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English version

Welding and allied processes — Joint preparation — Part 2: Submerged arc welding of steels

(ISO 9692-2:1998)

Soudage et techniques connexes — Préparation de joints — Partie 2: Soudage à l'arc sous flux en poudre des aciers
(ISO 9692-2:1998)

Foreword

The text of the International Standard ISO 9692-2:1998 has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS.

This European Standard supersedes EN 29692:1994.

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of an identical text or by endorsement, at the latest by October 1998, and conflicting national standards shall be withdrawn at the latest by October 1998.

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.

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.

Endorsement notice

The text of the International Standard ISO 9692-2:1998 was approved by CEN as a European Standard without any modification.

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INTERNATIONAL STANDARD

ISO 9692-2

First edition
1998-04-01

Welding and allied processes — Joint preparation —

Part 2:
Submerged arc welding of steels

Soudage et techniques connexes — Préparation de joints —

Partie 2: Soudage à l'arc sous flux en poudre des aciers

Reference number
ISO 9692-2:1998(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9692-2 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes,* Subcommittee SC 7, *Representation and terms.*

ISO 9692 consists of the following parts, under the general title *Welding and allied processes — Joint preparation.*

— *Part 1: Metal arc welding of steel with covered electrode (currently ISO 9692:1992);*

— *Part 2: Submerged arc welding of steels;*

— *Part 3: Manual welding of aluminium and its alloys.*

Descriptors: Welding, arc welding, submerged arc welding, welded joints, butt joints, specifications, preparation.

Introduction

The intention of this International Standard is to use it as an addition to ISO 9692:1992 (which is to become ISO 9692-1, see Foreword) *Metal-arc welding with covered electrode, gas-shielded metal-arc welding and gas welding — Joint preparations for steel.* It follows similar rules and the same layout. Therefore, the introduction given in ISO 9692 also applies.

1 Scope

This part of ISO 9692 applies to types of joint preparation for submerged arc welding with one wire electrode (process 121 according to ISO 4063) on steel.

This part of ISO 9692 covers only the welding positions PA and PB according to ISO 6947. In case PC is used, special preparation will be necessary.

It applies to fully penetrated welds. For partly penetrated welds, types of joint preparation, shapes and dimensions may differ from the listed proposals if they are specified in the relevant application standard or agreed by parties concerned.

If the root is welded by a different arc welding process (see ISO 4063), the joint preparation according to ISO 9692 should be taken into account.

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 listed 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 3834-1:1994, *Quality requirements for welding — Fusion welding of metallic materials — Part 1: Guidelines for selection and use.*

ISO 3834-2:1994, *Quality requirements for welding — Fusion welding of metallic materials — Part 2: Comprehensive quality requirements.*

ISO 3834-3:1994, *Quality requirements for welding — Fusion welding of metallic materials — Part 3: Standards quality requirements.*

ISO 3834-4:1994, *Quality requirements for welding — Fusion welding of metallic materials — Part 4: Elementary quality requirements.*

ISO 4063:—[1], *Welding and allied processes — Nomenclature of processes and reference numbers.*

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

ISO 9692:1992[2], *Metal-arc welding with covered electrode, gas-shielded metal arc welding and gas welding — Joint preparations for steel.*

ISO 9956-2:1995 and Amd.1 — [3], *Specification and approval of welding procedures for metallic materials — Part 2: Welding procedure specification for arc welding.*

3 Materials

Joint preparations recommended in this part of ISO 9692 are suitable for all types of weldable steel.

4 Types of joint preparation

The recommended types of joint preparation and dimensions are specified in Table 1 and Table 2.

The root gaps referred to in this part of ISO 9692 are those gaps presented after tack welding, if used.

This part of ISO 9692 gives no dimensions or type of possibly used backing materials. Root runs may also be used as backing. They may influence the quality requirements for welding (according to the relevant part of ISO 3834) and the preparation as given in Table 1 and Table 2. They shall be part of the welding procedure specification according to ISO 9956-2.

