City Gas' Guidelines on Gas Water Heater (GWH) Installations for Domestic Use

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Foreword

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Disclaimer

This handbook is intended for use with gas water heaters under the Rinnai, Macro and Ferroli brands only.

The information contained in this handbook is to be used as a general guide only. Users and installers have to refer to the respective gas water heater manufacturer's specifications and instructions for the different types of gas water heaters used.

City Gas Pte Ltd (as Trustee) shall not be held accountable for any loss, damage or delay in whatsoever form, that is in relation to the accuracy or completeness of the information provided in this handbook.

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Guidelines on the Installation of Gas Water Heater in Domestic Premises

These guidelines has been prepared to assist Professional Engineers, Licensed Gas Service Workers, Licensed Gas Service Workers (Restricted) and other responsible persons such as plumbers and electricians in the planning, design and installation of the gas water heaters in domestic premises.

References: 1) Gas (Supply) Regulations
2) CP 51:2004 Code of Practice for Manufactured Gas Pipe Installation
3) City Gas Handbook on Gas Supply

1. General Requirements for Installation of Gas Water Heater

1.1 Under the Gas Supply Regulations, gas appliance installed should be in accordance with the specifications of the manufacturer. The responsible person shall ensure:

a) Sufficient and permanent supply of air for the gas appliance (as specified by the manufacturer) for proper combustion;
b) The flue, pipework or proper means of removal of products of combustion from the gas appliance;
c) The room or the internal space in which the gas appliance is to be used has adequate ventilation (as specified by the manufacturer);
d) There is a means of shutting off the supply of gas to such gas appliance;
e) The gas appliance is easily accessible for operation, inspection and maintenance

1.2 A qualified person(s) shall be engaged to provide the hot/cold water pipes works and electrical power point that is required for the installation of the gas water heater.

1.3 The gas water heater must be installed in a position that will not cause:
a) Obstruction or restriction to the exhaust flue air outlet from the gas water heater;
b) Damage to property and/or injury to people

1.4 Installation of the temperature controller shall comply to the manufacturer's guidelines and it is advisable to install the temperature controller in an accessible location to the users.

2. Gas Water Heater Installation in Condominium or Executive Condominium Development

2.1 Outdoor-Model

a) Provision of an electricity supply of 220-240V 13A power point/isolator (weather proof) to power the gas water heater.

b) The gas water heater must be installed away from any ventilation openings (at least 600mm away) i.e. windows to prevent exhaust flue air from being blown into the premises. (see Figure 2)

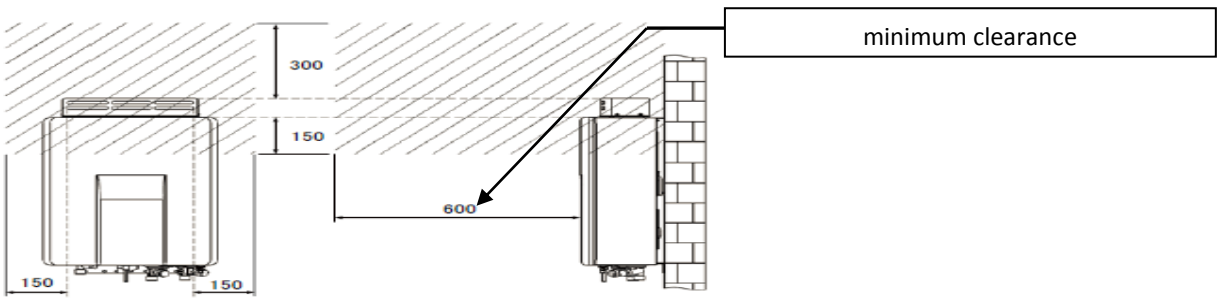


Figure 1: Installation dimensions (in mm) for outdoor-type GWH.

Note: the shaded areas where the exhaust flue air emits. Avoid installing near windows or openings where exhaust flue air can enter due to positioning of window.

c) Sufficient and adequate accessible space shall be provided for safe maintenance and replacement of the gas water heater.

