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BUREAU OF INDIAN STANDARDS

AGENDA

Made-up Textiles (Including Ready-Made Garments) Sectional Committee, TXD 20 **24th Meeting**

Date	Time	Venue
05 April 2023 (Tuesday)	1100 h	Through videoconferencing (Cisco Webex)

CHAIRMAN: Dr Arindam Basu, Director General, NITRA

MEMBER SECRETARY: Shri Himanshu Shukla, Scientist B, BIS

Item 0 WELCOME & INTRODUCTORY REMARKS

Item 1 CONFIRMATION OF THE MINUTES OF THE PREVIOUS MEETING

1.1 The minutes of the 23rd meeting of the Committee held on 19 July 2022 in virtual mode were circulated vide BISDG letter no. TXD 20/A2.23 dated 25 July 2022. No comments have been received.

1.1.1 The Committee may **CONFIRM** the minutes as circulated

Item 2 SCOPE AND COMPOSITION OF TXD 20

2.1 The present scope and composition of the Committee is given in **Annex 1 (Pages 6-7).**

2.2.1 The Committee may **REVIEW**.

Item 3 ISSUES ARISING OUT OF PREVIOUS MEETING OF TXD 20

3.1 Summary of actions taken on the various decisions of the 23rd meeting is given in **Annex 2 (Pages 8-9).**

3.1.1 The Committee may **NOTE**.

Item 4 DRAFT STANDARD FOR FINALIZATION

4.1 As decided by the committee in the last meeting, the wide circulation drafts on following ISO standards was prepared by BIS and the same was issued for wide circulation for two months for eliciting technical comments from stakeholders for two months vide our letter reference no.- TXD 20/19715 dated 15-06-2022:

1) ISO 20947-1:2021 Performance evaluation protocol for digital fitting systems — Part 1: Accuracy of virtual human body representation [Doc. No. TXD/20(21414)]

2) ISO 20947-2:2020 Performance evaluation protocol for digital fitting systems — Part 2: Virtual garment [Doc. No. TXD/20(21416)]

No comment has been received. Draft standards as issued in wide circulation are given in **Annex 3 (Pages 10-37).**

4.1.1 The committee may **DECIDE.**

4.2 The draft revision of 'IS 14452:2009 Textiles — Care labelling code using symbols [Doc. No. TXD/20(21318)] based on latest version of ISO standard 'ISO 3758 : 2012' as prepared by BIS was issued in wide circulation for one month time period with approval of chairman, TXD 20.

No comment has been received. Draft standards as issued in wide circulation is given in **Annex 4 (Pages 38-43).**

4.2.1 The committee may **DELIBERATE** and **DECIDE**.

4.3 In the last meeting the committee decided the followings for the draft '**Textiles — Nylon Blue Airmail Bags — Specification [DOC. TXD 20 (18199)]':**

i) Department of post shall send sample to NITRA, Ghaziabad for testing the tear strength of Nylon fabric within 15 days. Based on the results, the requirement and test method of tear strength shall be incorporated in the existing draft of Nylon Orange Airmail Bag.

ii) To change the colour of the Nylon Airmail Bag cloth to International Orange (Indian Standard Colour, ISC No. 592) and modify the title of the draft standard on 'Textiles - Nylon Blue Airmail Bags - Specification' as 'Textiles — Nylon Orange Airmail Bags — Specification'

Test reports of the tearing strength as received from NITRA, Ghaziabad is given in **Annex 5A**.

Comments/technical inputs have also been received from NITRA, Ghaziabad is given in **Annex 5 (Pages 44-46)**.

4.3.1 The Committee may **DELIBERATE** and **DECIDE**.

Item 5 PRELIMINARY DRAFTS UNDER TXD 20

5.1 As decided by the committee in the last meeting a panel meeting was convened on 24 February, 2023 for discussion on Age group classification, Physical and Chemical requirements of Kidswear:

The composition of the panel is given below:

a) **Shri Sounder Raj SITRA, Coimbatore, (Convener)**
b) Shri Rajneesh Rai, Shahi Exports Pvt. Ltd., Ghaziabad
c) Shri Vivek Agrawal, NITRA, Ghaziabad
d) Dr. Karthikeyan K., SGS India Private Limited, Mumbai
e) Smt Deepali Palawat, ATIRA, Ahmedabad
f) Prof. Monika Gupta, NIFT, Delhi

g) Dr. Subrata Das, Bannari Amman Institute of Technology, Tamilnadu (Invitee)

After detailed deliberations, the panel decided the followings:

a) To categorize the kids in two age groups:
   i) Infant (at the age of 36 months old or below) and;
   ii) Children (at the age of over 3 years old and under 14 years old)

b) To modify the requirement and test method for flammability by taking assistance from available international standards. The requirement shall also consider the raised or plain surface of fabrics.

c) Physical requirements will be elaborated by giving suitable figures against each requirements.

d) Requirement for Azo dye test shall be excluded.

e) The requirements for surface coating will be added in addition to Total Heavy Metal requirement.

f) Total Pthalates in ppm, Banned aryl amines, volatile hydrocarbons requirements shall be incorporated/modified by taking reference from available International specification, REACH regulation, DIN standards and other standards available on Product safety & restricted substances in apparel.

The working draft on Safety Requirements of Kids wear as prepared is given in **Annex 6 (Pages 47-74).**

5.1.2 The Committee may **NOTE** and **DECIDE**

5.2 As decided by the committee in the last meeting draft revision of '**IS 10228 School Bag**' has been prepared incorporating the suggestions/comments received from CSIR-CLRI, Chennai.

The draft revision as prepared on school bag is given in **Annex 7 (Pages 47-74).**

5.2.1 The Committee may **DELIBERATE** and **DECIDE**.

Item 6 FORMULATION OF INDIAN STANDARDS ON NEW SUBJECTS

6.1 A communication was received from Trade Advisor, Ministry of Textiles and Department for Promotion of Industry and Internal Trade (DPIIT) on availability of Indian Standards based on HSN codes on Apparel/Fabrics/Knitted & Hosiery products etc. It was also learnt that these products are considered under PLI scheme of Ministry of Textiles, Gov. of India.

After scrutiny of the list, the following subjects have been identified on Knitted & Hosiery products for formulation of Indian Standards in a time bound manner:

Identified subjects on Apparel and Fabrics:

1) Men's or boys' shirt
2) Men's or boys' trousers
3) Raincoats
4) Overcoats
5) Jackets
6) Frocks

7) Skirts
8) Blazers
9) Woven Fabrics made of monofilament, textured and non-textured polyester yarn. (Polyester >= 85%)
10) Polyester viscose rayon mixed woven Fabric (Polyester < 85%)
11) Nylon woven fabric (Nylon >= 85%)
12) Cardigan (Woven) (Cotton & Synthetic)
13) Waistcoat (Cotton & Synthetic)
14) Ties
15) Bow ties
16) Cravats

6.1.1 The committee may **DELIBERATE** and **DECIDE**.

6.2 Further to formulate new Indian Standards on identified subjects listed at agenda item **6.1** on Apparel and Fabrics in a time bound manner, a mail was circulated proposing the appointment of 2 consultants with textiles background for a period of 6 months, which may be extendable for a further period of 6 months, as per the guidelines framed for the engagement of consultants by BIS to the Made-up textiles (Including ready made garments) Sectional Committee, TXD 20 dated 25 January 2023 seeking the approval from Sectional Committee, the series of actions taken for the above proposal is given below:

a) A mail with the above proposal was circulated vide e-mail dated 25 January 2023 to the members of Made-up textiles (Including ready made garments) Sectional Committee, TXD 20, with the last date of comments/inputs by 01 February 2023.
b) In response to the mail circulated Shri Ajay Gupta, Reliance Industries Ltd., Mumbai, has agreed to the above proposal for the engagement of consultant. No objection has been received from other members of TXD 20 on the above proposal.
c) The proposal along with the comments was sent to Chairman, TXD 20 for according his approval. The approval of chairman, TXD 20 was received.
d) Further, the above proposal along with the inputs received from members of TXD 20 was subsequently circulated vide e-mail dated 6 February 2023 to the members of Textile Division Council (TXDC) with the last date of comments/inputs by 10 February 2023.
e) No objection were received on the proposal. However suggestions related to guidelines for engagement of consultant have been received from Dr. A. K. Samnata, Chairman, TXD 07 and Shri M. S. Verma, Reliance Industries, Mumbai for increasing the maximum age limit and renumeration. A separate note has been sent to SCMD for needful action on the comments on guidelines for engagement of consultants.
f) The above proposal was sent to Chairman, TXDC for according his approval. The approval of chairman was received.

6.2.1 Committee may **NOTE**.

Item 7 REVIEW OF INDIAN STANDARDS

7.1 As per the decision of the Competent Authority of Bureau it was decided that all standards published prior to the year 2000 shall be revised keeping in view the changes in technology, current industrial practices and the needs/expectations of the consumers/users.

The list of standards published prior to the year 2000 under the domain of TXD 20 are given at **Annex 8 (P-89).**

7.1.1 The committee may NOTE and DECIDE.

Item 8 TECHNICAL WORK PROGRAMME OF THE COMMITTEE

8.1 The list of published standards under TXD 20 is given in **Annex 9 (Pages 90-91).**

8.1.1 The Committee may **NOTE.**

Item 9 DATES AND PLACE OF NEXT MEETING

Item 10 ANY OTHER BUSINESS

ANNEX 1
(*Item* 2.1)

Scope & Composition of Made-up Textiles (Including Ready-Made Garments) Sectional Committee, TXD 20

Scope: To formulate Indian Standards for terminology and specifications for made-up textiles including ready-made garments.

SL NO.	ORGANIZATION REPRESENTED	NAME OF THE REPRESENTATIVE PRINCIPAL/(ALTERNATE)
1.	Northern India Textile Research Assn. Ghaziabad	Dr Arindam Basu (*Chairman*)
2.	Ahmedabad Textile Industry's Research Association, Ahmedabad	Smt. Deepali Plawat (Shri Jigar Dave)
3.	Apparel Export Promotion Council Gurgaon	Dr. Saurabh Kumar (Shri Praveen Kukreja)
4.	Birla VXL Limited, Faridabad	Shri Ajit Kumar (Shri P K Das)
5.	Clothing Manufacturers' Association of India Mumbai	Nomination awaited
6.	CSIR- Central Leather Research Institute, Chennai	Shri K. Krishnaraj (Shri R Mohan)
7.	Department of Posts, Ministry of Communications and IT, New Delhi	Shri R C Meena (Shri S Buchchan)
8.	Directorate General of Quality Assurance New Delhi	Shri Jeevendra Singh (Shri Anuj Shukla)
9.	Garment Exporters Association, New Delhi	Shri H K L Magu
10.	Indian Institute of Technology New Delhi	Dr. Deepti Gupta
11.	Intertek Testing Services (I) Pvt Ltd New Delhi	Shri Milind Marathe (Shri Narayan Borade)
12.	Ministry of Defense (R & D) Kanpur	Shri Hirday Ram (Shri K K Gupta)

SL NO.	ORGANIZATION REPRESENTED	NAME OF THE REPRESENTATIVE PRINCIPAL/(ALTERNATE)
13.	National Institute of Fashion Technology New Delhi	Prof Vandana Narang (Prof Monika Gupta)
14.	National Textile Corporation Limited. New Delhi	Shri H S Sachdev
15.	Northern India Textile Research Association Ghaziabad	Shri Vivek Agarwal (Smt. Neha Kapil)
16.	Office of the Textile Commissioner Mumbai	Shri N K Gupta (Shri D S Rane)
17.	Orient Craft Ltd., Gurgaon	Nomination Awaited
18.	Reliance Industries Limited, Mumbai	Shri M S Verma (Shri Ajay Gupta)
19.	Sarla Fabric Pvt Ltd Mumbai	Shri Somes Bhaumick (Shri Rajneesh Rai)
20.	SGS, Chennai	Dr. Karthikeyan (Shri Michel Francis)
21.	Sheela Foams (P) Ltd Ghaziabad	Shri Rahul Gautam (Shri Arvind Kumar)
22.	Shahi Exports Pvt Ltd Faridabad	Shri J D Giri (Rajneesh Rai)
23.	Shriram Institute for Industrial Research Delhi	Shri Vinay Kumar Samania (Dr. Bhuvneshwar Rai)
24.	SITRA, Coimbatore	Shri Sounder raj
25.	Textiles Committee, Mumbai	Shri J.D.Barman (Shri R Chandran)

Annex 2
(*Item 3.1***)**

SUMMARY OF ACTIONS TAKEN ON THE MINUTES OF THE LAST MEETING

Item No.	Decision	Action taken
2.1	Changes in the composition/nominations	Updated composition is given in Annex 1
4.1	**DRAFT STANDARDS FOR FINALIZATION** The committee decided to finalize the following after incorporating standard colour and tearing strength requirement for Nylon Blue Airmail Bag: **1.** Textiles - Nylon Blue Airmail Bags - Specification [DOC. TXD 20 (18199)]	Coming for discussion under Agenda item **4.3.**
5.1	**WORKING DRAFT FOR APPROVAL FOR PRELIMINARY DRAFT** **5.1** The committee constituted a panel to prepare the preliminary draft on Safety requirements of Kidswear.	Coming for discussion under Agenda item **5.1.**
6	**TRANSFER OF INDIAN STANDARD ON SCHOOL BAG** In the last meeting the committee decided to prepare draft revision of IS 10228 School Bag based on the comments received from CSIR-CLRI.	Coming for discussion under Agenda item **5.2.**
7	**INTERNATIONAL ACTIVITIES** The committee considered the following International Standards published by ISO/TC 133 Clothing sizing systems - size designation, size measurement methods and digital fittings". 1) ISO 20947-1:2021 Performance evaluation protocol for digital fitting systems — Part 1: Accuracy of virtual human body representation 2) ISO 20947-2:2020 Performance evaluation protocol for digital fitting systems — Part 2: Virtual garment The committee decided that the preliminary drafts on above ISO standards shall be prepared by BIS and the	The drafts were issued on wide circulation. Coming for discussion under Agenda item **4.1.**

	same shall be issued for wide circulation for eliciting technical comments for two months	
8.1	**REVIEW OF INDIAN STANDARDS** The committee decided to circulate soft copies (preferably in word format for ease in incorporation of changes) to all members of committee for obtaining technical comments for 2 months.	No input has been received. Coming for discussion under Agenda item **7.1.**

Annex 3
(*Item 4.1***)**

Wide circulation drafts on 'ISO 20947-1:2021 Performance evaluation protocol for digital fitting systems — Part 1: Accuracy of virtual human body representation [Doc. No. TXD/20(21414)]' and 'ISO 20947-2:2020 Performance evaluation protocol for digital fitting systems — Part 2: Virtual garment [Doc. No. TXD/20(21416)]'

DRAFT FOR COMMENTS ONLY Doc. No: TXD 20 (21414)
December 2022

BUREAU OF INDIAN STANDARDS

Draft Indian Standard

PERFORMANCE EVALUATION PROTOCOL FOR DIGITAL FITTING SYSTEMS — PART 1: ACCURACY OF VIRTUAL HUMAN BODY REPRESENTATION

Not to be reproduced without permission of BIS or used as Standard

Last date for receipt of comment is **12 February 2023**

Made-up Textiles (Including Ready - Made Garments) Sectional Committee, TXD 20

NATIONAL FOREWORD

(Formal clauses will be added later)

This draft Indian Standard intended to be adopted is identical with ISO 20947-1 : 2021 'Performance evaluation protocol for digital fitting systems — Part 1: Accuracy of virtual human body representation' issued by the International Organization for Standardization (ISO).

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to thoseused in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to thisstandard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standardsthe current practice is to use a point (.) as the decimal marker.

In this standard intended to be adopted, reference appears to the following International Standard for which Indian Standard also exists. The corresponding Indian Standard which is to be substituted in its place is listed below along with its degree of equivalence for the edition indicated.

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*

ISO 8559-1, Size designation of clothes — Part 1: Anthropometric definitions for body measurement	IS/ISO 8559-1 : 2017 Textiles – Size designation of clothes – Anthropometric definitions for body measurement	Identical with ISO 8559-1
ISO 18825-1, Clothing — Digital fittings — Part 1: Vocabulary and terminology used for the virtual human body	IS/ISO 18825-1 : 2016 Textiles Clothing Digital fittings Part 1: Vocabulary and terminology used for the virtual human body	Identical with IS/ISO 18825-1
ISO 18825-2, Clothing — Digital fittings — Part 2: Vocabulary and terminology used for attributes of the virtual human body	IS/ISO 18825-2 : 2016 Textiles Clothing Digital fittings Part 2: Vocabulary and terminology used for attributes of the virtual human body	Identical with ISO 18825-2
ISO 20685-1, 3-D scanning methodologies for internationally compatible anthropometric databases — Part 1: Evaluation protocol for body dimensions extracted from 3-D body scans	IS 17030 : 2018 3 - D scanning methodologies for internationally compatible anthropometric databases	Technically Equivalent(Modified) with ISO 20685:2010

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (second revision)’.

