

Laboratory Nilawar Laboratories (A Unit of MNEC Consultants Pvt. Ltd.), At Km Stone 16.5, Amravati Road, Waddhamana, Nagpur, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-8128

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Validity 26.11.2018 to 25.11.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
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**CHEMICAL TESTING**

I.	<b>ATMOSPHERIC POLLUTION</b>			
1.	<b>Ambient Air</b>	Oxide of Nitrogen (NO <sub>2</sub> )	IS 5182 (Part 6)	6 µg/m <sup>3</sup> to 420 µg/m <sup>3</sup>
		Sulphur Dioxide (SO <sub>2</sub> )	IS 5182 (Part 2)	6 µg/m <sup>3</sup> to 1050 µg/m <sup>3</sup>
		Particulate Matter (PM <sub>10</sub> )	IS 5182 (Part 23)	5 µg/m <sup>3</sup> to 1000 µg/m <sup>3</sup>
II.	<b>POLLUTION &amp; ENVIRONMENT</b>			
1.	<b>Waste Water (Effluents/ Sewage)</b>	pH	IS 3025 (Part 11)	2 to 12
		Non-filterable Residue (Total Suspended Solids)	IS 3025 (Part 17)	1 mg/l to 10000 mg/l
		Sulphates (as SO <sub>4</sub> )	APHA 4500 SO <sub>4</sub> <sup>-2</sup> E	1 mg/l to 1000 mg/l
		Chloride (as Cl)	IS 3025 (Part 32)	1 mg/l to 1500 mg/l
		Oil & Grease	IS 3025 (Part 39)	Upto 200 mg/l
		Biochemical Oxygen Demand (3 days at 27 °C)	IS 3025 (Part 44)	2 mg/l to 10000 mg/l
	Chemical Oxygen Demand (COD)	IS 3025 (Part 58)	4 mg/l to 2000 mg/l	
III.	<b>SOIL &amp; ROCK</b>			
1.	<b>Soil</b>	pH (1:2.5 Ratio)	IS 2720 (Part 1)	2.0 to 12.0
		Electric Conductivity	Methods Manual Soil Testing in India 2011 (Page No. 81-82)	0.001 mS/cm to 20.00 mS/cm
		Organic Carbon	IS 2720 (Part 22)	0.10 % to 10 %
		Sulfur (as S)	IS 2720 (Part 27)	0.5 mg/kg to 50 mg/kg
		Free Lime %	IS 2720 (Part 23)	0.10 % to 10.0 %
		Copper (as Cu)	Methods Manual Soil Testing in India 2011 (Page	0.4 mg/kg to 20.0 mg/kg

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			no 105-114)	
		Iron (as Fe)	Methods Manual Soil Testing in India 2011 (Page no 105-114)	2.0 mg/kg to 20.0 mg/kg
		Manganese (as Mn)	Methods Manual Soil Testing in India 2011 (Page no 105-114)	1.0 mg/kg to 20.0 mg/kg
		Zinc (as Zn)	Methods Manual Soil Testing in India 2011 (Page no 105-114)	0.20 mg/kg to 20.0 mg/kg
		Calcium (as Ca)	Methods Manual Soil Testing in India 2011 (Page no 102-105)	0.10 Meq% to 40.0 Meq%
		Magnesium (as Mg)	Methods Manual Soil Testing in India 2011 (Page no 102-105)	0.10 Meq% to 20.0 Meq%
		Boron (as B)	Methods Manual Soil Testing in India 2011 (Page no 117-118)	0.05mg/kg to 20.0 mg/kg
		Available Phosphorus (P)	Methods Manual Soil Testing in India 2011 (Page no 95-98)	0.04 mg/kg to 20 mg/kg
		Available Potassium (as K)	Methods Manual Soil Testing in India 2011 (Page no 99-100)	1 mg/kg to 300 mg/kg
<b>IV.</b>	<b>WATER</b>			
<b>1.</b>	<b>Surface Water, Ground Water &amp; Drinking Water</b>	pH	IS 3025 (Part 11)	2.00 to 12.00
		Electric Conductivity	IS 3025 (Part 14)	1 µS/cm to 20000 µS/cm
		Turbidity	IS 3025 (Part 10)	0.1 NTU to 100.0 NTU
		Colour	IS 3025 (Part 4)	1 HZ to 70 HZ
		Filterable Residue	IS 3025 (Part 16)	1 mg/l to 20000 mg/l

