

## Garage Conversions

This Tip Sheet reflects code requirements of the 2021 International Residential Code (IRC) and Washington State Energy Code (WSEC), with Washington State Amendments. The following pages contain details that illustrate construction requirements, including how to insulate an existing slab-on-grade floor.

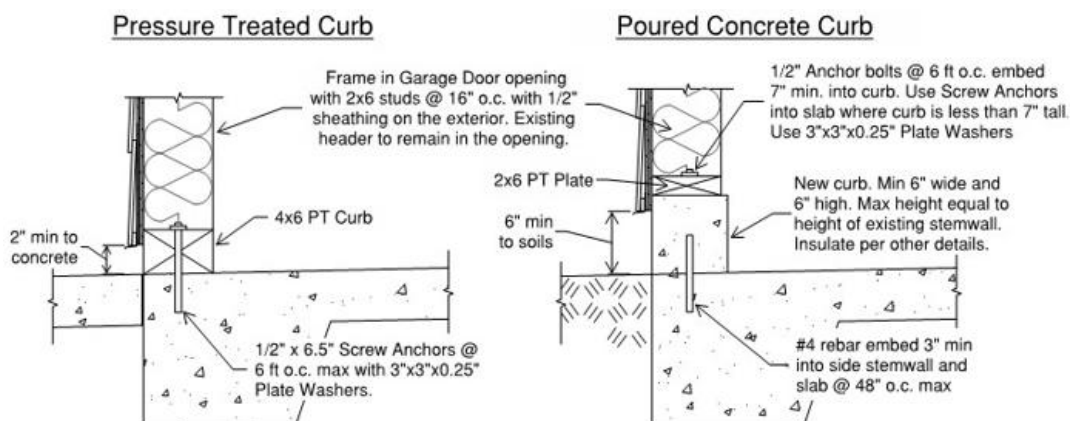
## General Requirements

Converting any portion of your existing garage into living space requires the same requirements for new construction, permits and plans required. Below is a list of general requirements.

- ☐ Check with your local land use/planning department to see if you need to provide parking for the spots you are displacing.
- ☐ New conditioned (heated) area must be fully insulated (ceiling, walls, foundation walls and floor) to the same insulation values required for new construction.
- ☐ Additional energy credits must be selected (based on square footage) and plans must show required information (see Energy Code Requirements section).
- ☐ Bedrooms require egress windows or doors (see tip sheet #10). Openings (windows and doors) directly into the garage are prohibited.
- ☐ If your driveway slopes towards the garage, water may leak into the new living space (see curb detail on page 2). Discuss options with your local jurisdiction.
- ☐ Floor plans that show proposed work, use of space, existing and proposed walls, windows, doors, smoke and carbon monoxide alarm locations, exhaust fans, stairs and any proposed plumbing fixtures.
- ☐ Detailed cross section(s) indicating floor, wall and roof construction, materials, insulation, and ceiling height are also required.

## Creating a Curb in the Garage Door Opening

When infilling the garage door with a wall, a curb is required for anchoring the bottom of the wall (see Figure 1).



**Figure 1: Options for Creating a Curb in the Garage Door Opening**

## Creating a Curb in the Garage Door Opening

When infilling the garage door with a wall, a curb is required for anchoring the bottom of the wall (see Figure 2).

