



FOAMGLAS®

**FOAMGLAS® INSULATION
FOR HOT TANK BASE APPLICATIONS**



FOAMGLAS® INSULATION



MATERIAL FEATURES

Thanks to its special set of properties, FOAMGLAS® insulation fulfils even the most stringent requirements. Because of its hermetically sealed cell structure, cellular glass is extremely incompressible, absolutely waterproof and sealed against vapour diffusion, and does not absorb any moisture.

The closed cell structure means that FOAMGLAS® insulation is the one of the few insulation materials where the vapour barrier is already “built-in” the material structure.

1 Waterproof

FOAMGLAS® insulation is water-proof because it consists of pure glass so it does not absorb any moisture and does not swell.

2 Pest-proof

FOAMGLAS® insulation cannot rot and is pest-proof because it is inorganic. This reduces the risk for use with for tank bases and buried applications as there is no basis for nesting, breeding or seed germination.

3 High compressive strength

FOAMGLAS® insulation is extraordinarily in-compressible without deformation even with long-term loads due to its cell geometry. This makes it an ideal material for high load bearing tank applications?

4 Incombustible

FOAMGLAS® insulation cannot burn because it consists of pure glass. Fire behaviour classification: EN 13501: A1. ASTM E84 flame spread 0 /Smoke development 0.

5 Vapour-tight

FOAMGLAS® insulation is vapour-tight because it consists of hermetically sealed glass cells. It doesn't become wet or transmit moisture. Constant thermal insulation value over decades. The vapour barrier consists of the full thickness of FOAMGLAS® insulation.

6 Dimensionally stable

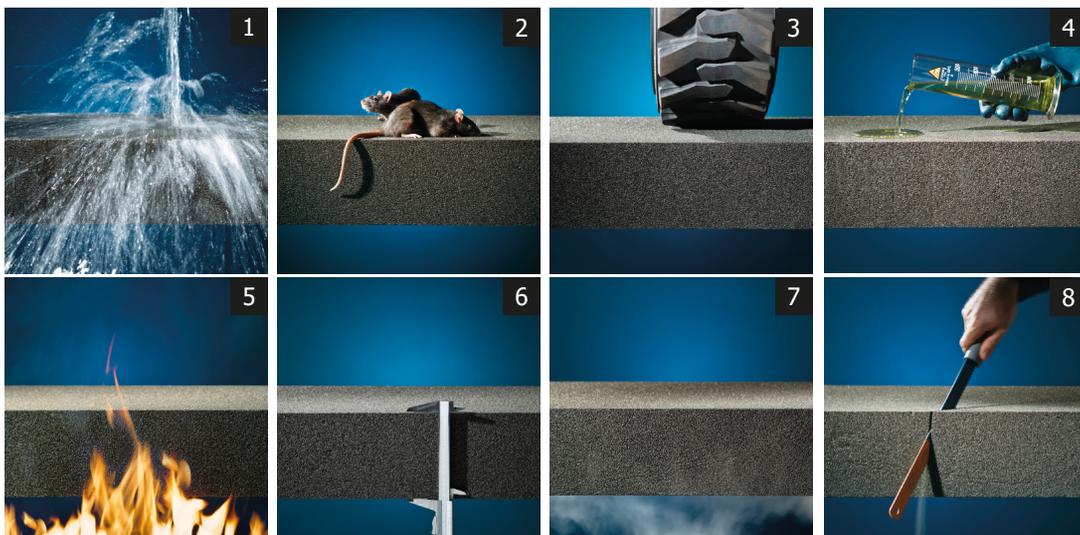
FOAMGLAS® is dimensionally stable because glass neither shrinks nor swells. No warping, contracting or creep. Low coefficient of expansion, nearly equal to that of steel and concrete.

7 Acid-resistant

FOAMGLAS® insulation is resistant to organic solvents and acids because it consists of pure glass.

8 Easy to work with

FOAMGLAS® insulation is easy to work with because it consists of thin-walled glass cells. FOAMGLAS® insulation can be cut to any desired measurement with simple tools like a saw blade or hand saw.



