Insulated Metal Wall and Roof Panels

HIGH PERFORMING SYSTEMS IN DESIGN, SUSTAINABILITY AND OPERATION

PRESENTED BY: ATAS International, Inc.

AIA/CES Provider Number J447 | AIA/CES Program Number IMP0419 | GBCI Course # 0920001083

ATAS International, Inc.
Sustainable Building Envelope Technology

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Learning Objectives

At the end of this program, participants will be able to:

Have a better understanding of insulated metal panels (IMPs) and components.

Explain how insulated metal panels prevent air and vapor infiltration, increase thermal comfort for building occupants and improve building performance through increased energy efficiencies.

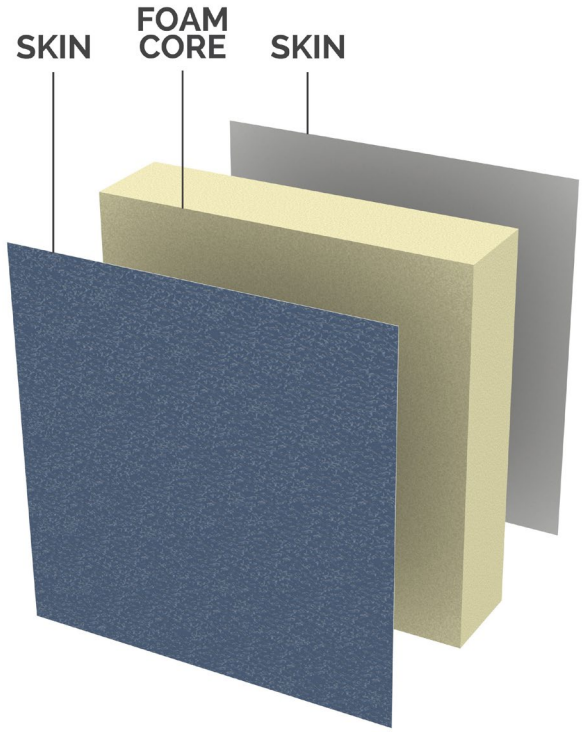
Compare insulated metal panels to traditional systems based on attributes, aesthetics, and performance.

Recognize the durability, thermal performance and energy efficiencies gained when using insulated metal panels vs. traditional systems and how they reduce their environmental impact.

Understand the criteria, attributes and sustainability benefits of insulated metal panels and how they may qualify for credits under LEED (Leadership in Energy and Environmental Design).

Insulated Metal Panels

What are Insulated Metal Panels?



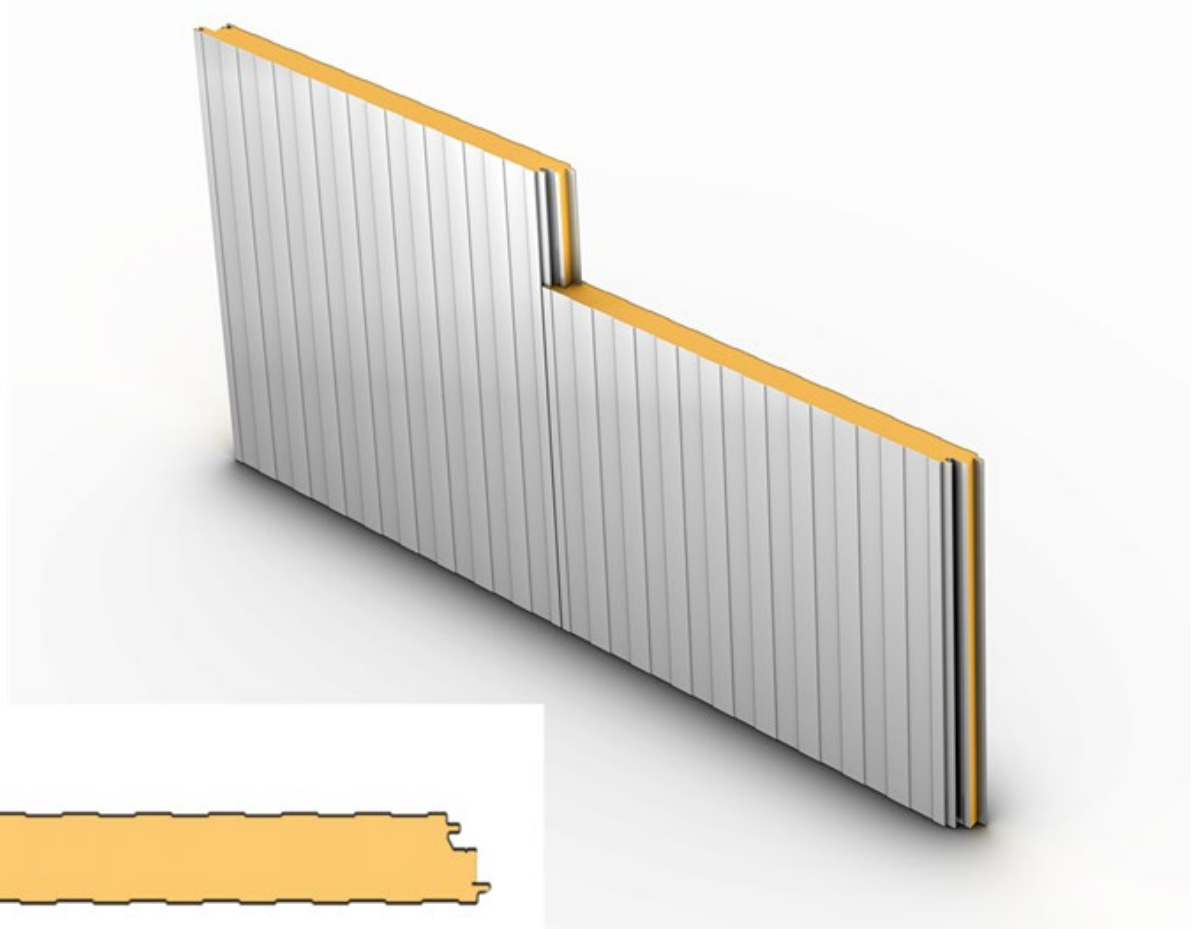
Insulated Metal Panels (IMPs)

- Lightweight composite exterior wall and roof panels
- Continuous foamed in place manufacturing process
- Finished exterior (facer) and interior (liner) steel skins
- Polyisocyanurate foam core

IMPs meets the needs of a variety of building projects

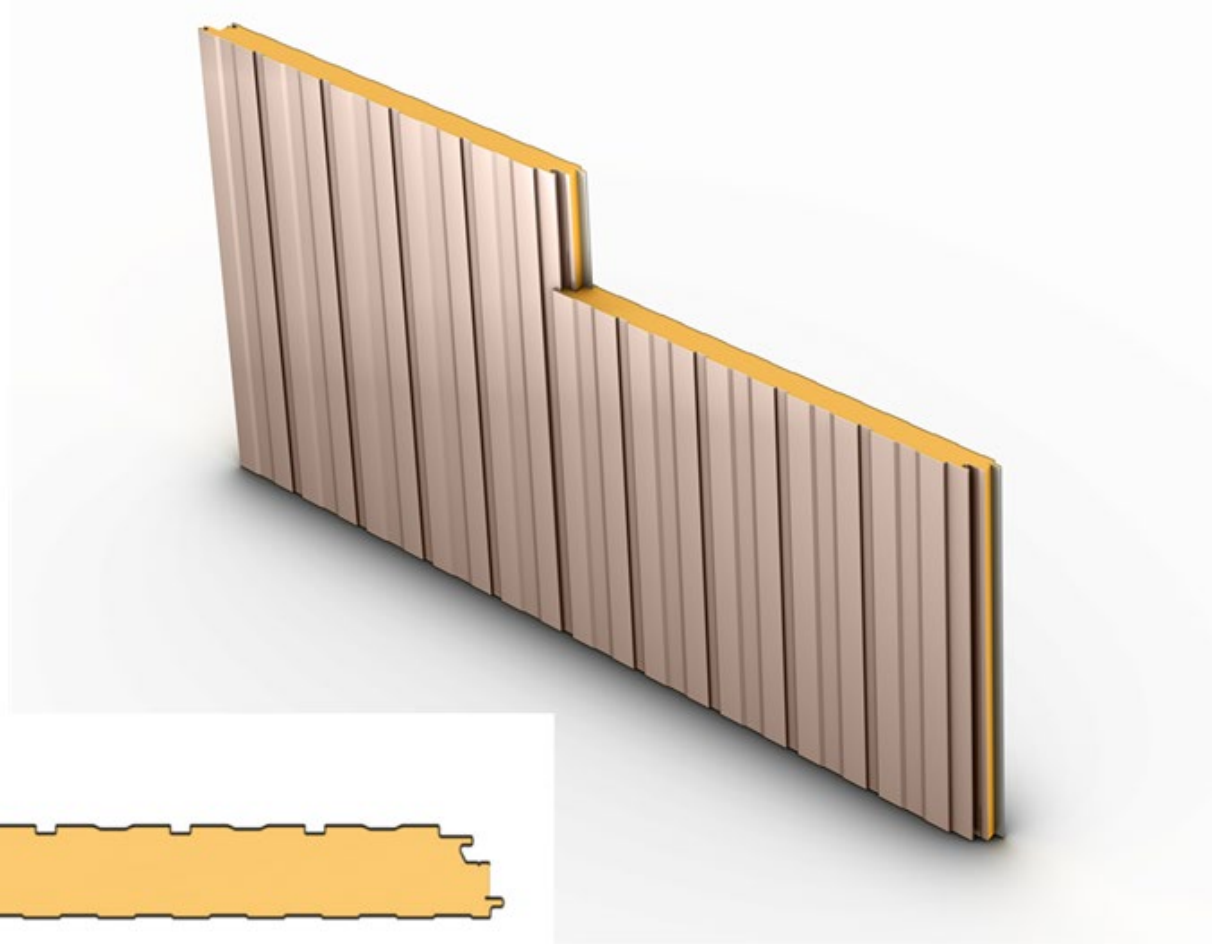
Insulated Metal Panel Profiles - Walls

- Lightly corrugated, ribbed profile
- Used for exterior wall or interior partition wall applications



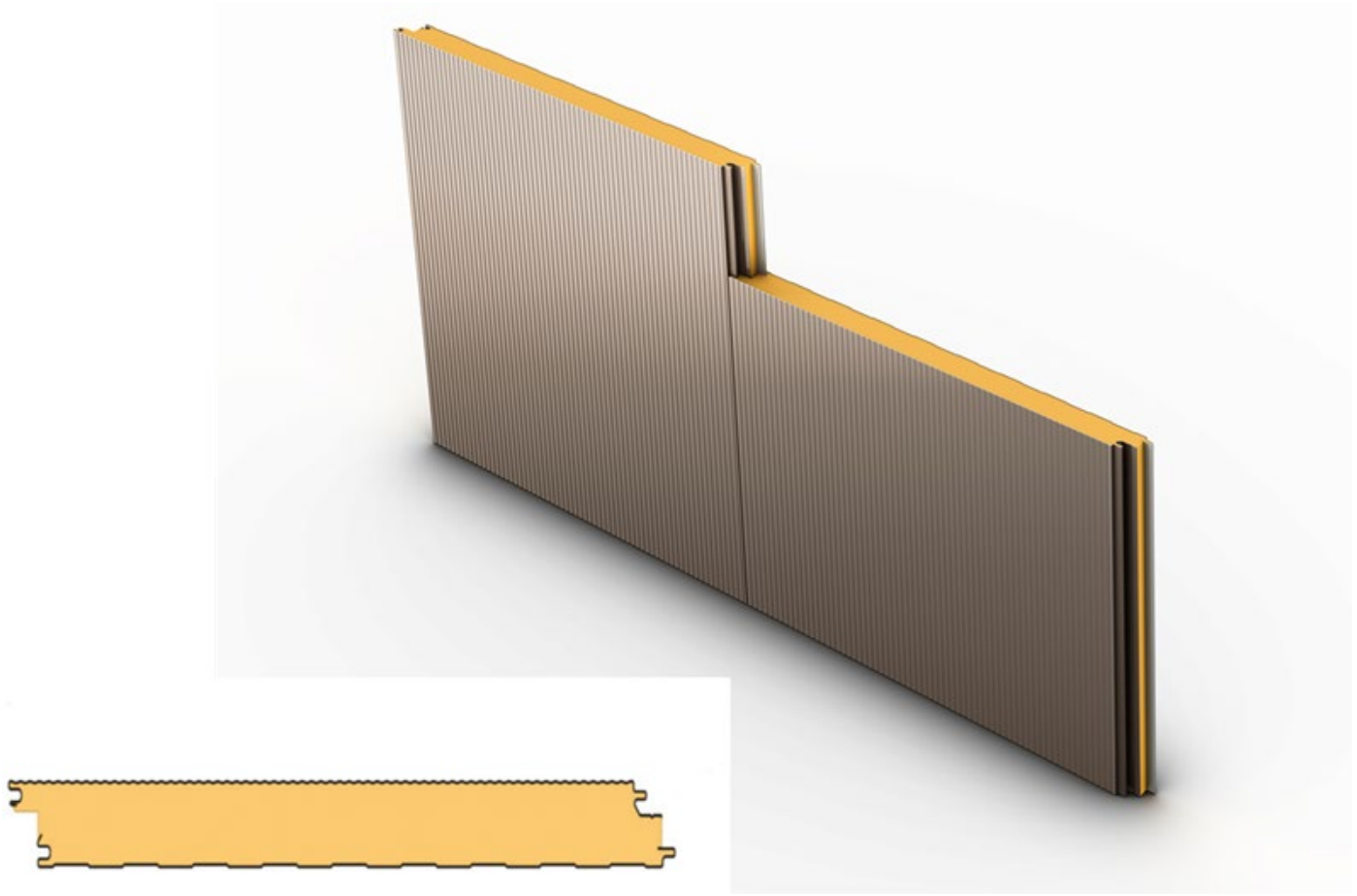
Insulated Metal Panel Profiles - Walls

- Dramatic, fluted insulated metal panels provide deep, rich, shadowing appearances that enhance the profile's bold lines



