SLOVENSKI STANDARD
SIST EN 10210-2:2006

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SIST EN 10210-2:1998

Vroče izdelani 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 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 de construction finis a chaud en aciers non alliés et a grains fins - Partie 2 : Tolérances, dimensions et caractéristiques de profil

Ta slovenski standard je istoveten z: **EN 10210-2:2006**

ICS:

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

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

Profils creux pour la construction finis à chaud en aciers non alliés et à grains fins - Partie 2 : Tolérances, dimensions et caractéristiques de 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 16 March 2006.

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.

This European Standard exists 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This European Standard (EN 10210-2:2006) has been prepared by Technical Committee ECISS/TC 10 “Structural steels - Grades and qualities”, the secretariat of which is held by NEN.

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 October 2006, and conflicting national standards shall be withdrawn at the latest by October 2006.

This European Standard supersedes EN 10210-2:1997.

This standard consists of the following parts under the general title 'Hot finished structural hollow sections of non-alloy and fine grain steels':

— Part 1: Technical delivery conditions

— Part 2: Tolerances, dimensions and sectional properties

It forms part of a series of standards on hollow sections together with EN 10219-1 and 2, which are also under revision.

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

1 Scope

This part of EN 10210 specifies tolerances for hot finished circular, square, rectangular and elliptical structural hollow sections, manufactured in wall thicknesses up to 120 mm, in the following size ranges:

Circular: Outside diameters up to 2 500 mm

Square: Outside dimensions up to 800 mm x 800 mm

Rectangular: Outside dimensions up to 750 mm x 500 mm

Elliptical: Outside dimensions up to 500 mm x 250 mm

The formulae for calculating sectional properties of sections manufactured to the dimensional tolerances of this standard, to be used for the purposes of structural design, are given in Annex A.

Dimensions and sectional properties for a limited range of sizes are given in Annex B.

Technical delivery conditions are specified in EN 10210-1.

NOTE The designation of the sections' major axis (yy) and its minor axis (zz) align with the axis designation used for structural design in the structural Eurocodes.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 10210-1:2006, *Hot finished structural hollow sections of non-alloy and fine grain steels — Part 1: Technical delivery conditions*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 10210-1:2006 apply.

4 Symbols

For the purposes of this European Standard, the symbols defined in Table 1 apply.

Table 1 —Symbols and definitions

Symbol	Unit	Definition
A	cm^2	Cross-sectional area
A_m	mm^2	Area of the surface delimited by the perimeter at mid-thickness
A_s	m^2/m	Superficial area per metre length
B	mm	Specified side dimension of a square hollow section. Specified dimension of the shorter side of a rectangular hollow section. Specified outside dimension of an elliptical section on its minor axis
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	Specified 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	Specified dimension of the longer side of a rectangular hollow section. Specified outside dimension of an elliptical section on its major axis
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
P	mm	External perimeter of an elliptical hollow section
R	mm	External corner radius of a square or rectangular hollow section
T	mm	Specified thickness
U	mm	Perimeter of an elliptical hollow section at mid-thickness
V	mm	Total measured twist
V_1	mm	Twist measured at one end of a section
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
yy	—	Axis of cross-section, major axis of a rectangular hollow section
zz	—	Axis of cross-section, minor axis of a rectangular hollow section
θ	°	Angle between adjacent sides of a square or rectangular hollow section

5 Information to be obtained by the manufacturer

5.1 Mandatory information

The following mandatory information from this part of EN 10210 shall be obtained by the manufacturer at the time of enquiry and order.

a) The type of length, 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 obtained by the manufacturer contained in EN 10210-1.

5.2 Options

One option is specified in this part of EN 10210. In the event that the purchaser does not indicate a wish to implement this option at the time of enquiry and order, the manufacturer shall supply in accordance with the basic specification.

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

6 Tolerances

6.1 Tolerances shall not exceed the values given in Table 2 for shape, straightness and mass, Table 3 for manufacturer's delivered 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.

Table 2 — Tolerances on shape, straightness and mass

Characteristic	Circular hollow sections	Square and rectangular hollow sections	Elliptical hollow sections
Outside dimensions (D, B, H)	±1 % with a minimum of ± 0,5 mm and a maximum of ± 10 mm	± 1 % [a] with a minimum of ± 0,5 mm	
Thickness (T)	-10 % [b, c]		
Out-of-roundness (O)	2 % for hollow sections having a diameter to thickness ratio not exceeding 100 [d]	—	
Concavity/Convexity (x_1, x_2) [e]	—	1 %	—
Squareness of side (θ)	—	90° ± 1°	—
External corner profile (C_1, C_2 or R) [f]	—	3T maximum at each corner	—
Twist (V)	—	2 mm [a] plus 0,5 mm/m length [a]	
Straightness (e)	0,2 [a] % of total length and 3 mm over any 1 m length		
Mass (M)	± 6 % on individual delivered lengths [g]		

[a] For elliptical hollow sections of sizes H < 250 mm the permitted tolerance is twice the value given in this table.

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

[c] 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.

