

BRITISH STANDARD

Specification for installation, exchange, relocation and removal of gas meters with a maximum capacity not exceeding 6 m³/h –

Part 3: Low and medium pressure (3rd family gases)

ICS 91.140.40



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This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 38, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI and came into effect on 30 November 2007. It was prepared by Technical Committee GSE/30, *Gas installations (1st, 2nd and 3rd family gases)*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of BS 6400, along with parts 1 and 2, supersedes BS 6400:1997, which is withdrawn.

Relationship with other publications

The standard is issued in three parts:

- *Part 1: Low pressure (2nd family gases);*
- *Part 2: Medium pressure (2nd family gases);*
- *Part 3: Low and medium pressure (3rd family gases).*

Terminology within this part might not necessarily be consistent with BS 6400-1 and BS 6400-2, which uses terminology that is consistent with the natural gas industry.

Information about this document

This new edition represents a full revision of BS 6400:1997, and:

- uses more up-to-date gas industry terminology;
- reflects changes in structure, practices and product availability in the gas industry;
- provides additional information on the installation, exchange, relocation and removal of gas meters with a maximum capacity not exceeding 6 m³/h supplied from low and medium pressure 3rd family gas systems.

Hazard warnings

WARNING. This British Standard calls for the use of substances and/or procedures that can be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Use of this document

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

Attention is drawn to the following statutory regulations.

- a) The Gas Safety (Installation and Use) Regulations 1998 [1].
- b) The Gas Safety (Installation and Use) Regulations (Northern Ireland) 2004 [2].
- c) The Gas Safety (Application) Order (Isle of Man) 1996 [3].
- d) The Gas Meters (Information on Connection and Disconnection) Regulations 1996 [4].
- e) The Gas Safety (Management) Regulations 1996 [5].
- f) The Gas Safety (Management) Regulations (Northern Ireland) 1997 [6].
- g) The Gas (Meters) Regulations 1983 (as amended) [7].
- h) The Building Regulations 2000 (as amended) [8].
- i) The Building (Scotland) Regulations 2004 (as amended) [9].
- j) The Building Regulations (Northern Ireland) 2000 (as amended) [10].
- k) The Measuring Instruments (EEC Requirements) (Gas Volume Meters) Regulations 1988 (as amended) [11].
- l) The Measuring Instruments (Gas Meters) Regulations 2006 [12]
- m) The Dangerous Substances and Explosive Atmospheres Regulations 2002 [13].

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

The standard specifies requirements for the installation, exchange, relocation and removal of credit or prepayment diaphragm and ultrasonic gas meters with a maximum capacity not exceeding 6 m³/h.

NOTE 1 For the purposes of this standard, installation includes design, inspection and commissioning. It is recognized that each of these tasks can be performed by the same person.

This part of BS 6400 is applicable to meter installations:

- a) supplied with 3rd family gases either:
 - 1) from low pressure service pipework with a maximum operating pressure not exceeding 75 mbar and a design maximum incidental pressure of 350 mbar; or
 - 2) from medium pressure service pipework with a maximum operating pressure exceeding 75 mbar but not exceeding 2 bar and a design maximum incidental pressure of 2.7 bar;
- b) only fitted downstream of the emergency control valve;
- c) that utilizes a meter regulator downstream of the emergency control valve;
- d) where all gas fittings subjected to medium pressure have been pre-assembled and where strength and gas tightness testing has been undertaken on the regulator assembly at the factory;
- e) where the operating pressure at the outlet of the meter is nominally 37 mbar.

Installation pipework is specified in BS 5482-1 and LPGA Code of Practice 25 [14].

Service pipework (including the first emergency control valve) is specified in BS 5482-1 and the LPGA Code of Practice 22 [15] and LPGA Code of Practice 25 [14].

This standard does not cover pressure regulating installations installed in a service pipework upstream of the emergency control valve.

NOTE 2 All pressures quoted in this standard are gauge pressures and all pressure absorption values are for liquefied petroleum gas unless otherwise specified.

NOTE 3 Additional guidance on domestic gas systems can be found in the European functional standards BS EN 1775.

