

## SECTION AQ101 GENERAL

**AQ101.1 Scope.** This appendix shall be applicable to tiny houses used as single dwelling units. Tiny houses shall comply with this code except as otherwise stated in this appendix.

## SECTION AQ102 DEFINITIONS

**AQ102.1 General.** The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of the 2021 International Residential code for general definitions.

**EGRESS ROOF ACCESS WINDOW.** A skylight or roof window designed and installed to satisfy the emergency escape and rescue opening requirements of Section R310.2.

**LANDING PLATFORM.** A landing provided as the top step of a stairway accessing a loft.

**LOFT.** A floor level located more than 30 inches (762 mm) above the main floor, open to the main floor on one or more sides with a ceiling height of less than 6 feet 8 inches (2032 mm) and used as a living or sleeping space.

**TINY HOUSE.** A dwelling that is 400 square feet (37 m<sup>2</sup>) or less in floor area excluding lofts.

## SECTION AQ103 CEILING HEIGHT

**AQ103.1 Minimum ceiling height.** Habitable space and hallways in tiny houses shall have a ceiling height of not less than 6 feet 8 inches (2032 mm). Bathrooms, toilet rooms and kitchens shall have a ceiling height of not less than 6 feet 4 inches (1930 mm). Obstructions including, but not limited to, beams, girders, ducts and lighting, shall not extend below these minimum ceiling heights.

**Exception:** Ceiling heights in lofts are permitted to be less than 6 feet 8 inches (2032 mm).

## SECTION AQ104 LOFTS

**AQ104.1 Minimum loft area and dimensions.** Lofts used as a sleeping or living space shall meet the minimum area and dimension requirements of Sections AQ104.1.1 through AQ104.1.3.

**AQ104.1.1 Minimum area.** Lofts shall have a floor area of not less than 35 square feet (3.25 m<sup>2</sup>).

**AQ104.1.2 Minimum horizontal dimensions.** Lofts shall be not less than 5 feet (1524 mm) in any horizontal dimension.

**AQ104.1.3 Height effect on loft area.** Portions of a loft with a sloped ceiling measuring less than 3 feet (914 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required area for the loft. See Figure AQ104.1.3.

**Exception:** Under gable roofs with a minimum slope of 6 units vertical in 12 units horizontal (50-percent slope), portions of a loft with a sloped ceiling measuring less than 16 inches (406 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required area for the loft.

**AQ104.2 Loft access and egress.** The access to and primary egress from lofts shall be of any type described in Sections AQ104.2.1 through AQ104.2.5. The loft access and egress element along its required minimum width shall meet the loft where its ceiling height is not less than 3 feet (914 mm).

**AQ104.2.1 Stairways.** Stairways accessing lofts shall comply with this code or with Sections AQ104.2.1.1 through AQ104.2.1.7.

**AQ104.2.1.1 Width.** Stairways accessing a loft shall not be less than 17 inches (432 mm) in clear width at or above the handrail. The width below the handrail shall be not less than 20 inches (508 mm).

**AQ104.2.1.2 Headroom.** The headroom above stairways accessing a loft shall be not less than 6 feet 2 inches (1880 mm), as measured vertically, from a sloped line connecting the tread, landing or landing platform nosings in the center of their width and vertically from the landing platform along the center of its width.

**AQ104.2.1.3 Treads and risers.** Risers for stairs accessing a loft shall be not less than 7 inches (178 mm) and not more than 12 inches (305 mm) in height. Tread depth and riser height shall be calculated in accordance with one of the following formulas:

