

No. 181 (1/7)

CERTIFICATE OF ACCREDITATION

Name of Laboratory : Woongjin Coway Co. Ltd.
(Environmental Analysis & Research Center)

Representative : Hong Jun Kee

Address of Headquarters : 658, Yuku-ri, Yuku-eup, Gongju-si,
Chungcheongnam-do, Korea

Address of Laboratory : Woongjin R&D Center. San 4-1
Nakseoungdae-dong, Gwanak-gu, Seoul, Korea

Duration : June. 16, 2009 ~ June. 15, 2013

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

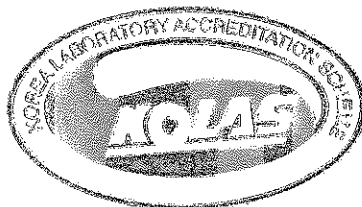
This is to certify that the above Laboratory is accredited as
Testing Laboratory in accordance with the provisions of Article 23
of the National Standards Act.

These criteria encompass the requirements of ISO/IEC
17025:2005.

May 29, 2012

Administrator,

Korea Laboratory Accreditation Scheme(KOLAS)



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21. Chemical Test

2.021 Water

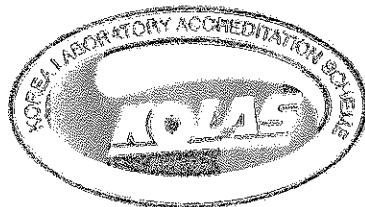
Test method	Standard designation	Limits of test and Limits of detection
Ministry of Environment Notice No. 2011-21	Official test method for Drinking water	
	ES 05301.1 Hardness as CaCO_3	> 10 mg/L
	ES 05302.1 Consumption of KMnO_4	(0.3 ~ 10) mg/L
	ES 05303.1 Odor	-
	ES 05304.1 Taste	-
	ES 05305.1 Color	(CU) 1
	ES 05306.1 pH	pH (3 ~ 10)
	ES 05307.1 Evaporation residue	(2 ~ 20 000) mg/L
	ES 05308.1 Turbidity	> 0.02 NTU
	ES 05309.1 ABS	(0.2 ~ 2.0) mg/L
	ES 05310.1 Residual chlorine	(0.01 ~ 10) mg/L
	ES 05311.1 Phenols	(0.001 ~ 0.1) mg/L
	ES 05352.1 CN^-	(0.01 ~ 0.2) mg/L
	ES 05353.1 $\text{NH}_3\text{-N}$	< 1 mg/L
	ES 05351.1 F	(0.05 ~ 0.5) mg/L
	ES 05354.1 $\text{NO}_3\text{-N}$	(0.02 ~ 2.0) mg/L
	ES 05355.1 Cl^-	(0.02 ~ 2.0) mg/L
	ES 05356.1 SO_4^{2-}	(0.02 ~ 2.0) mg/L
	ES 05401 Cu	> 0.008 mg/L
	ES 05402 Pb	> 0.04 mg/L
	ES 05403 Mn	> 0.005 mg/L
	ES 05404 B	> 0.01 mg/L
	ES 05405 As	> 0.005 mg/L
	ES 05406 Se	> 0.005 mg/L
	ES 05407.1 Hg	> 0.0005 mg/L
	ES 05408 Zn	> 0.002 mg/L
	ES 05409 Al	> 0.02 mg/L
	ES 05410 Fe	> 0.05 mg/L
	ES 05411 Cd	> 0.005 mg/L
	ES 05412 Cr	> 0.02 mg/L
	ES 05413 Sr	> 0.001 mg/L
	ES 05501.1 Diazinone	> 0.001 mg/L
	ES 05502.2 Carbaryl	> 0.002 mg/L
	ES 05501.1 Parathion	> 0.001 mg/L
	ES 05501.1 Fenitrothion	> 0.001 mg/L
	ES 05551.1 or 2 1,2-Dibromo-3-chloropropane	> 0.000 009 mg/L
	ES 05551.1 or 2 Dibromoacetonitrile	> 0.000 006 mg/L
	ES 05551.1 or 2 Dichloroacetonitrile	> 0.000 001 mg/L



