INDSTAAL

Sustainable Structures

MANUFACTURERS OF QUALITY
PRE-ENGINEERED STEEL BUILDING & STRUCTURES

www.indstaal.com

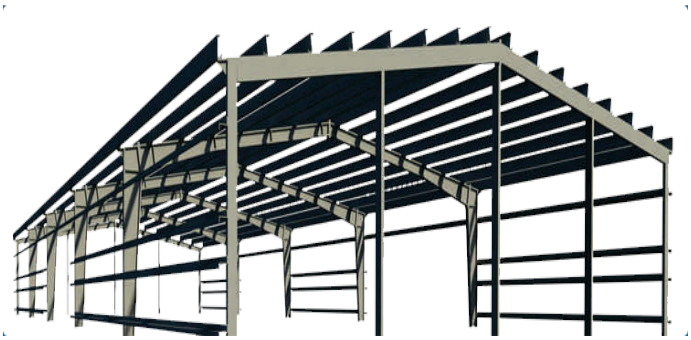
MODULAR + PREFABRICATION DESIGNED + DEPLOYED

Contents

COMPANY PROFILE

INDSTAAL is all about an exquisite experience when it comes to high quality pre-engineered building solutions.

The experts at INDSTAAL work dedicatedly to offer turnkey solutions by their constant innovation. We believe in making the world of architecture much more advanced with the help of our consistent efforts and contribution to multiple fields.



State-of-the-art manufacturing facility is indispensable to produce the finest products, designed and detailed accurately. Our projects are carved in a way to satisfy customer's needs, provide tailor made solutions and meet various specifications.

These buildings are flexible enough to suit different building dimensions, they are easily expandable, can with stand harsh climatic conditions and come with maintenance-free exteriors. Our Pre-Engineered Metal Building Systems offer modern solutions to all building constructions along with the benefits of superior quality, efficiency, and durability.

With the aim to solve problems and give meaningful sustainable solutions, we look forward to adding value to your organization. Our scope of work is varied and across categories likes warehouses, factory buildings, administrative blocks, show rooms and commercial spaces.

We have won well known customer across various industry segments- Automobile & Auto OEM, Food & Agro, Chemical, Pharmaceutical & Packaging, Textile, Warehousing, Steel, and Electrical & Electronics, Cold supply chain & Logistics

Our Pre-engineered buildings are suitable
for both, industrial as well as commercial operations such as :

- MANUFACTURING PLANTS
- WAREHOUSE BUILDINGS
- SHOWROOMS
- COLD STORAGE
- WORKSHOPS & OTHERS

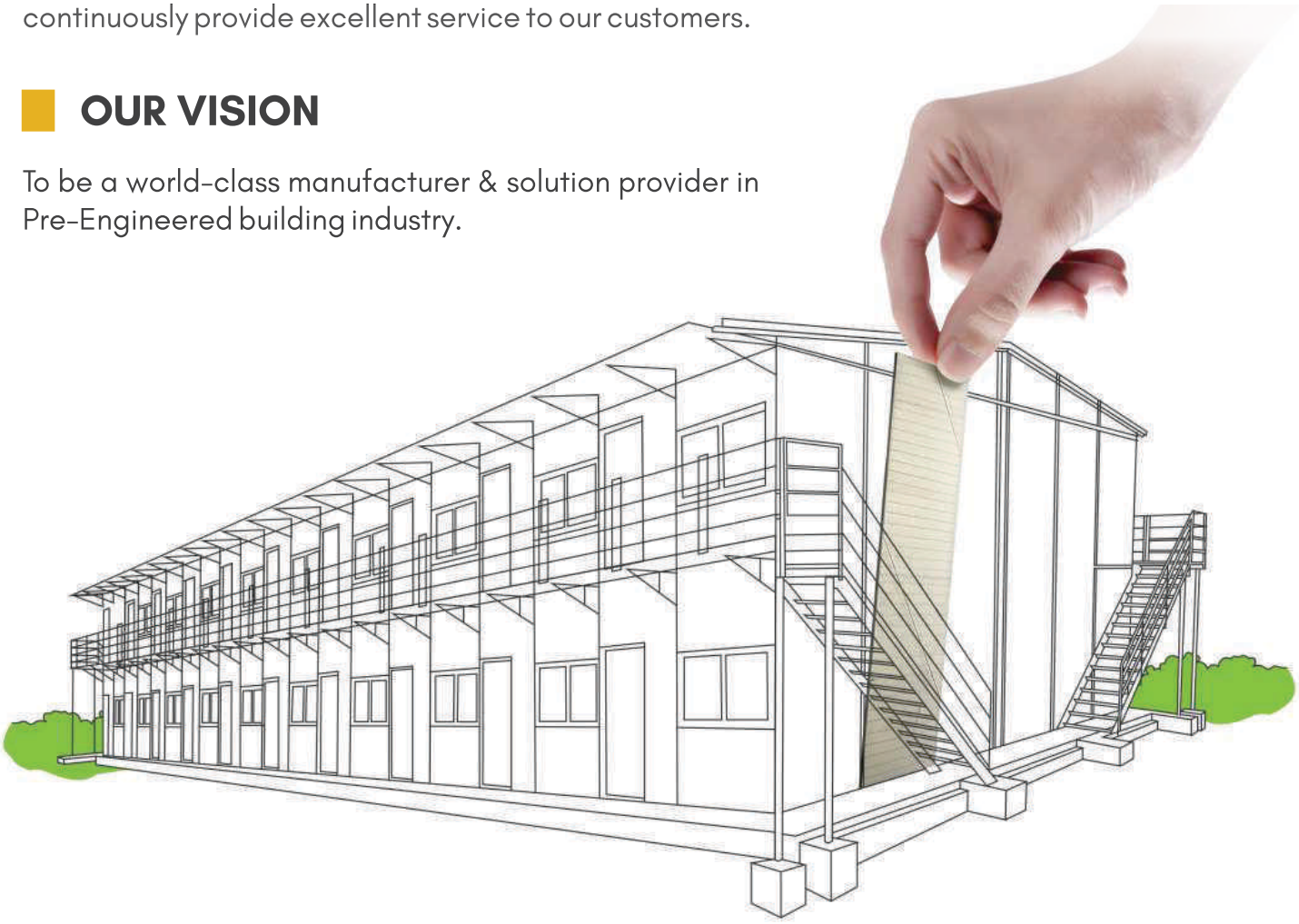
Our products are applied in Heavy steel fabrication, Roofing, Wall Cladding, Industrial & Commercial Partitions, Cold rooms, clean rooms, Sound proofing. We also do turnkey projects that include Design, fabrication, supply, & Installation of Prefab shelters/huts, Pre-engineered buildings etc.

OUR MISSION

INDSTAAL will consistently strive to trustfully deliver our customers with products that boast of supreme quality, sustainability and are energy, cost and time efficient. Profitable growth and our passion for innovation let us continue to offer rewarding careers to our employees and continuously provide excellent service to our customers.

OUR VISION

To be a world-class manufacturer & solution provider in Pre-Engineered building industry.



