Foam Glass Aggregate

Uusioaines Ltd began its production of foamed glass aggregate, under the brand name of Foamit, at the beginning of 2011. The new factory is located close to Uusioaines Ltd’s glass processing plant. The factory has a production capacity of 150 000 m³/ per annum.

The foamed glass aggregate is produced from cleaned recycled glass. The product is especially suited for usage in the construction of roads, as frost-heave insulation as well as a bulk lightening material. It is also excellent as an all-round building insulator (foundation and frost heave insulator, flat roof insulator in the structure of inverted roofs), as well as a bulk lightening material for foundations. Crushed foamed glass can also be used as a capillary blocker.

- Particle size 0-60 mm
- Dry loose bulk density 210 kg/m³ +/-15%
  long term design value after compaction dependent on conditions and usage 250-350 kg/m³
- Thermal conductivity 0,1-0,2 W/mK
- Bearing module 55 - 70 MPa
- Compaction factor 1.15-1.2

Foamit foamed glass aggregate, when used as a course, works depending on the usage desired as either a lightweight filler or thermal insulator and as a dry or capillary blocking layer for both infrastructure and building construction.

In many projects Foamit can have multiple uses as it can work, for example, as both an extremely lightweight filler and as a frost insulator simultaneously. The use of Foamit in all of its most typical usages has been extensively tested in Finland.

Corresponding products have been systematically used in central Europe since the 1980’s and in Scandinavia since the beginning of the 1990’s.

The design of Foamit’s structure is based on well-established dimensioning techniques. This is used as the basis for our design guidelines that have been drawn-up with leading experts to ensure the correct dimensioning for its different applications. Diagrams can be found on our website www.foamit.fi

Foamit has widespread uses, both for new construction projects as well as renovation. Foamit is always easy to install- for any of its applications- it can be tipped straight from the truck, blown or lifted onto any jobsite.

If Foamit needs to be lifted onto the jobsite it can be lifted in reinforced big bags or even in strong plastic or cardboard containers.

Foamit is easy to compact using standard machine equipment, in accordance with the manufacturer’s instructions. Depending on the location and the equipment used, compacting can be done straight on top of Foamit or, for example, with a levelling layer of sand in between.
Applications in infrastructure construction

- roads and streets
- yard areas
- pedestrian and cycle paths
- railway embankments
- noise barriers
- pipe trenches
- sports grounds
- ground preparations

Applications in house-building construction

- basements
- foundation footings and backfill
- filler for cellar wall footings
- floors and roofs
- terrace and garden covers
- rooftop parking areas
- crawl spaces
- frost-heave penetration depth blocker

LOCATIONS WHERE FOAM GLASS IS IN USE
A pilot scheme in Kangasala, Finland

The district council of Kangasala decided to find a sustainable, long term solution for their problems with damage from frost heaving to the district streets. In Ranta-Koiviston, a former housing fair area, the streets had suffered from severe damage from frost heaving.

The council decided to conduct a trial in Ranta-Koivisto on Lehtikuusentie, to compare the results of street repairs made using traditional stone aggregate, XPS thermal insulating panels and Foamit foamed glass aggregate.
The repair of damage from frost heaving to roads and pavements is a huge financial burden to districts themselves, as well as to the Finnish state. A sensible solution would be to build structures that would be both long-lasting and able to withstand all weather conditions; but unfortunately, there may not always be sufficient funds at the investment stage.

Repairs can be expensive and laborious, meaning that any new innovations which assist in making repairs easier whilst cutting costs are welcomed.

Foamit foamed glass aggregate has proved to be just such an innovative material as its properties include excellent heat insulation, lightness and easy workability.

It has been shown that repairs made to pedestrian and cycle paths using Foamit foamed glass aggregate are an extremely cost-effective and functional solution. Pirkanmaa centre for Economic Development, Transport and the Environment has used Sito Ltd’s design with Foamit for the repair of two pedestrian/cycle paths in the districts of Sastamala and in Mänttä-Vilppula.

“The cycle and pedestrian/cycle path on main road 249 in Sastamala had suffered from very bad damage from frost heaving, both cross-sectional and longitudinal. The usability was also weakened by the formation of 15-20cm high variations in the surface of the asphalt,” stated Anne Kasari, the manager in charge of planning repairs for Sito.

In Mänttä-Vilppula the pedestrian/cycle path along road 347 had formed longitudinal cracks of around 20cm wide. They were mended in the same way as in the Sastamala project: by digging up the old path and replacing the old material, damaged by frost heaving, with a layer of Foamit foamed glass aggregate, on top of which was added a further layer of crushed stone aggregate before surfacing.

