



# SLOVENSKI STANDARD

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**Vodocevni kotli in pomožne napeljave - 10. del: Zahteve za opremo in varnostne naprave za preprečevanje prekoračitve tlaka**

Water-tube boilers and auxiliary installations - Part 10: Requirements for safety devices against excessive pressure

Wasserrohrkessel und Anlagenkomponenten - Teil 10: Anforderungen an Sicherheitseinrichtungen gegen Überdruck

Chaudières à tubes d'eau et installations auxiliaires - Partie 10 : Exigences pour la protection vis-à-vis des excès de pression

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**ICS:**

13.240	Varstvo pred previsokim tlakom	Protection against excessive pressure
27.060.30	Grelniki vode in prenosniki toplote	Boilers and heat exchangers

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EUROPEAN STANDARD

EN 12952-10

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2021

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## Water-tube boilers and auxiliary installations - Part 10: Requirements for safety devices against excessive pressure

Chaudières à tubes d'eau et installations auxiliaires -  
Partie 10 : Exigences pour la protection vis-à-vis des  
excès de pression

Wasserrohrkessel und Anlagenkomponenten - Teil 10:  
Anforderungen an Sicherheitseinrichtungen gegen  
Überdruck

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

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

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

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## European foreword

This document (EN 12952-10:2021) 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of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.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 12952-10:2002.

EN 12952 series, *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.*

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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 may 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.

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## 1 Scope

This document specifies the requirements for safety devices against excessive pressure in 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 ISO 4126-1:2013,<sup>1</sup> *Safety devices for protection against excessive pressure - Part 1: Safety valves (ISO 4126-1:2013)*

EN ISO 4126-4:2013, *Safety devices for protection against excessive pressure - Part 4: Pilot-operated safety valves (ISO 4126-4:2013)*

EN ISO 4126-5:2013,<sup>2</sup> *Safety devices for protection against excessive pressure - Part 5: Controlled safety pressure relief systems (CSPRS) (ISO 4126-5:2013)*

EN 764-7:2002,<sup>3</sup> *Pressure equipment - Part 7: Safety systems for unfired pressure equipment*

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

EN 13480-3:2017, *Metallic industrial piping - Part 3: Design and calculation*

ISO 4126-9:2008, *Safety devices for protection against excessive pressure — Part 9: Application and installation of safety devices excluding stand-alone bursting disc safety devices*

## 3 Terms and definitions

For the purposes of this document the terms and definitions given in EN 12952-1:2015, EN ISO 4126-1:2013, EN ISO 4126-4:2013 and EN ISO 4126-5:2013 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/>

<sup>1</sup> Document impacted by EN ISO 4126-1:2013/A1:2016 and EN ISO 4126-1:2013/A2:2019.

<sup>2</sup> Document impacted by EN ISO 4126-5:2013/A1:2016.

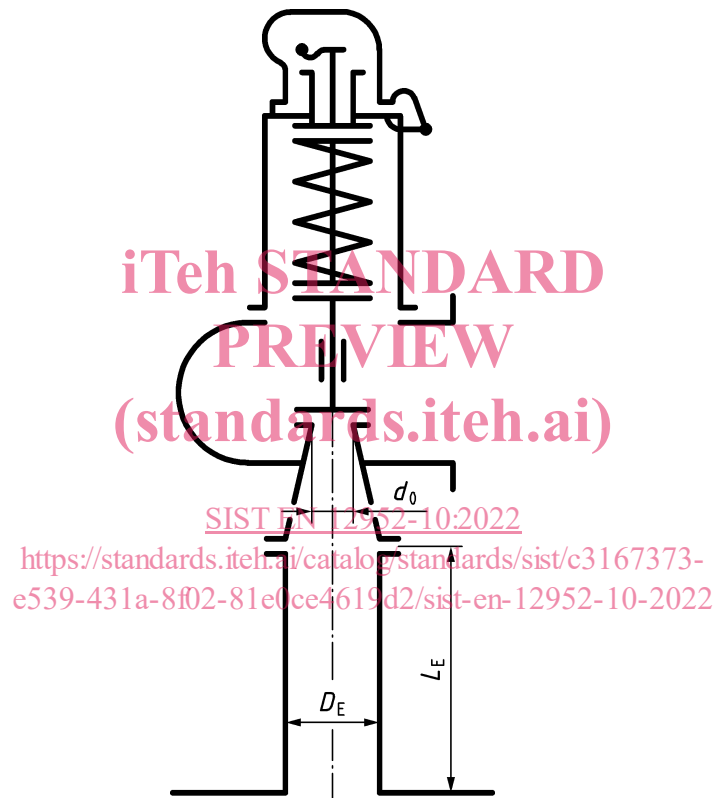
<sup>3</sup> Document impacted by EN 764-7:2002/AC:2006.

## 4 Symbols and abbreviations

For the purposes of this document, the symbols given in EN 12952-1:2015, Table 1 shall apply. Throughout this document, additional terminology and symbols have been included where necessary to meet the requirements of the specific text concerned (see Table 1 and Figure 1).