SAFETY POLICY

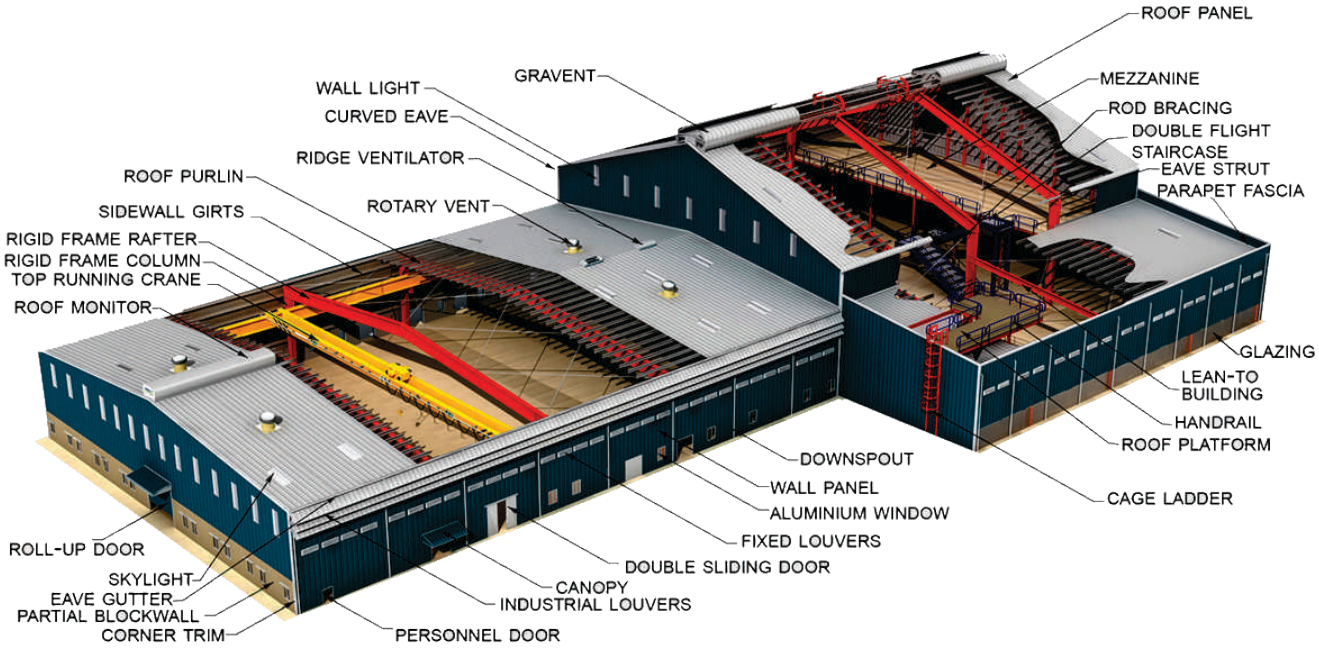
We have always and shall continue to hold safety as one of our most important responsibilities in the operation of this organization. We firmly believe that production and safety go hand in hand and that a safe working environment leads to improve production. At this time, a renewed effort must be placed on safety by every employee at this facility.

QUALITY POLICY

We at INDSTAAL are committed to maximizing customer satisfaction and shall try to achieve the goal of excellence by continual improvement through & on-going development of manufacturing and sale of reliable, safe, cost-effective products and services conforming to customer's national & international specification by using environmentally friendly technologies for improving level of efficiency, productivity & quality management system.

PRE-ENGINEERING BUILDINGS

Our pre-engineered building system is unmatched in its speed and value. Buildings to suit specific needs, are designed, engineered, manufactured and shipped in less than 8 weeks and at a cost that is as low as 30 percent of the cost of conventional steel buildings.



ADVANTAGES

➢ **Construction Time**

PEB reduces the total construction cost by the least 40% which leads to faster occupancy and early revenue.

➢ **Quality Control:**

PEB's are manufactured under controlled conditions depending on the site and hence the quality is assured.

➢ **Flexibility of expansion**

PEB can be easily expanded in length by adding additional bays.

➢ **Low Maintainance:**

PEB's have high quality paint systems for cladding which gives long durability and low maintenance costs.

➢ **Large Clear Span**

In PEB the buildings can be given up to 90m clear spans which is the important advantage of PEB with column free space.

➢ **Lower Cost**

Saving is accomplished in design, manufacturing and erection cost.

- Easy future expansion/modification.
- Weather proof and fire hazards.
- Optimized design of steel reducing weight.
- International Quality Standards
- Seismic & Wind pressure resistant.

LIST OF PLANT MACHINERY

- Oxy-Fuel plasma cutting machine
- Shearing Machine
- H-Beam Assembly line
- H-Beam Welding line
- Manual MIG Welding Machine
- Arc Welding Machine
- Magnetic Broch Cutter
- Radial Drill Machine
- Anchor Bolt Bender
- Grinder Machines (7",5",4")
- Overhead Cranes
- Hydra Crane
- Shot Blasting Machine
- Painting Facility
- Air less Spray Gun
- Z- Purlin forming machine
- C- Purlin forming machine
- Roll Forming Machinery
- Standing seam forming and seaming machines
- Crimping Machine
- Power Press
- Down take machine
- Sheeting Accessories

DESIGN / ENGINEERING / PRODUCT DEVELOPEMENT

We call this "Knowledge Hub" - a world class design & engineering office manned with team of experienced Design & Engineers professionals and equipped with latest sophisticated design softwares.

Staad-Pro, MBS BOCAD, STRUCAD are among the few design and detailing tools are used at INDSTAAL design & engineering center, thus delivers the quick, accurate and cost effective solutions. The design office offer intelligent engineering solutions and support pre & post order functions with arrangement, fabrication & erection drawings. The computerised drafting & detailing simplify manufacturing programs and erection methods.

INDSTAAL knowledge archives has variety of design codes such as AISC, MBMA, AWS, UBC, ASCE, IBC, IS and many others to suit customer need of a pre-engineered building at anywhere in the world.

The buildings are designed as per latest universal codes like AISC/IS, as per utility of the building in consultation with the client/ consultant INDSTAAL Structures consistent efforts in research & developments has positioned the organisation as a lead runner in introducing innovative ideas and products in market place.

GENERAL

➢ Definition

- ✓ The building, as specified herein, consists of columns, rafters, bracing, connection clips, roof purlins, wall girts, roof and wall sheeting, anchor bolts, flashing, trims, etc., or as specified. All materials shall be new and free from defects.
- ✓ The main building structure comprises of single or multiple gable interior rigid frames with either rigid or "post-and-beam" frames at the endwalls.
- ✓ The standard roof slopes are 0.5 or 1.0 unit of vertical rise to 10 units of horizontal run. Other slopes are available upon request. 1.1.4 The sidewall steel line is the plane of the inside vertical surface of the sidewall sheeting. It is also the plane of the outside vertical surface of the eave strut.
- ✓ The endwall steel line is the plane of the inside vertical surface of the endwall sheeting. It is also the plane of the outside vertical surface of the outer flange of the endwall girts.
- ✓ The building width is the distance between the steel lines of opposite sidewalls. Building width does not include the width of Lean-To buildings or roof extensions. The width of a Lean-To building is the distance from the steel line of the exterior sidewalls of the Lean-To building to the (sidewalls or endwalls) steel line of the main building to which the Lean-To building is attached.
- ✓ The building length is the distance between the steel lines of opposite endwalls. Building length is a combination of several bay lengths. Building length does not include the width of endwall Lean-To buildings or roof extensions.
- ✓ End bay length is the distance from the outside of the outer flange of endwall columns to the center line of the first interior frame.
- ✓ Interior bay length is the distance between the center lines of two adjacent interior rigid frame columns.
- ✓ The building eave height is the distance from finished floor level (FFL) to the top of the eave strut at the sidewalls steel line.
- ✓ The building clear height is the distance from finished floor level (FFL) to the bottom of the end plate of the rafter at the knee.

➢ Standard Structural Framing Systems

- ✓ Clear Span (CS) buildings have a gable roof with vertical sidewalls and endwalls. Interior bay frames are clear span rigid frames without interior columns.
- ✓ Multi-Span (MS) buildings have a gable roof with vertical sidewalls and endwalls. Interior bay frames are rigid frames, typically with tapered exterior columns, tapered rafters and square tube or built-up interior columns.
- ✓ Space Saver (SV) buildings have a gable roof with vertical sidewalls and endwalls. Interior bay frames are clear span rigid frames having constant depth columns and tapered rafters typically with horizontal bottom flanges.
- ✓ Lean-To (LT) buildings consist of outer sidewall columns and simple span rafters attached to the sidewall columns or the endwall posts of the main building. Lean-To columns are of constant depth. Lean-To rafters may be tapered or of constant depth.
- ✓ Multi-Gable (MG) buildings have a roof with two or more gables and vertical sidewalls and endwalls. Interior bay frames are rigid frames typically having tapered exterior columns, tapered rafters and built-up interior columns.

