SLOVENSKI STANDARD
SIST EN 10253-1:2000

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Cevni fitingi za soležne zvare - 1. del: Ogljikovo jeklo za splošno uporabo in brez posebnih zahtev kontrole

Butt-welding pipe fittings - Part 1: Wrought carbon steel for general use and without specific inspection requirements

Formstücke zum Einschweißen - Teil 1: Unlegierter Stahl für allgemeine Anwendungen und ohne besondere Prüfanforderungen

Raccords a souder bout a bout - Partie 1: Acier au carbone pour usages généraux et sans contrôle spécifique

Ta slovenski standard je istoveten z: **EN 10253-1:1999**

ICS:

23.040.40	Kovinski fitingi	Metal fittings
77.140.45	Nelegirana jekla	Non-alloyed steels

SIST EN 10253-1:2000 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
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EN 10253-1

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ICS 23.040.40

English version

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This European Standard was approved by CEN on 2 July 1999.

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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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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Foreword

This European Standard has been prepared by Technical Committee ECISS/TC 29 "Steel tubes and fittings for steel tubes", the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by March 2000, and conflicting national standards shall be withdrawn at the latest by March 2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association. This European Standard is considered to be a supporting standard to those application and product standards which in themselves support an essential safety requirement of a New Approach Directive and which make reference to this European Standard.

In writing the European Standard EN 10253, the competent committee recognized that there are two broad types of products commonly used and decided to reflect these in the standard by the differentiation between two parts.

Firstly the committee recognized the need to provide a basic type in which the minimum wall thickness of the fitting is guaranteed without formal reference to the pressure resistance. This type is considered in Part 1 ; it consists of fittings which are not intended to be used in applications covered by the European Pressure Equipment Directive.

Secondly the equipment standards under the Pressure Equipment Directive will impose that the fitting has a defined resistance to internal pressure. This approach imposes enhanced requirements that are considered in Part 2.

Part 1 : fittings are not designed to fulfil specific design requirements in regard of pressure resistance and are only defined by their chemical composition, mechanical characteristics and dimensions (outside diameter, wall thickness, radius ...).

Part 2 : fittings are designed to fulfil specific design requirements.

It is the ultimate responsibility of the user to select the appropriate part for the intended application.

NOTE This European Standard intends to reflect the needs of various national markets ; consequently it offers in a normative annex an alternative solution for an associated combination of steel grade and dimensions (see clause 1).

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

1.1 Scope

This European Standard specifies requirements for steel butt-welding fittings (elbows and return bends, concentric and eccentric reducers, equal and reducing tees, dished ends and caps) made of wrought carbon steel and delivered without specific inspection.

The fittings described in this European Standard do not fulfil specific design requirements ; consequently they cannot be considered as conforming to the Essential Requirements of the Pressure Equipment Directive (Directive 97/23/EC of 29.05.1997).

It specifies :

— the steel grade and its chemical composition ;

— the mechanical characteristics ;

— the dimensions and tolerances ;

— the technical conditions for inspection and testing ;

— the marking, packaging and inspection documents.

When steel grade S265 is specified in 4.1.2, the normative annex A applies and takes preference over conflicting requirements in the relevant areas of the main text.

Another part of this European Standard (describing fittings intented to fulfil the Essential Requirements of the PED) is :

— Butt-welding pipe fittings - Part 2 : Wrought carbon and ferritic alloy steels with specific inspection requirements.

1.2 Limitation of use

The allowed pressures and temperatures are the responsibility of the customer according to the state of the art and in application of the safety coefficients specified in the applicable regulations, codes or standards.

1.3 Technical delivery conditions

Unless otherwise specified in this European Standard the general technical delivery conditions specified in EN 10021 apply.

2 Normative references

This European Standard incorporates by dated or undated references, 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 287-1, *Approval testing of welders - Fusion welding - Part 1 : Steels.*

EN 288-1, *Specification and qualification of welding procedures for metallic materials - Part 1 : General rules for fusion welding.*

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

EN 10003-1, *Metallic materials - Brinell hardness testing - Part 1 : Method of test.*

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

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

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

EN 10079, *Definition of steel products.*

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

EN ISO 6708, *Pipework components - Definition and selection of DN (nominal size).*

EN 10246-7, *Non destructive testing of steel tubes - Part 7 : Automatic full peripheral ultrasonic testing of seamless and welded (except submerged arc welded) steel tubes for the detection of longitudinal imperfections.*

prEN 10246-8[1)], *Non destructive testing of steel tubes - Part 8 : Automatic ultrasonic testing of the weld seam of electric welded tubes for the detection of longitudinal imperfections.*

ISO 3166, *Codes for the representation of names of countries.*

3 Definitions and symbols

3.1 Definitions

For the purpose of this European Standard the definitions in EN 10020, EN 10021, EN 10052 and EN 10079 shall apply. In addition following definitions apply :

type
For elbows and return bends the type defines the bending radius of the piece. Possible types are :

— type 2D : R ≈ 1D ;

— type 3D : R ≈ 1,5D ;

— type 5D : R ≈ 2,5D.

welded fitting
Fitting made from a welded tube or fitting where welding is part of the fabrication of the fitting.

