

# ▶ Navigating the 2021 WSEC-C for Existing Building Upgrades



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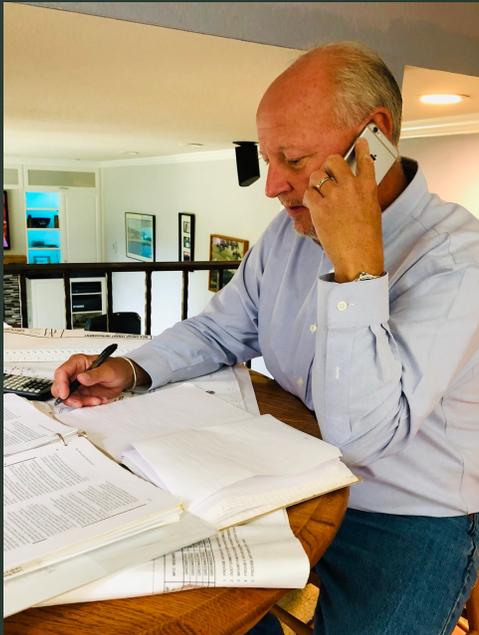
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# WSEC Commercial Technical Support

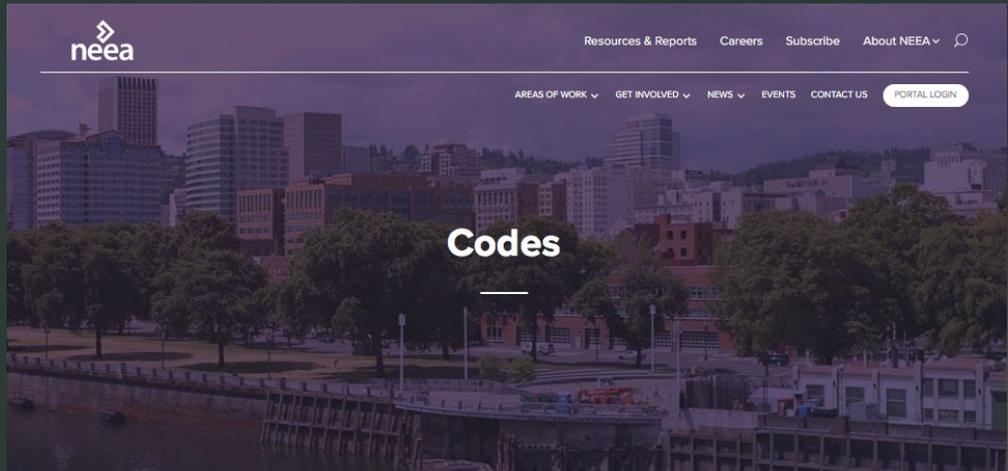
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- Classroom and webinar training
- We administer the technical support and compliance documentation webtool



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## Increasing progressive effectiveness of energy codes

The NEEA Codes and Standards program supports regional stakeholders in the development and adoption, training and implementation of energy codes. States engage in the code development process along different cycles and code versions, but all states now use the International Energy Conservation Code (IECC) as a baseline for their commercial energy codes. All states except Oregon now use the IECC as the basis of their residential code. The adoption of codes is the responsibility of state code boards or agencies. Official state-by-state energy code information can be found on state building code websites:

Idaho - <http://dbs.idaho.gov/boards/index.html>

Oregon - <http://www.cbs.state.or.us/external/bcd/>

Washington - <https://sbcc.wa.gov/>

Montana - <http://svc.mt.gov/gov/boards/>



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WSEC technical support services are made possible thanks to the generous support of the Northwest Energy Efficiency Alliance

[www.neea.org](http://www.neea.org)

# Today's Presentation

- This presentation represents ETC's *unofficial* interpretation of WA State Energy Code intent.
- Our technical support team is not an affiliate, nor do we speak for the Washington State Building Code Council (SBCC).
- The WSEC commercial technical support we provide is advisory only and non-binding.



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# Topics we'll discuss today ~

1. Existing building upgrade types
2. Addition compliance as a stand-alone project
3. Whole building compliance – Addition + Existing-to-remain
4. Alterations – Existing building system upgrades and new systems
5. Space use changes and space reconfiguration
6. Changes of space conditioning that trigger Section C505.2
7. Changes of occupancy that trigger Section C505.3
8. Compliance path options for change of space conditioning/occupancy
9. Combination projects - Addition + Change of occupancy/space conditioning

# Existing Building Upgrade Types



# New construction

## Initial tenant improvements

- Also referred to as the “tenant space first build out” of a shell and core space. This project type **does not** fall under Chapter 5. Shall fully comply as new construction.

