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Mammut: A Leader in Manufacturing and Innovation

Mammut has become one of the industry's pioneers since 1991, focusing on quality, innovation, and reliability. With nearly half a century of experience and 2,000,000 square meters of manufacturing space, the company is a leader in the production of sandwich panels, steel structures, industrial metal sheds, residential and industrial canopies, prefabricated buildings, industrial cold storage, specialized trailers, sinking trucks, commercial and passenger vehicles.

Mammut's commitment to quality and innovation has made this brand the first choice for customers.

Mammut Structures & Panel Company: A New Step in Development

In 2023, Mammut Holding, with the aim of focusing on key and related areas, concentrated the production of various types of sandwich panels, steel structures, industrial metal sheds, prefabricated buildings, industrial and residential connexes in the Mammut Structures & Panel company. All products in Mammut Industrial Company are produced using advanced technology and Mammut's proprietary systems.

Mammut Vision: A Sustainable Future

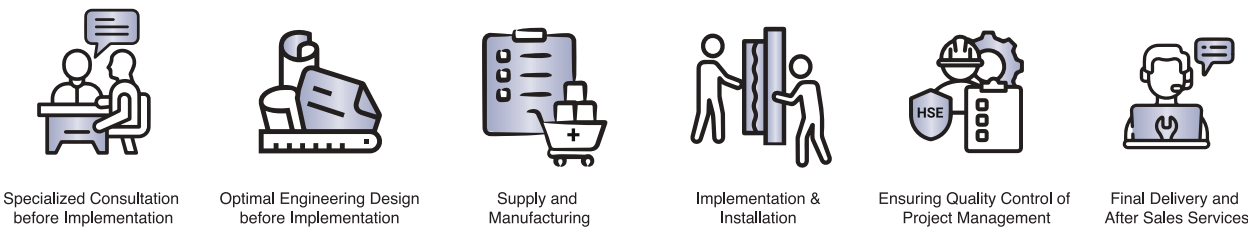
As one of the largest industrial companies in the country, Mammut is committed to providing world-class products. **Our slogan: "Expect the best"**. With industrial leadership, advanced technologies and expert human resources, Mammut will continue to shape the Middle East market and leave a lasting impact.

Turnkey Projects

Consulting, Designing and Integrated Implementation from Idea to Delivery of Turnkey Projects

Mammut manages all stages of the Turnkey project from expert consulting and engineering design to material procurement, construction, installation, and final delivery in an integrated manner, with a A-to-Z approach to project implementation.

► Integrated Project Execution Way



1. Specialized Consultation before Implementation

Technical-economic needs assessment, site review and limitations, selection of the most optimal solution according to project objectives.

2. Design and Engineering

Structural Modeling, Weight and Foundation Optimization, and Full Compliance with International Standards and HSE Requirements.

3. Industrial Supply and Production

Production of Steel Structures, Sandwich Panels and Other Accessories with Fully Automated Production Lines, focusing on quality consistency, manufacturing precision and parts traceability.

4. Installation and Erection

Precise Assembly of the Structure, Installation of Sandwich Panels, Implementation of Gutters and Flashing by experienced Teams.

5. Quality Control, HSE Project Management

Regular Quality Monitoring in Production and Installation, Safety Risks Management, and Regular Reporting of Progress Status.

6. Final Delivery and After-Sales Services

Turnkey delivery, operator training, technical support and post-implementation services to maintain optimal structure performance.



► Other Services

- Providing Solutions for Designing, Engineering, Supplying, Installing and Implementing of Solar Panels.
- Equipping a Temporary Workshop, by Using Mammut Cabins and Prefabricated Buildings.
- Equipping a Permanent Workshop, by Using Mammut Management, Engineering, and Administrative Buildings & Labor Camps
- Designing and Manufacturing of Mammut Wooden Products including Engineering and Professional Office Desks, Filing Cabinets and Shelves, and Kitchen Cabinet Services.



► Integrated Co-Operation Result

Consistent Performance, Controllable Cost and Reliable Quality.

► Scope of Application

- Factories, Industrial Sheds and Warehouses
- Cold Storages and Food Processing Centers
- Logistics, Export Projects and Other Industrial Usages



► Product Capabilities

- Wall, Roof, Cold Storage and Clean Room Sandwich Panels with a Variety of insulation and sheet Types.
- Industrial structures and sheds with optimized weight and foundation design
- Complementary solutions including flushing, installation accessories and implementation details

► Benefits of corporation with Mammut Structures & Panel

- **Integrated A to Z Management:** From Idea to Key Handover with A Single Responsible Authority
- **Cost and Time Optimization:** Weight Optimization, Waste Reduction, and Increased Agility in Procurement and Execution
- **Uniform and High Quality:** Industrial Production with Quality Control at All Stages
- **Reducing Complexity and Employer Risk:** Transparency in Timing, Costs and Final Quality
- **Specialized Support at All Stages:** From Initial Studies to Post-Implementation Services

Our Commitment

Mammut Structures & Panel company is committed to providing its clients with a reliable and lasting experience of co-operation in industrial projects by providing technical & economical solutions, transparency in the application program, reporting, and adherence to safety and quality principles.





Iran Mall

Metal Skeleton and Steel Structures

The use of steel as a construction material began in the early 20th century. After World War II, the accessibility and easier procurement of steel, along with its decreased prices, significantly increased the use of steel skeletons, making them of great interest to many engineers and building designers.

The fabrication of the steel structures of Mammut Company began operations in 2003. Today, with annual production records of 50,000 tons and executing over 2,500 diverse projects inside and outside the country, including industrial warehouses, power plant structures, oil and gas structures, petrochemical, pipe racks, vehicle and railway bridges, hotel steel frames, hospitals, residential and administrative buildings, we strive to fulfill our responsibilities regarding design, engineering, quality, and capacity of fabrication in the best possible manner.

We are proud to lead in the preparation, formulation, and implementation of Iran's national standards 3834-6, 3834-5, 3834-2, and 3834-1 in the steel structures industry and have obtained the permission from the Supreme Council of Standards of Iran to use the Iran standard mark on the manufactured products of Mammut.

We are leading in compliance with comprehensive quality requirements, including welding, in the fabrication of steel frames. You are certainly aware that one of the requirements for mandatory standards is having related equipment for various non-destructive tests such as PT, MT, and UT, all of which are carried out during the production process by experienced and qualified personnel.

One of the most significant advantages of the production lines of this company is having the latest version of shot blasting machines and a painting room equipped with a heating system. With a team of specialized human resources, we have utilized advanced equipment including CNC cutting systems, CNC drills, Submerged arc welding machine, H Beam (Plate Girder) Manufacturing Machine, H Beam Straightening Machine, box making machines, Wagner equipment, and more to achieve the highest productivity in building excellent products.

We are fully prepared to negotiate EPC contract agreements considering the existing potentials within the Mammut holding group, including Mammut Construction Company, Mammut Technology, and Mammut Vazneh, to alleviate customers' concerns in designing and completely delivering a project.

dotone project



South Pars



Kisan Pak Co.

► Industrial Sheds

Industrial Sheds are among the most important structures in the world of industry and commerce. There are various types of Sheds, which the beam Shed is one of the most common. Beam Sheds are metal structures where the main material used for their production is steel sheets, which are selected based on the dimensions of the final project and are connected through welding or bolts. The metal sheds found in our country can be considered classic and heavy sheds, which have the most applications among the various types of sheds. The flexibility of these types of sheds in design and fabrication has made beam sheds one of the most recognized and oldest products in the industry.

The Industrial Revolution in Europe led to many changes in industries. One of its effects was the increased use of iron in the construction industry. Following this event and the widespread use of iron, the need and demand for it increased. Therefore, experts were looking for new solutions to enhance the structure's resistance and reduce its weight by examining girders. This is how beam sheds entered the industrial world.

► Components of Sheds

The main components used in constructing the skeleton of all types of sheds are the same, and each type of sheds can include other parts depending on its specific application. To have a suitable shed, it is essential that all these main and secondary components are constructed with precision and the best possible quality.

► Main Components

Column: The columns bear the main load and weight of the shed; therefore, they are the most critical and important parts of the shed. The implementation of the columns occurs after the foundation is laid, and the shed columns are secured to the base plate using bolts.

Strut: Struts serve as lateral supports responsible for connecting the consecutive main frames along the longitudinal axis. The installation of struts is done through flange connections to the main middle beam on one side and on the other side to the main column.

Rafter: These components are used in the roof of the sheds and have a truss-like appearance. Each rafter is constructed from two steel beams separately and is transported in that form to the project site for assembly with cranes. The number of rafters required for each sheds depends on the project's dimensions.

Brace: The shed structure is sensitive and vulnerable. Therefore, additional components are necessary for greater support and to enhance strength. For this reason, braces are used to protect the steel frame of beam sheds. Different types of braces such as tension rods, wall posts, and other types of braces are used in beam sheds. Lack of braces in the sheds structure reduces the safety of the structure.

Purlin or lapel: These components are considered secondary connections of the shed and are made of Z or C channel profiles. The duty of the purlin is to provide the strength of the shed roof and to bear the weight of the covering placed on it. These components are implemented between the primary roof frames at specified intervals along the length of the shed.

► Secondary Components of Sheds

Base Plate: The base plate is used at the point where the columns connect to the pedestal of the shed.

Wall Post: These components are actually the secondary columns used at the beginning and end of the shed.

Gutter: Gutters are responsible for directing water from the roof downward to prevent damage from moisture.

Wind Brace: The purpose of using Wind Brace is to increase the stability of the structure.

Flange Stay: The role of the Flange Stay is to prevent torsion in the beam.





Advantages of Beam Sheds

Simple Transfer

The components and parts of the beam shed are made separately and are implemented using bolts and nuts at the final location of the project. This makes moving the structure less of a challenge if necessary.

High Strength and Longevity

The main material for the production of beam sheds is steel and the structure has good strength. For this reason, it can be used for long periods and even decades.

The Possibility of Using a Crane

Beam sheds have a very suitable height, which allows you to use overhead cranes in the shed environment.

The Possibility of Building a Multistorey Shed

Some industries prefer to add more floors to their sheds due to the special uses they have in mind, which is possible in beam sheds.

Recyclability

The parts used in beam shed can be recycled or reused.

Suitable for Sheds with Small Hanger

Maybe choosing beam sheds is not suitable for sheds that have a large hanger, but they are very suitable for sheds that have a smaller hanger.

► Applications of Beam sheds

Warehouses and Storage Spaces: Due to their high strength and durability, beam sheds are used as warehouses and storage spaces.

Workshops and Factories: These sheds, due to their flexibility in design and fabrication, can be customized according to individual needs and various applications, making them very popular for establishing workshops and industrial factories.

Sports and Exhibition Halls: Beam sheds are used as sports and exhibition halls due to their quick fabrication and installation. The speed of erecting these sheds makes them an excellent option for sudden events.

Agricultural Sheds: These sheds are used to create agricultural spaces such as storage for agricultural products and animal husbandry due to their resistance to various weather conditions.

► Strength of Beam sheds

Due to the presence of steel in the structure of beam sheds, these structures are very strong. This, along with the use of braces at appropriate points and an optimized design, can significantly enhance the shed's strength. However, it should be noted that if the necessary standards are not observed and there is insufficient precision in the fabrication process, the required strength may not be achieved, leading to serious damage under specific weather conditions such as wind, heavy rain, earthquake, or fire. Some people consider the use of steel as the reason for the heavy weight of beam sheds, while if the necessary standards are followed during the fabrication process, the final weight of these projects will be at an acceptable level.

➤ Truss sheds

A truss shed is a type of metal structure made by combining beams and truss parts. These structures are connected using triangular-shaped components to form a strong network. The truss design allows loads to be distributed uniformly, improving the structure's strength and stability. The steel truss acts as the main load-bearing member of these types of sheds.

➤ History of Truss sheds


The use of trusses dates back to ancient times when humans used wood and stone to build bridges and large structures. The triangular design of trusses, known for their stability and strength, has been in use since then. In the industrial era and the development of steel as a primary fabrication material, the use of trusses in warehouse construction increased.

The first modern truss sheds were built in Europe and America in the late 19th and early 20th centuries. In Iran, the use of truss sheds began decades ago and gradually became one of the most popular structures in various industries. The development of the steel industry and the increasing demand for modern industrial structures boosted the use of truss sheds.


➤ Types of Truss sheds

- **Simple Truss sheds:** These warehouses result from connecting trusses each composed of three members in two groups.
- **Composite Truss sheds:** These structures use more than one type of truss in their construction, with the important advantage of having no limitations in constructing wide spans.
- **Complex Truss sheds:** The application of this type of truss shed is less common than the previous two types and is used in specialized structures.

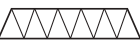
➤ Types of Trusses



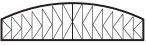
Triangular Truss (Simple): A structure consisting of triangles that evenly distributes forces. This type of truss is suitable for small projects and lightweight roofs.




Pratt Truss: Features vertical members under compression and diagonal members under tension. This design is ideal for bridges and industrial buildings with variable loads.




Warren Truss: Consists of repeating triangular members that distribute loads uniformly. It is used for large structures and long bridges.



K Truss: Designed in the shape of a K, it has high strength and is suitable for tall buildings and industrial structures with heavy loads.



Fink Truss: Economical and low-consumption, suitable for medium spans. It is commonly used in residential roofs and small warehouses.



Howe Truss: Features diagonal members under compression and vertical members under tension, optimizing the distribution of loads. It is used in pedestrian bridges and industrial buildings.

➤ Components of Truss sheds

Beams and Columns: Beams and columns are the main members of the truss structure that bear vertical and horizontal loads. These members are typically made from steel or aluminum, which offer high strength and low weight.

