

IRC 2018 APPENDIX Q
TINY HOUSES

Must comply to International Residential Codes, IECC, Life Safety Codes except for exceptions in Appendix Q

1. Less than 400 square feet
2. Ceiling height 6'8" minimum
3. Bathroom / kitchen 6'4"
4. Loft needs to be greater than 35 square feet, horizontal dimensions greater than 5'
Loft height less than 3 feet not counted in square footage.
5. Stair width - above handrail greater than 17", below 20"
Risers 7" to 12"
Tread 20" - $\frac{4}{3}$ riser Riser 15" - $\frac{3}{4}$ tread
example: tread 20 - $\frac{4}{3}$ riser of 9" = 8"
example: riser 15" - $\frac{3}{4}$ tread of 9" = 6.75"
Ceiling height, center of top riser 6'2" minimum
6. Handrails refer to IRC 311.7.8
7. Guards refer to IRC R312.1
8. Ladders: rung wider than 12", 10"-14" rung spacing, support 200 pounds, 70-80 degree from horizontal.
9. Loft guards: greater than 36" or 1/2 height from loft to ceiling
10. Bedroom egress: IRC R310.2
Loft bedroom egress window or skylight no more than 44" from loft floor IRC R310

Must meet foundation requirements for a home or (manufactured home?) requirements.
(NH requires manufactured homes to be on at least a concrete slab.)

AV104.1.2 Minimum dimensions. *Lofts* shall be not less than 5 feet (1524 mm) in any horizontal dimension.

AV104.1.3 Height effect on loft area. Portions of a *loft* with a sloping 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.

Exception: Under gable roofs with a minimum slope of 6:12, portions of a *loft* with a sloping 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.

AV104.2 Loft access. The access to and primary egress from *lofts* shall be of any type described in Sections AV104.2.1 through AV104.2.4

AV104.2.1 Stairways. Stairways accessing *lofts* shall comply with this code or with Sections AV104.2.1.1 through AV104.2.1.5

AV104.2.1.1 Width. Stairways accessing a *loft* shall not be less than 17 inches (432 mm) in clear width at all points at or above the permitted handrail height. The minimum width below the handrail shall not be less than 20 inches (508 mm).

AV104.2.1.2 Headroom. The headroom in stairways accessing a *loft* shall not be less than 6 feet 2 inches (1880 mm) measured vertically from the sloped line connecting the tread nosings in the middle of the tread width.

Exception: The headroom for *landing platforms* shall not be less than 4 feet 6 inches (1372 mm).

AV.104.2.1.3 Treads and Risers. Risers for stairs accessing a *loft* shall be a minimum of 7 inches (178 mm) and a maximum of 12 inches (305 mm). Tread depth and riser height shall be calculated with the following formulas:

$$\begin{aligned} \text{Tread depth} &= 20 \text{ inches (508 mm) minus } \frac{4}{3} \text{ riser height} \\ &\text{OR} \\ \text{Riser height} &= 15 \text{ inches (381 mm) minus } \frac{3}{4} \text{ tread depth} \end{aligned}$$

Exception: *Landing platforms* shall measure two treads deep and two risers tall.

AV104.2.1.4 Handrails. Handrails shall comply with Section R311.7.8.

AV104.2.1.5 Stairway guards. *Guards* at open sides of stairways shall comply with Section R312.1.

AV104.2.2 Ladders. Ladders accessing *lofts* shall comply with Sections AV104.2.2.1 and AV104.2.2.2

AV104.2.2.1 Size and capacity. Ladders accessing *lofts* shall have 12 inches (305 mm) minimum rung width and 10 inches (254 mm) to 14 inch (356 mm) spacing between rungs.

Ladders shall be capable of supporting a 200 pound (75 kg) load on any rung. Rung spacing shall be uniform within 3/8-inch (9.5 mm).

AV104.2.2.2 Incline. Ladders shall be installed at 70 to 80 degrees from horizontal.

AV104.2.3 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).

AV104.2.4 Ships ladders. *Ships ladders* accessing *lofts* shall comply with Sections R311.7.12.1 and R311.7.12.2. The clear width at and below the handrails shall be not less than 20 inches (508 mm).

AV104.3 Loft guards. *Loft guards* shall be located along the open side(s) of *lofts* located more than 30 inches (762 mm) above the main floor. *Loft guards* shall be not less than 36 inches (914 mm) in height or one-half the clear height to the ceiling, whichever is less.

