



2021 SEC draft Chapter 5 – Existing Buildings amendments

Jonlin Jan 12, 2023 version

- **Red Text: Introductory comment for each proposed change**
- **Yellow highlight: New proposals for this code**
- **Aqua highlight: Existing 2018 Seattle amendments transferred to 2021 code** (Typically, existing Seattle amendments carried forward are *not* shown in this document.)

C503.4.6 Replacement heating equipment. Makes several significant changes to the rules for moving from gas to heat pump heating:

- **Exception 6** is retained, exempting buildings that would require an electric service upgrade. (This had been stricken in earlier drafts.)
- **Exception 7** categorically exempts: affordable housing, I occupancies (hospital, correctional, etc.), buildings housing nonprofits, and buildings smaller than 20,000.
 - However, those buildings do have to provide a "**future decarbonization plan**" per C503.4.6.1 below.
- **Exception 8** permits buildings to retain half of their existing fossil fuel capacity, controlled to operate only during cold weather or other high-load situations. I'm guessing that that the heat pump will be able to provide 90% of the annual heating.
- **Exception 9** allows like-for-like temporary emergency replacement of one (or more) boilers beyond the 50% allowed by Exception 8. These projects also have to provide a "**future decarbonization plan**" per C503.4.6.1, and they have to ensure timely replacement of the temporary equipment with heat pumps via one of three options: TCO, performance bond, or opening a separate permit for completion of the system.

C503.4.6 Addition or replacement of heating appliances. Where

((a)) one or more central system mechanical heating appliances are added or replaced, the added or replaced appliances shall comply with Section C403.1.4 or with an alternate compliance option in Table C503.4.6.

EXCEPTIONS:1. Terminal unit equipment including, but not limited to, hydronic VAV boxes, electric resistance VAV boxes, electric duct heaters, water source heat pumps, fan coils, or VRF indoor units that are served by an unaltered central system, except such modifications to terminal equipment as required to accommodate lower-temperature fluids circulated from central heat pump systems.

2. Air handling equipment with hydronic coils.

3. Air handling equipment designed for 100 percent outdoor air that is not subject to the requirements in Section C403.3.5 or that qualifies for an exception to Section C403.3.5.

4. (Reserved.) ((Replacement of existing oil-fired boilers.))

5. Replacement of existing steam boilers with steam distribution to terminal units and the associated boiler feed equipment.

6. Where compliance with Section C403.1.4 would trigger an unplanned utility electrical service upgrade based on the NEC 220.87 method for determining existing loads.

7. Exempt buildings. Replacement heating equipment serving any of the following building categories is permitted to use the same fuel type as the existing equipment, provided the new equipment has the same or higher efficiency and the same or lower capacity than the existing, and that the requirements of Section C503.4.6.1 are met.

- a. *Affordable housing*
- b. I-1, I-2, or I-3 occupancies
- c. Buildings with more than 50 percent of conditioned floor area occupied by organizations recognized as nonprofit by the State of Washington or by federal tax law
- d. Buildings with less than 20,000 square feet of conditioned floor area

8. Retention of portion of existing system capacity. For buildings not exempted by Exception 7 above, a maximum of 50 percent of the existing central fossil fuel or electric resistance heating capacity is permitted to be retained or replaced to serve as supplementary heat for the new heat pump heating system, provided that the heat pump system is sized to provide no less than 50 percent of peak calculated load and that it is controlled to be used only when the heat pump system capacity is insufficient to meet the load, in compliance with the applicable Exception 5, 6, or 7 to Section C403.1.4, and that the requirements of Section C503.4.6.1 are met.

9. Temporary replacement of failing equipment. Temporary like-for-like replacement of one or more heating appliances, in excess of the 50 percent capacity permitted by Exception 8 above, is permitted where those appliances require immediate replacement, and where no other work on the HVAC system is planned. When using this exception, it is acceptable to replace a single appliance with two or more smaller appliances, provided the total capacity is not greater than that of the original appliance. In addition, the requirements of Section C503.4.6.1 shall be met, and the applicant shall ensure completion of the required heat pump system in compliance with one of the following options.

- a. SDCI will issue a temporary certificate of occupancy (TCO), which will remain in force until the heat pump heating system is installed and the final inspection of the system has been completed.
- b. Applicant shall post a performance bond in the amount of the full estimated cost of installation of the required heat pump system, to ensure completion of the heat pump system within 48 months.

