

Laboratory **Mananda Test House, Dhanauni Road, Derabassi, Distt. Mohali, Punjab**

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

Certificate Number **TC-7637 (in lieu of T-1454, T-1455)**

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Validity **05.09.2018 to 04.09.2020**

Last Amended on **12.02.2019**

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CHEMICAL TESTING

I	METALS & ALLOYS			
1	Carbon steel	Carbon Sulphur Phosphorus Manganese Silica	IS 228 (Part 1)-1987,RA 2018 IS 228 (Part 9)-1989,RA 2014 IS 228 (Part 3)-1987,RA 2018 IS 228 (Part 2)-1987,RA 2018 IS 228 (Part 8)-1989,RA 2014	0.10% to 0.40% 0.005% to 0.20% 0.005% to 0.20% 0.10% to 1.0% 0.05% to 0.50%
II.	BUILDING MATERIALS			
1	Cement	Insoluble residue OPC PPC Magnesia SO ₃ Loss on ignition CaO SiO ₂ Fe ₂ O ₃ Al ₂ O ₃ Chloride Alkali content (% by mass) as Na ₂ O Na ₂ O K ₂ O	IS 4032-1985, RA 2009 IS 4032-1985, RA 2009 IS 4032-1985, RA 2009 IS 4032-1985, RA 2009 IS 4032-1985, RA 2009 IS 4032-1985, RA 2009 IS 4032-1985, RA 2009 IS 4032-1985, RA 2009 IS 4032-1985, RA 2009 IS 4032-1985, RA 2009	0.2% to 8% 2 %to 35% 1.0% to 8% 0.5% to 4% 1.0% to 10% 35% to 65% 10% to 40% 2.5% to 6.0% 4.0% to 15% 0.004 % to 1.0% 0.02% to 1.0% 0.02% to 1.0%
2	Aggregate	pH value Alkali aggregate reactivity Water Soluble Chloride content Total Sulphate content (as SO ₃)	IS 2720 (Part 26)-1987, RA 2011 IS 2386 (Part 7)-1963, RA 2016 IS 14959 (Part-2): 2001, RA 2016 IS 4032-1985, RA 2009	2 to 12 Rc = 5.0 to 300, Sc = 2.0 to 100 millimoles/ltrs 0.001% to 1.0% 0.003% to 5.0%

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3	Fly ash	Loss on ignition Silica (as SiO ₂) Combined Ferric oxide & Alumina Calcium oxide (CaO) Magnesia (MgO) Sulphuric Anhydride (SO ₃) Available Alkalies as Sodium oxide (as Na ₂ O) Total chloride (Cl)	IS 1727-1967, RA 2008 IS 1727-1967, RA 2008 IS 1727-1967, RA 2008 IS 1727-1967, RA 2008 IS 1727-1967, RA 2008 IS 1727-1967, RA 2008 IS 3812 (Part-1): 2013 IS 4032-1985, RA 2009	0.1% to 20% 20% to 65% 1% to 50% 0.1% to 20% 0.1% to 10% 0.1% to 10% 0.02% to 2% 0.004% to 5%
4	Admixture	pH value Dry material content Ash content Relative density Chloride content	IS 9103-1999, RA 2013 IS 9103-1999, RA 2013 IS 9103-1999, RA 2013 IS 9103-1999, RA 2013 IS 6925-1973, RA 2008	2 to 12 1 % to 60% 0.50% to 25% 1.0 to 2.0 0.007% to 1.0%
5	Bitumen & Bituminous products	Specific gravity Absolute viscosity Kinematic viscosity Flash & fire point Solubility in trichloroethylene Depth of Penetration Softening point Separation, Difference in softening point R & B Test on residue from thin film oven tests/RTFOT Ductility Loss in weight Increase in softening point	IS 1202-1978, RA 2009 IS 1206 (Part II)-1978, RA 2009 IS 1206 (Part III)-1978, RA 2009 IS 1448 (Part 69): 2013 IS 1216-1978, RA 2009 IS 1203-1978, RA 2009 IS 1205-1978, RA 2009 IRC: SP: 53-2010 IS 1208-1978, RA 2009 IS 9382-1979, RA 2009 IS 1205-1978, RA 2009	0.90 to 1.10 600 to 5000 poises 100 cSt to 1000 cSt 100 °C to 345°C 50% to 100% 5.0 to 150 Tenths of mm 20 °C to 100°C 1.0 °C to 10°C 2 cm to 100 cm 0.10% to 5% 1.0 °C to 15 °C

