BSR/ASHRAE Addendum ae
to ANSI/ASHRAE Standard 62.1-2016

Public Review Draft

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

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

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FOREWORD

The 60°F (15°C) indoor air dewpoint limit avoids the microbial growth problems frequently observed when humid outdoor air infiltrates into buildings that are mechanically cooled. Microbial growth has been common during cooling seasons, and especially when cooling and occupancy are intermittent. Examples include schools during summer vacations, apartments and condominiums that are intermittently occupied during summer months, college dormitories and military barracks that are unoccupied for long periods and in health care buildings and hotels in hot or humid climates that contain both naturally-ventilated and mechanically-cooled spaces.

Humidity-related requirements of earlier versions of Standard 62.1 were intended to address both mold growth and comfort concerns by limiting indoor humidity to 65%RH. That requirement, however, did not explicitly extend to unoccupied hours when microbial growth often accelerates. More importantly, because it did not establish a coincident dry bulb temperature, the 65% RH limit did not limit the mass of water vapor available for surface absorption during periods when cooling is intermittent to conserve energy.

Microbial growth is governed by the availability of moisture in the surfaces of building materials, coatings, furnishings and mechanical systems. The RH of the air does not affect microbial growth until the water vapor is absorbed or condenses into the surface. Limiting the indoor air dewpoint rather than the RH limits the total mass of water vapor available for condensation or absorption. Further, limiting the dewpoint to 60°F (15°C) prevents actual condensation until the air contacts a surface that is cooler than 60°F. Few surfaces are cooled that low in buildings, even allowing for typical cold air leakage into interstitial spaces and the frequently less-than-perfect insulation of pipes, valves and duct work.

This specific limit is a compromise between energy and microbial growth concerns. Lower indoor dewpoints would further reduce risk. For example, a 55°F (13°C) maximum dewpoint is the guidance contained in the 2001 and 2008 ASHRAE Humidity Control Design Guide, and in Chapter 62 (Moisture Management in Buildings) and Chapter 23 (Museums, Galleries, Archives and Libraries) of the ASHRAE Handbook 2015—Applications. The 55°F dewpoint limit is also required for all high-performance buildings as defined by the 2017 Federal Facilities Standard (P-100) of the Public Buildings Service of the US General Services Administration. But a dewpoint limit of 55°F (13°C), while certainly an improvement appropriate for reducing risks and improving comfort in high-quality buildings, could also increase energy consumption in unoccupied buildings in highly humid climates, especially when a building is not airtight. A dewpoint limit of 60°F may provide a more affordable balance between the equally important concerns of reducing energy consumption while also reducing risks to occupant health from microbial growth.

This ISC adds an additional exception to allow for control of space humidity overnight rather than dewpoint. It also clarifies requirements in former 5.9.2.

[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 ae to 62.1-2016

Modify Section 5.9 as shown below.

5.9 Maximum Indoor Air Dewpoint in Mechanically Cooled Buildings. Buildings or spaces equipped with or served by mechanical cooling equipment shall be provided with dehumidification components and~~/or~~ controls that limit the indoor humidity to a maximum dewpoint of 60°F (15°C) during both occupied and unoccupied hours whenever the outdoor air dewpoint is above 60°F (15°C). The dewpoint limit shall not be exceeded when system performance is analyzed with outdoor air at the dehumidification design condition (that is, design dewpoint and mean coincident dry bulb temperatures) and with the space interior loads (both sensible and latent) at cooling design values and space solar loads at zero.

Exceptions:
1. Buildings or spaces that are neither equipped with nor served by mechanical cooling equipment.
2. Buildings or spaces equipped with materials, assemblies, coatings and furnishings that resist microbial growth and that are not damaged by continuously high indoor air dewpoints.
3. During overnight unoccupied periods not exceeding 12 hours, the 60°F dew point limit shall not apply, provided that indoor relative humidity does not exceed 65% at any time during those hours.

Informative Note: Examples of spaces are shower rooms, swimming pool enclosures, kitchens, spa rooms or semi-cooled warehouse spaces that contain stored contents that are not damaged by continuously high indoor air dewpoints or microbial growth.

Informative Note: This requirement reduces the risk of microbial growth in buildings and their interstitial spaces because it limits the mass of indoor water vapor that can condense or be absorbed into mechanically cooled surfaces. The dewpoint limit is explicitly extended to unoccupied hours because of the extensive public record of mold growth in schools, apartments, dormitories and public buildings that are intermittently cooled during unoccupied hours when the outdoor air dewpoint is above 60°F (15°C).

Modify Section 5.9.2 as shown below. Renumber following sections.

5.10~~9.2~~ Building Exfiltration. Ventilation systems for a building equipped with or served by mechanical cooling equipment shall be designed such that the total building outdoor air intake equals or exceeds the total building exhaust under all load and dynamic reset conditions.

Exceptions:
1. Where an imbalance is required by process considerations and approved by the authority having jurisdiction, such as in certain industrial facilities.
2. When outdoor air dry-bulb temperature is below the indoor space dew-point design temperature.

Informative Note: Although individual zones within a building may be neutral or negative with respect to outdoors or to other zones, net positive mechanical intake airflow for the building as a whole reduces infiltration of untreated outdoor air.