

**SLOVENSKI STANDARD
SIST EN 12952-6:2022****01-februar-2022****Nadomešča:****SIST EN 12952-6:2011**

**Vodocevni kotli in pomožne napeljave - 6. del: Kontrola med izdelavo,
dokumentacija in označevanje tlačno obremenjenih delov kotla**Water-tube boilers and auxiliary installations - Part 6: Inspection during construction;
documentation and marking of pressure parts of the boilerWasserrohrkessel und Anlagenkomponenten - Teil 6: Prüfung während der Herstellung,
Dokumentation und Kennzeichnung für drucktragende KesselteileChaudières à tubes d'eau et installations auxiliaires - Partie 6: Contrôles pendant la
construction, documentation et marquage des parties sous pression de la chaudière**SIST EN 12952-6:2022****Ta slovenski standard je istoveten z: EN 12952-6:2021**<https://standards.iteh.ai/catalog/standards/sist/cc458fe3-623f-446c-b2c8-8a653d6e7366/sist-en-12952-6-2022>**ICS:**27.060.30 Grelniki vode in prenosniki Boilers and heat exchangers
 toplote**SIST EN 12952-6:2022****en,fr,de**

**iTeh STANDARD
PREVIEW
(standards.iteh.ai)**

[SIST EN 12952-6:2022](https://standards.iteh.ai/catalog/standards/sist/cc458fe3-623f-446c-b2c8-8a653d6e7366/sist-en-12952-6-2022)

<https://standards.iteh.ai/catalog/standards/sist/cc458fe3-623f-446c-b2c8-8a653d6e7366/sist-en-12952-6-2022>

EUROPEAN STANDARD

EN 12952-6

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2021

ICS 27.040

Supersedes EN 12952-6:2011

English Version

Water-tube boilers and auxiliary installations - Part 6: Inspection during construction, documentation and marking of pressure parts of the boiler

Chaudières à tubes d'eau et installations auxiliaires -
Partie 6: Contrôles pendant la construction,
documentation et marquage des parties sous pression
de la chaudière

Wasserrohrkessel und Anlagenkomponenten - Teil 6:
Prüfung während der Herstellung, Dokumentation und
Kennzeichnung für drucktragende Kesselteile

This European Standard was approved by CEN on 1 November 2021.

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-CENELEC 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-CENELEC 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword	4
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	7
4 General organization	7
4.1 General.....	7
4.2 Conformity assessment.....	7
4.3 Competency of the manufacturer.....	7
4.4 Calibration of equipment.....	7
4.5 Inspection activities.....	8
5 Non-destructive testing (NDT) of parent materials	10
6 Production test plates for drums	10
6.1 General.....	10
6.2 Number of production test plates.....	10
6.3 Tests required.....	11
6.3.1 Non-destructive testing	11
6.3.2 Destructive tests.....	11
6.4 Acceptance criteria.....	11
6.4.1 Non-destructive testing	11
6.4.2 Transverse tensile test.....	11
6.4.3 Longitudinal tensile test on weld metal.....	12
6.4.4 Bend tests	12
6.4.5 Impact values	12
6.4.6 Macroscopic examination	12
6.4.7 Hardness survey.....	12
6.4.8 Dissimilar joints	12
6.5 Non-conformance of results.....	13
6.5.1 General.....	13
6.5.2 Specific case for Charpy V-notch impact tests	13
7 Non-destructive testing of welds.....	13
7.1 Type and extent of non-destructive testing	13
7.1.1 General.....	13
7.1.2 Drums and Headers.....	14
7.1.3 Tube walls.....	15
7.1.4 Pipes and Tubes.....	16
7.1.5 Extension procedure of random testing in case of repairs.....	18
7.2 Qualification of non-destructive testing (NDT) personnel	18
7.3 The detection of surface imperfections	19
7.3.1 General.....	19
7.3.2 Visual examination.....	19
7.3.3 Penetrant testing	19
7.3.4 Magnetic particle testing.....	19
7.3.5 Acceptance criteria for weld surface imperfections	20

