SLOVENSKI STANDARD
SIST EN 13786:2004+A1:2009

01-januar-2009

Samodejni preklopni ventili z najveļ jim izhodnim tlakom do vkljuļ no 4 bar, s pretokom do vkljuļ no 100 kg/h in pripadajoļ imi varnostnimi napravami za butan, propan ali njuni zmesi (vkljuļ no z dopolnilom A1)

Automatic change-over valves having a maximum outlet pressure of up to and including 4 bar with a capacity of up to and including 100 kg/h, and their associated safety devices for butane, propane or their mixtures

Automatische Umschaltventile mit einem höchsten Ausgangsdruck bis einschließlich 4 bar und einem Durchfluss bis einschließlich 100 kg/h für Butan, Propan oder deren Gemische sowie die dazugehörigen Sicherheitseinrichtungen

Inverseurs automatiques de débit inférieur ou égal à 100 kg/h, à pression de détente nominale maximale inférieure ou égale à 4 bar, et leurs dispositifs de sécurité associés, pour butane, propane ou leurs mélanges

Ta slovenski standard je istoveten z: **EN 13786:2004+A1:2008**

ICS:

23.060.20	Zapirni ventili (kroglasti in pipe)	Ball and plug valves

SIST EN 13786:2004+A1:2009 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13786:2004+A1

November 2008

ICS 23.060.20

Supersedes EN 13786:2004

English Version

Automatic change-over valves having a maximum outlet pressure of up to and including 4 bar with a capacity of up to and including 100 kg/h, and their associated safety devices for butane, propane or their mixtures

Inverseurs automatiques de débit inférieur ou égal à 100 kg/h, à pression de détente nominale maximale inférieure ou égale à 4 bar, et leurs dispositifs de sécurité associés, pour butane, propane ou leurs mélanges

Automatische Umschaltventile mit einem höchsten Ausgangsdruck bis einschließlich 4 bar und einem Durchfluss bis einschließlich 100 kg/h für Butan, Propan oder deren Gemische sowie die dazugehörigen Sicherheitseinrichtungen

This European Standard was approved by CEN on 2 February 2004 and includes Corrigendum 1 issued by CEN on 25 August 2004 and Amendment 1 approved by CEN on 27 September 2008.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Foreword

This document (EN 13786:2004+A1:2008) has been prepared by Technical Committee CEN/TC 181 "Dedicated liquefied petroleum gas appliances", the secretariat of which is held by AFNOR.

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 May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.

This document includes Amendment 1, approved by CEN on 2008-09-27 and Corrigendum 1 issued by CEN on 2004-08-25.

This document supersedes EN 13786:2004.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] ⟨A1⟩.

The modifications of the related CEN Corrigendum have been implemented at the appropriate places in the text and are indicated by the tags [AC] ⟨AC⟩.

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).

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

This European Standard covers only type testing.

Items relating to quality assurance systems, production testing and particularly certificates of conformity are not covered in this standard.

This text is the third part of a series of standards covering different applications of the equipment considered. Two complementary documents have been elaborated:

— EN 12864, *Low pressure, non adjustable regulators having a maximum outlet pressure of less than or equal to 200 mbar, with a capacity of less than or equal to 4 kg/h, and their associated safety devices, for butane, propane and their mixtures;*

— [A1] EN 13785 ⟨A1⟩, *Regulators with a capacity of up to and including 100 kg/h, having a maximum nominal outlet pressure of up to and including 4 bar, other than those covered by EN 12864 and their associated safety devices for butane, propane or their mixtures.*

The [A1] Annexes A, B, C, D, E, F, G, H, I and J ⟨A1] are normative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This European Standard defines the constructional and operational characteristics, the safety requirements and test methods, and the marking of automatic change over devices with a capacity of less than or equal to 100 kg/h and having a maximum regulated pressure of less than or equal to 4 bar for butane, propane or their mixtures only in the vapour phase.

NOTE 1 bar = 10^5 Pa.

Liquefied gases containing methylacetylene and propadiene are not covered by this standard.

This European Standard also covers safety devices likely to be fitted onto automatic change over devices. The characteristics of these devices are given in annex A.

The requirements of this European Standard generally cover designs where regulation is in one stage, using a single diaphragm. These requirements do not exclude designs using more than one diaphragm, provided that these diaphragms are integrated in a single automatic change over devices complying with the requirements of this European Standard.

