TINY HOUSE CONSTRUCTION GUIDE

AUSTRALIAN
TINY HOUSE
ASSOCIATION

Tiny House Construction Guide

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The Tiny House Construction Guide recognises Tiny Houses on Wheels (THOW) and Tiny Houses on Skids (THOS) as moveable dwellings.

The Tiny House Construction Guide (the Guide) sets out minimum requirements for the design and construction of moveable tiny houses.

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INTRODUCTION

The Tiny House Construction Guide serves to promote safe and structurally sound moveable tiny houses within Australia.

1. DEFINITIONS

Tiny House

The Australian Tiny House Association (ATHA) defines that a tiny house is a moveable dwelling suitable for permanent residential use, with self-contained amenities and services and the option to be grid connected.

A tiny house can be:

- A Tiny House on temporary foundations (skids) is a transportable structure with the ability to be moved.
- A Tiny House on Wheels (THOW) is constructed on a trailer designed to road legal dimensions, which can be moved.

Landing platform

A landing provided at the top step of a stairway to access a platform.

Bed platform

A bed platform is a space above the main floor level that is not enclosed as a room.

Stair elements

Going (stairs)

The horizontal dimension from the front to the back of a tread less any overhang from the next tread or landing above.

Landing (stairs)

An area at the top or bottom of a flight or between two flights.

Riser (stairs)

The height between consecutive treads and between each landing and continuous tread.

Local authority

The Local authority will have jurisdictional powers that may regulate the siting, design and construction of a tiny house.

Suitably qualified professional engineer

A professional who is licensed to practice in the relevant jurisdiction

2. TINY HOUSE ON WHEELS - TRAILER

Where tiny house trailers are to be road registered, they must be designed and constructed in accordance with the jurisdictional vehicle standard, which includes chassis length, width, overall travelling height. Trailers designed for greater than 4.5 tonnes must be designed by a Structural Engineer.

3. TINY HOUSE ON SKIDS

Where a tiny house on skids is designed to be transported on the road it should be constructed in accordance with the jurisdictional requirements for vehicle movement, which includes chassis length, width, overall travelling height.

Tiny house skids must be designed and certified by a Structural Engineer to demonstrate connection from the roof to the floor connection with the skid.

4. TINY HOUSE CONNECTION

The connection of a tiny house to the trailer or skid must be certified by a Structural Engineer. This includes:

- Connection of wall frames to chassis
- Connection of roof frames/trusses
- Connection of flooring/floor structure to chassis

5. SITE PREPARATION

Where a stormwater drainage system is installed, it must comply with the following:

(a) The position and manner of discharge of the stormwater drainage system must be to the satisfaction of the appropriate authority.

(b) The stormwater drainage system must be designed so that any overflow during heavy rain periods is prevented from flowing back into the Tiny House.

Explanatory information:

The manner of discharge of stormwater drainage systems includes consideration of discharge points. Some examples of discharge points which may be acceptable to the appropriate authority are:

- *A legal discharge point at the allotment boundary.*
- *On-site catchment systems, such as stormwater tanks.*
- *On-site soil drainage systems, such as soaker wells.*

Cover to stormwater drains:

the cover to 90 mm Class 6 UPVC stormwater drains installed underground must be not less than—

(i) under soil — 100 mm; or

(ii) under paved or concrete areas — 50 mm; or

(iii) under areas subject to light vehicle traffic—

(A) reinforced concrete — 75 mm; or

(B) paved — 100 mm.

Explanatory information:

Different depths of soil cover (or no cover at all) can be achieved using other types of pipes. The cover specified is measured from the top of the pipe to either the finished ground level or, in the case of paved or concreted areas, to the underside of the paving or concrete.

Subfloor Ventilation – must comply with (a) and (b) when a perimeter skirt or enclosure of the subfloor is constructed.

(a) Subfloor spaces must—

(i) be provided with openings in external walls and internal subfloor walls in accordance with the following;

Climate Zone A - 9 am RH < 60% minimum aggregate subfloor ventilation openings with no membrane: 2000 mm2 /m of wall, or 1000 mm2 /m of wall when ground sealed with impervious membrane.

Climate Zone B - 9 am RH > 60% and 3 pm RH > 40% minimum aggregate subfloor ventilation openings with no membrane: 4000 mm2 /m of wall, or 2000 mm2 /m of wall when ground sealed with impervious membrane.

Climate Zone C - 9 am RH > 70% and 3 pm RH > 60% minimum aggregate subfloor ventilation openings with no membrane: 6000 mm2 /m of wall, or 3000 mm2 /m of wall when ground sealed with impervious membrane.

