INTERNATIONAL STANDARD

ISO 16468

Second edition
2015-10-01

Investment castings (steel, nickel alloys and cobalt alloys) — General technical requirements

Pièces moulées en cire perdue (acier, alliages de nickel et alliages de cobalt) — Exigences techniques générales

Reference number
ISO 16468:2015(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

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 (see 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 (see 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 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 17, *Steel*, Subcommittee SC 11, *Steel castings*.

This second edition replaces the first edition (ISO 16468:2005), which has been technically revised with the following changes:

— Clause 2, two standards added;

— 3.3, revised;

— 3.4, deleted;

— 10.6, reference made to ISO 4992-1 and ISO 4992-2.

Investment castings (steel, nickel alloys and cobalt alloys) — General technical requirements

1 Scope

This International Standard specifies technical requirements for castings (steel, nickel alloys, and cobalt alloys) produced by the investment-casting process. The International Standards specifying metallurgical material requirements for steel, nickel alloy, and cobalt alloy casting grades are listed in the Bibliography.

The requirements stated in this International Standard form an integral part of the material specification. In cases of conflict, the requirements of this specification take precedence over the individual material specification requirements.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4986, *Steel castings — Magnetic particle inspection*

ISO 4987, *Steel castings — Liquid penetrant inspection*

ISO 4990, *Steel castings — General technical delivery requirements*

ISO 4992-1, *Steel castings — Ultrasonic examination — Part 1: Steel castings for general purposes*

ISO 4992-2, *Steel castings — Ultrasonic examination — Part 2: Steel castings for highly stressed components*

ISO 4993, *Steel castings — Radiographic inspection*

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 10474, *Steel and steel products — Inspection documents*

ISO 11970, *Specification and approval of welding procedures for production welding of steel castings*

ISO 13520, *Determination of ferrite content in austenitic stainless steel castings*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
primary heat
master
mother heat
melt
quantity of metal processed in a single furnace or refining vessel at one time, in such a manner, as to produce the desired composition and properties

3.2
sub-heat
melt
production heat
daughter heat
portion of a primary heat remelted for pouring into castings

3.3
investment casting
lost wax casting
metal casting that is produced in a ceramic shell or mould using an expendable pattern

Note 1 to entry: The expendable pattern may consist of wax, plastics, or other material, and is removed prior to filling the mould with liquid metal.

4 Materials and manufacture

4.1 Melting process

Primary heats shall be made by the electric furnace process, with or without separate refining, such as argon-oxygen-decarburization (AOD), vacuum-oxygen-decarburization (VOD), vacuum-induction-melting (VIM), etc., unless otherwise specified in the individual specification or agreed upon between the purchaser and manufacturer. Primary heats may be used directly for producing castings or converted into ingot, bar, shot, or other suitable form, for later remelting as a sub-heat.

4.2 Remelting process

Sub-heats shall be produced from primary-heat metal in suitable batch sizes by an electric induction furnace, with or without atmosphere protection, such as vacuum or inert gas, unless otherwise specified in the individual specification or agreed upon between the purchaser and manufacturer. Revert (gates, sprues, risers, and rejected castings) shall not be remelted except in primary heats. Additions of up to 5 %, by mass, are permitted for compositional adjustments and deoxidation.

5 Inspection and testing

5.1 General requirements

The general requirements for inspection and testing shall be in accordance with ISO 4990, except as described in 5.2.