7.4	Testing for volumetric imperfections	22
7.4.1	Radiographic testing	22
7.4.2	Ultrasonic testing.....	25
7.5	Non-destructive testing reports.....	26
8	Final inspection.....	27
8.1	Visual and dimensional examinations.....	27
8.2	Hydrostatic pressure test	27
8.2.1	General	27
8.2.2	Test procedure	27
9	Documentation	28
10	Marking.....	29
Annex A (normative) Special requirements for chemical recovery boilers.....		30
A.1	General	30
A.2	Special requirements for non-destructive testing (NDT) of welds.....	30
A.2.1	General	30
A.2.2	Special requirements for NDT of welds in a chemical recovery boiler - Volumetric testing.....	30
A.2.3	Methods of testing	30
Annex B (informative) Significant technical changes between this document and the previous edition.....		31
Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2014/68/EU aimed to be covered		32
Bibliography		33

[SIST EN 12952-6:2022](https://standards.iteh.ai/catalog/standards/sist/cc458fe3-623f-446c-b2c8-8a653d6e7366/sist-en-12952-6-2022)

<https://standards.iteh.ai/catalog/standards/sist/cc458fe3-623f-446c-b2c8-8a653d6e7366/sist-en-12952-6-2022>

EN 12952-6:2021 (E)**European foreword**

This document (EN 12952-6:2021) has been prepared by Technical Committee CEN/TC 269 “Shell and water-tube boilers”, 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 June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

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

This document supersedes EN 12952-6:2011.

Annex B provides details of significant technical changes between this document and the previous edition.

EN 12952 series concerning water-tube boilers and auxiliary installations consists of the following parts:

- *Part 1: General;*
- *Part 2: Materials for pressure parts of boilers and accessories;*
- *Part 3: Design and calculation for pressure parts;*
- *Part 4: In service boiler life expectancy calculations;*
- *Part 5: Workmanship and construction of pressure parts of the boiler;*
- *Part 6: Inspection during construction, documentation and marking of pressure parts of the boiler;*
- *Part 7: Requirements for equipment for the boiler;*
- *Part 8: Requirements for firing systems for liquid and gaseous fuels for the boiler;*
- *Part 9: Requirements for firing systems for pulverized solid fuels for the boiler;*
- *Part 10: Requirements for safeguards against excessive pressure;*
- *Part 11: Requirements for limiting devices of the boiler and accessories;*
- *Part 12: Requirements for boiler feedwater and boiler water quality;*
- *Part 13: Requirements for flue gas cleaning systems;*
- *Part 14: Requirements for flue gas DENOX-systems using liquefied pressurized ammonia and ammonia water solution;*
- *Part 15: Acceptance tests;*
- *Part 16: Requirements for grate and fluidized-bed firing systems for solid fuels for the boiler;*
- *CR 12952 Part 17: Guideline for the involvement of an inspection body independent of the manufacturer.*

- *Part 18: Operating instructions*

Although these parts can be obtained separately, it should be recognized that the parts are inter-dependent. As such, the design and manufacture of water-tube boilers requires the application of more than one part in order for the requirements of the document to be satisfactorily fulfilled.

NOTE A “Boiler Helpdesk” has been established in CEN/TC 269 which can be contacted for any questions regarding the application of EN 12952 series and EN 12953 series, see the following website: <http://www.boiler-helpdesk.din.de>

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

(standards.iteh.ai)

[SIST EN 12952-6:2022](https://standards.iteh.ai/catalog/standards/sist/cc458fe3-623f-446c-b2c8-8a653d6e7366/sist-en-12952-6-2022)

<https://standards.iteh.ai/catalog/standards/sist/cc458fe3-623f-446c-b2c8-8a653d6e7366/sist-en-12952-6-2022>

EN 12952-6:2021 (E)**1 Scope**

This document specifies requirements for the inspection during construction, documentation and marking of water-tube boilers as defined in EN 12952-1:2015.

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.

EN 12952-1:2015, *Water-tube boilers and auxiliary installations - Part 1: General*

EN 12952-2:2021, *Water-tube boilers and auxiliary installations — Part 2: Materials for pressure parts of boilers and accessories*

EN 12952-3:2011, *Water-tube boilers and auxiliary installations - Part 3: Design and calculation for pressure parts of the boiler*

EN 12952-5:2021, *Water-tube boilers and auxiliary installations — Part 5: Workmanship and construction of pressure parts of the boiler*

EN ISO 3452-1:2021, *Non-destructive testing - Penetrant testing - Part 1: General principles (ISO 3452-1:2021)*

EN ISO 5817:2014, *Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels for imperfections (ISO 5817:2014)*

