

S3.3.2 Clearing the Air: advances in Gas-Phase Air Filtration Technology, Standards and Applications

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Today a significant portion of the world's population lives in urban areas where outdoor air does not meet local, regional, and/or national air quality standards. Therefore, it seems intuitive that occupied spaces ventilated with outdoor air that is already deemed unacceptable are subject to reduced air quality when air cleaning is not employed prior to distribution into these spaces. However, many buildings provide no more air cleaning than the simple dust filters that were supplied with the HVAC system. Even when proper filtration for particulate pollutants is provided, it is almost a certainty that nothing is being done to control gaseous air pollutants.

Fortunately, air cleaning technologies have evolved to the point that there are effective and economical options for providing a healthy, comfortable indoor environment. Further, ventilation standards, mechanical codes, and building rating systems have similarly evolved with an eye on indoor air quality and how best to achieve an acceptable indoor environment.

Enhanced air cleaning is being used to provide and maintain acceptable IAQ in commercial buildings for the control of particulate pollutants, and increasingly so for the control of gaseous pollutants given the many options now available. Employing enhanced air filtration systems as an integral part of an HVAC system can effectively reduce airborne contaminants to well below standard levels, but effective control of environmental pollutants requires the use of a filtration system optimized for both particulate and gaseous pollutant removal. Use in either recirculation or mixed recirculation and outdoor air systems is effective for controlling undesirable contaminants and has the potential for conserving energy.

The acceptance and use of these enhanced air cleaning technologies is being noticed by standards writing bodies inasmuch that there are requirements for enhanced air cleaning where outdoor ventilation does not meet national air quality standards. Further, the use of standard testing for the evaluation of gas-phase air filtration media and devices has become a requirement ASHRAE 62.1: Ventilation for Acceptable Air Quality. Similarly LEED pilot credit EQpc68: Indoor air quality procedure also requires these use of standard testing in its application.

This paper will present an overview of ambient air quality standards, what contaminants are being measured, and what criteria are used to determine acceptability. Examples of local air quality data will be provided along with a discussion of suitable air cleaning technologies. This will include some of the more effective air cleaning options available today as well as some of the more promising emerging technologies. Cost considerations will be presented along with the potential energy savings possible allowed with existing ventilation standards.