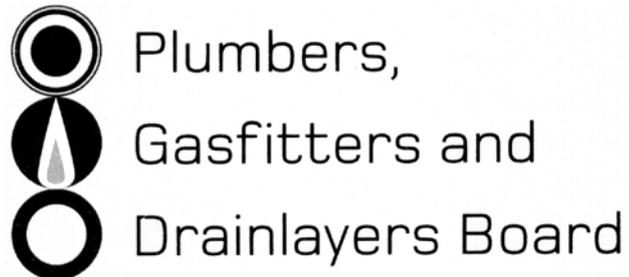


No. 9193



REGISTRATION EXAMINATION, JUNE 2007
GASFITTING

ANSWER SCHEDULE

ANSWER 1

- (a) Hole positioned in middle third of the depth of the joist Not more than three times the depth of the joist from the face of the support. Diameter not to exceed 20% of the depth of the joist or 32 mm whichever is the lesser.

(3 marks)

- (b) Pipe shall be metal and wrapped
Concrete cover shall be appropriate
Minimum number of joints and any must be brazed or welded
Placed to avoid interference with any reinforcing
Pipe shall not reduce the strength of the slab
Piping shall not extend through expansion joints
Any other clauses in the code 2.4.3.9 NZS 5261

(1 mark each) (6 marks)

- (c) Any THREE:
Protected against corrosion
Sealed at the wall
Not subjected to any loading from building or settlement
Allowance for expansion
Sealed to vapour barrier

(3 marks)

- (d) Any FOUR:
Parallel male threaded fittings
Square back elbows
Long screw connectors
Internally threaded PVC fittings
Compression fittings with non metallic olives
Any other clauses in the code 2.3.3 NZS 5261

(½ mark each) (2 marks)

- (e) ONE of:
To avoid internal erosion of the pipework
To prevent excessive noise from the pipework

(1 mark)

Total 15 marks

ANSWER 2

½ mark for name, 1 ½ marks for description

(a) Smoke test:

Either a smoke pellet is placed in the combustion chamber, or a smoke taper is held beside the DDD and with the appliance in full operation the flow of smoke is observed.

Spillage test:

A cold surface is held alongside the DDD and the condensation of water vapour indicates spillage.

(4 marks)

(b) Any FOUR:

Wind direction,

Turbulence and downdraught,

Proximity of people,

Clear of combustible material

Proximity to openings

Clear of abutments

(Any other from NZS 5261. 2.6.13 acceptable)

(2 marks)

(c) Any TWO:

Products of combustion can enter the circulating air,

The combustion can be upset leading to CO poisoning

Could cause a fire

Lockout on overheat switch

(2 marks)

Total 8 marks

ANSWER 3

- (a)
- 1 Gas control valve
 - 2 Thermo-electric flame failure device
 - 3 Pilot adjuster
 - 4 Main burner regulator
 - 5 Snap acting thermostat
 - 6 Thermal energy cut off device
- (6 marks)
- (b)
- 1 Provide air for combustion
 - 2 Provide air for flue gas dilution
 - 3 Provide air for cooling the surroundings
- (3 marks)

