

# DIN EN 1473:2021-12 (E)

## Installation and equipment for liquefied natural gas - Design of onshore installations

---

<b>Contents</b>		<b>Page</b>
European foreword .....		4
Introduction .....		5
<b>1</b>	<b>Scope .....</b>	<b>6</b>
<b>2</b>	<b>Normative references .....</b>	<b>7</b>
<b>3</b>	<b>Terms, definitions and abbreviated terms .....</b>	<b>11</b>
<b>3.1</b>	<b>Terms and definitions .....</b>	<b>11</b>
<b>3.2</b>	<b>Abbreviations .....</b>	<b>17</b>
<b>4</b>	<b>Quality management system .....</b>	<b>18</b>
<b>5</b>	<b>Site assessment .....</b>	<b>18</b>
<b>5.1</b>	<b>General and plant description .....</b>	<b>18</b>
<b>5.2</b>	<b>Geotechnical .....</b>	<b>18</b>
<b>5.3</b>	<b>Meteorological and Oceanographic .....</b>	<b>20</b>
<b>5.4</b>	<b>Environmental .....</b>	<b>21</b>
<b>5.5</b>	<b>Surroundings .....</b>	<b>23</b>
<b>5.6</b>	<b>Seismic .....</b>	<b>23</b>
<b>5.7</b>	<b>Hydrology .....</b>	<b>24</b>
<b>5.8</b>	<b>Social .....</b>	<b>24</b>
<b>6</b>	<b>Risk management .....</b>	<b>25</b>
<b>6.1</b>	<b>General .....</b>	<b>25</b>
<b>6.2</b>	<b>Hazard and risk assessment methodologies .....</b>	<b>26</b>
<b>6.3</b>	<b>Scenario identification .....</b>	<b>31</b>
<b>6.4</b>	<b>Consequence and impact assessment .....</b>	<b>32</b>
<b>6.5</b>	<b>Estimation of frequencies and probabilities .....</b>	<b>36</b>
<b>6.6</b>	<b>Safety improvement .....</b>	<b>36</b>
<b>6.7</b>	<b>Reviews .....</b>	<b>37</b>
<b>6.8</b>	<b>Safety during operation .....</b>	<b>37</b>
<b>7</b>	<b>Design .....</b>	<b>38</b>
<b>7.1</b>	<b>General .....</b>	<b>38</b>
<b>7.2</b>	<b>Civil structures .....</b>	<b>39</b>
<b>7.3</b>	<b>Electrical .....</b>	<b>53</b>
<b>7.4</b>	<b>Mechanical and piping design/material selection .....</b>	<b>56</b>
<b>7.5</b>	<b>Process automation and controls .....</b>	<b>66</b>
<b>7.6</b>	<b>Process technical safety .....</b>	<b>72</b>
<b>7.7</b>	<b>Marine transfer systems .....</b>	<b>75</b>
<b>7.8</b>	<b>Storage unit .....</b>	<b>77</b>
<b>7.9</b>	<b>Rotating equipment .....</b>	<b>81</b>
<b>7.10</b>	<b>Regasification and send-out unit .....</b>	<b>83</b>
<b>7.11</b>	<b>Trailer loading unit .....</b>	<b>84</b>
<b>7.12</b>	<b>Liquefaction unit .....</b>	<b>84</b>
<b>7.13</b>	<b>Buildings .....</b>	<b>84</b>
<b>7.14</b>	<b>LNG and NG quality measurement .....</b>	<b>85</b>
<b>7.15</b>	<b>Custody transfer flow metering .....</b>	<b>86</b>
<b>7.16</b>	<b>Boil-Off Gas (BOG) systems .....</b>	<b>86</b>
<b>7.17</b>	<b>Flare/vent system .....</b>	<b>89</b>

<b>7.18</b>	<b>Utilities .....</b>	<b>91</b>
	<b>Annex A (normative) Thermal radiation threshold values .....</b>	<b>94</b>
	<b>Annex B (normative) Definitions of reference flow rates .....</b>	<b>97</b>
	<b>Annex C (informative) Seismic classification .....</b>	<b>101</b>
	<b>Annex D (normative) Specific requirements for LNG pumps .....</b>	<b>103</b>
	<b>Annex E (normative) Specific requirements for LNG vaporizers .....</b>	<b>109</b>
	<b>Annex F (normative) Criteria for the design of pipes .....</b>	<b>115</b>
	<b>Annex G (informative) Description of the different types of onshore LNG installations .....</b>	<b>116</b>
	<b>Annex H (informative) Trailer loading unit .....</b>	<b>118</b>
	<b>Annex I (informative) Frequency ranges .....</b>	<b>120</b>
	<b>Annex J (informative) Classes of consequence .....</b>	<b>121</b>
	<b>Annex K (informative) Levels of risk .....</b>	<b>122</b>
	<b>Annex L (informative) Typical process steps of liquefaction .....</b>	<b>124</b>
	<b>Annex M (informative) Odorant systems .....</b>	<b>133</b>
	<b>Bibliography .....</b>	<b>136</b>