

TSR9000

SILANES



Due to uniform particle size, thermal stability and low surface energy TSR9000 particles can be useful when added to polymers or resins in which lubricity, anti-block or light diffusion properties are needed.

TSR9000 particles are a mix of spherical polymethylsilsequioxane particles having a narrow particle size distribution and a mean particle diameter of 2.2 microns.

Key Features and Typical Benefits

- spherical geometry may make this product useful as an anti-blocking agent for polyolefins
- low refractive index diffuses point and line light and can give articles a matte finish
- high heat stability can allow TSR9000 particles to be mixed with plastics using typical polymer processing equipment, *i.e.*, extruders
- low surface energy can help impart lubricity and slip properties to plastics
- polymethylsilsequioxane composition is typically compatible with many polymers, allowing its use as a light diffuser for acrylics
- high crosslink density contributes to low swelling in solvents and long use life

Typical Physical Properties

	Property
Appearance	Spherical white powder
Mean Particle Diameter, ⁽¹⁾ microns	2.2
Weight Loss at 250°C for 1 hour, %	0.2
pH ⁽²⁾	6.5
Bulk Specific Gravity	0.32
Particle Specific Gravity	1.32
Refractive Index	1.42

(1) Measured on a COULUTER MULTISIZER II (Electrical Sensing Zone method) particle analyzer

(2) A 2% dispersion in methanol/water (1/1)

TSR9000 polymethylsilsesquioxane particles

Potential Applications

- anti-block agent for polyolefin films
- light diffuser for acrylics
- slip agent for plastics
- solid lubricant

TSR9000 particles have key structural properties such as low surface energy, refractive index and uniform size and shape and generally 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 particles typically provides more efficient light diffusion than methyl methacrylate beads.

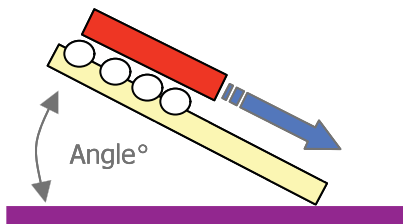
	Reflection Angle	Refractive Index
TSR9000 particles	45°	1.42
PMMA beads	42°	1.49

TSR9000 particles typically diffuse more light at lower levels compared to other powders. The light diffusion advantages of TSR9000 particles were tested using polymethyl methacrylate films filled with TSR 9000 particles or barium sulfate.

Formulation/Property		
Base Resin	PMMA	PMMA
Powder Type	TSR9000 particles	BaSO ₄
Powder Content, wt. %	1.0	2.5
Film Thickness, mm	1	1
Light Transmission, %	95.6	83.7
Diffuse Transmission, %	90.3	78.4
Parallel Transmittance, %	5.0	5.1

Note: Test data. Actual results may vary.

The lubricious and slip properties were tested using a simple slip test.



Angle is recorded when block starts sliding.

A comparison between a blank and silica showed significantly better lubricity.

	Slide Angle
TSR9000 particles	5.4°
Silica	16.7°
Blank	19.0°

TSR9000 polymethylsilsesquioxane particles

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