

**ITEM SPECIFICATION ITM CD :2101614085**

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ITM CODE	DETAILED SPECIFICATION
2101614085	<p>FABRICS FOR T-SHIRT WITH COLLAR</p> <p>a) Weft Knitted Single Jersey 100% Polyester 225-240 GSM Pantone shade No. 18-4043 TCX (Palace Blue) 160 cm width - Qty - 0.325 Kg</p> <p>b) Flat bed Weft Knitted 100% Polyester (1X1 rib) Pantone Shade No. 18-4043 TCX (Palace Blue) (To be supplied in specified length and width as per Collar size requirement) - Qty - 0.045 Kg Specification: As per Appendix - E of IAFS01060(T-Shirt with collar:2025(Oct).</p>
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**APPENDIX E**  
(Refers to Clause 6.2)

**RAW MATERIAL (FABRIC , SEWING THREAD) & BROAD STITCHING/HEMMING/BAR TACKING REQUIREMENTS FOR T-SHIRT WITH COLLAR**

PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
<b>REQUIREMENTS FOR THE BASE FABRIC (To be used in both the sleeves and the main body of the 'T Shirt' )</b>			
<b>Blend Composition of the Fabric</b>	<b>100% Polyester</b>	<b>IS</b>	667:1981 RA 2022 3416 (Part-1): 1988 RA 2022 (Dry Weight Basis) or AATCC 20 : 2011, AATCC 20 A : 2012
<b>Type of yarns to be used while knitting of the fabric</b>  1. Course wise 2. Wales wise	<b>1. Course wise.</b>  - Polyester, <b>continuous multifilament yarn</b>  - Single yarn should have a <b>Breaking Strength</b> of <b>380 gf (minimum)</b>  - <b>Single yarn Tenacity</b> should be <b>7.5 gf/d (minimum)</b>  - Can be made <b>either</b> from <b>virgin</b> or <b>recycled polyester</b>  - Can be made from Recycled polyester (with IPA content not more than 2.2 %)		IS 17261 : 2022 ( 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; S.O. 3193 (E) )  <b>Note :</b>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
	<p>OR Virgin polyester (with IPA content as NIL %) as per Table 4 of IS 17261 : 2022</p> <p>- Which can be Dope dyed (DD), 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)}</p> <p><b>2. Warp wise.</b></p> <p><b>Same as that of the Warp yarn (mentioned above)</b></p>		<p><i>The values of the <b>breaking strength of the single yarn, the tenacity of the single yarn</b> as well as the <b>IPA content</b> must be reported in the <b>Lab testing report</b></i></p>
<p><b>Approximate value of 'Nominal Count (and Filament) ' of Yarns (i.e Yarn size to be used in knitting of the fabric):-</b></p> <p><b>1. Course direction of the fabric</b></p> <p><b>2. Wales direction of the fabric</b></p> <p><i>{To be checked from the yarn; taken out from the finished garment i.e T-Shirt with collar + The roll of the yarn which is to be provided by the manufacturer firm}</i></p>	<p><b>1. Course wise.</b></p> <p><b>50 D +<sup>5D</sup> / 110 (min.) F</b> <i>(i.e 50 to 55 Denier with minimum of 110 Filaments)</i></p> <p><b>2. Wales wise.</b></p> <p><b>50 D +<sup>5D</sup> / 110 (min.) F</b> <i>(i.e 50 to 55 Denier with each yarn having a minimum of 110 Filaments)</i></p>	IS	<p>IS 3442: 2023 Amdt No.1 (RA 2018)</p> <p><b>Note :</b></p> <p>1. <b>Number of filaments per yarn</b> is to be checked &amp; reported by the Lab, post testing <b>as per the SOP given below</b> at the end of this Table</p> <p>2. <b>The firm is to provide a roll of the yarn</b> used for manufacturing of the fabric also</p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
<p>Approximate value of 'Twist' of the yarns (to be used in knitting) of fabric: -</p> <p>1. Course direction of the fabric</p> <p>2. Wales direction of the fabric</p> <p>{<i>Note: Though, the Lab testing values of this parameter are also mandatory to be submitted along with Technical Bids, however, this will not be considered for evaluation</i>}</p>	<p>1. Course wise.</p> <p><b>70 twists/m</b> (in 'Z' direction for 'Single' Yarn) *</p> <p>2. Wales wise.</p> <p><b>70 twists/m</b> (in 'Z' direction for 'Single' Yarn) *</p>	IS/ ISO	<p>IS 832: 2021 (Part-1) /</p> <p>ISO 2061 : 2015 (<i>Note: * These values are for guidance only, and need not be same</i>)</p>
<p>Type of knit (to be used while knitting of fabric)</p> <p>1. Main classification (Warp or Weft Knit)</p> <p>2. Sub classification</p>	<p>1. Main classification : <b>Weft Knit (Circular)</b></p> <p>2. Sub classification: <b>Single Jersey Dot knit</b> (Double knit) giving appearance of a textured extremely fine pin hole on the right side (i.e Outer surface) and without any pin hole texture on the wrong side(i.e inner surface) <b>EXACTLY in CONFORMITY with what has been DEPICTED in photographs given in Appendix 'D' of this IAFS</b></p>	Visual	<p>SP 45:1988 (Handbook on glossary of terms issued by BIS).</p> <p>- To be checked visually by the NABL Lab as well as by the O/o CQA Inspection at the BPC as well as at the BPI Stage. (The <b>visual texture of the knitted fabric should be in EXACT CONFORMITY</b>)</p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
			<p>with what has been as <b>DEPICTED</b> in photographs given in <b>Appendix D</b> of this IAFS )</p> <p>- This will also be checked visually at the TEC stage.</p>
<p>Size of each float (i.e Loop or Stitch length) in the knitted fabric</p> <p><i>{Note: Though, the Lab testing values / Manufacturer's authenticated values of this parameter are also mandatory to be submitted along with Technical Bids, however, this will not be considered for evaluation}</i></p>	1.92 mm (Maximum) *	Visual	<p>By the NABL Lab</p> <p>(<b>Note: * This value is for guidance only, and need not be same.</b>)</p> <p><b>However, the visual texture of the knitted fabric should be in EXACT CONFORMITY</b> with what has been as <b>DEPICTED</b> in photographs given in <b>Appendix 'D'</b> of this IAFS )</p>
Type of stitch (used while knitting the fabric)	Plain single jersey	Visual	<p>By the NABL Lab</p> <p>( The <b>visual texture of the knitted fabric</b> should be in <b>EXACT</b></p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
			<b>CONFORMITY</b> with what has been as <b>DEPICTED</b> in photographs given in <b>Appendix 'D'</b> of this IAFS )
Thread count (Knit Stitch density of the loops) of the fabric per dm  1. Course direction ( Courses / dm)  2. Wales direction (Wales/dm)	1. Courses / dm : <b>495 (Min.)</b>  2. Wales /dm : <b>285 (Min.)</b>	IS	IS1963 : 1981 (RA 2023)
Mass of the fabric per unit area (i.e. in GSM or g/m <sup>2</sup> )	<b>225 g/m<sup>2</sup> - 240 g/m<sup>2</sup></b>	IS	IS 1964: 2001 (RA 2017)
Bursting Strength of the Fabric	<b>1400 kN/m<sup>2</sup> (Min.)</b> i.e <b>1400 kPa (Min.)</b>	ISO / ASTM	ISO : 2960 / ASTM D 3786 / ASTM
Abrasion resistance of the fabric ( at 9kPa pressure and with Woollen Abrader)	- <b>No thread break</b> should be observed <b>after 35000 cycles</b>  - <b>Colour change during abrasion</b> should be <b>4 or better</b> (as per Grey Scale)	IS	12673 (Part 2): 2022



