



Zhengzhou Xinli New Materials Co., Ltd

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**Hollow Glass Sphere**

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## About Us



### LEADING MANUFACTURING TECHNOLOGY

XINLI ABRASIVES has developed advanced production processes through decades of R&D experience. The company owns complete independent intellectual property rights and has obtained multiple core invention patents.



### COMPREHENSIVE QUALITY ASSURANCE SYSTEM

XINLI ABRASIVES has established a complete quality control and assurance system, strictly implementing ISO quality management standards. The company is equipped with professional testing instruments, including density testers, laser particle size analyzers, and compressive strength testing equipment, ensuring stable and reliable product quality. XINLI ABRASIVES meets the supplier management requirements of internationally renowned companies and serves as a strategic supplier for many Fortune Global 500 enterprises.



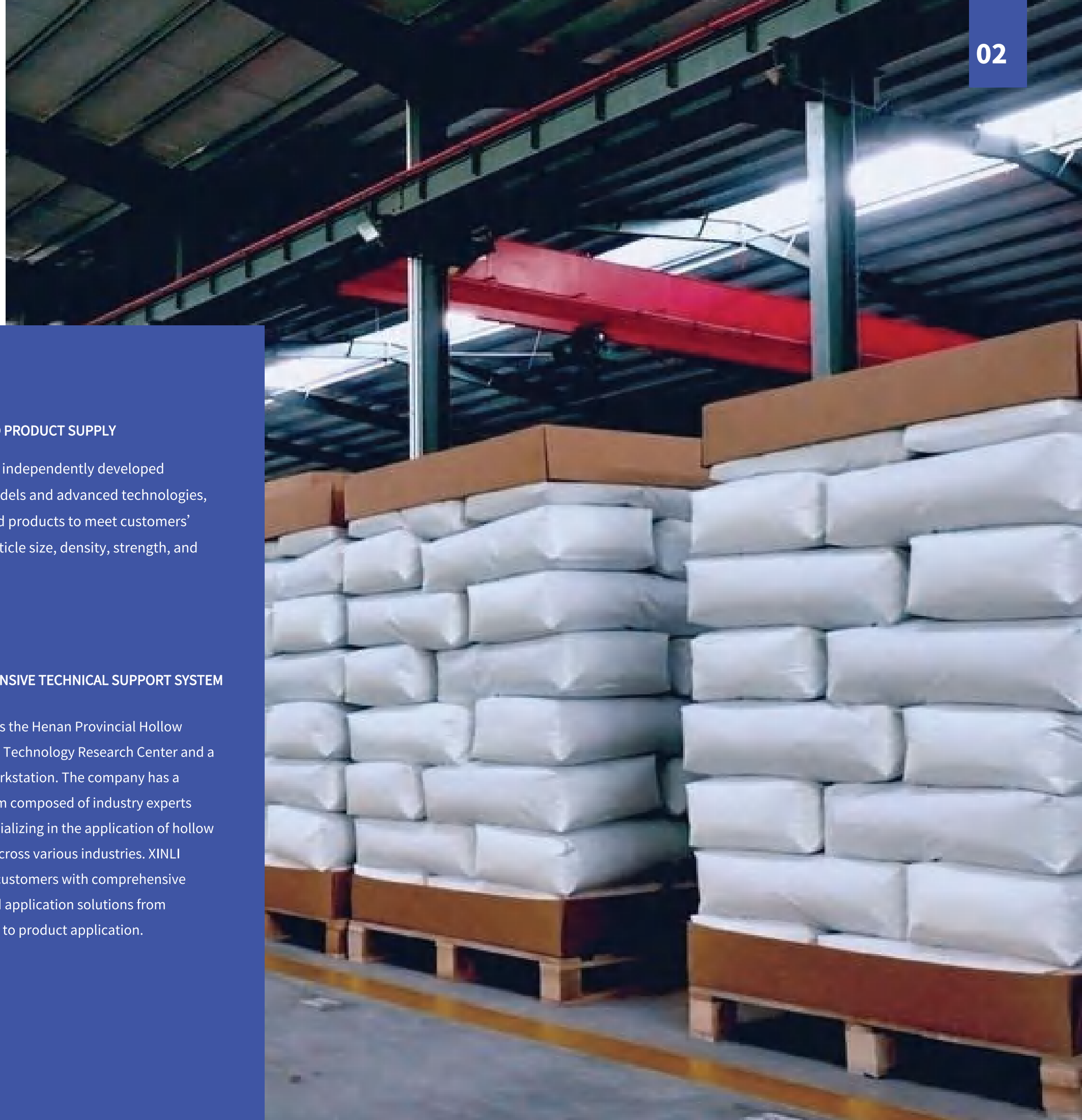
### CUSTOMIZED PRODUCT SUPPLY

XINLI ABRASIVES has independently developed dozens of special models and advanced technologies, providing customized products to meet customers' requirements for particle size, density, strength, and surface roughness.