C503.4.6.1 Future decarbonization plan. A schematic-level design of a heat pump system to replace the existing system shall be prepared by a professional engineer and submitted to SDCI. The professional engineer must be identified on the schematic design documents, but the engineer's stamp and signature is not required, and no party is obligated to provide any further development of the schematic design. Documents submitted with the schematic design must include:

- a. Completed SDCI decarbonization planning form, available on the SDCI website
- b. One-line system diagrams, showing only the impacted portions of systems
- c. Equipment sized and laid out to scale on plans of the existing facility. Only the impacted areas need be depicted, at a simple schematic level of detail.
- d. Required louvers, ducts, and air handling equipment
- e. Required structural modifications
- f. Required partitions, doors, and other architectural modifications
- g. Required electrical infrastructure
- h. Schematic-level cost estimate, AACE Level 5, ROM, or equivalent, including separate line items for structural, mechanical, electrical, architectural, and utility costs.
- i. Applicable compliance dates for Washington State Clean Buildings Performance Standards and Seattle Building Performance Standards.

C503.5 Replacement service water heating equipment. Makes several significant changes to the rules for moving from gas to heat pump water heating, structured to be similar to the space heating rules above.

C503.5 Service water heating equipment. All new service water heating systems, equipment, and components of existing systems that are altered or replaced shall comply with Section C404, C408.3, C409.5, and C501.6. Additions or alterations shall not be made to an existing service water heating system that will cause the existing system to become out of compliance.

EXCEPTIONS:((The following equipment is not required to comply with Section C404.2.1))

1. (Reserved.)
2. Replacement of any of the following water heater appliances is not required to comply with Section C404.2.1:
 - 2.1. Electric water heaters with an input of 12 kW or less.
 - 2.2. Gas storage water heaters with an input of 75,000 Btu/h or less.

2.3. Gas instantaneous water heaters with an input of 200,000 Btu/h or less and 2 gallons or less of storage.

Commented [DJ1]: Do we need to keep these exceptions?

3. (Reserved)

4. Exempt buildings. Replacement heating equipment for the following buildings is permitted to use the same fuel type as the existing equipment, provided the new equipment has no lower efficiency and no higher capacity than the existing, and that the requirements of Section C503.4.6.1 are met.

- a. *Affordable housing*
- b. I-1, I-2, or I-3 occupancies
- c. Buildings with more than 50 percent of conditioned floor area occupied by organizations recognized as nonprofit by the State of Washington or by federal tax law
- d. Buildings smaller than 20,000 square feet

5. Retention of portion of existing system capacity. A maximum of 50 percent of the existing central fossil fuel or electric resistance water heating capacity is permitted to be provided as supplementary heat for the new heat pump water heating system, provided the heat pump system is sized to provide no less than 50 percent of the peak calculated load, and that it is controlled to be used only when the heat pump system capacity is insufficient to meet the load, in compliance Section C404.2.1.4.

6. Temporary replacement of failing equipment. Temporary like-for-like replacement of one or more water heating appliances, in excess of the 50 percent capacity permitted by Exception 5 above, is permitted where those appliances require immediate replacement, and where no other work on the HVAC system is planned. When using this exception, it is acceptable to replace a single appliance with two or more smaller appliances, provided the total capacity is not greater than that of the original appliance. In addition, the requirements of Section C503.4.6.1 shall be met, and the applicant shall ensure completion of the required heat pump water heating system in compliance with one of the following options.

- a. SDCI will issue a temporary certificate of occupancy (TCO), which will remain in force until the heat pump water heating system is installed and the final inspection of the system has been completed.
- b. Applicant shall post a performance bond in the amount of the full estimated cost of installation of the required heat pump water heating system, to ensure completion of the system within 48 months.

C503.4.3 Heat pump installation at time of chiller replacement. Requires fossil fuel heating systems to be upgraded to heat pump systems when the chiller system is replaced.

C503.4.3 Alterations or replacement of existing cooling systems.

Where one or more central mechanical cooling appliances are added or replaced, and the existing space heating equipment is fossil fuel-fired, the space heating equipment shall be replaced by an electric heat pump system in compliance with Section C403.1.4.

Commented [DJ2]: Suggestion for use of A/C replacement as trigger for heat pump heating upgrade. Because, they will likely have sufficient electrical power available.

EXCEPTIONS: 1. Replacement of existing steam boilers that have steam distribution to terminal units is not required.

2. Where compliance with Section C403.1.4 would trigger an unplanned utility electrical service upgrade based on the NEC 220.87 method for determining existing loads, compliance with this section is not required.

3. Exempt occupancy buildings. The existing heating equipment serving any of the following building categories is permitted to remain, if the requirements of Section C503.4.6.1 are met.

