

BS 8499:2009



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Specification for domestic gas meter boxes and meter bracket

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Foreword

Publishing information

This British Standard is published by BSI and came into effect on 31 July 2009. It was prepared by Technical Committee GSE/25, *Gas meters*. A list of organizations represented on this committee can be obtained on request to its secretary.

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

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.

In particular, attention is drawn to the Gas Safety (Installation and Use) Regulations 1998 [1].

Introduction

As competition in the gas industry has increased, the introduction of new products has led to changes to certain designs of meter box for housing gas meters. Consequently, for some types of meter installations the market now comprises several distinct box designs. The number of different designs is causing difficulties for gas installers, meter asset managers and other parties involved in meter installation.

This Standard aims to address some of the disparities in existing box designs to facilitate the installation of meters across the UK. However, it is recognized that some designs, particularly those for the semi-concealed box, will need to be modified over time to obtain a solution that meets the aspiration of this Standard.

Attention is drawn to the fact that the type and construction of a meter box is subject to approval by the Gas Transporter, and, without this approval, the Gas Transporter may refuse to connect or, in some cases, may disconnect the gas supply to the consumer's premises.

1 Scope

This British Standard specifies requirements for gas meter boxes for use with single gas meter installations conforming to BS 6400, which:

- a) are supplied with gases of the 2nd and 3rd family, with a maximum capacity of 6 m³/h and a maximum operating pressure not exceeding 2 bar; and
- b) incorporate any of the following meters: diaphragm, ultrasonic, credit or prepayment.

It does not apply to multiple meter installations which are installed in the same housing.

NOTE 1 The composition of fuel gases of the 2nd and 3rd family is specified in BS EN 437.

NOTE 2 All pressures quoted in this standard are gauge pressures.

It covers the following designs of meter box, including any associated box extensions:

- 1) built-in;
- 2) surface mounted;
- 3) semi-concealed;
- 4) universal.

It does not cover security shrouds intended to provide additional protection to meter installations.

This British Standard also specifies requirements for the design of the standard meter bracket.

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 any amendments) applies.

BS 476-7, *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, *Specification for gas meter unions and adaptors*

BS 2782-6:Method 640A:1979, ISO 2577:1975, *Methods of testing plastics – Part 6: Dimensional properties – Method 640A: Determination of shrinkage of test specimens in the form of bars of compression moulded thermosetting moulding materials*

BS 3532, *Method of specifying unsaturated polyester resin systems*

BS 3643-1, *ISO metric screw threads – Part 1: Principles and basic data*

BS 3643-2, *ISO metric screw threads – Part 2: Specification for selected limits of size*

BS 4781:1990, *Specification for pressure-sensitive adhesive plastics labels for permanent use*

BS 5378-2, *Safety signs and colours – Part 2: Specification for colorimetric and photometric properties of materials*

BS 6400, *Installation of exchange, relocation and removal of domestic-sized gas meters (2nd and 3rd family gases)*

BS 7371-12, *Coatings on metal fasteners – Part 12: Requirements for imperial fasteners*

BS EN 10051, *Specification for continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels – Tolerances on dimensions and shape*

BS EN 10087:1999, *Free cutting steels – Technical delivery conditions for semi-finished products, hot rolled bars and rods*

BS EN 10088-2:2005, *Stainless steels – Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

BS EN 10111:2008, *Continuously hot rolled low carbon steel sheet and strip for cold forming – Technical delivery conditions*

BS EN 10130:2006, *Cold rolled low carbon steel flat products for cold forming – Technical delivery conditions*

BS EN 10131, *Cold rolled uncoated and zinc or zinc-nickel electrolytically coated low carbon and high yield strength steel flat products for cold forming – Tolerances on dimensions and shape*

BS EN 10346:2009, *Continuously hot-dip coated steel flat products – Technical delivery conditions*

BS EN 14020, *Reinforcements – Specification for textile glass rovings*

BS EN ISO 62:2008, *Plastics – Determination of water absorption*

BS EN ISO 178, *Plastics – Determination of flexural properties*

BS EN ISO 179-1:2001, *Plastics – Determination of Charpy impact properties – Part 1: Non-instrumented impact test*

BS EN ISO 295:2004, *Plastics – Compression moulding of test specimens of thermosetting materials*

BS EN ISO 1183-1:2004, *Plastics – Methods for determining the density of non-cellular plastics – Part 1: Immersion method, liquid pycnometer method and titration method*

BS EN ISO 2081:2008, *Metallic and other inorganic coatings – Electroplated coatings of zinc with supplementary treatments on iron or steel*

BS EN ISO 4042:2000, *Fasteners – Electroplated coatings*

BS EN ISO 4589-2, *Plastics – Determination of burning behaviour by oxygen index – Part 2: Ambient-temperature test*

BS EN ISO 9227, *Corrosion tests in artificial atmospheres – Salt spray test*

3 Terms and definitions

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

3.1 built-in meter box

purpose-made meter box, fitted with a meter bracket, for inseting into a building wall, normally during the construction of the wall

3.2 credit meter

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

3.3 diaphragm meter

positive displacement meter in which the measuring chambers have deformable walls

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 a service

3.5 gas transporter

company, licensed by Ofgem, which transports gas through its network on behalf of a gas shipper

3.6 installation pipework

pipework or fitting from the outlet of the primary 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] so that the pipework within the meter installation can be distinguished from the consumer's installation pipework.

