International Standard 4948/1

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Steels — Classification — Part 1 : Classification of steels into unalloyed and alloy steels based on chemical composition

Aciers — Classification — Partie 1 : Classification en aciers alliés et en aciers non alliés basée sur la composition chimique

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

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It has been approved by the member bodies of the following countries :

Australia	Iran	Poland
Austria	Iraq	Romania
Belgium	Italy	South Africa, Rep. of
Bulgaria	Japan	Spain
Canada	Korea, Dem. P. Rep. of	Sweden
China	Korea, Rep. of	Switzerland
France	Netherlands	Venezuela
Hungary	New Zealand	
India	Norway	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Czechoslovakia
United Kingdom
USA

Printed in Switzerland

Steels — Classification — Part 1 : Classification of steels into unalloyed and alloy steels based on chemical composition

1 Scope and field of application

This part of ISO 4948 lays down a classification of steels into unalloyed and alloy steels based on chemical composition.
Part 2 lays down the classification of unalloyed and alloy steels according to main quality classes and main property or application characteristics.

2 Definition

For the purpose of this International Standard, the following definition applies :

steel : A material with iron as the predominant element, having a carbon content generally less than 2,0 % and containing other elements. A limited number of chromium steels may have more than 2,0 % carbon, but 2,0 % is the usual dividing line between steel and cast iron.

3 Classification

3.1 Steels are classified as

a) unalloyed steels;

b) alloy steels.

3.1.1 From the different values given for the chemical composition of the steel, the following (3.1.1.1 to 3.1.1.4) shall be taken for classifying the steel as alloyed or unalloyed.

3.1.1.1 Where a minimum value or range is specified for the ladle analysis of the elements given in the table, the minimum value shall be taken for classification.

3.1.1.2 Where the manganese content of the ladle analysis is specified as a maximum value only, this maximum value shall be taken for classification.

3.1.1.3 Where for elements other than manganese a maximum value only is specified for the ladle analysis, a value of 0,7 times this maximum value shall be taken for classification.

3.1.1.4 Where there is no standard or specification or ordered composition, the ladle analysis reported by the manufacturer shall be taken for classification.

The results of product analysis may deviate from those of the ladle analysis to an extent permitted by the appropriate product standard. Where the product analysis indicates a value which would place the steel in a class other than that standard, then its inclusion in the class originally intended shall, if necessary, be separately and reliably substantiated.

3.1.2 Unalloyed steels are those in which for all elements listed in the table the percentage of each element taken in accordance with 3.1.1 is less than the boundary values given for the relevant element in the table.

Table — Unalloyed/alloy steel boundary
(See also 3.1.1.3.)

Constituent	Percentage
Aluminium	0,10
Boron	0,000 8
Bismuth	0,10
Chromium	0,30
Cobalt	0,10
Copper	0,40
Manganese	1,65*
Molybdenum	0,08
Nickel	0,30
Niobium	0,06
Lead	0,40
Selenium	0,10
Silicon	0,50
Tellurium	0,10
Titanium	0,05
Tungsten	0,10
Vanadium	0,10
Zirconium	0,05
Lanthanides (each)	0,05
Other specified elements (except S, P, C and N)	0,05

* If only a maximum is specified for the manganese content of the steel, the boundary shall be at 1,80 %.

NOTE — Limits specified in the table for the following elements shall not be considered for custom tariff purposes for demarcating unalloyed and alloy steels, unless otherwise agreed to.

a) bismuth;

b) lead;

c) selenium;

d) tellurium;

e) lanthanides and other specified elements (except S, P, C and N).

3.1.3 Alloy steels are those in which, for any element listed in the table, the percentage of the element taken in accordance with 3.1.1 is equal to or greater than the values given for the relevant element in the table.