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LED LIGHTING DIFFUSION APPLICATION

Spherical Silicone Resin Light Diffuser TSR9000

TSR9000 Spherical Silicone Resin

Due to uniform particle size and thermal stability TSR9000 spherical silicone resin can be useful when added to polymers or resins in which light diffusion properties are needed. TSR9000 spherical silicone resin is a mix of spherical polymethylsilsesquioxane particles having a narrow particle size distribution and a mean particle diameter of 2.0 microns.

Typical Physical Properties

	Property
Appearance	Spherical white powder
Mean Particles Diameter(1)	2.0
Weight Loss at 250 °C for 1 hr, %	0.2
pH(2)	7.0
Bulk Specific Gravity	0.32
Particle Specific Gravity	1.32
Refractive Index	1.42

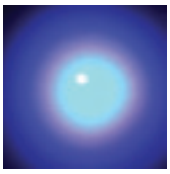
(1) Measured on a Coulter Multisizer 4 (Electrical Sensing Zone Method particle analyzer
(2) A 2% dispersion in methanol/water (1/1)
Typical properties are average data and are not to be used as or to develop specifications.

Key Features and Typical Benefits

- Low refractive index
- High heat stability
- High crosslink density
- Polymethylsilsesquioxane composition is typically compatible with many polymers, allowing its use as a light diffuser for acrylics

Low Refractive Index

Low refractive index diffuses point and line light and can give articles a matte finish. The light diffusing properties are attributable to the internal reflection angle and the larger delta refractive index. The higher total reflection angle of TSR9000 spherical silicone resin typically provides more efficient light diffusion than methyl methacrylate beads.



Light Diffuser	TSR9000	PMMA
Refractive Index	1.42	1.49
Total Reflection Angle(1)	45	42

1) Calculated by Snell's law

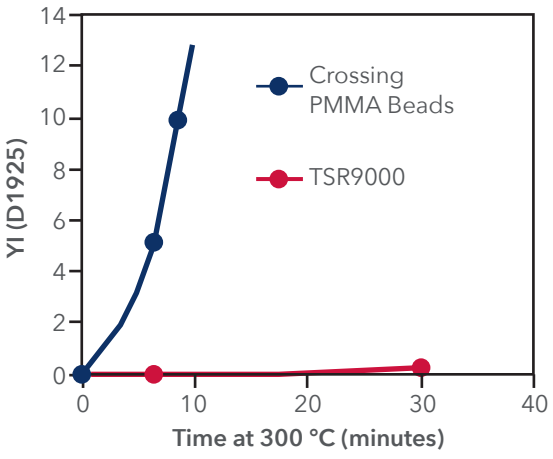
Thermal Stability

High heat stability can allow TSR9000 spherical silicone resin to be mixed with plastics using typical polymer processing equipment, i.e., extruders.

Crosslinking PMMA Beads

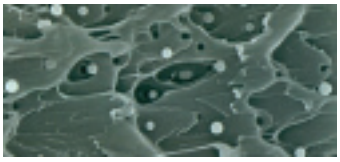
TSR9000

Color variation after heating 300 °C, 7 minutes
Note: Test results. Actual results may vary.

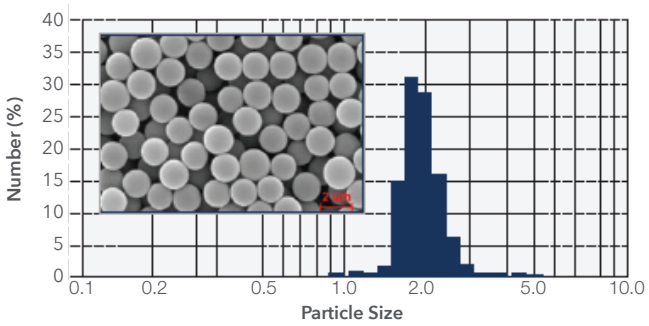


Spherical Geometry and Narrow Particles Size Distribution

Spherical geometry and narrow particles size distribution provide homogeneous light diffusion properties to plastics. TSR9000 composition is typically compatible with many polymers.



Polycarbonate resin plate
with 2% TSR9000
Note: Test data.
Actual results may vary.



Not specified values
Note: Text data. Actual results may vary.