EN ISO 6520-1:2007, *Welding and allied processes - Classification of geometric imperfections in metallic materials - Part 1: Fusion welding (ISO 6520-1:2007)*

EN ISO 9712:2012, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712:2012)*

EN ISO 11666:2018, *Non-destructive testing of welds - Ultrasonic testing - Acceptance levels (ISO 11666:2018)*

EN ISO 13588:2019, *Non-destructive testing of welds - Ultrasonic testing - Use of automated phased array technology (ISO 13588:2019)*

EN ISO 15614-1:2017, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2017, Corrected version 2017-10-01)*

EN ISO 17636-1:2013, *Non-destructive testing of welds - Radiographic testing - Part 1: X- and gamma-ray techniques with film (ISO 17636-1:2013)*

EN ISO 17636-2:2013, *Non-destructive testing of welds - Radiographic testing - Part 2: X- and gamma-ray techniques with digital detectors (ISO 17636-2:2013)*

EN ISO 17637:2016, *Non-destructive testing of welds - Visual testing of fusion-welded joints (ISO 17637:2016)*

EN ISO 17638:2016, *Non-destructive testing of welds - Magnetic particle testing (ISO 17638:2016)*

EN ISO 17640:2018, *Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels, and assessment (ISO 17640:2018)*

CEN ISO/TR 20172:2009, *Welding - Grouping systems for materials - European materials (ISO/TR 20172:2009)*

EN ISO 23277:2015, *Non-destructive testing of welds - Penetrant testing - Acceptance levels (ISO 23277:2015)*

EN ISO 23278:2015, *Non-destructive testing of welds - Magnetic particle testing - Acceptance levels (ISO 23278:2015)*

3 Terms and definitions

For the purposes of this document the terms and definitions given in EN 12952-1:2015 and the following apply.

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

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

3.1 inspection

conformity evaluation by observation and judgement accompanied as appropriate by measurement, testing or gauging

4 General organization

4.1 General

The manufacturer shall be responsible for ensuring the boiler conforms to the requirements of this document. Conformance shall be confirmed by completing a series of inspection activities as detailed in Table 1.

Except where explicitly stated otherwise in this document, inspection activities applicable to a manufacturer's works shall also be applicable to operations carried out on a construction site.

4.2 Conformity assessment

Guidance in the use of the conformity assessment procedures is given in CR 12952-17:2002.

4.3 Competency of the manufacturer

If an assessment of the competency of the manufacturer is required, guidance is given in EN 12952-5:2021, Annex F.

4.4 Calibration of equipment

The manufacturer shall establish procedures to ensure that tools, gauges, instruments and other measuring and testing devices used in the manufacture and inspection activities affecting boiler product quality, are properly controlled, calibrated and adjusted at specific intervals, to maintain accuracy within defined limits.

EN 12952-6:2021 (E)

4.5 Inspection activities

The manufacturer shall confirm that the boiler components, as a minimum, conform to the requirements of this document by performing and authenticating the activities listed in Table 1.

Depending upon the conformity assessment module adopted, some of the inspection activities listed should also be assessed by a responsible authority. For the guidance of the manufacturer, the specific involvement of such a responsible authority is indicated in CR 12952-17.

Table 1 — List of inspection activities to be undertaken by the manufacturer

Reference	Area of activity	Inspection operation
1	Design and general documentation	
1.1	Design data/calculations	Ensure that the design data/calculations conform to: <ul style="list-style-type: none"> — technical specifications, if applicable; — the requirements of this document.
1.2	Manufacturing drawings	Ensure that drawing information conforms to: <ul style="list-style-type: none"> — design data and calculations; — technical specifications, if applicable; — the requirements of this Document.
1.3	Purchase specifications	Ensure that material and component specifications conform to: <ul style="list-style-type: none"> — technical specifications, if applicable; — manufacturing drawings; — the requirements of this document.
1.4	Specifications for sub-contracted parts	Ensure that the specification for sub-contracted parts conform to: <ul style="list-style-type: none"> — technical specifications, if applicable; — manufacturing drawings; — the requirements of this document.
2	Material	
2.1	Material certificates	Verify that certificate information and results conform to the design specification.
2.2	Welding consumables	Verify that the consumables to be used are in accordance with the design specification.
2.3	Material identification	Identify the material with the material certificates and check the markings.
2.4	Transfer of identification marks	Ensure that the transfer of identification marks is in accordance with the approved procedure.
2.5	Acceptance of sub-contracted parts	Verify that sub-contracted parts conform to the manufacturer's specification.
3	Manufacturing and welding	
3.1	Welding procedure specifications	Verify that appropriate welding specifications are available and that their contents are compatible with the welding procedure qualifications.