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		Reduction in penetration of residue	IS 1203-1978, RA 2009	1.0 %to 50%
		Elastic recovery of half thread in ductilometer	IRC: SP: 53-2010	1.0% to 90%
		Bitumen binder content	IRC: SP:11-1997,Appendix 5	0.4% to 10%
6	Bitumen Emulsion	Viscosity by saybolt furol viscometer	IS 3117: 2004, RA 2009	10 sec to 400 sec
		Residue on 600micron	IS 8887: 2017	0.01% to 25%
		Coagulation of emulsion	IS 8887: 2017	Qualitative
		Storage stability after 24h	IS 8887: 2017	0.1% to 5%
		Miscibility with water	IS 8887: 2017	Qualitative
		Stability to mixing with cement	IS 8887: 2017	Qualitative
		Tests on residue		
		Residue by evaporation	IS 8887: 2017	10 %to 70%
		Depth of Penetration	IS 1203: 1978 RA 2009	10 to 200 Tenths of mm
		Ductility	IS 1208: 1978 RA 2009	20 cm to 100cm
		Solubility in trichloroethylene	IS 1216: 1978 RA 2009	85 %to 100%
III	METALLIC COATING & TREATMENT SOLUTIONS			
1	Anodizing solutions	Mass of zinc coating Anodic coating (Stripping method)	IS 6745-1972, RA 2016 IS 5523: 1983, RA 2016	10 g/m ² to 2000 g/m ² 2.5 µm to 25 µm
IV	SOIL & ROCK			
1	Clays & Soils	Total soluble sulphate	IS 2720 (Part 27)-1977, RA 2015	0.005 g/kg to 1.5 g/kg
		Chloride content	IS 4032-1985, RA 2009	0.004 % to 1.0%
		pH value	IS 2720 (Part 26)-1987, RA 2011	2 to 12

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V	WATER			
1	Construction water	Alkalinity (Volume of 0.02 N- H ₂ SO ₄ to neutralize 100 ml of water) Acidity (Volume of 0.02 N- NaOH to neutralize 100 ml of water). Organic Inorganic Chloride Sulphate Suspended solids pH	IS 456: 2000, RA 2016 IS 456: 2000, RA 2016 IS 3025 (Part 18)-1984, RA 2017 IS 3025 (Part 18)-1984, RA 2017 IS 3025 (Part 32)-1988, RA 2014 IS 3025 (Part 24)-1986, RA 2014 IS 3025 (Part 17)-1984, RA 2017 IS 3025 (Part 11)-1983, RA 2017	1 ml to 75 ml 0.10 ml to 50ml 1.0 mg/l to 1000 mg/l 5.0 mg/l to 6000mg/l 5.0 mg/l to 1000mg/l 5.0 mg/l to 1000mg/l 1.0 mg/l to 5000mg/l 2 to 12

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<u>MECHANICAL TESTING</u>				
I.	MECHANICAL PROPERTIES OF METALS			
1.	Ferrous Materials, Alloys & Products	Weight per meter Tensile strength Yield stress Elongation Bend test Rebend test	IS 1786: 2008, RA 2008/ IS 2062-2011, RA 2016 IS 1608: 2005, RA 2011 IS 1608: 2005, RA 2011 IS 1608: 2005, RA 2011 IS 1599: 2012, RA 2015 IS 1786: 2008, RA 2008	0.08 kg to 100kg 50 N/mm ² to 1000N/mm ² 50 N/mm ² to 800 N/mm ² 5 to 50% Qualitative (Mandrel dia 8, 10, 11, 12, 14, 16, 18, 20, 24, 30, 32, 36, 40, 48, 50, 60, 64, 75, 80, 84, 96, 100, 108, 112, 120, 125, 128, 140, 144, 150, 160, 168, 180, 192, 200, 216, 240mm) Qualitative (Mandrel dia 24, 30, 32, 36, 40, 42, 48, 50, 56, 60, 70, 72, 84, 96, 112, 120, 128, 140, 150, 160, 168, 175, 192, 196, 200, 216, 224, 240, 252, 256, 280, 288, 320mm)

