

3M Advanced Materials Division

3M™ Glass Bubbles S4630

Introduction

3M™ Glass Bubbles S4630 are small particle size and high strength-to-density ratio additives formulated for electronic applications. They are hollow glass microspheres made from water resistant and chemically-stable soda-lime borosilicate glass. These hollow glass microspheres can be used as a filler in materials for low to ultra-low dielectric electronic components, such as copper clad laminates (CCL), electrical connectors and radomes.

Processing Information

Flow properties: 3M Glass Bubbles S4630 have a shelf life of one year under ideal storage conditions, which include unopened cartons in a dry and temperature-controlled warehouse.

Extended exposure to high humidity and/or conditions susceptible to condensation may result in a moisture level of the product higher than 0.35%. If controlled storage conditions are unavailable, carry a minimum inventory and process on a first in/first out basis.

Glass bubble breakage: Breakage may occur if the product is severely processed. To minimize breakage, minimize exposure to high shear processes.

Material Description (Not for specification purposes)

Property	3M™ Glass Bubbles S4630
Shape	Hollow microspheres
Composition	Soda-lime-borosilicate glass
Color, unaided eye	White, powdery

Typical Physical Properties (Not for specification purposes)

Property	3M™ Glass Bubbles S4630
Dielectric Loss, Df (10GHz)	0.005
Dielectric Constant, Dk (10GHz)	1.5
True density (g/cc)	0.46
Crush strength, 90% (psi/MPa)	≥ 16,000 /110
Size D50 (µm)	18
Size D95 (µm)	< 40
270 Mesh (53 µm) Sieve Retain	< 0.05%
Moisture	≤ 0.35%
Non-white particles greater than 45 µm	< 200 / 10 g Glass Bubbles

3M Advanced Materials product realization process and manufacturing sites are aligned to ISO 9001 Quality Systems. Test data is generated by following documented procedures and test methods.

Product Storage, Handling & Safety

Storage: Ideal storage conditions include unopened cartons in a dry and temperature-controlled warehouse.

Extended exposure of 3M™ Glass Bubbles S4630 boxes to high humidity and/or conditions susceptible to condensation may result in some amount of “caking” of the glass bubbles. To minimize the potential for caking and thereby maximize storage life, the following suggestions are offered:

1. Carefully re-tie opened bags immediately after use.
2. If the polyethylene bag is punctured during shipping or handling, seal the hole as soon as possible or insert the contents into an undamaged bag.
3. During hot and/or humid months, store boxes in the driest, coolest space available.

If controlled storage conditions are unavailable, carry a minimum inventory and process on a first in/first out basis.

Handling: Due to the low weight and small particle size of 3M Glass Bubbles S4630, dusting may occur while handling and processing. To minimize the dusting potential during handling, consider the following:

1. Do not open glass bubbles packages until ready to use.
2. Upon opening, have an air siphon near the opening to pull away airborne particles. (Dust collection equipment may be required – check local OSHA and other applicable regulations.)
3. Remove glass bubbles with a suction “wand” (with slight positive pressure aeration) and transfer to a closed mixing tank inside fully contained piping. If a closed mixing tank is not available, use dust collection equipment as close as practical to the point of entry. Pneumatic conveyor systems have been used successfully to transport glass bubbles without dusting from shipping containers to batch mixing equipment. Equipment vendors should be consulted for recommendations.
4. Static eliminators should be used to prevent static buildup.

Safety: For worker protection, please consider the following:

- Use safety glasses with side shields for eye protection.
- Wear respiratory protection if ventilation is inadequate to prevent overexposure. An exposure assessment may be needed to decide if a respirator is required. (For additional information about personal protective equipment, refer to the product Safety Data Sheet.)
- Use with appropriate local exhaust ventilation/dust collection in the work area.

Additional Information

3M™ Glass Bubbles are supported by global sales, technical and customer service resources, with fully-staffed technical service laboratories in the U.S., Europe, Japan, China, and Latin America. Users benefit from 3M’s broad technology base and continuing attention to product development, performance, safety and environmental issues.

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