

Laboratory **The Bombay Textile Research Association, Lal Bahadur Shastri Marg
(L.B.S. Marg), Ghatkopar (West), Mumbai, Maharashtra**

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

Certificate Number **TC-6941 (in lieu of T-1252, T-0363 & T-0364) Page 1 of 15**

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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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BIOLOGICAL TESTING

I. RESISTANCE TO MICROBIAL ATTACK				
1.	Textiles & Fabrics	Antibacterial Activity (Parallel Streak Method)	AATCC 147-2016	Present/Absent
		Anti bacterial activity (Agar diffusion plate test)	ISO 20645-2004	Present/Absent
		Antibacterial activity	AATCC 100-2012 ASTM E 2149-13a/2013	(0 to 99.9) %
		Antibacterial activity (Absorption method)	JIS L 1902-2015 ISO 20743-2013	A <2 to >10
		Antimicrobial activity for carpets (Single streak method)	AATCC 174- 2016 AATCC 174-2016	(0 to 99.9) % Present/Absent
		Antifungal activity (Agar plate method)	AATCC 30-2013 (II) & (III)	Present/Absent
2.	Paints and Surface Coatings-Coated Material Sheets, Plastic, Painted Sheets, Non-Woven Fabric, Canvas	Antifungal Activity	ASTM D 3273-2016 (Reapproved 2013) ASTM D 5590-2000 (Reapproved 2005) ASTM G 21-2015	Present/Absent
		Antibacterial Activity	JIS Z 2801-2010 (Amended 2012)	R>2=Effective R<2=Not effective
			ISO 22196-2007 ASTM E 2180-2007	R>2=Effective R<2=Not effective (0 to 99.99) %

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II.	WATER			
1.	Drinking Water	Standard plate count (Viable bacterial count)	IS 1622:1981 (RA 2014)	≥ 1 CFU/ml
		Coliform count	IS 1622:1981 (RA 2014)	(2 to 1600) MPN/100ml
		E.coli	IS 1622:1981 (RA 2014)	Present / Absent per 100 ml

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CHEMICAL TESTING

I.	TEXTILE			
1.	Yarn / Fabric	Mercerization in Cotton – Barium Activity Number	IS 1689-1973 (RA 2013)	100 to 160
		Water Soluble Matter	IS 3456-1966 (RA 2016)	0.1 % to 20 %
		Whiteness by Reflectance Measurement	AATCC 110-2015	10 to 200
2.	Fibre / Yarn / Fabric	Identification of Fibre	IS 667-1981 (RA 2013) AATCC 20-2013	Qualitative
		Blend Analysis	IS 3416 (Part 1)- 1988 (RA 2013) IS 1889 (Part 4)-1979 (RA 2016) IS 2006-1988 (RA 2013) IS 3421-1988 (RA 2016) IS 2005-1988 (RA 2013) AATCC 20A-2014	(1 to 100) %
		Estimation of Fatty Matter, Fats / Waxes, Ash content	IS 199-1989 (RA 2016)	Wax: (0.1 to 5) % Ash: (0 to 100) %
		Moisture content	IS 199-1989 (RA 2016)	(0.5 to 20) %
		Colour Fastness to Washing with Soap or Soap and Soda	IS/ISO 105 C10-2006 A(1), B(2), C(3), D(4) & E(5)	Grade: 1 to 5
		Colour Fastness to Washing	IS 687-1979 (RA 2003) IS 3361-1979 (RA 2003) IS 764-1979 (RA 2003) IS 765-1979 (RA 2003) IS 3417-1979 (RA 2003)	Grade: 1 to 5