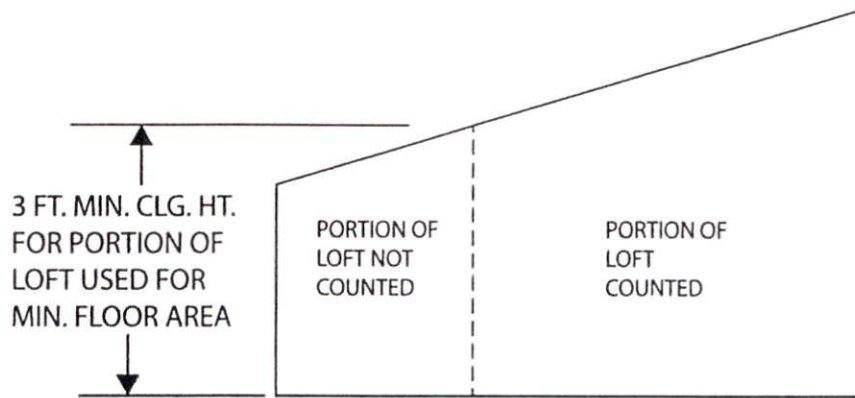
1. The tread depth shall be 20 inches (508 mm) minus four-thirds of the riser height.
2. The riser height shall be 15 inches (381 mm) minus three-fourths of the tread depth.

**AQ104.2.1.4 Landings.** Intermediate landings and landings at the bottom of stairways shall comply with Section R311.7.6, except that the depth in the direction of travel shall be not less than 24 inches (610 mm).

**AQ104.2.1.5 Landing platforms.** The top tread and riser of stairways accessing lofts shall be constructed as a landing platform where the loft ceiling height is less than 6 feet 2 inches (1880 mm) where the stairway meets the loft. The landing platform shall be not less than 20 inches (508 mm) in width and in depth measured horizontally from and perpendicular to the nosing of the landing platform. The landing platform riser height to the loft floor shall be not less than 16 inches (406 mm) and not greater than 18 inches (457 mm).

**AQ104.2.1.6 Handrails.** Handrails shall comply with Section R311.7.8.

## R311.7.8.4 Continuity. Handrails shall be continuous



for the full length of the flight, from a point directly

For SI: 1 foot = 304.5 mm.

**FIGURE AQ104.1.3  
HEIGHT EFFECT ON LOFT AREA**

**R311.7.8 Handrails.** Handrails shall be provided on not less than one side of each flight of stairs with four or more risers.

**R311.7.8.1 Height.** Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

**Exceptions:**

1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.
2. Where handrail fittings or bendings are used to provide continuous transition between flights, transitions at winder treads, the transition from handrail to guard, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed 38 inches (965 mm).

**R311.7.8.2 Handrail projection.** Handrails shall not project more than 4 1/2 inches (114 mm) on either side of the stairway.

**Exception:** Where nosings of landings, floors or passing flights project into the stairway reducing the clearance at passing handrails, handrails shall project not more than 6 1/2 inches (165 mm) into the stairway, provided that the stair width and handrail clearance are not reduced to less than that required.

**R311.7.8.3 Handrail clearance.** Handrails adjacent to a wall shall have a space of not less than 1 1/2 inches (38 mm) between the wall and the handrails.

above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned toward a wall, guard walking surface continuous to itself, or terminate to a post.

**Exceptions:**

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing.

**R311.7.8.5 Grip size.** Required handrails shall be of one of the following types or provide equivalent graspability.

1. Type I. Handrails with a circular cross section shall have an outside diameter of not less than 1 1/4 inches (32 mm) and not greater than 2 inches (51 mm). If the handrail is not circular, it shall have a perimeter of not less than 4 inches (102 mm) and not greater than 6 1/4 inches (160 mm) and a cross section of not more than 2 1/4 inches (57 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).

2. Type II. Handrails with a perimeter greater than 6 1/4 inches (160 mm) shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within 3/4 inch (19 mm) measured vertically from the tallest portion of the profile and have a depth of not less than



5/16 inch (8 mm) within 7/8 inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than 3/8 inch (10 mm) to a level that is not less than 1 3/4 inches (45 mm) below the tallest portion of the profile. The width of the handrail above the recess shall be not less than 1 1/4 inches (32 mm) and not more than 2 3/4 inches (70 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).

#### **R311.7.8.6 Exterior plastic composite handrails.**

Plastic composite exterior handrails shall comply with the requirements of Section R507.2.2.

**AQ104.2.1.7 Stairway guards.** Guards at open sides of stairways, landings and landing platforms shall comply with Section R312.1.

**R312.1 Guards.** Guards shall be provided in accordance with Sections R312.1.1 through R312.1.4.

**R312.1.1 Where required.** Guards shall be provided for those portions of open-sided walking surfaces, including floors, stairs, ramps and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a guard.

