INSTITUTION OF GAS ENGINEERS AND MANAGERS

IGEM/UP AND IGE/UP SERIES OF STANDARDS

AMENDMENTS. OCTOBER (2) 2010 (31 sides)

Amendments apply to the following Standards:

- **IGE/UP/1 Edition 2. Communication 1683**
  Strength testing, tightness testing and direct purging of industrial and commercial gas installations
  Amendments March 2005 (6 sides)
- **IGE/UP/1A Edition 2. Communication 1701**
  Strength testing, tightness testing and direct purging of small, low pressure industrial and commercial gas installations
  Amendments March 2005 (6 sides)
- **IGE/UP/1B Edition 2. Communication 1714**
  Tightness testing and direct purging of small Natural Gas installations.
  Amendments October 2008 (1 side)
- **IGEM/UP/2 Edition 2. Communication 1729**
  Installation pipework on industrial and commercial premises
  Amendments October 2008 (5 sides)
- **IGE/UP/7 Edition 2. Communication 1722**
  Gas installations in timber framed and light steel framed buildings
  Amendments October 2008 (1 side)
- **IGE/UP/10 Edition 3. Communication 1726**
  Installation of flued gas appliances in industrial and commercial premises
  Amendments October (2) 2010 (11 sides)
- **IGE/UP/12. Communication 1713**
  Application of burners and controls to gas fired process plant
  Amendments May 2009 (1 side)

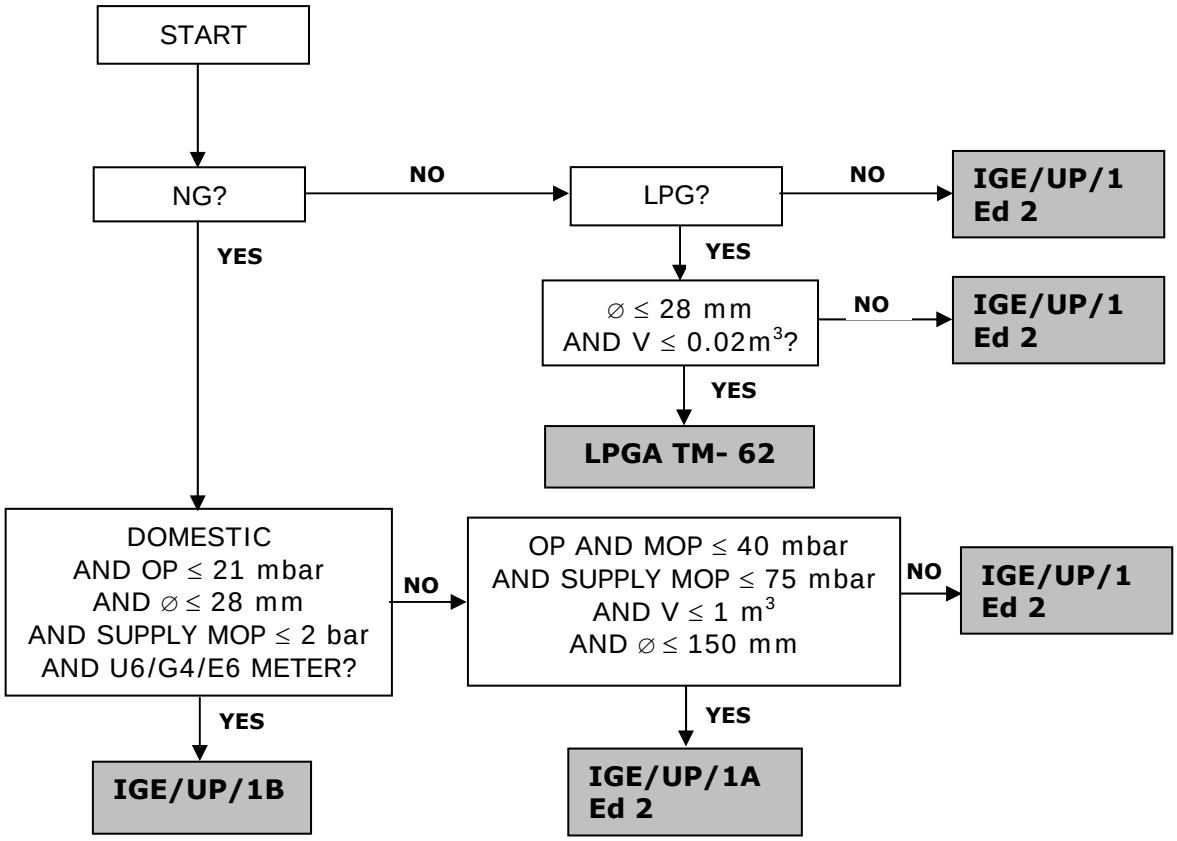
If the user copies these amendments onto A4 labels, the Amendments can be cut out and applied to the appropriate places within the relevant Standards i.e. the individual Amendments are tailored to fit over the existing text.

IGEM has a policy with respect to changes in prescribed practices. Unless deemed essential, IGEM does not issue new editions of publications within 5 years of the existing edition and the primary consideration for this is to keep the costs to the gas industry as low as reasonably possible. However, IGEM also has a policy to advise industry of recommended changes in prescribed practices as quickly as possible. This means that from time to time, free amendments are made available but the user has to take the time to insert them into their Standards. It is recognised that the changes enclosed to UP/1 Edition 2 and UP/1A Edition 2 are substantial and may take a while to apply to the Standards. However, these changes (which in general are not caused by errors in the original documents) (and other enhancements that are proposed but can be held for the next edition) would, normally, warrant new editions but this has not been done as the existing publications were less than 5 years since original publication when the Amendments were issued.

IGE/UP/1 EDITION 2
COMMUNICATION 1683
2003

The following Amendments (March 2005) apply to all copies of IGE/UP/1 Edition 2 published in 2003 and supersede the Amendment of August 2004. It is not necessary to apply these to IGE/UP/1 Edition 2 Reprint with Amendments (Communication 1716) which already includes them.

Figure 2. **Delete flow diagram entirely retaining the italicised key and title. Substitute:**



Sub-Section 2.2 **Add a further Note after Note 2:**

Note 3: See Sub-Section 2.7 regarding the principles adopted for the detection of leakage.

Section 2 **Add:**

2.7 IGE/UP/1 Edition 2 adopts the concept of "gauge readable movement (GRM)". When using a water gauge, it may be possible to reduce the duration of tests for new installations and extensions by adopting the concept of "no perceptible movement". This will lower test times in many cases but has to be subject to a thorough analysis, by the responsible person, of the complex fluid mechanics and mathematics involved.

Section 3 **Add:**

3.4 In the following situations, electronic equipment shall be certified for use in a hazardous area:

- when seeking the source of a known or suspected gas leak, using a gas detector
- when a hazardous area is imposed by another installation, for example an oil supply, and the equipment is to be used within that area
- when a risk assessment indicates that use of uncertified equipment is not acceptable (see below)

- when it is anticipated that the area in which the equipment will be located will be left unattended at any time during the test/purge.

The decision on whether electronic equipment, for example pressure gauges and gas detectors, can be of a type not certified for use in a hazardous area, may be complex and is not an issue that can be developed in IGE/UP/1. However, unless the pipework being tested or purged is known to contain only air and/or inert gases (in which case equipment that is not certified may be used) any use of such uncertified equipment shall be subject to a suitable risk assessment prior to use. Equipment manufacturers' instructions may assist in this risk assessment.

Note 1: For lower pressures, water gauges can always be used if there is any doubt about the use of uncertified gauges.

Note 2: For MOP ≤ 75 mbar, use of uncertified gauges placed in the open air and located at least 150 mm from any potential gas source (a greater clearance may be required) may be acceptable although it is still possible for a hazardous area to apply, particularly as imposed by another installation.

Note 3: Further guidance on hazardous area classification is available in IGE/GM/7 Edition 2 and IGE/G/3 (publication anticipated in 2005) and is contained in BS EN 60079.

Page 10 **Delete entirely. Substitute attached new page 10 (UP/1/3).**

Clause 4.2.1 **Delete clause and associated note entirely. Substitute:**

A strength test shall be carried out on any new installation or extension except for components that have been pre-tested or have been removed to avoid over pressurisation, for example appliances.

Note: Where a component or sub-assembly (meter installation component, meter "skid" unit, etc.) has been pre-tested and not subsequently modified and has appropriate certificates of conformity available, the strength testing of such a component/assembly need not be undertaken but a visual examination of joints, general condition, suitability, etc. is recommended prior to installing and subsequent tightness testing as for a new installation (see Sub-Section 4.4). Permanent marking, for example by manufacturer's badging/stamping, may be deemed as certification of conformity.

