International Standard 254

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

Quality, finish and balance of transmission pulleys

Qualité, état de surface et équilibrage des poulies de transmission

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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 254 was developed by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, and was circulated to the member bodies in February 1980.

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

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

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

Austria

This International Standard cancels and replaces ISO Recommendation R 254-1962, of which it constitutes a technical revision.

Quality, finish and balance of transmission pulleys

1 Scope and field of application

This International Standard specifies the characteristics of quality which are common to all transmission pulleys; it states specific quality levels for the finish and balance of transmission pulleys.

This International Standard applies to transmission pulleys for V-belts, flat or synchronous belts : it does not apply to those pulleys for variable speed drives that have one or more moving flanges.

The other characteristics of transmission pulleys may be found in the relevant International Standard.

2 References

ISO 468, *Surface roughness — Parameters, their values and general rules for specifying requirements.*[1)]

ISO 1940, *Balance quality of rotating rigid bodies.*

3 Choice and quality of materials

3.1 The pulleys shall be made of cast iron, steel, suitable alloys, or any material that could be shaped to the standardized dimensions and tolerances, and capable of withstanding without damage the conditions of service (heating, mechanical stresses, abrasion, environment, etc.); moreover it is desirable that the pulley material shall dissipate any significant heat which might be generated by the belts.

3.2 Cast or sintered pulleys shall consist of an appropriate material and be free of porosities or flaws and of shrinkage holes or voids in the arms, the web and the hub.

3.3 In the case of cast pulleys, surface defects of the rim, boss and centreplate or web (excluding those on the spokes or arms) may be filled with a material homogeneous with the original material in such a way as not to give rise to internal stresses. The use of materials having only the appearance of metal is not permitted.

4 Finish

4.1 The surface finish of the working surfaces shall be measured in a plane parallel to the action of the belt and shall in any direction not be coarser than the value given in the table.

Working surface	Surface R_a[1)] µm
V-pulley grooves	3,2
Flat pulley rims	6,3
Synchronous pulleys tooth flanks and tips :	
— industrial type drives	3,2
— high performance type drives (for example, automotive applications)	2,0
All pulleys bores and rim edges	6,3

1) As defined in ISO 468.

4.2 The edges of flat pulley rims and V-pulley grooves shall be chamfered or radiused.

5 Balance

5.1 The purpose of balancing a pulley is to improve its mass distribution so as to diminish the out-of-balance forces exerted as it revolves; such forces cannot be completely eliminated, but the remaining imbalance shall not be greater than the allowable limit.

5.2 As balancing is an expensive operation, the specified limit of the residual imbalance should be given a value as large as the envisioned applications might allow.

5.3 Two classes of balancing may be considered :

— balancing in one plane, called static balancing,

— balancing in two planes, called dynamic balancing.

5.4 Static balancing is usually sufficient; dynamic balancing may be necessary for pulleys with large face width or those revolving at relatively high speeds.

1) At present at the stage of draft. (Revision of ISO/R 468-1966.)

5.5 Pulleys manufactured for stock shall be statically balanced, their future conditions of usage not being known at the time of manufacture.

5.6 Static balancing shall be done so as to leave on the working diameter (pitch, outside, or effective, according to the type of pulley) an eccentric residual mass not exceeding the larger of the two following values :

a) 0,005 kg[1];

b) 0,2 % of the pulley and companion bushing equivalent mass.

The equivalent mass is taken as the mass of a geometrically identical pulley made of cast iron.

5.7 When the rotational frequency n (r/min) of a pulley becomes known, it is advisable to ascertain whether dynamic balancing may be necessary, as follows :

Determine the limiting speed n_1 (r/min) by reference to the figure or by calculation using the formula :

$$n_1 = \sqrt{\frac{1{,}58 \times 10^{11}}{l\,d}}$$

where

l is the pulley face width, in millimetres;

d is the diameter (pitch or effective) of the pulley, in millimetres.

then :

if $n \leqslant n_1$: static balancing should be suitable,

if $n > n_1$: dynamic balancing may be necessary.

5.8 For dynamic balancing, the operation shall be implemented according to ISO 1940 and, unless the user has specified a particular requirement, the G quality level shall be determined by the largest of the two numbers following :

$$G_1 = 6{,}3$$

$$G_2 = \frac{5\,v}{M}$$

The expression for G_2 derives from the definition in ISO 1940 in relation to the smallest practical residual eccentric mass given in 5.6 a).