Extract of ISO 20947-1 : 2021 'Performance evaluation protocol for digital fitting systems — Part 1: Accuracy of virtual human body representation'

1 Scope

This document focuses on the method of quantifying the differences in body dimensions and visualizing shape differences between the human body and a virtual human body model. This document provides a performance evaluation protocol for virtual human body representation systems, which create virtual human body (including virtual fit mannequin) models based on 3D body scan data and/or body dimensions data of a human body. The required accuracy of a virtual human body depends on the purpose and use of the digital fitting system.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- ISO 8559-1, *Size designation of clothes — Part 1: Anthropometric definitions for body measurement*
- ISO 18825-1, *Clothing — Digital fittings — Part 1: Vocabulary and terminology used for the virtual human body*
- ISO 18825-2, *Clothing — Digital fittings — Part 2: Vocabulary and terminology used for attributes of the virtual human body*
- ISO 20685-1, *3-D scanning methodologies for internationally compatible anthropometric databases — Part 1: Evaluation protocol for body dimensions extracted from 3-D body scans*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.
ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- — ISO Online browsing platform: available at https://www.iso.org/obp
- — IEC Electropedia: available at http://www.electropedia.org/

3.1
digital fitting system
fitting system that provides qualitative and/or quantitative evaluations of overall and/or specific simulation garment fit through analysis of the distribution of surface strain, gap between body and garment, heat map, cross section, surface wrinkles, seam drop, garment balance, etc.
3.2
virtual human modelling system
system for creating a **virtual human body** (3.3.2) for a specific market or individual
Note 1 to entry: Asymmetrical shape assumed to match the body shape of the individual.
3.3
virtual human model

three-dimensional model in digital format
[SOURCE:ISO 18825-1: 2016, 2.1.1]

3.3.1
parametric human body
virtual human model (3.3) with changeable parameters such as size and shape, etc.
Note 1 to entry: Parametric human body is created by modifying the parameters of the exemplar model imported from the 3D model library. The exemplar models vary by country as they are based on a database. Therefore, a parametric human body can be made on the basis of height variations, BMI (body mass index) and so on.
Note 2 to entry: The parameters of the parametric human body are presented in the parametric human body software. The parameters of the parametric human body can be added depending on the purpose of users.
Note 3 to entry: to entry See Figure 1.

Figure 1 — Examples of parameters of a male adult body

[SOURCE:ISO 18825-1: 2016, 2.1.1.1]

3.3.2 virtual human body
virtual clone (3.3.2.1) for digital fitting in the apparel industry, including information such as size, shape, cross section, body texture and skeletal structure
Note 1 to entry: Also called "fashion avatar". In computing, an avatar is the graphical representation of the user or the user's alter ego or character.
Note 2 to entry: The virtual human body is classified into two key types: virtual clone and virtual twin.
Note 3 to entry: In this document, virtual human body includes at least virtual clone, virtual twin and virtual fit mannequin model.
[SOURCE:ISO 18825-1: 2016, 2.1.1.2, modified — Note 3 to entry has been added.]

3.3.2.1
virtual clone
virtual shape

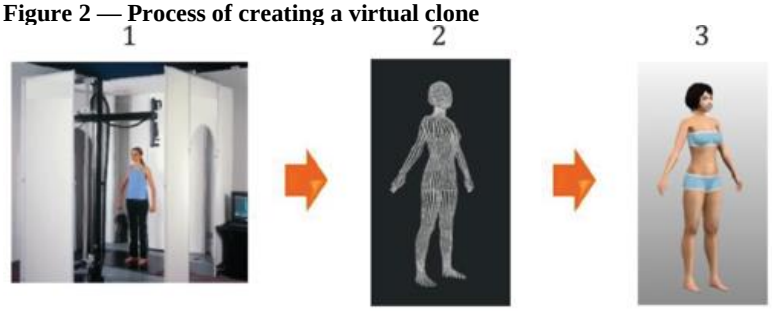
virtual human body (3.3.2) that is created by forming three-dimensional surface data from a 3D body scanned, using surface modelling processes including noise elimination, hole-filling and mesh generation

Note 1 to entry: It is essential that a user be scanned first to create a virtual clone.

Note 2 to entry: The virtual clone is identical to the body shape of the user.

Note 3 to entry: See Figure 2.

Figure 2 — Process of creating a virtual clone



Key

1	3D scanning
2	3D scanned point cloud
3	virtual clone

[SOURCE:ISO 18825-1: 2016, 2.1.1.2.1]

3.3.2.2

virtual twin

virtual size

virtual human body (3.3.2) morphed according to body dimensions acquired either through manual or automatic measurements

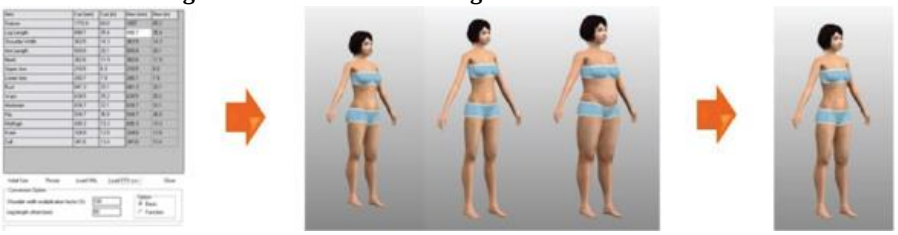
Note 1 to entry: The virtual twin is a **parametric human body** (3.3.1) as it can be altered with parameters.

Note 2 to entry: The virtual twin is not identical to the user; but is a close approximation that can be altered by entering parameters retrieved from a population database.

Note 3 to entry: See Figure 3.

Note 4 to entry: A virtual twin can be created directly from the person being scanned or as in case of most digital systems from an existing library.

Figure 3 — Process of creating a virtual twin



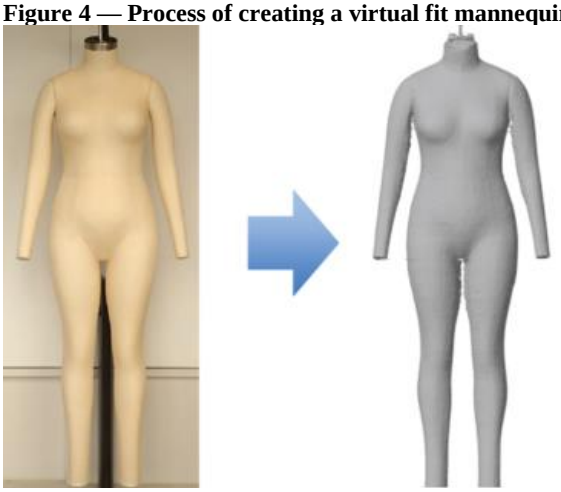
a) Body measurements **b) 3D model library** **c) Virtual twin**

NOTE Body measurements are necessary to create a virtual twin.

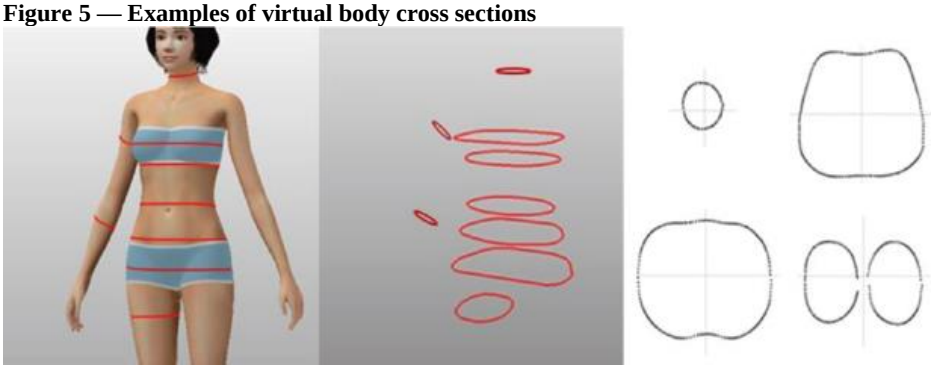
[SOURCE:ISO 18825-1: 2016, 2.1.1.2.2, modified — “that is applied” has been replaced by “according to” and Note 4 to entry has been added.]

3.3.2.3

virtual fit mannequin
virtual human body (3.3.2) that represents an actual human body model in digital format used for garment visualization
Note 1 to entry: The model is used for draping simulation (3D form and design realization for example) and examining silhouette and fit of a garment.
Note 2 to entry: See Figure 4.
Figure 4 — Process of creating a virtual fit mannequin



3.4
virtual standing position
posture of a **virtual human model** (3.3) used for measuring dimensions and fit
Note 1 to entry: In a virtual standing position, the head is in the Frankfurt plane, the long axes of the feet should be parallel to one another and 200 mm apart. The upper arms are abducted to form a 20° angle with the sides of the torso and the elbows are straight. But the palms face toward the torso. This position shall be used for evaluating the fit of garments.
3.5
virtual cross section
closed contour extracted from the plane cutting a virtual body segment perpendicular to its main axis or the three principle axes
Note 1 to entry: See Figure 5.
Note 2 to entry: The main axis is the axis that connects the joints on either side of the virtual body segment.
Figure 5 — Examples of virtual body cross sections



[SOURCE:ISO 18825-1: 2016, 2.2.2]

3.6

virtual body landmarks and levels

points that define the characteristic of the body shape of the user in the **virtual standing position** (3.4)

Note 1 to entry: For example, points of bone prominence, peak points on a convex or concave surface, or points like the bust point can be virtual body landmarks.

Note 2 to entry: On a physical body, a virtual fit mannequin or a physical fit mannequin, the landmarks and the levels are defined in the same manner.

Note 3 to entry: Some of the landmarks are evaluated in terms of their levels in this document (see Table 1).

Note 4 to entry: When a physical body or a physical fit mannequin is 3D scanned, markers for the landmarks can be put on it to extract their positions.

[SOURCE: ISO 18825-1:2016, 2.2.4]

Table 1 — Virtual and physical body landmark points and levels

No.	Virtual body landmark points	Male/Female
1	Virtual back neck-base point	both
2	Virtual shoulder point (Right and Left)	both
3	Virtual axilla point	male
4	Virtual bust point	female
5	Virtual underbust point	female
6	Virtual midriff level	female
7	Virtual side waist point (Right and Left)	both
8	Virtual back waist point	both
9	Virtual top hip level	both
10	Virtual hip point	both
11	Virtual crotch point	both
12	Virtual gluteal fold point	both
13	Virtual elbow point (Right and Left)	both
14	Virtual wrist point (Right and Left)	both
15	Virtual side neck-base point (Right and Left)	both
16	Virtual landing heel point	both

3.6.1

virtual back neck-base point

most posterior point at the back neck-base on the midsagittal plane with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)

[SOURCE:ISO 18825-2:2016, 2.1.5]

3.6.2

virtual shoulder point

most lateral point of the shoulder ridge line passing through the cross section covering the middle plane of the torso and arm with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.1.6]

3.6.3

virtual axilla point

lowest point under the axillary passing through the cross section between the torso and arm with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.1.7]

3.6.4

virtual bust point

most anterior point of the bust with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
Note 1 to entry: This point is used for a female.
[SOURCE:ISO 18825-2:2016, 2.1.10, modified — Note 1 to entry modified.]

3.6.5

virtual underbust point

lowest point or its level under the bust projection with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
Note 1 to entry: This point is used for a female.
[SOURCE:ISO 18825-2:2016, 2.1.11, modified — "or its level" has been added, Note 1 to entry has been modified.]

3.6.6

virtual midriff level

midway between the levels of the virtual underbust point and virtual side waist point
Note 1 to entry: This level is used for a female.
Note 2 to entry: [SOURCE: ISO 8559-1:2017, 3.1.21, modified — Term and definition modified to apply to the virtual human body, Note 1 to entry modified.]

3.6.7

virtual side waist point

most concave point or its level of the (right) side waist when viewed from the front with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.1.12]

3.6.8

virtual back waist point

point of the back waist on the midsagittal plane at the level of the **virtual side waist point** (3.6.7) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.1.13]

3.6.9

virtual top hip level

midway between the level of the virtual side waist point and virtual side hip point
[SOURCE:ISO 8559-1:2017, 3.1.24, modified — Term and definition modified to apply to the virtual human body.]

3.6.10

virtual hip point

most posterior point of the hip when viewed from the front when the **virtual human body** (3.3.2) is in a **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.1.15, modified — "when viewed from the front" has been added.]

3.6.11

virtual crotch point

lowest point of the torso on the midsagittal plane with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.1.16]

3.6.12
virtual gluteal fold point
most concave point on the sagittal plane passing through the**virtual hip point** (3.6.10) between hip and thigh or its level with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.1.20]

3.6.13
virtual elbow point
most protruding point of the elbow
[SOURCE:ISO 18825-2:2016, 2.1.17]

3.6.14
virtual wrist point
most concave point of the extended line of the little finger passing through the cross section between the arm and hand with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.1.18]

3.6.15
virtual side neck-base point
intersection point of the concave contour line at the neck-base passing through the shoulder ridge line with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.1.4]

3.6.16
virtual landing heel point
lowest point or level of the posterior calcaneus with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
Note 1 to entry: The virtual landing heel point can reach the floor or the top of the shoe heel.
[SOURCE:ISO 18825-2:2016, 2.1.26, modified — "or level" has been added, Note 1 to entry has been modified.]

3.7
virtual body dimensions
size information on virtual body segments of the **virtual human body** (3.3.2) that corresponds to measured anthropometric dimensions of the user in the **virtual standing position** (3.4)
Note 1 to entry: See 6.2.

3.7.1
virtual chest girth
horizontal girth of the torso passing through the **virtual axilla point** (3.6.3) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.17]

3.7.2
virtual bust girth
horizontal girth of the torso passing through the **virtual bust point** (3.6.4) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.18]

3.7.3
virtual underbust girth
horizontal girth of the torso passing through the **virtual underbust point** (3.6.5) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.19]

3.7.4
virtual waist girth
horizontal girth of the torso passing through the **virtual side waist point** (3.6.7) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.20]
3.7.5
virtual hip girth
horizontal girth of the torso passing through the **virtual hip point** (3.6.10) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.22]
3.7.6
virtual thigh girth
horizontal girth of the leg at the level of **virtual gluteal fold point** (3.6.12) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.23, modified — "virtual crotch point" has been changed to "virtual gluteal fold point".]
3.7.7
virtual chest height
vertical distance between the **virtual landing heel point** (3.6.16) and **virtual axilla point** (3.6.3) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
3.7.8
virtual bust height
vertical distance between the **virtual landing heel point** (3.6.16) and **virtual bust point** (3.6.4) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.2]
3.7.9
virtual underbust height
vertical distance between the **virtual landing heel point** (3.6.16) and **virtual underbust point** (3.6.5) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
3.7.10
virtual waist height
vertical distance between the **virtual landing heel point** (3.6.16) and **virtual side waist point** (3.6.7) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.3]
3.7.11
virtual hip height
vertical distance between the **virtual landing heel point** (3.6.16) and **virtual hip point** (3.6.10) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4).
[SOURCE:ISO 18825-2:2016, 2.2.4]
3.7.12
virtual thigh height
vertical distance between the **virtual landing heel point** (3.6.16) and **virtual gluteal fold point** (3.6.12) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
3.7.13
virtual arm length
sum of the distance of the straight line between **virtual shoulder point** (3.6.2) and **virtual elbow point** (3.6.13), and the distance of the straight line between virtual elbow point and **virtual wrist point** (3.6.14) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
Note 1 to entry: In case ‘virtual arm length’ is used to mean ‘surface length’, it should be marked that there has been a change in meaning.

Note 2 to entry: In this document virtual arm length is mainly used to mean surface length.
[SOURCE:ISO 18825-2:2016, 2.2.10, modified — Notes 1 and 2 to entry have been modified.]

3.7.14

virtual upper arm girth

maximum girth of the upper arm perpendicular to the main axis of the upper arm and passing through the **virtual axillia point** (3.6.3) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.14]

3.7.15

virtual wrist girth

girth of the forearm perpendicular to the main axis of the forearm and passing through the **virtual wrist point** (3.6.14) with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.16]

3.7.16

virtual inside leg height

vertical distance between the **virtual landing heel point** (3.6.16) and virtual crotch with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.5, modified — The term "virtual crotch height" has been deleted.]

3.7.17

virtual centre back waist length

surface distance between the virtual centre back neck-base point and the virtual centre back waist point with the **virtual human body** (3.3.2) in the **virtual standing position** (3.4)
[SOURCE:ISO 18825-2:2016, 2.2.9, modified — "Centre" was added to the term and to the definition.]

3.7.18

virtual shoulder width

horizontal distance between right and left **virtual shoulder points** (3.6.2)
Note 1 to entry: In case ‘virtual shoulder width’ is used to refer to ‘surface length’, it should be marked that there has been a change in meaning.
[SOURCE:ISO 18825-2:2016, 2.2.8]

3.7.19

virtual shoulder slope

values, in degrees, of the angles of inclination of a line joining the(virtual) shoulder point and the (virtual) side neck-base point against the horizontal plane
Note 1 to entry: The difference (in mm) between levels of the (virtual) shoulder point and the (virtual) side neck-base point may be used (see ISO 8559-1:2017, Figure 115).

3.7.20

virtual shoulder length

surface distance between a **virtual shoulder point** (3.6.2) and a **virtual side neck-base point** (3.6.15) in the right and left side of a **virtual human body** (3.3.2)

Please e-mail your comments to textiles.bis@gmail.com or txd@bis.gov.in

NAME OF THE COMMENTATOR/ORGANIZATION:

DOCUMENT NO: TXD 20 (21414)
BIS LETTER REFERENCE NO. : TXD 20/21414

Item, Clause Sub-Clause No. Commented upon (Use Separate Box afresh)	**Comments**	**Specific Proposal (Draft clause to be add/amended)**	**Remarks**	**Technical References and justification on which (2), (3), (4) are based**
(1)	**(2)**	**(3)**	**(4)**	**(5)**

DRAFT FOR COMMENTS ONLY Doc. No: TXD 20 (21416)
December 2022

BUREAU OF INDIAN STANDARDS

Draft Indian Standard

PERFORMANCE EVALUATION PROTOCOL FOR DIGITAL FITTING SYSTEMS — PART 2 : VIRTUAL GARMENT

Not to be reproduced without permission of BIS or used as Standard	Last date for receipt of comment is **12 February 2023**

Made-up Textiles (Including Ready - Made Garments) Sectional Committee, TXD 20

NATIONAL FOREWORD

(Formal clauses will be added later)

This draft Indian Standard intended to be adopted is identical with ISO 20947-2 : 2021 'Performance evaluation protocol for digital fitting systems — Part 2: Virtual Garment' issued by the International Organization for Standardization (ISO).

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to thoseused in Indian Standards. Attention is particularly drawn to the following:

c) Wherever the words 'International Standard' appear referring to thisstandard, they should be read as 'Indian Standard'.

d) Comma (,) has been used as a decimal marker while in Indian Standardsthe current practice is to use a point (.) as the decimal marker.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical values (second revision)'.

