



# SLOVENSKI STANDARD

## SIST EN 1708-1:2010

01-april-2010

Nadomešča:

SIST EN 1708-1:1999

SIST EN 1708-1:1999/A1:2004

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### Varjenje - Opisi zvarnih spojev na jeklu - 1. del: Tlačne komponente

Welding - Basic welded joint details in steel - Part 1: Pressurized components

Schweißen - Verbindungselemente beim Schweißen von Stahl - Teil 1:  
Druckbeanspruchte Bauteile

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Soudage - Descriptif de base des assemblages soudés en acier - Partie 1: Composants  
soumis à la pression

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Ta slovenski standard je istoveten z: **EN 1708-1:2010**

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#### **ICS:**

25.160.40      Varjeni spoji in vari      Welded joints

**SIST EN 1708-1:2010**      en,fr,de

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 1708-1**

January 2010

ICS 25.160.40

Supersedes EN 1708-1:1999

English Version

## Welding - Basic welded joint details in steel - Part 1: Pressurized components

Soudage - Descriptif de base des assemblages soudés en acier - Partie 1: Composants soumis à la pression

Schweißen - Verbindungselemente beim Schweißen von Stahl - Teil 1: Druckbeanspruchte Bauteile

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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 CEN Management Centre has the same status as the official versions.

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

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## Contents

Page

Foreword.....	3
<b>1 Scope .....</b>	<b>4</b>
<b>2 Normative references .....</b>	<b>4</b>
<b>3 Requirements .....</b>	<b>4</b>
<b>3.1 Selection of detail .....</b>	<b>4</b>
<b>3.2 Joint preparation (geometry and size).....</b>	<b>5</b>
<b>3.2.1 General.....</b>	<b>5</b>
<b>3.2.2 Joint preparation geometry .....</b>	<b>5</b>
<b>3.2.3 Weld sizes.....</b>	<b>5</b>
<b>3.3 Presentation .....</b>	<b>5</b>
<b>3.4 Removal of internal sharp edges in branch bores .....</b>	<b>5</b>
<b>3.5 Preparation of holes in shell for set-through branches.....</b>	<b>6</b>
<b>3.6 Welds for smooth transition.....</b>	<b>6</b>
<b>3.7 Oblique and tangential branches .....</b>	<b>6</b>

## Tables

Table 1 — Butt joints of different thickness .....	7
Table 2 — Branches without compensation rings .....	11
Table 3 — Branches with compensation rings .....	23
Table 4 — Sockets and couplings.....	25
Table 5 — Flanges .....	27
Table 6 — Jacketed vessels .....	31
Table 7 — Tube to tube plate connection.....	42
Table 8 — Flate end or tube plate to shell connections .....	46
Table 9 — Internal diaphragms and separators .....	53
Table 10 — Supports and non-pressure parts.....	54
Table 11 — Special shell to head end connections .....	61
Table 12 — Weld ring seal .....	62
Table 13 — Pipe details.....	64
Table 14 — Block flanges .....	70

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SIST EN 1708-1:2010

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## Foreword

This document (EN 1708-1:2010) has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DIN.

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 July 2010, and conflicting national standards shall be withdrawn at the latest by July 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1708-1:1999.

EN 1708, *Welding — Basic weld joint details in steel*, consists of the following parts:

- *Part 1: Pressurized components*
- *Part 2: Non internal pressurized components*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, 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 the United Kingdom.

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## EN 1708-1:2010 (E)

### 1 Scope

The purpose of this European Standard is to exemplify commonly accepted welded connections in pressure systems. It does not promote the standardization of connections that may be regarded as mandatory or restrict development in any way. Stress analysis rules should be considered if necessary.

This standard contains examples of connections welded by:

- Manual metal-arc welding with covered electrode (111);
- Submerged arc welding (12);
- Gas shielded metal arc welding (13);
- Tungsten inert gas arc welding; TIG-welding (14);
- Plasma arc welding (15)

processes (process numbers according to EN ISO 4063) in steel pressure systems. Other processes by agreement.

This standard covers welded joint details in steel, but can be applied to other metallic materials. In such cases the shape and dimensions of the weld should be checked.

The estimation of the suitability of welded connections for special service conditions, for example corrosion and fatigue are not specially considered. (standards.iteh.ai)

### 2 Normative references

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

EN ISO 4063, *Welding and allied processes — Nomenclature of processes and reference numbers (ISO 4063:2009)*

EN ISO 5817, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections (ISO 5817:2003, corrected version:2005, including Technical Corrigendum 1:2006)*

EN ISO 9692-1:2003, *Welding and allied processes — Recommendations for joint preparation — Part 1: Manual metal-arc welding, gas-shielded metal-arc welding, gas welding, TIG welding and beam welding of steels (ISO 9692-1:2003)*

EN ISO 9692-2:1998, *Welding and allied processes — Joint preparation — Part 2: Submerged arc welding of steels (ISO 9692-2:1998)*

### 3 Requirements

#### 3.1 Selection of detail

Connections are not considered to be equally suitable for all service conditions, nor is the order in which they are shown indicative of their relative characteristics. In selecting the appropriate detail to use from the several

alternatives shown for each type of connection, consideration shall be given to existing fabrication and service conditions that pertain.

### 3.2 Joint preparation (geometry and size)

#### 3.2.1 General

The limitations quoted in weld profiles and sizes are based on commonly accepted practice, but they may be subjected to modifications if required by special welding techniques or design conditions, which should be included in the design documents and in the welding procedure specifications (WPS).

#### 3.2.2 Joint preparation geometry

Examples of recommended joint preparation geometry (e.g. bevel angles, root radius, presence of backing strips, root faces) are referred to EN ISO 9692-1 when applicable and to EN ISO 9692-2 relative to submerged arc welding process. Missing dimensions of preparations are in accordance with EN ISO 9692-1.

In case where full penetration butt joints are indicated, it is intended that they shall be back chipped or gouged and back welded, or alternatively that the welding procedure shall be such as to ensure sound, effective root penetration.

For relevant difference of thickness (generally a difference of about 3 mm (see Table 1, no. 1.1.1 to 1.1.6) could be considered relevant; in any case the thickness of material shall be taken into account, as well as the shape of the joint) of parts to be butt welded, the thickest element shall be shaped with a slope of 1:5 up to 1:2. Smoother transition of wall thickness is applicable in severe service conditions.

#### 3.2.3 Weld sizes

The thickness of welds (in particular of fillet welds), which are not determined by their profile, are based on the assumption that the connection need not be stronger than the connected parts.

### 3.3 Presentation

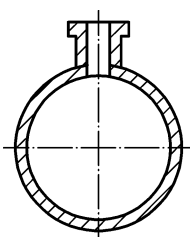


Figure 1 — Transversal section

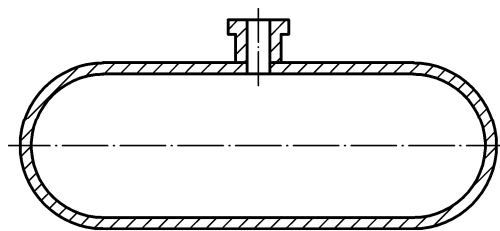


Figure 2 — Longitudinal section

The drawings of the nozzle and branch connections (see Tables 2 and 3) show a transversal section of the connection (see Figure 1) and a longitudinal section of the connection (see Figure 2).

### 3.4 Removal of internal sharp edges in branch bores

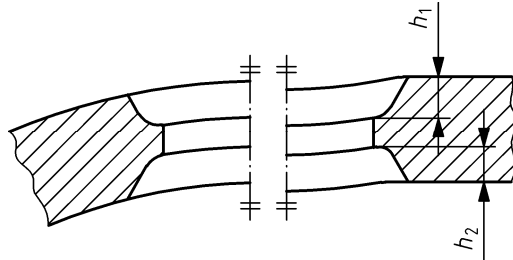
It will be noted that the internal edges on the bores of branches are shown partially radiused (for example see Table 2, no. 2.1.6) because a stress concentration occurs at this point. The rounding of the edges is recommended when the branch connection is subjected to severe service conditions like fatigue, creep and stress corrosion.

