

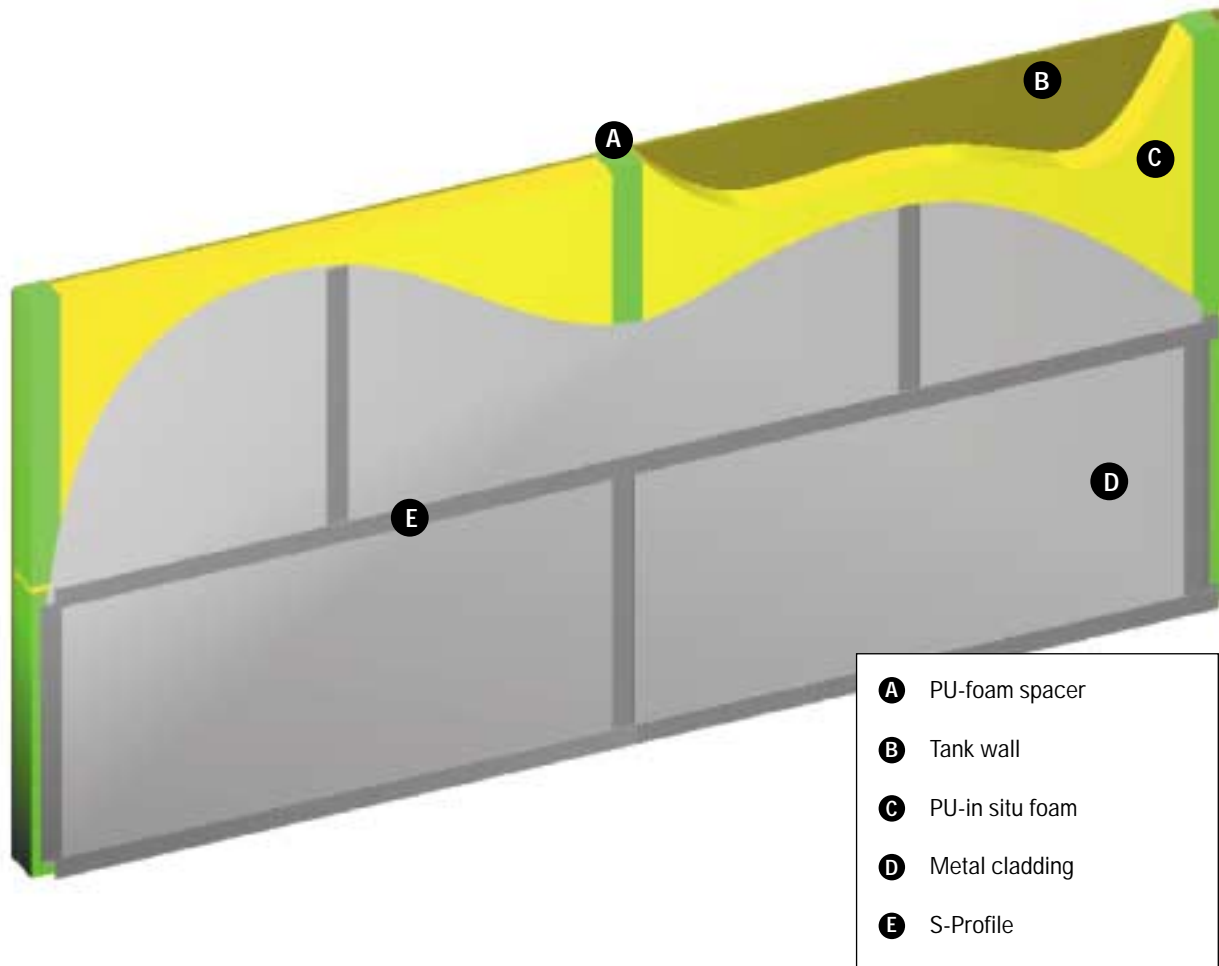
Foam In Situ Insulation System LPG Cargo Tanks

Insulation Technology



FOAM IN SITU INSULATION SYSTEM FOR PRISMATIC TANKS

- Injection of liquid polyurethane foam into open moulds
- The moulds are limited towards tank surface, metal cladding and spacers
- One open end minimise pressure towards cladding
- Foam machine operator has visual control of the mould filling
- Application condition; Dry and clean tank surface, temp > 5°C



Advantages with Foam In Situ Insulation

- Insulation with complete bonding to all surfaces gives:
 - No space for penetration or accumulation of moisture
 - Good corrosion protection
- Flexible cladding joints by use of S-profiles:
 - Allow for contraction/expansion reducing the stress and preventing damage to the cladding
- No joints in the foam gives:
 - Homogeneous insulation which increase the insulation efficiency.

