INTERNATIONAL STANDARD

ISO 14104

Second edition
2014-06-01

Gears — Surface temper etch inspection after grinding, chemical method

Engrenages — Contrôle par attaque chimique des zones surchauffées lors de la rectification

Reference number
ISO 14104:2014(E)

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Published in Switzerland

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Foreword

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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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 60, *Gears*, Subcommittee SC 2, *Gear capacity calculation.*

This second edition cancels and replaces the first edition (ISO 14104:1995), of which it constitutes a technical revision with the following changes:

— use of a grey scale card to qualify varying degrees of surface temper damage;

— inclusion of sample photographs which are intended to provide the user of this International Standard with indications of typical surface temper damage.

Introduction

This International Standard explains the materials and procedures necessary to determine, evaluate, and describe localized overheating on ground surfaces. A system to describe and classify the indications produced during this inspection is included. However, specific acceptance or rejection criteria are not contained.

An industry-wide survey was conducted to establish common solutions in time that were acceptable to the greatest number of users. The safety and environmental precautions were included therein for those not familiar with storage, handling, use, and disposal of concentrated acids, alkalis, and solvents. These precautions, however, do not supersede the latest applicable requirements.

Gears — Surface temper etch inspection after grinding, chemical method

1 Scope

This International Standard specifies procedures and requirements for the detection and classification of localized overheating on ground surfaces by chemical etch methods.

The process described in this International Standard is typically used on ground surfaces; however, it is also useful for the detection of surface anomalies that result from post-heat treatment machining such as hard turning, milling, and edge breaking (deburring) processes. Surface metallurgical anomalies caused by carburization or decarburization are also readily detectable with this process.

Some methods which have been used in the past are no longer recommended. Specifications are intended to be changed to use the methods in this International Standard. These etching methods are more sensitive to changes in surface hardness than most hardness testing methods.

This International Standard applies to steel parts such as gears, shafts, splines, and bearings. It is not applicable to nitrided parts and stainless steels. Alternative methods should be considered.

NOTE This process, although at times called “nital etch”, is not intended to be confused with other processes also known as “nital etch”.

The surface temper etch procedure is to be performed after grinding and before additional finishing operations such as superfinishing, shot peening, and honing.

2 Equipment

2.1 Container materials.

Container materials shall not react with the solutions contained, nor damage the parts to be processed. All containers shall be labelled with the solution contained and covered when not in use. Containers should be labelled according to local regulations.

2.2 Inspection area.

The area to be inspected shall be sufficiently illuminated to be free of shadows and reflections. A minimum light intensity of 2 200 lx (~200 foot candles) at the inspection level is recommended.

2.3 Cleaner.

An alkaline cleaner, vapour degreaser, solvent wash, or equivalent cleaning process shall be used.

2.4 Timing device.

A suitable timing device shall be used for the uniform processing of all parts in a group.

2.5 Grey scale reference.

A suitable grey scale reference should be used, such as Tiffen Color Separation Guide and Gray Scale Q13 (small) nor Q14 (large).[1)] Figure 1 is an example of a suitable grey scale reference. Use of a sample part with known indications to exhibit surface tempering is also recommended.

1) Tiffen Gray Scale is the trade name of a product supplied by Tiffen. This information is given for the convenience