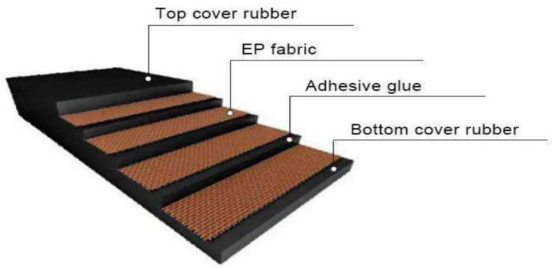
S.No.	Subject	Working Draft	S.No.		Changes Proposed by Forech	Comments
	Title	TEXTILES - FABRICS FOR CONVEYOR BELTS- SPECIFICATIONS		Title	TEXTILE - SYNTHETIC FABRICS FOR CONVEYOR BELTS - TREATED - SPECIFICATIONS OR TEXTILES - TREATED SYNTHETIC FABRICS FOR CONVEYOR BELTS - SPECIFICATIONS OR TEXTILE - SYNTHETIC FABRICS FOR CONVEYOR BELTS- DIPPED - SPECIFICATIONS	Other members of the commottee may decide on the selection of title proposed by the Forech. Can we allot it Standard No. IS 5996 (Part-2), needs to be deliberated.
	Foreword	Conveyor belts are mechanical devices used for the transportation of materials or goods. They are widely employed in various industries including mining, agriculture, and manufacturing to move products efficiently and continuously over short to medium distances. The performance of belts mainly depends on high-quality fabrics which endure the demanding operational environments characterized by heavy loads, abrasive materials and varying weather conditions. It directly decides the durability, strength and overall performance of conveyor belts. This standard aims to support the development of high-quality converyor belt fabrics that meet the stringent demands of modern industries.		Forward	This Indian Standard has been adopted by The Bureau of Indian Standards. after the draft was finalized by the Industrial Fabrics Sectional Committee TXD 33 and the approval of the Texile Division Council. The textiles majorily contribute to durability, strength and overall performance of conveyor belts. The traditional cotton fabrics have been replaced by synthetic textile constructions to meet the demand for wider, long-haul conveyors requiring high tensile strength and adhesion, minimum stretch in service and a more flexible and thinner and lighter belt and durability. This standard aims to support the development of high-quality converyor belt fabrics for that purpose. IS : 5996-1984 ' Specification for cotton belting ducks' covers the requirements of cotton belting ducks used in the manufacture of conveyor and elevator beltings. There is no International Standard on the subject. The composition of the Committee responsible for formulation of this standard is given in Annex.....	It is recommended to add in the forward: IS : 5996-1984 ' Specification for cotton belting ducks' covers the requirements of cotton belting ducks used in the manufacture of conveyor and elevator beltings. There is no International Standard on the subject. The composition of the Committee responsible for formulation of this standard is given in Annex.....
		For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 2022 ‘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. (Agreed)			For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 2022 ‘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	This standard covers the requirements of conveyor belt fabrics, ensuring that it meets the necessary performance criteria for various industrial applications.		1 Scope	This standard covers the requirements of synthetic conveyor belt fabrics well designed using yarn of polyamide, polyester and their combinations, duly treated for adhesion with ealstomeric compounds and heat-set, ensuring that it meets the necessary performance criteria and provides strength necessary for transmitting the power to drive the conveyor belt and also to support the load carried on the belt. The belt strength is determined by the combined strength of fabric plies used in the manufacture of the belts. The fabric properties are governed by the yarn material and size and the fabric construction and weave. Fabrics of plain weave, 2 x Oxford and Broken Twill are covered in the scope of this standard. Note 1. Fabrics such as made from cotton, rayon and aramid are excluded from the scope of this standard. Note 2. Fabrics mainly with plain weave and some exceptions with 2x1 Oxford and 2x2 Broken Twill for high strength fabrics have been considered in the scope of this standard. Other weave construction may be coverd later in the future.	
	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 encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A. (Agreed)		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 encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.	List of referred standards in Annex A of the agenda are not conducive to the subject. A review is required what to include and what not.
	3 Terms and Definitions			3 Terms and definitions		

