

Laboratory Ace Test House, KH No. 1048, Pepsi Wali Gali, Village: Bhalaswa, Delhi

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6214 (in lieu of T-3541, T-3542 & T-4177) Page 1 of 11

Validity 07.08.2017 to 06.08.2019 Last Amended on 04.09.2017

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.	BUILDING MATERIAL			
1.	Aggregate (Fine & Coarse)	Chloride Content	BS EN 1744-1: 2009	0.005 % to 1 %
		Sulphate Content	BS EN 1744-1: 2009	0.01 % to 1 %
2.	Cement (OPC/PPC/PSC)	Insoluble Residue	IS 4032: 1985 (RA 2014)	0.5 % to 40 %
		Loss on Ignition	IS 4032: 1985 (RA 2014)	0.5 % to 8 %
		Silica Content (as SiO <sub>2</sub> )	IS 4032: 1985 (RA 2014)	15 % to 40 %
		Combine Alumina oxide and Iron oxide	IS 4032: 1985 (RA 2014)	0.5 % to 15 %
		Available alkali (as Na <sub>2</sub> O)	IS 4032: 1985 (RA 2014)	0.01 % to 5 %
		Ferric oxide (Fe <sub>2</sub> O <sub>3</sub> )	IS 4032: 1985 (RA 2014)	0.1 % to 10 %
		Calcium oxide (CaO)	IS 4032: 1985 (RA 2014)	30 % to 70 %
		Sulphuric Anhydride (SO <sub>3</sub> )	IS 4032: 1985 (RA 2014)	0.2 % to 5 %
		Magnesia (MgO)	IS 4032: 1985 (RA 2014)	0.5 % to 10 %
		Chloride	IS 4032: 1985 (RA 2014), Amendment No. 2	0.01 % to 2.0 %
3.	Concrete	Chloride	IS 14959 (Part 2): 2001 (RA 2011) BS 1881 (P-124): 2015	0.005 % to 1 %
		Sulphate	BS 1881 (P-124): 2015	0.01 % to 1 %
4.	Admixture	pH value	IS 9103: 1999 (RA 2013)	2 to 13
		Relative density	IS 9103: 1999 (RA 2013)	0.5 to 1.5
		Ash content	IS 9103: 1999 (RA 2013)	1 % to 25 %
		Dry material content	IS 9103: 1999 (RA 2013)	1 % to 30 %
		Chloride content	IS 6925: 1973 (RA 2013)	0.01 % to 2.0 %
5.	Fly Ash	Loss on Ignition	IS 1727: 1967 (RA 2013)	0.1 % to 30 %
		Silica content (SiO <sub>2</sub> )	IS 1727: 1967 (RA 2013)	20 % to 70 %
		Combine Alumina oxide and Iron oxide	IS 1727: 1967 (RA 2013)	20 % to 50 %
		Sulphuric Anhydride (SO <sub>3</sub> )	IS 1727: 1967 (RA 2013)	0.1 % to 5 %
		Magnesia (MgO)	IS 1727: 1967 (RA 2013)	0.5 % to 10 %

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6.	<b>Silica Fume</b>	Loss on ignition	IS 1727: 1967 (RA 2013)	0.5 % to 10 %
		Silica	IS 1727: 1967 (RA 2013)	5 % to 95 %
		Moisture content	IS 15388: 2003 (RA 2012)	0.1 % to 10 %
		Available alkali as Na <sub>2</sub> O	IS 4032: 1985 (RA 2014)	0.01 % to 5 %
II.	<b>SOIL AND ROCK</b>			
1.	<b>Clays and Soils</b>	pH Value	IS 2720 (Part 26): 1987 (RA 2011)	2 to 12
III.	<b>METALS AND ALLOYS</b>			
1.	<b>Low Carbon Steel/ Mild Steel/ HT Strand Wire</b>	Carbon	IS 228 (Part 1): 1987 (RA 2013)	0.05 % to 0.25 %
		Sulphur	IS 228 (Part 9): 1989 (RA 2013)	0.01 % to 0.25 %
		Phosphorus	IS 228 (Part 3): 1987 (RA 2013)	0.005 % to 0.4 %
		Manganese	IS 228 (Part 2): 1987 (RA 2002)	0.2 % to 15.0 %
2.	<b>Stainless Steel</b>	Carbon	IS 228 (Part 1): 1987 (RA 2013)	0.05 % to 0.25 %
		Sulphur	IS 228 (Part 9): 1989 (RA 2013)	0.01 % to 0.25 %
		Phosphorus	IS 228 (Part 3): 1987 (RA 2013)	0.005 % to 0.4 %
		Manganese	IS 228 (Part 2): 1987 (RA 2002)	0.2 % to 15.0 %
		Silicon	IS 228 (Part 8): 1989 (RA 2004)	0.05 % to 5.0 %
		Nickel	IS 228 (Part 5): 1987 (RA 2002)	0.5 % to 15 %
		Chromium	IS 228 (Part 6): 1987 (RA 2002)	0.5 % to 25 %

