For discussion on
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Legislative Council
Panel on Food Safety and Environmental Hygiene

Requirement on Ventilation in Seating Areas of Dine-in Catering Premises under the Prevention and Control of Disease (Requirements and Directions) (Business and Premises) Regulation (Cap. 599F)

Purpose

This paper briefs Members on the requirement on ventilation in the seating areas of dine-in catering premises under the Prevention and Control of Disease (Requirements and Directions) (Business and Premises) Regulation (Cap. 599F) ("the Regulation").

Voluntary Declaration Scheme on Air Changes in Licensed Catering Premises

2. Under the Public Health and Municipal Services Ordinance (Cap. 132), licence holders of the restaurants and factory canteens that do not have adequate natural ventilation shall provide a ventilating system able to supply a minimum amount of 17 cubic metres of outside air per hour for each person accommodated in the premises. Based on anti-epidemic considerations, the Government has earlier accepted the expert advisers' recommendation on enhancement of air ventilation in the seating areas of dine-in catering premises such as restaurants and factory canteens to a minimum of six air changes per hour, so as to reduce the infection risk as far as possible through air dilution. In fact, the ventilating systems of some licensed catering premises have already met the air change rate of a minimum of six air changes per hour. If it has yet to reach that level, the catering premises may install air purification devices meeting the relevant specifications in the seating areas as the alternative, so as to reduce the infection risk through air filtration or germicide.

3. To implement the relevant recommendation, the Food and Environmental Hygiene Department (FEHD) launched on 16 October 2020 a "Voluntary Declaration Scheme on Air Changes in Licensed Catering Premises" for licensed catering premises to declare voluntarily the information on air

changes per hour of the ventilating system and/or air purification device installed in their premises. Upon confirmation of the information, the relevant licensed premises will be on the list shown at FEHD's website.

Requirement on Ventilation in Seating Areas of Catering Premises under the Regulation

4. On grounds of reducing the risk of virus transmission, a requirement on air change or air purifiers in dine-in catering premises was stipulated in the Secretary for Food and Health's directions under the Regulation issued on 17 March 2021. Under the Regulation, operators of catering premises are required to register on FEHD's designated webpage on or before 30 April 2021 that the seating areas of their premises have a minimum of six air changes per hour, or air purifiers (either High-Efficiency Particulate Arrestance Filter (HEPA) cum Ultraviolet-C (UV-C) device or HEPA device or UV-C device) that meet the specified specifications have been installed according to the on-the-ground situation (including the site condition) and the manufacturer's manual, together with a certificate issued by a registered specialist contractor (ventilation works category) ("registered contractors") providing information related to the air change or air purifier(s) installed in the respective premises. Upon confirmation of the information registered, the relevant licensed premises will be on the list shown at FEHD's website.

5. After the registration has been confirmed by FEHD, operators of catering premises must download within two days a notice from a designated position at FEHD's website and display the notice with the prescribed specifications round-the-clock at the entrance of the catering premises. For premises with air purifiers installed, operators of the catering premises must properly switch on, operate, maintain and repair the air purifiers in accordance with the manufacturer's manual when the premises is open for business.

Theoretical and scientific basis of the requirement

6. The main risk factors of catering premises providing dine-in environment includes long hours of mask-off eating and chatting in short distance. Many studies on COVID-19 have pointed out that the possibility of short range transmission of the virus in indoor environment with poor ventilation and congested with people cannot be ruled out. The World Health Organization, Centre of Disease Control in the United States, and many other international professional bodies (including professional bodies on public health, engineering, architectural, etc.) are advocating to increase the air change of indoor venues with

a view to reducing the risk of infection. The studies also suggest air purification or germicide as an alternative to help reduce the risk of dispersing infected particles in short range by the infected person, if air dilution is not possible.

7. As the ventilating system of catering premises providing dine-in service can normally achieve an air change of 3.8 to 4.98[1] or above per hour, regulating, upgrading or enhancing the existing ventilating system can complement the possible deviation from the new requirement (six air change per hour). It is also an alternative to install air purifiers equipped with air filtration or germicidal function at a standard which can effectively reduce the infection risk of COVID-19. These measures are accredited and recommended by international engineering and public health organisations, including the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Chartered Institution of Building Services Engineers and The United States Centers for Disease Control and Prevention. The detailed literature review on the theoretical and scientific basis is at **Enclosure I**. The Government has made reference to relevant literature and materials when devising the directions on air change requirements of the seating area of dine-in catering premises.

Implementation of the Requirement on Air Change/Air Purifiers of Catering Premises

8. The FEHD's online platform was launched on 18 March 2021 for registration by catering premises. The platform provides an air change calculator for them to make preliminary calculation on the air change rate of the ventilating system in the premises, as well as a link to the website of the Buildings Department (https://www.bd.gov.hk/en/resources/online-tools/registers-search/registrationsearch.html) containing the list of over 180 registered contractors.

9. To facilitate the smooth implementation of the ventilation requirement, the Government has established a Working Group comprising expert representatives coming from a wide spectrum of backgrounds to put forward recommendations to the Government and work on specific guidelines for ventilation contractors to assist catering premises operators in the smooth compliance of the requirement.

10. After it was established, on 18 March 2021, the Working Group invited suppliers to submit information of their air purifiers that met the specified specifications. Starting from 1 April 2021, details about air purifiers meeting relevant specifications are made available for reference by the catering premises

[1] Varies according to the storey height of the premises.

operators and registered contractors. In the past month or so, the Working Group met with stakeholders (including representatives of catering premises, ventilation equipment and electrical appliance suppliers, hotels, the Real Estate Developers Association of Hong Kong and other relevant trades) and maintained close liaison with them. It also conducted site visits at a number of catering premises of different sizes and operational modes (including a bar, a Chinese restaurant, a Hong Kong-style tea restaurant and a hotel restaurant) to learn more about their successful examples and experiences of resolving difficulties. A video of the experience sharing has been uploaded to the FEHD's website with a view to assisting other cases in finding appropriate solutions.

11. On specific technical details, the Working Group promulgated "A Guide on Compliance with the Requirement on Air Change/Air Purifiers in Seating Areas of Dine-in Catering Premises" ("the Guide"; See **Enclosure II**) on 12 April 2021 to enable the trade to master the key points and expedite follow-up actions for the prompt implementation of the relevant requirement. The Guide and a video have been uploaded to FEHD's website for browsing and download.

12. The Working Group and relevant Government departments held a webinar on 27 April 2021 to enable direct communication between catering business operators and registered contractors. It will continue to enhance publicity and education with a view to assisting the trade in grasping the key points and relevant arrangements regarding enhancement of air change of premises and installation of air purifiers. It will also continue to liaise with representatives of the relevant trades and the stakeholders.

13. If operators of catering premise are unable to complete the registration on time, they may download a form from FEHD's website and submit an application of extension according to the instructions on the website. The FEHD will consider each case based on individual circumstances. If the application is approved, the operators of catering premises must complete the registration within the deadline specified by FEHD.

14. During the extension period, premises which have submitted such an application may provide dine-in service subject to the prevailing guidelines on the dine-in hours and the maximum number of persons at each table and will not be regarded as not meeting the requirement on air change. The FEHD will handle separately cases which did not apply for extension or which applications have been rejected or which failed to follow up and complete the registration within the extended time limit specified by the FEHD. During the initial period of implementing the new requirement, the FEHD will focus on publicity, education and giving advice, and will closely monitor the situation for timely adjustments to the arrangement.

Conclusion

15. We hope that the trade could fulfil the relevant ventilation requirement as soon as possible to protect the health of staff, customers and the public and to reinforce people's confidence in patronising catering premises. We could then refrain from using a "stop-and-go" approach on the catering industry in the face of epidemic situations in future.

16. Members are invited to note the requirement on enhancing air change by catering premises as introduced by the Government to step up anti-epidemic efforts.

Food and Health Bureau
Food and Environmental Hygiene Department
April 2021

Enclosure I

Literature Review on Air Change Per Hour at 6 or above

(A) Literature Review prior to October 2020 (Extract from the Guide on Air Change and Air Purifiers in Dine-In Catering Outlets and its Annex C released on 11 April 2021)

To set the scene for this Guide, the Working Group has reviewed various research articles on the theoretical and scientific basis provided, and recorded that the concept of increasing air change per hour (ACH), either in lieu of or as augmentation to the existing provision of fresh air in catering premises, is a practical way taken worldwide to tackle the imminent issues at hand.

2. The ensuing paragraphs sets out the gist of the presentation made by the Government to the Working Group on the rationale behind its decision on ACH at 6 or above.

3. In the course of formulating the guidelines, the Government has briefed the Working Group on the development leading to the decision made (together with the justifications in support of the decision) for adopting "ACH at 6 or above or the installation of air purifiers that meet the specified specifications" as the threshold for the voluntary declaration scheme launched on 16 October 2020. The voluntary declaration scheme has been replaced by the mandatory registration scheme since 18 March 2021.

