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DRAFT TANZANIA STANDARD

Textiles — Treated synthetic fabrics for conveyor belts — Specification

TANZANIA BUREAU OF STANDARDS

Foreword

This Draft Tanzania Standard was published under the authority of the Board of Directors of Tanzania Bureau of Standards.

Tanzania Bureau of Standards (TBS) is the statutory national Standards body for Tanzania, established by the Standards Act Cap. 130.

Draft Tanzania Standards are developed through Technical Committees that are representative of key stakeholders, including government, academia, consumer groups, private sector and other interested parties. The Technical Committees work under the supervision of Divisional (sectoral) Committees. The Draft Tanzania Standards are developed in accordance with the Guide and Procedure for Development of Tanzania Standards and TZS 0, *Guide for presentation of Tanzania Standards*.

Tanzania Standards are subject to review to keep pace with science and technological advances. Users of the Tanzania Standards are therefore expected to ensure they always have the latest versions of the Tanzania Standards they implement.

This Draft Tanzania Standard was developed under the supervision of the Textile and Leather Divisional Standards Committee (TDC). The Technical Committee responsible for the Draft Tanzania Standards is TDC 12 - Specialized Textiles Technical Committee.

The reporting of the results of a test or analysis made in accordance with this Draft Tanzania Standard, if the final value, observed or calculated, is to be rounded off, shall be done in accordance with *TZS 4*.

Textiles — Treated Synthetic Fabrics for Conveyor Belts — Specification

1. Scope

1.1 This Draft Tanzania Standard specifies the requirements, test methods and sampling for woven treated synthetic fabrics used in conveyor belts, manufactured from polyamide, polyester, or their combination.

1.2 This Draft Tanzania Standard does not cover the requirements of fabrics made from cotton, rayon and aramid fibers used in conveyor belts and breaker fabrics used in the manufacture of conveyor belts

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.

TZS 4 *Rounding off numerical values*

TZS 21/ISO 7211-6 *Textiles — Methods for analysis of woven fabrics construction Part 6: Determination of the mass of warp and weft per unit area of fabric*

ISO 37 *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

TZS 44 *Textiles - Woven or knitted fabrics - Determination of length and width*

TZS 140/ISO 7211-3:1984 *Textiles — Woven fabrics — Construction — Methods of analysis Part 3: Determination of crimp of yarn in fabric*

TZS 249/ISO 13015 *Woven fabrics - Distortion - Determination of skew and bow*

ISO 2859-1 *Sampling procedures for inspection by attributes Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

TZS 3116 *Textiles — Standard test method for length, width, thickness, diameter and circumference of textile and leather products*

ISO 4647 *Rubber, vulcanized — Determination of static adhesion to textile cord — H-pull test*

FTZS 4894-1/ISO 13934-1*Textiles - Tensile properties of fabrics - Part 1 Determination of maximum force and elongation at maximum force using the strip method*

ISO 17493 *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven*

3. Terms and definitions

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

3.1
adhesion strength

force per unit width required to separate, by stripping, two piles of fabrics, or a rubber layer and a fabric ply bonded together.

3.2
bow

curvature of warp yarn or weft yarn of fabric. Weft bow is the total perfect perpendicular distance by which a weft yarn deviates from a straight line joining both ends of the weft yarn in proportion to the length of the first line (woven fabric width) as a percentage ratio. Warp bow is the greatest percentage perpendicular distance between the edge and a straight line joining two selected points on the edge in proportion to the distance between the two points, expressed as a percentage ratio.

3.3
breaking strength

greatest measured force during the tensile test divided by the width of the test piece.

3.4
carcass and piles

structural core of the conveyor belt, providing the belt with its strength and ability to carry loads, absorb impact and maintain its shape and stability.

3.5
crimp

percentage increase in length of the yarn, causing its curvature to waviness due to interlacing with the close yarns in a woven fabric.

3.6
dip pick-up

amount of dip on fabric treated with resorcinol formaldehyde latex (RFL) and other coatings onto the fabric during dipping (treating) process. It is expressed as a percentage of the oven-dry mass of the pretreated fabric.

3.7
EE (Polyester/Polyester) Fabric

fabric with both warp and weft yarns made of polyester. It is suited for conveyor belts requiring high cross rigidity in application.

3.8
elongation at Break

test specimen produced by the maximum force before rupture. It is the ratio of extension of a test piece to its initial length and is expressed in percentage.

