



# SLOVENSKI STANDARD

## SIST EN 10219-2:2006

01-julij-2006

Nadomešča:  
SIST EN 10219-2:1998

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

Cold formed welded structural hollow sections of non-alloy and fine grain steels - Part 2: Tolerances, dimensions and sectional properties

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

Profils creux de construction soudés, formés à froid en aciers non alliés et à grains fins - Partie 2 : Tolérances, dimensions et caractéristiques de profil

Ta slovenski standard je istoveten z: EN 10219-2:2006

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#### ICS:

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

SIST EN 10219-2:2006 en

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 10219-2**

April 2006

ICS 77.140.75

Supersedes EN 10219-2:1997

English Version

## Cold formed welded structural hollow sections of non-alloy and fine grain steels - Part 2: Tolerances, dimensions and sectional properties

Profils creux pour la construction soudés, formés à froid en aciers non alliés et à grains fins - Partie 2 : Tolérances, dimensions et caractéristiques de profil

Kaltgefertigte geschweißte 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 10219-2:2006) 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 10219—2:1997.

This standard consists of the following parts under the general title 'Cold formed welded 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 10210-1 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.

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**EN 10219-2:2006 (E)****1 Scope**

This part of EN 10219 specifies tolerances for cold formed welded circular, square and rectangular structural hollow sections, manufactured in wall thicknesses up to 40 mm, in the following size ranges:

Circular: Outside diameters up to 2 500 mm

Square: Outside dimensions up to 500 mm x 500 mm

Rectangular: Outside dimensions up to 500 mm x 300 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 B.

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

Technical delivery conditions are specified in EN 10219-1.

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. [SIST EN 10219-2:2006](https://standards.iteh.ai/catalog/standards/sist/a0bf08c9-964c-4b49-8b9c-10219-1-2006)

<https://standards.iteh.ai/catalog/standards/sist/a0bf08c9-964c-4b49-8b9c-10219-1-2006>  
EN 10219-1:2006, *Cold formed welded 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 10219-1:2006 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
$A$	$\text{cm}^2$	Cross-sectional area
$A_s$	$\text{m}^2/\text{m}$	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
$C_1/C_2$	mm	Length of corner region of a square or rectangular hollow section
$C_t$	$\text{cm}^3$	Torsional modulus constant
$D$	mm	Specified outside diameter of a circular hollow section
$D_{\text{max}}/D_{\text{min}}$	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
$I$	$\text{cm}^4$	Second moment of area
$I_t$	$\text{cm}^4$	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	Specified thickness
$V$	mm	Total measured twist
$V_1$	mm	Twist measured at one end of a section
$W_{\text{el}}$	$\text{cm}^3$	Elastic section modulus
$W_{\text{pl}}$	$\text{cm}^3$	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
$\theta$	$^\circ$	Angle between adjacent sides of a square or rectangular hollow section

## 5 Information to be obtained by the manufacturer

The following mandatory information from this part of EN 10219 shall be obtained by the manufacturer at the time of enquiry and order.

- a) The type of length, length range or length (see Table 4).
- 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 10219-1.

## 6 Tolerances

**6.1** Tolerances shall not exceed the values given in Table 2 for shape and mass, Table 3 for external corner profiles, Table 4 for manufacturer's delivered length and Table 5 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.

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6.3 Additional tolerances for out-of-roundness, accidental eccentricity and dimples may be applied to tubes of diameter  $\geq 900$  mm and  $D/T \geq 50$  when they are to be used as bearing piles or primary elements in combined walls in accordance with ENV 1993-5. In order for these additional tolerances to be applied the fabrication tolerance quality class, A, B, or C should be agreed. See Annex A.

