

BUREAU OF INDIAN STANDARDS

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Doc: PGD 33 (26088) WC

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भारतीय मानक मसौदा

स्पर और कुंडलित गियरों की भार क्षमता का परिकलन —

भाग 5: सामग्री की मजबूती और गुणता

Draft Indian Standard

Calculation of Load Capacity of Spur and Helical Gears —

Part 5: Strength and Quality of Materials

ICS 21.200

Transmission Device Sectional Committee, PGD 33

Last Date for Comments: **02-09-2024**

NATIONAL FOREWORD

(Formal clauses will be added later on)

This standard describes contact and tooth-root stresses and gives numerical values for both limit stress numbers. It specifies requirements for material quality and heat treatment and comments on their influences on both limit stress numbers.

Spur gears offer the simplest design, with straight teeth parallel to the gear axis. Conversely, helical gears have teeth cut in the form of a helix over the cylindrical blank. Both spur gears and helical gears are used to transmit power between a parallel driver and driven shafts.

This standard is published in five parts. The other parts in this series are:

Part 1	Basic principles, introduction and general influence factors
Part 2	Calculation of surface durability (pitting)
Part 3	Calculation of tooth bending strength.
Part 6	Calculation of service life under variable load

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are however not identical to those used in Indian Standards. Attention is particularly drawn to the following

- a) Wherever the words ‘International Standard’ appear referring to this standard, they should be read as ‘Indian Standard’.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current-practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 53 Cylindrical gears for general and heavy engineering — Standard basic rack tooth profile	IS 2535 (Part 1) : 2004/ISO 53 : 1998 Cylindrical gears for general and heavy engineering: Part 1 Standard basic rack tooth profile (<i>third revision</i>)	Identical
ISO 642 Steel — Hardenability test by end quenching (Jominy test)	IS 3848 : 2024/ISO 642 : 1999 Steel — Hardenability test by end quenching (Jominy Test) (<i>second revision</i>)	Identical
ISO 643 : 2012 Steels — Micrographic determination of the apparent grain size	IS 4748 : 2021/ISO 643 : 2019 Steel — Micrographic determination of the apparent grain size (<i>third revision</i>)	Identical
ISO 683-1 Heat-treatable steels, alloy steels and free-cutting steels — Part 1: Non-alloy steels for quenching and tempering	IS 5517 : 1993 Steels for hardening and tempering — Specification (<i>second revision</i>)	Not Equivalent
ISO 683-2 Heat-treatable steels, alloy steels and free-cutting steels — Part 2: Alloy steels for quenching and tempering	IS 5517 : 1993 Steels for hardening and tempering — Specification (<i>second revision</i>)	Not Equivalent
ISO 683-3 Heat-treatable steels, alloy steels and free-cutting steels — Part 3: Case-hardening steels	IS 4432 : 1988 Specification for case hardening steels (<i>first revision</i>)	Not Equivalent
ISO 683-4, Heat-treatable steels, alloy steels and free-cutting steels — Part 4: Free-cutting steels	IS 4431 : 1978 Specification for carbon and carbon manganese free cutting steels (<i>first revision</i>)	Not Equivalent

ISO 4967	Steel	—	IS 4163 : 2021/ISO 4967 : 2013	
Determination of content of non-metallic inclusions		—	Steel - Determination of content of non-metallic inclusions	Identical
Micrographic method using standard diagrams			Micrographic method using standard diagrams (<i>fourth revision</i>)	
ISO 10474	Steel and steel products	—	IS/ISO 10474 : 2013 Steel and steel products — Inspection documents	Identical
Inspection documents				
ISO 18265	Metallic materials	—	IS 4258 : 2018/ISO 18265:2013	
Conversion of hardness values			Metallic materials - Conversion of hardness values (<i>third revision</i>)	Identical

The technical committee has reviewed the provisions of the following International Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

<i>International Standard</i>	<i>Title</i>
ISO 683-5	Heat-treatable steels, alloy steels and free-cutting steels — Part 5: Nitriding steels
ISO 1328-1	Cylindrical gears — ISO system of flank tolerance classification — Part 1: Definitions and allowable values of deviations relevant to flanks of gear teeth
ISO 2639	Steels — Determination and verification of the depth of carburized and hardened cases
ISO 3754	Steel — Determination of effective depth of hardening after flame or induction hardening
ISO 4948-2	Steels — Classification — Part 2: Classification of unalloyed and alloy steels according to main quality classes and main property or application characteristics
ISO 6336-1	Calculation of load capacity of spur and helical gears — Part 1: Basic principles, introduction and general influence factors
ISO 6336-2	Calculation of load capacity of spur and helical gears — Part 2: Calculation of surface durability (pitting)
ISO 6336-3 : 2006	Calculation of load capacity of spur and helical gears — Part 3: Calculation of tooth bending strength
ISO 9443	Heat-treatable and alloy steels — Surface quality classes for hot-rolled round bars and wire rods — Technical delivery conditions
ISO 14104	Gears — Surface temper etch inspection after grinding, chemical method
EN 10204	Metallic products — Types of inspection documents
EN 10228-1	Non-destructive testing of steel forgings — Magnetic particle inspection
EN 10228-3	Non-destructive testing of steel forgings — Ultrasonic testing of ferritic or martensitic steel forgings
EN 10308	Non-destructive testing — Ultrasonic testing of steel bars
ASTM A388-01	Standard practice for ultrasonic examination of heavy steel forgings
ASTM A609-91	Standard practice for castings, carbon, low alloy and martensitic stainless steel, ultrasonic examination thereof

ASTM E428-00 Standard Practice for Fabrication and Control of Steel Reference
Blocks Used in Ultrasonic Examination

ASTM E1444-01 Standard practice for magnetic particle examination

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

NOTE: The technical content of draft standard is not available on website. For details, please refer to ISO 6336-5 : 2016 or contact:

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