

Code for Facilities, Technology and Inspection for Manufacturing of Seamless Cylinders for High-Pressure Gases

### **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 No.	KGS AC212 <sup>2019</sup>	
Code Title	Code for Facilities, Technology and Inspection for Manufacturing of Seamless Cylinders for High-Pressure Gas	

Date	ltem	
December 30, 2008	Established (Notification of the Ministry of Knowledge Economy, No. 2008-379)	
May 15, 2009	Revised (Notification of the Ministry of Knowledge Economy, No. 2009-193)	
June 29, 2009	Revised (Notification of the Ministry of Knowledge Economy, No. 2009-250)	
January 6, 2010	Revised (Notification of the Ministry of Knowledge Economy, No. 2009-480)	
January 3, 2011	Revised (Notification of the Ministry of Knowledge Economy, No. 2010-489)	
May 25, 2011	Revised (Notification of the Ministry of Knowledge Economy, No. 2011-261)	
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)	
December 31, 2013	Revised (Notification of the Ministry of Trade, Industry & Energy, No. 2013-353)	
May 27, 2014	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2014-231)	
November 17, 2014	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2014-589)	

June 10, 2015	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2015-331)
August 7, 2015	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2015-436)
December 10, 2015	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2015-641)
January 8, 2016	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2016-6)
July 11, 2016	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2016-354)
December 15, 2016	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2016-638)
June 2, 2017	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2017-298)
September 29, 2017	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2017-475)
April 10, 2018	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2018-193)
October 16, 2018	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2018-512)
August 14, 2019	Revised (Notification of the Ministry of Trade, Industry & Energy No. 2019-489)

## **Table of Contents**

neral	1
l.1 Scope	1
.2 Validity of Code	1
.3 Reference Codes and Standards	1
1.3.1 Inspection standard for new technology products	1
1.3.2 Manufacturing registration standard for foreign cylinders <r< td=""><td>evised on June</td></r<>	evised on June
26, 2012>	2
.4 Definitions	3
.5 Application of Codes and Standards	7
anufacturing Installation Standard	7
2.1 Manufacturing Facilities	7
2.2 Inspection Facilities	8
anufacturing Technology	8
3.1 Design (currently not used)	8
3.2 Materials	9
3.3 Thickness	9
3.4 Construction and Dimensions (currently not used)	11
3.4.1 Construction (currently not used)	11
3.4.2 Dimensions	11
3.5 Fabrication (currently not used)	11
8.6 Welding (currently not used)	12
3.7 Heat Treatment	12
8.8 Performance (currently not used)	12
3.9 Painting	12
3.9.1 Pretreatment	12
3.9.2 Painting method	12
3.10 Attachment of Safety Devices (currently not used)	14

3.11 Attachment of Accessories	14
3.12 Coloring and Marking	15
3.12.1 Coloring on external surface of cylinders	15
3.12.2 Marking of kind of gas	16
3.12.3 Marking of products	18
3.12.4 Marking of acceptance	19
4. Inspection Standard	20
4.1 Kinds of Inspections	20
4.1.1 Manufacturing installation inspection	20
4.1.2 Product inspection <revised 2011="" 25,="" may="" on=""></revised>	20
4.1.2.1 Design stage inspection < Revised on April 10, 2018>	20
4.2 Audit of Process Inspection Object	22
4.2.1 Application for audit	22
4.2.2 Audit method	22
4.2.3 Adjudication committee	23
4.3 Inspection Items	23
4.3.1 Manufacturing installation inspection	23
4.3.2 Product inspection	23
4.4 Inspection Methods	27
4.4.1 Manufacturing installation inspection	27
4.4.2 Product inspection	27
4.5 Other Inspection Standards	43
4.5.1 Inspection of imported goods (currently not used)	43
4.5.2 Partial exception from inspection <revised 2012="" 26,="" june="" on=""></revised>	43
4.5.3 Disposal of rejected products	44
5. Re-inspection Standard (Not Applicable) < Newly established on January 6, 2010 >	44
6. Other Manufacturing and Inspection Standards < Newly established on January 6, 20	010>44
6.1 Exception of Manufacturing Registration of Foreign Cylinders	44
Appendix A General Standard for Operation of Quality Control System for Gas Cy	/linder
Manufacturing Plants	45

## Code for Facilities, Technology and Inspection for Manufacturing of Seamless Cylinders for High-Pressure Gases

#### 1. General

#### 1.1 Scope

This code applies to facilities, technology and inspection for manufacturing of seamless cylinders (hereinafter referred to as "cylinders") among cylinders in conformity to the High-Pressure Gas Safety Control Act (hereinafter referred to the "Act"), Article 3, Clause 2. However, disposable cylinders which are manufactured for aerosol cutting and welding and of which internal volume is not over 1 liter shall conform to KGS AC 311 (Code for Facilities, Technology and Inspection for Manufacturing of Soldered or Joined Cylinders for High-Pressure Gases).

#### 1.2 Validity of Code

- **1.2.1** This Code has passed the deliberation and resolution by Gas Technical Standards Committee (Bill No. 2019-6, July 19, 2019) in accordance with the Act, Article 22-2, Clause 2, has been approved by the Minister of Trade, Industry & Energy (Notification No. 2019-489 of the Ministry of Trade, Industry & Energy, August 14, 2019), and is valid and effective as the detailed standards in conformity to the Act, Article 22-2, Clause 1.
- **1.2.2** Conformity to this Code is deemed to conform to Table 10 of the Enforcement Regulation in accordance with the Act, Article 22-2, Clause 4.

#### 1.3 Reference Codes and Standards

#### 1.3.1 Inspection standard for new technology products

- **1.3.1.1** In case the Minister of Trade, Industry & Energy acknowledges that cylinders do not meet the inspection standard in conformity to this Code in accordance with the Enforcement Regulation, Table 10, No. 4-c but do not hinder safety control as new cylinders developed through new technology development, such manufacturing and inspection methods of those cylinders may apply only restrictively to them.
- **1.3.1.2** Cylinders inspected by a relevant authorized inspection agency in accordance with an acceptable standard in Table 1.3.1.2 are deemed by the Minister of Trade, Industry & Energy not to hinder safety control in conformity to 1.3.1.1 above and may be inspected in accordance with the relevant acceptable code and standard without the need of applying for inspection exception and undergoing subsequent review.

Table 1.3.1.2 Acceptable Codes and Standards and Authorized Inspection Agencies for Foreign Cylinders <Revised on May 27, 2014, December 10, 2015>

Acceptable Standard	Authorized Inspection Agency	
DOT	Inspection bodies certified by DOT	
PED (Pressure Equipment Directive)	Notified bodies registered with EC (European	
TPED (Transportable Pressure Equipment	Commission)	
Directive)		
High-Pressure Gas Safety Security Law	Nuclear and Industrial Safety Agency of MITI, High-	
	Pressure Gas Safety Institute	
Other codes and standards acceptable to the	Inspection agencies acceptable to the Minister of	
Minister of Trade, Industry & Energy	Trade, Industry & Energy	

# 1.3.2 Manufacturing registration standard for foreign cylinders < Revised on June 26, 2012>

- **1.3.2.1** The "manufacturing installation standards and manufacturing technology standards" specified in the Enforcement Regulation, Article 9-2, proviso of Clause 3 means acceptable codes and standards in Table 1.3.1.2.
- **1.3.2.2** Foreign cylinders shall be manufactured in accordance with an acceptable code or standard in Table 1.3.1.2 in conformity to the Enforcement Decree of the High-Pressure Gas Safety Control Act, Article 5-2, Clause 2, No. 2.