



**SLOVENSKI STANDARD**  
**SIST EN 14222:2003**  
**01-december-2003**

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**Mnogovodni kotli iz nerjavnega jekla**

Stainless steel shell boilers

Edelstahl-Großwasserraumkessel

Chaudières a tubes de fumée en acier inoxydable

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**Ta slovenski standard je istoveten z: EN 14222:2003**

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27.060.30

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English version

## Stainless steel shell boilers

Chaudières à tubes de fumée en acier inoxydable

Edelstahl-Großwasserraumkessel

This European Standard was approved by CEN on 21 February 2003.

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 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 Management Centre has the same status as the official versions.

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## Foreword

This document (EN 14222:2003) 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of an identical text or by endorsement, at the latest by October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) {Pressure Equipment Directive (PED) 97/23/EC [1]}.

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

This European Standard refers to EN 12953: Shell boilers and EN 13445: Unfired pressure vessels.

Annex A is informative.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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## 1 Scope

This European Standard specifies requirements for electrically heated shell boilers manufactured from stainless steel specifically dedicated for generating steam for sterilizers and disinfectors.

This European Standard covers only boilers that are heated by immersion heaters and which have a maximum allowable pressure (PS) of 6 bar, a maximum volume (V) of 1 000 litres and a product of PS x V not greater than 3 000 bar x l.

## 2 Normative references

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).

EN 285:1996, *Sterilisation — Steam sterilizers — Large sterilizers*.

EN 12953-1, *Shell boilers — Part 1: General*.

EN 12953-5, *Shell boilers — Part 5: Inspection during construction, documentation and marking of pressure parts of the boiler*.

EN 12953-6, *Shell boilers — Part 6: Requirements for equipment for the boiler*.

EN 12953-8, *Shell boilers — Part 8: Requirements for safeguards against excessive pressure*.

prEN 12953-9:1999, *Shell boilers — Part 9: Requirements for limiting devices and safety circuits of the boiler and accessories*.

EN 13445-2:2002, *Unfired pressure vessels — Part 2: Materials*.

EN 13445-3, *Unfired pressure vessels — Part 3: Design*.

EN 13445-4, *Unfired pressure vessels — Part 4: Fabrication*.

EN 13445-5, *Unfired pressure vessels — Part 5: Inspection and testing*.

EN 60204-1, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:1997)*.

## 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 12953-1 and EN 12953-6 and the following apply:

### 3.1

#### controls

devices used for maintaining the variable to be controlled (e.g. water level, pressure, temperature) at a specific value (set point)

### 3.2

#### limiters

device that, on reaching a fixed value (e.g. pressure, temperature, flow, water level) is used to interrupt and lock-out the heating energy supply and lock-out requires manual unlocking before restart

### 3.3

#### **lock-out**

isolation of energy supply which requires a manual intervention to reinstate

### 3.4

#### **functional check**

testing of the safety device to ensure it performs its intended function

## 4 Materials

Each steam boiler shall be manufactured from materials in steel group 8 or 10 in accordance with EN 13445-2:2002, annex A.

## 5 Design

Each steam boiler shall be designed in accordance with EN 13445-3.

## 6 Manufacture

Each steam boiler shall be manufactured in accordance with EN 13445-4.

## 7 Inspection and testing

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Each steam boiler shall be inspected, tested and documented in accordance with EN 13445-5.

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## 8 Marking

The requirements for marking shall be in accordance with EN 12953-5.

## 9 Requirements for equipment

### 9.1 General

The following requirements for equipment for electrically heated stainless steel shell boilers are worked out on the basis of EN 12953-6.

### 9.2 Safeguards against excessive pressure

Each steam boiler shall be equipped with safeguards against excessive pressure in accordance with EN 12953-8. In a deviation from EN 12953-8 the minimum inside diameter of the safety valve seat could be reduced to 8 mm.

### 9.3 Materials for valves, fittings, flanges and bolting

Steel materials for valves, fittings, flanges and bolting shall be in accordance with EN 13445-2.

## 9.4 Limiting devices and safety circuits

**9.4.1** Limiters shall be designed in addition to prEN 12953-9. In accordance with prEN 12953-9:1999, 5.4.2 level electrode inclinations between 45° and 90° from the vertical shall be allowed provided that functional capability examinations have proven successful. The electrical safety circuits shall be in accordance with EN 60204-1.

**9.4.2** Functional checking of all limiters shall be possible at any time during operation e.g. by simulation where appropriate.

**9.4.3** If a limiter responds, the boiler shall automatically go to a safe condition and a signal shall be given to indicate boiler malfunction.

**9.4.4** After manual resetting of a limiter lock-out, the boiler shall be put back into operation by manual intervention only.

