



# PANELS AND PANEL ACCESSORIES

# Contents 2022



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# INTRODUCTI



### Company

Sana Building Systems is uniquely prepared to offer the best in pre-engineered steel buildings (PEB) and hotrolled steel structures (HRSS). SBS advanced capability in both design and fabrication enable us to offer buildings compliant to the latest building codes and fabricated within a strict factory quality-controlled environment using the latest fabrication technology. For more details, please visit <a href="https://www.sbslftz.com/">https://www.sbslftz.com/</a>

### PLANT CAPACITY

From the beginnings, the <u>SBS</u> site and factory complex was designed with all the structures, machinery, material handling systems, maintenance facilities, offices, and crane-serviced storage Yards to produce 2000 metric tons of PEB components per month. This output consists of approximately 1,200 MT of built-up main-frame members, 400 MT of secondary cold formed "C" & "Z" members, and 400 MT of Panels & Panel Accessories per month. In addition, the factory is equipped to produce and additional 2,000 MT /month of Hot Rolled Steel Structures (HRSS). After planned expansion, the HRSS capacity will increase to 3,000 MT/month.

Overall designed capacity at the <u>SBS</u> Lagos Free Zone facility is 5,000 metric tons of steel structures and components per month. 60,000MT per year!!

### **EXECUTIVE MANAGEMENT**



SBS is fortunate to have the most experienced and professional management team in the Pre-Engineered Steel Buildings industry in Africa. This team's humility, honesty, transparency, and flexibility coupled with their attention to details and obsession with quality has assured SBSs quick ascendancy to the enviable rank of the largest and most trusted PEB manufacturer in Africa.

This team has always advocated the following:

- Treat your subordinate's employees the way you want them to treat your best Customers.
- Accomplish each task in a manner that makes it easier for the next person to do his job.
- Consider the interests and welfare of others to be as important to you as your own interests.

### **GUIDING PHILOSOPHY**

At <u>SBS</u> our passion for Pre-Engineered Buildings extends beyond success and profitability. We desire to make everyone aware of the remarkable features and attributes of the PEB System and what makes it such an affordable and flexible building system. PEBs can be used to construct virtually all single story non-residential buildings and even multi-storey buildings (Ground + 5). The intention is to create an environment where every stakeholder of <u>SBS</u> (Shareholders, Employees, Suppliers, and Customers) is empowered to think, innovate and contribute to our success. Our vision is to create a great global company that attracts outstanding Employees, Suppliers and Customers. In addition, we respect the environment and support the communities in which we conduct business.

We pledge to exceed the expectations of all with whom come in contact.

# ISO certificates







This is to certify that

### SANA BUILDING SYSTEMS LFTZ

PLOT # S7-LZ-65, C/O Lagos Free Trade Zone, Ibeju Lekki, LGA Lekki, Lagos, Nigeria

Operates a Quality Management System which has been assessed as conforming to:

### ISO 9001:2015

### For the Scope of Activities:

Design, Estimation, Fabrication & Erection of Pre Engineered Steel Buildings (PEB) and Hot Rolled Structural Steel (HRSS).

Certificate Number UAE/5/2105260983

Date of Expiry:

This Certificate remains the property of Peers Quality Assurance Limited

Walsall Road Four Oaks Sutton Coldfield B74 4QY England

www.pqal.co.uk For verification of this certificate, please contact the POALLIK Office Certificate approved by:

Chris McMillan - Managing Director Peers Quality Assurance Limited





# CERTIFICATE OF REGISTRATION



This is to certify that

### SANA BUILDING SYSTEMS LFTZ

PLOT # S7-LZ-65, C/O Lagos Free Trade Zone, Ibeju Lekki, LGA Lekki, Lagos, Nigeria

Operates a Health & Safety Management System which has been assessed as conforming to:

### ISO 45001:2018

### For the Scope of Activities:

Design, Estimation, Fabrication & Erection of Pre Engineered Steel Buildings (PEB) and Hot Rolled Structural Steel (HRSS).

Certificate Number: UAE/5/8212532056

Date of Initial Assessment: Date of Registration: 29/11/2021

Date Re-Issued: 29/11/2022 Date of Expiry:

Peers Quality Assurance Limited Suite 2. Austin Court

Four Oaks Sutton Coldfield B74 4QY England

Certificate approved by:

Chris McMillan - Managing Director Peers Quality Assurance Limited





# CERTIFICATE OF REGISTRATION



This is to certify that

### SANA BUILDING SYSTEMS LFTZ

PLOT # S7-LZ-65, C/O Lagos Free Trade Zone, Ibeju Lekki, LGA Lekki, Lagos, Nigeria

Operates an Environmental Management System which has been assessed as conforming to:

### ISO 14001:2015

### For the Scope of Activities:

Design, Estimation, Fabrication & Erection of Pre Engineered Steel Buildings (PEB) and Hot Rolled Structural Steel (HRSS).

