

WSR 13-14-116
EXPEDITED RULES
BUILDING CODE COUNCIL

[Filed July 3, 2013, 9:30 a.m.]

Title of Rule and Other Identifying Information: Modification of chapter 51-54A WAC, Washington state amendments to the 2012 International Fire Code, Section 405 – School emergency drills.

NOTICE

THIS RULE IS BEING PROPOSED UNDER AN EXPEDITED RULE-MAKING PROCESS THAT WILL ELIMINATE THE NEED FOR THE AGENCY TO HOLD PUBLIC HEARINGS, PREPARE A SMALL BUSINESS ECONOMIC IMPACT STATEMENT, OR PROVIDE RESPONSES TO THE CRITERIA FOR A SIGNIFICANT LEGISLATIVE RULE. IF YOU OBJECT TO THIS USE OF THE EXPEDITED RULE-MAKING PROCESS, YOU MUST EXPRESS YOUR OBJECTIONS IN WRITING AND THEY MUST BE SENT TO Ray Allshouse, Chair, State Building Code Council, P.O. Box 41449, Olympia, WA 98504-1449, AND RECEIVED BY September 4, 2013.

Purpose of the Proposal and Its Anticipated Effects, Including Any Changes in Existing Rules: The 2013 legislature amended the number/type of school emergency drills to include lockdown drills. This rule will amend the Fire Code to require [require] three rather than six emergency drills per school year, referencing RCW 28A.320.125 for lockdown requirements.

Reasons Supporting Proposal: This rule is needed to implement legislation passed during the 2013 legislative session.

Statutory Authority for Adoption: RCW 19.27.031, 19.27.074.

Statute Being Implemented: RCW 28A.320.125.

Rule is not necessitated by federal law, federal or state court decision.

Name of Proponent: State building code council, governmental.

Name of Agency Personnel Responsible for Drafting: Joanne T. McCaughan, 1500 Jefferson, Olympia, WA 98504-1449, (360) 407-9279; Implementation: Tim Nogler, 1500 Jefferson, Olympia, WA 98504-1449, (360) 407-9277; and Enforcement: Local government fire officials.

June 14, 2013
 C. Ray Allshouse
 Chair

AMENDATORY SECTION (Amending WSR 13-04-063, filed 2/1/13, effective 7/1/13)

WAC 51-54A-0405 Emergency drills.

405.1 General. Emergency drills complying with the provisions of this section shall be conducted at least annually in the occupancies listed in Section 404.2.1 or when required by the fire code official. Drills shall be designed in cooperation with the local authorities.

405.2 Frequency. Required emergency drills shall be held at the intervals specified in Table 405.2 or more frequently where necessary to familiarize all occupants with the drill procedure.

405.2.1 Group E occupancies. The occupancy shall conduct at a minimum the following drills during the year:

1. One drill using the school mapping information system.

EXCEPTION: Day cares not collocated on a school campus.

2. ~~((Six))~~ Three fire evacuation drills.

3. One shelter-in-place drill.

4. Additional drills shall be as required by RCW 28A.320.125.

Table 405.2

Emergency Drill Frequency and Participation

Group or Occupancy	Frequency	Participation
Group A	Quarterly	Employees
Group B ^c	Annually	Employees
Group E	Monthly ^{a,e}	All Occupants
Group F	Annually	Employees
Group I	Quarterly on each shift	Employees ^b
Group R-1	Quarterly on each shift	Employees
Group R-2 ^f	Quarterly on each shift	Employees
Group R-2 ^d	Four Annually	All Occupants
High-rise buildings	Annually	Employees

- a The frequency shall be allowed to be modified in accordance with Section 408.3.2.
- b Fire and evacuation drills in residential care assisted living facilities shall include complete evacuation of the premises in accordance with Section 408.10.5. Where occupants receive habilitation or rehabilitation training, fire prevention and fire safety practices shall be included as part of the training program.
- c Group B buildings having an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
- d Applicable to Group R-2 college and university buildings in accordance with Section 408.3.
- e Day cares collocated on a Group E campus shall participate in emergency drills occurring on the campus.
- f Applicable to boarding homes, group homes, and residential treatment facilities licensed by the state of Washington.

405.4 Time. Drills shall be held at unexpected times and under varying conditions to simulate the unusual conditions that occur in case of an emergency.

405.5 Recordkeeping. Records shall be maintained of required emergency evacuation drills and include the following information:

1. Identity of the person conducting the drill.
2. Date and time of the drill.
3. Notification method used.
4. Staff members on duty and participating.
5. Number of occupants participating.
6. Special conditions simulated.
7. Problems encountered and corrective actions taken.
8. Weather conditions when occupants were evacuated.
9. Time required to accomplish complete evacuation, or shelter-in-place.

405.6 Notification. Where required by the fire code official, prior notification of emergency drills shall be given to the fire code official.

405.7 Initiation. Emergency drills shall be initiated in accordance with Sections 405.7.1 through 405.7.2.

405.7.1 Fire evacuation drills. Where a fire alarm system is provided, emergency evacuation drills shall be initiated by activating the fire alarm system. The fire alarm monitoring company shall be notified prior to the activation of the fire alarm system for drills proposed and again at the conclusion of the transmission and restoration of the fire alarm system to normal mode.

EXCEPTION: Drills conducted between the hours of 9:00 p.m. and 6:00 a.m., in Group R-2 boarding homes, group homes, and residential treatment facilities licensed by the state of Washington.

405.7.2 Shelter-in-place drills. Shelter-in-place drills shall be initiated by the shelter-in-place alert signal, generated by the alerting system in accordance with Section 915.

405.8 Accountability. As building occupants arrive at the assembly point, efforts shall be made to determine if all occupants have been successfully evacuated and/or have been accounted for in the shelter-in-place.

405.9 Recall and reentry. The recall signal initiation shall be manually operated and under the control of the person in charge of the premises or the official in charge of the incident. No one shall reenter the premises until authorized to do so by the official in charge.

ELIMINATE THE NEED FOR THE AGENCY TO HOLD PUBLIC HEARINGS, PREPARE A SMALL BUSINESS ECONOMIC IMPACT STATEMENT, OR PROVIDE RESPONSES TO THE CRITERIA FOR A SIGNIFICANT LEGISLATIVE RULE. IF YOU OBJECT TO THIS USE OF THE EXPEDITED RULE-MAKING PROCESS, YOU MUST EXPRESS YOUR OBJECTIONS IN WRITING AND THEY MUST BE SENT TO Ray Allshouse, Chair, State Building Code Council, P.O. Box 41449, Olympia, WA 98504-1449, AND RECEIVED BY September 4, 2013.

Purpose of the Proposal and Its Anticipated Effects, Including Any Changes in Existing Rules: Makes editorial changes to the following sections of the residential energy portion of the Washington State Energy Code:

Table R402.1.1: There is a change in the footnote numbering system to eliminate any confusion about the footnote letters: j, k, and l were changed to k, m and n because the size of the letters was making it difficult to differentiate between i, j and l.

