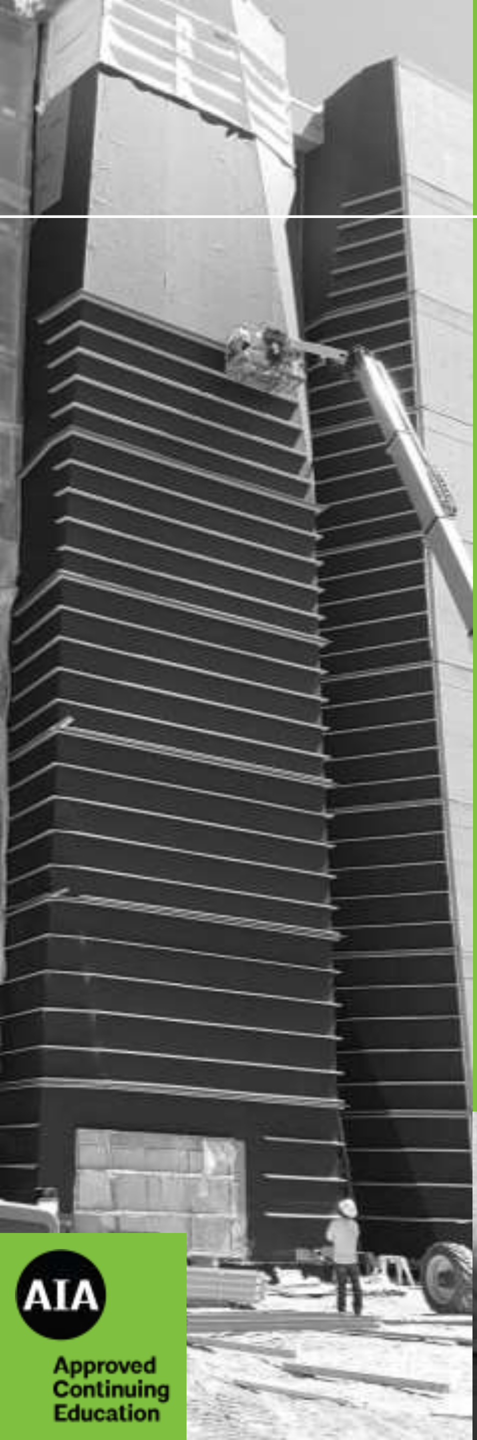

a2p ADVANCED ARCHITECTURAL PRODUCTS

GreenGirt® SMARTci™

Continuous Insulation Systems
With

Structural Composite Metal Hybrid (CMH) Sub-Framing

& How it Benefits Building Envelope Design

AIA HSW CES Presentation
Course: A2P201

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NFPA® Red List Free Declare. EPD VERIFIED MADE IN USA

A2P™ | ADVANCED ARCHITECTURAL PRODUCTS

SMARTci™
SMARTER BY DESIGN. PROVEN BY PERFORMANCE.

GreenGirt®
COMPOSITE METAL HYBRID

GreenGirt Delta™

Who We Are:

A2P and SMARTci provides best practice building envelope and structurally engineered continuous insulation solutions.

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What We Do:

1. Provide CI products and systems designed for the lifetime of your building.

- EVERY project receives a structural and application review by an engineer with **Finite Element Analysis (FEA),** ensuring proper use and real-world application of **SMARTci continuous insulation (CI) systems with composite metal hybrid (CMH) sub-framing**.
- Designed and tested for the eight CI systems **best practices.**

2. Offer the highest energy efficient family of CI products following best practices.

- A2P offers a family of universal CI systems and CMH products with the highest energy efficiency in the market.

3. We are net zero manufacturing.

- A2P manufactures sustainable CI systems and CMH products with net-zero carbon emissions, made with biopolymers and is certified Red List Free.
- Generate solar power, geological and carbon sequestering, and terrestrial sequestering

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Course Description:

This course will introduce the learner to the latest standards, requirements, benefits, and approaches of **continuous insulation (CI)** systems and composite metal hybrid (CMH) sub-framing. The learner will review how CI systems with CMH sub-framing can benefit the performance and resiliency of building envelope construction while contributing to the health, safety, and welfare of project participants.

Advanced Architectural Products
959 Industrial Drive
Allegan, MI 49010
(269) 355-1818

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Learning Objectives:

1. Participants will be able to relay how **continuous insulation (CI) systems with structural composite metal hybrid (CMH) sub-framing** benefits modern building envelope design and construction.
2. Participants will be able to recognize the eight-industry preferred best practice solutions for continuous insulation systems.
3. Participants will be able to identify various CI sub-framing materials and how each impacts the building envelope system.
4. Participants will be able to identify how CMH sub-framing benefits the performance and resiliency of building envelope construction while contributing to project participants' health, safety, and welfare.

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Building Envelope:

Approaches to wall design, materials, and systems may differ, but all envelopes essentially work to achieve one primary goal: to separate the interior and exterior environment of a building assembly. A building envelope must manage four basic things; heat, weather, structure, and fire.

The selection and design of systems and materials will determine how the wall functions and performs.

A well-designed envelope can help eliminate the potential for failure and greatly increase the performance of the building.

