



SLOVENSKI STANDARD
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Tekstilije - Univerzalni sistem za označevanje dolžinske mase (sistem tex)

Textiles -- Universal system for designating linear density (Tex System)

Textiles -- Système universel de désignation de la masse linéique (système Tex)

Ta slovenski standard je istoveten z: ISO 1144:1973

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59.080.01 Tekstilije na splošno Textiles in general

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INTERNATIONAL STANDARD



1144

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**Textiles – Universal system for designating linear density
(Tex System)**

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, International Standard ISO 1144 replaces ISO Recommendation R 1144-1969 drawn up by Technical Committee ISO/TC 38, *Textiles*.

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The Member Bodies of the following countries approved the Recommendation :

Australia	Iran	South Africa, Rep. of
Belgium	Ireland	Spain
Canada	Israel	Sweden
Cuba	Italy	Switzerland
Czechoslovakia	Japan	Thailand
Denmark	Netherlands	Turkey
Egypt, Arab Rep. of	New Zealand	United Kingdom
France	Norway	U.S.A.
Germany	Poland	U.S.S.R.
Hungary	Portugal	
India	Romania	

The Member Body of the following country expressed disapproval of the Recommendation on technical grounds :

Brazil

Textiles – Universal system for designating linear density (Tex System)

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0 INTRODUCTION

It has long been customary to designate the coarseness or the fineness of textile yarns by numbering or counting systems. Many branches of the textile industry employ systems of their own for this purpose, and those in current use may be classified in two groups:

- a) direct systems, in which the coarseness or the fineness of the yarn is expressed in terms of the mass of yarn per unit length (linear density, often called yarn number or yarn *titre*).
- b) indirect systems, in which the coarseness or the fineness of the yarn is expressed in terms of the length of yarn per unit mass (usually called yarn *count*).

With the growing use of yarns containing more than one kind of fibre, and of fabrics containing these yarns, it became increasingly evident that the general adoption of a single system of numbering or counting would avoid confusion and save time.

In 1956, after detailed studies, it was agreed that the Tex System be recommended for international adoption in place of the various traditional methods of numbering or counting. That system is direct and based on metric units: originally grams per kilometre (tex), milligrams per kilometre (millitex), and kilograms per kilometre (kilotex), with the addition of decigrams per kilometre (decitex) agreed in 1967.

1 SCOPE AND FIELD OF APPLICATION

This International Standard gives the principles and recommended units of the Tex System for the expression of linear density and includes conversion tables for calculating the tex values of numbers or counts in other systems together with a statement of the procedure for the implementation of the Tex System in trade and industry.

The Tex System is applicable to all kinds of textile fibres, intermediate products (for example tops, slivers and rovings), yarns and similar structures.

2 REFERENCE

ISO 1139, *Textiles – Designation of yarns*.

3 CHARACTERISTICS OF THE SYSTEM

3.1 This system, called the Tex System, is a *direct system*. It expresses the linear density, that is to say the mass of a certain length of the textile material.

3.2 The system is decimal and employs metric units.

3.3 The basic unit is the "tex". The linear density in "tex" expresses the mass, in grams, of one kilometre of yarn¹⁾.

NOTE – It is realized that, at present, usage of the term *linear density* is limited to scientific and laboratory applications but every effort should be made to ensure greater currency of it.

1) The term "yarn", which is used here for simplicity, is as defined in ISO 1139. It does not exclude the other textile applications mentioned in section 1.

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4 UNITS

The multiple and sub-multiples of the tex unit recommended for use in preference to other possible combinations are

- kilogram per kilometre, designated **kilotex**;
- decigram per kilometre, designated **decitex**;
- milligram per kilometre, designated **millitex**.