**R312.1.2 Height.** Required guards at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches (914 mm) in height as measured vertically above the adjacent walking surface or the line connecting the nosings.

#### **Exceptions:**

1. Guards on the open sides of stairs shall have a height of not less than 34 inches (864 mm) measured vertically from a line connecting the nosings.
2. Where the top of the guard serves as a handrail on the open sides of stairs, the top of the guard shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) as measured vertically from a line connecting the nosings.

**R312.1.3 Opening limitations.** Required guards shall not have openings from the walking surface to the required guard height that allow passage of a sphere 4 inches (102 mm) in diameter.

#### **Exceptions:**

1. The triangular openings at the open side of stair, formed by the riser, tread and bottom rail of a guard, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. Guards on the open side of stairs shall not have openings that allow passage of a sphere 4 3/8 inches (111 mm) in diameter.

**R312.1.4 Exterior plastic composite guards.** Plastic composite exterior guards shall comply with the requirements of Section R317.4

**AQ104.2.2 Ladders.** Ladders accessing lofts shall comply with Sections AQ104.2.1 and AQ104.2.2.2.

**AQ104.2.2.1 Size and capacity.** Ladders accessing lofts shall have a rung width of not less than 12 inches (305 mm), and 10-inch (254 mm) to 14-inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 300-pound (136 kg) load on any rung. Rung spacing shall be uniform within 3/8 inch (9.5 mm).

**AQ104.2.2.2 Incline.** Ladders shall be installed at 70 to 80 degrees from horizontal.

**AQ104.2.3 Alternating tread devices.** Alternating tread devices accessing *lofts* shall comply with Sections R311.7.11.1 and R311.7.11.2. The clear width at and below the *handrails* shall be not less than 20 inches (508 mm).

**R311.7.11.1 Treads of alternating tread devices.** Alternating tread devices shall have a tread depth of not less than 5 inches (127 mm), a projected tread depth of not less than 8 1/2 inches (216 mm), a tread width of not less than 7 inches (178 mm) and a riser height of not more than 9 1/2 inches (241 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projections of adjacent treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees (0.87 and 1.22 rad). The initial tread of the device shall begin at the same elevation as the platform, landing or

**R311.7.11.2 Handrails of alternating tread devices.** Handrails shall be provided on both sides of alternating tread devices and shall comply with Sections R311.7.8.2 through R311.7.8.6. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm) floor surface.



**AQ104.2.4 Ship's ladders.** Ship's ladders accessing lofts shall comply with Sections R311.7.12.1 and R311.7.12.2. The clear width at and below handrails shall be not less than 20 inches (508 mm).

**R311.7.12.1 Treads of ship's ladders.** Treads shall have a depth of not less than 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the nosing projection is not less than 8 ½ inches (216 mm). The riser height shall be not more than 9 1/2 inches (241 mm).

**R311.7.12.2 Handrails of ship's ladders.** Handrails shall be provided on both sides of ship's ladders and shall comply with Sections R311.7.8.2 through R311.7.8.6. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

**AQ104.2.5 Loft guards.** Loft guards shall be located along the open sides of lofts. Loft guards shall be not less than 36 inches (914 mm) in height or one-half of the clear height to the ceiling, whichever is less. Loft guards shall comply with Section R312.1.3 and Table R301.5 for their components.

**R312.1.3 Opening limitations.** Required guards shall not have openings from the walking surface to the required guard height that allow passage of a sphere 4 inches (102 mm) in diameter.

**Exceptions:**

1. The triangular openings at the open side of stair, formed by the riser, tread and bottom rail of a guard, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. Guards on the open side of stairs shall not have openings that allow passage of a sphere 4 3/8 inches (111 mm) in diameter.

## SECTION AQ105

### EMERGENCY ESCAPE AND RESCUE OPENINGS

**AQ105.1 General.** *Tiny houses* shall meet the requirements of Section R310 for emergency escape and rescue openings.

**Exception:** *Egress roof access windows* in lofts used as sleeping rooms shall be deemed to meet the requirements of Section R310 where installed such that the bottom of the opening is not more than 44 inches (1118 mm) above the loft floor, provided the egress roof access window complies with the minimum opening area requirements of Section R310.2.1.

