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**Structural steels —**  
**Part 2:**  
**Technical delivery conditions for**  
**structural steels for general purposes**

*Aciers de construction —*

*Partie 2: Conditions techniques de livraison pour aciers de  
construction métallique d'usage général*  
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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 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](http://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](http://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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html). (standards.itech.ai)

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This third edition cancels and replaces the second edition (ISO 630-2:2011), which has been technically revised. The main changes compared to the previous edition are as follows:

- applicable thickness ranges have been added in the Scope;
- additional terms and definitions concerning heat treatments have been deleted because ISO 4885 is in normative references of ISO 630-1;
- list of options has been integrated in ISO 630-1;
- test units have been updated;
- in Tables, the designation concerning thickness have been changed into “nominal thickness”;
- bibliography has been updated;
- the content of the document has been updated to harmonize with all parts of ISO 630.

A list of all parts in the ISO 630 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Structural steels —

## Part 2:

## Technical delivery conditions for structural steels for general purposes

### 1 Scope

This document specifies qualities for steels for general structural use. This document applies to steel plates rolled on a reversing mill, wide flats, hot-rolled sections and bars, which are used in the as-delivered condition and normally intended for welded or bolted structures.

This document covers 8 steel grades and 4 qualities. Grades S235, S275, S355, and S460 are covered in [Annex A](#). Grades SG205, SG250, SG285 and SG345 are covered in [Annex B](#). Not all grades are available in all qualities, and some qualities have Charpy V-notch requirements.

The steels specified in this document are applicable to hot-rolled flat products and sections with:

- thicknesses  $\geq 3$  mm and  $\leq 150$  mm for long products of steel grade S460 all qualities;
- thicknesses  $\geq 3$  mm and  $\leq 250$  mm for long products or  $\leq 400$  mm for flat products of all other grades and qualities;

and no restriction on nominal thickness for grades SG205, SG250, SG285, and SG345 for flat products, sections and long products.

This document does not include the following structural steels, some of which are covered by other International Standards:

- sheet and strip: refer to ISO TC 17/SC 12 “Continuous mill flat rolled products”;
- tubular products: refer to ISO TC 5/SC 1 “Steel tubes”.

NOTE 1 Lists of standards covered by ISO/TC 17/SC 12 and ISO/TC 5/SC 1 are available on the ISO website.

NOTE 2 In all parts of ISO 630, the term of “thickness” is considered as “nominal thickness”, unless otherwise stated.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 630-1, *Structural steels — Part 1: General technical delivery conditions for hot-rolled products*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 630-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

## 4 Classification and designation

### 4.1 Classification

The steel grades specified in this document shall be classified as unalloyed or alloy steels.

### 4.2 Designation (grades and qualities)

This document specifies 8 steel grades. Grades S235, S275, S355, and S460 are covered in [Annex A](#). Grades SG205, SG250, SG285, and SG345 are covered in [Annex B](#). Each grade is available in up to 4 qualities. These grades and qualities differ in their specified mechanical properties and impact energy requirements.

- Quality A: no impact testing.
- Quality B: impact testing at 20 °C.
- Quality C: impact testing at 0 °C.
- Quality D: impact testing at –20 °C.

### 4.3 Normative Annexes

The requirements of [Annex A](#) or [Annex B](#) are to be regarded separately. Each is independent of the other without combining in any way.

## 5 Information to be supplied by the purchaser

### 5.1 Mandatory information

The information that shall be supplied by the purchaser at the time of the order is specified in ISO 630-1.

### 5.2 Options

The options of ISO 630-1 may apply. If the purchaser does not specify any of these options at the time of enquiry and order, the products shall be supplied in accordance with the basic specification (see [5.1](#)).

## 6 Requirements

### 6.1 Steelmaking process

See ISO 630-1.

If a special steelmaking process has been specified, this shall be reported in the inspection document.

The steels shall be killed (non-rimming).

### 6.2 Delivery condition

At the manufacturer's discretion, the products covered by this document shall be delivered in the as-rolled condition, normalized rolled, normalized or thermomechanical processed condition. The delivery condition shall be indicated in the inspection document.

### 6.3 Chemical composition

#### 6.3.1 Heat analysis

The chemical composition determined by heat analysis shall comply with the values specified in [Table A.1](#) or [Table B.1](#).

#### 6.3.2 Product analysis

The product analysis of grades S235, S275, S355 and S460 shall comply with the values given in [Table A.2](#).

The permitted deviations on analysis of grades SG205, SG250, SG285 and SG345, relative to the values for heat analysis, are given in [Table B.2](#).

#### 6.3.3 Carbon equivalent value

The maximum carbon equivalent value (CEV) requirements for [Annex A](#) grades are given in [Table A.3](#).  
See ISO 630-1 for the formula.

### 6.4 Mechanical properties

#### 6.4.1 Tensile properties

The tensile properties at room temperature shall comply with the values specified in [Tables A.4](#) and [A.5](#) or [Table B.3](#).

