

**Laboratory**

**Shree Balaji Test House Pvt. Ltd. (Testing Division), FCA-560, Chawla Colony, Ballabgarh, Distt. Faridabad, Haryana**

**Location 1: FCA-560, Chawla Colony, Ballabgarh, Distt. Faridabad, Haryana**

**Location 2: FCA-633/A, East Chawla Colony, Ballabgarh, Distt. Faridabad, Haryana**

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

**Certificate Number TC-6681**

**Page 1 of 16**

**Validity 26.12.2017 to 25.12.2019**

**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**

<b>LOCATION 1</b>				
<b>I.</b>	<b>WATER</b>			
<b>1.</b>	<b>Water (for Construction Purpose)</b>	pH Value	IS 3025 (Part 11): 1983 (RA 2012)	2 to 12
		Chloride	IS 3025 (Part 32): 1988 (RA 2009)	10 mg/l to 1000 mg/l
		Sulphate	IS 3025 (Part 24): 1986 (RA 2009)	10 mg/l to 1000 mg/l
		Total Suspended Material	IS 3025 (Part 17): 1984 (RA 2012)	5 mg/l to 1000 mg/l
		Acidity (ml of 0.02 'N' NaOH used to neutralize the 100 ml of the water sample)	IS 3025 (Part 23): 1986 (RA 2009)	2 ml to 5 ml
		Alkalinity (ml of 0.02 'N' H <sub>2</sub> SO <sub>4</sub> used to neutralize the 100 ml of the water sample)	IS 3025 (Part 22): 1986 (RA 2009)	5 ml to 25 ml
		Organic Solids	IS 3025 (Part 18): 1984 (RA 2012)	2 mg/l to 1000 mg/l
		Inorganic Solids	IS 3025 (Part 16): 1984 (RA 2012)	10 mg/l to 3000 mg/l

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

**Certificate Number TC-6681**

**Page 2 of 16**

**Validity 26.12.2017 to 25.12.2019**

**Last Amended on --**

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II.	<b>BUILDING MATERIAL</b>			
1.	<b>Admixture</b>	pH value	IS 9103:1999 (RA 2008)	2 to 12
		Relative density	IS 9103:1999 (RA 2008)	1.0 to 1.5
		Chloride ion content	IS 6925:1973 (RA 2008)	0.01 % to 1.0 %
		Dry material content	IS 9103:1999 (RA 2008)	5 % to 40 %
		Ash content	IS 9103:1999 (RA 2008)	5 % to 40 %
2.	<b>Cement OPC/PPC/PSC</b>	Insoluble Residue	IS 4032:1985 (RA 2009)	0.5 % to 35 %
		Silica as SiO <sub>2</sub>	IS 4032:1985 (RA 2009)	18 % to 35 %
		Loss on Ignition	IS 4032:1985 (RA 2009)	1 % to 6 %
		Chloride	IS 4032:1985 (RA 2009)	0.01 % to 0.15 %
		Magnesia as MgO	IS 4032:1985 (RA 2009) 4.8.2 EDTA	1.5 % to 7 %
		Calcium as CaO	IS 4032:1985 (RA 2009) 4.7.2 EDTA	40 % to 70 %
		Aluminium as Al <sub>2</sub> O <sub>3</sub>	IS 4032:1985 (RA 2009) 4.6.1 Gravimetric	2 % to 10 %
		Iron as Fe <sub>2</sub> O <sub>3</sub>	IS 4032:1985 (RA 2009) 4.5.2 EDTA method	2 % to 5 %
		Sulphuric anhydride as SO <sub>3</sub>	IS 4032:1985 (RA 2009)	1 % to 4 %
3.	<b>Clays, Soil</b>	pH Value	IS 2720 (Part 26): 1987 (RA 2007)	2 to 12
		Soluble Sulphate as SO <sub>3</sub>	IS 2720 (Part 27): 1977 (RA 2010) BS 1377 (Part 3): 1990	0.01 % to 2 %
		Soluble Chlorides as Cl	IS 2720 (Part 27): 1977 (RA 2010) BS 1377 (Part 3): 1990	0.01 % to 0.4 %

