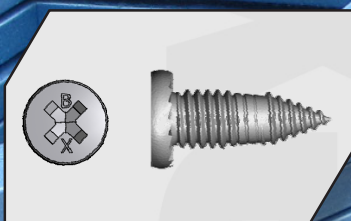




Decades of Timber Knowledge Rolled into Steel



ROOF TRUSS

Installation Guide

Revision 1.6

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TABLE OF CONTENTS

SECTION A: GENERAL SCOPE

- A-1 CRITERIA
- A-2 APPLICATION
- A-3 DOCUMENTATION
- A-4 TRANSPORTATION, ON-SITE HANDLING & STORAGE
- A-5 SAFETY & CONSTRUCTION EQUIPMENT

SECTION B: INSTALLATION OF ROOF TRUSSES

- B-1 GENERAL & DESIGN
- B-2 PRIOR TO CONSTRUCTION & TRUSS IDENTIFICATION
- B-3 ROOF TRUSS SET-OUT
- B-4 GABLE END CONSTRUCTION
- B-5 HIP END CONSTRUCTION
- B-6 DUTCH GABLE CONSTRUCTION
- B-7 HEXAGONAL END CONSTRUCTION
- B-8 GIRDER TRUSS INSTALLATION
- B-9 COMMON ROOF BLOCK CONSTRUCTION
- B-10 SADDLE TRUSS CONSTRUCTION
- B-11 TRUSS SPACERS AND BOTTOM CHORD TIES
- B-12 CEILING BATTENS & INTERNAL WALL BRACKETS
- B-13 ROOF BRACING REQUIREMENTS
- B-14 ROOF BATTENS & SPACINGS
- B-15 VALLEY TRAY, VALLEY BOARDS & FASCIAS

SECTION C: GENERAL INFORMATION

- C-1 FASTENING DESCRIPTIONS

SECTION A: GENERAL SCOPE

A-1 CRITERIA

The *Ultimate Steel Building System* wall frames and trusses by AusSteel are designed, engineered and manufactured in accordance with Australian Standards. AusSteel takes pride in its dedication to providing a secure, clean and efficient work place for its employees and associates.

It is essential that all respective parties involved are familiar with the guidelines and requirements set out in all documents supplied by AusSteel to guarantee that the product's full potential is achieved.

The guidelines in this document are a simple sub-set of the following Australian Standards and BCA requirements;

• AS/NZS 4600-2005	Cold Formed Steel Structures
• AS 4100-1998	Steel Structures Code
• AS 3623-1993	Domestic Metal Framing
• AS 3566-1-2002	Self Drilling Screws
• AS 4055-2006	Wind Loads for Housing
• AS/NZS 1170 Part 0, 2002	Structural Design Actions – General Principles
• AS/NZS 1170 Part 1, 2002	Structural Design Actions – Permanent, Imposed and other Actions
• AS/NZS 1170 Part 2, 2002	Structural Design Actions – Wind Actions
• AS/NZS 1170 Part 4, 2007	Structural Design Actions – Earthquake Loads
• NASH Standard Part 1	Residential and Low Rise Steel Framing
• NZS 1170 Part 5, 2007	Structural Design Actions – Earthquake Actions New Zealand

It is advised that the Australian Standards should be read in conjunction with all documents supplied by AusSteel Pty Ltd.

AusSteel Pty Ltd acknowledges Bluescope Steel and the National Association of Steel Framed Housing (NASH) for permission to reference some of the technical information from within their specific guidelines. AusSteel also acknowledges Summermore Structural Engineers for technical support.

A-2 APPLICATION

The assembly and construction method provided in this guide is to be applied once the concrete slab has been laid and properly cured or a floor frame or platform has been erected. This procedure explains the installation, spacing and fastening methods required to assemble an AusSteel steel frame.

This document aims to apply to AusSteel steel wall frames and trusses within the subsequent general limitations;

- Residential structures and light commercial structures,
- Maximum wind rating of N2 – C4,
- Maximum truss spacing of 3000mm,
- Tile and sheet roof construction,
- Standard stud spacings of 450mm to 600mm centres,
- Standard wall heights up to 6000mm,
- 70-90mm standard stud widths,
- Single and double storey construction.

For use above the listed limitations, AusSteel Pty Ltd will provide design documentation and engineering to substantiate the required stipulations.

A-3 DOCUMENTATION

Responsibility to provide all relevant information concerning construction and specifications rests on the builder prior to fabrication.

Failure to provide copies of subsequent changes and variations before fabrication will result in extra charges and on-site work at the expense of the builder.

SECTION A: GENERAL SCOPE

AusSteel will provide the following documentation upon delivery of our Ultimate Steel Building System wall frames and trusses;

- Yard Sheet (Ancillaries)
- Wall Framing Layout
- Roof Framing Layout

Upon request, AusSteel can also include *Wall and Truss Certification* in conjunction with *Wind Bracing Design* to the required authorities. Hard copies can be posted to the address given at the time of ordering.

A-4 TRANSPORTATION, ON-SITE HANDLING & STORAGE

In most cases, transportation will be organised by AusSteel. However, on the occasion of customer organised transportation, AusSteel is exempt from responsibility for any damages pertained to the load after it has left the premises.

AusSteel will take great care to ensure safety and prevent damage to the load in the process of lifting, loading, and transportation of steel frames. When a crane is used to unload, appropriate lifting methods will be enforced to minimise racking loads or local distortion of members.

When using a crane, trusses should be slung from the top chord panel points. When slinging wall frames, place the slings at the plate and stud connection point. It is imperative that you do NOT use chains as slings in the process of lifting the frames and trusses, as this can result in damage to the product.

Slings must be positioned at equal distances from the truss or wall centreline. The slings should be distanced about one-third to one-half the length apart. The angle between sling legs should not exceed 60 degrees at any time. In the case of a truss with a span greater than 9000mm, a spreader bar or strong back is recommended to avoid warping and damage to the truss. These spreader bars should be attached to web-chord joints.

Refer to Drawing No. 001

NOTE: Never lift trusses by the apex joint alone.

Placement of walls and trusses may also be aided by pulling the frames and trusses along skids, placed 3000mm apart to avoid sagging between supports. In the case of roof design, there is often multiple truss types, thus each truss type should be separated where possible. Components such as jack rafters and hip rafters should also be isolated. This will reduce double-handling during erection.

NOTE: When moving or placing any materials by hand be cautious not to damage the components. Examination of wall frames and trusses should be carried out on arrival to site. It is vital that any damaged parts be reported immediately to guarantee that appropriate repairs are made. Do NOT site repair without prior approval from AusSteel. Doing so may compromise the structural integrity.

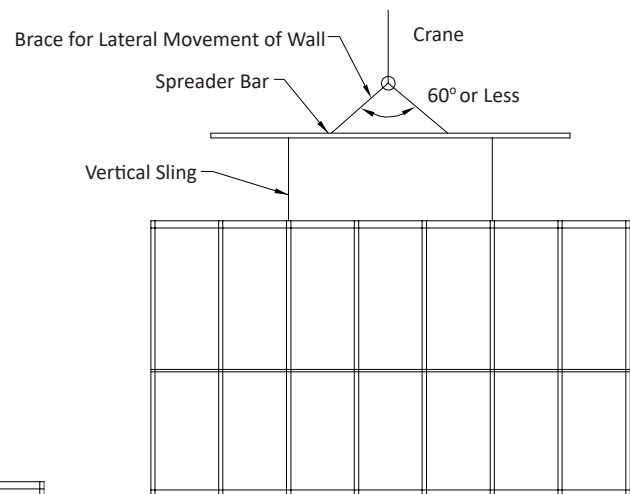
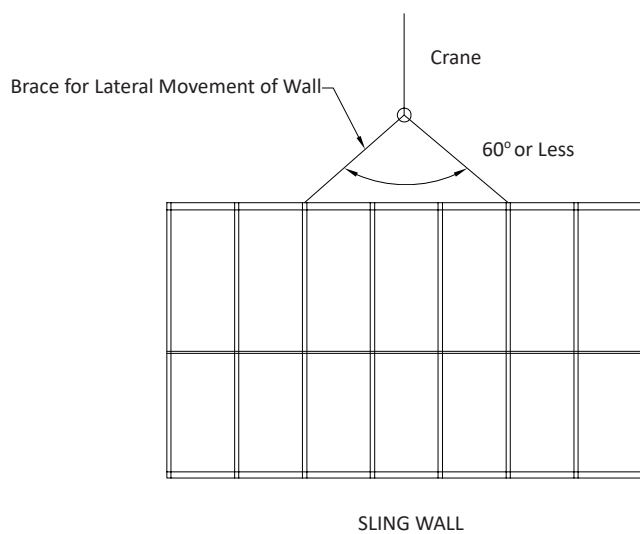
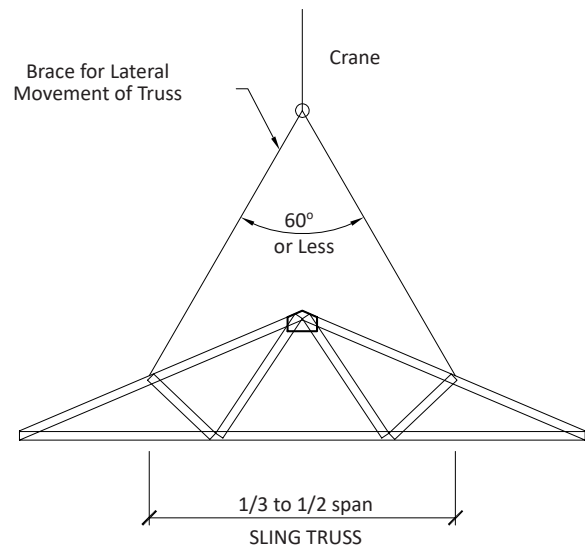
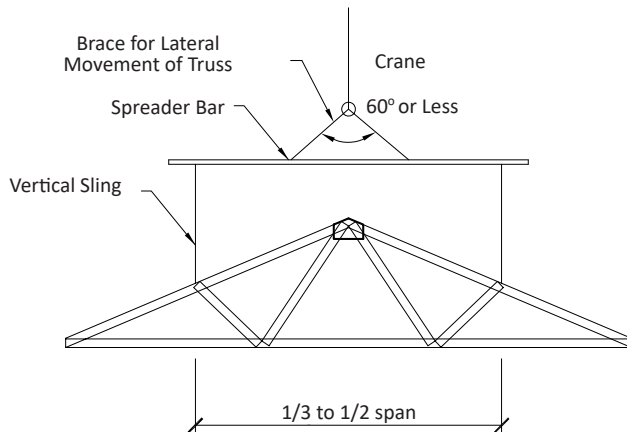
AusSteel remains exempt from liability for any site rectification without prior approval.

To maintain the integrity of our product, all steel wall frames, trusses and ancillaries must be kept dry and stacked off of the ground to ensure ventilation. It is vital that they are protected from water and condensation being trapped between adjacent surfaces. In the event the bundles or packs become wet, all components should be separated, wiped dry with a clean cloth and placed in a manner that allows for free circulation of air to complete the drying process.

ADVICE: Avoid contact with, or exposure to runoff from the following building materials and environmental conditions. These can be detrimental to coated steel products and compromise structural integrity. These include Incompatible metals (e.g. Lead or copper), Building materials subject to cycles or dryness/wetness, or which have excessive moisture content (e.g. improperly seasoned timber), Industrial, agricultural, marine or other aggressive atmospheric conditions, Materials which have been treated with preservatives (e.g. CCA or tanalith-treated timber).

SECTION A: GENERAL SCOPE

Drawing No. 001



SECTION A: GENERAL SCOPE

A-5 SAFETY & CONSTRUCTION EQUIPMENT

The following equipment is recommended for use when erecting an AusSteel steel frame.

a) Personal Protective Equipment

- Hearing protection (when using power tools)
- Safety glasses or eye protection
- Protective gloves
- Power lead stands or insulated hooks
- Earth leakage circuit breaker for power tools

b) Power Tools

- Electric or Battery screw gun (Impact Driver)
- Electric drill/Hammer drill
- (4-9") Angle grinder

c) Power Tool Accessories

- Suitable metal cutting discs
- Socket/Ratchet bar up to 150mm long
- 8mm (5/16") hexagonal socket
- No 2 Phillips head bits
- No 3 Phillips head bits
- Masonry anchor ties (e.g. anchor screws or dynabolts)
- Metal/Masonry drill bits
- Heavy duty power leads

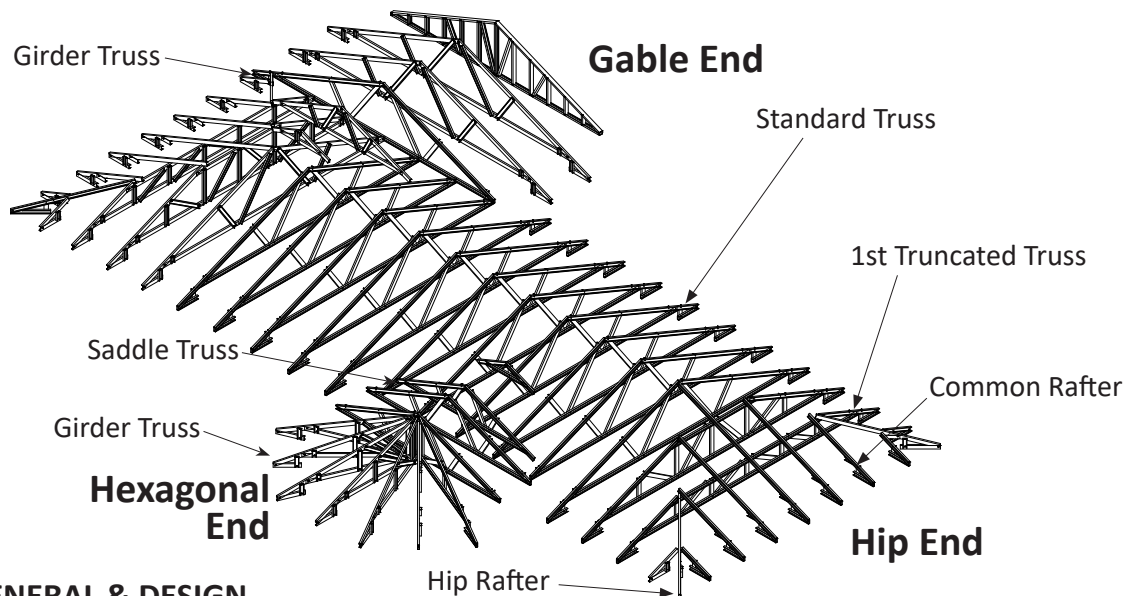
d) Hand Tools

- Chalk line
- Left and Right handed tin snips
- Spirit level
- Vice grips
- Step ladder

NOTE: The construction and erection of wall frames and trusses must comply with relevant safe work practices for general assembly and construction. Safety systems must not alter the wall frames and trusses or place or put loads onto wall frames and trusses unless designed for that purpose.

