

Rinnai FFU (Aluminium) Flue Systems

Flue Installation Manual

Rinnai



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

This appliance must be installed in accordance with:

- Manufacturer's Installation Instructions
- Current AS/NZS 3000, AS/NZS 3500 & AS/NZS 5601
- Local Regulations and Municipal Building Codes including local OH&S requirements

This appliance must be installed, maintained and removed by an Authorised Person.

For continued safety of this appliance it must be installed and maintained in accordance with the manufacturer's instructions.



The Australian Gas Association All Rinnai gas products are A.G.A. certified.

INSTALLATION TABLE OF CONTENTS

Warnings & Important Information 4
Before Using Installing Flue Components
Regulatory Information4
Notice to Victorian Consumers
Cutting The Flue Components5
Lubricating Components5
Appliance Spigot Dimensions & Centres5
Flue Length, Bends & Appliance Settings6
Flue Terminals
Multiple Terminal Installations

Installation methods

Installation methods	7
FFU Flueing Options	. 7
Common Installation Requirements	. 8
Direct Horizontal Flue	. 8
Extended Horizontal Flue	. 9
Vertical Flue	. 9
Combined Vertical & Horizontal Flue	. 9
Condensate Drain	10
Important Considerations For Condensate Drain Pipe	10
Length & Changes Of Direction	11
Installation Method	11
Interconnection Of Condensate Drain Lines	11
Common Stack Discharge	11
Tundish Drain Lines	11
Areas Subject To Freezing	11
Flue Terminal Clearances	12
Specifications	13
Flue Component Dimensions	13
Contacts	16

WARNINGS & IMPORTANT INFORMATION



BEFORE USING INSTALLING FLUE COMPONENTS

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

Always comply with the following precautions to avoid dangerous situations and to ensure optimum performance.

Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, property damage, personal injury and/or death.

DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in personal injury or death.

WARNINGS: Indicates a potentially hazardous situation which, if not avoided, could result in personal injury or death.

CAUTIONS: Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to the appliance. It may also be used to alert against unsafe practices.



REGULATORY INFORMATION

Your Rinnai gas continuous flow water heater flue has been certified by the Australian Gas Association. The A.G.A. Certification Number is shown on the data plate.

These flueing components **MUST** be installed in accordance with:

- Current AS/NZS 3500 and AS/NZS 5601
- The installation **MUST** comply with all relevant instructions supplied by Rinnai.
- Service and removal **MUST** be carried out by an authorised person.
- Local regulations and municipal building codes including local OH&S requirements

Flue components **MUST** be installed correctly by an appropriately licensed tradesperson. The installation of gas, water, and electricity must conform to local regulations.

All dimensions referred to in these instructions are in millimetres, unless otherwise specified.

These instructions **ONLY** apply to the Rinnai FFU 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.

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.

Appliances are certified to be installed side by side as shown on page 6. Refer to the operation and installation manual provided with the appliance for clearance details pertaining to single appliance installations.

A Rinnai internal continuous flow water heater fitted with an FFU flue system is room sealed as defined in AS/NZS 5601. No ventilation in the space where the water heater is installed is required.

The outer plastic section of the coaxial flue complies with temperature hazard requirements and can be installed with zero clearance to combustible material.

Notice to Victorian Consumers

The appliance and flue components **MUST** be installed by a person licensed with the Victorian Building Authority. **ONLY** a licensed person will have insurance protecting their workmanship. So make sure you use a licensed person to install this appliance and ask for your Compliance Certificate.

For further information contact the Victorian Building Authority on 1300 815 127.

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. See Fig. 1.





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 unfinished 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: **FFPIPE1000, FFROOFCOWL** and **FFWALLTERM**.

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

LUBRICATING COMPONENTS

A container of "O" ring grease is provided. To ease assembly, lubricate the "O" rings of the inner pipes of each flue component prior to assembly.

Use only a silicone based "O" ring seal lubricant. **DO NOT** use petroleum based lubricants such as petroleum jelly, as such products may cause deterioration.

APPLIANCE SPIGOT DIMENSIONS & CENTRES

When viewed from the front, the flue spigot is aligned with the centreline of the appliance.

The wall mounting brackets are adjustable by 50mm, with the minimum setting being 10mm, as such when adjusted the spigot centre relative to the wall mounting surface will also change.

The position of the spigot centre relative to the wall mounting surface is from a minimum of 95mm to a maximum of 135mm.

See Fig. 2 for dimension details.



(A) Flue spigot centreline from edge of applinance = 175mm

(B) Flue spigot centreline from wall Min = 95mm, Max = 135mm

Fig. 2

FLUE LENGTH, BENDS & APPLIANCE SETTINGS

Flue installations can consist of both horizontal and vertical runs with the following limitations.