- Envelopes manage heat, weather, structural strength, and fire with the use of systems and control layers that are either environmental separators or moderators:

- Continuous Insulation (CI) System
- Air Barrier
- Weather Resistant Barrier
- Cladding

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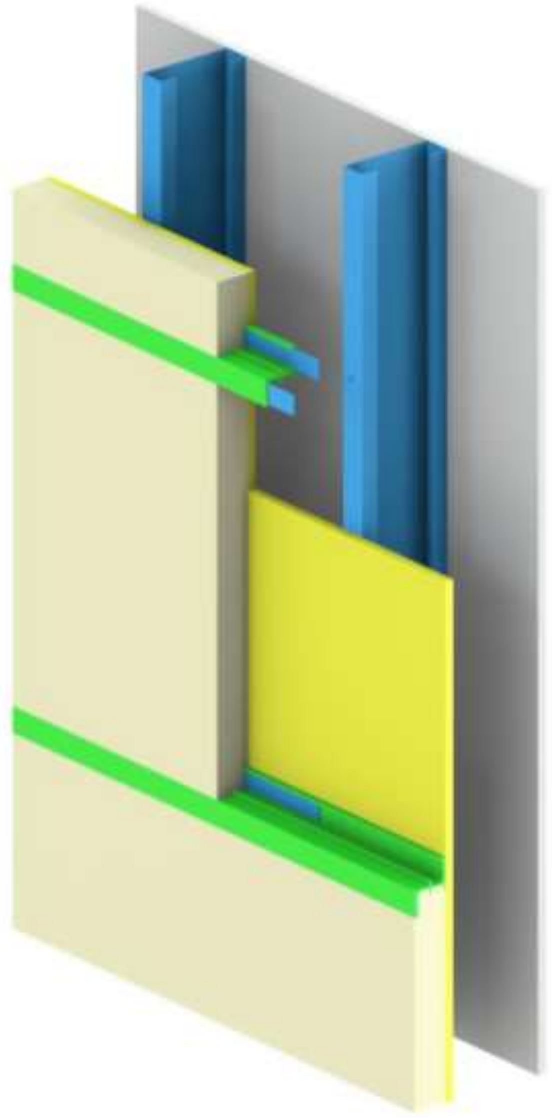

Continuous Insulation

Defined by ASHRAE 90.1:

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

Even though code allows fasteners, you should design to eliminate as much thermal bridging as possible.

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What is a Continuous Insulation System?

An insulation system installed outboard of the stud cavity, uninterrupted by conductive materials, drastically improves the efficiency of an envelope while also reducing the potential for failure.

CI systems moderate heat transfer, moisture control, and the overall performance of a building envelope.

CI Systems main components:

- Insulation Material
- Sub-Framing
- Weather-Resistive Barrier (WRB)

  Accessories

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Does your CI girt meet *best practice* goals?

Not all CI girts meet all
8-Best Practice goals.

1. Structural Integrity
- *For universal applications*

2. Fastener Retention
- *Pullout and torque retention*

3. Thermal Efficiency
- *Eliminates thermal bridging*

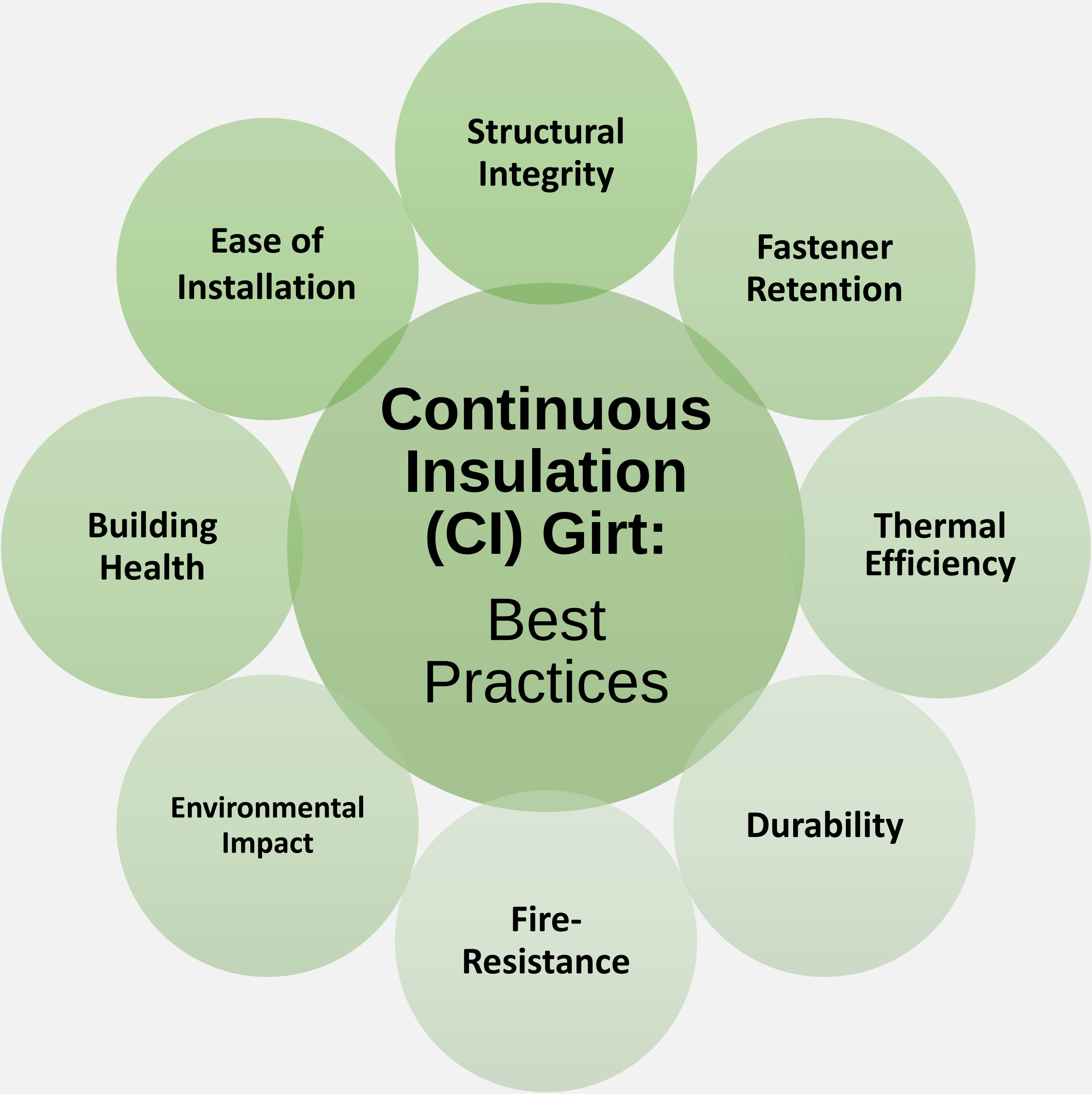
4. Durability
- *Designed for the life of the building*