3.1	Carcass & Plies — The carcass is the core of the conveyor belt, providing the required strength and shape. It is typically made of multiple layers of fabric, known as plies. Each ply is coated with a bonding agent to ensure adhesion between the layers and to the outer covers.	3.1	Nylon Nylon is the generic name for linear aliphatic polyamide. Nylon 6 is the polyamide derived from Ɛ-amino caproic acid (caprolactam) which contains 6 carbon atoms, hence giving the designation of Nylon 6. Nylon 66 is the polyamide obtained from from the polycondensation of hexamethylene diamine and adipic acid, each monomer containing six carbon atoms so giving the designation of Nylon 66. Chemical properties of both Nylon 66 and Nylon 6 are similar; with a difference in behaviour that Nylon 66 has higher modulus and higher tenacity, lower elongation and higher melting point (250- 265 deg.C for Nylon 66 and 215-225 deg.C for Nylon 6) in comparison to Nylon 6. In this standard, Nylon 66 is designated by letter 'P' and Nylon 6 by letter 'N' for ease of differentition between the two nylons. Both these yarns have good resistance to abrasion, fatigue, impact and have moderate moisture absorption and high resistance to mildew.	Nylon is a trade name of Dupont and hence its use in the standard needs to be avoided. Should we not avoid trade names?
3.2	NN (Nylon 6/Nylon 6) Fabric — Fabric with both warp and weft yarns made of Nylon 6. It is well-suited for conveyor belts used in light to medium-duty applications requiring high flexibility and good impact and abrasion resistance.	3.2	Polyester Polyester is the general name given to the fibres from polyethylene terephthalate. This is designated by letter 'E'. Polyester has high strength and modulus, low elongation, good abrasion and fatigue resistance, low moisture absorption and excellent resistance to mildew.	
3.3	EE (Polyester/Polyester) Fabric — Fabric with both warp and weft yarns made of polyester, providing good dimensional stability and high tensile strength. It is suitable for conveyor belts used in medium to heavy- duty applications where high tensile strength and dimensional stability are required.	3.3	Yarn A generic term for continuous strands of textile fibres or filaments. A filament yarn is produced by extruding synthetic materials, say Nylon, Polyester, through an orifice in a continuous process. A single filament is called a monofilament.A number of small filaments are combined by twisting together to form a multifilament yarn, which is normally called a filament yarn. Filament yarns are designated by Tex which is weight in grams per 1,000 metres of yarn. Tex is a direct measure of linear density.	Terminology defined under IS 1324-2021 reads : Yarn — A continuous strand of textile fibres or filamentswith or without twist suitable for plying, knitting,braiding, weaving, or otherwise intertwining to form abraiding, weaving, or otherwise intertwining to form a textile end product. Yarn occurs in the following forms: a) Spun Yarn — A yarn composed of fibres (short length, or staple) twisted together; b) Filament Yarn — A yarn composed of continuous filaments assembled with or without twist; c) A monofilament, with or without twist.
3.4	PP (Nylon 66/Nylon 66) Fabric — Fabric with both warp and weft yarns made of Nylon 66. It is ideal for conveyor belts used in heavy-duty applications that demand excellent abrasion resistance and high tensile strength.	3.4	Fabric Fabric is made of warp yarns, which run lengthwise and filling(weft) yarns, which run crosswise, as fabric is woven, usally at right angle to each other.The most common, and least complicated fabric pattern used for flat belts is the plain weave. In this construction, the warp and weft yarns cross each other aleternately. In the belt it is known as a fabric ply. The fabric is classified according to the code letters given in Table 1.	
3.5	EP (Polyester/Nylon 66) Fabric — Fabric with warp yarns made of polyester and weft yarns made of Nylon 66. It is suitable for conveyor belts used in medium to heavy-duty applications.	3.5	NN (Nylon 6/Nylon 6) Fabric — Fabric with both warp and weft yarns made of Nylon 6. It is well-suited for conveyor belts used in light to medium-duty applications requiring high flexibility and good impact and abrasion resistance.	
3.6	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.	3.6	PP (Nylon 66/Nylon 66) Fabric — Fabric with both warp and weft yarns made of Nylon 66. It is ideal for conveyor belts used in heavy-duty applications that demand excellent abrasion resistance and high tensile strength.	
		3.7	EP (Polyester/Nylon 66) Fabric — Fabric with warp yarns made of polyester and weft yarns made of Nylon 66. It is suitable for conveyor belts used in medium to heavy-duty applications.	

		3.8	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.	
3.7	Warp Crimp — The percentage increase in the length of the warp yarn, caused by its curvature or waviness due to interlacing with the weft yarns in a woven fabric.	3.9	Crimp The percentage increase in length of the yarn, caused by its curvature or waviness due to interlacing with the cross yarns in a woven fabric. The increase in length of warp yarns is called warp crimp and that of weft yarn is called weft crimp.	
4 Construction		3.10 Construction		
4.1	The conveyor belt as a whole consists of one or more layers that ensure its strength, stability and cut resistance. The main parts include: Carcass, Covers, Adhesive layer and Edge Reinforcement  		Figure of conveyor belt needs to replaced by figures of fabric of different weaves, say Plain, Oxford, Broken Twill.	It is recommended to explain the construction of fabric and not the conveyor belt.
4.1.1	The carcass is the internal structure of the conveyor belt, providing it with tensile strength and shape. It supports the load being transported and withstands the stress of movement and weight.			
4.1.2	Covers are the outer layers of the conveyor belt that protect the carcass from damage, wear, and environmental factors. Top cover provides resistance to wear and impact, protecting carcass from materials being conveyed & bottom cover provides resistance to wear and friction with the conveyor system's components	3.11	Multiply Belt belt with two or more of plies of woven textile fabric, the adjacent plies being bonded together by intertmediate layer of elastomeric compound. The body of these combined fabric plies is called carcass of the belt. Belt strength and load support characteristics depend on fabric construction and the number of plies used. Conveyor belt flexibility/ stiffness are also functions of the fabric construction and number of plies of fabric, and skim (intermediate layer of elastomeric compound between the plies) and cover thickness and their elastomeric properties.	A
4.1.3	The adhesive layer binds the carcass to the covers, ensuring the integrity and cohesion of the belt.		Omit	These are the features of conveyor belt and not of fabrics and thus do not need mentioning in this standard. If need be , can be included under terms and definitions
4.1.4	Edge reinforcement strengthens the sides of the conveyor belt, preventing fraying, tearing, and edge damage during operation.		Omit	These are the features of conveyor belt and not of fabrics and thus do not need mentioning in this standard.
4.2	Carcass of the belt is made of individual layers of woven fabric called plies. Each ply is composed of lengthwise yarns called "warp" and crosswise yarns called "weft." The warp yarns are tension-bearing, providing the necessary longitudinal strength, while the weft yarns offer cross rigidity and impact tolerance. Fabric is also passed through calendar rollers to apply the bonding agent and achieve desired thickness.		Omit	These are the features of conveyor belt and not of fabrics and thus do not need mentioning in this standard.
4.3	Carcass provides the belt with its tensile strength, flexibility and durability. The construction of the carcass can vary depending on the specific requirements of the application. The carcass shall consist either of one or more plies of woven fabric or of solid woven fabric and shall be coated with a polymer mix.		Omit	These are the features of conveyor belt and not of fabrics and thus do not need mentioning in this standard.

4.4 Single-ply carcass belts are made of one layer of fabric, offering flexibility and ease of installation. Duo- ply carcass belts are made of two plies of woven textile fabric and multi-ply belts consist of two or more layers of fabric, bonded together by an intermediate layer of elastomer providing additional strength and durability.

Omit

These are the features of conveyor belt and not of fabrics and thus do not need mentioning in this standard.

4.5 The belting shall be woven in a minimum of two plies (thickness shall be not less than 4 mm). The minimum thickness requirement can be met by a two-ply solid woven belting.

Omit

These are the features of conveyor belt and not of fabrics and thus do not need mentioning in this standard.

4.6 The fabric used shall be made of cotton or synthetic yarn or combination thereof evenly and firmly woven and free from manufacturing faults as is normal in the best manufacturing practice. Belt fabric/cord is classified according to the code letters given in Table 1, depending on yarn used in the warp (longitudinal) and weft (transverse) direction.

Omit

These are the features of conveyor belt and not of fabrics and thus do not need mentioning in this standard.