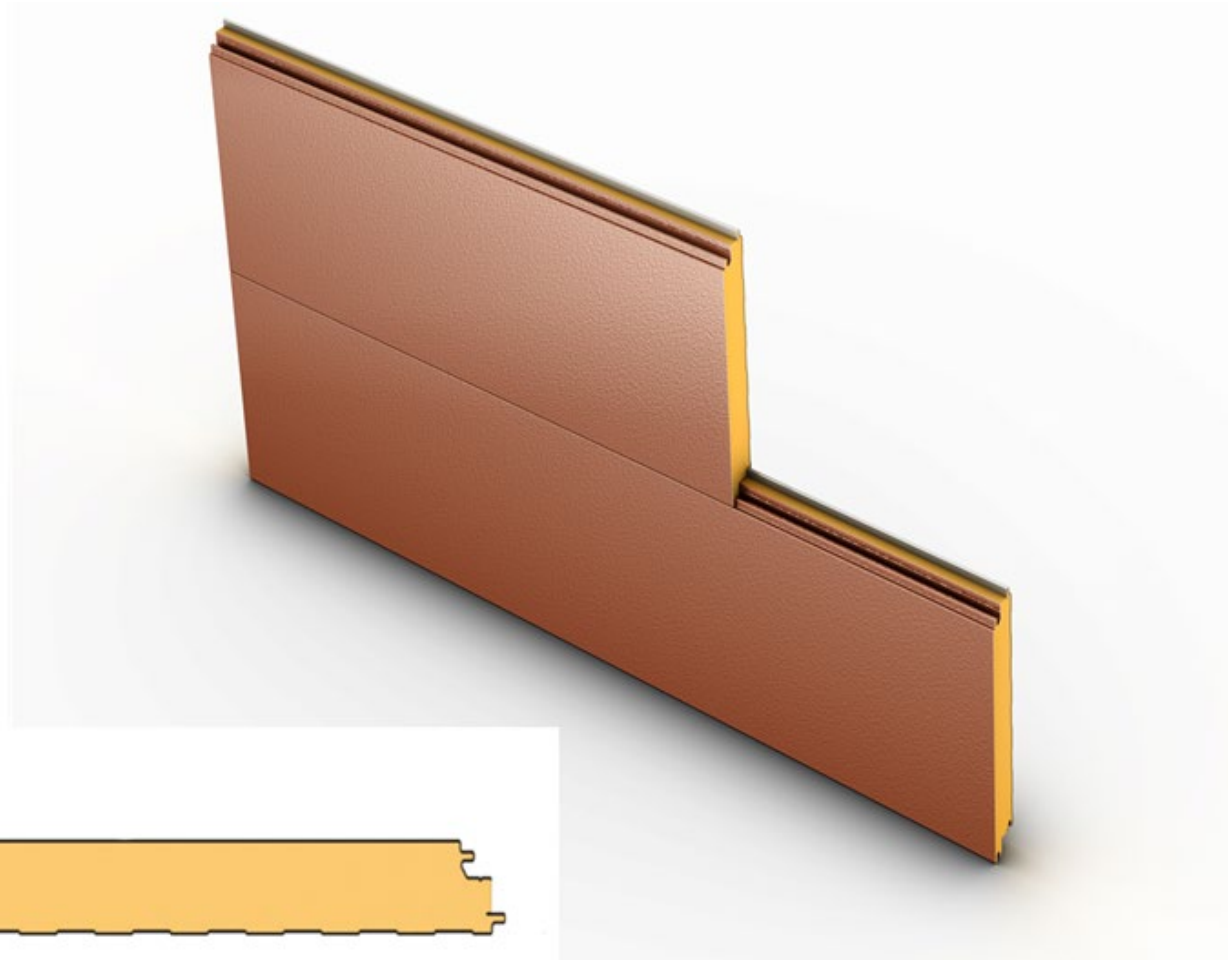
Insulated Metal Panel Profiles - Walls

- Striated profile appears relatively flat
- Provides texture to enhance the functionality and aesthetics of this multi-use panel



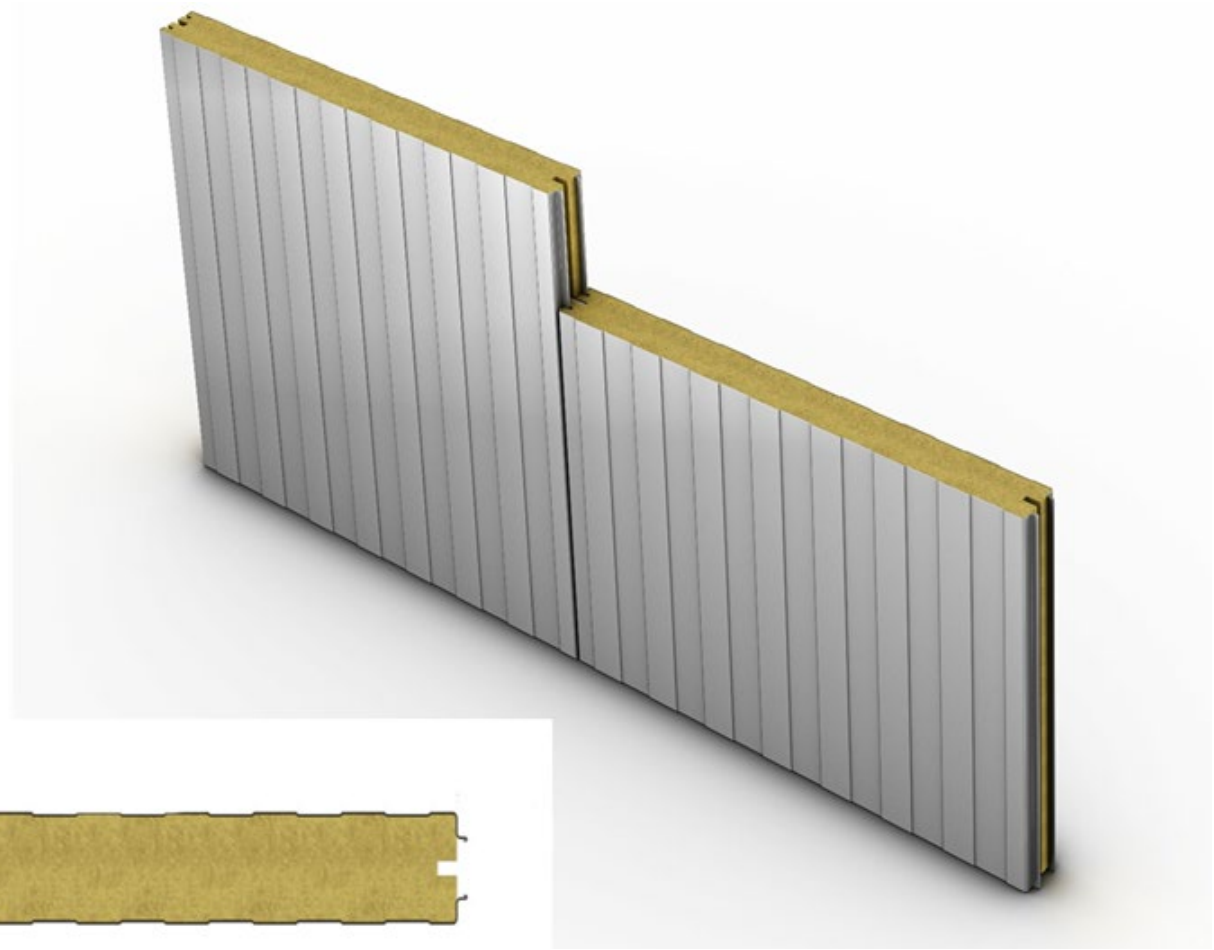
Insulated Metal Panel Profiles - Walls

- Flat, troweled embossed profile providing richly textured masonry stucco wall appearance
- Creates warmth and style when non-lined profile appearance is desired



Insulated Metal Panel Profiles - Walls

- Fire-rated panel combines aesthetics, flexibility and performance into a mineral wool core insulated panel
- Can achieve fire resistance ratings of one, two or three hours



Insulated Metal Panel Profiles - Roof

- Provides the look of a standing seam metal roof with the added benefits of thermal performance, building efficiency and durability

Applications

Applications

Applications of IMPs are extremely diverse and often include:

- Distribution warehouses
- Schools/Universities
- Aircraft hangars
- Hospitals
- Public works buildings
- Office buildings
- Manufacturing facilities
- Cold storage sites
- Maintenance buildings
- Car dealerships
- Sports complexes
- Churches
- Residential structures

Applications

Applications

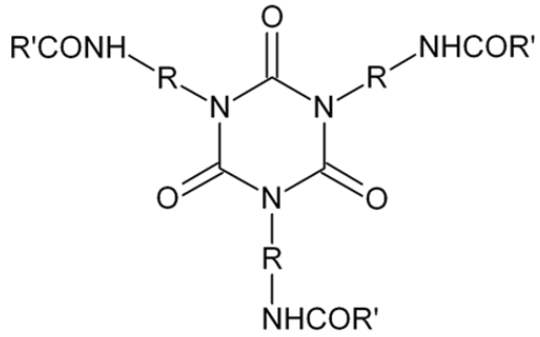
Applications

Applications

Components of Manufacturing

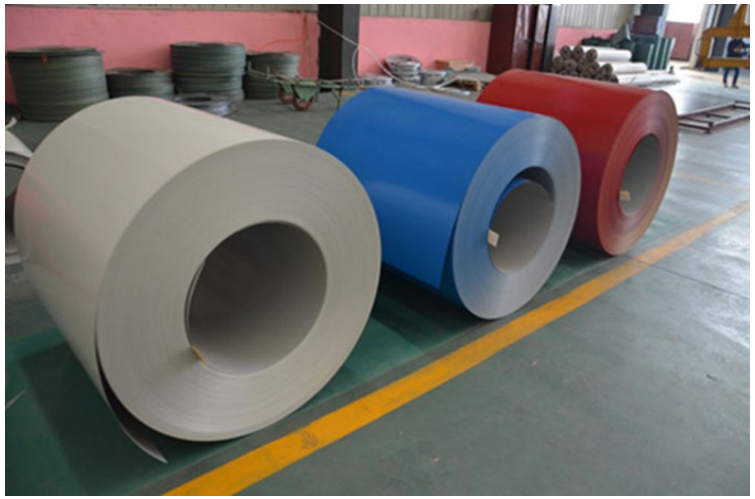
IMP Components – Foam Core

- Polyisocyanurate (PIR) or Polyurethane (PUR)
- Continuously foamed-in-place
- 90% closed cell structure
- Density - 2.2 lbs./cu.ft.
- Zero ozone depleting potential



