

3M Advanced Materials Division

# 3M™ Glass Bubbles HGS4K28

## Introduction

3M™ Glass Bubbles HGS4K28 are high-strength, low-density additives specially formulated to afford greater survivability than other lightweight additives under demanding downhole conditions. They are hollow glass microspheres made from water-resistant and chemically-stable soda-lime borosilicate glass.

When drilling and cementing across highly depleted zones and weaker formations, low-density systems are required to prevent/minimize problems associated with excessive overbalance conditions including fluid loss/lost circulation, formation damage, and reduced well productivity.

The use of 3M™ Glass Bubbles HGS4K28 as density reducing agents for completion, work-over and cement slurries offers the potential for:

- Reduced Non Productive Time (NPT)
- Improved well integrity
- Increased well productivity

## Material Description (Not for specification purposes.)

Property	3M™ Glass Bubbles HGS4K28
Shape	Hollow spheres with thin walls
Composition	Soda-lime-borosilicate glass
Color, unaided eye	Off-white, powdery

## Typical Physical Properties (Not for specification purposes.)

Property	3M™ Glass Bubbles HGS4K28
Crush strength, 80%	4,000 psi
True density	0.28 g/cc
Packing factor (bulk density to true particle density ratio)	62%
Average diameter (microns)	30

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.

## Processing Information

**Flow properties:** 3M glass bubbles HGS4K28 will remain free flowing for at least two years from the date of shipment from 3M when stored in the original, unopened container in accordance with the recommended storage conditions.

(See back side for storage recommendations.)

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

## Product Storage, Handling & Safety

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

Extended exposure of 3M™ Glass Bubbles HGS4K28 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 HGS4K28, 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, Latin America and Southeast Asia. Users benefit from 3M’s broad technology base and continuing attention to product development, performance, safety and environmental issues.

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