
**Welding — Guidelines for a metallic
materials grouping system**

*Soudage — Lignes directrices pour un système de groupement des
matériaux métalliques*

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, 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), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this Technical Report may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 15608 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 44, *Welding and allied processes*, Subcommittee SC 10, *Unification of requirements in the field of metal welding*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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Foreword

The text of CR ISO 15608:2000 has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS, in collaboration with Technical Committee ISO/TC 44 "Welding and allied processes".

This CEN Report supersedes CR 12187:1995.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This technical report provides a uniform system for grouping of materials for welding purposes. It may also apply for other purposes as heat treatment, forming, non destructive testing, ...

This technical report covers grouping systems for the following standardized materials :

- steel ;
- aluminium and its alloys;
- nickel and its alloys;
- copper and its alloys;
- titanium and its alloys;
- zirconium and its alloys;
- cast irons.

This technical report is part of a series of standards. Annex A gives details of this series of standards.

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2 Grouping system for steels (standards.iteh.ai)

Steels are grouped as shown in Table 1. Only those elements that are specified in material standards or specifications shall be considered. The figures given in group 1 and 11 are referring to the ladle analysis of the materials. The figures given in groups 4 to 10 are based on the element content used in the designation of the alloys.

Table 1 — Grouping system for steels

Group	Sub-group	Type of steel
1		Steels with a specified minimum yield strength $R_{eH} \leq 460 \text{ N/mm}^2$ ^a and with analysis in % : C $\leq 0,25$ Si $\leq 0,60$ Mn $\leq 1,70$ Mo $\leq 0,70$ ^b S $\leq 0,045$ P $\leq 0,045$ Cu $\leq 0,40$ ^b Ni $\leq 0,5$ ^b Cr $\leq 0,3$ (0,4 for castings) ^b Nb $\leq 0,05$ V $\leq 0,12$ ^b Ti $\leq 0,05$
	1.1	Steels with a specified minimum specified yield strength $R_{eH} \leq 275 \text{ N/mm}^2$
	1.2	Steels with a specified minimum yield strength $275 \text{ N/mm}^2 < R_{eH} \leq 360 \text{ N/mm}^2$
	1.3	Normalized fine grain steels with a specified minimum yield strength $R_{eH} > 360 \text{ N/mm}^2$
	1.4	Steels with improved atmospheric corrosion resistance whose analysis may exceed the requirements for the single elements as indicated under 1
2		Thermomechanically treated fine grain steels and cast steels with a specified minimum yield strength $R_{eH} > 360 \text{ N/mm}^2$
	2.1	Thermomechanically treated fine grain steels and cast steels with a specified minimum yield strength $360 \text{ N/mm}^2 < R_{eH} \leq 460 \text{ N/mm}^2$
	2.2	Thermomechanically treated fine grain steels and cast steels with a specified minimum yield strength $R_{eH} > 460 \text{ N/mm}^2$
3		Quenched and tempered steels and precipitation hardened steels except stainless steels with a specified minimum yield strength $R_{eH} > 360 \text{ N/mm}^2$
	3.1	Quenched and tempered steels with a specified minimum yield strength $360 \text{ N/mm} < R_{eH} \leq 690 \text{ N/mm}^2$
	3.2	Quenched and tempered steels with a specified minimum yield strength $R_{eH} > 690 \text{ N/mm}^2$
	3.3	Precipitation hardened steels except stainless steels
4		Low vanadium alloyed Cr-Mo-(Ni) steels with Mo $\leq 0,7 \%$ and V $\leq 0,1 \%$
	4.1	Steels with Cr $\leq 0,3 \%$ and Ni $\leq 0,7 \%$
	4.2	Steels with Cr $\leq 0,7 \%$ and Ni $\leq 1,5 \%$

(to be continued)

Table 1 (end)

Group	Sub-group	Type of steel
5		Cr-Mo steels free of vanadium with $C \leq 0,35 \% ^c$
	5.1	Steels with $0,75 \% \leq Cr \leq 1,5 \%$ and $Mo \leq 0,7 \%$
	5.2	Steels with $1,5 \% < Cr \leq 3,5 \%$ and $0,7 \% < Mo \leq 1,2 \%$
	5.3	Steels with $3,5 \% < Cr \leq 7,0 \%$ and $0,4 \% < Mo \leq 0,7 \%$
	5.4	Steels with $7,0 \% < Cr \leq 10,0 \%$ and $0,7 \% < Mo \leq 1,2 \%$
6		High vanadium alloyed Cr-Mo-(Ni) steels
	6.1	Steels with $0,3 \% \leq Cr \leq 0,75 \%$, $Mo \leq 0,7 \%$ and $V \leq 0,35 \%$
	6.2	Steels with $0,75 \% < Cr \leq 3,5 \%$, $0,7 \% < Mo \leq 1,2 \%$ and $V \leq 0,35 \%$
	6.3	Steels with $3,5 \% < Cr \leq 7,0 \%$, $Mo \leq 0,7 \%$ and $0,45 \% \leq V \leq 0,55 \%$
	6.4	Steels with $7,0 \% < Cr \leq 12,5 \%$, $0,7 \% < Mo \leq 1,2 \%$ and $V \leq 0,35 \%$
7		Ferritic, martensitic or precipitation hardened stainless steels with $C \leq 0,35 \%$ and $10,5 \% \leq Cr \leq 30 \%$
	7.1	Ferritic stainless steels
	7.2	Martensitic stainless steels
	7.3	Precipitation hardened stainless steels
8		Austenitic stainless steels
	8.1	Austenitic stainless steels with $Cr \leq 19 \%$
	8.2	Austenitic stainless steels with $Cr > 19 \%$
	8.3	Manganese austenitic stainless steels with $4,0 \% < Mn \leq 12,0 \%$
9		Nickel alloy steels with $Ni \leq 10,0 \%$
	9.1	Nickel alloy steels with $Ni \leq 3,0 \%$
	9.2	Nickel alloy steels with $3,0 \% < Ni \leq 8,0 \%$
	9.3	Nickel alloy steels with $8,0 \% < Ni \leq 10,0 \%$
10		Austenitic ferritic stainless steels (duplex)
	10.1	Austenitic ferritic stainless steels with $Cr \leq 24,0 \%$
	10.2	Austenitic ferritic stainless steels with $Cr > 24,0 \%$
11		Steels covered by group 1 ^d except $0,25 \% < C \leq 0,5 \%$
	11.1	Steels as indicated under 11 with $0,25 \% < C \leq 0,35 \%$
	11.2	Steels as indicated under 11 with $0,35 \% < C \leq 0,5 \%$
^a	In accordance with the specification of the steel product standards, R_{eH} may be replaced by $R_{p0,2}$ or $R_{t0,5}$.	
^b	A higher value is accepted provided that $Cr + Mo + Ni + Cu + V \leq 0,75 \%$.	
^c	"Free of vanadium" means not deliberately added to the material.	
^d	A higher value is accepted provided that $Cr + Mo + Ni + Cu + V \leq 1 \%$.	