3.9
elongation at Reference Load (Force)

one tenth of the specified (rated) breaking strength of the fabric in the warp (longitudinal) direction.

3.10
EN (Polyester/Nylon 6)

fabric with warp yarns made of polyester and weft yarns made of Nylon 6. It is suitable for conveyor belts used in medium-duty applications where a balance of strength, flexibility and abrasion resistance is essential.

3.11
ends

yarns which lie along the length of a fabric as woven. The ends per decimetre (Ends/dm) are the number of yarns per decimetre of width.

3.12
EP (Polyester /Nylon 6,6) Fabric

fabric with warp yarns made of polyester and weft yarns made of nylon 6,6. It is suitable for conveyor belts used in medium to heavy-duty applications.

3.13
heat-setting and adhesive treatment

treatment adjusted to tailor the adhesive characteristics and physical properties of the fabric to meet the requirements of adhesion to elastomeric rubber compound, fabric stability to temperature and controlled extensibility in both warp and weft direction.

3.14
hot air shrinkage

decrease in length of a specimen of fabric as a result of thermal treatment in dry-hot air (hot air oven) under specific condition (temperature and duration), expressed as a percentage of its original length.

3.15
NN (Nylon 6/Nylon 6) Fabric

fabric with both warp and weft yarns made of nylon 6. It is suited for conveyor belts used in light to medium-duty applications requiring high flexibility and good impact and abrasion resistance.

3.16
PP (Nylon 6,6/Nylon 6,6) Fabric

fabric with both warp and weft yarns made of nylon 6,6. It is suited for conveyor belts used in heavy-duty applications that demand excellent abrasion resistance and high tensile strength.

3.17
reference load (Force)

10 percent of the nominal breaking strength in the longitudinal direction multiplied by the width of the test piece in mm.

3.18
skew

Fabric condition where weft yarns, although straight, are not at right angle to the warp yarns.

3.19
skim

thin layer of elastomeric rubber compound applied to a fabric for lamination between two adjacent fabric plies and between fabric ply and a cover rubber.

3.20
skim rubber

each fabric ply is calendared with a rubber to ensure adhesion between the layers and to the outer covers when vulcanized together. It helps in absorbing impact and distribute load on to the belt.

4 Requirements

4.1 General

4.1.1 Types

The synthetic fabric for conveyor belting shall be of the following types depending upon the warp and weft yarn material used in the fabric:

a) NN (nylon 6/nylon 6);
b) EE (polyester/polyester);
c) PP (nylon 6,6/nylon 6,6);
d) EP (polyester/nylon 6,6); and
e) EN (polyester/nylon 6)

4.1.2 Manufacture

4.1.2.1 The yarn used in the manufacture of woven treated synthetic fabrics shall be continuous filament made of nylon 6, nylon 6,6 and polyester or their combination.

4.1.2.2 The yarn shall be evenly twisted and reasonably free from defects, such as undrawn yarn, cable knots, cork screws, kinks, broken filaments, oil stains and other extraneous material.

4.1.2.3 Woven synthetic fabric shall be treated for adhesion with suitable elastomeric compounds and heat-set to ensure adequate performance.

4.1.2.4 The fabric shall be reasonably free from foreign matter and defects, such as knots, lumps and irregularities of twist in yarn and free from foreign matters and defects, such as knots, lumps and irregularities of twist in yarn and free from oil stains when examined visually.

4.1.2.5 The synthetic fabric is classified according to the code letters given in Table 1, depending on yarn used in the warp (longitudinal) and weft (transverse) direction.

4.2 Specific requirements

4.2.1 Synthetic fabrics used in conveyor belts shall be treated primarily with resorcinol-formaldehyde-latex (RFL) to enhance adhesion between the fabric and rubber layers, ensuring strong bonding and resistance to delamination.

4.2.2 The construction parameters of woven treated synthetic fabric for conveyor belt shall be as agreed to between the buyer and the seller, subject to the tolerance and the test method as given in Table 2 (see Note).

4.2.3 Woven treated synthetic fabrics of different types, used in the conveyor belt, shall conform to the requirements given in Table 3 and Table 7.

Table 1 — Code Designation of Yarn

S/N	Code Letter	Yarn
1.	P	Nylon 6,6
2.	N	Nylon 6
3.	E	Polyester
NOTE: If a fabric contains a secondary yarn, its identity shall be indicated by the use of characters in parentheses to designate the yarn type.		

Table 2 — Tolerance on construction parameters of woven treated synthetic fabric for conveyor belt.

