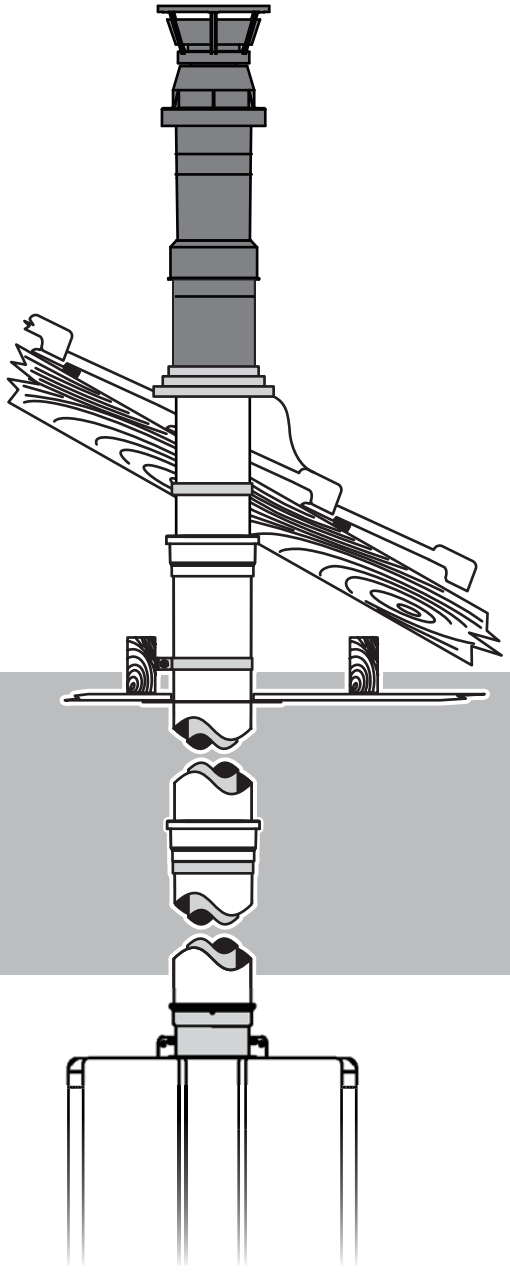
Rinnai

Flue Installation Manual

Rinnai FFSS (Stainless Steel) flue systems



Rinnai FFSS (Stainless Steel) coaxial flue system, suitable for use with the following Rinnai internal continuous flow water heater models:

HDC211i	**REU-KM3237FFUDC**
HDC211i (50)	**REU-KM3237FFUDC-50**

These components shall be installed in accordance with:

- Manufacturer's Installation Instructions
- Current AS/NZS 5601 AS/NZS 3000
- Local Regulations and Municipal Building Codes including local OH&S requirements

These components must be installed, serviced and removed by an Authorised Person.

For continued safety these components must be installed and maintained in accordance with the manufacturers instructions.

The Australian Gas Association

All Rinnai gas products are A.G.A. certified.

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GENERAL INSTALLATION INFORMATION

IMPORTANT

Stainless Steel Components of the flue are sharp, CARE is to be taken when handling to avoid injury.

Before proceeding with the installation of an FFSS coaxial flue system, read this manual thoroughly to gain a full understanding of the installation requirements.

This flue must be installed by an authorised person. The Installation must conform to local regulations.

Installation must comply with the instructions supplied by Rinnai.

Service and removal must be carried out by an authorised person.

CERTIFICATION

Certified by the Australian Gas Association (AGA) for use only with Rinnai internal continuous flow water heaters.

GENERAL

1. These instructions only apply to the Rinnai FFSS water heater coaxial flueing system. This flue system utilises pipe components with a stainless steel inner pipe and a white plastic outer pipe.

   These instructions **DO NOT** apply to older Rinnai water heater flueing that has either a stainless steel single skin or aluminium coaxial construction. If in doubt contact Rinnai.

2. Before commencing installation, please read the 'Installation Instructions - General', located inside a pouch behind the front cover of all Rinnai water heater models. The Rinnai internal water heater range must only be installed with Rinnai water heater flueing as referred to in these instructions.
3. The requirements of the current AS/NZS 5601 and local authorities must be met, which is the installers responsibility.
4. Appliances are certified to be installed side by side as shown on page 4. Refer to the operation and installation manual provided with the appliance for clearance details pertaining to single appliance installations.
5. A Rinnai internal continuous flow water heater fitted with an FFSS flue system is room sealed as defined in AS/NZS 5601. No ventilation in the space where the water heater is installed is required.
6. The outer plastic section of the coaxial flue complies with temperature hazard requirements and can be installed with zero clearance to combustible material.
7. Component Construction: The flueing for internal water heaters is a coaxial design. It has a stainless steel inner pipe to discharge products of combustion and a thermoplastic outer pipe for air supply to the appliance.

APPLIANCE SPIGOT CENTRES

The wall mounting brackets are adjustable by 50mm, the minimum setting is 10mm.

Adjusting the mounting bracket also adjusts the spigot centre, the adjustment range is from 149mm to 199mm.

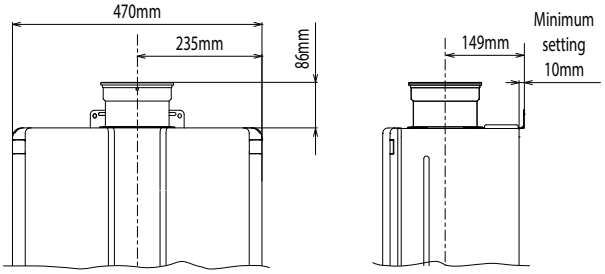


Fig. 1

MEANS OF DISCONNECTION

The appliance connection shall include a means of disconnection in accordance with AS/NZS 5601.