## Section C502 – Building additions

- Additional square foot area added to an existing building. Shall comply as new construction, with specific requirements and allowances.



# Existing building upgrade types

## Section C503 – Alterations

- Changes/upgrades to the existing thermal envelope
- Changes/upgrades to existing building systems and new systems added to serve existing spaces
- Space reconfiguration



## Section C505 – Building use changes

- Change of space conditioning category
- Change of occupancy classification
- Change of space use type



# Building Additions



# Building additions

## Prescriptive compliance

- The building envelope of the addition, and all new building systems installed as a part of the addition, shall demonstrate compliance as new construction.
- Unaltered existing building envelope assemblies, and unaltered existing building systems that serve the addition, ***are not required*** to be brought up to compliance with the current energy code.



# Building additions

## Additional energy efficiency

- An addition shall demonstrate compliance with the required number of additional energy efficiency measure credits per Table C406.1.
- Number of credits required for additions is about 50% of what is required for a new building.
- Load management measures **are not** required for building additions.

Required Credits for Projects	Section	Occupancy Group					
		Group R-1	Group R-2	Group B	Group E	Group M	All Other
New building energy efficiency credit requirement	C406.2	54	41	42	48	74	49
Building additions energy efficiency credit requirement	C406.2	27	20	21	23	36	21
New building load management credit requirement	C406.3	12	15	27	15	13	26

# Building additions

## Renewable energy

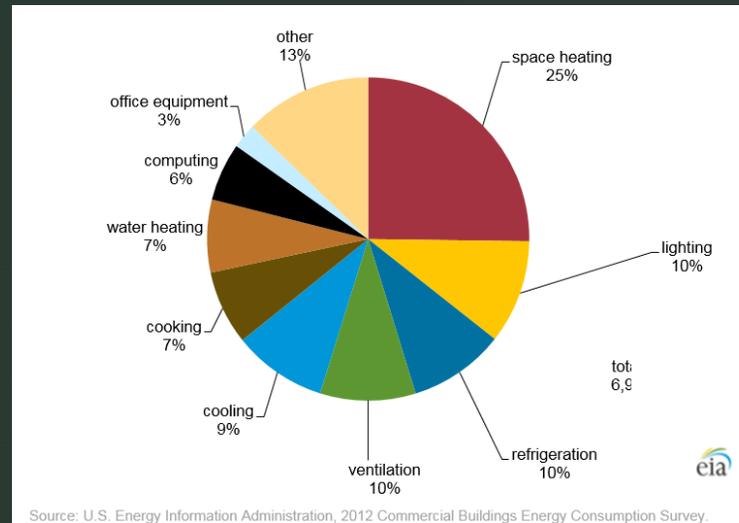
- Additions *larger than 10,000 SF* shall comply with the on-site renewable energy capacity requirements per Section C411.
- Required capacity is based on the SF area of the addition.
- Includes solar readiness provisions.



# Building additions

## Energy metering

- Additions that are *larger than 25,000 SF* shall comply with the energy metering and data acquisition requirements per Section C409.
- Only applicable to existing buildings that were permitted under the 2009 WSEC-C or later energy code edition.



# Compliance paths

## **Compliance options for building addition area stand-alone**

- Demonstrate prescriptive compliance for each discipline for the addition area only (independent of rest of building).
- Component performance calculations shall include the addition envelope assemblies only.
- May comply under the C407 Total building performance compliance path, applied to the addition area only.

## **Whole building – Building addition + existing-to-remain**

- For specific disciplines, the addition area may be combined with all existing-to-remain building systems to demonstrate prescriptive compliance as a single building.
- May comply under the C407 Total building performance compliance path for the addition combined with all existing-to-remain building areas.

# Whole building prescriptive compliance

## Thermal envelope whole building component performance

- UA and SHGC\*A calculations shall include the addition thermal envelope assemblies and all existing-to-remain envelope assemblies.
- Include only existing-to-remain areas that are of the **same space conditioning category** as the addition.
- The U-factors for existing-to-remain envelope assemblies used in the calculations shall be per record documents or existing conditions.
- If accurate record documents are not available, it's OK to use U-factors from the edition of the WSEC that was in effect when the building was permitted (for buildings constructed after 1994).



# Whole building prescriptive compliance

## Lighting power allowance whole building compliance

- For interior LPA, include the combined total SF area for all space types in the addition and all existing building areas.
- For exterior LPA, include the combined total SF area for all exterior surfaces of the addition and all existing building surface areas.
- Proposed lighting power density shall include the proposed total lighting wattage for the addition and the total wattage of all existing-to-remain lighting fixtures in all existing building areas.