Table 1 Code Designation of Yarn

3.12 Table 1 Code Designation of Yarn

It is recommended to include only three type of yarns Nylon 6, Nylon 66 and polyester which have been considered under the scope of this standard. Others should be omitted.

(Clause 6)

Code Letter	**Yarn**
C	Cotton
Z	Staple Rayon
R	Rayon
P	Nylon 66
N	Nylon 6
E	Polyester
D	Aramid
G	Glass

If a fabric contains a secondary yarn, its identity shall be indicated by the use of characters in parentheses to designate the yarn type.

Code Letter	Yarn	
Need to be omitted		Omit
Need to be omitted		Omit
Need to be omitted		Omit
P	Nylon 6.6	
N	Nylon 6	
E	Polyester	
Need to be omitted		Omit
Need to be omitted		Omit

Agreed (If a fabric contains a secondary yarn, its identity shall be indicated by the use of characters in parentheses to designate the yarn type.

3.13 Yarn

A generic term for continuous strands of textile fibres or filaments.

3.14 The yarn used in the manufacture of synthetic fabrics shall be continuous filament of type Nylon 6. Nylon 6.6 and Polyester. The yarn shall be evenly twisted and reasonably free from defects, such as undrawn yarn, cable knots,slubs, cork screws, kinks, broken filaments, oil stains and other exteraneous material.

3.15 Fabric

Fabric is made of warp yarns, which run lengthwise, and filling (weft) yarns, interlaced and runs crosswise at right angles to each other. Fatbric is designed to meet the required breaking strength and elongation in both warp and weft, flexibility, stiffness, fatigue resistance, gauge, tear strength apart from other special requirements stated by the purchaser and agreed by the manufacturer .All such properties have a bearing on the performance of the final product 'conveyor belt' made out the fabric designed for the purpose and its serviceability.

Fabric shall be evenly and firmly woven in plain weave or a selective weave. The fabric shall be resonably free from foreign matter and defects, such as knots, lumps and irregularities of twist in yarn and free from oil stains.

3.16 Fabric Count

The number of warp ends/dm and number of weft filling picks/ dm.

3.17 Breaking Strength

Maximum force recorded when a test specimen is taken to rupture during a tensile test under the specified conditions. at the point of rupture of a test piece during a tensile test. (see ……)
Breaking Strength is the greatest measured force during the tensile test divided by the width of the test piece, expressed in N/mm.
Breaking strength (N/mm) in controlled limits helps in obtaining better realization of belt strength, having multiple fabric plies. (see.....)

Should we consider force recorded at the point of rupture of a test specimen during a tensile test? Needs clarity.

3.18 Elongation at Break

Elongation of a test specimen produced by the maximum force before rupture. (see …) .
It is the ratio of extension of a test piece to its initial length and is expressed in percentage. B
Elongation at break (%) in controlled limits helps in obtaining better realization of belt strength, having multiple fabric plies. (see.....)
Calculate the mean value of elongation at break in percentage from all the observed values and the coefficient of variation. (see.....).

Sould we consider elongation of a test specimen corresponding to the force of rupture? Needs clarity.

3.19 Elongation at Reference Load

For this requirement, the reference load is defined as being one tenth of the specified (rated) breaking strength of the fabric in the warp (longitudinal) direction (see ----).
Note 1 - The elongation at reference load is intended as a control test only.It includes some permanent and some elasic stretch and therefore, can not be related to stretch characteristic in application. Note 2 - .ISO 9856 in conjunction with IS/ ISO 20932-1 :2018 may be used to supplement elongation characteristics such as permanent and elastic elongation and elastic modulus.

3.20 Heat-Setting and Adhesive Treatment

Drying, stretching, adhesive treatment and heat-setting are usually combined into one process is performed under controlled process conditions. This treatment is adjusted to tailor the adhesive characteristic and physical properties of the fabric to meet the requirements of adhesion to elastomeric rubber compound carefully formulated, fabric stability to temperature and controlled extensionability in both warp and weft direction.

3.21 Distortion

Skew and bow are considered defects in the woven fabric.

3.21.1 Skew

Fabric condition where weft yarns, although straight, are not at right angle to the warp yarns. Skew is the distance between one end of the weft yarn and the point on the same edge intersected by a normal perpendicular from the other end of the weft yarn to the fabric edge, in proportion to the distance between two points at which the normal perpendicular to the fabric edge intersects both edges (woven fabric width), expressed as a percentage ratio.

3.21.2 Bow

Curvature of warp yarn or weft yarn of fabric.
Weft bow is total 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 st line (woven fabric width) as a percentage ratio.
Warp bow is the greatest perpendicular distance between the edge and a straight line joining two selected points on the edge in proportion to the distance between the two ponits, expressed as percentage ratio.
A curved deviation from a straight line of the filling yarn in a fabric is termed bow in weft. A concave deviation from a straight line of the edge of a fabric unrolled on a flat surface under untensioned condition. The highest depth of curvature measured from the straight line in prortion to the length of the line drawn, expressed as a percent age ratio.

3.22 Conditioning

The system that permits specimens to reach equilibrium with the standard atmosphere.