Truss: Truss members consist of triangular-shaped pieces that are interconnected in a network. These members help distribute loads and increase the strength of the structure.

Pedestals: Foundations are the lower parts of the structure responsible for transferring loads to the ground. They are usually made of reinforced concrete to provide the necessary strength to withstand applied loads.

Roof and Wall Covering: The roof and wall coverings play an essential role in protecting the structure from weather elements and creating a suitable indoor environment. These coverings are typically made from steel sheets, polycarbonate, or sandwich panels.

Advantages of Truss Sheds
High Strength and Stability
One of the most important advantages of truss sheds is their high strength and stability. Truss design causes uniform distribution of loads, which helps to increase the resistance of the structure against various forces.
Reduction of Material Usage
The special design of the trusses reduces the weight of the structure and thus reduces the consumption of materials. This helps to reduce fabrication costs as well as fabrication time.
Flexibility in Design
Truss sheds have high flexibility in design due to their modular structure. This feature allows engineers and architects to design structures in different sizes and shapes to suit specific project needs.
Speed of Fabrication and Installation
Due to the prefabricated parts and the use of modern installation methods, the speed of fabrication and installation of truss sheds is very high. This helps to reduce the project time and costs associated with it.
Cost
Truss sheds are generally less expensive than other types of sheds due to reduced material consumption and fabrication time. This is especially useful for large and industrial projects that require a limited budget.

➤ Applications of Truss sheds

Warehouses and Storage Centers: Truss warehouses are very suitable for creating warehouses and storage centers due to their spacious interiors and high strength. These structures can effectively store and manage various goods and materials.

Workshops and Factories: Truss warehouses, with their high strength and large internal space, are suitable for establishing workshops and industrial factories. These structures can effectively accommodate and utilize heavy equipment and machinery.

Sports and Cultural Halls: The unique design and open interior space of truss warehouses make them suitable for creating sports and cultural halls. These structures can be used as multipurpose venues for hosting various events.

Exhibitions and Exhibition Spaces: Due to their design flexibility and spacious interior, truss warehouses are highly suitable for creating exhibition and conference spaces. These structures can be quickly produced, installed, and utilized for holding exhibitions and conferences.



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► High-rise steel building

A metal building skeleton is a very practical subset of metal structures. In simpler terms, metal building skeletons are the steel frameworks you see at the beginning of a building's construction. These structures are used to construct buildings of various sizes and different applications. The primary role of a metal skeleton in a construction project is to create sturdy foundations and columns on which subsequent construction stages occur. In other words, this structure provides the skeleton of a building and determines its strength.

► History of Metal Building Skeletons

Metal skeletons, considered as one of the most important developments in the construction industry, have had a significant impact on the design and execution of structures. In the late 19th century, with the advancement of technology and mass production of steel, the use of metal skeletons in buildings began. One of the early prominent examples was Insurance Building in Chicago, built in 1885. With the onset of the 20th century, technological advancements and the development of welding and connection methods the use of metal skeletons had expanded. During this period, tall buildings and skyscrapers widely utilized metal skeletons.

► Importance of Metal Frame Structures

The building skeleton, as the main framework, bears all live and dead loads and transfers them to the ground. Proper design and precise execution of the skeleton are of great importance and can significantly impact the structure's resistance to various factors such as earthquakes, wind, and external loads.

► Types of Metal Building Skeletons

Bolted Metal Skeletons: The types of metal building skeletons differ based on how their components are connected. In bolted metal structures, the connections between steel columns and beams are made using bolts and completed in the factory. The bolted type is often considered the best metal building skeleton because its fabrication processes are completed entirely in the factory following necessary standards.

Advantages: Most fabrication steps of this structure are completed in the factory, increasing the speed of project construction. This high speed minimizes congestion and crowding at the construction site. The easier transportability of these structures compared to welded ones has made them popular in larger projects. Unlike welded metal frames, bolted frames show more flexibility under weather conditions.

Welded Metal Skeletons: The fabrication of welded metal building skeletons occurs at the final construction site. The beams and columns of the steel structure are cut and welded together at the construction site. If the welding processes are not performed correctly, the building skeleton may weaken due to natural factors, leading to potential structural failures.

Advantages: It is recommended to use welded connections for structures subjected to torsional forces. The absence of additional bolts in this type of metal building frame results in a more uniform and aesthetically pleasing appearance.

► Applications of Various Types of Metal Building Skeletons

Bolted Metal Skeletons: This category of metal building structures is used in the construction of large skyscrapers that require high speed and precision in building. The ability for quick relocation and installation makes these structures suitable for large-scale projects.

► **Welded Metal Skeletons:** This type of building structure is used for constructing lower-scale buildings. Generally, it is recommended to use welded metal skeletons for buildings with simple designs.

More Specifically, the Applications of Metal Building Structures include:

- **Residential Buildings:** Metal building structures are used in residential construction due to their design flexibility and high strength, especially in earthquake-prone areas.
- **Commercial and Office Buildings:** The use of metal structures in commercial and office buildings is very common due to the high speed of execution and the ability to create large spaces without intermediate columns.
- **Bridges and Transportation Structures:** Metal building structures are widely used in the construction of bridges and other transportation structures due to their high resistance to compressive and tensile forces.
- **Sports and Exhibition Halls:** The use of metal building structures in constructing sports and exhibition halls is very common due to the possibility of creating spacious and unrestricted areas.

► Steps for Executing Metal Building Skeletons

1. Design and Structural Calculations: In this phase, engineers use specialized software to conduct design and structural calculations. These calculations include determining the dimensions and types of materials used in the skeleton, reviewing applied loads, and analyzing the stability of the metal building structure.

2. Foundation or Base: At this stage, the foundation or base of the building is constructed precisely according to the execution plans. The foundation is responsible for transferring the skeleton loads to the ground and must be executed carefully and according to standards.

3. Installation of Columns and Beams: After the foundation is completed, the main columns and beams of the skeleton are installed. This stage includes accurate cutting and connecting of components to each other and stabilizing them on the foundation.

4. Implementation of Walls and Roofs: In this phase, the walls and roofs of the building are installed. These components not only separate internal spaces but also play a significant role in the stability of the structure and need to be executed with precision.

5. Coating and Protection: After the installation of the metal building skeleton, the components are covered and protected from weather elements and corrosion. This stage includes painting and using protective coatings such as anti-corrosion and moisture insulation.





Abu Kamal Bridge
Syria

► Metal Bridge Structures

Metal bridges play a vital role in road and rail transportation, making them one of the most commonly used types of metal structures. Various types of metal bridges are constructed, each designed for a specific application. Metal bridges can be installed in urban areas or on intercity routes. The application and installation location of a metal bridge significantly influence its design.

► History of Metal Bridges

Metal bridges, like most metal structures, gained popularity after the development of the steel industry in the mid-19th century. It is noteworthy that the first metal bridges were made of iron, and with advancements in metal industry, the use of steel for their construction became more common. The Clark Bridge in Britain and the Brooklyn Bridge in America can likely be considered among the earliest examples of modern metal bridge structures.

► Types of Metal Bridge Structures

- **Beam Bridges:** These bridges consist of horizontal metal beams that rest on supports or piers. Beam bridges are typically suitable for short to medium spans and are popular due to their simplicity in design and construction.
- **Truss Bridges:** Metal truss bridges are made up of triangular-shaped metal members that connect to form a strong and stable structure. These bridges can carry greater loads compared to beam bridges and are suitable for medium to long spans with more complex designs.
- **Arch Bridges:** Arch bridges consist of one or more metal arches that uniformly transfer the weight of loads to the foundations. Due to their attractive design and capability to carry heavy loads, they are commonly used in constructing large and famous metal bridge structures.
- **Cable-Stayed Bridges:** Cable-stayed bridges consist of one or more vertical masts and tension cables that connect the masts to the bridge deck. This type of bridge is suitable for very long spans and is used in large, iconic projects due to its modern and aesthetically pleasing design.
- **Suspension Bridges:** These bridges comprise one or more main cables and secondary cables that convey the loads of the bridge deck to the main towers. Like cable-stayed bridges, they are suitable for very long spans and are utilized in major and special projects.

► Components of Metal Bridge Structures

- **Deck:** The deck of the bridge is the part where traffic, including vehicles and pedestrians, moves.
- **Beams:** Beams are the horizontal elements of the bridge that transfer the loads from the deck to the supports.
- **Piers:** Piers are vertical structures that carry the loads transferred from the beams to the foundations.
- **Abutments:** Abutments are the end points of the metal bridge structure that transfer loads to the ground and prevent deformation and settlement.
- **Cables:** Cables are used in suspension and cable-stayed bridges, transferring the loads from the deck to the towers.
- **Towers:** Towers are used in suspension and cable-stayed metal bridges and serve as the connection points for the cables.
- **Braces:** Braces are diagonal components that enhance stability and prevent deformation in the metal bridge structure.
- **Connections:** These are used to join various components of the metal bridge structure together and can be either welded or bolted types. Welded connections are for permanent joints, while bolted connections are for temporary and removable joints.

► Important Points about Metal Bridges

- **Inspection and Quality Control:** Metal bridges are structures where quality inspection is of utmost importance. Ensuring compliance with standards at all stages of bridge construction and installation is crucial, as even the smallest error or flaw at any stage can lead to irreparable damage.
- **Testing and Commissioning:** The most critical phase after installing the metal bridge structure involves conducting tests and necessary inspections to ensure the bridge's load-bearing capacity. A suitable metal bridge should be able to sustain the required weight without any issues.
- **Ensuring Component quality:** Regular inspections can ensure the quality of bridge components. If any defects or failures are detected, immediate action should be taken to stop its usage and repair or replace the affected parts. Otherwise, the likelihood of unpleasant incidents occurring will be higher than before.
- **Monitoring Environmental Changes:** Environmental events and climatic changes, such as winds, storms, or earthquakes, can damage metal bridge structures. Therefore, it is essential to consider environmental changes and conditions as much as possible for the bridge and take them into account during the manufacturing and installation process.

► Examples of Metal Bridges Worldwide:



► Suspension Bridges:

Brooklyn Bridge in New York, USA

Golden Gate Bridge in San Francisco, USA

Tsing Ma Bridge in Hong Kong

► Arch Bridges:

Sydney Harbour Bridge in Sydney, Australia

► Truss Bridges:

Forth Bridge in Scotland, UK

Eads Bridge in St. Louis, USA

► Cable-Stayed Bridges:

Millau Viaduct in France

Erasmus Bridge in Rotterdam, Netherlands

► Beam Bridges:

Trent Bridge

Mark Bridge in England

Tory Bridge in Scotland

► Pipe Rack Structures

A pipe rack is a type of safety equipment that significantly enhances work efficiency. In other word, a pipe rack is a metal or concrete structure composed of various components that, after being connected, serves to protect pipes by supporting them. Generally, pipe racks are utilized in locations with numerous piping systems for transporting gases and liquids where protection is crucial. These structures are typically made of steel and are usually installed at various heights to facilitate access to pipes and cables.

Advantages of Pipe Rack Structure

Increased Safety

Pipe racks help reduce the risk of falling and damaging equipment by maintaining and supporting pipes and cables. This is especially important in industrial environments with a large number of pipes and cables.

Better Coordination of Equipment

The use of pipe racks allows better organization of pipes and cables. This not only helps improve the appearance of the work environment, but also makes access to equipment easier.

Reducing Maintenance Costs

Pipe racks help reduce maintenance and repair costs by maintaining and supporting pipes and cables. This is especially important in large projects with a large number of pipes and cables.

Increasing the Longevity of Equipment

Pipe racks help to increase the useful lifespan of these equipment by preventing damage to pipes and cables. This is especially important in industrial environments with harsh working conditions.

► Applications of Pipe Rack Structures

Pipe racks play a crucial role in the oil, gas, petrochemical, and refinery industries by supporting and maintaining pipes and cables. These metal structures have evolved over time to meet industrial needs and technological advancements. The increasing demand for oil and gas has significantly heightened the need for efficient and safe transportation systems for these materials. During this period, the use of pipes and cables for transporting oil, gas, and chemicals became widespread.

► **Oil and Gas Industries:** Pipe racks are used in the oil and gas sectors to support and maintain pipes that transport oil and gas. These metal structures contribute to the safety and efficiency of transportation systems.

► **Petrochemicals and Refineries:** In petrochemical plants and refineries, pipe racks support and maintain pipes and cables that transport chemicals and petroleum products.

► **Power Plants:** In power plants, these metal structures are utilized to support and maintain pipes and cables that carry water, steam, and electricity. This enhances the efficiency and safety of energy production systems.

► **Food and Pharmaceutical Industries:** In the food and pharmaceutical sectors, pipe racks are used to support and maintain pipes and cables that transport food and medicinal materials. This aids in improving hygiene and safety during production processes.

► Difference Between Metal and Concrete Pipe Racks

As it's obvious, the primary difference between these two structures lies in the materials used for their construction. Metal pipe racks are made from steel, which results in a relatively higher price and greater strength. The overall structure of metal pipe racks is completely metallic, although concrete may be used in their implementation. In contrast, concrete pipe racks are produced at a lower cost but have less strength compared to metal structures.

► Components of Pipe Racks

► **Beams and Columns:** Beams and columns are the main components of a pipe rack, arranged vertically and horizontally to form the primary structure. These components are made of steel and produced in various cross-sectional shapes such as H, I, or L.

► **Braces:** Braces are used to enhance the strength and stability of the structure. These elements are typically installed diagonally to prevent deformation and instability.