SETTING FLUE LENGTH DIPSWITCH

Installations can consist of both horizontal and vertical runs to a maximum length of 9 metres and with a maximum of three 90° bends.

If flue length exceeds 2.0m, dipswitch 1 of SW1 is to be switched to the 'OFF' position (Fig. 2).

This increases the combustion fan speed to overcome the additional friction losses.

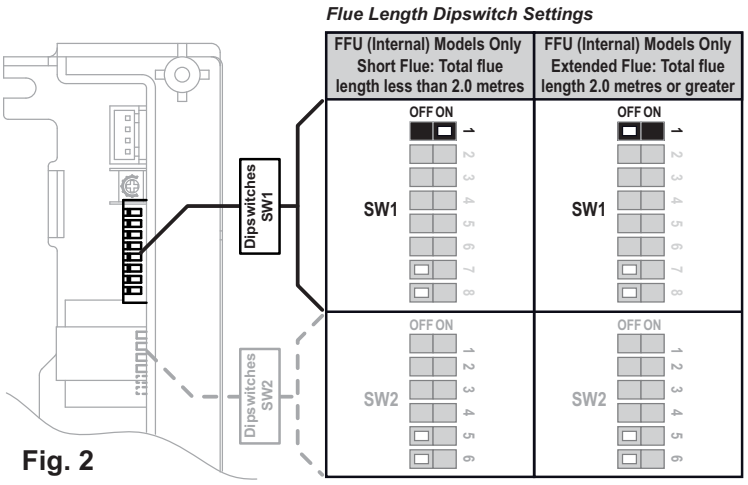


Fig. 2

GENERAL INSTALLATION METHODS

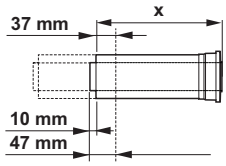
CUTTING THE FLUE COMPONENTS

Using the dimensions shown on page 10, calculate the required number and type of flue components that are needed to reach from the water heater to the flue terminal.

When cutting components the outer flue pipe should be cut to the required length plus 37mm and the inner flue pipe should be cut to the required length plus 47mm, this will ensure that the correct penetration is provided for joining of components.

When inner and outer pipes are re-assembled after cutting the inner pipe should extend 10mm beyond the end of the outer pipe (Fig. 3).

WHEN CUTTING FLUE COMPONENTS ONLY THE MALE END IS TO BE CUT!



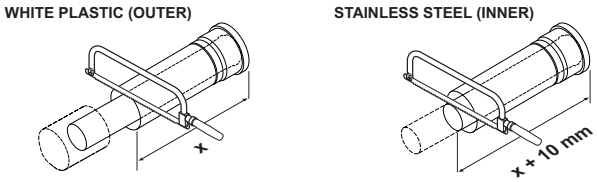


Fig. 3

IMPORTANT

Cutting flue components can create sharp edges, care must be taken to avoid injury, use a file to remove debris, burrs and sharp edges from cut ends.

Ends that are left un-finished can damage the flue seals and result in the flue components no longer being air or weather tight.

Use a 32TPI (or equivalent) hacksaw blade when cutting stainless steel components.

The ONLY COMPONENTS that can be cut are as follows:
FFSSKIT (pipe not bend), FFSSPIPE1000, FFSSROOFCOWL and UVROOF PROTECTORS.

Ensure all ends are cut square (the use of a mitre box will ensure a clean square cut).

FLUE TERMINALS

WARNING

The flue gases can reach high temperatures. The flue terminal is to terminate in a location not to cause a nuisance, in accordance with AS/NZS 5601.

Ensure the flue is fully supported independently of the appliance by use of suitable clips or brackets, in accordance with AS/NZS 5601. Appropriate standoff brackets are supplied with each FFSSROOFCOWL and FFSSPIPE1000.

MULTIPLE TERMINAL INSTALLATIONS

The terminal clearances in AS/NZS 5601 do not apply to the Rinnai internal continuous flow water heaters when installed side by side (Fig. 4).

AGA certification allows for a horizontal separation of 160mm for roof terminals and 270mm for wall terminals.

Each terminal is to be terminated at the same vertical height.

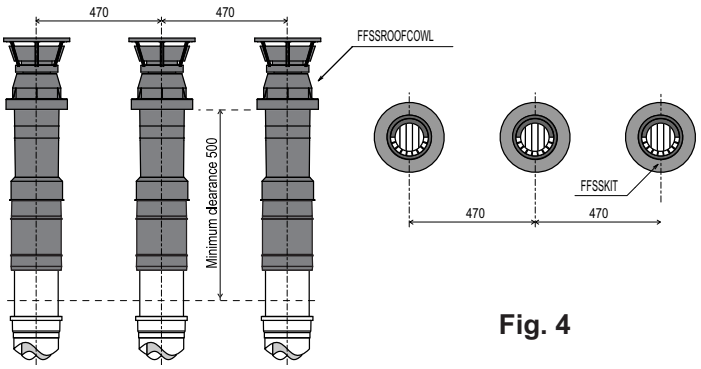


Fig. 4

UV ROOF PROTECTORS

The roof cowl comes with two black UV injection moulded pipe sections for covering and protecting the white flue pipe from UV damage. To install, click together and cut to length if required. If for some reason there is any remaining white pipe exposed, this should be painted with a suitable UV resistant coating.

IMPORTANT

When installing the UV protectors it is critical that the protector sits outside the decktite and not inside as weather sealing will be an issue if the protector is installed inside the decktite.

