# SLOVENSKI STANDARD

**SIST EN 334:2005**

**01-junij-2005**

**Nadomeġļa:**

**SIST EN 334:2000**

**SIST EN 334:2000/A1:2003**

---

**Regulatorji tlaka plina za vstopne tlake do 100 bar**

Gas pressure regulators for inlet pressures up to 100 bar

Gas-Druckregelgeräte für Eingangsdrücke bis 100 bar



Appareils de régulation de pression de gaz (régulateurs) pour des pressions amont jusqu'a 100 bar



**Ta slovenski standard je istoveten z:** **EN 334:2005**

---

**ICS:**

23.060.40

**SIST EN 334:2005** **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 334

March 2005

ICS 23.060.40

Supersedes EN 334:1999

English version

# Gas pressure regulators for inlet pressures up to 100 bar

Appareils de régulation de pression de gaz (régulateurs) pour des pressions amont jusqu'à 100 bar

Gas-Druckregelgeräte für Eingangsdrücke bis 100 bar

This European Standard was approved by CEN on 23 December 2004.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, 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**



Ref. No. EN 334:2005: E

# Contents

page

# Foreword

This document (EN 334:2005) has been prepared by Technical Committee CEN/TC 235 “Gas pressure regulators and associated safety devices for use in gas transmission and distribution”, the secretariat of which is held by UNI.

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 September 2005, and conflicting national standards shall be withdrawn at the latest by September 2005.

This document supersedes EN 334:1999.

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 97/23/EC.

For relationship with EU Directive 97/23/EC, see informative Annex ZA, which is an integral part of this document.

Gas pressure regulators dealt with in this document are standard gas pressure regulators and, when used in pressure regulating stations complying with EN 12186 or EN 12279, they are considered as standard pressure equipment in accordance with Clause 3.1 of Art. 1 of Pressure Equipment Directive 97/23/EC (PED).



For standard gas pressure regulators used in pressure regulating stations complying with EN 12186 or EN 12279, Table ZA.1 given in Annex ZA includes all applicable Essential Requirements given in Annex I of PED, except the external resistance to environmental conditions where corrosion occurs.



The normative Annex H of this document lists some suitable materials for pressure containing parts, inner metallic partition walls, fasteners and connectors. Other materials may be used when complying with the restrictions given in Table 5.

Gas pressure regulators complying with this document do not need protection against exceeding their allowable limit of pressure if the maximum downstream incidental pressure ($MIP_d$) of the upstream gas pressure regulating station is less than or equal to 1,1 times the maximum allowable pressure (PS) of the regulator itself.

The continuing integrity of gas pressure regulators is assured by periodic functional checks. For periodic functional checks it is common to refer to national regulations/standards where existing or users/manufacturers practices.

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

# 1 Scope

This document specifies constructional and functional requirements, regulator sizing, testing, documentation and marking of gas pressure regulators used in the pressure regulating stations:

— for inlet pressures up to 100 bar and nominal diameters up to DN 400;

— for an operating temperature range from -20 °C to +60 °C,

which operate with fuel gases of the 1st and 2nd family in accordance with EN 437 in transmission and distribution networks and also in commercial and industrial installations.

"Gas pressure regulators" hereafter will be called "regulators" except in the titles.

The harmonised part of this document deals with standard gas pressure regulators used in pressure regulating stations complying with EN 12186 or EN 12279. For gas pressure regulators integral strength type when used in pressure regulating stations complying with EN 12186 or EN 12279, Annex ZA lists all applicable Essential Requirements except the external resistance to environmental conditions where corrosion occurs.

This document considers the following classes of regulators:

— class 1: operating temperature range from -10 °C to 60 °C;

— class 2: operating temperature range from -20 °C to 60 °C.



This document applies to regulators which use the pipeline gas as a source of control energy unassisted by any external power source.



The regulator may incorporate a creep (venting) relief device, complying with the requirements in Annex F.

The regulators complying with the requirements of this document may be declared as "in compliance with EN 334" and bear the marking “EN 334”.