5.2 Sampling

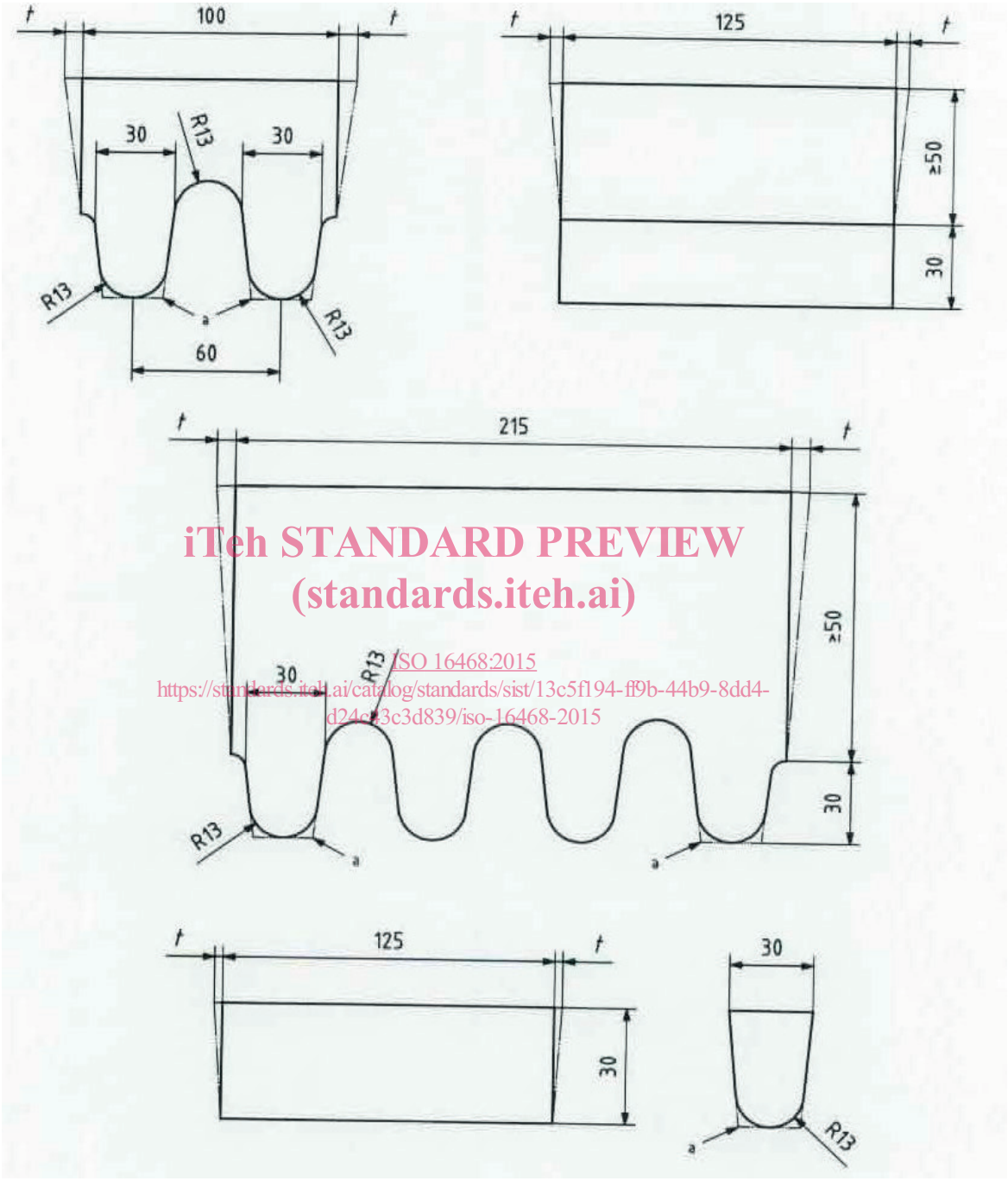
5.2.1 If castings are poured directly from one or more primary heats, then the samples for chemical and other required testing shall also be poured directly from each of the primary heats.

5.2.2 Unless otherwise specified by the purchaser, test blocks may be taken from castings, may be cast integrally with the castings, or may be cast in separate moulds of the same type and materials as those used for the castings. Samples for the determination of the chemical composition may be cast in other types of mould.