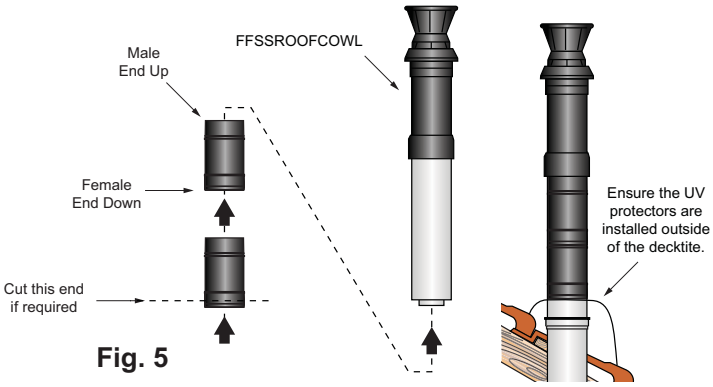


Fig. 5

FLUE INSTALLATION DETAILS

FFSS FLUEING OPTIONS

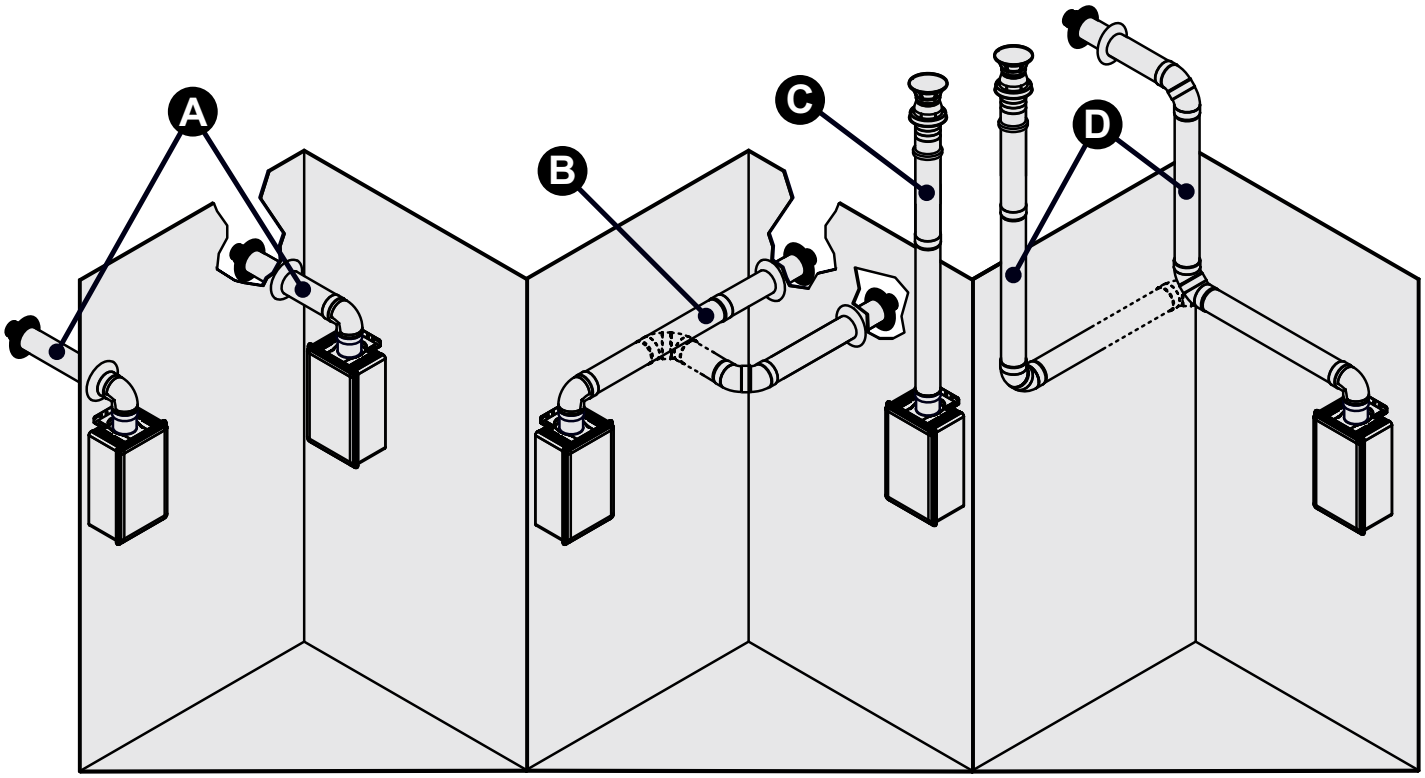


Fig. 6

A. Direct Horizontal Flue
For installations where the internal continuous flow unit is mounted directly on the inside of an external wall with a maximum thickness of 468mm.

Refer “DIRECT HORIZONTAL FLUE” on page 6 for details of this installation method.

B. Extended Horizontal Flue
The same as Direct Horizontal flueing with additional pipe required due to the longer horizontal distance.

Refer “EXTENDED HORIZONTAL FLUE” on page 6 for details of this installation method.

C. Vertical Flue
Installations where the water heater is flued vertically through the roof.

Refer “VERTICAL FLUE” on page 7 for details of this installation method.

D. Combined Vertical And Horizontal Flue
A combination of all the above.

Refer “COMBINED VERTICAL & HORIZONTAL FLUE” on page 8 for details of this installation method.

FLUE INSTALLATION DETAILS

DIRECT HORIZONTAL FLUE

The Direct Horizontal Flue option (Fig. 7) is used for flueing directly through an external wall and FFSSKIT **MUST BE** used for this purpose. Components included are: 90° starter bend, terminal pipe, white internal wall seal and black external wall seal.

Installation method

IMPORTANT

All horizontal flue is to be installed with a 2° fall towards the water heater.

Ensure there is enough space to install the water heater, flue assembly and pipe work.