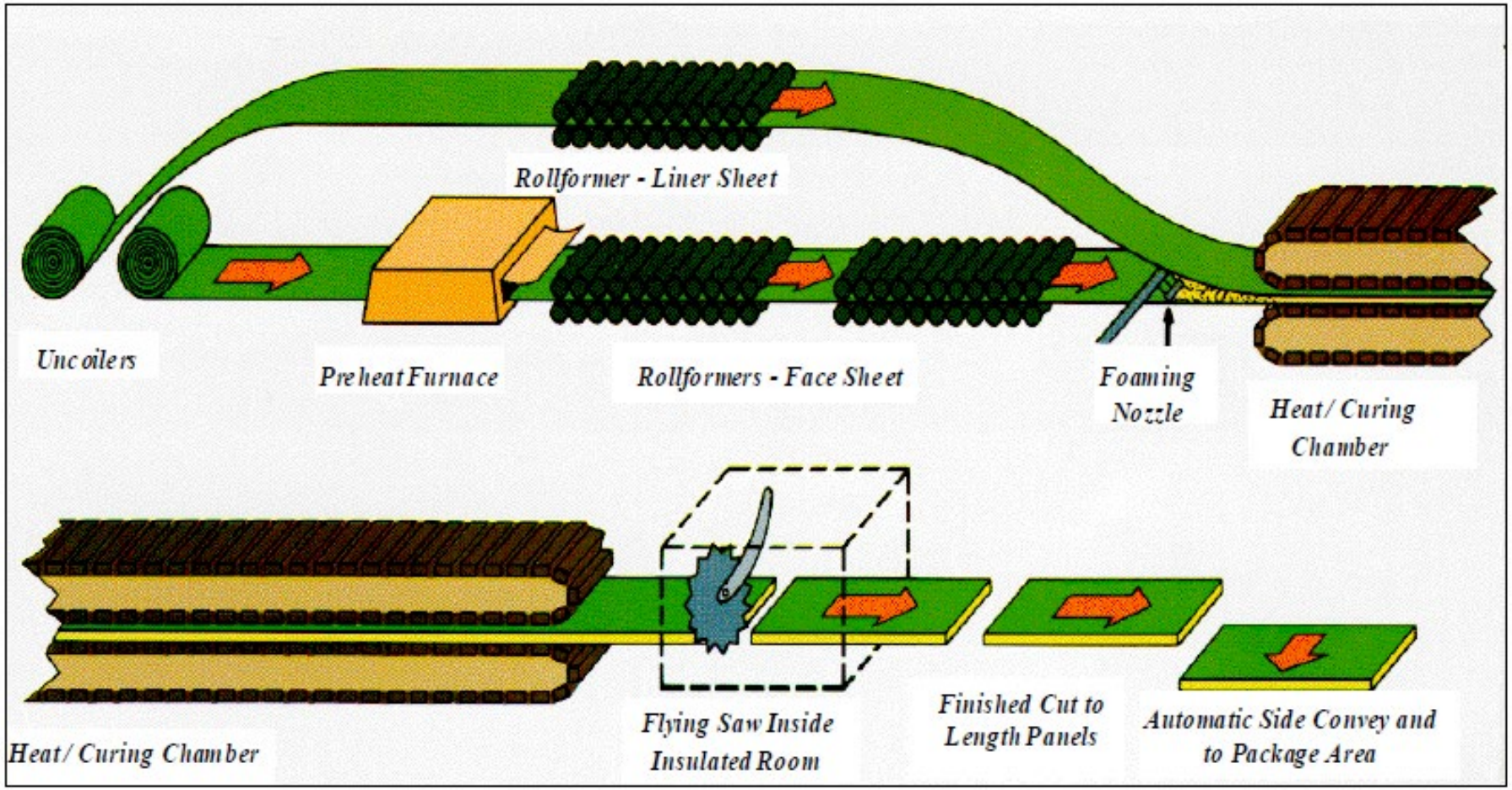
Isocyanurate structural element

IMP Components – Panel Skins



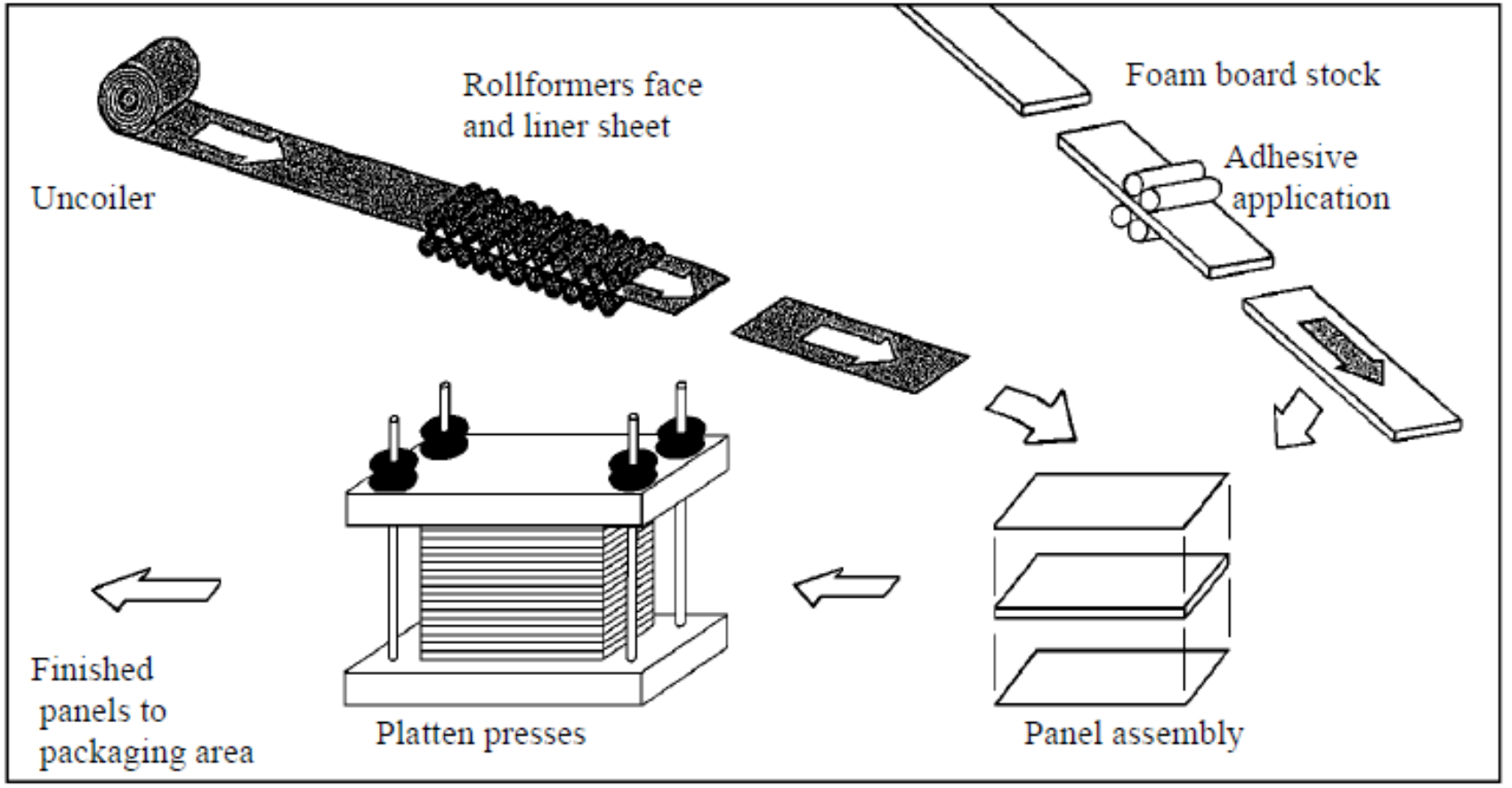
- Multiple profiles (striated, pleated, fluted, flat)
- Multiple textures (embossed, troweled embossed, non-embossed)
- 70% PVDF paint finish systems (two-coat, three-coat, metallics, specialty finishes)
- Galvalume®, G90 Steel or Stainless Steel
- High pre and post consumer recycled contents
- Highly recyclable skins

IMP Manufacturing Process



Continuously, foamed-in-place manufacturing process

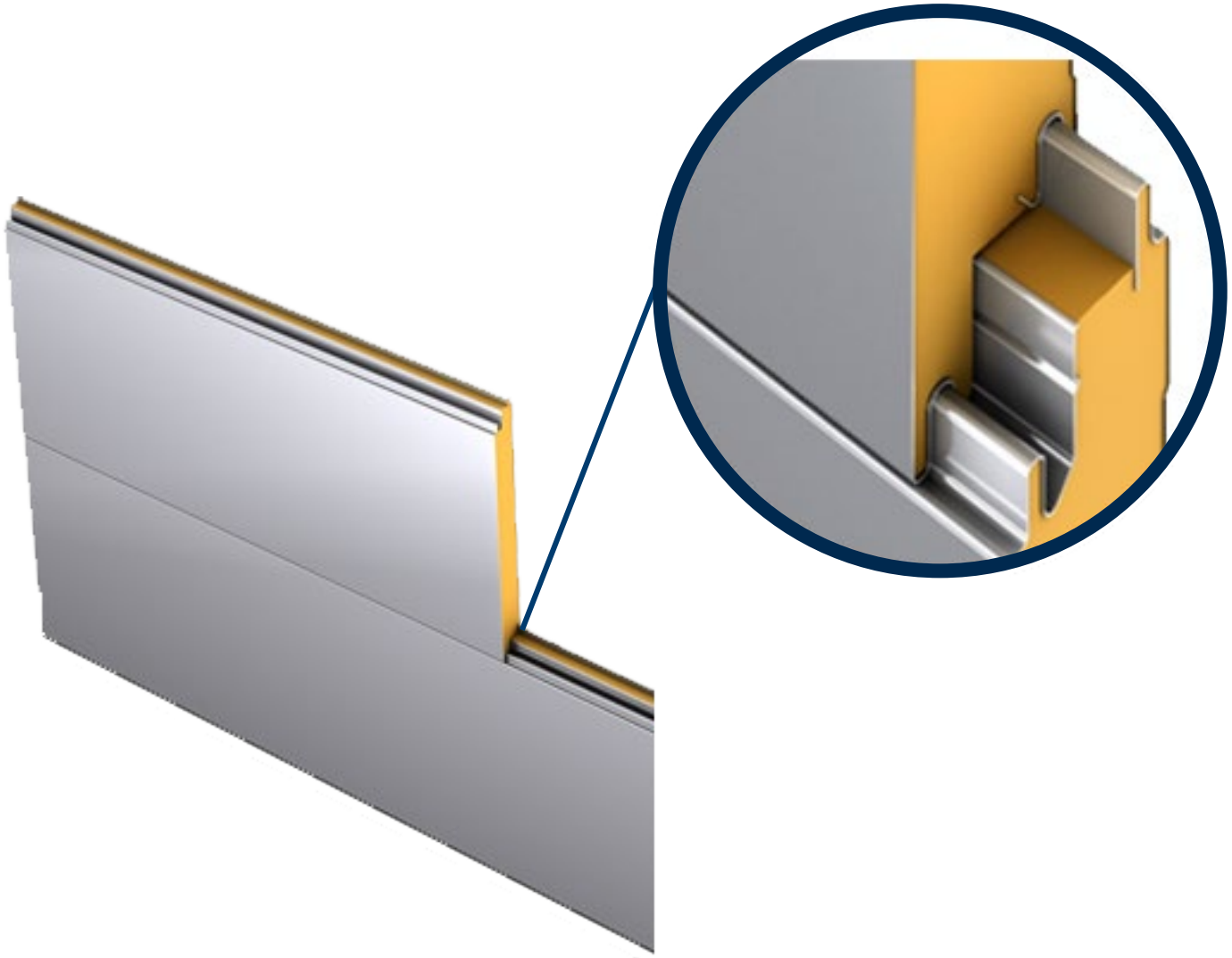
IMP Manufacturing Process



Laminated Line

IMPs Compared to Non-Metal External Systems

IMPs Compared To Non-Metal Exterior Systems



- Built-in thermal breaks
- Continuous insulation, high R-Values
- Connecting panel interlocks
- Applied sealant at interlocks creates air vapor barrier element
- Single element allowing for faster installs

IMPs Compared To Non-Metal Exterior Systems

- Can be disassembled, moved and reused
- Few field assembled components
- Can be installed in adverse weather conditions
- Includes vapor, air and water barriers
- Architecturally flexible
- Cost-effective

