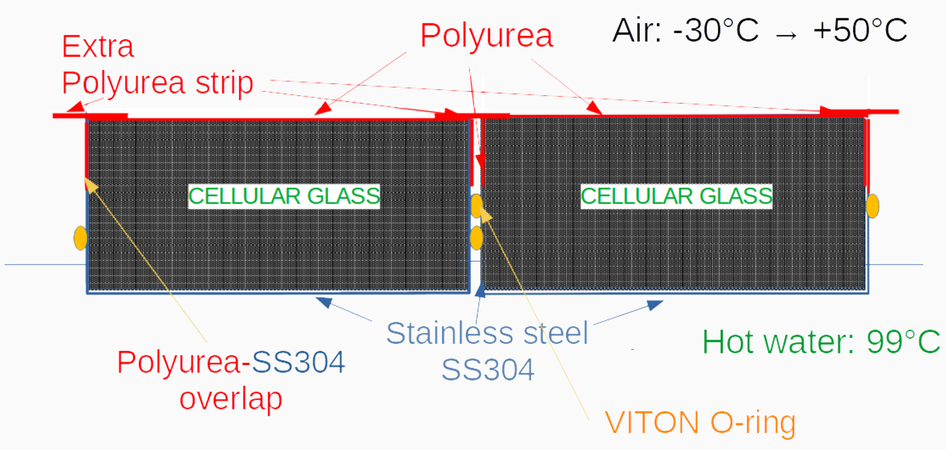
A durable PTES Lid made from **CELLULAR GLASS** and **STEEL**

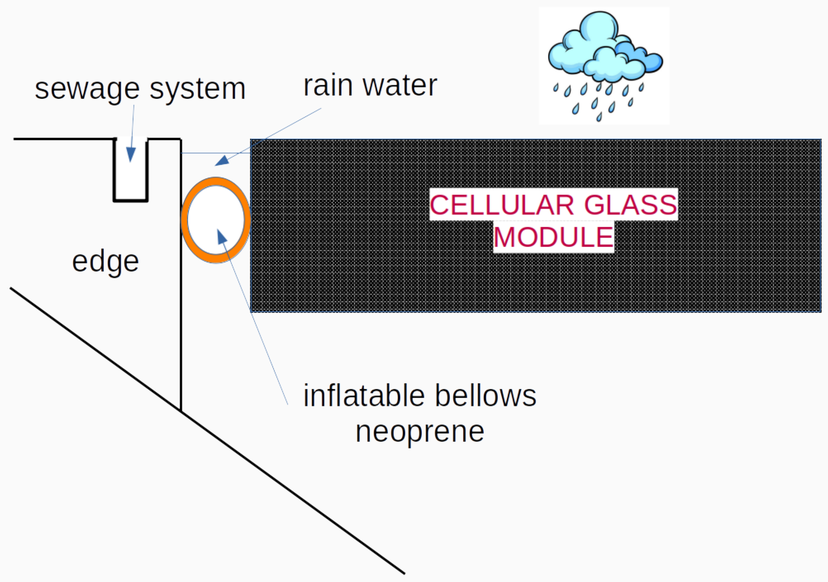
Walter Frank and Hans Strauven
GLAPOR Werk Mitterteich GmbH

The ideal lid for a PTES has a constant thermal resistance for at least 50 years, is able to resist 99°C hot water and allows a second function on top of the lid. Therefore, we design a lid, constructed from large modules with **cellular glass** and lined with **stainless steel SS304L** against corrosion. Stainless steel and (cellular) glass have a nearly matching small thermal expansion coefficient. To allow a double function on top of the pontoon, we use **polyurea**, which is already known as well-functioning flat roof waterproofing layer and hot water tank lining.

Construction and connection of the modules

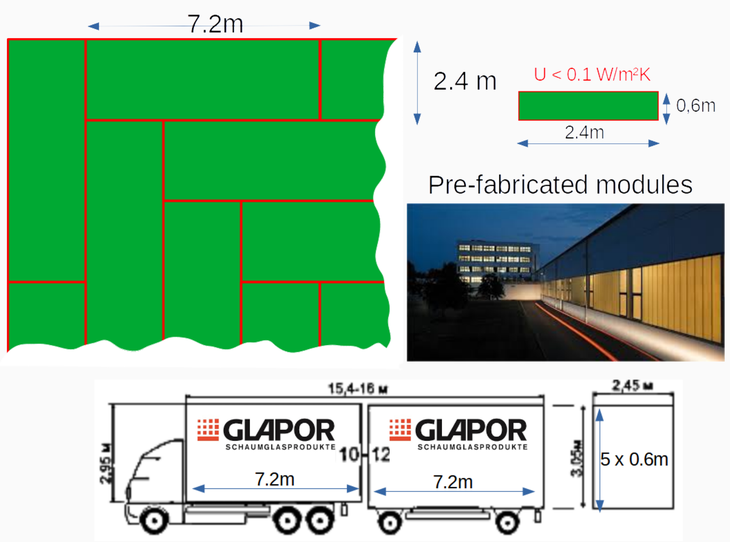


Edge of the pontoon with watertight seal

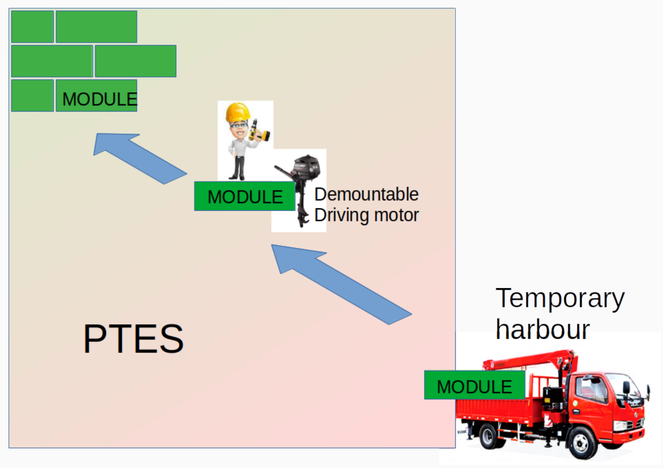


The folded SS304L-stainless steel forms a liner around the under halve of the cellular glass without welding. On top of the module and the upper halve, hot polyurea is sprayed with some overlap on the stainless steel. This forms the cover of the cellular glass against hot water corrosion and freeze and thaw on the top. The modules are connected on each other with another strip polyurea, when installed on the water. At the edge, an inflatable Neoprene bellows seals the PTES and allows thermal expansion.

Pontoon with modules in parket configuration



Installation of the modules on the water



The modules are pre-fabricated in a factory and can be efficiently transported in 7.2x2.4m format. The trucks are unloaded at the "temporary harbour". The modules are equipped with a driving motor and put on the water with a small 2 ton crane. A worker can navigate the module exactly against the already built pontoon, before fixing with an extra strip polyurea.

Floating pontoon experiment at RWTH Aachen

Cost of raw materials for the pontoon

U=0.1 W/m²K for 50 years

Material	**Cost (€/m²)**
Cellular glass: 600mm	215
Stainless steel SS304L: 0.3mm	20 ??
Polyurea: 2mm	15 ??
Brut estimate total	**250**
Return land (double function)	-100
Net estimate Total	**150**