



**MANUFACTURER OF STEEL
BUILDINGS & STEEL STRUCTURES**

Company Brochure





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TOTAL SOLUTIONS FOR CUSTOMIZED STEEL BUILDINGS



Introduction

Acero Building Systems (Acero) provides total solutions for steel buildings, including design, manufacture and supply, using internationally recognized engineering software and advanced production equipment.

Acero offers total solutions for customized steel buildings, providing complete building systems to its customers using internationally recognized engineering software and advanced production equipment, catering to the global market.

Acero's Headquarters and Manufacturing Facility are located in Jebel Ali, Dubai, United Arab Emirates. Acero follows an Integrated Management System (IMS) including a Quality Management System, Environmental Management System, Occupational Health and Safety Management System and Fusion Welding Management System which are certified according to ISO 9001, ISO 14001, ISO 45001, ISO 3834 and AS/NZS ISO 3834 (Australia and New Zealand), respectively.

Acero is also certified in accordance with European Standards EN-1090 and the CE mark is affixed to its products (CE Certification).

Acero specializes in pre-engineered steel buildings (fast-track and customized solutions), conventional steel buildings, roof and wall systems, racking systems, porta cabins and building accessories.

With highly experienced personnel in the steel building industry and one of the largest manufacturing facilities, Acero serves the global steel building market and is committed to always provide:

- A quick response to requests.
- The most competitive prices.
- The best delivery time.
- Continuous customer support.



Acero Manufacturing Facility



Acero Office



Acero Manufacturing Facility

Our Main Services

SALES

At Acero, sales engineers handle every proposal for a building inquiry with the utmost attention, offering the most comprehensive and economical solution. The Acero sales team is dedicated to customer service, ensuring seamless and constant communication with the customer.

ESTIMATION

A highly experienced team of structural engineers dedicated to providing quick, accurate and optimized estimates for all types of steel buildings. Acero's estimation team is conversant with all major design and building codes.

PROJECT MANAGEMENT

The project management department at Acero audits, supervises and monitors all the projects from entry to shipment. This department is the link to all the internal functions regarding project status, ensuring that all projects are handled efficiently and delivered on time.

ENGINEERING

With engineering groups in 5 locations (Dubai, Kannur, Kochi, Hyderabad and Cairo) across 3 countries (UAE, India and Egypt), procedural safeguards are in place to ensure that all engineering inputs and outputs, such as design calculations, approval drawings, shop details and bills of material are generated, checked, released and archived in digital format, ensuring the customers best interests at heart.

PRODUCTION

Acero boasts a fully equipped, state-of-the-art production facility, operated by skilled and experienced personnel. All welders are qualified and certified according to standards such as American Welding Society (AWS), British Standards (BS), European Standards (EN) and the International Organization for Standardization (ISO). The manufacturing process is streamlined to ensure that each building is complete and ready for on-time delivery.



Acero Sales Team



Engineering Software at Acero



Acero Detailing Engineer

MAINTENANCE

The Maintenance Department at Acero Building Systems plays a critical role in ensuring uninterrupted operations. Equipped with advanced tools and a highly skilled team, the department performs regular inspections, preventive maintenance and repairs on all machinery and equipment. This proactive approach minimizes downtime and maximizes productivity, ensuring that all manufacturing processes run smoothly. By adhering to a stringent maintenance schedule and leveraging the latest technology, the team at Acero maintains the facility's high standards of efficiency, reliability and safety, contributing significantly to the overall success of the company.



Acero Maintenance Engineer

QUALITY CONTROL

The Acero Quality Control team is trained and qualified in using the latest equipment and methods to ensure the consistent quality standards enforced by world-renowned organizations, such as the American Society for Testing and Materials (ASTM), British Standards Institute (BSI) and the European Standards (EN). Quality control at Acero starts with receiving raw material, where every batch of steel is tested for both physical and chemical properties, in-house as well as by third-party certified and accredited labs, to ensure consistent quality. Acero also enforces quality control checks at every workstation in the production cycle, ensuring that only the highest quality products make it to the final stages of the production process.



Acero Production Operator

HEALTH, SAFETY AND ENVIRONMENT

At Acero, Health, Safety and Environment (HSE) are top priorities. The company is dedicated to maintaining a safe and healthy workplace for all employees and visitors. The HSE department enforces strict safety protocols, conducts regular risk assessments, toolbox talks and fire safety drills, and ensures compliance with both local and international regulations. Continuous training and awareness programs are provided to all staff, promoting a strong culture of safety. Environmental stewardship is equally important, with initiatives focused on waste reduction and minimizing the environmental impact of operations. Acero's commitment to HSE ensures a secure, sustainable and responsible working environment.



Acero Certified Welder

SHIPPING & LOGISTICS

The Acero manufacturing facility is in Dubai, located near the Jebel Ali Port, one of the largest ports in the world, making it ideal for local as well as global supply. Materials loaded for delivery are part-marked and cross referenced for easy and accurate identification. Loaded materials are arranged according to the site requirements and defined erection sequence. All materials are delivered on specially designed forklift racks (called skids) to facilitate the unloading of materials on-site and to streamline the erection process.



Acero Forklift Operator

ERECTION SUPERVISION

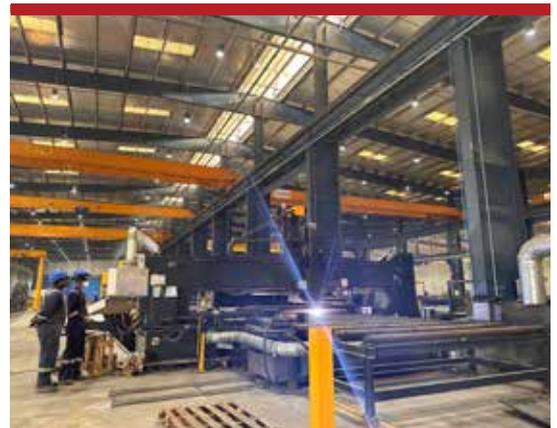
Acero offers expert erection supervision services to ensure the seamless assembly of your steel building. Available upon customer request, this service includes on-site guidance from our experienced supervisors, who oversee the entire erection process, ensuring that all components are correctly installed according to our specifications. This supervision helps prevent potential issues, ensures safety compliance and supports a smooth, efficient construction process, providing peace of mind that your structure is erected to the highest standards.



Erection of Acero Steel Building

RESEARCH & DEVELOPMENT

The research and development department at Acero is dedicated to product development and testing, focusing on the innovation of new products and services to elevate and advance Acero's offering. This ensures that Acero remains at the forefront of the industry, both in manufacturing equipment and machinery as well as in the latest engineering software and design codes. This department is a testament to Acero's commitment to innovation and continuous engineering and manufacturing advancement.



Inside the Acero Manufacturing Facility

Quality Certifications

Acero's systems are certified in accordance with the International Organization for Standardization (ISO), the European Standards (EN), Australian and New Zealand Standards (AS/NZS) and the British Standards (BS), some of Acero's certifications include:



ISO 9001



ISO 14001



AS/NZS ISO 3834



ISO 3834



ISO 45001



CE CERTIFICATION

2 Pre-Engineered Steel Buildings

INTRODUCTION TO PRE-ENGINEERED STEEL BUILDINGS (PEB)

Pre-engineered steel buildings (PEB) have revolutionized the construction industry, offering a cost-effective, efficient and versatile solution. Dating back to the early 20th century, PEBs have evolved to become a popular choice across a wide range of industries, including industrial, commercial, agricultural and residential, to name a few.

The concept of PEB emerged as a response to the growing demand for faster and more efficient construction methods, with the key idea to utilize standardization of connection design, raw material stock and fabrication techniques to streamline the construction process.

Over time, the steel manufacturing industry refined its techniques and introduced innovative design concepts, leading to the development of the modern pre-engineered steel building system. Today, PEBs are designed and manufactured using advanced computer-aided design (CAD) software, 3D structural analysis tools and CNC production lines.

The main concept behind PEBs is the integration of engineering and manufacturing processes. Specialized structural engineers design buildings that meet specific requirements, considering factors such as load-bearing capacity, wind, snow, seismic loads and other local regulations. This design phase ensures that the building is structurally sound and optimized for its intended use. Steel components, including columns, rafters, purlins, girts, roof and wall panels, are fabricated in a controlled factory environment. The use of standardized components allows for precise manufacturing, ensuring consistency and accuracy throughout the building process.



Aluminum Extrusion Plant - East Africa

One of the primary advantages of PEBs is their speed of production, as the components are fabricated using standardized raw materials that are readily available in the manufacturer's raw material yard. The materials are efficiently transported to the construction site and assembled easily and quickly. This significantly reduces construction time and in turn, total project time compared to traditional methods, enabling projects to be completed in a fraction of the time.

PEBs offer exceptional versatility. The design can be customized to meet specific requirements, allowing for various building sizes, configurations, and architectural styles. The flexible nature of steel as a building material enables wide-span designs, creating large, open interior spaces without the need for intrusive support columns. PEB's are also renowned for their durability and strength ensuring a long lifespan with minimal maintenance. Additionally, steel buildings can withstand extreme weather conditions, including high winds, heavy snow loads, and seismic activity, providing a safe and secure environment.

THE PRE-ENGINEERED BUILDING CONCEPT

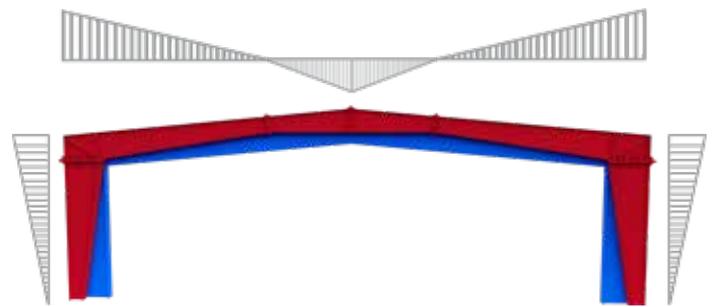
THE PRIMARY FRAMING SYSTEM

In conventional steel buildings, mill-produced hot rolled sections (beams and columns) are used. The size of each member is selected on the basis of the maximum internal stress in the member. Since a hot rolled section has a constant depth, many parts of the member (represented by the blue shaded area), in areas of low internal stresses, are in excess of design requirements.

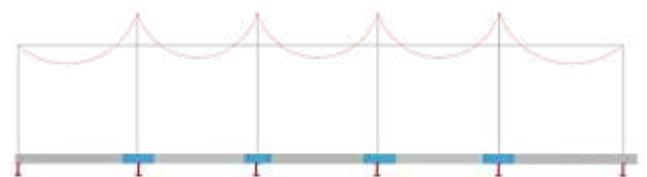
Frames of PEB's are made from an extensive inventory of standard plates stocked by the PEB manufacturer. PEB frames are normally tapered and often have flanges and webs of variable thicknesses along the individual members. The frame geometry matches the shape of the internal stress diagram thus minimizing material waste and reducing the total weight of the structure, resulting in smaller foundation.

THE SECONDARY FRAMING SYSTEM

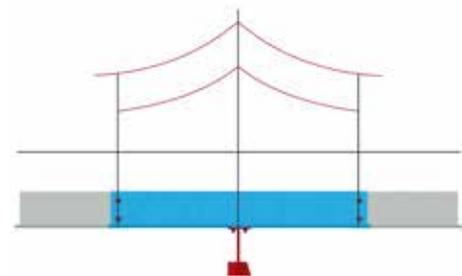
"Z" shaped roof purlins and wall girts are used for the secondary framing. They are lighter than the conventional hot-rolled "C" shaped sections in conventional steel buildings. Nesting of the "Z" shaped members allows them to act as continuous members along the length of the building. This doubles the strength capacity of the "Z" shaped members where the maximum internal stresses normally occur.