Section R403.4: Corrected the internal reference to include all three subsections under this section.

Table R406.2, item 2a. A period was added to correct a typo that resulted in two sentences running together.

Reasons Supporting Proposal: Some editorial errors were identified in the rules filed under WSR 13-04-055. This rule corrects those errors.

Statutory Authority for Adoption: RCW 19.27A.025, 19.27A.045.

Statute Being Implemented: Chapters 19.27, 19.27A, and 34.05 RCW.

Rule is not necessitated by federal law, federal or state court decision.

Name of Proponent: State building code council, governmental.

Name of Agency Personnel Responsible for Drafting and Implementation: Krista Braaksma, P.O. Box 41449, Olympia, WA 98504-1449, (360) 407-9278; and Enforcement: Local jurisdictions.

June 14, 2013
C. Ray Allshouse
Council Chair

WSR 13-14-119
EXPEDITED RULES
BUILDING CODE COUNCIL

[Filed July 3, 2013, 9:43 a.m.]

Title of Rule and Other Identifying Information: Editorial changes to chapter 51-11R WAC, 2012 Washington State Energy Code—Residential.

NOTICE

THIS RULE IS BEING PROPOSED UNDER AN EXPEDITED RULE-MAKING PROCESS THAT WILL

AMENDATORY SECTION (Amending WSR 13-04-055, filed 2/1/13, effective 7/1/13)

WAC 51-11R-40211 Table R402.1.1—Insulation and fenestration requirements by component.

**TABLE R402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a**

Climate Zone	Fenestration U-Factor ^b	Skylight ^b U-Factor	Glazed Fenestration SHGC ^{b, e}	Ceiling R-Value ^f	Wood Frame Wall ^{g, ((k)-l) m, n} R-Value	Mass Wall R-Value ^{((g)) k}	Floor R-Value	Below-Grade ^{c, ((k)) m} Wall R-Value	Slab ^d R-Value & Depth
5 and Marine 4	0.30	0.50	NR	49	21 int	21/ 21 ^h	30 ^g	10/15/ 21int+TB	10, 2 ft
6	0.30	0.50	NR	49	21+5ci	21+5 ^h	30 ^g	10/15/ 21int+TB	10, 4 ft

- For SI: 1 foot = 304.8 mm, ci = continuous insulation, int = intermediate framing.
- a R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the compressed R-value of the insulation from Appendix Table A101.4 shall not be less than the R-value specified in the table.
 - b The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
 - c "10/15/21+TB" means R-10 continuous insulation on the exterior of the wall, or R-15 on the continuous insulation on the interior of the wall, or R-21 cavity insulation plus a thermal break between the slab and the basement wall at the interior of the basement wall. "10/15/21+TB" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the wall. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall. "TB" means thermal break between floor slab and basement wall.
 - d R-10 continuous insulation is required under heated slab on grade floors. See R402.2.9.1.
 - e There are no SHGC requirements in the Marine Zone.
 - f Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.
 - g Reserved.
 - h First value is cavity insulation, second is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation R-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used to maintain a consistent total sheathing thickness.
 - i The second R-value applies when more than half the insulation is on the interior of the mass wall.
 - ((g)) k For single rafter- or joist-vaulted ceilings, the insulation may be reduced to R-38.
 - ((k)) m Int. (intermediate framing) denotes standard framing 16 inches on center with headers insulated with a minimum of R-10 insulation.
 - ((l)) n Log and solid timber walls with a minimum average thickness of 3.5 inches are exempt from this insulation requirement.

R403.4 Service hot water systems. Energy conservation measures for service hot water systems shall be in accordance with Sections R403.4.1 (~~and R403.4.2~~) through R403.4.3.

R403.4.1 Circulating hot water systems (Mandatory). Circulating hot water systems shall be provided with an automatic or *readily accessible* manual switch that can turn off the hot water circulating pump when the system is not in use.

R403.4.2 Hot water pipe insulation (Prescriptive). Insulation for hot water pipe shall have a minimum thermal resistance (R-value) of R-4.

R403.4.3 Electric water heater insulation. All electric water heaters in unheated spaces or on concrete floors shall be placed on an incompressible, insulated surface with a minimum thermal resistance of R-10.

AMENDATORY SECTION (Amending WSR 13-04-055, filed 2/1/13, effective 7/1/13)

WAC 51-11R-40340 Section R403.4—Service hot water systems.

AMENDATORY SECTION (Amending WSR 13-04-055, filed 2/1/13, effective 7/1/13)**WAC 51-11R-40621 Table R406.2—Energy credits.**

TABLE 406.2
ENERGY CREDITS (DEBITS)

OPTION	DESCRIPTION	CREDIT(S)
1a	EFFICIENT BUILDING ENVELOPE 1a: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Fenestration U = 0.28 Floor R-38 Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab or Compliance based on Section R402.1.4: Reduce the Total UA by 5%.	0.5
1b	EFFICIENT BUILDING ENVELOPE 1b: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Fenestration U = 0.25 Wall R-21 plus R-4 Floor R-38 Basement wall R-21 int plus R-5 ci Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab or Compliance based on Section R402.1.4: Reduce the Total UA by 15%.	1.0
1c	EFFICIENT BUILDING ENVELOPE 1c: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Fenestration U = 0.22 Ceiling and single-rafter or joist-vaulted R-49 advanced Wood frame wall R-21 int plus R-12 ci Floor R-38 Basement wall R-21 int plus R-12 ci Slab on grade R-10 perimeter and under entire slab Below grade slab R-10 perimeter and under entire slab or Compliance based on Section R402.1.4: Reduce the Total UA by 30%.	2.0
2a	AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2a: Compliance based on R402.4.1.2: Reduce the tested air leakage to 4.0 air changes per hour maximum and All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> shall be met with a high efficiency fan (maximum 0.35 watts/cfm), not interlocked with the furnace fan. Ventilation systems using a furnace including an ECM motor are allowed, provided that they are controlled to operate at low speed in ventilation only mode. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.	0.5
2b	AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2b: Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 2.0 air changes per hour maximum and All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.70. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.	1.0
2c	AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2c: Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 1.5 air changes per hour maximum and All whole house ventilation requirements as determined by Section M1507.3 of the <i>International Residential Code</i> shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.85. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.	1.5
3a	HIGH EFFICIENCY HVAC EQUIPMENT 3a: Gas, propane or oil-fired furnace with minimum AFUE of 95% To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	0.5