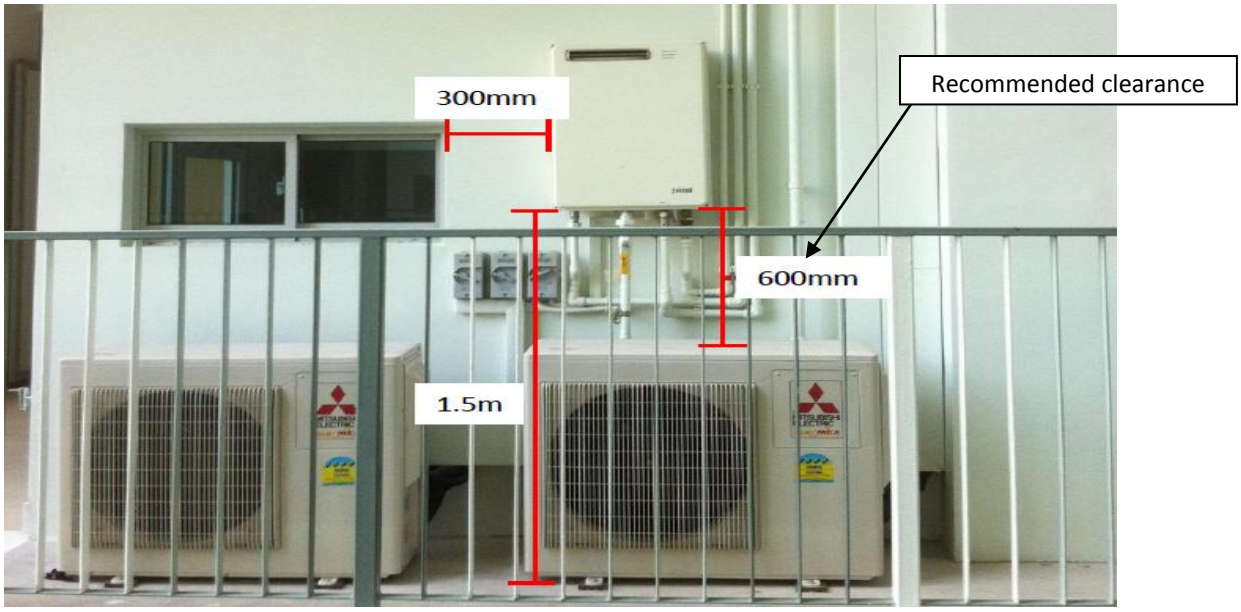


Figure 2: Example of outdoor-type GWH Installation: 1.5 metres from bottom of heater to ground, 600mm clearance from front of the heater exhaust and 300mm away from the window

2.2 <u>Indoor-Model</u>

a) Flue pipe accessories (supplied by manufacturer) are to be fitted to divert the exhaust flue air out of the premises for indoor gas water heater.

b) Flue pipe length must not be more than 5 metres. See Figure 3 below.

(Note: 1 elbow bend = 1 metre flue pipe length, which means the flue pipe can be configured as 3 metres length with 2 elbow bends, or 4 metres length with 1 elbow bend).

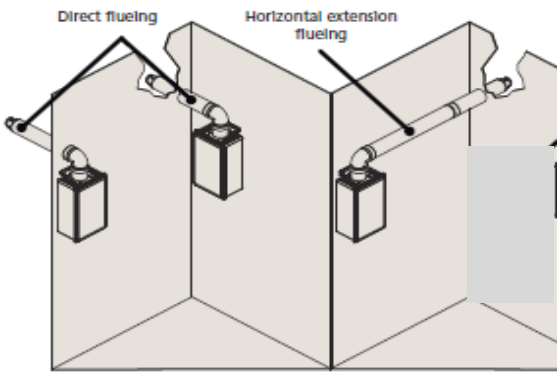


Figure 3: Example of Flue Pipe installations for Indoor-type GWH. Note that the indoor GWH should be installed at a height of 1.5 metres from the bottom of the heater to the ground and have a height clearance of at least 300mm (it must be slanted a bit towards the flue pipe end point)

c) The position of the flue terminal (end point) must not cause damage to the property and/or injury to people.

d) The flue pipe terminal point should not be obstructed to prevent dissipation of the exhaust flue air. (see Figure 4 below)

