

No. 45(1/11)

## CERTIFICATE OF ACCREDITATION

Name of Laboratory : KCC Corporation Central Research Institute

Representative : Chung, Mong Ik  
Chung, Mong Jin

Address of Headquarters : 1301-4, Seocho-dong, Seocho-ku, Seoul, Korea

Address of Laboratory : 83, Mabook-dong, Kiheong-gu, Yongin-Si,  
Kyungki-Do, 449-912, Korea

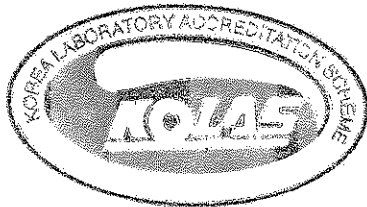
Duration : October 26, 2011 ~ October 25, 2015

Scope of Accreditation  
(Scope of Accreditation is described in the accompanying Annex)

This testing laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025 : 2005. 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 dated 8 January 2009).

May 17, 2012

**Administrator,**  
**Korea Laboratory Accreditation Scheme(KOLAS)**

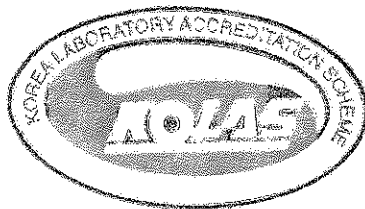


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**01 Mechanical Test**

0106 Construction and Related Products

Test method	Standard designation	Test range or Limits of detection
KS F 2292 : 2008	The method of air tightness for windows and doors	(- 1 000 ~ 1 000) Pa, (0 ~ 50) m/s
KS F 2293 : 2008	Test method of water tightness for windows and doors	(- 5.00 ~ 5.00) kPa
KS F 2296 : 1999	Windows and doorsets—Wind resistance test	(- 20.00 ~ 20.00) kPa, (0.0 ~ 100.0) mm

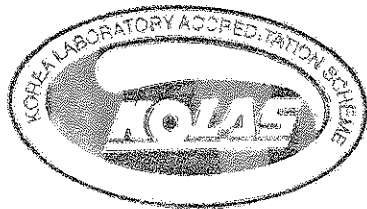


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## 02 Chemical Test

0204 Mine & related Ceramic materials

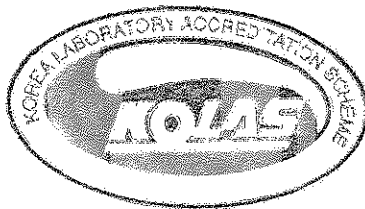
Test method	Standard designation	Test range or Limits of detection
KS E ISO 9685:2002	Iron ores - Determination of nickel and/or chromium contents - Flame atomic absorption spectrometric method	1) (0.003 ~ 0.1) %
KS E ISO 13310:2003	Iron ores -- Determination of zinc content -- Flame atomic absorption spectrometric method	1) (0.001 ~ 0.5) %
KS E ISO 4688-1:2007	Iron ores - Determination of aluminium content - Part 1: Flame atomic absorption spectrometric method	1) (0.1 ~ 5) %
KS L 2101:2009	Chemical analysis of silica sand and quartz	10.a) (0.5 ~ 10) % 10.b) (0.1 ~ 0.5) %
KS L 2512:2009	Methods for chemical analysis of borosilicate glasses	6) (1 ~ 70) % 7) (0.5 ~ 15) % 8) (0.5 ~ 15) % 9) (0.1 ~ 15) % 11.b) (0.01 ~ 15) %
ASTM C 146:94a(2009)	Standard test methods for chemical analysis of glass sand	10) (1 ~ 90) % 11) (0.5 ~ 20) % 12) (0.1 ~ 10) % 14) (0.05 ~ 10) % 15) (0.3 ~ 10) %
ASTM C 1301:95(2009) e1	Standard test method for major and trace elements in limestone and lime by inductively coupled plasma-atomic emission spectroscopy(ICP) and atomic absorption(AA)	(0.001 ~ 10) %
KS E 3071:1993	Methods for chemical analysis of limestone	6.5) (0.01 ~ 2.5) % 6.7) (0.01 ~ 2.5) % 6.9) (0.08 ~ 5) % 6.11) (0.03 ~ 1) %