4. After expert advisers put forward the suggestion on adopting "ACH at 6 or above or the installation of air purifiers that meet the specified specifications", Government departments conducted a literature review of the related research materials available at the time from August to September 2020 –

(a) there were discussions in the international community as well as locally on the possibility of short range air-borne transmission of COVID-19 and the use of engineering control means (including ventilating measures) to assist in controlling infection. According to data available at that time and statements by various health authorities, COVID-19 is mainly transmitted by droplet and contact routes. Short range air-borne transmission can occur in certain circumstances in the healthcare setting (e.g. aerosol-generating procedures) or certain community settings (e.g. in certain indoor crowded space, during choir practice, in restaurants,

fitness classes, etc.)[2]; and

(b) as there was no golden standard on ventilating measures for catering premises for preventing COVID-19 transmission at the time, Government departments could only examine pertinent ventilation standards available for non-residential buildings or other scientific and clinical studies on ventilating measures [3] (the proposed standards ranging from 5.1 litres/second/person to 10 litres/second/person).

5. It is clear that sufficient data would need to be accumulated over time to substantiate a conclusive view on the mode of transmission of COVID-19. Nonetheless, we could not rule out the fact that enhancing the ventilating measures could assist in controlling infection.

6. Based on the outcome of literature review, according to the national standards of the People's Republic of China and the guidelines on ventilating system design for public places (including food premises) formulated by the Chartered Institution of Building Services Engineers (in the United Kingdom), the fresh air provision for catering premises is recommended to be 8 to 10 litres/second/person (equivalent to 6.4 to 8 ACH with an assumed storey height of 3 metres). According to "Reducing the Risk of COVID-19 Using Engineering Controls – Guidance Document" (Version 4) published by the American Industrial Hygiene Association (AIHA) in September 2020, increasing ACH to 6 is an effective engineering control measure to reduce the relative risk of exposure to COVID-19 by 95% (ACH at 4.5 only offers a relative risk

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[2] Examples:
- "Transmission of SARS-CoV-2: implications for infection prevention precautions" published by the World Health Organization (WHO) in July 2020 (https://www.who.int/publications/i/item/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations)
- Dedicated website on COVID-19 of the Centers for Disease Control and Prevention of the United States at that time (https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/overview/index.html)
- Dedicated website on COVID-19 on the "Global Heat Health Information Network" of the WHO at that time (https://www.who.int/news-room/q-a-detail/q-a-ventilation-and-air-conditioning-in-public-spaces-and-buildings-and-covid-19 http://www.ghhin.org/heat-and-covid-19/ac-and-ventilation)

[3] Examples:
- The American Society of Heating, Refrigeration and Air-Conditioning Engineers Standard 62.1 (5.15 litres/second/person for restaurant dining rooms (people + area rate))
- "Hygienic Indicators and Limits of Public Places" National Standard GB37488-2019 of the People's Republic of China (30 square metres/hour/person or 8.3 litres/second/person)
- The Chartered Institution of Building Services Engineers (in the UK) Guide A (10 litres/second/person for restaurants)
- Practical Notes ADM-2 by Buildings Department (10 litres/second/person for office buildings)

reduction of 90% whereas an ACH at 6 offers a relative risk reduction of 95%). In non-healthcare facilities where occupant density cannot be limited to fewer than one person per about 3 square metres (or there is a likelihood that infected persons being present), it is necessary to increase the air change rate to ACH at 6 or above.

7. After balancing all the relevant factors (including the effectiveness of the measures and the acceptability to the trade), the Government made an optimal choice and decided in October 2020 to adopt ACH at 6 or above in respect of the seating areas of dine-in catering premises[4] as the threshold under the voluntary declaration scheme. This level is equivalent to 27 cubic metres/hour/person, which is higher than 17 cubic metres/hour/person stipulated under the Public Health and Municipal Services Ordinance (Cap. 132). To facilitate the public to understand the idea, the Government has not opted to express the threshold in terms of the 7.5 litres/second/person description. For ease of reference, the various standards are presented in the summary table below -

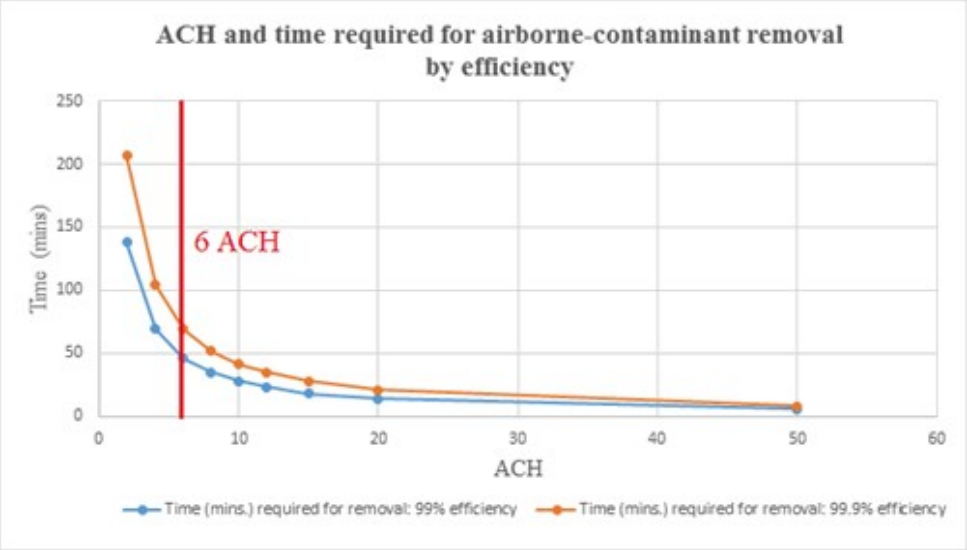
[4] Assuming a storey height of 3 metres and a footprint of 1.5 square metres per person.

Standards/Regulations	m^3/hr/person	L/s/person	ACH at 3m height Ceiling @1.5m^2/person	ACH at 2.3m height Ceiling @1.5m^2/person
Section 93(1) of and Second Schedule to the Public Health and Municipal Services Ordinance (Cap. 132) (for Restaurants)	17.0	4.7	3.8	4.9
American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 62.1 (for Restaurants)	18.7	5.1	4.2	5.4
國家市場監督管理總局、中國國家標準化管理委員會 (國家標準) GB37488-2019 Hygiene indicators and limits for public places (for Public leisure places)	30.0	8.3	6.7	8.7
Buildings Department Practice Note ADM2 (for Offices)	36.0	10.0	8.0	10.4
Chartered Institute of Building Services Engineer Guide A (for Restaurants)	36.0	10.0	8.0	10.4
Voluntary declaration scheme on air changes in licensed catering premises	27.0	7.5	6.0	6.0
(Compared with Cap. 132) Increase	10.0	2.8	2.2	1.1

(B) Literature Review between March and April 2021

8. Simultaneously, the Working Group also examined the literature below：

(a) In the Guidelines for Environmental Infection Control in Health-Care Facilities updated by the Centers for Disease Control and Prevention of the United States in 2019, a chart therein set out the time and efficiency for air-borne contaminant removal. An increase of ACH to 6 is an optimal choice in terms of removal of air-borne contaminant. The change of time and efficiency for removing air-borne contaminant will diminish substantially when ACH increases from beyond 6 and it will begin to plateau at a low level when ACH is at 12 and beyond:



9. The World Health Organization released in March 2021 the roadmap to improve and ensure good indoor ventilation in the context of COVID-19, suggesting enhancing the ventilating system as a means to prevent the transmission of COVID-19 in indoor environment. It mentions therein the necessity of providing sufficient fresh air (with a recommended level of 10 liters/second/person for non-residential setting). If circumstances do not allow doing so, the use of air purifiers may be considered for improving the situation.

A Guide on Compliance with the Requirement on Air Change / Air Purifiers in Seating Areas of Dine-in Catering Premises under Cap. 599F

Introduction

1. The World Health Organization ("WHO") declared on 30 January 2020 that the outbreak of a novel coronavirus infection[1] constituted a Public Health Emergency of International Concern, and characterised COVID-19 as a pandemic on 11 March 2020.

2. The HKSAR Government launched the Preparedness and Response Plan for Novel Infectious Disease of Public Health Significance on 4 January 2020. Among the anti-epidemic measures, social distancing is key to delaying the spread of COVID-19. The Prevention and Control of Disease (Requirements and Directions) (Business and Premises) Regulation (Cap. 599F) was enacted on 27 March 2020, and the Secretary for Food and Health's directions in relation to Catering Business ("SFH's directions") have been in place since 27 March 2020.

3. A voluntary declaration scheme was launched on 16 October 2020 for inviting catering business operators[2] to declare on-line, in respect of the seating areas of their dine-in catering premises, (1) whether they have attained air change per hour (fresh air) ("ACH") at 6 or above; or (2) whether they have installed air purifiers that meet the specified specifications[3] as an alternative, on or before 31 December 2020. It has subsequently been extended until 17 March 2021, after which it has been replaced by the mandatory registration scheme below.

4. Under the mandatory registration scheme launched on 18 March 2021, catering business operators as defined in section 3 of Cap. 599F[4] are required to register on-

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1 The virus and the disease it causes were respectively named by WHO as severe acute respiratory syndrome coronavirus 2 ("SARS-CoV-2") and COVID-19 on 11 February 2020.

2 It covered holders of general restaurant, light refreshment restaurant, marine restaurant and factory canteen licences issued by the Food and Environmental Hygiene Department ("FEHD").

