

APPENDICE E
STANDARD EUROPEI PER LE INSTALLAZIONI GNL, EN 1473:2007 –
APPENDIX H, DEFINITION OF DIFFERENT TYPES OF LNG TANKS

Annex H **(informative)**

Definition of different types of LNG tanks

H.1 General

The different types of vertical, cylindrical, flat-bottomed steel tanks are described in EN 14620-1.

Other following types could also be considered.

H.2 Spherical storage tank

The spherical, single containment tank system consists of an un-stiffened, sphere supported at the equator by a vertical cylinder. The tank is designed and constructed in compliance with the Gas Carrier Code of the International Maritime Organisation (IMO type B tank, [18]).

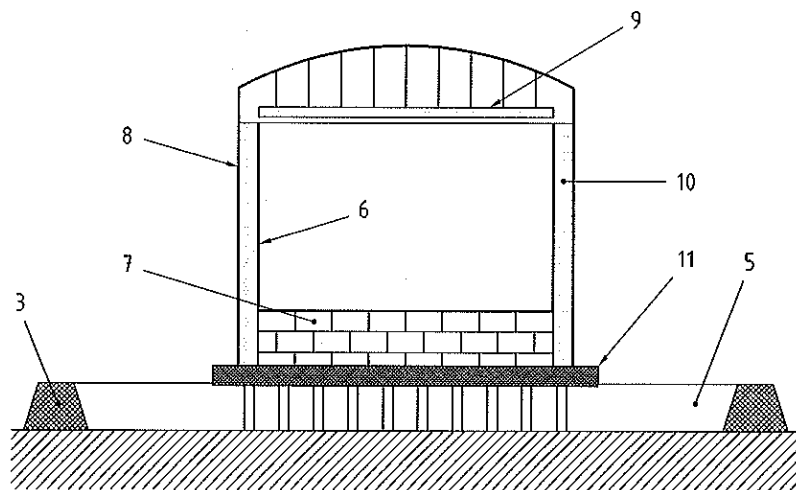
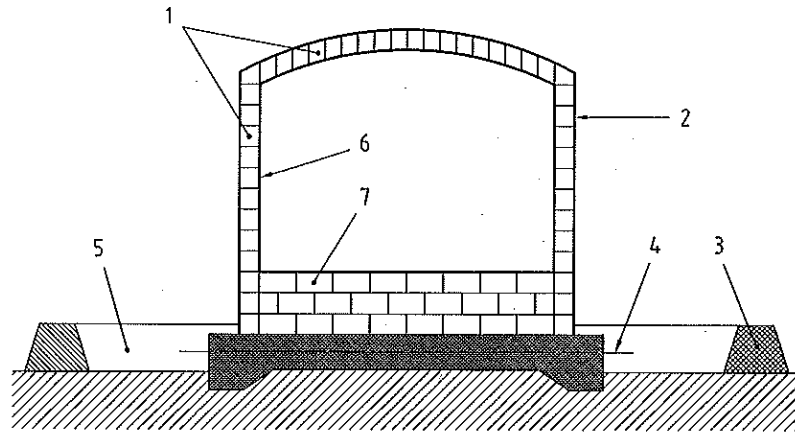
The spherical tank geometry allows accurate prediction of structural integrity. It can be designed for high earthquake accelerations.

An above-ground spherical tank shall be surrounded by a bund wall (see 6.8.) to contain any leakage.

H.3 Cryogenic concrete tank

A cryogenic concrete tank is either a double containment tank (see Figure H.3.) or a full containment tank (see Figure H.4.). For this type of tanks, the walls of the primary and secondary containers are both of pre-stressed concrete.

