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LIGHT CONVEYOR BELTS - METHOD OF TEST FOR THE DETERMINATION OF THE RELAXED ELASTIC MODULUS

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Light conveyor belts - Method of test for the determination of the relaxed elastic modulus

Courroies transporteuses légères - Méthode d'essai pour la détermination du module d'élasticité relaxé

Leichte Fördergurte - Prüfverfahren zur Bestimmung des relaxierten Elastizitätsmoduls

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 188 "Conveyor belts", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2000, and conflicting national standards shall be withdrawn at the latest by February 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Many applications for light conveyor belts require that the belt is initially tensioned and there is no subsequent change in belt length by adjustment of any rollers. In such cases the tensioning force in the belt changes throughout the life of the belt because of two effects: both permanent stretch and relaxation of the belt changing its real elastic modulus. It is vital to have a means of establishing the way in which the tensioning forces will change and this test applies a cyclic stretching between two defined states of elongation over a large number of cycles. It has been found experimentally that the tensioning force drops in an exponential way. It is possible to measure the tensioning force and then to calculate what is herein defined as the 'relaxed elastic modulus'. It is important to note that this is not a true elastic modulus, because it includes an element of permanent stretch but, except in cases where the permanent stretch is relatively large, it is a measure of great practical value in determining final tensioning forces. This standard is designed to meet the requirements for such applications.

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1 Scope

This European Standard specifies a test method for the determination of the relaxed elastic modulus of light conveyor belts as defined by EN 873 or other conveyor belts where ISO 9856 is unsuitable.

2 Normative references

This European Standard incorporates by dated or undated references, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 873	Light conveyor belts - Principal characteristics and applications
EN 10002-2	Metallic materials - Tensile testing - Part 2: Verification of the force measuring system of the tensile testing machines
ISO 471	Rubber - Temperatures, humidities and times for conditioning and testing
ISO 554 Specifications	Standard atmospheres for conditioning and/or testing -
ISO 7500-1	Metallic materials - Verification of static uniaxial testing machines - Part 1: Tensile testing machines
ISO 9856	Conveyor belts - Determination of elastic modulus

3 Definitions and symbols

For the purposes of this standard the following apply :

3.1 elastic modulus.

1) (in conveyor belt technology). A force per unit of width of a conveyor belt . It is expressed in newtons per millimetre width of belt and is represented in ISO 9856 by the symbol ***M.***
Note : This definition of the term deviates from that normally used in engineering which is expressed in units of stress, i.e. a force per unit of cross section and is represented by the symbol ***E*** ; (see for example ISO 527-4).

2) (in light conveyor belt technology). The force in newtons per unit of width required to extend a representative test piece of light conveyor belting by 1% of its original length. The force is represented by the symbol ***k*** and consequently the **elastic modulus** is represented by the symbol $k_{1\%}$. This value is also called the 'tensile force for 1 % elongation per unit of width' or '$k_{1\%}$ value'. It is expressed in newtons per millimeter.

Note : In EN 10002-1:1991, the symbol ***k*** is used to represent the coefficient of

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