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Pnevmatski tip**

Gas/air ratio controls for gas burners and gas burning appliances - Part 1: Pneumatic types

Gas-Luft-Verbundregler für Gasbrenner und Gasgeräte - Teil 1: Pneumatische Ausführung

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Dispositifs de régulation du rapport air/gaz pour brûleurs à gaz et appareils à gaz - Partie 1: Dispositifs pneumatiques

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This European Standard was approved by CEN on 15 February 1998.

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

Contents

	Page
Foreword	3
1 Scope	4
2 Normative references	4
3 Definitions	5
4 Construction requirements	6
5 Performance requirements	12
6 Test methods	16
7 Instructions and declarations	27
8 Marking	28
Annexes	
A (informative) Use of ISO 7-1: 1994 and ISO 228-1: 1994 threads for gas connections	29
B (informative) Leak tightness test - volumetric method	30
C (informative) Leak tightness test - pressure loss method	32
D (informative) Conversion of pressure loss into leakage rate	34
ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives	35

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SIST EN 12067-1:1999

<https://standards.iteh.ai/catalog/standards/sist/4eb2bcc3-dd8b-41ba-b92e-a3b8046b7e52/sist-en-12067-1-1999>

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 1999, and conflicting national standards shall be withdrawn at the latest by April 1999.

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 standard covers type testing only.

This Part of EN 12067 covers pneumatic type gas/air ratio controls. Other types will be covered in subsequent parts.

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 Part of this European Standard, EN 12067 specifies the safety, construction and performance requirements for gas/air ratio controls for inlet pressures up to and including 500 mbar of nominal connection size up to and including DN 150 , intended for use with gas appliances for use with one or more fuel gases of the first, second or third families. It also describes the test procedures for evaluating these requirements and specifies information necessary for installation and use.

It applies to gas/air ratio controls for gas burning appliances that can be tested independently of the appliance.

It applies to gas/air ratio controls which function by controlling a gas pressure (or differential pressure) output in response to an air pressure (or differential pressure) signal input, but gas/air ratio controls which change the air pressure in response to the gas pressure are not excluded.

It does not cover mechanically linked valves and electronic systems.

NOTE: Parts of the standard can be applied to the construction and performance of the ratio control function of multi-functional controls.

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 publications referred to applies.

EN 161: 1991 *Automatic shut-off valves for gas burners and gas appliances*

EN 60529: 1991 *Degrees of protection provided by enclosures (IP codes).*

EN 60730-1: 1995 *Automatic electrical controls for household and similar use*
Part 1: General requirements

EN 60998-2-1: 1995 *Connecting devices for low voltage circuits for household and similar purposes; part 2-1 : particular requirements for connecting devices as separate entities with screw-type clamping units.*

EN 60998-2-2: 1995 *Connecting devices for low voltage circuits for household and similar purposes; part 2-2 : particular requirements for connecting devices as separate entities with screwless type clamping units.*

ISO 7-1: 1994	<i>Pipe threads where pressure-tight joints are made on the threads. Part 1: Dimensions, tolerances and designation.</i>
ISO 228-1: 1994	<i>Pipe threads where pressure-tight joints are not made on the thread. Part 1: Dimensions, tolerances and designation.</i>
ISO 262: 1973	<i>ISO General purpose metric screw threads Selected sizes for screws, bolts and nuts</i>
ISO 274: 1975	<i>Copper tubes of circular section - Dimensions</i>
ISO 301: 1981	<i>Zinc alloy ingots intended for casting.</i>
ISO 1817: 1985	<i>Rubber vulcanized - Determination of the effect of liquids</i>
ISO 7005	<i>Metallic flanges</i>

3 Definitions

For the purposes of this standard, the following definitions apply.

3.1 gas/air ratio control: (hereafter referred to as ratio control). control which supplies gas at specified pressures or differential pressures at it's outlet in response to a signal.

3.2 standard conditions: standard reference conditions are 15 °C, 1 013 mbar, dry.

3.3 pressures

3.3.1 inlet pressure: gas pressure at the inlet of the ratio control.

3.3.2 outlet pressure: gas pressure at the outlet of the ratio control.

3.3.3 signal pressure: pressure input, differential pressure input or a combination of both applied to the ratio control in order to provide the specified gas outlet pressure or differential pressure.

3.3.4 gas/air ratio: slope of a straight line relationship between the outlet pressure and signal pressure applied to the ratio control.

3.4 flow rates

3.4.1 flow rate: volume flowing through the ratio control per unit time in m³/h of air at standard conditions.

