ADDENDA

ASHRAE Addendum l to
ASHRAE Guideline 36-2021

High-Performance Sequences of Operation for HVAC Systems

Approved by ASHRAE on December 3, 2024.

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 (www.ashrae.org/continuous-maintenance).

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(This foreword is not part of this guideline. It is merely informative and does not contain requirements necessary for conformance to the guideline.)

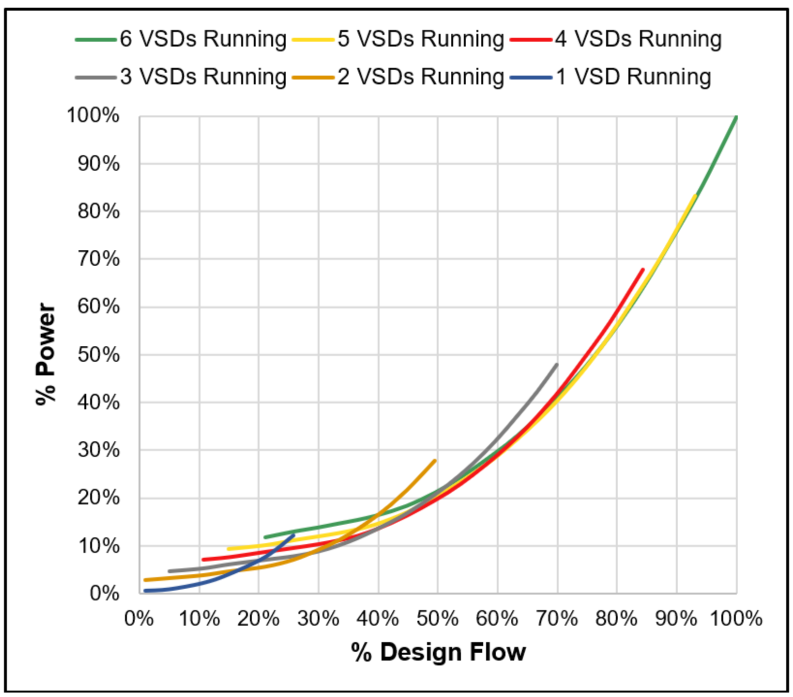
FOREWORD

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.

This addendum addresses large air handling systems that have

- Fans in parallel (e.g. fan arrays) with multiple variable speed drives (VSDs) and backdraft dampers or other means to prevent backflow, allowing the fans to be staged. This applies to supply fans as well as to return fans using airflow tracking.
- Large economizer dampers and airflow measuring stations (AFMS) that must be staged in order to ensure velocity through the AFMS is sufficient for accurate flow measurement. Guideline 36 outdoor air setpoint reset logic can result in very low minimum outdoor air setpoints compared to the design minimum due to small Zone Groups, CO_2 DCV, occupancy sensors, Ez adjustments, etc. Return air dampers can also be staged along with outdoor air dampers to improve controllability and/or to improve mixing of outdoor air and return air by staging dampers physically close to each other.

Staged fans can improve efficiency and (for centrifugal fans) prevent operating in surge as shown in this figure from Taylor 2018[1]:



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[1] Taylor, S. *Designing Mega-AHUs*, ASHRAE Journal, April 2018

To help size outdoor air damper/AFMS assemblies, a spreadsheet is included with this addendum. Inputs are:

- Lowest expected outdoor air setpoint
- Highest expected outdoor air setpoint
- Lowest airflow velocity the AFMS can accurately measure
- Maximum airflow velocity through each stage

The fundamental equations are included in the guideline as informative text.

Depending on the air handler size and minimum outdoor air range, two to three stages are required, but designers may choose more stages to accommodate the physical layout of the air handler mixing plenum. Typically, when there are multiple outdoor air damper/AFMS stages, 2 return air damper stages are also provided, mostly to improve mixing efficiency but also to improve controllability at low airflows.

Systems with staged outdoor air intakes look similar to designs that have separate minimum outdoor air and economizer damper sections (see Figure A-9). Instead, these systems are actually a special case of the design with a single damper/AFMS serving all outdoor air including economizer outdoor air; it just has multiple damper/AFMS that are staged but the minimum outdoor air control logic is the same as having a single common damper/AFMS for all outdoor air. A 3-stage example is shown in informative text.

