

**IGEM/GM/PRS/41 Edition 1  
Communication 1808**

**Founded 1863  
Royal Charter 1929  
Patron  
Her Majesty the Queen**

## **LOW PRESSURE METER INSTALLATION KITS**

### **DRAFT FOR COMMENT**

- 1 This draft Standard IGEM/GM/PRS/41 Edition 1 has been prepared by a Panel under the chairmanship of Mark Burrows.
- 2 This Draft for Comment is presented to Industry for comments, which are required by 20<sup>th</sup> July 2018, and in accordance with the attached Comment Form.
- 3 This is a draft document and should not be regarded or used as a fully approved and published Standard. It is anticipated that amendments will be made prior to publication.  
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Attached is the Draft for Comment of IGEM/GM/PRS/41 – “Low pressure meter installation kits” and the associated comment form.

We wish to make it as easy as possible for those of you representing industry bodies to issue the draft to your Members. You can either forward this email with attachment complete or forward it without the attachment and invite them to visit our website via <http://www.igem.org.uk/technical-standards/standards-development/drafts-for-comment.aspx> where the Draft and Comment Form are posted.

***Organisations to which this Draft has been circulated:***

**ORG**

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AIGT  
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Association of Register  
Gas Installers  
BPEC  
BRITISH GAS  
CADENT  
CAPITA  
CIPHE  
CMAP  
CORGI DIRECT  
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***IGEM/GM/PRS/41***  
***Communication 1808***

## ***Low pressure meter installation kits***

***Draft for Comment***



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***IGEM/GM/PRS/41***  
***Communication 1808***

## ***Low pressure meter installation kits***

***Draft for Comment***



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ISBN 978 1 905903 84 9  
ISSN 0367 7850

Published by the Institution of Gas Engineers and Managers

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## SECTION 1 : INTRODUCTION

1.1 This Specification is part of a series of Institution of Gas Engineers and Managers (IGEM) publications, providing a specification that covers the purchasing requirements for low pressure meter installation kits which will conform with the requirements of BS 6400-1. The document details the components incorporated in the various kits, provides the relevant component specifications, and where pre-assembly is necessary the requirements for jointing.

1.2 This Specification covers pre-assembled  $6 \text{ m}^3 \text{ h}^{-1}$  low pressure meter installation kits intended for installing:

- on a floor or wall mounted bracket e.g. surface mount or inset box, room in a building, etc.
- in a semi-concealed meter box
- in a universal box.

providing a nominal metering pressure of 21 mbar, which will be suitable for standard gas appliances, typically for domestic applications.

1.3 British Gas and latterly, National Grid Metering (NGM) developed a series of specifications for key metering components based on its own product requirements. These documents were made available to meter installers and purchasers under the title of PRS "e" documents. Originally these Specifications were made available through Advantica, as they were known at the time.

NGM has transferred the ownership of these documents to IGEM to make them available to the wider industry. It is some years since the original "e" documents were updated and these have been withdrawn.

1.4 This Specification has been drafted by an IGEM Working Group, appointed by IGEM's Gas Measurement Committee, and has been approved by IGEM's Technical Coordinating Committee on behalf of the Council of IGEM.

1.5 Details on the installation of low pressure gas meter installations are given in BS 6400-1.

1.6 Changes to the design of any product being supplied (or under consideration by a prospective purchaser following an invitation to tender) are to be notified immediately to the purchaser.

Full details are to be supplied with a fully dimensioned engineering drawing and test results, if appropriate, to:

- demonstrate that the product continues to satisfy the requirements of this document, and
- allow the purchaser to determine whether the modification(s) are acceptable to them.

1.7 Terms such as "maximum operating pressure" (MOP), "maximum incidental pressure" (MIP) and "operating pressure" (OP) are used to reflect gas pressure terminology used in European standards. These terms will arise in all relevant IGEM Standards and, possibly, in other standards. Other terms have been introduced to assist in recognition of design information to be transferred between interested parties.

1.8 This Specification makes use of the term "must", "shall" and "should" when prescribing particular procedures.

- the term "must" identifies a requirement by law in Great Britain (GB) at the time of publication
- the term "shall" prescribes a procedure which, it is intended, will be complied with in full and without deviation



- the term “should” prescribes a procedure which, it is intended, will be complied with unless, after prior consideration, deviation is considered to be acceptable.

Such a term may have different meanings when used in legislation, or Health and Safety Executive (HSE) Approved Codes of Practice (ACoPs) or guidance, and reference needs to be made to such statutory legislation or official guidance for information on legal obligations.

- 1.9 New and improved practices may be adopted prior to this Specification being updated. Amendments to this Specification will be issued when necessary and their publication will be announced in the Journal of IGEM and elsewhere as appropriate.
- 1.10 Requests for interpretation of this Specification in relation to matters within its scope, but not precisely covered by the current text, should be addressed to Technical Services, IGEM, IGEM House, High Street, Kegworth, Derbyshire, DE74 2DA or e-mail [technical@igem.org.uk](mailto:technical@igem.org.uk). Such requests will be submitted to the relevant Committee. Any advice given by or on behalf of IGEM does not imply acceptance of any liability, and does not relieve any party of their obligations.
- 1.11 This Specification was published in xxxxxx 2018.

## SECTION 2 : SCOPE

### 2.1 SCOPE

2.1.1 This Specification provides the purchasing requirements for:

- low pressure domestic meter installation kits
- use with 2<sup>nd</sup> family gases
- flow rates not exceeding 6 m<sup>3</sup> h<sup>-1</sup>, and
- a nominal metering pressure of 21 mbar.

2.1.2 The operating temperature range of the meter installation kit is -20°C to +60°C.

2.1.3 Meter installation kits designed to this Specification are appropriate for connecting to a standard low pressure Network, the operating parameters of which are shown in Table 1.

2.1.4 The meter installation kits are designed to provide a suitable pressure at the consumer's appliance, assuming the use of standard appliances and pipework in accordance with BS 6891.

*Note:* BS 6891 requires a maximum pressure drop between the outlet of the meter installation and the inlet of the consumers' appliance of 1 mbar.

2.1.5 Meter installation kits include the items required for the installation of a domestic meter from the outlet of the emergency control valve to the outlet of the meter installation. The meter installation kit includes:

- the meter regulator
- meter connector
- flexible meter connector
- meter outlet liner and
- any associated fittings, labels and drawings.

*Note 1:* The kit does not include the meter.

*Note 2:* This Specification also includes a regulator exchange kit (RF), intended for use on existing meter installations, which does not include the meter outlet liner.

## **SECTION 3 : LEGAL AND ALLIED CONSIDERATIONS**

### **3.1 GENERAL**

- 3.1.1 This Specification is set out against a background of legislation in force in GB at the time of publication. The devolution of power to the Scottish, Welsh and Northern Ireland Assemblies means that there may be variations to the legislation described below for each of them and consideration of their particular requirements must be made. Similar considerations are likely to apply in other countries where reference to appropriate national legislation is necessary.
- 3.1.2 All relevant legislation must be applied and relevant ACoPs, official Guidance and referenced codes, standards, etc. have to be taken into account.
- Note: Appendix 2 is relevant in this respect.*
- 3.1.3 Unless otherwise stated, the current editions of legislation and standards apply.
- 3.1.4 In the absence of specific legislation, it is essential that installations are designed, constructed, installed, operated and maintained so as to be safe.
- 3.1.5 The legislation appropriate to any installation will depend largely upon its location. Advice will need to be sought from the relevant Authorities.
- 3.1.6 Where British Standards, etc. are quoted, equivalent national or international standards, etc. equally may be appropriate.