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IV.	<b>METALLIC COATINGS &amp; TREATMENT SOLUTIONS</b>			
1.	<b>Aluminium &amp; Ferrous Materials</b>	Powder Coating (Film Thickness)	IS 101(Part 3/Sec 2): 1989 (RA 2004), Method 3	(10 to 200) micron
2.	<b>Galvanised Sheet/ Pipes</b>	Mass of Zinc Coating	IS 6745: 1972 (RA 2010)	(100 to 800) g/m <sup>2</sup>
V.	<b>WATER</b>			
1.	<b>Construction Water</b>	Volume of 0.02 N H <sub>2</sub> SO <sub>4</sub> required to neutralize 100ml of sample (Alkalinity)	IS 3025 (Part 23): 1986 (RA 2003)	0.1 ml to 40 ml
		Volume of 0.02 N NaOH required to neutralize 100ml of sample (Acidity)	IS 3025 (Part 22): 1986 (RA 2009)	0.1 ml to 40 ml
		pH value	IS 3025 (Part 11): 1964 (RA 2006)	1 to 12
		Chloride content	IS 3025 (Part 32): 1964 (RA 1999)	5 mg/l to 5000 mg/l
		Sulphate content	IS 3025 (Part 24): 1986 (RA 2003)	10 mg/l to 2000 mg/l
		Inorganic Solids	IS 3025 (Part 18): 1984 (RA 2002)	1 mg/l to 10000 mg/l
		Organic Solids	IS 3025 (Part 15): 1984 (RA 2003)	1 mg/l to 4000 mg/l
		Suspended Matter	IS 3025 (Part 17): 1964 (RA 2006)	2 mg/l to 3000 mg/l

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**MECHANICAL TESTING**

<b>I. BUILDINGS MATERIALS</b>				
1.	<b>Admixture</b>	Air content	IS 1199: 1959 (RA 2013)	0.1 % to 10 %
		Compressive Strength, % of control sample	IS 9103: 1999 (RA 2013) IS 516: 1959 (RA 2013)	80 % to 150 %
2.	<b>Coarse Aggregate</b>	Sieve analysis	IS 2386 (Part 1): 1963 (RA 2016)	1 % to 100% (4.75 mm to 80 mm)
		Flakiness Index	IS 2386 (Part 1): 1963 (RA 2016)	1 % to 70 %
		Elongation Index	IS 2386 (Part 1): 1963 (RA 2016)	1 % to 70 %
		Specific Gravity	IS 2386 (Part 3): 1963 (RA 2016)	1.5 to 4.0
		Bulk Density	IS 2386 (Part 3): 1963 (RA 2016)	(1.0 to 3.0) kg/l
		Water absorption	IS 2386 (Part 3): 1963 (RA 2016)	1 % to 10 %
		Crushing Value	IS 2386 (Part 4): 1963 (RA 2016)	1 % to 60 %
		Impact Value	IS 2386 (Part 4): 1963 (RA 2016)	1 % to 50 %
		Los Angeles Abrasion value	IS 2386 (Part 4): 1963 (RA 2016)	1 % to 60 %
		10 % Fines Value	IS 2386 (Part 4): 1963 (RA 2016)	(1 to 400) KN
3.	<b>Fine Aggregate</b>	Material finer than 75 micron sieve	IS 2386 (Part 1): 1963 (RA 2016)	0.1 % to 5 %
		Clay lumps	IS 2386 (Part 2): 1963 (RA 2016)	0.1 % to 15 %
		Sieve analysis	IS 2386 (Part 1): 1963 (RA 2016)	1 % to 100 % (75 micron to 10 mm)