Certificate Number: UAE/5/9138741317

Date of Expiry:

This Certificate remains the property of Peers Quality Assurance Limited Walsall Road

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For verification of this certificate, please contact the POALLIK Office

Certificate approved by

Chris McMillan - Managing Director Peers Quality Assurance Limited



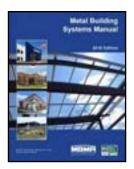


# Design Codes



Sana Building Systems is the leading supplier of high quality PEB and HRSS in Africa. We use the latest American codes and specifications for materials, loading, and design of steel buildings.

These are listed below.



Metal Building Systems Manual 2018.

Metal Building Manufacturers
Association 1300 Summer Ave, Cleveland, Ohio
44115



ANSI/AISC 360–10 Specifications for

Structural Steel Buildings,

Manual of Steel Construction 14h Edition 2010.

American Institute of Steel Construction,

130 East Randolph Street, Suite 2000,

Chicago, Illinois 6060



International Building Code IBC-2018

International Code Council,500 New Jersey Avenue, NW,6th Floor, Washington, DC 20001.



AWS D1.1/D1.1M:2020 Structural Weldin

Code - Steel 24th Edition.

American Welding Society,

8669 NW 36 Street, # 130.

Miami FL 33166



ASCE 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

International Code Council,500 New Jersey Avenue, NW,6th Floor, Washington, DC 20001.



AISI S100-16 North American Specifications for the Design of Cold-Formed

Steel Structural Members, 2016 Edition.

American Iron and Steel Institute.

25 Massachusetts Avenue NW, Suite 800,

Washington, DC 20001

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### **OVERVIEW**



The term "Panels & Panel Accessories" refers to exterior roof and wall panels, interior roof and wall liner panels, partition panels, fascia panels & soffit panels in addition to Panel Standard Buyouts (such as panel fasteners, foam closures, bead mastic, flowable mastic, purlin tape, pop rivets etc.) and Building Shell Accessories (such as windows, personnel walk doors, sand trap louvers, gravity ridge ventilators, skylights, wall lights, double sliding doors, roll-up doors, etc.).

### Standard Panel Profile

SBS Steel's standard single skin roof and wall panels are produced in an M32/333 profile. The details in this chapter, especially as related to the dimensions of flashings and trims, are applicable to this specific panel. These details will vary slightly when other single skin panel profiles or sandwich panels are used.

### Panel Thickness and Colors

Panels are available in 0.5 mm & 0.7 mm Aluzinc Coated Steel and in 0.7 mm Aluminum. 0.5 mm & 0.7 mm Aluzinc Coated Steel are available in mill finish and in pre-painted Polyester Coating in four <u>SBS</u> standard colors. 0.7mm Aluminum is available in the 4 <u>SBS</u> Standard Colors and in any RAL color. Interior liner panels, partition panels, fascia panels and soffit panels are made using the same profile in 0.5mm Frost White Aluzinc Coated Steel, unless otherwise specified

# Panel Specifications

The pre-painted finish on the weather surface of the panel has a 5 microns primer and a 20 microns polyester paint whereas the back side has a 5-7 microns thick Pu (Polyurethane) compatible epoxy primer.

The Aluzinc Coated Steel panel conforms to ASTM A 792 Grade 340 Class I with 150/sq.m Aluzinc coating. The Aluminum panel conforms to AA Alloy A 3105, H 46 with Fy=145N/mm2.

### Panel Supply Options

SBS recognizes that the presence of specialized Panel Manufacturers in this region gives Customers the choice to buy the PEB steel structure from a PEB Manufacturer and the Panel & Panel & Panel Accessories from a specialized Panel Manufacturer

When Panels & Panel Accessories are excluded from <u>SBS</u> scope of supply all the steel framing that is required to support the panels will be included in our PEB steel structure provided that the panel properties and load tables are intimated to us at the quotation stage as the spacing of roof purlins and wall girts depends on them.

# PANEL PROFILES & LOAD TABLES



# Single Skin Panel Profile

The table below shows the panel's allowable load (kN/m 2) for different panel spans.

Roof purlins spacing is generally 1.50 m but this may be changed depending on the magnitude of the loads that are applied on the roof.

