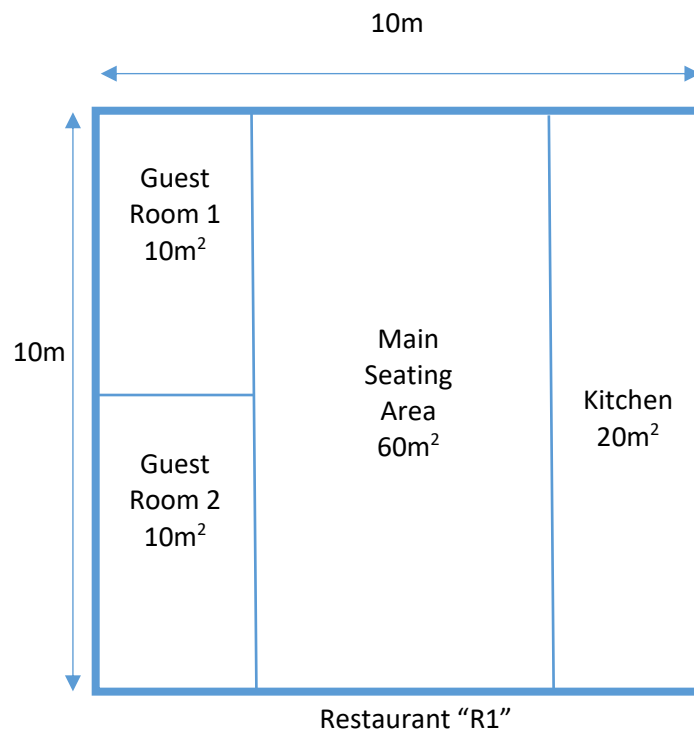


Worked Examples on Registration

Example 1

A restaurant “R1” has total area of 100m^2 and 2.9m ceiling height with the layout shown below. The total seating area is 80m^2 including 2 guest rooms, each of 10m^2 , and a kitchen of 20m^2 . The fresh air supply flow rate for Main Seating Area and each Guest Room, according to the food business licence, is $900\text{m}^3/\text{hr}$ and $150\text{m}^3/\text{hr}$ respectively.



- (1) Air Change per Hour (Fresh Air) = $A \div (B \times C)$
 A : capacity of outside fresh air supplied to seating area by the ventilation system (m^3/hr)
 B : size of footprint of the seating area (m^2)
 C : height from floor to ceiling of the seating area (m)

C is 2.9m

$$\text{ACH (Main Seating Area)} = 900 \div (60 \times 2.9) = 5.17$$

$$\text{ACH (Guest Room 1)} = 150 \div (10 \times 2.9) = 5.17$$

$$\text{ACH (Guest Room 2)} = 150 \div (10 \times 2.9) = 5.17$$

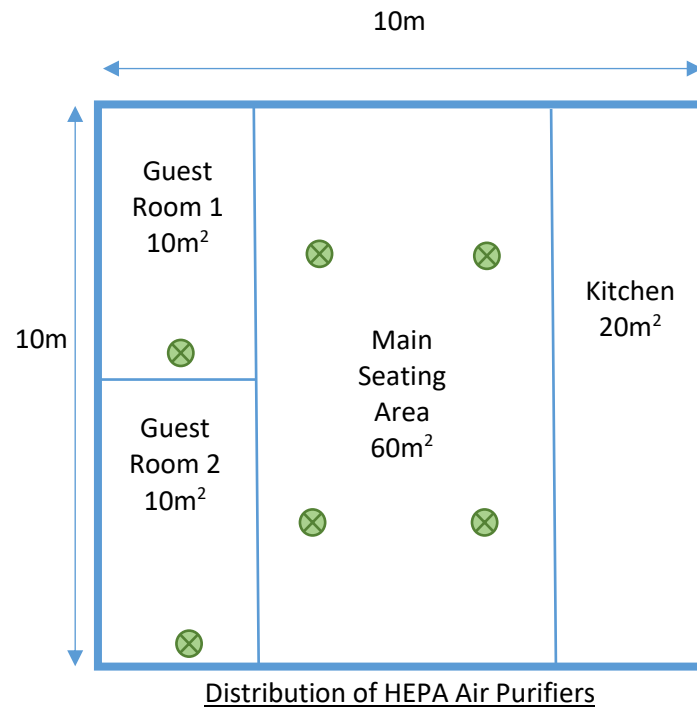
- (2) Owner considers to go for installing air purifiers as the alternative

Case A – HEPA Air Purifier (CADR $120\text{m}^3/\text{hr}$ and serving area 16m^2)

Nos. of purifier in main seating area = $60/16 = 3.75$, so 4 nos. are adopted.

