

Laboratory **Arihant Testing & Research Centre LLP, 19-8-94, Third Mill, Second Gate, Suryadevara Bhasvaiha Estate, Etukur Road, Guntur, Andhra Pradesh**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-7878**

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Validity **26.09.2018 to 25.09.2020**

Last Amended on --

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**CHEMICAL TESTING**

I.	<b>BUILDING MATERIALS</b>			
<b>1.</b>	<b>Fly ash, Silica Fume/ Micro Silica</b>	Loss on Ignition	IS 1727 Clause: 5.3	0.1 % to 6 %
		Moisture Content	IS 15388	1 % to 5 %
		Silica (as SiO <sub>2</sub> )	IS 1727 Clause 5.4	20 % to 75 %
		Alumina (Al <sub>2</sub> O <sub>3</sub> )	IS 1727 Clause 5.7	15 % to 35 %
		Calcium Oxide (CaO)	IS 1727 Clause 5.8	0.1 % to 5 %
		Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> )	IS 1727 Clause 5.6	0.1 % to 5 %
		Magnesium Oxide (MgO)	IS 1727 Clause: 5.9	0.1 % to 5 %
		Chlorides (as Cl)	IS 4032 Clause: 4.13	0.01 % to 2 %
		Sulphuric Anhydride (as SO <sub>3</sub> )	IS 1727 Clause: 5.10	0.1 % to 5 %
		<b>2.</b>	<b>Hydraulic Cement OPC-33 OPC-43 OPC-53 PPC PSC</b>	Silicon Dioxide
Al <sub>2</sub> O <sub>3</sub>	IS 4032 Clause: 4.6.1			1.0 % to 15 %
Fe <sub>2</sub> O <sub>3</sub>	IS 4032 Clause: 4.5.2			1.0 % to 10 %
Calcium Oxide (as CaO)	IS 4032 Clause: 4.7.2			20 % to 75 %
Magnesium Oxide (as MgO)	IS 4032 Clause: 4.8.2			0.1 % to 10 %
Sulfuric Anhydride	IS 4032 Clause: 4.9			0.1 % to 5 %

**Amit Kumar**  
Convenor

**Anuja Anand**  
Program Manager

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		Loss on Ignition	IS 4032 Clause: 4.2	0.5 % to 5.0 %
		Insoluble Residue	IS 4032 Clause: 4.10	0.3 % to 40 %
		Chloride	IS 4032 Clause: 4.13	0.005 % to 1 %
3.	Soil	pH	IS 2720 (Part 26) Clause: 2.1	4 to 12
		Chloride	IS 4032 Clause: 4.13	0.01 % to 5 %
		Sulphate	IS 2720 (Part 27) Clause: 2.0	0.05 % to 1 %
		Silica	IS 2720 (Part 25) Clause: 3.2	1 % to 25 %
		Organic Matter	IS 2720 (Part 22) Clause: 4.0	0.1 % to 5 %
		Conductivity (1: 2) at 25 °C	IS 2720 (Part 21) Clause: 3.0	1 micro mho/cm to 1000 micro mho/cm
		Total Nitrogen	ATRC/SOP/SL/010-C Issue No.01 Issue Date-01.08.2018	0.2 mg/kg to 300 mg/kg
		Calcium (as Ca)	ATRC/SOP/SL/010-B Issue No.01 Issue Date-01.08.2018	1 mg/kg to 10000 mg/kg
		Magnesium (as Mg)	ATRC/SOP/SL/010-B Issue No.01 Issue Date-01.08.2018	1 mg/kg to 10000 mg/kg
		Acidity	ATRC/SOP/SL/010-E Issue No.01 Issue Date-01.08.2018	1 mg/kg to 10000 mg/kg
4.	Concrete Admixture	Dry Material Content	IS 9103	1 % to 30 %
		Ash Content	IS 9103	1 % to 25 %
		Relative Density	IS 9103	1.00 to 2.00