S/N.	Characteristic	Tolerances (on Declared Parameters)	Test Methods
1.	Ends/dm	± 2 percent	TZS 20-2/ISO 7211-3
2.	Picks/dm	± 2 percent	
3.	Dimension (length and width), mm	+ 1 percent -0 percent	TZS 44
4.	Dimension (width), mm a) width up to 1000 mm	+ 10 mm -0 mm	TZS 44
	b) width above 1000 mm	+ 20 mm -0 mm	
5.	Skew/bow	≤ 3.0 percent	FTZS 249/ISO 13015
6.	Dip pick-up	± 1 percent	ISO 4647:2021 and Annex A for EP/EN fabrics
NOTE-The parameter given in Table 2 for woven treated synthetic fabric for conveyor belt shall be declared by the manufacturer and shall be mutually agreed to between the buyer and the seller; however, it shall comply with the specified tolerance on the declared value.			

Table 3 — Performance requirements of NN (Nylon 6/Nylon 6) woven treated synthetic fabrics for conveyor belt

S/N	Characteristics	Type and Grades										Test Methods
		NN 080	NN 100	NN 125	NN 160	NN 200	NN 250	NN 315	NN 350	NN 400	NN 500	
1.	Mass, g/m^2, ±3%	290	335	385	455	525	625	735	820	1000	1280	TZS 21/ISO 7211-6
2.	Thickness, mm	0.45 ±0.10	0.55 ±0.10	0.65 ±0.10	0.74 ±0.10	0.85 ±0.10	1.00 ±0.10	1.10 ±0.10	1.20 ±0.10	1.40 ±0.15	1.75 ±0.20	TZS 3116
3.	Average breaking strength (600 mm × 25mm) - Warp way, kN/m, Min.	120	135	160	192	245	295	355	410	490	625	FTZS 4894-1ISO 13934-1
4.	Average breaking strength (600 mm × 25 mm) – weft warp, kN/m, Min.	45	50	62	62	65	75	70	70	75	75	FTZS 4894-1ISO 13934-1
5.	Coefficient of variation for breaking strength (warp and weft way), %.	CV shall not be more than 10%										FTZS 4894-1ISO 13934-1
6.	Warp-wise crimp (%), Min.	30										TZS 140/ISO 7211-3
7.	Fabric elongation at break, warp way, %, Min.	20	20	20	20	20	20	20	24	24	24	FTZS 4894-1ISO 13934-1
8.	Fabric elongation at break, weft way, (%), Min.	24										FTZS 4894-1ISO 13934-1
9.	Initial elongation @10% load, %, Max.	4.0	4.0	4.5	4.5	4.5	5.0	5.0	5.5	5.5	5.5	FTZS 4894-1ISO 13934-1
10.	Adhesion (ply to ply), kN/m, Min.	7.8										ISO 37/Annex B
11.	Hot air shrinkage of fabric (150 ℃ for 30 min) – Warp way, %, Max.	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5	ISO 17493
12.	Hot air shrinkage of fabric (150 ℃ for	0.5										ISO 17493

	30 min)-Weft way (%), Max.		
13.	Heat retention strength test, warp way, 150 ℃ for 30 min, Min.	90%	Annex C
NOTE: The other GSM conveyor belting fabric of a particular grade and type may be used as per the agreement between the buyer and the seller with the tolerance of ± 3%.			

Table 4 — Performance requirements of EE (Polyester/Polyester) woven treated synthetic fabrics for conveyor belt