This document does not apply to:

— regulators upstream from/on/in domestic gas-consuming appliances which are installed downstream of domestic gas meters;

— regulators in accordance with prEN xxxxxx (WI 00235003 under preparation by CEN/TC 235);

— regulators for which a specific document exists (e.g. EN 88, etc.);

— industrial process control valves in accordance with EN 1349.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including amendments) applies.

EN 287 (all parts), *Qualification test of welders - Fusion welding*.

EN 288 (all parts), *Specification and approval of welding procedures for metallic materials*.

EN 473, *Non destructive testing – Qualification and certification of NDT personnel – General principles*.

EN 571-1, *Non destructive testing – Penetrant testing – Part 1: General principles*.

EN 970, *Non-destructive examination of fusion welds – Visual examination*.

EN 1289, *Non-destructive examination of welds – Penetrant testing of welds – Acceptance levels*.

EN 1290, *Non-destructive examination of welds – Magnetic particle examination of welds*.

EN 1291, *Non-destructive examination of welds – Magnetic particle testing of welds – Acceptance levels*.

EN 1349, *Industrial process control valves*.



EN 1418, *Welding personnel – Approval testing of welding operators for fusion welding and resistance weld setters for fully mechanised and automatic welding of metallic materials*.

EN 1435, *Non-destructive examination of welds – Radiographic examination of welded joints*.



EN 1712, *Non-destructive examination of welds – Ultrasonic examination of welded joints – Acceptance levels*.

EN 1713, *Non-destructive examination of welds – Ultrasonic examination – Characterization of indications in welds*.

EN 1714, *Non- destructive examination of welds – Ultrasonic examination of welded joints*.

EN 10045-1, *Metallic materials – Charpy impact test – Part 1: Test method*.

EN 10204, *Metallic products – Types of inspection documents*.

EN 12186, *Gas supply systems – Gas pressure regulating stations for transmission and distribution – Functional requirements*.

EN 12279, *Gas supply systems – Gas pressure regulating installations on service lines – Functional requirements*.

EN 12517, *Non-destructive examination of welds – Radiographic examination of welded joints – Acceptance levels*.

EN 12627, *Industrial valves – Butt welding ends for steel valves*.

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

EN 14382, *Safety devices for gas pressure regulating stations and installations – Gas safety shut-off devices for inlet pressures up to 100 bar*.

EN 60534-1:1993, *Industrial-process control valves – Part 1: Control valve terminology and general considerations (IEC 60534-1:1987)*.

EN 60534-2-1, *Industrial-process control valves – Part 2-1: Flow capacity – Sizing equations for fluid flow under installed conditions (IEC 60534-2-1:1998)*.

EN 60534-2-3, *Industrial-process control valves – Part 2-3: Flow capacity – Test procedures (IEC 60534-2-3:1997)*.

EN ISO 175:2000, *Plastics – Methods of test for the determination of the effects of immersion in liquid chemicals (ISO 175:1999)*.

EN ISO/IEC 17025:2000, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:1999)*.

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

ISO 1817, *Rubber, vulcanized – Determination of the effect of liquids*.

ISO 3419, *Non-alloy and alloy steel butt-welding fittings*.

ISO 5752, *Metal valves for use in flanged pipe systems – Face-to-face and centre-to-face dimensions*.

ISO 7005(all parts), *Metallic flanges*.



ANSI/ASME B1.20.1:1983, *Pipe threads, general purpose (inch)*.



ASME B16.34:1996, *Valves – Flanged, threaded and welding end*.



MSS SP 55:1985, *Quality standard for steel castings for valves, flanges and fittings and other piping components (Visual method)*.

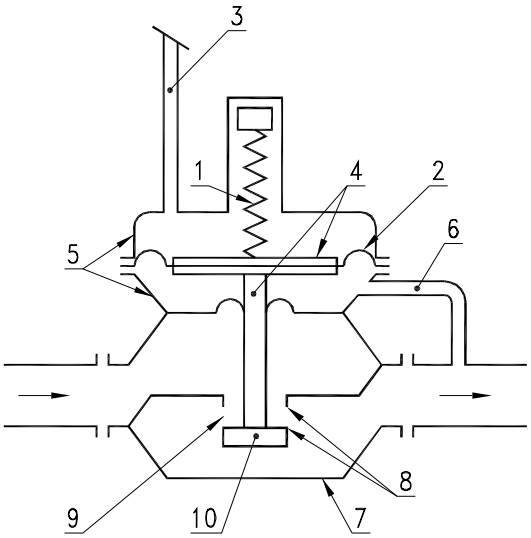
## 3 Terms, definitions and symbols

### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 60534-1:1993 and the following apply.