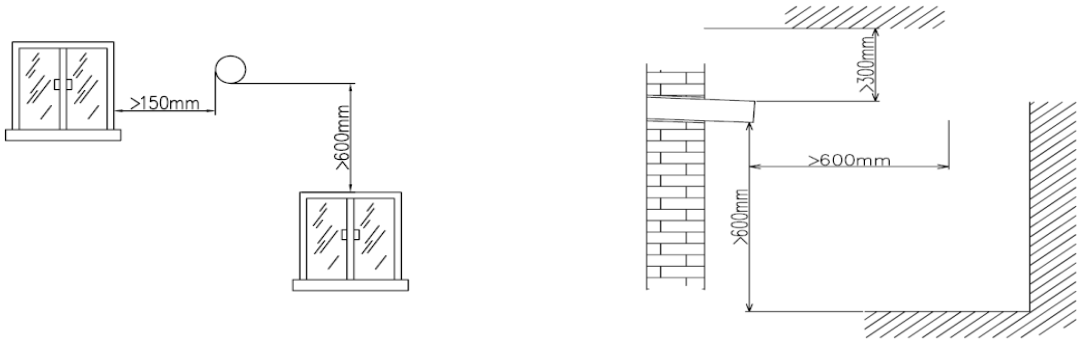


Figure 4: Example of flue pipe terminal point position for indoor-model. Note the dimensions for the positioning of the flue pipe end point, so as to prevent the exhaust flue air from causing damage to wall paintwork and other installations (electrical, piping, communications, etc) and entering other people's homes

e) The gas water heater must not be installed under an exhaust fan, range hood, near ovens and kitchen stoves.

2.2.1 Enclosing Compartment of Indoor Model Gas Water Heater

Please refer to the manufacturer's recommendation (if any) on enclosing the indoor model gas water heater. The following shall serve as a general guide:-

a) Minimum clearance of 150mm at both sides of the heater
b) The bottom of the enclosing compartment shall not be enclosed to facilitate combustion
c) The door closing the compartment shall be a fully louvered door with the minimum clearing distance of 100mm from the front panel of the heater to the louvered door.
d) The top of the enclosing compartment shall have a minimum opening of 150mm for the installation of the exhaust flue pipe.

3 Recommendation of Gas Water Heater

3.1 Single Unit Gas Water Heater Without Built-In Pump

Recommended for hot water supply pipe length that is less than 10 metres from the furthest hot water point to the gas water heater position.

