भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDRADS

Draft for comments only Doc: TXD 10 (26850) WC
January 2025

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

भारतीय मानक मसौदा

वस्त्रादि — सिंगल जर्सी, कॉटन, सिंथेटिक और मिश्रित, महिलाओं के स्टॉकिंग्स — विशिष्टि

(*Draft Indian Standard)*

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

Hoisery Sectional Committee	Last date for receipt of comments
TXD 10	March 2025

FOREWORD
(*Formal clauses will be added later*)

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

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

1 SCOPE

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

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

2 REFERENCES

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

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

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

2.4 For the purpose of this standard the definitions given in IS 1324, ISO 1833 given in **Annex C** and **Annex D** shall apply.

3 TERMINOLOGY

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

4 MATERIALS

4.1 Yarn

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

4.2 Identification of Textile Fibres

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

5 MANUFACTURE

5.1 Shape

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

5.2 Knitting

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

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

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

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

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

Sl No.	Gauge of	Approximate Count of Yarn – Cotton Count	Mass/m^2
(1)	(2)	(3)	(4)
i)	6 – 8	20s (30Tex) – 28s (21Tex)	250 – 380
ii)	10 – 18	30s(20 Tex) – 36s(16Tex)	150 – 200
iii)	18 – 24	40s(15 Tex) – 50s(12Tex)	100 – 150
NOTE — As determined by the number of needles per 2.54 CM			

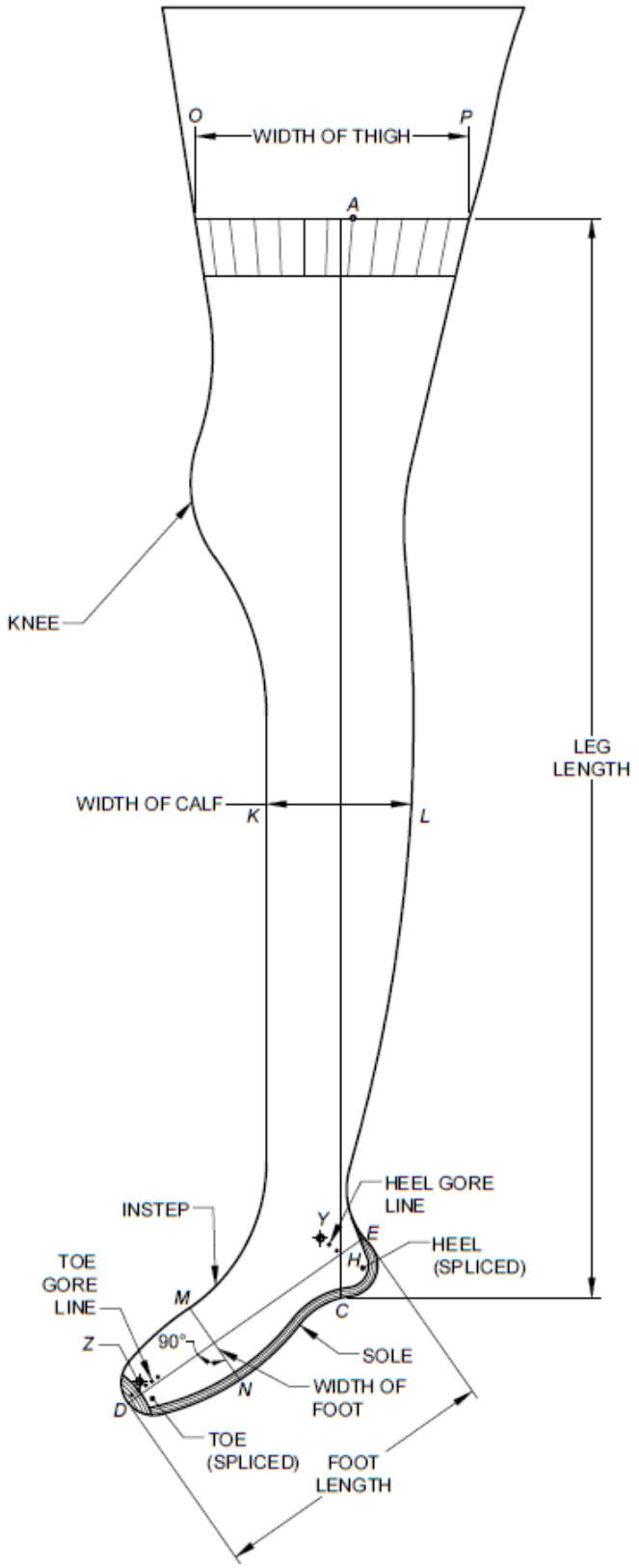

FIGURE1 FEMALE PLAIN AND RIB KNITTED THIGH STOCKING

Table 2 Dimension and Mass of Stockings

(*Clause* 5.1)