FOAMGLAS® HIGH LOAD BEARING INSULATION

FOAMGLAS® HLB BLOCK INSULATION



PRODUCT FEATURES

FOAMGLAS® High Load Bearing Cellular Glass Insulation is specially designed for high load bearing industrial applications and are specifically manufactured to meet the needs of the tank base industry worldwide.

Its combination of high compressive strength and low thermal conductivity makes it ideal for a wide range of tank base construction and other industrial load bearing applications.

FOAMGLAS® HLB insulation offers superior insulation properties with a stable and a non-deteriorating insulation efficiency which ensures a constant thermal performance that remains unchanged over time.

Physical Properties

PROPERTY	TEST METHOD	VALUE
Service temperature limits		-265 °C to +430 °C
Thickness ± 2 mm	EN 823	40 to 180 mm
Reaction to fire	EN 13501-1	Euroclass A1
Point load	EN 12430	PL ≤ 1 mm
Bending strength	EN 12089	BS ≥ 500 kPa
Compressive Creep	EN 1606	CC (1.5/1/50) ≥ 225 kPa
Tensile strength	EN 1607	TR ≥ 150 kPa
Trace quantities of water soluble chloride	EN 13468	CL ≤ 2 mg/kg
Water vapour resistance	EN ISO 10456	μ = ∞
Melting point	DIN 4102-7	> 1000 °C
Coefficient of thermal expansion	EN 13471	9 x 10 ⁻⁶ K ⁻¹

	HLB 800	HLB 1000	HLB 1200	HLB 1400	HLB 1600	HLB 2400
Density (± 15%)	800 kg/m ³	1000 kg/m ³	1200 kg/m ³	1400 kg/m ³	1600 kg/m ³	2400 kg/m ³
Compressive strength	800 kPa	1000 kPa	1200 kPa	1400 kPa	1600 kPa	2400 kPa
λ _D -value at 10 °C	0.044 W/(m•K)	0.046 W/(m•K)	0.048 W/(m•K)	0.049 W/(m•K)	0.050 W/(m•K)	0.058

TANK AND STORAGE APPLICATIONS

Storage tanks are used to hold a variety of organic liquids or gases including raw materials, intermediates, final products or usable byproducts. Each year, large amounts of energy is wasted due to hot storage tanks not having proper insulation.

Tanks can vary in design and equipment, and the type of construction depends on the storage temperature and properties of the products being stored. A detailed assessment is necessary to ensure that all aspects are taken into consideration, so products can be stored and handled in the safest and most efficient manner.

The growing worldwide demand for chemical products, as well as proper storage and handling, makes ensuring energy efficiency and the safety of storage tanks even more important.

With rising energy costs and an increased focus on energy efficiency, sustainability and overall safety around tanks, not having a tank base insulation system underneath your hot storage tank has become almost unimaginable.



ENERGY LOSS IN HEATED STORAGE TANKS

When tanks operate above ambient conditions, the tank walls and roofs are often viewed as the main sources of energy loss. However, the heat loss at tank walls and roof will fluctuate when the liquid level increases or decreases but the heat loss through the bottom will always remain constant.

Depending on the storage temperature and tank size, heat loss through the tank bottom can run up to $>250 \text{ W/m}^2$ (80 BTU/h·ft²) leading to large yearly energy losses that would accumulate to hundreds of thousands of euros over the lifetime of the tank.

Energy loss can also have adverse effects on the quality of the stored content. A decrease in temperature inside a hot storage tank can lead to an increase in viscosity or even product solidification. Therefore, when maintaining tank content quality is a key requirement, a tank base insulation system should always be specified for all tanks operating above ambient conditions.

WHAT ABOUT CARBON EMISSIONS?

Globally, heat accounts for nearly half of energy-related carbon emissions. Therefore, losing large amounts of heat leads to high amounts of unnecessary carbon emissions for your facility. In times when processing facilities and terminals are focussing on reducing their overall carbon footprint, it is inevitable that every opportunity to reduce heat losses and corresponding emissions should be grasped fully.

