



## **Commercial Construction**

### **-Technical Guide-**





# About Glavel

Glavel is a Vermont-based manufacturer of foamed glass aggregate with a commitment to low carbon construction solutions. Foamed glass aggregate is a lightweight, insulating aggregate that replaces traditional board insulation assemblies, enabling construction teams to reduce carbon emissions by providing an environmentally-safe alternative to carbon-intensive insulation materials.

Glavel's mission is to decarbonize the built environment by transforming recycled glass into foamed glass aggregate with renewable energy. With North America's first Environmental Product Declaration and Declare Label for foamed glass aggregate, Glavel offers transparent data to support low carbon design and material selection.



## How It's Made

Recycled glass is cleaned and milled into a powder, then combined with glycerin and sodium silicate, creating a sandy mixture. The mixture is deposited onto a 6' wide belt before entering the kiln and slowly heating to 1,600°. As the glass powder mixture heats up, it softens and sinters into a solid mass while the glycerin off-gases and creates a network of closed-cell micropores throughout the foamed glass slab.

These micropores are critical to the material's insulating properties, moisture resistance, and compressive strength. The foamed glass slab then exits the kiln and quickly begins fracturing into aggregate due to thermal stress from exiting the kiln.

The resulting foamed glass aggregate is stable, inert, non-combustible, and highly durable; well-suited for a broad range of construction applications, including subslab insulation, green roofs, and other load-bearing fill applications.

# Technical Data

## Density (Unit Weight)

Uncompacted dry bulk density (ASTM C29).....9 - 10pcf

## Estimated Dry Density

1.11 Compression Ratio (10% compaction of each lift).....10 - 11pcf

1.25 Compression Ratio (20% compaction of each lift).....11.25 - 12.5pcf

## Compressive Strength (EN 1097-11)

20% compaction.....100-110psi

25% compaction.....115-125psi

## Typical Gradation Characteristics (uncompacted) (ASTM C136 / ASTM C117)

### Measured in sieve size

4".....100%

2".....85-100%

3/8".....0-15%

## Physical Characteristics

Hydraulic conductivity (ASTM D2434-68).....0.086 cm/s

Moisture content

Volumetric.....0.47%

Gravimetric (ASTM C566).....0.62%

Particle Specific Gravity (ASTM C127).....0.54

## Soundness

Sodium sulfate (ASTM C88).....4.7% - 5.3% loss

## Impurities

Clay lumps (ASTM D4791).....0

Organic impurities (ASTM C40).....0

## Chemical Characteristics

Sulfates (AASHTO T 290).....<10ppm

Chlorides (AASHTO T 291).....<10ppm

TCLP (SW 846).....Non-leaching

# Foamed Glass Aggregate Advantages

**Frost Heave Resistant** - Will reduce impacts of freeze and thaw cycles

**Produced from Recycled Glass** - Categorized as 'clean fill'

**Non Combustible** - Will not burn, nor propagate fires

**Closed Cell** - Closed cell structure facilitates drainage

**Inert** - Prevents rodents, termites, bacteria, and rot

**Thermal Insulation** - R1.7 per compacted inch



# Delivery

Foamed glass aggregate is delivered in loose bulk or in 3 cubic yard supersacks. Bulk deliveries use 130CY walking floor trailers, and bagged deliveries use flatbed trailers with up to 72CY per truck. Pickup can also be arranged from the manufacturing plant in Essex, Vermont. Deliveries are typically scheduled within 3-4 weeks of order confirmation, and offloading requirements vary by delivery type. Walking floors self-unload while supersacks require a forklift, loader, or excavator on site to unload.



Walking floor trailer, 130cy per truck



Bagged delivery, 72cy per truck



# Installation Guidelines

## Site Prep:

Place geotextile and foamed glass aggregate in locations specified by drawings. A 6oz/yd nonwoven geotextile with 120 grab tensile strength is recommended. Ensure there is no standing water prior to placement. Avoid driving or maneuvering construction equipment over exposed foamed glass aggregate to minimize additional compaction.



Geotextile and foamed glass aggregate placement

## Compaction:

Compaction with tracked equipment is completed in 15" lifts and performed with 4-7 ground pressure psi tracks. Compaction with tracked equipment is completed by placing the initial lift thickness then tracking over the layer for 4-5 complete passes. One full pass is defined as a minimum of 100% coverage of the tracks passing over the top of the lift. Additional lifts can be completed in succession following the same procedure as the initial lift.

