

Laboratory **Hind Heat Treatment & Testing House, H-37 (b), Chambal Industrial Area, Kota, Rajasthan**

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

Certificate Number **TC-5694 (in lieu of T-1000, T-1983)** Page 1 of 10

Validity **01.06.2017 to 31.05.2019** Last Amended on --

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.	METAL & ALLOYS			
1.	Carbon Steel (Low Alloy Steel)	Carbon	ASTM E 415 IS 8811	0.10 % to 1.200 %
		Silicon		0.050 % to 2.00%
		Manganese		0.100 % to 2.00 %
		Phosphorous		0.01 % to 0.100 %
		Sulphur		0.01 % to 0.100 %
		Nickel		0.020 % to 4.000 %
		Chromium		0.020 % to 5.000 %
		Molybdenum		0.010 % to 1.50 %
		Copper		0.010 % to 0.50 %
		Vanadium		0.005 % to 0.010 %
		Aluminium		0.005 % to 0.30 %
	Boron	0.0005 % to 0.010 %		
2.	Stainless Steel	Carbon	ASTM E 1086 IS 9879	0.015 % to 0.300 %
		Silicon		0.150 % to 1.20 %
		Manganese		0.100 % to 2.00 %
		Phosphorous		0.005 % to 0.050 %
		Sulphur		0.005 % to 0.060 %
		Nickel		2.00 % to 25.00 %
		Chromium		5.00 % to 25.00 %
		Molybdenum		0.010 % to 3.50 %
		Copper		0.020 % to 1.20 %
		Vanadium		0.020 % to 0.100 %
		Aluminium		0.020 % to 0.050 %
		Titanium		0.010 % to 0.500 %
		Cobalt		0.020 % to 0.200 %
Neobium	0.070 % to 0.700 %			
	Lead	0.004 % to 0.040 %		
3.	Cast iron	Carbon	ASTM E 1999 IS 15338	2.500 % to 4.00 %
		Silicon		0.950 % to 3.00 %
		Manganese		0.100 % to 1.50 %

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Convenor

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		Phosphorous		0.020 % to 0.850 %
		Sulphur		0.010 % to 0.200 %
		Nickel		0.100 % to 7.00 %
		Chromium		0.100 % to 11.00 %
		Molybdenum		0.020 % to 1.10 %
		Copper		0.030 % to 2.200 %
		Vanadium		0.010 % to 0.100 %
		Magnesium		0.010 % to 0.100 %
		Titanium		0.001 % to 0.003 %
4.	Copper Alloys	Tin	BSEN 15079	0.1 % to 12.0 %
		Lead		0.05 % to 20.0 %
		Iron		0.01 % to 6.0 %
		Aluminum		0.03 % to 12.0 %
		Nickel		0.06 % to 30.0 %
		Manganese		0.06 % to 4.0 %
		Phosphorus		0.030 % to 1.0 %
		Silicon		0.010 % to 2.0 %
		Zinc		0.010 % to 45.0 %
		Copper		52 % to 95.0 %
5.	Low alloy Steel & Stainless Steel & Cast iron	Carbon	IS 228 (Part 1)	0.010 % to 4.00 %
		Silicon	IS 228 (Part 8)	0.050 % to 3.00 %
		Manganese	IS 228 (Part 2)	0.100 % to 2.00 %
		Phosphorous	IS 228 (Part 3)	0.005 % to 0.850 %
		Sulphur	IS 228 (Part 9)	0.005 % to 0.200 %
		Nickel	IS 228 (Part 5)	0.050 % to 20.00 %
		Chromium	IS 228 (Part 6)	0.050 % to 25.00 %
		Molybdenum	IS 228 (Part 7)	0.010 % to 3.0 %
II.	METALIC COATINGS & TREATMENT SOLUTIONS			
A.	Metallic Coatings			
1.	Zinc Coating on Steel Products	Mass of Zinc Coating	IS 6745	10 g/m ² to 800 g/m ²

