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Second edition
2023-07

Gears — FZG test procedures —

Part 1: FZG test method A/8,3/90 for relative scuffing load-carrying capacity of oils

Engrenages — Méthodes d'essai FZG —

Partie 1: Méthode FZG A/8,3/90 pour évaluer la capacité de charge au grippage des huiles

Reference number
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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 of 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 www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 14635-1:2000), of which it constitutes a minor revision. The changes are as follows:

— ISO 1328-1:1995[1)] has been dated as this document uses accuracy grade which is numerically different than tolerance class in ISO 1328-1:2013;

— replacement of ISO 4287 which has been withdrawn and replaced by ISO 21920-2;

— replacement of ISO 4964 which has been withdrawn and similar information can be found in ISO 18265;

— replacement of some bibliography entries which were withdrawn, and changes from dated to undated references;

— subclause 5.2, wording harmonized with the ISO 14635 series;

— Table 1, description "pitch line circumferential speed (v_w)" has been replaced by "circumferential velocity at the pitch line" to harmonize the wording with the ISO 6336 series;

— Table 4, insertion of lines "Direction of rotation" and "Test lubrication volume" to conform to the information in the ISO 14635 series.

A list of all parts in the ISO 14635 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

1) Cancelled and replaced by ISO 1328-1:2013.

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Introduction

The types of gear failures which can be influenced by the lubricant in use are scuffing, low-speed wear and the gear-surface fatigue phenomena known as micro- and macropitting. In the gear design process, these gear damages are taken into consideration by the use of specific lubricant and service-related characteristic values. For an accurate, field-related selection of these values, adequate lubricant test procedures are required. The FZG[2)] test procedures described in this document, ISO 14635-2 and ISO 14635-3 can be regarded as tools for the determination of the lubricant-related characteristic values to be introduced into the load-carrying capacity calculation of gears.

FZG test method A/8,3/90 for the relative scuffing load-carrying capacity of oils described in this document is typical for the majority of applications in industrial and marine gears. ISO 14635-2 is related to the relative scuffing load-carrying capacity of oils of very high extreme pressure (EP) properties, as used for the lubrication of automotive driveline components. Other FZG test procedures for the determination of low-speed wear, micro- and macropitting load-carrying capacity of gears are intended to be added to the ISO 14635 series as further parts.

2) FZG = Forschungsstelle für Zahnräder und Getriebebau, Technische Universität München (Gear Research Centre, Technical University, Munich).

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Gears — FZG test procedures —

Part 1:
FZG test method A/8,3/90 for relative scuffing load-carrying capacity of oils

1 Scope

This document specifies a test method based on a FZG four-square test machine to determine the relative load-carrying capacity of lubricating oils defined by the gear-surface damage known as scuffing. High surface temperatures due to high surface pressures and sliding velocities can initiate the breakdown of the lubricant films. This test method can be used to assess such lubricant breakdown under defined conditions of temperature, high sliding velocity and stepwise increased load.

NOTE This method is technically equivalent to ASTM D 5182-19 and CEC L-07-A-95.

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 1328-1:1995[3)], *Cylindrical gears — ISO system of accuracy — Part : Definitions and allowable values of deviations relevant to flanks of gear teeth*

ISO 18265, *Metallic materials — Conversion of hardness values*

ISO 21920-2, *Geometrical product specifications (GPS) — Surface texture: Profile — Part 2: Terms, definitions and surface texture parameters*

ASTM D 235, *Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
scuffing load-carrying capacity
(of a lubricant) maximum load which can be sustained under a defined set of conditions

Note 1 to entry: For examples of failure see Figure 1.

3) Cancelled and replaced by ISO 1328-1:2013.

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