

They serve the targeted modification of light propagation by refracting incident light and diffusing it.

The use of these additives enables the generation of uniform light distributions, prevents light hotspots and contributes to the optimization of visual perception – for example, by creating glare-free, pleasant lighting effects.

The light transmission of a medium can be precisely adjusted by the targeted selection and dosage of the light diffusing additives.

In particular, the particle size and the refractive index of the additive play a central role in the resulting optical effects.

INCREASED LIGHT SCATTERING

Generation of homogeneous light distribution, e.g. in diffusers for LED systems

REDUCED TRANSPARENCY

Production of translucent materials with a milky or opaque appearance

SURFACE MATTING

Reduction of gloss and reflection on high-gloss surfaces

EFFICIENT LIGHT CONTROL

Optimized light guidance in LED covers, displays or technical lighting applications

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PLASTICS

- Rigid and flexible lighting profiles
- LED Covers
- LCD-Displays
- Optical lenses
- Light guide plates
- Light-diffusing films
- Ambient lighting

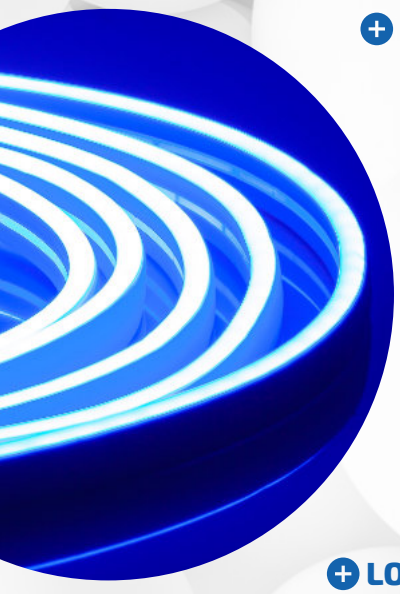
COATINGS

- Aqueous paints and varnishes
- Solvent-based paints and varnishes
- LED encapsulants
- UV-curing systems
- Coatings for light-diffusing films

ADVANTAGES OF THE MICROBEADS

THERMAL RESISTANCE

Ideal for plastics with high processing temperatures



CHEMICAL RESISTANCE

Polypearl™ is resistant to a wide range of chemicals

NO YELLOWING

Thanks to its high purity and thermal stability, Polypearl™ prevents unwanted yellowing of plastic

EVEN, NARROW PARTICLE DISTRIBUTION

The controlled size distribution of the Polypearl™ microbeads ensures homogeneous light scattering

GOOD SPOT COVERAGE

Polypearl™ enables effective coverage of light sources

LOW ADDITION

Even small amounts of Polypearl™ achieve great effects

HIGH COMPATIBILITY

Polypearl™ is compatible with many different paints and plastics (e.g. PET, PC, PA, PS, PMMA, silicone)

INDUCTION

For optimal performance, the homogeneous distribution of the microbeads in the medium is crucial. In plastics, Polypearl™ is therefore added as a masterbatch or compound, while in paints and coatings it is incorporated by dispersion with high shear forces.

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PRODUCTS & TECHNICAL DATA

Polypearl™ microbeads are available in different particle sizes, refractive indices and chemical structures, allowing you to precisely adjust the optical properties of your applications.

ME SERIES

BASE: PMSQ • pure white, free-flowing powder
REFRACTIVE INDEX: 1,42
DENSITY: 1,32 g/cm³
MELTING POINT: >400 °C
SIZES: 1 • 2 • 3 • 4 • 6 • 8 • 10 µm

MS-FHC SERIES

BASE: PS • fine, white powder
REFRACTIVE INDEX: 1,59
TEMPERATURE RESISTANCE: 310 °C
SIZES: 3 • 5 • 10 µm