Extract of ISO 20947-2 : 2021 'Performance evaluation protocol for digital fitting systems — Part 1: Accuracy of virtual human body representation'

1 Scope

This document specifies a method for describing the functions and the method for evaluating the performance of the virtual garment pattern cutting and clothing simulation modules of digital fitting systems. This document is applicable to fashion designers and pattern technologists (makers) for generating virtual garment patterns, and testing them on a virtual fit mannequin (fit form).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- — ISO Online browsing platform: available at https://www.iso.org/obp
- — IEC Electropedia: available at http://www.electropedia.org/

3.1 General

3.1.1

digital fitting system

simulation of a virtual garment pattern or virtual garment over a **virtual fit mannequin (fit form)** (3.1.2) providing qualitative and/or quantitative evaluation of the fit through analysis of the distribution of, among other things, surface strain, gap between body and garment, tension map, cross section, surface wrinkles, garment balance

3.1.2

virtual fit mannequin (fit form)

model used for draping and examining silhouette and fit of a garment in a virtual space used for digital fitting

3.1.3

virtual garment

three-dimensional clothing in digital form that exists in virtual space

3.1.4

virtual garment pattern

shapes consisting of straight lines and closed curves that mark the area of a digitized pattern used on the *virtual***garment** (3.1.3)

Note 1 to entry: Each pattern consists of a contoured and multiple internal lines, which are used to express seams, internal openings, fold lines, and other garment characteristics.

3.1.5

clothing simulation

creation and drape simulation of a virtual garment on the virtual human body using a **virtual garment pattern** (3.1.4), virtual sewing and bounding volume

3.1.6

material properties

physical properties of material, including tensile modulus, bending rigidity, shear resistance, thickness, weight

Note 1 to entry: These can be simulated for virtual fabrics using cloth simulation models.

Note 2 to entry: See Annex C.

3.1.7

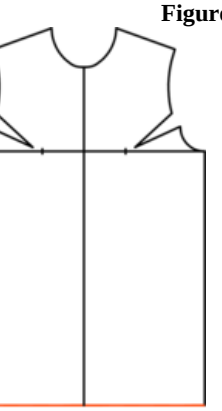
sewing information
information necessary to construct a virtual garment from virtual garment patterns, including seam lines, specific points on a virtual garment pattern such as positions of snaps, hooks, and buttons, notch marks, grain line, and layer information

3.2 Lines on virtual pattern and their lengths

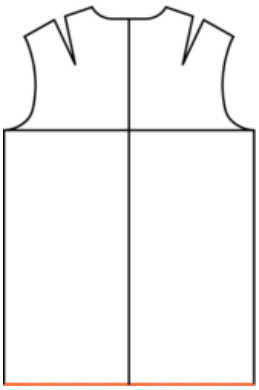
3.2.1 Upper pattern

3.2.1.1
hem line
line at the hem of front bodice or back bodice
Note 1 to entry: See Figure 1. Length of the front hem line, length of back hem line, and total length are measured.

Figure 1 — Hem line



a) Front hem line of front bodice

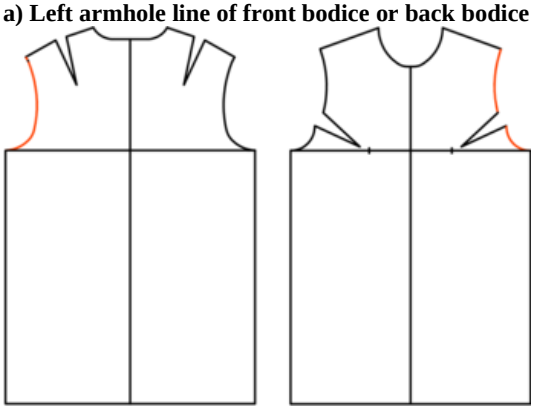


b) Back hem line of back bodice

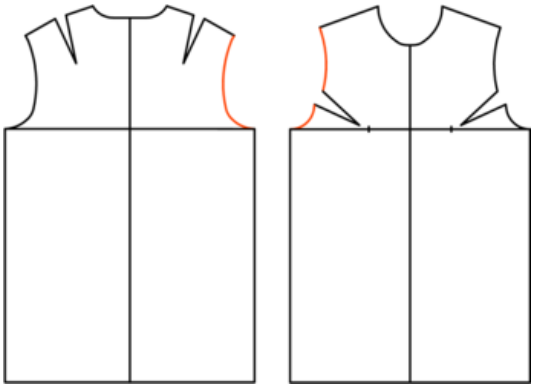
3.2.1.2
armhole line
line at the left and right armhole of front bodice or back bodice
Note 1 to entry: See Figure 2. Length of armhole lines, and total length of armhole lines of front bodice and back bodice are measured.

Figure 2 — Armhole line

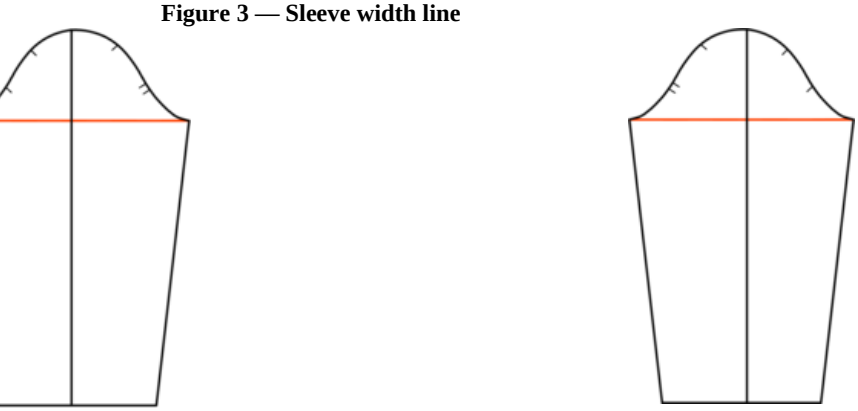
a) Left armhole line of front bodice or back bodice



b) Right armhole line of front bodice or back bodice

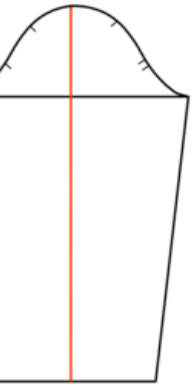


3.2.1.3
sleeve width line
straight line connecting the two ends of a line sewing front bodice and back bodice (left or right)
Note 1 to entry: See Figure 3. Length of right or left sleeve width line is measured.
Figure 3 — Sleeve width line

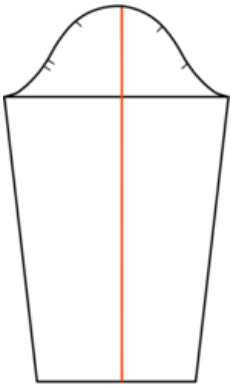


Left sleeve **b) Right sleeve**

3.2.1.4
sleeve length line
straight line passing the top of the line sewing front bodice and back bodice and perpendicular to sleeve width line (bicep line) (left or right)
Note 1 to entry: See Figure 4. Length is measured from the top of the sleeve crown seam line to sleeve hem line of the right or left sleeve.
Figure 4 — Sleeve length line



Left sleeve



b) Right sleeve

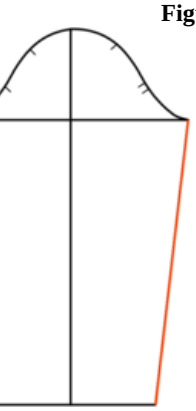
3.2.1.5

underarm seam line

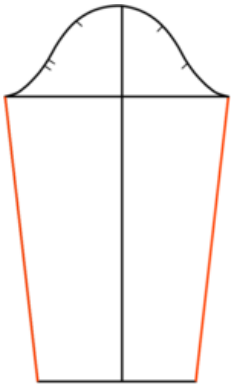
lines connecting the edge of line sewing front bodice and back bodice and edge of sleeve hem line along which a sleeve is stitched to make a tube (left or right)

Note 1 to entry: See Figure 5. Length is measured from the edge of line sewing front bodice and back bodice to the edge of sleeve hem line of the right or left sleeve. Either line of the left or right sleeve is measured because they are the same length.

Figure 5 — Underarm seam line



Left underarm



b) Right underarm

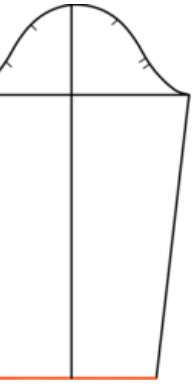
3.2.1.6

sleeve hem line

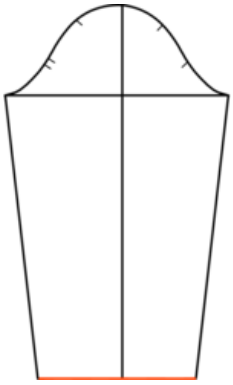
line at the lower edge of the sleeve pattern indicating the hem (left or right)

Note 1 to entry: See Figure 6. Length is measured for the right or left sleeve hem line.

Figure 6 — Sleeve hem line



Left sleeve



b) Right sleeve

3.2.2 Upper pattern and one-piece dress

3.2.2.1

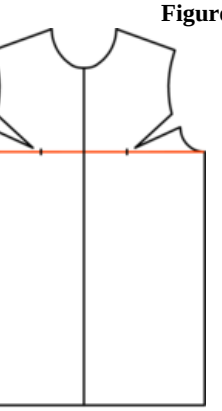
bust line

straight line passing the level of the breast point of the pattern and

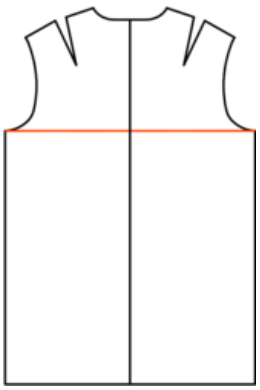
- — perpendicular to the front centre line of the front bodice from the left side line to the right side line (front bust line), or
- — perpendicular to the back centre line of the back bodice from the left side line to the right side line (back bust line)

Note 1 to entry: Upper pattern, see Figure 7, one-piece dress, see Figure 8. Length of the front bust line, length of back bust line, and total length are measured.

Figure 7 — Bust line (upper pattern)



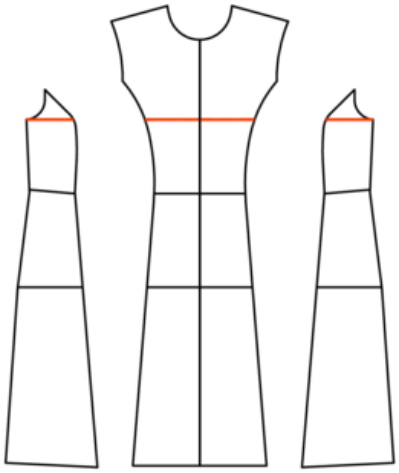
Front bust line of front bodice



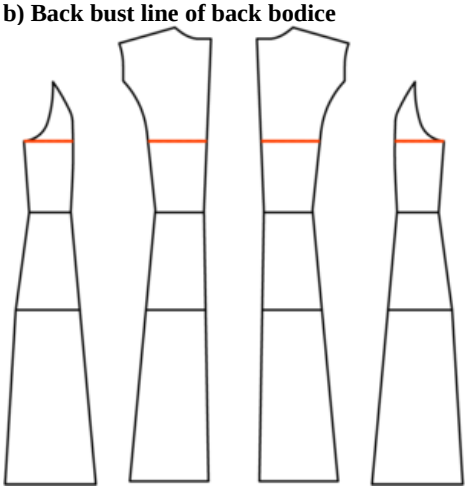
b) Back bust line of back bodice

Figure 8 — Bust line (one-piece dress)

a) Front bust line of front bodice



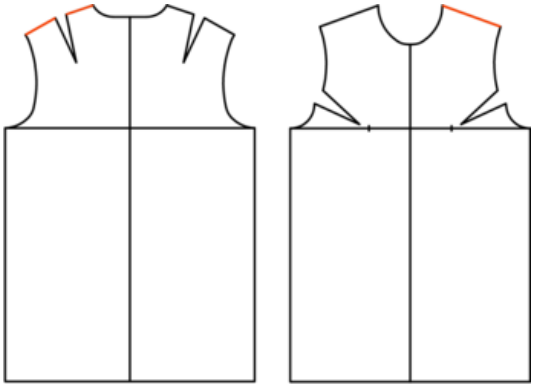
b) Back bust line of back bodice



3.2.2.2
shoulder line
straight line at the shoulder of front bodice or back bodice along which the front bodice and back bodice are stitched together
Note 1 to entry: Upper pattern, see Figure 9, one-piece dress, see Figure 10. Length of shoulder lines are measured.

Figure 9 — Shoulder line (upper pattern)

a) Left shoulder line of front bodice or back bodice



b) Right shoulder line of front bodice or back bodice

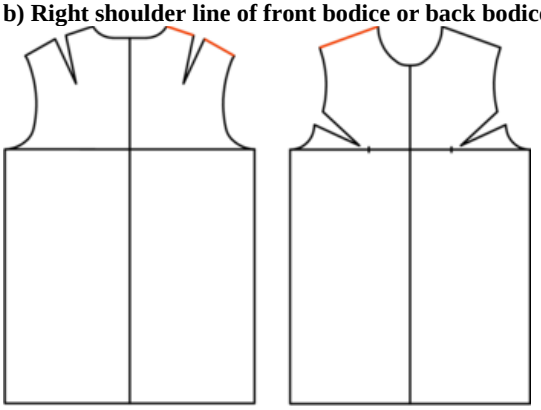
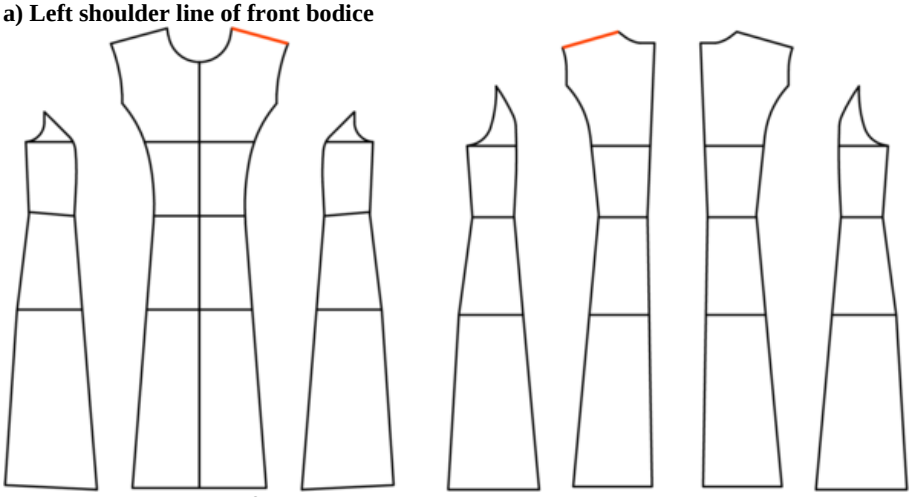
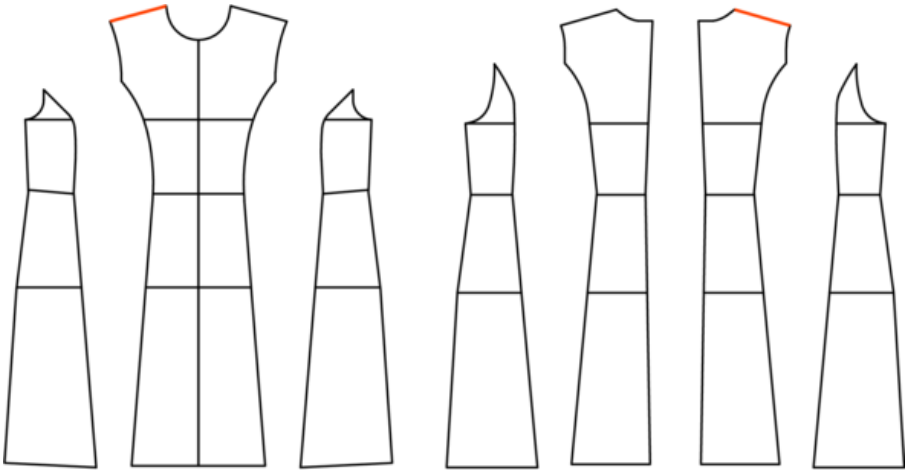


Figure 10 — Shoulder line (one-piece dress)

a) Left shoulder line of front bodice

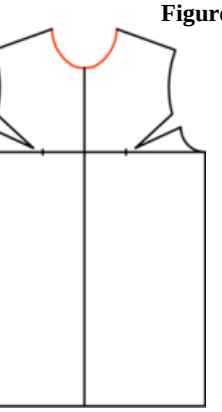


b) Right shoulder line of back bodice

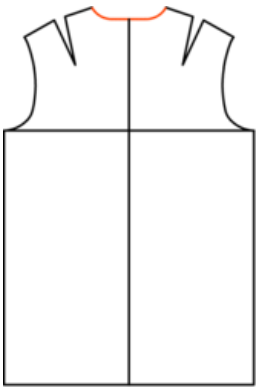


3.2.2.3
neck line
line at the neck of front bodice or back bodice
Note 1 to entry: Upper pattern, see Figure 11, one-piece dress, see Figure 12. Length of front neck line, length of back neck line, and total length are measured.

