ZAMIL STEEL

total steel building solutions

As of June 2017

Product Brochure

Pre-engineered steel buildings

Structural steel

MaxSEAM® roof system

Content

Zamil Steel Buildings Vietnam Co., Ltd
Introduction

The establishment of Zamil Steel Buildings Vietnam Co., Ltd., in 1997 brought together a joint venture between two renowned international corporations: **Zamil Industrial Investment Company (Zamil Industrial)** and **Mitsui & Co., Ltd.** Currently, with two state-of-the-art manufacturing facilities in Vietnam, supported by a network of sales offices in Thailand, Singapore, Philippines, Myanmar, Malaysia, Laos, Indonesia, Cambodia and Bangladesh, Zamil Steel Buildings Vietnam is the leading pre-engineered steel buildings and steel structures manufacturer in the Asia Pacific region.

Headquartered in the capital city of Hanoi, Zamil Steel Buildings Vietnam is in a unique position to serve the dynamic markets of Vietnam and Asia Pacific. With more than two decades of operation in this region, Zamil Steel Buildings Vietnam has witnessed sustained growth and success by consistently delivering steel buildings and steel structures of superior quality, thanks to customized, complete solutions; longstanding engineering expertise; and manufacturing excellence.

Vision
To be the world's most reliable and innovative manufacturer, and the premier service and solution provider in the steel building industry.

Mission
To supply high-quality steel buildings and structures, providing related services and solutions to a worldwide client base while utilizing innovative technologies within an environment of motivated employees, focused on continuous improvement, highest business standards, work ethics and corporate citizenship, leading to added value for our customers and sustained return on investment to our shareholders.

North Vietnam - Hanoi Plant
located in Noi Bai Industrial Zone, Hanoi, Vietnam

Constructed in 1997, this plant specializes in the fabrication of pre-engineered steel buildings and heavy structural steel products.

Total Area: 41,200 m^2

Fabrication Capacity:
5,000 metric tons (MT) per month

South Vietnam - Dong Nai Plant
located in Amata Industrial Zone, Dong Nai, Vietnam

Inaugurated in 2008, this new plant possesses the most up-to-date cutting-edge technologies and modern machinery for the fabrication of pre-engineered buildings and complex steel structures.

Total Area: 45,150 m^2

Fabrication Capacity:
4,500 metric tons (MT) per month

Zamil Steel Buildings Vietnam Co., Ltd
Introduction

Engineering Expertise

Zamil Steel's engineering groups collaborate through six different countries (Saudi Arabia, Vietnam, India, Egypt, Jordan and UAE) via electronic connections. Leveraging on the experience of supplying more than 68,000 steel buildings in over 90 countries, we have the capability to design based on all international codes and standards. With such expertise, we provide customized best solutions that meet customers' functional, architectural and financial requirements.

Our talented engineers work diligently within a culture that fosters optimum solutions and perfection. The final result is a consistent flow of design, process and practical solutions unique to Zamil Steel, bolstering our position as a global steel industry leader.

Seamless Quality Assurance

At Zamil Steel Buildings Vietnam, stringent quality control procedures are followed in order to ensure the utmost consistency of "Made by Zamil Steel" quality standards. Our Quality Control department has the best engineers, tools and facilities to reinforce the quality policies of Zamil Steel in accordance with international practices and standards.

International Quality Standards

Unless otherwise required by local conditions, all of our steel buildings and steel structures are designed and manufactured in accordance with the latest editions of the following codes:

- **Low Rise Building Systems Manual**
  Metal Building Manufacturer's Association, Inc. **(MBMA)**
- **Manual of Steel Construction Allowable Stress Design**
  American Institute of Steel Construction, Inc. **(AISC)**
- **Cold Formed Steel Design Manual**
  American Iron and Steel Institute (AISI)
- **Structural Welding Code-Steel Manual**
  American Welding Society (AWS)

Manufacturing Excellence

Our manufacturing facilities - which rank among the most advanced in Southeast Asia - are supported by over 40 years of industry experience and world-wide technical capability to ensure high production efficiency. Regardless of projects' locations (Vietnam, Southeast Asia or elsewhere in the world), we ensure that our finished products are of top quality and delivered on time to our clients.

Our manufacturing capabilities also enable us to introduce a diversified range of products to the market, from pre-engineered steel buildings and complementary MaxSEAM® roof systems to the most complicated steel structures. Zamil Steel Buildings Vietnam is well-equipped to bring clients total steel buildings solutions that exceed their expectations in terms of quality and functionality.

Zamil Steel Buildings Vietnam Co., Ltd
Introduction

An Unparalleled Solution Provider

The willingness of Zamil Steel's professionals to listen, understand, and solve clients' problems promptly and reasonably has made Zamil Steel an unparalleled steel buildings solutions provider in the industry. With our international experience and expertise, we provide clients with a variety of solutions that satisfy all their project requirements.

One-Stop Solution

We understand that the construction of steel buildings or steel structures can be challenging. Zamil Steel's One-Stop Solution provides clients with peace of mind. From designing and detailing to fabricating and erecting steel buildings, we handle all these steps with care and deliver superior services to our clients.

Cost Effective Solution

With a long-standing history of engineering excellence, Zamil Steel is pioneering the application of the latest software in designing and fabrication. We handle every single detail of clients' buildings with the newest software versions to ensure maximum cost-effectiveness.

Fast Solution

Every component is fabricated with the utmost attention to quality and detail in the factory, while the onsite assembly is handled by taking into account the cost-benefit of time. All Zamil Steel components are fabricated for speedy installation, enabling the performance of multiple tasks simultaneously and allowing heavy machinery to work concurrently onsite.

Premium Quality Solution

Zamil Steel's integrated manufacturing facilities and seamless quality assurance procedures ensure that every steel building is of premium quality. At Zamil Steel, quality is not by chance, but by choice.

Global Solution

From the snowy plateau of Mongolia to the stormy tropics, more than 68,000 Zamil Steel building projects have satisfied their owners in over 90 countries. With representation in 61 global locations, seven advanced manufacturing facilities and eight engineering offices worldwide, Zamil Steel has the capability to design and fabricate steel buildings based on any client's requirements, regardless of project size or budget.

Innovative Solution

At Zamil Steel, we constantly challenge convention to create greater value for our customers. Combining the technical expertise of pre-engineered steel buildings and structural steel has enabled us to deliver innovative solutions with highly commendable results.

Multi-Purpose Solution

From roof systems to floor systems, from factories to aircraft hangars, from pipe racks to petrochemical complexes, we have international experience in the engineering, manufacturing and supplying of steel buildings for a wide range of applications.

Customized Solution

Leveraging over 40 years of experience in the design and fabrication of pre-engineered steel building and steel structures, Zamil Steel provides customized, perfect-fit solutions that satisfy clients' functional, architecture and financial requirements.

Green Solution

At Zamil Steel, we aim for sustainable growth by emphasizing "green" as one of the key features in designing and manufacturing. Steel - being one of the most recyclable materials - has many environmental advantages. Our steel buildings can be reinstalled, moved to other places or recycled many times. Components can be shifted from one place to another without difficulty, with options to extend the structures as required by clients.

Zamil Steel **Global Network**

Eleven Factories in

- Hanoi, Vietnam (1 plant)
- Dong Nai, Vietnam (1 plant)
- Dammam, Saudi Arabia (5 plants)
- Cairo, Egypt (1 plant)
- 6th of October, Egypt (1 plant)
- Sadat, Egypt (1 plant)
- Pune, India (1 plant)
- Ras Al-Khaimah, UAE (1 plant)

Eight Engineering Offices worldwide

- Hanoi, Vietnam
- HCMC, Vietnam
- Alexandria, Egypt
- Cairo, Egypt
- Chennai, India
- Dammam, Saudi Arabia
- Kochi, India
- Pune, India

And 60 Representative Offices across Asia, Africa, Europe and Oceania

... and international recognition

ISO - 9001

ISO - 14001

OHSAS - 18001

S1 - Singapore

AISC - USA

FM Approval

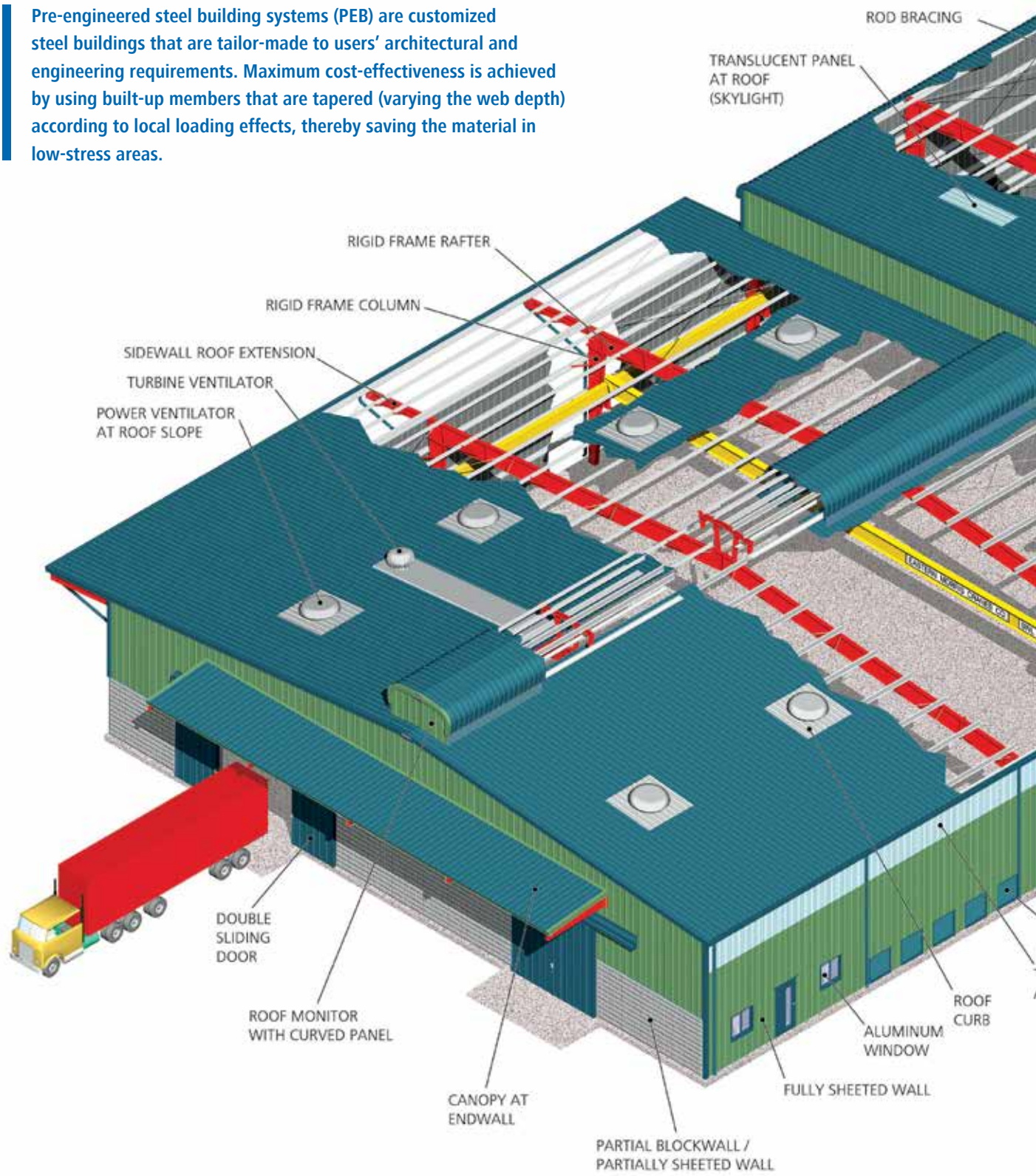
ZAMIL STEEL

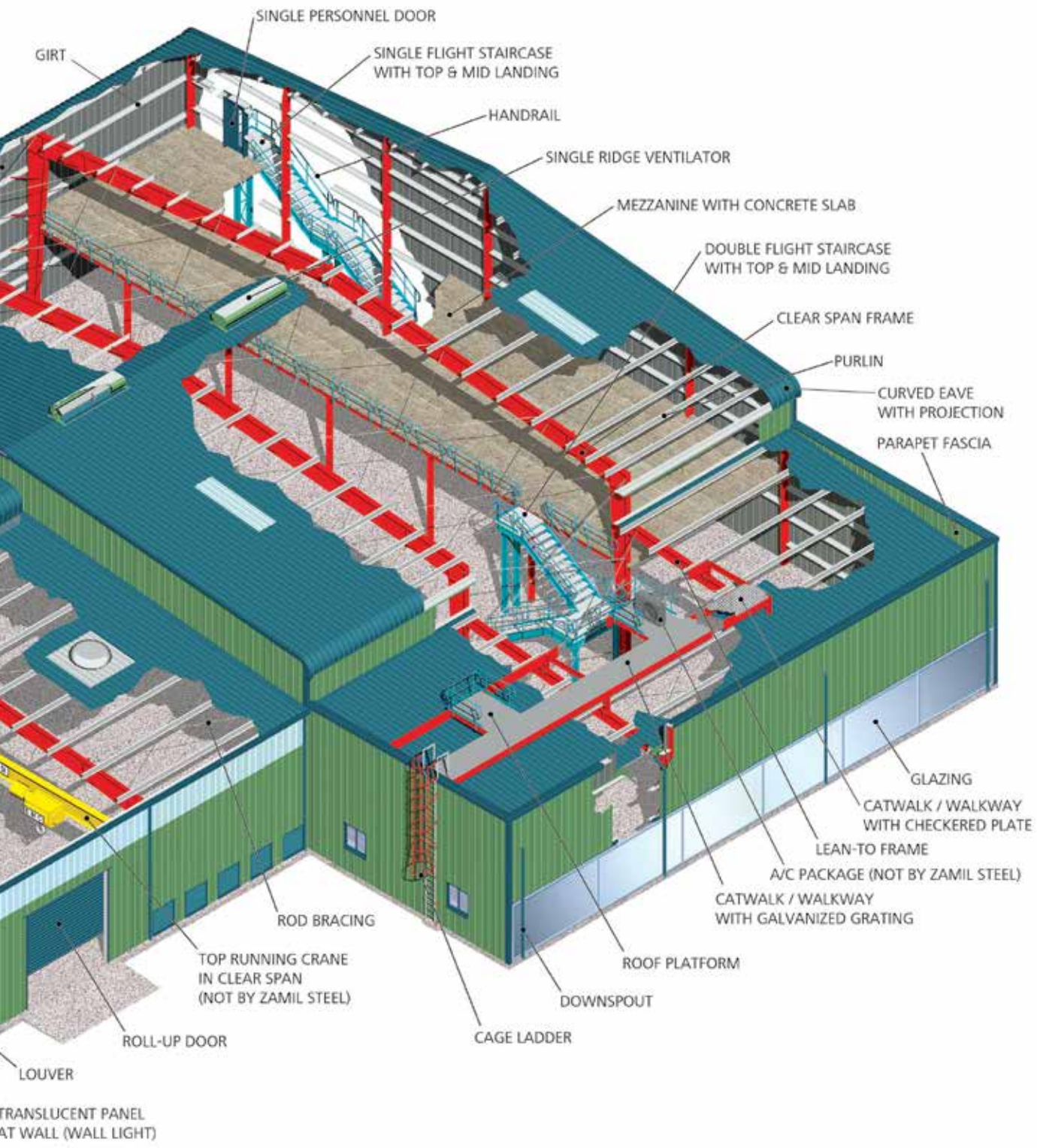
total steel building solutions

PRE-ENGINEERED STEEL BUILDINGS (PEB)

The Pre-Engineered
Steel Building (PEB) System

Pre-engineered steel building systems (PEB) are customized steel buildings that are tailor-made to users' architectural and engineering requirements. Maximum cost-effectiveness is achieved by using built-up members that are tapered (varying the web depth) according to local loading effects, thereby saving the material in low-stress areas.