Frame comparison Between Pre-Engineered Steel and Conventional Steel



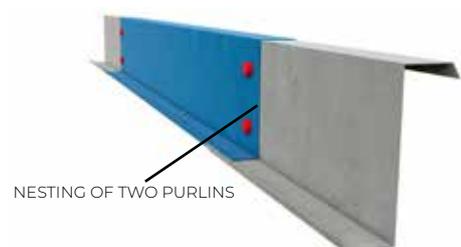
Continuous Members



Strength capacity is doubled at the lap

THE ADVANTAGES OF AN ACERO STEEL BUILDING INCLUDE:

- Custom design
- Fast and straightforward construction method
- Single source building solution
- Clear span options without interior columns
- Design flexibility
- Energy efficient and recyclable solutions
- Cost efficiency
- Controlled production environment
- Low maintenance requirements
- Minimal construction waste



Application of Steel buildings



Acero produces a wide range of steel buildings for all industries and sectors, including agriculture, education, aviation, transportation, logistics, industrial, commercial and residential applications, such as, but not limited to:



AIRCRAFT HANGAR



DISTRIBUTION CENTER



MULTI-STORY



REFINERY



STEEL PLATFORM



ACCOMMODATION CAMP



EXHIBITION HALL



OFFICE BUILDING



RESIDENTIAL BUILDING



SUGAR MILL



AIRPORT STRUCTURES



FACTORY BUILDING



PIPE RACK



SHOPPING CENTER



SUPERMARKET



BRIDGE STRUCTURE



FIELD HOSPITAL



POWER PLANT



SHOWROOM



WAREHOUSE



COLD STORAGE



FLOUR MILL



PROCESSING MILL



SPORTS CENTER



WATER TOWER



DESALINATION PLANT



MODULAR HOUSE



RACKING SYSTEM



STEEL MILL



WORKSHOP

Basic Building Parameters

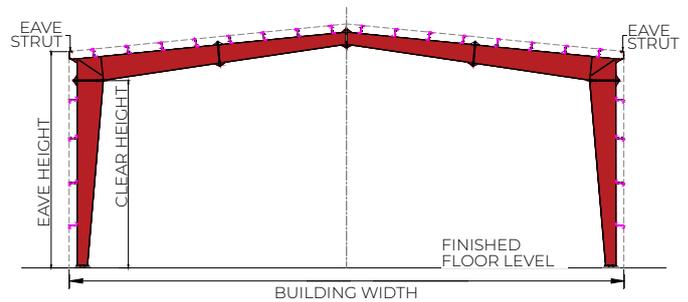
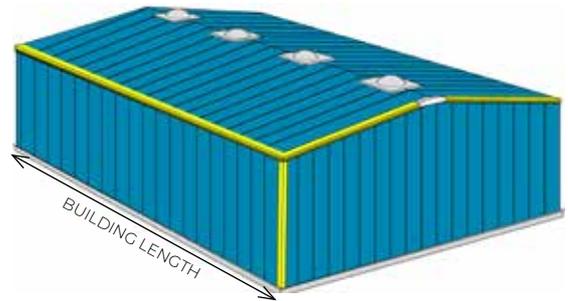
Acero's steel buildings are custom designed and manufactured to meet the customer's specific requirements. Some of the basic parameters that define a steel building include:

BUILDING LENGTH: The distance between the outside flanges of the end-wall columns and the facing wall. Building length does not include the width of the end wall, lean-to buildings or roof extensions.

BUILDING WIDTH: The distance from the outside of the eave strut of one sidewall to the outside of the eave strut of the facing wall. Building width does not include the width of lean-to building or roof extensions. The width of a lean-to building is the distance from the steel line of the exterior sidewall of the lean-to building to the sidewall (or end wall) steel line of the main building to which the lean-to is attached.

END BAY LENGTH: Is the distance from the outside of the outer flange of the end wall girts to the center line of the first interior frame.

INTERIOR BAY LENGTH: Measured as the distance between the center lines of two adjacent interior main frame columns.



Textile Factory - West Africa

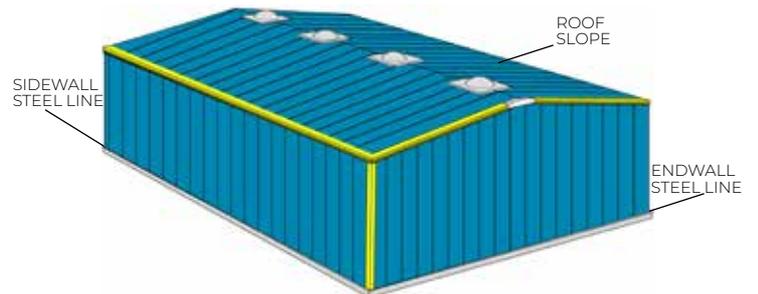
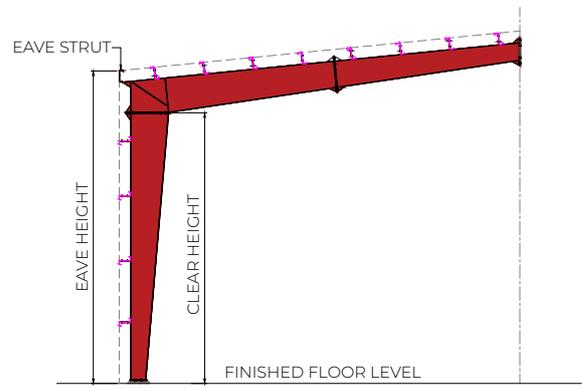
BUILDING EAVE HEIGHT: Is the distance from the finished floor level (FFL) to the top of the eave strut at the sidewall steel line. In the case of columns that are recessed or elevated from the FFL, the eave height is the distance from the finished floor to the top of the eave strut.

BUILDING CLEAR HEIGHT: Is the distance between the finished floor level (FFL) to the bottom of the end plate of the rafter at the knee.

ROOF SLOPE: Is the tangent of the angle that a roof surface makes with the horizontal.

SIDE WALL 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.

END WALL STEEL LINE: Is the plane of the inside vertical surface of the end wall sheeting. It is also the plane of the outside vertical surface of the outer flange of the end wall girt.



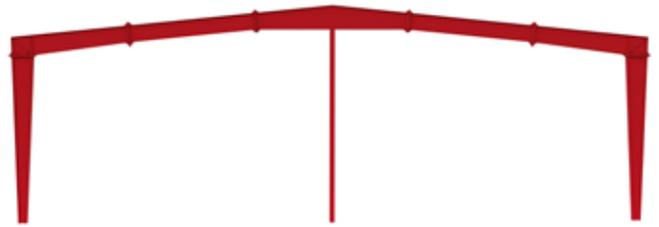
Airport Terminal - Central Asia

Primary Frame Types

Some common primary framing systems are shown below:



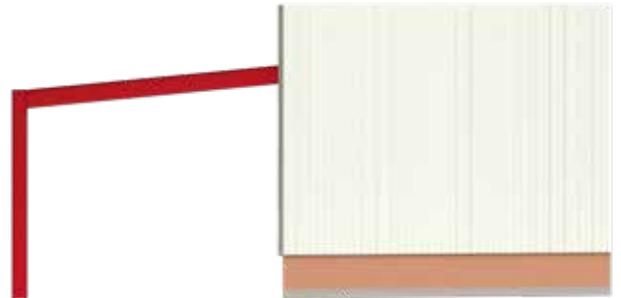
CLEAR SPAN buildings have a gable roof with vertical sidewalls and end walls. Interior bay frames are clear span rigid frames (without interior columns).



MULTISPAN MS-1 buildings have a gable roof with vertical sidewalls and end walls. Interior bay frames are rigid frames. The designation MS-1 implies one interior column, while MS-2 implies two interior columns, and so on.



MULTISPAN MS-2 buildings have a gable roof with vertical sidewalls and end walls. Interior bay frames are rigid frames. The designation MS-2 implies two interior columns, and so on.



LEAN-TO buildings consist of outer sidewall columns supporting simple span rafters attached to the sidewall columns or the end wall of the main building.



MULTIGABLE buildings have a roof with 2 or more gables, vertical sidewalls and vertical end walls. Interior bay frames are rigid frames.



MONO SLOPE is a building with the sloping roof in one plane. The slope is from one wall to the opposite wall.

Primary Framing Members

The **RIGID FRAME**, also called the main frame, is the primary structural member of the building system. The main frame consists of columns and rafters. Columns are used in the vertical position to transfer loads from main roof beams, trusses or rafters to the foundations. Rafters are the main beams supporting the roof system.

Rigid frame connections are bolted with columns and rafters with welded endplates for the anchoring of foundations and for member-to-member attachment.

The **END FRAME** is located at the end of a building and supports loads from a portion of the end bay.

The **END WALL** is an exterior wall that is parallel to the interior main frames of the building.

Bearing end frames may be constructed from cold formed channels, hot rolled sections or built-up welded plate sections depending on the engineering design requirements.

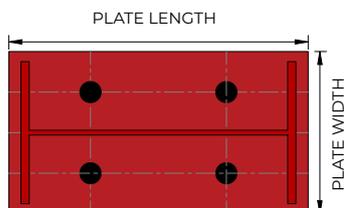
SURFACE PREPARATION AND PAINT primary members are blasted, cleaned and painted or HDG (hot-dip galvanized). Shot blasting up to the standard SA 2.5 and special paint systems may be provided upon request.



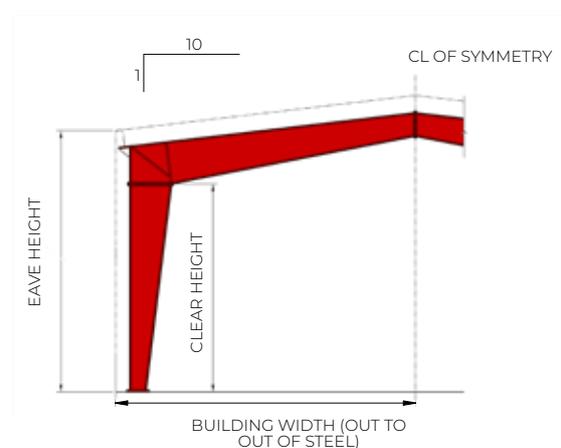
Food Processing Facility - GCC



Central Market - West Africa



Column Base Plan



Cross - Section

Secondary Framing Members & Cladding

Secondary framing members are those members that join the primary framing members together to form building bays and provide the means of supporting and attaching the walls and roof.

PURLINS and GIRTS are secondary framing members that serve to support roof and wall panels and transfer the loads to the rafters and columns.

Pre-punched holes and welded plates are provided for attachment of purlins, girts, bracing and other components.

EAVE STRUTS serve as longitudinal structural bracing members in addition to acting as attachments and bearing points for wall and roof sheeting.

GUTTERS (eave/valley) are metal members designed to carry water from the roof to the downspouts or drains.

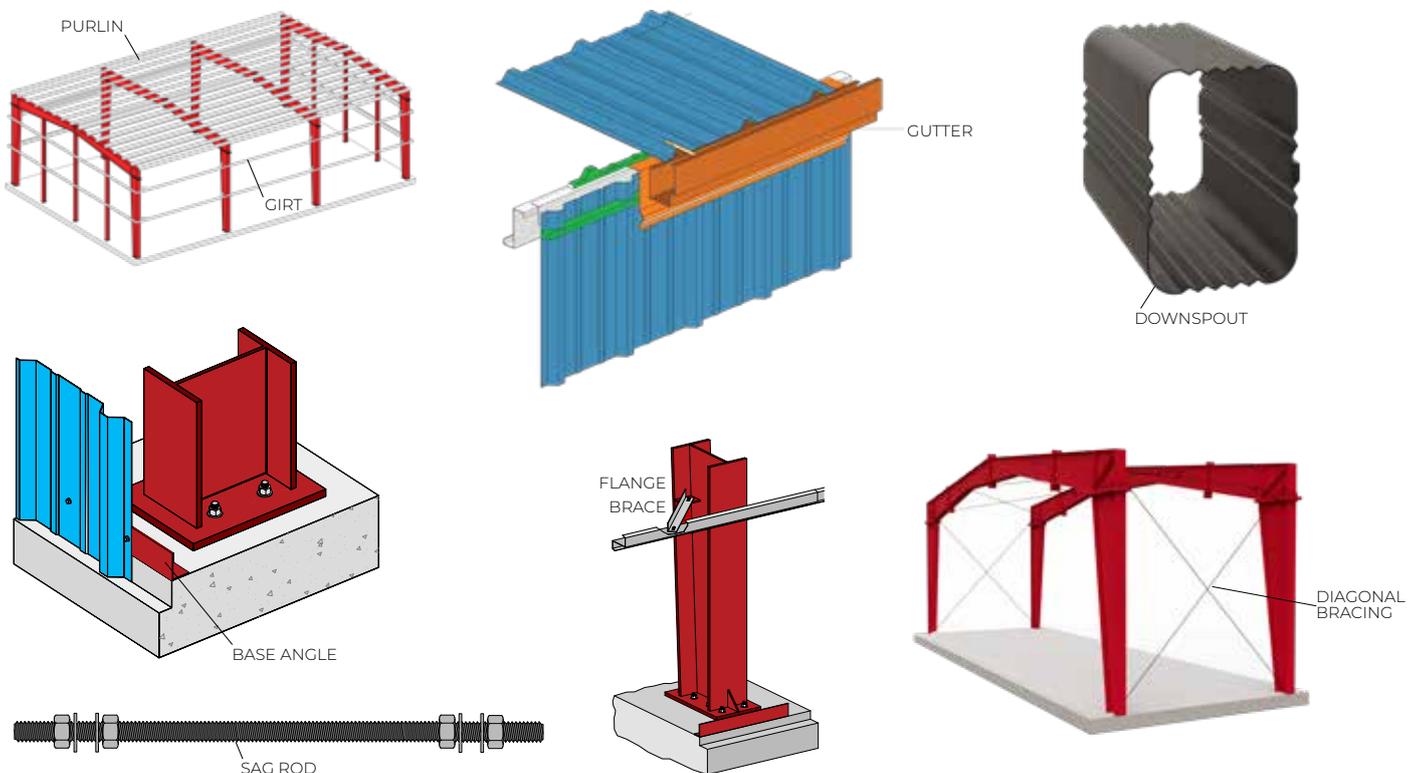
DOWNSPOUTS are conduits used to carry water from the gutter of a building to a drain.

