

Schedule

Admaterials Technologies Pte Ltd
58 Sungei Kadut Loop
Singapore 729501

Certificate No. : LA-2013-0546-F
Issue No. : 8
Date : 27 January 2021
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FIELD OF TESTING : Environmental Testing

MATERIALS / PRODUCTS TESTED	TESTS / PROPERTIES	STANDARD METHODS / TECHNIQUES / EQUIPMENT	SIGNATORY
<p>A Water Analysis</p> <ul style="list-style-type: none"> • Potable water • Non-potable water • Sewage, effluents and trade wastes • Water for industrial purposes • Swimming pool water • Ground water • RO water • Sea water • Pond water • Chiller water • Cooling tower water • Water Fountain water • Boiler water • Mineral, Spring Water 	<ol style="list-style-type: none"> 1. Acidity 2. Alkalinity (as CaCO₃) / 3. Bicarbonate / Carbonate 4. Aluminium (Al) 5. Ammonia (NH₃) 6. Ammonium 7. Antimony (Sb) 8. Arsenic (As) 9. Barium (Ba) 10. Beryllium (Be) 11. Biochemical Oxygen Demand (BOD) 12. Boron (B) 13. Bromide 14. Cadmium (Cd) 15. Calcium (Ca) 16. Calcium Hardness 17. Chemical Oxygen Demand (COD) 18. Chloride (Cl⁻) 19. Chlorine (Total Residual) 20. Chlorine (Free) 	<p><u>APHA Methods are based on 23rd Edition: 2017</u></p> <p>APHA 2310 B APHA 2320 B</p> <p>APHA 3120 B APHA 3125 B APHA 4500-NH3 F HACH 8038 HACH Doc 022.53.80029</p> <p>APHA 3120 B APHA 3125 B APHA 3120 B APHA 3125 B APHA 3120 B APHA 3125 B APHA 3120 B APHA 3125 B APHA 5210 B</p> <p>APHA 3120 B APHA 3125 B APHA 4110 B APHA 3120 B APHA 3125 B APHA 3120 B APHA 3120B / APHA 2340 B HACH 8000</p> <p>APHA 4110 B HACH 8167 HACH 8021</p>	<p>— LJP, DT</p>

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	22. Chromate (CrO ₄ ²⁻)	ADM/ENV/005:2018	
	23. Cobalt (Co)	APHA 3120 B APHA 3125 B	
	24. Colour	HACH 8025	
	25. Conductivity	APHA 2510 B	
	26. Copper (Cu)	APHA 3120 B APHA 3125 B	
	27. Cyanide (CN ⁻)	Hach 8027	
	28. Detergents (Linear alkylate sulphonate as methylene blue active substances)	APHA 5540 C HACH 8028	
	29. Dissolved Oxygen	APHA 4500-O, H	
	30. Fluoride (F ⁻)	APHA 4110 B APHA 4500-F- C	
	31. ffCOD	ADM/ENV/006:2018	
	32. Hardness	APHA 2340 C APHA 3120B / APHA 2340 B	
	33. Iron (Fe)	APHA 3120 B	
	34. Iodide (I ⁻)	ADM/ENV/005:2018	
	35. Lead (Pb)	APHA 3120 B APHA 3125 B	
	36. Lithium (Li)	APHA 3120 B APHA 3125 B	
	37. Magnesium (Mg)	APHA 3120 B	
	38. Manganese (Mn)	APHA 3120 B APHA 3125 B	
	39. Mercury (Hg)	ADM/ENV/004:2017 APHA 3125 B	
	40. Molybdenum (Mo)	APHA 3120 B APHA 3125 B	
	41. Nickel (Ni)	APHA 3120 B APHA 3125 B	
	42. Nitrate (NO ₃ ⁻)	APHA 4110B	
	43. Nitrite (NO ₂ ⁻)	APHA 4110B	
	44. Oil & Grease (Total)	APHA 5520 G	
	45. Oil & Grease (Hydrocarbon)	APHA 5520 F	
	46. pH	APHA 4500-H ⁺ B	
	47. Phenolic Compounds (as Phenol)	HACH 8047	
	48. Phosphate (PO ₄ ³⁻)	APHA 4110B	
	49. Total Phosphorus, Total Phosphate	Hach 8190 Test 'N Tube™ vials	

