Laboratory	**Bureau Veritas (India) Pvt. Ltd. - Construction Services Laboratory, Plot B3/B4, TTC Industrial Area, Off Thane-Belapur Road, M.I.D.C., Digha, Navi Mumbai, Maharashtra**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Discipline	**Mechanical Testing**	**Issue Date**	**06.05.2015**
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S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
I.	**MECHANICAL PROPERTIES OF MATERIALS**			
1.	**Steel Reinforcement**	Weight/meter	IS 1786: 2008 (RA 2013)	0.1 kg to 20 kg
		Ultimate Tensile Stress	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	200 N/mm² to 800 N/mm²
		0.2 % Proof Stress	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	200 N/mm² to 600 N/mm²
		Elongation	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	10 % to 40 %
		Bend Test	IS 1599: 2012 ASTM/ ASME SA 370: 2013a	Mandrels Dia: (8,10,12,15,16,18,20,25, 30,32,36,40,48,50,60,75, 84,96,100,108,112,120, 140,150,168,175,192,196, 200, 216, 224, 252, 279) mm
		Rebend Test	IS 1786: 2008 (RA 2013)	Mandrels Dia: (8,10,12,15,16,18,20,25, 30,32,36,40,48,50,60,75, 84,96,100,108,112,120,140, 150,168,175,192, 196, 200, 216,216, 224, 252,279) mm
2.	**Structural Steel**	Weight / meter	IS 808: 1989 (RA 2009) ASTM / ASME SA 370: 2013	0.5 kg to 20 kg
		Ultimate Tensile Stress	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	25 N/mm² to 800 N/mm²

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	Structural Steel	Yield Stress	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	15 N/mm² to 600 N/mm²
		Elongation	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	10 % to 40 %
		Bend Test	IS 1599: 2012 ASTM/ ASME SA 370: 2013	Mandrels Dia: (8,10,12,15,16,18,20,25, 30,32,36,40,48,50,60,75, 84,96,100,108,112,120, 140,150,168,175,192,196, 200,216,216,224,252, 279) mm
3.	**Mild steel tube**	Weight per meter	IS 1161: 1998 (RA 2009) ASTM / ASME SA 370: 2013a	0.25 kg to 20 kg
		Yield Stress	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	15 N/mm² to 600 N/mm²
		Ultimate Tensile Stress	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	25 N/mm² to 800 N/mm²
		Elongation	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	10 % to 40 %
		Flattening	IS 2328: 2005 (RA 2010) ASTM / ASME SA 370: 2013	Qualitative (Visual observation)
4.	**Steel Prestressed Strand**	Weight/meter	IS 1786: 2008 (RA 2013)	500 kg/km to 1500 kg/km
		Ultimate Tensile Load	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	100 kN to 350 kN

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	Steel Prestressed Strand	0.2 % Proof Load	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	100 kN to 300 kN
		Elongation	IS 1608: 2005 (RA 2010) ASTM / ASME SA 370: 2013a	1 % to 10 %
II.	**BUILDING MATERIALS**			
1.	**Coarse Aggregate**	Sieve Analysis	IS 2386 (Part 1): 1963 (RA 2011)	4.75 mm to 40 mm
		Specific gravity	IS 2386 (Part 3): 1963 (RA 2011)	2 to 4
		Water Absorption	IS 2386 (Part 3): 1963 (RA 2011)	0 to 5 %
		Bulk Density (Loose & Rodded)	IS 2386 (Part 3): 1963 (RA 2011)	500 kg/m^3 to 4000 kg/m^3
		Flakiness Index	IS 2386 (Part 1): 1963 (RA 2011)	1 % to 50 %
		Elongation Index	IS 2386 (Part 1): 1963 (RA 2011)	0 to 50 %
		Aggregate Impact value	IS 2386 (Part 4): 1963 (RA 2011)	5 % to 50 %
		Abrasion Resistance (Los Angale's abrasion value)	IS 2386 (Part 4): 1963 (RA 2011)	1 % to 50 %
		Aggregate Crushing value	IS 2386 (Part 4): 1963 (RA 2011)	1 % to 50 %
2.	**Fine Aggregate**	Sieve analysis	IS 2386 (Part 1): 1963 (RA 2011)	75 micron to 4.75 micron
		Specific gravity	IS 2386 (Part 3): 1963 (RA 2011)	2.00 to 4.00
		Water Absorption	IS 2386 (Part 3): 1963 (RA 2011)	1 % to 4 %