➢ Standard Framing Features

- ✓ Main frames are typically constructed from tapered or constant depth columns and rafters.
- ✓ Rigid frames for Clear Span (CS) and Multi-Span (MS) buildings are most commonly spaced from 6000 mm to 10000 mm, center line to center line.
- ✓ Outside flanges of Clear Span (CS) and Multi-Span (MS) rigid frame columns are inset 280 mm from the sidewall steel line to allow for by-pass girts.
- ✓ Outside flanges of Space Saver (SV) rigid frame columns shall be placed flush with the sidewalls steel line.
- ✓ The top flanges of all rigid frame rafters are 200/250 mm below the bottom of the roof sheeting
- ✓ End frames are "post-and-beam" (P&B) load bearing frames with endwall girts flush framed into the webs of the endwall posts so
- ✓ that the outer flanges of the girts are in the same vertical plane as the outer flanges of the posts. Optional rigid frames may be used at the building ends.
- ✓ Endwall posts are typically spaced at 6000 mm. Depending on
- ✓ the width of the building and endwall openings, other spacing may also be used. When the building width is not evenly divisible by 6000 mm, the interior spacing of the endwall posts is typically kept at 6000 mm with two equal end spacings smaller or larger than 6000 mm.
- ✓ For Clear Span (CS) and Multi-Span (MS) buildings, the sidewall girts are attached (by-passed) to the outer flanges of exterior columns. Sidewall girts are lapped at all interior frames. For Space Saver (SV) and Lean-To (LT) buildings, the sidewall girts are flush connected (flush framed) so that the outer flange of the girts is in the same vertical plane as the outer flange of the exterior columns.
- ✓ The bottom flanges of roof purlins are attached to the outer (top) flanges of the rafters. Purlins are lapped at all interior frames in all structural framing systems.

➢ Building Components

- ✓ Columns and rafters of rigid frames are tapered built-up "I" sections. Interior columns of multi-span frames may be square tube sections.
- ✓ All rigid frame connections are bolted. Columns and rafters are provided with welded end plates for anchoring to foundations and for member-to- member attachment. Pre-punched holes or welded clips are provided for attachment of purlins and girts, bracing, and other components.
- ✓ Load bearing "post-and-beam" (P&B) end frames may be constructed from cold-formed channels, hot rolled sections or built-up welded plate sections, as required.
- ✓ Purlins and girts are pre-punched cold-formed "Z" shaped sections, 200/250 mm in depth with stiffened flanges.
- ✓ Eave struts are pre-punched cold-formed "Z" shaped sections, 200/250 mm in depth with 65/75 mm stiffened flanges. The eave strut serves as a longitudinal structural bracing member in addition to acting as a transition point for walls & roof sheeting.
- ✓ Panels (roof & walls) are roll formed to the maximum practical length (generally 12000 mm) to minimize end laps in the field.
- ✓ The standard roof and walls panel is Profile "S". It is a roll formed panel having 4 major high ribs and 12 minor ribs. The panel covers a width of 1000 mm. The lapped major rib has a siphon break to prevent capillaric intrusion of water at the side lap. The panel has an extended bearing leg to provide stiffening during installation.
- ✓ Roof panels have a minimum end lap of 125 mm over purlins & are fully protected from siphon action by an end lap mastic.
- ✓ Wall panels have the same side lapping as the roof panels. End lap is 125 mm over the girts. Generally no side or end lap mastic is required.

DESIGN

➢ Codes

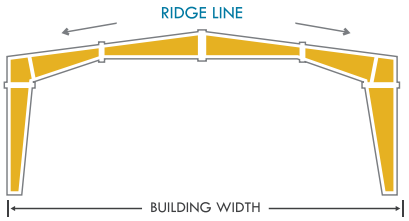
- ✓ Frame members (hot rolled or built-up) are designed in accordance with the American Institute of Steel Construction (AISC): Manual of Steel Construction, Allowable Stress Design/IS Codes.
- ✓ Cold-formed members are designed in accordance with the American Iron and Steel Institute (AISI): "Cold-formed Steel Design Manual."
- ✓ All welds are designed in accordance with the American Welding Society (AWS): "Structural Welding Code - Steel".
- ✓ Loads are applied in accordance with the requirements of the Metal Building Manufacturers Association (MBMA) of the USA: "Low Rise Building Systems Manual/IS-875".
- ✓ Other codes can be accommodated if specified.

➢ Loads

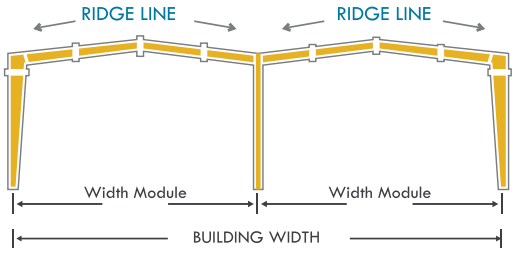
- ✓ The building is designed to withstand the dead load (DL) of the structure plus a specified live load (LL) and wind load (WL).
- ✓ Auxiliary (Collateral) loads, if any, must be specified by the customer at the time of request for quotation.
- ✓ When snow load is of concern, the customer will specify the snow load where applicable, in accordance with local codes. Load combinations shall be in accordance with the requirements of the "Low Rise Building Systems Manual" published by MBMA or as per IS Code.
- ✓ Other loads and load combinations can be accommodated and must be specified at the time of request for quotation.

STANDARD FRAME TYPES

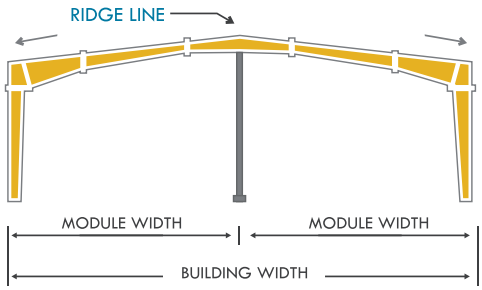
Tapered Column Clear Span (TCCS)



