Highly Frictional • Non-Leaching • Rot-Resistant • Non-Flammable • Durable • Safe

made from recycled container glass
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85-90% lighter than quarried aggregates
High friction angle
Excellent insulating properties

aeroaggregates.com
The idea of foaming waste glass to create a building material has been known for decades but it wasn’t until the 1980s when full scale production began in Europe. These aggregates are 85-90% lighter than quarried aggregates, have a high friction angle, and are good insulators due to their closed cell structure. The manufacturing process converts glass cullet into an inert, non-leaching, rot-resistant, non-flammable and durable construction material.

The initial use of UL-FGA was to prevent frost heave in frost susceptible soils throughout Scandinavia. However, the low unit weight and high frictional properties of the material led to other applications and the demand for UL-FGA has continued to increase.

Current civil engineering challenges require construction on soft soils, reduction of lateral earth pressures, decreased loads on structures, and the protection of tunnels and underground utilities. The unique properties of UL-FGA can address these challenges and be a sustainable solution through the beneficial reuse of glass containers.

AeroAggregates produces ultra-lightweight foamed glass aggregate (UL-FGA) from recycled container glass

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<table>
<thead>
<tr>
<th>Applications</th>
<th>UL-FGA has been successfully used in building and infrastructure construction projects for over 25 years.</th>
</tr>
</thead>
</table>
| Infrastructure | • Embankments  
• Retaining Walls & Bridge Abutments  
• Roadway Widening  
• Tunnels & Culverts  
• Utilities  
• Load Distribution |
| Commercial Construction | • Foundation Walls & Slabs  
• Greenroofs  
• Plaza Decks |

Ultra-Lightweight • Highly Frictional • Non-Leaching • Rot-Resistant • Non-Flammable • Durable • Safe
Ultra-lightweight aggregate provides solutions for the challenges of today’s infrastructure projects. Foamed glass aggregate is ideal for projects that require fill to be placed over soft compressible soils or over areas with underground utilities. Large embankments can be built with low net surcharge due to the low unit weight and high friction angle of UL-FGA.

**Embankments**
- Lightweight fill over compressible soils and/or utilities
- Insulating fills for frost susceptible soils
- Resiliency projects requiring fill on soft soil
- Reduced excavation for soil balancing
- Less soil removal and disposal
- Potential to stay out of the water table

**Retaining Walls & Bridge Abutments**
- Lightweight fill behind retaining walls and wing walls
- Greatly reduces lateral load
- Easily excavated for placement or repair of utilities
- Pullout testing completed on various types of reinforcement
- Free draining material
- Reduces settlement of embankments for bridge approaches

**Roadway Widening**
- Roadway widening and shoulder repair
- Slopes up to 1:1 can be built without additional reinforcement
- Increased slope inclination helps with right-of-way limitations
Tunnels & Culverts

- Lightweight backfill over and around tunnels and culverts

Utilities

- Lightweight backfill for sensitive utilities
- Bedding layer for utilities on soft compressible soils
- Insulating backfill for frost protection
- High friction angle creates soil arching to further reduce loads on utilities
- Heat resistant up to 800° F

Load Distribution

- Reduced weight of embankment fill over load distribution platforms
- Optimize number of piles
- Use in locations where in situ ground improvement is not possible due to underground utilities

ACCELERATED CONSTRUCTION DUE TO LIFT THICKNESS

UP TO 100 CUBIC YARDS PER TRUCK
AeroAggregates UL-FGA provides multiple functions in commercial construction applications. Foamed glass aggregate is lightweight against foundation walls or under slabs and provides excellent insulation and drainage. In addition, UL-FGA is not flammable, will not rot or decay, and is easy to place, especially in difficult to reach areas or confined spaces.

