



Permit Center
 210 Lottie Street
 Bellingham, WA 98225
 phone: 360-778-8300
 fax: 360-778-8301
 www.cob.org

Residential Energy/VIAQ Code

Single Family Dwelling or Duplex

| | |
|-------------------------|------------------------|
| Project Address: | Date Submitted: |
|-------------------------|------------------------|

Effective July 1, 2007

This form is not a substitute for the energy code itself. To obtain a copy of the energy or ventilation codes go to <http://www.energy.wsu.edu/code/code2006.cfm>

| Option | Glazing Area % of Floor | Glazing U Factor | | Door U Factor | Ceiling | Vaulted Ceiling ¹ | Wall Above Grade | Wall Interior Below Grade | Wall Exterior Below Grade | Floor | Slab on Grade |
|--------|--------------------------------|------------------|----------|------------------|---------|---------------------------------|---------------------|------------------------------|------------------------------|-------|------------------|
| | | Vertical | Overhead | | | | | | | | |
| I | 10% | 0.32 | 0.58 | 0.20 | R-38 | R-30 | R-15 | R-15 | R-10 | R-30 | R-10 |
| IV | Unlimited Group R-3 Only | .35 | 0.58 | 0.20 | R-38 | R-30 | R-21 | R-21 | R-10 | R-30 | R-10 |

1. Requirement applicable only to single rafter or joist vaulted ceiling where both (a) the distance between the top of the ceiling and the underside of the roof sheathing is less than 12 inches and (b) there is a minimum 1-inch vented airspace above the insulation. Other single rafter or joist vaulted ceiling shall comply with the "ceiling" requirements. This option is limited to 500 square feet of ceiling area for any one dwelling unit.

NOTE: Nominal R-values are for wood frame assemblies only or assemblies built in accordance with Section 601.1.

The following walls should be considered to meet R-21 without additional documentation:

- 2 x 6 framed and insulated with R-21 fiberglass batts.
- 2 x 4 framed and insulated with R-15 fiberglass batts plus R-4.0 foam sheathing.
- 2 x 4 framed and insulated with R-13 fiberglass batts plus R-5.0 foam sheathing.

1. **Submit a glazing schedule and percentage calculation** if not all the windows, skylights and doors comply with the maximum U-factor requirement OR you have selected Option I above.

2. Select the method for providing whole-house ventilation:

- A. Ventilation Using Exhaust Fans.** Kitchen, bath or laundry room fans with a sone rating of 1.5 or less can be used to provide outside air. Refer to Tables 3-2 & 3-3 below to determine required ventilation rates and exhaust duct sizes. Outdoor air must be distributed to each habitable room by individual outdoor air inlets with a net free area of at least 4 square inches per room. Doors shall be undercut one-half inch.
- B. Ventilation Integrated with Forced-Air System.** Outdoor air can be distributed to habitable rooms by means of a dampered outdoor air inlet duct connected to the return air plenum upstream of the blower and outside the furnace cabinet. Refer to the Tables 3-2 & 3-5 below to determine ventilation rates and inlet air duct sizes.
- C. Ventilation using a Supply Fan.** Outdoor air can be distributed to habitable rooms by means of an inline supply fan in the forced-air system ducts or in a dedicated duct system. Supply fan systems must have the capacity to provide the amount of outside air specified in Table 3-2. See VIAQ Section 303.4.3 for additional requirements.
- D. Ventilation Using a Heat Recovery System.** See VIAQ Section 303.4.4 for requirements.

3. Calculate the maximum allowable HVAC system output:

| | |
|---------------------------|--------------------------|
| _____ Sq.Ft. x 20 = _____ | _____ BTU/hr |
| Heated Floor Area | Maximum Allowable Output |

NOTE:

- Minimum AFUE for forced air heating systems = 0.78
- All appliances must be labeled as conforming to 1987 National Energy Conservation Act.