3.22.1 Standard Atmosphere

			Exposure of test piece to a standard atmosphere (temperature and humidity) for a stpulated period of time immediately before testing, in order to improve the reproducibility of test results. For Indian conditions, temperature 27º C ± 2º C and relative humidity 65% ± 5% (2 % as per IS 6359-2023) is considered as standard atmosphere necessary for conditioning the test specimens, at least for 24 hours in the relaxed state before testing. Other test conditions shall be adopted and maintained as agreed to between supplier and purchaser.	Different atmosphereic conditions are stated in different product standadards, say IS 196: 1966, IS 6359 : 2023, ISO 139 : 2005 , ISO 18573 : 2024.
		3.23 Skim		
			A thin layer of elasomeric rubber compound applied to a fabric for lamination between two adjacent fabric plies and between fabric ply and the cover rubber.	Should we not avoid mentioning of cover rubber as adhesion has to be between fabric and skim rubber? Madura specifies adhesion between ply to ply and ply to cover also.
		4 Designation and Requirements		
5 Requirements		4.1 Designation	Fabric is designated by fabric type and fabric rating. Fabric types and conventional ratings are given in Table 1,2, 3,4 and 5.	
5.1	Fabrics for conveyor belts come in four main types depending on the warp and weft yarn material used: ● Type I- NN (Nylon 6/Nylon 6) Fabric ● Type II- EE (Polyester/Polyester) Fabric ● Type III- PP (Nylon 66/Nylon 66) Fabric ● Type IV- EP (Polyester/Nylon 66) Fabric ● Type V- EN (Polyester/Nylon 6) Fabric		Fabric designation depends upon the warp and weft yarn material used therein. i) NN (Nylon 6/Nylon 6) Fabric ii) PP (Nylon 66/Nylon 66) Fabric EE (Polyester/Polyester) Fabric iii) EE (Polyester/Polyester) Fabric iv) EP (Polyester/Nylon 66) Fabric v) EN (Polyester/Nylon 6) Fabric	There are 5 types of fabrics, not four. These fabrics should no be denoted by types,1,2,3,4 and 5.
		4.1.1 Fabric Rating	Fabric is designated by its rated breaking strength (N/mm) in warp direction as given in Table 1, 2, 3, 4, and 5 and the same is expressed as fabric rating. Note1. Intermediate fabric ratings are permissiuble.	
		4.2 Requirements		
		4.2.1	The fabric shall be evenly and firmly woven and free manufacturing faults as is normal in the best manufacturing practice. Fabric is classified according to the the code letters given in Table .....depending on yarn used in warp (longitudinal) and weft direction.	
		4.2.2	Fabric shall be free from yarn defects such as undrawn yarn, broken filaments, and shall be reasonably free from defects, such as knots, lumps and irregularities of twist in yarn, kinks, etc., oil stains and other foreign and extraneous matter that would impair its servivibility.	
		4.2.3	Fabric Distortion Skew and bow in the fabric when determined as per test method described in ISO 13015, shall be not more than 3 percent both in the warp and weft direction	
		4.2.4	Fabric of designated type and rating shall conform to the requirements given in Table 1,2,3,4.5 distinguished as per fabric type.The constructional particulars of fabrics, namely linear density of yarn (single/ multiple ply), number of ends/dm, picks/dm, given in the Tables 1,2,3,4, and 5 are only for guideance. These characteristics may differ and shall be as agreed between the supplier and the purchaser.	
		4.2.5	The constructional particulars of fabric, namely, nature of yarn, linear density of yarn.(Tex / Ply) type of weave, number of ends/dm, number of picks/ dm, width and mass, roll length shall be as agreed to between the supplier and the purchaser subject to the tolerances given in Table 6, when tested as per the test method indicated against corresponding characteristic.	

4.2.6		The fabric shall also conform to the requirements laid down in Table 1, 2,3,4 and 5, corresponding to the fabric type and fabric rating,for its test characteristics, breaking strength, elongation at reference load, elongation at break and crimp when tested by the method described against each characteristic in the Table.	
4.3	Test Characteristics		
4.3.1	Fabric Count	Fabric Count , Number of ends/dm and Number of picks in the fabric are determined optically as described in IS 1963 (Method A), using thread count meter having magnifying glass of suitable power. The ends/dm and picks/ dm of the fabric shall be as agreed to between the supplier and the purchaser or as given in Table 1,Table 2, Table 3, Table 4 and Table 5 subject to the tolerances given therein.	
4.3.2	Mass of Fabric	Mass of the fabric shall be as as agreed to between the supplier and the purchaser or as given in Table 1, Table 2, Table 3, Table 4 and Table 5 subject to the tolerance of ± 3 percent.	
4.3.3	Dimensions	Thickness of fabric is given in the Table 1, Table 2, Table 3, Table 4 and Table 5 with indicated tolerance for guidance. Width of the fabric and length of the fabric roll shall be as agreed between supplier and the purchaser subject to the toerances mutually agreed between them or as given in Table 6.	
4.3.4	Crimp	Crimp The mean value of crimp in the warp direction of the fabric shall not be less than 3 percent or as agreed to between supplier and the purchaser, when determined as described in IS 3442 : 2023 / ISO 7211 (Part 3) : 1984.	
4.3.5	Breaking Strength	The mean breaking strength of the fabric expressed in N/mm(see...), when determined in accordance with the method described in either IS 1969 (Part 1) : 2018 / ISO 13934-1 :2013, shall be not less than the values given in Table 1, Table2, Table 3, Table 4 and Table 5 for the designated fabric (type and rating). Coefficient of variation, calculated from the standard deviation and the mean value, shall not be less than 10 percent on the cumulative observations obtained on the samples drawn from a individual lot.	
4.3.6	Elongation at reference load	The elongation of the fabric in the warp (longitudinal direction) at the reference load, when tested by the method described in IS 1969 (Part 1) : 2018 / ISO 13934-1 :2013, shall be not more than the values given in Table 1, Table2, Table 3, Table 4 and Table 5 for the designated fabric (type and rating).	
4.3.7	Elongation at break	The mean value of elongation at break of the fabric in both warp (longitudinal) and Weft (transverse) direction when determined according to test method IS 1969 (Part 1) / ISO 13934 (Part 1) shall be as described in Table 1, Table 2, Table 3, Table 4 and Table 5. Coefficient of variation, calculated from the standard deviation and the mean value, shall not be less than 10 percent on the cumulative observations obtained on the samples drawn from a individual lot.	Should we consider elongation at maximum force or corresponding to the force at rupture ?
4.3,8	Heat Shrinkage	The decrease in warp (longitudinal) and weft (transverse) of a specimen, expressed in percentage, exposed to hot air (hot air oven) at temperature 150º C for a period of 30 minutes shall be not more than the values given in the Table 1. Table 2, Table 3, Table 4 and Table 5 when determined according to IS 17088 or as agreed to between supplier and the purchaser.	IS 17088 is not true representative test method standard for this test characteristic for conveyor belt fabric. It is proposed to lay down a test procedure , properly worded and incoporate as an annexure.

