NASUWT
The Teachers' Union

Briefing

Joint Hazards/NASUWT Air Filtration Guidance

The Importance of Ventilation

A key route of transmission of the COVID-19 virus is via aerosol particles. These are tiny particles/droplets that can be carried many metres on air currents and can also hang in the air for a considerable amount of time. This means that social distancing offers little protection from the long range airborne aerosols which can be spread throughout the air in an indoor-shared air space.

Effective ventilation can dilute, disperse and remove viral particles, reducing the risk of transmission. It should also be remembered that ventilation is essential because it also brings in fresh air and removes carbon dioxide from the room, which has been proven to affect pupils' ability to learn, in high concentrations.

The Importance of Air Filtration

Achieving sufficient ventilation can present challenges in some rooms; especially in winter, where a balance with thermal comfort is required.

In these circumstances, air filtration units provide a supplementary measure, although it must be stressed that they should be in addition to, not instead of ventilation. Ventilation is also not very effective at preventing the inhalation of short-range airborne aerosols and so, wherever possible, 2-3m social distancing and wearing a good quality mask is still important, and filtering air can help.

Portable, plug in and used air filtration units typically use high efficiency particulate air (HEPA) filters to remove microscopic particles from the air. This will include viruses and other pathogens. Some also employ ultraviolet (UV) light to kill pathogens, but this is not proven to be necessary or to be effective in portable HEPA units. UV may, however, be useful inside mechanical ventilation systems and professionally installed upper room UV C Germicidal Irradiation systems.

HEPA filters are a long-used and proven technology removing all types of airborne particles, guaranteed to remove 99% of 0.3 micron particles and have been proven to effectively remove aerosols containing COVID-19 particles from the air. In one recent study at Addenbrookes Hospital in Cambridgeshire, virus levels in the air of a ward treating COVID-19 patients were reduced to undetectable levels when HEPA filters were employed.

HEPA filtration systems clean the air without adding dangerous chemicals to the air that other devices, such as ionisers and ozonisers do. These types of purifiers should be avoided.

Air filtration systems must not be seen as a purely COVID-19 measure. Each year, hundreds of thousands of school days are lost due to absence because to other respiratory infections, such as cold and flu. In addition, many pupils and staff have conditions such as asthma and hay fever made worse by airborne allergens and contaminants. Air pollution due to traffic etc. is also a major issue in some schools. HEPA filters will remove these pathogens, allergens and contaminants and make a better learning experience with reduced absence. It is likely that a filter would pay for itself very quickly by reducing absence rates, as well as improving learning.

Choosing a Filtration Unit

There are two considerations to take into account when considering a filtration unit, and schools should have competent advice to assist:

a. the clean air delivery rate (CADR) – how much air is filtered per hour;

b. the noise level of the unit – some are much louder than others. 45 dB and below should be the aim.

The noise levels and CADR should be stated on the product.

The CADR required depends on the size of the room and the number of people within the room. Filtration units should be purchased on the basis of maximum occupancy.

A good yardstick to use is five litres of filtered air per person, per second, which equates to 18m^3 per person per hour. If the room has a maximum occupancy of 32 people, that would be a CADR requirement of 576 m^3 per hour.

It can be more useful to buy two smaller units, rather than one large one as this allows the filtration to be adjusted by the occupancy. Spreads the filtration around the room and can reduce noise level.

A comparison of air filtrations units can be found at: https://www.fullplasticscientist.co.uk/air-purifier-comparison; a more detailed description of the importance of ventilation and filtration can be found at: https://drive.google.com/file/d/19KwC4TAOyt17E34a9i4dyn0atvDwHnxb/view?usp=sharing; and specific addition information on HEPA filters at: https://drive.google.com/file/d/1XdDaaMIZtf4VmqhA2O2LoKpVf5Tpsn0F/view? usp=sharing.

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