Ensure that positioning of the flue terminal complies with the requirements of AS/NZS 5601 (Fig.6.2 on page 11).

1. Mount the water heater in an appropriate location.
2. Using the dimensions provided in Fig. 8, mark a point along the appliance centreline 150mm from the top of the water heater. This mark forms the centre for the 140mm diameter wall penetration.
3. When installing the FFSSKIT directly backwards from the appliance, set water heater mounting brackets to the minimum (10mm).
4. Make a 140mm wall penetration for the flue. Ensure that the flue spigot is covered to avoid debris entering the appliance flue connection.
5. Measure the required length for the horizontal terminal to penetrate the wall and allow an extra 67mm protrusion from the inside wall surface as shown in Fig. 9. See also the section “CUTTING THE FLUE COMPONENTS” on page 4.
6. Fit the external wall seal to the terminal pipe. Pass male end of the terminal pipe through penetration point and weatherproof the penetration as required. Fit the internal wall seal to the terminal pipe.
7. Connect the terminal pipe to starter bend (ensuring components are pushed 'fully home'. Secure the PVC joints of bend to the terminal pipe with three (3) #8x1/2” or equivalent self tapping screws (not supplied) as shown in Fig. 10.
8. Connect condensate drain (go to “CONDENSATE DRAIN” on page 8 for connection details).

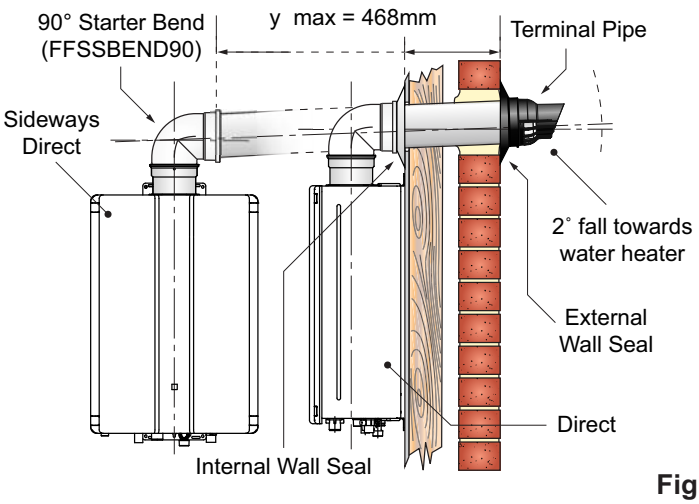


Fig. 7

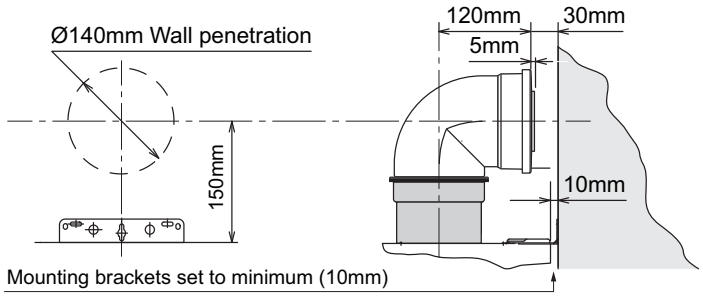


Fig. 8

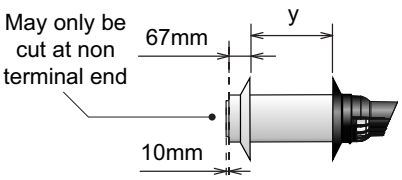


Fig. 9

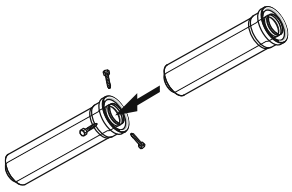


Fig. 10

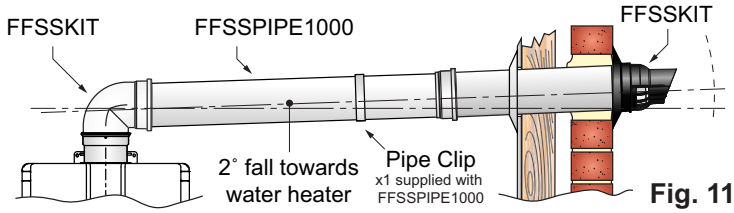


Fig. 11

EXTENDED HORIZONTAL FLUE

The Extended Horizontal Flue option (Fig. 11) can be used when the water heater is mounted against an internal wall and flueing needs to extend horizontally to exit an external wall. Use **ONLY** FFSS components to extend installations.

Installation method

IMPORTANT

Total flue length can be up to 9 metres long and a maximum of 3 bends can be used. If flue length exceeds 2.0m, dipswitch 1 of SW1 is to be switched to the 'OFF' position (Fig. 2).

All horizontal flue is to be installed with a 2° fall towards the water heater.

1. Follow the installation method as described for the DIRECT HORIZONTAL FLUE option, using FFSSPIPE1000 and FFSSBEND90 / FFSSBEND45 components to extend the installation horizontally as required.
2. PVC joints must be secured with three (3) #8x1/2” or equivalent self tapping screws (not supplied) Fig. 10.
3. Connect condensate drain (go to “CONDENSATE DRAIN” on page 8 for connection details).

FLUE INSTALLATION DETAILS

VERTICAL FLUE

The Vertical Flue option (Fig. 12) is used for flueing vertically through the roof and FFSSROOFCOWL and FFSSPIPE1000 **MUST BE** used for this purpose. Components included with FFSSROOFCOWL are: terminal pipe, 2x UV protectors and 1x pipe clip. Components included with FFSSPIPE1000 are: flue pipe, 1x pipe clip.

