

ITEM SPECIFICATION ITM CD :2101614055

ITEM CODE :-	2101614055	submit
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ITM CODE	DETAILED SPECIFICATION
2101614055	FABRIC-100% POLYESTER FABRIC WIDTH 148CM AS PER IAFS 01036 : 2025 OCT Appendix - E
04	METRE

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Appendix E
(Refers to Clauses 6, and 7.1)

**REQUIREMENTS FOR FABRIC / RAW MATERIAL / GARNITURES
(TO BE USED FOR STITCHING OF SHORTS GYMNASTICS, WITH PIPING)**

PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
WOVEN BASE (OUTER) FABRIC			
Type of Weave	<i>Plain Weave</i> (1 up 1 down)	SP	45:1988
Blend Composition	100% Polyester	IS/A ATC C	667:1981 RA 2022 3416 (Part-1): 1988 RA 2022 (Dry Weight Basis) or AATCC 20 : 2011, AATCC 20 A : 2012
Type of yarns to be used	1. Warp : <i>-Polyester, continuous multifilament Fully Drawn i.e Fully Oriented</i> <i>- Single yarn should have strength of 310 gf (minimum) and Tenacity of 3.8 gf/d (minimum)</i> <i>- Can be made from Recycled polyester (with IPA content not more than 2.2 %) OR Virgin polyester (with IPA content as NIL %) as per</i>		IS 17261 : 2022 and Annex C of IS 16481 (Also refer Sl. No. 3064 dated 17 Jul 2023 of The Gazette of India , published by the Ministry of Chemicals & Fertilizers; Deptt of Chemicals & petrochemicals;

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
	Table 4 of IS 17261 : 2022 - Should have Fully Dull (FD) Lustre having TiO₂ content percent above 1.5 % only as per Table 5 of IS 17261 : 2022 - With solid cross sectional filaments (round / hexagonal in shape) - Which can be Dope dyed (DD) or Easy Dyeable (ED) or Easy Dyeable Cationing (EDCD) or Cationic Dyeable (CD) or Disperse dyeable { i.e conventionally dyed (COD)/ Stock Dyed (STD) / Easy Dyeable (ED)} 2. Weft : Same as that of the Warp yarn (mentioned above)		S.O. 3193 (E)) Note : The end point traceability documents have to be produced by the firm at the time of Bulk production lot Inspection, for the type of yarn procured. The communication made by the firm to the manufacturer of the yarn, at the time of procurement, conveying the requirements specified in this Tech Specs are also to be produced at BPC stage. (The Lab testing report for all the parameters mentioned in Column b is to be submitted at TEC stage and would be checked at BPC and BPI stages)

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
Approximate Count of Yarn Warp Weft (Note : This will be checked from the fabric as well as from the yarn roll)	1. Warp : 80 ⁺⁵ Denier with 42 ⁺⁶ Filaments 2. Weft : 80 ⁺⁵ Denier with 42 ⁺⁶ Filaments (Note: The Number of filaments are to be counted as per the SOP mentioned at the end of Appendix E OR any other SOP, which has NABL accreditation)	IS	IS 3442: 2023 Amdt No.1 (RA 2018) Note : The end point traceability documents have to be produced by the firm at the time of Bulk production lot Inspection, for the type of yarn procured. The communication made by the firm to the manufacturer of the yarn, at the time of procurement, conveying the requirements specified in this Tech Specs are also to be produced. (The Lab testing report for all the parameters mentioned in Column b is to be submitted at TEC stage and would be checked at BPC and BPI stages)

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
Thread count of the fabric per dm (i.e construction) * 1. Warp (Ends/dm) 2. Weft (Picks/dm) <i>(* Note : This test parameter is for Guidance of the manufacturer only. Though this test parameter is also required to be tested in Lab, the Lab testing values of this parameter will not be considered for evaluation)</i>	1. Warp (Ends/dm): 500 (minimum) * 2. Weft (Picks/dm): 325 (minimum) *	IS	1963:1981 (RA 2023) Note: Lab testing values of this parameter are to be reported during TEC stage also
Mass of the fabric per unit area (g/m²)	120 GSM (min) 140 GSM (max) i.e. (120-140) GSM	IS	1964:2001 RA 2022
Tearing Strength(Min.) in kgf 1. Warp 2. Weft	1. Warp : 28 N (Minimum) 2. Weft : 26 N (Minimum)	IS	IS 6489 (Part-1) : 2011 (Elmendorf) / ISO 13937-1 : 2000

