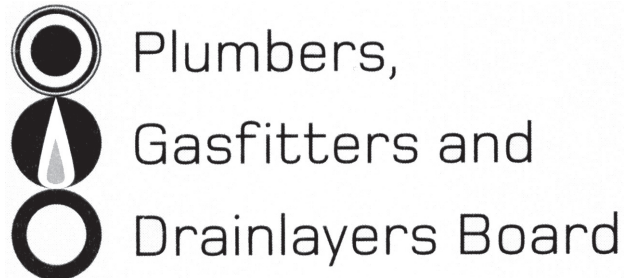


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No. 9196



## REGISTRATION EXAMINATION, JUNE 2022

### **CERTIFYING GASFITTER**

#### QUESTION AND ANSWER BOOKLET

Time allowed **THREE** hours

#### **INSTRUCTIONS**

Check that the Candidate Code Number on your admission slip is the same as the number on the label at the top of this page.

Do not start writing until you are told to do so by the Supervisor.

Total marks for this examination: 100.

This exam booklet consists of 2 sections

Section A – Questions 1 to 14

Section B – Questions 1 to 10

The pass mark for this examination is 60 marks.

Write your answers and draw your sketches in this booklet. If you need more paper, use pages 32-36 at the back of this booklet. Clearly write the question number(s) if any of these pages are used.

All working in calculations must be shown.

#### **Candidates are permitted to use the following in this examination:**

Drawing instruments, approved calculators, document(s) provided.

Publications, Acts, Regulations, Codes of Practice, or Standards other than the ones provided are NOT permitted in the examination room.

Do not use red pen for drawings or writing in your paper.

Check that this booklet has all of 38 pages in the correct order.

#### **YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION**

## USEFUL FORMULAE

Circumference of circle =  $2 \times \pi \times R$  or Circumference of circle =  $\pi \times D$

Area of circle =  $\pi \times R^2$  or Area of circle =  $0.7854 \times D^2$

Volume of cylinder =  $\pi \times R^2 \times H$  or Volume of cylinder =  $0.7854 \times D^2 \times H$

Heating time (seconds) =  $\frac{\text{mass of water (kg)} \times 4.2 \times \text{temp diff (}^\circ\text{C)} \times 100}{\text{heat energy input per hour (kJ)} \times \text{efficiency (\%)}}$

Correction factor =  $\frac{\text{atmospheric pressure} + \text{supply pressure}}{\text{atmospheric pressure}}$

Gas rate (m<sup>3</sup>/h) =  $\frac{\text{volume (m}^3\text{)} \times 3600}{\text{time (seconds)}}$

## SECTION A

### QUESTION 1

- (a) A decorative fire has been installed in a fireplace, using the existing chimney as the flue. A cowl is fitted to the top of the chimney. While the heater is operating, products of combustion are spilling into the room.

- (i) Give TWO reasons in relation to the construction of the chimney for this to occur.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

- (ii) Give TWO methods to remedy the situation.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

- (b) Give TWO effects on the operation of a natural draught flue caused by excessive heat loss.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

- (c) The operation of an extractor fan may be causing products of combustion to spill from an open-flued gas appliance.

Describe how the negative pressure test should be conducted.

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(5 marks)