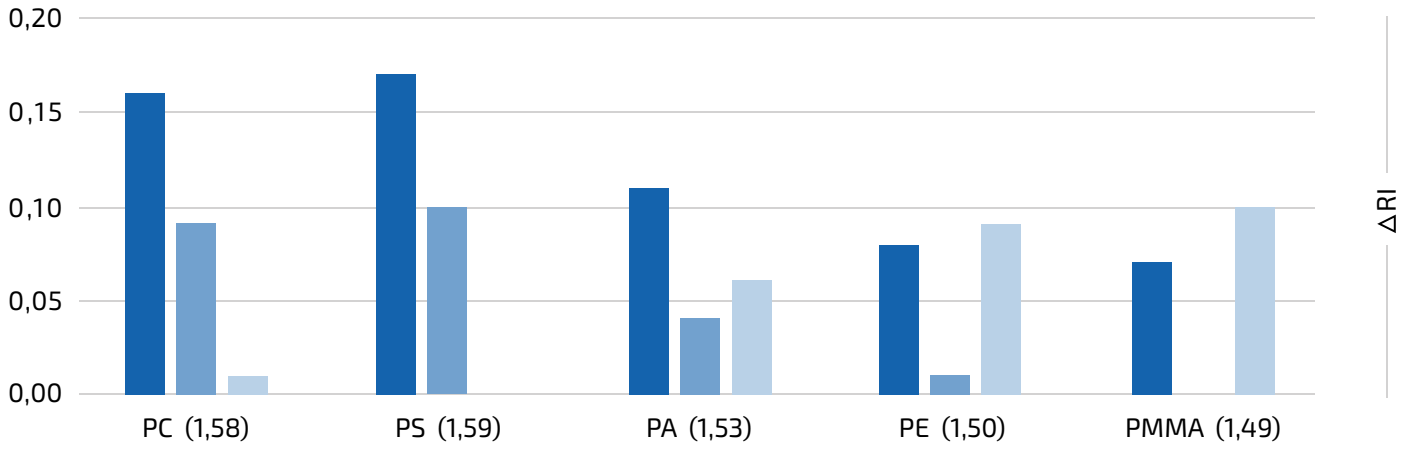
MH-FD SERIES

BASE: PMMA • white, free-flowing powder
REFRACTIVE INDEX: 1,49
DENSITY: 1,2 g/cm³
TEMPERATURE RESISTANCE: 260–270 °C
SIZES: 5 • 10 • 15 • 20 • 25 • 30 • 40 • 50 • 60 µm

MH-FHD SERIES

BASE: PMMA • white, free-flowing powder
REFRACTIVE INDEX: 1,49
DENSITY: 1,2 g/cm³
TEMPERATURE RESISTANCE: 300 °C
SIZES: 3 • 4 • 5 µm

OPTICAL PERFORMANCE IN PLASTICS



The higher ΔRI, the stronger the light scattering effect

ME (1,42) **MH** (1,49) **MS-FHC** (1,59)

POLYPEARL™ APPLICATION TABLE

TYPE	SIZE	REFRACTIVE INDEX	OPTICAL FOIL / FILM	PC / PS	PMMA	SILICONE	PAINTS & VARNISHES*
ME 1.0	1 µm	1,42	•	•	•		•
ME 2.0	2 µm	1,42	•	•	•		•
ME 4.0	4 µm	1,42	•	•	•		•
ME 6.0	6 µm	1,42	•				•
ME 8.0	8 µm	1,42	•				•
ME 10.0	10 µm	1,42	•				•
MH-5FD	5 µm	1,49	•				•
MH-10FD	10 µm	1,49	•				•
MH-15FD	15 µm	1,49	•				•
MH-20FD	20 µm	1,49	•				•
MH-25FD	25 µm	1,49	•				•
MH-30FD	30 µm	1,49	•				•
MH-40FD	40 µm	1,49	•				•
MH-50FD	50 µm	1,49	•				•
MH-60FD	60 µm	1,49	•				•
MH-3FHD	3 µm	1,49		•		•	•
MH-4FHD	4 µm	1,49		•		•	•
MH-5FHD	5 µm	1,49		•		•	•
MS-3FHC	3 µm	1,59	•		•	•	•
MS-5FHC	5 µm	1,59	•		•	•	•
MS-10FHC	10 µm	1,59	•				•

*SUITABILITY DEPENDS ON THE REFRACTIVE INDEX OF THE BINDER

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