SI No.	Size	Dimension					Mass of 10 Pairs, g *Min*
		Foot Length (cm) (Distance from D to E through H)	Width of the Foot (cm) (Distance from M to N)	Leg Length (cm) Distance From A to C Through H)	Width of Thigh (cm) Distance from O to P	Width of Calf (cm) Distance From K to L)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	19.2	19.2	8.8	72.8	49.6	32.0	50 to 380
ii)	19.6	19.6	9.0	74.2	50.5	32.6	
iii)	19.8	19.8	9.2	75.1	51.2	33.0	
iv)	20.0	20.0	9.4	76.0	51.8	33.4	
v)	20.4	20.4	9.6	77.4	52.7	34.0	
vi)	20.8	20.8	9.8	78.7	53.6	34.6	
vii)	21.0	21.0	10	79.1	54.2	35.0	
viii)	21.4	21.4	10.4	79.8	54.8	35.4	
ix)	21.8	21.8	10.8	80.1	55.1	36.0	
x)	22.0	22.0	11.0	80.4	55.6	36.4	
xi)	22.4	22.4	11.2	80.7	60.0	37.0	
xii)	23.0	23.0	11.6	81.0	62.5	37.4	
xiii)	24.0	24.0	12.0	81.2	66.0	38.0	
xiv)	24.5	24.5	12.6	81.6	66.7	38.4	
xv)	25.0	25	13.2	82.4	67.4	39.0	
xvi)	25.5	25.5	13.8	82.6	68.2	39.6	
xvii)	26.0	26.0	14.5	90.2	68.6	40.2	
xviii)	26.5	26.5	15.2	90.6	69.0	40.7	
xix)	30.0	27.0	15.8	91.2	69.4	41.2	
xx)	30.6	27.5	16.2	91.8	70.2	41.8	
xxi)	30.8	28.0	16.8	92.4	70.8	42.4	
xxii)	31.2	28.6	17.2	92.8	71.2	42.8	
xxiii)	31.8	29.2	17.6	93.2	71.8	43.2	
xxiv)	32.4	29.8	18.2	93.8	72.2	43.8	
xxv)	32.8	30.2	18.6	94.2	72.6	44.2	
Tolerance		± 0.5		± 1.0	± 0.5		
Method of Test Ref to		B-2					B-3

5.3 Splicing

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

5.4 Linking

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

5.5 Freedom from Defects

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

6 REQUIREMENTS

6.1 Dimension and Mass

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

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

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

7 SEALED SAMPLE

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

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

8 PAIRING

8.1 The stocking shall be paired according to their sizes.

9 MARKING

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

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

9.2 BIS Certification and Marking

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

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

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

10 PACKING

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

11 SAMPLING

11.1 Lot

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

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

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

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

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

Table 4 Sample Size and Permissible Number of Non-Conforming pairs of Stockings
(*Clause 9.3 and 9.4*)