3.7 knockout

section of material which can be removed under pressure to leave a hole

3.8 low pressure (LP)

gas supply with a maximum operating pressure of 75 mbar

3.9 medium pressure (MP)

gas supply at the outlet of the emergency control valve with a maximum operating pressure exceeding 75 mbar but not exceeding 2 bar

3.10 membrane knockout

knockout where the thickness of the material has been reduced across the entire face to enable removal

NOTE Membrane knockouts are generally not more than 1 mm thick.

- 3.11 meter**
instrument designed to measure, memorize and display the quantity of gas that has passed through it
- 3.12 meter box**
purpose-made compartment designed and prefabricated to accommodate a meter installation
- 3.13 meter box adaptor**
transition fitting used between the service pipe and the ECV
- 3.14 meter bracket**
purpose-made support incorporating a means of securing meter unions from which a meter can be suspended
- 3.15 meter installation**
installation that comprises a primary meter, valve, filter, meter regulator and associated protection devices, pliable connection, interconnecting pipework, fitting and support
- NOTE A meter installation commences at the outlet of the ECV. Depending on the type of meter installation it terminates at:*
- a) the outlet connection of the meter;
 - b) the outlet of the meter outlet adaptor if fitted; or
 - c) in the case of a semi-concealed meter with a pliable connection downstream of the meter, the outlet of the meter box outlet adaptor.
- 3.16 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
- 3.17 semi-concealed meter box**
purpose-designed meter box intended to be installed partially below ground level
- NOTE This box is to be installed against a wall or existing structure.*
- 3.18 service pipe**
pipe for distributing gas to premises from a distribution main, being any pipe between the distribution main and the outlet of the first emergency control valve downstream from that distribution main
- 3.19 spigot**
tubular case, sealed to an internal surface of a meter box, which is impermeable to gas and inserted in a prepared hole in a structure for the reception of an installation pipe
- 3.20 surface mounted meter box**
purpose-designed meter box fitted with a meter bracket and intended for attaching to the outside face of an existing wall
- 3.21 thin-edged knockout**
knockout where the thickness of the material has been reduced around the circumference to enable removal
- NOTE Thin-edged knockouts are generally not more than 0.7 mm thick around the circumference.*
- 3.22 ultrasonic meter**
meter that infers the volume passing through it by means of the behaviour of an ultrasonic beam

3.23 universal meter box

multi-purpose meter box fitted with a meter bracket and intended to be installed, either surface mounted or partially buried into the ground

NOTE This box is to be installed against a wall or existing structure.

4 Dimensions and features

COMMENTARY ON CLAUSE 4

When designing a meter box, it is essential to consider two basic objectives. The meter box needs to:

- a) *allow the fitting, operation and replacement of any of the following meter types, when installed in accordance with BS 6400: diaphragm or ultrasonic, credit or prepayment;*
- b) *provide unrestricted access, once the meter is installed, to enable:*
 - 1) *the operation and replacement of the ECV, or its handle;*
 - 2) *commissioning to be undertaken;*
 - 3) *the operation of any prepayment mechanism by the consumer;*
 - 4) *the meter index to be easily read;*
 - 5) *safety inspections and maintenance activities, including the replacement of any associated gas fittings and batteries, to be carried out without the need to remove the meter.*

A meter box conforming to 4.1, 4.2, 4.3, 4.4 and 4.5 can be expected to meet these objectives. However, in order to provide the additional space required for some diaphragm prepayment meters, it might be necessary to incorporate into the meter box a specific box extension or replacement door with increased depth. See 4.6.

4.1 All box types

4.1.1 Gas integrity

COMMENTARY ON 4.1.1

It is essential that a meter box is impermeable to gas at atmospheric pressure such that any leaking gas is prevented from directly entering the wall, cavity or property. The gas integrity of a meter box is affected by:

- a) *the composite material from which the box is manufactured; and*
- b) *the design and assembly of the box.*

If a meter box conforms to Clause 7, the finished material will provide adequate gas integrity. Requirements for the design and assembly of the box are specified in 4.1.1.