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	Fine Aggregate	Bulk Density (Loose & Rodded)	IS 2386 (Part 3): 1963 (RA 2011)	500 kg/m^3 to 3000 kg/m^3
		Bulking	IS 2386 (Part 3): 1963 (RA 2011)	1 % to 20 %
		Particle finer than 75 microns	IS 2386 (Part 1): 1963 (RA 2011)	0.5 % to 20 %
3.	**Paver Blocks**	Water Absorption	IS 15658: 2006 (RA 2011)	0.5 % to 20 %
		Compressive Strength	IS 15658: 2006 (RA 2011)	5 N/mm^2 to 100 N/mm^2
		Flexural strength	IS 15658: 2006 (RA 2011)	0.1 N/mm^2 to 15 N/mm^2
		Abrasion Resistance	IS 15658: 2006 (RA 2011)	(100 mm^3 to 15000 mm^3)/ 50000 mm^2
4.	**Bricks**	Water absorption	IS 3495: 1992 (RA 2011)	1 % to 40 %
		Compressive Strength	IS 3495: 1992 (RA 2011)	1 N/mm^2 to 20 N/mm^2
		Efflorescence	IS 3495: 1992 (RA 2011)	Qualitative (Visual Observation)
		Length	IS 1077: 1992 (RA 2011)	10 mm to 5000 mm
		Width	IS 1077: 1992 (RA 2011)	10 mm to 5000 mm
		Thickness	IS 1077: 1992 (RA 2011)	10 mm to 5000 mm
5.	**Ceramic Tiles**	Water absorption	IS 13630 (Part 2): 2006 (RA 2012)	0 to 25 %
		Flexural strength	IS 13630 (Part 6): 2006 (RA 2012)	1.5 N/mm^2 to 60 N/mm^2
		Length	IS 13630 (Part 1): 2006 (RA 2012)	Upto 5 %

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	Ceramic Tiles	Width	IS 13630 (Part 1): 2006 (RA 2012)	Upto 5 %
		Thickness	IS 13630 (Part 1): 2006 (RA 2012)	0 to 15 mm
		Straightness	IS 13630 (Part 1): 2006 (RA 2012)	Upto 5 %
		Rectangularity	IS 13630 (Part 1): 2006 (RA 2012)	Upto 5 %
		Centre of curvature	IS 13630 (Part 1): 2006 (RA 2012)	Upto 5 %
		Edge Curvature	IS 13630 (Part 1): 2006 (RA 2012)	Upto 5 %
		Warpage Curvature	IS 13630 (Part 1): 2006 (RA 2012)	Upto 5 %
		Hardness by Moh's scale	IS 13630 (Part 13): 2006 (RA 2012)	1 to 9
		Breaking strength	IS 13630 (Part 6): 2006 (RA 2012)	10 N to 2100 N
		Bulk density	IS 13630 (Part 2): 2006 (RA 2012)	1.5 g/cc to 2.5g/cc
		Crazing Resistance	IS 13630 (Part 9): 2006 (RA 2012)	Qualitative (Visual Observation)
6.	**Marble**	Moisture absorption	IS 1124: 1974 (RA 2013)	0.05 % to 20 %
		Hardness by moh`s scale	IS 13630 (Part 13): 2006 (RA 2012)	1 to 9
		Specific Gravity	IS 1122: 1974 (RA 2008)	1 to 4
7.	**Concrete Core**	Compressive Strength	IS 516: 1959 (RA 2008)	5 N/mm^2 to 120 N/mm^2
8.	**Concrete Cube**	Compressive Strength	IS 516: 1959 (RA 2008)	5 N/mm^2 to 120 N/mm^2

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9.	**Cement Concrete Flooring Tiles**	Water Absorption	IS 1237: 2012	1 % to 20 %
		Wet Transverse Strength	IS 1237: 2012	1 N/mm^2 to 10 N/mm^2
		Resistance to Wear (Abrasion)	IS 1237: 2012	0.1 mm to 6 mm
		Length	IS 1237: 2012	100 mm to 300 mm
		Width	IS 1237: 2012	100 mm to 300 mm
		Thickness	IS 1237: 2012	100 mm to 300 mm
		Flatness of the Tile Surface	IS 1237: 2012	0 to 5 %
		Perpendicularity	IS 1237: 2012	0 to 5 %
		Straightness	IS 1237: 2012	0 to 5 %
10.	**Cement Concrete Chequered tiles**	Water Absorption	IS 13801: 2013	1 % to 20 %
		Wet Transverse Strength	IS 13801: 2013	1 N/mm^2 to 10 N/mm^2
		Resistance to Wear	IS 13801 : 2013	0.1 mm to 6 mm
		Length	IS 13801: 2013	100 mm to 300 mm
		Width	IS 13801: 2013	100 mm to 300 mm
		Thickness	IS 13801: 2013	100 mm to 300 mm
		Flatness of the Tile Surface	IS 13801: 2013	Upto 5 %
		Perpendicularity	IS 13801: 2013	0 to 5 %
		Straightness	IS 13801: 2013	0 to 5 %