Figure 11 — Neck Line (upper pattern)

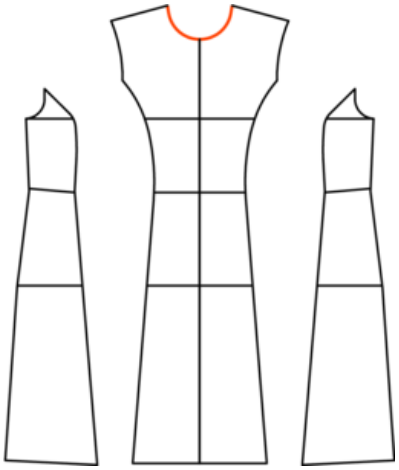


Front neck line of front bodice

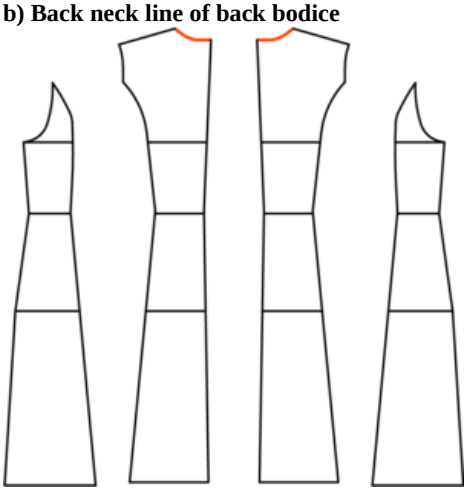


b) Back neck line of back bodice

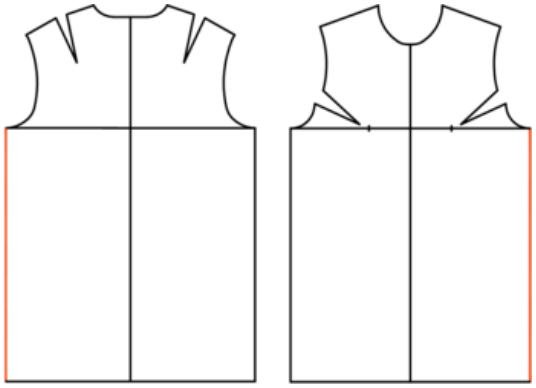
Figure 12 — Neck line (one-piece dress)
a) Front neck line of front bodice



b) Back neck line of back bodice



3.2.2.4
side seam line
lines at the side of front bodice or back bodice along which the front bodice and back bodice are stitched together (left or right)
Note 1 to entry: Upper pattern, see Figure 13, one-piece dress, see Figure 14. Length of side lines (right or left of front or back side lines) are measured.
Figure 13 — Side line seam line (upper pattern)
a) Left side line of front bodice or back bodice



b) Right side line of back bodice or back bodice

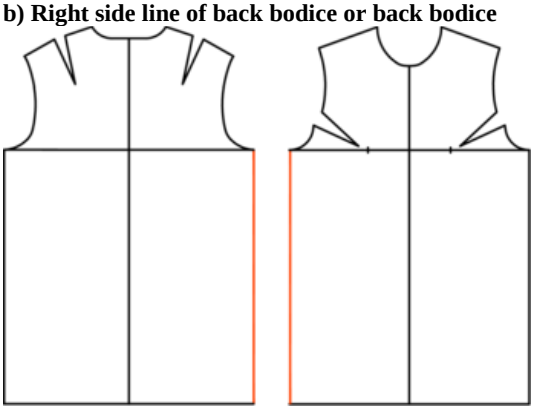
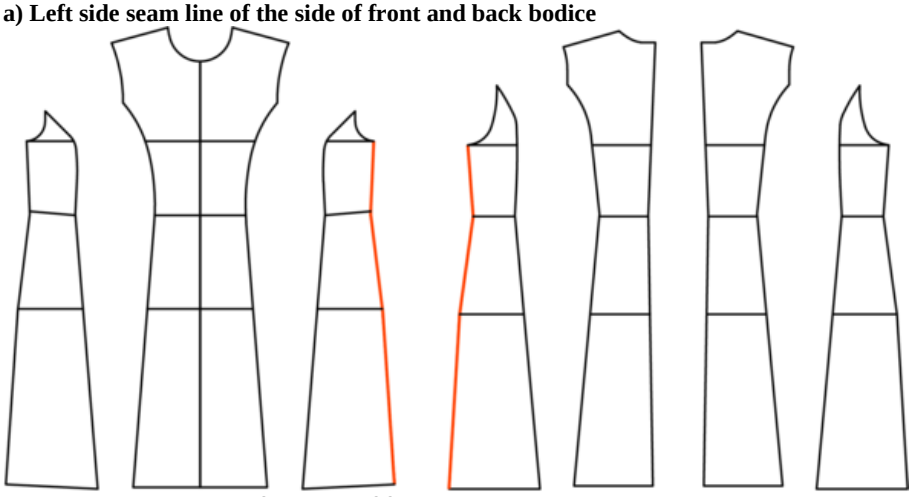
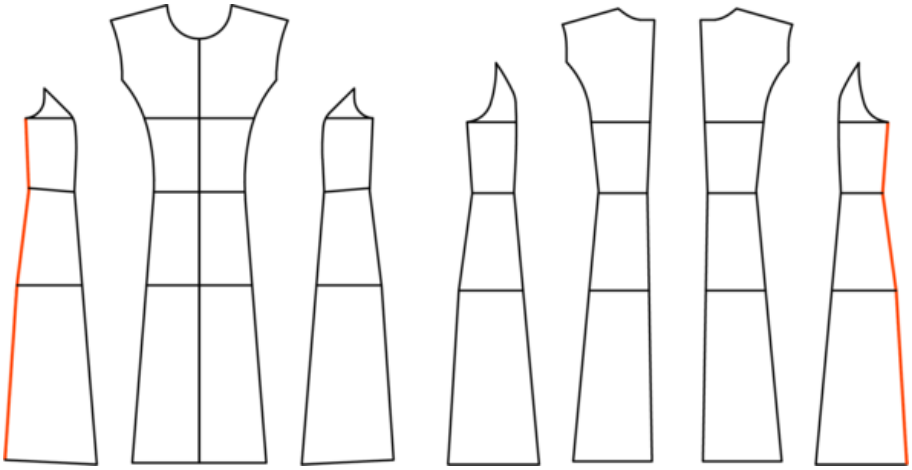


Figure 14 — Side seam line (one-piece dress)

a) Left side seam line of the side of front and back bodice



b) Right side seam line of the side of front and back bodice



3.2.2.5
centre front line
straight line passing the centre of front neck line and perpendicular to the bust line
Note 1 to entry: Upper pattern, see Figure 15, one-piece dress, see Figure 16. Length is measured from neck line to hem line.

Figure 15 — Centre front line (upper pattern)

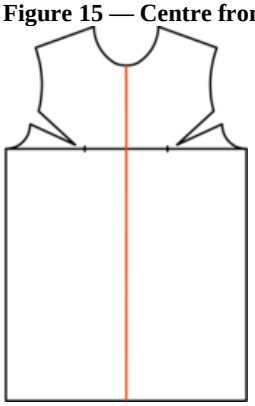
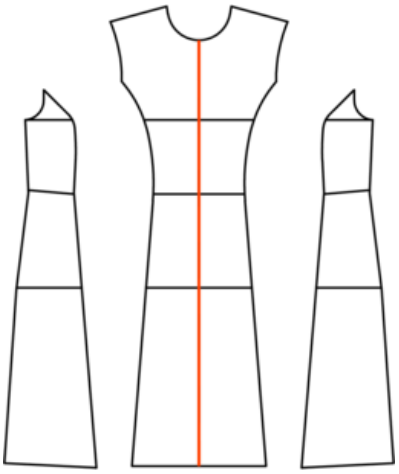


Figure 16 — Centre front line (one-piece dress)



3.2.2.6
centre back line
straight line passing the centre of back neck line and perpendicular to the bust line
Note 1 to entry: Upper pattern, see Figure 17, one-piece dress, see Figure 18. Length is measured from neck line to hem line.

Figure 17 — Centre back line (upper pattern)

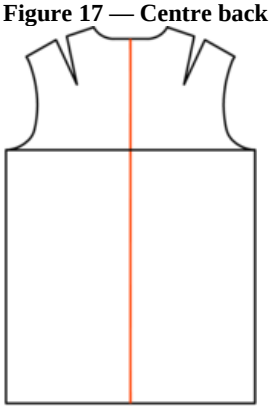
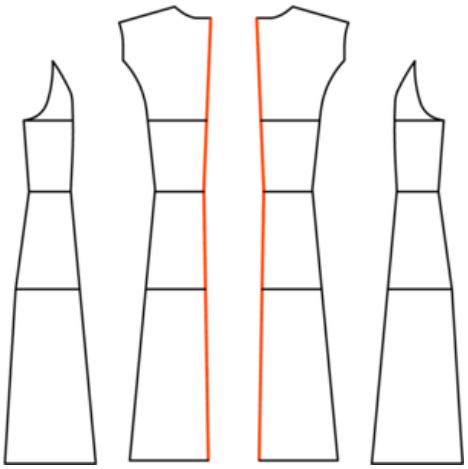


Figure 18 — Centre back line (one-piece dress)



3.2.3 Lower pattern

3.2.3.1

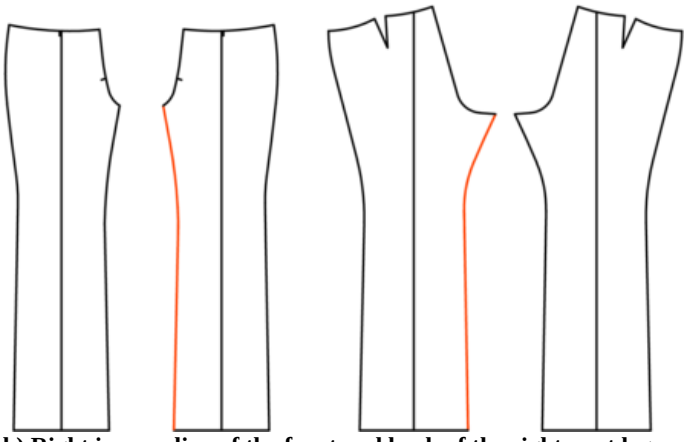
inseam line

inside line of the pant legs (below the crotch) (left or right)

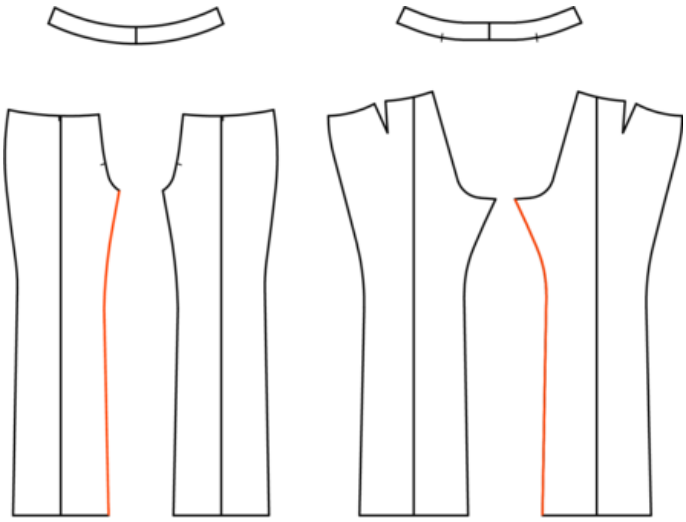
Note 1 to entry: See Figure 19. Length of inseam lines are measured.

Figure 19 — Inseam line

a) Left inseam line of the front and back of the left pant legs



b) Right inseam line of the front and back of the right pant legs



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NAME OF THE COMMENTATOR/ORGANIZATION:

DOCUMENT NO: TXD 20 (21416)
BIS LETTER REFERENCE NO. : TXD 20/21416

Item, Clause Sub-Clause No. Commented upon (Use Separate Box afresh)	**Comments**	**Specific Proposal (Draft clause to be add/amended)**	**Remarks**	**Technical References and justification on which (2), (3), (4) are based**
(1)	**(2)**	**(3)**	**(4)**	**(5)**

Annex 4
(*Item* 4.2**)**

Wide circulation draft on 'Textiles — Care labelling code using symbols'

DRAFT FOR COMMENTS ONLY Doc. No: TXD 20 (21318)
December 2022

BUREAU OF INDIAN STANDARDS

Draft Indian Standard

TEXTILES — CARE LABELLING CODE USING SYMBOLS

(*Second Revision of* IS 14452)

Not to be reproduced without permission of BIS or used as Standard	Last date for receipt of comment is **31 December 2022**

Made-up Textiles (Including Ready - Made Garments) Sectional Committee, TXD 20

NATIONAL FOREWORD

(Formal clauses will be added later)

This draft Indian Standard intended to be adopted is identical with ISO 3758 : 2012 'Textiles — Care labelling code using symbols' issued by the International Organization for Standardization (ISO).

This standard was originally published in 1997 and was based on ISO 3758 : 1991 ' Textiles — Care labelling code using symbols'. The first revision was undertaken to align it with ISO 3758 : 2005 by adoption under dual numbering system. Since the revised version of ISO 3758 : 2012 has been published, the present revision has been undertaken to harmonize it with the latest version of ISO 3758:2012.

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards the current practice is to use a point (.) as the decimal marker.

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.

Extract of ISO 3758 : 2022, Textiles — Care labelling code using symbols

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 3758 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 2, *Cleansing, finishing and water resistance tests*.

This third edition cancels and replaces the second edition (ISO 3758:2005), of which definition 2.4.2 **natural drying** was revised. Symbols for natural drying processes were added in the new Table 4 and Annex C of the 2005 edition was deleted. Subclause 4.3 **Use of symbols** was revised as in this edition. The symbols for bleaching in Table 2 have been technically revised and one symbol concerning bleaching has been changed. In Table 6, **Symbols for professional textile care**, a symbol for "do not professional wet clean" was added in this edition. Some editorial changes have also been made.

Introduction

The variety of fibres, materials and finishes used in the production of textile articles, together with the development of cleansing and care procedures, makes it difficult and often impossible to decide on the appropriate cleansing and care treatment for each article simply by inspecting it. To help those who have to make such a decision (principally the consumer but also launderers and dry cleaners), this code of graphic symbols was established, based on the GINETEX care labelling system, for use in the permanent marking of textile articles with information on their care in use as an International Standard in 1991. In certain countries GINETEX has the intellectual property right of the 5 main symbols specified in this International Standard.

In order to make this code "easily understandable and recognizable" for the consumer world-wide, symbols have been limited as to types and numbers as far as practicable.

The first and second editions of this International Standard published in 1991 and 2005 were a result of a compromise between two requirements: being simple enough to be understood by users in all countries, irrespective of the language they speak, yet providing as much information as possible to prevent irreversible damage being caused during care treatments. This International Standard has been made sufficiently flexible to accommodate the needs of practically all who wish to use it. This has been achieved by providing a sufficiently large selection of care treatments, from which the user may select the most suitable for any particular need.

The revision was necessary to reflect current cleansing practices including technical developments, new bleach systems, and the alternative to conventional dry cleaning using aqueous systems. Furthermore, modifications in the description of care processes have been introduced in order to avoid hindering process development.

The international care label used in this International Standard gives care instructions using a sequence of symbols in the order of five main treatments: washing, bleaching, drying, ironing and professional textile care.

Annex A has been developed to give a description of characteristics and available test methods to ensure the correct selection of care symbols.

Annex B deals with regional and national requirements in care labelling.

When deemed necessary, words may be used as well as the symbols. Examples are included in Annex C.

1 Scope

This International Standard

- — establishes a system of graphic symbols, intended for use in the marking of textile articles, and for providing information on the most severe treatment that does not cause irreversible damage to the article during the textile care process, and
- — specifies the use of these symbols in care labelling.

The following domestic treatments are covered: washing, bleaching, drying and ironing. Professional textile care treatments in dry and wet cleaning, but excluding industrial laundering, are also covered. However, it is recognized that information imparted by the domestic symbols will also be of assistance to the professional cleaner and launderer.

NOTE Symbols for industrial laundering can be found in ISO 30023.

This International Standard applies to all textile articles in the form in which they are supplied to the end user.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1

textile articles

yarns, piece goods and made-up articles containing at least 80 % by mass textile material

2.2

washing

process designed to clean textile articles in an aqueous bath

Note 1 to entry: Washing includes all or some of the following operations in relevant combinations:

- — soaking, pre-washing and main washing — carried out usually with heating, mechanical action and in the presence of detergents or other products — and rinsing;
- — water extraction, i.e. spinning or wringing performed during and/or at the end of the operations mentioned above.

These operations may be carried out by machine or by hand.

2.3

bleaching

process carried out in an aqueous medium before, during or after washing, requiring the use of an oxidizing agent including either chlorine or oxygen/non-chlorine products, for the purpose of improving soil and stain removal and/or improving whiteness

2.3.1

chlorine bleach

agent that releases hypochlorite ions in solution, e.g. sodium hypochlorite

2.3.2

oxygen/non-chlorine bleach

agent that releases a peroxygen species in solution

Note 1 to entry: Oxygen bleach products encompass a wide range of different activated and non-activated bleaching species which vary in their activity. A bleach activator is an agent that initiates bleaching to occur at lower washing temperatures.

2.4

drying

process carried out on textile articles after washing to remove residual water (or moisture)

2.4.1

tumble drying

process carried out on textile articles after washing and hydro-extracting, with the intention of removing residual water by treatment with hot air in a rotating drum

2.4.2

natural drying

process carried out on a textile article after washing, with the intention of removing residual water by line drying, or drip drying, or flat drying and, if appropriate, combined with drying in the shade

2.4.2.1

line drying

process carried out on a textile article after washing and hydro-extracting, with the intention of removing residual water by hanging on a line or hanger

2.4.2.2

flat drying

process carried out on a textile article after washing and hydro-extracting, with the intention of removing residual water by lying horizontal

2.4.2.3

drip line drying

process carried out on a textile article after washing without hydro-extracting, with the intention of removing residual water by hanging wet articles on a line or hanger

2.4.2.4

drip flat drying

process carried out on a textile article after washing without hydro-extracting, with the intention of removing residual water by laying wet articles horizontal

2.5

ironing and pressing

process carried out on a textile article to restore its shape and appearance by means of an appropriate appliance using heat, pressure and possibly steam

2.6

professional textile care

professional dry cleaning and professional wet cleaning, excluding industrial laundering

2.6.1

professional dry cleaning

process for cleaning textile articles by means of treatment in any solvent (excluding water) normally used for dry cleaning by professionals

Note 1 to entry: This process consists of cleaning, rinsing and spinning. It is followed by appropriate drying and restorative finishing procedures.

