

GLAS-SHOT®

TECHNICAL DATA SHEET

CHEMICAL PROPERTIES

All glasses are affected to some degree by chemical and weathering agents. In most cases, the effect of weathering is minute. The degree of resistance to various agents is proportional to the hardness and/or refractive index of the specific glass. The higher the refractive index, the more susceptible is the glass to chemical attack.

ACID RESISTANCE:

Glas-Shot has excellent resistance to most common acids. Two exceptions are hydrofluoric acid which attacks them vigorously, and phosphoric acid which will etch them in time.

ALKALI RESISTANCE:

This glass has fair resistance to mild alkalis, but strong alkali solutions, especially when hot, will etch the surface.

WATER RESISTANCE:

Water will remove some surface alkali. In the extremely fine sizes, where a tremendous surface area is exposed the beads show a fairly high alkalinity.

WEATHERABILITY:

As in any soda-lime silica glass, once the surface alkalis are removed, weather has no noticeable effect.

TYPICAL COMPOSITION OF STANDARD GLASS BEADS

Chemical	% by Weight
SiO ₂	71 - 74
Na ₂ O	12.0 - 15.0
CaO	8.0 - 10.0
MgO	1.5 - 3.8
Al ₂ O ₃	0.2 - 1.5
K ₂ O	0 - 0.2
Fe ₂ O ₃	0 - Trace

CAS Registry No.: 65997-17-3

Note: Soda-lime plate glass is used in the manufacture of glass beads. The composition of this material is an amorphous fusion of these oxides and are not crystalline types of free oxides (silica). Therefore no danger of silicosis exist. The composition of the glass beads varies within the above limits depending upon individual sources of glass used as raw materials.

HMIS Hazard Index:
Health - 0
Flammability - 0
Reactivity - 0

PHYSICAL PROPERTIES

OPTICAL PROPERTIES:

Color: Glass beads are high quality, colorless optical crown lenses.
Refractive Index*: The refractive index of Glas-Shot is 1.51 using a tungsten light source.

WEIGHT PROPERTIES:

Density of the solid glass is 2.42 - 2.50 g/cm³ (grams per cubic centimeter). Bulk density can be as low as 1.36 g/cm³ and as high as 1.55. Average values are usually 1.45 - 1.50. For specific requirements contact technical services.

THERMAL PROPERTIES:

Coefficient of thermal expansion, for the range 0 - 300° C, is 8.5 - 8.7 x 10⁻⁶ per ° C.

Thermal conductivity (approximate values):

at -100° C	1.9 x 10 ⁻³ (cal•cm/cm ² •0°C)
at 0° C	2.4 x 10 ⁻³
at 100° C	2.7 x 10 ⁻³

Mean specific heat (cm) for the range:

0 - 200° C	0.216 cal/g.° C
0 - 400° C	0.241
0 - 800° C	0.272

ELECTRICAL PROPERTIES:

Dielectric constant at 1 MHz and 20° C is 7.0
Loss tangent (%) at 1 MHz and 20° C is 0.40
Log of volume resistivity is 6.5 at 250° C and 5.2 at 350° C.

STRENGTH PROPERTIES:

*Modulus of elasticity (Young's modulus) at 20° C is 10.5 x 10⁶ pounds per square inch.

*The hardness of Glas-Shot is approximately 5.5 on the Mohs scale.

Crushing strength: The spherical shape results in tremendous resistance to crushing and for this reason, the beads can successfully be used on highways and in "shot" blasting of metal and other surfaces. The resistance strength is approximately 50,000 psi.

VISCOSITY DATA:

*Softening point	722 - 730° C
*Annealing point	540 - 548° C
*Strain point	505 - 510° C

*These are approximate values only, and apply to the solid glass rather than to beads in bulk.

Because glass is not a crystalline solid (it has a molecular structure similar to that of a liquid at very low temperatures), it does not have a sharply defined melting point, but rather a gradual decrease in viscosity (increase in fluidity) as the temperature increases.

Surface softening 400° C	(750° F)
Softening throughout 800° C	(1,475° F)
Molten stream 1200° C	(2,192° F)



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