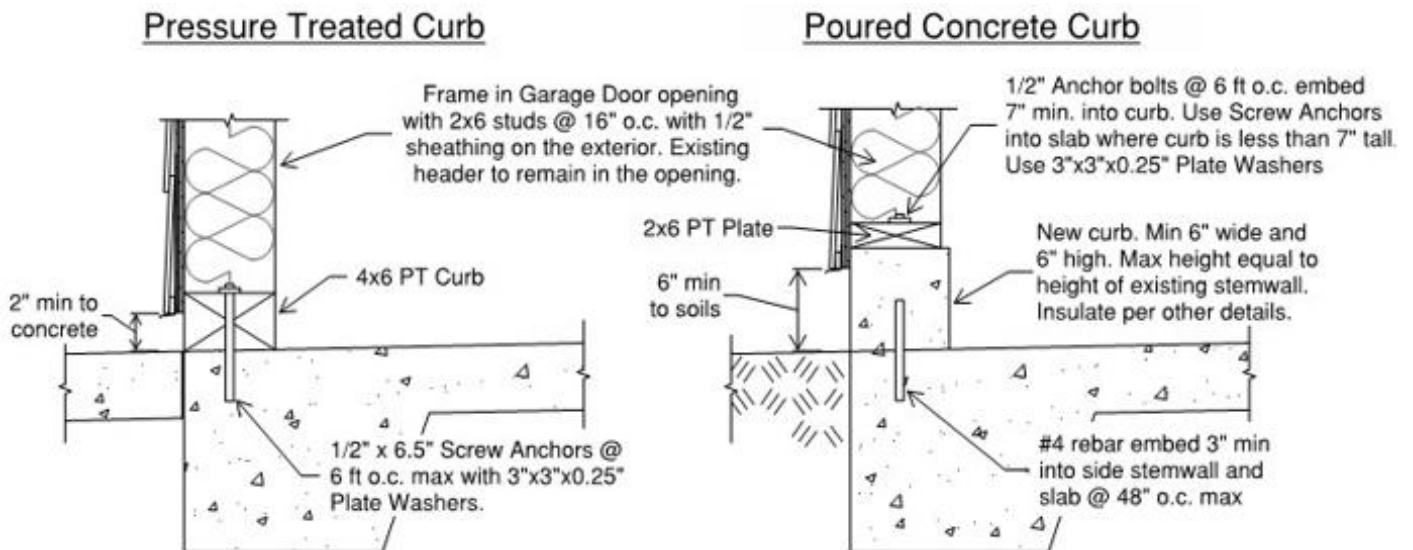


Figure 2: Options for Creating a Curb in the Garage Door Opening

## Creating a New Footing under the Slab

Some existing garage slabs will not have a thickened footing that runs beneath the slab in the garage door opening. In these cases, it is often required to dig under the slab and add a footing to support the new wall above. Figure 3 shows one way in which this can be done. For other options speak to your jurisdiction. Excavation may be required to verify the existing slab thickness.

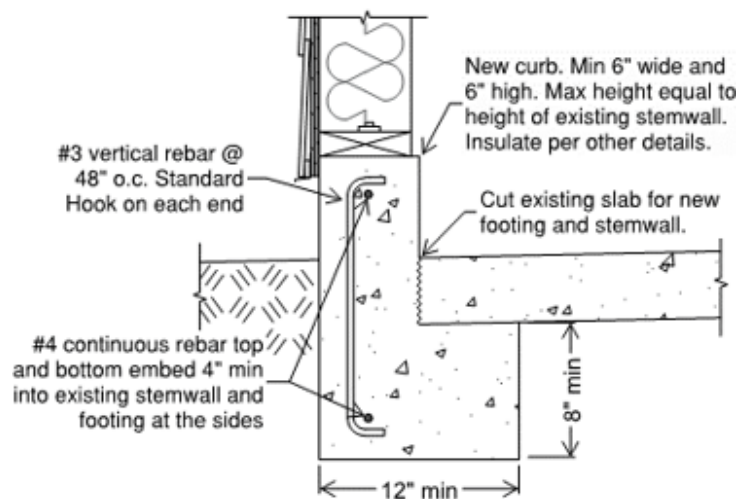


Figure 3: New Footing Under the Slab

## Energy Code Requirements

### Energy Credits

The energy code requires additional energy credits when adding or converting 150 square feet or more of conditioned space to a dwelling. The number of credits required is based on the size of the new conditioned space (for example, 2.0 credits for adding 150 to 500 square feet, and 2.5 credits for adding 501 to 1,500 square feet). See WSEC Section R406 for a complete list of options and requirements. Common options chosen are:

- ☐ Option 1.2 (1.0 credits) – Window U-factor 0.25, floor insulation R-38, slab-on-grade insulation R-10 under the entire slab (R-10 above an existing slab is also acceptable).
- ☐ Option 3.1 (1.0 credits) – Energy Star gas or propane furnace with a minimum AFUE of 95%.
- ☐ Option 3.5 (1.5 credits) – Ductless mini-split heat pump system with a minimum HSPF of 10.0 providing heat to the largest zone of the housing unit.
- ☐ Option 5.4 (1.0 credits) – Energy Star rated gas or propane water heater with a minimum UEF of 0.91.