For guest room 1 & 2, no. of purifier = $10/16 = 0.6$ so 1 no for each room is adopted.

[Note : For Main Seating Area, Total CADR = $120 \times 4 = 480\text{m}^3/\text{hr}$. ACH by air purifiers is = $(480 \div (60 \times 2.9)) = 2.76$. The total ACH for Main Seating Area, including the fresh air supply and air purifier, is $5.17 + 2.76 = 7.93$. By same method of calculation, the total ACH for each Guest Room, including the fresh air supply and air purifier, is $5.17 + 4.14 = 9.31$]



Case B – UV-C Air Purifier (serving area 35m^2)

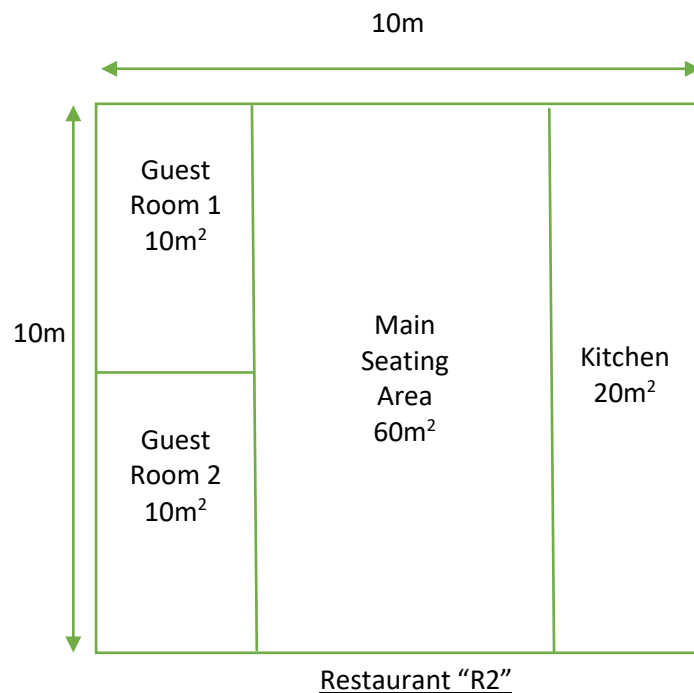
Nos. of purifier in main seating area = $60/35 = 1.7$, so 2 nos. are adopted.
 For guest room 1 & 2, no. of purifier = $10/35 = 0.3$ so 1 no for each room is adopted.

[Note : ACH_{UV-C} by air purifiers is 7. The total ACH for each compartment, including the fresh air supply and air purifier, is $5.17 + 7 = 12.17$]



Example 2

A restaurant “R2” has total area of 100m^2 and 3.1m ceiling height with the layout shown below. The total seating area is 80m^2 including 2 guest rooms, each of 10m^2 , and a kitchen of 20m^2 . The fresh air supply flow rate for Main Seating Area and each Guest Room, according to the food business licence, is $1,050\text{m}^3/\text{hr}$ and $175\text{m}^3/\text{hr}$ respectively.



- (1) Air Change per Hour (Fresh Air) = $A \div (B \times C)$
 A : capacity of outside fresh air supplied to seating area by the ventilation system (m^3/hr)
 B : size of footprint of the seating area (m^2)
 C : height from floor to ceiling of the seating area (m)

C is 3m (ceiling height, 3.1m , is more than 3m, 3m should be used for calculation)

$$\text{ACH (Main Seating Area)} = 1,050 \div (60 \times 3) = 5.83$$

$$\text{ACH (Guest Room 1)} = 175 \div (10 \times 3) = 5.83$$

$$\text{ACH (Guest Room 2)} = 175 \div (10 \times 3) = 5.83$$

- (2) Owners considers to carry out improvement measures to enhance the Air Change per Hour (Fresh Air) of the Main Seating Area by damper adjustment. During damper adjustment, one should pay attention if each compartment can still meet the Cap. 132 requirement on fresh air supply per person per hour.