3.4.2 maximum flow rate: maximum rate, as a function of inlet and outlet pressures, declared by the manufacturer and expressed in m³/h of air at standard conditions.

3.4.3 minimum flow rate: minimum rate, as a function of inlet and outlet pressures, declared by the manufacturer and expressed in m³/h of air at standard conditions.

3.5 signal chamber: part of the ratio control to which the air or gas signal inputs are connected.

3.6 signal tube (impulse line): small bore pipe that is used to convey pressure from part of an installation to the signal chamber

3.7 operational terms

3.7.1 external leak-tightness (soundness): leak-tightness of a gas or air-carrying compartment with respect to atmosphere.

3.7.2 mounting position: position declared by the manufacturer for mounting the ratio control.

3.8 response time: maximum time taken for the outlet pressure to reach stable conditions in the opening or closing direction in response to a step change in signal pressure.

3.9 maximum ambient temperature: highest air temperature declared by the manufacturer at which the ratio control may be operated.

3.10 minimum ambient temperature: lowest air temperature declared by the manufacturer at which the ratio control may be operated.

3.11 group 1 control (see table 3): ratio control for use in an appliance and/or installation where it is not subjected to bending stresses imposed by installation pipework, e.g. by the use of rigid adjacent supports.

3.12 group 2 control (see table 3): ratio control for use in any situation, either internal or external to the appliance, typically without support.

NOTE: A ratio control which meets the requirements for group 2 controls also meets the requirements for group 1 controls.

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4 Construction requirements

4.1 General

NOTE: Where no specific method of test is given, these general requirements are considered to be met, either by inspection or by compliance with the specific requirements of this standard.

4.1.1 The ratio control shall be designed, manufactured, and assembled so that it functions correctly when installed and used according to the manufacturer's instructions.

4.1.2 Ratio controls shall be free from sharp edges and corners which might cause damage, injury or incorrect operation.

All parts shall be clean internally and externally.

4.1.3 Holes for screws, pins, etc., which are used for the assembly of parts or for mounting, shall not penetrate gasways.

The wall thickness between these holes and gasways shall be at least 1 mm.

4.1.4 Holes necessary in manufacture which connect gasways to atmosphere but which do not affect the function of the ratio control shall be permanently sealed by metallic means. Suitable jointing compounds may additionally be used.

4.1.5 Closure parts, including those of measuring and test points, which may be dismantled for servicing, adjustment or conversion, shall be constructed such that leak-tightness in accordance with 5.2.1 is achieved by mechanical means (e.g. metal to metal joints, O-rings). This excludes all jointing compounds such as liquids, pastes and tapes.

Jointing compounds, however, may be used for permanent assemblies and shall remain effective under normal operating conditions.

Closure parts not intended to be dismantled during servicing, adjustment or conversion shall be sealed by means which will show evidence of interference (e.g. lacquer).

4.1.6 Parts that require dismantling e.g. for servicing, shall be capable of being dismantled and reassembled with commonly available tools and shall be constructed or marked such that incorrect assembly is impossible when following the manufacturer's instructions.

Screwed fastenings that may be removed during servicing shall have metric threads to ISO 262: 1973.

Self-tapping screws that cut a thread and produce swarf shall not be used for connecting gas-carrying parts or parts that may be removed in servicing.

Self-tapping screws that form a thread and do not produce swarf may be used provided that they can be replaced with metric machine screws conforming to ISO 262: 1973.

4.1.7 The function of moving parts, e.g. diaphragms, bellows, shall not be impaired by other parts.

4.1.8 Soldering or other processes where the jointing material has a melting point below 450 °C after application shall not be used for joining gas-carrying parts except for additional sealing.

4.1.9 Breather holes shall be designed such that, when the diaphragm is damaged, either:

- a) when tested in accordance with 6.2.4, the flow of air through the hole shall not exceed 70 dm³/h at the maximum inlet pressure, or
- b) they shall have a connection for a suitable vent pipe, in which case the installation and operation instructions shall state that the breather hole shall be vented to a safe place.

For maximum inlet pressures up to 30 mbar, requirement a) above shall be deemed to be met with a breather hole of diameter not greater than 0,7 mm.

If compliance with a) above is by the use of a leakage rate limiter, it shall be able to withstand three times the maximum inlet pressure. If a safety diaphragm is used as a leakage rate limiter it shall not take the place of the working diaphragm in case of a fault.

Breather holes shall be protected against blockage or shall be located so that they do not easily become blocked. They shall be arranged such that the diaphragm cannot be damaged by a sharp device inserted through the breather hole.

