

Specification for

Gas meters —

Part 7: Mechanical volume correctors

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Co-operating organizations

The Gas Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Department of the Environment
- Department of Trade and Industry*
- Gas Council*
- Heating and Ventilating Contractors' Association
- Institution of Gas Engineers*
- Institution of Heating and Ventilating Engineers
- Liquefied Petroleum Gas Industry Technical Association (UK)*
- National Federation of Plumbers and Domestic Heating Engineers
- Society of British Gas Industries*
- Water-tube Boilermakers' Association

The Government department and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

- British Non-ferrous Metals Federation
- Chief Fire Officers' Association

This British Standard having been approved by the Gas Industry Standards Committee, was published under the authority of the Executive Board on 15 May 1973

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The following BSI references relate to the work on this standard:
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Foreword

This British Standard is the seventh of a series relating to meters for gaseous fuels for registering the volume of gas passed.

A mechanical volume corrector is an instrument for attachment to a gas meter designed to indicate the volume of gas which has passed through the meter corrected to stated reference conditions. It is accurate within certain stated pressure and temperature ranges, and is driven by the meter or by a servomotor controlled by the meter. The addition of a volume corrector to a meter may affect the performance of the meter. The volume corrector has, therefore, to be matched with the meter so that the accuracy of each remains within the limits specified in the appropriate standard.

In operation, conditions of rapid fluctuation of flow, temperature or pressure may affect the performance of the corrector. If such fluctuations are liable to occur, reference should be made to the manufacturer regarding the performance of the corrector in these conditions.

The other parts of BS 4161, "Gas meters", already or soon to be published are:

- *Part 1: Meters of plate construction up to 1 000 ft³/h rating;*
- *Part 2: Meters of plate construction above 1 000 ft³/h rating;*
- *Part 3: Unit construction meter of 6 m³/h rating;*
- *Part 4: Plate constructed positive displacement diaphragm meters for a pressure of 350 mbar¹⁾ and up to 170 m³/h rating;*
- *Part 5: Positive displacement diaphragm meters for ratings above 6 m³/h and pressures up to 7 bar¹⁾ (in course of preparation);*
- *Part 6: Rotary displacement and turbine meters for pressures up to 100 bar¹⁾.*

Factors for the conversion of metric into imperial units are given in Appendix A. More comprehensive conversions will be found in BS 350, "Conversion factors and tables".

NOTE A meter used for the sale of gas has to comply with the statutory requirements. The addition of a volume corrector to such a meter does not necessarily mean that the system complies with current statutory requirements.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

¹⁾ 1 mbar = 10² N/m² = 0.1 kPa; 1 bar = 10⁵ N/m² = 100 kPa

1 Scope

1.1 General. This Part of BS 4161 specifies the points in the design, construction and performance of mechanical volume correctors which are of immediate concern to the user.

1.2 New developments. Notwithstanding the requirements specified in this standard any new designs, materials and methods of assembly giving at least equivalent results are acceptable.

NOTE The titles of the British Standards referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this standard the following definitions apply:

2.1

mechanical volume corrector

a device driven from a gas meter which will indicate the volume of gas which has passed through the meter, corrected mechanically from the actual conditions of measurement to any desired standard conditions. The corrected variables may be temperature, pressure, density, relative density, humidity or compressibility or any combination of these. Some of the variables may be incorporated in the corrector as fixed factors

2.2

type A corrector

a mechanical volume corrector in which the temperature and/or pressure of the gas are measured by appropriate sensing elements and their magnitudes then applied to the correcting mechanism by suitable linkages. Fixed factors for humidity and compressibility may be incorporated

2.3

type B corrector

a mechanical volume corrector in which a sample of gas is enclosed in a deformable chamber, or similar element, which is exposed to the gas under line conditions. The deformation of the chamber is a measure of the gas condition and is transferred by suitable linkages to the correcting mechanism. If the enclosed gas is identical with the gas being measured, no corrections will be required for humidity or compressibility, otherwise fixed factors for humidity and compressibility may be included

3 Design and construction

3.1 Materials. A corrector shall be constructed of materials of good quality complying, where applicable, with British Standards. The materials used shall not be adversely affected by conditions arising in that part of the corrector in which they are used.

3.2 Drive. A corrector shall be driven directly or indirectly from the same drive as that which drives the index of the meter. The direction of the drive shall be clearly indicated.

3.3 Sensing elements. Temperature and pressure sensing elements should comply with any relevant British Standards. A sensing element exposed to the gas being metered shall be capable of withstanding a pressure of 1.5 times the maximum of the pressure correction range.

3.4 Sealing. Provision for sealing case joints and indexes shall be made to prevent unauthorized interference.

3.5 Display. A corrector shall indicate the volume of gas passed through the meter corrected to standard reference conditions²⁾ or to any other desired standard.

3.6 Windows. An index window shall be of plate glass or material of equivalent performance and useful life. Plate glass windows shall satisfy the impact test given in B.1.4. Plastics windows shall satisfy the whole of Appendix B. Windows of other materials shall satisfy equivalent tests.

Windows displaying the interior of the instrument and moulded transparent covers shall also comply with the requirements of Appendix B.

Means shall be provided to prevent or remove condensation from the inner surface of any index window.

3.7 Index. The corrected volume index shall be of the direct reading type. The numerals shall be of uniform height and shall have minimum dimensions of 5 mm high and 2.6 mm wide. The index multiplying factors of the corrected and uncorrected volume indexes may differ if necessary. The drum of the lowest order need not rotate continuously.

3.8 Electrically assisted correctors

3.8.1 If electric power is used in conjunction with the volume corrector, characteristics of the power for which it is designed shall be stated, and variations of $\pm 10\%$ on the declared voltage and $\pm 5\%$ on the declared frequency shall have no effect on the accuracy of the corrector.

²⁾ Standard reference conditions (s.r.c.), as currently defined in the Gas Act 1948, Clause 74—(1), are 60 °F, 30 inHg, saturated. It is normally assumed that the condition of the mercury is at 60 °F at latitude 53 °N. The metric based standard reference conditions agreed for use by the British Gas Industry are 15 °, 1013.25 mbar, dry.