NOTE 4 For additional guidance on the installation of gas meters in caravan holiday homes, residential park homes and permanently moored boats, reference should be made to IGE/UP/8 [16].

2 Normative references

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

BS 21, *Specification for pipe threads for tubes and fittings where pressure-tight joints are made on the threads (metric dimensions)*

BS 476-7:1997, *Fire tests on building materials and structures – Part 7: Method of test to determine the classification of the surface spread of flame of products*

BS 746:2005, *Fittings for installation of low pressure gas meters – Requirements and test methods*

BS 5482-1, *Code of Practice for domestic butane- and propane-gas-burning installations – Part 1: Installations at permanent dwellings, residential park homes and commercial premises, with installation pipework sizes not exceeding DN 25 for steel and DN 28 for corrugated stainless steel or copper*

BS 7671, *Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition*

BS EN 1359, *Gas meters – Diaphragm gas meters*

BS EN 13785, *Regulators with a capacity of up to and including 100 kg/h, having a maximum nominal outlet pressure of up to and including 4 bar, other than those covered by EN 12864 and their associated safety devices for butane, propane or their mixtures*

BS EN 14236, *Ultrasonic domestic gas meters*

BS EN 60079-10, *Electrical apparatus for explosive gas atmospheres – Part 10: Classification of hazardous areas*

BS EN ISO 10806, *Pipework – Fittings for corrugated metal hoses*

INSTITUTION OF GAS ENGINEERS AND MANAGERS. PRS 6/E, *Semi-rigid and flexible meter connectors*, 2004

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 additional emergency control valve (AECV)

valve, not being the emergency control valve, for shutting off the supply of gas in an emergency, intended for use by a consumer of gas

NOTE An AECV may be located within either the meter installation or installation pipework and, as such, may not isolate all the consumer's pipework or meter installation.

3.2 equipotential bond

electrical connection maintaining various conductive parts at substantially the same electrical potential

3.3 electrical insulator

gas fitting having high electrical resistance, to minimize the flow of any stray electrical current

3.4 emergency control valve (ECV)

valve for shutting off the supply of gas in an emergency, which is intended for use by a consumer of gas and is installed at the end of the service pipework

3.5 gas fitting

pipework, valve, regulator, meter, fitting, apparatus or appliance

3.6 index

series of dials or rows of figures indicating the volume of gas that has passed through the meter

3.7 installation pipework

pipework or fitting from the outlet of the meter installation to points at which appliances are to be connected

NOTE This definition varies from that given in regulation 2 of the Gas Safety (Installation and Use) Regulations 1998[1].

3.8 interconnecting pipework

pipework assembled within the meter installation

3.9 lock-up pressure

outlet pressure of the regulator at which it shuts off completely

3.10 low pressure (LP)

gas supply with a maximum operating pressure of 75 mbar

3.11 lowest operating pressure (LOP)

lowest pressure at which a system can be operated under normal operating conditions

NOTE The gas supplier will be able to advise on the LOP of the gas supply.

3.12 maximum operating pressure (MOP)

maximum pressure at which a system can be operated continuously under normal operating conditions

NOTE The gas supplier will be able to advise on the MOP of the gas supply.

3.13 design pressure (DP)

pressure on which design calculations are based

NOTE The gas supplier will be able to advise on the DP of the gas supply.

3.14 design maximum incidental pressure (DMIP)

maximum pressure that a system is permitted to experience under fault conditions, limited by safety devices, when the system is operated at the design pressure

3.15 medium pressure (MP)

gas supply at the outlet of the emergency control valve with a design minimum pressure exceeding 75 mbar and a maximum operating pressure that does not exceed 2 bar

3.16 meter

instrument designed to measure, memorize and display the quantity of gas that has passed through it

3.16.1 credit meter

meter in which the volume registered by the index is the basis of a periodic account rendered to the consumer

3.16.2 diaphragm meter

positive displacement meter in which the measuring chambers have deformable walls, e.g. a U6 or G4 gas meter