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	51. Salinity	APHA 2520 B	
	52. Selenium (Se)	APHA 3120 B	
	53. Silver (Ag)	APHA 3125 B	
		APHA 3120 B	
	54. Sodium (Na)	APHA 3125 B	
		APHA 3120 B	
	55. Total Solid	APHA 2540 B	
	56. Total Dissolved Solid	APHA 2540 C	
	57. Total Suspended Solid	APHA 2540 D	
	58. Strontium (Sr)	APHA 3120 B	
		APHA 3125 B	
	59. Sulphate (SO ₄ ²⁻)	APHA 4110B	
	60. Sulphide (S ²⁻)	APHA 4500-S ²⁻ F	
		HACH 8131	
	61. Temperature	APHA 2550 B	
	62. Thallium	APHA 3125 B	
	63. Tin (Sn)	APHA 3120 B	
	64. Titanium	APHA 3125 B	
	65. Total Organic Carbon (TOC)	APHA 5310 B	
	66. Turbidity	Hach 8195	
	67. Vanadium (V)	APHA 3120 B	
		APHA 3125 B	
	68. Zinc (Zn)	APHA 3120 B	
69. Zirconium	APHA 3125 B		
70. Appearance	APHA 2110		
71. Total Nitrogen	ADM/ENV/003:2017		
72. Odour	ADM/ENV/002:2017		
73. Oil & Grease (Non Hydrocarbon)	APHA 5520 G & APHA 5520 F		
74. Chlorophyll a	APHA 10200 H		
B Environmental Samples (Water, Soil, Sediment Sludge)	1. Toxicity Characteristic Leaching Procedure As, Ag, Ba, Cr, Cd, Cu, Co, Fe, F, Hg, Mn, Ni, Pb, Se, Zn and Phenolic Compounds (as Phenol)	USEPA 1311: 1992 (exclude ZHE: Zero Headspace Extraction)	LJP, DT
	2. Heavy Metals (As, Al, Ag, B, Be, Ba, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Pb, Se, Sn, Sr, V, Zn and Hg)	Digestion by: USEPA 3051 A: 2007 Analysis by: USEPA 6010D:2018 (ICP-AES)	

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B Environmental Samples (Water, Soil, Sediment Sludge)	3. Volatile Organic Compounds by GC/MS	USEPA 8260D: 2017 Refer to Appendix 1 for the list of volatile organic compounds	LJP, DT		
	4. Semivolatile Organic Compounds by GC/MS	USEPA 8270E: 2018 Refer to Appendix 2 for the list of semivolatile organic compounds			
	5. Alkaline Digestion for Hexavalent Chromium	USEPA 3060A Rev.1 Dec 1996			
	6. Hexavalent Chromium	USEPA 7196A Rev.1 Jul 1992			
	7. Falling Velocity	ADM/ENV/007:2019			
	C Mixing water for concrete	<u>Suitability of Water</u>		BS EN 1008: 2002	LJP, DT
		1. Oil and Fats			
2. Detergents					
3. Colour					
4. Suspended Matter					
5. Odour					
6. Acids					
7. Humic Matter					
8. Chloride Content					
9. Sulphate Content					
10. Alkali Content					
D Non-metallic Products for Use in Contact with Water, and Glass Reinforced Polyester Sectional Water Tanks for PUB Potable Water	<u>Effects on Water</u>	SS 375: 2015	LJP, DT		
	1. Odour				
	2. Appearance				
	3. Extraction of Metals				
E Soil	1. pH Value	BS 1377-3: 2018 Clause 12	LJP, SW JUL, MAY, DT		
	2. Organic Matter	BS 1377-3: 2018 Clause 4			
	3. Mass Loss on Ignition	BS 1377-3: 2018 Clause 6			
	4. Water soluble sulphate in soil	BS 1377-3: 2018 Clause 7.3			
	Water extract or groundwater sulfate (Ion Chromatography IC method)	BS 1377-3: 2018 Clause 7.4			
Acid or water extract or groundwater sulfate	BS 1377-3: 2018 Clause 7.6				

