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BUREAU OF INDIAN STANDARDS
NEW DELHI

AGENDA

HOSIERY SECTIONAL COMMITTEE, TXD 10 **17th Meeting**

Date	Time	Venue
22nd November 2024 (Friday)	1100 h	Through CISCO Webex Video Conferencing

CHAIRPERSON: **Dr. Prakash Vasudevan, Director**
The South India Textile Research Association, Coimbatore

MEMBER SECRETARY: **Shri Tanishq Awasthi, Scientist B, 'Textiles'**
Bureau of Indian Standards, New Delhi

Item 0 WELCOME AND INTRODUCTORY REMARKS BY THE CHAIRPERSON

Item 1 CONFIRMATION OF THE MINUTES OF THE PREVIOUS MEETING

1.1 The minutes of the 16th meeting of the committee held on 06th August 2024 were circulated vide BIS DG letter No. TXD 10/A2.16 dated 13-09-2024. No comments have been received.

1.1.1 The Committee may **APPROVE** the minutes as circulated.

Item 2 COMPOSITION AND SCOPE OF TXD 10

2.1 The present composition and scope of TXD 10 is given in **Annex 1 (Pages 4-5).**

2.1.1 The committee may **REVIEW**.

2.2 Shri Akhtarul Islam Amjad have requested for representation on TXD 10 in Individual Capacity. CV and other information provided on BIS Standardization portal is given at **Annex 2 (Pages 6 -14).**

2.2.1 The Committee may **DECIDE**.

Item 3 ISSUES ARISING OUT OF THE PREVIOUS MEETING

3.1 A summary of actions on the various decisions taken in the last meeting is given in **Annex 3 (Page 15).**

3.1.1 The Committee may **NOTE**.

Item 4 NEW WORK ITEM PROPOSAL

4.1 The sectional committee in the 15th sectional committee meeting approved a list of subjects for formulation of Indian standards as given below:

1) Stockings
2) Shorts
3) Leggings
4) Mufflers and Scarf
5) T-shirt (Cotton & Synthetic)
6) Singlets (Cotton & Synthetic)
7) Other vests (Cotton & Synthetic)
8) Brassieres
9) Tracksuits
10) Pyjamas

Based on the decision taken by the sectional committee, BIS has prepared P-draft on the following subjects and the same has been given below:

1) Singlets (Cotton & Synthetic) (**Annex 4a**)(**Pages:16-33**)
2) Tracksuits (**Annex 4b**) (**Pages:34-60**)
3) Pyjamas (**Annex 4c**) (**Pages:61-79**)
4) Scarfs (**Annex 4d**) (**Pages:80-92**)

4.1.1 The Committee may **DECIDE.**

Item 5 COMMENTS RECIEVED ON P-DRAFT

5.1 The committee in the previous meetings decided to prepare draft standards for the following subjects based on the inputs received from stakeholders. These draft standards were circulated as Preliminary draft among the committee members for one week dated 25 October 2024 for eliciting technical comments. The draft standards so prepared are given in **Annex 5 (Pages 93-172)** and technical comments received on the same from the committee members are given in **Annex 6 (Pages 173-176)**

Sl No.	Doc No	Title
1.	TXD 10(26838)	Textiles – Single Jersey Cotton Synthetic and Blended Leggings – Specifications
2.	TXD 10(26837)	Textiles – Knitted Mens and Womens T-Shirt – Specifications
3.	TXD 10(26850)	Textiles – Single Jersey Cotton Synthetic and Blended Womens Stockings – Specifications
4.	TXD 10 (26839)	Textiles – Single Jersey And Rib Knitted Cotton Synthetic And Blended Shorts – Specifications

5.1.1 The Committee may **DECIDE**.

Item 6 TECHNICAL WORK PROGRAMME OF THE COMMITTEE

6.1 The list of published standards under TXD 10 is given in **Annex 7 (Pages 177-179)**.

6.1.1 The Committee may **NOTE.**

Item 7 DATE AND PLACE OF NEXT MEETING

Item 8 ANY OTHER BUSINESS

ANNEX 1
(*Item 2.1***)**

SCOPE AND COMPOSITION OF HOSIERY SECTIONAL COMMITTEE, TXD 10

Scope: To formulate Indian standards for terminology, specification and packaging relating to all types of hosiery goods.

Meeting(s) held	**Date & Place**
14th Meeting	01 March, 2023 through Video Conferencing
15th Meeting	22 September, 2023 through Video Conferencing
16th Meeting	06 August, 2024 through Video Conferencing

SL NO.	ORGANIZATION REPRESENTED	NAME OF THE REPRESENTATIVE PRINCIPAL/ (ALTERNATE)	ATTENDANCE
1.	The South India Textile Research Association, Coimbatore	Dr. Prakash Vasudevan, **Chairman** Shri S. Sounderraj	3/3
2.	Apparel Export Promotion Council, Tirupur	Shri Sundar Shri Sanjay Dudeja	3/3
3.	Central Armed Police Forces (CAPF), New Delhi,	Shri D.N. Lal Shri Randhir Kr. Jha	1/2
4.	DKTE Society's Textile & Engg. Institute, Ichalkaranji,	Dr. Uday J Patil Shri Anil U Awasare	2/3
5.	Defence Material and Stores Research and Development Establishment, Kanpur	Dr. Kamal Kumar Shri Manish Kumar Singh	1/2
6.	Essa Garments, Tirupur	Shri Durgadevi	2/3
7.	JKR Garments, Tirupur	Shri Jailani	2/3
8.	Knitwear & Apparel Manufacturers Association, Ludhiana	Shri Sudarshan Kumar Jain Shri Arun Aggarwal	1/2
9.	Lux Industry, Kolkata	Shri Uday Kumar Agarwal	1/1
10.	Ministry of Defence (DGQA), New Delhi	Shri Arvind Kamthane Shri J.K. Yadav	3/3
11.	National Institute of Fashion Technology, New Delhi	Shri Ashok Prasad Ms Amrita Roy	2/3

12. NIFT-TEA College of Knitwear Fashion, Tirupur,	Dr. K.P. Balakrishanan Dr. P.P. Gopalakrishanan	2/3
13. Office of the development Commissioner, Small Scale Industries, (MSME) New Delhi	Shri Kuldeep Singh Shri S Suresh Babuji	2/3
14. Office of Textile Commissioner, Mumbai	Shri N K Gupta Shri Satish Kumar N	3/3
15. Southern India Mills' Association, Coimbatore	Dr. K. Selvaraju Shri N Esakkimuthu	3/3
16. SGS Private ltd, Mumbai	Dr. Karthikeyan K. Ms. Mahalakshmi R	2/2
17. Textiles Committee, Mumbai	Shri R Chandran Shri J Parameswaran	3/3
18. The South India Hosiery Manufacturers' Association, Tirupur	Shri M Tyagrajan Shri R Balasaravanan	3/3
19. The Synthetic & Rayon Textiles Export Promotion Council, New Delhi,	Shri Anil Rajvanshi Shri Bhadresh M Dhodia	2/3
20. Tirupur Exporters Association, Tirupur	Shri T.R Vijaykumar Shri S. Shaktivel	2/3
21. Veermata Jijabai Technological Institute, Mumbai	Dr. Shashikant Borkar Dr. Arvind Bhongade	1/2
22. Wool Research Association, Thane	Dr. Mrinal Choudhari Shri Mayur Basuk	3/3

ANNEX 2

(Item -2.2)

CURRICULUM VITAE

Dr. Akhtarul Islam Amjad, Orcid ID I Google Scholar I Research gate Assistant Professor, Department of Fashion Technology, National Institute ofFashion Technology, Panchkula, India
Mail: akh.textile@gmail.com; akhtarul.amjad@nift.ac.in,
Mobile: +91-8209015640

Academic Qualifications – Ph. D. (Textile Engineering), M.Tech. (TextileEngg & Management), B.Tech (Textile Engineering)

Working Experience: 10 years of industrial, research, and academic experience in the fieldof Textile.

- Assistant Professor (Fashion Technology), at National Institute of FashionTechnology, Panchkula, India (Oct 2021 to Till date).
- Assistant Professor (Textile), Uttar Pradesh Textile Technology Institute, Kanpur,India (Sep 2018 to Sep 2021).
- Sr. Executive (QA), RSWM LTD, Bhilwara, Rajasthan, India (April 2016-Aug 2018)
- Assistant Executive (R&D), Vardhman Yarns and Threads Ltd., Hoshiarpur, Punjab,India (July 2015-April 2016).
- Nahar Spinning Mills Ltd. Mandideep, Madhya Pradesh, India (June 2012-July 2013).

List of Research Projects

- Development of Protective Clothing for Works Men of Transport Industries" under a collaboration research scheme sponsored by the National Project Implementation UnitIndia.
- Institute consultancy projects for MSME sponsored by UPTTI, Kanpur, India.

Member Ships – *Life member (L562), Asian Polymer Association: New Delhi, Delhi, IN, Life member (L562), Thriving Engineers Alumni of Mlvtec, Bhilwara, India*

Edited Books and Chapters

- **Akhtarul Islam Amjad**, 2023, Self-Cleaning Nanofinishes and Applications, in:Handbook of Nanofibers and Nanocomposites Characteristics, Synthesis, and Applications in Textiles, Jenny Stanford Publishing https://doi.org/10.1201/9781003432746
- **Amjad, A.I.,** Regar, M.L., 2023. Fabric preparatory, in: Textile Calculation. Elsevier,pp. 171–195. https://doi.org/10.1016/B978-0-323-99041-7.00005-9
- **Amjad, A.I**., Regar, M.L., 2023. Fabric preparatory, in: Textile Calculation. Elsevier,pp. 171–195. https://doi.org/10.1016/B978-0-323-99041-7.00005-9
- Meena, C.R., Hada, J.S., Regar, M.L., **Amjad, A.I.,** 2023. Fabric testing, in: TextileCalculation. Elsevier, pp. 349–368. https://doi.org/10.1016/B978-0-323-99041- 7.00006-0
- Edited book on "Sustainable Growth in Textile", International Conferenceproceeding, 2021, 978-1685632458

Publication in International Journals

- **Akhtarul Islam Amjad**. "Bamboo fibre: a sustainable solution for textile manufacturing." Advances in Bamboo Science (2024): 100088. https://doi.org/10.1016/j.bamboo.2024.100088
- Mohd. Vaseem, Amandeep Singh Grover, **Akhtarul Islam Amjad**, " New Carprice prediction model using AI before launch: Forward selection Regression" International Journal of Computer Sciences and Engineering, Vol.11, Issue.01,pp.49-55, 2023.
- Akhtarul Islam Amjad & Rajiv Kumar, Effect of Eco-friendly Bamboo Rayon, Lyocell, and Seacell Fibres on the Properties of Blended Knitted Melange Fabrics. Fibers Polym (2023). https://doi.org/10.1007/s12221-023-00148-1
- Akhtarul Islam Amjad & Rajiv Kumar (2022) Sustainable Production and Performance Analysis of Cotton Melange Fabrics, Journal of Natural Fibers, DOI:10.1080/15440478.2022.2044963
- Madan Lal Regar, **Akhtarul Islam Amjad.** Effect of Solvent Treatment on Siroand Ring Spun TFO Polyester Yarn. *Tekstilec, 2021, Vol. 64(1), 47–54* DOI: 10.14502/Tekstilec2021.64.47-54
- Madan Lal Regar, **Akhtarul Islam Amjad,** and Atiki Singhal, Camouflage Fabric
- Fabric for Today's Competitive Era, 2020 / Volume 3 / Issue 4 / Pages 186-201
- **Amjad, A.I.,** Kumar, R. Effect of Fibre Fineness and Noil Extraction on the Different Shade Depths of Melange Yarns. J. Inst. Eng. India Ser. E 101, 33–43 (2020). https://doi.org/10.1007/s40034-019-00155-z
- **Amjad, A.I.,** Kumar, R Evaluation of Mechanical and Physical Characteristics of Eco blended Melange YarnsTekstilec, 2020, 63(2), 94-103 DOI: 10.14502/Tekstilec2020.63.94-103
- Madan Lal Regar, **Akhtarul Islam Amjad,** and Niharika Aikat. "Studies on The Properties of Ring And Compact Spun Melange Yarn." *Internation Journal of Advance Research And Innovative Ideas In Education*, 2017 3(2), p. 476-484. DUI: 16.0415/IJARIIE-4082
- Madan Lal Regar, **Akhtarul Islam Amjad.** Basalt Fibre – Ancient Mineral Fibrefor Green and Sustainable Development. *Tekstilec*, 2016, 59(4), p. 321−334. doi: 10.14502/Tekstilec2016.59.321-334.

International and National Conference Publications

- **Akhtarul Islam Amjad**, Mohd. Vaseem, Optimization of complex product for warranty: a software of warranty, International Conference on Scientific Research, 26-28 April 2024, Kırşehir Ahi Evran University, Kırşehir, Türkiy
- Anita Chahal, **Akhtarul Islam Amjad,** The child psychology and clothing in iraniancinema: abbas kiarostami's 'where is the friend's home' International Conference onScientific Research, 26-28 April 2024, Kırşehir Ahi Evran University, Kırşehir, Türkiy
- **Akhtarul Islam Amjad,** Mohd. Vaseem, Nikita, Marketing of Fashion with the Help of Sustainability, 3rd International Architectural Sciences and Applications Symposium, September 14-15, 2023, Naples, Italy
- **Akhtarul Islam Amjad**, Amandeep Grover, Mohd Vaseem, New Car price prediction model using AI before launch: Forward selection Regression, NATIONAL CONFER. RESEARCH, JIS University, Agarpara, Kolkata (West Bengal) Date:23/06/2023

- **Akhtarul Islam Amjad**, Sustainable approaches for the textile manufacturing, AHI EVRAN 3rd INTERNATIO, Institute Of Economic Development And Social Researches IKSAD, Azerbaijan Turkey,03/03/2023
- **Akhtarul Islam Amjad**, Rajiv Kumar, Concept for the development of sustainable textile products, International conference on sustainable growth in textile (SGT, 2021), 19 to 21 Aug, 2021 at UPTTI, Kanpur.
- Mohini Katiyar, **A. I Amjad**, "Textile showing self-cleaning activity under day light irridation", International conference on sustainable growth in textile (SGT, 2021), 19 to 21 Aug, 2021 at UPTTI, Kanpur.
- Priya, Akanksha, **A. I Amjad**, "Indian consumer perception in Green apparels",International conference on sustainable growth in textile (SGT, 2021), 19 to 21 Aug, 2021 at UPTTI, Kanpur.
- Nirbhay Beri, Gaurav Sharma, **A. I Amjad**, Sufia Azim "Review on alovera gel as new thickening material", International conference on sustainable growth in textile (SGT, 2021), 19 to 21 Aug, 2021 at UPTTI, Kanpur.
- Saumya Gupta, Tithi Gupta, **A. I Amjad**, Sufia Azim "Review on electrical conductive textile by screen printing", International conference on sustainable growth in textile (SGT, 2021), 19 to 21 Aug, 2021 at UPTTI, Kanpur.
- **Akhtarul Islam Amjad**, Rajiv Kumar, Unique appearances and developments in melange yarn, International conference on advances in textile, fashion and craft (ATFC, 2021), 22 to 24 March, 2021 at UPTTI, Kanpur
- **Akhtarul Islam Amjad,** Rajiv Kumar, Eco-friendly functional fibre for melange yarn production, National conference on sustainable growth in textile (NCSGT,2020), 12to 14 Aug 2020 at UPTTI
- Madan Lal Regar, **A I Amjad,** Disha Verma, Shruti Upadhyay, Sonal Sahu, Akash Patel Sustainability in textiles, National conference on sustainable growth in textile (NCSGT,2020), 12 to 14 Aug 2020 at UPTTI Kanpur, India
- M L Regar, **A I Amjad,** M Uttam, Garima Pal, Sapna Giri, Priyanshi Gupta Aakriti **Yadav**, Recent development in medical textile, National conference on sustainable growth in textile (NCSGT,2020), 12 to 14 Aug,2020 at UPTTI Kanpur, India,
- **A I Amjad,** Madan Lal Regar, Alka Ali, S.K. Rajput, Tariq Khan, Advance in textile chemical processing, National conference on sustainable growth in textile (NCSGT,2020), 12 to 14 Aug 2020 at UPTTI Kanpur, India
- **Akhtarul Islam Amjad**, Rajiv Kumar, Aesthetic And Moisture-Transportation Properties Of Blended Melange Yarns, International Conference on Handlooms, Fashion, Non-woven and Technical Textiles (ICHFNTT 2020) on 27th and 28thFebruary 2020 at Department of Textile Technology, University College of Technology, Osmania University, Hyderabad, India.
- Sushmita Mukherjee, Madan Lal Regar & **A I Amjad,** Dyeing From The Waste Of Black Tea: A Socio-Economic Approach, International Conference on Handlooms, Fashion, Non-woven and Technical Textiles (ICHFNTT 2020) on 27th and 28thFebruary 2020 at Department of Textile Technology, University College of Technology, Osmania University, Hyderabad, India.
- Madan Lal Regar, **A I Amjad**, M Uttam, Surbhi Mishra, Satyam Jha, Shashi, Self Healing Fibre Reinforcement Composite, International Conference on Handlooms, Fashion, Non-woven and Technical Textiles (ICHFNTT 2020) on 27th and 28thFebruary 2020 at Department of Textile Technology, University College of Technology, Osmania University, Hyderabad, India.
- M L Regar, **A I Amjad**, M K Singh, Garima Pal, Srishti Agrawal, Priyanshi Gupta, Camouflage Fabric- Fabric For Today's Competitive Era, International Conference on

- Handlooms, Fashion, Non-woven and Technical Textiles (ICHFNTT 2020) on 27th and 28th February 2020 at Department of Textile Technology, University College of Technology, Osmania University, Hyderabad, India.
- M L Regar, **A I Amjad,** Anuj Kapoor, Aman Sachan, Fabric From Plastic Waste, International Conference on Handlooms, Fashion, Non-woven and Technical Textiles (ICHFNTT 2020) on 27th and 28th February 2020 at Department of Textile Technology, University College of Technology, Osmania University, Hyderabad, India.
- **Akhtarul Islam Amjad**, Rajiv Kumar, MELANGE YARN MANUFACTURING, PROPERTIES, DEVELOPMENTS AND APPLICATIONS, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December 2019 at UPTTI, Kanpur, India, India.
- Mansi Gupta, Neha Gond, Vedant Tripathi, Deeksha Mishra, Shubham Joshi, A**.I. Amjad,** Mukesh Kumar Singh, Monitoring Cardiac and Respiration Activity Using Fiber Bragg – Grating-Based Sensor, Conference on Recent Advance in PolymerTechnology (RAPT2020) on Jan 31st –Feb 1st, 2020 at University Institute of Chemical Technology, KBCNMU, Jalgaon, India.
- Madan Lal Regar, **A I Amjad**, Sufia Azim, Utkarsh Aggarwal, Shubhanshu Singh, Shikha Maurya, Nanofiber- A New Fibre Production Technology, Conference on Recent Advance in Polymer Technology (RAPT2020) on Jan 31st –Feb 1st, 2020 at University Institute of Chemical Technology, KBCNMU, Jalgaon, India.
- Madan Lal Regar, **A I Amjad**, M Uttam, Aarav Agnihotri, Antra Gupta, Savita Yadav, Electrical Conductive Textiles using Conductive ink, Conference on Recent Advance in Polymer Technology (RAPT2020) on Jan 31st –Feb 1st, 2020 at University Institute of Chemical Technology, KBCNMU, Jalgaon, India.
- Madan Lal Regar, **A I Amjad,** Alka Ali, Nirbhay Beri, Gaurav Sharma, Md. Kaif Salim, Production of Anti UV Textile Coloration from Peanut Red Skin, Conference on Recent Advance in Polymer Technology (RAPT2020) on Jan 31st –Feb 1st, 2020 atUniversity Institute of Chemical Technology, KBCNMU, Jalgaon, India.
- Madan Lal Regar, **A I Amjad,** S Azim, Mariyam Khanam, Akshat, Aayush Rathore, Utilization of Non-Degradable Waste- From Trash to Treasure, Conference on RecentAdvance in Polymer Technology (RAPT2020) on Jan 31st –Feb 1st, 2020 at University Institute of Chemical Technology, KBCNMU, Jalgaon, India.
- M L Regar, **A I Amjad,** Sufia Azim, Taha, Anuj Kapoor, Ishika Rajvanshi, Aman Sachan, A Sustainable Approach to Dye Fabric with Flowers, Conference on Recent Advance in Polymer Technology (RAPT2020) on Jan 31st –Feb 1st, 2020 at University Institute of Chemical Technology, KBCNMU, Jalgaon, India.
- **Akhtarul Islam Amjad,** Rajiv Kumar, Madan Lal Regar, Synthetic Sweat Transportation through Cotton Melange Yarns, Conference on Recent Advance in Polymer Technology (RAPT2020) on Jan 31st –Feb 1st, 2020 at University Institute of Chemical Technology, KBCNMU, Jalgaon, India.
- Madan Lal Regar, **A I Amjad,** Priyanshi Gupta, Garima Pal, Divya Dixit, CONDUCTIVE FABRIC PREPARATION BY GRAPHENE OXIDE, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- Madan Lal Regar, **A I Amjad**, M Uttam, Prateek Gupta, Rahul Lodhi, OIL AND STAIN RESIST FABRICS, Advances in Textile Material and Processes (ATMP- 2019) on2nd – 3rd December 2019 at UPTTI, Kanpur, India, India.

- **A I Amjad**, Madan Lal Regar, Disha Verma, Shivani Tyagi, FUTURE FABRICS- A NEW AGE OF CLOTHING, Advances in Textile Material and Processes (ATMP- 2019) on 2nd – 3rd December 2019 at UPTTI, Kanpur, India, India.
- **Akhtarul Islam Amjad**, Madan Lal Regar, Aditya Krishna, Sikandar Prajapati, PROPERTIES of DUAL CORE LYCRA YARN, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- M L Regar, **A I Amjad**, Pramod Kumar, Srishti Agrawal, Sapana Giri, Aakriti Yadav,EFFECT OF FIBER ON APPAREL QUALITY, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- Madan Lal Regar, **A I Amjad**, Jaya Sharma, Piyush Mishra, Anushka, CONVEYOR BELTS-A FLEXIBLE COMPOSITE, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- Madan Lal Regar, **A I Amjad**, Jaya Sharma, Rajeev Kumar Gautam, Shivansh Awasthi, APPLICATIONS OF NATURAL FIBER IN REINFORCED COMPOSITES, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- Madan Lal Regar, **A I Amjad**, J P Singh, Saurabh Mishra, WATsun: WATERPURIFIER, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- **A I Amjad**, Madan Lal Regar, Shivam Tiwari, Aditya Mishra, EVALUATION OF MOISTURE TRANSPORTATION BEHAVIOUR OF TEXTILE MATERIALS, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- Madan Lal Regar, **A I Amjad**, Abha Bhargava, Sushmita Mukherjee, WASTE OF BLACK TEA – A SUSTAINABLE WAY FOR DYEING, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- Madan Lal Regar, **A I Amjad**, Mahendra Uttam Ayushi Garg, Nidhi Mishra, SELF COOLING FABRIC: A NEW INNOVATION, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- Madan Lal Regar, **A I Amjad**, Sufia Azim, Sakshi Chaudhary, RECYCLING AND REUSING APPROACHES OF TEXTILE PRODUCTS, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- Madan Lal Regar, **A I Amjad**, Asha, Vaishali Singh, Saurabh Verma, SMART SENSOR FABRIC by ELECTRONIC TEXTILE**,** Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December, 2019 at UPTTI, Kanpur, India, India.
- **A I Amjad**, M L Regar, J P Singh, NirbhayBeri, Gaurav Sharma, USE OF PEANUT RED SKIN TO PRODUCE ANTI-UV TEXTILE COLORATION, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December 2019 at UPTTI, Kanpur, India, India.
- **A I Amjad**, Madan Lal Regar, Shivam Tiwari, Aditya Mishra, Evaluation of moisture transportation behavior of textile materials, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December 2019 at UPTTI, Kanpur, India, India.
- **A I Amjad**, Madan Lal Regar, Taha, Anuj Kapoor, Ishika Rajvanshi, Aman Sachan, Dyeing from floral waste, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December 2019 at UPTTI, Kanpur, India, India.
- **A I Amjad**, Madan Lal Regar, Manya Jain, Surbhi Mishra, Satyam Jha, Self-healing fiber rein enforcement composite, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December 2019 at UPTTI, Kanpur, India, India.

- M L Regar, **A I Amjad,** J P Singh, Somitra Yadav, Vaibhav Singh Panwar, Declineof Textile Industries In India, Advances in Textile Material and Processes (ATMP- 2019) on 2nd – 3rd December 2019 at UPTTI, Kanpur, India, India.
- **A I Amjad**, Madan Lal Regar, Alka Ali, Tariq Khan, BANANA FIBRE, Advances inTextile Material and Processes (ATMP-2019) on 2nd – 3rd December 2019 at UPTTI, Kanpur, India, India.
- **A I Amjad**, Madan Lal Regar, Mukesh Kumar Singh, Aarav Agnihotri, Antra Gupta, Flexible Shielding for electromagnetic Rays, Advances in Textile Material and Processes (ATMP-2019) on 2nd – 3rd December 2019 at UPTTI, Kanpur, India, India.
- **Akhtarul Islam Amjad** & Rajiv Kumar, Properties of Sustainable Cotton Melange Yarns, International Conference Emerging Trends in Traditional & Technical Textiles(ICETT 2019) on 1st – 3rd November 2019 at Department of Textile Technology, Dr.
- B.R. Ambedkar NIT, Jalandhar, India, ISBN: 978-93-5382-111-1.
- **A I Amjad**, M L Regar and Sushmita Mukherjee, Dyeing from Waste of Tea Shops, International Conference Emerging Trends in Traditional & Technical Textiles (ICETT 2019) on 1st – 3rd November 2019 at Department of Textile Technology, Dr.
- B.R. Ambedkar NIT, Jalandhar, India, ISBN: 978-93-5382-111-1.
- Madan Lal Regar, **A I Amjad**, J P Singh, Shivam Kumar Tiwari and Ajeet Kumar, Chemical Protective Clothing, International Conference Emerging Trends in Traditional & Technical Textiles (ICETT 2019) on 1st – 3rd November 2019 at Department of Textile Technology, Dr. B.R. Ambedkar NIT, Jalandhar, India, ISBN: 978-93-5382-111-1.
- **A I Amjad**, Madan Lal Regar, M K Singh, Aarav Agnihotri, Mohit Dinkar and Saurabh Maliyan, Structure and Properties of Healthcare and Hygiene Product, International Conference Emerging Trends in Traditional & Technical Textiles (ICETT 2019) on 1st – 3rd November 2019 at Department of Textile Technology, Dr.
- B.R. Ambedkar NIT, Jalandhar, India, ISBN: 978-93-5382-111-1.
- Madan Lal Regar, **A I Amjad**, Prashant Vishnoi, Hamza Faisal, Mohit Jaiswal and Anmol Singh, Ballistic Armour – Protective Clothing, International Conference Emerging Trends in Traditional & Technical Textiles (ICETT 2019) on 1st – 3rd November 2019 at Department of Textile Technology, Dr. B.R. Ambedkar NIT,Jalandhar, India, ISBN: 978-93-5382-111-1.
- M L Regar, **A I Amjad**, Mahendra Uttam, Astha Singh and Shrasti Rajouria, Agro Textile – A Need of Farmer, International Conference Emerging Trends in Traditional& Technical Textiles (ICETT 2019) on 1st – 3rd November 2019 at Department of Textile Technology, Dr. B.R. Ambedkar NIT, Jalandhar, India, ISBN: 978-93-5382- 111-1.
- Tariq Khan, M L Regar, **A I Amjad** and Alka Ali, Colour Fast Finish: A Eco – friendly Process, International Conference Emerging Trends in Traditional & Technical Textiles (ICETT 2019) on 1st – 3rd November 2019 at Department ofTextile Technology, Dr. B.R. Ambedkar NIT, Jalandhar, India, ISBN: 978-93-5382- 111-1.
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- Rahul Kumar Shringirishi, A.K. Patra, **Akhtarul I. Amjad,** and M.L. Regar, AReview on Antimicrobial Finishes on Cotton Fabric by Various Natural Extracts, *International Conference on Advances in Textile Materials and Processes (ATMP- 2018)* on 19-20 November, 2018 at UPTTI Kanpur, India in association with IIT- Kanpur, India, India.
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- Akhtarul Islam Amjad and **Ravi Jain**, Pashmina- The Diamond Fibre, *International Conference on Technical Textiles and Nonwovens, 2014*, held at IIT, Delhi, India.

Expert Lecture

- Delivered an Expert Lecture in the national workshop on Effective TechnicalCommunication at UPTTI Kanpur, India.
- Delivered an Expert Lecture for pre-PhD coursework at DG PG College, Kanpur,India.

Organized Workshop/Seminar/Summit/Webinar/Meet

- Convenor of International conference International E-conference on sustainablegrowth in textile (SGT-2021) organized on 19-21 Sep 2021 at UPTTI, Kanpur, India.
- Convenor of national conference NCSGT 2020 organized on 12-14 Aug 2020 atUPTTI, Kanpur, India.
- One-week Industrial visit on Recent Trends in Textile Industry in the capacity of
- **Convenor** from 20th February 2020 to 24th February 2020 at Baddi and Kullu.
- One-week Workshop on Entrepreneurship as a career option- IIC week in the capacityof **Convenor** from 26th December 2019 to 31st December 2019 at UPTTI Kanpur, India.
- One week Workshop on Start-up & Entrepreneurship in the capacity of **Convenor**
- from 23rd September, 2019 to 28th September, 2019 at UPTTI Kanpur, India.
- Smart Textile Hackathon 2019 in the capacity of Convenor from 27th September, 2019 to 28th September, 2019 at UPTTI Kanpur, India
- 1-day workshop on *Effective Technical Communication* in the capacity of **convenor**
- on 22nd Aug 2019 at UPTTI Kanpur, India.
- Organized Viraksha Ropan Maha Kumbh (*Election Pattern- 2019)* in the capacity of
- **Coordinator** on 8th Aug 2019 at UPTTI Kanpur, India
- Organized Tree Plantation Drive (*Van Mahotsav- 2019)* in the capacity of
- **Coordinator** on 6th July, 2019 at UPTTI Kanpur, India
- Organized Tree Plantation Derive (*Van Mahotsav- 2019)* in the capacity of
- **Coordinator** on 6th July, 2019 at UPTTI Kanpur, India

- Organized Technical Fest (*Texup 2019)* in the capacity of **convenor** on 2nd March, 2019 at UPTTI Kanpur, India.
- Competition and Workshop on *Paint your idea* in the capacity of **convenor** on 28th Feb, 2019 at UPTTI Kanpur, India.
- 1 days workshop on *orientation on entrepreneurship as a career option* in the capacity of **convenor** on 29th Jan, 2019 at UPTTI Kanpur, India.
- Summit on *Youth Technologist Startup Conclave 2019* in the capacity of **organizing secretary** on 22nd Jan, 2019 at UICT Jalgaon in collaboration with UPTTI Kanpur, India.
- Faculty-student Industrial Visit on 23rd Jan, 2019 at Raymond Jalgaon.
- Workshop on *Sustainability in Textile Chemical processing* in the capacity of
- **convenor** on 11th & 12th Jan, 2019 at UPTTI Kanpur, India.
- Workshop on *IPR for students and Faculty members* in the capacity of **convenor** on10th Jan, 2019 at UPTTI Kanpur, India.
- A Webinar on *India's first leadership talk* in the capacity of **convenor** on 1st and 3rdOct, 2018 at UPTTI Kanpur, India.
- Summit on *Young Innovators Summit 2018* in the capacity of **Program Coordinator**
- on 23rd Oct, 2018 at UPTTI Kanpur, India in collaboration with UICT Jalgaon.
- 2 days' workshop on *Communication and personality development* in the capacity of
- **organizing secretary** on 1st and 3rd Oct, 2018 at UPTTI Kanpur, India.

ANNEX 3

(Item 3.1)

SUMMARY OF ACTIONS TAKEN ON THE DECISIONS TAKEN IN THE 16th MEETING OF TXD 10

Item No.	Brief Description	Action Taken
2.1	**Changes in Scope and Composition of TXD 10**	Updated scope and compositionare given in Annex 1.
5.1	**Draft Indian Standards for Finalization**	10 Indian Standards were FINALIZED and sent for Publication.

ANNEX 4a

(Item 4.1)

DRAFT ON TEXTILES - KNITTED SINGLETS-SPECIFICATION

For BIS Use Only

Preliminary Draft Indian Standard

TEXTILES — KNITTED MEN'S AND WOMEN'S SINGLETS — SPECIFICATION

FORWARD

(*Formal foreword to be added later*)

Singlet, also known as a tank top in some regions, is a sleeveless garment that typically covers the upper body and is often worn as an undergarment or on its own. Singlets are versatile garments that can be adapted for various purposes, from sports to everyday wear.
.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS: 2-2022. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1 SCOPE

1.1 This standard prescribes constructional details and other requirements of ribbed and non-ribbed singlets for men's and women's wear.

1.2 This standard does not specify general appearance, feel, lustre, degree of whiteness and shade of welting of the singlets. **(**see also 9**).**

2 REFERENCES

2.1 The standards given in Annex A contain provisions which through, reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards**.**

2.2 The Standard definition given in Annex B, Annex C, shall apply**.**

3 TERMINOLOGY

3.1 A sleeveless T-shirt, also called a muscle shirt, is the same design, but without sleeves. Some sleeveless T-shirts, which possess smaller, narrower arm holes, are traditionally worn by both women and men. They are often worn during athletic activities or as casual wear during warmer weather. They were quite popular in the 1980s and were commonly associated with surfers and bodybuilders and often bore the names and logos of gyms. Such shirts without logos are now more commonly worn as casual wear.

3.2 For the purpose of this standard, the definitions given in IS 3596 shall apply

4 TYPES OF SINGLETS

A. Ribbed Singlets

B. Non-Ribbed Singlets

A. Men’s Ribbed Singlets

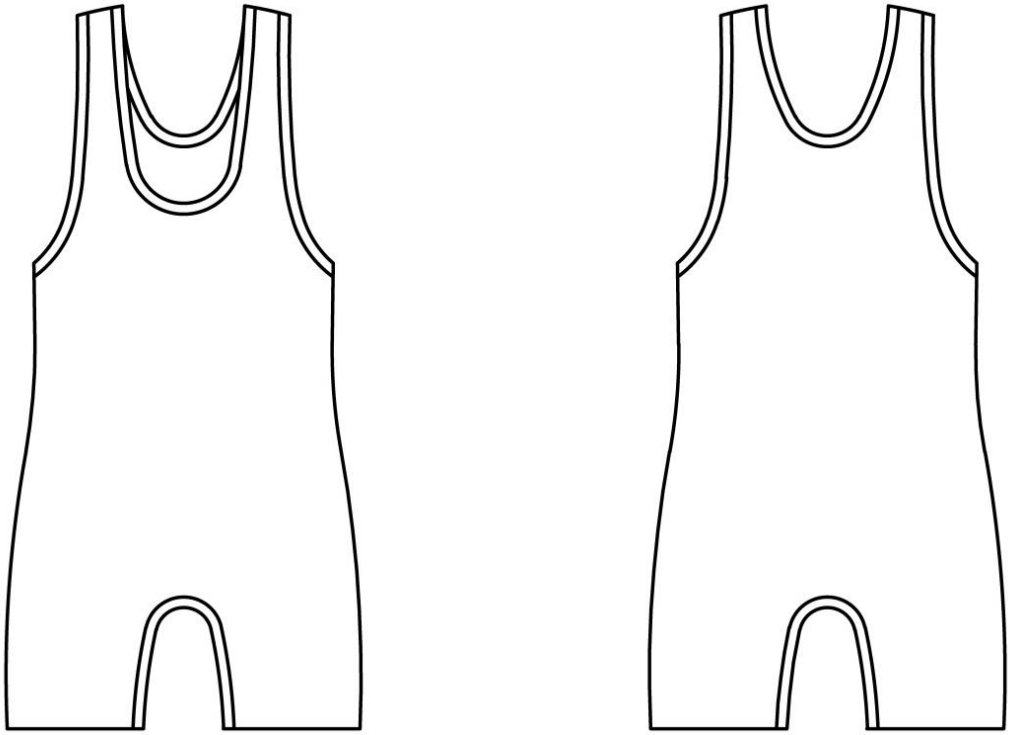


Figure 1 Ribbed Sleeveless Singlet for Men

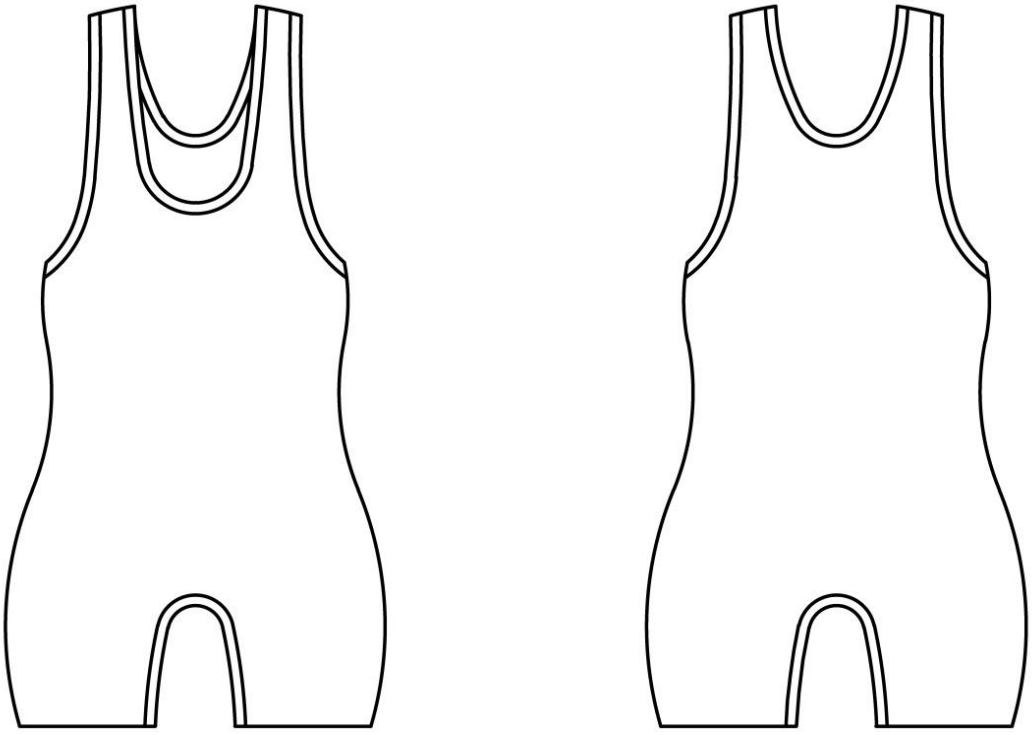


Figure 2 Women’s Ribbed Sleeveless Singlets

B. Non-Ribbed

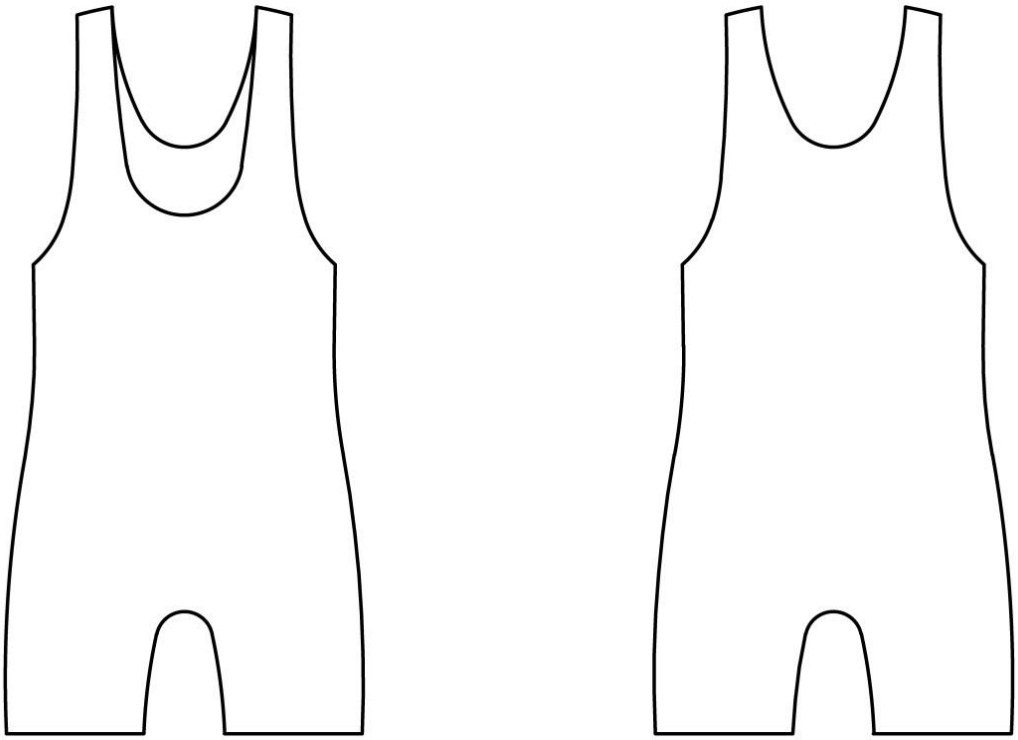


Figure 3 Men's Non-Ribbed Sleeveless Singlets

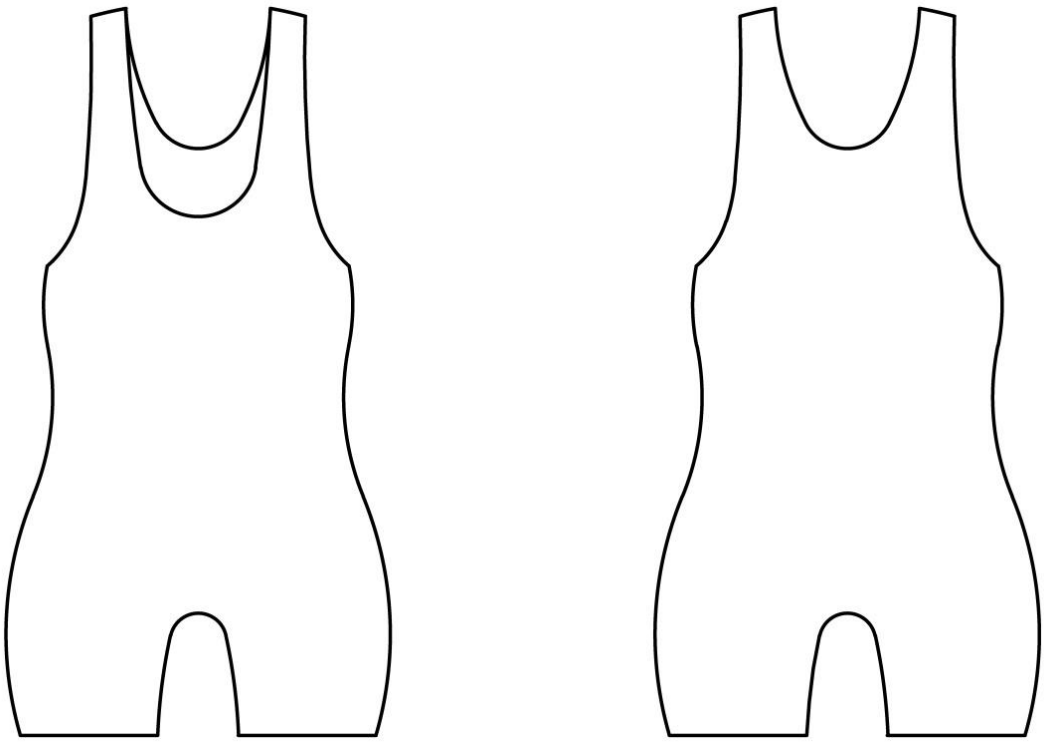


Figure 4 Women's Non-Ribbed Sleeveless Singlets

5 MATERIALS

5.1 Yarn

The yarn count used in manufacturing knitted singlets can vary depending on the desired characteristics of the fabric, such as softness, durability, and thickness. Singlets use blends of polyester, and natural fibres like cotton to enhance comfort and performance. The yarn count for cotton shall be in the range of 30s Ne –80s Ne (20 Tex – 8 Tex) and for multifilament synthetic and blended yarn shall be in the range of 100D – 250D. Apart from this specification, any other yarn count as per the agreement between the buyer & the seller shall be used for knitting, splicing, and linking of the singlets.