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		Colour Fastness to Domestic and Commercial Laundering	ISO 105 C06-2010 A1S, A1M, A2S, B1S, B1M, B2S, C1S, C1M, C2S	Grade: 1 to 5
		Colour Fastness to Dry Cleaning	IS 4802-1988 (RA 2016) ISO 105 D 01-2010	Grade: 1 to 5
		Colour Fastness to Organic Solvent	IS 688-1988 (RA 2013)	Grade: 1 to 5
		Colour Fastness to Artificial light (Xenon Arc Lamp)	IS 2454-1985 (RA 2013)	Blue Wool rating: 1 to 8
			ISO 105 B02-2014	Blue Wool rating: 1 to 8
			AATCC 16.3-2014	Grade: 1 to 5
		Colour Fastness to Water	IS/ISO 105 E01-2010 ISO 105 E01-2013 AATCC 107-2013	Grade: 1 to 5
		Colour Fastness to Chlorinated Water	IS/ISO 105 E03-2010	Grade: 1 to 5
		Colour Fastness to Sea Water	IS 690-1988 (RA 2013) ISO 105 E02-2013	Grade: 1 to 5
		Colour Fastness to Bleaching- Hypochlorite	IS 762-1988 (RA 2013)	Grade: 1 to 5
		Colour Fastness to Bleaching- Peroxide	IS 763-1988 (RA 2013)	Grade: 1 to 5
		Colour Fastness to Perspiration	IS /ISO 105 E04-2014 ISO 105 E04-2013 AATCC 15-2013	Grade: 1 to 5
		pH value of aqueous extract	IS 1390-1983 (RA 2013) AATCC 81-2016 ISO 3071-2005	1 to 12
		Colour fastness to domestic and commercial laundering- Oxidative bleach response using a non-phosphate reference detergent incorporating a low temperature bleach	ISO 105 C09-2001	Grade: 1 to 5

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		activator		
		Colour fastness to hot pressing	ISO 105 X11-1994	Grade: 1 to 5
3.	Fabric	Colour Fastness to Rubbing	IS 766-1988 (RA 2013) ISO 105 X12-2016 AATCC 8-2016	Grade: 1 to 5
		Colour Fastness to Laundering – Home and Commercial (Accelerated)	AATCC 61-2013 (Except 1B)	Grade: 1 to 5
		Scouring loss	IS 1383-1977 (RA 2013)	0.05 % to 10 %
		Dimensional changes of Fabric after Home Laundering	AATCC 135-2015	0.1 % to 20 %
		Dimensional changes of Garment after Home Laundering	AATCC 150-2012	0.1 % to 20 %
		Dimensional changes on soaking in Water	IS 2977-1989 (RA 2016) (other than wool) woven and knitted	0.1 % to 20 %
			IS 665-1989 (RA 2016) (containing wool)	0.1 % to 20 %
		Water Repellency of Fabrics by Water spray Test	IS 390-1975 (RA 2013)	Rating : 0 to 100
		Dimensional changes on washing of Fabrics woven from Rayon and Synthetic Fibres	IS 1299-1984 (RA 2016)	0.1 % to 20 %
		Resistance to Penetration by Water of Fabrics by Hydrostatic Head Test	IS 391-1975 (RA 2013)	Water column Height: (0 to 2000) mm

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		Determination of Water absorption & Penetration of Fabrics using Bundesman Type Apparatus	IS 392-1989 (RA 2016)	(0 to 100) % Leakage: (0 to 400) ml
		Flammability and Flame resistance of Textile Fabrics	IS 11871-1986 (RA 2013), Method A	Upto 305 mm
		Automotive Vehicles – Flammability Requirements	IS 15061-2002 (RA 2012), (Annexure A) FMVSS 302-2008 ISO 3795-1989	Upto 500 mm / minute
		Smoothness Appearance of Fabrics after Repeated Home Laundering	AATCC 124-2014	Grade: 1 to 5
		Burning Behaviour - Measurement of flame spread properties of vertically oriented specimen	IS 15590-2005 ISO 6941-2003 (RA 2013)	Ignition time: Upto 99.9 seconds
		Protective clothing – Protection against heat and flame	IS 15758 (Part 4)-2007 ISO 15025-2000 (RA 2013)	After flame time: Upto 100 seconds After glow time: Upto 100 seconds
			ISO 15025-2016	Char length: Upto 200 mm
			DIN EN ISO 15025-2017	Qualitative
		Flammability by oxygen index	IS 13501-1992 (RA 2013)	15 to 100
		Burning behavior- Determination of ease of ignition of vertically oriented specimen	ISO 6940-2004 IS 15589-2005	Ignition time: (1 to 20) seconds

