

# Driving down vehicle weight.



## Applications

- Door & pillar trim
- Under the hood plastics, including engine cover
- Instrument panel cover
- Center/floor console
- Headlight assembly
- Glove box
- Air inlet panel/cowl screens
- Relay boxes
- Electrical connectors

## Recommended Products

### 3M™ Glass Bubbles iM16K

- Density 0.46 g/cc
- Crush Strength 16,000 psi (110 MPa)

## Low-density additives for injection molded automotive components

Automotive OEMs continue to search for lightweighting solutions as demand grows for higher fuel efficiency and battery range. Now, you can be confident that thermoplastic parts can meet the requirements for a wide range of physical properties such as strength, process requirements, dimensional stability, aesthetics, dielectric performance, and more.

3M™ Glass Bubbles are high-strength, low-density hollow glass microspheres engineered to withstand the rigors of compounding and injection molding. Compared to conventional fillers used in PP, PA, PC/ABS and other thermoplastics, 3M Glass Bubbles enable lower linear thermal expansion and help improve the dimensional stability of polymer compounds for reduced shrinkage and warping. They also cool faster, increasing throughput.

## Performance and processing advantages

- Formulate thermoplastic parts to help meet requirements of low and medium impact applications
- Help reduce part weight up to 15%
- Decrease cycle time with 15–25% faster cooling
- Help reduce rejects by improving dimensional stability
- Low dielectric properties help improve performance and lower weight of signal transfer devices
- Improve performance of electrical connectors, especially vs. solid glass beads
- Excellent for virgin and recycled resin systems
- Minimal bubble breakage during regrind enables recycling of low-density thermoplastics
- Lightweight parts used to reduce vehicle weight can help contribute to better fuel economy

Component	Control PP, 30 GF		Formula 1 PP, 31.5 GF, 9 GB		Formula 2 PP, 29.5 GF, 10.5 GB		Formula 3 PP, 22.5 GF, 15 GB	
	Wt%	Vol%	Wt%	Vol%	Wt%	Vol%	Wt%	Vol%
Polypropylene	70	87	60	69	60	68	63	64
Glass Fiber	30	13	32	13	30	12	23	8
3M™ Glass Bubbles iM16K	-	-	9	18	11	21	15.0	28
Density	1.12		1.04		1.02		0.93	
Density Reduction (%)	-		7.4%		9.5%		17%	
Tensile Strength (MPa)	72.3		69		63.1		50	
Tensile Modulus (MPa)	4033	3594	5500	5294	5350	5271	4580	4909
Specific Modulus (MPa/g/cc)								
Flexural Modulus (MPa) @ 1% tangent	4890	4360	5400	5200	5385	5300	4350	4660
Specific Modulus (MPa/g/cc)								
Flexural Strength (MPa)	108		106		113		81	
Impact Strength – Izod @ RT (J/m)	100		87		84		71	
Melt Index (230°C, 2.16 kg)	4		3.8		3.9		3.8	

Component	Control PA6, 30 GF		Formula 1 PA6, 30 GF, 5 GB		Formula 2 PA6, 35 GF, 8.1 GB	
	Wt%	Vol%	Wt%	Vol%	Wt%	Vol%
Polyamide 6	70	84	65	72	57	62
Glass Fiber	30	16	30	15	35	17
3M™ Glass Bubbles iM16K	-	-	5.0	14	8.1	22
Density	1.37		1.26		1.23	
Density Reduction (%)	-		8%		10%	
Tensile Strength (MPa)	181		160		179	
Tensile Elongation (%)	4.3		3.75		3.60	
Tensile Modulus (MPa)	6961		6976		7724	
Flexural Modulus (MPa) @ 1% secant	7615		7957		10232	
Flexural Modulus (MPa) @ 2% secant	7585		7716		9774	
Flexural Strength (MPa)	254		224		252	
Impact Strength – Izod @ RT (J/m)	104		80		76	

**Warranty, Limited Remedy, and Disclaimer:** Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. User is solely responsible for evaluating the 3M and determining whether it is fit for a particular purpose and suitable for user's method of application. User is solely responsible for evaluating third party intellectual property rights and for ensuring that user's use of 3M product does not violate any third party intellectual property rights. Unless a different warranty is specifically stated in the applicable product literature or packaging insert, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. **3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OF NON-INFRINGEMENT OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE.** If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

**Limitation of Liability:** Except where prohibited by law, 3M will not be liable for any loss or damages arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

**Technical Information:** Technical information, recommendations, and other statements contained in this document or provided by 3M personnel are based on tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed. As to such information 3M makes no warranties or conditions, express or implied, including, but not limited to, any warranty or condition of non-infringement of a third party's intellectual property rights or warranty or condition of technical or commercial success. Such information is intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license under any 3M or third party intellectual property rights is granted or implied with this information.



**3M Advanced Materials Division**  
3M Center  
St. Paul, MN 55144 USA

Phone 1-800-367-8905  
Web [www.3M.com/autoglassbubbles](http://www.3M.com/autoglassbubbles)

3M is a trademark of 3M Company.  
Used under license.

Please recycle. Printed in USA. © 3M 2021.  
All rights reserved. Issued: 5/21 16747HB  
98-0212-4258-5 Rev. C