5.2 The material used for manufacturing singlets shall be tested as per Annex C.

5.3 Identification of Textile Fibres

5.3.1 The material used in manufacturing of singlets shall be tested as per Annex B.

6 MANUFACTURE

6.1 Fabric

6.1.1 The singlets fabric shall be knitted on circular and flatbed machines. These shall be neatly tailored out of well and evenly knitted tubular fabric. The fabric shall be of uniform texture and appearance. It shall be of uniform tension throughout its length and free from spirals. It shall be scoured, bleached or dyed. The singlets shall not have any seams or joining along their two outer sides. The Wales shall run along the length of the singlets. The fabric shall conform to construction particulars given in **Table 5** for plain knitted singlets and the singlets shall be tailored out of well and evenly knitted tubular fabric conforming to IS 9469. The neck and armholes shall be of the same material as that of the body and colour of the shade as agreed to between the buyer and the seller.

6.2 Shape

The shape of the singlets shall generally be as shown in Figure 5.

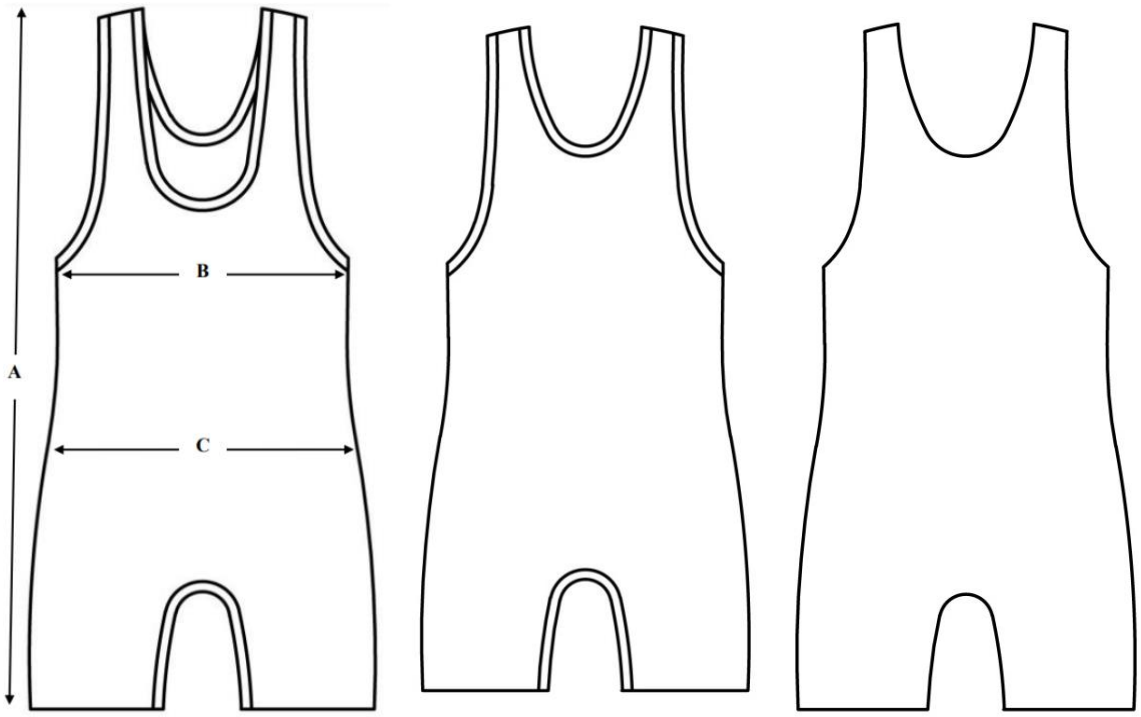


Figure 5 - Men's Ribbed & Non - Ribbed Sleeveless Singlet

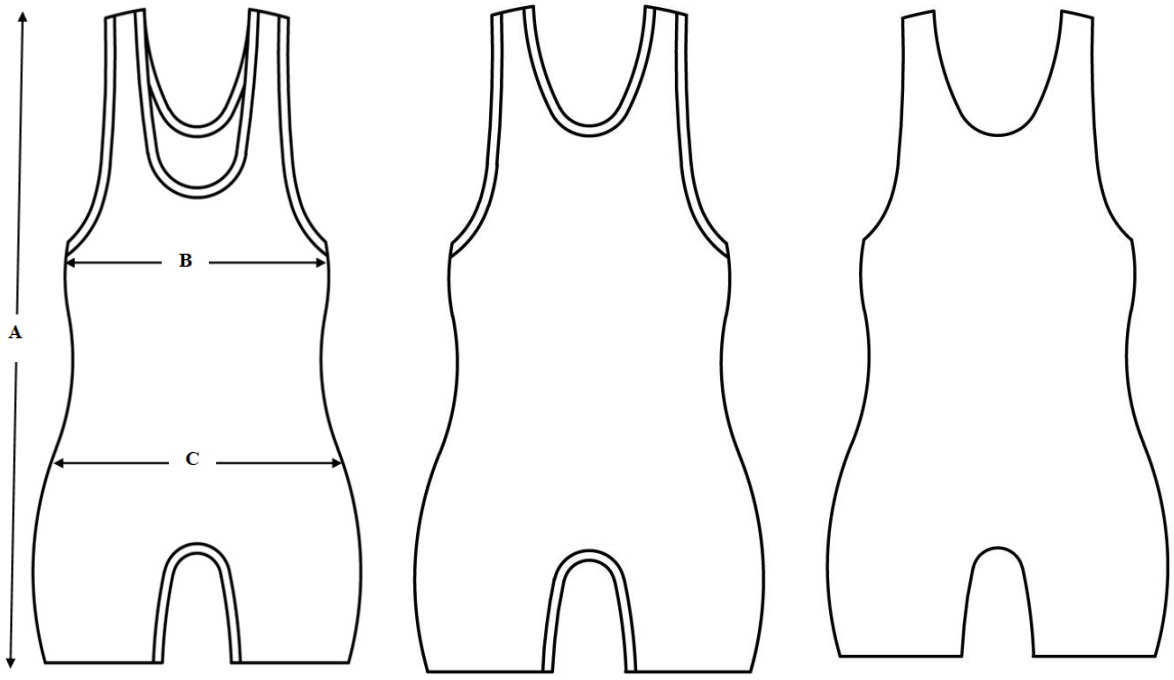


Figure 6 - Women's Ribbed & Non - Ribbed Sleeveless Singlet

Table 3 Typical Constructional details of Knitted Fabric
(Clause 7.1)

Sl No.	Fabric Type	GSM (g/m^2)	Gauge (Needles/inch)
(1)	**(2)**	**(3)**	**(4)**
(i)	Single Jersey	120-160	24-28
(ii)	Rib Knit	180-220	18-22
(iii)	Interlock Knit	180-220	20-24
(v)	Lycra/Spandex	150-200	28-32

Table 4 Size Chart for Men's & Women's Singlets

Sl. No.	Size	Men's Singlets			Women's Singlets		
1.		(A)	(B)	(C)	(A)	(B)	(C)
2.		Length	Chest	Waist	Length	Bust	Waist
3.	XS	64	72	76	76	79	64
4.	S	69	76	81	81	86	71
5.	M	74	80	86	86	94	79
6.	L	79	84	91	91	102	86
7.	XL	84	88	96	96	109	94
8.	2XL	89	92	101	102	117	102
9.	3XL	94	96	106	107	124	109
10.	4XL	99	100	111	112	131	116
11.	5XL	104	104	116	117	138	123
NOTE — All Measurements are in cm							

6.3 Seams and Stitches

6.3.1 For stitching various portions of singlets, the type of stitches shall be as given in Table 2. In case of dyed/printed singlets the sewing thread should be matching shade.

6.3.2 The count of sewing thread used in needle shall be one stand of 9.8 tex x 3(60c/3), the count of sewing thread used in loops shall be, Two stands of (15 tex x 2) or any other suitable value as per the agreement between the buyer and the seller.

Table 2 Seam and Stitches
(Clause 6.1.1)

Sl No.	Type of Stitch	Position to be Stitched	Thread in Needle 9.8 tex x 3(Ne 60/3)	Thread in Looper	Stitch Class
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
(i)	Overlock Stitch	Side Seams, Shoulder Seams	PC Thread	Polyester or Cotton Thread Two stands of 15 Tex × 2	512
(ii)	Zigzag Stitch	Neckline	Polyester Thread	Polyester Thread Two stands of 15 Tex × 2	304
(iii)	Flatlock Stitch	Hems	Polyester Thread	Polyester Thread Two stands of 15 Tex ×2	607
(iv)	Chain Stitch	Side Seams	Polyester Thread	Polyester Thread Two stands of 15 Tex × 2	103

(v)	Lockstitch	Labels	Polyester or Cotton Thread	Polyester Thread Two stands of 15 Tex × 2	301
NOTE — The number of stitches shall not be less than 4 stitches per inches.					

6.4 Reinforcement

6.4.1 The seams of the singlets at shoulders shall be suitably reinforced.

6.5 The Bottom hem & Sleeveless hem may be made from rib knitted fabrics, as agreed to between the buyer & seller.

6.6 The hem or folding at bottom sleeves and neck shall be evenly and securely stitched and the minimum dimensions shall be as agreed to between the buyers and the sellers.

6.7 Freedom from Defects

The sports singlets should be free from manufacturing defects, such as mends, ladders, dropped stitches, improper reinforcement, missed stitches at the stitched parts, badly sewn and mispositioned buttons, malformed button holes, chemical damages and dyeing defects, such as streakiness and uneven dyeing.

7 REQUIREMENTS

7.1 Dimension, Mass and Tolerances

The singlets fabric shall conform to the requirements of **Table 5** and **Table 6** considering the type of fabric used with tolerances typically ±0.5 cm to ± 2.0 cm.

NOTE — The Singlets size should be denoted by the number correspond to the length and waist diameter.

7.2 Seam and Stitching Tolerances

a) **Seam allowances** - Maintain consistent seam allowances (typically 0.6 cm to 1.5 cm) to ensure adequate construction and durability.

b) **Stitch quality** - Specify acceptable variations in stitch length, tension, and type such as; Lockstitch, Over-lock, or Cover-stitch; to ensure seams is secure and aesthetically pleasing.

7.3 Sewing Thread and Stitch Type

The stitch type details of the singlets shall be as under along with sewing thread as per IS 9543 and IS 1720.

Sl No.	Portion to be Stitched	Type of Stitch	Sewing Thread
i)	All Joining's	Flat – Lock	Three threads of 60s/3 count (100 dtex x 3) or 40s/2 count (145 dtex x 2) in the needle and one strand of the same threads in the each loopers.
ii)	Flap at the front opening (For Men's Only)	Lock Stitch	One strand of cotton sewing thread of 60s/3 count (100 dtex x 3) or 40s/2 count (145 dtex x 2) in each of the needle and the looper.
NOTE — Sewing thread of 60s/3.0 (100 dtex) count may be used in place of 40s/2 (145 dtex x 2)			

8 Other Requirements

Table 8 Requirements of Singlets

Sl. No.	Characteristic	Requirements	Method of Test Ref to
(1)	(2)	(3)	(4)
i.	Total number of Wales/dm,	150 - 250	B-4
ii.	Total number of Courses/dm,	200 - 300	B-4
iii.	Dimensional Change (due to relaxation) Percentage, *Max*	5.0	B-5
iv.	pH value	6 - 10	IS 1390
v.	Water soluble, *Min*	1.0	IS 3456
vi.	Ash Content	0.5	IS 199
vii.	Colour fastness ratings to min		
	i. Light	5	IS/ISO 105 – B02 OR IS/ISO 105 – B01
	ii. Washing a) Change in colour b) Staining of Adjacent fabric	4 4	IS/ISO 105 – C10
	iii. Perspiration a) Change in Colour b) Staining of adjacent fabric	3 3	IS/ISO 105 – E04
	iv. Rubbing a) Change in colour **b)** Staining of adjacent fabric	4 3	ISO 105 – X 12 : 2016
	v. Piling	4 - 5	BIS ISO 9943 : 2009
viii.	**Fibre Blend Composition**	--------	IS 677

9 Sealed Sample

If in order to illustrate or specify the indeterminable characteristics, such as general appearance, lustre, feel and colour of sports/wrestling singlets, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

9.4.1 The custody of the sealed sample shall be a matter of prior agreement between the buyers and the sellers.

10 MARKING

10.1 A suitable cloth label made of woven cotton, taffeta satin or fusing type shall be fastened or fused to each sport singlets at the inside of the neck portion on which the following shall be indicated by printing:

i) Size and type of singlets;

ii) Type of fabric namely, plain or interlock;

iii) Indication of the source of manufacture;

iv) Washing instructions, and

v) Any other information required by the buyer.

Note — The Color form the label shall not bleed on to the singlets during storage or use.

11 BIS Certification Marking

The Product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed there under, and the products may be marked with the Standard Mark.

12 PACKING

12.1 The Singlets shall be packed in bales or cases in accordance with **IS 3325** or **IS 3086** as the case may be.

13 SAMPLING

13.1 Lot

In any consignment, all the pairs of singlets of the same size manufactured from the same quality of yarn shall constitute a lot (IS 2500).

13.2 The conformity of a lot to the specification shall be determined on the basis of the test carried out on the pairs of singlets selected from the lot.

13.3 Unless otherwise agreed to between the buyer and the seller, number of pairs of Singlets depending on the lot size, shall be selected at random according to the Col 1 and 2 of Table 9 & 10

13.4 The number of pairs of singlets to be inspected and criterion for conformity for each characteristic shall be as follows:

Table 9 Performance Assessment criteria for Singlets
(Clause 12.3)

Sl.No.	**Characteristic**	**Number of pairs of Singlets to be Inspected**	**Criterion for Conformity**
(1)	(2)	(3)	(4)
I.	Visual inspection dimensions and number of wales and course	According to the col 3 of **Table 11**	Non-conforming pairs of singlets shall not exceed the corresponding number given in col 4 of the **Table 11**
II.	Mass	Sets of 10 pairs of singlets obtained from those selected according to col 3 of Table 3	All the observations shall satisfy the relevant requirements
III.	Dimension change, scouring loss, pH value, ash content and colour fastness	According to col 5 of **Table 11**	All the test results shall satisfy the relevant requirement

Table 10: Sample Size and Permissible Number of Non-Conforming pairs of Singlets

Sl. No.	**Number of pairs of Singlets In The Lot**	**For Dimensions and visual Inspection**		**Testing**
		Number of pairs of Singlets to be Inspected	**Number of permissible Non-Conforming Pairs**	**Number of pairs of Singlets to be tested for Chemical Characteristics**
(1)	(2)	(3)	(4)	(5)
I.	Up to 100	10	0	3
II.	100 – 300	20	1	3
III.	301 – 500	30	2	5
IV.	501 – 1000	50	3	5
V.	1001 and above	80	5	8

ANNEX A

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 582 (Part 5/Sec 1) : 2018 ISO 17234-1 : 2015	Methods of Chemical Testing of Leather Part 5 Determination of Certain Azo Colorants in Dyed Leathers Section 1 Determination of certain aromatic amines derived from azo colorants
IS 582 (Part 5/Sec 2) : 2018 ISO 17234-2 : 2011	Methods of Chemical Testing of Leather Part 5 Determination of Certain Azo Colorants in Dyed Leathers Section 2 Determination of 4-aminoazobenzene
IS 1390 : 2022 ISO 3071 : 2020	Textiles — Determination of pH of Aqueous Extract (*third revision*)
IS 1481 : 1970	Specification for metric steel scales for engineers (*first revision*)
IS 2500 (Part 1) : 2000 ISO 2859-1:1999	Sampling procedures for inspection by attributes: Part 1 sampling schemes indexed by acceptance quality limit (AQL) for lot - By - Lot inspection (*third revision*)
IS 7703 (Part 1) : 1990	Methods of Test For Man-Made Fibres Continuous Filament Flat Yarn — Part 1 Linear density (*first revision*)
IS 14563 : 2021 ISO 14184 -1 : 2011	Textiles — Determination of Formaldehyde Part 1 Free and Hydrolysed Formaldehyde (Water Extraction Method) (*first revision*)
IS 15061 : 2002	Automotive Vehicles — Flammability Requirements
IS 15570 : 2005	Textiles — Method of test — Detection of banned azo colorants in coloured textiles
IS 16914 (Part 2) : 2018 ISO 16373-2 : 2014	Textiles — Dyestuffs Part 2 General Method for the Determination of Extractable Dyestuffs including Allergenic and Carcinogenic Dyestuffs (Method using Pyridine-Water)
IS 16914 (Part 3) : 2018 ISO 16373-3 : 2014	Textiles — Dyestuffs Part 3 Method for Determination of Certain Carcinogenic Dyestuffs (Method using Triethylamine / Methanol)
IS/ISO 105-B01 : 2014 ISO 105-101 : 2014	Textiles — Tests for Colour Fastness — Part B01 Colour Fastness to Light: Daylight
IS/ISO 105-B02 : 2014 ISO 105-B02 : 2014	Textiles — Tests for Colour Fastness — Part B02 Colour Fastness to Artificial Light: Xenon Arc Fading Lamp Test
IS/ISO 105-C10 : 2006	Textiles — Tests for Colour Fastness — Part C10 Colour Fastness to Washing With Soap Or Soap And Soda
IS0-8559-1	Textiles – Size designation of clothes – Anthropometric definitions for body measurement.
IS0-8559-2	Textiles Size designation of clothes Part 2: Primary and secondary dimension indicators.
IS0-8559-3	Textiles Size designation of clothes Part 3: Methodology for the

	creation of body measurement tables and intervals.
IS/ISO 105-E02 : 2013	Textile — Tests for Colour Fastness — Part E02 Colour Fastness to Sea Water
IS 3086 : 1965	Code for seaworthy packaging of cotton hosiery yarn and goods.
IS 3325 : 1965	Code for inland packaging of cotton hosiery yarn and goods.
IS 3456 : 2022	Method for determination of water-soluble. matter of textile materials (*First Revision*).

ANNEX B
IDENTIFICATION OF FIBRES

B-1 IDENTIFICATION OF POLYESTER

The material used for manufacture is dipped in any one of the following reagents:

a) Solution of crystallized trichloroacetic acid/chloroform reagent, prepared at a mass ratio 1:1.
b) Benzyl Alcohol at temperatures of 150°C.
c) m-Cresol at boil.

B-1.1 If the material used for manufacture is polyester, it shall dissolve in any one of the above mentioned reagents.

B-2 IDENTIFICATION OF COTTON

The material used for manufacture is dipped in any one of the following reagents:

a) Cotton dissolves in Schweizer's Reagent ($Cu(OH)_2$ in ammonia), a specific test for cellulose.
b) Cotton will dissolve in concentrated sulfuric acid, indicating the presence of cellulose.
c) Boil the fabric sample in a 5% NaOH solution. Cotton will degrade and lose its structure in strong NaOH solutions.

B-2.1 If the material used for manufacture is cotton, it shall dissolve in any one of the above mentioned reagents.

B-3 IDENTIFICATION OF SPANDEX

The material used for manufacture is dipped in any one of the following reagents:

a) Spandex will dissolve in DMF (Dimethylformamide) or DMAc, unlike many other fibers.
b) Spandex is resistant to formic acid, while some other fibers may dissolve or degrade.

c) Spandex will degrade but not dissolve completely in sulfuric acid, often swelling and losing elasticity.
d) Spandex shows specific thermal transitions, such as a melting point around 240-270°C.

B-3.1 If the material used for manufacture is Spandex, it shall dissolve in any one of the above mentioned reagents.

B-4 IDENTIFICATION OF RAYON

The material used for manufacture is dipped in any one of the following reagents:

(a) Rayon dissolves in cuprammonium solution or concentrated sulfuric acid, which is used in lab analysis.
(b) Under a microscope, rayon fibres appear smooth and cylindrical with striations (longitudinal lines).

ANNEX C
METHOD OF TESTS

C-1 CONDITIONING OF THE TEST SPECIMEN AND ATMOSPHERIC COMDITIONS FOR TESTING

C - 1.1 The test specimen shall be tested in prevailing atmospheric conditions. In case of dispute**,** the specimen shall be conditioned and tested in the standard atmosphere as given in IS 6359.

C - 2 DIMENSIONS

C - 2.1 Take pyjamas from the test sample. Lay flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it. Measure dimensions correct to the nearest centimetre, as given in Table 8.

C - 3 MASS

C - 3.1 Take a set of 10 pairs of pyjamas from the test sample. Condition them for moisture equilibrium for 24 hours (see **B-1.1**)**.**

C - 4 WALES AND COURSES

C - 4.1 Take pyjamas from the test sample. Lay it flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it.

C - 4.1.1 Count the number of wales including any fraction on one side of the pyjamas. Similarly count the number of wales including any fraction on other side of the pyjamas and add the two values.

C - 4.1.2 Count the number of courses in 10 cm including any fraction on both sides of the pyjamas and calculate the average courses per decimetre.

C- 5 DIMENSIONAL CHANGE (Due to Relaxation)

C-5.1 Marking the Test Specimens. Take pyjamas from the test sample. Mark centrally on it, by means of indelible ink or fast dyed cotton sewing, a set of three points, namely, *X*, *Y* and, *Z* so that,

a) All the three points are on the same wale,
b) point *X* is on the top portion;
c) point *Y* is on the heel gore line; and
d) Point *Z* is on the toe portion.

C - 5.2 Procedure

C - 5.2.1 Place the test specimen on a glass plate. Remove by hand all the creases and wrinkles without stretching the specimen. Place another glass plate on the specimen. Measure separately, correct to the nearest millimetre, the distance between *X* and *Y* and that between *Y* and *Z*.

C - 5.2.2 Lay the test specimen flat in a tray of suitable size, having a depth of 10 cm. Soak the specimen under the head of 25mm of water containing 0.5 % of suitable wetting agent at room temperature for two hours. Drain out the water and remove the test specimen carefully so that it is not stretched. Lay the specimen flat on a smooth surface, remove the excess water by absorbent material and dry it at room temperature.

Note *– Removal of excess water by wringing the test specimen is not permitted*

C - 5.2.3 After drying, conditioned the test specimen to moisture equilibrium at room temperature, place it on the glass plate, carefully remove wrinkles and creases and place another glass plate on it. Measure, correct to the nearest centimetre, the distance between *X* and *Y* and that between *Z*

C-5.3 Calculation

C - 5.3.1 calculate separately, correct to one place of decimal, the percentage change between the points *X* and *Y* and that between *Y* and *Z* by following formula:

$$S = \frac{a - b}{a} \times 100$$

Whereas;

a) S = dimensional change (due to relaxation) percent;
b) a = distance between the two points X and Y, or Y and Z, before soaking; and
c) b = distance between the same points after soaking.

C - 5.3.2 Calculate the average dimensional change**.**

D - 1 SPIRALITY OF THE KNITTED FABRIC

Spirality is a major problem of knit fabrics which are produced in circular knitting machines. Relaxation of torsional stresses cause dimensional distortions and instability in the knitted loop constructions. The factors that influence the spirality include; machine gauge, no of feeders, yarn type and fabric properties, etc.

D – 1.1 Measurement of Spirality after Laundering

Spirality is determined by placing a protractor on the smooth fabric surface with its base-line along the course and reading the angle between the wale line and a line 90°perpendicular to the course line.

D - 1.2 Test Specimen Preparation and Marking Procedures

i. Prepare specimen for marking from appropriate location from the sample. Cut a specimen of size 380 mm x 380 mm single layer fabric.
ii. Place the test specimen on a glass plate with the technical face of the fabric upwards.
iii. Remove by hand all the creases and wrinkles without stretching the specimen.
iv. If necessary, place tensioning mass on either side of the fabric sample to keep the welt straight.

D - 1.3 Procedure - Diagonal Marking

i. Mark two pairs of 250 mm benchmark sets parallel to the length and two pairs of 250 mm benchmark sets perpendicular to the width to make a square. Draw a line through each of the four sets of adjacent benchmark to denote the square formed.

ii. Label the four corners, A, B, C and D in clockwise direction starting at the lower left corner as shown in figure -3. Using the middle third of the specimen width, place the ruler or a straightedge parallel to the direction of wales in the fabric specimen.

iii. Choose one wale, and align and the straight edge of the ruler with that wale at the intersection between the body of the specimen and the welt. Keeping that point fixed, rotate the straightedge until it crosses the same wale at a position (200 ± 1) mm from the top of the welt.

iv. Without moving the straightedge, place the protector on the straightedge with the base line parallel to the top of the welt. Measure the angle between the line of the straightedge and the bottom of the protector which is parallel to the top of the welt. (See figure 3)

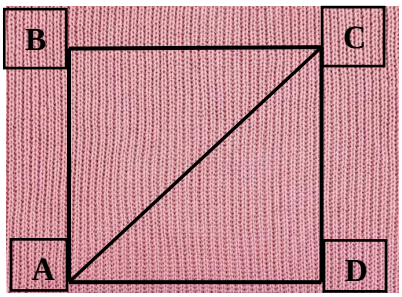


Figure – 3 Diagonal Marking Procedures

D – 1.2.4 Calculation of the Spirality in Percentage

i. Calculate the percentage change in the wale angle spirality from the original measurement as follow:

$$S = \frac{\alpha - \beta}{\alpha} \times 100$$

Where;

S = is the percentage spirality change after laundering, expressed as a percentage of the original;

α = is the original wale spirality angle, expressed in degrees [See Figure 4(a)];

β = is the wale spirality after laundering, expressed in degrees [See Figure 4(b)].

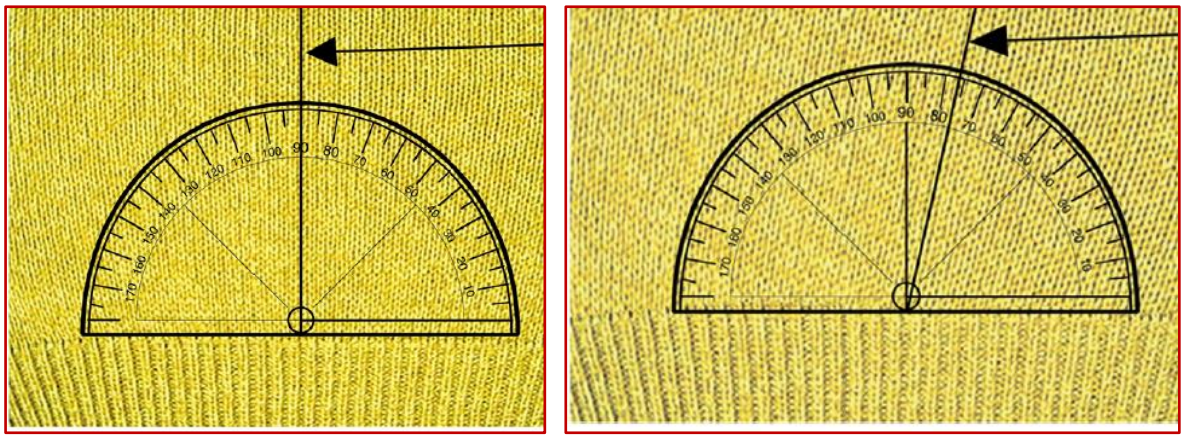


Figure 4: (a) Originally measured spirality angle α, (b) Measured spirality angle β after laundering.

ANNEX 4b

(Item 4.1)

For BIS Use Only

Preliminary Draft Indian Standard

TEXTILES — KNITTED MEN'S AND WOMEN'S TRACK SUIT — SPECIFICATION

FORWARD

(*Formal foreword to be added later*)

A tracksuit refers to a two-piece sportswear set, typically consisting of a **track jacket** and **track pants**, both made from knitted fabric. Knitted fabrics are created by interlooping yarns, which gives them a stretchy, flexible, and soft texture, unlike woven fabrics.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS: 2-2022. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1 SCOPE

1.1 This standard describes constructional details and other requirements of Track – Suits for men's and women's wear with Zipper and Hoodie.

1.2 This standard does not specify the general appearance, luster, feel and shade of the Track - Suit.

2 REFERENCES

2.1 The standards given in Annex A contain provisions which through, reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

2.2 For the purpose of this standard the definitions given in Annex B, Annex C, and Annex D shall apply.

3 TERMINOLOGY

3.1 Knitted tracksuits are made from soft, flexible materials like cotton knit blends **or** jersey**,** providing a cozy, stretchy fit. These suits often feature a knit track jacket (typically zip-up) and knit track pants, designed for comfort with elastic waistbands and cuffed ankles. The knit fabric offers breathability and warmth, making it ideal for cooler weather and casual settings. Knitted tracksuits often have ribbed cuffs, collars, and hems for added texture, and are popular in athleisure and retro styles due to their relaxed yet stylish appearance.

3.2 For the purpose of this standard, the definitions given in IS 3596 shall apply.

4 TYPES OF TRACK-SUIT

4.1 Track – Suit shall be of any one of the following two types.

A) Hoodie Track Suit

B) Zipper Track Suit

Men's Hoodie Track-Suit

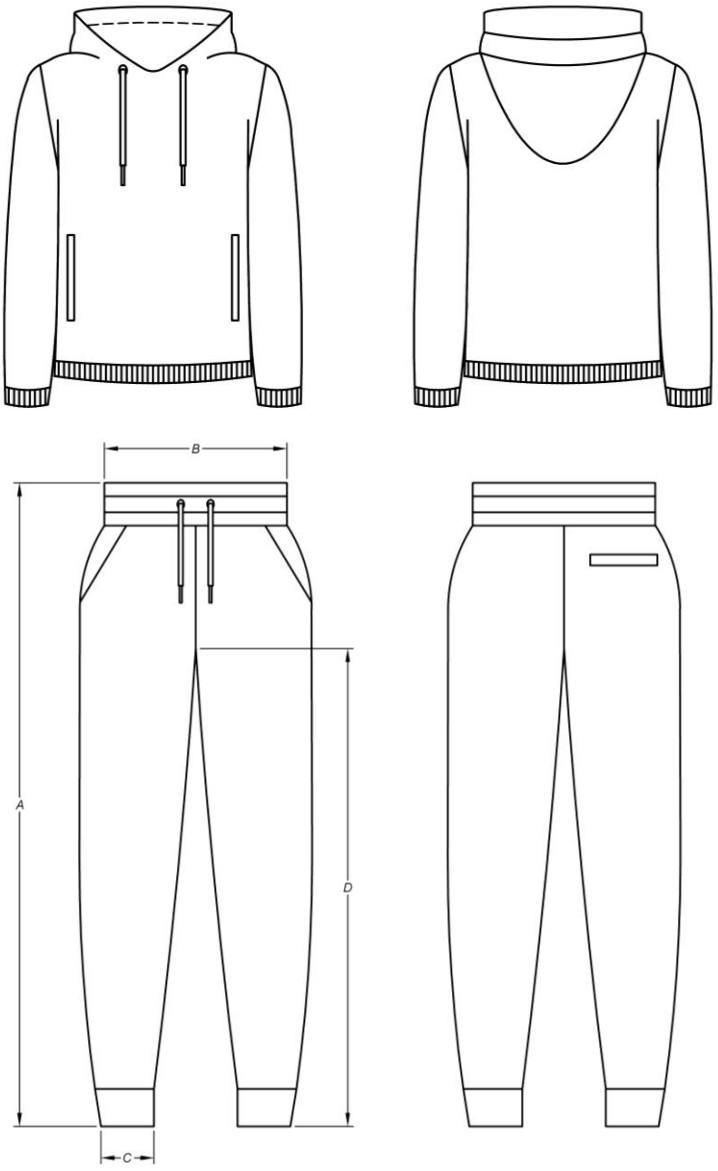


Figure 1 **Men’s Hoodie Track Suit**

Men’s Zipper Track Suit

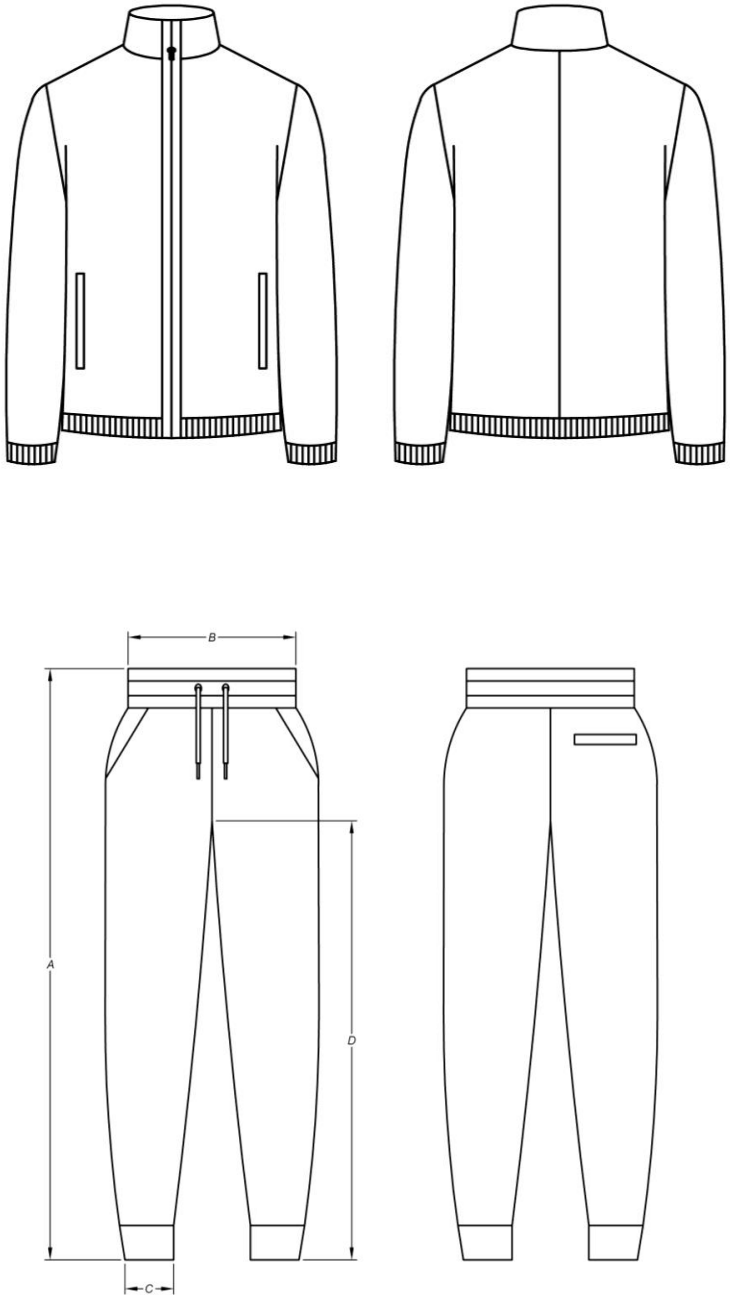


Figure 2 Men’s Zipper Track Suit

Women’s Hoodie Track-Suit

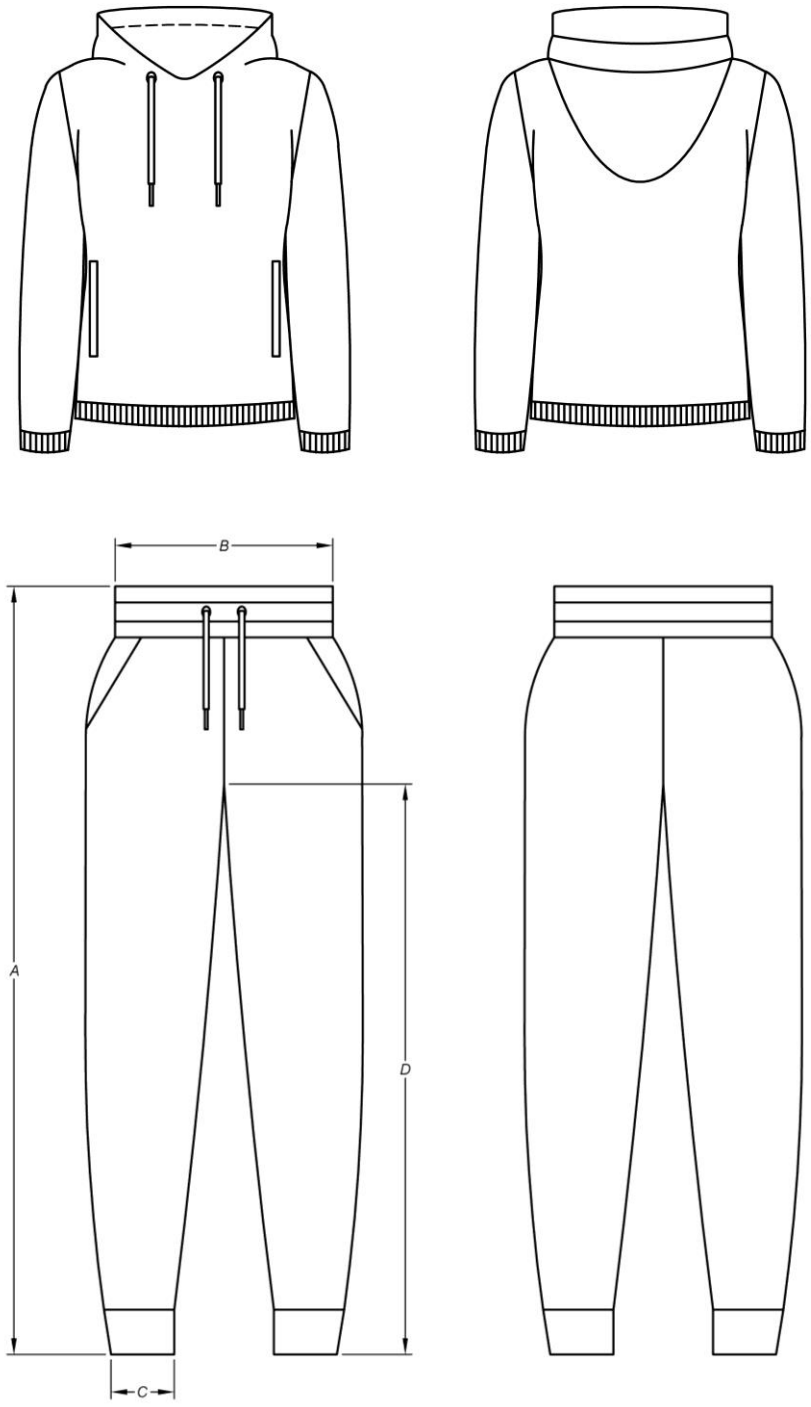


Figure 3 Women's Hoodie Track Suit

Women's Zipper Track-Suit

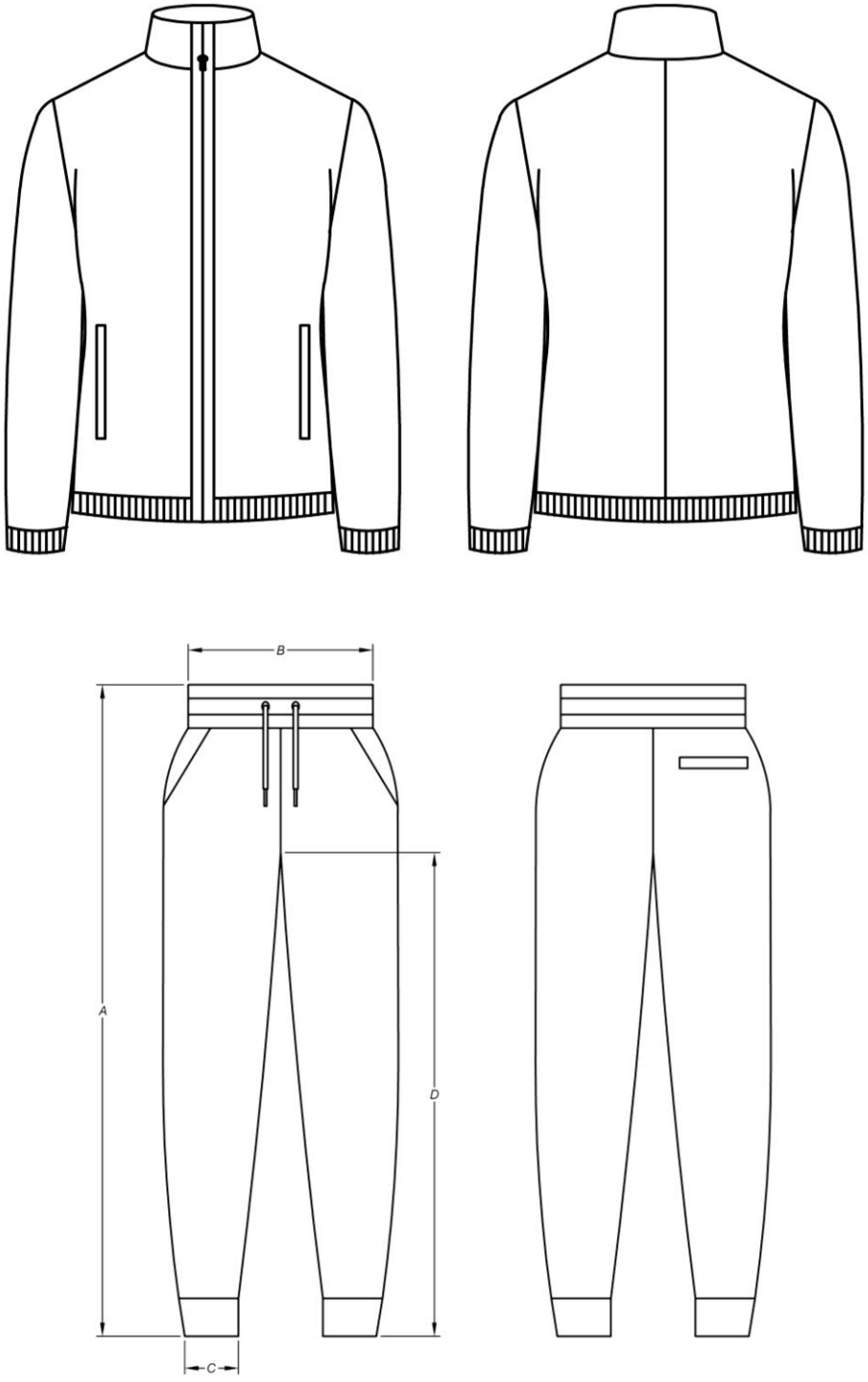


Figure 4 Women’s Zipper Track Suit

5 MATERIALS

5.1 **Yarn**

The yarn count used in manufacturing knitted Track suit can vary depending on the desired characteristics of the fabric, such as softness, durability, and thickness. Track suit use blends of polyester, and natural fibres like cotton to enhance comfort and performance. The yarn count for cotton shall be in the range of 20s Ne –70s Ne (30 Tex – 10 Tex) and for multifilament synthetic and blended yarn including textured yarns shall be in the range of 100D – 400D. Apart from this specification, any other yarn count as per the agreement between the buyer & the seller shall be used for knitting, splicing, and linking of the Track suit.