(RH = Relative Humidity)

and

(ii) have clearance between the ground surface and the underside of the lowest horizontal member in the subfloor of-

- 150mm where termite inspection or management system is not required, or;
- 300mm where termite inspection is required.

Explanatory information:

Subfloor ventilation is cross ventilation of the subfloor space between the underside of the subfloor and the ground surface under a THOW.

Ground moisture rising into or entering the subfloor space can create a damp environment which encourages timber rot, fungus growth and the potential for termite activity. Subfloor ventilation increases air flow, reducing any damaging water vapour in the subfloor space.

Factors that can affect achieving satisfactory levels of subfloor ventilation include height above ground, prevailing breezes (air transfer), differential temperature and humidity between the subfloor and the external environment and good THOW practice.

The amount of subfloor ventilation required for a THOW is related to the relative humidity likely to be encountered in that location.

6. FRAMING

Structural drawings prepared by manufacturer / supplier must be certified by a Structural Engineer inclusive of the following components **where relevant and applicable to** –

- Timber and/or Steel Framing Schedule;
- Structurally Insulated Wall and Roofing Panel Schedule;
- Alternative framing solutions subject to engineering certification;
- Bracing & Tie-down details; and
- In accordance with certified computations of a Structural Engineer.

5.1 SARKING

Sarking must—

(a) be installed when there is a risk of condensation forming on the underside of the roof covering; and

(b) comply with relevant local material standards and be installed with—

(i) each adjoining sheet or roll being—

(A) overlapped not less than 150 mm; or

(B) taped together; and

(ii) sarking fixed to supporting members at not more than 300 mm centres; and

(iii) no sags greater than 40 mm in the sarking.

Anti-ponding device/board

(a) An anti-ponding device/board must be provided where sarking is installed on—

(i) roofs with a pitch less than 20°; and

(ii) roofs with no eaves overhang, regardless of the roof pitch.

(b) An anti-ponding device required by (a) must be water resistant and fixed along the eaves line from the top of the fascia back up the rafter with a clearance of approximately 50 mm below the first batten.

5.2 Timber Framing

Objective: To achieve the correct specification and determination of timber members, bracing and connections, thereby minimising the risk of creating an environment that may adversely affect the ultimate performance of the structure

Refer to Structural drawings and as per relevant local building codes.

5.3 Structural Steel Members

Objective: To achieve the correct specification and determination of steel members, bracing and connections, corrosion and thermal bridging, thereby minimising the risk of creating an environment that may adversely affect the ultimate performance and thermal comfort of the structure.

Refer to the structural engineer's design.

7. SHEET ROOFING

Sheet roofing must be installed in accordance with certified computations of a Structural Engineer and/or the manufacturer's instructions, to the satisfaction of the relevant local authority.

Where eaves are required eave linings should be installed as per relevant building codes.

GUTTERS AND DOWNPIPES

Where gutters and downpipes are installed, the system must be designed to drain away from the tiny house and not be discharged onto adjoining property. Installation of gutters and downpipes must comply with any limitations on the maximum width of the THOW.

8. WALL CLADDING

Wall cladding must be installed in accordance with certified computations of a Structural Engineer and/or the manufacturer's instructions, to the satisfaction of the relevant local authority.

Timber cladding must be installed in accordance with relevant building codes, where appropriate.

Wall cladding boards must be fixed in accordance with manufacturers specifications.

Fibre-cement, hardboard, and structural plywood sheet wall cladding must be installed in accordance with relevant building codes, where appropriate.

Flashings to wall openings must be undertaken in accordance with relevant building codes, where appropriate.

Metal cladding must be designed and constructed in accordance with relevant building codes

Alternative cladding solutions as per manufacturers specifications.

9. STRUCTURAL FLOORING

Structural timber flooring must achieve an appropriate specification and determination of members and connections to minimise the risk of creating an environment that may adversely affect the ultimate performance of the structure; or

Be constructed of alternative flooring materials (as per manufacturer's instructions); or

Hardwood plywood (As per Engineering certification); or

Composite materials (As per Engineering certification).

10. GLAZING AND WINDOWS

All windows and glazing must be selected and installed in accordance with the requirements of the relevant local authority, taking into account human safety, structural adequacy, thermal performance and weather resistance.

The window supplier must be provided with performance requirements, climatic location and windspeed as determined by the relevant local authority or a suitably qualified professional engineer.

Where secondhand windows are used, they must be suitable for the climatic location and applicable windspeed as determined by the relevant local authority.