Table 1. **Delete entirely retaining the italicized text and title. Substitute:**

MOP	Ø (mm)	TEST METHOD	STP (greater of)	STABILIZE (mins)	STD (mins)	Maximum drop % STP	
METALLIC PIPEWORK						**Pneu.**	**Hydro.**
≤ 100 mbar	ALL	Pneumatic or hydrostatic *[1]	1.1 MIP and 2.5 MOP[*3]	5	5	20	5
>100 mbar ≤ 1 bar	ALL	Pneumatic or hydrostatic*[1]	1.1 MIP and 2.0 MOP[*3]	10	5	20	5
>1 bar ≤ 2 bar	ALL	Pneumatic or hydrostatic	1.1 MIP and 1.5 MOP	10	5	20	5
>2 bar ≤ 16 bar	≤ 25	Pneumatic or hydrostatic*[1]	1.1 MIP and 1.5 MOP[*3]	15	30	20	5
>2 bar ≤ 7 bar	>25 ≤ 150	Pneumatic or hydrostatic*[1]	1.1 MIP and 1.5 MOP [*3]	30	30	20	5
>2 bar ≤ 7 bar	>150	Hydrostatic*[2]	1.1 MIP and 1.5 MOP	30	30	N/A	5
>7 bar ≤ 16 bar	>25	Hydrostatic*[2]	1.1 MIP and 1.5 MOP	30	30	N/A	5
PE PIPEWORK							
≤100 mbar	ALL	Pneumatic or hydrostatic*[1]	1.1 MIP and 2.5 MOP[*3]	5	5	20	5
>100 mbar ≤ 200 mbar	ALL	Pneumatic or hydrostatic*[1]	1.1 MIP and 1.75 MOP[*3]	10	15	20	5
>200 mbar ≤ 1 bar*[4]	ALL	Pneumatic or hydrostatic*[1]	1.1 MIP and 1.5 MOP[*3]	15	15	20	5
>1 bar ≤ 3 bar*[4]	ALL	Pneumatic or hydrostatic*[1]	1.1 MIP and 1.5 MOP and 3 bar[*3]	30	15	20	5
>3 bar ≤ 6 bar*[4]	ALL	Hydrostatic*[2]	1.1 MIP and 1.5 MOP and 6 bar	30	30	N/A	5
>6 bar ≤ 7 bar*[4]	ALL	Hydrostatic*[2]	1.1 MIP and 1.5 MOP and 7 bar	30	30	N/A	5
>7 bar ≤ 10 bar*[4]	ALL	Hydrostatic*[2]	1.1 MIP and 1.5 MOP	30	30	N/A	5

SECTION 4 : STRENGTH TESTING

New pipework, designed in accordance with current relevant standards, will have been designed to withstand the strength test pressure (STP). However, particular components within the pipework may need to be removed for the strength test (see Sub-Section 4.4). In addition, appliances may not be designed to withstand STP.

Strength testing is used to identify any major flaw in the construction of a new installation, prior to tightness testing.

A strength test permits a fall in pressure limited to the value given in Table 1.

It is possible to combine the strength and tightness tests. This may save a little time by not requiring a stabilization period for the tightness test. It can only be achieved if the strength test is a pneumatic test (but see Note 1 to Table 1). Appendix 3 provides guidance which should be followed if it is decided to combine the strength and tightness tests. The procedures outlined in Sections 4 and 5 assume a separate test for each and the principles equally apply for a combined test.

Some LDFs have an adverse effect on certain pipework materials. Consequently, any residual fluid shall be washed thoroughly off the pipe and subsequently dried.

If necessary, for example when joints are broken, temporary electrical continuity bonds shall be installed before testing.

Acronyms

ECV	=	emergency control valve	NDT	=	non-destructive testing
IV	=	installation volume	OP	=	operating pressure
GT	=	gas transporter	PE	=	polyethylene
LDF	=	leak detection fluid	PRI	=	pressure regulating installation
MAM	=	meter asset manager	SSOV	=	safety shut-off valve
MIP	=	maximum incidental pressure	STP	=	strength test pressure
MOP	=	maximum operating pressure	STD	=	strength test duration.

4.1 DETERMINATION OF MOP AND MIP

Strength test pressure (STP) is determined using either a multiple of MOP or MIP or, for PE at higher pressures, a fixed pressure, all as given in Table 1. The following assumes that strength testing is applied to new installation pipework or new extensions only. If an existing installation is to be strength tested (see clause 4.2.2), it may be more difficult to obtain the detail of MIP and MOP for installations not previously tested as new to this edition of IGE/UP/1.

These Procedures assume that MOP equates to Design Pressure (DP). Where DP is quoted and is in excess of MOP, then the value of DP shall be used in the calculation of STP.

4.1.1 Normally, the values of MIP and MOP shall be obtained from the designer of the installation pipework or, for a meter installation, from the MAM. For pipework installed between the ECV and the nearest downstream regulator, the values shall be obtained from the GT.

Note: While MOP will often equate to OP, the designer may have chosen to declare MOP at a higher value, in which case the calculation of STP has to take this higher value into account.

4.1.2 Where a booster or compressor is included anywhere downstream of, or within, the installation pipework being tested, the maximum back pressure shall be obtained from its owner. Where this pressure exceeds MIP, this back pressure shall be taken as MIP.

Clause 4.5.15 **2nd paragraph. Delete entirely. Substitute:**

STP and MOP shall be recorded clearly and be available for reference by any party subsequently working on the installation.

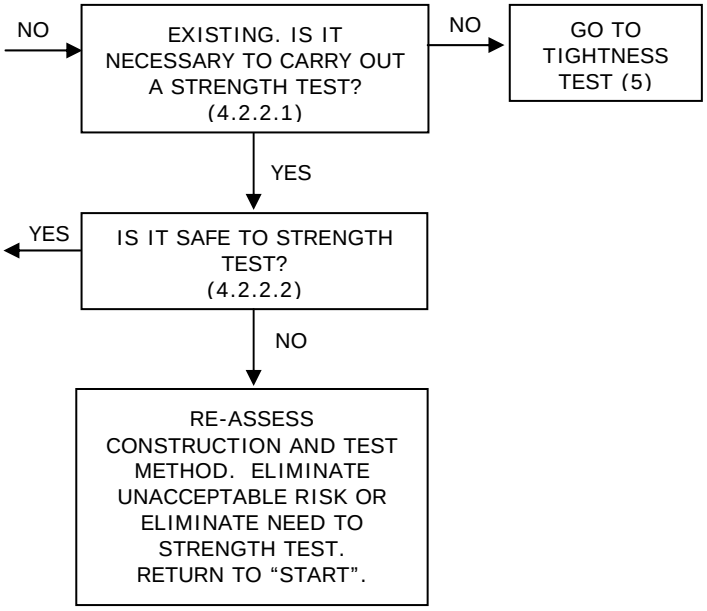
Clause 4.6.1 **Delete 2nd bullet. Substitute:**

- for PE, the lower of 350 mbar and STP.

Clause 4.6.13 **2nd paragraph. Delete entirely. Substitute:**

STP and MOP shall be recorded clearly and be available for reference by any party subsequently working on the installation.

Figure 4 **Delete top three right hand boxes. Substitute:**



Section 5 **Add new 6th paragraph:**

If necessary, for example when joints are broken, temporary continuity bonds shall be installed before testing.

Clause 5.1.2.6 **Delete entirely. Substitute:**

Where it is not necessary to test a component of the meter installation, such a component shall be isolated at the meter installation outlet valve/meter outlet valve (MIOV/MOV), as appropriate.

Clause 5.2.2(d) **2nd line of calculation. Delete entirely. Substitute:**

$= \quad 0.100 + (12 \times 0.0054) + (10 \times 0.00084) + (IV_{pa} + IV_{pb})\ (0.1)$

Clause 5.4.2 **5th bullet and Note. Delete entirely. Substitute:**

- ensure that, where necessary, any electronic gauge is certified for use in a hazardous area (see Sub-Section 3.4) and operated within the manufacturer's specification with regard to ambient temperature

Clause 5.5.2.7 **Retain title. Delete text entirely. Substitute:**

Where a pipework section passes through more than one of the Area types A, B or C/D shown in Table 8, the minimum value of MPLR shall apply for the whole section. If it can be proved that, for Area type A, there is no leak (see clause 5.5.2.2) the next lowest value of MPLR may be applied but the volume of pipework in the Area type A has to be included in the calculations unless it can be isolated.

Clause 5.7.4.1 (c) **1st sentence up to colon. Delete entirely. Substitute:**

Where TTD is less than the maximum for the gauge given in Table 6:

Clause 5.7.4.1(d) **1st sentence up to colon. Delete entirely. Substitute:**

Where TTD is greater than the maximum for the gauge given in Table 6:

Clause 5.7.4.2(d) **Delete text entirely, including Note. Substitute:**

Where TTD is less than the maximum for the gauge given in Table 6, the gauge shall be monitored as necessary for the duration of the test.

Clause 5.7.4.2(e) **Delete first sentence entirely.**

Clause 5.7.4.2(e) **Delete final sentence. Retain the note. Substitute:**

If LR exceeds MPLR, the test has failed and the leak(s) shall be traced, isolated and repaired, and the test repeated.