Table 2 — Tolerances on shape and mass

Characteristic	Circular hollow sections	Square and rectangular hollow sections	
		Side length mm	Tolerance
Outside dimensions ( $D$ , $B$ and $H$ )	$\pm 1$ % with a minimum of $\pm 0,5$ mm and a maximum of $\pm 10$ mm	$H, B < 100$	$\pm 1$ % with a minimum of $\pm 0,5$ mm
		$100 \leq H, B \leq 200$	$\pm 0,8$ %
		$H, B > 200$	$\pm 0,6$ %
Thickness ( $T$ )	For $D \leq 406,4$ mm:  $T \leq 5$ mm $\pm 10$ % $T > 5$ mm $\pm 0,5$ mm	$T \leq 5$ mm $\pm 10$ %  $T > 5$ mm $\pm 0,5$ mm	
	For $D > 406,4$ mm:  $\pm 10$ % with a maximum of $\pm 2$ mm		
Out-of-roundness ( $O$ )	2 % for hollow sections having a diameter to thickness ratio not exceeding 100 <sup>a</sup>	—	
Concavity/convexity ( $x_1, x_2$ ) <sup>b</sup>	—	Max. 0,8 % with a minimum of 0,5 mm	
Squareness of side ( $\theta$ )	—	$90^\circ \pm 1^\circ$	
External corner profile ( $C_1, C_2$ or $R$ )	—	See Table 3	
Twist ( $I$ )	—	2 mm plus 0,5 mm/m length	
Straightness ( $e$ )	0,20 % of total length and 3 mm over any 1 m length	0,15 % of total length and 3 mm over any 1 m length	
Mass per unit length ( $M$ )	$\pm 6$ % on individual delivered lengths		
<sup>a</sup> Where the diameter to thickness ratio exceeds 100 the tolerance on out-of-roundness shall be agreed.			
<sup>b</sup> The tolerance on convexity and concavity is independent of the tolerance on outside dimensions.			



Table 3 — Tolerances on external corner profiles

Dimensions in millimetres

Thickness $T$	External corner profile $C_1, C_2$ or $R^a$
$T \leq 6$	$1,6T$ to $2,4T$
$6 < T \leq 10$	$2,0T$ to $3,0T$
$10 < T$	$2,4T$ to $3,6T$

<sup>a</sup> The sides need not be tangential to the corner arcs.

Table 4 — Tolerances on manufacturer's delivered length

Dimensions in millimetres

Type of length <sup>a</sup>	Range of length or length $L$	Tolerance
Random length	$4\,000 < L \leq 16\,000$ with a range of $\geq 2\,000$ 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	$\geq 4\,000$	$^{+50}_0$ mm
Exact length <sup>b</sup>	$< 6\,000$	$^{+5}_0$ mm
	$6\,000 \leq L \leq 10\,000$	$^{+15}_0$ mm
	$> 10\,000$	$^{+5}_0$ mm + 1 mm/m

<sup>a</sup> The manufacturer shall establish at the time of enquiry and order the type of length required and the length range or length.

<sup>b</sup> Common lengths available are 6 m and 12 m.

**Table 5 — Tolerance on height of internal and external weld bead for submerged arc welded hollow sections**

Dimensions in millimetres

Thickness, $T$	Maximum weld bead height
$\leq 14,2$	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 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  $H$  for square and rectangular hollow sections are shown in Figure 1.