The maximum length of any flue run is **NOT** to exceed 9 metres and may **ONLY** have a maximum of three 90° bends.

If flue length exceeds 1.5m, dipswitch 1 of SW1 is to be switched to the 'OFF' position, see Fig. 3. This is to increase the combustion fan speed to overcome the additional friction losses incurred.



FLUE TERMINALS



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 FFROOFCOWL and FFPIPE1000.

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. See 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.



INSTALLATION METHODS

FFU FLUEING OPTIONS



(A) Direct Horizontal Flue

A horizontal flue installation that consists of a starter bend (FFSBEND) and a wall terminal (FFWALLTERM) only. For installations where the internal continuous flow unit is mounted directly on the inside of an external wall with a maximum thickness of 570mm (with wall bracket set to 45mm).

Refer "Direct Horizontal Flue" on page 8 for details of this installation method.

(B) Extended Horizontal Flue

A horizontal flue installation that consists of a starter bend (FFSBEND), flue pipe(s) (FFPIPE1000) and a wall terminal (FFWALLTERM).

This type of installation is base on that of the Direct Horizontal Flue (A), with the difference being that additional pipes and bends (consisting of a maximum three 90° changes of direction and 9 metres in total) are used to reach the location of the wall terminal.

Refer "Extended Horizontal Flue" on page 9 for details of this installation method.

© Vertical Flue

A vertical installation that consists of flue pipe(s) (FFPIPE1000) and a roof terminal (FFROOFCOWL). For installations where the water heater is flued vertically through the roof (not exceeding 9 metres in total).

Refer "Vertical Flue" on page 9 for details of this installation method.

D Combined Vertical And Horizontal Flue

A combination of the methods used in options B and C and can be terminated with either a roof terminal (FFROOFCOWL) or a wall terminal (FFWALLTERM) as required (consisting of a maximum three 90° changes of direction and 9 metres in total).

Refer "Combined Vertical & Horizontal Flue" on page 9 for details of this installation method.

COMMON INSTALLATION REQUIREMENTS

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



All external joints of the PVC pipe **MUST** be glued with approved PVC cement to prevent water entering the flue.

Ensure there is enough space to install the water heater, flue assembly and pipework and that the positioning of the flue terminal complies with the requirements of AS/NZS 5601 (see page 12).

Refer to "Appliance Spigot Dimensions & Centres" on page 5 when creating access holes through walls, floors and ceilings for flue pipe components.

Where the flue length is less than 1.5 metres, the "Drain Tube Cap" MUST remain fitted.

Vertical Flues, Combined Flues or flue installations where the length exceeds 1.5 metres, **MUST** be fitted with a condensate drain.

DIRECT HORIZONTAL FLUE

The Direct Horizontal Flue option (Fig. 7) is used for flueing directly through an external wall and consists of a starter bend (FFSBEND) and a wall terminal (FFWALLTERM).

Installation Method

- 1. Mount the water heater in an appropriate location.
- 2. Using the dimensions provided in Fig. 7, mark a point along the appliance centreline 160mm from the top of the water heater. This mark forms the centre for the 127mm diameter wall penetration.
- 3. When installing the FFSBEND directly backwards from the appliance it is necessary to extend the adjustable mounting brackets of the water heater to a minimum of 45mm to allow for the flue component radius
- 4. Make a 127mm wall penetration for the flue. Ensure that the flue spigot is covered to avoid debris entering the appliance flue connection.



If an accurate wall penetration is made then the FFSBEND will cover the hole and an internal wall plate will not be necessary.

- 5. Measure the required length for the horizontal terminal to penetrate the wall and allow an extra 10mm protrusion from the wall outer surface as shown in Fig. 8. See the section "Cutting The Flue Components" on page 5 for correct cutting requirements.
- 6. Connect the FFWALLTERM to FFSBEND (ensuring components are pushed 'fully home') and fit associated wall plates/seals as required.
- 7. To prevent rain water from entering the flue terminal ensure the required 2° fall to outside is achieved (Fig.6).
- 8. Connect the terminal pipe to starter bend (ensuring components are pushed 'fully home').
- 9. For a this type of installation ensure the drain tube cap remains fitted in place (Fig. 8).



FFROOFCOWL

Decktite or lead

collar flushing

EXTENDED HORIZONTAL FLUE

The Extended Horizontal Flue option (Fig. 9) is used when the water heater is mounted on an internal wall and flueing needs to extend horizontally to exit an external wall. Use **ONLY** FFU components to extend installations.

