

RHS STEEL FRAMED HIP ROOF FOR WARREGO TYPHOON PROOF BUNGALOW the 'GUNYA ROOF'

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- **Building external size:** 16.668 m long $\times$ 8.668 m wide
- **Roof type:** hip roof
- **Pitch:** 25°
- **Overhang:** none
- **Material:** RHS steel tube
- **Roof covering assumed:** light metal roofing

This remains a **conceptual design and material schedule**, suitable for planning, drawing, and discussion. Final member sizes and connections should still be checked by a structural engineer for your exact wind classification and local code requirements.

1) Corrected roof geometry

Half span

- $8.668 / 2 = \mathbf{4.334\text{ m}}$

Rise

- $\text{Rise} = 4.334 \times \tan 25^\circ$
- $\text{Rise} = \mathbf{2.021\text{ m}}$

Common rafter length

- $\text{Common rafter} = 4.334 / \cos 25^\circ$
- $= \mathbf{4.782\text{ m}}$

Ridge length

For a symmetrical hip roof:

- $\text{Ridge} = \text{Length} - \text{Width}$
- $16.668 - 8.668 = \mathbf{8.000\text{ m}}$

Hip plan run

- $= \sqrt{(4.334^2 + 4.334^2)}$
- $= \mathbf{6.129\text{ m}}$

Hip rafter length

- $6.129 / \cos 25^\circ$
- $= \mathbf{6.763\text{ m}}$

Plan area

- 16.668×8.668
- $= \mathbf{144.476\text{ m}^2}$

Roof surface area

- Plan area / $\cos 25^\circ$
- = **159.41 m² approx**

2) Recommended RHS steel member sizes

These are still sensible practical starting sizes for this span and roof type.

Primary members

- **Ridge beam:** RHS 150 × 100 × 4.0 mm
- **Hip rafters:** RHS 150 × 100 × 4.0 mm
- **Perimeter ring beam** if steel: RHS 150 × 100 × 4.0 mm

Secondary members

- **Common rafters:** RHS 100 × 50 × 3.0 mm
- **Jack rafters:** RHS 100 × 50 × 3.0 mm

Battens / purlins

- **RHS 75 × 50 × 2.5 mm**
or lighter proprietary steel battens/purlins if preferred

Bracing and plates

- Roof bracing: **40 × 5 flat bar** or **32 × 32 × 2.5 angle**
- Gusset / cleat plates: **6 mm plate**
- Heavier connection plates where needed: **8 mm plate**

3) Roof framing layout

The layout remains:

- one central ridge beam along the long axis
- four hip rafters from corners to ridge ends
- common rafters in the central zone
- jack rafters in the hipped ends
- battens/purlins across rafters to suit sheeting

4) Corrected member schedule

A. Ridge beam

- **1 pc RHS 150 × 100 × 4.0**
- **Length: 8.000 m**

B. Hip rafters

- **4 pcs RHS 150 × 100 × 4.0**
- **Length each: 6.763 m**
- **Total: 27.052 m**

C. Common rafters

With rafters at about **900 mm centres**, the central zone of **8.000 m ridge length** suits about **10 pairs** of full common rafters.

- **20 pcs RHS 100 × 50 × 3.0**
- **Length each: 4.782 m**
- **Total: 95.64 m**

D. Jack rafters

For each hipped end, using about **900 mm spacing**, you get roughly **4 jack steps per side**.

Approximate jack lengths are based on equal spacing along the length direction. Since the ridge is now exactly **8.000 m**, these lengths come out very neatly.

Per side, per end, approximate lengths:

- **0.963 m**
- **1.926 m**
- **2.889 m**
- **3.853 m**

Across both ends:

- **4 pcs @ 0.963 m**
- **4 pcs @ 1.926 m**
- **4 pcs @ 2.889 m**
- **4 pcs @ 3.853 m**

Total jack-rafter length:

- $4 \times (0.963 + 1.926 + 2.889 + 3.853)$
- **= 38.52 m approx**

E. Battens / purlins

Slope length remains **4.782 m**, so at about **900 mm spacing** up the slope you would use about **6 rows** from eave to ridge on each side.

Allow:

- **RHS 75 × 50 × 2.5**
- **about 175 to 190 linear metres**

A practical order allowance:

- **180 linear metres**

F. Roof bracing

Allow approximately:

- **35 to 45 linear metres**
of flat bar or angle bracing

G. Platework

Allow:

- **6 mm gusset / cleat plates**
- around **20 to 30 pieces**, depending on connection style

5) Corrected steel takeoff summary

RHS 150 × 100 × 4.0

For ridge + hips only:

- Ridge: **8.000 m**
- Hips: **27.052 m**
- **Subtotal: 35.052 m**

If also using this size as a full steel perimeter ring beam:

Perimeter:

- $2 \times (16.668 + 8.668)$
- **= 50.672 m**

Then total of this size becomes:

- $35.052 + 50.672$
- **= 85.724 m**

RHS 100 × 50 × 3.0

- Common rafters: **95.64 m**
- Jack rafters: **38.52 m**
- **Subtotal: 134.16 m**

RHS 75 × 50 × 2.5

- Battens / purlins: **180 m approx**

Flat bar / angle

- **35 to 45 m approx**

Plate

- **6 mm plates**, allow roughly **1.5 to 2 sheets equivalent** depending on cutting layout

6) Roof height

Rise above wall plate / ring beam:

- **2.021 m**

So if top of wall or ring beam is at **2.7 m**, ridge height is about:

- **4.721 m**

7) Clean corrected design summary

For your bungalow of **16.668 m × 8.668 m**, 25° pitch, no overhang:

- **Ridge length: 8.000 m**
- **Common rafter length: 4.782 m**
- **Hip rafter length: 6.763 m**
- **Roof rise: 2.021 m**
- **Plan area: 144.476 m²**
- **Roof area: 159.41 m² approx**

8) Recommended conceptual steel framing

A sound practical concept is:

- **Ridge + hips: RHS 150 × 100 × 4.0**
- **Common + jack rafters: RHS 100 × 50 × 3.0**
- **Battens/purlins: RHS 75 × 50 × 2.5**
- **Roof bracing: flat bar or angle**
- **Roof sheeting: lightweight metal only**

9) Nice feature of this corrected size

Because **16.668 – 8.668 = exactly 8.000 m**, the roof geometry becomes cleaner and easier to set out than the previous version. That makes your ridge dimension especially tidy for drafting and fabrication.