S/N	Characteristics	Type and Grades							Test Methods
		EE 080	EE 100	EE 125	EE 160	EE 200L	EE 250L	EE 315L	
1.	Mass, g/m^2, ±3%	305	335	420	530	620	775	950	TZS 21/ISO 7211-6
2.	Thickness, mm	0.40 - 0.50	0.45 - 0.55	0.53 - 0.63	0.70 - 0.80	0.75 - 0.95	0.95 - 1.15	1.20 - 1.40	TZS 3116
3.	Average breaking strength (600 mm × 25mm - Warp way) kN/m, Min.	120	130	160	205	240	304	343	FTZS 4894-1ISO 13934-1
4.	Average breaking strength (600 mm × 25 mm) – weft warp, kN/m, Min.	37	45	43	67	70	67	78	FTZS 4894-1ISO 13934-1
5.	Coefficient of variation for breaking strength (warp and weft way), %.	CV shall not be more than 10%							FTZS 4894-1ISO 13934-1
6.	Warp-wise crimp, %, Min.	3.0							TZS 140/ISO 7211-3
7.	Fabric elongation at break, warp way, %, Min.	20							FTZS 4894-1ISO 13934-1
8.	Fabric elongation at break, weft way, %, Min.	20							FTZS 4894-1ISO 13934-1
9.	Initial elongation @10% load, %, Max.	2.0	2.0	2.5	2.5	2.5	3.0	3.0	FTZS 4894-1ISO 13934-1
10.	Adhesion (ply to ply), kN/m, Min.	7.8							ISO 37/Annex B
11.	Hot air shrinkage of fabric (150 ℃ for 30 min) – Warp way, %, Max.	3.0							ISO 17493
12.	Hot air shrinkage of fabric (150 ℃ for 30 min)-Weft way, %, Max.	0.5							ISO 17493
13.	Heat retention strength test, warp way, 150 ℃ for 30 min, Min.	90%							Annex C
NOTE: The other GSM for conveyor belting fabric of a particular grade and type may be used per the agreement between the buyer and the seller with a tolerance of ± 3%									

Table 5 — Performance requirements of PP (Nylon 6,6/Nylon 6,6) woven treated synthetic fabrics for conveyor belt

S/N	Characteristics	Type and Grades								Test Methods
		PP 100	PP 125	PP 160	PP 200	PP 250	PP 315	PP 350	PP 400	
1.	Mass, g/m^2, ±3%	345	390	485	550	690	735	860	1030	TZS 21/ISO 7211-6
2.	Thickness, mm	0.55±0.05	0.65±0.10	0.75±0.10	0.90±0.10	1.05±0.15	1.15±0.15	1.25±0.15	1.40±0.15	TZS 3116
3.	Average breaking strength (600 mm × 25mm - Warp way) kN/m, Min.	140	165	205	250	330	370	420	490	FTZS 4894-1ISO 13934-1
4.	Average breaking strength (600 mm × 25 mm) – weft warp, kN/m, Min.	50	60	75	75	75	75	75	75	FTZS 4894-1ISO 13934-1
5.	Coefficient of variation for breaking strength (warp and weft way), %.	CV shall not be more than 10%								FTZS 4894-1ISO 13934-1
6.	Warp-wise crimp, %, Min.	30								TZS 140/ISO 7211-3
7.	Fabric elongation at break, warp way, %, Min.	20	20	20	20	24	24	28	28	FTZS 4894-1ISO 13934-1
8.	Fabric elongation at break, weft way, %, Min.	24	24	24	24	24	24	24	24	FTZS 4894-1ISO 13934-1
9.	Initial elongation @10% load, %, Max.	4.0	4.0	4.5	4.5	5.0	5.0	5.5	5.5	FTZS 4894-1ISO 13934-1
10.	Adhesion (ply to ply), kN/m, Min.	7.8								ISO 37/ Annex B
11.	Hot air shrinkage of fabric (150 ℃ for 30 min) – Warp way, %, Max.	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	ISO 17493
12.	Hot air shrinkage of fabric (150 ℃ for 30 min)-Weft way, %, Max.	0.5								ISO 17493
13.	Heat retention strength test, warp way, 150 ℃ for 30 min, Min.	90%								Annex C
NOTE: The other GSM conveyor belting fabric of a particular grade and type may be used as per the agreement between the buyer and the seller with a tolerance of ± 3%										

Table 6 — Performance requirements of EP (Polyester/Nylon 6,6) woven treated synthetic fabrics for conveyor belt

