

Chapter 5 [CE]

EXISTING BUILDINGS

SECTION C501 GENERAL

C501.1 Scope. The provisions of this chapter shall control the *alteration, repair, addition* and change of occupancy of existing buildings and structures.

C501.1.1 Existing buildings. Except as specified in this chapter, this code shall not be used to require the removal, *alteration* or abandonment of, nor prevent the continued use and maintenance of, an existing building or building system lawfully in existence at the time of adoption of this code. Unaltered portions of existing buildings used for residential purposes that received a certificate of occupancy at least three years prior to a permit application for residential uses shall not be required to comply with this code, except where required by other provisions of this code.

C501.2 Compliance. *Additions, alterations, repairs,* changes in space conditioning and changes of occupancy to, or relocation of, existing buildings and structures shall comply with Section C502, C503, C504, or C505 of this code, and with all applicable provisions in the *International Building Code, International Existing Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, Uniform Plumbing Code,* and ~~((NFPA 70))~~ the Seattle Electrical Code.

C501.2.1 U-factor requirements for additions and alterations. For existing building projects where an *addition or building envelope alteration area* is combined with existing-to-remain building areas to demonstrate compliance with this code as a whole building, the *U*-factors applied to existing-to-remain envelope assemblies shall be in accordance with record documents.

EXCEPTION: If accurate record documents are not available, *U*-factors for the existing envelope assemblies may be in accordance with the edition of the ~~((Washington State))~~ Seattle Energy Code that was in effect at the time the building was permitted, or as approved by the *code official.*

C501.2.2 Calculations of mechanical heating and cooling loads for alterations. For the installation of new or replacement mechanical equipment that serves existing building areas, design loads associated with heating, cooling and ventilation of the existing building areas served shall be determined in accordance with Section C403.1.2.

R-values and *U*-factors used to determine existing thermal envelope performance for the purpose of calculating design loads shall be in accordance with record documents or existing conditions.

EXCEPTION: If accurate record documents are not available, *R*-values and *U*-factors used to determine existing building thermal envelope performance may be in accordance with the edition of the ~~((Washington State))~~ Seattle Energy Code that was in effect at the time the building was permitted, or as *approved* by the *code official.*

C501.3 Maintenance. Buildings and structures, and parts thereof, shall be maintained in a safe and sanitary condition. Devices and systems which are required by this code shall be maintained in conformance with the code edition under which installed. The owner or the owner's authorized agent shall be responsible for the maintenance of buildings and structures. The requirements of this chapter shall not provide the basis for removal or abrogation of energy conservation, fire protection and safety systems and devices in existing structures.

C501.4 New and replacement materials. Except as otherwise required or permitted by this code, materials permitted by the applicable code for new construction shall be used. Like materials shall be permitted for repairs, provided no hazard to life, health or property is created. Hazardous materials shall not be used where the code for new construction would not permit their use in buildings of similar occupancy, purpose and location.

C501.5 ~~((Historic buildings))~~ Landmarks. The *code official* may modify the specific requirements of this code for *landmarks* and require in lieu thereof alternate provisions that the *code official* determines will not have an adverse effect on the designated historic features of the building and will result in a reasonable degree of energy efficiency.

~~((Provisions of this code relating to the construction, repair, alteration, restoration and movement of structures, and change of occupancy shall not be mandatory for historic buildings provided that a report has been submitted to the code official and signed by a registered design professional, or a representative of the state historic preservation office or the historic preservation authority having jurisdiction, demonstrating that compliance with that provision would threaten, degrade or destroy the historic form, fabric or function of the building.))~~

C501.6 Commissioning. Existing building systems shall be commissioned in accordance with Section C408. For the purposes of meeting the commissioning thresholds in Section C408.1, only the new and altered system capacities are considered when determining whether the project is exempt from some portion of the commissioning process.

SECTION C502 ADDITIONS

C502.1 General. *Additions* to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion of the existing building or building system to comply with this code. *Additions* shall not create an unsafe or hazardous condition or overload existing building systems. An *addition* shall be deemed to comply with this code if the *addition* alone complies or if the existing building and *addition* comply with this code as a single building.

This allowance applies to prescriptive compliance in accordance with Section C502.2 or total building performance in accordance with Section C407.

C502.1.1 Additional energy efficiency credits. Additions shall comply with Section C406.1. The addition shall be deemed to comply with this section if the addition alone complies or if the addition area is combined with existing building areas to demonstrate compliance with an additional efficiency credit.

Exception: *Additions* smaller than 500 square feet of *conditioned floor area* are not required to comply with Section C406.

C502.1.2 Renewable energy. Additions shall comply with Section C411. The addition shall be deemed to comply with this section if the addition alone complies or if the addition area is combined with existing building areas to demonstrate compliance with the requirements for on-site renewable energy or solar readiness, as applicable.

C502.2 Prescriptive compliance. *Additions* shall comply with Sections ((~~C502.3 through C502.8~~)) C502.2.1 through C502.2.8.

C502.2.1 Vertical fenestration. *Additions* with *vertical fenestration* that results in a total building vertical fenestration area less than or equal to that specified in Section C402.4.1 shall comply with Section C402.4. *Additions* with *vertical fenestration* that results in a total building *vertical fenestration area* greater than that specified in Section C402.4.1 shall comply with one of the following:

1. Component performance alternative with target area adjustment per Section C402.1.5 for the *addition* area of the building only.
2. Existing building and *addition* area are combined to demonstrate compliance with the component performance alternative for the whole building.
3. Total building performance in accordance with Section C407 for the *addition* area of the building only.
4. Total building performance for the whole building.

C502.2.2 Skylights. *Additions* with *skylights* shall comply with the following:

1. Where an *addition* with skylight area results in a total building skylight area less than or equal to the maximum allowed by Section C402.4.1, the *addition* shall comply with Section C402.4.
2. Where an *addition* with skylight area results in a total building skylight area greater than the maximum allowed by Section C402.4.1 (regardless of the ratio prior to the *addition*), the *addition* shall comply with one of the following:
 - 2.1. Component performance alternative with target area adjustment per Section C402.1.5 for the addition area of the building only.
 - 2.2. Existing building and addition area are combined to demonstrate compliance with the component performance alternative for the whole building. *U*-factors applied to existing envelope assemblies in the UA calculation shall comply with Section C501.2.1.
 - 2.3. Total building performance in accordance with Section C407 for the addition area of the building only.
 - 2.4. Total building performance for the whole building.

C502.2.3 (Reserved)

C502.2.4 Building mechanical systems. New mechanical systems and equipment serving the building heating, cooling or ventilation needs, that are installed as a part of the *addition* shall comply with Sections C403, C408.2, ((~~C409.5~~)) C506.1, and C501.6.

C502.2.5 Service water heating systems. New service water-heating systems and equipment that are installed as a part of the *addition* shall comply with Sections C404, C408.3, ((~~C409.5~~)) C506.1, and C501.6.