► **Clamps and Supports:** Clamps and supports are used to connect and maintain pipes and cables to the pipe rack. These components are usually made from steel or aluminum and are produced in different sizes and shapes.

► **Bases:** Bases connect the pipe rack to the ground. These components are typically made from concrete or steel and bear the loads imposed on the structure.

► Price of Pipe Rack Structures

Determining the price of pipe racks, like other metal structures, depends on several factors, including:

► **Design and Complexity of the Structure:** The design and complexity of the pipe rack influence its price. Simple structures with fewer beams and columns cost less than more complex designs that require more components. Additionally, the need for more braces to increase structural strength can drive up costs.

► **Dimensions and Size:** The dimensions and size of the pipe racks are crucial factors affecting the price. Larger structures with greater height and length require more raw materials, increasing construction costs.

► **Material Quality:** The raw materials used in constructing pipe racks are significant factors that influence the price. Normal steel, stainless steel, and aluminum are materials that vary in cost. Using stainless steel or aluminum leads to higher costs due to their enhanced resistance to corrosion and rust compared to regular steel.

► **Type of Connections:** The type of connections used in building the pipe rack also affects its price. Using bolted or welded connections incurs different costs. Bolted connections generally costing more due to their ease of installation and the possibility of disassembly.

► **Protective Coatings:** The application of protective coatings such as hot galvanizing, corrosion-resistant paints, and anti-rust coatings can increase expenses. While these coatings help extend the lifespan of the pipe rack and reduce maintenance costs, they raise initial expenses.

► **Transportation and Installation Costs:** Transportation and installation costs can also influence the final price of the pipe rack. Depending on the project's location and distance from the production site, transport costs can vary significantly. Furthermore, the need for specialized equipment for installation, such as cranes and skilled labor, can contribute to higher costs.



Sandwich Panel

The sandwich panel is a compound material which is produced in the form of sandwiches (layers) that the external layers are made of sheet metal (PPGI, Aluzinc or Aluminum) and also has a core made of polyurethane foam with different densities which is injected between two layers of the sheet.

This type of material is used to cover the Roof and wall of industrial halls, factories, production halls, warehouses, prefabricated buildings, portable cabins, cold storages, clean rooms, camps, temporary accommodation, etc.

► Sandwich Panel

Sandwich panels are the best material of their kind in terms of lightness and insulation compared to similar covering materials. In addition to low weight and speed of execution, this product is more economical than other materials and meets all energy storage standards.

The trapezoidal shape of the roof sandwich panel and its overlap on each other will cause it to be completely sealed and there is no need to be sealed. It will be fixed only with special screws and gaskets.

The use of sandwich panels as roof and wall coverage is a suitable option for construction in earthquake-prone areas along with strength due to its lightweight.

One of the important features of polyurethane sandwich panels is their insulation against temperature and the lowest temperature transfer coefficient. For example, the temperature transfer coefficient of a 5 cm thick sandwich panel is equivalent to a 172 cm thick brick wall due to its extremely low heat transfer coefficient, which will lead to energy savings and reduced costs in the long run.

► Key features and important reasons for using Sandwich panels include the following advantages:



Economical compared to traditional materials



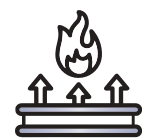
Washable



Resistant to moisture absorption (snow, rain and dust)



Long life of the product



Resistant to fire and slow burning



Thermal insulation (cold and heat)



High speed of production, installation and execution

For nearly half a century, by consistently using the most up-to-date and advanced production technologies and making a conscious effort, we have been able to produce Mammut sandwich panels to the highest standards. It is an honor that Mammut Structures & Panel company, as the market leader, has been able to have the most successful export experiences to many neighboring countries and the Middle East, in addition to meeting the extensive needs of domestic markets and advancing national projects in our beloved Iran.

The choice of color for a sandwich panel is based on the client's taste and sometimes related to the client's organizational color. Sometimes, ceilings and walls are even covered using several different colors. The most commonly used colors are as follows:

RAL 5015	RAL 5018	RAL 6017	RAL 6019	RAL 6021	RAL 6024
RAL 7040	RAL 7043	RAL 7047	RAL 9016	RAL 9006	RAL 7035
RAL 3000	RAL 3020	RAL 1015	RAL 1028	RAL 8023	RAL 2004





► Roof Sandwich Panel

Roof sandwich panels are used to cover the roof of industrial halls, agricultural halls, warehouses, factories and so on. In addition to covering the roof and ceiling, thermal and refrigeration insulation, ease of implementation and installation, and most importantly, the short operation time of this product as the remarkable advantages of this product, has drawn the attention of many factories, companies and managers.

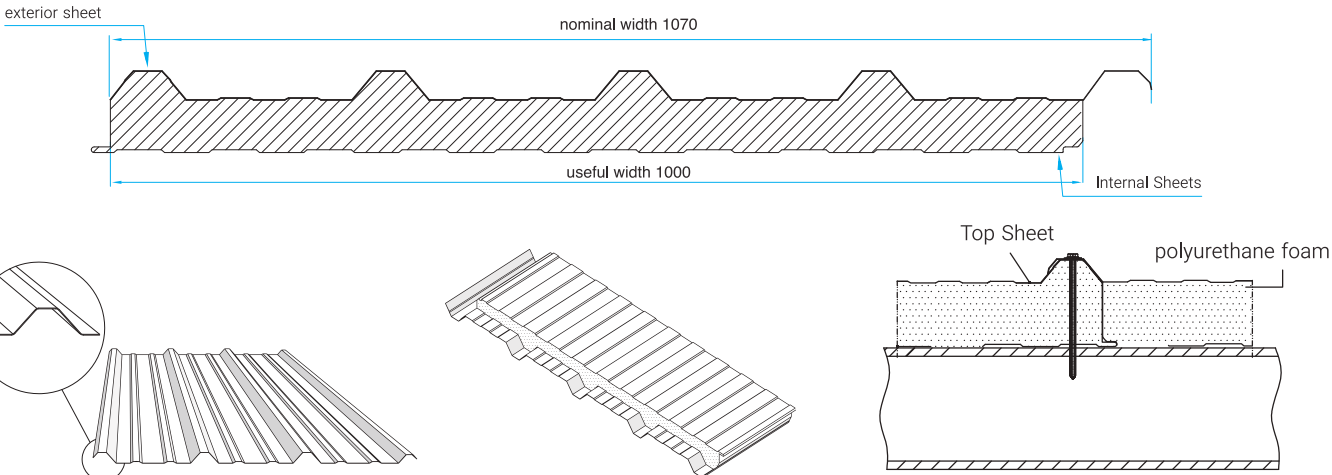
Roof sandwich panels should be designed and manufactured in such a way to be resistant against various factors such as sunlight, snow and rain, humidity and various ambiances. Regarding the low thermal conductivity of Roof sandwich panels, they are the best solution for energy management in closed spaces, so the most important factor in choosing their type and thickness is the regional climatic conditions.

With the advancement of technology, it is possible to produce sandwich panels in different colors, which has greatly contributed to the beauty of structures, and has made this product welcomed by architects.

Mammut Structures & Panel company manufactures roof sandwich panels with a trapezoidal shadowline design on the outer sheet surface. Also, this company is the only manufacturer of roof sandwich panels with the ability to produce left and right overlaps.

The overall width of the roof sandwich panels is 1.07 meters and the useful width is 1 meter. Excellent overlap of this type of Mammut sandwich panels is such that it causes complete sealing and beauty of the structure surface.

Roof Sandwich panel-Technical Specifications	
Overall Width (mm)	1070
Useful Width (mm)	1000
Length (m)	2m up to 13.60 (according to the order)
Density (ASTM 1622)	40±2 Kg/M³
Thickness (mm)	20-30-40-50-60-80-100 mm
Flammability range (DIN 4102)	PUR (B3), PIR (B1, B2)
Type of external coverage	Both sides sheet, one side sheet & one side AL foil
Type of sheet	Aluzinc, galvanized and aluminum, steel, super platinum
Upper sheet thickness (mm)	ø/4 - ø/5 - ø/7
Lower sheet thickness (mm)	ø/4 - ø/5 - ø/7



► Wall Sandwich Panel

Wall sandwich panel is a type of building material that consists of two layers of sheets and injected foam between them, and is used to cover the wall and facade. This type of sandwich panel is used for exterior walls as well as interior partition walls. Wall Sandwich panels usually have grooves that are created due to the greater strength of the sheet as well as better adhesion of foam to the sheet.

One of the unique features of wall sandwich panels is their simple and quick assembly. Also, due to their cost-effectiveness and easy installation, high load bearing, lightness, excellent against fire and other natural disasters, along with maintaining hygienic standards and compatibility with the environment, cause their use in covering exterior and Interior walls of halls, warehouses, shops, department stores, warehouses, garages, cold stores for fruits and vegetables, booths, livestock and poultry farms, industrial halls and factories, etc.

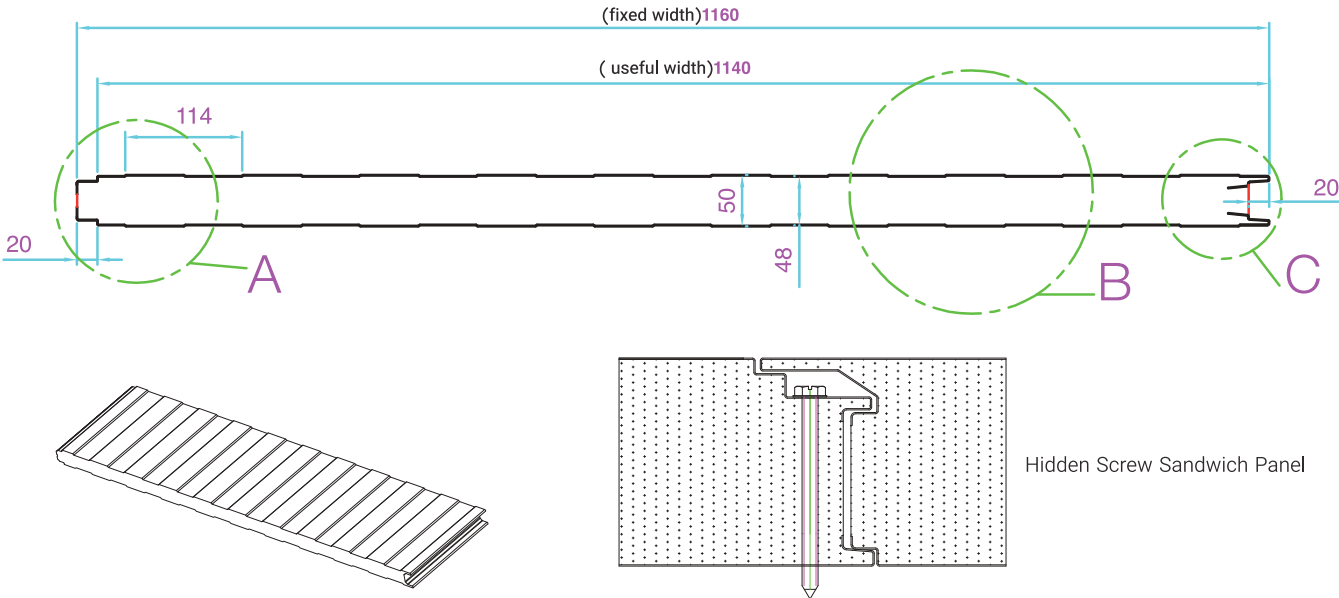
The way that sandwich panels are connected provides the tongue and groove of each sandwich panel and its function is such that it has an indentation on one side and a protrusion on the other side which causes overlapping of the edges of each other as the two panels are placed next to each other and can be screwed to connect to the structure in different positions.

Wall Sandwich panel-Technical Specifications	
Overall Width (mm)	1160
Useful Width (mm)	1140
Length (m)	2m up to 13.60 (according to the order)
Density (ASTM 1622)	40±2 Kg/M³
Thickness (mm)	30-40-50-60-80-100-125-150mm
Flammability range (DIN 4102)	PUR (B3), PIR (B1, B2)
Type of external coverage	Both sides sheet, both sides nylon
Type of sheet	Aluzinc, galvanized and aluminum, steel, super platinum
Upper sheet thickness (mm)	ø/4 - ø/5 - ø/7
Lower sheet thickness (mm)	ø/4 - ø/5 - ø/7

► Types of Wall Sandwich Panels:

- 1) Flat 2) Lined (grooved) 3)Microwave 4) Secret fix

In the secret fix sandwich panel, as its name implies, the screw due to the cross section is not visible. the Secret fix sandwich panel is manufactured as a part of a standard wall sandwich panel, and the only difference is that the cross-section is hidden as a cover to hide the screws and joints.



► Flashing Sheets

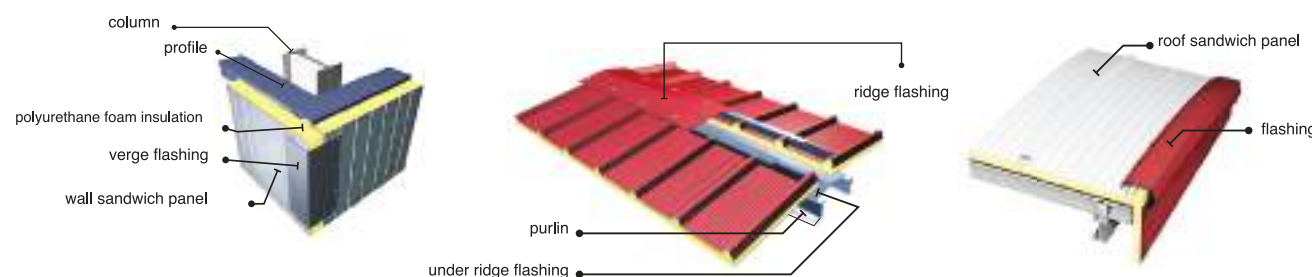
Flashing is a low-thickness painted sheet that is used to seal corners, joints, sides, etc. Flashing sections are different in each project and are designed and produced based on the desired structure. Flashing is connected by rivets.