## 9.5 Boiler heat supply

**9.5.1** The pressure of each boiler shall be controlled automatically by regulating the heating energy input.

**9.5.2** Automatic start-up of the boiler and the system is permitted provided that equipment is installed to ensure that start-up is conducted safely. Automatic restarting after normal shut-down shall not be considered a start-up.

**9.5.3** A high temperature alarm device for shutting off the heating energy supply shall be provided. The alarm temperature shall be determined by the manufacturer.

**9.5.4** The electrical supply circuits and the safety of the control equipment shall conform to EN 60204-1.

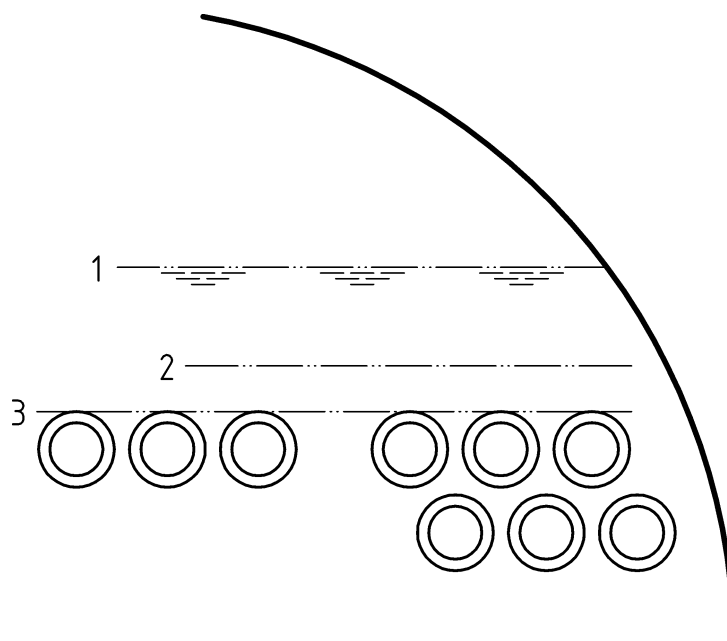
## 9.6 Water level indication

**9.6.1** Each steam boiler shall have at least one independent means (independent from other equipment) of indicating the water level, which shall be a gauge of transparent material directly connected to the boiler shell.

**9.6.2** The gauge(s) shall be mounted so that the water level is visible through the transparent material at the lowest alarm level, i.e. at the lowest permissible water level (LWL), which shall be marked. The maximum permissible water level, which shall be specified by the boiler manufacturer, shall be visible. The gauge shall be capable of showing a measurement of "15 mm below LWL".

**9.6.3** The lowest permissible water level (LWL) of the boiler (see Figure 1), which shall be permanently and legibly marked on the boiler shell and identified by the letters "LWL", shall be at least 30 mm above the uppermost surface of the immersion heaters "HHS".



**Key**

- 1 Controlled water level
- 2 LWL
- 3 HHS

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**Figure 1 – Water level indication**

**9.6.4** Pipes and fittings connecting a water level gauge to a boiler shall be as short as possible and constructed so that no undrained pocket is formed between the boiler and the gauge. There shall be no outlet therefrom except for regulators, steam pressure gauges and drains or other similar apparatus, which does not permit the escape of a significant amount of steam.

Pipes connecting a water level gauge to the boiler shall not be less than 8 mm bore. Where a chamber of a safety control or alarm device is fitted to the water gauge or its piping, the connecting pipes between the boiler and the water level gauge shall have a bore not less than 15 mm.

**9.6.5** Where the water level gauge is a part of the boiler shell, the requirements of 9.6.4 shall not apply.

### 9.7 Steam pressure indication

**9.7.1** Each boiler shall have a steam pressure gauge in accordance with EN 285:1996, 6.1.1.2, connected to the steam space either directly or through the water level gauge column or its steam connection.

**9.7.2** The steam pressure gauge shall be connected to a siphon or similar device of sufficient capacity to keep the gauge tube filled with water. The pipe shall be of sufficient size and shall have provision for blowing through if possible. Alternatively the pressure line shall be fitted with an isolating membrane close to the boiler. The pressure line between the membrane and the gauge shall contain a non-compressible fluid.

**9.7.3** Steam pressure gauge connections shall be made suitable for the design working pressure of the boiler.

**9.7.4** Pressure gauges shall be graduated to indicate the pressure in bars. The maximum allowable pressure shall be indicated by a fixed and readily visible red mark on the pressure gauge.

NOTE In addition, the operating pressure and the safety valve set pressure may also be indicated.

**9.7.5** Each boiler shall be provided with a valve connection for the special purpose of connecting a test gauge when the boiler is in service so that the accuracy of the boiler steam gauge can be ascertained.