

(Effective until March 15, 2024)

**WAC 51-11C-40341 Section C403.4.1—Thermostatic controls.**

**C403.4.1 Thermostatic controls.** The supply of heating and cooling energy to each zone shall be controlled by individual thermostatic controls capable of responding to temperature within the zone. Controls in the same zone or in neighboring zones connected by openings larger than 10 percent of the floor area of either zone shall not allow for simultaneous heating and cooling. At a minimum, each floor of a building shall be considered as a separate zone. Controls on systems required to have economizers and serving single zones shall have multiple cooling stage capability and activate the economizer when appropriate as the first stage of cooling. See Section C403.5 for further economizer requirements. Where humidification or dehumidification or both is provided, at least one humidity control device shall be provided for each humidity control system.

EXCEPTIONS:

1. Independent perimeter systems that are designed to offset only building envelope heat losses or gains or both serving one or more perimeter *zones* also served by an interior system provided:
  - 1.1. The perimeter system includes at least one thermostatic control *zone* for each building exposure having exterior walls facing only one orientation (within +/-45 degrees) (0.8 rad) for more than 50 contiguous feet (15,240 mm);
  - 1.2. The perimeter system heating and cooling supply is controlled by a thermostat located within the *zones* served by the system; and
  - 1.3. Controls are configured to prevent the perimeter system from operating in a different heating or cooling mode from the other equipment within the zones or from neighboring zones connected by openings larger than 10 percent of the floor area of either zone.
2. Any interior zone open to a perimeter zone shall have setpoints and deadbands coordinated so that cooling in the interior zone shall not operate while the perimeter zone is in heating until the interior zone temperature is 5°F (2.8°C) higher than the perimeter zone temperature, unless the interior and perimeter zones are separated by a partition whose permanent openings are smaller than 10 percent of the perimeter zone floor area.
3. Dedicated outdoor air units that provide ventilation air, make-up air or replacement air for exhaust systems are permitted to be controlled based on supply air temperature. The supply air temperature shall be controlled to a maximum of 65°F (18.3°C) in heating and a minimum of 72°F (22°C) in cooling unless the supply air temperature is being reset based on the status of cooling or heating in the zones served or it being reset based on outdoor air temperature.

**C403.4.1.1 Heat pump supplementary heat.** Unitary air cooled heat pumps shall include microprocessor controls that minimize supplemental heat usage during start-up, set-up, and defrost conditions. These controls shall anticipate need for heat and use compression heating as the first stage of heat. Controls shall indicate when supplemental heating is being used through visual means (e.g., LED indicators). Heat pumps equipped with supplementary heaters shall be installed with controls that prevent supplemental heater operation above 40°F (4.4°C).

EXCEPTION: Packaged terminal heat pumps (PTHPs) of less than 2 tons (24,000 Btu/hr) cooling capacity provided with controls that prevent supplementary heater operation above 40°F (4.4°C).

**C403.4.1.2 Deadband.** Where used to control both heating and cooling, zone thermostatic controls shall be configured to provide a temperature range or deadband of at least 5°F (2.8°C) within which the supply of heating and cooling energy to the zone is shut off or reduced to a minimum.

EXCEPTIONS:

1. Thermostats requiring manual changeover between heating and cooling modes.
2. Occupancies or applications requiring precision in indoor temperature control as *approved* by the *code official*.

**C403.4.1.3 Setpoint overlap restriction.** Where a *zone* has a separate heating and a separate cooling thermostatic control located within the zone, a limit switch, mechanical stop or direct digital control system with software programming shall be configured to prevent the heating setpoint from exceeding the cooling setpoint and to maintain a deadband in accordance with Section C403.4.1.2.

**C403.4.1.4 Heated or cooled vestibules.** The heating system for heated vestibules and air curtains with integral heating shall be provided with controls configured to shut off the source of heating when the outdoor air temperature is greater than 45°F (7°C). Vestibule heating and cooling systems shall be controlled by a thermostat located in the vestibule configured to limit heating to a temperature not greater

than 60°F (16°C) and cooling to a temperature not less than 85°F (29°C).

EXCEPTIONS:

1. Control of heating or cooling provided by transfer air that would otherwise be exhausted.
2. Vestibule heating only systems are permitted to be controlled without an outdoor air temperature lockout when controlled by a thermostat located in the vestibule configured to limit heating to a temperature not greater than 45°F (7°C) where required for freeze protection of piping and sprinkler heads located in the vestibule.