NOTE: Earth leakage breakers are mandatory on building sites. To prevent the risk of electric shock they should be installed between the power supply and electrical tools. It is essential that the finished steel frames are permanently earthed. This must be achieved in accordance with the conventions of the local electrical authority as soon as possible, once the frame is anchored.

SECTION B: INSTALLATION ROOF TRUSSES



B-1 GENERAL & DESIGN

AusSteel *Ultimate Steel Building System* trusses have been manufactured in accordance with engineered standards. To be sure that the trusses perform as designed, it is imperative that they be handled, assembled and braced correctly. The subsequent recommendations concern roof trusses on standard domestic and light commercial buildings.

The trusses are intended for average roof, ceiling and wind loads to suit specific jobs and circumstances. Extra loading such as Solar Units, Air Conditioning, Hot Water Tanks, etc. Call for specific consideration. Advice should be sought from AusSteel before commencing erection.

Wind load is a significant factor in the design and function of roof trusses. Make sure that you have accurately advised AusSteel with regard to wind load necessities and that appropriate provision has been made to secure trusses that support the roof load and resist wind uplift forces.

B-2 PRIOR TO CONSTRUCTION & TRUSS IDENTIFICATION

It is imperative that frame erectors be aware of the ensuing points prior to constructing AusSteel roof trusses. The wall frames must be fully braced, plumb and tied down before the erection of trusses can commence.

NOTE: Roof trusses must be thoroughly examined on arrival to site. Any damaged or faulty parts must be reported immediately to ensure correct repairs are made. No site repair should be undertaken without prior written approval from AusSteel.

AusSteel remains exempt from liability where on site rectification has been undertaken without prior written approval.

NOTE: It is solely the responsibility of the builder to provide AusSteel with all relevant information regarding truss design prior to ordering trusses.

a) Frame/Supporting Structure Dimensions **MUST** be compatible

Measure your support structure/wall frame to confirm the roof trusses will fit securely. This will highlight any differences between the two that must be catered for during truss set-out. A frame that is not level and is out of square will result in an uneven and unsatisfactory roof line.

To obtain a high quality and structurally sound result, it is essential that the following outcomes are achieved;

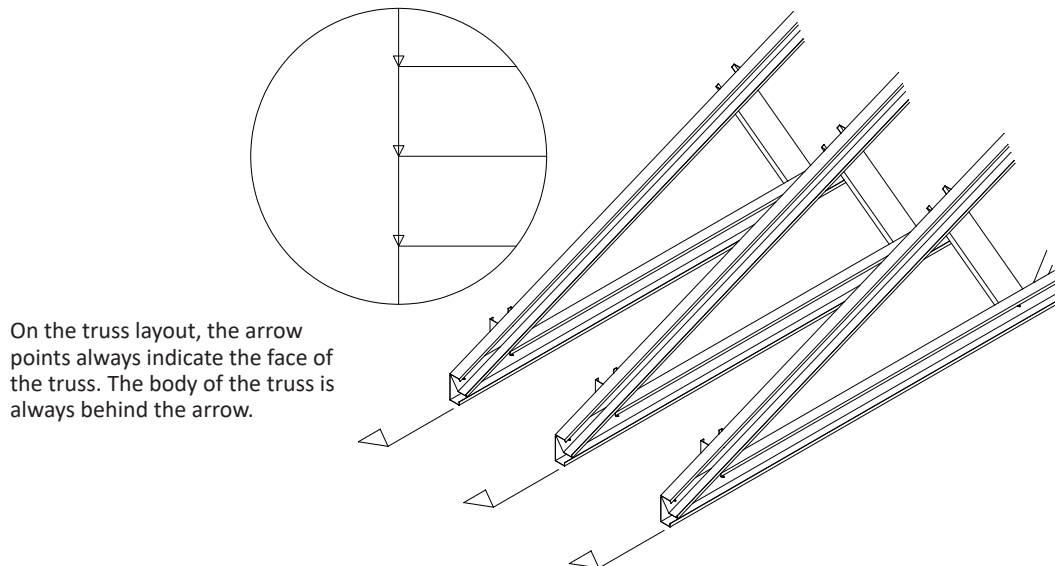
- 1) The load bearing top plates are level,
- 2) The structure is the correct dimensions,
- 3) The top plates as well as being level are straight over the length of the building within a 5mm tolerance.
- 4) The utmost care must be taken to ensure that the supporting structure is adequately braced and stable within its own right.

b) Roof Truss Set-out MUST be as per Correct Plan

It is vital that Roof truss set-out is completed with reference to the *Roof Framing Layout* to ensure all required measurements are transferred to the frame/supporting structure.

c) Trusses MUST be Installed the Right Way Around

Strictly adhering to the *AusSteel Roof Truss Numbering System* and *Roof Framing Layout* will guarantee each roof truss is installed correctly on-site.



d) Site Modifications MUST be Checked by AusSteel

Minor alterations to roof trusses are easily made on-site if needed by the client. It is essential to gain written approval and sign off by AusSteel before alterations are carried out.

e) Statutory Regulations MUST be Adhered to

Subsequent trades must be sure that statutory regulations are adhered to during the construction process.

NOTE: Throughout the construction of roof trusses, always observe the applicable safe work practices for general construction of roofs. This will require that barriers or safety systems be installed at the relevant time. These systems must not put loads that were not designed for that purpose on the trusses, or modify the trusses.

NOTE: Refer to the *Wall & Roof Framing Layouts* to view where internal walls are needed for support. To ensure allowance has been made for these loads, the supporting structure, including footings, etc must be checked by the builder.

ROOF TRUSS COMPONENTS: Drawing No. 008 illustrates the definition of terms for the various roof truss components.

ROOF TRUSS IDENTIFICATION: Drawings No. 009 & No. 010 illustrate the definition of terms for the various types of roof trusses.

ROOF TRUSS NUMBERING SYSTEM: The roof trusses are numbered to accurately identify them during the fabrication detailing process. This process incorporates numbers which reference back to the *Roof Truss Layout*.

SECTION B: INSTALLATION ROOF TRUSSES

B-3 ROOF TRUSS SET-OUT

Using the provided *Roof Truss Layout* for reference, mark out the truss locations on the top wall plate before lifting any trusses into place.

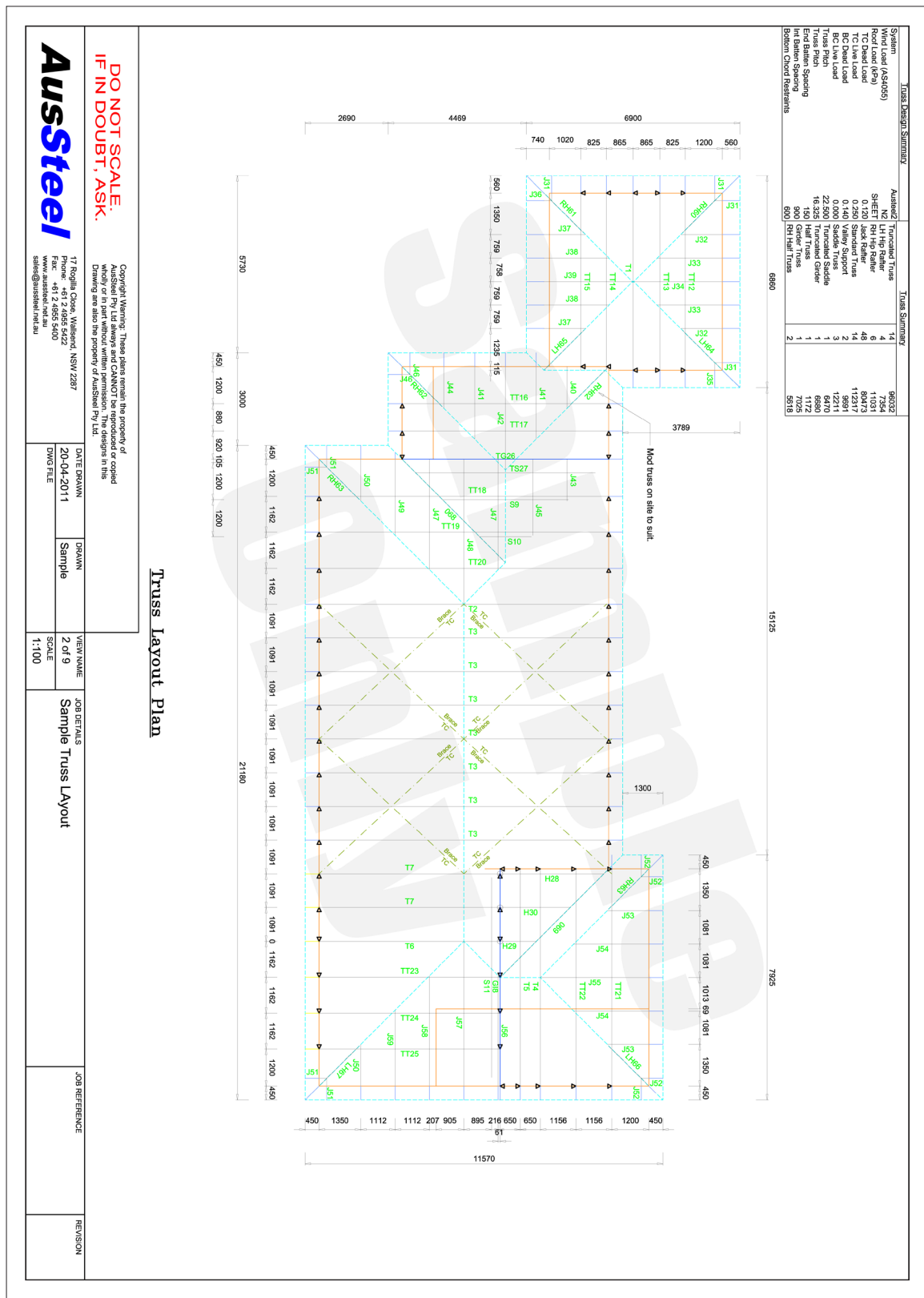
NOTE: The truss design spacing must not be exceeded.

Due to their specific, fixed locations, girder and truncated trusses should be set-out first. It is also important that special attention is given to dual purpose trusses such as truncated girders as they might appear similar in profile to other trusses. It is imperative that truncated girders are not exchanged for similar truncated trusses.

Standard trusses must then be set-out, taking care not to exceed the design spacing. In most cases they will be equally set-out over runs of similar trusses. However, to ensure the engineered load path remains intact, the Roof Truss Layout must be strictly adhered to.

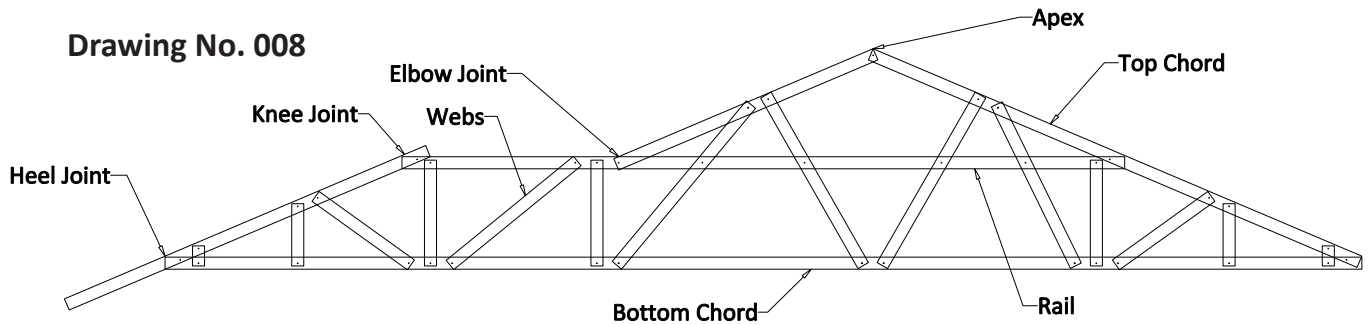
NOTE: Trusses must be fixed plumb and straight while erecting the roof. The trusses have not been installed correctly if a bow or tilt is evident after fixing. If this is the case, the problem must be rectified immediately.