Clause 5.7.4.2(f) **1st sentence up to colon. Delete entirely. Substitute:**

Where TTD is greater than the maximum for the gauge given in Table 6:

Clause 5.7.4.2(f) **Delete final sentence. Substitute:**

If LR exceeds MPLR, the test has failed and the leak(s) shall be traced, isolated and repaired, and the test repeated.

Clause 5.8.2 **Delete text entirely. Substitute:**

After existing pipework has been returned to service, joints in any inadequately ventilated area (Area type A (see clause 5.5.2.2)) shall, if practicable, be checked with a suitable intrinsically safe gas detector, when the reading should not move from 0% LFL on the 0-10% LFL scale.

Clause 5.9.2 **Delete text and Note entirely. Substitute.**

A let by test shall be carried out on the appliance isolation valve (see clause 5.7.4.2(a). Thereafter, a tightness test shall be undertaken on the appliance connector. For pipework volumes not exceeding 0.12 m^3, there shall be no perceptible movement of the gauge over a period of 2 minutes at a pressure of not less than OP. For pipework volumes exceeding 0.12 m^3, the volume of the pipework shall be calculated and a tightness test carried out in accordance with clause 5.7.4.

Clause 5.9.3 **Final paragraph. Delete entirely. Retain Note. Substitute:**

In order to prevent lock-up, the regulator should be by-passed, using tubing of suitable material and bore, fitted across the regulator (or it may be possible to put the regulator out of action by screwing down to its maximum setting – in which case the isolation valve should be opened slowly to prevent regulator lock-up).

Clause 5.9.3 **Add a Note 2:**

Note 2: For a meter regulator, the adjustment of the regulator may only be undertaken by a GT – authorised person.

Clause 6.2.5 **2nd paragraph. 1st sentence. Delete entirely. Substitute:**

If it becomes immediately apparent that a direct purge will not achieve the required flow rate, the restriction may be removed and the purge re-started. Otherwise, an indirect purge using N_2 shall be carried out (see Appendix 8).

Sub-Section 6.7 **1st bullet. Delete entirely. Substitute:**

- comply with Sub-Section 3.4

Clause 6.9.1 **Page 42. 1st line. Delete first 6 lines entirely. Substitute:**

- PV of a diaphragm meter
  = 5 cyclic volume (Table 3)

  Note: The cyclic volume (capacity per revolution) is shown either on the index plate of modern meters or, on older tin case meters, on the badge plate.

- PV of a rotary, turbine or ultrasonic meter

Clause 6.11.2(d) **Delete text entirely. Retain Note. Substitute:**

Open all purge points and valves on connected vent stacks and admit air. Simultaneously, start the chosen method of "measuring" the flow of air (see clause 6.5.1) i.e.

- start a timer and
- read the in-line meter, or read the flow meter rate.

Clause 6.11.2(g) **Add a further sentence:**

Seal or disconnect pipework from the gas supply, sealing all ends with an appropriate fitting.

A2.3 **Delete 3rd bullet entirely. Substitute:**

- BS EN 12874 Flame arresters.

A4.2 **Example at bottom of page 60. Last line. Delete entirely. Substitute:**

= 0.00088 m^3 h^{-1} (st) air at OP.

A7.3.2 **Example on page 70. 2nd paragraph. Delete entirely. Substitute:**

Creep will be much less at 1.5 bar but, to be conservative, test with a GRM of 20 mbar.
TTD = 0.047 GRM x IV x F1 (Table 9)
TTD = 0.047 x 20 x 0.5 x 42 = 20 mins.
If a leak is indicated, repeat the test immediately to check whether it may be creep (unless the observed gauge movement is clearly too large to be due to creep).

Table 21 **Centre main column. Delete PE 100 SDR 11. Substitute:**

PE 80 SDR 11

A8.3 **2nd paragraph. Delete entirely. Substitute:**

Ensure a minimum volume of nitrogen equal to 1.5 times the installation volume of the pipework is available (see Table 24 and Sub-Section 5.2).

Table 24 **In column title, amend "QUALITY" to: QUANTITY**

A8 **Add at end of Appendix:**

A8.9 Once the purge to nitrogen is complete, it is advisable to then purge to air and ensure the oxygen level is at least 20%.

END OF UP/1 EDITION 2 AMENDMENTS

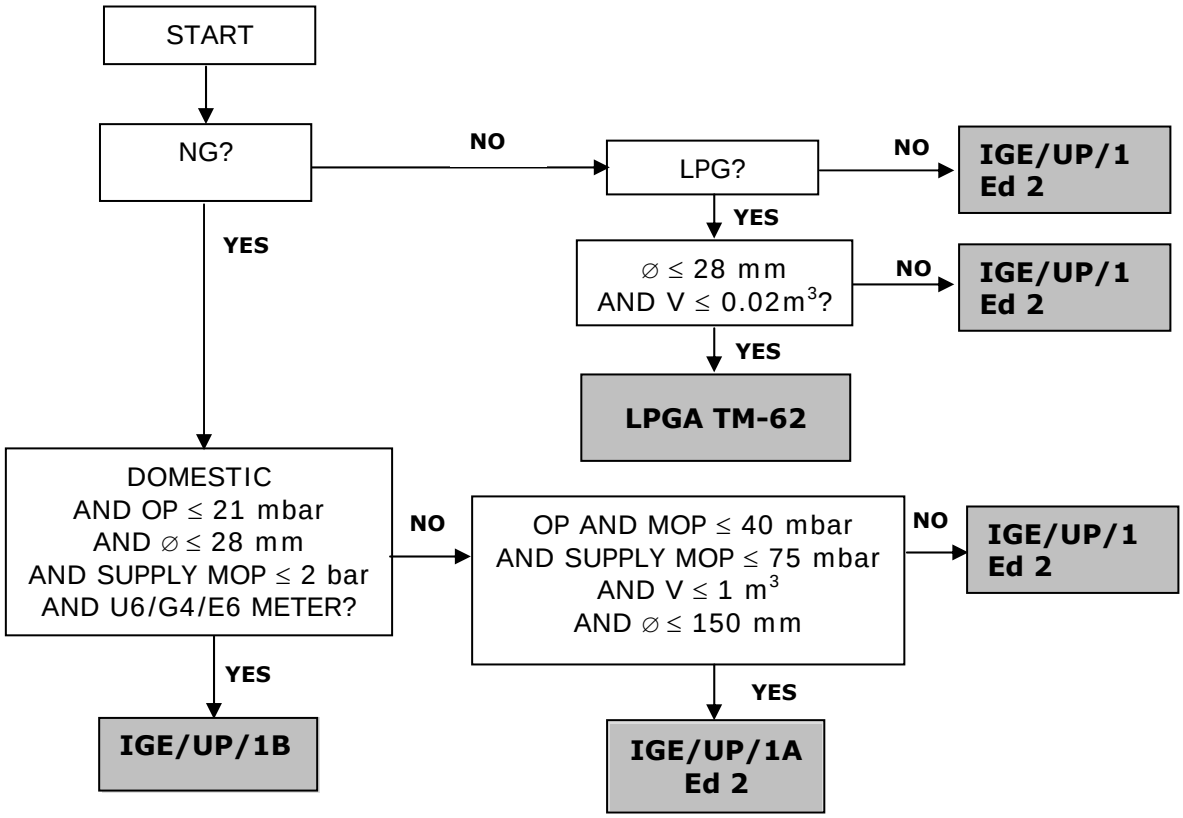
IGE/UP/1A EDITION 2
COMMUNICATION 1701
2003

The following Amendments (March 2005) apply to all copies of IGE/UP/1A Edition 2 published in 2003. It is not necessary to apply these to IGE/UP/1A Edition 2 Reprint with Amendments (Communication 1717) which already includes them.

Contents **Appendix. Add new row at end:**

4 Tightness test durations for a water gauge using the concept of "no perceptible movement" (for new installations only) 49

Figure 2 **Delete flow diagram and italicized key entirely. Retain the Note and Title. Substitute:**



≤ is less than or equal to
∅ is nominal diameter
V is volume.

Sub-Section 2.1 **1st paragraph. Add a 2nd sentence after Note 2:**
See additional text in 2.1(A) at base of page.

Add at base of page:

2.1(A) However, any new pipework between the ECV and the inlet of the first regulator downstream of the ECV is excluded from the scope unless it has been pre-tested for strength and tightness prior to assembly.

Sub-Section 2.2 **Add a further Note:**
Note 4: See Sub-Section 2.7 regarding the principles adopted for the detection of leakage.

Section 2 **Add:**

2.7. IGE/UP/1A Edition 2 adopts the concept of "gauge readable movement (GRM)". When using a water gauge, it may be possible to reduce the duration of tests for new installations and extensions by adopting the concept of "no perceptible movement" (see Appendix 4).

Sub-Section 4.1 **Adjacent to "Acronyms", add new paragraph:**

These Procedures assume that MOP equates to Design Pressure (DP). Where DP is quoted and is in excess of MOP, then the value of DP shall be used in the calculation of STP.