S/N	Characteristic	Type and Grades												Test Methods
		EP 080	EP 100	EP 125	EP 160	EP 200	EP 250	EP 315	EP 350	EP 400	EP 500	EP 630	EP 800	
1.	Mass, g/m^2, ±3%	305	335	460	530	640	840	960	1100	1300	1675	2200	2400	TZS 21/ISO 7211-6
2.	Thickness, mm	0.45± 0.05	0.50± 0.05	0.65 ± 0.05	0.75± 0.05	0.90 ± 0.10	1.15 ± 0.10	1.30 ± 0.15	1.50 ± 0.15	1.70 ± 0.15	2.30 ± 0.20	2.50 ± 0.20	3.15 ± 0.20	TZS 3116
3.	Average breaking strength (600 mm × 25mm - Warp way) kN/m, Min.	120	137	166	200	254	333	380	440	530	675	843	960	FTZS 4894-1ISO 13934-1
4.	Average breaking strength (600 mm × 25 mm) – weft warp, kN/m, Min.	40	40	74	65	69	76	80	110	100	100	170	196	FTZS 4894-1ISO 13934-1
5.	Coefficient of variation for breaking strength (warp and weft way), %.	CV shall not be more than 10%												FTZS 4894-1ISO 13934-1
6.	Warp-wise crimp, %, Min.	3.0												TZS 140/ISO 7211-3
7.	Fabric elongation at break, warp way, %, Min.	18	20	20	20	20	20	20	20	20	20	20	20	FTZS 4894-1ISO 13934-1
8.	Fabric elongation at break, weft way, %, Min.	24												IS 1969 (Part 1)
9.	Initial elongation @10% load, %, Max.	2.0	2.0	2.5	2.5	2.5	3.0	3.0	3.5	3.5	4.0	4.0	4.0	FTZS 4894-1ISO 13934-1
10.	Adhesion (ply to ply), kN/m, Min.	7.8												ISO 37/ Annex B
11.	Hot air shrinkage of fabric (150 ℃ for 30 min) – Warp way, %, Max.	3.0												ISO 17493
12.	Hot air shrinkage of fabric (150 ℃	0.5												ISO 17493

	for 30 min)-Weft way, %, Max.		
13.	Heat retention strength test, warp way, 150 ℃ for 30 min, Min.	90%	Annex C
NOTE: The other GSM for conveyor belting fabric of a particular grade and type may be used as per the agreement between the buyer and the seller with tolerance of ± 3%			

Table 7 — Performance requirements of EN (Polyester/Nylon 6) woven treated synthetic fabrics for conveyor belt

S/N	Characteristics	Type and Grades							Test Methods
		EN 100	EN 125	EN 160	EN 200	EN 250	EN 315	EN 350	
1.	Mass, g/m2, ±3%	360	440	540	650	850	960	1095	TZS 21/ISO 7211-6
2.	Thickness, mm	0.55 ± 0.10	0.67 ± 0.10	0.78 ± 0.10	0.90 ± 0.10	1.20 ± 0.10	1.35 ± 0.15	1.45 ± 0.15	TZS 3116
3.	Average breaking strength (600 mm × 25mm - Warp way) kN/m, Min.	135	170	210	265	330	380	450	FTZS 4894-1ISO 13934-1
4.	Average breaking strength (600 mm × 25 mm) – weft warp, kN/m, Min.	50	55	67	78	78	70	75	FTZS 4894-1ISO 13934-1
5.	Coefficient of variation for breaking strength (warp and weft way), %.	CV shall not be more than 10%							FTZS 4894-1ISO 13934-1
6.	Warp-wise crimp, %, Min.	3.0							TZS 140/ISO 7211-3
7.	Fabric elongation at break, warp way, %, Min.	18	20	20	20	20	20	20	FTZS 4894-1ISO 13934-1
8.	Fabric elongation at break, weft way, %, Min.	24	24	24	24	24	24	24	FTZS 4894-1ISO 13934-1
9.	Initial elongation @10% load, %, Max.	2.0	2.5	2.5	2.5	3.0	3.0	3.5	FTZS 4894-1ISO 13934-1
10.	Adhesion (ply to ply), kN/m, Min.	7.8							ISO 37/ Annex B
11.	Hot air shrinkage of fabric (150 ℃ for 30 min) – Warp way, %, Max.	3.0							ISO 17493
12.	Hot air shrinkage of fabric (150 ℃ for 30 min)-Weft way, %, Max.	0.5							ISO 17493
13.	Heat retention strength test, warp way, 150 ℃ for 30 min, Min.	90%							Annex C
NOTE: The other GSM for conveyor belting fabric of a particular grade and type may be used as per the agreement between the buyer and the seller with a tolerance of ± 3%									

5. Packing and marking/labelling.

5.1 Packing

Unless otherwise agreed to between the buyer and the seller, the conveyor belts shall be packed as follows:

5.1.1 The conveyor belt shall be rolled and packed suitably to prevent contamination from dust, ingress of moisture or physical damage.

5.1.2 The roll shall be packed securely to allow normal handling and transport without tearing, damage and to avoid exposing the contents to sunlight and artificial UV light in storage.

