

# SVENSK STANDARD

## SS-ISO 15787:2017



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**Teknisk produktdokumentation – Värmebehandlade detaljer av stål – Presentation och ritningsangivning (ISO 15787:2016, IDT)**

**Technical product documentation – Heat-treated ferrous parts – Presentation and indications (ISO 15787:2016, IDT)**

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Den internationella standarden ISO 15787 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 15787.

Denna standard ersätter SS-ISO 15787, utgåva 1.

The International Standard ISO 15787 has the status of a Swedish Standard. This document contains the official English version of ISO 15787.

This standard supersedes the Swedish Standard SS-ISO 15787, edition 1.

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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. [www.iso.org/directives](http://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. [www.iso.org/patents](http://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 on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is Technical Committee ISO/TC 10 *Technical product documentation*, Subcommittee SC 6, *Mechanical engineering documentation*.

This second edition of ISO 15787 cancels and replaces the first edition (ISO 15787:2001), which has been technically revised.

In addition to a number of editorial revisions, the following main changes have been made with respect to the previous edition:

- addition of an indication of both states of the part: 1) after the heat treatment (before final machining); and 2) after the final machining ([Figure 16](#) and [Figure 30](#));
- addition of examples representing the hardness values and their limiting deviations ([Table 1](#));
- addition of line types for the indication of local areas and their applications ([Table 2](#));
- addition of line type 07.2 (dotted wide line) for carburized, carbonitrided, nitrided or nitrocarburized workpieces to indicate areas where heat treatment is not allowed;
- replacement of the representation of hardness values, hardness depths, layer thicknesses and limiting deviations by their values and limiting deviations ([Tables 1, 3, 4](#) and [5](#));
- addition of marking of slip zones ([5.5.2](#)), key for the allocation test point and nominal value ([5.6](#)), indication of local areas ([5.7](#)), oxide layer thickness (OLT) ([5.11](#)), heat-treatment order (HTO) ([5.14](#)), heat-treatment document (HTD) ([5.15](#));
- replacement of the title of “Drawings providing specific indication of heat treatment” by “Heat-treatment sketch” ([6.4](#));
- deletion of the former [6.4 surface fusion hardening](#) in the 2001 edition;
- deletion of the [Annex A](#) tables present in the 2001 edition;
- addition of graphical symbols ([Annex A](#)).

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### Introduction

Technical drawings of workpieces are the most important documents

- for construction, development and production,
- for the assembling, and
- for the use of the final products.

Generally, a drawing provides information about the workpiece, its shape and design, the material used, the dimensions, surface behaviour, permitted abbreviations, inspection data, and more.

Workpieces made from steel and iron often have to withstand severe conditions to resist wear and corrosion.

To attain the required properties, the workpieces are heat-treated in most applications. A drawing is a very important document as it also informs the heat-treater about the parameters to be aware of for a successful heat-treatment. For that, he should know the material used, the required heat-treatment, the required hardness and hardness depth, the expected or permitted microstructure, the required testing method and the test points for testing the heat-treated workpiece.

In this time of global production, it is essential to dispose of an International Standard for technical product documentation, especially for the presentation and indication of heat-treated parts. Therefore, ISO 15787:2001 was revised to help to improve the quality of heat-treated workpieces.



# Technical product documentation — Heat-treated ferrous parts — Presentation and indications

## 1 Scope

This document specifies the manner of presenting and indicating the final condition of heat-treated ferrous parts in technical drawings.

