

CLAIMS

1. A fluid-tight and thermally insulative fluid tank, in which a tank wall includes at least one thermal insulation barrier and one sealing membrane, the sealing membrane including a series of parallel corrugations having a longitudinal direction and plane portions situated between said corrugations, said corrugations projecting from the plane portions on a side projecting from the sealing membrane, a thermal insulation barrier being disposed on the side projecting from the sealing membrane,
 - said thermal insulation barrier including a series of parallel grooves in which are housed the corrugations,
 - and in which said groove has a width in a widthwise direction perpendicular to the longitudinal direction of the corrugations greater than the width in said widthwise direction of the corrugation housed in said groove,
 - the thermal insulation barrier further including a housing, a widthwise axis of said housing in the widthwise direction of the groove intersecting said groove, said housing having a width greater than the width of the groove,
 - the tank further including a blocking member arranged in the housing, the blocking member having a width greater than the width of the groove, the blocking member having a cut-out configured to receive the corrugation,
 - the blocking member being arranged in the housing in such a manner that the cut-out is housed in the groove and the corrugation is housed in the cut-out and so that the blocking member blocks a portion of the groove situated on the side projecting from the sealing membrane by creating a pressure drop for a flow circulating in the groove.
2. The fluid-tight and thermally insulative tank according to claim 1, in which the thermal insulation barrier includes a plurality of juxtaposed insulating elements held against a support wall.

3. The fluid-tight and thermally insulative tank according to claim 2, in which the housing is formed in an insulating element.

4. The fluid-tight and thermally insulative tank according to claim 2, in which the housing is formed in an interstice between two adjacent insulating elements.

5 5. The fluid-tight and thermally insulative tank according to claim 4, in which an insulative filling is arranged in the interstice between the two adjacent insulating elements, said insulative filling forming a bottom of the housing.

6. The fluid-tight and thermally insulative tank according to any one of claims 1 to 5, in which the blocking member is made from a foam of correctly chosen
10 density in order to enable deformation thereof.

7. The fluid-tight and thermally insulative tank according to claim 6, in which the blocking member consist of expanded polystyrene with a density of 10 to 30 kg/m³.

8. The fluid-tight and thermally insulative tank according to any one of
15 claims 1 to 5, in which the blocking member includes a lower portion in contact with a bottom of the housing consisting of a rigid material and a locally deformable portion, the corrugation bearing on the locally deformable portion.

9. The fluid-tight and thermally insulative tank according to claim 8, in which the lower portion of the blocking member in contact with the bottom of the
20 housing consists of a material chosen from the material group consisting of polypropylene, polymethylmethacrylate, polyvinyl chloride, polyethylene, synthetic plastic foam or combinations thereof.

10. The fluid-tight and thermally insulative tank according to claim 8 or
25 9, in which the locally deformable portion of the blocking member includes a strip of compressible material on the upper face of the blocking member.

11. The fluid-tight and thermally insulative tank according to any one of claims 8 to 10, in which the locally deformable portion consists of a material chosen from the material group consisting of fibrous materials, glass wool, melamine foam, flexible polyurethane foam or combinations thereof.

5 12. The fluid-tight and thermally insulative tank according to any one of claims 1 to 11, in which the corrugation has a first lateral surface inclined relative to a thickness direction of the tank wall, the blocking member having a second surface inclined relative to said thickness direction of the tank in such a manner as to cause the blocking member to slide in the width of the housing when the corrugation is
10 inserted in the groove .

13. The fluid-tight and thermally insulative tank according to any one of claims 1 to 12, in which the width of the blocking member is greater than or equal to the width of the corrugation plus twice the width difference between the groove and the corrugation.

5 14. The fluid-tight and thermally insulative tank according to any one of claims 1 to 13, in which the longitudinal direction of the corrugation includes a vertical component with reference to the terrestrial frame of reference.

10 15. The fluid-tight and thermally insulative tank according to any one of claims 1 to 14, including a row of housings, said housings of the row of housings intersecting a respective groove of the series of grooves, said housings having a width greater than the width of the respective grooves, the tank further including a row of blocking members arranged in a respective housing, said blocking members having a width greater than the width of the groove intersected by the respective housing and less than a width of said housing, the blocking members having a cut-out configured
15 to receive the corresponding corrugation, the blocking members being arranged in said housings in such a manner that the cut-out is housed in the corresponding groove and the corrugation is housed in said cut-out and so that the blocking member blocks a portion of said groove situated on the side projecting from the sealing membrane creating a pressure drop for a flow circulating in said groove.

20 16. The fluid-tight and thermally insulative tank according to claim 15, in which the series of parallel corrugations of the sealing membrane is a first series of parallel corrugations of the sealing membrane and in which the longitudinal direction of said corrugations of said first series of corrugations is a first direction, the sealing membrane further including a second series of corrugations perpendicular to the first
25 series, a longitudinal direction of the corrugations of the second series of corrugations forming a second direction perpendicular to the first direction, the blocking members of the row of blocking members being arranged between two adjacent corrugations of the second series of corrugations.

30 17. The fluid-tight and thermally insulative tank according to either one of claims 15 or 16, the tank including a plurality of row of blocking members

housed in respective housings, said rows of blocking members being arranged at a regular interval in the longitudinal direction of the corrugations of such a manner that their effect is cumulative and creates serial pressure drops in the grooves housing the corresponding corrugations.

5 18. The fluid-tight and thermally insulative tank according to any one of claims 1 to 17, in which the sealing membrane is carried by the thermal insulation barrier, the corrugations projecting toward the support wall.

10 19. The fluid-tight and thermally insulative tank according to any one of claims 1 to 17, in which the sealing membrane is a secondary sealing membrane, the thermal insulation barrier is a primary thermal insulation barrier, the corrugations projecting toward the interior of the tank, and in which the tank further includes a secondary thermal insulation barrier retained on the support wall and supporting the secondary sealing membrane, the primary thermal insulation barrier being supported by the secondary sealing membrane, the tank further including a primary sealing
15 membrane supported by the primary thermal insulation barrier and intended to be in contact with the fluid in the tank, the grooves being formed on a lower surface of the primary thermal insulation barrier.

20 20. The fluid-tight and thermally insulative tank according to any one of claims 1 to 17, in which the sealing membrane is a primary sealing membrane, the thermal insulation barrier is a primary thermal insulation barrier, the corrugations projecting toward the exterior of the tank, and in which the tank further includes a secondary thermal insulation barrier retained on the support wall and supporting a secondary sealing membrane, the primary thermal insulation barrier being supported by the secondary sealing membrane, the primary sealing membrane being supported
25 by the primary thermal insulation barrier and intended to be in contact with the fluid in the tank, the grooves being formed on an upper surface of the primary thermal insulation barrier.

30 21. A ship for the transportation of a cold liquid product, the ship including a double hull and a tank as claimed in any one of claims 1 to 20 disposed in the double hull.

 22. A system for transferring a cold liquid product, the system including a ship as claimed in claim 21, insulated pipes arranged in such a manner as to connect the tank installed in the hull of the

ship to a floating or terrestrial storage installation and a pump for driving a flow of cold liquid product through the insulated pipes from or to the floating or terrestrial storage installation to or from the tank of the ship.

23. A method of loading or offloading a ship as claimed in claim 21, in
5 which a cold liquid product is fed through insulated pipes from or to a floating or terrestrial storage installation to or from the tank of the ship.