## EN 1708-1:2010 (E)

### 3.5 Preparation of holes in shell for set-through branches

In case of set-in and set-through branches (according to Table 2, no. 2.2 and no. 2.3) holes in the shell may be cut and profiled in two ways as follows:

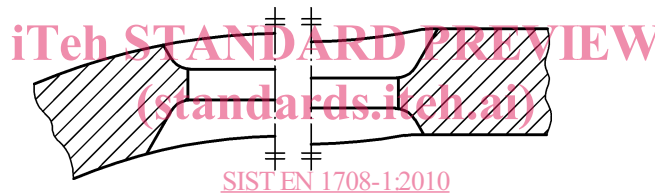
- The depth of the grooves  $h_1$  and  $h_2$  may be constant around the hole as shown in Figure 3.



**Key**  
 $h_1, h_2$  depth of the grooves

**Figure 3 — Preparation of holes in the shell**

- The roots of the joint preparations may be in one plane, as for example when they are machine drilled, in which case the depths of the grooves will vary around the hole as shown in Figure 4.



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**Figure 4 — Preparation of holes in the shell**

### 3.6 Welds for smooth transition

In some cases it is convenient to foresee a fillet weld providing smooth geometric transition from the surface of one welded part to the surface of the other one, e.g. from branch to shell. Its purpose is to soften the notch effect in the branch-shell edge and therefore the throat thickness is not presented on the figure concerned.

### 3.7 Oblique and tangential branches

The welded connections are contained in Tables 1 to 13. Regarding branches, the oblique and tangential ones are not specially considered as their preparation is similar to that reported on Tables 2 and 3 for radial branches. Only some significant cases are therefore considered (see Table 2, no. 2.2).

**NOTE 1** The welds are only blackened in the following tables when the figures do not give information about the dimension of the values for the preparation.

**NOTE 2** It is not intended that the values of the dimension given in the tables should be measured precisely but rather the general philosophy should be applied.