SECTION B: INSTALLATION ROOF TRUSSES

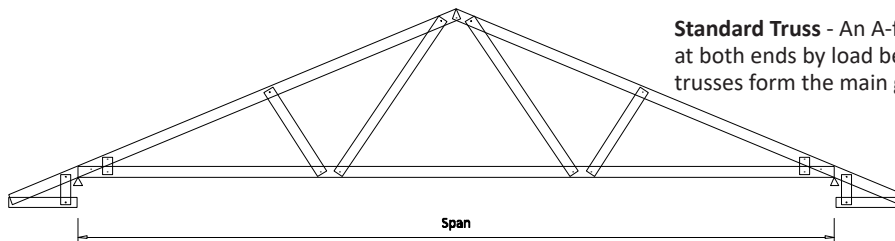


SECTION B: INSTALLATION ROOF TRUSSES

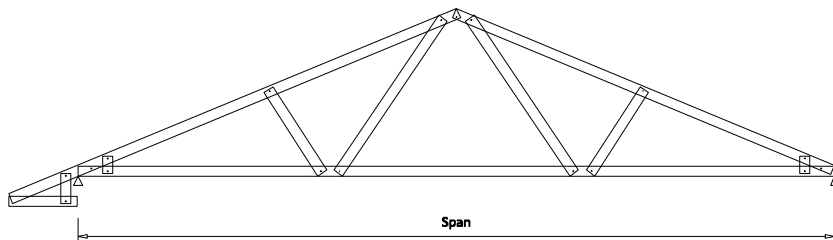
Drawing No. 008



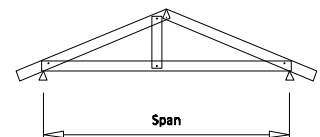
Drawing No. 009



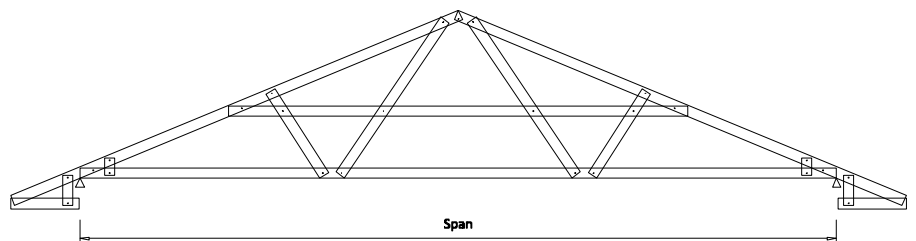
Standard Truss - An A-framed Truss supported at both ends by load bearing walls. Standard trusses form the main gable roof block.



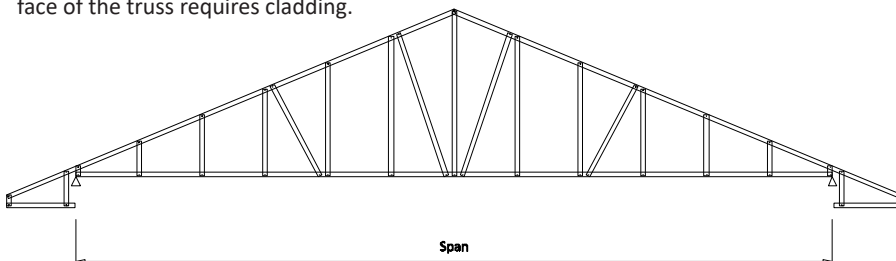
Bridge Truss - This truss type can be either a standard or truncated truss with the overhang removed at the connecting heel. That heel then butts into a girder truss or beam.



Saddle Truss - A truss with the top chords extended below the heel to form a foot cut. Saddle trusses are used to form a valley line when two roof planes intersect. They are supported by trusses or rafters below.



Gable Truss - This truss is used when either face of the truss requires cladding.

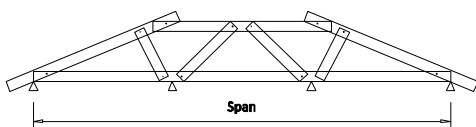
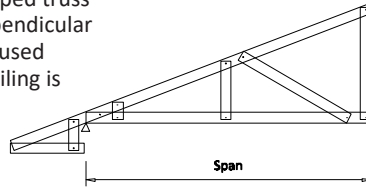


Dutch Gable Truss - This truss is formed when a mid rail is fixed to the face to support common rafters.

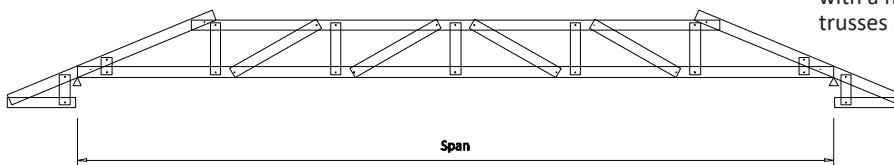
SECTION B: INSTALLATION ROOF TRUSSES

Drawing No. 010

Half Truss or Turret Truss - A triangular shaped truss with the endmost web fixed vertically, perpendicular to the bottom chord. These are commonly used to form verandah roofs where a finished ceiling is required, or on a hexagonal end.

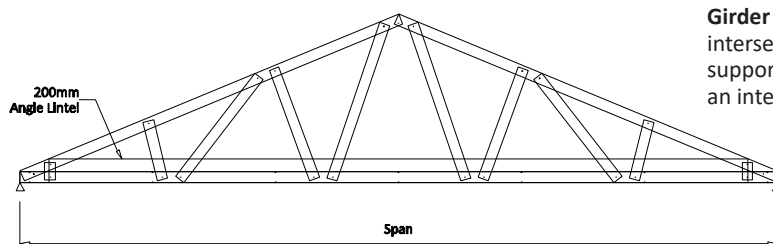
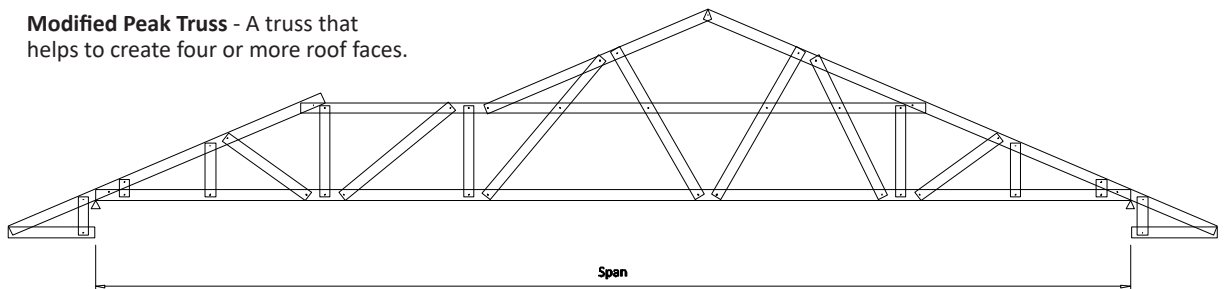


Truncated Saddle Truss - A saddle truss with a horizontal top chord used to form a valley line when two roof planes intersect with a hip close to the valley. They support hip and jack rafters.



Truncated Truss - A truss of varying depth with a horizontal top chord. Truncated trusses are commonly used to form a hip end.

Modified Peak Truss - A truss that helps to create four or more roof faces.



Girder Truss - A structural truss found at the intersection of two roof blocks. They are used to support bridge trusses and eliminate the need for an internal load bearing wall or beam.

SECTION B: INSTALLATION ROOF TRUSSES

B-4 GABLE END CONSTRUCTION

Compliance to all relevant building and/or industry codes is the responsibility of the roof truss erectors. Therefore the following recommendations are guidelines only.

Scope: - Up to N3 wind speed
- Sheet and tile roofing

Fasteners: - #12-14x20mm hex head tek screws

STEP 1: Examine the entire set of fabrication and Architectural drawings.

STEP 2: Referring to the Roof Framing Layout, mark out truss positions on the top plate.

Refer to Section B-3 Roof Truss Set-Out.

STEP 3: Begin by installing the gable end truss.

STEP 4: Use two #12-14x20mm hex head tek screws through the fixing bracket at each heel connection into the side of the top plates once the gable truss is in position.

STEP 5: Temporarily brace the gable truss plumb and straight.

STEP 6: As per Steps 4 and 5 install the next truss in its set-out position and temporarily brace the truss at or near the apex.

Refer to Drawing No. 011

STEP 7: Continue positioning trusses as per the procedures in, Section B-9 Common Roof Block Construction.

STEP 8: With the flush end towards apex, install Gable Frames. Gable frames will sit on top of the Gable truss and butt into the face of the first standard truss.

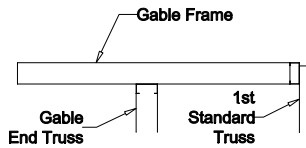
Refer to Drawing No. 011

Using 12-14x20mm tek screws fix Gable Frame to lip of first standard truss @ 900mm max centers.

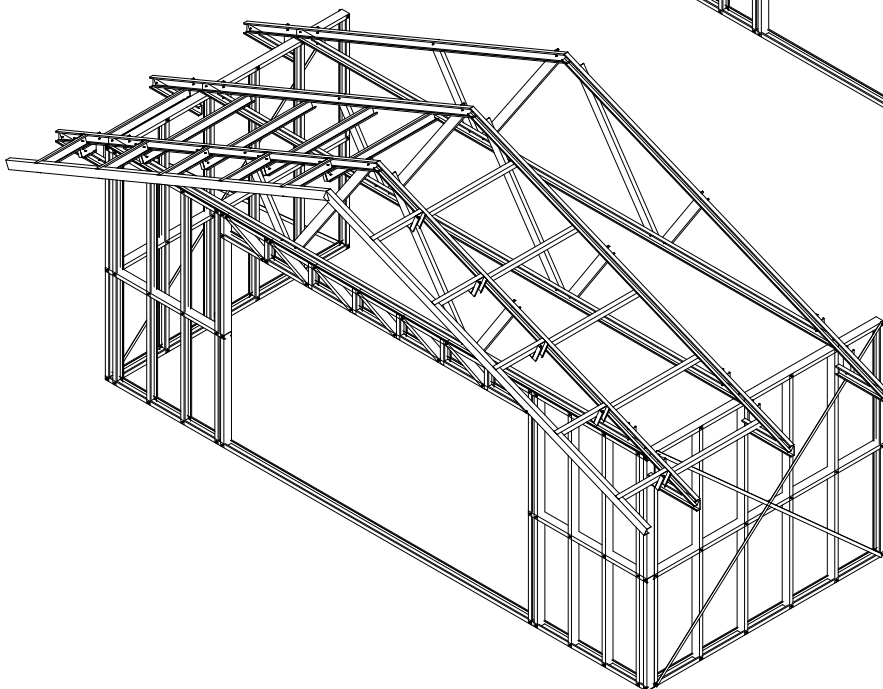
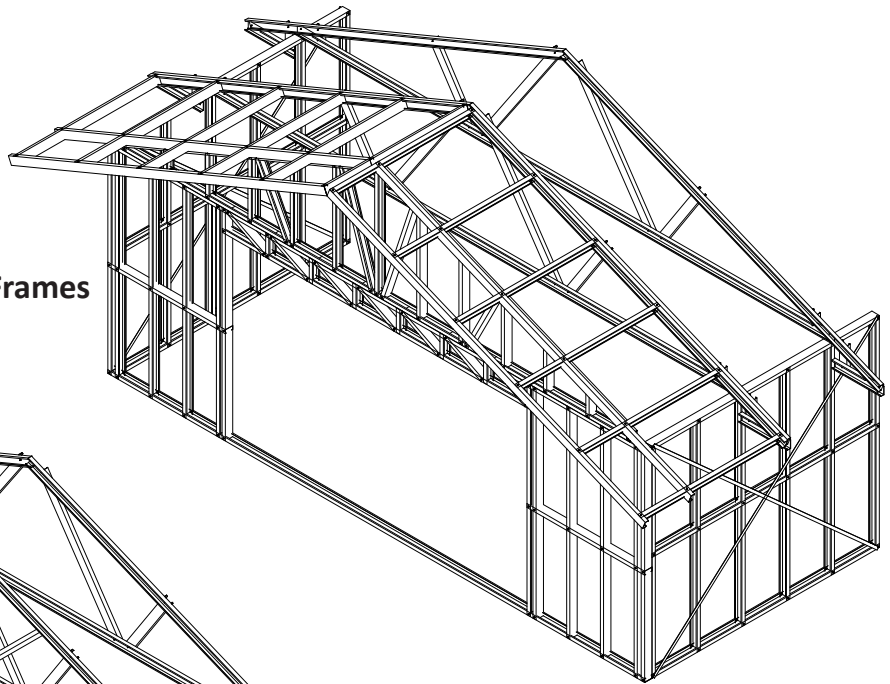
Using two 12-14x20mm tek screws, fix Gable Frame down to Gable Truss through each point where the Gable Frame studs cross over the Gable Truss.

SECTION 3: INSTALLATION ROOF TRUSSES

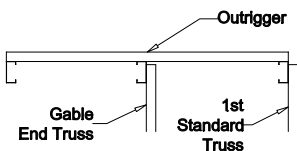
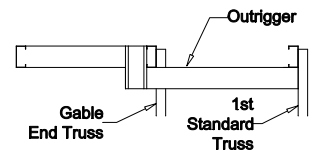
Drawing No. 011



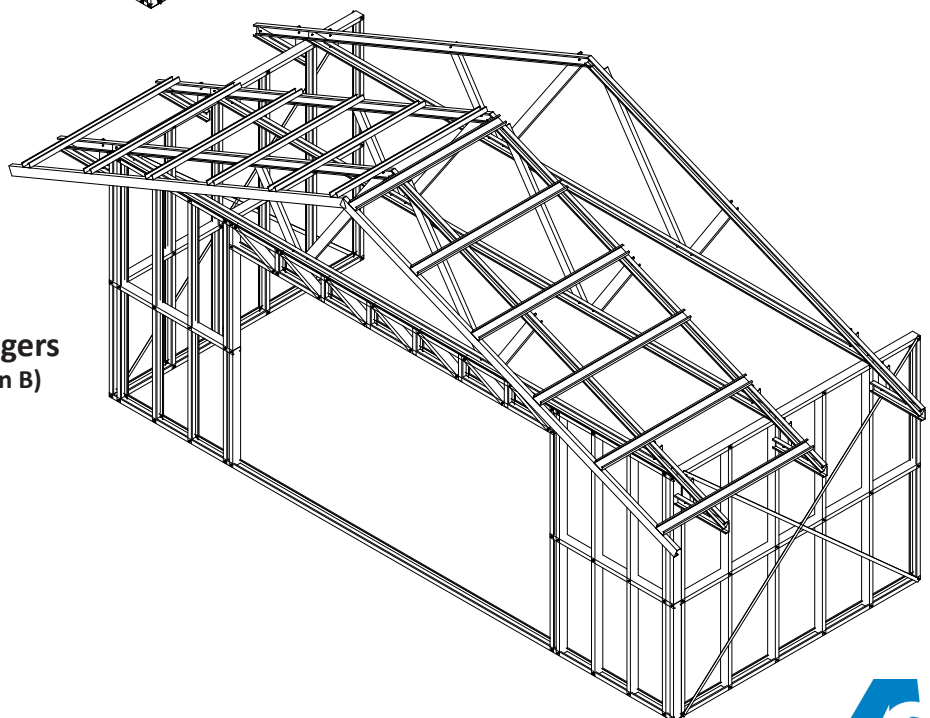
Gable Frames



Outriggers
(Option A)



Outriggers
(Option B)



SECTION B: INSTALLATION ROOF TRUSSES

B-5 HIP END CONSTRUCTION

Compliance to all relevant building and/or industry codes is the responsibility of the roof truss erectors, therefore the following recommendations are guidelines only.