C502.2.6 Pools and permanent spas. Systems and equipment serving new pools and permanent spas that are installed as a part of the *addition* shall comply with Sections C404.11, C408.3, ((~~C409.5~~)) C506.1, and C501.6.

C502.2.7 Electrical power and lighting systems and motors. New electrical power and lighting systems and motors that are installed as a part of the *addition* shall comply with Sections C405, C408.4, ((~~C409.5~~)) C506.1, and C501.6.

C502.2.7.1 Interior lighting power. The total interior lighting power for the addition shall comply with Section C405.4.2 for the addition alone, or the existing building and the addition shall comply as a single building.

C502.2.7.2 Exterior lighting power. The total exterior lighting power for the addition shall comply with Section C405.5.2 for the addition alone, or the existing building and the addition shall comply as a single building.

C502.2.8 Refrigeration systems. New refrigerated spaces and refrigeration systems and equipment that are installed as a part of the *addition* shall comply with Sections C408.7, (~~C409.5~~) C506.1, C410, and C501.6.

C502.3 Building envelope. Additions shall comply with Sections C402.1 through C402.5, C502.3.1, and C502.3.2.

EXCEPTION: Air leakage testing is not required for additions smaller than 500 square feet.

C502.3.1 Vertical fenestration. Additions with *vertical fenestration* shall comply with the following:

1. Where an *addition* with *vertical fenestration* area results in a total building *vertical fenestration* area less than or equal to the maximum allowed by Section C402.4.1, the addition shall comply with Section C402.4.
2. Where an *addition* with *vertical fenestration* area results in a total building *vertical fenestration* area greater than the maximum allowed by Section C402.4.1 (regardless of the ratio prior to the *addition*), the *addition* shall comply with one of the following:
 - 2.1. Component performance alternative with target area adjustment per Section C402.1.5 for the addition area of the building only.
 - 2.2. Existing building and addition area are combined to demonstrate compliance with the component performance alternative for the whole building. *U*-factors applied to existing envelope assemblies in the UA calculation shall comply with Section C501.2.1.
 - 2.3. Total building performance in accordance with Section C407 for the addition area of the building only.
 - 2.4. Total building performance for the whole building.

SECTION C503 ALTERATIONS

C503.1 General. Alterations to any building or structure shall comply with the requirements of Section C503 and the code for new construction. Alterations to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portions of the existing building or building system to comply with this code. Alterations shall be such that the existing building or structure is no less conforming with the provisions of this code than the existing building or structure was prior to the alteration. The additional energy efficiency credit requirements in Section C406.1 and the renewable energy requirements in Section C411 do not apply to alterations, except substantial alterations or change of space conditioning, occupancy, or use, in compliance with Section C505. Substantial alterations and repairs shall comply with Section C503.9.

EXCEPTION: The following alterations need not comply with the requirements for new construction provided the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Surface applied window film installed on existing single pane fenestration assemblies to reduce solar heat gain provided the code does not require the glazing fenestration to be replaced.
3. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are insulated to full depth with insulation having a minimum nominal value of R-3.0 per inch installed per Section C402.
4. Construction where the existing roof, wall or floor cavity is not exposed.
5. *Roof recover*.
6. *Air barriers* shall not be required for *roof recover* and roof replacement where the *alterations* or renovations to the building do not include *alterations*, renovations or *repairs* to the remainder of the building envelope.
7. Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided however that an existing vestibule that separates a conditioned space from the exterior shall not be removed.

C503.2 Reserved.

C503.3 Building envelope. New building envelope assemblies that are part of the alteration shall comply with Sections C402.1 through C402.5 and Sections C503.3.1 through C503.3.3. Where an opaque envelope assembly is altered or replaced, the new assembly shall in no case have a higher overall U-value than the existing.

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EXCEPTION: Air leakage testing is not required for alterations and repairs, unless the project has been defined as a substantial alteration according to Section C503.9, or includes a change in space conditioning according to Section ((C503.2)) C505.2 or a change of occupancy or use according to Section ((C505.1)) C505.3.

C503.3.1 Roof replacement. *Roof replacements* shall comply with Table C402.1.3 or C402.1.4 where the existing roof assembly is part of the *building thermal envelope* and contains no insulation or the insulation is located entirely above the roof deck. In no case shall the *R*-value of the roof insulation be reduced or the *U*-factor of the roof assembly be increased as part of the *roof replacement*.

C503.3.2 Vertical fenestration. Alterations that include the addition of new vertical fenestration area shall comply with the following:

1. Where the addition of new *vertical fenestration* ~~((that))~~ area results in a total building vertical fenestration area less than or equal to the maximum allowed by Section C402.4.1, the alteration shall comply with Section C402.4.
2. Where the addition of new *vertical fenestration* area ~~((result))~~ results in a total building *vertical fenestration* area greater than the maximum allowed by Section C402.4.1 (regardless of the ratio prior to the addition), the alteration shall comply with one of the following:
 - 2.1. Vertical fenestration alternate in accordance with Section ~~((C402.1.3))~~ C402.4.1.1 for the new vertical fenestration added, where the calculation of vertical fenestration area and gross above-grade wall area shall include either the entire building or, where approved, only those areas of the building involved in the alteration.
 - 2.2. ~~((Vertical fenestration alternate in accordance with Section C402.4.1.1 for the area adjacent to the new vertical fenestration added.))~~ (Reserved)
 - 2.3. Existing building and alteration areas are combined to demonstrate compliance with the component performance alternate in accordance with Section C402.1.5 for the whole building. *U*-factors applied to existing envelope assemblies in the UA calculation shall comply with Section C501.2.1. The Proposed Total UA is allowed to be up to 110 percent of the Allowed Total UA.
 - 2.4. Total building performance in accordance with Section C407 for the whole building. 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 in accordance with Section C407.3.
 - 2.5. The alteration does not increase the existing fenestration area.

EXCEPTION: Where *approved* by the *code official*, additional *fenestration* is permitted where sufficient envelope upgrades beyond those required by other sections of this code are included in the project so that the addition of new *vertical fenestration* does not cause an increase in the overall energy use of the building.

C503.3.2.1 Replacement fenestration products. Where some or all of an existing *fenestration* unit is replaced with a new *fenestration* product, including sash and glazing, the replacement *fenestration* unit shall meet the applicable requirements for *U*-factor and *SHGC* in Table C402.4. In addition, the area-weighted *U*-value of the new fenestration shall be equal to or lower than the *U*-value of the existing fenestration.

EXCEPTION: An area-weighted average of the *U*-factor of replacement fenestration products being installed in the building for each fenestration product category listed in Table C402.4 shall be permitted to satisfy the *U*-factor requirements for each fenestration product category listed in Table C402.4. Individual fenestration products from different product categories listed in Table C402.4 shall not be combined in calculating the area-weighted average *U*-factor.

C503.3.3 Skylights. Alterations that include the addition of new skylight area shall comply with the following:

1. Where the addition of new *skylight* area results in a total building skylight area less than or equal to the maximum allowed by Section C402.4.1, the alteration shall comply with Section C402.4.
2. Where the addition of new *skylight* area results in a total building skylight area greater than the maximum allowed by Section C402.4.1 (regardless of the ratio prior to the addition), the alteration shall comply with one of the following:
 - 2.1. Existing building and alteration area are combined to demonstrate compliance with the component performance alternative with target area adjustment in accordance with Section C402.1.5 for the whole building. *U*-factors applied to existing envelope assemblies in the UA calculation shall comply with Section C501.2.1. The Proposed Total UA is allowed to be up to 110 percent of the Allowed Total UA.
 - 2.2. Total building performance in accordance with Section C407 for the whole building. The 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 in accordance with Section C407.3.

EXCEPTION: Additional envelope upgrades are included in the project so the addition of new skylights does not cause a reduction in overall building energy efficiency, as *approved* by the *code official*.

C503.4 Building mechanical systems. Components of existing mechanical systems that are altered or replaced shall comply with Section C403 or Section C407, unless specifically exempted in Section C503.4, and Sections C408.2, ((C409.5)) C506.1, C501.2.2, C501.6, and C503.4.2 through C503.4.6. Additions or alterations shall not be made to an existing mechanical system that will cause the existing system to become out of compliance.

EXCEPTIONS:

1. Existing mechanical systems are not required to be modified to comply with Section C403.3.5 where mechanical cooling capacity is not added to a system that did not have cooling capacity prior to the alteration.
2. Compliance with Section C403.1.4 is not required where the alteration does not 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 makes 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 (16).
4. Only those components of existing HVAC systems that are altered or replaced shall be required to comply with Section C403.8.1. Section C403.8.1 does not require the removal and replacement of existing system ductwork. Additional fan power allowances are available when determining the fan power budget (Fan kW_{budget}) as specified in Table C503.4. These values can be added to the fan power allowance values in Tables C403.8.1.1(1) and C403.8.1.1(2) when calculating a new Fan kW_{budget} for the fan system being altered. The additional fan power allowance is not applicable to alterations that add or change passive components which do not increase the fan system static pressure.

**Table C503.4
Additional Fan Power Allowances (W/CFM)**

Airflow	Multi-Zone VAV Systems ^a ≤5,000 cfm	Multi-Zone VAV Systems ^a >5,000 and ≤10,000 cfm	Multi-Zone VAV Systems ^a >10,000 cfm	All Other Fan Systems ≤5,000 cfm	All Other Fan Systems >5,000 and ≤10,000 cfm	All Other Fan Systems >10,000 cfm
Supply <i>Fan System</i> additional allowance	0.135	0.114	0.105	0.139	0.120	0.107
Supply <i>Fan System</i> additional allowance in unit with adapter curb	0.033	0.033	0.043	0.000	0.000	0.000
Exhaust/Relief/Return/Transfer Fan System additional allowance	0.070	0.061	0.054	0.070	0.062	0.055
Exhaust/Relief/Return/Transfer <i>Fan System</i> additional allowance with adapter curb	0.016	0.017	0.220	0.000	0.000	0.000

^a See definition of *FAN SYSTEM, MULTI-ZONE VARIABLE AIR VOLUME (VAV)*.

C503.4.1 New building mechanical systems. All new mechanical systems and equipment in existing buildings shall comply with Sections C403, C408.2, ((C409.5)) C506.1, and C501.6.

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: Economizers are not required for cooling units and split systems serving one zone with a total cooling capacity rated in accordance with Section C403.3.2 of less than 33,000 Btu/h (hereafter referred to as qualifying small systems) provided that these are high-efficiency cooling equipment with SEER and EER values more than 15 percent higher than minimum efficiencies listed in Tables C403.3.2 (1), (2), (4), (8), (9), and (14), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. The total capacity of all qualifying small equipment without economizers shall not exceed 72,000 Btu/h per building, or 5 percent of the building total air economizer capacity, whichever is greater.

Notes and exclusions for Exception 1:

- 1.1. The portion of the equipment serving Group R occupancies is not included in determining the total capacity of all units without economizers in a building.
- 1.2. Redundant units are not counted in the capacity limitations.

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- 1.3. This exception shall not be used for the initial tenant improvement of a shell-and-core building or space, or for Total Building Performance in accordance with Section C407.
- 1.4. This exception shall not be used for unitary cooling equipment installed outdoors or in a mechanical room adjacent to the outdoors.
2. Chilled water terminal units connected to systems with chilled water generation equipment with IPLV values more than 25 percent higher than minimum part load equipment efficiencies listed in Table C403.3.2 (3), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. The total capacity of all systems without economizers shall not exceed ((480,000)) 72,000 Btu/h (141 kW) per building, or 20 percent of the building total air economizer capacity, whichever is greater.

Notes and exclusions for Exception 2:

- 2.1. The portion of the equipment serving Group R occupancy is not included in determining the total capacity of all units without economizers in a building.
- 2.2. This exception shall not be used for the initial tenant improvement of a shell-and-core building or space, or for total building performance in accordance with Section C407.

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 either the individual cooling unit capacity or the building total capacity of all cooling equipment without economizer does not comply with the exceptions in Section C403.5. Equipment replacements that include space heating shall also comply with Section C503.4.6.

C503.4.3.1 Addition of new or replacement of existing air-cooled chiller systems. Where one or more air-cooled chillers are added or replaced, and the existing HVAC heating equipment is included in one of the categories listed below and is fossil fuel-fired or electric resistance, the replacement cooling appliance shall be an electric heat pump system in compliance with Section C403.1.4, integrated with the existing HVAC heating system and configured to serve as the first stage of heating when conditions permit use of the fluid temperatures produced by the heat pump system, with the existing fossil fuel-fired or electric resistance HVAC heating equipment serving as supplemental heat. Additions, alterations, or replacements shall not be made to an existing HVAC heating system that will cause the system to become out of compliance.

Exceptions:

1. Exempt buildings and occupancies. The new heat pump is not required to serve as the first stage of heating if it serves any of the following building categories and the requirements of Section C503.4.6.2 are met.
 - a. Affordable housing.
 - b. Group I-1, I-2, and 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 no more than 20,000 square feet of conditioned floor area.
2. Exempt systems. Air-cooled chillers that serve dedicated server rooms, electronic equipment rooms, telecom switch rooms, or similar spaces that only require cooling and do not have any associated space heating equipment are not required to be replaced with heat pump systems. New heat pump systems are not required to serve as the first stage of heating if they serve any of the following system types, and if the requirements of Section C503.4.6.2 are met.
 - a. Steam heating systems, including replacement of existing steam boilers with steam distribution piping to terminal units and replacement of the existing associated boiler feed equipment.
 - b. Terminal unit equipment including but not limited to electric resistance VAV boxes, electric duct heaters, electric resistance fan coils, or electric resistance heaters.