WHAT ARE THE BENEFITS

THE BENEFITS OF A FOAMGLAS® INSULATION TANK BASE SYSTEMS FOR ABOVE AMBIENT TANKS

Energy and emissions savings

One of the easiest and most cost-effective ways to immediately save energy and reduce emissions is installing a FOAMGLAS® cellular glass insulation system underneath your heated storage tank. Insulating the tank base can effectively reduce the heat loss through the bottom up to 90% and cut the corresponding emissions.

The insulation value of cellular glass insulation also does not change during its lifespan, which helps to ensure constant and lasting energy savings. This allows for easy calculation of the yearly energy savings, payback periods, annual financial yields and, saved emissions over the lifetime of the tank.

High compressive strength

It is important to consider using an insulation material that can withstand high loads suitable for tank base applications. Insufficient compressive strength can lead to settlement, loss of mechanical and thermal performance and consequently issues with the quality of the tank content.

Our insulation blocks are available in high load bearing grades that have been specially designed for tank base applications and can deliver a compressive strength up to 160 t/m² without any compression.

A more cost-effective installation of the concrete foundation

Installing a tank base insulation system helps to protect the structural concrete base against the high temperatures of the tank content. This means that the reinforced concrete foundation can be installed more economically as less reinforcement may be required to reach the same mechanical performance.

Helps mitigate corrosion-related issues

A FOAMGLAS® insulation tank base system can also help protect the steel base structure of the tank against moisture and corrosion-related issues.

Throughout its lifespan, a typical storage tank may be used for different purposes, or operate under cyclic temperatures, creating an environment where corrosion could become an issue if the tank is not properly insulated. Corrosion of the tank structure can compromise the mechanical integrity of the tank possibly leading to rupture in the steel bottom or subsidence of the tank walls. This can have a large economical impact by causing unscheduled shutdowns, damage the adjacent equipment and cause product contamination.



WHAT ARE THE BENEFITS

THE BENEFITS OF A FOAMGLAS® INSULATION TANK BASE SYSTEMS FOR ABOVE AMBIENT TANKS

Simple design with profitable installation costs

FOAMGLAS® insulation offers a simple alternative for the insulation of tank bottoms. The installation costs are reduced by the simplicity of construction and the use of economic materials.

Our system can be installed with a built-in slope

FOAMGLAS® insulation can be delivered to the project site with a predefined built-in slope which makes it easy to create a fall for drainage. It also makes it possible to work with a flat base slab.

Short payback periods

Tank builders and terminal owners can call on the expertise of Owens Corning's technical services team to assist with the calculation of payback periods and annual yields of the investment in a FOAMGLAS® HLB insulation tank base insulation system.

These calculations consider all relevant factors such as temperatures and local energy prices. For each project, the heat lost through the base without insulation is calculated and compared with the total investment cost. This provides the total payback period of the investment in a FOAMGLAS® tank base insulation system, which can be as short as merely months depending on the storage temperature of the contained liquid.

In addition, the total future yield of the investment is calculated for the active life of the tank with an insulated tank base. This shows the amount of energy saved per area of insulated tank base, and the total yield per year after the payback period.



ENERGY & CO2 SAVINGS AND FINANCIAL YIELDS

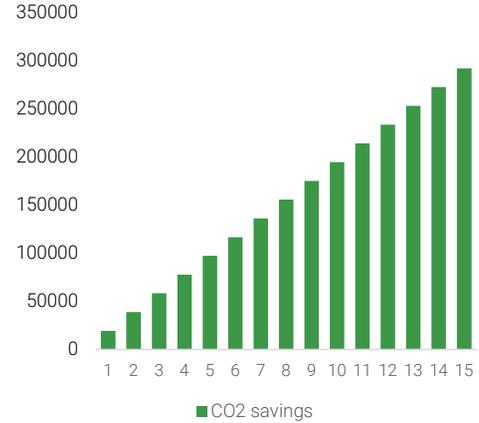
Bitumen storage tank, ø 25 meter, storage temperature: 150 °C*

Calculation for 100 mm FOAMGLAS® HLB 800 insulation vs uninsulated tank base

Yearly average heat loss - uninsulated tank base:	171.9 W/m²
Yearly average heat loss - insulated tank base:	56.5 W/m²
Energy savings if energy cost = 0.12 EUR/kWh:	496 226 kWh/year
Payback time if investment cost= 187,5 EUR/m ² :	14.2 months
CO2 emissions savings	243 151 kg/year