A flashing sheet is used as a cover for certain parts of a building such as window frames, wall edges, sloping ceilings, etc., which in addition to creating beauty and strength, also covers the remaining joints from the sandwich connection of roof or wall panels.

Flashing is installed at the junction of walls and ceilings in a way that helps to prevent the penetration of water, air and dust while hiding the seam between them. These coatings are produced in different shapes and sections, depending on the needs of the project.

For example, crown flashing is used to cover the top of roof sandwich panels, subfloor flashing is used to cover the bottom seam of roof panels and corner or frame flashing are used to cover the connection of panels and their sealing.

Flashing sheets are usually made of ordered sandwich panel sheets, including: Galvanized, Aluzinc and pre-painted Aluminum in thicknesses of 0.4, 0.5 or 0.7 mm, which are produced in different applications.

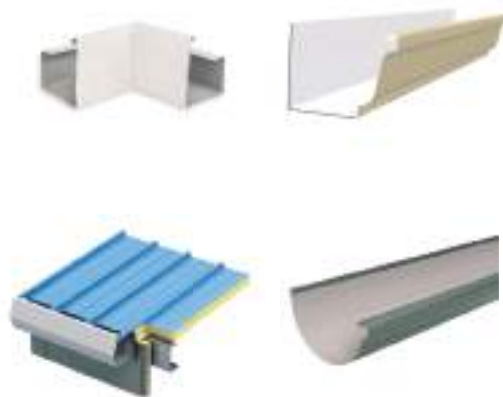


► Gutter

A Gutter is a prefabricated channel made of sheet metal for collecting and directing surface and spilled water from a sloping roof to water transfer pipes, which are responsible for exiting and directing water to wells or channels.

Using the gutter is very important because it helps to prevent the leakage of rainwater to the walls, the leakage of moisture to the foundation, and to maintain the strength of the structure.

To produce gutters, galvanized sheets with a thickness of 2 mm are used, because the connection of gutter sections in long lengths requires all-round welding to connect them completely. The gutter also has different sections that can be produced in different sections and dimensions depending on the needs of the project.



► Installation and Execution of Sandwich Panel

Before purchasing a sandwich panel, it is necessary to make an accurate engineering estimate of the required components, especially the amount and dimensions of the sandwich panels for ceilings, walls and flashing.

For this reason, conduct a visit and match the plans with the executed structure while reviewing the project plans, prepare shop drawings in AutoCAD software and inform the production unit about the details.

Shop drawing refers to the plans that are prepared before the production of sandwich panels and include the specifications, size and dimensions, length and number, placement of panels on the facade and the materials used.

Structural maps are prepared and sent to the factory for production after the approval of a consultant or supervisor. The sandwich panel installation is very fast in terms of time and the project is ready for a short time.

► Roof Sandwich Panel Installation

Roof sandwich panels are installed parallel to the outer side of the roof and on the roof profiles (Purline) by galvanized and screwed top screws, and due to the production section of the roof panels (trapezoidal and stepped), the panels are completely sealed.

► Wall Sandwich Panel Installation

To install wall sandwich panels, it is necessary to do the supportive back frames using industrial profiles. The dimensions, cross-section and size of these profiles depend on the amount of wind load, its direction and the height of the structure. Wall panels will generally be installed vertically and supportive back frames will be installed horizontally and finally will be installed on the structure using galvanized screws.

► Gutter Installation

The Gutter is used to collect water on the roof and transfer it to the ground. The Gutter sheets are usually made of 2 mm thick galvanized sheets, which are placed at the end of the roof slope.



► Warehouses

Nowadays, the speed of construction and cost-effectiveness of any structure that is used in warehouses to store a variety of products such as agricultural, food, dairy, pharmaceutical, health, cellulose, chemical, industrial, military or maintenance of equipment, devices and industrial tools is very important. Since the construction of such structures is usually being done by using steel, the use of methods is important that meet the required standards, to make the structure lighter and speed up finishing work, which ultimately helps to make the structure more affordable.

It is obvious that the use of sandwich panels in covering the walls and roof of the structures is much lighter than the use of conventional building materials such as brick or concrete. And significantly prevent insect penetration into them, and bacteria and fungus growth. The approach of using sandwich panels to cover the walls and roof of the structure has become common.

The use of wall sandwich panels instead of traditional materials, despite raising health standards, increases the optimal use of available space as well as warehouse shelving, and the structure of the sandwich panel protects goods from bad weather conditions such as snow and rain, cold and heat weather, wind and storm.

Mammut Structures & Panel Company can produce sandwich panels for warehouses with the ability to be sterilized and completely hygienic with both sides flat type wall panels to prevent the growth of bacteria. Also, it can cover structures with different uses, including gyms, shops, repair shops, halls, factories and industrial workshops, aircraft hangars, poultry and livestock farms, parking lots etc.



● Vitana Project
(Caspian Industrial district)
Qazvin



● Segments Warehouse
Karaj



● Restaurant Hall
Karaj



● Oil Company Project
Qazvin



● Iran Khodro Project
Tehran



● AGT Project
Isfahan

● Malard Mushroom Project
Karaj



● Shenzar Industrial Complex
Tehran

► Production Halls with Special Conditions

The process of production and preparation of some products should be done in halls with very humid conditions and special standards, some of which can be mentioned as follows.

Mushroom cultivation hall, special food and dairy production halls, special petrochemical production halls copper ingot production halls and some chemical industries due to special acidic or alkaline conditions, slaughterhouses, poultry slaughterhouses, sports halls, saunas, flower and plant breeding halls.

These conditions create challenges such as maintaining and controlling the required humidity, wear and tear of walls and ceilings in humid environments, frequent washing and cleaning of the work environment, severe corrosion of walls and ceilings; and many other problems for employers, designers and builders.

Mammut Structures & Panel company has been able to completely address the aforementioned concerns by producing very special roof and wall sandwich panels with specific technical specifications and using special sheets with the latest technologies that are specific to these humid years.

► Clean Room

A clean room is an environment in which the standards for controlling the amount of environmental pollutants have been observed, to conduct special scientific research or produce very sensitive equipment.

In sensitive and strategic industries such as nuclear industries, pharmaceuticals, medical equipment, electronics and microelectronics industries, aerospace, food or hospitals, the amount of environmental pollutants including dust, aerobic microbes and suspended chemical vapors should be at a low level and be kept in a controlled manner and be much lower than the usual space of a closed environment. It is also necessary to control other environmental conditions, including humidity, cold, heat and even pressure.

One of the main requirements of the components that make up clean rooms is covering the roof and walls using special sandwich panels, which should make cleaning easier by creating a completely smooth surface while preventing the accumulation of bacteria and microbes. This type of sandwich panel should have maximum resistance to corrosion and chemicals.

Currently, Mammut's sandwich panels for clean rooms, adhering to the highest quality standards of raw materials and production, are the most unique modern building materials and the main choice of clean room designers and builders.



► Cold Storage Halls

A cold storage is a closed and enclosed space whose temperature and humidity are carefully and continuously controlled and is used to freeze and store various materials, including food products, meat, poultry and fish, dairy products, fruits and vegetables, as well as electronic, medical, chemical and pharmaceutical equipment.

Depending on the dimensions of the cold storage and its loading rate, as well as the type and duration of product storage, the refrigeration capacity of the cold storage and, consequently, the power of the compressor, condenser and evaporator changes.

Cold storages operate on a compression refrigeration cycle and can be either freon or ammonia-based, depending on the required refrigeration capacity. In the construction of a cold store and to prevent energy waste, all surfaces of the cold store room, including walls, ceiling and floor, must be insulated. The type and thickness of the insulation have a very important effect on preventing energy waste and increasing the life of the refrigeration system, and thus preventing spoilage and damage to the stored materials.

Super-zero cold storage is employed for short-term storage of various types of fruits, vegetables and summer vegetables while maintaining freshness, as well as for short-term storage and distribution of various types of red and white meat.

Since one of the most important characteristics required of any cold storage is low temperature exchange with the outside environment, the use of sandwich panels made using the best polyurethane insulation material and their tongue and groove structure is in a way that ensures complete air tightness of the environment.

In Mammut Structures & Panel Co., special cold storage panels are produced with specific technical specifications.



● Agricultural Products Cold Storage
Sorkhab



● Meat Cold Storage (Sibnoosh)
Kordan



● Agricultural Products Cold Storage
Karaj



● Cold Storage (Fartak Ghasr Jam)
Isfahan





► Why are technical specifications important when choosing a sandwich panel?

At first glance, all sandwich panels look the same. However, there are very important points in the quality and technical specifications of the raw materials used in the manufacture of sandwich panels that increase the lifespan and maintain the product's properties in the long term.

It is obvious that various raw materials are used in the sandwich panel production process, but below we will discuss two of the most important ones:

► Technical specifications of colored sheets:

In galvanized sheets or the amount of (Zn) Since the amount of zinc coating, aluminum and silicon in Aluzinc sheets is completely related to the duration of corrosion in the sheets, this amount of coating is very important and ultimately related to the longer life of the product.

Another very important issue is the type, type, and thickness of the paint coating on the sandwich panel. Obviously, using a super polyester paint coating instead of regular polyester paint, as well as the thickness of the paint coating, will make a significant difference in helping to extend the life of the product and also the amount of fading over time.

The mechanical resistance of a sandwich panel roof is completely related to the number and height of the steps created on its sheets, so careful attention to the sandwich panel construction plan is also very important. Technical details and the way the sandwich panels overlap are other important factors that contribute greatly to maintaining the ambient temperature.



► Technical specifications of polyurethane foam:

Since forming a polyurethane foam that provides adequate thermal insulation for a sandwich panel requires a combination of raw materials, including polyol, isocyanate, catalysts, and other additives that complete the manufacturing process and a blowing gas (Pentane Gas), it is very important to know the quality of these raw materials and which factory and country they are made in.

When the basic rules for the production of polyurethane foam are made with poor quality materials, it eventually leads to the lack of the main characteristics of the final product. Examples of that are:

- Cracking and Breaking of Foam
- Sandwich Panel Inflation
- Foam Shrinkage
- Separation of Polyurethane Foam from Sheet and...



It is an honor that Mammut Structures & Panel Co., by adhering to the highest relevant standards and using the best raw materials and the latest technologies in the world, has been able to be the leader in quality in the sandwich panel production industry in the country and realize the slogan of Expect the Best.

► Types of Sheets Used in the Production of Sandwich Panel

One of the main components of a sandwich panel is a sheet that is placed on both sides of the sandwich panel. This sheet is made of different types of steel with different grades, which are produced by hot rolling mills in steel mills. The percentage of chemical elements forming the alloy of the sheet causes mechanical strength and high formability of the sheet. For this reason, the use of these types of sheets in the production of prefabricated structures and sandwich panels is very common.

Selecting the type of coating on the surface of sandwich panel sheets depends on environmental factors such as the type of climate of the region in terms of humidity, snow and rain, corrosion rate, altitude, temperature and amount of sunlight in the area where the project is to be built. It also depends on the type of activity or operation carried out after the construction of the project. The sheets used in producing sandwich panels are Galvanized, Aluzinc, Mammut Super Platinum, Aluminum and Steel.

► Galvanized and Aluzinc Sheets

The main material of both sheets is carbon steel, but the plated alloy coating on them prevents oxidation and rust in wet and rain-prone conditions.

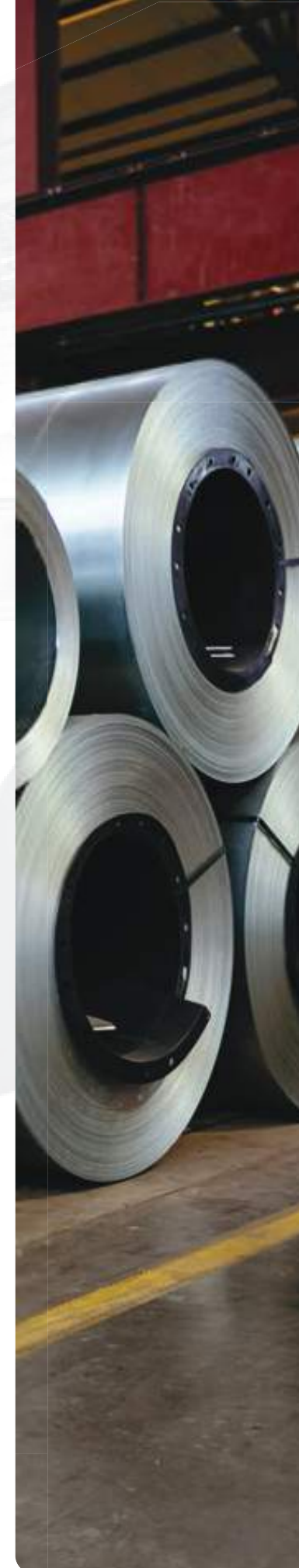
The difference between an Aluzinc sheet and a galvanized sheet is in the elements that form their coating. the Galvanized sheet has a plated coating of more than %98 zinc metal, but Aluzinc sheet is made of %55 aluminum, %44 zinc and %1 silicone with a plated alloy coating.