4.1.10 Sealing caps, if used, shall be capable of removal and replacement with commonly available tools and shall be capable of being sealed, e.g. by lacquer. A sealing cap shall not hinder adjustment within the whole range declared by the manufacturer.

4.1.11 Blockage of auxilliary canals and orifices shall not lead to an unsafe situation otherwise they shall be protected against blockage by suitable means.

4.1.12 Where an inlet strainer is fitted to a ratio control, the maximum strainer hole dimension shall not exceed 1,5 mm and it shall prevent the passage of a 1 mm diameter pin gauge.

Where an inlet strainer is not fitted to a ratio control, the installation instructions shall include relevant information concerning the use of at least a strainer conforming to the above requirements and its installation position to prevent the ingress of foreign matter.

4.2 Materials

4.2.1 General

The quality of materials, the dimensions used and the method of assembling the various parts shall be such that construction and performance characteristics are safe. Performance characteristics shall not alter significantly during a reasonable life when the ratio control is installed and used according to the manufacturer's instructions. Under these circumstances, all components shall withstand any mechanical, chemical, and thermal conditions to which they may be subjected during service.

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4.2.2 Zinc alloys

Zinc alloys shall only be used if of quality ZnAl4 to ISO 301: 1981 and if the parts will not be exposed to a temperature higher than 80 °C. For main inlet and outlet threaded connections of ratio controls, only external threads conforming to ISO 228-1: 1994 are permitted if these connections are made of zinc alloy.

4.2.3 Housing

Parts of the housing which directly or indirectly separate a gas-carrying compartment from atmosphere shall either be made from metallic materials or shall be such that, on removal or fracture of non-metallic parts other than 'O'-rings, gaskets, seals and diaphragms not more than 30 dm³/h of air at standard reference conditions escapes at the maximum inlet pressure, when tested to 6.2.3.

4.2.4 Resistance to corrosion

Any part in contact with gas or the surrounding atmosphere and also springs, shall be manufactured from corrosion-resistant materials or shall be suitably protected. The corrosion protection for springs and other moving parts shall not be impaired by any movement.

4.2.5 Impregnation

A production-line treatment such as impregnation may be carried out using an appropriate procedure, e.g. vacuum or internal pressure, using appropriate sealing materials.

4.3 Connections

4.3.1 Connection sizes

Equivalent connection sizes are given in table 1.

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SIST EN 12067-1:1999
<https://standards.iteh.ai/catalog/standards/sist/4eb2bcc3-dd8b-41ba-b92e-a3b8046b7e52/sist-en-12067-1-1999>

Table 1: Connection sizes

Nominal size DN	Designation of thread to ISO 7-1: 1994 or to ISO 228-1: 1994	Nominal size of flanges to ISO 7005	Outside diameter of tubes for compression fittings (range in mm)
6	$\frac{1}{8}$	6	2 to 5
8	$\frac{1}{4}$	8	6 to 8
10	$\frac{3}{8}$	10	10 to 12
15	$\frac{1}{2}$	15	14 to 16
20	$\frac{3}{4}$	20	18 to 22
25	1	25	25 to 28
32	1 $\frac{1}{4}$	32	30 to 32
40	1 $\frac{1}{2}$	40	35 to 40
50	2	50	42 to 50
65	2 $\frac{1}{2}$	65	-
80	3	80	-
100	-	100	-
125	-	125	-
150	-	150	-

4.3.2 Threads

4.3.2.1 It shall easily be possible to apply the necessary forces when making any gas connection e.g. by suitable spanner flats for commonly available tools.

4.3.2.2 If the inlet or outlet connection is a pipe thread it shall be to ISO 7-1: 1994 or to ISO 228-1: 1994 and shall be chosen from the series given in table 1.

NOTE: Additional information concerning the use of these threads is given in annex A.

4.3.2.3 For connections intended to be made with union joints, the union joints shall be made available or full details supplied with the device if the threads do not conform to ISO 7-1: 1994 or ISO 228-1: 1994.

4.3.3 Flanges

SIST EN 12067-1:1999

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If flanges are used, they shall be suitable for connection to flanges to ISO 7005 PN 6 or PN 16, or suitable adaptors shall be supplied to ensure connection to standard flanges or threads or full details of mating parts shall be made available upon request.

4.3.4 Compression fittings

Compression fittings shall be suitable for use with pipe of outside diameters to ISO 274: 1975, table 2. It shall not be necessary for the installer to form the tubes before connection is