4.1.1.1 To ensure that the meter box is impermeable to gas at atmospheric pressure, the surface and structure of the finished box shall be complete and, when installed in accordance with the manufacturer's instructions, there shall be no paths for leaking gas to directly enter any adjacent wall, cavity or property. This shall be verified by visual inspection.

4.1.1.2 For a built-in box, the manufacturer's installation instructions shall provide information on the method of sealing the spigot to the box and the gas pipework within the spigot to ensure that leaking gas is prevented from entering the wall, cavity or property.

4.1.2 Security and weather resistance

COMMENTARY ON 4.1.2

A meter box conforming to this British Standard is deemed to protect the meter installation against vandalism and the weather.

4.1.2.1 The meter box shall be designed and manufactured such that:

- a) features are incorporated in the door/lid to prevent warping; and
- b) the latch is secure when locked.

4.1.2.2 To prevent unauthorized access to the meter installation, the meter box shall be supplied with:

- a) a door or lid, as appropriate;
- b) a lock, conforming to 7.2 and 7.3; and
- c) a special key, conforming to Annex A.

4.1.3 Ventilation

4.1.3.1 General

The meter box shall be ventilated by the inclusion of purpose-designed, non-closable ventilation, sized and located in accordance with 4.1.3.2 or 4.1.3.3, as appropriate.

NOTE For meters installed to BS 6400, a meter box conforming to 4.1.3.1 is deemed to be a Zone 2 hazardous area as defined by BS EN 60079-10, and is suitable for 2nd and 3rd family gas installations with a maximum operating pressure not exceeding 2 bar.

4.1.3.2 Built-in and surface mounted boxes

The ventilation shall provide a total effective area that is a minimum of 2% of the plan area of the box. The ventilation openings shall be distributed and disposed at high and low levels, with a minimum of 1% at high level and a minimum of 1% at low level, via one or more exterior faces of the box.

NOTE The "plan area" is the largest internal cross-sectional area in plan view.

4.1.3.3 Semi-concealed and universal boxes

The ventilation shall provide a total effective area that is a minimum of 6% of the plan area of the box, equally distributed around the periphery of the box lid or door.

NOTE 1 The "plan area" is the largest internal cross-sectional area in plan view.

NOTE 2 Semi-concealed boxes by design are unable to provide ventilation equally disposed at high and low level.

NOTE 3 Typical universal boxes provide their ventilation around the periphery of the door, positioned so as not to allow water ingress.

4.1.4 General features

4.1.4.1 The wall thickness of the meter box, door and lid shall be not less than:

- a) 2.5 mm at any point for built-in and surface mounted boxes;
- b) 3 mm at any point for semi-concealed and universal boxes;

except where a knockout is indicated on Figure 2 or Figure 5.

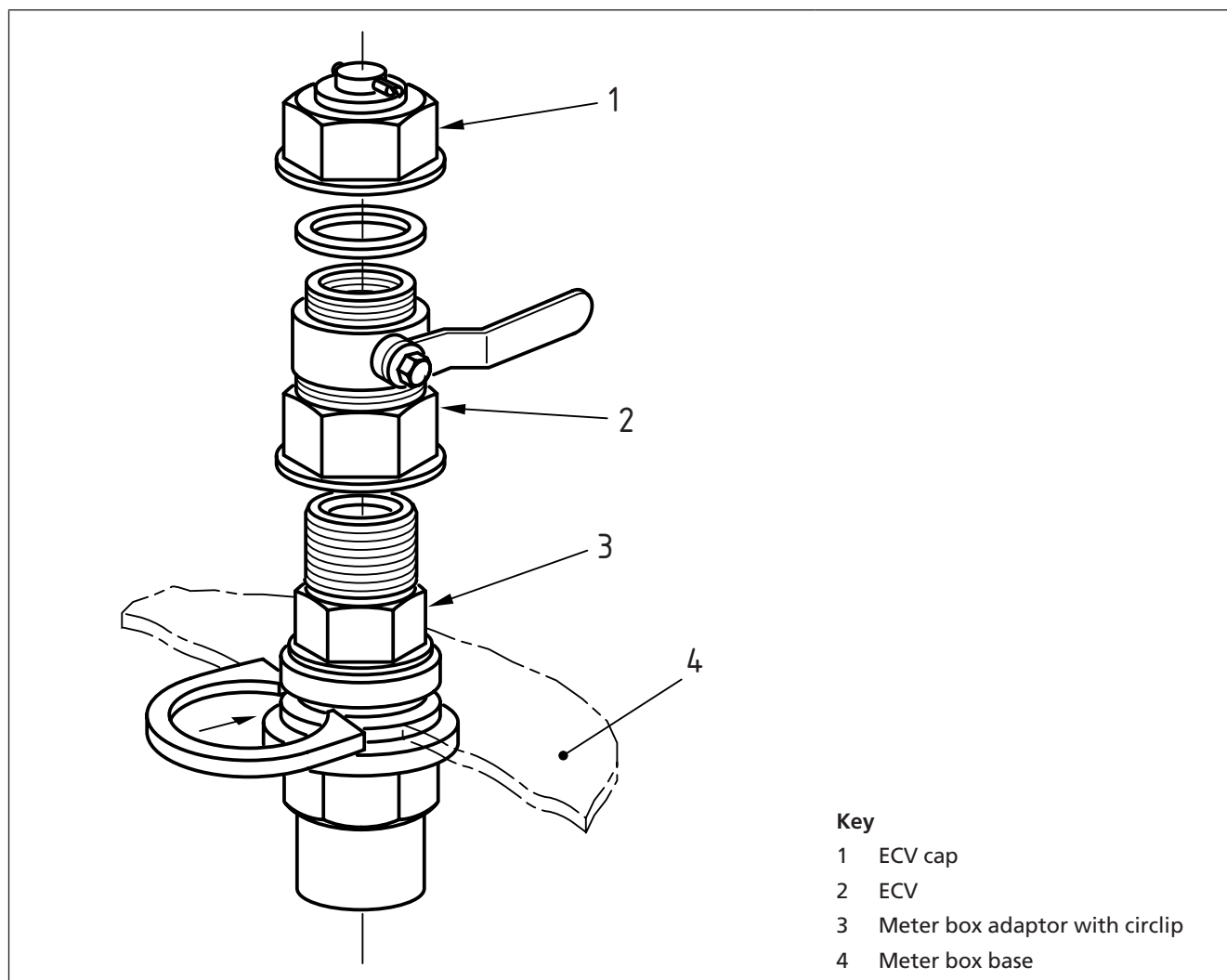
4.1.4.2 The meter box door/lid shall be removable and replaceable. Where the meter box casing is designed to be removable and replaceable, this shall be possible with the installation pipework and service pipe in place.

4.1.4.3 Where the meter box has a lid that opens upwards:

- a) the lid, when at rest in an open position, shall be set at an angle of not less than 95°; or
- b) a purpose-designed prop shall be incorporated within the meter box which secures the lid in its open position.

4.1.4.4 The meter box shall be designed to accommodate a meter box adaptor (see Figure 1), positioned in accordance with 4.2, 4.3, 4.4 or 4.5, as appropriate.

Figure 1 Typical meter box adaptor with ECV and cap



4.2 Built-in boxes

4.2.1 The meter box shall meet the dimensional requirements of Figure 2, incorporating the following features:

- a hole reinforced to a thickness of between 5 mm and 6 mm to allow the service pipe to enter the box and be secured using the meter box adaptor;
- a membrane knockout to allow the installation pipework to exit on the outer face of the building;
- a fitted meter bracket conforming to Annex B.

4.2.2 Where an exit point from the rear of the box is provided:

- it shall be in the form of a thin-edged knockout meeting the dimensional requirements of Figure 2;
- a spigot conforming to Clause 6 shall be made available unless otherwise specified by the purchaser.

Figure 2 Built-in box dimensions and features

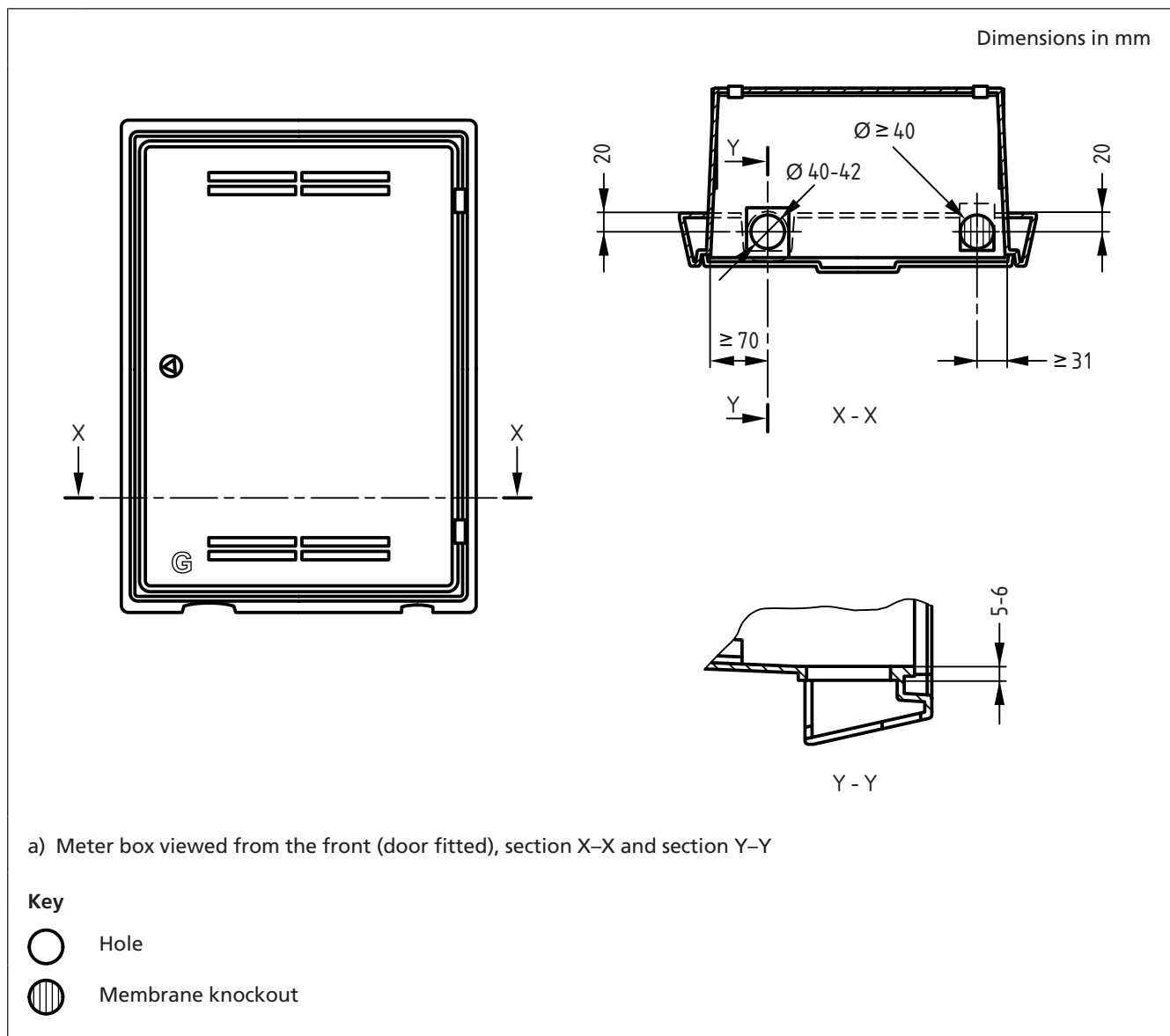
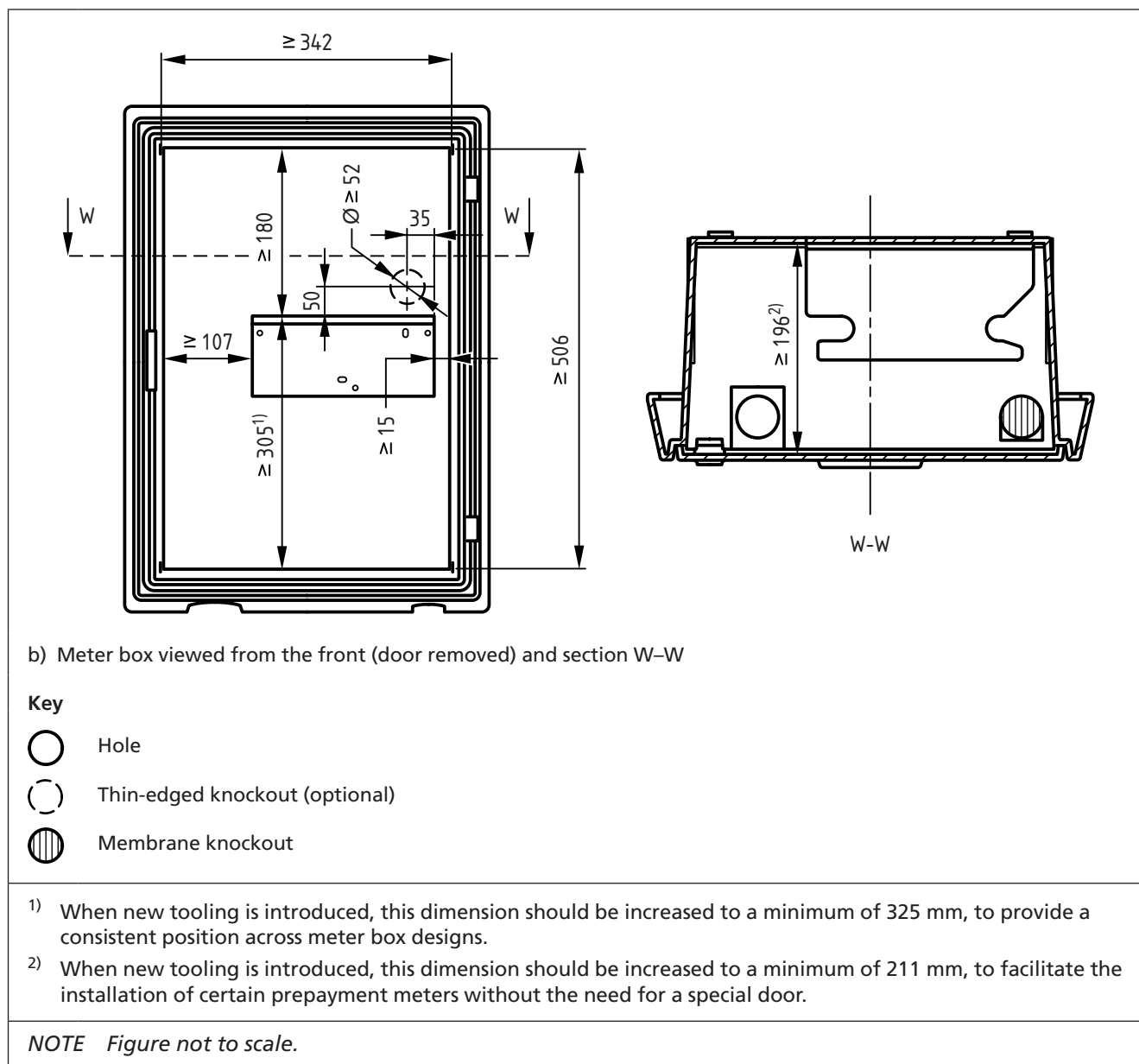


