

Chapter 7 Wall Covering

R702.3.7 Horizontal gypsum board diaphragm ceilings. Use of gypsum board shall be permitted on wood joists to create a horizontal diaphragm in accordance with Table R702.3.7. Gypsum board shall be installed perpendicular to ceiling framing members. End joints of adjacent courses of board shall not occur on the same joist. The maximum allowable diaphragm proportions shall be 1¹/₂:1 between shear resisting elements. Rotation or cantilever conditions shall not be permitted. Gypsum board shall not be used in diaphragm ceilings to resist lateral forces imposed by masonry or concrete construction. All perimeter edges shall be blocked using wood members not less than 2-inch (51 mm) by 6-inch (152 mm) nominal dimension. Blocking material shall be installed flat over the top plate of the wall to provide a nailing surface not less than 2 inches (51 mm) in width for the attachment of the gypsum board.

**TABLE R702.3.7
SHEAR CAPACITY FOR HORIZONTAL WOOD-FRAMED
GYPSUM BOARD DIAPHRAGM CEILING ASSEMBLIES**

MATERIAL	THICKNESS OF MATERIAL (min.) (in.)	SPACING OF FRAMING MEMBERS (max.) (in.)	SHEAR VALUE^{a, b} (plf of ceiling)	MINIMUM FASTENER SIZE^{c, d}
Gypsum Board	1/2	16 o.c.	90	5d cooler or wallboard nail; 1 ⁵ / ₈ -inch long; 0.086-
Gypsum Board	1/2	24 o.c.	70	5d cooler or wallboard nail; 1 ⁵ / ₈ -inch long; 0.086-inch shank; 1 ⁵ / ₆₄ -inch head

For SI: 1 inch = 25.4 mm, 1 pound per linear foot = 1.488 kg/m.

- a. Values are not cumulative with other horizontal diaphragm values and are for short-term loading caused by wind or seismic loading. Values shall be reduced 25 percent for normal loading.
- b. Values shall be reduced 50 percent in Seismic Design Categories D₁, D₂ and E.
- c. 1¹/₄, #6 Type S or W screws may be substituted for the listed nails.
- d. Fasteners shall be spaced not more than 7 inches on center at all supports, including perimeter blocking, and not less than 3/8 inch from the edges and ends of the gypsum board.

R702.3.8 Water-resistant gypsum backing board. Gypsum board used as the base or backer for adhesive application of ceramic tile or other required nonabsorbent finish material shall conform to ASTM C 630 or C 1178. Use of water-resistant gypsum backing board shall be permitted on ceilings where framing spacing does not exceed 12 inches (305 mm) on center for 1/2-inch-thick (13 mm) or 16 inches (406 mm) for 5/8-inch-thick (16 mm) gypsum board. Water-resistant gypsum board shall not be installed over a vapor retarder in a shower or tub compartment. Cut or exposed edges, including those at wall intersections, shall be sealed as recommended by the manufacturer.

R702.3.8.1 Limitations. Water resistant gypsum backing board shall not be used where there will be direct exposure to water, or in areas subject to continuous high humidity.

R702.4.2 Cement, fiber-cement and glass mat gypsum backers. Cement, fiber-cement or glass mat gypsum backers in compliance with ASTM C 1288, C 1325 or C 1178 and installed in accordance with manufacturers' recommendations shall be used as backers for wall tile in tub and shower areas and wall panels in shower areas.

~~Gypsum backer. Gypsum board utilized as the base or backer for adhesive application of ceramic tile or other non-absorbent finish material shall conform with ASTM C630 or C1178. Water resistant gypsum backing board shall be permitted to be used on ceilings where framing spacing does not exceed 12 inches (305 mm) on center for 1/2 inch thick (12.7 mm) or 16 inches (406 mm) for 5/8 inch thick (15.9mm) gypsum board. Water resistant gypsum board shall not be installed over a vapor retarder in a shower or tub compartment. All cut or exposed edges, including those at wall inter-sections, shall be sealed as recommended by the manufacturer.~~

R703.1 General. Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing as described in Section R703.8. The exterior wall envelope shall be designed and constructed in such a manner as to that prevents the accumulation of water within the wall assembly by providing a water-resistant barrier behind the exterior veneer as required by Section R703.2, and a means of draining water that enters the assembly to the exterior. Protection against condensation in the exterior wall assembly shall be provided in accordance with Chapter 11 of this code.

Exceptions:

1. A ~~weather~~ water-resistant exterior wall envelope shall not be required over concrete or masonry walls designed in accordance with Chapter 6 and flashed according to Section R703.7 or R703.8.

2. Compliance with the requirements for a means of drainage, and the requirements of Section R703.2 and Section R703.8, shall not be required for an exterior wall envelope that has been demonstrated to resist wind-driven rain through testing of the exterior wall envelope, including joints, penetrations and intersections with dissimilar materials, in accordance with ASTM E 331 under the following conditions:

2.1. Exterior wall envelope test assemblies shall include at least one opening, one control joint, one wall/eave interface and one wall sill. All tested openings and penetrations shall be representative of the intended end-use configuration.

2.2. Exterior wall envelope test assemblies shall be at least 4 feet (1219 mm) by 8 feet (2438 mm) in size.

2.3. Exterior wall assemblies shall be tested at a minimum differential pressure of 6.24 pounds per square foot (299 Pa).

2.4. Exterior wall envelope assemblies shall be subjected to a minimum test exposure duration of 2 hours.

The exterior wall envelope design shall be considered to resist wind-driven rain where the results of testing indicate that water did not penetrate: control joints in the exterior wall envelope; joints at the perimeter of openings penetration; or intersections of terminations with dissimilar materials.

R703.2 Water-resistive barrier. One layer of No. 15 asphalt-saturated felt, free from holes and breaks, weighing not less than 14 pounds per 100 square feet and complying with ASTM D 226 for Type 1 felt or other approved water-resistive barrier material shall be applied over studs or sheathing of all exterior walls. as required by Table 703.4. Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm). The felt or other approved material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1.

Exception: Omission of the water-resistive barrier is permitted in the following situations: Such felt or material shall not be required:

1. In detached accessory buildings.
- ~~2. Under panel siding with shiplap joints or battens,~~
2. Under exterior wall finish materials as permitted in Table R703.4.
3. Under paperbacked stucco lath when the paper backing is an approved weather-resistive sheathing paper.

R703.4 Attachments. Unless specified otherwise, all wall coverings shall be securely fastened in accordance with Table R703.4 or with other approved aluminum, stainless steel, zinc-coated or other approved corrosion-resistive fasteners. Where the basic wind speed per Figure R301.2(4) is 110 miles per hour (49 m/s) or higher, the attachment of wall coverings shall be designed to resist the component and cladding loads specified in Table R301.2(2), adjusted for height and exposure in accordance with Table R301.2(3).

