

Gas meters —

Part 8: Specification for electronic volume correctors

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- British Gas plc
- British Non-ferrous Metals Federation
- Chief and Assistant Chief Fire Officers' Association
- Department of Energy — Gas and Oil Measurement Branch
- Institution of Gas Engineers
- Society of British Gas Industries

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Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Definitions	1
3 Materials	2
4 Design	2
5 Performance	3
6 Marking	4
Appendix A Test methods	5
Table 1 — Amplitude, rise time, duration and repetition rate	6
Publications referred to	Inside back cover

Foreword

This Part of BS 4161 has been prepared under the direction of the Gas Standards Committee. It complements BS 4161-7 and covers electronic instruments that are attached to industrial and commercial gas meters to indicate the volume of gas that has passed through the meter after correction to reference conditions of temperature and/or pressure.

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.

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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 Scope

This Part of BS 4161 specifies requirements for electronic volume correctors used to convert a measurement of gas volume from one combination of temperature and/or pressure conditions to another. It covers equipment used at pressures not exceeding 7 bar¹⁾ with gas meters constructed primarily in accordance with BS 4161-5 and BS 4161-6 and with meters of similar types.

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

2 Definitions

For the purpose of this Part of BS 4161, the definitions given in BS 5233 apply, together with the following.

2.1

electronic volume corrector

a device that electronically corrects the volume of gas which has passed through a gas meter under the conditions prevailing in the meter to any desired reference conditions and indicates the corrected volume

2.2

electronic pressure and temperature corrector

an electronic volume corrector that takes electrical signals, proportional to the metered gas pressure and temperature, from appropriate transducers. The magnitudes of these signals are then applied to an electrical signal from the gas meter, which is proportional to the actual volume of gas, in order to correct this volume to reference conditions. The corrector may also include a computed or fixed factor compressibility correction

2.3

electronic temperature corrector

an electronic volume corrector similar to that defined in 2.2, except that pressure is not measured but may be included as a pre-set fixed multiplying factor which may itself incorporate compressibility in the correction process

2.4

gas

the gas produced from coal or oil-based feedstocks or natural gas or its synthetic equivalent or a combination of any of these. It may be either dry or saturated with water vapour

2.5

corrected volume (Q_c)

the volume measured at actual conditions of pressure and temperature converted to an equivalent volume at reference conditions of pressure, temperature and compressibility. It is given by the equation:

$$Q_c = Q_a \times \frac{P}{P_r} \times \frac{T_r}{T} \times \frac{Z_r}{Z}$$

where

Q_a is the measured volume at the actual conditions of pressure, P , temperature, T , and compressibility, Z ;

P_r , T_r and Z_r are the reference conditions of pressure, temperature and compressibility respectively.

NOTE Pressure and temperature are expressed as absolute values (see 2.12 and 2.13).

2.6

correction factor

the factor by which the measured volume is multiplied to derive the corrected volume. It is given by

$$\frac{Q_c}{Q_a}$$

2.7

computed correction factor (CF_c)

the correction factor indicated by the corrector

2.8

actual correction factor (CF_a)

the correction factor calculated from known values of inputs to the corrector and the stated method of compressibility calculation

2.9

error in correction (ϵ_c)

the difference between the computed correction factor (CF_c) and the actual correction factor (CF_a) expressed as a percentage of the actual correction factor. It is given by the equation:

$$\epsilon_c = \frac{CF_c - CF_a}{CF_a} \times 100$$

2.10

gauge pressure

pressure based on zero at the ambient atmospheric pressure

¹⁾ 1 bar = 10⁵ N/m² = 10⁵ Pa.