### COMPREHENSIVE TECHNICAL SUPPORT SYSTEM

XINLI ABRASIVES owns the Henan Provincial Hollow Materials Engineering Technology Research Center and a doctoral research workstation. The company has a professional R&D team composed of industry experts and researchers, specializing in the application of hollow glass microspheres across various industries. XINLI ABRASIVES provides customers with comprehensive technical support and application solutions from process development to product application.



## Product Introduction

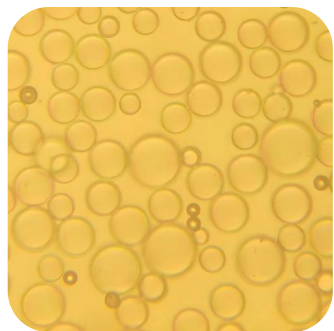
Hollow glass microspheres are micron-sized, smooth-surfaced hollow glass microspheres, primarily composed of soda-lime borosilicate glass. Under a microscope, they appear as hollow, transparent spheres.

Hollow glass microspheres possess a variety of properties, including low density, high strength, low thermal conductivity, high wave transmittance, electrical insulation, high temperature resistance, and acid and alkali resistance.

They also exhibit good flowability and chemical stability, making them a multifunctional, cutting-edge new material applicable across various fields.

### Product Characteristics:

- Appearance: White, free-flowing powder
- Microscopic appearance: Transparent, hollow, perfectly spherical
- True density: 0.12~1.0 g/cm<sup>3</sup>
- Bulk density: 0.10~0.62 g/cm<sup>3</sup>
- Particle size: 2~130 μm
- Thermal conductivity: 0.038~0.085 W/m·K
- Maximum compressive strength: 30000 psi
- pH: 8~9.5



## Hollow Glass Sphere XL Series

Type	True Density (g/cm <sup>3</sup> )	Bulk Density (g/cm <sup>3</sup> )	Compressive Strength (psi)	D50 (μm)	D90 (μm)	Application
XL15	0.13-0.17	0.08-0.09	500	80	≤120	Epoxy Tooling Board、 Buoyancy Materials、 Emulsion Explosive、
XL20	0.18-0.22	0.10-0.12	500	65	≤110	Epoxy Tooling Board、 Buoyancy Materials、 Emulsion Explosive
XL25	0.23-0.27	0.13-0.15	750	65	≤100	Thermal Insulation Coating、 Sealants、 Buoyancy Materials
XL30	0.28-0.32	0.15-0.18	1500	55	≤85	Thermal Insulation Coating、 Buoyancy Materials
XL32	0.30-0.34	0.17-0.19	2000	45	≤80	Paints、 SMC/BMC、 Sealants、 Putty
XL35	0.33-0.37	0.18-0.21	3000	40	≤70	Oilfield Cement Slurry、 Low-Density Drilling Fluid
XL38	0.36-0.40	0.19-0.22	5500	40	≤65	Paints、 SMC/BMC、 PVC Plastics、 Buoyancy Materials
XL40	0.38-0.42	0.19-0.23	4000	40	≤70	Oilfield Cement Slurry、 Low-Density Drilling Fluid、 Thermal
XL42	0.40-0.44	0.21-0.24	8000	40	≤60	Oilfield Cement Slurry、 Low-Density Drilling Fluid
XL46	0.44-0.48	0.23-0.26	6000	40	≤70	Oilfield Cement Slurry、 Low-Density Drilling Fluid、 SMC/BMC
XL50	0.48-0.52	0.25-0.27	8000	40	≤70	Oilfield Cement Slurry、 Low-Density Drilling Fluid
XL60	0.58-0.62	0.29-0.34	12000	40	≤70	Oilfield Cement Slurry、 Low-Density Drilling Fluid
XL60S	0.58-0.63	0.30-0.34	18000	35	≤55	Oilfield Cement Slurry、 Modified Plastics

