

CERTIFICATE OF ACCREDITATION

Hyundai Steel Company(Dangjin Laboratory)

Accreditation No. : KT533

Corporation Registration No. : 120111-0001743

Address of Laboratory : (Branch site)1480, Bukbusaneop-ro Songak-eup, Dangjin-si, Chungcheongnam-do, Republic of Korea

Date of Initial Accreditation : November 06, 2012

Validity of Accreditation : March 05, 2021 ~ March 04, 2025

Scope of Accreditation : Attached Annex

Date of issue : March 24, 2021

This testing laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025 : 2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to Joint ISO-ILAC-IAF Communiqué).



Sanghoon Lee

Head

Korea Laboratory Accreditation Scheme

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01. Mechanical Testing

01.001 Metals and Related Products

Test method	Standard designation	Test range	Site	Field testing
API RP 5L3:2014	Drop-Weight Tear Tests on Line Pipe	(0 ~ 100) % Temperature : (-80 ~ room temperature) °C	BS	N
AS 1391:2020	Metallic materials - Tensile testing at ambient temperature	Load : (10 ~ 1 600) kN Elongation : (0 ~ 60) % Reduction of area : (1 ~ 80) %	BS	N
AS 1544.2:2003	Methods for impact tests on metals charpy V-notch	Absorbed Energy : max. 640 J V-notch Liquid medium Temperature : -196 °C, (-170 ~ room temperature) °C	BS	N
ASTM E1382-97	Standard test methods for determining Average grain size using semiautomatic and automatic image analysis	Grain count method (single phase grain, planimetric procedure)	BS	N
ASTM E23-18	Standard test methods for notched bar impact testing of metallic materials	Absorbed Energy : max. 640 J V-notch Liquid medium Temperature : -196 °C, (-170 ~ room temperature) °C	BS	N
ASTM E290-14	Standard test methods for bend testing of material for ductility	R : (5 ~ 120) mm Flat wrought product	BS	N
ASTM E436-03	Standard test method for drop-weight tear tests of ferritic steels	(0 ~ 100) % Temperature : (-80 ~ room temperature) °C	BS	N
ASTM E8/E8M-16a	Standard test methods for tension testing of metallic materials	Load : (10 ~ 1 600) kN Elongation : (0 ~ 60) % Reduction of area : (1 ~ 80) %	BS	N

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Test method	Standard designation	Test range	Site	Field testing
ISO 148-1:2016	Metallic materials - Charpy pendulum impact test - Part 1 : Test method	Absorbed Energy : max. 640 J V-notch Liquid medium Temperature : -196 °C, (-170 ~ room temperature) °C	BS	N
ISO 4967:2013	Steel - Determination of content of nonmetallic inclusions - Micrographic method using standard diagrams	A method	BS	N
ISO 6506-1:2014	Metallic materials - Brinell hardness test - Part 1 : Test method	(100 ~ 400) HBW	BS	N
ISO 6507-1:2018	Metallic materials - Vickers hardness test - Part 1 : Test method	(100 ~ 300) HV	BS	N
ISO 6508-1:2016	Metallic materials - Rockwell hardness test - Part 1 : Test method	(40 ~ 90) HRB (20 ~ 60) HRC	BS	N
ISO 6892-1:2019	Metallic materials - Tensile testing - Part 1 : Method of test at room temperature	Load : (10 ~ 1 600) kN Elongation : (0 ~ 60) % Reduction of area : (1 ~ 80) %	BS	N
ISO 7438:2020	Metallic materials - Bend test	R : (5 ~ 120) mm Flat wrought product	BS	N
JIS G 0555:2020	Microscopic testing method for the non-metallic inclusions in steel	A method	BS	N
JIS Z 2241:2011	Metallic materials - Tensile testing - Method of test at room temperature	Load : (10 ~ 1 600) kN Elongation : (0 ~ 60) % Reduction of area : (1 ~ 80) %	BS	N
JIS Z 2242:2018	Method for charpy pendulum impact test of metallic materials	Absorbed Energy : max. 640 J V-notch Liquid medium Temperature : -196 °C, (-170 ~ room temperature) °C	BS	N