## SECTION 4 : PERFORMANCE

- 4.1 When the meter installation kit is installed and subjected to inlet pressures in the range lowest operating pressure upstream ( $LOP_u$ ) to maximum operating pressure upstream ( $MOP_u$ ) as shown in Table 1, and with flowrates in the range 5%  $Q_{max}$  to  $Q_{max}$  the outlet pressure conditions shall be in the range 18 mbar to 25 mbar.
- 4.2 With an inlet pressure of design minimum pressure upstream ( $DMP_u$ ) and a flowrate of  $Q_{max}$  the meter installation kit shall be designed to maintain a meter installation outlet pressure of not less than 15 mbar.

<b>PERFORMANCE</b>			
<b>Meter installation kit inlet conditions (mbar)</b>		<b>Meter installation kit outlet conditions (including allowance for the meter) (mbar)</b>	
$DMIP_u$	200	$MIP_{mi}$	75
$DP_u$	75	$DP_{mi}$	25
$MOP_u$	75	$MOP_{mi}$	25
$LOP_u$	25	$LOP_{mi}$	18
$DMP_u$	19	$DMP_{mi}$	15

*Note 1: An allowance of 1.25 mbar has to be allowed for the pressure drop across the meter.*

*Note 2: Refer to Appendix 1 for definition of suffix mi or u.*

**TABLE 1 - PERFORMANCE OF METER INSTALLATION KITS**

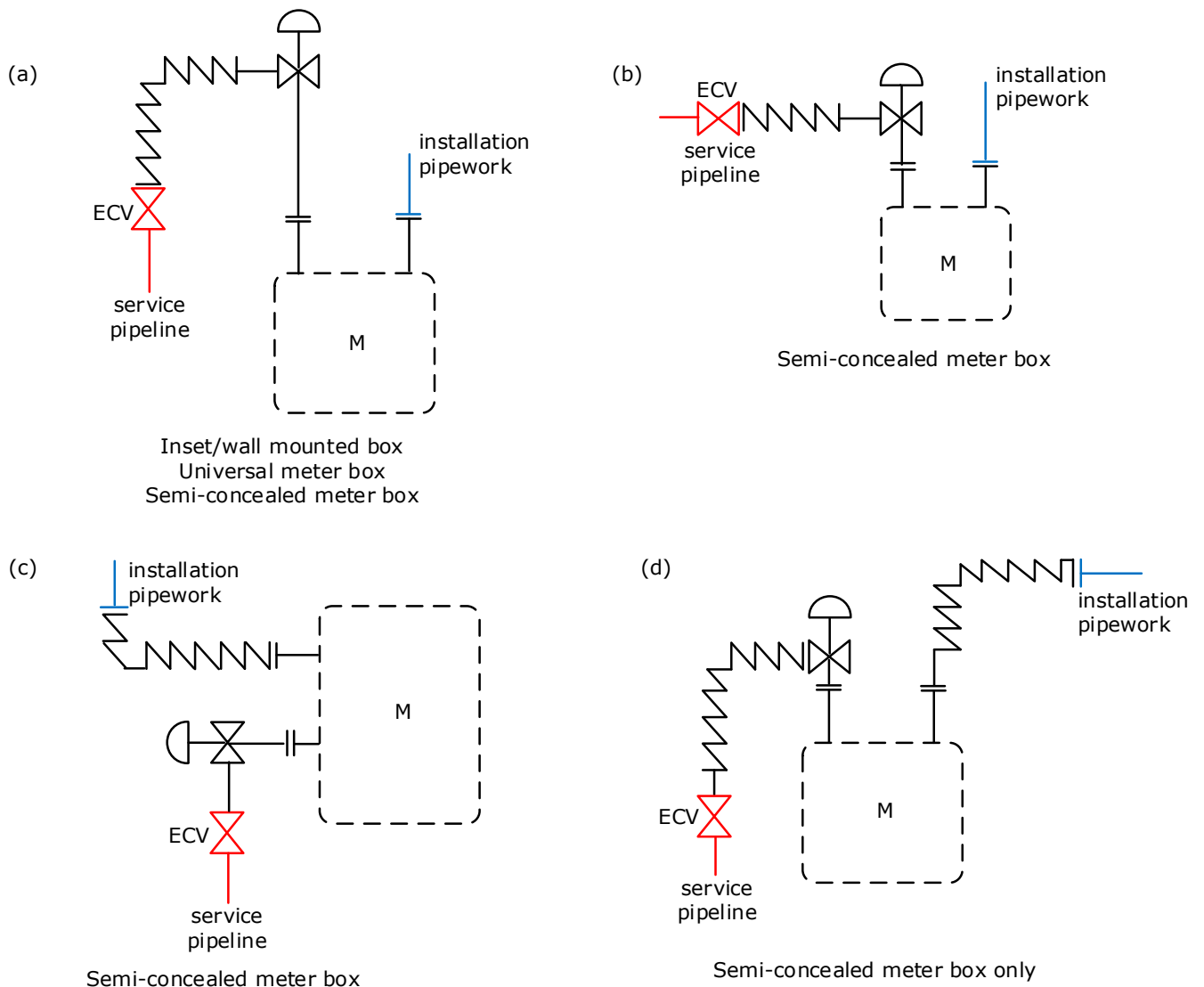
## SECTION 5 : COMPONENTS WITHIN THE METER INSTALLATION KITS

### 5.1 METER CONFIGURATIONS

Each kit shall:

- be arranged such that from inlet to outlet the main components are the regulator and meter
- a flexible connection shall be incorporated
- provide a method of connection from the outlet of an ECV to the inlet of a meter
- enable safe termination of the meter installation, or where required, connection to existing downstream consumer installation pipework.

Kits should comply with the line diagrams in Figure 1 and see example of kits in Appendix 3.



**FIGURE 1 – METER INSTALLATION CONFIGURATIONS**

### 5.2 FLEXIBLE METER CONNECTOR

- 5.2.1 Flexible meter connectors supplied shall comply with the requirements of IGEM/GM/PRS/6.

**5.3 LOW PRESSURE METER REGULATOR**

5.3.1 Low pressure meter regulators supplied shall comply with the requirements of IGEM/GM/PRS/3.

**5.4 METER LINER**

5.4.1 Meter liners shall be a minimum of ¾ inch in size and comply with BS 746 and IGEM/GM/PRS/1, as appropriate.

**5.5 WASHERS AND NUTS**

5.5.1 Washers shall comply with BS 746.

5.5.2 Nuts shall be ¾" inch or 1 inch in size, as appropriate and comply with BS 746 and/or IGEM/GM/PRS/1, as appropriate.

**5.6 GALVANISED FITTINGS**

5.6.1 Galvanised fittings shall comply with BS EN 10242.

**5.7 JOINTS**

5.7.1 Unless otherwise agreed, threaded joints shall be to BS 746 or BS EN 10226-2 (which replaced BS 21) as appropriate and be suitable for a maximum operating pressure of 75 mbar and a maximum incidental pressure of 200 mbar.