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
Pilling resistance / Pilling rate of the fabric ( <i>tumble pilling for 2 hours</i> ) using <i>tumble type pilling tester</i>	Average rating of 4-5 or better	IS	IS 10971: 2011 (RA 2022)
Fuzziness rating of the fabric	4 or better	IS	OR ASTM D 3512 / ASTM D 3512M :2022 (2 hrs)
Pilling resistance / Pilling rate of the fabric ( <i>after 7000 revolutions of test</i> ) using <i>Martindale tester</i>	Average rating of 4-5 or better after 7000 rubs	ISO	ISO 12945-2:2020
Fuzziness rating of the fabric	Average rating of 4 or better after 7000 rubs	IS	IS 10971: 2011 (RA 2022)
Seam (Yarn) Slippage in fabric ( <i>i.e slippage of interlocked loops of Course &amp; Wale yarns; of the stitched fabric under load, to i.e check of the resilience of the fabric to yarn slipping or opening along the seams.</i>  <i>Note: It is a fabric property and should not be confused with seam strength, which obviously would be much more that the force at which seam slippage commences / ends)</i>	When two fabric pieces are sewn together with a standardised seam in Course as well as Wale directions ( <u>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</u> ) to form test specimens for Course & Wale directions and then pulled apart with an equal and opposite force, the observed seam slippage should not exceed 6 mm upto application of  1. 250 N in Course direction (minimum)		ISO 13936-1: 2004  Note :  Qty: 05 Sewn Test specimen samples each stitched in Course as well as Wale directions (Course & Wales to be marked on the test specimens also) are to be provided by the firm at the time of seeking



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
<p>1. In Course direction</p> <p>2. In Wales direction</p>	<p>2. 250 N in Wales Direction (minimum)</p> <p>(Note: NO symptoms of slippage of yarns should be visible after application of 70 N force either in Course or Wales direction)</p>		<p><b>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 )</b></p>
<p><b>Fabric's Colour fastness to light (Blue Wool rating)</b></p>	<p>5 BW or better</p>	IS/ISO	<p>IS 2454 : 1985 IS/ISO 105 B 02 : 2014</p>
<p><b>Fabric's Colour fastness to washing (after 5 repeated washing / drying cycles at 38 °C to 44 °C)</b></p>	<p>1. Change in Shade : 4-5 or better</p> <p>2. Staining on</p> <p>2.1.Acetate : 4-5 2.2.Cotton : 4-5 or better 2.3.Nylon : 4-5 or better</p> <p>2.4.Polyester : 4-5 or better 2.5.Acrylic: 4-5 or better 2.6.Wool : 4-5 or better</p>	IS/ ISO	<p>IS/ISO 105 C 10 : 2006 Test A1 (RA 2021)</p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
Fabric's Colour fastness to perspiration (to be checked both in <b>acidic</b> and <b>alkaline</b> simulated conditions)	<b>ACIDIC</b>  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	ISO	ISO 105 E 04 : 2008 (RA 2019) <b>(Note : This standard has replaced IS 971 : 1983)</b>
	<b>ALKALINE</b>  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; after 40 AFUs)	Acid : 3 or better Alkaline : 3 or better	ISO	ISO 105 B 07 : 2009 <b>(After 40 AFU i.e. Accelerated Fading Units)</b>
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