**Total 11 marks**

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## QUESTION 2

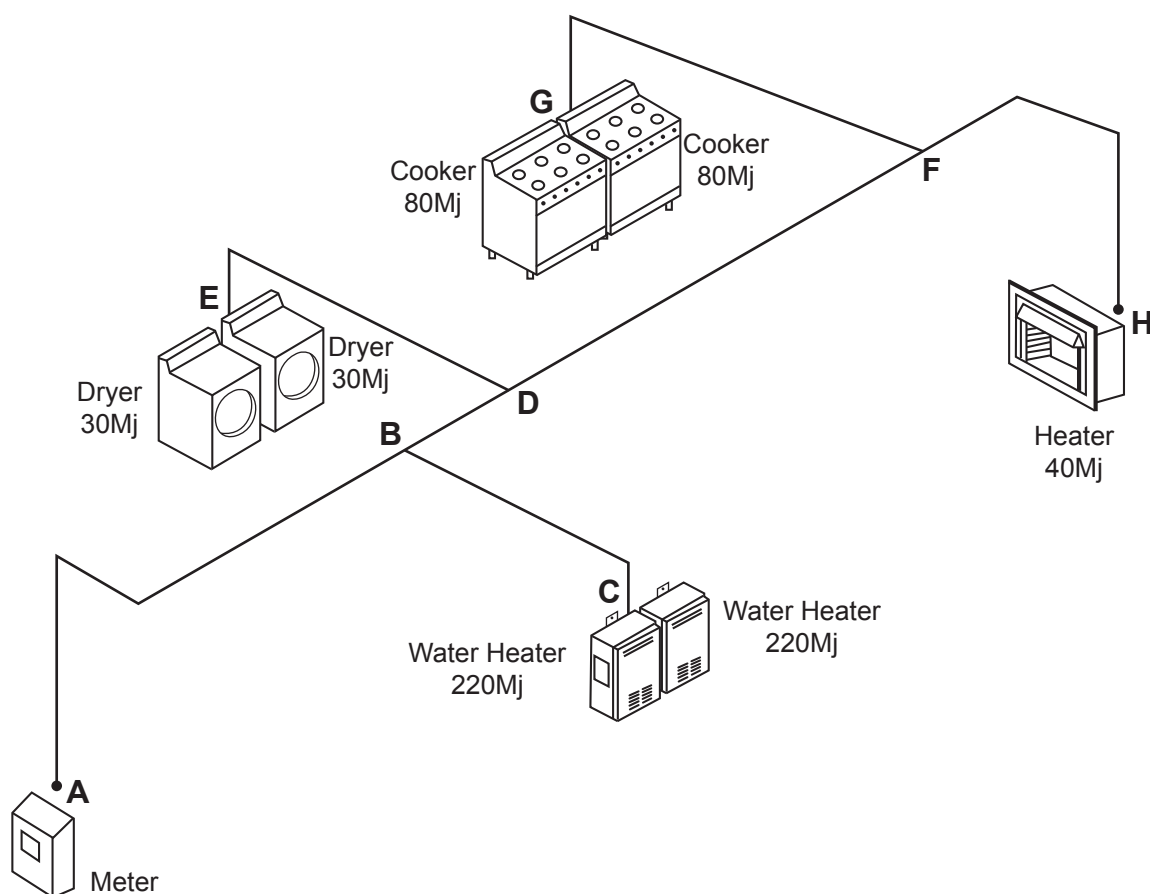
The diagram below shows the layout of the pipework and seven appliances for a gas installation in a hostel.

Installation details are as follows:

- Natural gas
- Copper pipe (NZS 3501)
- The installation supply pressure is 2.75 kPa.

Use the Pipe Sizing Tables (not the graphs) from AS/NZS 5601 Part 1 to complete the tables below.

Pipe section	Length (m)	Main run (m)	Gas flow (MJ/h)	Nominal size (mm)
A – B	5.2			
B – C	4.3			
B – D	2.7			
D – E	4.4			
D – F	6.2			
F – G	4.5			
F – H	6.6			



Total 11 marks

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### QUESTION 3

(a) Systems to manage working at height hazards can be categorised as group control measures or personal control measures.

(i) Describe the difference between group control measures and personal control measures.

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(1 mark) ☐

(ii) Give TWO examples of group control measures.

1 

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2 

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(2 marks) ☐

(iii) Give TWO examples of personal control measures.

1 

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2 

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(2 marks) ☐

(b) State why following the recommendations of Approved Codes of Practice is beneficial if an incident were to occur.

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(1 mark) ☐

**Total 6 marks** ☐

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#### QUESTION 4

A plant room is fitted with mechanical supply ventilation and natural exhaust ventilation directly to outside. The plant room houses two 50 MJ storage hot water cylinders with atmospheric burners and a 500 MJ induced draft boiler.

- (a) Calculate, in  $\text{m}^3$ , the minimum volume of air per hour the ventilation system must be able to supply.

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(5 marks)

- (b) Calculate the minimum area of the ventilation required if a natural high level exhaust opening is used.