SINGLE PERSONNEL DOOR
GIRT
SINGLE FLIGHT STAIRCASE
WITH TOP & MID LANDING
HANDRAIL
SINGLE RIDGE VENTILATOR
MEZZANINE WITH CONCRETE SLAB
DOUBLE FLIGHT STAIRCASE
WITH TOP & MID LANDING
CLEAR SPAN FRAME
PURLIN
CURVED EAVE
WITH PROJECTION
PARAPET FASCIA
GLAZING
CATWALK / WALKWAY
WITH CHECKERED PLATE
LEAN-TO FRAME
A/C PACKAGE (NOT BY ZAMIL STEEL)
CATWALK / WALKWAY
WITH GALVANIZED GRATING
ROD BRACING
TOP RUNNING CRANE
IN CLEAR SPAN
(NOT BY ZAMIL STEEL)
ROOF PLATFORM
DOWNSPOUT
ROLL-UP DOOR
CAGE LADDER
LOUVER
TRANSLUCENT PANEL
AT WALL (WALL LIGHT)

Basic Building Parameters

Zamil Steel's pre-engineered steel buildings are designed to meet clients' custom requirements. The basic parameters that define a pre-engineered steel building are as follows:

Building Width: No matter what primary framing system is used, the building width is defined as the distance from outside of eave strut of one sidewall to outside of eave strut of the opposite sidewall.

Building Length: The building length is the distance between the outside flanges of the endwall columns in opposite endwalls. Building length is a combination of several bay lengths.

End Bay Length: This is the distance from outside of the endwall columns' outer flange to the center line of the first interior frame columns.

Design Loads: Unless otherwise specified, Zamil Steel's Pre-Engineered Steel Buildings are designed for the following minimum loads:
Roof Live Load: 0.57 kN/m^2
Design Wind Speed: 110 km/h

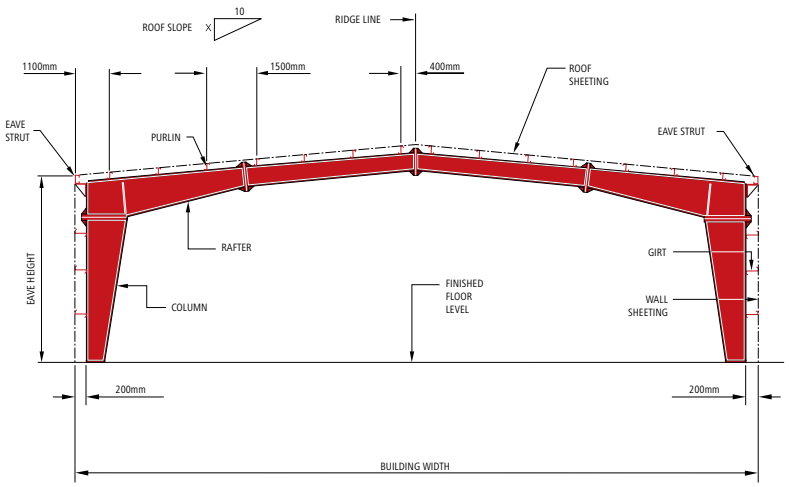
Design parameters for snow loads, earthquake loads, collateral loads, or any other local climatic condition (if required) must be specified at the time of quotation.

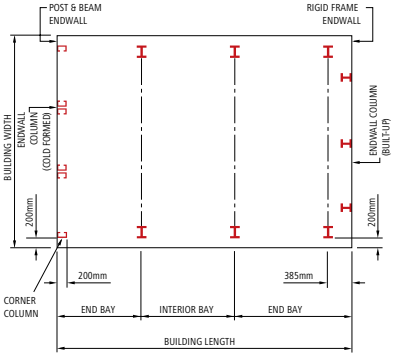
Loads are applied in accordance with the latest American codes and standards applicable to pre-engineered steel buildings, unless otherwise requested at the time of quotation.

Interior Bay Length: This is the distance between the center lines of two adjacent interior main frame columns. The most common bay lengths are 6m, 7.5m and 9m. Any bay length up to 15m is possible.

Building Height: Building height is the **eave height** which usually is the distance from the bottom of the main frame column base plate to the top outer point of the eave strut. Eave heights up to 30 m are possible. When columns are recessed or elevated from finished floor, eave height is the distance from finished floor level to top of eave strut.

Roof Slope (x/10): This is the tangent of the roof with respect to the horizontal. The most common roof slopes are 0.5/10 and 1/10. Any practical roof slope is possible.





Building Length: *Whenever possible maintain equal bay lengths throughout the building. When this is not possible, make all interior bays equal and make the end bays equal but shorter than the interior bays.*

Example: *A 100m long building will have 10 interior bays at 9m and 2 end bays at 5m or 11 interior bays at 8m and 2 end bays at 6m.*

Building Width: *Whenever possible make building width a multiple of 3 m. This is because roof purlins are spaced at 1.5 m and 3 m is equal to two purlin spacings one on each side of the ridge.*

For more details, please refer to the drawings below for pre-engineered steel buildings

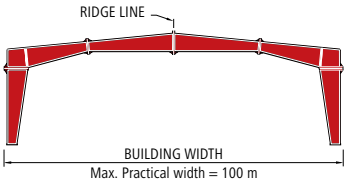
Primary Framing System

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 its maximum internal stress. Since a hot rolled section has a constant depth, many parts of the member in areas of low internal stress are in excess of design requirements.

Frames of pre-engineered steel buildings are made from standard plates stocked by the manufacturers of the buildings. The pre-engineered steel building frames are normally tapered and have flanges and webs of variable thicknesses along the individual members.

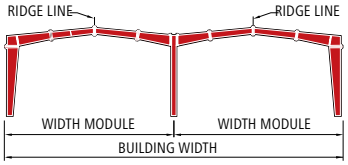
The frame geometry matches the shape of the internal stress bending moment diagram, thus optimizing material usage and reducing the total weight of the structure.

The most common primary framing systems are shown below. Zamil Steel's engineering group will design the proper systems to fit with clients' requirements for building usages.



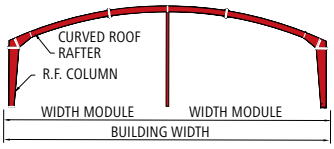
Max. Practical width = 100 m

Clear Span (CS)



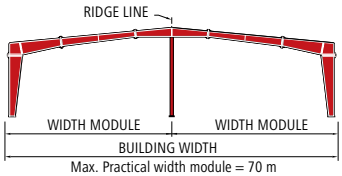
Max.Practical width module = 100 m
Max Practical building width = 200 m

Multi-Gable (MG)



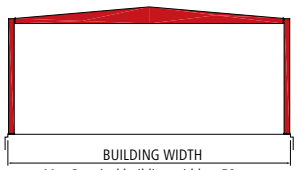
Max. Practical width module = 70 m
More Multi-Spans are possible (AMS-2, AMS-3,...)

Arched Multi-Span (AMS-1)



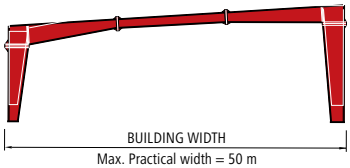
Max. Practical width module = 70 m
Max Practical building with = 140 m

Multi-span "1" (MS-1)



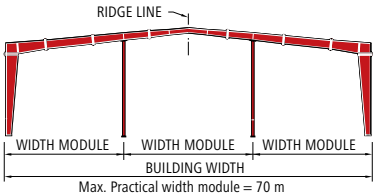
Max Practical building width = 50 m

Spacesaver Building



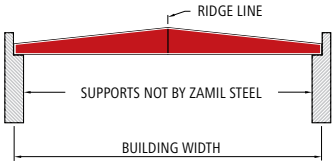
Max. Practical width = 50 m

Single Slope (SS)



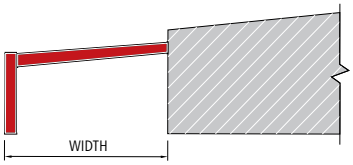
Max. Practical width module = 70 m
Max Practical building width = 210 m

Multi-Span"2" (MS-2)



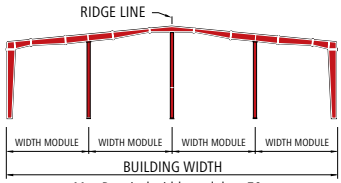
Max. Practical width = 50m

Roof System (RS)

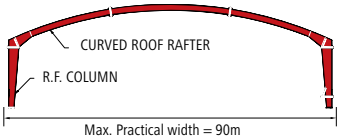


Max. Practical width = 24 m

Lean-To (LT)

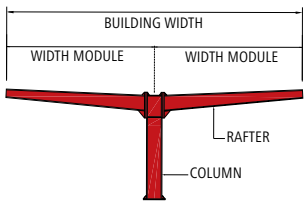


Max.Practical width module = 70 m
Max Practical building width = 280 m



Max. Practical width = 90m

Arched Clear-Span (AS)



Max. Practical width module = 6 m
Max Practical building width = 12 m

Pre-engineered Steel Buildings vs. Conventional Steel Buildings

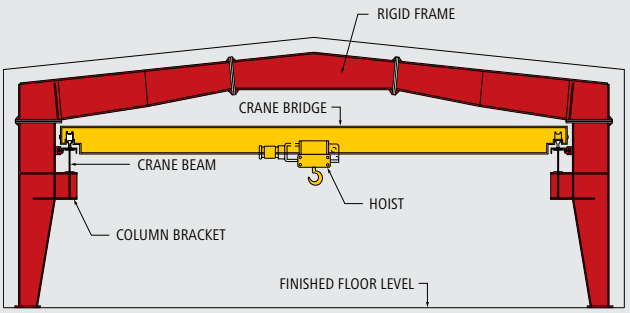
	ZAMIL STEEL® PRE-ENGINEERED STEEL BUILDINGS	CONVENTIONAL STEEL BUILDINGS
STRUCTURE WEIGHT	Pre-engineered steel buildings are 30% lighter. Primary framing members are tapered, built-up sections with large depths in the areas of highest stress. Secondary members are light gauge (lightweight) roll formed "Z" - or "C" - shaped members.	Primary steel members are selected from standard hot rolled "I" sections, which are (in many segments) heavier than required by the designs. Members have constant cross-sections regardless of the varying magnitude of the local internal stresses along the member length. Secondary members are selected from standard hot rolled "I" and "C" sections, which are heavier.
DESIGN	Designing is quick and convenient. Buildings are mainly formed by standard sections and connections, significantly reducing design time. Basic designs are based on international design standards and codes. Specialized design software and applications are used for optimizing material and drafting. Design, shop detail sketches and construction drawings/blueprints are provided. Approval drawings are prepared within two weeks. Zamil Steel has a library of various standard designs on-hand for faster and more efficient delivery of designs.	Each conventional steel structure is designed manually from scratch, with fewer supporting design software and applications. Substantial engineering and detailing works are required on every project. Extensive consultancy time is required for designing and drafting, coordination, and review. Each project is a separate case, so engineers need time to develop the design and details of the unique structure. More complicated design requires extensive design and drafting time.
ARCHITECTURE	Outstanding architectural designs can be achieved. Traditional walls and fascia materials such as concrete, masonry and wood can be utilized.	Special architectural designs and features must be customized if needed for each project, requiring research time and thus often resulting in much higher costs.
DELIVERY	Ranging from 6 to 8 weeks.	Ranging from 20 to 26 weeks.
FOUNDATION	Simple, lightweight and easy to construct.	Extensive, heavy foundation is required.
CONSTRUCTION SIMPLICITY	Standard connections among components make the learning curve steeper for construction of each subsequent project. Periodic job site support is provided.	Connections are complicated and differ from one project to another.

Pre-engineered Steel Buildings vs. Conventional Steel Buildings

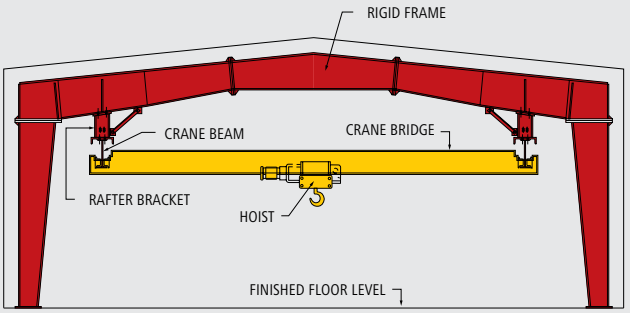
	ZAMIL STEEL® PRE-ENGINEERED STEEL BUILDINGS	CONVENTIONAL STEEL BUILDINGS
CONSTRUCTION COST AND TIME	Construction cost and time are precisely calculated. Our pre-engineered steel buildings are erected by professional, experienced builders. They usually have stock of standard components on-hand, enabling them to complete the projects on time should any shortage of materials occur. The systematic construction procedures are easy and fast, and require hardly any complex equipment.	Conventional steel buildings are 20% more expensive than pre-engineered steel buildings. In most cases, construction cost and time cannot be estimated precisely. Extensive time and manpower are required for construction. Heavy machinery and equipment are often needed.
SEISMIC RESISTANCE	The low-weight flexible frames offer greater resistance to seismic forces.	Rigid, heavy structures do not perform well in regions prone to earthquakes.
OVERALL PRICE	Price per square meter could be up to 30% lower than for conventional steel buildings.	The price per square meter is higher.
SOURCING & COORDINATION	Zamil Steel's pre-engineered steel buildings are supplied completely with cladding and all accessories. We also provide assembly service (if required by clients).	Buildings and components are sourced from different suppliers. Coordination between suppliers and sub-contractors takes a considerable amount of time in project management.
CHANGING AND EXPANSION	Pre-engineered steel buildings manufacturers have raw materials in stock to easily accommodate order changes. Future changes and expansion are simple and easy, as project data and drawings are recorded for years in our system.	Substitution of hot rolled sections is expensive and time-consuming. Changes made to orders after hot rolled sections are shipped for fabrication often result in additional costs because the components cannot be reused. Project data is recorded separately by different parties, making it difficult to track.
GLOBAL EXPERIENCE	Zamil Steel is a global supplier of pre-engineered buildings, with over 68,000 buildings supplied to 90 countries worldwide.	Conventional steel buildings suppliers are more locally oriented and have less experience.