5.2 The material used for manufacturing Track suit shall be tested as per Annex C.

5.3 Identification of Textile Fibres

The material used in manufacturing of Track suit shall be tested as per Annex B.

6 MANUFACTURE

6.1 **Fabric**

The Track suit fabric shall be knitted on circular and flatbed machines. These shall be neatly tailored out of well and evenly knitted tubular fabric. The fabric shall be of uniform texture and appearance. It shall be of uniform tension throughout its length and free from spirals. It shall be scoured, bleached or dyed. The Track suit shall not have any seams or joining along their two outer sides. The Wales shall run along the length of the Track suit. The fabric shall conform to construction particulars given in Table 5 for plain knitted Track suit and the Track suit shall be tailored out of well and evenly knitted tubular fabric conforming to IS 9469. The neck and armholes shall be of the same material as that of the body and colour of the shade as agreed to between the buyer and the seller.

6.2 **Shape**

The shape of the Track suit shall generally be as shown in Figure 5.

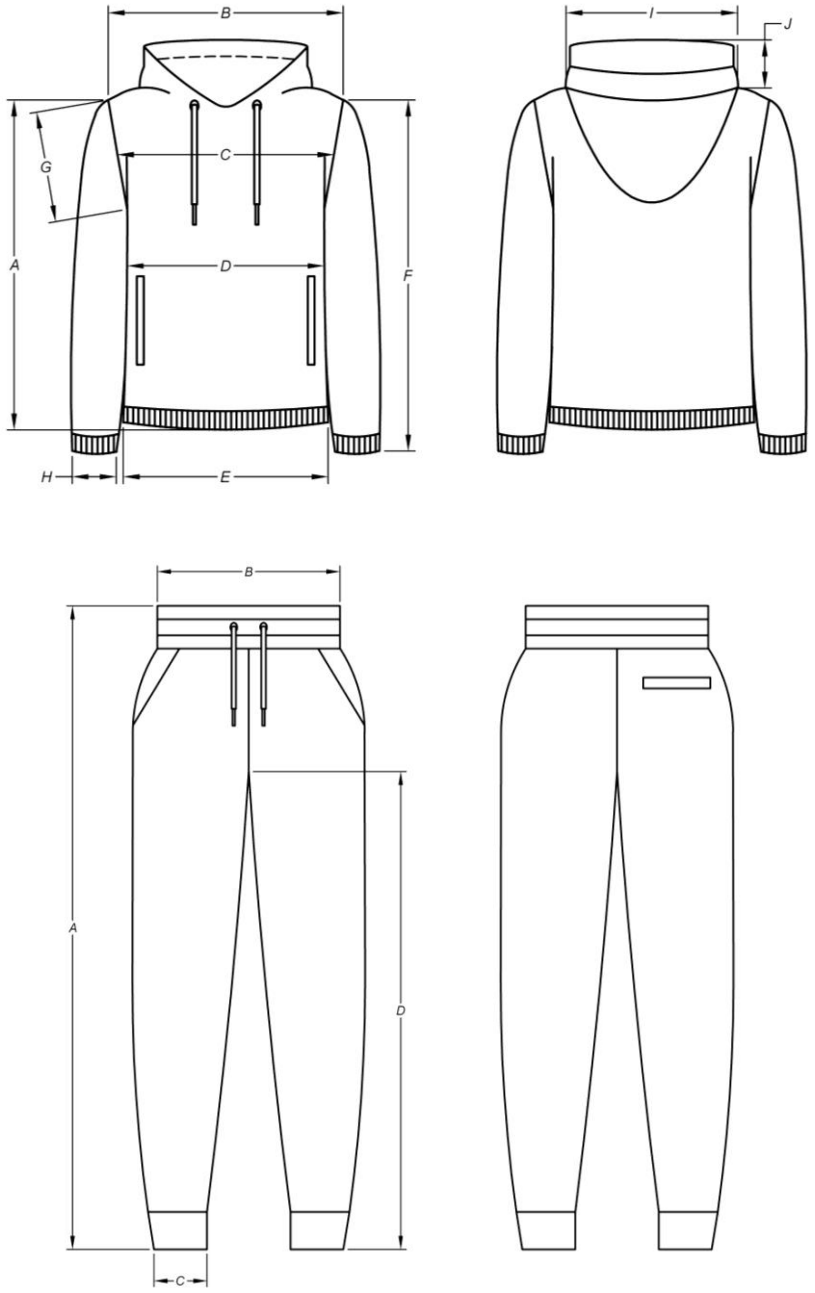


Figure 5 Men's Hoodie Track Suit

Table 1 Typical Constructional Details of Knitted Fabrics

Sl No.	**Fabric Type**	**GSM (g/m²)**	Gauge (Needles/inch)

(1)	(2)	(3)	(4)
(i)	Single Jersey	120-160	24-28
(ii)	Rib Knit	180-220	18-22
(iii)	Interlock Knit	180-220	20-24
(v)	Lycra/Spandex	150-200	28-32

6.3 **Reinforcement**

The seams of the Track-Suit at shoulders shall be suitably reinforced.

6.4 All major seams, including shoulder, side, armhole, and crotch seams, shall be reinforced with double or triple stitching (lockstitch or overlock) to ensure maximum durability during physical activity.

6.5 Bar-tacking or additional reinforcement stitching shall be applied to high-stress areas such as pocket openings, waistband, and hem edges to prevent seam failures.

6.6 Both cuffs and hemlines must have elastic or rib-knit bands, with reinforced stitching to enhance stretch recovery and prevent fraying after repeated wear and laundering.

6.7 Ribbed knit fabrics used for cuffs and hems shall be tested for tensile strength and elasticity to meet the durability requirements specified for sportswear.

6.8 Zippers shall be backed with reinforced tape (preferably polyester or nylon) to avoid tearing or detachment during use.

6.9 Zipper ends shall include bar-tack reinforcement to prevent accidental opening or damage to the zipper from high-stress activities.

6.10 The waistband elastic shall be securely sewn with reinforced topstitching to prevent curling or detachment during prolonged use.

6.11 In addition, all elastic bands must have a recovery rate of at least 90% after 1000 cycles of stretching to ensure long-lasting elasticity.

6.12 Pocket openings must be reinforced with bar-tack or overlock stitching to handle frequent pulling and stretching.

6.13 Pocket bags must be made from durable fabric (preferably double-layered) to prevent tearing when carrying items.

6.14 Drawstrings on hoodies or waistbands must be reinforced with metal or durable plastic eyelets to prevent tearing and the agreement between the buyer and seller.

6.15 The edges of eyelets must be reinforced with stitching to avoid fraying of the fabric.

5.15 All high-stress points, such as the intersection of multiple seams, must be reinforced with an additional stitch density (8-12 stitches per inch) to increase the garment's overall strength.

6.16 **Freedom from Defects**

The sports Track-Suit should be free from manufacturing defects, such as mends, ladders, dropped stitches, improper reinforcement, missed stitches at the stitched parts, badly sewn and mispositioned buttons, malformed button holes, chemical damages and dyeing defects, such as streakiness and uneven dyeing.

7 REQUIREMENTS

7.1 Dimension, Mass and Tolerances

The pyjamas fabric shall conform to the requirements of **Table 5** and **Table 6** considering the type of fabric used with tolerances typically ±0.5 cm to ± 2.0 cm.

NOTE — The Pyjamas size should be denoted by the number correspond to the length and waist diameter.

7.2 Seam and Stitching Tolerances

a) **Seam allowances** - Maintain consistent seam allowances (typically 0.6 cm to 1.5 cm) to ensure adequate construction and durability.

b) **Stitch quality** - Specify acceptable variations in stitch length, tension, and type such as; Lockstitch, Over-lock, or Cover-stitch; to ensure seams is secure and aesthetically pleasing.

7.3 Sewing Thread and Stitch Type

The stitch type details of the pyjamas shall be as under along with sewing thread as per IS 9543 and IS 1720.

Sl No.	Portion to be Stitched	Type of Stitch	Sewing Thread
i)	All Joining's	Flat – Lock	Three threads of 60s/3 count (100 dtex x 3) or 40s/2 count (145 dtex x 2) in the needle and one strand of the same threads in the each loopers.
ii)	Flap at the front opening (For Men's Only)	Lock Stitch	One strand of cotton sewing thread of 60s/3 count (100 dtex x 3) or 40s/2 count (145 dtex x 2) in each of the needle and the looper.
NOTE — Sewing thread of 60s/3.0 (100 dtex) count may be used in place of 40s/2 (145 dtex x 2)			

7.1 Men's Wear Hoodie Track Suit Size Chart

7.1.1 The Size dimension for Men's Wear Hoodie Track Suit shall be as per Table 5 & figure 5.

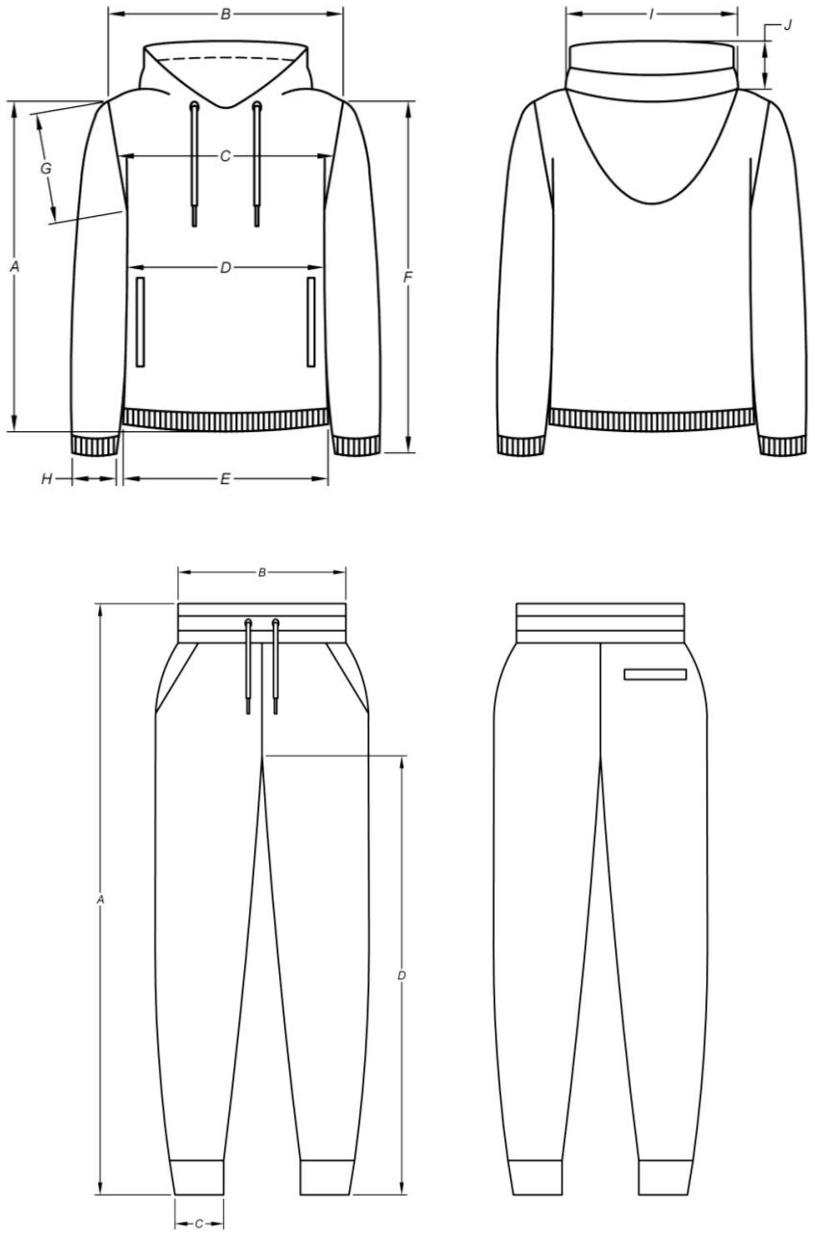


Figure 5 Men's Wear Track Suit

Table 5 Measurement Size Chart for Men's Track Suit

Sl No	Size	Length from HPS	Shoulder	Chest	Waist	Bottom Width	Sleeve Length	Armhole Length	Sleeve Opening	Neck Width	Front Neck Drop
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
1	XS	65	44	96	96	96	62	40	18-20	17	8
2	S	67	46	100	100	100	64	42	19-21	18	8.5
3	M	70	49	106	106	106	67	44	20-22	19	9
4	L	73	52	112	112	112	70	46	21-23	20	9.5
5	XL	76	55	118	118	118	73	48	22-24	21	10
6	XXL	79	58	124	124	124	76	50	23-25	22	10.5
7	3XL	81	60	128	128	128	78	52	24-26	23	11
8	4XL	83	63	134	134	134	80	54	25-27	24	11
Note: All Measurements are in cm											

Table 6 Measurement Size Chart for Men's Bottom Track Suit

Sl No	Size	Length	Waist	Leg-Opening	In - seam
		(A)	(B)	(C)	(D)
1	XS	84	66	23	56
2	S	89	71	24	61
3	M	92	76	25	66
4	L	98	81	26	71
5	XL	103	86	27	76
6	2XL	108	91	28	81
7	3XL	113	96	29	86
8	4XL	118	101	30	91

7.2 Women's Track Suit Size Chart

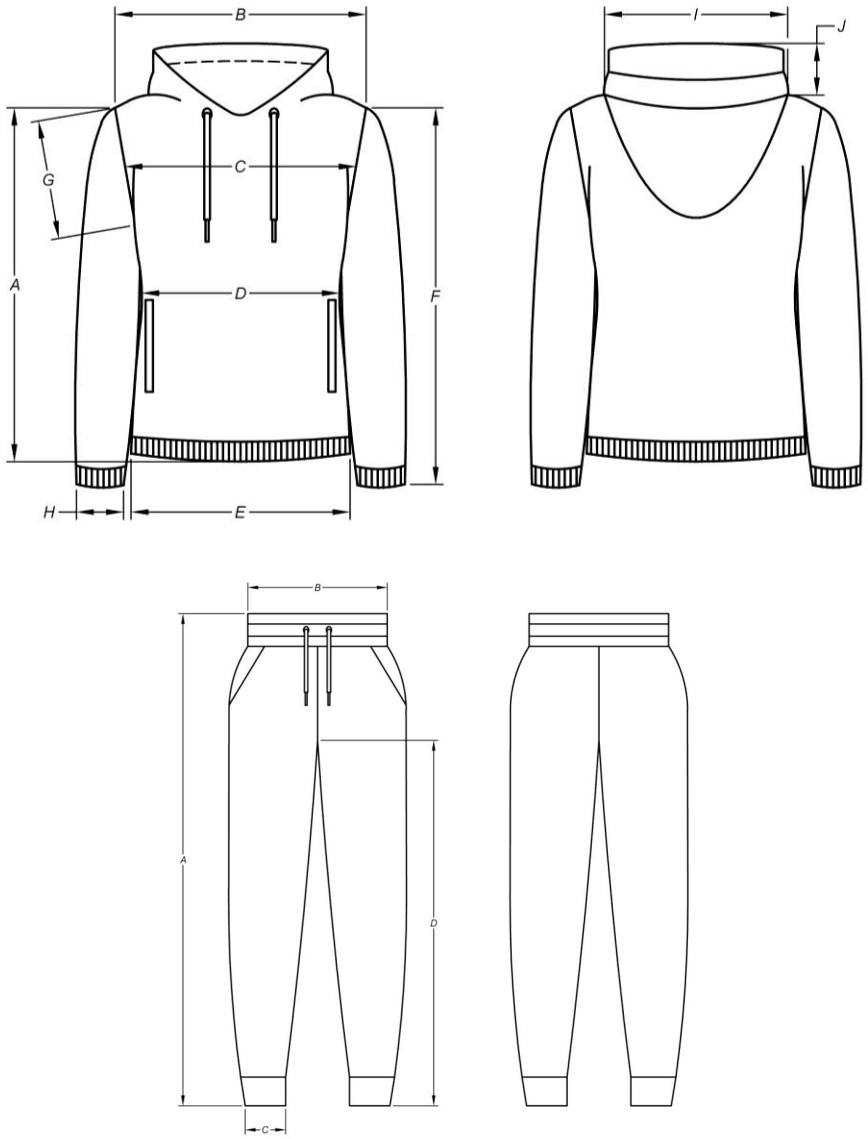


Figure 6 Women’s Wear Track Suit

Table 6 Size Dimension for Women's Track - Suit Size Chart

S No	Size	Front Length	Across Shoulder	Chest	Waist	Bottom Width	Sleeve Length	Armhole	Sleeve Opening	Neck Width	Front Neck Drop	Length	Waist	Leg Opening	In-Seam Length
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(A)	(B)	(C)	(D)
1	S	49.5	39	85-89	71-75	97	60-62	40-42	18-20	17-19	8.5	96-98	69	25-27	69
2	M	50.5	41	90-94	76-80	99	62-64	42-44	20-22	18-20	9	98-100	74	26-28	68
3	L	52	43	95-99	81-85	102	64-66	44-46	22-24	19-21	9.5	100-102	79	27-29	67
4	XL	53	54	100-104	86-90	104	66-68	46-48	24-26	20-22	10	102-104	84	28-30	68
5	2XL	54.5	46	105-109	91-95	107	68-70	48-50	26-28	21-23	10.5	104-106	89	29-31	67
6	3XL	56	48	110-114	96-100	110	70-72	50-52	28-30	22-24	11	106-108	94	30-32	65
7	4Xl	58	50	115-117	101-106	113									
Note : All Measurements are in cm															

8.1.1 The material used for product packaging shall be reusable or made from recyclable or biodegradable materials.

8.1.2 Fatty alcohol based non-ionics as emulsifier should be used wherever required.

8.1.3 Polyhalogenated based phenol fire retardants shall not be used**.**

8.4 Sealed Sample

If in order to illustrate or specify the indeterminable characteristics, such as general appearance, lustre, feel and colour of sports track-suits, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

8.4.1 The custody of the sealed sample shall be a matter of prior agreement between the buyers and the sellers.

9 MARKING

9.1 A suitable cloth label made of woven cotton, taffeta satin or fusing type shall be fastened or fused to each sport track-suit at the inside of the neck portion on which the following shall be indicated by printing:

i) Size and type of sports track-suits;

ii) Type of fabric namely, plain or interlock;

iii) Indication of the source of manufacture;

iv) Washing instructions, and

v) Any other information required by the buyer.

Note — The Color form the label shall not bleed on to the track-suit during storage or use.

10 BIS Certification Marking

The Product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed there under, and the products may be marked with the Standard Mark.

11 PACKING

11.1 The Track-suit shall be packed in bales or cases in accordance with **IS 3325** or **IS 3086** as the case may be.

12 SAMPLING AND CRITERIA FOR CONFORMITY

12.1 The sampling procedure gives desired protection to the buyers and the sellers provided the lot submitted for inspection is homogeneous. To achieve this, the manufacturers shall maintain system of process control at all stages of manufacture ensuring that track-suit tendered by him for inspection comply with the requirements of this standard in all respects.

NOTE — For effective process control, the use of statistical quality control technique is recommended and helpful guidance may be obtained in this respect from IS 397 (Part 1).

12.2 In any consignment all the sports track-suit of the same size and manufactured from the same count and quality of yarn and delivered to a buyer against one dispatch note shall constitute a lot.

12.2.1 The conformity of a lot to the requirements of this specification shall be determined on the basis of the tests carried out on the samples selected from the lot.

12.3 All the track-suit be examined for visual inspection, dimension, freedom from defect, gsm etc. Any sports track-suit failing in one or more of the above requirements shall be termed as defective. The lot shall be considered as conforming to the above requirements, if the total number of defectives found in the sample is less than or equal to the acceptance number given in column 4 of Table 8. Otherwise, the lot shall be rejected.

12.3.1 If the samples are found satisfactory, samples will be drawn as per column 5 for physical testing, from the sample originally drawn as per column 3 of Table 8.

12.3.2 For chemical parameters sample to be drawn as per column 7 randomly from the samples as per column 5 of Table 9.

12.3.3 Acceptance number mentioned in the physical parameter (Coloumn6) is inclusive of chemical parameter (coloumn8) that is, total acceptance number should not exceed acceptance number mentioned in column 6 of Table 9.

Table 9 Sample Size and Permissible Number of Non Conforming Track Suits

Table 9 Sample Size of Track Suits

Sl No.	Lots Size in Nos	Visual Inspection , Demenson, freedom from Defect, gsm etc at the time of sampling		Physical Parameters		Chemical Parameters	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		sample size	Acceptance No				
(i)	upto 280	13	1	13	1	5	0
(ii)	281-500	20	2	13	1	5	0
(iii)	501-1200	32	3	20	2	5	0
(iv)	1201-3200	50	5	32	3	8	1

(v)	3201-10000	80	7	32	3	8	1

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 582 (Part 5/Sec 1) : 2018 ISO 17234-1 : 2015	Methods of Chemical Testing of Leather Part 5 Determination of Certain Azo Colorants in Dyed Leathers Section 1 Determination of certain aromatic amines derived from azo colorants
IS 582 (Part 5/Sec 2) : 2018 ISO 17234-2 : 2011	Methods of Chemical Testing of Leather Part 5 Determination of Certain Azo Colorants in Dyed Leathers Section 2 Determination of 4-aminoazobenzene
IS 1390 : 2022 ISO 3071 : 2020	Textiles — Determination of pH of Aqueous Extract (*third revision*)
IS 1481 : 1970	Specification for metric steel scales for engineers (*first revision*)
IS 2500 (Part 1) : 2000 ISO 2859-1:1999	Sampling procedures for inspection by attributes: Part 1 sampling schemes indexed by acceptance quality limit (AQL) for lot - By - Lot inspection (*third revision*)
IS 7703 (Part 1) : 1990	Methods of Test For Man-Made Fibres Continuous Filament Flat Yarn — Part 1 Linear density (*first revision*)
IS 14563 : 2021 ISO 14184 -1 : 2011	Textiles — Determination of Formaldehyde Part 1 Free and Hydrolysed Formaldehyde (Water Extraction Method) (*first revision*)
IS 15061 : 2002	Automotive Vehicles — Flammability Requirements
IS 15570 : 2005	Textiles — Method of test — Detection of banned azo colorants in coloured textiles
IS 16914 (Part 2) : 2018 ISO 16373-2 : 2014	Textiles — Dyestuffs Part 2 General Method for the Determination of Extractable Dyestuffs including Allergenic and Carcinogenic Dyestuffs (Method using Pyridine-Water)
IS 16914 (Part 3) : 2018 ISO 16373-3 : 2014	Textiles — Dyestuffs Part 3 Method for Determination of Certain Carcinogenic Dyestuffs (Method using Triethylamine / Methanol)
IS 16915 : 2018 ISO/TS 16181 : 2011	Footwear — Critical Substances Potentially Present in Footwear and Footwear Components — Determination of Phthalates in Footwear Materials
IS 16981 : 2018	Footwear — Critical Substances Potentially Present in Footwear

ISO/TS 16179 : 2012	and Footwear Components — Determination of Organotin Compounds in Footwear Materials
IS 16991 : 2018 ISO/TS 16186 : 2012	Footwear — Critical Substances Potentially Present in Footwear and Footwear Components — Test Method to Quantitatively Determine Dimethyl Fumarate (DMFU) in Footwear Materials
IS/ISO 105-B01 : 2014 ISO 105-101 : 2014	Textiles — Tests for Colour Fastness — Part B01 Colour Fastness to Light: Daylight
IS/ISO 105-B02 : 2014 ISO 105-B02 : 2014	Textiles — Tests for Colour Fastness — Part B02 Colour Fastness to Artificial Light: Xenon Arc Fading Lamp Test
IS/ISO 105-C10 : 2006	Textiles — Tests for Colour Fastness — Part C10 Colour Fastness to Washing With Soap Or Soap And Soda
IS/ISO 105-E02 : 2013	Textile — Tests for Colour Fastness — Part E02 Colour Fastness to Sea Water

ANNEX B

(*Clause* 5.2)

METHOD FOR DETERMINATION OF POLYESTER, COTTON AND SPANDEX

B-1 IDENTIFICATION OF POLYESTER

The material used for manufacture is dipped in any one of the following reagents:

a) Solution of crystallized trichloroacetic acid/chloroform reagent, prepared at a mass ratio 1:1.
b) Benzyl Alcohol at temperatures of 150°C.
c) m-Cresol at boil.

B-1.1 If the material used for manufacture is polyester, it shall dissolve in any one of the above mentioned reagents.

B-2 IDENTIFICATION OF COTTON

The material used for manufacture is dipped in any one of the following reagents:

a) Cotton dissolves in Schweizer's Reagent ($Cu(OH)_2$ in ammonia), a specific test for cellulose.
b) Cotton will dissolve in concentrated sulfuric acid, indicating the presence of cellulose.
c) Boil the fabric sample in a 5% NaOH solution. Cotton will degrade and lose its structure in strong NaOH solutions.

B-2.1 If the material used for manufacture is cotton, it shall dissolve in any one of the above mentioned reagents.

B-3 IDENTIFICATION OF SPANDEX

The material used for manufacture is dipped in any one of the following reagents:

a) Spandex will dissolve in DMF (Dimethylformamide) or DMAc, unlike many other fibers.
b) Spandex is resistant to formic acid, while some other fibers may dissolve or degrade.
c) Spandex will degrade but not dissolve completely in sulfuric acid, often swelling and losing elasticity.
d) Spandex shows specific thermal transitions, such as a melting point around 240-270°C.

B-3.1 If the material used for manufacture is Spandex, it shall dissolve in any one of the above mentioned reagents.

ANNEX C

METHOD OF TEST

C-1 CONDITIONING OF THE TEST SPECIMEN AND ATMOSPHERIC COMDITIONS FOR TESTING

C - 1.1 The test specimen shall be tested in prevailing atmospheric conditions. In case of dispute**,** the specimen shall be conditioned and tested in the standard atmosphere as given in IS 6359.

C - 2 DIMENSIONS

C - 2.1 Take Track Suit from the test sample. Lay flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it. Measure dimensions correct to the nearest centimetre, as given in Table 8.

C - 3 MASS

C - 3.1 Take a set of 10 pairs of Track Suit from the test sample. Condition them for moisture equilibrium for 24 hours (see **B-1.1).**

C - 4 WALES AND COURSES

C - 4.1 Take Track Suit from the test sample. Lay it flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it.

C - 4.1.1 Count the number of wales including any fraction on one side of the Track Suit. Similarly count the number of wales including any fraction on other side of the track suit and add the two values.

C - 4.1.2 Count the number of courses in 10 cm including any fraction on both sides of the track suit and calculate the average courses per decimetre.

C- 5 DIMENSIONAL CHANGE (Due to Relaxation)

C-5.1 Marking the Test Specimens. Take track suit from the test sample. Mark centrally on it, by means of indelible ink or fast dyed cotton sewing, a set of three points, namely, *X*, *Y* and, *Z* so that,

a) All the three points are on the same wale,
b) point *X* is on the top portion;
c) point *Y* is on the heel gore line; and
d) Point *Z* is on the toe portion.

C - 5.2 Procedure

C - 5.2.1 Place the test specimen on a glass plate. Remove by hand all the creases and wrinkles without stretching the specimen. Place another glass plate on the specimen. Measure separately, correct to the nearest millimetre, the distance between *X* and *Y* and that between *Y* and *Z*.

C - 5.2.2 Lay the test specimen flat in a tray of suitable size, having a depth of 10 cm. Soak the specimen under the head of 25mm of water containing 0.5 % of suitable wetting agent at room temperature for two hours. Drain out the water and remove the test specimen carefully so that it is not stretched. Lay the specimen flat on a smooth surface, remove the excess water by absorbent material and dry it at room temperature.

Note *– Removal of excess water by wringing the test specimen is not permitted*

C - 5.2.3 After drying, conditioned the test specimen to moisture equilibrium at room temperature, place it on the glass plate, carefully remove wrinkles and creases and place another glass plate on it. Measure, correct to the nearest centimetre, the distance between *X* and *Y* and that between *Z*

C-5.3 Calculation

C - 5.3.1 calculate separately, correct to one place of decimal, the percentage change between the points *X* and *Y* and that between *Y* and *Z* by following formula:

$$S = \frac{a - b}{a} \times 100$$

Whereas;

a) S = dimensional change (due to relaxation) percent;
b) a = distance between the two points X and Y, or Y and Z, before soaking; and
c) b = distance between the same points after soaking.

C-5.3.2 Calculate the average dimensional change**.**

C - 6 SPIRALITY OF THE KNITTED FABRIC

Spirality is a major problem of knit fabrics which are produced in circular knitting machines. Relaxation of torsional stresses cause dimensional distortions and instability in the knitted loop constructions. The factors that influence the spirality include; machine gauge, no of feeders, yarn type and fabric properties, etc.

C – 6.1 Measurement of Spirality after Laundering

Spirality is determined by placing a protractor on the smooth fabric surface with its base-line along the course and reading the angle between the wale line and a line 90°perpendicular to the course line.

C - 6.2 Test Specimen Preparation and Marking Procedures

i. Prepare specimen for marking from appropriate location from the sample. Cut a specimen of size 380 mm x 380 mm single layer fabric.
ii. Place the test specimen on a glass plate with the technical face of the fabric upwards.
iii. Remove by hand all the creases and wrinkles without stretching the specimen.
iv. If necessary, place tensioning mass on either side of the fabric sample to keep the welt straight.

C - 6.3 Procedure - Diagonal Marking

i. Mark two pairs of 250 mm benchmark sets parallel to the length and two pairs of 250 mm benchmark sets perpendicular to the width to make a square. Draw a line through each of the four sets of adjacent benchmark to denote the square formed.

ii. Label the four corners, A, B, C and D in clockwise direction starting at the lower left corner as shown in figure -3. Using the middle third of the specimen width, place the ruler or a straightedge parallel to the direction of wales in the fabric specimen.

iii. Choose one wale, and align and the straight edge of the ruler with that wale at the intersection between the body of the specimen and the welt. Keeping that point fixed, rotate the straightedge until it crosses the same wale at a position (200 ± 1) mm from the top of the welt.

iv. Without moving the straightedge, place the protector on the straightedge with the base line parallel to the top of the welt. Measure the angle between the line of the straightedge and the bottom of the protector which is parallel to the top of the welt. (See figure 3)

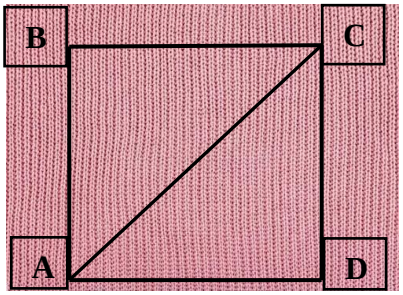


Figure – 3 Diagonal Marking Procedures

C – 6.4 Calculation of the Spirality in Percentage

i. Calculate the percentage change in the wale angle spirality from the original measurement as follow:

$$S = \frac{\alpha - \beta}{\alpha} \times 100$$

Where;

S = is the percentage spirality change after laundering, expressed as a percentage of the original;

α = is the original wale spirality angle, expressed in degrees [See Figure 4(a)];

β = is the wale spirality after laundering, expressed in degrees [See Figure 4(b)].

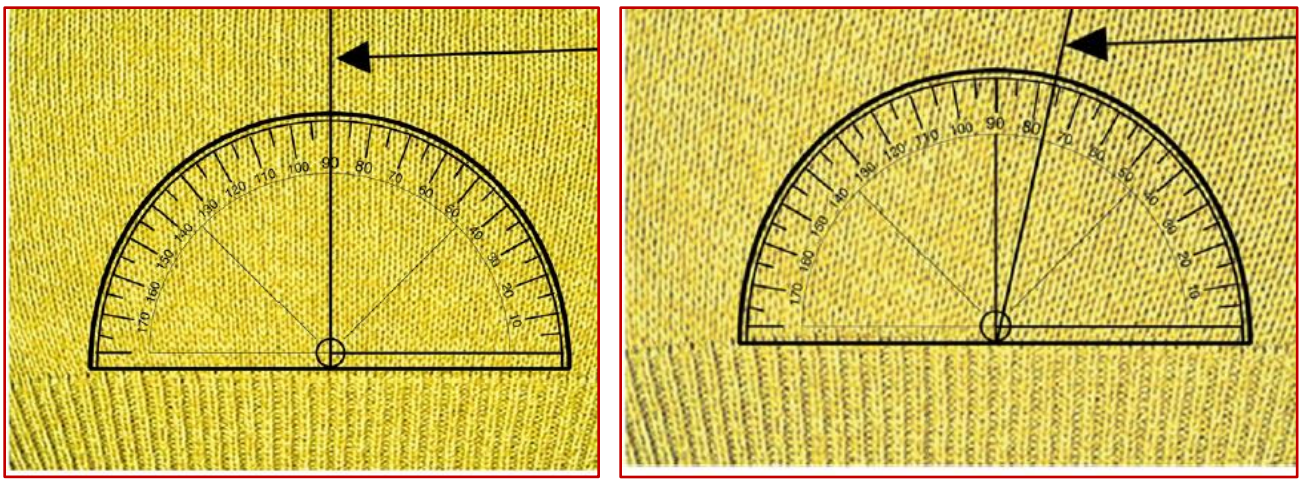


Figure 4: (a) Originally measured spirality angle α, (b) Measured spirality angle β after laundering.

ANNEX 4c
(Item 4.1)

For BIS Use Only

Preliminary Draft Indian Standard

TEXTILES — SINGLE JERSEY AND RIB KNITTED UNISEX PYJAMAS — SPECIFICATION

FOREWORD

(*Formal foreword to be added later*)

Knitted pyjamas hold a unique and cherished place. They are more than just nightwear; they are a symbol of relaxation, a gentle embrace after a long day, and an essential element of our daily routines. Knitted pyjamas are not just about warmth; they carry with them a sense of care and craftsmanship. Each stitch reflects the artistry and dedication that goes into creating pieces meant for relaxation and rejuvenation. With a variety of textures and designs, they cater to our personal styles while ensuring that comfort remains paramount.

1 SCOPE

1.1 This standard prescribes the constructional details and other particulars of single jersey, rib and interlock, cotton, synthetic/ regenerated cellulose, and blended knitted unisex pyjamas.

1.2 This standard does not specify the general appearance, feel, shade, texture, etc. of the pyjamas.

1.3 This standard does not apply to knitted interlinings, jeans, and dungarees.

2 REFERENCES

2.1 The standards listed in **Annex A,** which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged toinvestigate the possibility of applying the most recent editions.

2.2 For the purpose of this standard the definitions given in **Annex B**, **Annex C,** and **Annex D** shall apply.

3 TERMINOLOGY

3.1 Knitted pyjamas are a popular choice for sleepwear and loungewear due to their comfort and flexibility. Pyjamas are typically made from cotton, modal, bamboo, tencel/lyocel or a blend of fabrics, knitted pyjamas are soft and breathable, ensuring comfort throughout the night. The knitted fabric allows for stretch, making them easy to move in, which is especially beneficial for sleep. The Knitted pyjamas can provide warmth without being overly heavy, making them suitable for cooler climates. Available in various styles and a range of designs including; coordinated tops, bottoms, from solid colors to fun prints and patterns, catering to different tastes.

