City Gas Technical Seminar 2015

Design & Installation Guidelines for Gas Water Heater in Private Residential Buildings

Presented by:
Andrew Chua

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Presentation Outline

- Why Instantaneous Heater is Better
- About Gas Water Heater (GWH)
- Different types of GWH
- Design & Installation Guidelines
- Points of Consideration
- Procedure for installation of GWH
- Other household gas appliances

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Why instantaneous heater is better than storage heater?

Parameters	Storage Water Heater	Instantaneous Water Heater
Heat Up Time	Up to 20 min depending on capacity	Instantaneous
Hot Water Capacity	Depends on tank capacity	Unlimited flow of hot water
BCA Greenmark	None	Yes
Heat Loss	Yes, hot water stored in tank	Hot water on demand
Space requirements	Bulky and takes up space	Slim build and minimal space
Operation	User needs to turn on electrical switch and wait about 15 to 20 min	User only needs to turn on hot water and wait for hot water to travel from GWH to outlet
Temp Range	Fixed @ 60-75^{o}C	Adjustable between 35-50^{o}C
Electric requirements	**13A-15A** for both power supply and heating element	13A for power supply. Highly efficient gas-fired heater
Cold lag	No. Hot water tank usually installed above ceiling in bathroom	Built-in Re-circulation to help overcome cold lag

What is a Gas Instantaneous Water Heater?

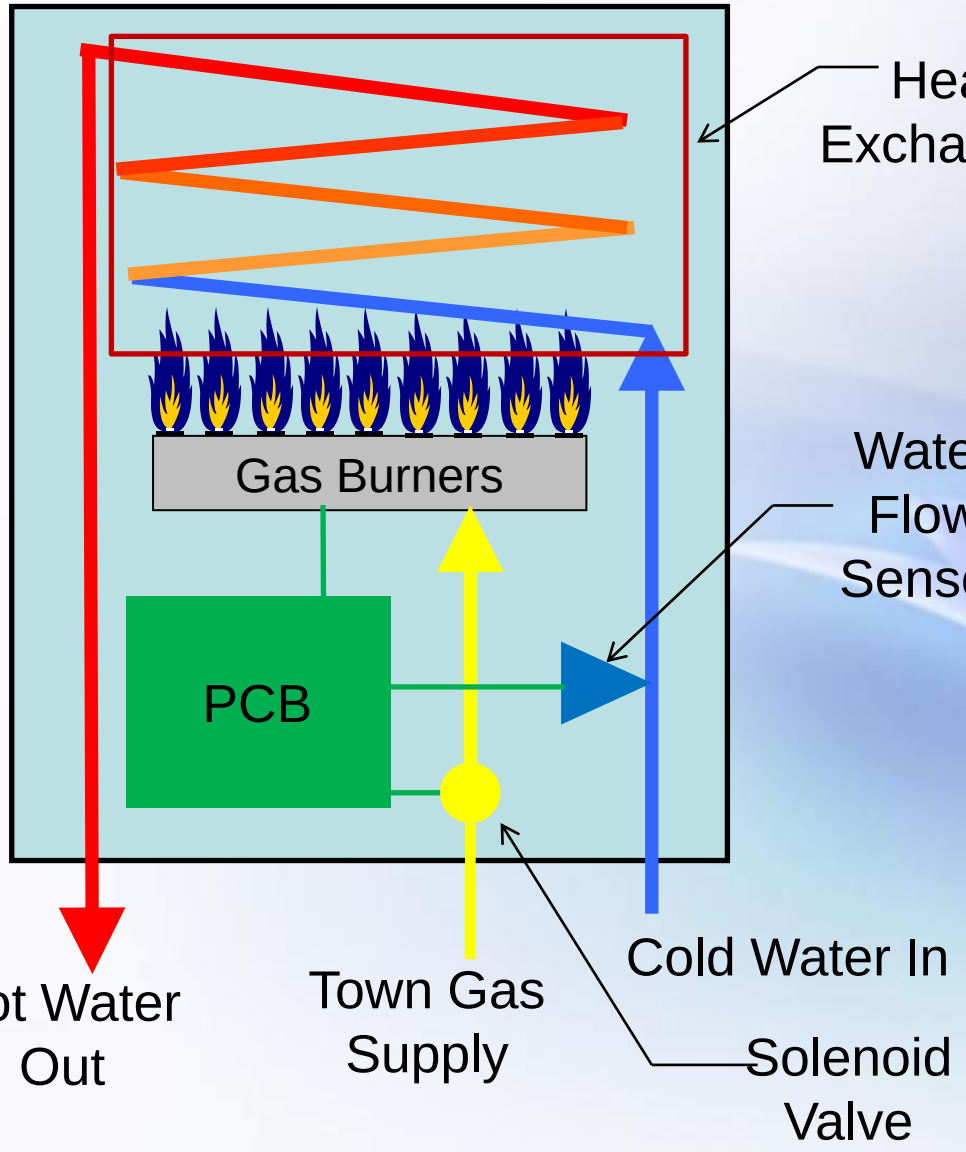
A gas water heater (GWH) is an appliance that uses gas to heat water instantly on demand.



Outdoor type Indoor type

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How does it work?