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2.	Weld & welded test specimens	Tensile strength Bend tests	IS 7307: 1974, RA 2008 & ASME Sec-IX IS 7307: 1974, RA 2008 & ASME Sec-IX	50N/mm ² to 1000N/mm ² Qualitative (Mandrel dia 8, 10, 11, 12, 14, 16, 18, 20, 24, 30, 32, 36, 40, 48, 50, 60, 64, 75, 80, 84, 96, 100, 108, 112, 120, 125, 128, 140, 144, 150, 160, 168, 180, 192, 200, 216, 240mm)
II	BUILDING MATERIAL			
1	Cement	Fineness • Dry Sieving • Blaine air permeability Soundness • Le-chatelier • Auto clave Initial Setting time Final Setting time Compressive strength Consistency Density	IS 4031(P-1): 1996, RA 2016 IS 4031 (P-2)-1999, RA 2013 IS 4031 (P-3)-1988, RA 2014 IS 4031 (P-3)-1988, RA 2014 IS 4031 (P-5)-1988, RA 2014 IS 4031 (P-5)-1988, RA 2014 IS 4031 (P-6)-1988, RA 2014 IS 4031 (P-4): 1988, RA 2014 IS 4031 (P-11):1988,RA 2009	0.1 % to 10% 100 m ² /kg to 450 m ² /kg 0.5 mm to 15mm 0.01 to 0.5% 5minutes to 800minutes 5minutes to 800minutes 10 MPa to 80 MPa 10% to 40% 1.5 g/cc to 3.5 g/cc

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2	Bricks	Dimensions Compressive strength Water absorption Efflorescence Warpage	IS 1077:1992, RA 2011 IS 3495 (P-1)-1992, RA 2011 IS 3495 (P-2)-1992, RA 2011 IS 3495 (P-3)-1992, RA 2011 IS 3495 (P-4)-1992, RA 2011	10 mm to 5000 mm 3.5 MPa to 35 MPa 2 %to 40% Qualitative 0 to 6mm
3	Pre-Casted Blocks (Paver block)	Compressive strength Water absorption Abrasion resistance Visual Inspection Dimensions: Width Length Thickness Aspect Ratio Arris/ Chamfer Thickness of wearing layer Plan Area Wearing Face Area Squareness Tensile Splitting Strength/ Failure load per unit length Flexural Strength/ Breaking Load Freeze-Thaw Durability Colour and Texture	IS 15658: 2006, RA 2017 IS 15658: 2006, RA 2017 IS 15658:2006, RA 2017 IS 15658:2006, RA 2017 IS 15658:2006, RA 2017 IS 15658:2006, RA 2017 IS 15658:2006, RA 2017 IS 15658:2006, RA 2017 IS 15658:2006, RA 2017	3 MPa to 80MPa 0.5% to 15% 2000 mm ³ to 50000 mm ³ /5000mm ² Qualitative (Visual) 10 mm to 300mm 10 mm to 300mm 10 mm to 150mm 1 to 8 0.1 mm to 15.0mm 0.5 mm to 30mm 0.010 m ² to 0.050 m ² 60 %to 100 % 0.05 mm to 10 mm 0.5 N/mm ² to 10.0 N/mm ² / 90 N/mm to 920 N/mm 0.5 to 15 N/mm ² / 900 to 16000 N 0.01 to 10.00% Qualitative (Visual)
4	Concrete	Compressive strength slump	IS 516-1959(RA 2013) IS 1199-1959(RA 2013)	10 MPa to 75 MPa 5.0 mm to 300mm