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2.021 Water

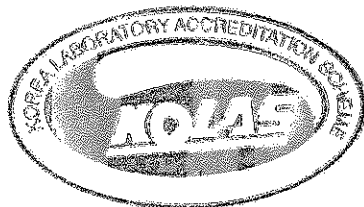
Test method	Standard designation	Limits of test and Limits of detection
Ministry of Environment Notice No. 2011-21	Official test method for Drinking water	
	ES 05551.1 or 2 Chloral Hydrate	> 0.000 005 mg/L
	ES 05551.1 or 2 Trichloroacetonitrile	> 0.000 002 mg/L
	ES 05552.1 or 2 Trichloroacetic acid	> 0.000 019 mg/L
	ES 05552.1 or 2 Dichloroacetic acid	> 0.000 02 mg/L
	ES 05601.1 or 2 1,1,1-Trichloroethane	> 0.000 08 mg/L
	ES 05601.1 or 2 1,1-Dichloroethylene	> 0.000 12 mg/L
	ES 05601.1 or 2 Dichloromethane	> 0.000 03 mg/L
	ES 05601.1 or 2 Benzene	> 0.000 04 mg/L
	ES 05601.1 or 2 Carbon tetrachloride	> 0.000 03 mg/L
	ES 05601.1 or 2 Ethylbenzene	> 0.000 06 mg/L
	ES 05601.1 or 2 Total THMs	> 0.000 03 mg/L
	ES 05601.1 or 2 Xylene	> 0.000 05 mg/L
	ES 05601.1 or 2 Tetrachloroethylene	> 0.000 14 mg/L
	ES 05601.1 or 2 Toluene	> 0.000 11 mg/L
	ES 05601.1 or 2 Trichloroethylene	> 0.000 19 mg/L
EPA 551.1 : 1995	Chloral Hydrate	> 0.000 005 mg/L
	Dibromoacetonitrile	> 0.000 006 mg/L
	Dichloroacetonitrile	> 0.000 001 mg/L
	Trichloroacetonitrile	> 0.000 002 mg/L
	1,2-Dibromo-3-chloropropane	> 0.000 009 mg/L
EPA 552.3 : 2003	Dichloroacetic acid	> 0.000 02 mg/L
	Trichloroacetic acid	> 0.000 019 mg/L
EPA 524.2 : 1995	Tetrachloromethane	> 0.000 21 mg/L
	Total THMs	> 0.000 03 mg/L
	1,1,1-Trichloroethane	> 0.000 08 mg/L
	Tetrachloroethylene	> 0.000 14 mg/L
	Trichloroethylene	> 0.000 19 mg/L
	Dichloromethane	> 0.000 03 mg/L
	Benzene	> 0.000 04 mg/L
	Toluene	> 0.000 11 mg/L
	Ethylbenzene	> 0.000 06 mg/L
	Xylene	> 0.000 05 mg/L
KS I ISO 8467 : 2008	1,1-Dichloroethylene	> 0.000 12 mg/L
	Consumption of KMnO ₄	> 0.5 mg/L
USGS-NWQL-O -1126-95	Parathion	> 0.000 022 mg/L
	Diazinone	> 0.000 008 mg/L
	Carbaryl	> 0.000 046 mg/L



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2.021 Water

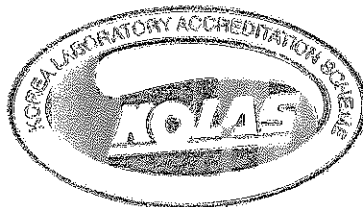
Test method	Standard designation	Limits of test and Limits of detection
Ministry of Environment Notice No. 2007-147	Official test method for Contaminated Water	
	Chapter 4. Itemized Test Method - Item 6. COD	(30 ~ 700) mg/L
	Chapter 4. Itemized Test Method - Item 35. Organophosphorous	0.0005 mg/L
ISO 10304-1 : 2007	NO ₃ ⁻	> 0.1 mg/L
	Cl ⁻	> 0.1 mg/L
	F ⁻	> 0.1 mg/L
	SO ₄ ²⁻	> 0.1 mg/L
ISO 7888 : 1985 KS I ISO 7888 : 2007	Electrical conductivity	-
KS I ISO 10523 : 2008	pH	pH (3 ~ 10)
KS I ISO 7887 : 2007 ISO 7887 : 1994	Color	(CU) 1
KS I ISO 7027-2003 ISO 7027 : 1999	Turbidity	> 0.02 NTU
SM 2540	Evaporation residue	< 20 000 mg/L
ISO 11885 : 2007 KS I ISO 11885 : 2008	Ni	> 0.002 mg/L
	Sn	> 0.06 mg/L
	Sb	> 0.004 mg/L
	Cu	> 0.002 mg/L
	Fe	> 0.002 mg/L
	Mn	> 0.000 4 mg/L
	Pb	> 0.005 mg/L
	Zn	> 0.001 mg/L
	Cr	> 0.002 mg/L
	As	> 0.014 mg/L
	Cd	> 0.000 2 mg/L
	Al	> 0.006 mg/L
	Se	> 0.007 mg/L
	Na	> 0.02 mg/L
	Ca	> 0.004 mg/L
	K	> 0.02 mg/L
	Mg	> 0.007 mg/L
	Si	> 0.01 mg/L
	B	> 0.005 mg/L
	Ag	> 0.004 mg/L
	Ba	> 0.000 4 mg/L
	Sr	> 0.000 1 mg/L