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0214 Paint

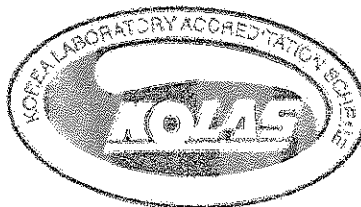
Test method	Standard designation	Test range or Limits of detection
KS D 9502:2009	Neutral, acetic acid and copper-accelerated acetic acid salt spray	-
KS M 0011:2008	Methods for determination of pH of aqueous solutions.	0.1 ~ 14.0
KS M 3827:2003	Testing methods for non-volatile matter in solvent-diluted epoxide resins	(0.1 ~ 99.9) %
KS M 5000:2009	Testing methods for organic and their related materials	1) Consistency: (42 ~ 143) KU 2) Fineness of grid : (0 ~ 8) NS
	2122 Testing method of consistency for pigmented material (Krebs-stomer viscosimeter )	
	2141 Testing method for fineness of grid	
KS M 6010:2009	Synthetic Resin Emulsion Paints	b) (42 ~ 143) KU
	4.2.2 b) Consistency	c) (0.1 ~ 99.9) %
	c) Non-volatile matter	
KS M ISO 3856-1:2007	Paints and varnishes-Determination of "soluble" metal content-Part 1:Determination of lead content-Flame atomic absorption spectrometric method and dithizone spectrophotometric method	(0.05 ~ 5) %
	3.Flame atomic absorption spectrometric method	
KS M ISO 3856-4:2007	Paints and varnishes-Determination of "soluble" metal content-Part 4:Determination of cadmium content-Flame atomic absorption spectrometric method and polarographic method	(0.05 ~ 5) %
	3.Flame atomic absorption spectrometric method	
KS M ISO 3856-5:2007	Paints and varnishes-Determination of "soluble" metal content:Determination of hexavalent chromium content of the liquid paint or the paint in powder form - Diphenylcarbazine spectrophotometric method	(0.05 ~ 5) %
KS M ISO 3856-7:2007	Paints and varnishes-Determination of "soluble" metal content-Part7:Determination of mercury content of the pigment portion of the paint and of the liquid of water - dilutable paints - Flameless atomic absorption spectrometric method	(0.005 ~ 0.05) %



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0214 Paint(Cont.)

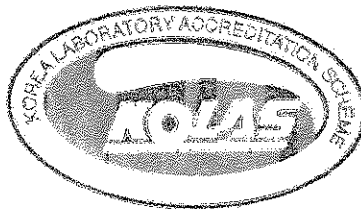
Test method	Test method	Test range or Limits of detection
KS M ISO 4623-1:2007	Paints and varnishes-Determination of resistance to filiform corrosion-Part 1:Steel substrates	-
KS M ISO 4623-2:2006	Determination of resistance to filiform corrosion — Part 2: Aluminium substrates	-
KS M ISO 8130-7:2008	Coating powders-Determination of loss of mass on stoving	(0.01 ~ 3) %
KS M ISO 8130-13:2008	Coating Powders-Part 13:Particle size analysis by laser diffraction	(1 ~ 300) $\mu$ m
KS M ISO 11890-2:2007	Paints and varnishes application of paints and related products-Determination of volatile organic compound (VOC) content-Part 2:Gas-chromatographic method	(0.1 ~ 15) %
ASTM B117-11	Standard Practice for Operating Salt Spray(Fog) Apparatus	-
ASTM B368-09	Standard Test Method for Copper-Accelerated Acetic Acid-Salt Spray(Fog) Testing(CASS Test)	-
ASTM D523-08	Standard Test Method for Specular Gloss	0.01 ~ 99.9
ASTM D870-09	Standard Practice for Testing Water Resistance of Coatings Using Water Immersion	-



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0214 Paint(Cont.)

