



## Mapping of ISO standards on LNG

<b>Date</b> 2018/07/18
<b>Reference</b> ISO/TC 67/SC9 <b>N 135</b>

Resolution 15/2017 was taken by ISO/TC 67/SC9 on 2017-10-19 to produce a mapping of existing standards in LNG equipment and installation. The intent was to identify potential gaps and needs for additional standards within the scope of ISO/TC 67/SC9.

The standards specific to LNG published and under development are listed by ISO/TC.

ISO/TC 67/SC9, Liquefied natural gas installations and equipment

Reference	Title	Status
ISO 28460	Ship-to-shore interface and port operations	Published 2010
ISO/TS 18683	Guidelines for systems and installations for supply of LNG as fuel to ships	Published 2015
ISO/TS 16901	Guidance on performing risk assessment in the design of onshore LNG installations including the ship/shore interface	Published 2015
ISO/TR 17177	Guidelines for the marine interfaces of hybrid LNG terminals	Published 2015
ISO 16903	Characteristics of LNG, influencing the design, and material selection	Published 2015
ISO 16904	Design and testing of LNG marine transfer arms for conventional onshore terminals	Published 2016
ISO 20088-1	Determination of the resistance to cryogenic spillage of insulation materials -- Part 1: Liquid phase	Published 2016
N 93	Guidance for conception, design and testing of LNG storage tanks – comparison of worldwide standards	Circulated 2017
ISO/AWI TR 18624	Guidance for conception, design and testing of LNG storage tanks - recommendations	First draft expected
ISO/NP 20088-2	Determination of the resistance to cryogenic spillage of insulation materials -- Part 2: Vapor phase	CD Q3 2018
ISO/DIS 20088-3	Determination of the resistance to cryogenic spillage of insulation materials -- Part 3: Jet exposure	FDIS Q3 2018
ISO/CD 20257-1	Design of floating LNG installations – Part 1: General Requirements for Floating LNG installations	DIS Q3 2018
ISO/AWI 20257-2	Design of floating LNG installations – Part 2: Specific Requirements for FSRU	After Part 1

ISO/PWI 20257-3	Design of floating LNG installations – Part 3: Specific Requirements for FLNG	After Part 1
-----------------	---	--------------

ISO/TC 8, Ships and marine technology

Reference	Title	Status
ISO 18154	Safety valve for cargo tanks of LNG carriers -- Design and testing requirements	Published 2016
ISO/DIS 19636	General requirements for inclinometers used for determination of trim and list of LNG carriers	Published soon
ISO 20519	Specification for bunkering of liquefied natural gas fuelled vessels	Published 2017
ISO 21635	Specification of high manganese austenitic steel used for LNG tanks on board ships	Published 2018
ISO/CD 21593	Marine LNG fuel bunkering quick connect/disconnect coupling standard	Soon DIS
ISO/AWI 22547	Performance test procedure for high-pressure pump in LNG Fuel Gas Supply Systems (FGSS)	CD or DIS
ISO/AWI 22548	Performance Test Procedure of Ship's LNG Fuel Gas Supply Systems (FGSS)	CD or DIS
ISO/AWI 23430	Specification of high manganese austenitic steel thin strips used for LNG tanks on board ships	WD Q2 2018
ISO/AWI 23448	Ships and marine technology -- LNG bunker fuel mass flow meters -- Requirements	CD or DIS

ISO/TC 22/SC 41, Road vehicles - Specific aspects for gaseous fuels

Reference	Title	Status
ISO 12614-1	Liquefied natural gas (LNG) fuel system components -- Part 1: General requirements and definitions	Published 2014
ISO 12614-2	Liquefied natural gas (LNG) fuel system components -- Part 2: Performance and general test methods	Published 2014
ISO 12614-3	Liquefied natural gas (LNG) fuel system components -- Part 3: Check valve	Published 2014
ISO 12614-4	Liquefied natural gas (LNG) fuel system components -- Part 4: Manual valve	Published 2014
ISO 12614-5	Liquefied natural gas (LNG) fuel system components -- Part 5: Tank pressure gauge	Published 2014
ISO 12614-6	Liquefied natural gas (LNG) fuel system components -- Part 6: Pressure regulator	Published 2014
ISO 12614-7	Liquefied natural gas (LNG) fuel system components -- Part 7: Pressure relief valve	Published 2014
ISO 12614-8	Liquefied natural gas (LNG) fuel system components -- Part 8: Excess flow valve	Published 2014
ISO 12614-9	Liquefied natural gas (LNG) fuel system components -- Part 9: Gas-tight housing and ventilation hose	Published 2014
ISO 12614-10	Liquefied natural gas (LNG) fuel system components -- Part 10: Rigid fuel line in stainless steel	Published 2014
ISO 12614-11	Liquefied natural gas (LNG) fuel system components -- Part 11: Fittings	Published 2014
ISO 12614-12	Liquefied natural gas (LNG) fuel system components -- Part 12: Rigid fuel line in copper and its alloys	Published 2014
ISO 12614-13	Liquefied natural gas (LNG) fuel system components -- Part 13: Tank pressure control regulator	Published 2014

