

Code of practice for air-conditioning and mechanical ventilation in buildings

AMENDMENT NO. 2

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1. Page 6, Table of contents

Add “Annex D Practical measures for existing building services operations amid pandemic” after Annex C.

Add “Bibliography” after Tables.

2. Page 60, New Annex D

Add the following Annex D after Annex C.

Annex D
(informative)

**Practical measures for existing building services
operations amid pandemic**

D.1 Scope

This annex provides guidance on measures to be put in place in the air-conditioning and mechanical ventilation (ACMV) systems in buildings to limit the risk of virus spread to occupants in pandemic situation (see Note 1). These measures should not replace the importance of the primary measures such as individual hygiene, disinfection practices, regular cleaning of high-touch points, mask wearing, isolation, and social distancing that have already been implemented.

NOTE 1 – Due to the short span since emergence of the COVID-19 pandemic, these measures are based on current research knowledge that will continue to evolve and may be revised from time to time when more research findings and data are available.

D.2 Key measures

D.2.1 General considerations

The measures in this Annex will only be effective if the key measures against pandemic (e.g. COVID-19), such as Safe Distancing Measures (SDM) for building occupants, wearing of masks and regular cleaning and disinfection of high-touch points such as door handles, handrails, and lift buttons have already been implemented. Occupants and guests should be screened, monitored and controlled to help avoid transmission of the disease.

D.2.2 Consider the airflow pathway (air distribution) and occupancy layout

As there have been reports on the association of airflows and spread of the SARS-CoV-2 virus [1, 2, 3], it is recommended that occupancy layout for social distancing take into consideration the airflow patterns and pathways (e.g. staggered layout instead of linear placement of live workstations).

It is also recommended that workstations be rearranged so that employees do not face each other, or establish partitions if facing each other cannot be avoided. If fans are used, ensure that air does not get blown from one person directly to another [4, 5, 6].

D.3 Air-conditioning system

D.3.1 Operational considerations

Mitigation of infectious aerosol dissemination in the event of a pandemic should be the primary consideration and includes the following provisions:

- Increased ventilation;
- Increased air filtration, and disinfection.

These are the key principles to dilute and reduce the concentration, and thereby occupant exposure, of any airborne virus in indoor environments.

D.4 Increased ventilation

D.4.1 Outdoor air supply

D.4.1.1 The outdoor air supply should minimally meet the level specified in Table 1. Additional outdoor air supply should be practiced (e.g. maximum setting) to enhance dilution indoors if it is beneficial in reducing health risks.

D.4.1.2 Outdoor air supply should be set to the maximum setting to enhance dilution indoors. Outdoor air dampers should be opened to as high a percentage as possible with fans running in the high-speed mode as indoor conditions permit. Demand control systems, such as those with CO₂ sensors, should be deactivated.

D.4.1.3 Longer operational period of the air-conditioning system, before and after occupancy, should be considered to remove traces of contaminants.

D.4.2 Purging of indoor air

D.4.2.1 An air purging system should be operated to introduce outdoor air into the space and discharging indoor air outside of the building. It is recommended for building owners and facilities management to operate the purging at least once a day prior to occupancy. Operation times should be at least two hours before the first occupant arrives.

D.4.2.2 In spaces without purging systems, operation hours of ACMV systems should be extended by two hours before and after occupancy.

D.4.3 Energy recovery units

Cross contamination issues need to be considered in the continued operation of such units. The energy recovery units may need to be switched off, leaks identified and sealed to prevent exhaust / recirculated air from getting entrained (bypass) into the supply air. This will reduce the risk of carry-over leakage from the exhaust air.

D.5 Increased air filtration, and disinfection

D.5.1 Air filtration

D.5.1.1 High-efficiency filters with rating of at least MERV 14 should be installed and operated in Air Handling Units (AHUs) that treat recirculation air. The filters should be properly installed and well-sealed according to manufacturer's recommendation to prevent filter bypass. The filters should be regularly inspected to ensure no leakage and that it is not fully loaded. Adequate precaution should be taken when changing the filters (done while the system is off, wearing personal protection equipment and gloves) and disposing of them in sealed bags.

D.5.2 Disinfection

D.5.2.1 Air cleaning devices such as Ultraviolet Germicidal Irradiation (UVGI) may be used, subject to space constraints, to enhance the cleaning effect, and supplement the air filters. The devices may be considered for use in occupied spaces or AHUs / ducts and should be sized, installed and maintained appropriately for its intended effectiveness. Users need to be aware of and follow relevant safety guidelines.

NOTE – Users may refer to the relevant government agencies' advisories [7] on the safe usage of UVGI.

D.5.2.2 Other air cleaning technologies (e.g. bipolar ionisers or photocatalytic oxidisers) may be considered. However, it is important to note that they may operate on different mechanisms, with each having different considerations for effectiveness and safety. Caution should be exercised and the required conditions for effective air cleaning and safety should be considered.

D.5.3 Portable air cleaners

D.5.3.1 Portable air cleaners or purifiers with high efficiency filters may 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 feasible. This is an additional solution for consideration at a localised level. These devices should comply with D.5.1 for air cleaners (enhanced with HEPA filters) and D.5.2 for air cleaners incorporating disinfection.

D.6 Operation and maintenance

D.6.1 Maximise ventilation in toilets and common areas

D.6.1.1 Due to the toilet exhaust fans being run at full capacity for longer operating hours, it is important to check on the water seal for sanitary fittings to ensure that the water seals are maintained. The toilet lid should be closed to minimise the risks associated with under-pressure (lower pressure than outdoor).

D.6.1.2 In common areas with a risk of crowd gathering, such as the entrance lobby, sufficient ventilation openings and air extraction / exhaust should be in place.

3. Page 63, Addition of Bibliography

Add the following Bibliography after Annex D.

Bibliography

Publications

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NOTE – Hyperlinks are valid at the time of publication.