Reference	Area of activity	Inspection operation
3.2	Welding procedure qualifications	Verify that the welding procedures are appropriate for the materials and the field of welding application, and that they have been approved by a responsible authority.
3.3	Welder qualification/ Operator qualification	Verify that the welder/operator qualifications have been approved by a responsible authority and that they are available and valid.
3.4	Forming procedures	Verify that forming procedures are available, where applicable, and their contents are appropriate to the product to be formed.
3.5	Joint preparations	Examine material cut edges where thermal cutting has been used and confirm machined preparations are to the correct profile.
3.6	Formed parts	Examine formed parts in accordance with the requirements of EN 12952-5:2021, Clause 7.
3.7	Weld assembly	Examine the weld assembly, including dimensional check.
3.8	Weld root	Examine second side of weld assembly, if applicable, after the first side of weld has been completed and the root cleaned.
3.9	Production test plates, if any	Identify and mark production test plates.
		Verify that any PWHT on production test plates independent of the component complies with the specific heat treatment applied to the component.
		Examine NDT reports on production test plates.
		Identify and mark the test specimens taken from production test plates for mechanical tests.
		Verify that the test information and results from the mechanical tests conform to the requirements of this document.
4	Non-destructive testing (NDT)	
4.1	Non-destructive testing procedures	Verify that appropriate non-destructive testing procedures are available and ensure the qualification of the originator is appropriate.
4.2	Non-destructive testing operator qualifications	Ensure the non-destructive testing operator's qualifications are appropriate and that they have been approved by a responsible authority.(cat. III +IV)
4.3	Non-destructive testing operation	Scrutinize any radiographs and check conformance to the acceptance criteria.
		Scrutinize the operator's ultrasonic testing reports.
4.4	Non-destructive testing reports	Verify that the information and results conform to the acceptance criteria.
5	Post-weld heat treatment (PWHT)	
5.1	PWHT procedures	Verify that the post-weld heat treatment procedures conform to this document.

EN 12952-6:2021 (E)

Reference	Area of activity	Inspection operation
5.2	PWHT records	Verify that temperature/time recordings conform to the requirements of this document.
6	Final inspection and marking	
6.1	Pre-hydrostatic pressure test inspection	Carry out dimensional checking, visual examination and identification of accessible parts after component completion, prior to hydrostatic pressure test.
6.2	Hydrostatic pressure test	Ensure the final hydrostatic pressure test is carried out in accordance with the requirements of this document.
6.3	Post-hydrostatic pressure test inspection	Perform visual examination on completion of the hydrostatic pressure test.
		Check marking on nameplate.
6.4	Safety devices	Ensure the provision of safety equipment.
6.5	Manufacturer's data dossier	Ensure completeness of the data dossier — see Clause 9.

5 Non-destructive testing (NDT) of parent materials

The NDT of parent materials shall be in accordance with EN 12952-2:2021.

6 Production test plates for drums

6.1 General

The material used for production test plates shall comply with the same standard and grade, or the same specification, as that used for the construction of the drums of the water-tube boiler. As a minimum, plates shall be from the same steel making process and of the same nominal thickness as the drum plates. Where possible, the plates shall be selected from the same cast as that used for the manufacture of the drum.

The dimensions of the test plates shall be large enough to allow the preparation of all the test specimens required by 6.3.2, and in no case shall their length be shorter than 350 mm.

The test plates shall be attached, wherever practical, to the drum plate so that the weld carried out on the production test plate is a continuation of the longitudinal weld.

Production test plates shall receive an identical post-weld heat treatment or stress relief as that applied to the production weld.

6.2 Number of production test plates

The number of production test plates required shall be as follows:

- longitudinal welds: One production test plate per welding procedure qualification per drum and per header;
- circumferential welds: If the welding procedure qualification is the same as that for the longitudinal seam of the drum, no additional production test plate is required. If the welding procedure qualification differs from that of the longitudinal joint, then one production test plate shall be performed per welding procedure qualification per year.