Addendum k to Guideline 36-2021

(IP and SI Units)

Add a subsection to 3.1.4.2 for minimum outdoor air staging setpoints for staged intakes:

3.1.4.2. Ventilation Setpoints

a. For projects complying with the Ventilation Rate Procedure of ASHRAE Standard 62.1:

1. DesVou, the uncorrected design outdoor air rate, including diversity where applicable

2. DesVot, design total outdoor air rate (Vou adjusted for ventilation efficiency)

DesVou and DesVot can be determined using the 62MZCalc spreadsheet provided with Standard 62.1 User's Manual.

b. For projects complying with California Title 24 Ventilation Standards:

1. AbsMinOA, the design outdoor air rate when all zones with CO_2 sensors or occupancy sensors are unpopulated

2. DesMinOA, the design minimum outdoor airflow with areas served by the system are occupied at their design population, including diversity where applicable

c. For multiple staged outdoor air intake damper/airflow measurement station (AFMS) assemblies:

The sequences include options for 2, 3, and 4 stages; enter a stage-up rate for each stage provided in the design.

1. OAstageup2, the minimum outdoor air rate setpoint above which stage 2 damper/AFMS assembly is enabled

2. OAstageup3, the minimum outdoor air rate setpoint above which stage 3 damper/AFMS assembly is enabled

3. OAstageup4, the minimum outdoor air rate setpoint above which stage 4 damper/AFMS assembly is enabled

Equations for determining the minimum number of stages and maximum size for each stage are as follows:

MinVelocity = Lowest velocity the AFMS can measure, per the AFMS manufacturer. Range is typically 150 to 300 fpm.

MaxVelocity = Maximum velocity through the AFMS assembly. If the assembly includes the outdoor air damper and/or outdoor air louver, then list the lowest of the maximum velocities for each. Range is typically 500 to 1500 fpm.

MinOA = Lowest minimum outdoor air setpoint expected to occur during normal operation. Worst case is typically the smallest zone group with all zones that have CO2 DCV or occupancy sensors assumed to be unoccupied. But this may be impractically small so increase this value until a reasonable size Stage 1 AFMS results. This may result in over-ventilation of this Zone Group when it operates alone but energy impact is very low since outdoor air rate is low.

MaxOA = Maximum outdoor airflow that needs to be measured. For AHUs that combine minimum outdoor air and economizer outdoor air sections, enter the highest supply air rate expected in economizer mode, typically equal to the design AHU supply air rate.

MinNumStages = Minimum number of stages of AFMS assemblies if the velocity range of each AFMS stage is maximized. This is calculated as follows and rounded up to the next integer:

$$\underline{MinNumStages \geq \log_{\frac{MaxVelocity}{MinVelocity}} \frac{MaxOA}{MinOA}}$$

MinTotalArea = Minimum total area of all AFMS assembly stages.

$$\underline{MinTotalArea = \frac{MaxOA}{MaxVelocity}}$$

MaxAreaStageX = Maximum area of AFMS assembly Stage X for overlapping outdoor air setpoints

AreaStageX = Actual area of AFMS assembly Stage X; must be less than MaxAreaStageX to meet minimum airflow setpoint criterion. The total area of all stages must be equal to or greater than MinTotalArea

$$\underline{MinOA_X = MinVelocity * AreaStageX}$$

$$\underline{MaxOA_X = MaxVelocity * AreaStageX}$$

$$\underline{MaxAreaStage1 \leq \frac{MinOA}{MinVelocity}}$$

$$\underline{MaxAreaStageX \leq \frac{MaxOA_{X-1}}{MinVelocity} - \sum_{previous\ stages} AreaStageX}$$

$$\underline{OAstageupX = MinOA_X}$$

$$\underline{\sum_{all\ stages} AreaStageX \geq MinTotalArea}$$

AFMS need only be provided for each stage up to the AHU's design minimum outdoor air rate where accurate outdoor air rate measurement is needed to meet ventilation codes, e.g. Standard 62.1 Section 5.10.1.1; for higher stages, AFMS may be deleted and the outdoor air rate through these stages assumed to have the same face velocity as the lower stages.