## Hollow Glass Sphere XS Series

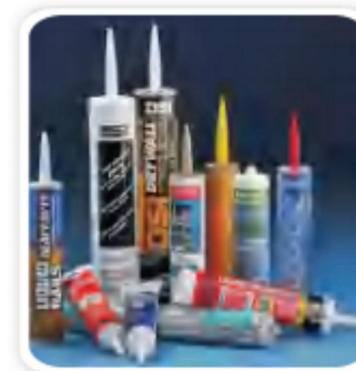
Type	True Density (g/cm <sup>3</sup> )	Bulk Density (g/cm <sup>3</sup> )	Compressive Strength (psi)	D50 (μm)	D90 (μm)	Application
XS20	0.18-0.22	0.10-0.12	1000	60	85±5	Epoxy Tooling Board、Buoyancy Materials、Emulsion Explosive
XS22	0.20-0.24	0.11-0.13	1200	45	70±5	Epoxy Tooling Board、Buoyancy Materials、Sealants、Car Repair
XS28	0.26-0.30	0.15-0.17	4000	45	55±5	Epoxy Tooling Board、Buoyancy Materials、Sealants、Car Repair
XS38	0.36-0.40	0.19-0.22	5500	30	50±5	Composite Circuit Board、SMC、Sealants
XS42	0.40-0.44	0.21-0.24	8000	25	40±3	Rubber,Shoe Material,Sealants and Adhesives,SMC,Cementing
XS60	0.58-0.62	0.29-0.33	28000	16	25±2	5G Plastics、Engineering Plastics
XS65	0.63-0.67	0.30-0.33	30000	13	20±2	5G Plastics、Engineering Plastics
XS70	0.75-0.80	0.33-0.35	30000	10	15±2	5G Plastics、Engineering Plastics

## Product Introduction

## 01 Applications of Hollow Glass Microspheres in Adhesives

Hollow glass microspheres are lightweight, hollow, and high-strength glass spheres with a high strength-to-density ratio. They are suitable for use in adhesives such as silicone, epoxy, acrylic, polyurethane, and synthetic rubber adhesives. Their inherent properties endow adhesives with a series of excellent properties

- Microsphere effect: Minimal specific surface area, low oil absorption value, reducing resin dosage and resulting in lower viscosity; improved flowability and processability; anisotropic properties, preventing warping and shrinkage due to stress inconsistencies after processing.
- Glass material: High chemical stability; as a filler, it will not react with the substrate or other substances, making it suitable for various systems.
- Hollow spheres: Low density, reducing adhesive density and volumetric cost; low thermal conductivity, giving the adhesive heat insulation and low thermal conductivity properties.
- Micron-sized particles: Improves the rheological properties of the adhesive while enhancing thixotropy; small microspheres fill the voids between large microspheres, thereby increasing solids content and reducing VOCs; easily dispersed and non-agglomerated.
- Other properties: Can also produce a frosted effect, improving the resin's wear resistance and dielectric properties.
- White color, good color compatibility.





## 02 Application of Hollow Glass Microspheres in Anti-Corrosion Coatings

Hollow glass microspheres can be widely used in weather-resistant anti-corrosion coatings, automotive coatings, marine antifouling coatings, pipeline anti-corrosion coatings, etc. Their functions in coatings include:

- **Lower VOC:** Even at high loading levels, coating viscosity does not increase significantly, reducing the use of organic components and lowering VOC emissions during application.
- **High Flowability:** The spherical structure acts like ball bearings, providing a lubricating effect, reducing coating viscosity, and improving flowability.
- **Low Oxygen/Water Permeability:** Hollow glass microspheres with different particle sizes improve packing density, reduce porosity, slow penetration rates, block conductive paths, isolate HO and O, and prevent electrolyte formation. This delays corrosion and provides stable long-term protection. Their micron-sized particles also help prevent coating sagging, increase dry film thickness, and delay moisture and oxygen reaching the steel surface.
- **Reduced Shrinkage & Cracking:** Their uniform spherical shape and isotropic structure reduce warping and shrinkage caused by uneven stress during film formation.
- **Barrier & Inhibiting Effect:** Hollow glass microspheres improve zinc powder dispersion and barrier performance, capture chloride ions, inhibit corrosion, and prevent corrosive particles from penetrating to the substrate surface.

## 03 Application of Hollow Glass Microspheres in Building Energy Conservation

Hollow glass microspheres are widely used in reflective thermal insulation coatings, giving the coatings excellent heat-reflective and insulating properties. These coatings combine reflection, radiation, and thermal insulation functions. By reflecting sunlight and infrared radiation, they reduce heat absorption on object surfaces, thereby lowering surface temperatures.

At present, reflective thermal insulation coatings are not only used in aerospace equipment, but also widely applied in pipelines, oil tanks, industrial plants, large storage tanks, and more.

