



**Code for Facilities, Technology,  
Inspection and Safety Diagnosis of  
Pipelines outside Manufacturing Plants  
and Supply Stations for General Urban  
Gas Business**



## 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.



<b>History of Establishment and Revision of KGS Code</b>	
Code Number	KGS FS551 <sup>2020</sup>
Code Title	Code for Facilities, Technology, Inspection and Safety Diagnosis of Pipelines outside Manufacturing Plants and Supply Stations for General Urban Gas Business

Date of Establishment/Revision	Description
December 31, 2008	Established (Notification of the Ministry of Knowledge Economy No. 2008-381)
May 15, 2009	Revised (Notification of the Ministry of Knowledge Economy No. 2009-193)
September 25, 2009	Revised (Notification of the Ministry of Knowledge Economy No. 2009-357)
December 2, 2009	Revised (Notification of the Ministry of Knowledge Economy No. 2009-454)
June 25, 2010	Revised (Notification of the Ministry of Knowledge Economy No. 2010-260)
November 3, 2010	Revised (Notification of the Ministry of Knowledge Economy No. 2010-421)
January 5, 2012	Revised (Notification of the Ministry of Knowledge Economy No. 2011-635)
April 5, 2012	Revised (Notification of the Ministry of Knowledge Economy No. 2012-179)
June 26, 2012	Revised (Notification of the Ministry of Knowledge Economy No. 2012-313)
December 28, 2012	Revised (Notification of the Ministry of Knowledge Economy No. 2012-549)
June 27, 2013	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2013-136)
October 14, 2013	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2013-279)
December 18, 2013	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2013-343)
September 11, 2014	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2014-449)
February 27, 2015	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2015-139)

April 14, 2015	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2015-223)
July 3, 2015	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2015-372)
August 7, 2015	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2015-436)
October 2, 2015	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2015-518)
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)
June 16, 2016	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2016-306)
October 19, 2016	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2016-545)
November 23, 2016	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2016-603)
May 17, 2017	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2017-265)
August 7, 2017	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2017-411)
November 20, 2017	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2017-542)
August 10, 2018	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2018-419)
October 16, 2018	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2018-512)
November 12, 2018	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2018-567)
April 5, 2019	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2019-218)
July 16, 2019	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2019-434)
October 16, 2019	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2019-597)
March 18, 2020	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2020-167)
March 18, 2020	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2020-169)

## Table of Contents

1 General.....	1
1.1 Scope.....	1
1.2 Validity of Code .....	1
1.3 Definitions .....	1
1.4 Application of Other Codes (currently not used).....	8
1.5 Interim Measures.....	8
1.5.1 Interim measure for installation of line marks.....	8
1.5.2 Interim measure for installation and protection of pipelines .....	10
1.5.3 Interim measure for pipeline materials.....	10
1.5.4 Interim measure for installation and inspection of pressure regulators.....	12
1.5.5 Interim measure for preparation of pipeline drawings.....	12
1.5.6 Interim measure for marking.....	12
1.5.7 Interim measure for piping installation inside buildings <Newly established on October 14, 2013> .....	12
1.5.8 Interim measure for heat fusion machines<Newly established on September 11, 2014> .....	12
1.5.9 Application example of socket fusion <Newly established on October 2, 2015> .....	12
1.5.10 Interim measure for repairs and reinforcement after detailed safety diagnosis <Newly established on November 23, 2016>.....	13
1.6 Restriction to Use of Appliances.....	12
1.7 Restriction to Pipeline Pressure.....	13
1.8 Restriction to Pipeline Installation (currently not used)<Deleted on October 14, 2013>.....	13
1.9 Restriction to Installation of Polyethylene Pipes for Gases.....	14
2. Installation Standard.....	14
2.1 Layout Standard (currently not used).....	14
2.2 Foundation Standard (not applicable) .....	14
2.3 Storage Facility Standard (not applicable).....	14
2.4 Gas Facility Standard .....	14
2.4.1 Materials of Gas Facilities (currently not used).....	14
2.4.2 Construction of gas facilities (currently not used) .....	14
2.4.3 Thickness and strength of gas facilities (currently not used).....	14