Test method	Standard designation	Test range or Limits of detection
ASTM D1735-08	Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus	—
ASTM D2247-11	Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity	—
ASTM D2371-85(2010)	Standard Test Method for Pigment Content of Solvent-Reducible Paints	(0.1 ~ 99.9) %
ASTM D2698-05(2010)	Standard Test Method for Determination of the Pigment Content of Solvent-Reducible Paints by High-Speed Centrifuging	(0.1 ~ 99.9) %
ASTM D3257-06	Standard Test Methods for Aromatics in Mineral Spirits by Gas Chromatography	(0.1 ~ 30) %
ASTM D 3335-85a(2009)	Standard Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy	1) Pb (0.01 ~ 5) % 2) Cd (50 ~ 150)
	Except for Cobalt	mg/kg
ASTM D3359-09e2	Standard Test Methods for Measuring Adhesion by Tape Test	
ASTM D3723-05(2011)	Standard Test Method for Pigment Content of Water-Emulsion Paints by Low-Temperature Ashing	(0.1 ~ 99.9) %
ASTM D5402-06(2011)	Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs	—



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0214 Paint(Cont.)

Test method	Standard designation	Test range or Limits of detection
ASTM D6580-00(2009)	Standard Test Method for the Determination of Metallic Zinc Content in Both Zinc Dust Pigment and in Cured Films of Zinc-Rich Coatings	(0.1 ~ 99.9) %
ASTM D6695-08	Standard Practice for Xenon-Arc Exposures of Paint and Related Coatings	—
ISO 15184:1998	Paints and varnishes—Determination of film hardness by pencil test	9B ~ 9H
GMW14124:2010	Automotive Environmental Cycles	—
GMW14162:2011	Colorfastness to Artificial Weathering	$\Delta E$ : (0.01 ~ 3)
GMW14333:2009	Resistance to Fuels of Exteriors Automotive Materials and Components	—
GMW14334:2009	Chemical Resistance to Fluids	—
GMW14458:2011	Copper-Accelerated Acetic Acid Salt Spray (CASS ) Test	—
GMW14700:2009	Stone Impact Resistance of Coatings	—
GMW14701:2011	Resistance of Coatings to Chemical Etching and Distortion	—
GMW14729:2010	Procedures for High Humidity Test	—
GMW14829:2011	Tape Adhesion Test for Paint Finishes	—
GMW14872:2010	Cyclic Corrosion Laboratory Test	—

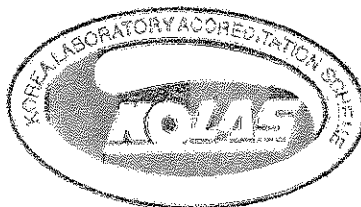


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0214 Paint

Test method	Standard designation	Test range or Limits of detection
GMW15282:2011	Corrosion/Undercutting Scribe Creepback	—
GMW15287:2007	Filiform Corrosion Test Procedure for Painted Aluminum Wheels and Painted Aluminum Wheel Trim	—
GMW15433:2007	Yellowing of Clearcoat Systems	0.01 ~ 99.9
GMW15487:2008	Determining the Resistance to Abrasion of Organic Coating	—
GMW15545:2008	Ultraviolet/Visible Transmission Through Cured Paint Film	(0 ~ 20)%
GMW15891:2008	Solvent Rub Method for Determining Cure of Painted Metal or Plastic Substrates	—
GMW3286:2011	Neutral Salt Spray (NSS) Test	—
SAE J1545:2005	Instrumental Color Difference Measurement for Exterior Finishes, Textiles and Colored Trim	0.01 ~ 99.9
SAE J2527:2004	Performance Based Standard for Accelerated Exposure of Automotive Exterior Materials Using a Controlled Irradiance Xenon-Arc Apparatus	—