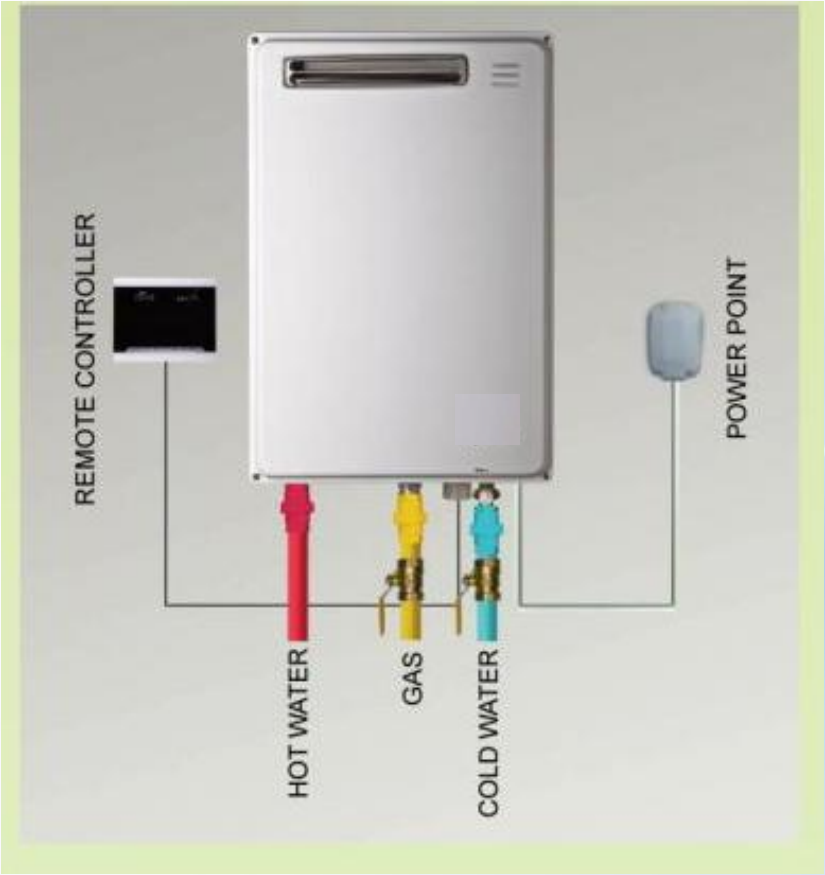


- Hot water tap turned on
- Cold water goes in
- Water flow sensor detects water flow
- PCB detects and activates burner
- Water circulates through heat exchanger
- Water is heated to desired temperature
- GWH shuts down when hot water tap is turned off

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Types of Gas Water Heater

Stand-alone model



Built-in Re-circulation model



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Indoor GWH models



Stand-alone type



Built-in Re-Circulation type

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Types of Gas Water Heater

Standalone GWH



HW Outlet (Kitchen)

HW Outlet (Common Bathroom)

HW Outlet (Master Bathroom)

Hot water supply

Cold water supply

Gas

Recommended HW pipe length

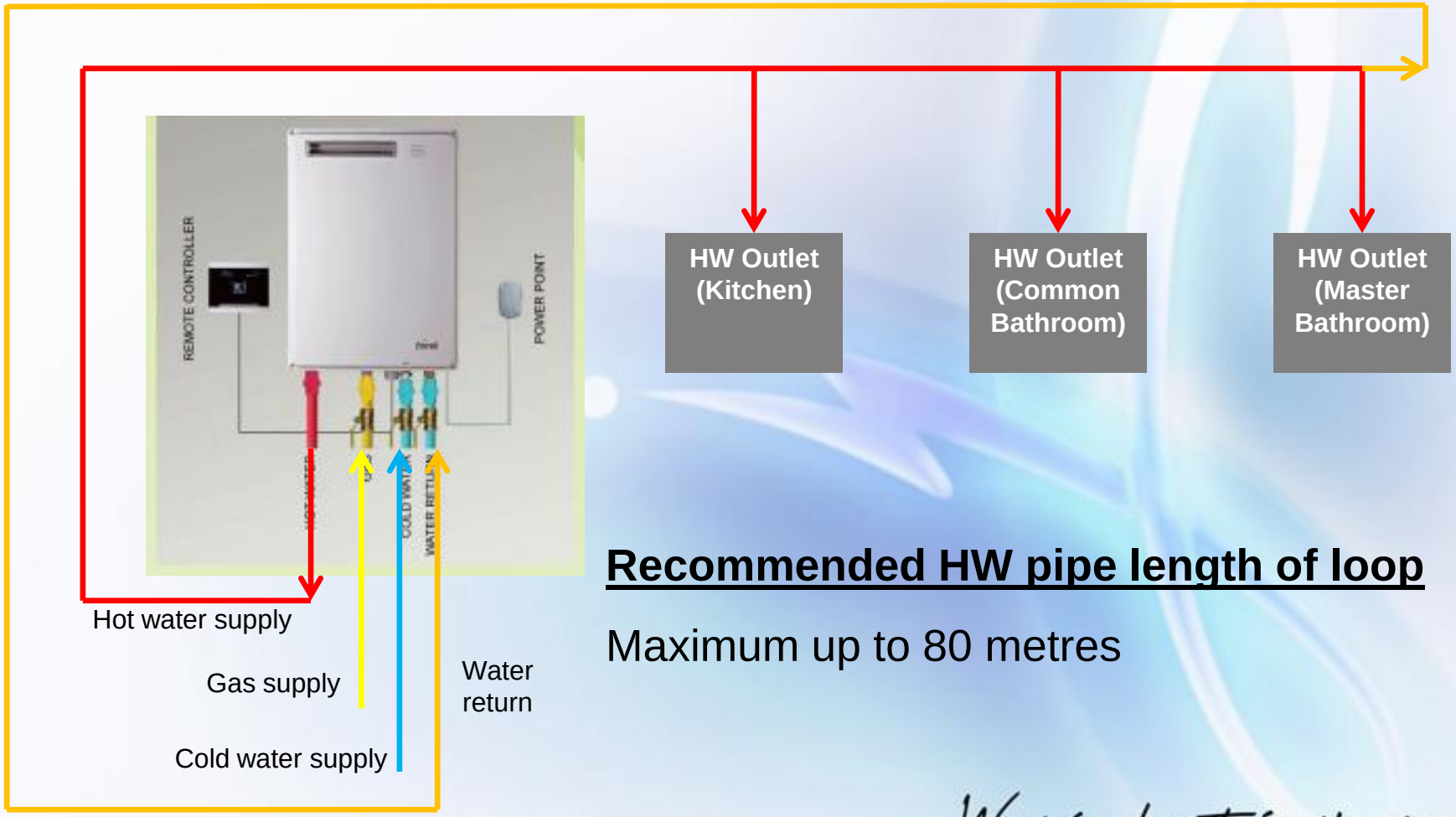
Not more than 10 metres

(about 30s of waiting time)