**NOTE** - *It's OK to mix & match prescriptive compliance methods between disciplines. The addition thermal envelope can comply via component performance for the addition stand-alone area, and interior lighting can comply via whole building, etc.*

# Whole building prescriptive compliance

## **Additional energy efficiency**

- Additional energy efficiency measures that the existing building complies with may be combined with measures that the addition complies with to achieve the required number of credits for the addition.

## **Renewable energy**

- On-site renewable energy capacity of the existing building may be combined with capacity included in the addition to satisfy this requirement for the addition.

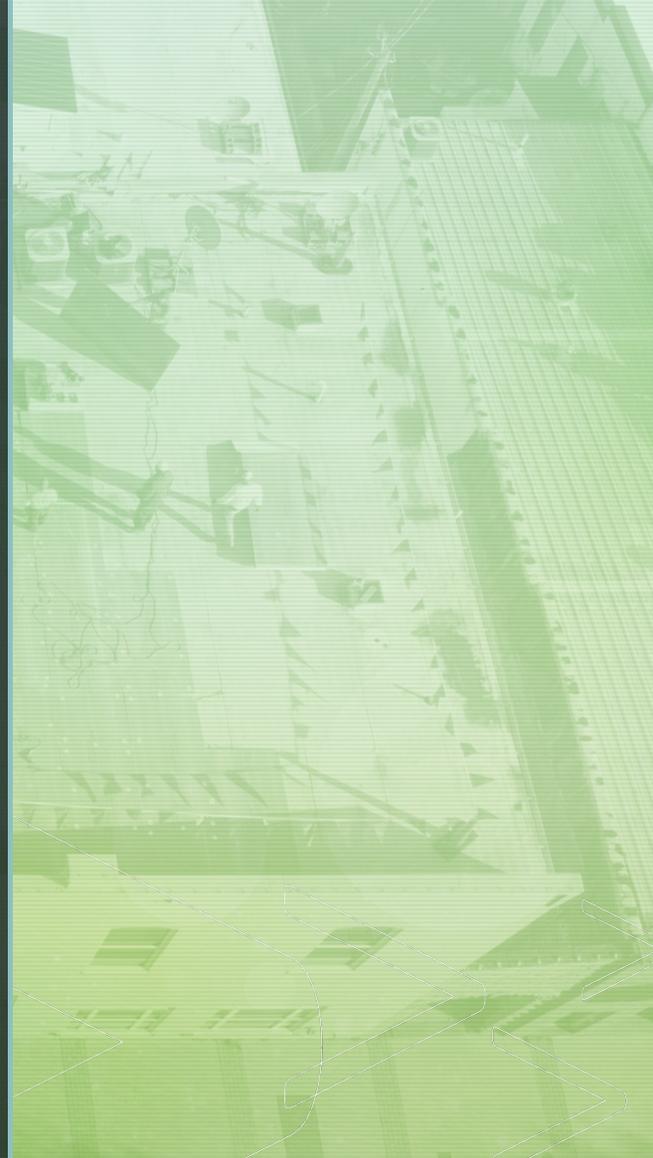
# Total building performance

## Stand-alone building addition area

- Perform an energy model for just the addition area to demonstrate performance-based compliance.
- Energy model shall include all building systems that serve the addition area.
- For central systems that serve both the new addition and existing areas of the building, only the capacities required to serve the loads in the addition are included in the energy model.
- Addition shall comply with all C407 total building performance mandatory requirements.

Section C502.1  
Section C502.2.6.1  
Section C502.2.6.2

# Alteration Examples



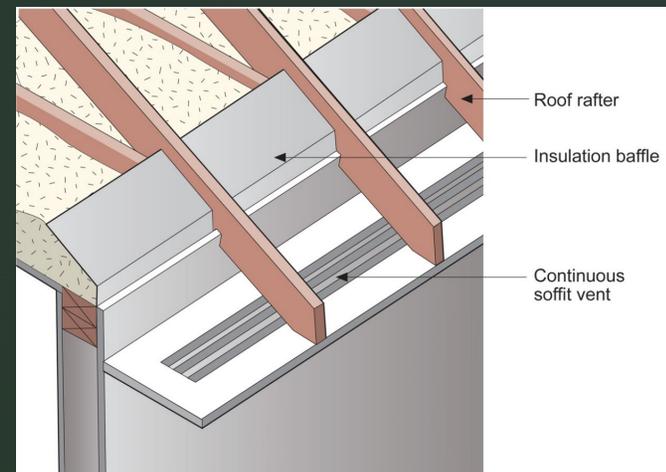
# Roof alterations

## Basis of WSEC Requirements

- Depends upon the scale of the alteration – *roof repair, roof recover, roof replacement* or new roof.
- Depends upon the location of the existing insulation – *entirely above deck, entirely below the roof deck* or a combination of above & below deck.