2.6.2

professional wet cleaning

process for cleaning textile articles in water carried out by professionals using special technology (cleaning, rinsing and spinning), detergents, and additives to minimize adverse effects

Note 1 to entry: Professional wet cleaning is followed by appropriate drying and restorative finishing procedures.

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NAME OF THE COMMENTATOR/ORGANIZATION:

DOCUMENT NO: TXD 20 (21318)
BIS LETTER REFERENCE NO. : TXD 20/21318

Item, Clause Sub-Clause No. Commented upon (Use Separate Box afresh)	**Comments**	**Specific Proposal (Draft clause to be add/amended)**	**Remarks**	**Technical References and justification on which (2), (3), (4) are based**
(1)	**(2)**	**(3)**	**(4)**	**(5)**

Annex 5
(*Item* 4.3**)**

Comments from Dr. Arindam Basu, Director General, NITRA

Dear Mr. Gupta
During the meeting we discussed that the standard for Nylon Air Mail Bag. As we discussed there are various lacunae in the proposed standard and I am sending herewith our comments on the same. We have tested the bag and found the fabric is nowhere near the standard.
1) Nature of fibre/ filament should be mentioned as on top we are telling it Nylon bag.
2) It is mentioned that fabric should be plain. We thought if rib stock weave is used it will give more strength.
3) The ends/dm mentioned as 520+/- 5% but for the supplied bag it is 402 only
4) Picks/ dm should be 378+/- 5% in actual case it was found 287
5) Mass gsm is mentioned 80 max, actual bag have only 56.4 GSM. We recommend lower limit also.
6) As the fabric is very much inferior as compared to the standard all kind of tensile properties are very much inferior. Hence its tearing strength cannot be considered in standard. Test method doesn't match with IS method described.
7) For help to the manufacturers standard warp and weft count may be provided as guideline.
If it is not possible to make all these changes without convening the meeting we should postpone the approval now. The postal department may be in hurry but the bag sent by them are not comparable with standard.
Thanking you

Proposed changes:

Table 1 : Requirement of " Nylon Fabric For Air Mail Bags "

SN	Characteristics	Requirements as given in Draft Spec.	Comments	Test Result	Test Method
1	Nature of Fibre/Filament	Not Given in Table	Nylon	--	IS : 2005
2	Weave	Plain	**Proposed :** **May be Rib Stop Weave (for guidance- 2/3 thread Rib may be at every 16 threads of warp and weft)**	Plain	Visual
3	End/dm	520 ±5 %	**Proposed :** 420 ±5 %	402	IS 1963-2004

			Tolerance may be given as minimum also		
4	Picks/dm	378± 5 %	**Proposed :** **400 ±5 %** **Tolerance may be given as minimum also**	287	IS 1963-2004
5	Mass, g/m^2	80 Max	In place of 80 Max , **Proposed :** **75-85 GSM**	56.4	IS 1964-2001
6	Breaking strength, N -Warp-wise -Weft-wise	1020 N(104 Kgf) ,Min 892N (91 Kgf) , Min	Test Method referes to 20x 10 cm strip which may be amended to 5x 20 cm ,Ravelled strip Method and accodingly requirements needs to be amended **Proposed :** **Warp : 600 N Min** **Weft : 500 N Min** **As per IS 1969 part-1** **5x 20 cm Ravelled Strip Method**	432 453	IS: 1969 Part-1
7	Tearing Strength,N - Warp-wise - Weft-wise	Not Given	Requirement needs to be on higher side than the Test results recd. (Low tear and Tensile Strength is due to low GSM Fabric) **Proposed –** **Warp – 40 N Min** **Weft – 35 N Min** **As per IS 6489 Pt-1**	**As per IS 6489-1 (Elmendorf Tear Method)** **Warp -11.26 N** **Weft - 9.71 N** **As per IS 7016 Pt-3 , Trouser Shape -Single Tear method)** **Warp-13.63N** **Weft- 11.40 N**	IS:6489 Pt-1 (Elmendorf Tear Method) or IS 7016 Pt-3 Method A2 (Trouser Shape - Single Tear Method)
8	Count of Yarn , Den **(For Manufacturer's guidance)** - Warp - Weft	Not Given	Requirement needs to be changed , may not be taken as per test result received . **Proposed :** **Warp – 80 den (App)** **Weft – 80 den (App)**	88.7 Den 63.2 Den	IS 3442-1980
9	Colour fastness to light	5 or better	OK	--	IS/ISO 105 B02:2014 or IS /ISO 105-B01: 2014

10	Colour fastness to washing - Change in colour - Staining on adjacent fabric	 4 or better 4 or better	OK	 -- --	IS/ISO 105 C10 C(3):2006

Annex 6
(*Item* 5.1**)**

Preliminary draft on 'Textiles — Safety Requirements of Kidswear — Specification'

Foreword

(Formal clauses shall be added later)

Safety and comfort are considered as top priority for Children's clothing. Children have no sense of danger and rely on others to keep them safe. Even safe products can be harmful if they are not used in a proper way. The delicate skin of children reacts to certain fabrics which make them less comfortable to wear.
It is imperative to mention that children of all ages can get injured from wearing defective clothing. Kidswear safety is an essential need. Children aged 36 months and under are particularly susceptible to choking, asphyxiation and ingestion hazards caused by small objects. All components that could become detached from children's clothing are all examples of small parts, and therefore choking hazards.
There are cases all over the world where children got injured & died due to unsafe garments they wore. Injuries to children are not usually 'accidents' and most of the injuries can be avoided, particularly the injuries which cause because of unsafe garments.

Safety standards and regulation reduces the accidents associated with kids wear. In developed countries, product safety standards and regulations are defined for kids wear. Globally awareness about kidswear is increasing, and it is mandatory for the stakeholders to consider kids wear safety standards while dealing with garments for children at any stage and encompass no hazardous substances.

The aim of this standard is to minimize the risk of accidental entrapment of kidswear attachments like cords and drawstrings on clothing while playing, climbing trees, travelling and to provide safety to kids from chemical toxicity, choking and ingestion small parts attached on fabrics, sharp edges and points, strangulation and entrapment and from other sources of hazards.

TEXTILES — SAFETY REQUIREMENTS OF KIDSWEAR — SPECIFICATION

1 SCOPE

This standard specifies the safety technical requirements, test methods and inspection rules for infants, and children textile products.

2 REFERENCES

The standards listed 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 encouragedto investigate the possibility of applying the most recent edition of the standards indicated below.

3 TERMINOLOGY

For the purpose of this document, the following terms and definitions apply.

3.1 Textile products

The products with natural fiber and chemical fiber as principal raw materials and made by spinning, weaving, Knitting, dying and other processing techniques or then be sewed and composited, etc., such as yarn, fabric and their finished products

3.2 Textile products for infants

The textile products for children at the age of 36 months or below to wear or use.

Note: generally the textile products worn or used by infants of 100cm or below in height may serve as the textile products for infants.

3.3 Textile products for children

The textile products for children at the age of over 3 years old and under 14 years old to wear or use.

Note: generally the textile products worn or used by children (girls) above 100cm and below 155cm (including 155cm) or children (boys) above 100cm and below160cm (including 160cm) in height may serve as textile products for children, where the textile products for children of 130cm or below in height may serve as the children clothing under 7 years old.

3.4 Textile products with direct contact to skin

The textile products that most parts of the products directly contacts to skin when worn or used.

3.5 Textile products without direct contact to skin

The textile products that do not directly contact to skin or only a small part directly contact to skin when worn or used.

3.6 Attached components

The components for connecting, decorating and labeling, etc. in textile products.

3.7 Cords and drawstrings

Cords, drawstrings and belt loops, etc. which were made by various textile or non-textile materials and with or without ornaments

4 TYPES

Based on age group of children and proximity of fabrics contact with skin the kids wear can be classified into the following types:

a) *Type I* — The textile products used or wear by infants.(0-3yr)

b) *Type II* —The textile products used or wear by children with direct contact to skin.

c) *Type III* —The textile products used or wear by children without direct contact to skin

5 REQUIREMENT

Table 1 Physical Requirements of Kidswear

(Clause 5.1)

Sl. No (1)	**Characteristic** (2)	**Requirement** (3)	**Method of Test, Ref to**
i)	Cords and Drawstrings	Complies to Annex A	Annex A
ii)	Sharp Points and edges, mm	penetration ≤ 0.5 mm	IS 9873 (Part 1) : 2019/ ISO 8124-1 : 2018
iii)	Separable small parts	Small parts shall not fit entirely in the cylinder	IS 9873 (Part 1) : 2019/ ISO 8124-1 : 2018
iv)	Non-separable small parts		
	a) diameter ≤ 3	negligible change	Annex A

Commented [HS1]: Is it grippable parts?

Commented [HS2]: Is it grippable parts?

Commented [HS3]: (There is no test method available in Annex A)

	mm:		
	b) diameter > 3 mm but ≤ 6 mm: (except sequins)	50 N	
	c) diameter > 6 mm: (except sequins)	90 N	
	d) Nm	≤ 0.34	
v)	Non-grippable small parts	negligible change	Annex A
vi)	Flammability Test for nightwear (45degree) 16CFR 1610	Class 1 (normal combustibility)	IS 15590 : 2005/ ISO 6941:2003
vii)	16CFR 1615, 1616	??	
viii)			

Commented [HS4]: What test is referred? Is it torque test?

Commented [HS5]: (As per IS 15590 test standard, there is no classification as Class 1) What about children's daywear flammability testing?

Flammability test: (16CFR 1610, 16CFR 1615, 1616)

Nightwear/sleepwear:

Raised surface, plain surface

Notes

1. Sharp point includes safety pins, sharp edges on metal hardware, Hook and Loop Tape (Velcro) zipper teeth, zipper stops and embellishments, etc.

8. Trims and Embellishment safety standards

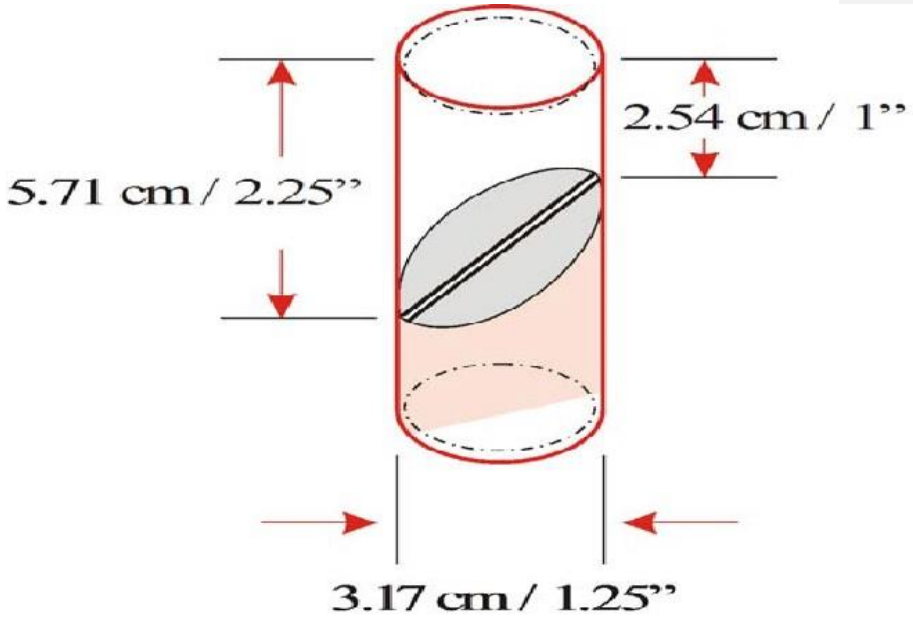
8.1 Small Parts

Small components that become detached from children's apparel through normal use, or reasonably foreseeable damage or abuse can present choking, aspiration, or ingestion hazards to young children.

Examples of small parts found on children's apparel include, but are not limited to:

Snaps/Rivets, Zipper Components, Dungaree Clip (Hasps) & Slider, Toggles, Decorative labels, Pom-poms & Fringe, Appliqués, Eyelets & Grommets, Aglets (plastic sleeves), Buttons, Belt fastenings, Bows and Rosettes, Stud Buttons, Hook & Loop Tape, Decorative & Functional Loops.

Children's apparel sizes 0 – 7 years shall not exhibit any hazardous small parts as received, and after
being subjected to normal use and reasonably foreseeable damage.



Small part of trim or component

If the trim or component can fit within the small parts cylinder shown above, the item is considered a potential choking hazard. It is therefore, standard policy for all small parts intended for children 36 months and under to withstand a 90N pull force.

Attached components ≤3 mm should not be used in textile products for infants; the streching resistance of various attached components which may be seized and bitten by infants shall be in accordance with those specified in following table.

Sl. No.	Maximum size of attached components, mm	Stretching resistance, N	Method of test
1.	≤3	Should not be present for infant	To be given
2.	3-6	50	
3.	>6	70	

8.2 General safety requirements for trims and embellishments:

Safety requirements are provided for the following trims and embellishments

- Applique, Badges, Embroidery
- Beads and jewel trims
- Bows, Fabric loops, Hanger loops, Decorative 3D motives
- Buttons
- Diamantes, Glued and Heat-sealed Decorations
- Drawcords, Functional Ties, Decorative Ties and Sashes
- Metal Trims, Buckles, Rivets and Snaps
- Novelties
- Pom poms, Tassels, Fringing, Braids and Plaits
- Sequins
- Zips-slide Fasteners and pullers,
- For others (Refer 5.3.4 and 8.1 to 8.9)

Table 10. General safety requirements for trims and embellishments

S.No.	Hazards	Safety Requirements	Ages		Standard
			<2 and > 7	> 7	
1.	Chocking and Ingestion	Trims and Embellishments must be securely attached. Jewels should be secure in claws.	Required	Optional	As per BIS 9873(part 1:2012 Or ISO 8124-1:2009

		Multi-component trims must not separate under any circumstances of use			
2.	Sharp Edges and Points	Trims and Embellishments should be free from sharp edges. Beads or Jewels or sequins must not have burrs.	Required	Recommended	As per BIS 9873(part 1:2012 Or ISO 8124-1:2009
3.	Chemical Toxicity	Materials should not contain any of the known irritants as listed (Refer table 3)	Required	Recommended	As per BIS 9873(part 3:1999 Or ISO 8124-3:1997
4.	Strangulation and Entrapment	Careful consideration should be given to the designing, application and attachment of bows, ties, drawstrings, sashes, tied belts, etc	Required	Recommended	As per BIS 9873(part 3:1999 Or ISO 8124-3:1997 **

** can use the standards by changing children's knitwear instead of "Toy" wherever it is applicable.

8.3 General allowable specifications of Cords, Straps, fabric trims, sashes, tied belts

8.3.1 Adjusting Tabs : For 0-14years in Hood And Neck Area, At Waist Area (Internal & External To Garment) maximum length is 14cm, in sleeves allowed maximum length of 10cm.

8.3.2 Shoulder Straps : For 0-14years in Hood And Neck Area, shoulder straps must be constructed from a continuous length of fabric. Decorative cords can be attached to the strap. No free ends longer than 75mm Loop no longer than 75mm circ. (*See Fig.10)*

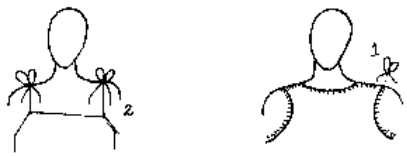


Figure 10 – Example of shoulder strap

8.3.3 Halter neck straps : For 0-14years in Hood And Neck Area, The use of ties / free ends behind the neck (halter) are not allowed, Hlater neck style garment should be constructed with no free ends in the hood and neck areas. *See Fig.11*

Figure 11 – Example of a halter neck

8.3.4 Attached Trims : E.g. Bows / Loops. For 0-14years in Hood And Neck Area, No free ends longer than 75mm. Loop no longer than 75mm circ *See Fig.12*

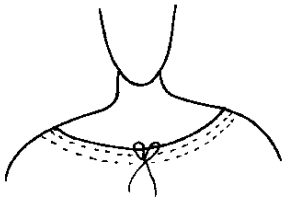


Figure 12 – Example of a permissible with decorative cords with no loose ends trim / bow / loop

8.3.5 Sashes And Tied Belts +3cm Wide : For 0-14years in Waist area, If tied at back - no more than 36cm long (from tie point) and do not hang below hem of garment. If tied at front - no more than 36cm long (from tie point). Sash must be permanently attached to the garment. Sash ends must be clean finished – no knots. *See Fig 13 & 14*

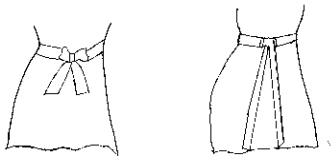


Figure 13 - Permissible sashes and belts at the back

Figure 14 - Example of a permissible tied belt at the front

8.3.6 Fur / Pile trimmings: For 0 – 24 months maximum pile height is 0.5", For 2 – 7 years maximum pile height is 1.0", For 7 years and above pile height can exceed 1.0"

8.4 Embellishments.

- Ribbon and ties edges must not unravel. Ends must be turned and stitched neatly or heat sealed.
- Pom poms and Tassels cannot be used on garments intended for children aged 0-36 months.
- Sequins, beads and other similar components cannot be used on garments intended for children aged 0-12 months.
- Must be attached by lockstitch on garments for children age between 12- 36 months. A minimum of two stitches should be used to hold each sequin flat. When hand stitching, stitching should be locked off after every 10th stitch.
- Machine attached sequins must have a minimum of 2 stitches to hold the sequin flat. Diamanté's and heat fused decorations must not be attached to uneven surfaces. Consistency and security of application must be monitored.
- Embroidery and appliqués must be backed or lined with a fusible interlining to avoid rubbing against the skin. OTB (over the back) Backing is required to cover embroidery on the inside of the garment to prevent skin irritation. Cut rounded consistent shape OTB backing, never cut corners.
- Embroidery float stitches should not exceed 1cm in length for children aged 0-36 months.

- All trims/embellishments must be compatible with the base fabric's care instructions.