According to the application standard or agreement between contracting parties, it may be necessary to grind the slag before welding the next run.

NOTE 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, takes into account the variants of joint preparations.

[1] To be published. (Revision of ISO 4063:1990)
[2] See Foreword.
[3] To be published.

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

Dimensions in millimetres

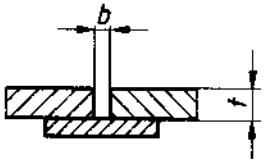
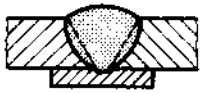
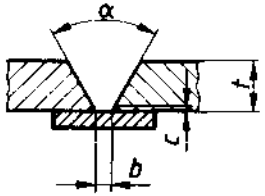
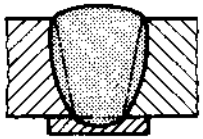
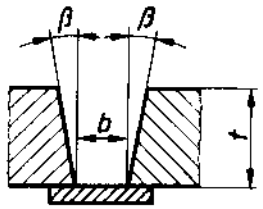
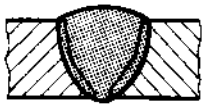
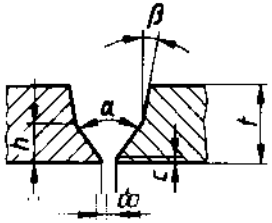
Weld					Joint preparation					Welding position	Remarks
Ref. No.	Workpiece thickness t	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross section	Angle α, β	Gap b Radius R	Thickness of root face c	Depth of preparation h	(in accordance with ISO 6947)	
1.2	$3 \leqslant t \leqslant 12$	Square butt weld				—	$b \leqslant 0{,}5$ t max. 5	—	—	PA	With backing minimal thickness for backing: 5 mm or 0,5 t
1.3	$10 \leqslant t \leqslant 20$	Single-V butt weld				$30° \leqslant \alpha \leqslant 50°$	$4 \leqslant b \leqslant 8$	$c \leqslant 2$	—	PA	With backing minimal thickness for backing: 5 mm or 0,5 t
1.14	$t > 20$	Steep-flanked single-V butt weld				$4° \leqslant \beta \leqslant 10°$	$10 \leqslant b \leqslant 25$	—	—	PA	With backing minimal thickness for backing: 5 mm or 0,5 t
1.3.3	$t > 12$	Single-V butt weld with V root				$60° \leqslant \alpha \leqslant 70°$ $4° \leqslant \beta \leqslant 10°$	$1 \leqslant b \leqslant 4$	$0 \leqslant c \leqslant 3$	$4 \leqslant h \leqslant 6$	PA	Root run welded with optional welding process