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		Specific Gravity	IS 2386 (Part 3): 1963 (RA 2016)	1.5 to 4.0
		Bulk Density	IS 2386 (Part 3): 1963 (RA 2016)	(1.0 to 3.0) kg/l
		Water absorption	IS 2386 (Part 3): 1963 (RA 2016)	1 % to 25 %
		Material finer than 75 micron sieve	IS 2386 (Part 1): 1963 (RA 2016)	0.1 % to 5 %
		Clay lumps	IS 2386 (Part 2): 1963 (RA 2016)	0.1 % to 15 %
4.	<b>Bitumen</b>	Softening Point	IS 1205: 1978 (RA 2014)	25 °C to 150 °C
		Penetration (1/10 mm) Division	IS 1203: 1978 (RA 2014)	10 to 350
		Ductility	IS 1208: 1978 (RA 2014)	1 cm to 100 cm
		Specific gravity	IS 1202: 1978 (RA 2014)	0.99 to 2.0
		Flash Point	IS 1448 (Part 69): 2013	25 °C to 400 °C
		Solubility in Trichloroethylene/ Carbon disulphide	IS 1216: 1978 (RA 2014)	95 % to 100 %
5.	<b>Bitumen Emulsion</b>	Residue on 600 micron IS sieve % by mass	IS 8887: 2004 (RA 2014), Annexure B	0.001 % to 0.1 %
		Viscosity by Saybolt furol Viscometer	IS 3117: 2004 (RA 2014)	10 s to 500 s
6.	<b>Bituminous Material</b>	Marshall Stability	ASTM D 6927: 2006	0.1 KN to 25 KN
		Marshall Flow	ASTM D 6927: 2006	0.1 mm to 6.0 mm
		Binder content	ASTM D 2172: 2017	1 % to 8 %
		Density	ASTM D 2726: 2014	1 g/cc to 3 g/cc
7.	<b>Burnt Clay Bricks and Fly Ash Bricks</b>	Compressive strength	IS 3495 (Part 1): 1992 (RA 2011)	1 N/mm <sup>2</sup> to 20 N/mm <sup>2</sup>
		Efflorescence	IS 3495 (Part 3): 1992 (RA 2011)	Qualitative (Visual Observation)
		Water absorption	IS 3495 (Part 2): 1992 (RA 2011)	1 % to 40 %

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8.	Cement (OPC / PPC)	Dimensions:	IS 1077: 1992 (RA 2011)			
		Length		Upto 5000 mm		
		Width		Upto 3000 mm		
				Height		Upto 2000 mm
				Consistency	IS 4031 (Part 4): 1988 (RA 2016)	25 % to 40 %
				Initial Setting Time	IS 4031 (Part 5): 1988 (RA 2014)	(30 to 400) minutes
				Final Setting time	IS 4031 (Part 5): 1988 (RA 2014)	(30 to 600) minutes
				Compressive strength	IS 4031 (Part 6): 1988 (RA 2014)	(10 to 80) N/mm <sup>2</sup>
9.	Hardened Concrete	Soundness By Le-Chatelier method	IS 4031 (Part 3): 1988 (RA 2014)	0.05 mm to 10 mm		
		Soundness By Autoclave method	IS 4031 (Part 3): 1988 (RA 2014)	0.01 % to 10 %		
		Fineness by dry sieving (% retained)	IS 4031 (Part 1): 1988 (RA 2014)	0.1 % to 50 %		
		Fineness by Blaine Air permeability	IS 4031 (Part 2): 1999 (RA 2013)	(100 to 600) m <sup>2</sup> /kg		
		Compressive Strength	IS 516: 1959 (RA 2008)	(10 to 80) N/mm <sup>2</sup>		
		10.	Concrete Hollow/ Solid Block	Density	IS 2185 (Part I): 2005 (RA 2010)	(500 to 3000) kg/m <sup>3</sup>
				Water Absorption	IS 2185 (Part I): 2005 (RA 2010)	0.5 % to 50 %
		Compressive Strength	IS 2185 (Part I): 2005 (RA 2010)	(1 to 30) N/mm <sup>2</sup>		
11.	Paver Block	Compressive Strength	IS 15658: 2006 (RA 2016)	(5 to 100) N/mm <sup>2</sup>		
		Water Absorption	IS 15658: 2006 (RA 2016)	0.5 % to 20 %		
		Abrasion Resistance	IS 15658: 2006 (RA 2016)	(100 to 15000) mm <sup>3</sup> per 5000 mm <sup>2</sup>		
		Visual inspection	IS 15658: 2006 (RA 2016)	Qualitative		

