

Laboratory **Delta Testing & Research Laboratories, Plot No. C-5, Block C, Main Kanjhawala Road, Rajiv Nagar, New Delhi**

Accreditation Standard **ISO/IEC 17025: 2017**

Certificate Number **TC-7414**

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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.	BUILDING MATERIALS			
1.	Cement (OPC, PPC, Portland Slag Cement, Clinker White Cement)	SiO ₂	IS 4032 (Clause 4.3)	15 % to 30%
		Loss on Ignition	IS 4032 (Clause 4.2)	0.5 % to 10 %
		Al ₂ O ₃	IS 4032 (Clause 4.6.1)	0.5 % to 10 %
		Fe ₂ O ₃	IS 4032 (Clause 4.5.2)	0.5 % to 10 %
		CaO	IS 4032 (Clause 4.7.2)	40 % to 70 %
		MgO	IS 4032 (Clause 4.8.2)	0.5 % to 10 %
		SO ₃	IS 4032 (Clause 4.9)	0.1 % to 10 %
		Insoluble Residue	IS 4032 (Clause 4.10)	0.5 % to 40 %
		Total Chloride	IS 4032 (Amendment 2)	0.001 % to 0.5 %
		Sodium Oxide (Na ₂ O)	IS 4032 (Clause 4.11)	0.01% to 1 %
Potassium Oxide (K ₂ O)	IS 4032 (Clause 4.11)	0.01 % to 1 %		
2.	Pozzollana Material (fly ash)	SiO ₂	IS 1727	25 % to 70 %
		Loss on Ignition	IS 1727	0.5 % to 10 %
		Al ₂ O ₃	IS 1727	0.5 % to 20 %
		Fe ₂ O ₃	IS 1727	0.5 % to 10 %
		CaO	IS 1727	0.5 % to 5 %
		MgO	IS 1727	0.5 % to 7.5 %
		SO ₃	IS 1727	0.1 % to 6 %
3.	Concrete admixture (Admixture, Accelerator, Retarder)	Total Chloride	IS 4032	0.001 % to 0.5 %
		pH	IS 9103	4 to 12
		Dry Material content	IS 9103	5% to 50 %
		Ash Content	IS 9103	0.1% to 30 %
		Relative Density	IS 9103	0.8 to 1.5
		Chloride ion content	IS 6925 (Clause 4)	0.001% to 0.5 %
4.	Hardened Concrete and Aggregate	Chloride	BS 1881(Part 124) BS 812 (Part 117)	0.001 % to 0.5 %
		Sulphate	BS 1881 (Part 124) BS 812 (Part 118)	0.01 % to 10 %

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		Sodium Oxide	BS 1881(Part 124)	0.01 % to 5 %
		Potassium Oxide	BS 1881(Part 124)	0.01 % to 5 %
5.	Bentonite	pH	IS 6186	4 to 12
6.	Gypsum and its Products	Loss on ignition	IS 2547 (Part 1)	0.1 % to 10.0 %
		Free Lime	IS 2547 (Part 1)	0.1 % to 5.0 %
		Sulphuric Anhydride (as SO ₃)	IS 1288	30.0 % to 50.0 %
		Calcium Oxide (as CaO)	IS 1288	20.0 % to 40.0 %
		Soluble Magnesium (as MgO)	IS 2547(Part 1)	0.01 % to 1.0 %
		Soluble sodium (as Na ₂ O)	IS 2547(Part 1)	0.01 % to 0.5 %
II.	SOIL & ROCK			
1.	Soil	pH	IS 2720 (Part 26)	4 to 12
		Sulphate (as SO ₄)	IS 2720 (Part 27)	0.01 % to 10 %
		Total Nitrogen	IS 10158	0.02 % to 10 %
		Calcium Carbonate	IS 2720 (Part 23)	1.0 % to 50 %
		Cation Exchange Capacity	IS 2720 (Part 24)	(0.1 to 50) meq/100 g
		Chloride	IS 4032	0.01% to 0.5%
		Electrical Conductivity (1:2) at 25 °C	IS 14767	1 μΩ /cm to 5000 μΩ /cm
		Total Organic Matter	IS 2720 (Part 22)	0.1 % to 50 %
2.	Micro Silica	Moisture	IS 15388	0.1 % to 10.0 %
		Loss on Ignition	IS 1727	0.5 % to 10 %
		SiO ₂	IS 1727	5.0 % to 100.0 %
III.	METALLIC COATING			
1.	Ferrous and Non-Ferrous	Anodic Coating	IS 5523	2 μm to 40 μm

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		Powder Coating (Micrometer Method)	IS 101 (Part 3 / Section 2)	5 µm to 200 µm
		Mass of Zinc Coating	IS 6745	20.0 g/m ² to 2000 g/m ²
		Uniformity of Zinc Coating	IS 2633	Qualitative
2.	Coating Material (Ferrous and Non-Ferrous)	Salt Spray (Corrosion)	ASTM B 117	Qualitative
IV.	METAL & ALLOYS			
1.	Low Alloy Steel & Plain Carbon Steel	Carbon	IS 228 (Part 1)	0.05 % to 2.50 %
		Sulphur	IS 228 (Part 9)	0.010 % to 0.50 %
		Silicon	IS 228 (Part 8)	0.10 % to 2.0 %
		Manganese	IS 228 (Part 2)	0.01 % to 2.0 %
		Phosphorus	IS 228 (Part 3)	0.010 % to 0.50 %
		Nickel	IS 228 (Part 5)	0.050 % to 2.0 %
		Molybdenum	IS 228 (Part 7)	0.10 % to 1.0 %
	Stainless Steel	Chromium	IS 228 (Part 6)	0.10 % to 2.0 %
2.		Carbon	IS 228 (Part 1)	0.05 % to 1.50 %
		Sulphur	IS 228 (Part 9)	0.010 % to 0.50 %
		Silicon	IS 228 (Part 8)	0.10 % to 2.0 %
		Manganese	IS 228 (Part 2)	0.01 % to 2.0 %
		Phosphorus	IS 228 (Part 3)	0.010 % to 0.50 %
		Nickel	IS 228 (Part 5)	0.050 % to 20.0 %
	Molybdenum	IS 228 (Part 7)	0.10 % to 5.0 %	
	Chromium	IS 228 (Part 6)	1.50 % to 25.0 %	
V.	RUBBER & RUBBER PRODUCTS			
1.	Rubber	Ash Content (Filler)	ASTM D 297 IS 3400 (Part 22)	0.1 % to 50.0 %