Modify Section 4.6 as follows:

4.6 Multiple-Zone VAV Air-Handling Unit

For staged supply air fans, staged outdoor airflow measuring stations and dampers, staged relief fans, staged return air fans, and staged supply and return fan airflow measuring stations (e.g. inlet bell sensors), a "stage x" point is required for each stage.

Required?	Description	Type	Device
R	Supply fan start/stop	DO	Connect to VFD Run
A	Supply fan start/stop, stage x	DO	Connect to VFD Run, stage x
A	Supply fan high static alarm reset (optional—see control schematic)	DO	Dry contact to 120 or 24 V control circuit
R	Supply fan speed	AO	Connect to VFD Speed
O	Supply fan status	DI	Connect to VFD Status
O	Supply fan status, stage x	DI	Connect to VFD Status, stage x

Required?	Description	Type	Device
R	Supply air temperature	AI	Duct temperature sensor (probe or averaging at designer's discretion)
R	Duct static pressure (DSP)	AI	DP transducer down duct
O	Filter pressure drop	AI	DP transducer across filter
O	Heating coil supply air temperature	AI	Averaging temperature sensor
R	Economizer outdoor air damper	AO	Modulating actuator
A	Economizer outdoor air damper, stage x	AO	Modulating actuator, stage x
R	Return air damper	AO	Modulating actuator
A	Return air damper, stage x	AO	Modulating actuator, stage x
R	Outdoor air temperature	AI	Temperature sensor at outdoor air intake
O	Mixed air temperature	AI	Averaging temperature sensor
A	Return air temperature	AI	Duct temperature sensor
R	Cooling signal	AO	Modulating CHW valve
A	Heating signal	AO	Modulating HW valve OR Modulating electric heating coil
For units with a common (or staged) economizer/minimum OA damper, include the following points.			
A	Outdoor airflow	AI	Airflow measurement station (AFMS)
A	Outdoor airflow, stage x	AI	Airflow measurement station (AFMS), stage x
For units with a separate minimum outdoor air damper and DP sensor, include the following points.			
A	Minimum outdoor air damper open/close	DO	Two position actuator
A	Minimum outdoor air damper DP	AI	DP transducer
For units with a separate minimum outdoor air damper and AFMS, include the following points.			
A	Minimum outdoor air damper	AO	Modulating actuator
A	Minimum outdoor airflow	AI	Airflow measurement station
For units with actuated relief dampers but no relief fan, include the following points.			
A	Relief damper open/close	AO	Modulating actuator
A	Building static pressure	AI	DP transducer between representative space and outdoors
For units with a relief fan, include the following points.			
A	Relief-fan start/stop	DO	Connect to VFD Run
A	Relief-fan start/stop, stage x	DO	Connect to VFD Run, stage x

Required?	Description	Type	Device
O	Relief-fan status	DI	Connect to VFD Status
O	Relief-fan status, stage x	DI	Connect to VFD Status, stage x
A	Relief-fan speed	AO	Connect to VFD Speed
A	Relief damper open/close	DO	Two position actuator
A	Building static pressure (if direct building pressure logic is used)	AI	DP transducer between representative space and outdoors
For units with a return fan, include the following points.			
A	Return fan start/stop	DO	Connect to VFD Run
A	Return fan start/stop, stage x	DO	Connect to VFD Run, stage x
O	Return-fan status	DI	Connect to VFD Status
O	Return-fan status, stage x	DI	Connect to VFD Status, stage x
A	Return-fan high-static alarm reset (optional—see control schematic)	DO	Dry contact to 120V or 24V control circuit
A	Return-fan speed	AO	Connect to VFD Speed
A	Supply airflow (if airflow tracking logic used)	AI	Airflow measurement station at supply fan (or sum of VAV zones)
A	Supply airflow (if airflow tracking logic used), stage x	AI	Airflow measurement station at supply fan, stage x
A	Return airflow (if airflow tracking logic used)	AI	Airflow measurement station at return fan
A	Return airflow (if airflow tracking logic used), stage x	AI	Airflow measurement station at return fan, stage x
A	Return-fan discharge static pressure (if direct building pressure logic is used)	AI	DP transducer at fan
A	Exhaust damper	AO	Modulating actuator
A	Building static pressure (if direct building pressure logic is used)	AI	DP transducer between representative space and outdoors

