



ARCHITECTURAL MARVELS IN **BOLTED SOLID BALL JOINT** TECHNOLOGY

Innovative • Aesthetic • Durable • Economical 3D Structural solutions

CREATIVE VERSATILE GEOMETRIC FORMS
IN LONG SPAN LIGHT WEIGHT STRUCTURES



INTRODUCTION

Triocon Space Frame Technologies (TSF) is an integrated custom design and manufacturing company specializing in the design, development, production, and installation of aesthetic 3D space frame structures. We utilize our “advanced bolted solid ball joint hollow tube technology” in steel, stainless steel, and aluminum. In addition to space frames, we also design, manufacture, and service other building forms, miscellaneous steel works, and building materials for the construction industry.

Space frames are able to span large spatial areas without the need for intermediate columns by interlocking struts in a geometric pattern. This is extremely advantageous for projects such as coal, cement, and sugar storage domes, sports stadiums, airports, and shopping malls.

They can also create architectural marvels in long skywalks, pedestrian bridges, and domes. Furthermore, space frames can add aesthetic appeal, rigidity, and longevity to smaller span structures like metro railway stations, swimming pool covers, toll gates, border security gates, and petrol/gas stations.



OUR CAPABILITIES

Customized In-house design software, tested and validated for over three decades to all global codes and standards

Management staff with over 25 years of experience and expertise in the execution of 3.5 million sq. meter of space frames in various complex & large-span span structural forms globally.

Products are supplied to international specifications and quality standard

Low-cost manufacturing facility exclusively for Space Frame components.

Capacity to produce about 30,000 Square meters a month.

Our advanced technology in the design of bolted ball joints helps reduce the weight of the space frame considerably without compromising on the structural needs and stability. This helps us to be competitive among space frame suppliers.

OUR MISSION

Our mission is to continue our tradition of producing excellent products and innovative technology to offer high-quality, lightweight, reliable, and safe space structure products and services that meet the evolving needs of both society and individuals.

With over two decades of hands-on experience in executing various long-span and complex geometry space frame and other steel structure projects worldwide, we have acquired expertise to ensure strength, beauty, colour, and speed in metal building construction. This also reflects our commitment to a greener world.

We aim to sustain our vision and mission by consistently seeking improvement through education and learning, enabling us to provide customers with the highest level of technical knowledge in the industry.

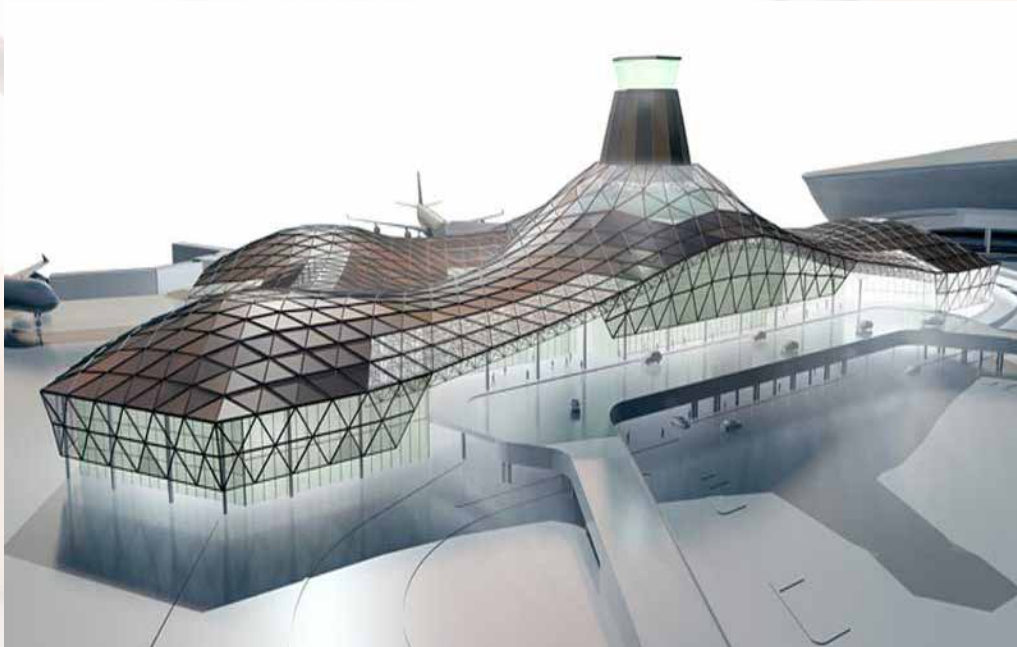
We strive to create a friendly, nurturing, and growth-oriented environment that encourages our employees to be highly productive and to develop both personally and professionally.