**3.1.1**
**gas pressure regulator**
device whose function is to maintain the value of the controlled variable (see 3.2.2.1) within its tolerance field irrespective of disturbance variables

**3.1.1.1**
**direct acting gas pressure regulator**
regulator in which the net force required to move the control member is supplied directly by the controlled variable (see example in Figure 1)




**Key**

1 Setting element
2 Detector element
3 Breather/exhaust line
4 Actuator
5 Casing of actuator
1 + 2 = Controller
6 Sensing line
7 Regulator body
8 Valve seats
9 Seat ring
10 Control member

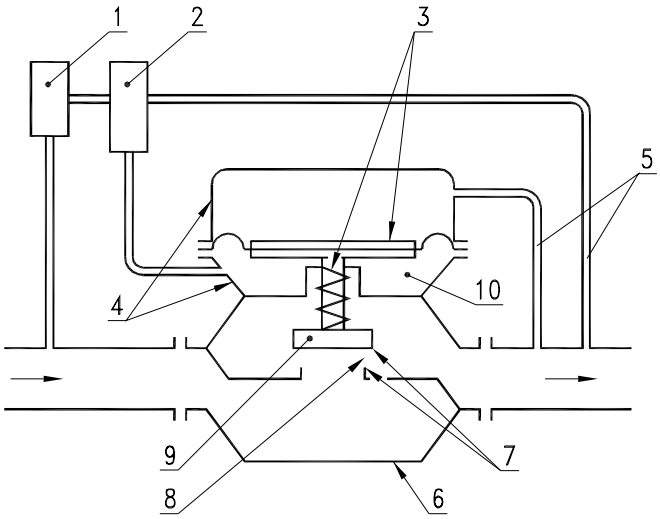


**Figure 1 — Example of a direct acting regulator**

**3.1.1.2**
**pilot controlled gas pressure regulator (indirect acting)**



regulator in which the net force required to move the control member is supplied by a pilot (see example in Figure 2)




**Key**

1 Fixture
2 Pilot
3 Actuator
4 Casing of actuator
5 Sensing/process line
6 Regulator body
7 Valve seats
8 Seat ring
9 Control member
10 Motorization chamber



**Figure 2 — Example of a pilot controlled regulator**



**3.1.1.3**
**monitor**
second regulator normally installed in series with an active regulator which has the task of maintaining the controlled variable within allowable limits in the event of its value exceeds a pre-established value (e.g. in the event of opening of the active regulator due to a failure, etc.)



**3.1.1.4**
**series of regulators**
regulators with the same design concept but differing only in size

**3.1.1.5**
**fail open regulator**
regulator whose control member automatically tends to open when the main diaphragm fails or when the energy required to move the control member fails

NOTE The definition in this clause is based on typical control failure modes.

**3.1.1.6**
**fail close regulator**
regulator whose control member automatically tends to close when the main diaphragm fails or when the energy required to move the control member fails

NOTE The definition in this clause is based on typical control failure modes.

**3.1.1.7**
**integral strength regulator**
regulator in which the pressure containing parts have a design pressure equal to the maximum allowable pressure PS

**3.1.1.8**
**differential strength regulator**
regulator in which some of the pressure containing parts have a design pressure less than the maximum allowable pressure PS

**3.1.1.9**
**regulator size**
nominal inlet diameter
nominal size DN of the inlet connection in accordance with EN ISO 6708

**3.1.1.10**
**nominal outlet diameter**
nominal size DN of the outlet connection in accordance with EN ISO 6708

**3.1.2**
**main components**
parts including normally: control member, regulator body, actuator, casing of actuator, controller, pilot (only in pilot controlled regulators)

NOTE The regulator might include additional devices such as a shut-off device, a monitor, a relief valve and other fixtures. The Figures 1 and 2 serve as examples.

