



SLOVENSKI STANDARD
oSIST prEN ISO 15614-4:2021
01-oktober-2021

Popis in kvalifikacija varilnih postopkov za kovinske materiale - Preskus varilnega postopka - 4. del: Varjenje aluminijevih ulitkov (ISO/DIS 15614-4:2021)

Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 4: Finishing welding of aluminium castings (ISO/DIS 15614-4:2021)

Anforderung und Qualifizierung von Schweißverfahren für metallische Werkstoffe - Schweißverfahrensprüfung - Teil 4: Fertigungsschweißen von Aluminiumguss (ISO/DIS 15614-4:2021)

(standards.iteh.ai)

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques - Épreuve de qualification d'un mode opératoire de soudage - Partie 4: Réparation par soudage pour les travaux de finition des pièces moulées en aluminium (ISO/DIS 15614-4:2021)

Ta slovenski standard je istoveten z: prEN ISO 15614-4

ICS:

25.160.10	Varilni postopki in varjenje	Welding processes
77.120.10	Aluminij in aluminijeve zlitine	Aluminium and aluminium alloys

oSIST prEN ISO 15614-4:2021

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 15614-4:2021](https://standards.iteh.ai/catalog/standards/sist/3c8fe1e3-d0aa-48b7-9635-737175883832/osist-pren-iso-15614-4-2021)

<https://standards.iteh.ai/catalog/standards/sist/3c8fe1e3-d0aa-48b7-9635-737175883832/osist-pren-iso-15614-4-2021>

DRAFT INTERNATIONAL STANDARD

ISO/DIS 15614-4

ISO/TC 44/SC 10

Secretariat: DIN

Voting begins on:
2021-09-07Voting terminates on:
2021-11-30

Specification and qualification of welding procedures for metallic materials — Welding procedure test —

Part 4: Finishing welding of aluminium castings

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques — Épreuve de qualification d'un mode opératoire de soudage —

Partie 4: Réparation par soudage pour les travaux de finition des pièces moulées en aluminium

ICS: 25.160.10

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 15614-4:2021](https://standards.iteh.ai/catalog/standards/sist/3c8fe1e3-d0aa-48b7-9635-737175883832/osist-pren-iso-15614-4-2021)

<https://standards.iteh.ai/catalog/standards/sist/3c8fe1e3-d0aa-48b7-9635-737175883832/osist-pren-iso-15614-4-2021>

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING



Reference number
ISO/DIS 15614-4:2021(E)

© ISO 2021

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN ISO 15614-4:2021
https://standards.iteh.ai/catalog/standards/sist/3c8fe1e3-d0aa-48b7-9635-737175883832/osist-pren-iso-15614-4-2021](https://standards.iteh.ai/catalog/standards/sist/3c8fe1e3-d0aa-48b7-9635-737175883832/osist-pren-iso-15614-4-2021)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Preliminary welding procedure specification (pWPS)	2
5 Welding procedure test	3
6 Test pieces	3
6.1 General.....	3
6.2 Shape and dimensions of test pieces.....	3
6.3 Welding of test pieces.....	4
7 Examination and testing	5
7.1 Extent of testing.....	5
7.2 Non-destructive testing.....	6
7.3 Destructive testing.....	6
7.3.1 Fracture testing.....	6
7.3.2 Microscopic examination.....	9
7.4 Acceptance levels.....	9
7.5 Re-testing.....	9
8 Range of qualification	10
8.1 General.....	10
8.2 Related to the manufacturer.....	10
8.3 Related to the parent material.....	10
8.3.1 Parent material grouping.....	10
8.3.2 Parent material thickness.....	10
8.4 Common to all welding procedures.....	10
8.5 Specific to processes.....	10
9 Welding procedure qualification record (WPQR)	10
Annex A (informative) Example of a welding procedure qualification record (WPQR) form	12
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2014/68/EU (PED) aimed to be covered	15
Annex ZB (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2014/29/EU (SPVD) aimed to be covered	16
Bibliography	17

ISO/DIS 15614-4:2021(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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 10, *Quality management in the field of welding*.

