SLOVENSKI STANDARD
SIST EN 10210-2:1998

01-avgust-1998

Vroče oblikovani votli konstrukcijski profili iz nelegiranih in drobnozrnatih jekel - 2. del: Mere, mejni odstopki in značilnosti profilov

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

Warmgefertigte Hohlprofile für den Stahlbau aus unlegierten Baustählen und aus Feinkornbaustählen - Teil 2: Grenzabmaße, Maße und statische Werte

Profils creux pour la construction finis a chaud en aciers de construction non-alliés et a grains fins - Partie 2: Tolérances, dimensions et caractéristiques du profil

Ta slovenski standard je istoveten z: **EN 10210-2:1997**

ICS:

77.140.45	Nelegirana jekla	Non-alloyed steels
77.140.70	Jekleni profili	Steel profiles

SIST EN 10210-2:1998 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 10210-2

August 1997

ICS 77.140.70; 91.080.10

Descriptors: steel construction, metal sections, hollow profils, structural steels, unalloyed steels, dimensions, dimensional tolerances, measurements, geometric characteristics, fine grain steel

English version

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

Profils creux pour la construction finis à chaud en aciers de construction non-alliés et à grains fins - Partie 2: Tolérances, dimensions et caractéristiques du profil

Warmgefertigte Hohlprofile für den Stahlbau aus unlegierten Baustählen und aus Feinkornbaustählen - Teil 2: Grenzabmaße, Maße und statische Werte

This European Standard was approved by CEN on 1997-06-22. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Contents

Foreword

The European Standard has been prepared by the Technical Committee ECISS/TC 10 "Structural steels - Qualities", the secretariat of which was 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 February 1998, and conflicting national standards shall be withdrawn at the latest by February 1998.

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.

1 Scope

This Part of this European Standard specifies the tolerances for hot finished circular, square and rectangular structural hollow sections and gives the dimensions and sectional properties for a range of standard sizes.

For the technical delivery requirements, see EN 10210-1.

2 Normative references

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 European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 10210-1 Hot finished structural hollow sections of non-alloy and fine grain structural steels Part 1: Technical delivery requirements

3 Definitions

See EN 10210 - 1.

4 Symbols

Symbols used in this standard are given in table 1.

Table 1: Symbols used in this European Standard

Symbol	Unit	Definition
A	cm^2	Cross-sectional area
A_s	m^2/m	Superficial area per metre length
B	mm	Nominal length of side of square hollow section. Nominal length of the shorter side of a rectangular hollow section.
C_1 / C_2	mm	Length of corner region of a square or rectangular hollow section.
C_t	cm^3	Torsional modulus constant.
D	mm	Nominal outside diameter of a circular hollow section
D_{max}/D_{min}	mm	The maximum and minimum outside diameter of a circular hollow section measured in the same plane
e	mm	Deviation from straightness.
H	mm	Nominal length of the longer side of a rectangular hollow section.
I	cm^4	Second moment of area.
I_t	cm^4	Torsional inertia constant (polar moment of inertia in the case of circular hollow sections only).
i	cm	Radius of gyration.
L	mm	Length.
M	kg/m	Mass per unit length.
O	%	Out-of-roundness
R	mm	External corner radius of a square or rectangular hollow section.
T	mm	Nominal thickness.
V	mm	Total measured twist.
V_1	mm	Twist measured at one end of a section.

continued

Table 1: Symbols used in this European Standard (concluded)

Symbols	Unit	Definitions
W_{el}	cm^3	Elastic section modulus.
W_{pl}	cm^3	Plastic section modulus
x_1	mm	Concavity of a side of a square or rectangular hollow section
x_2	mm	Convexity of a side of a square or rectangular hollow section
xx	-	Axis of cross-section, major axis of a rectangular hollow section
yy	-	Axis of cross-section, minor axis of a rectangular hollow section
θ	Degrees	Angle between adjacent sides of a square or rectangular hollow section

5 Information to be supplied by the purchaser

5.1 Mandatory information

The following information from this Part of this European Standard shall be supplied by the purchaser at the time of enquiry and order.

a) The type of length and the length range or length (see table 3).

b) The dimensions (see clause 8).

NOTE: This information is included in the list of information to be supplied by the purchaser contained in clause 5.1 of EN 10210-1.

5.2 Options

One option is specified in this Part of this European Standard. In the event that the purchaser does not indicate his wish to implement this option at the time of enquiry of order, the supplier shall supply in accordance with the basic specification.

2.1 The tolerance on approximate length shall be $^{0}_{+150}$ mm (see table 3).

6 Tolerances

6.1 Tolerances on the dimensions and mass of hot finished hollow sections shall not exceed the values given in table 2 for shape and mass, table 3 for length and table 4 for the height of the internal and external weld bead of submerged arc welded hollow sections.

6.2 The internal corners of square and rectangular hollow sections shall be rounded.

NOTE: The internal corner profile is not specified.

7 Measurement of size and shape

7.1 General

All external dimensions including out-of-roundness shall be measured at a distance from the end of the hollow section of not less than D for circular sections, B for square sections or H for rectangular sections, with a minimum of 100 mm.