IMPs Compared To Non-Metal Exterior Systems

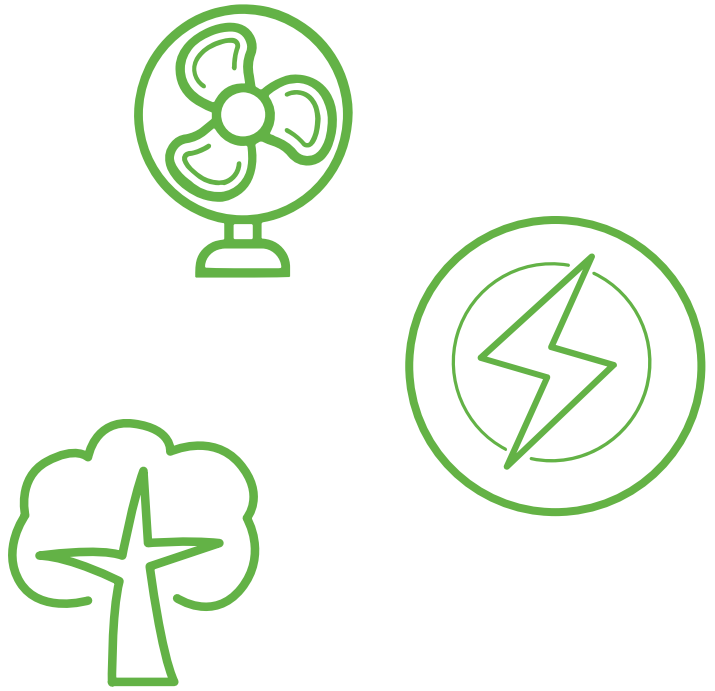
- Requires less maintenance than other exterior systems
- Will not crack or peel; significantly reduces the potential of water penetration
- Increased longevity, performance and weather integrity

IMP Performance

Why is Insulation Important

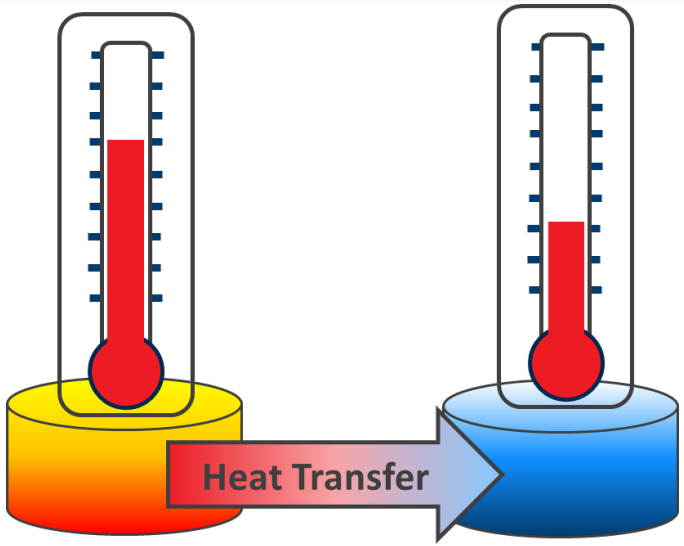
Well-insulated buildings:

- Reduce overall heating and cooling costs
- Cause less wear and tear on HVAC equipment
- Provide higher levels of indoor comfort
- Prevent air leakage and filtration
- Provide moisture control
- Help protect against fire



It pays to insulate!

It’s all about the R-Value



Insulation Type *	R Value/1 Inch
Extruded Polystyrene	5
Expanded Polystyrene	4
Mineral Fiber	3
Cellular Glass	3
Polyurethane	7
(Encapsulated)**	

*Source: Society of Plastics Industry
** Impermeable panel faces protect the foam from gas diffusion
And ensure virtually no loss of thermal performance over time

R-Value is a measure of the ability to resist heat flow through a material

- IMPs offer the highest R-Value per inch
- Provides continuous insulation that helps minimize the effects of thermal bridging
- Reduces the risk of condensation

The higher the R-Value, the better the insulator!

Continuous Insulation (CI)

CI is required by ASHRAE 90.1, the U.S. standard for all commercial and residential buildings.

Insulation that is continuous across all structural members without thermal bridges other than fasteners and service openings. It is installed on the interior, exterior, or is integral to any opaque surface of the building envelope.

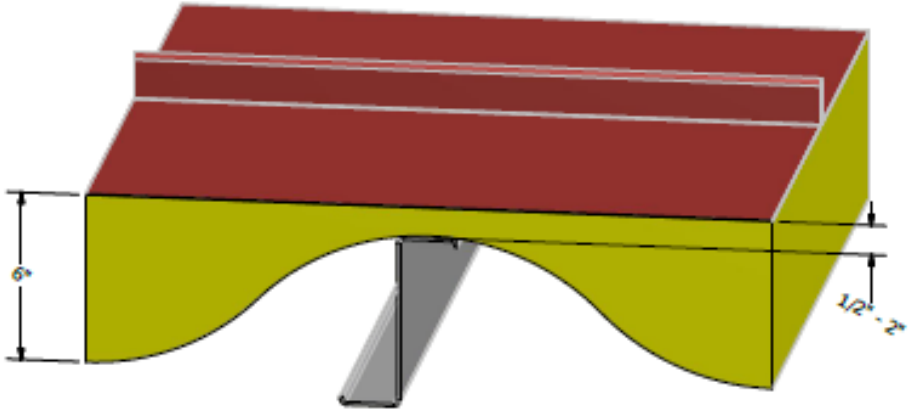
ASHRAE 90.1 ECB

Energy Cost Budget

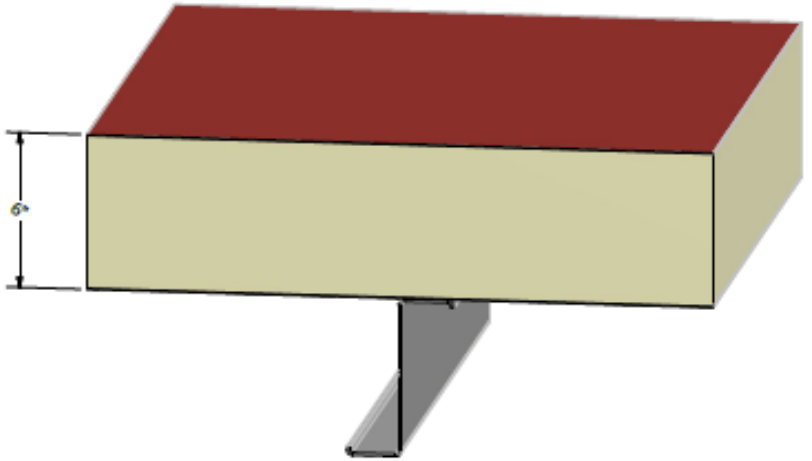
A tool for modeling compliance with ASHRAE Standard 90.1-2010

Continuous Insulation (CI)

- Increases energy efficiency
- Enhances thermal performance
- Minimizes the effects of thermal bridging
- Controls condensation
- Helps protect against air and moisture infiltration



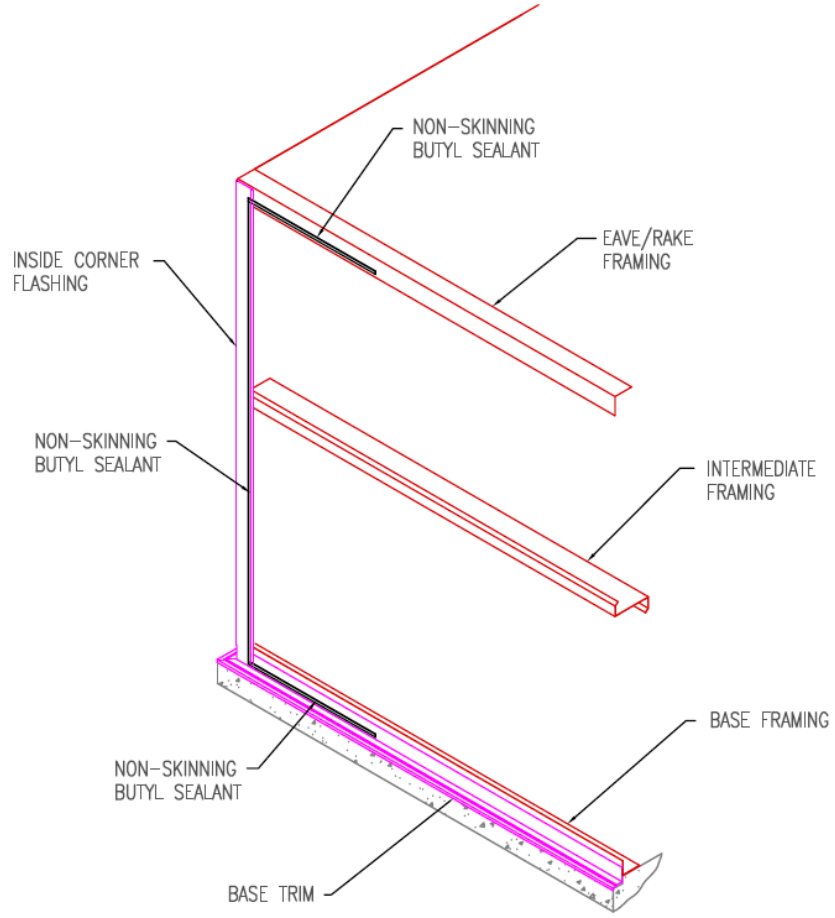
Non-Continuous



Continuous

Continuous Air Barrier

- Ensure air-tightness of the building envelope
- Should be continuous over the entire building
- Non-skinning butyl, gaskets and caulks used to achieve a properly sealed system



Continuous Air Barrier

- Use of non-skinning butyl sealant required to seal panel interlock
- Applied sealant at interlock creates vapor, air and water barriers
- Joint sealant can be factory or field applied
- Built-in thermal breaks

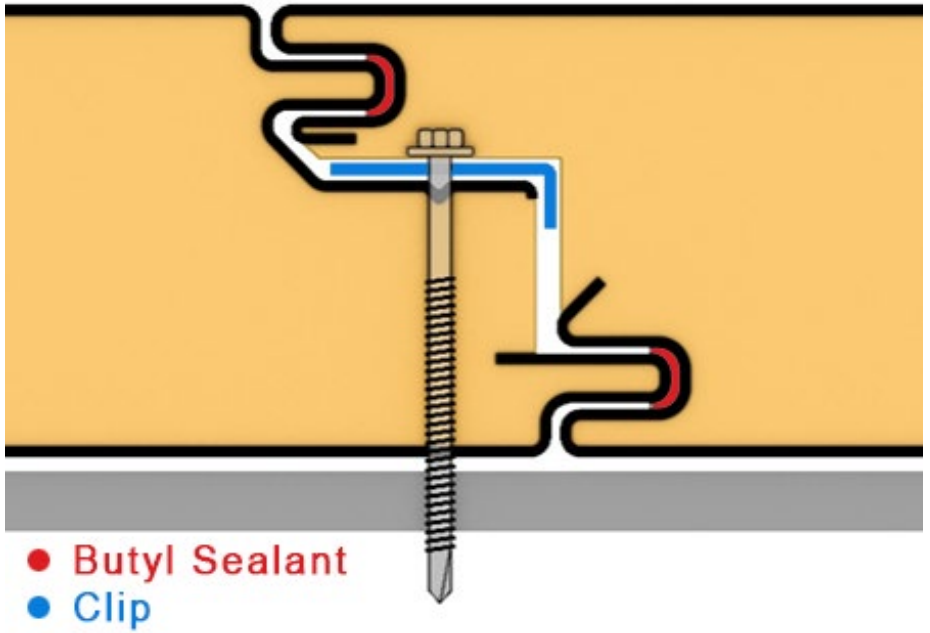


Image shows both panel interlocks sealed with non-skinning butyl

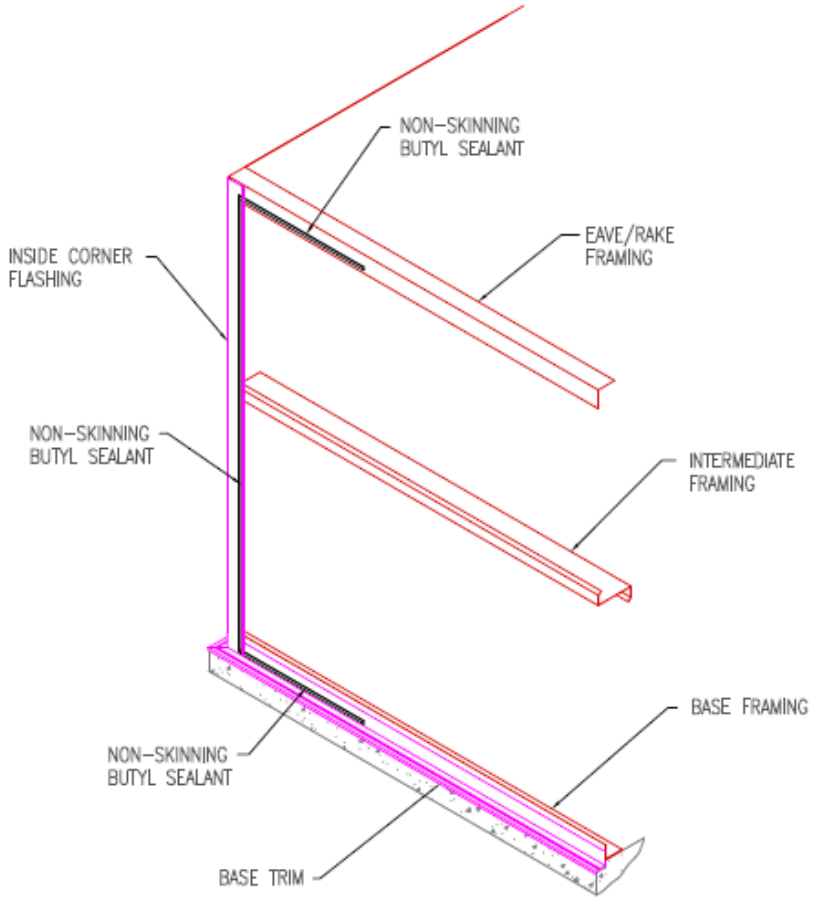
Performance Benefits of Insulated Metal Panels