5. Fire-Resistance
- *NFPA 285 compliant*

6. Environmental Impact
- *Declare Label, Red List Free, EPD*

7. Building Health
- *Proper moisture control and management*

8. Ease of Installation
- *Quick installation with fewer parts*



Types of Insulation:

Different types of insulation can be used in the continuous insulation layer, including:

- **Rigid Board** (Polyiso, XPS)
- **Mineral Wool**
- **Spray Foam**

Each will perform differently and have different characteristics. It is important to select an insulation that meets code and performance requirements.

Some CI systems only work with specific insulation types.

The actual effectiveness of the insulation will be impacted by the CI system components including sub-framing and attachment; **Effective vs. Nominal R-value**.

Question:
What type of insulation do you like to design with?

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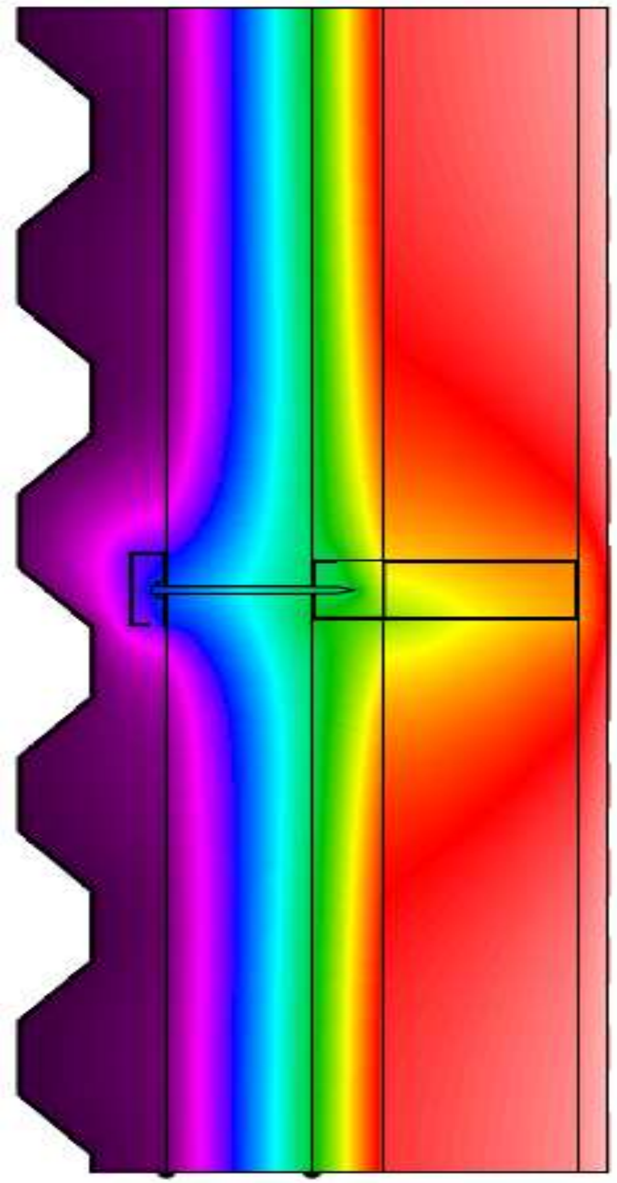

Thermal Bridge

Defined by ASHRAE 90.1:

A **thermal bridge**, also called a *cold bridge*, is a fundamental method of heat transfer where a penetration of the insulation layer by a highly conductive or non-insulation material takes place in the separation between the interior (or conditioned space) and exterior environments of a building assembly (also known as the building enclosure, building envelope, or thermal envelope).

Thermal bridges render nearby insulation ineffective.

