

NB

**ENERGY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

NB/T 1001-2011

**Technical standard for vehicle liquefied natural gas fueling
station**

液化天然气(LNG)汽车加气站技术规范

Issued on: July 28, 2011

Implemented on: November 1, 2011

Issued by: National Energy Administration of the PRC

Table of Contents

1 Scope	1
2 Normative references	2
3 Terms	4
4 Classification of fueling stations and site selection	6
4.1 Basic requirements	6
4.2 Classification of fueling stations	6
4.3 Site selection	7
5 General layout within the station	9
5.1 Boundary walls	9
5.2 Roads	9
5.3 Dikes	9
5.4 Arrangement of fueling islands and canopies	10
5.5 Fire separation distances	10
6 Process facilities	12
6.1 LNG tank system	12
6.2 Unloading	12
6.3 LNG pumps	12
6.4 Fueling facilities	13
6.5 Vaporizers	13
6.6 Piping system	14
6.7 Emergency shut-off system	15
6.8 Combustible gas alarm system	15
6.9 LNG mobile fueling units	15
7 Fire protection facilities, water supply and drainage	17
7.1 Arrangement of fire extinguishing equipment	17
7.2 Fire water supply system	17
7.3 Drainage	18
8 Electrical	19
8.1 Power supply and distribution	19
8.2 Lightning protection and static electricity protection	19
9 Buildings and structures, heating and ventilation, landscaping	21
9.1 Buildings and structures	21

9.2 Heating and ventilation	21
9.3 Landscaping	22
10 Construction and acceptance	23
10.1 General requirements	23
10.2 Inspection of equipment and materials	24
10.3 Civil works	25
10.4 Installation of process equipment	28
10.5 Piping works	29
10.6 Electrical and instrumentation works	31
10.7 Anti-corrosion and thermal insulation works	31
10.8 Precooling, cold insulation and test run	31
10.9 Completion acceptance	32
Appendix A Starting and ending points for calculating distances	33
Appendix B Classification of hazardous areas of explosive gas atmospheres in fueling stations	34
Explanation of wording in this code	38
Addition: Explanation of provisions	39

Foreword

This document was issued on 28 July 2011 by the National Energy Administration of the PRC and takes effect on 1 November 2011.

It is a NB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

In accordance with the Measures for the Administration of Standardization of Energy Sector Standards (Trial), the National Energy Administration approved the Technical standard for vehicle liquefied natural gas fueling station as a sector standard numbered NB/T 1001-2011 by Announcement No. 4 of 2011, dated 28 July 2011, to be implemented from 1 November 2011.

The code is under the management of the National Energy Administration; North China Municipal Engineering Design and Research Institute is responsible for the interpretation of its specific technical contents, and the Oil and Natural Gas Department of the National Energy Administration organized its publication and distribution by China Architecture and Building Press.

This code was drafted in accordance with the rules given in GB/T 1.1-2009 Directives for standardization - Part 1: Structure and drafting of standards.

In accordance with the Notice of the National Energy Administration on the First Batch of Energy Sector Standard Formulation (Revision) Plans for 2010 (Guoneng Keji [2010] No. 320), this code was formulated to regulate the construction of liquefied natural gas (LNG) vehicle fueling stations, unify technical requirements and achieve safety and reliability, advanced technology and economic rationality.

This code consists of 10 chapters and 2 appendices. Its main contents are: scope, normative references, terms, classification of fueling stations and site selection, general layout within the station, process facilities, fire protection facilities and water supply and drainage, electrical, buildings and structures, heating and ventilation, landscaping, and construction and acceptance.

This code was proposed by and is under the jurisdiction of the Oil and Gas Department of the National Energy Administration of the People's Republic of China.

Users are asked to summarize experience and accumulate data in the course of applying this code, and to send comments and relevant information to the drafting group of this code at the Fourth Design Institute of North China Municipal Engineering Design and Research Institute (No. 99 Qixiangtai Road, Hexi District, Tianjin, postcode 300074) for reference in future revisions.

