



Your Guide to

# Planning a Metal Building



[www.cornerstonesteelmt.com](http://www.cornerstonesteelmt.com)





# Welcome to Cornerstone Steel

*The premier metal building contractor in the greater  
Missoula region.*

Cornerstone works closely with leading metal building manufacturers to offer our customers the highest quality, world class fabrication, engineering, and customer support, while offering the efficiency of a building that is prefabricated and requires minimal onsite approvals or changes.

This e-book is designed to give you a fundamental understanding of your options, considerations, and decisions you'll make on your way to the best metal building for your needs.



## Understanding Your Needs

Every successful project starts with understanding your needs. Consider the building's purpose, the desired size, and location. Our team will guide you through refining these ideas.



## Site Planning

Site planning is a crucial aspect of our process. We'll evaluate your location, considering factors like land topography, access routes, and local building codes. Our expert team will ensure the site is optimally prepared for construction, mitigating any potential issues.



## Designing Your Building

Once we have assessed your needs and your site, we will design a building that perfectly fits your requirements. You can choose from a range of styles, colors, and finishes to customize your building to your preference.



## Budget and Timeline

We'll provide you with a detailed quote and a project timeline upfront, so you have clear expectations in terms of cost and completion date.



## Construction and Installation

Our team of skilled professionals will handle the construction and installation process, upholding the highest standards of quality and safety.



## Post-Construction Support

Once your building is complete, our support continues. We're always available to answer questions and address any issues you may have.



# When Planning A New Metal Building, There Are Several Factors To Consider.

## 01 Purpose

Define the purpose of your building. Is it for residential, commercial, or industrial use? The purpose will determine the type and size of the building.

## 02 Size

Determine the size of the building. You'll need to consider both the square footage (the area of the building) and the height. These measurements will affect the building's structural requirements, as well as its cost.

## 03 Location

Evaluate the location where you plan to build. Consider the climate, the condition of the soil, and any local building codes or zoning restrictions. The location will affect both the design and the construction of your building.

## 04 Design

Choose a design for your building. Consider how it will be used, and how you want it to look. You may want to hire an architect or designer to help with this step. The design should include detailed plans for the building's structure, as well as its plumbing, electrical, and HVAC systems.

## 05 Materials

Choose the materials for your building. The primary material will be metal, but you'll also need to choose the type of metal, as well as any additional materials for insulation, interior walls, and finishes. Your choices will affect the building's performance, as well as its cost.

## 06 Specifications

Define the specifications for your building. These should include the design and materials, as well as the methods for constructing and finishing the building. Be sure to consider all aspects of the building, from the foundation to the roof.





## 07 Contractor Selection

Choose a contractor who specializes in metal buildings. Be sure to check their qualifications, experience, and reputation. Also, make sure they are familiar with the local building codes and regulations.

## 08 Budget

Determine your budget. This will affect every aspect of the project, from the size and design of the building to the materials and contractor you choose. Make sure to include contingencies for unexpected costs.

## 09 Building Code Compliance

Ensure the building meets all local and national building codes. This will likely involve submitting your plans to a local building department for review and approval.

## 10 Project Timeline

Establish a timeline for the project. This should include the start and end dates, as well as any key milestones along the way. The timeline should be realistic, but also ambitious enough to keep the project moving forward.



**Be sure to consult with professionals such as commercial contractors to ensure that your project is safe, legal, and suitable for your needs.**

# What Are The Different Types of Metal Buildings?

Metal buildings are a versatile option for a range of commercial, industrial, and residential applications due to their durability, sustainability, and cost-effectiveness. The type of metal building structure you choose largely depends on its intended use, the building's location, local building codes, and your budget. Here are some of the common types:



## Gable - Rigid Frame Clear Span

This provides a roof with two sloping sides and a ridge. The tapered columns are a cost-effective solution for office, warehouse, industrial and commercial applications. A straight column option is ideal for palletized storage or display racks, as well as for shopping centers and other commercial buildings. Clear span frames or interior columns are possible. The roof slope can be as low as 1/4:12 or as steep as 6:12.



## Single Slope Clear Span

These buildings have one roof surface. The single-side drainage makes them suitable for manufacturing facilities, warehouses and retail shopping centers. Tapered columns provide an inexpensive solution for wider buildings, while the available straight columns maximize usable interior space. The roof slope can be as low as 1/4:12 or as steep as 6:12.