Scope: - Up to N3 wind speed
- Sheet and tile roofing

STEP 1: Examine the entire set of fabrication and Architectural drawings.

STEP 2: Referring to the *Roof Framing Layout*, mark out truss positions on the top plate.

Refer to Section 2.3 Roof Truss Set-Out.

STEP 3: Making sure the webs of the trusses face away from the hip end wall, lift trusses into position.

STEP 4: Stand the first station truncated truss in its set-out position and, fix two #12-14x20mm hex head tek screws through the fixing bracket at each heel connection into the side of the top plates.

STEP 5: Temporarily brace the truss plumb and straight.

STEP 6: When installing the second, third and fourth station truncated trusses repeat Steps 3 and 4 and temporarily brace.

NOTE: Refer to the *Roof Framing Layout* for the standard set-out for the first four truncated trusses.

STEP 7: As per the procedures in Section B-9 Common Roof Block, continue positioning trusses.

STEP 8: Line up the fixing bracket with the outside of the top plate at the centre of the hip end wall to install the crown end rafter. Using two 12-14x20mm hex head tek screws, screw through the fixing bracket. Keeping the crown end rafter square to the hip end wall, use a Multi Grip with two #12-14x20mm teks to screw it to the top chord of each truncated truss. Be sure that the top chords of all truncated trusses are straight and plumb.

STEP 9: Before fixing all jack rafters it is suggested to construct the external corner of the roof. Use the AusSteel hip corner to form the roof structure at the eave line and to assist in the fitting of the fascia. Using two #12-14x20mm hex head tek screws fix the hip corner to the top plates at external corners and to the top of the first truncated truss as per a standard jack rafter.

Refer to Drawing No. 012 for hip corner construction information.

STEP 10: Mark out the positions of the jack rafters on the hip end wall. Be sure that the design spacing is maintained. Line up the fixing bracket with the outside of the top plate to fix the jack rafters to the hip end wall. Use two #12-14x20mm hex head tek screws to screw through the fixing bracket. Keeping the jack rafter square to the hip end wall, use a Multi Grip with two #12-14x20mm, screw it to the top chord of each truncated truss in each face at each intersection. Be sure that the top chords of all truncated trusses are straight and plumb

Continue to install all jack rafters until the hip end is complete.

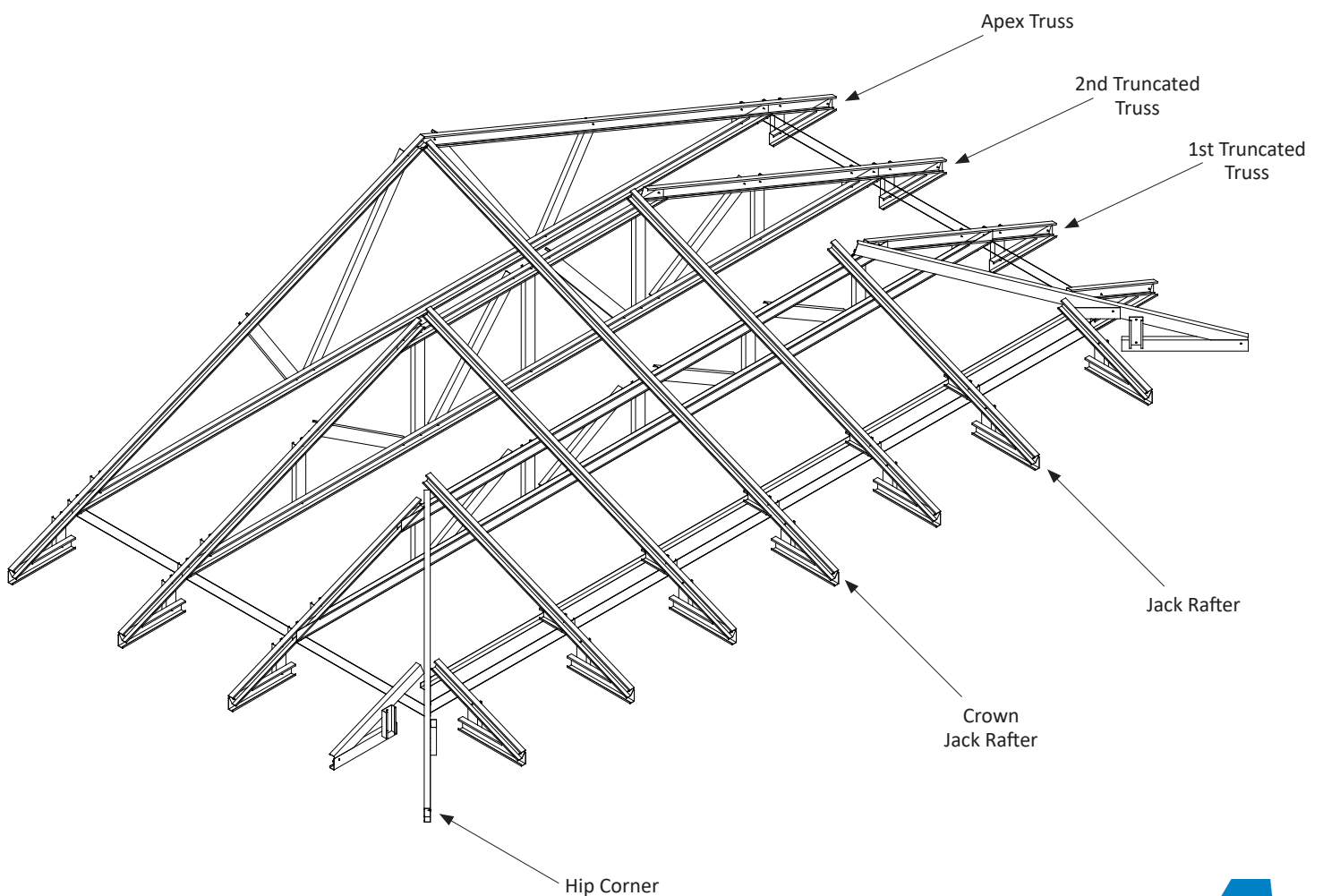
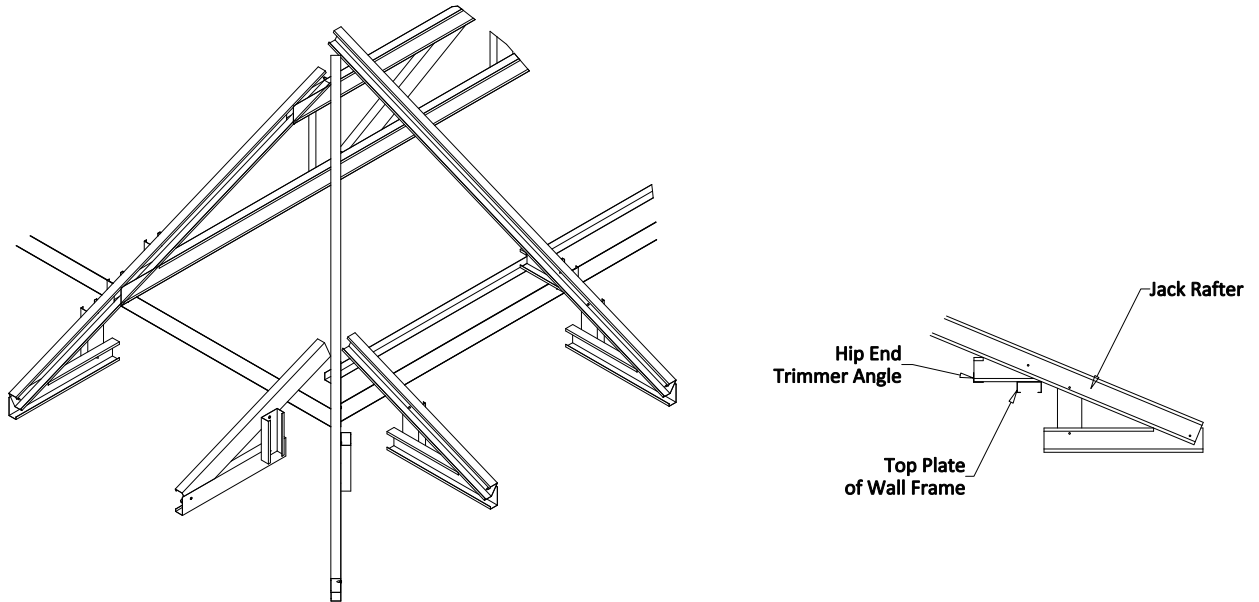
Refer to Drawing No. 012

STEP 11: To finish the hip roof line with sheet roofing fix a Topspan 40 roof batten each side of the line formed from the intersection of the jack rafters and the chords of the truncated trusses. At each intersection use two #12-14x20mm hex head tek screws.

FOR TILE ROOFING: Fix the hip rafter section directly to the intersection of the jack rafters and the chords of the truncated trusses for tile roofing. Use two #12-14x20mm hex head tek screws at each intersection.

SECTION B: INSTALLATION ROOF TRUSSES

Drawing No. 012



SECTION B: INSTALLATION ROOF TRUSSES

B-6 DUTCH GABLE CONSTRUCTION

Compliance to all relevant building and/or industry codes is the responsibility of the roof truss erectors, thus, the following recommendations are guidelines only.

Scope: - Up to N3 wind speed
- Sheet and tile roofing

Fasteners: - #12-14x20mm hex head tek screws

STEP 1: Examine the entire set of fabrication and Architectural drawings.

STEP 2: Referring to the Roof Framing Layout, mark out truss positions on the top plate.

Refer to Section B-3 Roof Truss Set-Out

NOTE: Dutch gable truss set-back can be found on the Architectural plans or *Roof Framing Layout*.

STEP 3: Ensuring that the webs of the trusses face away from the hip end wall, lift trusses into position.

STEP 4: Stand the first station truncated truss in its set-out position and, fix two #12-14x20mm hex head tek screws through the fixing bracket at each heel connection into the side of the top plates.

STEP 5: Temporarily brace the truss plumb and straight.

Refer to Section B-5 Hip End Construction for truncated truss construction

STEP 6: When installing additional truncated trusses repeat Steps 3 and 4 until the dutch gable truss is reached. Temporarily brace the trusses plumb and straight.

STEP 7: As per Steps 3 and 4, install the dutch gable truss making sure that the battened face of the truss faces the hip end wall to allow for fixing of cladding

Refer to Section B-4 Gable end Construction, Step 8 & Step 9 for gable overhang set-up.

STEP 8: Line up the fixing bracket to the outside of the top plate at the centre of the hip end wall to install the crown end rafter. Use two #12-14x20mm hex head tek screws to screw through the fixing bracket. Keeping the crown end rafter square to the hip end wall, use a Multi Grip with two #12-14x20mm teks to screw it to the top of the mid-rail on the dutch gable truss and each top chord of the truncated trusses in each face at each intersection. Be sure the top chords of all truncated trusses are straight and plumb.

STEP 9: Before fixing all jack rafters it is suggested to construct the external corner of the roof. Use the AusSteel hip corner to form the roof structure at the eave line and assist in the fitting of the fascia. Using two #12-14x20mm hex head tek screws fix the top plates at external corners and to the top of the first truncated truss as per a standard jack rafter.