**WSEC TABLE 3-1
MINIMUM SOURCE SPECIFIC VENTILATION CAPACITY REQUIREMENTS**

| | Bathrooms/Laundry | Kitchens |
|--------------------------|--------------------------|-----------------|
| Intermittently operating | 50 cfm | 100 cfm |
| Continuous operation | 20 cfm | 25 cfm |

**WSEC TABLE 3-2
VENTILATION RATES FOR ALL GROUP R OCCUPANCIES FOUR STORIES AND LESS*
Minimum and Maximum Ventilation Rates: Cubic Feet Per Minute (CFM)**

| Floor Area, ft ² | Bedrooms | | | | | | | | | | | | | |
|--------------------------------|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 2 or less | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | |
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| <500 | 50 | 75 | 65 | 98 | 80 | 120 | 95 | 143 | 110 | 165 | 125 | 188 | 140 | 210 |
| 501-1000 | 55 | 83 | 70 | 105 | 85 | 128 | 100 | 150 | 115 | 173 | 130 | 195 | 145 | 218 |
| 1001-1500 | 60 | 90 | 75 | 113 | 90 | 135 | 105 | 158 | 120 | 180 | 135 | 203 | 150 | 225 |
| 1501-2000 | 65 | 98 | 80 | 120 | 95 | 143 | 110 | 165 | 125 | 188 | 140 | 210 | 155 | 233 |
| 2001-2500 | 70 | 105 | 85 | 128 | 100 | 150 | 115 | 173 | 130 | 195 | 145 | 218 | 160 | 240 |
| 2501-3000 | 75 | 113 | 90 | 135 | 105 | 158 | 120 | 180 | 135 | 203 | 150 | 225 | 165 | 248 |
| 3001-3500 | 80 | 120 | 95 | 143 | 110 | 165 | 125 | 188 | 140 | 210 | 155 | 233 | 170 | 255 |
| 3501-4000 | 85 | 128 | 100 | 150 | 115 | 173 | 130 | 195 | 145 | 218 | 160 | 240 | 175 | 263 |
| 4001-5000 | 95 | 143 | 110 | 165 | 125 | 188 | 140 | 210 | 155 | 233 | 170 | 255 | 185 | 278 |

*For residences that exceed 8 bedrooms, increase the minimum requirement listed for 8 bedrooms by an additional 15 CFM per bedroom. The maximum CFM is equal to 1.5 times the minimum.

**WSEC TABLE 3-3
PRESCRIPTIVE EXHAUST DUCT SIZING**

| Fan Tested CFM @0.25" W.G. | Minimum Flex Diameter | Maximum Length Feet | Minimum Smooth Diameter | Maximum Length Feet | Maximum Elbows ¹ |
|-------------------------------|--------------------------|------------------------|----------------------------|------------------------|--------------------------------|
| 50 | 4 inch | 25 | 4 inch | 70 | 3 |
| 50 | 5 inch | 90 | 5 inch | 100 | 3 |
| 50 | 6 inch | No Limit | 6 inch | No Limit | 3 |
| 80 | 4 inch ² | NA | 4 inch | 20 | 3 |
| 80 | 5 inch | 15 | 5 inch | 100 | 3 |
| 80 | 6 inch | 90 | 6 inch | No Limit | 3 |
| 100 | 5 inch ² | NA | 5 inch | 50 | 3 |
| 100 | 6 inch | 45 | 6 inch | No Limit | 3 |
| 125 | 6 inch | 15 | 6 inch | No Limit | 3 |
| 125 | 7 inch | 70 | 7 inch | No Limit | 3 |

- For each additional elbow, subtract 10 feet from length
- Flex ducts of this diameter are not permitted with fans of this size.

**WSEC TABLE 3-5
PRESCRIPTIVE INTEGRATED FORCED AIR SUPPLY DUCT SIZING**

| Required Flow (CFM) Per Table 3-2 | Minimum Smooth Duct Diameter | Minimum Flexible Duct Diameter | Maximum Length ¹ | Maximum Number of Elbows ² |
|--------------------------------------|---------------------------------|-----------------------------------|--------------------------------|--|
| 50-80 | 6" | 7" | 20' | 3 |
| 80-125 | 7" | 8" | 20' | 3 |
| 115-125 | 8" | 10" | 20' | 3 |
| 170-240 | 9" | 11" | 20' | 3 |

- For lengths over 20' increase duct diameter 1 inch.
- For elbows numbering more than 3, increase duct diameter 1 inch.

NOTE:

- In all cases the ventilation system shall be controlled by a 24-hour clock timer set to operate the system for at least 8 hours a day.