We are committed to conducting our business ethically, transparently, and profitably by adopting best business practices.

Furthermore, we seek to develop diversified markets to secure adequate financial returns, enabling us to achieve our goals and add value to society.

OUR VISION

Our vision is to create and sustain a greener world by providing high-quality and aesthetically pleasing 3D structural and architectural solutions to the world of construction.

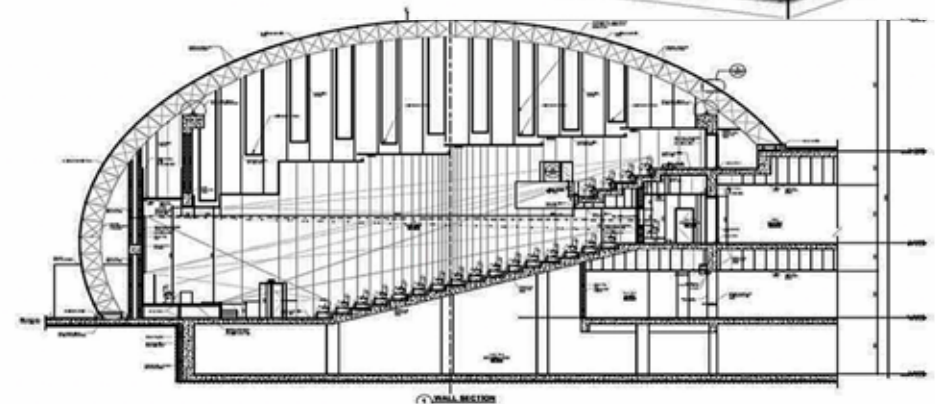
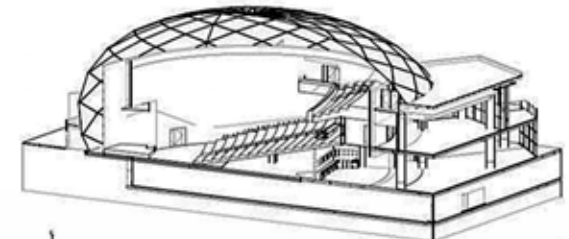