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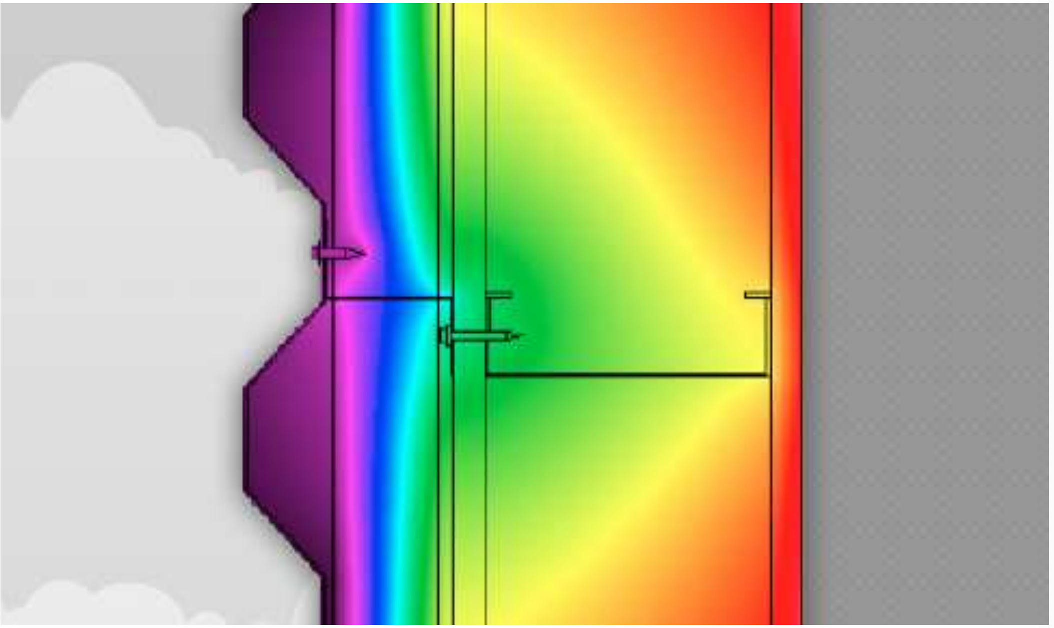
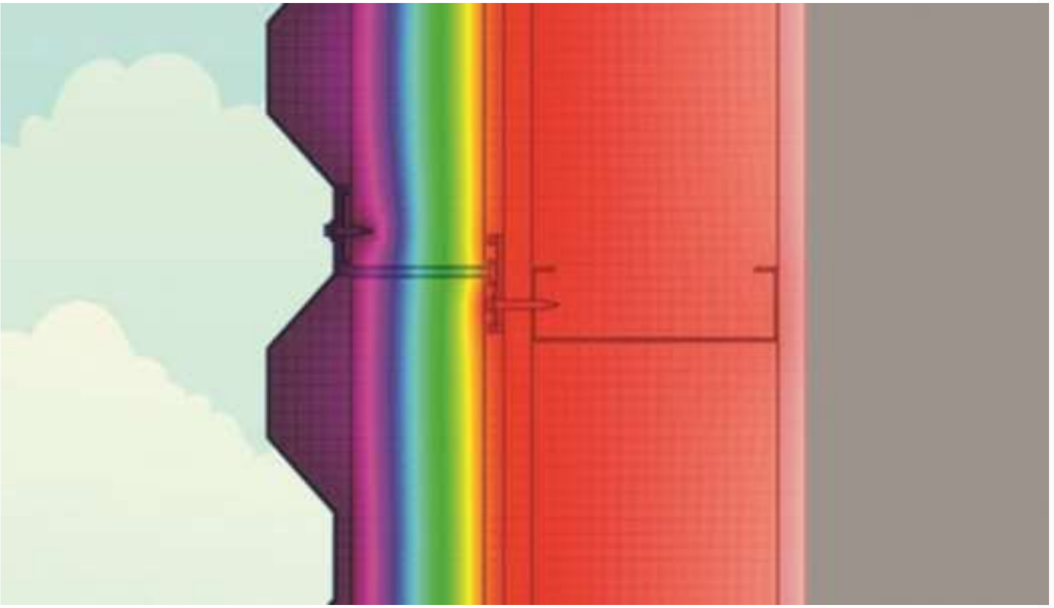
Thermal Bridge



No Thermal Bridge



Thermal Bridges:

Continuous insulation (CI) systems increase the overall efficiency of opaque wall assemblies by cutting off areas of thermal transfer.

A best practice CI system can also help stop potential issues by moderating issues related to thermal bridges such as moisture control.

WUFI (Wärme-und Feuchtetransport instationär) modeling can be used to provide assembly conditions for condensation control of CI systems.

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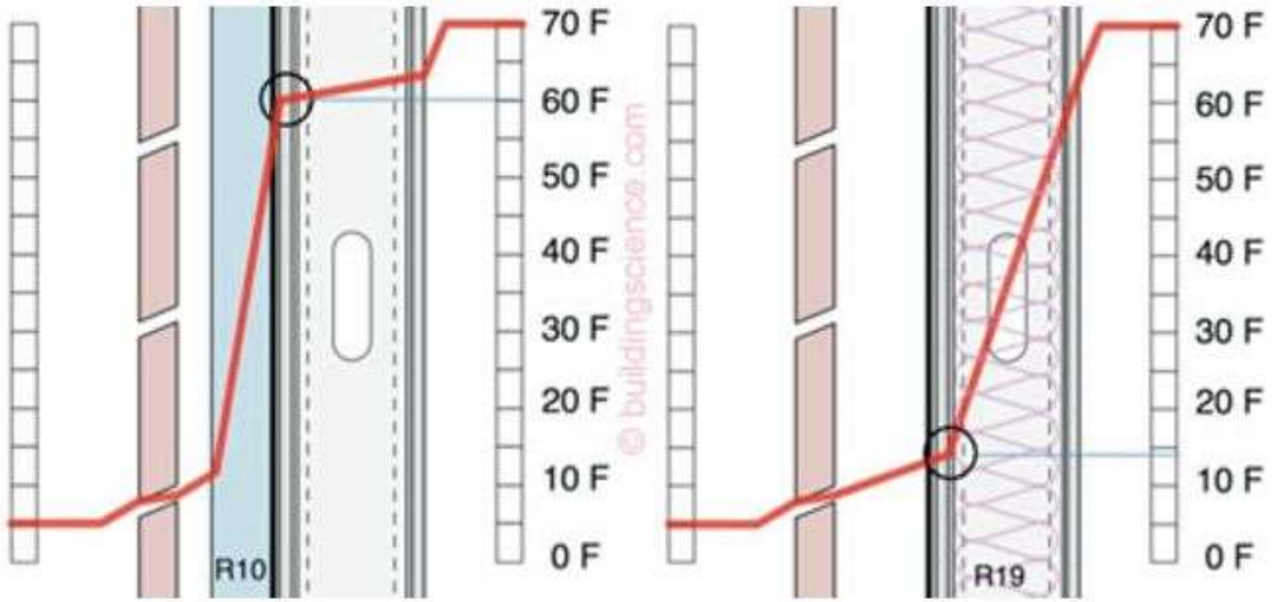

Continuous Insulation helps control the dew points.

