

Laboratory

Radhey Testing & Consultants Pvt. Ltd., B-363, Kalindi Vihar, Agra, Uttar Pradesh

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

TC-7475

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Validity

22.06.2018 to 21.06.2020

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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.	WATER			
1.	Water (for construction purpose)	pH Value	IS 3025-(Part 11)	2 to 12
		Chloride	IS 3025-(Part 32)	10 mg/l to 1000 mg/l
		Sulphate	IS 3025-(Part 24)	10 mg/l to 1000 mg/l
		Total Suspended Matter (Total Suspended Solids)	IS 3025- (Part 17)	5 mg/l to 1000 mg/l
		Acidity	IS 3025- (Part 23) (ml of 0.02 'N' NaOH used to neutralize the 100 ml of the water sample)	2 ml to 5 ml
		Alkalinity	IS 3025- (Part 22) (ml of 0.02 'N' H <sub>2</sub> SO <sub>4</sub> used to neutralize the 100 ml of the water sample)	5 ml to 25 ml
		Organic Solids	IS 3025- (Part 18)	2 mg/l to 1000 mg/l
	Inorganic Solids	IS 3025- (Part 16)	10 mg/l to 3000 mg/l	
II.	METAL & ALLOYS			
1.	Plain Carbon & Alloy Steels/ Crash Barrier	Carbon (C)	IS 228-(Part 1)	0.1 % to 1.5 %
		Sulphur (S)	IS 228-(Part 9)	0.01 % to 0.5 %
		Phosphorous (P)	IS 228-(Part 3)	0.01 % to 0.5 %
		Manganese	IS 228-(Part 2)	0.5 % to 0.8 %
III.	BUILDING MATERIAL			
1.	Cement (OPC and PPC)	Insoluble Residue	IS 4032	0.5 % to 35 %
		Silica (SiO <sub>2</sub> )	IS 4032	18 % to 35 %
		Loss on Ignition	IS 4032	1 % to 6 %
		Chloride	IS 4032	0.01 % to 0.15 %

Ramprasath. R  
Convenor

Jitendra B. Vispute  
Program Manager

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		Magnesia	IS 4032 4.8.2 EDTA Method	1.5 % to 7.0 %
		Total Lime (CaO)	IS 4032 4.7.2 EDTA Method	40 % to 70 %
		Alumina(Al <sub>2</sub> O <sub>3</sub> )	IS 4032 4.6.1 Gravimetric Method	2 % to 10 %
		Iron Oxide(Fe <sub>2</sub> O <sub>3</sub> )	IS 4032 4.5.2 EDTA method	2 % to 5 %
		Sulphuric Anhydride(SO <sub>3</sub> )	IS 4032	1 % to 4 %
2.	Admixture	pH value	IS 9103	2 to 12
		Relative density	IS 9103	1 g/cc to 1.5 g/cc
		Chloride ion content	IS 6925	0.01 % to 1.0 %
		Dry material content	IS 9103	5 % to 40 %
		Ash content	IS 9103	5 % to 40 %
		Calcium Carbonate	IS 2720 (Part 23)	0.05 % to 15 %
3.	Fly ash	Soluble Salts	IS 1727	0.1 % to 0.2 %
		Total Sulphate as Sulphuric anhydride (SO <sub>3</sub> )	IS 1727	0.01 % to 1.0 %
		Total Soluble Chlorides	IS 4032	0.01 % to 0.2 %
4.	Aggregates	Potential Reactivity(Alkali Aggregate Reactivity)	IS 2386(Part 7) (Clause-3) (by Chemical Method)	
		Dissolved Silica	(Clause 3.7) (Gravimetric)	(2 to 500) milimoles/L
		Reduction in Alkalinity	(Clause 3.9)	(50 to 500) milimoles/L
		Water Soluble Sulphate	BS EN 1744-1	0.05 % to 5 %
		Water Soluble Chloride	BS EN 1744-1	0.01 % to 2 %
IV.	SOIL AND ROCK			
1.	Soil	pH Value	IS 2720 (Part 26)	1 to 14
		Soluble Sulphate	IS 2720 (Part 27) BS:1377 (Part 3)	0 .01 % to 2 %
		Soluble Chlorides	IS 2720 (Part 27) BS:1377 (Part 3)	0 .01 % to 0.4 %

