TECHNICAL REPORT

ISO TR 7003

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Unified format for the designation of metals

Format unifié pour la désignation des métaux

Reference number
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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 main task of ISO technical committees is to prepare International Standards. In exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

— type 1, when the necessary support within the technical committee cannot be obtained for the publication of an International Standard, despite repeated efforts;

— type 2, when the subject is still under technical development requiring wider exposure;

— 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 are accepted for publication directly by ISO Council. 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 Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/TR 7003, which is a Technical Report of type 2, was prepared by Technical Advisory Group ISO/TAG 2, *Metals.*

Annex A forms an integral part of this Technical Report. Annex B is for information only.

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Historical background

At its meetings in February 1976 and 1977, PLACO (at present ISO Technical Board) considered the question of harmonization of designation numbering systems for materials, particularly metals and alloys, because several technical committees were about to use, or were considering the adoption of, different systems. The ISO Central Secretariat was instructed to initiate action in this matter.

The question of a unified numbering system was therefore discussed at a coordination meeting of secretariats of technical committees in the metals field. At this meeting, it was acknowledged that the development of a unified numbering system for all metals and their alloys would be of significant value and it was decided to submit the conclusions of the meeting together with a preliminary draft to all P-members of the technical committees dealing with metals.

A revised proposal taking into account the comments received was then prepared and considered at an ad hoc meeting to which all P-members of the "metals" TCs were invited. This meeting also discussed the question of the form in which the International Numbering System for Metals (INSM) should be published. After considering the pros and cons of publishing it as an ISO Guide or as an International Standard, the delegations (Australia, Austria, Canada, France, Germany F.R., India, Israel, Italy, UK and USA) unanimously decided that it should be published as an International Standard; this would ensure its proper implementation as well as facilitate its referencing into other International Standards or national standards. It was therefore agreed that the INSM proposal should be submitted as a draft proposal to all P-members of the "metals" TCs until it reached the Draft International Standard stage. The meeting also recommended that the secretariat functions for the submissions should be exercised by the Central Secretariat.

A first draft proposal (ISO/DP 7003) was then prepared and submitted to all P-members of the "metals" TCs. The five negative votes together with all the comments received were considered at a meeting of the secretaries of the "metals" TCs and a second draft proposal (ISO/DP 7003.2) was prepared on the basis of the decisions taken. A similar consultation and consideration of comments was conducted on ISO/DP 7003.2 which received six negative votes.

At the second ISO/TAG 2 meeting, the voting results on the third draft proposal (ISO/DP 7003.3) were considered. As four negative votes were registered, the interest in the proposed numbering system was reevaluated. Although some doubts were expressed with regard to its usefulness, due to the increasing performances of electronic data processing means, it was nevertheless decided to pursue the development of the INSM in the form of a type 2 Technical Report in order to allow the "metals" TCs to test its applicability in connection with their standards.

Finally, at the third ISO/TAG 2 meeting, it was recognized that the INSM, whilst there was no objection to its content, stood little chance of being applied by member bodies that already had their own system. It was therefore agreed to reorientate ISO/TR 7003 towards defining a unified presentation format for metals designation, with the INSM in an annex as an ISO proposal for an international numbering system.

Introduction

The draft Technical Report ISO/DTR 7003 "International Numbering System for Metals (INSM)" of June 1986 did not receive adequate support for further development, after taking into account several comments that, whilst there was no objection to the content of the draft, it would not be used in individual countries. Although the numbering scheme will not be widely adopted, it is clearly necessary to provide a numbering system to be used in countries and industries where none exists.

The present situation is that there is a multiplicity of designation systems for metals in individual countries. These designations usually work satisfactorily, but there is a need to produce a standard form of presentation for the different designations, to allow them to be understood internationally and to produce a means of identifying methods internationally.

Therefore, the purpose of this Technical Report is to present a unified format whereby current systems in use are endorsed, for example systems employed by ISO, AFNOR, BSI, DIN, etc., and the UNS system currently in use in North America.

Unified format for the designation of metals

1 Scope

This Technical Report describes a unified format for presenting the items of information required by the wide variety of designation systems of metals used within individual countries, within industries regionally or internationally and within existing ISO technical committees. The unified presentation format accommodates both numerical and alphanumerical systems.

Annex A sets out the proposed International Numbering System for Metals and annex B lists examples of other systems which can be accommodated.

2 Designation format

The international format for the presentation of numerical and alphanumerical designations is composed of three elements separated by oblique strokes.

Element 1 consists of a symbol for the organization responsible for the designation, e.g. AFNOR, ASTM, BSI, DIN, ISO, etc.

