

CLAIMS

- [Claim 1] Storage installation (1) for liquefied gas comprising a supporting structure (2) and a sealed and thermally insulated tank, the tank including at least one bottom wall (4) attached to the supporting structure (2), in which the bottom wall (4) comprises a multilayer structure in a thickness direction, including at least one sealing membrane (5, 7) and at least one thermally insulating barrier (4, 6) arranged between the sealing membrane (5, 7) and the supporting structure (2),
in which the bottom wall (4) wall includes a sump structure (9) interrupting the sealing membrane (5, 7) of the bottom wall (4) locally, the sump structure (9) having a container (11) comprising a side wall (15), the container (11) being arranged through the thickness of the bottom wall (4) and being located at least partially in a well (8) formed in the supporting structure (2), the well (8) extending towards the outside of the tank (71) along a well axis (39), and the sump structure (9) comprising a metal support ring (18) attached all around the side wall (15), in such a manner as to protrude from the container (11) in a radial direction towards the outside of the container (11),
in which the storage installation (1) includes at least one support beam (19) attached to the supporting structure (2) and arranged around the well (8), the support beam (19) including at least one mastic layer (20) extending parallel to the supporting structure (2), the metal support ring (18) of the sump structure (9) being configured to rest on the support beam (19).
- [Claim 2] Storage installation (1) according to Claim 1, in which the support beam (19) includes, in the direction parallel to the well axis (39), the mastic layer (20), a plywood layer (21) and a metal layer (22), the metal support ring (18) of the sump structure (9) being configured to rest on the metal layer (22) of the support beam (19).
- [Claim 3] Storage installation (1) according to Claim 1 or Claim 2, in which the supporting structure (2) includes a flat supporting wall drilled with an opening forming a well entrance (8), the at least one support beam (19) being attached to the flat supporting wall around the opening.
- [Claim 4] Storage installation (1) according to any one of Claims 1 to 3, in which the container (11) and the well (8) have a cylindrical shape with a circular cross-section and the storage installation (1) includes at least two support beams (19), each beam having an annular sector shape.

- [Claim 5] Storage installation (1) according to Claim 4, in which the at least two support beams (19) are sized in such a manner that the sum of the annular sectors of the support beams (19) forms an annular sector of at least 180°.
- [Claim 6] Storage installation (1) according to Claim 4 or Claim 5, in which the storage installation (1) includes at least one stop (33) attached to the supporting structure (2) and located between two support beams (19) in a circumferential direction around the well, the metal support ring (18) including a notch (32) in which the stop (33) is housed, the notch (32) having a shape configured to limit, in cooperation with the stop (33), the movement of the sump structure (9) in the circumferential direction and to restrict the movement of the sump structure (9) in the radial direction.
- [Claim 7] Storage installation (1) according to Claim 6, in which the storage installation (1) includes four support beams (19) evenly distributed around the well (8) and four stops (33) evenly distributed around the well, the sealing membrane (5, 7) having a first series of parallel corrugations extending in a first direction and a second series of parallel corrugations extending in a second direction, two of the four stops (33) being aligned with the centre of the container (11) in the first direction and the other two of the four stops (33) being aligned with the centre of the container (11) in the second direction.
- [Claim 8] Storage installation (1) according to any one of Claims 1 to 7, in which the storage installation (1) includes a film (24) arranged between the mastic layer (20) and the supporting structure (2) in a direction parallel to the well axis (39), the film (24) being configured to prevent the mastic layer (20) from adhering to the supporting structure (2).
- [Claim 9] Storage installation (1) according to any one of Claims 1 to 8, in which the storage installation (1) includes at least one anti-lifting plate attached to the support beam (19), the metal support ring (18) being interposed between the support beam (19) and the at least one anti-lifting plate (35).
- [Claim 10] Storage installation (1) according to any one of Claims 1 to 9, in which the well axis (39) is an axis of revolution of the well (39) and the sump structure has an axis of revolution of the sump structure (40), the axis of revolution of the well (39) and the axis of revolution of the sump structure (40) being parallel and spaced apart from one another by a distance ranging between 0 and 30 mm.
- [Claim 11] Vessel (70) for transporting a cold liquid product, said vessel having a double hull (72) and a storage installation (1) according to any one of Claims 1 to 10 arranged within the double hull.

[Claim 12] Transfer system for a cold liquid product, said system including a vessel (70) according to Claim 11, insulated pipelines (73, 79, 76, 81) arranged in such a manner as to connect the tank (71) installed in the hull of the vessel to a floating or onshore (77) storage installation (1), and a pump for driving a flow of cold liquid product through the insulated pipelines from or to the floating or onshore storage installation (1) to or from the tank of the vessel.

[Claim 13] Method for assembling a sump structure (9) of a storage installation (1) for liquefied gas, the storage installation comprising a supporting structure (2) and a sealed and thermally insulated tank (71), in which the method comprises the following steps:

- providing the supporting structure (2) including a well (8), said well (8) extending towards the outside of the tank along a well axis (39),
- providing a sump structure (9) comprising a container (11) having a side wall (15), and the sump structure (9) comprising a metal support ring (18) fixed all around the side wall (15) in such a manner as to protrude from the container (11) in a radial direction towards the outside of the container (11),
- attaching supporting feet (25) and at least one support beam (19) to the supporting structure (2), in such a manner that the supporting feet (25) and the support beam (19) are arranged around the well (8), the support beam (19) including at least one mastic layer (20) extending parallel to the supporting structure (2),
- lowering the sump structure (9) in such a manner as to place the metal support ring (18) on the at least one support beam (19) and to position the container (11) in the well (8) at least partially,
- adjusting the centring and inclination of the sump structure (9) with the help of the supporting feet (25),
- waiting for the mastic layer (20) to polymerize,
- removing the supporting feet (25).

[Claim 14] Method for assembling a sump structure (9) of a storage installation (1) for liquefied gas, the storage installation comprising a supporting structure (2) and a sealed and thermally insulated tank (71), in which the method comprises the following steps:

- providing the supporting structure (2) including a well (8), said well (8) extending towards the outside of the tank along a well axis (39),
- providing a sump structure (9) comprising a container (11) having a side wall (15), and the sump structure (9) comprising a metal support ring (18) fixed all around the

side wall (15) in such a manner as to protrude from the container (11) in a radial direction towards the outside of the container (11),

- preassembling a portion of at least one support beam (19) on the metal support ring (18),

- attaching supporting feet (25) to the supporting structure (2) in such a manner that the supporting feet (25) are disposed around the well (8),

- placing a mastic layer (20) belonging to the at least one support beam (19) around the well,

- lowering the sump structure (9) in such a manner as to place the portion of the at least one support beam (19) on the mastic layer (20) and to at least partially position the container (11) in the well (8),

- adjusting the centring and inclination of the sump structure (9) with the help of the supporting feet (25),

- waiting for the mastic layer (20) to polymerize,

- removing the supporting feet (25).

[Claim 15] Method for loading or unloading a vessel (70), in which a cold liquid product is conveyed through insulated pipelines (73, 79, 76, 81) from or to a floating or onshore (77) storage installation (1) to or from the tank (71) of the vessel (70) according to Claim 11.