Envelope modeling should take into consideration all connection points and thermal bridges.

The best performing walls control the dew point with one continuous layer of insulation on the exterior of the stud cavity.

This allows easier application of barriers to control exfiltration as well as infiltration.

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Building Envelope Failures:

Building envelope failures related to managing heat, raise the potential for moisture to develop within the wall system, creating unsafe conditions.

Thermal bridges often create issues as they render the insulation around them ineffective and create conditions that allow water vapor to condense into liquid water.

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Integrated Building Enclosures:

Wall systems manage the movement of air and moisture through the envelope with barriers, which should be designed and positioned based on the project location and demands.

Continuous insulation or cladding attachment systems should be designed with the other envelope systems in mind; limiting penetrations through the barrier systems that are often a cause of failure.

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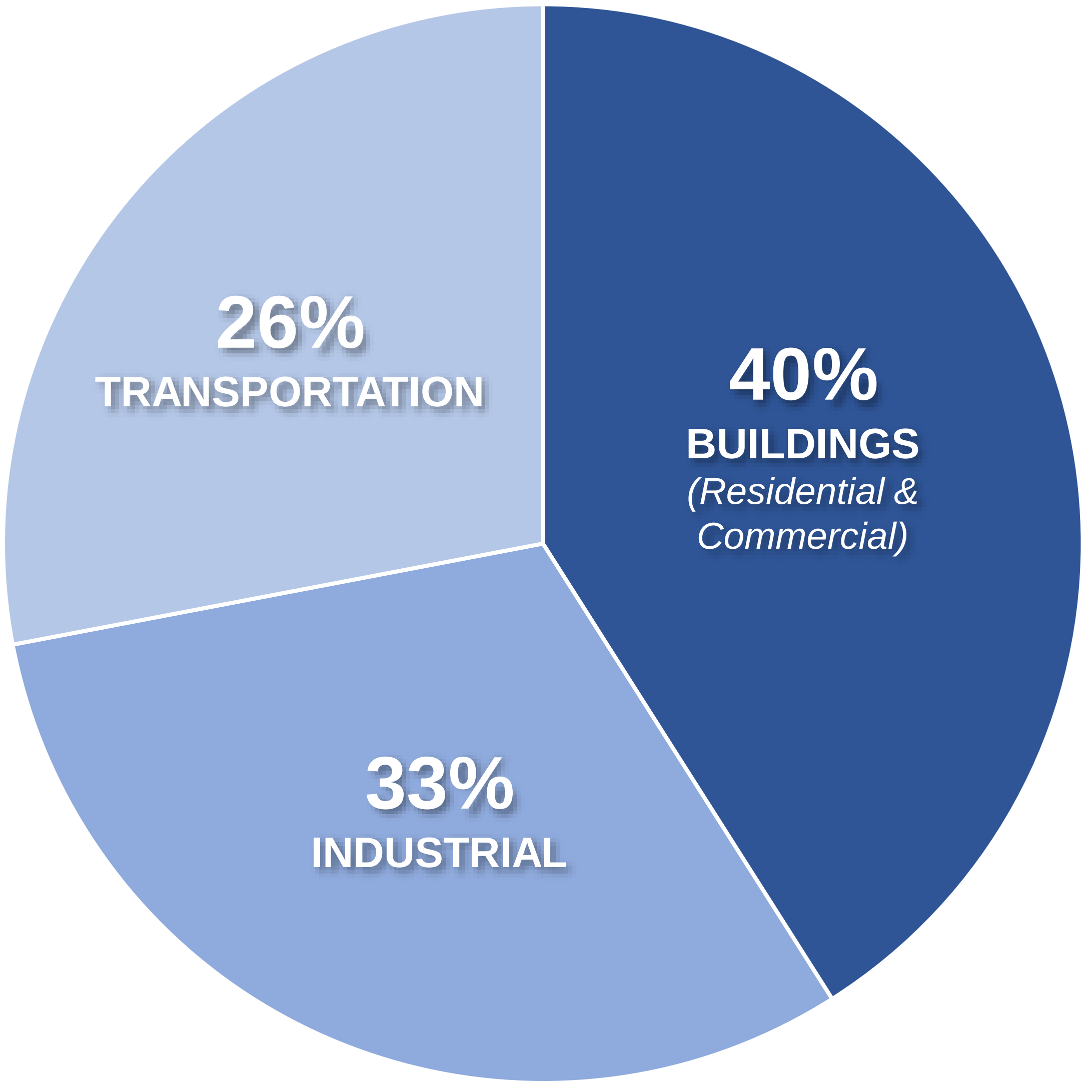

Source: U.S. Energy Information Administration, Monthly Energy Review, April 2021, preliminary data.
Note: Sum of individual percentages may not equal 100 because of independent rounding.

U.S. Energy Consumption:

Buildings use more energy than the Transportation and Industrial sectors, with much of that energy ***wasted*** through inefficient building envelopes (50%).

Building envelope systems using conductive materials is the main contributor to loss of efficiency and costly moisture accumulation issues.