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

**Certificate Number**        **TC-6681**

**Page 3 of 16**

**Validity**                        **26.12.2017 to 25.12.2019**

**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
		Organic Matter	IS 2720 (Part 22): 1972 (RA 2010)	0.01 % to 10 %
		Soluble Solids	IS 2720 (Part 21): 1977 (RA 2010)	0.01 % to 10 %
		Calcium Carbonate	IS 2720 (Part 23): 1976 (RA 2010)	0.05 % to 15 %
4.	<b>Thermoplastic Road Marking Material</b>	Titanium Dioxide (TiO <sub>2</sub> )	ASTM D 4797:88 (2012)	2.0 % to 15 %
		CaCO <sub>3</sub> & Inert Fillers	ASTM D 4797:88 (2012)	0.5 % to 80 %
5.	<b>Fly Ash</b>	Sulphate as SO <sub>3</sub>	IS 1727:1967	0.01 % to 1 %
		Chlorides as Cl	IS 1727:1967	0.01 % to 0.2 %
6.	<b>Rock Stone, Coarse &amp; Fine Aggregate</b>	Calcium Carbonate	BS 1377 (Part 3): 1990	2 % to 50 %
		Sulphate as SO <sub>3</sub> (Acid Extract)	BS 1377 (Part 3): 1990 Gravimetric	0.05 % to 5 %
		Soluble Chloride as Cl	BS 1377 (Part 3): 1990	0.01 % to 2 %

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

**Certificate Number**        **TC-6681**

**Page 4 of 16**

**Validity**                        **26.12.2017 to 25.12.2019**

**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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**MECHANICAL TESTING**

<b>LOCATION 1</b>				
<b>AT LABORATORY</b>				
<b>I.</b>	<b>BUILDING MATERIALS</b>			
<b>1.</b>	<b>Admixture</b>	Water content	IS 9103 (Part 3): 1999 (RA 2016)	10 % to 90 %
		Time of setting	IS 8142:1976 (RA 2011)	5 min to 5 hrs
		Flexural strength	IS 516:1959 (RA 2013)	01 N/mm <sup>2</sup> to 10 N/mm <sup>2</sup>
		Length change	IS 1199:1959 (RA 2013)	0.02 mm to 150 mm
		Bleeding	IS 9103:1999 (RA 2013)	0 to 5 %
		Air content	IS 9103:1999 (RA 2013)	0.5 % to 5 %
<b>2.</b>	<b>Hardened Concrete/Fresh Concrete</b>	Compressive Strength of Concrete cube/ Cylindrical	IS 516:1959 (RA 2013)	0.1 MPa to 80 MPa
		Compressive Strength of accelerated cured concrete specimen	IS 516:1959 (RA 2013)	0.1 MPa to 80 MPa
		Water absorption	IS 2185 (Part 2): 1983 (RA 2010)	0.10 % to 15 %
		Flexural Strength	IS 516:1959 (RA 2013)	0.5 MPa to 20 MPa
		Slump	IS 1199:1959 (RA 2013)	1.0 mm to 300mm
<b>3.</b>	<b>Timber/ Plywood</b>	Moisture Content	IS 1708 (Part 1): 1986 (RA 2010)	0.1 % to 10 %
<b>4.</b>	<b>Thermoplastic Road Marking Material</b>	Binder Content	AASHTO-T- 250-05-2014)	0.5 % to 80 %
		Glass Beads Content	AASHTO-T- 250-05-2014 )	0.5 % to 80 %
		Drying Time	As Per MORTH Spec. 2001	1 min. to 300 min.

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

**Certificate Number TC-6681**

**Page 5 of 16**

**Validity 26.12.2017 to 25.12.2019**

**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
		Cracking Resistance	ASHTO T-249-2012 1997	Qualitative
		Softening Point- R&B	ASTM D 36-09	30 °C to 400 °C
		Flow Resistance Test	AASHTO T-250-2014	1 % to 50 %
		Gradation of Glass Beads	AASHTO T-250-2014	1 % to 100 %
		Roundness-Microscopic	BS 6088:1981	1 % to 100 %
		Free Flow Test	MORTH Spec. 2001	Qualitative
		Luminance Test	AASHTO M249-12/ASTM E2302-03(2012)	10 % to 98 %
		Skid Resistance Test	BS 6044:1987	10 % to 70 %
		Yellowness Index Test	AASHTO M249-4/ASTM E2302-03(2009)	0.02 % to 0.13 %
		Refractive Index	BS 6088: 1981	0.02 % to 1.6 %
		Coeff. of retro-reflection	ASTM D1710-11	1.0 mcd/m <sup>2</sup> /lux to 1000 mcd/m <sup>2</sup> /lux
5.	<b>Bitumen Emulsion</b>	Solubility in trichloroethylene	IS 1216:1978 (RA 2009)	20 % to 100 %
		Distillation in % by volume	ASTM D-244 (RA 2009)	0 to 100 %
		Residue on 600 Micron sieve	IS 8887:2004 (RA 2009)	0 to 10 %
		Viscosity by sayblot furol viscometer	IS 3117:2004 (RA 2009)	5 sec to 500 sec
		Coagulation of emulsion @ low temperature	IS 8887:2004 (RA 2009)	Qualitative
		Storage stability after 24 hour	IS 8887:2004 (RA 2009)	0 to 5 %