3.16.3 positive displacement meter

meter that measures directly the volume of gas passing through it

NOTE An example of a positive displacement meter is a diaphragm gas meter

3.16.4 prepayment meter

meter fitted with a mechanism that, on the insertion of a coin, mechanical token or smartcard, permits the passage of a predetermined volume of gas

3.16.5 primary meter

meter nearest to and downstream of a service pipe or service pipework for ascertaining the volume of gas supplied through that pipe by a supplier

3.16.6 semi-concealed meter

meter designed and manufactured for use in a semi-concealed meter box

3.16.7 ultrasonic meter

meter that infers the volume of gas passing through it by means of the behaviour of an ultrasonic beam

3.17 meter box

purpose-made compartment designed and prefabricated to accommodate a meter installation

3.18 meter bracket

purpose made support incorporating a means of securing meter unions from which a meter can be suspended

3.19 meter exchange

situation where a meter on an existing installation is replaced with another of similar capacity without modification to the associated gas fittings

3.20 filter

device fitted upstream of the meter regulator to capture particles in the gas stream

3.21 meter housing

area or room designed and constructed to contain one or more meters with their associated gas fittings

NOTE The meter housing is not part of the meter installation.

3.22 meter inlet valve (MIV)

valve fitted upstream of, and adjacent to, a meter to shut off the supply of gas to it

3.23 meter installation

installation that comprises a meter, valves, filter, meter regulator and associated safety devices, pliable connector, interconnecting pipework, fittings and support.

NOTE A meter installation commences at the outlet of the ECV. Depending on the type of meter installation it terminates at:

- the outlet connection of the meter;
- the outlet of the meter outlet adaptor if fitted; or
- in the case of a semi-concealed meter with a pliable connector downstream of the meter; the outlet of the meter box outlet adaptor.

3.24 non-return valve

device to prevent the reverse flow of gas, air or other extraneous gas

3.25 safety device

device which automatically operates in the event of pressure deviations outside pre determined limits

3.25.1 over pressure shut off (OPSO)

shut off device, triggered by an excess outlet pressure, which causes the complete shut off of the flow of gas for all values of inlet pressure

NOTE The restoration of the gas flow is only possible by manual intervention when the conditions which caused the shut off device to operate have cleared.

3.25.2 under pressure shut off (UPS0)

device integral to the regulator, which causes the complete shut off of the gas flow when the outlet pressure is below a pre-determined value

3.25.3 limited relief valve

device which is part of the regulator and which limits, in the event of a failure, the pressure rise above a pre-determined value without shutting off the flow of gas

3.26 meter regulator

device which controls the pressure at its outlet within predetermined parameters

3.26.1 regulator assembly

factory assembled kit comprising meter regulator, safety devices, vent pipe, meter inlet valve, interconnecting pipework and/or pliable connector

3.26.2 medium pressure (MP) meter regulator

regulator supplied at MP

3.26.3 low pressure (LP) meter regulator

regulator supplied at LP

3.27 meter support post

post for securely mounting a meter box

3.28 pressure test point

gas fitting provided for temporary connection of a pressure gauge

3.29 pliable connector

stainless steel tube formed with annular corrugations and having factory fitted end connections

NOTE Pliable connectors are sometimes referred to as semi-rigid connectors.

3.30 service pipework

pipe for supplying gas to premises from a gas storage vessel, being any pipe between the gas storage vessel and the outlet of the ECV

3.31 semi-concealed meter box

meter box intended to be installed partially below ground level

3.32 strength test

procedure intended to verify the strength of gas fittings

3.33 tightness test

procedure intended to verify that the pipework meets the requirements for gas tightness

3.34 pressure absorption

difference between the pressure measured at the inlet and outlet of one or more gas fittings

3.35 vent pipe

pipe that conveys the gas from the regulator relief to the external atmosphere

4 Planning and exchange of information

4.1 Consultation

4.1.1 At the initial stages of the building design and planning of the meter installation the party e.g. architect, responsible for the design and planning shall consult with the relevant gas supplier to verify the operating pressure parameters of the gas service pipework and that the supply is of sufficient capacity to meet the needs of all the proposed appliances. An assessment shall be made of the potential gas load to determine the flow capacity of the meter installation. This assessment shall be carried out in accordance with Annex A.