## In all scenarios ~

- Ensure required roof venting is provided per the IBC.
- Energy performance of the building after the alteration shall be no less than the existing building prior to the alteration.



Source: Building Science Corporation

# WSEC & IBC Definitions

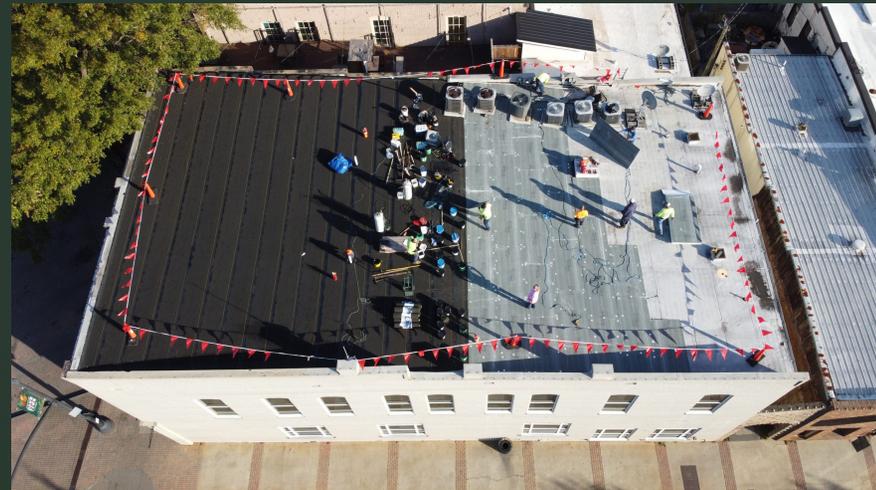
- **ROOF ASSEMBLY (WSEC).** A system designed to provide weather protection and resistance to design loads. The system consists of a *roof covering* and *roof deck* or a single component serving as both the roof covering and the roof deck. A roof assembly includes the roof covering, *underlayment*, roof deck, insulation, *vapor retarder* and interior finish.
- **ROOF COVERING (IBC).** The covering applied to the roof deck for weather resistance, fire classification or appearance.
- **ROOF REPAIR (IBC).** Reconstruction or renewal of any part of an existing roof for the purposes of correcting damage or restoring pre-damage conditions.
- **REROOFING (WSEC).** The process of recovering or replacing an existing roof covering. See “*Roof Recover*” and “*Roof Replacement*”.

# Reroofing – Roof recover

**ROOF RECOVER (IBC).** The process of installing an additional *roof covering* over a prepared existing roof covering without removing the existing roof covering.

## 2021 WSEC-C Requirements

- Existing roof/ceiling insulation may remain as is, regardless of insulation location.
- Not required to be upgraded to comply with the thermal insulation and air barrier requirements of the current energy code.



Section C503.1  
Section C504

# Reroofing – Roof replacement

**ROOF REPLACEMENT (IBC).** The process of removing the *existing roof covering*, repairing any damaged substrate and installing a new roof covering.

WSEC roof/ceiling *insulation & air barrier* provisions apply depending on the location of the existing roof/ceiling insulation:

- Applies when existing insulation is located ***entirely above the roof deck***, or when roof assembly contains ***no insulation*** and space is not unconditioned.
- Does not apply when all existing insulation is located ***below the roof deck*** in between the roof joists or metal building girts, or within the attic/rafters.
- Upgrade of above deck insulation may be necessary where existing insulation is located above & below the roof deck.
- Roof air barrier requirements do not apply if project does not include alterations, renovations or repairs to the remainder of the building envelope.

# Roof structure cavities exposed during construction

**Scenario #1** – Project is strictly a repair where damaged ceiling sections are replaced.

Roof/ceiling insulation requirements do not apply.



**Scenario #2** – Tenant improvement where a portion of the roof structure cavities are exposed.

Fill exposed roof structure cavities to full depth with un-compressed insulation with rating of R-3 per inch or better.



# Roof structure cavities exposed during construction

**Scenario #3** – Tenant improvement where the entire roof structure is exposed.

Upgrade roof/ceiling to comply with insulation requirements of the current energy code.



**Scenario #4** – Project is a change of space conditioning or change of occupancy.

Roof/ceiling shall be brought up to full compliance with the current energy code - includes insulation and air barrier provisions.



# Interior lighting system alterations

## Alterations that trigger lighting power & controls requirements

- Installation of new interior and/or exterior lighting fixtures
- Reconfiguration of interior spaces
- Building addition or initial tenant improvement (first build out)
- Change of use - Space is changed from one space use type to another based on the lighting power allowance tables in Section C405, either per Building Area or Space-by-Space method.
- Change of occupancy or change of space conditioning



Section C503.7.1  
Section C503.7.2

# Lighting power – Alteration adds/replaces existing lighting fixtures

**Scenario #1** – Where **< 20%** of the existing fixtures in the space are added/replaced and the ***space use type is not changed***.

Total lighting power in the space prior to the alteration shall be maintained or reduced (cannot be increased).

**Scenario #2** – Where **< 20%** of the existing fixtures in the space are added/replaced and ***project includes a change in space use type or occupancy***.

Total proposed lighting power in the space (new + existing-to-remain fixtures) shall comply with the lighting power allowance of the current energy code.

# Lighting power – Alteration adds/replaces existing lighting fixtures

**Scenario #3** – Alteration adds/replaces  $\geq 20\%$  of the existing fixtures in the space and the space use type *is not* changed.

**Scenario #4** – Alteration adds/replaces  $\geq 20\%$  of the existing fixtures in the space and project includes a change in space use type or occupancy.

In both Scenarios #3 and #4, proposed lighting power in the space (new + existing-to-remain fixtures) shall comply with the lighting power allowance of the current energy code.

**NOTE** – For all scenarios, the lighting power allowance test applies to each **space type** and **building area type** separately.

# Lighting controls – Alteration involves rewiring and/or recircuiting

**Scenario #1** – Where *new wiring* is installed to serve added or relocated fixtures.

- Occupant sensing (C405.2.1)
- Manual controls (C405.2.3)
- Light-reduction controls (C405.2.4)
- Daylight responsive controls (C405.2.5)

**Scenario #2** – New a *new lighting panel* is installed with new raceway and conductors from the panel to the fixtures.

- Same requirements as Scenario #1, **AND**
- Specific application additional lighting controls (C405.2.6)
- Advanced lighting controls (C405.2.8)
- Commissioning (C408.4)

Section C503.7.3  
Section C503.7.4

# Lighting for a space reconfiguration

**Scenario #3** – Where new walls or ceiling-height partitions are added to an existing space to create a new enclosed space, but the lighting fixtures are not changed other than being relocated.

- Lighting power allowance requirements **do not** apply unless there is a change in space use, occupancy classification or space conditioning.
- Lighting controls provisions **do apply** based on:
  - Space type (occupancy sensing)
  - Fixture locations relative to the exterior envelope (daylight sensing)
  - Specific application additional lighting controls, if applicable
  - Manual and light-reduction controls, where occupancy sensing and/or daylight sensing are not provided

# LUMINAIRE LEVEL LIGHTING CONTROLS

## Simple Installation

Sensors and control programming are integrated into fixtures for straightforward setup out of the box.

## Occupant Comfort

With the ability to adjust each individual fixture, LLLCs boost occupant comfort and productivity.

## Flexible Control

Adaptable for changes in space usage, LLLCs reduce cost of change-over to new occupants.

## Savings

Energy savings of 25 to 75%, and decreased installation and maintenance costs.

## Better Lighting

Overall light quality is improved with LED and sensor light fixtures.

## Building Improvement

LLLCs can enable emergency lighting, demand response, asset tracking and integrate with other building systems.

## SMARTER CONTROLS, BIG BENEFITS

Combining LEDs with integrated controls and sensors, Luminaire Level Lighting Controls (LLLC) offer a single solution that will improve buildings, deliver maximum energy savings and enable long-term flexibility.



## Lighting upgrade controls strategy

- Eliminates the need for separate control devices
- Provides flexible lighting control
- Provides better lighting quality and occupant comfort
- Lowers maintenance costs
- Supports integration with other existing building lighting systems
- Delivers energy savings

**betterbricks/**

<https://betterbricks.com/resources/luminaire-level-lighting-controls>

Section C405.2.8.1

# Mechanical systems serving a new, or reconfigured existing, thermal zone

## **New mechanical systems in existing buildings**

- Applies to new mechanical systems that are independent of existing-to-remain systems.
- New systems shall comply as new construction.
- This alteration category includes new mechanical cooling equipment added to a space that was not previously cooled.
- New mechanical systems include cooling and/or heating equipment, distribution system components, and zone-level controls.
- Also includes new stand-alone equipment that do not require distribution system components (unit heaters, evaporative coolers).
- ***Refer to State Building Code Council Opinion 24-30.***

# Cooling added to a formerly heated-only zone

New cooling system shall comply with either **Section C403.3.5 DOAS** or **Section C403.5 Economizer**.