Wall girts spacing depends on design but is generally 1.5 - 1.8 m on centers, starting above the first girt. Generally,

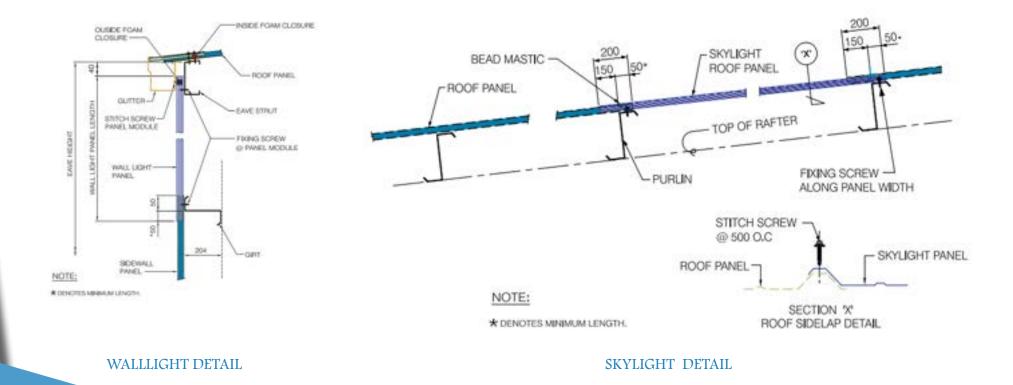
the first girt is located at 2.28 m above FFL. An intermediate girt will be added (between FFL and first girt) if required by design.

Base Metal	Nominal Thickness (mm) Type of span	Allowable Load (kN/m 2) for Different Panel Spans								
		v -	Panel Span (m)							
		span	0.70	0.90	1.00	1.20	1.35	1.50	1.65	1.80
	0.50	Two Spans	10.60	4.76	3.86	2.67	2.12	1.71	1.42	1.19
				12.30	8.96	5.20	3.66	2.64	1.98	1.52
		Three or more	11.27	4.99	4.06	2.82	2.24	1.80	1.48	1.24
Aluzinc Coated Steel		spans		9.66	7.06	4.09	2.88	2.09	1.58	1.20
	Two Spans  0.70  Three e or more spans	There Co	24.41	6.75	7.00	3.80	3.00	2.40	2.00	1.65
		Two spans		19.11	13.90	8.05	5.65	4.15	3.10	2.40
		Three e or	28.16	7.805	6.35	4.40	3.45	2.80	2.30	1.95
		more spans		14.95	10.90	6.30	4.45	3.25	2.45	1.85
Aluminum	O.70 Three or mor spans	T C	11.27	3.11	3.21	1.74	1.37	1.10	0.72	0.75
		Two Spans		6.52	4.74	2.74	1.93	1.42	1.06	0.82
		Three or more	13.00	3.65	2.97	2.05	2.08	1.31	1.07	0.92
		spans		5.10	3.72	2.15	1.52	1.10	0.83	0.63

# SKY LIGHTS AND WALL LIGHTS



SBS roof and wall translucent panels allow the transmission of natural light into the building and greatly reduce daytime electrical lighting requirements. Translucent panels (skylights/ wall lights) are available in the same width as SBS metal panels and are supplied in 3250 mm lengths. Skylights are often used over two 1500 mm wide purlin spacings whereas wall lights are often used at the eave in 1625 mm (3250/2) lengths. The corrugations of translucent panels match the profile of SBS standard panel profile. Translucent panels are approximately 1.5mm thick and weigh 2.4 kg/m<sup>2</sup>.



# TRIMS AND FLASHING

S B S

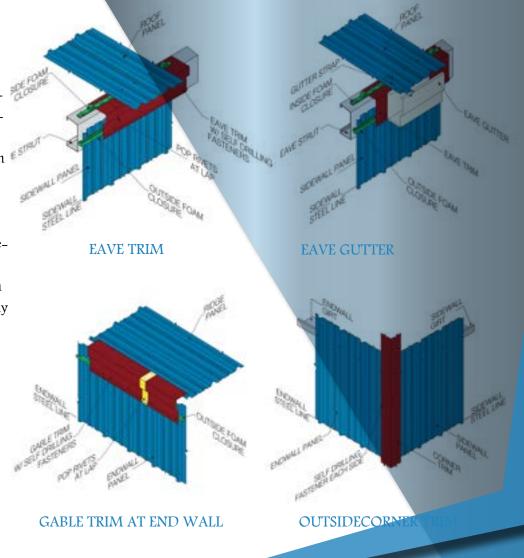
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Flashing and trims are sheet metal closures designed primarily to provide weather tightness and neat appearance at corners and junctions. The name flashing and trims are used synonymously.

Nothing enhances the overall appearance of a pre-engineered steel building more than the correct and appropriate trim. The appearance of standard building accessories (such as ridge ventilators, windows, personnel doors, sand trap louvers, roll-up doors, sliding doors, framed openings, etc.) and structural additions (such as partitions, fascias, canopies, roof extensions and parapets) is greatly enhanced with flashing and trims. The most common trims are eave trim, gable trim and corner trim.

<u>SBS</u> roof trims and flashing are produced from the exact same material as the roof panels while wall trims and wall flashings are produced from the exact same material as the wall panels.

