

# Seattle Permits

— part of a multi-departmental City of Seattle series on getting a permit

## Common Seattle Residential Code Requirements

Updated May 22, 2017

Tip 303A applies only to structures within the scope of the Seattle Residential Code (SRC) including detached one- and two-family dwellings, townhouses up to three stories in height, each with a separate means of egress, and their accessory structures. Generally, all other structures are subject to the Seattle Building Code (SBC).

This Tip outlines important code items that you are required to include on plans for your projects. You may need to include additional items depending on your specific project. Remember that these guidelines are not substitutes for our codes and regulations. You are responsible for ensuring that your project complies with the specific requirements of all relevant codes and regulations.

The following codes are available online at [www.seattle.gov/dpd/codesrules/codes/default.htm](http://www.seattle.gov/dpd/codesrules/codes/default.htm).

- Seattle Residential Code (SRC) (International Residential Code with Seattle Amendments)
- Seattle Building Code (SBC) (International Building Code with Seattle Amendments)
- Seattle Energy Code (SEC) (Washington State Energy Code)

Director's Rules (DRs) are online at <http://web6.seattle.gov/dpd/dirrulesviewer>.

SRC code interpretations are online at [www.seattle.gov/dpd/codesrules/codeinterpretations/default.htm](http://www.seattle.gov/dpd/codesrules/codeinterpretations/default.htm).

### 1. REQUIREMENTS ON PLANS

For specific requirements for your plans, see SRC R105.5.1, Tip 303, *Applicant Responsibilities and Plan Requirements for Single Family and Two-Unit Dwellings*, and Tip 106, *General Standards for Plans and Drawings*.

We require an architect's or structural engineer's signed stamp on townhouse plans. Generally, we don't require a design professional's stamp for one- and two-family detached dwellings and accessory structures, except for complex structures. Whether your plans need to be stamped is subject to our approval. (SRC R105.5.1.1)

Your plans must be of reproducible quality with legible lettering. Plans must be at least 18" x 18". You can submit your plans online at <http://web6.seattle.gov/dpd/eplan/>.

Please include all the specific items listed below on your plans in the appropriate locations. Do not list just code references.

- A completed SDCI Construction Stormwater Control and Soil Amendment Plan (2016), with the plan set. See [www.seattle.gov/sdci](http://www.seattle.gov/sdci) under Forms.
- A completed SDCI Standard Drainage and Wastewater Control Plan (2016), with the plan set. See [www.seattle.gov/sdci](http://www.seattle.gov/sdci), under Forms.
- Site Plan.
- Foundation plan.
- Floor plans, including labeled use of all rooms.
- Exterior elevations.
- Roof and floor framing plans, including existing framing affected by additions and alterations.
- Building cross-section(s).
- Architectural/structural notes and details.

Do not include any options or alternates on your plans. SDCI only approves specific proposals.



## 2. BUILDING SEPARATION REQUIREMENTS

**For walls, openings and eaves close to the property line you need to follow these separation requirements (SRC R302.1):**

- A one-hour fire-rated wall is required if the wall is less than 5' from the property line. (Carport posts define an exterior wall, and the space between posts is considered an opening.) See the description in the adjacent box for a typical one hour rated wall.
- No openings (doors and windows) are allowed in walls less than 3' from the property line.
- Openings in the wall can't exceed 25% of the total wall area of the story in walls that are 3' to 5' from the property line.
- Eaves are not allowed to be closer than 2' to the property line.
- Under-eave or soffit vents are not allowed in eaves less than 5' from the property line; instead, solid blocking is required from the top of the wall framing to the roof sheathing.

## 3. GARAGE FIRE SEPARATION REQUIREMENTS

(See SRC R302.5 and Table R302.6.)

- 1/2" regular gypsum board (on the garage side) is required at walls separating the garage from the dwelling, including garages less than 3' from a dwelling unit on the same lot.
- When a dwelling is above a garage, the garage ceilings must be covered with 5/8" Type X gypsum board. The structure supporting the dwelling unit (walls, beams and posts) must be covered with 1/2" regular gypsum board.
- Doors between a garage and a dwelling must be 1-3/8" thick (minimum) solid wood or steel (solid or honey-comb core), or be a 20-minute fire-rated door. The door must also be self-closing.
- No fire separation is required between a carport and dwelling unit. (Carports have at least two open sides. See R309.2).

## 4. SOUND TRANSMISSION CONTROL FOR NEW DUPLEXES AND ACCESSORY DWELLING UNITS

See SRC R330 for detailed sound control requirements.

- Floors between dwelling units (or between a unit and a common area) are required to have sound deadening (STC = 45 minimum and impact sound insulation IIC = 50 minimum).
- Walls between dwelling units and between dwelling units and common areas are required to have sound deadening (STC = 45 minimum).

## 5. LIFE SAFETY REQUIREMENTS

**Stairs:** Your stairs must meet the following requirements (SRC R311.7).

- Minimum of 36" clear width
- Maximum of 7<sup>3</sup>/<sub>4</sub>" riser (height of each step)
- Minimum of 10" tread depth (a tread nosing may be required)
- Minimum of 6'8" headroom
- Handrail with a 34"-38" height
- Handrail grasping dimension of at 1-1/4" and no more than 2"
- Winding stair treads: Each step must be at least 10" measured 12" from the narrowest point and at least 6" at the narrowest point

**Guardrails and Window Fall Protection:** Your project must meet the following requirements (SRC R312)

- A guard (guardrail) is required for walking surfaces 30" above adjacent grade or floor
- Minimum of 36" for the guard height
- Maximum of 4" clear space between intermediate rails in guards
- Fall protection is required for operable windows more than 6 feet above finished grade or surface below, when lowest edge of window opening is within 24" of finished floor of the room in which the window is located

**Carbon Monoxide Alarms:** You must install alarms according to these requirements (See SRC R315).

- You must install carbon monoxide alarms in new construction and in existing dwelling units.

- Carbon monoxide alarms are required outside sleeping areas, and on all floors (including basements). Show the alarm location(s) on your plans.

**Smoke Alarm:** The following rules apply for smoke alarms (SRC R314).

- You must install smoke alarms in new construction and existing dwelling units.
- The alarms must be powered by interconnected building wiring, and have battery back-up in new construction and new additions.
- Smoke alarms may be battery-powered if you are altering or repairing a dwelling unit, except when you can install interconnected building wiring without removing the interior finishes.
- Alarms are required in sleeping rooms, outside sleeping areas, and on other floors (including basements). An alarm outside of the bedrooms must be clearly audible in the bedrooms. Show the alarm location on your plans.

**Emergency Escape and Rescue:** One window (or door) in the basement, a habitable attic, and in each bedroom, must meet these requirements (SRC R310):

- The minimum net clear open area is 5.7 square feet (however, openings at grade floor may be a minimum of 5 square feet)
- The minimum clear open width is 20"
- The minimum clear open height is 24"
- The maximum allowed sill height is 44"
- The inside of the window wells must be a minimum of 9 square feet in area, with a minimum 3' width, and must allow the window to open all the way. A ladder is required if the bottom of the window well is more than 44" below the adjacent ground.

**Security Requirements:** (SRC R329)

- Exterior entrance doors must have a dead bolt with a minimum 1/2" throw on the bolt, including the exterior door into the garage.
- Exterior entry doors must have a peephole (visitor observation port).
- Windows less than 10' above the ground (or above an accessible deck) must have locks.
- At least one 3' wide exterior entrance must have a lock that can be opened from the inside without a key or any special knowledge or effort.

**Skylights:** (SRC R308.6)

- See R308.6.2 for the types of safety glazing that is allowed
- See R308.6.3, R308.6.4 and R308.6.5 for safety screen requirements
- A 4" curb is required when the roof pitch is less than 3:12 (25% slope)

**Safety Glazing:** (SRC R308.4)

Safety glazing is generally required as follows, but please see the code for specific details.

- Glazing in or within 24" of the arc of a door
- Glazing close to the floor
- Glazing adjacent to stairs and stair landings
- Glazing near wet floor surfaces

## 6. VENTILATION REQUIREMENTS

**Mechanical Ventilation/Outside Air Supply:** See SRC Chapter 15 for further information about sizing intermittent whole house ventilation fan and other whole house ventilation options, for new houses and additions.

- Local exhaust fans are required, specifically in kitchens, bathrooms, laundry rooms, indoor swimming pool areas, spas, and other rooms where excess water vapor or cooking odor is produced. The minimum airflow rate must not be less than the levels specified in Table M1507.4.
- Each dwelling unit must also have a whole house ventilation system that can provide continuous flow rate of fresh outdoor air not less than specified in Table M1507.3.3(1).
- Whole-house ventilation systems are allowed to operate intermittently as long as the system has controls that enable operation at least 25 percent of each 4-hour segment. The system must have a ventilation rate as prescribed in Table M1507.3.3(1) that is multiplied by the factor listed in Table M1507.3.3(2).
- Whole house fans located 4' or less from the interior grille in the ceiling or wall, shall have a sone rating of 1.0 or less.
- Exhaust ducts must end outside of the building.
- Every habitable room must receive outdoor air by means of individual air inlets, a separate ducted system, or a forced-air system.

**Table M1507.3.3(1)**  
**Continuous Whole-House Mechanical Ventilation System Airflow Rate Requirements**

| Number of Bedrooms                           |       |       |       |       |     |
|--|-------|-------|-------|-------|-----|
| Dwelling Unit<br>Floor Area<br>(Square Feet) | 0 - 1 | 2 - 3 | 4 - 5 | 6 - 7 | >7  |
| Airflow in CFM                               |       |       |       |       |     |
| < 1,500                                      | 30    | 45    | 60    | 75    | 90  |
| 1,501 - 3,000                                | 45    | 60    | 75    | 90    | 105 |
| 3,001 - 4,500                                | 60    | 75    | 90    | 105   | 120 |
| 4,501 - 6,000                                | 75    | 90    | 105   | 120   | 135 |
| 6,001 - 7,500                                | 90    | 105   | 120   | 135   | 150 |
| > 7,501                                      | 105   | 120   | 135   | 150   | 165 |

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 cubic foot per minute = 0.0004719 m<sup>3</sup>/s.

**Table M1507.3.3(2)**  
**Intermittent Whole-House Mechanical Ventilation Rate Factors<sup>a, b</sup>**

| Run-Time Percentage in Each<br>4-Hour Segment | 25% | 33% | 50% | 66% | 75% | 100% |
|---|-----|-----|-----|-----|-----|------|
| Factor <sup>a</sup>                           | 4   | 3   | 2   | 1.5 | 1.3 | 1.0  |

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.

b. Extrapolation beyond the table is prohibited.

**Table M1507.4**  
**Minimum Required Local Exhaust Rates for One- and Two-Family Dwellings**

| Areas to be Exhausted  | Exhaust Rates   |
|--|---|
| Kitchens   | 100 cfm intermittent or 25 cfm continuous                               |
| Bathrooms - toilet rooms, laundry rooms, indoor swimming pools, spas | Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous |

- For systems using an exhaust fan, doors must be undercut to a minimum of one-half inch above the finish floor covering.
- Doors and operable windows can't be used to meet the outdoor air supply requirements.

**Roof Ventilation:** Ventilation is required on the cold side of attic/roof insulation (SRC R806). See SRC R806.5 for unvented roof construction requirements.

- The ventilation openings must be at least 1 square foot of venting per 150 square feet of area to be vented. This can be reduced to 1 square foot of venting per 300 square feet of area to be vented if you provide ventilators in the upper portion of the area to be vented.
- There vent must have at least 1" of air space above the roof insulation.
- Cross-ventilation is required.

**Crawl Space Ventilation:** (SRC R408)

- Cross-ventilation is required in crawl spaces. (See also SRC R317.1 for crawl space clear heights; 18" minimum for joists; 12" minimum for wood girders without pressure treating.)
- The minimum cross-ventilation openings allowed are 1 square foot per 150 square feet of crawl space area.

## 7. TOWNHOUSES

- Townhouses must be designed by a licensed design professional. (SRC R105.5.1.1)
- Townhouse units shall be separated by two fire-rated one-hour walls or a common fire-rated two-hour wall that contains no plumbing or mechanical equipment. (SRC R302.2)
- Townhouse buildings with four or more dwelling units must comply with SBC Chapter 11 accessibility requirements. (SRC R320)

## 8. TWO-FAMILY DWELLINGS

- Duplex units shall be separated by a fire rated one-hour wall or floor. (SRC R302.3)
- The structure that supports a one-hour floor (walls, beams, posts), shall have a minimum one-hour rating. (SRC R302.3.1)

## 9. MISCELLANEOUS REQUIREMENTS

**Room Dimension Requirements:** (SRC R304 and R305)

- The required ceiling height is 7'0" minimum for habitable spaces, including bathrooms, laundry rooms, basements and hallways.
- Rooms with sloped ceilings must meet the minimum height for at least 50% of the area (areas with ceilings less than 5' high don't count towards the minimum required room area).
- When a bathroom has a sloping ceiling, a minimum 6'8" height at the center line of bathroom fixtures is required.
- At least one habitable room must have a minimum 120 square foot floor area and other habitable rooms must have at least 70 square foot floor area.
- Every habitable room is required to have a 7' minimum width (except for bathrooms, closets, storage, or utility rooms).

For exceptions to headroom in existing basement spaces, see Director's Rule (DR) 23-2008.

**Attic Access:** (SRC R807)

- The attic opening must be 22" x 30" at a minimum
- Attic headroom to be 30" at the access

**Crawl Space:** (SRC R408.4)

The minimum crawl space access opening is 24" x 18" through a floor or 24" x 16" through the wall.

**Fire and Draftstops:** (SRC R302.11 and R302.12)

- Fireblocking and draft stops are required in floor-ceiling assemblies so that the concealed space does not exceed 1,000 square feet.
- Fire blocks are required between connected, concealed spaces per R302.11

**Non-combustible Surface on Garage Floors**

For regulations related to non-combustible surface on garage floors, see SRC R309.1.

**Drainage**

For more information, see SMC 22.800, Stormwater Code, and SMC 22.16, Side Sewer Code; For more detailed, permanent stormwater design, see DR 21-2015, *Stormwater Manual*. See DR 4-2011, *Requirements for Design & Construction of Side Sewers (Drainage & Wastewater Discharges)*, for more detailed side sewer installation requirements.