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		Polymer Identification	ASTM D 297 ASTM D 3677 IS 3400 (Part 22)	Qualitative
		Total Extract	IS 3400 (Part 22) ASTM D 297	1 % to 30.0 %
		Alcoholic Potash Extract	IS 3400 (Part 22) ASTM D 297	0.01 % to 1.0 %
		Total Sulphur	IS 3400 (Part 22) ASTM D 297-2015	0.01 % to 1.0 %
		Nitrogen	IS 3400 (Part 22) ASTM D 297-2015	0.01 % to 2.0 %
		Rubber Polymer content	IS 3400 (Part 22) ASTM D 297-2015	20 % to 80 %
VI.	PLASTIC & RESINS			
1.	Plastic & Polymer	Ash Content(Filler)	ASTM D 5630	0.1 % to 50.0 %
		Glass Content	IS 10661	1 % to 50.0 %
		Sulphated ash content	IS 4985	1.0 % to 50.0 %
		Carbon black content	IS 2530	0.5 % to 40.0 %
		Carbon black dispersion	IS 2530	Qualitative
		Volatile Content	IS 13360 (Part 8/Section 12)	0.1 % to 20%
		Effect of liquid including water absorption	IS 13360 (Part 8 / Section 3)	0.1 % to 20%
		Migration	IS 13360 (Part 8 / Section 5) IS 9845	5 mg/L to 250 mg/L
VII.	WATER			
1.	Drinking Water	Colour Hazen units	IS 3025 (Part 4) Platinum Cobalt (Visual)	(1 to 50) Hazen Unit

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		Turbidity	IS 3025 (Part 10)	1.0 NTU to 500 NTU
		Total Dissolved Solid	IS 3025 (Part 16)	5 mg/L to 2000 mg/L
		pH value	IS 3025 (Part 11)	2.0 to 12.0
		Fluoride	IS 3025 (Part 60)	0.1 mg/L to 20 mg/L
		Chloride	IS 3025 (Part 32)	2.0 mg/L to 2000 mg/L
		Total Hardness (as CaCO ₃)	IS 3025 (Part 21)	5 mg/L to 2000 mg/L
		Total Alkalinity (as Calcium carbonate)	IS 3025 (Part 23)	1 mg/L to 2000 mg/L
		Residual Free Chlorine	IS 3025 (Part 26)	0.5 mg/L to 10 mg/L
		Iron (Fe)	IS 3025 (Part 53)	0.1 mg/L to 20 mg/L
		Calcium (Ca)	IS 3025 (Part 40)	1 mg/L to 500 mg/L
		Magnesium (Mg)	IS 3025 (Part 46)	1 mg/L to 500 mg/L
		Sulphate (as SO ₄)	IS 3025 (Part 24)	1 mg/L to 500 mg/L
		Nitrate (as NO ₃)	IS 3025 (Part 34)	1.0 mg/L to 100 mg/L
		Sodium (as Na)	IS 3025 (Part 45)	1 mg/L to 500 mg/L
		Potassium (as K)	IS 3025 (Part 45)	1 mg/L to 500 mg/L
2.	Construction Water	Total Dissolved Solid	IS 3025 (Part 16)	1 mg/L to 10000 mg/L
		Organic Matter	IS 3025 (Part 18)	1.0 mg/L to 1000 mg/L
		Inorganic Matter	IS 3025 (Part 18)	1.0 mg/L to 1000 mg/L
		Alkalinity	IS 3025 (Part 23)	1.0 mL to 50 mL (0.02N H ₂ SO ₄ required to Neutralize 100 mL Water sample using mixed indicator)
		Acidity	IS 3025 (Part 22)	0.5 mL to 50 mL (0.02N NaOH required to Neutralize 100 mL Water using Phenolphthalein Indicator)
		Total Suspended Solid	IS 3025 (Part 17)	1.0 mg/L to 5000 mg/L
		pH value	IS 3025 (Part 11)	2 to 12
		Chloride	IS 3025 (Part 32)	1.0 mg/L to 2000 mg/L

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		Sulphate (as So ₃)	IS 3025 (Part 24)	1 mg/L to 2000 mg/L
VIII.	POLLUTION & ENVIRONMENT			
1.	Waste Water (Effluent/Sewage)	Dissolved Oxygen	IS 3025 (Part 38)	1 mg/L to 12 mg/L
		BOD	IS 3025 (Part 44)	5 mg/L to 2000 mg/L
		COD	IS 3025 (Part 58)	5 mg/L to 5000 mg/L
		Oil & Grease	IS 3025 (Part 39)	5 mg/L to 100 mg/L
		Phosphorus	IS 3025 (Part 31)	1 mg/L to 50 mg/L
		Nitrate Nitrogen	IS 3025 (Part 34)	1 mg/L to 500 mg/L
		Sulphide	IS 3025 (Part 29)	1 mg/L to 200 mg/L
		Calcium	IS 3025 (Part 40)	1 mg/L to 1000 mg/L
		Magnesium	IS 3025 (Part 46)	1 mg/L to 1000 mg/L
		Sodium	IS 3025 (Part 45)	1 mg/L to 1000 mg/L
	Potassium	IS 3025 (Part 45)	1 mg/L to 1000 mg/L	
IX.	PAINTS & SURFACE COATING			
1.	Thermoplastic road marking material	Binder Content	BS 3262 (Part 1)	5 % to 30%
		Titanium Dioxide	IS 411 (Amendment 1) Clause B-3 (Gravimetric)	1 % to 20 %
		Calcium Carbonate	IS 8767	20.0 % to 50.0 %
X.	PAPER AND PULPS			
1.	Paper	Substance	IS 1060 (Part 1) Method 6	20 g/m ² to 600 g/m ²
		Moisture Content	IS 1060 (Part 1) Method 9	0.1 % to 25 %
		Ash Content	IS 1060 (Part 1) Method 11	0.1 % to 25 %
		pH value	IS 1060 (Part 1) Method 10	3.0 to 12

