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.

C501.2 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.

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 Compliance. *Alterations, repairs, additions* and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions for *alterations, repairs, additions* and changes of occupancy or relocation, respectively, in this code and 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~~)) Seattle Electrical Code.

C501.4.1 U-factor requirements for retrofits. For existing building projects where an *addition* or *building envelope retrofit* 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 Energy Code that was in effect at the time the building was permitted, or as approved by the *code official.*

C501.4.2 Calculation of mechanical heating and cooling loads for retrofits. 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 Energy Code that was in effect at the time the building was permitted, or as approved by the *code official.*

C501.5 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.

C501.6 ((~~Historic buildings~~)) Landmarks. The ((~~building official~~)) *code official* may modify the specific requirements of this code for ((~~historic buildings~~)) *landmarks* and require in lieu thereof alternate provisions ((~~which~~)) 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. ((~~This modification may be allowed for those buildings or structures that are listed in the state or national register of historic places; designated as a historic property under local or state designation law or survey; certified as a contributing resource with a national register listed or locally designated historic district; or with an opinion or certification that the property is eligible to be listed on the national or state registers of historic places either individually or as a contributing building to a historic district by the state historic preservation officer or the keeper of the national register of historic places.~~))

C501.7 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. *Additions* using the prescriptive path in Section C401.2, item 1, shall also comply with Sections C402, C403, C404, C405, C406, C409.5, C410 and C502.2.

C502.1.1 Additional efficiency package options. *Additions* shall comply with Section C406, either for the *addition* only or for the total of the existing building plus *addition.*

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

C502.2 Prescriptive compliance. *Additions* shall comply with Sections C502.2.1 through C502.2.6.2.

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 Skylight area. *Additions* with *skylights* that result in a total building skylight area less than or equal to that specified in Section C402.4.1 shall comply with Section ((~~C402.4~~)) C402. *Additions* with skylights that result in a total building skylight area greater than that specified in Section C402.4.1 shall comply with one of the following:

((~~1. Vertical fenestration alternate per Section C402.4.1.1 or C402.4.1.3 for the addition area of the building only~~

~~2~~)) 1. Component performance alternative with the target area adjustment per Section C402.1.5 for the *addition* area of the building only.

((~~3~~)) 2. Existing building and *addition* area combined to demonstrate compliance with the component performance alternative for the whole building.

((~~4~~)) 3. Total building performance in accordance with Section C407 for the *addition* area of the building only.

((~~5~~)) 4. Total building performance for the whole building.

C502.2.3 Building mechanical systems. New mechanical systems and equipment serving the building heating, cooling or ventilation needs, that are part of the *addition,* shall comply with Section C403.

C502.2.4 Service water heating systems. New service water-heating equipment, controls and service water heating piping shall comply with Section C404.

C502.2.5 Pools and permanent spas. New pools and permanent spas shall comply with Section C404.11.

C502.2.6 Lighting and power systems. New lighting systems that are installed as part of the addition shall comply with Section C405.

C502.2.6.1 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.

C502.2.6.2 Exterior lighting power. The total exterior lighting power for the addition shall comply with Section ((~~C405.5.1~~)) C405.5.2 for the *addition* alone, or the existing building and the addition shall comply as a single building.

C502.2.7 Refrigeration systems. New refrigerated spaces and refrigeration equipment shall comply with Section C410.

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 to the provisions of this code than the existing building or structure was prior to the *alteration.* Substantial alterations and *repairs* shall comply with Section C503.8.

Exceptions:

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

((1)) a. Storm windows installed over existing fenestration.

((2)) b. 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)) c. 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)) d. Construction where the existing roof, wall or floor cavity is not exposed.

((5)) e. *Roof recover.*

((6)) f. *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)) g. 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.

2. *Alterations* are not required to comply with Section C406 except where specifically noted in Sections C503.2, C503.8.3 and C505.1.

C503.2 Change in space conditioning. 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. 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.

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.