- a. Affordable housing
- b. I-1, I-2, or I-3 occupancies
- c. Buildings with more than 50 percent of conditioned floor area occupied by organizations recognized as nonprofit by the State of Washington or by federal tax law
- d. Buildings with less than 20,000 square feet of conditioned floor area

4. Retention of portion of existing system capacity. For buildings not exempted by item 3 above, a maximum of 50 percent of the existing central fossil fuel or electric resistance heating capacity is permitted to be retained or replaced to serve as supplementary heat for the new heat pump heating system, provided that the heat pump system is sized to provide no less than 50 percent of peak calculated load and that it is controlled to be used only when the heat pump system capacity is insufficient to meet the load, in compliance with the applicable Exception 5, 6, or 7 to Section C403.1.4, and that the requirements of Section C503.4.6.1 are met.

6. Temporary retention of existing heating equipment. Temporary retention of one or more heating appliances, in excess of the 50 percent capacity permitted by Exception 5 above, is permitted where an existing cooling appliance requires immediate replacement, and where no other work on the HVAC system is planned. In addition, the requirements of Section C503.4.6.1 shall be met, and the applicant shall ensure completion of the required heat pump system in compliance with one of the following options.

- a. SDCI will issue a temporary certificate of occupancy (TCO), which will remain in force until the heat pump heating system is installed and the final inspection of the system has been completed.
- b. Applicant shall post a performance bond in the amount of the full estimated cost of installation of the required heat pump system, to ensure completion of the heat pump system within 48 months.

C505—Change of space conditioning, occupancy or use. A number of clarifications and corrections for this section. No new requirements.

C505.1 General. Buildings or spaces undergoing a change in space conditioning alteration shall comply with Sections C505.2 and C505.4. Buildings or spaces undergoing a change in occupancy

alteration((s)) shall comply with Sections C505.3 and C505.4. Spaces changing from one use type to another shall **also** comply with Section C505.5.

Buildings or spaces undergoing a change in space conditioning, change in occupancy or **change in use** shall conform to the provisions of this code without requiring the unaltered portion of the existing building to comply with this code. Alterations shall be such that the existing building or structure is no less conforming to the provisions of this code than the existing building or structure was prior to the alteration.

~~((A change in space conditioning alteration shall be deemed to comply with this code if the alteration area alone complies or if the alteration area is combined with all other spaces within the existing building that are of the same space conditioning category according to Section C505.2 to demonstrate compliance. A change in occupancy alteration shall be deemed to comply with this code if the alteration area alone complies or if the existing building and the alteration area are combined to demonstrate complete for the whole building. This allowance applies to prescriptive compliance in accordance with Section C505.4 or total building performance in accordance with Section C407.))~~

Buildings or spaces ~~((that were permitted prior to the 2009 Washington State energy code, or were originally permitted as unconditioned, may comply with this section as follows))~~ **are permitted to utilize one of the following modifications for compliance with this section:**

1. **Increased envelope UA with prescriptive compliance.** Where the component performance alternative in Section C402.1.5 is used to demonstrate compliance with this section, **and the project area complies with all other requirements of this code,** the Proposed Total UA is allowed to be up to 110 percent of the Allowable Total UA. This exception ~~((may))~~ **is permitted to** be applied to the project area alone, or to the existing building and project area combined as a whole building.

2. **Increased carbon emissions with total building performance compliance.** Where total building performance in accordance with Section C407 is used to demonstrate compliance with this section, the total annual carbon emissions from energy consumption of the proposed design is allowed to be up to 110 percent of the annual carbon emissions from energy consumption allowed by Section C407.3. This exception ~~((may))~~ **is permitted to** be applied to the project area alone, or to the existing building and project area combined as a whole building.

C505.1.1 Additional energy efficiency credits. Buildings or spaces that are required to comply with Sections C505.2 or C505.3 shall also comply with Section C502.1.1 in the same manner as an addition.

C505.1.2 Renewable energy. Buildings or spaces that are required to comply with Section C505.2 or C505.3 shall also comply with Section C502.1.2 in the same manner as an addition.

Commented [DJ3]: These are moved to the respective change of occupancy and change of space conditioning sections below.

Commented [DJ4]: So, what about buildings that were permitted after the 2009 code?

C505.2 Change in space conditioning. For the purposes of this section, space conditioning area categories include the following: low energy space in accordance with Section C402.1.1.1, semi-heated space, and conditioned space. Spaces undergoing a change in space conditioning ((alteration)) shall be brought up to full compliance with this code for all disciplines in the following cases:

1. Any low energy space in accordance with Section C402.1.1.1 that is altered to become conditioned space or semi-heated space shall be brought into full compliance with this code.
2. Any semi-heated space in accordance with Section C402.1.1.2 that is altered to become conditioned space or any heated but not cooled space that is altered to become both heated and cooled shall be brought into full compliance with this code. Compliance shall include the provisions of Section C406, applied only to the portion of the building undergoing a change in space conditioning.