R703.6.2 Plaster. Plastering with portland cement plaster shall be not less than three coats when applied over metal lath or wire lath and shall be not less than two coats when applied over masonry, concrete, pressure-preservative treated wood or decay-resistant wood as specified in Section R319.1 or gypsum backing. If the plaster surface is completely covered by veneer or other facing material or is completely concealed, plaster application need be only two coats, provided the total thickness is as set forth in Table R702.1(1).

R703.6.3 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section R703.2 and, where applied over wood-based sheathing, shall include a water-resistive vapor-permeable barrier with a performance at least equivalent to two layers of Grade D paper.

Exception: Where the water-resistive barrier that is applied over wood-based sheathing has a water resistance equal to or greater than that of 60 minute Grade D paper and is separated from the stucco by an intervening, substantially nonwater-absorbing layer or designed drainage space.

**TABLE R703.4
WEATHER-RESISTANT SIDING ATTACHMENT AND MINIMUM THICKNESS**

SIDING MATERIAL	NOMINAL THICKNESS ^a (inches)	JOINT TREATMENT	WATER-RESISTIVE BARRIER REQUIRED	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS ^{b,c,d}					
				Wood or wood structural panel sheathing	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud	Direct to studs	Number or spacing of fasteners
Horizontal Aluminum ^e	Without insulation 0.019 ^f 0.024	Lap	<u>Yes</u>	0.120 nail 1 1/2" long	0.120 nail 2" long	0.120 nail 2" long	0.120 nail ^y	Not allowed	Same as stud spacing
		Lap	<u>Yes</u>	0.120 nail 1 1/2" long	0.120 nail 2" long	0.120 nail 2" long	0.120 nail ^y	Not allowed	
	With insulation 0.019	Lap	<u>Yes</u>	0.120 nail 1 1/2" long	0.120 nail 2 1/2" long	0.120 nail 2 1/2" long	0.120 nail ^y	0.120 nail 1 1/2" long	
Brick veneer ^z Concrete masonry Veneer ^z	2 2	Section R703	Yes (Note 1)	See Section R703 and Figure R703.7 ^g					
Hardboard ^k Panel siding-vertical	7/16	—	<u>Yes</u>	Note n	Note n	Note n	Note n	Note n	6" panel edges 12" inter. Sup. ^o
Hardboard ^k Lap-siding-horizontal	7/16	Note q	Yes	Note p	Note p	Note p	Note p	Note p	Same as stud spacing 2 per bearing
Steel ^h	29 ga.	Lap	<u>Yes</u>	0.113 nail 1 3/4" Staple-1 3/4"	0.113 nail 2 3/4" Staple-2 1/2"	0.113 nail 2 1/2" Staple-2 1/4"	0.113 nail ^y Staple ^y	Not allowed	Same as stud spacing
Stone veneer	2	Section R703	Yes (Note 1)	See Section R703 and Figure R703.7 ^g					
Particleboard panels	3/8 – 1/2	—	<u>Yes</u>	6d box nail (2" x 0.099")	6d box nail (2" x 0.099")	6d box nail (2" x 0.099")	box nail ^y	6d box nail (2" x 0.099"), 3/8 not allowed	6" panel edge, 12" inter. sup.
	5/8	—	<u>Yes</u>	6d box nail (2" x 0.099")	8d box nail (2 1/2" x 0.113")	8d box nail (2 1/2" x 0.113")	box nail ^y	6d box nail (2" x 0.099")	
Plywood panel ^l (exterior grade)	3/8	—	<u>Yes</u>	0.099 nail-2"	0.113 nail-2 1/2"	0.099 nail-2"	0.113 nail ^y	0.099 nail-2"	6" on edges, 12" inter. sup.
Vinyl siding ^m	0.035	Lap	<u>Yes</u>	0.120 nail 1 1/2" Staple-1 3/4"	0.120 nail 2" Staple-2 1/2"	0.120 nail 2" Staple-2 1/2"	0.120 nail ^y Staple ^y	Not allowed	Same as stud spacing
Wood ^j rustic, drop	3/8 Min	Lap	<u>Yes</u>	Fastener penetration into stud-1"				0.113 nail-2 1/2" Staple-2"	Face nailing up to 6" widths, 1 nail per bearing; 8" widths and over, 2 nails per bearing
Shiplap	19/32 Average	Lap	<u>Yes</u>						
Bevel	7/16	Lap	<u>Yes</u>						
Butt tip	3/16	Lap	<u>Yes</u>						
Fiber cement panel Siding ^r	5/16	Notes	Yes Note x	6d corrosion-resistant nail ^t	6d corrosion-resistant nail ^t	6d corrosion-resistant nail ^t	6d corrosion-resistant nail ^{t,y}	4d corrosion-resistant nail ^u	6" o.c. on edges, 12" o.c. on intermed. studs
Fiber cement lap siding ^r	5/16	Note v	Yes Note x	6d corrosion-resistant nail ^t	6d corrosion-resistant nail ^t	6d corrosion-resistant nail ^t	6d corrosion-resistant nail ^{t,y}	6d corrosion-resistant nail ^w	Note ^w

For SI: 1 inch = 25.4 mm.

a. Based on stud spacing of 16 inches on center where studs are spaced 24 inches, siding shall be applied to sheathing approved for that spacing.

b. Nail is a general description and shall be T-head, modified round head, or round head with smooth or deformed shanks.

c. Staples shall have a minimum crown width of 7/16-inch outside diameter and be manufactured of minimum 16 gage wire.

d. Nails or staples shall be aluminum, galvanized, or rust-preventative coated and shall be driven into the studs for fiberboard or gypsum backing.

e. Aluminum nails shall be used to attach aluminum siding.

f. Aluminum (0.019 inch) shall be unbacked only when the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.

g. ~~boards or panels are applied over sheathing or a weather-resistant membrane, joints need not be treated. Otherwise, vertical joints shall occur at studs and be covered with battens or be lapped.~~

g. All attachments shall be coated with a corrosion-resistant coating.

h. Shall be of approved type. (continued)

New Table

**TABLE R703.7(1)
STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS, WOOD
OR STEEL FRAMING, SEISMIC DESIGN CATEGORIES A, B AND C**

SEISMIC DESIGN CATEGORY	NUMBER OF WOOD OR STEEL FRAMED STORIES	MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATION ^a (feet)	MAXIMUM NOMINAL THICKNESS OF VENEER (inches)	MAXIMUM WEIGHT OF VENEER (psf) ^b	WOOD OR STEEL FRAMED STORY	MINIMUM SHEATHING AMOUNT (percent of braced wall line length) ^c
A or B	Steel: 1 or 2 Wood: 1, 2 or 3	30	5	50	all	Table R602.10.1 or Table R603.7
C	1	30	5	50	1 only	Table R602.10.1 or Table R603.7
	2	30	5	50	top	Table R602.10.1 or Table R603.7
					bottom	1.5 times length required by Table R602.10.1 or 1.5 times length required by Table R603.7
	Wood only: 3	30	5	50	top	Table R602.10.1
					middle	1.5 times length required 1.5 Table R602.10.1
					bottom	1.5 times length required by Table R602.10.1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa.