Refer to Drawing No. 013

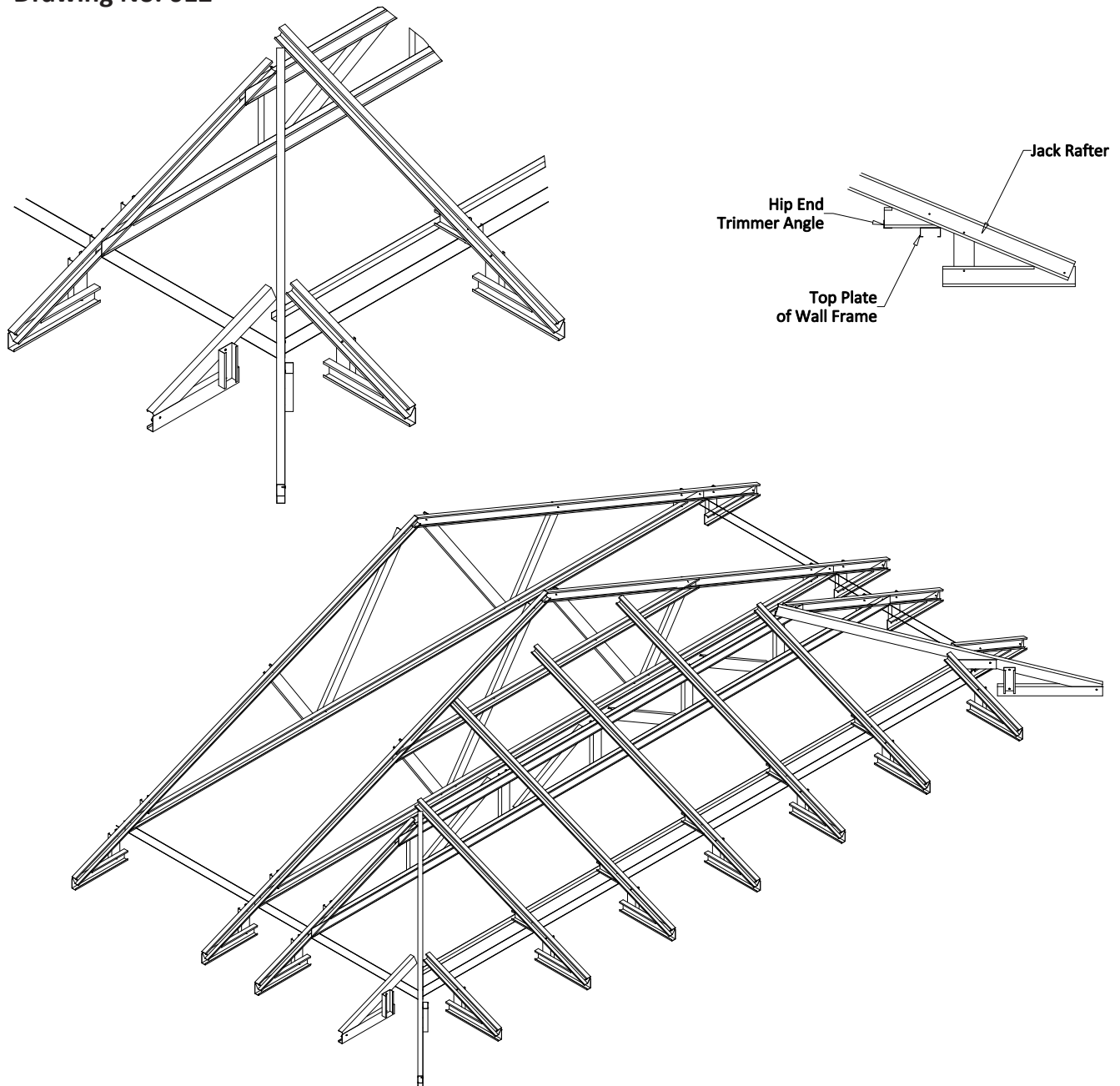
STEP 10: Make sure the design spacing is maintained after marking out the positions of the jack rafters of the hip end wall. Line up the fixing bracket with the outside of the top plate to fix the jack rafters to the hip end wall. Use two #12-14x20mm hex head tek screws to screw through the fixing bracket. Using a Multi Grip and two #12-14x20mm Tekes, keep the jack rafter square to the hip end wall and screw it to the mid-rail on the dutch gable truss and each top chord of the truncated trusses with a tek in each face at each intersection. Be sure that the top chords of all truncated trusses are straight and plumb

Continue to install all jack rafters until the hip end is complete.

Refer to Drawing No. 013

SECTION B: INSTALLATION ROOF TRUSSES

Drawing No. 012



STEP 11: To finish the hip roof line with sheet roofing fix a Topspan 40 roof batten each side of the line formed from the intersection of the jack rafters and the chords of the truncated trusses. At each intersection use two #12-14x20mm hex head tek screws

FOR TILE ROOFING: Fix the hip rafter section directly to the intersection of the jack rafters and the chords of the truncated trusses for tile roofing. Use two #12-14x20mm hex head tek screws at each intersection.

NOTE: IF a dutch gable is formed out of saddle trusses, be sure that the largest saddle truss is turned around so the battened face of the truss faces outwards. This allows for appropriate fixing of cladding materials.

For standard saddle truss positioning and fixing Refer to **Section B-10 Saddle Truss Construction**.

SECTION B: INSTALLATION ROOF TRUSSES

B-7 HEXAGONAL END CONSTRUCTION

Compliance to all relevant building and/or industry codes is the responsibility of the roof truss erectors, thus, the following recommendations are guidelines only.

Scope: - Up to N3 wind speed
- Sheet and tile roofing

Fasteners: - #12-14x20mm hex head tek screws

STEP 1: Examine the entire set of fabrication and Architectural drawings.

STEP 2: Referring to the Roof Framing Layout, mark out truss positions on the top plate.

Refer to Section 2.3 Roof Truss Set-Out.

STEP 3: Refer to the *Roof Framing Layout* and place the turret truss accordingly, with the barrel section facing the incoming half trusses.

STEP 4: Use two #12-14x20mm hex head tek screws to fix the turret truss to the top plate, screwing through the fixing bracket at each heel connection into the side of the top plates.

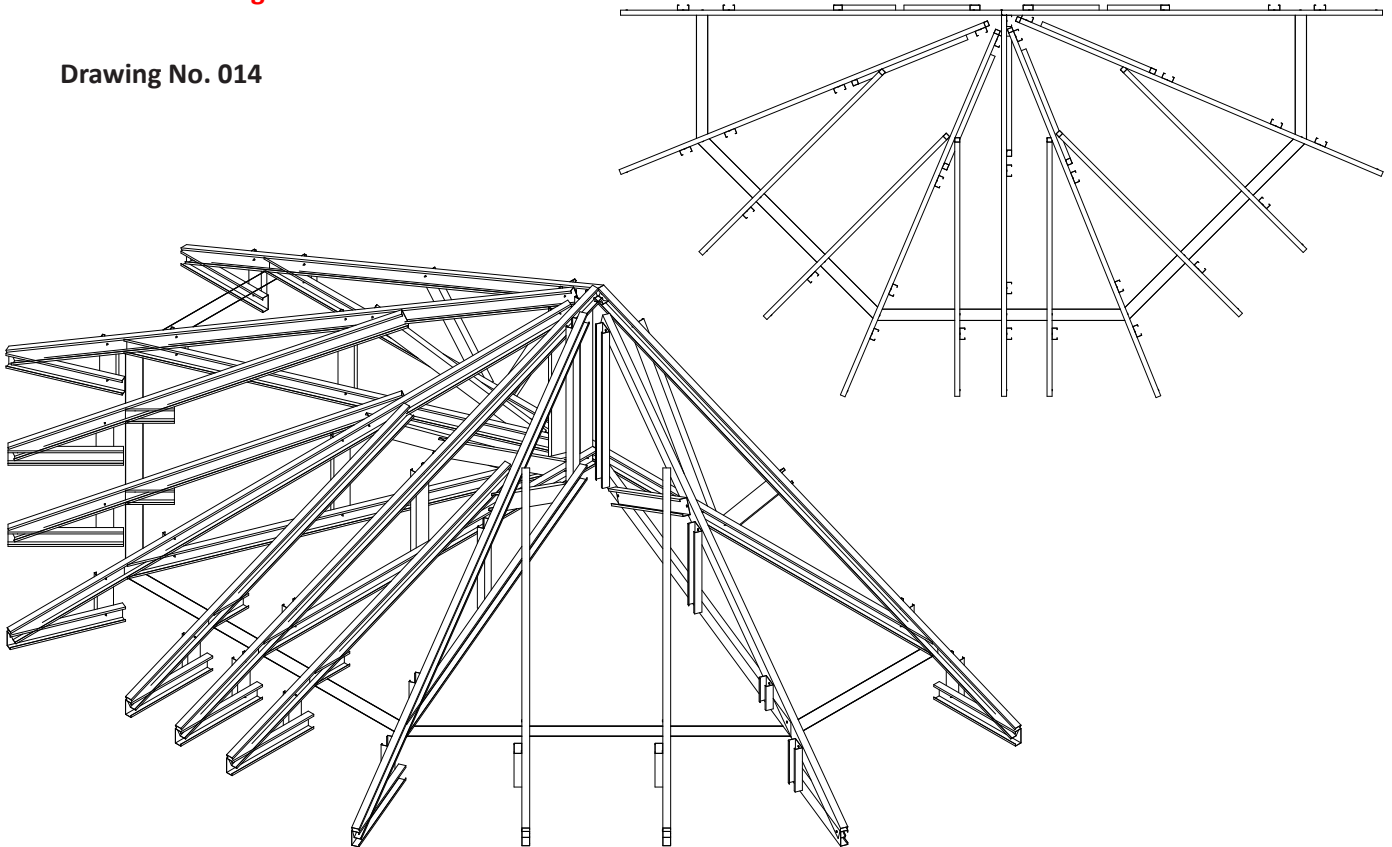
STEP 5: Temporarily brace the turret truss plumb and straight.

STEP 6: Fix incoming half trusses to the turret truss with two #12-14x20mm hex head tek screws through the top and bottom of the barrel section into the upright chord of the half trusses.

Using two #12-14x20mm hex head tek screws fix incoming half trusses to the turret truss through the top and bottom of the barrel section into the upright chord of the half trusses.

Refer to Drawing No. 014

Drawing No. 014



SECTION B: INSTALLATION ROOF TRUSSES

B-8 GIRDER TRUSSES INSTALLATION

Compliance to all relevant building and/or industry codes is the responsibility of the roof truss erectors, thus, the following recommendations are guidelines only.

Scope: - Up to N3 wind speed
- Sheet and tile roofing

Fasteners: - #12-14x20mm hex head tek screws

STEP 1: Examine the entire set of fabrication and Architectural drawings

STEP 2: Referring to the *Roof Framing Layout*, mark out truss positions on the top plate.

Refer to Section 2.3 Roof Truss Set-Out.

STEP 3: Referring to the *Roof Framing Layout*, place the girder truss accordingly, with the angle lintel seat facing the incoming bridge trusses.

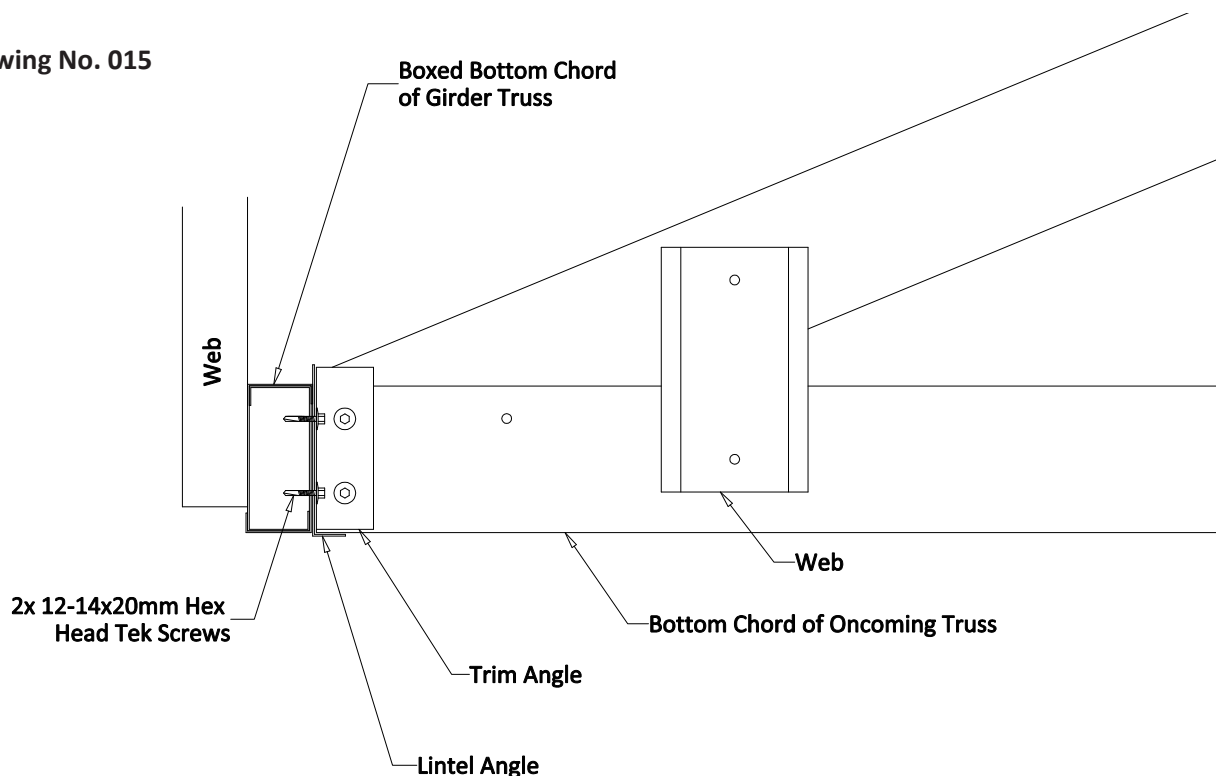
STEP 4: Using two #12-14x20mm hex head tek screws fix the girder truss to the top plate screwing through the fixing bracket at each heel connection into the side of the plates.

STEP 5: It is imperative that you permanently brace the girder truss. The girder truss can not be allowed to roll over under load.

STEP 6: Using two #12-14x20mm hex head tek screws, fix the incoming bridge trusses to the girder truss, screwing through the trim angle bracket at the end of the bridge truss, into the angle lintel seat on the bottom chord of the girder truss.

Refer to Drawing No. 015

Drawing No. 015



SECTION B: INSTALLATION ROOF TRUSSES

B-9 COMMON ROOF BLOCK CONSTRUCTION

Compliance to all relevant building and/or industry codes is the responsibility of the roof truss erectors, thus, the following recommendations are guidelines only.

Scope: - Up to N3 wind speed
- Sheet and tile roofing

Fasteners: - #12-14x20mm hex head tek screws

STEP 1: Examine the entire set of fabrications and Architectural drawings.

STEP 2: Referring to the *Roof Framing Layout*, mark out truss positions on the top plate.

Refer to Section 3.3 Roof Truss Set-Out.