Many feature elastic waistbands, adjustable drawstrings, and gussets for added comfort and fit. The fabric allows air circulation, helping to regulate body temperature as well as some materials have ability to extract moisture away from the skin, keeping you dry. Knitted Pyjamas are an excellent investment for comfort and style, whether for sleep or casual lounging.

4 MATERIALS

4.1 Yarn

The yarn count used in manufacturing knitted pyjamas can vary depending on the desired characteristics of the fabric, such as softness, durability, and thickness. Pyjamas use blends of polyester, nylon, and natural fibers like cotton or modal to enhance comfort and performance. The yarn count for cotton shall be in the range of 20s Ne – 60s Ne (30 Tex – 12 Tex) and for multifilament synthetic and blended yarn shall be in the range of 20D – 150D. Apart from this specification, any other yarn count as per the agreement between the buyer & the seller shall be used for knitting, splicing, and linking of the pyjamas.

4.2 The material used for manufacturing pyjamas shall be tested as per **Annex B**.

5 MANUFCTURE

5.1 Shape

The shape of Pyjamas shall be generally as shown in Figure 1A & Figure 1B

5.2 Fabric Manufacturing

5.2.1 The pyjamas fabric shall be knitted on circular and flatbed machines. These shall be neatly tailored out of well and evenly knitted tubular fabric. The fabric shall be of uniform texture and appearance.

It shall be of uniform tension throughout its length and free from spirals. It shall be scoured, bleached or dyed. The pyjamas shall not have any seams or joining along their two outer sides. The wales shall run along the length of the pyjamas. The fabric shall conform to construction particulars given in **Table 1** for plain knitted pyjamas and **Table 2** for rib knitted pyjamas.

5.2.2 Pockets, if required may also be provided having dimensions and shape as per the agreement between the buyer and the seller. (See Figure 1B)

5.2.3 Ankle Fit Pyjamas, if required may also be provided having dimensions and shape as agreed to between the buyer and seller (*See* Figure 1B).

5.2.4 Draw strings, if required may also be provided as agreed to between the buyer and the seller. (See Figure 1B)

5.3 Elastic Strap

Pyjamas shall have outer woven elastic strap stitched at the waist band or inner woven elastic strap shall be formed by the folding the raw edges of the fabric to a depth of minimum 25 mm and stitching it with flat stitches. In case of latter, a cotton tape having width of minimum 25 mm preferably confirming to IS 9686: 1980 or a suitable tape made out of same fabric that is used for fabricating the pyjamas shall be provided in waist fold for tying purposes. It shall be at least 30 cm longer than the corresponding waist girth.

The ankle and waistband should be either plain or rib knitted or as per the agreement between the buyer and the seller. The ankle width shall be a minimum of 5.0 cm and the waistband width shall be a minimum of 2.5 cm.

5.4 Crutch Piece

The fabric used for crutch piece shall be of same type and construction as that of the pyjamas (leg portion). The crutch piece shall be reinforced throughout with cotton calico (IS 1544). The crutch piece and the reinforcement fabric shall be scoured or bleached as the pyjamas.

5.5 Linking

The pieces of pyjamas shall be securely linked using over-lock and or flat-lock stitch. The stitch type selection must be as per the agreement with the buyer and the seller. The linking shall be elastic, smooth and free from knots. The length of the free ends of the linking yarn and other loose ends, if any, shall be neither less than 5.0 mm nor more than 15.0 mm. The linking shall not give way when the Pyjamas are stretched without breaking to the full extent of the stretch ability of Pyjamas. Linking of crutch piece shall be done at right angle i.e. 90º at the intersection to prevent tearing during extension while sitting.

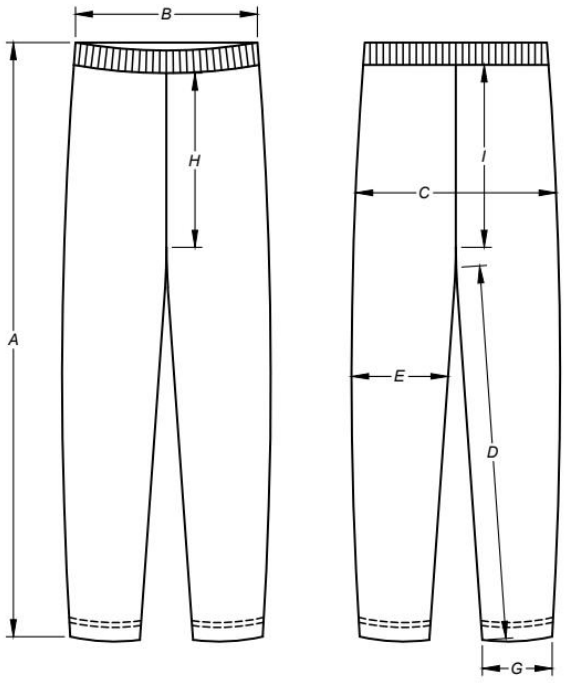


Figure 1(A) General Shape of Knitted Pyjamas

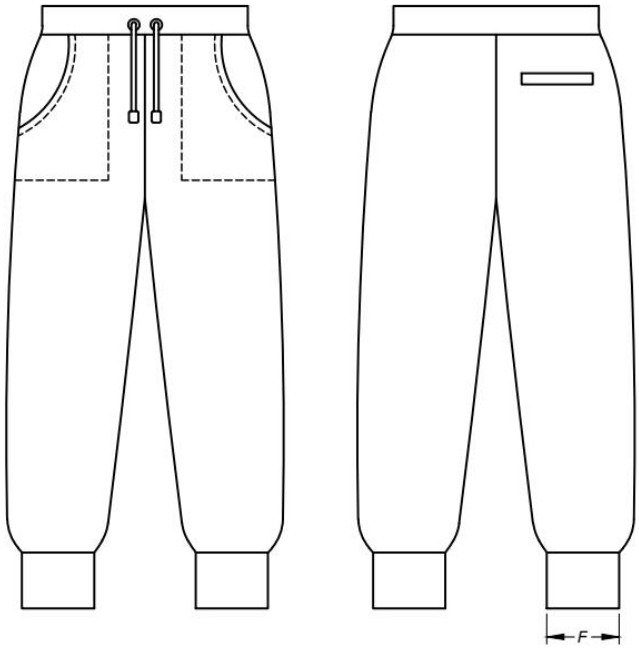


Figure 1 (B) - General Shape of Ankle Fit Knitted Pyjamas

Table 1 Constructional Particulars of Plain Knitted Fabric for Pyjamas
(*Clause* 5.2.1 and 7.1)

Sl. No.	Gauge of Machine (See Note)	Approximate Count of Yarn – Ne (Tex)	Mass ($g/m^{2)}$ Min
(1)	(2)	(3)	(4)
1	12 - 18	20s (30.0) – 28s (21.0)	250
2	24 - 28	30s (19.5) – 40s (14.5)	230
3	28 - 32	34s (17.0) – 50s (12.0)	200
4	32 - 36	40s (14.5) – 50s (12.0)	160
5	36 - 40	50s (12.0) – 60s (10.0)	120
NOTE — As determined by the number of needles per 2.54 CM			

Table 2 Constructional Particulars of Rib Knitted Fabric for Pyjamas
(*Clause 5.2.1* and 7.1)

Sl. No.	Gauge of Machine (See Note)	Approximate Count of Yarn – Ne (Tex)	Mass ($g/m^{2)}$ Min
(1)	(2)	(3)	(4)
1	12 – 18	20s (30.0) – 28s (21.0)	350
2	18 – 24	30s (19.5) – 40s (14.5)	320
3	24 – 28	34s (17.0) – 50s (12.0)	260
4	28 – 32	38s (15.5) – 50s (12.0)	230
5	32 – 36	50s (12.0) – 60s (10.0)	200
NOTE — As determined by the number of needles per 2.54 CM			

Table 3 Body Measurements Chart for Pyjamas (Figure 1A & 1B)
(*Clause* 7.1)

Sl No.	SIZE	LENGTH [cm]	WAIST [cm]		HIP [cm]		INSEAM [cm]	THIGH [cm]		ANKLE [cm]		BOTTOM LEG OPENING [cm]
		(A)	(B)		(C)		(D)	(E)		(F)		(G)
			Women's	Men's	Women's	Men's		Women's	Men's	Women's	Men's	----------
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(13)	(14)	(15)
1.	XS	90	61 – 66	71 – 76	81 – 86	86 – 91	64	46	52	18.0	22.0	30
2.	S	94	68 – 72	76 – 81	86 – 91	91 – 97	66	48	54	19.0	22.5	33
3.	M	96	74 – 76	81 – 86	91 – 97	97 – 102	68	50	55	20.0	23.0	34
4.	L	100	79 – 81	86 – 91	97 – 102	102- 107	70	52	57	21.0	23.5	35
5.	XL	102	84 – 86	91 – 97	102 – 107	107- 112	72	54	58	22.0	24.0	36
6.	2XL	104	89 – 91	97 – 102	107 – 112	112 – 117	74	56	60	23.0	25.0	37
7.	3XL	108	94 – 99	102 – 107	112 – 117	117 – 122	76	58	62	24.0	26.0	38
8.	4XL	110	100 – 104	107 – 112	117 – 122	122 – 127	78	60	64	25.0	27.0	39
9.	5XL	112	106 – 110	112 – 117	122 – 127	127 – 132	80	62	66	26.0	28.0	40
10.	6XL	116	112 – 118	117 – 122	127 – 132	132 – 137	82	64	68	27.0	29.0	41
11.	7XL	120	118 – 124	122 – 127	132 – 137	137 – 142	84	66	70	28.0	30.0	42
12.	8XL	124	124 – 130	127 – 132	137 – 142	142 – 147	86	68	72	30.0	32.0	43

Table 4 Body Measurements Chart for Pyjamas (Figure 1A)
(*Clause* 7.1)

Sl No.	Pyjamas Particulars	**Front Rise** (cm)		**Back Rise** (cm)	
		(H)		**(I)**	
		Women's	**Men's**	**Women's**	**Men's**
1)	Low Rise Pyjamas	18 - 20	20 - 23	25 - 28	25 - 28
2)	Mid Rise Pyjamas	20 - 25	23 - 27	28 – 32	28 – 32
3)	High Rise Pyjamas	25 - 30	27 - 30	32 - 36	32 - 36
NOTE — Measurements Shall Apply to All Sizes of Pyjamas					

6 FREEDOM FROM DEFECTS

The Pyjamas shall be reasonably free from the manufacturing defects, such as large mends, ladders, dropped stitches, holes, improper splicing and chemical damages. The dyed and bleached pyjamas shall be free from dyeing defects, such as streakiness and uneven dyeing and the white pyjamas from blueing agents.

7 REQUIREMENTS

7.1 Dimension, Mass and Tolerances

The pyjamas shall conform to the requirements of **Table1**, **Table 2, Table 3** and **Table 4** considering the type of fabric used with tolerances typically ±0.5 cm to ± 2.0 cm.

NOTE — The Pyjamas size should be denoted by the number correspond to the length and waist diameter.

7.2 Seam and Stitching Tolerances

a) **Seam allowances** - Maintain consistent seam allowances (typically 0.6 cm to 1.5 cm) to ensure adequate construction and durability.

b) **Stitch quality** - Specify acceptable variations in stitch length, tension, and type such as; Lockstitch, Over-lock, or Cover-stitch; to ensure seams is secure and aesthetically pleasing.

7.3 Sewing Thread and Stitch Type

The stitch type details of the pyjamas shall be as under along with sewing thread as per IS 9543 and IS 1720.

Sl No.	Portion to be Stitched	Type of Stitch	Sewing Thread
i)	All Joining's	Flat – Lock	Three threads of 60s/3 count (100 dtex x 3) or 40s/2 count (145 dtex x 2) in the needle and one strand of the same threads in the each loopers.
ii)	Flap at the front opening (For Men's Only)	Lock Stitch	One strand of cotton sewing thread of 60s/3 count (100 dtex x 3) or 40s/2 count (145 dtex x 2) in each of the needle and the looper.
NOTE — Sewing thread of 60s/3.0 (100 dtex) count may be used in place of 40s/2 (145 dtex x 2)			

7.4 Sealed Sample

If in order to illustrate or specify general appearance, lustre, handle, type of finish, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in each respect.

8 MARKING

8.1 Each Pair of Pyjamas shall be marked with the following

a) Size (marked toward the waistband);

b) manufacturer's name, initials or trademark, if any (marked on the waistband);

c) fibre blend compositions must be given;

d) suitable post-care instruction must be given, and;

e) Any other information as required by the law in force must be listed.

9 BIS CERTIFICATION

The Product(s) conforming to the requirements of this standard may certified as per the conformity assessment schemes under the provisions of the Bureau of Indian Standards Act, 2016, and the Rules and Regulations framed thereunder, and the product (s) may be marked with the Standard Mark.

Table 5 Other Requirements of Pyjamas
(*Clause 5.2*)

Sl. No.	Characteristic	Requirements	Method of Test Ref to
(1)	(2)	(3)	(4)
i.	Total number of Wales/dm	150 - 300	B-4
ii.	Total number of Courses/dm	180 - 350	B-4
iii.	Dimensional Change (due to relaxation) Percentage, *Max*	5.0	B-5
iv.	pH value	6 - 10	IS 1390
v.	Water soluble, *Min*	1.0	IS 3456

vi.	Ash Content	0.5	IS 199
vii.	Colour fastness ratings to min		
	i. Light	3 - 4	IS/ISO 105 – B02 OR IS/ISO 105 – B01
	ii. Washing a) Change in colour b) Staining of Adjacent fabric	4 4	IS/ISO 105 – C10
	iii. Perspiration a) Change in Colour b) Staining of adjacent fabric	3 3	IS/ISO 105 – E04
	iv. Rubbing a) Change in colour **b)** Staining of adjacent fabric	4 3	ISO 105-X12
	v. Pilling **(**Martindale Pilling Box- 14400 Rev)	4 - 5	ISO 9943 : 2009
viii	Fibre Blend Compositions	---------	IS 13719 : 2023

10 PACKING

The pyjamas shall be packed as per the agreement between the buyer and seller.

11 SAMPLING

11.1 Lot

In any consignment, all the pairs of pyjamas of the same size manufactured from the same quality of yarn shall constitute a lot (IS 2500).

11.2 The conformity of a lot to the specification shall be determined on the basis of the test carried out on the pairs of pyjamas selected from the lot.

11.3 Unless otherwise agreed to between the buyer and the seller, number of pairs of Pyjamas depending on the lot size, shall be selected at random according to the Col 1 and 2 of Table 6 & Table 7

11.4 The number of pairs of pyjamas to be inspected and criterion for conformity for each characteristic shall be as follows:

Table 6 Performance Assessment criteria for Pyjamas
(Clause 11.3)

Sl. No.	Characteristic	Number of pairs of Pyjamas to be	Criterion for Conformity
(1)	(2)	(3)	(4)
I.	Visual inspection dimensions and number of wales and course	According to the col 3 of **Table 7**	Non-conforming pairs of pyjamas shall not exceed the corresponding number given in col 4 of the **Table 7**
II.	Mass	Sets of 10 pairs of pyjamas obtained from those selected according to col 3 of Table 3	All the observations shall satisfy the relevant requirements
III.	Dimension change, scouring loss, pH value, ash content and colour fastness	According to col 5 of **Table 7**	All the test results shall satisfy the relevant requirement

Table 7: Sample Size and Permissible Number of Non-Conforming pairs of Pyjamas
(*Clause 9.3 and 9.4*)

Sl. No.	Number of pairs of Pyjamas In The Lot	For Dimensions and visual Inspection		Testing
		Number of pairs of Pyjamas to be Inspected	Number of permissible Non-Conforming Pairs	Number of pairs of Pyjamas to be tested for Chemical Characteristics
(1)	(2)	(3)	(4)	(5)
I.	Up to 100	10	0	3
II.	100 – 300	20	1	3
III.	301 – 500	30	2	5
IV.	501 – 1000	50	3	5
V.	1001 and above	80	5	8

ANNEX A

LIST OF REFERRED STANDARDS

Sl. No.	*IS No.*	*Title*
1.	IS 199 : 1989	Textiles - Estimation of moisture, total size or finish, ash and fatty matter in grey and finished cotton textile materials
2.	IS 1390 : 2022	Textiles Determination of pH of aqueous extract (Third Revision)
3.	IS 3086 : 1965	Code for seaworthy packaging of cotton hosiery yarn and goods
4.	IS 3325 : 1965	Code for inland packaging of cotton hosiery yarn and goods
5.	IS 3456 : 2022	Method for determination of water-soluble. matter of textile materials (*First Revision*)
6.	IS 3596 : 1967	Glossary of terms relating to hosiery
7.	IS 6359 : 2023	Method for conditioning of textiles
8.	IS/ISO 105 – B01: 2014	Textiles: Tests for colour fastness - Part B01 colour fastness to light: Daylight
9.	IS/ISO 105 – B02: 2014	Textiles: Tests for colour fastness – Part B02 colour fastness to artificial light: xenon arc fading lamp test
10.	IS/ISO 105 – C10: 2006	Textiles: Tests for colour fastness – Part C10 colour fastness to w with soap or soda and soap
11.	IS/ISO 105 – E04: 2008	Textiles: Tests for colour fastness – Part E04 colour fastness to perspiration
12.	ISO 16373-3	Textiles. Dyestuffs – Method for determination of certain carcinogenic dyestuffs (method using tri-ethylamine/methanol)
13.	BS EN ISO 14362-1,2,3	Textiles. Methods for determination of certain aromatic amines derived from Azo colorants - Textile testing; Amines (aromatic) ...
14.	ISO 105 – NO2	Textiles - Test for colour fastness Part NO2: Colour fastness to bleaching- Peroxide
15.	ISO 766 ISO 105-X12	Textiles - Method for determination of colour fastness of textile materials to rubbing [TXD 5: Chemical Methods of Test]
16.	IS 667: 1981	Textiles fibres - Methods for identification of textile fibers
17.	ISO 1833-1:2020	Textiles – Quantitative chemical analysis – Part 1: General principles of testing
18.	IS-10971(P-2): 2022 ISO 12945-2:2020	Textiles – Determination of Fabric Propensity to Surface Fuzzing and to Pilling, Part 2: Modified Martindale Method
19.	ISO 6989:1981	Textile fibres — Determination of length and length distribution of staple fibres (by measurement of single fibres)
20.	IS 15336: 2003	Textiles – Acrylic Yarn for Hosiery – Specification
21.	IS 13719:2003	Textiles Spun cotton regenerated cellulosic fiber blended grey yarn - Specifications
22.	IS 9543:2019	Textiles – Spun polyester sewing thread – Specifications
23.	ISO/TR 11827:2012	Textiles — Composition testing — Identification of fibres
24.	ISO 10132:1993	Textiles – Textured filament yarn – Definitions
25.	ISO 5688:2024	Textiles – Synthetic filament yarns - Test methods for crimp properties of Textured yarn
26.	ISO 7211-5	Textiles- methods for the determination of linear density of yarn removed from fabric.
27.	IS 13003: 1991	Textiles — Fabric, Cotton, Interlock knitted - Specification
28.	IS 9469 : 2003	Textiles – Fabric, cotton, plain (Single jersey) knitted –

		Specification (second revision)
29.	IS 834 : 2006	Textiles – Ring Spun Grey Cotton Yarn for Textiles
30.	ISO 8559 - 1	Textiles – Size designation of clothes – Anthropometric definitions for body measurement
31.	ISO 8559 - 2	Textiles Size designation of clothes Part 2: Primary and secondary dimension indicators
32.	ISO 8559 - 3	Textiles Size designation of clothes Part 3: Methodology for the creation of body measurement tables and intervals
33.	IS 1966-1 (2009)	Textiles — Bursting Properties of Fabrics - Determination of Bursting Strength and Bursting Distension, Part 1: Hydraulic Method [TXD 1: Physical Methods of Tests]
34.	IS 1670 (1991)	Textiles—Yarn—Determination of breaking load and elongation at break of single strand [TXD 1: Physical Methods of Tests]
35.	IS/ISO 16322 (1-3)	Determination of spirality of knitted fabrics post laundering.
36.	ISO 6330	Textiles — Domestic washing and drying procedures for textile testing
37.	IS 10099: 2020 ISO 3759: 2011	Textiles — Preparation marking and measuring of fabric specimens and garments in tests for determination of dimensional change
38.	IS 9686:2022	Textiles — Specification For Elastic Tape
39.	IS 2500	Part 4,5 & 6 Sampling Procedures for inspection by attributes.
40.	IS 14563 Part 2 ISO 14184-2 : 2011	Textiles — Determination of formaldehyde Part-2: Released formaldehyde vapour absorption method first revision.
41.	IS 1720:2022	Textiles — Specification for cotton sewing threads
42.	IS 1889(Part 1 - 4): 2024 ISO 1833-5:2006	Textiles — Quantitative Chemical Analysis: Mixtures of Viscose, Cupra or Modal and Cotton Fibres (Method Using Sodium Zincate)

ANNEX B

METHODS OF TEST

B-1 CONDITIONING OF THE TEST SPECIMEN AND ATMOSPHERIC COMDITIONS FOR TESTING

B - 1.1 The test specimen shall be tested in prevailing atmospheric conditions. In case of dispute**,** the specimen shall be conditioned and tested in the standard atmosphere as given in IS 6359.

B - 2 DIMENSIONS

B - 2.1 Take pyjamas from the test sample. Lay flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it. Measure dimensions correct to the nearest centimetre, as given in Table 8.

B - 3 MASS

B - 3.1 Take a set of 10 pairs of pyjamas from the test sample. Condition them for moisture equilibrium for 24 hours (see **B-1.1**)**.**

B - 4 WALES AND COURSES

B - 4.1 Take pyjamas from the test sample. Lay it flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it.

B - 4.1.1 Count the number of wales including any fraction on one side of the pyjamas. Similarly count the number of wales including any fraction on other side of the pyjamas and add the two values.

B - 4.1.2 Count the number of courses in 10 cm including any fraction on both sides of the pyjamas and calculate the average courses per decimetre.

B- 5 DIMENSIONAL CHANGE (Due to Relaxation)

B-5.1 Marking the Test Specimens. Take pyjamas from the test sample. Mark centrally on it, by means of indelible ink or fast dyed cotton sewing, a set of three points, namely, *X*, *Y* and, *Z* so that,

a) All the three points are on the same wale,
b) point *X* is on the top portion;
c) point *Y* is on the heel gore line; and
d) Point *Z* is on the toe portion.

B - 5.2 Procedure

B - 5.2.1 Place the test specimen on a glass plate. Remove by hand all the creases and wrinkles without stretching the specimen. Place another glass plate on the specimen. Measure separately, correct to the nearest millimetre, the distance between *X* and *Y* and that between *Y* and *Z*.

B - 5.2.2 Lay the test specimen flat in a tray of suitable size, having a depth of 10 cm. Soak the specimen under the head of 25mm of water containing 0.5 % of suitable wetting agent at room temperature for two hours. Drain out the water and remove the test specimen carefully so that it is not stretched. Lay the specimen flat on a smooth surface, remove the excess water by absorbent material and dry it at room temperature.

Note – *Removal of excess water by wringing the test specimen is not permitted*

B - 5.2.3 After drying, conditioned the test specimen to moisture equilibrium at room temperature, place it on the glass plate, carefully remove wrinkles and creases and place another glass plate on it. Measure, correct to the nearest centimetre, the distance between *X* and *Y* and that between *Z*

B-5.3 Calculation

B - 5.3.1 calculate separately, correct to one place of decimal, the percentage change between the points *X* and *Y* and that between *Y* and *Z* by following formula:

$$S = \frac{a - b}{a} \times 100$$

Whereas;

a) S = dimensional change (due to relaxation) percent;
b) a = distance between the two points X and Y, or Y and Z, before soaking; and
c) b = distance between the same points after soaking.

B-5.3.2 Calculate the average dimensional change**.**

C - 6 SPIRALITY OF THE KNITTED FABRIC

Spirality is a major problem of knit fabrics which are produced in circular knitting machines. Relaxation of torsional stresses cause dimensional distortions and instability in the knitted loop constructions. The factors that influence the spirality include; machine gauge, no of feeders, yarn type and fabric properties, etc.

C – 6.1 Measurement of Spirality after Laundering

Spirality is determined by placing a protractor on the smooth fabric surface with its base-line along the course and reading the angle between the wale line and a line 90°perpendicular to the course line.

C - 6.2 Test Specimen Preparation and Marking Procedures

i. Prepare specimen for marking from appropriate location from the sample. Cut a specimen of size 380 mm x 380 mm single layer fabric.

ii. Place the test specimen on a glass plate with the technical face of the fabric upwards.

iii. Remove by hand all the creases and wrinkles without stretching the specimen.

iv. If necessary, place tensioning mass on either side of the fabric sample to keep the welt straight.

C - 6.3 Procedure - Diagonal Marking

i. Mark two pairs of 250 mm benchmark sets parallel to the length and two pairs of 250 mm benchmark sets perpendicular to the width to make a square. Draw a line through each of the four sets of adjacent benchmark to denote the square formed.

ii. Label the four corners, A, B, C and D in clockwise direction starting at the lower left corner as shown in figure -3. Using the middle third of the specimen width, place the ruler or a straightedge parallel to the direction of wales in the fabric specimen.

iii. Choose one wale, and align and the straight edge of the ruler with that wale at the intersection between the body of the specimen and the welt. Keeping that point fixed, rotate the straightedge until it crosses the same wale at a position (200 ± 1) mm from the top of the welt.

iv. Without moving the straightedge, place the protector on the straightedge with the base line parallel to the top of the welt. Measure the angle between the line of the straightedge and the bottom of the protector which is parallel to the top of the welt. (See figure 3)

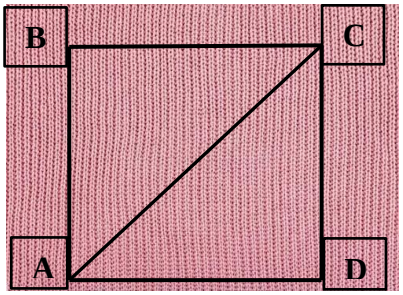


Figure – 3 Diagonal Marking Procedures

C – 6.2.4 Calculation of the Spirality in Percentage

i. Calculate the percentage change in the wale angle spirality from the original measurement as follow:

$$S = \frac{\alpha - \beta}{\alpha} \times 100$$

Where;

S = is the percentage spirality change after laundering, expressed as a percentage of the original;

α = is the original wale spirality angle, expressed in degrees [See Figure 4(a)];

β = is the wale spirality after laundering, expressed in degrees [See Figure 4(b)].

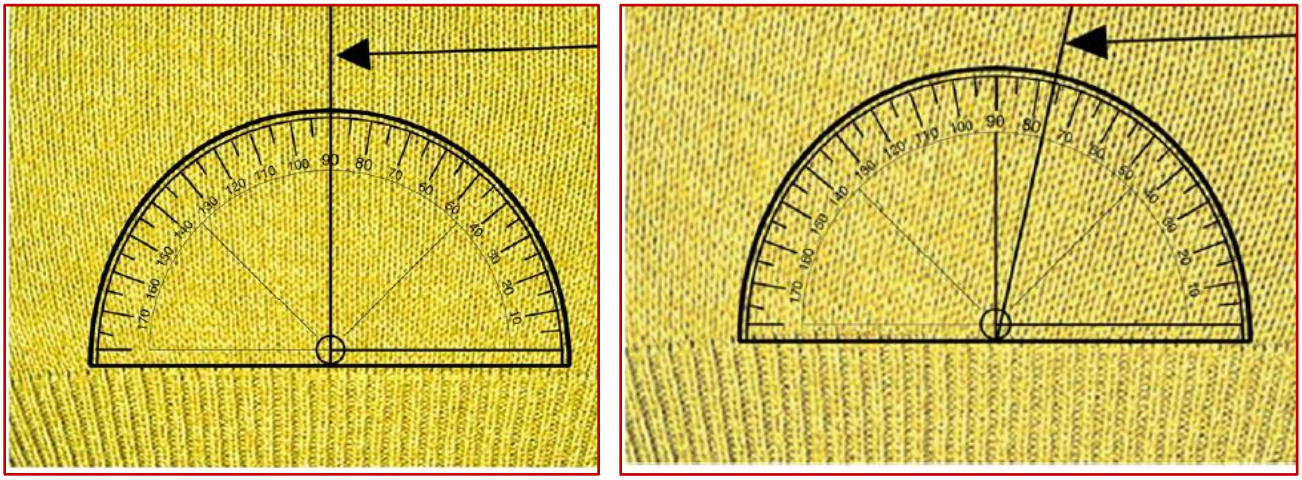


Figure 4: (a) Originally measured spirality angle α, (b) Measured spirality angle β after laundering.

ANNEX C
IDENTIFICATION OF FIBRES

D - 1 IDENTIFICATION OF COTTON

D – 1.1 The material used for manufacture is dipped in any one of the following reagents:

a) Cotton dissolves in Schweitzer's Reagent ($Cu(OH)_2$ in ammonia), a specific test for cellulose.

b) Cotton will dissolve in concentrated sulfuric acid, indicating the presence of cellulose.

c) Boil the fabric sample in a 5% NaOH solution. Cotton will degrade and lose its structure in strong NaOH solutions.

D-2.2 If the material used for manufacture is cotton; it shall dissolve in the above mentioned reagents.

D-2 IDENTIFICATION OF POLYESTER

D – 2.1 The material used for manufacture is dipped in the following reagents:

a) Solution of crystallized tri-chloro-acetic acid/chloroform reagent, prepared at a mass ratio 1:1.

b) Benzyl Alcohol at temperatures of 150°C.

c) M-cresol at 93 ºC, Polyester will dissolve

D-2.2 If the material used for manufacture is polyester; it shall dissolve in the above mentioned reagents.

D – 3 IDENTIFIOCATION OF VISCOSE RAYON

D- 3.1 The material used for manufacture is viscose rayon, it shall either dissolve or swell in the above mentioned reagents.

a) **Procedure:** Immerse a small sample in a solution of sodium hydroxide (NaOH). Viscose rayon will swell and may dissolve, while cellulose fibers like cotton will remain largely unchanged.

b) **Procedure:** Soak the fiber in concentrated acetic acid for a few minutes. Viscose rayon will dissolve in acetic acid, while most other fibers will not.

D – 4 IDENTIFIOCATION OF NYLON 6

D- 4.1 The material used for manufacture is dipped in the following reagents:

a) Formic Acid at temperatures of 70°C.

d) m-Cresol at temperatures of 80°C.

D-4.2 If the material used for manufacture is Nylon 6; it shall dissolve in the above mentioned reagents.

D – 5 IDENTIFICATION OF BAMBOO AND MODAL FIBRES

D- 5.1 The material used for manufacture is dipped in the following reagents:

a) **Procedure:** Immerse a small sample in a solution of 1% sodium hydroxide (NaOH) for about 30 minutes.

b) **Observation:** If the fibre dissolves, it is likely a cellulose-based fibre (bamboo or modal).

D – 6 IDENTIFICATION OF TENCEL FIBRES

D- 6.1 The material used for manufacture is dipped in the following reagents:

a) **Procedure:** Tencel is more resistant to strong bases, but can dissolve in a solution of 60% zinc chloride.

b) Immerse the fiber sample in this solution for about 30 minutes.

c) Observation: If the fibre dissolves in this solution, it is likely Tencel.

ANNEX 4d
(Item 4.1)

DRAFT ON TEXTILES-KNITTED SCARF-SPECIFICATION

For BIS Use Only

Preliminary Draft Indian Standard

TEXTILES — KNITTED SCARF — SPECIFICATION

FORWARD

(*Formal foreword to be added later*)

A Scarf is a piece of fabric worn around the neck, head, or shoulders, primarily used for warmth, comfort, or as a fashion accessory. Scarves can be made from various materials such as wool, cotton, silk, or synthetic fiber, with each material offering distinct qualities in terms of texture, warmth, and style. They are often designed in various shapes such as rectangular, square, triangular, or circular also termed as infinity scarves and come in a range of sizes and colors.
.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS: 2-2022. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1 Scope

1.1 A scarf is a multifunctional accessory with a wide range of applications across fashion, utility, culture, and environmental protection.

1.2 This standard does not specify the general appearance, feel, shade, texture, etc. of the scarves.

2 REFERENCES

2.1 The standards given in Annex A contain provisions which through, reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

2.2 For the purpose of this standard, the definitions given in IS 3596 shall apply.

3 TERMINOLOGY

A scarves typically covers various fabric types, style, and construction terms associated with scarves, particularly those made of knits. It provides an understanding of the structure, style, and materials used in scarves, enabling accurate descriptions and better choices in selecting or crafting scarves for various needs.

3.1 Type

i. Square Type

4 MATERIALS

4.1 The material used for manufacturing scarf shall be as per Table 1.

Table 1 Blend Ratio for Different Classes of Scarf
(Clause 5.1)

Sl No.	Classes	Fabric Composition	
		Fabric Material	Blend Ratio
(1)	(2)	(3)	(4)

(i)	Class 1	Cotton	100 percent cotton
(ii)	Class 2	Cotton/Polyester	80 percent Cotton, 20 percent Polyester
(iii)	Class 3	Cotton/Polyester	70 percent Cotton, 30 percent Polyester
(iv)	Class 4	Cotton/Polyester	60 percent Cotton, 40 percent Polyester

Table 2 Constructional Details of Knitted Fabric

Sl No.	**Yarn Specification**	**Gauge (Needles/inch)**	**GSM (g/m^2)**
(1)	(2)	(3)	(4)
(i)	Single jersey	10-24	80-200

4.2 Identification of Textile Fibres

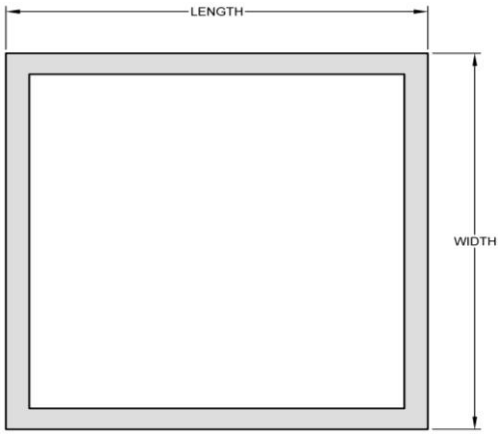
4.2.1 The material used in manufacturing of scarf shall be tested as per Annex B.

5 MANUFACTURE

5.1 Shape

Scarf shall be of square size shape having dimension of minimum 20 × 20 Inches as per indicated in Figure 1.

Fig 1 – Square Shaped Single Jersey Knitted Scarf



5.2 Seams and Stitches

5.3 Scarves should have neatly hemmed edges to avoid fraying. Rolled hem (300 class, 301 stitch) for silk or delicate fabrics, or over lock (500 class) for thicker fabrics.

5.4 Tex 30 to Tex 40 for needle, depending on fabric thickness.

5.5 Reinforcement

5.6 Use over lock stitches along scarf edges to prevent unravelling or fraying.

6.7 Choose thread types with moderate Tex values (e.g., Tex 30-40) that match the scarf's weight, ensuring seam strength without excess bulk.

5.7 Freedom from Defects

The sports singlets should be free from manufacturing defects, such as mends, ladders, dropped stitches, improper reinforcement, missed stitches at the stitched parts, badly sewn and mispositioned buttons, malformed button holes, chemical damages and dyeing defects, such as streakiness and uneven dyeing.

DIMENSIONS

5.8 Size Measurements of Scarf shall be in Table - 3.

Table 3 - Size Measurements of Scarf

Sl No.	**Category**	**Size (Inches)** Tolerances (+/-2)
1	Square Scarves	20 x 20 to 120 x

		120

6 Other Requirements

6.1 When manufacturing scarf, several requirements and tests are crucial to ensure the quality, durability, and comfort of the final product. Here's a table summarizing the additional requirements along with common tests:

Table 5 Technical Requirements

Sl. No.	Characteristic	Requirements	Method of Test Ref to
(1)	(2)	(3)	(4)
i.	Total number of Wales/dm,	100 - 200	B-4
ii.	Total number of Courses/dm,	150 - 250	B-4
iii.	Dimensional Change (due to relaxation) Percentage, *Max*	5.0	B-5
iv.	pH value	6 - 10	IS 1390
v.	Colour fastness ratings to min		
	i. Light	3 - 4	IS/ISO 105 – B02 OR IS/ISO 105 – B01
	ii. Washing a) Change in colour b) Staining of Adjacent fabric	4 4	IS/ISO 105 – C10
	iii. Perspiration a) Change in Colour b) Staining of adjacent fabric	3 3	IS/ISO 105 – E04
	iv. Rubbing a) Change in colour **b)** Staining of adjacent fabric	4 3	ISO 105-X12
	v. Pilling **(**Martindale Pilling Box- 14400 Rev)	4 - 5	ISO 9943 : 2009
viii	Fibre Blend Compositions	---------	IS 667

10 BIS Certification Marking

The Product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed there under, and the products may be marked with the Standard Mark.

11 PACKING

11.1 The scarfs shall be packed in bales or cases in accordance with **IS 3325** or **IS 3086** and or as per the agreement between the buyer and seller.

12 SAMPLING

11.1 Lot

In any consignment, all the pairs of scarf of the same size manufactured from the same quality of yarn shall constitute a lot (IS 2500).

11.2 The conformity of a lot to the specification shall be determined on the basis of the test carried out on the pairs of scarf selected from the lot.

11.3 Unless otherwise agreed to between the buyer and the seller, number of pairs of Scarf depending on the lot size, shall be selected at random according to the Col 1 and 2 of Table 6 & 7.