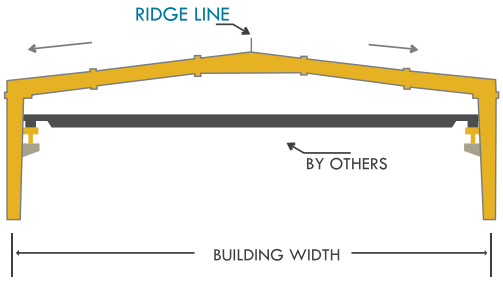
Multi Gable (MG) I / II



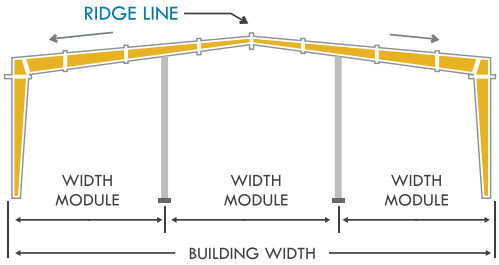
Multi Span I



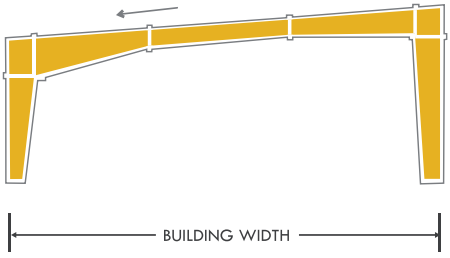
Clear Span with Crane



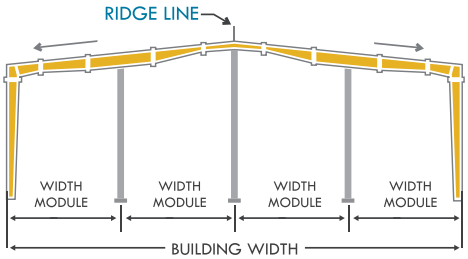
Multi Span II



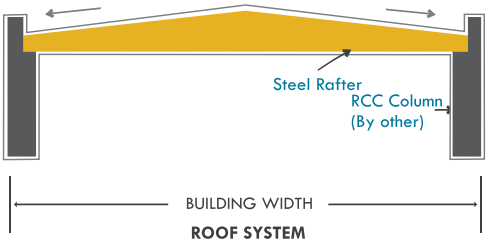
Mono Slope



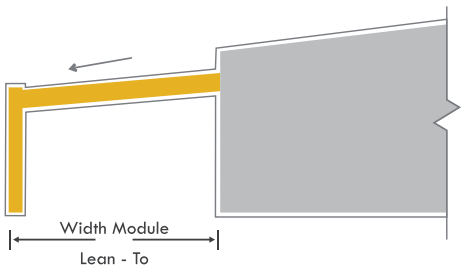
Multi Span III



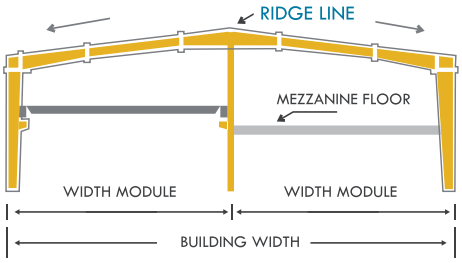
Rafter System



Lean - To



Multi Span I with Crane & Mezzanine

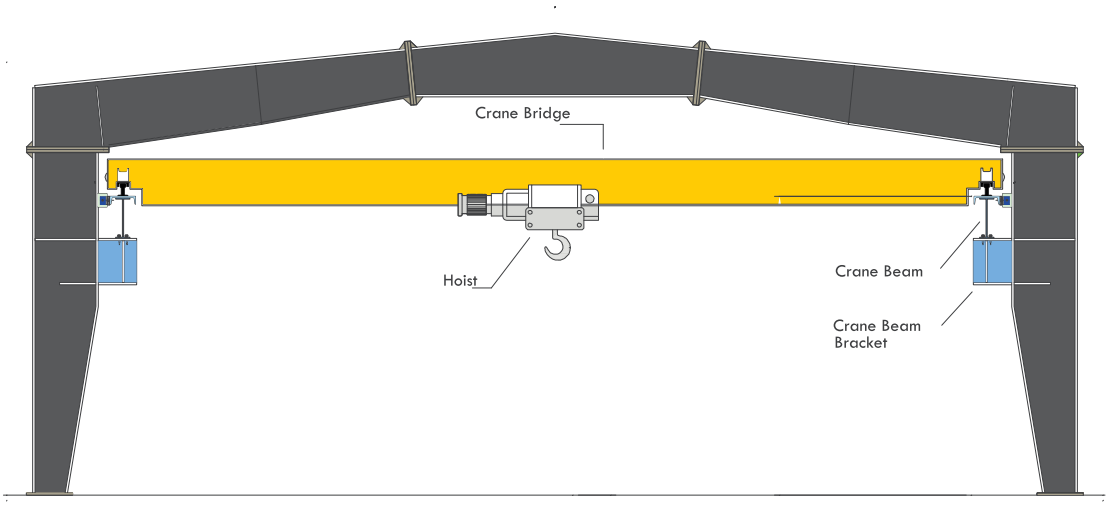


STANDARD CRANES

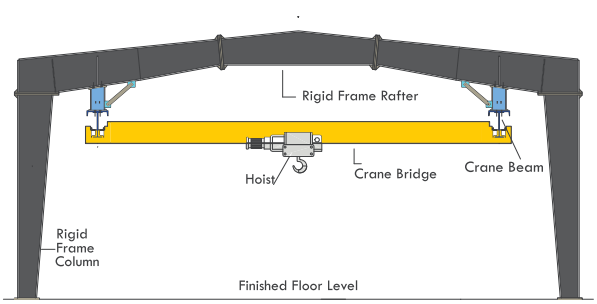
INDSTAAL pre-engineered buildings can be designed to accept most types of crane systems such as EOT, Monorail, Under-hung cranes and other load carrying devices like conveyors etc., in both clear- span and multi-span buildings. When a crane system is to be integrated, INDSTAAL's scope is limited to brackets and crane runway beams which support the crane system. Complete information on the crane system is required in order to design and estimate buildings with cranes.

The most common types of Crane System available for Pre-Engineered Steel Building are:

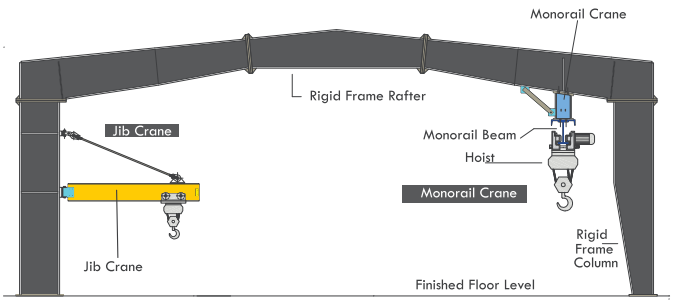
Top Running Crane Along Building Length



Underhung Crane

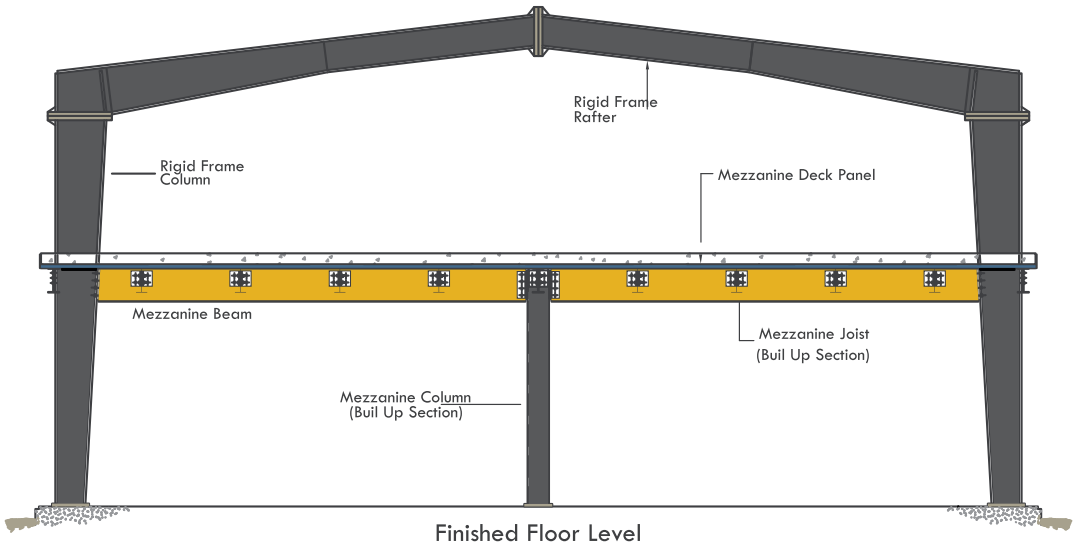


Jib Crane and Monorail Crane



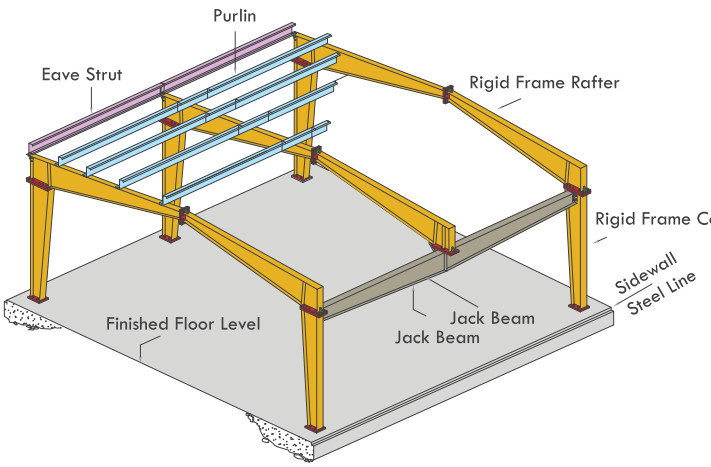
MEZZANINE SYSTEMS

Intermediate mezzanine floors are possible in metal buildings. Mezzanine floors can be provided in complete or partial area in pre- engineered buildings to suit loading requirements for office and storage. Mezzanine floors consists of steel decks, supported by joists framed to the mezzanine beams. Main mezzanine beams normally run across the width of the building and are located under the main rafters while joists run parallel to the length of the building. The top flange of the joists fit immediately below the top flange of the mezzanine beam.