3 It covered (1) Ultraviolet-C ("UV-C") cum High-Efficiency Particulate Arrestance Filter ("HEPA") device; or (2) UV-C device.

4 It covered holders of general restaurant, light refreshment restaurant, marine restaurant and factory canteen licences issued by FEHD and non-licensed operators of catering premises (those in a clubhouse holding a certificate of compliance issued by the Home Affairs Department ("HAD"), school canteens, workplace canteens etc.).

line[5], in respect of the seating areas of their dine-in catering premises, (1) whether they have attained ACH at 6 or above; or (2) whether they have installed air purifiers that meet the specified specifications[6], on or before 30 April 2021; and to download a notice within 2 days after the registration for display at the entrance of their dine-in catering premises[7]. The requirement is set out in the SFH's directions gazetted on 17 March 2021 (see **Annex A** for an extract on the requirement).

5. Against the above background on the Government's decision made, a Working Group was established on 16 March 2021 to advise the Government on the smooth implementation of the requirement (see **Annex B** for the terms of reference and the composition).

6. The Working Group has held two meetings (18 March 2021 and 30 March 2021), including formulating its work plan and engagement plan, and held a press briefing on 31 March 2021 to make public how to use engineering control means for enhancing ventilation, apart from announcing the release of a list of air purifiers that met the specified specifications.

7. The purpose of this Guide released today (11 April 2021) is to provide general information and guidance on how the requirement could be fulfilled, leading to the registration formalities and transparency measures that follow. It should be read by catering business operators and registered specialist contractors (ventilation works category) ("RSC(V)").

Background, Theoretical Basis and Legislative Framework

8. Please see **Annex C** for the Government's position as presented to the Working Group, including the rationale behind its decision made in October 2020. To set the scene for this Guide, the Working Group has reviewed various research articles on the theoretical and scientific basis provided, and recorded that the concept of increasing ACH, either in lieu of or as augmentation to, the existing provision in the catering premises, is a practical means taken worldwide to tackle the imminent issue

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5 The link of the on-line platform is https://www.fehd.gov.hk/english/licensing/CateringPremisesAir.html. A certificate issued by a RSC(V) in prescribed format is required to be uploaded and the submission is required to be signed by the catering business operator concerned.

6 It covered (1) HEPA cum UV-C device; or (2) HEPA device; or (3) UV-C device (see section 19 below).

7 In addition, the list of licensed catering premises meeting ACH of 6 or above, and/or those installed with air purifier(s) meeting the specified specifications, will be published on FEHD webpage for public inspection.

at hand as articulated by the Government.

Theoretical and Scientific Basis

9. While discussion of short range air-borne transmission of SARS-COV-2 is still evolving, the Working Group could appreciate the theoretical and scientific basis behind the Government's decision on using ACH at 6 or above in October 2020, on which the current exercise is also premised. There are several key risk factors of COVID-19 in dine-in catering premises, including long mask-off time and oral conversation at short distance. Given recent studies, one could not rule out the possibility that SARS-CoV-2 can be transmitted by a short range air-borne route in poorly ventilated and crowded indoor spaces, and good air ventilation or air changes can dilute virus-laden particles at close-range of infected persons.

10. Increasing indoor air changes to reduce infection risk is promoted by WHO, the Centers for Disease Control and Prevention of the United States ("US CDC") as well as many other international professional organisations (public health, engineering, building etc.), while the accumulation of evidence on short range airborne transmission of SARS-COV-2 is still on-going. Their suggestions also highlight that when the air dilution option is not possible, the air filtration or germicide option may be pursued as the alternative. In summary, augmentation of fresh air provision through air change or infection control by air filtration or germicide option would help reduce the risk of short range airborne transmission of SARS-COV-2.

11. As the ventilating system of existing dine-in catering premises generally meets ACH at 3.8 to 4.9[8] or above, the system could be adjusted, upgraded or improved to make up the difference, if any, or by installing air purifiers with filtration or germicide function of a level that is effective in reducing the risk of SARS-COV-2 transmission. These measures are recognised and recommended by international/national engineering and health organisations, including (a) the American Society of Heating, Refrigeration and Air-Conditioning Engineers ("ASHRAE"); (b) the Chartered Institution of Building Services Engineers ("CIBSE"); and (c) US CDC.

Legislative Framework

12. It should be borne in mind that –

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[8] This is the baseline as per Cap. 132. An assumed footprint of 1.5 square meters for each person and an assumed storey height (ranging from 3 metres to 2.3 metres) are adopted.

(i) the policy intent behind Cap. 132 is municipal services, and the concept is sufficient fresh air;

(ii) the policy intent behind Cap. 599F is infection control, and the concept is clean air with virus-load minimised; and

(iii) one is required to comply with all laws of Hong Kong (in this context, both Cap. 132 and Cap. 599F inclusive). Given the threshold of the ventilating requirement under Cap. 599F is higher than that under Cap. 132, it is incumbent on one to attain the higher threshold as well.

Calculation of ACH

13. The ACH is to be calculated according to the instructions set out on the FEHD's webpage based on the plans for food business licence or the plans for certification of compliance for the clubhouse (or on the basis of site measurement, in the absence of such plans):-

(i) floor area of seating space;
(ii) height of seating area measured from floor to ceiling (may opt for actual storey height or assumed storey height at 3 metres); and
(iii) capacity of outside fresh air supplied to the seating area by the ventilating system.

14. In general, ACH of the seating area of the premises can be calculated as below:-

Air Change per Hour (Fresh Air) = A ÷ (B × C)

A : capacity of outside fresh air supplied to the seating area by the ventilating system (cubic metres/hour)
B : size of footprint of the seating area (square metres)
C : height from floor to ceiling of the seating area (metres)

15. For open ceiling including baffle / egg crate / perforated types[9] etc., structural soffit is to be taken as the ceiling. Catering business operators may opt for actual ceiling height / highest point of ceiling (coved type) / structural soffit height (open type) or assumed storey height at 3 metres (see working examples for illustration purposes at **Annex D**), whichever is the smaller, in the calculation of ACH.

[9] with free area ratio at more than 70%

16. An air change calculator is also available at the online platform on the FEHD's webpage for making preliminary calculation on the air change rate of the ventilating system of the premises.

17. Natural ventilation is affected by many factors including layout, compartment, depth of interior area, prevailing wind speed and direction, etc. and/or when the openings are curtailed by air curtain etc. Outdoor dining area is outside the scope of this exercise. The ventilating requirement is applicable to all indoor dining area of dine-in catering premises.

Improvement of ACH

18. A RSC(V) may carry out improvement measures to enhance ACH of dine-in catering premises. Some viable measures to enhance ACH are listed as follows for reference:-
    (i) filter cleaning;
    (ii) commissioning (e.g. damper adjustment, fan belt adjustment, etc.);
    (iii) fresh air fan speed adjustment (e.g. change of fan pulley within limit of motor power, change of frequency invertor set point, etc.);
    (iv) fresh air inlet enlargement;
    (v) liaison with landlord to provide additional fresh air supply (if applicable); and
    (vi) air-conditioning ("A/C") or ventilating system upgrading works.

Alternative Measures

19. If attaining ACH at 6 or above is not possible and carrying out improvement of ACH as suggested in section 18 above is not feasible, air purifiers of the following types that meet the specified specifications are to be installed according to the on-the-ground situation and the manufacturer manual:-
    (i) HEPA cum UV-C device; or
    (ii) HEPA device; or
    (iii) UV-C device.

20. The above three types of air purifiers are recommended by US CDC and ASHRAE to reduce the spread of and lower the risk of exposure to COVID-19.

21. Installation of air purifiers is considered as an alternative means to augment ACH having regard to the following general observations:-
    (i) according to manufacturer's design information, HEPA air purifier can

provide an equivalent clean air ACH of around 2 to 6, derived from its Clean Air Delivery Rate ("CADR") and serving area;

(ii) UV-C device also has serving area based on irradiation coverage as per manufacturer's design. UV-C covered area has an equivalent ACH_{UVC} of 7; and

(iii) air purifier of UV-C or HEPA or UV-C cum HEPA with clean air supply on-the-ground (at around ACH of at least 3.8 to 4.9 as per the baseline under Cap. 132) can achieve the equivalent effect of ACH of around 6 or above, and this would help minimise the risk of indoor short range airborne transmission.

Standards required of Air Purifiers

22. The air purifiers are required to comply with relevant international standards and the Consumer Goods Safety Ordinance (Cap. 456) and the Electrical Products (Safety) Regulation (Cap. 406G) under the Electricity Ordinance (Cap. 406), including but not limited to:-

(i) IEC 60335-1 (Household and similar electrical appliances - Safety - Part 1: General requirements);

(ii) IEC 60335-2-65 (Household and similar electrical appliances – Safety – Part 2-65: Particular requirements for air-cleaning appliances);

(iii) IEC 62233 (Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure); and/or

(iv) other equivalent standards.

23. For electrical work and extension units, one must comply with the safety tips at **Annex E** (Safety Tips for Electrical Work) and **Annex F** (Safety Tips for Extension Units (with poster and leaflet attached)).

