

Metal-arc welding with covered electrode,
gas-shielded metal-arc welding and gas welding
Joint preparation for steel
(ISO 9692:1992)
English version of DIN EN 29692

DIN
EN 29692

This standard incorporates the English version of **ISO 9692**.

ICS 25.160.10

Supersedes DIN 8551
Part 1, June 1976 edition.

Lichtbogenhandschweißen; Schutzgasschweißen und Gasschweißen; Schweiß-
nahtvorbereitung für Stahl (ISO 9692:1992)

European Standard EN 29692:1993 has the status of a DIN Standard.

National foreword

This standard has been published in accordance with a decision taken by CEN/BT to adopt, without alteration, International Standard ISO 9692 as a European Standard.

The responsible German body involved in its preparation was the *Normenausschuß Schweißtechnik* (Welding Standards Committee).

The dimensions and the dimensional ranges given in this standard are based on experience. In order to make the scope as comprehensive as possible, wide tolerances have been specified for angles, gaps and root face thickness. The joint type shall be selected as a function of the materials employed, the welding position and the welding process, subject to the weld being fully penetrated. This requires the selection of appropriate welding parameters and, if necessary, root machining in the case of double-sided welding.

The symbols for joint types are intended to facilitate communication. If necessary, the designation may be completed by an additional indication of the required dimensions.

The DIN Standards corresponding to the International Standards referred to in clause 2 are listed below:

ISO Standard	DIN Standard
ISO 2553	DIN 1912 Part 5 and Supplement 1 to DIN 1912 Part 5
ISO 4063	DIN EN 24 063
ISO 6947	DIN ISO 6947

Standards referred to

(and not included in **Normative references**)

DIN 1912 Part 5	Symbolical representation of welded, soldered and brazed joints; symbols and dimensioning
Supplement 1 to DIN 1912 Part 5	Symbolical representation of welds, soldering and brazing joints; symbols and dimensioning; examples of joints as specified in ISO 2553
DIN EN 24 063	Welding, brazing, soldering and braze welding of metals; list of process names and reference numbers for use in technical documentation (ISO 4063:1990)

Continued overleaf.
EN comprises 15 pages.

Previous editions

DIN 8551 Part 1: 01.59, 06.76; DIN 8551 Part 2: 01.59; DIN 8551 Part 5: 09.67.

Amendments

DIN 8551 Part 1, June 1976 edition, has been superseded by the specifications of EN 29692, which is identical to ISO 9692.

International Patent Classification

B 23 K 003/16

B 23 K 005/00

B 23 K 005/02

B 23 K 009/00

B 23 K 009/235

B 23 K 031/00

UDC [621.791.5+.75]:621.791.02

Descriptors: Arc welding, gas-shielded welding, gas welding, welding electrodes, covered electrodes, welded joints, joint preparation, dimensions.

English version**Metal-arc welding with covered electrode,
gas-shielded metal-arc welding and gas welding**Joint preparation for steel
(ISO 9692:1992)Soudage à l'arc avec électrode enrobée,
soudage à l'arc sous protection gazeuse
et soudage aux gaz; préparations de joint
sur acier (ISO 9692:1992)Lichtbogenhandschweißen, Schutzgas-
schweißen und Gasschweißen, Schweiß-
nahtvorbereitung für Stahl
(ISO 9692:1992)

This European Standard was approved by CEN on 1994-02-04 and is identical to the ISO Standard as referred to.

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

CENEuropean Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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

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EN 29 692:1994**Foreword**

In 1992, CEN/BT decided to submit International Standard ISO 9692:1992 Metal-arc welding with covered electrode, gas-shielded metal-arc welding and gas welding; joint preparations for steel

to the Unique Acceptance Procedure in accordance with resolution BTS 2 C 48/1992.

The result was positive.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by August 1994 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

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

Endorsement notice

The text of the International Standard ISO 9692:1992 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in annex ZA (normative).

Introduction

This International Standard defines the parameters characterizing the joint preparation and the collection of well-experienced values and shapes representing more design limits than manufacturing limits.

The requirements given in this International Standard have been compiled on the basis of experience, and contain dimensions for types of joint preparation that are generally found to provide suitable welding conditions. However, the extended field of application makes it necessary to give a range of dimensions. The dimension ranges specified represent design limits and are not tolerances for manufacturing purposes. Manufacturing limits depend, for instance, on welding process, parent metal, welding position, quality level, etc. Therefore, the requirements given are more a recommendation than a specification. Because of the common character of this International Standard, the examples given cannot be regarded as the only solution for the selection of a joint type.

Specific fields of application and manufacturing requirements (e.g. pipeline construction) may be covered by selected ranges specified in other standards adapted from this basic International Standard.

1 Scope

This International Standard pertains to types of joint preparation for metal-arc welding with covered electrode, gas-shielded metal-arc welding and gas welding on steel (see clauses 3 and 4).

It applies to joint preparation for fully-penetrated butt welds, except in the case of some recommended types of joint preparation (reference numbers 3.10A, 3.10B and 4.10.10C); if a butt weld is not possible or necessary, special arrangements need to be made. For not-fully-penetrated butt welds, types of joint preparation and dimensions differing from those specified in this International Standard may be stipulated.

The root gaps referred to in this International Standard are those gaps presented after tack welding, if used.

Consideration should be given to altering the joint preparation details (where appropriate) to facilitate temporary backing, "one-sided welding", etc.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid international Standards.

ISO 2553:1992, *Welded, brazed and soldered joints — Symbolic representation on drawings.*

ISO 4063:1990, *Welding, brazing, soldering and braze welding of metals — Nomenclature of processes and reference numbers for symbolic representation on drawings.*

ISO 6947:1990, *Welds — Working positions — Definitions of angles of slope and rotation.*

3 Materials

Joint preparations recommended in this International Standard are suitable for all kinds of steel.

4 Welding processes

Joint preparations recommended in this International Standard are suitable for welding carried out in accordance with the following processes as specified in tables 1 to 4; combinations of different processes are possible:

- a) (3) gas welding; fuel gas welding.
- b) (111) metal-arc welding with covered electrode; (manual metal-arc welding); shielded metal-arc welding
- c) (13) gas-shielded metal-arc welding; gas metal-arc welding:
 - (131) metal-arc inert gas welding; MIG welding;
 - (135) metal-arc active gas welding; MAG welding.
- d) (141) tungsten inert gas welding; TIG welding; gas tungsten arc welding.

NOTE 1 The numbers in parentheses refer to the reference number of the welding process specified in ISO 4063.

5 Finish

The longitudinal edges of the root face should be de-burred and may be chamfered (up to 2 mm).

6 Type of joint preparation

The recommended types of joint preparation and dimensions are specified in tables 1 to 4.

NOTE 2 The reference numbers have been determined in accordance with the following scheme:

The first digit corresponds to the number of the table, the second digit or numerical group corresponds to the number in ISO 2553, the third indication, expressed by a letter, considers variants of joint preparation.

Table 1 — Joint preparations for butt welds, welded from one side

Reference No.	Workpiece thickness	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross-section	Joint preparation				
						Angle ¹⁾ α, β	Gap ²⁾ b	Thickness of root face c	Depth of preparation v	
1.1	$r \leq 2$	Butt weld between plates with raised edges	∩			Angle ¹⁾	Gap ²⁾	Thickness of root face	Depth of preparation	Recommended welding process ³⁾ (reference number in accordance with ISO 4063)
						—	—	—	—	
1.2	$r \leq 4$ $3 < r \leq 8$	Square butt weld	=			Angle ¹⁾	Gap ²⁾	Thickness of root face	Depth of preparation	Recommended welding process ³⁾ (reference number in accordance with ISO 4063)
						—	$b \approx r$	—	—	
1.3	$3 \leq r \leq 10$	Single-V butt weld	∇			Angle ¹⁾	Gap ²⁾	Thickness of root face	Depth of preparation	Recommended welding process ³⁾ (reference number in accordance with ISO 4063)
						$40^\circ \leq \alpha \leq 60^\circ$	$b \leq 4$	$c \leq 2$	—	