If your project includes disturbing more than 750 square feet of the site or is adding or replacing more than 750 square feet of hard surfaces, you must include two drawings in your plans: the Standard Construction Stormwater Control and the Soil Amendment Plan (CSC/Soil Plan) and Standard Drainage and Wastewater Control Plan (DWC Plan). These are available on our website [www.seattle.gov/dpd/permits/forms/default.htm](http://www.seattle.gov/dpd/permits/forms/default.htm).

Stormwater Code Requirements:

- Drainage plan review is required when more than 750 square feet of ground is disturbed during construction or when 750 square feet of hard surface is added or replaced. Examples of hard surface include building roof areas and all paving (including gravel).
- For on-site stormwater management requirements and plan submittal requirements, see the Stormwater Code, available online at [www.seattle.gov/dpd/codesrules/codes/stormwater/default.htm](http://www.seattle.gov/dpd/codesrules/codes/stormwater/default.htm).

Side Sewer Code Requirements:

- A separate side sewer permit is required for side sewer work associated with your building permit.
- For private sanitary and stormwater control pipe (side sewers) installation requirements, see Side Sewer Code, available online at [www.seattle.gov/dpd/codesrules/codes/sidesewercode/index.htm](http://www.seattle.gov/dpd/codesrules/codes/sidesewercode/index.htm).

Questions regarding stormwater and wastewater requirements can be directed to [sidesewerinfo@seattle.gov](mailto:sidesewerinfo@seattle.gov) or 206-684-5362.

## 10. BUILDING CONSTRUCTION REQUIREMENTS

For projects that don't comply with the requirements below, an alternate design with calculations must be provided by a licensed Washington state structural engineer that meet the criteria in the Seattle Building Code.

**Foundation:** (SRC R403.1 and R602.11)

- Footings must sit on soil that has never been excavated (disturbed) and be at least 12" below grade, including deck footings.
- For the sill plate anchorage, you must use 1/2" x 10" anchor bolts with 1/4" x 3" x 3" minimum plate washers spaced at no more than 6' o.c. (on center) Each plate must have two bolts per piece and at least one bolt within 12" of each end of each piece.

### Concrete Foundations

- Concrete Strength: 2,000 psi, 5 sack concrete is acceptable, as it has been shown to achieve the strengths of the code required strength of 2,500 psi.
- For minimum reinforcement criteria, see SRC R403.1.3 (footings), SRC R403.1.31. (stem walls), SRC Table R404.1.2.2 and R404.1.4.2 (walls), and section 12 below.

**Soil Types:** (SRC Table R401.4.1)

- Soil is assumed to have the ability to resist a 2,000 pounds per square foot (psf) load (weight of the house on the footing), except in ECA areas or per pre-application site inspection.
- If your project is designed for soil that can support more than 2,000 psf, you need to provide geotechnical engineer justification.

**Wood/Earth Separation:** (SRC R317.1)

- Pressure-treated wood or foundation cedar is required for wood that is in contact with concrete or for wood that close to earth.
- There must be a minimum of 6" clearance between wood and earth.

**Framing:** (SRC R301.2.2.3 and R602.10)

Conventional wall bracing ("prescriptive design") can only be used for houses that are three stories tall.

**Wall Stud Size:** (SRC Table R602.3(5))

The required size and spacing of studs is based on the number of floors supported and the clear height of stud.

**Connections Between Beam/Columns:** (SRC R502.9)

Positive connection (connection hardware) is required in order to resist the forces of an earthquake or wind storms.

### Masonry Fireplace and Chimneys

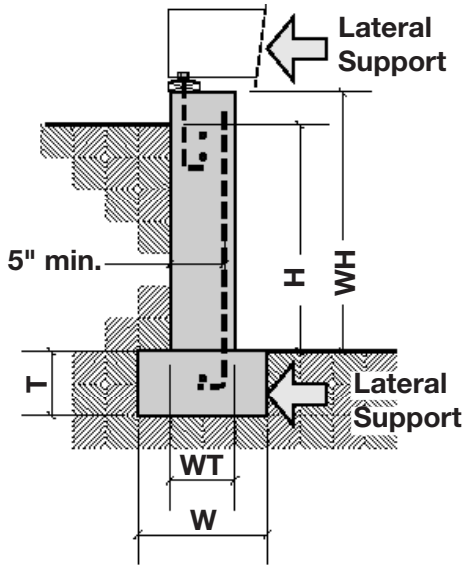
Existing exterior unreinforced masonry chimneys may be repaired, strengthened, or extended per DR 5-2004, *Alteration and Repair of Unreinforced Masonry Chimneys*.

**Factory-Built Fireplaces and Chimneys:** (SRC R1004 and R1005)

- Factory-built fireplaces and chimneys must be UL- or ICC- approved, and must be installed per manufacturer's requirements.