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Types of Gas Water Heater

Built-in Re-Circulation GWH



Recommended HW pipe length of loop

Maximum up to 80 metres

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Types of Gas Water Heater

Features	Stand-Alone	Built-In Re-Circulation
Operation	Open-loop	Closed-loop (with hot water return pipe)
Pipe Length from GWH to furthest point	Not more than 10 metres	>10 metres and < 80 metres hot water return pipe loop
Pre-heat function	No	Yes
Timer set on temp.controller	No	Yes, two time phases for pre-heating according to user
Electrical requirements	220-240V, 50Hz, 13A 12V DC for controller	220-240V, 50Hz, 13A 12V DC for controller
Installation	AC ledge or service yard	AC ledge or service yard

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GWH capacity

Both GWH types are available in these capacities:

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

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Generic specifications for GWH

s/n	Description	Specification
Gas Supply		
1	Type of Gas	Town Gas
2	Inlet Connection Size	20mm (3/4 inch)
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 Size	Refer to GWH catalogue
2	Hot Water Outlet Connection Size	Refer to GWH catalogue
3	Return Inlet Connection (*for *B.I.C model*)	Refer to GWH catalogue
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 Controller		
1	Controller power supply	12V DC
2	Signal cable diameter	0.5mm

Design & Installation Guidelines

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Purpose of the design & installation guidelines

To provide a general guide to assist:

- Professional Engineers
- Licensed Gas Service Workers,
- Licensed Gas Service Workers (Restricted)
- Other responsible persons
  - in the planning, design and installation of the gas water heaters in domestic premises.

All gas installations are required to comply with the following:

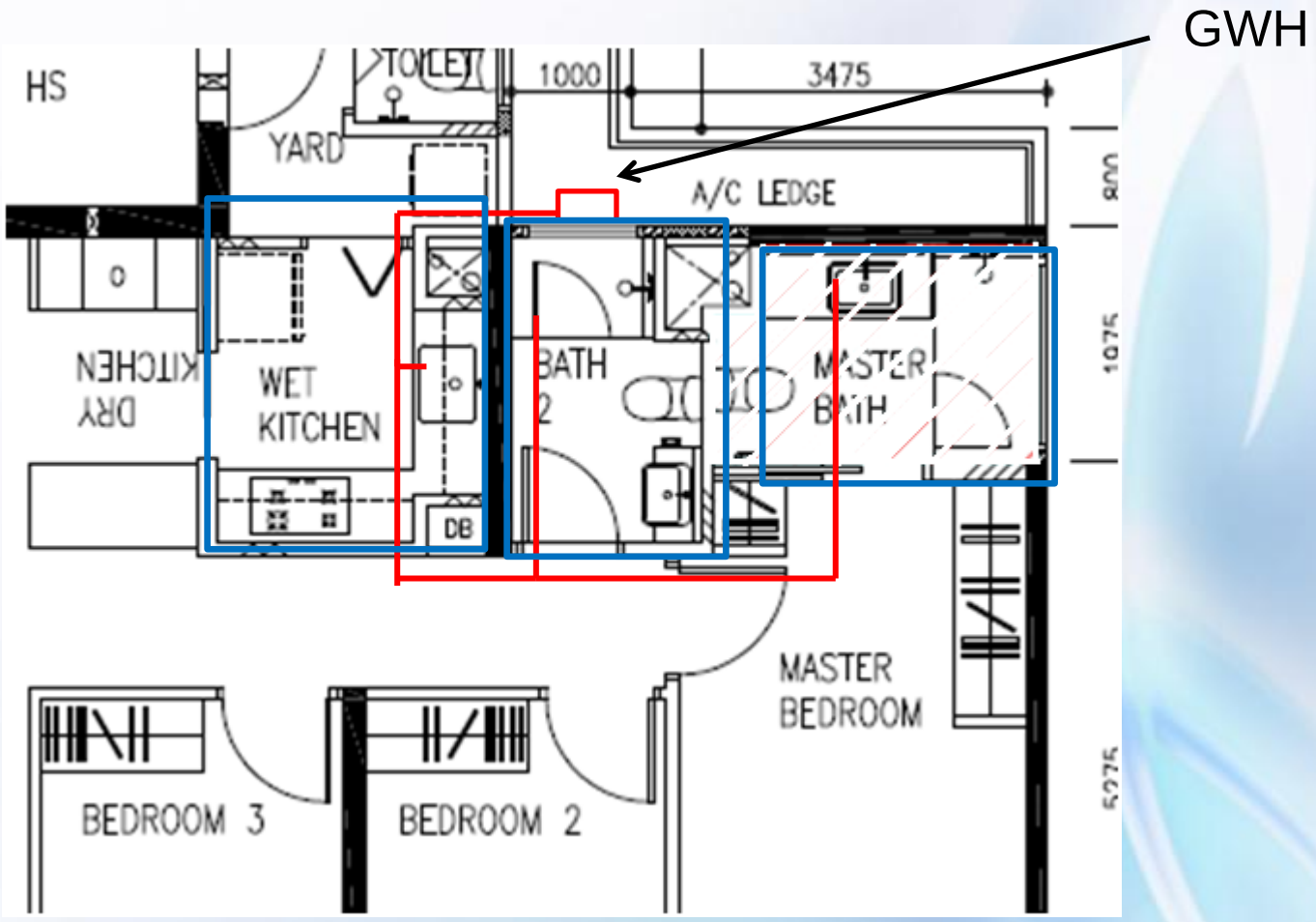
1) Gas (Supply) Regulations

2) CP 51:2004 Code of Practice for Manufactured Gas Pipe Installation

3) City Gas Handbook on Gas Supply

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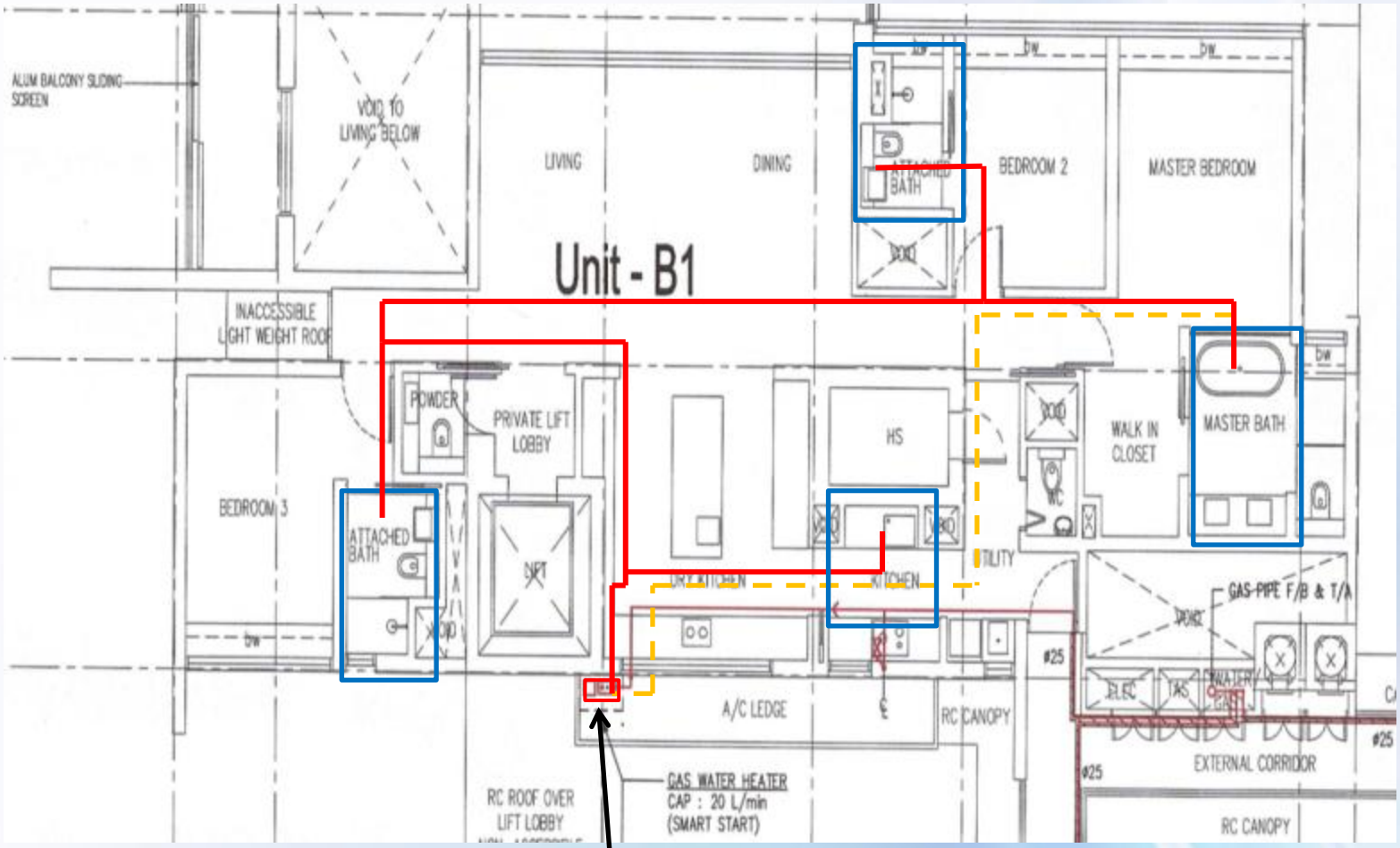
Hot water piping layout using standalone GWH



Hot water supply

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Hot water piping layout using GWH with Built-in Re-Circulation