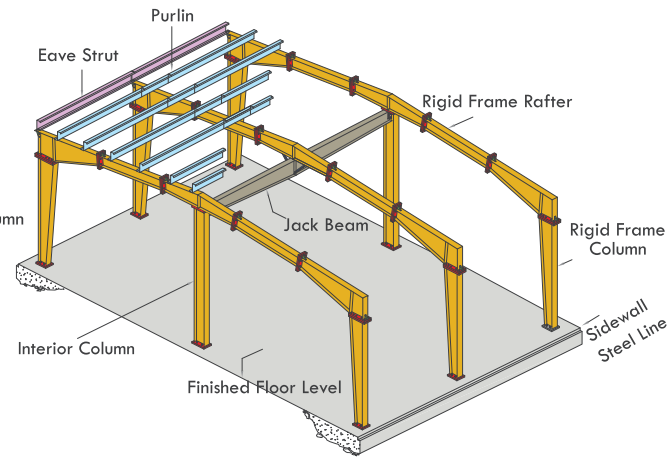


JACK BEAM

Jack Beams are used to make economical as well as safe approach for creating longer bay length when large unimpeded space, is required. Common bay lengths (5,6,7,8,9 & 10) can be doubled by the use of jack beam making it possible to have 12,15,16,18 and 20 m clear bay length in areas where unstructured space is required. For example, if a customer specifies to have 10 m bay lengths instead of the more economical 8 m bay length, jack beams will be used in the interior of the building to make that possible. Jack beams may also be used on the exterior walls in the same way.



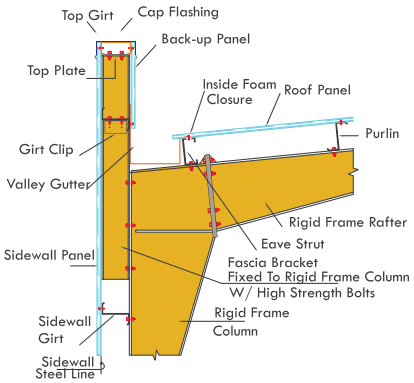
ISOMETRIC: Jack Beam at Sidewall



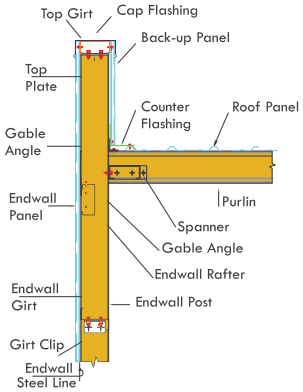
ISOMETRIC: Jack Beam at Interior Column Location

FASCIA SYSTEM

Flush Fascias with Eave Gutter

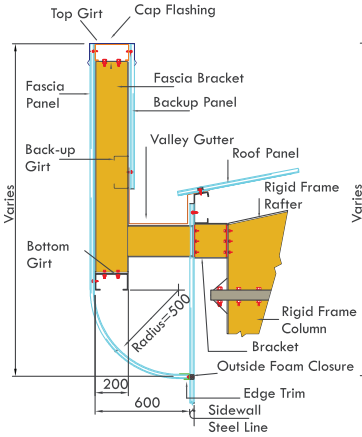


Typical Sidewall Section for Flush Fascia

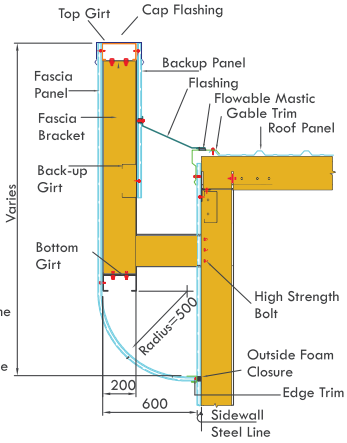


Typical Endwall Section for Flush Fascia

Section: Bottom Curved Fascia with Valley Gutter

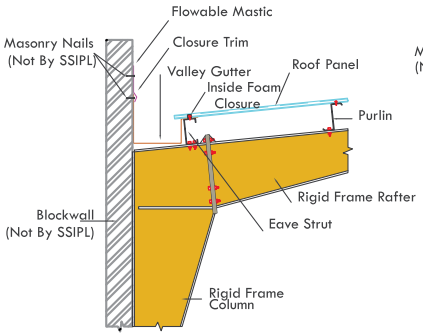


Typical Sidewall Section

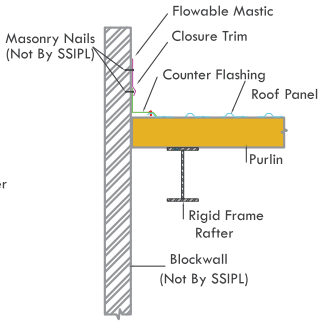


Typical Endwall Section

Flushed Fascia or Parapet Fascia

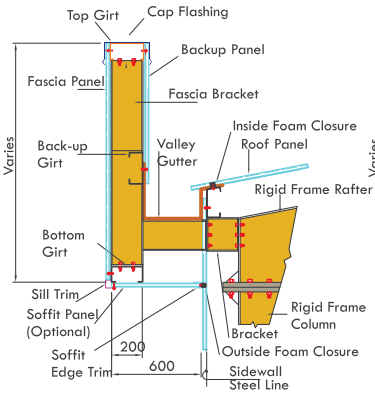


Typical Sidewall Section
Flushed Fascia with Box Gutter

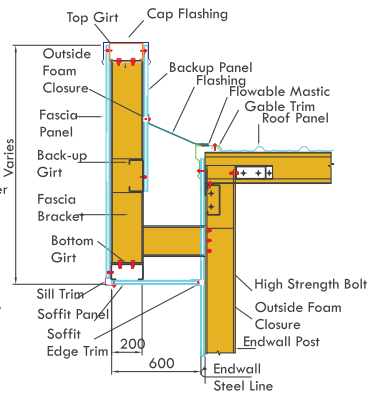


Typical Endwall Section
Flushed Fascia with Box Gutter

Section : Vertical Fascia with Valley Gutter, Back Panel & Soffit



Typical Sidewall Section



Typical Endwall Section

TRUSSES

The INDSTAAL Truss System is one of the company's most popular and highly economical products. It is a rigid structure, ideal for large span roof systems, multiple bay buildings and as mezzanine floor framing. Significant reductions in building heights are possible by running service pipes/ducts through the trusses. Foundation costs also are reduced due to fewer columns being required to support larger spans.

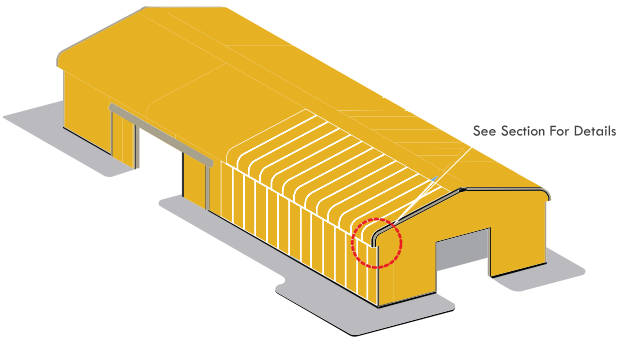
The INDSTAAL Truss System structures are individually designed to meet the specific requirements of each building and are fabricated utilizing high quality efficient fixtures. The system allows for easy erection as all connections are field bolted. Except for field splices on very large spans, no site welding is required.

