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Clear the air: How to make your building air quality more attractive without breaking the bank, and how room air purifiers can help

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Boston, MA The good news is we are always learning. If you doubt that, consider the past three years. Who could forget the early pandemic phase? Staying safe meant buildings emptying out, wiping down the groceries with bleach, and wearing homemade cloth masks. Thanks to rapid scientific research, we learned to protect ourselves with vaccines and high-filtration N-95 masks, and importantly, we learned the most common COVID-19 transmission route is airborne.

Airborne, aerosolized virus transmission could have been a fatal blow to the commercial property industry. Who would ever want to work in a communal office now, let alone one without operable windows? And this concern expanded to broader category of healthy air quality indoors. Not many people were aware of the damaging effects of ultrafine particles (PM2.5) pre-COVID, and nowadays we're all PM2.5 aficionados, rightly concerned with the full range of contaminants inside buildings—from ozone, Co2, volatile organic chemicals (VOCs), mold, and pathogens to outdoor pollutants including smog, wildfire smoke, and dust.

Again, we learned and adapted, based on expert research, to provide safer and even healthier building indoor air quality. But not all the adaptations are effective (some HVAC systems can't be upgraded), and many come with negative consequences (including significant energy cost increases). To solve these problems, the most recent industry IAQ guidelines reduce the importance of ventilation with outdoor air (which requires conditioning and may introduce new contaminants) shifting the focus to a layered approach using HVAC systems paired with in-room technologies, including air purifiers, closest to the contaminant sources.

We asked Agentis Air president Larry Rothenberg to answer some of questions he gets asked about these new guidelines and how to best use room air purifiers.

Can't we just use a better HVAC filter and be protected? The simple answer is no. During COVID, operators relied on two techniques to reduce ultrafine contaminants – increasing the MERV rating of filters and increasing the amount of fresh air introduced. The problem is that both come with an energy penalty. In addition to the costs required to power high-MERV-rated filters and to condition the air, the energy expended makes it difficult to reach sustainability targets. The new approach, driven by recent amendments to ASHRAE standard 62.1, involves controlling the MERV rating of your filters, adjusting the amount of fresh air being introduced, and using other technologies including room air purifiers in areas of the building that have high traffic, exposure to the public, or

otherwise have increased generation of particulates (such as rooms with copiers and 3D printers).

Is there specific guidance on how to balance these technologies? This is a relatively new and rapidly evolving field, and it is a complicated technical issue. Using the most recent ASHRAE standards for IAQ procedure, a systematic approach to balancing the goals of improving indoor air quality and sustainability is recommended. One such approach includes setting IAQ goals, installing IAQ monitors, making sure you have at least MERV 13 filters, and then deploying supplemental resources such as room air purifiers in problem areas (such as reception areas, lunchrooms, and conference rooms) or areas where the HVAC unit just is not doing the job. For more on this approach I recommend this white paper: <https://enverid.com/resources/learning/how-to-achieve-sustainable-indoor-air-quality-a-roadmap-to-simultaneously-improving-indoor-air-quality-meeting-building-decarbonization-and-climate-resiliency-goals/>

In December 2022, ASHRAE announced it will also develop a voluntary standard for pathogen mitigation, to be released by mid 2023. There has never been a standard for building IAQ, so this is a big step forward. Complying with this standard will be a marketable advantage for building owners.

How has the role of room air purifiers changed since the COVID epidemic? Prior to COVID, buildings relied on HVAC systems plus ventilation, and room air purifiers were used for special IAQ situations to remove problematic particulates for people with allergic or other respiratory sensitivities. Since COVID, room air purifiers are understood to have an important role in reducing the spread of contagions and other damaging airborne particulates at the source.

It's not just COVID anymore. Nervous tenants worry about breathing healthy air. How can a room air purifier help? There are three basic IAQ threats everyone should be concerned with: pathogens, particulate matter, and gasses. Pathogens (such as COVID-19 and other viruses) usually come from infectious people releasing pathogens into the air. Particulate matter can come from wildfires and other types of combustion (cars, powerplants, airplanes), as well as asbestos, dust, dust mites, mold, and pollen. Gasses include Co₂, carbon monoxide, and formaldehyde. Room air purifiers are particularly effective at removing pathogens and particulates.

Are there standards or other guidelines to use when choosing a room air purifier? Yes, absolutely. The first is the Clean Air Delivery Rate (CADR), an industry standard, set by the Association of Home Appliance Manufacturers (AHAM), to compare the cleaning power between new air purifiers. Use the CADR to select an air purifier that is right sized for the space.

For safety, make sure that air purifier is UL listed and certified as ozone-safe (under 50 parts per billion) by the California Air Resources Board (CARB). To conserve energy, look for Energy Star certification.

It is important to choose an air purifier that removes fine and ultrafine particles (look for independent test results) and that will remain at peak performance between filter changes.

Mechanical (HEPA) air purifiers, physically block and trap particles, so the filter clogs, and performance drops off. Electrostatic APARTTM technology, in our Brio air purifiers, offers a different approach. APART removes all particles, including the most dangerous ultrafine pathogens, without filter clogging, so clean air can flow freely, and effectiveness stays constant between filter changes. Due to clogging, HEPA air purifiers may need filter changes every two to three months. Under the same conditions, Brio's non-clogging particle collection cartridge can last a year or longer before replacement.

Pay attention to this difference in filter replacement rate. When you do the math, less frequent filter changes can mean considerable savings and less maintenance year after year.

For more on choosing an air purifier, see this recent NEREJ article: <https://nerej.com/clear-the-air-a-guide-to-increased-productivity-and-happier-tenants-through-better-iaq>

Established in 2019, Agentis Air is a collaboration of research scientists, engineers, and air quality experts on a mission to improve human health and longevity through better indoor air purification technology. With decades of university research and development experience, our company is focused on transformational air purification technologies with broad applications for institutional, commercial, and consumer markets.

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