- You need a separate furnace permit for wood stoves.
- Fireplaces and wood stoves must be certified as meeting emission standards. See Section R1004.1.

**Solid Fuel Burning Appliances:** (SRC R1006.2)



**Footing Sizes<sup>a</sup>**  
(See R403.1.3 and Figure R403.1(1) for Light-Frame Construction)

|                            | "T"(in.) | "W"(in.) | Reinforcing            |
|----------------------------|----------|----------|------------------------|
| 1 Story <sup>b,c,d,e</sup> | 6        | 12       | 1-#4 Bottom of Footing |
| 2 Story <sup>b,c,d,e</sup> | 6        | 12       | 1-#4 Bottom of Footing |
| 3 Story <sup>b,c,d</sup>   | 6        | 17       | 1-#4 Bottom of Footing |

- a. 2000 psf soil bearing.
- b. Numbers of floors.
- c. Floors and roofs (with live loads of 40 psf for floors and 20 psf for roofs).
- d. Slab on grade.
- e. With crawl space.

**Stem Walls**

(Tables R404.1.2(1) & R404.1.2(8))

| Maximum Unbalanced Backfill<br>"H" <sup>4</sup> | Maximum Wall Height<br>"WH" | Minimum Wall Thickness<br>"WT" | Horizontal Reinforcing<br>(Grade 40 psi rebar) | Vertical Reinforcing<br>(Grade 60 psi rebar)      |
|---|-----------------------------|--------------------------------|--|---|
|   |                             |                                | See SRC Table R404.1.2.(1)                     | Soil Classes GW, GP, SW, SP <sup>6</sup>          |
| 4'  | ≤4'6"                       | 6"                             | 1-#4 top of stem wall <sup>2</sup>             | #4 @ 48"<br>Min. 14" into stemwall <sup>1,5</sup> |
| 4'  | 8'                          | 8"                             | 1-#4 top of stem wall <sup>2</sup>             | #4 @ 48"<br>Min. 14" into stemwall <sup>1,5</sup> |
| 4'-5'   | 9'                          | 8"                             | 2-#4 top of stem wall <sup>3</sup>             | #4 @ 48"  |
| 5'-6'   | 6'                          | 8"                             | 2-#4 top of stem wall <sup>2</sup>             | #4 @ 48"  |
| 5'-6'   | 9'                          | 8"                             | 2-#4 top of stem wall <sup>3</sup>             | #4 @ 48"  |
| 7'  | 7'                          | 8"                             | 2-#4 top of stem wall <sup>2</sup>             | #4 @ 48"  |
| 7'  | 9'                          | 8"                             | 2-#4 top of stem wall <sup>3</sup>             | #4 @ 48"  |
| 8'  | 8'                          | 8"                             | 2-#4 top of stem wall <sup>2</sup>             | #4 @ 30" or #5 @ 47"                              |
| 8'  | 9'                          | 8"                             | 2-#4 top of stem wall <sup>3</sup>             | #4 @ 26" or #5 @ 41"                              |
| 9'  | 9'                          | 8"                             | 2-#4 top of stem wall <sup>3</sup>             | #4 @ 21" or #6 @ 46"                              |

- 1. Vertical reinforcing is required (for shear) only where a construction joint is created between a concrete footing and stem wall. Reinforcing may be placed at center of wall.
- 2. 1-#4 near mid-height of stem wall story
- 3. 1-#4 near 1/3 point of stem wall story
- 4. Where walls will retain 4 ft. or more of unbalanced backfill, they shall be laterally supported at the top and bottom before backfilling.
- 5. With standard hook per R608.5.4.5
- 6. SRC Table R405.1

**LEGAL DISCLAIMER:** This Tip should not be used as a substitute for codes and regulations. The applicant is responsible for compliance with all code and rule requirements, whether or not described in this Tip.

- Tight fitting glass or metal doors are required on solid fuel burning appliances like wood stoves or fireplaces.
- An outside source of combustion air must be ducted to the firebox.

## 11. PRESCRIPTIVE FOUNDATION REQUIREMENTS

**SRC Concrete Footing and Stemwall Requirements in Seattle:** The following diagram and charts summarize the requirements that apply in Seattle and are based on SRC R403 and R404.

## 12. ENERGY CODE REQUIREMENTS

The Seattle Energy Code contains separate stand-alone sections for “commercial buildings” and “residential buildings.” In the energy code, the term “residential buildings” includes single-family, two-family and townhouse structures, as well as multi-family buildings up to three stories. Section numbers in the code for residential buildings start with the letter R (R101.6), and the page numbers also start with an R (R-23). Sections and page numbers for commercial buildings each start with the letter C. Most technical requirements are found in Chapter 4, and rules for additions and alterations are in Chapter 5. The Seattle energy code requirements for “residential buildings” are the same as in the Washington state code.