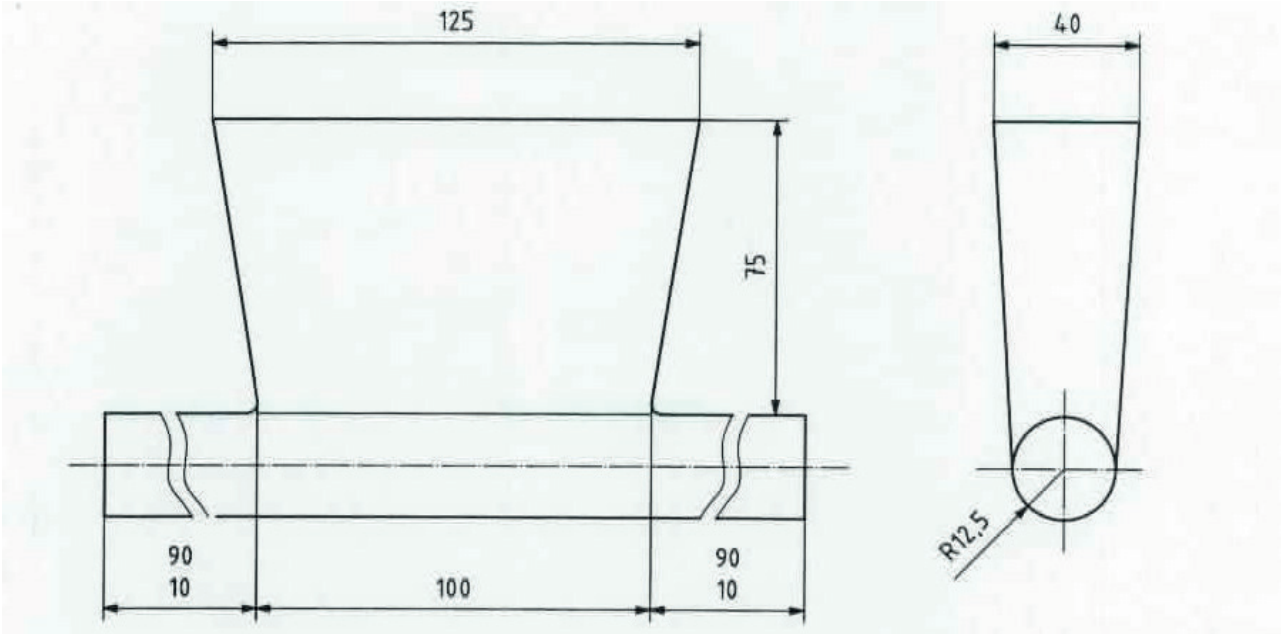
5.2.3 If castings are poured from a sub-heat, then the samples for chemical and other required tests shall also be poured from a sub-heat of the same primary melt, but not necessarily from the same sub-melt as the castings. The sub-melt used for the test samples shall be produced using the same practices and additions as used for the castings.

5.2.4 Examples of test blocks which may be used for mechanical testing are shown in Figure 1, except when 10.14 is specified. The test block in Figure 1 d) may be employed only for austenitic alloy castings with a ruling thickness less than 65 mm.

