

Laboratory	Unique Engineering Testing & Advisory Services, 216, Bridge Road No. 6-F, New Estate, Udhyog Nagar, Udhna, Surat, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Mechanical Testing	Issue Date	31.10.2016
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AT LABORATORY

I. BUILDINGS MATERIALS

1.	Fine Aggregate	Sieve Analysis	IS 2386 (Part 1): 1963 (RA 2016)	10 mm to 75 μ
		Finer than 75 Micron.	IS 2386 (Part 1): 1963 (RA 2016)	1 % to 20 %
		Specific Gravity Water Absorption	IS 2386 (Part 3): 1963 (RA 2016)	2.4 to 3.1 0.1 % to 3 %
		Bulk Density	IS 2386 (Part 3): 1963 (RA 2016)	1.4 kg/l to 2.2 kg/l
		Soundness by Sodium Sulphate	IS 2386 (Part 5): 1963 (RA 2016)	1 % to 20 %
2.	Coarse Aggregate	Sieve Analysis	IS 2386 (Part 1): 1963 (RA 2016)	80 mm to 4.75 mm
		Elongation Flakiness Index	IS 2386 (Part 1): 1963 (RA 2016)	5 % to 50 %
		Water absorption	IS 2386 (Part 3): 1963 (RA 2016)	0.2 % to 05 %
		Specific Gravity	IS 2386 (Part 3): 1963 (RA 2016)	2.5 to 3.2
		Bulk Density	IS 2386 (Part 3): 1963 (RA 2016)	1.2 kg/l to 1.7 kg/l
		Ten Percent Fines Value	IS 2386 (Part 4): 1963 (RA 2016)	10 T to 30 T

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	Coarse Aggregate	Abrasion Value	IS 2386 (Part 4): 1963 (RA 2016)	5 % to 55 %
		Impact value	IS 2386 (Part 4): 1963 (RA 2016)	5 % to 55 %
		Crushing value	IS 2386 (Part 4): 1963 (RA 2016)	5 % to 55 %
		Soundness by Sodium Sulphate	IS 2386 (Part 5): 1963 (RA 2011)	2 % to 25 %
3.	Bitumen	Specific Gravity	IS 1202: 1978 (RA 2014)	0.95 to 1.05
		Penetration. (Div. - 1/10 mm)	IS 1203: 1978 (RA 2014)	30 to 100 (0.1 mm)
		Softening Point.	IS 1205: 1978 (RA 2014)	30 °C to 65 °C
		Ductility.	IS 1208: 1978 (RA 2014)	70 cm to 100 cm
		Kinematic Viscosity	IS 1206 (Part 3): 1978 (RA 2014)	250 cSt to 450 cSt
		Absolute Viscosity	IS 1206 (Part 2): 1978 (RA 2014)	800 Poises to 5000 Poises
4.	Asphalt Mix	Marshall Stability Flow Value	ASTM D6927-06	0.5 kN to 50 kN 0.1 mm to 10 mm
		Bulk Specific Gravity Density	ASTM D2726-05a	1.8 g/cc to 2.7 g/cc
		Theoretical Max. Specific Gravity	ASTM D2042-03a	1.8 g/cc to 2.7 g/cc

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	Asphalt Mix	Binder Content	IRC SP-11-Annexure 5	1.5 % to 7.5 %
5.	Burnt Clay Building Brick & Burnt Clay Fly Ash Building Brick	Dimension.	IS 1077: 1992 & IS 12894: 1993 (RA 2011)	L: 4000 mm to 5000 mm W:2000 mm to 2500 mm H: 1200 mm to 1600 mm
		Compressive Strength	IS 3495 (Part 1): 1992 (RA 2011)	2.5 N/mm ² to 20 N/mm ²
		Water absorption	IS 3495 (Part 2): 1992 (RA 2011)	10 % to 40 %
		Efflorescence	IS 3495 (Part 3): 1992 (RA 2011)	Qualitative
6.	Autoclave Cellular (Aerated) Concrete Blocks	Dimensions	IS 2185 (Part 3): 1984 (RA 2015)	L :400 mm to 600 mm W:100 mm to 250 mm H: 200 mm to 300 mm
		Block Density	IS 6441 (Part 1): 1972 (RA 2012)	450 kg/m ³ to 1000 kg/m ³
		Compressive Strength.	IS 6441 (Part 5): 1972 (RA 2012)	0.5 N/mm ² to 10 N/mm ²
		Drying Shrinkage	IS 6441 (Part 2): 1972 (RA 2012)	0.005 % to 0.2 %
7.	Paving Block	Water Absorption	IS 15658: 2006 (RA 2011) Annexure C	3 % to 10 %
		Compressive Strength.	IS 15658: 2006 (RA 2011) Annexure D	20 N/mm ² to 70 N/mm ²