Modify 5.16.1 as follows:

5.16.1. Supply Fan Control

5.16.1.1. Supply Fan Start/Stop

a. Supply fan shall run when system is in the Cooldown Mode, Setup Mode, or Occupied Mode.

b. If there are any VAV-reheat boxes on perimeter zones, supply fan shall also run when system is in Setback Mode or Warmup Mode (i.e., all modes except unoccupied).

Retain the following if the AHU has multiple supply air fans in an array, each with non-powered backdraft dampers. If VFDs are used, they may each serve multiple fan motors. If ECMs are used, each fan can be controlled individually. But there is little energy value to having more than 6 stages so if there are more than 6 VFDs/ECMs, they should be grouped to be controlled with six digital outputs.

c. Staged supply fan controls

1. VFD/ECM groups shall be lead/lag controlled per Section 5.1.15.

2. When supply fans are enabled to run, start the lead supply fan VFD/ECM group. When %-supply airflow (totalized enabled VAV box setpoints (not readings) divided by design AHU airflow) exceeds stage-up setpoint (below) for 15 minutes then the next lag supply fan shall run. All VFDs/ECMs receive the same speed signal. When %-airflow falls below the stage-up setpoint for 15 minutes then the last lag VFD/ECM group shall be staged off. Each stage shall have its own PID gains, separately tuned. Any VAV box whose setpoint is not known (e.g. due to loss of communication) shall be assumed to be at its maximum airflow setpoint Vmax.

Pick one of the following tables based on the quantity of VFD/ECM groups:

VFD/ECM Stage	Stage up Flow
1	0%
2	45%

VFD/ECM Stage	Stage up Flow
1	0%
2	30%
3	60%

VFD/ECM Stage	Stage up Flow
1	0%
2	25%
3	40%
4	75%

VFD/ECM Stage	Stage up Flow
1	0%
2	10%
3	25%
4	35%
5	55%
6	75%

Directly before 5.16.2.3 b.2, modify as follows:

The engineer must specify whether minimum outdoor air and economizer functions use separate dedicated minimum outdoor air dampers and economizer dampers, or a single (or staged) common outdoor air damper(s) that provide both minimum outdoor air and economizer functions.

If there are separate dedicated dampers, keep subsection (2) and delete subsection (3).

If there is a single (or staged) common damper(s), keep subsection (3) and delete subsection (2).

~~Note that a single common damper requires an outdoor air AFMS. It is not a valid choice if minimum outdoor air control is being done by DP (i.e., if is being used).~~

Delete this flag note after selection has been made.

2. For units with a separate minimum outdoor air damper, economizer damper minimum position MinOA-P is 0%, and return air damper maximum position MaxRA-P is modulated to control minimum outdoor airflow ~~volume~~ (see Sections 5.16.4 and 5.16.5).

3. For units with a single (or staged) common minimum outdoor air and economizer damper(s), return air damper maximum position MaxRA-P and economizer damper minimum position MinOA-P are modulated to control minimum outdoor airflow ~~volume~~ (see Section 5.16.6). Economizer damper maximum position MaxOA-P is limited during minimum outdoor air control (e.g., economizer lockout due to high OAT).

Directly before 5.16.4, modify instruction text as follows:

The engineer must select among options for minimum outdoor air control logic based on two criteria:

Do the minimum outdoor air and economizer functions use separate dedicated minimum outdoor air dampers and economizer dampers, or a single (or staged) common damper(s) that provide both minimum outdoor air and economizer functions?

Is outdoor airflow measured by ΔP or an airflow measurement station (AFMS)?

Control logic selections should be made as follows:

For AHUs with separate dedicated dampers and OA measurement by ΔP, use Section 5.16.4 and delete Sections 5.16.5 and 5.16.6.