Exception: Buildings or spaces that were permitted prior to the 2009 WSEC, or were originally permitted as unconditioned, may comply with this section as follows:

1. Where the component performance alternative in Section C402.1.5 is used to demonstrate compliance with this section, the Proposed Total UA is allowed to be up to 110 percent of the Allowable Total UA. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.
2. Where total building performance in 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 be applied to the project area alone, or to the existing building and project area combined as a whole building.
3. The addition of cooling equipment serving rooms or spaces totaling less than 2,000 square feet in floor area does not trigger the requirement to comply with this section.

C503.3 Building envelope. New building envelope assemblies that are part of the *alteration* shall comply with Sections C402.1 through C402.5 as applicable. 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.

Exception: Air leakage testing is not required for *alterations* and repairs, unless the project includes a change in space conditioning according to Section C503.2 or a *change of occupancy* or use according to Section C505.1.

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 contains insulation entirely above the roof deck.

C503.3.2 Vertical fenestration. The addition of *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. Alterations that result in a total building vertical fenestration area greater than specified in Section C402.4.1 shall comply with one of the following:

1. Vertical fenestration alternate in accordance with Section C402.4.1.3 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. ((Vertical fenestration alternate in accordance with Section C402.4.1.1 for the area adjacent to the new vertical fenestration added.)) (Reserved)
3. Existing building and ((alternation)) *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. The Proposed Total UA is allowed to be up to 110 percent of the Allowed Total UA.

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.

Exception: ((~~Additional~~)) 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 vertical fenestration does not cause ((~~a reduction in overall building energy efficiency, as approved by the *code official*~~)) an increase in the overall energy use of the building.

C503.3.2.1 Application to 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 Skylight area. The addition of *skylights* that results in a total building skylight area less than or equal to that specified in Section C402.4.1 shall comply with Section C402.4.

The addition of *skylights* that results in a total building skylight area greater than that specified in Section C402.4.1 shall comply with one of the following:

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. The Proposed Total UA is allowed to be up to 110 percent of the Allowed Total UA.
2. 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.

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

C503.4 Mechanical systems. Those parts of systems which are altered or replaced shall comply with Section C403. Additions or alterations shall not be made to an existing mechanical system that will cause the existing mechanical system to become out of compliance.

Exceptions:

1. Existing mechanical systems which are altered or where parts of the system are replaced are not required to be modified to comply with Section C403.3.5 as long as mechanical cooling capacity is not added to a system that did not have cooling capacity prior to the alteration.
2. Alternate mechanical system designs that are not in full compliance with this code may be approved when the *code official* determines that existing building constraints including, but not limited to, available mechanical space, limitations of the existing structure, or proximity to adjacent air intakes or exhausts make full compliance impractical. Alternate designs shall include additional energy saving strategies not prescriptively required by this code for the scope of the project including, but not limited to, demand control ventilation, energy recovery, or increased mechanical cooling or heating equipment efficiency above that required by Tables C403.3.2(1) through ((~~C403.3.2(12)~~)) C403.3.2(13).
3. Only those components of existing HVAC systems that are altered or replaced shall be required to meet the requirements of Section C403.8.1, Allowable fan motor horsepower. Components replaced or altered shall not exceed the fan power limitation pressure drop adjustment values in Table C403.8.1(2) at design conditions. Section C403.8.1 does not require the removal and replacement of existing system ductwork.

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

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) through (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 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.

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(7), 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 ((~~1~~)) 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 when either the individual cooling unit capacity ((~~and~~)) or the building total capacity of all cooling equipment without economizer ((~~do~~)) does not comply with Sections C403.3.5 or C403.5.