- Highest installed R-Value per inch @ R7+
- Qualifies as continuous insulation where required by IECC and ASHRAE 90.1
- Creates continuous air barrier due to their sealed, single element design with few field assembled components
- Accelerated construction scheduling and installation
- Less spanning and secondary framing

Installation

Installation - Walls

- Left to right installation shown
- All panels level, starter panel critical
- Non-skinning butyl at all perimeter locations, panel interlock and pigtails
- Minimum of two fasteners per clip
- Calculated spanning capabilities
- Pancake head fasteners at edges/non-interlock locations
- Drill point hex head fasteners at panel clip locations



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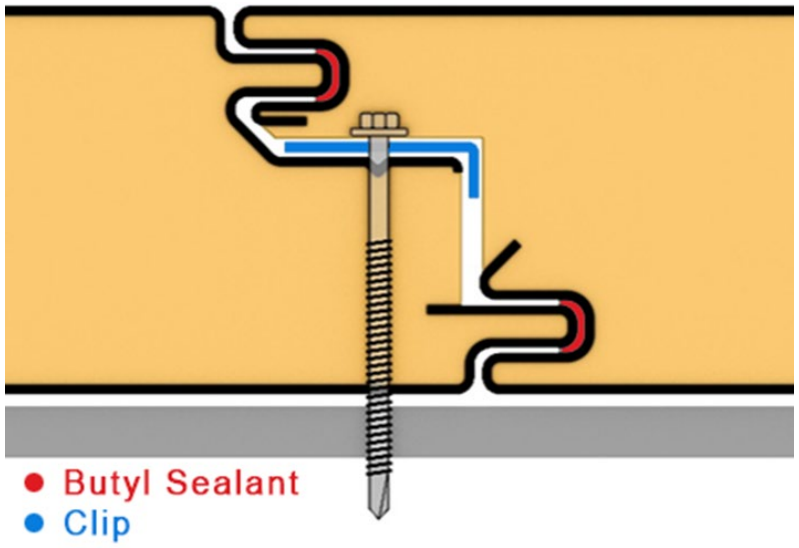
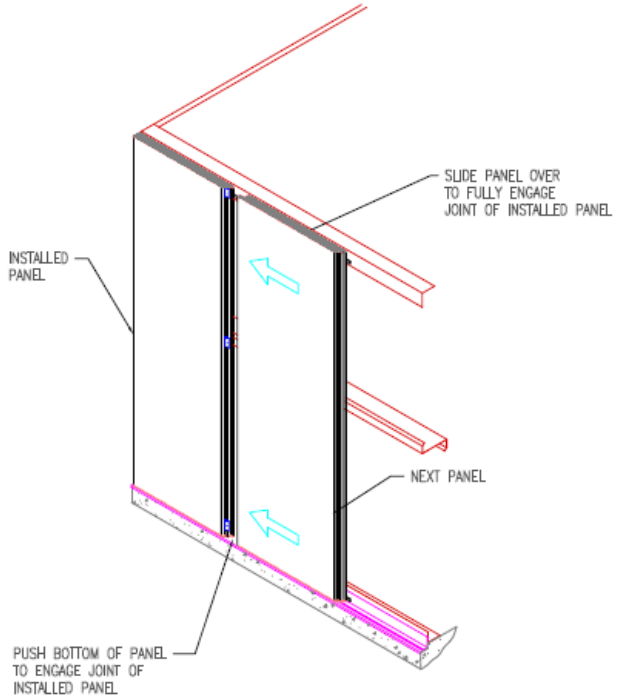
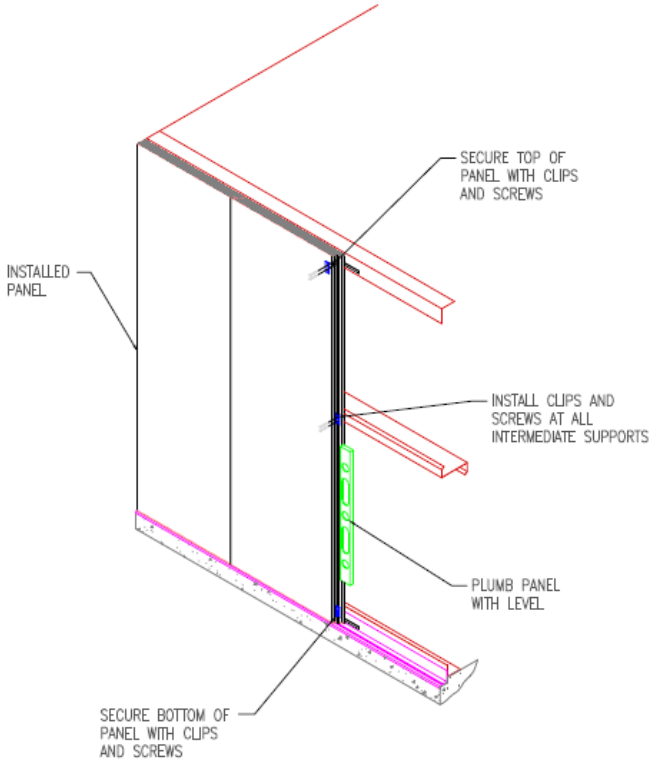


Installation - Walls

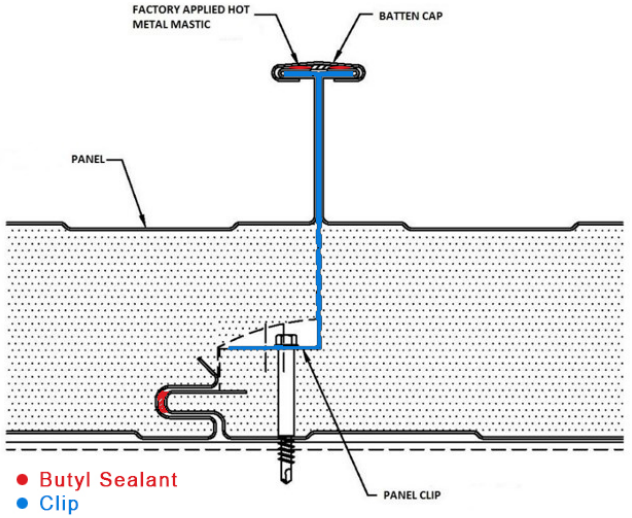
- Align and level all interlock locations
- Properly fit and fill all trim locations per shop drawings or details

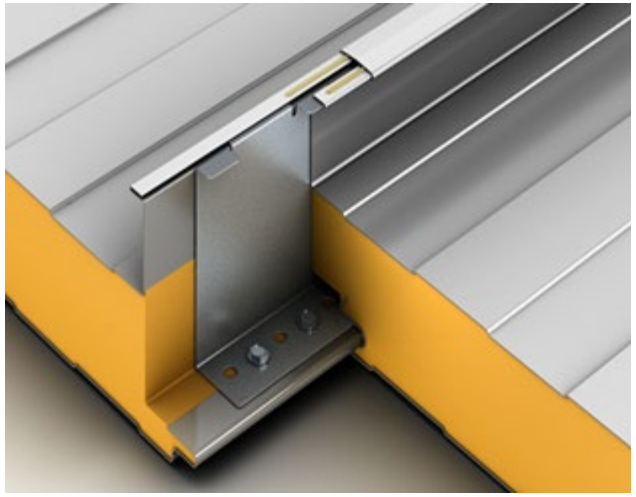




Installation - Roof

- Standing Seam – T-Design
- Raised panel clip supports/strengthens standing seam
- Separate batten cap helps ensure weather tightness
- Non-skinning butyl required at joint interlock
- Roof seamer crimps batten cap over standing seam
- Minimum Slope: ½:12



