3M™ Glass Bubbles iM16K

Introduction

3M™ Glass Bubbles iM16K* are high-strength polymer additives made from a water-resistant and chemically-stable soda-lime borosilicate glass. These hollow glass microspheres can be used as a low density filler material ideal for plastic and rubber parts created from injection molding, extrusion processes, and/or other vigorous processing equipment (e.g., Banbury mixers, etc.), offering improved processing over many conventional fillers.

3M glass bubbles iM16K help to reduce weight, improve dimensional stability, reduce shrinkage and sink marks, and contribute to material and process cost savings. They may be ideal additive materials for applications in the automotive, heavy truck, aerospace, electrical, sports and leisure, electronics, appliance and durable goods industries, as well as in construction products such as polymer/wood composites and siding – helping not only to reduce part weight, but also to improve dimensional stability and nail-ability.

Material Description (Not for specification purposes.)

Properties	3M™ Glass Bubbles iM16K
Shape	Hollow spheres with thin walls
Composition	Soda-lime-borosilicate glass
Color, unaided eye	Off-white, powdery

Typical Physical Properties (Not for specification purposes.)

Properties	3M™ Glass Bubbles iM16K	Test Method
Isostatic crush strength	16,500 psi	3M QCM 14.1.8
True density	0.46 g/cc	3M QCM 14.24.1
Packing factor (bulk density to true particle density)	58%	
pH	9.8 at 5 wt% loading in water	3M QCM 30.54
Average diameter (microns)	20	3M QCM 193.0

Formulating Information

Flow properties: 3M glass bubbles iM16K will remain free-flowing for at least one year from the date of shipment from 3M when stored in the original, unopened container in accordance with the recommended storage conditions. (See below for storage recommendations.)

Glass bubble breakage: Breakage may occur if the product is severely processed. To minimize breakage, minimize exposure to high shear processes and to point contact shear, such as inter-meshing gear pumps, 2-roll and 3-roll mills. When adding to an extrusion process, the material should be added downstream of the feed hopper via a side-stuffer or top feeder (similar to adding glass fiber).

*3M Glass Bubbles iM16K is an experimental or developmental product that has not been introduced or commercialized for general sale, and its formulation, performance characteristics and other properties, specifications (if any), availability, and pricing are not guaranteed and are subject to change or withdrawal without notice.

Product Storage, Handling and Safety

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

Extended exposure of 3M glass bubbles iM16K 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 iM16K, 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 local OSHA and other applicable 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 recommendations.
- 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.
- For respiratory protection, wear an appropriate NIOSH/MSHA approved respirator based on airborne concentration of contaminants and in accordance with OSHA regulations. (For additional information about personal protective equipment, refer to the product Material 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, 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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