

3M™ Glass Bubbles HGS Series for lightweight cement applications

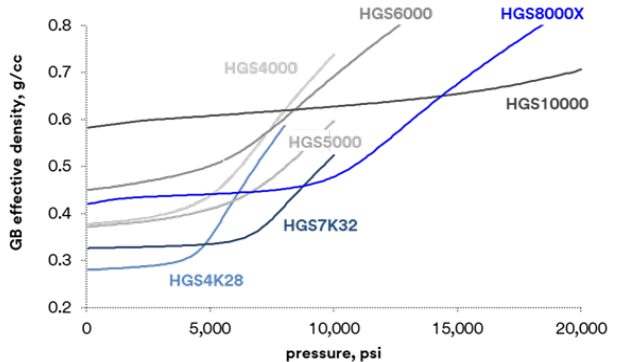
Engineered to perform under pressure



3M Glass Bubbles HGS Series are hollow glass microspheres engineered for greater survivability under demanding downhole conditions.

Low-density cements formulated with 3M Glass Bubbles HGS series offer the potential to reduce costs and improve performance compared to other commonly used techniques, including water-extended slurries, foamed cements or other microspheres, or more costly multi-staging.

- Help prevent problems associated with lost circulation, such as reduced Top of Cement (TOC) and thus the need for remedial squeeze
- Help achieve higher strength-to-weight cement designs
- Increased yield per sack of cement



3M Glass Bubbles (GB) effective densities at pressure
(Not for specification purposes.)

3M™ Glass Bubbles typical physical properties (Not for specification purposes.)

Product	Nominal density (g/cc)	D ₅₀ (Microns)	Isostatic crush strength*	
			Minimum fractional survival	Test pressure (psi)
HGS4K28	0.28	30	80%	4,000
HGS7K32	0.32	22	80%	7,000
HGS8000X	0.42	26	90%	8,000
HGS 4000	0.38	40	80%	4,000
HGS5000	0.38	40	80%	5,500
HGS6000	0.46	40	80%	6,000
HGS10000	0.60	30	90%	6,000

* Tests performed in nitrogen for test pressure up to 6000 psi and in glycerol for test pressure 8000 psi and above

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