DIAGONAL BRACING provides longitudinal stability against wind, seismic or other forces and is attached to the web of the rigid frame, near the outer flange of columns and rafters. Diagonal bracing can be galvanized cable strand, solid round bars or hot rolled angles as required.

FLANGE BRACES are provided to stabilize the interior flange of rigid frame rafters and columns at certain purlin and girt locations.

SAG RODS are solid round steel bars used to brace purlins and girts in bays longer than 8.5 m or in buildings with slopes larger than 1.5:10.

BASE ANGLES are provided in fully sheeted walls to attach the wall panel to the concrete slab.



METAL PANEL: (for sheeting) refers to the metal sheets used for roof and wall, interior roof and wall liners, partition panels, fascia panels and soffit panels. The single skin profiled sheet is either steel or aluminum, roll-formed to the maximum practical length to minimize end laps in the field. Profiled ridge panels are provided at the ridge of all buildings.

GALVANIZED STEEL PANELS: The protective steel coating is a zinc alloy applied on both sides, may be bare or painted.

ALUZINC STEEL PANELS: The protective steel coating is an aluminum zinc alloy (55% aluminum and 45% zinc), applied on both sides. The aluminum zinc alloy coating offers roughly four times more corrosion resistance compared to the galvanized (zinc only) alternative. May be bare or painted.

PAINTED STEEL PANELS: The protective coating consists of a polyester paint system applied on both sides.

ALUMINUM PANELS: made from aluminum alloy ASTM B 209M Grade AA 3105. These can be either mill finish or painted panels.

Roof and wall panels come standard in two thicknesses for steel (0.5 mm and 0.7 mm) as well as 0.7 mm for aluminium. These may be upgraded to a higher thickness and/or a higher quality exterior paint system such as PVF2, however this is subject to an extended delivery period.

There are four standard colors (Beige, Light Blue, Grey White and Pale Green), any special color may be accommodated and may be referenced using the RAL number or name.

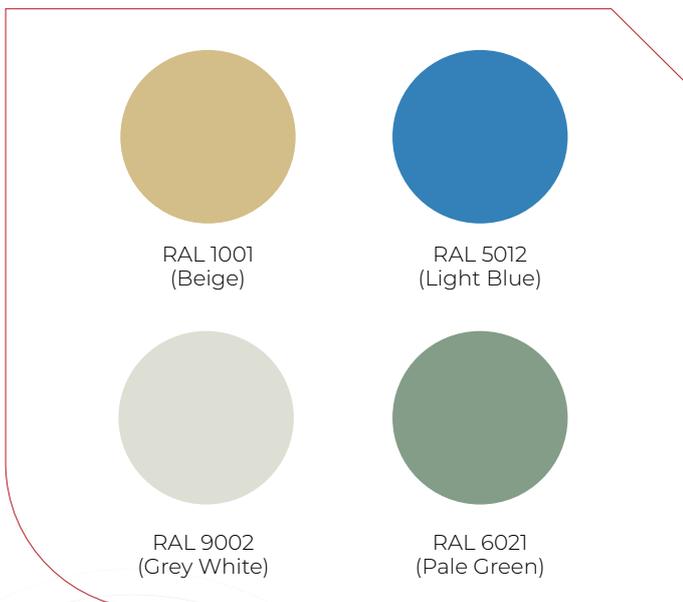


View of building without cladding

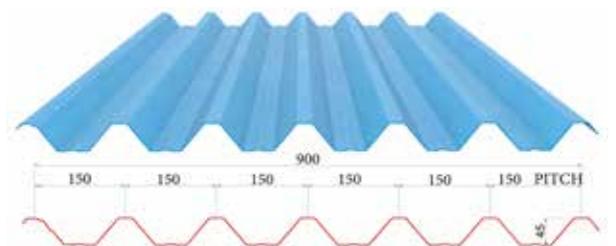


View of building with cladding

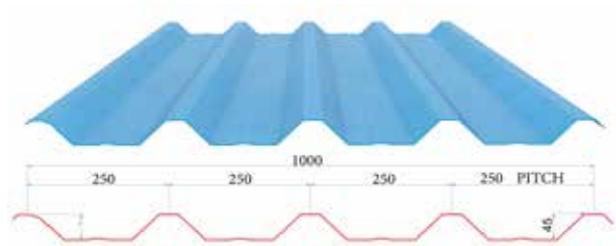
Acero Standard Colors



Standard Sheeting Profiles



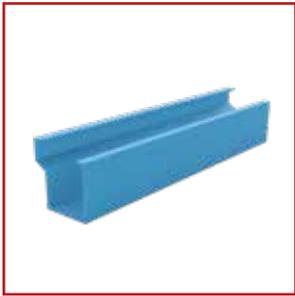
ACERO-45-150



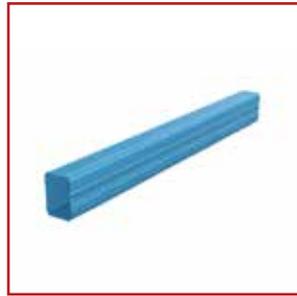
ACERO-45-250

COMPONENTS OF ROOF DRAINAGE AND TRIMS

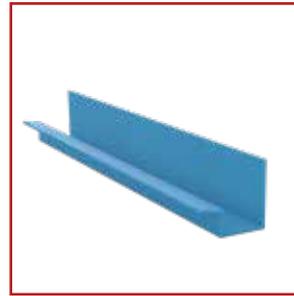
Eave gutters and downspouts are made of the same material as the wall panels.



Eave Gutter



Downspout



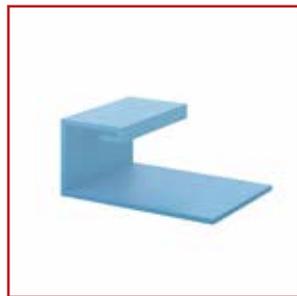
Valley Gutter



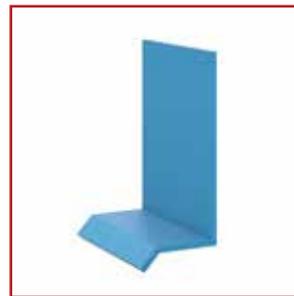
Trims are made of the same material as the panels. Some common trims are shown below:



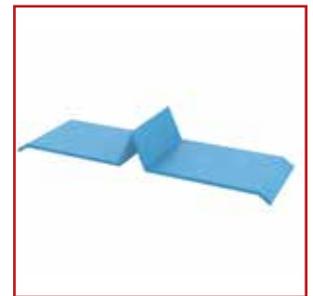
Corner Trim



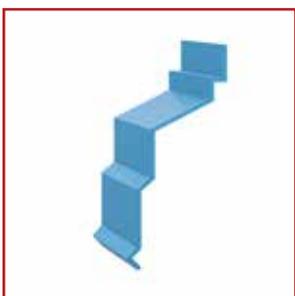
Panel End Closure Trim



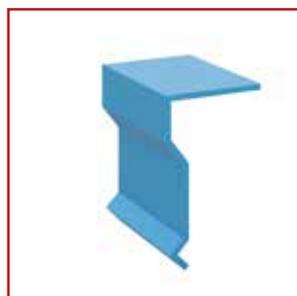
Drip Trim



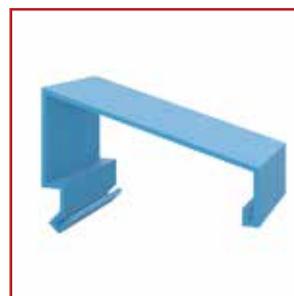
Expansion Joint Trim



Hood Trim



Eave Trim



Fascia Cap Flashing Trim



Gable Trim

ROOF CURBS are used to support power ventilators. They are made from fiberglass reinforced polyester and coated with a weathering surface on the exterior face. The roof curbs base is the same profile as the roof panel for easy and watertight installation. The roof curb package includes the fasteners and sealant required to install the curbs on the roof.

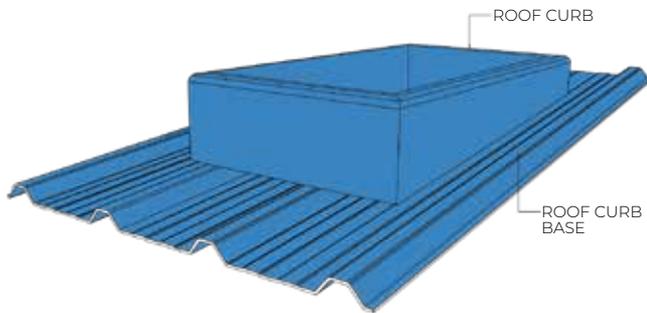
TRIMS AND FLASHING provide a cover for a seam or opening, e.g., where the roof panels meet the wall panels.

WALL FLASHING and trims (gable, corner, frame opening, accessories, etc.) are made from the same material (color and finish) as the wall panels.

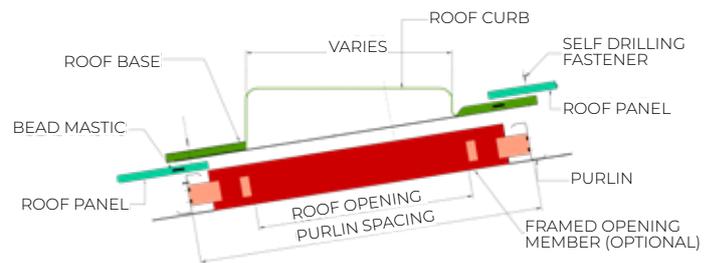
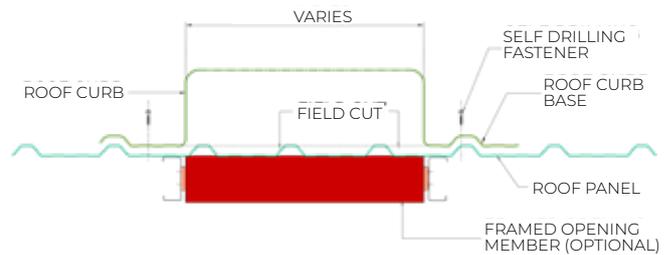
ROOF DRAINAGE COMPONENTS including gutters, bead mastic and downspouts.

SUNDRY ITEMS include double-sided tape and patching tape, stapler and staples, hillside washer, fasteners, anchor bolts, bolts with nuts and washers.

OTHER BUILDING ACCESSORIES include fixed louvres, roof curbs, translucent panels, ridge ventilators, power ventilators, insulation, suspended ceilings and roof monitors.