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2.	Conversion Coating Anodizing Coating on Aluminum	Thickness of Anodizing Coating Thickness	IS 5523	5 micron to 20 micron.
III.	BUILDING MATERIAL			
1.	Cement	Loss on Ignition	IS 4032	0.1 % to 20 %
		Silica as SiO ₂	IS 4032	0.5 % to 50 %
		Aluminium as Al ₂ O ₃	IS 4032	0.2 % to 35 %
		Iron as Fe ₂ O ₃	IS 4032	0.1 % to 10 %
		Sulphate as SO ₃	IS 4032	0.1 % to 10 %
		Sodium as Na ₂ O	HH & T/PR/090	0.05 % to 5 %
		Potassium as K ₂ O	HH & T/PR/090	0.05 % to 5 %
		Chloride as Cl	IS 4032	0.01 % to 2.5 %
		Calcium as CaO	IS 4032	2.0 % to 70 %
		Manganese as MgO	IS 4032	0.2 % to 20 %
		Insoluble Residue	IS 4032	0.1 % to 40 %
2.	Fly Ash, Pozzolanic & Clay Etc.	Loss on Ignition	IS 1727	0.1 % to 20 %
		Silica as SiO ₂	IS 1727	1 % to 65 %
		Aluminium as Al ₂ O ₃	IS 1727	0.2 % to 35 %
		Iron as Fe ₂ O ₃	IS 1727	0.1 % to 10 %
		Sulphate as SO ₃	IS 1727	0.01 % to 10 %
		Sodium as Na ₂ O	IS 3812 (Part 1)	0.01 % to 5 %
		Potassium as K ₂ O	IS 3812 (Part 1)	0.01 % to 5 %
		Chloride as Cl	IS 4032	0.1 % to 5 %
		Calcium as CaO	IS 1727	0.2 % to 10 %
		Manganese as MgO	IS 1727	0.05 % to 10 %
		Insoluble Residue	IS 1727	20 % to 95 %
3.	Concrete Admixture	pH	IS 9103	2 to 12
		Ash Content	IS 9103	1.0 % to 15%
		Dry material content	IS 9103	2.0 % to 50 %
		Density	IS 9103	0.9 gm/cc to 2.0 gm/cc

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4.	Soil	pH Value	IS 2720 (Part 26)	2 to 12
		Water Soluble Sulphates	IS 2720 (Part 27)	1.0 mg/L to 1000 mg/L
		Water Soluble Chlorides	AASTHO T 291	1.0 mg/L to 1000 mg/L
		Organic Matter	IS 2720 (Part 22)	1.0 mg/L to 1000 mg/L
		Soluble Solids	IS 2720 (Part 21)	1.0 mg/L to 10000 mg/L
		Calcium Carbonate	IS 2720 (Part 23)	1.0 mg/L to 10000 mg/L
5.	Concrete	Acid soluble chloride	IS 14959 (Part 1 & 2)	0.01 % to 2.5 %
		Water soluble sulphate	IS 3025 (Part 24)	0.01 % to 2.5 %
6.	Aggregate	Acid soluble chloride	IS 3025 (Part 32)	0.01 % to 2.5 %
		Water soluble sulphate	IS 3025 (Part 24)	0.01 % to 2.5 %
		Alkali Reactivity (Mortar Bar & Chemical Method)	IS 2386 (Part 7)	Qualitative
7.	Emulsion	Miscibility with water	IS 8887	Qualitative
		Solubility in trichloroethylene	IS 1216	80 % to 100 %
8.	Bitumen Testing	Solubility in TCE	IS 1216	80 % to 100 %
IV.	WATER			
1.	Water For Construction purpose	pH	IS 3025 (Part 11)	2 to 12
		Chloride (Cl)	IS: 3025 (Part 32)	5 mg/L to 5000 mg/L
		Sulphate (SO ₃)	IS: 3025 (Part 24)	10 mg/L to 2000 mg/L
		Organic Matter	IS: 3025 (Part 18)	10 mg/L to 2000 mg/L
		Inorganic Matter	IS: 3025 (Part 18)	10 mg/L to 5000 mg/L
		Acidity by 0.02N NaOH	IS: 3025 (Part 22)	0.1 mL to 100 mL
		Alkalinity by 0.02N H ₂ SO ₄	IS: 3025 (Part 23)	0.1 mL to 100 mL
	Total Suspended Matter	IS: 3025 (Part 17)	10 mg/L to 5000 mg/L	

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MECHANICAL TESTING

I.	METAL AND ALLOYS			
1.	Reinforcement Bar	Tensile Testing	IS 1608	4 kN to 400 kN 40 kN to 1000 kN
		Yield Strength	IS 1608	4 kN to 400 kN 40 kN to 1000 kN
		% Elongation	IS 1608	Qualitative
		Bend Test	IS 1599	Qualitative {Mandrel diameter: (12, 14, 16, 18, 20, 22,32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 60, 62, 64, 75, 80, 84, 96, 100, 112, 120, 125, 128, 140, 142, 144, 150, 160, 168, 175, 180, 192, 196, 216, 224) mm}
		Re-bend Test	IS 1786	Qualitative {Mandrel diameter: (12, 14, 16, 18, 20, 22, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 60, 62, 64, 75, 80, 84, 96, 100, 112, 120, 125, 128, 140, 142, 144, 150, 160, 168, 175, 180, 192, 196, 216, 224) mm}
		Mass per meter	IS 1786	0.01 kg/m to 10 kg/m
2.	Structural Steel (Plates, Angle, channels, beams, Pipes etc) Steel Casting,	Tensile Testing	IS 1608 SA 370-17- ASME Section IIA	4 kN to 400 kN 40 kN to 1000 kN
		Yield Strength	IS 1608 SA 370-17- ASME Section IIA	4 kN to 400 kN 40 kN to 1000 kN