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

Dimensions in millimetres

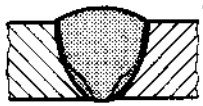
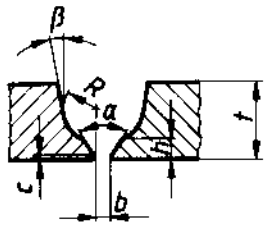
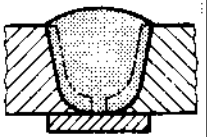
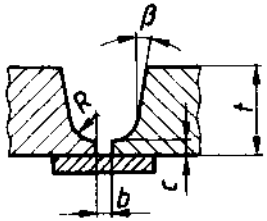
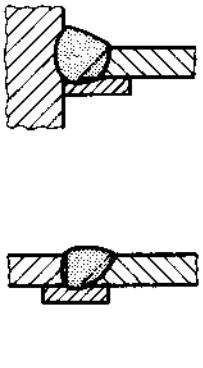
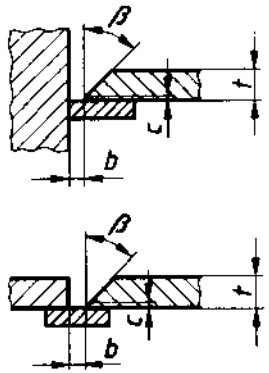
Weld					Joint preparation					Welding position (in accordance with ISO 6947)	Remarks
Ref. No.	Workpiece thickness t	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross section	Angle α, β	Gap b Radius R	Thickness of root face c	Depth of preparation h		
1.3.7	$t \geqslant 12$	Single-U butt weld with V root				$60° \leqslant \alpha \leqslant 70°$ $4° \leqslant \beta \leqslant 10°$	$1 \leqslant b \leqslant 4$ $5 \leqslant R \leqslant 10$	$0 \leqslant c \leqslant 3$	$4 \leqslant h \leqslant 6$	PA	Root run welded with optional welding process
1.7	$t \geqslant 30$	Single-U butt weld				$4° \leqslant \beta \leqslant 10°$	$1 \leqslant b \leqslant 4$ $5 \leqslant R \leqslant 10$	$2 \leqslant c \leqslant 3$	—	PA	With backing minimal thickness for backing: 5 mm or 0.5 t
1.4	$3 \leqslant t \leqslant 16$	Single-bevel butt welded				$30° \leqslant \beta \leqslant 50°$	$1 \leqslant b \leqslant 4$	$c \leqslant 2$	—	PA PB	With backing minimal thickness for backing: 5 mm or 0,5 t

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

Dimensions in milimeters

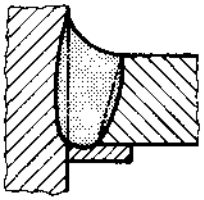
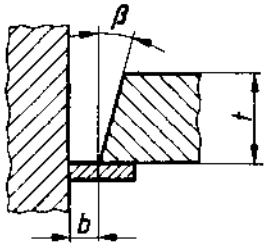
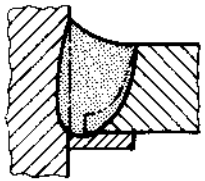
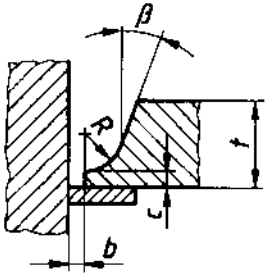
Weld					Joint preparation					Welding position (in accordance with ISO 6947)	Remarks
Ref. No.	Workpiece thickness t	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross section	Angle α, β	Gap b Radius R	Thickness of root face c	Depth of preparation h		
1.15	$t \geq 16$	Steep-flanked single-bevel butt weld	V			$8° \leq \beta \leq 10°$	$5 \leq b \leq 15$	—	—	PA PB	With backing minimal thickness for backing: 5 mm or 0,5 t
1.8	$t \geq 16$	Single-J butt weld	Y			$4° \leq \beta \leq 10°$	$2 \leq b \leq 4$ $5 \leq R \leq 10$	$2 \leq c \leq 3$	—	PA PB	With backing minimal thickness for backing: 5 mm or 0,5 t