Roof Curb at Slope



Detail of Roof Curb at Slope



Packaging Factory - North Africa

Accessories and Miscellaneous Items

HIGH STRENGTH BOLTS are used to connect structural members.

ANCHOR BOLTS are used to anchor members to a foundation or other support.

ROOF AND WALL FASTENERS are used to attach panels to purlins, girts, etc. and are self-drilling fasteners with a washer that is bonded to an EPDM seal.

STITCH FASTENERS are used at panel laps and to attach flashings to panels and are self-drilling with a washer that is bonded to an EPDM seal.

For steel panels, the fasteners are manufactured from high grade carbon steel with the surface protected by a zinc-based coating. For aluminum panels the fasteners head and stud are manufactured from stainless steel, whereas the drill bit is made of hardened carbon steel.

POP RIVETS are used in gutter splicing, fixing trim to trim or trim to panel and fastening accessories to roof and wall panels.

SKYLIGHTS and WALL LIGHTS are made from translucent white, acrylic modified, ultraviolet stabilized fiberglass. The profile of translucent panels matches that of the adjoining roof and wall panels to ensure that weather resistant tightness is achieved through the same lapping technique used for the other panels.

FOAM CLOSURES match the panel profile and are made from expanded polyurethane or similar material.

BEAD MASTIC is a butyl rubber-based sealant and supplied in rolls on silicon release paper.

FLOWABLE MASTIC (caulking sealant) is a neutral silicone sealant that is chemically inert and non-corrosive. It is UV resistant and suitable for exterior applications against weathering and rainwater. When cured it is non-toxic and will accommodate high thermal and shrinkage changes in structural movement joints.



Bead Mastic, Flowable Mastic and Tape



Pop Rivet



Self Drilling Screw



Wall Light



PVC Pipe Accessories



Foam Closures



Anchor Bolts

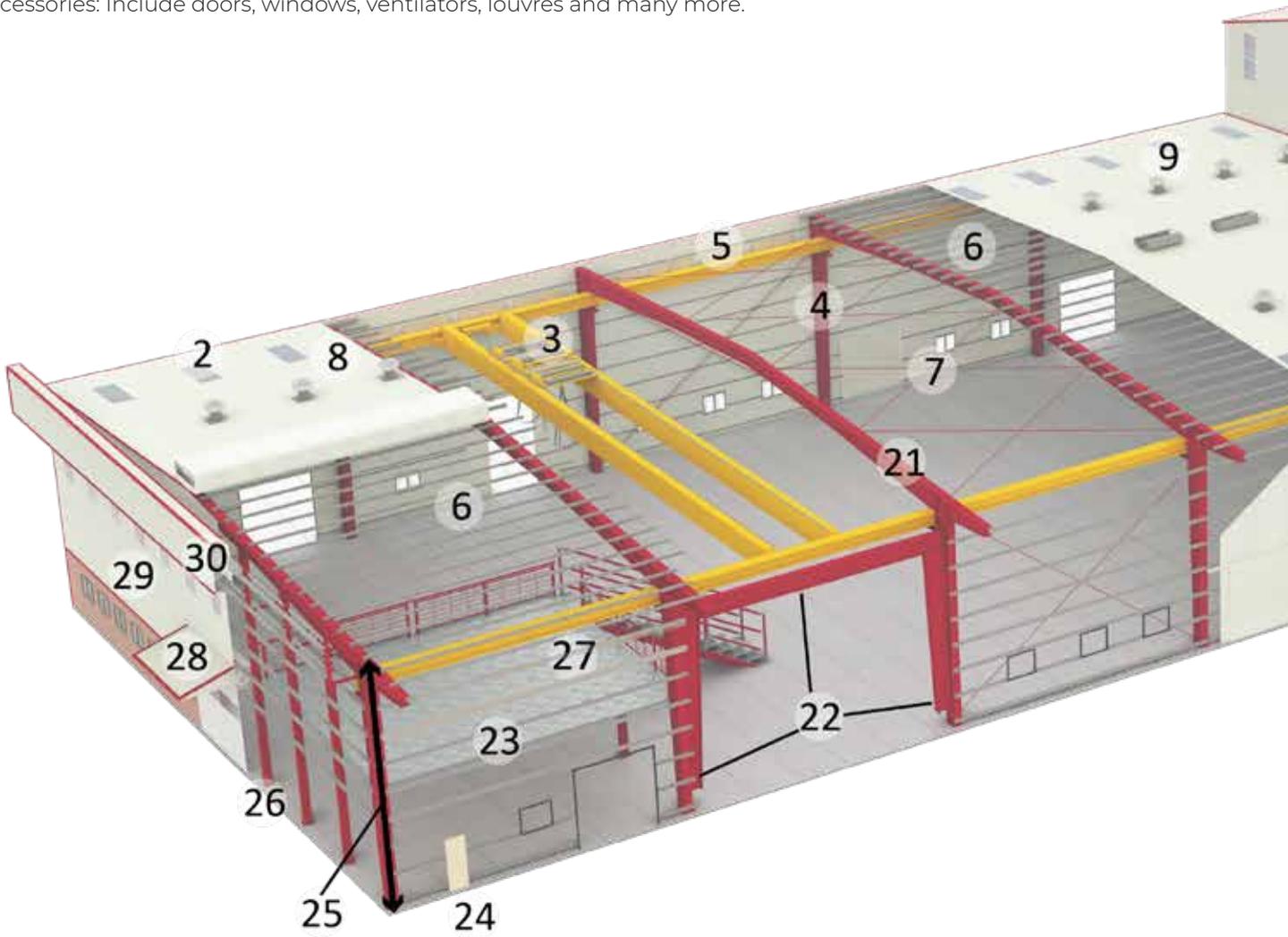


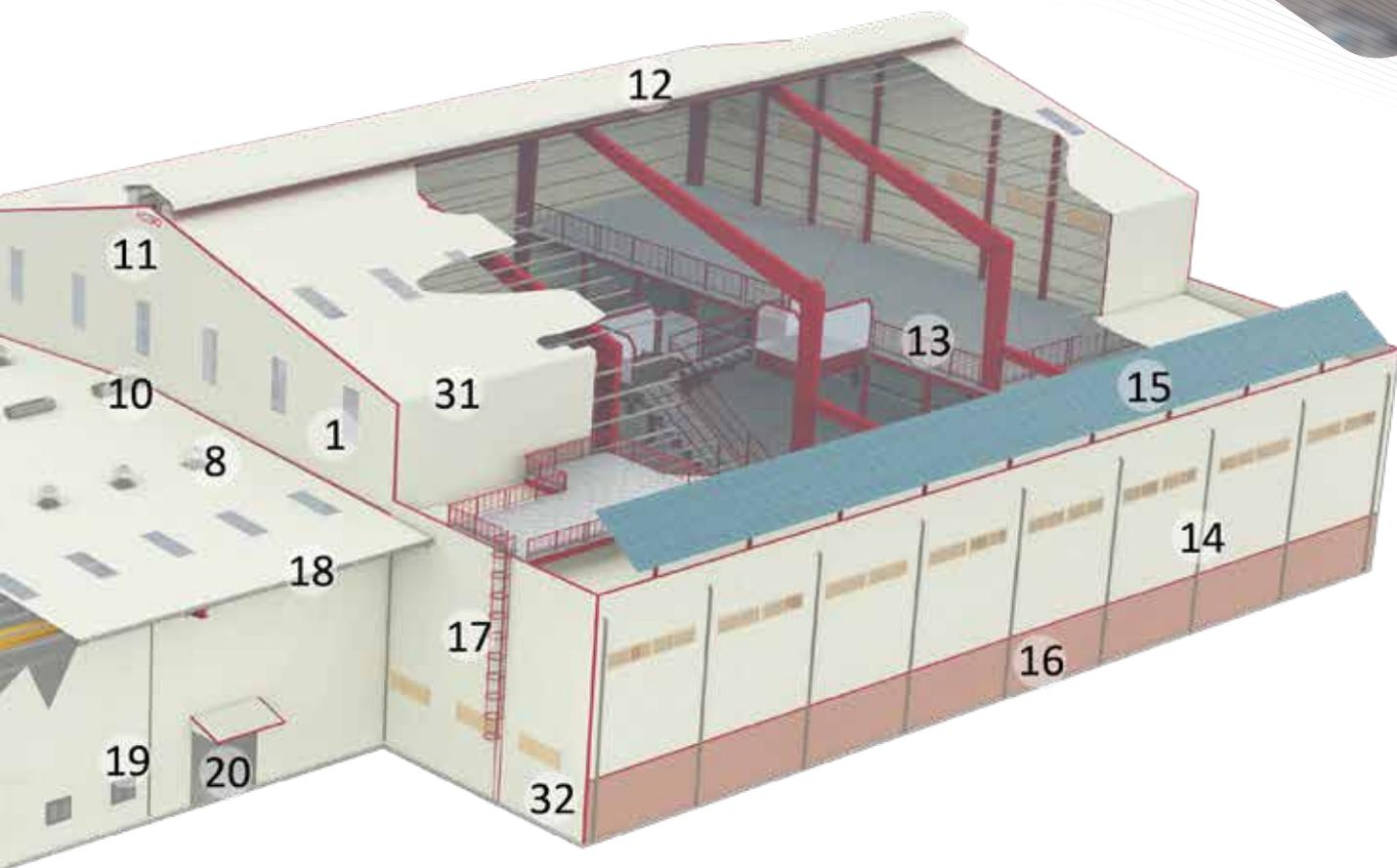
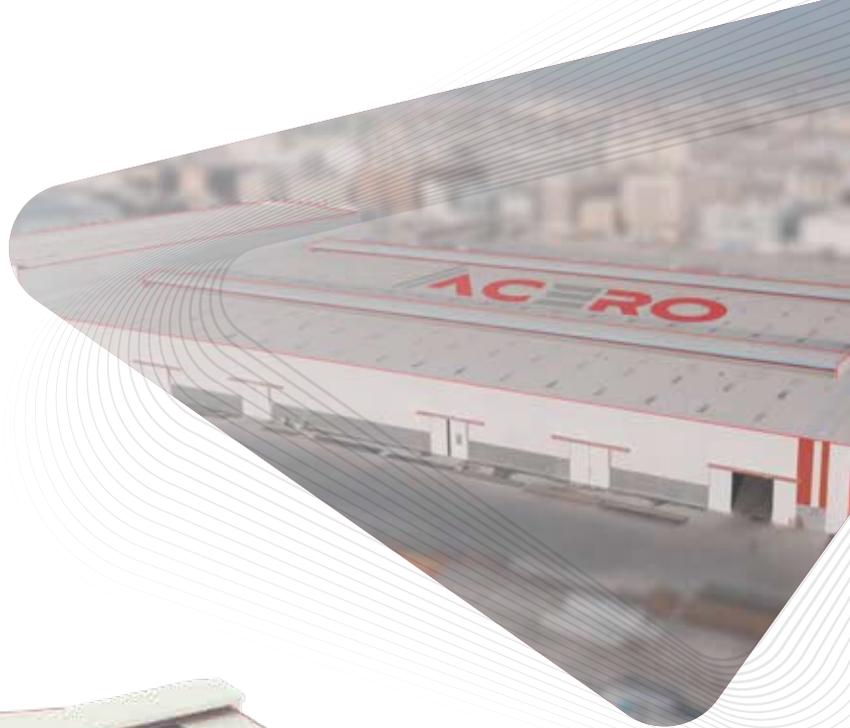
Sky Light

PEB MODEL

The building system consists of primary framing members, secondary framing members, roof systems, wall systems and accessories.

1. Primary framing members;
 - A. Columns: vertical beams.
 - B. Rafters: horizontal beams.
 - C. Bracing: Portal frames and cross bracing rods or angles.
2. Secondary framing members: Purlins and girts to join the cladding to the frame.
3. Roof and wall systems: The outside covering of the building.
4. Accessories: Include doors, windows, ventilators, louvres and many more.





Acero Steel Building Elements

- | | | |
|------------------------|-------------------------|--------------------|
| 1. Wall Light | 12. Roof Monitor | 23. Girt |
| 2. Sky Light | 13. Hand Rail | 24. Personnel Door |
| 3. Double Girder Crane | 14. Downspout | 25. Eave Height |
| 4. Column | 15. Solar Panels | 26. Endwall Column |
| 5. Crane Beam | 16. Block Wall | 27. Mezzanine |
| 6. Purlin | 17. Cage Ladder | 28. Canopy |
| 7. Bracing | 18. Roof Extension | 29. Wall Panel |
| 8. Roof Panel | 19. Window | 30. Fascia Post |
| 9. Power Ventilator | 20. Double Sliding Door | 31. Curved Eave |
| 10. Ridge Vent | 21. Rafter | 32. Louvre |
| 11. Peak Sign | 22. Portal Bracing | |

Design Codes & Design Loads

DESIGN CODES

Acero designs and manufactures in accordance with the required internationally recognized codes and guidelines.

All welding is done in accordance with the required

codes and standards, such as the American Welding Society (AWS): Structural Welding (Steel) and the British Standards Institute (BSI). All Acero welders are qualified and certified for the type of welds performed.

DESIGN LOADS

- **DEAD LOAD:** The weight of the metal building system, such as roof, framing and covering members.
- **LIVE LOAD:** Any temporary load imposed on a building that is not wind load, snow load, seismic load or dead load. A few examples of a live load are workers, equipment and materials.
- **WIND LOAD:** The forces imposed by the wind blowing from any direction.
- **SNOW LOAD:** The vertical load induced by the weight of snow, assumed to act on the horizontal projection of the roof of the structure.
- **SEISMIC LOAD:** The load or loads acting in any direction on a structural system due to the action of an earthquake.
- **AUXILIARY LOADS:** All dynamic live loads such as cranes and material handling systems.
- **COLLATERAL LOAD:** The weight of additional permanent materials, other than the weight of the metal building system, such as sprinklers, mechanical and electrical systems and ceilings.



Warehouse - Central Asia

Submittals

QUOTATION STAGE PROPOSAL PACKAGE

PROPOSAL DRAWINGS

A set of CAD drawings (2-dimensional), which may include a column layout plan, roof layout plan, mezzanine layout plan, frame cross section, etc. depending on the requirements of the building or structure.

PROPOSAL OFFER

A detailed technical and commercial offer. The technical section contains the building parameters, wall conditions, accessories, panel description, design loads, design codes, steel surface preparation, material specifications, etc. The commercial section contains the delivery and dispatch terms, supply price, payment terms, contract form, etc.

PROJECT STAGE APPROVAL PACKAGE

APPROVAL DRAWINGS

Approval drawings are the final set of drawings to be approved by the customer before proceeding to fabrication and consist of an anchor bolt setting plan, main frame cross section, roof plan and wall framing elevations, wall sheeting elevations, details for other building accessories, and important notes. Fabrication will not start until one set of the approval drawings is signed by the customer or their representative with "Approved As Is" or "Approved As Noted" marked and returned to Acero. Approval drawings are issued as "Not for Construction" drawings.

The contractor is specifically instructed not to use dimensions shown on approval drawings for civil work, foundation work, etc.

Acero is not responsible for any consequences arising from the premature use of information provided in drawings that are not issued for construction.

DESIGN CALCULATIONS

Consist of details of the building profile and computer generated output for structural analysis and design of all the primary and secondary structural members, bracings, connections, etc.

ERECTION DRAWINGS

Erection drawings "Issued for Construction" are provided for the assembly of the buildings and consist of an anchor bolt setting plan, a frame cross section, a roof framing plan, wall framing details. Part marks for all bill of material (BOM) components are shown on the erection drawings. The bolts schedule is for identifying the required bolt diameter and length for specific connections and is shown on the erection drawings.

FOUNDATIONS

Foundations, tie beams and concrete floor slabs should be designed by a licensed civil engineer. Acero does not provide this service. The design of the concrete substructure should be based on the Acero "Issued for Construction" anchor bolt setting plans and column reactions. Anchor bolts must be set in strict accordance with Acero's anchor bolt setting plan. Acero is not responsible for incorrectly set anchor bolts.



Pipe Factory - East Africa

3 Structural Subsystems

CANOPIES

The function of the canopy is to provide shelter to areas that require open access. For example, loading docks are such open areas where an “overhead roof” is useful. Not only do canopies protect merchandise and supplies as they are loaded and unloaded but shelter and shade the crews.

Sidewall canopies are cantilevered rafters attached to the sidewall columns at any point below the eave. End wall canopies are cantilevered rafters attached to the end wall posts below the roof line.

Canopy soffits can be either designed to only conceal the canopy purlins, leaving the rafters exposed, or conceal both rafters and purlins.

The roof panels of the canopies can be made to match the specifications of the main building roof panels or may be different, depending on the customer's preference.

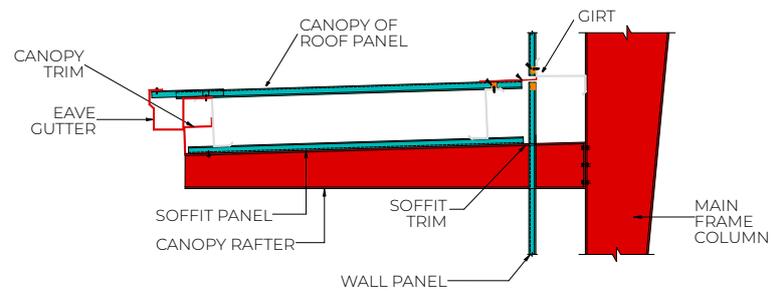
The length of a canopy is ideally a multiple of bay lengths of the sidewall or a multiple of column spacing of the end wall.

ROOF EXTENSIONS

Sidewall roof extensions extend beyond the defined building width and are a continuation of the main building roof slope.

End wall roof extensions extend beyond the defined building length and are constructed by extending the end bay purlins and eave struts of the main building past the end wall rafter.

Soffit panels for roof extensions are used to cover the underside and conceal the structural elements.



Detail of Canopy



Canopy with soffit panels

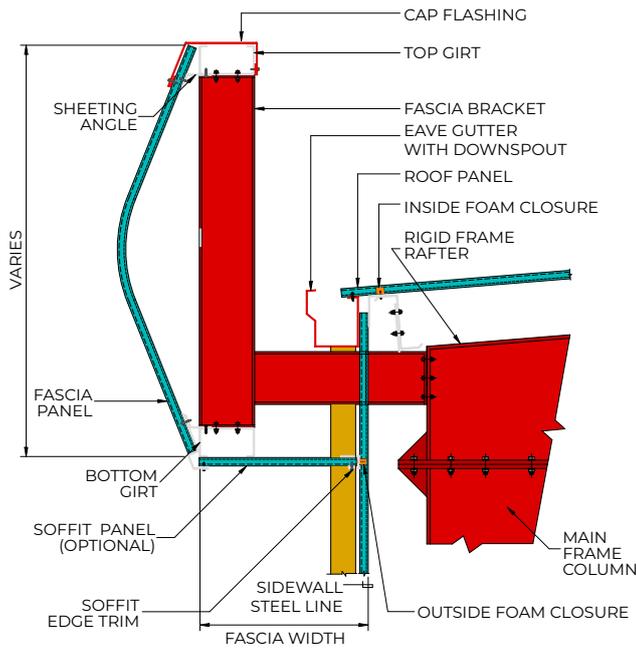
FASCIA AND PARAPETS

Fascia is a decorative trim or panel projecting from the face of a wall, and a parapet is that portion of the vertical wall of a building that extends above the roofline.

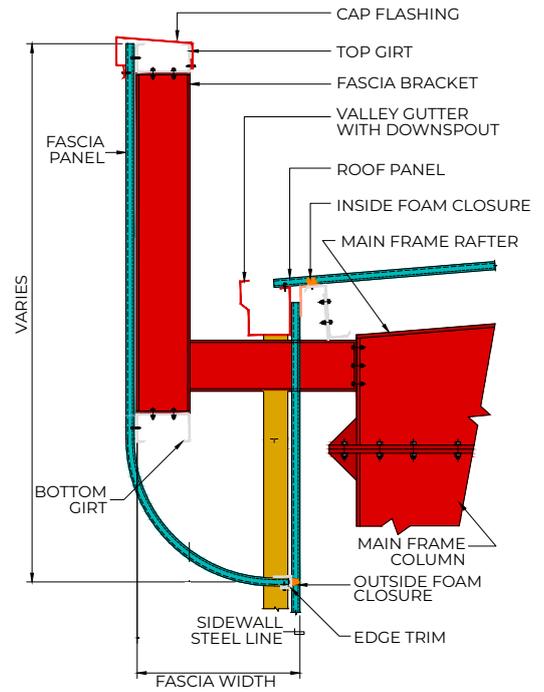
Fascia sheeting is designed to match the specifications of the sidewall panel, or any other specifications according to the customer's requirement. Soffit panels and backup panels are provided when specified.

Fascia comes in a large variety and may be vertical, sloped or curved (bottom curved fascia, center curved fascia). A parapet fascia is an extension of the sidewall and end wall above the roof line. The wall sheeting of the building will continue to the top of the parapet.

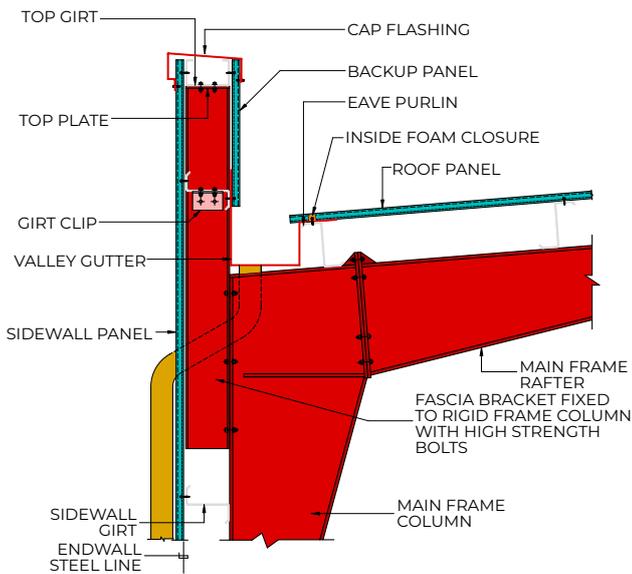
Eave gutters and downspouts are used in buildings with sidewall vertical fascia. Valley gutters are used in buildings with sidewall parapet fascia.



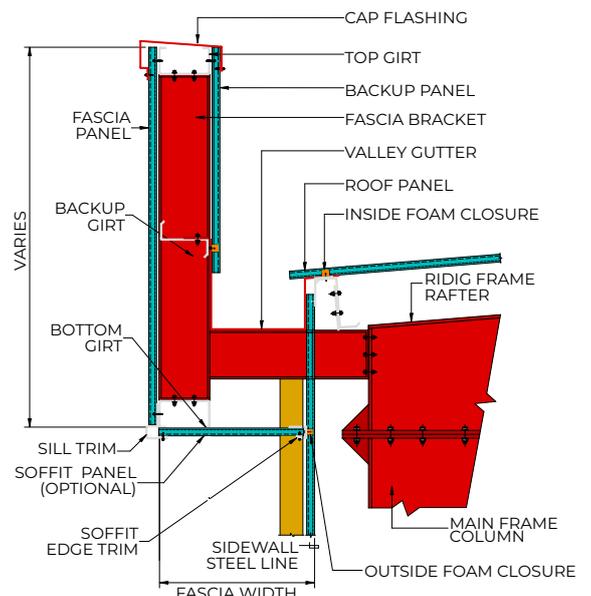
Center Curved Fascia



Bottom Curved Fascia



Parapet Fascia



Vertical Fascia

MEZZANINE SYSTEMS

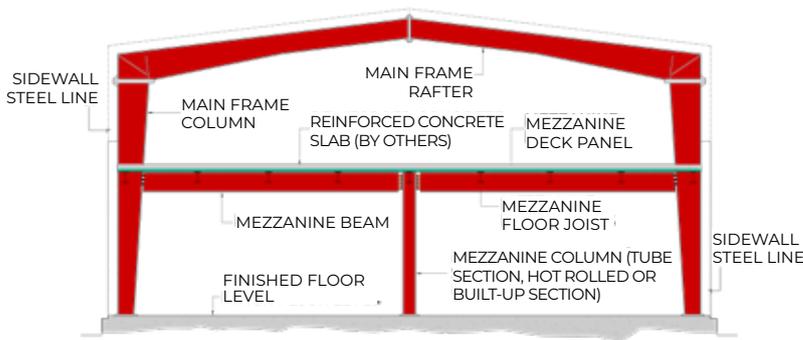
A mezzanine system includes mezzanine columns, beams, joists, deck and edge angles. The mezzanine columns are placed along the frame line, to support the mezzanine beams, which in turn support the mezzanine joists. The mezzanine joists are normally placed parallel to the roof purlins. Joist spacing varies depending on the joist length and applied loads.

The mezzanine columns, beams and joists are designed to withstand the mezzanine live load, the weight of the reinforced concrete slabs and the weight of the deck. Additional dead loads and collateral loads, if present must be communicated to Acero to be considered in the mezzanine design.

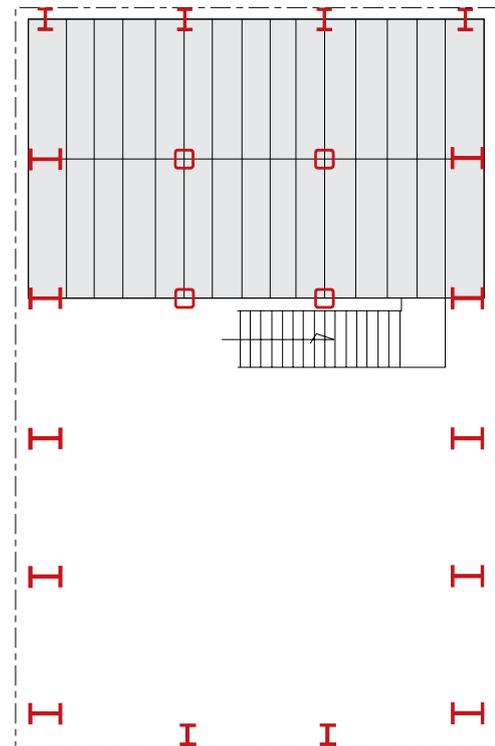
The concrete slab requires structural reinforcement to support its own weight, in addition to other dead loads, live loads and collateral loads. Please note that Acero does not provide slab designs.

Staircase with handrails may be single or double flight and with or without an intermediate landing (delivered in a knocked down condition, for field assembly).

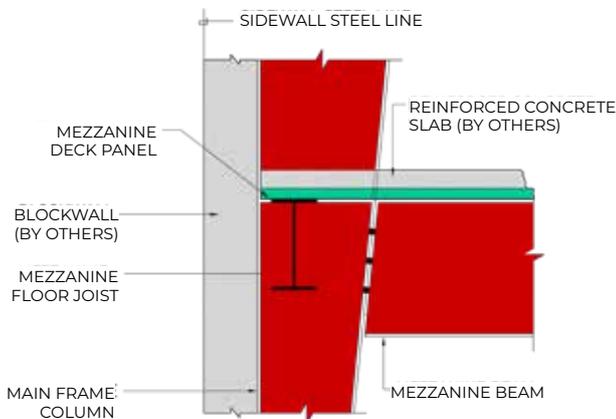
The customers requirements with respect to the clear height of the mezzanine and the height above the mezzanine FFL are required to accurately design the mezzanine system.



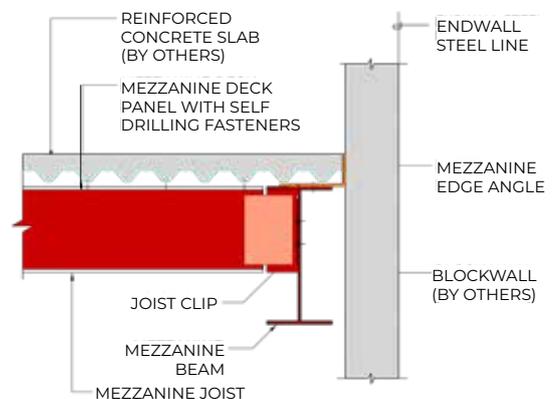
Mezzanine Cross Section



Column Layout Plan



Beam Connection at Main Frame Column

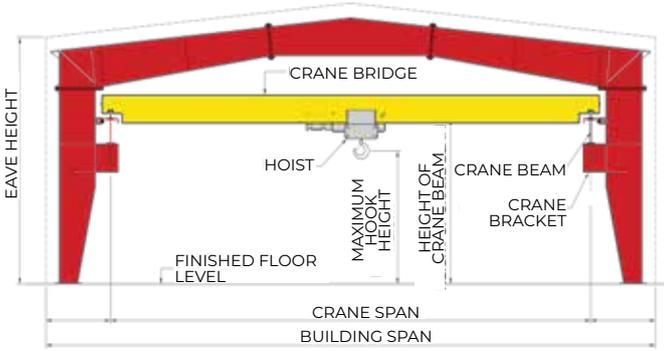


Joist to Beam Connection at End Wall

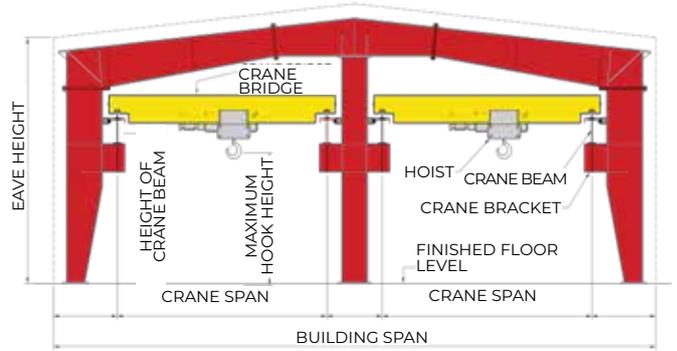
CRANE SYSTEMS

Acero buildings can incorporate any required crane system in the building design. A building with a crane is a complex structural system which consists of the crane with the trolley and hoist, crane rails with their fastenings, crane runway beams, structural supports, stops and

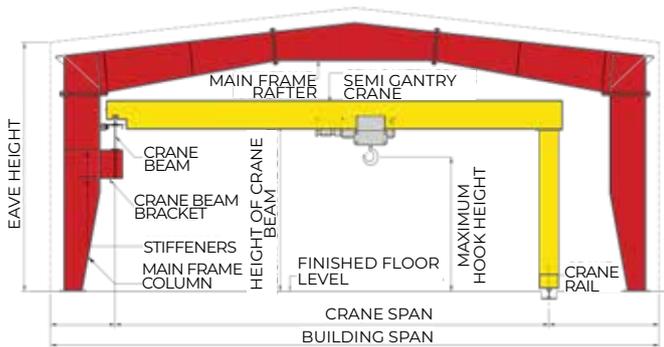
bumpers. Some of the most common types of crane systems for steel buildings are top running cranes, under hung cranes, monorail cranes, jib cranes and gantry cranes.



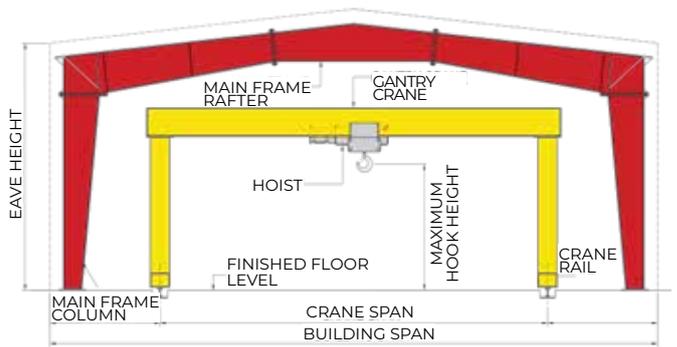
Top Running Crane in a Clear Span Building



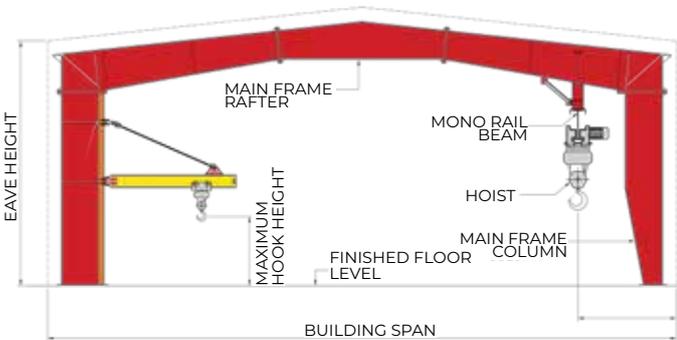
Top Running Crane in a Multi Span Building



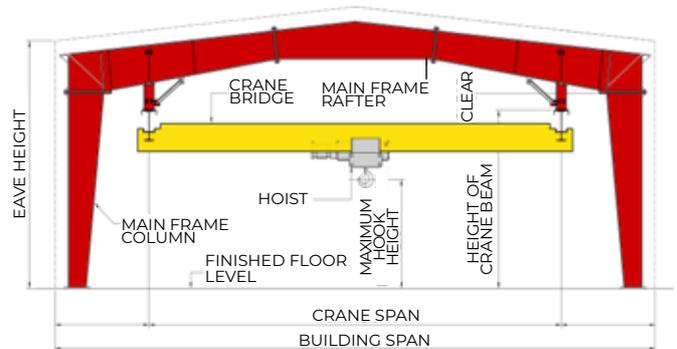
Semi Gantry Crane



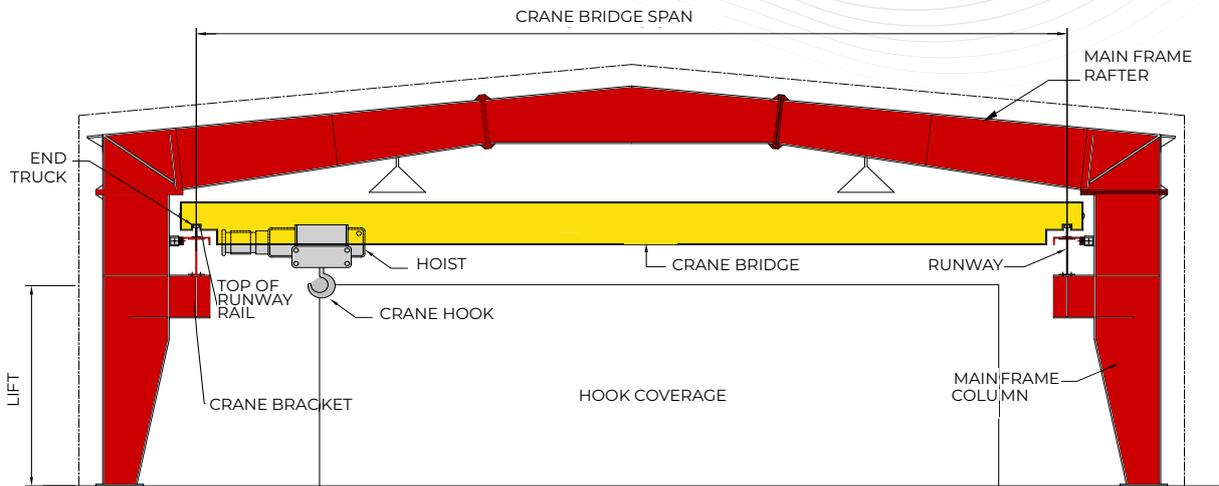
Gantry Crane



Jib Crane



Underhung Crane



Parts of a crane

The customer's complete crane system information (ex: capacity and hook height, etc.) is required to design and estimate buildings with cranes as this requires strengthening the building's main frames to support the crane load and supplying the crane brackets and crane runway beams that support the crane system.