Reference No.	Workpiece thickness	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross-section	Joint preparation				Recommended welding process ³⁾ (reference number in accordance with ISO 4063)	Remarks
						Angle ¹⁾ α, β	Gap ²⁾ b	Thickness of root face c	Depth of preparation a		
1.14	$r > 16$	Steep-flanked single-V butt weld				$5^\circ \leq \beta \leq 20^\circ$	$5 \leq b \leq 15$	—	—	111 131 135	With backing strip
1.5	$5 \leq r \leq 40$	Single-V butt weld with broad root face				$\alpha \approx 60^\circ$	$1 \leq b \leq 4$	$2 \leq c \leq 4$	—	111 131 135 141	—
1.3.7	$r > 12$	Single-U butt weld with V root				$60^\circ \leq \alpha \leq 90^\circ$ $8^\circ \leq \beta \leq 12^\circ$	$1 \leq b \leq 3$	—	$a \approx 4$	111 131 135 141	$R = 6 \text{ to } 9$

Reference No.	Workpiece thickness	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross-section	Joint preparation				Recommended welding process ³⁾ (reference number in accordance with ISO 4063)	Remarks
						Angle ¹⁾ α, β	Gap ²⁾ b	Thickness of root face c	Depth of preparation a		
1.3.3	$r > 12$	Single-V butt weld with V root				$70^\circ \leq \alpha \leq 90^\circ$ $10^\circ \leq \beta \leq 15^\circ$	$2 \leq b \leq 4$	≈ 3	—	111 131 135 141	—
1.7	$r > 12$	Single-U butt weld				$8^\circ \leq \beta \leq 12^\circ$	$1 \leq b \leq 4$	$c \leq 3$	—	111 131 135 141	—
1.4	$3 < r \leq 10$	Single-bevel butt weld				$35^\circ \leq \beta \leq 60^\circ$	$2 \leq b \leq 4$	$1 \leq c \leq 2$	—	111 131 135 141	—

Reference No.	Workpiece thickness	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross-section	Joint preparation				Recommended welding process ³⁾ (reference number in accordance with ISO 4063)	Remarks
						Angle ¹⁾ α, β	Gap ²⁾ b	Thickness of root face c	Depth of preparation h		
1.15	$t > 16$	Steep-flanked single-bevel butt weld				$15^\circ \leq \beta \leq 30^\circ$	$6 \leq b \leq 12$	—	—	111 131 135	With backing strip
1.8	$t > 16$	Single-J butt weld				$10^\circ \leq \beta \leq 20^\circ$	$2 \leq b \leq 4$	$1 \leq c \leq 2$	—	111 131 135 141 ³⁾	—

1) Angles are also larger and/or asymmetric for welding in position PC according to ISO 6947 (horizontal position).

2) Dimensions given apply to the beveled condition.

3) The indication of the welding process does not mean that it is applicable for the whole range of workpiece thicknesses.

4) In special cases also applicable for 111, 131, 135, 141.

5) Symbol not yet standardized in ISO 2553.

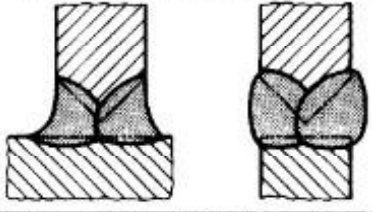
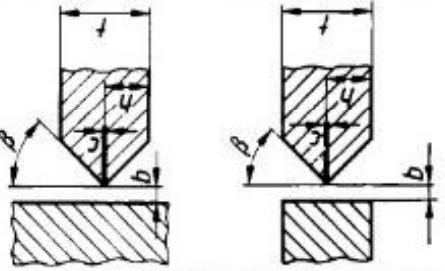
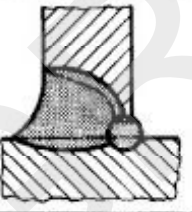
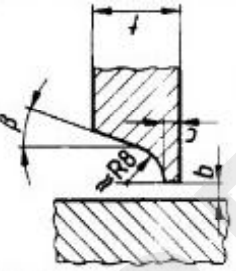
Table 2 — Joint preparations for butt welds, welded from both sides