For specific uses in caravans and leisure vehicles, the automatic change over devices function may also be carried out by an assembly of regulators, forming a "automatic change over devices system" as defined in 3.1.2. This standard covers such an assembly as follows:

— special requirements for the manufacture, adjustment and operation of regulators forming a automatic change over devices system, as well as the corresponding test methods are given in annex B;

— except for these special requirements, and unless otherwise stated, constructional and performance characteristics given in the body of the standard are also applicable to the devices in annex B.

The requirements apply generally to automatic change over device used in locations where the temperature likely to be reached during use is between −20 °C and +50 °C. When the devices are used at temperatures outside this range they shall comply with special requirements defined in annex C.

This standard does not include the installation rules for automatic change over devices. In this matter, reference should be made to national regulations in force in the member countries.

This standard only covers type testing.

WARNING NOTICE: The figures in annexes G and H show the types of connections used according to the country of use of the regulators.

The top part of these figures (above the horizontal line) applies to the regulator and is normative. The bottom part of these figures (below the horizontal line) applies to the part to be connected to the regulator.

This is given as a guide for the tests and is not normative.

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 their publications apply to this European Standard only when incorporated in it by amendment or revision. For undated reference the latest edition of the publication referred to applies (including amendments).

EN 437:2003, *Test gases – Test pressures – Appliance categories*

EN 549, *Rubber materials for seals and diaphragms for gas appliances and gas equipment*

EN 1949, *Specification for the installation of LPG-systems for habitation purposes in leisure accommodation vehicles and in other road vehicles*

prEN 1763, *Flexible rubber and plastics hose, tubing, nozzles and assemblies for use with propane and butane in the vapour phase – Specification*

EN 12164, *Copper and copper alloys – Rod for free machining purposes*

EN 12165, *Copper and copper alloys – Wrought and unwrought forging stock*

EN 12864:2001, *Low pressure, non adjustable regulators having a maximum outlet pressure less than or equal to 200 mbar, with a capacity of less than or equal to 4 kg/h, and their associated safety devices for butane, propane or their mixtures*

▌A1⟩ EN 13785 ⟨A1▌, *Regulators with a capacity of up to and including 100 kg/h, having a maximum nominal outlet pressure of up to and including 4 bar, other than those covered by EN 12864 and their associated safety devices for butane, propane or their mixtures*

EN ISO 75-3, *Determination of temperature of deflection under load*

EN ISO 178, *Plastics – Determination of flexural properties (ISO 178:2001)*

EN ISO 180, *Plastics – Determination of Izod impact strength (ISO 180:2000)*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads - Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

EN ISO 527-4, *Plastics – Determination of tensile properties*

EN ISO 3166-1, *Codes for the representation of names of countries and their subdivision – Part 1: Country codes (ISO 3166-1:1997)*

EN ISO 4892-3, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps (ISO 4892-3:1994)*

▌A1⟩ EN ISO 7253, *Paints and varnishes - Determination of resistance to neutral salt spray (fog)* ⟨A1▌

EN ISO 9773, *Plastics - Determination of burning behaviour of thin flexible vertical specimens in contact with a small-flame ignition source (ISO 9773:1998)*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads – Part 1: Dimensions, tolerances and designation*

ISO 301, *Zinc alloy ingots intended for casting*

ISO 565, *Test sieves – Metal wire cloth, perforated metal plate and electroformed sheet – Nominal sizes of openings*

ISO 7005-2, *Metallic flanges – Part 2: Cast iron flanges*

3 Terms and definitions

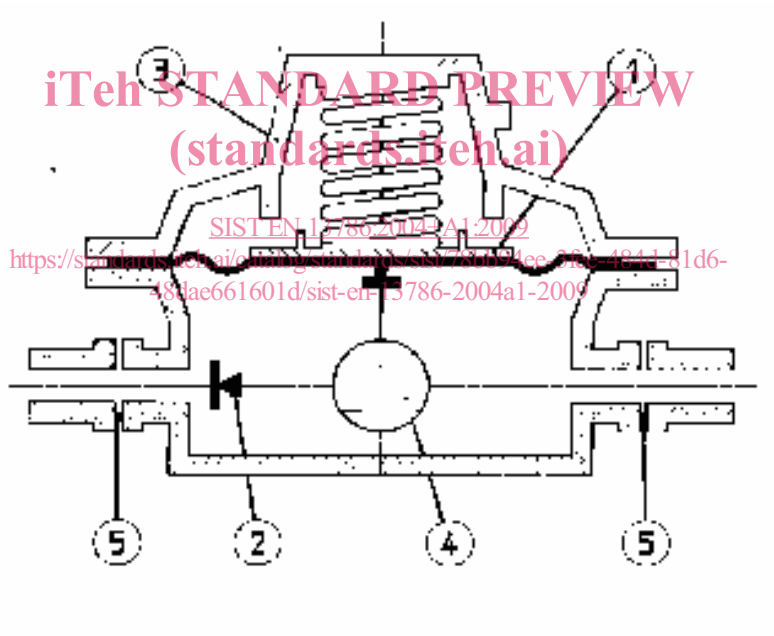
For the purposes of this European Standard, the following terms and definitions apply.