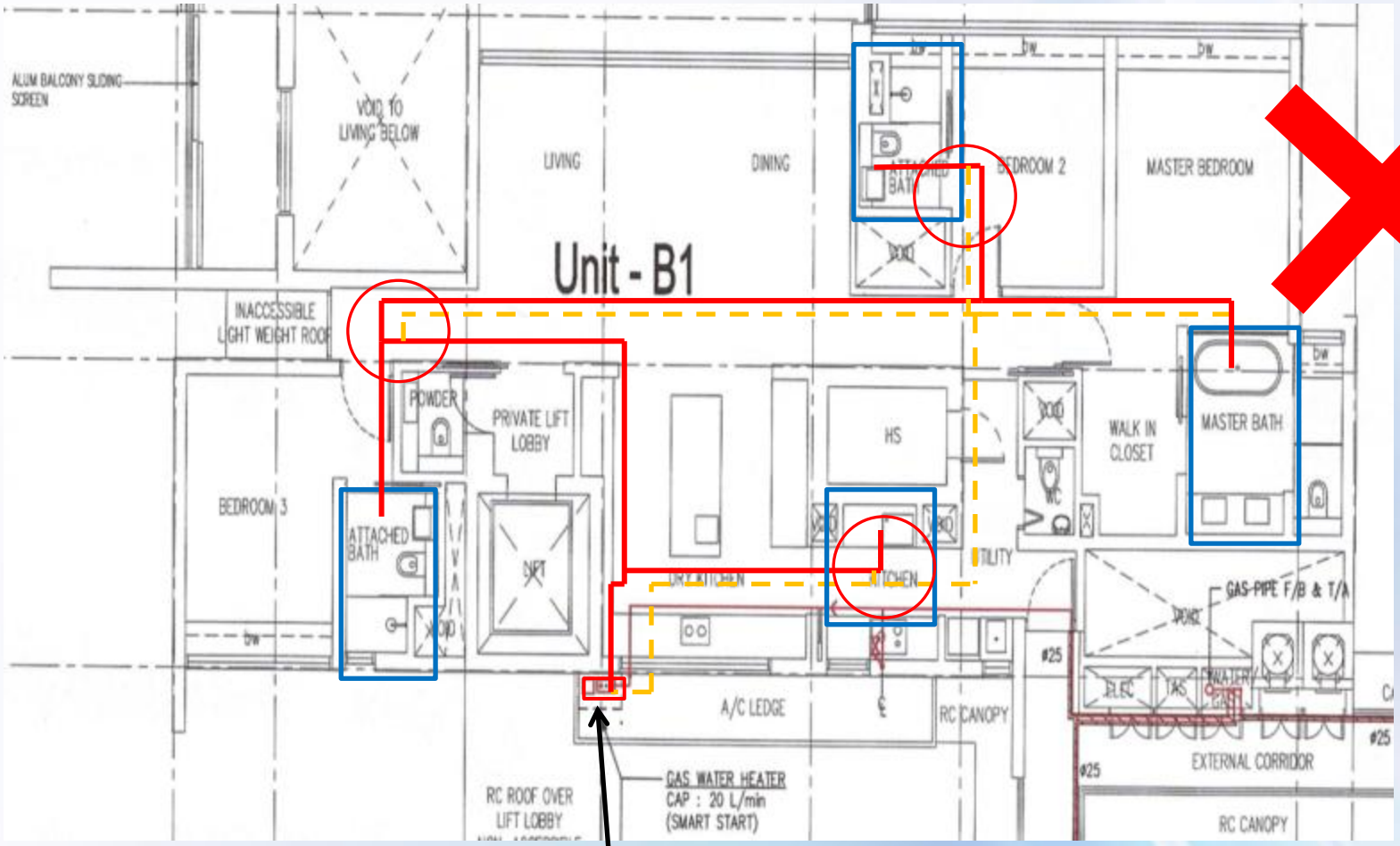
GWH

Hot water supply

Hot water return

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Hot water piping layout using GWH with Built-in Re-Circulation



Hot water supply

Hot water return

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Why cannot have multiple return points?

IMPORTANT!

Having multiple hot water return points will result in ‘short-circuiting’, which means the return loop will go from the nearest point back to the heater, which can result in the other points taking a long time to receive hot water.

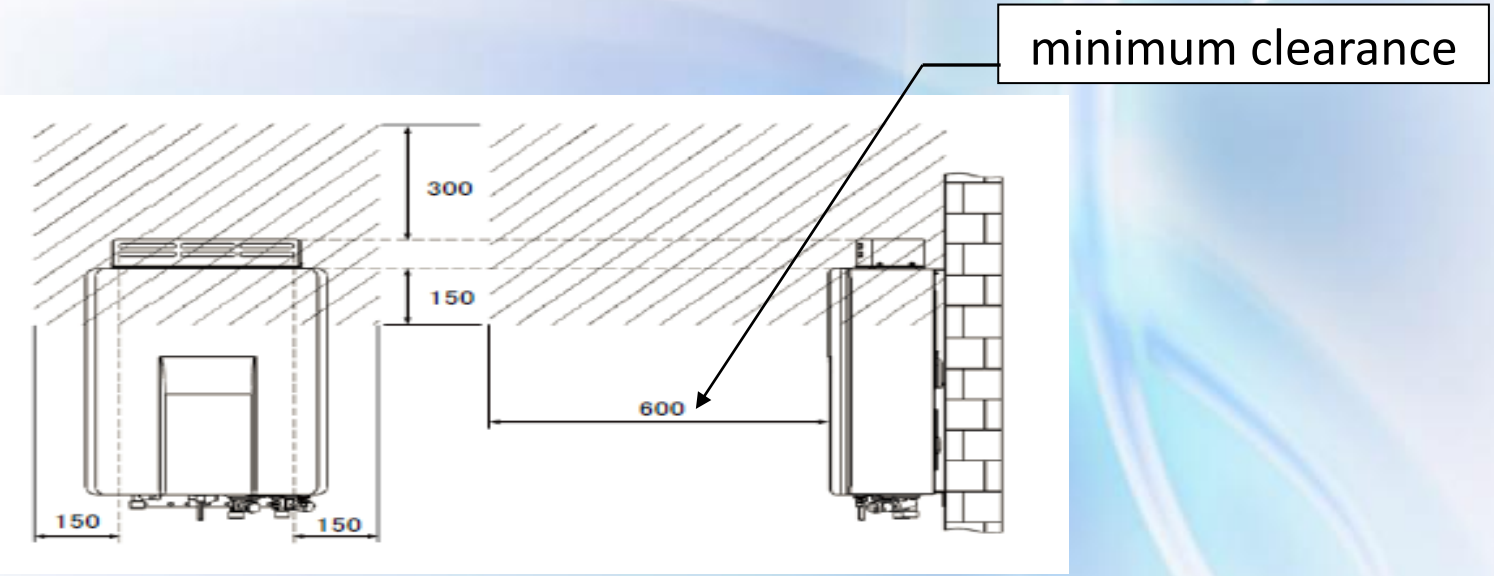
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Gas water heater installation in condominium housing development