Crane System

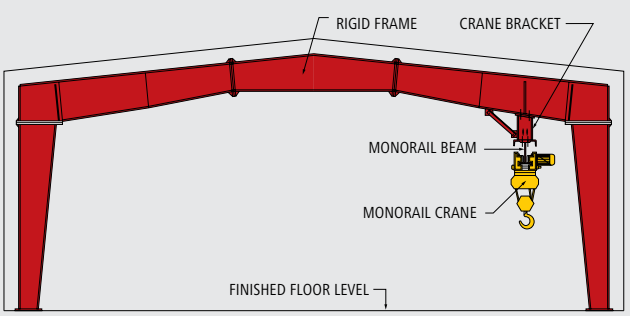
For buildings that require crane systems, Zamil Steel designs the supports base on crane capacity and operation detail.



TOP RUNNING CRANE



UNDERHUNG CRANE

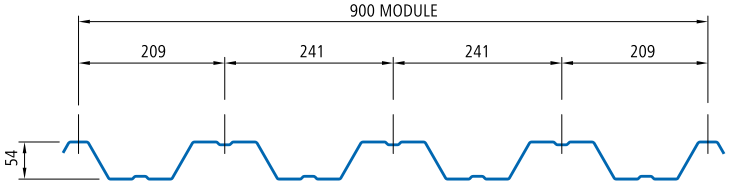


MONORAIL CRANE

Flooring System

Floor systems offered by Zamil Steel include flooring, catwalks, walkways, platforms, all their components and subsystems such as grating, checkered plates, staircase, handrails and guardrails.

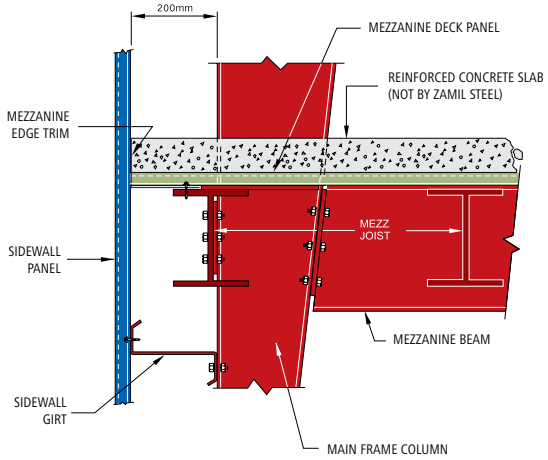
Flooring system options range from single to multiple levels.



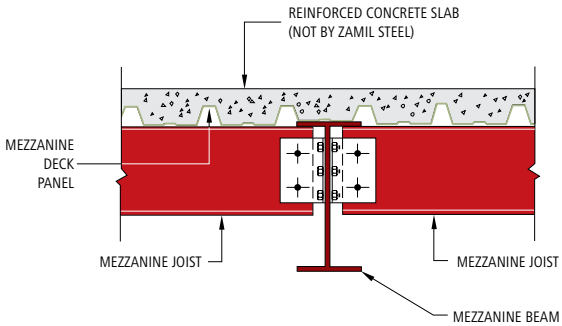
0.7MM THICK - TYPE "K" PROFILE PANEL
(For mezzanine decking)

1. Concrete floor

Reinforced concrete slab (0.7mm thick) is cast on the metal deck supplied by Zamil Steel.



MEZZANINE BEAM CONNECTION TO MAIN FRAME COLUMN



MEZZANINE JOIST CONNECTION TO MEZZANINE BEAM

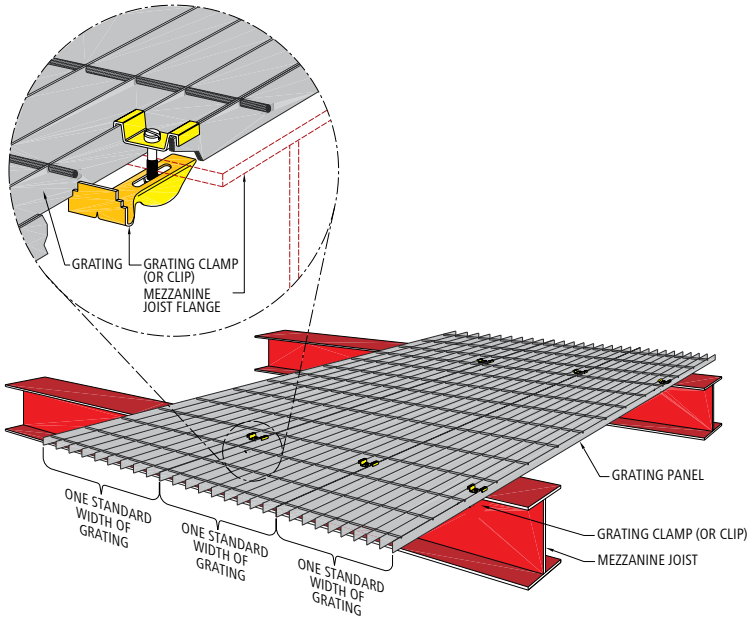
NON-COMPOSITE DESIGN WITH STEEL DECK SUPPORT

COMPOSITE DESIGN WITH STEEL DECK AND SHEAR STUD

Flooring System

2. Galvanized steel grating floor

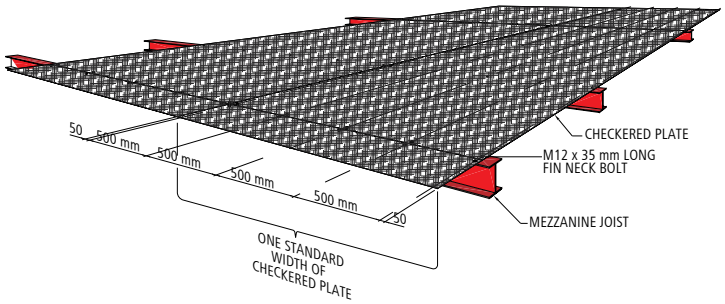
Grating is a kind of floor finishing that uses galvanized steel and is connected to the main frame by clamps.



MEZZANINE GRATING CONNECTION TO JOIST

3. Checkered plate floor

The checkered plate is a floor finishing that connects to the main frame by fin neck bolts.

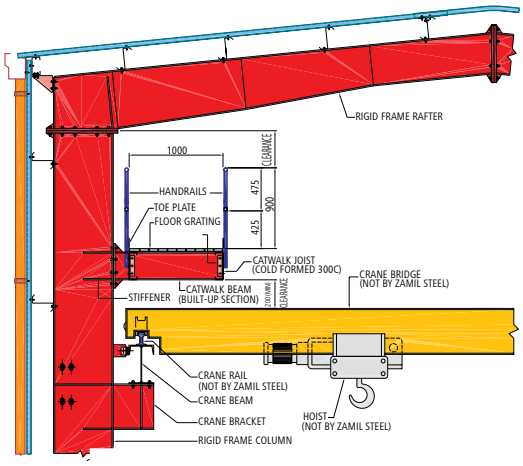


MEZZANINE CHECKERED PLATE CONNECTION TO JOIST

Sub - Flooring System

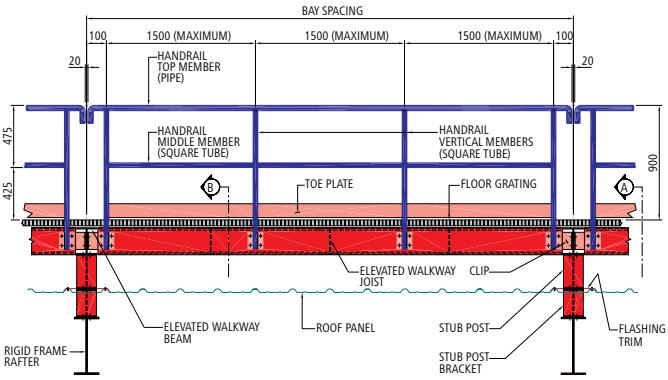
Catwalk, Walkway, Staircase, Handrail

Catwalk



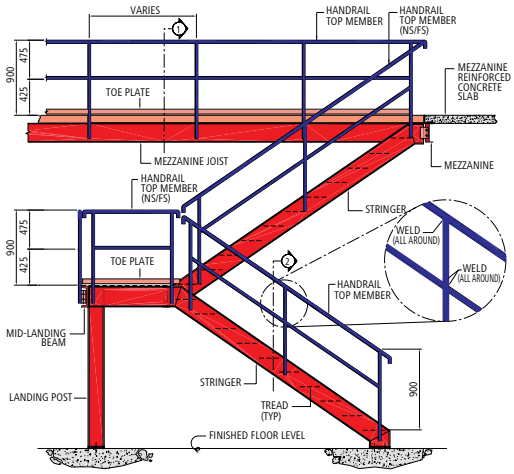
CATWALKS AT RIGID FRAME COLUMN

Walkway



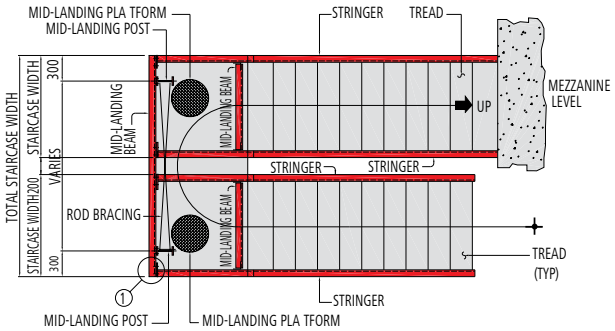
ELEVATED WALKWAY

Handrail



TYPICAL INDUSTRIAL HANDRAILS

Staircase

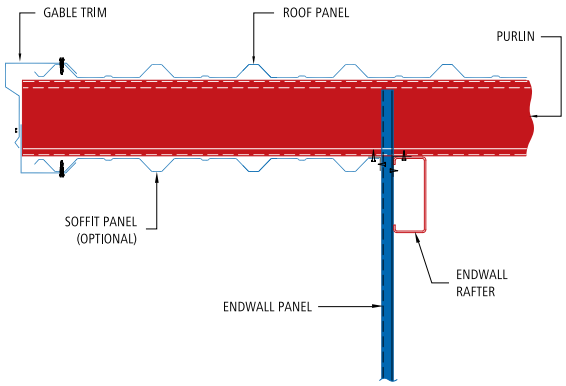


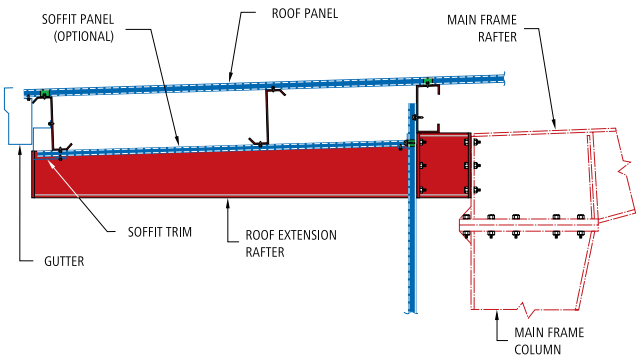
DOUBLE FLIGHT STAIRCASE

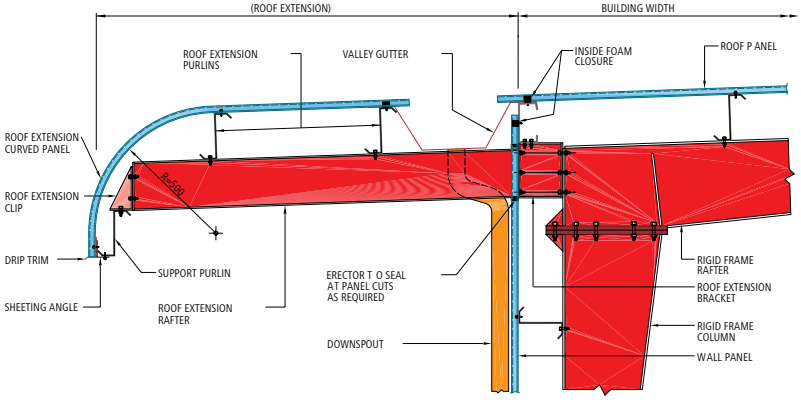
Sub-Structural System

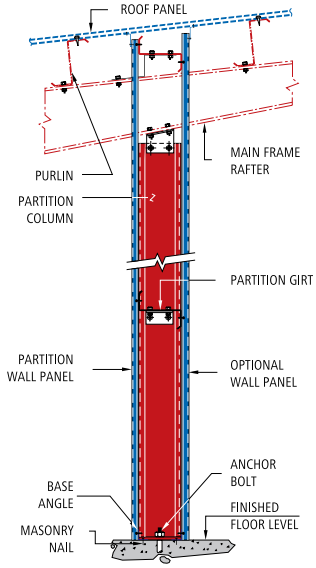
ENDWALL ROOF EXTENSION

SIDEWALL ROOF EXTENSION







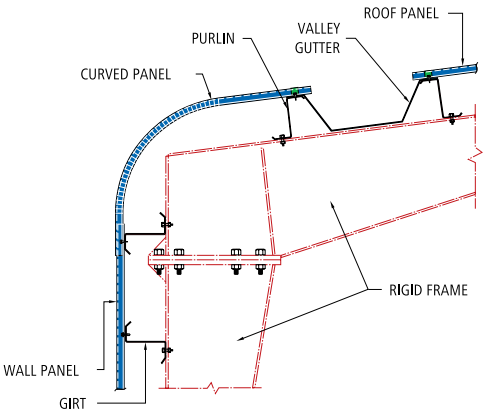


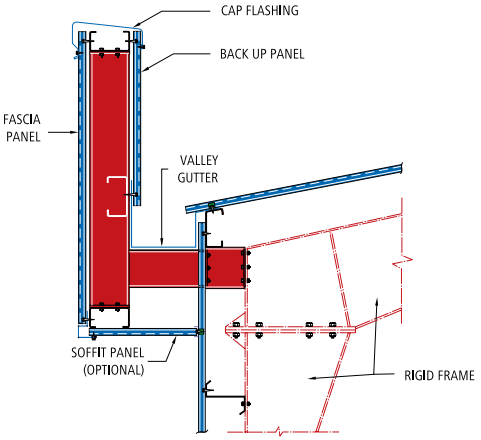
CURVED CANOPY

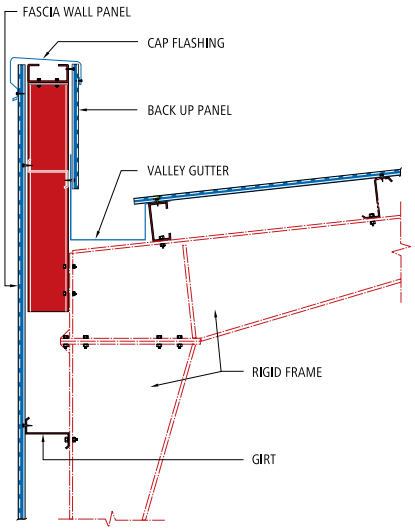
LONGITUDINAL PARTITION

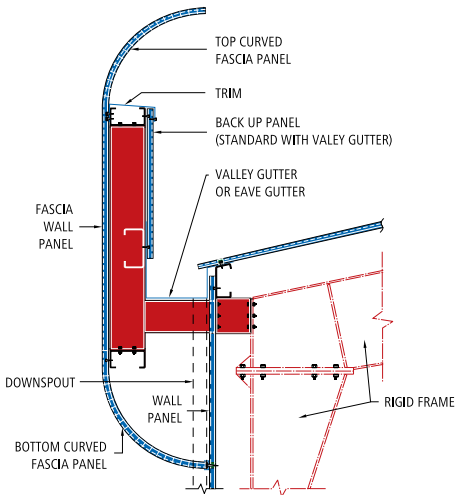
CURVED EAVE WITHOUT PROJECTION (WITH VALLEY GUTTER)