OPTION	DESCRIPTION	CREDIT(S)
3b	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3b: Air-source heat pump with minimum HSPF of 8.5 To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	1.0
3c	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3c: Closed-loop ground source heat pump; with a minimum COP of 3.3 or Open loop water source heat pump with a maximum pumping hydraulic head of 150 feet and minimum COP of 3.6 To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	2.0
3d	<p>HIGH EFFICIENCY HVAC EQUIPMENT 3d: DUCTLESS SPLIT SYSTEM HEAT PUMPS, ZONAL CONTROL: In homes where the primary space heating system is zonal electric heating, a ductless heat pump system shall be installed and provide heating to at least one zone of the housing unit. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</p>	1.0
4	<p>HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM:^a All heating and cooling system components installed inside the conditioned space. All combustion equipment shall be direct vent or sealed combustion. Locating system components in conditioned crawl spaces is not permitted under this option. Electric resistance heat is not permitted under this option. Direct combustion heating equipment with AFUE less than 80% is not permitted under this option. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and shall show the location of the heating and cooling equipment and all the ductwork.</p>	1.0
5a	<p>EFFICIENT WATER HEATING 5a: Water heating system shall include one of the following: Gas, propane or oil water heater with a minimum EF of 0.62 or Electric water heater with a minimum EF of 0.93. and for both cases All showerhead and kitchen sink faucets installed in the house shall be rated at 1.75 GPM or less. All other lavatory faucets shall be rated at 1.0 GPM or less.^b To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and shall specify the maximum flow rates for all showerheads, kitchen sink faucets, and other lavatory faucets.</p>	0.5
5b	<p>EFFICIENT WATER HEATING 5b: Water heating system shall include one of the following: Gas, propane or oil water heater with a minimum EF of 0.82 or Solar water heating supplementing a minimum standard water heater. Solar water heating will provide a rated minimum savings of 85 therms or 2000 kWh based on the Solar Rating and Certification Corporation (SRCC) Annual Performance of OG-300 Certified Solar Water Heating Systems or Electric heat pump water heater with a minimum EF of 2.0 and meeting the standards of NEEA's Northern Climate Specifications for Heat Pump Water Heaters or Water heater heated by ground source heat pump meeting the requirements of Option 3c. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and, for solar water heating systems, the calculation of the minimum energy savings.</p>	1.5
6	<p>RENEWABLE ELECTRIC ENERGY: For each 1200 kWh of electrical generation provided annually by on-site wind or solar equipment a 0.5 credit shall be allowed, up to 3 credits. Generation shall be calculated as follows: For solar electric systems, the design shall be demonstrated to meet this requirement using the National Renewable Energy Laboratory calculator PVWATTS. Documentation noting solar access shall be included on the plans. For wind generation projects designs shall document annual power generation based on the following factors: The wind turbine power curve; average annual wind speed at the site; frequency distribution of the wind speed at the site and height of the tower. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall show the photovoltaic or wind turbine equipment type, provide documentation of solar and wind access, and include a calculation of the minimum annual energy power production.</p>	0.5

Footnotes:

- a **Interior Duct Placement.** Ducts included as Option 4 of Table R406.2 shall be placed wholly within the heated envelope of the housing unit. The placement shall be inspected and certified to receive the credits associated with this option.

EXCEPTION: Ducts complying with this section may have up to 5% of the total linear feet of ducts located in the exterior cavities or buffer spaces of the dwelling. If this exception is used the ducts will be tested to the following standards:

- Post-construction test: Leakage to outdoors shall be less than or equal to 1 CFM per 100 ft² of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.
- b **Plumbing Fixtures Flow Ratings.** Low flow plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following requirements:
- 1 Residential bathroom lavatory sink faucets: Maximum flow rate - 3.8 L/min (1.0 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.
 - 2 Residential kitchen faucets: Maximum flow rate - 6.6 L/min (1.75 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.
 - 3 Residential showerheads: Maximum flow rate - 6.6 L/min (1.75 gal/min) when tested in accordance with ASME A112.18.1/CSA B125.1.

WSR 13-14-126
EXPEDITED RULES
BUILDING CODE COUNCIL

[Filed July 3, 2013, 11:56 a.m.]

Title of Rule and Other Identifying Information: Editorial changes to chapter 51-11C WAC, 2012 Washington State Energy Code—Commercial.

NOTICE

THIS RULE IS BEING PROPOSED UNDER AN EXPEDITED RULE-MAKING PROCESS THAT WILL ELIMINATE THE NEED FOR THE AGENCY TO HOLD PUBLIC HEARINGS, PREPARE A SMALL BUSINESS ECONOMIC IMPACT STATEMENT, OR PROVIDE RESPONSES TO THE CRITERIA FOR A SIGNIFICANT LEGISLATIVE RULE. IF YOU OBJECT TO THIS USE OF THE EXPEDITED RULE-MAKING PROCESS, YOU MUST EXPRESS YOUR OBJECTIONS IN WRITING AND THEY MUST BE SENT TO Ray Allshouse, Chair, State Building Code Council, P.O. Box 41449, Olympia, WA 98504-1449, AND RECEIVED BY September 4, 2013.

Purpose of the Proposal and Its Anticipated Effects, Including Any Changes in Existing Rules: Makes editorial changes to the following sections of the commercial energy portion of the Washington State Energy Code.

WAC 51-11C-10140 – Section C101.4.3.1, this section is coordinates requirements for replacement of lighting fixtures. The section originally referred to both interior and

exterior lighting "in a space enclosed by walls or ceiling-height partitions." Requirements for exterior lighting were broken out into a separate paragraph without reference to enclosures.

WAC 51-11C-10143 – Table C101.4.3.2, this table number was changed from C101.4.3.1 to C101.4.3.2 to reference the correct section. Internal references within the table were also corrected.

WAC 51-11C-403247 – Section C403.2.4.7, this change corrects a typographical error in the text.

WAC 51-11C-403248 – Section C403.2.4.8 and C403.2.4.9, this change corrects a typographical error and adds text in the deadband control requirements.

WAC 51-11C-403254 – Section C403.2.5.4.2, this change corrects a typographical error in the text.

WAC 51-11C-403291 – Section C403.2.10, this change corrects referenced section numbers.

WAC 51-11C-40332 – Section C403.3.2, this change corrects a typographical error in the text.

WAC 51-11C-40341 – Section C403.4.1, this change adds clarification that all subsections of the referenced section need to be met for compliance.

WAC 51-11C-40343 – Section C403.4.3.5, this change corrects a typographical error in the text.

WAC 51-11C-61031 – Section A103.1, this change corrects internal table reference numbers. The original table references were incorrect (they referenced an early draft of the appendix) and did not capture all the frame types.

Reasons Supporting Proposal: Some editorial errors were identified in the rules filed under WSR 13-04-056. This rule corrects those errors.

Statutory Authority for Adoption: RCW 19.27A.025, 19.27A.045.

Statute Being Implemented: Chapters 19.27, 19.27A, and 34.05 RCW.

Rule is not necessitated by federal law, federal or state court decision.

Name of Proponent: State building code council, governmental.

Name of Agency Personnel Responsible for Drafting and Implementation: Krista Braaksma, P.O. Box 41449, Olympia, WA 98504-1449, (360) 407-9278; and Enforcement: Local jurisdictions.

June 14, 2013
C. Ray Allshouse
Council Chair

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-10140 Section C101.4—Applicability.

C101.4 Applicability. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

C101.4.1 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.

C101.4.2 Historic buildings. The building official may modify the specific requirements of this code for historic buildings and require in lieu of alternate requirements which 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.

C101.4.3 Additions, alterations, renovations or repairs. Additions, alterations, renovations or repairs 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(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs 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.