Advantages of Hollow Glass Microspheres in Reflective Thermal Insulation Coatings

- Hollow microspheres have much higher infrared reflectivity than ordinary fillers, effectively reducing radiant heat transfer and thermal conductivity for better insulation performance.
- The hollow structure contains thin air inside the microspheres. Due to air's low thermal conductivity (0.038–0.085 W/m·K), the microspheres provide excellent thermal insulation.
- Their spherical structure acts like ball bearings, providing lubrication in coatings, reducing viscosity, and improving flowability.
- They can adsorb nano-scale fillers, helping disperse nanoparticles evenly and preventing agglomeration or sedimentation in the resin system.



## 04 Application of Hollow Glass Microspheres in Rubber Elastomers

Hollow glass microspheres are micron-sized sealed hollow spheres with the characteristics of low density, high strength, and low thermal conductivity. When applied in rubber elastomers, they provide heat insulation, weight reduction, and improved rebound elasticity.

### ● Lightweight Footwear Materials

Adding hollow glass microspheres into rubber can significantly reduce the weight of footwear materials, making shoes lighter and more comfortable.

### ● Industrial Rubber

Used as fillers in cable and communication cable rubber layers, sealing rubber products, and damping materials to reduce weight, improve thermal insulation, and enhance crack resistance.



## 05 Application of Hollow Glass Microspheres in Tooling Board

The application of hollow glass microspheres in tooling board can improve its processability, providing excellent quality assurance for the manufacturing of furniture components, automotive models, shoe molds, tire molds, architectural models, decorations and sculptures.

● Adding hollow glass microspheres allows adjusting to achieve stable density of tooling board products.

● Compared with ordinary mineral powder fillers, hollow glass microspheres have better fluidity and dispersibility, which can ensure the dimensional stability of products, reduce shrinkage and warpage, and enhance the impact strength of products at the same time.



## 06 Application of Hollow Glass Microspheres in Transportation Lightweighting

Engineering plastics play an important role in the lightweighting of transportation equipment, while further lightweighting of plastic components has become a key issue in technological development. Current approaches mainly focus on reducing density. Hollow glass microspheres, with their low density, lightweight characteristics, and excellent functionality, are an ideal lightweight filler for engineering plastics and SMC/BMC composite materials, providing the following advantages:

- Reduced specific gravity;
- Improved material processing performance;
- Enhanced toughness;
- Improved flame retardancy;
- Improved surface finish and elimination of sink marks;
- Enhanced surface hardness and wear resistance;
- Reduced resin usage and lower VOC emissions;
- Increased thermal insulation and reduced heat release.
- Reduced shrinkage and warping while maintaining dimensional stability;