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4.	Yarn / Fabric Chemicals and Auxiliaries	Instrumental Colour Measurement	AATCC 173-2015	1 % to 100 %
		Colour strength value using Reflectance measurement		
5.	Water soluble Textile chemicals and Auxiliaries Dyes	Chemical Oxygen Demand (COD)	IS 3025 (Part 58)-2006 (RA 2017)	(20 to 3000) mg/l
		Biochemical Oxygen Demand (BOD)	IS 3025 (Part 44)-1993 (RA 2014)	(20 to 3000) mg/l
		Biodegradability of Textile Chemicals and Auxiliaries	BTRA/CTL/SOP/01-2015 [based on OECD guidelines (1992) 301D closed bottle method]	10 % to 100 %
6.	Textile	Flammability of clothing textile (45° inclined flammability tester)	16 CFR 1610-2017 ASTM D 1230-2017 IS 11871-1986 (RA 2013), Method B	(1 to 60) seconds
		Domestic washing and drying procedures for textile testing	ISO 6330-2012 (ISO 3759-2011, ISO 5077-2007)	0.1 % to 20 %
II.	HAZARDOUS & RESTRICTED CHEMICALS			
1.	Textile	Free and hydrolyzed formaldehyde (water extraction method)	ISO 14184 (Part 1)-2011	(16 to 10000) mg/kg
		Released formaldehyde content (vapour absorption method)	ISO 14184 (Part 2)-2011	(20 to 10000) mg/kg
		Free formaldehyde (water extraction method)	JISL 1041-2011	(16 to 10000) mg/kg

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		Extractable Heavy Metals:	BTRA/ECO/SOP-08-2013	
		Antimony	By Acid perspiration solution as per ISO 105	(3.0 to 10000) mg/kg
		Copper	E04: 2014 followed by	(0.1 to 10000) mg/kg
		Lead	AAS/ICP-OES	(0.2 to 10000) mg/kg
		Nickel		(0.5 to 10000) mg/kg
		Cobalt		(1.0 to 10000) mg/kg
		Cadmium		(0.1 to 10000) mg/kg
		Arsenic		(0.2 to 10000) mg/kg
		Chromium		(0.25 to 10000) mg/kg
		Mercury		(0.02 to 10000) mg/kg
2.	Textile Auxiliaries	Free Formaldehyde content	BTRA/ECO/SOP/01-2013	(1 to 50000) mg/kg
3.	Textile/Dyes/Pigments	Certain aromatic amine derived from azo colorants:	EN 14362 Part 1-2017	(20 to 10000) mg/kg
		4-amino biphenyl		
		Benzidine		
		4-Chloro-o-toluidine		
		2-Naphthylamine		
		O- aminoazotoluene		
		5 -nitro-o-toluidine		
		4-chloroaniline		
		2,4-diaminoanizole		
		4,4'-methylenedianiline		
		3,3'-dichlorobenzidine		
		3,3'-dimethoxybenzidine		
		3,3'-dimethylbenzidine		
		4,4'-methylenedi-o-toluidine		
		P-cresidine		
		2,2' dichloro-4,4'-methylene-dianiline		
		4,4'-oxydianiline		

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		4,4'-thiodianiline O-toluidine 2,4-toluenediamine 2,4,5-trimethylaniline O-anisidine 2,4-xylydine 2,6-xylydine Certain azo colorants which may release 4-Aminoazobenzene-4-aminoazobenzene	EN 14362 Part 3-2017	(20 to 10000) mg/kg
4.	Textile accessories of children's garment and metal jewelry	Total Lead (Pb) in children's Metal Products (including children's metal jewelry)	CPSC-CH-E-1001-08-2010 (Microwave digestion followed by AAS/ICP-OES method) ASTM E 1613-2012	(5 to 900000) mg/kg
5.	Non metal children's Product	Total Lead (Pb) in Non-metal children's products	CPSC-CH-E-1002-08-2010 (Microwave digestion followed by AAS/ICP-OES method)	(5 to 900000) mg/kg
6.	Paint & Surface coating material	Lead in surface coating	CPSC-CH-CHE-1003-09-2011 (Microwave digestion followed by AAS/ICP-OES method)	(5 to 10000) mg/kg