**3.1.2.1**
**control member**
movable part of the regulator which is positioned in the flow path to restrict the flow through the regulator



NOTE A control member may be a plug, ball, disk, vane, gate, diaphragm, etc.



**3.1.2.2**
**body**
main pressure containing envelope which provides the fluid flow passageway and the pipe end connections



**3.1.2.3**
**valve seats**
corresponding sealing surfaces within a regulator which make full contact only when the control member is in the closed position

**3.1.2.4**
**seat ring**
part assembled in a component of the regulator to provide a replaceable seat

**3.1.2.5**
**actuator**
device or mechanism which changes the signal from the controller into a corresponding movement controlling the position of the control member

**3.1.2.6**
**casing of actuator**
housing of the actuator (which may consist of two chambers under pressure)

NOTE When the pressure in each chamber is different from atmospheric pressure, the chamber at the higher pressure is termed the "motorization chamber".

**3.1.2.7**
**controller**
device which normally includes:

— a setting element, normally a spring, to obtain the set value of the controlled variable;

— a detector element, normally a diaphragm, for the controlled variable

**3.1.2.8**
**pilot**
device which includes:

— a setting element to obtain the set value of the controlled variable;

— a detector element for the controlled variable;

— a unit which compares the set value of the controlled variable with its feedback value;

— a system which provides the motorization energy for the actuator

**3.1.2.9**
**main diaphragm**
diaphragm, the function of which is to detect the feedback of the controlled variable and/or the diaphragm which provides the thrust to move the control member

**3.1.2.10**
**pressure containing parts**
parts whose failure to function would result in a release of the retained fuel gas to the atmosphere which include bodies, control member, bonnets, the casing of the actuator, blind flanges and pipes for process and sensing lines



**3.1.2.11**
**inner metallic partition wall**
metallic wall that separates a chamber into two individual pressure-containing chambers at different pressures under normal operating conditions



**3.1.3**
**accessories**
parts or minor devices connected to the regulator

**3.1.3.1**
**process and sensing lines**
lines which connect impulse points to the regulator

NOTE Sensing and process lines may be integrated into the regulator or external to the regulator. Those lines with no internal flow are termed "sensing lines"; those with internal flow are termed "process lines".

**3.1.3.2**
**breather line**
connection line between the controller and/or pilot and atmosphere to equalize the pressure on the detector element when it changes its position in normal operating conditions

NOTE In the event of a fault in the detector element this line may become an exhaust line.

**3.1.3.3**
**exhaust line**
connection line between the regulator or its fixtures and atmosphere for the safe exhausting of gas in the event of failure of any part

**3.1.3.4**
**fixtures**
functional devices connected to the main components of the regulator (see 3.1.2)

## 3.2 Control variables

### 3.2.1 Reference values

**3.2.1.1**
**pressure**

all pressures specified in this document are static gauge pressures

NOTE Pressure is expressed in bar[1)].

**3.2.1.1.1**
**inlet pressure**
$p_u$
gas pressure at the inlet of the regulator

**3.2.1.1.2**
**outlet pressure**
$p_d$
gas pressure at the outlet of the regulator

**3.2.1.1.3**
**differential pressure**
$\Delta p$
difference between two values of pressure at two different points



**3.2.1.1.4**
**motorization pressure**
$p_m$
gas pressure in the motorization chamber



**3.2.1.1.5**
**pilot feeding pressure**
$p_{up}$
gas pressure at the inlet of the pilot

### 3.2.1.2 Flow conditions

**3.2.1.2.1**
**normal conditions**
absolute pressure $p_n$ of 1,013 bar and temperature $T_n$ of 0 °C (273,15 K)

NOTE For calculation purposes a value of 273 K is used in this document.

**3.2.1.2.2**
**gas volume**
volume of gas at normal conditions

NOTE Gas volume is expressed in $m^3$.

---

[1)] 1 bar = 1 000 mbar = $10^5$ $N/m^2$ = $10^5$ Pa = $10^{-1}$ MPa.