Figure 2 Built-in box dimensions and features (*continued*)

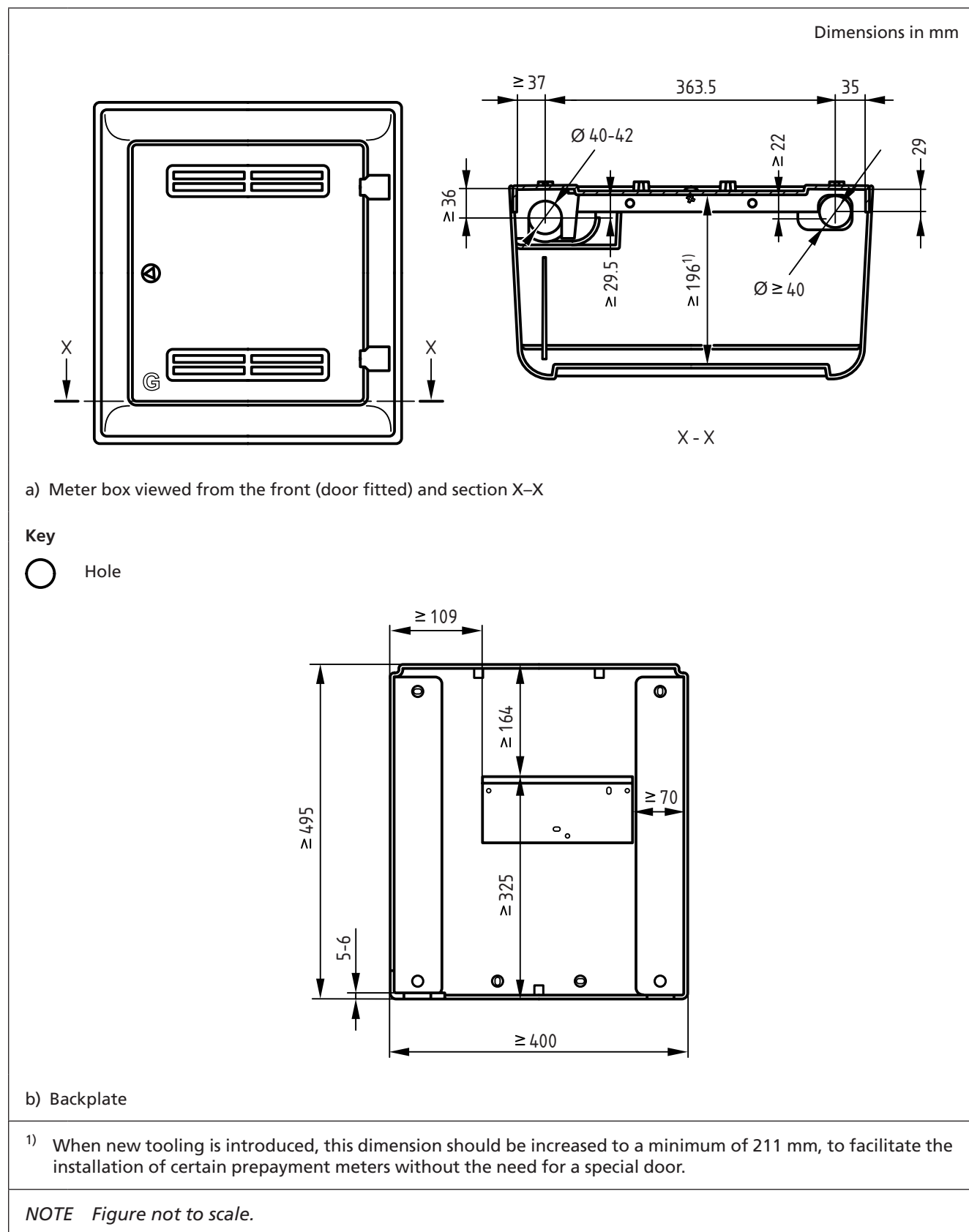
4.3 Surface mounted boxes

4.3.1 The meter box shall meet the dimensional requirements of Figure 3, incorporating the following features:

- a) a hole reinforced to a thickness of between 5 mm and 6 mm to allow the service pipe to enter the box and be secured using the meter box adaptor;
- b) an additional hole to allow the installation pipework to exit on the outer face of the building;
- c) a fitted meter bracket conforming to Annex B;
- d) fixing holes to secure the box to the wall;
- e) a separate backplate and removable outer case.

4.3.2 The meter box shall be designed such that, when installed, there is a gap of not less than 5 mm between the rear of the box and fixing area, e.g. brick wall.

Figure 3 Surface mounted box dimensions and features



4.4 Semi-concealed boxes

COMMENTARY ON 4.4

Subclause 4.4 specifies the dimensional requirements for a semi-concealed meter box and incorporates the core dimensions of those box designs in use at the time of publication. However, in order