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

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

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 38, *Textiles*, Subcommittee SC 23, *Fibres and yarns*.

This second edition cancels and replaces the first edition (ISO 1144:1973), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

a) the content structure has been updated;

b) some printing errors in Table A.3 (previously Table 4) have been corrected.

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.

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

1 Scope

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 Normative references

There are no normative references in this document.

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 yarn[1] .

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

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 µg/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

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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 scope.

1

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   Notation[2)]

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

EXAMPLE   100 mtex; 60 dtex; 20 tex; 15 ktex

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

Annex A
(informative)

Conversion and rounding

A.1   Introduction

This annex 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 A.1 will serve as guide and should be used whenever practicable.

A.2   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 A.1 and the constants in Table A.2 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.

A.2.1   Conversion from direct systems

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

Table A.1 gives the multiplying factors for multiplying the known number (or titre).

EXAMPLE   The equivalent of 840 denier in tex is

840×0, 1111 = 93,32 tex or 933,2 dtex = 933 dtex to three significant figures.

Table A.1 — 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 g	1 km	g/km	-
Denier	Td	1 g	9 000 m	g/9 000 m	0,111 1
Linen dry spun Hemp Jute	Tj	1 pound	14 400 yards (spindle unit)	lb/14 400 yd	34,45