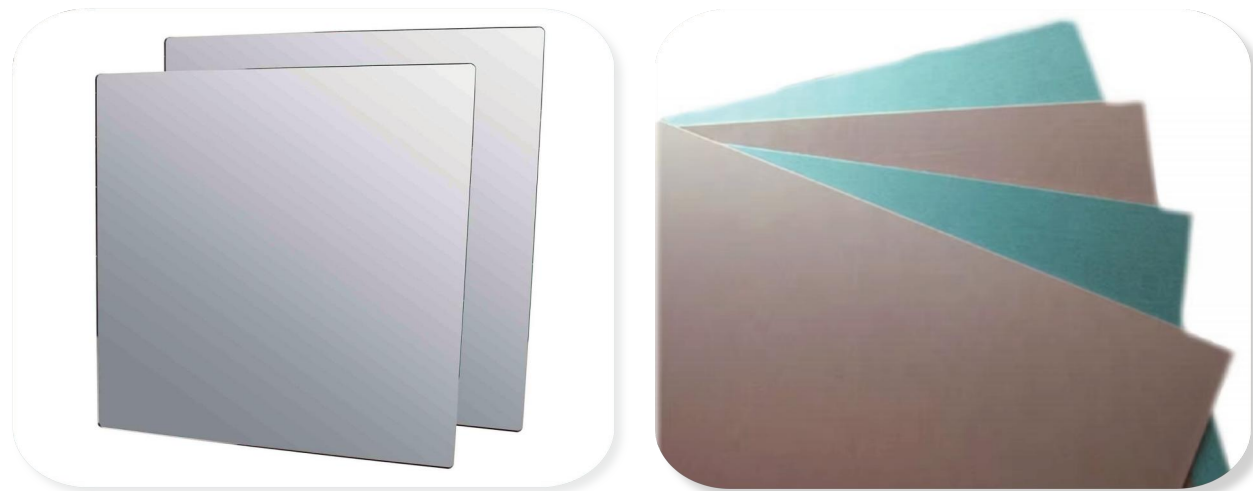


## 07 Application of Hollow Glass Microspheres in 5G Communication

5G communication adopts millimeter waves, featuring long wavelengths and weak diffraction ability. Signal attenuation occurs during transmission, so materials with lower dielectric constant and dielectric loss are required to improve signal transmission speed and efficiency while reducing delay and signal loss. Due to their hollow structure, hollow glass microspheres possess relatively low dielectric constant and dielectric loss, making them ideal low-dielectric fillers to enhance product electrical performance. They can be widely applied in 5G base station antennas, 5G mobile phone frames and backboards, as well as materials for IoT devices.

Main Electrical Properties of Hollow Glass Microspheres:

- Dielectric Constant: 1.2 ~ 1.8
- Dielectric Loss: 0.003 ~ 0.006
- Particle Size D90: 10 $\mu$ m ~ 40 $\mu$ m
- Strength: 16000 psi ~ 30000 psi



## 08 Application of Hollow Glass Microspheres in Oil Well Cementing

Low-density, high-strength cement slurry formulated with hollow glass microspheres is one of the main solutions for addressing low-pressure formations and preventing cement slurry loss during oil well cementing operations.

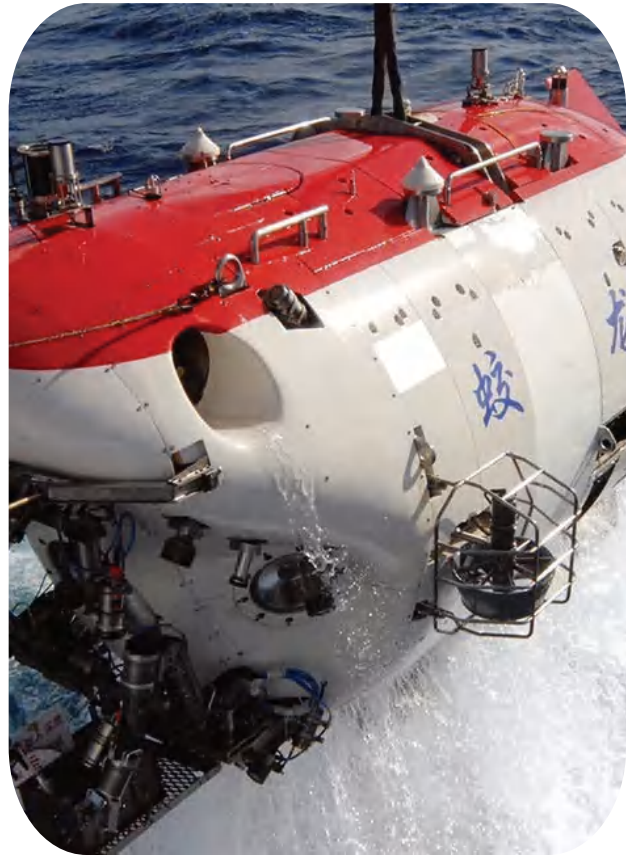
Advantages of Hollow Glass Microsphere Cement Slurry:

- Excellent fluidity, making mixing and pumping easier;
- Free water resistance, high-temperature resistance, and stable compressive strength performance;
- Reduced cementing displacement and mixing time for easier operation;
- Effective control of water loss to prevent pollution;

Lower slurry density with high compressive strength — 24-hour compressive strength can reach 15 MPa or above;

Improved cementing quality and extended oil well service life.





## 09

## Applications of Hollow Glass Microspheres in Marine Equipment

Hollow glass microspheres, as low-density, high-strength, lightweight fillers, are ideally suited for use in solid buoyancy materials. Their main characteristics include:

- Low density: Hollow glass microspheres are among the lightest fillers available.
- High strength: The glass wall provides high compressive strength, making them suitable for deep-sea applications.
- Good stability: Hollow glass microspheres are inorganic powders with stable chemical properties, acid and alkali resistance, and resistance to high and low temperatures.
- Spherical shape: Reduces internal stress, making the product less prone to deformation and exhibiting excellent dimensional stability.

## 10

## Applications of Hollow Glass Microspheres in Aerospace Materials

Application Features of Hollow Glass Microspheres in Aerospace Materials

- Low density, reducing material weight;
- Thermal insulation and heat preservation;
- Excellent dimensional stability with minimal deformation;
- Ideal filler material for lightweight composite materials.