Although <u>SBS</u> has several standard trims & flashings, any type of flashing/ trim can be produced, giving Architects the opportunity to develop elegant details to suit any desired application.



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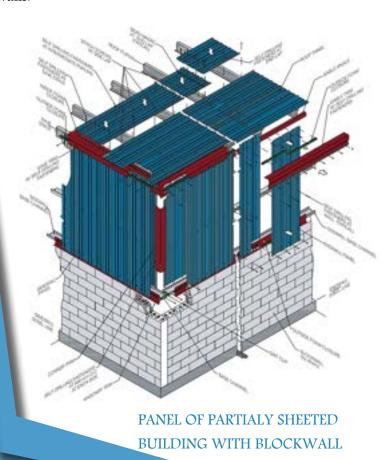
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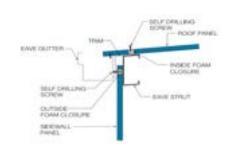
# PANEL DETAILS

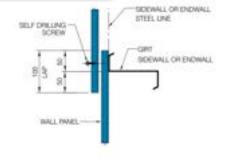


This section illustrates the most common details of single skin panels in the roof and

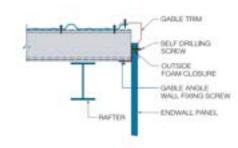
walls of both fully sheeted walls and partially sheeted walls above block walls.



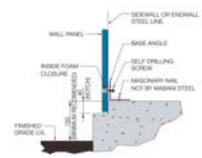




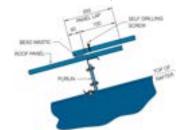
### EAVE / ROOF & WALL PANEL/



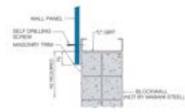
### WALL PANEL AT GIRT ENLAP



### ENDWALL GABLE /ROOF & WALL PANEL/



WALL PANEL AT BASE



ROOF PANEL AT PURLIN ENDLAP

WALL PANEL ATPARTIAL BLOCK WALL

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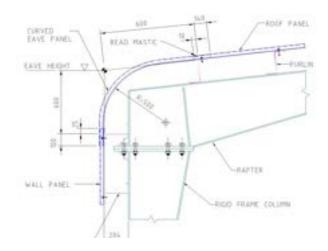
# CURVED EAVE AND RIDGE PANELS



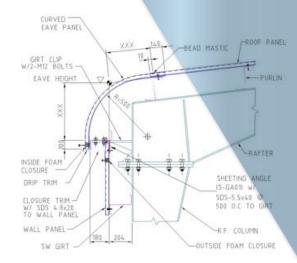
Curved Eave Panels are made from the same material as wall panels and are a good substitute for eave gutters and downspouts because they do not need any maintenance.

There are two details for curved eaves. We recommend the curved eave with projection because it is considerably easier to erect. Fitting the ribs of the curved eave panels simultaneously with the ribs of both the roof and wall panels is a very difficult task whereas fitting the ribs of the curved eave panels with the ribs of the roof panels only considerably easier.

<u>SBS</u> profiled ridge panels are made from the same material as the roof panel. They provide an excellent weather seal at the ridge without the need for foam closures.