3.1 General terms and definitions

3.1.1
automatic change over devices
device which maintains the gas supply continuity by automatically using a gas from a "reserve" cylinder or series of cylinders when the supply pressure from a "service" cylinder or series of cylinders preselected by the user drops below a set value. This device allows regulation of the gas with upstream pressure within set limits, to a specified regulated pressure. It controls the operation of a supply-reserve indicator, allowing the identification of the cylinder or series of cylinders in use

The terminology used is shown in Figure 1. The diagram is shown as a guide, no other method is excluded.

3.1.2
automatic change over devices system
system of several regulators designed and adjusted in such a way as to operate like an automatic change over device as in 3.1.1 (see annex B)



Key

1 Pressure sensing subassembly
2 Regulation subassembly
3 Back pressure subassembly
4 Mechanical connection subassembly
5 Connection subassembly

Figure 1 — Diagram of an automatic change over devices

3.1.3
fixed automatic change over device
automatic change over device whose regulated pressure is adjusted by the manufacturer and fixed and whose adjustment cannot be modified by the user

3.1.4
variable automatic change over device
automatic change over device whose regulated pressure may be modified by the user simple manipulation between two fixed limits

3.1.5
adjustable automatic change over device
automatic change over device whose regulated pressure may only be modified by a specialist at the time of installation; it is then fixed fashion

3.1.6
tap
device for closing the gas flow which requires an intentional manual action (for example on a lever, a knob, etc...)

3.1.7
valve
component part of the regulation subassembly which ensures soundness between the part of the automatic change over devices at supply pressure and the part of the automatic change over devices at regulated pressure, when this is equal to the ▌A1⟩ lock up pressure ⟨A1▐

3.1.8
sealing
any arrangement of any device, for example an adjuster, such that any interference likely to change its setting causes the breaking of the device or sealing material making the interference apparent

3.1.9
nominal diameter (DN)
numerical designation common to all the components of a same pipe-work other than those named by their external diameter or by the size of the thread. It is a whole number used as a reference and related approximately to the manufacturing dimensions

[EN 88]

3.2 Terms and definitions concerning gas

3.2.1
butane
mixture of third family gases whose vapour pressure (p_v) at 50 °C is greater than or equal to 4,3 bar and at most equal to 7,5 bar, of mean volumetric mass in the gas phase equal to 2,4 kg/m^3

3.2.2
propane
mixture of third family gases whose vapour pressure (p_v) at 50 °C is greater than or equal to 7,5 bar or at most equal to 16 bar, of mean volumetric mass in the gas phase equal to 1,85 kg/m^3

3.2.3
LPG
mixture of third family gases whose vapour pressure (p_v) at 50 °C is greater than or equal to 4,3 bar or at most equal to 16 bar, of mean volumetric mass in the gas phase equal to 2,12 kg/m^3

3.3 Terms and definitions concerning pressures

Values of pressures given in the text are to be considered as values of relative pressure and are expressed in bar (bar) or millibar (mbar).

3.3.1
supply pressure
p
value of the gas pressure measured at the automatic change over device's inlet

3.3.2
regulated pressure
value of the gas pressure measured at the automatic change over device outlet or of the automatic change over device system as described in annex B

3.3.3
nominal regulated pressure
p_d
value of the regulated pressure corresponding:

— either to the normal pressure for appliances as defined in 3.6 of EN 437:2003;

— or to the normal pressure for appliances operating outside the scope of EN 437;

— or to an intermediate pressure allowing the supply of a second stage regulator under the conditions of 6.2.

From this pressure the operational limits of the automatic change over devices are obtained. This pressure is marked on the automatic change over devices.