TABLE 1 – Tex System – Recommended units

Name	Symbol	Definition
millitex	mtex	1 mtex = 1 mg/km = 1 μ g/m
decitex	dtex	1 dtex = 1 dg/km = 0,1 mg/m
tex	tex	1 tex = 1 g/km = 1 mg/m
kilotex	ktex	1 ktex = 1 kg/km = 1 g/m

NOTE – To indicate linear density in the Tex System as a quantity in formulae, tables, and preprinted forms, irrespective of units, the symbol **Tt** is used. It should never be used with a numerical value of

linear density because it is not a unit. It is equivalent in fact to the expression "linear density expressed in the Tex System". In a general formula, without a numerical value in which the linear density of a yarn (or other product) occurs, the symbol **Tt** serves to indicate that in a numerical application of the formula, this linear density is expressed in a unit of the Tex System.

5 NOTATION¹⁾

The linear density in the Tex System is indicated by the numerical value followed by the name of the unit used.

Examples :

100 mtex
60 dtex
20 tex
15 ktex

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1) More detailed specifications for the designation of folded and cabled yarns are given in ISO 1139.

APPENDIX Y

CONVERSION AND ROUNDING

Y.0 INTRODUCTION

This Appendix is intended to facilitate the implementation of the Tex System by describing the rational development of tex equivalents and giving guidance on the choice of rounded tex values.

Three possibilities are given for the choice of tex equivalent :

- calculated tex equivalent;
- rounded tex value;
- recommended tex value.

The recommended tex values given in Table 5 will serve as guide and should be used whenever practicable.

Y.1 CALCULATION OF TEX EQUIVALENTS

Counts and numbers (titres), as expressed in other counting or numbering systems, are converted into tex values as set out below. The multiplying factors in Table 2 and the constants in Table 3 are expressed to four significant figures to give an accuracy of 0,05 %.

The equivalent values, calculated to four significant figures, are rounded to three significant figures to obtain an accuracy within 0,5 % with respect to the value in the traditional system.

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Y.1.1 Conversion from direct systems

In direct systems, the coarseness or fineness of yarn (linear density) equals mass of yarn per unit of length.

Table 2 gives the multiplying factors for multiplying the known number (or titre).

Example : The equivalent of 840 denier in tex is

$$840 \times 0,1111 = 93,32 \text{ tex or } 933,2 \text{ dtex}$$

$$= 933 \text{ dtex to three significant figures}$$

TABLE 2 – Multiplying factors for direct systems

Yarn number system	Symbolic abbreviation	Unit of mass used	Unit of length used	Unit of yarn number	Multiplying factor, yarn number to tex value
Tex	Tt	1 gram	1 kilometre	g/km	–
Denier	Td	1 gram	9 000 metres	g/9 000 m	0,1111
Linen dry spun Hemp Jute	Tj	1 pound	14 400 yards (spyndle unit)	lb/14 400 yd	34,45
Número en cuartos de onza	To	1/4 onza	500 cañas	0,25 onza/500 cañas	10,71
Woollen (Aberdeen)	Ta	1 pound	14 400 yards	lb/14 400 yd	34,45
Woollen (Catalonian)	Tcw	1 gram	504 metres	g/504 m	1,984

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Y.1.2 Conversion from indirect systems

In indirect systems, coarseness or fineness of yarn equals length of yarn per unit of mass.

Table 3 gives the constants which are to be divided by the count in the indirect system.