8.5 Metal Press Fasteners and Studs.

- All metal components must be nickel free and ferrous free.
- Magnets must not be used.
- Metal fasteners must be selected correctly taking into consideration fabric types and component position.
- Metal components must be securely attached using the following guidelines:
    - Must not be attached to a single layer of material, components should always be attached through two layers of fabric with an additional layer of interlining.
    - Must be positioned on an even foundation, they must not be positioned over seams, stitching or bindings.
    - Must not be removed and repositioned.
    - The security of the attached metal components must be checked.

- Under no circumstances should components be attached by using hand tools. Machinery must be used to attach the metal components.

8.6 Buttons.

- All buttons must be either two or four hole, to minimize any choking hazard. Shank buttons should not be used.
- Buttons must not break under force.
- Natural / shell buttons should not be used.
- Two piece or multi component buttons are not permitted for ages 0–36 months and their use for older age groups as agreed between buyer and seller.
- Buttons should not tear the fabric when they are pulled. Functional buttons must be attached through a minimum of two layers of fabric, if this isn't possible reinforce the area of attachment with a small circular cut out of fusible.
- Buttons must be attached by a lockstitch machine with a minimum of ten stitches. Chain stitched buttons are not acceptable.
- Hand stitching of buttons is allowed as agreed between buyer and seller, in cases where machine stitching isn't possible. This must be strictly controlled to ensure security, consistency and safety.
- Thread used to attach buttons must be sufficiently strong.
- Buttons should not resemble like food for 0 to 5 years.

8.7 Zips.

- Zips must be ferrous free to ensure that they can be metal detected.
- Zips must be nickel free.
- Zips must have plastic top and bottom stops, metal claw stops are unacceptable.
- Metal zips should not be used on garments for 0- 5 years.
- Zips must have an inner fabric zip guard, especially if they are positioned around the face or neck area and bottom of the zipper tape should be secured in a seam
- All dress and skirt zips, for garments aged 3 years and above, are to have a hook and eye at the top opening. Zip must finish 0.4cm below the top edge to allow for hook and eye.

- Decorative zipper slides are not permitted for use with zippers for children 0 – 7 years of age.
- Zipper puller embellishment shall be no longer than 3" in length from zipper slider for children 7-14 years. The same not permitted for children 0-7 years.

8.8 Other fastenings.

- Spring-loaded toggles are not acceptable; instead a rubber toggle and bead should be used.
- Toggles must not be used on drawstrings with free ends unless it is a non-functional decorative cord.
- When using touch and close fastenings the risk of injury needs to be minimised by placing the loop side where contact with a hand is most likely and the scratchy hook side where less contact is likely.
- All touch and close fastenings must be attached with a lockstitch machine and all thread ends should be secured.
- The corners of touch and close fastening must be dye cut rounded corners, to eliminate any sharp points.
- Buckles with moving parts i.e. two or more pieces must not be used on products under 36 months

8.9 Functional / Mock Drawstrings / Cords :

- For head-Neck area, Cuff and sleeve openings and in waist area drawstrings and cords are not allowed for children 0-5 years. For 6 – 12 years hooded shirt with drawstrings/cords are allowed.

- For children above 7 years, the draw strings must be securely tacked at midpoint. Cannot extend more than 3" from exit point when garment is fully extended. Ends must be clean finished - no knots. Shall not hang below the edge of the garment. Toggles, knots or other decorative findings are not allowed. The free ends should be secured to prevent fraying,

e.g. by heat sealing or bar tacking. The ends may be doubled or folded provided no hazard of entrapment is created.

8.10 Elastic tape:

Type of fibers/yarns used in elastic, type of elastic- inner or outer, design of elastic, size of elastic, stretch level of elastic, position of attaching of elastic tape, etc as agreed between buyer and seller.

9. Needle control and Metal Detection.

9.1 Key points

- A needle control system is mandatory for machine needles, hand-stitched work, and tagging gun needles
- A control system is also necessary for sharp tools.
- All children's garments must be passed through a conveyer-style metal detector.
- Factory should have the following forms in place to monitor a needle control policy.
- Required Forms
- Needle Control Record for Sewing Machine Needles
- Record of Destroyed Contaminated Product
- Needle Control Record for Hand-stitched Work
- Needle Control Record for Tagging Gun Needles
- Sharp Tools Control Record
- Metal Detection Record
- Metal Detector Testing Record

9.1.1 Needle control

A needle control system must be in place for all hand and machine-sewing operations, including off-line embroidery rooms and other stand-alone sewing areas (e.g., sample rooms) and tagging (Kimble) gun needles.. Only one supervisor or mechanic in each sewing line should be given responsibility for needle control. This person will hereafter be called 'the needle supervisor.'

Sewing machine operators must not be allowed to possess spare needles. All needles other than those fitted in machines are to be kept in a locked needle cupboard or drawer with only the needle supervisor having access. All used needles must be replaced and collected by the needle supervisor and placed in a sealed container for disposal. If a needle breaks, the sewing Machine operator must summon the needle supervisor. The supervisor must then ensure that the sewing machine operator has all the pieces of the broken needle in his or her possession.

The needle supervisor must affix all pieces of the broken needle to the Needle Control Record for Sewing Machine Needles with clear adhesive tape and record the incident before issuing a replacement. (with the broken pieces below) must be kept in the locked cupboard or drawer where the needles are kept. This will ensure that broken pieces are not lost and will protect the integrity of the records.

If all the pieces of a needle cannot be accounted for, the entire product in the area of the machine that suffered the broken needle must be removed to a separate area for examination. Here a handheld metal detector would be invaluable for determining the location of the missing piece or pieces.

If the missing needle piece or pieces cannot be found, all products at the location where the breakage occurred must be destroyed. This must be recorded in the Record of Destroyed Contaminated Product and cross-referenced in the Needle Control Record for Sewing Machine Needles).

The factory must keep all records in a log dated sequentially (with no missing pages), and the log must be available upon request.

9.2 Sharp tools (e.g. knives and scissors)

Only one supervisor should be given responsibility for managing sharp tools. All sharp tools must be kept in a locked cupboard or drawer which only the supervisor can access. The supervisor must record the total number of sharp tools on line, all of which must be tied to work benches.

Workers must request new blades and/or sharp tools from the supervisor. If a sharp tool breaks, the worker must summon the supervisor. The supervisor must then ensure that the worker has all the pieces of the broken tool in his or her possession. The supervisor must affix all pieces of the broken tool to the Sharp Tools Control Record (similar to Needle control form with clear adhesive tape and record the incident before issuing a replacement. Form with the broken pieces attached, must be kept in the locked cupboard or drawer where the needles are kept. This will ensure that broken pieces are not lost and will protect the integrity of the records.

If all the pieces of a sharp tool cannot be accounted for, the entire product in the area where the tool was being operated must be removed to a separate area for examination. Here a hand-held metal detector would be invaluable for determining the location of the missing piece or pieces.

If the missing tool piece or pieces cannot be found, all products at the location where the breakage occurred must be destroyed. This must be recorded in the Record of Destroyed Contaminated Product and cross-referenced in the Sharp Tools Control Record.

9.3 Metal detection

It is required that all apparel and products for infants, toddlers, and children be passed through metal detection equipment.

To allow the metal detection equipment to function, all snaps and other metal components used in products for children must be non-ferrous and nickel free. The detection process must be conducted when goods are completed and ready for packing. The goods may pass through the detecting machine either in or out of polythene bags and then must be packed or put into cartons immediately.

The detection equipment must be located in a confined area that is effectively metal free. The machine must rest on a level surface and be calibrated and regularly serviced in accordance with the maker's manual. The operation of the equipment should be restricted to a limited number of fully trained, responsible employees. When the detector registers an alarm, an entry should be made in the Metal Detection Record. The supervisor should attach any metal pieces found to Form with clear, sticky tape. The product should then be passed through the detector once more to ensure that all traces have been removed.

If a product registers an alarm and no metal can be found, then the product must be destroyed, since a needle part or metal component may be concealed in a seam and may surface later.
During the course of a working day, the metal detector must be regularly tested in accordance with the maker's instructions to ensure it is working properly; the results of these tests must be kept in the Metal Detector Testing Record. Testing usually involves passing two 1.2 mm ferrous cards through the machine separately. The first card should lie flat on the conveyor while the second should sit on a small nonmetallic block, to ensure that the machine is detecting at a range of heights from the conveyor. The alarm should sound in both instances.

If the alarm fails to sound, the supervisor should be called to reset the sensitivity level. If the supervisor cannot adjust the machine to register an alarm, no further product may be processed until a trained engineer repairs the machine.

Table 3 Chemical Requirements of Kidswear

(Clause 7.1)

Sl. No (1)	**Characteristic** (2)	**Requirement** (3)			**Method of Test, Ref to**
		Type I	*Type II*	*Type III*	
i)	Colour fastness to rubbing, *Min*				IS 766
	a) Dry	4-5	3-4	3-4	
	b) Wet	4 (3-4 for dark colour)	3	3	
ii)	Resistance to Saliva				
	a) Staining on adjacent fabric filter paper	— No stain —			IS 15626:2006(Reference to be made to DIN std.)
iii)	Total Heavy metal, ppm *Max*				Annex B
	a. Lead	90	-		
	b. Cadmium	90	-		
	Surface coating, ppm *Max* a. Lead b. Cadmium	 90 90			

Commented [HS6]: As per IS 15626, filter paper staining will be reported (genuinely resistant or not)

iv)	Total Phthalate, *ppm, Max* (Reference from REACH regulation)	≤ 1000 ppm			IS 17529 : 2021/ISO 14389 : 2014
v)	pH of aqueous extract	5.5-7.5	6-8	6-8	IS 1390
vi)	Free & Releasable formaldehyde, *ppm, Max*	20	75	300	IS 14563 (Part 1 & 2)
vii	Banned aryl Amines released from Azo-dyes (Sum parameters) (Reference from GB std.)	30	30	30	IS 15570 and IS 15651:2006
vii	Azo Dye Test				
ix)	Volatile Hydrocarbons (non-halogens)	Reference from International specification available Product safety & restricted substances in apparel			As per oekotex Standard 100

Commented [HS7]: Need to know the list of Phthalates.
Do we have any requirement for individual Phthalate

Commented [HS8]: In general, we look for Individual amines requirement as per EU regulation
Sum of banned amines may not be required

Commented [HS9]: Banned arylamines already covered under part V. Please check what we have to tested here

Commented [HS10]: Required list of VOC's to further check this requirement.
In Oeko-tex, we have a test name "Emission of volatiles" and Aromatic hydrocarbons. But the unit of reporting is mg/cubic meter Need to understand this test requirement. Suggest to refer AFIRM list for volatile substances

Notes

1. Only the textile containing coating and paint dyeing are examined for heavy metal content and the index is the ratio of the total amount of lead and cadmium in the mass of coating or paint dyeing
2. Only the textile containing coating and print dyeing shall be examined for Phthalate content.
3. Prints on children garments (all ages) must be tested for formaldehyde, blankets

Pthalates:

CPSIA Requirements:

For child care articles:

Limit: 1000 ppm

Restricted phthalates
DEHP, DBP, BBP, DINP or DnOP

Mouthable toys:
Limit: 1000 ppm
Restricted phthalates
DEHP, DBP, BBP, DINP or DnOP

All other toys:

Limit: 1000 ppm
Restricted phthalates

DEHP, DBP, BBP

Raised screen print on toddler shirt

Plastic light up patch on toddler T-shirt

ANNEX A

(*Clauses* 2.1)

REQUIREMENTS OF CORDS AND DRAWSTRINGS FOR SAFETY OF CHILDREN'S CLOTHING

A-1 GENERAL

A-1.1 The free ends of drawstrings, functional cords, and tied belts or sashes shall have no knots or three dimensional embellishments and shall be secured to prevent fraying, for example by heat sealing or bar tacking. The ends may be doubled or folded provided no hazard of entrapment is created. Knots and three dimensional embellishments along the length of the free ends are not permitted

A-1.2 Toggles shall only be used on drawstrings with no free ends, or decorative cords.

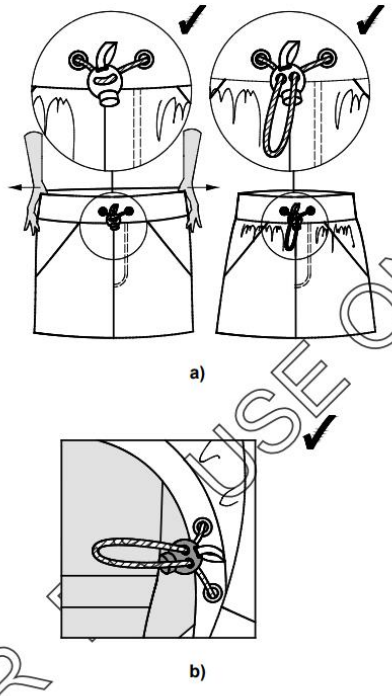


Figure F.1 — Example of toggle fixed to the garment on drawstring with no free ends (see 3.1.2 , 3.3.1, 3.4.1 b and 3.4.2 b)

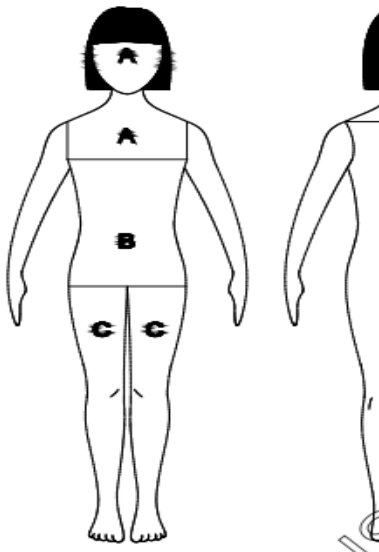
A-1.3 Where drawstrings are permitted, they shall be attached to the garment, for example using a bar tack, in at least one point positioned equidistant from the exit points.

A-1.4 Fixed loops, which protrude from the garment, for example to fasten, or loops on fixed bows, shall be no more than 7,5 cm in circumference. Flat loops which do not protrude from the garments, for example belt loops, shall be no more than 7,5 cm in length, between the fixed points of attachment to the garment (for example, see Figure F.4).

A-1.5 Zip pullers including any embellishment shall be not longer than 7,5 cm in length from zip slider.

A-1.6 Zip pullers with or without embellishment shall not hang below the lower edge of garments designed to finish at the ankle (for example, see Figure F.5)

A-1.7 All measurements shall be carried out in accordance with the following:



Key
A head, neck and upper chest area
B chest and waist area
C below hip area
D back area

Figure 1 — Body zones

A-2 Head, neck and upper chest area on garments for young children (Figure 1, zone A)

A-2.1 Garments intended for young children shall not be designed, manufactured or supplied with drawstrings or functional cords in the head, neck or upper chest area.

A-2.2 Garments intended for young children shall not be designed, manufactured or supplied with drawstrings or functional cords in the head, neck or upper chest area.

A-2.3 In other parts of neck and upper chest areas, decorative cords shall have free ends no longer than 7,5 cm, shall have no knots, toggles or three dimensional embellishments and shall not be positioned so they can tie across the throat

A-2.4 Adjusting tabs are permissible provided that the length is no more than 7,5 cm, and shall have no button, toggle, buckle on the free end which may present an entrapment hazard

NOTE — The hazard from elastic cords is that they may "snap" back to face or neck resulting in injury. Elasticated shoulder straps and halter necks fit close to the body and do not pose the same risk**.**

A-2.5 Shoulder straps shall be constructed such that, when worn, there shall be no free ends external to the garment. Shoulder straps may be permanently fixed to front and back, or attached to permit adjustment of strap length by for example buttons, press fasteners, provided the free end is inside the garment. The use of a clip or fastening of two cords is acceptable, provided these do not result in free ends of cords when garment is worn

Where a mechanism, for example ring and slider, is used to adjust the length of the shoulder strap, the strap including the loop shall lie flat to the body when worn

NOTE — Where this mechanism is used, the loop will be of variable length. The general requirement for flat loop length is not applicable, as the loop is flat to the body when worn.

Decorative cords attached to a shoulder strap shall not have free ends longer than 7,5 cm and fixed loops shall be no more than 7.5 cm in circumference (for example, see Figure F.6).

A-2.6 Halter neck-style garments shall be constructed with no free ends in the neck and throat (for example, see Figure F.7).

The use of a clip or fastening of two cords is acceptable, provided these do not result in free ends of cords when garment is worn.

Where a mechanism, for example ring and slider, is used to adjust the length of the halter neck, the strap including the loop shall lie flat to the body when worn.

NOTE — Where this mechanism is used, the loop will be of variable length. The general requirement for flat loop length is not applicable, as the loop is flat to the body when worn.

A-3 Head, neck and upper chest area on garments for older children and young persons (Figure 1, zone A)

A-3.1 Drawstrings shall not have free ends.

Drawstrings with no free ends shall have no protruding loop when the garment is open to its largest and laid flat. When the garment opening is at its smallest, i.e. the size it is intended to fit, the maximum protruding loop circumference shall be 15 cm (for example, see Figure F.8).

Where toggles are used for adjustment of drawstrings with no free ends, the toggle shall be fixed to the garment (see Figure F.1).

A-3.2 Functional cords shall be not more than 7.5 cm in length. Functional cords shall not be made from elastic cords.

NOTE — The hazard from elastic cords is that they may "snap" back to face or neck resulting in injury. Elasticated shoulder straps and halter necks fit close to the body and do not pose the same risk.

A-3.3 Decorative cords shall not be more than 7.5 cm in length including any attachment or three dimensional embellishment. Decorative cords shall not be made from elastic cords.

NOTE — The hazard from elastic cords is that they may "snap" back to face or neck

resulting in injury, especially if they have a toggle.

A-3.4 Adjusting tabs are permissible provided that the length is no more than 7.5 cm, and shall have no button, toggle, buckle on the free end which may present an entrapment hazard.

A-3.5 Shoulder straps are permissible provided any free ends are no longer than 14 cm from the point at which they are to be tied and fixed loops are no more than 7.5 cm in circumference (for example, see Figure F.6).

Where a mechanism, for example ring and slider, is used to adjust the length of the shoulder strap, the strap including the loop shall lie flat to the body when worn.