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(2 marks)

- (c) Calculate how many  $\text{m}^3$  per hour a mechanical high-level exhaust would be required to discharge at.

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(1 mark)

**Total 8 marks**

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## QUESTION 5

- (a) Describe what is meant by the term nominated person.

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(2 marks)

- (b) Name TWO licensing categories other than trainees and exemption holders who must be supervised and have their work verified by a certifying gasfitter.

1 

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2 

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(2 marks)

**Total 4 marks**

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## QUESTION 6

- (a) State when a soaker flashing is required on a flue penetration of a corrugated iron roof.

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(1 mark)

☐

- (b) Describe the situation when additional timber support is required under a soaker flashing.

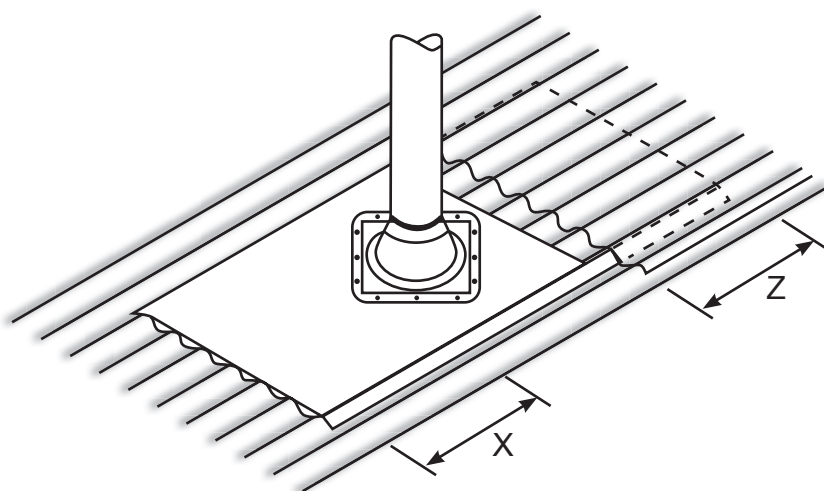
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(1 mark)

☐

- (c) The diagram below shows a 150 mm flue penetrating a corrugated iron roof. The roof has a pitch of 20°.



- (i) Give the minimum measurement of “X” where the maximum wind speed expected for the location is 35 metres per second.

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(3 marks)

☐

- (ii) Give the minimum allowable measurement of “Z” where the soaker flashing is to terminate under the cover sheet.

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(1 mark)

☐

**Total 6 marks**

☐

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## QUESTION 7

- (a) The diagram below is a schematic of existing gas copper pipework (NZS 3501) in a building.

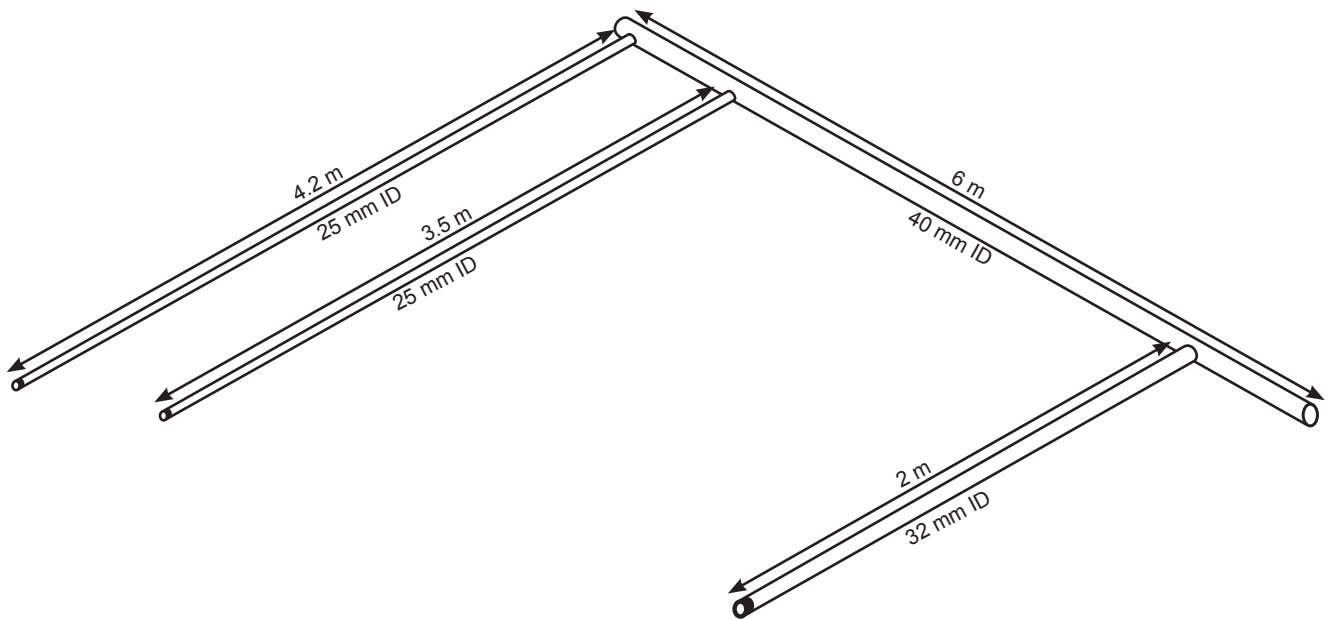
Calculate, in litres, the approximate volume of the pipework.