Installation method

IMPORTANT

Total flue length can be up to 9 metres long and a maximum of 3 bends can be used. If flue length exceeds 2.0m, dipswitch 1 of SW1 is to be switched to the 'OFF' position (Fig. 2).

Ensure there is enough space to install the water heater, flue assembly and pipe work. Also ensure that positioning of the flue terminal complies with the requirements of AS/NZS 5601 (Fig.6.2 on page 11).

The distance of centreline of the appliance flue spigot from the wall is variable from a minimum 149mm to a maximum 199mm (see Fig. 1 on page 3). Take this into account when creating access holes through floors and ceilings for flue pipe components.

1. Mount the water heater in an appropriate location.
2. Set plumb bob from the centre of the heater flue outlet to ceiling marking position. Cut 140mm hole in plasterboard (or a suitable 'oval' for pitched roof applications). Repeat this step for underside of roofing.
3. Install, UV protectors to the vertical terminal as required, refer to “UV ROOF PROTECTORS” on page 4.
4. Calculate the required number and combination of FFSSPIPE1000 lengths and cut to size as required, see Fig.3, in section “CUTTING THE FLUE COMPONENTS” on page 4.
5. Install decktite roof seal (Not supplied).
6. Ensure the flue is fully supported independently of the appliance, by the use of suitable clips or brackets, in accordance with AS/NZS 5601. Appropriate standoff brackets are supplied with each FFSSROOFCOWL and FFSSPIPE1000 component.
7. Ensure that the appliance can be removed without causing movement or displacement of the flue, in accordance with AS/NZS 5601.
8. All PVC joints must be secured with 3x #8x1/2” or equivalent self tapping screws (not supplied) as shown in Fig. 13.
9. Connect condensate drain (go to “CONDENSATE DRAIN” on page 8 for connection details).

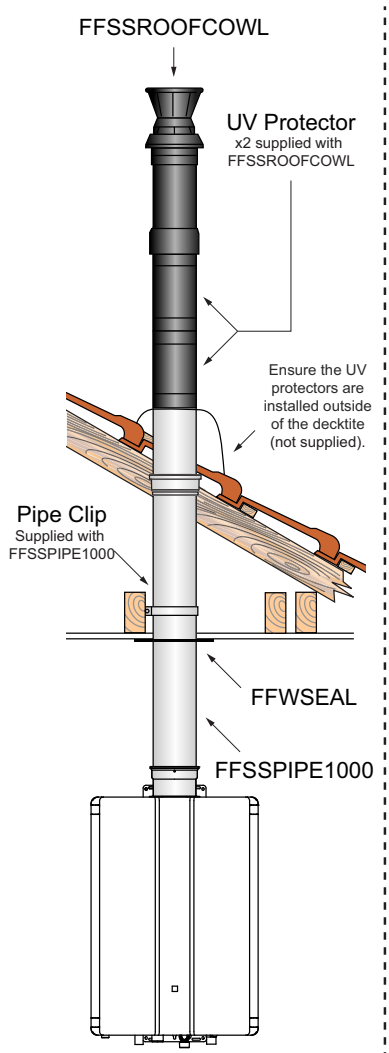


Fig. 12

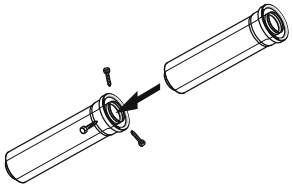


Fig. 13

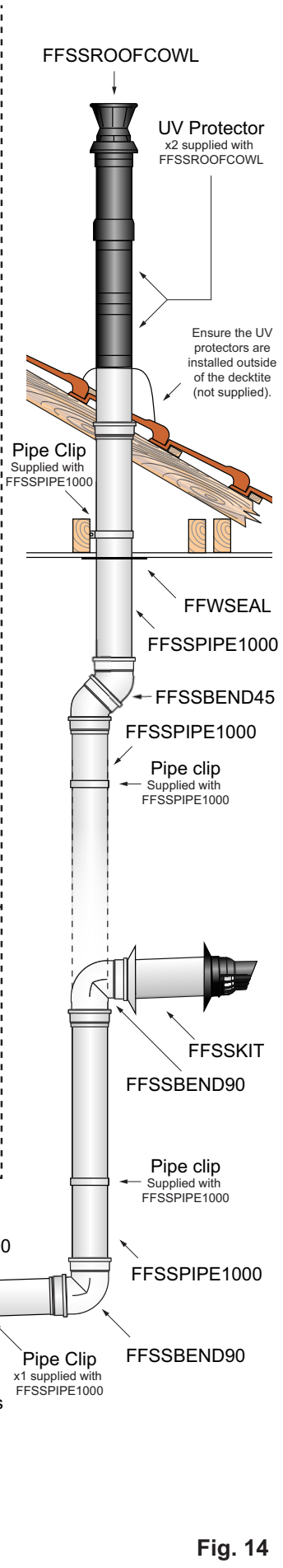


Fig. 14

FLUE INSTALLATION DETAILS

COMBINED VERTICAL & HORIZONTAL FLUE

The Combined Vertical & Horizontal Flue option (Fig. 14, page 7) allows the water heater to be installed virtually anywhere using a wall (FFSSKIT) or roof (FFSSROOFCOWL) terminal. Extension pieces (FFSSPIPE1000, FFSSBEND90 and FFSSBEND45) can be mounted horizontally or vertically as required.

Installation method

IMPORTANT

Total flue length can be up to 9 metres long and a maximum of 3 bends can be used. If flue length exceeds 2.0m, dipswitch 1 of SW1 is to be switched to the 'OFF' position (Fig. 2).

All horizontal flue is to be installed with a 2° fall towards the water heater.