STEP 3: Fix remaining trusses in their set-out positions and secure using two #12-14x20mm hex head tek screws through the fixing bracket at each heel connection into the side of the top plates. In order to plumb and straighten the trusses temporarily brace as close as possible to the apex of each truss.

NOTE: Maintain a straight line at the apex of all trusses to easily keep trusses in-line. This can be done using a string line, or alternatively by running a string line along a common point on the trusses.

NOTE: When all trusses are erected, install wind bracing as specified in **Section B-12 Roof Bracing Requirements**

B-10 SADDLE TRUSS CONSTRUCTION

Compliance to all relevant building and/or industry codes is the responsibility of the roof truss erectors, thus, the following recommendations are guidelines only.

Scope: - Up to N3 wind speed
- Sheet and tile roofing

Fasteners: - #12-14x20mm hex head tek screws

STEP 1: Examine the entire set of fabrication and Architectural drawings.

STEP 2: To aid in the positioning of saddle, trusses fix a string line along the ridge line of your roof.

STEP 3: Position the largest saddle truss keeping it parallel to the edge of the main roof. Adjust the truss, with the open face of the bottom chord facing down the slope and the webs facing up the slope so that the long points of the foot cut line up with the valley string lines.

STEP 4: The apex line should line up with the apex string line when the saddle truss is standing plumb.

STEP 5: Using two #12-14x20mm hex head tek screws fix the bottom chord of the saddle trusses to the top chord of the underlying truss at each intersection.

STEP 6: Repeat steps 3, 4 and 5 for consequent saddle trusses until the saddle block is complete.

STEP 7: Temporarily brace the apex of the saddle trusses.

NOTE: The smallest saddle truss will require a trimmer to be installed below for extra support.

SECTION B: INSTALLATION ROOF TRUSSES

B-11 TRUSS NOGGINS AND BOTTOM CHORD TIES

Bottom Chord Ties and Truss Noggins are a structural component of Aus Steel's roof construction. They are used to brace the bottom and top chords and help to hold the trusses in position.

(Note: Depending on the design of your roof, Truss Noggins may or may not be required)

Scope: - Up to N3 wind speed

- Sheet and tile roofing

Fasteners: - #12-14x20mm hex head tek screws

STEP 1: Study the entire set of Architectural and fabrication drawings.

STEP 2: Install truss noggins as supplied by Aus Steel. Truss noggins will be pre cut to length and are installed between the truss top chords at a maximum of 2000mm centres.

Refer to diagram on following page

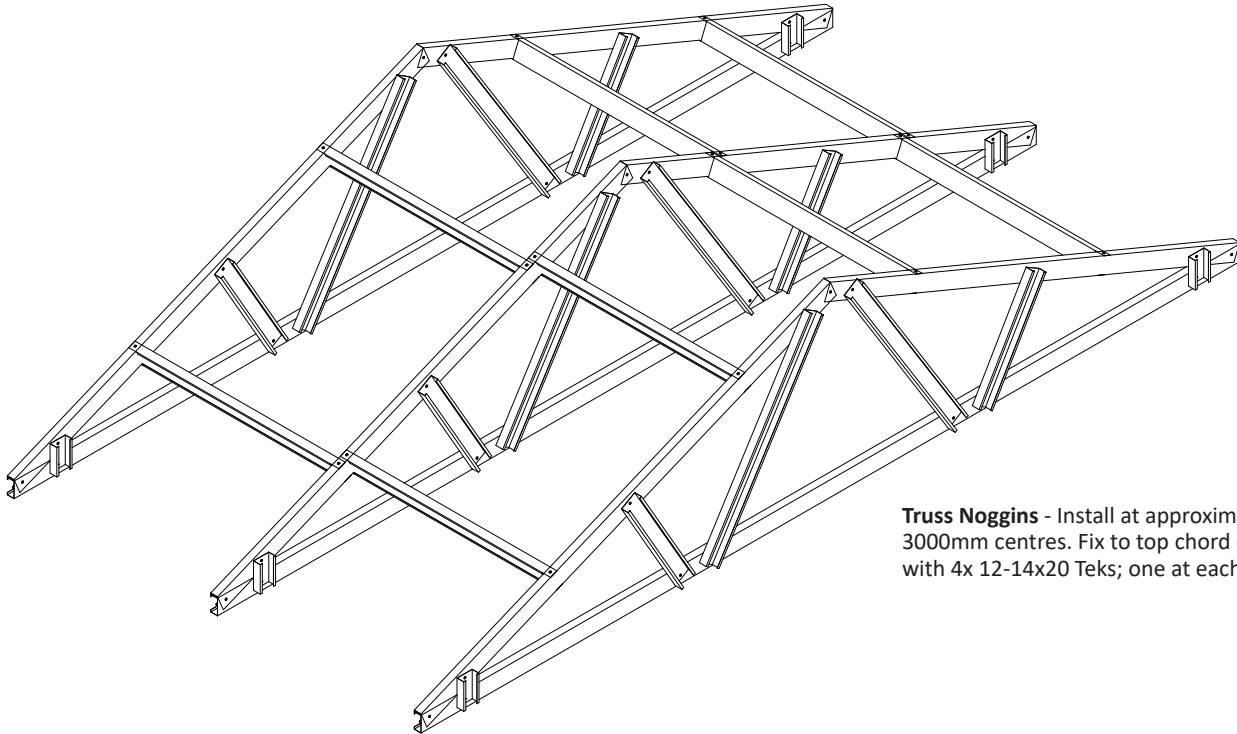
STEP 3: Fix each tab, of which there are 4, to the tops and bottoms of the top chords of the trusses with one #12-14x20mm Tek Screw through each tab.

STEP 4: Position Bottom Chord Ties on top of the bottom chords of the trusses at a maximum of 3000mm between centres.

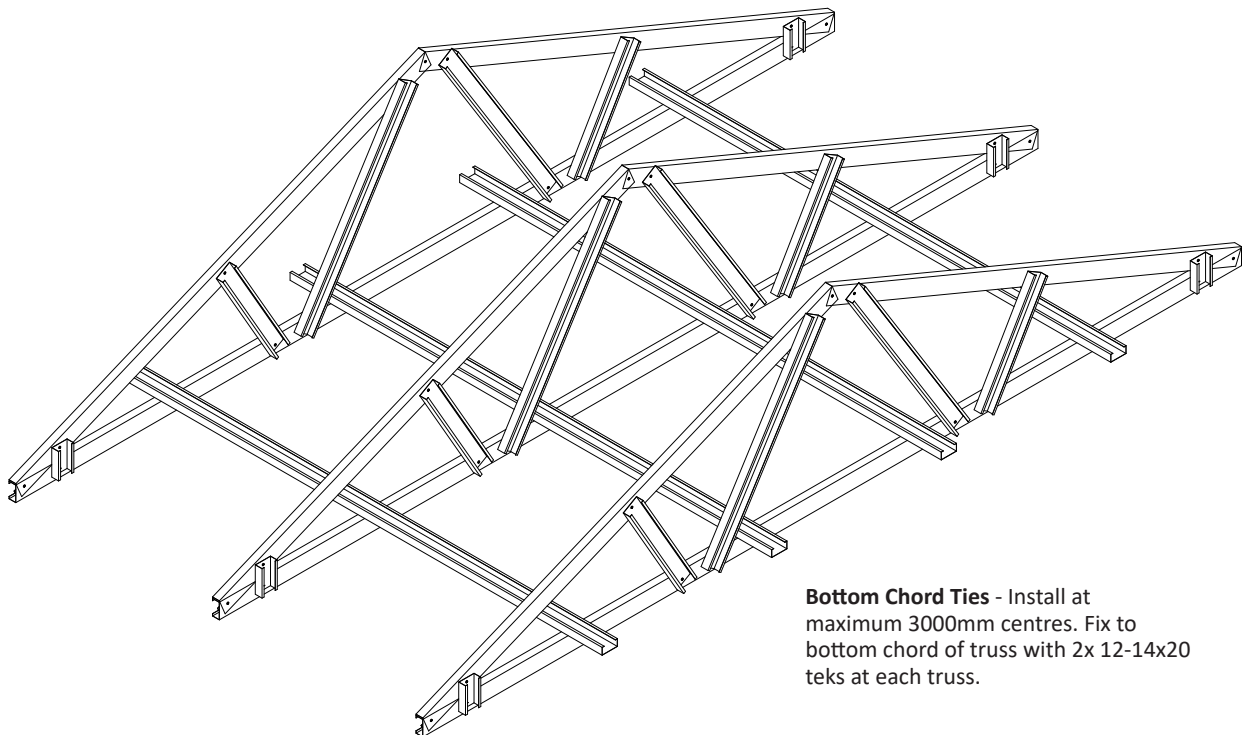
Refer to diagram on following page

STEP 4: Where each bottom chord tie crosses a truss, fix with two #12-14x20 Tek Screws.

SECTION B: INSTALLATION ROOF TRUSSES



Truss Noggins - Install at approximately 3000mm centres. Fix to top chord of trusses with 4x 12-14x20 Tek's; one at each tab.



Bottom Chord Ties - Install at maximum 3000mm centres. Fix to bottom chord of truss with 2x 12-14x20 teks at each truss.

SECTION B: INSTALLATION ROOF TRUSSES

B-12 CEILING BATTENS & INTERNAL WALL BRACKETS

AusSteel recommends that all ceiling battens **MUST** be installed immediately after the roof trusses have been installed. By securing the ceiling battens at this time the roof trusses will be laterally restrained.

STEP 1: Install ceiling battens to the underside of the bottom chords once all trusses are erected. Depending on the type of plasterboard that will be used for the ceiling, ceiling battens can be spaced at 600mm centres or 450mm centres (check specifications).

NOTE: Unless specified, AusSteel will supply ceiling battens to suit 600mm.

STEP 2: Using two #10-16x16mm hex head tek screws fix the ceiling battens, one into each flange of the batten into the bottom chords of the truss

STEP 3: At the intersection of the ceiling batten and the load bearing wall junction trim angle must be used to support the ends of the ceiling battens. Using #10-16x16mm hex head screws fix to wall at max. 600 centres.

Refer to Drawing No. 016

STEP 4: Install internal wall bracket once all truss and ceiling batten installations are complete. Internal brackets are designed to provide lateral support to internal walls and at the same time allow vertical movement of the roof structure.

Internal wall brackets must be fixed at a maximum of 1200mm centres on non-load bearing internal walls.

STEP 5: Screw one #10-16x16mm hex head tek screw down through the top of the bracket and into the top of the ceiling batten to stop the bracket from sliding.

Refer to Drawing No. 017

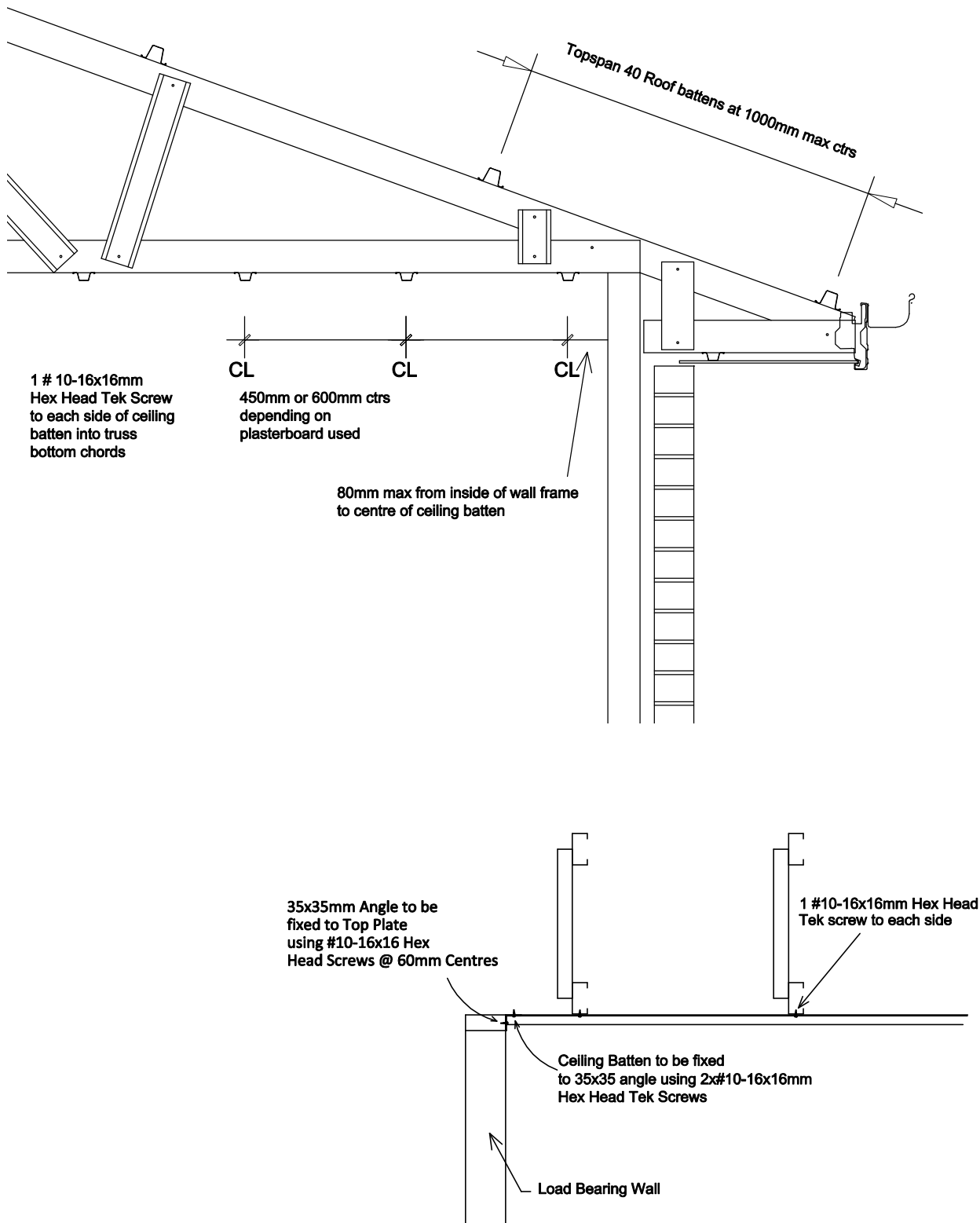
STEP 7: At a maximum of 1200mm centres, install internal wall brackets to the bottom chord of trusses. Secure two #10-16x16mm hex head tek screws into the side of the flat face of the bottom chord.