## Single Slope Multi-Span

This system provides a cost-effective way to make a building wider. A single slope system is attached to a lower level of the building or extends the roofline.



## Gable - Modular Rigid Frame

Our modular rigid frame's interior columns provide multiple spans on wider buildings. This economical frame type makes use of interior load-bearing columns to more evenly distribute the building load. Thus helping to reduce the size of the rafter & columns. It is available in both gable and single slope designs.



## Western Rigid Frame

The Western frame is designed for use where a stepped roof is required with a column-free interior floor space. Straight sidewall column designs are an option. It is typically used in situations where widths are up to 150®.







# What Types Of Materials Are Used In Metal Building Panels?

Metal building panels play a vital role in the construction of a variety of buildings, from industrial and commercial to residential. These panels are made of a variety of materials, each with their own unique properties and advantages. When choosing the best material for your project, it is important to consider factors that will make it most suitable for you.

## Steel

Steel is a popular material for metal building panels. It is a great choice for its durability, strength and resistance to corrosion and rust. Steel panels are available in different gauges for different applications. The thickness of the steel panel is measured by gauges. A lower gauge indicates a thicker sheet. This material can also be coated with different finishes, such as zinc and paint, to improve its durability and appearance. Steel panels are used in many construction projects including commercial buildings, residential homes, and industrial facilities.

## Zinc

Zinc is an extremely versatile material and is used in many metal building panels. It is highly corrosion resistant and can be coated in various finishes to increase its durability and appearance. Zinc panels can be found in many contemporary architectural designs. They are available in different gauges for various applications. Zinc is an eco-friendly, recyclable material. It's a great choice for anyone looking for sustainable building materials.

## Aluminum

Aluminum is also a common material in metal building panels. It is a great choice for those who are looking for a lightweight material that is corrosion-resistant and easy to work with. Aluminum panels come in a variety of gauges, and can be finished with different finishes to enhance performance and appearance. This material is ideal for areas with high humidity because it won't rust or corrode. Aluminum panels are used in both residential and commercial buildings.

## Other Material

Other materials used for metal building panels are stainless steel, composite materials, and titanium. Each of these materials offers unique benefits and properties, depending on the needs of the project. Stainless steel is a great choice if you are looking for something that is resistant against rust and corrosion. Composite materials are widely used in metal panels because they offer excellent durability, strength, and corrosion resistance.

Metal building panels are made from a wide range of materials. Each material has its own unique properties and advantages. Metal building panels are made from a variety of materials, including steel, aluminum, zinc and others. When choosing the right material for your project, you should consider factors like gauge, durability and corrosion resistance. By choosing the right material for your project you can ensure your metal building panels are durable, long-lasting and functional for many years.



# Metal Panel Composition

Understanding the impact of paints, substrates and thicknesses on metal panels is crucial. Regional manufacturers are often focused on cost-effectiveness, while national manufacturers provide a variety of options and high-end products. It is recommended that buyers consult manufacturers to accurately determine the thickness of steel, rather than relying on gauge measurements.



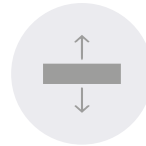
## Substrate

Metal panel quality is affected by the type of metal that's used. Metal panels are usually made of Galvanized steel or Galvalume(r). The Galvanized substrates are coated in a zinc-alloy, while the Galvalume(r), on the other hand, is coated with a combination of zinc and aluminum. Both have advantages. Galvanized substrates come in different zinc levels, G60 and G100 are the most common. G100 products are coated with a higher amount of zinc and offer better corrosion protection than G60 substrates. Galvalume(r) panels are used for projects that need long-term performance, as they show superior corrosion resistance to Galvanized panels. Galvalume(r), unlike Galvanized panels, comes with a warranty on the substrate.



## Paint

The quality of the paint or coating used is also a crucial factor in determining metal panel quality. Coatings are made up of pigments, resin/binder, and solvents. The pigments provide color and the resin binds it, protecting the coating against UV degradation. Resins of higher quality offer greater protection against panel fade and chalk. Solvents determine the proper application of paint. The coatings are available in a wide range of quality, from the low-end polyester to the silicone modified polyesters and PVDF coatings (Kynar® 500(r)). PVDF coatings offer better long-term protection than SMP. PVDF coatings provide the best protection from fade and chalk.