11. FIRE PRECAUTIONS

Tiny Houses must be fitted with:

- A 10-year photo-electric smoke alarm that is either connected to a permanent external power source and include an internal battery backup; and
- An appropriate fire extinguisher; and
- Gas ventilation as per relevant local authority requirements.

Installation of smoke alarms to be fitted in accordance with relevant local authority requirements. At least one photo-electric sensor is highly recommended regardless of local authority requirements.

Where a free-standing fireplace is installed the fireplace and the installation of the fireplace and flue must comply with the relevant building code.

NB Should the tiny house be moved, then this may trigger the upper section to be removed prior to transport.

12. LP GAS SYSTEMS

All LP Gas systems and appliances must be installed and ventilated in accordance with the relevant local authority requirements.

13. ROOM HEIGHTS AND SIZES

Bathroom ceiling height have an overall minimum clearance of 2.0m that provides minimum head clearance for a non-habitable room

The kitchen ceiling height of work areas have an overall minimum clearance of 2.0m.

Storage loft as required for its intended use.

14. ROOM FACILITIES

A Tiny House, when used as a dwelling, must be provided with –

- a kitchen sink and facilities for the preparation and cooking of food;
- a bath or shower;
- a toilet; and
- a washbasin.

A door leading onto a sanitary compartment should either open outwards, slide, bifold or be removable, unless a clear space of 1.2m is provided in front of the toilet.

Natural lighting must be provided into all habitable spaces. Windows must have an aggregate light transmitting area of not less than 10% of the floor area of the space.

Where a sanitary compartment opens onto a food preparation area, the compartment must be provided with an exhaust fan discharging to the exterior.

Cooking appliances using combustible fuels must have an exhaust system discharging to the exterior. External venting for kitchens is good practice in all cases to reduce the risk of condensation and the build-up of odours.

15. Stair construction

15.1 Stair width

Stairways accessing lofts shall not be less than 432mm clear width at or above the handrail. The width below the handrail shall be no less than 508mm. See Appendices for detailed drawings.

15.2 Stairway External

External stairs must be designed to withstand all loading forces and must have—

(i) not more than 18 and not less than 2 risers in each flight; and

(ii) Goings (G), risers (R) and a slope relationship quantity (2R + G).

(iii) constant goings and risers throughout each flight, except as permitted by (c) and (d), and the dimensions of goings (G) and risers (R) in accordance with (a), (b) and (c) are considered constant if the variation between—

(A) adjacent risers, or between adjacent goings, is no greater than 5 mm; and

(B) the largest and smallest riser within a flight, or the largest and smallest going within a flight, does not exceed 10 mm; and

(iv) risers which do not have any openings that would allow a 125 mm sphere to pass through between the treads.

Explanatory information:

Not more than 18 and not less than 2 risers:

A stairway must have not more than 18 and not less than 2 risers in each flight. Where there are less than 2 risers in a flight, it does not comprise a stairway for the purpose of this code. 18 risers is considered to be the maximum reasonable number that an average person can negotiate before requiring a rest. Winders are counted as part of the maximum number of 18 risers. More than 1 riser is considered necessary for a person to observe and adjust to a change in level.

Going and riser dimensions:

The purpose is to achieve constant going and riser dimensions deemed safe for people to walk up and down. This minimises the risk of people overstepping during descent on uneven stairs (due to short goings) and tripping on ascent (due to high risers). The express ratios between going and riser dimensions are considered safe for use, accounting for conditions such as movement of materials due to atmospheric moisture changes or minor deviations related to variations in materials which affect finished stair dimensions.

15.3 STAIRWAY INTERNAL

Internal stair must be designed to take loading forces in accordance with and the local building regulations and is recommended to have:

(a) Goings (G), risers (R) and a slope relationship quantity (2R+G) in accordance with Table 1.

Table 1

Stair design	**Riser**		**Going**		**Slope relationship (2R+G)**	
	Max	Min	Max	Min	Max	Min
Stairs	310mm	115mm	355mm	220mm	975mm	470mm

15.4 LANDING PLATFORMS

Landings for external access are to be constructed in accordance with local building regulations.

Internal landings shall be constructed as a landing platform with a minimum of 500mm-by-500mm area.

15.5 THRESHOLDS

Where the threshold of an external doorway is more than 230mm above the adjoining surface it must incorporate steps.

15.6 BARRIERS TO PREVENT FALLS

Balustrade, if used must comply with local building code.