5.1.3 Packaging of the product shall be such as to maintain the integrity of the product throughout its shelf life.

5.2 Marking/labelling

The synthetic fabric for conveyor belt shall be marked on the outer covering for its identification with the following information:

a) name of the product;
b) type and grade (NN, EE, PP, EP and EN);
c) manufacturer's name and/or address or trade mark;
d) country of origin;
e) batch number;
f) length of roll (m);
g) width (mm);
h) date and year of manufacture; and
i) net/gross weight of the roll.

6. Sampling

Sampling shall be done in accordance with ISO 2859-1.

Annex A
(Normative)

TEST METHOD FOR DETERMINATION OF DIP PICK-UP FOR COMBINATION OF NYLON AND POLYESTER FABRICS USED IN CONVEYOR BELTING

A-1 PRINCIPLE

This procedure is used to determine the dip pick-up of dried RFL (resorcinol-formaldehyde-latex) in conveyor belting fabrics. A weighed quantity of fabric (such as EE, EP, NN, PP, EN) is dissolved in a suitable solvent system, which dissolves the textile fibers while leaving the dip as an undissolved residue. The residue is oven-dried and weighed. Dip pick-up is calculated as a percentage of the oven-dry mass of the pure textile material.

A-2 APPARATUS AND REAGENTS

A-2.1 Magnetic Stirrer

A-2.2 250 ml Conical Flask with Stopper

A-2.3 Vacuum Pump

A-2.4 Dichloromethane and Trichloroacetic Acid

A-2.5 90 Percent Formic Acid

A-2.6 Analytical Balance — accuracy ± 0.1 mg

A-2.7 Hot Air Oven — 150 °C ± 1 °C

A-2.8 Desiccator

A-2.10 Sintered Glass Crucible — Grade G-4

A-2.11 Suction Flask and Suction Device

A-2.12 Draft Tanzania Standard Laboratory Glassware — measuring cylinders, pipettes, etc

A-3 PROCEDURE

A-3.1 Take a square piece of the dipped nylon/polyester fabric sample weighing approximately 1 g to 2 g. Ensure that the piece includes both warp and weft yarns.

A-3.2 Cut the fabric into small pieces of approximately 2 mm to 3 mm in length.

A-3.3 Place the cut pieces in a hot air oven and dry them at 150 °C ± 1 °C for 20 min.

A-3.4 Remove the sample, allow it to cool in a desiccator and weigh the dried sample (*M*m) accurately. The mass shall be taken as constant when the difference between two successive weighings made at an interval of 20 min is less than 0.1 percent.

A-3.5 Transfer the dried sample into a 250 ml conical flask. Add the appropriate solvents and stir the contents as mentioned below in Table 9.

A-3.6 After stirring for 45 min, filter the contents of the flask through a sintered glass crucible (preferably Grade G-4).

A-3.7 Thoroughly wash both the flask and the residue retained in the crucible with three portions of 25 ml each of the same solvent(s) used earlier, followed by washing with distilled water.

A-3.8 Dry the crucible containing the residue in a hot air oven at 150 °C ± 1 °C until a constant mass is obtained. Record this weight as *M*r (dip residue).

A-4 CALCULATION

A-4.1 Dip pick up percent = $\frac{Mr}{Mm\text{-}Mr} \times 100$

Where

*M*r = Oven-dry mass, in g, of the residue; and

*M*m = Oven-dry mass, in g, of textile material.

A-4.2 Report the average of two values of the dip pick up in percentage.

Table 8 — Solvent used for Dip Pick up of Fabric

S/N	Fabric type	Solvent	Quantity	Stir Time
1.	a) EE (polyester/polyester) fabric b) EP (Nylon 6/Nylon 6,6) fabric	Dichloromethane and trichloroacetic acid = - mixed solution (3: 1 ratio	Mixed solution - 75 ml	45 min
2.	a) NN (Nylon 6/Nylon 6) fabric b) PP (Nylon 66/Nylon 6,6) fabric	90 percent formic acid	100 ml	45 min
3.	EN (polyester/Nylon/Nylon 6) fabric	a) Dichloromethane and trichloroacetic acid – mixed solution (3:1 ratio) b) 90 percent formic acid	Add 75 ml After 45 min, add 25 ml in the same flask	45 min 45 min

Annex B
(Normative)

METHOD FOR PREPARATION OF MOULD AND TEST SPECIMEN FOR ADHESION STRENGTH TEST

B-1 MOULD AND SAMPLE PREPARATION

B-1.1 Cut 3 specimens of fabric of size 230 mm × 150 mm parallel to warp and weft directions.