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Outdoor GWH model

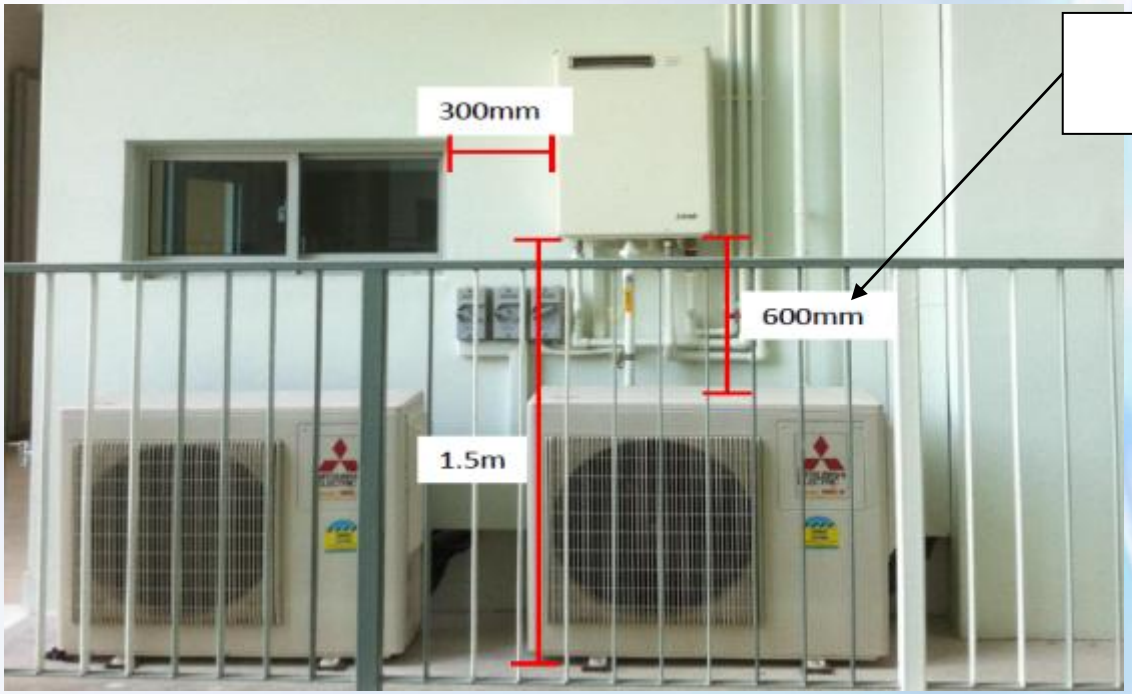
- Provision for 220-240V, 13A power point/isolator
- Must be installed away from ventilation openings (at least 600mm away) to prevent exhaust flue air from being blown inside



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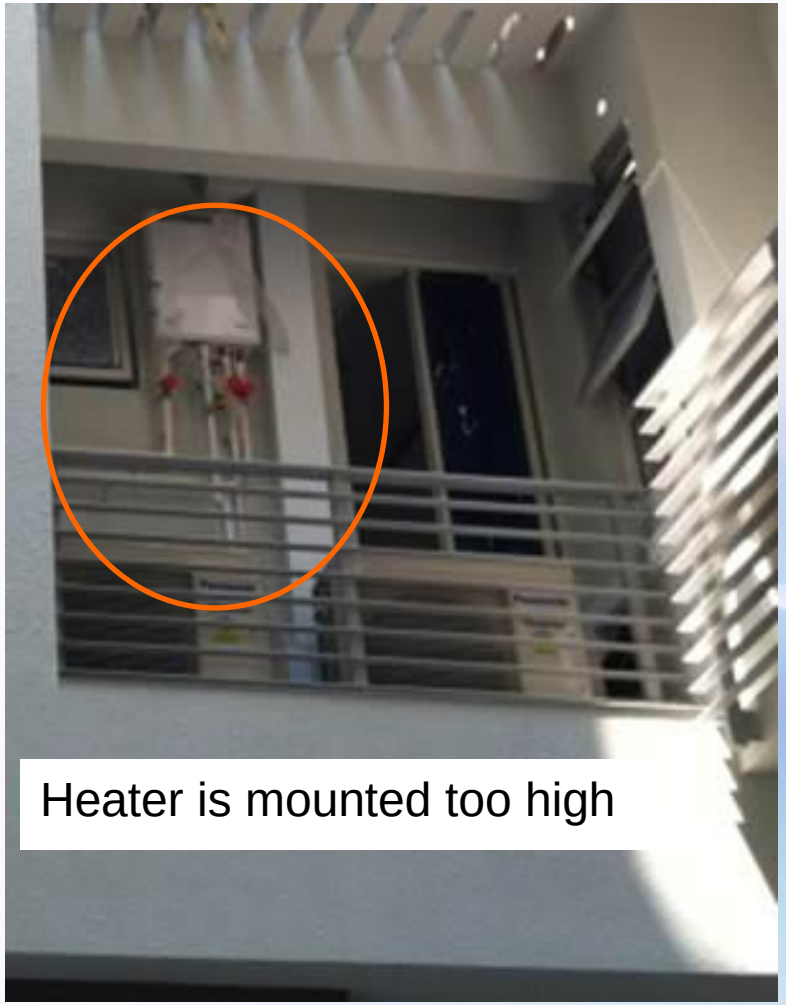
Outdoor GWH model

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



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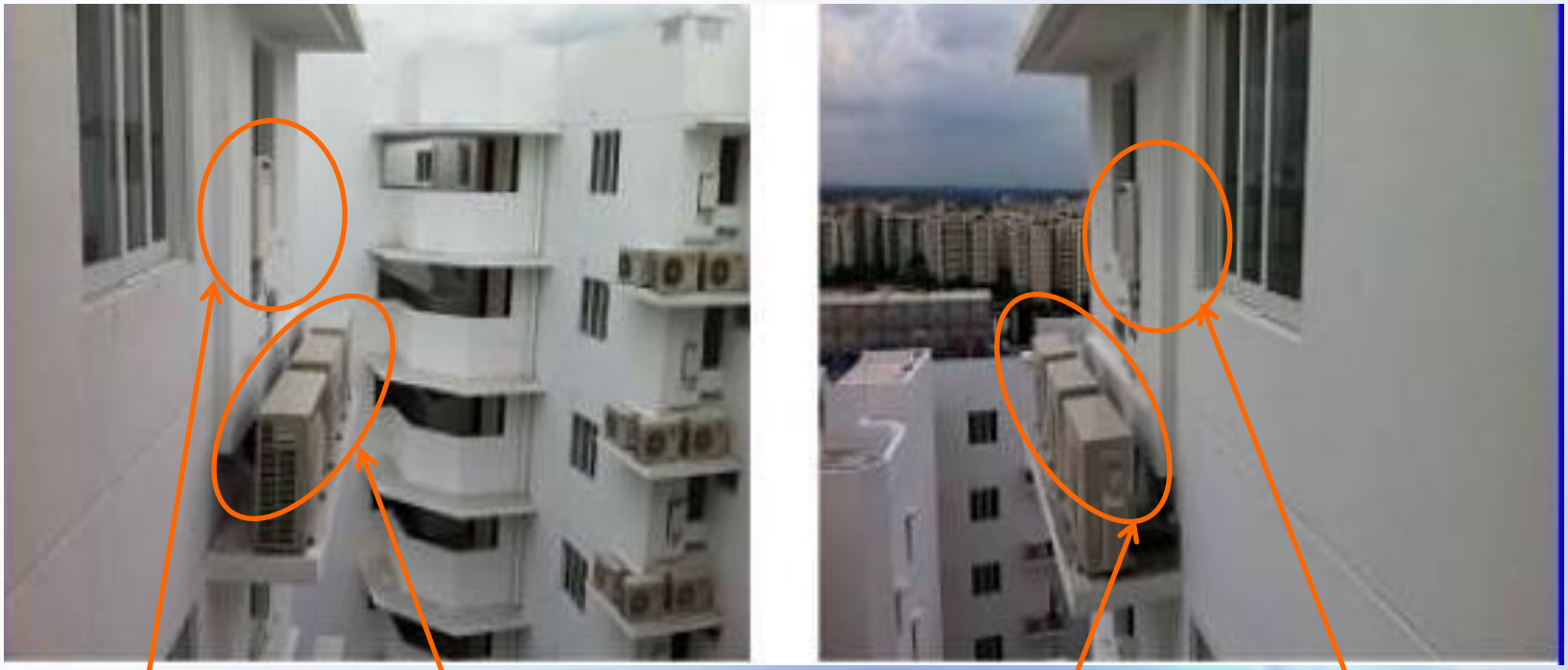
Improper Installations