Clause 4.2.1 **Delete clause and associated note in their entirety. Substitute:**

A strength test shall be carried out on any new installation or extension except for components that have been pre-tested or have been removed to avoid over pressurisation, for example appliances.

Note: Where a component or sub-assembly (meter installation component, meter "skid" unit, etc.) has been pre-tested and not subsequently modified and has appropriate certificates of conformity available, the strength testing of such a component/assembly need not be undertaken but a visual examination of joints, general condition, suitability, etc. is recommended prior to installing and subsequent tightness testing as for a new installation (see Sub-Section 4.4). Permanent marking, for example by manufacturer's badging/stamping, may be deemed as certification of conformity.

Clause 4.5.11 **2nd sentence. Delete "MOP". Substitute:**

STP and MOP

Figure 4 **3rd arrow down of 2nd column of boxes. Delete "No".**

Clause 5.1.2.4 **Delete entirely. Substitute:**

Where it is not necessary to test any component of the meter installation, such a component shall be isolated at the meter installation outlet valve/meter outlet valve (MIOV/MOV), as appropriate.

Clause 5.2.2(d) **2nd line of calculation. Delete entirely. Substitute:**

$= \quad 0.100 + (12 \times 0.0054) + (10 \times 0.00084) + (IV_{pa} + IV_{PB})\ (0.1).$

Table 4 **Delete right hand column entirely. Delete Note entirely.**

Table 5 **Delete the Table and its Note entirely. Retain the title. Substitute the following page (UP/1A/3).**

Table 6 **Add below the table title:**

IGE/UP/1A Edition 2 adopts the concept of "gauge readable movement (GRM). When using a water gauge, it is possible to reduce the duration of tests for new installations and extensions by adopting the concept of "no perceptible movement" in which case Appendix 4 shall be used.

Clause 5.7.3(d) **Delete entirely. Substitute:**

Raise the pressure in the section to at least TTP. Isolate the air supply.

Clause 5.7.3(f) **Delete text entirely. Substitute:**

Adjust to TTP.

IV (m^3)	VOLUME OF SMALLEST OCCUPIED SPACE (RV) (m^3)																										
	≤10	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**35**	**40**	**45**	**50**	**55**	**≥60**
≤ 0.15	0.7	0.8	0.8	0.9	1	1	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.7	1.8	1.8	1.9	2	2.1	2.4	2.8	3.1	3.5	3.9	4.2
>0.15 ≤ 0.2	0.7	0.8	0.9	0.9	0.9	1	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.7	1.8	1.8	1.9	2	2.1	2.3	2.8	3	3.4	3.8	4.1
>0.2 ≤ 0.25	0.7	0.7	0.8	0.9	0.9	0.9	1	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.7	1.7	1.8	1.8	1.9	2	2.2	2.7	2.9	3.3	3.7	4.0
>0.25 ≤ 0.3	0.7	0.7	0.8	0.9	0.9	0.9	1	1.1	1.2	1.2	1.3	1.3	1.4	1.5	1.6	1.6	1.7	1.7	1.8	1.8	2	2.1	2.7	2.9	3.2	3.6	3.9
>0.3 ≤ 0.35	0.7	0.7	0.8	0.9	0.9	0.9	1	1.1	1.2	1.2	1.3	1.3	1.4	1.5	1.6	1.6	1.6	1.7	1.7	1.8	1.9	2.1	2.6	2.8	3.2	3.6	3.9
>0.35 ≤ 0.4	0.6	0.7	0.8	0.8	0.8	0.9	1	1	1.1	1.2	1.3	1.3	1.5	1.5	1.5	1.6	1.6	1.7	1.7	1.8	1.9	2	2.6	2.8	3.1	3.5	3.8
>0.4 ≤ 0.45	0.6	0.7	0.7	0.8	0.8	0.9	1	1	1.1	1.2	1.3	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.7	1.8	1.9	2	2.5	2.7	3.1	3.4	3.7
>0.45 ≤ 0.5	0.6	0.7	0.7	0.8	0.8	0.9	1	1	1.1	1.2	1.2	1.3	1.3	1.4	1.5	1.5	1.5	1.6	1.7	1.7	1.9	2	2.5	2.7	3	3.4	3.7
>0.5 ≤ 0.55	0.6	0.6	0.7	0.8	0.8	0.9	1	1	1.1	1.1	1.2	1.2	1.3	1.4	1.5	1.5	1.5	1.6	1.6	1.7	1.8	2	2.4	2.6	3	3.3	3.6
>0.55 ≤ 0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.9	1	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.8	1.9	2.4	2.6	3	3.3	3.6
>0.6 ≤ 0.65	0.6	0.6	0.7	0.7	0.8	0.8	0.9	1	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.4	1.5	1.5	1.6	1.7	1.8	1.9	2.3	2.5	2.9	3.2	3.5
>0.65 ≤ 0.7	0.5	0.6	0.7	0.7	0.8	0.8	0.9	1	1	1.1	1.2	1.2	1.2	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.9	2.3	2.5	2.9	3.2	3.5
>0.7 ≤ 0.75	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.9	1	1.1	1.1	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.7	1.9	2.2	2.4	2.9	3.1	3.4
>0.75 ≤ 0.8	0.5	0.5	0.6	0.7	0.8	0.8	0.9	0.9	1	1.1	1.1	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.7	1.9	2.2	2.4	2.8	3.1	3.3
>0.8 ≤ 0.85	0.5	0.5	0.6	0.6	0.7	0.8	0.8	0.9	1	1	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.8	2.1	2.3	2.8	3	3.2
>0.85 ≤ 0.9	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.9	0.9	1	1	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.8	2.1	2.3	2.6	3	3.1
>0.9 ≤ 0.95	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.9	0.9	1	1	1	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.8	2	2.2	2.6	2.9	3.1
>0.95 ≤ 1.0	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1	1	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.7	2	2.2	2.5	2.8	3.0
Maximum allowable pressure drop (mbar)																											

Note 1: For RV between two stated values, assume the lower value e.g. for RV = 42 m^3, use 40 m^3.

Note 2: For a water gauge, where appropriate, round the maximum allowable pressure drop downwards to the next lower 0.5 mbar e.g. for 1.3 mbar, use 1.0 mbar, for 1.8 mbar, use 1.5 mbar.

Clause 5.7.4(a) **Delete entirely. Substitute:**

Where practical, turn off all appliances and close any appliance isolation valve. Close any upstream section isolation valve to prevent air entering the upstream pipework.

Clause 5.7.4(c) **Delete entirely. Substitute:**

Carry out a let-by test of the isolation valve. Adjust the pressure to approximately 50% OP by slowly opening the isolation valve and turn off the gas supply by closing the isolation valve.

If, over the test period as given in Table 8, a perceptible rise in pressure is observed, the isolation valve may be letting-by. Any defective isolation valve shall be repaired/replaced before proceeding to the tightness test. If let-by is confirmed on an ECV, the National Gas Emergency Service Call Centre shall be notified and the installation made safe, suspending the test until a repair has been made.

Clause 5.7.4(d) **Delete entirely. Retain Note. Substitute:**

Admit gas or air, as appropriate, and adjust the pressure in the section to at least TTP.

Clause 5.7.4(f) **Delete entirely. Substitute:**

Adjust the pressure to TTP and observe the gauge for the tightness test duration (TTD). If using air (see (d) above), isolate the source of the air supply.

Clause 5.7.4(h) **Delete 3rd paragraph. Substitute:**

If a discernible pressure drop is recorded, or there is a smell of gas, any individual appliance isolation valve that has been left open shall be closed and the test repeated until the leak is located (see below).

Clause 5.8.2 **Delete entirely. Substitute.**

A let-by test shall be carried out on the appliance isolation valve (see clause 5.7.4(c). Thereafter, a tightness test shall be undertaken on the appliance connector. For pipework volumes not exceeding 0.12 m^3, there shall be no perceptible movement of the gauge over a period of 2 minutes at a pressure of not less than OP. For pipework volumes exceeding 0.12 m^3, the volume of the pipework shall be calculated and a tightness test carried out in accordance with clause 5.7.4.

Clause 5.8.3 **Final paragraph. Delete entirely. Retain Note. Substitute:**

In order to prevent lock-up, the regulator should be by-passed, using tubing of suitable material and bore, fitted across the regulator (or it may be possible to put the regulator out of action by screwing down to its maximum setting – in which case the isolation valve should be opened slowly to prevent regulator lock-up).

Clause 5.8.3 **Add a Note 2:**

Note 2: For a meter regulator, the adjustment of the regulator may only be undertaken by a GT-authorised person.

Clause 6.2.6 **2nd paragraph. 1st sentence. Delete entirely. Substitute:**
If it becomes immediately apparent that a direct purge will not achieve the required flow rate, the restriction may be removed and the purge re-started. Otherwise, an indirect purge via N_2 shall be carried out (see Appendix 3).

Clause 6.11.2(a) **Amend "5.7.2(c)" to:** 5.7.4(c)).

Clause 6.11.2(g) **Add two further sentences:**
Seal or disconnect pipework from the gas supply, sealing all ends with an appropriate fitting. Decommission in accordance with these Procedures.