CURVED EAVE DETAIL W/O PROJECTION

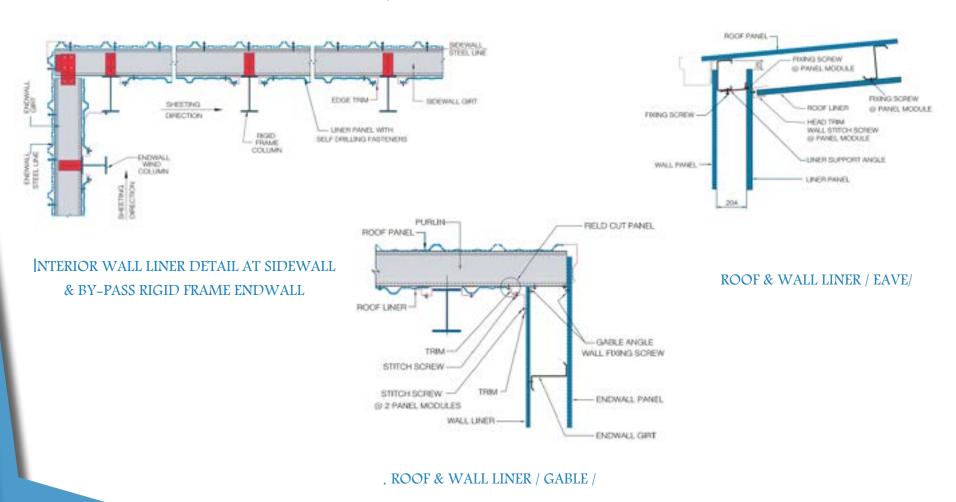


CURVED EAVE DETAIL /W/ PROJECTION

# INTERIOR ROOF & WALL LINER DETAILS



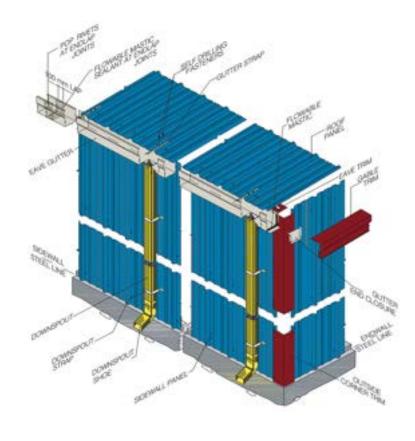
Liner Panels are used to conceal the roof purlins, wall girts and fiberglass insulation on the inside of buildings. <u>SBS</u> standard liner panel is M 32/333, the same panel used on the exterior roof and walls. It is available in frost white colour only either in 0.5mm Aluzinc Coated Steel or in 0.5 mm/0.7 mm Aluminium.



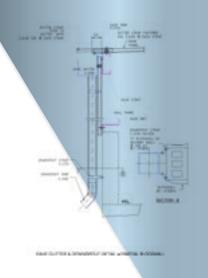
# EAVE GUTTERS AND DOWNSPOUTS



SBS standard eave gutters and downspouts are produced from 0.7mm thick Aluzinc Coated Steel in any SBS standard color.



GUTTER AND DOWNSPOUT AT FULLY SHEETED WALL



EAVE GUTTER AND DOWNSPOUT



. EAVE GUTTER

# VALLEY GUTTERS AND DOWNPIPES



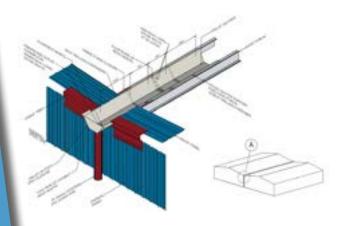
valley gutter system is unique in the PEB industry in this region. Its features are truly superior should be compared with other suppliers' offerings. 

SBS standard valley gutter is produced from 0.9mm thick G90 galvanized steel. The inside of the valley gutters is epoxy painted at our factory. 

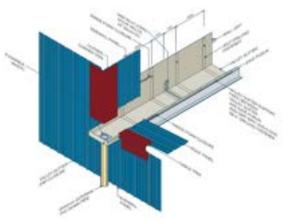
Valley gutters are supplied in full bay lengths up to a maximum length of 10m. They are nested at each column location on slightly oversized 1000mm long splice pieces that have the same profile as the valley gutter. 150mm diameter downpipes with PVC outlets are provided at each interior valley column location.

SBS supply extends to the FFL only. Customers should work with their consultant to design methods for carrying out rainwater to the location outside the building. One method is to provide trenches in the concrete slab. Another method is to provide under slab piping.

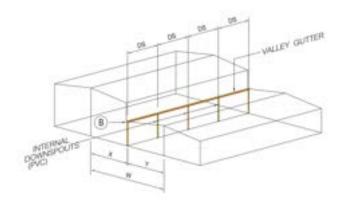
Valley gutters are generally required at Multi Gable Buildings, at the common eave of two adjacent buildings that have different eave heights at parapets and at some fascias



VALLEY GUTTER MULTI GABLE
OF BUILDING



VALLEY GUTTER DETAIL AT BUILDING WITH DIFFERENT EAVE HEIGHT



# MASONRY CONDITIONS



Generally, the walls of a SBS are sheeted full height with single skin pre-painted metal (Aluzinc Coated Steel or Aluminum) panels or Sandwich panels.

Pre-painted single skin panels are the most economical option. They are also attractive and easy to install. However, in this region customers often specify a partial height (2.5 – 3m high) block wall above F.F.L.

Common reasons for choosing a block wall are:

- Storage inside the building may be placed against the exterior walls of the building causing a higher load than the metal walls can resist.
- ome stored materials may be corrosive and may cause the metal panels to rust or erode
- The use of heavy forklifts inside or outside the building may accidentally dent the metal walls. The fixing of metal panels is more costly than plastered block walls.
- The type, size and location of wall accessories (such as personnel walk doors, sand trap louvers and windows) can be finalized long after the pre-engineered steel building is ordered giving the Customer flexibility to change their locations without affecting the delivery of the steel building
- A block wall is specified for aesthetic reasons.