((For buildings with more than one space conditioning category, the interior partition walls, ceilings, floors and fenestration that separate space conditioning areas shall comply with the thermal envelope requirements per the area with the highest level of space conditioning.))

Interior walls, ceilings, floors and fenestration that separate conditioned spaces from low energy or semi-heated spaces shall comply with the thermal envelope requirements for conditioned space. Interior walls, ceilings, floors and fenestration that separate semi-heated spaces from low energy spaces shall comply with the thermal envelope requirements for semi-heated space.

((A change in space conditioning project shall be deemed to comply with this code if the project area alone complies or if the existing building and the project area combined comply with this code as a whole building.))

A change in space conditioning alteration project is permitted to demonstrate compliance either if the alteration area alone complies or if the alteration area combined with all existing spaces of the same space conditioning area category complies. This applies to either prescriptive compliance in accordance with Section C505.4 or total building performance in accordance with Section C407.

Exception. The addition of cooling equipment to already-conditioned rooms or spaces less than 2000 square feet in floor area does not trigger the requirement to comply with this Section 505.2.

C505.3 Change in occupancy. Spaces undergoing a change in occupancy ((alteration)) shall be brought up to full compliance with this code for all disciplines in the following cases:

1. Any space that is converted from ((an)) a Group F, S or U occupancy to an occupancy other than Group F, S or U.

Commented [DJ5]: DJ insert interpretation language here

Commented [DJ6]: Reworded for clarity

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Commented [DJ7]: Paragraph moved from above and revised

2. Any space that is converted to a Group R dwelling unit or portion thereof, from another use or occupancy.

3. Any Group R dwelling unit or portion thereof permitted prior to July 1, 2002, that is converted to a commercial use or occupancy.

Exceptions:

1. Where the building or space is altered to become a bakery, commercial kitchen or commercial laundry, and the proposed design uses only all-electric Energy Star-rated process equipment and code compliant all-electric HVAC equipment, improvements to the building envelope immediately adjoining the spaces containing that use shall not be required. For the purposes of this exception, no fossil fuel burning equipment of any kind may be installed within the building or space undergoing the *change of occupancy*.

2. A change in occupancy alteration project is permitted to demonstrate compliance either if the alteration area alone complies or if the alteration area combined with all existing spaces of the same space conditioning area category complies. This applies to either prescriptive compliance in accordance with Section C505.4 or total building performance in accordance with Section C407.

Commented [DJ8]: Do we want to continue this exception, or drop it?

Commented [DJ9]: Paragraph moved from above and revised.

C505.4 Prescriptive compliance. Change in space conditioning and change in occupancy ((alterations)) projects shall comply with Sections C505.4.1 through C505.4.6.

C505.4.1 Vertical fenestration. ((A)) Either a change in space conditioning or change in occupancy ((alteration)) to a space or building with vertical fenestration shall comply with the following:

1. Where the vertical fenestration area of the alteration combined with the vertical fenestration area of all equivalent space conditioning areas in the existing building results in a total vertical fenestration area that is less than or equal to the maximum allowed by Section C402.4.1, the alteration shall comply with Section C402.4.

2. Where the vertical fenestration area of the alteration combined with the vertical fenestration area of all equivalent space conditioning areas in the existing building results in a total vertical fenestration area that is greater than the maximum allowed by Section C402.4.1, the alteration shall comply with one of the following:

2.1. Component performance alternative with target area adjustment in accordance with Section C402.1.5 for the alteration area of the building only.

2.2. Alteration area is combined with all equivalent space conditioning areas to demonstrate compliance with the component performance alternative.

2.3. Total building performance in accordance with Section C407 for the alteration area of the building only.

2.4. Alteration area is combined with all equivalent space conditioning areas to demonstrate total building performance compliance.

C505.4.1.2 Skylights. (A) Either a change in space conditioning ((alteration)) or change in occupancy to a space or building with skylights shall comply with the following:

1. Where the skylight area of the alteration combined with the skylight area of all equivalent space conditioning areas in the existing building results in a total skylight area that is less than or equal to the maximum allowed by Section C402.4.1, the alteration shall comply with Section C402.4.

2. Where the skylight area of the alteration combined with the skylight area of all equivalent space conditioning areas in the existing building results in a total skylight area that is greater than the maximum allowed by Section C402.4.1, the alteration shall comply with one of the following:

2.1. Component performance alternative with target area adjustment in accordance with Section C402.1.5 for the alteration area of the building only.

2.2. Alteration area is combined with all equivalent space conditioning areas to demonstrate compliance with the component performance alternative.

2.3. Total building performance in accordance with Section C407 for the alteration area of the building only.

2.4. Alteration area is combined with all equivalent space conditioning areas to demonstrate total building performance compliance.