## Economizer option

- Provide an economizer, or project complies with an economizer exception per Section C403.5.
- Cannot be applied in lieu of DOAS in occupancy classifications that require DOAS.

## DOAS option

- Provide a DOAS, for all occupancy classifications that require DOAS.
- Also applies to projects that are eligible to provide a DOAS in lieu of economizer, per Section C403.5 Economizer Exceptions 1a or 1b.



# New mechanical space heating systems

## Prescriptive compliance

- Space heating shall be provided by *heat pumps* per Section C403.1.4 (not electric resistance or fossil fuel combustion appliances).
- Several exceptions available for various elements of the new heating system - heating system type alternatives, auxiliary/supplemental heating allowances, general exemptions.

## Fossil fuel alternate

- Achieve the required number of additional energy credits per Table C401.3.3 under the *new building category*.



Images courtesy of Trane

# Replacement and “added” mechanical space heating systems

## Mechanical alterations

- Applies to alterations to, or replacement of, existing mechanical heating systems.
- Also applies to new space heating equipment incorporated into an existing system for the purpose of increasing total heating capacity to serve an existing thermal zone.
- Shall comply as a mechanical alteration per Section C503.4.6.
- **Refer to State Building Code Council Opinion 24-30.**



*Image courtesy of Trane*



*Image courtesy of Mitsubishi*



**Section C503.4.6**

# Replacement and “added” mechanical space heating systems

## Four compliance options depending on the scope of the alteration

1. Comply prescriptively as required for new construction (i.e. heat pumps) per Section C403.1.4, including exceptions available for various elements of the new heating system.
2. Comply under the fossil fuel alternate and achieve the required number of additional energy credits per Table C401.3.3 under the *building additions category*.\*
3. Comply with an alternate compliance option based on the specific space heating equipment type per Table C503.4.6.
4. Qualify for an exception to Section C503.4.6.

\* Alterations *are not* required to comply with **C406** additional energy efficiency credits per Section C503.1.

# Example - Boiler replacement

Table C503.4.6 Mechanical heating equipment alterations

Proposed Heating Equipment Type <sup>a</sup>	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 <sup>c</sup> 2. Compliance with C403.1.4, except electric resistance mixed air preheat is permissible <sup>c</sup>
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)	1. Efficiency: + 5% <sup>b</sup>
4 Gas-fired hot water boilers with fewer than 80% of served coils replaced	Table C403.3.2(6)	1. Efficiency: + 5% <sup>b</sup>
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

Fossil fuel alternate – Table C401.3.3 Additional credits required

Measure Title	Applicable Section	Occupancy Group					
		Group R-1	Group R-2	Group B	Group E	Group M	All Other
New building - Additional efficiency credits required for space heating systems using the fossil fuel pathway	C401.3.3.1	7	24	101	38	111	56
New building - Additional efficiency credits required for service water heating systems using the fossil fuel pathway	C401.3.3.2	198	212	27	17	79	107
Building additions - Additional efficiency credits required for space heating systems using the fossil fuel pathway	C401.3.3.1	4	12	51	19	56	28
Building additions - Additional efficiency credits required for service water heating systems using the fossil fuel pathway	C402.3.3.2	99	106	14	9	40	54

- New mechanical systems comply under the ***new building*** category.
- Replacement mechanical systems comply under the ***building additions*** category.

# Alterations to, and replacement of, mechanical cooling systems

Alteration shall not decrease the existing building total economizer capacity unless the altered or replacement system complies with one of the following:

## **Economizer compliance options**

- Provide an economizer, or project complies with an economizer exception per Section C403.5.
- Comply with an ***economizer alternate compliance option*** based on the cooling equipment type per Table C503.4.3.

## **DOAS option**

- Same rules for DOAS as in the case of adding cooling to a space that was not previously cooled.

# Load calculations

## General requirement for all mechanical alterations

- ***Updated heating, cooling & ventilation design loads*** for the existing building areas served by the new, altered or replacement mechanical systems ***are required***.
- Ventilation loads shall be determined based on the new space type, occupancy classification, or space reconfiguration.
- R-values & U-factors used in load calculations to determine existing thermal envelope performance shall be per record documents or existing conditions.
- If accurate record documents are not available, it's OK to use R-values & U-factors from the edition of the WSEC that was in effect when the building was permitted (for buildings constructed after 1994).