3.3.4
〚A1〛 lock up pressure 〚A1〛
p_0
maximum regulated pressure obtained at no rate and for which all the values of the supply pressure between the limits given in 6.1

3.3.5
minimal admitted pressure
p_{Mg}
minimal value of the regulated pressure delivered by the automatic change over device for all values of the supply pressure and all values of the flow rate

3.3.6
maximal admitted pressure
p_{Mp}
maximal value of the regulated pressure delivered by the automatic change over device for all values of the supply pressure and all values of the flow rate in the operational area

3.3.7
change over nominal pressure
p_{di}
value of the nominal regulated pressure of the change over function, in case of two stages automatic change over devices, integrating a change over function and a regulator

3.4 Terms and definitions concerning rates

3.4.1
guaranteed rate
M_g
mass flow of gas that can be obtained, for any value of the supply pressure, at the "working" and "reserve" pressures between the specified limits

NOTE The guaranteed rate is expressed in grams per hour (g/h).

3.4.2
pilot rate
M_p
for automatic change over device up to 4 kg/h and for pressures complying with EN 437, the pilot rate is the gas flow (15 g/h) necessary for the supply of the ignition system of the appliance, generally called pilot

NOTE The pilot rate is expressed in grams per hour (g/h).

3.4.3
closing area
for automatic change over device over than 4 kg/h or for pressures not complying with EN 437 the closing area is the range between 0 % and 5 % of the guaranteed rate

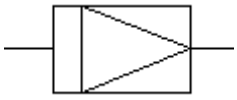
3.4.4
operational area
rate range between the pilot rate or the maximum of the closing area and 100 % of the guaranteed rate

4 Types of automatic change over devices

4.1 Introduction

There are typically two types of automatic change over device with pressure reduction:

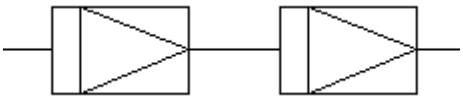
1 – Single stage:



Single stage automatic change over devices

- the supply pressure of the automatic change over device is equal to the pressure of the LPG supply containers;
- the automatic change over device supplies a gas appliance.

2 – Two or more stages:



First stage automatic change over device *Regulator*

- the supply pressure of the automatic change over devices is equal to the pressure of the LPG supply containers;
- the supply pressure of the regulator depends on the regulated pressure of the automatic change over device and on the pressure losses in the intermediate line;
- this regulator, covered by [A1] EN 13785 [A1], supplies a gas appliance or another regulator.

4.2 Automatic change over devices for installations where the final regulator supplies a pressure specified in EN 437

Where an automatic change over device is a single stage it shall be fixed.

It is recommended that a first stage automatic change over device is fixed.

For interchangeability the recommended nominal values of regulated pressures (p_d) of the first stage automatic change over device are the following:

3 – 1,5 – 1 – 0,75 – 0,5 – 0,4 – 0,3 – 0,15

4.3 Other automatic change over devices installation

To supply appliances with pressures which are different from those specified by EN 437 fixed, variable or adjustable automatic change over devices are used.

5 Constructional characteristics

5.1 General

Automatic change over devices shall be designed, manufactured and assembled in such a way that their operation is satisfactory under the installation and service conditions specified by the manufacturer.

Safety devices likely to be fitted to automatic change over devices covered by this standard shall, if applicable, be designed and constructed in accordance with the requirements given in annex A.

All the parts of an automatic change over devices shall be free of sharp corners or edges capable of causing deterioration, injury or faulty operation.

Parts shall be clean internally and externally.

Holes for screws, pins, etc., intended for the assembly of the automatic change over devices components and for their fixing shall not open into the gas ways. The thickness of the wall between these holes and the gas ways shall be at least 1 mm.

Holes necessary for machining which join gas ways to the atmosphere, but which have no influence on the operation of the automatic change over devices, shall be permanently closed metallically. Appropriate additional sealing compounds may be used.

Gas tight threads shall be in accordance with ISO 7-1, where pressure-tight joints are made on the threads or with ENPT.

Devices capable of modifying the operation of the automatic change over device shall not go out of adjustment and shall be sealed. In particular, the automatic change over device body and cover shall be assembled in such a way that a separation is not possible without permanent damage of these parts or of this sealing.

5.2 Materials

The quality of materials, the dimensions used and the means of assembling the various components shall be such that the construction and performance characteristics are secure. Performance characteristics shall not alter significantly during the life expectancy mentioned in the literature when the automatic change over device is installed and used in accordance with the manufacturer's instructions. Under these conditions all components shall withstand the mechanical, chemical and thermal conditions to which they may be submitted during their use, under normal conditions.

The automatic change over devices shall withstand the action of organic substances, either of vegetable or animal origin.

The body shall be made of metallic material.

Internal parts and parts of the cover not related to pressure (except for the connections, see Figure 1), may be made of non metallic (thermoplastic or thermal setting) materials, provided that the following requirements are met: