

International Standard



5292

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Industrial V-belt drives — Calculation of power ratings

Transmissions industrielles par courroies trapézoïdales — Calcul des puissances transmissibles

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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 5292 was developed by Technical Committee ISO/TC 41, *Pulleys and belts (including vee-belts)*, and was circulated to the member bodies in October 1978.

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

Austria	France	South Africa, Rep. of
Belgium	Germany, F. R.	Spain
Bulgaria	India	Sweden
Canada	Ireland	United Kingdom
Chile	Italy	USA
Czechoslovakia	Netherlands	USSR
Finland	Romania	

The member body of the following country expressed disapproval of the document on technical grounds :

Australia

Industrial V-belt drives — Calculation of power ratings

1 Scope

This International Standard provides generally acceptable formulae for power ratings together with appropriate correction terms and factors used in the design of industrial V-belt drives with two pulleys.

2 Field of application

The formulae are suitable for use with V-belt cross-sections covered in existing International Standards as well as for cross-sections which are in the process of being studied for future International Standards.

3 Definition

power rating : The power that a specific V-belt can transmit under specified geometrical and ambient conditions during a given period of time provided the drive is installed and maintained following generally accepted rules for V-belt drives.

The power rating is a function of the V-belt cross-section, the pitch diameter and angular velocity of the small pulley. Correction terms or factors for speed ratio, angle of contact and belt length are introduced.

4 Power rating

The total power rating of the drive, P , is given, in kilowatts, by the formula

$$P = K (P_1 + \Delta P_1 + \Delta P_2)$$

where

$$K = 1,25 (1 - 5^{-\theta/\pi})$$

$$P_1 = d_p \omega \left[C_1 - C_2 \frac{1}{d_p} - C_3 (d_p \omega)^2 - C_4 \log (d_p \omega) \right]$$

$$\Delta P_1 = C_4 \omega d_p \log \frac{2}{1 + 10 \frac{C_2}{C_4} \frac{1}{d_p} \left(\frac{1}{S} - 1 \right)}$$

$$\Delta P_2 = d_p \omega C_4 \log \frac{L}{L_0}$$

P_1 being the basic power rating, in kilowatts;

ω being the angular velocity of the small pulley, in radians per second;

d_p being the pitch diameter of the small pulley, in millimetres;

ΔP_1 being the add-on power for speed ratio, in kilowatts;

ΔP_2 being the add-on power for length, in kilowatts;

L_0 being the base length, in millimetres;

L being the actual belt length, in millimetres;

L_0 and L being measured in the datum system or in the pitch system;

S being the largest figure of R or $1/R$, where R is the speed ratio;

C_1 , C_2 , C_3 and C_4 being parameters corresponding to a specific quality level of the belts and to a satisfactory period of time (these can be different from one make of belts to another and/or from one grade of quality to another of belts from the same manufacturer);

θ being the angle of contact on the small pulley, in radians (if θ is given in degrees, then π must be replaced by 180 in the formula for K).