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Heat treatment — Control of quality

Traitement thermique — Maîtrise de la qualité

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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 document 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 of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 244, *Industrial furnaces and associated processing equipment*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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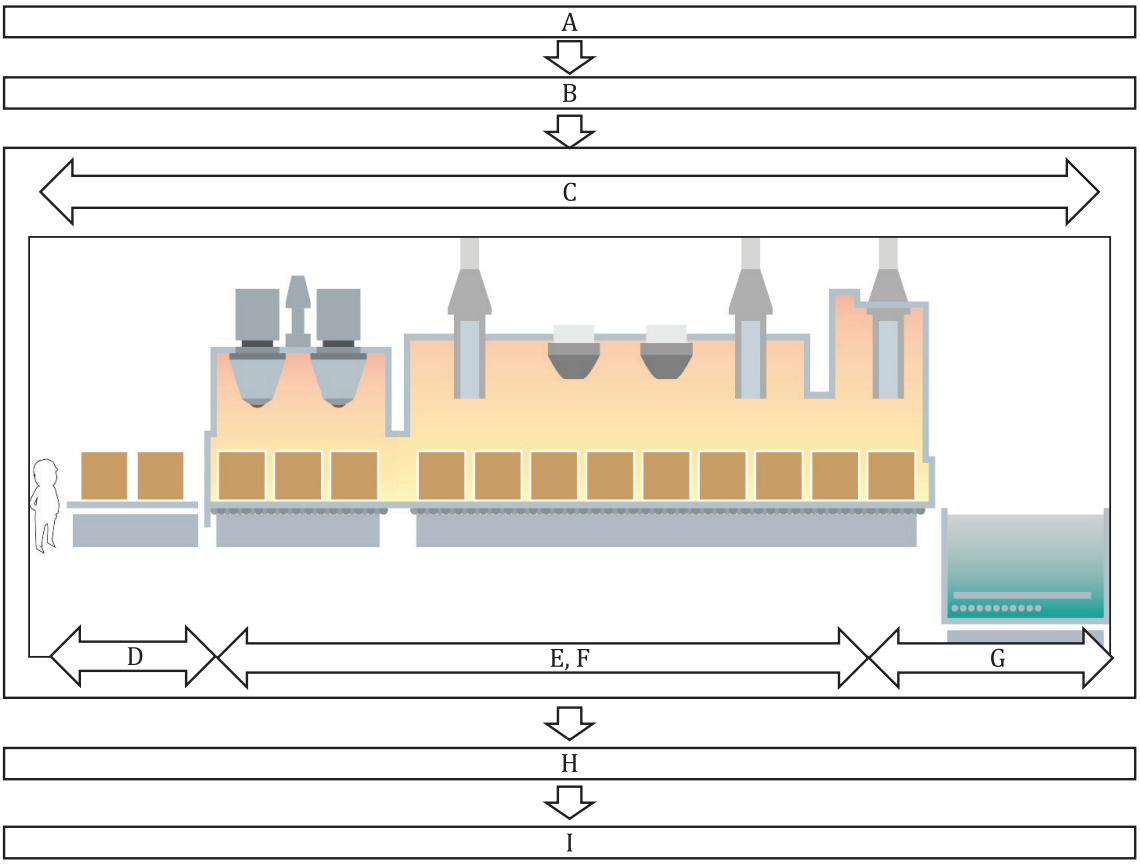
Introduction

This document draws a list of best practices in order to ensure quality control in the application of heat treatment. This document is for use with equipment constructed in accordance with International Standards for thermoprocessing equipment. These concepts are also suitable for application with other heat-treatment processes.

This document is a reference for assessment and continuous improvement which is part of the quality management system of a heat-treatment facility.

Figure 1 shows the typical flowchart for a heat-treatment process. The main steps are subject to requirements and recommendations in this document.



Key

A general organisation of a heat-treatment facility (see 5.1)
B contract review and heat-treatment conception (see 5.2)
C carrying out the heat treatment
D preparation (see 5.3)
E control of the thermal cycle (see 5.4)
F control of the heat-treatment medium (see 5.5)
G control of cooling (see 5.6)
H control of product testing (see 5.7)
I finishing (see 5.8)

Figure 1 — Heat-treatment process

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Heat treatment — Control of quality

1 Scope

This document defines the quality requirements and recommendations applicable to heat treatment on mechanical parts intended to be used in the industry (e.g. car manufacturing, aerospace, pipeline systems, civil engineering equipment, earth moving machinery, agricultural equipment, naval industry, energy equipment, tooling, fasteners).

This document provides a reference for quality audit and for the inspection of heat-treatment facilities, whether these are integrated or belonging to subprime contractors. This document can also be used as a basis for discussion and development of specifications.

A description of the equipment calibration and the frequency of the controls is given in Annex A. An example of scoring table is given in Annex B. An example of audit report is given in Annex C. The different measuring chain testing methods (SAT) are presented in Annex D.

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 4885, *Ferrous materials — Heat treatments — Vocabulary*

ISO 6506 (all parts), *Metallic materials — Brinell hardness test*

ISO 6507 (all parts), *Metallic materials — Vickers hardness test*

ISO 6508 (all parts), *Metallic materials — Rockwell hardness test*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
heat-treatment facility
set of equipment implementing processes associated with each other used to modify, through a thermal cycle, the physical, mechanical and/or chemical properties of a metallic material

3.2
recommendation
preferred advice and criterion (criteria) providing guidance, but not required to be in accordance with this document

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