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**Rolling bearings -- Methods for calculating the modified
reference rating life for universally loaded bearings**

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Foreword

This guidance technical document was drafted in accordance with the rules given in GB/T 1.1-2009.

This guidance document uses the translation method equivalent to ISO /T S16281.2008 "Rolling bearing bearing repair under general load conditions"

Positive reference to the calculation method of the rated life" and ISO /T S16281.2008/Cor.1.2009.

The following technical documents have also been edited as follows.

--- Incorporate the content of the technical corrigendum ISO /T S16281.2008/Cor.1.2009, which corrects equations (19) and (20).

The documents of our country that have a consistent correspondence with the international documents that are normatively cited in this guidance document are as follows.

---GB/T 6391-2010 Rolling bearings rated dynamic load and rated life (ISO 281.2007, IDT)

---GB/T 7811-2015 Rolling bearing parameter symbol (ISO 15241.2012, IDT)

This guidance technical document was proposed by the China Machinery Industry Federation.

This guidance technical document is under the jurisdiction of the National Rolling Bearing Standardization Technical Committee (SAC/TC98).

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Introduction

Since the release of ISO 281 in 1990, more information has been gained on pollution, lubrication, installation internal stress, hardening stress and material fatigue.

Knowledge of the effects of load limits and other factors on bearing life. Therefore, it is now more comprehensive to consider bearing life in life calculations.

the elements of.

ISO 281:2007 provides a way to continuously apply new knowledge in this area when calculating the bearing's corrected rating life. However,

The calculation method given in ISO 281:2007 does not take into account the effect of bearing tilt or skew on life and the bearing clearance during operation.

The impact of life. This guidance document describes an advanced calculation method that takes into account not only these effects, but also

Calculate the impact of pollution and other factors to provide the most accurate support.

Bearing correction for rolling bearings under general load conditions

Reference rated life calculation method

1 Scope

This guidance document gives a recommended method for calculating the reference life rating of a bearing correction that takes into account lubrication, contamination and bearings.

Material fatigue load limit, as well as the influence of tilt or skew, bearing working clearance and internal load distribution of rolling elements. This guidance technical document

The calculation method given covers more influence parameters than ISO 281.

The guidance and limitations given in ISO 281 also apply to this guidance document. This calculation method is applicable to the fatigue life of the bearing

Life. Other failure mechanisms, such as wear or micro-peeling (graying), are beyond the scope of this guidance document.

This guidance document applies to inclined single row radial ball bearings that are subjected to radial and axial loads, taking into account radial play and tilt;

This guidance document also applies to inclined single row roller bearings bearing pure radial loads, taking into account radial clearance, edge stress and inclination

oblique. This guidance document also provides a reference method for analyzing internal load distribution under normal load conditions.

Analysis of internal load distribution and modified reference rating life for multi-row bearings or more complex geometric bearings can be guided by this guide

The formula given in the technical paper was introduced. For these bearings, the load distribution for each column needs to be considered.

The main purpose of this guidance document is for computer programs, which together with ISO 281 cover the information required for life calculations.

For accurate life calculations under the above specified conditions, it is recommended to use this guidance technical document or advanced calculations provided by the bearing manufacturer.

Machine calculation method to determine the reference equivalent dynamic load under different load conditions.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

ISO 281.2007 Rolling bearings rated dynamic load and rated life
(Rollingbearings-Dynamicloadratingsand
Ratinglife)

ISO 15241 rolling bearing parameter symbols
(Rollingbearings-Symbolsforphysicalquantities)

3 symbol

The symbols given in ISO 15241 and the following symbols apply to this document, as well as the terms and definitions in Chapter 3 of ISO 281.2007.

And other definitions in ISO 281.

A. groove center distance of the ball bearing without play and original contact angle, mm

aISO . life correction factor, system method based on life calculation

A1. reliability life correction factor

Ca. axial basic dynamic load rating, N

Cr. radial basic dynamic load rating, N

Cu. fatigue load limit, N

cL. elastic constant of the rolling element when the wire is in contact, $N/mm^{10/9}$

cP. elastic constant of the rolling element at point contact, $N/mm^{3/2}$

cS. elastic constant of roller slice, $N/mm^{8/9}$

Dpw. ball group or roller group pitch diameter, mm

Dw. ball nominal diameter, mm

Dwe. roller diameter for rated load calculation, mm

E. modulus of elasticity, MPa¹⁾

1) 1 MPa = 1 N/mm² .

E(chi). The second type of complete elliptic integral

e. subscript of the outer ring or seat

eC. pollution coefficient

F(rho). relative curvature difference

Fa. bearing axial load (axial component of bearing actual load), N

Fr. bearing radial load (radial component of bearing actual load), N

f[j,k]. stress correction function considering edge load

i. subscript of inner ring or shaft ring

i. number of rolling body columns

K(chi). The first type of complete elliptic integral

Lnmr. corrected reference rating life, 10⁶r

Lwe. effective roller length for rated load calculation, mm

L10r. basic reference rating life, 10⁶r