		4.3.9 Adhesion	Adhesion strength when determined by the method described in ISO 36 in conjunction with ISO 252 and ISO 6133, either on the prepared test sample as described in Annex……., or the sample drawn from product, the conveyor belt, produced using the fabric at the belt manufacturer's end, as mutually agreed between fabric supplier and purchasr using the skim rubber of agreed recipe shared between them, mean value shall be not less than 7.8 N/mm and lowest graphically recorded peak value shall not be less than 6.0 N/mm and the rubber coverage on the separated fabric plies shall not be less than 80 percent. Note - In no case should the highest recorded peak value in all tests exceed 20 N/mm in order to avoid difficulties in preparing the conveyor belt end for splicing.	
		4.3.10 Dip Pick-Up	The requirements of dip pick-up when determined according to IS 4910 (Part4) :2023 shall be as agreed to between supplier and purchaser. The permissible tolerances on the same are given in Table 6. Note : The dip pick-up on fabrics having different yarns, Nylon and Polyester (Fabric EP and EN) shall be determined separately for Nylon and Polyester after extracting the yarn from the fabrics and then summed up according to their mass ratio (proportionate weight) in the fabric.	
6 MARKING				
6.1	The belting fabric shall be marked at intervals of maximum 15 m on the carrying surface as follows:	5 Marking	Each roll of fabric shall be marked with the following on the outer covering.	Marking at15m is true for conveyor belt marking and not for fabrics. Needs correction.
	a) Name of the product		Fabric Designation (NN, PP, EE, EP, EN)	
	b) Fabric Designation (CC, NN, EP & EE)		Fabric Rating	Omit CC, add EN
	c) Thickness (mm)		Thickness of fabric does not need to be a part of marking for fabrics.	Omit
	d) Width (mm)		Width (cm).	
			Length of roll (m)	
	e) Last two figures of the year of manufacture		Both Month and Year needs mentioning, say 07/24 for July,2024 or Date of manufacture {adhesive treatment (actual date of dipping)}. Date of manufacture is preferred	Since treated fabrics have limited shelf life (normally said 6 moths), actual date of manufacture should be provided.
	f) Manufacturer’s identification number		Manufacturer's name and trade mark, if any;	
	g) Manufacturer’s name, initials or trade mark		Manufacturer's product identification No. and/or Packing list with Net / Gross weight of fabric roll.	
	h) Any other statutory requirement as required by the law in force or as agreed between buyer and purchaser.		Number of this standard.	Any other statutory requirement as required by the law in force or as agreed between buyer and purchaser are not needed to be included in Marking.
			Each roll of fabric may also be marked with Standard Mark. (see ……)	
	The manner in which these details are identified shall be decided by the manufacturer or by agreement with the purchaser.		Omit	Proposed requirement is not necessary to incorporate and can be skipped
6.2 BIS Certification Marking		6 BIS Certification Marking		
6.2.1	The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the Bureau of Indian Standards Act, 2016 and the Rules and Regulations framed thereunder.		The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the Bureau of Indian Standards Act, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark. Note: The details of conditions under which the license of the use of Standard Mark may be granted to manufacturer or producers may be obtained from the Bureau of Indian Standards.	
7 PACKING		7 Packing		
7.1	The belting fabric shall be suitably packed and as mutually agreed to between the purchaser and the supplier.		Unless as agreed to between supplier and purchaser, the synthetic fabrics shall be packed in rolls in conformity with the procedure laid down either in IS : 2195 (inland packageing) or in IS : 2194 (seaworthy packaging, as reqired. (suitability of these standards need to be checked and verified)	

				The representative samples drawn from the rolls of fabric from the lot, well sealed and protected, shall be provided by the manufacturer/ supplier to the customer separately to avoid disturbing the original packageing affecting the product quality in storage , for testing / verification at customer end, as agreed between the two.	
8 Sampling And Criteria For Conformity					
			8 Sampling And Testing		
8.1 Lot		The number of conveyor belt fabric pieces of the same type and composition and constructional particulars delivered to a buyer against one dispatch note shall constitute a lot.	8.1	The number of rolls of fabric of the same type, designation, constructional particulars and of same width delivered to the purchaser under one consignment shall constitute a lot.	
8.2		The number of conveyor belt fabrics to be selected at random shall be according to col 2 and 3 of Table 3. To ensure the randomness of selection, IS 4905 may be followed.	8.2	The appropriate number of fabric samples (bulk sample or set of samples) shall be drawn at random according to IS 4905 / ISO 24153 from the lot as specified in Table 7 or the sealed representative samples received from the supplier as agreed to between supplier and purchaser (see ……).	
8.3		Number of Tests and Criteria for Conformity	8.3	Alternatively, the following procedure may be adopted subject to agreement between the supplier and the purchaser. Arrange all the rolls in the lot in a systematic manner and starting from any roll, count them as 1, 2.3. etc. up to r where r is the integral part of N/n (N being the lot size(number of rolls in the lot) and n the sample size (number of samples to be drawn) Every rth roll shall be drawn till the requisite number of rolls are obtained.	
8.3.1		The number of pieces to be selected for IS 15852 : 2009 major flaws shall be in accordance with Col. 3 of Table 7. For constructional details, such as count of yarn, threads per decimetre, mass in g/m2, length, width and manufacture, the number of pieces selected shall be in accordance with Col. 5 of Table 7. For all other tests, the number of pieces selected shall be given in Col. 6 of Table 7.	8.4	Sample that shows signs of damage or dampness incurred during transit or have a visible fault shall not be included in the bulk sample plan.	
8.3.2		All the pieces selected from the lot shall be visually examined for major flaws and tested for all other requirements as specified in 3.1, 3.2 and Table 2-6. A piece shall be declared defective if it contains one or more major flaws or it does not meet any of the requirements specified in Table 2-6. The lot shall be declared conforming to the requirements of this standard if the total number of defective pieces does not exceed the value given in col 4 of Table 7.	8.5	From each of the rolls selected, one meter length of fabric in full width shall be cut, care being taken to exclude not less than 200 mm length of fabric from the end. The test specimens necessary for the various tests, specified in the respective test method standards, shall be cut from the drawn samples as explained there in.	
			9 Conditioning	For physical tests, all test specimens, immediate before tests shall, be conditioned in a relaxed state for atleast 24 hours, in an atmosphere of 27º C and relative humidity 65 percent or as agreed to between supplier and the purchaser. (see IS 196). Tolerance limits for temperature and relative humidity shall be ± 2º C and ± 2 percent respectively (see IS 6359)	In IS 196, two classes of test conditions are described, one with narrow tolerances ± 1º C for temperature and ± 2 % R.H.and the other as normal ± 2º C for temp. and ± 5% R.H… We find this a liitle contradiction in IS 196 and IS 6359.
1 Test method for determining breaking strength, elongation at break and Intermediate Elongation of Belting Fabric.			10 Re-tests and Rejections	Should any sample fail to comply with the specified test requirements, two additional samples shall be drawn from the same fabric roll and tested according to specified procedure. In the event of either of these two samples failing to comply with test requirements, the supply from that lot shall be rejected. If both the samples pass the test, the supply shall be accepted.	