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5	Coarse aggregate	Sieve analysis Impact value Crushing value Flakiness index Elongation index Abrasion value Specific gravity Water absorption Bulk density Soundness Deleterious material 10% fine value Combined flakiness & elongation index	IS 2386 (Part 1)1963,RA 2016 IS 2386 (Part 4)1963,RA 2016 IS 2386 (Part 4)1963,RA 2016 IS 2386 (Part 1)1963,RA 2016 IS 2386 (Part 1)1963,RA 2016 IS 2386 (Part 4)1963,RA 2016 IS 2386 (Part 3)1963,RA 2016 IS 2386 (Part 3)1963,RA 2016 IS 2386 (Part 3)1963,RA 2016 IS 2386 (Part 5)1963,RA 2016 IS 2386 (Part 2)1963,RA 2016 IS 2386 (Part 4)1963,RA 2016 IS 2386 (Part 1)1963,RA 2016 IS 383 : 2016	0.1 % to 100% (Sieve size 10 to 80mm) 5 %to 60% 5% to 50% 1% to 50% 1% to 50% 5% to 60 % 1.5 to 3.50 0.1 %to 10% 1.00 kg/ltr to 3.00 kg/ltr 0.1% to 30 % 0.02% to 50% 5 to 60 Tonnes 1.0 % to 60%
6	Fine aggregate	Sieve analysis Specific gravity Water absorption Bulk density Soundness Deleterious material Organic impurities Measuring mortar making properties of fine aggregate	IS 2386 (Part)1963,RA 2016 IS 2386 (Part 3)1963,RA 2016 IS 2386 (Part 3)1963,RA 2016 IS 2386 (Part 3)1963,RA 2016 IS 2386 (Part 5)1963,RA 2016 IS 2386 (Part 2)1963,RA 2016 IS 2386 (Part 2)1963,RA 2016 IS: 2386(Part-6)1963,RA 2016	0.1% to 100% (Sieve size 4.75 to 0.075mm) 1.5 to 3.50 & 0.1% to 10% 1.00 kg/ltr to 3.00 kg/ltr 0.1 to 30 % 0.02% to 50% Qualitative 75% to 100%

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7	Tiles Chequered cement concrete tiles	Dimension Flatness of the tile surface Perpendicularity Straightness Water absorption Thickness of wearing layer Resistance to wear Wet Transverse Strength	IS 13801-2013	10 mm to 350mm (Length, Width & Thickness) 0.05 mm to 3mm 0 to 3% 0 to 3% 1% to 30% 1 mm to 15mm 1 mm to 10mm 1 N/mm ² to 10 N/mm ²
8	Tiles Cement concrete flooring tiles (Plain cement/Plain coloured/Terrazzo)	Dimension Flatness of the tile surface Perpendicularity Straightness Water absorption Thickness of wearing layer Resistance to wear Wet Transverse Strength	IS 1237-2012, RA 2016	10 to 350mm(Length, Width & Thickness) 0.05 to 3mm 0 to 3% 0 to 3% 1 to 30% 1 to 15mm 1 to 10mm 1 to 10 N/mm ²
9	Fly ash	Fineness (By Blaine air	IS 1727-1967, RA 2008	100 m ² /kg to 800 m ² /kg

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		permeability) Soundness by Autoclave Density Particle retained on 45 micron Lime reactivity-Av. compressive Strength, MPa Compressive strength at 28 days	IS 4031 (P-3)-1988, RA 2014 IS 4031 (P-11):1988, RA 2009 IS 1727-1967, RA 2008 IS 1727-1967, RA 2008 IS 1727-1967, RA 2008	0.01% to 0.5% 1 g/cc to 3 g/cc 1 % to 70% 2 MPa to 10MPa 200 kg/cm ² to 410 kg/cm ²
III	SOIL AND ROCK			
1	Clays & Soils (Soil, Granular material & Bentonite clay)	Liquid limit Plastic limit Plasticity index Light compaction test MDD/OMC Heavy compaction test MDD/OMC CBR (Soaked) Water content Specific gravity (fine grained) Grain size distribution Unconfined compressive strength Free swell index	IS 2720 (P-5)-1985, RA 2015 IS 2720 (P-5)-1985, RA 2015 IS 2720 (P-5)-1985, RA 2015 IS 2720 (P-7)-1980, RA 2011 IS 2720 (P-8)-1983, RA 2015 IS 2720 (P-16)-1987, RA 2011 IS 2720 (P-2)-1973, RA 2015 IS 2720 (P-3/Sec-1)1980, RA 2011 IS 2720 (P-4)-1985, RA 2015 IS 2720 (P-10)-1991, RA 2010 IS 2720 (P-40)-1977, RA 2011	18 %to 500% 01% to 300% 1% to 200% 1.0 g/cc to 3.0 g/cc 3% to 20 % 1.0 g/cc to 3.0 g/cc 2% to 20% 0.2% to 80% 0.5% to 30% 1.5 to 4.0 0.1% to 100% 0.1 kg/cm ² to 18 kg/cm ² 10.0% to 2500%

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		Shrinkage factors	IS 2720 (P-6)-1972, RA 2011	10.0% to 50%
		Direct shear test <ul style="list-style-type: none">• C-value• ϕ value	IS 2720 (P-13)-1986, RA 2015	0.00 to 5.0kg/cm ² 5 ⁰ to 50 ⁰