STEP 8: Using two #10-16x16mm hex head tek screws, secure the foot of the bracket into the top plate.

Refer to Drawing No. 017

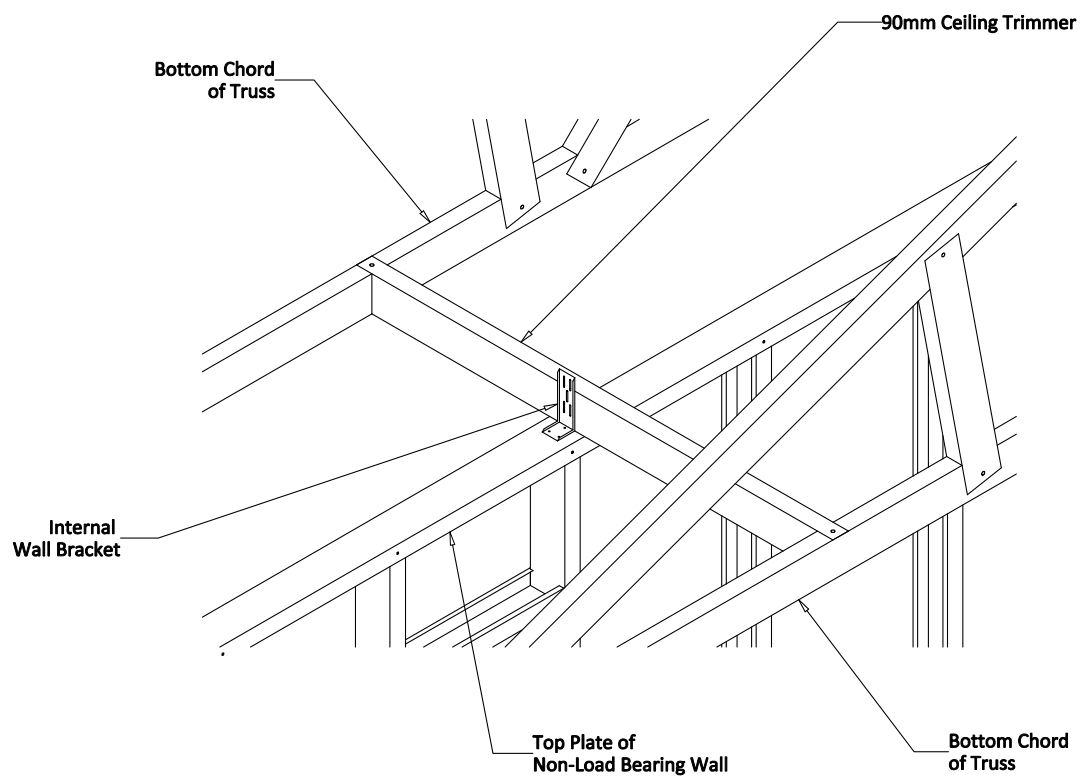
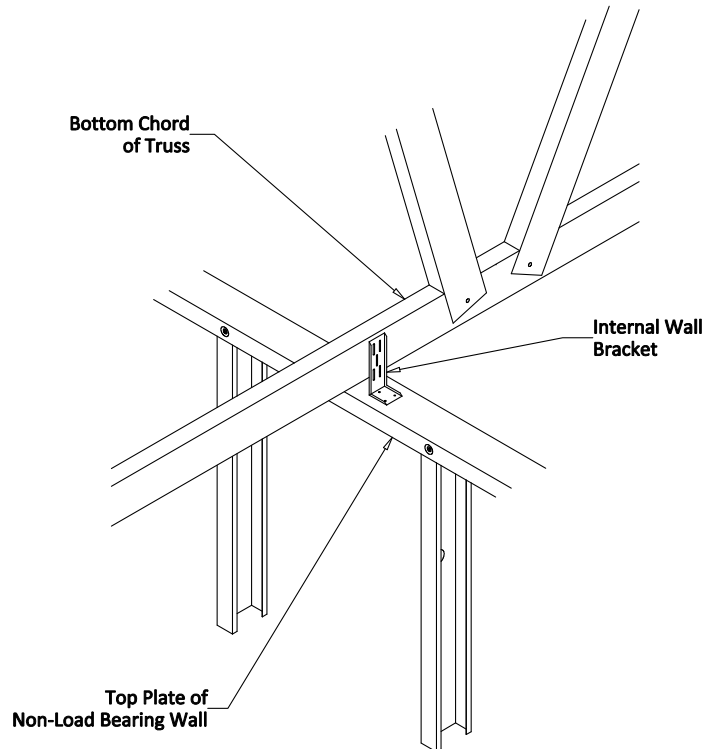
SECTION B: INSTALLATION ROOF TRUSSES

Drawing No. 016



SECTION B: INSTALLATION ROOF TRUSSES

Drawing No. 017



SECTION B: INSTALLATION ROOF TRUSSES

B-13 ROOF BRACING REQUIREMENTS

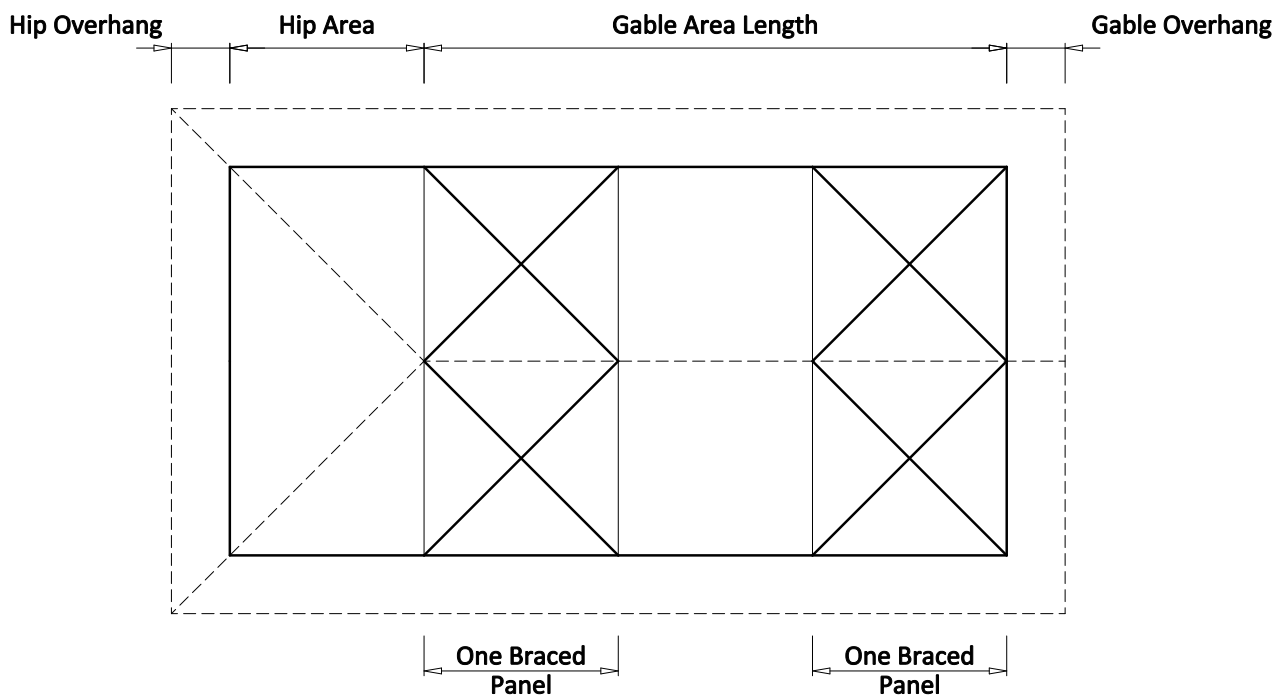
Standard speed bracing or hoop iron bracing, as used in timber construction, are the permitted forms of roof bracing for the AusSteel *Ultimate Steel Building System*. Bracing provides roof stability during construction and on completion for a tile roof. In the case of sheet roof, bracing will only stabilise the roof during construction as the roof sheeting, upon completion, may be considered as permanent bracing. The truss span, roof length and roof pitch determines the number of braced roof panels needed. In most cases, speed bracing is not required for a hip end due to the bracing action of the hip rafters.

Brace fixing must be carried out in accordance with standard construction requirement guidelines within the Australian Standards.

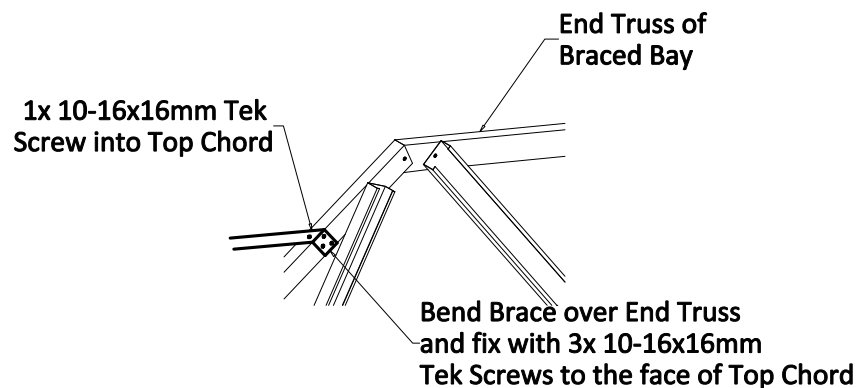
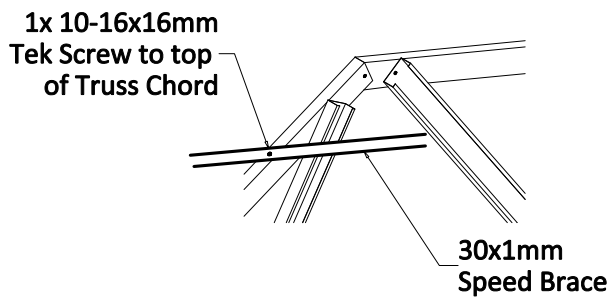
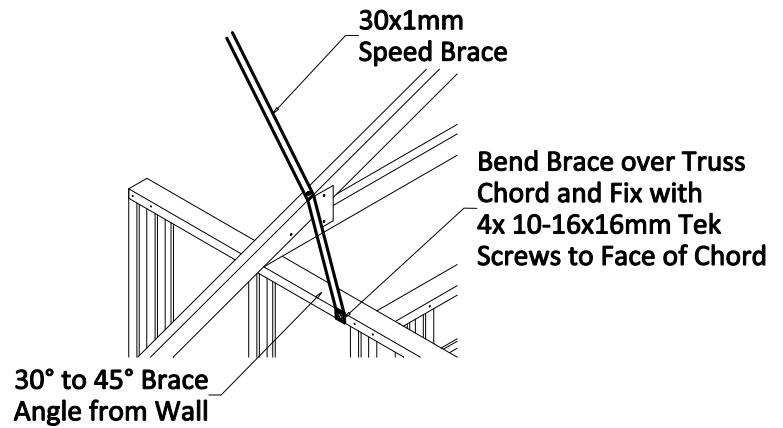
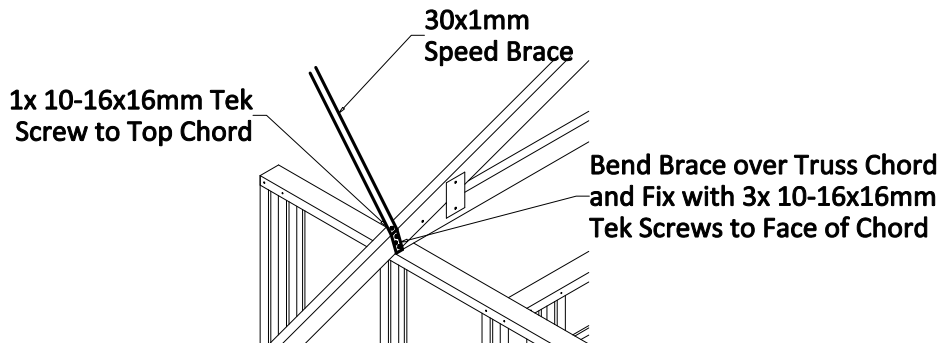
NOTE: The gable roof (standard truss) area should be braced using its corresponding length.

Refer to Drawing No. 018 for roof brace usage and fixing details.

Drawing No. 018



SECTION B: INSTALLATION ROOF TRUSSES

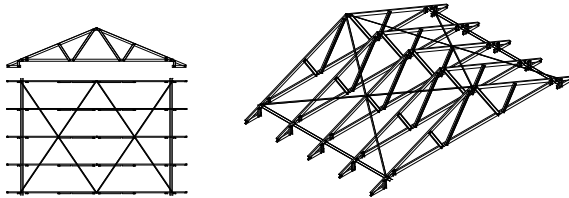


SECTION B: INSTALLATION ROOF TRUSSES

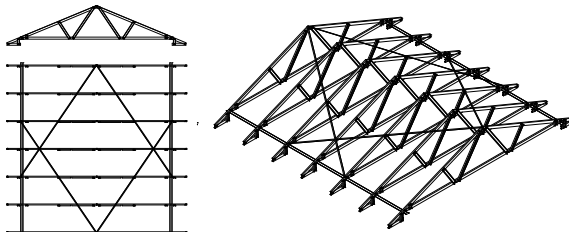
Refer to Drawing No. 019 for standard bracing patterns based on roof span.