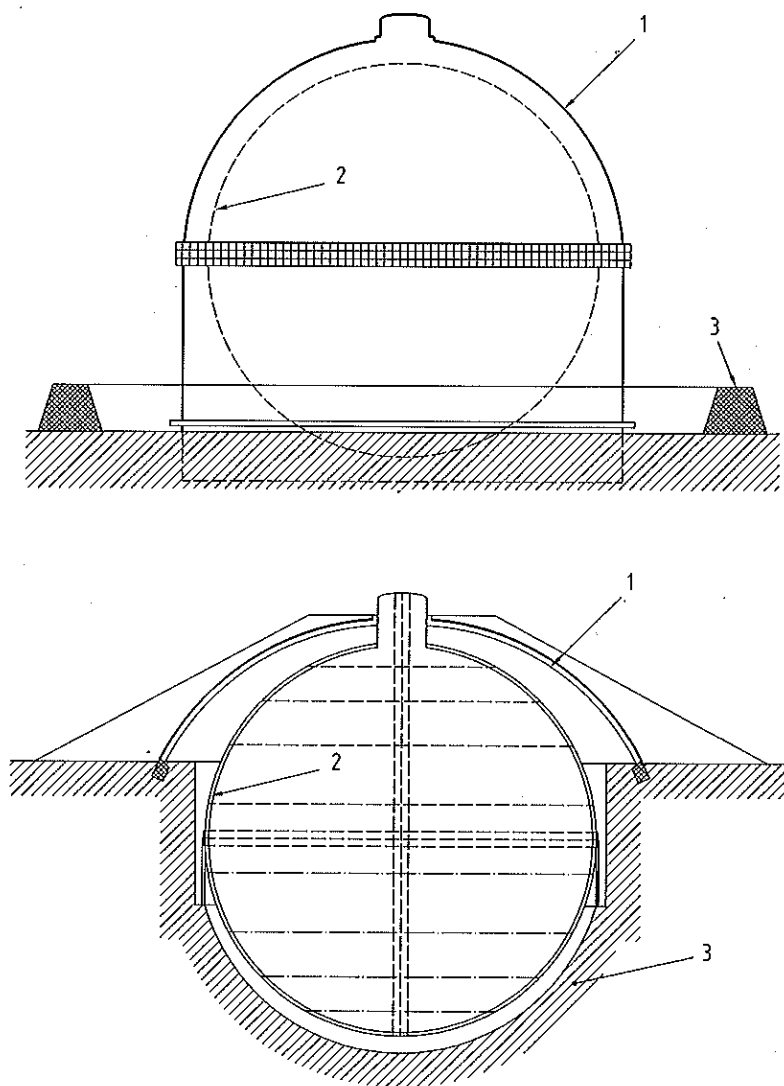
NOTE Examples of cryogenic concrete tanks are given in Figure H.6.



Key

- | | |
|--------------------------------------|--|
| 1 external insulation | 7 base insulation |
| 2 outer shell (water barrier) | 8 outer shell (not able to contain liquid) |
| 3 bund wall (as secondary container) | 9 suspended deck |
| 4 bottom heating | 10 loose fill insulation |
| 5 impounding area | 11 elevated slab |
| 6 primary container | |

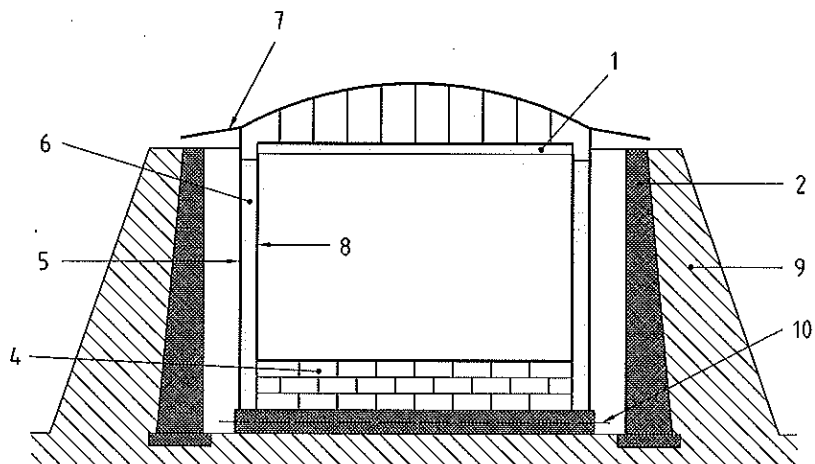
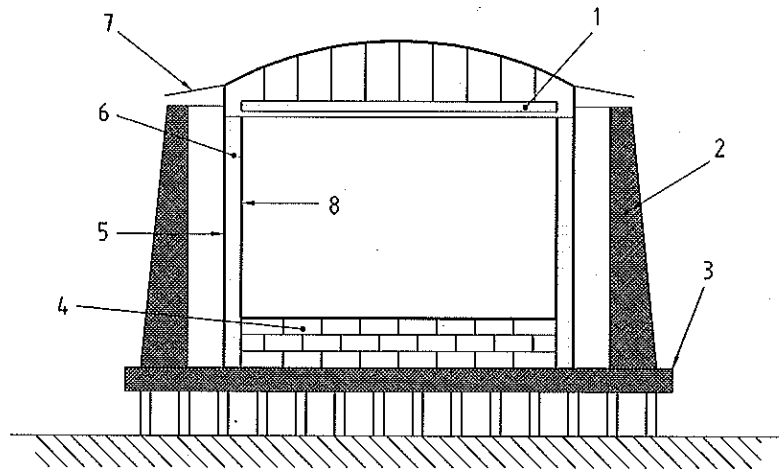
Figure H.1 — Examples of single containment tanks