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		Organic Matters	IS 2720 (Part 22)	0.5 % to 10 %
		Soluble Solids	IS 2720 (Part 21)	0.1 % to 10 %
V.	PAINTS			
1.	Thermoplastic Road Marking Paint	Titanium Dioxide (TiO <sub>2</sub> )	ASTM D 4797	5 % to 80 %
		Fillers(CaCo <sub>3</sub> ) (Pigments + Beads)	ASTM D 4797	10 % to 80 %

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**MECHANICAL TESTING**

I.	SOIL AND ROCK			
1.	Soil (Sub Grade)	Liquid Limit	IS 2720 (Part 5)	10 % to 80 %
		Plastic Limit	IS 2720 (Part 5)	5 % to 50 %
		Shrinkage Limit	IS 2720 (Part 6)	1 % to 50 %
		Heavy Compaction OMC/MDD	IS 2720 (Part 8)	1.5 gm/cc to 2.5 gm/cc 1 % to 18 %
		Light Compaction OMC/MDD	IS 2720 (Part 7)	1.0 g/cc to 2.5 g/cc 1 % to 18 %
		Moisture content	IS 2720 (Part 2)	1 % to 30 %
		Tri axial shear Test	IS 2720(Part 11)	$\phi=5^{\circ}$ to $50^{\circ}$ $c=0$ to 2 kg/cm <sup>2</sup>
		Consolidation Test	IS 2720(Part 15)	$0.1 \times 10^{-3}$ to $8.0 \times 10^{-5}$ cm <sup>2</sup> /s
		Free Swell Index	IS 2720 (Part 40)	5 % to 70 %
		Relative Density	IS 2720 (Part 14)	10 % to 90 %
		Grain size Analysis	IS 2720 (Part 4)	0.075mm to 2 mm
		California Bearing Ratio (C.B.R.)	IS 2720 (Part 16)	3 % to 60 %
		Direct Shear Test	IS 2720(Part 13)	$C= 0$ to 1kg/cm <sup>2</sup> $\phi =5^{\circ}$ to $50^{\circ}$
		Coefficient of Interface Friction	IS 13326 (Part 1)	$1^{\circ}$ to $50^{\circ}$
		Permeability		
		Coefficient of Permeability	IS 2720(Part 36)	(10 to 50) m/day
		Coefficient of Permeability	IS 2720(Part 36)	(0 to 2) cm/s
		Void Ratio-e	IS 2720(Part 36)	(0.1 to 1.5)
		Standard Penetration Test (Soil Investigation Test)	IS 2131	N Value (1 to 100)
		Dry Density- Core Cutting Method	IS 2720 (Part 29)	1 g/cc to 3 g/cc

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		Dry Density- Sand Replacement Method	IS 2720 (Part 28)	1 g/cc to 3 g/cc
		Plate Load Test	IS 1888	200 kN to 5000 kN
		K-Value Test	IS 9214	(3 to 8) kg/cm <sup>2</sup> /cm
		Ev2 Test	DIN:18134	(15 to 90) MN/m <sup>2</sup>
2.	Rock	Unconfined Compressive Strength	IS 9143	50 MPa to 300 MPa
		Bulk Density	IS 13030	1 g/cc to 3.0 g/cc
		Moisture Content	IS 13030	1 % to 3.0 %
		Specific Gravity	IS 13030	1 to 3.0
		Water Absorption	IS 13030	1 % to 3.0 %
		Porosity	IS 13030	0.1 to 0.5
		Dry Density	IS 13030	0.8 g/cc to 3 g/cc
		Retained Tensile Strength	AASHTO -T- 283-07	1 % to 100 %
		Cerchar Abrasiveness Index	ASTM D-7625-10	0.5 to 10
		Fractured Faces	ASTM D- 5821:13	1 % to 100 %
II.	<b>BUILDINGS MATERIALS</b>			
1.	Coarse Aggregate	Sieve Analysis	IS 2386(Part 1)	1 % to 100 % Sieve Size:4.75 mm to 125mm
		Specific Gravity	IS 2386(Part 3)	1.0 to 3.0
		Water Absorption	IS 2386(Part 3)	0.1 % to 10 %
		Aggregate Impact Value	IS 2386(Part 4)	5 % to 60 %
		Flakiness Index	IS 2386(Part 1)	5 % to 60 %
		Elongation Index	IS 2386(Part 1)	5 % to 60 %
		Crushing Value	IS 2386(Part 4)	5 % to 60 %
		Los Angle Abrasion Value	IS 2386(Part 4)	5 % to 60 %
		10% fines value	IS 2386(Part 4)	5 Tonne to 40 Tonne
		Bulk Density	IS 2386(Part 3)	1 kg/L to 3 kg/L
		Polished stone value	IS 2386(Part 4) BS:812 (Part 114)	10 % to 80 %