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		Dimension:	IS 15658: 2006 (RA 2016)	
		Length, L		100 mm to 500 mm
		Width, W		100 mm to 500 mm
		Thickness, T		50 mm to 120 mm
		Aspect Ratio, (L/T)	IS 15658: 2006 (RA 2016)	1 to 10
		Arris/ Chamfer (Depth)	IS 15658: 2006 (RA 2016)	1 mm to 10 mm
		Arris/ Chamfer (Width)	IS 15658: 2006 (RA 2016)	1 mm to 10 mm
		Thickness of Wearing layer	IS 15658: 2006 (RA 2016)	1 mm to 100 mm
		Plan Area, Asp	IS 15658: 2006 (RA 2016)	0.001 m <sup>2</sup> to 10 m <sup>2</sup>
		Wearing face area, Asw	IS 15658: 2006 (RA 2016)	10 % to 100 %
		Squareness	IS 15658: 2006 (RA 2016)	1 mm to 50 mm
		Tensile Splitting strength	IS 15658: 2006 (RA 2016)	(0.1 to 15) N/mm <sup>2</sup>
		Flexural Strength/ Breaking load	IS 15658: 2006 (RA 2016)	(0.1 to 15) N/mm <sup>2</sup>
		Freeze-Thaw Durability	IS 15658: 2006 (RA 2016)	0.001 % to 100 %
12.	AAC Block	Dimensions:	IS 2185 (Part 3): 1984 (RA 2010)	
		Length		100 mm to 1000 mm
		Width		100 mm to 1000 mm
		Height		50 mm to 1000 mm
		Bulk density	IS 6441 (Part 1): 1972 (RA 2017)	(100 to 1000) kg/m <sup>3</sup>
		Compressive Strength	IS 6441 (Part 5): 1972 (RA 2017)	(0.5 to 20) N/mm <sup>2</sup>
		Drying Shrinkage	IS 6441 (Part 2): 1972 (RA 2017)	0.001 % to 0.50 %
13.	Fly Ash	Fineness (Specific Surface Blaine's)	IS 1727: 1967 (RA 2013)	(100 to 1000) m <sup>2</sup> /kg
		Comparative compressive strength at 28 days	IS 1727: 1967 (RA 2013)	20 % to 100 %
		Soundness (by Autoclave)	IS 1727: 1967 (RA 2013)	0.01 % to 10 %

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		Particle retained on 45 micron sieve (wet sieving)	IS 1727: 1967 (RA 2013)	1 % to 100 %
14.	Pozzolanic Materials (Silica Fumes)	Compressive Strength at 7 days as % of control sample	IS 1727: 1967 (RA 2013)	50 % to 100 %
		Material retained on 45 micron IS sieve	IS 1727: 1967 (RA 2013)	0.1 % to 100 %
15.	Concrete Flooring Tiles	Dimensions: Length Width Thickness	IS 1237: 2012 (RA 2016)	100 mm to 500 mm 100 mm to 500 mm 5 mm to 35 mm
		Water Absorption	IS 1237: 2012 (RA 2016)	1 % to 25 %
		Resistance to wear (Abrasion)	IS 1237: 2012 (RA 2016)	0.1 mm to 5 mm
		Wet Transverse Strength	IS 1237: 2012 (RA 2016)	(1 to 10) N/mm <sup>2</sup>
16.	Ceramic Tiles/ Vitrified Tiles	Water Absorption	IS 13630 (Part 2): 2006 (RA 2016)	0.5 % to 25 %
		Hardness by Moh's scale	IS 13630 (Part 13): 2006 (RA 2016)	1 to 9
		Bulk density	IS 13630 (Part 2): 2006 (RA 2016)	1.5 g/cc to 2.5 g/cc
		Breaking Strength	IS 13630 (Part 6): 2006 (RA 2016)	10 N to 5000 N
		Modulus of Rupture	IS 13630 (Part 6): 2006 (RA 2016)	(1.5 to 70) N/mm <sup>2</sup>
<b>II.</b>	<b>MECHANICAL PROPERTIES OF METALS</b>			
1.	HT Stand Wire	Breaking Load	IS 14268: 1995 IS 1608: 2005 (RA 2006)	100 KN to 900 KN
		0.2% Proof Load	IS 1608: 2005 (RA 2006)	100 KN to 700 KN
		Mass	IS 14268: 1995 (RA 2013)	0.5 kg/m to 5 kg/m