Any feedback, question or request for official interpretation related to any aspect of this document should be directed to the Secretariat of ISO/TC 44/SC 10 via your national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Official interpretations of ISO/TC 44 documents, where they exist, are available from this page: <https://committee.iso.org/sites/tc44/home/interpretation.html>.

This second edition cancels and replaces the first edition (ISO 15614-4:2005), which has been technically revised.

The main changes compared to the previous edition are as follows:

- normative references have been updated;
- to be updated closer to publication.

Specification and qualification of welding procedures for metallic materials — Welding procedure test —

Part 4: Finishing welding of aluminium castings

1 Scope

This document is part of a series of standards, details of which are given in ISO 15607:2019, Annex A.

This document specifies how a welding procedure specification for finishing welding of aluminium castings is qualified by welding procedure tests.

Arc welding of aluminium castings is performed by the following processes in accordance with ISO 4063:

- 131 MIG welding with solid wire electrode
- 132 MIG welding with flux cored electrode
- 133 MIG welding with metal cored electrode
- 141 TIG welding with solid filler material (wire/rod)
- 142 Autogenous TIG welding
- 143 TIG welding with tubular cored filler material (wire/rod)
- 145 TIG welding using reducing gas and solid filler material (wire/rod)
- 146 TIG welding using reducing gas and tubular cored filler material (wire/rod)
- 15 plasma arc welding

The shielding gases used with these processes are:

- argon, ISO 14175 - I1
- helium, ISO 14175 - I2
- argon helium mixture, ISO 14175 - I3

The principles of this document can be applied to other welding processes and shielding gases.

This document is not applicable for repair welding or for welding of joints where ISO 15614-2 is to be used.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 3452-1, *Non-destructive testing — Penetrant testing — Part 1: General principles*

ISO 4063, *Welding and allied processes — Nomenclature of processes and reference numbers*

ISO/DIS 15614-4:2021(E)

ISO 6947, *Welding and allied processes — Welding positions*

ISO 9017, *Destructive tests on welds in metallic materials — Fracture test*

ISO 10042, *Welding — Arc-welded joints in aluminium and its alloys — Quality levels for imperfections*

ISO 14175, *Welding consumables — Gases and gas mixtures for fusion welding and allied processes*

ISO 15607:2019, *Specification and qualification of welding procedures for metallic materials — General rules*

ISO/TR 15608, *Welding — Guidelines for a metallic materials grouping system*

ISO 15609-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding*

ISO 15614-2:2005, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 2: Arc welding of aluminium and its alloys*

ISO 17635, *Non-destructive testing of welds — General rules for metallic materials*

ISO 17636 (all parts), *Non destructive testing of welds — Radiographic testing*

ISO 17637, *Non-destructive testing of welds — Visual testing of fusion-welded joints*

ISO 17639, *Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in the ISO/TR 25901 series and ISO 15607:2019 apply and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1**production welding**

any welding carried out before final delivery to the end user

3.2**joint welding**

production welding used to assemble components together to obtain an integral unit

Note 1 to entry: This includes the welding of cast or wrought components as well as combinations of cast and wrought materials.

3.3**finishing welding**

welding carried out during production in order to remove casting defects and core openings to ensure the agreed quality of castings

4 Preliminary welding procedure specification (pWPS)

A preliminary welding procedure specification shall be prepared in accordance with ISO 15609-1.

5 Welding procedure test

The preparation and testing of test pieces representing the type of welding used in production shall be in accordance with [Clauses 6](#) and [7](#).

The welder shall only be qualified by welding test pieces in accordance with [Clause 6](#).