**Table 1 — Symbols and units**

Symbol	Explanation	Unit
$D_E$	inlet pipe internal diameter	mm
$d_0$	smallest flow diameter (minimum free bore)	mm
$L_E$	developed length of inlet pipe	mm



### Key

- $D_E$  inlet pipe internal diameter, in mm
- $d_0$  smallest flow diameter (minimum free bore), in mm
- $L_E$  developed length of inlet pipe, in mm

**Figure 1 — Safety valves**



## 5 Requirements

### 5.1 Steam boiler

**5.1.1** Each steam boiler and each isolatable heated compartment (e.g. reheater, superheater, economizer) shall be provided with at least one suitable safety device which shall ensure against excessive pressure. The total certified discharge capacity of all safety devices mounted on the boiler shall be at least equal to the maximum continuous rating (MCR) of the boiler. Pressure relieving devices shall be installed in accordance with relevant parts of EN 764-7:2002. The suitability of the safety device shall be demonstrated by a hot test on the assembled boiler.

The number and type of safety devices to be installed shall be specified by the manufacturer and shall meet the requirements of this clause.

At least one of the following safety devices shall be considered suitable:

- a) safety valves in accordance with EN ISO 4126-1:2013 or;
- b) pilot-operated safety valve (POSV) in accordance with EN ISO 4126-4:2013, consisting of a main valve, controlled by signals from 3 pilot valves;
- c) controlled safety pressure relief system (CSPRS) in accordance with EN ISO 4126-5:2013, consisting of a main valve, controlled by 3 redundant control paths.

In the case of safety devices in accordance with b) and c) the following shall apply:

- The safety device shall be capable of operating when the signal from only one pressure sensing line is available.
  - The size and position of the pressure sensing lines shall ensure that the risk of loss of function is reduced to a minimum.
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- NOTE 1 The common size of sensing line is 15 mm internal diameter.
- The mechanical and electrical parts of the pilot and control unit which are used to actuate the main valves shall still be functionally fit even in the case of an assumed individual defect.
  - It shall be possible to prove the reliability of the safety pressure relief device by functional testing on the plant.

It is permissible to operate more than one main valve from a single control unit.

Safety devices shall have a set pressure not exceeding the maximum allowable pressure (*PS*) of the equipment to be protected, except as permitted as follows.

The discharge capacity corresponding to the required relief capacity at maximum continuous rating of the applicable boiler parts shall be achieved without causing the pressure to be increased by more than 10 % of the maximum allowable pressure. The duration of the pressure increase up to 1,1 *PS* shall not exceed 1 h per event.

If the capacity is provided by more than one safety device, only one of the devices needs to be set at a pressure not exceeding *PS*. The other device(s) may be set at a pressure not more than 5 % in excess of *PS*. In these cases, it is necessary to use safety devices with certified overpressure lower than 10 %.

NOTE 2 More information can be found in EN 764-7:2002, Annex A.

The pressure at which a safety device is set to operate shall take into account the effect of static head, of superimposed back pressure and whether this is constant or variable.

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**5.1.2** The minimum flow diameter of safety valves or main valves of POSV or CSPRS for boilers with a volume  $\leq 10$  litres shall be at least 6 mm and for volumes  $> 10$  litres shall be at least 15 mm.

**5.1.3** In the case of boilers without superheater(s) the safety valves or main valves of POSV or CSPRS shall be connected to the steam space.

If the total required discharge capacity is  $q_m$  and the steam space is simultaneously protected by  $n$  safety devices ( $n > 1$ ) the discharge capacity of each of them should be at least  $q_m/(n + 1)$ .

**5.1.4** In the case of once-through steam generators the safety valves or main valves of POSV or CSPRS shall be located at the steam outlet of the boiler.

**5.1.5** In the case of natural and forced circulation boilers with superheaters which cannot be isolated the following shall apply:

- a) Safety devices in accordance with 5.1.1 located at the superheater outlet shall be of sufficient capacity to prevent the allowable wall temperature of the superheater from being exceeded. The safety device at the superheater outlet shall be so arranged, that it is always open when the safety device on the saturated steam space opens, or alternatively, the heat source is immediately cut-out with no residual heat release allowed.
- b) Safety devices in accordance with 5.1.1 a) rated for at least 75 % or in accordance with 5.1.1 b) or c) rated for at least 25 % of the required discharge capacity shall be located at the saturated steam space of the boiler. No safety devices need to be installed at the saturated steam space if the capacity of the safety device in accordance with 5.1.1 b) or c) located at the superheater outlet corresponds to the total steam quantity to be discharged. At least one pressure signal shall be transmitted to the control unit from the saturated steam space and at least one pressure signal shall be taken from the superheater outlet.
- c) The superheater safety device shall be so set as to respond before the safety device on the saturated steam space.

**5.1.6** A superheater that can be isolated shall be equipped with at least one safety valve or main valve of POSV or CSPRS at the superheater outlet. The safety valve or main valve of POSV or CSPRS shall be rated for at least 20 % of the required discharge capacity of the boiler. The safety valve or main valve of POSV or CSPRS located on the saturated steam space of the steam generator shall in this case be rated for the maximum continuous rating. If the superheater can be isolated precautions shall be taken to prevent overheating. Superheaters that can be isolated from the saturated steam space are not allowed for boilers firing fuels with considerable residual heat release.

**5.1.7** Every reheater shall have at least one safety valve or main valve of POSV or CSPRS with a total discharge capacity of not less than the maximum steam flow for which the reheater is designed.

**5.1.8** There shall be no shut off devices between the boiler and its protective safety devices or between the safety devices and their points of discharge.

**5.1.9** Direct-loaded safety valves shall be installed in the vertical position.

Safety devices shall be safeguarded against damaging external influences, e.g. the weather, which can impair the functional capability of the safety device. The transfer of vibrations onto the safety device shall be avoided.

Safety devices where leaking fluid, e.g. due to open bonnet, can directly or indirectly endanger persons or the environment, shall be provided with suitable protective devices.