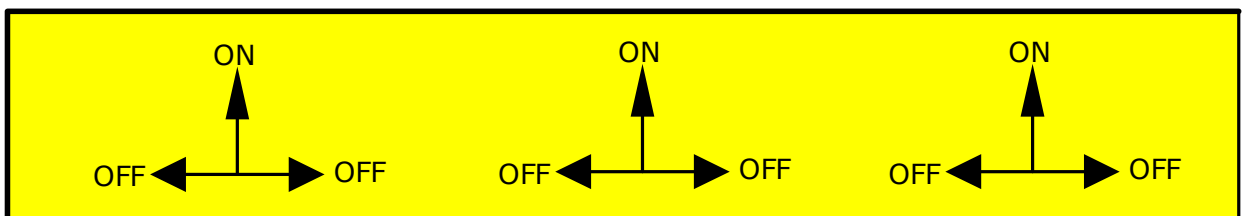
**5.8 THREAD SEALING**

5.8.1 Threaded joints, other than those to BS 746 shall be sealed using a sealant suitable for natural gas (NG) applications, the materials and pressures involved. Suitable sealant compound for thread locking meeting the requirements of BS EN 751-1 class H should be used.

**5.9 LABELS**

5.9.1 The meter installation kit shall contain an on/off tape label conforming BS 4781, see Figure 2. The label shall be wrapped around the body of the inlet component in such a position and orientation that it will clearly indicate the operation of the emergency control valve.

*Note: Where the kit includes a flexible meter connector on the inlet, this label is a requirement of IGEM/GM/PRS/6.*



**FIGURE 2 - ON/OFF TAPE**

**5.10 CONTENTS LIST AND ASSEMBLY DRAWING**

5.10.1 A brief description of the meter installation kit (including the following information) shall be provided with each kit:

- a) Kit part number
- b) Inlet pressure tier details,  $DMP_u$ ,  $LOP_u$ ,  $MOP_u$ ,  $DP_u$  and  $DMIP_u$

- c) A statement of conformity to IGEN/GM/PRS/\*\* and that the meter installation kit has been approved for use by the purchaser in SPAA CoP/1a applications
- d) Manufacturer's name and address
- e) Itemised contents list as detailed in Appendix 3.

5.10.2 An assembly drawing, as shown in Appendix 3, shall be made available on request.

## **SECTION 6 : ASSEMBLY**

- 6.1 Appendix 3 defines which kits should be pre-assembled, and which components within the kit are to be pre-assembled.
- 6.2 Each assembly shall have its components aligned to facilitate fitting of the assembly into its intended location.
- 6.3 If the screwed flexible meter connector or meter liner is tapered, it shall be screwed into the regulator so that at least three threads shall be engaged, or 6 mm whichever is the greater, and shall be tightened to a minimum torque of 40 Nm.
- 6.4 If the screwed flexible meter connector or meter liner is parallel, it shall be screwed into the regulator fully with a tight seal on the connecting faces, this shall result in at least 4 threads being engaged or 6 mm whichever is the greater.
- 6.5 Care shall be taken to ensure that the items are not cross-threaded. Where assembly is automated, procedures shall be in place to ensure cross threading does not occur.
- 6.6 The procedure for aligning components (see Sub-Section 7.1) and the requirement to check all assemblies shall be defined in the manufacturer's Quality Plan.



## **SECTION 7 : PRODUCTION TESTS**

### **7.1 ALIGNMENT TEST**

All production assembled units shall be checked against a jig or template to demonstrate that components are correctly aligned and sufficient threads are engaged. The design and methodology of this jig or template shall be approved by the purchaser.

### **7.2 GAS TIGHTNESS TESTS ON ASSEMBLY**

7.2.1 Where components (e.g. the flexible meter connector, regulator and meter liner) are pre-assembled, a gas tightness test shall be performed on the assembly as a unit, in accordance with A4.1.

*Note: Meter installation kits that are assembled on site as part of the installation process do not need to undergo these tests.*

7.2.2 Any external leakage of air from the assembly during tests shall not exceed  $15 \text{ cm}^3 \text{ h}^{-1}$ .

## **SECTION 8 : TYPE TESTS – MECHANICAL STRENGTH TESTS ON ASSEMBLY**

### **8.1 GENERAL**

8.1.1 The meter installation kits shall be constructed such that they have adequate strength to withstand the likely mechanical stress to which they may be subjected during transportation, installation and service.

*Note: Meter installation kits that meet the requirement of Sub-Sections 8.2, 8.3 and 8.4 are deemed to have met this requirement.*

8.1.2 The following type tests shall be applied to pre-assembled meter installation kits in accordance with Appendix 3. Immediately prior to testing in accordance with Sub-Sections 8.2, 8.3 and 8.4, the meter installation kits shall be pressurised with gas for twenty four hours and then purged. A leak tightness test shall be carried out as stated in Sub-Section 7.2 before and after undertaking the tests detailed below.

*Note: Meter installation kits that are assembled on site as part of the installation process do not need to undergo these tests.*

### **8.2 TORQUE TIGHTNESS OF JOINTS**

8.2.1 The assembly shall be subjected to a torque of 75 Nm in accordance with A5.1 of Appendix 5.

8.2.2 After testing, the threaded joints between the regulator and meter liner/flexible meter connector shall not be loosened, deformed, damaged or broken.

8.2.3 The leakage rate after the torsion test shall not exceed that indicated in Sub-Section 7.2.

### **8.3 BENDING MOMENT TEST**

8.3.1 The assembly shall be subjected to a bending moment of 150 Nm in accordance with A5.2 of Appendix 5.

8.3.2 After testing, the joints between the regulator and the meter liner/flexible meter connector shall not be deformed, damaged or broken.

8.3.3 The leakage rate after the bending test shall not exceed that indicated in Sub-Section 7.2.

### **8.4 IMPACT TEST**

8.4.1 The assembly shall be subjected to a dropped mass of 3 kg from a height of not less than 500 mm in accordance with A5.3 of Appendix 5.

8.4.2 After testing, the joints between the regulator and the meter liner/flexible meter connector shall not be deformed, damaged or broken.

8.4.3 The leakage rate after the impact test shall not exceed that indicated in Sub-Section 7.2.

## **SECTION 9 : TYPE APPROVAL AND SPAA CoP/1A CONFORMITY**

### **9.1 TYPE APPROVAL**

9.1.1 Each meter installation kit type shall be type approved by the purchaser.

9.1.2 The meter installation kit supplier shall supply the purchaser with a technical dossier demonstrating compliance with this Specification. This should include designs, test results, certificates, etc, as appropriate.

9.1.3 A sample of meter installation kits shall be supplied for approval prior to purchase.

### **9.2 MANUFACTURER'S STATEMENT OF CONFORMITY**

9.2.1 Each production kit shall include the manufacturer's statement that the design has been:

- strength tested at 350 mbar (up to the regulator) and 220 mbar downstream
- the kit conforms to this Specification with a declaration of DmP, MOP and DMIP, and
- include confirmation of the purchaser's statement of approval to SPAA COP/1a.

## **SECTION 10 : PROTECTION, PACKAGING AND LABELLING**

### **10.1 GENERAL**

- 10.1.1 Meter installation kits shall be protected against damage and deterioration throughout all stages of processing, storage and delivery.
- 10.1.2 To facilitate safe handling, the items shall be packaged as detailed below, unless otherwise agreed in writing with the purchaser.
- 10.1.3 Packaging materials shall not have any detrimental effect upon the meter installation kits.

### **10.2 POLYTHENE BAGS AND BOXES**

- 10.2.1 Each complete meter installation kit shall be packed and sealed within a clear strong polythene bag. Within this large bag, a small clear polythene bag shall be included containing small items such as sealing washers and tamper screws.
- 10.2.2 Each bag shall be appropriately labelled with the relevant meter installation kit details (see clause 5.7.1).