B-1.2 Cut 2 pieces of the cover rubber compound (thickness*: 3.5 mm to 4 mm) of size 230 mm × 150 mm. Cut 4 pieces of skim rubber compound (thickness*: 1 mm to 1.2 mm) of size 230 mm × 150 mm. Stick the skim compound on one side of the cover compound. It shall be done for both the cover compounds.

NOTE — Thickness of cover and skim rubber compound may differ based on functional requirements.

B-1.3 Place the cover and skim compound on the table. Keep a cellophane paper of size 150 mm × 75 mm on the top left of the rubber compound.

B-1.4 Place the first specimen of the fabric.

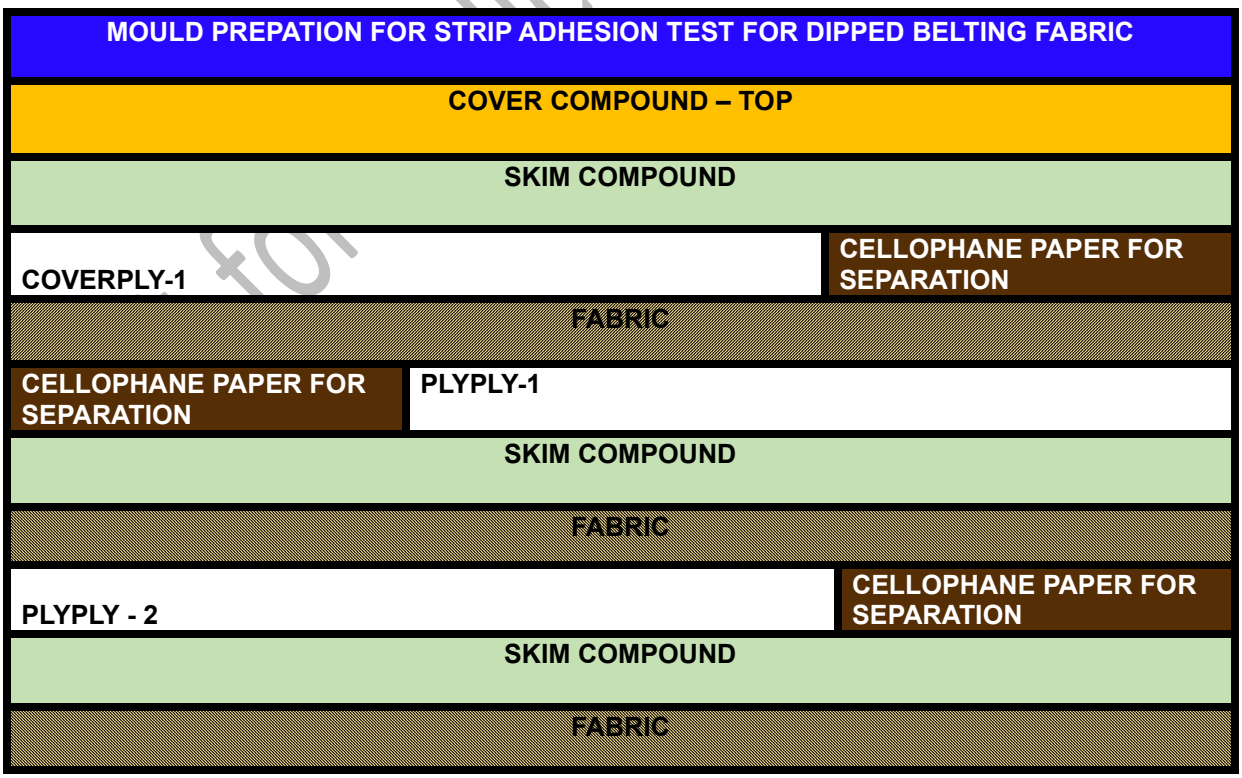
B-1.5 Place the skim compound on this specimen; keep a cellophane paper on the top right on this

B-1.6 Place the second specimen of the fabric.

B-1.7 Place the second skim compound; keep a cellophane paper on the left top of the fabric.

B-1.8 Place the third specimen of the fabric and keep a cellophane paper on the top right of this.

B-1.9 Cover this with the second cover and skim compound (see Fig. 1).