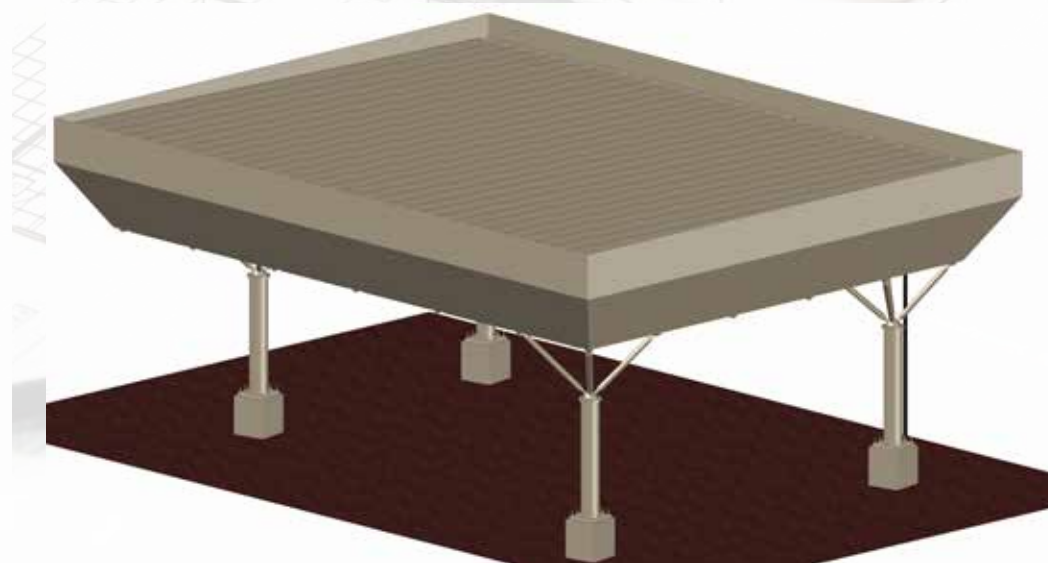
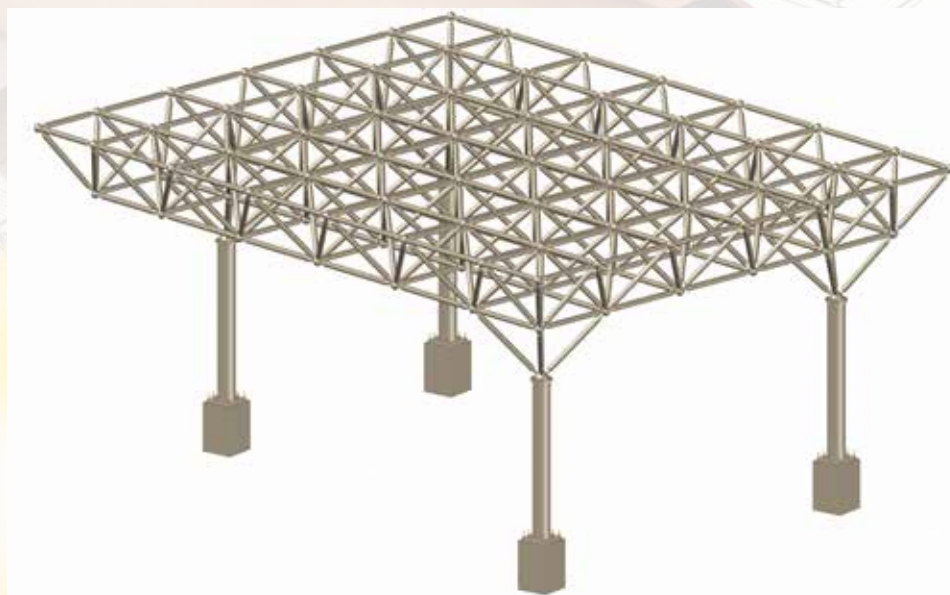
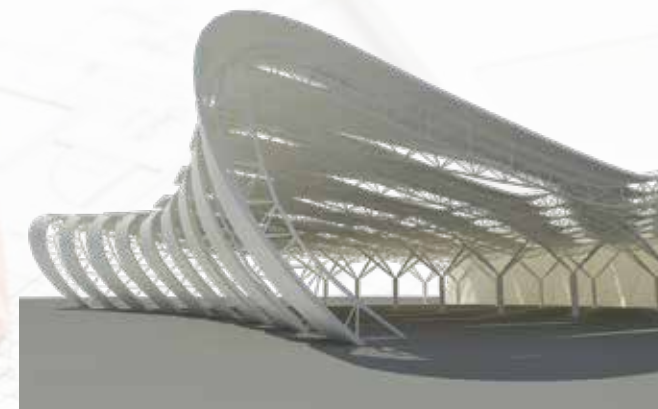
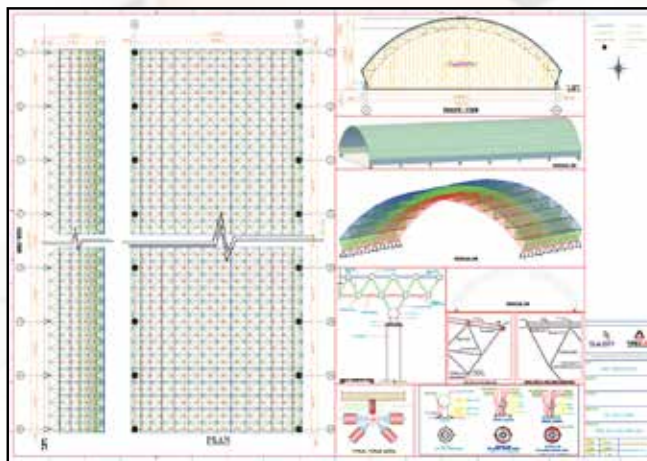
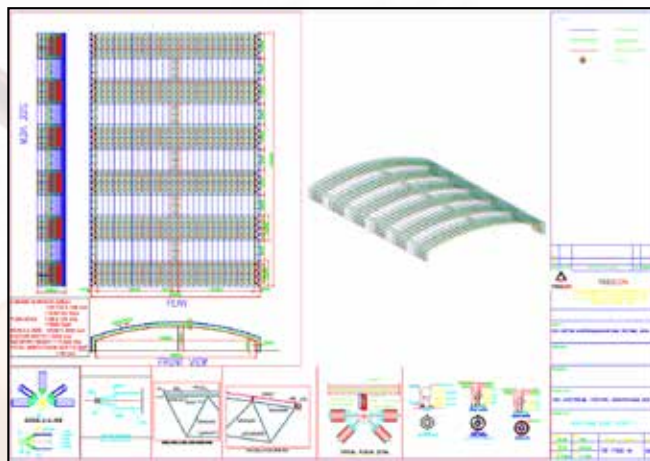
DESIGN SERVICES