Drawing No. 019

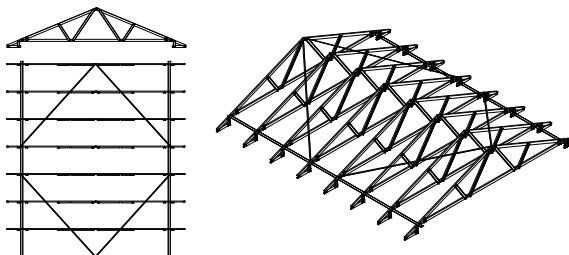
Bracing Configuration Roof Span <8.0 Metres



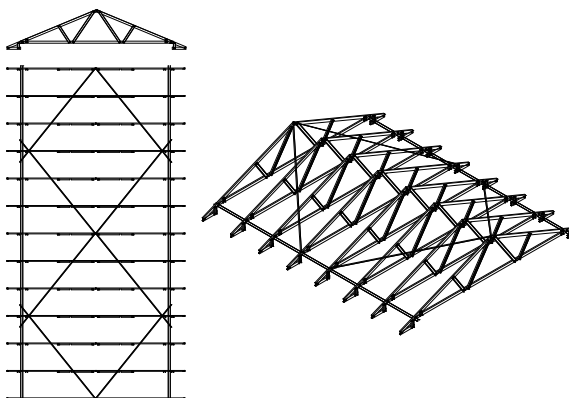
Where Braced Panel is 1-1.5 Times
the Half Span of the Truss



Where Braced Panel is 1.5-3.5 Times
the Half Span of the Truss

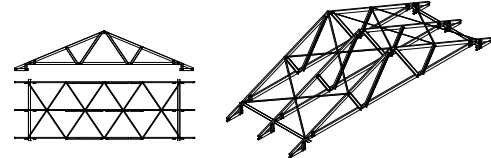


Where Braced Panel is 3.5-4 Times
the Half Span of the Truss

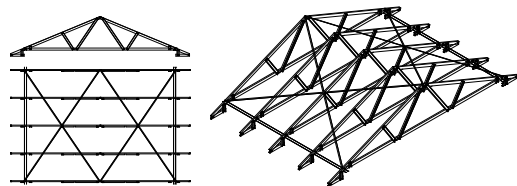


Where Braced Panel More Than 4 Times
the Half Span of the Truss

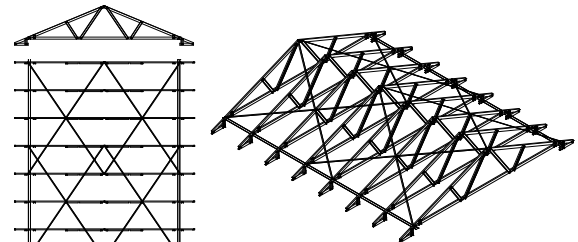
Bracing Configuration Roof Span 8.0-14.0 Metres



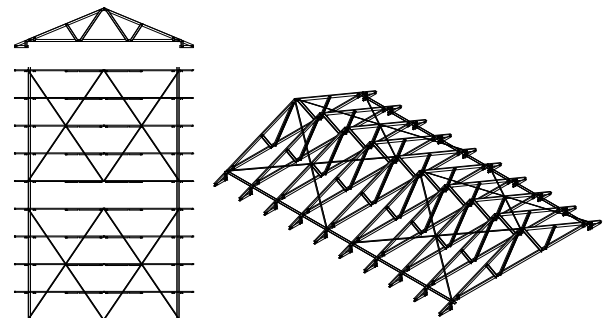
Where Braced Panel Less Than
the Half Span of the Truss



Where Braced Panel 1-2 Times
the Half Span of the Trusses



Where Braced Panel 2-4 Times
the Half Span of the Trusses



Where Braced Panel More Than 4 Times
the Half Span of the Trusses

NOTE: All cut-off trusses with vertical end webs not intersecting another truss will need end web bracing similar to the top chord bracing. Diagonal bracing from the top chord to the supporting structure should be provided at each end of each run of trusses.

SECTION B: INSTALLATION ROOF TRUSSES

B-14 ROOF BATTENS & SPACINGS

AusSteel can provide the roof battens for sheet roofing. A roof tiler, in most cases, will supply and fix the battens for tile roofing.

The overlying roof battens provide the bracing for the top chords. In the case of battens no two splices should be adjacent at the same truss, nor should any more than one third of the battens be spliced at a single truss. The roof batten must join over a truss.

NOTE: Areas in the proximity of the ends of gable roofs must be as free of splices, as is practicle.

STEP 1: Spacing of roof battens is calculated in alignment with the sheet profile and length. Sheet manufacturer's tables usual define the number of supports per sheet. AusSteel recommend a standard spacing of roof battens of 900mm centres.

STEP 2: Fix roof battens to trusses using #12-14x20mm hex head tek screws, to both batten flanges at each truss.

Use #12-14x20mm hex head tek screws to fix roof battens to trusses, screw to both batten flanges at each truss.

NOTE: To finish the sheet roof hip line fix a Topspan 40 roof batten each side of the line formed from the intersection of the jack rafters and the chords of the truncated trusses. At each intersection use two #12-14x20mm hex head tek screws.

B-15 VALLEY BOARDS & FASCIA

Whether sheet roofing or tile roofing is specified AusSteel designs and supplies valley support. If specified, Valley Tray may also be provided.

Valley Supports

Valley supports are assembled using Topspan 20 and Topspan 40 battens. 4 runs of Topspan 20 battens, 2 on either side of the valley centre line, form the support for the valley gutter with 2 runs of Topspan 40, 1 either side, forming the valley battens. As with standard roof battens, fix these battens to trusses using #12-14x20mm hex head tek screws, to both batten flanges at each truss.

Fascia

Fascia is fitted to fascia brackets in alignment with the manufacturer's specifications. In most cases the fascia brackets are fixed to the truss overhang (top chord) using three #10-16x16mm hex head tek screws.

To be sure a straight gutter line is achieved, firstly fix the two end fascia brackets, then extend a string line between the two end brackets and secure intermediate brackets to the string line. Install a central bracket to avoid the string sagging. Install the fascia to the brackets, with corners and joints as required.

Eaves and Eave Trusses

Typically, your AusSteel trusses will have been supplied with a built in "trussed" eave. Alternatively, 35x35x1.0mm Angle can be provided to trim out eaves on site.

ROOF TRUSS AND BRACING INSTALLATION CHECKLIST

When installing your roof trusses use the following checklist to ensure a quality job and to avoid overlooking any important aspects.

Supporting Structure

- ☐ Check that all top plates that support trusses are plumb. (Any misalignment of supporting structure will be reflected in the straightness of the roof.)
- ☐ Check that the distance between supporting walls match the spans of the trusses.
- ☐ Are the tops of internal non-load bearing walls set down below that of external load bearing walls?
- ☐ Are lintels in load bearing walls suitable for truss loading?
- ☐ Is supporting structure fully braced, plumb and stable?

Roof Trusses

- ☐ Have trusses been stored and lifted in accordance with these instructions?
- ☐ Are trusses free of any modifications, cut members or broken members?
- ☐ Does the truss design criteria on the documentation conform to the job specification for roof cladding and special loads, eg roof mounted hot water tanks, air conditioners, etc?
- ☐ Are trusses correctly positioned according to truss layout plan?
- ☐ Are trusses accurately spaced?
- ☐ Have cantilever or internally supported trusses been orientated correctly?
- ☐ Are trusses installed within installation tolerances?
 - ☐ a) Plumb - All sections of truss less than 50mm or height/50 out of vertical within 50mm tolerance
 - ☐ b) Bow - All chord bows less than 50mm or chord length/200 within 50mm tolerance
- ☐ Are all multiple ply trusses screwed/bolted together?
- ☐ Is gable end framing as per design?

Temporary Bracing

- ☐ Are top chord temporary ties no greater than 3000mm spacing?
- ☐ Are bottom chord temporary ties no greater than 2000mm spacing?

Permanent Bracing - Top Chord Bracing

- ☐ Is the SpeedBrace configuration correct according to "AusSteel Installation Guidelines"?
- ☐ Is the SpeedBrace fixing to each truss top chord correct according to "AusSteel Installation Guidelines"?
- ☐ Is the SpeedBrace to top plate fixing correct according to "AusSteel Installation Guidelines"?
- ☐ Is the SpeedBrace splice detail correct according to "AusSteel Installation Guidelines"?
- ☐ Has all cantilever and web bracing been installed as per design?
- ☐ Have all web ties been installed and braced back to a rigid part of the building with cross braces?
- ☐ Are roof battens of correct size and grade?
- ☐ Are roof battens spliced correctly:-
 - ☐ a) no more than 1 in 3 on any truss?
 - ☐ b) no 2 splices adjacent on any truss and none in unbraced zones of gable roof ends?
- ☐ Are intermediate top chord ties fixed between saddle trusses (if applicable)?

Permanent Bracing - Bottom Chord Bracing

- ☐ For suspended ceilings or where furring channels are "clipped" to bottom chords:- have bottom chord ties and diagonal bracing been installed in accordance with AS4440?

Truss Connection Details

Have trusses been fixed to top plates correctly at:-

- ☐ a) load bearing wall i.e. Trip-L-Grip
- ☐ b) internal non-brace wall i.e. Internal Wall Bracket
- ☐ c) internal braced wall i.e. blocking pieces fixed in accordance with AS4440?

Have hip end components been fixed correctly at:-

- ☐ a) jack truss to hip truss - small stations i.e. screwed
- ☐ b) jack truss to hip truss - large station i.e. Creeper Connector
- ☐ c) hip truss & jack trusses to truncated girder and to truncated standard truss
- ☐ d) structural fascia and/or strutted overhangs?
- ☐ Are saddle trusses fixed in accordance with AS4440?
- ☐ Are standard truss to girder truss fixing types according to approved plans and are all screws installed and tight?
- ☐ Has all strengthening been completed for guard rail systems - (if applicable)

SECTION C: GENERAL INFORMATION

C-1 FASTENING DESCRIPTIONS

For all screws required for erecting and finishing an AusSteel steel frame system refer to the following Fastening description sheet.

Point Type

An s-point or needle point screw is best for fastening through steel up to 0.8mm thick. These have a sharp point with a flat side that partly extrudes the metal around the hole as they drill and increase the grip of the screw.

A drill point is used for fastenings through steel from 1.0mm up to 5.0mm due to the fact it acts like a twist drill

A screw point is used for drilling through metal up to 1.2mm thick and into timber. The screw point is a large blunt s-point which has been hardened.

An enlarged drill point is optimal for drilling through thick steel up to 12.5mm thick while wing cutters are used to fix thick sheets to steel. The wings cut a wider hole through the sheet material then break off when they come into contact with the steel.

Thread Types

There are two types of threads:

- Course
- Fine

Coarse thread is used for fixing through or into thin metals up to 2.5mm thick and into timber and board products. The coarse threads allow a more secure grip to be obtained without stripping.

Fine thread is used for fixing into thick metals as it has an easier action for cutting into metal.

Finishes

Screws come in a range of metal bases and surface finishes. The base and finish chosen will depend upon:

- The material being fixed
- Surface finish required
- Environmental conditions
- Manufacturers specification

It is best to ensure that the finish is compatible with the metal it is fixing through and into.

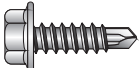
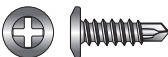
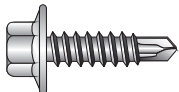
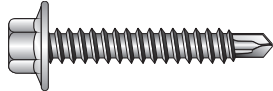
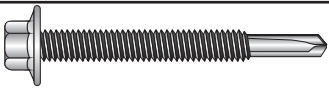
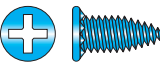
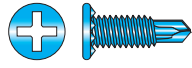
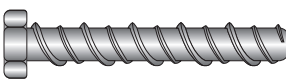
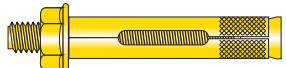
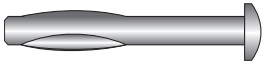
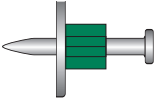


Refer to following page for general screw specifications.

NOTE: Minimum coating for framing screws is to comply with AS 3566 Class 3.

SECTION C: GENERAL INFORMATION



C-1 FASTENER DESCRIPTIONS

Description		Uses
	10-16x16mm Hex Head SteelMates®	General, fixing screw. Used for wall connections, ceiling battens, etc.
	10-16x16mm Wafer Head SteelMates®	Flush fixing screw where flush finish is required such as plasterboard corner angles
	12-14x20mm Hex Head SteelMates®	Structural fixing screw.
	12-14x45mm Hex Head SteelMates®	Structural fixing screw.
	Super 500 Hex Head SteelMates®	Structural fixing screw. Used to fix to heavy gauge structural steel.
	14 x 14mm SupaLow™ Serrated StudMates®	Frame Fixing Screw. Used during fabrication of Frames and Trusses.
	M6 x 17mm SupaLow™ Serrated SteelMates®	Frame Fixing Screw. Used during fabrication of Frames and Trusses.
	IDEAL Fasteners Scru Bolt™	Self tapping concrete bolt. Used for hold downs.
	IDEAL Fasteners SleeveMates™	Alternative hold down.
	IDEAL Fasteners SplitMates™	Alternative hold down used for lighter applications.
	IDEAL Fasteners .300 Drive Pin & Washer 22mm	Alternative hold down used for lighter applications.
	IDEAL Fasteners ChemMates™ Chemical Anchor	Alternative hold down.
	10-16x45mm CSK Rib Wing SteelMates®	Flooring Screw. Used to fix timber flooring to steel joists.

PRODUCT CERTIFICATION

All AusSteel products specified in this guideline are engineered building products that have been designed, developed to comply with the requirements of the Building Code of Australia. The design values, applications and specifications of these products are certified by qualified chartered engineers and they are published in individual product brochures freely available on the AusSteel website.

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