## Material Thickness

Metal panels are rated by their gauge, or thickness. This has an impact on both quality and durability. Metal panels are available in different gauges. Smaller numbers indicate heavier steel. The more expensive panels offer better weather resistance, such as against hail, wind, and snow. The terms gauge and thickness are closely related, but they cannot be used interchangeably. Regional manufacturers produce lighter gauged panels while national manufacturers offer heavier gauged panels at the heavier end. When selecting metal panels for a particular project, it's crucial to take into account the thickness.



## Site Preparation and Planning

When a company is preparing to purchase and construct a building, they need to consider several factors related to the building site. Here are some important things to keep in mind:



### Zoning and Building Codes

Before purchasing a building site, it is essential to check the zoning and building codes for the area. This will help ensure that the company can legally construct the type of building they want on the site.



### Site Access and Infrastructure

The company needs to consider how easy it is to access the site and whether the necessary infrastructure (e.g., electricity, water, sewage) is available. If the site is difficult to access or lacks adequate infrastructure, it could significantly increase the cost of construction.



### Soil Testing

Soil testing is an important step in preparing a building site. The soil needs to be tested to ensure that it can support the weight of the building and its foundation. If the soil is not suitable, additional preparation work may be needed, which could add to the overall cost of construction.



### Environmental Factors

The company needs to consider any environmental factors that could impact the building site, such as flooding, high winds, or seismic activity. The building needs to be designed to withstand any potential environmental hazards in the area.



### Building Permit Requirements

Before construction can begin, the company needs to obtain the necessary building permits from local authorities. The permit requirements vary depending on the location and the type of building being constructed.

# How Do Metal Buildings Hold Up To Extreme Weather?

Metal buildings are known for their durability and resilience, making them well-suited to withstand extreme weather conditions. Here's how metal buildings hold up to various types of severe weather:

- 01 High Winds:** Metal buildings have a high wind resistance capacity. They are designed to withstand strong winds, including hurricane-force winds. The key to their resistance lies in the structural design, which includes strong connections, bracing, and anchoring systems. Proper installation and adherence to building codes are essential for ensuring maximum wind resistance.
- 02 Snow Loads:** Metal buildings are engineered to handle heavy snow loads. The roof systems of metal buildings are designed with sufficient slope to allow snow to slide off easily. Additionally, the framing and structural components are designed to support the weight of accumulated snow, preventing any structural damage.
- 03 Seismic Activity:** Metal buildings can be engineered to withstand seismic activity, such as earthquakes. The flexibility of steel structures allows them to absorb and distribute the energy generated during an earthquake. By incorporating appropriate structural design elements, including seismic bracing and proper anchoring, metal buildings can be made resilient against seismic forces.
- 04 Fire Resistance:** Contrary to popular belief, metal buildings offer excellent fire resistance. Steel is non-combustible and does not contribute to the spread of fire. Additionally, metal buildings can be designed with fire-resistant coatings or insulation to further enhance their fire resistance.
- 05 Moisture and Water Resistance:** Metal buildings are designed to be watertight, preventing moisture infiltration. Roofing systems are typically constructed with durable panels that effectively shed water. Proper insulation and vapor barriers can also be included to prevent condensation and moisture-related issues inside the building.
- 06 Corrosion Resistance:** While metal can corrode over time, modern metal buildings are constructed using corrosion-resistant materials such as galvanized or coated steel. These protective coatings help prevent rust and extend the lifespan of the building.



It's important to note that the performance of a metal building in extreme weather conditions depends on various factors, including the quality of construction, proper maintenance, adherence to building codes, and the specific design requirements for the geographical location. Consulting with experienced professionals and following recommended guidelines will ensure that your metal building is well-prepared to withstand severe weather events.





# Why Do Custom Metal Buildings Cost Less Than Tradition Commercial Construction?

There are several reasons why custom metal buildings might cost less than traditional commercial construction:

## Efficient Construction

Metal buildings are often pre-engineered in a factory and then assembled on-site. This can reduce the time and labor required for construction, leading to lower costs.

## Energy Efficiency

Metal buildings can be designed to be energy efficient, which can reduce the cost of heating and cooling. This can lead to long-term savings, especially in climates with extreme temperatures.

## Reduced Material Waste

Because the components of a metal building are manufactured to exact specifications, there's less waste from excess materials. This can also result in cost savings.