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2.	<b>Reinforcement Steel / Structural Steel/ Hollow Steel/ Steel Tube</b>	Yield Stress	IS 1608: 2005 (RA 2011) IS 1786: 2008 (RA 2013)	(100 to 850) N/mm <sup>2</sup>
		Ultimate Tensile Strength	IS 1608: 2005 (RA 2011) IS 1786: 2008 (RA 2013)	(100 to 850) N/mm <sup>2</sup>
		Elongation	IS 1608: 2005 (RA 2011)	10 % to 50 %
		Re-bend Test	IS 1786: 2008 (RA 2013)	Qualitative [Mandrel size: (70, 72, 80, 120, 125, 140, 150, 160, 168, 175, 192, 196, 224) mm]
		Bend Test	IS 1599: 2012 (RA 2015)	Qualitative [Mandrel size: (32, 40, 48, 50, 56, 60, 64, 80, 84, 96, 100, 112, 128) mm]
		Mass per meter	IS 1786: 2008 IS 1161: 2014 IS 1239 (Part 1): 2004 IS 4923: 1997	0.1 kg/m to 10 kg/m
		Dimensions	IS 1161: 2014 IS 1239 (Part 1): 2004 IS 4923: 1997	1 mm to 500 mm
		Hydrostatic Pressure test	IS 1239 (Part 1): 2004	Qualitative (Visual Examination)
<b>III.</b>	<b>SOIL AND ROCK</b>			
1.	<b>Clays &amp; Soil</b>	Grain Size Analysis	IS 2720 (Part 4): 1985 (RA 2015)	1 % to 100 % (75 micron to 40 mm)
		Liquid Limit	IS 2720 (Part 5): 1985 (RA 2015)	18 % to 80 %
		Plastic Limit	IS 2720 (Part 5): 1985 (RA 2015)	10 % to 60 %

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		Light compaction	IS 2720 (Part 7): 1980 (RA 2011)	MDD: (1 to 3) g/cc OMC: 1 % to 40 %
		Heavy compaction	IS 2720 (Part 8): 1983 (RA 2015)	MDD: (1 to 3) g/cc OMC: 1 % to 40 %
		California Bearing ratio	IS 2720 (Part 16): 1987 (RA 2011)	1 % to 100 %
		Direct shear test	IS 2720 (Part 13): 1986 (RA 2015)	C: (0.01 to 0.40) kg/cm <sup>2</sup> Φ: 10 <sup>0</sup> to 50 <sup>0</sup>
		Free Swell Index	IS 2720 (Part 40): 1977 (RA 2011)	Upto 70 %
2.	Stone (Granite, Kota Lime, Marble)	Water Absorption	IS 1124: 1974 (RA 1993)	0.01 % to 20 %
		Compressive strength	IS 1121 (Part 1): 2013	(100 to 5000) kg/cm <sup>2</sup>
		Hardness	IS 13630 (Part 13): 2006 (RA 2016)	1 to 9
		Specific Gravity	IS 1122: 1974 (RA 2003)	2.0 to 5.0
IV.	WOOD AND WOOD PRODUCTS			
1.	Timber	Moisture Content	IS 11215: 1991 (RA 2010)	1 % to 40 %
		Density	IS 1708: 1986 (RA 2010)	(400 to 2000) kg/m <sup>3</sup>

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**NON – DESTRUCTIVE TESTING**

I.	<b>BUILDING MATERIALS - REINFORCED CONCRETE STRUCTURES</b>			
1.	<b>Reinforced Concrete Structures</b>	Ultrasonic Pulse Velocity Test	IS 13311 (Part 1): 1992 (RA 2008)	0.1 km/s to 6 km/s
		Rebound Hammer Test	IS 13311 (Part 2): 1992 (RA 2008)	Rebound no.: 20 to 100

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