VERTICAL FASCIA WITH BACK UP PANEL AND VALLEY GUTTER









PARAPET FASCIA

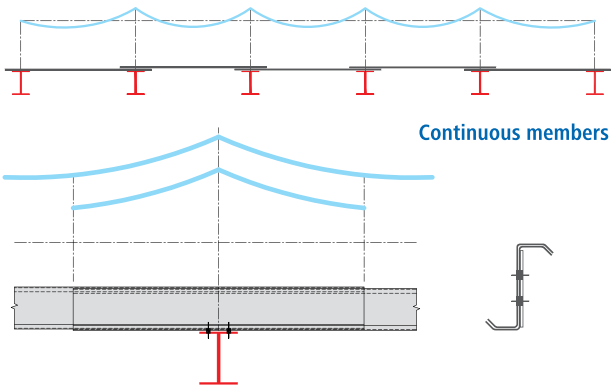
TOP AND BOTTOM CURVED FASCIA PANEL

Secondary and Bracing system

Secondary Framing System

"Z"-shaped roof purlins and wall girts are used for the secondary framing. They are lighter than the conventional hot rolled "I" - or "C"- shaped sections in conventional steel buildings.

Nesting of the "Z" - shaped members at the frames allows them to act as continuous members along the length of the building. This doubles the strength capacity of the "Z" - shaped members at the laps, where the maximum internal stresses normally occur.

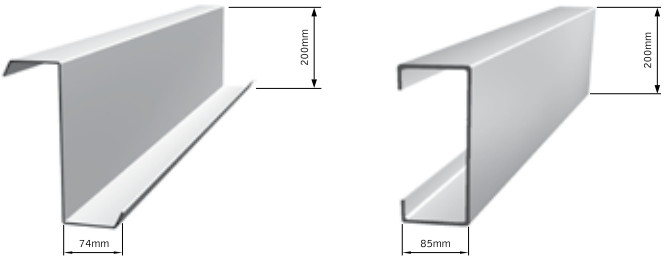


Continuous members

Strength capacity is double at the lap

Nesting at two purlins

Secondary Members



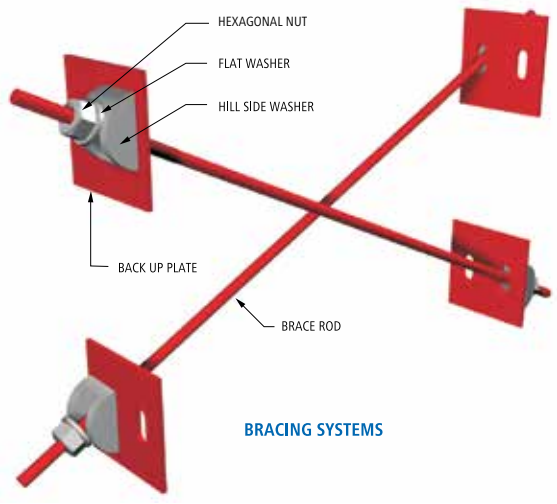
TYPICAL "Z" SECTION

TYPICAL "C" SECTION

SECONDARY MEMBERS
(Minimum Yield Strength is 34.0 kN/cm^2)

Cold-formed from steel coils (available in 1.5mm, 1.75mm, 2.0mm and 2.5mm thickness) conform to ASTM A653M SS Grade 340 Class 1 (or equivalent) with zinc coating to Z275 designation (275 g/m^2).

Bracing Systems



BRACING SYSTEMS

Rod bracings conform to JIS G3101 SS400 (or equivalent) with an ultimate tensile strength of 40.0 kN/cm^2. (Other bracing systems are available at the discretion of the Zamil Steel engineering department.)

Building Accessories

Doors and Windows

Based on your requirements, we supply all building accessories such as windows, louvers, sliding doors, roll-up doors, personnel doors, etc.

Aluminum Window

Fixed Louver

Personnel Door

Double Sliding Door

Roll-up Door

Ridge Ventilator

Translucent Panel (Skylight)

Wall Light

Insulation

Examples of Sundry items

- Anchor Bolts
- Bolts and Nuts
- Mild Steel Bolt
- Hillside Washers
- Coupling Nuts
- Fasteners
- Sealants and Closures

Roofing, Wall Claddings and Drainage Systems

Wall cladding and Conventional roofing systems

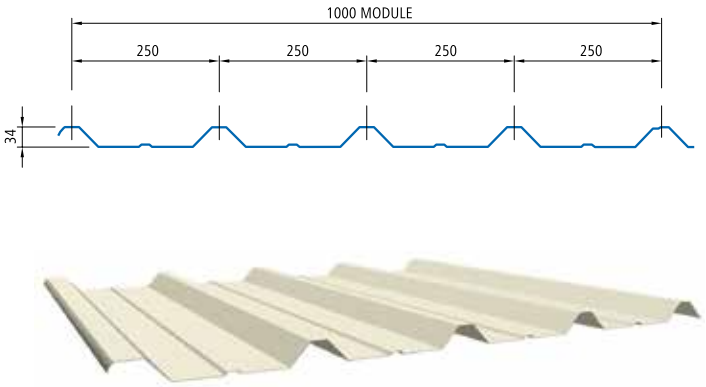
Type S panel

The panels used for Zamil Steel pre-engineered steel buildings are composed of the following:

Base metal of Zamil Steel single-skin panels (minimum yield strength of 34.0 kN/cm^2) coated with zinc (approximately 55%) and aluminum (45%), conforming to ASTM A792M-SS Grade 340 Class 2 (or equivalents).

An exterior surface or weather-facing coating on painted panels of 5 microns epoxy and 20 microns of high-durability polyester.

An interior surface coating on painted panels of 5 microns epoxy and 5 to 7 microns of regular polyester.



0.5MM THICK - TYPE "S" PROFILE PANEL
(For roof and wall application)

Standard Panel Colors

Bare Zincalume	Cactus Green	Frost White	Shasta Blue	Galaxy Blue

Actual color may differ slightly from printed examples. Refer to Zamil Steel's "Panel Chart (colors and profiles)" for actual color samples.

Bare Zincalume® steel panels (0.5mm nominal thickness) are available in all standard colors.

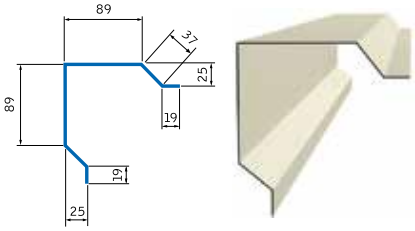
Panels may be specially ordered to any base metal specification, coating, finish, color and thickness. Consult Zamil Steel's representative for price and delivery.

* Other colors are available upon request (or shall be advised) in advance only.

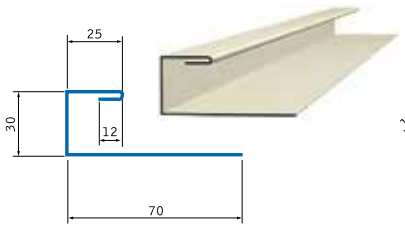
Roofing, Wall Claddings and Drainage Systems

Trim

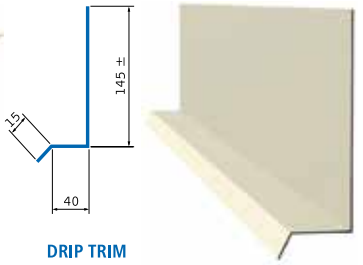
Trims are made of the same material as single-skin panels and are available in all standard panel colors. Shown below are the most common trims used in Zamil Steel pre-engineered steel buildings.



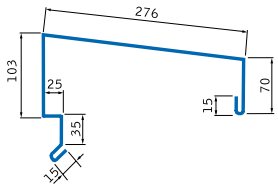
OUTSIDE CORNER TRIM
(at intersection of endwall and sidewall)



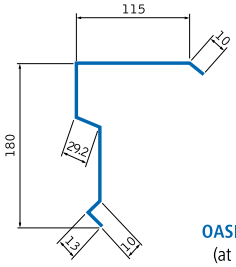
FRAMED OPENING TRIM



DRIP TRIM



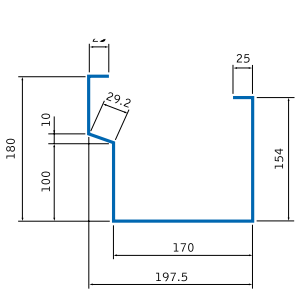
CAP FLASHING

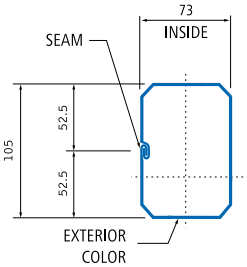


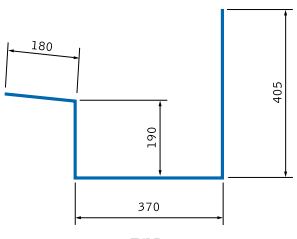
OASIS GABLE TRIM
(at endwalls only)

Drainage System

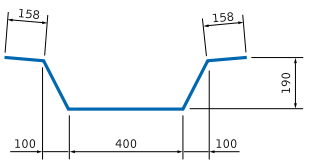
Eave gutters and downspouts are made of the same material as standard single-skin panels and are available in all standard panel colors. Valley gutters are made of plain Zincalume (1.0mm thick).







TYPE I



TYPE II

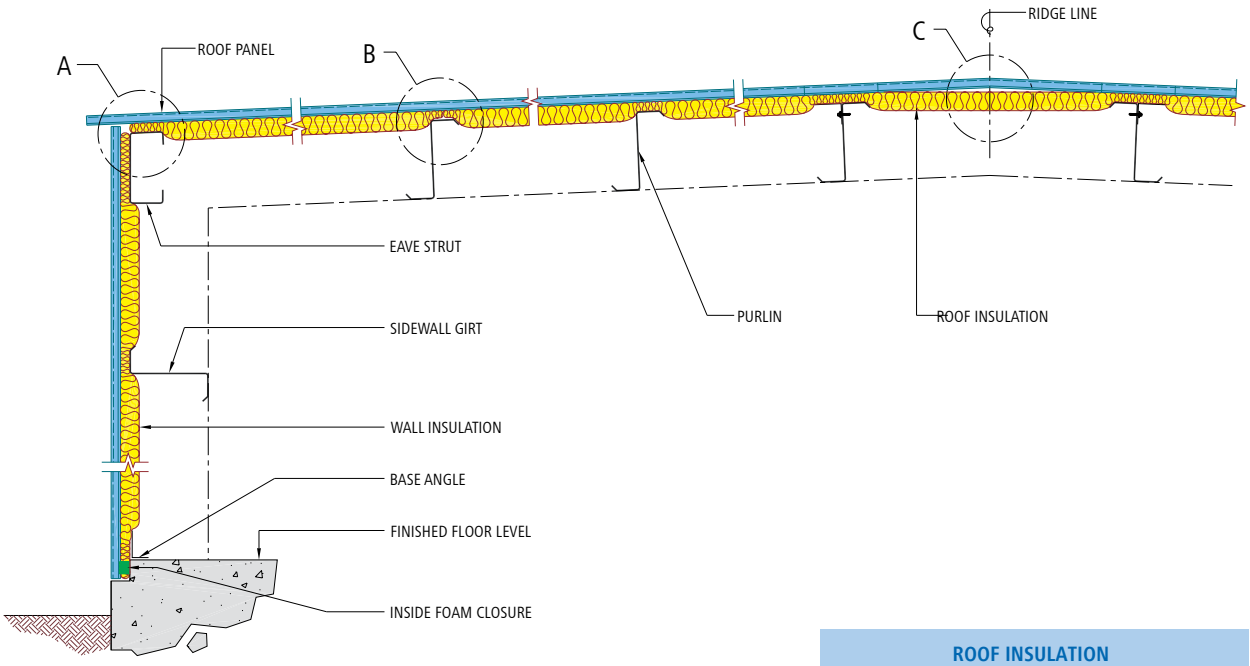
EAVE GUTTER

DOWNSPOUT

VALLEY GUTTER

Insulation

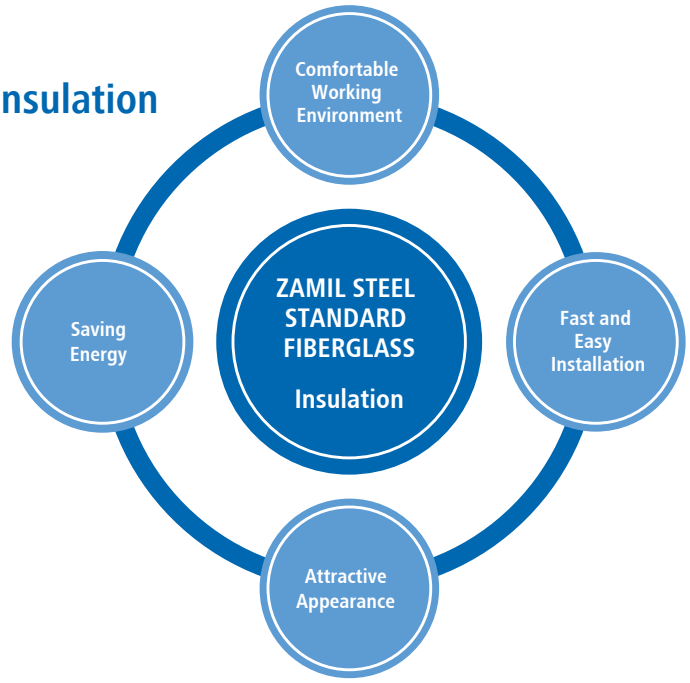
In roof installation, one of the challenging factors is thermal flows through unit area of a wall and roof system when temperature difference exists between airs on each side of the structure. To reduce heat gain or loss through the building envelope, Zamil Steel recommends that roofs and wall of pre-engineered steel buildings be insulated with Zamil Steel standard fiberglass insulation.



