

INDOOR AIR QUALITY

Engineering sector has the solution to droplet (aerosol) transmission

In the context of the current Covid-19 pandemic, the leading European Indoor Environmental Quality (IEQ) associations – covering heating, mechanical ventilation, air-conditioning, lighting, and building automation and control systems – have issued a joint statement that asserts the dangers of indoor air pollution and outlines proposals that would help address the problem. It cites the lack of a coherent EU legislative framework on the matter and proposes adding quality standards and policies to relevant directives and frameworks such as the Energy Performance of Buildings Directive, the Occupational Safety and Health Strategic Framework, and public procurement practices.

The following extracts

highlight the key recommendations outlined in the statement in the context of current evidence with regard to droplet (aerosol) transmission and airflow in a room.

Mechanical air renewal

Mechanical ventilation and air-conditioning units should not be switched off. Rather, outdoor air supply volume flow should be elevated to increase the frequency of the replacement of polluted indoor air with outdoor air supply. The greater the number of air changes per hour (ACH) – a measure of ventilation rate – the more any aerosol can be diluted/removed.

Extended operating hours before and after the regular time-of-use should be actively considered. If air humidity control is possible with the mechanical ventilation or air-conditioning system, this functionality should also be used as evidence suggests that in drier environments, Covid-19 transmission increases. Therefore, it is recommended that relative air humidity be kept in the accepted comfort range between 40-60%.

Window airing

In buildings without mechanical ventilation systems and those with insufficient mechanical ventilation, or where the installation of a

mechanical ventilation system is not technically feasible, window airing is supportive but has a limited effect on the dilution of aerosols, depending on the outside conditions (1-2 ACH). Depending on the outdoor weather conditions, window airing might cause discomfort. It can also incur major thermal losses, significantly increasing the energy consumption of buildings.

Air treatment technologies

Air treatment systems, such as UV-C disinfection used in addition to mechanical ventilation, will add to the effect of the ventilation rate significantly (an impact equivalent to an additional 6-10 ACH can be easily achieved) in reducing the concentration of infectious viral load in the air. Recent studies have shown the technology has been proven to inactivate, without exception, all bacteria and viruses against which it has been tested. This includes (among others) those causing tuberculosis, influenza, the common cold and SARS.

UV-C disinfection can also be used inside HVAC systems to keep cooling coils free of infectious biofilm in heat exchangers, to disinfect surfaces and disinfect the air flow. In applications where air recirculation is unavoidable, the use of air treatment technologies is also strongly recommended.

Remote control BAC systems

Existing building automation and control systems (BACS) can monitor indoor air quality (IAQ), adjust air renewal settings to the optimum levels, and enable remote connectivity. This avoids the need for physical presence at locations while having full 24/7 control of the building's HVAC systems. Most of the monitoring, supervising and adjustment of BACS-equipped HVAC systems can be achieved safely and efficiently from remote locations without physical presence. This may help to reduce the time of exposure of service and maintenance staff.

IEQ Associations

EHPA

European Heat Pump Association

EPEE

European Partnership for Energy and the Environment

eu.bac

European Building Automation and Controls Association

EVIA

European Ventilation Industry Association

GCP Europe

European association for building engineering services

LightingEurope

Reduce aerosolised transmission

Indoor air pollution must be fully recognised alongside ambient air pollution as a risk to human health. The recent European Parliament INI on the implementation of the Ambient Air Quality (AAQ) Directives,¹ noted that the EU lacks a coherent legislative framework for addressing indoor air pollution. This has also been recognised in the Commission's *Zero Pollution Action Plan*.²

A number of existing EU policies should be used to support reduced aerosolised transmission. The revision of the Energy Performance of Buildings Directive (EPBD), expected in Q4 2021, should be used to mandate the introduction of minimum indoor environmental quality performance standards (MIEQPS) for buildings, including for indoor air quality (IAQ) as a component of overall IEQ. Such minimum performance standards would drive the uptake of mechanical ventilation, air-conditioning and air treatment systems, thereby improving air dilution and reducing aerosolised contamination risk in buildings.

The EU's forthcoming Occupational Safety and Health (OSH) Strategic Framework for 2021/2027 should fully integrate IEQ among the aspects to be considered and regulated by

member states in their OSH policies, and in the Commission's model OSH evaluation framework.

IEQ conditionality should also be integrated into public procurement policy by adding/establishing IEQ in green public procurement criteria and in the revision of the Energy Efficiency Directive (EED) in conditionality for purchasing by public bodies. ■

References

1. https://www.europarl.europa.eu/doceo/document/A-9-2021-0037_EN.pdf
2. https://ec.europa.eu/environment/pdf/zero-pollution-action-plan/communication_en.pdf