CANOPY

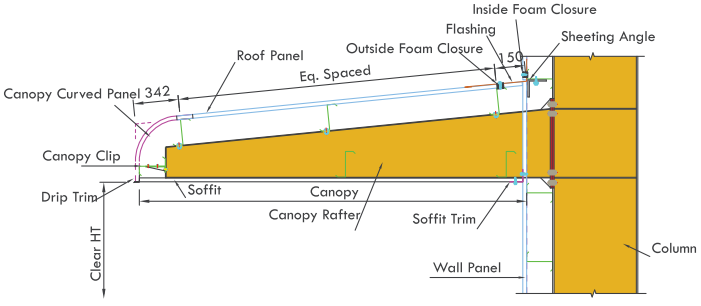
Wall canopies over doors and windows at sidewall or end wall are available. Sidewall canopies are supplied without soffit panel and end wall roof extension canopies are supplied with INDSTAAL soffit panel unless noted otherwise.

End wall roof extension canopies are not to be supplied with soffit panel if the building remains open all around. Canopy brace angle should be supplied for bay spacings over 7000 mm or as required.

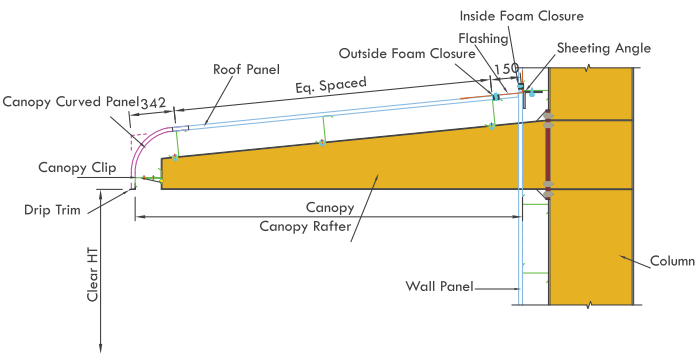
Isometric : Curved Eaves



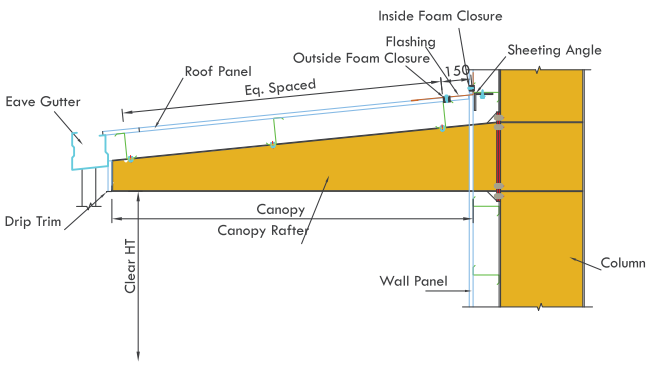
Canopy with Curved Eaves with Bottom Soffit



Canopy with Curved Eaves without Soffit



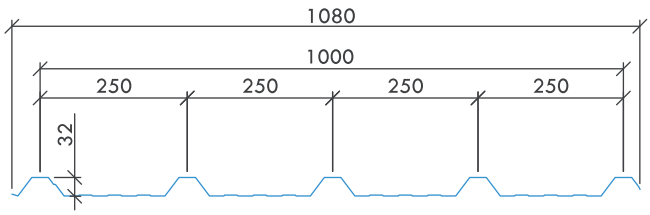
Canopy with Gutter & Downtake without Soffit



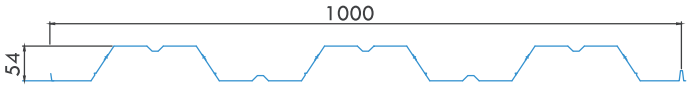
ROOFING & WALL PANEL

Metals panels are the most attractive features of Metal Building System, having contributed mightily for the growing popularity of the Metal Buildings. The term "Panel" in this context refers to the metal skins used as roof and wall panels, interior roof and wall liners, partition panels, Fascia Panels, soffit panels etc. INDSTAAL roof systems can be used as single skin roof or wall cladding or can be used in combination with advanced multi-layered insulated systems to give optimal thermal and acoustic characteristics. They can also be combined with other cladding systems on the inside to form a Sandwich Panel System.

HI-RIB Sheet Profile

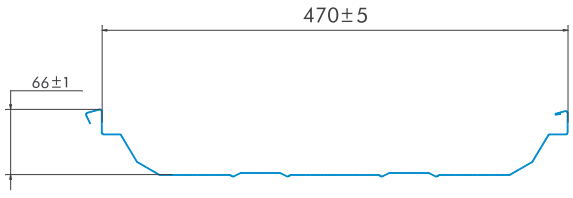


DECK Sheet Profile

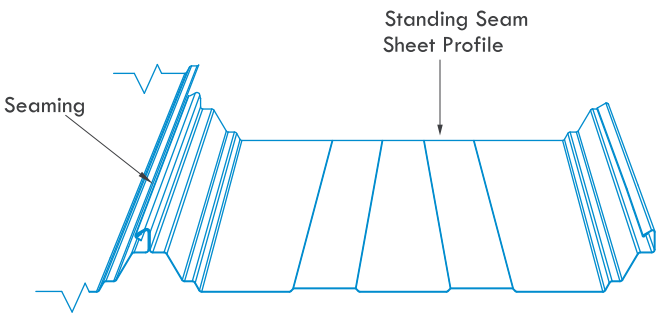


Thickness : 0.8MM/1MM/1.2MM

Standing Seam Sheet Profile



Standing Seam Sheet Profile with Seaming



From Industrial & Infrastructure projects to commercial developments, malls, offices, and homes, INDSTAAL offers several systems for structural and architectural roof and wall cladding applications. All the panels are available in Galvalume and Galvanised steel substrates and in premium color coatings for permanent appearance. All the roof and wall coverings are supplied with custom accessories such as flashings, cappings, trims, Fasteners etc. which are formed out of the same substrates and coatings as the roof and wall covering panels.

Sheeting standard color shades

- Taurus Blue
- Sky Blue
- Mist Green
- Off-white
- Gray
- Bare Galvalume

SECONDARY MEMBERS

Secondary structural framing refers to purlins, girts, eave struts, wind bracing, flange bracing, base angles, clips and other miscellaneous structural parts.
Purlins, girts and eave struts are cold form steel members which have a minimum yield strength of 345 MPa (50,000 psi) and will conform to the physical specifications of ASTM A1011 (Grade 50) or ASTM A-653 (Grade 50).

➢ C-Section

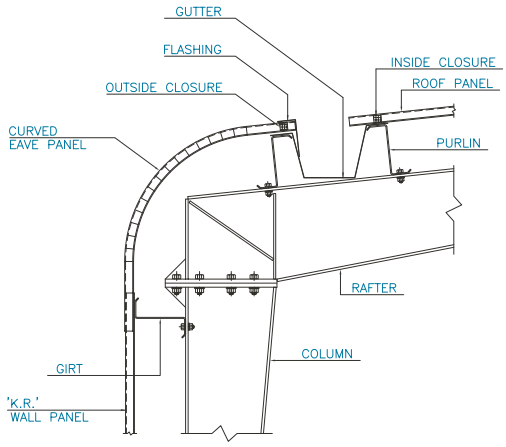
C Sections are 120 to 300 mm deep with the thickness range of 1.5mm to 3mm.

