
Stainless steels — Chemical composition

Aciers inoxydables — Composition chimique



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 main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard (“state of the art”, for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until data they provide are considered to be no longer valid or useful.

ISO/TR 15510, which is a Technical Report of type 2, was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 4, *Heat treatable and alloy steels*.

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

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This document is being issued in the Technical Report (type 2) series of publications (according to subclause G.3.2.2 of part 1 of the ISO/IEC Directives, 1995) as a “prospective standard for provisional application” in the field of chemical composition of stainless steels because there is an urgent need for guidance on how standards in this field should be used to meet an identified need.

This document is not to be regarded as an “International Standard”. It is proposed for provisional application so that information and experience of its use in practice may be gathered. Comments on the content of this document should be sent to the ISO Central Secretariat.

Annexes A and B of this Technical Report are for information only.

Introduction

In 1991 ISO/TC 17/SC 4 considered it useful to prepare an International Standard for the chemical composition of stainless steels to which those ISO standards with technical delivery conditions for the various stainless steel products (wire, tubes, forgings etc.) and for the various applications (general, pressure purposes etc.) could refer. During the discussions on such a standard it became obvious that, in spite of the existing ISO standards with technical delivery conditions for stainless steels, the chemical compositions and also the mechanical properties specified in the frequently applied national and regional standards showed many technically unjustified or questionable differences. For the elimination of such differences intensive negotiations were initiated between experts on stainless steel of the following organizations:

- the American Society for Testing and Materials (ASTM)
- the European Committee for Iron and Steel Standardization (ECISS) and
- the Japanese Industrial Standards Committee (JISC)

On the basis of these negotiations ISO/TC 17/SC 4 agreed on the chemical compositions given in table 1 and its members promised to undertake all efforts for the implementation of these specifications in their national standards.

However

- only Japan and a minority of the ECISS members declared themselves prepared to take over the specifications given in table 1 in their standards and only when those compositions were approved for ISO Standards;
- a majority of the ECISS-members favoured, when discussing the corresponding European Standard (EN 10088-1), a number of more or less important deviations from the specifications given in table 1;
- ASTM concentrates its efforts on the preparation of a similar national standard but sees for the near future no possibility of implementing the specifications given in table 1 or making constructive proposals for their amendment.

In view of this ISO/TC 17/SC 4 regards it as impossible to bring its attempts for worldwide harmonization of stainless steel specifications to a satisfactory end in the near future. Nevertheless, the data compiled during these negotiations and the specifications proposed by the committee may be useful within work on national or regional standards or when, perhaps at a later date, within ISO, the international harmonization efforts are taken up again. Therefore, the relevant data and results are published in this ISO Technical Report.

Stainless steels — Chemical composition

1 Scope

This ISO Technical Report lists the chemical compositions of stainless steels agreed by ISO/TC 17/SC 4 mainly on the basis of a comparison of the specifications in existing ISO, ASTM, EN and JIS standards. They apply to all product forms including ingots and semi-finished material.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this Technical Report. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this Technical Report are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6929:1987, *Steel products — Definitions and classification*.

3 Definitions

For the purposes of this Technical Report the following definition, as well as those given in ISO 6929, applies.

3.1 Stainless steel

Steel with at least 10,5 % Cr and maximum 1,2 % C are considered as stainless steels if their resistance to corrosion is of primary importance.

NOTES

- 1 It is intended to also include in this Technical Report, at a later stage, creep resisting and heat resisting steel grades.
- 2 For the classification of stainless steels according to their structure, composition and application see annex A.

4 Chemical composition

The chemical composition of stainless steels approved by ISO TC 17/SC 4 is given in table 1.

NOTE — If, in special cases, for example an ISO committee charged with the establishment or revision of a standard for a specific product or application of stainless steels sees the necessity of deviating from the specifications in table 1 it should inform ISO/TC 17/SC 4 (Secretariat's address: DIN, Postfach 10 51 45, D-40042 Düsseldorf, Germany) of the reasons for this and try, before such deviations are considered, to achieve consensus for a corresponding modification to table 1.

5 Designations of comparable steels

In table 2 are given the designations of stainless steels which are listed in other international, regional or national standards or designation systems and are comparable to the grades in table 1.

NOTE — It is expected that the compositions specified in these other standards or designation systems will, in the near future, be aligned with those in table 1. (See Introduction.)