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

**Certificate Number** **TC-6681**

**Page 6 of 16**

**Validity** **26.12.2017 to 25.12.2019**

**Last Amended on --**

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		Particle charge	IS 8887:2004 (RA 2009)	(-) to (+)
		Miscibility with water	IS 8887:2004 (RA 2009)	Qualitative
		Residue by evaporation	IS 8887:2004 (RA 2009)	10 % to 95 %
		Ductility	IS 1208:1978 (RA 2009)	0.05 m to 1 m
		Penetration	IS 1203:1978 (RA 2013)	(10 to 100) 1/10 <sup>th</sup> mm
		Determination of coating ability & water resistance	IS 8887:2004 (RA 2009)	Qualitative
		Determination of mixing with cement	IS 8887:2004 (RA 2009)	0 to 10 %
6.	<b>Curing Compound</b>	Water Retention	ASTM C 156-11	0.5 % to 100 %
		Surface Drying Time	ASTM C 309-11	1 minute to 600 minutes
		Curing Efficiency	BS 7542:1992	1 % to 100 %
7.	<b>Bentonite</b>	Moisture	IS 6186:1986 (RA 2010)	5 % to 12 %
		Fineness	IS 6186:1986 (RA 2010)	50 % to 98%
		Sand Content	IS 6186:1986 (RA 2010)	0.1 % to 2%
		PH Value	IS 6186:1986 (RA 2010)	9.0 to 10.5
		Swelling	IS 6186:1986 (RA 2010)	Qualitative
II.	<b>SOIL &amp; ROCK</b>			
1.	<b>Soil</b>	Liquid Limit	IS 2720 (Part 5): 1985 (RA 2015)	10 % to 80 %
		Plastic Limit	IS 2720 (Part 5): 1985 (RA 2015)	5 % to 50 %
		Shrinkage Limit	IS 2720 (Part 6): 1972 (RA 2011)	1 % to 50%
		<b>Heavy Compaction</b> MDD/OMC	IS 2720 (Part 8): 1983 (RA 2015)	1.5 g/cc to 2.5 g/cc 1 % to 18%

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

**Certificate Number** **TC-6681**

**Page 7 of 16**

**Validity** **26.12.2017 to 25.12.2019**

**Last Amended on --**

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		Light Compaction MDD/OMC	IS 2720 (Part 7): 1980 (RA 2011)	1.2 g/cc to 2.5 g/cc 1 % to 30%
		Moisture content	IS 2720 (Part 2): 1973 (RA 2015)	0.1 % to 30 %
		Tri axial shear Test (UU)	IS 2720 (Part 11): 1993 (RA 2011)	$\Phi = 5$ to $50^\circ$ $C = 0.01 - 2 \text{ kg / cm}^2$
		Consolidation Test	IS 2720 (Part 15) : 1965 (RA 2011)	$0.1 \times 10^{-3}$ To $8 \times 10^{-5} \text{ cm}^2/\text{s}$
		Free Swell Index	IS 2720 (Part 40): 1977 (RA 2011)	5 % to 70 %
		Relative Density	IS 2720 (Part 14): 1983 (RA 2015)	0.5 to $3.0 \text{ g/cm}^3$
		Grain size Analysis	IS 2720 (Part 4): 1985 (RA 2015)	75 mic. – 2 mm
		California Bearing Ratio (C.B.R.)	IS 2720 (Part 16): 1987 (RA 2011)	3% to 60%
		Direct Shear Test	IS 2720 (Part 13): 1986 (RA 2015)	$\Phi = 5 - 50^\circ$ $C = 0.01$ to $1 \text{ kg / cm}^2$
		Coefficient of Interface Friction	IS 13326 (Part 1): 1992 (RA 2010)	$1^\circ$ to $50^\circ$
2.	Concrete Structure	Pile Load Test (Concrete Structure) Static Load Test Dynamic Load Test Lateral Load Test Pullout Test	IS 2911 (Part 4): 1985 (RA 2010)	100 Tone to 2500 Tone NA 1 Tone to 50 Tone 1 Tone to 50 Tone
3.	Retro reflective Signboards	Coefficient of Retro-reflection	ASTM -E810-03 ASTM -E1709-09	$(10 \text{ cd to } 1000 \text{ cd})/\text{m}^2/\text{lux}$
4.	Rock	Unconfined Compressive Strength	IS 9143:1979 (RA 2010)	50 MPa to 300 MPa