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		(Total dissolved Solids)		
		Non-Filterable Residue (Total Suspended Solids)	IS 3025 (Part 17)	1 mg/l to 4000.0 mg/l
		Total Alkalinity	IS 3025 (Part 23)	5 mg/l to 2500.0 mg/l
		Total Hardness	IS 3025 (Part 21)	2 mg/l to 1000.0 mg/l
		Calcium (as Ca)	IS-3025 (Part 40)	0.5 mg/l to 400.0 mg/l
		Magnesium (as Mg)	APHA 3500 Mg B	0.5 mg/l to 200.0 mg/l
		Sulphates (as SO <sub>4</sub> )	APHA 4500 SO <sub>4</sub> <sup>-2</sup> E	1.0 mg/l to 500.0 mg/l
		Chloride (as Cl)	IS 3025 (Part 32)	0.5 mg/l to 1500 mg/l
		Phosphates (as P)	IS 3025 (Part 31)	0.03 mg/l to 10.00 mg/l
		Nitrate (as NO <sub>3</sub> N)	APHA 4500 NO <sub>3</sub> B	0.2 mg/l to 100 mg/l
		Sodium (as Na)	IS 3025 (Part 45)	4.0 mg/l to 150 mg/l
		Potassium (as K)	IS 3025 (Part 45)	1.0 mg/l to 10 mg/l
		Boron (as B)	IS 3025 (Part 57)	0.02 mg/l to 10 mg/l
		Ammonical nitrogen (as NH <sub>3</sub> N)	IS 3025 (Part 34)	0.1 mg/l to 5.0 mg/l
		Nitrite (as NO <sub>2</sub> N)	IS 3025 (Part 34)	0.001 mg/l to 10.00 mg/l
		Oil & Grease	IS 3025 (Part 39)	Upto 100.0 mg/l
		Dissolved Oxygen	IS 3025 (Part 38)	0.1 mg/l to 10.0 mg/l
		Biochemical Oxygen Demand-BOD (3 days at 27°C)	IS 3025 (Part 44)	2 mg/l to 5000 mg/l
		Chemical Oxygen Demand (COD)	IS 3025 (Part 58)	4 mg/l to 1000 mg/l
2.	Construction Water	pH	IS 3025 (Part 11)	2.0 to 12.0
		Filterable Residue (Total dissolved Solids)	IS 3025 (Part 16)	2 mg/l to 20000 mg/l
		Non-Filterable Residue (Total Suspended Solids/Matter)	IS 3025 (Part 17)	2 mg/l to 20000 mg/l
		Volatile Residue (Organic)	IS 3025 (Part 18)	2.0 mg/l to 500.00 mg/l
		Fixed residue (Inorganic)	IS 3025 (Part 18)	2.0 mg/l to 4000.00 mg/l
		Total Alkalinity	IS 3025 (Part 23)	0.1 ml to 50 ml

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		Acidity	IS 3025 (Part 22)	0.1 ml to 25 ml
		Sulphate (as SO <sub>3</sub> )	APHA 4500 SO <sub>4</sub> <sup>-2</sup> E	1 mg/l to 500 mg/l
		Chloride (as Cl)	IS 3025 (Part 32)	0.5 mg/l to 1000 mg/l
III.	<b>RESIDUES IN WATER</b>			
1.	<b>Trace Metal Elements in Water</b>	Iron (as Fe)	IS 3025 (Part 53)	0.1 mg/l to 10.0 mg/l
		Manganese (as Mn)	APHA 3111B IS 3025 (Part 59)	0.1 mg/l to 10.0 mg/l
		Copper (as Cu)	IS 3025 (Part 42)	0.1 mg/l to 10.0 mg/l
		Lead (as Pb)	IS 3025 (Part 47)	0.1 mg/l to 10.0 mg/l
		Zinc (as Zn)	IS 3025 (Part 49)	0.1 mg/l to 20.0 mg/l
		Cadmium (as Cd)	IS 3025 (Part 41)	0.1 mg/l to 10.0 mg/l