11.4 The number of pairs of scarf to be inspected and criterion for conformity for each characteristic shall be as follows:

Table 6 Performance Assessment criteria for Scarf
(Clause 12.2, 12.3 & 12.4)

Sl. No.	**Characteristic**	**Number of pairs of Scarf to be Inspected**	**Criterion for Conformity**
(1)	(2)	(3)	(4)
I.	Visual inspection dimensions and number of wales and course	According to the col 3 of **Table 7**	Non-conforming pairs of scarf shall not exceed the corresponding number given in col 4 of the **Table 7**
II.	Mass	Sets of 10 pairs of scarf	All the observations shall

		obtained from those selected according to col 3 of Table 3	satisfy the relevant requirements
III.	Dimension change, scouring loss, pH value, ash content and colour fastness	According to col 5 of **Table 7**	All the test results shall satisfy the relevant requirement

Table 7: Sample Size and Permissible Number of Non-Conforming pairs of Scarf
(*Clause 9)*

Sl. No.	**Number of pairs of Scarf In The Lot**	**For Dimensions and visual Inspection**		**Testing**
		Number of pairs of Scarf to be Inspected	**Number of permissible Non-Conforming Pairs**	**Number of pairs of Scarf to be tested for Chemical Characteristics**
(1)	(2)	(3)	(4)	(5)
I.	Up to 100	10	0	3
II.	100 – 300	20	1	3
III.	301 – 500	30	2	5
IV.	501 – 1000	50	3	5
V.	1001 and above	80	5	8

ANNEX A

Sl. No.	***IS No.***	***Title***
1.	IS 199 : 1989	Textiles - Estimation of moisture, total size or finish, ash and fatty matter in grey and finished cotton textile materials (*Third Revision*)
2.	IS 1390 : 2022	Textiles Determination of pH of aqueous extract (Third Revision)
3.	IS 3086 : 1965	Code for seaworthy packaging of cotton hosiery yarn and goods
4.	IS 3325 : 1965	Code for inland packaging of cotton hosiery yarn and goods
5.	IS 3456 : 2022	Method for determination of water-soluble. matter of textile materials (*First Revision*)

6.	IS 3596 : 1967	Glossary of terms relating to hosiery
7.	IS 6359 : 2023	Method for conditioning of textiles
8.	IS/ISO 105 – B01: 2014	Textiles: Tests for colour fastness - Part B01 colour fastness to light: Daylight
9.	IS/ISO 105 – B02: 2014	Textiles: Tests for colour fastness - Part B02 colour fastness to artificial light: xenon arc fading lamp test
10.	IS/ISO 105 – C10: 2006	Textiles: Tests for colour fastness - Part C10 colour fastness to w with soap or soda and soap
11.	IS/ISO 105 – E04: 2008	Textiles: Tests for colour fastness - Part E04 colour fastness to perspiration
12.	ISO 16373-3	Textiles. Dyestuffs - Method for determination of certain carcinogenic dyestuffs (method using tri-ethylamine/methanol)
13.	BS EN ISO 14362-1,2,3	Textiles. Methods for determination of certain aromatic amines derived from Azo colorants - Textile testing; Amines (aromatic) ...
14.	ISO 105 – NO2	Textiles - Test for colour fastness Part NO2: Colour fastness to bleaching- Peroxide
15.	ISO 766 ISO 105-X12	Textiles - Method for determination of colour fastness of textile materials to rubbing [TXD 5: Chemical Methods of Test]
16.	IS 667: 1981	Textiles fibres - Methods for identification of textile fibers (first revision)
17.	ISO 1833-1:2020	Textiles -- Quantitative chemical analysis -- Part 1: General principles of testing
18.	IS-10971(P-2): 2022 ISO 12945-2:2020	Textiles – Determination of Fabric Propensity to Surface Fuzzing and to Pilling, Part 2: Modified Martindale Method
19.	ISO 6989:1981	Textile fibres — Determination of length and length distribution of staple fibres (by measurement of single fibres)
20.	IS 15336: 2003	Textiles – Acrylic Yarn for Hosiery – Specification
21.	IS 13719:2003	Textiles Spun cotton regenerated cellulosic fiber blended grey yarn - Specifications
22.	IS 9543:2019	Textiles - Spun polyester sewing thread – Specifications (first revision)
23.	ISO/TR 11827:2012	Textiles — Composition testing — Identification of fibres
24.	ISO 10132:1993	Textiles - Textured filament yarn - Definitions
25.	ISO 5688:2024	Textiles - Synthetic filament yarns - Test methods for crimp properties of Textured yarn
26.	ISO 7211-5	Textiles- methods for the determination of linear density of yarn removed from fabric.
27.	IS 13003: 1991	Textiles - Fabric, Cotton, Interlock knitted - Specification
28.	IS 9469 : 2003	Textiles – Fabric, cotton, plain (Single jersey) knitted – Specification (second revision)
29.	IS 834 : 2006	Textiles – Ring Spun Grey Cotton Yarn for Textiles
30.	IS 1966-1 (2009)	Textiles - Bursting Properties of Fabrics - Determination of Bursting Strength and Bursting Distension, Part 1: Hydraulic Method [TXD 1: Physical Methods of Tests]
31.	IS 1670 (1991)	Textiles - Yarn - Determination of breaking load and elongation at break of single strand [TXD 1: Physical Methods of Tests]
32.	IS/ISO 16322 (1-3)	Determination of spirality of knitted fabrics post laundering.
33.	ISO 6330	Textiles — Domestic washing and drying procedures for textile testing
34.	IS 2500	Part 4,5 & 6 Sampling Procedures for inspection by attributes.
35.	IS 14563 Part 2 ISO 14184-2 : 2011	Textiles Determination of formaldehyde Part-2 : Released formaldehyde vapour absorption method first revision.
36.	IS 1720:2022	Textiles - Specification for cotton sewing threads (Second revision)
37.	IS 1889 (Part 1 – 4)	Textiles – Quantitative Chemical Analysis : Mixtures of Viscose, Cupra

	2024 ISO 1833 – 5: 2006	or Modal and Cotton Fibres (Method Using Sodium Zincate)

ANNEX B

METHOD FOR DETERMINATION OF POLYESTER, COTTON

B-1 IDENTIFICATION OF POLYESTER

The material used for manufacture is dipped in any one of the following reagents:

a) Solution of crystallized trichloroacetic acid/chloroform reagent, prepared at a mass ratio 1:1.
b) Benzyl Alcohol at temperatures of 150°C.
c) m-Cresol at boil.

B-1.1 If the material used for manufacture is polyester, it shall dissolve in any one of the above mentioned reagents.

B-2 IDENTIFICATION OF COTTON

The material used for manufacture is dipped in any one of the following reagents:

a) Cotton dissolves in Schweizer's Reagent ($Cu(OH)_2$ in ammonia), a specific test for cellulose.
b) Cotton will dissolve in 75 % Sulphuric acid, indicating the presence of cellulose.
c) Boil the fabric sample in a 5% NaOH solution. Cotton will degrade and lose its structure in strong NaOH solutions.
d) If the material used for manufacture is cotton, it shall dissolve in any one of the above mentioned reagents.

B – 3 IDENTIFIOCATION OF VISCOSE RAYON

B- 3.1 The material used for manufacture is viscose rayon, it shall either dissolve or swell in the above mentioned reagents.

a) **Procedure:** Immerse a small sample in a solution of sodium hydroxide (NaOH). Viscose rayon will swell and may dissolve, while cellulose fibers like cotton will remain largely unchanged.
b) **Procedure:** Soak the fiber in concentrated acetic acid for a few minutes. Viscose rayon will dissolve in acetic acid, while most other fibers will not.

B – 4 IDENTIFIOCATION OF NYLON 6

B- 4.1 The material used for manufacture is dipped in the following reagents:

a) Formic Acid at temperatures of 70°C.

d) m-Cresol at temperatures of 80°C.

B-4.2 If the material used for manufacture is Nylon 6; it shall dissolve in the above mentioned reagents.

ANNEX C

METHOD OF TEST

C-1 CONDITIONING OF THE TEST SPECIMEN AND ATMOSPHERIC COMDITIONS FOR TESTING

C - 1.1 The test specimen shall be tested in prevailing atmospheric conditions. In case of dispute**,** the specimen shall be conditioned and tested in the standard atmosphere as given in IS 6359.

C - 2 DIMENSIONS

C - 2.1 Take scarf from the test sample. Lay flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it. Measure dimensions correct to the nearest centimetre, as given in Table 8.

C - 3 MASS

C - 3.1 Take a set of 10 pairs of scarf from the test sample. Condition them for moisture equilibrium for 24 hours (see **B-1.1**)**.**

C - 4 WALES AND COURSES

C - 4.1 Take scarf from the test sample. Lay it flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it.

C - 4.1.1 Count the number of Wales including any fraction on one side of the scarves. Similarly count the number of Wales including any fraction on other side of the scarves and add the two values.

C - 4.1.2 Count the number of courses in 10 cm including any fraction on both sides of the scarves and calculate the average courses per decimetre.

C- 5 DIMENSIONAL CHANGE (Due to Relaxation)

C-5.1 Marking the Test Specimens. Take scarf from the test sample. Mark centrally on it, by means of indelible ink or fast dyed cotton sewing, a set of three points, namely, *X*, *Y* and, *Z* so that,

a) All the three points are on the same wale,
b) point *X* is on the top portion;
c) point *Y* is on the heel gore line; and
d) Point *Z* is on the toe portion.

C - 5.2 Procedure

C - 5.2.1 Place the test specimen on a glass plate. Remove by hand all the creases and wrinkles without stretching the specimen. Place another glass plate on the specimen. Measure separately, correct to the nearest millimetre, the distance between *X* and *Y* and that between *Y* and *Z*.

C - 5.2.2 Lay the test specimen flat in a tray of suitable size, having a depth of 10 cm. Soak the specimen under the head of 25mm of water containing 0.5 % of suitable wetting agent at room temperature for two hours. Drain out the water and remove the test specimen carefully so that it is not stretched. Lay the specimen flat on a smooth surface, remove the excess water by absorbent material and dry it at room temperature.

Note *– Removal of excess water by wringing the test specimen is not permitted*

C - 5.2.3 After drying, conditioned the test specimen to moisture equilibrium at room temperature, place it on the glass plate, carefully remove wrinkles and creases and place another glass plate on it. Measure, correct to the nearest centimetre, the distance between *X* and *Y* and that between *Z*

C-5.3 Calculation

C - 5.3.1 calculate separately, correct to one place of decimal, the percentage change between the points *X* and *Y* and that between *Y* and *Z* by following formula:

$$S = \frac{a - b}{a} \times 100$$

Whereas;

a) S = dimensional change (due to relaxation) percent;
b) a = distance between the two points X and Y, or Y and Z, before soaking; and
c) b = distance between the same points after soaking.

C-5.3.2 Calculate the average dimensional change**.**

ANNEX 5
(Item 5.1)

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDRADS

Draft for comments only Doc: TXD 10 (26838) WC
November 2024

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भारतीय मानक मसौदा

वस्त्रादि - सिंगल जर्सी, कपास, सिंथेटिक और मिश्रित लेगिंग - विशिष्टि

(Draft *Indian Standard*)

TEXTILES – SINGLE JERSEY, COTTON, SYNTHETIC, AND BLENDED LEGGINGS - SPECIFICATIONS

Hoisery Sectional Committee,	Last date for receipt of comments
TXD 10	January 2024

FOREWORD

(*Formal foreword to be added later*)

Knitted leggings have become a timeless staple in modern wardrobes, celebrated for their unmatched comfort, flexibility, and stylish appeal. Made from soft, stretchable fabrics, these leggings offer a second-skin feel while ensuring freedom of movement, making them ideal for a variety of activities—from workouts to casual wear.

Their versatile design allows them to be paired effortlessly with a range of outfits, making knitted leggings perfect for both athleisure and everyday fashion. Available in a wide array of colours and patterns, they cater to personal tastes while maintaining their practicality and durability. Whether at the gym, running errands, or lounging at home, knitted leggings are the epitome of comfort without compromising on style.

1 SCOPE

1.1 This standard describes constructional details, characteristics and performance related parameters of single jersey, cotton, synthetic, and blended leggings.

1.2 This standard does not take into consideration such as appearance, lustre, handle, finish type, whiteness index or shade of the leggings.

1.3 This standard does not apply to knitted interlinings, jeans, and dungarees.

2 REFERENCES

2.1 The standard listed in **Annex A** contains provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subjected to revision and parties to agreements based on this standard are encouraged investigating the possibility of applying the most editions of these standards.

2.2 For the purpose of this standard, details of test methods given in **Annex-B** and Identification of Material is given in **Annex-D**

3 TERMINOLOGY

3.1 Leggings are tight-fitting garments that cover the legs, typically made of stretchy material such as spandex, polyester, cotton, or a blend of these fabrics. They are often worn by both men and women as casual wear, exercise attire, or as a fashion statement. Leggings are characterized by their form-fitting nature, often extending from the waist down to the ankles, though variations in length exist, such as Capri-length or mid-calf styles.

4 MATERIALS

4.1 Yarn

The yarn count for cotton shall be in the range of 30s Ne – 60s Ne (20 Tex – 10 Tex) and for multifilament synthetic yarn shall be in the range of 150D – 200D. Apart from this specification,

any other yarn count in compliance with the buyer & seller agreement shall be used for knitting, splicing, and linking of the leggings.

4.2 Identification of Fibres

The material used for manufacturing shall be tested as per **Annex D**.

5 MANUFACTURING

5.1 Shape

The shape of leggings shall be generally as shown in Figure. 1.

5.2 Knitting

5.2.1 The leggings fabric shall be knitted on circular, flatbed and warp knitting machines. These shall be neatly tailored out of well and evenly knitted tubular fabric. The fabric shall be of uniform texture and appearance. It shall be of uniform tension throughout its length and free from spirals. It shall be scoured, bleached or dyed. The leggings shall not have any seams or joining along their two outer sides. The wales shall run along the length of the drawers. The fabric shall conform to construction particulars given in **Table 5** for plain knitted Leggings and **Table 6** for rib knitted Leggings.

5.2.1 The mass of the leggings in grams per square meter shall be determined by the method given in B - 3.

5.2.2 Pockets; if required may also be provided having dimensions and shape as agreed to between the buyer and the seller.

5.3 Elastic Strap

Leggings shall have outer woven elastic strap stitched at the waist band or inner woven elastic strap shall be formed by the folding the raw edges of the fabric to a depth of minimum 25 mm and stitching it with flat stitches. In case of latter, a cotton tape having width of 25 mm preferably confirming to IS 9686: 2022 or a suitable tape made out of same fabric that is used for fabricating the leggings shall be provided in waist fold for tying purposes. It shall be at least 30 cm longer than the corresponding waist girth.

The ankle and waistband should be either plain or rib knitted or in compliance with the agreement between the buyer and the seller. The ankle width should be atleast 5.0 - 10.0 cm's and the waistband width up to 2.5 cm's.

5.4 Crutch Piece

The fabric used for crutch piece shall be of same type and construction as that of the legging (leg portion). The crutch piece shall be reinforced throughout with cotton calico (IS 1544). The crutch piece and the reinforcement fabric shall be scoured or bleached as the legging.

5.5 Linking

The pieces of leggings shall be securely linked using over-lock and or flat-lock stitch. The stitch type selection must be in compliance with the buyer and the seller. The linking shall be elastic, smooth and free from knots. The length of the free ends of the linking yarn and other loose ends, if any, shall be neither less than 5.0 mm nor more than 15.0 mm. The linking shall not give way when the leggings are stretched without breaking to the full extent of the stretch ability of leggings. Linking of crutch piece shall be done at right angle i.e. 90^{o} at the intersection to prevent tearing during extension while sitting.

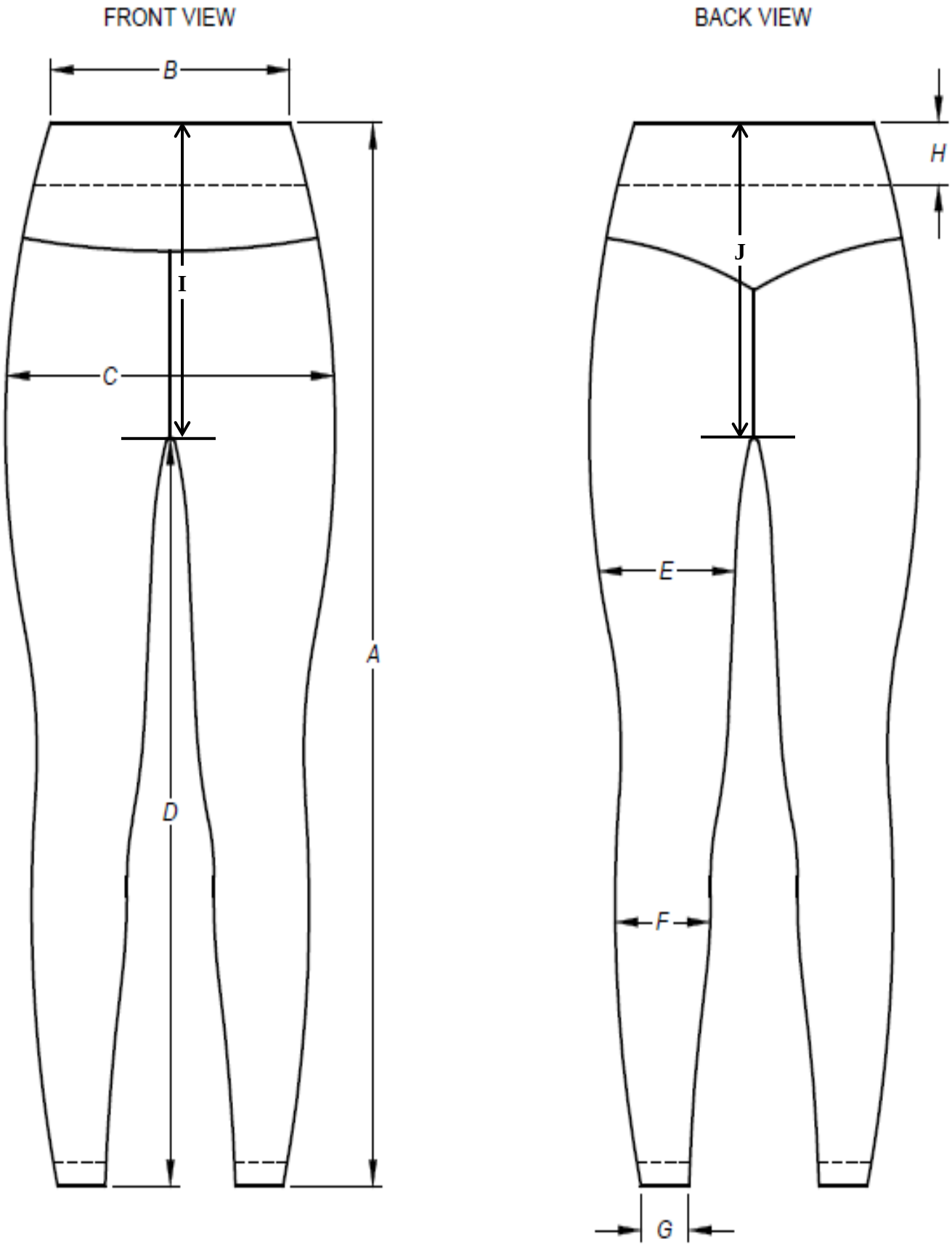

FIGURE-1 General Shape of the Plain and Rib Knitted Leggings

Table 5 Constructional Particulars of Plain Knitted Fabric for Leggings
(*Clause 5.1*)

Sl. No.	Gauge of Machine (See Note)	Approximate Count of Yarn – Ne (Tex)	Mass g/m^2 Min (g)
(1)	(2)	(3)	(4)
1	12 - 18	20s (30.0) – 28s (21.0)	250
2	24 - 28	30s (19.5) – 40s (14.5)	230
3	28 - 32	34s (17.0) – 50s (12.0)	200
4	32 - 36	40s (14.5) – 50s (12.0)	180
5	36 - 40	50s (12.0) – 60s (10.0)	120
NOTE	*As determined by the number of needles per 2.54 CM*		

Table 6 Constructional Particulars of Rib Knitted Fabric for Leggings
(*Clause 5.1*)

Sl. No.	Gauge of Machine* (See Note)	Approximate Count of Yarn – Ne (Tex)	Mass g/m^2 Min (g)
(1)	(2)	(3)	(4)
1	12 – 18	20s (30.0) – 28s (21.0)	350
2	18 – 24	30s (19.5) – 40s (14.5)	330
3	24 – 28	34s (17.0) – 50s (12.0)	300
4	28 – 32	38s (15.5) – 50s (12.0)	250
5	32 – 36	50s (12.0) – 60s (10.0)	200
NOTE	*As determined by the number of needles per 2.54 CM*		

TABLE 7 Body Measurements Chart for Pyjamas (Figure 1)
(Clause 5.1)

Sl No.	SIZE	LENGTH [cm]	WAIST [cm]		HIP [cm]		INSEAM [cm]	THIGH [cm]		CALF [cm]		ANKLE [cm]	
		(A)	(B)		(C)		(D)	(D)		(F)		(G)	
			Women'	Men's	Wome	Men's		Wome	Men'	Wome	Men	Women'	Men's
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1.	XS	90	61 – 66	71 – 76	81 – 86	86 – 91	64	46	52	30	33	18.0	22.0
2.	S	94	68 – 72	76 – 81	86 – 91	91 – 97	66	48	54	30.5	35	19.0	22.5
3.	M	96	74 – 76	81 – 86	91 – 97	97 – 102	68	50	55	31	37	20.0	23.0
4.	L	100	79 – 81	86 – 91	97 – 102	102-107	70	52	57	33	39	21.0	23.5

5.	XL	102	84 – 86	91 – 97	102 – 107	107-112	72	54	58	34	40	22.0	24.0
6.	2X	104	89 – 91	97 –	107 –	112 –	74	56	60	35	41	23.0	25.0
7.	3X	108	94 – 99	102 –	112 –	117 –	76	58	62	36	42	24.0	26.0
8.	4X	110	100 –	107 –	117 –	122 –	78	60	64	37	43	25.0	27.0
9.	5X	112	106 –	112 –	122 –	127 –	80	62	66	38	44	26.0	28.0
10.	6X	116	112 –	117 –	127 –	132 –	82	64	68	39	45	27.0	29.0
11.	7X	120	118 –	122 –	132 –	137 –	84	66	70	41	46	28.0	30.0
12.	8X	124	124 –	127 –	137 –	142 –	86	68	72	42	48	30.0	32.0
NOTE – *For sizes above 3XL, a suitable crutch piece can be added as the clause 5.4 and the agreement betwee the buyer and seller.*													

TABLE 8 Body Measurements Chart for Leggings (Figure 1) (Clause 5.1)

Sl No.	**Leggings Particulars**	**Front Rise (CM)**		**Back Rise (CM)**	
		I		**J**	
		Women's	**Men's**	**Women's**	**Men's**
1)	Low Rise Leggings	18 - 20	20 - 23	25 - 28	25 - 28
2)	Mid Rise Leggings	20 - 25	23 - 27	28 – 32	28 – 32
3)	High Rise Leggings	25 - 30	27 - 30	32 - 36	32 - 36
NOTE	*Measurements Shall Apply to All Sizes of Pyjamas*				

6 FREEDOMS FROM DEFECTS

The leggings shall be reasonably free from the manufacturing defects, such as large mends, ladders, dropped stitches, holes, improper splicing and chemical damages. The dyed and bleached leggings shall be free from dyeing defects, such as streakiness and uneven dyeing and the white leggings from blueing agents.

7 REQUIREMENTS

7.1 Dimension, Mass and Tolerances

The legging shall conform to the requirements of **Table 5**, and read with **Figure - 1**, along with considering the tolerances typically ±0.5 cm to ± 2.0 cm.

NOTE----*The legging size should be denoted by the number correspond to the length and waist diameter.*

7.2 Seam and Stitching Tolerances

a) **Seam allowances** - Maintain consistent seam allowances (typically 0.6 cm to 1.5 cm) to ensure adequate construction and durability.

b) **Stitch quality** - Specify acceptable variations in stitch length, tension, and type such as; Lockstitch, Over-lock, or Cover-stitch; to ensure seams is secure and aesthetically pleasing.

7.2.1 Sewing

The sewing details of the leggings shall be as under:

Sl No.	Portion to be Stitched	Type of Stitch	Sewing Thread
i.)	All Joining's	Flat – Lock	Three threads of 60s/3 count (100 dtex x 3) or 40s/2 count (145 dtex x 2) in the needle and one strand of the same threads in the each loopers.
ii.)	Flap at the front opening (For Men's Only)	Lock Stitch	One strand of cotton sewing thread of 60s/3 count (100 dtex x 3) or 40s/2 count (145 dtex x 2) in each of the needle and the looper.
NOTE - *Sewing thread of 60s/3.0 (100 dtex) count may be used in place of 40s/2 (145 dtex x 2)*			

7.3 The leggings shall also conform to the requirements in Table 1, 2, 3, 4, 5, 6, 7

7.4 **Sealed Sample** - If in order to illustrate or specify general appearance, lustre, handle, type of finish and whiteness index or yellowness (ISO 105: J02, ISO 11475:2017), a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in each respect.

8 MARKING

7.1 Each pair of leggings shall be marked with the following:

a) Size (marked toward the waistband);

b) manufacturer's name, initials or trademark, if any (marked on the waistband) and;

c) fibre blend compositions must be given;

d) suitable washing instruction must be given;

e) Any other information as required by the law in force.

9 BIS CERTIFICATION

The Product(s) conforming to the requirements of this standard may certified as per the conformity assessment schemes under the provisions of the bureau of Indian Standards Act, 2016, and the Rules and Regulations framed thereunder, and the product (s) may be marked with the Standard Mark.

Table 9 Other Requirements of Leggings
(*Clause 5.2*)

Sl. No.	Characteristic	Requirements	Method of Test Ref to
(1)	(2)	(3)	(4)
i.	Total number of Wales/dm	250 - 450	B-4
ii.	Total number of Courses/dm	300 - 500	B-4
iii.	Dimensional Change (due to relaxation) Percentage, *Max*	5.0	B-5
iv.	pH value	6 - 10	IS 1390
v.	Water soluble, *Min*	1.0	IS 3456
vi.	Ash Content	0.5	IS 199
vii.	Colour fastness ratings to min		
	i. Light	3 - 4	IS/ISO 105 – B02 OR IS/ISO 105 – B01
	ii. Washing a) Change in colour b) Staining of Adjacent fabric	4 4	IS/ISO 105 – C10
	iii. Perspiration a) Change in Colour b) Staining of adjacent fabric	3 3	IS/ISO 105 – E04
	iv. Rubbing a) Change in colour **b)** Staining of adjacent fabric	4 3	IS/ISO 105 X12 : 2001
	v. Pilling **(**Martindale Pilling Box- 14400 Rev)	4 - 5	BIS ISO 9943 : 2009
viii	Fibre Blend Compositions		**Annex C**

10 PACKING

The leggings shall be packed as per the agreement between the buyer and seller.

11 SAMPLING

11.1 Lot

In any consignment, all the pairs of leggings of the same size manufactured from the same quality of yarn shall constitute a lot (IS 2500).

11.2 The conformity of a lot to the specification shall be determined on the basis of the test carried out on the pairs of leggings selected from the lot.

11.3 Unless otherwise agreed to between the buyer and the seller, number of pairs of leggings depending on the lot size, shall be selected at random according to the Col 1 and 2 of Table 9 & 10

11.4 The number of pairs of leggings to be inspected and criterion for conformity for each characteristic shall be as follows:

Table 10 Performance Assessment criteria for leggings
(Clause 12.3)

Sl. No.	Characteristic	Number of pairs of leggings to be Inspected	Criterion for Conformity
(1)	(2)	(3)	(4)
I.	Visual inspection dimensions and number of wales and course	According to the col 3 of **Table 11**	Non-conforming pairs of legging shall not exceed the corresponding number given in col 4 of the **Table 11**
II.	Mass	Sets of 10 pairs of legging obtained from those selected according to col 3 of Table 3	All the observations shall satisfy the relevant requirements
III.	Dimension change, scouring loss, pH value, ash content and colour fastness	According to col 5 of **Table 11**	All the test results shall satisfy the relevant requirement

Table 11: Sample Size and Permissible Number Of Non-Conforming pairs of Leggings

(*Clause 9.3 and 9.4*)

Sl. No.	Number of pairs of Leggings In The Lot	For Dimensions and visual Inspection		Testing
		Number of pairs of Leggings to be Inspected	Number of permissible Non-Conforming Pairs	Number of pairs of Leggings to be tested for Chemical Characteristics
(1)	(2)	(3)	(4)	(5)
I.	Up to 100	10	0	3

II.	100 – 300	20	1	3
III.	301 – 500	30	2	5
IV.	501 – 1000	50	3	5
V.	1001 and above	80	5	8

ANNEX A - LIST OF REFERRED STANDARDS

(*Clause 4.1, 4.2, 4.3***)**

IS No.	***Title***
IS 199 : 1989	Textiles - Estimation of moisture, total size or finish, ash and fatty matter in grey and finished cotton textile materials
IS 1390 : 2022	Textiles Determination of pH of aqueous extract (Third Revision)
IS 3086 : 1965	Code for seaworthy packaging of cotton hosiery yarn and goods
IS 3325 : 1965	Code for inland packaging of cotton hosiery yarn and goods
IS 3456 : 2022	Method for determination of water-soluble matter of textile materials
IS 3596 : 1967	Glossary of terms relating to hosiery
IS 6359 : 2023	Method for conditioning of textiles
IS/ISO 105 – B01: 2014	Textiles: Tests for colour fastness - Part B01 colour fastness to light: Daylight
IS/ISO 105 – B02: 2014	Textiles: Tests for colour fastness - Part B02 colour fastness to artificial light: xenon arc fading lamp test
IS/ISO 105 – C10: 2006	Textiles: Tests for colour fastness - Part C10 colour fastness to w with soap or soda and soap
IS/ISO 105 – E04: 2008	Textiles: Tests for colour fastness - Part E04 colour fastness to perspiration
ISO 16373-3	Textiles. Dyestuffs - Method for determination of certain carcinogenic dyestuffs (method using tri-ethylamine/methanol)
BS EN ISO 14362-1,2,3	Textiles. Methods for determination of certain aromatic amines derived from Azo colorants - Textile testing; Amines (aromatic) ...
ISO 105 – NO2	Textiles - Test for colour fastness Part NO2: Colour fastness to bleaching- Peroxide
IS/ISO 105 X12 : 2001	Textiles - Method for determination of colour fastness of textile materials to rubbing.
IS 667: 1981	Textiles fibres - Methods for identification of textile fibres
ISO 1833-1:2020	Textiles -- Quantitative chemical analysis -- Part 1: General principles of testing
IS-10971 (P-2) : 2022 ISO 12945-2:2020	Textiles – Determination of Fabric Propensity to Surface Fuzzing and to Pilling, Part 2: Modified Martindale Method
ISO 6989:1981	Textile fibres — Determination of length and length distribution of staple fibres (by measurement of single fibres)
IS 15336: 2003	Textiles – Acrylic Yarn for Hosiery – Specification
IS 13719:2003	Textiles Spun cotton regenerated cellulosic fiber blended grey yarn - Specifications

IS 9543:2019	Textiles - Spun polyester sewing thread – Specifications
ISO/TR 11827:2012	Textiles — Composition testing — Identification of fibres
ISO 10132:1993	Textiles - Textured filament yarn - Definitions
ISO 5688:2024	Textiles - Synthetic filament yarns - Test methods for crimp properties of Textured yarn
ISO 7211-5	Textiles- methods for the determination of linear density of yarn removed from fabric.
IS 13003: 1991	Textiles - Fabric, cotton, interlock knitted - Specification
IS 9469 : 2003	Textiles – Fabric, cotton, plain (Single jersey) knitted – Specification
IS 834 : 2006	Textiles – Ring Spun Grey Cotton Yarn for Textiles
ISO 8559 - 1	Textiles – Size designation of clothes – Anthropometric definitions for body measurement
ISO 8559 - 2	Textiles Size designation of clothes Part 2: Primary and secondary dimension indicators
ISO 8559 - 3	Textiles Size designation of clothes Part 3: Methodology for the creation of body measurement tables and intervals
IS 1966-1 (2009)	Textiles - Bursting Properties of Fabrics - Determination of Bursting Strength and Bursting Distension, Part 1: Hydraulic Method
IS 1670 (1991)	Textiles - Yarn - Determination of breaking load and elongation at break of single strand.
IS/ISO 16322 (1-3)	Determination of spirality of knitted fabrics post laundering.
ISO 6330	Textiles — Domestic washing and drying procedures for textile testing
IS 10099 : 2020 ISO 3759 : 2011	Textiles – Preparation marking and measuring of fabric specimens and garments in tests for determination of dimensional change.
IS 9686:2022	Textiles - Specification For Elastic Tape
IS 2500	Part 4, 5 & 6 Sampling Procedures for inspection by attributes.

ANNEX B

METHODS OF TEST

B-1 CONDITIONING OF THE TEST SPECIMEN AND ATMOSPHERIC COMDITIONS FOR TESTING

B - 1.1 The test specimen shall be tested in prevailing atmospheric conditions. In case of dispute**,** the specimen shall be conditioned and tested in the standard atmosphere as given in IS 6359.

B - 2 DIMENSIONS

B - 2.1 Take a legging from the test sample. Lay flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it. Measure dimensions correct to the nearest centimetre, as given in Table 8.

B - 3 MASS

B - 3.1 Take a set of 10 pairs of legging from the test sample. Condition them for moisture equilibrium for 24 hours (see B-1.1)**.**

B - 4 WALES AND COURSES

B - 4.1 Take leggings from the test sample. Lay it flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it.

B - 4.1.1 Count the number of wales including any fraction on one side of the leggings. Similarly count the number of wales including any fraction on other side of the legging and add the two values.

B - 4.1.2 Count the number of courses in 10 cm including any fraction on both sides of the leggings and calculate the average courses per decimetre.

B- 5 DIMENSIONAL CHANGE (Due To Relaxation)

B-5.1 Marking the Test Specimens. Take a legging from the test sample. Mark centrally on it, by means of indelible ink or fast dyed cotton sewing, a set of three points, namely, *X*,*Y* and, *Z* so that,

a) All the three points are on the same wale,
b) point *X* is on the top portion;
c) point *Y* is on the heel gore line; and
d) Point *Z* is on the toe portion.

B - 5.2 Procedure

B - 5.2.1 Place the test specimen on a glass plate. Remove by hand all the creases and wrinkles without stretching the specimen. Place another glass plate on the specimen. Measure separately, correct to the nearest millimetre, the distance between *X* and *Y* and that between *Y* and *Z*.

B - 5.2.2 Lay the test specimen flat in a tray of suitable size, having a depth of 10 cm. Soak the specimen under the head of 25mm of water containing 0.5 % of suitable wetting agent at room temperature for two hours. Drain out the water and remove the test specimen carefully so that it is not stretched. Lay the specimen flat on a smooth surface, remove the excess water by absorbent material and dry it at room temperature.

Note *– Removal of excess water by wringing the test specimen is not permitted*

B - 5.2.3 After drying, conditioned the test specimen to moisture equilibrium at room temperature, Place it on the glass plate, carefully remove wrinkles and creases and place another glass plate on it. Measure, correct to the nearest centimetre, the distance between *X* and *Y* and that between *Z*

B-5.3 Calculation

B - 5.3.1 calculate separately, correct to one place of decimal, the percentage change between the points *X* and *Y* and that between *Y* and *Z* by following formula:

$$S = \frac{a - b}{a} \times 100$$

Where;

a) S = dimensional change (due to relaxation) percent;
b) a = distance between the two points X and Y, or Y and Z, before soaking; and
c) b = distance between the same points after soaking.

B-5.3.2 Calculate the average dimensional change**.**

C - 6 SPIRALITY OF THE KNITTED FABRIC

Spirality is a major problem of knit fabrics which are produced in circular knitting machines. Relaxation of torsional stresses cause dimensional distortions and instability in the knitted loop constructions. The factors that influence the spirality include; machine gauge, no of feeders, yarn type and fabric properties, etc.

C – 6.1 Measurement of Spirality after Laundering

Spirality is determined by placing a protractor on the smooth fabric surface with its base-line along the course and reading the angle between the wale line and a line 90°perpendicular to the course line.

C - 6.2 Test Specimen Preparation and Marking Procedures

i. Prepare specimen for marking from appropriate location from the sample. Cut a specimen of size 380 mm x 380 mm single layer fabric.

ii. Place the test specimen on a glass plate with the technical face of the fabric upwards.

iii. Remove by hand all the creases and wrinkles without stretching the specimen.

iv. If necessary, place tensioning mass on either side of the fabric sample to keep the welt straight.

C - 6.3 Procedure - Diagonal Marking

i. Mark two pairs of 250 mm benchmark sets parallel to the length and two pairs of 250 mm benchmark sets perpendicular to the width to make a square. Draw a line through each of the four sets of adjacent benchmark to denote the square formed.

ii. Label the four corners, A, B, C and D in clockwise direction starting at the lower left corner as shown in figure -3. Using the middle third of the specimen width, place the ruler or a straightedge parallel to the direction of wales in the fabric specimen.

iii. Choose one wale, and align and the straight edge of the ruler with that wale at the intersection between the body of the specimen and the welt. Keeping that point fixed, rotate the straightedge until it crosses the same wale at a position (200 ± 1) mm from the top of the welt.

iv. Without moving the straightedge, place the protector on the straightedge with the base line parallel to the top of the welt. Measure the angle between the line of the straightedge and the bottom of the protector which is parallel to the top of the welt. (See figure 3)

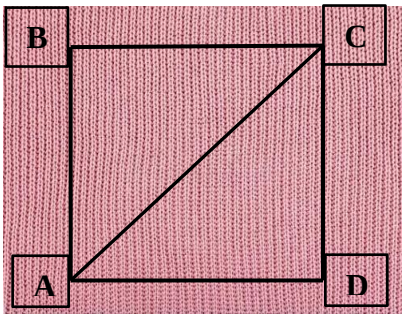

Figure – 3 Diagonal Marking Procedures

C – 6.2.4 Calculation of the Spirality in Percentage

i. Calculate the percentage change in the wale angle spirality from the original measurement as follow:

$$S = \frac{\alpha - \beta}{\alpha} \times 100$$

Where;

S = is the percentage spirality change after laundering, expressed as a percentage of the original;

α = is the original wale spirality angle, expressed in degrees [See Figure 4(a)];

β = is the wale spirality after laundering, expressed in degrees [See Figure 4(b)].

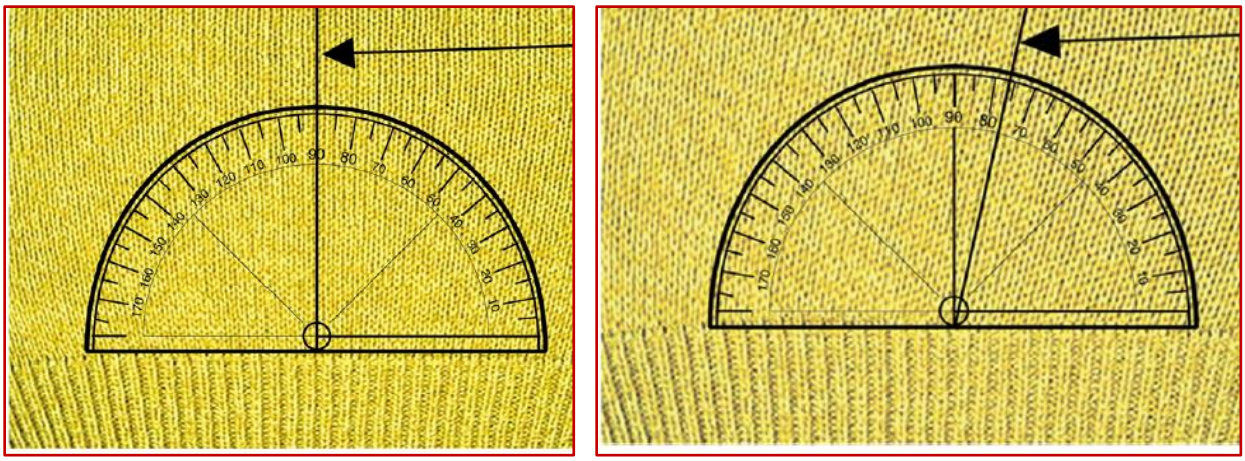

Figure 4: (a) Originally measured spirality angle α, (b) Measured spirality angle β after laundering.

ANNEX C
YARN

Table 1 100% Cotton Carded & Combed Hosiery Yarn
(Clause 4.1)

Test Parameters	**20CH**	**24CH**	**30CH**	**32CH**	**36CH**	**40CH**	**50CH**	**60CH**
Count(Ne)	20s	24s	30s	32s	36s	40s	50s	60s
	20KH	**24KH**	**30KH**	**32KH**	**36KH**	**40KH**	-----	-----
Count(Ne)	20s	24s	30s	32s	36s	40s	----	----
Count CV%	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Note:	**KH** – Carded Yarn, **CH** – Combed Yarn							
	Data obtained from T.T Limited ***[www.ttlimited.co.in]***							

Table 2 The Cotton Carded, Combed Yarn and Commercially Blended Yarn used in the Hosiery as per **Annex-C**
(Clause 4.1)

Sl. NO.	**Blend Type**	**Blend %**	**Count Range (Ne)**	**Yarn Ply**
	Cotton	100%	20s – 60s	1 Ply, 2 Ply

1.	Cotton/Polyester	60/40, 65/35, 50/50, 52/48, 33/67, 70/30, 80/20,	20s – 60s	1 Ply, 2 Ply
2.	Cotton/Viscose	55/45, 65/35 70/30, 85/15, 40/60, 50/50,	20s – 60s	1 Ply, 2 Ply
3.	Polyester/Viscose	50:50, 90:10, 75:25, 65:35	20s – 50s	1 Ply, 2 Ply
4.	Polyester/Spandex [240 – 270 GSM]	80/20, 70/30, 88/12, 90/10, 84/16	20s – 60s	1 Ply, 2 Ply [210 – 300 GSM]
5.	Nylon/Spandex	70/30, 80/20, 75/25, 90/10, 87/13	20s – 60s	210 - 300 GSM
6.	Cotton/Acrylic	75/25, 60/40 50/50, 40/60	20s – 60s	
7.	Cotton/Spandex	50/50, 90/10, 95/5	20s – 60s	140 GSM Fabric
8.	Viscose Jersey Fabric	———	20s, 24s, 30s, 34s, 40s.	220 GSM
9.	Cotton/Nylon /Spandex Fabrics		20s – 60s	200 GSM Fabric
10.	Cotton/Viscose/Spandex		20s – 60s	160 GSM

Table 3 Spandex Filament used Commercially Available
(Clause 4.1)

Sl. No.	Filament Type	Denier
1	Spandex/Lycra	20, 40, 55, and 70 denier (22, 44, 61, and 78 dtex)

Table 4 Fiber Bend compositions and Structure combinations for Leggings
(Clause 4.1)

Sl. No.	**Brands in the Market**	**Product Type**	**Fabric Structure Details**						**Machine Details Gauge**	
			Cotton	**Nylon**	**Polyester**	**Spandex**	**Acrylic**		**Circular**	**Flatbed**

				filament	**Filament**	**(Denier)**				
1.	Pretty Polly	Smooth Leggings		93%		7%		Plain	24 5 - 40	5 - 14
2.	CETTE	London Leggings Plus	1.0%	93% (60		6.0%		Plain	24 5 - 40	5 - 14
3	Glamour Velvet	Leggings		89% (80		11%		Plain	24 5 - 40	5 - 14
4	FALKE	Pure Matt Leggings		91% (100		9%		Plain	24 5 - 40	5 - 14
5	WOLFORD	Twenties Econyl Leggings		82%		18%		Plain	24 5 - 40	5 - 14
6	GIPSY	Thermal Legging		95% (200		5%		Plain	24 5 - 40	5 - 14
7	FALKE	Cotton Touch Leggings	43%	50%		7%		Plain	24 5 - 40	5 - 14
8	GM Hosiery	Leggings	95 %			5 %		Plain	24 5 - 40	5 - 14
9	Dinesh Exports	Cotton/Lycra & Custom	50%			50%		Plain	24 5 - 40	5 - 14
10	Active Fit	Acrylic /Polyester/Nylon/S		40%	5%	15%	40%		24 5 - 40	5 - 14

ANNEX D

(Clause 4.2)

D-1 IDENTIFICATION OF POLYESTER

The material used for manufacture is dipped in the following reagents:

a) Solution of crystallized tri-chloro-acetic acid/chloroform reagent, prepared at a mass ratio 1:1.

b) Benzyl Alcohol at temperatures of 150°C.

c) M-cresol at 93 ºC, Polyester will dissolve

D-1.1 If the material used for manufacture is polyester; it shall dissolve in the above mentioned reagents.