**Table C503.4.3
Economizer Compliance Options for Mechanical Alterations**

Unit Type	Option A	Option B (alternate to A)	Option C (alternate to A)	Option D (alternate to A)
	Any alteration with new or replacement equipment	Replacement unit of the same type with the same or smaller output capacity	Replacement unit of the same type with a larger output capacity	New equipment added to existing system or replacement unit of a different type
1. Packaged Units	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b
2. Split Systems	Efficiency: min. ^a Economizer: C403.5 ^b	For units ≤ 60,000 Btuh, comply with two of two measures: 1. Efficiency: + 10% ^c 2. Economizer: shall not decrease existing economizer capability	For units ≤ 60,000 Btuh replacing unit installed prior to 1991 comply with at least one of two measures: 1. Efficiency: + 10% ^c 2. Economizer: 50% ^f	Efficiency: min. ^a Economizer: C403.5 ^b
		For all other capacities: Efficiency: min. ^a Economizer: C403.5 ^b	For all other capacities: Efficiency: min. ^a Economizer: C403.5 ^b	
3. Water Source Heat Pump	Efficiency: min. ^a Economizer: C403.5 ^b	For units ≤ 72,000 Btuh, comply with at least two of three measures: 1. Efficiency: +10% ^c 2. Flow control valve ^g 3. Economizer: 50% ^f	For units ≤ 72,000 Btuh, comply with at least three of three measures: 1. Efficiency: +10% ^c 2. Flow control valve ^g 3. Economizer: 50% ^f (except for certain pre-1991 systems ^q)	Efficiency: min. ^a Economizer: C403.5 ^b (except for certain pre-1991 systems ^q)
		For all other capacities: Efficiency: min. ^a Economizer: C403.5 ^b	For all other capacities: Efficiency: min. ^a Economizer: C403.5 ^b	
4. Water Economizer using Air-Cooled Heat Rejection Equipment (Dry Cooler)	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: + 5% ^d Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b
5. Air-Handling Unit (including fan coil units) where the system has an air-cooled chiller	Efficiency: min. ^a Economizer: C403.5 ^b	Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b (except for certain pre-1991 systems ^q)	Efficiency: min. ^a Economizer: C403.5 ^b (except for certain pre-1991 systems ^q)
6. Air-Handling Unit (including fan coil units) and Water-cooled Process Equipment, where the system has a water-cooled chiller ¹⁰	Efficiency: min. ^a Economizer: C403.5 ^b	Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b (except for certain pre-1991 systems ^q and certain 1991-2016 systems ⁱ)	Efficiency: min. ^a Economizer: C403.5 ^b (except for certain pre-1991 systems ^q and certain 1991-2016 systems ⁱ)
7. Cooling Tower	Efficiency: min. ^a Economizer: C403.5 ^b	No requirements	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: min. ^a Economizer: C403.5 ^b

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**Table C503.4.3—continued
Economizer Compliance Options for Mechanical Alterations**

Unit Type	Option A	Option B (alternate to A)	Option C (alternate to A)	Option D (alternate to A)
	Any alteration with new or replacement equipment	Replacement unit of the same type with the same or smaller output capacity	Replacement unit of the same type with a larger output capacity	New equipment added to existing system or replacement unit of a different type
8. Air-Cooled Chiller	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: + 10% ^k Economizer: shall not decrease existing economizer capacity	Efficiency: Comply with two of two measures: 1. + 10% ^{k,l} and 2. Multistage compressor(s) Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b
9. Water-Cooled Chiller	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: Comply with at least one of two measures: 1. Part load IPLV + 15% ⁿ or 2. Plate frame heat exchanger ^o Economizer: shall not decrease existing economizer capacity	Efficiency: Comply with two of two measures: 1. Part load IPLV + 15% ⁿ 2. Plate-frame heat exchanger ^o Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b
10. Package Terminal Air Conditioner	Efficiency: min. ^a Economizer: C403.5 ^b	Efficiency: + 5% ^a Economizer: shall not decrease existing economizer capacity	Efficiency: + 5% ^a Economizer: shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b
11. Package Terminal Heat Pump	Efficiency: min. ^a Economizer: C403.5 ^b	Cooling efficiency: + 5% ^d Heating efficiency: + 10% ^c Shall not decrease existing economizer capacity	Cooling efficiency: + 5% ^d Heating efficiency: + 10% ^e Shall not decrease existing economizer capacity	Efficiency: min. ^a Economizer: C403.5 ^b

- a Minimum equipment efficiency shall comply with Section C403.3.2 and the tables in Section C403.3.2.
- b All separate new equipment and replacement equipment shall have air economizer complying with Section C403.5 including both the individual unit size limits and the total building capacity limits on units without economizer. It is acceptable to comply using one of the exceptions to Section C403.5.
- c Reserved.
- d Equipment shall have a capacity-weighted average cooling system efficiency that is 5% better than the requirements in the tables in Section C403.3.2 (1.05 × values in the tables).
- e Equipment shall have a capacity-weighted average cooling system efficiency that is 10% better than the requirements in the tables in Section C403.3.2 (1.10 × values in the tables).
- f Minimum of 50% air economizer that is ducted in a fully enclosed path directly to every heat pump unit in each zone, except that ducts may terminate within 12 inches of the intake to an HVAC unit provided that they are physically fastened so that the outside air duct is directed into the unit intake. If this is an increase in the amount of outside air supplied to this unit, the outside air supply system shall be configured to provide this additional outside air and be equipped with economizer control.
- g Water-source heat pump systems shall have a flow control valve to eliminate flow through the heat pumps that are not in operation and variable speed pumping control complying with Section C403.4.3 for that heat pump.
 - When the total capacity of all units with flow control valves exceeds 15% of the total system capacity, a variable frequency drive shall be installed on the main loop pump.
 - As an alternate to this requirement, the capacity-weighted average cooling system efficiency shall be 5% better than the requirements in footnote e for water-source heat pumps (i.e., a minimum of 15% greater than the requirements in Table C403.3.2 (14)).
- h Water economizer equipment shall have a capacity-weighted average cooling system efficiency that is 10% better than the requirements in Tables C403.3.2 (7), C403.3.2(10), and C403.3.2 (16) (1.10 × values in Tables C403.3.2 (7), C403.3.2(10), and C403.3.2 (16)).
- i Air economizer is not required for systems installed with water economizer plate and frame heat exchanger complying with previous codes between 1991 and June 2016, provided that the total fan coil load does not exceed the existing or added capacity of the heat exchangers.
- j For water-cooled process equipment where the manufacturers specifications require colder temperatures than available with waterside economizer, that portion of the load is exempt from the economizer requirements.
- k The air-cooled chiller shall have an IPLV efficiency that is a minimum of 10% greater than the IPLV requirements in EER in Table C403.3.2 (3) (1.10 × IPLV values in EER in Table C403.3.2 (3)).
- l The air-cooled chiller shall be multistage with a minimum of two compressors.
- m ((The water-cooled chiller shall have full load and part load IPLV efficiency that is a minimum of 5% greater than the IPLV requirements in Table C403.3.2(3).))