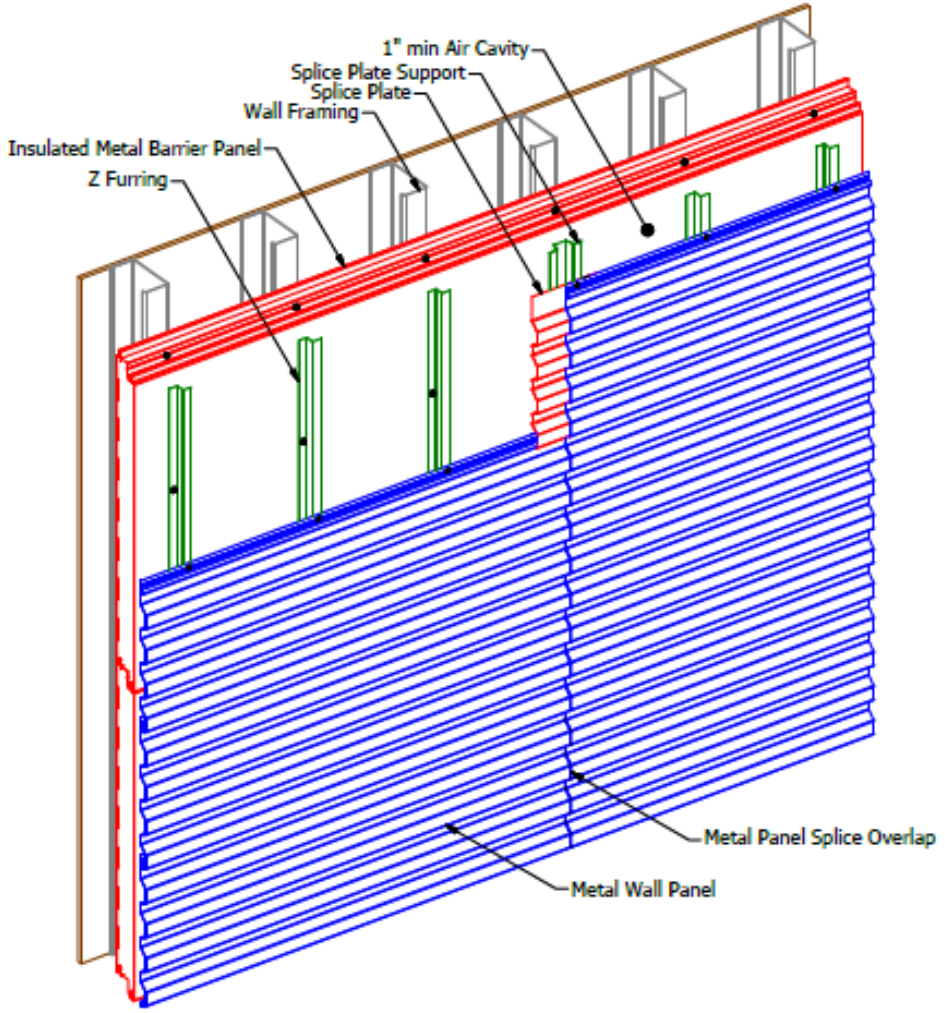


IMPs with Other Systems

IMPs as Barrier/Back-up Panel Systems

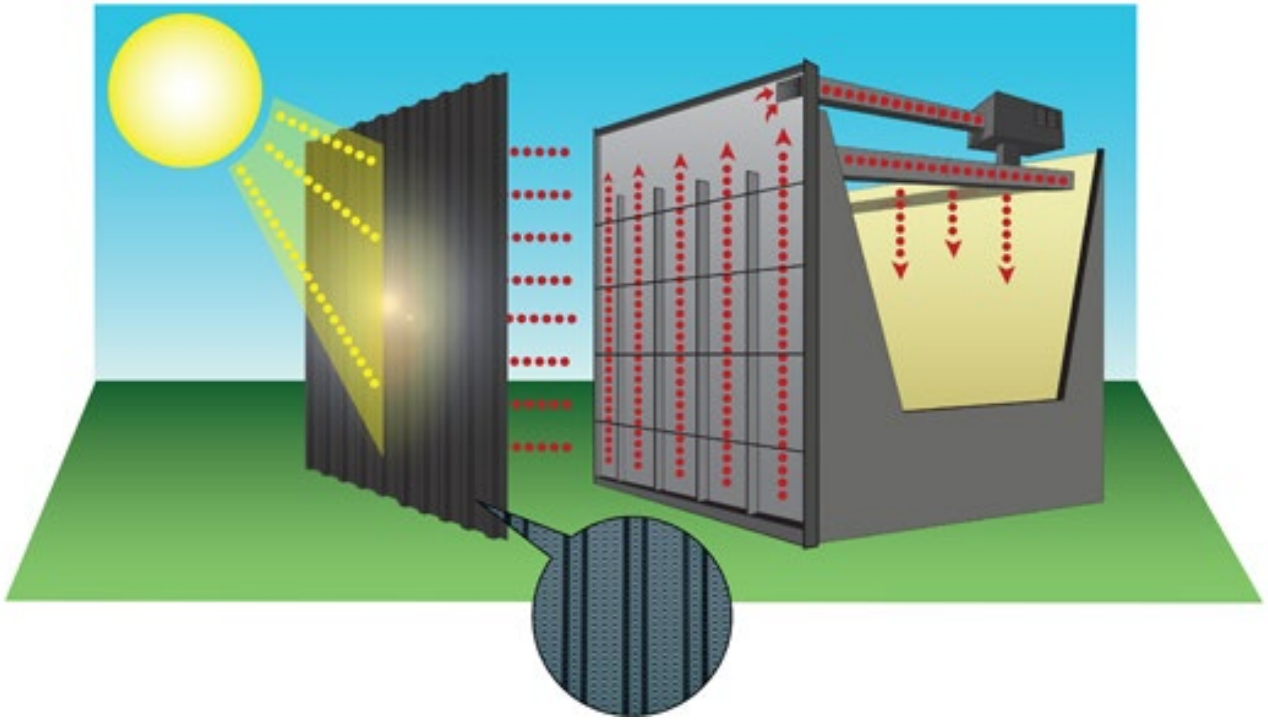
(Two-stage method of weatherproofing)

- Alternate to standard multi-component wall assemblies
- Provides air and vapor barrier, insulation and metal drain plane
- For use with exterior facade such as single skin metal or metal composite material panels
- Requires integrated furring channels, anchors or zees depending upon type of facade

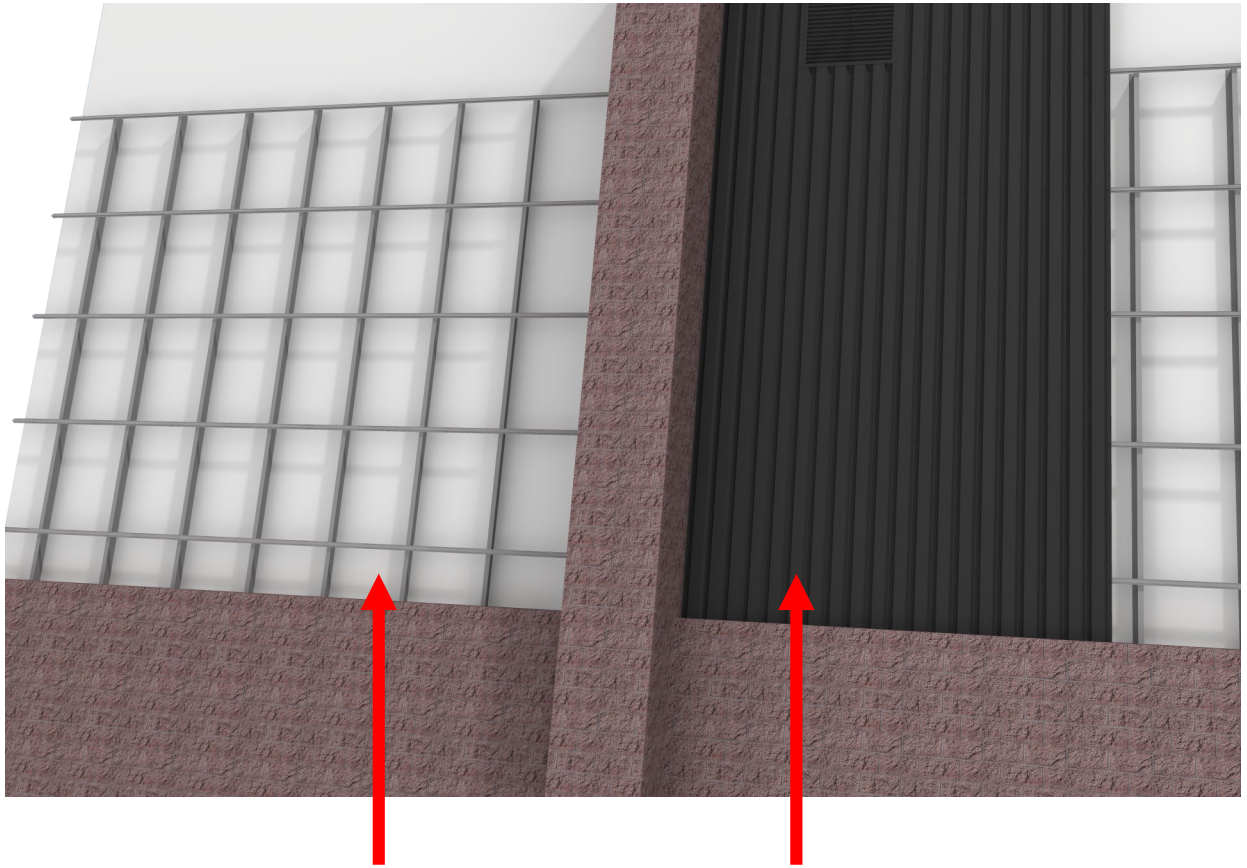


IMPs and Transpired Solar Collectors

- Provides enhanced system performance – increased thermal performance
- Reduces heating/cooling costs
- Includes vapor, air and water barriers
- Easily integrated
- Increases system ROI



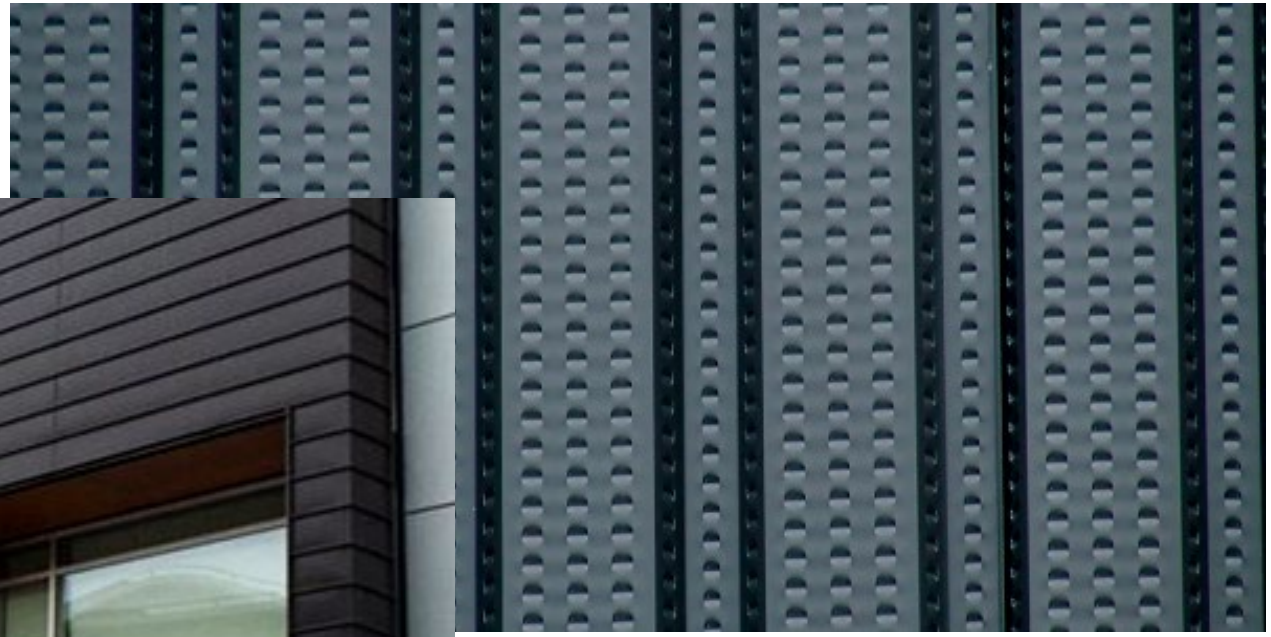
IMPs and Transpired Solar Collectors



Insulated Metal Panel

Transpired Solar Collector

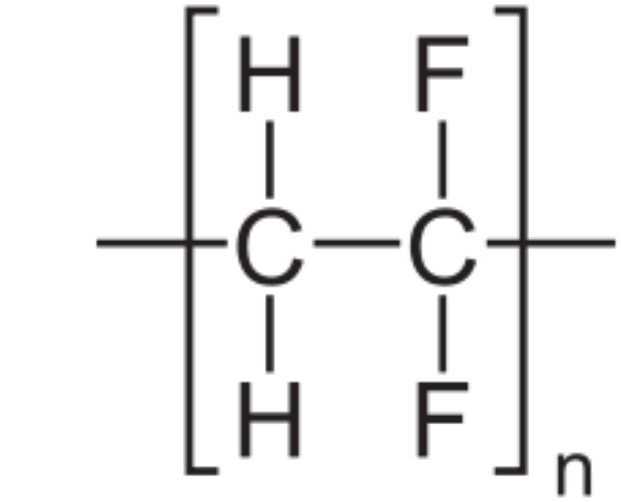
IMPs and Transpired Solar Collectors

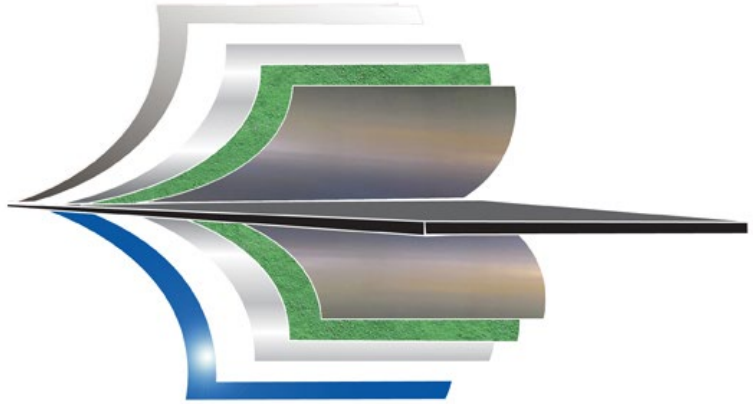


Factory Options

IMP Finishes and Coatings

- 70% PVDF (Polyvinylidene Fluoride) paint finishes
- Siliconized polyester paint finishes
- Polyester paint finishes
- Natural finishes like stainless steel
- Multiple color options including metallic, premium colors and custom colors
- Variety of coating options to meet specific project applications and environmental considerations