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	Paving Block	Abrasion Resistance	IS 15658: 2006 (RA 2011) Annexure E	(3000 mm ³ to 15000 mm ³) / 5000 mm ²
		Tensile Splitting Strength	IS 15658: 2006 (RA 2011) Annexure F	1 N/mm ² to 5 N/mm ²
		Flexural Strength / Breaking Load	IS 15658: 2006 (RA 2011) Annexure G	2 N/mm ² to 8 N/mm ²
		Dimension & Tolerance	IS 15658: 2006 (RA 2011) Annexure B	50 mm to 300 mm
		Thickness of Wearing Layer	IS 15658: 2006 (RA 2011) Clause. 6.2.3,	5 mm to 30 mm
		Plan Area	IS 15658: 2006 (RA 2011) Annexure B	200 cm ² to 500 cm ²
8.	Concrete Manhole Cover & Frame	Dimension	IS 12592: 2002 Amd. 1: 2013 Annexure B	30 cm to 90 cm
		Load	IS 12592: 2002 Amd. 1: 2013 Annexure C	5 t to 40 t
9.	Cement (OPC, PPC, SRC, PSC)	Fineness dry sieve	IS 4031 (Part 1): 1996 (RA 2016)	1 % to 10 %
		Fineness by Specific surface by Blain air permeability	IS 4031 (Part 2): 1999 (RA 2013)	2000 cm ² /g to 5000 cm ² /g
		Soundness by le-chatelier	IS 4031 (Part 3): 1988 Amd. 1: 2014	0 to 15 mm
		Consistency	IS 4031 (Part 4): 1988 (RA 2014)	25 % to 35 %

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	Cement (OPC, PPC, SRC, PSC)	Initial Setting Time	IS 4031 (Part 5): 1988 (RA 2014)	30 min to 150 min
		Final Setting Time	IS 4031 (Part 5): 1988 (RA 2014)	150 min to 450 min
		Compressive strength	IS 4031 (Part 6): 1988 (RA 2014)	10 N/mm ² to 65 N/mm ²
		Specific Gravity	IS 4031 (Part 11): 1988 (RA 2014)	2.8 to 3.3
10.	Concrete - Core/Cylinder/ Cube	Compressive strength	IS 516: 1959 (RA 2013)	5.0 N/mm ² to 70 N/mm ²
		Flexural Strength	IS 516: 1959 (RA 2013)	2 N/mm ² to 8 N/mm ²
		Slump	IS 1199: 1959 (RA 2013)	0 mm to 250 mm
		Split Tensile Strength	IS 5816: 1999 (RA 2013)	1 N/mm ² to 5 N/mm ²
11.	Thin-bed Mortar for AAC Block	Splitting Tensile Strength	ASTM C1660-09	0.1 N/mm ² to 1.0 N/mm ²
12.	Fly Ash/Pozzolana	Fineness by Specific surface by Blain air permeability	IS 1727: 1967 Amd. 1: 2013	200 m ² /kg to 500 m ² /kg
		Lime Reactivity	IS 1727: 1967 (RA 2013)	0.5 N/mm ² to 6.0 N/mm ²
		Compressive strength	IS 1727: 1967 (RA 2013)	20 N/mm ² to 60 N/mm ²
		Specific Gravity	IS 1727: 1967 (RA 2013)	2.0 to 3.0
		Fineness by Sieving	IS 1727: 1967 (RA 2013)	5 % to 50 %

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13.	Fly Ash/Pozzolana Plain & Chequered Concrete Tiles	Soundness by le-chatelier	IS 1727: 1967 (RA 2013)	0 to 15 mm
		Initial & Final Setting Time	IS 1727: 1967 (RA 2013)	15 min to 450 min
		Flatness of Surface	IS 1237: 2012 Annexure B IS 13801: 2013 Annexure B	0.1 mm to 1 mm
		Perpendicularity	IS 1237: 2012 Annex C IS 13801: 2013 Annexure C	0.1 mm to 2 mm
		Straightness	IS 1237: 2012 Annex D IS 13801: 2013 Annexure D	0.1 mm to 2 mm
		Water Absorption	IS 1237: 2012 Annexure E IS 13801: 2013 Annexure E	5 % to 15 %
		Wet Transverse Strength	IS 1237: 2012 Annexure F IS 13801: 2013 Annexure F	1.0 N/mm ² to 5.0 N/mm ²
14.	Ceramic Tiles / Pressed Ceramic (Vitrified) Tiles	Resistance to Wear	IS 1237: 2012 Annexure G IS 13801: 2013 Annexure G	0.2 mm to 4 mm
		Water Absorption	IS 13630 (Part 2): 2006 (RA 2012)	0 to 12 %
		Flexural Strength	IS 13630 (Part 6): 2006 (RA 2012)	10 N/mm ² to 75 N/mm ²
		Breaking Strength	IS 13630 (Part 6): 2006 (RA 2012)	200 N to 2000 N
		Dimension	IS 13630 (Part 1): 1993 (RA 2012)	L: 30 cm to 60 cm W: 20 cm to 60 cm T: 6 mm to 12 mm