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11.	**Stone**	Water Absorption	IS 1124: 1974 (RA 2013)	0.1 % to 5 %
		Hardness by Moh`s scale	IS 13630 (Part 13): 2006 (RA 2012)	1 to 9
12.	**Admixture**	Workability (slump)	IS 1199: 1959 (RA 2008)	Upto 250 mm
		Setting time	IS 8142: 1976 (RA 2011)	30 min to 12 hr
		Bleeding	IS 9103: 1999 (RA 2008)	0 to 10 %
		Water content	IS 9103: 1999 (RA 2008)	5 % to 30 %
		Compressive strength	IS 516: 1959 (RA 2008)	15 N/mm^2 to 60 N/mm^2
		Length change	IS 1199: 1959 (RA 2008)	0 to 0.5 %
		Air content	IS 1199: 1959 (RA 2008)	0 to 10 %
13.	**Solid/Hollow Concrete Blocks**	Length	IS 2185 (Part 1): 2005 (RA 2010)	100 mm to 1000 mm
		Width	IS 2185 (Part 1): 2005 (RA 2010)	100 mm to 1000 mm
		Thickness	IS 2185 (Part 1): 2005 (RA 2010)	100 mm to 1000 mm
		Block Density	IS 2185 (Part 1): 2005 (RA 2010)	500 kg/m^3 to 2500 kg/m^3
		Compressive Strength	IS 2185 (Part 1): 2005 (RA 2010)	1 MPa to 25 MPa
		Water Absorption	IS 2185 (Part 1): 2005 (RA 2010)	0 to 30 %
14.	**Concrete Beam**	Flexural Strength	IS 516: 1959 (RA 2008)	0.03 Mpa to 10 Mpa

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15.	**AAC Block**	Length	IS 2185 (Part 3): 1984 (RA 2010)	1 mm to 1000 mm
		Width	IS 2185 (Part 3): 1984 (RA 2010)	1 mm to 1000 mm
		Thickness	IS 2185 (Part 3): 1984 (RA 2010)	1 mm to 1000 mm
		Block Density	IS 2185 (Part 3): 1984 (RA 2010)	450 kg/m^3 to 1200 kg/m^3
		Compressive Strength	IS 2185 (Part 3): 1984 (RA 2010)	1 MPa to 7 MPa
16.	**Bitumen/ CRMB/PMB**	Specific Gravity	IS 1202: 1978 (RA 2009)	0.5 to 1.50
		Flash & Fire Point-Cleveland Open Cup	IS 1448 (Part 69): 2013	100 ºC to 300 ºC
		Softening Point	IS 1205: 1978 (RA 2009)	25 ºC to 150 ºC
		Penetration	IS 1203: 1978 (RA 2009)	1 division to 350 divisions
		Loss on heating	IS 1212: 1978 (RA 2004)	Upto 2 %
		Penetration of the residue	IS 1204: 1978 (RA 2009)	10 divisions to 350 divisions
		Ductility	IS 1208: 1978 (RA 2009)	1 cm to 100 cm
		Elastic recovery	IS 15462: 2004 (RA 2009)	70 % to 100 %
		Matter soluble in trichloroethylene	IS 1216: 1978 (RA 2009)	95 % to 100 %

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17.	**Bitumen Emulsion**	Residue on 600 µ	IS 8887: 2004 (RA 2009) Annexure B	0 to 0.1 %
		Viscosity by Saybolt Furol Viscometer	IS 8887: 2004 (RA 2009) IS 3117: 2004 (RA 2009)	10 s to 500 s
		Storage stability	IS 8887: 2004 (RA 2009) Annexure D	0 to 2 %
		Miscibility with water	IS 8887: 2004 (RA 2009) Annexure H	Qualitative (Visual Observation)
		Test on Residue Residue by evaporation	IS 8887: 2004 (RA 2009) Annexure J	50 % to 100 %
		Penetration	IS 8887: 2004 (RA 2009) IS 1203: 1978 (RA 2009)	10 division to 350 division
		Ductility	IS 8887: 2004 (RA 2009) IS 1208: 1978 (RA 2009)	5 cm to 100 cm
		Solubility in trichloroethylene	IS 8887: 2004 (RA 2009) IS 1216: 1978 (RA 2009)	90 % to 100 %
18.	**Cement**	Consistency	IS 4031 (Part 4): 1988 (RA 2009)	23 % to 35 %
		Initial setting time	IS 4031 (Part 5): 1988 (RA 2009)	30 min to 400 min
		Final setting time	IS 4031 (Part 5): 1988 (RA 2009)	30 min to 600 min
		Fineness (Blaine's method)	IS 4031 (Part 2): 1999 (RA 2008)	100 m^2/kg to 400 m^2/kg