#### 6.4.2 Charpy V-notch impact properties

The impact properties of Charpy V-notch test pieces shall conform with the values specified in [Table A.6](#) or [Table B.4](#). The orientation of the specimens shall be longitudinal unless transverse orientation is agreed between purchaser and manufacturer (see [5.2](#) and ISO 630-1).

### 6.5 Surface condition

See ISO 630-1.

### 6.6 Internal soundness

See ISO 630-1.

### 6.7 Dimensions, tolerances on dimensions and shape, mass

See ISO 630-1.

## 7 Inspection

Type of inspection documents (specific or non-specific) shall be specified. Refer to ISO 630-1.

## 8 Sampling - Frequency of testing

### 8.1 Verification

The verification of mechanical properties shall be by heat.

## 8.2 Test units

### 8.2.1 [Annex A](#)

The test unit shall contain products of the same form, grade, quality, delivery condition and thickness range as specified in [Table A.4](#) for the yield strength, and shall be by heat and:

- 60 tonnes or part thereof;
- 80 tonnes or part thereof for heavy sections with a mass > 200 kg/m;
- 80 tonnes or part thereof for all sections if the mass of the heat exceeds 200 tonnes.

By agreement at the time of ordering, two tests by heat may be used.

### 8.2.2 [Annex B](#)

The test unit shall contain products of the same form, grade, quality, delivery condition and thickness range as specified in [Table B.3](#) for the yield strength and shall be by heat and 50 tonnes or part thereof. By agreement at time of ordering, two tests by heat may be used.

## 9 Test methods

See ISO 630-1.

## 10 Marking

See ISO 630-1.

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## Annex A

### (normative)

## Steel grades S235, S275, S355 and S460: Chemical composition and mechanical properties

**Table A.1 — Chemical composition % by mass (heat analysis)<sup>a</sup>**

Designation		Method of deoxidation <sup>b</sup>	C in % max. for nominal product thickness in mm			Si	Mn	P	S	N	Cu	Other
			≤ 16	> 16 ≤ 40	> 40 <sup>c</sup>	% max.	% max.	% max. <sup>d</sup>	% max. <sup>d, e</sup>	% max. <sup>f</sup>	% max. <sup>g</sup>	% max. <sup>h</sup>
S235	B	FN	0,17	0,17	0,20	—	1,40	0,035	0,035	0,012	0,55	—
	C	FN	0,17	0,17	0,17	—	1,40	0,030	0,030	0,012	0,55	—
	D	FF	0,17	0,17	0,17	—	1,40	0,025	0,025	—	0,55	—
S275	B	FN	0,21	0,21	0,22	—	1,50	0,035	0,035	0,012	0,55	—
	C	FN	0,18	0,18	0,18 <sup>i</sup>	—	1,50	0,030	0,030	0,012	0,55	—
	D	FF	0,18	0,18	0,18 <sup>i</sup>	—	1,50	0,025	0,025	—	0,55	—
S355	B	FN	0,24	0,24	0,24	0,55	1,60	0,035	0,035	0,012	0,55	—
	C	FN	0,20	0,20 <sup>j</sup>	0,22	0,55	1,60	0,030	0,030	0,012	0,55	—
	D	FF	0,20	0,20 <sup>j</sup>	0,22	0,55	1,60	0,025	0,025	—	0,55	—
S460 <sup>k</sup>	B, C, D	FF	0,20	0,20	0,22	0,55	1,70	0,030	0,030	0,025	0,55	<sup>l</sup>
<p><sup>a</sup> See 6.3.1.</p> <p><sup>b</sup> FN = rimming steels not permitted; FF = fully killed steel.</p> <p><sup>c</sup> For sections with nominal thickness &gt; 100 mm, the C content is by agreement.</p> <p><sup>d</sup> For long products, the P and S content may be 0,005 % higher.</p> <p><sup>e</sup> For long products, the max. S content may be increased for improved machinability by 0,015 % by agreement if the steel is treated to modify the sulfide morphology, and if the chemical composition shows min. 0,002 0 % Ca.</p> <p><sup>f</sup> The maximum value for nitrogen does not apply if the chemical composition shows a minimum total Al content of 0,020 % or, alternatively, minimum 0,015 % acid-soluble Al or if sufficient other N-binding elements are present. In this case, the N-binding elements shall be mentioned in the inspection document.</p> <p><sup>g</sup> Cu content above 0,40 % can cause hot shortness during hot forming.</p> <p><sup>h</sup> If other elements are added, they shall be mentioned on the inspection document.</p> <p><sup>i</sup> For nominal thickness &gt; 150 mm: C = 0,20 % max.</p> <p><sup>j</sup> For nominal thickness &gt; 30 mm: C = 0,22 % max.</p> <p><sup>k</sup> Applicable for long products only.</p> <p><sup>l</sup> The steel may show an Nb content of max. 0,05 %, a V content of max. 0,13 % and a Ti content of max. 0,05 %.</p>												