ROOF INSULATION

Features and Benefit
Zamil Steel Standard Fiberglass Insulation

Zamil's standard insulation is fiberglass, a highly efficient, lightweight, strong, resilient, and easy-to-handle flexible blanket insulation. It is composed of fine, stable, and uniformly textured inorganic glass fibers which is bonded together by a non-water soluble and fire-retardant thermosetting resin. Due to its mineral composition, it is free from coarse fibers and shot particles.



Insulation

Zamil Steel Standard Fiberglass Insulation

The main technical values of Zamil Steel insulation include the following:

Standard Nominal Density

10 - 12 kg/m^3 - 0.625 - 0.75 lb/ft^3

Working Temperature Limitations (ASTM C 411)

-4° to +260°C. At excessive temperatures and/or in contact with hot surfaces, a limited migration of binder may occur in the insulation. This in no way impairs the performance of the insulation.

Nominal Thermal Conductivity (ASTM C 518, B.S. 874)

"K" or "λ" = 0.040W/m. °C or 0.28Btu.in/ft^2.hr °F at 24°C or 75 °F mean temperature

Thermal Conductance, 'C' .Value (ASTM C 518,ASTM C 177)

C=1/R =W/m^2.OC or Btu/hr.ft^2.oF

Thermal Transmittance (U value)

Thermal transmittance is the rate of heat flow through unit area of a wall system when unit temperature difference exists between air on each side of the structure. The U value is the reciprocal of the sum of the resistances of the component parts of the structure plus the resistance of the surfaces and any cavities within the structure.

U=1/ Rt

U-values for roofs and walls using a 50mm and 100mm thick fiberglass with density 10kg/m^3 are shown below:

Insulation Thickness (mm)	U value	
	Roof	Wall
	(W/m^2.K)	(W/m^2.K)
50	0.642	0.678
100	0.364	0.375

Thermal Resistance, "R" Value (ASTM C 167)

R-value is a measure of the resistance to heat of a material of any givens thickness.

R= T/K

Where "T"=thickness and "K" or "λ"=thermal conductivity.

"R"=m2.°C/W or hr.ft2.°F/Btu.

Insulation

Zamil Steel Standard Fiberglass Insulation

R-Values of Standard Sizes Available

Insulation Thickness (mm)	R-value (m^2.K/W) at Various Densities			
	10 kg/m^3	12 kg/m^3	16 kg/m^3	20 kg/m^3
50	1.190	1.250	1.282	1.389
100	2.381	2.500	2.564	2.778

Sound Transmission

Sound transmission losses for single metallic wall sheet plus insulation
(as per ASTM E90) are as follows:

Density Kg/m3	Thickness (mm)	Sound Transmission Loss (dB)						
		Sound Frequencies (Hz)						
10	50	125	250	500	1000	2000	4000	STC
	10	12	14	15	21	21	25	20
12	50	11	15	16	29	31	37	24
	100	12 11	16 17	18 21	31 34	32 35	39 42	25 27

Specifications and Material Characteristics of Zamil Steel Standard Fiberglass Insulation

Zamil Steel standard fiberglass insulation is manufactured by AFICO under license from and utilizing the manufacturing specifications and technology of **Owens-Corning Corporation**, Toledo, Ohio, U.S.A.

Specifications Compliance

Zamil standard fiberglass insulation complies with the property requirements of the following specifications

- U.S. Federal Specification HH-I-521 F,
- U.S. Federal Specification HH-I-558 B, TYPE I,
- CLASS 6, B-I
- TIMA Standard 202
- ASTM C 423

Insulation

Zamil Steel Standard Fiberglass Insulation

Fire and Safety Properties

- BS 476 Part 4: Non-combustible; ASTM E84 (Via UL 723); ASTM E136
- BS 476 Part 5: Ignitability
- BS 476 Part 6: Fire propagation
- BS 476 Part 7: Surface spread of flame
- UL 723, ASTM E 84, ASTM E 136: Surface burning characteristics

Base glass fiber is non-combustible when tested to ASTM E 84.

FACING	FLAME SPREAD	SMOKE DEVELOPED	FUEL CONTRIBUTED
FRK	25	10	0
WMS	20	30	0

Material Characteristics

- **Mold growth (ASTM D2020, UL181, ASTM C991)**

Non-Toxic, rot proof, odorless, non-hygroscopic and does not breed or sustain mold, fungus, bacteria or rodents.

- **Corrosiveness (ASTM C665)**

This non-corrosive and chemical insert will not cause or accelerate corrosion of steel, stainless steel, copper or aluminum, due to its inorganic and mineral composition.

- **Moisture absorption (ASTM D-07B, ATSM C553)**

In conditions of 95% relative humidity at 49oC for 96 hours, moisture absorption is less than 0.2% by volume, when tested in accordance with ASTM C553. Zamil Steel standard fiberglass insulation products do not absorb moisture from the ambient air nor water by capillary attraction.

- **Alkalinity**

PH9

- **Vapor permeability comply with ASTM E96 A 0.02**

Performance Characteristics

- **Compressive Strength**

  PCF AT 10% DEFORMATION 5

  PCF AT 25% DEFORMATION 10

- **Puncture resistance (ASTM D781)**

  FRK 25 Units

  WMSK 25 Units

Insulation

Zamil Steel Standard Fiberglass Insulation Facing

Zamil Steel standard fiberglass insulation is designed and factory-laminated to a choice of functional finishes in order to provide attractive interiors, resist abuse, and help control moisture or vapor condensation. Available standard insulation options include one-side factory-applied Foil Reinforced Kraft (FRK), White Metalized Scrim Kraft (WMSK) or other specific vapor barrier facings.

The proper facing preserves the inherent fire safety of metal buildings. These facings brighten the building interiors due to their high light reflectance, reduce the cost of interior lighting, and contribute to an effective vapor barrier to control condensation and dripping moisture.

Facing is 50mm wider than insulation in order to staple.

Type	Thickness (mm)	Light reflectance	Perm Rating
FRK	**50**	**89%**	**0.02**
WMSK	**100**	**80%**	**0.02**

Maintenance

No maintenance is required. Zamil Steel standard fiberglass insulation has a high resistance to accidental damage from knocks and handling during installation and maintenance. The insulation is dimensionally stable under varying conditions of temperature and humidity. It is also rot-proof, odorless and non-hygroscopic, and will not sustain vermin or fungus due to its inorganic and mineral composition.

Zamil Steel standard fiberglass insulation will maintain its thermal properties throughout the lifetime of the construction and will not age. It is also non-toxic and not hazardous to health.

Storage

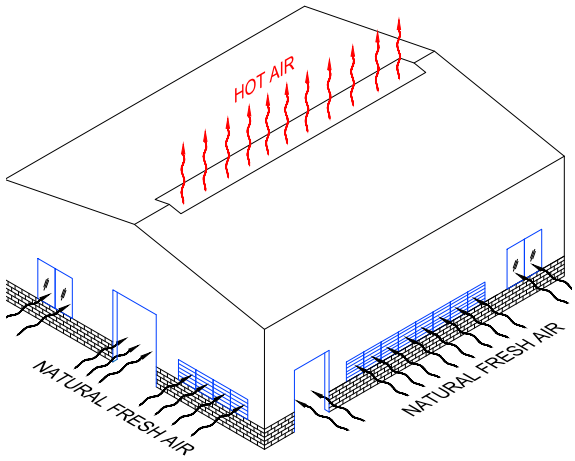
To avoid introducing moisture to the building during construction, Zamil Steel standard fiberglass insulation must be kept in a dry place when stored outside.

Ventilator Systems

Zamil Steel Buildings Vietnam provides natural ventilator systems for steel buildings, with great ventilation capacity and excellent water leakage prevention.

A ventilator controls the interior environment of the building through reduction and removal of head build-up, gaseous byproducts, and flammable fumes, thus providing a healthier, more comfortable atmosphere for workers, preserving goods and enabling equipment to function properly, and minimizing fire hazards.

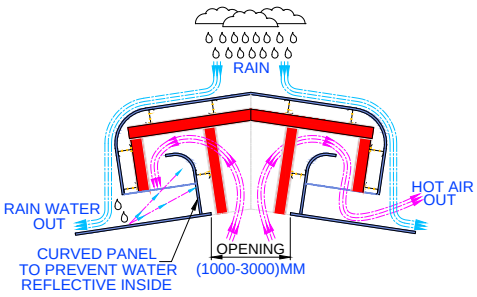
Ventilator systems come in two categories: inlet and outlet equipment. The principle of ventilation is shown as below.

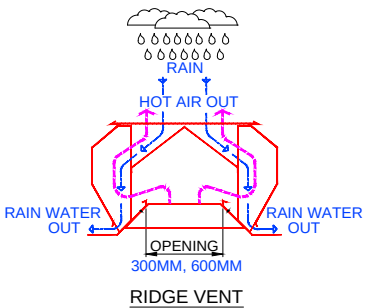


NATURAL VENTILATOR PRINCIPLE

Natural fresh air will enter the building through the inlet equipment, and hot air inside the building will go out through the outlet equipment.

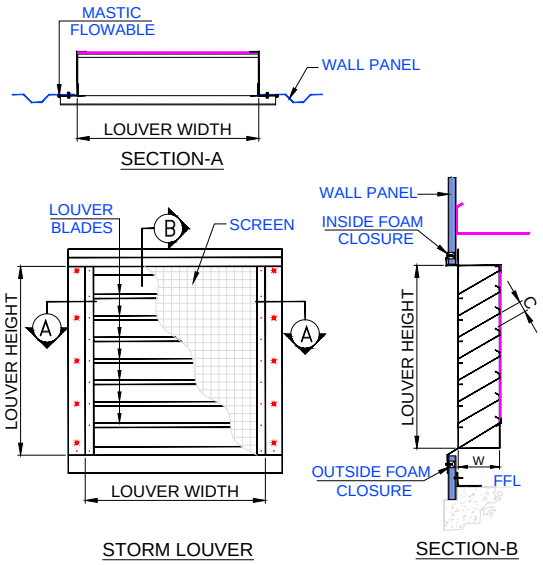
Standard outlet ventilator





Zamil Steel Standard Outlet Ventilator Product

Standard inlet ventilator



Zamil Steel Standard Inlet Ventilator Product

Examples of Pre-Engineered Steel Buildings Applications

Petrochemical	Automotive	Garment, Textile
Electronics	Food	Beverage
Paper	Plastic	Aviation
Ports	Hypermarkets, Shopping Malls	Apartments, Office Buildings
Agriculture	Schools, Universities	Sport Centers, Sport Halls

Fertilizer factory	Refinery Complex	Sugar Mill
		
Hypermarket	**Gymnasium**	**School**
		

ZAMIL STEEL

total steel building solutions

MaxSEAM®
THE ULTIMATE ROOF SYSTEM

FM APPROVED

MaxSEAM®

The ultimate weatherproof roof system

The application of Standing Seam Roof systems (SSRs) have been one of the most exciting breakthroughs in roofing technology in the last 30 years. For the past few years, they have been widely used in almost 50% of all low-rise commercial, industrial and institutional buildings across United States, Europe and other regions. SSRs have also proven to be the most efficient, effective and value-for-money roofing systems for construction in rainy, windy and tropical regions.

The Zamil Steel MaxSEAM® roof system is one of the strongest and most weather-tight standing seam roof systems available in the industry today.

Features

The product features a 360-degree seam along the side laps of the panels; a special type of sliding clip and a carefully engineered system for improving strength, durability and resistance to weather.

The **MaxSEAM®** roof system acts as a monolithic membrane that completely protects your building, and is the most recommended roof system for tropical, rainy, snowy or high wind (cyclonic) regions.

Zamil Steel's **MaxSEAM®** can withstand up to 280km/h windspeed and higher windspeed value can be supported also by using special design.

Using Zamil Steel's Super SEAMER machine, the side laps of adjacent panels are seamed together, creating a 360 degree. double-lock seam, which has machine-applied mastic to ensure a secure, weather tight leak-proof joint. To increase weather-tightness level of this roofing system, the end laps could be eliminated by rolling **MaxSEAM®** panels on site, using a mobile roll former.

With our mobile roll former, the standard **MaxSEAM®** panels have a maximum length of 11.5 meters when they are roll formed in-house, while they can reach a length up to 100 meters when rolled on site.

MaxSEAM®

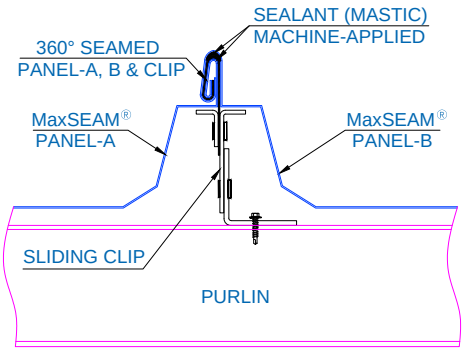
The ultimate weatherproof roof system

FM APPROVED

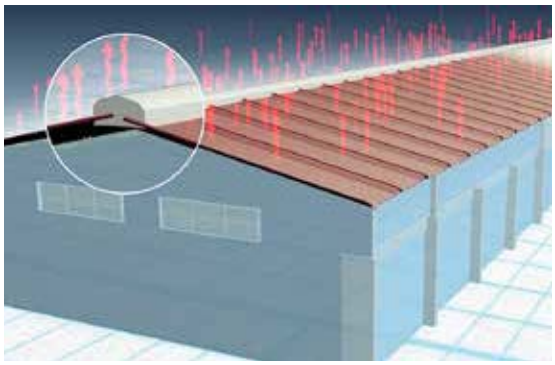
Benefits

• Weather-tightness

MaxSEAM® assures adequate drainage from rain and snow. Designed as a water barrier, the raised seam assists drainage, while the end laps, inside closure, outside closure, tri-bead mastic, along with the machine-applied sealant (inside the seams), increase the lap tightness further.



360° SEAMED WITH CLIP

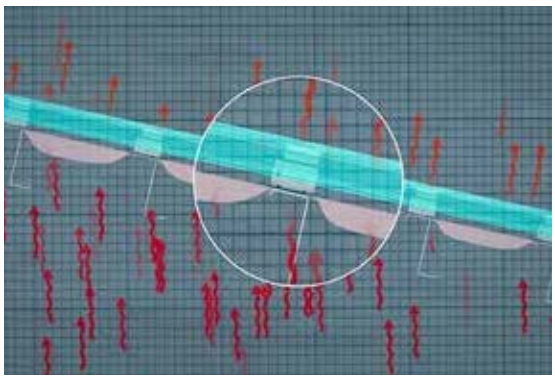


• Thermal Movement & Leakage Prevention

The fastening system of MaxSEAM® is designed to handle the potentially damaging effects of thermal movement (especially heat expansion).

The system features a sliding clip which slides between the base components and intermediate components to eliminate binding and offers greater flexibility for durability and thermal movement, while also minimizing the probability of leakage.

Unlike most other SSR systems, the gables at both ends of the roof finish with a 76 mm high standing seam, instead of finishing in the low, flat part of the panel, where the greatest possibilities for leaks occurs.