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
<p><b>Fabric's Colour fastness to hot pressing at 110° C ± 2°C, maintaining a pressure of 4 ± 1 kPa</b></p>	<p><b>IMMEDIATELY</b></p> <p>1. Immediately after <b>Dry pressing for 15 s : 4-5 or better</b></p> <p>2. Immediately after <b>Damp pressing for 15 s : 4-5 or better</b></p> <p>3. Immediately after <b>Wet pressing for 15 s : 4-5 or better</b></p> <p><b>AFTER CONDITIONING</b></p> <p>4. After conditioning of all three test specimens for 4 hours: <b>4-5 or better</b></p> <p>5. Staining on the cotton (adjacent) fabric: <b>4-5 or better</b></p>	IS/ ISO	<p>( RA 2009) / ISO 105 X11: 1994</p> <p><i>(Note: This standard has replaced IS 689: 1988)</i></p>
<p><b>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</b></p> <p><b>1. Lengthwise / Width wise direction</b></p>	<p><b>1. In case checked with the garmented T-Shirt ( in which the fabric has been pre-treated / washed before garmenting to cater for the dimensional variation )</b></p> <p>1.1. Length wise : <b>± 0.5 % (i.e Max. Range is 0.5 % inclusive of Shrinkage + Expansion)</b></p> <p>1.2. Width wise : <b>± 0.5 % (i.e Max. Range is</b></p>	IS	<p>IS 2977 :1989 (RA 2020)</p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
<p><b>2. Course wise / Wales wise direction</b></p> <p><i>(Note: This is to be checked after single soaking &amp; drying cycle only)</i></p>	<p>0.5 % inclusive of Shrinkage + Expansion)</p> <p><b>2. In case checked with the fabric used in the garmented T-Shirt</b></p> <p>2.1. Course : ± 1.0 % (i.e Max. Range is 1.0% inclusive of Shrinkage + Expansion)</p> <p>2.2. Wales : ± 1.0 % (i.e Max. Range is 1.0 % inclusive of Shrinkage + Expansion)</p>		
<p><b>Fabric's Dimensional Change / stability ( i.e Relaxation residual shrinkage / expansion) to repeated Domestic LAUNDRY i.e repeated washing &amp; drying ; in</b></p> <p><b>1. Lengthwise / Width wise direction</b></p> <p><b>2. Course wise / Wales wise direction</b></p> <p><i>(Note: This is to be checked after five repeated home laundering cycles i.e washing &amp; drying)</i></p>	<p><b>1. In case checked with the garmented T-Shirt ( in which the fabric has been pre-treated / washed before garmenting to cater for the dimensional variation )</b></p> <p>1.1. Length wise : ± 2.0 % (i.e Max. Range is 2% inclusive of Shrinkage + Expansion)</p> <p>1.2. Width wise : ± 1.0 % (i.e Max. Range is 1 % inclusive of Shrinkage + Expansion)</p> <p><b>2. In case checked with the fabric used in the garmented T-Shirt</b></p>	<p>IS</p>	<p>IS 15370 : 2020 (at 41 ± 3°C, using Type B washer)</p> <p>for domestic washing &amp; drying ( i.e domestic laundry to be checked after 5 laundry cycles)</p> <p>and</p> <p>IS 2977 :1989 (RA 2020) for calculation of the percentage shrinkage /expansion</p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
	2.1. Course : $\pm 3\%$ (i.e Max. Range is 3% inclusive of Shrinkage + Expansion)  2.2. Wales : $\pm 2\%$ (i.e Max. Range is 2% inclusive of Shrinkage + Expansion)		OR AATCC 150
<b>Initial Bowness and skewness in the woven fabric</b> (in the initial , original unlaundered state)  (Note: The manufacturer is to provide 2 m X 1.6 m i.e two metres of running length of the fabric , from the fabric roll, for this test along with a stitched garment, during stitching of which the fabric from the roll was not washed / treated to )	<b>Fabric Skewness in unwashed state:</b> 0.5% (max.)	ASTM	ASTM D 3882:2008 (2020) , in case the fabric roll is used for testing  OR ASTM D7811-13 (2017) using Bow Skew Tool with open slots (in case the garmented fabric is to be used for testing)
<b>Dimensional stability w.r.t Spirality i.e change in skewness from the initial skew</b> (due to skew movement / torqueing in the garment) after home laundering (after 03 laundering cycles) of the T-shirt as per ISO 6330-5A at 40 ° C followed by flat drying	<b>Fabric skewness (Spirality) after 3<sup>rd</sup> laundering cycle :</b> 1.0 % (max.)	AATC C	AATCC-179:2004) OR IS/ISO 16322-1: 2005  (washing as per ISO 6330-5A at 40 ° C followed by flat dry) AATCC TM 179 - 2023



