



SLOVENSKI STANDARD
SIST EN 1643:2002
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Sistemi za preskušanje samodejnih zapornih ventilov za plinske gorilnike in plinske aparate

Valve proving systems for automatic shut-off valves for gas burners and gas appliances

Ventilüberwachungssysteme für automatische Absperrventile für Gasbrenner und Gasgeräte

Systemes de contrôle d'étanchéité pour robinets automatiques de sectionnement pour brûleurs et appareils a gaz

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ICS:

23.060.40	Tlačni regulatorji	Pressure regulators
27.060.20	Plinski gorilniki	Gas fuel burners

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1643

October 2000

ICS 23.060.20

English version

Valve proving systems for automatic shut-off valves for gas burners and gas appliances

Systèmes de contrôle d'étanchéité pour robinets automatiques de sectionnement pour brûleurs et appareils à gaz

Ventilüberwachungssysteme für automatische Absperrventile für Gasbrenner und Gasgeräte

This European Standard was approved by CEN on 29 September 2000.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 58 "Safety and control devices for gas-burners and gas-burning appliances", the secretariat of which is held by BSI.

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 April 2001, and conflicting national standards shall be withdrawn at the latest by April 2001.

This European Standard 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).

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

This European Standard covers type testing only.

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.

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1 Scope

This European Standard specifies the safety, constructional and performance requirements for valve proving systems, hereafter referred to as VPS, for gas burners and gas appliances.

It applies to all types of VPS which are used for the automatic detection of leakage in a gas burner section having at least 2 valves designed to EN 161 and which give a signal if the leakage of one of the valves exceeds the detection limit.

It applies to VPS with declared maximum working pressure up to and including 4 bar, for use in systems using fuel gases of the 1st, 2nd or 3rd families.

This standard does not apply to VPS for use in explosive atmospheres.

This European Standard covers type testing only.

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 161:1991

Automatic shut-off valves for gas burners and gas appliances

EN 298:1993

Automatic gas burner control systems for gas burners and gas burning appliances with or without fans

EN 1854

Pressure sensing devices for gas burners and gas burning appliances

EN 60529 : 1991

Degrees of protection provided by enclosures(IP Code) (IEC 60529:1989)

prEN 60730-1 : 1999

Automatic electrical controls for household and similar use – Part 1: General requirements (IEC 60730-1:1999)

EN 61000-4-2 : 1995

Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test – Basic EMC publication (IEC 61000-4-2:1995)

EN 61000-4-3 : 1996

Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 3: Radiated radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:1995, modified) [390d92e84c38/sist-en-1643-2002](https://standards.iteh.ai)

EN 61000-4-4 : 1995

Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test - Basic EMV publication (IEC 61000-4-4:1995)

EN 61000-4-5 : 1995

Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 5: Surge immunity test (IEC 61000-4-5:1995)

EN 61000-4-6 : 1996

Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:1996)

EN 61000-4-11 : 1994

Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 11: Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:1994)

3 Terms and definitions

For the purpose of this standard the following terms and definitions apply:

3.1

valve proving system (VPS):

system to check the effective closure of automatic shut-off valves by detecting leakage. It may consist of a programming unit, a measuring device, valves and other functional assemblies.

3.2

VPS programming unit

unit which follows a predetermined sequence of valve proving actions.

3.3

detecting device

device for direct or inferential detection of leakage e. g. by measuring flow or pressure.

3.4

VPS operational time

time taken by the VPS to perform its entire cycle of operation.

3.5

detection limit

leakage at which the VPS gives a signal.

3.6

minimum detection setting

lowest value for setting specified by the manufacturer at which the VPS gives a signal.

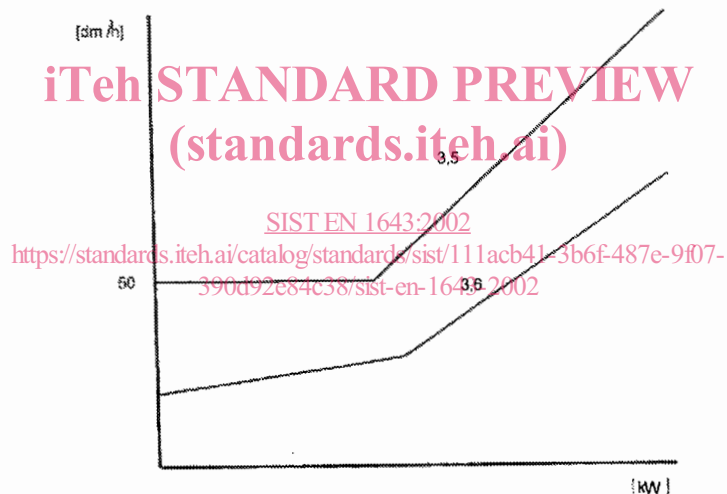


Figure 1 - Detection values (Definitions of 3.5 and 3.6)

3.7**Leakage testing time**

Time in which the VPS monitors a gas valve for leakage.