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2.021 Water

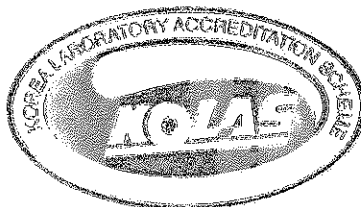
Test method	Standard designation	Limits of test and Limits of detection
ISO 17294-1 : 2004	Cu	> 0.001 mg/L
	Mn	> 0.003 mg/L
	Pb	> 0.005 mg/L
	Zn	> 0.001 mg/L
	Cr	> 0.001 mg/L
	As	> 0.001 mg/L
	Cd	> 0.000 1 mg/L
	Al	> 0.005 mg/L
	Se	> 0.01 mg/L
	Na	> 0.01 mg/L
ISO 17294-2 : 2003	Ca	> 0.1 mg/L
	K	> 0.05 mg/L
KS I ISO 17294-1 : 2010	Mg	> 0.001 mg/L
	B	> 0.01 mg/L
KS I ISO 17294-2 : 2010	Ag	> 0.001 mg/L
	Sb	> 0.000 2 mg/L
	V	> 0.001 mg/L
	Ba	> 0.000 5 mg/L
	Sr	> 0.000 3 mg/L
EPA 335.2	CN ⁻	< 1 mg/L
SM 5530 Phenols - C	Phenols	(0.01 ~ 10) mg/L
SM 4500-NH ₃ F.	NH ₃	(0.02 ~ 2) mg/L
SM 4500-NO ₃ ⁻ C.	NO ₃ ⁻	> 0.5 mg/L
SM 4500-Cl G.	Residual chlorine	(0 ~ 9) mg/L
SM 5540-C.	ABS	(0.2 ~ 2.0) mg/L
SM 2340	Hardness as CaCO ₃	> 10



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2.025 Indoor and Other Environment

Test method	Standard designation	Limits of test and Limits of detection
National Institute of Environmental Research Notice No. 2007-18	Official test method for Odor	
	Chapter 4. Instrumental Analysis Method - Item 4. Acetaldehyde, propionaldehyde, butyraldehyde, n-valeraldehyde and i-valeraldehyde test (7.1 DNPH cartridge - (HPLC/UV) method)	1 nmol/mol
	Chapter 4. Instrumental Analysis Method - Item 6. Toluene, xylene, methylethylketone, methylisobuthylketone, buthylacetate, styrene, i-buthylalcohol test	10 nmol/mol
Ministry of Environment Notice No. 2010-24	Official test method for Indoor air quality	
	ES 02601.1 Determination of formaldehyde in indoor and emitted from building materials by 2,4-DNPH cartridge and high performance liquid chromatograph	3 µg/m ³
	ES 02602.1 Determination of volatile organic compounds in indoor and emitted from building materials by sorbent tube and gas chromatograph using MS/FID	5 µg/m ³
	ES 02302.1 Determination of particulate matter(PM10) in indoor by the gravimetric method	10 µg/m ³
KS I ISO 16000-3 : 2008	Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds - Active sampling method	3 µg/m ³
KS I ISO 16000-6 : 2004	Indoor air - Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS/FID	5 µg/m ³
EPA TO-11A : 1999	Determination of Formaldehyde in Ambient Air Using Adsorbent Cartridge Followed by High Performance Liquid Chromatography (HPLC) [Active Sampling Methodology]	3 µg/m ³
EPA TO-17 : 1999	Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes	5 µg/m ³



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9. Biological test

9.002 Microbiological test

Test method	Standard designation	Limits of test and Limits of detection
Ministry of Environment Notice No. 2011-21	Official test method for Drinking water	
	ES 05701.1 Psychrophilic Colony Count	CFU/mL
	ES 05702.1 (Mesophilic) Colony Count	CFU/mL
	ES 05702.2 (Mesophilic) Colony Count	CFU/mL
	ES 05703.4 Total Coliforms	(+, -/100 mL)
	ES 05704.1 Fecal Coliforms	(+, -/100 mL)
	ES 05705.3 E. Coli.	(+, -/100 mL)
	ES 05706.1 Fecal Streptococci	(+, -/250 mL)
	ES 05707.1 Pseudomonas aeruginosa	(+, -/250 mL)
	ES 05708.1 Spore-forming Sulfite-reducing Aerobes	(+, -/50 mL)
	ES 05709.2 Salmonella	(+, -/250 mL)
	ES 05710.2 Shigella	(+, -/250 mL)
	ES 05711.2 Yersinia	(+, -/2000 mL)
Ministry of Environment Notice No. 2010-24	Official test method for Indoor air quality	
	ES 02701.1 Determination of total airborne bacteria in indoor by the impactor	CFU/m ³
Standard method : 2005	9215B Psychrophilic Colony Count	CFU/mL
	9215B (Mesophilic) Colony Count	CFU/mL
	9221 Total Coliforms	(+, -/100 mL)
	9221E Fecal Coliforms	(+, -/100 mL)
	9230B Fecal Streptococci	(+, -/250 mL)
	9213F Pseudomonas aeruginosa	(+, -/250 mL)
	9260B Salmonella	(+, -/250 mL)
	9260E Shigella	(+, -/250 mL)
	9223B E. Coli.	(+, -/100 mL)

End.