- a. An Additional 8 feet is permitted for gable end walls. See also story height limitations of Section R301.3.
- b. Maximum weight is installed weight and includes weight of mortar, grout, lath and other materials used for installation. Where veneer is placed on both faces of a wall, the combined weight shall not exceed that specified in this table.
- c. Applies to exterior and interior braced wall lines.

New Table

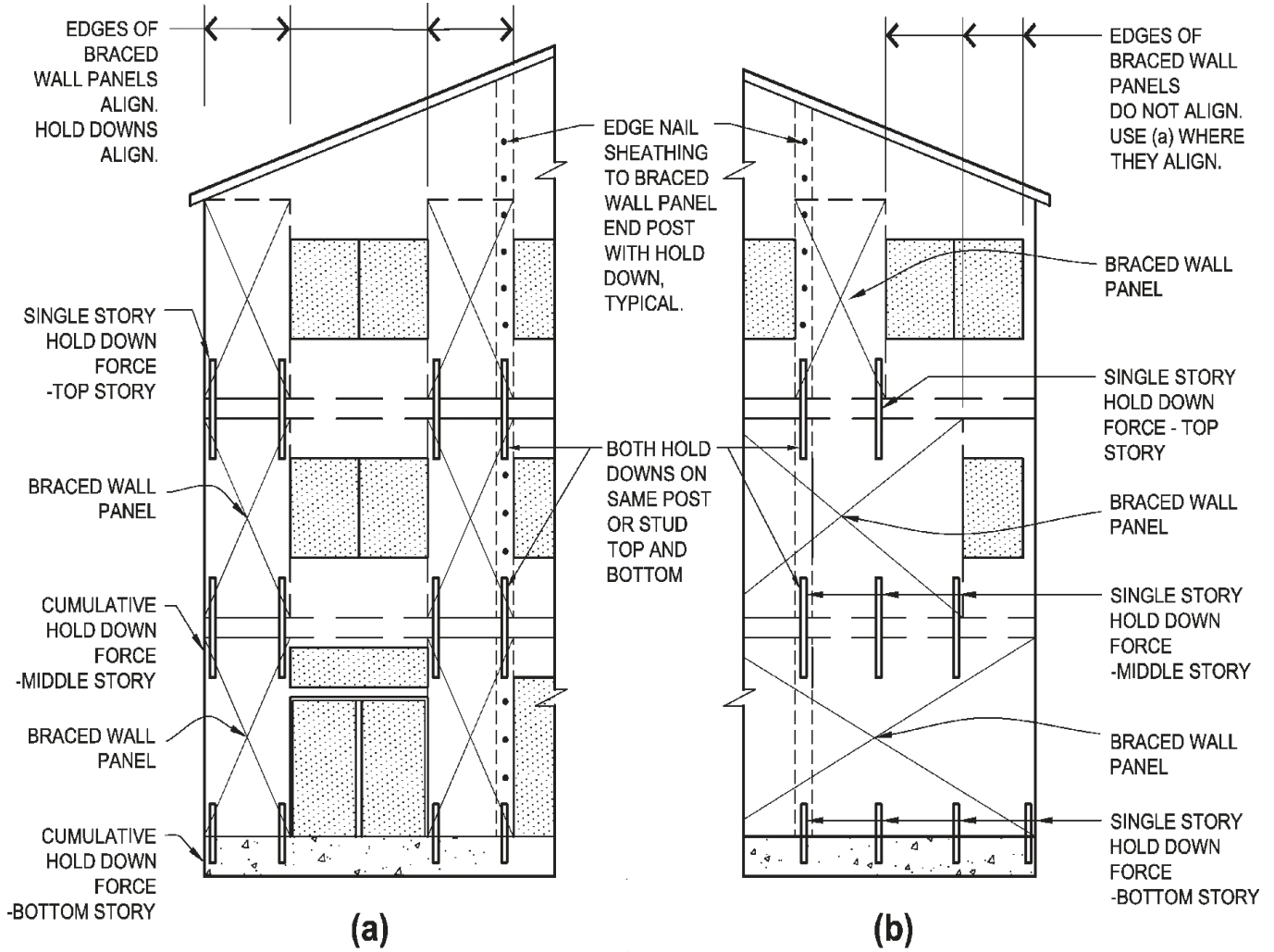
**TABLE R703.7(2)
STONE OR MASONRY VENEER LIMITATIONS AND REQUIREMENTS, ONE- AND TWO-FAMILY DETACHED DWELLINGS, WOOD FRAMING, SEISMIC DESIGN CATEGORIES D₁ AND D₂**

SEISMIC DESIGN CATEGORY	NUMBER OF WOOD FRAMED STORIES ^a	MAXIMUM HEIGHT OF VENEER ABOVE NONCOMBUSTIBLE FOUNDATION OR FOUNDATION WALL (feet)	MAXIMUM NOMINAL THICKNESS OF VENEER (inches)	MAXIMUM WEIGHT OF VENEER (psf) ^b	WOOD FRAMED STORY	MINIMUM SHEATHING AMOUNT (percent of braced wall line length) ^c	MINIMUM SHEATHING THICKNESS AND FASTENING	SINGLE STORY HOLD DOWN FORCE (lb) ^d	CUMULATIVE HOLD DOWN FORCE (lb) ^e
D ₀	1	20 ^f	4	40	1 only	35	7/16-inch wood structural panel 8d sheathing with common nails spaced at 4 inches on center at panel edges, 12 inches on center at intermediate supports. 8d common nails at 4 inches on center at braced wall panel end posts with hold down attached.	N/A	—
	2	20 ^f	4	40	top	35		1900	—
					bottom	45		3200	5100
	3	30 ^g	4	40	top	40		1900	—
					middle	45		3500	5400
					bottom	60		3500	8900
D ₁	1	20 ^f	4	40	1 only	45	2100	—	
	2	20 ^f	4	40	top	45	2100	—	
					bottom	45	3700	5800	
	3	20 ^f	4	40	top	45	2100	—	
					middle	45	3700	5800	
					bottom	60	3700	9500	
D ₂	1	20 ^f	3	30	1 only	55	2300	—	
	2	20 ^f	3	30	top	55	2300	—	
					bottom	55	3900	6200	

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.479 kPa, 1 pound-force = 4.448 N.