Advantages with our insulation systems

- High production efficiency giving short installation production time
- Low material consumption
- Fewer components giving easy material handling
- Small storage volumes
- Easy to insulate uneven surfaces, corners, supports and odd geometrical shapes.
- Flexible application, on land, onboard or in combination (cargo tanks for more than 60 vessels insulated onboard)

MOULDING SYSTEM FOR PRISMATIC TANKS

Purpose

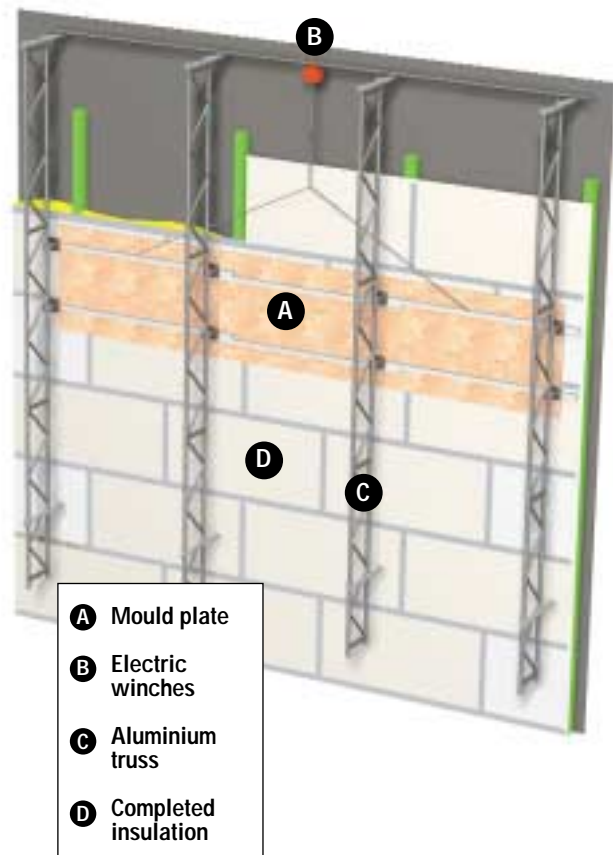
- Moulding system developed for on land insulation.
To resist the pressure from the expanding foam.
To keep the cladding in position, to get the correct insulation thickness and avoid deformation on the cladding.
To achieve good productivity and quality of the insulation.



Insulation work on upper-sloped side.

How

- Mould plates resist the pressure from the expanding foam.
The pressure from the mould plates is transferred to support rack made of aluminium truss works fixed to the tank by stud bolts.
Electric winches move the sliding mould plates.
The system is easy to install, and gives excellent quality and productivity.



LPG - FSO Cargo tanks On board insulation



On Board Insulation

A modified version of the system is designed for onboard insulation. This system is in general similar to the on land system, except from the aluminium trusses. The trusses are not used due to the narrow space on board. The pressure from the mould plates is transferred to the hull structure. Drawing at left showing this insulation system on board in a LPG-FSO.