## Flexibility

The design of metal buildings can be easily modified and expanded, which can result in cost savings if the building's purpose or layout needs to change in the future.

## Durability

Metal buildings are known for their durability and resistance to damage from weather and pests. This can reduce maintenance and repair costs over the building's lifespan.

## Insurance Costs

Due to their durability and resistance to fire, some insurance companies may offer lower premiums for metal buildings.

**It's important to note that while metal buildings can be more cost-effective in many cases, the cost can vary depending on factors like the quality of the materials, the complexity of the design, the location of the building, and the current price of steel. Always consult with a knowledgeable builder or contractor to understand the full cost implications of your project.**

# Recent Improvements in Metal Building Construction

The field of metal building construction has seen several advancements that have significantly improved the quality, durability, and efficiency of these structures. Here are some notable advancements:

## Improved Coating Technologies

There have been advancements in coatings used on metal buildings to protect against corrosion, weathering, and ultraviolet light. These coatings can help extend the lifespan of metal buildings and reduce maintenance needs.

## Insulation Technology

There's been a rise in the use of more advanced insulation materials in metal buildings. For instance, insulated metal panels (IMPs) are becoming more popular due to their superior insulating properties, as well as their ease of installation. They can provide excellent thermal performance, improving energy efficiency.

## Sustainability

Many manufacturers are focusing on sustainable production processes, including recycling and using recycled materials. Metal buildings are inherently more sustainable than many other types of structures due to their long lifespan and recyclability. Additionally, some metal buildings are designed to accommodate solar panels or green roofs, improving their environmental footprint.

## Design Flexibility

Thanks to advancements in computer-aided design (CAD) and manufacturing processes, metal buildings can now be customized to a greater degree than ever before, offering a wide range of design options and architectural styles.

## Prefab and Modular Construction

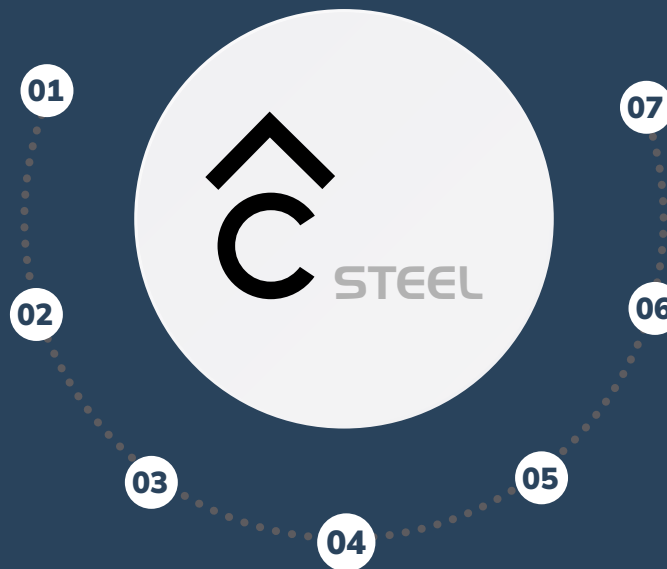
Prefabricated and modular metal buildings are becoming more popular. These buildings are made in a factory and then assembled on-site, which can save time and reduce costs.

## Structural Systems

Newer structural systems, like clear-span frames, have allowed for greater open spaces inside metal buildings, expanding their potential uses.

## Energy Efficiency

Besides improved insulation, there are also advances in energy-efficient design, such as cool roofing materials that reflect more sunlight and absorb less heat than traditional roofing materials, reducing energy costs.





## How About Residential Buildings?

Yes, metal buildings can certainly be used for residential occupancy. There are various types of metal residential buildings, including:

### 01 Metal Homes

Entire homes can be constructed from metal for a modern, industrial look. These homes can be customized to fit personal preferences, and many of them are indistinguishable from traditional homes when finished with exterior and interior cladding materials.

### 03 Steel Frame Homes

In these cases, the structure of the house is built with steel, but the rest of the home can be built with more traditional materials. This gives the benefit of a strong, durable frame while maintaining the look and feel of a traditional home.

### 05 Metal Building Add-Ons

Some homeowners choose to use smaller metal structures as add-ons to their homes, such as garages, workshops, or storage buildings.

### 02 Metal Barn Homes or “Barndominiums”

These are a popular trend in rural and suburban areas. They combine the functionality of a barn or a workshop with the living spaces of a traditional home.

