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Gears — FZG test procedures —

Part 3: FZG test method A/2,8/50 for relative scuffing load-carrying capacity and wear characteristics of semifluid gear greases

Engrenages — Méthodes d'essai FZG —

Partie 3: Méthode FZG A/2,8/50 pour évaluer la capacité de charge au grippage et les caractéristiques d'usure des graisses d'engrenages semi-fluides

Reference number
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Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Brief description of method **4**
4.1 General 4
4.2 Precision 4
5 Test materials **4**
5.1 Test gears 4
5.2 Cleaning fluid 4
6 Apparatus **6**
6.1 FZG spur gear test rig 6
6.2 Heating device 7
6.3 Revolution counter 7
6.4 Weight measurement 7
7 Preparation of apparatus **8**
8 Test procedure **9**
9 Reporting of results **10**
Annex A (informative) **Test report** **12**
Annex B (informative) **Additional test procedure for the investigation of extended wear characteristics of the lubricant** **13**
Annex C (informative) **Checklist for maintenance of FZG gear test rig** **15**
Bibliography **20**

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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 14635-3:2005), 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;

— Table 1, description "pitch line velocity (v_w)" has been replaced by "circumferential velocity at the pitch line" to harmonize the wording with the ISO 6336-series;

— Table 1, symbol for "specific sliding" has been corrected according to ISO 21771;

— Table 2, grinding: unit for "generating stroke drive" has been corrected;

— Table 3, information on the load coupling has been harmonized with ISO 14635-1;

— Clause 9, the reporting value of the specific weight loss has been corrected.

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 failure which can be influenced by the lubricant are scuffing, low-speed wear and the gear fatigue phenomena known as micro- and macropitting. In the gear design process, these types of gear damage are taken into consideration by the use of specific lubricant and service-related characteristic values. In order to provide a reasonable estimate of performance in service, adequate lubricant test procedures are required. The FZG[2)] test procedures described in ISO 14635-1, ISO 14635-2 and ISO 14635-3 can be regarded as tools for the determination of relative scuffing performance of lubricants. Characteristic values can be introduced into the load-carrying capacity calculation of gears. ISO 14635-1 FZG test method, A/8,3/90 for relative scuffing load-carrying capacity of oils, is useful for the majority of applications in industrial and marine gears. ISO 14635-2, FZG step load test A10/16, 6R/120, is related to the relative scuffing load-carrying capacity of high extreme pressure (EP) oils as used, e.g. for the lubrication of automotive driveline components such as manual transmissions. ISO 14635-3 FZG test method A/2,8/50 describes a test procedure for the determination of the relative scuffing load-carrying capacity and wear characteristics of semi-fluid greases used for enclosed gear drives. Other FZG test procedures for the determination of low-speed wear, micro- and macropitting load capacity of gears are currently being considered for standardization. They can be added later to ISO 14635 as further parts.

It has been assumed by the compilers of this test method that anyone using the method will either be fully trained and familiar with all normal engineering and laboratory practice, or will be under the direct supervision of such a person. It is the responsibility of the operator to ensure that all local legislative and statutory requirements are met.

When the rig is running, there are long-loaded shafts and highly stressed test gears turning at high speed and precaution needs to be taken to protect personnel. It is also necessary to provide protection from noise.

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 3:
FZG test method A/2,8/50 for relative scuffing load-carrying capacity and wear characteristics of semifluid gear greases

1 Scope

This document specifies a test method based on a FZG four-square test machine for determining the relative load-carrying capacity of semi-fluid gear greases defined by the gear surface damage known as scuffing.

This method is useful for evaluating the scuffing load capacity potential of semi-fluid gear greases of NLGI classes 0 to 000, typically used with highly stressed gearing for enclosed gear drives. It can only be applied to greases giving a sufficient lubricant flow in the test gear box of the FZG test machine.

NOTE The test method is technically equivalent to DIN Fachbericht 74.

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 1: Definitions and allowable values of deviations relevant to flanks of gear teeth*

ISO 6743-6, *Lubricants, industrial oils and related products (class L) — Classification — Part 6: Family C (Gears)*

ISO 12925-1, *Lubricants, industrial oils and related products (class L) — Family C (Gears) — Part 1: Specifications for lubricants for enclosed gear systems*

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

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