D- 2 IDENTIFICATION OF COTTON

D – 2.1 The material used for manufacture is dipped in any one of the following reagents:

a) Cotton dissolves in Schweitzer's Reagent ($Cu(OH)_2$ in ammonia), a specific test for cellulose.
b) Cotton will dissolve in concentrated sulfuric acid, indicating the presence of cellulose.
c) Boil the fabric sample in a 5% NaOH solution. Cotton will degrade and lose its structure in strong NaOH solutions.

D-2.2 If the material used for manufacture is cotton; it shall dissolve in the above mentioned reagents.

D - 3 IDENTIFICATION OF SPANDEX

D- 3.1 The material used for manufacture is dipped in any one of the following reagents:

a) Spandex will dissolve in DMF (Dimethyl Formamide) or DMAc, unlike many other fibers.
b) Spandex is resistant to formic acid, while some other fibers may dissolve or degrade.
c) Spandex will degrade but not dissolve completely in sulfuric acid, often swelling and losing elasticity.

D-3.2 Spandex shows specific thermal transitions, such as a melting point around 240-270°C.

D– 4 IDENTIFIOCATION OF VISCOSE RAYON

D- 4.1 The material used for manufacture is viscose rayon, it shall either dissolve or swell in the above mentioned reagents.

a) **Procedure:** Immerse a small sample in a solution of sodium hydroxide (NaOH). Viscose rayon will swell and may dissolve, while cellulose fibers like cotton will remain largely unchanged.

b) **Procedure:** Soak the fiber in concentrated acetic acid for a few minutes. Viscose rayon will dissolve in acetic acid, while most other fibers will not.

भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDRADS

Draft for comments only

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November 2024

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भारतीय मानक मसौदा

वस्त्रादि — बुने हुए पुरुषों और महिलाओं के टी-शर्ट — विशिष्टता

Draft Indian Standard

TEXTILES — KNITTED MEN'S AND WOMEN'S T-SHIRT — SPECIFICATION

Hoisery Sectional Committee, TXD 10	Last date for receipt of comments January 2024

FOREWORD
(*Formal foreword to be added later*)

A T-shirt is a casual upper-body garment made from knitted fabric, typically cotton or polyester. It features Polo, Round or V-neck with short sleeves, and a T-shaped design. Known for its comfort and versatility, it often displays printed designs and is suitable for both men and women.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1 SCOPE

1.1 This standard prescribes the requirement of three types of T-Shirt in Round Neck, Polo and V-Neck made from Cotton, Polyester and their blends.

1.2 This standard does not specify the general appearance, luster, feel and shade of the T-Shirt.

2 REFERENCES

The standards given in Annex A contain provisions which through, reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 3596 shall apply.

4 TYPES OF T-SHIRT

4.1 T-Shirt shall be of any one of the following three types.

A) Polo T-Shirt
B) V-Neck T-Shirt
C) Round Neck T-Shirt

A) **Polo T-Shirt**

i) Men's Polo T-Shirt as per given in Figure 1.

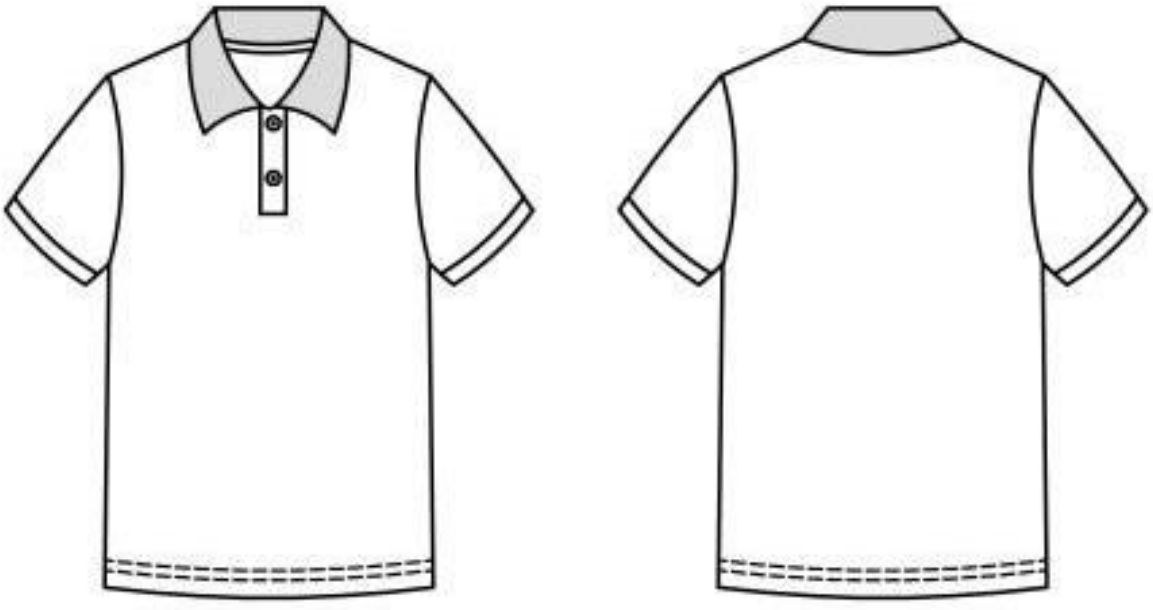


Figure 1 Men's Polo T-Shirt

ii) Women's Polo T-Shirt as per given in Figure 2.

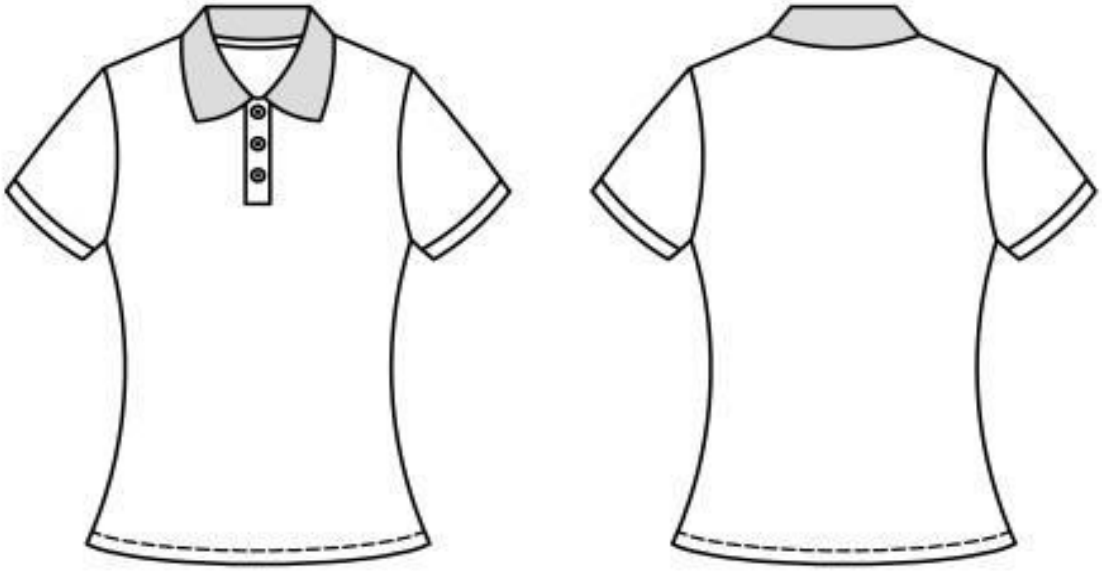


Figure 2 Women's Polo T-Shirt

B) V-Neck T-Shirt

i) Men's V-neck T-Shirt as per given in Figure 3.

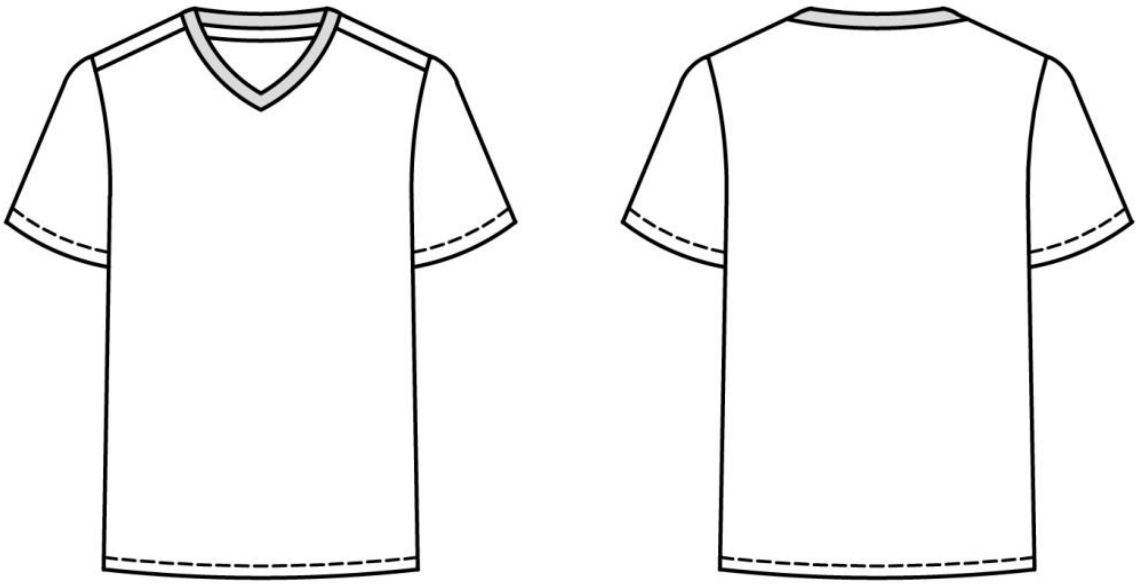


Figure 3 Men's V-Neck T-Shirt

ii) Women's V-Neck T-Shirt as per given in Figure 4.

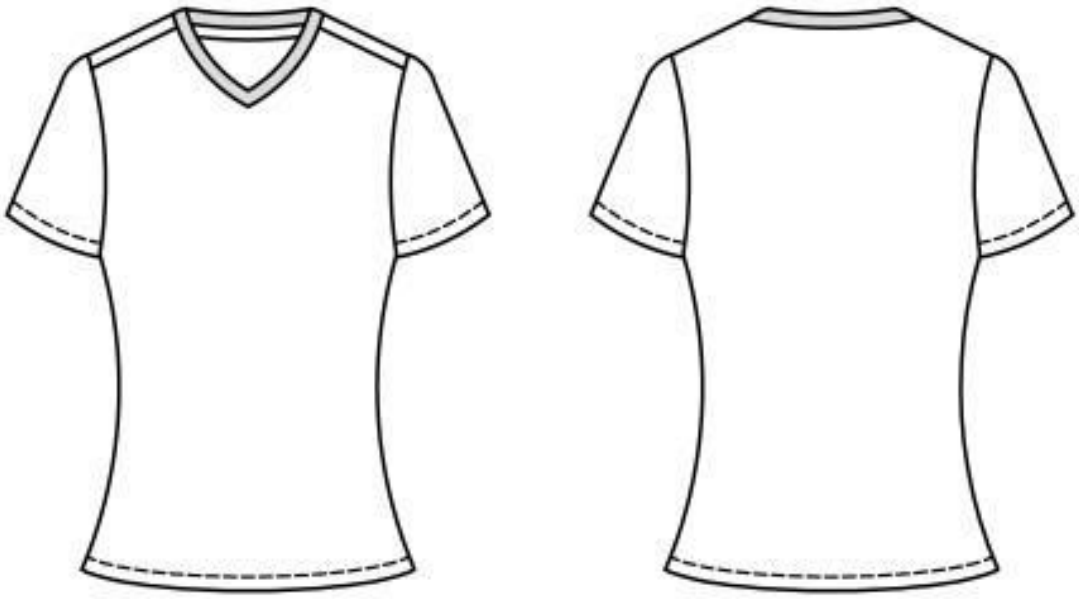


Figure 4 Women's V-Neck T-Shirt

C) Round Neck T-Shirt

i) Men's Round Neck T-Shirt as per given in Figure 5.

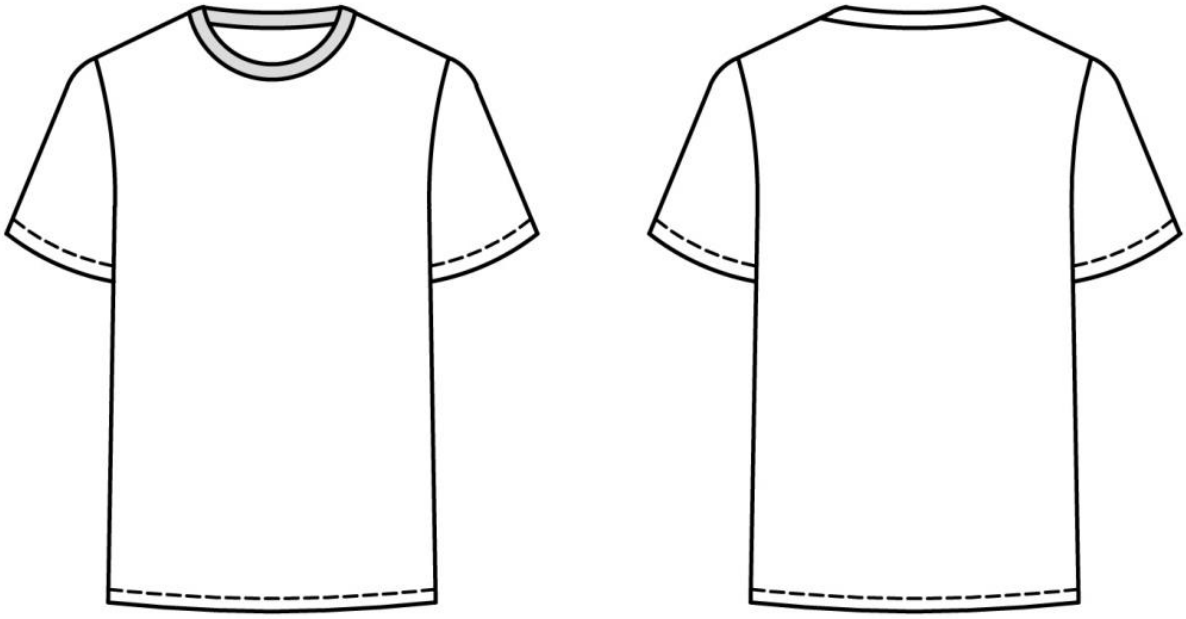


Figure 5 Men's Crew Neck T-Shirt

ii) Women's Round Neck T-Shirt as per given in Figure 6.

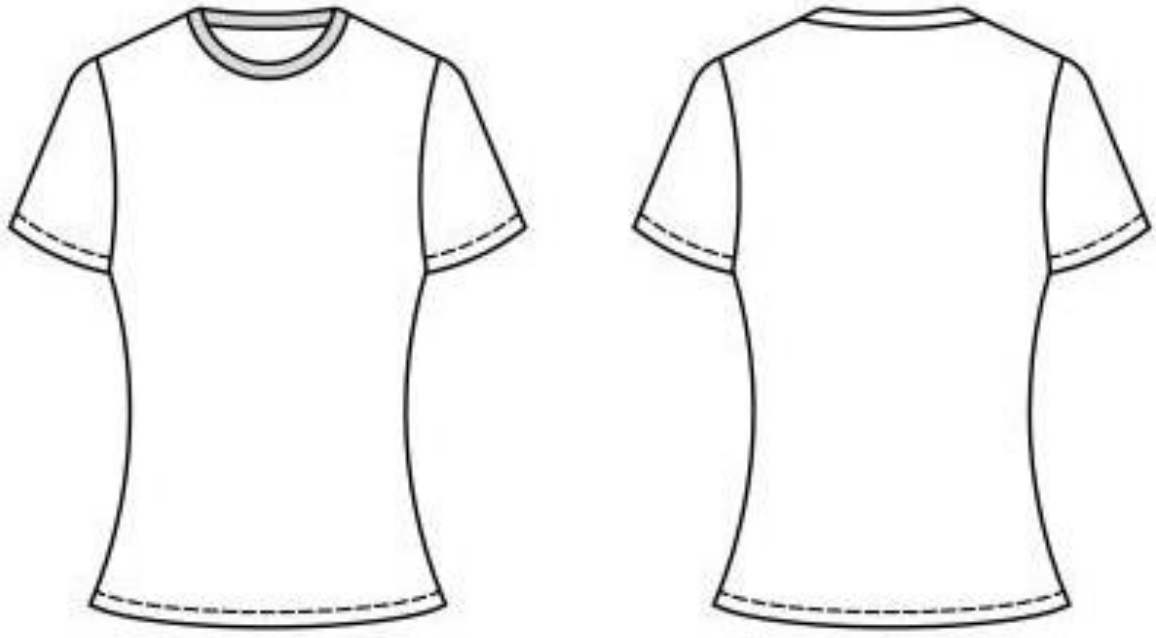


Figure 6 Women's Round Neck T-Shirt

5 MATERIALS

5.1 The material used for manufacturing T-Shirts shall be as per Table 1.

Table 1 Blend Ratio for Different Classes of T-Shirts
(Clause 5.1)

Sl No.	Classes	Fabric Composition	
		Fabric Material	Blend Ratio
(1)	(2)	(3)	(4)
(i)	Class 1	Cotton	100 percent Cotton
(ii)	Class 2	Cotton/Polyester	50 percent Cotton, 50 percent Polyester
(iii)	Class 3	Cotton/Spandex	95 percent Cotton, 5 percent Spandex
(iv)	Class 4	Polyester	100 percent Polyester

5.2 The material used in manufacturing of T-Shirt shall be tested as per Annex B.

6 MANUFACTURE

6.1 Seams and Stitches

For stitching various portions of T-shirt, the type of stitches shall be as given in Table 2. In case of dyed/printed T-shirts the sewing thread should be matching shade.

The count of sewing thread used in needle shall be one stand of 9.8 tex x 3(60c/3), the count of sewing thread used in loops shall be, Two stands of (15 tex x 2) or any other suitable value as per the agreement between the buyer and the seller.

Table 2 Seam and Stitches

(Clause 6.1.1)

Sl No.	**Type of Stitch**	**Position to be Stitched**	**Thread in Needle 9.8 tex x 3(Ne 60/3)**	**Thread in Looper**	**Stitch Class**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
(i)	Overlock Stitch	Side Seams, Shoulder Seams	P/C Thread	Polyester or Cotton Thread Two stands of 15 tex x 2	512
(ii)	Cover stitch	Sleeve Openings	Spun Polyester Thread	Polyester Thread Two stands of 15 tex x 2	406
(iii)	Zigzag Stitch	Neckline, Armholes	Polyester Thread	Polyester Thread Two stands of 15 tex x 2	304
(iv)	Flatlock Stitch	Decorative Seams, Hems	Polyester Thread	Polyester Thread Two stands of 15 tex x 2	607
(v)	Chain Stitch	Side Seams	Polyester Thread	Polyester Thread Two stands of 15 tex x2	103
(vi)	Lockstitch	Labels, Pockets	Polyester or Cotton Thread	Polyester Thread Two stands of 15 tex x 2	301
NOTE — The number of stitches shall not be less than 4 stitches per inches.					

6.2 **Reinforcement —** The seams of the T-Shirts at shoulders shall be suitably reinforced.

6.3 The collar and sleeves at the hem may be made from rib knitted fabrics, as agreed to between the buyer & seller.

6.4 The dimensions of pocket(s), collar and number of buttons to be provided (for Type A) and the length and width of placket shall be as agreed to between the buyers and the sellers.

6.5 If desired by the buyers, slide fasteners or press buttons of good quality may be provided in place of buttons.

6.6 The hem or folding at bottom sleeves and neck shall be evenly and securely stitched and the minimum dimensions shall be as agreed to between the buyers and the sellers.

6.7 The T-shirt may also be screen or transfer printed with motifs or design as agreed to between the buyer & seller.

6.8 Freedom from Defects

The sports t-shirt should be free from manufacturing defects, such as mends, ladders, dropped stitches, improper reinforcement, missed stitches at the stitched parts, badly sewn and mispositioned buttons, malformed button holes, chemical damages and dyeing defects, such as streakiness and uneven dyeing.

7 REQUIREMENTS

7.1 The construction of fabric can vary depending on the fabric weight, type of yarn and knitting technique. However, knit fabric used in T-Shirts shall be as per Table 3.

Table 3 Typical Constructional details of Knitted Fabric
(Clause 7.1)

Sl No.	Fabric Type	GSM (g/m^2)	Gauge
(i)	Single Jersey	120-160	24-28
(ii)	Rib Knit	180-220	24-28
(iii)	Interlock Knit	200-250	18-22
(iv)	Pique Knit	180-220	24-28

8 DIMENSIONS

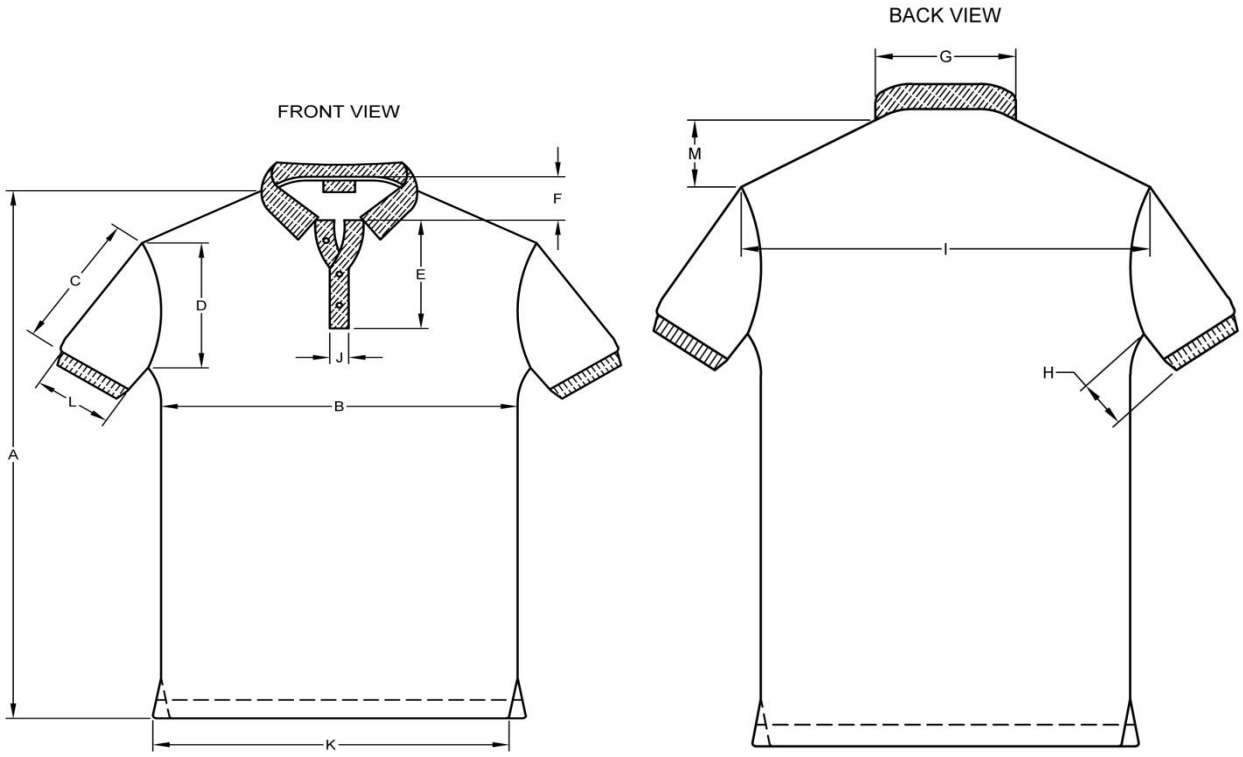
8.1 Men's Wear Polo T-Shirt Size Chat

8.1.1 The Size dimension for Men's Polo T-shirt shall be as per Table 4 & figure 1.

Table 4 Size Dimension for Men's Wear Polo T-Shirt

Sl No.	Size	Length	Chest	Sleeve Length	Armhole Straight	Placket Length	Front Neck Drop	Neck Width	Under Arm Length	Across Shoulder	Placket Width	Bottom Width	Sleeve Opening	Back Neck Drop
		A	B	C	D	E	F	G	H	I	J	K	L	M
(1)	(2)	(3)	(4)	(5)	(6)	(	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(i)	S	27.25	19.5	6.5	8.7	5	3.6	6.75	2.75	16.5	1	19.5	10	.625
(ii)	M	28	20.5	6.7	9	5	3.7	7	3	17	1	20.5	11	.625
(iii)	L	28.75	21.5	7	9.2	5	3.8	7.25	3.25	17.5	1	21.5	12	.625
(iv)	XL	29.5	22.5	7.2	9.5	5	4	7.5	3.5	18	1	22.5	13	.625
(v)	XX	30.25	23.5	7.5	9.7	5	4.1	7.75	3.75	18.5	1	23.5	14	.625
NOTE — All Measurements are in Inches.														

Men’s Polo T-shirt Figure 1



LEGEND		
Sl No.	**Front**	**Back**
(i)	A- FRONT LENGTH FROM HPS	(x) G- NECK WIDTH
(ii)	B- CHEST WIDTH	(xi) H- UNDER ARMLENGTH
(iii)	C- SLEEVE LENGTH	(xii) I- ACROSS SHOULDER
(iv)	D- ARMHOLE STRAIGHT	(xiii) M- BACK NECK DROP
(v)	E- PLACKET LENGTH	
(vi)	F- FRONT NECK DROP	
(vii)	J- PLACKET WIDTH	
(viii)	K- BOTTOM WIDTH	
(ix)	L- SLEEVE OPENING	

8.2 Women's Polo T-shirt Size Chart

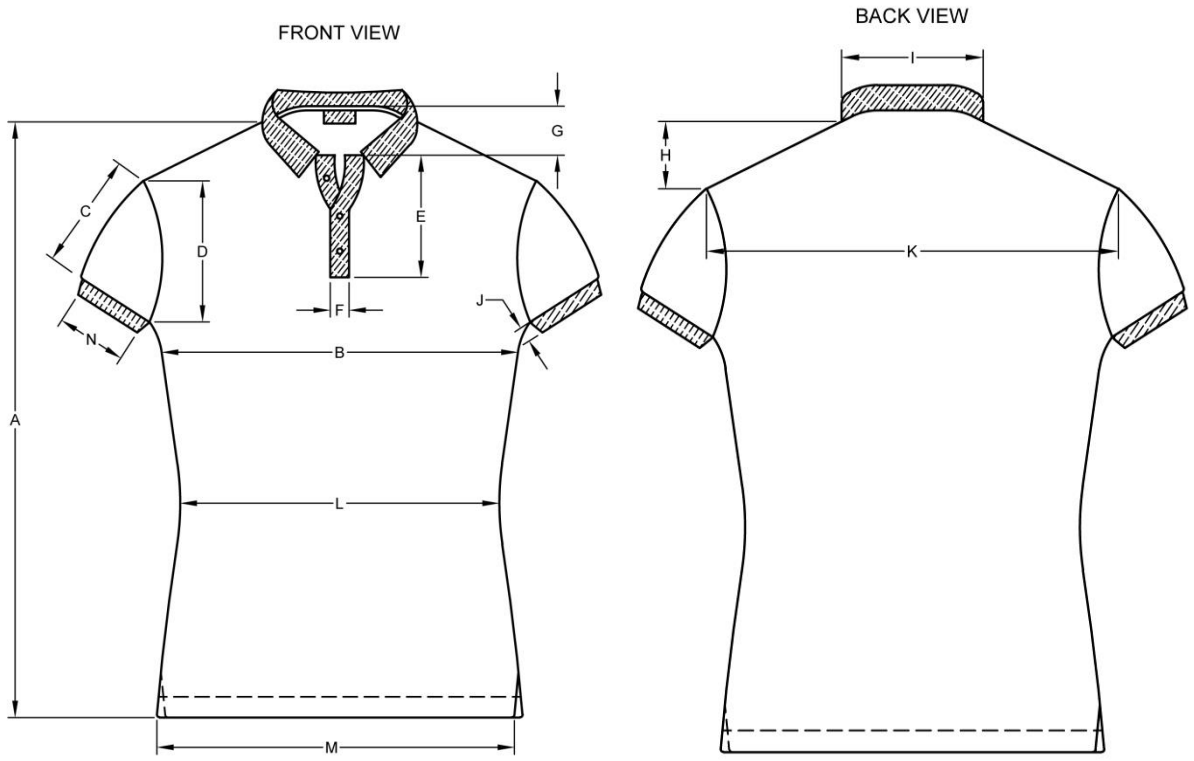
8.2.1 The Size Dimensions of Women's Polo T-Shirt shall be as per Table 5 and Figure 2.

Table 5 Size Dimension of Women's Polo T-shirt
(Clause 8.2.1)

Sl No.	**Size**	**Length of T-Shirt**	**Width Across Chest**	**Sleeve Length**	**Armhole Straight**	**Placket Length**	**Placket width**	**FRONT NECK DROP**	**Back Neck Drop**	**Neck Width**	**Under Arm Length**	**Across Shoulder**	**Waist**	**Bottom Width**	**Sleeve Opening**
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(i)	6	24	15.75	4.5	7.5	5	1	3.25	.625	6	2	13.5	15.5	15.75	6
(ii)	8	24.5	16.5	4.75	7.75	5	1	3.5	.625	6.25	2	14	16.25	16.5	6.5
(iii)	10	25	17.25	5	8	5	1	3.75	.625	6.5	2	14.5	17	17.25	7
(iv)	12	25.5	18	5.25	8.25	5	1	4	.625	6.75	2	15	17.75	18	7.5
(v)	14	26	18.75	5.5	8.5	5	1	4.25	.625	7	2	15.5	18.5	18.75	8
(vi)	16	26.5	19.5	5.75	8.75	5	1	4.5	.625	7.25	2	16	19.25	19.5	8.5
(vii)	18	27	20.25	6	9	5	1	4.75	.625	7.5	2	16.5	20	20.25	9

NOTE — All Measurements are in Inches.

Figure 2 Women's Polo T-shirt



LEGEND		
Sl No.	**FRONT**	**BACK**
(i)	A- LENGTH FROM HPS	(x) H- BACK NECK DROP
(ii)	B- CHEST LENGTH	(xi)I- NECK WIDTH
(iii)	C- SLEEVE LENGTH	(xii) J- UNDER ARM LENGTH
(iv)	D- ARMHOLE STRAIGHT	(xiii) K- ACROSS BACK
(v)	E- PLACKET LENGTH	(xiv) N- SLEEVE OPENING
(vi)	F- PLACKET WIDTH	
(vii)	G- FRONT NECK DROP	
(ix)	L- WAIST	
(x)	M - BOTTOM WIDTH	

8.3 Men's V-neck T-shirt Size Chart

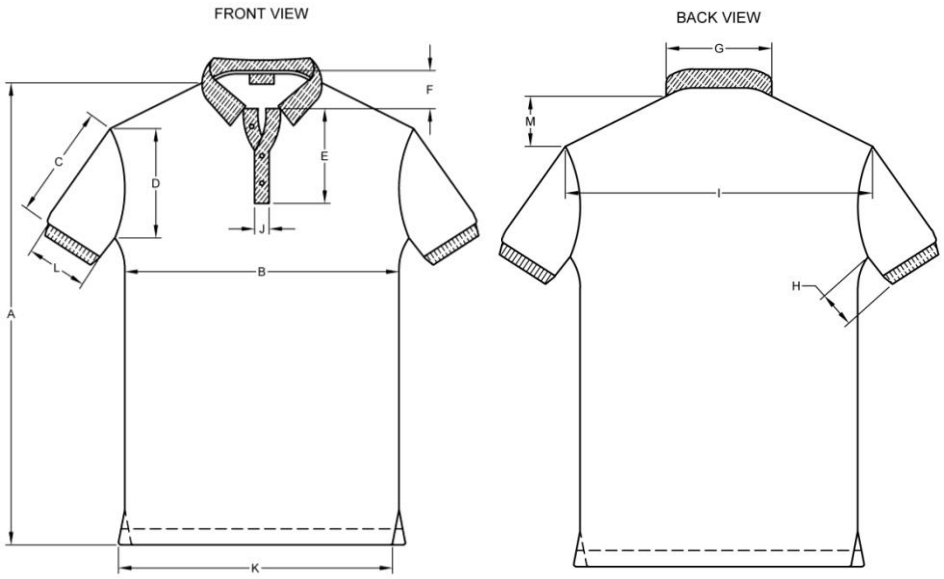
8.3.1 The Size dimension for men's round-neck T –Shirt shall be as per Table 6 and Figure 3.

Table 6 Size Dimension for V-Neck T-Shirt

(Clause 8.3.1)

Sl No.	**Size**	**Length**	**Chest**	**Across Shoulder**	**Armhole Straight**	**Sleeve Length**	**Neck Width**	**FrontNeck Drop**	**Neck Rib Width**	**Front Neck Drop**	**Under Arm Length**	**Sleeve Opening**	**Bottom width**
		A	B	C	D	E	F	G	H	I	J	K	L
1	2	3	4	5	6	7	8	9	10	11	12	13	14
(i)	S	27.25	19	16.5	8.75	7.5	7.5	4.125	0.75	4.00	2.75	6	19
(ii)	M	28	20	17	9	8	8	4.25	0.75	4.13	3.00	6.5	20
(iii)	L	28.75	21	17.5	9.25	8.5	8.5	4.375	0.75	4.25	3.25	7	21
(iv)	XL	29.5	22	18	9.5	9	9	4.5	0.75	4.37	3.50	7.5	22
(v)	XXL	30.25	23	18.5	9.75	9.5	9.5	4.675	0.75	4.50	3.75	8	23
NOTE — All Measurements are in Inches.													

Figure 3 Men's V-Neck T-shirt



LEGEND		
Sl No.	**FRONT VIEW**	**BACK VIEW**
(i)	LENGTH FROM HPS	(x) BACK NECK DROP
(ii)	ACROSS BACK	(xi) NECK WIDTH
(iii)	CHESTWIDTH	(xii) RIB WIDTH
(iv)	BOTTOM WIDTH	(xiii) ARM HOLE STRAIGHT
(v)	SLEEVE LENGTH	(xiv) UNDER ARM SLEEVE LENGTH
(vi)	FRONT NECK DROP	
(vii)	SLEEVE OPENING	
(viii)	PLACKET LENGTH	
(ix)	PLACKET WIDTH	

8.4 Women's V- Neck T-shirt Size Chart

8.4.1 The Size Dimension for Women's V-Neck T-Shirt shall be as per table 8 and Figure 4.

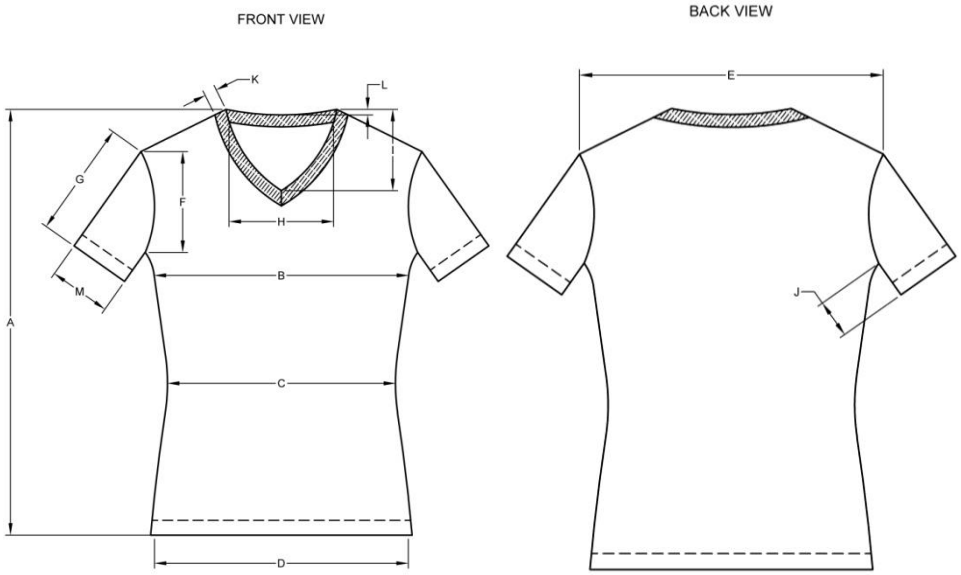
Table 8 Size dimension for Women's V-Neck T-Shirt's

(Clause 8.4.1)

Sl No.	Size	Length of T-Shirt	Width Across Chest	Waist	Bottom Width	Across Shoulder	Armhole Straight	Sleeve Length	Neck Width	Front Neck Drop	Under arm Sleeve Length	Neck Rib Width	Back Neck Drop	Sleeve Opening
		A	B	C	D	E	F	G	H	I	J	K	L	M
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(i)	6	21.5	16	15	16	14	7	10.75	8.75	4	2.75	0.75	0.62	6
(ii)	8	22	17	16	17	14.5	7.5	11.13	9.13	4.13	3	0.75	0.62	6.5
(iii)	10	22.5	18	17	18	15	8	11.5	9.5	4.25	3.25	0.75	0.62	7
(iv)	12	23	19	18	19	15.5	8.5	11.88	9.88	4.38	3.5	0.75	0.62	7.5
(v)	14	23.5	20	19	20	16	9	12.25	10.25	4.5	3.75	0.75	0.62	8
(vi)	16	24	21	20	21	16.5	9.5	12.63	10.63	4.63	4	0.75	0.62	8.5
(vii)	18	24.5	22	21	22	17	10	13	11	4.75	4.25	0.75	0.62	9
NOTE — All Measurements are in Inches														

Women's V-Neck T- Shirt Figure 4

FRONT VIEW **BACK VIEW**



LEGEND		
Sl No.	**FRONT VIEW**	**BACK VIEW**
(i)	A- LENGTH FROM	(x) K-RIBWIDTH
(ii)	E- ACROSS SHOULDER	(xi)L-BACK NECK DROP
(iii)	B- CHESTWIDTH	(xii) J-UNDER ARM LENGTH
(iv)	D- BOTTOM WIDTH	E- ACROSS SHOULDER
(v)	G-SLEEVE LENGTH	
(vi)	M-SLEEVE OPEN	
(vii)	I-FRONT NECK DROP	
(viii)	F-ARM HOLE DEPTH	
(ix)	H- NECK WIDTH	

8.5 Men's Wear Round Neck T-Shirt Size Chart

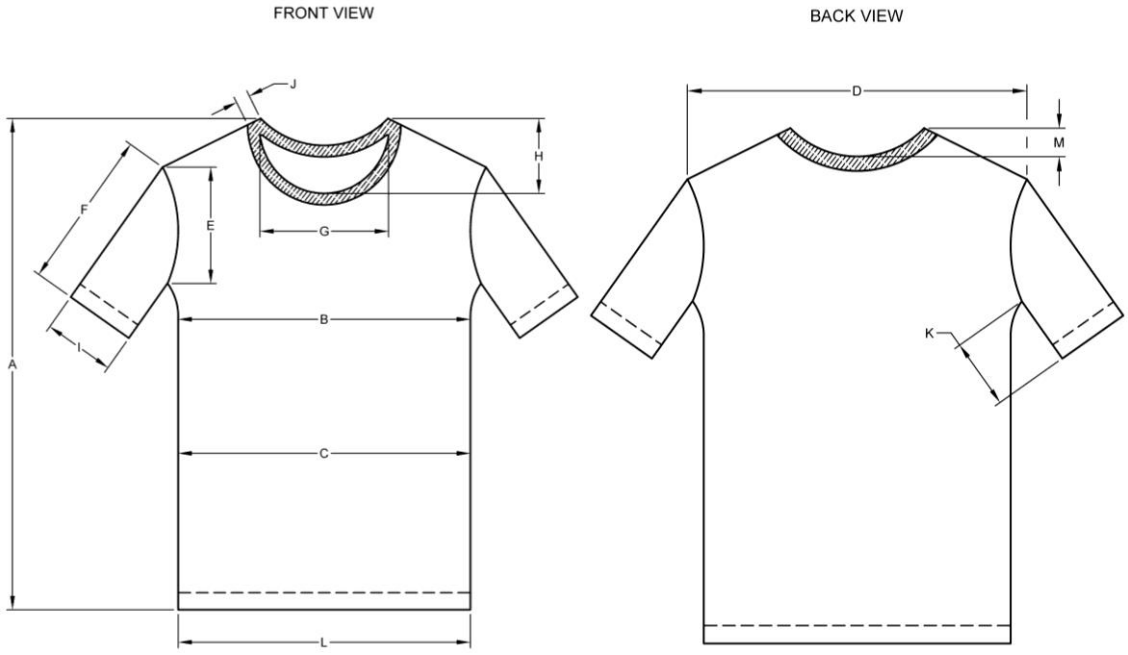
8.5.1 The Size dimension for men's round-neck T –Shirt shall be as per Table 9 and Figure 5.

