

29 May 2020

GUIDANCE NOTE ON BUILDING AIR-CONDITIONING AND MECHANICAL VENTILATION (ACMV) OPERATIONS AMID COVID-19 SITUATION

1. With the gradual easing of Circuit Breaker (CB) measures after 1 June 2020, the Government is phasing in the reopening of work premises with requirements for businesses to put in place safe management measures. In line with these measures, the Building and Construction Authority (BCA), the National Environment Agency (NEA), and the Ministry of Health (MOH) are providing operational guidance for Air Conditioning and Mechanical Ventilation (ACMV) systems in buildings. Building owners and facilities managers may wish to refer to this Guidance Note for precautionary measures associated with operations of ACMV systems¹ during the period relevant to COVID-19 situation.

2. Please note the Guidance Note only applies to air-conditioned premises where air-conditioning is used intermittently or continuously, with exception of factory production areas, hospitals, polyclinics and laboratories. Advice from subject experts and specialists should be sought for specialised premises.

Guidance Note for ACMV Operations

3. This Guidance Note serves to provide precautionary measures for building operations to reduce the risk of disease transmission and minimise the build-up of chemicals from cleaning and disinfection activities.

4. The measures in this Guidance Note will only be effective if the key measures against COVID-19, such as Safe Distancing Measures for building occupants, wearing of masks and regular cleaning of high-touch points are already implemented.

¹ ACMV systems include air handling units and fan coil units such as cassette-type or wall-mounted type

5. A strategic plan should be created on safe management of building comprehensively, including developing communication plans for building support, enhancing ventilation, and ensuring supply of critical items such as filters. The plan should consider the possibility of decreased thermal comfort and increased energy use due to implementation of the measures. Indoor Relative Humidity (RH) should be closely monitored and maintained according to SS554².

5.1 Increase ventilation for indoor air dilution

- a. **Purge the indoor air before and after occupancy.** Air flushing and purging should be provided two hours before and after occupancy. In buildings without purging systems, operation hours of ACMV systems should be extended two hours before and after occupancy.
- b. **Keep toilet exhaust fans running for longer operating hours.** Toilet exhaust fans should be kept running at full capacity for longer operating hours to enhance ventilation in the building. It is important to also check on the water seal for sanitary fittings to ensure that they are not dried-out.
- c. **Increase outdoor air intake.** Outdoor air intake should be adjusted to the maximum during occupancy, including maximum opening of outdoor air dampers, high speed mode of fresh air fans. Demand control systems such as those with CO₂ sensor should be deactivated.
- d. **Reduce indoor air recirculation.** Where possible, it is recommended to reduce recirculation of indoor air during this period. Recirculation air dampers should be adjusted and set to minimum.
- e. **Use window openings.** If operable windows are provided, facilities managers are encouraged to open windows more frequently for natural ventilation, unless outdoor air quality is poor. ACMV should be reduced or turned off when windows are opened.
- f. **Stop rotatory heat exchangers or heat recovery wheels.** Rotatory heat changers or heat recovery wheels should be switched off to reduce the risk of carry-over leakage from the exhaust air.

² Singapore Standard SS554: Code of Practice for Indoor Air Quality for Air-Conditioned Buildings

5.2 Enhance indoor air cleaning

- a. **Use high efficiency filters for AHUs.** High efficiency filters, preferably MERV 14 or F8 and above, should be considered for treating recirculation air in Air Handling Units (AHUs). To prevent filter bypass, the filters should be properly installed and maintained according to manufacturer's recommendation. Filters should be changed with the system turned off while wearing gloves with respiratory protection and disposed off in sealed bags.
 - b. **Localised air-cleaning with portable air cleaners.** Portable air cleaners or purifiers with high efficiency filters (such as HEPA filters) should be used for localised air-cleaning, if the ACMV system is unable to be fitted with high efficiency filters, and if increasing ventilation is not feasible³.
 - c. **Use of Ultraviolet Germicidal Irradiation (UVGI).** If the ACMV system has been equipped with air cleaning devices, such as UVGI, these devices should be activated as a supplement to the MERV 14 filters to enhance the air-cleaning effect.
6. The installation and maintenance of the ACMV system should be carried out in accordance to manufacturer's recommendations. These may include weekly surface cleaning of air grilles. However, major modification works, or duct cleaning works should be avoided during COVID-19 period.
7. The above measures are for building owners and facilities managers to consider when operating building ACMV systems amid COVID-19 situation. Further reference can be made to similar guidance documents published by ASHRAE⁴, REHVA⁵, and SinBerBEST⁶.

³ For spaces without ducted outdoor air supply system, using toilet exhaust fans and opening of windows are options to improve the ventilation. In the event where these are not possible, the use of portable air cleaners should be seriously considered, and owners of such spaces should make plans for mechanical ventilation whenever possible.

⁴ American Society of Heating, Refrigerating and Air-Conditioning Engineers
<https://www.ashrae.org/technical-resources/resources>

⁵ Federation of European Heating, Ventilation and Air Conditioning Association
<https://www.rehva.eu/activities/covid-19-guidance>

⁶ Singapore Berkeley Building Efficiency and Sustainability in the Tropics, a research programme funded by National Research Foundation (NRF) <https://www.sleb.sg/Context/ContentDetails/46/17>

8. Please feel free to contact the following officers if you need further clarifications.

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