This element may be omitted where space is limited, for example, in drawings.

Element 2 consists of an identification of the standard in which the designation originates.

Element 3 consists of information that is specific in designating the metal or alloy.

EXAMPLES

	Element 1 / Element 2 / Element 3
Stainless steel with 18 % Cr, 9 % Ni	ASTM / A 479 / S 30400
Structural steel with minimum tensile strength of 490 N/mm²	ISO / ISO 630 / Fe 510 B
	BSI / BS 4360 / 50 B

3 Examples of the use of the format

3.1 Cast iron

ISO	/	ISO 1083	/	400-15
AFNOR	/	NF A 32-201	/	400-15
DIN	/	DIN 1693-1	/	GG-40
JISC	/	JIS G 5502	/	FCD 40
SIS	/	MNC 706 E	/	0717-00

3.2 Steel

ISO	/	ISO 683-13	/	11
AFNOR	/	NF A 35-573	/	Z 6 CN 18.09
ASTM	/	ASTM A 479	/	S 30400
BSI	/	BS 970:1	/	304 S 31
DIN	/	DIN 17440	/	X5CrNi1810 or 1.4301
JISC	/	JIS G 4303	/	SUS 304

3.3 Nickel

ISO	/	ISO 6207	/	Ni Cu30
ASTM	/	ASTM B 127	/	NO4400
BSI	/	BS 3072	/	NA 13
DIN	/	DIN 17743	/	Ni Cu30 Fe or 2.4360
JISC	/	JIS H 4553	/	NCuB

3.4 Lead

ASTM	/	ASTM B 29	/	High purity lead
BSI	/	BS 334	/	Type A
DIN	/	DIN 1719	/	Pb 99,99 or 2.3010
JISC	/	JIS H 2105	/	Special class

3.5 Aluminium

ISO	/	ISO 209-1	/	Al 99,5
AFNOR	/	NF A 50-451	/	1050 A
BSI	/	BS 1470	/	1050 A
DIN	/	DIN 1712	/	Al 99,5 or 3.0255
JISC	/	H 4000	/	A 1050
SIS	/	SIS 14 40 07	/	Aluminium 40 07 - xx
ÖNORM	/	M 3426	/	Al 99,5
IBN	/	NBN-P-21001	/	1050
SCC	/	HA-4M	/	9950
AENOR	/	UNE 38030	/	L-3051 or Al 99,5
UNI	/	UNI 4507	/	1050 A
SNV	/	SN 210900	/	Al 99,5
AA	/	—	/	1050 A

3.6 Copper

ISO	/	ISO 426-2	/	CuZn36Pb3
AFNOR	/	NF A 51-105	/	CuZn36Pb3
ASTM	/	ASTM B 16	/	C 36000
BSI	/	BS 2874	/	CZ124
DIN	/	DIN 17660	/	CuZn36Pb3 or 2.0375
JISC	/	JIS H 3250	/	C 3601
SIS	/	SIS 14 51 70	/	Mässing 51 70 - xx
GOST	/	GOST 15527	/	LS 63-3

3.7 Powder metals

ISO	/	ISO 5755-1	/	P2012Z

3.8 Zinc

ISO	/	ISO 301	/	Zn Al4 Cu1
AFNOR	/	NF A 55-102	/	Z—A4 U1 G
ASTM	/	ASTM B 86	/	AC 41 or Z 35531
BSI	/	BS 1004	/	alloy B
DIN	/	DIN 1743-2	/	GD — Zn Al4 Cu or 2.2141.05
JISC	/	JIS H 5301	/	ZDC 1
SIS	/	MNC 71E	/	7030

3.9 Ferroalloys

ISO	/	ISO 5445	/	FeSi75Al1
AFNOR	/	NF A 13-010	/	FeSi75Al1
ASTM	/	ASTM A 100	/	Grade C
DIN	/	DIN 17560	/	FeSi75-Al1 or 0.3376
JISC	/	JIS G 2302	/	F Si 2
GOST	/	GOST 1415	/	FS 75 V

3.10 Titanium

ASTM	/	ASTM B 265	/	Grade 5 or R 56400
BSI	/	BS 2 TA...	/	2 TA 10/11/12/13
DIN	/	DIN 17851	/	Ti Al6 V4 or 3.7165

Annex A
(normative)

International Numbering System for Metals (INSM)

This annex describes a system which has been developed to be applicable to all metals and to accommodate additional materials. For the time being, implementation of the system is limited to those metals and their alloys for which specific systems have been developed by existing ISO technical committees.