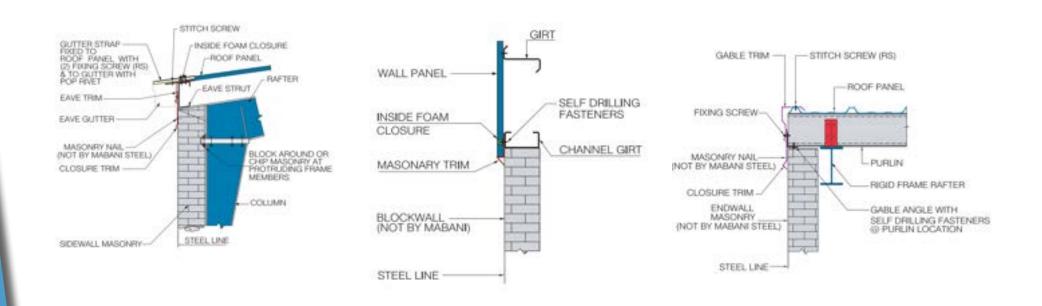
When a flush end wall is open for block wall, <u>SBS</u> requires that the end wall wind columns be tied to the block wall at standard girt locations or at a maximum spacing of 2 meters in order to maintain adequate lateral bracing of the Endwell columns. This is not required for by-pass end walls which rely on diagonal bracing for lateral stability. A more conservative practice is to design the columns next to block walls as being unbraced for the height of the block wall.

In partial block walls, foam closures, trims and flashing are provided at the transition between the wall sheeting and the block wall in order to provide a watertight joint and a neat, finished appearance.



When considering the partial removal of the metal wall sheeting, it is important to know the standard location of wall girts so that an economically sound decision can be made. The location of the first wall girt is at 2.28 m above the finished floor level (FFL) and this is the most economical height for block walls in a standard SBS pre-engineered building.

The top of most wall accessories (such as personnel doors, sand trap louvers and windows) is located at the first girt which is 2.28 m above the FFL.



**BLOCK WALL AT EAVE** 

BLOCKWALL AT GIRT

. BLOCKWALL AT GABLE

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# POWER VENTS



Power ventilators consist of a one-piece aluminium base and throat assembly complete with spun aluminium non-return shutters incorporating an anti dust/ sand seal.



### POWER VENTILATOR INSTALLATION & ROOF SLOPE

### POWER VENTILATOR AT ROOF SLOPE

Power is supplied by means of a direct drive motor with an integral aluminium aerofoil blade impeller, statically and dynamically balanced as a complete unit. The motor and impeller are fitted with guards for protection against moving parts. Noise level does not exceed 66 dB(A) at 2.0 m. The unit is weatherproof against rain and dust, considering a maximum rainfall of 75 mm/h and wind speed of 130 km/h. The power unit is fitted with a non return shutter, which closes when the unit is not in operation and is held in position by a centrifugal locking mechanism.

Recommended free air inlet area to be at least 2.5 m<sup>2</sup> per fan. Special ventilators may be supplied upon request.

	Power Ventilator [Colt To	ornado T630] (Weight=32 kg)	
	Performan	ce Range Table	
	Powe	er Supply	
Phase	Frequency Voltage (Hz)	Voltage (V)	Exhaust Volume (m3/ sec)
	50	415	2.4
	60	380	2.6

# SLIDING DOOR



ses double sliding doors are designed for quick assembly and ease of operation. The door framing of sliding doors is made from 100mm deep galvanized cold formed channels having yield strength of 34.5KN/cm2 and a thickness of 1.5-2.5 mm. It is delivered knocked-down for field assembly. The door leavers are sheeted with the same panels as the exterior wall panels. Double sliding doors are suspended by galvanized hangers whose wheels glide inside a galvanized steel track that is attached to a hot rolled or built -up door header. The hanger has 4 wheels whose axles are mounted on hardened steel roller bearings. When the panel and panel accessories are excluded from ses supply the framing of the sliding doors will remain in our scope of supply unless we are requested to exclude it. In such cases we need to know the panel weight and depth to ensure that our framing is sufficient to support and accommodate it.







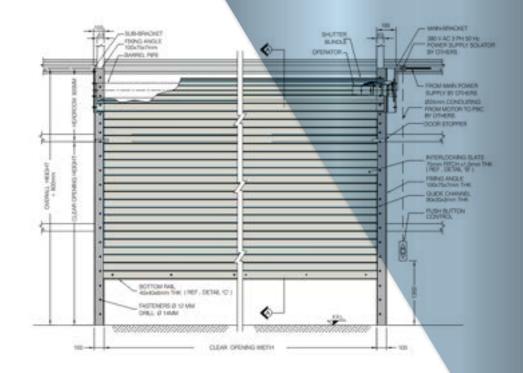
SINGLE SLIDING DOOR

# ROLL-UP DOORS



Roll-up Doors are supplied complete with guides, axles, springs, curtains and weather stripping. Manually operated roll-up door unit are chain operated. Electrically operated roll up doors are supplied with additional chain equipment to work manually in case of a power failure.