The competent and dedicated team of professional turned technocrats of the space frame industry have created customized software for design and related structural analysis. We are well equipped with most modern and sophisticated engineering tools to meet the architectural and structural needs of variety of customers for complex geometric and larger span structures. In-house developed software programs are also designed to perform specific tasks of structural analysis to international codes AISC, ANSI, ASCE, etc. as well as to generate manufacturing data and installation drawings to ensure speed and accuracy throughout construction.

2. LOADS TECHNICAL DESCRIPTION:

Loads for Space Frame	:	
Module Height (m)	:	2.0m x 2.0m
Critical Span Length (m)	:	1.2 m
Critical Span Length (m)	:	Approx. 33.5 m
Surface Area (m ²)	:	2500 m ²
Dead Load (kg/m ²)	:	Self-weight of structure
Purlin + Sandwich Load (kg/m ²)	:	25
Service Load (kg/m ²)	:	15
Live Load (kg/m ²)	:	60
Wind Load	:	90 kg/m ² inward, 98kg/m ² outward
Earthquake Load	:	0.1*Seismic Mass
Temperature Load (C)	:	+ -30 C





Salient features of TSF

- Pillar less long and have clear spans and cantilevers up to 180 meters.
- Minimum structure weight and minimum deflections.
- Space frames are pinned jointed, hence all loadings are on solid sphere nodal joints
- Members transmit only Axial Forces (compressive and tensile forces only) in the truss envelope.
- All service lines can run through the frames.
- Accommodate concentrated loads.
- Suit irregular support positions.
- Variable depth and module sizes can be selected.
- Variable depth for roof drainage is built-in.
- Pre-Assembly allows project acceleration and accuracy.



- All space frame parts are manufactured in factory, no site fabrication or painting is required at project site.
- Accommodate any kind of metal roof /cladding materials, glass, polycarbonate,PVC fabric etc.
- Hot dip galvanized & powder coated structure having corrosion protection and color retention for a period of 20 years for first maintenance.
- Double or triple-layer powder coating techniques to withstand extreme corrosive environment like near sea, chemical industry, etc.
- Coating can be selected according to the corrosion classification of the location
- Simple modification or dis-assembly of entire structure for re-use
- Full or partial assembly of structure at work site and lift on to position using suitably sized crane.
- Where there is no access to crane the structure can be installed using full or on mobile scaffold.
- Triocon's "Advanced Space Structure Technology" is unique and are formed by structurally sealed hollow sections concentrically connected to solid spherical metal balls
- No punched or drilled holes in any of the structural components like pipe, bolt and sleeve.
- This special feature does not allow any replenishment of oxygen and moisture. Hence there is no question of internal corrosion of primary structural elements so these structures are extremely corrosion resistant.
- As supported nodes are also pin jointed, ensuring that the supporting media is subjected to horizontal and vertical forces only, without any moment at support, making the supporting media more economical
- Reduces dust formation on the structure due to rounded tubular members (pipes) when structure is adopted for coal and lime storage sheds in thermal and cement plants.
- Unlike other conventional steel structure, static redundancy of the 3D design of the structure prevents the collapse of the entire structure even when some members are detached.