TABLE C503.4
ECONOMIZER COMPLIANCE OPTIONS FOR MECHANICAL ALTERATIONS

Unit Type	Option A Any alteration with new or replacement equipment	Option B (alternate to A) Replacement unit of the same type with the same or smaller output capacity	Option C (alternate to A) Replacement unit of the same type with a larger output capacity	Option D (alternate to A) 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: CC403.5[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%[e] 2. Economizer: shall not decrease existing economizer capability For all other capacities: Efficiency: min.[a] Economizer: C403.5[b]	For units ≤ 60,000 Btuh replacing unit installed prior to 1991, comply with at least one of two measures: 1. Efficiency: + 10%[e] 2. Economizer: 50%[f] For all other capacities: Efficiency: min.[a] Economizer: C403.5[b]	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%[e] 2. Flow control valve[g] 3. Economizer: 50%[f] For all other capacities: Efficiency: min.[a] Economizer: C403.5[b]	For units ≤ 72,000 Btuh, comply with at least two of three measures: 1. Efficiency: + 10%[e] 2. Flow control valve[g] 3. Economizer: 50%[f] (except for certain pre-1991 systems[h]) For all other capacities: Efficiency: min.[a] Economizer: C403.5[b]	Efficiency: min.[a] Economizer: C403.5[b] (except for certain pre-1991 systems[q])
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: C403.5b	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[j]	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[h] and certain 1991-2016 systems[i].)	Efficiency: min.[a] Economizer: C403.5[b] (except for certain pre-1991 systems[h] 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]
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] 2. Multistage 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] 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]

a. Minimum equipment efficiency shall comply with Section C403.3.2 and Tables C403.3.2(1) through ((~~C403.3.2(12)~~)) C403.3.2(13).
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 percent better than the requirements in Tables C403.3.2(1) and C403.3.2(2) (1.05 × values in Tables C403.3.2(1) and C403.3.2(2)).
e. Equipment shall have a capacity-weighted average cooling system efficiency that is 10 percent better than the requirements in Tables C403.3.2(1)A and C403.3.2(2) (1.10 × values in Tables C403.3.2(1)A and C403.3.2(2)).
f. Minimum of 50 percent 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 percent 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 percent better than the requirements in footnote e for water-source heat pumps (i.e. a minimum of 15 percent better than the requirements in Table C403.3.2(2) (1.15 × values in Table C403.3.2(2)).
h. Water economizer equipment shall have a capacity-weighted average cooling system efficiency that is 10 percent better than the requirements in Tables C403.3.2(8) and C403.3.2(9) (1.10 × values in Tables C403.3.2(8) and C403.3.2(9)).
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 water-side 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 percent greater than the IPLV requirements in EER in Table C403.3.2(7)(1.10 × IPLV values in EER in Table C403.3.2(7)).
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 percent greater than the IPLV requirements in Table C403.3.2(7) (1.05 × IPLV values in Table C403.3.2(7)).~~))
n. The water-cooled chiller shall have an IPLV value that is a minimum of 15 percent lower than the IPLV requirements in Table C403.3.2(7), (((~~1.15~~)) 0.85 × IPLV values in Table C403.3.2(7)). Water-cooled centrifugal chillers designed for non-standard conditions shall have an NPLV value that is at least 15 percent lower than the adjusted maximum NPLV rating in kW per ton defined in Section C403.3.2.1 (((~~1.15~~)) 0.85 × NPLV).
o. Economizer cooling shall be provided by adding a plate-frame heat exchanger on the water-side 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 Cooling 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 New and replacement HVAC heating system equipment. For substantial alterations as defined in Section C503.8.1, or where a building's central HVAC heating system equipment is augmented or replaced, the building shall comply with Section C403.1.4.

Exception: Where only one heating appliance is failing and is replaced by another having the same or lesser heating capacity and the same or higher efficiency, no other alterations are made to the central HVAC system, and this exception has not been used within the same building in the previous 24-month period, this provision does not apply.

SDCI Informative Note: The term "central HVAC heating system" for the purposes of this section means a heating system that provides heating to multiple spaces or multiple dwelling or sleeping units (as opposed to a distributed heating system such as a baseboard heater or PTHP that provides heating to only a single space). A central heating system may include multiple pieces of heating equipment.

The exception permits like-for-like replacement of a single boiler, furnace or heat pump, where no other HVAC work is planned, so that a failed heating appliance can be expediently replaced.

C503.5 Service hot water systems. New service hot water systems that are part of the *alteration* shall comply with Section C404.

Exception: Where only one service hot water appliance is failing and is replaced by another having the same or lesser heating capacity and the same or higher efficiency, no other alterations are made to the central service hot water system, and this exception has not been used within the same building in the previous 24-month period, this provision does not apply.

C503.6 Lighting, ((~~controlled~~)) receptacles and motors. *Alterations* or the addition of lighting, ((~~controlled~~)) receptacles and motors shall comply with Sections C503.6.1 through C503.6.6.