Fresh air supply flow rate to different compartments after damper adjustment: -

- (a) Main Seating Area: $1,100\text{m}^3/\text{hr}$
- (b) Guest Room 1: $150\text{m}^3/\text{hr}$
- (c) Guest Room 2: $150\text{m}^3/\text{hr}$

For Main Seating Area, the Air Change per Hour (Fresh Air) = $1,100 \div (60 \times 3) = 6.11$

However, for each Guest Room 1 and Guest Room 2, the Air Change per Hour (Fresh Air) = $150 \div (10 \times 3) = 5$

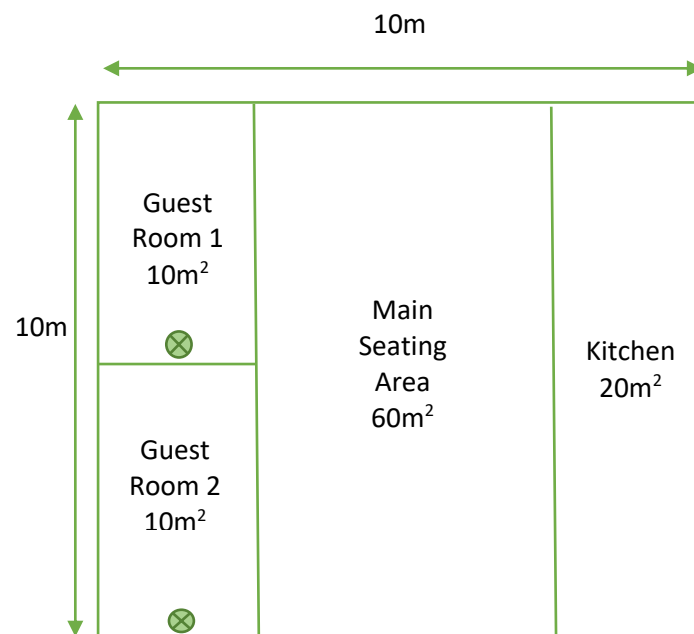
Air purifiers are needed for Guest Room 1 and Guest Room 2.

- (3) Owner considers to go for installing air purifiers as the alternative for Guest Room 1 and Guest Room 2

Case A – HEPA Air Purifier (CADR $120\text{m}^3/\text{hr}$ and serving area 16m^2)

For each guest room 1 & 2, no. of purifier = $10/16 = 0.6$ so 1 no for each room is adopted.

[Note : CADR = $120\text{m}^3/\text{hr}$, ACH by air purifier for each Guest Room = $(120 \div (10 \times 3))=4$. The total ACH for each Guest Room including the fresh air supply and air purifier is $5 + 4 = 9$]

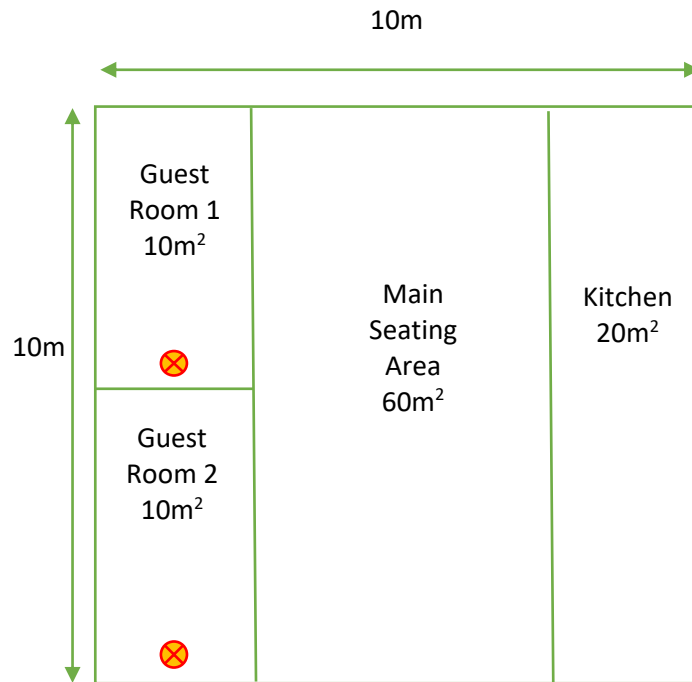


Distribution of HEPA Air Purifiers

Case B – UV-C Air Purifier (serving area 35m²)

For each guest room 1 & 2, no. of purifier = $10/35 = 0.3$ so 1 no for each room is adopted.

[Note : ACH_{UV-C} by air purifiers is 7. The total ACH for each Guest Room including the fresh air supply and air purifier is $5 + 7 = 12$]