- Cripple walls are not permitted in Seismic Design Categories D₁ and D₂.
- Maximum weight is installed weight and includes weight of mortar, grout and lath, and other materials used for installation.
- Applies to exterior and interior braced wall lines.
- Hold down force is minimum allowable stress design load for connector providing uplift tie from wall framing at end of braced wall panel at the noted story to wall framing at end of braced wall panel at the story below, or to foundation or foundation wall. Use single story hold down force where edges of braced wall panels do not align; a continuous load path to the foundation shall be maintained. [See Figure R703.7(1)(b)].
- Where hold down connectors from stories above align with stories below, use cumulative hold down force to size middle and bottom story hold down connectors. [See Figure R703.7(1)(a)].
- The veneer shall not exceed 20 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls, or 30 feet in height with an additional 8 feet for gable end walls where the lower 10 feet has a backing of concrete or masonry wall. See also story height limitations of Section R301.3.
- The veneer shall not exceed 30 feet in height above a noncombustible foundation, with an additional 8 feet permitted for gable end walls. See also story height limitations of Section R301.3.

New Figure



- (a) Braced wall panels stacked (aligned story to story). Use cumulative hold down force.
- (b) Braced wall panels not stacked. Use single story hold down force.

FIGURE R703.7(1)
HOLD DOWNS AT EXTERIOR AND INTERIOR BRACED WALL PANELS
WHEN USING STONE OR MASONRY VENEER

R703.7.4.2 Air space. The veneer shall be separated from the sheathing by an air space of a minimum of a nominal 1 inch (25 mm) but not more than 4¹/₂ inches (114 mm). ~~The weather-resistant membrane or asphalt-saturated felt required by Section R703.2 is not required over water-repellent sheathing materials.~~

R703.8 Flashing. ~~Approved corrosion-resistant flashing shall be provided in the exterior wall envelope applied shingle-fashion in such a manner as to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. The flashing shall extend to the surface of the exterior wall finish. And shall be installed to prevent water from reentering the exterior wall envelope.~~ Approved corrosion-resistant flashings shall be installed at all of the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage.
1. ~~At top of all exterior window and door openings in such a manner as to be leakproof, except that self-flashing windows having a continuous lap of not less than 1 1/8 inches (28 mm) over the sheathing material around the perimeter of the opening, including corners, do not require additional flashing; jamb flashing may also be omitted when specifically approved by the building official.~~
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood trim.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

R703.11 Vinyl siding. Vinyl siding shall be certified and labeled as conforming to the requirements of ASTM D 3679 by an approved quality control agency.

R703.11.1 Installation. Vinyl siding, soffit and accessories shall be installed in accordance with the manufacturer's installation instructions.

R802.7.2 Engineered wood products. Cuts, notches and holes bored in ~~laminated veneer lumber~~ trusses, structural composite lumber, structural glue-laminated members or I-joists are ~~not permitted unless prohibited~~ except where permitted by the manufacturer's recommendations or where the effects of such penetrations alterations are specifically considered in the design of the member by a registered design professional.

TABLE R802.5(1) thru R802.5(9)
(Tables has remained unchanged, but the "Rafter Span Adjustment Factor" numbers in footnote ^a have changed.)

R802.10.2.1 Applicability limits. The provisions of this section shall control the design of truss roof framing when snow controls for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist, rafter or truss span, not greater than 36 feet (10 973 mm) in width parallel to the joist span or truss, not greater than two stories in height with each story not greater than 10 feet (3048 mm) high, and roof slopes not smaller than 3:12 (25-percent slope) or greater than 12:12 (100-percent slope). Truss roof framing constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum design wind speed of 110 miles per hour (49 m/s), Exposure A, B or C, and a maximum ground snow load of 70 psf (3352 Pa). Roof snow load is to be computed as: 0.7 pg.

R802.10.3 Bracing. Trusses shall be braced to prevent rotation and provide lateral stability in accordance with the requirements specified in the construction documents for the building and on the individual truss design drawings. In the absence of specific bracing requirements, trusses shall be braced in accordance with the Building Component Safety Information (BCSI 1-03) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses. ~~TPI/HIB.~~

R804.1.3 Roof trusses. The design, quality assurance, installation and testing of cold-formed steel trusses shall be in accordance with the AISI Standard for Cold-formed Steel Framing-Truss Design (COFS/Truss). Truss members shall not be notched, cut or altered in any manner without an approved design.

R804.2 Structural framing. Load-bearing steel roof framing members shall comply with Figure R804.2(1) and with the dimensional and minimum thickness requirements specified in Tables R804.2(1) and R804.2(2). Tracks shall comply with Figure R804.2(2) and shall have a minimum flange width of 1¼ inches (32 mm). The maximum inside bend radius for load-bearing members shall be the greater of $\frac{3}{32}$ inch (2.4 mm) or twice the uncoated steel thickness. Holes in roof framing members shall comply with all of the following conditions:

1. Holes shall conform to Figure R804.2(3);
2. Holes shall be permitted only along the centerline of the web of the framing member;
3. Holes shall have a center-to-center spacing of not less than 24 inches (610 mm);
4. Holes shall have a width not greater than 0.5 times the member depth, or 2½ inches (64 mm);
5. Holes shall have a length not exceeding 4½ inches (114 mm); and
6. Holes shall have a minimum distance between the edge of the bearing surface and the edge of the hole of not less than 10 inches (254 mm).

Framing members with web holes not conforming to these requirements shall be patched in accordance with Section R804.3.6 or designed in accordance with accepted engineering practices.

Tables R804.3.1(1) thru R804.3.1(8) are new tables and replace Tables in the 2005 ORSC.

R804.3.6 Hole patching. Web holes not conforming to the requirements in Section R804.2 shall be designed in accordance with one of the following:

1. Framing members shall be replaced or designed in accordance with accepted engineering practices when web holes exceed the following size limits:

1.1. The depth of the hole, measured across the web, exceeds 70 percent of the flat width of the web; or

1.2. The length of the hole measured along the web, exceeds 10 inches (254 mm) or the depth of the web, whichever is greater.