It should be noted that despite the material of the coating, the weight of the coating and its thickness are also very important. According to the standard, the weight of Aluzinc or Galvanized metal coating should not be less than 100 g / m². The higher the coating mass, the higher the corrosion resistance. This amount of coating protects the sheet from corrosion factors such as moisture and corrosion and increases the life of the sheet and thus the product of the sandwich panel.

► Sandwich Panel Paint Coating

Galvanized sheets, Aluzinc etc. should be included in the coil coating process. This coating is a type of super polyester resin with high durability and stability with a thickness of 25 microns (5 microns primer + 20 microns surface coating). This paint has a very high durability and appearance stability, which increases the resistance to UV, corrosion resistance and chemicals in this product.

Also, for better adhesion, a 7-micron primer coat of epoxy primer called BACK COAT is applied, with the ability to foam at the junction of the sheet with polyurethane foam.

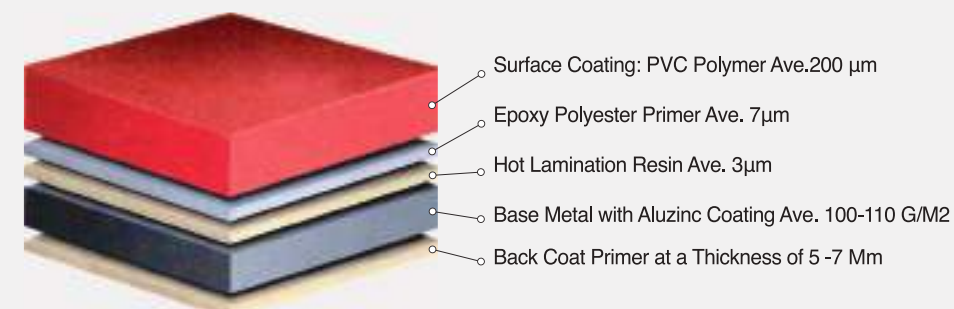


► Mammut Super Platinum Sandwich Panel

The production process of some products is carried out in halls that may have very humid conditions, acidic or special environments, and it is necessary to use sandwich panels to cover the roof and walls of their production halls, which are much more resistant than galvanized or Aluzinc sandwich panels. Production halls such as: mushroom production halls, copper ingot production, some petrochemical products, production of special foods and dairy products, etc. Therefore, it is necessary to use coatings that have maximum resistance to corrosion in order to build such environments. These conditions create challenges such as severe corrosion in walls and ceilings, maintaining and controlling the required humidity, depreciation of walls and ceilings, continuous washing and cleaning of the work environment, and many other problems for designers and manufacturers in the final years of production.

Mammut Structures & Panels Co. has been able to completely address all these concerns and set the bar for quality in this industry by producing very special ceiling and wall sandwich panels with specific technical specifications and using super platinum coated Aluzinc sheets, which are specifically designed for humid halls and acidic environments.

Super Platinum is a type of organic polymer coating (paint) based on the thermoplastic polymer polyvinyl chloride (PVC) that is applied in a thickness of 150 to 200 microns on metal coil sheets made of Aluzinc. This type of sheet is used in the production of ceiling and wall sandwich panels that require higher resistance and better performance against the above conditions and atmospheric environments that require high corrosion resistance.



Advantages of Super Platinum Sandwich Panels

- High resistance to certain acidic, special atmospheric and humid environments with high corrosion.
- Resistant to scratches and surface injuries that can cause possible damage to the sheet surface.
- Resistant to sunlight for a long time and prevent paint damage.
- Excellent coverage quality

Mammut Structures & Panel Co. is proud to assist its customers in making the right choices by offering specialized consultations and, if necessary, on-site project visits based on the precise needs of its clients

► Polyurethane

Polyurethane foam is a very strong insulator, which is produced from the combination of polyol and isocyanate under special conditions and in the presence of a catalyst and other cases, where most of the cells are closed, then for this reason, it has very good efficiency as a thermal insulator.

Hard polyurethane foams are one of the most popular insulators. These foams can significantly reduce energy costs due to their ability to maintain a uniform temperature, and are also highly resistant to impact wear and cracking, which ultimately make industrial, commercial and residential environments more efficient and comfortable.

The core of the sandwich panel is the injection foam between the sheets, which is called polyurethane. The insulation used in sandwich panels is hard polyurethane, which makes sandwich panels one of the best thermal insulators, so that the heat transfer coefficient in a sandwich panel with a thickness of 5 cm is approximately equal to the heat transfer coefficient in a brick wall with a thickness of 172 cm.

The choice of polyurethane foam in sandwich panels completely depends on the thickness, type of application, the possibility of fire, etc., so it is necessary to be familiar with the following concepts about polyurethane foams used in sand- wich panels:

► Density

Density means measuring the amount of some physical properties (usually mass) per unit length, area or volume. The density or mass density of an object is directly related to its mass. That is, the heavier the body, the higher its density. The higher the density of polyurethane foam, the heavier it is and the higher its strength, because of the less space between its constituents and the more compact it is.

► PUR & PIR Polyurethane

Rigid Polyurethane or PUR for short, has been used in the construction industry since the 1960s as a high -performance insulation material. Industrial development in Europe and the United States led to the production of the second generation called Polyisocyanurate or PIR.

► Fire class B1, B2 and B3

Polyurethane insulations are among the most widely used thermal insulation materials in the sandwich panel manufacturing industry. These insulations are divided into three categories: B1, B2 and B3 based on their fire resistance grade (German DIN 4102 standard):

► Fire Grade B1 (Self-Extinguishing)

It is very slow and resistant to contact with flame and will extinguish itself after the fire source is removed.

► Fire rating B2 (Very Low Flammable)

Burns slowly in the presence of a flame and does not leave a trail of flame when the fire source is removed.

► Fire rating B3 (Easily Flammable)

It catches fire easily and the flame spreads quickly.

► summary

B1: Highly Resistant and Self-Extinguishing – The Best Option for Safety

B2: Resistant and With Self-Extinguishing Additives – Standard in Most Projects.

B3: Highly Flammable – Not Permitted in Modern Buildings.



► Mammut Structures & Panel Company is proud to be the first manufacturer of sandwich panels made with fire class B1, B2 in our beloved country, in addition to producing B3 sandwich panels.



Lab address	Mehrsa Chemie Fartak Co., Hashtgerd			Test Results Report	
Applicator	Mammut Structures & Panel Co.			Report Serial No.	L-280-08-02
Company Address	Karaj Qazvin highway- 5 km after Kordan Bridge- Mammut Industrial Town- Mammut Structures & Panel Co.			Report submission date	2025/05/25
Sample Name	Sandwich Panel with Polyurethane Foam Core			REV No.	-
Environmental Conditions	Temp: 23±2	Moist: 50±5	Sampling has been done by the customer	Appendix	-
				Date Of Sample Receipt	2025/05/25
				Date of Confirmation done	2025/06/02
				Letter No. of Customer	2025/06/05
				Customer Form Code	L-F-01-708
				Page No.:	1 from 1

Test Results

Fire Behavior

- The samples sent by Mammut are of type B1, B2.
 - According to the standard, the sample exposure time to the flame is 15 seconds.
 - The flame height was less than 100 mm.
 - Before the test, the sample was kept and stabilized for 48 hours in standard ambient conditions according to the standard Laboratory temperature was 23 ± 2 °C and relative humidity was 50 ± 5 %.
 - The test was performed on a test specimen.
 - The sample thickness is less than 70 mm.
- The sample produced very little smoke.

Test Results

Flammability Test

Method of Test	ISIRI 7271 - 4
Method of Preparing Tests	Has been done by Customer
Test Device Code	L / E 02
Number of Tests	1



Product sample B1
Mammut tested

Product sample B2
Mammut tested

Tested B3 Product
Sample

Notice:

Test report is just valid for the tested sample. The above report only shows the sample under test. Any copying of the test report without written permission from Mehrsa Chemie Fartak Laboratory is prohibited, and in case of consent, it must be in full and from all pages. This laboratory is not responsible for any matching the name of the sample with the tested part.



Tested B2 Product Sample

► Sandwich Panel Laboratory

In order to improve the quality of the products produced by Mammut Structures & Panel Co. and achieve the leading position in quality in the country, the establishment of a highly specialized laboratory center using academic and experienced personnel was placed on the agenda of Mammut Holding. In this regard, the necessary measures were taken to purchase and launch the most advanced and up-to-date polyurethane foam testing devices as well as testing devices for various types of sheets, and the laboratory units began operating in accordance with internationally recognized standards.



► Polyurethane foam thermal conductivity measurement test according to ASTM C518 standard

In order to check and determine the thermal conductivity coefficient of the foam sample at a fixed and specific temperature according to the standard to calculate the heat transfer in the sandwich panel



► Polyurethane foam flame behavior test according to DIN 4102 standard

The slow-burning or fast-burning reaction of sandwich panel foam flaming against direct flame and evaluating the extent of fire spread to determine the fire resistance class of foam.



► To measure the adhesion strength of sheet to foam according to ASTM D1621 standard

Evaluation of the non-separation of the sheet layers from the foam in sandwich panel using a tensile test device and determination of adhesion strength in terms of kilopascals.



► Dimensional stability measurement test of sandwich panel in different environmental conditions in terms of temperature and humidity according to ASTM D2126 Standard (Aging Test)

Studying and simulating the performance of panels in the long term to evaluate the lifespan and not to observe dimensional changes of them in different conditions in terms of temperature and relative humidity of the environment.



► EST RUB MEK for coating resistance against chemicals based on ASTM D5402 standard

The resistance of the paint film to the solvent (Ethyl Methyl Ketone) with ASTM D5402 standard.

➤ **Gloss control based on ASTM D523 standard**

Determining the gloss level of the coating using a gloss meter according to ASTM D523 standard.



➤ **Moisture resistance test based on ASTM D2247 standard**

Determination of 100% moisture resistance is done by placing the sheet sample in the device for 1000 hours in accordance with ASTM D2247 standard in an enclosed chamber containing a heated mixture saturated with air and water vapor. Typical temperature at 100 degrees Fahrenheit (38 degrees Celsius) is maintained.



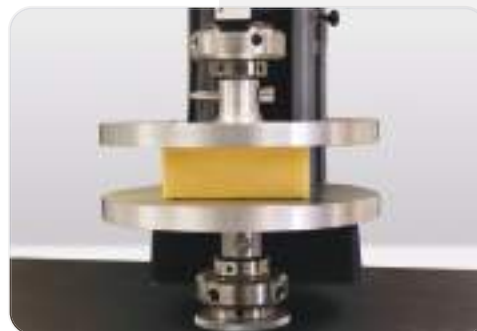
➤ **Cupping test based on EN ISO 1520 standard**

Evaluation of the resistance of the coating, against cracking or separation from a metal substrate in case of gradual deformation by indentation according to the EN ISO 1520 standard.



➤ **Compressive properties testing according to ASTM D1621 standard**

The testing procedure for determining the compressive properties of rigid cellular materials, particularly expanded plastics. Rigid cellular, or foamed, plastics are manufactured in different forms for a variety of construction-related applications.



➤ **Color hardness control based on ASTM D3363 standard**

Determining the hardness of paint using a pencil hardness tester to the resistance and flexibility of it against scratching, polishing, rubbing and other external abrasive forces.



➤ **The bending test based on ASTM D522 standard**

Evaluation of coating resistance against cracking after bending



➤ **To determine the thickness of paint using a paint thickness gauge based on SSPC PA2 standard**

Determining the thickness of dry paint film applied on Galvanized, Aluzinc and colored Aluminum sheets.



➤ **Paint adhesion test based on ASTM D3359 standard**

Determination of film adhesion color using testing tools and equipment adhesion (TEST CUT CROSS) according to the ASTM B117 standard.



➤ **Salt spray test to determine the resistance of paint against corrosion based on ASTM B117 standard**

Determining the amount of corrosion resistance by placing the sheet sample in the salt spray machine for 1000 hours



➤ **Resistance test based on ASTM D4587-11 standard**

Determining the resistance to ultraviolet rays by placing the sheet sample in the UV device for 1000 hours according to ASTM D4587-11 standard.





Prefabricated Buildings and Portable cabins

Modular prefabricated buildings and Portable cabins are manufactured by skilled technical personnel after careful and principled design by experienced experts. The components of the aforementioned buildings will be sent to the project site at the factory after passing the 7-stage production process and also the mammoth final quality control. The main advantages of the constructed projects include the following:

- High speed of construction
- Mobility capability
- Lightweight and earthquake-resistant
- More usable space compared to occupied area
- Adequate thermal and sound insulation
- Ability to be implemented in hard-to-reach locations
- Environmental compatibility



► Prefabricated Building

A modern and innovative method in the construction industry is to use prefabricated buildings. In this method, building components are manufactured in advance at the factory and then packaged and transported to the final project site and installed. These components are usually manufactured in ready-made, portable modules and include most of the building's parts, including walls, roofs, windows, doors and other equipment.

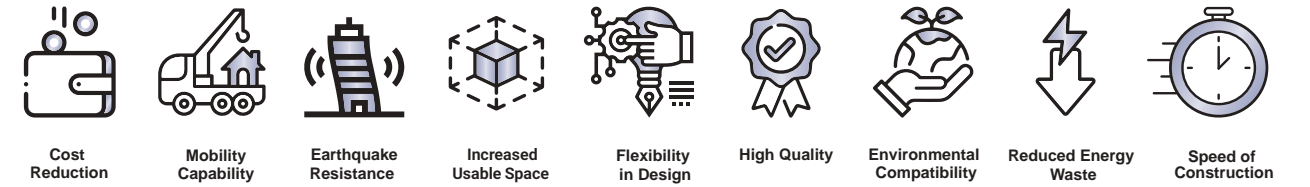
By constructing a prefabricated building, the time required for construction and completion is greatly reduced. Also, due to the use of factory machinery and processes, this method can minimize the waste of resources and materials and greatly help increase the efficiency and quality of construction.