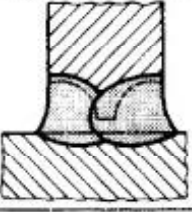
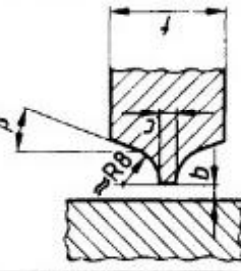
Reference No.	Workpiece thickness	Designation	Combined symbols (in accordance with ISO 2553)	Illustration	Cross-section	Joint preparation				Recommended welding process ³⁾ (reference number in accordance with ISO 4063)	Remarks
						Angle ¹⁾ α, β	Gap ²⁾ b	Thickness of root face c	Depth of preparation h		
2.2	$t \leq 8$	Square butt weld				—	$b \approx \frac{t}{2}$	—	—	111 141	—
2.3.9	$3 \leq t \leq 40$	Single-V butt weld with run sealing				$\alpha \approx 60^\circ$	$b \leq 3$	$c \leq 2$	—	111 141	—
2.5.9	$t > 10$	Single-V butt weld with root face and sealing run				$40^\circ \leq \alpha \leq 60^\circ$	$1 \leq b \leq 3$	$2 \leq c \leq 4$	—	131 135	In special cases, also possible for smaller workpiece thicknesses and welding process 3

Dimensions in millimetres

Reference No.	Workpiece thickness	Designation	Combined symbols (in accordance with ISO 2553)	Illustration	Cross-section	Joint preparation				Recommended welding process ¹⁾ (reference number in accordance with ISO 4063)	Remarks
						Angle ¹⁾ α, β	Gap ²⁾ b	Thickness of root face c	Depth of preparation h		
2.5.5	$t > 10$	Double-V butt weld with broad root face				$\alpha \approx 60^\circ$	$1 \leq b \leq 4$	$2 \leq c \leq 6$	$h_1 = h_2 = \frac{t-c}{2}$	111 141	—
2.3.3	$t > 10$	Double-V butt weld				$\alpha \approx 60^\circ$	$1 \leq b \leq 3$	$c \leq 2$	$h = \frac{t}{2}$	111 141	—
2.3.3	$t > 10$	Asymmetrical double-V butt weld				$\alpha_1 \approx 60^\circ$ $\alpha_2 \approx 60^\circ$	$1 \leq b \leq 3$	$c \leq 2$	$h = \frac{t}{3}$	111 141	—

Reference No.	Workpiece thickness	Designation	Combined symbols (in accordance with ISO 2553)	Illustration	Cross-section	Joint preparation				Recommended welding process ¹⁾ (reference number in accordance with ISO 4063)	Remarks
						Angle ¹⁾ α, β	Gap ²⁾ b	Thickness of root face c	Depth of preparation h		
2.7.9	$t > 12$	Single-U butt weld with sealing run				$8^\circ \leq \beta \leq 12^\circ$	$1 \leq b \leq 3$	$c \approx 5$	—	111 131 135 141	—
2.7.7	$t \geq 30$	Double-U butt weld				$8^\circ \leq \beta \leq 12^\circ$	$b \leq 3$	$c \approx 3$	$h \approx \frac{t-c}{2}$	111 131 135 141	This type of joint preparation can also be produced asymmetrically in a similar manner to the asymmetrical double-V butt weld.
2.4.9	$3 \leq t \leq 30$	Single bevel butt weld with sealing run				$35^\circ \leq \beta \leq 60^\circ$	$1 \leq b \leq 4$	$c \leq 2$	—	111 131 135 141	—