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<u>MECHANICAL TESTING</u>				
I.	BUILDING MATERIAL			
1.	Hydraulic Cement	Initial Setting time Final Setting time	IS 4031 (Part 5)	10 minute to 150 minute 150 minute to 600 minute
		Soundness by Lechatlier by Autoclave	IS 4031 (Part 3)	0.5 mm to 10 mm 0.05 % to 2.0 %
		Compressive Strength (24 Hour, 72 Hour, 168 Hour & 678 Hour)	IS 4031 (Part 6)	5 MPa to 70 MPa
		Fineness (by Blaine's Method)	IS 4031 (Part 2)	100 m ² /kg to 600 m ² /kg
		Consistency	IS 4031 (Part 4)	20 % to 50 %
2.	Cement (OPC / PPC / PSC)	Density	IS 4031 (Part 11)	2 g/cc to 3.5 g/cc
		Drying Shrinkage	IS 4031 (Part 10)	0.01 % to 1.0 %
3.	Fly ash	Fineness (By Blaine's Method)	IS 1727	100 m ² /kg to 600 m ² /kg
		Residue 45 µm (Wet Sieving)	IS 1727	2 % to 100 %
		Compressive strength	IS 1727	60 % to 100 %
		Soundness Autoclave Expansion	IS 1727	0.05 % to 2.0 %
		Specific Gravity	IS 1727	1 to 3
4.	Burnt Clay Bricks, Sewer Bricks, Fly Ash Lime Bricks, Fly Ash Bricks	Dimension Length Width Height	IS 13757 IS 12894 IS 1077 IS 4885	2000 mm to 5000 mm 1000 mm to 3000 mm 1000 mm to 2000 mm
		Water absorption	IS 3495 (Part 2)	1 % to 50 %
		Efflorescence	IS 3495 (Part 3)	Qualitative
		Compressive strength	IS 3495 (Part 1)	20 kg/cm ² to 300 kg/cm ²

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5.	Blocks (Hollow & Solid)	Block Density	IS 2185 (Part 1 & 3)	500 kg/m ³ to 2500 kg/m ³
		Compressive Strength	IS 6441 (Part 5) IS 2185 (Part 1)	2 N/mm ² to 30 N/mm ²
		Water absorption	IS 6441 (Part 4) IS 2185 (Part 1)	2 % to 20 %
		Dimension Length Width Thickness	IS 2185 (Part 1, 3 & 4)	200 mm to 600 mm 200 mm to 400 mm 20 mm to 400 mm
6.	Pre Cast Concrete Paver Blocks	Compressive Strength	IS 15658	10 N/mm ² to 80 N/mm ²
		Thickness of the Wearing Layer	IS 15658	1 mm to 20 mm
		Water absorption	IS 15658	2 % to 20 %
		Dimension Length Width Thickness	IS 15658	200 mm to 600mm 200 mm to 400mm 20 mm to 200mm
		Abrasion Resistance (Abrasive wear)	IS 15658	5000 mm ³ to 15000 mm ³
7.	Cellular Concrete Block (autoclaved)	Drying Shrinkage	IS 6441 (Part 2)	0.001 % to 1 %
8.	Hollow and Solid Concrete Blocks	Drying Shrinkage	IS 2185 (Part 1)	0.001 % to 1 %
9.	Concrete Admixture	Air Content	IS 1199	0.5 % to 5 %
		Water Content	IS 1199	0.05 % to 20 %
		Bleeding Test	IS 9103	0.5 % to 10 %
		Initial Setting Time	IS 1199 (Part 7)	100 minute to 800 minute
		Final Setting Time	IS 1199 (Part 7)	100 minute to 800 minute
10.	Fine Aggregate	Elongation Index	IS 2386 (Part 1)	10 % to 60 %
		Deleterious Materials 75 µm Passing Clay and Lump Coal and Lignite	IS 2386 (Part 1 & 2)	0.1 % to 25 % 0.1 % to 10 % 0.1 % to 10 %