24. For the purpose of fulfilling the ventilating requirement, once one goes for installing air purifiers as the alternative, one has to look at the on-the-ground situation (including site condition[10]) and the manufacturer manual (the serving area), with a view to optimising the intended effect of the air purifiers (see working examples for illustration purposes at **Annex D**). The number of air purifiers required in the seating area is to be determined according to the seating layout and zoning and is required to comply with pertaining instructions by the manufacturer on installation and designed coverage. Also, the air purifiers are to be distributed evenly as reasonably as possible with respect to the seating layout. Individual partitioned

[10] for example, if a seating area is segregated into various compartments, then each compartment is to be considered on its own in terms of installation of air purifiers.

zone(s) / room is (are) to be treated on their individual merits and equipped with air purifier(s) as appropriate.

25. After the air purifiers have been installed at the premises, they must be properly switched on, operated, maintained and repaired in accordance with the manufacturer manual when the premises is opened for business.

26. HEPA

26.1 The HEPA should have minimum class of H13. The minimum local efficiency of HEPA in removing small particles of sizes larger than or equal to 0.3 micrometre from air is required to be 99.97% and comply with the European Standard BS EN1822-1:2009 to BS EN 1822-5:2009 (EPA, HEPA and ULPA) or other equivalent international/national standards.

26.2 The device is required to be regularly maintained as per the manufacturer's instruction. The HEPA filter shall be replaced regularly according to the recommended interval by the manufacturer, or otherwise under general circumstances not more than 3 to 6 months, in order to maintain the filtration efficiency. Before replacing the filter, 1:49 diluted bleach or other equivalent disinfectant should be sprayed onto the surface of the filter with proper personal protective equipment (i.e. gloves, eye shield and surgical mask). The filter can then be put inside an enclosed plastic bag for disposal.

27. UV-C

27.1 The air purifiers are required to have UV-C with an optimal wavelength of 253.7 nanometers of UV-C spectrum, of which the effective range should be ranging from 100nm to 280nm.

27.2 Design of the UV lamps is required to comply with relevant safety standards, such as those listed by Underwriters Laboratories ("UL") and tested to meet UL Standard 153:2014 - Standard for Portable Electric Luminaires, UL Standard 1598:2018 - Luminaires and UL Standard 1995:2015 - Heating and Cooling Equipment, or other equivalent international/national standards.

27.3 For UV-C lights for air handling units or air duct or inside a housing/container with fan blowing air across the UV-C lights, the UV-C

should be tested in accordance with ASHRAE 185.1-2015 Method of Testing UV-C Lights for Use in Air-Handling Units or Air Ducts to Inactivate Airborne Microorganisms. Unless the UV-C device is completely encased, it is also required to comply with IEC 62471 (Photobiological safety of lamps and lamp systems).

27.4 To prevent eye and skin injuries, sources of UV-C must either be shielded or encased inside the disinfection device or mounted at a location to avoid direct exposure to eye and skin.

27.5 For encased UV-C device, automatic interlock function is required to be provided to switch off the UV-C light when the device casing is opened.

27.6 Regarding installation of wall-mount, pendant and corner mount upper-air UV-C device, the following points are to be followed:-

(i) the construction and placement are to be done by trained personnel to prevent excessive UV energy from striking the occupants below;
(ii) the wall and ceiling UV-reflectivity are to be taken into consideration;
(iii) the fixture is to be mounted in such a way that the UV energy is distributed parallel to the plane of the ceiling and no excessive UV energy will affect the occupants below; and
(iv) the minimum mounting height of UV-C device and the minimum ceiling height requirement is to be decided having regard to Chapter 62 of 2019 ASHRAE Handbook – HVAC Applications[11], or according to manufacturer's installation instruction.

27.7 The sources of UV-C must be conspicuously labelled with a warning attached to the housing of the sources. The warning sign should state:-

WARNING
DO NOT EXPOSE EYES AND SKIN TO ULTRA-VIOLET LIGHT RAYS
WHICH ARE HARMFUL TO UNPROTECTED EYES AND SKIN
警告
切勿讓眼睛及皮膚暴露於紫外光之下，可引致損害

[11] According to the 2019 ASHRAE Handbook – HVAC Applications (SI): Chapter 62, Ultraviolet air and surface treatment, for wall-mounted fixtures, the fixture mounted height and minimum ceiling height should be 2.1 metre and 2.44 metre respectively; while for ceiling-mounted fixtures, the fixture mounted height and minimum ceiling height should be 2.4 metre and 2.89 metre respectively.

27.8 The device shall be regularly maintained as per the manufacturer's instruction.

27.9 All UV-C light must be switched off before any maintenance works of the device could be conducted. Maintenance should only be carried out by trained workers.

27.10 For shielded UV-C device or upper-room UV-C device, the **UV-C light must be SWITCHED OFF**, before any nearby maintenance work is to take place, to minimise potential risk of exposure of the workers to the UV-C light.

Building Safety Aspects

28. Air purifiers to be installed should not reduce the width of exit routes for the premises. For devices suspended from ceiling or installed at high level, vertical clearance of not less than 2 metres measured from the floor should be maintained.

29. Enhancing the ACH of the dine-in catering premises as mentioned in section 18 above may involve the carrying out of building works. Under the Minor Works Control System ("MWCS"), certain small-scale building works are designated as minor works, which may be carried out under the simplified requirements as an alternative to obtaining approval and consent under the Buildings Ordinance (Cap. 123). Reference may be made to Schedule 1 to the Building (Minor Works) Regulation ("B(MW)R") and Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers ("PNAP") APP-147. Common minor works items[12] related to A/C and mechanical ventilating system upgrading works are as follows:-

(i) erection/alteration of metal ventilation ducts or associated supporting frames inside a building, on grade, on a roof of a building, or projecting from an external wall or a fence wall;

(ii) erection/alteration of supporting frames for suspending an A/C plant or a mechanical ventilation plant inside a building;

(iii) erection/alteration of supporting structures or frames for an A/C unit on grade, on a roof of a building, or projecting from an external wall;

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[12] Details of the minor works items and the associated requirements are stipulated in the B(MW)R and the Technical Guidelines on MWCS. These documents are available at Buildings Department website www.bd.gov.hk.

(iv) erection/alteration of fire dampers in a ventilating system; and
(v) alteration of external walls, windows or window walls such as for formation or enlargement of duct or fresh air inlet.

30. Where erection or alteration of a fire damper in a ventilating system of an existing building is involved, the RSC(V) who installs the fire dampers should inspect and certify that the fire dampers are in a safe and efficient working order pursuant to Clause E8.3 of the Code of Practice for Fire Safety in Buildings in 2011. If the fire dampers are installed by the registered general building contractor ("RGBC") / registered minor works contractor ("RMWC"), a RSC(V) should be engaged to inspect the fire dampers and certify that these are in a safe and efficient working order. The RGBC/RMWC in submitting the certification on fire dampers should include an inspection certificate on fire dampers by RSC(V). PNAP APP-13 is relevant.

Fire Safety aspects

31. For improvement measures as mentioned in section 18 above, please be reminded that the ventilating system shall comply with the following fire safety requirements:-
(i) for holders of general restaurant, light refreshment restaurant and factory canteen licences, one must comply with fire safety requirements for ventilating system for scheduled premises at **Annex G**;
(ii) for non-licensed operators of catering premises (those in a clubhouse holding a certificate of compliance from HAD, school canteens, workplace canteens etc., one must comply with the Building (Ventilating Systems) Regulations (Cap. 123J); and
(iii) for both item (i) and (ii) above, one must comply with fire safety requirements for mechanical ventilating system as stipulated in the Fire Services Department Circular Letter No. 4/96 Part XI which can be found at http://www.hkfsd.gov.hk/eng/source/circular/e04_1996.pdf.

32. Regarding the provision of UV-C installed in air handling unit or air-duct which could be connected to the ventilating system of the premises operating dine-in catering business, the following fire safety points should be observed:-
(i) all parts of material of the system/equipment as installed in air stream of the ventilating system should be non-combustible;
(ii) any PVC cables or cable glands as located inside the air stream should be enclosed in metallic conduits or enclosures; and
(iii) the UV-C equipment including the accessories should conform to UL

1995:2015 - Heating and cooling equipment or equivalent national/international standards. Documents such as catalogue as well as i) test reports issued by the accredited local, Mainland or overseas testing laboratories OR ii) information about the product certification bodies, for example UL online certifications directory with specification of brand name and model of the equipment could be relevant.

Registration Procedure and Transparency Measures

33. The catering business operators specified in section 4 and footnote 4 are required to register through the online platform on FEHD's webpage that they have met the requirement of having attained the threshold of ACH at 6 or above; or, as an alternative, having installed air purifiers meeting the specified specifications and according to the on-the-ground situation and manufacturer's manual in the seating areas of the dine-in catering premises.

34. Catering business operators which have submitted certificates in respect of ACH and/or air purifiers through the FEHD's webpage on "Voluntary Declaration Scheme on Air Changes in Licensed Catering Premises" can already be handled under FEHD's system. Other catering business operators specified in section 4 and footnote 4 must register on the FEHD's designated webpage https://www.fehd.gov.hk/english/licensing/guide_general_reference/Registration_air-changes_purification.html on or before 30 April 2021, with certificate(s) in specified form filled in and signed by a RSC(V) and the signature(s) of the catering business operator(s). The certificate, which can be downloaded via the above webpage, includes the following information:-

(i) the ACH, and whether the ACH is 6 or above;

(ii) if the ACH is not 6 or above, whether having installed air purifiers and provided the following information about the air purifiers:-

(1) type;

(2) brand;

(3) model;

(4) quantity; and

(5) location.