### **10.3 PALLETS**

For delivery purposes of bulk orders as appropriate, bags should be placed in a box(es) to be stacked on to wooden pallets 1200 mm by 800 mm, and be:

- a) Designed to be 4-way entry and designed to prevent pallet tipping.
- b) Constructed to withstand the normal climatic conditions encountered during transit and storage.
- c) Constructed to withstand the total weight of the bagged assembly kits.
- d) Stacked to a height not exceeding 940 mm.
- e) Suitable for use by forklift or pallet trucks.

*Note: The preference is for 270 units per pallet, supplied in boxes of 10.*

### **10.4 PALLET LOADING AND PROTECTION**

- 10.4.1 Pallets with a number of stacked boxes shall be secured by means of plastic strapping, e.g. four plastic straps – two each way across the stacked pallet with strapping of sufficient strength and thickness, such that the load is stable and minimises the risk of collapse during transportation.
- 10.4.2 Where loaded pallets are able to be stacked, the boxes fastened to the pallet shall be labelled to reflect the maximum stacked load. Where pallets are unable to be stacked, this shall also be clearly displayed on a label.
- 10.4.3 The boxes fastened to the pallet shall be shrink or stretch wrapped, the level of wrapping being such as to prevent rain ingress to the box(es) during transportation and storage.

## 10.5 IDENTIFICATION OF CONTENTS

10.5.1 The following information shall be provided on a label securely affixed to one end of the packaging:

- a) A description of the meter installation kit
- b) Pressure tier details,  $DMP_u$ ,  $LOP_u$ ,  $MOP_u$ ,  $DP_u$  and  $DMIP_u$ , etc.
- c) A statement of conformity to IGEN/GM/PRS/\*\* and that the meter installation kit has been for use in SPAA CoP/1a applications
- d) Approved by purchaser (see Sub-Section 9.1)
- e) Manufacturer's name and address
- f) The purchase's catalogue code
- g) Weight of box
- h) Date code.

10.5.2 A bar code label shall be affixed to one end of the box capturing its contents.

10.5.3 The format of the bar code label shall be agreed between the purchaser and the supplier.

10.5.3.1 The bar code should be in the form of a machine readable barcode to "Code 128" (Subset A) to BS ISO 15417, with a width (excluding quiet zones) of 32 mm  $\pm$  5 mm.

10.5.3.2 Markings shall be made directly onto a label or the packaging. Upper case lettering shall have a character height of not less than 3 mm and a stroke width of not less than 0.2 mm. Lower case lettering etc. shall be in proportion.

10.5.3.3 Labels shall be type 1 to BS 4781 or comply with the legibility and durability requirements of Appendix A of BS EN 60730-1.

## 10.6 PALLETISED TRANSIT PACKS

The following information should be provided on the pallet:

- a) An itemised contents list
- b) Catalogue code
- c) The weight of pallet and date code.

## APPENDIX 1 : GLOSSARY, ACRONYMS, ABBREVIATIONS AND UNITS

### GLOSSARY

Standard definitions are given in IGEN/G/4 which is freely available by downloading a printable version from IGEN’s website [www.igem.org.uk](http://www.igem.org.uk).

Standard legacy gas meter arrangements are given in IGEN/G/1 which is freely available by downloading a printable version from IGEN’s website.

The following definitions apply to this Specification and are not given in IGEN/G/4.

<b>assembly</b>	The assembled meter regulator, flexible meter connector, meter liner and fittings.
<b>meter installation kit</b>	Includes a meter regulator, flexible meter connector, meter liner and fittings.
<b><math>Q_{max}</math></b>	Maximum flowrate of the meter installation kit.
<b>suffix<sub>c</sub></b>	Pressures describing the performance of the consumer’s system downstream of the meter installation (see IGEN/GM/8 for full definition).
<b>suffix<sub>u</sub></b>	Pressure supplied by the upstream network (see IGEN/GM/8 for full definition).
<b>suffix<sub>mi</sub></b>	Pressure subjected to the downstream pipework by the meter installation (see IGEN/GM/8 for full definition).

## ACRONYMS AND ABBREVIATIONS

ACoP	Approved Code of Practice
DmP	design minimum pressure
GB	Great Britain
HSE	Health and Safety Executive
IGEM	Institution of Gas Engineers and Managers
LOP	lowest operating pressure
MIP	maximum incidental pressure
MOP	maximum operating pressure
NG	Natural Gas
NGM	National Grid Metering
OP	operating pressure.

## UNITS

bar	bar
mbar	millibar
kg	kilogram
°	degree angular
°C	degree Centigrade
µm	micron
mm	millimetre
m <sup>3</sup> h <sup>-1</sup>	cubic metre per hour.

## **APPENDIX 2 : REFERENCES**

This specification refers to the documents listed below (see Section 3)

### **A2.1 BRITISH STANDARDS**

- BS 21 - withdrawn - Specification for pipe threads for tubes and fittings where pressure-tight joints are made on the threads (metric dimensions)
- BS 746 - Gas meter unions and adaptors
- BS 4781 - Specification for pressure-sensitive adhesive plastics labels for permanent use
- BS 6891 - Specification for the installation and maintenance of low pressure gas installation pipework of up to 35 mm (R1¼) on premises
- BS 6001-1 - Sampling procedures for inspection by attributes. Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection
- BS 6400-1 - Specification for installation, exchange, relocation and removal of gas meters with a maximum capacity not exceeding 6 m<sup>3</sup>/h  
Part 1: Low pressure (2<sup>nd</sup> family gases)
- BS EN 1359 - Diaphragm gas meters
- BS EN 10226-1 - Pipe threads where pressure tight joints are made on the threads. Taper external threads and parallel internal threads. Dimensions, tolerances and designation
- BS EN 10226-2 - Pipe threads where pressure tight joints are made on the threads. Taper external threads and parallel internal threads. Dimensions, tolerances and designation
- BS EN 10242 - Threaded pipe fittings in malleable cast iron
- BS EN ISO 9001 - Quality management systems. Requirements.

### **A2.2 ENGINEERING DOCUMENTS**

- IGEM/GM/PRS/1 - Meter installation fittings
- IGEM/GM/PRS/3 - Meter regulators for gas flow rates not exceeding 6 m<sup>3</sup> h<sup>-1</sup> and inlet pressures not exceeding 75 mbar
- IGEM/GM/PRS/6 - Meter connectors.

### **A2.3 INSTITUTION OF GAS ENGINEERS AND MANAGERS (IGEM) DOCUMENTS**

- IGEM/GM/8  
Parts 1-5  
Edition 2 - Meter installations of flow exceeding 6 m<sup>3</sup> per hour.



A2.4 **OFGEM DOCUMENTS**

- SPAA CoP/1a
- Code of practice for low pressure diaphragm and electronic meter installations with badged meter capacities not exceeding 6 m<sup>3</sup>/h (212 ft<sup>3</sup>/h).

## APPENDIX 3 : COMPONENT LISTS AND DIAGRAMS

The following are typical kits that are on the market at the time of publication and are intended for illustration purposes only (see Sub-Section 5.1).