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CI System Sub-Framing Material Choice:

CI system sub-framing commonly consists of one of the materials listed below:

- ***Metal***
- ***Fiber-Reinforced Polymer (Generic FRP)***
- ***Composite Metal Hybrid (CMH)***

Question:

What sub-framing material do you typically design with?

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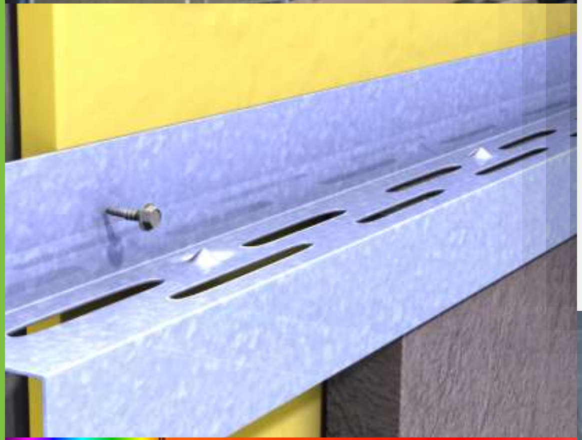

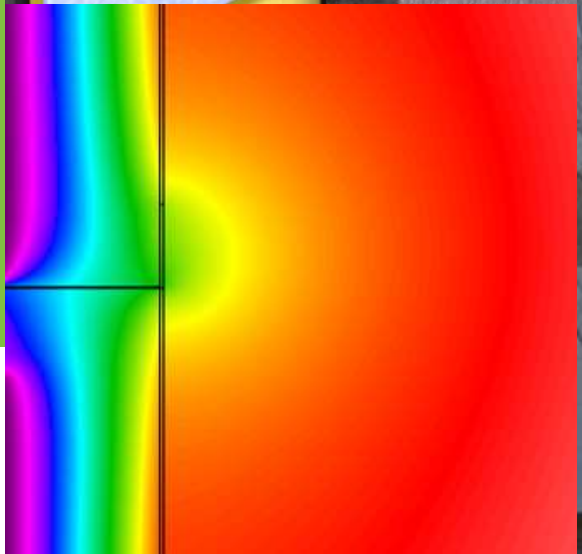

Metal Sub-Framing Systems:

- Connection through insulation
- Large amounts of thermal bridging; ~40% effective
- Independent insulation attachment
- Easily fabricated

Question:

Can you spot what is happening in this photo?

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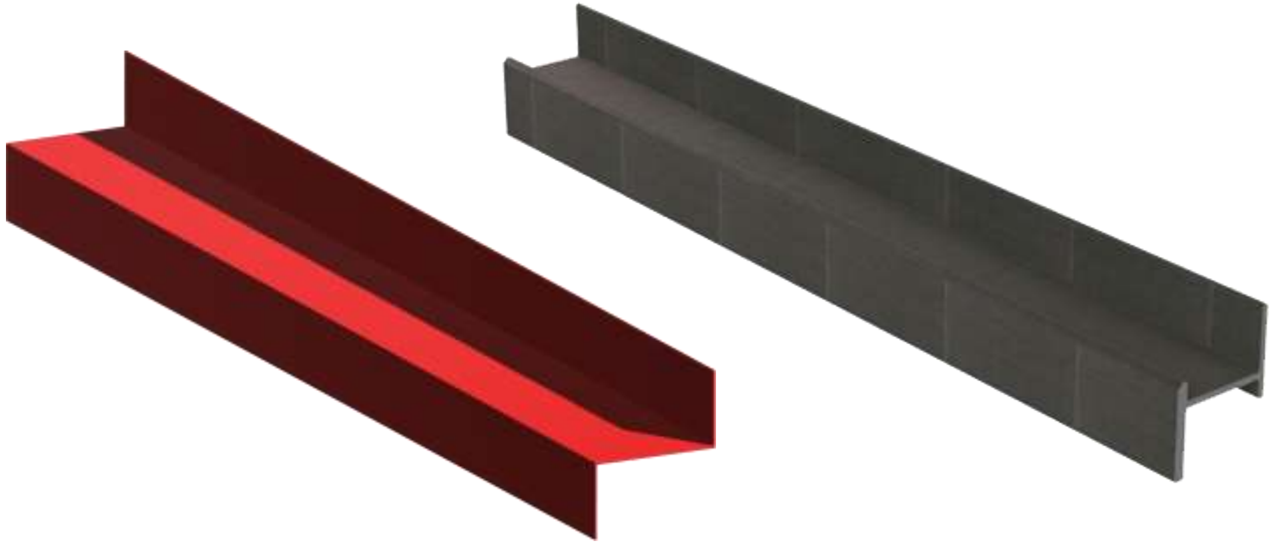

Generic FRP Sub-Framing Systems:

- Fiber-reinforced polymer (FRP)
- Low structural strength
- Low thermal conductivity
- Corrosion resistant
- Lower fastener torque, retention, and pullout strength
- Lower load retention
- Contains Halogen/Bromine *(see disclaimer)*
- NOT LBC Red List Free
- No cantilever interlock