3.2 Symbols

DN	Conventional dimension used in piping ; non measurable value (See EN ISO 6708)
D	Specified outside diameter for elbows, return bends, equal tees and large diameter for reducers and reducing tees, in millimetres
D_1	Specified small outside diameter for reducers and reducing tees, in millimetres
T	Specified wall thickness at the welding ends, in millimetres
T_1	Specified wall thickness at the welding end of the D_1 face of reducers and reducing tees, in millimetres

1) In preparation. Until this document is published as a European Standard, the corresponding national standard should be agreed at the time of enquiry and order.

R Radius of elbows and return bends, in millimetres

C Centre to centre distance for return bends (C=2F), in millimetres

B Face to top distance for return bends, in millimetres

F Distance from the axis of the branch outlet to the face of the centre body of tees, in millimetres

G Distance from the axis of the centre line to the face of the branch outlet of reducingtees, in millimetres

h Height of the straight part of dished ends, in millimetres

H Face to centre distance for 45° elbows, in millimetres

K_1 Internal height for dished ends, in millimetres

K_2 Total height for caps, in millimetres

L Face to face distance for reducers, in millimetres

Q Tolerance on the form for fittings

R_m Tensile strength at room temperature, in Newton per square millimetre

R_{eH} Upper yield limit at room temperature, in Newton per square millimetre

A Percentage of elongation at rupture, with reference to a gauge length of $5{,}65\sqrt{S_0}$

HB Brinell hardness

4 Information to be supplied by the purchaser

4.1 Mandatory information

4.1.1 Designation of fittings

The fittings are designated by their name, reference to this European Standard and the following :

— elbows, return bends :

  — for elbows : The type (2D, 3D or 5D), the angle (45° or 90°), the outside diameter D and the wall thickness T ;

  — for return bends : The type (2D, 3D or 5D), the outside diameter D and the wall thickness T ;

— reducers :

  — the form (1 or 2), the large diameter D and the wall thickness T, the small diameter D_1 and the wall thickness T_1.

  — The form does not apply for eccentric reducers ;

— tees :

  — for equal tees : The outside diameter D and the wall thickness T ;

  — for reducing tees : The large diameter D and the wall thickness T, the small diameter D_1 and the wall thickness T_1 ;

— dished ends :

  — the outside diameter D and the wall thickness T ;

— caps :

  — the outside diameter D and the wall thickness T.

4.1.2 The enquiry and order shall include following information :

— quantity ;

— designation of fittings ;

— steel grade (see clause 6 and annex A) ;

— reference to this European Standard.

4.2 Options

A number of options are specified in this European Standard and these are listed below. 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 :

— type of tube as starting product (seamless or welded). See 5.2.1 ;

— definition of coating. See clause 11.

4.3 Examples

EXAMPLE 1 :

1000 elbows in accordance with this European Standard of type 3D with angle 90° and dimensions 60,3 X 2,9 made of steel grade S235.

1 000 elbows - EN 10253-1 - type 3D - 90° - 60,3 X 2,9 - S235.

EXAMPLE 2 :

50 elbows in accordance with this European Standard of type 3D with angle 90° and dimensions 273 X 9,5 made of steel grade S265.

50 elbows - EN 10253-1 - type 3D - 90° - 273 X 9,5 - S265.

EXAMPLE 3 :

2 000 concentric reducers in accordance with this European Standard of form 2 with dimensions 219,1 X 6,3 - 139,7 X 4,0 made of steel grade S235.

2 000 concentric reducers - EN 10253-1 - form 2 - 219,1 X 6,3 - 139,7 X 4,0 - S235.

5 Manufacturing process

5.1 Steelmaking process

The steelmaking process of the base material is at the discretion of the manufacturer. The steels shall be fully killed.

5.2 Fitting making-process and heat treatment

5.2.1 Fitting-making processes

The allowed processes and the relevant starting products are given in Table 1.

Table 1 — Fitting-making processes - Starting products [a]

Process for fittings	Hot Deformation		Cold Deformation		
	Bending	Stamping or Forming followed by machining [b]	Bending	Stamping [b]	Forming [b]
Elbows Return Bends	1-2	1-2-3	1-2	1-2-3	1-2-3
Reducers	-	1-2-3	-	1-2-3	1-2-3
Tees	-	1-2-3-4-5	-	1-2-3	1-2-3
Dished ends and caps	-	3-5	1-2-3	-	3

[a] Starting products.
1 Seamless Tube 2 Welded Tube 3 Plate 4 Forgings 5 Bars

[b] For these processes welding may additionally be used.

The process is at the discretion of the manufacturer.

Where tubes are used as starting material, the following conditions apply :

— the choice of the type of tubes (seamless or welded) is left at the discretion of the manufacturer ;

— helical submerged arc welded (SAW) tubes are not permitted ;

— for welded tubes, the full length of the weld seam shall be nondestructively tested in the tube condition in accordance with EN 10246-7 or prEN 10246-8, to acceptance level L4.