### Chapter 4, Section C402

#### Building thermal envelope—insulation and air barriers

- Section R402 contains the insulation and air barrier requirements for the “building thermal envelope” – the walls, windows, roof, floor, and slab that enclose the heated space.
- You can use either minimum R-values (Table R402.1.1) or maximum U-values (Table R402.1.3) to meet the code.
  - R-values represent the thermal “resistance” of insulation to heat flow (higher R-values are better). The R-values in Table R402.1.1 (see summary table below) are for insulation in wood frame construction. Windows and doors (called “fenestration” in the code) do not have R-values.
  - U-values represent the rate of heat loss (lower U-values are better) through an entire assembly, such as a window unit or a wall. Table R402.1.3 shows the maximum U-values for each assembly category (see summary table below). Steel-

stud walls and other steel-framed assemblies must meet the U-values in this table (including the line reading “wood-frame wall U-factor”).

- The summary table below shows the minimum R-values for opaque assemblies (wall, roof, floor) and the maximum U-values for fenestration (window, door, skylight).
- Sealed air barriers eliminate drafts and reduce heating bills. The entire building thermal envelope must be sealed against air leakage and pass a blower door test.
- A two-page summary of the insulation and air barrier requirements for envelope components is shown in Table R402.4.1.1.
- See Section R702.7 in the Seattle Residential Code for vapor retarder requirements.
- The “Total UA Alternative” in Section R402.1.4 is a calculation that allows some building envelope assemblies with lower (better) U-values to be traded off against others with higher (worse) U-values. The reference design building cannot have glazing area that is larger than 15 percent of the floor area. A form for this calculation is available online at [www.seattle.gov/dpd/cs/groups/pan/@pan/documents/web\\_informational/s048039.xls](http://www.seattle.gov/dpd/cs/groups/pan/@pan/documents/web_informational/s048039.xls).

See the Summary of R-Value and U-Value Requirements table on page 11.

#### Energy modeling

- The “Simulated Performance Alternative” in Section R405 is a calculation method using advanced energy modeling software that allows above-code building components to be traded off against below-code components. The calculation can take into account the heating, cooling, water heating, windows, and many other components. This process is rarely used for single-family homes, and is typically performed by specialized consultants.

#### Solar readiness

- See Appendix U in the Seattle Residential Code for solar readiness requirements.

#### Heating and cooling systems

- Calculate the heating and air conditioning equipment sizes using ACCA Manual S and Manual J, or using the “simple heating system sizing” form online: [http://www.seattle.gov/dpd/cs/groups/pan/@pan/documents/web\\_informational/s048035.xlsx](http://www.seattle.gov/dpd/cs/groups/pan/@pan/documents/web_informational/s048035.xlsx). The equipment must be the small-



est size available that can serve the calculated load. See Section R403.7.

- If your dwelling unit will be primarily heated with electric resistance (typically baseboard or fan coil units), you must install an “inverter-driven ductless mini-split heat pump” in the largest heating zone. Ductless mini-splits use much less power than electric resistance heaters. See Section R403.7.1.
- See Section M1507 of the Seattle Residential Code for ventilation requirements.
- We don't require insulation for ducts that are completely inside the heated space. Provide R-8 insulation for ducts outside the thermal envelope (such as in an attic or garage) , and R-10 insulation for in-slab or underground ducts.
- Ducts, air handlers, and filter boxes must be sealed and pass an air leakage test, unless the air handler and ductwork system is entirely located within the building thermal envelope. Very short runs of supply and return ducts can be located outside of the thermal envelope, typically in the attic, if they are properly sealed and insulated. See Section R403.3.3.
- Pipes for hydronic space heating systems must have 1/2-inch insulation for the first 200 feet of pipe within the conditioned space, and R-6 insulation for any additional pipe length and any pipe outside the conditioned space. See Section R403.4.
- You should provide a programmable thermostat for forced-air furnace systems, with capability for separate weekday/weekend (5-2) schedules and two daily setback periods. Section R403.1.1.

### Water heating and lighting

- Wrap domestic hot water piping with R-3 insulation, both inside and outside of the building thermal envelope, except where it passes through studs, joists or beams. See Section R403.5.3.
- See Section R403.10 for pool and spa requirements, including heaters, pumps, and pool covers.
- 75 percent of the lamps in permanent light fixtures must be high-efficacy lamp types, such as LED, compact fluorescent (CFL), or T-5 or T-8 fluorescent.

### Wall certificate

- Post a permanent wall certificate near the electrical service panel or furnace, listing the insulation values and air barrier testing results for the building thermal envelope, as well as the rated efficiency

of heating, cooling, and water heating equipment and the location of the “solar zone.” See Section R401.3. See example certificate online at [www.seattle.gov/dpd/cs/groups/pan/@pan/documents/web\\_informational/s048035.xlsx](http://www.seattle.gov/dpd/cs/groups/pan/@pan/documents/web_informational/s048035.xlsx).