ISO 12614-14	Liquefied natural gas (LNG) fuel system components -- Part 14: Differential pressure fuel content gauge	Published 2014
ISO 12614-15	Liquefied natural gas (LNG) fuel system components -- Part 15: Capacitance fuel content gauge	Published 2014
ISO 12614-16	Liquefied natural gas (LNG) fuel system components -- Part 16: Heat exchanger - vaporizer	Published 2014
ISO 12614-17	Liquefied natural gas (LNG) fuel system components -- Part 17: Natural gas detector	Published 2014
ISO 12614-18	Liquefied natural gas (LNG) fuel system components -- Part 18: Gas temperature sensor	Published 2014
ISO 12614-19	Liquefied natural gas (LNG) fuel system components -- Part 19: Automatic valve	Published 2014
ISO 12617	Liquefied natural gas (LNG) refuelling connector -- 3,1 MPa connector	Published 2015
ISO 19723-1	Liquefied natural gas (LNG) fuel systems -- Part 1: Safety requirements	Published 2018
ISO 19723-2	Liquefied natural gas (LNG) fuel systems -- Part 2: Test methods	Published 2018
ISO/WD 21104	Liquefied natural gas (LNG) Low pressure refuelling connector -- 1,8 MPa connector	CD or DIS

ISO/TC 28, Petroleum and related products, fuels and lubricants from natural or synthetic sources

Reference	Title	Status
ISO 8943	Sampling of liquefied natural gas -- Continuous and intermittent methods	Published 2007
ISO 10976	Measurement of cargoes on board LNG carriers	Published 2015
ISO 19970	Metering of gas as fuel on LNG carriers during cargo transfer operations	Published 2017
ISO/CD 21903	Guidance for the calibration, installation and use of flow meters for LNG and other refrigerated hydrocarbon fluids	Soon DIS
ISO/WD 23306	Specification of liquefied natural gas as a fuel for marine applications	CD or DIS

ISO/TC 193, Natural gas

Reference	Title	Status
ISO/NP 22813	Liquefied Natural Gas, Determination of composition and associated uncertainty by sensor technology	CD or DIS

ISO/TC 220, Cryogenic vessels

Reference	Title	Status
ISO 12991	Liquefied natural gas (LNG) -- Tanks for on-board storage as a fuel for automotive vehicles	Published 2012
ISO/AWI 12991	Liquefied natural gas (LNG) -- Tanks for on-board storage as a fuel for automotive vehicles	Revision

ISO/PC 252, Natural gas fuelling stations for vehicles (disbanded)

Reference	Title	Status
ISO 16924	Natural gas fuelling stations -- LNG stations for fuelling vehicles	Published 2016

The following additional ISO standards are not specific to LNG but can be applied to LNG installations/facilities/applications:

**Onshore installations terminals & small scale:**

ISO 31010, Risk management - Risk assessment techniques (IEC/ISO 31010:2009).

ISO 21013, Cryogenic vessels - Pressure-relief accessories for cryogenic service

ISO/TS 17969:2015 Petroleum, petrochemical and natural gas industries - Guidelines on competency for personnel

**Floating offshore LNG installations**

ISO 13623:2009, Petroleum and natural gas industries - Pipeline transportation systems

ISO 9606-1, Qualification testing of welders - Fusion welding - Part 1: Steels

ISO 9606-4, Approval testing of welders - Fusion welding - Part 4: Nickel and nickel alloys

ISO 10156, Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets (ISO 10156:2010 + Cor 1:2010)

ISO 13702, Petroleum and natural gas industries - Control and mitigation of fires and explosions on offshore production installations - Requirements and guidelines

ISO 15589-2, Petroleum, petrochemical and natural gas industries - Cathodic protection of pipeline transportation systems - Part 2: Offshore pipelines

ISO 17776, Petroleum and natural gas industries - Offshore production installations - Guidelines on tools and techniques for hazard identification and risk assessment

ISO 19900, Petroleum and natural gas industries - General requirements for offshore structures

ISO 19901-series, Petroleum and natural gas industries - Specific requirements for offshore structures — Part 1 to 8

ISO 19902, Petroleum and natural gas industries - Fixed steel offshore structures

ISO 19903, Petroleum and natural gas industries - Fixed concrete offshore structures

ISO 19904-1, Petroleum and natural gas industries - Floating offshore structures - Part 1: Monohulls, semi-submersibles and spars

ISO 19905-1, Petroleum and natural gas industries - Site-specific assessment of mobile offshore units - Part 1: Jack-ups

ISO/TR 19905-2, Petroleum and natural gas industries - Site-specific assessment of mobile offshore units - Part 2: Jack-ups commentary and detailed sample calculation.

ISO 19906, Petroleum and natural gas industries - Arctic offshore structures.

ISO 8310, Refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels - General requirements for automatic tank thermometers on board marine carriers and floating storage

### **LNG road & rail transport - LNG fueling stations- Natural Gas Fuelled Ship Projects**

ISO 13702, Petroleum and natural gas industries - Control and mitigation of fires and explosions on offshore production installations - Requirements and guidelines

ISO 17776, Petroleum and natural gas industries - Offshore production installations - Guidelines on tools and techniques for hazard identification and risk assessment

ISO 1496-3, Series 1 freight containers - Specification and testing - Part 3: Tank containers for liquids, gases and pressurized dry bul

ISO 7203-1, Fire extinguishing media - Foam concentrates - Part 1: Specification for low-expansion foam concentrates for top application to water-immiscible liquids

ISO 7203-2, Fire extinguishing media - Foam concentrates - Part 2: Specification for medium- and high-expansion foam concentrates for top application to water-immiscible liquids

ISO 7203-3, Fire extinguishing media - Foam concentrates - Part 3: Specification for low-expansion foam concentrates for top application to water-miscible liquids

ISO 8310, Refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels - General requirements for automatic tank thermometers on board marine carriers and floating storage

ISO 15401, Ships and marine technology - Bulk carriers - Construction quality of hull structure

ISO 16384, Refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels - Dimethylether (DME) - Measurement and calculation on board ships

ISO 17357-1, Ships and marine technology - Floating pneumatic rubber fenders - Part 1: High pressure