

A bright, modern living room with large windows and a light-colored sofa. The room is filled with natural light from the windows, which offer a view of a snowy outdoor area. The sofa is a light beige color and is positioned in the foreground. The floor is made of light-colored wood. The overall atmosphere is clean and airy.

3M Science.
Applied to Life.™

3M™ Ceramic Microspheres

**The shape
of things
to come.**

**Superior fillers for architectural
paints and industrial coatings.**

The start of a better finish.

Imagine flat painted surfaces that stay looking like new, longer ... that have a smooth finish and an even sheen ... and are even easier to clean.

Designed to enhance performance and durability in a variety of coatings systems, particularly in architectural paint, 3M™ Ceramic Microspheres can provide formulators with an important competitive edge. These functional additives are engineered to enhance consumer appeal while helping manufacturers control costs and improve processing.



Formulate for success with 3M™ Ceramic Microspheres

3M™ Ceramic Microspheres are intrinsically hard, uniquely-shaped fillers engineered to provide a number of customer-pleasing properties – all while helping paint and coating formulators reduce costs, enhance durability and improve processability.

Because of their shape and particle size distribution, 3M ceramic microspheres enable lower resin demand and lower viscosities without sacrificing filler loading. In addition, the high strength and intrinsic hardness of 3M ceramic microspheres help make painted surfaces more durable, to better resist scrubbing and burnishing.

From the interior of your home to industrial structures exposed to the elements, 3M ceramic microspheres can help add value to a variety of architectural and industrial paints and coatings – helping manufacturers formulate for success.

Properties

- Made of alkali alumino-silicate ceramic
- Higher strength than any other spherical filler/extender (>60,000 psi crush strength)
- Intrinsically hard (Mohs scale 6)
- Chemically inert, no crystalline silica
- UV transparent down to 250 nm

What does it mean for you?

- Improve viscosity control
- Enhance paint performance and longevity
- Enhanced packing and higher filler loading to help reduce costs
- Increase solids and reduce resin demand while maintaining desired properties
- May allow formulations with lower volatile organic compounds (VOCs)

Potential applications

- Semi-gloss to matte formulations
- Consumer paint
- Industrial and maintenance coatings
- Architectural coatings
- Radiation curable and other specialty coatings



Better performance in the mix.

Core advantage

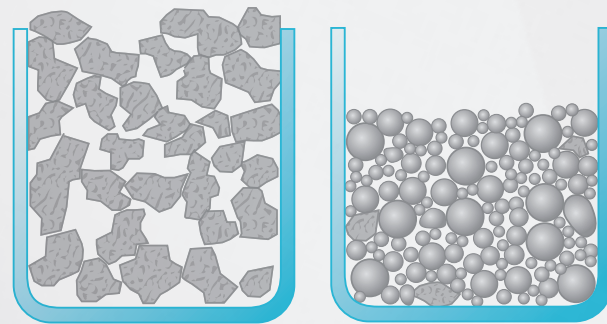
The benefits of 3M™ Ceramic Microspheres come from their high strength, hardness, unique shape and particle size distribution. These properties allow for tighter packing for lower resin demand and easier application. The ceramic composition provides additional strength for durability and scrubability.

Improve flow



Unlike many irregularly shaped fillers, the smooth shape of 3M™ Ceramic Microspheres allows them to move more freely for lower viscosity and improved flow.

Reduce resin demand

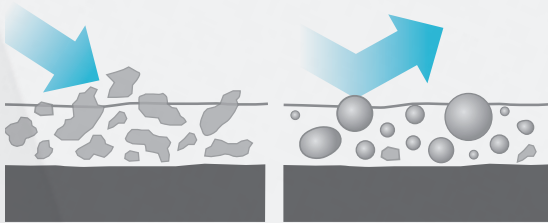


With their low surface area to volume ratio, 3M ceramic microspheres can help reduce resin demand and increase volume loading capacity. Smaller particles help fill voids between larger ones for high packing density.

Manage VOC (volatile organic compound) levels

Volatile organic compounds (VOCs) can be emitted in the application and cure of solvent-based paints and coatings. By allowing higher solids and lower resin demand, 3M ceramic microspheres may help formulators meet the increased consumer demand for low-VOC formulations.

Add burnish resistance and scrub resistance



The high hardness level and smooth, unique shape of 3M™ Ceramic Microspheres contribute to increased burnish resistance. With ordinary fillers, soft or jagged particles on the surface more often break or wear away. 3M ceramic microspheres help surfaces maintain their appearance longer to save the time and cost of touch-ups or repainting.