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		% Elongation	IS 1608 SA 370-17- ASME Section IIA	Qualitative
		Bend Test	IS 1599 ASTM A370	Qualitative {Mandrel diameter: (12, 14, 16, 18, 20, 22, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 60, 62, 64, 75, 80, 84, 96, 100, 112, 120, 125, 128, 140, 142, 144, 150, 160, 168, 175, 180, 192, 196, 216, 224) mm}
3.	Structural Steel/ Welded Pipe & Plate	Rockwell Hardness	IS 1586 (Part 1)	40 HRA to 91 HRA 30 HRB to 100 HRB 20 HRC to 70 HRC
		Brinell Hardness	IS 1500 (Part 1)	100 HBW to 400 HBW 10/3000
		Vickers Hardness	IS 1501 (Part 1)	50 HV5 to 1000 HV5 50 HV10 to 1000 HV10 50 HV30 to 1000 HV30
		Charpy Impact Test	IS 1757 (Part 1) EIL Spec No 6-77-0006	2 J to 240 J (as Ambient Temperature 10°C to 35°C)
4.	HT Strand Wire	Mass per meter Lay Length Nominal Diameter Dia. of Centre Wire Breaking Load 0.2% Proof strength Elongation at 600 mm Gauge length	IS 14268 IS 1608	0.1 kg/m to 6 kg/m 100 mm to 500 mm 9 mm to 16 mm 3 mm to 6 mm 4 kN to 400 kN 4 kN to 400 kN 0 to 20 %
5.	Ferrous Tubes and Pipes	Flattening Test	IS 2328 SA 370-17- ASME Section IIA	Qualitative 50 mm NB to 690 mm NB

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6.	Welded Plates and Pipes (PQR & WPS)	Tensile Test (Transverse / All Weld Tensile), Macro (Visual) Fracture Test Nick Break Test	IS 1608 ASME SEC IX -2015 (QW 150, 160, 180) IS 2825 IS 7310 (Part 1) IS 7307 (Part 1) IS 814 ASME SEC II Pt. C IBR API- 1104 AWS D1.1/D1.1M	Qualitative Qualitative Qualitative Qualitative Qualitative Qualitative Qualitative Qualitative
7.	Austenitic Stainless Steel	Intergranular Corrosion Test – Practice-E	ASTM-A262:2015	Qualitative (Magnification 5X to 20 X and 200X)
II.	BUILDING MATERIAL			
1.	Coarse Aggregate	Flakiness Index	IS 2386 (Part 1)	1 % to 100 %
		Elongation Index	IS 2386 (Part 1)	1% to 100 %
		Sieve Analysis	IS 2386 (Part 1)	1 % to 100 %
		Water Absorption	IS 2386 (Part 3)	0.1 % to 20 %
		Impact Value	IS 2386 (Part 4)	1 % to 100 %
		Abrasion Value	IS 2386 (Part 4)	1 % to 100 %
		Crushing Value	IS 2386 (Part 4)	1 % to 100 %
		Bulk Density	IS 2386 (Part 3)	1 Kg/L to 3 Kg/L
		Specific Gravity	IS 2386 (Part 3)	2 to 3.5
		Soundness	IS 2386 (Part 5)	0 to 100 %
		Deleterious Matter Aggregate	IS 2386 (Part 2)	0 to 10 %
		Stripping Value	IS 6241	Qualitative
		Ten percent fine value	IS 2386 (Part 4)	1 kN to 500 kN
2.	Fine Aggregate	Sieve Analysis	IS 2386 (Part 1)	1 % to 100 %
		Water Absorption	IS 2386 (Part 3)	0.1 % to 20 %
		Specific Gravity	IS 2386 (Part 3)	2 to 3.5
		Soundness	IS 2386 (Part 5)	0 to 100 %
		Deleterious Matter	IS 2386 (Part 2)	0 to 10 %
		Bulk Density	IS 2386 (Part 3)	1 Kg/L to 3 Kg/L