2.4.4 Installation of gas facilities .....	14
2.5 Pipeline Facility Standard .....	19
2.5.1 Preparation of pipeline facility drawings .....	19
2.5.2 Materials of pipeline facilities.....	22
2.5.3 Configuration of pipeline facilities.....	24
2.5.4 Pipeline thickness.....	24
2.5.5 Joints of pipeline facilities.....	27
2.5.6 Measures for absorption of expansion and contraction of pipelines .....	35
2.5.7 Measures for insulation of pipeline facilities .....	40
2.5.8 Installation of pipelines .....	40
2.5.9 Performance of pipeline facilities .....	64
2.6 Governor Station (Valve Station) Standard (currently not used).....	65
2.7 Accident Prevention Facility Standard.....	65
2.7.1 Installation of overpressure safety devices (currently not used) .....	65
2.7.2 Installation of gas leak alarm and automatic shutoff system .....	65
2.7.3 Installation of explosion-proof electrical facilities (currently not used) .....	67
2.7.4 Installation of ventilation systems (currently not used).....	67
2.7.5 Installation of hazard monitoring and control systems.....	67
2.7.6 Installation of corrosion protection systems.....	67
2.7.7 Measures for prevention of damage to pipelines due to excavation works.....	67
2.7.8 Installation of pressure rise prevention device <Newly established on November 3, 2013> .....	68
2.8 Damage Control Facility Standard .....	70
2.8.1 Installation of bund walls (currently not used).....	70
2.8.2 Installation of protection walls (currently not used).....	70
2.8.3 Installation of sprinkler systems (currently not used).....	70
2.8.4 Installation of detoxification facilities (currently not used) .....	70
2.8.5 Installation of neutralization and transfer facilities (currently not used).....	70
2.8.6 Installation of emergency shutoff devices.....	69
2.8.7 Installation of gas supply cutoff devices.....	70
2.9 Associated Facilities Standard .....	72
2.9.1 Installation of metering system (currently not used).....	72
2.9.2 Installation of emergency power systems (currently not used).....	72
2.9.3 Installation of pressure recorders (currently not used) .....	72
2.9.4 Installation of communication systems (currently not used) .....	72
2.9.5 Installation of operation facilities (currently not used) .....	72
2.9.6 Installation of stable supply facilities (currently not used).....	72



2.9.7 Installation of vent stacks (currently not used).....	72
2.9.8 Installation of water traps.....	72
2.9.9 Installation of valve boxes.....	73
2.10 Marking Standard.....	73
2.10.1 Boundary markings and warning signs <Newly established on January 5, 2012>..	73
2.10.2 Boundary fences (currently not used).....	74
2.10.3 Marking of pipeline.....	74
3. Technical Standard.....	81
3.1 Safety Maintenance Standard.....	81
3.1.1 Maintenance of foundations (currently not used).....	81
3.1.2 Maintenance of storage facilities (currently not used).....	81
3.1.3 Maintenance of gas facilities <Revised on June 27, 2013> .....	81
3.1.4 Maintenance of pipeline facilities.....	81
3.1.5 Maintenance of accident prevention facilities (currently not used).....	83
3.1.6 Maintenance of damage control facilities (currently not used).....	83
3.1.7 Maintenance of utilities (currently not used).....	83
3.1.8 Maintenance of excavation works.....	83
3.2 Transfer and Filling Standard (not applicable) .....	95
3.3 Inspection Standard.....	95
3.3.1 Inspection of overall installations (currently not used).....	95
3.3.2 Inspection of foundations (currently not used).....	95
3.3.3 Inspection of storage facilities (currently not used).....	95
3.3.4 Inspection of gas facilities <Revised on January 5, 2012> .....	95
3.3.5 Inspection of pipeline facilities (currently not used).....	96
3.3.6 Overhaul of governors (currently not used).....	96
3.3.7 Inspection of accident prevention facilities .....	96
3.3.8 Inspection of damage control facilities (currently not used) .....	96
3.3.9 Inspection of utilities (currently not used).....	96
3.3.10 Inspection of excavation works.....	96
4. Inspection Standard.....	96
4.1 Inspection Items .....	96
4.1.1 Intermediate inspection (currently not used) .....	96
4.1.2 Construction supervision.....	97
4.1.3 Regular inspection.....	97
4.1.4 Occasional inspection <Newly established on October 16, 2018> .....	98