1. Using a combination of the installation procedures covered in the "EXTENDED HORIZONTAL FLUE" on page 6 and "VERTICAL FLUE" on page 7, determine and install the required components.
2. All PVC joints must be secured with 3x #8x1/2" or equivalent self tapping screws (not supplied) as shown in Fig. 13, page 7.
3. Connect condensate drain (go to "CONDENSATE DRAIN" on page 8 for connection details).

CONDENSATE DRAIN

The Rinnai range of condensing water heaters generate condensate continuously at a rate of up to 5 litres per hour as a by-product of highly efficient gas burner system. This condensate must be drained via a pipe to a suitable point of discharge (Fig. 15). Because the condensate is a by-product of gas combustion it is mildly acidic. For this reason copper tube and fittings **MUST NOT** be used as it will corrode. Instead, Rinnai recommend plastic pipes and fittings such as Unplasticised Polyvinyl Chloride (UPVC) or Polyethylene (PE) which is commonly used for irrigation piping.

Important Considerations for the Condensate Drain Pipe

NOTE

The content of AS/NZS 3500 'Temperature / Pressure Relief and Expansion Control Valve Drain Lines' has been used as a guide in preparing these considerations.

Ⓐ Water heater drain outlet connection, R½" (15mm) BSP male. Condensate drain outlet connection, 1/2" (15mm) BSP male nylon

NOTE

The black plastic shipping cap MUST BE removed from the condensate drain outlet prior to water heater operation.

Ⓑ PE R½" BSP (15mm) female to barbed irrigation system connector (13 – 19mm) or equivalent plastic fitting. ⓒ Drain pipe and fittings to match item Ⓑ.

Ⓓ Continuous fall (of at least 2°) from water heater to discharge point. Lengths and bends in accordance with **'LENGTH AND CHANGES OF DIRECTION'** below.

Ⓔ Suitable points of discharge are deemed to be drains, sewers or pits. **DO NOT** discharge onto electrical connections, earth stakes, copper pipes, concrete paths or into a pond

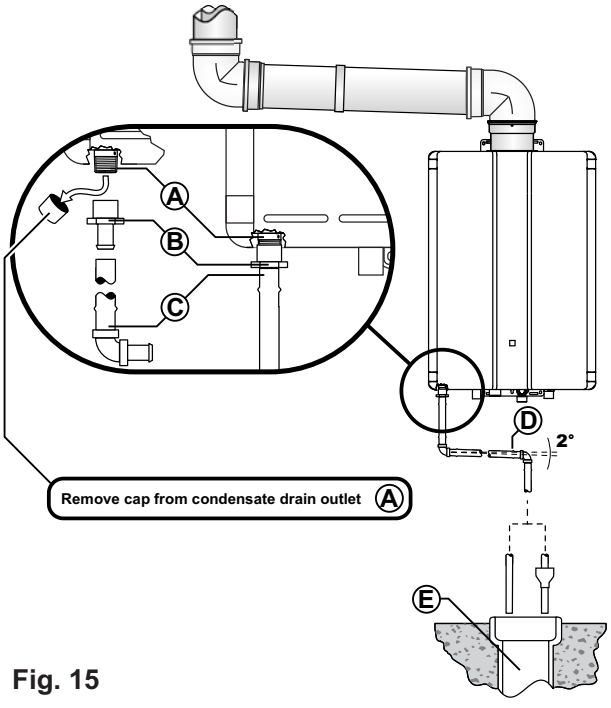


Fig. 15

Length and Changes of Direction

Maximum length and changes of direction greater than 45° should be as follows:

Lengths and changes of direction				
Max length (Metres)	**9**	**8**	**7**	**6**
Max changes of direction >45°	**3**	**4**	**5**	**6**

Installation Method

(a) The drain line **MUST NOT** discharge onto electrical connections, earth stakes, copper pipes, concrete paths or into a pond.

(b) The point of discharge from each drain line shall be located so that the release of condensate does not cause a nuisance, is readily discernible and incurs no risk of damage to the building.

In view of (a) and (b), suitable points of discharge are deemed to be drains, sewers or pits.

(c) There shall be no tap, valve or other restrictions in any line.

(d) Each line shall fall continuously from the valve to the approved point of discharge.

(e) Drain lines shall not discharge into a storage water heater safe tray.

(f) The end of the condensate drain line shall be:

(i) not lower than 200mm or higher than 300mm above an unpaved surface; or

(ii) not lower than 75mm or higher than 300mm above a gravel pit not less than 100mm in diameter in a paved surface.

(g) Where discharging over a tundish or gully trap, drain lines shall have an air gap of a size at least twice the diameter of the drain line.

Interconnection of Condensate Drain Lines

Condensate drain lines from multiple water heaters may be joined together provided they conform with the **'INSTALLATION'** requirements on page 8.

Common Stack Discharge

Where individual water heaters are installed in a multistory building, the condensate drain lines may discharge into a common stack, subject to the following:

(a) The discharge from the common stack is to a tundish, having a discharge line, that is not less than the size of the common stack, directly connected to a fixture trap, and installed in connection with any adjacent soil or waste stack.

(b) The discharge point of the common stack is such that any discharge is readily visible and not cause any nuisance.

(c) The common stack is vented by extending the pipe upwards, above the roof level.

Tundish Drain Lines

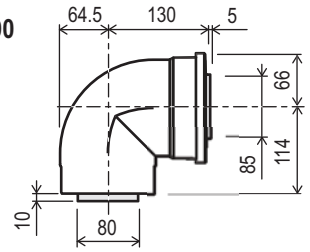
The drain line from any tundish shall be not less than DN 20 or less than one size larger than that of the largest drain line discharging into the tundish. Tundish drain lines shall comply with the **'INSTALLATION'** requirements on page 8.