Naveen Jangra
Convenor

Anuja Anand
Program Manager

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		Bulk Density	IS 2386 (Part 3)	1.0 kg/L to 3.0 kg/L
		Specific Gravity	IS 2386 (Part 3)	2 to 3
		Water absorption	IS 2386 (Part 3)	0.2 % to 5 %
		Soundness (Na ₂ SO ₄)	IS 2386 (Part 5)	0.1 % to 15 %
		Soundness (MgSO ₄)		0.1 % to 15 %
		Sieve Analysis	IS 2386 (Part 1)	0.1 % to 100 % (0.15 mm to 4.75 mm)
		Organic Impurities	IS 2386 (Part 2)	Qualitative
11.	Coarse Aggregate	Flakiness Index	IS 2386 (Part 1)	10 % to 60 %
		Elongation Index	IS 2386 (Part 1)	10 % to 60 %
		Deleterious Materials 75 µm Passing Clay and Lump Coal and Lignite	IS 2386 (Part 1 & 2)	0.1 % to 25 % 0.1 % to 10 % 0.1 % to 10 %
		Bulk Density	IS 2386 (Part 3)	1.0 kg/L to 3.0 kg/L
		Specific Gravity	IS 2836 (Part 3)	2 to 3
		Water absorption	IS 2386 (Part 3)	0.2 % to 5 %
		Crushing Value	IS 2386 (Part 4)	10 % to 60 %
		Impact value	IS 2386 (Part 4)	10 % to 60 %
		Los Angeles Abrasion	IS 2386 (Part 4)	10 % to 60 %
		10 % Fines Value	IS 2386 (Part 3) BS 812 (Part 111)	1 to 19.4 Ton
		Soundness (Na ₂ SO ₄)	IS 2386 (Part 5)	0.1 % to 15 %
		Soundness (MgSO ₄)		0.1 % to 15 %
		Sieve Analysis	IS 2386(Part 1)	10 % to 100 % (4.75 mm to 80 mm)
		Organic Impurities test	IS 2386 (Part 2)	Qualitative
12.	Hardened Concrete (Cube, Core, Beam)	Compressive strength	IS 516	5 N/mm ² to 80 N/mm ²
		Moisture Movement	IS 2185 (Part 1)	0.001 % to 1 %
		Water Absorption	IS 2185 (Part 1)	0.1 % to 15 %
		Flexural Strength	IS 516	2 N/mm ² to 10 N/mm ²
		Split Tensile Strength	IS 5816	1 N/mm ² to 10 N/mm ²
		Drying Shrinkage	IS 1199	0.001 % to 1 %

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13.	Cement Concrete Tiles	Thickness of Wearing Layer	IS 1237 IS 13801	1.0 mm to 25 mm
		Wet Transverse Strength	IS 1237 IS 13801	1.0 N/mm ² to 20 N/mm ²
		Water absorption	IS 13801 IS 1237	2 % % to 20 %
		Straightness Flatness	IS 13801 IS 1237	0.01 mm to 5 mm
		Squareness	IS 13801 IS 1237	0.01 mm to 0.5 mm
		Dimension Length Width Thickness	IS 13801 IS 1237	200 mm to 600 mm 200 mm to 400 mm 15 mm to 60 mm
		Abrasion Resistance	IS 13801/IS 1237	0.5 mm to 25mm
14.	Unglazed Tiles, Vitrified Tiles, Glazed Tiles and AR Tiles	Thermal shock	IS 13630 (Part 5)	Qualitative
		Crazing Resistance	IS 13630 (Part 9)	Qualitative
		Water absorption	IS 13630 (Part 2) IS 4457	0.01 % to 30 %
		Apparent, Relative and Bulk Density	IS 13630 (Part 2) IS 4457	1.0 g/cc to 1.70 g/cc
		Modulus of Rupture	IS 13630 (Part 6) IS 4457	5 N/mm ² to 70 N/mm ²
		Breaking Strength	IS 13630 (Part 6) IS 4457	50 N to 5000N
		Scratch Hardness	IS 13630 (Part 13)	1 Mohs to 9 Mohs
15.	Ceramic Tiles	Dimension and Surface Quality	IS 13630 (Part 1) IS 4457	100 mm to 2000 mm
		Plainness and Straightness	IS 13630 (Part 1)	0.1 mm to 1.0 mm
		Rectangularity	IS 13630 (Part 1)	0.1 mm to 1.0 mm
16.	Bitumen and Allied Products	Penetration	IS 1203	(10 to 300) 1/10mm at 25 °C, 100 g
		Softening Point	IS 1205	10 °C to 200 °C
		Ductility	IS 1208	3 cm to 100 cm

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17.	Paving Bitumen (VG Grade)	Specific Gravity	IS 1202	0.5 to 2.0
		Solubility in Trichloroethylene	IS 1216	50 % to 100 %
		Flash Point	IS 1448 (Part 69)	100 °C to 400 °C
		Fire Point	IS 1209	100 °C to 400 °C
		Absolute Viscosity at 60 °C	IS 1206 (Part 2)	400 Poise to 8000 Poise
18.	Polymer & Rubber Modified Bitumen (PMB, CRMB and NRMB)	Kinematic Viscosity at 135 °C	IS 1206 (Part 2)	100 cSt to 800 cSt
		Flash Point	IS 1209	100 °C to 400 °C
		Fire Point	IS 1209	100 °C to 400 °C
		Elastic Recovery of Half Thread in Ductilometer at 25 °C	IS 15462 (Annexure A)	10 % to 100 %
		Viscosity at 150 °C	IS 1206 (Part 1)	0.5 Poise to 10 Poise
		Loss in Mass on Residue	IS 9382	0.1 % to 50 %
19.	Bitumen Emulsion (MS, RS-1, RS-2, SS-1 and SS-2)	Separation difference in Softening Point	IS 15462 (Annexure B)	10 °C to 100 °C
		Residue on 600 micron IS Sieve	IS 8887 (Annexure B)	0.01 to 0.20
		Residue by evaporation	IS 8887 (Annexure J)	10 % to 99 %
		Storage Stability after 24 hours	IS 8887 (Annexure D)	0.1 % to 10 %
20.	Bituminous Mix	Binder Content	IRC SP 11(Appendix-5 Cl. C)	0.5 % to 20 %
		Density	ASTM D 2726 17	1.5 to 5.0
		Marshal Stability	ASTM D 6927-15	10 kN to 30 kN
		Stripping Value	IS 6241	85 % to 100 %
II.	SOIL & ROCK			
1.	Micro Silica	Sieve Analysis (45 µm) Residue	IS 1727	2 % to 25 %