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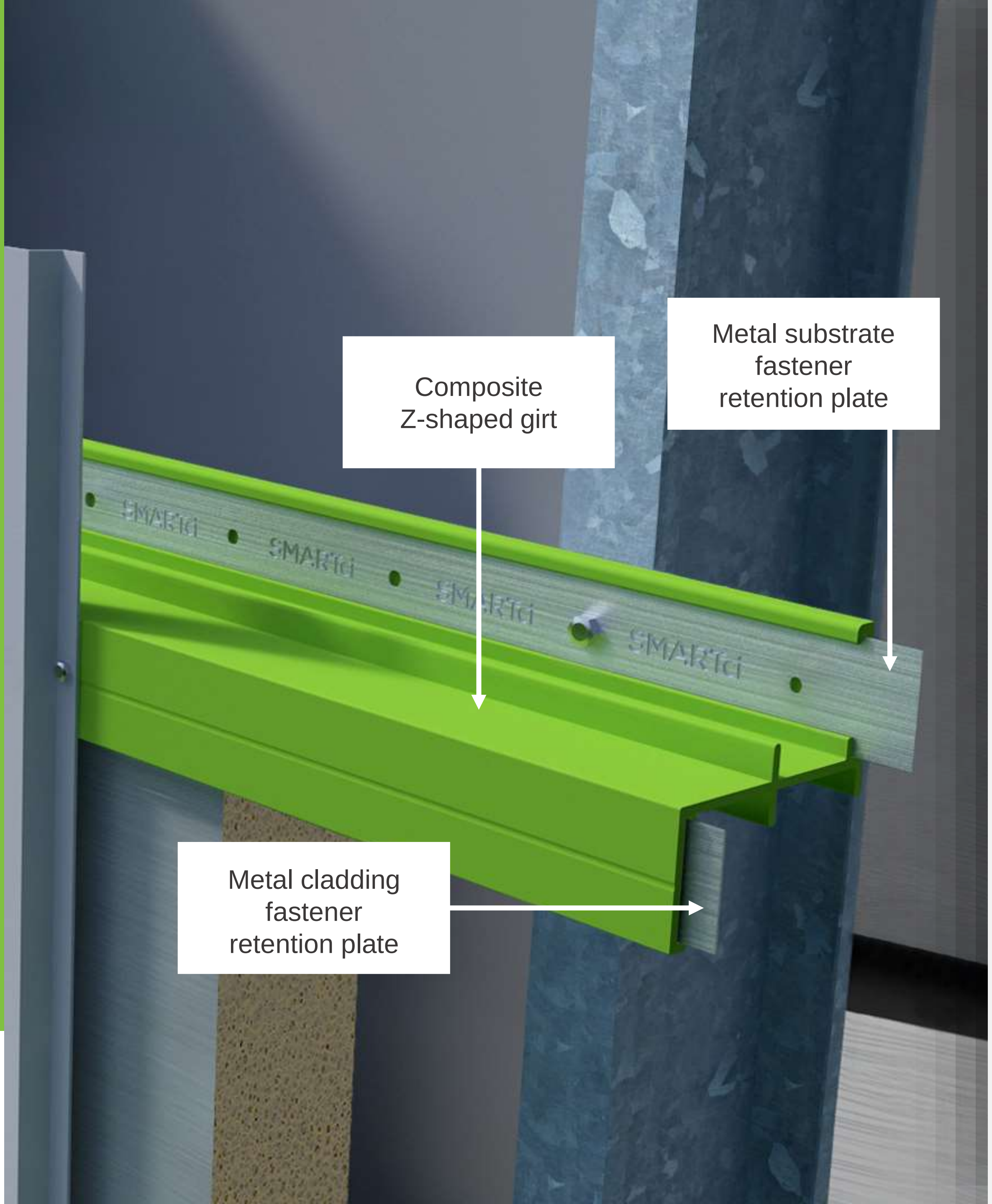

Composite Metal Hybrid (CMH) Sub-Framing:

Composite metal hybrid (CMH) is the best practice material for CI system sub-framing. CMH sub-framing consists of composite fiber-reinforced polymer (FRP) paired with metal inserts.

The best features of the two materials (metal and FRP) are united providing a thermal break with no through-metal fasteners, insulation retention system, and universal mounting platform for cladding applications.

- Declare Label & Red List Free
- Halogen/Bromine Free
- Environmental Product Declaration (EPD)
- IAPMO & LEED contributing
- NFPA 285 and ASTM E84 Compliant

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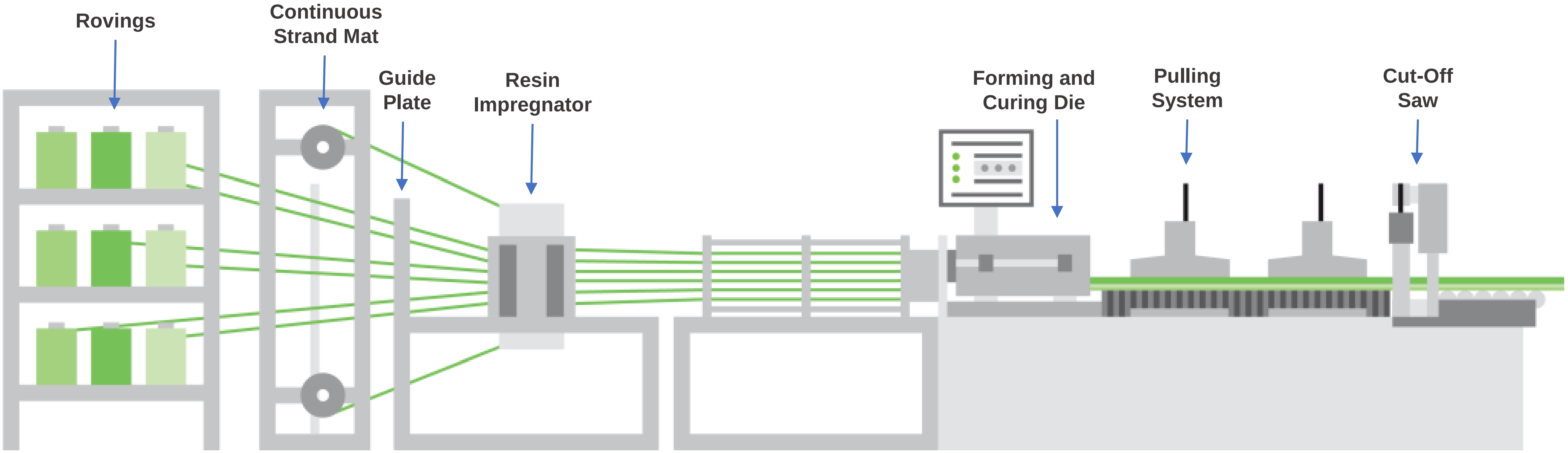
How is CMH made?