## 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 128-24:2014, *Technical drawings — General principles of presentation — Part 24: Lines on mechanical engineering drawings*

ISO 4885, *Ferrous products — Heat-treatments — Vocabulary*

ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method*

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*

ISO/TS 8062-2, *Geometrical product specifications (GPS) — Dimensional and geometrical tolerances for moulded parts — Part 2: Rules*

ISO 81714-1, *Design of graphical symbols for use in the technical documentation of products — Part 1: Basic rules*

## 3 Terms, definitions

For the purposes of this document, the terms and definitions given in ISO 4885 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

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### 4 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

CHD	Case-hardening hardness depth
CD	Carburizing depth
CLT	Compound layer thickness
NHD	Nitriding hardness depth
SHD	Surface-hardening hardness depth
HTO	Heat-treatment order
HTD	Heat-treatment document
IOD	Internal oxidation depth
OLT	Oxide layer thickness

### 5 Indications in drawings

#### 5.1 General

Indications in drawings concerning the heat-treatment condition can relate to the assembly or final condition as well as to the condition directly after heat-treatment. This difference has to be observed implicitly, as heat-treated parts are often subsequently machined (e.g. by grinding). By this, the hardness depth is reduced, especially with case-hardened, surface-hardened and nitrided parts, as is the compound layer thickness of nitrided and nitrocarburized parts. The machining allowance shall therefore be taken into account appropriately during heat-treatment. If no separate drawing is made for the condition of the heat-treated part before the subsequent machining or finishing, it is necessary to give information about the machining allowance. For this, indications should be made for both states of the part: 1) after the heat-treatment (before final machining); and 2) after the final machining.

NOTE This can be done, for example, by indicating the heat-treated state and the finished state in accordance with ISO/TS 8062-2, by an additional representation, or by adding the words “before grinding” or “after grinding” (see [Figures 16](#) and [30](#)).

The words indicating the heat-treated condition, the hardness and the hardness depth data shall be placed near the title block of the drawing.

For some applications, it might be necessary to keep special data on the heat-treatment process to make sure that the required properties after the heat treatment are attained.

- In this case, a heat-treatment order (HTO) should be used. If an HTO exists, in the drawing, a reference shall be given by the wording “see HTO number ...”. Examples are given in [Figures 11, 12, 25, 29](#) and [42](#).
- To document the heat-treatment process carried-out in the heat-treatment workshop, a heat-treatment document (HTD) should be used.

## 5.2 Material data

Regardless of the heat-treatment method, generally the drawing shall identify the material used for the heat-treated part (name of the material, reference to the bill of materials, etc.).

## 5.3 Heat-treatment condition

The heat-treated condition shall be specified in words, such as “quench-hardened”, “quench-hardened and tempered”, “case-hardened”, “surface-hardened”, “nitrided”, etc.

If more than one heat-treatment is required, these treatments shall each be identified in words in the sequence of their execution, for example, “quench-hardened and tempered”. Indications by wording shall be chosen in accordance with ISO 4885. See [Clause 7](#) for practical examples.

The heat-treatment condition can be achieved in different ways. As a result, the performance characteristics can differ. Particulars of the technical process shall be specified in supplementary documents (e.g. HTO, HTD) where this is of importance for the heat-treated condition.

## 5.4 Hardness data

### 5.4.1 Surface hardness

The surface hardness shall be indicated

- as Rockwell hardness in accordance with ISO 6508-1,
- as Vickers hardness in accordance with ISO 6507-1, or
- as Brinell hardness in accordance with ISO 6506-1.

Additional hardness values shall be given in instances where the parts in the heat-treated condition have areas with different hardnesses (see [Clause 6](#)).

For case-hardened, surface-hardened, nitrided or nitrocarburized parts, the hardness decreases downwards from the surface to the core. A test of the hardness in a cross section of a part from the surface until the core yields a hardness profile; this profile can be used, for instance, in accordance with ISO 2639 to specify the hardness depth. The surface hardness value depends on the hardness profile, the hardness depth and the test load. Therefore, if the surface hardness is indicated for case-hardened or surface-hardened parts, the test load shall be adjusted according to the hardness depth and the expected surface hardness.

### 5.4.2 Core hardness

The core hardness shall be indicated in the drawing where a specification is given that it is to be tested. The core hardness shall be given

- as Rockwell hardness in accordance with ISO 6508-1,
- as Vickers hardness in accordance with ISO 6507-1, or
- as Brinell hardness in accordance with ISO 6506-1.

### 5.4.3 Hardness value and limit deviations

All hardness values shall be toleranced. They can be written as shown in the examples in [Table 1](#).