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2.	Soil	Compressive Strength	IS 1727	20 % to 95 %
		Proctor Test (Light Compaction)	IS 2720 (Part 7)	MDD: 0.7 g/cc to 2.5 g/cc OMC: 1 % to 30%
		Proctor test (Heavy Compaction)	IS 2720 (Part 8)	MDD: 0.7 g/cc to 2.5 g/cc OMC: 1 % to 30 %
		Liquid limit	IS 2720 (Part 5)	1 % to 50 %
		Plastic limit	IS 2720 (Part 5)	1 % to 50 %
		CBR Value (Lab)	IS 2720 (Part 16)	5 % to 80 %
		Grain Size analysis	IS 2720 (Part 4)	1 % to 100 %
		Moisture Content	IS 2720 (Part 1)	0.25 % to 50 %
		Specific Gravity	IS 2720 (Part 3 / Section1)	2 to 3
		Shrinkage Limit	IS 2720 (Part 6)	0.9 % to 50 %
		Direct Shear	IS 2720 (Part 13)	C: upto 0.5 kg/cm ² Φ: 5° to 50 °
3.	Bentonite	Triaxial Compression - CU	IS 2720 (Part 12)	C: upto 1.0 kg/cm ² Φ: 1 ° to 30 °
		Swelling Pressure	IS 2720(Part 41)	0.01 kg/cm ² to 5 kg/cm ²
		Free Swell Index	IS 2720 (Part 40)	10 % to 700 %
		Liquid limit	IS 2720 (Part 5)	200 % to 500 %
		Density	IS 2720 (Part 2)	0.95 g/cc to 1.5 g/cc
		Sand Content	IS 6186	0 % to 20 %
		Marsh Cone Viscosity	ASTM D 6910	10 s to 200 s
4.	Natural Building Stone	Specific Gravity	IS 1122	1.5 to 3.5
		Apparent Specific Gravity	IS 1124	1.5 to 3.5
		Moisture / Water Absorption	IS 1124	0.1 % to 10 %
		Scratch Hardness	IS 13630 (Part 13)	1 Mohs to 9 Mohs
		Porosity (True and Apparent)	IS 1124	0.5 % to 4.0 %
		Moisture Content	IS 13030	0.01 % to 1.0 %
		Dry Density	IS 13030	1.0 to 3.5
		Durability	IS 1126	Qualitative
Compressive Strength	IS 1121 (Part 1)	5 N/mm ² to 500 N/mm ²		

Naveen Jangra
Convenor

Anuja Anand
Program Manager

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		Tensile Strength	IS 1121 (Part 3)	2 N/mm ² to 25 N/mm ²
		Transverse Strength	IS 1121 (Part 3)	5 N/mm ² to 50 N/mm ²
III.	WOOD & WOOD PRODUCTS			
1.	Wood, Timber, Marine Plywood, Fire Retardant, Shuttering, Plywood	Dimensions Length Width Thickness	IS 303, IS 4990, IS 5509 IS 1328, IS 710	1000 mm to 3000 mm 500 mm to 1500 mm 3 mm to 50 mm
		Glue Adhesion (Adhesion of Plies)	IS 1734 (Part 5)	Qualitative
		Modulus of rupture Modulus of Elasticity	IS 1734 (Part 11) IS 1708 (Part 5)	5 N/mm ² to 100 N/mm ²
		Water Resistance	IS 1734 (Part 6)	Qualitative
		Tensile Strength Parallel to Grain Perpendicular to Grain	IS 1734 (Part 9)	5 N/mm ² to 100 N/mm ²
		Moisture Content	IS 1734 (Part 1) IS 1708 (Part 1)	0.5 % to 30 %
		Density	IS 1708 (Part 2) IS 1734 (Part 1)	300 kg/m ³ to 1000 kg/m ³
		Glue Shear	IS 1734 (Part 4)	50 N to 10000 N
		Moisture	IS 2380 (Part 3)	0.5 % to 30 %
		2.	Particle Board, Pre-laminated Particle Board, Medium Density Fibre Board	Dimensions Length Width Thickness
Water absorption	IS 2380 (Part 16)			1.0 % to 100 %
Density	IS 2380 (Part 3)			300 kg/m ³ to 1000 kg/m ³
Screw Withdrawal Strength	IS 2380 (Part 14)			400 N to 10000 N

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		Swelling in Water	IS 12823 IS 3087 IS 2380 (Part 17) IS 12406	0 to 300 mm
		Modulus of Rupture	IS 12823 IS 3087 IS 2380 (Part 4) IS 12406	5 N/mm ² to 100 N/mm ²
		Modulus of Elasticity	IS 12823 IS 3087 IS 2380 (Part 4) IS12406	(500 to 8000) N/mm ²
		Tensile Strength Perpendicular to Surface	IS 12823 IS 2380 (Part 5) IS 3087	0.5 N/mm ² to 5 N/mm ²
		Tensile Strength Perpendicular to Surface after Cyclic Test	IS 12823 IS 2380 (Part 5) IS 3087 IS 12406	0.5 N/mm ² to 5 N/mm ²
3.	Block board	Dimensions Length Width Thickness	IS 1659	1000 mm to 3000 mm 500 mm to 1500 mm 3 mm to 50 mm
		Dimension Change caused by Humidity (Length & Thickness)	IS 1659	0.01 mm to 5 mm
		Resistance to Water	IS 1659	Qualitative
		Adhesion of Plies	IS 1659	Qualitative
		Modulus of Rupture	IS 1659	5 N/mm ² to 100 N/mm ²
		Modulus of Elasticity	IS 1659	(500 to 8000) N/mm ²
		Spot test	IS 1659	Qualitative
		Edge straightness & Squareness	IS 1659	0 to 10 mm