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	Ceramic Tiles / Pressed Ceramic (Vitrified) Tiles	Straightness	IS 13630 (Part 1): 1993 (RA 2012)	0.1 mm to 1 mm
		Rectangularity	IS 13630 (Part 1): 1993 (RA 2012)	0.1 mm to 2 mm
		Flatness	IS 13630 (Part 1): 1993 (RA 2012)	0.1 mm to 2 mm
II.	MECHANICAL PROPERTIES OF METALS			
1.	Reinforcement & Structural Steel	Ultimate Tensile strength	IS 1608: 2005 (RA 2011)	250 N/mm ² to 700 N/mm ²
		0.2% Proof Stress	IS 1608: 2005 (RA 2011)	200 N/mm ² to 550 N/mm ²
		Percentage Elongation	IS 1608: 2005 (RA 2011)	8 % to 35 %
		Rebond	IS 1786: 2008 (RA 2013) Amd. 1: 2012	Qualitative (Up to 32 mm dia.)
		Bend	IS 1599:1985 (RA2012)	Qualitative (30° to 180°)
III.	SOIL AND ROCK			
1.	Clays and Soils	Water content	IS 2720 (Part 2): 1973 (RA 2015)	1 % to 50 %
		Specific Gravity – Fine Grained Soil	IS 2720 (Part 3/Sec I): 1980 (RA 2011)	2.4 to 2.9
		Specific Gravity – Coarse Grained Soil	IS 2720 (Part 3/Sec II): 1980 (RA 2011)	2.5 to 3.1

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	Clays and Soils	Grain size Analysis – 1) Dry 2) Wet 3) Hydrometer	IS 2720 (Part 4): 1985 (RA 2015), Clause. 3 & 4 & Clause. 5.2	10 mm to 0.001 mm
		Liquid Limit / Plastic Limit	IS 2720 (Part 5): 1985 (RA 2015), Clause. 6 & 7	20 % to 350 % 15 % to 80 %
		Shrinkage limit	IS 2720 (Part 6): 1972 (RA 2011)	10 % to 35 %
		Light Compaction MDD OMC	IS 2720 (Part 7): 1980 (RA 2011)	1.40 g/cc to 1.95 g/cc 10 % to 30 %
		Heavy Compaction MDD OMC	IS 2720 (Part 8): 1983 (RA 2015)	1.50 g/cc to 2.40 g/cc 05 % to 25 %
		Unconfined Compression Strength	IS 2720 (Part 10): 1980 (RA 2015)	0.2 kg/cm ² to 4.0 kg/cm ²
		Triaxial (UU) Cohesion Friction Angle	IS 2720 (Part 11): 1980 (RA 2011)	Upto 2.0 kg/cm ² 5° to 40°
		Direct Shear Cohesion Friction Angle	IS 2720 (Part 13): 1986 (RA 2011)	C : Upto 1.0 kg/cm ² & Ø : 05 ° to 45°
		California Bearing Ratio	IS 2720 (Part 16): 1987 (RA 2011)	0.5 % to 50 %

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		Consolidation Compression Index Cc	IS 2720 (Part 15): 1986 (RA 2011)	3 to 1.0
		Free Swell Index	IS 2720 (Part 40): 1977 (RA 2011)	1 % to 400 %
	Clays and Soils	Swelling Pressure	IS 2720 (Part 41): 1977 (RA 2011)	0.1 kg/cm ² to 2.0 kg/cm ²
		Relative Density	IS 2720 (Part 14): 1983 (RA 2015)	1.1 g/cc to 2.5 g/cc
		Laboratory Permeability	IS 2720 (Part 17): 1986 (RA 2011)	10 ⁻¹ cm/s to 10 ⁻⁸ cm/s
2.	Rock	Compressive Strength	IS 9143: 1979 (RA 2016)	1 N/mm ² to 125 N/mm ²
		Water Content, Density & Porosity	IS 13030: 1991 (RA 2016)	0.5 % to 15 %
		Point Load Index	IS 8764: 1998 (RA 2014)	10 N/mm ² to 80 N/mm ²
		Modulus of Elasticity	IS 9221: 1979 (RA 2016)	1000 N/mm ² to 50000 N/mm ²
		Slake Durability Index	IS 10050: 1981 (RA 2016)	2 % to 100 %
		Brazilian	IS 10082: 1981 (RA 2016)	15 N/mm ² to 100 N/mm ²

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AT SITE

I. SOIL & ROCK

1. Soil	Dry Density of soil in place by Core-cutter Method	IS 2720 (Part 29): 1975 (RA 2015)	1.2 g/cc to 2.4 g/cc 6 % to 30 %
	Dry Density of soil in place by Sand Replacement Method	IS 2720 (Part 28): 1974 (RA 2015)	1.2 g/cc to 2.4 g/cc 2 % to 15 %
	Plate Load	IS 1888: 1992 (RA 2011)	Upto 100 t/m ²
	Pile Load	IS 2911 (Part 4): 2013	Upto 40 t
	Vertical Load (Compression)		Upto 25 t
	Lateral Load		Upto 40 t
	Pull Out (Uplift)		Upto 40 t
	Field CBR	IS 2720 (Part 31) (RA 2015)	Upto 50 %
	Modulus of Sub-grade Reaction	IS 9214: 1979 (RA 2011)	2 kg/cm ³ to 8 kg/cm ³
	Electrical Resistivity	IS 15736: 2007 (RA 2012)	0.0001 to 19.99 kΩ

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