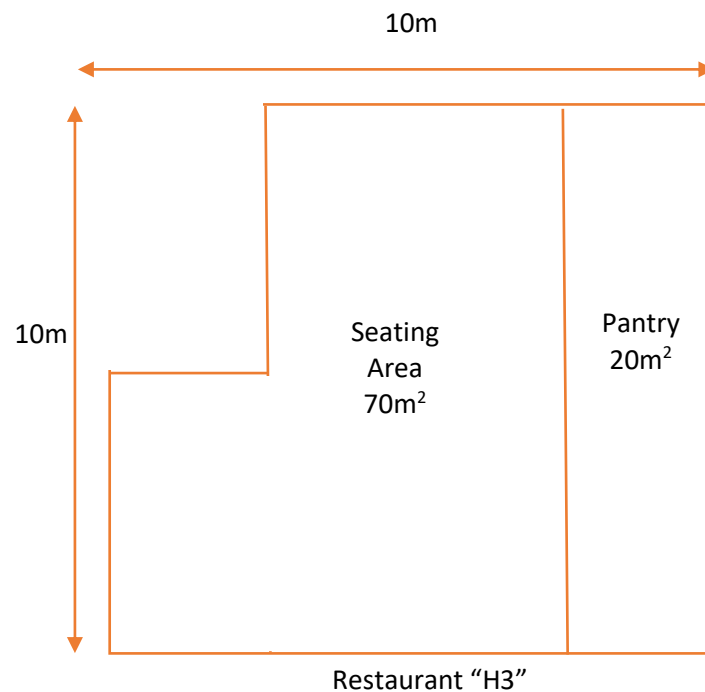
Distribution of UV-C Air Purifiers

Example 3

Restaurant “R3” and Restaurant “H3” of the same hotel are registered under the same food business licence. Assessment of Air Change per Hour (Fresh Air) should be carried for each restaurant separately.

For Restaurant “R3”, please refer to Example 1.

Restaurant “H3” has a total area of 90m² located in lobby area with 10m ceiling height with the layout shown below. The total seating area is 70m² and the pantry is 20m² under food business licence. The fresh air supply flow rate to the seating area according to the food business licence is 1,200m³/hr.



(1) Air Change per Hour (Fresh Air) = $A \div (B \times C)$

A : capacity of outside fresh air supplied to seating area by the ventilation system (m³/hr)

B : size of footprint of the seating area (m²)

C : height from floor to ceiling of the seating area (m)

C is 3m (ceiling height, 10m, is more than 3m, 3m should be used for calculation)

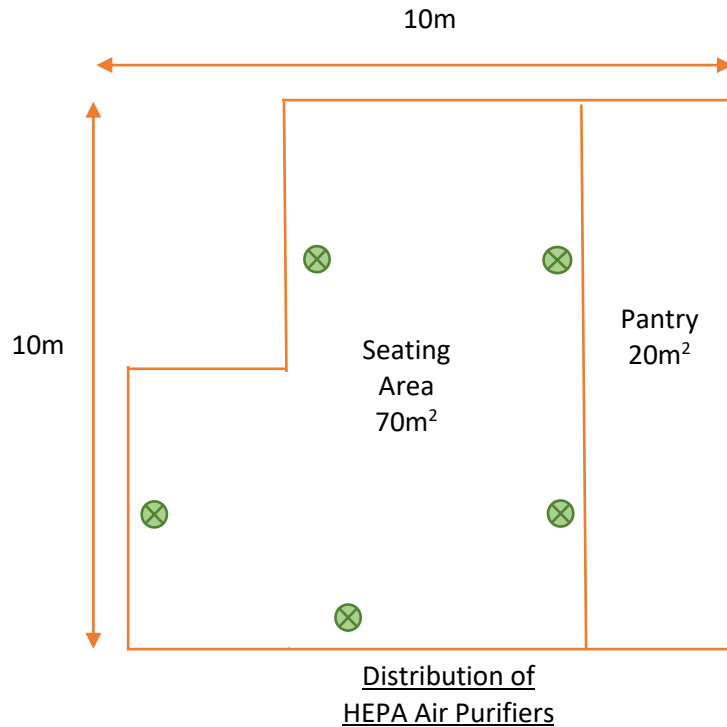
$$ACH = 1,200 \div (70 \times 3) = 5.71$$

(2) Owner considers to go for installing air purifiers as the alternative

Case A – HEPA Air Purifier (CADR $120\text{m}^3/\text{hr}$ and serving area 16m^2)

Nos. of purifier in seating area = $70/16 = 4.38$, so 5 nos. are adopted.

[Note : Total CADR = $120 \times 5 = 600\text{m}^3/\text{hr}$, ACH by air purifiers = $(600 \div (70 \times 3)) = 2.86$. The total ACH including the fresh air supply and air purifier is $5.71 + 2.86 = 8.57$]



Case B – UV-C Air Purifier (serving area 35m^2)

Nos. of purifier in main seating area = $70/35 = 2$, so 2 nos. are adopted.

[Note : ACH_{UV-C} by air purifiers is 7. The total ACH including the fresh air supply and air purifier is $5.71 + 7 = 12.71$]