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		Stripping Value of Aggregate	IS 6241	95 % to 98 %
		Soundness(by Na <sub>2</sub> SO <sub>4</sub> )	IS 2386(Part 5)	2 % to 30 %
		Soundness(by MgSO <sub>4</sub> )	IS 2386(Part 5)	2 % to 30 %
		Deleterious Material	IS 2386(Part 2)	0.1 % to 5 %
		Petrographic Examination	IS 2386 (Part 8)	Qualitative
2.	<b>Fine Aggregate</b>	Sieve Analysis	IS 2386(Part 1)	1 % to 100 % Sieve Size:75µm to 4.75mm
		Specific Gravity	IS 2386(Part 3)	1 to 3.0
		Water Absorption	IS 2386(Part 3)	0.2 % to 10 %
		Bulk Density	IS 2386(Part 3)	1 kg/L to 3 kg/L
		Sand equivalent Test	IS 2720(Part 37)	40 % to 85 %
		Soundness(by Na <sub>2</sub> SO <sub>4</sub> )	IS 2386(Part 5)	2 % to 30 %
		Soundness(by MgSO <sub>4</sub> )	IS 2386(Part 5)	2 % to 30 %
		Deleterious Material	IS 2386(Part 2)	0.1 % to 5.0 %
		Mortar Making Properties	IS 2386 (Part 6)	0.1 % to 100 %
3.	<b>Admixture</b>	Water content	IS 2386(Part 3)	10 % to 90 %
		Time of setting	IS 8142	5 Min. to 300 Min.
		Flexural strength	IS 516	10 kg/cm <sup>2</sup> to 100 kg/cm <sup>2</sup>
		Drying Shrinkage	IS 1199	0.01 % to 0.5 %
		Bleeding %	IS 9103	0.1 % to 5 %
		Air content % (by Pressure method)	IS 1199	0.5 % to 5 %
		Dry Material Content	IS 9103	0.5 % to 80 %
		Relative Density	IS 9103	0.5 g/cc to 1.5 g/cc
4.	<b>Thermoplastic Road Marking Material</b>	Binder Content	AASHTO-T- 250-05	0.5 % to 80 %
		Glass Beads Content	AASHTO-T- 250-05	0.5 % to 80 %
		Drying Time	MORTH Spec.	01 min. to 300 min.
		Cracking Resistance	ASHTO- T-249	01 min. to 300 min.
		Softening Point- R&B	ASTM- D 36-09	30 °C to 400 °C
		Flow Resistance	AASHTO- T-250	1 % to 50 %
		Gradation of Glass Beads	AASHTO- T-250	1 % to 100 %
		Roundness-Microscopic	BS:6088	1 % to 100 %

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		Free Flow Test	MORTH Spec.	Qualitative
		Colour	AASHTO - M249-4	Visual
		Luminance %	AASHTO M249-12/ASTM E2302-03	10 % to 98 %
		Skid Resistance	BS- 6044	10 % to 70 %
		Yellowness Index	AASHTO M249-4/ASTM E2302-03	0.02 % to 0.13 %
		Refractive Index	BS- 6088	1.5% to 5.0%
		Coeff. of retro-reflection	ASTM- D1710-11	(1.0 to 1000) mcd/m <sup>2</sup> /lux
5.	Hardened Concrete/ Fresh Concrete	Compressive Strength of concrete	IS 516	0.1 N/mm <sup>2</sup> to 80 N/mm <sup>2</sup>
		Compressive Strength of accelerated cured concrete	IS 516	0.1 N/mm <sup>2</sup> to 80 N/mm <sup>2</sup>
		Flexural Strength	IS 516	0.5 kg/cm <sup>2</sup> to 20 kg/cm <sup>2</sup>
		Slump	IS 1199	1 mm to 300 mm
6.	Bituminous Products (Bitumen PMB/CRMB/NRMB)	Thermal Stability	IS 14982	Qualitative
		Binder Content	ASTM D- 2172,	0.1 % to 9 %
		Specific Gravity	IS 1202	0.5 to 1.5
		Softening Point	IS 1205	15°C to 80°C
		Penetration	IS 1203	30 mm to 225 mm
		Flash point	IS 1209	15°C to 275°C
		Ductility	IS 1208	0.05 m to 1 m
		Viscosity	IS 1206	5 sec to 1200 sec
		Kinematics Viscosity	IS 1206(Pt-3) IS 73	30 cst to 100000 cst
		Absolute Viscosity	IS 1206(Pt-2)	360 poise to 24000 poise
		Elastic Recovery	IS 15462	1 % to 100 %
		Frass Breaking Point	IS 9381	Upto 40 °C
		Separation	IS 15462	0.1 % to 100 %
	Loss on heating	IS 212	0.05 % to 10 %	
	Loss in weight	IS 9382	0.01 % to 10 %	
	Water content	IS 1211	0.1 % to 10 %	
	Mineral Matter (Ash)	IS 1217	0.1 % to 10 %	