Your plans must list which credit(s) you are selecting and any specific information required by the credit. Building inspectors will verify that work was done to meet all your selected energy credits. Forms and additional information can be found on the WSU Energy Program website:

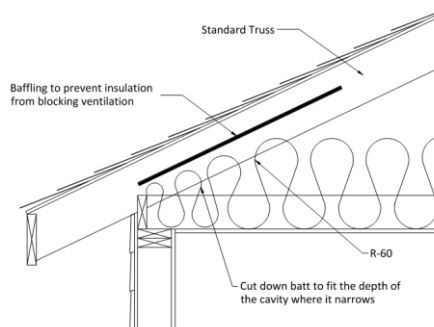
<https://www.energy.wsu.edu/BuildingEfficiency/EnergyCode/CodeForms.aspx>

### Roof Insulation and Ventilation

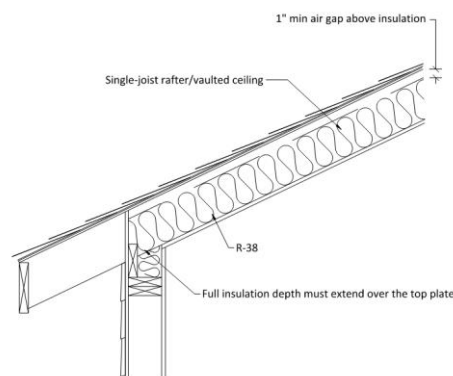
The attic space above the newly conditioned area is required to have minimum R-60 insulation and be ventilated with a minimum vent area of 1 square foot for every 150 square feet of attic area (or 1 square foot for every 300 square feet if 40%-50% of the vents are within 3 feet vertically of the ridge). Attics with a height of 30 inches (or more) and an area of 30 square feet (or more) must have an access opening (22 inches by 30 inches minimum).

Single-joint rafter/vaulted ceilings require minimum R-38 insulation.

**Standard or Scissor Truss R-Value**

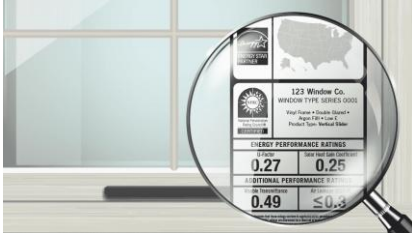


**Single Rafter/Joist-vault R-Value**



## Windows and Exterior Doors

Windows and exterior doors located in the newly conditioned space must have a maximum U-factor of 0.30. Replacement of existing windows and doors may be required.

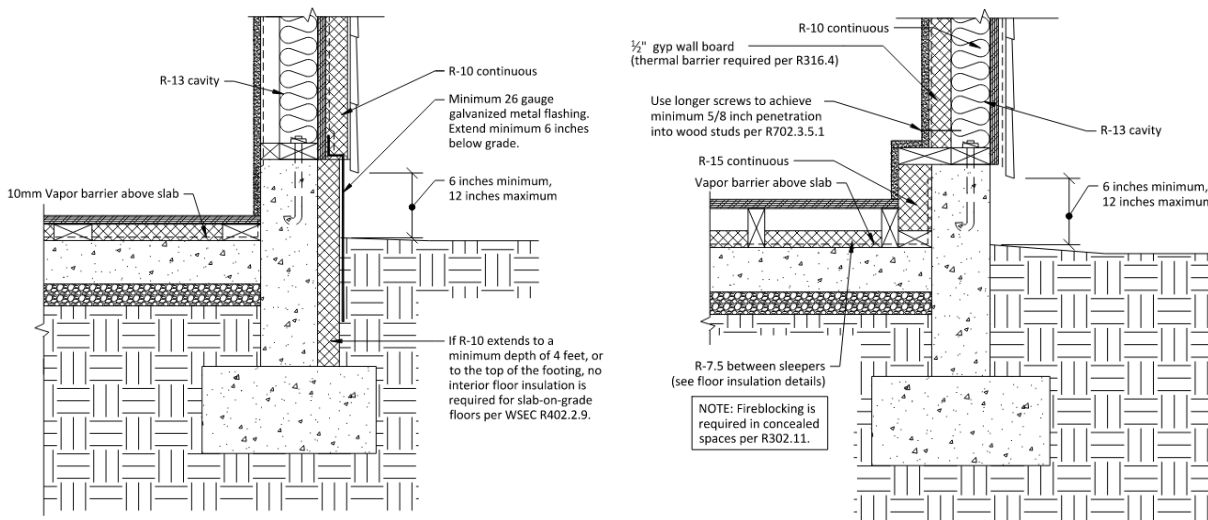


## Framed and Foundation Walls

**Framed** walls require minimum R-20 cavity plus R-5 continuous insulation, or R-13 cavity plus R-10 continuous. Continuous insulation may be installed on the interior or exterior of framed walls.

