

Hot finished structural hollow sections of non-alloy and fine grain structural steels —

Part 1: Technical delivery requirements

The European Standard EN 10210-1:1994 has the status of a British Standard

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National foreword

This British Standard has been prepared under the direction of the Iron and Steel Standards Policy Committee and is the English language version of EN 10210-1:1994 *Hot finished structural hollow sections of non-alloy and fine grain structural steels — Part 1: Technical delivery requirements*, published by the European Committee for Standardization (CEN).

Along with BS EN 10113-1 to BS EN 10113-3, BS EN 10155, BS 7613 and BS 7668 this British Standard supersedes BS 4360:1990 which is withdrawn.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 22, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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Descriptors: Metal sections, hollow profiles, hot rolled products, structural steels, unalloyed steels, classifications, designation, delivery condition, chemical composition, mechanical properties, mechanical tests, marking

English version

Hot finished structural hollow sections of non-alloy and fine grain structural steels — Part 1: Technical delivery requirements

Profils creux pour la construction finis à chaud en aciers de construction non alliés et à grains fins — Partie 1: Conditions techniques de livraison

Warmgefertigte Hohlprofile für den Stahlbau aus unlegierten Baustählen und aus Feinkornbaustählen — Teil 1: Technische Lieferbedingungen

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

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Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard has been prepared by the Technical Committee ECIS/TC 10, Structural steels — Qualities, the secretariat of which is held by NNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 1994, and conflicting national standards shall be withdrawn at the latest by September 1994.

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

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1 Scope

1.1 This Part of this European Standard specifies the technical delivery requirements for hot finished hollow sections of circular, square or rectangular form and applies to hollow sections formed hot with or without subsequent heat treatment or formed cold with subsequent heat treatment to obtain equivalent metallurgical conditions to those obtained in the hot formed product. Fine grain steels are generally delivered in the normalized condition.

The specified requirements apply to non-alloy base steel, non-alloy quality steel, fine grain non-alloy quality steel and fine grain alloy special steels as defined in European Standard EN 10020.

The grades, chemical composition and mechanical properties for the non-alloy base and quality steels are given in Annex A.

The grades, chemical composition and mechanical properties for the fine grain non-alloy quality and alloy special steels are given in Annex B.

The products specified in this Part of this European Standard are intended for use in construction.

Requirements for tolerances, dimensions and sectional properties are contained in Part 2 of this standard (EN 10210-2).

NOTE A range of material grades is specified in this standard and the user should select the grade appropriate to the intended use and service conditions. The grades and mechanical properties are compatible with those in EN 10025 and EN 10113.

This European Standard does not apply to products covered by the following European Standards:

EN 10025, *Hot rolled products of non-alloy structural steels — Technical delivery conditions.*

EN 10113, *Hot rolled products in weldable fine grain structural steels.*

EN 10155, *Structural steels with improved atmospheric corrosion resistance.*

prEN 10219, *Cold formed welded structural hollow sections of non-alloy and fine grain steels.*

prEN 10225, *Weldable structural steels for fixed offshore structures.*

2 Normative references

This Part of this European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Part of this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

2.1 General standards

EN 10020, *Definition and classification of grades of steel.*

EN 10021, *General technical delivery requirements for steel and iron products.*

EN 10027, *Designation systems for steel — Part 1: Steel names, principal symbols — Part 2: Steel numbers.*

EN 10079, *Definition of steel products.*

EN 10204, *Metallic products — Types of inspection documents.*

prEN 10052, *Vocabulary of heat treatment terms for ferrous products.*

EURONORM 168, *Iron and steel products — Inspection documents — Contents¹⁾.*

Information Circular No. 2, *Weldable fine-grained structural steels — Recommendations for processing, in particular for welding.*

Information Circular No. 10, *Designation system for steel: additional symbols for steel names.*

EN 287-1, *Approval testing of welders — Fusion welding — Part 1: Steels.*

EN 288, *Specification and approval of welding procedures for metallic materials — Part 1: General rules for fusion welding — Part 2: Welding procedure specification for arc welding — Part 3: Welding procedure tests for arc welding of steels.*

EN 29002, *Quality systems: Model for quality assurance in protection and installation.*

2.2 Standards for dimensions and tolerances

prEN 10210-2, *Hot finished structural hollow sections of non-alloy and fine grain steels — Part 2: Tolerances, dimensions and sectional properties.*

¹⁾ Until these EURONORMs are transformed into European Standards, they can either be implemented or reference made to the corresponding national standards, the list of which is given in Annex D to this Part of this European Standard.