6 Test pieces

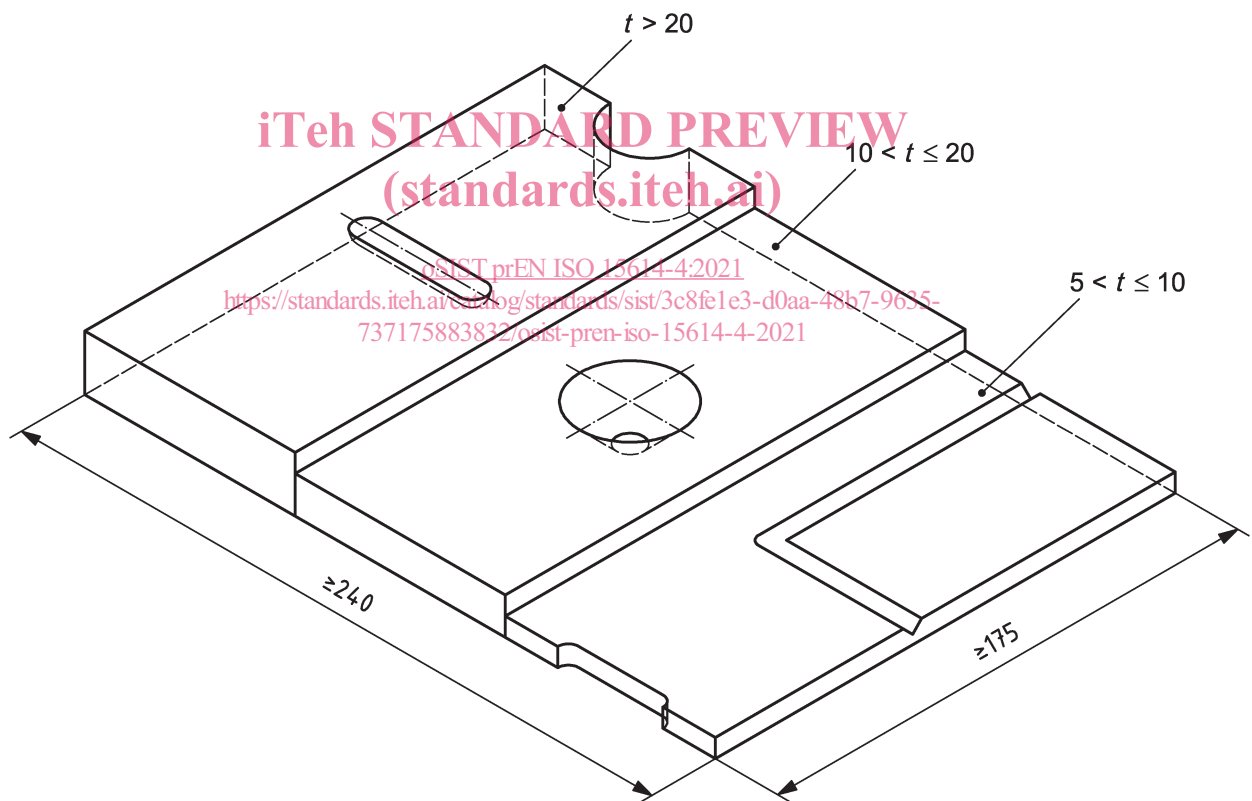
6.1 General

Test pieces shall be cast as one test piece in accordance with [Figure 1](#) or three separate test pieces in accordance with [Figure 2](#) or may be taken from a production casting which exhibits the same features as [Figure 1](#) or [2](#) (slot, hole and groove). Machining of the test pieces is permitted.

6.2 Shape and dimensions of test pieces

The shape and minimum dimensions shall be in accordance with [Figures 1](#) and [2](#).