In general, prefabricated buildings are known as a new and effective solution in the construction industry by improving the speed and quality of construction, flexibility in design and use, and improving costs. They have become very popular in recent years and have played an important role in the developments in the construction industry.

Prefabricated buildings have different applications. They are often used as residential, office, villa buildings and without any limitation in the project area. In the past, most prefabricated buildings were built as one-story buildings. Mammot Structures & Panel Co., relying on its engineering capabilities and using modern production technologies, has been able to build multi-story prefabricated buildings based on global standards and be a leader and pioneer in this industry.

► Advantages of Prefabricated Buildings

Prefabricated buildings are known as a fast and efficient solution in the construction industry due to their unique advantages and features compared to traditional buildings.



► **Speed of Construction:** One of the biggest advantages of prefabricated buildings is their high speed of construction. The time required to produce building components in a factory is significantly less than that of traditional construction. Also, the installation of these components at the project site is also faster, which can greatly reduce the time required to complete the project. It is noted that most construction projects that are built using traditional methods are sometimes stopped due to bad weather conditions. It is noteworthy that the production operations of prefabricated buildings are carried out in a factory and are not dependent on weather conditions. Therefore, the high speed of construction, installation and operation minimizes the financial effects of time and inflation and makes a significant contribution to the project's profitability plan from an economic perspective.

► **Cost Reduction:** Reducing the production time of prefabricated buildings minimizes labor costs and energy consumption, and since standard and high-quality materials are used in the production process of prefabricated buildings, it ultimately leads to a reduction in maintenance and repair costs over time.

► **High Quality:** Due to the use of advanced technologies and production operations with maximum quality control at the Mammot Structures & Panel Co., Mammot prefabricated buildings are of higher quality. These buildings are usually manufactured in accordance with national and international standards and are examined by Mammot quality control inspectors in various aspects including executive quality control, environmental compatibility and safety.

► **Environmentally Friendly:** Many materials used in the prefabricated buildings are recyclable, which helps to protect the environment. Furthermore, some of these buildings can be designed and constructed to allow for future relocation and reuse, leading to resource savings and reduced waste.

► **Flexibility in Design:** Prefabricated buildings have a high degree of flexibility in terms of design. These types of buildings can be built in different sizes and uses and can be designed and manufactured according to the needs of customers.

► **Reduced Energy Waste:** Mammot's prefabricated buildings are constructed using insulation such as polyurethane or rock wool, which are far better than traditional materials. In addition to preventing energy waste, these insulations also ensure optimal energy consumption in the building.

► **More usable space:** Using walls with better insulation reduces the thickness of the walls of prefabricated buildings compared to masonry buildings, and as a result, these buildings will have more usable space than traditional buildings of the same area.

► **Earthquake-Resistant:** Lightweight materials are often used in the construction of prefabricated buildings, which, in addition to complying with standard building principles, makes them resistant to critical conditions such as earthquakes.

► **Mobility:** Mammot's prefabricated buildings, due to their modular design and linear, flat, and volumetric transportation methods, can be assembled and disassembled in the fastest possible time.



► Comparison of Prefabricated and Traditional Buildings

Features	Prefabricated Buildings	Traditional Building
Construction Speed	They are produced faster due to ready-made components at the factory site.	All steps take place at the project site and take a lot of time.
Construction Quality	Quality control is carried out at high levels in the factory by using advanced technologies.	The quality of construction of traditional buildings depends on the experience of local employees and environmental conditions.
Construction Cost	Due to reduced construction time and minimal labor intervention, construction costs are reduced.	Due to the use of human labor and a lot of transportation, the construction cost is high.
Design Flexibility	There is a possibility of choosing different designs and models for customers.	This possibility is limited in traditional buildings.
Strength and Durability	Prefabricated buildings usually have high resistance due to the use of quality materials and strict quality control during construction.	The resistance of traditional buildings is usually average.
Environmental Impact	Due to reduced energy loss, prefabricated buildings have fewer adverse effects on the environment.	The adverse environmental effects of traditional buildings are much greater.
Repairs and Maintenance	Prefabricated buildings require less repair and maintenance.	Traditional buildings usually require more repairs.
Recyclability	Its components are usually recyclable.	This possibility does not exist in traditional buildings.

Today, for various reasons, including changing lifestyles, shrinking families, lack of specialized manpower, earthquake damage, and environmental protection, the construction industry is undergoing rapid fundamental changes. To this end, Mammut Structures & panel Co., as a leading company in the field of prefabricated buildings, has been able to play an effective role as the leader of the prefabricated buildings market in Iran by relying on specialized human resources and utilizing the latest technologies and innovations in the design and manufacture of its products.



► Smart Prefabricated Buildings

One of the recent innovations in the construction industry is smart prefabricated villa buildings, which have attracted many buyers and investors. Imagine a smart home with touch-sensitive keys and locks mounted on the walls, adding a special beauty to the environment. Electric curtains, steel and crystal keys, wall and ceiling speakers, remote control of your villa's security, traffic control, management of every single component of your luxury home via your mobile phone, all designed and implemented in a way that not only creates a different experience for you, but also multiplies the pleasure of life and comfort for you.

Mammut prefabricated villa buildings are structures that are carefully designed in the engineering department, manufactured in the Mammut factory, and then transported to the project site, freeing you from the hassles of construction. This type of construction is considered a modern and economical solution for creating a desirable living space due to the quality control processes in the factory and the high speed of installation. These buildings are designed and constructed without any restrictions in the use of modern building materials and using modern technologies and in accordance with world standards. Prefabricated villa buildings are mainly used for personal use or special startup environments, modern tourist accommodations, etc.

Mammut Structures & Panel Co., with more than 30 years of experience in designing and constructing high-quality, smart, prefabricated villa buildings, creates a different experience for customers. These buildings, utilizing modern technologies and quality materials, provide a safe and ideal space for living, and this modern and efficient solution in the construction and tourism industry has created many attractions for buyers and investors.



► Office, Labor Camps and Workshop Equipment Complexes



In today's world, the use of prefabricated and modular structures has increased greatly, especially in construction and workshop projects.

A collection of workshop and construction camp equipment cabins with different uses, including: workers' rest buildings, sanitary and bathroom services, administrative and management units, meeting rooms, etc., are designed and constructed.

The administrative, labor camps, and workshop equipment cabins built by Mammut Structures & Panel Co. are designed and built in a way that is highly efficient, cost-effective, lightweight, resistant to all types of weather conditions, earthquakes, has appropriate thermal and acoustic insulation, and brings a sense of peace and comfort.

The high speed of construction and implementation of these complexes, as well as their ability to be assembled, disassembled, and customized, has made this method one of the best options for use as temporary and permanent camps and workshops.

Using Mammut workshop equipment cabins and labor camps is an effective and economical solution to meet the needs of construction and industrial projects. These structures, with their unique features, enable the creation of efficient and safe spaces for workers and managers, and help improve the quality of work, increase productivity in projects, and the economic conditions of projects.



► Portable Workshop Cabins

A Portable Workshop Cabin is one of the simplest prefabricated Cabins and is used in construction and development spaces, road construction, and construction workshops, and is generally used for temporary or permanent housing of workers.

The two main reasons for using cabins in civil engineering and construction projects are:

1. Permanent housing of workers due to the distance of the project from their place of residence, such as road construction projects, dam construction, etc., which are located outside the city.
2. Workshop cabins are used during construction and during the progress of the project as a place to deploy project supervisor engineers, as well as accommodation and rest for personnel.

In every construction site, there are usually several workshop cabins with different uses, some of which are used for workers' rest rooms, engineers' offices, and some for providing services such as water supply and toilets.

Usually, before starting work on a construction or demolition site, affordable workshop containers are prepared, and as the project progresses and work teams are added, more of these containers may be purchased and deployed at the project site.

Generally, after the project is completed, the existing containers are sold as used containers to colleagues or other contractors or stored in a location to reuse them in subsequent projects.

Using Mammut's structural steelwork sheds when equipping or dismantling construction sites has numerous advantages that have made them a permanent fixture in construction operations.

Some of These Advantages Include:

- **High Speed in Equipping the Workshop:** Due to being prefabricated, the speed of equipping the workshop with the conex is much higher.
- **Mobility:** During the progress of the project, we may have to change the location of temporary structures and the offices of the workshop engineers many times, which is only possible by using prefabricated structures.
- **Reduction in Costs:** Building structures with traditional materials is always associated with high wages and a lot of time, and also the requirement to demolish the temporary structure in contrast to the ability to move or sell the conex at the end of the project reduces costs.
- **Prevention of Energy Waste:** Due to the use of basic and standard insulation in the walls of prefabricated structures, energy waste is largely prevented.
- **Elegance and Efficiency:** Temporary structures built with masonry materials lack any equipment and decorations, which in some cases are not at all suitable for use as offices for project engineers, supervising engineers, or guests, while prefabricated structures usually have great beauty in this case.
- **Earthquake-Resistant:** One of the advantages of using a workshop building is its resistance to earthquakes and natural disasters, which ensures that personnel who rest at the workshop at night are safe.



► Mammut Space Cabin; Beyond a Dream

All of us dream of staying in a dream space in the heart of Iran's pristine nature. Our expectations from a dream residence go beyond sleeping in a space; we seek peace, inspiration, and a special experience. A dream residence should be designed in such a way that every moment of being there evokes a sense of luxury, security, and absolute comfort. Natural light, eye-catching views, complete silence, modern and smart facilities, comfortable beds, air conditioning, luxurious bathrooms and toilets, green and pleasant space, and the ability to personalize the environment according to our taste, all define our expectations of an ideal residence.

Ultimately, a dream residence should create a lasting memory, where being "me" feels comfortable and completely free. Inspired by the best in the world, the Mammut Luxury Space Cabin presents you with the portable architecture of the future. This spaceship with its minimalist and luxurious design, complete sound and thermal insulation, smart lighting, automatic air conditioning system, panoramic windows, professional toilet and bathroom with clean tech equipment, custom kitchen, antibacterial flooring and custom interior are just some of the distinctive features of this cabin.

Mammut Space Cabins are designed to the highest international standards for your well-being, comfort and security and are fully customized to your taste and lifestyle. In addition, you can entrust us with your own residential and tourist villages. Our mission: to build your dream, to amaze you!



► Accommodation Containers

A modular accommodation container has excellent security due to high-quality materials and a strong modular structure. In addition to protection against weather events and intruders, this prefab residential container is designed to provide maximum safety, comfort and healthy living spaces for the workforce in many industries such as construction and mining. The thickness of the walls, which varies from 50 to 80 ,60 and 100 mm, guarantees maximum heat and sound insulation. Also, the design of the prefabricated accommodation container makes the building resistant to fire and against earthquake and flood protection.

This container is also very durable and high-quality, which makes the building lasts for many years. Finally, the accommodation container has several environmentally friendly features that make it an ideal option for an infrastructure solution aimed at protecting the environment.

Accommodation containers can be workplaces, homes, residences, or portable modular homes. There are many advantages to using these containers. Including excellent security, durability and environmentally friendly features of the models modern construction also offers dozens of superior features that meet the specific needs of sites.

These containers can provide long-term services in construction and mining sites and in areas with extreme desert weather. Residential containers are also resistant to fire and can be used to protect you from earthquakes and floods.

► Technical Specifications

- **Structure:** surface and frame of steel sheet with strength and high quality painted.
- **Interior wall:** Polyurethane or stone wool insulated sandwich panels for exterior and interior walls.
- **Insulation thickness:** 50mm, 60mm, 80mm or 100mm
- **Roof and wall:** 80mm Polyurethane insulation
- **Flooring:** 18 mm fiber cement panel surface + 2 mm PVC flooring, parquet or ceramic tiles (optional) ,50 or 100 mm floor chassis insulation (optional).
- **Door and window joinery:** aluminum or PVC windows. Lighting and electrical equipment are included.
- **Sanitary equipment:** ceramic hand wash 37x45 cm, acrylic shower tray 102x92 cm, ceramic toilet
Option: Inox WC and hand wash, compact laminate bathroom and shower cabin
Interior arrangement (optional): air conditioning, fully equipped kitchen, furniture, data socket.
- **Connection set (optional):** A connection set is provided to connect to or facilitate overlapping.
- **Additional roof (optional):** Galvanized trapezoidal roof or additional polyurethane insulation sandwich panel roof cover.
- **Delivery in a special package:** Up to 8 accommodation containers are delivered in a special package with a 40 Cube High shipping container.

The best choice of accommodation container for construction and mining companies

- Residential containers are a practical and economical alternative for construction and mining companies because they can be quickly assembled and dismantled. However, the best choice for the container construction site or mine to specific needs, depends on your budget and operating time.
- Modular accommodation containers are offered in various sizes, including 6 x 2.50 meters, which can be used for offices. With a medium size and 11.70 x 2.50 meters, it is suitable for larger spaces. Their internal height is 2.40 on average meters, which provides enough space for air circulation in hot areas.
- Available thicknesses of 80 ,60 ,50 mm and 100 mm guarantee maximum heat and sound insulation inside the prefabricated container of the residence during work. There is also wall insulation made of stone wool or polyurethane (PUR), which is very effective, light-weight and able to connect with all known materials.



► Portable Shop Cabins

Initially, Portable Shop Cabins were installed in high-traffic areas with simple design and construction, even without special equipment. These Cabins were very small and with an unassuming appearance, used solely for work and product sales, until over time, with the advancement of technology and the construction of expert Cabins by experienced designers and builders, they were transformed into more equipped and decorated shop Cabins that attracted more customers.