Areas Subject To Freezing

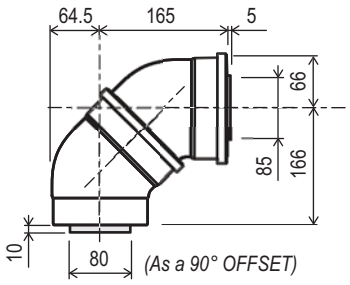
In areas where water pipes are prone to freezing, the drain pipe from any valve shall be insulated and not exceed 300mm in length. It shall discharge into a tundish through an air gap of not less than 75mm and not more than 150mm measured from the outlet of the drain pipe to the rim of the tundish.

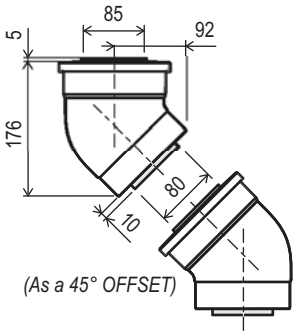
DIMENSIONS

FFSSBEND90
Includes:
90° Bend

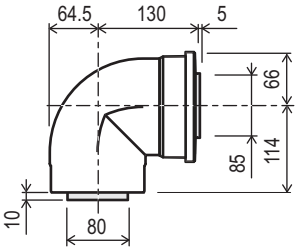


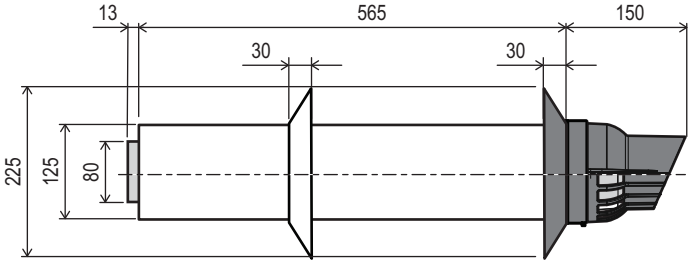
FFSSBEND45
Includes:
45° Bend (x2)



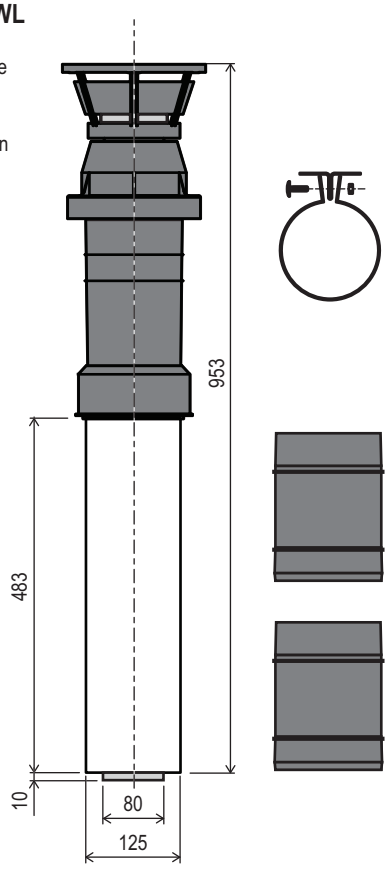


FFSSKIT
Includes:
Starter Bend (FFSSBEND90)
Horizontal Terminal Pipe
Internal Wall Seal (White)
External Wall Seal (Black)
Installation Instruction

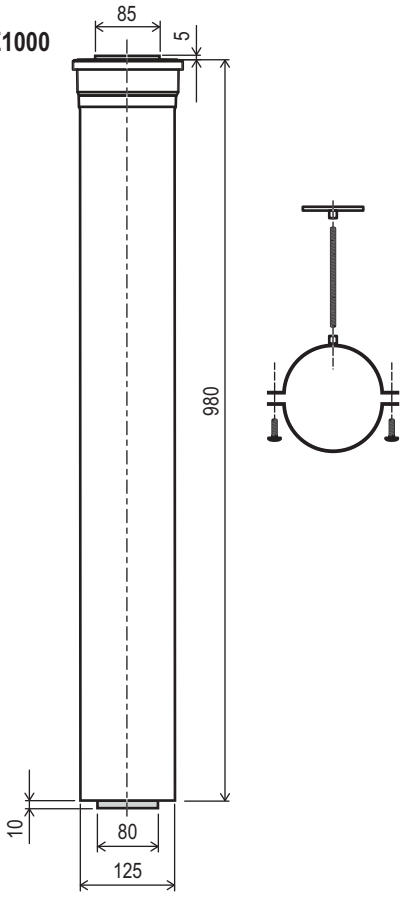




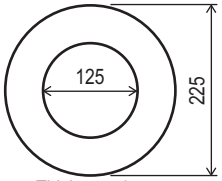
FFSSROOFCOWL
Includes:
Vertical Terminal Pipe
UV Protector (x2)
Wall bracket
Installation Instruction