Acero crane at manufacturing facility

4 Sandwich Panels

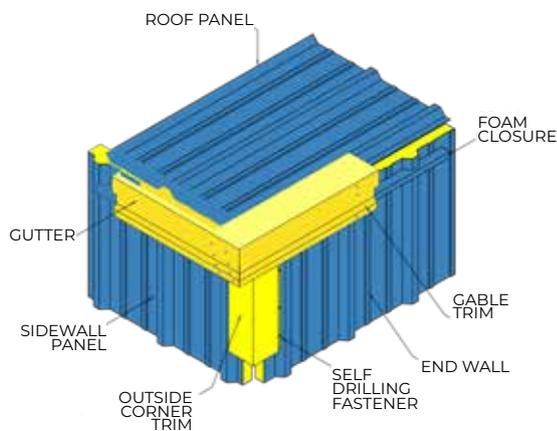
Acero offers insulated sandwich panels. Sandwich panels are increasingly successful in meeting the requirements of the construction industry, with an emphasis on cost effective building systems and conservation. Some popular applications include industrial and commercial buildings, as well as the food supply sector (ex: cold storage).

TESTING QUALITY AND CONTROL

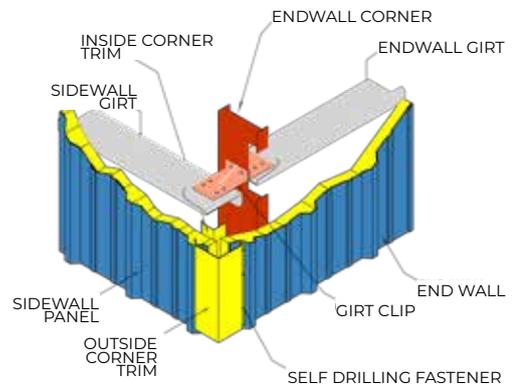
To maintain adherence to the relevant standards for sandwich panels and to ensure continuous improvement, Acero maintains a quality control and process inspection plan. Key factors in the production process are monitored and controlled against internationally recognized tolerances and counter measures and any non-conformance is swiftly identified, rectified and standardized.

Sandwich panels offer a wide range of desirable properties, some of these properties include:

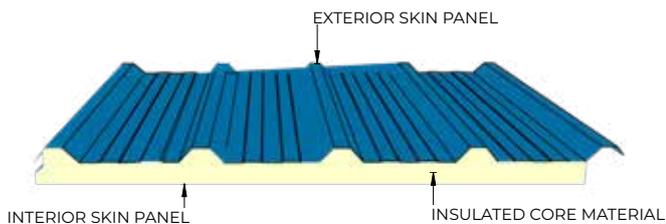
- Thermal insulation
- Impact resistance and stability
- Light weight and space saving
- Low maintenance and long life
- Fast delivery
- Long length and wide spans
- Environmentally friendly



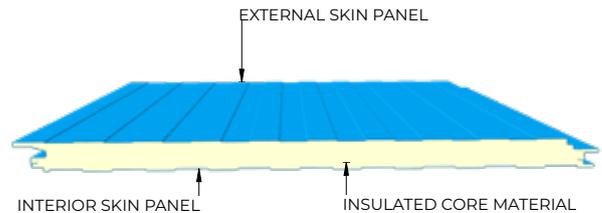
Roof and Wall Detail at Eave Corner



Detail at Wall Corner



Sandwich Panel Corrugated



Sandwich Panel Microribbed

5 Building Accessories

INSULATION may be fiberglass or rockwool (blanket or roll).

HEAVY DUTY PERSONNEL DOORS are flush finished and can be single leaf doors or double leaf doors. Doors are reinforced, stiffened and sound deadened with an expanded polystyrene core, laminated to the inside faces of door panels, completely filling the inside cavity of the door leaf, they are factory prepared for a cylindrical lockset and door frames are delivered knocked down.

STEEL SLIDING DOORS are delivered with the frames knocked down for field assembly. All clips, fasteners and other items necessary for assembly are provided. The exterior face of the door leaf is sheeted with profiled panels that match the profile and material of the wall panel. Door leaves are suspended from an exterior mounted trolley rail, attached to a structural header beam. The door hood trim to conceal and protect the header and rail, is supplied in the same material as the wall panel. Doors are bottom guided by a specially designed steel rail track. Sliding doors may also be provided with flush hinged pilot doors. A pilot door is a personnel door located within a leaf or the sliding door.

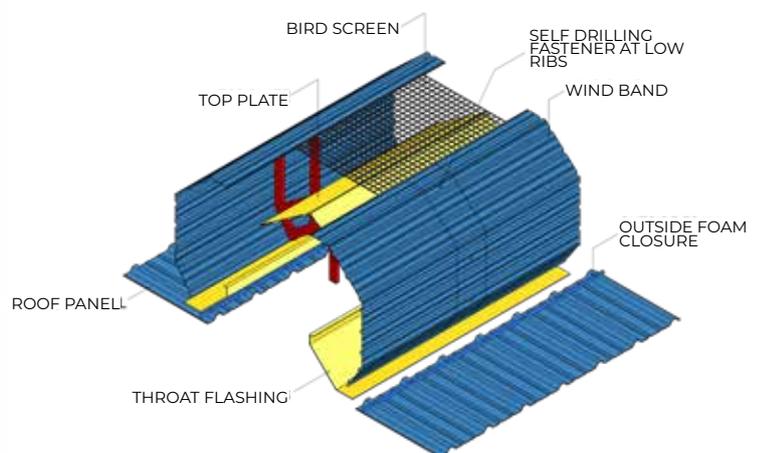
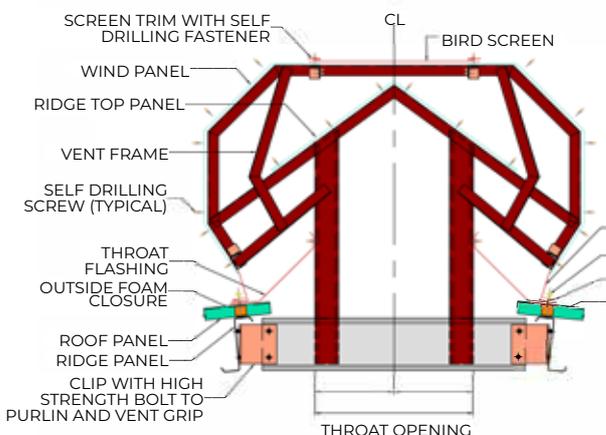
STEEL ROLL UP DOOR is a roll up door curtain made from steel and painted with a polyester paint. The bottom rail of the door curtain is an aluminum angle guide. The door

drum, supporting the door curtain, houses safety springs, end shafts, collars and bearings. Doors are supplied either manual or electrically operated, and are complete with guides, axle, curtain, manual chain and a reduction gear operating system.

WINDOWS with the frame made of anodized or powder coated aluminum extrusions and are the horizontal half slide type, specifically designed for installation in profiled exterior wall panels. Windows are factory glazed with clear glass and are equipped with latches and removable insect screen.

STEEL LOUVRES are openings provided with slanted fins to allow for the flow of air, may be either adjustable or fixed.

RIDGE VENTILATORS are used on the roof and allow the air to pass through. Installed as either individual units or as continuous (ex: joined) units. The outer skin of the ventilator is made from the same material as the profiled roof panels. The ventilators are supplied complete with bird screens and knocked down, to be assembled on site before installation.



Ridge Ventilator (Single or Continuous)



Sandtrap Louvre



Fixed/Adjustable Louvre



Rollup Door



Ventilator



Framed Opening



Window



Sliding Door



Personnel Door



Sectional Door

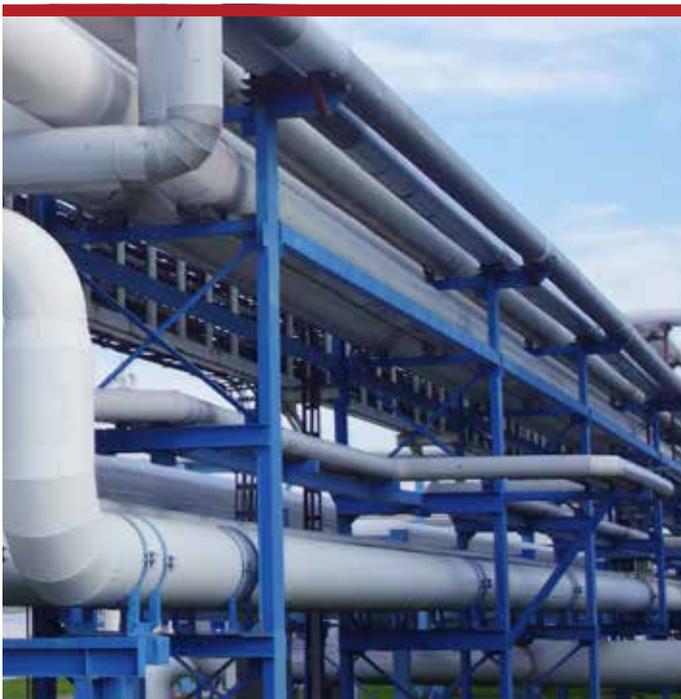
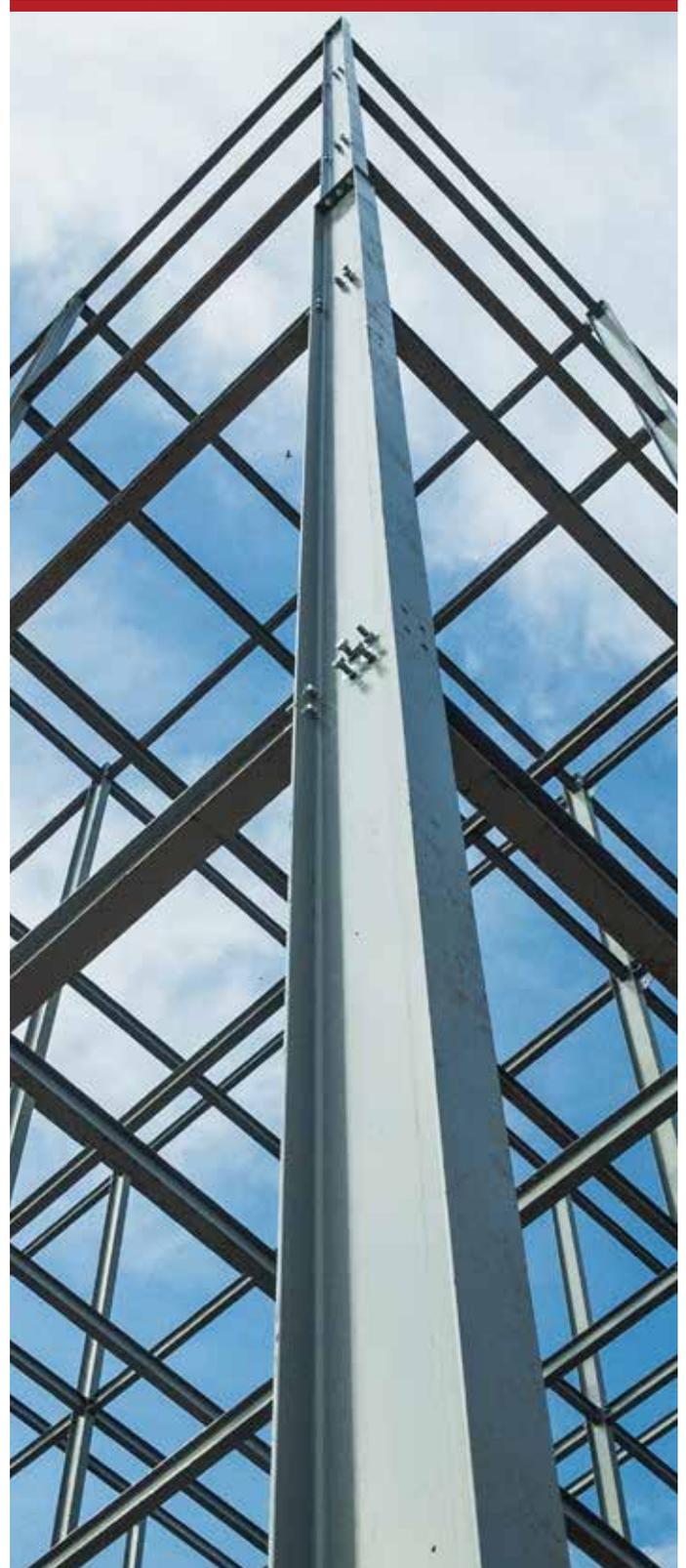
6 Conventional Steel Buildings

Conventional steel buildings are traditional metal structures constructed using hot rolled steel sections which are designed individually and fabricated.