EXCEPTION: The following need not comply provided the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Glass only replacements in an existing sash and frame.
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. Reroofing for roofs where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.
6. 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.
7. Alterations to lighting systems only that replace less than 60 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.
8. Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the alteration does not increase the installed interior lighting power.

C101.4.3.1 Lighting and motors. Alterations that replace 60 percent or more of the luminaires in a space enclosed by walls or ceiling-height partitions shall comply with Section C405.5 ~~(and C405.6)~~. Where less than 60 percent

of the ~~(fixtures)~~ luminaires in a space enclosed by walls or ceiling-height partitions are new, the installed lighting wattage shall be maintained or reduced.

Alterations that replace 60 percent or more of the exterior luminaires shall comply with Section C405.6. Where less than 60 percent of the exterior luminaires are new, the installed lighting wattage shall be maintained or reduced.

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, C405.2.2.3, C405.2.3, ~~(C405.3.4)~~ C405.2.4, and as applicable C408.3. In addition, office areas less than 300 ft² enclosed by walls or ceiling-height partitions, and all meeting and conference rooms, and all school classrooms, shall be equipped with occupancy sensors that comply with Section C405.2.2 and C408.3. 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 the other requirements in Sections C405.2.2 and C408.3.

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, C405.2.2, C405.2.3 and C408.3.

Those motors which are altered or replaced shall comply with Section C403.2.13.

C101.4.3.2 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.

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

Where mechanical cooling is added to a space that was not previously cooled, the mechanical cooling system shall comply with the economizer requirements in Section C403.3.1 or C403.4.1.

EXCEPTION: Alternate designs that are not in full compliance with this code may be approved when the building official determines that existing building or occupancy constraints make full compliance impractical or where full compliance would be economically impractical.

Alterations to existing mechanical cooling systems shall not decrease economizer capacity unless the system complies with Section C403.3.1 or C403.4.1. In addition, for existing mechanical cooling systems that do not comply with Sections C403.3.1 or Section 403.4.1, including both the individual unit size limits and the total building capacity limits on units without economizer, other alterations shall comply with Table ~~(C101.4.3.1)~~ C101.4.3.2.

When space cooling equipment is replaced, controls shall be installed to provide for integrated operation with economizer in accordance with Section C403.3.

Existing equipment currently in use may be relocated within the same floor or same tenant space if removed and reinstalled within the same permit.

C101.4.4 Change in occupancy or use. Spaces undergoing a change in occupancy from an F, S or U occupancy to an occupancy other than F, S or U shall comply with this code. Any space that is converted to a residential dwelling unit or portion thereof, from another use or occupancy shall comply with this code. Where the use in a space changes from one use in Table C405.5.2 (1) or (2) to another use in Table C405.5.2 (1) or (2), the installed lighting wattage shall comply with Section C405.5.

EXCEPTION: Where the component performance building envelope option in Section C402.1.3 is used to comply with this section, the Proposed UA is allowed to be up to 110 percent of the Target UA. Where the total building performance option in Section C407 is used to comply with this section, the annual energy consumption of the proposed design is allowed to be 110 percent of the annual energy consumption otherwise allowed by Section C407.3 and Section C401.2 (3).

C101.4.5 Change in space conditioning. Any nonconditioned space that is altered to become *conditioned space* or

semi-heated space shall be required to be brought into full compliance with this code. Any semi-heated space that is altered to become conditioned space shall be required to be brought into full compliance with this code.

EXCEPTION: Where the component performance building envelope option in Section C402.1.3 is used to comply with this section, the Proposed UA is allowed to be up to 110 percent of the Target UA. Where the total building performance option in Section C407 is used to comply with this section, the annual energy consumption of the proposed design is allowed to be 110 percent of the annual energy consumption otherwise allowed by Section C407.3 and Section C401.2 (3).

C101.4.6 Mixed occupancy. Where a building includes both *residential* and *commercial* occupancies, each occupancy shall be separately considered and meet the applicable provisions of IECC—Commercial Provisions or IECC—Residential Provisions.

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-10143 Table ((~~C101.4.3.1~~) C101.4.3.2—Economizer compliance options for mechanical alterations.

Table ((~~C101.4.3.1~~) C101.4.3.2
Economizer Compliance Options for Mechanical Alterations

	Option A	Option B (alternate to A)	Option C (alternate to A)	Option D (alternate to A)
Unit Type	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. ¹ Economizer: C403.4.1 ²	Efficiency: min. ¹ Economizer: C403.4.1 ^{2,3}	Efficiency: min. ¹ Economizer: C403.4.1 ^{2,3}	Efficiency: min. ¹ Economizer: C403.4.1 ^{2,4}
2. Split Systems	Efficiency: min. ¹ Economizer: C403.4.1 ²	Efficiency: + 10/5% ⁵ Economizer: Shall not decrease existing economizer capability	Only for new units < 54,000 Btu/h replacing unit installed prior to 1991 (one of two): Efficiency: + 10/5% ⁵ Economizer: 50% ⁶ For units > 54,000 Btu/h or any units installed after 1991: Option A	Efficiency: min. ¹ Economizer: C403.4.1 ^{2,4}
3. Water Source Heat Pump	Efficiency: min. ¹ Economizer: C403.4.1 ²	(two of three): Efficiency: + 10/5% ⁵ Flow control valve ⁷ Economizer: 50% ⁶	(three of three): Efficiency: + 10/5% ⁵ Flow control valve ⁷ Economizer: 50% ⁶ (except for certain pre-1991 systems ⁸)	Efficiency: min. ¹ Economizer: C403.4.1 ^{2,4} (except for certain pre-1991 systems ⁸)

	Option A	Option B (alternate to A)	Option C (alternate to A)	Option D (alternate to A)
Unit Type	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
4. Hydronic Economizer using Air-Cooled Heat Rejection Equipment (Dry Cooler)	Efficiency: min. ¹ Economizer: 1433 ²	Efficiency: + 10/5% ⁵ Economizer: Shall not decrease existing economizer capacity	Option A	Efficiency: min. ¹ Economizer: C403.4.1 ^{2,4}
5. Air-Handling Unit (including fan coil units) where the system has an air-cooled chiller	Efficiency: min. ¹ Economizer: C403.4.1 ²	Economizer: Shall not decrease existing economizer capacity	Option A (except for certain pre-1991 systems ⁸)	Option A (except for certain pre-1991 systems ⁸)
6. Air- Handling Unit (including fan coil units) and Water-cooled Process Equipment, where the system has a water-cooled chiller ¹⁰	Efficiency: min. ¹ Economizer: C403.4.1 ²	Economizer: Shall not decrease existing economizer capacity	Option A (except for certain pre-1991 systems ⁸ and certain 1991-2004 systems ⁹)	Efficiency: min. ¹ Economizer: C403.4.1 ^{2,4} (except for certain pre-1991 systems ⁸ and certain 1991-2004 systems ⁹)
7. Cooling Tower	Efficiency: min. ¹ Economizer: C403.4.1 ²	No requirements	Option A	Option A
8. Air-Cooled Chiller	Efficiency: min. ¹ Economizer: C403.4.1 ²	Efficiency: + 5% ¹¹ Economizer: Shall not decrease existing economizer capacity	Efficiency (two of two): (1) + 10% ¹² and (2) multistage Economizer: Shall not decrease existing economizer capacity	Efficiency: min. ¹ Economizer: C403.4.1 ^{2,4}
9. Water-Cooled Chiller	Efficiency: min. ¹ Economizer: C403.4.1 ²	Efficiency (one of two): (1) + 10% ¹³ or (2) plate frame heat exchanger ¹⁵ Economizer: Shall not decrease existing economizer capacity	Efficiency (two of two): (1) + 15% ¹⁴ and (2) plate frame heat exchanger ¹⁵ Economizer: Shall not decrease existing economizer capacity	Efficiency: min. ¹ Economizer: C403.4.1 ^{2,4}
10. Boiler	Efficiency: min. ¹ Economizer: C403.4.1 ²	Efficiency: + 8% ¹⁶ Economizer: Shall not decrease existing economizer capacity	Efficiency: + 8% ¹⁶ Economizer: Shall not decrease existing economizer capacity	Efficiency: min. ¹ Economizer: C403.4.1 ^{2,4}