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Improper Installations



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Improper Installations



No safety fence to protect technician during maintenance

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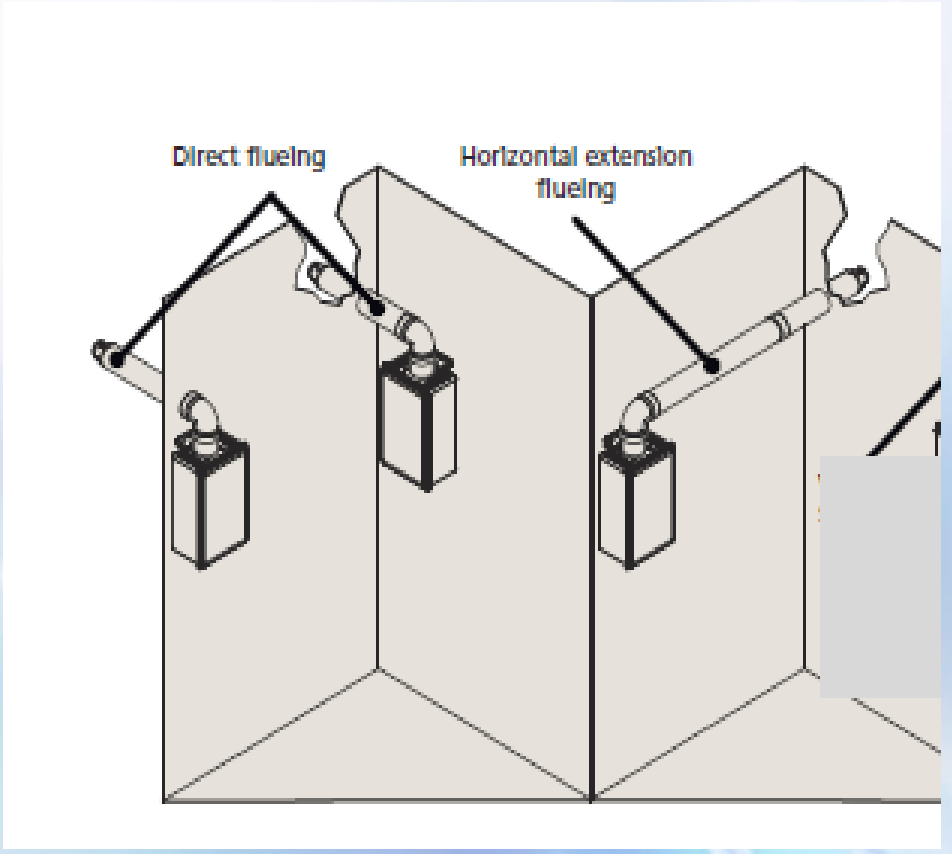
Indoor GWH models

- Flue pipe are required to be installed to discharge the products of combustion out of the premises.