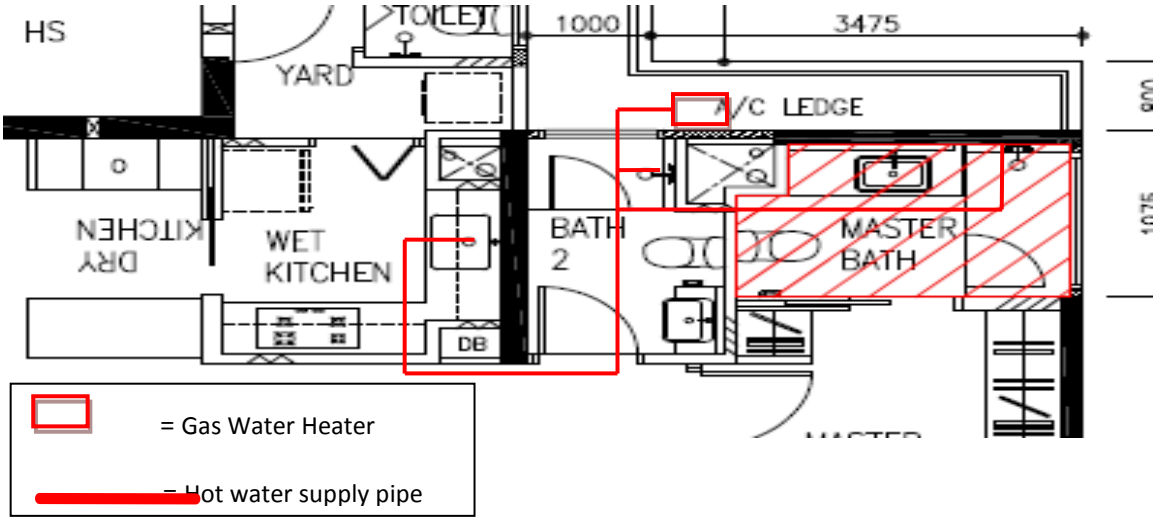


Figure 5: Ideal Stand-Alone GWH hot water piping installation

3.2 Single Unit Gas Water Heater with Built-in pump for water re-circulation

Recommended for hot water supply pipe length exceeding 10 metres from the furthest hot water point to the gas water heater position. The total distance of the hot water pipe which loops back to the gas water heater should not exceed 80 metres (see Figures 6 for more information).

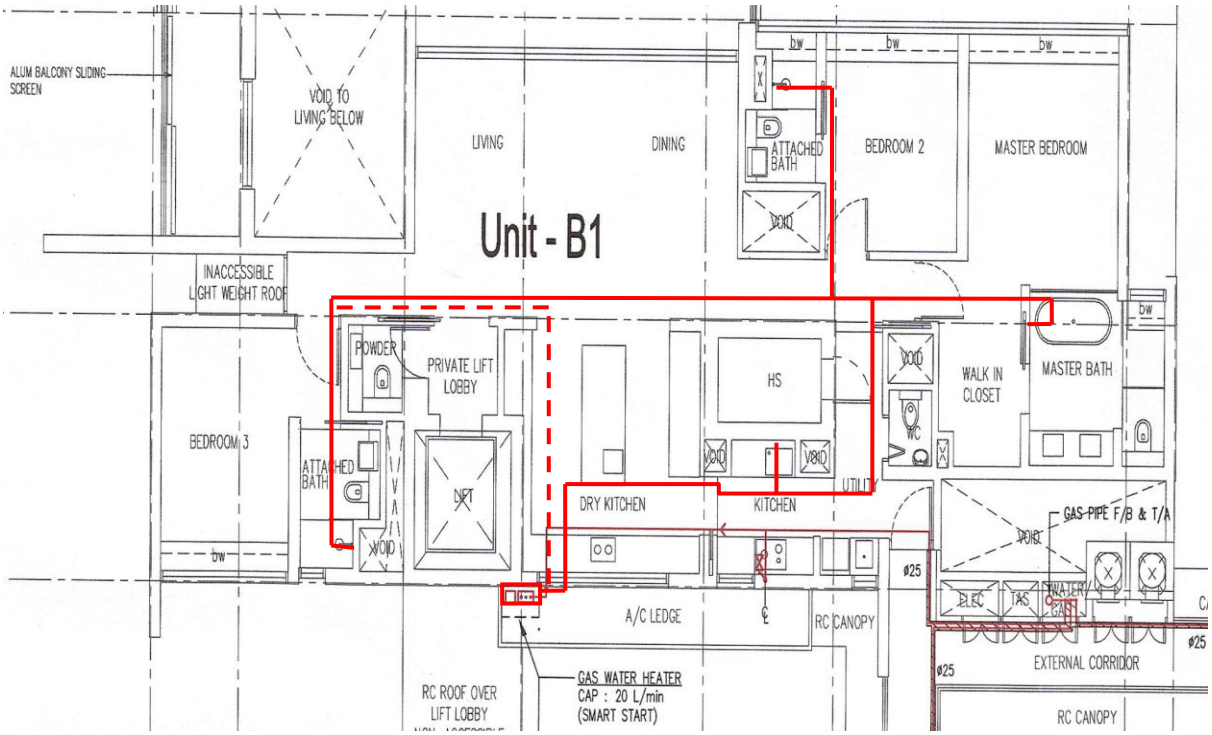


Figure 6: Ideal Gas Water Heater with Built-In pump re-circulation hot water piping installation

- Gas Water Heater
- Hot water supply pipe
- Hot water return pipe

3.3 Gas Water Heater As A Central Unit

3.3.1 The gas water heater can be used as a central unit to supply hot water to various points in the house which are usually in two-storey abode i.e. landed housing or penthouse units.