## Chapter 5

Chapter 5 contains most of the requirements for changes to existing buildings.

- Generally, any elements that were legally built can remain in place indefinitely.
- Always preserve and protect the designated historic elements of landmark buildings.

### Additions (Section R502)

- Either the addition alone or the total (existing plus addition) must comply with the code
  - One exception: If changing unheated to conditioned space without meeting all of the envelope requirements, you can upgrade parts of the existing house to compensate
- Provide the additional energy efficiency credits required by Section R406.
- New ductwork must be sealed and leak-tested, unless the addition is less than 750 square feet.
- The new work in the addition must meet the code requirements for new construction, including air leakage testing (R402.4) and additional energy efficiency credits as required for additions in R406.2.
- We do not require solar readiness for additions.

### Change of space conditioning (Section R503.2)

- An unheated space such as a basement or garage that is converted to heated space must meet the energy code requirements for “additions.” This includes the additional energy efficiency credits required by Section R406.2.

### Alterations (Section R503)

- Alterations must not increase the energy use of the existing building. See Section R503.1. One exception is you may install additional windows.
- Any new or replacement wall, floor, or roof assemblies in envelope alterations must meet current code.
- You must fill any framing cavities in the thermal envelope that are exposed during the project with insulation.

- If you expose roof sheathing during re-roofing work and the roof framing cavities are not already insulated, insulate the roof to current code. For roof recover work (over existing roofing), where the sheathing is not exposed, we don't require additional insulation.

#### **Repair (Section R504)**

Repair means maintaining or fixing damage to a part of the building. Like-for-like replacements of existing materials, such as the following, don't have to meet current code.

- Replacing broken glass
- Patching a leaking roof
- Replacing bulbs and ballast in an existing light fixture

#### **Change of occupancy or use (Section R505)**

We require full code compliance for:

- A change from residential use to any other use
- A change from a non-residential use (such as a garage) to a dwelling unit or any other "residential building"
- Any other change of occupancy that increases energy use

#### **Additional Energy Efficiency Credits (Section R406)**

Energy Credits required:

- 0.5 credits: Additions smaller than 500 square feet
- 1.5 credits: Additions of 501 – 1499 square feet
- 1.5 credits: New dwelling units smaller than 1,500 square feet
- 3.5 credits: New dwelling units of 1,500 – 5,000 square feet
- 4.5 credits: New dwelling units larger than 5,000 square feet

See Energy Credit Options on page 12.

## Access to Information

Links to electronic versions of many of the SDCI documents mentioned in this Tip are available on the "Tools & Resources" page of our website at [www.seattle.gov/sdci](http://www.seattle.gov/sdci). Paper copies are available from our Public Resource Center, located on the 20th floor of Seattle Municipal Tower at 700 Fifth Ave. in downtown Seattle, (206) 684-8467.

### Summary of R-Value and U-Value Requirements

|  | <b>Minimum R-value of Insulation</b> | <b>Maximum U-value of Assembly</b> | <b>Notes</b>  |
|--|--------------------------------------|------------------------------------|---|
| <b>Fenestration – windows and glazed doors</b> | (none)                               | 0.30                               | Windows and glazed doors should have an NFRC sticker showing the U-value  |
| <b>Opaque doors</b>                            | (none)                               | 0.30                               | Opaque doors generally use the default values shown in Appendix Table R303.1.3(2)   |
| <b>Skylights</b>                               | (none)                               | 0.50                               | Skylights should have an NFRC sticker showing the U-value   |
| <b>Roof/ceiling: conventional attic</b>        | R-49                                 | 0.026                              | Provide R-49 where the insulation thickness tapers to thinner than R-49 at the eaves  |
| <b>Wood frame wall</b>                         | R-21 + int. framing                  | 0.056                              | Intermediate framing means studs 16 inch on center plus R-10 insulation at headers  |
| <b>Steel frame wall</b>                        | (none)                               | 0.056                              | Continuous insulation outside of the steel framing would be required to meet this U-value   |
| <b>Mass wall – Typically concrete or CMU</b>   | R-21                                 | 0.056                              | Insulation can be placed on the inside or outside of the wall   |
| <b>Wood frame floor over unheated area</b>     | R-30                                 | 0.029                              |   |
| <b>Steel frame floor over unheated area</b>    | (none)                               | 0.029                              | Continuous insulation outside of the steel framing would be required to meet this U-value   |
| <b>Below-grade wall</b>                        | R-10 or                              |                                    | Batts in narrow cavities shall be cut to fit and installed to the correct density without any voids or gaps or compression, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space. |
| <b>Edge of unheated slab on grade</b>          | R-10 for 2 feet                      | (none)                             | Insulation can be placed inside or outside the foundation wall, extending from top of slab down 2 feet, or to top of the footing  |
| <b>Heated slab on grade</b>                    | R-10 for 2 feet + under slab         | (none)                             | Heated slabs on grade must have R-10 insulation around the perimeter and under the entire slab area   |

