



**Code for Facilities, Technology, Inspection,
Safety Diagnosis and Safety Assessment and
Inspection for Filling LP Gas Cylinders**

Personnel

Gas Technical Standards Committee

Chairman	Kwang-Won Lee, Professor of Hoseo University
Vice-Chairman	Seung-Hoon Nam, Principal Researcher of KRISS
Ex Officio Member	Hui-Won Lee, Manager of Energy Safety Department, Ministry of Trade, Industry & Energy Hae-Myeong Yang, Director of Technology and Safety, Korea Gas Safety Corporation
High-Pressure Gas	Seung-Hoon Nam, Principal Researcher of KRISS Beom-Seok Lee, Principal Professor of Kyung Hee University Dong-Myeong Ha, Professor of Semyung University Chang-Gi Kim, Principal Researcher of Korea Institute of Machinery and Materials Hyuk-Myun Kwon, Director General of Occupational Safety & Health Research Institute Su-Dong Byun, CEO of Q-Best
Liquefied Petroleum Gas	Doo-Seon Park, Managing Director of Daesung Industrial Gas Co., Ltd Hyeong-Hwan Ann, Professor of Korea National University of Transportation Byeong-Hak Choei, Professor of Gangneung-Wonju National University Seong-Min Lee, Director of KOGAS Research Institute Yong-Gwon Lee, Vice-President of EG CNE Co.,Ltd Gi-hyeon Jang, Director of Kiturmi Jeong-Sik Chon, Direto of E1 CO., Ltd.

History of Establishment and Revision of KGS Code

Code Number	KGS FP331 ²⁰¹⁹
Code Title	Code for Facilities, Technology, Inspection, Safety Diagnosis and Safety Assessment and Inspection for Filling LP Gas Cylinders

Date of Establishment/Revision	Description
December 31, 2008	Established (Notification of the Ministry of Knowledge Economy No. 2008-380)
December 2, 2009	Revised (Notification of the Ministry of Knowledge Economy No. 2009-454)
January 3, 2011	Revised (Notification of the Ministry of Knowledge Economy No. 2010-489)
July 27, 2011	Revised (Notification of the Ministry of Knowledge Economy No. 2011-369)
June 26, 2012	Revised (Notification of the Ministry of Knowledge Economy No. 2012-313)
May 20, 2013	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2013-087)
June 27, 2013	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2013-136)
October 31, 2013	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2013-308)
October 6, 2014	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2014-510)
November 17, 2014	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2014-589)
November 4, 2015	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2015-578)

January 8, 2016	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2016-006)
March 9, 2016	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2016-094)
October 19, 2016	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2016-545)
January 9, 2017	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2017-003)
February 10, 2017	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2017-066)
September 29, 2017	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2017-476)
October 16, 2018	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2018-512)
February 28, 2019	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2019-153)

Table of Contents

1. General.....	1
1.1 Scope.....	1
1.2 Validity of Code	1
1.3 Definitions.....	1
1.4 Application of Codes<currently not used>	7
1.5 Interim Measures.....	7
1.5.1 Interim measure for thickness calculation and material of piping.....	7
1.5.2 Interim measure for installation of safety devices	7
1.5.3 Interim measure for protection walls.....	7
1.5.4 Interim measure for installation standard for water spray systems.....	8
1.5.5 Interim measure for installation standards for heat resistance construction of storage tanks and cooling sprinkler systems.....	9
1.5.6 Interim measure for standards for installation of, supply by and use of small tanks.....	9
1.5.7 Interim measure for installation of piping.....	10
1.5.8 Interim measure for installation standard for water sprinkler systems <newly established January 3, 2011>	10
1.5.9 Interim measure for installation standard for underground storage tank room <newly established January 3, 2011>.....	10
1.5.10 Interim measure for reinforcing bar arrangement for storage tank rooms<newly established on January 3, 2011>.....	11
1.5.11 Interim measure for safety valves <newly established January 3, 2011>	11
1.5.12 Interim measure for installation of boundary marking <newly established on July 27, 2011>	11
1.5.13 Interim measure for installation of storage tanks <newly established on July 27, 2011>	11
1.5.14 Interim measure for installation of sprinkler systems <newly established on June 26, 2012>.....	12
1.5.15 Interim measures for collecting pipes and detection tubes of storage tanks <Newly established on May 20, 2013>	13
1.5.16 Interim measures for calculating the blow-off quantity of overpressure safety device, etc. <Newly established on June 27, 2013>	13