• Cost Effectiveness

The life cycle cost of the MaxSEAM® roof system is lower than any other steel panel roof system. Using Zincalume coated steel, its life expectancy is longer since less maintenance is required.

ZAMIL STEEL

MaxSEAM®

The ultimate weatherproof roof system

Quality Tests

- **Uplift ratings**

Carries UL90 Uplift ratings and covers a wide range of installation procedures, MaxSEAM® has met all test requirements as specified in CEGS 07416 Standing Seam Metal Roofing System Guide Spec.

- **FM Global Approved**

Tested under ASTM E1646 "Standard Test Method for Water Penetration through Exterior Metal Roof Panel System" and ASTM E1680" Test Method for Rate of Air Leakage through Exterior Metal Roof Panel System", MaxSEAM® has achieved FM Global's Approval as a Class 1 Roof Panel.

Under the same certification, MaxSEAM® also meets Class 1-SH hail damage requirements and 'Class 1A Fire Classification when installed at a maximum roof slope of 5 in 12 (42%).

- **High-Quality Materials**

MaxSEAM® panels are available in 0.5 mm - 18" panel width Zincalume coated steel. The Panels conform to ASTM A729M Grade 345B and are coated with a protective layer of Zincalume (55% aluminum, 1.6% silicon and 43.4% Zinc) alloy coating (150g/m^2 on both sides).

The steel panels are available in 0.53 mm (nominal) bare Zincalume or 0.56 mm (nominal) – 24" panel width, exterior roofing and walling (XRW) pre-painted Zincalume. Please refer to Zamil Steel sales representatives for availability of non-standard colors and non-standard coating systems (Exterior Premium Durability - XPD or Polyvinyl Fluoride-PVF2). We can provide you different options for:

1. Sketch of panels
2. Physical properties
3. Load tables
4. Material specifications

MaxSEAM®

The ultimate weatherproof roof system

Convenient Installation

MaxSEAM® roof system is installed using MaxSEAM® Mobile Roll Former and SuperSEAMER machine.

Using the Zamil Steel SuperSEAMER, the side laps of adjacent panels are seamed together through a mechanical action, creating a 360 deg. double lock seam, which has a machine applied mastic to ensure a secure and weather tight leak proof roofing system.

After pre-seaming the start of the panels using a Seaming hand tool, the SuperSEAMER is then fitted on to the pre-seamed panel, adjusted and locked, before the rollers are activated to start the complete electric seaming process. With the simple and quick release handle, it only requires a very short time to move the SuperSEAMER from one seam to another. Weather-tight 360 deg. seams are made without affecting the panel paint finish.

The MaxSEAM® mobile roll former will be used in case end laps are not preferred in the roofing system. The roll former machine weighs approximately 3.5 MT and can be transported to most jobsite via a container. With a roll forming capacity of between 12-15 m per minute, MaxSEAM® panels can be roll formed on site as a continuous panels for up to 100 m. Depending on the project size and requirements, Zamil Steel will consult with you for onsite-roll-forming of panels with length exceeding 50 meters.

Zamil Steel has appointed Authorized Installers of MaxSEAM® (AIM's) are assigned by Zamil Steel after having been adequately trained and experienced and possess the necessary facilities for installing MaxSEAM®. Zamil Steel strongly recommends that all MaxSEAM® roof systems should be installed only by one of our AIM's.

MaxSEAM®

The ultimate weatherproof roof system

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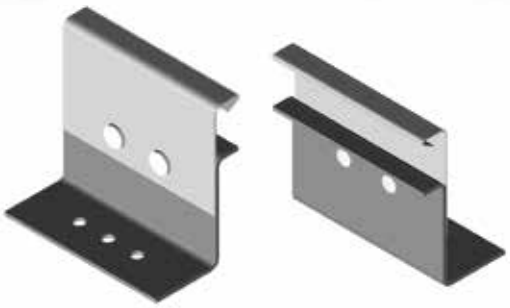
MaxSEAM® CLIPS

• Fixed Clip

Zamil Steel's **MaxSEAM®** distinguishes itself from the many types of standing seam roof systems available in the industry. The strong **MaxSEAM®** clip is made from high-grade steel and has a long, sliding steel tab, which will be seamed with the **MaxSEAM®** panel.

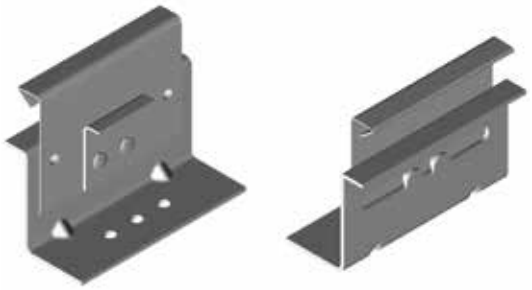
Fixed clip is also available for the fixed side of the roof system and/ or subject to guideline requirements.



FIXED CLIP

• Sliding Clip

The sliding clip consists of a single component steel base that interlocks with two components in the sliding steel tab. The tab is attached to the base with two rivets and slides along a slot in the clip base.



SLIDING CLIP

• Artifloat Clip

The ArtiFloat clip comprises of three main components; the base, intermediate component and sliding steel tab. ArtiFloat clip articulates and slides at the same time.

The ArtiFloat clip articulates between the base component and intermediate component of the clip thus eliminating binding.

ARTIFLOAT CLIP

MaxSEAM®

The ultimate weatherproof roof system

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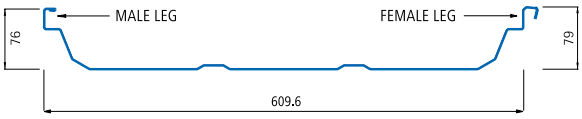
MaxSEAM® PANEL

• Specifications and Properties

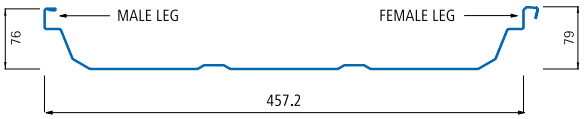
MaxSEAM® panels conform to ASTM A792M SS Grade 340 Class 2 (or equivalent) and are coated with a protective layer of Zincalume (AZM 150). The MaxSEAM® steel panels are available with 18 inches, (457.2mm) wide profiles. The panels, at 18 inches (457.2mm) wide, are available in 0.50mm-thick (nominal) bare Zincalume or 0.53mm-thick (nominal) ZSP pre-painted Zincalume.

Please refer to Zamil Steel representative for extended deliveries on non-standard colors; non-standard coating systems (ZPF or PVF2) or non-standard thickness or 24 inch (609.6mm) MaxSEAM® panel.

• Section Properties



MaxSEAM® panel Cross – 24inch (609.6mm)



MaxSEAM® panel Cross – 18inch (457.2mm)

Section Properties

Panel Type	Panel Nominal Metal Thickness (mm)	FY (kN/cm^2)	Nominal Weight (kg/m^2)	Top in Compression			Bottom in Compression		
				Ix (cm^4)	Sx (cm^3)	Ma (kN.m)	Ix (cm^4)	Sx (cm^3)	Ma (kN.m)
18 inch wide	0.50	34.0	4.40	5.942	1.227	0.253	2.129	0.746	0.154
24 inch wide	0.53	34.0	5.12	4.009	0.815	0.168	1.786	0.635	0.131

All properties are per one foot (0.3048m) of panel width.

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MaxSEAM® PANEL

- **Allowable Uniform Loads (kN/m²)**

Notes:

- Allowable loads are based in uniform span length and Fy = 34.0 kN/cm²
- Wind load is allowable wind load and has been increased by 33.33%
- Deflection loads are limited by the maximum deflection of L/240 or maximum bending stress from live load.
- Weight of panel has not been deducted from allowable loads
- Load table values do not include web crippling requirements

Allowable Uniform Loads (kN/m^2)

Panel Type	Panel Nominal Metal Thickness (mm)	Number of Spans	Load Type	Span (m)						
				0.91	1.07	1.22	1.37	1.52	1.68	1.83
18 inch wide	0.50	1	L.L Deflection	7.96	5.84	4.49	3.56	2.88	2.37	2.03
			WP	10.64	7.79	5.97	4.70	3.81	3.18	2.67
		2	L.L Deflection	4.86	3.58	2.47	2.17	1.72	1.46	1.19
			WP	6.44	4.72	3.62	2.87	2.34	1.90	1.64
		3	L.L Deflection	6.04	4.46	3.40	2.69	2.16	1.83	1.38
			WP	8.08	5.87	4.55	3.58	2.92	2.38	2.04
24 inch wide	0.53	1	L.L Deflection	5.29	3.87	2.96	2.34	1.88	1.58	1.32
			WP	7.03	5.19	3.97	3.15	2.54	2.09	1.78
		2	L.L Deflection	4.10	3.00	2.30	1.85	1.50	1.20	1.05
			WP	5.49	4.04	3.10	2.45	2.00	1.65	1.35
		3	L.L Deflection	5.15	3.79	2.90	2.30	1.58	1.54	1.19
			WP	6.85	5.04	3.85	3.05	2.45	2.05	1.70

MaxSEAM®

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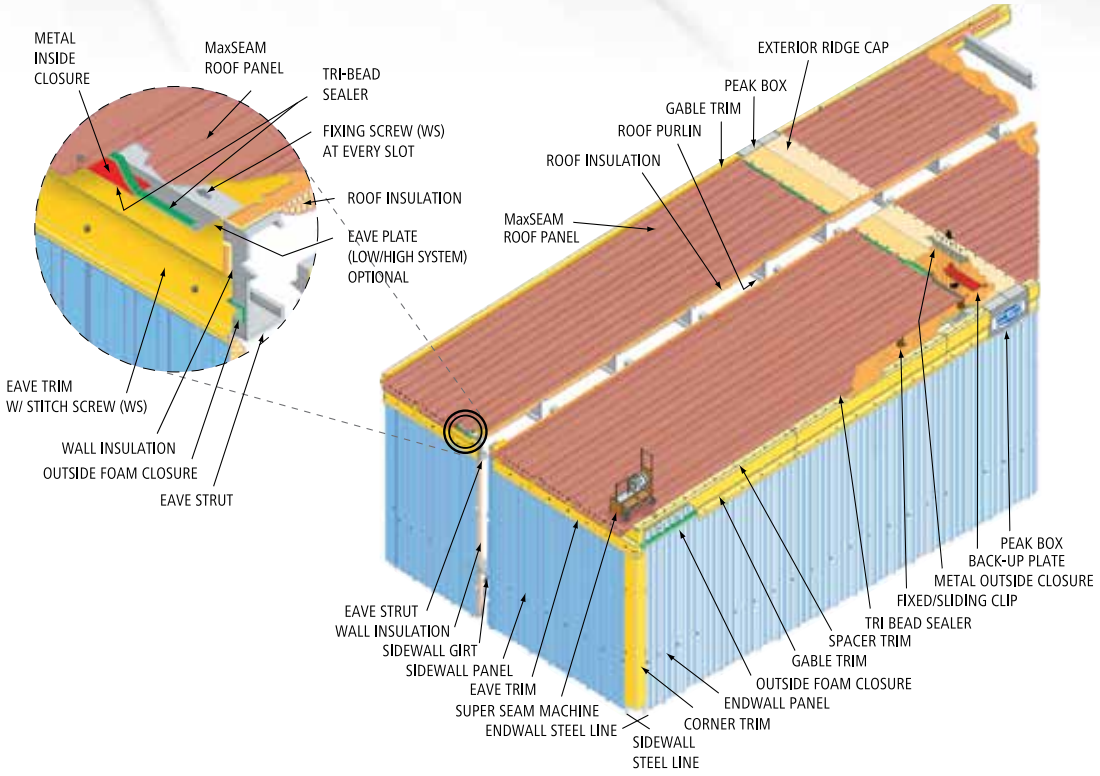
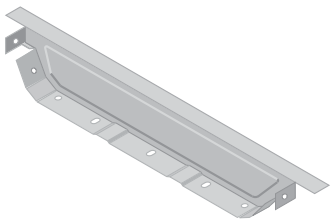
MaxSEAM® system details

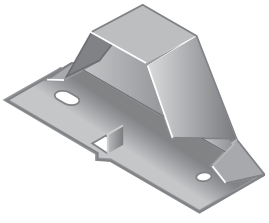


MaxSEAM® Accessories

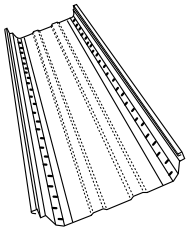
SLIDING CLIP



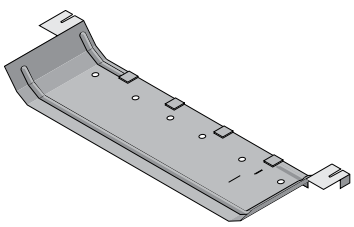
OUTSIDE METAL CLOSURE



INSIDE METAL CLOSURE



LIGHT TRANSMITTING PANEL (SKYLIGHT)



BACKUP PLATE

ZAMIL STEEL

MaxSEAM®

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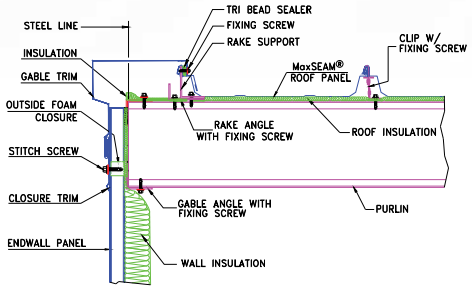
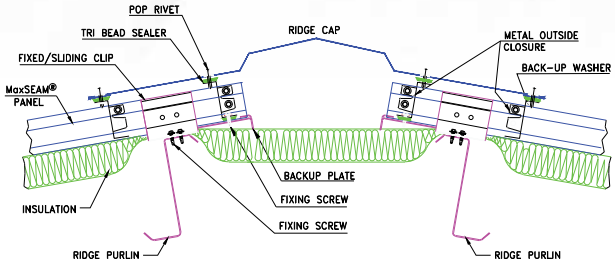
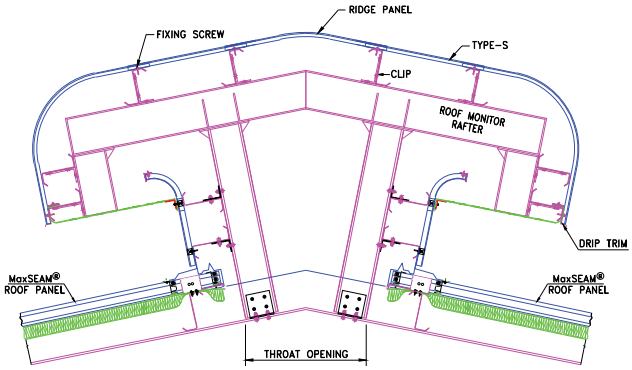
Details at gable with insulation



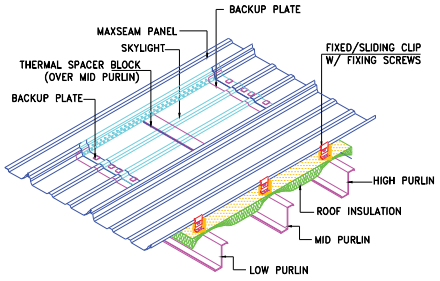
Details at ridge with insulation (floating)



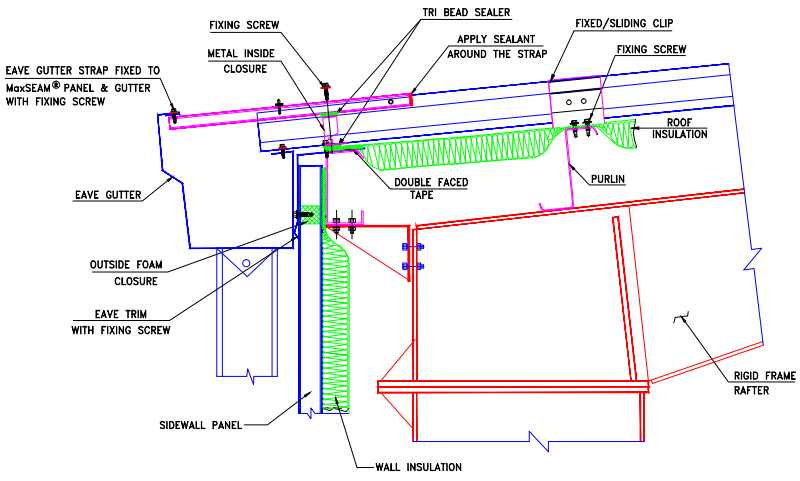
Roof monitor cross section with curved eave



Skylight details for MaxSEAM® roof panel with insulation



Detail of special eave gutter (fixed) with insulation



MaxSEAM®

The ultimate weatherproof roof system

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Re-roofing system by MaxSEAM® panel

Depending on the level of maintenance, it is not uncommon for steel building roofs to deteriorate over the years, thus causing significant leakage problems. Solutions for this deterioration vary from partial replacement to replacement of the whole system, depending on your budget.