### Energy Credit Options

| 1. Envelope Options                      | Base code                 | Option 1a                     |                               | Description                   | Credit(s) |
|--|---------------------------|-------------------------------|-------------------------------|-------------------------------|-----------|
| <b>Vertical Fenestration</b>             | U-0.30                    | U-0.28                        | U-0.25                        | U-0.22                        | U-0.24    |
| <b>Ceiling (including single rafter)</b> | R-49 (or R-38)            | --                            | --                            | R-49 advanced framing         | --        |
| <b>Wood frame wall</b>                   | R-21 intermediate framing | --                            | R-21 plus R-4 c.i.            | R-21 plus R-12 c.i.           | --        |
| <b>Floor</b>                             | R-30                      | R-38                          | R-38                          | R-38                          | --        |
| <b>Basement wall</b>                     | R-10/15/21 intermediate   | --                            | R-21 plus R-5 c.i.            | R-21 plus R-12 c.i.           | --        |
| <b>Slab on grade</b>                     | R-10 perimeter            | R-10 perimeter and under slab | R-10 perimeter and under slab | R-10 perimeter and under slab | --        |
| <b>Below-grade slab</b>                  | --                        | R-10 perimeter and under slab | R-10 perimeter and under slab | R-10 perimeter and under slab | --        |
| <b>UxA alternative</b>                   | --                        | Reduce heat loss 5%           | Reduce heat loss 15%          | Reduce heat loss 30%          | --        |

To qualify for one of these options, improve each envelope component in the column below the option.

c.i. means continuous insulation, usually installed between the framing and the exterior cladding. See Appendix A102.2.1 for “advanced” ceiling framing, A103.2.2 for “intermediate” wall framing.

| 2. Air Leakage & Ventilation  | Base Code                          | Option 2a<br>0.5 credit            | Option 2b<br>1.0 credit | Option 2c<br>1.5 credit |
|-------------------------------|------------------------------------|------------------------------------|-------------------------|-------------------------|
| <b>Air leakage rate</b>       | 5 ACH50                            | 3 ACH50                            | 2 ACH50                 | 1.5 ACH50               |
| <b>Ventilation efficiency</b> | 0.28 watts/cfm max whole house fan | 0.35 watts/cfm max whole house fan | HRV 70% efficient       | HRV 85% efficient       |
| <b>UxA alternative</b>        | --                                 | Reduce heat loss 5%                | Reduce heat loss 15%    | Reduce heat loss 30%    |

To qualify for one of these options, provide reduced air leakage and improved ventilation efficiency.

HRV means heat recovery ventilator. ACH50 is the air change rate in the blower door test at 50 Pascals of pressure.

| 3. HVAC                  | Base Code                               | Option 3a<br>1.0 credit           | Option 3b<br>1.0 credit           | Option 3c<br>1.5 credit                         | Option 3d<br>1.0 credit   |
|--------------------------|---|-----------------------------------|-----------------------------------|---|---|
| <b>Mechanical system</b> | Simply meet federal equipment standards | Min 94% efficient gas/oil furnace | Min 9.0 HSPF air-source heat pump | Min 3.3 COP closed-loop ground source heat pump | Ductless mini-split heat pump serving largest zone of house otherwise heated with electric resistance baseboard or fan coil units |

To qualify for one of these options, provide the higher-efficiency water heating equipment listed.

COP means coefficient of performance. EF means rated efficiency.

| <b>5. Water Heating</b>     | <b>Base Code</b>                        | <b>Option 5a<br/>0.5 credit</b>   | <b>Option 5b<br/>1.0 credit</b>     | <b>Option 5c<br/>1.5 credit</b>                 | <b>Option 5d<br/>0.5 credit</b>   |
|-----------------------------|---|---|-------------------------------------|---|---|
| <b>Water heating system</b> | Simply meet federal equipment standards | Showerheads and kitchen sink faucets 1.75 GPM (gallons per minute). Other lavatory faucets 1.0 GPM. | Gas water heater efficiency 0.74 EF | Min 3.3 COP closed-loop ground source heat pump | Ductless mini-split heat pump serving largest zone of house otherwise heated with electric resistance baseboard or fan coil units |

To qualify for one of these options, provide the higher-efficiency water heating equipment listed.

COP means coefficient of performance. EF means rated efficiency.

| <b>6. Renewable Energy</b> | <b>Base Code</b> | <b>Solar Photovoltaic Panel Arrays<br/>0.5 credits per 1200 kWh<br/>3 credits maximum</b>   |
|----------------------------|------------------|---|
| <b>PV panels</b>           | No requirement   | Install solar panel arrays sized to produce 1200 kWh per year (as determined by the PVWATTS calculator from National Renewable Energy Laboratory) for each 1/2 credit, up to 3 credits. |