In providing the information on location, the use of an indicative plan showing where the air purifiers are placed would be useful.

35. If a catering business operator is unable to complete the registration referred to in section 34 above on or before 30 April 2021, it must submit an application to FEHD

for an extension of time for registration. If approved, it must complete the registration within the time limit as specified by FEHD.

36. Within 2 days after the registration has been confirmed by FEHD, the catering business operator must download a notice from a designated position of the FEHD's webpage, and display the notice with the following specifications round-the-clock at the entrance of the catering premises:-

(i) the size of the notice must not be less than 297 x 420 mm (A3 size);

(ii) the letters in the notice must be black in colour, the font type must be Times New Roman, and the font size must not be less than 32; and

(iii) the content of the notice must be displayed in a way that is clearly legible and in a location unobstructed, with the following information included:-

(1) the licence number (if any);

(2) name and address of the business; and

(3) air change per hour (fresh air) and/or air purifier(s) installed (as applicable).

37. List of dine-in catering premises covered by a valid food business licence issued by FEHD meeting the required ACH at 6 or above and/or installing air purifier(s) that meet(s) the specified specifications will be published on the FEHD's webpage for public inspection.

38. For dine-in catering premises not covered by a valid food business licence issued by FEHD, upon confirmation of the registration (registration received in respect of a clubhouse with a certificate of compliance will be processed by HAD), they will receive a notification through short message services.

Registered Specialist Contractor (Ventilation Works Category)

39. The certificate mentioned in section 34 above is required to be filled in and signed by a RSC(V). Information of the registered contractor can be found at https://www.bd.gov.hk/en/resources/online-tools/registers-search/registrationsearch.html.

40. The RSC(V) is to check whether the ACH is 6 or above, based on the information on the plans for food business licence or the plans for certification of compliance for the clubhouse (or on the basis of site measurement, in the absence of such plans).

41. Should the catering business operator decide to opt for the alternative of installing air purifiers, the RSC(V) is to be responsible for calculating the number of air purifiers required and determining the placement of air purifiers in the seating areas, having regard to the on-the-ground situation and the manufacturer manual, and completing the certificate based on information as provided by air purifier manufacturers (the onus and accuracy of the information on air purifiers rest with the air purifier manufacturers concerned).

Work Flow

42. To summarise, a schematic presentation of the work flow is at **Annex H**.

Working Group on the Air Change or Air Purifier Requirement
in Dine-In Restaurants under Cap. 599F
11 April 2021

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20	Viable SARS-CoV-2 in the air of a hospital room with COVID-19 patients https://pubmed.ncbi.nlm.nih.gov/32949774/	Lednicky JA et.al	Int J Infect Dis	November 2020	Public Health

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24	Probable airborne transmission of SARS-CoV-2 in a poorly ventilated restaurant https://www.sciencedirect.com/science/article/pii/S0360132321001955	Prof Yuguo Li et al	Building and Environment	March 2021	Public Health/ Building

(e) in respect of seating area of catering premises:—

(i) if the air change per hour (fresh air) (***ACH***) is not 6 or above, must on or before 30 April 2021 install air purifiers of any of the following types that meet the specified specifications set out in the Food and Environmental Hygiene Department (***FEHD***) webpage in the seating area according to the on-the-ground situation (including the site condition) and the manufacturer manual:—

1. High-Efficiency Particulate Arrestance Filter (HEPA) cum Ultraviolet-C (UV-C) device; or
2. High-Efficiency Particulate Arrestance Filter (HEPA) device; or
3. Ultraviolet-C (UV-C) device;

(ii) except food business which has submitted a certificate in respect of ACH and/or air purifiers through the FEHD's webpage on "Voluntary Declaration Scheme on Air Changes in Licensed Catering Premises", must register on FEHD's designated webpage on or before 30 April 2021 and upload onto a designated position of the FEHD webpage a certificate in specified form filled in and signed by a registered specialist contractor (ventilation works category) providing the following information:—

1. the ACH and whether the ACH is 6 or above

   (the ACH must be calculated according to the instructions set out in the FEHD webpage on the basis of the following information on its food business licence (or on the basis of site condition, if without a food business licence):—

   (1) area of seating area;
   (2) height of seating area measured from floor to ceiling (may opt for actual storey height or assumed storey height at 3 metres); and
   (3) capacity of outside fresh air supplied to the seating area by the ventilation system);

2. if the ACH is not 6 or above, whether having installed air purifiers referred to in item (i) above and provide the following information about the air purifiers:—

   (1) type;
   (2) brand;
   (3) model;
   (4) quantity; and
   (5) location;

(iii) if unable to complete the registration referred to in item (ii) above on or before 30 April 2021, must submit an application to the FEHD for an extension of time for registration. If approved, must complete the registration referred to in item (ii) above within the time limit as specified by the FEHD;

(iv) within 2 days after the registration has been confirmed by the FEHD, must download a notice from a designated position of the FEHD webpage, and display the notice with the following specifications round-the-clock at the entrance of the catering premises:—

1. the size of the notice must not be less than 297 x 420 mm (A3 size);
2. the letters in the notice must be black in colour, the font type must be Times New Roman, and the font size must not be less than 32; and
3. the content of the notice must be displayed in a way that is clearly legible and in a location unobstructed, with the following information included:—

   (1) licence number (if any);
   (2) name and address of the business; and
   (3) air change per hour (fresh air) and/or air purifier(s) installed (as applicable); and

(v) after the air purifiers have been installed at the premises, must properly switch on, operate, maintain and repair the air purifiers in accordance with the manufacturer manual when the premises is opened for business;

Annex B

Working Group on the Air Change or Air Purifier Requirement in Dine-in Restaurants under the Directions in relation to Catering Business under Cap. 599F

Terms of Reference

A requirement on air change or air purifiers in dine-in restaurants is stipulated in the Secretary for Food and Health's directions in relation to catering business under the Prevention and Control of Disease (Requirements and Directions) (Business and Premises) Regulation (Cap. 599F) on infection control grounds. The Working Group is appointed by the Director of Food and Environmental Hygiene to advise on the smooth implementation of the requirement by around end April 2021 (or by an extended time limit as may be necessary that may be further provided for in the updated directions) and work on the following deliverables for reference by restaurant operators, ventilation contractors and air purifier suppliers –

(a) specific guidelines for implementing the air change per hour at 6 or above in terms of fresh air intake for the seating area; and

(b) specific guidelines for the alternative of using air purifiers (HEPA[1] cum UV-C[2] device or HEPA device or UV-C device) in terms of meeting the specified specifications and application on-the-ground in a proper manner.

Composition (on an ad personam basis)

Chairman
Professor PL YUEN

Members
Ir Antonio CHAN
Mr HO Kui-yip
Ir Kenneth LI
Professor LI Yu-guo
Dr David LUNG
Mr Simon SIU Yat-ming
Professor WANG Sheng Wei

Other Details

Representatives from the Food and Environmental Hygiene Department and (FEHD) and the Electrical and Mechanical Services Department (EMSD) will serve as observers on the Working Group.

FEHD will provide secretariat support for the Working Group.

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1 High-Efficiency Particulate Air Filter
2 Ultraviolet-C

Annex C

Presentation by the Government to the Working Group on the Rationale Behind the Government's Decision made in October 2020 on Air Change Per Hour (Fresh Air) at 6 or above

The ensuing paragraphs sets out the gist of the presentation made by the Government to the Working Group on the rationale behind its decision on air change per hour (fresh air) (ACH) at 6 or above.

In the course of formulating the guidelines, the Government has briefed the Working Group on the development leading to the decision made in October 2020 (together with the justifications in support of the decision) for adopting "ACH at 6 or above or the installation of air purifiers that meet the specified specifications" as the threshold for the voluntary declaration scheme launched on 16 October 2020. The voluntary declaration scheme has been replaced by the mandatory registration scheme since 18 March 2021.

The use of "ACH at 6 or above or the installation of air purifiers that meet the specified specifications" was suggested by Professor Yuen Kwok-yung. In considering the advice, government departments conducted from August to September 2020 a literature review of the research materials available at the time –

(a) There were discussions in the international community, other places and Hong Kong on the possibility of short range air-borne transmission of SARS-COV-2 and the use of engineering control means (including ventilating measures) to assist the infection control cause. According to data available at that time and statements by various health authorities, COVID-19 is mainly transmitted by droplet and contact routes. Short range air-borne transmission can occur in certain circumstances in the healthcare setting (e.g. aerosol-generating procedures) or certain community settings (e.g. in certain indoor crowded space, during choir practice, in restaurants, fitness classes etc.) [1]; and

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[1] Examples:

- "Transmission of SARS-CoV-2: implications for infection prevention precautions" published by the World Health Organization (WHO) in July 2020 (https://www.who.int/publications/i/item/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations)
- Dedicated website on COVID-19 of the Centers for Disease Control and Prevention of the United States at that time (https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/overview/index.html)
- Dedicated website on COVID-19 on the "Global Heat Health Information Network" of the WHO at that time (https://www.who.int/news-room/q-a-detail/q-a-ventilation-and-air-conditioning-in-public-spaces-and-buildings-and-covid-19 http://www.ghhin.org/heat-and-covid-19/ac-and-ventilation)

(b) As there was no gold standard on ventilating measures for catering premises for preventing SARS-COV-2 transmission at the time, government departments could only examine pertinent ventilation standards available for non-residential buildings or other scientific and clinical studies on ventilating measures[2] (the proposed standards ranging from 5.1 litres/second/person to 10 litres/second/person).