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

**Certificate Number**        **TC-6681**

**Page 8 of 16**

**Validity**                        **26.12.2017 to 25.12.2019**

**Last Amended on --**

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		Bulk Density	IS 13030:1991 (RA 2010)	1.0 g/cc to 3.0 g/cc
		Moisture Content	IS 13030:1991 (RA 2010)	1.0 % to 3.0 %
		Specific Gravity	IS 13030:1991 (RA 2010)	1.0 to 3.0
		Water Absorption	IS 13030:1991 (RA 2010)	1.0 % to 3.0 %
		Porosity	IS 13030:1991 (RA 2010)	0.1 to 0.5
		Dry Density	IS 13030:1991 (RA 2010)	0.8 g/cc to 3 g/cc
		Retained Tensile Strength	AASHTO T 283-07	1.0 % to 100 %
		Cerchar Abrasiveness Index	ASTM D7625-10 ISRM Method	0.5 to 10
		Fractured Faces	ASTM D 5821:13	1.0 % to 100 %



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

**Certificate Number**        **TC-6681**

**Page 9 of 16**

**Validity**                        **26.12.2017 to 25.12.2019**

**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
-----	----------------------------	-------------------------	---	--

**MECHANICAL TESTING**

<b>LOCATION 1</b>				
<b>AT SITE</b>				
<b>I.</b>	<b>SOIL &amp; ROCK</b>			
<b>1.</b>	<b>Soil</b>	Standard Penetration Test (Soil Investigation Test)	IS 2131:1981 (RA 2011)	N. value (0 to 100)
		Dry Density- Core Cutting Method	IS 2720 (Part 29): 1975 (RA 2010)	1 g/cc to 3.0 g/cc
		Dry Density- Sand Replacement Method	IS 2720 (Part 28): 1974 (RA 2010)	1 g/cc to 3.0 g/cc
		Plate Load Test K-Value Test Ev2 Test	IS 1888:1982 (RA 2011) IS 9214:1979 (RA 2011) DIN:18134:2001-09	(200 to 5000) kN (3 to 8) Kg/cm <sup>2</sup> /cm (15 to 90) MN/m <sup>2</sup>
<b>2.</b>	<b>Bituminous/ Concrete Road Section</b>	Benkelman Beam Deflection Test (Bituminous Section)/ FWD	IRC:81-1981-1997 Ministry of Road Transport & Highway-Manual for Construction and Supervision of Bituminous Works, IRC, Year 2001	0 to 15 mm
		Surface evenness of Highway Pavements (Bituminous & Concrete Road)/NSV	IRCSP:16-2004	1500 mm/km to 3500 mm/km

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

**Certificate Number**        **TC-6681**

**Page 10 of 16**

**Validity**                        **26.12.2017 to 25.12.2019**

**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
		Bridge Load Test (Bituminous & Concrete Section)	IRCSP:51 Ministry of Road Transport & Highway-Manual for Construction and Supervision of Bituminous Works, IRC, Year 2001	100 Tone to 1000 Tone