Option 1

The type of starting product shall be as defined in the order.

5.2.2 Fusion welding

In the case of the fusion welding process the weld seam shall include at least one external bead and one internal bead, as far as the internal face is accessible.

The welding process, the welders and/or the welding operators shall be qualified in accordance with EN 288-1 or EN 287-1.

Any weld made during the fitting-making process shall be tested in accordance with 9.4.6.

5.2.3 Heat treatment

Fittings produced by cold deformation shall be subsequently normalized.

Fittings produced by hot deformation may be delivered without heat treatment if hot deformation produces a technically equivalent metallurgical structure with the mechanical characteristics according to Table 3.

This condition is regarded as satisfied when the final forming operation is completed between 750 °C and 980 °C.

Dished ends produced by cold deformation need not be heat treated.

6 Metallurgical properties

6.1 Chemical composition

The cast analysis as reported by the steel manufacturer shall comply with the requirements given in Table 2.

Table 2 — Chemical composition

Steel grade	C max. %	Si max. %	Mn max. %	S max. %	P max. %
S235	0,16	0,35	1,2	0,025	0,030

NOTE 1 Elements not included in this table shall not be intentionally added to the steel without agreement of the purchaser, with the exception of elements used for deoxidation. However, residual elements may be tolerated provided that the mechanical properties and applicability of the product are not adversely affected.

NOTE 2 See Annex A for details of alternative grade S265.

6.2 Mechanical characteristics

The mechanical characteristics (at room temperature) shall comply with the requirements given in Table 3.

Table 3 — Mechanical characteristics

Steel Grade	R_{eH} min. N/mm²	R_m N/mm²	A min. %	HB max.
S235	235	360-500	25	170

The mechanical properties may be determined on the finished product or on the base material provided it is in the same heat treatment condition as the fitting it represents.

6.3 Weldability

Fittings covered by this European Standard are weldable. Moreover account should be taken of the fact that the behaviour of the steel during and after welding is dependant not only on the steel, but also essentially on the conditions of preparing and carrying out the welding and on the final use of the fitting.

7 Dimensions and tolerances

7.1 Dimensions

For reducers and tees it is not mandatory that the produced pieces correspond to the exact representation in the figures. Only the dimensions given in the relevant tables shall be respected.

7.1.1 Elbows and return bends

Elbows type 3D and type 5D shall be produced according to Figures 1 and 2, elbows type 2D according to Figure 2. Return bends shall be produced according to Figure 3. Dimensions shall be in accordance with Tables 4, 5 and 6.

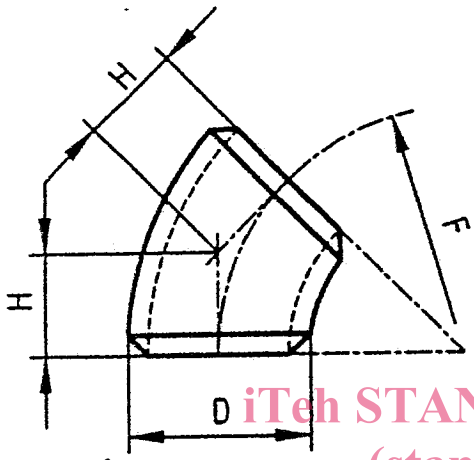

Figure 1 — 45° Elbow

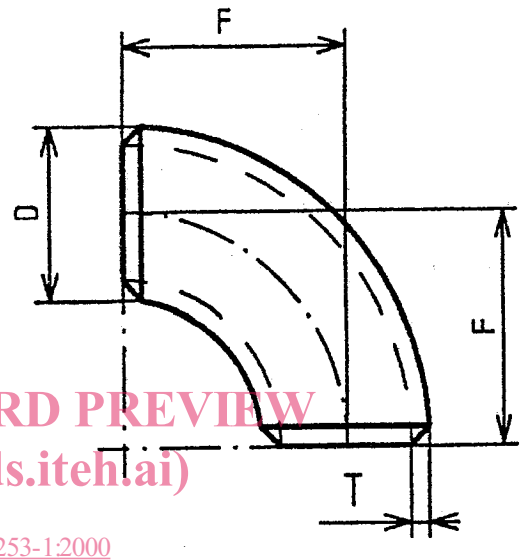

Figure 2 — 90° Elbow

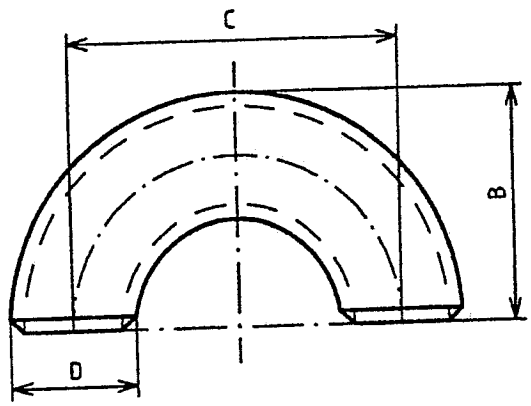

Figure 3 — Return bend