4 Conditions for testing and measuring tolerances

All the tests shall be carried out under normal conditions unless otherwise specified. The normal conditions are:

- rated voltage or rated voltage range;
- rated frequency;
- ambient temperature of (20 ± 5) °C.

The error of measurement shall not exceed:

- for time measurements: $\pm 0,1$ s;
- for temperature measurements: ± 1 K;
- for supply frequency measurements: $\pm 0,1$ Hz;
- for electrical supply measurements: $\pm 0,5$ %.

All measurements shall be made after stable temperature conditions have been achieved.

Tests are carried out in the mounting position declared by the manufacturer. Where there are several mounting positions, tests are carried out in the least favourable position.

5 Design requirements**5.1 General construction requirements**

The quality of the materials, the design and the structure of the components used shall be such that the VPS will operate safely in accordance with the requirements of this standard for a reasonable period of time (service life) under the normally expected mechanical, chemical, thermal and environmental conditions. This is providing that the manufacturer's instructions for installation, adjustment, operation and maintenance are followed. Compliance is checked by conformity to the tests specified in this standard.

The VPS shall be designed such that changes in critical circuit component values (such as those affecting timing or sequence) within the component manufacturer's declared worst case tolerances, including the long term stability, shall result in the system continuing to function in accordance with this standard. Compliance shall be checked by worst case analysis.

The construction of any additional functions included in the VPS for which no provisions exist in this standard, shall be such that they do not degrade the safe and correct operation.

5.2 Components

Where components are used to complete the VPS these components shall comply with the relevant component standard. Valves (e. g. for pressurizing and relieving the test section) integrated into the VPS functional sequence shall comply with EN 161:1991 and pressure sensing devices with EN 1854. In either case this valves shall comply with EN 161:1991 class A.

5.3 Leak tightness

A VPS shall be leaktight. A VPS is considered to be leaktight if no single component of a VPS has no higher external leakage rate greater than $60 \text{ cm}^3/\text{h}$, unless a lower value is specified in the relevant component standard.

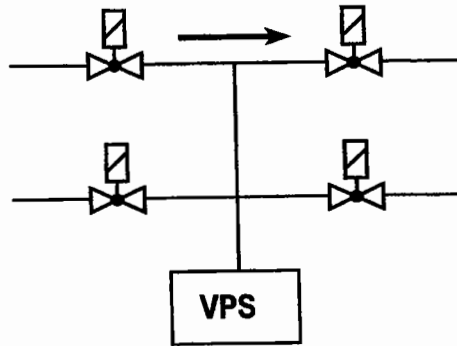


Figure 2A — Example of a VPS with external valves to be monitored

An integrated VPS is considered to be a single component. Integrated VPS shall have no higher leakage rate than $120 \text{ cm}^3/\text{h}$.

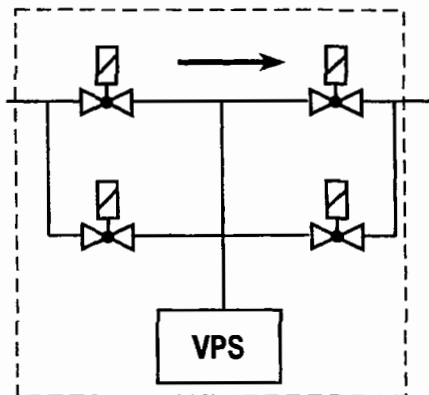


Figure 2B — Example of a VPS with integrated valves

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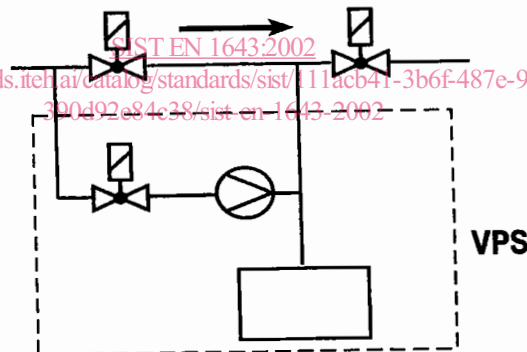


Figure 2C — Example of a VPS with partly integrated valves

5.4 Housing

Parts of the housing which directly or indirectly separate a gas-carrying compartment from atmosphere shall either:

- be made from metallic materials, or
- on removal or fracture of non-metallic parts other than O-rings, gaskets, seals and diaphragms, no more than 30 dm³/h of air escapes at the maximum inlet pressure.

