

Frequently Asked Questions about Insulated Metal Panels

1. What is an insulated metal panel?

An insulated metal panel (IMP) is a strong single unit constructed of a rigid foam core sandwiched between two sheets of coated metal that provides an exceptionally strong building enclosure. It is a cost competitive, visually appealing, high performance system that can provide quick building enclosure and long-term low maintenance.

The IMP's unique combination of impermeability, excellent thermal performance and visual appeal makes it a better choice than other exterior finish options such as stucco, masonry or pre-cast concrete.

2. In what applications can IMPs be used?

Insulated metal panels are chosen for commercial, industrial, institutional and cold storage applications for their excellent performance characteristics and competitive in-place costs.

Structures such as airplane hangars, banks, convention centers, distribution centers, manufacturing plants, museums, office buildings, schools, sports facilities, and religious structures, cold storage and food processing facilities have proven to be excellent applications for IMPs.

3. How are IMPs manufactured?

Most IMPs are factory manufactured using a foamed-in-place process. Foam is applied as a liquid or froth, between the sheets of metal. It undergoes a chemical reaction causing it to rise and bond to the metal skins, filling the interior cavity, creating a solid monolithic panel that maintains a consistent thermal value and resists moisture, insect and rodent infiltration.

IMP's can also be manufactured by a laminating process. In this method, pre-cured foam board stock is adhered to preformed metal facers with structural adhesives and placed under pressure in a platen press or pinch-roll operation.

With both types of IMPs a factory controlled, uniform foam thickness provides consistent insulation performance; all IMPs can be produced in a variety of styles and sizes depending on application.

4. Why is an IMP thermally efficient?

The durable metal panel facings resist damage and create a vapor barrier that offers long-term thermal stability. The IMP has proven R-values from R-14 to R-48 in a variety of building types, and built-in thermal breaks that significantly improve the energy efficiency of buildings, thus reducing heating and cooling costs for building owners. Additionally, insulated metal panels are placed outboard of the structural supports thereby creating a continuous thermal barrier for maximum thermal efficiency.

IMPs also reduce airflow in and out of the building envelope, which helps improve HVAC performance. This enhancement may potentially contribute to points for Optimized Energy Performance if the building is aiming for certification in the USGBC's LEED program. IMPs also help the environment by reducing or eliminating field cutting and material waste.

5. How does an IMP improve construction quality and timing?

Because the IMP is a single building element, it speeds up project completion and can be installed in almost any kind of weather without risk to system integrity. This is in contrast to multiple steps usually needed to field assemble and install other insulated wall systems. IMPs are installed using concealed clips and fasteners, which complete a system that includes the vapor barrier, air barrier, and water barrier along with a high efficiency insulated core, thus reducing the need for multiple components.

6. Can IMPs help qualify for points in LEED or other green building guidelines?

Yes, IMPs can help qualify for green building points in several ways.

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Performance if the building is aiming for certification in the USGBC's LEED program. IMPs also help the environment by reducing or eliminating field cutting and material waste.

Typically the metal used in IMPs contains at least 25% recycled content and up to 80% depending on the metal and how much scrap content it has. This can raise the building's overall average recycled content and help contribute to LEED points under Material and Resources Credit 4, Recycled Content.

IMPs are part of the envelope energy simulation calculations and can qualify for LEED points under Energy and Atmosphere Credits, Optimize Energy Performance.

IMPs integrated into a building's overall design can contribute to points for Innovation and Design if the building's design team applies strategies or measures that demonstrate such performance.

7. What factors affect upfront and long-term costs?

The lightweight nature of IMPs translates to savings on framing and foundation. They are designed to meet the most demanding performance requirements, which, when combined with the inherent benefits of metal facings, requires less maintenance than any other exterior building system.

For more details about performance criteria, panel thicknesses and finish options, [click here](#).

8. What about design options?

Architecturally, IMPs offer many design options because they are available in various joint sizes, in curved and formed panels, and with a variety of high performance coatings and surface textures. The most widely used IMPs range from 1 to 4 inches thick, but manufacturers can provide thicker panels for thermal applications.

The metal skins come in a multitude of colors and textures for both exterior and interior needs. Interior coatings also provide easy cleaning and washing as well as high light reflectivity.