SECTION AV105 EMERGENCY ESCAPE AND RESCUE OPENINGS

AV105.1 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 with the bottom of their opening no more than 44 inches (1118 mm) above the loft floor.

COMMENTER'S REASON

During the Committee Action Hearings in Kentucky, IRC Committee members explained their disapproval of RB168-16, but also their support for addressing the issue of small houses. In the published reasons the Committee stated “The issue of small houses and apartments is important,” and that “The IRC needs to address them in some fashion.” They encouraged further development of the proposal, stating “There needs to be a more comprehensive approach”, and that “The concept of smaller houses may be more suited for an appendix.”

This Public Comment follows the Committee’s advice by replacing the original piecemeal proposal with a proposed appendix that takes a “more comprehensive approach”. It also reduces the 500 square foot threshold for “small houses” in the original proposal to the widely accepted threshold of 400 square feet for “tiny houses”. At that smaller size there is increased difficulty in meeting certain dimensional requirements of the IRC; however, through years of practice by tiny house advocates and years of extensive use of comparably sized “recreational park vehicles” governed by ANSI A119.5, safe alternative dimensions and other requirements have been established that are included in the proposed appendix.

In the published reasons the Committee finally noted that “Small houses are a growing concern, [and] the demand for them is increasing.” The reasons for that growing demand are both environmental and financial in nature. Below are statistics illustrating problematic housing trends, the environmental impacts of construction, the cost of home ownership, and how tiny houses can be a part of the solution. That is followed by specific reasons for the code language in the proposed appendix.

- The average **home size** in the U.S. increased 61% since 1973 to over 2600 square feet. In that time period the average household size decreased, leading to a 91% increase in home square footage per inhabitant (1000 SF per person) (source: US Census Bureau).
- The average house in the U.S. uses approximately 17,300 board feet of **lumber** and 16,000 square feet of other wood products. A 200 square foot tiny house uses only 1,400 board feet of lumber and 1,275 square feet of additional wood products. The lifetime conditioning costs can be as low as 7% of a conventionally sized home.
- United States Green Building Council (USGBC), the California Energy Commission (CEC), and other entities are working hard to increase energy efficiency in the construction industry. This is a great start, however a reduction in home size is the easiest way to lower energy consumption.
- National home ownership fell to 63.7% in 2015, the lowest level in two decades. **Increased housing cost is cited as the main reason for low ownership** rate. (source: Joint Center for Housing Studies (JCHS) at Harvard University)

- The **average home** in the United States **costs** approximately \$358,000 to build, an increase of roughly \$200,000 since 1998, whereas the average annual income in the United States has remained unchanged for the last several years, lingering near \$52,000. (source: US Census Bureau)
- The average American spends roughly 27% of their annual income on housing (nearly 11 hours of every 40-hour work week). 48% of households making less than \$30,000 annually pay more than half of their income on housing, leaving these households less than \$15,000 a year to purchase food, health care, education, clothing, and anything else. (source: JCHS)
- The cost of new construction for a 200 square foot tiny house can be as low as \$35,000. A typical down payment on an average-sized house is \$72,000, more than twice the full **cost** of a tiny house.
- Cities benefit from tiny house ordinances. With significant need for **affordable housing**, cities are hard-pressed to find solutions that quickly expand their low-income housing stock without burdening an already burdened system. Tiny houses can be quickly installed in municipalities and set up at little or no cost to the cities.
- Although not addressed in the proposed code language of this public comment, it is important to recognize the need for codes pertaining specifically to **movable** tiny houses. For some people, homeownership is heavily impacted by the **cost of land** and even the construction of a fixed tiny house becomes unattainable. For those individuals, the presence of movable tiny houses in the building code may create their only path to home ownership. The **flexibility** of a movable tiny house allows individuals to locate their homes in areas of community living or on ancillary home sites, without the burdensome cost of a single-family lot. It also allows them to take their home with them should they need to **relocate**, thus eliminating many typical **costs of moving**.

Tiny houses can play an important role in minimizing the environmental impacts of housing while providing safe and healthy homes at affordable prices. Pride of ownership improves neighborhoods and community morale. Tiny houses enable more people to become homeowners and contribute to their communities.

REASONS FOR DEFINITIONS:

EGRESS ROOF ACCESS WINDOW. Most manufacturers use this term for their skylights and roof windows that are designed to satisfy the dimensional requirements of emergency escape and rescue openings in U.S. building codes.