¹Minimum equipment efficiency shall comply with Section C403.2.3 and Tables C403.2.3(1) through C403.2.3(9).

²System and building shall comply with Section C403.4.1 (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 C403.4.1.

³All equipment replaced in an existing building shall have air economizer complying with Sections C403.3.1 and C403.4.1 unless both the individual unit size and the total capacity of units without air economizer in the building is less than that allowed in Exception 1 to Section C403.3.1.

⁴All separate new equipment added to an existing building shall have air economizer complying with Sections C403.3.1 and C403.4.1 unless both the individual unit size and the total capacity of units without air economizer in the building is less than that allowed in Exception 1 to Section C403.4.1.

⁵Equipment shall have a capacity-weighted average cooling system efficiency:

a. For units with a cooling capacity below 54,000 Btu/h, a minimum of 10% greater than the requirements in Tables C403.2.3(1) and C403.2.3(2) (1.10 x values in Tables C403.2.3(1) and C403.2.3(2)).

- b. For units with a cooling capacity of 54,000 Btu/h and greater, a minimum of 5% greater than the requirements in Tables C403.2.3(1) and C403.2.3(2) (1.05 x values in Tables C403.2.3(1) and C403.2.3(2)).
- 6 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 capable of providing this additional outside air and equipped with economizer control.
- 7 Have flow control valve to eliminate flow through the heat pumps that are not in operation with 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, have a capacity-weighted average cooling system efficiency that is 5% greater than the requirements in note 5 (i.e., a minimum of 15%/10% greater than the requirements in Tables C403.2.3(1) and C403.2.3(2) (1.15/1.10 x values in Tables C403.2.3(1) and C403.2.3(2)).
- 8 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 Btu/h.
- 9 Economizer not required for systems installed with water economizer plate and frame heat exchanger complying with previous codes between 1991 and June 2013, provided that the total fan coil load does not exceed the existing or added capacity of the heat exchangers.
- 10 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.
- 11 The air-cooled chiller shall have an IPLV efficiency that is a minimum of 5% greater than the IPLV requirements in Table C403.2.3(7) (1.05 x IPLV values in Table C403.2.3(7)).
- 12 The air-cooled chiller shall:
 - a. Have an IPLV efficiency that is a minimum of 10% greater than the IPLV requirements in Table C403.2.3(7) (1.10 x IPLV values in Table C403.2.3(7)); and
 - b. Be multistage with a minimum of two compressors.
- 13 The water-cooled chiller shall have an IPLV efficiency that is a minimum of 10% greater than the IPLV requirements in Table C403.2.3(7) (1.10 x IPLV values in Table C403.2.3(7)).
- 14 The water-cooled chiller shall have an IPLV efficiency that is a minimum of 15% greater than the IPLV requirements in Table C403.2.3(7), (1.15 x IPLV values in Table C403.2.3(7)).
- 15 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.
- 16 The replacement boiler shall have an efficiency that is a minimum of 8% higher than the value in Table C403.2.3(5) (1.08 x value in Table C403.2.3(5)), except for electric boilers.

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-403247 Section C403.2.4.7—Hotel/motel controls.

C403.2.4.7 Group R-1 hotel/motel guest rooms. For hotel and motel guest rooms, a minimum of one of the following control technologies shall be required in hotels/motels with over 50 guest rooms such that the space temperature would

automatically setback (winter) or set up (summer) by no less than 5°F (3°C) ~~((or hotel and motel guest rooms, a minimum of))~~ when the occupant is not in the room:

1. Controls that are activated by the room occupant via the primary room access method - Key, card, deadbolt, etc.
2. Occupancy sensor controls that are activated by the occupant's presence in the room.

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-403248 Section C403.2.4.8—Residential occupancy controls.

C403.2.4.8 Group R-2 and R-3 dwelling units. The primary space conditioning system within each dwelling unit shall be provided with at least one programmable thermostat for the regulation of space temperature. The thermostat shall allow for, at a minimum, a 5-2 programmable schedule (weekdays/weekends) and be capable of providing at least two programmable setback periods per day.

Each additional system provided within the dwelling unit shall be provided with at least one adjustable thermostat for the regulation of temperature.

- EXCEPTIONS:
1. Systems controlled by an occupant sensor that is capable of shutting the system off when no occupant is sensed for a period of up to 30 minutes.
 2. Systems controlled solely by a manually operated timer capable of operating the system for no more than two hours.
 3. Ductless heat pumps.

Each thermostat shall be capable of being set by adjustment or selection of sensors as follows: When used to control heating only: 55°F to 75°F; when used to control cooling only: 70°F to 85°F; all other: 55°F to 85°F with an adjustable deadband of not less than 10°F.

C403.2.4.9 Group R-2 sleeping units. The primary space conditioning system within each sleeping unit shall be provided with at least one programmable thermostat for the regulation of space temperature. The thermostat shall allow for, at a minimum, a 5-2 programmable schedule (weekdays/weekends) and be capable of providing at least two programmable setback periods per day.

Each additional system provided within the sleeping unit shall be provided with at least one adjustable thermostat for the regulation of temperature.

- EXCEPTIONS:
1. Systems controlled by an occupant sensor that is capable of shutting the system off when no occupant is sensed for a period of up to 30 minutes.
 2. Systems controlled solely by a manually operated timer capable of operating the system for no more than two hours.
 3. *Zones* with a full HVAC load demand not exceeding 3,400 Btu/h (1 kW) and having a readily accessible manual shutoff switch.
 4. Ductless heat pumps.

Each thermostat shall be capable of being set by adjustment or selection of sensors as follows: When used to control

heating only: 55°F to 75°F; when used to control cooling only: 70°F to 85°F; all other: 55°F to 85°F with an adjustable deadband of not less than 10°F.