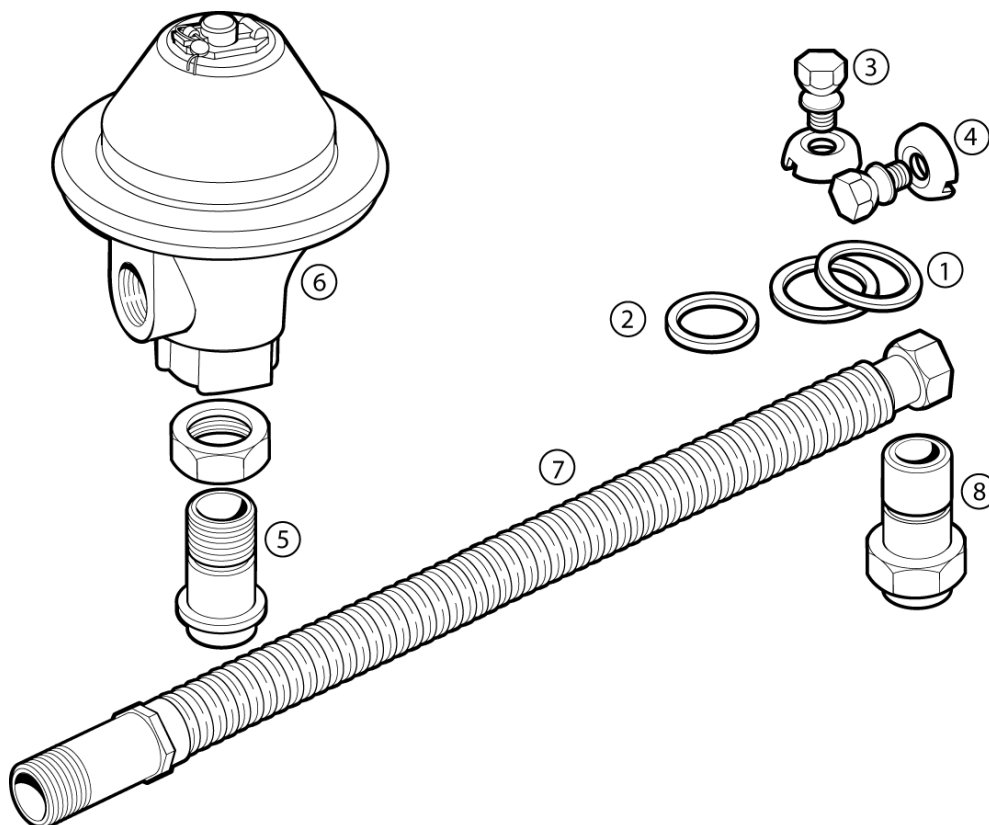
### A3.1 STANDARD G4 KIT COMPONENTS LIST

#### A3.1.1 Kit of installation components

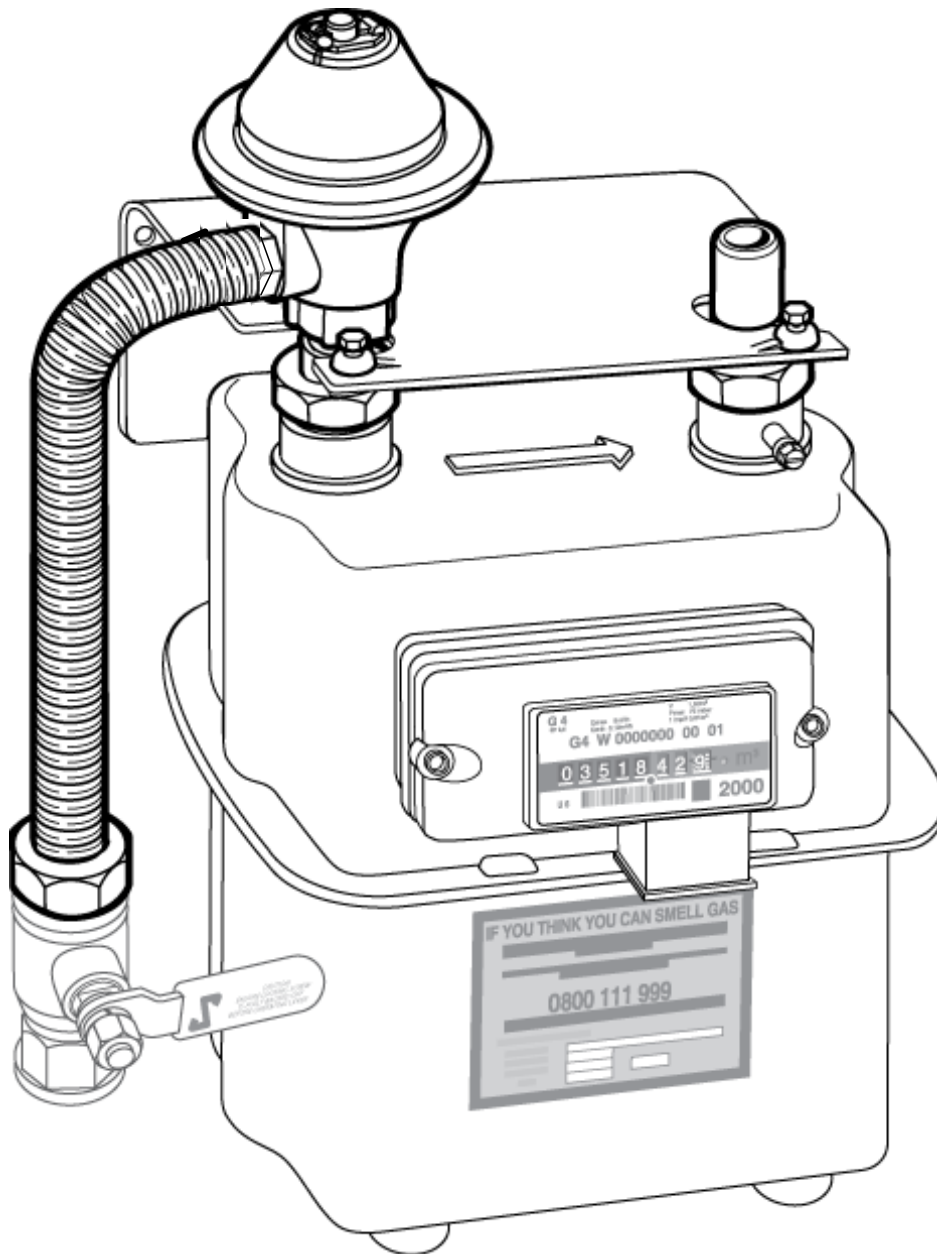
COMPONENT NO.	ITEM DESCRIPTION	QTY
1	Meter Coupling Washer - 1 in	2
2	Meter Coupling Washer - ¾ in	1
3	Shear Bolts	2
4	Security Washers - 19 mm	2
5*	Meter Connection - 1 in BS 746 Union x ¾ in x ¾ in BSP	1
6*	Domestic Low Pressure Regulator - ¾ in x ¾ in BSP	1
7*	Flexible Meter Connector - ¾ in BS 746 Union x ¾ in in BSPM x 395 mm long (including on/off tape)	1
8	Meter Connection - 1 in BS 746 Union x 22 mm Cu Socket c/w groove for Meter Bracket	1