**R310.2.1 Minimum size.** Emergency escape and rescue openings shall have a net clear opening of not less than 5.7 square feet (0.530 m<sup>2</sup>).

## SECTION R310

### EMERGENCY ESCAPE AND RESCUE OPENINGS

#### R310.1 Emergency escape and rescue opening required.

Basements, habitable attics and every sleeping room shall have not less than one operable emergency escape and rescue opening. Where basements contain one or more sleeping rooms, an emergency escape and rescue opening shall be required in each sleeping room. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court having a minimum width of 36 inches (914 mm) that opens to a public way.

**Exceptions:**

1. Storm shelters and basements used only to house mechanical equipment not exceeding a total floor area of 200 square feet (18.58 m<sup>2</sup>).
2. Where the dwelling unit or townhouse unit is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in basements shall not be required to have emergency escape and rescue openings provided that the basement has one of the following:
  - 2.1. One means of egress complying with Section R311 and one emergency escape and rescue opening.
  - 2.2. Two means of egress complying with Section R311. 3. A yard shall not be required to open directly into a public way where the yard opens to an unobstructed path from the yard to the public way. Such path shall have a width of not less than 36 inches (914 mm).

#### R310.1.1 Operational constraints and opening control devices.

Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys, tools or special knowledge. Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as a required emergency escape and rescue opening and shall be not more than 70 inches (178 cm) above the finished floor.

**R310.2 Emergency escape and rescue openings.** Emergency escape and rescue openings shall have minimum dimensions in accordance with Sections R310.2.1 through R310.2.4.

**R310.2.1 Minimum size.** Emergency escape and rescue openings shall have a net clear opening of not less than 5.7 square feet (0.530 m<sup>2</sup>).

**Exception:** The minimum net clear opening for grade-floor emergency escape and rescue openings shall be 5 square feet (0.465 m<sup>2</sup>).



**R310.2.2 Minimum dimensions.** The minimum net clear opening height dimension shall be 24 inches (610 mm). The minimum net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.

**R310.2.3 Maximum height from floor.** Emergency escape and rescue openings shall have the bottom of the clear opening not greater than 44 inches (1118 mm) above the floor.

**R310.2.4 Emergency escape and rescue openings under decks, porches and cantilevers.** Emergency escape and rescue openings installed under decks, porches and cantilevers shall be fully openable and provide a path not less than 36 inches (914 mm) in height and 36 inches (914 mm) in width to a yard or court.

**R310.3 Emergency escape and rescue doors.** Where a door is provided as the required emergency escape and rescue opening, it shall be a side-hinged door or a sliding door.

**R310.4 Area wells.** An emergency escape and rescue opening where the bottom of the clear opening is below the adjacent grade shall be provided with an area well in accordance with Sections R310.4.1 through R310.4.4.

**R310.4.1 Minimum size.** The horizontal area of the area well shall be not less than 9 square feet (0.9 m<sup>2</sup>), with a horizontal projection and width of not less than 36 inches (914 mm). The size of the area well shall allow the emergency escape and rescue opening to be fully opened.

**Exception:** The ladder or steps required by Section R310.4.2 shall be permitted to encroach not more than 6 inches (152 mm) into the required dimensions of the area well.

**R310.4.2 Ladder and steps.** Area wells with a vertical depth greater than 44 inches (1118 mm) shall be equipped with an approved, permanently affixed ladder or steps. The ladder or steps shall not be obstructed by the emergency escape and rescue opening where the window or door is in the open position. Ladders or steps required by this section shall not be required to comply with Section R311.7.

**R310.4.2.1 Ladders.** Ladders and rungs shall have an inside width of not less than 12 inches (305 mm), shall project not less than 3 inches (76 mm) from the wall and shall be spaced not more than 18

inches (457 mm) on center vertically for the full height of the area well.

**R310.4.2.2 Steps.** Steps shall have an inside width of not less than 12 inches (305 mm), a minimum tread depth of 5 inches (127 mm) and a maximum riser height of 18 inches (457 mm) for the full height of the area well.