2. Web holes not exceeding the dimensional requirements in Section R804.3.6, Item 1, shall be patched with a solid steel plate, stud section, or track section in accordance with Figure R804.3.6. Holes in ceiling joist and rafters with dimensions conforming to Section R804.2 that are closer than 10 inches (254 mm) from the edge of the hole to the edge of bearing surface shall be patched with a solid steel plate, C section or track section in accordance with Figure R804.3.6. The steel patch, shall be of a minimum thickness as the receiving member and shall extend at least 1 inch (25 mm) beyond all edges of the hole. The steel patch shall be fastened to the web of the receiving member with No.8 screws (minimum) spaced no greater than 1 inch (25 mm) center-to-center along the edges of the patch with a minimum edge distance of 1/2 inch (13 mm).

**Table R804.3.3(1) and Table R804.3.3.1
(Have been modified.)**

R806.4 Conditioned Unvented attic assemblies. ~~Unvented conditioned attic assemblies (spaces between the ceiling joists of the top story and the roof rafters) are permitted under the following conditions shall be permitted if all the following conditions are met:~~

1. The unvented attic space is completely contained within the building thermal envelope.

2. A minimum insulation level of R-20 air-impermeable or rigid board insulation imbedded into air-impermeable insulation shall be installed above all recessed fixtures such as recessed lights and exhaust fans.

3. Where wood shingles or shakes are used, a minimum 1/4 inch (6 mm) vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing.

4. Air-impermeable insulation shall be a vapor retarder, or shall have a vapor retarder coating or covering in direct contact with the underside of the insulation.

5. Either "a", "b", or "c" shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.

a. Air-impermeable insulation only. Insulation shall be applied in direct contact to the underside of the structural roof sheathing.

b. Air-permeable insulation only. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing to a minimum insulation level of R-20 for condensation control.

c. Air-impermeable and air-permeable insulation. The air-impermeable insulation shall be applied in direct contact to the underside of the structural roof sheathing to a minimum insulation level of R-20 for condensation control. The air-permeable insulation shall be installed directly under the air-impermeable insulation.

Chapter 9 Roof Assemblies

R903.5 Hail exposure. Hail exposure, as specified in Sections R903.5.1 and R903.5.2, shall be determined using Figure R903.5.

R903.5.1 Moderate hail exposure. One or more hail days with hail diameters larger than 1.5 inches (38 mm) in a 20-year period.

R903.5.2 Severe hail exposure. One or more hail days with hail diameters larger than or equal to 2.0 inches (51 mm) in a 20-year period.

R905.2.6 Attachment. Asphalt shingles shall have the minimum number of fasteners required by the manufacturer. For normal application, asphalt shingles shall be secured to the roof with not less than four fasteners per strip shingle or two fasteners per individual shingle. Where the roof slope exceeds 20 units vertical in 12 units horizontal (167 percent slope), special methods of fastening are required. For roofs located where the basic wind speed per Figure R301.2(4) is 110 mph (49 m/s) or higher, special methods of fastening are required. Special fastening methods shall be tested in accordance with ASTM D 3161, Class F. Asphalt shingle wrappers shall bear a label indicating compliance with ASTM D 3161, Class F, modified to use a wind speed of 110 mph (177 km/h).

~~Shingles classified using ASTM D 3161 are acceptable for use in wind zones less than 110 mph. Shingles classified using ASTM D 3161 modified to use a wind speed of 110 mph are acceptable for use in all cases where special fastening is required.~~

R905.2.7.1 Ice barrier. In areas where the average daily temperature in January is 25°F (-4°C) or less or where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the ~~eave's edge~~ lowest edges of all roof surfaces to a point at least 24 inches (610 mm) inside the exterior wall line of the building.

Exception: Detached accessory structures that contain no conditioned floor area.

The same ice barrier language is added in the following sections:

-R905.4.3.1 Ice barrier.

-R905.5.3.1 Ice barrier.

-R905.6.3.1 Ice barrier.

-R907.7.3.1 Ice barrier.

-R905.8.3.1 Ice barrier.

R905.4.4 Material standards. Metal roof shingle roof coverings of galvanized steel shall be 0.013 inch (0.378 mm) minimum thickness. Metal roof shingle roof coverings of aluminum shall be of 0.024 inch (0.610 mm) minimum thickness. shall comply with Table R905.10.3 (1). The materials used for metal roof shingle roof coverings shall be naturally corrosion resistant or be made corrosion resistant in accordance with the standards and minimum thicknesses listed in Table R905.10.3(2).

TABLE R905.10.3(2)
MINIMUM CORROSION RESISTANCE

<u>55% Aluminum-zinc alloy coated steel</u>	<u>ASTM A 792 AZ 50</u>
<u>5% aluminum alloy-coated steel</u>	<u>ASTM A 875 GF60</u>
<u>Aluminum-coated steel</u>	<u>ASTM A 463 T2 65</u>
<u>Galvanized steel</u>	<u>ASTM A 653 G-90</u>
<u>Prepainted steel</u>	<u>ASTM A 755a</u>

a. Paint systems in accordance with ASTM A 755 shall be applied over steel products with corrosion-resistant coatings complying with ASTM A 792, ASTM A 875, ASTM A 463, or ASTM A 653.

R906.2 Material standards. Above-deck thermal insulation board shall comply with the standards in Table R906.2.

TABLE R906.2
MATERIAL STANDARDS FOR ROOF INSULATION

<u>Cellular glass board</u>	<u>ASTM C 552</u>
<u>Composite boards</u>	<u>ASTM C 1289, Type III, IV, V, or VI</u>
<u>Expanded polystyrene</u>	<u>ASTM C 578</u>
<u>Extruded polystyrene board</u>	<u>ASTM C 578</u>
<u>Perlite Board</u>	<u>ASTM C 728</u>
<u>Polyisocyanurate Board</u>	<u>ASTM C 1289, Type I or Type II</u>
<u>Wood fiberboard</u>	<u>ASTM C 208</u>

SECTION R1002 (was R1006)
MASONRY HEATERS

R1002.1 Definition. A masonry heater is a heating appliance constructed of concrete or solid masonry, hereinafter referred to as masonry, which is designed to absorb and store heat from a solid-fuel fire built in the firebox by routing the exhaust gases through internal heat exchange channels in which the flow path downstream of the firebox may include flow in a horizontal or downward direction before entering the chimney and which delivers heat by radiation from the masonry surface of the heater.