Drafting organizations of this code: North China Municipal Engineering Design and Research Institute; Xinjiang Guanghui Shiye Gufen Youxian Gongsi; CNOOC Gas and Power Group Co., Ltd.

Chief drafters of this code: Deng Yuan, Yang Chusheng, Wu Hongsong, Du Jianmei, Chen Hailong, Ma Jingzhu, Zhang Shugang, Jiao Wei, Wang Jianjun, Gao Yonghe, Lu Fengqin, Zeng Li, Wang Lijun, Fu Yiping, Wei Hong, Yuan Shuming.

Chief reviewers of this code: Gu Anzhong, Ni Zhaopeng, Han Jun, Chen Yunyu, Deng Zhiwei, Li Jingbo, Huang Daxin, Zhang Xiaobo, Jiang Jinhua, Hao Jiandong.

1 Scope

NB/T 1001-2011 is the Chinese technical specification for liquefied natural gas vehicle fuelling stations - LNG stations, L-CNG stations that vaporise LNG to supply compressed gas, combined LNG/L-CNG stations, and stations that combine gas with conventional liquid fuels. It covers stations with storage of up to 180 cubic metres, at pressures up to 1.6 MPa for LNG and 25 MPa for L-CNG. An LNG station stores a cryogenic, flammable liquid next to a public road and dispenses it into vehicles driven by the public, so the specification is dominated by safety distances, containment of spills and the control of boil-off. It sets the general provisions and defined terms, then the classification of stations by storage capacity and the site selection and layout requirements, with the tabulated fire separation distances between tanks, dispensers, buildings, roads and neighbouring property. Process design follows - storage tanks and their insulation and pressure relief, submerged pumps,

vaporisers and heaters, compressors and high-pressure storage for L-CNG, dispensers and hoses, piping and valves, the treatment of vented gas - together with the instrumentation, emergency shutdown and gas detection systems. Fire protection and water supply, electrical installation in hazardous areas, lightning and static protection, buildings and the construction, installation, testing and acceptance of the station close the specification.

1.0.1 This code specifies provisions for the design, construction and building of liquefied natural gas (LNG) vehicle fueling stations.

1.0.2 This code applies to the design, construction and acceptance of the following new, expanded and reconstructed vehicle fueling station projects with an LNG storage capacity not exceeding 180 cubic metres, an LNG working pressure not greater than 1.6 MPa and an L-CNG working pressure not greater than 25.0 MPa: 1) liquefied natural gas (LNG) fueling stations (hereinafter LNG fueling stations); 2) natural gas fueling stations in which liquefied natural gas is pressurized in the liquid state and vaporized (hereinafter L-CNG fueling stations); 3) fueling stations combining LNG and L-CNG (hereinafter LNG/L-CNG fueling stations); 4) stations combining LNG, L-CNG or LNG/L-CNG gas fueling with oil fueling (hereinafter oil and gas fueling stations).

1.0.3 In addition to this code, the design and construction of fueling stations shall comply with the relevant current mandatory national standards.

2 Normative references

The following standards are indispensable for the application of this code. For dated references, only the edition cited applies to this code. For undated references, the latest edition (including all amendments) applies to this code.

GB 150 Steel pressure vessels; GB/T 11790 General rules for cold insulation of equipment and pipes; GB/T 14976 Stainless steel seamless tubes for fluid transport; GB 18047 Compressed natural gas for vehicles; GB 18442 Cryogenic insulated pressure vessels; GB/T 19204 General characteristics of liquefied natural gas; GB/T 20368 Production, storage and handling of liquefied natural gas (LNG).

GB 50016 Code for fire protection design of buildings; GB 50019 Code for design of heating, ventilation and air conditioning; GB 50052 Code for design of power supply and distribution systems; GB 50057 Code for design of lightning protection of buildings; GB 50058 Code for design of electrical installations in explosive and fire hazardous environments; GB 50217 Code for design of cables of electric power engineering; GB 50140 Code for design of extinguisher distribution in buildings; GB 50156 Code for design and construction of automobile gasoline and gas fueling stations; GB 50191 Code for seismic design of structures.

GB 50235 Code for construction and acceptance of industrial metallic piping; GB 50236