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

Dimensions in millimetres

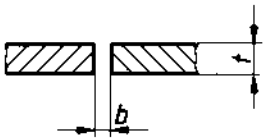
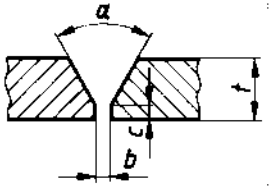
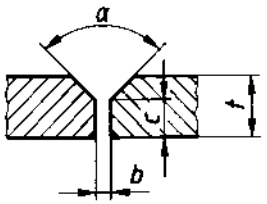
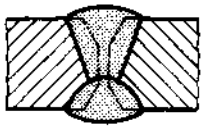
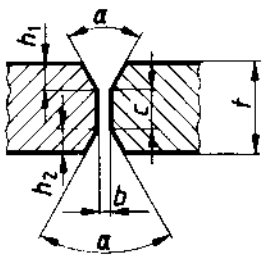
Weld					Joint preparation					Welding position	Remarks
Ref. No.	Workpiece thickness t	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross section	Angle α, β	Gap b Radius R	Thickness of root face c	Depth of preparation h	(in accordance with ISO 6947)	
2.2	$3 \leqslant t \leqslant 20$	Square butt weld				—	$b \leqslant 2$	—	—	PA	Width of gap shall be kept within small tolerances
2.5.9	$10 \leqslant t \leqslant 35$	Single-Y butt weld with broad root face and backing run				$30° \leqslant \alpha \leqslant 60°$	$b \leqslant 4$	$4 \leqslant c \leqslant 10$	—	PA	Root run may be welded by another fusion welding process.
2.5.2	$10 \leqslant t \leqslant 20$	Single-V butt weld with square butt weld				$60° \leqslant \alpha \leqslant 80°$	$b \leqslant 4$	$5 \leqslant c \leqslant 15$	—	PA	Root run may be welded by another fusion welding process.
2.5.5	$t \geqslant 16$	Double-V butt weld with broad root face				$30° \leqslant \alpha \leqslant 70°$	$b \leqslant 4$	$4 \leqslant c \leqslant 10$	$h_1 \approx h_2$	PA	—

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

Dimensions in millimetres

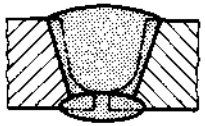
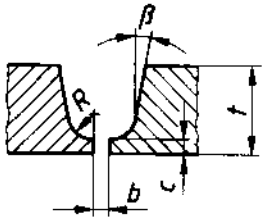
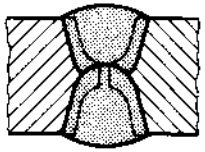
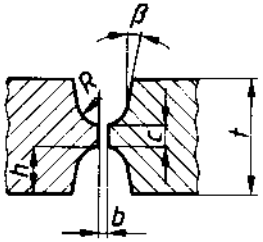
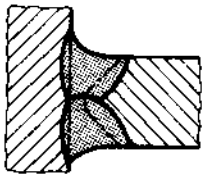
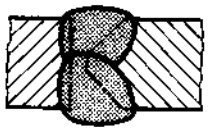
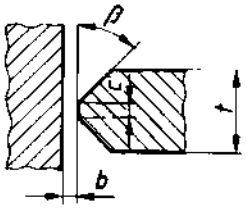
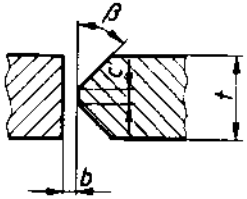
Weld					Joint preparation					Welding position	Remarks
Ref. No.	Workpiece thickness t	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross section	Angle α, β	Gap b Radius R	Thickness of root face c	Depth of preparation h	(in accordance with ISO 6947)	
2.7.9	$t \geqslant 30$	Single-U butt weld with backing run				$5° \leqslant \beta \leqslant 10°$	$b \leqslant 4$ $5 \leqslant R \leqslant 10$	$4 \leqslant c \leqslant 10$	—	PA	
2.7.7	$t \geqslant 50$	Double-U butt weld				$5° \leqslant \beta \leqslant 10°$	$b \leqslant 4$ $5 \leqslant R \leqslant 10$	$4 \leqslant c \leqslant 10$	$h = 0{,}5\ (t - c)$	PA	This type of joint preparation can also be produced asymmetrically in a similar manner to the asymmetrical double-V butt weld.
2.6.6	$t \geqslant 12$	Double-bevel butt weld with broad root face		 	 	$30° \leqslant \beta \leqslant 50°$	$b \leqslant 4$	$4 \leqslant c \leqslant 10$	—	PA PB	This type of joint preparation can also be produced asymmetrically in a similar manner to the asymmetrical double-V butt weld. Root run may be necessary.

