INTERNATIONAL STANDARD

**ISO 21181**

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# Light conveyor belts — Determination of the relaxed elastic modulus

*Courroies transporteuses légères — Détermination du module d'élasticité relaxé*

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## Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 21181 was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, Subcommittee SC 3, *Conveyor belts*.

This International Standard is based on EN 1723:1999, prepared by CEN/TC 188.

## 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: permanent stretch and relaxation of the belt, both of which change 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 International Standard is designed to meet the requirements for such applications.



 

# Light conveyor belts — Determination of the relaxed elastic modulus



## 1 Scope

This International Standard specifies a test method for the determination of the relaxed elastic modulus of light conveyor belts according to ISO 21183-1, or other conveyor belts where ISO 9856 is not applicable.

## 2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 7500-1:2004, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

ISO 9856, *Conveyor belts — Determination of elastic and permanent elongation and calculation of elastic modulus*

ISO 18573:2003, *Conveyor belts — Test atmospheres and conditioning periods*

ISO 21183-1, *Light conveyor belts — Part 1: Principal characteristics and applications*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

**3.1**
**elastic modulus**
⟨conveyor belt technology⟩ force per unit of width of a conveyor belt

NOTE 1 It is expressed in newtons per millimetre width of belt and is represented in ISO 9856 by the symbol $M$.

NOTE 2 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 represented by the symbol $E$; (see, for example, ISO 527-4).

**3.2**
**elastic modulus**
⟨light conveyor belt technology⟩ force in newtons per unit of width required to extend a representative test piece of light conveyor belting by 1 % of its original length

NOTE 1 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 millimetre.

NOTE 2 In EN 10002-1:2001, the symbol $k$ is used to represent the coefficient of proportionality.