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		Marshal Stability	ASTM D-6927	Min 9.0kN
		Flow	ASTM D-6927	Flow 2.0 mm to 4.0 mm
		Thin Film oven Test		
		Increase in softening point	IS 1205	5 % to 10 %
		Reduction in Penetration of residue	IS 1203	30 % to 45 %
		Elastic recovery of half thread in Ductilometer at 25°C	IS 15462	72 % to 90 %
		Viscosity ratio at 60°C	IS 1206	3 to 5
		Ductility at 25°C(cm)	IS 1208	0.4 m to 1 m
		Boiling Water Test	ASTM D-3625	Qualitative
		Pour Point	IS 1448 (Part 10)	0°C to 50°C
		Solubility in HDO	IS 14982	0.1 % to 100 %
		Solubility in LDO	IS 14982	0.1 % to 100 %
		Retained Marshall Stability	IS 14982	0.5 % to 100 %
		Mastic Hardness	IS 1195	Up to 100 %
		Resilient Modulus	IRC:37	500 MPa to 6000 MPa
7.	Bitumen/ Emulsion	Solubility in trichloroethylene	IS 1216	20 % to 100 %
		Distillation in % by volume	ASTM D-244	Up to 100 %
		Residue on 600 Micron sieve	IS 8887	Up to 10 %
		Viscosity by say blot furol viscometer	IS 3117	5 sec. to 500 sec.
		Coagulation of emulsion @ low temperature	IS 8887	Up to 1 %
		Storage stability after 24 hour	IS 8887	Up to 5 %
		Particle charge	IS 8887	(-) to (+)
		Miscibility with water	IS 8887	Qualitative
		Residue by evaporation	IS 8887	10 % to 95 %

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		Ductility	IS 1208	0.05 m to 1 m
		Penetration	IS 1203	10 mm to 100 mm
		Coating ability & water resistance	IS 8887	Qualitative
		Stability to mixing with cement	IS 8887	Up to 10 %
8.	Clay Burnt Bricks/Fly Ash	Water Absorption	IS 3495(Part 2)	1 % to 20 %
		Compressive Strength	IS 3495(Part 1)	3.5 N/mm <sup>2</sup> to 15 N/mm <sup>2</sup>
		Efflorescence	IS 3495(Part 3)	Visual
		Dimension	IS 1077	L=4000 mm to 5000 mm W=2000 mm to 3000 mm H=1000 mm to 2000 mm
9.	Bituminous /concrete road Section	Benkelman Beam Deflection Test (Bituminous Section)/FWD	IRC:81	Up to 15 mm
		Surface evenness of Highway Pavements (Bituminous & Concrete Road)/NSV	IRCSP:16	1500 mm/km to 3500 mm/km
		Bridge Load Test (Bituminous & Concrete Section)	IRCSP:51	50 Tone to 500 Tone
10.	Concrete Structure	Pile Load Test (Concrete Structure) Static Load Test Dynamic Load Test Lateral Load Test Pullout Test	IS 2911 (Part 4)	100 Tone to 2500 Tone NA 1 Tone to 50 Tone 1 Tone to 50 Tone
		Concrete Permeability Test(co-efficient of permeability)	IS 3085	(1x10 <sup>-10</sup> to 3.86x10 <sup>-10</sup> ) m/sec