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E	Soil	5.	(Gravimetric method) Sulfate in groundwater Acid soluble sulfate Carbonate Content	BS 1377-3: 2018 Clause 7.8 BS 1377-3: 2018 Clause 7.9 BS 1377-3: 2018 Clause 8.2 BS 1377-3: 2018 Clause 8.3 BS 1377-3: 2018 Clause 8.4 BS 1377-3: 2018 Clause 9.2 BS 1377-3: 2018 Clause 9.3 BS 1377-3: 2018 Clause 11 BS 1377-3: 2018 Clause 5	LJP, SW JUL, MAY, DT		
		6.	Water soluble Chloride Acid soluble Chloride	BS 1377-3: 2018 Clause 9.2 BS 1377-3: 2018 Clause 9.3		LJP, SW, JUL	
		7.	Total Dissolved Solid	BS 1377-3: 2018 Clause 11			
		8.	Total Organic carbon (TOC)	BS 1377-3: 2018 Clause 5			
		9.	Heavy Metals (As, Al, Ag, B, Be, Ba, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Mo, Na, Ni, Pb, Se, Sn, Sr, V, Zn and Hg)	Digestion by: USEPA 3050 B-1996 USEPA 3051 A-2007 (Microwave assisted acid digestion) Analysis by: USEPA 6010D-2018 (ICP-AES) ASTM D4373-14			
		10.	Rapid Determination of Carbonate Content of Soils	BS 1377-3: 2018 Clause 13 BS 1377-3: 2018 Clause 14			
		11.	Electrical resistivity				
		12.	Redox potential				

Approved Signatories

Lu Jin Ping	LJP
Sherly Wijaya	SW
Julifin	JUL
May Soe Moe	MAY
Doris Tan	DT

Note:

This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. A laboratory's fulfilment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and **management system requirements** that are necessary for it to consistently deliver technically valid test results. The **management system requirements** in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001.

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Appendix 1 (Volatile Organic Compound List)

Compound Name		Method Detection Limit (MDL)
Dichlorodifluoromethane	Benzene, bromo-	2 µg/L
Methane, chloro-	Benzene, propyl-	
bromomethane	4-chlorotoluene	
Ethyl Chloride	2-chlorotoluene	
Trichloromonofluoromethane	Benzene, 1,3,5-trimethyl-	
Ethene, 1,1-dichloro-	Benzene, tert-butyl-	
Methylene Chloride	Benzene, 1,2,4-trimethyl-	
Ethene, 1,2-dichloro-, (Z)-	Benzene, 1,3-dichloro-	
Ethane, 1,1-dichloro-	sec-butylbenzene	
Ethene, 1,2-dichloro-, (E)-	Benzene, 1,2-dichloro-	
1 Propane, 2,2-dichloro-	4-isopropyltoluene	
Methane, bromochloro-	Benzene, 1,4-dichloro-	
chloroform	Benzene, butyl-	
Ethane, 1,1,1-trichloro-	Benzene, 1,3,4-trichloro-	
Ethane, 1,2-dichloro-	Naphthalene	
1-Propene, 1,1-dichloro-	Benzene, 1,2,3-trichloro-	
Benzene	hexane	
Propane, 1,2-dichloro-	heptane	
Trichloroethylene	Tetrahydrofuran	
Methane, bromodichloro-	Nonane	
Toluene	Decane	
Ethane, 1,1,2-trichloro-	Octane	
Propane, 1,3-dichloro-	tetrachloromethane	
Methane, dibromochloro-	Methyl tert-butyl-ether	
Ethane, 1,2-dibromo-	furan	
Tetrachloroethylene	Isobutanol	
Benzene, chloro-	DMF (N,N-Dimethylformamide)	
Ethane, 1,1,1,2-tetrachloro-	Turpentine	
Ethylbenzene	Methyl Ethyl Ketone	
p-Xylene,m-xylene	Methyl Isobutyl Ketone	
bromoform	Isopropyl ether	
Styrene	Diethyl ether	
o-Xylene	Dimethyl Sulphide	
Ethane, 1,1,2,2-tetrachloro-	Dimethyl Sulphoxide	
Propane, 1,2,3-trichloro-	Epichlorohydrin	
isopropylbenzene		