2.3 Standards for testing

EN 10002-1, *Metallic materials — Tensile testing — Part 1: Method of test (at ambient temperature)*.

EN 10045-1, *Metallic materials — Charpy impact test — Part 1: Test method*.

EURONORM 18, *Selection and preparation of samples and test pieces for steel and iron products*²⁾.

EURONORM 103, *Micrographical determination of ferritic or austenitic grain size of steel*²⁾.

prEN 10246-3, *Non-destructive testing of steel tubes — Part 3: Seamless and welded (except submerged arc-welded) steel tubes — Automatic eddy current testing for the detection of imperfections*.

prEN 10246-5, *Non-destructive testing of steel tubes — Part 5: Seamless and welded (except submerged arc-welded) ferromagnetic steel tubes — Automatic full peripheral magnetic transducer/flux leakage testing for the detection of longitudinal imperfections*.

prEN 10246-8, *Non-destructive testing of steel tubes — Part 8: Electric resistance and induction welded steel tubes — Automatic ultrasonic testing of the weld seam for the detection of longitudinal imperfections*.

prEN 10246-9, *Non-destructive testing of steel tubes — Part 9: Submerged arc-welded steel tubes — Automatic ultrasonic testing of the weld seam for the detection of longitudinal and/or transverse imperfections*.

ISO 2566-1, *Steel — Conversion of elongation values — Part 1: Carbon and low alloy steels*.

3 Definitions

For the purposes of this European Standard, the following definitions apply:

- non-alloy base steel, non-alloy quality steel and alloy special steel: as defined in EN 10020;
- inspection and testing: as defined in EN 10021;
- heat treatment terms: as defined in prEN 10052;
- hollow section: as defined in EN 10079;
- inspection documents: as defined in EN 10204 and their contents as defined in EURONORM 168²⁾;

— normalizing rolling

A rolling process in which the final deformation is carried out in a certain temperature range leading to a material condition equivalent to that obtained after normalizing so that the specified values of the mechanical properties are retained even after normalizing.

— supplier

The manufacturer for material supplied ex-mill, the merchant for material supplied from a merchant's stock;

4 Classification and designation

4.1 Classification

4.1.1 Within the strength grades of the non-alloy steels given in Annex A, three qualities JR, J0, and J2 are specified. These differ in respect of specified impact requirements, method of deoxidation, limits on values of various elements with particular reference to sulfur and phosphorus and the inspection and testing requirements.

In accordance with the classification system in EN 10020 steel grade S235 is a non-alloy base steel. All other steel grades in Annex A are non-alloy quality steels.

4.1.2 Within the strength grades of the fine grain steels given in Annex B, two qualities N and NL are specified. These differ in respect of the carbon, sulfur and phosphorus content, and low temperature impact properties.

In accordance with the classification system in EN 10020 steel grades S275 and S355 are non-alloy quality steels and steel grade S460 is an alloy special steel.

4.2 Designations

4.2.1 For the products covered by this European Standard the steel names are allocated in accordance with EN 10027-1 and ECIS IC 10; the steel numbers are allocated in accordance with EN 10027-2.

NOTE For a list of corresponding former national designations see Annex E, Table E.1.

4.2.2 For non-alloy steel standard hollow sections the designation shall consist of:

- the number of this European Standard (EN 10210);
- the capital letter S for structural steel;
- the indication of the minimum specified yield strength for thicknesses ≤ 16 mm expressed in N/mm²;

²⁾ Until these EURONORMs are transformed into European Standards, they can either be implemented or reference made to the corresponding national standards, the list of which is given in Annex D to this Part of this European Standard.

