STANDARD 5048

Second edition
1989-09-15

Continuous mechanical handling equipment — Belt conveyors with carrying idlers — Calculation of operating power and tensile forces

Engins de manutention continue — Transporteurs à courroie munis de rouleaux porteurs — Calcul de la puissance d'entraînement et des efforts de tension

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Contents

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 5048 was prepared by Technical Committee ISO/TC 101, *Continuous mechanical handling.*

This second edition cancels and replaces the first edition (ISO 5048 : 1979), clause 2, subclauses 4.1.2 and 4.3.4, clause 5 and figures 3, 4 and 5 of which have been technically revised, and figure 6 and table 4 deleted. A new clause 2 (definitions) has been added.

Introduction

In the design of belt conveyors, it is advisable first to calculate the required driving force on the driving pulley and the belt tensile stresses resulting therefrom, since these values will effectively determine the choice of driving system and the construction of the belt.

The operating power requirements are derived from the driving force on the driving pulley and from the speed of the belt.

The necessary belt width is calculated on the basis of the maximum capacity of the belt and, possibly, of the particle size of the material to be handled.

Attention is drawn to the many varied factors which influence the driving force on the driving pulley and which make it extremely difficult to predict the power requirement exactly. This International Standard is intended to give a simple method of conveyor design calculation. Consequently it is limited in terms of precision but is sufficient in the majority of cases. Many factors are not taken into account in the formulae but details are provided on their nature and their effect.

In simple cases, which are the most frequent, it is possible to progress easily from the calculation of power requirements to those of the necessary and the real tensions in the belt, which are critical in the selection of the belt and in the design of the mechanical equipment.

However, certain conveyors present more complicated problems, for example those with multiple drives, or with an undulating profile in vertical elevation. For these calculations, which are not covered in this International Standard, it is advisable to consult a competent expert.

Continuous mechanical handling equipment — Belt conveyors with carrying idlers — Calculation of operating power and tensile forces

1 Scope

This International Standard specifies methods for the calculation of the operating power requirements on the driving pulley of a belt conveyor, and of the tensile forces exerted on the belt. It applies to belt conveyors with carrying idlers.

2 Definitions

For the purposes of this International Standard, the following definitions apply.

2.1 surcharge angle (of the material handled), θ : Angle formed with the horizontal by the tangent to the material cross-section at the intersecting point with the belt in motion (see figure 3). The surcharge angle is expressed in degrees.

2.2 angle of repose, α : Angle formed with the horizontal by the surface of a conical heap of material falling slowly and regularly from a small height onto a horizontal stationary surface. The angle of repose is expressed in degrees.