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MECHANICAL TESTING

1.	TEXTILE MATERIALS			
1.	Fibre	Physical Properties of Cotton Fibres by High Volume Instrument (HVI):	ASTM D 5867-2012	
		2.5% Span Length		15 mm to 40mm
		Uniformity Ratio		40 % to 60 %
		Tenacity		(10 to 35) g/tex
		Micronaire		(2 to 9) microgram/inch
	Length of Man-made Staple Fibres	ISO 6989-1981	2 mm to 130 mm	
2.	Yarn	Lea Strength and Lea Count of Spun Yarns	IS 1315-1977 (RA 2014) IS 1671-1977 (RA 2014)	(1 ^s to 200 ^s) Ne (10 to 200) kgf (22.1 to 441) lbf
		Twist in Yarn	IS 832 (Part 1 & 2)-2017 ASTM D 1422-2013 ASTM D 1423-2002 (2016) ISO 2061-2015 (E) ISO 17202-2002	Upto 9999 turns
		Unevenness of Textile Strands using Capacitance Testing Equipment	ASTM D 1425-2014	U%: 1 % to 30 %
		Unevenness & Imperfections per unit length of Textile Strand	ISO 16549-2004	U%: 1 % to 30 % Imperfections: Upto 9999 per km for Thin (-)50%, Thick (+)50%, Neps 200% & 280% Hairiness Index: Upto 15 Sh(-): Upto 5

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3.	Yarn, Fabrics (woven), Garment and Apparel	Single Thread Strength and Elongation at Break	IS 1670-1991 (RA 2017) ASTM D 2256-2015 ISO 2062-2009	Strength: 0.5 N to 450 N [(50 to 45887) gf] Elongation: Upto 140 %
4.	Fabrics (woven and nonwoven), Garment and Apparel, Coated Fabrics	Length & Width of the Fabric	IS 1954-1990 (RA 2017) ASTM D 3773-2010 (2014) ASTM D 3774-1996 (2016)	10 mm to 5000 mm
		Weight per Square Meter and Weight per Linear meter of Fabric	IS 1964-2001 (RA 2017) ASTM D 3776-2009 (2017), Option C ISO 3801-1977 (M5) BS EN ISO 12127-1998	(25 to 5000) gsm
		Thickness of Fabric (Woven, Knitted fabric)	ASTM D1777-1996 (2015) IS 7702-2017	0.01 mm to 8 mm
		Threads per inch in Woven Fabrics	IS 1963-2004 (RA 2014) ASTM D 3775-2017 ISO 7211-2-1984 BS EN 1049-2-1994	(3 to 1016) per cm (1 to 400) per inch
		Crimp and Count of Warp and Weft Yarns	IS 3442-1980 (RA 2014)	Woven: (0.5 to 20) % Knitted: (0.5 to 500) %
		Count of Yarn Removed from Fabric	BTRA/MECH/FAB/IM01-2013 (RA 2014)	2 Ne to 200 Ne
		Tear Strength of Textile Fabric by Elmendorf Tester	IS 6489 (Part 1 to 4)-1993 (RA 2017) ASTM 1424-2009 (2013) ISO 13937-1-2000	1.6 N to 102.4 N
		Breaking Load and Elongation-Strip and Grab method	IS 1969 (Part 1)-2014 ASTM D 5035-2015 BS EN ISO 13934-1-2013 ISO 13934-1-2013 IS 1969 (Part 2)-2014 BS EN ISO 13934-2-14 (E) ISO 13934-2-14 (E) ASTM D 5034-2009 (2017)	20 N to 100 KN 1 % to 250 %

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		Crease Recovery Angle by Measuring Angle of Recovery	IS 4681-1981 (RA 2014)	20° to 180° (each direction)
		Pilling Resistance – ICI Pill Box Method	IS 10971 (Part 1)- 2017 ISO 12945-1-2000	Qualitative Grade: 1 to 5
		Resistance to Slippage of Yarns in Woven Fabrics using a Standard Seam	ASTM D 434-1995 (w)	At 6 mm and 6.4 mm opening, Load: 20 N to 50 KN
		Single Rip Tear Strength	ASTM D 2261-2017	20 N to 50 KN
		Trapezoid Tear Strength	ASTM D 5587-2015	20 N to 50 KN
		Abrasion Resistance of Textile Fabrics (Martindale Abrasion Tester Method)	ASTM D 4966-2016 (Option 1 and 3) ISO 12947 (Part 1, 2 & 3)-1998	Up to 50,000 cycles Upto 20 % Qualitative Grade: 1 to 5
		Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Martindale Tester	ASTM D 4970-2016 IS 10971 (Part 2)-2011	(1 to 50000) cycles Qualitative Grade: 1 to 5
		Fabric propensity to surface fuzzing and to pilling -- Part 2: Modified Martindale method	ISO 12945-2-2000	(1 to 50000) cycles Qualitative Grade: 1 to 5
		Bursting Strength of Textile Fabrics— Diaphragm Bursting Strength Tester Method	ASTM D 3786-2013 IS 1966 (Part 1)-2014	(1 to 100) kg/cm ²
		Air Permeability of Textile Fabrics	ASTM D 737-2004 (2016) IS 11056-2013	Water Column: (10 to 400) mm
		Slippage resistance of yarns at a seam in woven fabrics -- Part 1: Fixed seam opening method	ISO 13936-1-2004	Seam strength: 20 N to 50 KN Seam efficiency: Upto 90 %