Clearly, it took time for sufficient data to be built up to substantiate a conclusive view on short range air-borne transmission of SARS-COV-2. Nonetheless, we could not rule out the fact that enhancing the ventilating measures could assist the infection control cause.

Consolidating the outcome of the literature review, based on the national standards of the People's Republic of China and the guidelines on ventilation system design for public places (including food premises) formulated by the Chartered Institution of Building Services Engineers (in the UK), the fresh air provision for catering premises is recommended to be 8 to 10 litres/second/person (equivalent to 6.4 to 8 ACH with an assumed storey height of 3 metres). According to "Reducing the Risk of COVID-19 Using Engineering Controls – Guidance Document" (Version 4) published by the American Industrial Hygiene Association (AIHA) in September 2020, increasing ACH to 6 is an effective engineering control measure to reduce the relative risk of exposure to COVID-19 by 95% (ACH at 4.5 only offers a relative risk reduction of 90% whereas an ACH at 6 offers a relative risk reduction of 95%). In non-healthcare facilities where occupant density cannot be limited to fewer than one person per about 3 square metres (or there is a likelihood that infected persons being present), it is necessary to increase the air change rate to ACH at 6 or above.

After balancing all the relevant factors (including the effectiveness of the measures and the acceptability to the trade), the Government made an optimal choice and decided in October 2020 to adopt ACH at 6 or above in respect of the seating areas of dine-in catering premises[3] as the threshold under the voluntary declaration scheme. This level is equivalent to 27 cubic metres/hour/person, which is higher than 17 cubic metres/hour/person stipulated under the Public Health and Municipal Services Ordinance (Cap. 132). To facilitate the public to grasp the idea, the Government has not opted to express the threshold in terms of the 7.5 litres/second/person description. For ease of reference, the various standards are presented in the summary table below -

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[2] Examples:
- The American Society of Heating, Refrigeration and Air-Conditioning Engineers Standard 62.1 (5.15 litres/second/person for restaurant dining rooms (people + area rate))
- "Hygienic Indicators and Limits of Public Places" National Standard GB37488-2019 of the People's Republic of China (30 square metres/second/person or 8.3 litres/second/person)
- Practical Notes ADM-2 by Building Department (10 litres/second/person for office buildings)
- The Chartered Institution of Building Services Engineers (in the UK) Guide A (10 litres/second/person for restaurants)

[3] assuming a storey height of 3 metres and a footprint of 1.5 square metres per person

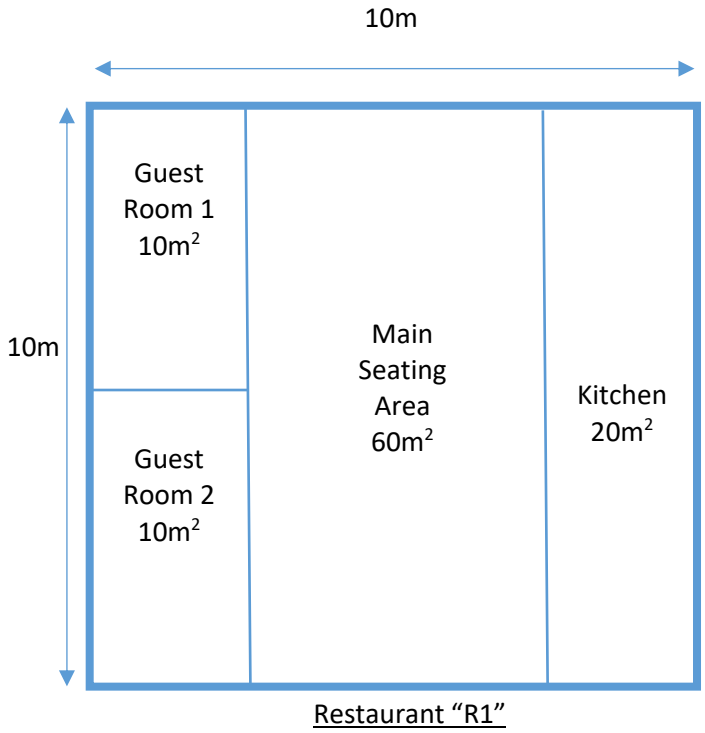
Standards/Regulations	m^3/hr/person	L/s/person	ACH at 3m height Ceiling @1.5m^2/person	ACH at 2.3m height Ceiling @1.5m^2/person
Section 93(1) of and Second Schedule to the Public Health and Municipal Services Ordinance (Cap. 132) (for Restaurants)	17.0	4.7	3.8	4.9
ASHRAE Standard 62.1 The Standards for Ventilation and Indoor Air Quality (for Restaurants)	18.7	5.1	4.2	5.4
國家市場監督管理總局、中國國家標準化管理委員會 (國家標準) GB37488-2019 Hygiene indicators and limits for public places (for Public leisure places)	30.0	8.3	6.7	8.7
Buildings Department Practice Note ADM2 (for Offices)	36.0	10.0	8.0	10.4
Chartered Institution of Building Services Engineer (CIBSE) Guide A (for Restaurants)	36.0	10.0	8.0	10.4
Voluntary declaration scheme on air changes in licensed catering premises	27.0	7.5	6.0	6.0
Net increase	10.0	2.8	2.2	1.1

Annex D

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 900m^3/hr and 150 m^3/hr respectively.



(1) Air Change per Hour (Fresh Air) = A ÷ (B × 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

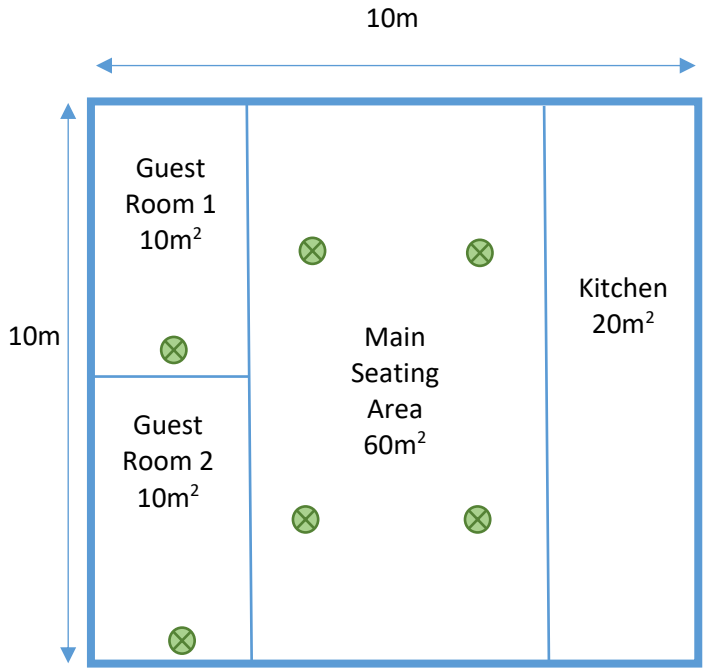
ACH (Main Seating Area) = 900 ÷ (60 x 2.9) = 5.17
ACH (Guest Room 1) = 150 ÷ (10 x 2.9) = 5.17
ACH (Guest Room 2) = 150 ÷ (10 x 2.9) = 5.17

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

Case A – HEPA Air Purifier (CADR 120m^3/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 x 4 = 480m³/hr. ACH by air purifiers is = (480÷(60 x 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]

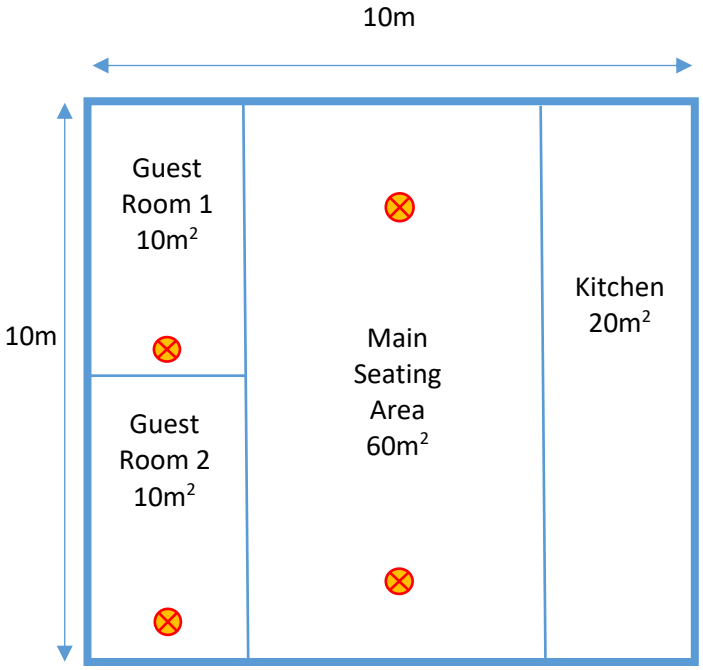


Distribution of HEPA Air Purifiers

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

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.