NOTE For test see 8.7.2.2 of EN 161:1991.

5.5 Switching cycles

Mechanical and electro-mechanical components and contacts which are actuated at every switch-on operation or only when a shutdown occurs due to a disturbance shall satisfy the number of switching cycles specified in 5.11. (Relays shall, as a minimum, meet the requirements of EN 298:1993, Annex A including notes 7 and 8)

5.6 Switching contacts

Appropriate means (e. g. overcurrent protection devices) shall be used to protect switching contacts against the effects of short circuits. Where these protection devices are external, the manufacturer shall provide appropriate data.

5.7 Signal for indication

A signal for indication e. g. optical indication shall be given when the leakage exceeds the detection limit.

5.8 VPS setting

The setting of a detecting device shall require the use of tools. If the VPS is adjustable the manufacturer shall supply information for its setting, e. g. detection setting.

5.9 Protection provided by the enclosure

The class of protection for systems with their own enclosure shall be a minimum of IP 40 specified in EN 60529:1991 when installed in accordance with the manufacturer's instructions. For systems for use in the open air the protection shall conform at least to IP 54 when installed in accordance with the manufacturer's instructions. For systems without enclosure, equivalent protection shall be provided by the appliance in which it is installed.

5.10 Electrical equipment

The electrical equipment shall comply with the relevant requirements of prEN 60730-1: 1999, Clauses 8, 9, 10, 11, 12, 13, 14, 18, 19, 20, 21, 22, 23 and 24. If the supply voltage polarity can affect the safety, provisions have to be made to avoid uncontrolled opening of a gas valve or clear warnings shall be given in the installation and operating instructions.

5.11 Durability

5.11.1 Durability of marking

The durability of marking is tested according to prEN 60730-1 : 1999, Annex A.

5.11.2 General

5.11.2.1 Long term performance test

All components of the system shall be able to withstand 250 000 operations (255 000 where vibration is declared) and still comply with this standard. Parts which are actuated by manual reset shall be able to withstand 5 000 cycles. This requirement shall be checked by carrying out the tests detailed in 5.11.2.2 and 5.11.2.3.

The test of 5.11.2.2 and 5.11.2.3 shall be carried out on different test samples. The tests as described in 6.1.6 shall be carried out before and after the long-term performance test of 5.11.2.2 and 5.11.2.3. Additionally, on completion of the tests described in 5.11.2.3, the tests described in prEN 60730-1: 1999, 13.2.2 through 13.2.4 shall be carried out.

5.11.2.2 Thermal stress test for the VPS electronic circuit (carried out by a test laboratory)

The thermal stress test shall be carried out with the terminals loaded with the loads and power factors as declared by the manufacturer.

The system shall be tested under the following conditions:

During the tests a), b), c) and d) described below, the system shall be operated in such a way that the normal VPS sequence is performed. The time that the system is held in the stand-by (if applicable) position and the time that the control loop is interrupted before the cycle is repeated shall be agreed between the manufacturer and the test authority.

- a) The purpose of this test is to cycle components of an electronic circuit between the temperature extremes likely to occur during normal use and which may result from ambient temperature variation, mounting surface temperature variation, supply voltage variation, or the change from an operating condition to a non-operation condition or vice versa.

The following conditions shall form the basis of this test:

Duration of test : 14 days at thermal and electrical conditions

Electrical conditions:

The system is loaded according to the ratings declared by the manufacturer, the voltage then being increased to 110 % of the maximum declared rated voltage except that for 30 minutes during each 24 h period the voltage is reduced to 90% of the minimum declared rated voltage. The changes of voltage shall not be synchronised with the change of temperature. Each 24 h period shall also include at least one period of approximately 30 s during which the supply voltage is switched off.

Temperature conditions:

The ambient temperature and/or the mounting surface temperature are varied between the maximum declared ambient temperature or 60 °C, whichever is higher, and the minimum declared ambient temperature or 0 °C, whichever is lower, to cause the temperature of the components of the electronic circuit to be cycled between the resulting extremes. The rate of ambient and/or mounting surface temperature change shall be in the order of 1 °C/min and the extremes of temperature maintained for approximately 1 h.