SVENSK STANDARD
SS-EN 1708-1:2010

Fastställd/Approved: 2010-01-21
Publicerad/Published: 2010-03-10
Utgåva/Edition: 2
Språk/Language: engelska/English
ICS: 25.160.40

Svetsning – Svetsförband i stål – Del 1: Trycksatta komponenter

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

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188

SWEDISH STANDARDS INSTITUTE

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188

Hitta rätt produkt och ett leveranssätt som passar dig

Standarder
Genom att följa gällande standard både effektiviserar och säkrar du ditt arbete. Många standarder ingår dessutom ofta i paket.

Tjänster
Abonnemang är tjänsten där vi uppdaterar dig med aktuella standarder när förändringar sker på dem du valt att abonnera på. På så sätt är du säker på att du alltid arbetar efter rätt utgåva.
e-nav är vår online-tjänst som ger dig och dina kollegor tillgång till standarder ni valt att abonnera på dygnet runt. Med e-nav kan samma standard användas av flera personer samtidigt.

Leveranssätt
Du väljer hur du vill ha dina standarder levererade. Vi kan erbjuda dig dem på papper och som pdf.

Andra produkter
Vi har böcker som underlättar arbetet att följa en standard. Med våra böcker får du ökad förståelse för hur standarder ska följas och vilka fördelar den ger dig i ditt arbete. Vi tar fram många egna publikationer och fungerar även som återförsäljare. Det gör att du hos oss kan hitta över 500 unika titlar. Vi har även tekniska rapporter, specifikationer och "workshop agreement". Matriser är en översikt på standarder och handböcker som bör läsas tillsammans. De finns på sis.se och ger dig en bra bild över hur olika produkter hör ihop.

Standardiseringsprojekt
Du kan påverka innehållet i framtida standarder genom att delta i någon av SIS ca 400 Tekniska Kommittéer.

Find the right product and the type of delivery that suits you

Standards
By complying with current standards, you can make your work more efficient and ensure reliability. Also, several of the standards are often supplied in packages.

Services
Subscription is the service that keeps you up to date with current standards when changes occur in the ones you have chosen to subscribe to. This ensures that you are always working with the right edition.
e-nav is our online service that gives you and your colleagues access to the standards you subscribe to 24 hours a day. With e-nav, the same standards can be used by several people at once.

Type of delivery
You choose how you want your standards delivered. We can supply them both on paper and as PDF files.

Other products
We have books that facilitate standards compliance. They make it easier to understand how compliance works and how this benefits you in your operation. We produce many publications of our own, and also act as retailers. This means that we have more than 500 unique titles for you to choose from. We also have technical reports, specifications and workshop agreements. Matrices, listed at sis.se, provide an overview of which publications belong together.

Standardisation project
You can influence the content of future standards by taking part in one or other of SIS's 400 or so Technical Committees.

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188

Europastandarden EN 1708-1:2009 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 1708-1:2009.

Denna standard ersätter SS-EN 1708-1, utgåva 1 och SS-EN 1708-1/A1:2004, utgåva 1.

The European Standard EN 1708-1:2009 has the status of a Swedish Standard. This document contains the official English version of EN 1708-1:2009.

This standard supersedes the Swedish Standard SS-EN 1708-1, edition 1 and SS-EN 1708-1/A1:2004, edition 1.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00.
Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), tel +46 8 555 520 00.
Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

SIS Förlag AB, SE 118 80 Stockholm, Sweden. Tel: +46 8 555 523 10. Fax: +46 8 555 523 11.
E-mail: sis.sales@sis.se Internet: www.sis.se

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188

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

This European Standard was approved by CEN on 28 November 2009.

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

CEN members are the national standards bodies of 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 United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

© 2010 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. EN 1708-1:2010: E

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188

Contents

Page

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

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

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188

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.

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188

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.

2 Normative references

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

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188

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

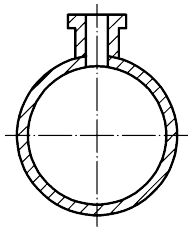


Figure 1 — Transversal section

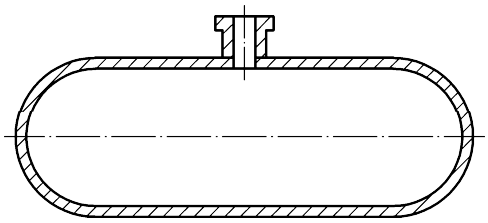


Figure 2 — Longitudinal section

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

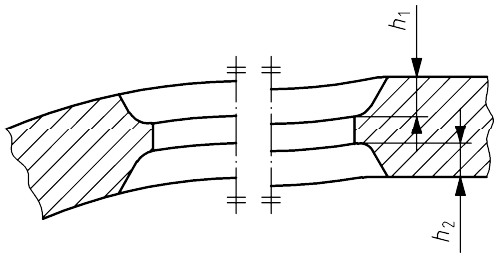
It will be noted that the internal edges on the bores of branches are shown partially radiused (for example see Table 2, no. 2.1.6) because a stress concentration occurs at this point. The rounding of the edges is recommended when the branch connection is subjected to severe service conditions like fatigue,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

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188

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.

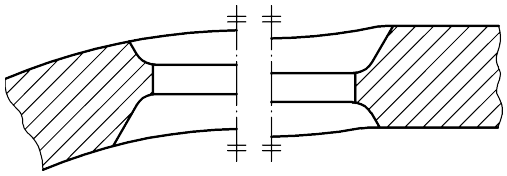


Figure 4 — Preparation of holes in the shell

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.

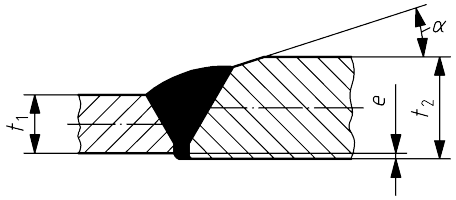
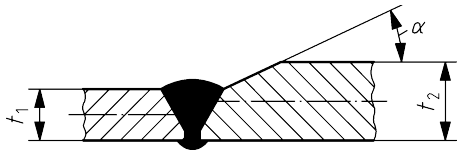
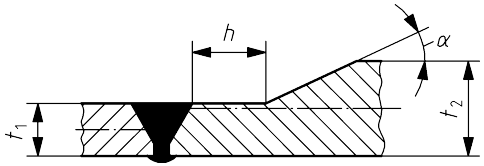
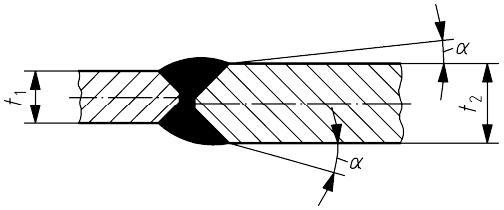
3.7 Oblique and tangential branches

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
1.1 Butt joints in plates of different thickness				
1.1.1		$\alpha \leq 30°$ $t_1 < t_2$	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		$\alpha \leq 30°$ $t_1 < t_2$		1.5, 2.3 and 2.5.2
1.1.3		$\alpha \leq 30°$ $t_1 < t_2$	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		$\alpha \leq 30°$	see 1.1.1	2.5.1

This preview is downloaded from www.sis.se. Buy the entire standard via https://www.sis.se/std-72188