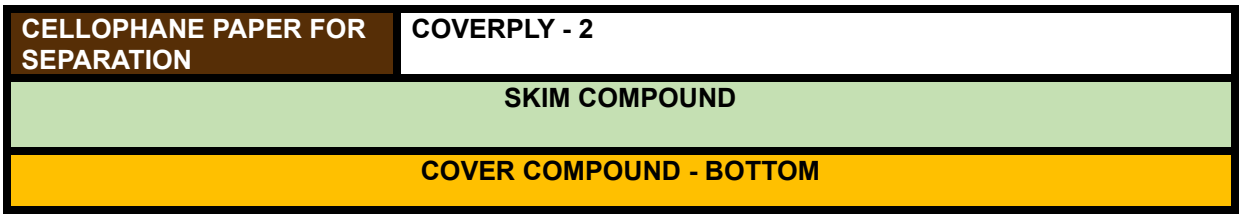


FIG. 1 METHOD FOR PREPARATION OF MOULD

B-2 CURING CONDITION AND TEST CONDITION

B-2.1 Curing Condition

The mould shall be cured in a curing press as mentioned below:

S/N	Compound to be used	Specific Pressure (kg/cm^2)	Time* (mins)	Temperature (°C)
1.	As agreed between the buyer and the seller	20 ± 2	20 to 30	150
	NOTES 1. Time shall be set depending on belt thickness 2. The above-mentioned curing conditions may be modified as agreed to between the buyer and the seller			

B-2.2 Test Condition

The cured sample shall be conditioned before testing for a minimum period of 16 h at room temperature. The cured samples shall be allowed to condition at a temperature of 27 °C ± 2 °C and a relative humidity of 65 percent ± 4 percent (see IS 6359) before carrying out the tests.

B-2.3 Cut a 25 mm strip from the cured sample using a clicker press. For testing of the samples, the procedure given in IS 3400 (Part 5) shall be followed.

Annex C
(Normative)

TEST METHOD FOR DETERMINING PERCENTAGE OF HEAT STRENGTH RETENTION

C-1 PRINCIPLE

This procedure is used to determine the percentage heat strength retention of RFL-treated synthetic fabric for conveyor belting. The sample is first tested for its initial tensile strength. Another portion is exposed to elevated temperature (heat ageing), cooled to room temperature, etc, and retested for tensile strength. The percentage of retained tensile strength after heat exposure is calculated and reported.

C-2 TEST CONDITION

C-2.1 The sample shall be exposed to 150 °C ± 1 °C for 30 min in a hot air oven.

C-2.2 The exposed sample shall be cooled to room temperature and shall be conditioned as per IS 6359.

C-3 APPARATUS

C-3.1 Constant Rate-of-Extension (CRE) — machine [see IS 1969 (Part 1)]

C-3.2 Hot Air Oven — temperature range 100 ° C to 250 °C

C-4 PROCEDURE

C-4.1 Cut 3 test pieces, each of approximately 1 200 mm length in the warp direction, maintaining a minimum 10 cm margin from either selvedge.

C-4.2 From the 1 200 mm warp direction sample, ravel several yarns from this cut edge until a full length of 1 200 mm warp yarn is available; then cut 50 mm ± 1 mm of strip and ravel out threads in both sides to make it 25 mm.

C-4.3 Divide each sample into two equal parts of 600 mm:

a) One part is used for initial tensile testing (before heat ageing); and
b) The second part is subjected to heat ageing at 150 °C for 30 min in a hot air oven.

C-4.4 During heat ageing, hang the sample freely:

a) Avoid contact with the oven's walls, floor or ceiling; and
b) If required, fold only the top and bottom edges to fit, but do not fold the central test portion (~ 300 mm to 400 mm).

C-4.5 After heat exposure, allow the sample to condition at a temperature (27 °C ± 2 °C) for at least 1 h before tensile testing.

C-4.6 Set the gauge length of the tensile tester to 200 mm ± 1 mm.

C-4.7 Clamp the sample centrally between jaws, ensuring no slack or twisting.

C-4.8 Set the clamping pressure depending on fabric strength, in the range of 150 kPa/cm to 250 kPa/cm.

C-4.9 Configure the test parameters (speed of crosshead, preload, elongation at specified load, etc) as per IS 1969 (Part 1).

C-5 Calculation Calculate the average tensile strength from the test results of three individual specimens, separately for both before heat ageing and after heat ageing conditions:

$$\text{Percent heat strength retention} = \frac{Average\ of\ after\ heat\ ageing\ tensile}{Average\ of\ before\ heat\ ageing\ tensile} \times 100$$

C-6 Test Report

Test report shall include the following:

a) Name of the Instrument used;
b) Test atmospheric conditions;
c) Intermediate elongation measured load; and
d) Heat ageing conditions.