LANDING PLATFORM: The design in this definition has demonstrated in practice to allow for the safe transition between stairways and lofts. The large tread depth provides

adequate standing space while the tall riser allows for a simple transition between standing and kneeling when entering or exiting the loft. (See photos)

LOFT. This definition is a modified version of the definition of loft area in Section 1-3 of ANSI A119.5 Recreational Park Trailer Standard and differentiates a loft from a mezzanine and habitable attic within this code.

TINY HOUSE. This definition is based on the widely accepted maximum square footage for tiny houses in the construction industry.

REASONS PER SECTION:

AV103. CEILING HEIGHT: The minimum ceiling height for non-loft habitable spaces in this proposed appendix is 6 feet 8 inches. Though lower than the 7 foot minimum for habitable spaces in the IRC, it is higher than the minimum of 6 feet 6 inches in Section 5-3.5.4 of ANSI A119.5 Recreational Park Trailer Standard, that has proven to provide safe and adequate head room during the extended occupancy of recreational park trailers.

AV104 LOFT: Tiny houses have considerably smaller footprints and building height than conventional houses. As such, lofts are essential to maximize the use of space in tiny houses and make them viable shelter for many individuals and families.

It is common knowledge to many building inspectors that spaces labeled “non-habitable storage” in dwellings of all sizes are sometimes used for sleeping or other habitable purposes once the final inspection is complete. Rather than being unable to enforce a falsely stated use, building departments could regulate the health and safety of those spaces for their intended use with the proposed appendix, ensuring health and safety with minimum loft dimensions, requirements for access and egress, and proper emergency escape and rescue openings.

MINIMUM AREA and MINIMUM DIMENSIONS: Lofts in tiny houses are small by necessity; however, minimum dimensions are required for lofts used as a living or sleeping space, so as to not impose a risk to occupant health and safety.

HEIGHT EFFECT ON LOFT AREA: For most roof designs in tiny houses, a minimum ceiling height of 3 feet has proven adequate in sleeping lofts for consideration of their required floor area. For gable roofs with moderate to high slopes, the slope has an aggressive impact on the loss of ceiling height but makes up for it with higher areas under the ridge. Thus lofts under gable roofs with a minimum 6:12 slope have a lesser minimum ceiling height when calculating their required floor area.

STAIRWAY WIDTH: These dimensional requirements are identical to those in Section 5-10.4.1.1 of ASNI A119.5. This provision is considered and proven safe for extended occupancy of recreational park trailers.

STAIRWAY HEADROOM: Because tiny houses are limited in square footage and height, IRC compliant head heights for stairs serving lofts are often not achievable. Therefore the stair headroom requirement has been reasonably reduced to 6 feet 2 inches. The inclusion of the “double tread/riser” landing platform design, with its own headroom requirement, allows for a safe transition from standing height to kneeling height, making for safe access to and egress from the loft.

STAIRWAY TREAD/RISER: This is identical to the requirements for treads/risers in Section 5-10.4.1.1 of ANSI A119.5. This provision is considered and proven safe for extended occupancy of recreational park trailers.

STAIRWAY LANDING PLATFORM: This defines the specific, technical parameters of a landing platform in terms of height, depth, and measurement locations.

LADDERS: This is identical to the requirements for ladders in Section 5-10.5 of ANSI A119.5. This provision is considered and proven safe for extended occupancy of recreational park trailers.

ALTERNATING TREAD DEVICES: Alternating tread devices as described in the IRC, are allowed to provide access to and egress from lofts.

SHIPS LADDERS: Ships ladders as described in the IRC, are allowed to provide access to and egress from lofts.

LOFT GUARDS: The height requirement for loft guards is identical to that for guardrails in Section 5-10.7 of ANSI A119.5.

AV105 EMERGENCY ESCAPE AND RESCUE: Due to the considerably smaller footprints of tiny houses, ceiling heights in sleeping lofts therein are often necessarily lower than minimum ceiling heights required by the IRC for sleeping rooms in larger houses. Egress roof access windows (which are specifically designed to meet the dimensional requirements of emergency escape and rescue openings) can be installed with their openings within 44 inches of the loft floor, thus meeting the requirements of Section R310 when wall mounted windows meeting these requirements are not possible.

BIBLIOGRAPHY:

ANSI A119.5 Recreational Park Trailer Standard - 2009 Edition