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
Stretch and recovery	1. <b>25 % stretch</b> (minimum) after <b>10 seconds in EITHER direction</b>  2. <b>93% recovery</b> (minimum) after <b>60 minutes in EITHER direction</b>	ASTM	ASTM D 2594 : 2021 (knitted fabric)
<b>Fabric's Dimensional stability to Dry Heat, when tested for contact with heated plane metal plate at 120° ± 2° C , 30 sec</b> 1. <b>Course direction</b> 2. <b>Wales direction</b>	1. Course : <b>± 2.5 %</b> (i.e Max. Range is 2.5 % inclusive of Shrinkage + Expansion)  2. Wales : <b>± 2.5 %</b> (i.e Max. Range is 2.5 % inclusive of Shrinkage + Expansion)	IS	IS 12170 : 1987 (RA 2020), Temp 120° ± 2° C , 30 sec
<b>pH value of the aqueous extract of the Fabric (using Hot method)</b>	<b>5.0 – 8.0</b>	IS/ ISO	IS 1390 : 1983 ( RA 2009) / ISO 3071: 2020
<b>Percentage (by mass) of Water soluble matter in the fabric</b>	<b>1% by mass (Max)</b>	IS	IS 3456 : 2022
<b>Air permeability of the fabric</b>	<b>75 cc/sec/cm<sup>2</sup> (Min.)</b>	IS	IS 11056 :2013
<b>Moisture transmission of fabric (Water permeability) vapour of fabric vapour</b>	<b>2100 g/m<sup>2</sup>/day (Min.)</b>	ASTM	ASTM E-96 (Water method), RH: 50 ± 2% and Temp. : 32 ± 3° C
<b>Glaze and Fading property (property to withstand frequent laundings at 100° F ± 5° F) after 05 abrasive washes at</b>	<b>4-5 GS or better (After 05<sup>th</sup> wash)</b>	AATC C / ISO	AATCC 61- Method 2A (as per ASTM F 1506) / ISO 105 -



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
washing cycles - Accelerated laundering test			C06:2010
<p><b>Initial - Anti bacterial (microbial) activity Value</b> after incubation period of 18 - 24 hrs ( To tested with <i>absorption method</i>. The washing is to be carried out as per procedure 5 A and reference detergent specified in 4.1.2 of IS 15370:2005 and followed by drying as per 8.5 of IS 15370)</p> <p>1. <b>Staphylococcus aureus Strain no. ATCC 6358 ( Gram Positive Bacteria)</b></p> <p>2. <b>Klebsiella pneumoniase aureus Strain no. ATCC 4352 ( Gram Negative Bacteria)</b></p>	<p><u><b>Initial</b></u></p> <p>1. <b>Staphylococcus aureus Strain no. ATCC 6358 ( Gram Positive Bacteria) - <u>2.75 (minimum)</u></b></p> <p>2. <b>Klebsiella pneumoniase aureus Strain no. ATCC 4352 (Gram Negative Bacteria) - <u>2.75 (minimum)</u></b></p>	ISO	20743 : 2021
<p><b>After 30 washes - Anti bacterial (microbial) activity Value</b> after incubation period of 18 - 24 hrs ( To tested with <i>absorption method</i>. The washing is to be carried out as per procedure 5 A and reference detergent specified in 4.1.2 of IS 15370:2005 and followed by drying as per 8.5 of IS 15370)</p> <p>1. <b>Staphylococcus aureus Strain no. ATCC 6358 ( Gram Positive</b></p>	<p><u><b>After 30 washes</b></u></p> <p>1. <b>Staphylococcus aureus Strain no. ATCC 6358 ( Gram Positive Bacteria) - <u>2.0 (minimum)</u></b></p> <p>2. <b>Klebsiella pneumoniase aureus Strain no. ATCC 4352 (Gram Negative Bacteria) - <u>2.0 (minimum)</u></b></p>	ISO	20743 : 2021 & Washing as per IS 15370:2020, Temp 40 Degree Celsius, after 30 repeated Laundry and Tumble drying



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
<b>Bacteria)</b>  2. <i>Klebsiella pneumoniae aureus Strain no. ATCC 4352 ( Gram Negative Bacteria)</i>			
<b>Oily soil stain release efficiency after home laundering</b> (after creating the stain on the fabric by using Maize corn oil as per IS 4055 , under weight of 2.26 kg for 55s-65s seconds, and washing thereafter as per procedure 5A and reference detergent specified in 4.1.2of is15370 and followed by drying as per 8.5 of IS 15370 )	<b>1. Initial (after staining the fabric with corn oil) :</b> 3.5 or better  <b>2. After 10 washings :</b> 3.5 or better	AATC C /IS	AATCC TM 130-2018t 130 ( by comparison with standard replicas)  IS 4055 (for Maize Corn Oil) & Washing as per IS 15370:2020, Temp 40 Degree Celsius, after 10 repeated Laundry and Tumble drying
<b>Absorbency</b> <b>1. Initial (in original fabric without laundering)</b>  <b>2. After 5 washes</b>	<b>1. Initial :</b> Not more than 10 seconds  <b>2. After 5 washes :</b> Not more than 20 seconds	AATC C	AATCC TM 79



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
<b>Vertical wicking</b>  <b>1. Lengthwise direction</b>  1.1. Initial (in original fabric without laundering)  1.2. After 05 washes  <b>2. Width wise direction</b>  2.1. Initial (in original fabric without laundering)  2.2. After 05 washes	<b>1. Lengthwise direction.</b>  1.1. Initial (in original fabric without laundering) : <b>Must wick 14 cm in 30 minutes</b>  1.2. After 05 washes : <b>Must wick 6.5 cm in 30 minutes</b>  <b>2. Width wise direction</b>  2.1. Initial (in original fabric without laundering) : <b>Must wick 13 cm in 30 minutes</b>  2.2. After 05 washes : <b>Must wick 6 cm in 30 minutes</b>	AATC C	AATCC TM 197: 2018
<b>Horizontal wicking</b>  1. Initial (in original fabric without laundering)  2. After 05 washes	1. Initial : <b>19 mm<sup>2</sup>/ sec (min.)</b>  2. After 05 washes : <b>9 mm<sup>2</sup>/ sec (min.)</b>	AATC C	AATCC TM 198 : 2018
<b>Antistatic properties</b>  1. Electric surface resistivity	1. Electric surface resistivity: <b>0.24 X 10<sup>12</sup> Ohm</b>	AATC C	AATCC TM 76 : 2018 & AATCC TM 115



PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD c.	STD NO d.
a.	b.		
Type of Dye (Filament Dope/ Yarn/ Fabric) *	Dope (Solution) dyeing at the time of <b>FILAMENT</b> extrusion stage <b>OR</b> Disperse dyeing of the <b>YARN/ FABRIC</b> , provided the <b>defined colour</b> and <b>ALL COLOUR FASTNESS</b> as well as <b>OTHER RELATED PROPERTIES</b> as enumerated in this <b>Appendix 'E'</b> are achieved within <b>SPECIFIED LIMITS.</b>	---	* <b>Note</b> : The 'quality of the dye' and the 'process quality control' during dyeing will be evaluated by checking the compliance with the achievement of permissible values of Delta E and all colour fastness related properties' enumerated below in this Appendix E)
Nature of Dye	<b>DOPE (SOLUTION)</b> dyeing at the time of filament extrusion stage <b>OR DISPERSE DYEING</b> of the Yarn/Fabric provided the defined colour and <b>ALL COLOUR FASTNESS</b> as well as <b>OTHER RELATED PROPERTIES</b> as enumerated in this <b>Appendix 'E'</b> are achieved within <b>SPECIFIED LIMITS.</b>	---	IS 4472-Part I, II & III : 2021  * <b>Note</b> : The 'quality of the dye' and the 'process quality control' during dyeing will be evaluated by checking the compliance with the achievement of permissible values of Delta E



PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD c.	STD NO d.
a.	b.		<i>and all colour fastness related properties' enumerated below in this Appendix E</i>
Nearest matching Pantone Colour Shade of the fabric	<p>As per PANTONE Shade Card No. 18-4043 TCX (Palace Blue)</p> <p>{ <b>Note</b> : 1. This has been provided <b>ONLY to facilitate</b> the manufacturer, in meeting the required Tristimulus co-ordinates (including the permissible variation); <b>in least number of iterations.</b> However, <b>at the time of submitting the Technical Bids (i.e at TEC stage), MATCHING</b> of the Colour with this <b>Pantone Shade would be MANDATORY, which will be checked with the lab remnants (whole T Shirt with Collar) by the Office of C Eng O (QAS).</b></p> <p>2. Matching of the colour at TEC Stage, The variation in Colour i.e <b>Delta E cmc</b> at BPC / BPI Lot evaluation</p>	Visual	<p><b>By the Office of C Eng O (QAS) at TEC Stage</b></p> <p><b>Note:</b> The variation in Colour i.e <b>Delta E cmc</b> at BPC / BPI Lot evaluation stage will be checked by comparing the <b>LCH values observed in the Lab</b> (during testing of the fabric sample submitted by the firm) with the <b>reference values given below. This will be verified by the O/o CQA (Insp) at BPC as well as at the BPI</b></p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
	<i>stage will be checked by comparing the <b>LCH values observed in the Lab</b> (during testing of the fabric sample submitted by the firm) with the <b>reference values given below.</b> }</i>		<i>stages, through Lab testing.</i>
CIE Lab L C h° coordinates	L: 44.99	AATC C	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 <b>single layer</b> of the fabric <b>against black background</b> (of the instrument
	C: 33.44		
	h°: 262.54		
Tristimulus Values  X Y Z	X: 13.106		
	Y: 14.532		
	Z: 35.486		
CIE Lab (Star) L a b coordinates	L: 44.99		
	a: - 4.35		
	b: - 33.16		
Tolerance	2:1		
Illuminant	D 65		
Standard Observer	10 Degree		



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
			<p>cover for the aperture) are to be used. The values obtained thereafter are then to be used for calculation of the <b>Delta E<sub>cmc</sub></b></p> <p>2. The <b>geometry</b> of the <b>spectrophotometer</b> to be used during measurement should be <b>diffuse / 0 type</b> with Illuminant as D65 and Tolerance as 2:1, where the <b>actual viewing angle is 8°</b>. The measurement made on other geometrics will likely produce different spectral results.</p> <p>3. At-least <b>10 readings</b> shall be taken; <b>spread</b></p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
			<i>across at-least 1m<sup>2</sup> 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)</i>
<p><b>Delta E<sub>cmc</sub> (Permissible variation in colour of the Fabric)</b> <i>(when compared with Colour Spectrum coordinate / tri-stimulus values obtained with actual fabric, with Illuminant as D65, Standard Observer as 10 Degrees and Tolerance as 2 :1.</i></p> <p><b>(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</b></p>	<p><b>Delta E<sub>cmc</sub> ≤ 1.2 and as accepted by the O/o CQA (Insp) at BPC stage</b></p>	<p>AATC C</p>	<p>AATCC 173 : 2009 (Test Method for Calculation of Small Colour Differences for Acceptability) <b>and</b> AATCC EP6-2016e (Evaluation Procedure for Instrumental Colour measurement) + As accepted by the O/o CQA Inspection at BPC stage.</p> <p><b>(Note</b> 1. For measuring</p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
mentioned above is mandatory)			<p>of the <math>L C h^\circ</math>, <math>X Y Z</math> and <math>L a b</math> values, only <b>single layer</b> of the fabric <b>against black background</b> (of the instrument cover for the aperture) are to be used. The values obtained thereafter are then to be used for calculation of the <b>Delta E<sub>cmc</sub></b></p> <p>2. The <b>geometry</b> of the <b>spectrophotometer</b> to be used during measurement should be <b>diffuse / 0 type</b> with Illuminant as D65 and Tolerance as 2:1, where the <b>actual viewing angle is 8°</b>. The measurement made on other geometrics will</p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
			<p>likely produce different spectral results.</p> <p><b>3. At-least 10 readings shall be taken; spread across at-least 1m<sup>2</sup> 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)</b></p>
<b>REQUIREMENTS FOR THE RIBBED COLLAR FABRIC (To be used in the Polo Collar Neck of T Shirt)</b>			
<b>Blend Composition of the Fabric</b>	<b>100% Polyester</b>	IS/ AATC C	IS 3416 (Part 1) : 1988 (based upon dry mass) (RA 2017) , and IS 667 : 1981 or AATCC 20 : 2011, AATCC 20 A : 2012