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
Breaking load (Tensile Strength) in Newton on 5.0 x 20.0 cm strip (Min.) 1. Warp 2. Weft	1. Warp : 800 N / 5 cm (Minimum) 2. Weft : 550 N / 5 cm (Minimum)	IS	IS1969 : 2018 (RA 2023) / ISO 13934-1 : 2013
Seam (Yarn) Slippage in fabric (i.e slippage of interlaced warp yarns over the weft & vice versa; of the stitched fabric under load, to i.e check of the resilience of the fabric to yarn slipping or opening along the seams. Note: It is a fabric property and should not be confused with seam strength, which obviously would be much more than the force at which seam slippage commences / ends) 1. In Warp directions 2. In Weft direction	When two fabric are sewn together with a standardised seam in warp as well weft directions (with the type of needle, type of stitches, type of thread and stitch density actually used by the firm in stitching of the finished product) to form test specimens for warp & weft directions and then pulled apart with an equal and opposite force, the observed seam slippage should not exceed 6 mm up to application of 1. 250 N in Warp direction (minimum) 2. 250 N in Weft Direction (minimum) (Note: NO symptoms of slippage of yarns should be visible after application of 70 N force either in Warp or weft direction)		ISO 13936-1: 2004 Note : Qty: 05 Sewn Test specimen samples each stitched in warp as well as weft directions (warp & weft to be marked on the test specimens also) are to be provided by the firm at the time of seeking BPC as well as at the time of BP Lot Inspection. All 10 specimens are to be made using the same type of needle, same type of stitches, same type of thread and same stitch density, which has been actually used by the firm in manufacturing of the BPC sample / Bulk production lot)

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
% Elongation of the fabric at break * <i>(* Note : This will not be used for evaluation. But the observed values are to be reported after lab testing)</i>	1. Warp: 25 % (Min.)* 2. Weft: 15 % (Min.)*	IS	IS 1969 : 1985 * Note: Lab testing values of this parameter are to be reported during TEC stage also
pH value of the aqueous extract of the fabric	6.0 – 8.0	IS	1390:2022 (Cold Method)
Abrasion resistance of the fabric	- No thread break should be observed after 35000 cycles <i>(Note: Actual number of cycles at which the thread broke needs to be reported)</i> - Colour change during abrasion should be 4 or better (as per Grey Scale)	IS	12673 (Part 2): 2022
Pilling resistance / Pilling rate of the fabric (after 18000 revolutions as well as after 5 hours of test)	Average rating of 4-5 or better	IS	IS 10971: 2011 Part-2 (RA 2022)
Fuzziness rating	Average rating of 4 - 5 or better	IS	IS 10971: 2011 (RA 2022) Part-2

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
Type of Dye (Dope, Fiber / Filament, Yarn, Fabric)* <i>(* Note : The quality of the dye and the process quality control during dyeing will be evaluated by checking the compliance with all colour fastness properties' values enumerated below in this Appendix 'E')</i>	Any type of Dye , which ensures meeting of ALL Colour Fastness properties as enumerated in this Appendix 'E'	---	---
Nature of Dye * <i>(* Note : The quality of the dye and the process quality control during dyeing will be evaluated by checking the compliance with all colour fastness properties' values enumerated below in this Appendix 'E')</i>	Any type of Dye (inclusive of DISPERSE DYEING of the fabric) , which ensures meeting of ALL Colour Fastness properties as enumerated in this Appendix 'E'	---	---
Fabric's Colour fastness to light (Blue Wool rating)	5 BW or better	IS/ ISO	IS 2454 : 1985 / ISO 105 B 02 : 2014