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		Chloride Content	IS 6925 Clause 5.3.2	0.005 % to 2.0 %
		pH	IS 9103	2 to 13
5.	<b>Bentonite</b>	Moisture Content	IS 6186 Clause A-2	1 % to 15 %
		pH	IS 6186 Clause A-3	8 to 12
		Loss on Ignition	IS 6186 Clause. A-10	1 % to 10 %
II.	<b>METALS &amp; ALLOYS</b>			
1.	<b>Plain Carbon, Low Alloy, Steels &amp; Tor Steel</b>	Carbon	IS 228 (Part 1)	0.05 % to 1.5 %
		Manganese	IS 228 (Part 2)	0.05 % to 2.0 %
		Sulphur	IS 228 (Part 9)	0.01 % to 0.1 %
		Phosphorus	IS 228 (Part 3)	0.01 % to 0.25 %
		Silicon	IS 228 (Part 8)	0.1 % to 0.5 %
III.	<b>WATER</b>			
1.	<b>Water for Construction</b>	To Neutralize 100 ml sample of water, using 0.02N H <sub>2</sub> SO <sub>4</sub>	IS 456	0.1 ml to 150 ml
		To Neutralize 100 ml sample of water, using 0.02N NaOH	IS 456	0.1 ml to 50 ml
		Chloride	IS 3025 (Part 32)	5 mg/l to 2500 mg/l
		Sulphate	IS 3025 (Part 24)	10 mg/l to 600 mg/l
		Inorganic Solids	IS 3025 (Part 18)	10 mg/l to 4000 mg/l
		Organic Solids	IS 3025 (Part 18)	10 mg/l to 2000 mg/l
		pH	IS 3025 (Part 11)	2 to 13

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#### MECHANICAL TESTING

<b>I.</b>	<b>MECHANICAL PROPERTIES OF METALS</b>			
<b>1.</b>	<b>High Strength Deformed Steel Bars, Hot Rolled Medium and High Tensile Structural Steel &amp; Steel Section for Structural Purposes</b>	Nominal Mass	IS 1786	0.2 kg/m to 10 kg/m
		Yield Strength	IS 1608	205 N/mm <sup>2</sup> to 980 N/mm <sup>2</sup>
		Tensile Strength	IS 1608	205 N/mm <sup>2</sup> to 980 N/mm <sup>2</sup>
		Percentage Elongation after Fracture (A)	IS 1608	1 % to 30 %
<b>II.</b>	<b>BUILDING MATERIALS</b>			
<b>1.</b>	<b>Cement (OPC / PPC / PSC)</b>	Fineness by Baline's Air Permeability	IS 4031 (Part 2)	200 m <sup>2</sup> /kg to 450 m <sup>2</sup> /kg
		Soundness by Le-Chatelier Method	IS 4031 (Part 3)	0.5 mm to 10 mm
		Standard Consistency	IS 4031 (Part 4)	20 % to 40 %
		Initial Setting Time	IS 4031 (Part 5)	25 min to 300 min
		Final Setting Time	IS 4031 (Part 5)	300 min to 650 min
		Compressive Strength	IS 4031 (Part 6)	10 N/mm <sup>2</sup> to 80 N/mm <sup>2</sup>
		Density	IS 4031 (Part 11)	2.5 to 3.5 g/cc
<b>2.</b>	<b>Bricks (Burnt Clay/ Fly Ash)</b>	Compressive Strength	IS 3495 (Part 1)	3 N/mm <sup>2</sup> to 40 N/mm <sup>2</sup>
		Water Absorption	IS 3495 (Part 2)	1 to 30 %
		Dimension:	IS 1077 IS 13757	L:3550 mm to 4000 mm W:1600 mm to 1950mm H:1600 mm to 1950 mm
		Efflorescence	IS 3495 (Part 3)	Qualitative