Reference No.	Workpiece thickness	Designation	Combined symbols (in accordance with ISO 2553)	Illustration	Cross-section	Joint preparation				Recommended welding process ³⁾ (reference number in accordance with ISO 4063)	Remarks
						Angle ¹⁾	Gap ²⁾	Thickness of root face	Depth of preparation		
2.4.4	$t > 10$	Double-bevel butt weld	K			$35^\circ \leq \beta \leq 60^\circ$	$1 \leq b \leq 4$	$c \leq 2$	$h = \frac{t}{2}$ or $h = \frac{t}{3}$	111 131 135 141	This type of joint preparation can also be produced asymmetrically in a similar manner to the asymmetrical double-V butt weld.
2.8.9	$t > 16$	Single-J butt weld with sealing run	J			$10^\circ \leq \beta \leq 20^\circ$	$1 \leq b \leq 3$	$c \geq 2$	-	111 131 135 141 ^{a)}	-

Reference No.	Workpiece thickness	Designation	Combined symbols (in accordance with ISO 2553)	Illustration	Cross-section	Joint preparation				Recommended welding process ³⁾ (reference number in accordance with ISO 4063)	Remarks
						Angle ¹⁾	Gap ²⁾	Thickness of root face	Depth of preparation		
2.8.8	$t > 30$	Double-J butt weld	J			$10^\circ \leq \beta \leq 20^\circ$	$b \leq 3$	$c \geq 2$	-	111 131 135 141 ^{a)}	This type of joint preparation can also be produced asymmetrically in a similar manner to the asymmetrical double-V butt weld.

1) Angles are also larger and/or asymmetric for welding in position PC according to ISO 6947 (horizontal position).
2) Dimensions given apply to the tacked condition.
3) The indication of the welding process does not mean that it is applicable for the whole range of workpiece thicknesses.

Table 3 — Joint preparations for fillet welds, welded from one side

Dimensions in millimetres

Reference No.	Weld			Illustration	Cross-section	Joint preparation		Recommended welding process ¹⁾ (reference number in accordance with ISO 4063)	
	Workpiece thickness	Designation	Symbol (in accordance with ISO 2553)			Dimensions	Angle		Gap
	t					α, β	b		
3.10A	$t_1 > 2$ $t_2 > 2$	Fillet weld, T-joint				$70^\circ < \alpha < 100^\circ$	$b < 2$	3 111 131 135 141	
3.10B	$t_1 > 2$ $t_2 > 2$	Fillet weld, lap joint				—	—	$b < 2$	3 111 131 135 141
3.10C	$t_1 > 2$ $t_2 > 2$	Fillet weld, corner joint				$60^\circ < \alpha < 120^\circ$	—	$b < 2$	3 111 131 135 141

1) The indication of the welding process does not mean that it is applicable for the whole range of workpiece thicknesses.

Table 4 — Joint preparations for fillet welds, welded from both sides

Dimensions in millimetres

Reference No.	Weld			Illustration	Cross-section	Joint preparation		Recommended welding process ¹⁾ (reference number in accordance with ISO 4063)	
	Workpiece thickness	Designation	Combined symbols (in accordance with ISO 2553)			Dimensions	Angle		Gap
	t					α, β	b		
4.10.10A	$t_1 > 3$ $t_2 > 3$	Double fillet weld, corner joint (with gap)				$70^\circ < \alpha < 110^\circ$	$b < 2$	3 111 131 135 141	
4.10.10B	$t_1 > 2$ $t_2 > 5$	Double fillet weld, corner joint (without gap)				$60^\circ < \alpha < 120^\circ$	—	—	3 111 131 135 141
4.10.10C	$2 < t_1 < 4$ $2 < t_2 < 4$	Double fillet weld				—	—	$b < 2$	3 111 131 135 141
	$t_1 > 4$ $t_2 > 4$				—	—	—	—	

1) The indication of the welding process does not mean that it is applicable for the whole range of workpiece thicknesses.

Annex ZA (normative)**Normative references to international publications
with their relevant European publications**

This European Standard incorporates by dated or undated reference, 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 (including amendments).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN</u>	<u>Year</u>
ISO 2553	1992	Welded, brazed and soldered joints — Symbolic representation on drawings	—	—
ISO 4063	1990	Welding, brazing, soldering and braze welding of metals — Nomenclature of processes and reference numbers for symbolic representation on drawings Bilingual edition	EN 24063	1992
ISO 6947	1990	Welds — Working positions — Definitions of angles of slope and rotation	—	—