For AHUs with separate dedicated dampers and OA measurement by AFMS, use Section 5.16.5 and delete Sections 5.16.4 and 5.16.6.

For AHUs with a single (or staged) common damper(s) and OA measurement by AFMS, use Section 5.16.6 and delete Sections 5.16.4 and 5.16.5.

~~AHUs with a single common damper and OA measurement by ΔP are not supported because OA measurements are not accurate in this configuration.~~

~~DCV is supported in all three options but only for California Title 24 ventilation.~~

5.16.4. Minimum Outdoor Air Control with a Separate Minimum Outdoor Air Damper and Differential Pressure Control

Directly before 5.16.5, modify instruction text as follows:

The engineer must select among options for minimum outdoor air control logic based on two criteria:

Do the minimum outdoor air and economizer functions use separate dedicated minimum outdoor air dampers and economizer dampers, or a single (or staged) common damper(s) that provide both minimum outdoor air and economizer functions?

Is outdoor airflow measured by ΔP or an airflow measurement station (AFMS)?

Control logic selections should be made as follows:

For AHUs with separate dedicated dampers and OA measurement by AFMS, use Section 5.16.5 and delete Sections 5.16.4 and 5.16.6.

For AHUs with separate dedicated dampers and OA measurement by ΔP, use Section 5.16.4 and delete Sections 5.16.5 and 5.16.6.

For AHUs with a single (or staged) common damper(s) and OA measurement by AFMS, use Section 5.16.6 and delete Sections 5.16.4 and 5.16.5.

~~**AHUs with a single common damper and OA measurement by ΔP are not supported because OA measurements are not accurate in this configuration.**~~

~~**DCV is supported in all three options but only for California Title 24 ventilation.**~~

5.16.5. Minimum Outdoor Air Control with a Separate Minimum Outdoor Air Damper and Airflow Measurement

Directly before 5.16.6, modify instruction text as follows:

The engineer must select among options for minimum outdoor air control logic based on two criteria:

Do the minimum outdoor air and economizer functions use separate dedicated minimum outdoor air dampers and economizer dampers, or a single (or staged) common damper(s) that provide both minimum outdoor air and economizer functions?

Is outdoor airflow measured by ΔP or an airflow measurement station (AFMS)?

Control logic selections should be made as follows:

For AHUs with a single (or staged) common damper(s) and OA measurement by AFMS, use Section 5.16.6 and delete Sections 5.16.4 and 5.16.5.

For AHUs with separate dedicated dampers and OA measurement by ΔP, use Section 5.16.4 and delete Sections 5.16.5 and 5.16.6.

For AHUs with separate dedicated dampers and OA measurement by AFMS, use Section 5.16.5 and delete Sections 5.16.4 and 5.16.6.

~~**AHUs with a single common damper and OA measurement by ΔP are not supported because OA measurements are not accurate in this configuration.**~~

~~**DCV is supported in all three options but only for California Title 24 ventilation.**~~

5.16.6. Minimum Outdoor Air Control with a Single (or Staged) Common Damper(s) for Minimum Outdoor Air and Economizer Functions and Airflow Measurement

Add 5.16.6 3.a. text as follows:

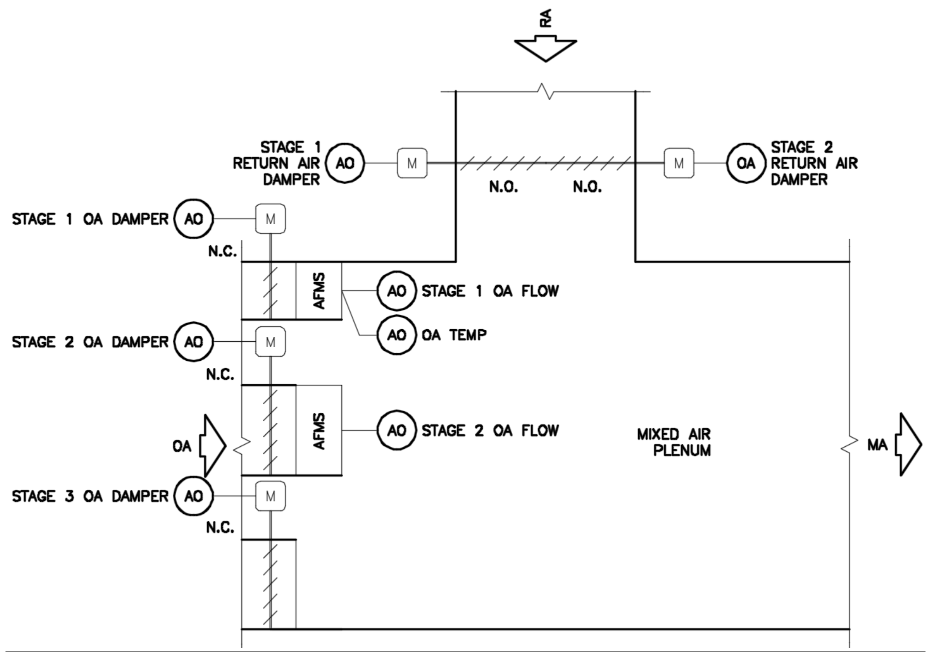
5.16.6.3. Minimum Outdoor Air Control Loop

Include the following section if the air handling unit is very large and thus requires staged outdoor air damper/AFMS assemblies so that airflow measurement can be accurate when the AHU is serving small Zone Groups and/or due to many zones with CO_2 DCV or occupancy sensors which can result in very low minimum outdoor air rate setpoints.

a. Staged Outdoor Air Dampers/AFMS Assemblies

1. Stage each outdoor air economizer damper/AFMS assembly as follows:

Design drawings must clearly indicate which outdoor air damper/AFMS assembly corresponds to each stage. Fundamentally, the first stage must be the smallest outdoor air damper/AFMS assembly, and it should be located as *close as possible to the first stage return air damper with parallel blade dampers directing the two airstreams at each other for best mixing. The second stage outdoor air damper/AFMS assembly is usually the next closest to the return air dampers, etc. AFMS need only be provided for each stage up to the AHU's design minimum outdoor air rate where accurate outdoor air rate measurement is needed to meet ventilation codes; for higher stages, AFMS may be deleted and the outdoor air rate through these stages assumed to have the same face velocity as the lower stages. Here is a typical design with 3 stages of outdoor air (with the first two having AFMS) and 2 stages of return air:*



i. All enabled outdoor air dampers receive the same AO signal.

ii. Each damper/AFMS stage shall be enabled no less than 10 minutes before disabling. When changing stages, a ramp limit shall be placed on the damper AO signal to avoid instabilities. Staging timer does not start until ramp limit is finished.

iii. Staging shall enable outdoor air dampers for damper/AFMS stage x as follows based on the current minimum outdoor air setpoint, MinOAsp and actual outdoor air reading of all enabled AFMSs.

Pick one of the tables below based on the number of stages of outdoor air damper/AFMS assemblies:

2 stages

Stage	Stage up to the next damper/AFMS stage if		Stage down to the previous damper/AFMS stage if	
	With the economizer enabled	With the economizer disabled	With the economizer enabled	With the economizer disabled
0	Minimum outdoor air control loop is enabled		–	
1	OA reading exceeds 120% of OAstageup2 or MinOAsp exceeds OAstageup2	MinOAsp exceeds OAstageup2	Minimum outdoor air control loop is disabled	
2	–	–	OA reading falls below OAstageup2	–

3 stages

Stage	Stage up to the next damper/AFMS stage if		Stage down to the previous damper/AFMS stage if	
	With the economizer enabled	With the economizer disabled	With the economizer enabled	With the economizer disabled
0	Minimum outdoor air control loop is enabled		–	
1	OA reading exceeds 120% of OAstageup2 or MinOAsp exceeds OAstageup2	MinOAsp exceeds OAstageup2	Minimum outdoor air control loop is disabled	
2	OA reading exceeds 120% of OAstageup3	–	OA reading and MinOAsp fall below OAstageup2	MinOAsp falls below OAstageup2
3	–	–	OA reading falls below OAstageup3	–