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(4 marks)

- (b) State the maximum acceptable pressure drop permitted according to AS/NZS 5601 Part 1 when undertaking a leakage test of the installation in (a).

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(1 mark)

**Total 5 marks**

**INTENTIONALLY BLANK**



## QUESTION 8

A fire collar is to be fitted to a multi-layer gas pipe that passes through a concrete wall of a plant room.

- (a) Explain the purpose of the fire collar.

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(2 marks)

- (b) Explain how the fire collar achieves its intended purpose.

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(2 marks)

- (c) A building may have active and passive fire protection in place.

Give TWO examples, other than fire wraps, of passive fire protection.

1 

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2 

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(2 marks)

**Total 6 marks**

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## QUESTION 9

- (a) State how long before work commences a Notification of Particular Hazardous Work form should be submitted.

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(1 mark)

- (b) Give FIVE items of information that are to be provided on a Notification of Particular Hazardous Work form.

1 

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2 

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3 

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4 

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5 

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(5 marks)

**Total 6 marks**

## QUESTION 10

- (a) According to the Gas (Safety and Measurement) Regulations, gasfitting work falls under three different risk categories.

Name THREE risk categories.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(1 mark)

☐

- (b) Name the government agency that enforces the requirement for gas certificates.

\_\_\_\_\_

(1 mark)

☐

- (c) Name THREE different types of gas certificates, and give an example of a situation when each certificate would be required.

Certificate 1: \_\_\_\_\_

Situation: \_\_\_\_\_

Certificate 2: \_\_\_\_\_

Situation: \_\_\_\_\_

Certificate 3: \_\_\_\_\_

Situation: \_\_\_\_\_

(3 marks)

☐

### QUESTION 10 (cont'd)

- (d) Name the online database that a gasfitter will be required to use when installing a new gas appliance to an existing gas installation.

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(1 mark)

- (e) Gas appliances that are approved to be installed in New Zealand are listed in an online database.

- (i) Name the online database that lists the appliances.

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(1 mark)

- (ii) Give the term used to describe an individual who is authorised by WorkSafe to test and approve a gas appliance for use in New Zealand.

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(1 mark)

**Total 8 marks**

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## QUESTION 11

- (a) State the maximum number of commercial cooking appliances that are permitted to be connected together to form a combination cooking range.

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(1 mark)

- (b) Describe the situation where commercial catering equipment may be installed on a combustible surface without requiring fire resistant material.

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(2 marks)

- (c) Give the minimum clearance from grease filters for each of the commercial cooking appliances below.

- (i) Griddle

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(1 mark)

- (ii) Deep fryer

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(1 mark)

**Total 5 marks**

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## QUESTION 12

Use AS/NZS 5601 Part 1 to complete the table below to show the outlet operating pressure that a consumer piping gas regulator is permitted to provide before a permanent and durable notice displaying the pressure is required.