**Foundation** walls are required to be insulated above and below grade with one of the following options: minimum R-10 continuous insulation on the exterior of the wall, R-15 continuous on the interior of the wall, R-21 cavity plus a thermal break between the slab and the basement wall at the interior, or R-13 cavity plus R-5 continuous (at interior or exterior). See Figure 4 below:

### Exterior Continuous Insulation      Interior Continuous Insulation

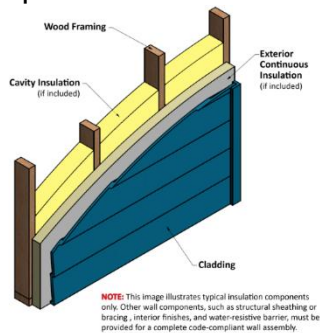


**Figure 4: Foundation and Framed Wall Insulation Options**

Framed walls require continuous insulation when following the R-value pathway. See page 6 for a diagram depicting continuous versus cavity insulation. To eliminate continuous insulation, projects must follow the U-factor pathway and note that on the plans. A framed wall with R-21 batt insulation and using intermediate or advanced framing techniques would meet the U-factor pathway, however it would likely require replacing the exterior wall framing since most garages are framed using *standard* framing.

For more assistance following the U-factor pathway, please visit the WSU Energy Program website at <https://www.energy.wsu.edu/BuildingEfficiency/EnergyCode/CodeForms.aspx> and/or consult a design professional (such as an architect).

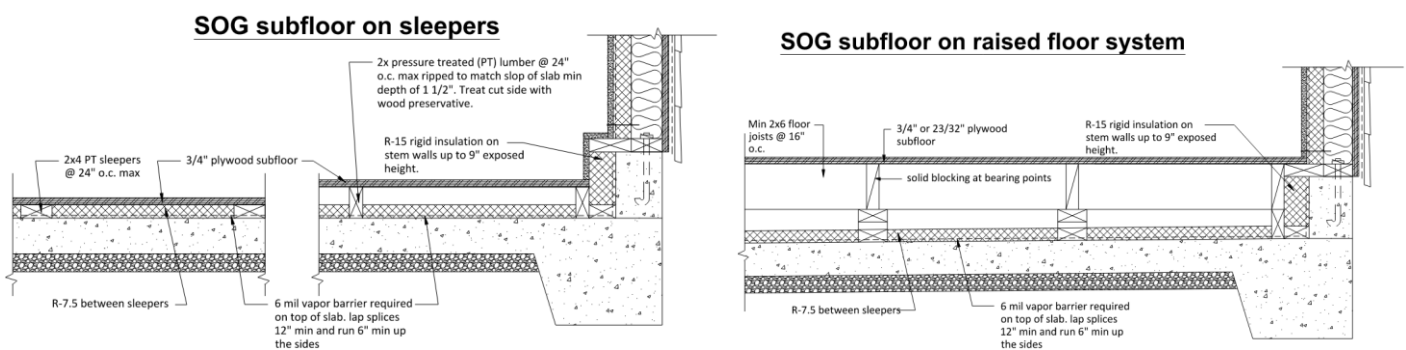
**Continuous insulation** means it is not interrupted by framing members. Cavity insulation fills the space between framing members. Please discuss the sequence of inspections with your building inspector.



## Floor Insulation

The floor of the newly conditioned area is required to be insulated. While the energy code requires minimum R-10 insulation under the slab at the perimeter, removing and replacing portions of the slab is difficult. Figure 5 depicts two approved insulation options above the slab that are equivalent to under-slab perimeter insulation.

Note: If batt insulation is to be used in raised framing without the R-7.5 rigid insulation indicated below, the minimum value is R-30 (or higher depending on energy credit), and the space below the floor joists will either need to be ventilated or filled to capacity with rigid insulation.



**Figure 5: Approved Insulation Options Above the Slab**

Note: If you select an energy credit that requires minimum R-10 “under entire slab,” then you must install minimum R-10 above the slab. The above example with R7.5 is only equivalent to R-10 at the *perimeter*, not the entire slab.