

3M™ Glass Bubbles S42XHS

Introduction

3M™ Glass Bubbles S42XHS are high-strength additives for polymers made from a water-resistant and chemically stable soda-lime-borosilicate glass. These hollow glass microspheres can be compounded with a variety of polymers to reduce the overall thermal conductivity of the composite. These composites can be coated or incorporated into deep sea oil pipelines to improve the flow assurance properties of the system. The high strength of S42XHS glass bubbles can withstand both the high processing pressure of polymer extrusion and the pressure of seawater in many applications. The S42XHS glass bubbles have isostatic crush strengths of 8000 psi with a minimum of 90% survival.

Material Description (Not for specification purposes.)

Product	3M™ Glass Bubbles S42XHS
Shape	Hollow spheres with thin walls
Composition	Soda-lime-borosilicate glass
Color, unaided eye	White, powdery

Typical Physical Properties (Not for specification purposes.)

Product	3M™ Glass Bubbles S42XHS
Isostatic crush strength (psi)	90% survival @ 8,000 psi
True density	0.42 g/cc
Packing factor (ratio of bulk density to true particle density)	60%
Softening point	600°C
Flotation (density < 1.0 g/cc)	97.5% (in volume)
Volatile content	0.4 % (by weight)
Alkalinity	0.4 milliequivalents/gram
pH	9.5 at 5% loading in water
Average diameter	25 microns
Calculated thermal conductivity	0.14 W/mK @ 50°C

Formulating Information

Flow properties

S42XHS glass bubbles will remain free flowing for at least one year from the date of shipment when stored in the original, unopened container in accordance with the recommended storage conditions.

Glass bubble breakage

Breakage may occur if the product is severely processed. To minimize breakage, minimize exposure to high shear processes such as high speed Cowles Dissolvers, and point contact shear such as gear pumps and 3-roll mills. For twin screw extruders, place S42XHS glass bubbles in the downstream port to minimize time in the extruder. Contact your vendor for assistance if breakage is suspected.

Packaging

S42XHS glass bubbles are packaged in heavy-duty polyethylene bags with cardboard containers designed to prevent damage during normal handling and shipping while maintaining free-flowing properties. Each container is labeled with the following:

- Name of manufacturer
- Product identification
- Lot number
- Quantity in pounds

Product Storage, Handling and Safety

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

Extended exposure of 3M™ Glass Bubbles S42XHS 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 made:

1. Carefully re-tie open bags after use.
2. If the polyethylene bag is punctured during shipping or handling, use this bag as soon as possible, patch the hole, or insert the contents into an undamaged bag.
3. During hot and humid months, store in the driest, coolest space available.
4. 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 S42XHS glass bubbles, dusting may occur while handling and processing. To minimize the dusting potential during handling, consider the following:

- Do not open glass bubbles packages until ready to use.
- Upon opening, have an air siphon near the opening to pull away airborne particles. (Dust collection equipment may be required—check with local OSHA regulations.)
- 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 specific recommendations.
- Static eliminators should be used to prevent static buildup.

Safety: For worker protection, please consider the following:

- Use chemical safety goggles for eye protection.
- For respiratory system protection wear an appropriate NIOSH/MSHA approved respirator. (For additional information about personal protective equipment, refer to the Material Safety Data Sheet.)
- Use appropriate 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, Latin America and Southeast Asia. Users benefit from 3M’s broad technology base and continuing attention to product development, performance, safety and environmental issues.

For additional technical information on 3M glass bubbles in the United States, call 3M Energy and Advanced Materials Division, **800-367-8905**.

For other 3M global offices, and information on additional 3M products, visit our web site at: www.3M.com/microspheres.

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