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

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

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

[g] The positive tolerance on the mass of seamless hollow sections is 8 %.

Table 3 — Tolerances on manufacturer's delivered length

Dimensions in millimetres

Type of length [a]	Range of length or length L	Tolerance
Random length	4 000 ≤ L ≤ 16 000 with a range of 2 000 per order item	10 % of sections supplied may be below the minimum for the ordered range but not shorter than 75 % of the minimum range length
Approximate length	4 000 ≤ L ≤ 16 000	± 500 mm [b]
Exact length	2 000 ≤ L ≤ 6 000 > 6 000 [c]	$^{+10}_{0}$ mm $^{+15}_{0}$ mm

[a] The manufacturer shall establish at the time of enquiry and order the type of length required and the length range or length.

[b] Option 2.1 the tolerance on approximate length is $^{+150}_{0}$ mm.

[c] Common lengths available are 6 m and 12 m.

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

Dimensions in millimetres

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

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 and elliptical sections, with a minimum of 100 mm.

7.2 Outside dimensions

For circular hollow sections the diameter (D) and for elliptical hollow sections the outside dimensions (B and H) 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 for square and rectangular hollow sections are shown in Figure 1.

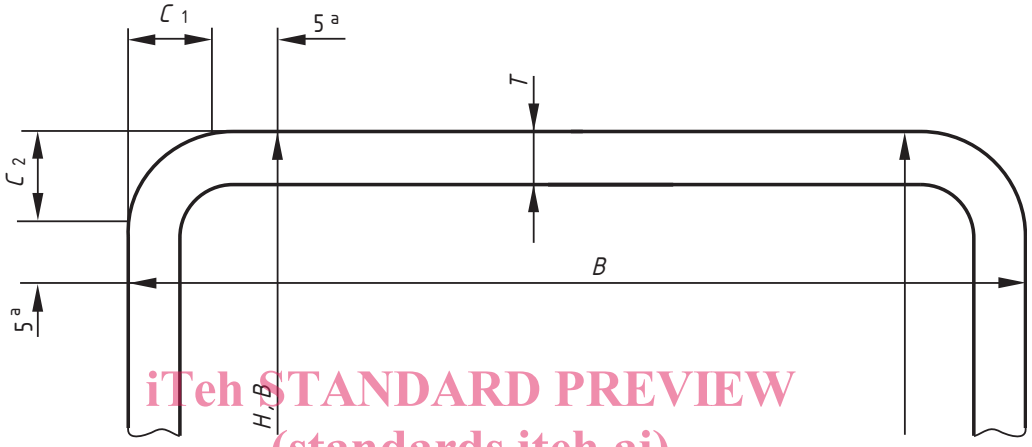
7.3 Thickness

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 dimension of the longer side from the end of the section.

Dimensions in millimetres



[a] This dimension is a maximum when measuring B or H and a minimum when measuring T.

Figure 1 — Limiting cross-sectional positions for measuring the dimensions B, H and T for square or rectangular hollow sections

7.4 Out-of-roundness

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

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

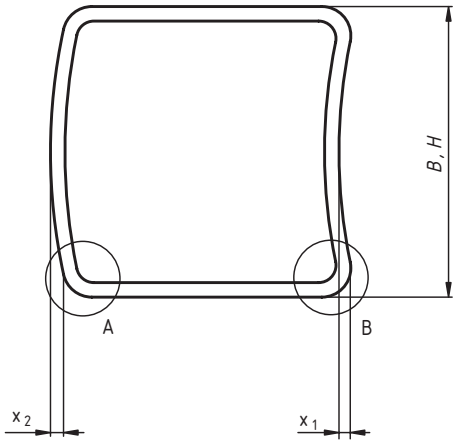
7.5 Concavity and convexity

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 dimensions of the sides containing the concavity x_1 or the convexity x_2.



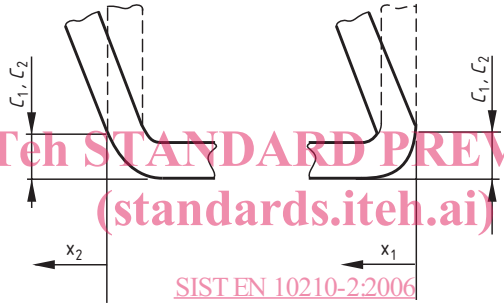


Figure 2 — Measurement of concavity/convexity of square or rectangular hollow sections

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.

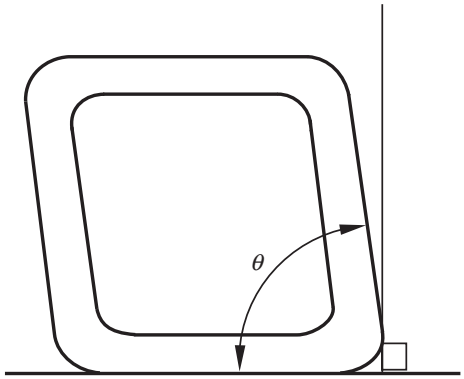


Figure 3 — Squareness of sides of square or rectangular hollow sections