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4.	Flush Door Shutter	Glue adhesion	IS 4020 (Part 15)	Qualitative
		End Immersion	IS 4020 (Part 13)	Qualitative
		Knife Test	IS 4020 (Part 14)	Qualitative
		Dimensions Length Width Thickness	IS 4020 (Part 2) IS 2202 (Part 1)	1000 mm to 3000 mm 500 mm to 1500 mm 20 mm to 50 mm
		Straightness	IS 4020 (Part 2)	Upto 1 mm
		Squareness	IS 4020 (Part 2)	Upto 1 mm
		Screw Withdrawal Test	IS 4020 (Part 16)	0 to 10000 N
IV.	PLASTIC & POLYMERS			
1.	UPVC Pipes and Fitting, CPVC Pipe	Dimension Outside Diameter Inside Diameter Wall Thickness Socket Length	IS 12235 (Part 1 & 2) IS 12818, IS 4985, IS 10124, IS 13592, IS 15778	28 mm to 300 mm 300 mm to 600 mm 0.1 mm to 25 mm 25 mm to 50 mm
		Visual Appearance	IS 4985, IS 2508, IS 12818, IS 10124 (Part 2)	Qualitative
		Reversion	IS 12235 (Part 5) IS 15778	0.2 % to 20 %
		Resistance to Chemical Action	IS 13592 IS 12235 (Part 7)	0.01 % to 5 %
		Specific Gravity / Density	IS 12235 (Part 14/Section 1) IS 13360 (Part 3/Section 1) ASTM D 297	0.5 g/cc to 5 g/cc
		Tensile Strength	IS 12818 IS 12235 (Part 13)	Upto 100 N/mm ²
		2.	HDPE, PE Pipes	Dimension Outside Diameter Wall Thickness Ovality

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		Visual Appearance	IS 4984 IS14151 (Part 1) IS14151 (Part 2)	Qualitative
		Reversion	IS 4984/IS 14151 (Part 1)	0.2 % to 100 %
		Specific Gravity / Density	IS 7328 IS 13360 (Part 3/Section 1) ASTM D 297	10 kg/m ³ to 1100 kg/m ³
3.	Plastic Films and Plastic Sheets	Tensile Strength	IS 2508 IS 10889	10 N/mm ² to 50 N/mm ²
		Elongation	IS 2508 IS 10889	5 % to 800 %
		Dimension	IS 10889 IS 2508	10 µm to 1000 µm 1000 µm to 5000 µm
		Density	IS 2508 IS 10889	0.8g/cc to 2g/cc
		Appearance	IS 2508 IS 10889	Qualitative
		Odour	IS 2508 IS 10889	Qualitative
		Carbon Black content	IS 2530	0.1 % to 20 %
		Carbon Black Dispersion	IS 2530	Qualitative
4.	Packaging and Containers (Polyethylene Flexible Pouches)	Thickness	IS 15609	1 µm to 1000 µm
		Width	IS 15609	0.5 mm to 600 mm
		Overall migration	IS 9845	0.1 mg/L to 200 mg/L
		Tensile Strength	IS 2508	1 kg/cm ² to 400 kg/cm ²
		Elongation at Break	IS 2508	0 % to 600 %
		Water Potability	IS 15609	Qualitative
		Stack Load	IS 15609	Qualitative
		Drop Test	IS 15609	Qualitative
		Ink Adhesion for Printed Pouch	IS 15609	Qualitative
		Product Resistance for Printed Pouch	IS 15609	Qualitative

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5.	Containers for the packaged drinking water / packaged mineral water with cap	Finish, Workmanship, Appearance	IS 15410	Qualitative
		Capacity (Nominal / Brimful)	IS 2798	0.001 kg to 35 kg
		Wall thickness (Top, Middle, Bottom)	IS 2798	0.01 mm to 25 mm
		Drop Test	IS 2798	Qualitative
		Migration Test (40 ± 2) °C at 10 day	IS 9845	0.5 mg/L to 50 mg/L
		Water Portability test (38 ± 2) °C for 30 day	IS 3025 (Part 5) IS 3025 (Part 8)	Qualitative (Smell and Taste)
		Leakage test (a) Closure leakage	IS 2798	Qualitative
6.	Rotational Moulded Polyethylene Water Storage Tank	Dimensions	IS 1270 (Part 1)	2 mm to 5000 mm
		Finish	IS 1270 (Part 1)	Qualitative
		Resistance to Deformation	IS 1270 (Part 1)	2 % to 3 %
		Tensile Strength	IS 8543 (Part 4/Section 1)	10 kg/cm ² to 40 kg/cm ²
		Flexural Modulus	IS 13360 (Part 5/Section 7)	100 kg/cm ² to 300 kg/cm ²
		Overall Migration	IS 9845	5 mg/L to 200 mg/L
7.	Plastic Sheet	Hardness Shore D	IS 13360 (Part 5/Section 11)	(5 to 100) Shore D
8.	Plastic Feeding Bottles	Wall Thickness	IS 2978	0.01 mm to 25 mm
		Capacity	IS 14625	100 ml to 300 ml
		Capacity Scale	IS 14625	20 mm to 300 mm
		Permanency of Pigments	IS 14625 (Annexure B)	Qualitative
		Leakage	IS 14625	Qualitative
		Drop Test	IS 14625	Qualitative
		Ageing Resistance	IS 14625	Qualitative
		Product Resistance of Printed Containers	IS 2798	Qualitative
9.	PVC Water Stops	Migration	IS 9845	0.1 mg/L to 100 mg/L
		Hardness	IS 13360 (Part 5/Section 11)	5 to 100 shore A
		Water absorption	IS 15058	0.01 % to 10 %