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11.	Retro reflective Signboards	Coefficient of Retro-reflection	ASTM -E810-03 ASTM -E1709-09	(10 cd to 1000 cd)/ m <sup>2</sup> /lux
12.	Cement- OPC/PPC/PSC	Standard Consistency	IS 4031(Part 4)	10 % to 45 %
		Compressive Strength	IS 4031(Part 6)	10 N/mm <sup>2</sup> to 80 N/mm <sup>2</sup>
		Soundness By Le-Chatelier By Autoclave	IS 4031(Part 3)	0.1 mm to 10 mm 0.01 % to 0.8 %
		Fineness By Blaine Dry Sieving	IS 4031(Part 2) IS 4031 (Part 1)	150 m <sup>2</sup> /kg to 600 m <sup>2</sup> /kg 0.1 % to 10 %
		Setting Time Initial Setting Time	IS 4031(Part 5)	30 min to 300 min
		Setting Time Final Setting time	IS 4031(Part 5)	60 min to 600 min
		Density	IS 4031 (Part 11)	0.5 g/cc to 5.0 g/cc
13.	Bentonite	Moisture	IS 6186	5 % to 12 %
		Fineness	IS 6186	50 % to 98 %
		Sand Content	IS 6186	0.1 % to 2 %
		PH Value	IS 6186	9.0 to 10.5
		Swelling Power	IS 6186	Qualitative
14.	Timber/ Plywood	Moisture Content	IS 1708	0.1 % to 10 %
15.	Curing Compound	Water Retention	ASTM -C 156	0.5 % to 100 %
		Loss of Water In 72 Hrs.	BS:7542	0.15 kg/cm <sup>2</sup> to 0.55 kg/cm <sup>2</sup>
		Curing Efficiency	BS:7542	01 % to 100 %
		Specific Gravity Time	BS:7542	0.7 to 0.90
		Surface Drying Time	ASTM C 309-11	20 min to 600 min
		Day Light reflectance	BS 7542	60 % to 95 %
		Ford Cup (B4) Viscosity	BS:7542	10 seconds to 30 seconds

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<b>III.</b>	<b>MECHANICAL PROPERTIES OF METALS</b>			
<b>1.</b>	<b>Steel Deformed Bars/MBCB Ferrous Materials &amp; Alloys Products</b>	Mass per Unit Length	IS 1786	0.1 kg/m to 10 kg/m
		Tensile Strength	IS 1608	100 N/mm <sup>2</sup> to 700 N/mm <sup>2</sup>
		Yield Stress	IS 1608	100 N/mm <sup>2</sup> to 700 N/mm <sup>2</sup>
		Elongation	IS 1608	1 % to 50 %
		Bend Test	IS 1599	Mandrel Size to mm 24,30,32,36,40,43,48, 60, 80,100,108,112,120, 125,128,140,144,160
		Re-Bend Test	IS 1786	Mandrel Size to mm 24,30,32,36,40,43,48, 60, 80,100,108,112,120, 125,128,140,144,160
<b>2.</b>	<b>Zinc Coated Iron &amp; Steel Articles</b>	Mass of Zinc Coating	IS 6745(Stripping Method)	(550 to 1000) g/sqm
<b>IV.</b>	<b>PERFORMANCE/DURABILITY/ SAFETY TEST</b>			
<b>A.</b>	<b>Industrial Equipments/Instruments/Products</b>			
<b>1.</b>	<b>Bridge Bearings Elastomeric, Pot,Pot-cum-PTFF, Pin &amp; metallic Guide</b>	Shear Modulus	IRC:83 (Part 2)	0.5 MPa to 20 MPa
		Elastic Modulus-Compression Stiffness	IRC:83 (Part 2)	0.5 MPa to 125 MPa
		Stripping/Adhesion Strength-Bond Shear Strength	IRC:83 (Part 2)	Qualitative
		Ultimate Compressive Strength	IRC:83 (Part 2)	5 MPa to 125 MPa
		Load Test-Vertical/Horizontal	IRC:83 (Part 3)	20 kN to 5000 kN
		Friction Test	IRC:83 (Part 3)	Qualitative
		Rotation Test	IRC:83 (Part 3)	Qualitative

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**NON-DESTRUCTIVE TESTING**

I.	BULDING, MATERIALS- REINFORCED CONCRETE STRUCTURES			
1.	Ndt Testing (Concrete Structure)	Rebound Hammer Test -NDT	IS 13311 (Part 2)	20 N/mm <sup>2</sup> to 60 N/mm <sup>2</sup>
		Ultra- Sonic Pulse velocity Test (UPV)	IS 13311 (Part 1)	0.1 km/sec to 5.5 km/sec
		Pile Integrity Test	ASTM-D 5882-07	2 m to 40 m