TECHNICAL SPECIFICATION

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Calculation of load capacity of bevel gears —

Part 20: Calculation of scuffing load capacity — Flash temperature method

Calcul de la capacité de charge des engrenages coniques —

Partie 20: Calcul de la capacité de charge au grippage — Méthode de la température-éclair

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Foreword

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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.

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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 parts 1 to 19 cover fatigue analyses for gear rating. The procedures described in ISO 10300 parts 20 to 29 are predominantly related to the tribological behaviour of the lubricated flank surface contact. ISO 10300 parts 30 to 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 the ISO 10300 series 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 the ISO 10300 series 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 — Parts of ISO 10300 series (status as of DATE OF PUBLICATION)

Calculation of load capacity of bevel gears	International Standard	Technical Specification	Technical Report
Part 1: Introduction and general influence factors[a]	X		
Part 2: Calculation of surface durability (pitting)[a]	X		
Part 3: Calculation of tooth root strength[a]	X		
Part 4 to 19: to be assigned			
Part 20: Calculation of scuffing load capacity — Flash temperature method		X	
Part 21 to 29: to be assigned			
Part 30: ISO rating system for bevel and hypoid gears — Sample calculations			X
Part 32: ISO rating system for bevel and hypoid gears — Sample Calculations of scuffing load capacity			X

[a] Under revision.

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This document and the other parts of the ISO 10300 series provide a coherent system of procedures for the calculation of the load capacity of bevel and hypoid gears. The ISO 10300 series is designed to facilitate the application of future knowledge and developments, and also the exchange of information gained from experience.

Design considerations to prevent fractures emanating from stress raisers in the tooth flank, tip chipping and failures of the gear blank through the web or hub will need to be analysed by general machine design methods.

Several methods for the calculation of load capacity, as well as for the calculation of various factors, are permitted. The directions in the ISO 10300 series are thus complex, but also flexible.

Scuffing is a localized damage caused by solid-phase welding between sliding surfaces. It is accompanied by transfer of metal from one surface to another due to welding and tearing. Scuffing can occur in gear flanks that operate in the boundary-lubrication regime where the lubricant film is insufficient to separate tooth surfaces and contact breaks through the oxide layers that normally protect the surfaces and enables bare metal surfaces to weld together. Blok[4] hypothesized that scuffing occurs

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