FFSSPIPE1000
Includes:
Flue Pipe
Wall bracket



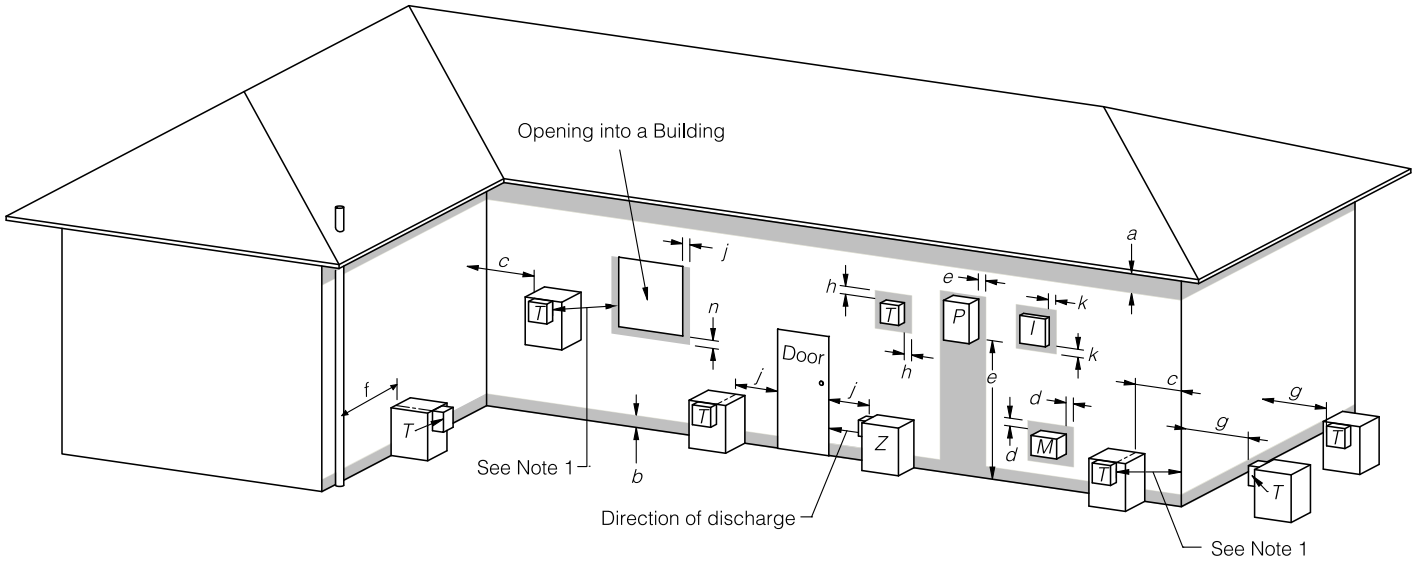
FFWSEAL
Includes:
Ceiling Ring



Thickness 1mm

DESCRIPTION	CODE NUMBER	BAR CODE NUMBER
90 Degree Bend	FFSSBEND90	940100401006
45 Degree Bend	FFSSBEND45	940100401007
Horizontal Flue Terminal	FFSSKIT	940100401003
Flue Pipe 1000mm length	FFSSPIPE1000	940100401005
Vertical Flue Terminal	FFSSROOFCOWL	940100401004
Ceiling Ring	FFWSEAL	9314109107722

CLEARANCES (AS/NZS 5601 - Fig.6.2 extract)



T = Flue terminal *Z* = Fan assisted flue appliance only *M* = Gas meter *P* = Electricity meter or fuse box *I* = Mechanical air inlet

Shading indicates prohibited areas for flue terminals

Ref.	Item	Min. clearances (mm)	
		Natural draft	Fan assisted
a	Below eaves, balconies and other projections:		
	• *Appliances* up to 50 MJ/h input	300	200
	• *Appliances* over 50 MJ/h input	500	300
b	From the ground, above a balcony or other surface *	300	300
c	Front a return wall or external corner *	500	300
d	From a gas *meter* (M) (see 5.11.5.9 for vent terminal location of *regulator*) (see Table 6.6 for New Zealand requirements)	1000	1000
e	From an electricity *meter* or fuse box (P) †	500	500
f	From a drain pipe or soil pipe	150	75
g	Horizontally from any building structure* = or obstruction facing a terminal	500	500
h	From any other *flue terminal* , cowl, or combustion air intake †	500	300
j	Horizontally from an openable window, door, non-mechanical air inlet, or any other opening into a building with the exception of sub-floor ventilation:		
	• *Appliances* up to 150 MJ/h input *	500	300
	• *Appliances* over 150 MJ/h input up to 200 MJ/h input *	1500	300
	• *Appliances* over 200 MJ/h input up to 250 MJ/h input *	1500	500
	• *Appliances* over 250 MJ/h input *	1500	1500
	• All fan-assisted *flue appliances* , in the direction of discharge	-	1500
k	From a mechanical air inlet, including a spa blower	1500	1000
n	Vertically below an openable window, non-mechanical air inlet, or any other opening into a building with the exception of sub-floor ventilation:		
	• Space heaters up to 50 MJ/hr input	150	150
	• Other *appliances* up to 50 MJ/hr input	500	500
	• *Appliances* over 50 MJ/h input and up to 150 MJ/h input	1000	1000
	• *Appliances* over 150 MJ/h input	1500	1500

* - unless *appliance* is *certified* for closer installation

† - Prohibited area below electricity meter or fuse box extends to ground level.

NOTES:

1 Where dimensions *c, j* or *k* cannot be achieved an equivalent horizontal distance measured diagonally from the nearest discharge point of the terminal to the opening may be deemed by the Technical Regulator to comply.

2 See Clause 6.9.4 for restrictions on a *flue terminal* under a covered area.

3 See Figure J3 for clearances required from a *flue terminal* to an LP Gas *cylinder.* A *flue terminal* is considered to be a source of ignition.

4 For *appliance* **s** not addressed above acceptance should be obtained from the Technical Regulator.

FIGURE 6.2 (in-part) MINIMUM CLEARANCES REQUIRED FOR BALANCED FLUE TERMINALS, FAN-ASSISTED FLUE TERMINALS, ROOM-SEALED APPLIANCE TERMINALS AND OPENINGS OF OUTDOOR APPLIANCES

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Cost of a local call higher from mobile or public phones.

Rinnai has a Service and Spare Parts network with personnel who are fully trained and equipped to give the best service on your Rinnai appliance. If your appliance requires service, please call our National Help Line. Rinnai recommends that this appliance be serviced every 2 years.