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		Accelerated Extraction	IS 15058	Qualitative
		Effect of Alkali	IS 15058	0.01 % to 5 %
		Tensile Strength	IS 13360 (Part 5/Section 1) IS 13360 (Part 5/Section 2) IS 13360 (Part 5/Section 3)	2 N/mm ² to 30 N/mm ²
10.	HDPE Sack	Elongation	IS 13360 (Part 5/Sec. 1,2&3)	5 % to 500 %
		Mass	IS 1964	0.1 g to 5000 g
		Dimension	IS 1954	0.1 cm to 150 cm
		Ends/dm	IS 14887 IS 14968	1 to 20
		Picks/dm	IS 14887 IS 14968	1 to 20
		Breaking strength	IS 1969	1 N to 10000 N
		Elongation at break	IS 1969	5 % to 600 %
		Breaking Strength Bottom Seam	IS 9030	1 N to 10000 N
V.	RUBBER AND RUBBER PRODUCTS			
1.	Rubber Hose and Rubber Products	Tensile Strength	IS 3400 (Part 1)	2 N/mm ² to 50 N/mm ²
		Elongation	IS 3400 (Part 1)	5 % to 800 %
		Adhesion	IS 3400 (Part 5)	0 to 50 kN/m
		Compression Set	IS 3400 (Part 10)	0.1 % to 100 %
		Hardness Shore A	IS 3400 (Part 23)	5 Shore A to 100 Shore A
		Specific Gravity / Density	IS 3400 (Part 9)	0.5 g/cc to 5 g/cc
VI.	MECHANICAL PROPERTIES OF METALS			
1.	Ferrous and Non-Ferrous Products (Reinforcement Steel Bar, GI Pipe, Structural Steel,	Elongation	IS 1608	5 % to 80 %
		Tensile Strength	IS 1608	(100 to 1500) N/mm ²
		Yield Stress	IS 1608	(100 to 1000) N/mm ²
		0.2 % Proof Stress	IS 1608	(100 to 1000) N/mm ²

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	Galvanized Steel Sheet, Steel Tube, MS Pipe, Fastener (Bolts, Screw and Studs), Hollow Steel Section, CRC Sheet, GI Barbed Wires, Stainless Steel Plate, Sheet, Strip)	Bend	IS 1599 IS 2329	Qualitative
		Rockwell Hardness (HRB / HRC)	IS 1586 (Part 1)	20 HRB to 100 HRB 20 HRC to 70 HRC
2.	Reinforcement Steel Bar (All grades upto 40 mm Diameter)	Bend	IS 1599 IS 2329	Qualitative (Mandrel Diameter: 8 mm, 10 mm, 12 mm, 15 mm, 16 mm, 18 mm, 20 mm, 24 mm, 25 mm, 28 mm, 30 mm, 32 mm, 36 mm, 40 mm, 45 mm, 48 mm, 56 mm, 60 mm, 64 mm, 72 mm, 75 mm, 84 mm, 96 mm, 100 mm, 108 mm, 112 mm, 120 mm, 124 mm, 126 mm, 135 mm, 140 mm, 144 mm, 150 mm, 160 mm, 168 mm, 175 mm, 178 mm, 192 mm, 196 mm, 200 mm, 216 mm, 240 mm, 252 mm, 280 mm and 320 mm)

Naveen Jangra
Convenor

Anuja Anand
Program Manager

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		Re-bend	IS 1599 IS 1786	Qualitative (Mandrel Diameter: 8 mm, 10 mm, 12 mm, 15 mm, 16 mm, 18 mm, 20 mm, 24 mm, 25 mm, 28 mm, 30 mm, 32 mm, 36 mm, 40 mm, 45 mm, 48 mm, 56 mm, 60 mm, 64 mm, 72 mm, 75 mm, 84 mm, 96 mm, 100 mm, 108 mm, 112 mm, 120 mm, 124 mm, 126 mm, 135 mm, 140 mm, 144 mm, 150 mm, 160 mm, 168 mm, 175 mm, 178 mm, 192 mm, 196 mm, 200 mm, 216 mm, 240 mm, 252 mm, 280 mm and 320 mm)
		Mass per meter	IS 1786 IS 1732	0.09 kg to 50 kg
		Bond Requirement a). Rib area by dimension measurement b). Pull Out Test	IS 1786 IS 2770 (Part 1)	1 mm ² /mm to 50 mm ² /mm 5 kg/cm ² to 200kg/cm ²
		Total Elongation at maximum force	IS 1608	2 % to 10 %
3.	Ferrous and Non-Ferrous Metal	Brinell hardness	IS 1500 (Part 1)	50 HBW to 400 HBW (2.5 / 187.5)
4.	Sheet Metal	Cupping Test	IS 10175 (Part 1)	0.1 mm to 25 mm
5.	Steel Pipes/ Tubes	Flattening Test	IS 2328	Qualitative
6.	Splicing coupler	Slip test	IS 16172:2014	0.01 mm to 1.0 mm

Naveen Jangra
Convenor

Anuja Anand
Program Manager

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		Tensile/ Breaking Load	IS 1608 IS 16172	100 kN to 900 kN
7.	Seven Ply Strand Wire for Pre-stressed Concrete	Breaking Load	IS 14268 IS 1608	100 kN to 900 kN
		Elongation at break	IS 14268	1 % to 10 %
		0.2% Proof Load	IS 1608	50 kN to 700 kN
		Lay length	IS 14268	0.02 mm to 300 mm
		Mass per km	IS 14268	0.2 kg to 15 kg
		Modulus of Elasticity	IS 14268 IS 1608	5 kN/mm ² to 500 kN/mm ²
8.	Ferrous and Non-Ferrous Metals and Products (Welded Sample)	Transverse Tensile	IS 3600 (Part 3) ASME (Section-IX)	50 kN to 900 kN
		Bend (Root / Face / Side)	IS 3600 (Part 5 & 6)	Qualitative
VII.	PERFORMANCE TEST			
1.	Riders Helmet	Materials: Shell Protective Padding Comfort Padding Retention System Chin Strap	IS 4151 Clause 4 Clause 4.1 Clause 4.2 Clause 4.3 Clause 4.4	Qualitative
		Corrosion Test for Metal Parts	IS 4151 (Clause 4.5) IS 9844	Qualitative
		Size (by Matching with the Head Forms)	IS 4151 (Clause 5.1)	Qualitative
		Mass	IS 4151 (Clause 8.1)	500 g to 2000 g
		Construction Hard Outer Shell Ear Flaps Neck Curtain Detachable Peak Visor Lower Face Cover	IS 4151 (Clause. 6) Clause 6.1.1 Clause 6.1.2 Clause 6.1.2 Clause 6.1.2 Clause 6.1.2 Clause 6.1.2	Qualitative