Table 1 — Butt joints of different thickness

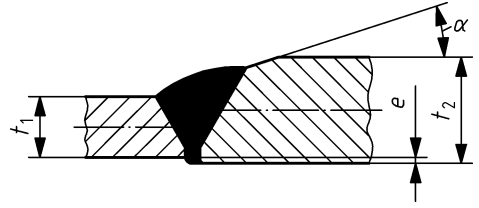
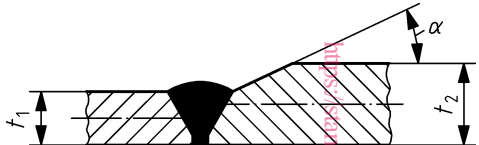
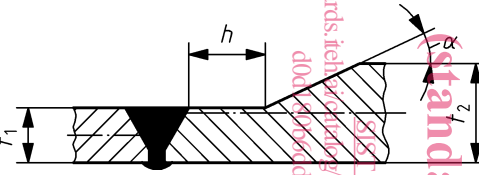
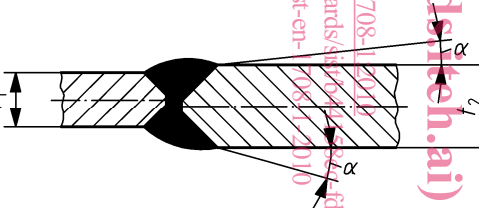
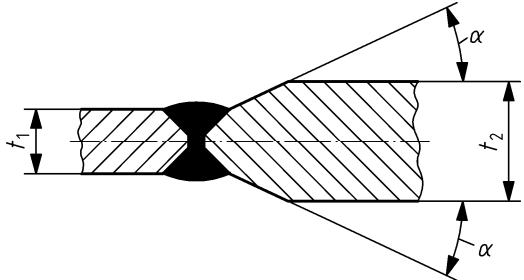
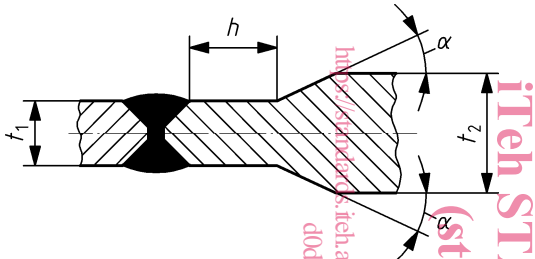
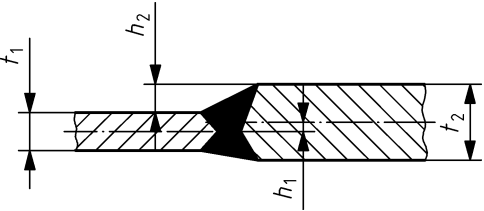
no.	Figure	Application/ condition	Note	Reference to EN ISO 9692-1:2003 and EN ISO 9692- 2:1998
<b>1.1 Butt joints in plates of different thickness</b>				
1.1.1		$\alpha \leq 30^\circ$ $t_1 < t_2$	In case of severe service conditions, the design shall be in accordance with Figures 1.1.2 and 1.1.3.  $e \leq 0,1 t_1$ max. 2 mm (for one side welding)	1.5 and 2.3
1.1.2		$\alpha \leq 30^\circ$ $t_1 < t_2$		1.5, 2.3 and 2.5.2
1.1.3		$\alpha \leq 30^\circ$ $t_1 < t_2$	for ultrasonic test $h > 3 t_1$ , but min. 20 mm for radiographic test $h \geq t_1$	1.5, 2.3 and 2.5.2
1.1.4		$\alpha \leq 30^\circ$	see 1.1.1	2.5.1

Table 1 (continued)

no.	Figure	Application/ condition	Note	Reference to EN ISO 9692-1:2003 and EN ISO 9692- 2:1998
1.1.5		$\alpha \leq 30^\circ$		2.5.1
1.1.6		$\alpha \leq 30^\circ$	for ultrasonic test $h > 3 t_1$ , but min. 20 mm for radiographic test $h \geq t_1$	2.5.1

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Table 1 (continued)

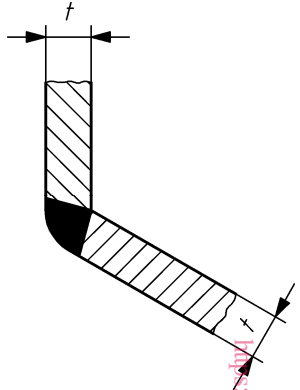
no.	Figure	Application/ condition	Note	Reference to EN ISO 9692-1:2003 and EN ISO 9692- 2:1998
1.1.7		<p>longitudinal weld:</p> <p><math>h_1 \leq 0,15 t_1</math>; maximum 3 mm</p> <p><math>h_2 \leq 0,3 t_1</math>; maximum 6 mm</p> <p><math>t_2 - t_1 \leq 0,3 t_1</math>; maximum 6 mm</p> <p>circumferential weld:</p> <p><math>h_1 \leq 0,2 t_1</math>; maximum 5 mm</p> <p><math>h_2 \leq 0,4 t_1</math>; maximum 10 mm</p> <p><math>t_2 - t_1 \leq 0,4 t_1</math>; maximum 10 mm</p>		

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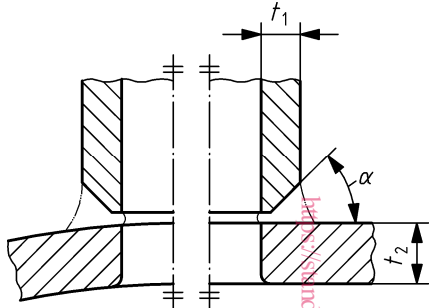
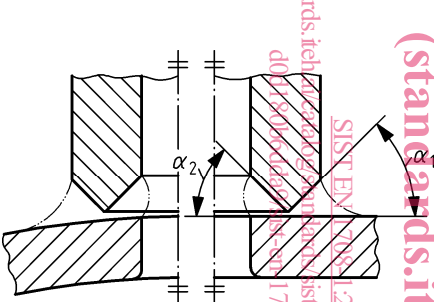
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Table 1 (continued)

no.	Figure	Application/ condition	Note	Reference to EN ISO 9692-1:2003 and EN ISO 9692- 2:1998
1.1.8			Fully penetrated or sealing run	