Key

- 1 outer shell
- 2 primary container
- 3 secondary container

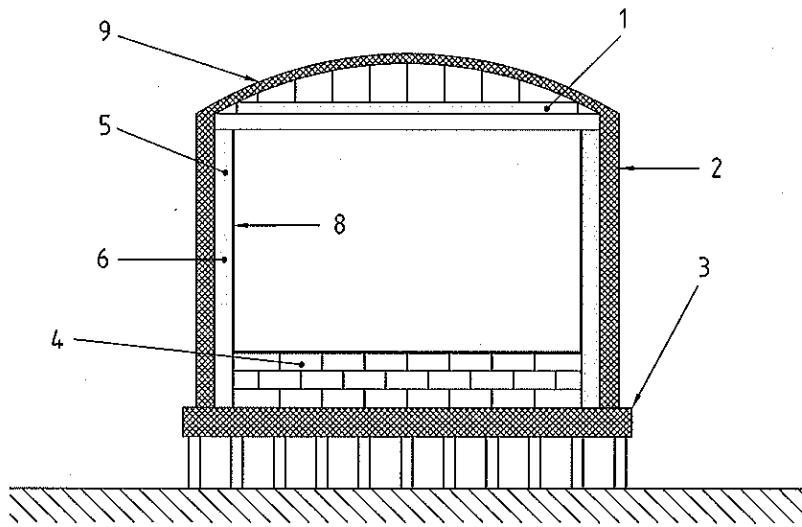
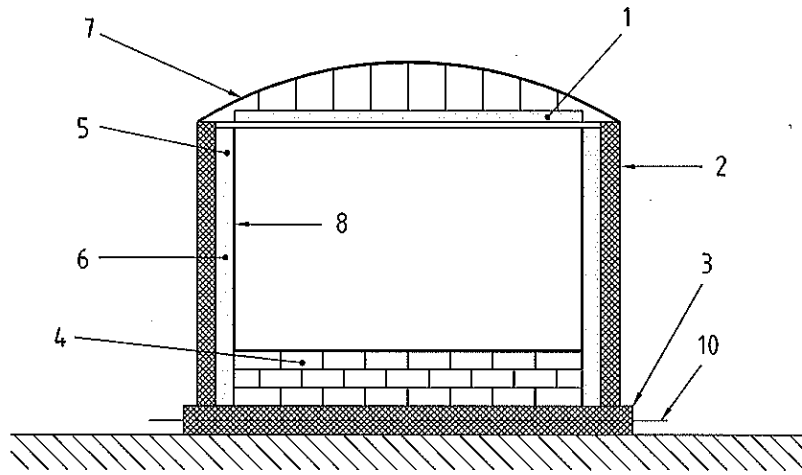
Figure H.2 — Examples of spherical storage tanks



Key

- | | |
|---|-------------------------|
| 1 suspended deck (insulated) | 6 loose fill insulation |
| 2 pre-stressed concrete secondary container | 7 roof if required |
| 3 elevated slab | 8 primary container |
| 4 base insulation | 9 earth embankment |
| 5 outer shell (not able to contain liquid) | 10 bottom heating |

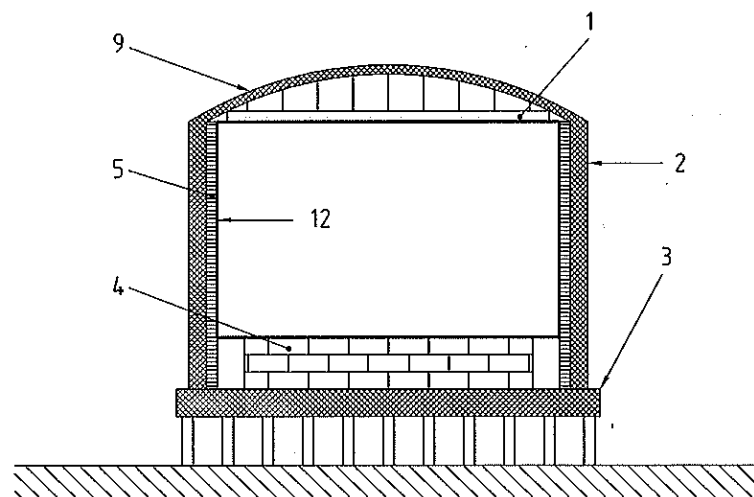
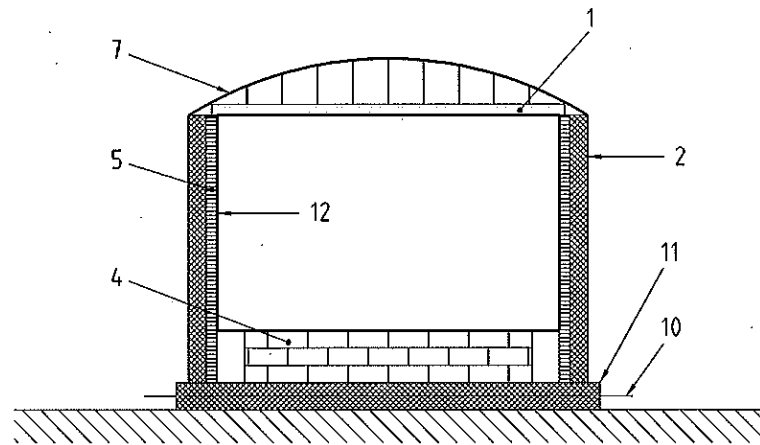
Figure H.3 — Examples of double containment tanks