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
<p>Type of yarns to be used while knitting of the fabric</p> <p>1. Course wise 2. Wales wise</p>	<p><b>1. Course wise.</b></p> <ul style="list-style-type: none"> <li>- Polyester, <b>continuous multifilament yarn</b></li> <li>- Single yarn should have a <b>Breaking Strength</b> of <b>340 gf (minimum)</b></li> <li>- <b>Single yarn Tenacity</b> should be <b>3.4 gf/d (minimum)</b></li> <li>- Can be made <b>either</b> from <b>virgin</b> or <b>recycled polyester</b></li> <li>- Can be made from Recycled polyester (with IPA content not more than 2.2 %) OR Virgin polyester (with IPA content as NIL %) as per Table 4 of IS 17261 : 2022</li> <li>- Which can be Dope dyed (DD), 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)}</li> </ul> <p><b>2. Warp wise.</b></p> <p><b>Same as that of the Warp yarn (mentioned above)</b></p>		<p>IS 17261 : 2022 ( Also refer Sl. No. 3064 dated 17 Jul 2023 of The Gazette of India , published by the Ministry of Chemicals &amp; Fertilizers; Deptt of Chemicals &amp; petrochemicals; S.O. 3193 (E) )</p> <p><b>Note :</b></p> <p>The values of the <b>breaking strength of the single yarn, the tenacity of the single yarn</b> as well as the <b>IPA content</b> must be reported in the Lab testing report</p>
<p>Approximate value of 'Nominal Count (and Filament) ' of Yarns (i.e Yarn size to be used in knitting of the fabric):-</p>	<p><b>1. Course wise.</b></p> <p><b>100 D <math>\pm</math> 5 D / 110 (min.) F</b> (i.e 95 to 105 Denier with minimum of 110 Filaments)</p>	IS	<p>IS 3442: 2023 Amdt No.1 (RA 2018)</p> <p><b>Note : Number of filaments per</b></p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
<p>1. Course direction of the fabric</p> <p>2. Wales direction of the fabric</p> <p><i>{To be checked from the yarn; taken out from the finished garment i.e T-Shirt with collar + The roll of the yarn which is to be provided by the manufacturer firm}</i></p>	<p>2. Wales wise.</p> <p><b>100 D <math>\pm</math> 5<sup>D</sup> / 110 (min.) F</b> <i>(i.e 95 to 105 Denier with minimum of 110 Filaments)</i></p>		<p>yarn is to be checked &amp; reported by the Lab, post testing <b>as per the SOP given below</b> at the end of this Table</p>
<p>Type of knit (to be used while knitting of fabric)</p> <p>1. Main classification <b>(Warp or Weft Knit)</b></p> <p>2. Sub classification</p>	<p>1. Main classification : <b>Flat bed weft Knit</b> ( for durability &amp; strength)</p> <p>2. Sub classification <b>1x1 Rib knit</b> ( however, it should be <b>extremely closely fine knit</b>, with <b>high knit stitch density</b>)</p> <p><b>Note: The knit should be in EXACT CONFORMITY with what has been DEPICTED in photographs given in Appendix 'D' of this IAFS</b></p>		<p>SP 45:1988 (Handbook on glossary of terms issued by BIS).</p> <p>- To be checked visually by the NABL Lab as well as by the O/o CQA Inspection at the BPC as well as at the BPI Stage. ( <b>The visual texture of the knitted fabric should be in EXACT CONFORMITY with what has been as DEPICTED in photographs given in Appendix 'D' of this IAFS</b> )</p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
			- This will also be checked visually at the TEC stage.
<p>Size of each float (i.e Loop or Stitch length) in the knitted fabric</p> <p><i>{Note: Though, the Lab testing values / Manufacturer's authenticated values of this parameter are also mandatory to be submitted along with Technical Bids, however, this will not be considered for evaluation}</i></p>	2.59 mm (Maximum) *	Visual	<p>By the NABL Lab</p> <p><i>(Note: * This value is for guidance only, and need not be same.)</i></p> <p><b>However, the visual texture of the knitted fabric should be in EXACT CONFORMITY with what has been as DEPICTED in photographs given in Appendix D of this IAFS )</b></p>
Type of stitch (used while knitting the fabric)	1 X 1 rib	Visual	<p>By the NABL Lab</p> <p><i>( The visual texture of the knitted fabric should be in EXACT CONFORMITY with what has been as DEPICTED in photographs given in Appendix D of this IAFS )</i></p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
Thread count (Knit Stitch density of the loops) of the fabric per dm 1. Course direction ( Courses / dm) 2. Wales direction (Wales/dm)	1. Courses / dm : 155 (Min.)  2. Wales /dm : 155 (Min.)	IS / ASTM	IS1963 : 1981 (RA 2023) / ASTM D 3887 :1996
Mass of the fabric per unit area (i.e. in GSM or g/m <sup>2</sup> )	745 - 765 g/m <sup>2</sup>	IS	IS 1964: 2001 (RA 2022)
Pilling resistance / Pilling rate of the fabric (tumble pilling for 2 hours) using tumble type pilling tester	Average rating of 4-5 or better	IS	IS 10971: 2011 (RA 2022)  OR ASTM D 3512
Fabric's Colour fastness to light (Blue Wool rating)	5 BW or better	IS/ISO	IS 2454 : 1985 IS/ISO 105 B 02 : 2014
Fabric's Colour fastness to washing (after 5 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 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	ISO	ISO 105 E 04 : 2008 (RA 2019) (Note : This