In that formula, v is the circumferential pulley speed in metres per second, and M is its equivalent mass in kilograms as given in 5.6 b).

1) This value applies only to pulleys where there is adequate material to remove for balancing. Many light duty pulleys have inadequate space to drill balancing holes.

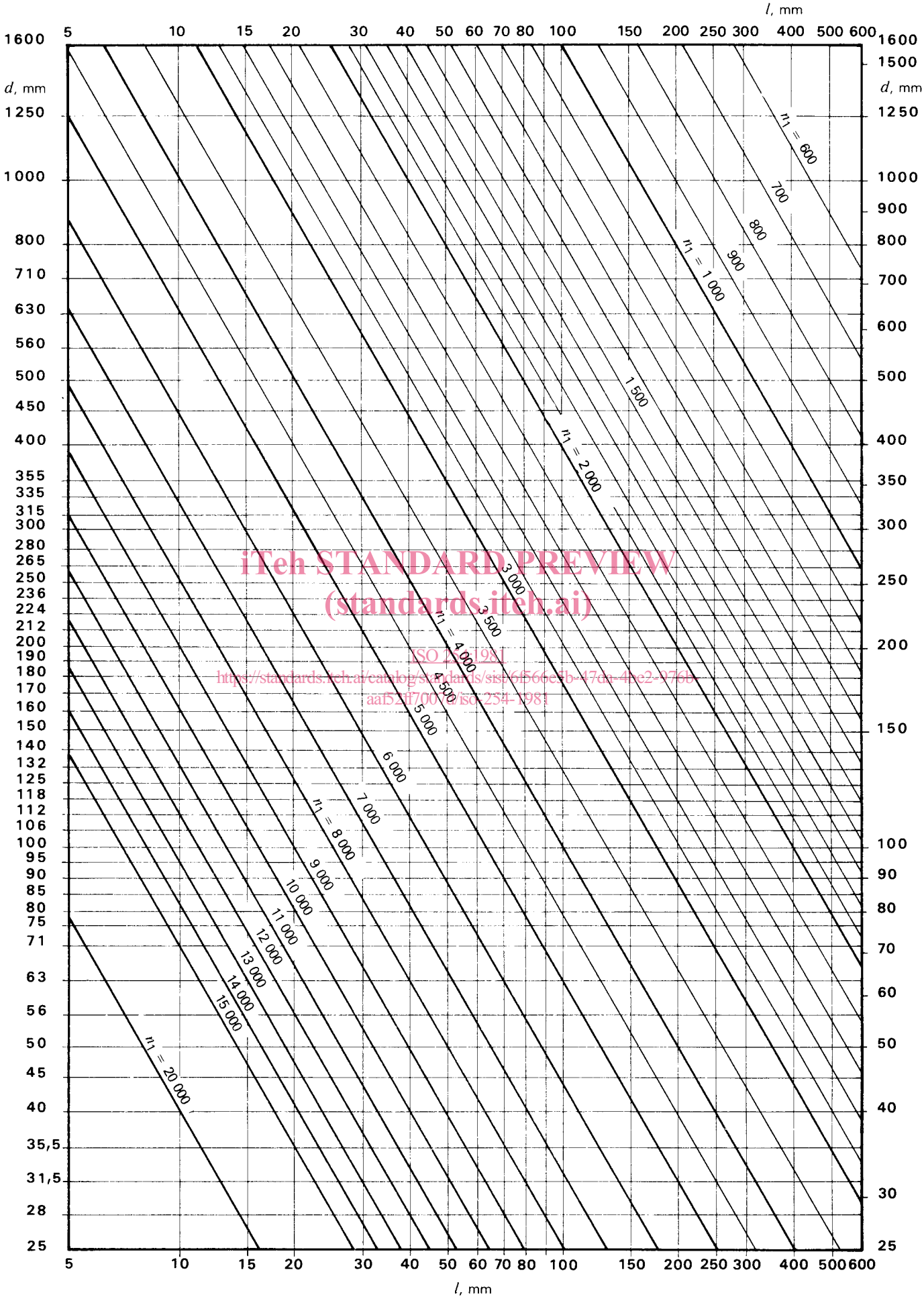

Figure — Limit n_1 (r/min) for static or dynamic balancing