NOTE — Where this mechanism is used, the loop will be of variable length. The general requirement for flat loop length 3.1.4 is not applicable, as the loop is flat to the body when worn.

A-3.6 Halter neck-style garments shall be constructed with no free ends at the neck and throat (for example, see Figure F.7). The use of a clip or fastening of two cords is acceptable, provided these do not result in free ends of cords when garment is worn.

Where a mechanism, for example ring and slider, is used to adjust the length of the halter neck strap, the strap including the loop shall lie flat to the body when worn.

NOTE — Where this mechanism is used, the loop will be of variable length. The general requirement for flat loop length 3.1.4 is not applicable, as the loop is flat to the body when worn.

A-4 Chest and waist area (Figure 1, zone B)

A-4.1 Garments worn from waist down without shoulder straps, braces, or sleeves, such as trousers, shorts, skirts, briefs, bikini bottoms, shall not have:

a) free ends of drawstrings longer than 20 cm at each end when the garment is in a relaxed natural state.(for example, see Figure F.9);
b) protruding loops on drawstrings with no free ends, when the garment is open to its largest and laid flat.
Where toggles are used for adjustment of drawstrings with no free ends, the toggles shall be fixed to the garment (for example see Figure F.1);
c) functional cords longer than 20 cm;
d) decorative cords longer than 14 cm including any embellishment.

A-4.2 Garments other than those listed in 3.4.1 such as shirts, coats, dresses, and dungarees shall not have:

a) free ends of drawstrings longer than 14 cm at each end when the garment is open to its largest and laid flat;
b) protruding loops on drawstrings with no free ends when the garment is open to its largest and laid flat .
Where toggles are used for adjustment of drawstrings with no free ends, the toggles shall be fixed to the garment (for example see Figure F.1);
c) functional cords longer than 14 cm;
d) decorative cords longer than 14 cm including any embellishment.

A- 4.3 For all garments, adjusting tabs in the waist area shall be a maximum of 14 cm.
A-4.4 For young children, tied belts or sashes intended to be tied at the back of the garment are permissible provided that when untied and measured from the point where they are to be tied, they shall be no more than 36 cm in length. When untied, they shall not hang below the hem of the garment (for example, see Figures F.10 and F.11).

A-4.5 For older children and young persons, tied belts or sashes intended to be tied at the back of the garment are permissible provided that, when untied and measured from the point where they are to be tied they shall be no more than 36 cm in length (for example, see Figures F.10 and F.11).
A-4.6 For both age groups, tied belts or sashes intended to be tied at the front or at the side of the garment shall be acceptable provided that when untied they shall be no more than 36 cm in length measured from the point where they are to be tied (for example, see Figure F.12)

A-5 Chest and waist area (Figure 1, zone B)

A-5.1 Garments worn from waist down without shoulder straps, braces, or sleeves, such as trousers, shorts, skirts, briefs, bikini bottoms, shall not have:

a) free ends of drawstrings longer than 20 cm at each end when the garment is in a relaxed natural state.(for example, see Figure F.9);
b) protruding loops on drawstrings with no free ends, when the garment is open to its largest and laid flat.
Where toggles are used for adjustment of drawstrings with no free ends, the toggles shall be fixed to the garment (for example see Figure F.1);
c) functional cords longer than 20 cm;
d) decorative cords longer than 14 cm including any embellishment.

A-5.2 Garments other than those listed in 3.4.1 such as shirts, coats, dresses, and dungarees shall not have:
a) free ends of drawstrings longer than 14 cm at each end when the garment is open to its largest and laid flat;
b) protruding loops on drawstrings with no free ends when the garment is open to its largest and laid flat .
Where toggles are used for adjustment of drawstrings with no free ends, the toggles shall

be fixed to the garment (for example see Figure F.1);
c) functional cords longer than 14 cm;
d) decorative cords longer than 14 cm including any embellishment.

A-5.3 For all garments, adjusting tabs in the waist area shall be a maximum of 14 cm.

A-5.4 For young children, tied belts or sashes intended to be tied at the back of the garment are permissible provided that when untied and measured from the point where they are to be tied, they shall be no more than 36 cm in length. When untied, they shall not hang below the hem of the garment (for example, see Figures F.10 and F.11).

A-5.5 For older children and young persons, tied belts or sashes intended to be tied at the back of the garment are permissible provided that, when untied and measured from the point where they are to be tied they shall be no more than 36 cm in length (for example, see Figures F.10 and F.11).

A-5.6 For both age groups, tied belts or sashes intended to be tied at the front or at the side of the garment shall be acceptable provided that when untied they shall be no more than 36 cm in length measured from the point where they are to be tied (for example, see Figure F.12)

A-6 Other parts of the garment

In all other areas of the garment, not previously addressed, the drawstring or functional and decorative cords shall protrude by no more than 14 cm when the garment is open to its largest and laid flat

ANNEX B

TEST METHOD FOR DETERMINATION OF TOTAL CONTENT OF LEAD AND CADMIUM

B-1 PRINCIPLE

The specimen is digested with concentrated acid and the digested solution is diluted and scaled to the volume, emission intensity of lead and cadmium is determined with inductively coupled plasma emission spectrometer (ICP-AES) under appropriate conditions; by comparison of standard work curves, concentration of various metal ions is determined and total amount of heavy metal in the specimen is calculated.

B-2 REAGENTS AND MATERIALS

Unless otherwise specified, only analytical reagent water specified in IS 1070 shall be used.

B-2.1 Concentrated nitric acid
B-2.2 3% (volume fraction) nitric acid
3mL concentrated nitric acid (4.1) is taken and its volume is scaled to 100mL with Grade II water.
B-2.3 Fluoboric acid
B-2.4 Hydrofluoric acid
B-2.5 Hydrogen peroxide
B-2.6 Standard stock solution

The standard stock solution of each element shall be prepared with standard substance or according to the following method.

B-2.6.1 Standard stock solution (1000μg/mL) of lead (Pb)

Weigh 0.160g lead nitrate [Pb(NO3)2] and dissolve it with 10mL nitric acid (1+9), then transfer it into 100mL volumetric flask and dilute to the scale.

B-2.6.2 Standard stock solution (1000μg/mL) of cadmium (Cd)
Weigh 0.203g cadmium chloride ($CdCl_2 \cdot \frac{5}{2} H_2O$) and dissolve with 10mL nitric acid (1+9), then transfer it into 100mL volumetric flask and dilute to the scale.

Note: unless otherwise specified, the shelf life of the standard stock solution at normal temperature (15℃~25℃) is 6 months and it should be re-prepared in case of turbidity, precipitation or change in color, etc.

B-3 Standard working solution (50μg/mL)

Accurately transfer 2.50mL standard stock solution into a volumetric flask and scale the volume to 50mL with 3% nitric acid (4.2).

Note: the shelf life of standard working solution at normal temperature (15℃~25℃) is generally two weeks and it should be re-prepared in case of turbidity, precipitation or change in color, etc.

B-4 Apparatus

B-4.1 Inductively coupled plasma emission spectrometer (ICP-AES) or atomic absorption spectrophotometer.
B-4.2 Microwave digestion instrument: with program temperature control function.
B-4.3 Digestion vessel.
B-4.4 Disposable blade.
B-4.5 Volumetric flask: 50mL and 100mL.
B-4.6 Pipette: 0.5mL, 1.0mL and 2.0mL.

B-4.7 Water-phase filtering membrane: 0.45μm hole diameter.
B-4.8 Balance: 0.01mg accuracy

B-5 Analysis Steps
B-5.1 Preparation and treatment of the specimen

B-5.1.1 Preparation

Take representative specimens；cut the specimens into 5mm×5mm pieces；weigh about 0.2g specimen, accurate to 0.0001g.

B-5.1.2 Digestion

Add 5.0 mL concentrated nitric acid (4.1) in digestion vessel with to-be-tested specimen and blank digestion vessel respectively; after complete reaction of the specimen and acid at ambient temperature, seal and place the digestion vessel in the microwave digestion instrument (5.2), heat to (175±5)℃ in 10min and maintain for 5min at (175±5)℃, cool the specimen for at least 5min and then take out from the microwave digestion instrument. Before opening the digestion vessel, the microwave digestion tank shall be cooled to the ambient temperature or for at least 30min in the fume hood.

Notes
1. Due to different digestion instrument models, different digestion procedures may be adopted in different laboratories, as long as they can ensure complete digestion of samples.
2. For such coating samples as PU which are difficult to digest, appropriate amount of fluoboric acid, hydrofluoric acid and hydrogen peroxide etc. may be added.
3. If hydrofluoric acid is used during the test, 30mL 4% boric acid shall be added in each vessel so that it is complexed with hydrofluoric acid to protect rectangular quartz plasma tube.

B-5.1.3 Sizing of sample solution

Transfer the digested solution into a 50mL volumetric flask (5.5), elute the digestion vessel with a small amount of water for three times, merger the eluent in the volumetric flask, scale the volume with water to the scale, mix uniformly, pass through the water-phase filtering membrane (5.7); the filtrate shall be used for inductively coupled plasma emission spectrometer (ICP-AES) or atomic absorption spectrophotometer (5.1) analysis as soon as possible.

Note : pretreatment method for accessories and decoration components of textile products are detailed in Appendix A.

B-5.2 ICP-AES analysis and determination

B-5.2.1 Analytical wavelength of ICP-AES analytical elements

Analytical wavelength of Pb element is 220.3nm and that of Cd element is 214.4nm.

Note: in order to eliminate spectral interference from other elements, one piece of spectral line at other wavelengths may
be selected simultaneously for reference.

B-5.2.2 Determination

B-5.2.2.1 Determination of work curve

According to the test requirements and the apparatus conditions, dilute the standard working solution (4.7) with water to proper concentration of series of working solution in a step-by-step way; set the analysis conditions of the apparatus and ignite the plasma torch, then
determine the spectral intensity of the elements to be tested in the series of working solution from the low concentration to high concentration at corresponding wavelength after the torch gets stable. Draw work curves with the spectral intensity as longitudinal coordinate and the element concentration (μg/mL) as lateral coordinate.

B-5.2.2.2 Determination of sample solution

According to apparatus conditions set in 6.2.2.1, determine the spectral intensity of all the to-be-determined elements in blank solution and sample solution (6.1.3) and calculate the concentration of all the to-be-determined elements from the work curves.

Notes

1. If concentration of lead and cadmium in the sample solution exceeds 1.5 times of the peak at the standard curve, the sample solution should be properly diluted and re-analyzed.
2. Where concentration of lead and cadmium in blank solution and sample solution is determined, flame atomic absorption spectrometric method may also be adopted; if this method is adopted, attention shall be paid to correction of possible interference. The method adopted shall be indicated in the report.
3. Different apparatuses may have different analysis conditions and operating conditions of partial ICP spectrometers and analytical wavelength of to-be-determined elements are detailed in Appendix B.

B-5.2.2.3 Quality checking

Quality calibration curve shall be made per 20 times of test to ensure accuracy of test results.

B-6 Calculation of Results

B-6.1 Content of heavy metal element in the specimen is calculated according to Formula (1).

$$w_i = \frac{c_i - c_0}{m} * v$$

Where,

ωi - the total content of heavy metal element i in the specimen (mg/kg);
ci - the mass concentration of the tested heavy metal element i in the sample solution (μg/mL);
c0 - the mass concentration of tested heavy metal element i in the blank solution (μg/mL);
V - the total volume of the sample solution (mL);
m - the mass of the specimen (g).
7.2 Calculated results are represented to digits. If the test results are less than determination lower limit, they are not detected.

B-7 Determination of Lower Limit and Precision

B-7.1 Detection limit of method
In this method, detection limits of lead and cadmium are 2.50mg/kg and 0.25mg/kg respectively. If flame atomic absorption spectrometric method is adopted for the analysis, detection limits of the method may be different.

B-7.2 Precision

Relative standard deviation of results of two mutually independent tests on the same measured object by the same operator using the same equipment according to the same test method in the same laboratory in a short time is not greater than 10%, provided that 10% of arithmetic average of these two determination values doesn't exceed 5%.

B-8 Test Report

Test report shall cover the following contents at least:
a) Serial number of the standard used (i.e., this Standard);
b) Source and description of sample;
c) Test result;
d) Any detail deviation from this Standard;
e) Test date

Annex 7
(*Item* 5.2**)**

Draft Revision of IS 10228 School Bag

Indian Standard

SPECIFICATION FOR SCHOOL BAG
0. FOREWORD

0.2 The school bag described in this standard is in three sizes 'Small' 'Medium' and 'Large', with two different designs in each size, for example, one with side strap and the other with back straps. The bag is provided with a patch pocket in front, piping all-round the edges and buckles with straps for closure.

0.3 The school bags shall be provided with back strap or side strap or both, as agreed to between the purchaser and the manufacturer. A handle may also he provided if required by the purchaser.

0.4 This standard contains clauses which call for agreement between the purchaser and the manufacturer, which permit the purchaser to use his option for selection, to suit his requirements. The relevant clauses are **3.1, 4.1, 5.5, 6.1** and **9.1**.

1 SCOPE

1.1 This standard covers the requirements for hags, used by school students for carrying books, writing material, and drawing instruments.

2 REFERENCES

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

3 NOMENCLATURE

For the purpose of this standard following definition shall apply.
The nomenclature of the bag shall be as shown in Fig. 1.

3. SHAPE AND DIMENSIONS

3.1 The shape and dimensions of the school hag shall be as given in Table 1. It may also be made to other shapes and dimensions as agreed to between the purchaser and the manufacturer.

3.1.1 The length of back strap for 'small', 'medium' and 'large' size shall preferably be 430 mm, 455 mm and 470 mm respectively.

3.1.2 The length of side strap shall be adjustable by means of a buckle as shown in Fig. I. The length shall be adjustable between 260 mm to 950 mm.

4. MATERIAL

4.1 The various components of the school bag shall be made from the materials specified below or from other types of materials, suitable for the intended purpose, subject to the agreement between the purchaser and the supplier.

Bag Fabric (Outer fabric): The outer fabric used for manufacturing school bag shall be made up of minimum 600 denier polyester. The polyester fabric shall be coated with PVC weight 500 gm/sq mtr.

The bag can also be made with Nylon fabric: Material: 420 DENIER NYLON, ENDS/cm-20, PICKS/cm-10, THICKNESS-0.40mm.

The bag shall be made dirt resistant, waterproof.

Breaking strength(minimum warp-100 kgs,weft-50 kgs, tearing strength-7 kg, proofing content per sq mtr (minimum)-375 gms, weight of basic fabric i.e. polyester fabric 600 denier per sq mtr(min)-125 gms.

Compartment fabric (Inner fabric): MATERIAL: 600 MATTY NYLON, ENDS/cm-10, PICKS/cm-10, THICKNESS-0.41 mm

Piping: The piping used for reinforcing the bag shall be made of HDPE or any other suitable Plastic of best quality to maintain shape of the bag. Piping should be covered with minimum 600 denier PVC coated polyester fabric or polypropylene knitted fabric or any other suitable material as agreed to between the purchaser and the manufacturer.

Sewing thread for body and straps: Sewing cotton thread, Variety No. 28 (165 dtex × 6) (6 cord, 3 strands, each 2 fold) conforming to IS 1720 or Sewing polyester thread Variety No 9 (145 dtex × 6) conforming to IS 9543 or any other suitable thread, as agreed to between purchaser and the manufacturer. Thread may be grey or any colour matching to the body colour

Sewing thread for piping: Sewing cotton thread, Variety No. 32 (74 dtex × 6) (6 cord, 3 strands, each 2 fold) conforming to IS 1720 or Sewing polyester thread Variety No. 5 (145 dtex × 3) or any other suitable thread, as agreed to between purchaser and the manufacturer. Thread may be black or of same colour as that of piping

Bottle case or pocket: Knitted PET fabric of minimum 150 GSM or PET fabric having inner flexible PVC layer of minimum 400 D warp count and 200 D weft count shall be used as net alongwith elastic tape.

Zipper (Fastener): Zip runner shall be made of gun metal or plastic runner. Zip fastener shall be made of polyethylene terephthalate. Polyester zip with putty 20 grams per meter grade.

a) For Main compartment: A closed end slide fastener
b) For Front pocket.

with 2nossliding tabs Toothed edges of plastic with metalsliding tabs (Best Quality)

Handle : Soft nylon width 2.5 cm, PVC polypropylene

Handle shall be made of Top and bottom surface made out of PVC coated polyester fabric with 6mm thick soft XLPE Foam (Lifting Area).

Adjustable belt:

Polypropylene knitted fabric shall be used

Shoulder adjustable buckle: High impact polystyrene or nylon shall be used.

Shoulder strip: Lengthwise stitched at the edges along with foam

5. MANUFACTURE, WORKMANSHIP AND FINISH

5.1 The school bag shall be made from three pieces of material, that is, front, back and gusset.

5.2 The front portion shall be provided with a patch pocket for small articles for use in school as shown in Fig. I. The bag may also be provided with two patch pockets in the front portion. The shape of the pocket or pockets should be such as to provide sufficient space for keeping lunch-box, pencil box, instrument box, etc. This may be done with or without gusset.

5.3 The bag shall be provided with minimum 10 mm wide piping at the pocket, top edges and the sides as shown in Fig. I. The piping shall be of the material specified in Table 1.

5.4 The school bag shall be assembled 'lock stitch' or 'chain stitch' regulated to give 6 to 8 stitches per 25 mm. All ends shall be securely fastened, off and loose threads properly trimmed.

5.5 Two buckles with straps shall be provided in the bag for closure as shown in Fig. 1. A handle may also be provided if required by tile purchaser.

5.6 The bag shall be neatly finished with straight and parallel rows of stitching, where required.

5.7 The ends of buckle loops, side, back and buckle straps shall be properly tacked with the rows of stitches as shown in Fig. 1.