to allow the fitting of the full range of meters covered by this Standard, it is recognized that existing designs might require modification when new tooling is introduced.

Therefore, when a manufacturer designs a new semi-concealed meter box, it should conform to both 4.4 and Figure 4. It is anticipated that the dimensions recommended in Figure 4 will become requirements when this Standard is revised.

4.4.1 The meter box shall have:

- a) a method of restraining the meter from tilting by more than 30°, which can be achieved by either the design of the box or the use of a meter bracket that has been fitted to the box;

NOTE 1 A meter with dimensions of 136 mm deep (excluding the depth of the meter index) × 188 mm wide × 218 mm high (including the meter connections) is to be assumed when verifying this requirement.

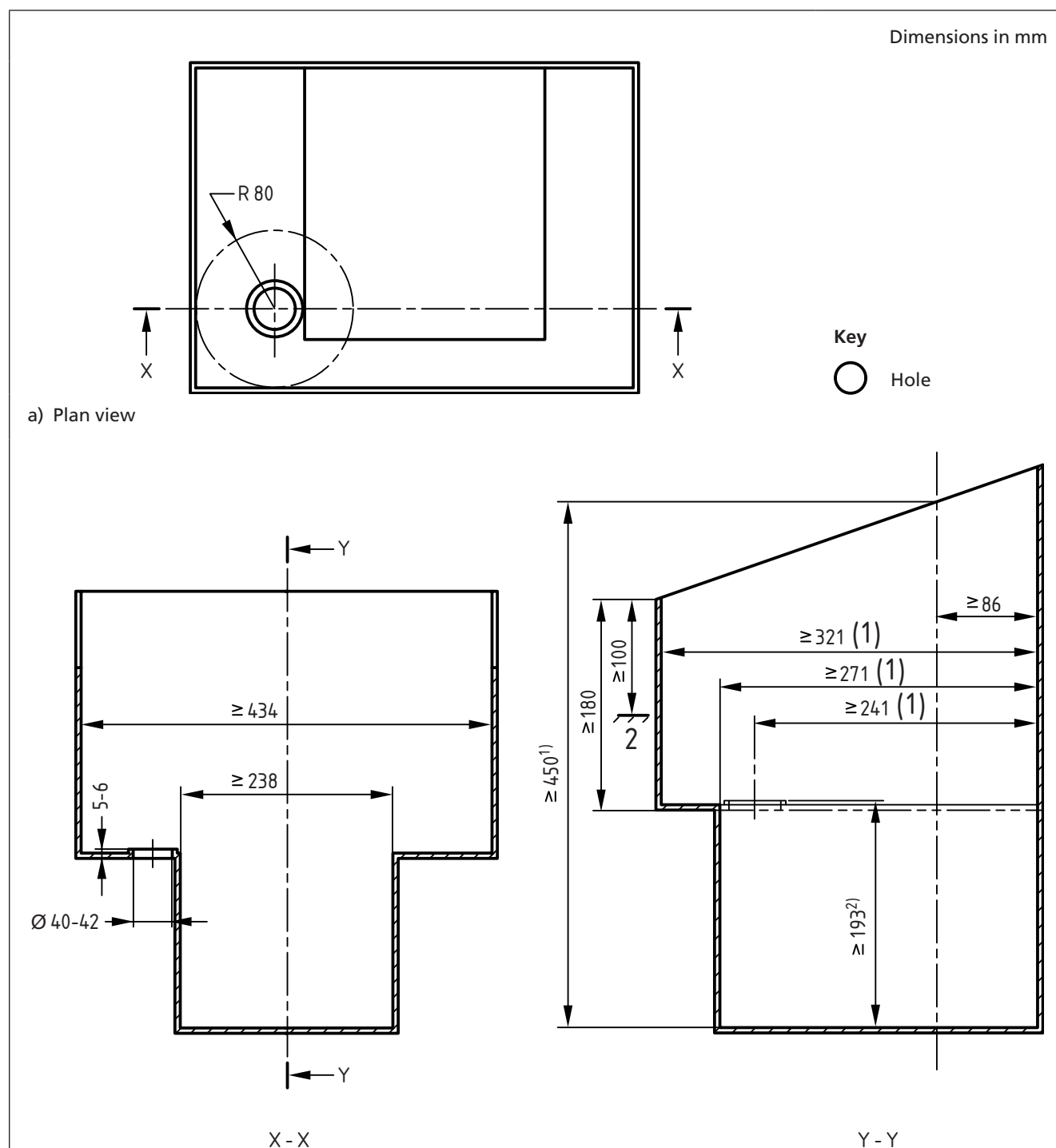
NOTE 2 On existing semi-concealed meter installations the method of restraining the meter has been the responsibility of the meter asset manager where the meter box itself or a meter bracket has held the meter in its correct position.