**R310.4.3 Drainage.** Area wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section R405.1.

**Exception:** A drainage system for area wells is not required where the foundation is on well-drained soil or sand-gravel mixture soils in accordance with the United Soil Classification System, Group I Soils, as detailed in Table R405.1.

**R310.4.4 Bars, grilles, covers and screens.** Where bars, grilles, covers, screens or similar devices are placed over emergency escape and rescue openings, bulkhead enclosures or area wells that serve such openings, the minimum net clear opening size shall comply with Sections R310.2 through R310.2.2 and R310.4.1. Such devices shall be releasable or removable from the inside without the use of a key or tool or force greater than that required for the normal operation of the escape and rescue opening.

**R310.5 Replacement windows for emergency escape and rescue openings.** Replacement windows installed in buildings meeting the scope of this code shall be exempt from Sections R310.2 and R310.4.4, provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window is of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. The replacement window is not part of a change of occupancy.

**R310.6 Dwelling additions.** Where dwelling additions contain sleeping rooms, an emergency escape and rescue opening shall be provided in each new sleeping room. Where dwelling additions have basements, an emergency escape and rescue opening shall be provided in the new basement.

**Exceptions:**



1. An emergency escape and rescue opening is not required in a new basement that contains a sleeping room with an emergency escape and rescue opening.
2. An emergency escape and rescue opening is not required in a new basement where there is an emergency escape and rescue opening in an existing basement that is accessed from the new basement.
3. An operable window complying with Section 310.7.1 shall be acceptable as an emergency escape and rescue opening.

### **R310.7 Alterations or repairs of existing basements.**

New sleeping rooms created in an existing basement shall be provided with emergency escape and rescue openings in accordance with Section R310.1. Other than new sleeping rooms, where existing basements undergo alterations or repairs, an emergency escape and rescue opening is not required.

**Exception:** An operable window complying with Section 310.7.1 shall be acceptable as an emergency escape and rescue opening.

**R310.7.1 Existing emergency escape and rescue openings.** Where a change of occupancy would require an emergency escape and rescue opening in accordance with Section 310.1, operable windows serving as the emergency escape and rescue opening shall comply with the following:

1. An existing operable window shall provide a minimum net clear opening of 4 square feet (0.38 m<sup>2</sup>) with a minimum net clear opening height of 22 inches (559 mm) and a minimum net clear opening width of 20 inches (508 mm).
2. A replacement window where such window complies with both of the following:
  - 2.1. The replacement window meets the size requirements in Item 1.
  - 2.2. The replacement window is the manufacturer's largest standard-size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.

## **SECTION AQ106 ENERGY CONSERVATION**

**AQ106.1 Air leakage testing.** The air leakage rate for *tiny houses* shall not exceed 0.30 cubic feet per minute at 50 Pascals of pressure per square foot of the *dwelling unit* enclosure area. The air leakage testing shall be in accordance with the testing methods required in Section N1102.4.1.2. The dwelling unit enclosure area shall be the sum of the areas of ceilings, floors and walls that separate the conditioned space of a dwelling unit from the exterior, its adjacent unconditioned spaces and adjacent dwelling units.

**N1102.4.1.2 (R402.4.1.2) Testing.** The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding five air changes per hour in Climate Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8. Testing shall be conducted in accordance with ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the code official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weather stripping or other infiltration control measures.
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures.
3. Interior doors, if installed at the time of the test, shall be open.
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed.
5. Heating and cooling systems, if installed at the time of the test, shall be turned off.
6. Supply and return registers, if installed at the time of the test, shall be fully open.

**AQ106.1.1 Whole-house mechanical ventilation.** Where the air leakage rate is in accordance with Section AQ106.1, the *tiny house* shall be provided with whole-house mechanical ventilation in accordance with Section M1505.4.

**M1505.4 Whole-house mechanical ventilation system.** Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1505.4.1 through M1505.4.4.

**M1505.4.1 System design.** The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as such a system. Outdoor air ducts connected to the return side of an



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air handler shall be considered as providing supply ventilation.