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-403254 Section C403.2.5.4—Exhaust systems.

C403.2.5.4 Exhaust systems.

C403.2.5.4.1 Kitchen hoods. Each kitchen area with total exhaust capacity larger than 2,000 cfm shall be provided with make-up air sized so that at least 50% of exhaust air volume be (a) unheated or heated to no more than 60°F and (b) uncooled or cooled without the use of mechanical cooling.

- EXCEPTIONS:
1. Where hoods are used to exhaust ventilation air which would otherwise exfiltrate or be exhausted by other fan systems. A detailed accounting of exhaust airflows shall be provided on the plans that accounts for the impact of any required demand controlled ventilation.
 2. Certified grease extractor hoods that require a face velocity no greater than 60 fpm.

C403.2.5.4.2 Laboratory exhaust systems. Buildings with laboratory exhaust systems having a total exhaust rate greater than 5,000 cfm (2,360 L/s) shall include heat recovery systems to ((preconditioned)) precondition makeup air from laboratory exhaust. The heat recovery system shall be capable of increasing the outside air supply temperature at design heating conditions by 25°F (13.9°C) in Climate Zones 4C/5B and 35°F (19.4°C) in Climate Zone 6B. A provision shall be made to bypass or control the heat recovery system to permit air economizer operation as required by Section C403.4.

- EXCEPTIONS:
1. Variable air volume laboratory exhaust and room supply systems capable of reducing exhaust and make-up air volume to 50% or less of design values; or
 2. Direct make-up (auxiliary) air supply equal to at least 75% of the exhaust rate, heated no warmer than 2°F (1.1°C) below room set point, cooled to no cooler than 3°F (1.7°C) above room set point, no humidification added, and no simultaneous heating and cooling used for dehumidification control; or
 3. Combined Energy Reduction Method: VAV exhaust and room supply system capable of reducing exhaust and makeup air volumes and a heat recovery system to precondition makeup air from laboratory exhaust that when combined will produce the same energy reduction as achieved by a heat recovery system with a 50% sensible recovery effectiveness as required above. For calculation purposes, the heat recovery component can be assumed to include the maximum design supply airflow rate at design conditions. The combined energy reduction (Q_{ER}) shall meet the following:

$$Q_{ER} \geq Q_{MIN}$$

$$Q_{MIN} = CFM_S \cdot (T_R - T_O) \cdot 1.1 \cdot 0.6$$

$$Q_{ER} = CFM_S \cdot (T_R - T_O) \cdot 1.1(A + B)/100$$

Where:

- Q_{MIN} = Energy recovery at 60% sensible effectiveness (Btu/h)
- Q_{ER} = Combined energy reduction (Btu/h)
- CFM_S = The maximum design supply airflow rate to conditioned spaces served by the system in cubic feet per minute
- T_R = Space return air dry bulb at winter design conditions
- T_O = Outdoor air dry bulb at winter design conditions
- A = Percentage that the exhaust and makeup air volumes can be reduced from design conditions
- B = Percentage sensible heat recovery effectiveness

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-403291 Section C403.2.10—Air system design and control.

C403.2.10 Air system design and control. Each HVAC system having a total fan system motor nameplate horsepower (hp) exceeding 5 horsepower (hp) (3.7 kW) shall meet the provisions of Sections C403.2.10.1 through ((C403.2.10.2)) C403.2.10.3.

C403.2.10.1 Allowable fan floor horsepower. Each HVAC system at fan system design conditions shall not exceed the allowable *fan system motor nameplate hp* (Option 1) or *fan system bhp* (Option 2) as shown in Table C403.2.10.1(1). This includes supply fans, return/relief fans, and fan-powered terminal units associated with systems providing heating or cooling capability. Single *zone* variable-air-volume systems shall comply with the constant volume fan power limitation.

- EXCEPTION:
- The following fan systems are exempt from allowable fan floor horsepower requirement.
1. Hospital, vivarium and laboratory systems that utilize flow control devices on exhaust and/or return to maintain space pressure relationships necessary for occupant health and safety or environmental control shall be permitted to use variable volume fan power limitation.
 2. Individual exhaust fans with motor nameplate horsepower of 1 hp or less.

C403.2.10.2 Motor nameplate horsepower. For each fan, the selected fan motor shall be no larger than the first available motor size greater than the brake horsepower (bhp). The fan brake horsepower (bhp) shall be indicated on the design documents to allow for compliance verification by the *code official*.

- EXCEPTIONS:
1. For fans less than 6 bhp (4413 W), where the first available motor larger than the brake horsepower has a nameplate rating within 50 percent of the bhp, selection of the next larger nameplate motor size is allowed.

- 2. For fans 6 bhp (4413 W) and larger, where the first available motor larger than the bhp has a nameplate rating within 30 percent of the bhp, selection of the next larger nameplate motor size is allowed.
- 3. For fans used only in *approved* life safety applications such as smoke evacuation.

C403.2.10.3 Fractional hp fan motors. Motors for fans that are 1/12 hp or greater and less than 1 hp shall be electronically commutated motors or shall have a minimum motor efficiency of 70 percent when rated in accordance with DOE 10 C.F.R. 431. These motors shall also have the means to adjust motor speed for either balancing or remote control. Belt-driven fans may use sheave adjustments for airflow balancing in lieu of a varying motor speed.

- EXCEPTIONS:
- 1. Motors in the airstream within fan-coils and terminal units that operate only when providing heating to the space served.
 - 2. Motors installed in space conditioning equipment certified under Section C403.2.3.

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-40332 Section C403.3.2—Hydronic system controls.

C403.3.2 Hydronic system controls. Hydronic systems of at least 300,000 Btu/h (87,930 W) design output capacity supplying heated ~~(and chilled water)~~ to comfort conditioning systems shall include controls that meet the requirements of Section C403.4.3.

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-40341 Section C403.4.1—Economizers.

C403.4.1 Economizers. Air economizers shall be provided on all new systems including those serving computer server rooms, electronic equipment, radio equipment, and telephone switchgear. Economizers shall comply with Sections C403.4.1.1 through C403.4.1.4.

- EXCEPTIONS:
- 1. Water-cooled refrigeration equipment serving chilled beams and chilled ceiling space cooling systems only which are provided with a water economizer meeting the requirements of Section ~~(C403.4.1)~~ C403.4.1.1 through C403.4.1.4. Water economizer capacity per building shall not exceed 500 tons. This exception shall not be used for Total Building Performance.