Total 9 Marks

ANSWER 4

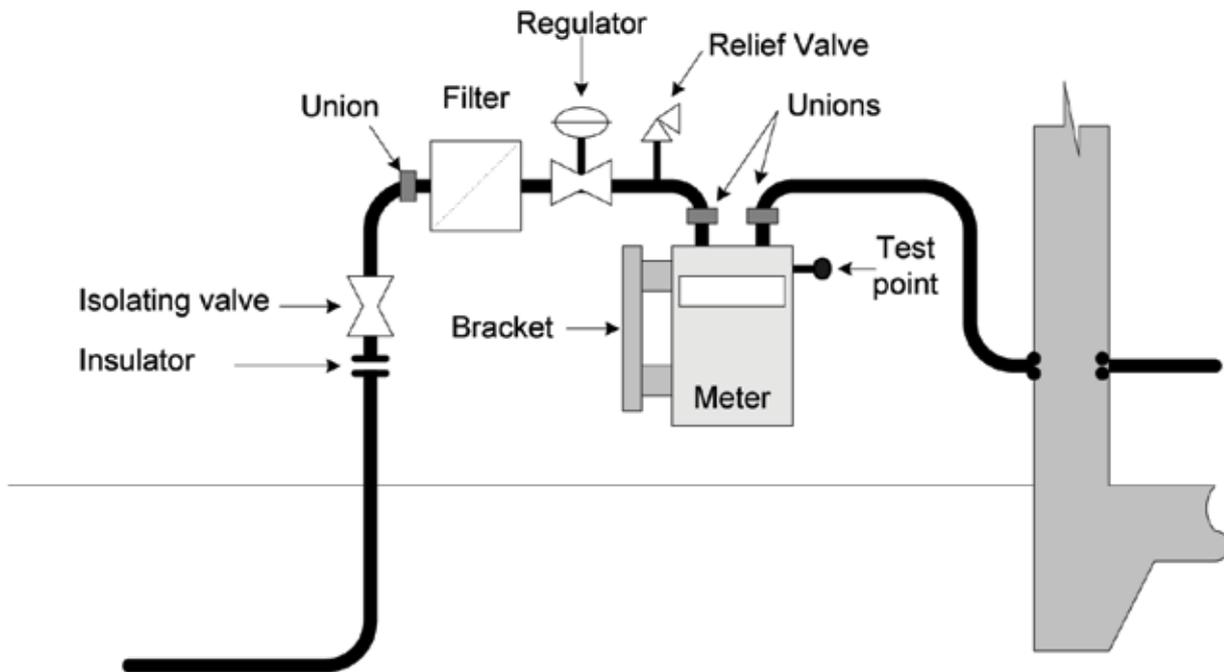
- (a) Any TWO:
- PE is degraded by UV light
 - PE is easily physically damaged
 - PE is more readily damaged by fire
- (2 marks)
- (b) A pigtail provides a flexible connection between the rigid pipework and the cylinder (or appliance) to prevent undue stressing and to allow easy connection.
- (2 marks)
- (c) Any THREE:
- Does not corrode
 - Long lengths and thus less joints
 - Lighter and more flexible to handle
 - Non-conducting material
 - Cost effective (labour saving)
 - Less friction loss/greater flow
- (1 mark each) (3 marks)

Total 7 marks

ANSWER 5

(a)

Require each of the following correctly positioned and labeled. Symbols not to be marked.

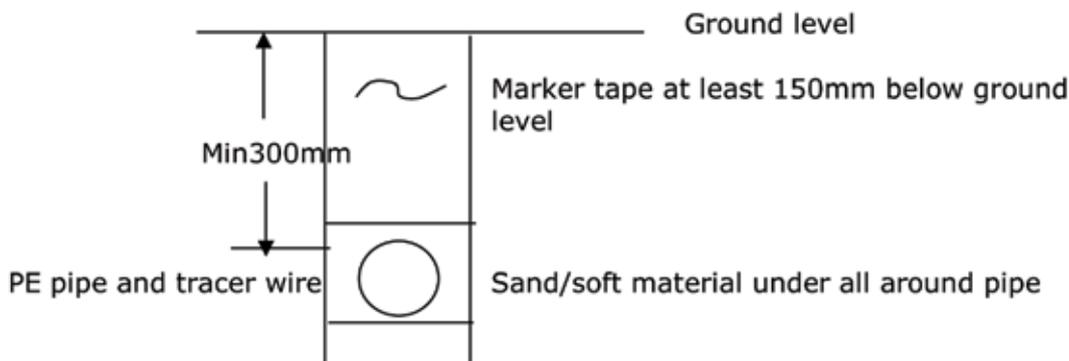


Note: Filter, Regulator, Relief valve often an integrated unit

- 1 Insulator
- 2 Isolating Valve
- 3 Filter
- 4 Regulator
- 5 Relief Valve
- 6 Meter
- 7 Union connections
- 8 Bracket
- 9 Meter not on ground
- 10 Meter not supported by pipework

(½ mark each) (5 marks)

- (b) 1 Not to obstruct exit in case of fire.
 2 So that any gas leaking from the meter set does not enter the house. (2 marks)
- (c) $0.025 \times 2 = 0.05 \text{ m}^3/\text{min}$
 $0.05 \times 60 = \underline{3 \text{ m}^3/\text{hr}}$ (2 marks)
- (d) To ensure that if the pipework is carrying any stray electrical currents a spark is not created or a shock obtained when the pipes are separated. (1 mark)
- (e) Must have min. 300 mm and any 2 of the other 3.