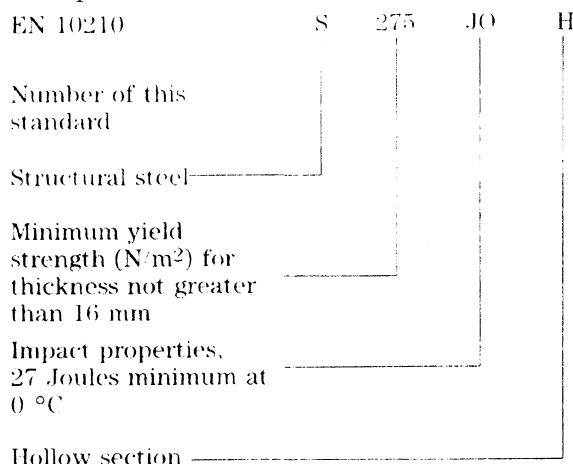
- the capital letters JR for the qualities with specified impact properties at room temperature;
- the capital letter J and a number 0 or 2 for the qualities with specified impact properties at 0 °C and – 20 °C respectively;
- the capital letter H to indicate hollow sections.

4.2.3 For fine grain steel structural hollow sections the designation shall consist of:

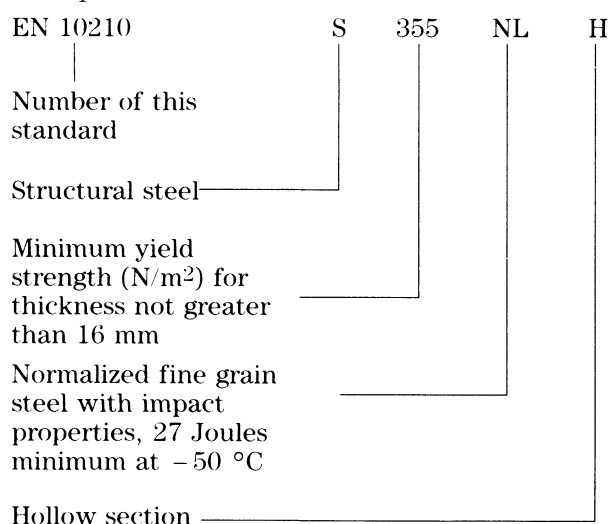
- the number of this European Standard (EN 10210-1);
- the capital letter S for structural steel;
- the indication of the minimum specified yield strength for thicknesses ≤ 16 mm expressed in N/mm²;
- the capital letter N to indicate normalized or normalized rolled, (see 6.3);
- the capital letter L for the qualities with specified minimum values of impact energy at a temperature of – 50 °C;
- the capital letter H to indicate hollow sections.

4.2.4 The product shall be designated as illustrated by the following examples:

Example 1



Example 2



5 Information to be supplied by the purchaser

5.1 General

The following information shall be supplied by the purchaser at the time of enquiry and order:

- the quality (mass or total length);
- the range and type of length (see prEN 10210-2);
- details of the product form
HFCHS = hot finished circular hollow sections
HFRHS = hot finished square or rectangular hollow sections
- the designation (see 4.2);
- the dimensions (see prEN 10210-2);
- the options required (see 5.2);
- the type of inspection document required (see 7.2 and Table 2 and Table 3).

5.2 Options

A number of options are specified in Parts 1 and 2 of this European Standard. Those relevant to this Part are listed below with appropriate clause references. In the event that the purchaser does not indicate his wish to implement any of these options at the time of enquiry and order the supplier shall supply in accordance with the basic specification.

1.1 Product analysis shall be carried out (see 6.5.1).

1.2 A maximum carbon equivalent value in accordance with Table A.2 shall be provided for non-alloy grades (see 6.5.2).

1.3 The Cr, Cu, Mo, Ni, Ti and V ladle analysis contents shall be reported in the inspection certificate or inspection report for non-alloy grades (see 6.5.2).

1.4 A maximum carbon equivalent value in accordance with Table B.2 shall be provided for fine grain steels S275 and S355 (see 6.5.3).

1.5 The ladle analysis limits for grade S460 (see 6.5.3) shall be:

- $V + Nb + Ti \leq 0,22 \%$; and
- $MO + Cr \leq 0,30 \%$.

1.6 Impact properties of quality JO and JR shall be verified by test. This option applies only when products are ordered with specific inspection and testing (see 6.6.4).

1.7 The material shall be suitable for hot dipped galvanized coating (see 6.7.2).

1.8 Weld repairs to the body of non-alloy structural steel hollow sections shall not be permitted (see 6.8.4).

1.9 Specific inspection and testing for non-alloy grades of qualities JR and JO shall be applied (see 7.1.1).