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**ISO 14521**

## **Gears — Calculation of load capacity of worm gears**

*Engrenages — Calcul de la capacité de charge des engrenages à vis*

**First edition  
2026-09**

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Published in Switzerland

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This document was prepared by Technical Committee ISO/TC 60, *Gears*, Subcommittee SC 1, *Accuracy, nomenclature and wormgearing*.

This first edition cancels and replaces ISO/TS 14521:2020, which has been technically revised.

The main changes are as follows:

- conversion of ISO/TS 14521 to an International Standard;
- update of terminology and symbols for coherence with ISO 10828;
- "Hertzian stress" replaced with "Hertzian pressure";
- integration of Method B in [Annex B](#);
- update of [Annex C](#) formulae;
- update of [Figure D.2](#);
- update of Bibliography.

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This document was developed for the rating and design of enclosed or open single enveloping worm gears with cylindrical worms, and cylindrical worm-gear motors having either solid or hollow output shafts.

This document is only applicable when the flanks of the worm wheel teeth are conjugate to those of the worm threads.

The particular shapes of the rack profiles from tip to root do not affect the conjugacy when the worm and worm wheel hobs have the same profiles; thus worm wheels have proper contact with worms and the motions of worm gear pairs are uniform.

This document can apply to wormgearing with cylindrical helicoidal worms as defined in ISO 10828 having the following thread forms: A, C, I, N, K.

Other than those mentioned in the three preceding paragraphs, no restrictions are placed on the manufacturing methods used.

In order to ensure proper mating and because of the many different thread profiles in use, it is generally desirable that worms and worm wheels be supplied by the same manufacturer.

In this document, the permissible torque for a worm gear is limited by considerations of surface stresses (conveniently referred to as wear or pitting) or bending stresses (referred to as strength) in both worm threads and worm wheel teeth, worm deflection or thermal limitation.

Consequently, the load capacity of a pair of gears is determined using calculations concerned with all criteria described in the scope and [6.4](#). The permissible torque on the worm wheel is the least of the calculated values.

The choice of appropriate methods of calculation requires knowledge and experience. This document is intended for use by experienced gear designers who can make informed judgements concerning factors. It is not intended for use by engineers who lack the necessary experience. See [4.7](#).

**WARNING** — The geometry of worm gears is complex; therefore the user of this document is encouraged to make sure that a valid working geometry has been established.