Roof cladding is the very first form of protection from external factors for your well-invested building structure and its contents. If your building was erected a long time ago, we recommend a checkup survey of your roofing system.

Delaying the inevitable will lead to further deterioration and possible consequential damage. For peace of mind in the years to come, our roofing experts provide ingenious, cost-effective MaxSEAM® re-roofing solutions without the unnecessary miscellaneous costs.

ADVANTAGE OF MaxSEAM® Re-roofing System

- **No Tear-off**

Thanks to its extremely lightweight features, MaxSEAM® roofing system can be installed right over the existing roof, thus eliminating the costly and time-consuming tear-off process.

- **Minimum Downtime**

With no need to tear off the existing roof, the re-roofing operation is minimized, hence reducing downtime. Furthermore, with zero exposure involved, the threat of damage to the building's interior and machinery is also significantly minimized.

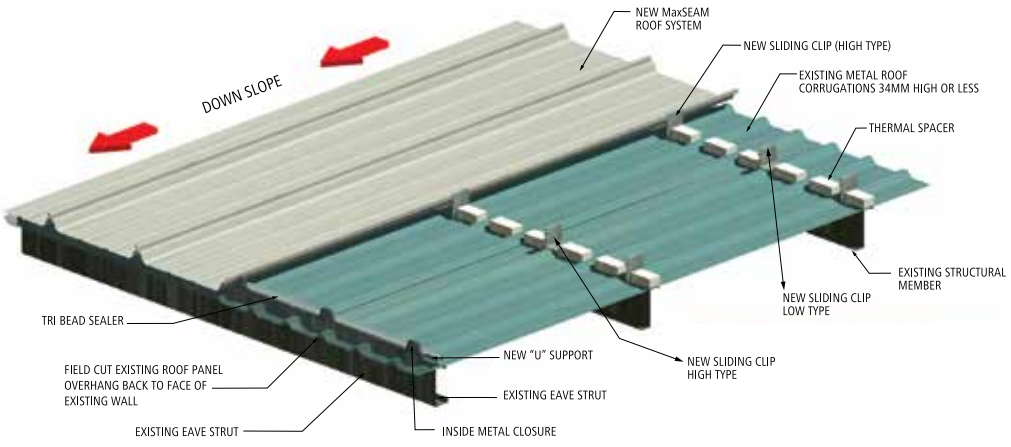
- **Desirable Slope-to-drain**

Re-roofing with MaxSEAM® system can improve the roof gradient necessary for drainage. Moreover, MaxSEAM® re-roofing provides a low-slope solution to existing flat, built-up roofs. Introduction of slope to the flat roof allows re-routing of drainage to eliminate troublesome internal drains - saving time and money.

MaxSEAM® Re-roofing System

For supreme weather-tightness and long-term performance, customers can opt for re-roofing of the entire building with our MaxSEAM® panels. This solution allows for the installation of our MaxSEAM® system over an existing roof.

MaxSEAM® monolithic roofing possesses unique features to assure adequate drainage from rain, and is designed to handle the damaging effect of thermal movement by giving the entire roof a "floating" action.



ZAMIL STEEL

MaxSEAM®

The ultimate weatherproof roof system

• Installation of MaxSEAM®

MaxSEAM® roof system is installed on site using a field seamer - the SuperSEAMER Machine

After pre-seaming of the start of the panels using a Seaming hand tool, the SuperSEAMER is then fitted on to the pre-seamed panel, adjusted and locked, before the rollers are activated to start the complete electric seaming process. With the simple quick release handle, a very short time is required to move the SuperSEAMER from one seam to another. Weathertight 360 deg. seams are made without affecting the panel paint finish.

• SuperSEAMER

Using the Zamil Steel SuperSEAMER machine, the side laps of adjacent panels are seamed together through a mechanical action, creating a 360 deg. double lock seam, which has a machine applied sealant to ensure a secure and weather tight leak proof roof system.

• Mobile Roll Former

The MaxSEAM® mobile roll former is available if endlaps are not preferred in the roofing system. The roll former weighs approximately 3.5 MT and can be transported to most jobsite via a container. With a roll forming capacity of between 12 – 15m per minute, MaxSEAM® panels can be roll formed on site as a continuous panel for up to 90m.

MaxSEAM® Erection Procedures

1- Mobilizing Mobile Roll Former on site

2- Setting the coil on the uncoiler

3- Rolling of panel on the conveyor

4- Lifting of panels with two cranes

5- Positioning panels by trolley

6- Laying of insulation and MaxSEAM® panel

7- Seaming process using SuperSEAMER

8- Competed MaxSEAM® roofing system

ZAMIL STEEL

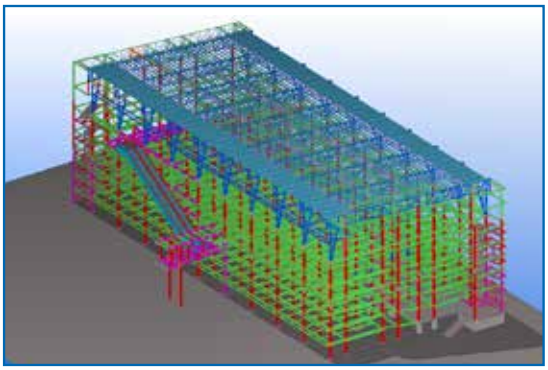
total steel building solutions

STRUCTURAL STEEL

Structural Steel

Beside pre-engineered steel buildings, structural steel is another solution that Zamil Steel offers to clients with diverse requirements for large-scale and complex projects.

Our structural steel fabrication process is controlled by state-of-the-art computer numerically controlled (CNC) machines and equipment, utilizing the latest engineering software for detailing and connection design.



Zamil Steel's Strength on Structural Steel

• Sales and Marketing

Zamil Steel's structural steel products are backed by a skilled and experienced sales team that is highly talented, dedicated and objective oriented. With customer satisfaction as their top priority, the sales staff identify the customer's needs and requirements and respond professionally and promptly.

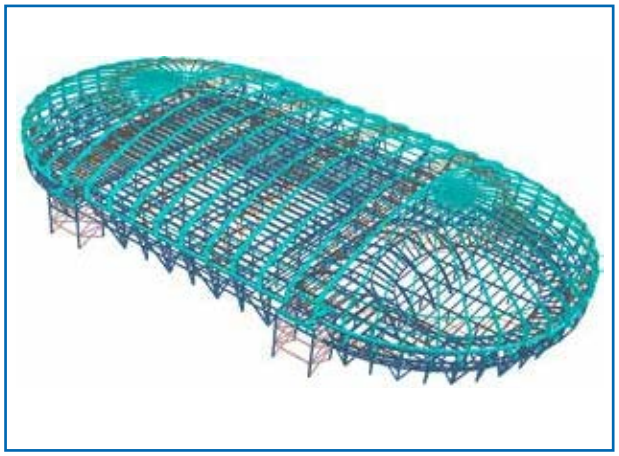
• Estimating

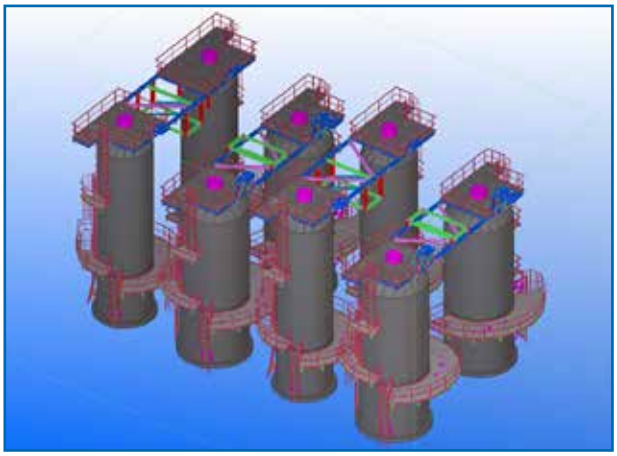
Short turnover and practical conceptual estimating strategy.

After receiving a new request for quotation along with the customer's BOQ, drawings and other relevant documents from our sales office, the estimating team conducts an initial conceptualization on a per-project basis, immediately raising relevant concerns and addressing clarifications.

Once all relevant information is provided and clarifications are addressed by the customer, an estimating engineer will proceed with the pricing stage and the preparation of a proposal offer. A series of reviews is set up to make sure that all assumptions and deviations are considered and that the price is reasonable and satisfactory to the customer.

We focus on our vision: to be the **provider of the market's most competitive and precise structural steel prices in this region while achieving total customer satisfaction**.





Structural Steel

• Engineering

Strong technical and expertise

Zamil Steel serves clients in various engineering and contracting sectors and offers professional expertise that covers all stages of design, from concept to completion, with due consideration of budget and time limitations.

The experienced and professional engineers of Zamil Steel utilize the latest software for detailing and connection design.

• Project Management

Systematic and skillful

Zamil Steel has a project management team of experienced engineers and skillful professionals dedicated to planning and managing all product- and service-related activities throughout the project life cycle.

• Fabrication

State-of-the-art technology

Zamil Steel continuously strives to find the latest methods, technologies, and machines to ensure the highest levels of productivity, quality and timely delivery for all our clients' satisfaction.

With more than 50,000m^2 of manufacturing facilities, Zamil Steel Buildings Vietnam delivers products of the highest quality and precision by combining up-to-date engineering software with comprehensive, modern production equipment.

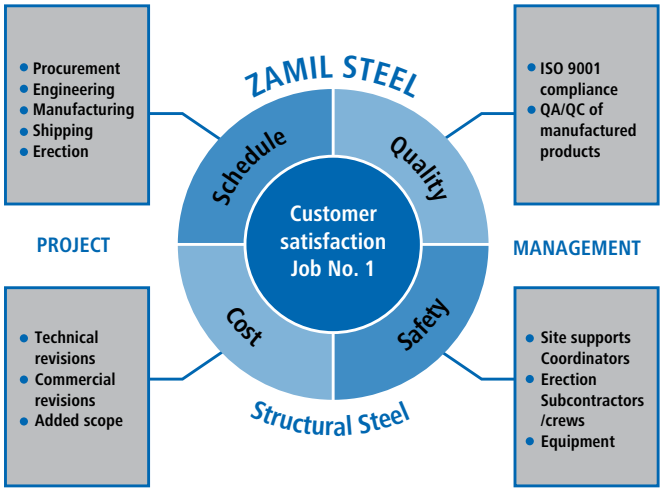
• Seamless Quality Assurance and Control

A highly qualified and equipped internal quality control department ensures all Zamil Steel products are manufactured in accordance with stringent international standards. All inspection activities are carried out by certified professional engineers.

• Site Support Supervision Services

As part of Zamil Steel's long-term strategy to provide proper support and services to our customers before and after a sale, the project management department ensures that all our customers are satisfied with our services and solutions, from the date of placing the order with us until the building construction is completed.

We want to ensure that each building is erected in accordance with Zamil Steel's construction drawings/ blueprints, and following the proper and safe construction procedures.



