

# DIN EN 14620-1:2024-09 (E)

Design and manufacture of site built, vertical, cylindrical, flat-bot tomed tank systems for the storage of refrigerated, liquefied gases with operating temperatures between 0 °C and -196 °C - Part 1: General

---

<b>Contents</b>		<b>Page</b>
	European foreword .....	4
<b>1</b>	<b>Scope .....</b>	<b>6</b>
<b>2</b>	<b>Normative references .....</b>	<b>7</b>
<b>3</b>	<b>Terms and definitions .....</b>	<b>8</b>
3.1	General .....	8
3.2	Components .....	9
3.3	Design .....	12
3.4	Operation .....	13
3.5	Other .....	14
<b>4</b>	<b>Concept selection .....</b>	<b>14</b>
4.1	Types of tank systems .....	14
4.1.1	General .....	14
4.1.2	Single containment system .....	14
4.1.3	Double containment system .....	15
4.1.4	Full containment system .....	15
4.1.5	Membrane containment system .....	15
4.2	Risk assessment based tank system selection .....	21
4.2.1	General .....	21
4.2.2	Site selection .....	21
4.2.3	Key drivers for tank system selection .....	21
4.2.4	Hazard identification .....	22
4.2.5	Risk assessment methodology .....	24
4.2.6	Changes .....	25
4.2.7	Determination of actions .....	25
<b>5</b>	<b>Quality assurance and quality control .....</b>	<b>26</b>
<b>6</b>	<b>Health, safety and environment .....</b>	<b>26</b>
6.1	Health, safety .....	26
6.2	Environmental .....	26
<b>7</b>	<b>General design considerations .....</b>	<b>26</b>
7.1	General .....	26
7.1.1	Responsibilities .....	26
7.1.2	Performance criteria .....	27
7.1.3	Limit state and allowable stress theory .....	27
7.1.4	Earthquake design .....	28
7.1.5	Tightness .....	29
7.1.6	Permanent openings in the primary, secondary, purge gas, warm vapour containers and membrane containment system .....	30
7.1.7	Attachments to primary and secondary containers and membrane containment system ..	32
7.1.8	Liquid levels and capacities .....	32
7.1.9	Cool-down .....	33
7.1.10	Foundation .....	34
7.1.11	Foundation heating system .....	35

7.1.12	Thermal Protection System (TPS) of concrete secondary liquid container .....	36
7.1.13	Bund wall .....	36
7.1.14	Lightning .....	36
7.1.15	Vertical anchors .....	36
7.2	Protection systems .....	37
7.2.1	Instrumentation .....	37
7.2.2	Pressure and vacuum protection .....	39
7.2.3	Fire protection .....	40
7.3	Actions (loadings) .....	40
7.3.1	General .....	40
7.3.2	Normal actions .....	40
7.3.3	Accidental actions .....	42
7.3.4	Action combinations .....	44
7.3.5	Loads from ancillary components .....	44
8	Inspection and maintenance .....	44
9	Marking and documentation .....	44
9.1	Nameplates .....	44
9.2	Certification .....	47
9.3	Handover documentation .....	47
	Annex A (informative) Physical properties of gases .....	48
	Annex B (normative) Design information .....	49
	Annex C (normative) Seismic analysis .....	51
	Annex D (informative) Tank heating system .....	55
	Annex E (informative) Recommendations for geotechnical investigations and seismic hazard evaluation .....	57
	Annex F (informative) Guidance for duties and responsibilities between parties .....	63
	Bibliography .....	65