R1002.2 Installation. Masonry heaters shall be installed in accordance with this section and comply with one of the following:

1. Masonry heaters shall comply with the requirements of ASTM E 1602; or
2. Masonry heaters shall be listed and labeled in accordance with UL 1482 and installed in accordance with the manufacturer's installation instructions. ~~The terms of its listing.~~

R1002.3 Footings and foundation. The firebox floor of a masonry heater shall be a minimum thickness of 4 inches (102 mm) of noncombustible material and be supported on a noncombustible footing and foundation in accordance with Section R1003.2.

R1002.4 Seismic reinforcing. In Seismic Design Categories D₁ and D₂, masonry heaters shall be anchored to the masonry foundation in accordance with Section R1003.3. Seismic reinforcing shall not be required within the body of a masonry heater whose height is equal to or less than 3.5 times its body width and where the masonry chimney serving the heater is not supported by the body of the heater. Where the masonry chimney shares a common wall with the facing of the masonry heater, the chimney portion of the structure shall be reinforced in accordance with Section R1003.

R1002.5 Masonry heater clearance. Combustible materials shall not be placed within 36 inches (914 mm) of the outside surface of a masonry heater in accordance with NFPA 211 Section 8-7 (clearances for solid-fuel-burning appliances), and the required space between the heater and combustible material shall be fully vented to permit the free flow of air around all heater surfaces.

Exceptions:

1. When the masonry heater wall is at least 8 inches (203 mm) thick of solid masonry and the wall of the heat exchange channels is at least 5 inches (127 mm) thick of solid masonry, combustible materials shall not be placed within 4 inches (102 mm) of the outside surface of a masonry heater. A clearance of at least 8 inches (203 mm) shall be provided between the gas-tight capping slab of the heater and a combustible ceiling.
2. Masonry heaters tested and listed by an American National Standards Association (ANSI)-accredited laboratory to the requirements of UL1482 may be installed in accordance with the listing specifications and the manufacturer's written instructions.

SECTION R1003 (was R1001)
MASONRY CHIMNEYS

R1003.1 Definition. A masonry chimney is a chimney constructed of concrete or masonry, hereinafter referred to as masonry. Masonry chimneys shall be constructed, anchored, supported and reinforced as required in this chapter.

R1003.2 Support Footings and foundations. Footings for masonry chimneys shall be constructed of concrete or solid masonry at least 12 inches (305 mm) thick and shall extend at least 6 inches (152 mm) beyond the face of the foundation or support wall on all sides. Footings shall be founded on natural undisturbed earth or engineered fill below frost depth. In areas not subjected to freezing, footings shall be at least 12 inches (305 mm) below finished grade.

R1003.3 Seismic reinforcing. Masonry or concrete chimneys shall be constructed, anchored, supported and reinforced as required in this chapter. In Seismic Design Category D₁ or D₂ masonry and concrete chimneys shall be reinforced and anchored as detailed in Section R1003.3.1, R1003.3.2 and R1003.4. In Seismic Design Category A, B or C, reinforcement and seismic anchorage is not required.

R1003.3.1 Vertical reinforcing. For chimneys up to 40 inches (1016 mm) wide, four No. 4 continuous vertical bars, anchored in the foundation, shall be placed in the concrete, or between wythes of solid masonry, or within the cells of hollow unit masonry, and grouted in accordance with Section R609.1.1. Grout shall be prevented from bonding with the flue liner so that the flue liner is free to move with thermal expansion. For chimneys more than 40 inches (1016 mm) wide, two additional No. 4 vertical bars shall be installed for each additional 40 inches (1016 mm) in width or fraction thereof.

R1003.3.2 Horizontal reinforcing. Vertical reinforcement shall be placed enclosed within $\frac{1}{4}$ -inch (6 mm) ties, or other reinforcing of equivalent net cross-sectional area, spaced not to exceed 18 inches (457 mm) on center in concrete, or placed in the bed joints of unit masonry, at a minimum of every 18 inches (457 mm) of vertical height. Two such ties shall be installed at each bend in the vertical bars.

R1003.4 Seismic anchorage. Masonry and concrete chimneys and foundations in Seismic Design Category D₁ or D₂ shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above grade, except where constructed completely within the exterior walls. Anchorage shall conform to the requirements in Section R1003.4.1.

R1003.4.1 Anchorage. Two $\frac{3}{16}$ -inch by 1-inch (5 mm by 25 mm) straps shall be embedded a minimum of 12 inches (305 mm) into the chimney. Straps shall be hooked around the outer bars and extend 6 inches (152 mm) beyond the bend. Each strap shall be fastened to a minimum of four floor joists with two $\frac{1}{2}$ -inch (13 mm) bolts.

Chapter 11
Energy Efficiency

N1101.1 General. The provisions of this chapter regulate the exterior envelope; the design, construction and selection of heating, ventilating and air-conditioning systems, lighting and piping insulation, required for the purpose of effective conservation of energy within a building or structure governed by this code.

All conditioned spaces within residential buildings shall comply with Table N1101.1(1) and one additional measure from Table N1101.1(2).

Exceptions:

1. Application to existing buildings shall comply with Section N1101.2.
2. Application to additions shall comply with Section N1101.3.

N1101.2.3 Change of occupancy or use. Definition of “Change of use” for purposes of N1101.2.3 is a change of use in an existing residential building and shall include any of the following: any unconditioned spaces such as an attached garage, basement, porch, or canopy that are to become conditioned spaces; any unconditioned, inhabitable space that is to become conditioned space, such as a large attic.

N1101.2.3.1 Change of use. A building that changes use, without any changes to the components regulated in this chapter, are required to comply with the minimum component requirements as specified in Footnote d of Table N1104.1(1) to the greatest extent practical.

N1101.2.3.2 Change of occupancy. Alteration and repair of non residential buildings, such as a small church or school, that are changing occupancy to residential may use the minimum component requirements as specified in Footnote d of Table N1104.1(1) to the greatest extent practical.

Exception: The minimum component requirements may be disregarded when thermal performance calculations are completed for change of use to Group R occupancy.

N1101.3 Additions. Additions to existing buildings or structures may be made without making the entire building or structure comply, if the new additions comply with the requirements of this chapter.

Exception: Additions that are either 30 percent of existing building heated space floor area or 400 square feet in area, whichever is less, shall not be required to comply with Table N1101.1(2).