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3.	Fresh Concrete Mix	Workability by slump Cone	IS 1199	25 mm to 250 mm
4.	Concrete Cube	Compressive Strength	IS 516	200 KN to 2700 KN 9 N/mm ² to 120 N/mm ²
5.	Concrete	Permeability Test	DIN 1048 (Part 5)	Qualitative
		Core Testing	IS 516 IS 1199	8.9 N/mm ² to 120 N/mm ²
6.	Cement (OPC 33 Gr./ OPC 43 Gr./ OPC 53 Gr./ PPC – Fly Ash Based/ PPC – Calcined Clay Based)	Fineness	IS 4031 (Part 2)	100 m ² /Kg to 500 m ² /Kg
		Initial Setting Time	IS 4031 (Part 5)	5 min to 600 min
		Final Setting Time	IS 4031 (Part 5)	5 min to 600 min
		Consistency	IS 4031 (Part 4)	10 % to 50 %
		Compressive Strength	IS 4031 (Part 6)	10 N/mm ² to 80 N/mm ²
		Soundness (Le-Chatelier)	IS 4031 (Part 3)	0 to 10 mm
		Soundness (by auto clave method)	IS 4031 (Part 3)	0.01 % to 5 %
		Drying Shrinkage	IS 4031 (Part 10)	0.01 % to 5 %
7.	Fly Ash	Fineness	IS 1727	300 m ² /kg to 450 m ² /kg
		Particles retained on 45 micron IS Sieve	IS 1727	1 % to 100 %
		Lime reactivity	IS 1727	1 N/mm ² to 20 N/mm ²
		Compressive Strength at 28 days	IS 1727	1 N/mm ² to 50 N/mm ²
		Soundness by autoclave	IS 1727 IS 4031 (Part 3)	0.01% to 1.3 %
8.	Bricks	Dimension		
		Length	IS 3495 (Part 4)	100 mm to 5000 mm
		Width	IS 3495 (Part 4)	100 mm to 5000 mm
		Height	IS 3495 (Part 4)	100 mm to 5000 mm
		Compressive Strength	IS 3495 (Part 1)	5 N/mm ² to 120 N/mm ²
		Water Absorption	IS 3495 (Part 2)	2 % to 100 %
		Efflorescence	IS 3495 (Part 3)	Qualitative
9.	Tiles (Cement concrete flooring)	Water absorption	IS 1237	Upto 50 %
		Wet transverse Strength	IS 1237	1.7 N/mm ² to 4.0 N/mm ²
		Resistance to wear	IS 1237	0.2 mm to 10 mm

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10.	Paver Block	Water absorption	IS 15658	1 % to 50 %
		Compressive Strength	IS 15658	8.9 N/mm ² to 120 N/mm ²
		Abrasion resistance of wearing layer	IS 15658	1000 mm ³ to 10000 mm ³
11.	Bitumen	Flash point test (Cleveland open cup)	IS 1209	15 °C to 360 °C
		Softening Point (R & B)	IS 1205	Upto 110 °C
		Penetration at 25°C 100g 5 s in 0.1mm	IS 1203	5 division to 400 division
		Kinematic Viscosity at 135°C	IS 1206 (Part 3)	100 CsT to 1000 CsT
		Absolute Viscosity at 60°C	IS 1206 (Part 2)	600 Poises to 6500 Poises
		Ductility Test at 25°C	IS 1208	5 cm to 100 cm
12.	Emulsion	Residue on 600 micron	IS 8887	0.1%
		Viscosity by saybolt furol viscometer 25 & 50C	IS 3117	10 sec to 300 sec
		Coagulation of emulsion	IS 8887	Qualitative
		Storage stability	IS 8887	0.1 % at 3 %
		Particle charge	IS 8887	Qualitative
		Miscibility with water	IS 8887	Qualitative
		Test on residue		
		Residue by evaporation	IS 8887	0 to 80 %
Penetration 25C/100g/5 sec	IS 1203	0 to 400 %		
Ductility 27C/cm	IS 1208	0 to 100 %		
III.	SOIL AND ROCK			
1.	Soil	Proctor Compaction test (Light Compaction)	IS 2720 (Part 7)	1 % to 50 %
		Moisture Content		
		Proctor Compaction test (Heavy Compaction)	IS 2720 (Part 8) 1983 RA 2015	1 g/cc to 4 g/cc
		Density		

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		CBR California Bearing ratio (Soaked, Un-soaked)	IS 2720 (Part 16)	1 % to 100 %
		Free swelling index	IS 2720 (Part 40)	0.5 % to 400 %
		Specific gravity	IS 2720 (Part 3)	1 to 4
		Atterberg limit Liquid limit Plastic limit	IS 2720 (Part 5)	15 % to 400 % 5 % to 100 %
		Grain Size Analysis Sieve analysis Wet sieve analysis Hydrometer	IS 2720 (Part 4)	1 % to 100% for 100 mm to 4.75 mm 4.75 mm to 75 micron 75 micron to 2 micron
		Shrinkage Limit	IS 2720 (Part 6)	1 % to 50 %
		Direct Shear Test	IS 2720 (Part 13)	Vertical stress upto 4.0 Kg/cm ² & Shearing load upto 250 Kg
		Swelling Pressure	IS 2720 (Part 41)	0.01 Kg/cm ² to 10 Kg/cm ²

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