➢ Purlins & Girts

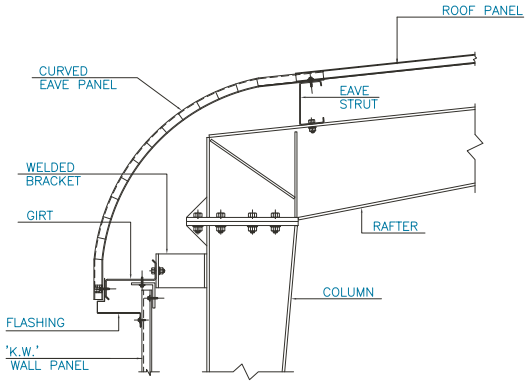
Purlin and Girts are roll formed Z Sections, 150 to 300 mm deep with the thickness range of 1.5mm to 3mm.

➢ Curved Eaves

Curve Eaves can transform the look of any building. Curved canopies and walkways provide an inviting entryway into commercial establishments. Curved eaves eliminate seam lines and provide a smooth line for the eye to follow. Our crimping-curving process increases the rigidity of the Curved panels making this choice of panels not only visually appealing but also practically durable.



DETAIL AT EAVE WITH GUTTER (WITHOUT PROJECTION)



DETAIL AT EAVE WITHOUT GUTTER (WITH PROJECTION)

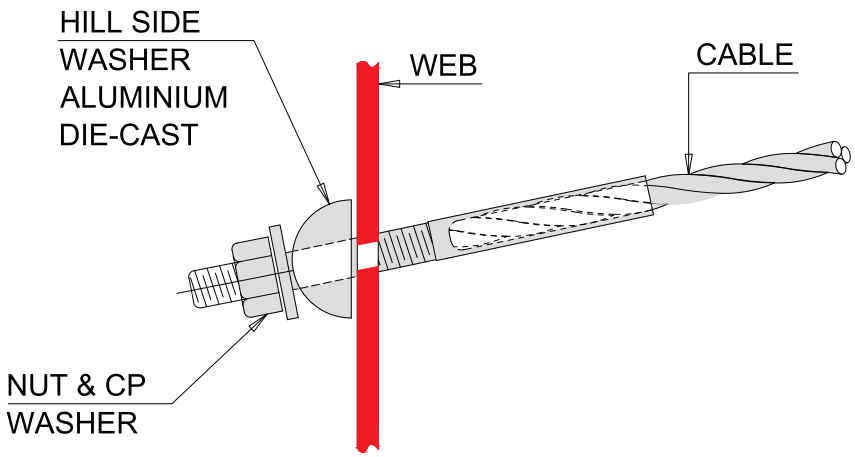
➢ Eave Strut

Eave Struts are 120 to 300 mm deep with the thickness range of 1.5mm to 3mm. Structural members are located along the side wall; at the intersection of the planes of the roof and wall. It is constructed with cold formed "C" Sections and is rolled to suit the roof slope. This member transmits longitudinal wind force on the end walls from roof brace rods to wall brace rods.

BRACING SYSTEMS

➢ Cable Bracing

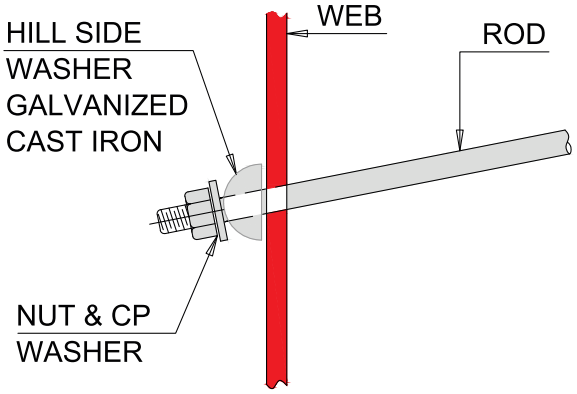
This member is designed to ensure the stability of the building against forces in the longitudinal and lateral direction due to wind, cranes, and earthquakes. It is made of a cable which is forged into a rod terminal and this arrangement is then fixed on a structure using a hill side washer, nut washer and a nut.



CABLE END CONNECTION

➢ Rod Bracing

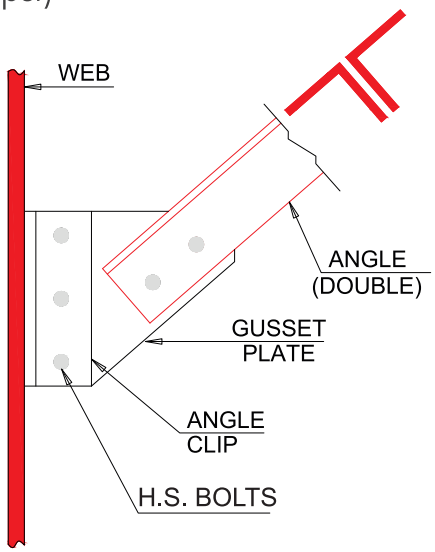
Rod bracing shall have a minimum yield strength of 250MPa (36,000 psi) and will conform to the physical specifications of ASTM A-36 or equivalent.



BRACE ROD CONNECTION

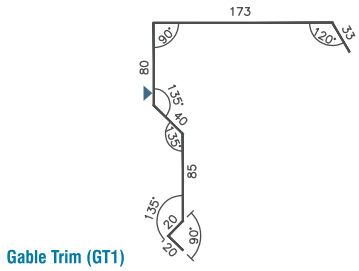
➢ Angle Bracing

Angle Bracings are used to withstand the actions of longitudinal forces (tension only). These angles shall have minimum yield of 250 Mpa (36,000 psi) or 345 Mpa (50,000 psi)

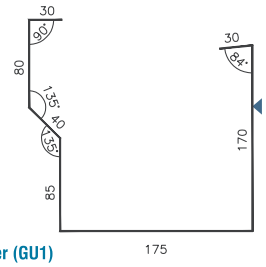


ANGLE BRACE CONNECTION

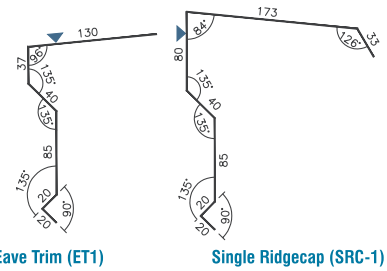
STANDARD TRIMS



Gable Trim (GT1)

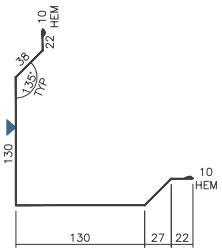


Eave Gutter (GU1)



Eave Trim (ET1)

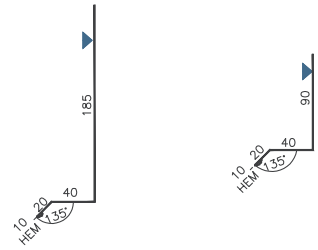
Single Ridgecap (SRC-1)



Outside Corner Trim (OT1)

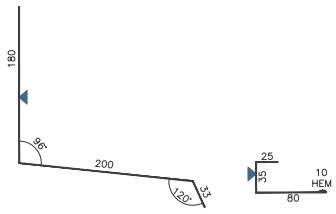
Facia Sill Trim (FST-1)

Facia Sill Trim (FST-2)



Masonary Trim- MF1

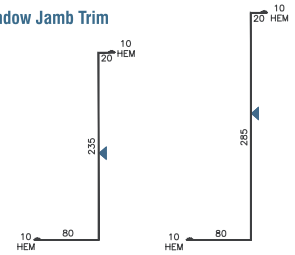
Drip Trim (DT1)



Transistion Trim (TT1)

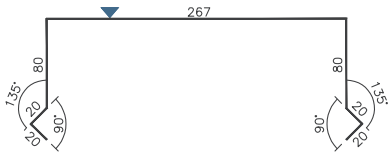
Jamb Trim (JT1)

Window Jamb Trim

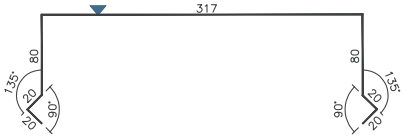


Jamb Trim (JT2-200)

Jamb Trim (JT2-250)