**Foundation Walls & Slabs**
- Support of excavation backfill and retaining walls
- Under concrete slabs – as a capillary break and insulator
- Vertical backfill for insulation drainage, and reduced load
- Rot-resistant, non-flammable
- Insulation protection against frost heave

**Greenroofs**
- Easily contours and shapes due to friction angle of aggregate
- Insulating and draining layer on roofs
- Reduces load on roof structure

**Plaza Decks**
- Insulates substructure or protects against frost heave
- Free draining
- Reduces load on roof structure or soft soils
**Density (Unit Weight)**

Uncompacted dry bulk density (ASTM C29/C29M/ AASHTO T 19)\(^1\)  
12-15 pcf

Estimated compacted dry density
- 1.11 Compression Ratio (10% Compaction of Each Lift)  
  13.3-16.7 pcf
- 1.25 Compression Ratio (20% Compaction of Each Lift)  
  15-18.8 pcf

Estimated buoyant unit weight  
-15 pcf

**Typical Gradation Characteristics (uncompacted) [ASTM C136/ AASHTO T 27] \(^1\)**

<table>
<thead>
<tr>
<th>D85</th>
<th>2.5&quot; (maximum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D15</td>
<td>0.375&quot; (minimum)</td>
</tr>
</tbody>
</table>

**Physical Characteristics**

**Moisture Content**

<table>
<thead>
<tr>
<th>Volumetric (%)</th>
<th>0-10 (6% typical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravimetric (%) [ASTM C566/ AASHTO T 255](^1)</td>
<td>0-60 (25% typical)</td>
</tr>
</tbody>
</table>

**Particle Specific Gravity (AASHTO T 85)**  
0.38

**Porosity**

<table>
<thead>
<tr>
<th>Uncompacted</th>
<th>0.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.25 Compression Ratio</td>
<td>0.38</td>
</tr>
</tbody>
</table>

**Soundness (% Loss)**

<table>
<thead>
<tr>
<th>Magnesium Sulfate (ASTM C88/AASHTO T 104(^1))</th>
<th>4.1-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Sulfate (ASTM C88/AASHTO T 104(^1))</td>
<td>3.1-6.9</td>
</tr>
</tbody>
</table>

**Stability**

<table>
<thead>
<tr>
<th>Angle of internal friction – loose</th>
<th>45°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angle of internal friction – up to 1200 psf (ASTM D3080(^1))</td>
<td>55°</td>
</tr>
<tr>
<td>Angle of internal friction – up to 3000 psf (ASTM D3080(^1))</td>
<td>41°</td>
</tr>
</tbody>
</table>

\(^1\)Modified test method due to particle size/density
Physical Characteristics (cont.)

Impurities
- Clay lumps (ASTM C142) 0
- Organic impurities (ASTM C40) 0
- Popouts (ASTM C151) 0

Electrical Resistance
- Lab (AASHTO T 288) 15,600 ohm-cm

Chemical Characteristics
- Ignition loss (ASTM C114) 0
- Sulfates (ppm) [AASHTO T 290] 11
- Chlorides (ppm) [AASHTO T 291] <10
- TCLP (SW-846) Non-leaching

Daily Quality Control Testing
- Bulk dry density, maximum [EN 1097-3]\(^1\) 15 pcf
- Compressive Strength at 20% Deformation, minimum [EN 1097-11]\(^1\) 15,000 psf

Advantages
- Good Insulator
- Capillary Break
- Freeze-Thaw Stable
- Rodent Resistant
- Highly-Permeable
- Volume Stable
- Non-Flammable
- Accelerated Construction

Shipping & Handling
- 100 CY/Truckload

By shipping up to 100 CY per truckload, we are not only reducing the number of trucks on the road, helping logistics, but we also are reducing the carbon footprint of your aggregate needs.

Material can also be supplied in super sacks for easy placement on sites with confined access.

\(^1\)Modified test method due to particle size/density

For more information, please visit aeroaggregates.com or call (833) 261-8499.
AeroAggregates offers in-house technical support for designers and contractors working with foamed glass aggregate. Our facility includes state-of-the-art testing equipment for both quality control, performance testing, and research and development.
Quality Controlled
Performance Tested