- b) a hole, with a diameter between 40 mm and 42 mm, reinforced to a thickness between 5 mm and 6 mm, positioned on the left hand side of the base of the box (when viewed from the front) to allow the service pipe to enter the box and be secured using the meter box adaptor. The centre of this hole shall be not less than 55 mm from the front internal surface the box and 70 mm from the left hand side internal surface of the box (box side/front/back);
- c) a hole, with a diameter of not less than 40 mm, positioned near the top rear right side of the box to allow the installation pipework to exit the box;
- d) fixing holes and fixings to secure the box to the wall;
- e) a ground level line indicated on the external surface of the box;

4.4.2 The box shall incorporate, either by design or by the provision of purpose provided spacers, a gap of not less than 50 mm between the rear of the box and fixing area, e.g. brick wall.

NOTE When attaching a meter box extension, this dimension can be reduced by the thickness of the extension, i.e. 5 mm.

Figure 4 Recommended dimensions and features for new semi-concealed box designs



b) Section X-X and section Y-Y

Key

- 1 From int. of A & B
- 2 Ground level line

NOTE 1 Dimension 450 mm required for clearance of 6 m³/h steel-cased meters (see BS 6400-1:2006, Figure 3).

NOTE 2 Dimension 193 mm required for clearance of 6 m³/h steel-cased meters (see BS 6400-1:2006, Figure 4). This dimension is measured from the base of the meter box to the face where the meter box adaptor is fitted.

NOTE 3 Figure not to scale.

4.5 Universal boxes

4.5.1 The meter box shall meet the dimensional requirements of Figure 5, incorporating the following features:

- a) a fitted meter bracket conforming to Annex B;
- b) at least one thin-edged knockout to allow the service pipe to enter the box and be secured using the meter box adaptor. The area around this knockout shall be reinforced to a thickness of between 5 mm and 6 mm. Where a second knockout is provided, it shall be reinforced to the same thickness and positioned in accordance with Figure 5;
- c) a hole to allow the installation pipework to exit the box;
- d) fixing holes to secure the box to the wall;
- e) a ground level line indicated on the external surface of the box.

4.5.2 The depth between the inside rear face of the meter box and the internal surface of the front face of the box shall be a minimum of 211 mm, between a point 260 mm and 325 mm below the meter bracket.

The depth above this point shall be such as to allow the meter box lid or door to close for a meter with maximum dimensions of 200 mm deep (including the depth of the meter index) × 235 mm wide × 282 mm high (including the meter connections).

Free unobstructed access shall be provided from the top of the box to a point 260 mm below the meter bracket.

NOTE This space is necessary for commissioning, operation and maintenance of the meter, e.g. use of the consumer's gascard. The dimension can be achieved by the use of a removable panel.

4.5.3 The meter box shall incorporate, either by design, or by the provision of purpose provided spacers, a gap of not less than:

- a) 5 mm between the rear of the box and fixing area, e.g. brick wall, when fitted as a surface mounted box; or
- b) 50 mm between the rear of the box and fixing area, when fitted as a semi-concealed box.

4.6 Box extensions

Where a meter box extension is used, it shall be designed to be securely fastened directly to the meter box, and shall conform to 4.1 and Clauses 7 to 11.