\*Items shall be pre-assembled

#### A3.1.2 Kit installation components diagram



A3.1.3 **Kit installation assembly diagram**



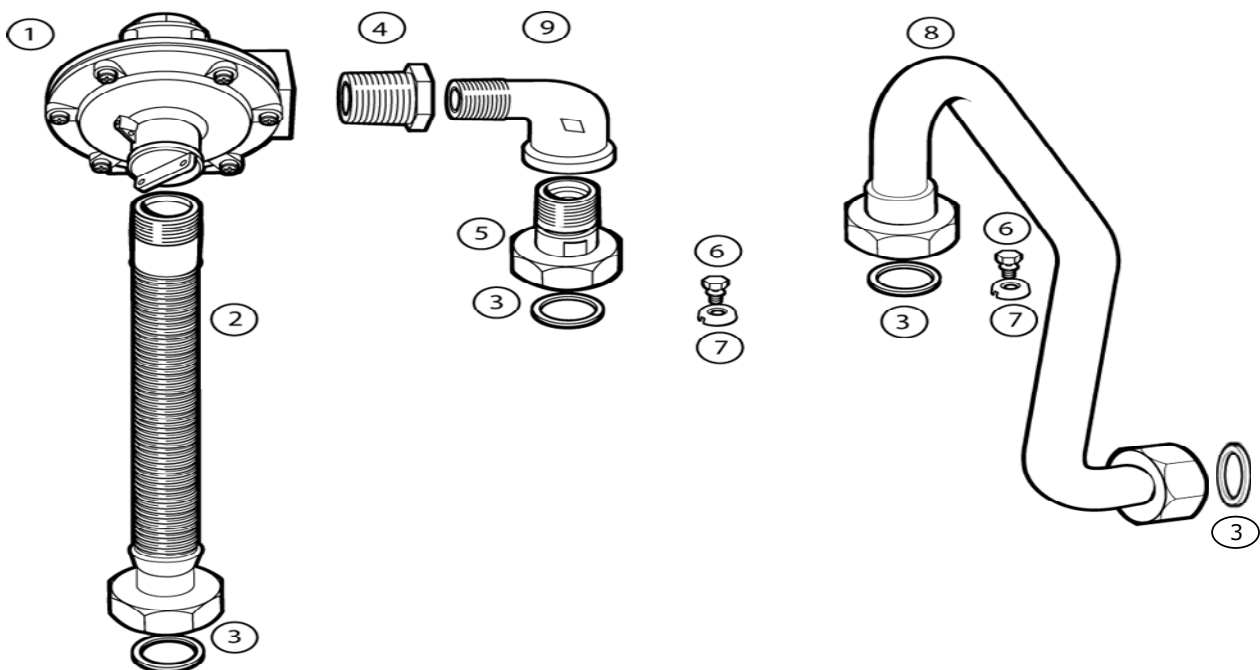
A3.2 **KIT COMPONENTS LIST**

A3.2.1 **Semi-concealed ETM Kit installation components**

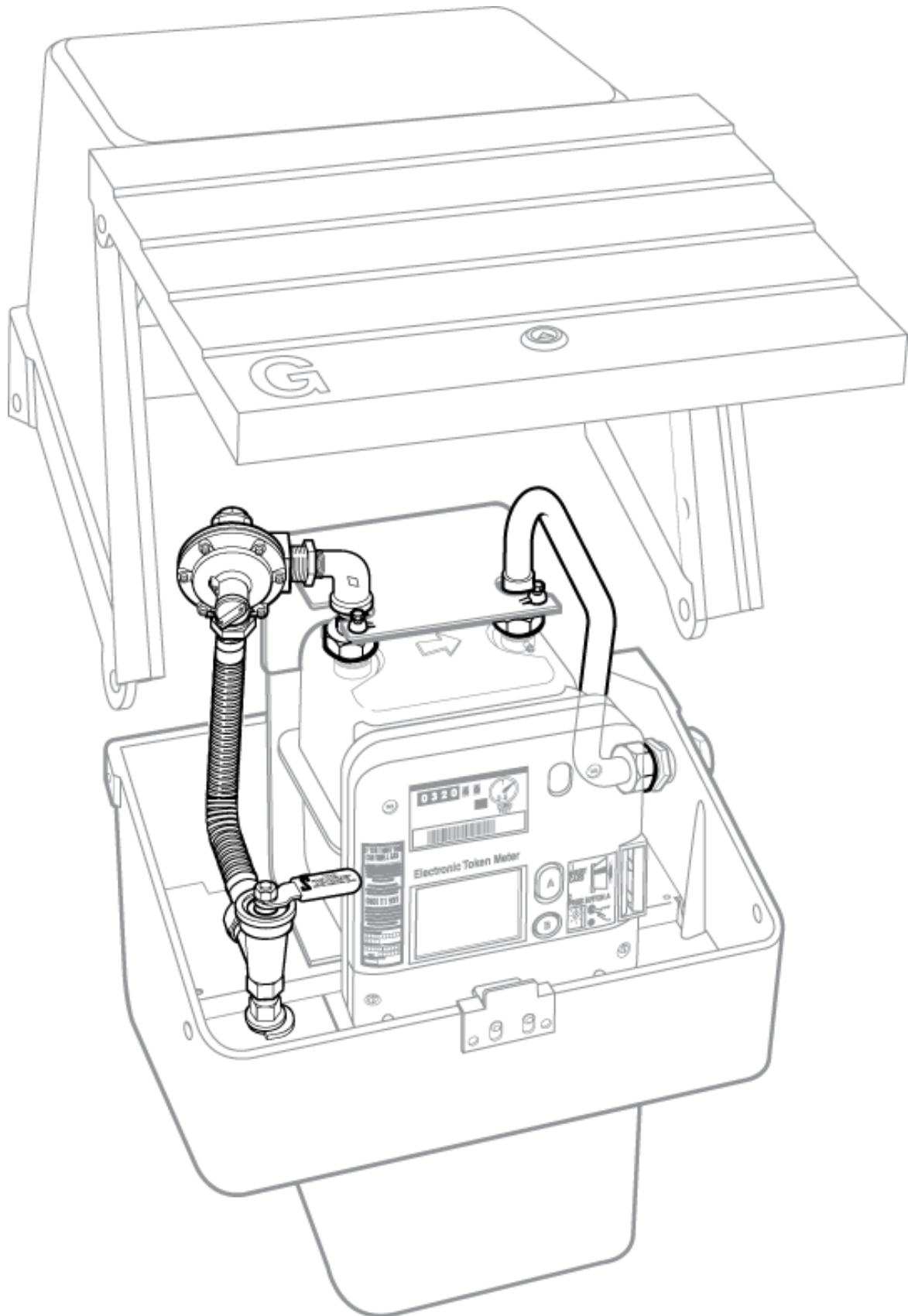
DRAWING NO.	ITEM DESCRIPTION	QTY
1*	Domestic Low Pressure Meter Regulator (right angled) - 1 in x ¾ in	1
2*	Flexible Meter Connector - ¾ in BSP x 1 in BS 746 x 325 mm long (on/off tape to be fitted by kit manufacturer)	1
3	Meter Coupling Washer - 1 in	4
4	Bush Hexagon Galvanised – 1 in x ¾ in	1
5*	Meter Connection - 1 in BS 746 Union x ¾ in BSPM c/w groove for Meter Bracket	1
6	Shear Bolts	2
7	Security Washers – 19 mm	2
8	Outlet Pipe Assembly for s/c Meter Box Extension	1
9	Elbow M&F Galvanised – ¾ in BSPF x BSPM	1