- n The water-cooled chiller shall have an IPLV value that is a minimum of 15% lower than the IPLV requirements in Table C403.3.2(3) ($0.85 \times$ IPLV values in Table C403.3.2(3)). Water-cooled centrifugal chillers designed for nonstandard conditions shall have an NPLV value that is at least 15% lower than the adjusted maximum NPLV rating in kW per ton defined in Section C403.3.2.3 ($0.85 \times$ NPLV).
- o Economizer cooling shall be provided by adding a plate-frame heat exchanger on the waterside with a capacity that is a minimum of 20% of the chiller capacity at standard AHRI rating conditions.
- p Reserved.
- q Systems installed prior to 1991 without fully utilized capacity are allowed to comply with Option B, provided that the individual unit cooling capacity does not exceed 90,000 Btuh.

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 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.

~~(C503.4.6 Addition or replacement of heating appliances. Where a mechanical heating appliance is 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. Where use of heat pump equipment for space heating is required by this section, it is permissible to utilize the Fossil Fuel Compliance Path in Section C401.3 to attain the credits required for building additions shown in Table C401.3.3.~~

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.~~
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. ~~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. ~~Replacement of heating equipment with equipment that is the same type and where the rated capacity of the new equipment does not exceed the rated capacity of the existing equipment.)~~

C503.4.6 Addition or replacement of HVAC heating appliances. New HVAC heating systems shall comply with Section C403.1.4. Where one or more HVAC mechanical heating appliances are added or replaced, the added or replaced appliances shall comply with Section C401.3, Section C403.1.4, Section C407, or with an alternate compliance option in Table C503.4.6, and in all cases with Sections C501.6 and C506.1. When complying with the alternate compliance option in Table C503.4.6, added or replaced HVAC heating appliances must select HVAC heating appliances from one of the Proposed Heating Type Options and the applicable Heating Efficiency Tables. Additions, alterations, or replacements shall not be made to an existing HVAC heating system that will cause the existing system to become out of compliance. Where use of heat pump equipment for space heating is required by this section, it is permissible to utilize the Fossil Fuel Compliance Path in Section C401.3 to attain the credits required for building additions shown in Table C401.3.3.

EXCEPTIONS:

1. Exempt buildings and occupancies. Replacement heating equipment serving any of the following building categories is permitted to use the same fuel type as the existing equipment, provided the replacement equipment complies with the minimum efficiency in Table C503.4.6 and the same or lower capacity than the existing, and that the requirements of Section C503.4.6.2 are met.
 1. Affordable housing.
 2. Group I-1, I-2, and I-3 occupancies.
 3. 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.
 4. Buildings with no more than 20,000 square feet of conditioned floor area.
2. Retention of portion of existing system capacity. For buildings not exempted by Exception 1 above, a maximum of 50 percent of the existing fossil fuel or electric resistance heating capacity is permitted to be retained or replaced to serve as supplemental heat for the new heat pump heating system, provided that the supplemental heat is controlled to be used only when the heat pump system capacity is insufficient to meet the load, in compli-

ance with the applicable Exception 5, 6, or 7 to Section C403.1.4, and that the requirements of Section C503.4.6.2 are met. Where an alteration replaces less than 50 percent of the existing fossil fuel or electric resistance heating capacity, the remaining heating appliances are permitted to be retained. Where the alteration project decreases the peak heating load, the fossil fuel or electric resistance heating capacity shall be limited to 50 percent of the calculated peak heating load. The replacement equipment shall comply with the minimum efficiency in Table C503.4.6.

3. 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 2 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 C503.4.6.2 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.
4. Utility service upgrade. Compliance with Section C403.1.4 is not required where the requirements of Section C503.4.6.2 are met, and where such compliance would trigger an unplanned utility electrical service upgrade, based on the Seattle Electrical Code Section 220.87 method for determining existing loads, where one or more of the following is required:
 - a. A new utility transformer vault located in the existing building or on the site, or an enlargement of the floor area of such a vault.
 - b. Trenching across the vehicle lanes of a public way.
 - c. The estimated construction cost for the required electrical service enlargement exceeds 50 percent of the project valuation for the remainder of the work, as determined in accordance with the *fee subtitle*. Construction cost shall be documented by an AACE Level 3 or equivalent cost estimate, including required demolition, construction, site work, and utility fees.

The replacement equipment shall comply with the minimum efficiency in Table C503.4.6.

5. Exempt equipment. Alterations to the following equipment types are not required to comply with this section.
 - a. Terminal unit equipment including but not limited to hydronic VAV terminal units, electric resistance VAV boxes, electric duct heaters, water source heat pumps, fan coils, or VRF indoor units, except such modifications to terminal equipment with hydronic heating coils as are required to accommodate lower-temperature fluids circulated from new central heat pump systems in accordance with Section C403.3.8.2.
 - b. Air handling equipment with hydronic heating coils, except such modifications to the air handling equipment as are required to accommodate lower-temperature fluids circulated from central heat pump systems in accordance with Section C403.3.8.2.
 - c. Replacement of existing steam boilers with steam distribution piping to terminal units and replacement of the existing associated boiler feed equipment.

C503.4.6.1 Hydronic system alteration supply water temperature. Hydronic heating coils and appliances subject to Section C503.4.5 or Section C503.4.6 shall comply with Section C403.3.8.2.

C503.4.6.2 Future decarbonization plan. For buildings with more than 20,000 square feet of conditioned space, 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 signature and date 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:

1. Completed SDCI decarbonization planning form, available on the SDCI website.
2. Mechanical and electrical one-line system diagrams, showing only the impacted portions of systems.
3. 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.
4. Required louvers, ducts, and air handling equipment.
5. Required structural modifications.
6. Required partitions, doors, and other architectural modifications.

7. Required electrical infrastructure, including any electrical service upgrade and vault.
8. Schematic-level cost estimate, AACE Class 5, or equivalent, including separate line items for structural, mechanical, electrical, architectural, and utility costs.
9. Applicable compliance dates for Washington State Clean Buildings Performance Standards and Seattle Building Emissions Performance Standards (BEPS) with maximum allowable energy use index (EUI) and carbon emissions.