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
	<p><b>2. Staining on</b>                      2.1. Acetate : <b>4-5 or better</b>                      2.2. Cotton : <b>4-5 or better</b></p> <p>2.3. Nylon : <b>4-5 or better</b>                      2.4. Polyester : <b>4-5 or better</b>                      2.5. Acrylic: <b>4-5 or better</b>                      2.6. Wool : <b>4-5 or better</b></p> <p><b>ALKALINE</b></p> <p>1. Change in Shade : <b>4-5 or better</b>                      2 Staining on                      2.1. Acetate : <b>4-5 or better</b>                      2.2. Cotton : <b>4-5 or better</b>                      2.3. Nylon : <b>4-5 or better</b>                      2.4. Polyester : <b>4-5 or better</b>                      2.5. Acrylic: <b>4-5 or better</b>                      2.6. Wool : <b>4-5 or better</b></p>		<p><i>standard has replaced IS 971 : 1983)</i></p>
<p><b>Fabric's Colour fastness to perspiration &amp; light</b> (both to be checked simultaneously; after 40 AFU)</p>	<p><b>Acid : 3 or better</b>  <b>Alkaline : 3-4 or better</b></p>	ISO	<p>ISO 105 B 07 : 2009 (After 40 AFU)</p>
<p><b>Fabric's Colour fastness to rubbing</b></p>	<p>1. Dry : <b>4-5 or better</b>                      2. Wet : <b>4-5 or better</b></p>	IS/ ISO	<p>IS 766 : 1988 / ISO 105 X12 : 2016</p>
<p><b>Fabric's Colour fastness to hot pressing at 110° C ± 2°C, maintaining a pressure of 4 ± 1 kPa</b></p>	<p><b>IMMEDIATELY</b></p> <p>1. Immediately after Dry pressing for 15 s : <b>4-5 or</b></p>	IS/ ISO	<p>( RA 2009) / ISO 105 X11: 1994</p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
	<p><b>better</b></p> <p>2. Immediately after <b>Damp pressing</b> for 15 s : <b>4-5 or better</b></p> <p>3. Immediately after <b>Wet pressing</b> for 15 s : <b>4-5 or better</b></p> <p><b>AFTER CONDITIONING</b></p> <p>4. After conditioning of all three test specimens for 4 hours: <b>4-5 or better</b></p> <p>5. Staining on the cotton (adjacent) fabric: <b>4-5 or better</b></p>		<p><i>(Note: This standard has replaced IS 689: 1988)</i></p>
<b>pH value of the aqueous extract of the Fabric</b> (using Hot method)	<b>5.0 – 8.0</b>	IS/ ISO	IS 1390 : 1983 ( RA 2009) / ISO 3071: 2020
<b>Glaze and Fading property</b> (property to withstand frequent abrasive launderings at 100° F ± 5° F) after 05 washing cycles – Accelerated laundering test	<b>4 or better</b> (After 05 <sup>th</sup> wash)	AATC C / ISO	AATCC 61- Method 2A (as per ASTM F 1506) / ISO 105 - C06:2010
<b>Type of Dye (Filament Dope/ Fiber/ Yarn/ Fabric)</b>	Dope (Solution) dyeing at the time of <b>FILAMENT</b> extrusion stage <b>OR</b> Disperse dyeing of the <b>YARN/FABRIC</b> , provided the <b>defined colour</b> and <b>ALL COLOUR FASTNESS</b> as well as	---	* <b>Note</b> : The 'quality of the dye' and the 'process quality control' during dyeing will be evaluated by



PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD c.	STD NO d.
a.	b.		
	<p><b>OTHER RELATED PROPERTIES</b> as enumerated in this <b>Appendix 'E'</b> are achieved within <b>SPECIFIED LIMITS.</b></p>		<p><i>checking the compliance with the achievement of permissible values of Delta E and all colour fastness related properties' enumerated below in this Appendix E</i></p>
Nature of Dye	<p><b>DOPE (SOLUTION) dyeing</b> at the time of filament extrusion stage <b>OR DISPERSE DYEING</b> of the Yarn/Fabric provided the defined colour and <b>ALL COLOUR FASTNESS</b> as well as <b>OTHER RELATED PROPERTIES</b> as enumerated in this <b>Appendix 'E'</b> are achieved within <b>SPECIFIED LIMITS.</b></p>	---	<p>IS 4472-Part I, II &amp; III : 2021</p> <p>* <b>Note</b> : The 'quality of the dye' and the 'process quality control' during dyeing will be evaluated by checking the compliance with the achievement of permissible values of Delta E and all colour fastness related properties' enumerated below in this Appendix E</p>