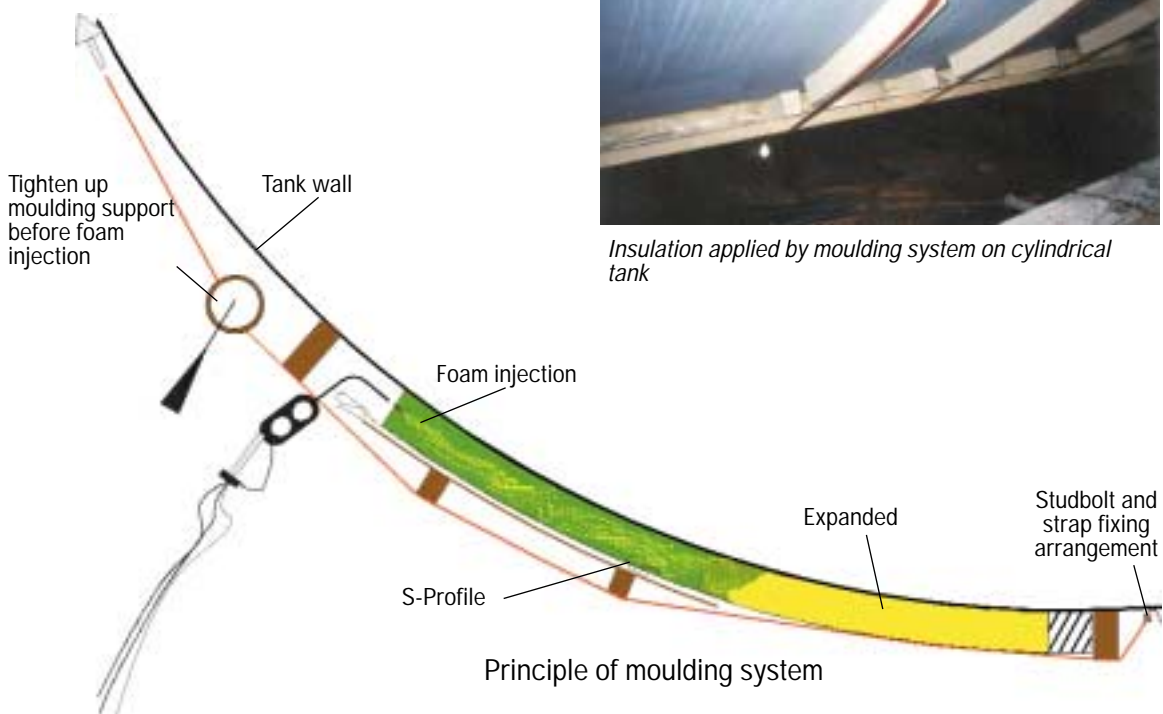
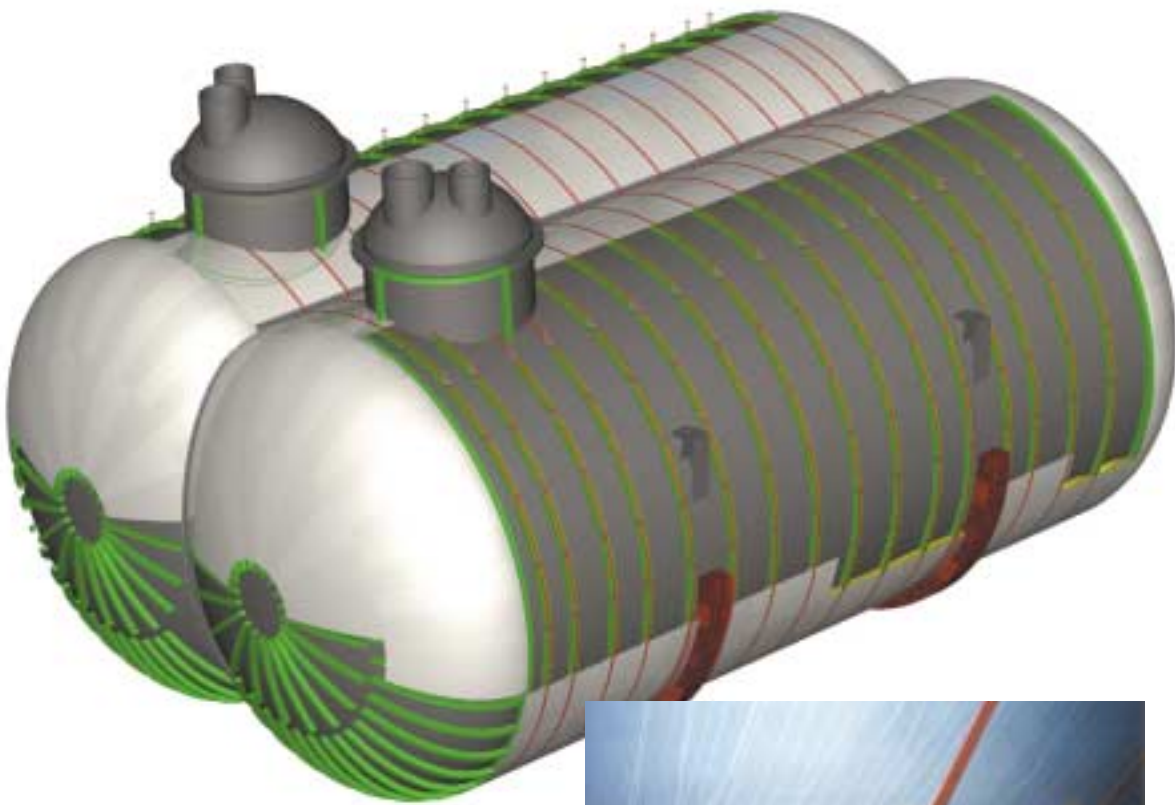
MOULDING SYSTEM FOR BILOBE TANKS

Purpose

- Moulding system developed for on land and onboard insulation.
To resist the pressure from the expanding foam.
To keep the cladding in position, to get the correct insulation thickness and avoid deformation on the cladding.
To achieve good productivity and quality on the insulation.