4 stages

Stage	Stage up to the next damper/AFMS stage if		Stage down to the previous damper/AFMS stage if	
	With the economizer enabled	With the economizer disabled	With the economizer enabled	With the economizer disabled
0	Minimum outdoor air control loop is enabled		–	
1	OA reading exceeds 120% of OAstageup2 or MinOAsp exceeds OAstageup2	MinOAsp exceeds OAstageup2	Minimum outdoor air control loop is disabled	
2	OA reading exceeds 120% of OAstageup3	–	OA reading and MinOAsp fall below OAstageup2	MinOAsp falls below OAstageup2
3	OA reading exceeds 120% of OAstageup4	–	OA reading and MinOAsp fall below OAstageup3	MinOAsp falls below OAstageup3
4	–	–	OA reading falls below OAstageup4	–

Include the following section if the air handling unit has two staged return air dampers. This is typical of AHUs with two or more stages of outdoor air/AFMS in the previous section.

2. Stage return air dampers as follows:

   i. When only Stage 1 outdoor air economizer damper is enabled, enable Stage 1 return air damper and disable Stage 2 return air damper.

   ii. When more than one outdoor air economizer damper stage is enabled, enable both return air damper stages.

After 5.16.10. add informative text as follows:

5.16.10. Return-Fan Control − Direct Building Pressure

Note that return fan arrays, if used, are not staged (as they are with supply air fans) because there is little energy benefit to doing so and also because staging requires knowledge of return airflow rate and that is not always measured when using Direct Building Pressure control logic.

Modify 5.16.11.1 as follows:

5.16.11. Return-Fan Control − Airflow Tracking

5.16.11.1. Return fan operates whenever associated supply fan is proven ON and shall be off otherwise.

Retain the following if the system has multiple return fans in an array, each with non-powered backdraft dampers. If VFDs are used, they may each serve multiple fan motors. If ECMs are used, each fan can be controlled individually. But there is little energy value to having more than 6 stages so if there are more than 6 VFDs/ECMs, they should be grouped to be controlled with six digital outputs. Staging logic does not match supply air fan array staging setpoints because there is little or no minimum discharge air pressure that must be maintained so the return fan performance will more closely follow the ideal system curve.

a. Staged return fan controls

1. VFD/ECM groups shall be lead/lag controlled per Paragraph 3.1P.

2. When return fans are enabled to run, start the lead return fan VFD/ECM group. When %-return airflow setpoint (equal to the return air fan airflow setpoint determined below divided by total design return airflow) exceeds stage-up setpoint in the table below for 15 minutes then the next lag return fan shall run. All VFDs/ECMs receive the same speed signal. When %-airflow falls below the stage-up setpoint in the table below for 15 minutes then the last lag VFD/ECM group shall be staged off. Each stage shall have its own PID gains, separately tuned.

Pick one based on the quantity of VFD/ECM groups:

VFD Stage	Stage up Flow
1	0%
2	50%

VFD Stage	Stage up Flow
1	0%
2	33%
3	66%

VFD Stage	Stage up Flow
1	0%
2	25%
3	50%
4	75%

VFD Stage	Stage up Flow
1	0%
2	17%
3	35%
4	50%
5	67%
6	83%

Directly after 5.16.14.1, modify instructional text as follows:

5.16.14.1. AFDD conditions are evaluated continuously and separately for each operating AHU.

The engineer must specify whether the unit has a return fan, relief dampers or relief fans and a separate minimum outdoor air damper or relief dampers or relief fans and a single <u>(or staged)</u> common damper<u>(s)</u> for minimum outdoor air and economizer functions.

If there is a return fan, keep Section 5.16.14.2 and delete Sections 5.16.14.3 and 5.16.14.4.

If there are relief dampers or relief fans and a separate minimum outdoor air damper, keep Section 5.16.14.3 and delete Sections 5.16.14.2 and 5.16.14.4.

If there are relief dampers or relief fans and a single <u>(or staged)</u> common damper<u>(s)</u> for minimum outdoor air and economizer functions, keep Section 5.16.14.4 and delete Sections 5.16.14.2 and 5.16.14.3.

Delete this flag note after selections have been made.

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

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.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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