Example : The equivalent of yarn count $N_{e_w}20$ in tex is

$$\frac{885,8}{20} = 44,29 \text{ tex}$$

= 44,3 tex to three significant figures

TABLE 3 – Constants for conversion of indirect systems

Yarn count system	Symbolic abbreviation	Unit of length used	Unit of mass used	Unit of yarn count	Constant for conversion to tex values
Asbestos (American)	N_{aA}	100 yards (cut)	1 pound	100 yd/lb	4 961
Asbestos (English)	N_{eA}	50 yards	1 pound	50 yd/lb	9 921
Cotton bump yarn	N_B	1 yard	1 ounce	yd/oz	31 000
Cotton (English)	N_{eC}	840 yards (hank)	1 pound	840 yd/lb	590,5
Cotton (Catalonian)	N_{eC}	500 cañas	1,1 libra catalana	500 cañas/1, 1 lb cat.	565,9
Glass (U.S.A. and U.K.)	N_G	100 yards	1 pound	100 yd/lb	4 961
Linen (wet or dry spun)	N_{eL}	300 yards (lea)	1 pound	300 yd/lb	1 654
Metric	N_m	1 kilometre	1 kilogram	km/kg	1 000
Numero en puntos	N_p	1 320 metres	1 libra de Alcoy	1 320 m/lb de Alc.	358,7
Spun silk	N_S	840 yards	1 pound	840 yd/lb	590,5
Typp	N_t	1 000 yards	1 pound	1 000 yd/lb	496,1
Woollen (Alloa)	N_{aI}	11 520 yards (spindle)	24 pounds	11 520 yd/24 lb	1 033
Woollen (American cut)	N_{aC}	300 yards	1 pound	300 yd/lb	1 654
Woollen (American run)	N_{aR}	100 yards	1 ounce	100 yd/oz	310
Woollen (Cardado Covilhã)	N_{pW}	1 metre	5 gram	m/5 g	5 000
Woollen (Dewsbury)	N_d	1 yard	1 ounce	yd/oz	31 000
Woollen (Galashiels)	N_g	300 yards (cut)	24 ounces	300 yd/24 oz	2 480
Woollen (Hawick)	N_h	300 yards (cut)	26 ounces	300 yd/26 oz	2 687
Woollen (Irish)	N_{iW}	1 yard	0,25 ounce	yd/0,25 oz	7 751
Woollen (West of England)	N_{we}	320 yards (snap)	1 pound	320 yd/lb	1 550
Woollen (Yorkshire)	N_y	256 yards (skein)	1 pound	256 yd/lb	1 938
Woollen (Yorkshire)	N_y	1 yard	1 dram	yd/dram	1 938
Worsted	N_{eW}	560 yards (hank)	1 pound	560 yd/lb	885,8

Y.2 CHOICE OF ROUNDED TEX VALUES

When counts and numbers (titres) are converted into tex, decimal values are usually obtained, which may be used as they are or rounded for practical purposes.

Where trade authorities concerned with each type of product have not published agreed lists in tex values of the yarns and fibres to be produced, the values in tex to three significant figures obtained according to section Y.1 and rounded using one of the alternatives given in Y.2.1 may be used. Examples of the rounded values are given in Table 4.

Y.2.1 For selecting rounded tex values, two possibilities are given :

- a) rounding to the nearest two significant figures;
- b) rounding in the direction of the recommended values of Table 5, using two significant figures or three significant figures when the last figure is 5.

(See the examples in a) and b) of column 3 in Table 4.)

Y.2.2 Care should be taken to ensure that rounding is applied consistently so that the rounded tex values for two traditional counts of which one is ten times the other should consist of the same digits and vary only in the position of the decimal point.

Y.2.3 When rounded values are chosen certain cases will arise where the difference between a yarn according to a traditional count and according to the value of the corresponding rounded tex value will be sufficient to necessitate some adjustment to the yarn being spun.

TABLE 4 — Choice of rounded values

1		2	3		4
Traditional yarn count		Equivalent tex value in three figures	Rounded tex value		Recommended tex value according to Table 5
system	value		a)1)	b)1)	
Nm	15	66,7	67	67	68
Nm	30	33,3	33	33,5	34
Nm	60	16,7	17	17	17
NeC	12	49,2	49	49,5	50
NeC	24	24,6	25	25	25
NeC	48	12,3	12	12,5	12,5
NeC	120	4,92	4,9	4,9	5
Td	60	6,67	6,7	6,7	6,8
Td	120	13,3	13	13	13
Td	480	53,3	53	53	52
Td	600	66,7	67	67	68
NeW	18	49,2	49	49,5	50
Ny	24	80,7	81	80,5	80
NeL	25	66,1	66	66,5	68
NG	75	33,3	33	33,5	34
NaA	75	33,3	33	33,5	34

NOTE — This table can be extended in national standards by including figures from lists published by accepted trade authorities.

1) See Y.2.1.