

The technical codes and standards for LNG related projects including Floating offshore storage (FSRU/FSU), Onshore LNG Storage, Virtual LNG projects, safe transportation of LNG, Mooring Equipment guidelines, LNG Loading Arms, Design of Onshore LNG Installations, Safety guidelines with special relevance to harsh weather zones etc, in Pakistan are as under:

TECHNICAL CODES AND STANDARDS

The design, construction and operation of the LNG terminal and allied facilities will satisfy *inter-alia* the following internationally recognized and proven codes, standards and guidelines for land based and offshore LNG installations (or equivalent):

Shipping and Marine Facilities

Standards

- Standard for the Production, Storage and Handling of Liquefied Natural Gas (LNG) – 2006, NFPA 59A, NFPA.
- Installations and Equipment for Liquefied Natural Gas – Design of Onshore Installations – 1997, (BS EN 1473) CEN.
- Installations and Equipment for Liquefied Natural Gas – Design and Testing of Loading/Unloading Arms – 1996, (BS EN 1474) CEN.
- Installations and Equipment for Liquefied Natural Gas – Ship to Shore Interface for Liquefied Natural Gas – 1996, (BS EN 1532) CEN.
- Installations and Equipment for Liquefied Natural Gas – General Characteristics of Liquefied Natural Gas – 1997, (BS EN 1160) CEN.
- Maritime Structures – Part 1, General Criteria – 1984. (BS 6349), BSI.
- Maritime Structures – Part 4. Code of Practice for Design of Fendering and Mooring Systems – 1994, (BS 6349), BSI.
- IGC Code – IMO-104E – International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk – IGC Code, 1993 including amendments.
- Guidance Notes, Classification and Certification of Floating Offshore Liquefied Gas Installations – Lloyd’s Register, April 2004, Revision 2.
- Guidance Notes, Classification and Certification of Offshore Gravity Based Liquefied Gas Terminals – Lloyd’s Register, April 2004, Revision 1.

Guidelines

- Site Selection and Design for LNG Ports and Jetties – 1997. SIGTTO, ISBN 1 85609 129 5.
 - Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas – 1995, (IMO 290E) IMO, ISBN 92-801-1329-1.
 - Dangerous Goods in Ports: Recommendations for Port Designers and Port Operators – 1985, PIANC.
 - Mooring Equipment Guidelines – 1996, (OCIMF) Oil Companies International Marine Forum, ISBN 1 85609 088 4.
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- Prediction of Wind Loads on Large Liquefied Gas Carriers – 1985, SIGTTO, ISBN 0 90088697 8.
 - Big Tankers and their Reception – 1974, PIANC.

- Guidelines on Port Safety and Environmental Protection – 1989, IAPH.

Operating Practices

- Accident Prevention – the Use of Hoses and Hard-Arms at Marine Terminals Handling Liquefied Gas – 1996 SIGTTO, ISBN 1 85609 1147.
- Manual on Chemical Pollution; Section 1: Problem Assessment and Response Arrangements – 1987, (IMO 630E) IMO, ISBN 92-801-1223-6.
- A Guide to Contingency Planning for Marine Terminals Handling Liquefied Gases in Bulk – 1989, SIGTTO, ISBN 0 948691 81 6.
- APELL: Awareness and Preparedness for Emergencies at Local Level – 1988, (UNEP) United Nations Environment Programme, ISBN 92807 1183 0 – 00900P.
- Offshore Loading Safety Guidelines with Special Relevance to Harsh Weather Zones – 1999, OCIMF, ISBN 1 85609 1481.
- Tug Use in Port – H Hensen, Nautical Institute, 1997, ISBN 1 870077 39 3.
- Guidelines for Hazard Analysis as an Aid to Management of Safe Operations – 1992, SIGTTO, ISBN 1 85609 054 X.

Onshore LNG Terminal

Standards

- Standard for the Production, Storage and Handling of Liquefied Natural Gas (LNG) – 2006, NFPA 59A, NFPA.
- Design and Construction of Large, Welded, Low – Pressure Storage Tanks, Appendix R - Low pressure Storage tanks for Refrigerated Products, (API 620 R).
- Installations and Equipment for Liquefied Natural Gas – Design of Onshore Installations – 1997, (BS EN 1473) CEN.
- Flat-Bottomed, Vertical, Cylindrical Storage Tanks for Low Temperature Service, (BS 7777).
- Installations and Equipment for Liquefied Natural Gas – General Characteristics of Liquefied Natural Gas – 1997, (BS EN 1160) CEN.
- Criteria for design and construction of refrigerated liquefied gas storage tanks – ‘EEMUA 147’.