Table 9 Size Dimensions for Round Neck T-Shirt

(Clause 8.5.1.)

Sl No.	Size	Length	Chest	Waist	Across Shoulder	Armhole Straight	Sleeve Length	Neck Width	Front Neck Drop	Sleeve opening	Neck Rib Width	Under Arm Length	Bottom Width	Back neck drop
		A	B	C	D	E	F	G	H	I	J	K	L	M
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(i)	S	27.	19	18	16.5	8.75	7.5	7.75	3.63	5.75	0.75	2.75	19	.62
(ii)	M	28	20	19	17	9	8	8	3.75	6.00	0.75	3.00	20	.62
(iii)	L	28.	21	20	17.5	9.25	8.5	8.25	3.88	6.25	0.75	3.25	21	.62
(iv)	XL	29.	22	21	18	9.5	9	8.5	4.00	6.5	0.75	3.50	22	.62
(v)	XX	30.	23	22	18.5	9.75	9.5	8.75	4.13	6.75	0.75	3.75	23	.62
NOTE — All Measurements are in Inches														

Men's Round Neck T-Shirt Figure 5.



LEGEND		
Sl. No.	**FRONT VIEW**	**BACK VIEW**
(i)	A-LENGTH FROM HPS	(x) G-NECK WIDTH
(ii)	B-CHESTWIDTH	(xi) M-BACK NECK DROP
(iii)	C-WAIST	(ix) K-UNDER ARM LENGTH

(iv)	L- BOTTOM WIDTH	(x) D- ACROSS SHOULDER
(v)	F- SLEEVE LENGTH	
(vi)	I- SLEEVE OPEN	
(vii)	H-FRONT NECK DROP	
(viii)	E- ARM HOLE DEPTH	
(ix)	J-RIB WDTH	

8.6 Women's Knit Round Neck T-shirt Size Chart

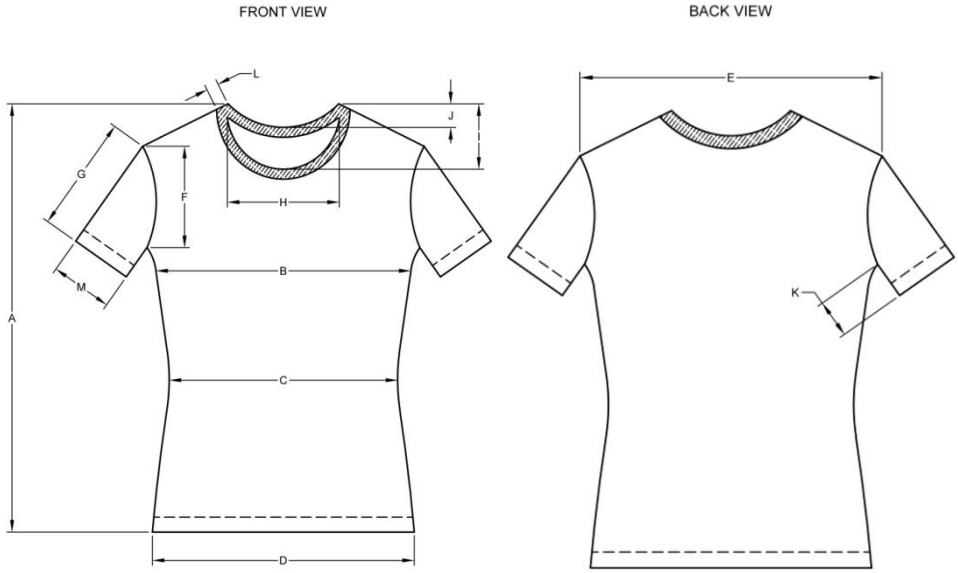
8.6.1 The size dimension for Women's Round Neck T-shirt shall be as per Table 10 & Figure 6.

(Clause 8.6.1)

Table 10 Size Dimension For Women's Round Neck T-Shirt

Sl No.	Size	Length of T-Shirt	Chest	Waist	Bottom Width	Across Shoulder	Armhole Straight	Sleeve Length	Neck Width	Front Neck Drop	Back Neck Drop	Neck Rib Width
		A	B	C	D	E	F	G	H	I	J	K
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(i)	6.00	21.50	16.00	15.00	16.00	14.00	7.00	10.75	8.75	3.75	.62	.75
(ii)	8.00	22.00	17.00	16.00	17.00	14.50	7.50	11.13	9.13	3.88	.62	.75
(iii)	10.0	22.50	18.00	17.00	18.00	15.00	8.00	11.50	9.50	4.00	.62	.75
(iv)	12.0	23.00	19.00	18.00	19.00	15.50	8.50	11.88	9.88	4.13	.62	.75
(v)	14.0	23.50	20.00	19.00	20.00	16.00	9.00	12.25	10.25	4.25	.62	.75
(vi)	16.0	24.00	21.00	20.00	21.00	16.50	9.50	12.63	10.63	4.38	.62	.75
(vii)	18.0	24.50	22.00	21.00	22.00	17.00	10.00	13.00	11.00	4.50	.62	.75
NOTE — All Measurements are in Inches												

Women's Knit Round Neck T-shirt Figure 6.



LEGEND		
Sl No.	**FRONT VIEW**	**BACK VIEW**
(i)	A-LENGTH FROM HPS	(ix)NECK WIDTH
(ii)	E-ACROSS SHOULDER	(x)RIBWIDTH
(iii)	B-CHESTWIDTH	(xi) BACK NECK DROP
(iv)	D-BOTTOM WIDTH	(xii) UNDER ARM LENGTH
(v)	G-SLEEVE LENGTH	(xiii)NECK RIB WIDTH
(vi)	M-SLEEVE OPENING	
(vii)	I-FRONT NECK DROP	
(viii)	F-ARM HOLE DEPTH	

9 OTHER REQUIREMENTS

9.1 The T-Shirt shall satisfy the other requirements as given in table 11.

Table 11 Requirements of T-shirt

Sl No.	Characteristic	Requirement	Method of Test, Ref to IS/Annex of this standard
(i)	Dimensional Change due to relaxation,		
	A) Wales, min	3.5 percent	C-1 (*SEE* Annex C)
	B) Courses, min	3.5 percent	C-1 (*SEE* Annex C)
(ii)	pH Value of aqueous extract(cold)	6.0 to 8.0	IS 1390
(iii)	Color fastness of dyed Sport T-shirts to		
	a) Light	4 or better	IS 2454 OR IS 686
	b) Washing, Test C (3):		
	1) Change in colour	4 or better	IS/ISO 105-C10
	2) Staining on Adjacent fabric	4 or better	
	c) Perspiration (Acidic and Alkaline):		
	1) Change in colour	4 or better	IS/ISO 105 E04
	2) Staining on Adjacent fabric	4 or better	
	d) Rubbing:		IS/ISO 105- X12:2016
	1) Dry	4 or better	
	2) Wet	3 or better	
(iv)	Pilling Resistance Test (upto 1000 rev)	3 or better	IS 10971 Part 2
(v)	Spirality after laundering (as per wash) Max care instruction)	4 percent	IS/ISO 16322-3
NOTE — In case of dispute colorfastness to light shall be determined by the method prescribed in IS 686.			

9.1.1 The material used for product packaging shall be reusable or made from recyclable or biodegradable materials.

9.1.2 Fatty alcohol based non-ionics as emulsifier should be used wherever required.

9.1.3 Polyhalogenated based phenol fire retardants shall not be used.

9.4 Sealed Sample

If in order to illustrate or specify the indeterminable characteristics, such as general appearance, lustre, feel and colour of sports shirt/t-shirt, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

9.4.1 The custody of the sealed sample shall be a matter of prior agreement between the buyers and the sellers.

10 MARKING

10.1 A suitable cloth label made of woven cotton, taffeta satin or fusing type shall be fastened or fused to each sport shirt/t-shirt at the inside of the neck portion on which the following shall be indicated by printing:

i) Size and type of sports shirt/t-shirt;

ii) Type of fabric namely, plain or interlock;
iii) Indication of the source of manufacture;
iv) Washing instructions, and
v) Any other information required by the buyer.
NOTE — The Color form the label shall not bleed on to the t-shirt during storage or use.

11 BIS Certification Marking
The Product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed there under, and the products may be marked with the Standard Mark.

12 PACKING
12.1 The T-shirt shall be packed in bales or cases in accordance with **IS 3325** or **IS 3086** as the case may be.

13 SAMPLING AND CRITERIA FOR CONFORMITY

13.1 The sampling procedure gives desired protection to the buyers and the sellers provided the lot submitted for inspection is homogeneous. To achieve this, the manufacturers shall maintain system of process control at all stages of manufacture ensuring that t-shirt tendered by him for inspection comply with the requirements of this standard in all respects.
NOTE — For effective process control, the use of statistical quality control technique is recommended and helpful guidance may be obtained in this respect from IS 397 (Part 1).
13.2 In any consignment all the sports shirt/t-shirt of the same size and manufactured from the same count and quality of yarn and delivered to a buyer against one dispatch note shall constitute a lot.
13.2.1 The conformity of a lot to the requirements of this specification shall be determined on the basis of the tests carried out on the samples selected from the lot.
13.3 All the t-shirt be examined for visual inspection, dimension, freedom from defect, gsm etc. Any sports shirt/t-shirt failing in one or more of the above requirements shall be termed as defective. The lot shall be considered as conforming to the above requirements, if the total number of defectives found in the sample is less than or equal to the acceptance number given in column 4 of Table 8. Otherwise, the lot shall be rejected.
13.3.1 If the samples are found satisfactory, samples will be drawn as per column 5 for physical testing, from the sample originally drawn as per column 3 of Table 11.
13.3.2 For chemical parameters sample to be drawn as per column 7 randomly from the samples as per column 5 of Table 11.
13.3.3 Acceptance number mentioned in the physical parameter (Coloumn6) is inclusive of chemical parameter (coloumn8) that is, total acceptance number should not exceed acceptance number mentioned in column 6 of Table 12.

Table 12 Sample Size and Permissible Number of Non Conforming T-shirts

Table 12 Sample Size of T-Shirts

Sl No.	Lots Size in Nos	Visual Inspection , Dimension, freedom from Defect, GSM etc at the time of sampling		Physical Parameters		Chemical Parameters	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		sample size	Acceptance No				
(i)	upto 280	13	1	13	1	5	0
(ii)	281-500	20	2	13	1	5	0
(iii)	501-1200	32	3	20	2	5	0
(iv)	1201-3200	50	5	32	3	8	1
(v)	3201-10000	80	7	32	3	8	1

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

Sl No.	*IS No.*	*Title*
1)	IS 1390 : 2022 ISO 3071 : 2020	Textiles — Determination of pH of Aqueous Extract (*third revision*)
2)	IS 1481 : 1970	Specification for metric steel scales for engineers (*first revision*)
3)	IS 2500 (Part 1) : 2000 ISO 2859-1:1999	Sampling procedures for inspection by attributes: Part 1 sampling schemes indexed by acceptance quality limit (AQL) for lot - By - Lot inspection (*third revision*)
4)	IS 7703 (Part 1) : 1990	Methods of Test For Man-Made Fibres Continuous Filament Flat Yarn — Part 1 Linear density (*first revision*)
5)	IS 14563 : 2021 ISO 14184 -1 : 2011	Textiles — Determination of Formaldehyde Part 1 Free and Hydrolyzed Formaldehyde (Water Extraction Method) (*first revision*)
6)	IS 15570 : 2005	Textiles — Method of test — Detection of banned azo colorants in coloured textiles
7)	IS 16914 (Part 2) : 2018 ISO 16373-2 : 2014	Textiles — Dyestuffs Part 2 General Method for the Determination of Extractable Dyestuffs including Allergenic and Carcinogenic Dyestuffs (Method using Pyridine-Water)
8)	IS 16914 (Part 3) : 2018 ISO 16373-3 : 2014	Textiles — Dyestuffs Part 3 Method for Determination of Certain Carcinogenic Dyestuffs (Method using Triethylamine / Methanol)
9)	IS/ISO 105-B01 : 2014 ISO 105-101 : 2014	Textiles — Tests for Colour Fastness — Part B01 Colour Fastness to Light: Daylight
10)	IS/ISO 105-B02 : 2014 ISO 105-B02 : 2014	Textiles — Tests for Colour Fastness — Part B02 Colour Fastness to Artificial Light: Xenon Arc Fading Lamp Test
11)	IS/ISO 105-C10 : 2006	Textiles — Tests for Colour Fastness — Part C10 Colour Fastness to Washing With Soap Or Soap And Soda
12)	IS/ISO 105-E02 : 2013	Textile — Tests for Colour Fastness — Part E02 Colour Fastness to Sea Water
13)	IS/ISO 105- X12:2016	Textiles – Tests for colour fastness Part X12 Colour

		fastness to rubbing (first revision)
14)	IS 10099 : 2020 ISO 3759 : 2011 (Active)	Textiles – Preparation marking and measuring of fabric specimens and garments in tests for determination of dimensional change (first revision)
15)	ISO 6330	Textiles — Domestic washing and drying procedures for textile testing
16)	IS/ISO 16322 (1-3)	Determination of spirality of knitted fabrics post laundering.
17)	IS 1966-1 (2009)	Textiles - Bursting Properties of Fabrics - Determination of Bursting Strength and Bursting Distension, Part 1: Hydraulic Method [TXD 1: Physical Methods of Tests]
18)	IS 1670 (1991)	Textiles - Yarn - Determination of breaking load and elongation at break of single strand [TXD 1: Physical Methods of Tests].
19)	IS0-8559-1	Textiles – Size designation of clothes – Anthropometric definitions for body measurement.
20)	IS0-8559-2	Textiles Size designation of clothes Part 2: Primary and secondary dimension indicators.
21)	IS0-8559-3	Textiles Size designation of clothes Part 3: Methodology for the creation of body measurement tables and intervals.
22)	IS 9469 : 2003	Textiles – Fabric, cotton, plain (Single jersey) knitted – Specification (second revision).
23)	IS 13003: 1991	Textiles - Fabric, cotton, interlock knitted – Specification.
24)	ISO 1833-1:2020	Textiles -- Quantitative chemical analysis -- Part 1: General principles of testing.
25)	IS 667: 1981	Textiles fibers - Methods for identification of textile fibres (first revision).
26)	IS 3596 : 1967	Glossary of terms relating to hosiery.
27)	IS 6359 : 2023	Method for conditioning of textiles.
28)	IS 3086 : 1965	Code for seaworthy packaging of cotton hosiery yarn and goods.
29)	IS 3325 : 1965	Code for inland packaging of cotton hosiery yarn and goods.
30)	IS 3456 : 2022	Method for determination of water-soluble. matter of textile materials (*First Revision*).

ANNEX B

(*Clause* 5.2)

METHOD FOR DETERMINATION OF POLYESTER, COTTON AND SPANDEX

B-1 IDENTIFICATION OF POLYESTER

The material used for manufacture is dipped in any one of the following reagents:

a) Solution of crystallized trichloroacetic acid/chloroform reagent, prepared at a mass ratio 1:1.
b) Benzyl Alcohol at temperatures of 150°C.
c) m-Cresol at boil.

B-1.1 If the material used for manufacture is polyester, it shall dissolve in any one of the above mentioned reagents.

B-2 IDENTIFICATION OF COTTON

The material used for manufacture is dipped in any one of the following reagents:

a) Cotton dissolves in Schweizer's Reagent ($Cu(OH)_2$ in ammonia), a specific test for cellulose.
b) Cotton will dissolve in concentrated sulfuric acid, indicating the presence of cellulose.
c) Boil the fabric sample in a 5% NaOH solution. Cotton will degrade and lose its structure in strong NaOH solutions.

B-2.1 If the material used for manufacture is cotton, it shall dissolve in any one of the above mentioned reagents.

B-3 IDENTIFICATION OF SPANDEX

The material used for manufacture is dipped in any one of the following reagents:

a) Spandex will dissolve in DMF (Dimethylformamide) or DMAc, unlike many other fibers.
b) Spandex is resistant to formic acid, while some other fibers may dissolve or degrade.
c) Spandex will degrade but not dissolve completely in sulfuric acid, often swelling and losing elasticity.
d) Spandex shows specific thermal transitions, such as a melting point around 240-270°C.

B-3.1 If the material used for manufacture is Spandex, it shall dissolve in any one of the above mentioned reagents.

Annexure C

Method of Tests

C - 1 WALES AND COURSES

C - 1.1 Take leggings from the test sample. Lay it flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it.

C - 1.1.1 Count the number of wales including any fraction on one side of the leggings. Similarly count the number of wales including any fraction on other side of the legging and add the two values.

C - 1.1.2 Count the number of courses in 10 cm including any fraction on both sides of the leggings and calculate the average courses per decimetre.

C- 5 DIMENSIONAL CHANGE (Due To Relaxation)

C-5.1 Marking the Test Specimens. Take a legging from the test sample. Mark centrally on it, by means of indelible ink or fast dyed cotton sewing, a set of three points, namely, *X*,*Y* and, *Z* so that,

All the three points are on the same wale,

point *X* is on the top portion;

point *Y* is on the heel gore line; and

Point *Z* is on the toe portion.

C - 5.2 Procedure

C - 5.2.1 Place the test specimen on a glass plate. Remove by hand all the creases and wrinkles without stretching the specimen. Place another glass plate on the specimen. Measure separately, correct to the nearest millimeter, the distance between *X* and *Y* and that between *Y* and *Z*.

C - 5.2.2 Lay the test specimen flat in a tray of suitable size, having a depth of 10 cm. Soak the specimen under the head of 25mm of water containing 0.5 % of suitable wetting agent at room temperature for two hours. Drain out the water and remove the test specimen carefully so that it is not stretched. Lay the specimen flat on a smooth surface, remove the excess water by absorbent material and dry it at room temperature.

Note *– Removal of excess water by wringing the test specimen is not permitted*

C - 5.2.3 After drying, conditioned the test specimen to moisture equilibrium at room temperature, Place it on the glass plate, carefully remove wrinkles and creases and place another glass plate on it. Measure, correct to the nearest centimeter, the distance between *X* and *Y* and that between *Z*

C- 5.3 Calculation

C - 5.3.1 calculate separately, correct to one place of decimal, the percentage change between the points *X* and *Y* and that between *Y* and *Z* by following formula: $S = \frac{a-b}{a} \times 100$

Where;

S = dimensional change (due to relaxation) percent;

a = distance between the two points X and Y, or Y and Z, before soaking; and

b = distance between the same points after soaking.

C-5.3.2 Calculate the average dimensional change.

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDRADS

Draft for comments only Doc : TXD 10 (26850) WC
November 2024

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भारतीय मानक मसौदा

वस्त्रादि - सिंगल जर्सी, कॉटन, सिंथेटिक और मिश्रित, महिलाओं के स्टॉकिंग्स - विशिष्टता

(Draft *Indian Standard*)

TEXTILES – SINGLE JERSEY, COTTON, SYNTHETIC AND BLENDED, WOMEN'S STOCKINGS – SPECIFICATIONS

Hoisery Sectional Committee, TXD 10	Last date for receipt of comments January 2024

FOREWORD
(*Formal clauses will be added later*)

In the world of fashion, few garments hold as much power to transform an outfit and boost confidence as stockings. From the classic sheer styles to bold colors and intricate patterns, stockings are not just functional pieces; they are an essential part of a woman's wardrobe that allows for self-expression and creativity. Stockings have symbolized elegance and sophistication, evolving with trends while remaining a staple of femininity. They enhance the beauty of the legs, adding a touch of allure and refinement to any ensemble. From the classic allure of sheer nylon to the bold statements made by vibrant patterns and textures, stockings have the unique ability to elevate an outfit, inspire confidence, and reflect individuality. Whether paired with a timeless dress

for a formal occasion or worn casually to bring a touch of sophistication to everyday attire, stockings transcend the boundaries of fashion, offering versatility and charm.

1 SCOPE

1.1 This standard describes the constructional details and other closely related particulars of Single jersey, Rib knitted Cotton, Synthetic and Blended Female Stockings.

1.2 This standard does not take into consideration such as appearance, lustre, handle, finish type, whiteness index or shade of the stockings.

2 REFERENCES

2.1 The standard listed in Annex A contains provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subjected to revision and parties to agreements based on this standard are encouraged investigating the possibility of applying the most editions of these standards.

2.2 For the purpose of this standard the list of referred standards given in **Annex A**, shall apply.

2.3 For the purpose of this standard the definitions of yarn are given in **Annex B**, shall apply.

2.4 For the purpose of this standard the definitions given in IS 1324:1966, ISO 1833 (1 - 28), given in **Annex C** and **Annex D** shall apply.

3 TERMINOLOGY

Stockings are a type of hosiery that covers the foot and leg, usually extending up to the thigh or just below the knee. They are worn for fashion, warmth, or modesty, and come in various styles, materials, and thicknesses. Thigh stockings are a type of hosiery that extends from the foot up to the mid-thigh.

4 MATERIALS

4.1 Yarn

The yarn count for Cotton shall be from 20s Ne – 40s Ne (30.0 Tex – 15.0 Tex) and for multifilament synthetic staple and blended yarns shall be from 15D – 200D. Apart from this specification, any other yarn count in compliance with the buyer & seller agreement shall be used for knitting, splicing, and linking of the stocking.

4.2 Identification of Textile Fibres

The material used for manufacturing shall be tested as per **Annex C**.

5 MANUFACTURE

5.1 Shape

The shape of the stocking shall generally be as shown in Figure 1.

5.2 Knitting

The stocking shall be knitted on circular and or flatbed knitting machine. The top of the stockings shall be rib-knitted in 1x1 rib stitches. The welt at the beginning shall be a four course welt knitted either in one step or in two steps of the two courses each.

5.2.1 The leg and instep of the stockings shall be knitted in single/double jersey or as per agreement with the buyer or user whichever the case maybe.

5.2.2 The heel, sole, toe, and top of the stocking shall be 5x1 rib knitted and or as per agreement with the buyer/user whichever the case maybe.

5.2.3 The machine particulars for socks knitting machine mentioned in Table 1 shall apply.

Table 1 Requirement for Stocking Manufacture (*Clause 5.1*)

Sl. No.	Gauge of Machine*	Approximate Count of Yarn - Cotton Count (Tex)	Mass/m^2 Min (g)
(1)	(2)	(3)	(4)
1	6 - 8	20s (30.0Tex) – 28s (21.0 Tex)	250 - 380
2	10 - 18	30s(20.0 Tex) – 36s(16.0 Tex)	150 - 200
3	18 - 24	40s(15 .0 Tex) – 50s(12 Tex)	100 - 150
NOTE - As determined by the number of needles per 2.54 CM			

5.3 Splicing

The stockings shall be spliced at heal and toe portion. The splicing should be uniform and the spliced portion shall be free from creases or folds.

5.4 Linking

The stockings shall be securely linked over or under the toe. The linking shall be elastic, smooth and free from knots. The length of the free ends of the linking yarn and other loose ends, if any, shall be neither less than 13mm nor more than 25mm. the linking shall not give way when the stockings are stretched without breaking to the full extent of the stretch-ability of stockings.

5.5 Freedom from Defects

The stockings shall be reasonably free from the manufacturing defects, such as large mends, ladders, dropped stitches, holes, improper splicing and chemical damages. The dyed and bleached stockings shall be free from dyeing defects, such as streakiness and uneven dyeing and the white stockings from blueing agents.

6 REQUIREMENTS

6.1 Dimension and Mass

The stocking shall conform to the requirements of **Table 2** read with the **Figure 1**.

NOTE – Size of stockings is denoted by a number which is the numerical value of the foot length in centimetres.

6.2 The stocking shall also conform to requirements given in **Table 3.**

7 SEALED SAMPLE

If in order to illustrate or specify general appearance, lustre, handle, type of finish and whiteness index or yellowness (ISO 105: J02, ISO 11475:2017), a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in each respect.

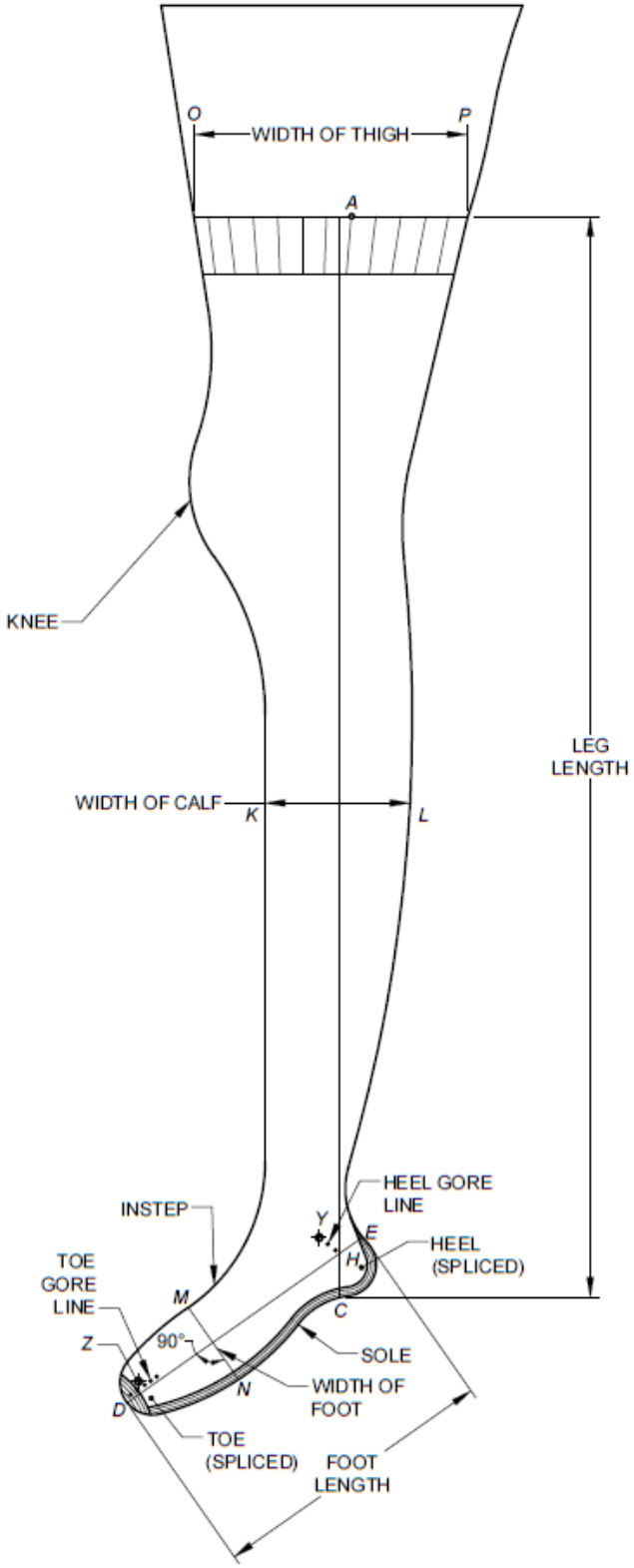
7.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and seller.

8 PAIRING

8.1 The stocking shall be paired according to their sizes.

FIGURE 1 Female Plain and Rib Knitted Thigh Stocking

(*Clause 5.1*)



SI. No.	Size	Dimension	Mass of 10 Pairs

		Foot Length (cm) (Distance from D to E through H)	Width of the Foot (cm) (Distance from M to N)	Leg Length (cm) Distance From A to C Through H)	Width of Thigh (cm) Distance from O to P	Width of Calf (cm) Distance From K to L)	Min (g)
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
1	19.2	19.2	8.8	72.8	49.6	32.0	**50 to 380 Grams**
2	19.6	19.6	9.0	74.2	50.5	32.6	
3	19.8	19.8	9.2	75.1	51.2	33.0	
4	20.0	20.0	9.4	76.0	51.8	33.4	
5	20.4	20.4	9.6	77.4	52.7	34.0	
6	20.8	20.8	9.8	78.7	53.6	34.6	
7	21.0	21.0	10	79.1	54.2	35.0	
8	21.4	21.4	10.4	79.8	54.8	35.4	
9	21.8	21.8	10.8	80.1	55.1	36.0	
10	22.0	22.0	11.0	80.4	55.6	36.4	
11	22.4	22.4	11.2	80.7	60.0	37.0	
12	23.0	23.0	11.6	81.0	62.5	37.4	
13	24.0	24.0	12.0	81.2	66.0	38.0	
14	24.5	24.5	12.6	81.6	66.7	38.4	
15	25.0	25	13.2	82.4	67.4	39.0	
16	25.5	25.5	13.8	82.6	68.2	39.6	
17	26.0	26.0	14.5	90.2	68.6	40.2	
18	26.5	26.5	15.2	90.6	69.0	40.7	
19	30.0	27.0	15.8	91.2	69.4	41.2	
20	30.6	27.5	16.2	91.8	70.2	41.8	
21	30.8	28.0	16.8	92.4	70.8	42.4	
22	31.2	28.6	17.2	92.8	71.2	42.8	
23	31.8	29.2	17.6	93.2	71.8	43.2	
24	32.4	29.8	18.2	93.8	72.2	43.8	
25	32.8	30.2	18.6	94.2	72.6	44.2	
Tolerance		**± 0.5**		**± 1.0**	**± 0.5**		
Method of Test Ref to		**B-2**					**B-3**

Table 2 Dimension and Mass of Stockings

7 MARKING

7.1 Each pair of stockings shall be marked with the following:

a) Size of the stocking (marked toward the toe);
b) Manufacturer's name, initials or trademark, if any (marked on the sole) and;
c) Batch Number
d) Any other information as required by the law in force.

e) Month and Year of Manufacture

7.2 BIS Certification and Marking

The Product (s) conforming to the requirements of this standard may certified as per the conformity assessment schemes under the provisions of the bureau of Indian Standards Act, 2016, and the Rules and Regulations framed thereunder, and the product (s) may be marked with the Standard Mark.

Table 3 Other Requirements of Stockings
(*Clause 5.2*)

Sl. No.	**Characteristic**	**Requirements**	**Method of Test Ref to**
(1)	(2)	(3)	(4)
i.	Total number of Wales/dm	300 - 500	B-4
ii.	Total number of Courses/dm	350 - 600	B-4
iii.	Dimensional Change (due to relaxation) Percentage, *Max*	5.0	B-5
iv.	pH value	6 - 10	IS 1390
v.	Water soluble, *Min*	1.0	IS 3456
vi.	Ash Content	0.5	IS 199
vii.	For Colour Fastness Ratings of Dyed Stockings, *Min*		
	I. Light	5	IS/ISO 105 – B02 OR IS/ISO 105 – B01
	II. Washing a) Change in colour b) Staining of Adjacent fabric	4 4	IS/ISO 105 – C10
	III. Perspiration a) Change in Colour b) Staining of adjacent fabric	3 3	IS/ISO 105 – E04
	IV. Rubbing a) Change in colour **b)** Staining of adjacent fabric	4 3	IS/ISO 1O5 - X12:2001
	V. Pilling **(**Martindale Pilling Box – 14400 Rev**)**	4 - 5	BIS ISO 9943 : 2009
viii.	**Fibre Blend Compositions**		**Annex - B**

8 PACKING

The stockings shall be packed as per the agreement between the buyer and seller

9 SAMPLING

9.1 Lot

In any consignment, all the pairs of stocking of the same size manufactured from the same quality of yarn shall constitute a lot (IS 2500)

9.2 The conformity of a lot to the specification shall be determined on the basis of the test carried out on the pairs of stockings selected from the lot.

9.3 Unless otherwise agreed to between the buyer and the seller, number of pairs of stockings depending on the lot size, shall be selected at random according to the Col 1 and 2 of Table 4.

9.4 The number of pairs of stockings to be inspected and criterion for conformity for each characteristic shall be as follows:

Sl. No.	**Characteristic**	**Number of pairs of Stockings to be Inspected**	**Criterion for Conformity**
(1)	(2)	(3)	(4)
I.	Visual inspection dimensions and number of wales and course	According to the col 3 of Table 4	Non-conforming pairs of stockings shall not exceed the corresponding number given in col 4 of the Table 4
II.	Mass	Sets of 10 pairs of stockings obtained from those selected according to col 3 of Table4	All the observations shall satisfy the relevant requirements
III.	Dimension change, scouring loss, pH value, ash content and colour fastness	According to col 5 of Table 4	All the test results shall satisfy the relevant requirement

Table 4 Sample Size and Permissible Number of Non-Conforming pairs of Stockings

(*Clause 9.3 and 9.4*)

Sl. No.	**Number of pairs of Stockings In The Lot**	**For Dimensions and visual Inspection**		**Testing**
		Number of pairs of Stockings to be Inspected	**Number of permissible Non-Conforming Pairs**	**Number of pairs of Stockings to be tested for Chemical Characteristics**
(1)	(2)	(3)	(4)	(5)
I.	Up to 100	10	0	3
II.	100 – 300	20	1	3
III.	301 – 500	30	2	5
IV.	501 – 1000	50	3	5
V.	1001 and above	80	5	8

ANNEX A
(*Clause 2.1 and Clause 3.1***)**
LIST OF REFERRED STANDARDS

IS No.	***Title***
IS 199 : 1989	Textiles - Estimation of moisture, total size or finish, ash and fatty matter in grey and finished cotton textile materials.
IS 1390 : 2022	Textiles Determination of pH of aqueous extract (Third Revision)
IS 3086 : 1965	Code for seaworthy packaging of cotton hosiery yarn and goods
IS 3325 : 1965	Code for inland packaging of cotton hosiery yarn and goods
IS 3456 : 2022	Method for determination of water-soluble. matter of textile materials
IS 3596 : 1967	Glossary of terms relating to hosiery
IS 6359 : 2023	Method for conditioning of textiles
IS/ISO 105 – B01: 2014	Textiles: Tests for colour fastness - Part B01 colour fastness to light: Daylight
IS/ISO 105 – B02: 2014	Textiles: Tests for colour fastness - Part B02 colour fastness to artificial light: xenon arc fading lamp test
IS/ISO 105 – C10: 2006	Textiles: Tests for colour fastness - Part C10 colour fastness to w with soap or soda and soap
IS/ISO 105 – E04: 2008	Textiles: Tests for colour fastness - Part E04 colour fastness to perspiration
ISO 16373-3	Textiles. Dyestuffs - Method for determination of certain carcinogenic dyestuffs (method using triethylamine/methanol)
BS EN ISO 14362-1,2,3	Textiles. Methods for determination of certain aromatic amines derived from Azo colorants - Textile testing; Amines (aromatic) ...
ISO 105 – NO2	Textiles - Test for colour fastness Part NO2: Colour fastness to bleaching- Peroxide
S/ISO 1O5 X12:2016	Method for determination of colour fastness of textile materials to rubbing.
IS 667: 1981	Textiles fibers - Methods for identification of textile fibres
ISO 1833-1:2020	Textiles -- Quantitative chemical analysis -- Part 1: General principles of testing
BIS ISO 9943 : 2009	Textiles – Determination of Fabric Propensity to Surface Fuzzing and to Pilling, Part 2: Modified Martindale Method
ISO 6989:1981	Textile fibres — Determination of length and length distribution of staple fibres (by measurement of single fibres)
IS 15336: 2003	Textiles – Acrylic Yarn for Hosiery – Specification
IS 13719:2003	Textiles Spun cotton regenerated cellulosic fiber blended grey yarn - Specifications
IS 9543:2019	Textiles - Spun polyester sewing thread – Specifications
ISO/TR 11827:2012	Textiles — Composition testing — Identification of fibres

ISO 10132:1993	Textiles - Textured filament yarn - Definitions
ISO 5688:2024	Textiles - Synthetic filament yarns - Test methods for crimp properties of Textured yarn
ISO 7211-5	Textiles- methods for the determination of linear density of yarn removed from fabric.
IS 833 (1977)	Textiles - Gents' Rib-Knitted Nylon Stockings
IS 3329 (1973):	Textiles - Socks, Cotton

ANNEX B

Materials for Stocking Manufacture
(Clause 4.1**)**

Table 5 Combed & Carded 100% Cotton Hosiery Yarn

Test Parameters	**20CH**	**24CH**	**30CH**	**32CH**	**36CH**	**40CH**	**50CH**	**60CH**
Actual Count(Ne)	20s	24s	30s	32s	36s	40s	50s	60s
	20KH	**24KH**	**30KH**	**32KH**	**36KH**	**40KH**		
Actual Count (Ne)	20s	24s	30s	32s	36s	40s		
NOTE	**CH** – Combed Yarn, **KH** – Carded Yarn							

Table 6 Blended hosiery yarns used commercially
(Clause 4.1)

Sl. NO.	**Blend Type**	**Blend %**	**Count Range (Ne)**	**Yarn Ply**
1	Cotton/Polyester	60/40, 65/35, 50/50, 52/48, 33/67, 70/30, 80/20,	20s – 60s	1 Ply, 2 Ply
2	Cotton/Viscose	55/45, 65/35 70/30, 85/15, 40/60, 50/50	20s – 60s	1 Ply, 2 Ply
3	Polyester/Viscose	50:50, 90:10, 75:25, 65:35	20s – 50s	1 Ply, 2 Ply
4	Polyester/Spandex	80/20, 70/30, 88/12, 90/10, 84/16	20s – 60s	1 Ply, 2 Ply 240 – 270 GSM
5	Nylon/Spandex	73/30, 80/20, 90/10		240 GSM
6	Cotton/Acrylic	75/25, 60/40 50/50, 40/60	20s – 60s	

7	Cotton/Spandex	50/50, 90/10, 95/5	---------	140 GSM Fabric
8	Viscose Jersey Fabric	100%	20s, 24s, 30s, 34s, 40s.	220 GSM
9	Cotton/Nylon /Spandex Fabrics	70/25/5	---------	200 GSM Fabric
10	Cotton/Viscose/Spandex	65/30/5	---------	160 GSM
11	Woollen	100%		
12	Polyester/Wool			

ANNEX C

METHOD FOR DETERMINATION OF NYLON 6, POLYESTER AND POLYPROPYELENE YARNS

C-1 IDENTIFICATION OF NYLON 6

The material used for manufacture is dipped in the following reagents:

a) Formic Acid at temperatures of 70°C.

d) m-Cresol at temperatures of 80°C.

C-1.1 If the material used for manufacture is Nylon 6 ; it shall dissolve in the above mentioned reagents.

C-2 IDENTIFICATION OF POLYESTER

The material used for manufacture is dipped in the following reagents:

a) Solution of crystallized tri-chloro-acetic acid/chloroform reagent, prepared at a mass ratio 1:1.

b) Benzyl Alcohol at temperatures of 150°C.

C-2.1 If the material used for manufacture is polyester; it shall dissolve in the above mentioned reagents.

C-3 IDENTIFICATION OF COTTON

C – 3.1 The material used for manufacture is dipped in any one of the following reagents:

a) Cotton dissolves in Schweitzer's Reagent ($Cu(OH)_2$ in ammonia), a specific test for cellulose.
b) Cotton will dissolve in concentrated sulfuric acid, indicating the presence of cellulose.
c) Boil the fabric sample in a 5% NaOH solution. Cotton will degrade and lose its structure in strong NaOH solutions.

C-4 IDENTIFICATION OF POLYPROPYLENE

The material used for manufacture is dipped in the following reagents:

a) Boiling xylene at temperatures of 145°C.

C-3.1 If the material used for manufacture is polypropylene; it shall dissolve in the above mentioned reagents.

C – 5 IDENTIFICATION OF SPANDEX

C-5.1 The material used for manufacture is dipped in any one of the following reagents:

a) Spandex will dissolve in DMF (Dimethyl Formamide) or DMAc, (Dimethyl Acetamide) unlike many other fibers.
b) Spandex is resistant to formic acid, while some other fibers may dissolve or degrade.
c) Spandex will degrade but not dissolve completely in sulfuric acid, often swelling and losing elasticity.
d) Spandex shows specific thermal transitions, such as a melting point around 240-270°C.

