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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 3481.1-2025

Replacing GB/T 3481-1997

**Gears - Wear and damage to gear teeth - Part 1: Nomenclature
and characteristics
(English Translation)**

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Table of Contents

Preface	
Introduction	
1 Scope	
2 Normative references	
3 Terms and Definitions	
4 Failure Classification and Modes	
5 Friction damage (non-fatigue)	
5.1 General information on wear	
5.2 Polishing wear	
5.3 Abrasions	
5.4 Abrasive wear	
5.5 Gluing	
5.6 Adhesive wear	
5.7 Fretting Corrosion Wear	
5.8 Interference wear	
6 Fatigue damage	
6.1 Fatigue cracks	
6.2 Contact fatigue	
6.3 Bending fatigue	
7 Non-fatigue fracture	
7.1 Overview	
7.2 Tooth root fracture	
7.3 Tooth end fracture	
7.4 Gear tooth shearing	
8 Plastic deformation	
8.1 Overview	
8.2 Indentation	
8.3 Brinell indentation	
8.4 Cold Flow	
8.5 Heat Flow	
8.6 Root fillet yield	
8.7 Fracture after plastic deformation	

8.8	Rolling deformation
8.9	Gear tooth hammering plastic deformation
8.10	Wrinkle
8.11	Ridge
8.12	Flash
8.13	Interference deformation
9	Creating Problems
9.1	Forging Cracks
9.2	Hardening cracks
9.3	Grinding cracks
9.4	Failure due to hydrogen embrittlement and internal residual stress
9.5	Grinding burn (grinding tempering)
9.6	Grinding Notch (Non-Failure Mode)
9.7	Scale Erosion
9.8	Form/Core Separation
10	Other surface damage
10.1	Corrosion
10.2	Cavitation
10.3	Erosion
10.4	Electrolytic Corrosion
10.5	Overheating
	Reference

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 1 of GB/T (Z) 3481 Wear and damage of gear teeth. GB/T 3481(Z) has been published.

Lower part.

--- Part 1: Terms and characteristics;

--- Part 2: Supplementary information.

This document replaces GB/T 3481-1997 "Terminology for wear and damage of gear

teeth". Compared with GB/T 3481-1997, except for the structural in addition to adjustments and editorial changes, the main technical changes are as follows.

a) Added failure modes and their descriptions, including adhesive wear (see 5.6), white layer peeling (see 6.2.5), tooth surface fracture (see 6.2.6), Deep fatigue fracture (see 6.2.7), tooth root fracture (see 7.2), Brinell indentation (see 8.3), cold flow (see 8.4), hot flow (see 8.5), tooth root fillet yielding (see 8.6), interference deformation (see 8.13), hydrogen embrittlement (see 9.4), surface/core separation (see 9.8);

b) Updated the images in the file.

This document is equivalent to ISO 10825-1:2022 "Wear and damage of gear teeth - Part 1: Terms and characteristics".

The following minimal editorial changes have been made to this document.

--- Deleted the footnote "1)" of "See ISO/TR 10825-2" in the second paragraph of Chapter 4 and the corresponding footnote content (because ISO/TR 10825-2:2022 released).

Introduction

In order to more accurately describe the objective phenomena of gear wear and failure, it is necessary to first define the relevant basic concepts and give explanations to help Better communication between buyers and manufacturers to improve efficiency.

GB/T (Z) 3481 consists of two parts.

--- Part 1: Terminology and characteristics. The purpose is to give a common description of gear wear and damage and to provide consistency and coherence by explaining the gear failure mode morphology, it is easy to communicate between equipment buyers and gear manufacturers, and then Effective analysis of failure and damage. Since gear tooth wear and damage have various forms and causes, this section does not cover the causes of each type of wear and damage are analyzed and no remedial measures are provided.

--- Part 2: Supplementary information. The purpose is to help users of the standard better identify the causes of gear tooth damage and avoid potential damage.

Because some of the reasons are still under research, the contents given in this section are intended to propose more possibilities and no clear justification was given for the observed impairments. In addition, in some cases, it may be possible to reduce certain impairments while Increased risk of other types of injuries.

The above two parts are independent and complementary to each other.

Wear and damage of gear teeth Part 1: Terms and characteristics Important Note. The electronic file of this document contains color images, which will help readers to correctly understand the content of the text.

Consider printing this document on a color printer.

1 Scope

This document provides terminology for common gear tooth wear and failure modes, classifies, identifies, and describes typical failure modes, and Provides information that can, in many cases, help the user determine the failure mode and assess the extent of the change from the initial condition.

This document is based on studies of steel gears, but many of the failure modes discussed are also applicable to gears of other materials.

The model does not fully cover the failure of gears made of these materials (such as plastic gears, bronze gears, or powdered metal gears).

Solutions to many gear problems require detailed investigation and analysis by experts and are beyond the scope of this document.

This document defines only terms that are intended to help identify and record the appearance and condition of gears after a period of operation.

The causes and preventive measures are not described in this document.

Unless otherwise specified, gears in this document generally include driving wheels and driven wheels.

This document does not define "gear failure".

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

Note: GB/T 3374.1-20101) Gear terms and definitions Part 1: Geometric definitions (ISO 1122-1:1998, IDT)

1) Excluding ISO 1122-1:1998/Cor.1.1999 and ISO 1122-1:1998/Cor.2.2009.

3 Terms and Definitions

For the purposes of this document, the terms and definitions given in ISO 1122-1 apply.