*\*This kit might be ordered as a retrofit kit without these items*

A3.2.2 **Kit installation components diagram**



A3.2.3 **Kit installation assembly diagram**



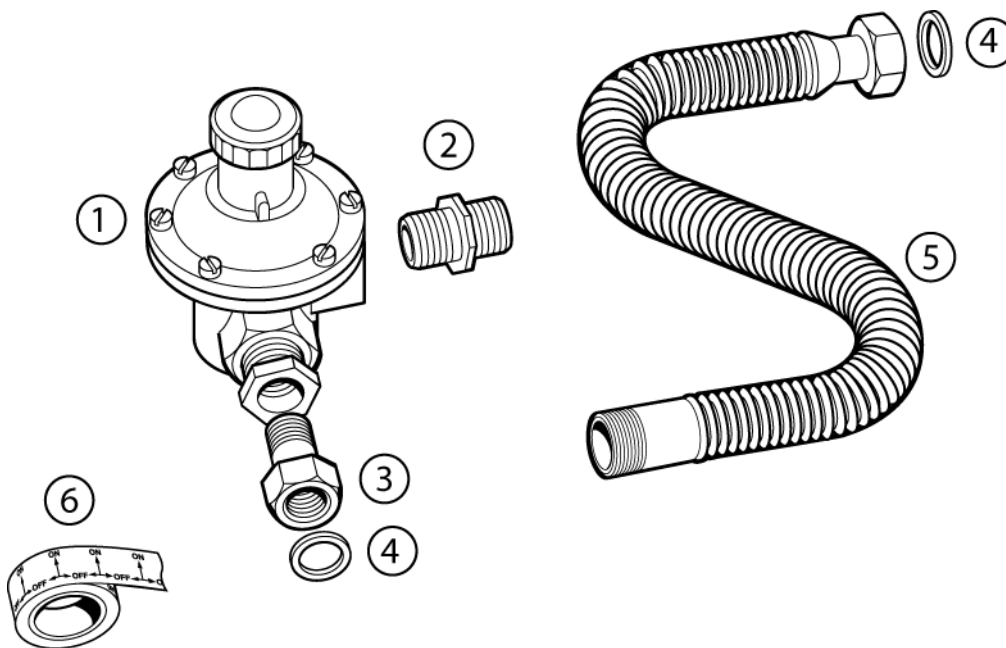
**A3.3 KIT COMPONENTS LIST**

**A3.3.1 Semi-concealed G4 meter Kit installation components**

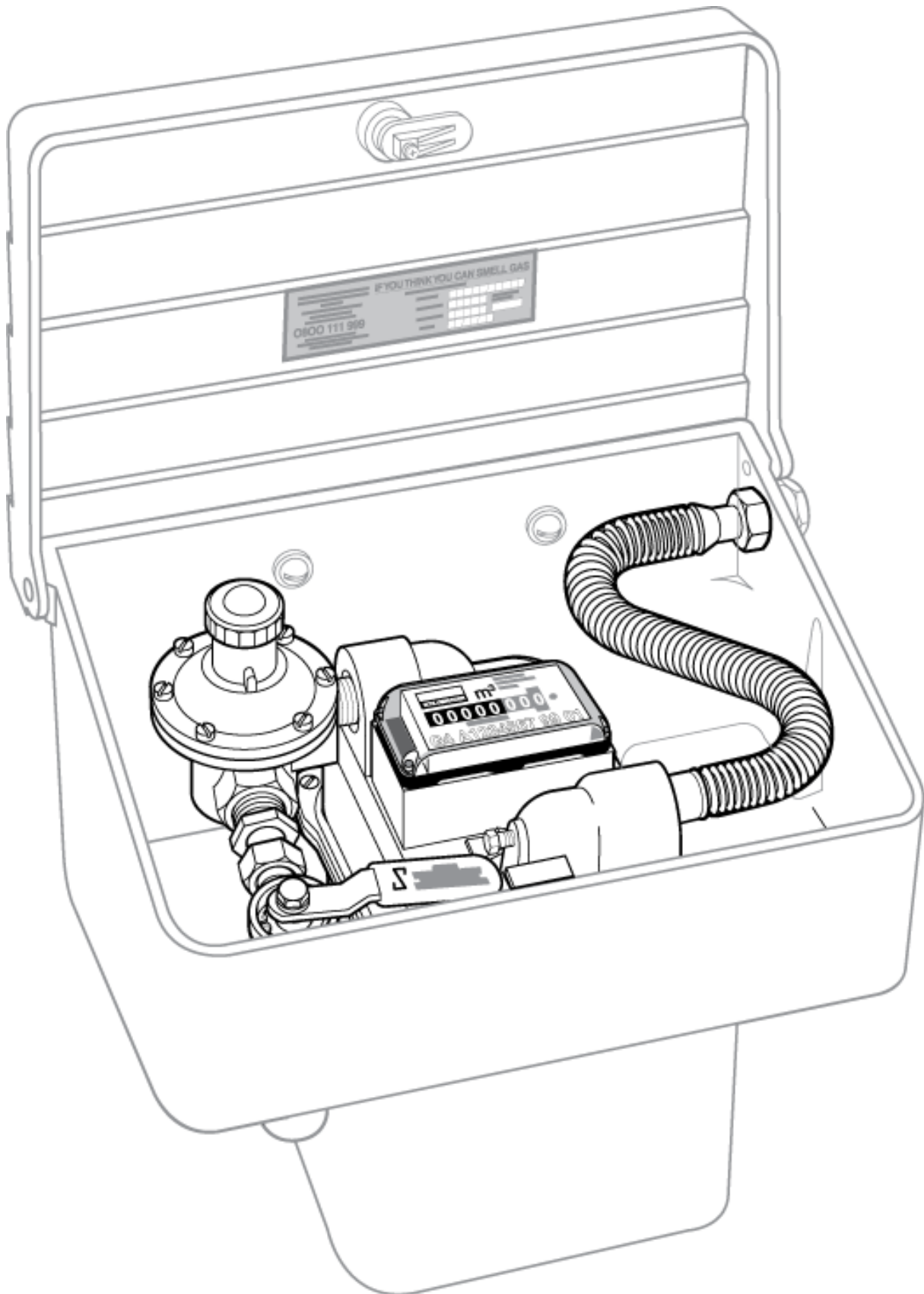
COMPONENT NO.	ITEM DESCRIPTION	QTY
1	Domestic Low Pressure Meter Regulator (right angled) – 1 in x ¾ in	1
2	Nipple Malleable Iron Galvanised Hex T.T BS EN 10242-1 in BSP	1
3*	Meter Connection - 1 in BS 746 Union x ¾ in BSPM c/w groove for Meter Bracket	1
4	Meter Coupling Washer – 1 in	2
5	Flexible Meter Connector – ¾ in BSP x 1 in BS 746 x 325 mm long	1
6*	Length of on/off tape	1