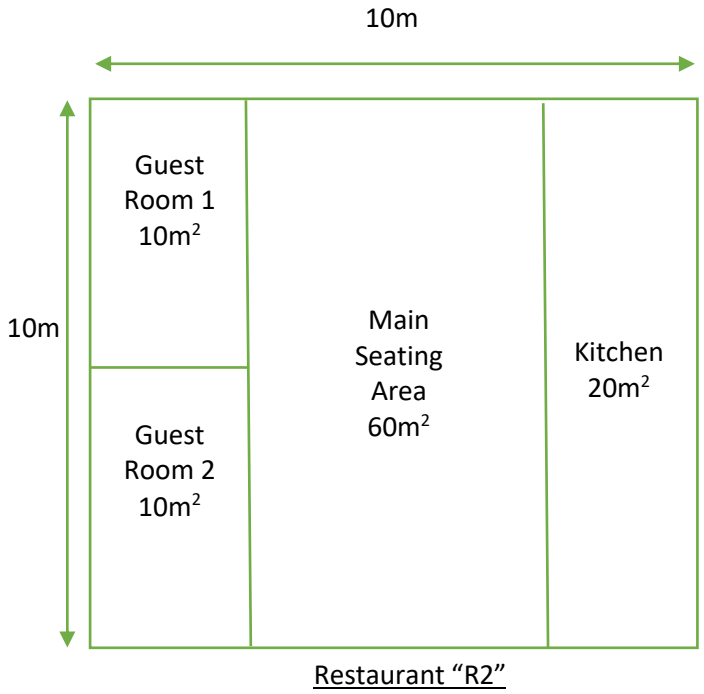
[Note : ACH_{UVC} by air purifiers is 7. The total ACH for each compartment, including the fresh air supply and air purifier, is 5.17 + 7 = 12.17]



Distribution of UV-C Air Purifiers

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 1,050m^3/hr and 175 m^3/hr respectively.



Restaurant "R2"

(1) Air Change per Hour (Fresh Air) = A ÷ (B × 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)

ACH (Main Seating Area) = 1,050 ÷ (60 x 3) = 5.83
ACH (Guest Room 1) = 175 ÷ (10 x 3) = 5.83
ACH (Guest Room 2) = 175 ÷ (10 x 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: 1,100m^3/hr
(b) Guest Room 1: 150m^3/hr
(c) Guest Room 2: 150m^3/hr

For Main Seating Area, the Air Change per Hour (Fresh Air) = 1,100 ÷ (60 x 3) = 6.11

However, for each Guest Room 1 and Guest Room 2, the Air Change per Hour (Fresh Air) = 150 ÷ (10 x 3) = 5

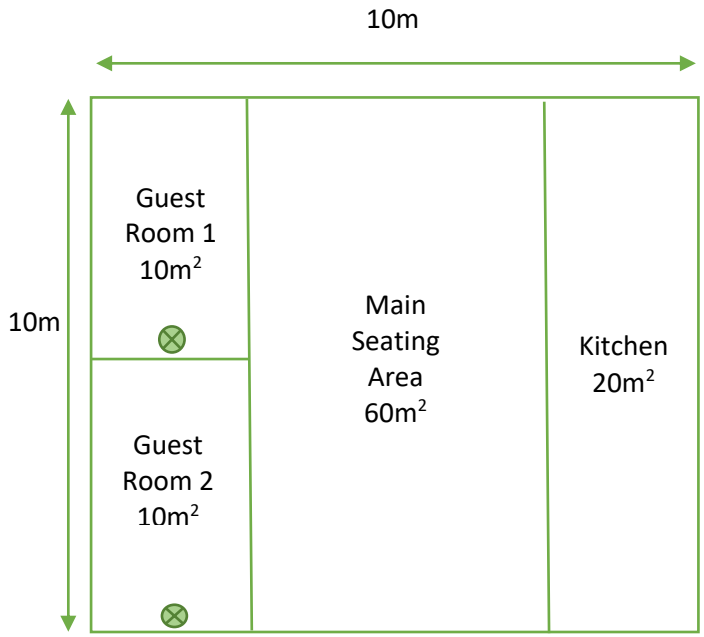
Air purifiers are needed for Guest Room 1 and Guest Room 2.

(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 120m^3/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 = 120m^3/hr, ACH by air purifier for each Guest Room = (120 ÷ (10 x 3))=4 . The total ACH for each Guest Room including the fresh air supply and air purifier is 5 + 4 = 9]

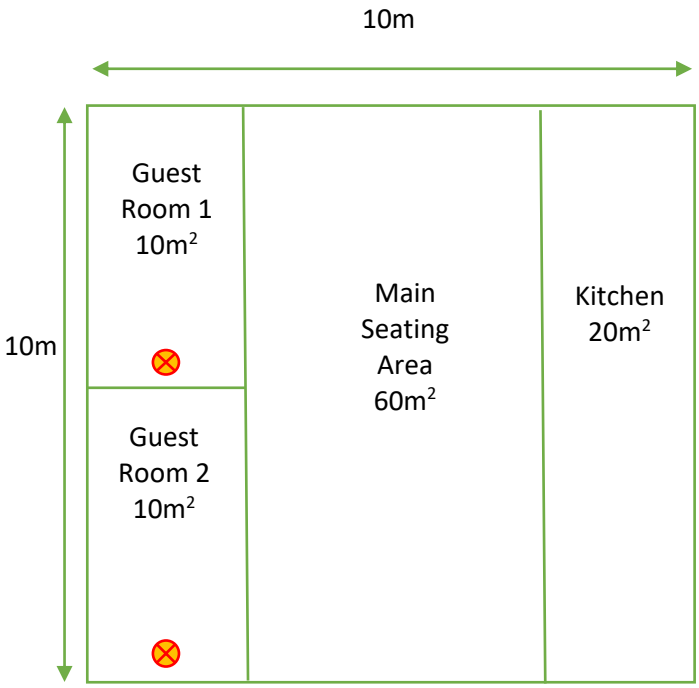


Distribution of HEPA Air Purifiers

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

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

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



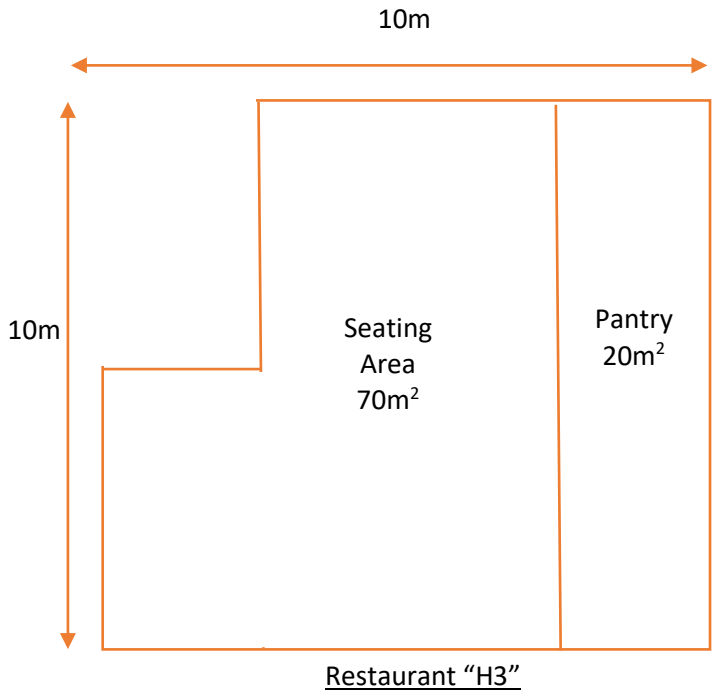
Distribution of UV-C Air Purifiers

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 90m^2 located in lobby area with 10m ceiling height with the layout shown below. The total seating area is 70m^2 and the pantry is 20m^2 under food business licence. The fresh air supply flow rate to the seating area according to the food business licence is 1,200m^3/hr.