**M1505.4.2 System controls.** The whole-house mechanical ventilation system shall be provided with controls that enable manual override. Controls shall include text or a symbol indicating their function.

**M1505.4.3 Mechanical ventilation rate.** The whole house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1505.4.3(1) or not less than that determined by Equation 15-1. Ventilation rate in cubic feet per minute =  $(0.01 \times \text{total square foot area of house}) + [7.5 \times (\text{number of bedrooms} + 1)]$  (Equation 15-1)

**Exceptions:**

1. Ventilation rate credit. The minimum mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or Equation 15-1 shall be reduced by 30 percent, provided that both of the following conditions apply:

1.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

- 1.1.1. Living room.
- 1.1.2. Dining room.
- 1.1.3. Kitchen

1.2. The whole-house ventilation systems a balanced ventilation system.

2. Programmed intermittent operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1505.4.3(1), by Equation 15-1 or by Exception 1 is multiplied by the factor determined in

accordance with Table M1505.4.3(2).

**M1505.4.4 Local exhaust rates.** Local exhaust systems shall be designed to have the capacity to exhaust the minimum airflow rate determined in accordance with Table M1505.4.4.

**TABLE M1505.4.4  
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR  
ONE- AND TWO-FAMILY DWELLINGS**

AREA TO BE EXHAUSTED	EXHAUST RATES*
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m<sup>3</sup>/s,  
1 inch water column = 0.2488 kPa.

a. The listed exhaust rate for bathrooms-toilet rooms shall equal or exceed the exhaust rate at a minimum static pressure of 0.25 inch water column in accordance with Section M1505.3.

**AQ106.2 Alternative compliance.** Tiny houses shall be deemed to be in compliance with Chapter 11 of this code and Chapter R4 of the International Energy Conservation Code, provided that the following conditions are met:

1. The insulation and fenestration meet the requirements of Table N1102.1.2.
2. The thermal envelope meets the requirements of Section N1102.4.1.1 and Table N1102.4.1.1.
3. Solar, wind or other renewable energy source supplies not less than 90 percent of the energy use for the structure.
4. Solar, wind or other renewable energy source supplies not less than 90 percent of the energy for service water heating.
5. Permanently installed lighting is in accordance with Section N1104.
6. Mechanical ventilation is provided in accordance with Section M1505 and operable fenestration is not used to meet ventilation requirements.

**TABLE M1505.4.3(1)  
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS**

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	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
> 7,500	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 M1505.4.3(2)  
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS<sup>a, b</sup>**

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor <sup>c</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.

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**TABLE N1102.1.2 (R402.1.2)  
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>**

CLIMATE ZONE	FENESTRATION U-FACTOR <sup>b</sup>	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>b, c</sup>	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE <sup>e</sup>	FLOOR R-VALUE	BASEMENT <sup>f</sup> WALL R-VALUE	SLAB <sup>g</sup> R-VALUE & DEPTH	CRAWL SPACE <sup>h</sup> WALL R-VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13 + 5 <sup>b</sup>	8/13	19	5/13 <sup>i</sup>	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13 + 5 <sup>b</sup>	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13 + 5 <sup>b</sup>	13/17	30 <sup>j</sup>	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20 + 5 or 13 + 10 <sup>b</sup>	15/20	30 <sup>j</sup>	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20 + 5 or 13 + 10 <sup>b</sup>	19/21	38 <sup>j</sup>	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

- a. R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
- b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.  
**Exception:** Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- c. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.
- e. There are no SHGC requirements in the Marine Zone.
- f. Basement wall insulation is not required in warm-humid locations as defined by Figure N1101.10 and Table N1101.10.
- g. Or insulation sufficient to fill the framing cavity, R-19 minimum.
- h. The first value is cavity insulation, the second value is continuous insulation, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation.
- i. The second R-value applies when more than half the insulation is on the interior of the mass wall.

**N1102.4.1.1 (R402.4.1.1) Installation.** The components of the building thermal envelope as indicated in Table N1102.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria indicated in Table N1102.4.1.1, as applicable to the method of construction. Where required by the code official, an approved third party shall inspect all components and verify compliance.