1.5.17	Interim measures for the distance between filling machines and road boundary <Newly established on October 31, 2013>	13
1.5.18	Interim measure for installation of water sprinkler systems <Newly established on October 6, 2014>	13
1.5.19	Interim measures for the center of transfer and filling location for a vehicle-mounted tank<Newly established on November 4, 2015>	14
1.5.20	Interim measure for installation of sunlight generation facilities <Newly establish on March 9, 2016>	14
1.5.21	Interim measures for coverage criteria for road <Newly established on March 9, 2016>	14
1.6	Restriction on Use of Materials	14
2.	Facility Standard	15
2.1	Layout standard	15
2.1.1	Distance from protected installations	15
2.1.2	Distance from naked lights	16
2.1.3	Distance from other facilities (currently not used)	17
2.1.4	Distance from business place perimeter	17
2.1.5	Distance from road boundary<Newly established on October 31, 2013>	18
2.1.6	Distance from railroad (currently not used)	18
2.1.7	Securement of open area (currently not used)	18
2.1.8	Special case of distance from extension or modification area	18
2.1.9	Distance between safety zones (currently not used)	20
2.1.10	Adjacency to road	20
2.1.11	Reinforcement by approval authorities <Revised on July 27, 2011, November 17, 2014>	20
2.2	Foundation Standard	20
2.2.1	Soil survey	21
2.2.2	Foundation works	24
2.2.3	Fixing of storage tanks	26
2.3	Storage Facility Standard	30
2.3.1	Materials of storage facilities (currently not used)	30
2.3.2	Construction of storage facilities	30
2.3.3	Installation of storage facilities	32
2.4	Gas Facility Standard	48
2.4.1	Materials of gas facilities	48
2.4.2	Construction of gas facility <currently not used>	49
2.4.3	Thickness and strength of gas facilities	49

2.4.4 Installation of gas facilities	49
2.4.5 Performances of gas facilities.....	49
2.5 Piping Standard.....	50
2.5.1 Piping materials	50
2.5.2 Configuration of piping systems (currently not used)	53
2.5.3 Thickness of piping	53
2.5.4 Piping joints <revised on January 3, 2011>	54
2.5.5 Expansion/contraction absorption measures for piping	54
2.5.6 Insulation of piping	56
2.5.7 Installation of piping	57
2.5.8 Installation of associated piping facilities (currently not used).....	64
2.5.9 Performance of piping.....	64
2.5.10 Marking of piping systems	64
2.6 Accident Prevention Standard.....	69
2.6.1 Installation of overpressure safety devices	69
2.6.2 Installation of gas leak alarm and automatic shutoff systems.....	80
2.6.3 Installation of emergency shutoff devices	83
2.6.4 Installation of backflow prevention devices (currently not used)	85
2.6.5 Installation of backfire prevention devices (not applicable).....	85
2.6.6 Installation of hazard monitoring and control devices (not applicable).....	85
2.6.7 Installation of accidental startup prevention devices (not applicable).....	85
2.6.8 Installation of explosion-proof electrical facilities	85
2.6.9 Installation of ventilation system.....	85
2.6.10 Installation of corrosion prevention system	86
2.6.11 Installation of static eliminators	87
2.6.12 Installation of toppling prevention devices	88
2.7 Damage Control Facility Standard.....	89
2.7.1 Installation of dikes	89
2.7.2 Installation of protection walls <Revised on November 17, 2014>	92
2.7.3 Installation of sprinkler systems.....	95
2.7.4 Installation of detoxification facilities (not applicable).....	96
2.7.5 Installation of neutralization and transfer facilities (not applicable)	96
2.7.6 Installation of wind indicators (currently not used).....	96
2.7.7 Installation of fire extinguishing systems (currently not used)	96
2.7.8 Installation of traffic systems (currently not used).....	96
2.7.9 Installation of temperature rise prevention devices.....	96
2.8 Associated Facilities Standard	96