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Test method	Standard designation	Test range	Site	Field testing
JIS Z 2243-1:2018	Brinell hardness test - Part 1 : Test method	(100 ~ 400) HBW	BS	N
JIS Z 2243-2:2018	Brinell hardness test - Part 2 : Table of hardness value	(100 ~ 400) HBW	BS	N
JIS Z 2244:2009	Vickers hardness test - Test method	(100 ~ 300) HV	BS	N
JIS Z 2245:2016	Rockwell hardness test - Test method	(40 ~ 90) HRB (20 ~ 60) HRC	BS	N
JIS Z 2248:2006/ AMENDMENT 1:2014	Metallic materials - Bend test	R : (5 ~ 120) mm Flat wrought product	BS	N
KS B 0802:2003	Method of tensile test for metallic materials	Load : (10 ~ 1 600) kN Elongation : (0 ~ 60) % Reduction of area : (1 ~ 80) %	BS	N
KS B 0804:2001	Metallic materials - Bend test	R : (5 ~ 120) mm Flat wrought product	BS	N
KS B 0805:2000	Metallic materials - Test method of brinell hardness	(100 ~ 400) HBW	BS	N
KS B 0806:2000	Metallic materials - Test method of rockwell hardness	(40 ~ 90) HRB (20 ~ 60) HRC	BS	N
KS B 0810:2003	Method of impact test for metallic materials	Absorbed Energy : max. 640 J V-notch Liquid medium Temperature : -196 °C, (-170 ~ room temperature) °C	BS	N
KS B 0811:2003	Metallic materials - Vickers hardness test - Part 1 : Test method	(100 ~ 300) HV	BS	N
KS D 0204:2007	Steel - Determination of content of nonmetallic inclusions - Micrographic method using standard diagrams	A method	BS	N
KS D 0205:2002	Steel - Micrographic determination of the ferritic or austenitic grain size	5.3.3 McQuaid Ehn Method by carburizing for 925°C	BS	N

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Test method	Standard designation	Test range	Site	Field testing
KS D 0283:2005	Standard test method for drop-weight tear tests of ferritic steels	(0 ~ 100) % Temperature : (-80 ~ room temperature) °C	BS	N
KS D 3504:2019	Steel bars for concrete reinforcement	Tensile test : (10 ~ 800) kN Elongation : (0 ~ 60) % Bend test : D8 ~ D51	BS	N
NACE TM0177:2016	Laboratory Testing of Metals for Resistance to Sulfide Stress Cracking and Stress Corrosion Cracking in H ₂ S Environments	B method	BS	N
NACE TM0284:2016	Evaluation of pipeline and pressure vessel steels for resistance to hydrogen-induced cracking	Solution A, Pressure vessel plate	BS	N
NACE TM0316:2016	Four-Point Bend Testing of Materials for Oil and Gas Applications	Test Solution A, B	BS	N

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02. Chemical Testing

02.001 Iron and Steel

Test method	Standard designation	Test range	Site	Field testing
AS/NZS 1050.16:1994	Methods for the analysis of iron and steel Part 16 : Determination of sulfur content - Infrared absorption method after combustion in an induction furnace	S(0.002 ~ 0.10) %	BS	N
AS/NZS 1050.32:1994	Methods for the analysis of iron and steel Part 32 : Determination of carbon content - Infrared method	C(0.002 ~ 0.45) %	BS	N
AS3641.1:1999	Recommended practice for atomic emission spectrometric analysis Principles and techniques	C(0.001 ~ 1.3) % Mn(0.003 ~ 2.2) % S(0.001 ~ 0.31) % Al(0.001 ~ 1.00) % Cr(0.002 ~ 5.0) % V(0.001 ~ 0.65) % Nb(0.001 ~ 0.2) % Si(0.004 ~ 3.1) % P(0.001 ~ 0.08) % Cu(0.001 ~ 1.4) % Ni(0.002 ~ 5.2) % Mo(0.001 ~ 1.5) % Ti(0.001 ~ 0.3) % Sn(0.001 ~ 0.10) % B(0.0003 ~ 0.010) %	BS	N
ASTM E1019-18	Standard test methods for determination of carbon, sulfur, nitrogen and oxygen in steel, iron, nickel and cobalt alloys by various combustion and fusion techniques	C(0.001 ~ 4.50) % S(0.002 ~ 0.35) % N(0.00055 ~ 0.50) % O(0.0005 ~ 0.03) %	BS	N