Forech feels that there is no need to incorporate the test methods where established test mehods are available. Their references at appropriate places are sufficient. Only those methods should be included as annexures, where such standards are not available. e.g. 'Preparation of test sample for Adhesion Test, Determination of Heat-shrinkage etc.

2 SCOPE

2.1 This test method prescribes a method for determination of breaking load, elongation at break, load at specified elongation, elongation at specified load of RFL treated woven fabrics.

Follow IS 1969-1 / ISO 13934-1

3 SAMPLING

3.1 Sample for the lot shall be drawn so as to be representative of the lot. Sample drawn in accordance with the relevant material specification or as agreed to between the buyer and the seller shall be held to be representative of the lot.

4 CONDITIONING OF TEST SPECIMENS

4.1 Unless otherwise agreed between the buyer and the seller, the test sample shall be conditioned to a state of moisture equilibrium from the dry side in the standard atmosphere at 65 ± 2 percent relative humidity and 20 ± 2°C temperature. may also be used provided it is declared in the test report.

5 ATMOSPHERIC CONDITIONS FOR TESTING:

5.1 The test shall be carried out in a standard atmosphere (see 3.1).

6 APPARATUS:

Testing Machine

6.1 UTM- /Zwick –Z100 (Computer Interfaced) – Constant Rate-of- Traverse (CRT) Machine Speed: 460mm/min or based on Buyer and seller agreement.

A particular make (Zwick) of the test machine can not be referred in the test procedure

6.1.1 PROCEDURE: This Test method is based on ASTM D 5035, ISO 13934-1 or based on buyer test method

We should adopt Indian Standard and / or ISO standard where available, avoiding other standards to the extent possible.

6.1.2 Test on Conditioned Specimen

Specimen Preparation:
3 test pieces shall be cut with the length parallel to the warp threads and 3 test pieces with length parallel to the weft threads. Ensure sample taken after 10cm from both selvedges

Preparation of raveled strips:

Make a cut of 600 mm in the warp direction, ravel several yarns from this cut edge until a full length of 600mm warp yarn is available; then cut 50 +/-5mm of strip and ravel out threads in both the sides to make it 25 mm. For weft, length is 600 mm and width before raveling is 30
+/-5m m and make it 25 mm. For chafer the length should be 600mm and the width 50 +/- 5 mm before raveling.

Check for the presence of required no. of threads in the raveled strip equivalent to the EPI/PPI of the roll.

Set the jaws of the machine 200 mm +/-1mm apart.

Clamp the test piece centrally in jaws without any slackness

Apply pressure depends upon the Fabric strength (Pressure range :150-250 kp/cm)

7 Select, speed of Crosshead movement (jaw movement), Pre-Load, Elongation at Specified Load, using the Computer Programmed setting manual.

8 Then start the testing. Before Starting the test initial force to be, make it as Zero

8.1 Expression of Results: Calculate the Average value of 3 strips of Breaking Strength, Elongation At Break, and Elongation at Specified Load Results and Displayed in the Computer monitor and report as per Customer specified units in Customer specification sheet.

Report

Test report shall include the following
a) Name of the Instrument used
b) Test atmospheric conditions
c) Intermediate elongation measured Load

Safety Precautions:
1.Trained personnel only to be involved in testing
2. Use Scissors and scale smoothly for avoiding hand/finger injuries.
3. Use of rubber gloves for avoiding electrical shock/Chemicals
4. Before testing ensure the Grip pin has to properly fixed both top and bottom jaw.
5. During closing of the grips leave fingers from the gripping portion. Ensure your full Concentration on testing.
6. To allow to stand nearby the grips during testing.

EMS Related:
1. Waste to be disposed as per procedure
2. Usage of resource like power, water, chemicals, solutions, polythene Sheet, rubber compounds, Oil etc. without wastage/spillage etc.
3. Chemical /oil /rubber spillage to be avoided by using secondary containment
4. LDPE cover to be reused to a maximum recycling frequency

1

1.1 **Test method for Peel adhesion on Dipped Belting Fabric**
3Ply Belt Cover Ply & Ply ply Method

2 SCOPE

2.1 This test method prescribes a method for determination of Adhesion Force & Rubber coverage,
On RFL treated woven fabrics

3 SAMPLING

3.1 Sample for the lot shall be drawn so as to be representative of the lot. Sample drawn in accordance with the relevant material specification or as agreed to between the buyer and the seller shall be held to be representative of the lot.

5 PRECAUTION OF TEST SPECIMENS

5.1 RFL Treated fabric should be covered or sealed in Black Polythene cover to avoid exposure from
Sunlight or UV lights which will affect bonding of RFL and Rubber

5.2

5.3 APPARATUS

5.4

Curing Press 50MT capacity with 3 platens(Top/Middle/Bottom)

6 Clicker Press For Cutting Cured Mold

Cutting Die For Cutting strip as required spec.

6.1 Testing Machine: UTM- /Zwick –Z100 (Computer Interfaced)
– Constant Rate-of- Travers (CRT)

PROCEDURE This method is based on ASTM -D4393, ISO 36 or based on buyer test method

6.2

Speciment Preparation

6.2.1 Cut 3 specimens of this fabric of size 9” x 6” (for both Warp and Weft directions. Sample to be taken after 10cm from Selvedge.

6.2.2 Rubber Compound preparation

6.2.3 Cut 2 pieces of cover rubber compound of thickness 3.8mm - size 9” x 6".

6.3

Cut 6 pieces of skim rubber compound of thickness 0.4mm - size 9” x 6”.