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		Skin trouble	Clause 6.1.3	
		Retention (Chin Strap) Under Load 15 k	IS 4151 (Clause 6.4.1) Annexure F-1.2	10 mm to 30 mm
		Peripheral Vision	IS 4151 (Clause 6.5) Annexure B	15 ° to 180 °
		Workmanship & Finish (Edge Smooth & Round)	IS 4151 (Clause 7)	Qualitative
		Impact Absorption Test	IS 4151 (Clause 9.1) Annexure C	100 g to 500 g
		Resistance to penetration under 3 kg	IS 4151 (Clause 9.2) Annexure D	10 mm to 50 mm
		Rigidity under load 30 N to 630 N	IS 4151 (Clause 9.3) Annexure E	10 mm to 50 mm
		Dynamic Test for Retention under 15 kg	IS 4151 (Clause 9.4) Annexure F	10 mm to 60 mm
		Audibility Test	IS 4151 (Clause 9.5) Annexure G	5 dB to 15 dB
		Retention Test (Positional Stability)	IS 4151 (Clause 9.6) Annexure C-1.3	15° to 40°
		Flexibility of Peak	IS 4151 (Clause 9.8) Annexure H	20 mm to 50 mm
2.	Protective Helmet for Two Wheeler Riders	Materials: Shell, Protective Padding, Comfort Padding, Retention System	IS 4151 Clause 4, 4.1, 4.2, 4.3, 4.4	Qualitative
		Corrosion Test (for Metal Parts)	IS 4151 Clause 4.5 IS 9844	Qualitative
		Size	IS 4151 Clause. 5	Qualitative
		Construction: Hard Outer Shell, Ear Flaps, Neck Curtain, Detachable peak visor, Lower Face Cover	IS 4151 Clause 6 and 6.1.2	Qualitative

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		Shell	IS 4151 Clause 6.2	Qualitative
		Protective Padding	IS 4151 Clause 6.3	Qualitative
		Retention System	IS 4151 Clause 6.4	10 mm to 150 mm
		Peripheral Vision	IS 4151 Clause 6.7	Qualitative
		Workmanship & Finish	IS 4151 Clause 6.8.1	Qualitative
		Mass	IS 4151 Clause 6.9	1 g to 2000 g
		Type of conditioning Solvent conditioning, Ambient temperature and hygrometry conditioning, Heat conditioning, Low-temperature conditioning, Ultraviolet-radiation conditioning and moisture conditioning	IS 4151 Clause 7.1.1 Clause 7.1.1.1 Clause 7.1.1.2 Clause 7.1.1.3 Clause 7.1.1.4 Clause 7.1.1.5	Qualitative
		Impact Absorption	IS 4151 Clause 7.2 Amnd. June 2018	10 g to 500 g
		Rigidity Longitudinal Axis Transverse Axis	IS 4151 Clause 7.3	1 mm to 60 mm (30 N to 630 N)
		Projections & Surface Friction (Method B)	IS 4151 Clause 7.4	1 kg to 60 kg
		Dynamic Test of Retention System	IS 4151 Clause 7.5	1 mm to 60 mm
		Audibility	IS 4151 Clause 7.6	1 dB to 20 dB
		Retention (Detaching) Test of Helmet	IS 4151 Clause 7.7	1° to 50°
		Micro-Slip Test of the Chin Strap	IS 4151 Clause 7.8	Qualitative
		Resistance to Abrasion of Chin Strap	IS 4151 Clause 7.9	Qualitative

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		Retention Systems Relying on Quick – Release Mechanisms	IS 4151 Clause 7.10	Qualitative 100 N 100 mm Diameter 1 N to 196 N 1 N to 3 kN 1 to 5000 Cycle Upto 60 hours Temp. (-) 35 °C ± 5 °C Timer: Upto 99 minute
3.	Visor for Scooter Helmets/ Two Wheeler Riders	Materials	IS 9844 IS 9973 Clause 3.1	Qualitative
		Design	IS 9973 Clause 4.1	Qualitative
		Impact Resistance	IS 9973 Clause 5.1	Qualitative
		Penetration Resistance	IS 9973 Clause 5.2	Qualitative
		Flammability Resistance	IS 9973 Clause 5.3	Qualitative
		Distortion	IS 9973 Clause 5.4.1	Qualitative
		Spherical and Cylindrical Error	IS 9973 Clause 5.4.2	Qualitative
		Prismatic Error	IS 9973 Clause 5.4.3	(-) 1 to 1 diopter
		Diffuse Transmittance	IS 9973 Clause 5.4.4	1 % to 100 %
		Light Transmission	IS 9973 Clause 5.4.5	1 % to 100 %
		Field of Vision	IS 9973 Clause 5.5	Qualitative
Workmanship & Finish	IS 9973 Clause 6	Qualitative		
Mass	IS 9973 Clause 7	1 g to 2000 g		

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MECHANICAL TESTING

AT SITE				
I.	SOIL & ROCK			
1.	Soil	Field Density by Sand Replacement Method	IS 2720 (Part 28)	1 g/cc to 3.2 g/cc
		Field Density by Core Cutter Method	IS 2720 (Part 29)	1 g/cc to 3.2 g/cc

Naveen Jangra
Convenor

Anuja Anand
Program Manager