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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 18683-2025

Replacing GB/T 18683-2002

Laser surface hardening of iron and steel parts

钢铁件激光表面淬火

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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 replaces GB/T 18683-2002 "Laser surface hardening of steel parts". Compared with GB/T 18683-2002, except for the structural adjustment Besides the editorial changes, the main technical changes are as follows.

a) Added the terms "overlap ratio", "case quenching hardened layer depth", "case quenching total hardened layer depth", and "case quenching hardened layer width" and their definitions (see 3.4 to 3.7); the terms "phase transformation hardening zone", "heat affected zone", "minimum surface hardness", "hardness limit", and " Effective hardened layer depth, effective hardened layer width, total hardened layer depth, total hardened layer width and their definitions (see 2002 edition 3.4~3.11);

b) The material grades of commonly used laser quenching workpieces have been changed (see Table 1, Appendix A of the 2002 edition);

c) The requirements for laser hardening equipment have been changed (see 5.1 to 5.7, 5.1 and 5.1.1 to 5.1.4 of the 2002 edition);

d) Added process formulation principle elements and process parameter determination methods, changed "overlap coefficient" to "overlap rate", and changed the corresponding Calculation formula (see 6.1.2, 6.2, 6.4, 6.5, 5.3.1, 5.3.3, 5.3.4 of the 2002 edition);

e) The workpiece surface pretreatment method has been changed (see 6.3, 5.2 of the 2002 edition);

f) The quality inspection items and requirements have been changed (see 7.1 to 7.7, 6.1, 6.3 to 6.6 of the 2002 edition), and the reference to "surface roughness" has been deleted.

and "hardness distribution" test (see 6.2, 6.3.2 of the 2002 edition), and deleted "microhardness measurement method" and "microstructure measurement method".

(See 6.5.1, 6.5.2, 6.6.1, 6.6.2 of the 2002 edition);

g) Deleted "Arbitration Method" and related content (see 6.7 of the 2002 edition);

h) The content related to "records" has been modified (see Chapter 9, 5.4 of the 2002 edition).

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document is proposed and coordinated by the National Technical Committee for Standardization of Heat Treatment (SAC/TC75).

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This document was first published in 2002 and this is the first revision.

1 Scope

This document specifies the workpiece materials and original state, laser quenching equipment, process specifications, quality inspection, safety protection for laser surface quenching and records.

This document applies to the surface hardening of steel parts using laser.

2 Normative references

GB/T 1958

GB/T 3864

GB/T 4340.1

GB/T 4842

GB/T 5617

GB/T 7232

GB 7247.1

GB/T 9443

GB/T 9444

GB/T 10320

GB/T 10610

GB 15735

GB/T 38762.1

3 Terms and Definitions

The terms and definitions defined in GB/T 7232 and GB/T 5617 and the following apply to this document.

3.1

Using laser as energy, the workpiece surface is heated at an extremely fast speed for self-cooling quenching.

3.2 laser power densitylaser power density

The laser beam power acting on the unit area of the workpiece surface.

Note. The unit is watt per square centimeter (W/cm2).

3.3 Scanning speed

The distance the laser spot moves relative to the workpiece per unit time.