4.1.2 The designer/planner shall also ensure that the proposed meter installation is capable of providing a gas supply adequate for the immediate needs of the proposed appliances.

4.1.3 The designer/planner shall establish from the gas supplier the LOP, MOP, DP and DMIP of the gas supply.

4.1.4 The gas supplier shall be consulted to ensure that adequate provision is made for siting, installing and housing the meter installation.

4.1.5 Prior to installation, the meter installer shall obtain from the gas supplier authorization to break the seal, set and seal the meter regulator.

4.2 Dissemination of information

NOTE The designer/planner should make available all information regarding the position and housing of the meter installation to the architect and builders, etc., as early as possible by means of drawings, specifications and consultations.

4.3 Scheduling

NOTE A time schedule for fixing the meter should be agreed as early as possible by the interested parties and any subsequent changes shall be advised at the earliest opportunity.

4.4 Co-ordination of work

NOTE Any work relevant to the installation that requires attendance by trades other than the gas meter installer should be clearly specified.

4.5 Non-return valve

Where an installation uses a gas compressors, pre-mixed blown or compressed air or extraneous gas in conjunction with the gas supply, the gas meter and incoming gas supply shall be protected by a non-return valve approved by the relevant gas supplier.

5 Competency

5.1 Persons carrying out the installation shall be competent.

5.2 Installation work shall only be carried out by a business or self-employed person, who is a member of a class of persons approved for the time being by the Health and Safety Executive (HSE) as required by the Gas Safety (Installation and Use) Regulations 1998 [1].

COMMENTARY ON 5.1 AND 5.2

At the time of publication, the only body with HSE approval to operate and maintain a register of businesses who are a “member of a class of persons” is CORGI.

Persons deemed competent to carry out gas work are those who hold a certificate of gas safety competence acceptable to CORGI, which include (without limitation) the Accredited Certification Scheme (ACS) and the Gas Services S/NVQ that has been aligned with ACS.

5.3 Persons who design the installation shall have a knowledge and understanding of the standards and regulations that apply to ensure that the completed plans will produce a safe and satisfactory installation.

6 Design

6.1 General

6.1.1 Arrangement of the meter installation

The meter installation shall be arranged in accordance with Figure 1.

6.1.2 Gas fittings

6.1.2.1 All installations

All gas fittings shall be suitable for use over the complete range of pressures at which they could be required to operate, including LOP, MOP and DMIP.

6.1.2.2 Medium pressure (MP) installations

6.1.2.2.1 All gas fittings upstream of point X in Figure 1a) or Figure 1b) shall:

- a) be capable of withstanding the DMIP advised by the gas supplier, i.e. in Great Britain this value is 2.7 bar;
- b) be suitable for a MOP of 2 bar;
- c) have been strength and gas tightness tested at the factory to a minimum of 3 bar.

6.1.2.2.2 All gas fittings downstream of point X in Figure 1a) or Figure 1b) to the outlet of the meter installation shall:

- a) be capable of withstanding a pressure resulting from the operation of the final safety device, i.e. the OPSO;
- b) have been strength and gas tightness tested at the factory to a minimum of 1.5 times the set pressure of the final safety device, i.e. the OPSO.

NOTE Regulation 5 of the Gas Safety (Installation and Use) Regulations 1998 [1] requires that all gas fittings be of good construction and sound material, and of adequate strength and size to ensure safety.

6.1.2.3 Low pressure (LP) installations

6.1.2.3.1 All gas fitting upstream of point X in Figure 1c) shall:

- a) be capable of withstanding a DMIP of 350 mbar;
- b) be suitable for a MOP of 75 mbar;
- c) have been strength and gas tightness tested at the factory to a minimum of 525 mbar.

6.1.2.3.2 Any gas fittings downstream of point X in Figure 1c) to the outlet of the meter installation shall be capable of withstanding a MOP of 75 mbar:

NOTE Regulation 5 of the Gas Safety (Installation and Use) Regulations 1998 [1] requires that all gas fittings be of good construction and sound material, and of adequate strength and size to ensure safety.