7.2 Outside dimensions

For circular hollow sections the diameter (D) shall be measured either directly e.g. using a calliper gauge or by circumference tape at the discretion of the manufacturer.

The limiting cross-sectional positions for measuring B and H are shown in figure 1.

7.3 Thickness

The thickness (T) of welded hollow sections shall be measured at a position not less than 2T from the weld.

The limiting cross-sectional positions for measuring the thickness of square and rectangular hollow sections are shown in figure 1.

NOTE: Thickness is normally measured within a distance of half the outside diameter or half the longer side length from the end of the section.

7.4 Out-of-roundness

The out-of-roundness (O) of a circular hollow section shall be calculated from the following equation.

$$O\,(\%) = \frac{D_{max} - D_{min}}{D} \times 100$$

7.5 Concavity and convexity

The concavity (x_1) or the convexity (x_2) of the sides of a square or rectangular hollow section shall be measured as shown in figure 2.

The percentage concavity or convexity shall be calculated as follows:

$$\frac{x_1}{B} \times 100\,\%; \frac{x_2}{B} \times 100\,\%; \frac{x_1}{H} \times 100\,\%; \frac{x_2}{H} \times 100\,\%$$

where B and H are the lengths of the sides containing the concavity x_1 or the convexity x_2

7.6 Squareness of sides

The deviation from squareness of the sides of a square or rectangular hollow section shall be measured as the difference between 90 ° and θ as shown in figure 3.

7.7 External corner profile

The external corner profile of a square or rectangular hollow section shall be measured according to 7.7.1 or 7.7.2 at the discretion of the manufacturer.

7.7.1 The corner arc shall be measured with a radius gauge.

7.7.2 The distance between the intersection of the flat side and the corner arc and the intersection of the projections of the flat sides to the corner (C_1 and C_2 in figure 4) shall be measured.

7.8 Twist

The twist (V) in a square or rectangular hollow section shall be determined in accordance with 7.8.1 or 7.8.2 at the discretion of the manufacturer.

7.8.1 The hollow section shall be placed on a horizontal surface with one side at one end pressed flat against the surface. At the opposite end of the hollow section the difference in height of the two lower corners from a horizontal surface (see figure 5) shall be measured.

7.8.2 The twist shall be measured with a spirit level and micrometer gauge (screw). The reference length of the spirit level shall be the distance between the intersection of the flat sides and the corner arcs (see figure 6). The twist V is the difference between the values V_1 (see figure 6) measured at each end of the hollow section.

7.9 Straightness

The deviation from straightness (e) of the total length of a hollow section shall be measured at the point of maximum departure of the hollow section from a straight line connecting its two ends as shown in figure 7. The percentage deviation from straightness shall be calculated as follows:

$$\frac{e}{L} \times 100\ \%$$

8 Dimensions and sectional properties

The nominal section dimensions and sectional properties for a range of standard sizes of hot finished structural hollow section are given in table 5 for circular sections, table 6 for square sections and table 7 for rectangular sections. The sectional properties were calculated from the formulae given in annex A.

NOTE: Other sizes and thicknesses may be available by agreement with the manufacturer.

Table 2: Tolerances

Characteristic	Circular Hollow Sections	Square and Rectangular Hollow Sections
Outside dimensions (D, B, H)	± 1 % with a minimum of ± 0,5 mm and a maximum of ± 10 mm.	± 1 % with a minimum of ± 0,5 mm
Thickness (T)	- 10 % [1) 2)]	
Out-of-roundness (O)	2 % for hollow sections having a diameter to thickness ratio not exceeding 100 [3)]	-
Concavity/Convexity[4)]	-	1 %
Squareness of side	-	90 ° ± 1°
External corner profile (C_1 C_2 or R)[5)]	-	3T maximum at each corner
Twist (V)	-	2 mm plus 0,5 mm/m length.
Straightness	0,2 % of total length	
Mass (M)	± 6 % on individual lengths[6)]	

[1)] The positive deviation is limited by the tolerance on mass.

[2)] For seamless sections thicknesses of less than 10 % but not less than 12,5 % of the nominal thickness may occur in smooth transition areas over not more than 25 % of the circumference.

[3)] Where the diameter to thickness ratio exceeds 100 the tolerance on out-of-roundness shall be agreed.

[4)] The tolerance on convexity and concavity is independent of the tolerance on outside dimensions.

[5)] The sides need not be tangential to the corner arcs.

[6)] The positive tolerance on the mass of seamless hollow sections shall be 8 %.

Table 3: Tolerances on length[1)]

Type of length		
Random length	4000 to 16000 with a range of 2000 per order item.	10 % of sections supplied may be below the minimum for the ordered range but not less than 75 % of the minimum of the range.
Approximate length	4000 to 16000	± 500 mm[2)]
Exact length	≥ 2000 to 6000 > 6000	+ 10 mm 0 + 15 mm 0

[1)] The purchaser shall indicate in the enquiry and order the type of length required and the length range or length as appropriate.

[2)] Option 2.1. The tolerance on approximate length shall be $^{0}_{+150}$ mm (see 5.2)

Table 4: Tolerance on height of internal and external weld bead for submerged arc-welded hollow sections

Thickness (T) mm	Maximum weld bead height mm
≤ 14,2	3,5
> 14,2	4,8