# International Standard 7119

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION



## Continuous mechanical handling equipment for loose bulk materials — Screw conveyors — Design rules for drive power

*Engins de manutention continue pour produits en vrac — Transporteurs à vis — Règles pour le calcul de la puissance d'entraînement*

**First edition — 1981-10-01**



**UDC 621.867.4** **Ref. No. ISO 7119-1981 (E)**

**Descriptors :** handling equipment, continuous handling, conveyors, screw conveyors, computation, power.

Price based on 4 pages

ISO 7119-1981 (E)

## 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.

International Standard ISO 7119 was developed by Technical Committee ISO/TC 101, *Continuous mechanical handling equipment*, and was circulated to the member bodies in May 1980.

It has been approved by the member bodies of the following countries :

| | | |
|---|---|---|
| Australia | France | Poland |
| Belgium | India | Romania |
| Chile | Ireland | Sweden |
| Czechoslovakia | Netherlands | United Kingdom |
| Finland | Norway | USSR |

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Austria
Germany, F. R.

This International Standard is based on the work carried out by "Section II — Continous handling" of the European Mechanical Handling Confederation (FEM).



Printed in Switzerland

# Continuous mechanical handling equipment for loose bulk materials — Screw conveyors — Design rules for drive power

## 1 Scope

This International Standard establishes a method for the calculation of drive power of screw conveyors.

## 2 Field of application

This International Standard only applies to a screw conveyor, used in a horizontal or inclined position (up to approximately 20°), for a regular, controlled and continual supply of the bulk materials.

Excluded from this International Standard are the special screws for the following special uses :

- extracting screws
- calibrating screws
- mixing screws
- moistening screws
- inclined screw (above 20°)
- vertical screws

## 3 Reference

ISO 2148, *Continuous mechanical handling equipment — Nomenclature.*

## 4 Comments

The necessary drive power and the rate of flow of the material which may be reached by a screw conveyor are interdependent.

Nevertheless, they also depend upon the operating conditions, the nature of the product conveyed and the design parameters, the most important of which are considered in this International Standard which describes a relatively easy design method and therefore only reaches a limited accuracy which is however quite sufficient in most cases.

A large number of less important parameters are not taken into account in the following formulae. Numerous factors in the formulae are empirical and result from long practical experience.

## 5 Symbols and units

| Symbol | Designation | Units |
|---|---|---|
| $A$ | Working section of screw conveyor | $m^2$ |
| $D$ | Nominal screw diameter | m |
| $F_H$ | Main resistances | N |
| $F_N$ | Secondary resistances | N |
| $F_{St}$ | Resistances due to inclination | N |
| $g$ | Acceleration due to gravity | $m/s^2$ |
| $H$ | Lifting height | m |
| $I_M$ | Mass flow rate | t/h |
| $I_V$ | Volume flow rate | $m^3/h$ |
| $L$ | Conveying length | m |
| $n$ | Number of screw r.p.m. | r/min |
| $P$ | Total power | kW |
| $P_H$ | Power for material progress | kW |
| $P_N$ | Power when operating at no load | kW |
| $P_{St}$ | Power due to inclination | kW |
| $S$ | Screw pitch | m |
| $v$ | Linear speed of material movement | m/s |
| $\varphi$ | Trough filling coefficient | — |
| $\varrho$ | Density of bulk material | $t/m^3$ |
| $\lambda$ | Progress resistance coefficient | — |

## 6 Calculation of the capacity of a screw conveyor

The nominal capacity to be considered is the capacity per hour of the maximum volume that may be reached by a screw conveyor.

The volume flow rate $I_V$ is the product of :

the working section of the screw conveyor $A = \varphi D^2 \frac{\pi}{4}$, in square metres

by the conveying speed, $v = S\frac{n}{60}$ in metres per second

from which results the equation :

$$I_V = 60\ \varphi \frac{\pi}{4} D^2\ Sn$$