New Table

TABLE N1101.1(1)
PRESCRIPTIVE ENVELOPE REQUIREMENTS ^a

Building Component	Standard Base Case		Log Homes Only	
	Required Performance	Equiv. Value ^b	Required Performance	Equiv. Value ^b
Wall insulation-above grade	U-0.060	R-21 ^c	^d	^d
Wall insulation-below grade ^e	F-0.565	R-15	F-0.565	R-15
Flat ceilings ^f	U-0.031	R-38	U-0.025	R-49
Vaulted ceilings ^g	U-0.042	R-38 ^g	U-0.027	R-38A ^h
Underfloors	U-0.028	R-30	U-0.028	R-30
Slab edge perimeter	F-0.520	R-15	F-0.520	R-15
Heated slab interior ⁱ	n/a	R-10	n/a	R-10
Windows ^j	U-0.35	U-0.35	U-0.35	U-0.35
Window area limitation ^j	n/a	n/a	n/a	n/a
Skylights ^k	U-0.60	U-0.60	U-0.60	U-0.60
Exterior doors ^l	U-0.20	U-0.20	U-0.54	U-0.54
Exterior doors w/>2.5 ft ² glazing ^m	U-0.40	U-0.40	U-0.40	U-0.40
Forced air duct insulation	n/a	R-8	n/a	R-8

a. As allowed in Section N1104.1, thermal performance of a component may be adjusted provided that overall heat loss does not exceed the total resulting from conformance to the required *U*-value standards. Calculations to document equivalent heat loss shall be performed using the procedure and approved *U*-values contained in Table N1104.1(1).

b. R-values used in this table are nominal, for the insulation only in standard wood framed construction and not for the entire assembly.

c. Wall insulation requirements apply to all exterior wood framed, concrete or masonry walls that are above grade. This includes cripple walls and rim joist areas. R-19 Advanced Frame or 2 x 4 wall with rigid insulation may be substituted if total nominal insulation R-value is 18.5 or greater.

d. The wall component shall be a minimum solid log or timber wall thickness of 3.5 inches (90 mm).

e. Below-grade wood, concrete or masonry walls include all walls that are below grade and does not include those portions of such wall that extend more than 24 inches above grade.

f. Insulation levels for ceilings that have limited attic/rafter depth such as dormers, bay windows or similar architectural features totaling not more than 150 square feet (13.9 m²) in area may be reduced to not less than R-21. When reduced, the cavity shall be filled (except for required ventilation spaces).

g. The maximum vaulted ceiling surface area shall not be greater than 50 percent of the total heated space floor area unless area has a U-factor no greater than U-0.031. The U-factor of 0.042 is representative of a vaulted scissor truss. A 10-inch deep rafter vaulted ceiling with R-30 insulation is U-0.033 and complies with this requirement, not to exceed 50 percent of the total heated space floor area.

h. A = advanced frame construction, which shall provide full required insulating value to the outside of exterior walls.

i. Heated slab interior applies to concrete slab floors (both on and below grade) that incorporate a radiant heating system within the slab. Insulation shall be installed underneath the entire slab.

j. Sliding glass doors shall comply with window performance requirements. Windows exempt from testing in accordance with NF1111.2 Item 3 shall comply with window performance requirements if constructed with thermal break aluminum or wood, or vinyl, or fiberglass frames and double-pane glazing with low-emissivity coatings of 0.10 or less. Buildings designed to incorporate passive solar elements may include glazing with a U-factor greater than 0.35 by using Table N1104.1(1) to demonstrate equivalence to building envelope requirements.

k. Reduced window area may not be used as a trade-off criterion for thermal performance of any component.

l. Skylight area installed at 2% or less of total heated space floor area shall be deemed to satisfy this requirement with vinyl, wood, or thermally broken aluminum frames and double-pane glazing with low-emissivity coatings. Skylight U-factor is tested in the 20 degree overhead plane per NFRC standards.

m. A maximum of 28 square feet (2.6 m²) of exterior door area per dwelling unit can have a U-factor of 0.54 or less.

n. Glazing that is either double pane with low-e coating on one surface, or triple pane shall be deemed to comply with this U-0.40 requirement.

New Table

TABLE N1101.1(2)
ADDITIONAL MEASURES (select one)^a

Measure	
1	High efficiency HVAC system: Gas-fired furnace or boiler with minimum AFUE of 90% ^a , or Air-source heat pump with minimum HSPF of 8.5 or Closed-loop ground source heat pump with minimum COP of 3.0
2	High efficiency duct sealing: Certified performance tested duct systems ^b or All ducts and air handler are contained within building envelope ^a
3	High efficiency building envelope: Replace corresponding Table N1101.1(1) components with all of the following: Wall insulation-above grade – U-0.047 / R-24, and Vaulted ceilings – U-0.033 / R-30A ^{c, d} , and Flat ceilings – U-0.025 / R-49, and Windows – U-0.32
4	Zonal electric, ductless furnace or ductless heat pumps: 75 percent of permanently installed lighting fixtures as CFL or linear fluorescent or a min efficacy of 40 lumens per watt, or Windows – U-0.32, or Flat ceilings – U-0.025 / R-49 and vaulted ceilings – U-0.033 / R-30A or Exterior walls – U-0.047 / R24
5	High efficiency ceilings & windows/lighting: Replace corresponding Table N1101.1(1) components with all of the following: Vaulted ceilings – U-0.033 / R-30A ^{c, d} , and Flat ceilings – U-0.025 / R-49, and Windows – U-0.32, and 75 percent of permanently installed lighting fixtures as CFL or linear fluorescent or a min efficacy of 40 lumens per watt
6	High efficiency ceilings & windows / water heating: Replace corresponding Table N1101.1(1) components with all of the following: Vaulted ceilings – U-0.033 / R-30A ^{c, d} , and Flat ceilings – U-0.025 / R-49, and Windows – U-0.32, and Natural gas/propane, on-demand water heating with min EF of 0.80
7	High efficiency water heating / lighting: Natural gas/propane, on-demand water heating with min EF of 0.80 75 percent of permanently installed lighting fixtures as CFL or linear fluorescent or a min. efficacy of 40 lumens per watt
8	Solar photovoltaic: Minimum 1 Watt / sq ft. conditioned floor space ^e
9	Solar water heating: Minimum of 40 ft ² of gross collector area ^f

a. Furnaces located within the building envelope shall have sealed combustion air installed. Combustion air shall be ducted directly from the outdoors.

b. Documentation of Performance Tested Ductwork shall be submitted to the Building Official upon completion of work. This work shall be performed by a contractor that is certified by the Oregon Department of Energy's (ODOE) Residential Energy Tax Credit program and documentation shall be provided that work demonstrates conformance to ODOE duct performance standards.

c. A = advanced frame construction, which shall provide full required ceiling insulation value to the outside of exterior walls.

d. The maximum vaulted ceiling surface area shall not be greater than 50 percent of the total heated space floor area unless vaulted area has a U-factor no greater than U-0.026.

e. Solar electric system size shall include documentation indicating that Total Solar Resource Fraction is not less than 75%.

f. Solar water heating panels shall be Solar Rating and Certification Corporation (SRCC) Standard OG-300 certified and labeled, with documentation indicating that Total Solar Resource Fraction is not less than 75%.