16. ENERGY EFFICIENCY

Energy efficiency requirements will be influenced with the climate in which the THOW will be sited and could be designed in accordance with local building requirements. In the absence of energy efficiency requirements, the following is recommended as a minimum:

- Walls to have a total of at least R value 2.0
- Roof to have a total of at least R value 4.0
- Subfloor to have a total of at least R value 1.0
- External glazing to be 4mm thickness
- For greater efficiency consider Low e glass

17. MANAGEMENT OF WASTEWATER ON SITE

Management of wastewater needs to be undertaken in accordance with the relevant local authority requirements.

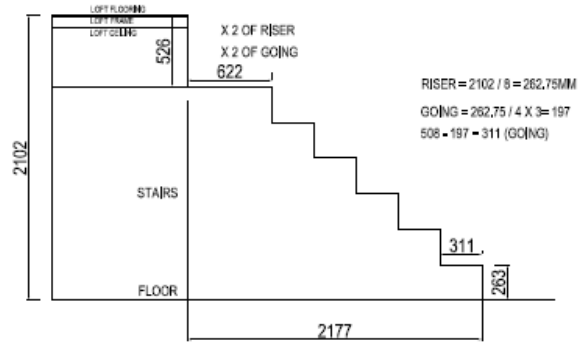
18. STAIRS

Diagrams of stair designs that demonstrate how Section 15.3 Table 1 could be interpreted.

STAIR 1

STRAIGHT STAIRS / 8 STEPS / LANDING

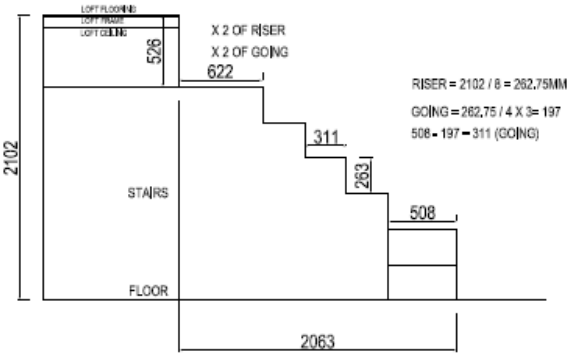
MINIMUM LOFT CEILING HEIGHT FROM TOP OF LANDING



STAIR 2

WITH 90 DEGREE BOTTOM TREAD / 8 STEPS / LANDING

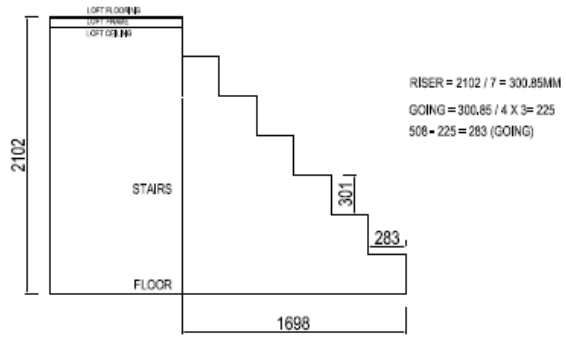
MINIMUM LOFT CEILING HEIGHT FROM TOP OF LANDING



STAIR 3

STRAIGHT STAIRS / 7 STEPS

MINIMUM LOFT CEILING HEIGHT FROM TOP OF LANDING



RISER = 2102 / 7 = 300.85MM

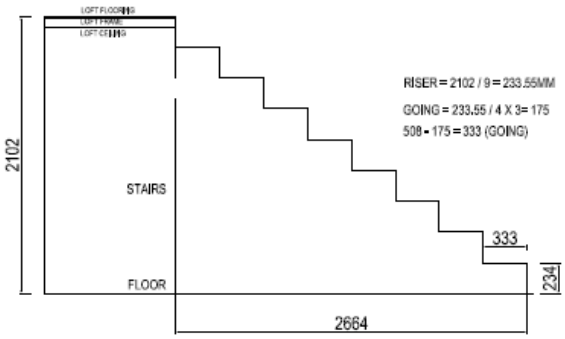
GOING = 300.85 / 4 X 3= 225

508 - 225 = 283 (GOING)