A.1 Scope

An International Numbering System for Metals (INSM) is described in which a unique number is allocated to a metal or alloy in order to categorize it. The INSM is applicable to

a) internationally standardized metals (see A.4.2);

b) regionally standardized metals (see A.4.3);

c) nationally standardized metals (see A.4.4).

The procedure for such allocation is specified together with the assignment of responsibility for the development, maintenance, operation and administration of the system.

NOTE — Although the scope of the system is limited to metals, it is structured so as to be capable of being extended in future to include other industrially produced materials, if and when so decided.

A.2 Field of application

The system is primarily intended for all metals recognized in International Standards as well as future additions to them. However it also permits, when desired and approved by the appropriate ISO technical committee, the inclusion of metals standardized in other international/regional organizations, and when specifically requested by an ISO member body, the inclusion of nationally standardized metals, provided that these have been considered by the appropriate ISO metal technical committee and found to be inappropriate for inclusion in an ISO standard.

The system is suitable for the identification of a metal and also for facilitated indexing and record keeping and for storage and retrieval by the use of automatic or manual data processing equipment. In addition, the system may be used for identifying equivalent metals.

This numbering system does not preclude the existence of descriptive designations when needed in ISO standards, in addition to the numbering.

A.3 Reference

Designation of internationally standardized items (IEC/ISO Directives Part 2, First edition, 1989, annex E).

A.4 Definitions

A.4.1 Metal

The term metal in this document covers the unalloyed metal as well as its alloys.

A.4.2 Internationally standardized metal

An internationally standardized metal is one which has been approved for inclusion in an International Standard by the appropriate ISO technical committee.

NOTE — This system should also be applicable in the IEC field after consultation on an ISO/IEC basis.

A.4.3 Regionally standardized metal

A regionally standardized metal is one which has been approved for inclusion in a regional standard by the appropriate regional standardization organization.

A.4.4 Nationally standardized metal

A nationally standardized metal is one which has been approved for inclusion in a national standard by the appropriate national standards body.

A.5 Details of the international numbering system for metals (INSM)

A.5.1 Individual metal numbers

The system shall provide only one number for each metal, as decided by the appropriate ISO technical committee (see A.5.3), and conversely a number assigned to an individual metal shall not be assigned to another even if the first mentioned metal has been withdrawn.

A.5.2 Structure of metal numbers

A.5.2.1 Total structure

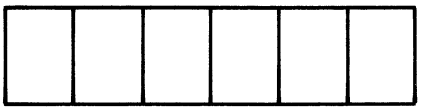
The metal number shall consist of six characters or positions.

A.5.2.2 Composition of metal numbers

The metal number shall be composed of alphabetic (Latin) (upper case) and numeric (Arabic) characters in order to take advantage of the larger capacity of such a system over a purely numerical system.

A.5.2.3 Positions of characters

The positions of characters are as follows:



A.5.2.3.1 Position 1 — Main group of metals

The first position shall contain an upper case letter of the alphabet to indicate the type of metal. However, the use of letters "I", "O" and "Q" shall be avoided (see IEC/ISO Directives — Part 2, E.6.2.2). The letter symbols as indicated below shall apply.

Letter	Meaning
A	Aluminium (ISO/TC 79)
B	Light metals, e.g. titanium, magnesium, except aluminium (ISO/TC 79)
C	Copper (ISO/TC 26)
D	
E	
F	Ferroalloys (ISO/TC 132)
G	Gold or other precious metals, e.g. silver, platinum
H	High melting point metals not covered elsewhere, e.g. tungsten, molybdenum
J	Cast iron and pig iron (ISO/TC 25)
K	
L	Low melting point metals not covered elsewhere, e.g. lead, tin
M	
N	Nickel (ISO/TC 155) and cobalt
P	Powder metallurgical materials (ISO/TC 119)
R	
S	Steel (ISO/TC 17)
T	Steel (ISO/TC 17)
U	
V	
W	
X	
Y	
Z	Zinc (ISO/TC 18) and cadmium

NOTE — The responsible ISO technical committee is indicated in parenthesis.

A.5.2.3.2 Positions 2 to 6

One of the last five positions shall be an alphabetic character. In some instances, two or more metals have been allocated a single alphabetic character. The system nevertheless allows each metal to be characterized by the introduction in the designation of a second alphabetic character in position 2 to 6 by decision of the technical committee.

It is the responsibility of the appropriate ISO technical committee to decide on its place and significance. The significance may be connected with some of the following examples:

i) qualification of the type or form of metal;

ii) specification of the production method, i.e. wrought or cast;

iii) classification of the alloys of the base metal;

iv) chemical, physical or mechanical property.