Installation Method

- 1. Follow the installation method as described for the "Direct Horizontal Flue" on page 8.
- 2. Use FFPIPE1000 and FFBEND90 / FFBEND45 components to extend the installation horizontally as required.
- 3. If the flue length exceeds 1.5 metres connect a condensate drain (go to "Condensate Drain" on page 10 for connection details).



I. I.

I.

L 500 mm

Decktite or lead

collar flushing

Minimum

Clearance



VERTICAL FLUE

The Vertical Flue option (Fig. 12) is used for flueing vertically through the roof and FFROOFCOWL and FFPIPE1000 **MUST** be used for this purpose. Components included with FFROOFCOWL are: terminal pipe, 2x UV protectors and 1x pipe clip. Components included with FFPIPE1000 are: flue pipe, 1x pipe clip.

FFROOFCOWL

Minimum

Clearance

500 mm

Installation Method

- 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 127mm hole in plasterboard (or a suitable 'oval' for pitched roof applications). Repeat this step for underside of roofing.
- 3. Calculate the required number and combination of FFPIPE1000 lengths and cut to size as required, see Fig.1, in section "Cutting The Flue Components" on page 5.
- 4. Install decktite roof seal (Not supplied).
- 5. 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 FFROOFCOWL and FFPIPE1000 component.
- 6. Ensure that the appliance can be removed without causing movement or displacement of the flue, in accordance with AS/NZS 5601.
- 7. All joints of the PVC pipe MUST be glued with approved PVC cement to prevent water entering the flue.
- 8. Connect condensate drain (go to "Condensate Drain" on page 10 for connection details).

Flue pipe clip Flue pipe clip I. supplied with supplied with FFROOFCOWL FFROOFCOWL Flue pipe clip Flue pipe clip supplied with supplied with FFPIPE1000 FFPIPE1000 FFPIPE1000 FFWSEAL FFWSEAL FFPIPF1000 ᡐ Flue pipe clip FFBEND I supplied with FFPIPE1000 I FFPIPE1000 FFPIPE1000 FFPIPE1000 Drain Tube I (See Page 10) FFWALLTERM I FFPIPE1000 FFBEND Fig. 10 FFBFND FFPIPE1000 FFSBEND 2° fall to trap Drain Tube Flue pipe clip supplied with FFPIPE1000 (See Page 10) Fig. 11

COMBINED VERTICAL & HORIZONTAL FLUE

The Combined Vertical & Horizontal Flue option (Fig. 11) allows the water heater to be installed virtually anywhere using a wall (FFWALLTERM) or roof (FFROOFCOWL) terminal. Extension pieces (FFPIPE1000, FFSBEND and FFBEND) can be mounted horizontally or vertically as required.

Installation Method

Using a combination of the installation procedures covered in the "EXTENDED HORIZONTAL FLUE" on 1. page 6 and "Vertical Flue" on page 9, determine and install the required components.

° fall to

Terminal

CONDENSATE DRAIN

The condensate trap and associated drain connection are integral with the appliance flue spigot. The condensate trap collects any condensate from the flue system, thereby preventing condensate from entering the water heater and causing damage.

A condensate drain tube kit is supplied with the terminals (FFWALLTERM and FFROOFCOWL) and will require connection to the condensate drain connection in flue systems where the total length exceeds 1.5 metres and condensate cannot be drained via the flue terminal. Usually, the condensate drain tube requires connection in 'vertical flue' and 'combined vertical & horizontal flue' systems and does not require connection in 'direct horizontal' and 'extended horizontal' flue systems.



If the condensate drain tube is not required to be connected it is important to keep the drain tube cap in place on the appliance flue spigot. It is **ONLY** to be removed if the condensate drain tube is connected (Fig. 12)



Appliances **MUST NOT** be operated with the drain tube cap removed and with no condensate drain tube connected.

As the condensate is a by-product of gas combustion it is mildly acidic. For this reason 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 Condensate Drain Pipe





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.

- (A) Flue spigot with integral condensate trap. Water heater drain outlet connection is 16mm.
- (B) Aluminium condensate drain tube. (Supplied with flue terminals FFWALLTERM or FFROOFCOWL).
- © Silicone connection tube and retaining clips. (Supplied with flue terminals FFWALLTERM or FFROOFCOWL).
- Continuous fall (of at least 2°) from water heater to discharge point. Lengths and bends in accordance with "Table 2. Drainage lengths & changes of direction" on page 11
- (E) 16 mm UPVC conduit to terminate in accordance with (G).
- (F) Drainage tube to be sealed to conduit with approved silicone.
- G 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.

