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Structural steels —

Part 3:
Technical delivery conditions for fine-grain structural steels

Aciers de construction —

Partie 3: Conditions techniques de livraison pour aciers de construction à grains fins

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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).

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).

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.

This document was prepared by Technical Committee ISO/TC 17, Steel, Subcommittee SC 3, Steel for structural purposes.

This second edition cancels and replaces the first edition (ISO 630-3:2012), which has been technically revised.

The main changes compared to the previous edition are as follows:

— grades S390N, S390M, S500M and pertaining requirements have been added;

— 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;

— quality E has been renamed L (impact testing at -50°C) to keep quality E for impact testing at -40°C in all parts;

— quality E (impact testing at -40 °C) has been added

— quality F (impact testing at -60 °C) has been added to S355N and S355M;

— list of options has been integrated in ISO 630-1;

— the formula for CEV has been deleted because given in ISO 630-1;

— test units have been updated;

— in Tables, the designation concerning thickness have been changed into “nominal thickness”;

— order of listing chemical elements has been updated for grades of Annex A in accordance with ISO 6306;

— 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.

Structural steels —

Part 3:
Technical delivery conditions for fine-grain structural steels

1 Scope

This document specifies requirements for flat and long products of hot-rolled weldable fine-grain structural steels in the as-rolled (for SG grades only), normalized/normalized rolled and thermomechanical processed delivery conditions. It applies to steel plates rolled on a reversing mill, wide flats, hot-rolled sections and bars, which are intended for use in heavily loaded parts of welded or bolted structures.

This document covers 13 grades and 6 qualities. Grades S275, S355, S390, S420, S460 and S500 are covered in Annex A. Grades SG245, SG290, SG325, SG345, SG365, SG415 and SG460 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 plates, wide flats, sections and bars with a minimum nominal thickness of 3 mm and a maximum nominal thickness of 250 mm for grades S275N, S355N, S390N, S420N and S460N, a maximum nominal thickness of 150 mm for grades S275M, S355M, S390M, S420M, S460M, and S500M, a maximum nominal thickness of 200 mm for grades SG245, SG325 and SG415, a maximum nominal thickness of 100 mm for grades SG345, SG365 and SG460, and a maximum nominal thickness of 40 mm for grades SG290.

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 Web site.

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*

ISO 643, *Steels — Micrographic determination of the apparent grain size*

3 Terms and definitions

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

3.1
fine-grain steel
steel with fine-grain structure with an equivalent index of grain size ≥6 determined in accordance with ISO 643

Note 1 to entry: See 6.1.

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 13 steel grades. Grades S275, S355, S390, S420, S460 and S500 are covered in Annex A. Grades SG245, SG290, SG325, SG345, SG365, SG415 and SG460 are covered in Annex B.

Each grade is available in up to 6 qualities. These grades and qualities differ in their specified mechanical properties and impact energy requirements. All S grades require impact testing. SG grades require impact testing upon agreement at the time of ordering:

— Quality A: no impact testing;

— Quality C: impact testing at 0 °C;

— Quality D: impact testing at -20 °C;

— Quality E: impact testing at -40 °C;

— Quality L: impact testing at -50 °C;

— Quality F: impact testing at -60 °C.

4.3 Normative annexes

The requirements of Annex A or Annex B are to be regarded separately. Each annex 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 indicate a wish to implement any of these options at the time of the 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 contain sufficient amount of nitrogen-binding elements and have a fine-grain structure.

The steels specified in this specification shall be fully killed.

6.2 Delivery condition

The products covered by this document are delivered in the as-rolled (for SG grades only), normalized rolled, normalized (including normalized + tempered) or thermomechanical processed (including thermomechanical processed + tempered) 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 given in Table A.1 or Table A.2 or Table B.1.

6.3.2 Product analysis

The product analysis of grades S275, S355, S390, S420, S460 and S500 shall comply with the values given in Table A.3 or Table A.4.

The permitted deviations on analysis of grades SG245, SG290, SG325, SG345, SG365, SG415 and SG460, 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 Tables A.5 or Table A.6, and for Annex B grades in Table B.3.

6.4 Mechanical properties

6.4.1 Tensile properties

The tensile properties at room temperature shall comply with the values specified in Table A.7 or Table A.8 or Table B.4.

6.4.2 Charpy V-notch impact properties

The impact properties of Charpy V-notch test pieces shall comply with the values specified in Table A.9 or Table A.10 or Table A.11 or Table A.12 or Table B.5. The orientation of the specimens shall be longitudinal unless a transverse orientation is agreed between the purchaser and manufacturer (see 5.2 , ISO 630-1 and the values in Table A.10).

6.5 Surface condition

See ISO 630-1.