Enhance gloss control



Incorporating higher levels of 3M ceramic microspheres can help incrementally lower gloss levels without significantly increasing viscosity in many applications. 3M ceramic microspheres can help formulators balance gloss and other properties to achieve optimal performance.

Provide exterior durability



Tight particle packing, combined with high hardness, creates a durable, low-permeation barrier against the weather.

Enable UV curing

To help improve productivity and depth of cure for UV-curable coatings, 3M ceramic microspheres are UV transparent to 250nm. The microspheres allow transmission of the UV energy through the coating.

Simplify mixing

With high compression strength, 3M ceramic microspheres can be added during the standard grind. For optimum dispersion, sand, ball and roll mills are preferred.

No crystalline silica

3M ceramic microspheres are solid particles and contain no detectable crystalline silica as determined by x-ray diffraction (XRD) technology.

Application Benefits

Architectural coatings

- Durability
- Scrubbability
- Higher PVC
- Improved burnish resistance
- Uniformity of sheen

Industrial coatings

- Durability
- Lower film permeability
- High loading with low viscosity
- Reduced VOC
- Improved hardness
- Gloss control
- Sprayability
- Cost reduction

Primers

- Higher volume solids
- Cost reduction

UV-cured coatings

- High loading with low viscosity
- Cost reduction

Mastics, grouts

- Improved rheology
- Higher loading
- Durability
- Reduced shrinkage

Improved production

Grades of 3M™ Ceramic Microspheres

Not for Specification Purposes

Product Characteristics Overview

Product	Target Crush Strength ¹	True Density ²	Hegman Grind ³	Particle Size ⁴ 90th%	Color ⁵	Comments	Application Ideas
W-210	>60,000	2.4	7	12	white	Finest 3M product, least gloss reduction of any white grade	Light colored and thin film coatings
W-410	>60,000	2.5	6	21	white	Medium gloss reduction	Burnish-resistant wall and house paints, most light-colored industrial and maintenance products
W-610	>60,000	2.5	3+	32	white	325 mesh, most gloss reduction of any 3M white grade	Maintenance paints thicker than 2 mils, low gloss paints, adhesives and decorative flooring

¹ 90% survival, psi ² g/cc ³ ASTM D12-10 ⁴ Microns by volume ⁵ Unaided eye

Other 3M™ Microspheres for specialty coatings

3M™ Ceramic Microspheres are one in a family of 3M microspheres. Low-density 3M™ Glass Bubbles offer enhancements for specialty applications such as high-build/low-slump coatings, solar reflective roof coatings and lower thermally conductive finishes.

For dispersal, use low shear mixing equipment and add during the let-down stage.

... enhanced performance

Grades of 3M™ Glass Bubbles Not for Specification Purposes

Product Characteristics Overview

Product	Target Crush Strength ¹	Minimum Fractional Survival ²	True Density ³	Particle Size ⁴	Color ⁵	Suggested Coating Application Area						
						Spackle/ Wall Repair Compounds/ Caulks	Insulative Coatings with Lower Thermal Conductivity	Brush/Roller Coatings	Exterior Solar Reflective Coatings	Deck Coatings	Airless Spray Coatings*	Architectural Paints (<3 mils) or Smooth Appearance
K1	250	80	0.125	65	white	●	●	●				
S15	300	85	0.15	55	white	●	●	●				
K15	300	80	0.15	60	white	●	●	●				
S22	400	80	0.22	35	white	●	●	●				
K20	500	80	0.20	60	white			●				
S28HS	3,000	90	0.28	30	white		●	●	●	●	●	●
K37	3,000	80	0.37	45	white			●	●	●	●	
S38HS	5,500	80	0.38	40	white			●	●	●	●	
K46	6,000	80	0.46	40	white			●	●	●	●	
S60	6,000	90	0.60	30	white			●	●	●	●	●
iM16K	16,000	90	0.46	20	white			●	●		●	●
S60HS	18,000	90	0.60	30	white			●	●	●	●	●
iM30K	27,000	90	0.60	18	white			●	●		●	●

¹ psi ² % ³ g/cc ⁴ D50 (microns by volume) ⁵ Unaided eye

* For airless spray applications or processes which are subjected to higher shear, we recommend a glass bubble product with a minimum crush strength of 3000 psi.

Global support for your business

Formulators and manufacturers around the world rely on 3M paint additive technologies to help enhance performance, reduce costs and add more customer-pleasing properties to a broad range of architectural and industrial paints and coatings. Reduce resin demand, protect against stains and abrasion, improve surface finish and much more with 3M™ Additives for Paints and Coatings.

For more information about 3M™ Ceramic Microspheres, including formulation assistance, contact your 3M technical representative.

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