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3.	<b>Coarse Aggregates</b>	Sieve Analysis	IS 2386 (Part 1)	0.1 to 100 % (4.75 to 40 mm)
		Flakiness Index	IS 2386 (Part 1)	2 % to 50 %
		Elongation Index	IS 2386 (Part 1)	2 % to 50 %
		Specific Gravity	IS 2386 (Part 3)	2.5 to 3.5
		Water Absorption	IS 2386 (Part 3)	0.1 % to 10 %
		Aggregate Impact Value	IS 2386 (Part 4)	10 % to 50 %
		Crushing Value	IS 2386 (Part 4)	5 % to 30 %
		10% Fine Value	IS 2386 (Part 1)	2 T to 50 T
		Bulk Density	IS 2386 (Part 3)	1.2 kg/m <sup>3</sup> to 3.0 kg/m <sup>3</sup>
		Soundness (By Na <sub>2</sub> SO <sub>4</sub> )	IS 2386 (Part 5)	0.1 % to 15 %
	Soundness (By MgSO <sub>4</sub> )	IS 2386 (Part 5)	0.1 % to 20 %	
4.	<b>Fine Aggregate</b>	Sieve Analysis	IS 2386 (Part 1)	10 to 100 % (0.075 to 4.75 mm)
		Material Finer than 75 Micron	IS 2386 (Part 1)	2 to 15 %
		Specific Gravity	IS 2386 (Part 3)	2.5 to 3.5
		Water Absorption	IS 2386 (Part 3)	0.1 % to 10 %
		Bulk Density	IS 2386 (Part 3)	1.2 kg/m <sup>3</sup> to 3.0 kg/m <sup>3</sup>
		Deleterious Material	IS 2386 (Part 2)	0.1 to 5%
		Organic Impurities	IS 2386 (Part 2)	Qualitative
		Soundness (By Na <sub>2</sub> SO <sub>4</sub> )	IS 2386 (Part 5)	0.1 % to 15 %
	Soundness (By MgSO <sub>4</sub> )	IS 2386 (Part 5)	0.1 % to 20 %	
5.	<b>Hardened Concrete - Cube</b>	Compressive Strength	IS 516	10 N/mm <sup>2</sup> to 80 N/mm <sup>2</sup>
6.	<b>Precast Concrete Kerbs</b>	Water Absorption	IS 5758	1 % to 10 %
7.	<b>Paver Blocks</b>	Dimensions	IS 15658 Annex B	50 mm to 600 mm

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		Thickness of Wearing Layer	IS 15658 Clause 6.2.3	0 to 25 mm
		Water Absorption	IS 15658 Annex C	1 % to 10 %
		Compressive Strength	IS 15658 Annex D	10 N/mm <sup>2</sup> to 80 N/mm <sup>2</sup>
<b>8.</b>	<b>Fly Ash</b>	Fineness by Blaine's Air Permeability	IS 1727	50 m <sup>2</sup> /kg to 500 m <sup>2</sup> /kg
		Particle Retained on 45µ Sieve (Wet Sieving)	IS 1727	0.05 % to 100 %
		Compressive Strength	IS 1727	50 N/mm <sup>2</sup> to 100 N/mm <sup>2</sup>
		Specific Gravity	IS 1727	2.0 to 2.8
<b>9.</b>	<b>Bitumen</b>	Solubility in Trichloroethylene	IS 1216	10 % to 100 %
		Flash Point	IS 1209	50 °C to 250 °C
<b>10</b>	<b>Natural Building Stone</b>	Moh's Hardness (Scratch Hardness)	IS 13630 (Part 13)	1 to 9
		Water Absorption	IS 1124	0.01 % to 10 %
		Apparent Specific Gravity	IS 1124	0.01 % to 10 %
		True Specific Gravity	IS 1122	1 to 3.5
		Compressive Strength	IS 1121 (Part 1)	20 N/mm <sup>2</sup> to 100 N/mm <sup>2</sup>
<b>II.</b>	<b>SOIL &amp; ROCK</b>			
<b>1.</b>	<b>Soil</b>	Water Content	IS 2720 (Part 2)	0.5 % to 20 %
		Grain Size Analysis	IS 2720 (Part 4)	0.1 % to 100 % (0.075 mm to 4.75 mm)
		Liquid Limit	IS 2720 (Part 5)	5 % to 60 %
		Plastic Limit	IS 2720 (Part 5)	5 % to 60 %
		Light Compaction	IS 2720 (Part 7)	MDD: 1 g/cc to 2.70 g/cc OMC: 5 % to 20 %
		Heavy Compaction	IS 2720 (Part 8)	MDD: 1 g/cc to 2.9 g/cc OMC: 5 % to 15 %

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<b>2.</b>	<b>Soil-Field Test</b>	Dry Density by Core Cutter Method	IS 2720 (Part 29)	1 g/cc to 2.9 g/cc
		Dry Density by Sand Replacement Method	IS 2720 (Part 28)	1 g/cc to 2.8 g/cc
<b>3.</b>	<b>Bentonite</b>	Liquid Limit	IS 2720 (Part 5)	150 % to 600 %
		Sand Content	IS 6186 Clause A-9	0.1 % to 10 %
		Swelling Power	IS 6186 Clause A-5	Qualitative
		Gel Formation Index	IS 6186 Clause A-4	Qualitative

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