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## Gas cylinders — Cylinder valves with integrated pressure regulators — Specification and type testing

*Bouteilles à gaz — Robinets de bouteilles avec détendeur intégré — Spécifications et essais de type*

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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 2, *Cylinder fittings*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 23, *Transportable gas cylinders*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 22435:2007), which has been technically revised. It also incorporates the Amendment ISO 22435:2012/Amd. 1:2012.

The main changes are as follows:

- Introduction: clarification that this document gives additional requirements to those specified in ISO 10297, ISO 17871, ISO 17879 and ISO 23826, unless specifically mentioned.
- Scope:
  - requirements in this document are in addition to those specified in ISO 10297, ISO 17871, ISO 17879 and ISO 23826, unless specifically mentioned;
  - clarification of different VIPR types with different positions of primary operating mechanism within the valve;



- ~~—~~ exclusion of VIPRs for liquefied petroleum gas (LPG) and cryogenic applications.
- ~~—~~ Terms and definitions: definition of a primary valve operating mechanism.
- ~~—~~ Introduction of VIPR types A, B and C for easy referencing of different design types.
- ~~—~~ Symbols and descriptions:
  - ~~—~~ clarification of inlet pressure to the regulating function  $p_1$  and valve test pressure for different gas types;
  - ~~—~~ additional characteristic column in table with link to test method, if relevant.
- ~~—~~ Design requirements and considerations:
  - ~~—~~ general: VIPRs to comply with the relevant closure standards;
  - ~~—~~ materials: lubricant requirements given in relevant closure standard;
  - ~~—~~ pressure and flow indicating devices: relevant pressure indicator requirements in this document;
  - ~~—~~ cylinder connection: clause removed;
  - ~~—~~ main shut-off valve: clause removed because requirements already given in relevant closure standard;
  - ~~—~~ pressure adjusting device: addition of a new Clause ~~clause~~;
  - ~~—~~ leakage: total external and internal leakage shall not exceed 12 cm<sup>3</sup>/h;
  - ~~—~~ mechanical strength: mechanical strength of inlet side moved to relevant closure standard;
  - ~~—~~ resistance to ignition: moved to ISO 10297;
  - ~~—~~ resilience to ignition: addition of a new clause;
  - ~~—~~ resistance to vibration and shock: addition of a new Clause ~~clause~~.
- ~~—~~ Type testing:
  - ~~—~~ general: clarification of changes to the VIPR design that require repetition of type tests;
  - ~~—~~ test schedule: table reformatted for relevant tests;
  - ~~—~~ test method for accuracy of VIPR with flowmeter: reference standard changed to ISO 2503;
  - ~~—~~ test methods for leakage: test for regulating device only;
  - ~~—~~ test method for the endurance test of the VIPR with the pressure regulator valve acting as primary valve operating mechanism: moved to ISO 10297;

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- ~~test method for endurance of the filling connection closing device: moved to ISO 10297;~~
- ~~test method for VIPR pressure regulator endurance test: addition of new test.~~
- ~~Removal of previous Annex A, "Valve impact test" and Annex B, "Endurance test", because both are already given in relevant closure standardstandards.~~
- ~~Addition of new Annexes A, B, C and D.~~
- Addition of new Annexes A, B, C and D.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html)~~www.iso.org/members.html~~.

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## Introduction

Valves with integrated pressure regulators (VIPRs) are used to reduce the pressure receptacle pressure to a lower pressure suitable for end use processes.

VIPRs incorporate the basic functionality of a primary valve operating mechanism, with the additional ability to regulate the pressure and/or flow at the valve outlet. They remove the need for end users to make and break a high-pressure gas connection.

These valves operate over a wide range of inlet and outlet pressures and flows which require specific design characteristics. It is important that the operating characteristics of these valves be specified and tested in a defined manner.

Such valves are more complicated than conventional cylinder valves yet subject to the same environmental and transport conditions. These conditions should be kept in mind at the design and development stage.

This document gives additional requirements for VIPRs to those given for cylinder valves in general in ISO 10297, for quick-release cylinder valves in ISO 17871, for self-closing cylinder valves in ISO 17879 or for ball valves in ISO 23826.

This document ~~pays particular attention to~~ focusses on:

- a) ~~a)~~ suitability of materials;
- b) ~~b)~~ safety (mechanical strength, safe relief of excess pressure, etc.);
- c) ~~c)~~ gas-specificity;
- d) ~~d)~~ cleanliness;
- e) ~~e)~~ testing;
- f) ~~f)~~ identification;
- g) ~~g)~~ information supplied.

When a VIPR has been tested according to the previous version of this document, the organisation responsible for testing the same VIPR to this document should consider which tests need to be performed.

In this document, the unit bar is used, due to its universal use in the field of technical gases. ~~It should, however, be noted that bar~~ Bar is not an SI unit, and ~~that~~ the corresponding SI unit for pressure is Pa (1 bar = 10<sup>5</sup> Pa = 10<sup>5</sup> N/m<sup>2</sup>).

Pressure values given in this document are given as gauge pressure (pressure exceeding atmospheric pressure) unless noted otherwise.

Tests and examinations performed to demonstrate compliance with this document are conducted using instruments calibrated before being put into service and thereafter according to an established programme.

Any tolerances given in this document include measurement uncertainties.