6.3.1

6.3.2 Stick the 0.5mm skim compound on one side of the cover compound.
It should be done for both the Cover compounds. Stick the 0.4mm skim compounds together to make a 0.8mm thickness skim compounds. So 2 pieces of skim of 0.8mm thickness should be made.

Mold Preparation

6.3.3

Place the cover+ skim compound on the table. Keep a paper of size 6” X 3” on the top right of the rubber compound.

6.3.4 Place the first specimen of the fabric.

6.3.5 Place the skim compound 0.8mm on this specimen; keep a paper on the top left on this.

6.3.6 Place the second specimen of the fabric; keep a paper on the left top of the fabric.

6.3.7 Place the second skim compound (0.8mm).

Place the third specimen of the fabric and keep a paper on the top right of this.

Cover this with the second cover + skim compound.

7.0

(TABLE)

7.1

8.1 Curing conditions:

Keep the above assembled set in a Hydraulic curing press with the following curing conditions : Refer : WI/QA/01

9.0

Cured Mold Atmosphere Conditioning:

9.1 After curing keep the mold in the lab atmosphere for minimum 8hours at ambient temperature.

9.2 **Testing**

10.0 Cut a 25 mm strip from the mould and test it on the tensile testing machine with the suitable grips. (one Ply to ply adhesion can be tested from a strip)

After closing the grips, select the appropriate full scale load and traverse speed of 100mm/minute.

11.0

Calculation:

11.1 After peeling the strip for 2 inches, Calculate the results in Kgs either on computer or on charts manually by taking the averages of peaks and the troughs.

Report:

Test report shall include the following
a) Name of the Instrument used
b) Test atmospheric conditions c) Adhesion Force
d) Rubber Coverage
e) Rubber compound Batch number

Safety Precautions:

1.Trained personnel only to be involved in testing
2. Use Scissors and scale smoothly for avoiding hand/finger injuries.
3. Use of rubber gloves for avoiding electrical shock/Chemicals
4. During the insertion of sample, wear Kevlar gloves to avoid finger injury due capillary breakage
5. During moving of platen in curing press, both hands should be outside

EMS Related:

1 1. Waste to be disposed as per procedure
2. Usage of resource like power, water, chemicals, solutions, polythene sheet, rubber compounds, Oil, capillaries etc. without wastage/spillage etc

1.1 **Test method for determining Crimp of Belting and chafer fabric** Follow IS 3442 : 2023

2 SCOPE:

2.1 This test method prescribes a method for determination of Crimp % of Warp and Weft of RFL treated woven fabrics.

3 SAMPLING:

3.1 Sample for the lot shall be drawn so as to be representative of the lot. Sample drawn in accordance with the relevant material specification or as agreed to between the buyer and the seller shall be held to be representative of the lot.

5 CONDITIONING OF TEST SPECIMENS:

4.1 Unless otherwise agreed between the buyer and the seller, the test sample shall be conditioned to a state of moisture equilibrium from the dry side in the standard atmosphere at 65 ± 2 percent relative humidity and 20 ± 2°C temperature. may also be used provided it is declared in the test report.

5 ATMOSPHERIC CONDITIONS FOR TESTING:

5.1 The test shall be carried out in a standard atmosphere (see 3.1).

APPARATUS:

6 Testing Machine
Not Applicable

6.1.1 PROCEDURE:

A: Manual Method
This method is based on ASTM -D 3883 & ISO 13934-1

6.1.2 **Specimen Preparation:**

6.1.2.1 Make a cut of 350 mm in the direction of Warp and Weft Ravel several yarns from this cut edge until a full length of 350 mm warp or weft yarn is available.

6.1.2.2 **Marking and Testing:**

6.1.2.3 With a suitable marking device, mark two lines of 250 mm, in such a manner that two small marks will appear on the thread raveled from the prepared edge. Take care not to disturb the twist or to strain the thread.

6.1.2.4 Remove the thread, and apply a load to the thread just sufficient to remove the undulation due to weaving, without imparting stretch

6.1.2.5 Hold the other end with the finger.

7 Keep the thread on the measuring scale and measure the distance between the two marks to the nearest 1mm.

7.1 Test three threads per sample using this procedure.

Expression of results:

Warp or Weft Crimp (%) = (D 2 - D 1) X 100 / D 1

8 Where,
D 1 = Distance in mm between the marks on the fabric
8.1 D 2 = Distance in mm on the straighten yarn

Report:

Report the Average value of Crimp Percentage for both Warp and Weft

Safety Precautions:
1.Trained personnel only to be involved in testing
2. Use Scissors and scale smoothly for avoiding hand/finger injuries.
3. Use of rubber gloves for avoiding electrical shock/Chemicals
4. Before testing ensure the Grip pin has to properly fixed both top and bottom jaw.
5. During closing of the grips leave fingers from the gripping portion. Ensure your full
Concentration on testing.

6. To allow to stand nearby the grips during testing.

EMS Related:
1. Waste to be disposed according to WI/QA/33
2. Usage of resource like power, water, chemicals, solutions, polythene Sheet, rubber compounds, Oil etc. without wastage/spillage etc.

3. Chemical /oil /rubber spillage to be avoided by using secondary containment.

1 4. LDPE cover to be reused to a maximum recycling frequency

1.1 **Test method for determining weight per square meter (GSM) for belting and chafer fabrics**

Follow IS 1964 : 2001

2 **SCOPE:**

2..1 This test method prescribes a method for determination of Weight /Square meter of woven fabrics.

3 **SAMPLING:**

3.1 Sample for the lot shall be drawn so as to be representative of the lot. Sample drawn in accordance with the relevant material specification or as agreed to between the buyer and the seller shall be held to be representative of the lot.

6 CONDITIONING OF TEST SPECIMENS:

4.1 Unless otherwise agreed between the buyer and the seller, the test sample shall be conditioned to a state of moisture equilibrium from the dry side in the standard atmosphere at 65 ± 2 percent relative humidity and 20 ± 2°C temperature. may also be used provided it is declared in the test report.