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Test method	Standard designation	Test range	Site	Field testing
ASTM E415-17	Standard test method for Analysis of Carbon and Low-Alloy Steel by Spark Atomic Emission Spectrometry	C(0.001 ~ 1.1) % Mn(0.006 ~ 2.0) % S(0.001 ~ 0.055) % Al(0.006 ~ 0.093) % Cr(0.007 ~ 5.0) % V(0.003 ~ 0.3) % Nb(0.003 ~ 0.12) % Si(0.02 ~ 1.54) % P(0.006 ~ 0.085) % Cu(0.006 ~ 0.5) % Ni(0.006 ~ 5.0) % Mo(0.007 ~ 1.3) % Ti(0.001 ~ 0.2) % Sn(0.005 ~ 0.061) % B(0.000 4 ~ 0.007) %	BS	N
JIS G 1253:2002/ AMENDMENT 1:2013	Iron and steel - Method for spark discharge atomic emission spectrometric analysis	C(0.001 ~ 1.3) % Mn(0.003 ~ 2.2) % S(0.001 ~ 0.31) % Al(0.001 ~ 1.00) % Cr(0.002 ~ 5.0) % V(0.001 ~ 0.65) % Nb(0.001 ~ 0.2) % Si(0.004 ~ 3.1) % P(0.001 ~ 0.08) % Cu(0.001 ~ 1.4) % Ni(0.002 ~ 5.2) % Mo(0.001 ~ 1.5) % Ti(0.001 ~ 0.3) % Sn(0.001 ~ 0.10) % B(0.000 3 ~ 0.010) %	BS	N
KS D 1652:2007	Iron and steel - Method for spark discharge atomic emission spectrometric analysis	C(0.001 ~ 1.3) % Mn(0.003 ~ 2.2) % S(0.001 ~ 0.31) % Al(0.001 ~ 1.00) % Cr(0.002 ~ 5.0) % V(0.001 ~ 0.65) % Sn(0.001 ~ 0.15) % Si(0.004 ~ 3.1) % P(0.001 ~ 0.08) % Cu(0.001 ~ 1.4) % Ni(0.002 ~ 5.2) % Mo(0.001 ~ 1.5) % Ti(0.001 ~ 0.3) % Nb(0.001 ~ 0.2) % B(0.000 3 ~ 0.010) %	BS	N
KS D 1655:2008	Method for X-ray fluorescence spectrometric analysis of iron and steel	Si(0.03 ~ 4.69) % P(0.005 ~ 1.5) % Ti(0.001 ~ 0.28) % Mn(0.003 ~ 2.23) % S(0.001 ~ 0.16) % V(0.001 ~ 0.50) %	BS	N

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Test method	Standard designation	Test range	Site	Field testing
KS D 1673:2007	Methods for inductively coupled plasma emission spectrochemical analysis of steel	Si(0.01 ~ 0.6) % P(0.003 ~ 0.1) % Cr(0.01 ~ 3.0) % V(0.002 ~ 0.5) % Ti(0.001 ~ 0.3) % Mn(0.01 ~ 2.0) % Ni(0.01 ~ 4.0) % Cu(0.01 ~ 0.5) % Co(0.003 ~ 0.2) % Al(0.004 ~ 0.1) %	BS	N

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02. Chemical Testing

02.004 Mine and Ceramic Related Products

Test method	Standard designation	Test range	Site	Field testing
KS D 1901:1999	Method for chemical analysis of ferromanganese 6.2 Volumetric Analysis Method B	Mn (74.40 ~ 88.15) %	BS	N
KS D 2515:2011	Methods for chemical analysis of ferrovanadium (Annex A:Vanadium determination method-Potassium permanganate oxide, iron(II) ammonium sulfate titration method)	V (53.40 ~ 82.31) %	BS	N
KS E 3075:2017	Method for X - ray fluorescence spectrometric analysis of limestone and dolomite	Fe ₂ O ₃ (0.05 ~ 2.0) % CaO (29.0 ~ 55.8) % MgO (0.1 ~ 22.0) % SiO ₂ (0.1 ~ 12.4) % Al ₂ O ₃ (0.05 ~ 5.0) %	BS	N
KSEISO 2597-1:2007	Iron ores - Determination of total iron content - Part 1 : Titrimetric method after tin(II) chloride reduction	Fe (36.76 ~ 72.0) %	BS	N

End.