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

**Certificate Number**        **TC-6681**

**Page 11 of 16**

**Validity**                        **26.12.2017 to 25.12.2019**

**Last Amended on --**

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**MECHANICAL TESTING**

LOCATION 2				
I.	<b>BUILDING MATERIALS</b>			
1.	<b>Coarse Aggregates</b>	Sieve Analysis/ Particle Shape & Size/Material Finer	IS 2386 (Part 1): 1963 (RA 2016)	20 % to 100 %
		Specific Gravity	IS 2386 (Part 3): 1963 (RA 2016)	1.0 to 3.0
		Water Absorption	IS 2386 (Part 3): 1963 (RA 2016)	0.1 % to 30 %
		Aggregate Impact Value	IS 2386 (Part 4): 1963 (RA 2016)	5 % to 60 %
		Flakiness Index	IS 2386 (Part 1): 1963 (RA 2016)	5 % to 60 %
		Elongation Index	IS 2386 (Part 1): 1963 (RA 2016)	5 % to 60 %
		Crushing Value	IS 2386 (Part 4): 1963 (RA 2016)	5 % to 60%
		Los Angle Abrasion Value	IS 2386 (Part 4): 1963 (RA 2016)	5 % to 60%
		10% fine value	IS 2386 (Part 4): 1963 (RA 2016)	50 kN to 400 kN
		Bulk Density	IS 2386 (Part 3): 1963 (RA 2016)	1 g/cc to 3g/cc
		Polished stone value	IS 2386 (Part 4): 1963 (RA 2016) BS 812 (Part 114): 1989	10 % to 80 %

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

**Certificate Number TC-6681**

**Page 12 of 16**

**Validity 26.12.2017 to 25.12.2019**

**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
		Stripping Value of aggregate	IS 6241:1971 (RA 2008)	40 % to 98 %
		Soundness	IS 2386 (Part 5): 1963 (RA 2016)	2 % to 30 %
		Deleterious Material	IS 2386 (Part 2): 1963 (RA 2016)	0.1 % to 5.0 %
		Alkali Reactivity	IS 2386 (Part 7): 1963 (RA 2016)	2 mili/moles to 500 mili/moles
		Petrographic Examination	IS 2386 (Part 8): 1963 (RA 2016)	Qualitative
		Mortar Making Properties	IS 2386 (Part 6): 1963 (RA 2011)	0.1 % to 100 %
<b>2.</b>	<b>Fine Aggregates</b>	Sieve Analysis/ Particle Shape & Size/Material Finer	IS 2386 (Part 1): 1963 (RA 2016)	20 % to 100 %
		Specific Gravity	IS 2386 (Part 3): 1963 (RA 2016)	1.0 % to 3.0 %
		Water Absorption	IS 2386 (Part 3): 1963 (RA 2016)	0.1 % to 30 %
		Bulk Density	IS 2386 (Part 3): 1963 (RA 2016)	1 g/cc to 3 g/cc
		Sand equivalent Test	IS 2720 (Part 37): 1976 (RA 2011)	1 % to 85 %
		Soundness	IS 2386 (Part 5): 1963 (RA 2016)	2 % to 30 %
		Deleterious Material	IS 2386 (Part 2): 1963 (RA 2016)	0.1 % to 5.0 %
		Alkali Reactivity	IS 2386 (Part 7): 1963 (RA 2016)	2 mili/moles to 500 mili/moles

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

**Certificate Number TC-6681**

**Page 13 of 16**

**Validity 26.12.2017 to 25.12.2019**

**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
3.	Clay Burnt Bricks/Fly Ash	Water Absorption	IS 3495 (Part 2): 1992 (RA 2011)	1 % to 30 %
		Compressive Strength	IS 3495 (Part 1): 1992 (RA 2011)	3.5 MPa to 50 MPa
		Efflorescence	IS 3495 (Part 3): 1992 (RA 2011)	Qualitative
		Dimension	IS 1077:1992 (RA 2011)	L=4000 mm to 5000 mm W=2000 mm to 3000 mm H=1000 mm to 2000 mm
4.	Cement- OPC/PPC/PSC	Standard Consistency	IS 4031 (Part 4): 1988 (RA 2009)	20 % to 45 %
		Compressive Strength	IS 4031 (Part 6): 1988 (RA 2009)	10 MPa to 80 MPa
		Soundness By Le-Chatelier By Autoclave	IS 4031 (Part 3): 1988 (RA 2014)	0.1 mm to 10 mm 0.01 % to 0.8 %
		Fineness Blaine Dry sieving	IS 4031 (Part 2): 1996 (RA 2008) IS 4031 (Part 1): 1996 (RA 2016)	150 m <sup>2</sup> /kg to 600 m <sup>2</sup> /kg 0 to 10 %
		Setting Time a) Initial Setting Time b) Final Setting time	IS 4031 (Part 5): 2008 (RA 2009)	30 min to 300 min 60 min to 600 min
		Specific Gravity	IS 4031 (Part 11): 1988 (RA 2014)	0.5 to 5.0
5.	Bituminous Products (Bitumen PMB/ CRMB/NRMB)	Thermal Stability	IS 14982-2001 (RA 2012)	Qualitative
		Bitumen Content / Binder Content Test	ASTM D 2172 (RA 2011)	0.1 % to 10%
		Specific Gravity	IS 1202:1978 (RA 2014)	0.5 to 1.5
		Softening Point	IS 1205:1978 (RA 2014)	15 °C to 80 °C