Summary of IMP features and benefits

- When compared to other construction product options for roofs and walls in both metal and non-metal, IMPs offer a cost competitive, high performance system that answers today's demands for quick building enclosure at a low cost while offering a wide range of design and performance features.
- Insulated metal panel systems are installed as a single element allowing for faster building completion in almost any kind of weather without risk to system integrity, as opposed to multiple installation steps for other insulated wall and roof systems.
- The metal facings of IMPs require less maintenance than other exterior systems, resist damage, and meet the most demanding performance requirements.
- IMPs form an integrated modular system that offers high insulation values and built-in thermal breaks. Vapor and air infiltration barriers are easily achieved and thermal performance is enhanced, since there is no metal conductance from exterior to interior skin.
- Under normal wind conditions, support girt spacing in the 8-ft. to 12-ft. range is used to take advantage of the high panel strength. Also, 24 and 26 light gauge metal skins are used with profiled or striated patterns to minimize the material cost while maintaining the structural integrity and product flatness.
- The designer has a myriad of design options ranging from color and texture to panel width, joint size options and joint orientations, as well as product performance options ranging from panel insulation value to span length.
- The erector has a lightweight product that erects quickly to meet fast-track schedule demands. The weight difference also offers framing and foundation savings.

- The owner gets a highly energy efficient building envelope with lower heating and cooling costs and a high performance system at one of the best life cycle costs of any product available today. Plus, interior coatings provide easy cleaning and washing as well as high light reflectivity.

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Performance Criteria

Insulated metal panels are manufactured to meet the performance and testing requirements of the model building codes and insurance listing agencies. IMPs carry ratings for fire, structural, thermal transmittance, foam core properties, water leakage and air pressure differential. In some cases, an additional fire barrier may be required on the inside of these panels for certain fire ratings. Individual manufacturers can provide specific details.

Full-scale tests must also be conducted to indicate the in-place performance of the product in a fire. These tests are small room - and large-scale corner tests conducted at independent testing agencies such as Underwriters Laboratories and Factory Mutual that are required for UBC and IBC compliance, as well as multistory testing to meet some conditions. Before specifying an insulated metal panel, a manufacturer should be requested to demonstrate the product's compliance with an array of fire tests as described in Chapter 26 of IBC.

Insulated metal wall and roof panel designs are verified by representative structural tests for positive and negative wind loads. Manufacturers should provide calculations verifying that all factors affecting the load carrying capacity of the panels have been analyzed and that they meet the project requirements.

Foam cores are subjected to a series of physical performance tests to determine the strength and aging characteristics of the material. Foam is measured for (1) density, (2) shear strength, (3) tensile strength, (4) compressive strength, (5) humidity aging, (6) heat and cold aging and (7) flash and ignition properties.

Complete assemblies are tested to determine that there is no uncontrolled water or air leakage at required pressure differentials. See Section 3 of the Guideline for specifics of testing and certification relating to these criteria.

One of the main features of IMPs is the insulation value. The panels have a foam core that provides R-values generally ranging from 7 to 48 as tested with ASTM C 1363 in thicknesses from 2 to 6 inches for wall systems, and R-values ranging from 8 to 48 for roof systems. The test specimen includes a panel side joint to account for any thermal inefficiency that may occur. Most products, however, perform very well because the side joints of virtually all panel designs have a natural thermal break between the outer and inner metal facers.

Panel Thickness Variations

These products offer nearly three times the insulation efficiency as a field assembled glass fiber system. To achieve an R-value of 20 with an insulated metal panel you only need a 2 ¾- inch to 3-inch thickness. For the same R20 using glass fiber along with a separate liner, sub girt and fascia, the wall system must be approximately 7.5 inches thick. When compared to conventional field assembled walls, insulated metal panel walls yield a significant increase in a building's useable floor space.

IMPs are very strong structurally due to the composite action between the flat skins and the foam core. For a 2-inch panel most wind load requirements in the 20-to 30 psf ranges can be met with 7-foot to 10-foot span conditions. Typically, panel capacity is controlled by the fastener system under negative wind loads. Check the negative load performance when using load span data for any product. Also, note that insulated metal panels are not designed for use as bearing walls or shear diaphragm walls.

Panel Selection

The primary variable in the selection of an IMP is the thickness needed to meet the required thermal value. After the thermal value is determined, a review of the structural span tables is necessary to ensure that the panels in the thickness selected will meet the structural requirements.

The most common substrates for insulated metal panels are minimum 26 gauge G90 galvanized (A653) steel, and 26 gauge AZ50 aluminum zinc alloy coated (A792) steel for both the interior and exterior faces. Heavier combinations of gauges for both interior and exterior faces are

available depending on requirements for load/span capability, resistance to abuse, and aesthetic needs.

Finish Selection

Insulated metal wall and roof panels are typically prefinished on both the interior and exterior faces. The typical exterior finish is the industry standard nominal 1 mil (inclusive of primer) PVDF (70% Kynar® 500/Hylar® 5000). A silicone modified polyester paint is commonly used as the exterior finish on cold storage buildings.

The typical interior finish is a nominal 0.8 mil (inclusive of primer) standard polyester, in a light reflective, easy to maintain white color.

Special high build coatings are available on both the interior and exterior faces of the panels to provide added protection in extreme environments.