INSTALLATIONS

The method chosen for the Installation of a space frame depends on its behavior of load transmission and constructional details so that it will meet the overall requirements of quality, safety, speed of construction, and economy. The scale of the structure being built, the method of joining the individual elements, and the strength and rigidity of the space frame until its form is closed must all be considered

1. SCAFFOLD METHOD

Individual elements are assembled in place at actual elevations, members and joints or prefabricated sub assembly elements are assembled directly on their final position. Full scaffoldings are usually required for this type of erection. Sometimes only partial scaffoldings are used if the cantilever erection of the space frame can be executed. The elements are fabricated at the shop and transported to the construction site, and no heavy lifting equipment is required



1. SCAFFOLD METHOD



2 . BLOCK ASSEMBLY METHOD



3 . LIFT-UP METHOD

2. BLOCK ASSEMBLY METHOD

The space frame is divided on its plan into individual strips or blocks. These units are fabricated on the ground level, then hoisted up into their final position and assembled on the temporary supports. With more work being done on the ground, the amount of assembling work at high elevations is reduced. This method is suitable for those double-layer grids where the stiffness and load-resisting behavior will not change considerably after dividing into strips or blocks, such as two-way orthogonal latticed grids, orthogonal square pyramid space grids, and those with openings. The size of each unit will depend on the hoisting capacity available.

3 . LIFT-UP METHOD

The whole space frame is assembled at ground level so that most of the work can be done before hoisting. This will result in increased efficiency and better quality. For short and medium spans, the space frame can be hoisted up by several cranes. For long-span space frame, temporary posts are used as the support, and electric winches as the lifting power. The whole space frame can be translated or rotated in the air and then seated on its final position. This method can be employed in all types of double-layer grids.

APPLICATIONS OF SPACE FRAMES

Power plant bulk coal storage domes/ barrel vault
Cement plant bulk limestone, gypsum storage domes
Auditoriums
Convention centers
LPG gas bottling plant
Sports stadium
Airport Facilities
Warehouses
Factories / Industrial sheds
Architectural Monuments
Exhibition Halls / Showrooms
Recreational and Sports areas
Pedestrian Overpasses
Shopping Malls
Atriums and Courtyards Areas
Car Park Sheds
Gas / Petrol Stations
Metro Railway Stations
Highway Toll Gates
Solar Panel
Bus Stations
Commercial building composite beams

Railway Stations





Contemporary Architecture



Stadium Covering



Metro Stations



Sport Stadiums



Airport Facility Structure

INDUSTRIAL ENCLOSURES

"SAY NO TO POLLUTION, SAVE NATURAL RESOURCES"

TSF is one of the experienced designers and builders of industrial enclosure shed structures for cement plants and thermal power plants to check and control environmental pollution and to save natural resources.

We use the most modern Bolted Solid Steel Ball Joint technology (Pinned Joints) to span large spatial areas with out intermediate columns to produce the light weight and stiff steel structures in various geometric forms such as Barrel Vaults (Linear shed up to 1 KM) and spherical domes shapes of any practical diameters.

Our structures can span up to 200 meters with out middle column, thus it is the most economical, light weight, rigid structural solutions for Lime stone storage sheds, Additive sheds, Coal handling sheds where stacker reclaimers to be accommodated.

Coal Handling Sheds



"Cover your stock piles"