- 2. Systems complying with all of the following criteria:
 - 2.1. Consist of multiple water source heat pumps connected to a common water loop;
 - 2.2. Have a minimum of 60 percent air economizer;
 - 2.3. Have water source heat pumps with an EER at least 15 percent higher for cooling and a COP at least 15 percent higher for heating than that specified in Section C403.2.3;
 - 2.4. Where provided, have a central boiler or furnace efficiency of 90 percent minimum for units up to 199,000 Btu/h; and
 - 2.5. Provide heat recovery with a minimum 50 percent heat recovery effectiveness as defined in Section C403.2.6 to preheat the outside air supply.
- 3. Chilled water terminal units connected to systems with chilled water generation equipment with IPLV values more than 25 percent higher than minimum part load efficiencies listed in Table C403.2.3(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 Btu/h per building, or 20 percent of its air economizer capacity, whichever is greater. That portion of the equipment serving Group R Occupancy is not included in determining the total capacity of all units without economizers in a building. This exception shall not be used for the initial permit (this includes any initial permit for the space including, but not limited to, the shell-and-core permit, built-to-suit permit, and tenant improvement permit) or for Total Building Performance Method.
- 4. For Group R occupancies, cooling units installed outdoors or in a mechanical room adjacent to outdoors with a total cooling capacity less than 20,000 Btu/h and other cooling units with a total cooling capacity less than 54,000 Btu/h provided that these are high-efficiency cooling equipment with SEER and EER values more than 15 percent higher than minimum efficiencies listed in Tables C403.2.3 (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. For split systems, compliance is based on the cooling capacity of individual fan coil units.
- 5. Equipment used to cool any dedicated server room, electronic equipment room or telecom switch room provided that they completely comply with Option a, b, or c in the table below. The total capacity of all systems without economizers shall not exceed 240,000 Btu/h per building or 10 percent of its air economizer capacity, whichever is greater. This exception shall not be used for Total Building Performance.

	Equipment Type	Higher Equipment Efficiency	Part-Load Control	Economizer
Option a	Tables C403.2.3(1) and C403.2.3(2) ^a	+15% ^b	Required over 85,000 Btu/h ^c	None Required
Option b	Tables C403.2.3(1) and C403.2.3(2) ^a	+5% ^d	Required over 85,000 Btu/h ^c	Waterside Economizer ^e
Option c	ASHRAE Standard 127 ^f	+0% ^g	Required over 85,000 Btu/h ^c	Waterside Economizer ^e

Notes for Exception 5:

^aFor a system where all of the cooling equipment is subject to the AHRI standards listed in Tables C403.2.3(1) and C403.2.3(2), the system shall comply with all of the following (note that if the system contains any cooling equipment that exceeds the capacity limits in Table C403.2.3(1) or C403.2.3(2), or if the system contains any cooling equipment that is not included in Table C403.2.3(1) or C403.2.3(2), then the system is not allowed to use this option).

^bThe cooling equipment shall have an EER value and an IPLV value that is a minimum of 15 percent greater than the value listed in Tables C403.2.3(1) and C403.2.3(2) (1.15 x values in Tables C403.2.3(1) and C403.2.3(2)).

^cFor units with a total cooling capacity over 85,000 Btu/h, the system shall utilize part-load capacity control schemes that are able to modulate to a part-load capacity of 50 percent of the load or less that results in the compressor operating at the same or higher EER at part loads than at full load (e.g., minimum of two-stages of compressor unloading such as cylinder unloading, two-stage scrolls, dual tandem scrolls, but hot gas bypass is not credited as a compressor unloading system).

^dThe cooling equipment shall have an EER value and an IPLV value that is a minimum of 5 percent greater than the value listed in Tables C403.2.3(1) and C403.2.3(2) (1.05 x values in Tables C403.2.3(1) and C403.2.3(2)).

^eThe system shall include a water economizer in lieu of air economizer. Water economizers shall meet the requirements of C403.4.1.2 through C403.4.1.4 and be capable of providing the total concurrent cooling load served by the connected terminal equipment lacking airside economizer, at outside air temperatures of 50°F dry-bulb/45°F wet-bulb and below. For this calculation, all factors including solar and internal load shall be the same as those used for peak load calculations, except for the outside temperatures. The equipment shall be served by a dedicated condenser water system unless a nondedicated condenser water system exists that can provide appropriate water temperatures during hours when waterside economizer cooling is available.

^fFor a system where all cooling equipment is subject to ASHRAE Standard 127.

^gThe cooling equipment subject to the ASHRAE Standard 127 shall have an EER value and an IPLV value that is equal or greater than the value listed in Tables C403.2.3(1) and C403.2.3(2) when determined in accordance with the rating conditions ASHRAE Standard 127 (i.e., not the rating conditions in AHRI Standard 210/240 or 340/360). This information shall be provided by an independent third party.

6. Variable refrigerant flow (VRF) systems, multiple-zone split-system heat pumps, consisting of multiple, individually metered indoor units with multi-speed fan motors, served on a single common refrigeration circuit with an exterior reverse-cycle heat pump with variable speed compressor(s) and variable speed condenser fan(s). These systems shall also be capable of providing simultaneous heating and cooling operation, where recovered energy from the indoor units operating in one mode can be transferred to one or more indoor units operating in the other mode, and shall serve at least 20 percent internal (no perimeter wall within 12') and 20 percent perimeter zones (as determined by conditioned floor area) and the outdoor unit shall be at least 65,000 Btu/h in total capacity. Systems utilizing this exception shall have 50 percent heat recovery effectiveness as defined by Section C403.2.6 on the outside air. For the purposes of this exception, dedicated server rooms, electronic equipment rooms or telecom switch rooms are not considered perimeter zones. This exception shall be limited to buildings of 60,000 square feet and less.

C403.4.1.1 Design capacity. Water economizer systems shall be capable of cooling supply air by indirect evaporation and providing up to 100 percent of the expected system cooling load at *outdoor air* temperatures of 50°F dry-bulb (10°C dry-bulb)/45°F wet-bulb (7.2°C wet-bulb) and below.

EXCEPTION: Systems in which a water economizer is used and where dehumidification requirements cannot be met using outdoor air temperatures of 50°F dry-bulb (10°C dry-bulb)/45°F wet-bulb (7.2°C wet-bulb) shall satisfy 100 percent of the expected system cooling load at 45°F dry-bulb (7.2°C dry-bulb)/40°F wet-bulb (4.5°C wet-bulb).

C403.4.1.2 Maximum pressure drop. Precooling coils and water-to-water heat exchangers used as part of a water economizer system shall either have a waterside pressure drop of less than 15 feet (4572 mm) of water or a secondary loop shall be created so that the coil or heat exchanger pressure drop is not seen by the circulating pumps when the system is in the normal cooling (noneconomizer) mode.

C403.4.1.3 Integrated economizer control. Economizer systems shall be integrated with the mechanical cooling system and be capable of providing partial cooling even where additional mechanical cooling is required to meet the remainder of the cooling load.

EXCEPTIONS:

1. Direct expansion systems that include controls that reduce the quantity of *outdoor air* required to prevent coil frosting at the lowest step of compressor unloading, provided this lowest step is no greater than 25 percent of the total system capacity.
2. Individual direct expansion units that have a rated cooling capacity less than 54,000 Btu/h (15,827 W) and use nonintegrated economizer controls that preclude simultaneous operation of the economizer and mechanical cooling.

C403.4.1.4 Economizer heating system impact. HVAC system design and economizer controls shall be such that economizer operation does not increase the building heating energy use during normal operation.

EXCEPTION: Economizers on VAV systems that cause *zone* level heating to increase due to a reduction in supply air temperature.