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Table 2 — Branches without compensation rings

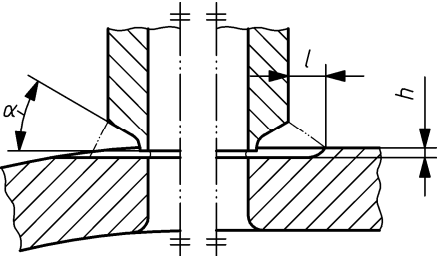
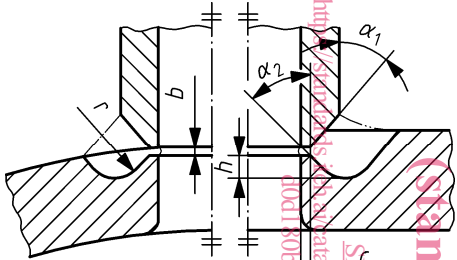
no.	Figure	Application/ condition	Note	Reference to EN ISO 9692-1:2003 and EN ISO 9692- 2:1998
These connections include the provision of compensation by thickening of the branch and/or shell.				
<p align="center"><b>2.1 Set-on branches</b> (for special branch connections see 13.2)</p> <p>If the shell is stressed in direction of the thickness, it should be examined for laminations before setting on the branch.</p>				
2.1.1		$t_1 < 0,5 t_2$ $45^\circ \leq \alpha \leq 60^\circ$		1.9.1 or 1.11 one side welding
2.1.2		$45^\circ \leq \alpha_1 \leq 60^\circ$ $30^\circ \leq \alpha_2 \leq 45^\circ$	These details are recommended only where the bore of the branch is readily accessible for welding. The joint should be back-gouged from the side most accessible and suitable for this purpose generally from the outside.	2.9.1, 2.9.2 or 2.11

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Table 2 (continued)

no.	Figure	Application/ condition	Note	Reference to EN ISO 9692-1:2003 and EN ISO 9692- 2:1998
2.1.3		$\alpha_1 = 30^\circ$ $\alpha_2 = 45^\circ$	See 2.1.2	
2.1.4		no gap $c \geq 1,5 \text{ mm}$ $r \geq 5 \text{ mm}$ $\alpha = 30^\circ$	<ul style="list-style-type: none"> <li>— Joints generally used for small branch to shell diameter ratios.</li> <li>— Diameter <math>d</math> to be bored out after welding to remove the weld root, in order to ensure sound weld.</li> </ul>	1.9.1 or 1.11 one side welding

Table 2 (continued)

no.	Figure	Application/ condition	Note	Reference to EN ISO 9692-1:2003 and EN ISO 9692- 2:1998
2.1.5		<p><math>10 \text{ mm} \leq l \leq 15 \text{ mm}</math>  <math>h \geq 3 \text{ mm}</math>  <math>30^\circ \leq \alpha \leq 45^\circ</math></p>	<p>Joints generally used for small branch to shell diameter ratios.</p>	<p>1.11 one side welding</p>
2.1.6		<p>For branches up to approximately 100 mm bore.  <math>1 \text{ mm} \leq b \leq 3 \text{ mm}</math>  <math>h \leq 5 \text{ mm}</math>  <math>c = 1 \text{ mm}</math>  <math>r = 7 \text{ mm}</math>  <math>\alpha_1 \leq 45^\circ</math>  <math>\alpha_2 \leq 45^\circ</math></p>	<p>Generally used for the attachment of branches to thick-walled shells.</p>	

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