

TIGHTNESS TESTING NATURAL GAS INSTALLATIONS WITH A MAXIMUM INSTALLATION VOLUME OF 0.035 m³

TO CALCULATE THE total volume of an installation, use the following formula:

$$IV_t = IV_m + IV_p + IV_f$$

To ascertain the volume of the meter (IV_m) see Table 2 overleaf

To ascertain the volume of pipework (IV_p) see Table 1 overleaf

To ascertain the volume of fittings (IV_f) multiply IV_p by 0.1 (10 %)

Example

G4 meter and 9 metres of 15 mm copper

$$IV_m = 0.008 \text{ m}^3$$

$$IV_p = 9 \times 0.00014 = 0.00126 \text{ m}^3$$

$$IV_f = 9 \times 0.00014 \times 0.1 = 0.000126 \text{ m}^3$$

$$IV_t = 0.008 + 0.00126 + 0.000126 = \mathbf{0.009386 \text{ m}^3}$$

Tightness testing summary (supply pressure not exceeding 75 mbar - low pressure)

- a) Let-by test pressure of isolation valve between 7 and 10 mbar.
 - ❖ Let-by test duration 1 minute – no perceptible movement (rise) of gauge permitted.
- b) Tightness test pressure between 20 and 21 mbar.
 - ❖ 1 minute pressure and temperature stabilisation (may require longer for a stable reading to be achieved).
 - ❖ 2 minute tightness test (where necessary adjust pressure to between 20 and 21 mbar before commencing test).
 - » New installation (with or without appliance connected) and existing installations with no appliances connected – no perceptible movement (fall) of gauge permitted.
 - » Existing installations with appliances connected – see Table 4 overleaf for permissible drop with **NO smell of gas**.

Purging

Use Table 3 overleaf to calculate the purge volume.

If the installation volume exceeds 0.02 m³ then at the relevant purge point the purge mixture shall be ignited as soon as possible at an open burner by continually attempting ignition throughout the purge process. This may require the installation of a temporary burner at the purge point to facilitate this.

Further information can be found in IGEM/UP/1B Edition 3

Table 1. IV of pipe (IV_p)

(mm)	(Inch)	Volume of 1 m of pipe (m^3)
Steel/Stainless Steel		
15	1/2	0.00024
20	3/4	0.00046
25	1	0.00064
32	1 1/4	0.0011
Copper		
15	NA	0.00014
22	NA	0.00032
28	NA	0.00054
35	NA	0.00084
PE (SDR 11)		
20	NA	0.00019
25	NA	0.00033
32	NA	0.00053

Note: The volume of fittings is normally taken as 10 % of the IV_p

Table 2. IV of meters (IV_m)

Meter designation	IV_m (m^3)
G4/U6	0.008
E6	0.0024
U16	0.025

Table 3. Purge volume (PV)

Meter and pipework diameter	PV
E6, G4 or U6 meter with pipework ≤ 28 mm	0.01 m^3 (0.35 ft^3)
E6, G4, U6 or G10 meter with pipework > 28 mm ≤ 35 mm	1.5 x IV_t

> Greater than \leq Less than or equal to \geq Greater than or equal to

Table 4. Existing domestic installations maximum allowable pressure drop with appliances connected and NO SMELL of gas

Meter	Pipework ≤ 28 mm (mbar)	Pipework ≥ 28 mm ≤ 35 mm (mbar)
E6 or meter fitted	8	4
U6/G4	4	2.5
U16/G10	1	1

Note: Perceptible movement on a water gauge is 0.25 mbar. Perceptible movement on an electronic gauge is 0.25 mbar, unless the gauge only reads to one decimal place, in which case no perceptible movement will be 0.2 mbar.