How

- Mould plates resist the pressure from the expanding foam.
The pressure from the mould plates is transferred to strapping band fixed to the top and bottom of the tank.
The system is easy to install, and gives the best quality and productivity.



Insulation applied by moulding system on cylindrical tank

INSULATION COMPONENTS

POLYURETHANE FOAM IN SITU

Premixed polyols and isocyanate of MDI type.

Foam density 40kg/m³ +- 10%

Flammability, B2 - DIN 4102, Part 2

POLYURETHANE FOAM SPACER

Spacers made of rigid polyurethane foam with density 40kg/m³ +- 5%.

Flammability, B2 - DIN 4102, Part 2

Dimension: Insulation thickness x 100mm x 1000mm

METAL CLADDING

External metal cladding made of 0,5mm to 0,9mm Alu-Zink steel plates.

(Alternatives: Galvanised or stainless steel).

S-PROFILE

Joints between cladding are made of prefabricated S-profiles.

The S-profiles are made of the same materials as the cladding.

POP-RIVETS

TLP/D 3,8mm/4,8mm x 9mm

SEALANT

Polyurethane based sealant.

GASKET/SEALANT BAND

Non curing, flexible sealing band

1,5 x 40mm or 1,5 x 20mm

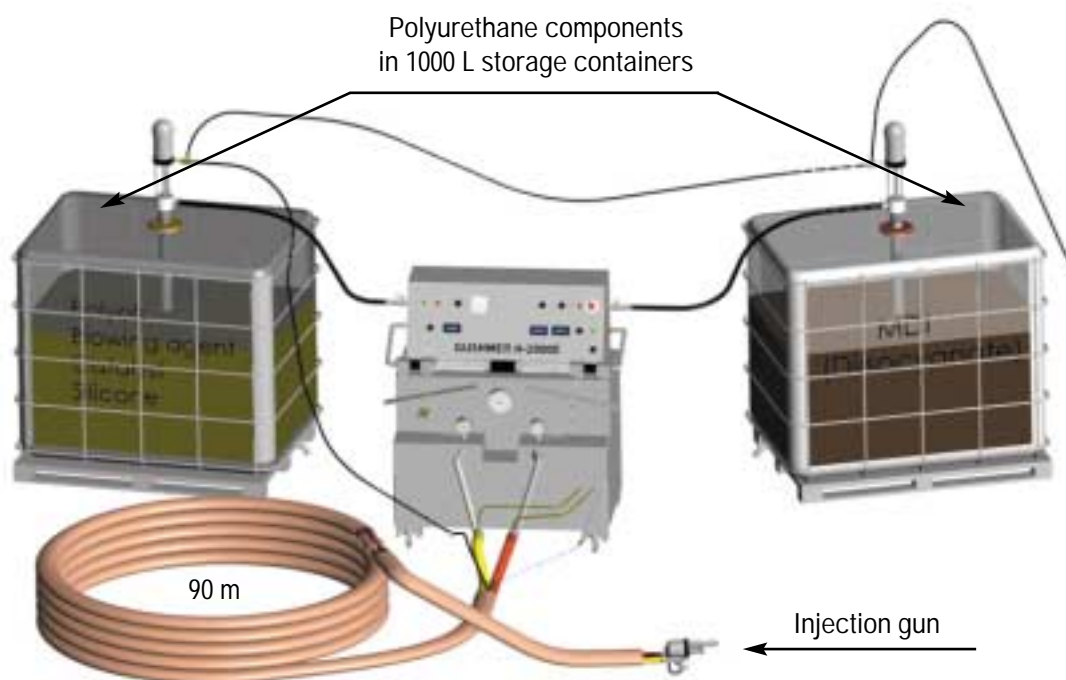
ADHESIVES

Two component Polyurethane adhesive

One component Contact adhesive

The insulation system is based on 8 to 10 standard material components. The Polyurethane is stored as liquid components. This simplifies the material handling and minimises required storage areas.

FOAMING MACHINE



A matter of confidence

The real work starts when the contract is negotiated. Work must commence on time and be carried out as planned. With the size and complexity of many projects, there is no substitute for experience and know-how. Choosing the right contractor is a matter of confidence.



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