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

ANNEX A

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 199 : 1989	Textiles – Estimation of moisture, total size or finish, ash and fatty matter in grey and finished cotton textile materials.
IS 667: 1981	Textiles fibres – Methods for identification of textile fibers
IS 833 : 1977	Specification for gents' rib-knitted nylon stockings (first revision)
IS 1390 : 2022	Textiles – Determination of pH of aqueous extract (*Third Revision*)
IS 3086 : 1965	Code for seaworthy packaging of cotton hosiery yarn and goods
IS 3325 : 1965	Code for inland packaging of cotton hosiery yarn and goods
IS 3329 : 1973	Specification for socks, cotton (first revision)
IS 3456 : 2022	Method for determination of water-soluble. matter of textile materials
IS 3596 : 1967	Glossary of terms relating to hosiery
IS 6359 : 2023	Method for conditioning of textiles
IS 9543:2019	Textiles – Spun polyester sewing thread – Specifications
IS 13719:2003	Textiles Spun cotton regenerated cellulosic fiber blended grey yarn - Specifications
IS 15336: 2003	Textiles – Acrylic Yarn for Hosiery – Specification
ISO 9943 : 2009	Textiles – Determination of Fabric Propensity to Surface Fuzzing and to Pilling, Part 2: Modified Martindale Method
ISO 10132:1993	Textiles – Textured filament yarn - Definitions
ISO 5688 : 2024	Textiles – Synthetic filament yarns – Test methods for crimp properties of Textured yarn
ISO 6989:1981	Textile fibers — Determination of length and length distribution of staple fibers (by measurement of single fibers)
IS/ISO 105 – B01: 2014	Textiles – Tests for colour fastness – Part B01 colour fastness to light: Daylight
ISO 1833-1:2020	Textiles – Quantitative chemical analysis – Part 1: General principles of testing
IS/ISO 105 – B02: 2014	Textiles – Tests for colour fastness – Part B02 colour fastness to artificial light: xenon arc fading lamp test
IS/ISO 105 – C10: 2006	Textiles – Tests for colour fastness – Part C10 colour fastness to w with soap or soda and soap

IS/ISO 105 – E04: 2008	Textiles – Tests for colour fastness – Part E04 colour fastness to perspiration
IS 16914 (Part 3) : 2018 ISO 16373-3 : 2014	Textiles – Dyestuffs – Method for determination of certain carcinogenic dyestuffs (method using triethylamine/methanol)
IS 17336 (Part 1) : 2019 ISO 14362-1 : 2017	Textiles – Methods for determination of certain aromatic amines derived from azo colorants – Part 1: Detection of the use of certain azo colorants accessible with and without extracting the fibres
IS/ISO 1O5 X12:2016	Method for determination of colour fastness of textile materials to rubbing.
ISO/TR 11827 : 2012	Textiles — Composition testing — Identification of fibres

ANNEX B
(*Clause* 4.1**)**

Materials for Stocking Manufacture

Table 5 **Combed & Carded 100% Cotton Hosiery Yarn**

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

Table 6 Blended hosiery yarns used commercially
(*Clause* 4.1)

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

vii)	Cotton/Spandex	50/50, 90/10, 95/5	---------	140 GSM Fabric
viii)	Viscose Jersey Fabric	100%	20s, 24s, 30s, 34s, 40s.	220 GSM
ix)	Cotton/Nylon /Spandex Fabrics	70/25/5	---------	200 GSM Fabric
x)	Cotton/Viscose/Spandex	65/30/5	---------	160 GSM
xi)	Woollen	100%		
xii)	Polyester/Wool			

ANNEX C

METHOD FOR DETERMINATION OF NYLON 6, POLYESTER AND POLYPROPYLENE YARNS

C–1 IDENTIFICATION OF NYLON 6

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

a) Formic Acid at temperatures of 70°C.
b) m-Cresol at temperatures of 80°C.

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

C–2 IDENTIFICATION OF POLYESTER

The material used for manufacture is dipped in the following reagents:
a) Solution of crystallized tri-chloro-acetic acid/chloroform reagent, prepared at a mass ratio 1:1.
b) Benzyl Alcohol at temperatures of 150°C.

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

C–3 IDENTIFICATION OF COTTON

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

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

C– 4 IDENTIFICATION OF POLYPROPYLENE

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

a) Boiling xylene at temperatures of 145°C.

C– 4.1 If the material used for manufacture is polypropylene; it shall dissolve in the above mentioned reagents.

C–5 IDENTIFICATION OF SPANDEX

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

a) Spandex will dissolve in DMF (Dimethyl Formamide) or DMAc, (Dimethyl Acetamide) unlike many other fibers.

b) Spandex is resistant to formic acid, while some other fibers may dissolve or degrade.

c) Spandex will degrade but not dissolve completely in sulfuric acid, often swelling and losing elasticity.

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

ANNEX D

METHODS OF TEST

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

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

D–2 DIMENSIONS

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

D–3 MASS

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

D–4 WALES AND COURSES

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

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

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

D–5 DIMENSIONAL CHANGE (DUE TO RELAXATION)

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

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

D–5.2 Procedure

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

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

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

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

D–5.3 Calculation

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

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

Where;

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

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