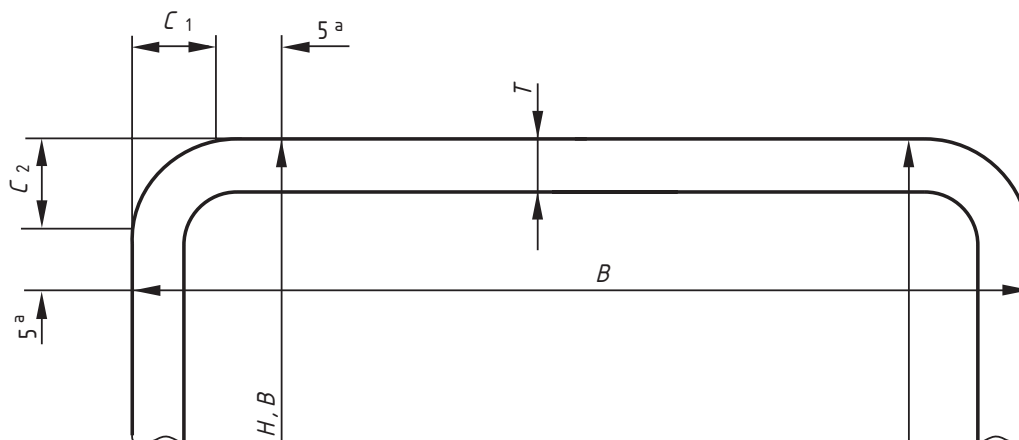
### 7.3 Thickness

The thickness ( $T$ ) 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



<sup>a</sup> 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, but see Annex A for piling tube.

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

#### 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  $x_2$ .

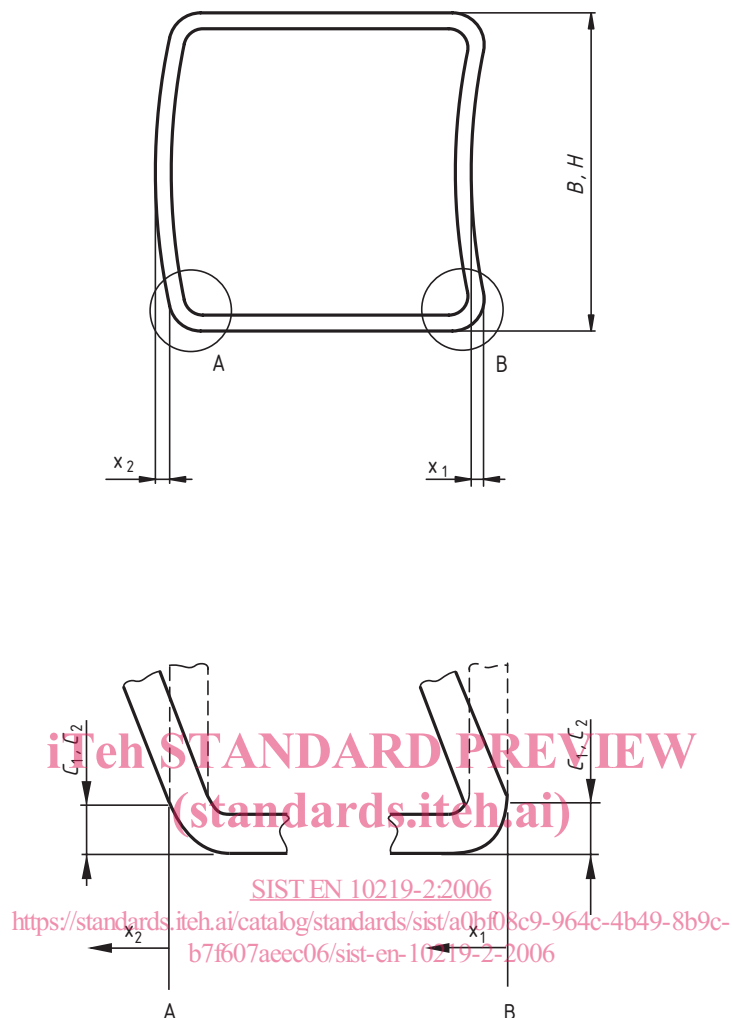


Figure 2 — Measurement of concavity/convexity of square or rectangular hollow sections

### 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  $90^\circ$  and  $\theta$  as shown in Figure 3.

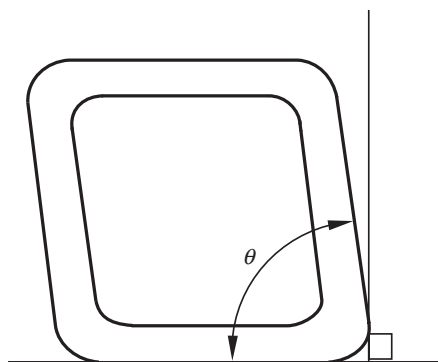


Figure 3 — Squareness of sides of square or rectangular hollow sections