
**Rolling bearings — Damage and
failures — Terms, characteristics and
causes**

*Roulements — Détérioration et défaillance — Termes, caractéristiques
et causes*



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Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Classification of failure modes occurring in rolling bearings	1
5 Failure modes	3
5.1 Fatigue	3
5.2 Wear	4
5.3 Corrosion	6
5.4 Electrical erosion	8
5.5 Plastic deformation	11
5.6 Fracture and cracking	13
Annex A (informative) Failure analysis — Illustrations of damage — Terms	16
Bibliography	41

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 15243 was prepared by Technical Committee ISO/TC 4, *Rolling bearings*.

Introduction

In practice, damage or failure of a bearing can often be the result of several mechanisms operating simultaneously. The failure can result from improper assembly or maintenance or from faulty manufacture of the bearing or its adjacent parts. In some instances, failure is due to a design compromise made in the interests of economy or from unforeseen operating conditions. It is the complex combination of design, manufacture, assembly, operation and maintenance that often causes difficulty in establishing the primary cause of failure.

In the event of extensive damage to or catastrophic failure of the bearing, the evidence is likely to be lost and it will then be impossible to identify the primary cause of failure. In all cases, knowledge of the actual operating conditions of the assembly and the maintenance history is of the utmost importance.

The classification of bearing failure established in this International Standard is based primarily upon the features visible on rolling element contact surfaces and other functional surfaces. Consideration of each feature is required for reliable determination of the cause of bearing failure. Since more than one process may cause similar effects to these surfaces, a description of appearance alone is occasionally inadequate for determining the reason for the failure. In such cases, the operating conditions must be considered.

Rolling bearings — Damage and failures — Terms, characteristics and causes

1 Scope

This International Standard defines, describes and classifies the characteristics, changes in appearance and possible causes of failure of rolling bearings occurring in service. It will assist in the understanding of the various forms of change in appearance and the failure that has occurred.

For the purposes of this International Standard the term “failure of rolling bearings” means the result of a defect or damage that prevents the bearing meeting the intended design performance.

Consideration is restricted to characteristic forms of change in appearance and failure, which have a well-defined appearance and which can be attributed to particular causes with a high degree of certainty. The features of particular interest for explaining changes and failures are described. The various forms are illustrated with photographs and diagrams, and the most frequent causes are indicated.

The failure mode designations shown in the subclause titles are recommended for general use, but similar expressions or synonyms are given within parentheses below the titles.

Examples of rolling bearing failures are given in Annex A, together with a description of the causes of failure and proposed corrective actions.

2 Normative references

The following referenced documents are indispensable for the application 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 5593:1997, *Rolling bearings — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5593 and the following apply.

3.1

characteristics

visual appearance resulting from service performance

NOTE Surface defects and types of geometrical change that occur during wear (appearance of wear) are partly defined in ISO 6601 and ISO 8785.

4 Classification of failure modes occurring in rolling bearings

Rolling bearing failures are classified strictly according to their primary causes. However, it is not always easy to distinguish between causes and characteristics (symptoms) or, in other words, between failure mechanisms and failure modes. The large number of articles and books written on the subject confirms this (see Bibliography).