# Change of Space Conditioning, Occupancy or Use



# Change of occupancy vs. Change of use

## Change of Use Type scope as defined in Section C505.5

- The space is changed from one space use type to another within the same general use category and 2021 IBC occupancy classification.
- **Space use types** are based on the lighting power allowance tables in Section C405.
- Includes **building area types** defined in Table C405.4.2(1) and **space types** defined in lighting Table C405.4.2(2).

# Change of (space) use

## *What is required for a change of use project?*

- Proposed lighting power density (LPD) shall be  $\leq$  the lighting power allowance (LPA) for the *new space use type*.
- Ventilation minimum airflow (CFM) provided to the space shall comply with the required airflow for the *new space use type* as defined in Chapter 4 of the IMC.

2021 WSEC-C - TABLE C405.4.2(2) INTERIOR LIGHTING POWER ALLOWANCE		
Space Type		LPA Watts/SF
Sales area	<b>New Use</b>	1.05
Warehouse	<b>Existing Use</b>	0.33

2021 IMC - TABLE 403.3.1 MINIMUM VENTILATION RATES		
Occupancy Classification		Breathing Zone CFM/SF
Sales area	<b>New Use</b>	0.12
Warehouse	<b>Existing Use</b>	0.06

# Change of occupancy classification

## Scope as defined in Section C505.3 of the 2021 WSEC-C

- Based on the occupancy classifications in 2021 IBC Chapter 3, the space is converted from Group F, S or U occupancy to an occupancy other than Group F, S or U.
- The space is **converted to** a Group R dwelling unit from a commercial occupancy classification or space use.
- The space is **converted from** a Group R dwelling unit to a commercial occupancy classification, provided the dwelling unit was originally permitted prior to July 1, 2002.
- Section C505.3 **does not apply** to any other change of occupancy condition.

# Change of occupancy

## *What is required for a change of occupancy project?*

- A space under-going a change of occupancy “...shall be brought up to full compliance with this code for all disciplines...”



*“School conversions breathe life into affordable housing” – Multifamily Executive*

## What does “*full compliance with this code*” include?

- The space is upgraded to comply with all applicable mandatory and prescriptive requirements for all disciplines governed under the energy code.
- Building envelope requirements include thermal envelope performance, maximum WWR and SRR, and air barrier testing.
- All applicable building systems & controls requirements for all disciplines.
- Achieve the number of additional energy efficiency measure credits that would be required for a ***building addition***.
- On-site renewable energy capacity (or equivalent off-site renewable energy capacity) that would be required for a ***building addition***.

# Change of space conditioning

## Space conditioning categories

- Installed heating & cooling capacities define the level of space conditioning.
- **Low energy** – Heating and/or cooling capacity is  $\leq 3.4$  Btu/h (1 watt) per SF
- **Semi-heated** – Heating capacity is  $3.4 \leq 8$  Btu/h (2.35 watts) per SF and **NO** mechanical cooling capacity is provided.
- **Conditioned** – Heating or cooling capacity exceeds what's allowed for low energy or semi-heated.
- Note that "conditioned" **is not** based on the capacity required to satisfy design heating or cooling conditions.

# Change of space conditioning

## Scope as defined in Section C505.2 of the 2021 WSEC-C

- Any low energy space that is altered to become conditioned or semi-heated space.
- Any semi-heated space that is altered to ***no longer qualify*** as a semi-heated space.
- Adding cooling capacity to a semi-heated space changes the space conditioning category to conditioned space.
- Cooling capacity added to a heated-only conditioned space ***is not*** considered a change of space conditioning that would trigger the requirements of C505.2.\*

\* In the 2021 Seattle Energy Code, cooling added to a heated-only space ***is deemed*** a change of space conditioning.

# Change of space conditioning

## ***What is required for a change of space conditioning project?***

- A space under-going a change of space conditioning “...*shall be brought up to full compliance with this code for all disciplines...*”
- Same general requirements for “*full compliance*” as a change of occupancy.
- For an existing building upgrade that involves more than one space conditioning category, envelope compliance for the assemblies enclosing each space conditioning category area shall be calculated separately.
- Interior partition assemblies shall be applied to the area with the highest level of space conditioning.