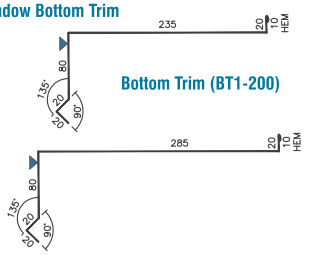


Cap Flashing For 200Z-FC200

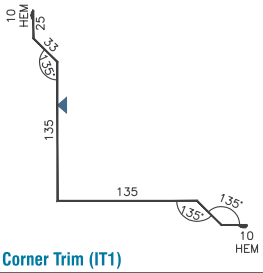


Cap Flashing For 250Z-FC250

Window Bottom Trim



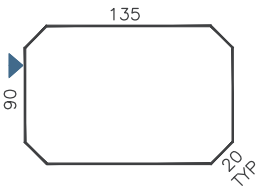
Bottom Trim (BT1-250)



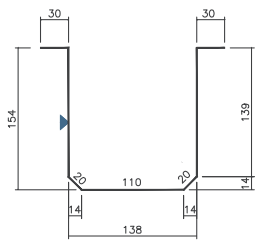
Inside Corner Trim (IT1)

Fascia Transition Flashing (FT1)

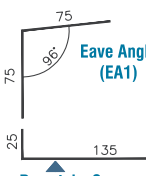
Apron Trim



Downtake Profile

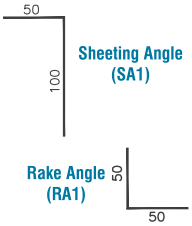


Downtake Strap (DSS1)



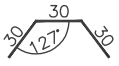
Eave Angle (EA1)

Downtake Spacer (DSP1)

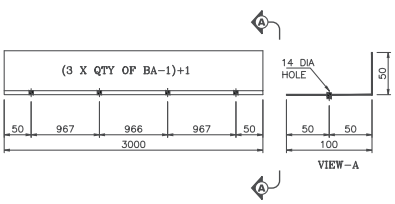


Sheeting Angle (SA1)

Rake Angle (RA1)



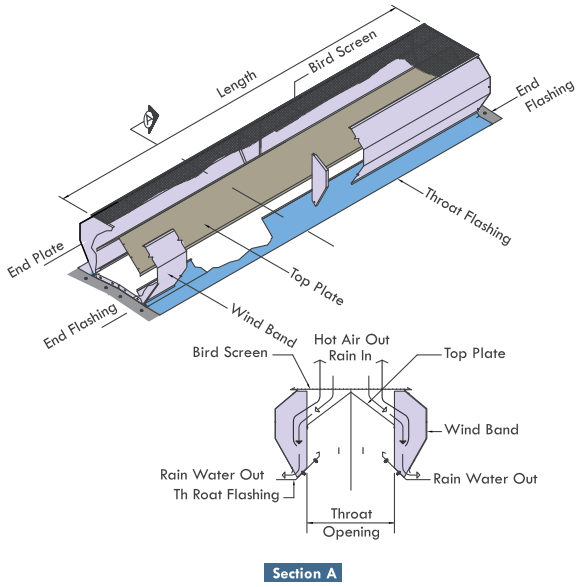
Length - 400mm
Gutter Strap (GS1)



Base Angle (BA1)

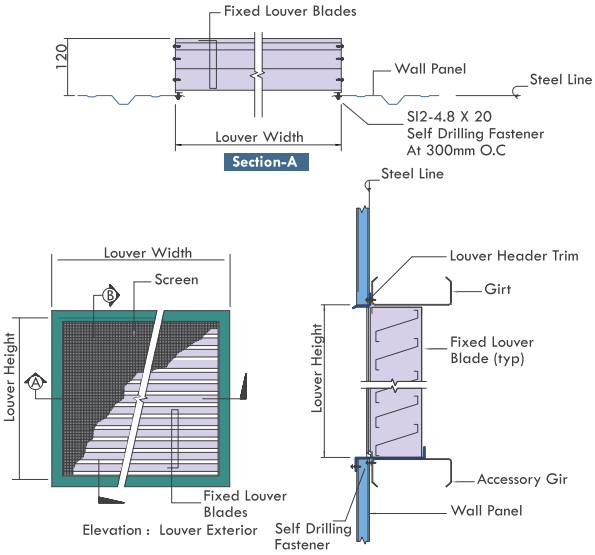
ACCESSORIES

Ridgevent System

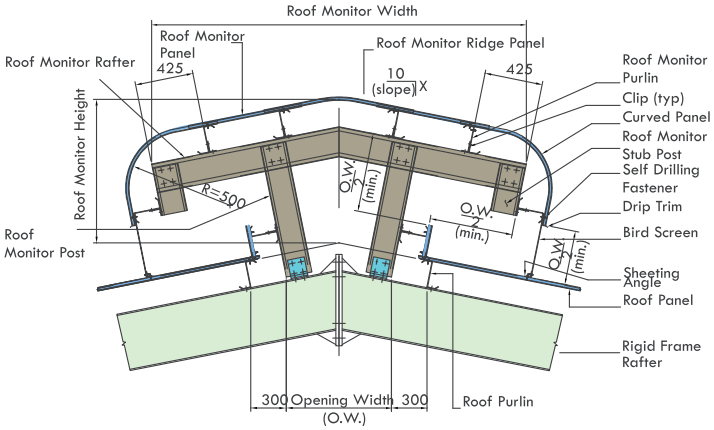


Section A

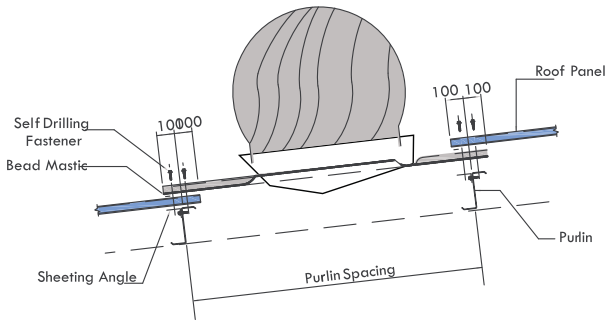
S-type Louver Detail



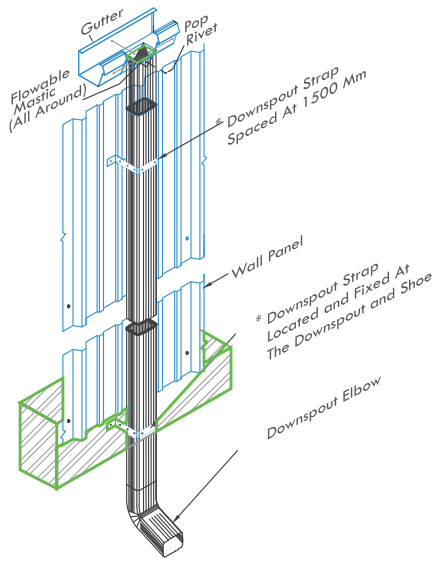
Roof Monitor



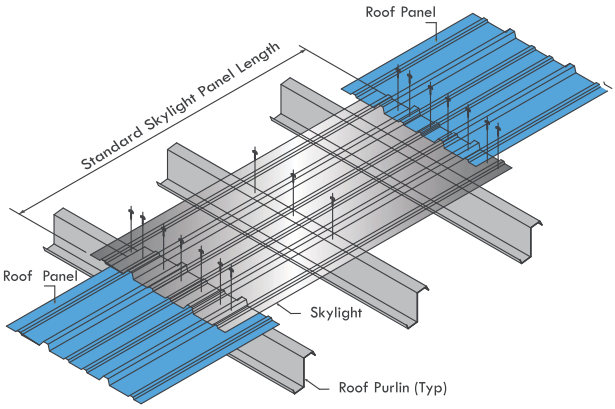
Turbovent Fixing Detail



Gutter / Downspout Fixing To Wallpanel Using Strap



Sky Lights And Wall Lights



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