Standard SBS roll-up doors sizes are:					
Width (mm) Height (mm)					
3000	3000				
4000	4000				
5000	5000				
6000	6000				

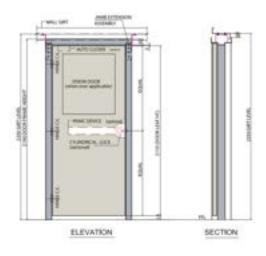


ROLL-UP DOOR

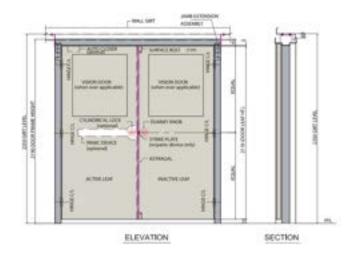
# PERSONNEL WALK DOORS



<u>SBS</u> Spersonnel walk doors are manufactured to fit in fully sheeted walls, partially sheeted walls and in block walls. The supply includes all the necessary hardware such as the hinges and the lockset. They are available in two sizes: single and double. Single personnel walk doors have a single door leaf whose size that is 915mm wide x 2135mm high while double personnel walk doors have two single door leaves.



SINGLE WALK DOOR ELEVATION



DOUBLE WALK DOOR ELEVATION

# Windows

<u>SBS</u> aluminum windows are self-flashing two-leafed horizontal half slide type. They are pre-assembled with factory glazing and single leaf insect screen and shipped ready for installation. The standard window size is 1000mm wide x 1000mm high that is powder coated in Frost White color. Standard glazing consists of a single 6 mm thick clear glass. Sliding sash has full weather strips.

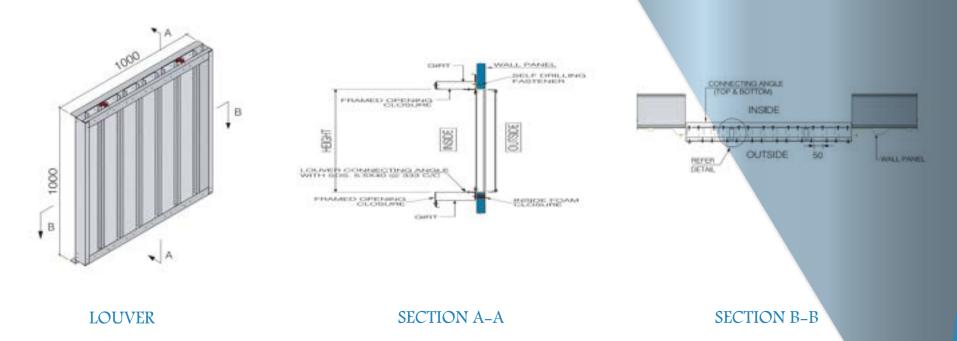
# SAND TRAP LOUVERS



SBS Sand Trap Louvers provide natural air flow into a building while trapping the sand from entering the building during sandstorms. Their standard size is 1000mm wide x 1000mm high. The louver channels are produced from 0.7mm thick Frost white Aluzinc Coated steel sheets.

Louvers are frequently specified in industrial and storage buildings. They form a part of the ventilation system that is often required to reduce buildup of dust, vapor and heat inside buildings to practical levels. The use of louvers (suitably positioned in the perimeter walls of a building) in combination with roof ventilators provides continuous circulation of natural air and creates a healthier atmosphere for the building occupants.

In PEB's, the top of the louvers is often set at 2280mm above finished floor level to enable the top of the louver to be fixed to the first wall girt.



# PANEL FASTENERS



<u>SBS</u> uses self-drilling fasteners because they drill a hole and seal it in one step ensuring that no oversized gaps develop between the fasteners and the drilled surfaces that may allow water condensation to seep through the roof.

For fixing Aluzinc Coated Steel panels <u>SBS</u> uses self-drilling carbon steel fasteners that are tuff coated to withstand a 1500-hour Salt Spray Test, making them durable and rust resistant especially in humid regions. For fixing Aluminum panels <u>SBS</u> uses self-drilling S.S 304 stainless steel fasteners with carbon steel drill tips. <u>SBS</u> self-drilling fasteners have 19mm washer diameters instead of the 14mm washer diameters that are commonly used by other PEB manufacturers in this region. The washer is integrated with a 3mm thick EPDM seal. A 19mm diameter washer provides considerably more protection against leakage and is often specified in areas of heavy rainfall.