### 04 Prefab Metal Homes

These homes are manufactured off-site and then assembled on-site. This can lead to cost and time savings.

The advantages of using metal for residential buildings include durability, reduced maintenance, potential cost savings, and design flexibility. However, like any building material, there are also downsides, including potential issues with heat and cold transfer if not properly insulated, noise during rain or hailstorms, and the industrial aesthetic that may not appeal to everyone.

**It's important to work with a knowledgeable builder or contractor who is familiar with residential metal buildings and local building codes to ensure a successful project.**



# Why Are Metal Buildings Considered Environmentally Friendly?

Metal buildings are considered environmentally friendly for several reasons:



## Recyclability

Metals, especially steel and aluminum, are highly recyclable without losing their properties. This means old metal buildings or scraps can be recycled to make new building materials, reducing the demand for new raw materials.



## Sustainability

Many metal buildings are made from a high percentage of recycled materials. Additionally, at the end of their lifespan, these buildings can almost entirely be recycled.



## Energy Efficiency

With proper insulation, metal buildings can be very energy-efficient, reducing the amount of energy needed for heating and cooling. Furthermore, reflective coatings on metal can repel heat, reducing cooling costs in hot climates.



## Durability

Metal buildings are resistant to many of the factors that can cause wear and tear in other types of buildings. They are resistant to pests, like termites, and they stand up well to weather, including wind and heavy snow. This durability means they require fewer resources for maintenance and repairs, and they can have a longer lifespan than buildings made from other materials.



## Construction Waste

As metal buildings are often pre-engineered, the components are manufactured to size, which results in minimal waste during construction. This contrasts with traditional construction methods that can produce significant waste.



## Green Building Standards

Metal buildings can contribute to achieving green building standards such as LEED (Leadership in Energy and Environmental Design), which can lead to tax benefits in certain regions.



## Solar Panels

Metal roofs are typically good candidates for solar panel installation, which can further reduce a building's environmental impact.

The environmental impact can vary based on factors like the percentage of recycled material, the type and amount of insulation, the manufacturing process, and the distance the materials are transported. Always check with your supplier or builder to ensure your metal building meets your environmental standards.





## What About Changes During Fabrication?

Changes to a prefab metal building can certainly be made, although the ease and cost-effectiveness of these changes can vary depending on when they're made in the construction process and the nature of the changes themselves. Here are some typical scenarios:

### 01 Design Stage

Entire homes can be constructed from metal for a modern, industrial look. These homes can be customized to fit personal preferences, and many of them are indistinguishable from traditional homes when finished with exterior and interior cladding materials.

### 02 Fabrication Stage

Changes during this stage can be more challenging, as the components are being manufactured off-site according to the original design. Alterations at this point could lead to delays and additional costs, depending on the extent of the changes and how far into the fabrication process the project is.

### 03 Assembly Stage

Once the prefabricated components have been delivered to the site and assembly has begun, making changes can be complex and costly. Depending on the nature of the changes, it might involve disassembling parts of the structure, ordering new components, or modifying existing ones.

### 04 Post-Construction Stage

After the building is fully assembled, changes can still be made, but they will typically be more limited and potentially more expensive. Some changes, like adding or moving windows or doors, or changing interior walls, might be feasible. But major changes that impact the structure of the building would likely be more difficult and costly.

**In all cases, it's essential to communicate with your design-build team or contractor as soon as possible if you're considering making changes. They can provide guidance on the feasibility, cost, and impact on the project timeline of any proposed changes.**





# Why Choose Cornerstone?

We understand that constructing a new metal building is a significant investment. You need a trusted partner who can deliver quality results on time and within budget. We are proud to say that we have an impressive track record of doing just that.



## Experience

We've been in the construction industry for over 20 years, during which we have successfully completed numerous metal building projects. Our team is well-versed in the latest advancements in metal building features, design, and technology.



## Custom Solutions

We believe that every client has unique needs and every project is different. Therefore, we provide tailored solutions, designing and constructing buildings that fit your specific requirements and preferences.



## Quality Assurance

We use high-grade materials to ensure the durability and longevity of our structures. We also follow a rigorous quality control process throughout the construction phase to ensure every aspect of your building is up to standard.