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**Location 2:** FCA-633/A, East Chawla Colony, Ballabgarh, Distt. Faridabad, Haryana

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

**Certificate Number** **TC-6681**

**Page 14 of 16**

**Validity** **26.12.2017 to 25.12.2019**

**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
		Penetration	IS 1203:1978 (RA 2014)	I div to 350 div
		Flash point	IS 1209:1978 (RA 2014)	15 °C to 275 °C
		Ductility	IS 1208:1978 (RA 2014)	0.05 m to 1 m
		Viscosity	IS 1206:1978 (RA 2014)	5 sec to 1200 sec
		Kinematic Viscosity at 135°C	IS 1206 (Part 3): 1978 (RA 2014) IS 73:2013	150 cSt to 600 cSt
		Absolute Viscosity	IS 1206 (Part 2): 1978 (RA 2014)	360 Poise to 24000 Poise
		Elastic Recovery	IS 15462:2014	1 % to 100 %
		Frass Breaking Point	IS 9381: 2014	0 to (-40) °C
		Separation,	IS 15462:2004 (RA 2014)	0.1 % to 100 %
		Loss on heating	IS 212:1983 (RA 2014)	0.05 % to 10 %
		Loss in weight	IS 9382:1979 (RA 2014)	0.01% to 10 %
		Water content	IS 1211:1978 (RA 2014)	0.1 % to 10 %
		Mineral Matter (Ash)	IS 1217:1978 (RA 2014)	0.1 % to 10 %
		Marshal Stability & Flow	ASTM D 6927:2004	Min-900 kg, Flow 2.0 to 4.0 mm
		<b>Thin Film oven Test</b>		
		Increase in softening point	IS 1205:1978 (RA 2014)	5 % to 10 %
		Reduction in Penetration of residue	IS 1203:1978 (RA 2014)	30 % to 45 %
		Elastic recovery of half thread in ductilometer at 25 °C	IS 15462:1978 (RA 2014)	72 % to 90 %
		Viscosity ratio at 60 °C	IS 1206:1978 (RA 2014)	3 % to 5 %
		Ductility at 25 °C (cm)	IS 1208:1978 (RA 2014)	0.4 m to 1 m
		Boiling Water Test	ASTM D3625:1996 (2005)	Qualitative
		Pour Point	IS 1448 (Part 10): 1970 (RA 2010)	0 to 50 °C

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**Page 15 of 16**

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**Last Amended on --**

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		Solubility in HDO	IS 14982:2001 (RA 2012)	0.1 % to 100 %
		Solubility in LDO	IS 14982:2001 (RA 2012)	0.1 % to 100 %
		Retained Marshall Stability	IS 14982:2001 (RA 2012)	0.5 % to 100 %
		Mastic Hardness	IS 1195:2002 (RA 2012)	0 to 100 %
		Resilient Modulus	IRC 37:2012	500 MPa to 6000 MPa

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**Page 16 of 16**

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**NON - DESTRUCTIVE TESTING**

LOCATION 1				
I.	BUILDING MATERIALS-REINFORCED CONCRETE STRUCTURES			
1.	Reinforced Concrete Structures	Pile Integrity Test	ASTM-D 5882-07	2 m to 40 m
		Rebound Hammer	IS 13311 (Part 2): 1992 (RA 2013)	20 N/mm <sup>2</sup> to 60 N/mm <sup>2</sup>
		Ultrasonic Pulse Velocity Test (UPV)	IS 13311 (Part 1): 1992 (RA 2013)	0.1 km/sec to 5.5 km/sec