(3 mark)

Total 13 marks

ANSWER 6

- (a) A balanced flue is room sealed and air for combustion is drawn from outside and the products of combustion are discharged outside. Combustion air is drawn in and the products of combustion are pushed out by convection, because the hot products are less dense. The air inlet and outlet have the same point of discharge. (4 marks)
- (b) The FFD has a probe, placed in the flame, that contains two wires of different metals. When the thermo couple is heated a small electric current is generated at the hot junction and this is used to hold open a electro magnetic valve in the gas line. When the flame goes out the probe cools, the current stops and the electro magnetic valve is de-energised and the valve is closed by spring. (4 marks)

(c) Any FOUR:

Burner lited or otherwise restricted

Primary air restricted

Combustion air contaminated

Excessive pull on flue

Cracked radiants

(4 marks)

Total 12 marks

ANSWER 7

(a) Any FOUR:

Quarter turn isolating valve to shut of gas supply

Filter to trap any dust in the gas and prevent damage

Pressure Regulator to control pressure in installation

Overpressure shut off/relief valve to protect installation

Gas meter to measure consumption

(4 marks)

(b) An Automatic Safety Shut-off Valve opens slowly to establish the main burner flame,
and then shuts the gas off instantaneously if the flame fails or if it is signalled to close.

(2 marks)

(c) Any FOUR:

To control the ignition and flame detection devices.

To control purge times

To control ignition times

To provide flame proving

To provide rapid shut down if a fault occurs

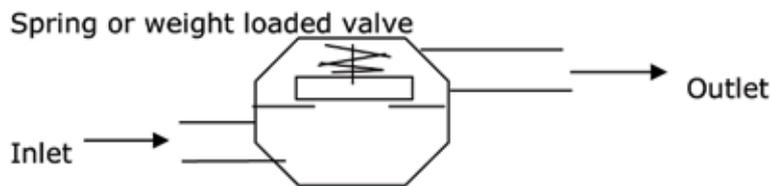
(4 marks)

(d) By deleting the incorrect word in each box in the following table, indicate the status of the equipment in each stage of the operating sequence for an automatic gas burner.

Stage	Fan	Igniter	Flame Detector	Pilot Burner Control Valve	Main Burner Control Valve
Pre-purge	On	Off	Off	Closed	Closed
Start flame establishment	On	On	On	Open	Closed
Start flame proving	On	Off	On	Open	Closed
Main flame establishment	On	Off	On	Open	Open
Full operation	On	Off	On	Closed	Open
Post -purge	On	Off	Off	Closed	Closed

(1 mark for each correct row) (6 marks)

(e) Non-return valve



Reverse flow must force valve down on to seat

(2 marks for sketch, 1 for direction of flow) (3 marks)

Total 19 Marks

ANSWER 8

- (a) Ventilation is required to reduce the gas/air mixture below the lower explosive limit as quickly as possible. (2 marks)
- (b) Any TWO:
The flame is luminous, yellow, floppy and may be smoky and deposit soot. (2 marks)
- (c) For safety reasons – so that any escaping gas may be readily noticed and the gas identified. (1 mark)
- (d) Carbon monoxide (CO). (1 mark)

- (e) 1 Methane (CH₄)
2 Carbon Dioxide (CO₂)

(1 mark each) (2 marks)

Total 8 marks

ANSWER 9

(a) Any FIVE:

- 1 Bedrooms
- 2 Bathrooms
- 3 Saunas
- 4 Toilets
- 5 Hallways
- 6 Residential garages

(1 mark each) (5 marks)

(b) Any FOUR:

Plumbers, Gasfitters & Drainlayers Act

Gas Act

Building Act

Hazardous Substances and New Organisms Act

Occupational Health and Safety Act

(4 marks)

Total 9 marks