S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Cement	Compressive strength	IS 4031 (Part 6): 1988 (RA 2009)	10 N /mm^2 to 100 N/mm^2
		Soundness: Le-Chatelier's method Autoclave method	IS 4031 (Part 3): 1988 (RA 2009)	 0.10 mm to100 mm (-) 0.1 % to 2 %
		Specific Gravity	IS 4031 (Part 11): 1988 (RA 2009)	2 to 4
19.	**Fly Ash**	Fineness	IS 1727: 1967 (RA 2008)	100 m^2/kg (-)700 m^2/kg
		Comparative compressive strength	IS 1727: 1967 (RA 2008)	5 N/mm^2 to 80 N/mm^2
		Soundness (by autoclave)	IS 1727: 1967 (RA 2008)	0.1 % to 2 %
		Specific gravity	IS 1727: 1967 (RA 2008)	1 to 3
		Lime Reactivity	IS 1727: 1967 (RA 2008)	0.5 N/mm^2 to 15 N/mm^2
		45 microns	IS 1727: 1967 (RA 2008)	1 % to 100 %
20.	**Timber**	Moisture Content	IS 11215: 1991 (RA 2010)	1 % to 40 %
21.	**Cement Grout**	Compressive Strength	ASTM C 1107/ C1107M: 13	10 N/mm^2 to 100 N /mm^2
		Expansion	ASTM C 1107/ C1107M: 13	0 to 10 %
		Flow	ASTM C 1107/ C1107M: 13	0 to 300 %
22.	**Micro Silica**	Retained on 45 µm	ASTM C -1240: 05 IS 1727: 1967 (RA 2008)	0.1 % to 60 %

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	Micro Silica	Compressive Strength @ 7 days as percentage of control sample	ASTM C -1240: 05 IS 1727: 1967 (RA 2008)	50 % to 120 %
23.	**Ground Granulated Blast Furnace Slag (GGBFS)**	Retained on 45 µm	ASTM C-989: 99	1 % to 60 %
		Slag Activity Index (Min.)	ASTM C-989: 99	50 % to 120 %
24.	**Door Shutter**	End Immersion test	IS 4020 (Part 13): 1998	Qualitative
		Knife Test	IS 4020 (Part 14): 1998	Qualitative
		Glue Adhesion Test	IS 4020 (Part 15): 1998	Qualitative
III.	**SOIL AND ROCK**			
1.	**Soil**	Liquid Limit	IS 2720 (Part 5): 1985 (RA 2011)	20 % to 80 %
		Plastic Limit	IS 2720 (Part 5): 1985 (RA 2011)	10 % to 60 %
		Shrinkage limit	IS 2720 (Part 6): 1972 (RA 2011)	10 % to 30 %
		Determination of water content	IS 2720 (Part 2): 1973 (RA 2010)	1 % to 75 %
		Grain size analysis	IS 2720 (Part 4): 1985 (RA 2010)	0.075 mm to 4.75 mm
		Particle Size Analysis by Hydrometer method	IS 2720 (Part 4): 1985 (RA 2011)	2 µm to 75 µm
		Direct Shear Test	IS 2720 (Part 13): 1986 (RA 2011)	Cohesion 0 to 0.3 kg/cm^2 Angle of internal friction: 10 º to 50 º

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	Soil	Light Compaction	IS 2720 (Part 7): 1980 (RA 2011)	Optimum Moisture Content: 1 % to 40 % Maximum dry Density: 1 g/cc to 3 g/cc
		Heavy compaction	IS 2720 (Part 8): 1983 (RA 2010)	Optimum Moisture Content: 1 % to 40 % Maximum Dry Density: 1 g/cc to 3 g/cc
		Specific gravity	IS 2720 (Part 3/Sec I): 1980 (RA 2011)	2.0 to 3.0
		Free Swell Index	IS 2720 (Part 40): 1977 (RA 2011)	5 % to 70 %
		CBR	IS 2720 (Part 16): 1987 (RA 2011)	1 % to 100 %
		Consolidation test	IS 2720 (Part 15): 1965 (RA 2011)	Cc: 0.05 to 0.4
		Unconfined Compressive Strength	IS 2720 (Part 10): 1991 (RA 2010)	Compressive strength: 0 to 6.0 kg/cm^2
		Triaxial Shear Test by Unconsolidated Undrained Method	IS 2720 (Part 11): 1993 (RA 2011)	Cohesion: 0 to 1.0 kg/cm^2 Angle of internal friction: 5 º to 50 º
2.	**Rock**	Water Content	IS 13030: 1991 (RA 2011)	0.1 % to 25 %
		Porosity	IS 13030: 1991 (RA 2011)	0.01 % to 25 %
		Wet/Dry Density	IS 13030: 1991 (RA 2011)	1 to 4

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	Rock	Specific Gravity	IS 13030: 1991 (RA 2011)	1 to 4
		Unconfined Compression Strength	IS 9143: 1979 (RA 2011)	10 kg/cm^2 to 2500 kg/cm^2

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