Examples of Structural Steel Applications

Zamil Steel Buildings Vietnam specializes in fabrication and erection of structural steel works in a wide range of applications such as:

High-rise Buildings	Commercial Centers	Hypermarkets, Shopping Malls
Exhibition Halls	Hotels	Schools
Airport Terminals	Aircraft Hangars	Sport Stadiums
Steel Rolling Mills	Heavy Industrial Plants	Power Plants
Petrochemical Plants	Refineries	Oil & Gas Plants
Built-up Girders and Columns	Equipment Support Structures	Military Utilities
Mining & Smelting	Building Materials	Ports

Airport

Mining

Oil & Gas Conveyor System

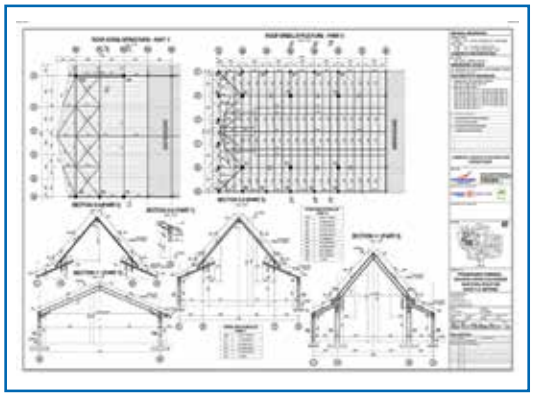
Shopping Mall

Thermal Plant

Visiting Center

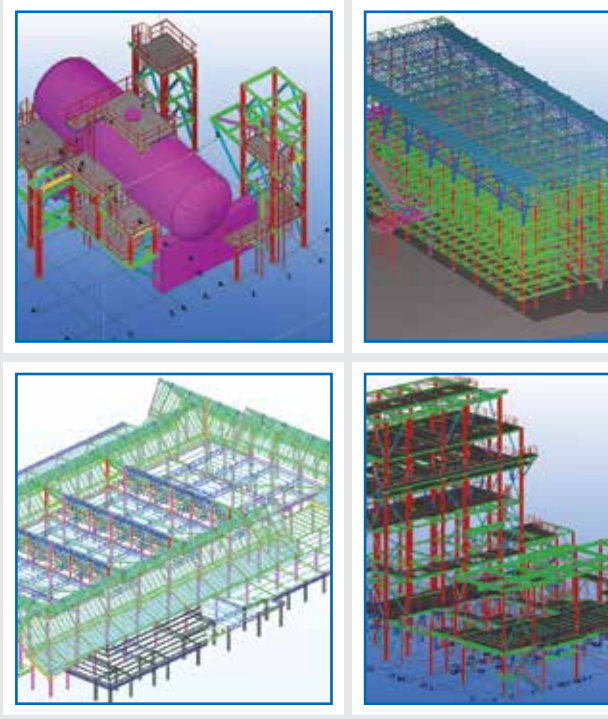
The Zamil Steel Structural Steel Certified and Systematic Process

1



IFC DRAWINGS

2



3D MODELING BY TEKLA

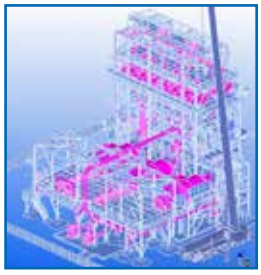
5

SITE ERECTION

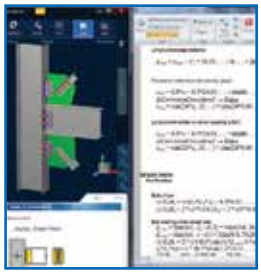
6

YOUR SATISFACTION

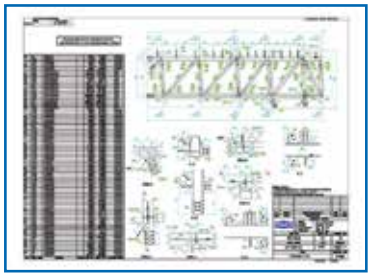
3



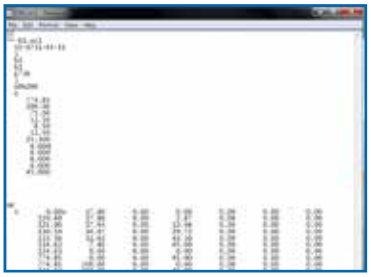
EQUIPMENT
CLASH CHECKING



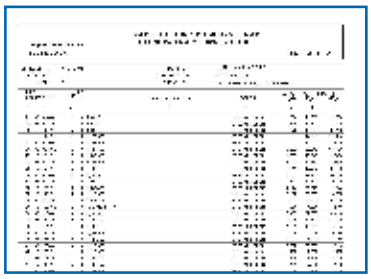
CONNECTION
DESIGN



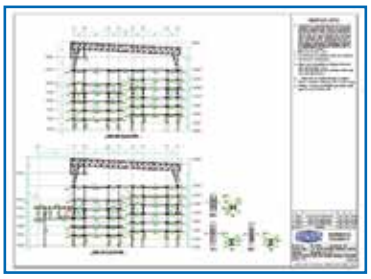
SHOP DRAWINGS



CNC FILES



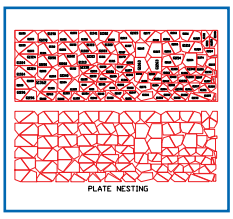
BILL OF MATERIALS



ERECTION DRAWINGS

DOCUMENTS EXPORTED FROM 3D MODEL

CNC MACHINE



MATERIAL NESTING

STRICT QUALITY CONTROL

STATE OF THE ART FABRICATION

SAFETY

SITE SUPERVISION

4

Inspection and Testing Plan (ITP)
for structural steel materials

"Test #"	Nature of Inspection / Test	Extend of Insp. by ZS	Acceptance Norm	Record Format	Inspection
1	**Quality Control System Implementation**	100%	ZS QSM	CAR # QA-S-16	R/V
1.1	WPS/PQR/WQTR/NDT Procedure				
1.1.1	Welding Procedure Specifications	100%	AWS D1.1	WPS/PQR	V
1.1.2	Welders/ Operations Qualification Records	100%	AWS D1.1	WQTR	V
1.1.3	NTD Procedures/ NDT Technician certificates	100%	AWS D1.1	Procedures/ Certificates	R
1.1.4	Welding Consumables Receipt Inspection	On every P.O	AWS D1.1/P.O	NCR # QC-S-14 *	V
2	**MATERIAL RECEIPT INSPECTION**				
	Steel Plates and Steel Sections:		ASTM A572M (or) Equivalent	Insp.Rpt.# QC-S-01	
2.1	Verification of P.O requirements	100% MTC	Mat'l Specs	Insp.Rpt.# QC-S-01	I
2.2	Fasteners: Bolts/Nuts/Washer				
	Verification of P.O requirements	100% TC	ASTM/ANSI	NCR # QC-S-14 *	I
2.3	Material Certificates	100%	ASTM/ANSI		R
3	**MATERIAL PREPARATION**				
	Shearing/ Gas Cutting, Machining, Sawing, Drilling or Punching, Milling, Hard				
3.1	Stamping				
3.2	Visual Inspection	10% Min.	AISC/ZS Drwgs.	NCR # S-14 *	I
3.3	Dimensional Inspection	10% Min.	AISC/ZS Drwgs	NCR # QC-S-14 *, Insp. Rpt.# QC-S-05D, Insp. Rpt.# QC-S-05E*	I
4	**FABRICATION AND FIT UP COMPONENTS**				
4.1	Dimensional check of fit up components, holes, overall length, hard stamp markings. (Primary members)	100%	ZS Drwgs./AISC	Insp.Rpt.# QC-S-05	I
4.2	Dimensional check of fit up components, holes, overall length, hard stamp markings. (Secondary members)	50% Min.	ZS Drwgs./AISC	Insp.Rpt.# QC-S-05	I
4.3	Butt Splice, Fit up (if any)	100%	ZS Drwgs./AISC	Insp.Rpt.# QC-S-05	H
5	**IN-PROCESS WELDING INSPECTION**				
5.1	Verification of actual Welding Parameters	10% Min	WPS/PQR	NCR # QC-S-14 *	V
5.2	Verification of Welders Qualification	100%	WQTR	NCR # QC-S-14 *	V
6	**NON-DESTRUCTIVE TESTING**				
6.1	Visual Inspection	100%	AWS D1.1	Insp.Rpt.# QC-S-07	I
6.2	Shapes/ Plates: (Primary members)				
6.2.1	Butt welds (Flange & Web splice joints) -UT	15% Min.	AWSD1.1	UT Rpt. # S-10	T
6.2.2	Fillet welds: End plates - MT	(If required by contract)	AWSD1.1	MT Rpt. # QC-S-11	T
7	**SURFACE PREPARATON & PAITNING**				
7.1	Receipt Inspection of Abrasives, Paints, Thinner	On every P.O	P.O/Job Spec	NCR # S-14 *	V
7.2	Surface Cleaning-Shot blasting (SA 2 ½) or Job specs	20% Min.	SSPC/Job Spec	NCR # S-14 *	I
7.3	Anchor profile	20% Min	SSPC/Job Spec	NCR # S-14 *	I
7.4	Visual inspection of Coating	50% Min	SSPC/Job Spec	NCR # QC-S-14 *	I
7.5	Paint – DFT – (Minimum Require't as specified)	20% Min	SSPC/Job Spec	Insp.Rpt.# QC-S-08	I
7.6	Marking	5% Min	ZS Drawings/Job Spec	NCR # QC-S-14 *	V
8	**GALVANIZING**				
8.1	Surface cleaning-SP8 (Acid picking)	5% Min	SSPC/Job Spec.	NCR # QC-S-14 *	M
8.2	In Process:				
	(Zinc Quality, Bath composition, Bath temperature etc.).	5% Min	B6.Job Spec./ATSM A123	NCR # QC-S-14 *	V
8.3	Visual Inspection of Zinc Coating	100%	ATSM A123/Job Spec.	NCR # QC-S-14 *	I
8.4	Zinc coating thickness – (As per ASTM A123)	20% Min.	ATSM A123	Galvanizer Certificate	I
8.5	Adhesion: Hammer (or) Stout knife Test	5% Min. of each day output	ATSM A123	NCR # QC-S-14 *	M
9	**PACKAGING AND SHIPPING**				
9.1	Pre-Shipment Inspection-Final	100%	Job Specs.	NCR # QC-S-14 *	H
9.2	Packaging Inspection (Truck load)	100%	Job Specs.	Packing List	H/RL
10	**DOCUMENTATION**				
	Final Inspection Dossiers for submittal to Client upon competition of the job	All documents as per approved ITP	ZS-Standard	Final Dossiers	S

Legend:
R = Review, I = Inspection, H = Hold, * = If any, A = Attend, W = Witness @ Random, M = Monitor, S = Submit, V= Verify, TC = Test Certificate, NCR = Non Conformance Report, CA = Corrective Action, ZS = Zamil Steel, T = Testing, MTC = Material Test Certificate, PL = Packing List, SRC = Shipment Release Certificate, IC = Inspection Certificate, RL = Release

Note:
1) Inspection allotment would mean (%) percentage by number of Pcs to be Inspected
2) Pre-Inspection Meeting one time before commencement of the job

Machinery list

No.	Machinery List in Hanoi Factory	Quantity	No.	Machinery List in Dong Nai Factory	Quantity
1	Shearing machine Material Capacity: 20mm plate thickness, 6020mm plate length; Model No.: HACO PSC 6020	1	1	Shear machine 350ton	1
			2	Small shear machine 250ton	1
2	Shearing Machine 0.6M	1	3	Vacuum Lifter For Shearing M.C	2
3	Crank press for Slot punching machine Model No. PC-5 (IV)	1	4	Slot punching machine	1
4	Movable slot punching machine	2	5	Movable slot punching machine	2
5	Flange straigntening machine Model No. LTJ-800	1	6	Splice plate straightening press	2
6	Flange line	1	7	Flange line machine	2
7	Flame Planer (FP- 4000E)	2	8	Flame plane machine (multi torch cutting 7nos)	1
8	Punching machine (Puma 110S)	1	9	Flame plane machine (multi torch cutting 7nos)	1
9	Iron worker machine (Hydracrop 110S)	3	10	Rod Bending MC	1
10	Radial drilling machine (VO 50,60 DIA)	2	11	Plate bending MC(Roller 3 nos 3000x12mm)	1
11	Auto welding machine line (SAW) Bay 3	1	12	Rod threading MC	3
12	Auto welding machine line (SAW) Bay 5	1	13	H-Beam Straightening machine	1
13	Full Weld station (FCAW)	13	14	Ironworker 110ton	3
14	Fitting weld Station	7	15	Ironworker 165ton	2
15	Vacuum lifter crane, Cap.5000lbs	4	16	Hydraulic Ironworkers Machine 165 ton	1
16	MaxSEAM roll former	3	17	Abrasive cutting disc	2
17	Purlin roll former line: DTR	1	18	Radial drilling MC	2
18	Sheeting Panel line – roll forming machine	1	19	Hyraulic Press brake 220ton	1
19	Curb panel press brake	1	20	CNC Plasma flame cutter	1
20	Panel cutting machine (hydraulic) type:MCT-0-8x1200	1	21	CNC Drilling MC 1250	1
21	CNC Folding machine - Model No. SL300 MB4001-10	1	22	CNC Band saw 1270	1
22	CNC Folding machine JZW800 Digital Control Folder Slitter	1	23	CNC Plate Drilling machine	1
23	Down spout lock former	1	24	CNC Coping MC	1
24	Rod threading machine No. FE099 98	2	25	CNC Roller Bending Machine	1
25	Press brake machine	1	26	Hydraulic band saw	1
26	Press machine (hydraulic) Model: WS-110	1	27	Bending canam MC	1
27	Slitting machine	1	28	Shot Blasting & Peening machine	1
28	Abrasive Disc cutting machine PN 2414 NB	1	29	Airless spray painting machine (Graco)	7
29	Crank Shaft press machine	1	30	Sundry part dipping paint	1
30	Sundry part dipping paint	1	31	Autoweld machine line	2
31	Airless Spray painting machine Model: EXTREME KING 68:1 (2pcs) and Model: EXTREME KING 33:1 (3pcs)	5	32	Tacking station machine	2
			33	Seam Welding machine	2
32	LT-7.Auto-Fillet Welding Machine/Squirt mobile	2	34	Welding station MIC	63
33	Air compressor with dryer	3	35	Welding station Tack	31
34	Overhead crane 10MT (6pcs) and 5MT (14pcs)	20	36	Welding TIC	1
35	Travel crane	6	37	LT-7.Auto-fillet welding machine/Squirt mobile	7
36	Jib crane	16	38	Stud welding machine	2
37	Gantry crane	3	39	Side Table	1
38	Shot blasting machine with accessories	1	40	Saw line	1
39	Rod bending machine; Model No. BENDHOR-50	1	41	Angle Splice line	1
40	Magnetic drill 220V; Model: AO-3000;AO-3500;AO-5500	8	42	Angle Cutting line	1
41	PORTABLE AUTOMATIC GAS CUTTER; MODEL: IK-93 HAWK	2	43	Portable Rollformer (Maxseam MC)	2
42	PORTA-PUNCH 35 TON Model No.: HS11-1624	3	44	Overhead crane 15ton	3
43	Fork lift 5 tons/ 10 tons	2	45	Overhead crane 10ton	8
44	Side loader	1	46	Overhead crane 5ton	8
45	CNC Drilling Machine FD-1635	1	47	Wall crane 2ton	19
46	Crankpress MC 15 tons / 70 tons	7	48	Zip crane 2ton	7
47	Plate Straignte Press MC	2	49	Vacuum lifter crane 2ton	6
			50	Turning fiture	6
			51	Transfer cart	12
			52	Forklift 11ton	1
			53	Forklift 1.5ton	1
			54	Plate Straing Press	4

ZAMIL STEEL

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EXAMPLES OF MAJOR PROJECTS

PEB projects by Zamil Steel


Cambodia


Indonesia


Malaysia


Laos


Mauritius


Mongolia


Myanmar


Philippines


Singapore


Thailand


Vietnam


Vietnam


Vietnam


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MaxSEAM®
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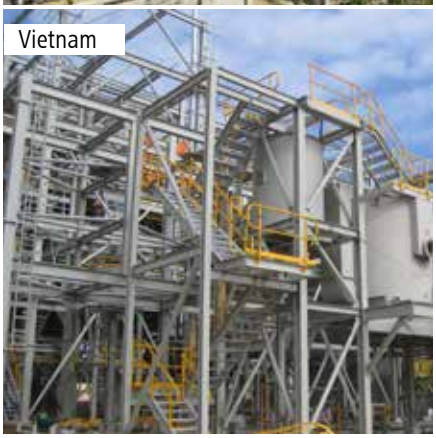
Philippines


Philippines


Philippines


Singapore


Singapore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Representative Offices
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As of June 2017