Performance Comparison vs. other Beads

	TSR9000	PMMA
Heat Resistance	Excellent: No Color Change & No Melt	Weak: Change to Yellow & Melt
Weatherability	Excellent: No Color Change	Weak: Change to Yellow
Particles Size Distribution	Narrow	Medium
Does Level	Maximum 2%	Around 3 times of TSR9000
Light Diffusion Type	High Diffusion	Medium Diffusion
Color of Molded Goods	Bright White	White

Potential Applications

- Light diffuser for polycarbonate and acrylics

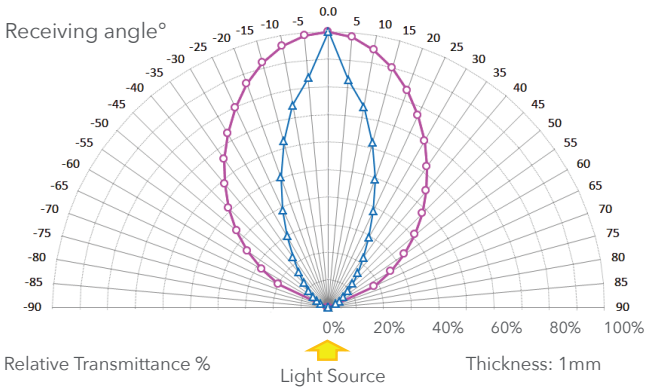
TSR9000 spherical silicone resin has key structural properties such as:

- Low surface energy
- Low refractive index
- Uniform size and shape
- Ability to impart lubricity and light diffusion properties to plastics

The light diffusing properties are attributable to the internal reflection angle and the larger delta refractive index. The higher total reflection angle of TSR9000 spherical silicone resin typically provides more efficient light diffusion than methyl methacrylate beads.

TSR9000 spherical silicone resin typically diffuses more light at lower levels compared to other powders.

Potential Applications Data



△ Average light diffusion angle of polycarbonate filled with 1% PMMA beads light diffuser: 20°

○ Average light diffusion angle of polycarbonate filled with 1% TSR9000 light diffuser: 44°

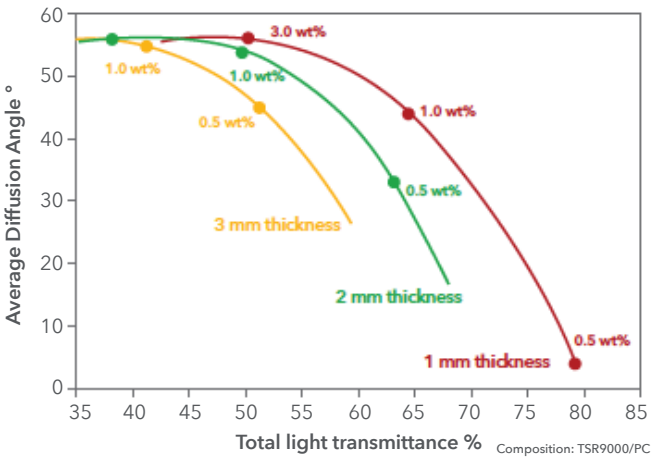
— Pure polycarbonate: 0°

- ***Relative Transmittance %:*** The transmitted light at receiving angle to the transmitted light at receiving angle 0°
- ***Average light diffusion angle:*** receiving angle at which half of the relative transmittance %

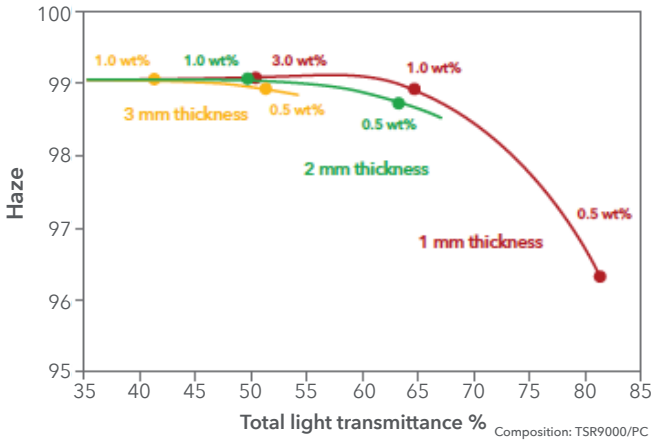
Note: Test data. Actual results may vary.

TSR9000 spherical silicone resin provides good light diffusion properties in various polymer systems (for example: polycarbonate and acrylic resin formulation).

Optimize performance between Tt % vs. Average light diffusion angle and Haze.



Note: Test data. Actual results may vary.



Note: Test data. Actual results may vary.

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