Restaurant "H3"

(1) Air Change per Hour (Fresh Air) = A ÷ (B × 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)

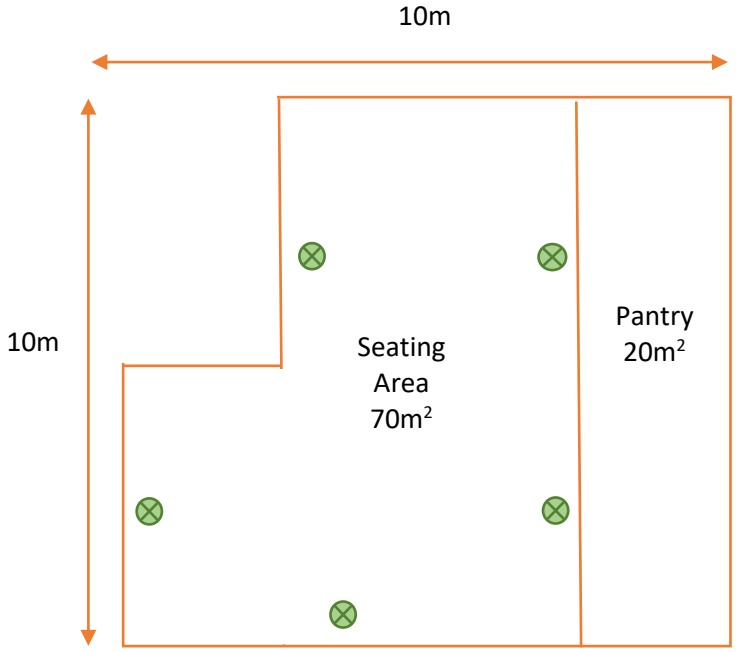
C is 3m (ceiling height, 10m, is more than 3m, 3m should be used for calculation)
ACH = 1,200 ÷ (70 x 3) = 5.71

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

Case A – HEPA Air Purifier (CADR 120m^3/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 x 5 = 600m^3/hr, ACH by air purifiers = (600 ÷ (70 x 3))=2.86. The total ACH including the fresh air supply and air purifier is 5.71 + 2.86 = 8.57]

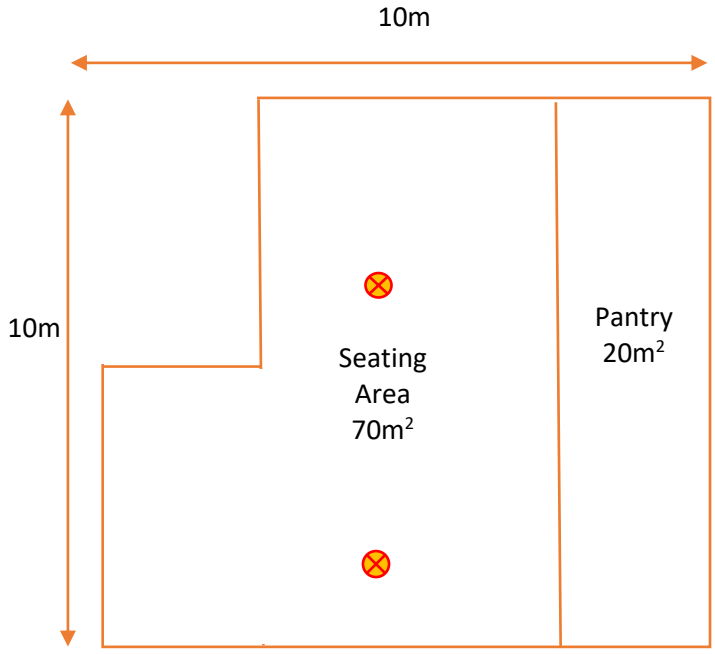


Distribution of
HEPA Air Purifiers

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_{UVC} by air purifiers is 7. The total ACH including the fresh air supply and air purifier is 5.71 + 7 = 12.71]



Distribution of UV-C
Air Purifiers

Annex E

Safety tips in relation to electrical work

a) To engage a registered electrical contractor to carry out the electrical work including installation, inspection, testing, maintenance, alteration, repair and issue of certificate.

b) To obtain a Work Completion Certificate (i.e. Form WR1) from the registered electrical contractor upon completion of the electrical work and before the fixed electrical installation is energised so as to confirm that the requirements of the Electricity Ordinance (Cap. 406) and its subsidiary regulations have been met.

Annex F

1. Safety tips for use of extensions units

During the use of the extension units, citizens should follow the following safety measures:

a) Buy and use extension units which comply with relevant safety standards (such as BS 1363).

b) Buy and use extension units with sockets containing safety shutters

c) Do not use or buy extension units with irregular holes sockets.

d) To avoid overload of circuit and fire, no more than one extension unit should be inserted into a socket outlet.

e) The position of extension units should not be susceptible to collision, resulting in damage of extension units.

f) Do not force two-pin plug into the socket of extension units.

g) If there are any abnormalities observed in the extension unit, such as damage or broken, loosen plug-pin, etc., do not use that extension unit.

h) Do not use the extension units at humid environment such as bathroom.

2. Poster and leaflet for "Safety tips for Plugs, Adopters and Extension Unit"

Poster_PAEU - Adaptors and Exte

Leaflet_PAEU.pdf

Fire Safety Requirements for Ventilating System for Scheduled Premises*

附表所列處所*內通風系統的消防安全規定

1. Application 適用範圍

These requirements shall apply to every ventilating system of the scheduled premises, which include restaurants, dancing establishments, cinemas, theatres, funeral parlours and factory canteens.
本規定適用於任何附表所列處所的通風系統。這些處所包括:食肆、跳舞場所、戲院、劇院、殯儀館及工廠食堂。

2. The Requirements 規定

(a) No air intake for the ventilating system shall be sited in any place which in the opinion of the Director of Fire Services constitutes a fire hazard.
通風系統的入氣口不得位於消防處處長認爲構成火警危險的任何地方。

(b) The opening of every air intake shall be fitted with a screen constructed of corrosion-resistant material having a mesh not greater than 12mm.
每個入氣口須裝上一個用防蝕物料製造的網罩，其網孔不得超過 12 毫米闊。

(c) Every duct shall be wholly constructed of non-combustible material having a strength and durability similar to that of galvanized sheet iron or steel.
每條管道須全部用不易燃物料製成，該等物料的強度及耐用度須與鍍鋅鐵片或鋼片的強度及耐用度相近。

(d) Every duct shall, at the point where it passes through any floor, wall or ceiling, be fitted with a damper which shall be operated by fusible links of a type approved by the Director of Fire Services, and designed to operate up to a temperature of 69 degrees Celsius, and be so constructed or protected as to resist the action of fire for a period not less than the period for which the floor, wall or

ceiling through which it passes is designed to resist the action of fire.
在管道經過任何地面、牆壁或天花板之處，即須裝設以保險連杆操作的防火閘，該保險連杆須屬消防處處長所批准的類型，而保險連杆的設計則須在溫度升達攝氏 69 度時能操作，至於防火閘的構造及防護性能，亦須能抵受火力不少於管道所經過的地面、牆壁或天花板在設計上所能抵受火力的時間。

(e) No duct shall serve more than one building.
每條管道不能供多過一座建築物使用。

(f) Every air filter shall be constructed wholly of non-combustible material, other than steel wool.
每個空氣過濾器須全部用鋼絲絨以外的不易燃物料製成。

(g) Every electrostatic filter or precipitator shall be of a type approved by the Director of Fire Services.
每個靜電過濾器或聚塵器須屬消防處處長所批准的類型。

(List of approved electrostatic filter or precipitator is provided on the FSD's website at:
有關本處批准的靜電過濾器或聚塵器的類型，可瀏覽本處網址：
http://www.hkfsd.gov.hk/home/eng/source/licensing/list_of_acceptable_material_ventilation.pdf)

(h) Electric motors and other apparatus shall not be installed in any air duct or in the air stream of any ventilating system unless they form part of the ventilating system.
任何電動機及其他器具如非構成任何通風系統的一部分，則不得安裝在該通風系統的任何空氣管道內或氣流經過之處。

(i) Electric motors and other apparatus forming part of the ventilating system shall be totally enclosed in a way to exclude dust and dirt; and if they are installed in an air-input duct, shall be of such design that, in the event of overheating, smoke will not be discharged into the air stream.
構成通風系統一部分的電動機及其他器具須完全密封以防止塵埃及污物進入；及如安裝在輸入空氣的管道內，則在設計上須做到一旦過熱時，煙霧不會排進氣流中。

3. Daily Operation and Maintenance 日常操作及保養

(a) The ventilating system shall be kept in safe and efficient working order at all times.
通風系統須時刻保持在安全和有效的操作狀態。

(b) Every damper, filter and precipitator in the ventilating system that embodies the use of ducting or trunking in the premises shall be inspected at intervals not exceeding 12 months by a registered specialist contractor (ventilation works category).
處所內的通風系統如敷設有管道或幹槽，則須由註冊專門承建商(通風系統工程類別) 在每隔不超過 12 個月的期間內檢查該系統內的每個防火閘、過濾器及聚塵器。

4. Warning 警告

In pursuant to section 13 of the Ventilation of Scheduled Premises Regulation, Cap. 132CE, Laws of Hong Kong, the licensing authority may revoke the licence issued or granted by it in respect of any scheduled premises, either temporarily or permanently, in the event of any contravention of these fire safety requirements.
根據香港法例第 132CE 章《附表所列處所通風設施規例》第 13 條，任何人如違反本消防安全規定，發牌當局可將其就任何附表所列處所發出或批出的牌照暫時或永久撤銷。

**"Scheduled premises" means any premises of any of the classes of premises specified in the first column of the Second Schedule of the Public Health and Municipal Services Ordinance, Chapter 132, Laws of Hong Kong.*
**"附表所列處所"指香港法例第 132 章《公眾衞生及市政條例》附表 2 第 1 欄所指明的其中任何類別的處所。*

Hong Kong Fire Services Department 香港消防處

November 2007
2007 年 11 月

Annex H

Flowchart showing how to comply with the Requirements on Air Change / Air Purifiers in Seating Areas of Dine-in Catering Premises under Cap. 599F