Maximum outlet operating pressure LPG	
Maximum outlet operating pressure natural gas	

Total 2 marks

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### QUESTION 13

A natural draught combined flue is to be designed to suit several gas appliances.

Give SIX factors to be taken into account when calculating the size of the flue.

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_
- 6 \_\_\_\_\_

Total 3 marks

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## QUESTION 14

- (a) According to AS/NZS 5601 Part 2, a 90 litre gas refrigerator installed in a caravan has ventilation requirements that are specific to refrigerators.

- (i) Give TWO conditions regarding the ventilation that must be met.

1 \_\_\_\_\_

2 \_\_\_\_\_

(2 marks)

- (ii) Give the minimum free area of the ventilation required for this situation.

\_\_\_\_\_

(1 mark)

- (b) A caravan is being designed to house three occupants.

The appliances to be installed in the caravan are a cooker with a gas consumption of 32,000 BTU, and a heater with a gas consumption of 16,000 BTU.

- (i) Calculate the minimum free area of the permanent ventilation required.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(4 marks)

- (ii) Each ventilation opening for the caravan is to be 300 mm wide.

Calculate the height of each opening.

\_\_\_\_\_

(2 marks)

**Total 9 marks**

## SECTION B

Answer the following multiple-choice questions by writing your answer (A, B, C, D or E) in the box provided after each one of the questions.

Each correct answer in this section of the examination is worth 1 mark.

Should your choice of answer be unclear no mark will be awarded.

1. According to AS/NZS 5601 Part 1, if the maximum over-pressure is not indicated on an individual component used in a gas installation and the rated working pressure is known to be 2 kPa, which of the following would be used as the maximum over-pressure for the installation?

A 2 kPa.  
B 2.5 kPa.  
C 3 kPa.  
D 7 kPa.  
E 14 kPa.

2. According to AS/NZS 5601 Part 1, what should the minimum height of a natural draught flue be if it is not specified in the manufacturer's instructions?

A 0.6 m  
B 1.2 m  
C 1.8 m  
D 2.4 m  
E 3.0 m

3. Which of the following pressures is equivalent to eight inches water gauge?

A 0.8 kPa  
B 1.0 kPa  
C 1.6 kPa  
D 2.0 kPa  
E 2.4 kPa

4. Which of the following is the maximum length of a gas appliance restraint on a freestanding appliance according to AS/NZS 5601 Part 1?
- A 75% of the length of the flexible hose.
  - B 80% of the length of the flexible hose.
  - C 85% of the length of the flexible hose.
  - D 95% of the length of the flexible hose.
  - E 100% of the length of the flexible hose.

☐

5. Which of the following New Zealand Building Code clauses provides an acceptable solution for durability of products?
- A B2
  - B E1
  - C E2
  - D G1
  - E G12

☐

6. Which of the following standards provides guidance when verifying the safety of an existing gas installation?
- A AS/NZS 5601 Part 1
  - B AS/NZS 5601 Part 2
  - C AS/NZS 5261
  - D NZS 5255
  - E NZS 5261

☐

7. A 9 kg LPG cylinder is permitted to be used indoors with what type of connection?
- A Companion/camping.
  - B POL.
  - C CGA555.
  - D QCC.
  - E Primus.

☐

8. According to AS/NZS 5601 Part 1, what is the maximum size notch or hole permitted where a notch or hole is cut into a 100 mm wide timber stud?

A 19 mm.

B 25 mm.

C 30 mm.

D 32 mm.

E 40 mm.

☐

9. According to AS/NZS 5601 Part 1, above what incoming operating pressure is over-pressure protection required on an LPG installation?

A 3 kPa.

B 5 kPa.

C 7 kPa.

D 14 kPa.

E 20 kPa.

☐

10. A 30 MJ storage water heater with a natural draught flue is to be installed in a cupboard. The cupboard will be ventilated using mechanical means.

According to AS/NZS 5601 Part 1, what is the minimum rate at which the fan will need to supply air at low level?

A 15 litres/second

B 30 litres/second

C 60 litres/second

D 120 litres/second

E 300 litres/second

☐

**Total 10 marks**

☐



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