3.3.2 For such residential units, the water supply pressure must at least attain the minimum dynamic operating pressure and minimum activation flow rate of the gas water heater. (see Figure 7 and section 3.3.5 for details).

Flowrate	No. of hot water points	Supply to:
12L/min	2	1 bathroom + 1 kitchen
16L/min*	3	2 bathroom + 1 kitchen
20L/min	4	3 bathroom + 1 kitchen

Figure 7: Guide showing the different flow rates and the number of hot water points it can support (*16L/min will be phased out)

3.3.3 The hot water re-circulation return pipe must not exceed 5 metres high or below 5 metres.

3.3.4 Table on the Size of the Inlet/Outlet connections

GWH pipe connection size							
Brand	**Ferroli (Outdoor & Indoor)**		**Macro (Outdoor & Indoor)**		**Rinnai (Outdoor & Indoor)**		
Flowrate	16L/min	20L/min	12L/min	20L/min	* 12L/min	**12L/min	20L/min
GWH connections	**Standalone type**						
Water Inlet Connection	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)
Water Outlet Connection	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)
Gas Inlet Connection	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)
GWH connections	**Built-In Re-Circulation type**						
Water Inlet Connection	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	N/A	Ø 15mm ($\frac{1}{2}$ inch)	Ø 20mm ($\frac{3}{4}$ inch
Water Outlet Connection	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	Ø 15mm ($\frac{1}{2}$ inch)	N/A	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)
Hot Water Return Inet Connection	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	N/A	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)
Gas Inlet Connection	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)	N/A	Ø 20mm ($\frac{3}{4}$ inch)	Ø 20mm ($\frac{3}{4}$ inch)

*Only applicable for the REU-1215WF-RS and REU-1215W-RS models only

**Only applicable for the REU-1216WP-RS and REU-1216WFP-RS models only

3.3.5 Table on General Requirement of Gas / Water / Electricity

s/n	***Description***	***Specification***
Gas Supply		
1	Type of Gas	Town Gas
2	Inlet Connection	Refer to above
3	Maximum Pressure	12 Inch W.C.
4	Nominal Pressure (*Dynamic*)	6 ~ 8 Inch W.C.
5	Minimum Pressure (*Dynamic*)	3 Inch W.C.
Water Supply		
1	Cold Water Inlet Connection	Refer to above
2	Hot Water Outlet Connection	Refer to above
3	Return Inlet Connection (*for *B.I.C model*)	Refer to above
4	Minimum Operating Pressure *@ Factory Product Point Test only*	0.1 bar
5	Maximum Operating Pressure (Static)	7 bar
6	Minimum Operating Pressure (*Dynamic*)	1.5 to 2 bar
7	Minimum Activation Flow Rate (*Dynamic*)	2.5 to 3L/min
Electrical Supply		
1	AC 230V / 50Hz / 13A	3-pin socket / isolator
Temperature Controler		
1	Controller power supply	12V DC
2	Signal cable diameter	0.5mm

Procedure for the Installation of the Gas Water Heater (GWH)

Applicable for private residential developments. This procedure must be read in conjunction with the City Gas Handbook on Gas Supply (2013).

The designated contractors shall do a mock-up of the GWH installation for review and approval by the Developer's DR, Vendor's Representative and City Gas (CG) Project Coordinator prior to actual work commencement. This procedure is required for every different unit design type in the project.

Upon completion of the installation and prior to admittance of gas into the development, DR shall carry out quality inspection along with Vendor's Representative and ensure the work done is in accordance with the approved design plans and specified installation guidelines.

Upon successful admittance of gas into the development, the designated contractors shall arrange for a live test and demonstration of the GWH at one of the residential units (preferably a penthouse-type) for the incoming estate managing agent by Vendor's Representative.

CG will provide the gas meter for temporary gas supply and the Vendor's own technicians are to install the gas meter as well as test the GWH. The technicians must be LGSW (R) certified.

The GWH vendor shall ensure that the proper usage and operation of the GWH is communicated clearly to the owners/users of the installed GWH.

Upon successful admittance of gas into the premises, the premises owner shall ensure that the relevant gas utilities account for the premises is successfully set up prior to the activation of the heater.