ANNEX D

(Tables 1 and 2)

METHODS OF TEST

D-1 CONDITIONING OF THE TEST SPECIMEN AND ATMOSPHERIC COMDITIONS FOR TESTING

D-1.1 The test specimen shall be tested in prevailing atmospheric conditions. In case of dispute**,** the specimen shall be conditioned and tested in the standard atmosphere as given in IS 6359.

D-2 DIMENSIONS

D-2.1 Take a stocking from the test sample. Lay flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it. Measure dimensions correct to the nearest millimetre, as given in Table 1.

D-3 MASS

D-3.1 Take a set of 10 pairs of stockings from the test sample. Condition them for moisture equilibrium for 24 hours (B-1.1)**.**

D-4 WALES AND COURSES

D-4.1 Take stockings from the test sample. Lay it flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it.

D-4.1.1 Count the number of wales including any fraction on one side of the stocking. Similarly count the number of wales including any fraction on other side of the stocking and add the two values.

D-4.1.2 count the number of courses in 10 cm including any fraction on both sides of the stocking and calculate the average courses per decimetre.

D-5 DIMENSIONAL CHANGE (DUE TO RELAXATION)

D-5.1 Marking the Test Specimens. Take a stocking from the test sample. Mark centrally on it, by means of indelible ink or fast dyed cotton sewing, a set of three points, namely, *X*,*Y* and, *Z* so that,

a) All the three points are on the same wale,

b) point *X* is on the top portion;

c) point *Y* is on the heel gore line; and

d) Point *Z* is on the toe portion.

D-5.2 Procedure

D-5.2.1 Place the test specimen on a glass plate. Remove by hand all the creases and wrinkles without stretching the specimen. Place another glass plate on the specimen. Measure separately, correct to the nearest millimetre, the distance between *X* and *Y* and that between *Y* and *Z*.

D-5.2.2 Lay the test specimen flat in a tray of suitable size, having a depth of 10 cm. Soak the specimen under the head of 25mm of water containing 0.5 % of suitable wetting agent at room temperature for two hours. Drain out the water and remove the test specimen carefully so that it is not stretched. Lay the specimen flat on a smooth surface, remove the excess water by absorbent material and dry it at room temperature. ***Note*** *– Removal of excess water by wringing the test specimen is not permitted.*

D-5.2.3 After drying condition the test specimen to moisture equilibrium at room temperature, Place it on the glass plate, carefully remove wrinkles and creases and place another glass plate on it. Measure, correct to the nearest millimetre, the distance between *X* and *Y* and that between *Z*

D-5.3 Calculation

D-5.3.1 calculate separately, correct to one place of decimal, the percentage change between the points *X* and *Y* and that between *Y* and *Z* by following formula:

$$S = \frac{a - b}{a} \times 100$$

Where;

a) S = dimensional change (due to relaxation) percent;

b) a = distance between the two points X and Y, or Y and Z, before soaking; and

c) b = distance between the same points after soaking.

D-5.3.2 Calculate the average dimensional change**.**

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDRADS

Draft for comments only Doc : TXD 10 (xxxx) WC
November 2024

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भारतीय मानक मसौदा

वस्त्रादि - सिंगल जर्सी, कॉटन, रिब बुना हुआ सिंथेटिक और मिश्रित शॉर्ट्स – विशिष्टताएँ

(Draft *Indian Standard*)

TEXTILES – SINGLE JERSEY AND RIB KNITTED, COTTON, SYNTHETIC, AND BLENDED SHORTS- SPECIFICATIONS

ICS

Hoisery Sectional Committee, TXD 10	Last date for receipt of comments January 2024

FOREWORD
(*Formal foreword to be added later*)

Knitted shorts represent the perfect blend of comfort and style, ideal for both casual and active wear. Designed with soft, breathable fabric, these shorts provide a flexible and snug fit, ensuring ease of movement during any activity. Whether lounging at home, working out, or engaging in outdoor activities, knitted shorts are a wardrobe staple for anyone seeking versatile and durable apparel.

Designed for men and women alike, knitted shorts are available in a variety of styles and colors, seamlessly blending functionality with fashion. Whether for sports, leisure, or every day wear, they embody the perfect balance between comfort and practicality, suited for every occasion.

1 SCOPE

1.1 This standard describes the constructional details and other closely related particulars of Single jersey, Cotton, Synthetic and Blended, Shorts.

1.2 This standard does not take into consideration such as appearance, lustre, handle, finish type, whiteness index or shade of the shorts.

2 REFERENCES

2.1 The standard listed in Annex A contains provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subjected to revision and parties to agreements based on this standard are encouraged investigating the possibility of applying the most editions of these standards.

2.2 For the purpose of this standard the definitions of yarn are given in Annex B, shall apply.

2.3 For the purpose of this standard the definitions given in Annex C, shall apply**.**

3 TERMINOLOGY

3.1 Shorts

Knitted shorts are a type of casual wear made from knitted fabric, which is produced by interlocking loops of yarn. Knitted shorts can vary in style, length, and design, and are often used for activities such as lounging, exercising, or casual outings. They are available in various patterns and materials, including cotton, polyester, and blends, and often feature an elastic waistband for added comfort.

4 MATERIALS

4.1 Yarn

The yarn count for Cotton shall be in the range of 30s Ne – 60s Ne (20 Tex – 10 Tex) and for multifilament synthetic yarn shall be in the range of 150D – 350D or higher depending on the specific fabric requirements. Any other yarn count in compliance with the buyer & seller agreement shall apply for knitting, splicing, and linking of the shorts.

4.2 Identification of Fibers

The materials used for manufacturing shall be tested as per Annex D.

5 MANUFACTURE

5.1 Dimensions

The shorts fabric shall be knitted on circular, flatbed and warp knitting machines of suitable gauge. These shall be neatly tailored out of well and evenly knitted tubular fabric. The fabric shall be of uniform texture and appearance. It shall be of uniform tension throughout its length and free from spirals. It shall be scoured, bleached or dyed. The shorts shall not have any seams or joining along their two outer sides. The wales shall run along the length of the shorts. The fabric shall conform to construction particulars given in **Table 4** for plain knitted shorts and **Table 5** for rib Knitted Shorts.

5.1.1 The mass of the shorts in grams per square meter shall be determined by the method given in B-4.

5.1.2 Pockets; if required may also be provided having dimensions and shape as agreed to between the buyer and the seller**.**

5.2 Waist Band

The waist band should be either plain or rib knitted and the waistband width up to 2.5 - 5.0 cm’s or the agreement between the buyer and the seller.

5.3 Elastic Strap

Shorts shall have outer woven elastic strap stitched at the waist band or inner woven elastic strap shall be formed by the folding the raw edges of the fabric to a depth of minimum 25

mm and stitching it with flat stitches. In case of latter, a cotton tape having width of 25 mm preferably confirming to IS 9686: 1980 or a suitable tape made out of same fabric that is used for fabricating the shorts shall be provided in waist fold for tying purposes. It shall be at least 30 cm longer than the corresponding waist girth.

a) Outer Elastic Strap

1) Width of strap shall be minimum 25 mm.

2) Minimum mass per 100 m of finished strap shall be 1.7 kg.

3) Minimum number of ends of covered rubber in the strap shall be 20.

4) In 250 mm of finished strap, each covered rubber thread shall have a minimum of 160 mm of rubber core of not less than 0.6 mm diameter.

5) The minimum elongation of covered rubber shall be 160 percent under a load of 225 g with respect to specimen length of 100 mm.

b) Inner Elastic Strap:

1) Width of strap shall be minimum 25mm.

2) Minimum mass per 100 m of finished strap shall be 1.1 kg.

3) Minimum number of ends of covered rubber in the strap shall be 15.

4) In 250 mm of finished strap, each covered rubber thread shall have a minimum of 160 mm of rubber core of not less than 0.6 mm diameter.

5) The minimum elongation of covered rubber shall be 160 percent under a load of 225 g with respect to specimen length of 100 mm.

5.4 Crutch Piece

The fabric used for crutch piece shall be of same type and construction as that of the legging (leg portion). The crutch piece shall be reinforced throughout with cotton calico (IS 1544). The crutch piece and the reinforcement fabric shall be scoured or bleached as the legging.

5.5 Linking

The pieces of shorts shall be securely linked using over-lock and or flat-lock stitch. The stitch type selection must be in compliance with the buyer and the seller. The linking shall be elastic, smooth and free from knots. The length of the free ends of the linking yarn and other loose ends, if any, shall be neither less than 5.0 mm nor more than 15.0 mm. The

linking shall not give way when the shorts are stretched without breaking to the full extent of the stretch-ability of shorts. Linking of crutch piece shall be done at right angle i.e. 90º at the intersection to prevent tearing during extension while sitting.

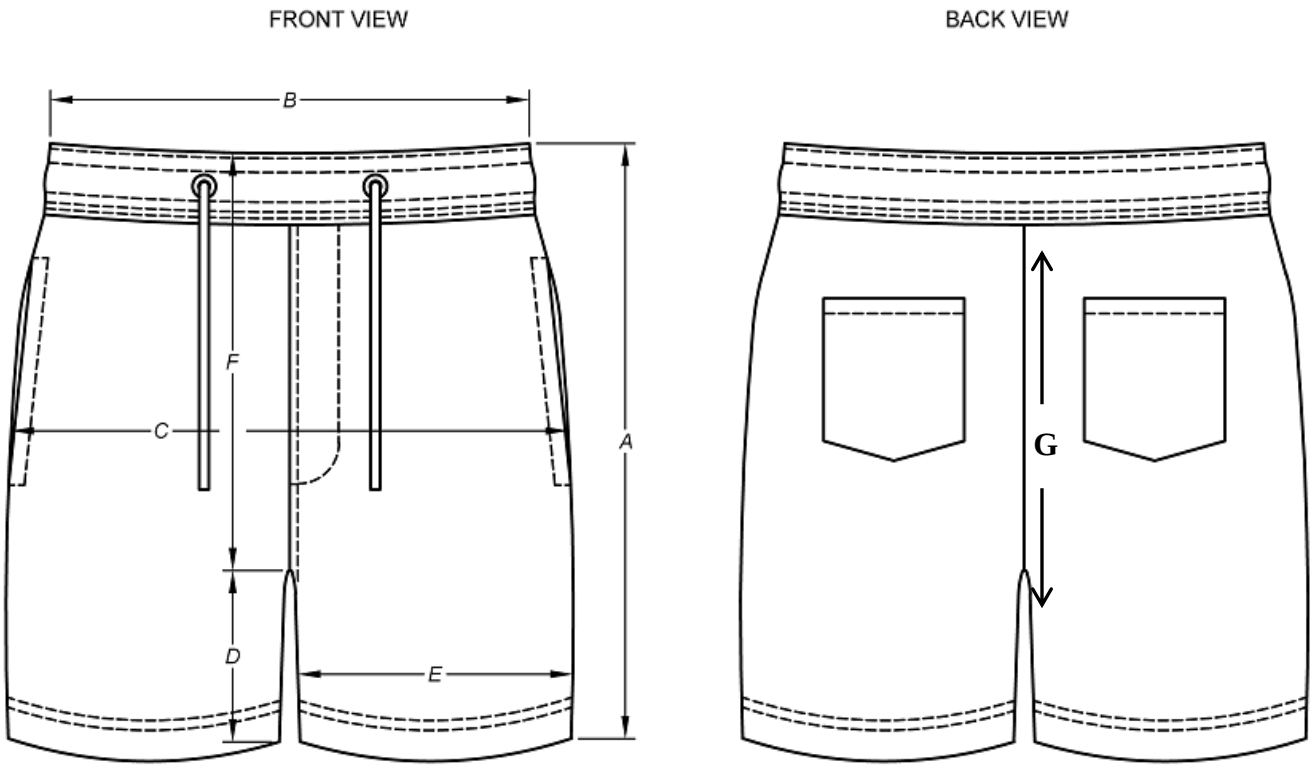

Figure 1 Standard Dimension for Shorts

Table 3 Constructional Particulars of Plain Knitted Fabric for Shorts
(*Clause 5.2*)

Sl No.	**Gauge of Machine** ***(See Note)***	**Approximate Count of Yarn - Ne (Tex)**	**Mass g/m^2, *Min* (g)**
(1)	(2)	(3)	(4)
i.	12 - 18	20s (30.0) – 28s (21.0)	250
ii.	24 - 28	30s (19.5) – 40s (14.5)	230
iii.	28 - 32	34s (17.0) – 50s (12.0)	210
iv.	32 - 36	40s (14.5) – 50s (12.0)	180
v.	36 - 40	50s (12.0) – 60s (10.0)	150
NOTE -- As determined by the number of needles per 2.54 Cm			

Table 4 Body Measurement and Sizing Chart for Knitted Shorts
(*Clause 5.1*)

Sl No.		MEN'S					WOMEN'S				
	Size (cm)	Length cm	Waist (cm)	Hips (cm)	Inseam (cm)	Thigh (cm)	Length cm	Waist (cm)	Hips (cm)	Inseam (cm)	Thigh (cm)
		A	B	C	D	E	A	B	C	D	E
i.	XS		---	---	---	---		61 - 66	86 - 91	18 – 20	46 - 51
ii.	S	51	71 - 76	86 – 91	20 – 23	51 - 56	36	71 - 76	97 -102	20 – 23	51 - 56
iii.	M	61	81 – 86	97 – 102	22 –24	56 - 61	46	81 - 86	107 - 112	22 – 24	56 - 61
iv.	L	66	91 – 97	107 – 112	23 – 25	61 - 66	51	91 - 97	117 - 122	23 – 25	61 - 66
v.	XL	76	102 – 107	117 – 122	24 – 27	66 - 71	61	102 - 107	127 - 132	24 – 27	66 - 71
vi.	XXL	81	112 – 117	127 – 132	25 - 28	71 - 76	76	112 – 117	137 - 142	25 – 28	71 - 76
vii.	XXXL	91	122 – 128	138 – 142	27 - 30	76 - 81	81	122 - 128	147 - 152	27 – 30	76 - 81
NOTE – *For sizes above 3XL, a suitable crutch piece can be added as the clause 5.4 and the agreement between the buyer and seller.*											

Table 5 Body Measurement and Sizing Chart for Knitted Shorts
(*Clause 5.1*)

Sl. No.	Particulars	Front Rise (CM)		Back Rise (CM)	
		F		G	
		Women's	Men's	Women's	Men's
1)	Low Rise Shorts	18 - 20	20 - 23	25 - 28	25 - 28
2)	Mid Rise Shorts	20 - 24	23 - 27	28 - 30	28 - 32
3)	High Rise Shorts	24 - 28	27 - 30	30 - 36	32 - 36
NOTE: Measurements Shall Apply to All Sizes					

6 FREEDOM FROM DEFECTS

The Shorts shall be reasonably free from the manufacturing defects, such as large mends, ladders, dropped stitches, holes, improper splicing and chemical damages. The dyed and

bleached Shorts shall be free from dyeing defects, such as streakiness and uneven dyeing and the white Shorts from blueing agents.

7 REQUIREMENTS

7.1 Dimension, Mass and Tolerances

The shorts shall conform to the requirements of **Table 5**, and read with Figure - 1 & 2, along with considering the tolerances typically ±0.5 cm to ± 2.0 cm.

NOTE - The short size should be denoted by the number correspond to the length and waist diameter.

7.2 Sewing and stitching Tolerances

i. **Seam allowances** - Maintain consistent seam allowances (typically 0.6 cm to 1.5 cm) to ensure adequate construction and durability.

ii. **Stitch quality** - Specify acceptable variations in stitch length, tension, and type such as; Lockstitch, Over-lock, or Cover-stitch; to ensure seams is secure and aesthetically pleasing.

7.2.1 Sewing

The sewing details of the shorts shall be as under:

Sl No.	Portion to be Stitched	Type of Stitch	Sewing Thread
i.)	All Joining's	Flat – Lock	Three threads of 60s/3 count (100 dtex x 3) or 40s/2 count (145 dtex x 2) in the needle and one strand of the same threads in the each loopers.
ii.)	Flap at the front opening (For Men's Only)	Lock Stitch	One strand of cotton sewing thread of 60s/3 count (100 dtex x 3) or 40s/2 count (145 dtex x 2) in each of the needle and the looper.
NOTE - Sewing thread of 60s/3.0 (100 dtex) count may be used in place of 40s/2 (145 dtex x 2)			

7.3 The shorts shall also conform to the requirements in Table 1, 2, 3, 4, 5, 6.

7.4 Sealed Sample

If in order to illustrate or specify general appearance, lustre, handle, type of finish and whiteness sample has been agreed upon and sealed, the supply shall be in conformity with the sample in each respect.

8 MARKING

8.1 Each pair of short shall be marked with the following:

a) Size (marked toward the waistband);

b) Manufacturer's name, initials or trademark, if any (marked on the waistband);

c) fibre blend compositions must be given;

d) suitable washing instruction must be given;

e) Any other information as required by the law in force.

Table 6 Other Requirements of Leggings
(*Clause 5.2*)

Sl. No.	Characteristic	Requirements	Method of Test Ref to
(1)	(2)	(3)	(4)
i.	Total number of Wales/dm	200 - 350	B-4
ii.	Total number of Courses/dm	250 - 400	B-4
iii.	Dimensional Change (due to relaxation) Percentage, *Max*	5.0	B-5
iv.	pH value	6 - 10	IS 1390
v.	Water soluble, *Min*	1.0	IS 3456
vi.	Ash Content	0.5	IS 199
vii.	Colour fastness ratings of dyed stockings, *Min*		
	I. Light	3 - 4	IS/ISO 105 – B02 OR IS/ISO 105 – B01
	II. Washing a) Change in colour b) Staining of Adjacent fabric	4 4	IS/ISO 105 – C10
	III. Perspiration a) Change in Colour b) Staining of adjacent fabric	3 3	IS/ISO 105 – E04

	IV. Rubbing a) Change in colour **b)** Staining of adjacent fabric	4 3	IS/ISO 105 – X12: 2016
	V. Piling **(**Martindale Pilling Box-14400 Rev**)**	4 - 5	BIS ISO 9943 : 2009
viii.	Fibre Blend composition		*See* Table - 2

9 BIS CERTIFICATION

The Product(s) conforming to the requirements of this standard may certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016,* and the Rules and Regulations framed thereunder, and the product (s) may be marked with the Standard Mark.

10 PACKING

The shorts shall be packed as per the agreement between the buyer and seller.

11 SAMPLING

11.1 Lot

In any consignment, all the pairs of shorts of the same size manufactured from the same quality of yarn shall constitute a lot as per (IS 2500).

11.2 The conformity of a lot to the specification shall be determined on the basis of the test carried out on the pairs of shorts selected from the lot**.**

11.3 Unless otherwise agreed to between the buyer and the seller, number of pairs of shorts depending on the lot size, shall be selected at random according to the Col 1 and 2 of Table 8 & Table 9

11.4 The number of pairs of shorts to be inspected and criterion for conformity for each characteristic shall be as follows:

Table 7 Performance Assessment criteria for Shorts
(*Clause 12.3*)

Sl. No.	Characteristic	Number of pairs of Shorts to be Inspected	Criterion for Conformity
(1)	(2)	(3)	(4)
I.	Visual inspection dimensions and number of wales and course	According to the col 3 of **Table 8**	Non-conforming pairs of shorts shall not exceed the corresponding number given in col 4 of the **Table 8**
II.	Mass	Sets of 10 pairs of legging obtained from those selected according to col 3 of **Table 8**	All the observations shall satisfy the relevant requirements
III.	Dimension change, scouring loss, pH value, ash content and colour fastness	According to col 5 of **Table 8**	All the test results shall satisfy the relevant requirement

Table 8 Sample Size and Permissible Number Of Non-Conforming pairs of Shorts
(*Clause 9.3 and 9.4*)

Sl. No.	Number of pairs of Shorts In The Lot	For Dimensions and visual Inspection		Testing
		Number of pairs of Shorts to be Inspected	Number of permissible Non-Conforming Pairs	Number of pairs of Shorts to be tested for Chemical Characteristics
(1)	(2)	(3)	(4)	(5)
I.	Up to 100	10	0	3
II.	100 – 300	20	1	3
III.	301 – 500	30	2	5
IV.	501 – 1000	50	3	5
V.	1001 and above	80	5	8

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(*Clause 4.1, 4.2, 4.3***)**

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IS 6359 : 2023	Method for conditioning of textiles
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ISO 5688:2024	Textiles - Synthetic filament yarns - Test methods for crimp properties of Textured yarn
ISO 7211-5	Textiles- methods for the determination of linear density of yarn removed from fabric.
IS 13003: 1991	Textiles - Fabric, cotton, interlock knitted - Specification
IS 9469 : 2003	Textiles – Fabric, cotton, plain (Single jersey) knitted – Specification
IS 834 : 2006	Textiles – Ring Spun Grey Cotton Yarn for Textiles
ISO 8559 - 1	Textiles – Size designation of clothes – Anthropometric definitions for body measurement
ISO 8559 - 2	Textiles Size designation of clothes Part 2: Primary and secondary dimension indicators
ISO 8559 - 3	Textiles Size designation of clothes Part 3: Methodology for the creation of body measurement tables and intervals
IS 1966-1 (2009)	Textiles - Bursting Properties of Fabrics - Determination of Bursting Strength and Bursting Distension, Part 1: Hydraulic Method
IS 1670 (1991)	Textiles - Yarn - Determination of breaking load and elongation at break of single strand [TXD 1: Physical Methods of Tests]
IS/ISO 16322 (1-3)	Determination of spirality of knitted fabrics post laundering.
ISO 6330	Textiles — Domestic washing and drying procedures for textile testing
IS 10099 : 2020 ISO 3759 : 2011	Textiles – Preparation marking and measuring of fabric specimens and garments in tests for determination of dimensional change.
IS 9686:2022	Textiles - Specification For Elastic Tape
IS 3100:2023	Textiles – Men’s Wool – Cotton Short Drawers - Specification
IS 2500	Part 4,5 & 6 Sampling Procedures for inspection by attributes.
IS 4376: 2013	Textiles – Gents Cotton Short Drawers (Trunks) - Specification

ANNEX B

METHODS OF TEST

B-1 CONDITIONING OF THE TEST SPECIMEN AND ATMOSPHERIC COMDITIONS FOR TESTING

B - 1.1 The test specimen shall be tested in prevailing atmospheric conditions. In case of dispute**,** the specimen shall be conditioned and tested in the standard atmosphere as given in IS 6359.

B - 2 DIMENSIONS

B - 2.1 Take a legging from the test sample. Lay flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it. Measure dimensions correct to the nearest centimetre, as given in Table 8.

B - 3 MASS

B - 3.1 Take a set of 10 pairs of legging from the test sample. Condition them for moisture equilibrium for 24 hours (see B-1.1)**.**

B - 4 WALES AND COURSES

B - 4.1 Take shorts from the test sample. Lay it flat on a horizontal surface. Remove by hand all creases and wrinkles without distorting it.

B - 4.1.1 Count the number of wales including any fraction on one side of the shorts. Similarly count the number of wales including any fraction on other side of the short and add the two values.

B - 4.1.2 Count the number of courses in 10 cm including any fraction on both sides of the shorts and calculate the average courses per decimetre.

B - 5 DIMENSIONAL CHANGE (Due To Relaxation)

B-5.1 Marking the Test Specimens. Take a legging from the test sample. Mark centrally on it, by means of indelible ink or fast dyed cotton sewing, a set of three points, namely, *X*,*Y* and, *Z* so that,

a) All the three points are on the same wale,
b) point *X* is on the top portion;
c) point *Y* is on the heel gore line; and
d) Point *Z* is on the toe portion.

B-5.2 Procedure

B - 5.2.1 Place the test specimen on a glass plate. Remove by hand all the creases and wrinkles without stretching the specimen. Place another glass plate on the specimen. Measure separately, correct to the nearest millimetre, the distance between *X* and *Y* and that between *Y* and *Z*.

B - 5.2.2 Laid the test specimen flat in a tray of suitable size, having a depth of 10 cm. Soak the specimen under the head of 25mm of water containing 0.5 % of suitable wetting agent at room temperature for two hours. Drain out the water and remove the test specimen carefully so that it is not stretched. Lay the specimen flat on a smooth surface, remove the excess water by absorbent material and dry it at room temperature.

NOTE – *Removal of excess water by wringing the test specimen is not permitted*

B - 5.2.3 After drying, conditioned the test specimen to moisture equilibrium at room temperature, Place it on the glass plate, carefully remove wrinkles and creases and place another glass plate on it. Measure correct to the nearest centimetre, the distance between *X* and *Y* and that between *Z*.

B-5.3 Calculation

B - 5.3.1 calculate separately, correct to one place of decimal, the percentage change between the points *X* and *Y* and that between *Y* and *Z* by following formula:

$$S = \frac{a - b}{a} \times 100$$

Where;

a) S = dimensional change (due to relaxation) percent;
b) a = distance between the two points X and Y, or Y and Z, before soaking; and
c) b = distance between the same points after soaking.

B-5.3.2 Calculate the average dimensional change**.**

Table 1 100% Cotton Carded & Combed Hosiery Yarn
(Clause 4.1)

Test Parameters	**20CH**	**24CH**	**30CH**	**32CH**	**36CH**	**40CH**	**50CH**	**60CH**
Count(Ne)	20s	24s	30s	32s	36s	40s	50s	60s
	20KH	**24KH**	**30KH**	**32KH**	**36KH**	**40KH**	-----	-----

Count(Ne)	20s	24s	30s	32s	36s	40s	----	----
Count CV%	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
NOTE	**KH** – Carded Yarn, **CH** – Combed Yarn							

Table 2 Blended Yarns Used Commercially in Hosiery
(Clause 4.1)

Sl. NO.	**Blend Type**	**Blend %**	**Count Range (Ne)**	**Yarn Ply**
	Cotton	100%	20s – 60s	1 Ply, 2 Ply
1	Cotton/Polyester	60/40, 65/35, 50/50, 52/48, 33/67, 70/30, 80/20,	20s – 60s	1 Ply, 2 Ply
2	Cotton/Viscose	55/45, 65/35 70/30, 85/15, 40/60, 50/50,	20s – 60s	1 Ply, 2 Ply
3	Polyester/Viscose	50:50, 90:10, 75:25, 65:35	20s – 50s	1 Ply, 2 Ply
4	Cotton/Acrylic	75/25, 60/40 50/50, 40/60	20s – 60s	
5	Cotton/Spandex	50/50, 90/10, 95/5	20s – 60s	140 GSM Fabric
6	Viscose Jersey Fabric	_____	20s, 24s, 30s, 34s, 40s.	220 GSM
7	Cotton/Viscose/Spandex		20s – 60s	160 GSM

ANNEX C
(Clause 4.2)
IDENTIFICATION OF FIBRES

C-1 IDENTIFICATION OF POLYESTER

The material used for manufacture is dipped in the following reagents:

a) Solution of crystallized tri-chloro-acetic acid/chloroform reagent, prepared at a mass ratio 1:1.

b) Benzyl Alcohol at temperatures of 150°C.

C -1.1 If the material used for manufacture is polyester; it shall dissolve in the above mentioned reagents.

C - 2 IDENTIFICATION OF COTTON

C – 2.1 The material used for manufacture is dipped in any one of the following reagents:

a) Cotton dissolves in Schweitzer's Reagent ($Cu(OH)_2$ in ammonia), a specific test for cellulose.
b) Cotton will dissolve in concentrated sulfuric acid, indicating the presence of cellulose.
c) Boil the fabric sample in a 5% NaOH solution. Cotton will degrade and lose its structure in strong NaOH solutions.

C -2.2 If the material used for manufacture is cotton; it shall dissolve in the above mentioned reagents.

C – 3 IDENTIFICATION OF SPANDEX

C -3.1 The material used for manufacture is dipped in any one of the following reagents:

a) Spandex will dissolve in DMF (Dimethyl-formamide) or DMAc, unlike many other fibers.
b) Spandex is resistant to formic acid, while some other fibers may dissolve or degrade.
c) Spandex will degrade but not dissolve completely in sulfuric acid, often swelling and losing elasticity.

C – 3.2 Spandex shows specific thermal transitions, such as a melting point around 240-270°C.

C – 4 IDENTIFIOCATION OF VISCOSE RAYON

C - 4.1 The material used for manufacture is viscose rayon, it shall either dissolve or swell in the above mentioned reagents.

a) **Procedure:** Immerse a small sample in a solution of sodium hydroxide (NaOH). Viscose rayon will swell and may dissolve, while cellulose fibers like cotton will remain largely unchanged.
b) **Procedure:** Soak the fiber in concentrated acetic acid for a few minutes. Viscose rayon will dissolve in acetic acid, while most other fibers will not.

ANNEX 6
(Item 5.1)

a) Comment received from Shri Arvind Kamthane, New Delhi on TXD 10(26838) 'Textiles – Single Jersey Cotton Synthetic and Blended Leggings – Specifications'

Sl No.	Clause / Subclause No.	Paragraph No./Figure No./Table No.	Type of Comment	Attachment
1	Clause 2.1, Annex-A	Sl. No.15	Technical	N/A
Comments/Suggestions along with Justification for the Proposed Change			ISO 766 for Textiles - Method for determination of colour fastness of textile materials to rubbing [TXD 5: Chemical Methods of Test] is not available.	
Proposed Change/Modified Wordings			Replace at Sl No.15 of Annex-A as under IS/ISO 105 12 Textiles - Method for determination of colour fastness of textile materials to rubbing	

Sl No.	Clause / Subclause No.	Paragraph No./Figure No./Table No.	Type of Comment	Attachment
1	Clause No. 2.2	1st paragraph	General	N/A
Comments/Suggestions along with Justification for the Proposed Change			Clause 2.2 written as For the purpose of this standard the definitions given in Annex B & D, shall apply. However, Annex-B is for Method of Tests and Annex-D is for identification of materials".	
Proposed Change/Modified Wordings			suggested for change as Under at Clause 2.2 For the purpose of this standard, details of test methods given in Annex-B and Identification of Material is given in Annex-D	

Sl No.	Clause / Subclause No.	Paragraph No./Figure No./Table No.	Type of Comment	Attachment
1	Clause 4.2	Annex C	General	N/A
Comments/Suggestions along with Justification for the Proposed Change			4.2 Identification of Fibres The Material used for manufacturing shall be tested as per Annex C.	

Proposed Change/Modified Wordings	It is suggested for Change as under 4.2 : Commercial available yarns and its blends The cotton carded, combed yarn and commercially blneded yatn used in the Hosiery as per Annex-C

Sl No.	**Clause / Subclause No.**	**Paragraph No./Figure No./Table No.**	**Type of Comment**	**Attachment**
1	Clause 5.2, Table -9	Sl No. i to iii	General	N/A
Comments/Suggestions along with Justification for the Proposed Change			1. in last column mentioned as Annex- D. 2. For Sl.No.ii, Course per dm is Min and in requirement cloumn is 100 +/- 4. 3. For Sl.No. VII, Colour fastness ratings Min for Rubbing referred method of Test is ISO 766. 4. For Sl.No. VII, Piling spelling mistake	
Proposed Change/Modified Wordings			1. As suggested as Annex-B 2. When Min is mentioned, the requirement should 100 only. 3. Method of Test for colurfastness to Rubbing is IS/ISO 105 X12 4. Pilling	

b) Comment received from Shri Arvind Kamthane, New Delhi on TXD 10(26837) 'Textiles – Knitted Mens and Womens T-Shirt – Specifications'

Sl No.	**Clause / Subclause No.**	**Paragraph No./Figure No./Table No.**	**Type of Comment**	**Attachment**
1	Clause 2.0	Annex -A	General	N/A
Comments/Suggestions along with Justification for the Proposed Change			Textile — Tests for Colour Fastness — Part E02 Colour Fastness to Rubbing Test Method IS/ISO 105 X12 is not mentioned in List of Reference Standard	
Proposed Change/Modified Wordings			Textile — Tests for Colour Fastness — Part E02 Colour Fastness to Rubbing Test Method IS/ISO 105 X12 to be included in the Annex -A	

Sl No.	Clause / Subclause No.	Paragraph No./Figure No./Table No.	Type of Comment	Attachment
1	Clause 9.1	Table 11	Technical	N/A
Comments/Suggestions along with Justification for the Proposed Change			1. Dimensional Change due to relaxation, percent, : A) Wales, min B) Courses, min Method of Test ref to B-3, which is not defined 2. Sl. No.iii (d) Color fastness of dyed Sport T-shirts to Rubbing test method is mentioned as IS 766 whch is changed to IS/ISO 105 X12	
Proposed Change/Modified Wordings			1. Test method for Dimensional Change due to relaxation, percent, is not defined in B-3. Define the test method for the same and change the method refe to B-4. 2. Sl. No.iii (d) Color fastness of dyed Sport T-shirts to Rubbing test method is IS/ISO 105 X12	

c) Comment received from Shri Arvind Kamthane, New Delhi on TXD 10(26850) 'Textiles – Single Jersey Cotton Synthetic and Blended Womens Stockings – Specifications'

Sl No.	Clause / Subclause No.	Paragraph No./Figure No./Table No.	Type of Comment	Attachment
1	Clause 6.2	Table-3	Technical	N/A
Comments/Suggestions along with Justification for the Proposed Change			Refer Table-3 1. Sl No. Course per dm (Min) 100+/-4. when minimum requirement is mentioned , +/- 4 is not required. 2. Method of Test Ref to B-4 for Course and Wales per dm and Dimensional Change (due to relaxation) Percentage, Max refer to B-5. It is suggested B-4 & 5 of Annex-D. 3. Sl.No VII of Table -3 for Colour fastness ratings of dyed stockings, Min (IV) Rubbing test method is IS/ISO 105-X12 in place of ISO 766. 4. spelling mistake at (v) Piling shall be changed to Pilling. 5. In Clause 6.2 Table refer as Table-2 , it should be Table-3.	

			6. In Annex-A, at Sl. No.15, IS No. Column shall be change from ISO 766 TO IS/ISO 105 - X12	
Proposed Change/Modified Wordings			Refer Table-3 1. Sl No. Course per dm (Min) mentioned as 100+/-4. when minimum is requirement, **+/- 4 is not required.** 2. Method of Test Ref to B-4 for Course and Wales per dm and Dimensional Change (due to relaxation) Percentage, Max refer to B-5. It is suggested to B-4 & B- 5 of **Annex-D.** 3. Sl.No VII of Table -3 for Colour fastness ratings of dyed stockings, Min (IV) Rubbing test method is **IS/ISO 105-X12** in place of ISO 766. 4. spelling mistake at (v) Piling shall be changed to **Pilling.** 5. In Clause 6.2 Table refer as Table-2, it should be **Table-3.** 6. In Annex-A, at Sl. No.15, IS No. Column shall be change from ISO 766 TO **IS/ISO 105-X12**	
Sl No.	**Clause / Subclause No.**	**Paragraph No./Figure No./Table No.**	**Type of Comment**	**Attachment**
1	Clause 2.2	1st para	General	N/A
Comments/Suggestions along with Justification for the Proposed Change			For the purpose of this standard the definition given in Annex A, shall apply.	
Proposed Change/Modified Wordings			For the purpose of this standard the **LIST OF REFERRED STANDARDS** given in Annex A, shall apply.	

ANNEX 7
(Item 7.1)

PROGRAMME OF WORK

Sl No.	IS No.	TITLE	Reaffirm M-Y
1	IS 10590 : 1983 Reviewed In : 2023	Code of practice for manual bleaching and processing of cotton knitted fabric	February, 2023
2	IS 13003 : 1991 Reviewed In : 2023	Textiles - Fabric, cotton, interlock knitted - Specification	February, 2023
3	IS 14320 : 2013 Reviewed In : 2023	Textiles – Plain knitted, ladies', cotton panties – Specification (first revision)	February, 2023
4	IS 14717 : 2021 ISO 8499 : 2003 ISO 8499 : 2003	Knitted fabrics Description of defects Vocabulary First Revision	
5	IS 14759 : 2000 Reviewed In : 2020	Textiles – Fabric, cotton, rib-knitted – Specification	October, 2020
6	IS 14760 : 2000 Reviewed In : 2020	Textiles – Vests, cotton, rib-knitted – Specification	October, 2020
7	IS 17776 : 2021	Textiles Knitted Combat T-shirt Specification	
8	IS 17777 : 2021	Textiles Dyed knitted or crochet fabric made from synthetic fibres Specification	
9	IS 2187 : 2023	TEXTILES WOOL SOCKS SPECIFICATION Third Revision of IS 2187	
10	IS 2360 : 2023	TEXTILES WORSTED JERSEYS Y NECK PLAIN KNITTED SPECIFICATION	
11	IS 2518 : 1964 Reviewed In : 2020	Code for seaworthy packaging of wool hosiery yarn and goods	October, 2020
12	IS 2522 : 2023	TEXTILES KNITTED WORSTED MUFFLERS SPECIFICATION	
13	IS 2523 : 1982 Reviewed In : 2020	Specification for wool hose tops (first revision)	October, 2020
14	IS 2783 : 2023	TEXTILES BALACLAVA CAPS WOOL PLAIN-KNITTED	
15	IS 3086 : 1965 Reviewed In : 2020	Code for seaworthy packaging of cotton hosiery yarn and goods	October, 2020
16	IS 3100 : 2023	TEXTILES MENS WOOL COTTON SHORT DRAWERS SPECIFICATION	
17	IS 3325 : 1965 Reviewed In : 2020	Code for inland packaging of cotton hosiery yarn and goods	October, 2020

18	IS 3326 : 1978 Reviewed In : 2020	Specification for cotton stockinette (first revision)	October, 2020
19	IS 3329 : 1973 Reviewed In : 2020	Specification for socks, cotton (first revision)	October, 2020
20	IS 3330 : 2023	TEXTILES WOOL COTTON VESTS SPECIFICATION	
21	IS 3353 : 1966 Reviewed In : 2020	Code for inland packing of wool hosiery yarn and goods	October, 2020
22	IS 3530 : 1983 Reviewed In : 2020	Specification for gents' rib-knitted cotton stockings (first revision)	October, 2020
23	IS B3530 : 1983 Reviewed In : 2021	Gents' Rib - Knitted Cotton Stockings(Bi-lingual)	January, 2021
24	IS 3555 : 1983 Reviewed In : 2020	Specification for cotton singlets, white with blue welting (first revision)	October, 2020
25	IS 3596 : 1967 Reviewed In : 2020	Glossary of terms relating to hosiery	October, 2020
26	IS 3604 : 2023	TEXTILES JERSEYS ROUND- NECK PLAIN-KNITTED WORSTED SPECIFICATION	
27	IS 3617 : 2022	Textiles Gents pullover knitted Specification Second Revision	
28	IS 4044 : 2023	TEXTILES GENTS SLIPOVER KNITTED SPECIFICATION	
29	IS 4046 (Part 1) : 2013 Reviewed In : 2023	Textiles – Gent's cotton briefs – Specification Part 1 1x1 Rib knitted (third revision)	February, 2023
30	IS 4046 (Part 2) : 2013 Reviewed In : 2023	Textiles – Gent's cotton briefs – Specification Part 2 Plain knitted (first revision)	February, 2023
31	IS 4053 : 2023	TEXTILES KNITTED PUTTEES DYED SPECIFICATION	
32	IS 4375 : 2019 Reviewed In : 2024	Specification for men's cotton knitted sports shirt/T-shirt (second revision)	March, 2024
33	IS 4376 : 2013 Reviewed In : 2023	Textiles – Gent's cotton short drawers (Trunks) – Specification (second revision)	February, 2023
34	IS 4582 : 2021	Textiles Womens Cardigan Knitted Specification Second Revision	
35	IS 4809 : 1968 Reviewed In : 2020	Specification for cotton - Knitted string vests	October, 2020
36	IS 4964 : 2013 Reviewed In : 2023	Textiles – Vests, cotton, plain (Single jersey) knitted – Specification (fifth revision)	February, 2023

37	IS 4965 : 1991 Reviewed In : 2023	Textiles – Vest, cotton, interlock-knitted – Specification (second revision)	February, 2023
38	IS 4965 : 2024	Textiles â€" Cotton Interlock-Knitted Vest â€" Specification (Third Revision)	
39	IS 5084 : 2023	TEXTILES SOCKS NYLON SPECIFICATION	
40	IS 5085 : 2023	TEXTILES BERETS WOOL KNITTED SPECIFICATION	
41	IS 5450 : 2023	TEXTILES GLOVES WOOL KNITTED SPECIFICATION	
42	IS 5524 : 2023	TEXTILES MENS WOOL - COTTON UNDERPANTS SPECIFICATION	
43	IS 833 : 1977 Reviewed In : 2020	Specification for gents' rib-knitted nylon stockings (first revision)	October, 2020
44	IS 9469 : 2003 Reviewed In : 2023	Textiles – Fabric, cotton, plain (Single jersey) knitted – Specification (second revision)	February, 2023