5 ATMOSPHERIC CONDITIONS FOR TESTING

5.1 The test shall be carried out in a standard atmosphere (see 3.1).

APPARATUS:

6 Testing Machine
Not Applicable

6.1 **PROCEDURE:**

6.1.1 This method is based on ASTM D3776 & ISO 3801

Test on Conditioned Specimen

6.1.2 Specimen Preparation:

6.1.2.1 Test piece shall be square, to have an test area of 10000 +/- 100 mm2.

6.1.2.2 **Marking and Testing:**

7 Cut a specimen parallel and perpendicular to warp direction so as to form a square of 100 mm x 100 mm. Cut at least three specimens one at the center and two from the two sides avoiding 10cms from the selvedges

Weight this on the calibrated analytical balance to the nearest 0.0005 g.

Expression of results:

8 Weight in grams per square meter (g/sq. m) = W X 100
Where,

8.1 W= Weight of the specimen in grams.

Reports:

Calculate the average of 3 reading of gsm and report as per Customer specified unites in Customer specification sheet

Safety Precautions:
1.Trained personnel only to be involved in testing
2.Operate the measuring scale/Scissors smoothly during measuring and cutting the specimen to avoid cut injury in hand/fingers

EMS Related:
1. Waste to be disposed according to WI/QA/33

1 2. Usage of resource like power, water, chemicals, solutions, polythene sheet, rubber compounds etc. without wastage/spillage etc.

1.1 **Test method for checking Hot air shrinkage for Dipped belting fabric**

2 **SCOPE:**

2.1 This test method prescribes a method for determination of Hot Air Shrinkage of woven fabrics.

3 **SAMPLING:**

3.1 Sample for the lot shall be drawn so as to be representative of the lot. Sample drawn in accordance with the relevant material specification or as agreed to between the buyer and the seller shall be held to be representative of the lot

7 CONDITIONING OF TEST SPECIMENS:

4.1 Unless otherwise agreed between the buyer and the seller, the test sample shall be conditioned to a state of moisture equilibrium from the dry side in the standard atmosphere at 65 ± 2 percent relative humidity and 20 ± 2°C temperature. may also be used provided it is declared in the test report.

5 ATMOSPHERIC CONDITIONS FOR TESTING:

5.1 The test shall be carried out in a standard atmosphere (see 3.1).

5.1.1 **APPARATUS:**

6 Testing Machine

Hot Air Oven (with thermostatic controller)

6.1 **PROCEDURE:**

6.1.1 This method is based on ASTM –D2646 & ISO 17493

Test on Conditioned Specimen

6.1.2 **<u>Specimen Preparation</u>:**

6.1.2.1 Prepare a specimen with lines marked parallel and perpendicular to warp direction so as to form a square of 250 mm with a ball point pen.

6.1.2.2

6.1.2.3 **<u>Marking and Testing</u>:**

7 Draw lines parallel and perpendicular and mark a square of 200 mm centrally inside the specimen. Measure the distance between the marked lines to the nearest mm at three different places.

Suspend the specimen in a Hot air oven of forced air circulation at 150 Deg C + /- 2 Deg C. for 15 minutes or as agreed between buyer and seller.

Remove the specimen after 15 minutes and measure the distance between the marked lines immediately and record the observations. Keep the specimen in the laboratory atmosphere for 1 hour and measure the final distance between the lines at the same different places.

<u>Expression of results</u>:

Calculate the % shrinkage or expansion between each pair of dates by the relation:

$$\text{Shrinkage \%} = \frac{100\,(L1-L2)}{\text{---------}}$$

L1

8 Where,
L 1 = distance between lines before exposure and
8.1 L 2 = distance between same lines after exposure

Reports:

Report the average Shrinkage of Warp and Weft direction In percentage

Safety Precautions:
1.Trained personnel only to be involved in testing
2. Use of Kevlar gloves to avoid injury due to hot surface
3. Use of rubber gloves for avoiding electrical shock/Chemicals

EMS Related:
1. Chemical /oil /rubber spillage to be avoided by using secondary containment.

1 2. Waste to be disposed according to WI/QA/33
3. Don't keep any chemical/rubber/DM water/water container/ Fabric samples in open or Excess so that it may lead to incident due to vaporization and wastage.

1.1 **Test method for determining thickness of belting, chafer fabric**

2 **SCOPE:**

2.1 This test method prescribes a method for determination of Thickness of woven fabrics. Follow IS 7702/ IS0 5084

3 **SAMPLING:**

3.1 Sample for the lot shall be drawn so as to be representative of the lot. Sample drawn in accordance with the relevant material specification or as agreed to between the buyer and the seller shall be held to be representative of the lot.

8 **CONDITIONING OF TEST SPECIMENS:**

4.1 Unless otherwise agreed between the buyer and the seller, the test sample shall be conditioned to a state of moisture equilibrium from the dry side in the standard atmosphere at 65 ± 2 percent relative humidity and 20 ± 2°C temperature. may also be used provided it is declared in the test report.

5 ATMOSPHERIC CONDITIONS FOR TESTING:

5.1 The test shall be carried out in a standard atmosphere (see 3.1).

5.1.1 APPARATUS:

5.1.2 Testing Machine

6 Digital Thickness Gauge

Capacity :0.10 mm to 10.00 mm

6.1 PROCEDURE:

6.1.1 This method is based on ASTM D 1777 & ISO 5084

Test on Conditioned Specimen

6.1.2 **Specimen Preparation:**

6.1.2.1 Test piece shall be square, to have an area of 100 +/- 10 mm.

6.1.2.2 **Testing:**

6.1.2.3 Inspect the top and bottom of the specimen to be sure that no knots, splices are foreign particles are present.

6.1.2.4 Place the specimen on the anvil and directly under the pressure foot.

7 Lower the spindle of the dial gauge with the help of thumb screw gradually and gently until it presses the foot in contact with the specimen.

7.1 Wait unitl the gauge reading becomes stable

8 Expression of results:

8.1 Read the thickness on the dial micrometer to the nearest 0.01mm

Report

Report the average thickness of three specimens in mm

Safety Precautions:

1.Trained personnel only to be involved in testing
2. Use Scissors and scale smoothly for avoiding hand/finger injuries.
3. Use of rubber gloves for avoiding electrical shock/Chemicals
4. During the insertion of sample, wear Kevlar gloves to avoid finger injury due capillary breakage

EMS Related:

1. Waste to be disposed according to WI/QA/33
2. Usage of resource like power, water, chemicals, solutions, polythene sheet, rubber compounds, Oil, capillaries etc. without wastage/spillage etc