INDUSTRIAL ENCLOSURES





Security Guard Headquarters, Sudan



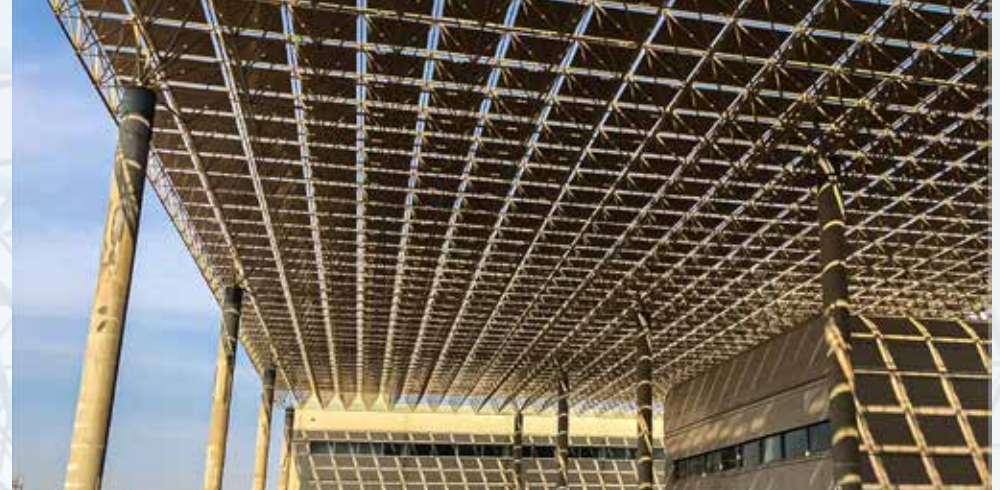
SWCC Security Gate Sunshade, Jubail



NEOM Community 2 Security Gate Sunshade



Daimler India Chennai



Marafiq Project



Schneider India Pune



Car Parking Shelter



Sadara



Toll Booths



Maaden Phosphate



Shopping Malls



Restaurants



Gas/Petrol Stations



Tamil Nadu Electricity Board



Pedestrian Suspended Arch Bridge

ALUMINUM & GLAZING

Saudi Specialized General Contracting Company stands as a prominent service provider dedicated to supporting the construction industry in the Kingdom of Saudi Arabia. Our specialization in Aluminium & Glazing works is underpinned by a commitment to delivering high-quality professionalism. With a team of experienced professionals, we are well-equipped to actualize your project vision, offering comprehensive engineering services encompassing design, development, fabrication, and installation of superior quality metal and glazing solutions.

SASP is unwavering in its commitment to serving as a dependable partner in addressing the multifaceted challenges and requirements of the construction and architectural domains. Our approach is characterized by tailoring bespoke solutions to address hurdles, thereby ensuring the highest precision and adherence to industry standards. Embracing contemporary designs and cutting-edge technology, our services epitomize a fusion of quality and innovation. Our steadfast dedication to client satisfaction is underscored by our ability to deliver quality at competitive rates, thereby ensuring a seamless service life.

At SASP, we place emphasis on nurturing meaningful relationships with both our employees and customers. Our management team consistently employs strategic measures and techniques to foster harmonious relationships within and beyond our organization.



- Conventional Curtain Wall
- Two Way Structural Glazing
- Four Way Structural Glazing
- Wall Cladding
- Canopy



ALUMINUM WINDOW'S AND DOOR'S



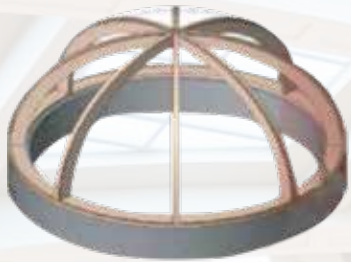
- Double or Single Glazed Windows
- Arch Windows Horizontal Sliding
- Vertical Sliding
- Hinged Windows
- Fixed and Movable Louvers
- Bottom Hung Windows
- Tilt and Turn Windows

- Tubular Doors
- Arch Doors
- Sandwich Panel Doors
- Saj box doors (Door Panel)
- Double Glazed with Georgian bar
- Fiber Door
- Sliding Door
- Automatic Sliding Doors
- Automatic Revolving Doors
- Swing doors

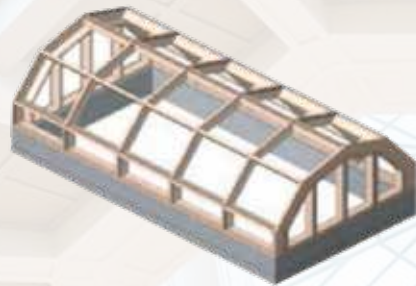


ALUMINUM SKYLIGHT & DOMS

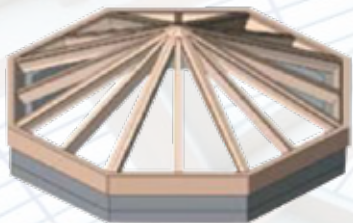
Aluminum Skylights of SASP is an excellent alternative to plastic skylights, which may degrade over time. Maintenance free, frames will never rot, excellent weather resistance. SASP Skylights are provided with hidden drainage system , which drains the moisture without unsightly openings and is designed to prevent the air and water infiltration that causes drafts and leakage.



Dome



Barrel Vault Segmented



Polygon



**Factory
Photos**



Arch Bending Machine

ALUMINUM LOUVERS

Aluminum louvers offer numerous advantages, including great functionality and aesthetic value. They provide effective protection from the sun, wind, and other weather influences. When used for windows and doors, shutters offer necessary safety, discretion, and enhanced protection. They also provide exceptional resistance to wind-driven rain, ventilation, longevity, light weight, durability, resistance to external influences, and easy and practical use.

Sun breakers are typically used to shade small areas or entire facade fields. Adjustable sun breakers can be oriented vertically or horizontally and can be controlled manually or by an electromotor.



STAINLESS STEEL HANDRAIL



FRAMELESS PARTITION & SHOWER PARTITION







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