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-40343 Section C403.4.3—Hydronic systems controls.

C403.4.3 Hydronic systems controls. The heating of fluids that have been previously mechanically cooled and the cooling of fluids that have been previously mechanically heated shall be limited in accordance with Sections C403.4.3.1 through C403.4.3.3. Hydronic heating systems comprised of multiple-packaged boilers and designed to deliver conditioned water or steam into a common distribution system shall include automatic controls capable of sequencing operation of the boilers. Hydronic heating systems comprised of a single boiler and greater than 500,000 Btu/h (146,550 W) input design capacity shall include either a multi-staged or modulating burner.

C403.4.3.1 Three-pipe system. Hydronic systems that use a common return system for both hot water and chilled water are prohibited.

C403.4.3.2 Two-pipe changeover system. Systems that use a common distribution system to supply both heated and chilled water shall be designed to allow a dead band between changeover from one mode to the other of at least 15°F (8.3°C) outside air temperatures; be designed to and provided with controls that will allow operation in one mode for at least 4 hours before changing over to the other mode; and be provided with controls that allow heating and cooling supply temperatures at the changeover point to be no more than 30°F (16.7°C) apart.

C403.4.3.3 Hydronic (water loop) heat pump systems. Hydronic heat pump systems shall comply with Sections C403.4.3.3.1 through C403.4.3.3.3.

C403.4.3.3.1 Temperature dead band. Hydronic heat pumps connected to a common heat pump water loop with central devices for heat rejection and heat addition shall have controls that are capable of providing a heat pump water supply temperature dead band of at least 20°F (11.1°C) between initiation of heat rejection and heat addition by the central devices.

EXCEPTION: Where a system loop temperature optimization controller is installed and can determine the most efficient operating temperature based on real time conditions of demand and capacity, dead bands of less than 20°F (11°C) shall be permitted.

C403.4.3.3.2 Heat rejection. Heat rejection equipment shall comply with Sections C403.4.3.3.2.1 and C403.4.3.3.2.2.

EXCEPTION: Where it can be demonstrated that a heat pump system will be required to reject heat throughout the year.

C403.4.3.3.2.1 Climate Zones 3 and 4. For Climate Zones 3 and 4:

1. If a closed-circuit cooling tower is used directly in the heat pump loop, either an automatic valve shall be installed to bypass all but a minimal flow of water around the tower, or lower leakage positive closure dampers shall be provided.

2. If an open-circuit tower is used directly in the heat pump loop, an automatic valve shall be installed to bypass all heat pump water flow around the tower.

3. If an open- or closed-circuit cooling tower is used in conjunction with a separate heat exchanger to isolate the cooling tower from the heat pump loop, then heat loss shall be controlled by shutting down the circulation pump on the cooling tower loop.

C403.4.3.3.2.2 Climate Zones 5 through 8. For Climate Zones 5 through 8, if an open- or closed-circuit cooling tower is used, then a separate heat exchanger shall be provided to isolate the cooling tower from the heat pump loop, and heat loss shall be controlled by shutting down the circulation pump on the cooling tower loop and providing an automatic valve to stop the flow of fluid.

C403.4.3.3.3 Isolation valve. Each hydronic heat pump on the hydronic system having a total pump system power exceeding 10 horsepower (hp) (7.5 kW) shall have a two-way (but not three-way) valve. For the purposes of this section, pump system power is the sum of the nominal power demand

(i.e., nameplate horsepower at nominal motor efficiency) of motors of all pumps that are required to operate at design conditions to supply fluid from the heating or cooling source to all heat transfer devices (e.g., coils, heat exchanger) and return it to the source. This converts the system into a variable flow system and, as such, the primary circulation pumps shall comply with the variable flow requirements in Section C403.4.3.6.

C403.4.3.4 Part load controls. Hydronic systems greater than or equal to 300,000 Btu/h (87,930 W) in design output capacity supplying heated or chilled water to comfort conditioning systems shall include controls that have the capability to:

1. Automatically reset the supply-water temperatures using zone-return water temperature, building-return water temperature, or outside air temperature as an indicator of building heating or cooling demand. The temperature shall be capable of being reset by at least 25 percent of the design supply-to-return water temperature difference; and

2. Reduce system pump flow by at least 50 percent of design flow rate utilizing adjustable speed drive(s) on pump(s), or multiple-staged pumps where at least one-half of the total pump horsepower is capable of being automatically turned off or control valves designed to modulate or step down, and close, as a function of load, or other *approved* means.

Hydronic systems serving hydronic heat pumps are exempt from item 1, and only those hydronic systems with a total pump system power greater than 3 hp (2.2 kW) shall have controls meeting the requirements of item 2, above.

C403.4.3.5 Pump isolation. Chilled water plants including more than one chiller shall have the capability to reduce flow automatically through the chiller plant when a chiller is shut down and automatically shut off flow to chillers that are shut down. Chillers piped in series for the purpose of increased temperature differential shall be considered as one chiller.

EXCEPTION: Chillers that are piped in series for the purpose of increased temperature differential.

Boiler plants including more than one boiler shall have the capability to reduce flow automatically through the boiler plant when a boiler is shut down and automatically shut off flow to (~~chillers~~) boilers that are shut down.

C403.4.3.6 Variable flow controls. Individual pumps requiring variable speed control per Section C403.4.9 shall be controlled in one of the following manners:

1. For systems having a combined pump motor horsepower less than or equal to 20 hp (15 kW) and without direct digital control of individual coils, pump speed shall be a function of either:

1.1. Required differential pressure; or

1.2. Reset directly based on zone hydronic demand, or other zone load indicators; or

1.3. Reset directly based on pump power and pump differential pressure.

2. For systems having a combined pump motor horsepower that exceeds 20 hp (15 kW) or smaller systems with

direct digital control, pump speed shall be a function of either:

- 2.1. The static pressure set point as reset based on the valve requiring the most pressure; or
- 2.2. Directly controlled based on zone hydronic demand.

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-61031 Section A103.1—General.

A103.1 General. ~~The tables ((A103.1(1), A103.1(2) and A103.1(3))~~ in this section list heat loss coefficients for the opaque portion of above-grade wood stud frame walls, metal stud frame walls and concrete masonry walls (Btu/h • ft² • °F) ~~((respectively.))~~ They are derived from procedures listed in the ASHRAE Fundamentals Handbook. For intermediate floor slabs which penetrate the insulated wall, use the concrete wall U-factors in Table ~~((A103.1(2))~~ A103.3.7.1(1).

Insulation is assumed to uniformly fill the entire cavity and to be installed as per manufacturer's directions. All walls are assumed to be finished on the inside with 1/2 inch gypsum wallboard, and on the outside with either beveled wood siding over 1/2 inch plywood sheathing or with 5/8 inch T1-11 siding. Insulated sheathing (either interior or exterior) is assumed to cover the entire opaque wall surface, except where modified in accordance with footnote h to Table C402.1.1.

Metal building walls have a different construction and are addressed in Table A103.3.6.3.