One of the prominent features of these Cabins is easy transportation to any desired location and even to another city, and in terms of cost, they are definitely very affordable without paying a lot of money and paying monthly rent and are a great help to people in business.



► Modulae Prefabricated Cabins

- Composite store portable cabins
- Siding store cabins
- Normal store cabins
- Mobile store cabins

► Advantages of Using Shop Cabin

- Earthquake Resistance and No Need for the Foundation
- Quick and Easy Installation
- Ability To Move with the Trailer
- Use Of High-Quality Consumables
- Speed In Construction and Delivery Time
- Rapid Settlement of People Affected by Disasters in The Event of Unexpected Events
- Suitable For Hot and Cold Regions
- Possibility of Building on Two Floors
- Beauty, Variety of Colors and Internal Layout for Construction

► Usages of Shop Container

- **Buffet:** A store cabin in the form of buffet or shop is one of the most common ones that are used in places such as offices, medical or hospital buildings and educational or sports centers.
- **Special products store:** Some companies that reach the position of annual sales, use a series of cabins near their branches to display their products as a temporary exhibition.
- **Deli stalls:** Food industries such as fast food, and etc. can be located in any location to introduce their business and improve their sales, for this reason, store cabins are used.



► Cabins with Special Applications

Making cones with special applications is one of the main concerns of customers who are looking for their cones to be designed and manufactured to suit their needs. Mammut Structures & Panel Co., with its very strong design and engineering team, has been able to minimize this concern among its customers.

Below are some of the various types of special cabins:

► Clinic

A clinic is a building or part of a building designed to provide health and medical services, where superficial and outpatient medical services are provided and, unlike hospitals, patients are not admitted to the premises. Clinics are built in two types: specialized and general, where health, emergency, vaccination, etc. services are provided.

A prefabricated clinic is a pre-designed structure whose components are prefabricated in the Mammut Structures & Panel Co. and the final assembly operations will be carried out on site. The walls of this structure are covered with Mammut Structures & Panel sandwich panels, which are grooved or have two smooth sides, and ceiling sandwich panels are also used to cover the roof of the clinics.

Sandwich panels are placed on the chassis and skeleton of the structure, which is made of steel profiles, using steel rivets. The clinic flooring is made of wood-plastic parquet, which is a combination of P.V.C and fire-resistant wood powder. The finished structure of a prefabricated clinic has all the necessary facilities in accordance with the relevant plans, including water, electricity, etc., and is easy to operate.

► Some Types of Prefabricated Clinics with Different Uses in Indoor and Outdoor Spaces Include:

- Use As an Inpatient Ward of a Hospital If Capacity Is Reached
- Small Health Centers in Remote and Deprived Areas
- Creation Of Emergency Medical and Treatment Centers
- Mobile And Rural Dental Clinics
- Field And Roadside Emergency Clinics
- Mobile Clinics in Times of Crisis Such as Natural Disasters
- Small Clinics in Tourist and Recreational Areas
- Vaccination Centers in And Outside the City
- Providing Medical Services in Military Areas
- Blood Transfusion Centers





► Foldable Containers

One type of Mammut Structures and Panel's container is the foldable container, which is a specially designed product due to its unique engineering and design features. The main characteristics of these foldable containers are as follows:

- Due to the compact size of this product, it is possible to pack, store, and keep 300 folded containers in an area of 400 square meters.
- The compactness of this product significantly reduces costs related to loading, transporting the product to the site, and unloading, allowing for the transport of 10 foldable containers using a single 40-foot container.
- Thanks to correct engineering and quality manufacturing, the container can be collected and transferred to a new location without damage once work is completed.
- It only needs to be placed on a flat surface without any special foundation requirements.
- This product, constructed using Mammut polyurethane sandwich panels, is fully insulated against cold, heat, and moisture.
- The installation of foldable containers is very simple and quick, allowing for installation by two people within one hour. These features facilitate rapid establishment during emergencies and natural disasters.
- Due to the use of highly durable materials, there is no need for covered warehouses when storing this product.
- If larger spaces are required, multiple foldable containers can be installed next to each other to provide more space.



► Flat Pack Containers

In today's world where speed and efficiency are top priorities in the construction industry, Mammut's Flat Pack Containers offer a modern, cost-effective and flexible solution for project offices, workforce accommodation and temporary spaces. The modular structure and industrial design of this product allow for easy assembly and disassembly, saving significant time and money.

Outstanding Advantage of Transportation and Storage:

Thanks to the flat pack design, it is possible to fit 10 of these products in a 40-foot container; this means a significant reduction in transportation costs compared to conventional containers and the possibility of sending a large number of containers to different parts of the country or international projects.

In addition, storing these containers in a closed state is very simple and inexpensive, and is an important advantage for projects with limited storage space or requiring multiple movements.

Key features of Mammut Flat Pack Containers:

- Quick Installation and Commissioning at The Project Site Without the Need for Special Equipment
- Thermal And Acoustic Insulation in Accordance with Current Standards
- Strong Steel Frame with Polyurethane Paint Coating
- Complete Electrical Wiring, Standard Lighting and Double-Glazed Windows
- Possibility Of Customizing the Interior Layout, Color and Equipment
- Easy Disassembly and Reusable
- Serious Reduction in Transportation and Warehousing Costs

► Bulletproof Conex

Today, the use of conex in various applications has attracted the attention of many organizations, and one of these unique applications is Mammoth's bulletproof conex.

Bulletproof Connexus are portable, prefabricated structures that, using special materials and advanced technologies, have the ability to withstand bullets. These connexus are generally used in places that are of high security importance due to potential risks, to provide maximum protection for people's lives in the event of a shooting.

The impermeability of the building to bullets, while creating a safe environment for personnel, has a very positive psychological impact on each individual, resulting in increased efficiency.

Among the places that should be bulletproof are the buildings of police stations, military, military and security bases, police and public security centers, guard buildings, embassies and consulates, special commercial and administrative buildings such as gold and jewelry complexes, etc.

Mammut bulletproof vests are considered a new solution in providing security and protecting people and property from serious threats. Due to their diverse uses, they have been very well received in society and play an important role in maintaining security in various societies.



► Fireproof Conex

Able to withstand fire up to 1100 degrees Celsius for one-hour NFPA Fireproof enclosure is called an enclosure that is manufactured according to global standards and this product has NFPA in some oil and gas companies. Fireproof enclosures in this company are used according to global standards. Among the competitive advantages of this company's enclosures compared to other manufacturers are the use of the best raw materials with various approvals, high technical knowledge, and quality control at all stages. The most important point about this type of enclosure is the use of fireproof paint even up to 1500 microns in diameter, which is much more resistant than electrostatic paint and is not in the production capacity of most manufacturers.

► Uses of Fireproof Enclosures

- Oil, Gas and Petrochemical Industries Including Control Rooms and Substations
- Control Rooms and Command Centers
- Military and Defense Industries
- Hospital and Laboratory Centers
- Food Industries and Isolation Rooms
- Security Level B Rooms (These Rooms Are Usually Located Inside Explosion-Proof Structures)
- All Places That Are Discussed in Passive Defense Discussions.

► Production of Fireproof Enclosures

- Galvanized sheet is used in the production of fireproof enclosures to the thickness required by the customer.
- These enclosures do not have specific dimensions and are produced according to the customer's requirements.
- The enclosure is insulated from the inside with rock wool or alternative materials with a thermal conductivity coefficient of $W/mC=0.041$ and a density of 120 kg/cubic meter, which can also be changed.
- This type of enclosure has explosion resistance in the second layer (indirect explosion up to 2 kPa).
- The interior of the enclosure is usually reinforced in two ways so that it does not change its general state during a fire.
- Inside the enclosure layers, a 40 x 40 mm profile is used throughout the enclosure (routine production).
- The grid of the interior of the enclosure is made with bent sheets, which is recommended for special cases and is not used routinely.
- Sealing tape and airtight rubber are used at the opening and closing of the doors (insulating rubber).
- It is possible to cover all or part of the enclosure with scratch-resistant steel sheets of different diameters for special laboratory cases.
- The enclosure frame can be produced according to the customer's wishes and in different designs, but in many cases, the use of standard designs is recommended to maintain product quality.
- Of course, for enclosures that have dimensions larger than the standard limit, changes are considered on the chassis to support the weight of the enclosure, according to precise scientific calculations.



► Fixed and Mobile Energy Center

In critical and industrial projects, the battery room must provide a safe, stable and specialized environment for storing batteries.

Mammut offers this solution in two professional formats:

1. Battery Room Conex:

A prefabricated and portable structure with quick installation capability, ideal for temporary, rural projects, mobile workshops or any location where speed and mobility are of paramount importance.

2. Specialized Battery Room Shelter:

A more robust structure with industrial insulation and ventilation, suitable for power plant sites, data centers or critical environments and areas with harsh weather conditions, where stability and special protection are constantly required.

► Features:

- Standard Thermal, Moisture and Sound Insulation to Increase Battery Life and Efficiency
- Possibility Of Equipping with Industrial Ventilation, Heat and Gas Sensors, Acid-Proof Floor and Fire Alarm System
- Resistant Skeleton with Anti-Corrosion Paint, Safe and Explosion-Proof Windows and Doors (If needed)
- Safe Wiring and Electrical Panel According to The Latest Standards
- Ability To Customize Dimensions, Equipment and Interior Decoration
- Fast Transportation, Easy Installation and Possibility of Use Even in Remote Locations

Your choice between a Mammut enclosure or specialized shelter is made according to the needs of the project; both ensure security and stable performance for your industrial batteries and UPS.



► Fixed and Mobile Data Centers

In today's world where data is the beating heart of every organization, Mammut offers you reliable, fast and portable solutions. Mammut data centers in the form of conex, container and mobile data centers on trailers provide a completely safe, robust and international standard-compliant environment for deploying servers, network equipment, storage and data transfer.

► Key Features and Benefits:

- Specialized Thermal, Moisture and Sound Insulation: Temperature Stability and Definitive Protection of Sensitive IT Equipment
- Durable Skeleton, Fireproof and Anti-Theft Coating: Physical Security at The Highest Level for Sensitive Centers
- Stable Power Supply, With the Possibility of Connecting to The Grid or Mobile Fuel Supply: UPS Complete Power System, Generator, Electrical Panel And
- Dedicated Industrial Ventilation and Cooling System for Data Centers: Precise Temperature and Ventilation Management to Extend the Life of Equipment
- Possibility Of Quick Assembly and Easy Transportation Using the Design of a Container, Container or Trailer; Suitable for Emergency Situations, Temporary Projects, Or Even
- Permanent Operation
- Ability To Customize Dimensions, Server Racks, Smart Monitoring, Anti-Electricity Floors and Security Equipment
- Fast Start-Up Without the Need for Traditional Construction; Delivery, Installation and Operation in The Shortest Time
- Support For Telecommunications, Corporate Data Centers, Construction and Infrastructure Projects, Government and Security Centers
- Possibility Of Modular Construction and Implementation

Mammut's fixed and mobile data center guarantees the security of your data anytime, anywhere; from deployment in the heart of the city to the most remote locations of the project or in times of crisis in accordance with global standards.



► **Conex Remok Transporter**

The Mammut Conex Remok Transporter is a smart answer to the need for fast, reliable and safe transportation of all types of prefabricated structures. These remote containers, with their safe braking system and high maneuverability, enable the transportation, loading and unloading of containers and shelters directly on the site or project location without the need for a crane.

► **Features:**

- Advanced And Stable Braking System for Complete Stopping and Safety on The Road and During Operation
- Easy Loading and Unloading of The Container, Shelter or Modular Structure Without the Need for A Crane and Heavy Equipment
- Ability To Implement Various Types of Customized Campers (Travel and Residential Campers) On the Remok Chassis
- Durable Skeleton and Rustproof Coating, Compatible with Harsh Weather Conditions and Uneven Roads
- Standard Locking and Restraint System for Complete Load Stabilization
- Compatibility with All Types of Tractors and The Ability to Move in and Out of Town

These trailers are an ideal choice for transporting all kinds of containers, relief operations, mobile workshops, and even recreational and tourist campers.



► **Electrical Control Room**

In large construction projects, oil and gas, power and mining industries, choosing a suitable electrical control room determines the stability and security of the system. Based on years of experience, Mammut designs and manufactures various types of electrical control rooms and enclosures according to global standards:

Types of electrical control rooms (Control Room/Shelter/Conex)

- **Fixed Electrical Control Room:** Permanent Installation, Complete Insulation and Robust Structure.
- **Portable Electrical Room Enclosures:** Easy to Move and Deploy in Temporary Projects Or Projects That Require a Lot of Movement.

Prefabricated Electrical Shelter

- **Factory Production, Initial Assembly and Seamless Transfer to Site, Fast Installation and Full Customization for Hazardous and Sensitive Environments**
- **HSE Explosion-Proof Shelters:** In Accordance with Requirements
- **Automation Control Rooms:** Equipped with Advanced Infrastructure for PLC Systems and Monitoring

Each model is supplied with strong thermal and acoustic insulation, industrial ventilation and cooling system, anti-static flooring, intelligent monitoring systems according to customer requirements.



► Diesel Generator Containers

As you may know, industrial generators fueled by various types produce a significant amount of noise during operating and regarding to the places which are installed and used, can disturb individuals in the surrounding environment.