**C403.4.1.5 Hot water boiler outdoor temperature setback control.** Hot water boilers that supply heat to the building through one- or two-pipe heating systems shall have an outdoor setback control that lowers the boiler water temperature based on the outdoor temperature.

**C403.4.1.6 Door switches for HVAC system thermostatic control.** Doors that open to the outdoors from a conditioned space must have controls configured to do the following once doors have been open for 5 minutes:

1. Disable the mechanical heating to the zone or reset the space heating temperature setpoint to 55°F or less within 5 minutes of the door open enable signal.
2. Disable the mechanical cooling to the zone or reset the space cooling temperature setpoint to 85°F or more within 5 minutes of the door open enable signal.

EXCEPTIONS:

1. Building entrances with vestibules.
2. Alterations to existing buildings.
3. Loading docks.

[Statutory Authority: RCW 19.27A.020, 19.27A.025, 19.27A.160 and chapter 19.27 RCW. WSR 19-24-040, § 51-11C-40341, filed 11/26/19, effective 7/1/20. Statutory Authority: RCW 19.27A.025, 19.27A.160, and 19.27.074. WSR 16-03-072, § 51-11C-40341, filed 1/19/16, effective 7/1/16. Statutory Authority: RCW 19.27A.025, 19.27A.045, 19.27.020, and 19.27.074. WSR 14-24-122, § 51-11C-40341, filed 12/3/14, effective 1/3/15. Statutory Authority: RCW 19.27A.025, 19.27A.045, and 19.27.074. WSR 13-20-120, § 51-11C-40341, filed 10/1/13, effective 11/1/13. Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, § 51-11C-40341, filed 2/1/13, effective 7/1/13.]

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**C403.4.1 Thermostatic controls.** The supply of heating and cooling energy to each zone shall be controlled by individual thermostatic controls capable of responding to temperature within the zone. Controls in the same zone or in neighboring zones connected by openings larger than 10 percent of the floor area of either zone shall not allow for simultaneous heating and cooling. At a minimum, each floor of a building shall be considered as a separate zone. Controls on systems required to have economizers and serving single zones shall have multiple cooling stage capability and activate the economizer when appropriate as the first stage of cooling. See Section C403.5 for further economizer requirements. Where humidification or dehumidification or both is provided, at least one humidity control device shall be provided for each humidity control system.

EXCEPTIONS:

1. Independent perimeter systems that are designed to offset only building envelope heat losses or gains or both serving one or more perimeter zones also served by an interior system provided:
  - 1.1. The perimeter system includes at least one thermostatic control zone for each building exposure having exterior walls facing only one orientation (within +/-45 degrees) (0.8 rad) for more than 50 contiguous feet (15,240 mm);

- 1.2. The perimeter system heating and cooling supply is controlled by a thermostat located within the *zones* served by the system; and
- 1.3. Controls are configured to prevent the perimeter system from operating in a different heating or cooling mode from the other equipment within the zones or from neighboring zones connected by openings larger than 10 percent of the floor area of either zone.
2. Where an interior zone and a perimeter zone are open to each other with permanent openings larger than 10 percent of the floor area of either zone, cooling in the interior zone is permitted to operate at times when the perimeter zone is in heating and the interior zone temperature is at least 5°F (2.8°C) higher than the perimeter zone temperature. For the purposes of this exception, a permanent opening is an opening without doors or other operable closures.
3. Dedicated outdoor air units that provide ventilation air, make-up air or replacement air for exhaust systems are permitted to be controlled based on supply air temperature. The supply air temperature shall be controlled to a maximum of 65°F (18.3°C) in heating and a minimum of 72°F (22°C) in cooling unless the supply air temperature is being reset based on the status of cooling or heating in the zones served or it being reset based on outdoor air temperature.

**C403.4.1.1 Heat pump supplementary heat.** Unitary air cooled heat pumps shall include microprocessor controls that minimize supplemental heat usage during start-up, set-up, and defrost conditions. These controls shall anticipate need for heat and use compression heating as the first stage of heat. Controls shall indicate when supplemental heating is being used through visual means (e.g., LED indicators). Heat pumps equipped with supplementary heaters shall be installed with controls that prevent supplemental heater operation above 40°F (4.4°C).

