



**BSR/ASHRAE Addendum aa
to ANSI/ASHRAE Standard 62.1-2016**

Public Review Draft

Proposed Addendum aa to Standard 62.1-2016, Ventilation for Acceptable Indoor Air Quality

**Third Public Review (February 2019)
(Draft Shows Proposed Independent Substantive
Changes to Previous Public Review Draft)**

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(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

The indoor air quality procedure (IAQP) has a long history going back to the 1981 standard. It has flexibility.

For design, it requires (simplified version):

- 1. Identification of contaminants of concern*
- 2. Determining indoor and outdoor sources*
- 3. Identifying a concentration limit and exposure period*
- 4. Specifying percentage of building occupants to be satisfied with perceived IAQ*
- 5. Performing a mass balance analysis for selected compounds*

Weaknesses in current requirements exist in items 1, 3, and 4 above. Although the percentage in item 4 may be specified, and the standard requires that it be measured; this measurement usually would take place after occupancy so is often ignored or omitted. No measurement of any resulting concentration is currently required so the effectiveness of any design is not measured or verified.

This proposed addendum adds requirements for designing to specific targets. The target design compounds are specifically identified. Mixtures are specifically identified.

[Note to Reviewers: This public review draft makes proposed independent substantive changes to the previous public review draft. These changes are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the previous draft are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed substantive changes.]

Addendum aa to 62.1-2016

Revise the definition in Section 3 as shown below. The remainder of Section 3 is unchanged.

3. DEFINITIONS (SEE FIGURE 3.1)

Particulate Matter 2.5 (PM_{2.5}): aerosol particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

Revise Section 6.3 as shown below. The remainder of Section 3 is unchanged.

6.3 Indoor Air Quality (IAQ) Procedure. Breathing zone outdoor airflow (V_{bz}) shall be determined in accordance with Sections 6.3.1 through 6.3.6.

6.3.1 Design Compounds and PM_{2.5} Sources. The system design shall be based on the DCs and PM_{2.5} specified in Table 6.3.2.1 at a minimum. If there are additional outdoor sources identified from completing the process in Section 4, or unusual sources for the occupancy category, the compounds present in the source shall be

determined and they shall be added to the DC list if a design target from a cognizant authority exists. For each DC and PM_{2.5}, the emission rates from indoor sources from **people-occupants**, building materials, furnishings, equipment and other sources and the rate of contaminant influx into the building (mass per unit time) shall be determined.

Informative Note: Indoor emission rate information for some compounds is provided in Appendix C.

[...]

6.3.3 Air cleaning. Where particulate or **gaseous gas phase** air cleaning is included in the design, the removal efficiencies shall be specified as follows. Particulate matter filters shall report an efficiency reporting value (MERV) in accordance with ASHRAE Standard 52.2¹². **Gas phase Air cleaners shall report an efficiency test for the DCs in accordance with ASHRAE Standard 145.2^{xx}. Devices that intentionally or unintentionally add ozone, aldehydes, or ultrafine particulate to the indoor air are prohibited. Devices that increase ozone or formaldehyde concentrations above background levels by a quantifiable amount are prohibited.**

6.3.3.1 Ozone Measurement. Measurement of ozone concentrations shall be conducted in accordance with ASHRAE Standard 145.2^{xx} and using instruments meeting the criteria in Table 6.3.4.4.2. A quantifiable increase in ozone is an increase of 5 ppb or more above background levels.

Informative Note: A concentration difference of 5 ppb of ozone is 10 µg/m³, which is approximately 3x the detection limit of commercially available instruments.

6.3.3.2 Formaldehyde Measurement. Measurement of formaldehyde concentrations shall be conducted in accordance with ASHRAE Standard 145.2^{xx} and using measurement methods in Table 6.3.4.4.1. A quantifiable increase in formaldehyde is an increase of 5 ppb or more over background levels.

Informative Note: A concentration difference of 5.0 ppb is 6.15 µg/m³, which is approximately 3x the detection limit attainable with methods listed in Table 6.3.4.4.1.

[...]

Table 6.3.4.4.1 Allowed laboratory test methods

Compound	Allowed Test Methods
VOCs except formaldehyde	ISO 16000-6 ^{yy} ; EPA IP-1 ^{gg} , EPA TO-17 ^{ee} ; ISO 16017-1 ^{aa} ; ISO 16017-2 ^{bb} ; ASTM D6345-10 ^{kk}
formaldehyde	ISO 16000-3 ^{zz} ; EPA TO-11 ^{ff} ; EPA IP-6 ⁱⁱ ; ASTM D5197 ^{ll}
ozone	ASTM D5149-02^{mm}; ISO13964^{cc}
PM _{2.5}	EPA IP-10 ^{jj}
carbon monoxide	ISO 4224 ^{dd} ; EPA IP-3 ^{hh}
carbon dioxide	ISO 4224 ^{dd} ; EPA IP-3 ^{hh}

Table 6.3.4.4.2 Direct reading instruments minimum specifications

	CO ₂	Ozone	PM _{2.5}	CO
Accuracy (±)	100 ppm ± 3% of reading	Greater of 5 ppb or 20% of reading	Greater of 5 micrograms/m ³ or 20% of reading	Greater of 3 ppm or 20% of reading
Resolution (of 5 min average data) (±)	5 ppm	§ 1 ppb	5 µg/m ³	1 ppm

6.3.4.4.1 Design Compounds and PM_{2.5} Measurement Test. The measurement equipment shall be positioned in the breathing zone. The measurement shall be conducted within 60 days of building commissioning and occupancy during normal working hours, maximum typical occupant load under conditions of current operation, and with the HVAC system in normal operation and lowest outdoor air intake setting expected during the year. The number of measurement points shall be specified according to Table 6.3.4.4.3.

[...]

6.3.6 Documentation. Design documentation shall include the inventory of PM_{2.5}, DCs and DTs and mixtures thereof; outdoor source data; emission rates including citations; cognizant authorities for any additional DCs; ASHRAE 52.2¹² and 145.2^{XX} efficiency test data required by 6.3.3 for all air cleaning devices; mass balance calculations; subjective survey and results or documentation of compliance with 6.3.4.3. Design documentation shall include documentation for air cleaners that they do not produce detectable ozone, aldehydes, and ultrafine particulate matter under representative conditions of operation. The concentrations shall be measured using the relevant laboratory methods specified in Table 6.3.4.4.1 and the performance requirements specified in Table 6.3.4.4.2 shall be followed.

Delete the following references in Section 9. The remainder of Section 9 is unchanged.

9. References

[...]

~~CC.— ISO Standard 13964 (1998), Air quality—Determination of ozone in ambient air—Ultraviolet photometric method. Geneva, Switzerland, International Organization for Standardization.~~

[...]

~~MM.— ASTM D5149-02 (2016). Standard Test Method for Ozone in the Atmosphere: Continuous Measurement by Ethylene Chemiluminescence. ASTM International, West Conshohocken, PA.~~