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0225 Other Environment

Test method	Standard designation	Test range or Limits of detection
KS I ISO 16000-3:2008	Determination of formaldehyde and other carbonyl compounds—Active Sampling Method	1 $\mu\text{g}/\text{m}^3$ ~ 1 $\text{mg}/\text{m}^3$
KS I ISO 16000-6:2004	Indoor air — Part 6 : Determination of volatile organic compounds in indoor and chamber air by active sampling on TENAX TA sorbent, thermal desorption and gas chromatography using MSD/FID	1 $\mu\text{g}/\text{m}^3$ ~ 1 $\text{mg}/\text{m}^3$
KS I ISO 16000-9:2004	Indoor air — Part 9: Determination of the emission of volatile organic compounds — Emission test chamber method	1 $\mu\text{g}/\text{m}^3$ ~ 1 $\text{mg}/\text{m}^3$
KS I ISO 16000-11:2004	Indoor air — Part 11: Determination of the emission of volatile organic compounds — Sampling, storage of samples and preparation of test specimens	1 $\mu\text{g}/\text{m}^3$ ~ 1 $\text{mg}/\text{m}^3$
Ministry of Environment Republic of Korea Notice No. 2010-24	Environment standard method for indoor air quality ES 02131.1, ES 02601.1, ES 02602.1	Formaldehyde : 1 $\mu\text{g}/\text{m}^3$ ~ 1 $\text{mg}/\text{m}^3$ TVOC : 1 $\mu\text{g}/\text{m}^3$ ~ 1 $\text{mg}/\text{m}^3$



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#### **04 Heat and Temperature Measurement**

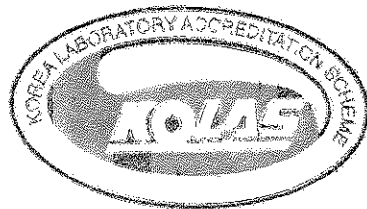
##### **0401 Temperature and Humidity**

<b>Test method</b>	<b>Standard designation</b>	<b>Test range or Limits of detection</b>
KS F 2277:2002	Thermal insulation – Determination of steady –state thermal transmission properties – Calibrated and guarded hot box	(0.1 ~ 9) W/m <sup>2</sup> K
KS F 2278:2008	Test method of thermal resistance for windows and doors	(0.1 ~ 9) W/m <sup>2</sup> K
KS F 2295:2004	Test method of dew condensation for windows and doors	thermostatic chamber : –temp. (10 ~ 70) °C –humidity (30 ~ 90) %RH cold chamber : (– 40 ~ 60) °C

#### **06 Sound and Vibration test**

##### **0601 Sound**

<b>Test method</b>	<b>Standard designation</b>	<b>Test range or Limits of detection</b>
KS F 2805:2004	Measurement of sound absorption in a reverberation room	Reverberation Time : 1/100 s to 60 s Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3
KS F 2808:2001	Laboratory measurements of airborne sound insulation of building elements	Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3
KS F 2862:2002	Rating of airborne sound insulation in buildings and of building elements	Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3



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0601 Sound(Cont.)

Test method	Standard designation	Test range or Limits of detection
KS F 2866:2003	Laboratory measurement of room -to- room airborne sound insulation of a suspended ceiling with a plenum above it	Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3
ASTM C 423:09a	Standard test method for sound absorption and sound absorption coefficients by the reverberation room method.	Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3
ASTM E 90:09	Standard test method for laboratory measurement of airborne sound transmission loss of building partitions and elements	Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3
ASTM E 413:10	Classification for rating sound insulation	Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3
ASTM E 1414:06	Standard test method for airborne sound attenuation between rooms sharing a common ceiling plenum	Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3
ISO 140-4:1998	Acoustics-Measurement of sound insulation in buildings and of building elements - part 4: Field measurements of airborne sound insulation between rooms	Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3
ISO 354:2003	Acoustics-Measurement of sound absorption in a reverberation room	Reverberation Time : 1/100 s to 60 s Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3,
ISO 717-1:1996	Acoustics-Rating of sound insulation in buildings and of building elements - Part1 : Airborne sound insulation	Frequency Range : 1 Hz to 20 000 Hz Octave Band : 1/3

End.