## Sustainability

As an environmentally conscious builder, we use metal due to its recyclability and energy efficiency. Our buildings are designed to minimize environmental impact, contributing to a greener planet.



## Cost-Effective

By integrating the design and building process, we can offer a cost-effective solution without compromising quality. Our efficient construction methods reduce waste and minimize delays, resulting in substantial cost savings for you.



## Excellent Customer Service

We prioritize clear communication and transparency with our clients. Our team will keep you updated on the progress of your project, promptly address any concerns, and provide professional advice when needed.



## Safety and Compliance

We strictly adhere to all local and national building codes, prioritizing the safety of both our workers and your future building's occupants.



## Start Your Journey Today

Thank you for considering Cornerstone as your building partner. We look forward to delivering first class metal building.





## Roof systems

### SSII/SS360 Standing Seam Roof Systems



This system offers superior performance, full flexibility of design, and low life cycle cost with minimum maintenance. SS360 panels are joined by an electric seaming machine developing a full 360 degree rolled seam to ensure weathertightness. It's been approved for wind uplift, hail and fire resistance.

**GAUGE:** 24 OR 22    **COVERAGE:** 24"    **PANEL LENGTHS:** UP TO 50'

### R-Panel



Our R-Panel offers a simple and efficient roof system available in a variety of options. Its even-shadowed appearance has 1-1/4" ribs on 12" centers. It offers 36" of coverage, that is reinforced between the ribs for additional strength.

**GAUGE:** 26  
(22 & 24 AVAILABLE)    **COVERAGE:** 36"    **PANEL LENGTHS:** UP TO 50'

### Translucent Roof Panels



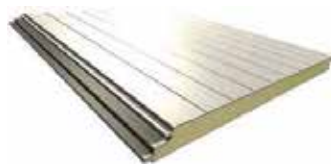
Our translucent roof panels are available in R-Panel at 11'-0" lengths, and standing seam at 10'-6" lengths. Both panels are available in insulated and non-insulated, and designed for 5° purlin/joist spacing.

**GAUGE:** 24 OR 22    **COVERAGE:** 24", 36"  
**PANEL LENGTHS:** 11'-0" R-Panel / 10'-6" Standing Seam



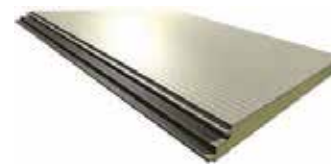
# Insulated metal panel systems

Our insulated wall and roof systems provide 100% reliable thermal performance and insulation continuity with no cavities, gaps, crushed insulation or thermal bridges. R-values remain stable when purlin and girt center dimensions are varied, and R-value can be easily increased with thicker panels. The insulated core is the most thermally effective insulant commonly available today. The wide panels are attractive, lightweight, sturdy, durable, and install quickly and easily.



## Striated Profile Wall Panel

**Exterior Finish:**  
Light Embossed



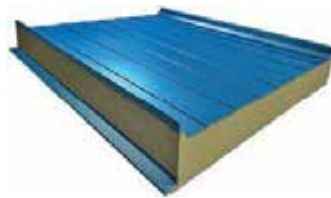
## Double Mesa Wall Panel

**Exterior Finish:**  
Light Embossed



## Heavy Embossed Wall Panel

**Exterior Finish:**  
Heavy Embossed Flat



## Hi-Rib Roof Panel

**Exterior Finish:**  
Smooth, No Emboss



## Standing Seam Roof Panel

**Exterior Finish:**  
Smooth, No Emboss



## Wall Systems

### R-Panel



Both durable and attractive, the R-Panel is ideal for industrial, agricultural, and commercial applications. With a 36° width coverage, the R-Panel's main ribs are 1-1/4", and offers an even-shadowed appearance.

### Reverse R-Panel



Our Reverse R-Panel is designed to compress insulation without unsightly bulges at the girt. Its fasteners are semiconcealed which offers a decorative shadow line. The Reverse R-Panel provides a 36° width coverage.

### A-Panel



The A-Panel features recessed fasteners, providing a clean exterior appearance and making it ideal for fascias and decorative wall designs. Our A-Panel provides 36° coverage with 1-5/16" high ribs.

### Translucent Wall Panels



Allow natural light to transmit into your building by adding translucent wall panels. Not only do translucent wall panels offer a source of natural illumination, they can help with energy savings. Translucent panels are available in each of our standard wall panel profiles.









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