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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 3480.3-2021

Calculation of load capacity of spur and helical gears - Part 3: Calculation of tooth bending strength

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Foreword

GB/T 3480 "Calculation of Load Capacity of Spur Gears and Helical Gears" is divided into the following 5 parts.

---Part 1.Basic principles, overview and general influence coefficient;

---Part 2.Calculation of tooth surface contact strength (pitting);

---Part 3.Calculation of the bending strength of gear teeth;

---Part 5.Strength and quality of materials;

---Part 6.Calculation of service life under variable load conditions.

This part is Part 3 of GB/T 3480.

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

This part replaces part of the content in GB/T 3480-1997 "Calculation Method for Carrying Capacity of Involute Cylindrical Gears".

Compared with GB/T 3480-1997, the main technical changes in this part are as follows.

---This part adopts ISO 6336-3.2019, which only specifies the calculation of the bending strength of gear teeth, and does not involve the basic requirements specified in ISO 6336-1.

Principle, overview and general influence coefficient and tooth surface contact strength (pitting) calculation specified in ISO 6336-2;

---Modified some terms, such as "tooth direction" changed to "helical line", "tooth profile" changed to "tooth profile", "longitudinal" changed to "axial", etc.;

--- Increase the load factor Kgamma [see formula (3)];

---Modified the calculation formula of the helix angle coefficient Ybeta related to the bending fatigue strength [see formula (66)];

---The structure of the main text and the content of the appendix have been greatly adjusted.

The translation method used in this part is equivalent to ISO 6336-3.2019 ``Calculation of Load Capacity of Spur Gears and Helical Gears Part 3.Gear Curved

Calculation of bending strength.

The Chinese documents that have a consistent correspondence with the international documents cited in this section are as follows.

---GB/T 3480.1-2019 Calculation of load-carrying capacity of spur gears and helical gears Part 1.Basic principles, overview and general effects

Coefficient (ISO 6336-1.2006, IDT);

---GB/T 3480.5-2008 spur gear and helical gear load capacity calculation part 5.material strength and quality

(ISO 6336-5.2003, IDT).

This section also made the following editorial changes.

--- Change "chi*K" in Table 2 of ISO 6336-3.2019 to "chi*k";

---Delete the interpretation of the symbol sigmaFP in ISO 6336-3.2019 formula (3);

--- Change "sigmaPlim" in ISO 6336-3.2019 formula (A.2) to "sigmaplim".

---Added informative appendix NA.

This part is proposed and managed by the National Gear Standardization Technical Committee (SAC/TC52).

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Introduction

ISO 6336 (all parts) is a standard (GB) and technical specification (TS) whose general title is "Calculation of Load Capacity of Spur Gears and Helical Gears"

And technical report (TR), see Table 1.among them.

---The standard provides a widely accepted and proven calculation method;

---Technical specifications provide calculation methods that still need to be further developed;

---The technical report provides valid data, such as calculation examples.

The content of ISO 6336 series Part 1 to Part 19 covers the fatigue analysis when calculating the bearing capacity of gears; Part 20 to Part 20

The content of part 29 mainly relates to the friction performance of tooth surface contact under lubrication conditions; the content of part 30 to part 39 is a calculation example.

The ISO 6336 series can add new parts in the future to explain the situation reflected by some standard users.

According to the ISO 6336 series of standards (see Table 1), the calculation of the specification can only be used for the parts specified in the standard, and cannot be used

for special zero

Pieces. When further calculations are required, the relevant clauses or parts of the ISO 6336 series need to be specified. When using technical specifications as a special design

It is necessary to obtain the consent of the manufacturer and the buyer in advance when the acceptance criteria are met.

Table 1 ISO 6336 series (as of the state before the publication of this part)

Technical Report of Standard Technical Specification for Calculation of Load Capacity of Spur Gears and Helical Gears

Part 1.Basic principles, overview and general influence coefficientsqrt

Part 2.Calculation of tooth surface contact strength (pitting corrosion) sqrt

Part 3.Calculation of bending strength of gear teethsqrt

Part 4.Calculation of Tooth Surface Fracture Bearing Capacity sqrt

Part 5.Strength and quality of materials sqrt

Part 6.Service life calculation under variable load conditionssqrt

Part 20.Gluing load capacity calculation (also applicable to helical gears and hypoid gears)

Flash temperature method (instead of ISO /T R13898-1)

Part 21.Gluing load capacity calculation (also applicable to helical gears and hypoid gears)

Integration method (replaces ISO /T R13898-2)

Part 22.Calculation of micropitting corrosion bearing capacity (replaces ISO /T R15144-1) sqrt

Part 30.Application examples of ISO 6336 Part 1, 2, 3, 5 sqrt

Part 31.Calculation example of micropitting corrosion bearing capacity (replaces ISO /T R15144-2) sqrt

The maximum tensile stress at the root of the gear (in the direction of the tooth height) should not exceed the allowable bending stress of the material, which is to determine the bending strength of the gear tooth

basis. This tensile stress occurs at the "stretched fillet" of the working tooth side. If the load induces cracks, it will usually appear first in the generation of compressive stress.

Within the fillet of the force, that is, within the "compression fillet" of the non-working tooth side. When the loading direction is unidirectional and a general tooth profile, this kind of compression crack is very

Less expansion causes gear failure. The initial crack originating from the stretched fillet is