C503.6.1 Luminaire additions and alterations. *Alterations* that add, alter or replace ((~~50~~)) 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 ((~~50~~)) 20 percent or more of parking garage luminaires, or replace ((~~50~~)) 20 percent or more of the total installed wattage of exterior luminaires shall comply with Sections C405.4 and C405.5. Where less than ((~~50~~)) 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 ((~~50~~)) 20 percent of the installed exterior wattage is replaced, the installed lighting wattage shall be maintained or reduced.

C503.6.2 Rewiring and recircuiting. Where new wiring is being installed to serve added fixtures and/or fixtures are being relocated to a new circuit, controls shall comply with Sections C405.2.1, C405.2.3, C405.2.4, C405.2.5, and C405.2.6, and as applicable ((~~C408.3~~)) C408.4. New lighting control devices shall comply with the requirements of Section C405.2.

C503.6.3 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, controls shall also comply with, in addition to the requirements of Section C503.6.2, all ((~~remaining~~)) requirements in Sections C405.2 and C408.3.

C503.6.4 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 controls that comply with Sections C405.2.1, C 405.2.2, C405.2.3, C405.2.4, C405.2.5 and C408.3.

C503.6.5 Motors. Those motors which are altered or replaced shall comply with Section C405.8. In no case shall the energy efficiency of the building be decreased.

C503.6.6 Controlled receptacles. Where electric receptacles are added or replaced, controlled receptacles shall be provided in accordance with Section C405.10.

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 cubicle 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 1 to Section C405.10, they are not required to be *controlled receptacles* or be located within 12 inches of non-*controlled receptacles*.

C503.7 Refrigeration systems. Those parts of systems which are altered or replaced shall comply with Section C410. Additions or alterations shall not be made to an existing refrigerated space or system that will cause the existing mechanical system to become out of compliance. All new refrigerated spaces or systems in existing buildings, including refrigerated display cases, shall comply with Section C410.

C503.8 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.

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 C503.8.3 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.

C503.8.1 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: Definitions 1, 2 and 4 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.
4. Re-occupancy of a building that has been substantially vacant for more than 24 months in occupancies other than Group R-3.

C503.8.2 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.

C503.8.3 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).
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 C401.3.7 through C401.3.11, and to meet the requirements of Sections C401.3.12 through C401.3.14, substituting the energy consumption standard in option 4 of this Section C503.8.3 for the energy consumption targets set out in Section C401.3.2.
   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.

C503.8.4 Impracticality. In cases where full compliance with all the requirements of Section C503.8 is impractical, the applicant is permitted to arrange a pre-design 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.~~))

SDCI Informative Note: Exceptions 3 and 4 appear in the exceptions to Section C503.1.

((~~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.~~))

SDCI Informative Note: For exception 5, see Section C503.6.1.

SECTION C505
CHANGE OF OCCUPANCY OR USE

C505.1 General. Spaces undergoing a change in occupancy shall be brought up to full compliance with this code in the following cases:

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

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Exception: Buildings or spaces that were permitted prior to the 2009 WSEC, or were originally permitted as unconditioned, may comply with this section as follows:

1. Where the component performance alternative in Section C402.1.5 is used to demonstrate compliance with this section, the Proposed Total UA is allowed to be up to 110 percent of the Allowable Total UA. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.

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2. Where total building performance in 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 110 percent of the annual carbon emissions from energy consumption allowed by Section C407.3. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.
3. 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*.

Compliance shall include the provisions of Section C406, applied only to the portion of the building undergoing a *change of occupancy* or 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 shall comply with Section C405.4.

SECTION C506
METERING FOR EXISTING BUILDINGS

SDCI Informative Note: Section C506.1 was relocated from Section C409.5.

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 C409.3. This includes systems or equipment added in conjunction with *additions* or *alterations* to existing buildings.

C506.1.1 Small existing buildings. In buildings that were constructed subject to Section C409, metering and *data acquisition systems* shall be provided for *additions* over 10,000 square feet in accordance with the requirements of Sections C409.2, C409.3 and C409.4.

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.
    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.