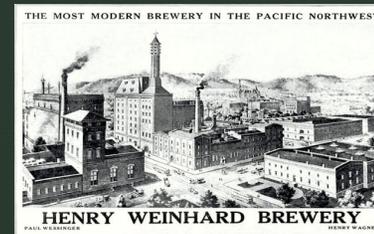
# Compliance paths – Similar to *Additions*

## Compliance options for change of occupancy or space conditioning area as a stand-alone project

- Demonstrate prescriptive compliance for each discipline for the change of occupancy or space conditioning area only.
- Component performance calculations shall include the envelope assemblies in the change of occupancy or space conditioning area only.
- Comply under the C407 Total building performance compliance path, applied to the change of occupancy or space conditioning area only.



*Brewery Blocks – Portland, OR*



Section C505.1  
Section C505.4

# Compliance paths – Similar to *Additions*

## **Whole building – Changed area + existing-to-remain**

- For specific disciplines, the change of occupancy or space conditioning area may be combined with all existing-to-remain building systems to demonstrate prescriptive compliance as a single building.
- Combined areas must be the same space conditioning category.
- May comply under the C407 Total building performance compliance path for the change of occupancy or space conditioning area combined with all existing-to-remain building areas.

# Compliance paths – Additional criteria

For buildings or spaces permitted prior to the 2009 WSEC-C and/or permitted as unconditioned ~

- Building thermal envelope – Proposed Total UA may be up to 110% of Allowed Total UA.
- Total building performance – Total annual site energy use of the proposed design may be up to 110% of the annual site energy use allowed by Section C407.3.
- Applies to change of occupancy or space conditioning projects complying as stand-alone or whole building.

# “Combination” Projects

## Compliance strategy

- A building addition project may be combined with a change of occupancy or space conditioning project to demonstrate overall building compliance.
- Combined areas must be the same space conditioning category.
- The additional 110% allowance for component performance, or total building performance, **can only be applied** to the change of occupancy or space conditioning area(s).
- **Strategy** for a Building Addition + Change of Occupancy project – An envelope deficiency in the change of occupancy area could be offset by a better-than-code envelope in the building addition by combining the component performance calculation results for the two areas (must be calculated separately first).

# Existing Building Upgrade Examples



# Change of occupancy & space conditioning

## Warehouse converted to Indoor Pickleball Courts

- Group S converted to Group A change of occupancy classification **and** change of space conditioning.
- Existing warehouse is a semi-heated pre-fabricated metal building.
- For pickleball court use, increasing heating capacity with additional unit heaters and adding evaporative cooling capacity.
- Requires full compliance with the current energy code.



*Image courtesy of Sunward Steel Buildings*

# Change of occupancy from dwelling unit to commercial use

## Historic house converted into a Restaurant

- Group R dwelling unit was permitted prior to July 1, 2002.
- Requires full compliance with the current energy code for all applicable disciplines, including commercial kitchen systems.
- Existing uninsulated-to-remain slab edge may require component performance (UA) calculations for trade-off compliance.
- Original building envelope may qualify for **historic building exemption** per Section C501.5, upon jurisdiction pre-approval.



*Manor House Restaurant, Bainbridge Island*

# Change of space use type

## High School converted to Retail Spaces

- Space conversion is from Group E to Group M occupancy classification.
- Fully conditioned existing building
- Alteration is considered a change of space use type only (C505), **does not** require an upgrade to full compliance with the current energy code.
- Shall comply with lighting power allowances & ventilation requirements for the new space use types.
- All new systems shall comply as new construction.



*Image courtesy of Fort Hood Sentinel*

# Initial tenant improvement

## Office building project that straddles energy code editions

- Shell & core project was permitted under the 2018 WSEC-C.
- Office tenant space first build out (initial TI) will be permitted under the 2021 WSEC-C.
- Carryover additional energy efficiency credits:
  - Number of C406 credits required for the initial TI is the same as for a new building.
  - If the shell & core project complied with the envelope, renewable energy or elevator efficiency measures, these same measures may be applied to the initial TI credit tally.
  - Credit value for these achieved measures is the number of credits earned under the 2018 WSEC-C, multiplied by six (6).



Section C406.1.1  
Section C406.1.1.1

# What type of existing building upgrade?

## Existing Mixed-Use Building

- Permitted as 6 floors of Group R-2 dwelling units over 1 floor of commercial space.
- Commercial area was permitted as shell & core.
- Commercial floor has sufficient floor-to-floor height to incorporate a mezzanine level for additional dwelling units.
- **Are new mezzanine dwelling units considered an initial tenant improvement, addition, change of occupancy classification, or change of space use?**



# ▶ Navigating the 2021 WSEC-C for Existing Building Upgrades



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