**TABLE N1104.1(1)
RESIDENTIAL THERMAL PERFORMANCE CALCULATIONS**

BUILDING COMPONENTS ^b	Standard base case ^a			Proposed alternative			
	Areas ^c	U-factor	Areas x U	R-value ^d	Areas ^c	U-factor ^e	Areas x U
Flat ceilings		0.031					
Vaulted ceilings ^f		<u>0.042</u>					
Conventional wood-framed walls		0.060					
Underfloor		<u>0.028</u>					
Slab edge		(perimeter ft. =) F=0.52 ^g					
Windows		<u>0.35</u>					
Skylights <2% ^h		<u>0.75</u>					
Skylights >2% ^h		<u>0.60</u>					
Exterior doors ⁱ		0.20					
Doors with >2.5 ft ² glazing		<u>0.40</u>					
		CODE UA =				Proposed UA ^j =	

a. Base path 1 represents Standard Base Case from Table N1101.1(1).

b. Performance trade-offs are limited to those listed in column 1. Heat plant efficiency, duct insulation levels, passive and active solar heating, air infiltration and similar measures including those not regulated by code may not be considered in this method of calculation.

c. Areas from plan take-offs. All areas must be the same for both Standard Base Case and Proposed Alternate. The vaulted ceiling surface area for Standard Base Case must be the actual surface area from the plan take-off not to exceed 50 percent of the total heated space floor area. Any areas in excess of 50 percent for Base Case must be entered at U-0.031 (R-38) with "Flat Ceilings" area.

d. Minimum Component Requirements: Walls R-15; Floors R-21; Flat Ceilings R-38; Vaults R-21; Below-Grade Wood, Concrete or Masonry Walls R-15; Slab Edge R-10; Duct Insulation R-8. R-values used in this table are nominal, for the insulation only and not for the entire assembly. Window and skylight U-values shall not exceed 0.65 (CL65). Door U-values shall not exceed 0.54 (Nominal R-2). A maximum of 28 square feet (2.6 m²) of exterior door area per dwelling unit can have a U-factor of 0.54 or less and shall not be included in calculations.

e. U-values for wood frame ceilings, walls and floor assemblies shall be as specified in Table N1104.1(2). U-values for other assemblies, which include steel framing, brick or other masonry, stucco, etc., shall be calculated using standard ASHRAE procedures.

f. Vaulted area, unless insulated to R-38, U-0.031, may not exceed 50 percent of the total heated space floor area.

g. F = The heat loss coefficient, BTU/hr./ft.²/°F. per foot of perimeter.

h. Whenever skylight area for Proposed Alternative exceeds 2 percent of the total heated space floor area, enter 2 percent of area under Standard Base Case at U-0.75 then the remaining area under Standard Base Case at U-0.60. For Proposed Alternative skylights, enter the actual skylight area and U-factor of those to be installed in residence.

i. A maximum of 28 square feet (2.6 m²) of exterior door area per dwelling unit can have a U-factor of 0.54 or less. Default U-factor for an unglazed wood door is 0.54.

j. Proposed UA must be less than or equal to Code UA.

N1104.1 General. This section provides, minimum requirements for exterior envelope construction.

Exterior building envelope shall comply with Table N1101.1(1) or may be demonstrated using Table N1104.1(1). The requirements specified in Table N1101.1(2) shall apply to both Tables N1101.1(1) and N1104.1(1).

Buildings designed to incorporate passive solar elements may use Table N1104.1(1) to demonstrate building envelope requirements in this code, in addition to requirements specified in Table N1101.1(2).

N1104.4 Windows. All windows installed in Oregon shall meet the requirements of Part III, Fenestration Standard.

1. Decorative or unique architectural feature glazing not exceeding 1 percent of the heated space floor area is exempt from thermal performance requirements and do not need to be included in Table N1104.1(1) thermal performance calculations.

2. Glass block assemblies may use a *U*-factor of 0.51.

3. The *U*-factor for windows may be a weighted average of total window area when all other building envelope measures are in compliance with performance requirements specified in this code. This calculation shall be provided to the building official and the windows that are less than required for prescriptive compliance shall be identified on the plans.

N1104.5.2 Intermediate framing for walls. Intermediate framing for walls is an optional construction method. Intermediate framing, when used to achieve improved wall performance under the requirements of Table N1104.1(2), shall meet the following requirements:

1. Walls. Walls shall be framed with 2X studs at 16 inches (610 mm) on center and shall include the following, as detailed in Items 2 and 3.

2. Corners and intersections. Exterior wall and ceiling corners shall be fully insulated through the use of three-stud corners configured to allow full insulation into the corner, or two-stud corners and drywall backup clips or other approved technique. Intersections of interior partition walls with exterior walls shall be fully insulated through the use of single backer boards, mid-height blocking with drywall clips or other approved technique.

3. Headers. Voids in headers 1 inch (25.4 mm) or greater in thickness shall be insulated with rigid insulation that has a value of R-4 or greater per 1 inch (25.4 mm) thickness. Nonstructural headers (such as in gable end walls) can be eliminated and replaced with insulation to achieve equivalent levels as the surrounding area.

N1104.7.1 Slab-on-grade floors with hydronic heat. For slab-on-grade floors that incorporate hydronic heating, in addition to perimeter insulation, the entire underside of slab shall be insulated to R-10.

N1104.9.1 Vapor retarders. A one-perm, dry cup rating vapor retarder shall be installed on the warm side (in winter) of all insulation.

Exceptions:

1. When insulation is installed in ceilings in an existing structure and ventilation is provided as specified in Section R806, a vapor retarder need not be installed.
2. Below grade walls are not required to have a vapor retarder.
3. Slab-on-grade floors need not have a warm-side vapor retarder.

N1105.2 Insulation of ducts. All new duct systems, or new portions thereof, exposed to unconditioned spaces shall be insulated according to Table N1101.1(1).

Exception: The replacement or addition of a furnace, air conditioner or heat pump shall not require existing ducts to be insulated to current code.

N1105.5.1 Heat pumps. Single phase, air-cooled split and packaged system heat pumps of less than 65,000 Btu/hr capacity shall have a heating seasonal performance factor (HSPF) of not less than 7.7 and seasonal energy efficiency ratio (SEER) of not less than 13.

N1105.5.2 Air conditioners. Single phase, air-cooled split and packaged system air conditioners of less than 65,000 Btu/hr capacity shall have a SEER of not less than 13.0.