STAIR 4

STRAIGHT STAIRS / 7 STEPS

MINIMUM LOFT CEILING HEIGHT FROM TOP OF LANDING

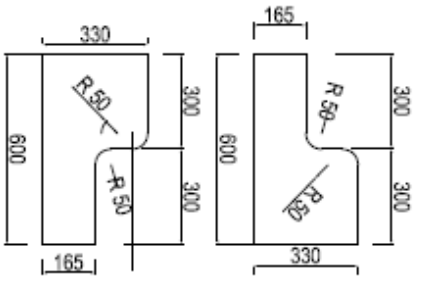


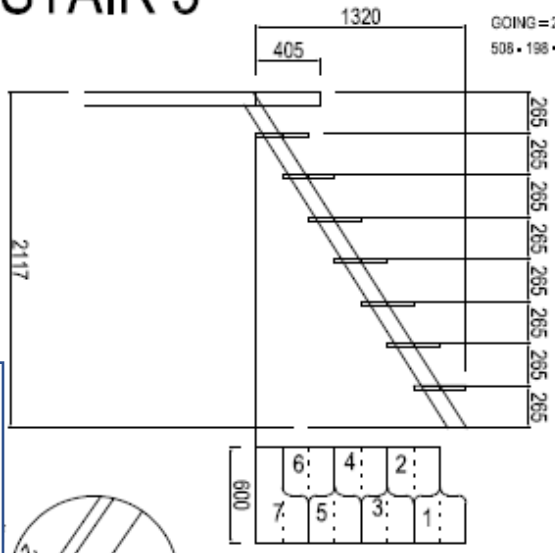
RISER = 2102 / 9 = 233.55MM

GOING = 233.55 / 4 X 3= 175

508 - 175 = 333 (GOING)

STAIR 5

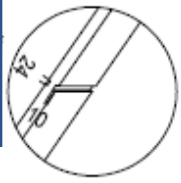




RISER = 2117 / 8 = 265MM

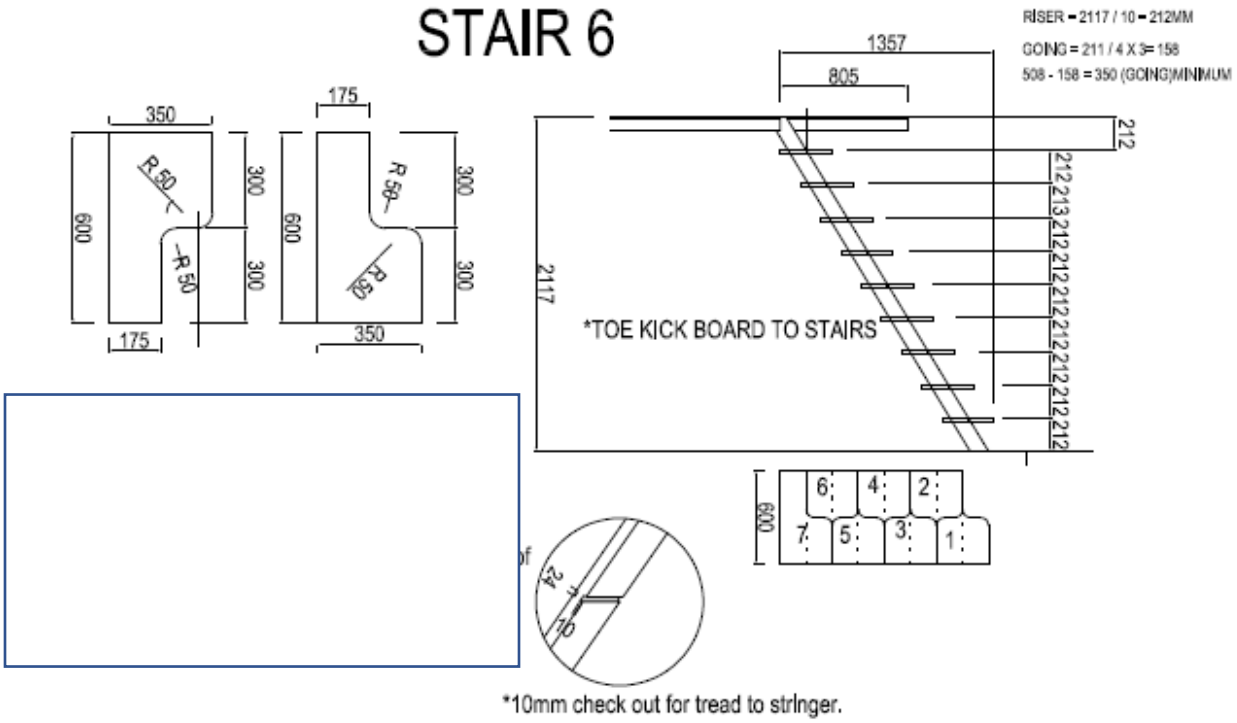
GOING = 265 / 4 X 3= 198

508 - 198 = 310 (GOING)MINIMUM



*10mm check out for tread to stringer.

STAIR 6



*10mm check out for tread to stringer.