**Table C503.4.6
Compliance Options for ((Mechanical)) HVAC Heating Equipment Alterations**

	Proposed Heating Equipment Type^a	Heating Efficiency Table Reference	Alternate Compliance Options to Section C403.1.4
1	Air-Cooled Unitary Heat Pumps	Table C403.3.2(2)	1. Compliance with C403.1.4, except heat pump rated capacity in accordance with Section C403.1.4 exception 5d is permitted to be sized equal to the supplemental internal resistance heating capacity in Climate Zone 4 or 5 ^c 2. Compliance with C403.1.4, except electric resistance mixed air preheat is permissible ^c
2	Packaged terminal, single-package vertical, and room air-conditioner heat pumps	Table C403.3.2(4)	1. Compliance with C403.1.4, except heat pump rated capacity in accordance with Section C403.1.4 Exception 5d is permitted to be sized equal to the supplemental internal resistance heating capacity in Climate Zone 4 or 5
3	Furnaces, duct furnaces, and unit heaters	Table C403.3.2(5)	<u>1. Permitted only when qualifying for and complying with Section C503.4.6 Exceptions 1, 2, 3 or 4</u> <u>2. Efficiency: ((+10%)) +5%^b</u>
4	Gas-fired hot water boilers	Table C403.3.2(6)	<u>1. Permitted only when qualifying for and complying with Section C503.4.6 Exceptions 1, 2, 3 or 4</u> <u>2. Efficiency: +5%^b</u>
5	Variable refrigerant flow air-to-air and applied heat pumps	Table C403.3.2(9)	No alternate compliance option
6	DX-DOAS equipment	Table C403.3.2(12) and Table C403.3.2(13)	1. DX-DOAS is provided with heat recovery if not required by C403.3.5.1.
7	Water-source heat pumps	Table C403.3.2(14)	No alternate compliance option

- a Includes replacement of equipment with a unit that is the same type or higher efficiency and the same or lower capacity, or a replacement of one equipment type with a different equipment type.
- b Equipment shall have a capacity-weighted average heating system efficiency that is 5 percent better than that shown in the reference table (1.05 x values in reference table).
- c Option 1 and Option 2 can be combined.

C503.5 New Service water heating equipment. All new service water heating systems shall comply with Section C404.

C503.5.1 Addition or replacement of service water heating equipment. All existing service hot water systems, equipment, and components of existing systems that are altered or replaced shall comply with Section C404 or Section C407 ((or Sections C404, C408.3, C409.5)) and in all cases with C506.1, 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. Where use of heat pump equipment for space heating is required by this section, it is permissible to utilize the Fossil Fuel Compliance Path in Section C401.3 to attain the credits required for building additions shown in Table C401.3.3.

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

1. ~~((Reserved.))~~ Utility service upgrade. Compliance with Section C403.1.4 is not required where the requirements of Section C503.4.6.2 are met, and where such compliance would trigger an unplanned utility electrical service upgrade, based on the Seattle Electrical Code Section 220.87 method for determining existing loads, where one or more of the following is required:
 - a. A new utility transformer vault located in the existing building or on the site, or an enlargement of the floor area of such a vault.
 - b. Trenching across the vehicle lanes of a public way.
 - c. The estimated construction cost for the required electrical service enlargement exceeds 50 percent of the project valuation for the remainder of the work, as determined in accordance with the fee subtitle. Construction cost shall be documented by an AACE Level 3 or equivalent cost estimate, including required demolition, construction, site work, and utility fees.

GENERAL REQUIREMENTS

- The replacement equipment shall comply with the minimum efficiency in Table C503.4.6.
2. Exempt Systems. Replacement of any of the following water heater appliances is not required to comply with this section or with Section C404.2.1:
 - 2.1. Electric water heaters with an input of ~~((+2))~~ 24 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.
 - 2.4. Replacement of existing steam boilers with steam distribution piping to terminal units and replacement of the existing associated boiler feed equipment.
 3. (Reserved)
 4. Exempt buildings. Replacement service water 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 C503.4.6.2 are met.
 - a. Affordable housing.
 - b. Group 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 supplemental heat for the new heat pump water heating system, provided that the supplemental heat is controlled to be used only when the heat pump system capacity is insufficient to meet the load, in compliance with Section C404.2.1.4, and that the requirements of Section C503.4.6.2 are met. Where an alteration replaces less than 50 percent of the existing fossil fuel or electric resistance service water heating capacity, the remaining service water heating appliances are permitted to be retained. Where the alteration project decreases the peak service water heating load, the fossil fuel or electric resistance heating capacity shall be limited to 50 percent of the calculated peak heating load.
 6. Temporary replacement of failing equipment. Temporary like-for-like replacement of one or more service 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 service water heating 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 C503.4.6.2 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.

C503.6 Pools and permanent spas. All new systems and equipment serving pools and permanent spas and components of existing systems that are altered or replaced, shall comply with Sections C404.11, C408.3, ~~((C409.5))~~ C506.1, and C501.6. Additions or alterations shall not be made to an existing system serving a pool or spa that will cause the existing system to become out of compliance.

C503.7 Electrical power and lighting systems and motors. Alterations or the addition of lighting, receptacles and motors shall comply with Sections C503.7.1 through C503.7.7. Additions or alterations shall not be made to an existing lighting or electrical system that will cause the existing system to become out of compliance.

C503.7.1 New lighting (~~(systems and))~~ system controls. All new interior and exterior lighting systems within an existing building site shall be provided with lighting controls in accordance with Section C405.2 and shall comply with C408.4, ~~((C409.5))~~ C506.1, and C501.6.

C503.7.2 Luminaire additions and alterations. Alterations that add or replace 20 percent or more of the luminaires, or of the lamps plus ballasts alone, in a space enclosed by walls or ceiling-height partitions, replace 20 percent or more of parking garage luminaires, or replace 20 percent or more of the total installed wattage of exterior luminaires shall comply with Sections C405.4 and C405.5. Exterior power allowance shall be determined using the specific area allowances for the areas altered and shall not include the base site allowance. Where less than 20 percent of the fixtures in an interior space enclosed by walls or ceiling-height partitions or in a parking garage are added or replaced, or less than 20 percent of the installed exterior wattage is replaced, the installed lighting wattage shall be maintained or reduced.

C503.7.3 Rewiring and recircuiting. Where new wiring is being installed to serve added fixtures and/or fixtures are being relocated to a new circuit, lighting controls shall comply with all applicable requirements in accordance with Sections C405.2.1, C405.2.3, C405.2.4, C405.2.5, C405.2.6, C405.2.7, C405.2.8, C408.4, and C501.6.

C503.7.4 New or moved lighting panel. Where a new lighting panel (or a moved lighting panel) with all new raceway and conductor wiring from the panel to the fixtures is being installed, lighting controls shall also comply with, in addition to the requirements of Section C503.7.3, all (~~remaining~~) requirements in Sections C405.2, C408.4, and C501.6.

C503.7.5 Newly-created rooms. Where new walls or ceiling-height partitions are added to an existing space and create a new enclosed space, but the lighting fixtures are not being changed, other than being relocated, the new enclosed space shall have lighting controls that comply with all applicable requirements in accordance with Sections C405.2.1, C405.2.2, C405.2.3, C405.2.4, C405.2.5, C405.2.6, C408.4 and C501.6.

C503.7.6 Motors. Motors that are altered or replaced shall comply with Section C405.8. In no case shall the energy efficiency of the building be decreased.

C503.7.7 Controlled receptacles. Where electric receptacles are added or replaced, controlled receptacles shall be provided in accordance with Section C405.10 and shall comply with Sections C408.4 and C501.6.f

EXCEPTIONS:

1. Where an alteration project impacts an area smaller than 5,000 square feet, controlled receptacles are not required.
2. Where existing systems furniture or partial-height relocatable office cubical partitions are reconfigured or relocated within the same area, controlled receptacles are not required in the existing systems furniture or office cubicle partitions.
3. Where new or altered receptacles meet (~~the exception~~) Exception 1 to Section C405.10, they are not required to be controlled receptacles or be located within 12 inches of noncontrolled receptacles.

