

Proposal Change #1:

**7. Ground source heat pumps.** Buildings are permitted to utilize electric resistance auxiliary heating to supplement heat pump heating for hydronic heating systems with ground source heat pump equipment that meets all of the following conditions:

- a. Controls for the auxiliary resistance heating are configured to lock out the supplemental heat when the equipment source-side entering water temperature is above 42 outdoor air temperature is above 32°F, unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.
- b. The heat pump controls are configured to use the compressor as the first stage of heating.
- c. The heat pump rated heating capacity shall be sized to meet 100% of the design heating load at the rating condition of the applicable equipment type per Table C403.3.2(14). at 32°F entering water conditions is no less than 70% of the design heating load.
- e.d. The ground source heat exchanger shall be sized so that the heat pump annual heating output is no less than 70% of the total annual heating output over the course of a 30-year simulation using IGSHPA approved-simulation software.

Proposal Change #2:

**10. Kitchen exhaust.** Make-up air for commercial kitchen exhaust systems required to be tempered by Section 508.1.1 of the International Mechanical Code is permitted to be heated by using fossil fuel in Climate Zone 5 or using electric resistance appliances in Climate Zone 4 or 5.

Proposal Change #3:

15. **Freeze Protection.** Heating systems sized for spaces with indoor design conditions of 45°F or lower and intended for freeze protection are permitted to use electric resistance. The envelope of any such space shall be insulated in compliance with Section C402.1. ~~Spaces sized for indoor design conditions of 45°F or lower, intended for freeze protection, and insulated as conditioned are permitted to use electric resistance heating.~~

Proposal Change #4:

16. **DOAS ERV Auxiliary Heat.** Dedicated outdoor air system with energy recovery ventilation are permitted to utilize fossil fuel-fired for Climate Zone 5 or electric resistance in Climate Zones 4 or 5 for auxiliary heating to preheat outdoor air for defrost or as auxiliary supplemental heat to temper supply air to 55 °F or lower for buildings that do not have hydronic heating systems.

Proposal Change #5:

Delete this:

~~**C503.4.1 New mechanical systems.** All new mechanical systems in existing buildings, including packaged unitary equipment and packaged split systems shall comply with Section C403, except as noted in the subsections below.~~

- ~~● **C503.4.6 New and Replacement HVAC heating system equipment.** Where building HVAC mechanical heating equipment is added or replaced, the new equipment shall comply with Section C403.1.4 if one or more of the following project conditions exist: An existing heat pump is replaced, or new heating capacity is added to an existing system.~~
- ~~● An existing fossil fuel-fired or electric resistance unit with DX cooling is replaced, or new heating capacity is added to an existing system.~~
- ~~● A fossil fuel-fired furnace or electric resistance unit is replaced, and cooling is added to the same previously uncooled space~~
- ~~● A fossil fuel-fired or electric resistance boiler is replaced. If exception 6, 7, 8, or 9 of C403.1.4 is used and an electric service upgrade would be required, gas auxiliary heat in lieu of electric resistance auxiliary heat is permissible for any climate zone. The auxiliary heat can be used at the outdoor air temperature required by the load.~~

Exceptions:

- ~~● Where only one heating appliance is failing and is replaced by another having the same or lesser heating capacity and the same or higher efficiency, C403.1.4 does not apply. This exception cannot be used within the same building more than once in a 24-month period.~~
- ~~● Code officials have discretion to grant additional exceptions based on space impracticality.~~

~~If the alteration does not meet one of the above conditions yet opts to comply with C403.1.4, the project is exempt from all requirements of C406.~~

~~**C503.4.6.1 Added or Replaced Heating Hydronic Equipment.** Any added or replaced heating hydronic equipment shall be designed with a supply water temperature of 120F or less.~~

Replace with this:

**C503.4 Mechanical systems.** Those parts of systems which are altered or replaced shall comply with Section C403 unless a requirement is specifically exempted in Section C503.4.2, C503.4.5 or C503.4.6. Additions or alterations shall not be made to an existing mechanical system that will cause the existing mechanical system to become out of compliance.

**Exceptions:**

1. Existing mechanical systems ~~which are altered or~~ where parts of the system are altered or replaced are not required to be modified to comply with Section C403.3.5 ~~as long as~~ provided mechanical cooling capacity is not added to a system that did not have cooling capacity prior to the alteration.
2. Existing mechanical systems where parts of the system are altered or replaced are not required to be modified to comply with Section C403.1.4 provided the alteration does not increase heating system capacity or include replacement of a heating appliance.
3. Alternate mechanical system designs that are not in full compliance with this code may be approved when the code official determines that existing building constraints including, but not limited to, available mechanical space, limitations of the existing structure, or proximity to adjacent air intakes or exhausts make full compliance impractical. Alternate designs shall include additional energy saving strategies not prescriptively required by this code for the scope of the project including, but not limited to, demand control ventilation, energy recovery, or increased mechanical cooling or heating equipment efficiency above that required by Tables C403.3.2(1) through C403.3.2(12).
4. Only those components of existing HVAC systems that are altered or replaced shall be required to meet the requirements of Section C403.8.1. Allowable fan motor horsepower. Components replaced or altered shall not exceed the fan power limitation pressure drop adjustment values in Table C403.8.1(2) at design conditions. Section C403.8.1 does not require the removal and replacement of existing system ductwork.

**C503.4.1 New mechanical systems.** All new mechanical systems in existing buildings, ~~including packaged unitary equipment and packaged split systems,~~ shall comply with Sections C403 and C408.

**C503.4.2 Addition of cooling capacity.** Where mechanical cooling is added to a space that was not previously cooled, the mechanical system shall comply with either Section C403.3.5 or C403.5.