PROPERTY / PARAMETER	REQUIRED VALUE	TEST METHOD	
		GOV STD c.	STD NO d.
a.	b.		
Nearest matching Pantone Colour Shade of the fabric	<p>As per PANTONE Shade Card No. 18-4043 TCX (Palace Blue)</p> <p>{ <b>Note</b> : 1. This has been provided <b>ONLY to facilitate</b> the manufacturer, in meeting the required Tristimulus co-ordinates (including the permissible variation); <b>in least number of iterations.</b> However, <b>at the time of submitting the Technical Bids (i.e at TEC stage), MATCHING</b> of the Colour with this <b>Pantone Shade would be MANDATORY, which will be checked with the lab remnants (whole T Shirt with collar) by the Office of C Eng O (QAS).</b></p> <p>2. Matching of the colour at TEC Stage, The variation in Colour i.e <b>Delta E cmc</b> at BPC / BPI Lot evaluation stage will be checked by comparing the <b>LCH values observed in the Lab</b> (during testing of the fabric sample submitted by the firm) with the <b>reference values given</b></p>	Visual	<p><b>By the Office of C Eng O (QAS) at TEC Stage</b></p> <p><b>Note:</b> The variation in Colour i.e <b>Delta E cmc</b> at BPC / BPI Lot evaluation stage will be checked by comparing the <b>LCH values observed in the Lab</b> (during testing of the fabric sample submitted by the firm) with the <b>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.</b></p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
	<i>below. }</i>		
CIE Lab L C h° coordinates	L: 44.99 C: 33.44 h°: 262.54	AATC C	AATCC 173 : 2009 (Test Method for Calculation of Small Colour Differences for Acceptability) <b>and</b> AATCC EP6-2016e (Evaluation Procedure for Instrumental Colour measurement)  (1. For measuring of the the L C h° , X Y Z and L a b values , only <b>single layer</b> of the fabric <b>against black background</b> (of the instrument cover for the aperture) are to be used. The values obtained thereafter are then
Tristimulus Values	X: 13.106		
X Y Z	Y: 14.532		
	Z: 35.486		
CIE Lab (Star) L a b coordinates	L: 44.99 a: - 4.35 b: - 33.16		
Tolerance	2:1		
Illuminant	D 65		
Standard Observer	10 Degree		



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
			<p>to be used for calculation of the <b>Delta E<sub>cmc</sub></b></p> <p>2. The <b>geometry</b> of the <b>spectrophotometer</b> to be used during measurement should be <b>diffuse / 0 type</b> with Illuminant as D65 and Tolerance as 2 :1, where the <b>actual viewing angle is 8°</b>. The measurement made on other geometrics will likely produce different spectral results.</p> <p>3. At-least <b>10 readings</b> shall be taken; <b>spread across at-least 1m<sup>2</sup></b> area of the fabric sample. The final value will be treated as the</p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
			average of the 10 readings. <b>All 10 readings are to be reported in the lab report</b>
<p><b>Delta E<sub>cmc</sub> (Permissible variation in colour of the Fabric)</b> <i>(when compared with Colour Spectrum coordinate / tri-stimulus values obtained with actual fabric, with Illuminant as D65, Standard Observer as 10 Degrees and Tolerance as 2 :1.</i></p> <p><b>(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)</b></p>	<p><b>Delta E<sub>cmc</sub> ≤ 1.2 and as accepted by the O/o CQA (Insp) at BPC stage</b></p>	<p>AATCC C</p>	<p>AATCC 173 : 2009 (Test Method for Calculation of Small Colour Differences for Acceptability) <b>and</b> AATCC EP6-2016e (Evaluation Procedure for Instrumental Colour measurement) + As accepted by the O/o CQA Inspection at BPC stage.</p> <p><b>(Note</b> <b>1</b> For measuring of the L C h°, X Y Z and L a b values , only <b>single layer</b> of the fabric <b>against black</b></p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
			<p><b>background</b> (of the instrument cover for the aperture) are to be used. The values obtained thereafter are then to be used for calculation of the <b>Delta E<sub>cmc</sub></b></p> <p><b>2</b> The <b>geometry</b> of the <b>spectrophotometer</b> to be used during measurement should be <b>diffuse / 0 type</b> with Illuminant as D65 and Tolerance as 2:1, where the <b>actual viewing angle is 8°</b>. The measurement made on other geometrics will likely produce different spectral results.</p> <p><b>3</b> At-least <b>10</b></p>



PROPERTY / PARAMETER  a.	REQUIRED VALUE  b.	TEST METHOD	
		GOV STD c.	STD NO d.
			<i>readings shall be taken; spread across at-least 1m<sup>2</sup> 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)</i>
<b>REQUIREMENTS OF THE BINDING TAPE FABRIC ( used in the neck hole during attachment of Polo Collar of the T Shirt)</b>			
1 The fabric for the <b>BINDING</b> Tape used in the neck hole during attachment of <b>Polo Collar</b> should be <b>EXACTLY same ( Quality &amp; Colour both)</b> as that of details enumerated in <b>Appendix E</b> above, for the <b>BASE FABRIC</b> .			
<b>SEWING THREAD ( to be used in entire stitching of T Shirt with collar)</b>			
<b>Material of Sewing Thread</b>	100% Polyester	<b>IS</b>	IS 667:1981 (RA 2022)
<b>Strength of Sewing thread</b>	<b>Tenacity:</b> 30 gf/ tex (minimum)	<b>IS</b>	IS 4910 (Part-3) :2023 IS 9543:2015 RA 2019
	<b>Elongation:</b> 20 % at break (maximum)		