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Air Supply, Ventilation and Flue Terminal Positioning Quick Reference Guide for; BS 6644:2011, IGE/UP/10 (ed4) 2014 & BS 5440-1:2008, BS 5440-2:2009,

BS6644:2011 Specification for the Installation of gas-fired hot water boilers of rated inputs between 70 kW (net) and 1.8 MW (net) (2nd and 3rd family gases) & IGE/UP/10 2014 Edition 4 Installation of Gas Appliances in Industrial and Commercial Premises

For BS 6644 and IGE UP 10 Installations the ventilation openings might need to be increased if the following air temperatures are exceeded. (@15℃ Ambient)

High-Level (100mm Below Ceiling Level)	40℃
Mid-level (1500mm Flow Floor Level)	32℃
Low-Level (100mm Above Floor Level)	25℃

As a guide, reduction of air temperature may be achieved by increasing the inlet and outlet air supply by 0.15 m^3/h or 0.2 cm^2/kW of net heat input per ^0C of temperature reduction required.

Open Flued Appliances Installed within an Enclosure

(Natural ventilation requirements direct to Outside Air)

System Type / Grille Location 600m from any obstruction	Heating &/or HWS Operation < 50% during summer months	Heating &/or HWS Operation > 50% < 75% during summer months	Heating &/or HWS Operation > 75% during summer months
High Level (Free Area/kW)	5 cm^2	6 cm^2	7 cm^2
Low Level (Free Area/kW)	10 cm^2	11 cm^2	12cm^2

Room Sealed Appliances Installed within an Enclosure

(Natural ventilation requirements direct to Outside Air)

System Type / Grille Location 600m from any obstruction	Heating &/or HWS Operation < 50% during summer months	Heating &/or HWS Operation > 50% < 75% during summer months	Heating &/or HWS Operation > 75% during summer months
High Level (Free Area/kW)	5 cm^2	6 cm^2	7 cm^2
Low Level (Free Area/kW)	5 cm^2	6 cm^2	7 cm^2

Room Sealed Appliances Installed within an Enclosure

(Natural ventilation requirements Via an internal Space)

System Type / Grille Location 600m from any obstruction	Heating &/or HWS Operation < 50% during summer months	Heating &/or HWS Operation > 50% < 75% during summer months	Heating &/or HWS Operation > 75% during summer months
High Level (Free Area/kW)	10 cm^2	11cm^2	12 cm^2
Low Level (Free Area/kW)	10 cm^2	11cm^2	12 cm^2

Room Sealed Appliances Installed within a Boiler Room / Heated Space

(Natural ventilation requirements direct to Outside Air.)

System Type / Grille Location (600m from any obstruction)	Heating &/or HWS Operation < 50% during summer months	Heating &/or HWS Operation > 50% < 75% during summer months	Heating &/or HWS Operation > 75% during summer months
High Level (Free Area/kW)	2 cm^2	3 cm^2	4 cm^2
Low Level (Free Area/kW)	2 cm^2	3 cm^2	4 cm^2

Max Operating Pressure < 100mbar, Room Air Change Rate >0.5/hour = No Additional Ventilation. If the air change rate is less than 0.5/hour them the following must be applied.

Open Flued Appliances Installed within a Boiler Room

(Natural ventilation requirements direct to Outside Air)

System Type / Grille Location (600m from any obstruction)	Heating &/or HWS Operation < 50% during summer months (Biomass/Solid Fuel Boiler Additional Free Area In/Out)	Heating &/or HWS Operation > 50% < 75% during summer months (Biomass/Solid Fuel Boiler Additional Free Area In/Out)	Heating &/or HWS Operation > 75% during summer months (Biomass/Solid Fuel Boiler Additional Free Area In/Out)
High Level (Free Area/kW)	2 cm^2 (3/4 cm^2)	3 cm^2 (4/5.4cm^2)	4 cm^2 (5/6.7 cm^2)
Low Level (Free Area/kW)	4 cm^2 (6/8 cm^2)	5 cm^2 (7/9.4cm^2)	6 cm^2 (8/10.7 cm^2)

1. For lighter than air gases where high and low level ventilation is not practicable and the volume of the space is equal to or greater than 1m^3 per 2kW total net input, it is permitted to install 6cm^2 per kW of total ventilation at high level only provided more than one ventilator is fitted. This is not permitted for heavier than air gasses.
2. For lighter than air gases where the plant room does not exceed 1m^3 per 2kW total net heat input, ducting of ventilation air to low level without mechanical assistance is not recommended.

Open Flued Appliances Installed within a Balanced Compartment

(Natural ventilation requirements direct to Outside Air)

System Type / Grille Location (600m from any obstruction)	Heating &/or HWS Operation (If room sealed appliances are installed within the balanced compartment 50% of their/its total net heat input must be added to the Open Flued appliances total heat input.)
High Level (Free Area)	10 cm^2 <500kW + 8 cm^2 / kW above 500kW (Duct to be sub-divided entire length for separation of air supply and extract.)
Low Level	Only required when heavier than air gas is used. Minimum 60cm^2 Direct to Outside

Open Flued Appliances. Modern low radiation losses and low excess air burners

(Mechanical ventilation flow rate requirements direct to Outside Air)

Appliances with draught diverters

System Type / Grille Location (600m from any obstruction)	Heating &/or HWS Operation < 50% time during summer months	Heating &/or HWS Operation >50% < 75% time during summer months	Heating &/or HWS Operation > 75% during summer months
High Level Extract (Difference Between Inlet and Extract Air)	2.07 +/- 0.18 (m^3/h/kW)	2.07 +/- 0.18 (m^3/h/kW)	2.07 +/- 0.18 (m^3/h/kW)
Low Level Inlet	2.8 (m^3/h/kW)	3.52 (m^3/h/kW)	4.24 (m^3/h/kW)

Appliances without draught diverters with or without draught stabilisers

System Type / Grille Location (600m from any obstruction)	Heating &/or HWS Operation < 50% time during summer months	Heating &/or HWS Operation >50% < 75% time during summer months	Heating &/or HWS Operation > 75% during summer months
High Level Extract (Difference Between Inlet and Extract Air)	1.35 +/- 0.18 (m^3/h/kW)	1.35 +/- 0.18 (m^3/h/kW)	1.35 +/- 0.18 (m^3/h/kW)
Low Level Inlet	2.6 (m^3/h/kW)	3.32 (m^3/h/kW)	4.04 (m^3/h/kW)

Where high level/discharge openings are not mechanically assisted, the free area must be calculated at 2 cm^2/kW net input.
All air inlet and extract fans must be fitted with automatic controls (interlocks) causing safety shut-down or lockout of the installed gas burning appliances in the event of an inlet or extract air flow failure.
Document Intended for quick guidance only. Absolute guidance must be sought from BS6644 & IGE/UP/10 Edition 4 directly.

BS5440-2:2009. Installation and maintenance of flue and ventilation for gas appliances of rated input not exceeding 70 kW net (1st 2nd & 3rd family gases)

Open Flued Appliances Installed within a Room
(Natural ventilation requirements direct to Outside Air)

Total rated net input not in excess of (70 kW – 7 kW) x 5cm² = Ventilation opening free area

Open Flued Appliances Installed within an enclosure
(Natural ventilation requirements)

Ventilation route / Grille Location	Ventilation to room or internal space (The internal space ventilated into must be ventilated as detailed above to outside air)	Ventilation direct to outside air
High Level (Free Area/kW)	10 cm²	5 cm²
Low Level (Free Area/kW)	20 cm²	10 cm²

Balanced Flued Appliances Installed within an Enclosure
(Natural ventilation requirements)

Ventilation route / Grille Location	Ventilation to room or internal space	Ventilation direct to outside air
High Level (Free Area/kW)	10 cm²	5 cm²
Low Level (Free Area/kW)	10 cm²	5 cm²

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Note

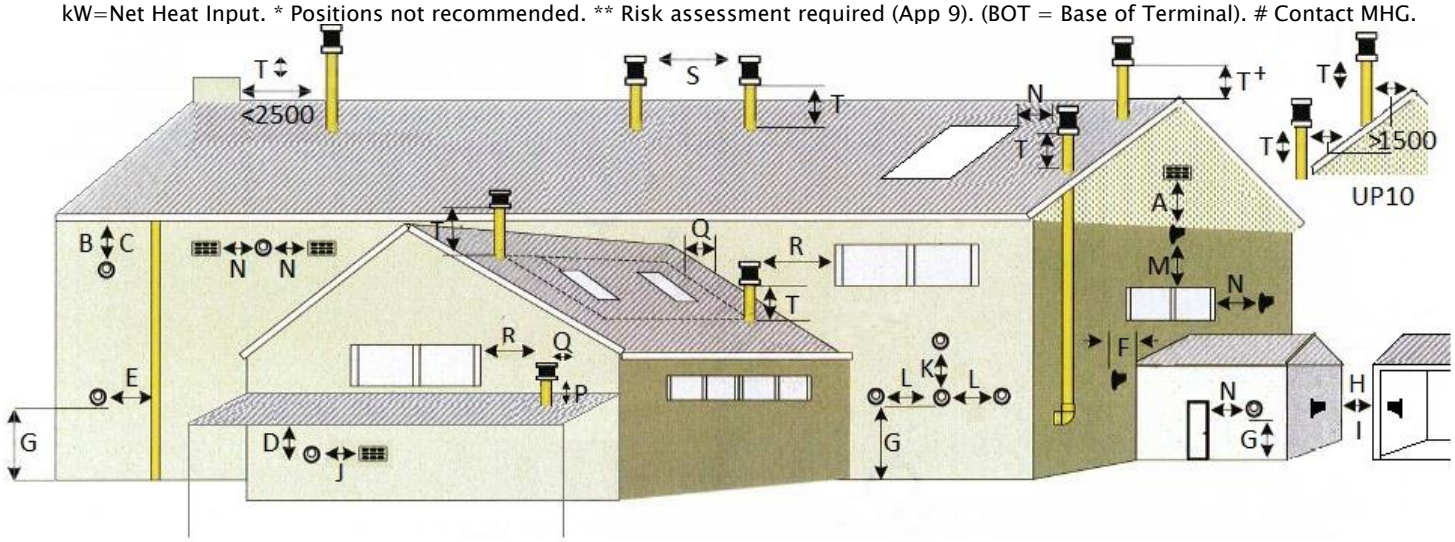
Flue Terminal Positions For Boilers Below and Above 70kW Net Input

BS5440-1:2008 (Fanned Draught), BS6644:2011& IGE UP 10 Ed4 2014

All measurements are in mm, are minimum clearances and relate to MHG products only.

Terminal Location		BS5440 Boilers with a rated Input <70kW Net	IGE-UP-10 Boilers Input >70kW <333kW Net Fan Draught Balanced Flue X	IGE-UP-10 Boilers Input >70kW <333kW Net Fan Draught & Open Flued V	IGE-UP-10 Boilers Input >70kW <333kW Net Nat Draught Balanced Flue W
A	Directly below an opening into the building	300	2500	2500	2500
B	Below gutter soil pipes etc.	75	200	200	300
C	Below Eaves	200	200	200	300
D	Below balconies or car port roof	200*	Not Recommended**	Not Recommended**	Not Recommended**
E	From vertical drain or soil pipe etc.	150	150	150	150
F	From internal or external corners	300	If <2500 use Plume Ext	If <2500 use P/T below#	Not Recommended**
G	Above ground or balcony level	300	If <3000 use Plume Ext	If <3000 use Plume Ext	Not Recommended**
H	From a surface facing the terminal	600	23.126 x (kW) + 618.84	23.126 x (kW) + 618.84	Not Recommended**
I	From a terminal facing the terminal#	1200	19.32 x (kW) + 647.59	19.32 x (kW) + 647.59#	Not Recommended**
J	From opening in a carport into a dwelling	1200*	Not Recommended**	Not Recommended**	Not Recommended**
K	Vertically from a terminal on the same wall#	1500	2500	2500#	2500
L	Horizontally from a terminal on the same wall	300	7.232 x (kW) + 93.708	9.5156 x (kW) + 833.91	1.9031 x (kW) + 1866.8
M	Above an opening into the building	300	7.232 x (kW) + 93.708	9.5156 x (kW) + 833.91	1.9031 x (kW) + 1866.8
N	Horizontally to an opening into the building	300*	7.232 x (kW) + 93.708	9.5156 x (kW) + 833.91	1.9031 x (kW) + 1866.8
P	Above a flat roof (Obstacle> 2500) From Roof Level	300	4.5675 x (kW) -19.723	4.5675 x (kW) -19.723	3.4256 x (kW) + 360.21
P+	Above a flat roof (Obstacle<2500) From Obstacle Level	300	4.5675 x (kW) -19.723	4.5675 x (kW) -19.723	3.4256 x (kW) + 360.21
Q	From an adjacent wall (edge of terminal)	300	If <2500 use Plume Ext	If <2500 use Plume Ext#	Not Recommended**
R	To an opening into the building	1000	7.232 x (kW) + 93.708	9.5156 x (kW) + 833.91	1.9031 x (kW) + 1866.8
S	From any other flue terminal#	300	7.232 x (kW) + 93.708	9.5156 x (kW) + 833.91#	1.9031 x (kW) + 1866.8
T	Above a >20⁰ Pitched Roof (BOT)	300	4.5675 x (kW) -19.723	4.5675 x (kW) -19.723	3.4256 x (kW) + 360.21
T+	Above a >20⁰ Pitched Roof (BOT) (Valley)	300	4.5675 x (kW) -19.723	4.5675 x (kW) -19.723	3.4256 x (kW) + 360.21

kW=Net Heat Input. * Positions not recommended. ** Risk assessment required (App 9). (BOT = Base of Terminal). # Contact MHG.



Horizontal Terminals Shall Not Be Located: Discharging into any road, track, thoroughfare, walkway or property boundary, to any play area/playing field, seating area or area where public gatherings take place. Where a surface or building element that may be adversely affected from plume condensates. Where vehicles may be parked unless separated by at least 1800mm. Areas that may affect the dispersion of products of combustion, foliage, shrubs, trees, canopies, roof structures, nearby structures, or any locations with unfavourable wind conditions.

Groups of appliances of (333kW net input) and above must comply with the Clean Air Act with respect to the chimney discharge height.

Where a chimney is used, the chimney height, rounded up to the nearest meter, shall give a termination position at least 3m above the level of any adjacent area to which there is general access, for example ground level, roof areas or adjacent openable windows. The chimney height shall not be less than the height of any building within a distance of 5 x the uncorrected chimney height (U) for appliances above 134kW net heat input. $U = 1.496\ [Qx1.1]^{0.6}$ where Q = Net Heat Input MW

The terminal/s shall be guarded if it is less than 2000mm above the ground or in any position where it may cause injury to persons resulting from touching a hot surface

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