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		Failure in Sewn Seams of Woven Apparel Fabrics	ASTM D 1683-2017	Seam strength: 20 N to 50 KN Seam efficiency: Upto 90 %
		Bow and Skew in Woven and Knitted Fabrics	ASTM D 3882-2008 (2016)	(0 to 5) %
		Pilling Resistance and other related Surface changes of Textile Fabrics: Random Tumble Pilling Tester	ASTM D 3512-2014	Qualitative Grade: 1 to 5
5.	Geo-membranes	Density & Specific Gravity (Relative Density) of plastics by Displacement	ASTM D 792-2013 (Method A & B)	(0.88 to 3.0) g/cc
		Initial Tear Resistance of Plastic Film & Sheeting	ASTM D 1004-2013	50 N to 10 kN
		Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer (Melt Flow Index)	ASTM D 1238-2013 (Method A & B)	(0.1 to 20) g/10 minutes
		Carbon Black in Olefin Plastics	ASTM D 1603-2014	0.05 % to 5 %
		Index Puncture Resistance of Geomembranes and related products	ASTM D 4833-2013	50 N to 10 kN
		Tensile Strength of Geomembranes Using Wide Strip Testing- Wide-Width Tensile Strength & elongation	ASTM D 4885-2011	600 N to 80 kN 1 % to 100 %
		Tensile Properties of Nonreinforced Polyethylene and	ASTM D 6693-2015	50 N to 10 kN 1 % to 900 %

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		Nonreinforced Flexible Polypropylene Geomembranes		
		2% Secant Modulus for Polyethylene Geomembranes	ASTM D 5323-2011	50 N to 10 kN
6.	Geo textiles	Water permeability of Geotextiles by permittivity method	ASTM D 4491-2017 ISO 11058-2010	(0.5 to 150) l/m ² /s
		Trapezoid Tear Resistance of Geotextile	ASTM D 4533-2015	50 N to 10000 N
		Wide-Width Tensile Strength & Elongation	ASTM D 4595-2017 ISO 10319-2015	600 N to 80 kN 1 % to 100 %
		Grab Breaking Load and Elongation	ASTM D 4632-2015	50 N to 10 kN 1 % to 100 %
		Static Puncture Strength (CBR)	ASTM D 6241-2014 ISO 12236-2006	50 N to 50 kN
		Dynamic perforation (Cone Drop) Test	ISO 13433-2006	1 mm to 30 mm
		Pore Size	ASTM D 6767-2015	(0.1 to 300) μ
		Seam Strength	ASTM D 4884-2014	600 N to 80 kN
7.	Geotextiles & Geomembranes	Mass per unit area	ASTM D 5261-2010 ISO 9864-2005	(0.1 to 10000) g/m ²
8.	Geogrids	Single Rib Tensile Strength & Elongation	ASTM D 6637-2015	50 N to 50 kN 1 % to 100 %
II.	TOYS AND SIMILAR PRODUCTS			
1.	Toys and Similar Products	Sharp point in toys & other articles	ASTM F 963-17 (Section 4.9) IS 9873 (Part 1)-2017 Clause 4.7, Clause 5.9 16 CFR 1500.48 (1-1-11 Edition)	Qualitative (Pass/Fail)

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		Sharp metal or glass edge in toys and other articles	ASTM F 963-17 (Section 4.7) IS 9873 (Part 1): 2017 Clause 4.6, Clause 5.8 16 CFR 1500.49 (1-1-11 Edition)	Qualitative (Pass/Fail)
		Identifying toys and other articles which prevent choking, aspiration, or ingestion hazards because of small parts	ASTM F 963-17 (Section 4.6) IS 9873 (Part 1): 2017 Clause 4.4, Clause 5.2 16 CFR 1501-2013 (1-1-11 Edition)	Qualitative (Pass/Fail)

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