EXCEPTION: Packaged terminal heat pumps (PTHPs) of less than 2 tons (24,000 Btu/hr) cooling capacity that have reverse-cycle demand defrost and are configured to operate in heat pump mode whenever the outdoor air temperatures are above 25°F (-3.9°C) and the unit is not in defrost.

**C403.4.1.2 Deadband.** Where used to control both heating and cooling, zone thermostatic controls shall be configured to provide a temperature range or deadband of at least 5°F (2.8°C) within which the supply of heating and cooling energy to the zone is shut off or reduced to a minimum.

EXCEPTIONS: 

1. Thermostats requiring manual changeover between heating and cooling modes.
2. Occupancies or applications requiring precision in indoor temperature control as *approved* by the *code official*.

**C403.4.1.3 Setpoint overlap restriction.** Where a *zone* has a separate heating and a separate cooling thermostatic control located within the zone, a limit switch, mechanical stop or direct digital control system with software programming shall be configured to prevent the heating setpoint from exceeding the cooling setpoint and to maintain a deadband in accordance with Section C403.4.1.2.

**C403.4.1.4 Heated or cooled vestibules and air curtains.** The heating system for heated vestibules and air curtains with integral heating shall be provided with controls configured to shut off the source of heating when the outdoor air temperature is greater than 45°F (7°C). Vestibule heating and cooling systems shall be controlled by a thermostat located in the vestibule configured to limit heating to a temperature not greater than 60°F (16°C) and cooling to a temperature not less than 85°F (29°C).

EXCEPTIONS: 

1. Control of heating or cooling provided by transfer air that would otherwise be exhausted.
2. Vestibule heating only systems are permitted to be controlled without an outdoor air temperature lockout when controlled by a thermostat located in the vestibule configured to limit heating to a temperature not greater than 45°F (7°C) where required for freeze protection of piping and sprinkler heads located in the vestibule.

**C403.4.1.5 Hot water boiler outdoor temperature setback control.** Hot water boilers that supply heat to the building through one- or two-pipe heating systems shall have an outdoor setback control that lowers the boiler water temperature based on the outdoor temperature.

**C403.4.1.6 Operable opening switches for HVAC system thermostatic control.** Operable openings meeting the minimum size criteria of Section C402.5.11 and that open to the outdoors from a conditioned space must have controls configured to do the following once doors have been open for 5 minutes:

1. Disable the mechanical heating to the zone or reset the space heating temperature setpoint to 55°F or less within 5 minutes of the door open enable signal.

2. Disable the mechanical cooling to the zone or reset the space cooling temperature setpoint to 85°F or more within 5 minutes of the door open enable signal.

EXCEPTION: Hydronic radiant heating and cooling systems.

**C403.4.1.7 Demand responsive controls.** Thermostatic controls for heating or cooling systems shall be provided with *demand responsive controls* capable of increasing the cooling setpoint and decreasing the heating setpoint by no less than 4°F (2.2°C). The thermostatic controls shall be capable of performing all other functions provided by the control when the *demand responsive controls* are not available. Systems with *direct digital control* of individual zones report to a central control panel shall be capable of remotely increasing the cooling setpoint and decreasing the heating setpoint for each zone by no less than 4°F (2.2°C).

EXCEPTION: Health care and assisted living facilities.

[Statutory Authority: RCW 19.27A.020, 19.27A.025, 19.27A.160 and chapters 19.27A and 19.27 RCW. WSR 22-14-091, 23-12-101, and 23-20-021, § 51-11C-40341, filed 7/1/22, 6/7/23, and 9/25/23, effective 3/15/24. Statutory Authority: RCW 19.27A.020, 19.27A.025, 19.27A.160 and chapter 19.27 RCW. WSR 19-24-040, § 51-11C-40341, filed 11/26/19, effective 7/1/20. Statutory Authority: RCW 19.27A.025, 19.27A.160, and 19.27.074. WSR 16-03-072, § 51-11C-40341, filed 1/19/16, effective 7/1/16. Statutory Authority: RCW 19.27A.025, 19.27A.045, 19.27.020, and 19.27.074. WSR 14-24-122, § 51-11C-40341, filed 12/3/14, effective 1/3/15. Statutory Authority: RCW 19.27A.025, 19.27A.045, and 19.27.074. WSR 13-20-120, § 51-11C-40341, filed 10/1/13, effective 11/1/13. Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, § 51-11C-40341, filed 2/1/13, effective 7/1/13.]