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#### MECHANICAL TESTING

I.	<b>BUILDING MATERIALS</b>					
1.	<b>Cement</b>	Consistency	IS 4031 (Part 4)	23 % to 40 %		
		Initial Setting Time	IS 4031 (Part 5)	30 min to 300 min		
		Final Setting Time	IS 4031 (Part 5)	150 min to 600 min		
		Fineness Dry Sieving	IS 4031 (Part 1)	Up to 10%		
		Soundness by Lechatlier	IS 4031 (Part 3)	0.1 mm to 10 mm		
		Density of cement	IS 4031 (Part 11)	2.0 g/cc to 4.0 g/cc		
2.	<b>Aggregate</b>	<b>a. Aggregate Coarse</b>	Sieve Analysis	IS 2386 (Part 1)	0.1 % to 100 % (4.75 mm to 80 mm)	
			Water absorption	IS 2386 (Part 3)	0.1 % to 20.0 %	
			Flakiness Index	IS 2386 (Part 1)	Up to 50 %	
			Elongation Index	IS 2386 (Part 1)	Up to 50 %	
			Impact Value	IS 2386 (Part 4)	Up to 50 %	
			Crushing Value	IS 2386 (Part 4)	Up to 50 %	
		<b>b. Aggregate (Fine)</b>	Los Angles Abrasion Value	IS 2386 (Part 4)	Up to 60 %	
			Bulk Density	IS 2386 (Part 3)	1.00 kg/l to 4.00 kg/l	
			Sieve Analysis	IS 2386 (Part 1)	150 Micron to 4.75 mm (0.1 % to 100 %)	
			Specific gravity by (Pycnometer Method)	IS 2386 (Part 3)	2.00 to 4.00	
			<b>3. Bricks: Building Brick</b>	Water Absorption	IS 3495 (Part 2)	1 % to 50 %
				Compressive Strength	IS 3495 (Part 1)	10 kg/cm <sup>2</sup> to 200 kg/cm <sup>2</sup>
Efflorescence	IS 3495 (Part 3)	Qualitative				
<b>4. Concrete</b>	Compressive Strength of	IS 516	5 N/mm <sup>2</sup> to 100 N/mm <sup>2</sup>			

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		Concrete cubes		
<b>II.</b>	<b>SOIL &amp; ROCK</b>			
<b>1.</b>	<b>Soil</b>	Specific gravity	IS 2720 (Part 3 & Sec 1)	1.0 to 4.0
		Grain Size Analysis (Sieve)	IS 2720 (Part 4)	75 micron to 80 mm
		Liquid Limit	IS 2720 (Part 5)	20 % to 200 %
		Plastic limit	IS 2720 (Part 5)	10 % to 80 %
		Natural Moisture Content (oven dry method)	IS 2720 (Part 2)	1 % to 25 %
		Direct Shear Test	IS 2720 (Part 13)	0 to 5.0 kg/cm <sup>2</sup>
		Permeability Test (Falling Head)	IS 2720 (Part 17)	10 <sup>-3</sup> to 10 <sup>-10</sup> cm/s
		Free Swell Index	IS 2720 (Part 40)	5 % to 120 %
		Heavy compaction of Soil	IS 2720 (Part 8)	1.0 kg/cm <sup>2</sup> to 3 kg/cm <sup>2</sup>
		California Bearing Ratio (CBR) Test	IS 2720 (Part 16)	1 % to 50 %
<b>2.</b>	<b>Rock</b>	Uniaxial Compressive Strength Test	IS 9143	1 kg/cm <sup>2</sup> to 1500 kg/cm <sup>2</sup>
		Water Absorption	IS 13030	0.01 % to 2 %
		Point Load Test	IS 8764	0.5 kN to 25 kN