# Tiny Houses 2021

**TABLE N1102.4.1.1 (R402.4.1.1)  
AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION<sup>a</sup>**

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
General requirements	A continuous air barrier shall be installed in the building envelope. Breaks or joints in the air barrier shall be sealed.	Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling or soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed. Access openings, drop-down stairs or knee wall doors to unconditioned attic spaces shall be sealed.	The insulation in any dropped ceiling/soffit shall be aligned with the air barrier.
Walls	The junction of the foundation and sill plate shall be sealed. The junction of the top plate and the top of exterior walls shall be sealed. Knee walls shall be sealed.	Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance, <i>R</i> -value, of not less than R-3 per inch. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.
Windows, skylights and doors	The space between framing and skylights, and the jambs of windows and doors, shall be sealed.	—
Rim joists	Rim joists shall include an exterior air barrier. <sup>b</sup> The junctions of the rim board to the sill plate and the rim board and the subfloor shall be air sealed.	Rim joists shall be insulated so that the insulation maintains permanent contact with the exterior rim board. <sup>b</sup>
Floors, including cantilevered floors and floors above garages	The air barrier shall be installed at any exposed edge of insulation.	Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of subfloor decking. Alternatively, floor framing cavity insulation shall be in contact with the top side of sheathing, or continuous insulation installed on the underside of floor framing and extending from the bottom to the top of all perimeter floor framing members.
Basement, crawl space, and slab foundations	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder/air barrier in accordance with Section N1102.2.10. Penetrations through concrete foundation walls and slabs shall be air sealed. Class I vapor retarders shall not be used as an air barrier on below-grade walls and shall be installed in accordance with Section R702.7.	Crawl space insulation, where provided instead of floor insulation, shall be installed in accordance with Section N1102.2.10. Conditioned basement foundation wall insulation shall be installed in accordance with Section N1102.2.8.1. Slab-on-grade floor insulation shall be installed in accordance with Section N1102.2.10.
Shafts, penetrations	Duct and flue shafts and other similar penetrations to exterior or unconditioned space shall be sealed. Utility penetrations of the air barrier shall be caulked, gasketed or otherwise sealed and shall allow for expansion, contraction of materials and mechanical vibration.	Insulation shall be fitted tightly around utilities passing through shafts and penetrations in the building thermal envelope to maintain required <i>R</i> -value.
Narrow cavities	Narrow cavities of 1 inch or less that are not able to be insulated shall be air sealed.	Batts to be installed in narrow cavities shall be cut to fit or narrow cavities shall be filled with insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.	Insulated portions of the garage separation assembly shall be installed in accordance with Sections N1101.10–N1101.12 and N1102.2.7.

(continued)



# Tiny Houses 2021

TABLE N1102.4.1.1 (R402.4.1.1)—continued  
AIR BARRIER AND INSULATION INSTALLATION\*

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air sealed in accordance with Section N1102.4.5.	Recessed light fixtures installed in the building thermal envelope shall be airtight and IC rated, and shall be buried or surrounded with insulation.
Plumbing, wiring or other obstructions	All holes created by wiring, plumbing or other obstructions in the air barrier assembly shall be air sealed.	Insulation shall be installed to fill the available space and surround wiring, plumbing, or other obstructions, unless the required <i>R</i> -value can be met by installing insulation and air barrier systems completely to the exterior side of the obstructions.
Shower/tub on exterior wall	The air barrier installed at exterior walls adjacent to showers and tubs shall separate the wall from the shower or tub.	Exterior walls adjacent to showers and tubs shall be insulated.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical and communication boxes. Alternatively, air-sealed boxes shall be installed.	—
HVAC register boots	HVAC supply and return register boots that penetrate building thermal envelope shall be sealed to the subfloor, wall covering or ceiling penetrated by the boot.	—
Concealed sprinklers	Where required to be sealed, concealed fire sprinklers shall only be sealed in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.	—

For SI: 1 inch = 25.4 mm.

- a. Inspection of log walls shall be in accordance with the provisions of ICC 400.
- b. Air barrier and insulation full enclosure is not required in unconditioned/ventilated attic spaces and at rim joists.