4.2 Inspection Methods.....	98
4.2.1 Intermediate inspection (not applicable).....	98
4.2.2 Construction supervision, regular inspection and occasional inspection <Revised on October, 16, 2018> .....	98
4.2.3 Other inspection methods.....	108
4.2.4 Detailed safety diagnosis <Newly established on December 18, 2013>.....	108
Appendix A. Standard for Ultrasonic Test of Electrofusion Joints of Polyethylene Pipes for Supply of Gaseous Fuels <Newly established on June 25, 2010> .....	119
Appendix B. Method for Absorption of Expansion and Contraction of Exposed City Gas Piping <Newly established on November 3, 2010>.....	131
Appendix C. Standard for Installation of Pressure Rise Preventers for Super High-rise Buildings <Newly established on November 3, 2010>.....	145
Appendix D. Method for Field Coating of Underground Piping Joints <Newly established on November 3, 2010>.....	148
Appendix E. Test Standard and Test Method for Performance Check of Heat (BUTT) Fusion Machines <Newly established on September 11, 2014> .....	158
Appendix F. Test Standard and Test Method for Performance Check of Electro-fusion Machines (EF) <Newly established on September 11, 2014> .....	161
Appendix G. Reference for Non-opencut Excavation Methods for Constructors <Newly established on June 16, 2016> .....	166
Appendix H. Standard for Repairs and Reinforcement of City Gas Pipelines <Newly established on November 23, 2016> .....	174

# Code for Facilities, Technology, Inspection and Safety

## Diagnosis of Pipelines outside Manufacturing Plants and Supply Stations for General Urban Gas Business

### 1 General

#### 1.1 Scope

This code applies to the installation, operation, inspection and diagnosis of gas pipelines among the gas supply installations of general urban gas business operators in conformity to the Urban Gas Business Act (hereinafter referred to as "the Act"), Article 2, Clauses 4 and 5. <Revised on December 18, 2013>

#### 1.2 Validity of Code

**1.2.1** This Code has passed the deliberation and resolution by the Gas Technical Standards Committee (Bill No. 2019-10, December 20, 2019) in conformity to the High-pressure Gas Safety Control Act, Article 22-2, Clause 2 in accordance with the Act, Article 17-5, Clause 2, has been approved by the Minister of Trade, Industry & Energy (Notification No. 2020-169 of the Ministry of Trade, Industry & Energy, March 18, 2020, and is valid and effective as the detailed standard in conformity to the Act, Article 17-5, Clause 1

**1.2.2** Conformity to this Code is deemed to conform to Table 6, 3 of the Enforcement Rule of the Act (hereinafter referred to as "Enforcement Rule") in accordance with the Act, Article 17-5, Clause 4. <Revised on August 7, 2015 and August 10, 2018>

#### 1.3 Definitions

The meanings of the terms used in this Code are as follows:

**1.3.1**"Pipelines" mean pipelines installed to supply city gas, and include main pipelines, supply

pipelines, internal piping and other pipelines. <Revised on October 14, 2013>

**1.3.2** A “main pipeline” means any pipeline among the followings: <Revised on October 14, 2013>

(1) In the case of wholesale gas manufacturing business, a pipeline from the perimeter of a city gas manufacturing plant (inclusive of an LNG receiving terminal; hereinafter the same shall apply) to the perimeter of a governor station; However, pipelines in valve stations are excluded.

(2) In the case of general city gas manufacturing business, a pipeline from the perimeter of a city gas manufacturing plant or the perimeter of a gas installation of a wholesale gas business operator to a governor

**1.3.3** A “supply pipeline” means one of the followings:

(1) In case gas is supplied to an apartment, an officetel, a condominium or a building recognized to be necessary for safety control by the Minister of Trade, Industry & Energy (hereinafter referred to as “apartment, etc.”), it means the pipeline from a governor to the upstream valve of the gas meter installed on the external wall of a building owned or occupied by gas users by partitioning the building (to the external wall of the building, if the gas meter is installed inside the building).

(2) In case gas is supplied to a building other than an apartment, etc., it means a pipeline from a governor to the perimeter of the land occupied or owned by a gas user.

(3) In the case of gas wholesale business, it means a pipeline from a governor to a gas supply installation of a general urban gas business operator or to the gas user installation of a large gas user. <Revised on October 14, 2013>

**1.3.4** A “user pipeline” means a pipeline from the perimeter of the land owned or occupied by gas users to the upstream valve of the gas meter installed on the external wall of a building owned or occupied by the gas users by partitioning the building (to the external wall of the building, if the gas meter is installed inside the building) among supply pipelines in conformity to 1.3.3(1).

**1.3.5** “High pressure” means a pressure not lower than 1 MPa (gauge pressure; hereinafter the same shall apply). However, liquefied gas in a liquid state is deemed to be a high pressure gas.

**1.3.6** “Medium pressure” means a pressure not lower than 0.1 MPa to but not including 1 MPa. However, in the case of liquefied gas which is vaporized but not mixed with another gas, it means a pressure not lower than 0.1 MPa to but not including 0.2 MPa.

**1.3.7** “Low pressure” means a pressure lower than 0.1 MPa. However, in the case of liquefied gas which is vaporized but not mixed with another gas, it means a pressure lower than 0.01 MPa. <Revised on October 16, 2018>