C503.8 Refrigeration systems. Components of existing refrigeration systems that are altered or replaced shall comply with Sections C408.7, C410 and C501.6. Additions or alterations shall not be made to an existing refrigeration system that will cause the existing system to become out of compliance. All new refrigerated spaces and refrigeration systems and equipment in existing buildings, including new refrigerated display cases, shall comply with Sections C408.7, (~~C409.5~~) C506.1, C410 and C501.6.

C503.9 Substantial alterations or repairs. In addition to meeting the requirements of this code, any building or structure to which substantial alterations or repairs are made shall comply with the requirements of this section. Compliance with Sections C502, C503, and C504 is not required.

EXCEPTIONS:

1. Alterations and repairs to landmark buildings shall comply with this section to the extent that the code official determines that such compliance does not have an adverse effect on the designated historic features of the building. The energy use allowed by subsections 2, 3 or 4 of Section C503.9.3 is permitted to be increased in proportion to the additional energy use required for preservation of such designated features.
2. A project that is defined as a substantial alteration primarily due to the seismic retrofitting of a building's unreinforced masonry walls is exempt from the requirements of this section.
3. A building constructed in compliance with the 2003 or more recent edition of the Seattle Building Code that would be classified as a substantial alteration only due to being reoccupied after being substantially vacant for more than 24 months is exempt from the requirements of this section.

C503.9.1 Definition. For the purposes of this section, substantial alterations or repairs means items 1, 2 or 4, or any combination thereof, of the definition of substantial alterations or repairs in Chapter 3 of the Seattle amendments to the IEBC, as determined by the code official.

SDCI Informative Note. Alterations that convert HVAC heating systems, water heating systems, or both from fossil fuel or electric resistance to heat pump systems, and where the only additional alterations provide necessary electrical power, structural support, or air circulation for the heat pump system, might in certain cases not be classified as substantial alterations. Consult with your SDCI Building Code reviewer, and see additional guidance in SDCI Tip 314.

SDCI Informative Note: Definitions 1, 2 and 4 (on next page) of “substantial alterations or repairs” in the Seattle Existing Building Code are as follows:

1. Repair of a building with a damage ratio of 60 percent or more.
2. Remodeling or *additions* that substantially extend the useful physical and/or economic life of the building or a significant portion of the building, other than typical tenant remodeling.

GENERAL REQUIREMENTS

4. Re-occupancy of a building that has been substantially vacant for more than 24 months in occupancies other than Group R-3.

C503.9.2 Pre-submittal conference. The applicant shall attend a pre-submittal conference to discuss the selected compliance path. Prior to this conference, the applicant shall meet with each energy utility serving the building to determine whether technical assistance or financial incentives are available for energy efficiency upgrades, and shall submit documentation of these meetings at the pre-submittal conference.

C503.9.3 Energy efficiency. Buildings undergoing substantial alterations shall comply with Section C503.4.6 and one of the following:

1. Full code compliance. Fully comply with the requirements of this code for new construction, including Section C406.
2. Envelope thermal performance within 15 percent of code. Demonstrate that heat loss through the building envelope is no more than 15 percent greater than allowed by the Seattle Energy Code, using the Component Performance Building Envelope Option in Section C402.1.5, and meet all other prescriptive requirements of the Seattle Energy Code for new construction, including Section C406.
 - 2.1. Default U-values. The values listed in Appendix A and Section C303 shall be used as the default U-values for existing building envelope components. For buildings whose original construction permits were applied for after January 1, 1992, existing building envelope components are deemed to meet the minimum U-values required by the edition of the Seattle Energy Code in effect at the time of permit application, where visual inspection by the *code official* reveals that those components appear to be equal to or better than code-compliant components.
 - 2.2. Disproportionality. Where *approved* by the *code official*, the cost of required thermal improvements to the building envelope are not required to exceed 20 percent of the valuation of the substantial alterations project, determined in accordance with the Fee Subtitle, when using this envelope thermal performance compliance method. Envelope improvement costs shall be documented using standard cost estimating software and methodology.
3. Total building performance within 10 percent of code. Demonstrate that the Building Performance Factor is no more than 10 percent higher than that permitted by Table C407.3(2).

EXCEPTION: The UxA calculation required by Section C407.3.1 is not required when using this option.

4. Operating energy alternative. The *code official* is permitted to allow calculated building performance factor 20 percent greater than the baseline building design calculated in accordance with the Total Building Performance methodology in Section C407, provided that:
 - a. The applicant demonstrates that constructability, economic, or historic preservation considerations preclude conformance with any of the above options; and
 - b. The owner agrees to operate the building at or below the annual energy use level predicted for that calculated energy performance during a period of 12 consecutive months, concluding no later than three years after issuance of the certificate of occupancy, adjusted as allowed by Sections C401.4.7 through C401.4.11, and to meet the requirements of Sections C401.4.12 through C401.4.14, substituting the energy consumption standard in option 4 of this Section C503.9.3 for the energy consumption targets set out in Section C401.4.2.
- 4.1. Reporting. The building owner shall report the energy consumption in kBtu/square foot using automated reporting directly from utilities via Energy Star Portfolio Manager, and shall authorize the *code official* to view the reports directly in Portfolio Manager during the demonstration period.

C503.9.4 Impracticality. In cases where full compliance with all the requirements of Section C503.9 is impractical, the applicant is permitted to arrange a pre-application conference with the design team and the *code official* to seek modifications. The applicant shall identify specific requirements that are impractical, and shall identify design solutions and modifications that achieve a comparable level of energy efficiency. The *code official* is authorized to waive specific requirements in this code to the extent that the *code official* determines those requirements to be impractical.

SECTION C504 REPAIRS

C504.1 General. Buildings and structures, and parts thereof, shall be repaired in compliance with Section C501.3 and this section. Work on nondamaged components that is necessary for the required *repair* of damaged components shall be considered part of the *repair* and shall not be subject to the requirements for *alterations* in this chapter. Routine maintenance required

by Section C501.3, ordinary repairs exempt from *permit*, and abatement of wear due to normal service conditions shall not be subject to the requirements for *repairs* in this section.

C504.2 Application. For the purposes of this code, the following shall be considered repairs.

1. Glass only replacements in an existing sash and frame.
2. *Roof repairs.*
3. Air barriers shall not be required for *roof repair* where the repairs to the building do not include *alterations*, renovations or *repairs* to the remainder of the building envelope.
4. Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided however that an existing vestibule that separates a conditioned space from the exterior shall not be removed.
5. *Repairs* where only the bulb and/or ballast within the existing luminaires in a space are replaced provided that the replacement does not increase the installed interior lighting power.