Primary steel members are selected from international standard hot-rolled sections, such as but not limited to “UB”, “UC” and “PFC” (British Specifications), “HE” and “IPE” (EU Specifications) and “JIS” (Japanese Specifications), W Sections (American Specifications).

Some common conventional steel buildings and structures include, but not limited to:

- Pipe racks
- Equipment support structures
- Desalination plants
- Petrochemical plants
- Oil & gas structures
- Cement plants
- Steel mills



Pipe Rack

CONVENTIONAL STEEL MEMBERS

Components of conventional steel buildings come in standard shapes and sizes with limited modifications permitted. These components are ordered from the steel mill (hot-rolled sections) according to unique specifications and generally on a per-project basis. Some of the common shapes include:



T-Section



Wide Flange



Angle



I-Beam



SHS/RHS



Channel



7 Racking Systems

A warehouse racking system is a storage solution designed to stack materials in horizontal rows with multiple levels. These systems can help manage and better utilize warehouse space while organizing materials to streamline operations.

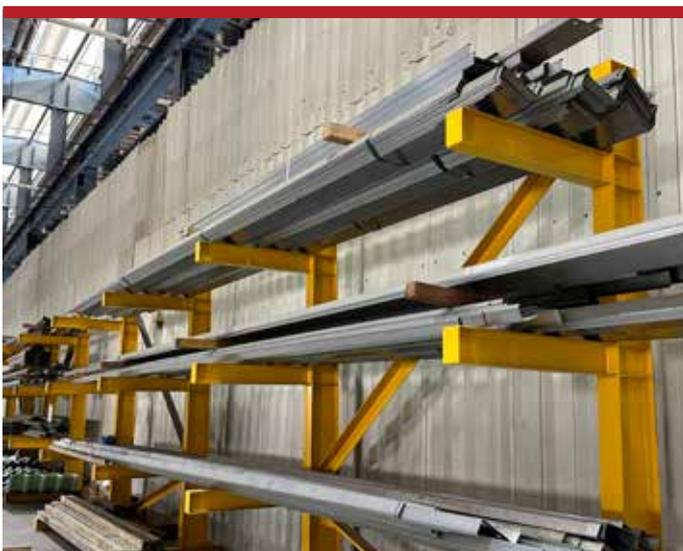
A racking system enables the user/owner to store palletized products up to seven stacks high, depending on the available height and weight considerations. Aside from

goods handling, racking systems are also used for raw material and parts storage.

At Acero we also provide cantilever racking solutions for loads that require no obstruction, this is the ideal solution for bulky non-standard sized items. This solution allows the more efficient use of warehouse space.

FACTORS TO CONSIDER WHILE SELECTING THE RIGHT RACKING SYSTEM

Types Factors	Drive-In System	Double-Deep Racking System	Push Back Racking System	Selective Racking System	Live Racking System
Budget	Medium	Low	Very High	Very Low	High
Floor Utilization	60-70%	60-65%	70-75%	40-45%	70-75%
Versatility	Multiple Products/ Single Row	Same SKU	Same SKU items	Various Goods	High Volume/ Same SKU
Forklift Accessibility	Yes	Extendable Forks	Various Goods	Yes	Yes
Inventory Management	LIFO	LIFO	LIFO	FIFO	FIFO



Cantilever Racking Systems



Pallet Racking Systems

8 Porta Cabins and Affordable Houses

Acero manufactures and supplies Porta Cabins in all sizes, customized to meet the requirements. Acero's Porta Cabins are carefully designed to be economical, strong, durable and easy to install.

Partitions and building accessories such as doors, windows, framed openings, etc. can be added to meet the specifications, please consult with an Acero Sales Engineer for more information.

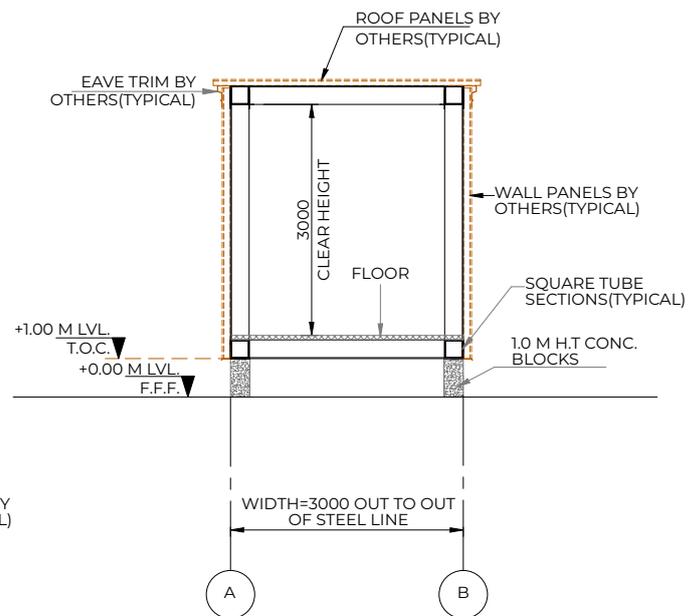
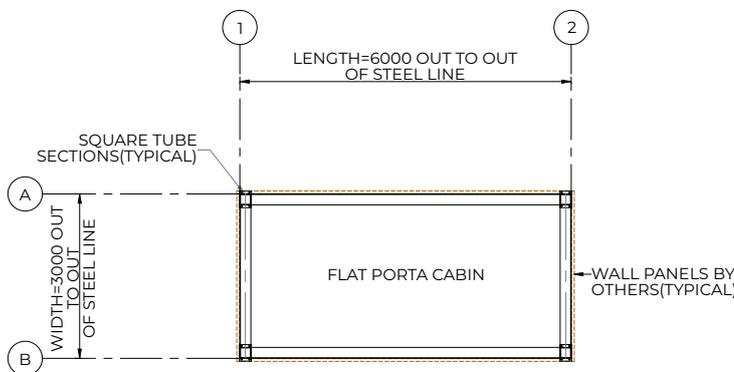
For international supply, the Porta Cabin is shipped in a knocked down condition (for more economical export transportation) to be assembled at the site (may be dismantled and reassembled at any time). Acero provides comprehensive and straightforward erection drawings, with a step by step installation procedure clearly outlined on the drawings. Basic Porta Cabins are easily erected with a 2-3 man crew within a day or two without the need for any heavy equipment.

ADVANTAGES OF PORTA CABINS

-  Time Saving
-  Portability
-  Cost Saving
-  Flexibility

APPLICATIONS OF PORTA CABINS

- Accommodation Camps
- Modular Buildings
- Temporary Facilities
- Offices
- Commercial
- Affordable Houses



Porta Cabin and layout Plan



Stackable Porta Cabins

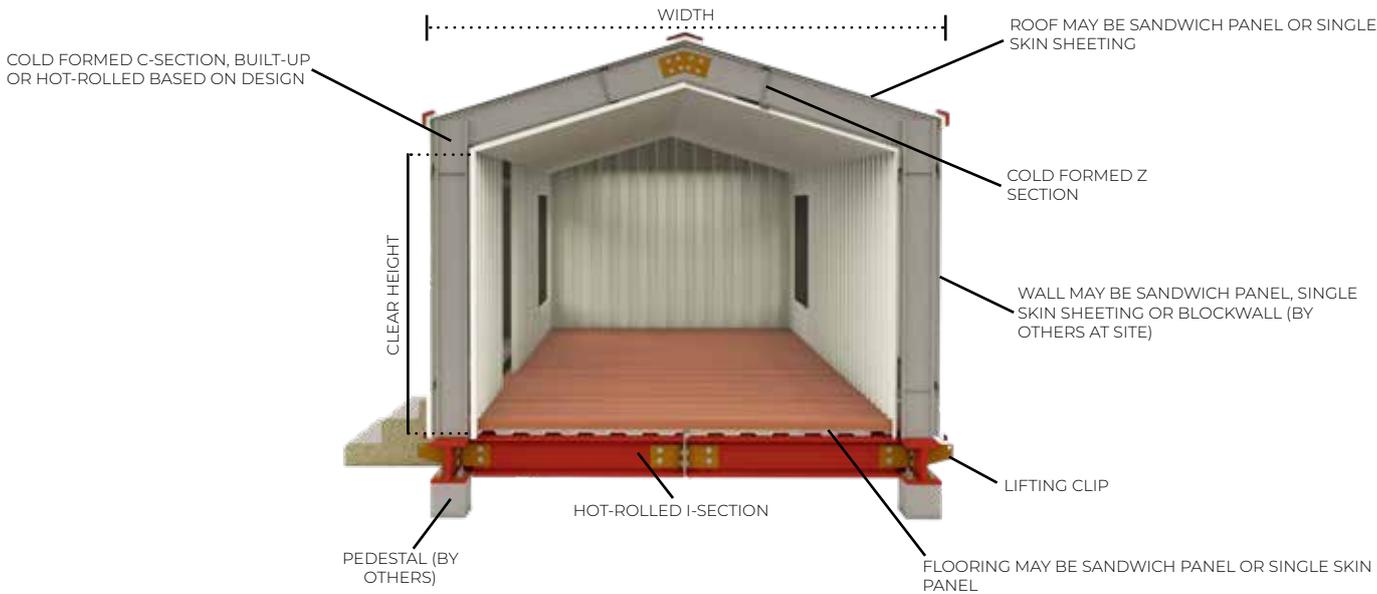


Porta Cabin Flat Roof

For local supply, the Porta Cabin may be supplied factory assembled (and may be dismantled and reassembled at any time). The Acero Porta Cabin is available in single units or stackable and can be arranged vertically and/or horizontally (stackable arrangements available with staircases).

All primary and secondary building members are high strength sections and may be pre-galvanized, built-up or hot rolled, depending on the requirements and design. The roof sheeting may be single skin (with or without insulation) or sandwich panels, and the wall cladding may be single skin (with or without insulation), sandwich panels or block wall (this is by others and is done on site).

Acero Standard Panels are Aluzinc coated steel in 0.5 mm and 0.7 mm thickness, standard colors or any other special colors may be accommodated by referencing the RAL number or name.



Porta Cabin Cross Section

Porta Cabins may come with a flat roof, pitched roof, mono slope roof or any other roof design that may be required.



Porta Cabin Pitched Roof



Porta Cabin Mono Slope

9 Project Reference



Warehouse - Saudi Arabia



Aluminum Extrusion Plant - Ethiopia



Sports Hall - Rwanda



Automotive Car Showroom - Iraq



Agri-Products Warehouse - New Zealand



Cafe - Georgia



Office and Warehouse - UAE



Warehouse - Czech Republic



Warehouse for Mining Operations - Zambia



Hotel - Armenia



Ferro Alloy Plant - Oman



Fish Food Processing Factory - Algeria



Heavy Engineering and Manufacturing Facility - India



Chemical Warehouse - Ghana



Textile Factory - Benin



Workshop - Kenya



Industrial Shed - Sierra Leone



Port Logistics Center - Mauritania



Garment Factory - Togo



Airport Terminal - Armenia



Pipe Factory - Tanzania



Barn - New Zealand



School - UAE



Pipe Racks - Saudi Arabia



Warehouse - Ghana



Logistics Facility - Senegal



Coffee Processing Plant - Ethiopia



Warehouse and Showroom - Georgia



Warehouse - UAE



Central Market - Benin



Automotive Workshop - Georgia



Bar Mill - Ethiopia



Packaging Factory - Morocco



Soap and Detergent Storage Building - Mauritius



Steel Mill - Mauritius



Gym - Guinea



Multi-Storey Car Park - Georgia



Food and Beverage Factory - Georgia



Calcium Carbonate Manufacturing Plant - Oman



Warehouse and Office Facility - UAE



Ceramics Storage Building - Argentina



Forklift Showroom and Workshop - UAE



Natural Mineral Water Bottling Facility - Georgia



Salphonation Plant and Warehouse - Nigeria



Warehouse - Mozambique



Ores Factory - Iraq



Warehouse - Seychelles



Car Park - Qatar



***“Providing Steel Building Systems
and Structures Globally”***



LOCATION

Head Office and Manufacturing Facility
Jebel Ali Industrial Area, Dubai,
United Arab Emirates

Engineering Offices
Dubai, UAE
Cairo, Egypt
Kochi, India
Kannur, India
Hyderabad, India

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