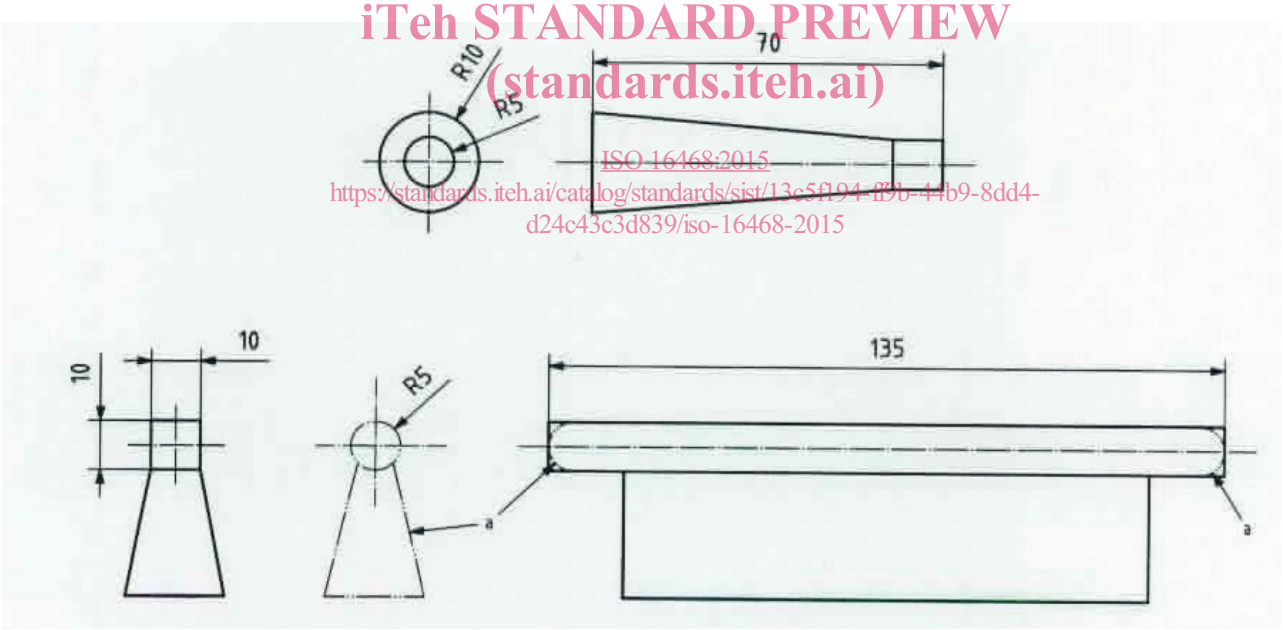
Dimensions in millimetres



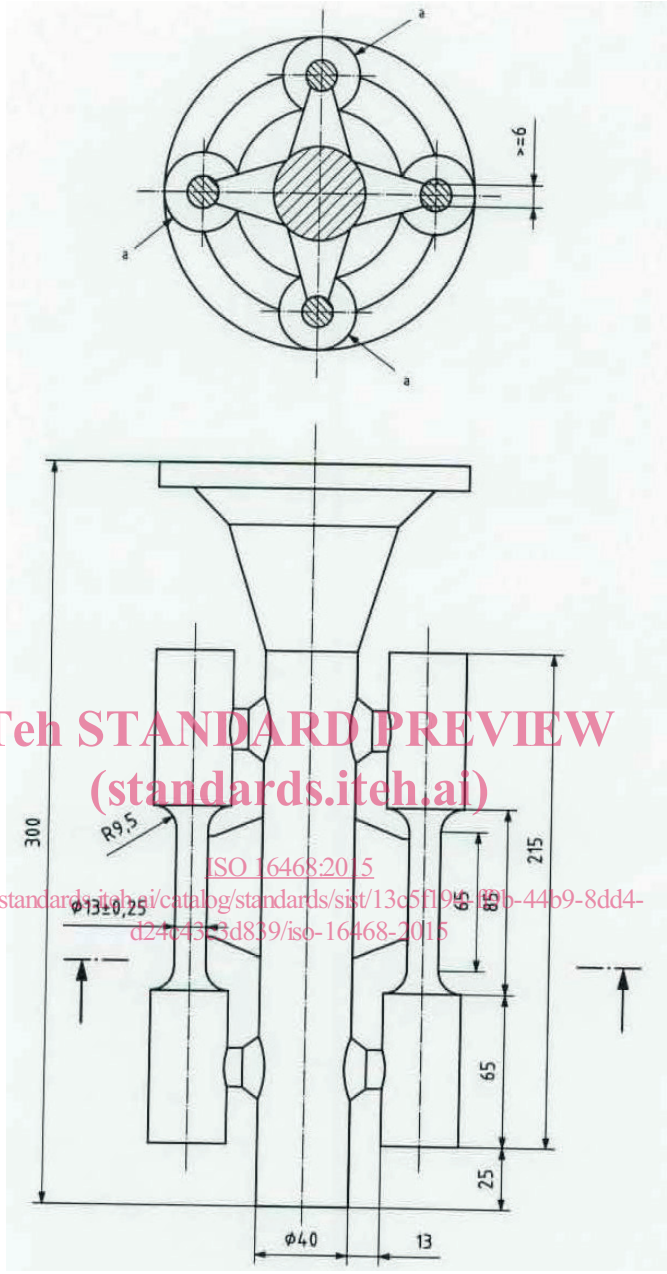
a)



b)



c)



d)