Table A.2 — Chemical composition % by mass (product analysis)<sup>a</sup> based on Table A.1

Designation		Method of deoxidation <sup>b</sup>	C in % max. for nominal product thickness in mm			Si	Mn	P	S	N	Cu	Other
Grade	Quality		≤ 16	> 16 ≤ 40	> 40 <sup>c</sup>	% max.	% max.	% max. <sup>d</sup>	% max. <sup>d,e</sup>	% max. <sup>f</sup>	% max. <sup>g</sup>	% max. <sup>h</sup>
S235	B	FN	0,19	0,19	0,23	—	1,50	0,045	0,045	0,014	0,60	—
	C	FN	0,19	0,19	0,19	—	1,50	0,040	0,040	0,014	0,60	—
	D	FF	0,19	0,19	0,19	—	1,50	0,035	0,035	—	0,60	—
S275	B	FN	0,24	0,24	0,25	—	1,60	0,045	0,045	0,014	0,60	—
	C	FN	0,21	0,21	0,21 <sup>i</sup>	—	1,60	0,040	0,040	0,014	0,60	—
	D	FF	0,21	0,21	0,21 <sup>i</sup>	—	1,60	0,035	0,035	—	0,60	—
S355	B	FN	0,27	0,27	0,27	0,60	1,70	0,045	0,045	0,014	0,60	—
	C	FN	0,23	0,23 <sup>j</sup>	0,24	0,60	1,70	0,040	0,040	0,014	0,60	—
	D	FF	0,23	0,23 <sup>j</sup>	0,24	0,60	1,70	0,035	0,035	—	0,60	—
S460 <sup>k</sup>	B, C, D	FF	0,23	0,23 <sup>j</sup>	0,24	0,60	1,80	0,040	0,040	0,027	0,60	<sup>l</sup>

<sup>a</sup> See 6.3.2.

<sup>b</sup> FN = rimming steels not permitted; FF = fully killed steel.

<sup>c</sup> For sections with nominal thickness > 100 mm, the C content by agreement.

<sup>d</sup> For sections and bars, the P and S content may be 0,005 % higher.

<sup>e</sup> For sections and bars, the max. S content may be increased for improved machinability by 0,015 % by agreement, if the steel is treated to modify the sulfide morphology and the chemical composition shows min. 0,002 0 % Ca.

<sup>f</sup> The max. value for nitrogen does not apply if the chemical composition shows a minimum total Al content of 0,015 % or alternatively min. 0,013 % acid-soluble Al or if sufficient other N-binding elements are present. In this case, the N-binding elements shall be mentioned in the inspection document. <https://standards.iteh.ai/catalog/standards/sist/994d71a4-f247-4480-8510-1a55dbc5eda2/iso-630-2-2021>

<sup>g</sup> Cu content above 0,45 % can cause hot shortness during hot forming.

<sup>h</sup> If other elements are added, they shall be mentioned on the inspection document.

<sup>i</sup> For nominal thickness > 150 mm: C = 0,22 % max.

<sup>j</sup> For nominal thickness > 30 mm: C = 0,24 % max.

<sup>k</sup> Applicable for sections and bars only.

<sup>l</sup> The steel may show a Nb content of max. 0,06 %, a V content of max. 0,15 % and a Ti content of max. 0,06 %.

Table A.3 — Maximum CEV based on the heat analysis<sup>a</sup>

Designation		Method of deoxidation <sup>b</sup>	Maximum CEV in % for nominal product thickness in mm				
Grade	Quality		≤ 30	> 30 to ≤ 40	> 40 to ≤ 150	> 150 to ≤ 250	> 250 to ≤ 400
S235	B, C	FN	0,35	0,35	0,38	0,40	0,40
	D	FF					
S275	B, C	FN	0,40	0,40	0,42	0,44	0,44
	D	FF					
S355	B, C	FN	0,45	0,47	0,47	0,49 <sup>c</sup>	0,49
	D	FF					
S460 <sup>d</sup>	B, C, D	FF	0,47	0,49	0,49	—	—

<sup>a</sup> For the optional increase of elements which influence the CEV, the following applies:

1 For all S235, S275, and S355 qualities, the following additional chemical requirement may be agreed at the time of the order: Copper content between 0,25 % and 0,40 % on heat analysis and between 0,20 % and 0,45 % on product analysis. In this case, the maximum carbon-equivalent value of this table shall be increased by 0,02 %.

2 When products of grades S275 and S355 are supplied with a control on Si (e.g. for hot-dip zinc coating) so that there could be a need to increase the content of other elements, such as C and Mn, to achieve the required tensile properties, the maximum carbon equivalent value of this table shall be increased as follows:

— for Si ≤ 0,030 %, increase CEV by 0,02 %;

— for Si ≤ 0,25 %, increase CEV by 0,01 %.

<sup>b</sup> FN = rimming steels not permitted; FF = fully killed steel.

<sup>c</sup> For long products, a maximum CEV of 0,54 applies.

<sup>d</sup> Applicable for long products only.

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