SECTION C505 CHANGE OF SPACE CONDITIONING, OCCUPANCY OR USE

C505.1 General. Buildings or spaces undergoing a change in space conditioning alteration shall comply with Sections C505.1.1, C505.1.2, C505.2 and C505.4. Buildings or spaces undergoing a change in occupancy (~~(alterations)~~) alteration shall comply with Sections C505.1.1, C505.1.2, 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 site energy use 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.

C505.2 Change in space conditioning. For the purposes of this section, space conditioning area categories include: 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, other than Sections C502, C503, and C504, 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.)~~)

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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.~~)

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.

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.)

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 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.

EXCEPTIONS:

1. A change in space conditioning does not require full compliance with this code if the existing heated but not cooled space is altered to become both heated and cooled solely by replacement of the existing heating-only HVAC system with an electric heat pump HVAC system, provided that there is no change in the use or occupancy classification of the area served by the HVAC system that would increase the cooling load, and the new system includes a DOAS with energy recovery in compliance with Section C403.3.5.
2. The addition of cooling equipment to an already-conditioned floor area of less than 2,000 square feet 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, other than Sections C502, C503, and C504, for all disciplines in the following cases:

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

A change in occupancy 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.

C505.4 Prescriptive compliance. Change in space conditioning and change in occupancy 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.
- 2.5. The alteration does not increase the existing fenestration area.

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.

C505.4.2 Building mechanical systems. All new and existing mechanical systems and equipment that serve the new building heating, cooling and ventilation needs of the alteration area shall comply with Sections C403, C408.2, ~~((C409.5))~~ C506.1 and C501.6.

C505.4.3 Service water-heating systems. All new and existing service water-heating systems and equipment that serve the new service water-heating needs of the alteration area shall comply with Sections C404, C408.3, ~~((C409.5))~~ C506.1 and C501.6.

C505.4.4 Pools and permanent spas. All new and existing systems and equipment serving pools and permanent spas that are included in the alteration shall comply with Sections C404.11, C408.3, ~~((C409.5))~~ C506.1 and C501.6.

C505.4.5 Electrical power and lighting systems and motors. All new and existing electrical power and lighting systems and motors that are included in the alteration shall comply with Sections C405, C408.4, ~~((C409.5))~~ C506.1 and C501.6.

C505.4.6 Refrigeration systems. All new and existing refrigerated spaces and refrigeration systems and equipment that serve the new refrigeration needs of the alteration area shall comply with Sections C410, C408.7, ~~((C409.5))~~ C506.1 and C501.6.

C505.5 Change of use. Where the use in a space changes from one use in Table C405.4.2 (1) or (2) to another use in Table C405.4.2 (1) or (2), the installed lighting wattage in the space shall comply with Section C405.4 and the ventilation air flow provided to the space shall be in accordance with Chapter 4 of the International Mechanical Code.

SECTION C506 METERING FOR EXISTING BUILDINGS

C506.1 Existing buildings that were constructed subject to the requirements of this section. Where new or replacement systems or equipment are installed in an existing building that was constructed subject to the requirements of this section, metering shall be provided for such new or replacement systems or equipment so that their energy use is included in the corresponding end-use category defined in Section C409.2. This includes systems or equipment added in conjunction with additions or alterations to existing buildings.

C506.1.1 Small existing buildings. Metering and data acquisition systems shall be provided for additions over 25,000 square feet to buildings that were constructed subject to the requirements of this section, in accordance with the requirements of Sections C409.2 and C409.3.

C506.2 Metering for the addition or replacement of HVAC equipment in existing buildings. Where HVAC equipment is added or replaced, metering shall be provided according to Sections C506.2.1 or C506.2.2, as applicable.

C506.2.1 Addition or replacement of individual HVAC equipment pieces. Where HVAC equipment is added or replaced, but compliance with Section C506.2.2 is not required, metering shall be provided as follows, and the data from these meters is permitted to either be stored locally using a manual totalizing meter or other means at the meter or fed into a central data collection system.

1. Electrical metering shall be provided for all of the following:
 - a. Each new or existing branch circuit serving a new piece of HVAC equipment with minimum circuit ampacity (MCA) that equates to 50 kVA or more. A single meter is permitted to serve multiple circuits of the same sub-metering category from Section C409.3.
 - b. Each new or existing branch circuit supplied by a new electrical panel that is dedicated to serving HVAC equipment. It shall be permitted to meter the circuits individually or in aggregate.

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- c. Each new HVAC fan or pump on a variable speed drive, where the fan, pump, or variable speed drive are new, unless the variable speed drive is integral to a packaged HVAC unit or the existing variable speed drive does not have the capability to provide electric metering output.
2. Natural gas metering shall be provided for each new natural gas connection that is rated at 1,000 kBTU or higher. A single meter is permitted to serve multiple equipment pieces of the same sub-metering category from Section C409.3; HVAC, water heating or process.

C506.2.2 Addition or replacement of the majority of HVAC equipment in a building. Where permits are issued for new or replacement HVAC equipment that has a total heating and cooling capacity greater than 1,200 kBTU/hour and greater than 50 percent of the building's existing HVAC heating and cooling capacity, within any 12-month period, the following shall be provided for the building:

1. Energy source metering required by Section C409.2.
2. HVAC system end-use metering required by Section C409.3.1
3. Data acquisition and display system per the requirements of Section C409.4.

Each of the building's existing HVAC chillers, boilers, cooling towers, air handlers, packaged units and heat pumps that has a capacity larger than 5 tons or that represents more than 10 percent of the total heating and cooling capacity of the building shall be included in the calculation of the existing heating and cooling capacity of the building. Where heat pumps are configured to deliver both heating and cooling, the heating and cooling capacities shall both be included in the calculation of the total capacity.

Each of the building's existing and new HVAC chillers, boilers, cooling towers, air handlers, packaged units and heat pumps that has a heating or cooling capacity larger than 5 tons or that represents more than 10 percent of the total heating and cooling capacity of the building shall be included in the HVAC system end-use metering.

Construction documents for new or replacement heating and cooling equipment projects shall indicate the total heating and cooling capacity of the building's existing HVAC equipment and the total heating and cooling capacity of the new or replacement equipment. Where permits have been issued for new or replacement heating and cooling equipment within the 12 month period prior to the permit application date, the heating and cooling capacity of that equipment shall also be indicated. For the purpose of this tabulation, heating and cooling capacities of all equipment shall be expressed in kBTU/hour.

C506.3 Tenant space electrical sub-metering for existing buildings. For tenant improvements in which a single tenant will occupy a full floor or multiple floors of a building, the electrical consumption for the tenant space on that floor shall be separately metered, and the metering data provided to the tenant with a display system per the requirements of Section C409.4.3. For the purposes of this section, separate end use categories need not be segregated.

EXCEPTION: Where an existing branch circuit electrical panel serves tenant spaces on multiple full floors of a building, the floors served by that panel are not required to comply with this section.

C506.4 Metering for complete electrical system replacement. If all, or substantially all, of the existing electrical system is replaced under a single electrical permit or within a 12-month period, all of the provisions of Section C409 shall be met.