The City of Vantaa built a sports field in the district of Hakunila in the 1970’s. The subsoil is made up of a thick layer of clay resulting in the need for the sport’s grounds maintenance building, among others, to be piled.

In order to avoid settlement differences between the building and its surroundings the sensible solution was to use a lightweight bulk filling material for the technical municipalities’ area.

“We wanted to use foamed glass aggregate in repairs to the technical municipalities in the yard area. This choice has proven to be the most sensible solution as it has been an excellent material. It has been highly resistant to movement upon it and the course has settled well and kept its shape,” said site manager Matti Martikainen from the City council of Vantaa.
The town of Porvoo is, from a subsoil point of view, a demanding area for construction. The subsoil is formed from clay from an ancient sea bed whose load bearing capacity and settlement properties are insufficient without ground conformation or bulk lightening. Estinmäki belongs to this group of areas whose subsoil, from a technical construction point of view, is extremely difficult to work with.

Hamppukuja is a street built in the Eestinmäki area in 1974. Over the last decades the street has sunk by up to a metre and during flood periods the road has been in a near unusable state. When the decision was made to repair Hamppukuja the work took place at a fast pace. A plan was drawn up in accordance with Ramboll Finland Ltd’s requirements and bulk lightening was achieved over a 6-10m thick layer of clay with a 55-85cm layer of Foamit foamed glass aggregate.

The use of foamed glass in the project was decided by Juha Forsmann of Ramboll. His decision was based on a thorough technical and economic alignment optimization methodology. “The final decision was made when we were convinced about the new products excellent load-bearing capacity and workability. Due to foamed glass’s excellent friction angle properties the foamed glass layer has stayed together well,” explains Kari Hällström, Porvoo council’s head of planning.

A 40cm thick stone crush aggregate was installed on top of the Foamit foamed glass aggregate. Foamit was also used as circumference bulk filler on the repairs to the area of the same street’s sewer lines.

“The product has proven to be easy and pleasant to work with, as well as having excellent load-bearing capacities,” states site manager, master-builder Juha Valkonen from Porvoo City council.
Finland’s first Ikano department store was completed very close to IKEA’s department store in Vantaa. Due to the fact that the building would be erected on a brand new plot the construction of the technical municipalities system of pipe trenches was very extensive.

The area’s subsoil has poor load-bearing capacity as it is made up of weak cohesion soil, meaning that it would be most sensible if the bulk site filler would be as light as possible.

Ikano’s main contractor, Peab Rakennus Ltd, chose Foamit foamed glass aggregate as the lightweight bulk filler for the system of underground sewage trenches.

“We chose Foamit as the lightweight bulk filler for the sewage trench system as it is extremely lightweight so it forms a significantly smaller load on the sand and the lower layer of clay subsoil. This also removed the load on the sewage and drainage system itself,” said Project Manager Markku Luolakari of Peab Rakennus Ltd.

Forssan resident Niko Järvi decided to build the foundations of his energy saving Passive House using Foamit foamed glass aggregate.

He explained his decision to use Foamit as follows: “Foam glass as well as being an excellent capillary blocker, is also a fantastic insulator. This means that by using Foamit I could save money on material costs as well as labour costs, as I did not need a layer of EPS. This also meant that it took away the need for another building phase in the basement. The importance in reduction of building phases was vital, as my building plot is on a slope, so the use of machinery bought about its own challenges.”
Three blocks of flats are being built to be used as sheltered housing for the elderly on Helsinginkatu 13 in the Tuomaansilta area of Turku. The building plot’s land is geologically typical of the Turku area in that it is made up of a 40m thick layer of loose clay. This meant that the yard area’s structures had to be planned as settlement-resistant whilst also being able to withstand heavy loads.

It was decided that a lightweight bulk filler was needed for the project and so Foamit foamed glass aggregate was chosen. This solution minimised the overall load on the subsoil.

Even though Foamit is an extremely lightweight material its bearing capacity properties are well proven.

NCC Rakennus Ltd the main contractor for the site, used thousands of cubic metres of Foamit for the project.

The bulk lightening layer thickness varied between 1-2 metres. The Foamit material was compacted by driving twice over the installation site in a digger which resulted in the Foamit layer compacting in size by around 15 percent. No other compaction was needed in this case, and the compacted Foamit layer has worked as a very stable and load bearing foundation.

The use of foamed glass aggregate has established itself permanently in all the Scandinavian countries. In recent times the demand for foamed glass has grown exponentially in both Sweden and Norway. Uusioaines Ltd has delivered foamed glass aggregate to countless infrastructure projects all over Scandinavia.

In Sweden many of the foamed glass bulk lightening projects involve road repairs and the goal is to make old roads less susceptible to settlement and therefore safer.
Foamed glass aggregate sales

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