Design and Dimension of School Bag –

School bag rucksack style made of PVC coated dirt resistant & waterproof polyester fabric 600 denier (as mentioned in Table 1) with zipper/fastener as shown in Fig 1 One Pair of padded shoulder strap (width-6cm each, foam thickness-3mm) with an adjustable attachment of buckle (width 25mm), padded shoulder straps should be reinforced at the top with 38 mm polypropylene tape as shown in figure-1, one strap of polypropylene tape width 25mm used as handle to be provided on back of the bag as shown in figure-1.). Back & front seams of the bag and pocket at front are to be reinforced with plastic piping to maintain shape of the bag. One front pocket of size 23x27cm with zipper/fastener for closure to be provided on front as shown in Fig 1. The width of gusset of the pocket should be 4cm. One pouch pocket at gusset of school bag of self material and synthetic netting cloth with elastic at top shall be provided for carrying water bottle.

Handle
The handle of the portable book bag should be convenient for the user and can be held comfortably, and the length of the gripable handle should be greater than 80mm .

5 REQUIREMENTS

5.1 Physical Requirement — The bag shall meet the physical requirements as specified in Table 1.

5.2 Chemical Requirement — The bag shall meet the chemical requirements as specified in Table 2 as per the agreement between the buyer and seller.

5.3 Comfort — The bag should meet the ergonomic requirements of the user's body, that is, there is a sense of comfort after the shoulders , back, and waist fit the curves of the human body, and the body reaches a balanced state when carrying it. The supporting part on the back of the book bag should be treated with soft and elastic cushioning , and there should be no convex points (edges) where the pressure is concentrated.

Table 1 Physical requirements of School Bag
(*Clause* 5.1)

S. No	Properties	Minimum Requirement	Test Method
I. Body (outer)/Compartment (Inner)/Strap/Pockets)			
1	GSM, g/m^2, *Min* 1) Outer (Body/Strap/pocket) 2) Inner (Compartment)	 400 300	 IS 1964 ISO 3801
2	Breaking strength , kg/5cm, *Min* 1)Outer (Body/Strap/pocket) a) Tighter direction	 50 30	IS 7016 (Part2) ISO 1421

	b) Stretch direction 2) Inner (Compartment) a) Tighter direction b) Stretch direction	 40 25	
3	Tear strength, Kg, *Min* 1) Outer (Body/Strap/pocket), Tighter/Stretch direction 2) Inner (Compartment), Tighter/Stretch direction, *Min*	6.0 4.5	IS 7016 (Part3/sec 1) ISO 4674-1 (method A)
4	Colour fastness to water, change in colour, *Min*	Grade 3	ISO 17700 (Method D)
5	Colour fastness to rubbing (crocking method) Dry and wet, change in color after 10 rubs	Grade 3	IS/ISO 105 : PART X12
II. Sewing Thread			
1	Breaking strength, N, *Min*	20	ISO 2062
2	Elongation at break, %	15-30	ISO 2062

Table 2 Performance requirement of school bag

Sl. No	Properties	Minimum Requirement			Test Method
		Small	Medium	Large	
Zip Materials					
1	Fatigue resistance of zip, cycles, *Min*	1000	1000	1000	Annex C of IS 3148
2	Security of Puller Attachment of Zip, N, *Min*	250	250	250	Annex G of of IS 3148
3	Lateral strength of slide fastener (Zip), N, *Min*	250	300	400	Annex B of IS 3148
4	Static load bearing capacity of bag for 1 hour	No damage to the Bag at 5 Kg	No damage to the Bag at 10 Kg	No damage to the Bag at 15 Kg	Annex B
5	Top Handle attachment strength, N, *Min*	200	225	250	Annex C

6	Back strap attachment strength, N, *Min*	200	225	250	Annex D
7	Attachment strength of adjustable belt and buckle, N, *Min*	200	225	250	Annex E
8	Seam strength, N/mm, *Min*	6.0	7.0	8.0	ISO 17697

Chemical substances	**Requirements**	**IS/ISO test methods**
Textile		
Aromatic amines released from Azo dyes (each individual amines)	<20 mg/kg	IS 582 (PART 5/SEC1) and IS 582 (PART 5/SEC2) ISO 14362-1&3
Formaldehyde	Adult: <100 mg/kg (Not in direct contact with skin) / <75 mg/kg(In direct contact with skin) Chlidren: <20 mg/kg	IS 16297 (PART 1,2&3) ISO 14184-1
DMFu	<0.1 mg/kg	IS 16991 ISO 16186
Organotins	Dibutyltin, Dibutyltin dichloride, Dioctyltin, Monobutyltin, Monoctyltin: <5.0 mg/kg	IS 16981 ISO 16179
	Tributyltin, Triphenyltin, Bis(tributyltin)oxide: < 1.0 mg/kg	
*p*H	Not less than 3.5. in the case less than 3.5 the difference of pH dilution of factor 10 times shall not be more than 0.6	IS 1390 ISO 3071
Allergenic and carcinogenic disperse dyes	< 1 mg/l	IS 16914 PART 2&3 ISO 16373-1,2,&3
Phthalates (each individual phthalate)	<500 mg/kg for each	IS 16915 ISO 16181
Non-leather (PU, PVC, EVA, Rubber, etc.,)		
DMFu	<0.1 mg/kg	IS 16991 ISO 16186
Organotins	Dibutyltin, Dibutyltin dichloride, Dioctyltin, Monobutyltin, Monoctyltin: <5.0 mg/kg	IS 16981 ISO 16179

Chemical substances	Requirements	IS/ISO test methods
	Tributyltin, Triphenyltin, Bis(tributyltin) oxide: < 1.0 mg/kg	
Phthalates (each individual phthalate)	<500 mg/kg for each	IS 16915 ISO 16181

Breaking Load (Full widthx20cm)- (min Kg)	Mass per 100 meter in Gms (Max)	
* Strap (25mm wide Polypropylene tape)	325	1700
** Strap (38mm wide Polypropylene tape)	550	2400

6. SAMPLING

6.1 Unless otherwise agreed to between the purchaser and the supplier, the procedure given in IS: 2500 (Part I)-1973* shall be followed for sampling. The inspection level and sampling plan as given in 6.2 and 6.3 shall be followed.

6.2 The scale of sampling shall correspond to inspection level III given in Table 1 of IS: 2500 (Part I)-1973* for all the requirements specified in this standard.

6.3 The sampling plan shall correspond to AQL plans of 4.0 percent given in Table 2 of IS: 2500 (Part I) - I 1973*.

7. TEST

7.1 Drop Tests - The school bag shall be fully loaded with books or any other suitable material, weighing 6 kg in case of 'small', 8 kg in case of 'medium' and 10 kg in case of 'large' size school bags. After filling the specified weight, the bags shall be closed, buckles fastened and hung on pegs at the wall, with the help of either the side strap or the back straps. The distance between the floor and the peg shall be 1.5 metre in case of side strap and 1.0 metre in case of back strap. The bags shall then be suddenly dropped and this operation shall be repeated 10 times. During or after the test the stitches shall not open, the straps and buckles shall not give way or come off the stitched tacks.

7.2 Handle Snatch Test - The school bag shall be securely fixed in an inverted position on a rigid support, leaving the strap free for applying the load. The strap shall be suitably harnessed to distribute the load applied over the entire middle portion. A load of 50 N (5 kgf) shall be applied suddenly to the strap for a period of 30 seconds. This operation shall be repeated 10 times.

7.2.1 The weight may be applied either by means of spring balance or weights, suitably placed on a stirrup. During or after the test, the strap shall not have snapped, loosened or come off the stitching.

8. MARKING

8.1 Each school bag shall be legibly marked with the following:

a) Manufacturer's name or registered trade-mark,

b) Size, and

e) Year of manufacture in case of rubberized fabric.

*Specification for sampling inspection tables: Part I Inspection by attributes and by count of defect. (*first revision*).

Bag Dimensions:

Size	Length, mm, Min	Width, mm, Min	Height, mm, Min	First compartment depth, Min	Second compartment depth, Min
Small	330	279	152	51	102
Medium	356	305	178	51	127
Large	406	330	178	51	127

Shoulder strip dimension:

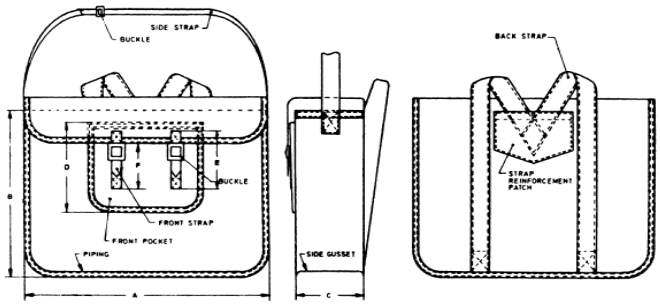
Size	Length, mm, Min	Width, mm, Min	Thickness, mm, Min	Hooke free length, mm, Min
Small	279	51	6.5	191
Medium	305	51	6.5	191
Large	356	51	6.5	191

Old dimensions:

Size	A	B	C	D	E	F
Small	330	230	90	140	130	65
Medium	360	260	110	140	130	65
Large	380	280	140	140	180	65

Water bottle pocket dimension:

Length	203	203	203
Depth at Bottom, Min	32	32	32
Diameter of diameter on stretching, Min	191	191	203



All dimensions in millimetres.
FIG. 1 SCHOOL BAG

8.2 The product may also be marked with Standard mark.

8.2.1 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

9. PACKING

9.1 Each school hag shall either be packed first in alkathene bag and then in any other suitably packing material to ensure safe transportation, or as agreed to between the purchaser and the supplier.

Annexure I

Procedure for Static load bearing capacity of the bag

Scope

This method is intended to determine the Static load bearing capacity of the bag where the bag is lifted when loaded.

Principle

The bag is loaded with defined mass distributed as evenly as possible. It is lifted using handle for the period of 1 hour and set down. Any damage occurred is assessed visually.

Conditioning

All test pieces and product shall be conditioned in a standard atmosphere of 27 ± 2 °C and 65 ± 5% RH for a minimum of 48 h before testing

Apparatus and materials

1. A bag to be loaded with suitable material (sand, steel balls etc) such that the load is spread as evenly as possible
2. Balance for measuring the load up to 50 kg to an accuracy of 0.1 kg.
3. A suitable hook to hang the bag.
4. A stop watch for measuring time in seconds
5. A steel ruler for measuring the height of the loaded sample capable of measuring 1.0 meter.

Procedure

Open the bag and insert filling materials into the bag until the approximate maximum load for small – 5 kg, medium – 10kg, large – 15 kg is reached. Place the bag in the balance and ensure that the load is distributed as evenly as possible. Fasten the bag. Gently raise the bag approximately 50 cm from the floor and maintain it in the raised position for period of one hour as measured by the stop clock. Gently lower the bag to the floor and assess the damage at handle and other parts of the bag.

Annexure II

Procedure for Handle attachment strength

Scope

This method is intended to determine the strength of load bearing of the handle of the bag.

Principle

Bag handle is gradually stressed by the tensile testing machine until failure occurs. The force required for failure of the attachment of handle of the bag is measured.

Conditioning

All test pieces and product shall be conditioned in a standard atmosphere of 27 ± 2 °C and 65 ± 5% RH for a minimum of 48 h before testing

Apparatus and materials

1. Universal tensile testing machine with load cell capacity of approximate 1KN with 2% accuracy for measuring force.
2. Jaw separation rate 100 ±10 mm/min
3. Cutting knife or other suitable material

Preparation of test specimen

Using the cutting knife cut the bag handle along with reinforcement area and sufficient non reinforcement area to allow the sample to be clamped. Ensure that reinforced area is not clamped.

Procedure

Clamp the handle of the bag in upper jaw of the universal tensile testing machine and the non- reinforcement area of the bag in the bottom jaw such that jaws separate the handle of bag will be stressed. Operate the testing machine so that the jaw separates at a speed of 100 ± 10mm/minute until failure of the handle of the bag. Record the maximum forces to the nearest 1 N at which failure occurs.

Annexure III

Procedure for Attachment strength of back strap

Scope

This method is intended to determine the attachment strength of back strap (top back strap) of the bag.

Principle

Bag strap is gradually stressed by the tensile testing machine until failure occurs. The force required for failure of the attachment of strap of the bag is measured.

Conditioning

All test pieces and product shall be conditioned in a standard atmosphere of 27 ± 2 °C and 65 ± 5% RH for a minimum of 48 h before testing

Apparatus and materials

1. Universal tensile testing machine with load cell capacity of approximate 1KN with 2% accuracy for measuring force.
2. Jaw separation rate 100 ±10 mm/min
3. Cutting knife or other suitable material

Preparation of test specimen

Using the cutting knife cut the bag strap along with reinforcement area and sufficient non reinforcement area to allow the sample to be clamped. Ensure that reinforced area is not clamped

Procedure
Clamp the strap of the bag in upper jaw of the universal tensile testing machine and the non-reinforcement area of the bag in the bottom jaw such that jaws separate the strap of bag will be stressed. Operate the testing machine so that the jaw separates at a speed of 100 ± 10mm/minute until failure of the strap of the bag. Record the maximum forces to the nearest 1 N at which failure occurs

Annexure IV

Procedure for Attachment strength of adjustable belt and buckle

Scope

This method is intended to determine the attachment strength of adjustable belt and buckle of the bag.

Principle

A test specimen with strap and buckle is gradually stretched by a tensile machine until failure occurs. The force required for failure of strap and buckle accessories of the bag is measured.

Conditioning
All test pieces and product shall be conditioned in a standard atmosphere of 27 ± 2 °C and 65 ± 5% RH for a minimum of 48 h before testing

Apparatus and materials

1. Universal tensile testing machine with load cell capacity of approximate 1KN with 2% accuracy for measuring force.
2. Jaw separation rate 100 ±10 mm/min
3. Cutting knife or other suitable material

Preparation of test specimen

Using the cutting knife cut the strap with fastened buckle

Procedure

Clamp one end of the strap in upper jaw of the universal tensile testing machine and clamp the fastened buckle with strap in the bottom jaw such that jaws separate the strap and fastenedbuckle will be stressed. Operate the testing machine so that the jaw separates at a speed of 100 ± 10mm/minute until failure of either buckle or strap occurs. Record the maximum force to the nearest 1 N at which failure occurred.

Annex 8
(*Item* 7.1**)**

List of Pre-2000 Standards under TXD 20

Sl.No	IS Number	Title
1	IS 8928 : 1988	Specification for CHAGUL
2	IS 14351 : 1996	Textiles – Ground sheets (light weight) – Specification
3	IS 14354 : 1996	Textiles – Waterproof covers – Specification
4	IS 4039 : 1975	Code for packaging of ready-made garments for export (first revision)
5	IS 7609 : 1988	General requirements for tents (first revision)
6	IS 7955 : 1976	Specification for holdalls
7	IS 8857 : 1989	Canvas water bucket – Specification (first revision)
8	IS 8927 : Part 1 : 1978	Specification for haversacks – Part 1 For railway personnel
9	IS 11047 : 1984	Specification for postal green cash bags
10	IS 12675 : 1989	Guide to garment quality
11	IS 12840 : 1989	Kit bag, universal - Specification

Annex 9
(*Item* 8.1**)**

TXD 20 MADE-UP TEXTILES (INCLUDING READY-MADE GARMENTS)

SCOPE - To formulate Indian Standards for terminology and specifications for made-up textiles including ready-made garments

Sl. No.	**IS Number**	**Title**	**No. of Amd**
1.	IS 4039 : 1975	Code for packaging of ready-made garments for export (first revision)	1
2.	IS/ISO 5971 : 2017	Textiles Size designation of clothes Tights	
3.	IS 7609 : 1988	General requirements for tents (first revision)	
4.	IS 7955 : 1976	Specification for holdalls	
5.	IS/ISO 8559-1 : 2017	Textiles – Size designation of clothes – Anthropometric definitions for body measurement	
6.	IS/ISO 8559-2 : 2017	Textiles — Size designation of clothes— Part 2: Primary and secondary dimension indicators	
7.	IS/ISO 8559-3 : 2018	Textiles— Size designation of clothes — Part 3: Methodology for the creation of body measurement tables and intervals	
8.	IS 8857 : 1989	Canvas water bucket – Specification (first revision)	
9.	IS 8927 : Part 1 : 1978	Specification for haversacks – Part 1 For railway personnel	
10.	IS 8928 : 1988	Specification for CHAGUL	1
11.	IS 10789 : 2000/ ISO 4915:1991	Textiles - Stitch Types - Classification and Terminology	
12.	IS 11047 : 1984	Specification for postal green cash bags	1
13.	IS 11048 : 1984	Specification for postal red accounts bags	1
14.	IS 11054 : 1984	Specification for nylon blue airmail bags	
15.	IS 11055 : 1984	Specification for cotton blue airmail bags	1
16.	IS 11161 : 2000/ ISO 4916:1991	Textiles – Seam types – Classification and terminology (first revision)	
17.	IS 11978 : 1987	Specification for waterproof delivery bag for postman	
18.	IS 12675 : 1989	Guide to garment quality	
19.	IS 12840 : 1989	Kit bag, universal - Specification	
20.	IS 13489 : 2000	Textiles – Bed mattress – Specification (first revision)	
21.	IS 14281 : 2004	Textiles – Glossary of terms relating to made-up textile items and ready-made garments (first revision)	

22.	IS 14351 : 1996	Textiles – Ground sheets (light weight) – Specification	
23.	IS 14354 : 1996	Textiles – Waterproof covers – Specification	
24.	IS 14452 : 2014/ ISO 3758:2012	Textiles – Care labelling code using symbols	
25.	IS/ISO 18163 : 2016	Textiles— Clothing Digital fittings — Vocabulary and terminology used for the virtual garment	
26.	IS/ISO 18825-1 : 2016	Textiles— Clothing Digital fittings — Part 1: Vocabulary and terminology used forthe virtual human body	
27.	IS/ISO 18825-2 : 2016	Textiles — Clothing Digital fittings— Part 2: Vocabulary and terminology used for attributes of the virtual human body	
28.	IS/ISO 18831 : 2016	Textiles — Clothing — Digital Fittings — Attributes of Virtual Garments	
29.	IS/ISO 18890 : 2018	Textiles Clothing Standard method of garment measurement	