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Appendix 2 (Semi-Volatile Organic Compound List)

Method Detection Limit (MDL): 4 µg/L

Compound Name		
N-Nitrosodimethylamine	Naphthalene, 2-chloro-	Carbazole
Pyridine	2-Nitroaniline	Methyl parathion
2-Picoline	Benzene, 1,4-dinitro-	Heptachlor
Ethanamine, N-methyl-N-nitroso-	Dimethyl phthalate	Dibutyl phthalate
Ethanamine, N-ethyl-N-nitroso-	Benzene, 1,3-dinitro-	Parathion
Phenol	Benzene, 2-methyl-1,3-dinitro-	Aldrin
Aniline	Acenaphthylene	Methapyrilene
Bis(2-chloroethyl) ether	Benzene, 1,2-dinitro-	Heptachlor epoxide
Phenol, 2-chloro-	3-Nitroaniline	Fluoranthene
Benzene, 1,3-dichloro-	Acenaphthene	Benzidine
Benzene, 1,4-dichloro-	Phenol, 2,4-dinitro-	trans-Chlordane
Benzyl Alcohol	Phenol, 4-nitro-	Pyrene - D10
Benzene, 1,2-dichloro-	Dibenzofuran	Pyrene
Phenol, 2-methyl-	Benzene, 1-methyl-2,4-dinitro-	cis-Chlordane
Bis(2-chloroisopropyl) ether	1-Naphthalenamine	Endosulfan I
Phenol, 3-methyl- & Phenol, 4-methyl-	Phenol, 2,3,5,6-tetrachloro-	4,4'-DDE
Pyrrolidine, 1-nitroso-	2-Naphthalenamine	Dieldrin
N-nitrosomorpholine	Phenol, 2,3,4,6-tetrachloro-	Benzenamine, N,N-dimethyl-4-(phenylazo)-
1-Propanamine, N-nitroso-N-propyl-	Diethyl Phthalate	Endrin
o-Toluidine	Benzene, 1-chloro-3-phenoxy-	4,4'-DDD
Ethane, hexachloro-	Thionazin	Endosulfan II
Benzene, nitro-	Fluorene	Famphur
Piperidine, 1-nitroso-	5-nitro-o-toluidine	Benzyl butyl phthalate
2-Cyclohexen-1-one, 3,5,5-trimethyl-	4-Nitroaniline	Benzidine, 3,3'-dimethyl-
Phenol, 2-nitro-	Phenol, 2-methyl-4,6-dinitro-	Bis(2-ethylhexyl)adipate
Phenol, 2,4-dimethyl-	Diphenylamine	4,4'-DDT
Methane, bis(2-chloroethoxy)-	Azobenzene	Endosulfan sulfate
O,O,O-Triethyl thiophosphate	Sulfotep	2-acetylaminofluorene
Phenol, 2,4-dichloro-	Phorate	Methoxychlor
Benzene, 1,2,4-trichloro-	Benzene, 1-bromo-4-phenoxy-	Bis(2-ethylhexyl) phthalate
Naphthalene	alpha-BHC	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-
4-Chloroaniline	Dimethoate	Endrin ketone
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	Benzene, hexachloro-	Endrin aldehyde
N-nitrosodibutylamine	[1,1'-Biphenyl]-4-amine	Chrysene
1,4-Benzenediamine	beta-BHC	Benz[a]anthracene
Phenol, 4-chloro-3-methyl-	Phenol, pentachloro-	di-n-octyl phthalate
Naphthalene, 1-methyl-	delta-BHC	Benzo[b]fluoranthene

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Naphthalene, 2-methyl-	Disulfoton	Benzo[a]pyrene
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	Phenanthrene	Benzo[k]fluoranthene
Phenol, 2,4,6-trichloro-	Anthracene	Indeno[1,2,3-cd]pyrene
Phenol, 2,4,5-trichloro-	Lindane	Dibenz[a,h]anthracene
		Benzo[ghi]perylene