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

Dimensions in millimetres

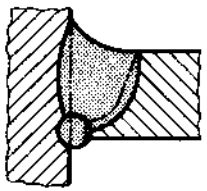
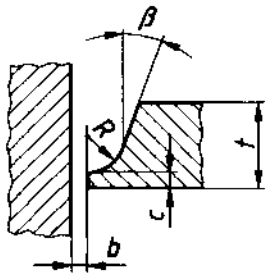
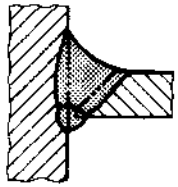
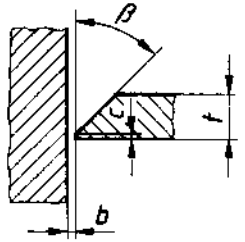
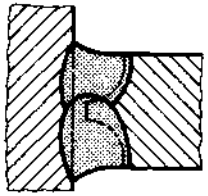
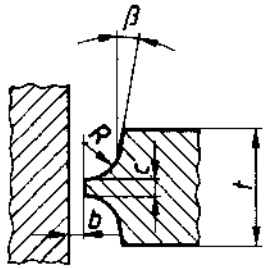
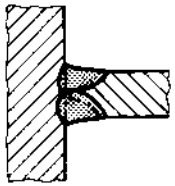
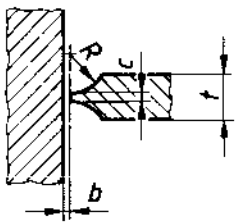
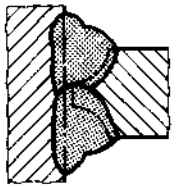
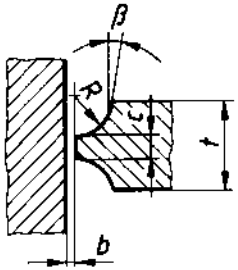
Weld					Joint preparation					Welding position (in accordance with ISO 6947)	Remarks
Ref. No.	Workpiece thickness t	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross section	Angle α, β	Gap b Radius R	Thickness of root face c	Depth of preparation h		
2.8.9	$t \geqslant 20$	Single-J butt weld with backing run				$5° \leqslant \beta \leqslant 10°$	$b \leqslant 4$ $5 \leqslant R \leqslant 10$	$4 \leqslant c \leqslant 10$	—	PA PB	Root run may be necessary.
2.1.9	$t < 12$	Single bevel butt weld with backing run				$30° \leqslant \beta \leqslant 50°$	$b \leqslant 4$	$c \leqslant 2$	—	PA PB	Root run may be necessary.
2.8.8 A	$t \geqslant 30$	Double-J butt weld				$5° \leqslant \beta \leqslant 10°$	$b \leqslant 4$ $5 \leqslant R \leqslant 10$	$2 \leqslant c \leqslant 7$	—	PA PB	This type of joint preparation can also be produced asymmetrically in a similar manner to the asymmetrical double-V butt weld. Root run may be necessary.

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

Dimensions in millimetres

Weld					Joint preparation					Welding position	Remarks
Ref. No.	Workpiece thickness t	Designation	Symbol (in accordance with ISO 2553)	Illustration	Cross section	Angle α, β	Gap b Radius R	Thickness of root face c	Depth of preparation h	(in accordance with ISO 6947)	
2.8.8 B	$t \leqslant 12$	Double-J butt weld for single pass welding process				—	$b \leqslant 2$ $5 \leqslant R \leqslant 10$	$2 \leqslant c \leqslant 3$	—	PA PB	Joint preparation for single pass welding process
2.8.8 C	$t > 12$	Double-J butt weld for multipass welding process				$5° \leqslant \beta \leqslant 10°$	$b \leqslant 4$ $5 \leqslant R \leqslant 10$	$2 \leqslant c \leqslant 7$	—	PA PB	Joint preparation for multi-pass welding process Root run may be necessary.