*\*Items shall be pre-assembled*

**A3.3.2 Kit installation components diagram**



### A3.3.3 Kit installation assembly diagram



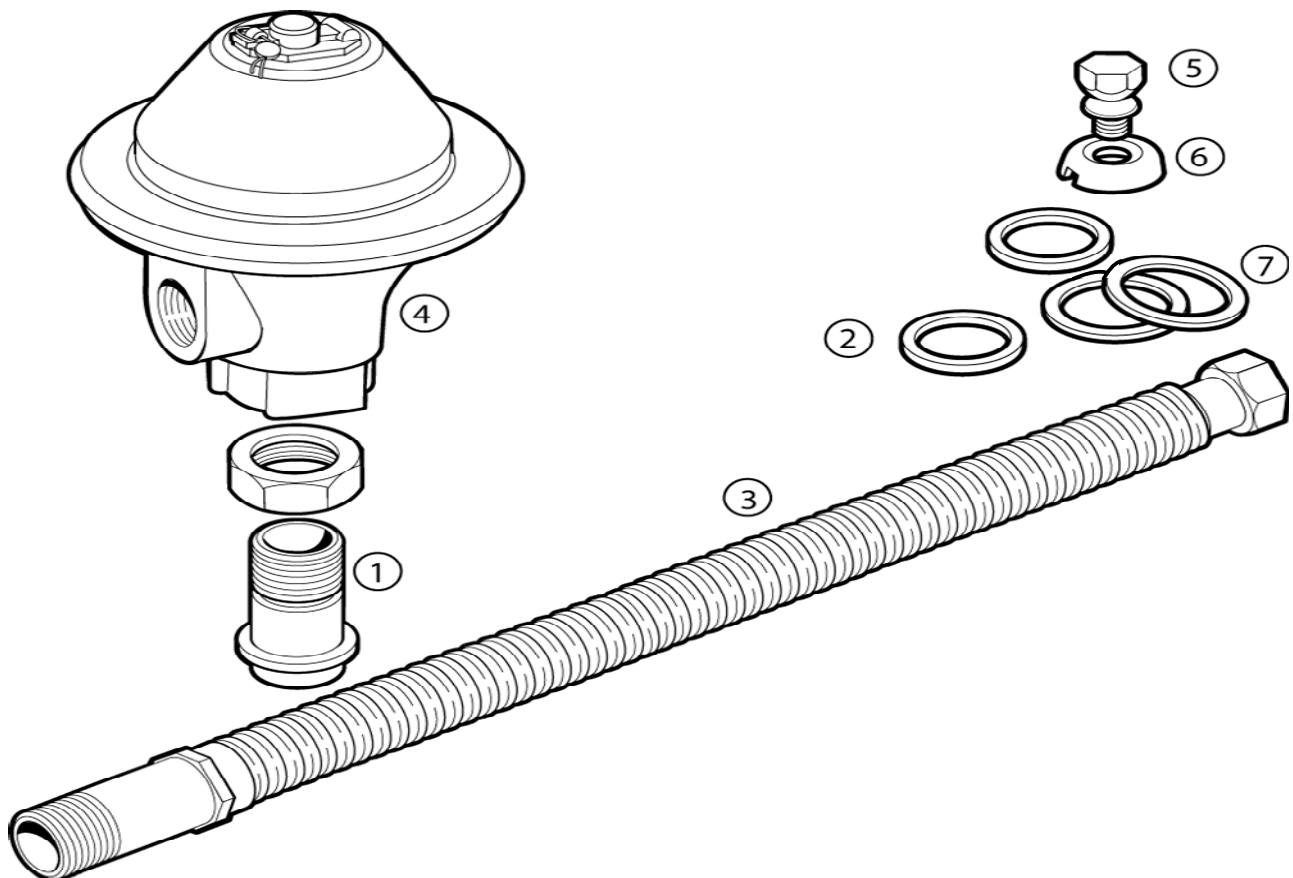
**A3.4 REGULATOR/FLEX KIT COMPONENTS LIST**

**A3.4.1 Regulator/flex kit installation components**

COMPONENT NO.	ITEM DESCRIPTION	QTY
1*	Meter Connection - 1 in BS 746 Union x ¾ in BSPM c/w groove for Meter Bracket	1
2	BS 746 Table 8 Washer – ¾ in	1
3*	Flexible Meter Connector – ¾ in BS 746 Union x ¾ in BSPM x 395 mm long (including on/off tape)	1
4*	Domestic Low Pressure Regulator ¾ in x ¾ in BSP	1
5	Shear Bolt	1
6*	Security Washer – 19 mm	1
7	Meter Coupling Washer – 1 in	3

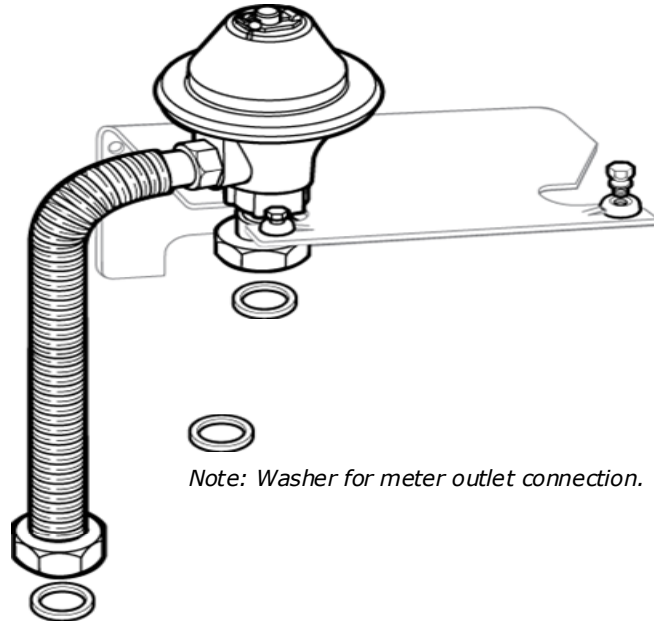
*\*Items shall be pre-assembled*

**A3.4.2 Regulator/flex kit installation components diagram**





A3.4.3 **Regulator/flex kit installation assembly diagram**



## **APPENDIX 4 : GAS TIGHTNESS TEST**

### **A4.1 External gas tightness test**

*Method:*

The complete assembly is mounted on the test equipment.

The method of mounting and test method is to not mask any faults or leaks (e.g. the regulator is to not be clamped across the spring housing and main body).

An air pressure of at least 220 mbar is to be applied to the inlet and the outlet connections of the assembly simultaneously and any external leakage from the assembly is to be measured by a suitable flow indicator situated in the air supply.

The accuracy of measurement of pressure to be  $\pm 2\%$ .

The method of test, test duration, etc, is to be such as to be able to prove the leak rate is less than that specified in Sub-Section 8.2.

*Performance:*

The leakage rate is not to exceed that specified in Sub-Section 8.2.

## APPENDIX 5 : MECHANICAL STRENGTH TESTS

### A5.1 **Torsion test**

*Method:*

The regulator is clamped using an appropriate method. The anticlockwise torque (see clause 8.2.1) is applied to the meter liner for a minimum of 10 s. The same anticlockwise torque is then applied to the flexible meter connector's nipple end for a minimum of 10 s.

*Note 1: The inlet or outlet components may be used to hold the regulator as appropriate.*

*Note 2: The torque is anticlockwise as the test is to check the strength of the tightened and sealed threaded joint to resist becoming loose.*

*Performance:*

The assembly is to conform to clauses 8.2.2 and 8.2.3.

### A5.2 **Bending Moment test**

*Method:*

The regulator is clamped using an appropriate method and the bending moment (see clause 8.3.1) applied to the meter liner for a minimum of 10 s. The same bending moment will then be applied to the flexible meter connector's nipple end for a minimum of 10 s.

*Note: The inlet or outlet components may be used to hold the regulator as appropriate.*

*Performance:*

The assembly is to conform to clauses 8.3.2 and 8.3.3.

### A5.3 **Impact test**

*Method:*

The assembled meter installation kit is clamped using the outlet fitting, e.g. in the case of the G4 Kit in A3.1 via the BS 746 union on the meter liner. A 3 kg mass (see clause 8.4.1) is released vertically and unimpeded from a height of not less than 500 mm, such that it strikes the regulator body on the joint between the main regulator body and the spring housing of the regulator.

This shall be undertaken three times in total.

The test is then repeated with the inlet component clamped, e.g. the flexible meter connector nipple on the G4 Kit example in A3.1.

*Performance:*

The assembly is to conform to clause 8.4.2.

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