Mammut Structures and Panel Company has engineered, designed, and constructed special containers that significantly reduce the noise pollution from diesel generators and utilize special cellulose filters to enhance the lifespan and proper functioning of the engines. These containers are popularly known as Mammut silent diesel generator containers; which is manufactured with sandwich panel and a special structure coated with polyurethane paint suitable for various weather conditions, effectively protecting the diesel generator from dust, rain, snow, and frost in the winter, which ultimately increases the device's longevity and efficiency.

Moreover, this container facilitates the transportation of diesel generators and increases the speed of restarting the device by up to %90 after physical relocation.

These cabins significantly reduce noise to a considerable extent due to their internal structure, use of neoprene materials, and sandwich panels for soundproofing. Mammut diesel generator containers are engineered and standardized to provide sufficient access from all four sides of the device for repairing and maintenance of the generator and its pipes, fuel charging, exhaust, and air ventilation, and radiator water supply. The design of this containers is such that, in emergency situations, the diesel generator can be easily removed.



► Telecommunications Portable Cabin

Telecommunication cabins or shelters are special prefabricated structures that are used to install sensitive equipment and devices in the telecommunication industry in EC, NSS, VAS, MSC, SATA, BSS, BTS Tx, military, electrical, power plant, aerospace, nuclear and security.

The type and size of these portable cabins are determined and ordered according to their application. Because shelter rooms are often used in very bad and unsuitable places and climatic conditions, in the structure of such cabins following the principles of standard and safety, should be done by experienced builders and using high and up-to-date technology.

Shelter rooms can be built on a fixed basis, mounted on a foundation, as well as mounted on a truck and wheeled portable remote system. These portable cabins are used for the establishment of BTS mobile telecommunication stations, radio and wireless transmitters, special satellite systems, etc. which are made of sandwich panels with thicknesses of 4, 5, 6, ..., 10 with their own skeletons. In this type of portable cabin, special facilities are considered for the installation of telecommunication devices so that the BTS cabin can be easily used in telecommunication and satellite works. Telecommunication portable cabins can also be produced in a mobile way.

Mammut Structures and Panel Co. is proud to produce this product with executive technical approval according to the American ANSI standard and approval of Iran Telecommunication Company and is known as the most reliable manufacturer and business partner of reputable companies providing telecommunication services in this industry.





► Drilling Site Cabins

Due to the special and unfavorable conditions of the location of oil and gas wells, which are sometimes located in inaccessible areas on land or on platforms located at sea, there is a need for cones that are produced in accordance with specific global standards to have the greatest possible durability in specific weather conditions and... in the environment of oil rigs. Therefore, the general structure, technical and technological specifications of this type of cones are very different and more resistant than regular cones.

Standard camp cabins located on oil rig sites include the following:

- Wellhead, company representative, camp manager, 8- and 12-person residential condos, 4-bedroom guest, gym, geology, sanitary, kitchen, dining, prayer room, security and special connexion.
- Drilling connexion are special products of Mammut Structures & Panel, which, due to the need to comply with special standards, achieve the highest quality and undergo a very different production process. Initially, according to the customers' demands, the design and technical calculations of the condos are carried out based on national building standards and regulations, then in order to manufacture and supply the required raw materials, accurate production drawings and required technical documents are prepared and compiled, and subsequently sent to the planning and production units.

Based on the drawings and technical documents provided, the planning unit prepares and sends all the necessary requirements that have the necessary certificates and are approved by the quality control unit, and the product is manufactured by the production unit based on the drawings and technical documents provided by the engineering unit and in accordance with current world standards.

Mammut Structures & Panel Co. is proud to be included in all vendor lists of oil, gas, petrochemical companies and oil subsidiaries, utilizing the knowledge of its expert technical and engineering team, possessing the latest relevant technologies in the world, and complying with the American ANSI and European CE manufacturing standards. It also has the brightest resume in this industry and is approved as a contractor.



► Cold Storage Portable Cabins

A Cold room cabin is a storage for a variety of materials with the ability to adjust and change the temperature from below zero to above zero.

The size and capacity of the cold storage varies according to the customer's request and can be designed and produced from small to very large areas.

In applications where the installation speed of the cold storage is important and there is no need to build a cold storage room, a fixed portable cabin is used. These cold room cabins can be installed indoors and outdoors and can store a variety of food, pharmaceutical and laboratory products.

The dimensions of the cold room cabins are made according to the capacity and type of products in special models. Generally, polyurethane sandwich panels with a thickness of more than 10 cm are used for covering walls of cold rooms in the surrounding walls, floor, ceiling and interior, but in special circumstances, sandwich panels with a thickness of 15 cm are also used.

The quality of the structure and sandwich panels in terms of sheet structure, paint coating and quality of injection foam, density and technology used in the way of injection by the relevant machines, has a significant effect on the quality of cold storage. This can greatly reduce or increase the energy costs of the consumer and also have a direct and significant impact on the quality of food storage.

Our cold storage portable cabins have many different uses and are used to store protein foods or for environmental storage and laboratory activities.

The Mammut Structures and Panel Co., by using unique, proprietary technology and high-quality sandwich panels, has been able to revolutionize the refrigeration industry and has brilliant resumes in many related large-scale projects.



► Toilet and Bathroom Trailers/ Portable Cabins

These structures are actually small kiosks that have one or more toilet fountains or multiple bathrooms, sometimes even shared toilet and bathroom cabins.

If in some cases the number of users of the toilet is high and more than one fountain is needed, multi-fountain structures are usually used. Designing and using these structures is more economical than providing multiple separate single-fountain structures, and in addition, concentrating all plumbing and sewage facilities in a specific area also helps reduce repair and maintenance costs. Today, placing toilet or bathroom cabins on public roads in cities, roadside posts on roads outside the city, camping camps, temporary housing camps, workshop camps, etc. has found a special application and place.

In developed countries, mobile toilet or bathroom cabins are quickly transported, installed, and rented to the project site by contractors based on the consumer's request and needs. The capacity of the toilet cabin varies and can be delivered from one toilet or bathroom to any number and design requested, depending on the construction request.

The Mammut Structures & Panel Co. produces cabin as a space-saving system. Naturally, in this type of system, there is no need for a large space for storage, and a large number of these cabins can be stored in a small space and used in times of need or crisis in the shortest possible time.

Centers such as the United Nations, charities, the Red Cross, the Red Crescent, refugee camps, crisis centers, and many industrial companies, oil and petrochemical companies, etc. are among the valuable customers of Mammut Structures & Panel company. Given that the structures produced by Mammut Structures & Panel are manufactured using sandwich panels and the best materials, these types of structures are usually used industrially and have very high durability.



► Mammut Portable Clinic

In situations where quick, hygienic and safe access to medical services is of vital importance, Mammut Portable clinic (fixed and mobile) is a smart choice for equipping medical centers in construction, industrial projects, villages and remote areas or crisis situations. This product, using modern technology, complete insulation and modular design, provides a suitable platform for providing medical services, emergency and even vaccinations

The Most Important Features:

- Completely hygienic and standard structure: Body, ceiling and floor with antibacterial, washable and moisture-resistant material
- Strong thermal and acoustic insulation: Ensuring the comfort of patients and staff in any weather conditions
- Possibility of equipping with ventilation, cooling/heating, and air filtration systems
- Specialized facilities: Examination table and bed, stainless steel sink, medicine storage, medical refrigerator, fire extinguishing system and double-glazed windows For safety and well-being
- Engineered wiring and lighting: Sustainable energy supply for all medical equipment
- Possibility of installing a bathroom, toilet and washbasin
- Mobile design with rapid transportability: Optimal dimensions and weight for transportation by various vehicles, immediate installation and use in the shortest time
- Internal customization according to the clinic's mission: From the doctor and nurse's room to the injection, dressing or vaccination section
- Ability to add telecommunications and internet systems to manage files and communicate with superior medical centers
- Ability to use temporarily or permanently as a project clinic, workshop health center, emergency complex located at the scene of an accident and

Mammut's Clinic connexion, utilizing the latest health, safety, and design standards, provide a reliable means of maintaining health and managing crises. Whether for permanent equipment of industrial and rural centers, or for relief operations and emergencies, these cabins are the best option.



► Rescue Capsules

In underground and open-pit mines, accidents such as collapses, explosions, fires, or the release of toxic gases always pose a serious threat to the lives of human resources. As a specialized emergency shelter, the mine rescue room plays a vital role in maintaining the safety and lives of mine personnel. This space provides the golden time necessary for rescue operations and allows people to remain in an isolated and safe environment in critical situations until help arrives or the danger is eliminated. The use of a rescue room is a requirement in modern mines and a sign of adherence to global HSE standards and the social responsibility of mining companies.

Rescue Capsules Features

- **Ultra-resistant structure:** Reinforced steel body and multi-layer insulation capable of withstanding pressure and severe impacts from falls and explosions
- **Explosion-proof and isolated door:** Entrance equipped with specialized gaskets and emergency locks to prevent smoke, gas and fire from penetrating
- **Emergency air supply system:** Standard oxygen capsules, air purification filter system and the possibility of installing a tank for safe CO₂ ventilation Up to several hours
- **Thermal and temperature insulation:** Maintaining acceptable temperatures in conditions of sudden cooling or heating of the mine environment
- **Emergency lighting system:** Internal lighting with backup battery to provide full visibility even during power outages
- **Communication facilities:** Installing emergency telephones, cordless phones or other communication devices for quick contact with surface rescue teams
- **First aid and medical equipment:** First aid kit, folding chair or bed and electric shock facilities and vital support until rescue
- **Water and food storage compartment:** Maintaining health and meeting the basic needs of people while in the rescue room
- **Portable and quick installation:** Modular design and the ability to move to a new mine area or quickly install at any required point
- **Moisture resistance, Corrosion and earthquake:** Anti-rust coating and high resistance standards for harsh mining conditions.

The Mammut Mine Rescue Room, a combination of the most advanced safety technologies and global standards, ensures the safety of your workers on the front lines of production.



► On-Site Portable Cabins

These types of cabins are made of steel frames and prefabricated walls made of Mammut Structures and Panels, sandwich panels, which are optimally packaged and assembled at the desired location. This feature makes it possible to transport the portable cabins in large numbers and at the lowest possible cost. This product is currently used in many construction sites, villages, accident areas and etc.

The use of on-site prefabricated cabins is mostly done when it is not possible to transport and move to the installation site. Numerous factors can lead to the impossibility of moving the cabins to one place.

If there are obstacles such as large trees, narrow streets, construction of cabins on the roofs of buildings, difficult areas, accident-prone areas and etc., the use of on-site assembly portable cabins is the best choice.

However, some customers prefer to place the structure as a separate piece or in the form of raw materials to the place due to special transportation conditions, avoiding high transportation costs for a portable cabin, lack of sufficient space for storage and some other limitations, also move and perform part of the construction process at the desired location.

The most important features of an on-site portable cabin in Mammut Company:

- 1) Design and manufacture of the best product, to preserve the main characteristics of the cabin after the on-site assembly operation.
- 2) Utilizing the best technical specifications to increase the strength of the cabin, which will ultimately lead to a long life of.
- 3) Design and construction of a product that according to the location of the portable cabin, even after the assembly operation is heat insulating.



► Turnpike Portable Cabins

Turnpike portable cabin is a type of cabin with security use that is used to control and collect tolls on freeways. The customers of Turnpike cabin are mostly government agencies and private companies in the field of road and tunnel construction. At the end of the project, they also build the turnpike stations that should be created along the way and then install them on special platforms that have been installed for this purpose.

Usually, not all turnpike gates are the same and may be different depending on the region, weather conditions, specific details, etc. However, it usually has a two-sided mode for collecting tolls, for which purpose, doorways and sliding windows are installed on both sides. Generally, to build this structure, a place should be considered for installing air conditioners, desks and office equipment, fire extinguishers and first aid kits.

The important point in designing a turnpike portable cabin is that each cabin should have space for two employees to sit parallel next to each other because the cars pass on both sides of the barracks. The windows should also be sliding so that they can be closed when needed and do not occupy the interior space when they are open.

The slope of the roof should be transverse so that rainwater does not flow in front of the windows and does not disrupt the activity. The roof of the turnpike portable cabin is usually a very high structure for passing high-altitude vehicles, and when it rains, if the wind blows and the slope is not transverse, rain will inevitably penetrate the cabin.

Since that turnpike cabins are located on roads and in harsh environmental conditions, and also to maintain the health of personnel, the need to maintain the temperature of the indoor environment and the penetration of heat or cold in them is very important.

Mammut Structures & Panel Co. designs and manufactures its portable cabins in such a way that while having a long life and maintaining good quality; it provides long-term security and comfort for the people living in it.



► Guard Portable Cabins

From past years, the use of guard rooms with different uses of neighborhood guards, police and entrances to various complexes and factories has been common, and despite the use of intelligent monitoring systems, it is still preferred that the main task be performed by the guard.

Guard posts are small prefabricated structures that are installed at the entrances of companies, parking lots or sometimes neighborhoods and are the location of the guard for controlling tasks in the complex.

Based on the expected efficiency as well as the number of personnel who have to take control, Mammut portable cabins are produced in different dimensions.

Security portable cabins must have special features so that the security team can do its job well. At Mammut design section, we always try to observe and improve these features in different designs.

The most important features of Mammut guard cabins are:

- 1) Utilizing the best technical specifications with to increase the strength of the structure, will ultimately lead to a long life of the conex.
- 2) Design and construction of a product that according to the location of the portable cabin is heat insulating.
- 3) Proper design to create a suitable vision with the least blind spot to the area under the responsibility of the guard.
- 4) Utilizing the most efficient dimensions, commensurate with the expected efficiency and the number of personnel.
- 5) Beauty in the conex view using a suitable design, beautiful and homogeneous colors with the location and use of the product.





Certificate Control Quality & Testing