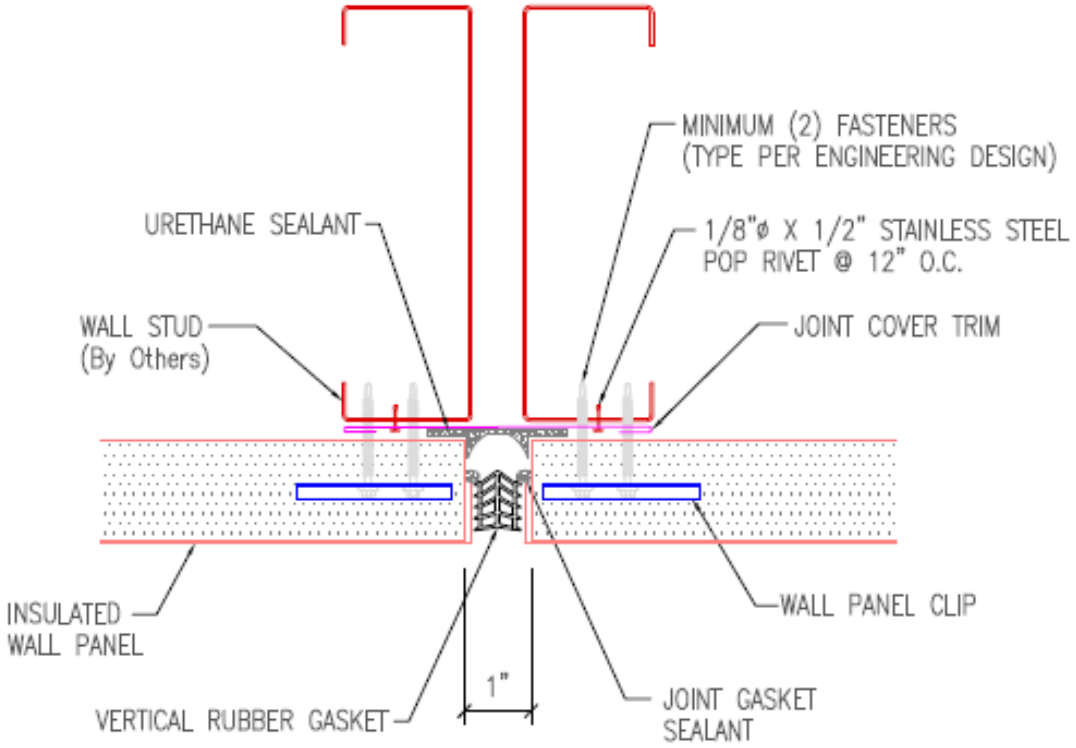
IMP Factory Options

- Factory formed corners
- Trimless ends
- Integrated systems: louvers, sunshades, windows and facades
- Panel reveals
- Gasketed systems
- Factory applied butyl joint sealant

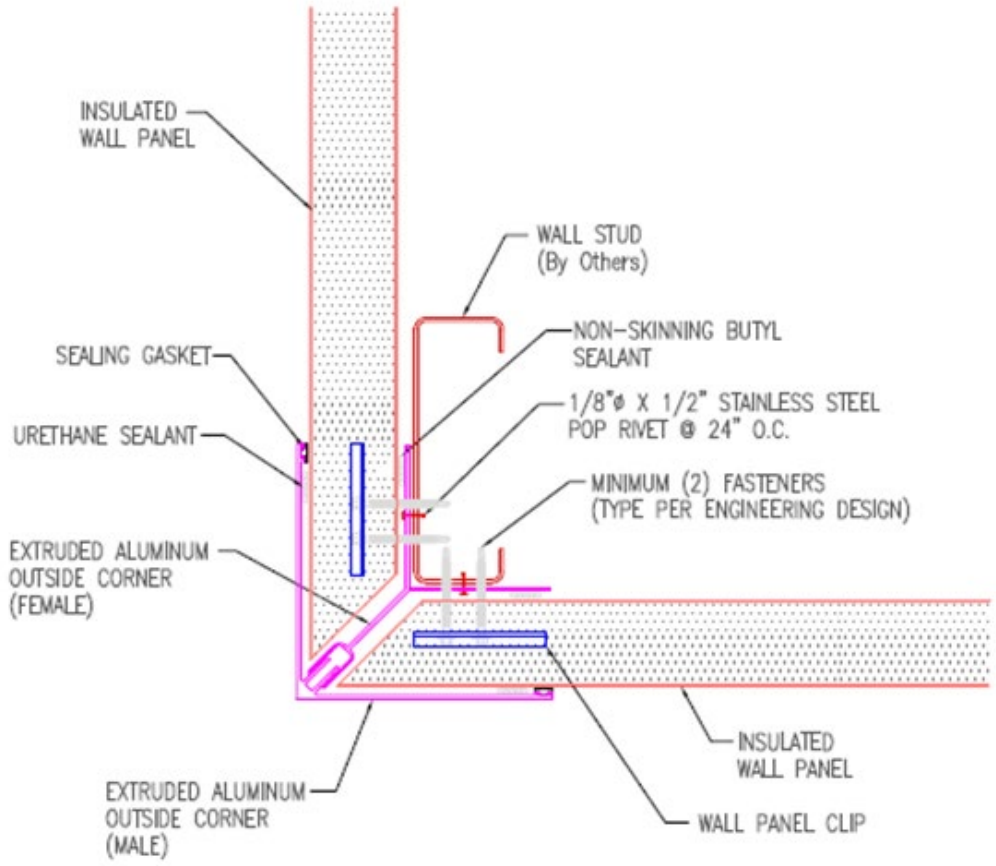
IMP Factory Options

Trimless Ends

- Factory formed option
- Architectural vertical joint applications
- Enhanced, uninterrupted appearance
- Vertical gutter drainage plane



IMP Factory Options



Aluminum Extrusion

- Variety of extrusion details available
- Post-painting options
- Enhanced aesthetics

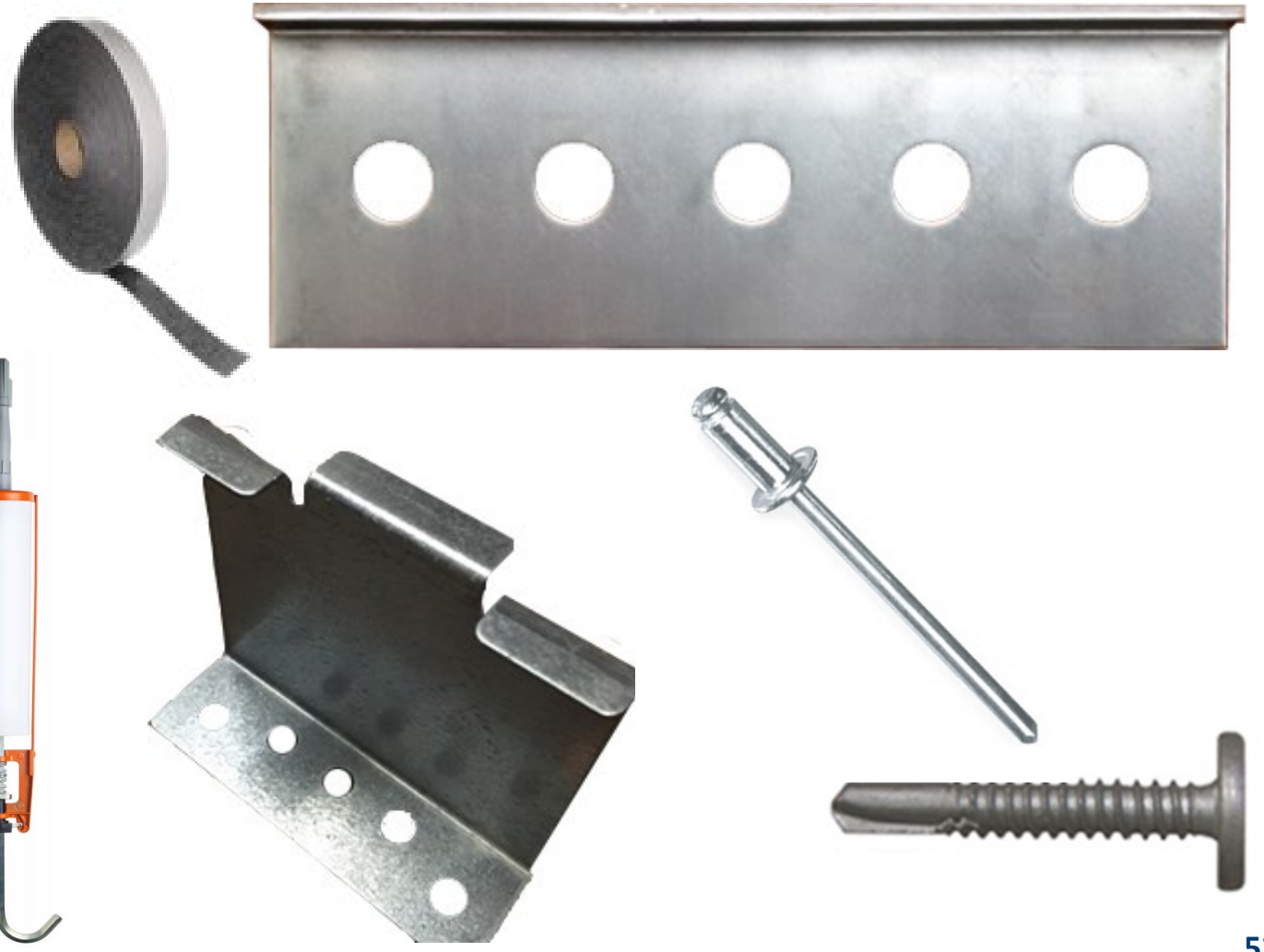
IMP Factory Options

Sheet Metal Trims

- Custom colors
- Custom trims
- Premium metallics
- Variety of gauges
- Smooth or Embossed

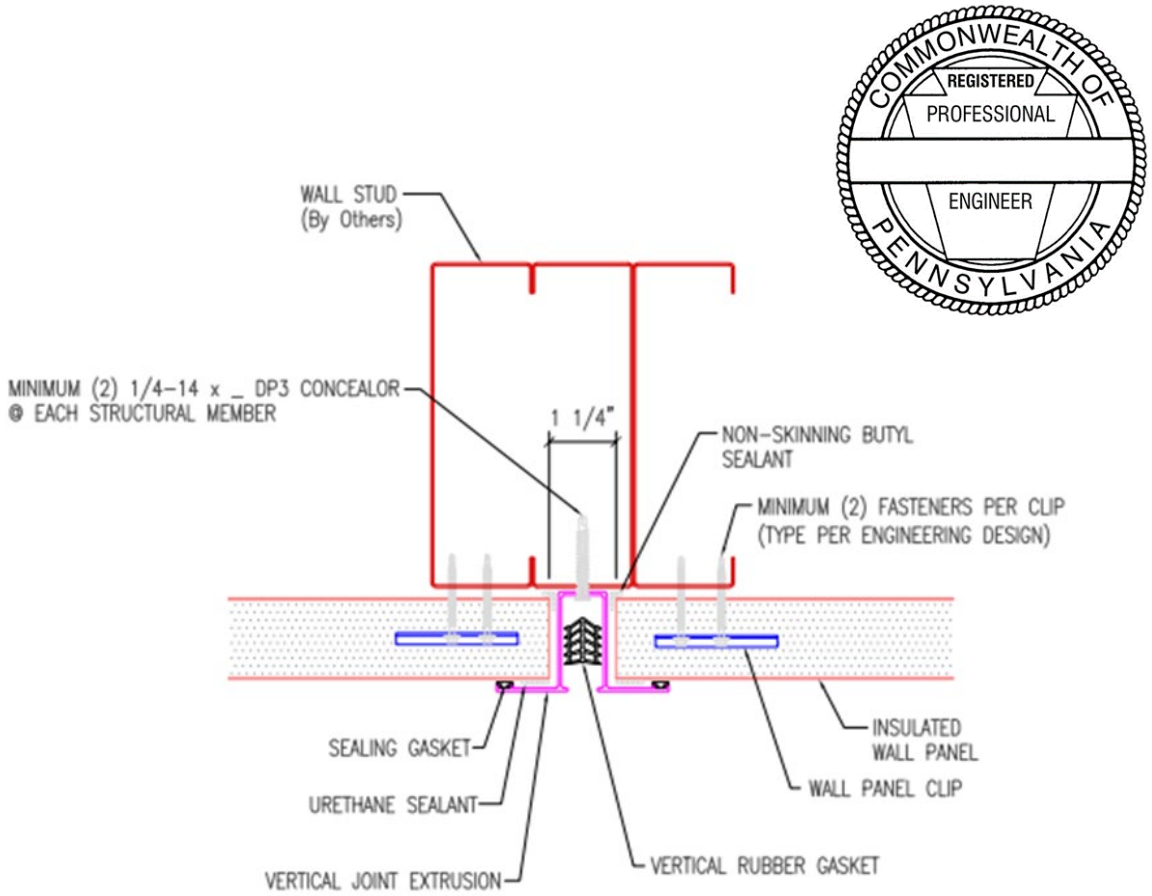
IMP Accessories

- Panel clips
- Non-skinning butyl tubes
- Non-skinning butyl tape
- Urethane sealant
- Fasteners
- Pop rivets
- Joint gasket
- Angles
- Channels



IMP Drafting and Engineering

- Shop drawings with panel layout and details
- Job specific engineering
- Architectural design support
- Technical bulletins



IMP Performance and Summary

IMP Testing Requirements

- Thermal performance
- Fire
- Structural
- Foam core properties
- Water penetration and air pressure differential

Foam Core Properties

IMPs foam properties play a key role in the overall performance of the building envelope. As a single component wall assembly the following properties must be taken into consideration:

- Density
- Shear strength
- Tensile strength
- Compressive strength
- Humidity aging
- Heat and cold aging
- Flash and ignition properties

Key Performance Summary

Feature	Function	Benefit
• Single manufactured unit	• Quick erection • Minimizes erector impact on product quality	• Labor cost savings • Shorter project schedule
• Insulated core	• Provides good insulation and efficiency • Structural core	• Energy cost savings • Long span and high load performance

Key Performance Summary - Continued

Feature	Function	Benefit
• Metal skins	• Provides moisture resistance • Offer design flexibility via color/coating options	• Weather integrity • Vapor barrier • Design options and durability • Warranted finish
• Lightweight	• Easy to handle • Lower dead loads • Lighter foundations	• Minimize labor • Material savings

Key Performance Summary - Continued

Feature	Function	Benefit
• Concealed attachment	• Fasteners protected from the elements	• Increased longevity • Improved aesthetics
• Specific joinery	• Allows use of the product in horizontal and/or vertical positions	• Improved weather integrity • Design flexibility/joint size and orientation
• Thermally broken side joinery	• Minimizes thermal through conductivity • Minimizes cold spots	• Lower energy costs

IMPs and Green Building

U.S. Green Building Council (USGBC)

- USGBC is making cost-efficient, energy-saving green buildings a reality across the country

- LEED certified buildings save money and resources and have a positive impact on the health of occupants, while promoting renewable, clean energy

LEED Credit Categories: LEEDv4

Point-based system within each of the credit categories. LEED credit requirements cover the performance of materials collectively, not the performance of individual products.

