PD ISO/TR 10300-30:2017

BSI Standards Publication

Calculation of load capacity of bevel gears

Part 30: ISO rating system for bevel and hypoid gears — Sample calculations

bsi.

National foreword

This Published Document is the UK implementation of ISO/TR 10300-30:2017.

The UK participation in its preparation was entrusted to Technical Committee MCE/5/-/13, Bevel gears.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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TECHNICAL REPORT

ISO/TR 10300-30

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Calculation of load capacity of bevel gears —

Part 30: ISO rating system for bevel and hypoid gears — Sample calculations

Calcul de la capacité de charge des engrenages coniques —

Partie 30: Système d'évaluation ISO pour engrenages conique et hypoïde - Type de calcul

Reference number
ISO/TR 10300-30:2017(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 60, *Gears*, Subcommittee SC 2, *Gear capacity calculation*.

A list of all parts in the ISO 10300 series can be found on the ISO website.

Introduction

The ISO 10300 series consists of International Standards, Technical Specifications (TS) and Technical Reports (TR) under the general title *Calculation of load capacity of bevel gears* (see Table 1).

— International Standards contain calculation methods that are based on widely accepted practices and have been validated.

— TS contain calculation methods that are still subject to further development.

— TR contain data that is informative, such as example calculations.

The procedures specified in ISO 10300-1 to ISO 10300-19 cover fatigue analyses for gear rating. The procedures described in ISO 10300-20 to ISO 10300-29 are predominantly related to the tribological behaviour of the lubricated flank surface contact. ISO 10300-30 to ISO 10300-39 include example calculations. The ISO 10300 series allows the addition of new parts under appropriate numbers to reflect knowledge gained in the future.

Requesting standardized calculations according to ISO 10300 without referring to specific parts requires the use of only those parts that are currently designated as International Standards (see Table 1 for listing). When requesting further calculations the relevant part or parts of ISO 10300 need to be specified. Use of a Technical Specification as acceptance criteria for a specific design need to be agreed in advance between manufacturer and purchaser.

Table 1 — Overview of ISO 10300

Calculation of load capacity of bevel gears	International Standard	Technical Specification	Technical Report
Part 1: Introduction and general influence factors	X		
Part 2: Calculation of surface durability (pitting)	X		
Part 3: Calculation of tooth root strength	X		
Part 4 to 19: to be assigned			
Part 20: to be assigned for scuffing of bevel and hypoid gears			
Part 21 to 29: to be assigned			
Part 30: Rating system for bevel and hypoid gears — Sample calculations			X
At the time of publication of this document, some of the parts listed here were under development. Consult the ISO website.			

This document was prepared with sample calculations for different bevel gear designs. They are intended for users of the ISO 10300 series to follow a whole calculation procedure formula by formula. Practical experience has shown that this way, to get into a complex subject, is very helpful.

On the other hand, this document is not intended for use by the average engineer. Rather, it is aimed at the well-versed engineer capable of selecting reasonable values for the parameters and factors in these formulae based on knowledge of similar designs and on awareness of the effects behind these formulae.

TECHNICAL REPORT **ISO/TR 10300-30:2017(E)**

Calculation of load capacity of bevel gears —

Part 30: ISO rating system for bevel and hypoid gears — Sample calculations

1 Scope

This document provides sample calculations for different bevel gear designs, how the load capacity is numerically determined according to the methods and formulae of the ISO 10300 series. The initial geometric gear data necessary for these calculations in accordance with ISO 23509.

The term "bevel gear" is used to mean straight, helical (skew), spiral bevel, zerol and hypoid gear designs. Where this document pertains to one or more, but not all, the specific forms are identified.

The manufacturing process of forming the desired tooth form is not intended to imply any specific process, but rather to be general in nature and applicable to all calculation methods of the ISO 10300 series. The fact that there are bevel gear designs with tapered teeth and others where the tooth depth remains constant along the face width (uniform depth) does not demand to apply Method B2 for the first and Method B1 for the second tooth configuration.

The rating system of the ISO 10300 series is based on virtual cylindrical gears and restricted to bevel gears whose virtual cylindrical gears have transverse contact ratios of $\varepsilon_{v\alpha} < 2$. Additionally, the given relations are valid for bevel gears of which the sum of profile shift coefficients of pinion and wheel is zero (see ISO 23509).

WARNING: The user is cautioned that when the formulae are used for large average mean spiral angles, $(\beta_{m1} + \beta_{m2})/2 > 45°$, for effective pressure angles, $\alpha_e > 30°$ and/or for large face widths, $b > 13\ m_{mn}$, the calculated results of the ISO 10300 series should be confirmed by experience.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10300-1:2014, *Calculation of load capacity of bevel gears — Part 1: Introduction and general influence factors*

ISO 10300-2:2014, *Calculation of load capacity of bevel gears — Part 2: Calculation of surface durability (pitting)*

ISO 10300-3:2014, *Calculation of load capacity of bevel gears — Part 3: Calculation of tooth root strength*