For a lifetime of 15 years:

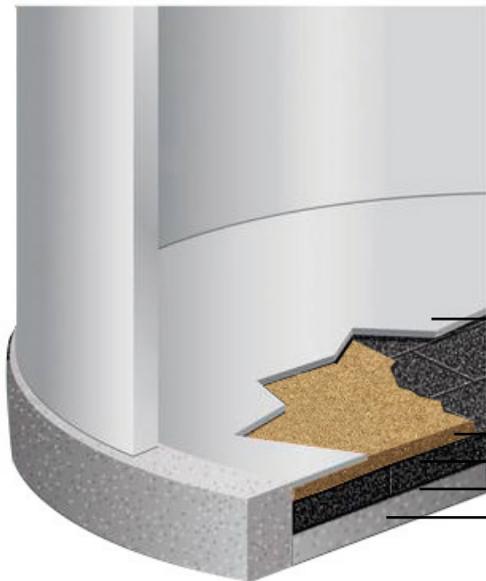
Cost of investment:	188 EUR/m²
Total profit of energy:	€ 893 207
Total CO2 emissions savings:	3 647 264 kg
Total CO2 tax savings:	€ 291 781
Yearly ROI:	20.7 %/year



*Based on a 2023 European project and calculated with regional cost prices

SYSTEMS AND PRODUCTS

SYSTEM BUILD-UP FOR TANKS OPERATING AT ABOVE AMBIENT TEMPERATURES



GENERAL INFORMATION

The compressive strength of FOAMGLAS® cellular glass applied with hot bitumen or a PC® adhesive and capped with oil mixed sand is lower than the published compressive strength measured under ASTM/EN conditions.

- 5 Tank
- 4 Pressure distributing layer
- 3 FOAMGLAS® HLB insulation
- 2 PC® Tank base adhesive
- 1 Concrete base

FOAMGLAS® INSULATION INSTALLATION GUIDE SPECIFICATIONS

We maintain FOAMGLAS® insulation installation guide specifications for a wide variety of commercial and industrial insulation systems, including hot tank base applications, to assist engineers, contractors and facility owners with all aspects of the design, installation and maintenance of their insulation systems. Our experienced Technical Services Engineers will provide you with personalized support and documentation to enable you to achieve your objectives using high-quality, reliable FOAMGLAS® insulation systems.

PC® ACCESSORIES FOR SPECIFIC USE WITH ABOVE AMBIENT TANK BASE APPLICATIONS

PC® 500



PRODUCT FEATURES

A single component bituminous adhesive with low solvent content and a high content of extenders. It retains long-term flexibility, does not freeze, and is thixotropic. PC® 500 is used for the full bonding of FOAMGLAS® slabs to concrete substrates in specific load bearing applications.

Service Temperature Limits

-30 °C to 80 °C

SOLUTIONS FOR EXISTING TANKS

Modus operandi for existing tanks - installation method #1

- Tank completely made empty of content
- Degassing and regulatory controls/protocol for internal access
- Cutting of an access into the steel wall of the tank. The access should be high enough for workers (2 meters) and wide enough to allow the access of a wheelbarrow
- Cleaning the tank bottom of the remaining existing products as much as possible to bring a reasonable flatness
- A layer of compacted sand
- An appropriate interleaving layer
- A layer of FOAMGLAS® HLB insulation
- An appropriate interleaving layer
- Lean concrete
- New steel tank bottom

Modus operandi for existing tanks - installation method #2

- Tank completely made empty of content
- Degassing and regulatory controls/protocol for internal access
- Lifting of the existing tank by positioning it on jacks
- Metallurgical repairs on tank bottom
- Inspection of existing concrete tank base and executing repairs when needed
- Complete gluing of first layer of FOAMGLAS® HLB insulation to the existing concrete slab with a PC® adhesive
- An interleaving layer of PC® 85 with a reinforced glass cloth
- OPTIONAL: a second layer of FOAMGLAS® HLB insulation
- An appropriate pressure distribution layer
- Lowering of tank on the newly insulated tank base







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