Categories:

- Integrative Process
- Location & Transportation (LT)
- Materials & Resources (MR)
- Water Efficiency (WE)
- Energy & Atmosphere (EA)
- Sustainable Sites (SS)
- Indoor Environment Quality (EQ)
- Innovation (IN)
- Regional Priority (RP)

LEED Credits for IMPs: LEEDv4

Insulated Metal Panels may help contribute to a building's project requirements of earning LEED credits in the following categories:

- Integrative Process
- Sustainable Sites (SS)
- Energy & Atmosphere (EA)
- Materials & Resources (MR)
- Indoor Environmental Quality (EQ)
- Innovation (IN)
- Regional Priority (RP)

LEEDv4 Potential Contributors

Integrated Process

- (1 point)

Heat Island Reduction – Option 1

- Nonroof and Roof (2 points except Healthcare, 1 point Healthcare)

Minimum Energy Performance Prerequisite – Option 1

- Whole Building Energy Performance

Enhanced Commissioning – Option 2

- Envelope Commissioning (2 Points)

Optimized Energy Performance – Option 1

- Whole Building Energy Simulation (1-18 points, except Schools and Healthcare, 1-16 points Schools, 1-20 points Healthcare)

LEEDv4 Potential Contributors

Building Life-Cycle Impact Reduction

- Option 1 - Historic Building Reuse (5 points)
- Option 2 - Renovation of Abandoned or Blighted Building (5 points)
- Option 3 - Building and Material Reuse (2-4 points)
- Option 4 - Whole Building Life Cycle Assessment (3 points)

Building Product Disclosure and Optimization – Environmental Product Declarations - Option 1

- Environmental product declaration (EPD) (1 point)

Building Product Disclosure and Optimization – Sourcing of Raw Materials - Option 1

- Raw Material Source and Extraction Reporting (1 point)

LEEDv4 Potential Contributors

Building Product Disclosure and Optimization – Materials Ingredients - Option 1

- Material Ingredient Reporting (1 point)

Construction and Demolition Waste Management – Possible 3 points - Option 1

- Diversion (1-2 points)

Low Emitting Materials – Possible 3 points - Option 1

- Product Category Calculations

Innovation –

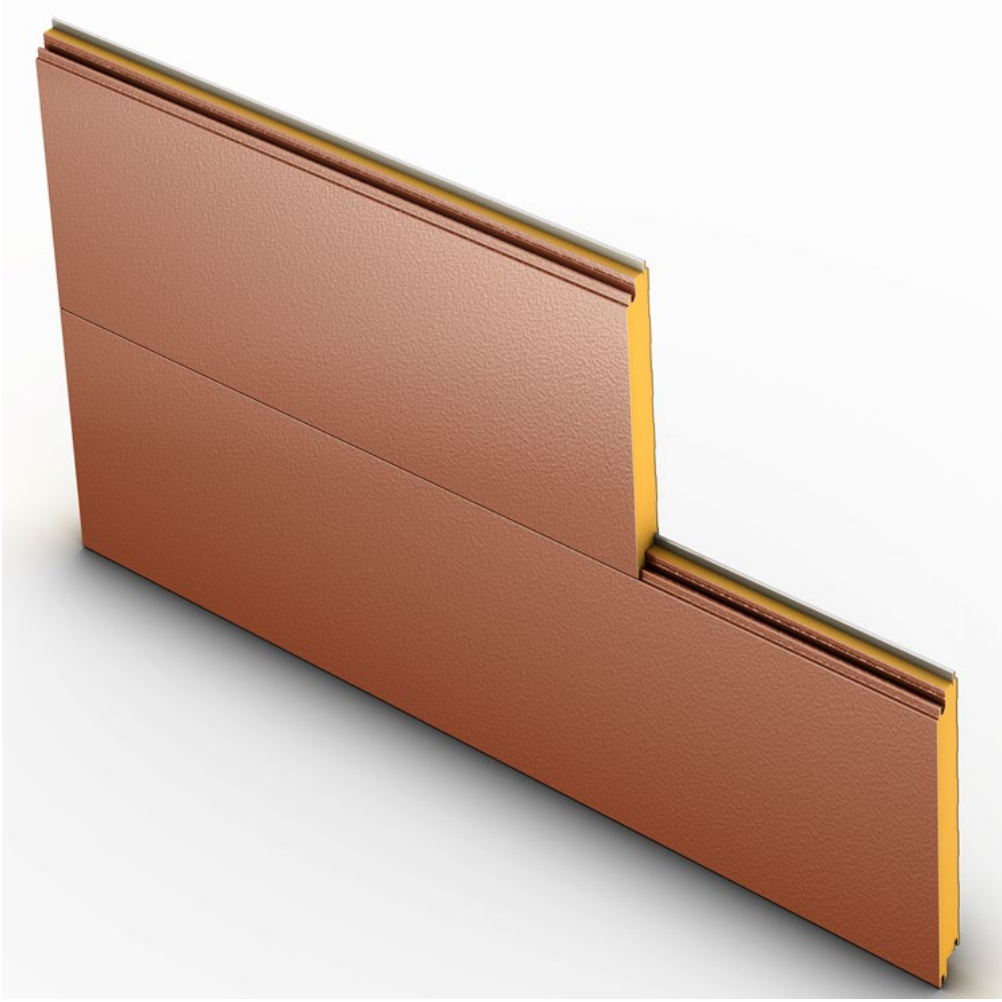
- Possible 5 points

Regional Priority –

- Possible 4 points

Insulated Metal Panel Review

- Exceptional insulating properties
- Superior spanning capability
- Accelerated installation time
- Cost-effective
- Architectural flexibility
- Can be installed in adverse weather conditions
- Single component with few field assembled components



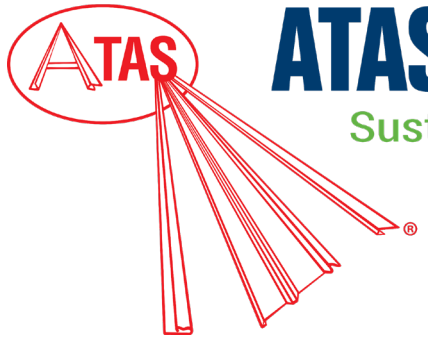
Insulated Metal Panel Walls

Insulated Metal Panel Roofs

Thank You For Your Time!

Questions?

This concludes the AIA/CES presentation.



ATAS International, Inc.

Sustainable Building Envelope Technology

Web | www.atas.com Phone | 800.468.1441

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- Submittal Builder
- CAD Details
- BIM Models
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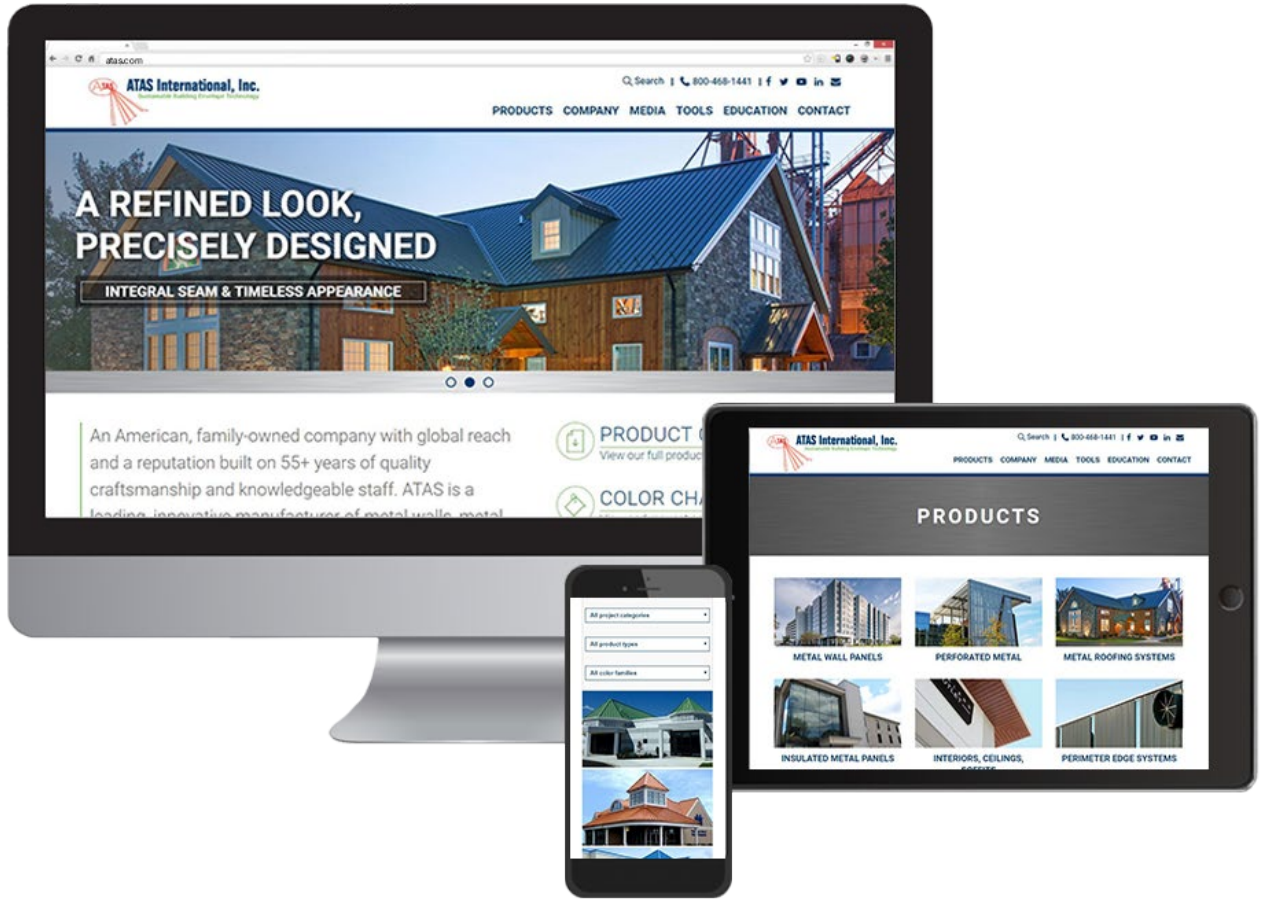
- “Did You Know”?



This highlights only some of what ATAS offers online!

METAL WALL PANELS

PERFORATED METAL

METAL ROOFING SYSTEMS

INSULATED METAL PANELS

INTERIORS, CEILINGS, SOFFITS

PERIMETER EDGE SYSTEMS

ARCHITECTURAL ACCENTS

ACCESSORIES

SECONDARY FRAMING COMPONENTS

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- Wall Panels
- Roof Panels
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- Curved Panels
- Column Covers
- Perimeter Edge Systems/ Water Control
- Rainware/Gutters
- Insulated Metal Panels
- Metal Composite Materials
- Accessories