Suggested fastener sizes for Steel-to-Steel connections (Single Skin Panels)					
Postonou Cina	total combined this	ckness of steel (mm)			
Fastener Size	Min.	Max.			
4.8 X 20	2.79	4.45			
5.5 X 40	2.29	5.33			

General Fastener Capacity						
Fastener Size Fastener Size		Ultimate Tensile Zb (kN)	Ultimate Shear Qb (kN)			
Carbon Steel	SDS 4.8	7.33	6.22			
	SDS5.5	17.12	11.56			
Stainless Steel	SDS 4.8	7.11	6.22			
	SDS5.5	14.01	9.56			

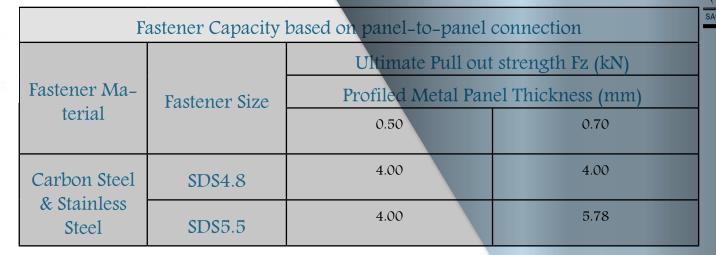








FOR SANDWICH PANELS



Fastener Capacity based on panel to supporting steel member connection							
Fastener Material		Ultimate Pull out strength Fz (kN)					
	Fastener Size	Supporting Member Thickness (mm) having Material Grade 50 (Fy=34.5 k N/cm 2)					
		1.50	2.00	2.50	3.00		
Carbon Steel	SDS 4.8	1.90	2.89	4.00	5.56		
	SDS 5.5		2.89	4.00	5.56		
Stainless Steel	SDS 4.8						
	SDS 5.5	1.33	2.89		5.56		

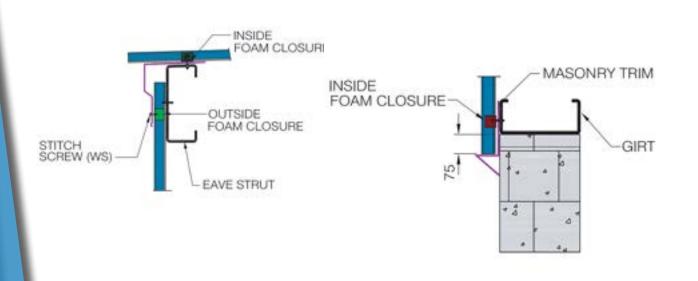
# FOAM CLOSURES

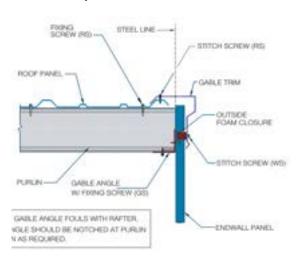


Foam closures match a specific panel profile. They are used to provide a weather tight seal between profiled panels and secondary framing members and between panels and trims, at the building eave, gable and base as well as above block walls.

SBS foam closures are made of soft, but rigid, polyethylene foam that has very high resistance to ultraviolet rays, can withstand harsh environments and resists aggressive chemical attacks. The polyethylene foam can also resist the usual damaging effects of ozone in the air and base of the building walls free of moisture that could cause rust and mildew. The ease and speed of installation, due to the interlocking dovetail shape at the end of each foam closure, eliminate gaps at connections and assure a snug fit with no closure sag out.

The required quantities of inside foam closures and outside foam closures for a typical building are not the same. The required quantity of inside foam closures is always higher than the required quantity of outside foam closures. SBS ships foam closures in pairs. The quantity of pairs that is shipped is equal to the required quantity of inside foam closure. This results in a surplus quantity of outside foam closures at the jobsite, which should be thrown away.





**EAVE DETAIL** 

**BASE DETAIL** 

GABLE DETAIL

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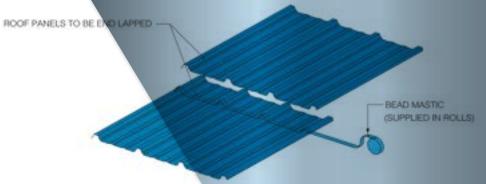
# **BEAD MASTIC**



Bead mastic is a high-performance elastic butyl tape with silicone release paper. It is designed to bond to mill finish and pre painted metal surfaces. Bead mastics are engineered to withstand extreme temperatures while offering low temperature compressibility and resistance to cold flow.

They are also formulated without asbestos fillers and are supplied in rolls of 19 m for easy application.

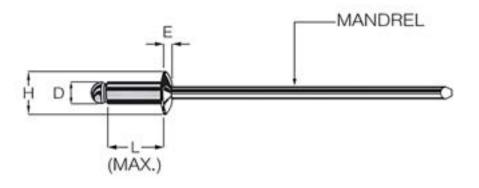
Bead mastic is used in roof panel end laps and, if specified, on roof panel side laps. They are also used in valley gutter splice plates.



BEAD MASTIC @ ROOF PANEL END LAP

# POB RIVETS

Pop rivets are used to attach trims to trims and sometimes trims to panels.



A TYPICAL RIVETLAP

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