Key

- | | |
|---|----------------------------|
| 1 suspended deck (insulated) | 6 loose fill insulation |
| 2 pre-stressed concrete secondary container | 7 outer steel roof |
| 3 concrete raft | 8 primary container |
| 4 base insulation | 9 reinforced concrete roof |
| 5 insulation on inside of secondary container | 10 bottom heating |

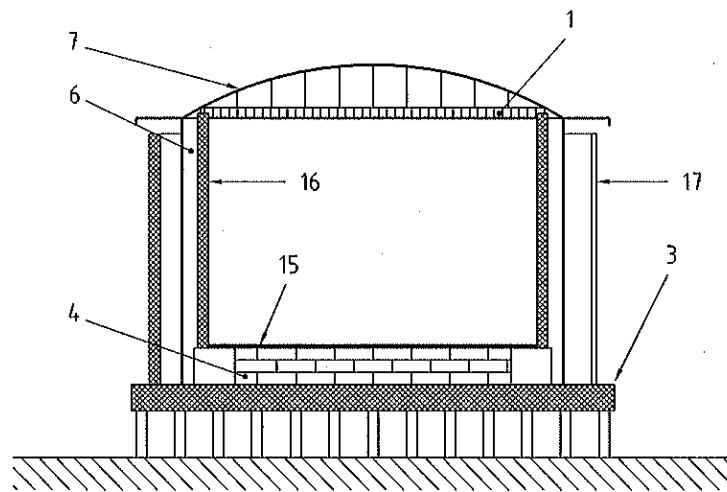
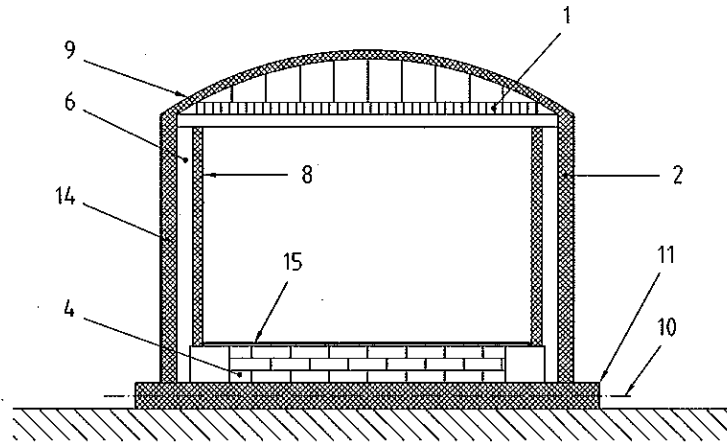
Figure H.4 — Examples of full containment tanks



Key

- | | | | |
|---|---|----|----------------------------|
| 1 | suspended deck (insulated) | 7 | outer steel roof |
| 2 | prestressed concrete secondary container | 9 | reinforced concrete roof |
| 3 | elevated concrete raft | 10 | bottom heating |
| 4 | base insulation | 11 | concrete slab |
| 5 | insulation on inside of secondary container | 12 | primary container membrane |

Figure H.5 — Examples of membrane tanks



Key

- | | | | |
|---|---|----|---|
| 1 | suspended deck (aluminium deck) | 9 | reinforced concrete roof |
| 2 | pre-stressed concrete secondary container | 10 | bottom heating |
| 3 | elevated slab | 11 | concrete outer raft |
| 4 | base insulation | 14 | carbon steel liner |
| 6 | loose fill insulation | 15 | 9 % Ni steel base |
| 7 | outer steel roof | 16 | cryogenic pre-stressed concrete primary container |
| 8 | primary container | 17 | cryogenic pre-stressed concrete secondary container |

Figure H.6 — Examples of cryogenic concrete tanks