The characters for the four remaining positions should preferably all be numeric. It is the responsibility of the appropriate ISO technical committee to decide whether any significance is to be attributed to any of these characters and whether any further classification is required. Underutilization of a position in the numbering should be avoided as this can lead to a loss in capacity of the system.

Any significance attributed to any position shall be notified to the ISO Central Secretariat and to the relevant technical committee for coordination purposes.

A.5.2.3.3 Suffixes

Since a six position numbering system is expected to be adequate for the metals and alloys field, suffixes, if used, should be limited to meeting any additional localized or special requirements or applications.

A.5.3 Significance of metal numbers

The decision whether any of the positions in the metal number, other than the first, have any significance with regard to particular criteria associated with the metal (e.g. chemical, physical, mechanical etc.) shall be made by the appropriate ISO technical committee (see A.5.2.3.2).

A.5.4 Compatibility with IEC/ISO Directives — Part 2, annex E

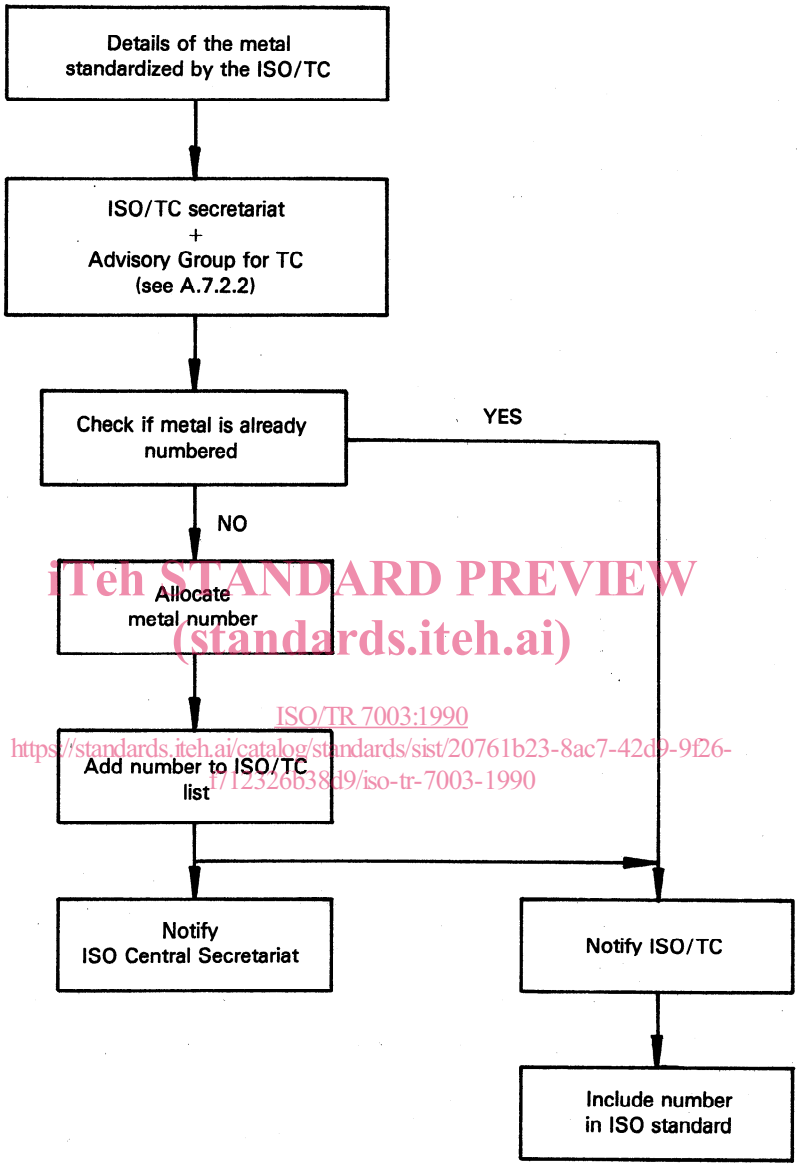
Metal numbers are compatible with the content of IEC/ISO Directives — Part 2, annex E in that they form the first six characters of the "individual item block", following a hyphen after the standard number block.

In order to avoid any confusion with other possible numbering systems, the INSM number shall always be preceded by the reference of the International Standard or regional or national standard.

A.6 Procedure

A.6.1 The procedure for allocation of a metal number based on a submission from within the ISO technical committee responsible for the metal concerned is indicated in Route 1.

A.6.2 The procedure for allocation of a metal number based on a submission from any other source is indicated in Route 2.



Route 1 — Submission from within the ISO technical committee responsible for the metal