Appendix 3 **Add new Sub-Appendix:**

A3.10 Once the purge to Nitrogen is complete, it is advisable to then purge to air and ensure the oxygen level is at least 20%.

Appendix 4 **Add to the inside of the back cover a new Appendix 4 (following page) (UP/1A/6).**

APPENDIX 4 : TIGHTNESS TEST DURATIONS FOR A WATER GAUGE USING THE CONCEPT OF "NO PERCEPTIBLE MOVEMENT"(FOR NEW INSTALLATIONS ONLY)

For clarity, IGE/UP/1A Edition 2 adopts the concept of "gauge readable movement (GRM)". This is because the meaning of "no perceptible movement" is open to differing interpretation with respect to electronic gauges, which are seeing increased usage. However, in the case of a water gauge, the use of "no perceptible movement" is an established and understood concept.

When testing a new installation, using this concept for a water gauge has the benefit of significantly reducing the test times from those given in Table 6 which are based on GRM. The table below gives the equivalent values for "no perceptible movement".

Any movement of the gauge during the test time indicates the installation has failed the tightness test.

IV (m^3)	**TIGHTNESS TEST DURATION NPM (0.25 mbar) (water gauges)**
Up to 0.06	2
> 0.06 ≤ 0.09	2
> 0.09 ≤ 0.12	2
> 0.12 ≤ 0.15	3
> 0.15 ≤ 0.18	3
> 0.18 ≤ 0.21	4
> 0.21 ≤ 0.24	4
> 0.24 ≤ 0.27	5
> 0.27 ≤ 0.3	5
> 0.3 ≤ 0.33	6
> 0.33 ≤ 0.36	6
> 0.36 ≤ 0.39	7
> 0.39 ≤ 0.42	7
> 0.42 ≤ 0.45	8
> 0.45 ≤ 0.48	8
> 0.48 ≤ 0.51	9
> 0.51 ≤ 0.54	9
> 0.54 ≤ 0.57	10
> 0.57 ≤ 0.6	10
> 0.6 ≤ 0.63	11
> 0.63 ≤ 0.66	11
> 0.66 ≤ 0.69	12
> 0.69 ≤ 0.72	12
> 0.72 ≤ 0.75	13
> 0.75 ≤ 0.78	13
> 0.78 ≤ 0.81	14
> 0.81 ≤ 0.84	14
> 0.84 ≤ 0.87	15
> 0.87 ≤ 0.9	15
> 0.90 ≤ 0.93	16
> 0.93 ≤ 0.96	16
> 0.96 ≤ 1.0	17

TIGHTNESS TEST DURATION (TTD) FOR NEW INSTALLATIONS AND EXTENSIONS USING NO PERCEPTIBLE MOVEMENT

END OF UP/1A EDITION 2 AMENDMENTS

IGE/UP/1B Edition 2
COMMUNICATION 1714
2008

The following Amendments (July 2008) apply to all copies of IGEM/UP/1B Edition 2, published in 2006.

A5.2 Result of calculation $PV_t = 0.0363\ m^3$. Delete. Substitute:

$= \quad 0.3693\ m^3$.

END OF UP/1B EDITION 2 AMENDMENTS

IGEM/UP/2 Edition 2
COMMUNICATION 1729
2008

The following Amendments (August 2008) apply to all copies of IGEM/UP/2 Edition 2, published in 2008.

Contents. **Title of Sub-Section 11.2. Delete entirely. Substitute:**

Buildings containing domestic type premises

Title of Sub-Section 11.4. Delete entirely. Substitute:

Materials and jointing

Title of Sub-Section 11.6. Delete entirely.

Sub-Section 1.3 **1st paragraph. Add additional sentence:**

Until IGE/UP/6 is revised, the principles of IGE/UP/6 may be used for such plant of higher discharge pressure.

Sub-Section 1.11 **2nd paragraph. Delete entirely.**

Clause 4.2.2.5 **Delete "MOP". Substitute:**

pressure

Table 2 **2nd column. Delete "40". Substitute:**

75

Table 2 **2nd column. Delete "As appropriate". Substitute:**

Not exceeding 40

Clause 4.2.5.1 **Add to note:**

All components need to be suitable for the testing pressure.

Clause 4.2.9.1 **Delete both bullets and text. Substitute:**

- for a 2nd family gas, a service of 50 mm internal diameter or greater
- for a 3rd family gas, service pipework of 30 mm internal diameter or greater

Clause 5.3.3.2 **Delete "65". Substitute:**

108

Clause 6.4.1.4 **Delete "NB". Substitute:**

diameter

Clause 7.7.2.1 **Delete 3rd and 4th bullets and text. Substitute:**

- for NG, at any offtake of 50 mm internal diameter or greater
- for LPG, at any offtake of 30 mm internal diameter or greater

Clause 7.8.4 **Delete "8.3". Substitute:**

8.6

Clause 7.10.9 **Delete "clause 10.1.2". Substitute:**

Sub-Section 3.16

Table 9 **3rd column. Sub-title. Delete "0.5 bar < MOP ≤ 5 bar". Substitute:**

MOP > 0.5 bar

Table 10 **3rd column. Sub-title. Delete"75 mbar < MOP ≤ 5 bar or ∅ > 63 mm". Substitute:**

MOP > 75 mbar or
∅ > 63 mm

Sub-Section 11.2 **5th Bullet. Delete "clause 3.2.2)". Substitute:**

Sub-Section 3.3)

Sub-Section 11.4 **Delete title. Substitute:**

MATERIALS AND JOINTING

Clause 11.4.2 **Delete entirely (2 paragraphs). Substitute:**

For any riser exceeding 20 m high or exceeding 50 mm diameter, pipework shall be of welded steel construction or CSST of continuous length without a joint.

Table 12 **1st column. Title. Delete entirely. Substitute:**

NB FOR CARBON STEEL AND CSST (OD FOR PE AND COPPER) (mm)

Appendix 1 **After Note 2 to "design pressure", insert:**

diameter	See A1.6.

A1.3 **Delete "nominal diameter". Substitute:**

nominal diameter dependent upon pipework material

Page 83. Insert:

A1.6 **DIAMETERS AND NOMINAL BORES**

diameter
nominal bore (NB)
nominal diameter (∅)
inside (internal) diameter

Pipes and fittings are specified differently dependent upon material, legislation, Standards and specifications, with respect to diameter. The terms used in this Standard equally vary and, for the purposes on this Standard, the following apply:

- "nominal bore (NB)" is the specified inside diameter and may apply to any material
- "inside (internal) diameter" is the actual inside diameter and may apply to any material
- "nominal diameter (∅)" is the specified inside or outside diameter dependent upon the material type. For example, for carbon steel and CSST, nominal diameter is the specified inside diameter whereas, for PE and copper, nominal diameter is the specified outside diameter.
- "diameter" is the actual inside or outside diameter dependent upon the material type, as for nominal diameter.

A2.4 For BS EN 10253. Delete "But". Substitute:

Butt

Table 16. Delete "# = higher flow rates exceed 20 m s^{-1}". Substitute:

Note 1: Materials sizes are shown as nominal diameter (mm).
Note 2: # = higher flow rates exceed 20 m s^{-1}.

A3.3 and A3.4 **Delete entirely. Substitute:**

A3.3 **PRESSURE LOSS DUE TO PIPEWORK FITTINGS AND COMPONENTS**

Allow for pressure loss due to fittings in accordance with the table below, or with manufacturers' information, as appropriate. Refer to manufacturers' information for details of pressure loss due to flexible connections, secondary meters, check valves, regulators, etc. Isolation valves, full bore plug and ball valves normally have negligible pressure loss. Butterfly and other valves may have significant pressure loss – these need to be confirmed with the manufacturer/supplier.

Nominal pipe size (mm)				Equivalent pipe length (m)	
Steel*	**Copper**	**PE**	**CSST**	**High loss fittings**	**Low loss fittings**
25	28	32	28	0.5	0.3
32	35	-	32	0.75	0.4
40	42	55	40	1	0.45
50	54	63	50	1.5	0.65
65	67	-	-	2	0.9
80	76	90	-	2.5	1.2
100	108	125	-	3	1.8
125	-	-	-	3.5	2.1
150	-	180	-	4	2.4
200	-	250	-	5	3
250	-	315	-	6	3.6

Note 1: High loss fittings include 90° elbows, tees and reducing bushes or sockets with more than a single change in pipe size.

Note 2: Low loss fittings include bends, long bends, full bore valves, reducers or sockets with a single change in pipe size, unions, flanged joints and a "straight through" tee.

A3.4 **EFFECT OF ALTITUDE**

Compensation for the effects of altitude should be made for pipes in high rise buildings. Lighter than air gases will show an increase in pressure due to altitude whereas for heavier than air gas the reverse is true. The following formula should be used:

$$h = 0.123\ (1-s)\ H$$

h = pressure change due to altitude (mbar)
H = altitude change (m)
s = density of gas relative to air (dimensionless)

Table 18 **1st column. Sub-Heading. Delete entirely. Substitute:**

Nominal diameter (mm)

Figure 26 **Delete text label to the left of drawing. Substitute:**

For high pressure regulator outlet pressures, fit a low pressure regulator in the by-pass loop

A10 **1st column. Sub-heading. Delete "trior". Substitute:**

prior

A12 **Example 2. Table. Appliance inlet pressure. 2nd row. Delete "12.8 mbar". Substitute:**

12.5 mbar

A13 Pressed fittings. Jointing procedure. Add:

A13.8 It is important to consider that compatibility and instructions are in place before using these fittings and to:

- check that the fittings to be used are specifically designed for use on gas (similar fittings are available for water)
- ensure the fittings are not painted with oil or solvent-based paints.

END OF AMENDMENTS TO IGEM/UP/2

IGE/UP/7 Edition 2
COMMUNICATION 1722
2006

The following Amendments (October 2008) apply to all copies of IGE/UP/7 Edition 2 published in 2006.

Clause 6.1.1 **1st paragraph. Delete "IGE/UP/2". Substitute:**

IGEM/UP/2

Note 3: Delete *"IGE/UP/2"*. Substitute:

IGEM/UP/2

Clause 6.2.2 **2nd paragraph. Delete from 'pipework' to 'specifications' i.e. the end of the Note. Substitute:**

Pipework shall not be installed between joists at intermediate floor levels unless there is sufficient adventitious ventilation available; ventilation shall be provided in accordance with BS 6891 or IGEM/UP/2 Edition 2, as appropriate.

Note: Research has indicated that where gas installation pipework (of diameter not exceeding 35 mm and at OP not exceeding 25 mbar) is installed at intermediate joisted floors in dwellings, there is sufficient adventitious ventilation of the floor construction to safely disperse any minor leakage of gas. Therefore, there is no requirement to install purpose provided ventilation to floors of this construction in timber frame or light steel frame buildings. The results and conclusions of this Report apply to Natural Gas installations only and, therefore, cannot be applied to installations supplied with 3rd family gases.

Section 11 **1st paragraph. 5th line. Delete "BS 6891 or IGE/UP/2, as appropriate". Substitute:**

Clause 6.2.2

A2.3 **4th Bullet. Delete entirely. Substitute:**

- IGEM/UP/2 Edition 2 — Gas installation pipework on industrial and commercial premises

Outer back cover **Delete entry for IGE/UP/2. Substitute:**

IGEM/UP/2 Edition 2	Gas installation pipework on industrial and commercial premises.	2008	1729

END OF UP/7 AMENDMENTS.

IGE/UP/10 Edition 3
COMMUNICATION 1726
2007

The following Amendments (October (2) 2010) apply to all copies of IGE/UP/10 Edition 3, published in 2007, and supersede the Amendments (September 2009) which are now included below.

Front page **Add under the title:**

Incorporating specific requirements for appliances fired by bio-fuels

CONTENTS **Add after APPENDIX 5**

6	Initial design criteria for planning submission of chimney discharge heights for bio-mass appliances	114

CONTENTS **Add FIGURES 36 and 37 at the bottom of the page after FIGURE 35**

36	Variation of external thermal resistance (R'_0) with external diameter (D_0) for exposed vertical chimneys	108
37	Values of factor G_4 from calculated values of factor G_3	109

CONTENTS **Delete original FIGURES 36 and 37. Substitute:**

38	Assessment of termination height of chimney – natural gas appliance	115
39	Assessment of termination height of chimney – bio-mass appliance	116

CONTENTS **Add after SECTION 11**

12	Additional requirements for bio-fuelled appliances	51

Table 5. **Delete title. Substitute:**

MINIMUM SPACING OF HORIZONTAL ROOM SEALED TERMINALS FROM FACING FLAT SURFACES, OPENINGS AND TERMINALS

Clause 2.1 **1st, 4th and 5th bullets. Add:**

(see Note 3 at bottom of page)

(see Note 3 at bottom of page)

(see Note 3 at bottom of page)

Clause 2.3 **Delete 2nd para of the Note. Substitute:**

These Procedures also apply to the installation of bio-fuelled appliances in conjunction with existing or new gas appliances (for more information see clause 5.1.6, Section 12 and Appendix 6).

Clause 2.9 After clause. Add:

Note 3 (to Sub-Section 2.1): For appliances of heat input not exceeding those stated, installed in rooms and compartments, the appropriate British Standard applies. However, where the appliance is located within a heated space such as within a factory or warehouse, clause 7.5.4 or Sub-Section 7.6 applies with respect to alternative ventilation arrangements.

Clause 4.2 After note. Add:

5.1.6(A) Where a bio-fuelled (see clause 12.1) appliance is installed in the same space as a gas appliance, the ventilation provisions for the bio-fuelled appliance (whether gaseous, liquid or solid fuel) shall be in accordance with those in clause 7.2.1.2 or such larger amount as may be specified by the manufacturer. Where a bio-fuelled appliance is installed in the same space as a gas heating appliance, the ventilation provisions shall be at least those specified for a gas heating appliance or such larger amount as may be specified by the manufacturer.

Where a bio-fuelled appliance is installed, a risk assessment shall be performed to consider the hazards of dust accumulation in the vicinity of the appliances in compliance with DSEAR. It is strongly recommended that in all cases where a bio-fuelled appliance is to be installed in conjunction with other heating/process plant and/or as an individual appliance above 50 kW net, the Local Authority (LA) Environmental Health Officer (EHO) is consulted to be made aware of the proposed installation (see LAQM TG(09)).

Clause 5.1.6 Delete entirely. Substitute:

Where an additional appliance is installed in the same area as other fuel-fired plant, or another air-consuming process, a risk assessment shall be made regarding the safety of the location. There shall be adequate provision for combustion air and the correct discharge of products of combustion. See additional text in 5.1.6(A) on previous page.

Clause 6.1.1 Delete "7". Substitute:

5

Clause 6.1.1 Note. Delete entirely.

Clause 7.2 Delete the title of the sub-section entirely. Substitute:

NATURAL VENTILATION – BOILERS, STORAGE WATER HEATERS AND THERMAL FLUID HEATERS

Clause 7.2.1 Delete the title of the sub-section entirely. Substitute:

Open flued appliances in plant rooms

Clause 7.2.1.2 1st para. Delete entirely. Substitute:

For an installation having a total net heat input exceeding 70 kW, the openings shall be as follows (see additional text in 7.2.1.2(A) at bottom of next page):

(a) At low level (inlet): 4 cm^2 per kW total net heat input.

(b) At high level (outlet): 2 cm^2 per kW total net heat input.

Figure 3 **After Figure 3. Add:**

7.2.1.2(A) Where bio-mass or solid fuel appliances are installed, the additional natural ventilation provision for those appliances shall be at least 6 cm^2 per kW total nett heat input low level and 3 cm^2 per kW total nett heat input high level (approximately 8 cm^2 per kW low level and 4 cm^2 per kW high level based on heat output).

Clause 7.3.1 **1st and 2nd para. Delete entirely. Substitute:**

Normally, the quantity of air and extract ventilation for plant of total nett heat input exceeding 70 kW and not exceeding 1.8 MW shall be as given in Table 2. The quantity of air and extract ventilation shall at least be as given in Table 2 or the ventilation flow rate for the specific plant shall be calculated using an appropriate method. Where a bio-fuelled appliance is installed in the same space as a gas appliance, the additional mechanical ventilation provisions for that appliance shall be as per that of a gas fired appliance as detailed in Table 2.

Clause 7.6.1 **Delete entirely. Substitute:**

General

In a building having an air change rate of less than 0.5 air changes per hour and room volume in excess of 1500 m^3, clauses 7.6.2 and 7.6.3, as appropriate shall be applied.

Clause 8.5.2 **Delete entirely. Substitute:**

Chimney pipes and other joints shall be able to contain the combustion gases and any condensate under all operating temperature, pressure and suction conditions. The top of the chimney shall be vented to outside.

Note: See also clause 8.2.1.5, Sub-Section 10.3 and HVCA DW 144. Chimneys attached to fan assisted room sealed appliances will need to be able to withstand the associated higher pressures.

Clause 8.5.3 **Add:**

See also 8.5.3 Note at the bottom of the page.

Clause 8.5.7 **After clause. Add:**

8.5.3 Note *Note: It is recommended that in the duct or space containing the chimney pipes, inspection openings of at least 300 mm x 300 mm for pipes up to 80 mm Nominal Diameter (ND) and 600 mm x 600 mm for pipes above 80 mm ND be fitted.*

Clause 8.7.1.4 **1st para. Add:**

For a room sealed or balanced flue appliance, see also clause 8.7.3.

Clause 8.7.3.2 **1st para. Delete entirely. Substitute:**

The position of the termination of any chimney shall be such as not to affect adversely the operation of any adjacent chimney or air inlet system.

Clause 8.7.3.2 **2nd para. Delete entirely. Substitute:**

The minimum horizontal spacing between balanced or room sealed flue terminals and nearby combustion air inlets for other appliances shall be 1000 mm for natural draught and 600 mm for forced draught flues. The manufacturers should be consulted whether a larger spacing is required.

Clause 8.7.3.2 **Note. Delete entirely. Substitute:**

Note: Groups of appliances of total 150 kW gross heat input or more, need to comply with the Clean Air Act with respect to discharges at high level.

Clause 8.7.3.3 **Delete entirely. Substitute:**

Any terminal shall be located such that combustion products cannot re-enter the building, for example through a door, window or air inlet vent. The minimum spacing from openings for horizontal and vertical terminals shall be as given in Table 4

Wall terminations shall be in a horizontal direction (to aid good dispersion). Termination at roof level shall be in a vertical direction and the termination heights shall comply with clauses 8.7.1 and 8.7.2.

Note: Vertical flue terminations on the face of a wall are not recommended.

Where more than one appliance flue terminates vertically on the face of a wall, they shall be at least 1 m apart.

Table 4 **Delete 3rd column. Substitute:**

FANNED HORIZONTAL	**FANNED VERTICAL**
0.6 m	2.0 m
0.6 m	1.0 m
0.6 m	1.0 m

Clause 8.7.3.4 **1st para. Delete entirely. Substitute:**

Where a horizontal terminal faces a flat wall surface or is opposite another terminal or opening, the minimum spacing from the terminal should be as given in Table 5.

Table 5 **Delete Table and title entirely. Substitute:**

TERMINAL SITED FACING	NATURAL DRAUGHT	FORCED DRAUGHT
A flat surface	1.0 m	1.0 m
Another terminal	1.0 m	2.0 m
Another opening	2.0 m	3.0 m

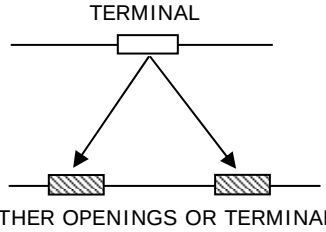


TABLE 5 - MINIMUM SPACING OF HORIZONTAL ROOM SEALED APPLIANCE TERMINALS FROM FACING FLAT SURFACES, OPENINGS AND TERMINALS

Clause 8.7.5.13 **Delete "$75F_G$ ms^{-1}". Substitute:**

$75/F_G$ m s^{-1}

Clause 8.9.2 **Delete entirely. Substitute:**

The differing proportions of excess air from the use of solid and oil fuels may lead to problems of condensation, chimney corrosion and acid smutting. In such cases, specialist advice shall be sought in the construction of the chimney system and the need for any chimney lining. It shall be verified that the chimney system can be operated safely on dissimilar fuels. See additional text in 8.9.2(A) on page 44.

Clause 8.12 **After Clause. Add:**

8.9.2(A) The differing proportions of excess air from the use of bio-fuel may lead to problems of condensation, chimney corrosion and acid smutting. In such cases, specialist advice shall be sought in the construction of the chimney system and the need for any chimney lining. Gas fired appliances shall not share the same flue as any bio-mass (solid fuel) appliance.

A gas fired appliances may in certain instances share the same flue with bio-liquid appliances where the burner type is specifically designed to be a "dual fuel burner" but only one type of fuel is to be used at any one time to fire into the system.

Bio-gas and bio-liquid fuel appliances must comply with 3rd Edition of the Chimney Heights Memorandum of the Clean Air Act in the same manner as gas fired appliances.

Clause 10.3 **1st para. Delete entirely. Substitute:**

Appliances and associated systems shall be commissioned by persons who are competent to perform such work. Due account should be taken of the manufacturer's instructions. Combustion analysis shall consider the actual levels of excess air (oxygen), carbon monoxide and exhaust flue gas temperature (see Figure 28). Chimney systems shall be commissioned in accordance with the manufacturer's instructions taking due account of their design usage, maximum system heat input and in accordance with HVCA DW 144 Class C or DIN 24194, as appropriate. Every appliance shall be operational to verify the effectiveness of the ventilation and flue system under maximum conditions.

Clause 11.1.2 **1st and 2nd para. Delete entirely. Substitute:**

Maintenance schedules shall include, among other items, a check on the gas tightness and correct operation of the burner safety shut-off valve system, valve proving system, any flame detection system, appliance safety circuits and any alarm trip system. At all times, the safety integrity shall be maintained. Advice on maintenance should be obtained from the manufacturer or supplier. Schedules should also include the verification of the fan flow rates of mechanical ventilation and fan diluted flue systems. See additional text in clause 11.1.2(A) on page 50.

Clause 11.1.3 **Add:**

See also clause 11.1.4 at the bottom of the page.

Clause **Add to the bottom of page 48:**

11.1.4 Appliances and associated systems shall be re-commissioned by competent persons who shall take account of the manufacturer's instructions. Combustion analysis shall consider the actual levels of excess air (oxygen), carbon monoxide and exhaust flue gas temperature. See Figure 28 for comparative oxygen and CO_2 figures.

Clause 11.2.6 **After Clause. Add:**

11.1.2(A) Where bio-fuelled appliances share the same space as gas fired appliances, due care shall be taken to remove combustible dusts. Such dusts may lead to dust explosions. A risk assessment must be prepared and kept up to date by the site occupier to consider the risks of dust explosions in compliance with DSEAR. Additional maintenance may also be required to ensure the cleanliness of combustion air supply systems.

Section 12 Add new page after page 50

SECTION 12: ADDITIONAL REQUIREMENTS FOR BIO-FUELLED APPLIANCES

12.1 INTRODUCTION

Due to the unique nature of the wide range of bio-fuels:

- Bio-gas - gaseous
- Bio-mass - Wood Pellet, Wood chip or logs
- Bio-liquid - various oils or a mixture of oils;

it is vital to provide the full range of the fuel characteristics to all equipment suppliers and installers during the design and specification stages of a project.

Bio-fuels and their combustion products may contain acidic aqueous fluids and condensates in addition to solid materials and sticky deposits such as 'gums'.

These materials may lead to internal failure of controls, meters, valves, pumps, boosters, pipework, burners and internal parts of engines, as well as chimney flueways.

With some Bio-gases (such as landfill) the SG (density) can be greater than 0.8 so that any leak will tend to fall, which can affect ventilation requirements and gas detector positioning (see Sub-Section 7.2.1)

Bio-gas is typically un-odourised and there can be an additional safety issue in that gas leaks may not be detected by smell. Personnel or contractors working on site should be made aware of the dangers.

Gasifier based bio-gas/bio-mass may not be methane based and may contain a high CO content. A risk assessment needs to be carried out where CO is a major gas constituent, as leakage may not be apparent by smell.

Note: The application of bio-mass and solid fuelled plant may be such that it has to operate under base load conditions rather than following demand as is normal with gas and oil fired boiler plant. This is because it is unable to reduce/increase load as quickly as with gas and oil fired systems and at the same time they may not have the turndown capability of modern gas and oil plant. As such it may be important to operate non-bio-mass plant in parallel as part of load demand matching in order to maintain system efficiency. There may also be safety implications with large turndown solid fuelled plant as the restriction of air flow is one method of controlling the 'fire'. This may in turn lead to un-burnt combustible gases entering the flueways with the potential for flue explosions.

For this reason gas fired appliance combustion products ought never to be run or allowed to discharge into the same flue as bio-mass or solid fuelled appliances.

12.2 DESIGN SAFETY

Wherever a bio-mass appliance is installed, a risk assessment shall be performed to consider the hazards of dust accumulation in the vicinity of the appliances in compliance with DSEAR. In all cases where a bio-mass appliance is to be installed in conjunction with other heating/process plant and or as an individual appliance, regardless of output, the LA planning office should be contacted to be made aware of the proposed installation.

12.3 NATURAL VENTILATION

Where a bio-mass appliance is installed in the same space as a gas appliance, the additional natural ventilation provisions for the biomass fuelled appliance shall be at least 6 cm^2 per kW heat input low level and 3 cm^2 per kW heat input high level (approximately 8 cm^2 per kW low level and 4 cm^2 per kW high level based on heat output).

12.4 MECHANICAL VENTILATION

Where a bio-mass appliance is installed in the same space as a gas appliance, the additional mechanical ventilation provisions for the bio-mass fuelled appliance shall be as per that of a gas fired appliance as detailed in Clause 7.3 Table 2.

12.5 TERMINATION HEIGHTS

The Clean Air Act 3rd Edition of the Chimney Heights Memorandum may not be totally relevant or appropriate for accessing a flue discharge height for submission to the LA for approval. If the discharge contains particulates (PM10, PM2.5) and/or high levels of Nitrous Oxides (NO_x) then the Memorandum would not be appropriate. It is advisable in all proposed bio-fuel installations to consult at an early stage with the LA's EHO to obtain guidance.

The determination of the discharge height for a gas fired appliance where installed with bio-fuel fired appliances should be performed separately using the Clean Air Act Chimney Heights Memorandum procedure (CAAM). If the gas fired boiler discharge is separated by a distance of 5U (CAAM procedure) from the bio-fuel fired boiler discharge then the chimneys can be treated as separate discharges with different discharge heights. However if the gas fired appliance discharge is within that 5U distance (CAAM procedure) then both discharges should terminate at the worst case height.

The procedure given in Appendix 6 should also be used for the determination of the chimney height for the submission of an application to the LA EHO for approval of the discharge height for bio-mass appliances.

Appendix 6 Add new page after page 113

APPENDIX 6 : INITIAL DESIGN CRITERIA FOR PLANNING SUBMISSION OF CHIMNEY DISCHARGE HEIGHTS FOR BIO-MASS APPLIANCES

A6.1 ASSESSMENT OF TERMINATION HEIGHT OF CHIMNEY

To design generally in accordance with Local Air Quality Management, Technical Guidance LAQM.TG(09) estimate the discharge height in the first instance using the following procedure:

(i) Up to 1 MW input the termination height to be at least 2 m above the roof penetration or adjacent roof parapet/ridge with a minimum discharge velocity of 4 m sec^{-1}. Above 1 MW input the termination height to be at least 3 m above the highest point of the building.

In addition, there is to be an overriding minimum height of 3 m above the top of any adjacent opening windows, mechanical or natural ventilation terminal air intakes or an area where there may be general access.

If the highest part of any adjacent building is within a distance of 5 x the total discharge height of the new chimney above ground level, increase the discharge height of the new chimney to 2 m above the adjacent building, or 3 m above the top of any adjacent opening windows, mechanical or natural ventilation terminal air intakes or an area where there may be general access. Whichever is the greater.

(ii) The chimney exit velocity to be increased above the minimum value of 4 m sec^{-1} to as high a value as possible up to a maximum of 10 m sec^{-1}, ensuring that the draught requirements of the relevant appliance manufacturer are achieved. If a reduced diameter exit cone is to be fitted it ought not create an initial start up resistance greater than 20 Pascals.

(iii) In all cases the proposed discharge height must be submitted to the LA for approval as required by Part IV of the Environment Act 1995, Environment Order 2002 Part III, Local Air Quality Management, Technical Guidance LAQM. TG(09).

(iv) It may be possible in some cases through consultations with the LA EHO to reduce the above chimney height, conversely in some cases, particularly in sensitive Air Quality Managed Areas the LA may require an increase in the proposed height. The relevant LA may require dispersion modelling to be carried out to confirm the final discharge height.

Important note- A high efflux velocity will greatly assist the dispersion modelling exercise and possibly reduce the final determined chimney discharge height.

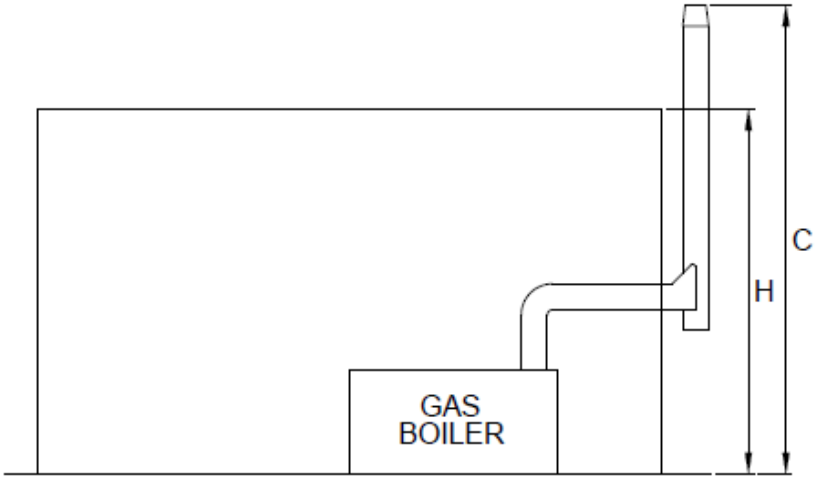
A6.2 PROXIMITY INFLUENCES OF NEARBY STRUCTURES

The determination of the discharge height for a gas fired appliance where installed with a bio-mass fired appliance is to be performed separately using the Clean Air Act Chimney Heights Memorandum procedure (CAAM). If the gas fired boiler discharge is separated by a distance of 5U (CAAM procedure) from the bio-mass fired boiler discharge then the chimneys can be treated as separate discharges with different discharge heights. However if the gas fired appliance discharge is within that 5U distance (CAAM procedure) then both discharges are to terminate at the worst case height.

A6.3 **IMPORTANT DESIGN CRITERIA**

- Under no circumstances is a bio-mass fired appliance be incorporated into a gas/oil fired flue system
- All bio-mass fired appliances are to incorporate an explosion relief type draught stabiliser in accordance with the appliance manufacturer's requirements
- Due to the exhaust product carry-over particularly with wood chip or pellet fired appliances, cleaning access is to be incorporated within the flueway at every change of direction or a minimum of every 10 metres depending on site conditions.

A6.4 **EXAMPLES**



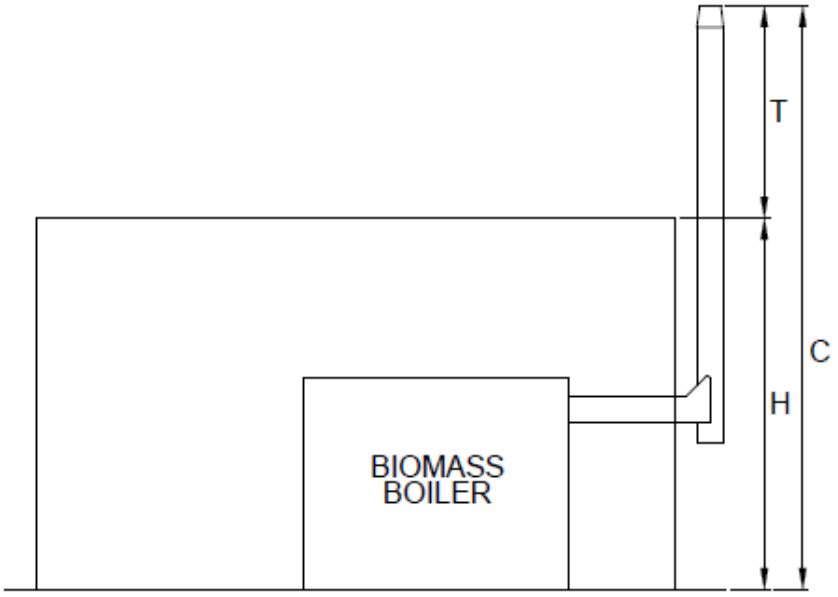
(i) Natural Gas appliance

Uncorrected Chimney Height (U) = 'Clean Air Act Memorandum' calculation with respect to gross heat input.
Radius of consideration for adjacent buildings = 5 x U
Corrected Chimney Height (C) = 0.6 x U above any structure within a radius of 5U, where there are no other buildings within range, but is to be no less than 1.0 m above the highest structure.
With respect to `Clean Air Act Memorandum', Section 25a the chimney is to terminate 3.0 m above any area of general access or openings into the building, within radius, which include openable windows and air inlets etc.

For example:

Uncorrected Chimney Height (U) for a gas fired gross input of 500 kW = 0.9 m
Therefore 5U radius = 5 x 0.9 = 4.5 m
Assuming a single building within this radius of H= 4.0 m then the Corrected Chimney Height (C) = 4.0 + (0.6 x 0.9) = 4.54 m
This is less than the minimum 1.0 m required above the roof, therefore C is adjusted to 5.0 m

FIGURE 38 – ASSESSMENT OF TERMINATION HEIGHT OF CHIMNEY – NATURAL GAS APPLIANCE



(ii) Bio-mass appliance

Uncorrected Chimney Height (U) = H + T
Where T is 2.0 m <= 1.0 MW < 3.0 m
Radius of Consideration = 5 x U
Corrected Chimney Height (C) = T above any structure within a radius of 5U
With respect to 'Clean Air Act Memorandum', Section 25.a. the chimney is to terminate 3.0 m above any area of general access or openings into the building, within radius, which include openable windows and air inlets etc.

For example:

Uncorrected Chimney Height (U) for 500 kW gross input of the appliance = H + 2.0
Building Height (H) = 4.0 m so U = 6.0 m
Therefore 5U radius = 5 x 6 = 30.0 m
Assuming that there is another building within this radius, with a height H = 8.0 m
Then C is increased to 8.0 + 2.0 = 10.0 m

FIGURE 39 – ASSESSMENT OF TERMINATION HEIGHT OF CHIMNEY – BIO-MASS APPLIANCE

END OF AMENDMENTS TO IGE/UP/10 Edition 3.

IGE/UP/12
COMMUNICATION 1713
2006

The following Amendments (May 2009) apply to all copies of IGE/UP/12, published in 2006.

A8.5.6.1(a) 2nd para Delete equation. Substitute:

$X = 270V^{\frac{1}{3}}$ (mm) (see Figure 12).

Figure 12 Delete entirely. Substitute.