**Exceptions:**

1. Qualifying small equipment...
2. Chilled water terminal units connected to systems with chilled water generation equipment with OPLV values more than 25 higher than minimum part load efficiency listed in Table C403.3.2(7)....

**C503.4.3 Alterations or replacement of existing cooling systems.** Alterations to, or replacement of, existing mechanical cooling systems shall not decrease the building total economizer capacity unless the system complies with either Section C403.3.5 or C403.5. System alterations or replacement shall comply with Table C503.4.3 when the individual cooling unit capacity and the building total capacity of all cooling equipment without economizer do not comply with Sections C403.3.5 or C403.5.

**TABLE C503.4.3**  
**ECONOMIZER COMPLIANCE OPTIONS FOR MECHANICAL ALTERATIONS**

**C503.4.4 Controls for cooling equipment replacement.** When space cooling equipment is replaced, controls shall comply with all requirements under Section C403.3.5 and related subsections, and Section C403.5.1. for integrated economizer control.

**C503.4.5 Addition of heating capacity.** Where a new mechanical heating appliance or system is added that increases the building heating capacity, the appliance or system shall comply with C403.1.4.

Exceptions:

1. New hydronic coils that are served by existing unaltered hydronic heating systems and equipment.
2. New electric resistance heating coils in variable air volume (VAV) terminal units or fan coil terminal units, that are added to the distribution system and are served by an unaltered central air handling system.
3. New terminal water source heat pumps that are served by existing unaltered heating systems and equipment.

**C503.4.6 Replacement of existing heating appliances.** Where a mechanical heating appliance is replaced with a unit with equal or smaller heating output capacity, the replacement appliance shall comply with C403.1.4 or with an alternate compliance option in Table C503.4.6.

Exceptions:

- Replacement hydronic coils that are served by existing unaltered hydronic heating systems and equipment.
- Replacement electric resistance heating coils in variable air volume (VAV) terminal units or fan coil terminal units, that are served by an unaltered central air handling system.
- Replacement terminal water source heat pumps that are served by existing unaltered heating systems and equipment.
- Air handling equipment designed for 100% outdoor air that is not subject to the requirements in Section C403.3.5 or that qualifies for an exception to C403.3.5.

- Air handling equipment with a heating output capacity less than 225,000 Btu/h with existing mixed air entering temperature less than 60F.
- Where compliance with C403.1.4 would trigger an unplanned utility electrical service upgrade based upon the NEC 220.87 method for determining existing loads.
- Where the building is served by multiple heating appliances of the same type and only one appliance requires replacement. This exception cannot be used for boilers or for multiple successive mechanical alteration permit applications.

**TABLE C503.4.6 COMPLIANCE OPTIONS FOR MECHANICAL HEATING EQUIPMENT REPLACEMENT**

	<b><u>Replacement Equipment Type<sup>a</sup></u></b>	<b><u>Efficiency Table Reference</u></b>	<b><u>Alternate Compliance Options to Section C403.1.4</u></b>
1	<u>Single packaged equipment</u>	<u>Table C403.3.2(4)</u>	1) <u>Packaged heat pump controls are configured in accordance with Section C403.1.4 Exception 5b down to an outdoor air temperature of 32°F or lower. [note to reviewer: request consensus on temp]</u>
2	<u>Unitary equipment</u>	<u>Tables C403.3.2(1) and C403.3.2(2)</u>	1) <u>Heat pump controls are configured in accordance with Section C403.1.4 Exception 5b down to an outdoor air temperature of 32°F or lower. [note to reviewer: request consensus on temp]</u>
3	<u>Water-source heat pump</u>	<u>Table C403.3.2(14)</u>	<u>NA</u>
4	<u>Variable refrigerant flow equipment</u>	<u>Table C403.3.2(9)</u>	<u>NA</u>
5	<u>DX-DOAS equipment</u>	<u>Table C403.3.2(12) and Table C403.3.2(13)</u>	1) <u>DX-DOAS is provided with heat recovery if not required by C403.3.5.1.</u>
6	<u>Warm air furnace</u>	<u>Table C403.3.2(5)</u>	1) <u>Efficiency: +10%<sup>b</sup></u>
7	<u>Boiler</u>	<u>Table C403.3.2(6)</u>	1) <u>Efficiency: +15%<sup>c</sup>, or</u> 2) <u>Boiler replacement is combined with the addition of a heat recovery chiller.</u>
8	<u>Boiler and hydronic coils (&gt;80% of coils replaced)</u>	<u>Table C403.3.2(6)</u>	<u>NA</u>
9	<u>Air handling unit (that is not unitary) with electric resistance heating</u>	<u>NA</u>	1) <u>Energy recovery is provided in accordance with Section C403.3.5.1 or C403.7.6 without exception.</u>

a. Includes like-for-like equipment type replacement or a replacement unit of a different equipment type.

b. This requirement only applies to direct fired appliances; indirect fired appliances do not need to comply with C403.1.4.

- c. Where multiple performance requirements are provided, the equipment shall exceed all requirements by 15 percent. Hot water boilers with input capacity greater than 2,500,000 Btu/h are deemed to comply with this section when minimum thermal efficiency is 95 percent E, per the test procedure in 10 CFR Part 431.

**C503.4.6.1 Hydronic System Alteration Supply Water Temperature.** Any hydronic heating coil or appliance subject to C503.4.5 or C503.4.6 shall comply with C403.3.7.2 [note to reviewer: to be coordinated with proposal number 21-GP1-52].

**C503.4.7 Cooling Mechanical equipment relocation.** Existing equipment currently in use may be relocated within the same floor or same tenant space if removed and reinstalled within the same permit.