



ADDENDA

**ASHRAE Addendum t to
ASHRAE Guideline 36-2018**

High Performance Sequences of Operation for HVAC Systems

Approved by ASHRAE on February 24, 2021.

This addendum was approved by a Standing Guideline Project Committee (SGPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the guideline. Instructions for how to submit a change can be found on the ASHRAE® website (<https://www.ashrae.org/continuous-maintenance>).

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- b. participation in the next review of the Guideline,
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FOREWORD

Addendum t clarifies that a single building pressure loop should be used for each pressure zone. This addendum also provides direction on which building pressure sensor(s) to use as the control loop input and provides options for relief fans that do not share a common relief fan inlet plenum. Informative text is added to remove Stage 0 (barometric) relief if the return air pressure drop is high.

Note: In this addendum, changes to the current guideline are indicated in the text by underlining (for additions) and strikethrough (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum t to Guideline 36-2018

Revise Section 5.16.9 as shown (I-P and SI Units).

5.16.9 Relief-Fan Control

A pressure zone is defined as an enclosed area with interconnected return paths. The appropriate boundaries for pressure zones, establishing which relief fans run together and which building pressure sensors are used, will need to be determined by the engineer based on building geometry.

Relief fans are enabled and disabled with their associated supply fans, but all relief fans that are running and serve a ~~common volume of space~~ pressure zone run at the same speed. All operating relief fans that serve a ~~common/shared air volume~~ pressure zone shall be controlled as if they were one system, running at the same speed and using the same control loop, even if they are associated with different AHUs. For example, if two AHUs share a pressure zone, their relief fans should be controlled together as one system while both AHUs are operating.

This prevents relief fans from fighting each other, which can lead to flow reversal or unstable fan speed control and space pressurization problems.

The appropriate boundaries between relief systems, establishing which relief fans run together, will need to be determined by the engineer based on building geometry.

- 5.16.9.1 All operating relief fans that serve a ~~common/shared air volume~~ pressure zone shall be grouped and controlled as if they were one system, running at the same speed when enabled and using the same control loop, even if they are associated with different AHUs.
- 5.16.9.2 A relief fan shall be enabled when its associated supply fan is proven ON, and shall be disabled otherwise.
- 5.16.9.3 Building static pressure shall be time averaged with a sliding 5-minute window and 15 second sampling rate (to dampen fluctuations). The averaged value shall be that displayed and used for control.
- a. Where multiple building pressure sensors are used, each shall be time-averaged and the highest of the averaged values for sensors within a pressure zone shall be used for control.

5.16.9.4 A single P-only control loop for each pressure zone shall maintains the building pressure at a set point of 12 Pa (0.05 in. of water) with an output ranging from 0% to 100%. The loop shall be enabled when any supply fan within the pressure zone is proven ON. The loop is disabled ~~and with output set to zero when all fans in the relief system group are disabled~~ otherwise.

The following is intended to use barometric relief as the first stage and then maintain many fans on at low speed to minimize noise and reduce losses through discharge dampers and louvers. Fans are staged OFF only when running at minimum speed is reached.

For best results, fan speed minimums should be set as low as possible.

5.16.9.5 Fan speed signal to all operating fans in the relief system group shall be the same and shall be equal to the PID signal but no less than the minimum speed. Except for Stage 0, discharge dampers of all relief fans shall be open only when fan is commanded ON.

In some installations, the relief fan inlet plenum may also be the return plenum to the AHU mixed air plenum, in which case, the pressure in this plenum may be drawn negative relative to the outdoors by the supply air fan drawing return air from this plenum. This can occur when the return path has a fairly high pressure drop. If the engineer is concerned that this may occur, Stage 0 and references to it should be deleted.

- a. Stage 0 (barometric relief). When relief system is enabled, and the control loop output is above 5%, open the motorized dampers to all relief fans serving the relief system group that are enabled; close the dampers when the loop output drops to 0% for 5 minutes.
- b. Stage Up. When control loop is above minimum speed plus 15%, start stage-up timer. Each time the timer reaches 7 minutes, start the next relief fan (and open the associated damper) in the relief system group, per staging order, and reset the timer to 0. The timer is reset to 0 and frozen if control loop is below minimum speed plus 15%.
 1. ~~Note, when~~ For systems where relief fans share a common relief fan inlet plenum: When staging from Stage 0 (no relief fans) to Stage 1 (one relief fan), the ~~discharge-relief~~ dampers of all nonoperating relief fans must be closed.
 2. For systems where relief fans do not share a common relief fan inlet plenum: When staging from Stage 0 (no relief fans) to Stage 1 (one relief fan), the discharge dampers of all nonoperating relief fans shall remain open when the associated supply fan is proven ON.
- c. Stage Down. When PID loop is below minimum speed, start stage-down timer. Each time the timer reaches 5 minutes, shut off lag fan per staging order and reset the timer to 0. The timer is reset to 0 and frozen if PID loop rises above minimum speed or all fans are OFF. If all fans are OFF, go to Stage 0 (all dampers open and all fans OFF).

5.16.9.6 For fans in a Level 2 alarm and status is OFF, discharge damper shall be closed when stage is above Stage 0.

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ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

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