2.8.1 Installation of measuring facilities	96
2.8.2 Installation of emergency power systems.....	97
2.8.3 Installation of communication systems	99
2.8.4 Installation of operation facilities	99
2.8.5 Installation of safety maintenance facilities.....	100
2.8.6 Stable supply facilities	102
2.9 Marking Standard	105
2.9.1 Boundary markings and warning signs.....	105
2.9.2 Identification marking and danger signs (currently not used).....	109
2.9.3 Perimeter fences.....	110
3. Technical Standard.....	110
3.1 Safety Maintenance Standard	110
3.1.1 Maintenance of foundations (currently not used).....	110
3.1.2 Maintenance of storage facilities.....	110
3.1.3 Maintenance of gas facilities	114
3.1.4 Maintenance of piping systems.....	117
3.2 Manufacturing and Filling Standard.....	118
3.2.1 Preparation for manufacturing and filling.....	118
3.2.2 Manufacturing and filling operation.....	123
3.3 Inspection Standard.....	126
3.3.1 Inspection of overall installation.....	126
3.3.2 Inspection of foundations (currently not used).....	129
3.3.3 Inspection of storage facilities.....	129
3.3.4 Inspection of gas facilities (currently not used)	129
3.3.5 Inspection of piping systems (currently not used).....	129
3.3.6 Inspection of accident prevention facilities	129
3.3.7 Inspection of damage control facilities	130
3.3.8 Inspection of associated facilities.....	130
3.4 Repairs, Cleaning and Removal Standard.....	130
3.4.1 Preparation for repairs, cleaning and removal.....	130
3.4.2 Repairs, cleaning and removal works.....	132
3.4.3 Follow-up measures after repairs, cleaning and removal.....	133
3.5 Other Standards.....	134
3.5.1 <Deleted on June 26, 2012>	134
4. Inspection Standard	134
4.1 Inspection Items	134
4.1.1 Safety confirmation.....	134

4.1.2 Completion inspection	135
4.1.3 Regular inspection <revised on December 2, 2009>	135
4.1.4 Occasional inspection	137
4.1.5 Detailed safety diagnosis	137
4.1.6 Safety assessment.....	138
4.2 Inspection Methods	138
4.2.1 Safety confirmation <revised on January 3, 2011>	138
4.2.2 Completion inspection and regular inspection	140
4.2.3 Detailed safety diagnosis	148
4.2.4 Safety assessment.....	150
5. Temporary Storage Standard.....	150
5.1 Installation Standard.....	150
5.2 Maintenance Standard.....	152
5.3 Other Standards.....	152
Appendix A Standard for Installation of Safety Devices before March 8, 2005.....	153

Code for Facilities, Technology, Inspection, Safety Diagnosis and Safety Assessment for Filling LP Gas Cylinders

1. General

1.1 Scope

This Code applies to the facilities, technology, inspection, detailed safety diagnosis and safety assessment for the business of filling and supplying liquefied petroleum gas in cylinders [exclusive of fuel vessels for vehicles and cylinders of which internal volume is less than one liter (hereinafter referred to as "small cylinders")] in the filling business of liquefied petroleum gas in conformity to the Safety Control and Business Regulation of Liquefied Petroleum Act (hereinafter referred to as "Act"), Article 5, Clause 1. <Revised on November 4, 2015>

1.2 Validity of Code

1.2.1 This Code has passed the deliberation and resolution by Gas Technical Standards Committee (Bill No. 2019-1 February 15, 2019) in conformity to the High Pressure Gas Safety Control Act (hereinafter referred to as "High Pressure Gas Act"), Article 33, Clause 2 in accordance with the Act, Article 45, Clause 2, has been approved by the Minister of Trade, Industry & Energy (Notification No. 2019-153 of the Ministry of Trade, Industry & Energy, February 28, 2019), and is valid and effective as the detailed standards in conformity to the Act, Article 45, Clause 1.

1.2.2 Conformity to this Code is deemed to conform to Table 4, No. 1 of the Enforcement Regulation of the Act in accordance with the Act, Article 45, Clause 4. <Revised on November 4, 2015>

1.3 Definitions

The terms used in this Code are defined as follows: