CPM-SP Boiler range
Flue Guide

Models covered:
CPM-SP 116

Lochinvar®

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Document Control

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GENERAL

Lochinvar CPM Boilers are certified for use on the following flue categories:

Installation type	Category	Description
B23	Open flue	An appliance intended to be connected to a flue that evacuates the products of combustion to the outside of the room containing the appliance. The combustion air is drawn directly from the room.
C13	Closed Flue	An appliance connected to either a concentric or twin-pipe flue system with a Horizontal flue terminal. Both the air inlet and flue exhaust must be in the same pressure zone.
C33	Closed Flue	An appliance connected to either a concentric or twin-pipe flue system with a Vertical flue terminal. Both the air inlet and flue exhaust must be in the same pressure zone.
C43	Closed Flue	An appliance connected to a common air inlet and flue exhaust system, which is designed for more than one appliance. This common system has a single air inlet and flue exhaust and is part of the building not the appliance.
C53	Closed Flue	An appliance connected to a twin-pipe flue system with a Horizontal or Vertical flue terminal. Both air inlet and flue exhaust may be in different pressure zones.
C63	Closed Flue	An appliance intended to be connected to a separately approved and marketed system for the supply of combustion air and discharge of combustion products (i.e. other than that supplied by the water heater manufacturer).
C83	Closed Flue	An appliance connected via one of its ducts to a single or common duct system. This duct system consists of a single natural draught duct (i.e. not incorporating a fan) that evacuates the products of combustion. The appliance is connected via a second of its ducts to a terminal, which supplies air to the appliance from outside the building.

All installations should comply with the requirements of:

1. For appliances up to 70kW net input- BS5440-1:2008- Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases). Specification for installation of gas appliances to chimneys and for maintenance of chimneys.
    a. Refer to drawing 1 and table 1 for details of terminal locations.
2. For appliances over 70kW net input- IGEM/UP/10 Edition 4 +A: 2016 - Installation of flued gas appliances in industrial and commercial premises, specific attention should be paid to the following sections.
    a. Refer to drawing 1 and table 1 for details of terminal locations.
    b. Horizontal terminations shall be located according to the minimum distances given in table 1, and subject to the risk assessment criteria shown in table 2.
    c. Horizontal flue terminations (other than for fan dilution systems) must not be installed for any single appliance or group of appliances with a total nett input exceeding 333kW net heat input.
    d. For any single appliance or group of appliances with a total net heat input exceeding 333 kW, the general requirements of IGEM/UP/10 Edition 4 +A: 2016 shall apply and approval must be sought from the Local Authority prior to commencement of the installation.
3. The Clean Air Act for installations exceeding 333kW nett input.

DRAWING 1 BOILER TERMINAL LOCATIONS

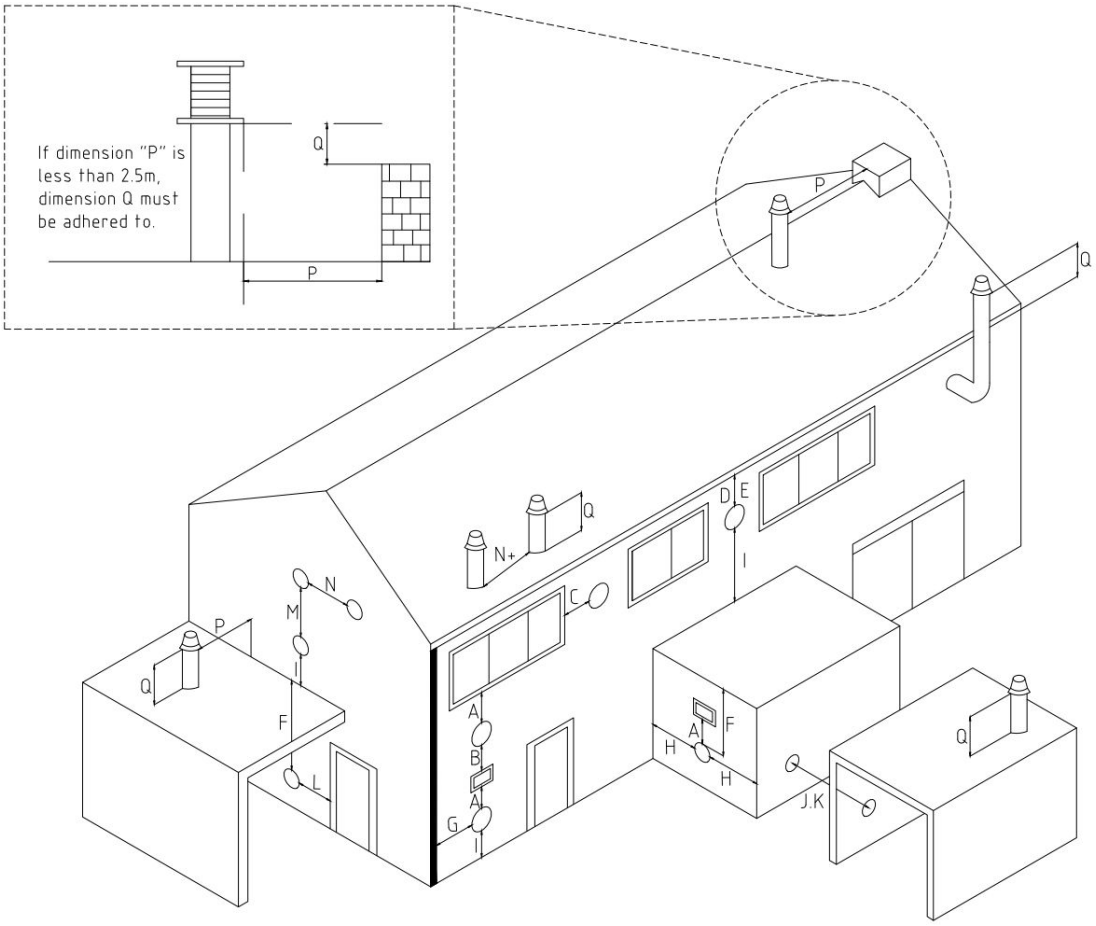


TABLE 1 BOILER TERMINAL LOCATIONS

Location	Description		CPM-SP 116
A	Directly below an opening, air brick, opening windows etc.#	mm	2500
B	Above an opening, air brick, opening windows etc.	mm	896
C	Horizontally to an opening, air brick, opening windows etc.#	mm	896
D	Below a gutter or sanitary pipework	mm	200
E	Below the eaves	mm	200
F	Below a balcony or car port roof	mm	Not reccomended see UP10 risk assesment
G	From a vertical drain or soil pipe	mm	150
H	From an internal or external corner	mm	1948
I	Above ground, roof or balcony level	mm	300
J	From a surface facing the terminal	mm	1948
K	From a terminal facing the terminal	mm	2792
L	From an opening in the car port (e.g. door, window) into the dwelling	mm	Not reccomended see UP10 risk assesment
M	Vertically from a terminal on the same wall	mm	2500
N	Horizontally from a terminal on the same wall*	mm	900
N+	Vertically from a terminal on the same roof	mm	900
P	From a vertical structure on the roof	mm	1500
Q	Above intersection with the roof	mm	409

*distances shown ensure the boilers will operate without problems under most conditions, these distances can be reduced in certain circumstances contact Lochinvar Technical support for assistance if required.

**multiple boiler installation of model CPM175 are covered by the clean air act and must comply with its requirements

see UP10 figure 7 for full clarification

TABLE 2 RISK ASSESMENT

The table below is an excerpt from IGEMUP10 and should be used in conjunction with that document

Further to the requirements in IGEM/UP/10 Edition 4 +A: 2016 Section 8 under clause 8.7.3.3 and Figure 7 the following risk assessment gives guidance for the positioning of horizontal flues. This form should be completed before work commences and undertaken by a person who is competent to undertake the risk assessment.

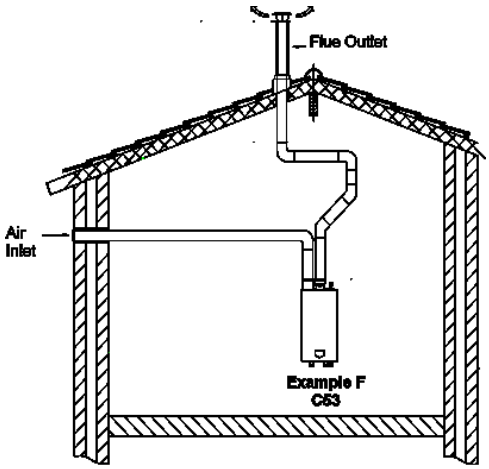
Type C appliances with net heat input exceeding 70 kW and not exceeding 333 kW low level flue discharge risk assessment (including net heat input for groups of appliances)			
No.	**Regarding the flue position**	**No**	**Yes**
1	Is the proposed flue termination within the distance in Figure K of a road, path, track, thoroughfare, walkway, property boundary or area, which is used for general public access other than for maintenance purposes?	No	Yes
2	Is the proposed flue termination within the distance in Figure K to a playground, school, yard, seating area, or area where there may be a public gathering	No	Yes
3	If the proposed flue termination enclosed on more than two sides then does it comply with the requirements of Figure 11B?	No	Yes
4	Is the proposed flue termination within the distance in Figure K of a surface or building element that may be affected by corrosion or deterioration from plume condensate?	No	Yes
5	Is the proposed flue position in an area where vehicles could be parked within distances from Figure 12 Line G to the flue?	No	Yes
6	Are there shrubs or trees within minimum distances shown on Figure K of the proposed terminal position?	No	Yes
7	Is the proposed flue termination within a light well?	No	Yes
8	Are the products of combustion from the proposed flue position likely to build up under unfavourable atmospheric conditions, due to poor cross flow of air caused by enclosures or adjacent structures and/or likely to cause nuisance?	No	Yes
9	Is the flue termination position likely to cause a nuisance to adjoining properties?	No	Yes
Building Regulations part J			
10	Is the proposed flue termination less than 300 mm from the boundary of the property, as measured from the side of the terminal to the boundary?	No	Yes
Regarding the Clean Air Act			
11	Is the total output of the individual, or group of flue terminals (if within 5U (see A3.7)), greater than 333 kW net heat input?	No	Yes
General			
12	Are there any other considerations that are required for this risk assessment, see separate sheet.	No	Yes
13	Comments:		
If all answers are Blue then the flue position should be suitable			
If any answer is Orange then the flue position is unsuitable, consider revising the position or type of flue outlet or contact the local Environmental Health officer for assistance and/or approval			

Model Number		**CPM116**
FLUE DATA TYPE B_{23}		
Nominal flue diameter	mm	100
Maximum flue gas temp	°C	95
Flue gas temperature	°C	85-95
Flue draught requirements	mbar	-0.03 to -0.1
Available pressure for the flue system	Pa	200
Maximum flue gas volume	g/s	11.6 to 57.7
FLUE DATA TYPE C_{13} & C_{33}		
Nominal flue diameter	mm	100/150
Maximum flue gas temp	°C	95
FLUE DATA TYPE C_{43} & C_{53}		
Nominal flue diameter	mm	100
Maximum flue gas temp	°C	95

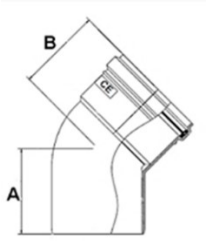
TWIN-PIPE FLUE SYSTEMS TYPE C_{53}

CPM TWIN-PIPE FLUE ASSEMBLY		
COMPONENTS REQUIRED TO START INSTALLATION		
VERTICAL FLUE		
Item No	Description	No Required
LV304872B	APPLIANCE AIR INTAKE GUARD Ø100/150mm	1
LV310754B	CONCENTRIC VERTICAL TERMINAL Ø100/150mm PP	1

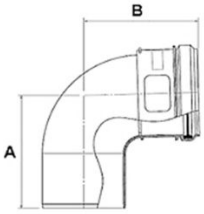
HORIZONTAL FLUE		
Item No	Description	No Required
LV304872B	APPLIANCE AIR INTAKE GUARD Ø100/150mm	1
LV310758B	CONCENTRIC HORIZONTAL TERMINAL Ø100/150mm PP	1
LV305039B	HORIZONTAL AIR INLET Ø100mm ALU	1



Additional Flue Ancillary Items		
Item No.	Description	Dimensions
M85176B	EXTENSION Ø100mm PP CUT TO LENGTH	500mm
M85177B	EXTENSION Ø100mm PP CUT TO LENGTH	1000mm
M85181B	BEND 90° 100mm PP	See Drawing Below
M85182B	BEND 45° 100mm PP	See Drawing Below
M87193B	WALL BAND (100mm)	n/a



A=78mm,
B=65mm

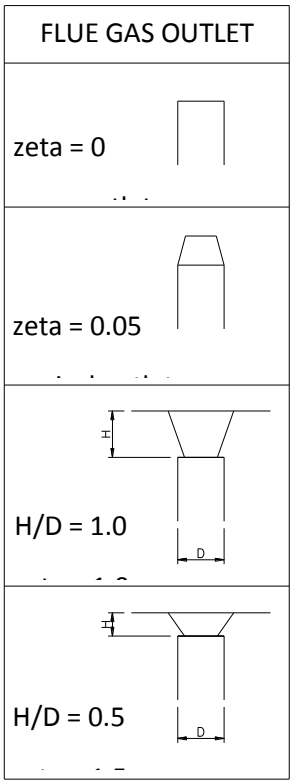


A=78mm,
B=65mm

TWIN-PIPE FLUE SIZING/CALCULATIONS

Component	Resistance R [Pa]	
	* twin pipe **Ø 100**	
	flue	air
straight tube/m	4.4	5
45° bend	9.9	11.5
90° bend	16	18.4
roof terminal zeta = 0,05	0.8	
roof terminal zeta = 1,0	16.8	19.4
roof terminal zeta = 1,5	25.2	

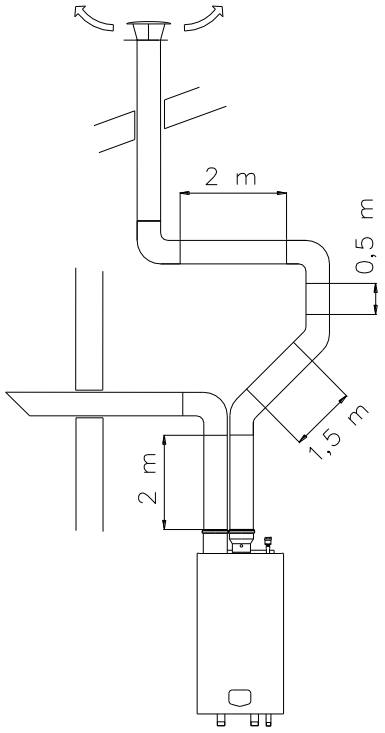
To be used for Lochinvar supplied M&G air inlet system components resistance only



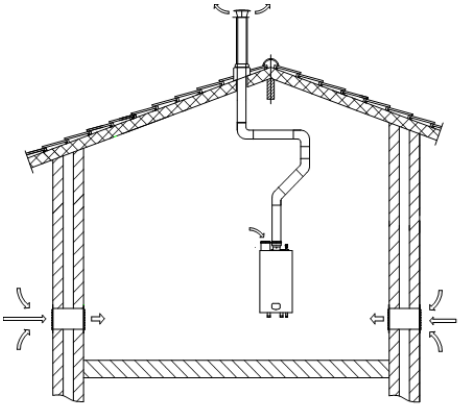
Total calculated system resistance must be less than 160pa

	Item	Quantity	Resistance	Total
Flue exhaust	Straight tube (m)	4	4.4	17.6
	45° Elbow	2	9.9	19.8
	90° Elbow	2	16	32
	Vertical terminal (zeta 1.0)	1	16.8	16.8
	Total Resistance flue exhaust (Pa)			**86.2**
Air Inlet	**Item**	**Quantity**	**Resistance**	**Total**
	Straight tube (m)	2	5	10
	45° Elbow			
	90° Elbow	1	18.4	18.4
	Air Inlet	1	19.4	19.4
	Total Resistance air inlet (Pa)			**47.8**
Total Resistance air inlet and flue exhaust (Pa)				**134**

Total resistance is <160Pa so flue system is suitable for use



CPM CONVENTIONAL FLUE ASSEMBLY		
COMPONENTS REQUIRED TO START INSTALLATION		
VERTICAL FLUE		
Item No.	Description	No Required
LV304872B	APPLIANCE AIR INTAKE GUARD Ø100/150mm	1
LV310754B	CONCENTRIC VERTICAL TERMINAL Ø100/150mm PP	1



Additional Flue Ancillary Items		
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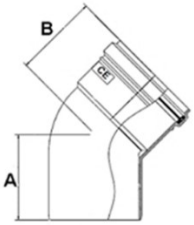
M85182B	BEND 45° 100mm PP	See Drawing Below
M87193B	WALL BAND (100mm)	n/a



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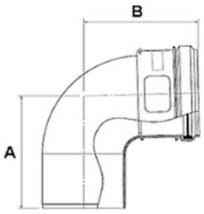


A=78mm,
B=65mm

CONVENTIONAL FLUE SIZING/CALCULATIONS

Component	Resistance R [Pa]
	Ø 100
	flue
straight tube/m	4.4
45° bend	9.9
90° bend	16
roof terminal zeta = 0,05	0.8
roof terminal zeta = 1,0	16.8
roof terminal zeta = 1,5	25.2

To be used for Lochinvar supplied M&G air inlet system components resistance only

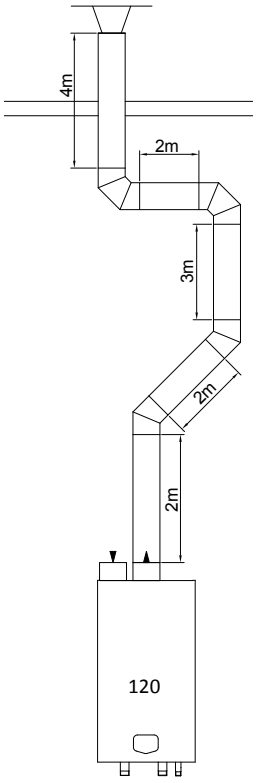
Use the table below to calculate the flue system resistance.

Item	Quantity	Resistance	Total
Straight tube (m)			
45° Elbow			
90° Elbow			
Concentric Vertical terminal			
Total Resistance flue exhaust (Pa)			

Total calculated system resistance must be less than 160pa

Item	Quantity	Resistance	Total
Straight tube (m)	13	4.4	57.2
45° Elbow	2	9.9	19.8
90° Elbow	2	16	32
Vertical terminal (zeta 1.0)	1	16.8	16.8
Total Resistance flue exhaust (Pa)			**125.8**

Total resistance is <160Pa so flue system is suitable for use



FLUE SYSTEMS USING FLUE NOT SUPPLIED BY LOCHINVAR TYPE C_{63}

In general, boilers are certified with their own purpose supplied Concentric or Twin Pipe flue systems, C63 certified appliances allow the installer to use other flue systems when installing the boiler however, they must be of a suitable minimum standard as per table below.

CE string Flue gas material	European standard	Temperature class	Pressure class	Resistance to condensate	Corrosion resistance class	Metal: liner specifications	Soot fire resistance class	Distance to combustible material	Plastics:	Plastics: fire behaviour	Plastics:
min. eis PP	EN 14471	T120	P1	W	1	n/a	O	30	I of E	C/E	L
min. eis RVS	EN 1856-1	T120	P1	W	1	L20040	O	40	n/a	n/a	n/a

Material	Boiler	d_{nom}	$D_{outside}$	d_{inside}	L_{insert}
SS	CPM58-CPM77	80	80 +0,3/ -0,7	81 +0,3/ -0,3	50 +2/ -2
SS	CPM96-CPM116	100	100 +0,3/ -0,7	101 +0,3/ -0,3	50 +2/ -2
SS	CPM144-CPM175	130	130 +0,3/ -0,7	131 +0,5/ -0,5	50 +2/ -2
PP	CPM58-CPM77	80	80 +0,6/ -0,6		50 +20/ -2
PP	CPM96-CPM116	100	100 +0,6/ -0,6		50 +20/ -2
PP	CPM144-CPM175	130	130 +0,9/ -0,9		50 +20/ -2

Aluminium flue pipe must not be used on this appliance as it may lead to premature failure of the heat exchanger and will invalidate the warranty.

COMMON FLUE SYSTEMS

Lochinvar can supply a PP common flue header see separate guide available at www.lochinvar.ltd.uk

Alternatively the installer can use a flue installation specialist to design and supply a separate flue system under the flue designation C63 using the specifications shown on page 13 and information in the table below.

Any installations using flue type C63 must be designed and installed in compliance with any local Building or planning regulations, but as these systems use a flue system not supplied by Lochinvar, Lochinvar cannot comment / advise or provide support on the design of this type of flue system. To design such a flue system, the installer/contractor must consult a specialist flue supplier who will be responsible for the design and installation of the separate flue system. When designing the type C63 flue system, the instructions in the Installation Manual, provided with the boiler, must be taken into account. Lochinvar will provide pressure loss figures for the specific units, but other than that, Lochinvar cannot provide support on Common Flue requests because flue certification is limited to the certified categories in the table on page 2. Lochinvar cannot accept any responsibility for Flue system design.

	CPM 116
Available pressure at the flue gas outlet	160Pa
Flue Gas Mass Rate (G20) 96% (g/sec)	45.1
Flue Gas Mass Rate (G20) 25% (g/sec)	11.3
Flue Gas Mass Rate (G31) 96% (g/sec)	46.2
Flue Gas Mass Rate (G31) 25% (g/sec)	11.6

The CPM boiler range does not have an internal Non Return Valve (NRV) as such any flue must be designed on zero or negative pressure unless a suitable NRV is fitted and if necessary interlocked to the appliance. Non Return Valves are included with the Lochinvar common flue header.

Notes-Items to order		
Item No.	No required	Notes

Contact Lochinvar customer service to order additional flue items on 01295 269981

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