4

3

5

6

Length & Changes Of Direction

Maximum length and changes of direction greater than 45° for the drainage pipe to be in accordance with that described in the Table 2.

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 200 mm or higher than 300 mm above an unpaved surface; or
 - (ii) not lower than 75 mm or higher than 300 mm above a gravel pit not less than 100 mm 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 requirements of the above sections.

Common Stack Discharge

Where individual water heaters are installed in a multi-storey 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 requirements of the "Installation Method" on page 11.

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 300 mm in length. It shall discharge into a tundish through an air gap of not less than 75 mm and not more than 150 mm measured from the outlet of the drain pipe to the rim of the tundish.

D :		
~	nn	
1 \1		a

Table 2. Drainage lengths & changes of direction				
Max length (Metres)	9	8	7	6

Max changes of direction >45°

FLUE TERMINAL CLEARANCES

Horizontal Terminal Clearances (Extract from AS/NZS 5601)

= Gas meter

М



LEGEND:

I = Mechanical air inlet

S = Structure

= Electricity meter or fuse box P Z = Fan-assisted appliance only

Shading indicates prohibited area for flue terminals

	T = Flue terminal Z = Fan-assisted appliance only	area for flue te
		Min. Clearances (mm)
D _(l kara	Fan
Ref.	Item	assisted
	Below eaves, balconies and other projections:	
а	For appliances up to 50 MJ/h input	200
	For appliances over 50 MJ/h input	300
b	From the ground, above a balcony or other surface *	300
С	Front a return wall or external corner *	300
	From a gas meter (M) (see Note 5)	
d	(see Clause 5.11.5.9 for vent terminal location of regulator)	1000
	(see Table 6.7 for New Zealand requirements)	
е	From an electricity <i>meter</i> or fuse box (P) † (see Note 5)	500
f	From a drain pipe or soil pipe	75
g	Horizontally from any building structure* = or obstruction facing a terminal	500
h	From any other flue terminal, cowl, or combustion air intake *	300
	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 *	300
j	Appliances over 150 MJ/h input up to 200 MJ/h input *	300
	Appliances over 200 MJ/h input up to 250 MJ/h input *	500
	Appliances over 250 MJ/h input *	1500
	All fan-assisted flue appliances, in the direction of discharge	1500
k	From a mechanical air inlet, including a spa blower	1000
	Vertically below an openable window, non-mechanical air inlet, or any o	ther opening into a
	building with the exception of sub-floor ventilation:	
n	Space heaters up to 50 MJ/hr input	150
	Other appliances up to 50 MJ/hr input	500
	Appliances over 50 MJ/h input and up to 150 MJ/h input	1000
	Appliances over 150 MJ/h input	1500

* Unless appliance is certified for closer installation.

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

NOTES:

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

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

- See Figure J3 for clearances required from a flue terminal to an LP Gas cylinder. A 3 flue terminal is considered to be a source of ignition.
- For minimum clearances not addressed above acceptance should be obtained from the 4 Technical Regulator.

Minimum clearances d and e also apply to any combustion air intake openings of appliances. 5

LOCATION OF FLUE TERMINALS OF BALANCED FLUE, FIGURE 6.2 (in-part) ROOM-SEALED, FAN-ASSISTED OR OUTDOOR APPLIANCES

SPECIFICATIONS

FLUE COMPONENT DIMENSIONS



DESCRIPTION	CODE NUMBER	BAR CODE NUMBER
Starter Bend	FFSBEND	9314109158311
Universal 45/90 Degree Bend	FFBEND	9314109143058
Horizontal Flue Terminal	FFWALLTERM	9314109107685
Flue Pipe 1000mm length	FFPIPE1000	9314109107061
Vertical Flue Terminal	FFROOFCOWL	9314109107678
Ceiling Ring	FFWSEAL	9314109107722
Wall Plate	FFWPLATE	9314109107715

NOTES

NOTES

Rinnai Australia Pty Ltd

ABN 74 005 138 769 | AU24752

100 Atlantic Drive, Keysborough, Victoria 3173 P.O. Box 460, Braeside, Victoria 3195 Tel: (03) 92716625 Fax: (03) 92716622

National Help Line

Tel: 1300 555 545* Fax: 1300 555 655 Monday to Friday, 8.00 am to 5.00 pm EST.

After Hours Hot Water Service Line Tel: 1800 000 340*

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

For further information visit **www.rinnai.com.au** or email **enquiry@rinnai.com.au**

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 3 years.

With our policy of continuous improvement, we reserve the right to change, or discontinue at any time, specifications or designs without notice.