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
Fabric's Colour fastness to washing (after 05 repeated washing / drying cycles at 38 °C to 44 °C)	1. Change in Shade : 4-5 or better 2. Staining on 2.1. Acetate : 4-5 or better 2.2. Cotton : 4-5 or better 2.3. Nylon : 4-5 or better 2.4. Polyester : 4-5 or better 2.5. Acrylic: 4-5 or better 2.6. Wool : 4-5 or better	IS/ ISO	IS/ISO 105 C 10 : 2006 Test A1 (RA 2021)
Fabric's Colour fastness to perspiration (to be checked both in acidic and alkaline simulated conditions)	Acidic 1. Change in Shade : 4-5 or better 2. Staining on 2.1. Acetate: 4-5 or better 2.2. Cotton : 4-5 or better 2.3. Nylon : 4-5 or better 2.4. Polyester : 4-5 or better 2.5. Acrylic: 4-5 or better	ISO	ISO 105 E 04 : 2008 (RA 2019) (Note : This standard has replaced IS 971 : 1983)

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
	2.6. Wool : 4-5 or better Alkaline 1. Change in Shade : 4-5 or better 2. Staining on 2.1. Acetate: 4-5 or better 2.2. Cotton : 4-5 or better 2.3. Nylon : 4-5 or better 2.4. Polyester : 4-5 or better 2.5. Acrylic: 4-5 or better 2.6. Wool : 4-5 or better		
Fabric's Colour fastness to perspiration & light (both to be checked simultaneously)	Acidic : 4-5 or better Alkaline : 4-5 or better	ISO	ISO 105 B 07 : 2009
Fabric's Colour fastness to hot pressing at 120° C ± 2°C, maintaining a pressure of 4 ± 1 kPa	1. Immediately after Dry pressing for 15 s : 4-5 or better 2. Immediately after Damp pressing for 15 s : 4-5 or better	IS/ ISO	(RA 2009) / ISO 105 X11 : 1994 (Note : This standard has replaced IS 689 : 1988)

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
	3. Immediately after Wet pressing for 15 s : 4-5 or better 4. After conditioning of all three test specimens for 4 hours : 4-5 or better 5. Staining on the cotton (adjacent) fabric : 4-5 or better		
Fabric's Colour fastness to rubbing	1. Dry : 4-5 or better 2. Wet : 4-5 or better	IS/ ISO	IS 766 : 1988 / ISO 105 X12 : 2016
Fabric's Dimensional Change / stability (i.e Relaxation residual shrinkage / expansion) upon SOAKING in water (along with Wetting agent) for 3 hours and flat drying; as per the procedure mentioned in the specified test method; in 1. Warp direction 2. Weft direction	1. Warpwise : $\pm 2.0 \%$ (i.e Max. Range is 2% inclusive of Shrinkage + Expansion) 2. Weftwise : $\pm 2.0 \%$ (i.e Max. Range is 2% inclusive of Shrinkage + Expansion)	IS	IS 2977 :1989 (RA 2020) (Note: This is to be checked after SINGLE soaking & drying cycle only)

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
Fabric's Dimensional Change / stability (i.e Relaxation residual shrinkage / expansion) to 10 repeated Domestic LAUNDRY cycles (i.e 10 repeated washing & drying) 1. Warp direction 2. Weft direction	1. Warpwise : $\pm 2\%$ (i.e Max. Range is 2% inclusive of Shrinkage + Expansion) 2. Weftwise : $\pm 2\%$ (i.e Max. Range is 2 % inclusive of Shrinkage + Expansion)	IS	IS 15370 : 2020 (at $41 \pm 3^{\circ}\text{C}$, using Type B washer) for domestic washing & drying (i.e domestic laundry) and IS 2977 :1989 (RA 2020) for calculation of the percentage shrinkage /expansion (Note: This is to be checked after Ten repeated home laundering cycles i.e washing & drying)
Stretch and recovery	Stretch : 10 % (maximum) after 30 minutes Recovery : 98% (minimum) after 30 seconds	ASTM	ASTM D 3107: 2007 (RA 2019) (woven fabric)
Nearest matching Pantone Colour Shade of the fabric	As per PANTONE Shade Card No. 19-3923 TCX (Navy Blazer) { Note : 1. This has been provided ONLY to facilitate the	Visual	By the Office of C Eng O (QAS) at TEC Stage Note: The variation in Colour i.e Delta E