Dimensions in millimetres

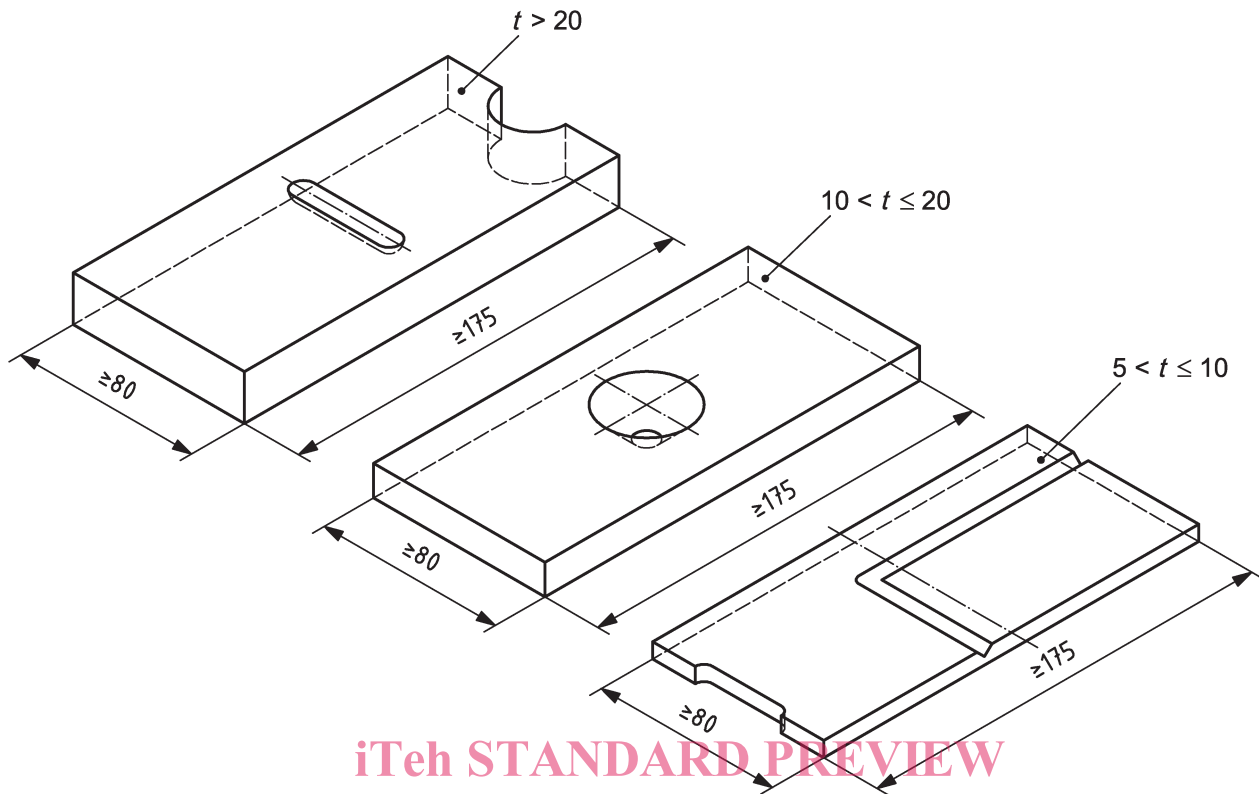


Key

t material thickness

Figure 1 — Combined test piece with slot, hole and groove

Dimensions in millimetres



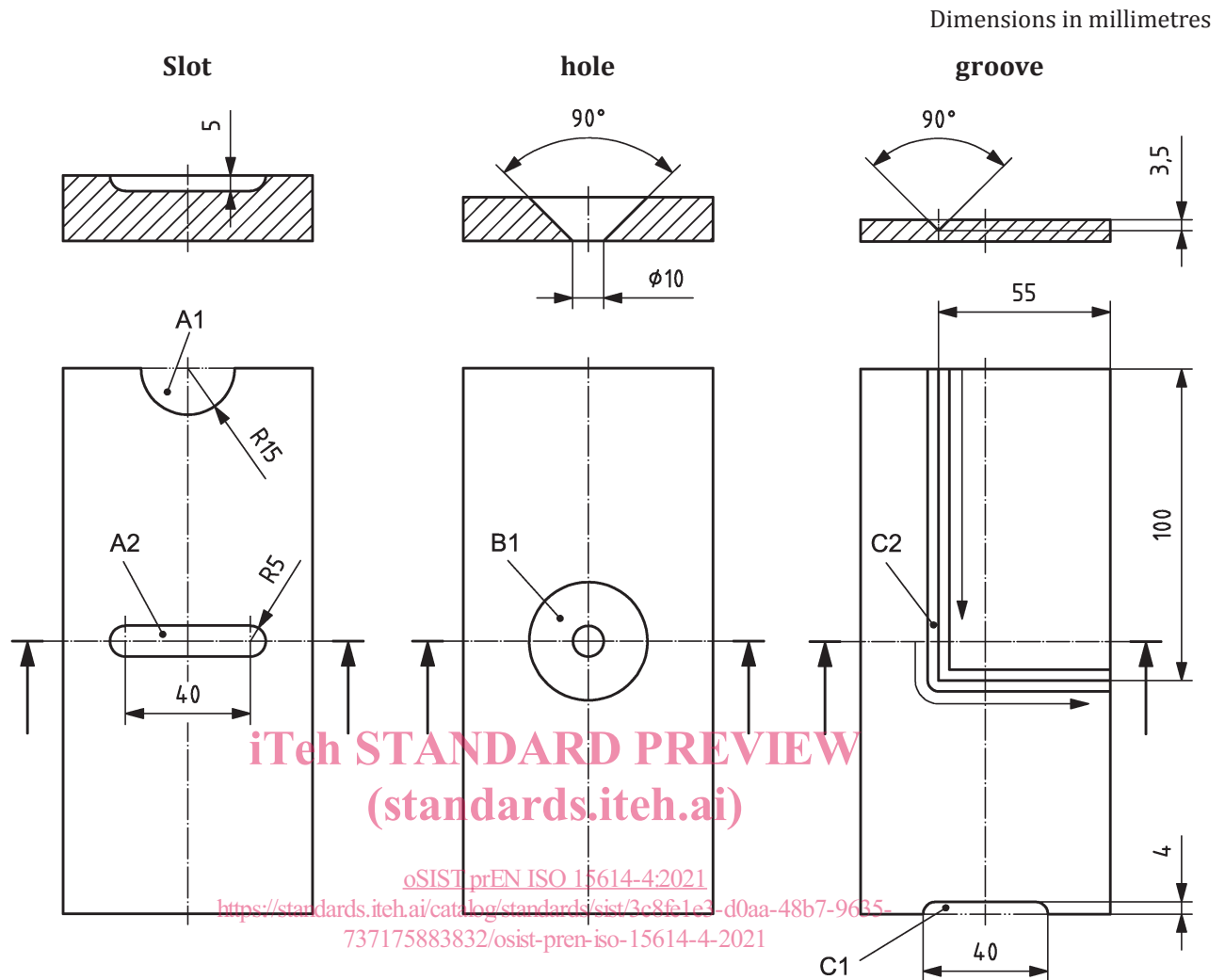
iTeh STANDARD PREVIEW
(standards.iteh.ai)

Key t material thickness

oSIST prEN ISO 15614-4:2021

<https://standards.iteh.ai/catalog/standards/sist/3c8fe1e3-d0aa-48b7-9635-560000000000/iso-15614-4-2021>
Figure 2 — Single test pieces with slot, hole and groove**6.3 Welding of test pieces**

Preparation and welding of test pieces shall be carried out in accordance with the pWPS and under the general conditions of welding in production which they shall represent. The demonstration shall be as shown in [Figure 3](#). In each case one stop and restart is required.



Key

- A1 shall show the filling up of a slot. Normally the test piece shall be welded in “vertical up” position PF or “flat”
- A2 shall show the filling up of a slot. Normally the test piece shall be welded in position PA in accordance with ISO 6947.
- B1 shall show the filling up of a hole. Normally the test piece shall be welded in position PA in accordance with ISO 6947, in which it demonstrates the welding of a hole in a casting. Normally a backing will be used.
- C1 shows the production welding of a rib. Normally the test piece shall be welded in position PF or PA in accordance with ISO 6947.
- C2 shall be welded in the direction shown in the figure. One stop and restart is required. Normally the test piece shall be welded in position PA in accordance with ISO 6947.

NOTE Chain-dotted lines indicate fracture lines.

Figure 3 — Dimensions of test pieces and weld locations for finishing weld tests

7 Examination and testing

7.1 Extent of testing

The test pieces shall be tested as follows:

- visual examination in accordance with [7.2](#)