- Flue pipe length must not be more than 5 metres

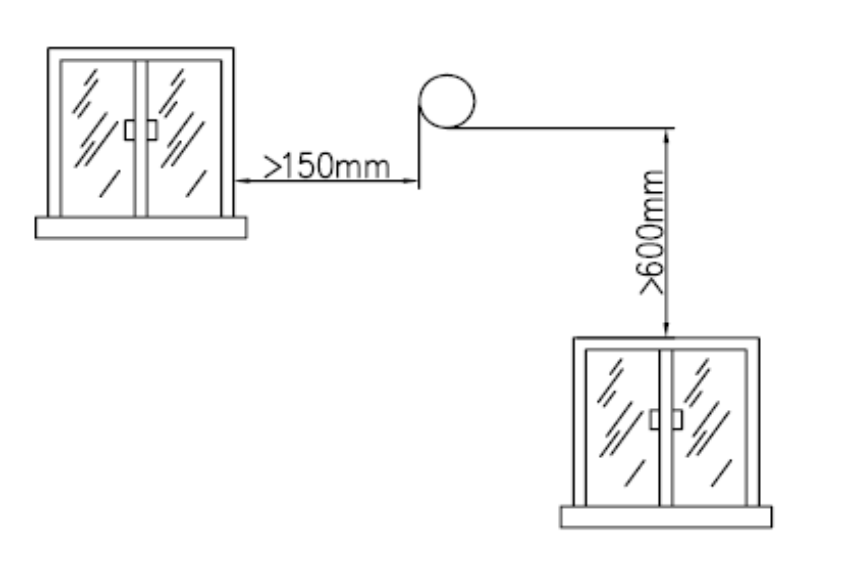
Indoor GWH with flue installation



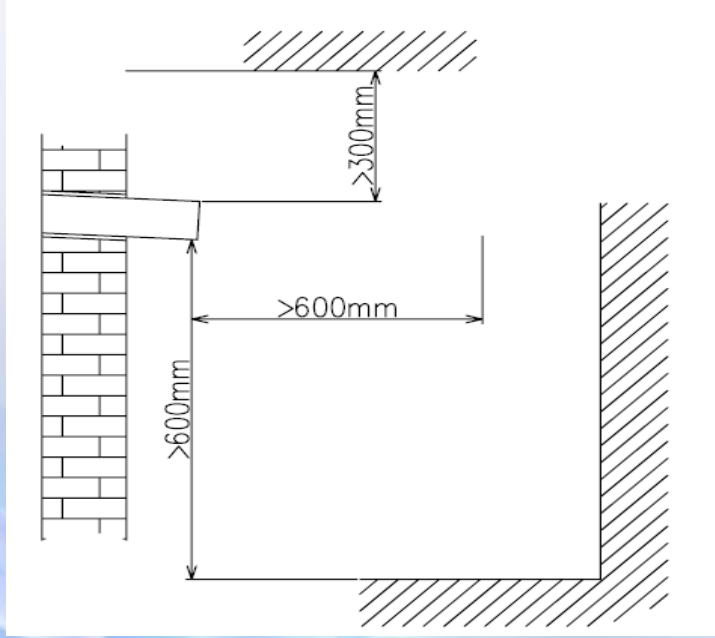


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Indoor GWH flue installation



Front view



Side view

To prevent hot air and by-products from re-entering homes and cause inconvenience to occupants

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Enclosing Indoor GWH in cabinets

The following shall serve as a general guide. However, please refer to the respective vendor for further information:

- 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.

- Bottom of the compartment shall not be enclosed to facilitate combustion

- Minimum clearance of 150mm at both sides of the heater

- Top of the compartment shall have a minimum opening of 150mm for the installation of the exhaust flue pipe.

Points of Consideration for Design and Installation of GWH

- Sufficient and permanent supply of air for proper combustion
- Unhindered discharge of products of combustion
- Location is easily accessible for operation, inspection and maintenance
- Location must not be in a position that can cause products of combustion to re-enter premises or deterioration to property

Procedure for installation of GWH

Mock-up of GWH installation for review and approval by DR, Vendor's representative and City Gas

DR carry out quality inspection along with vendor's representative to ensure work done in accordance to design plans and installation guidelines

Gas admitted

Contractor to arrange live test and demo of GWH by vendor at residential unit for MCST representative. City Gas to provide gas meter for temporary gas supply

Vendor to communicate clearly to home owner on how to use GWH

Home owner to apply for gas utilities account prior to activation of GWH

Suppliers of GWH

Ferroli

Founded in 1955 and headquartered in Italy, Ferroli offers the widest range of gas heating products, which are sold in more than 120 countries worldwide and in Singapore, Ferroli is the first to launch the built-in circulator model

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macro

A Revolutionary Lifestyle

Chinese brand producing gas water heaters since 1988, with manufacturing facilities in China. Represented by Swee Huat Heng Engineering Pte Ltd in Singapore. First to introduce the GWH with wireless temperature controller

To date, more than 65,000 gas water heaters have been installed in condominium projects across Singapore and about 30,000 units for projects in the pipeline.

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Project References

Name of the Development	Location
Ascentia Sky @ Alexandra	Alexandra Rd
Residence @ Canberra	Canberra Dr
NV Residences	Pasir Ris Gr
Waterfront Key	Bedok Reservoir Rd
Tree House	Chestnut Ave
The Canopy EC	Yishun Ave 11
Hundred Trees	West Coast Dr
Vista Residences	Jln Dusun
The Sound	East Coast Rd
The Shore Residences	Amber Rd
Centro	Ang Mo Kio Ave 8
Prive	Punggol Field
Greenwich V	Yio Chu Kang Road
Silverseas	Amber Rd
Austville Residences	Sengkang East Ave
Questa @ Dunman	Dunman Rd

Name of the Development	Location
Water View	Tampines Ave 1
Horizon Residences	Pasir Panjang Hill
Esparina	Buangkok Dr
Boathouse Residences	Upp Serangoon View
THE NAUTICAL	JLN SENDUDOK
Riversound	Sengkang East Ave
Arc at Tampines	Tampines Ave 8
Belysa	Pasir Ris Dr 1
Palm Isles	Flora Dr
Seastrand @ Pasir Ris	Pasir Ris Dr 3
Vacanza @ East	Lenkong Tujoh
Forresque	Petir Rd
8 Courtyard	Yishun Ave 2
Flamingo Valley	Siglap Rd
Nin Residences	Upp Serangoon Rd
Woodhaven	Woodlands Ave 1

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Project References

Name of the Development	Location
Lincoln Residences	Surrey Rd
Adria	Derbyshire Rd
Jardin	Dunearn Rd
Rochelle at Newton	Keng Lee Rd
martinplace Residences	Martin Place
The Trizon	Ridgewood Cl
Emerald Mansion	Emerald Hill Rd
Grange Infinite	Grange Rd
One Jervois	Jervois Close

Name of the Development	Location
Fernhill Place	Fernhill Rd
Viz Holland	Queensway
Newton Suites	Newton Rd
Nexus	Bt Timah Rd
Leonie Studio	Leonie Hill
Nathan Place	Nathan Rd
Garden Vista	Dunearn Rd
Derbyshire Heights	Derbyshire Rd
Robertson 100	Robertson Quay
Amaryllisville	Newton Rd

Project References

Some upcoming developments using gas water heaters



UP@Robertson Quay



Skyline@Orchard



Pollen & Bleu



Luxus Hills Phase 8 &9

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Other gas applications that are adopted by some of the residential developments:

1. **Centralised Laundry System**
2. **Clothes Drying**
3. **BBQ**
4. **Pool Heating**

Gas Clothes Dryer



Centralised Laundry System



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Gas BBQ Stove



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Pool Heating System





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Thank You!

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