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
	manufacturer, in meeting the required Tristimulus co-ordinates (including the permissible variation); in least number of iterations. However, at the time of submitting the Technical Bids (i.e at TEC stage), MATCHING of the Colour with this Pantone Shade would be MANDATORY, which will be checked with the lab remnants (whole shorts) by the Office of C Eng O (QAS). 2. Matching of the colour at TEC Stage, The variation in Colour i.e Delta E cmc at BPC / BPI Lot evaluation stage will be checked by comparing the LCH values observed in the Lab (during testing of the fabric sample submitted by the firm) with the reference values given below. }		cmc at BPC / BPI Lot evaluation stage will be checked by comparing the LCH values observed in the Lab (during testing of the fabric sample submitted by the firm) with the reference values given below. This will be verified by the O/o CQA (Insp) at BPC as well as at the BPI stages, through Lab testing.

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
L C h° coordinates	L : 22.17	AAT CC	AATCC 173 : 2009 (Test Method for Calculation of Small Colour Differences for Acceptability) and AATCC EP6-2016e (Evaluation Procedure for Instrumental Colour measurement) (1. For measuring of the L C h° , X Y Z and L a b values , only single layer of the fabric against black background (of the instrument cover for the aperture) are to be used. The values obtained thereafter are then to be used for calculation of the Delta E_{cmc} 2. The geometry of the spectrophotometer to be used during measurement should be diffuse / 0 type with
	C : 8.02		
	h°: 270.90		
Tristimulus Values X Y Z	X: 3.385		
	Y: 3.562		
	Z: 5.397		
CIE Lab (Star) L a b coordinates	L: 22.17		
	a: 0.13		
	b: - 8.02		

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		GOV STD	STD NO
a.	b.	c.	d.
			Illuminant as D65 and Tolerance as 2:1, where the actual viewing angle is 8°. The measurement made on other geometrics will likely produce different spectral results. 3. At-least 10 readings shall be taken; spread across at-least 1m² area of the fabric sample. The final value will be treated as the average of the 10 readings. All 10 readings are to be reported in the lab report)
Tolerance	2:1	AAT CC	AATCC 173 : 2009 (Test Method for Calculation of Small Colour Differences for Acceptability) and AATCC EP6-2016e (Evaluation Procedure for Instrumental Colour measurement)

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
Illuminant	D 65	AAT CC	AATCC 173 : 2009 (Test Method for Calculation of Small Colour Differences for Acceptability) and AATCC EP6-2016e (Evaluation Procedure for Instrumental Colour measurement)
Standard Observer	10 degree	AAT CC	AATCC 173 : 2009 (Test Method for Calculation of Small Colour Differences for Acceptability) and AATCC EP6-2016e (Evaluation Procedure for Instrumental Colour measurement)
Delta E_{cmc} (Permissible variation in colour of the Fabric) (when compared with Colour Spectrum coordinate / tri-stimulus values obtained with actual fabric, with	Delta $E_{cmc} \leq 1.2$ and as accepted by the O/o CQA (Insp) at BPC stage	AAT CC	AATCC 173 : 2009 (Test Method for Calculation of Small Colour Differences for Acceptability) and AATCC EP6-2016e (Evaluation

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
Illuminant as D65, Standard Observer as 10 Degrees and Tolerance as 2 :1. (Note : Variation in Colour will be checked at BPC as well as Bulk Production inspection stages only and will not be applicable at Technical Evaluation Stage. However, at TEC stage, visual matching of the fabric colour with the Pantone Shade Card mentioned above is mandatory)			Procedure for Instrumental Colour measurement) + As accepted by the O/o CQA Inspection at BPC stage. (Note 1. For measuring of the L C h°, X Y Z and L a b values , only single layer of the fabric against black background (of the instrument cover for the aperture) are to be used. The values obtained thereafter are then to be used for calculation of the Delta E_{cmc} 2. The geometry of the spectrophotometer to be used during measurement should be diffuse / 0 type with Illuminant as D65 and Tolerance as 2 :1, where the actual viewing angle is 8°. The measurement

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PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD	STD NO
a.	b.	c.	d.
			<i>made on other geometrics will likely produce different spectral results.</i> 3. At-least 10 readings shall be taken; spread across at-least 1m² area of the fabric sample. The final value will be treated as the average of the 10 readings. All 10 readings are to be reported in the lab report)
(			