Areas not accessible by tracked equipment or to compact thinner lifts are compacted with a lightweight plate compactor (<200 lbs). Compaction is completed after 4-5 full passes with the plate compactor.

Successful compaction of 4-5 passes will compact the foamed glass aggregate layer by 25%. Additional compaction will increase material consumption but will not improve material properties.

If the contractor must vary the method described in the Compaction section (differing lift thickness or equipment), the contractor should reach out the project engineer for installation guidance.



Tracked equipment compaction



Plate compactor compaction



# Installation Guidelines, Continued

## Capping Layer:

After compaction, install a capping layer to provide a stable base for subsequent construction and to prevent migration of fine materials into the foamed glass aggregate. Acceptable capping materials include:

A minimum 2-inch layer of sand, stone dust, or fine gravel, or a nonwoven or woven geotextile meeting ASTM D4751 (AOS  $\leq 0.43$  mm) and ASTM D4632 (grab tensile  $\geq 120$  lb).

Place the capping layer immediately after final compaction to protect the foamed glass aggregate surface from moisture infiltration.

Where specified, install a heavy-duty vapor barrier directly above the capping layer or geotextile, with sealed seams, to limit moisture transmission into the floor slab. Take care to avoid puncturing or tearing the barrier during placement of reinforcement or concrete.

No vehicular traffic shall be permitted on the uncapped foamed glass aggregate surface.



Capping layer



Vapor barrier with radiant heat

# Material Transparency

Glavel is committed to full material disclosure and third-party verification to support informed decision-making in low carbon design.

Glavel’s Environmental Product Declaration (EPD) reports Glavel’s environmental impacts across a cradle-to-gate scope (A1–A3), covering raw material extraction, transportation, and manufacturing. Developed in accordance with ISO 14025, EN 15804 and ISO 21930:2017, the EPD enables direct comparisons within product categories and is fully integrated into the EC3 (Embodied Carbon in Construction Calculator) platform for benchmarking and specification.

Glavel also holds a Declare Label verifying that the product is Red List Free. This supports material health goals across programs like the Living Building Challenge, LEED v4.1/5, and WELL. By combining verified embodied carbon data with material health transparency, Glavel empowers design teams to meet performance and sustainability targets without compromise. This commitment reflects Glavel’s broader mission to make the construction industry cleaner, healthier, and more accountable.



As the construction industry increasingly prioritizes low-carbon design, material choices beneath the slab can have a significant impact on a project’s total embodied carbon. Below is a comparison of subslab insulation assemblies, measured by total Global Warming Potential (GWP) in kg CO<sub>2</sub>e per square meter for assemblies providing equivalent thermal performance.

Embodied Carbon Comparisons per m<sup>2</sup> at R20

Assembly	Total GWP (kg CO <sub>2</sub> e / m <sup>2</sup> )	GWP Increase vs Glavel's Assembly
Glavel Foamed Glass Aggregate	7.71	-
Type IX EPS + #57 Stone	17.20	123.05%
Type IV XPS* + #57 Stone	33.29	331.49%

\*Includes B1 and C4 to account for blowing agent emissions during installation and disposal.

# Our Story

We are on a mission to decarbonize the built environment. By transforming recycled glass into foamed glass aggregate with renewable energy, we are proving that low carbon building materials can beat traditional materials on both performance and cost.

Glavel's story began from a 2016 discovery made by Glavel's Founder and CEO Rob Conboy at the International Passive House Conference in Darmstadt, Germany. He was searching for building materials that could advance energy efficient construction in North America when he discovered foamed glass aggregate, a lightweight, insulating aggregate with decades of proven performance. Immediately he recognized the potential and committed to bringing it to North America.

Rob spent two years learning the product and understanding the market while identifying how to bring it to North America. In 2019, Glavel began importing foamed glass aggregate from Germany to introduce the product to the Passive House community. Not long after, Rob decided that the most impactful way to bring this product to market in North America was by transitioning away from industry-standard fossil fuel powered kilns, and instead pioneering North America's first fully electrified foamed glass aggregate kiln.

Glavel now produces industry-leading foamed glass aggregate from 100% post-consumer recycled glass, powered by a 5-megawatt solar array in northern Vermont provided by Encore Renewable Energy. Rob and the Glavel team's commitment to decarbonization, circularity, and social responsibility continue to drive the built environment to a low carbon future.