The composite component of CMH sub-framing is created through a pultrusion process. In pultrusion, resin-soaked fiber is pulled through a heated die where the resin is cured. Metal insert components are added once the composite component is formed.



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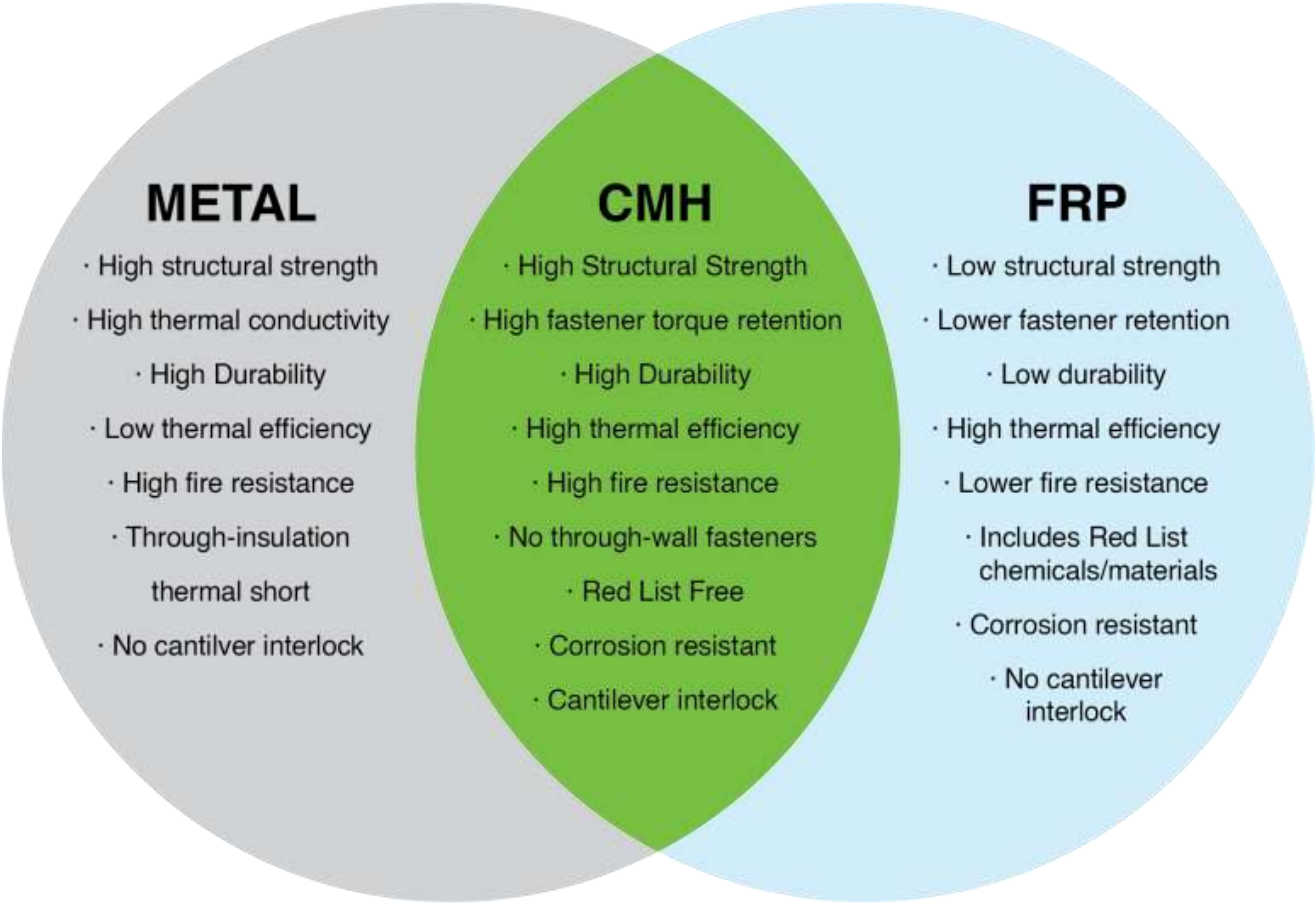
Comparison of CI System Sub-Framing Material



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Sub-Framing Materials & Best Practices:

	Structural Integrity	Fastener Retention	Durability	Thermal Efficiency	Fire Resistance	Sustainability	Building Health	Ease of Installation
Metal	✓	✓	✓	✗	✓	✗	✗	✗
FRP	✗	✗	✗	✓	✓	✗	✗	✗
CMH	✓	✓	✓	✓	✓	✓	✓	✓

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CMH in Other Industries:

Toolbox

Automotive Stabilizing Bar

Wagon

Hollow-Profile Hybrid (HPH) Technology

Question: Why is metal used at all fastening locations?

Ladder

Short-Term Fastening in FRP vs. Permanent Fastening in 16 ga. Steel & GreenGirt® CMH™

- Fiber-Reinforced Polymer (FRP) differs from steel in that it will exhibit **Screw-Creep**. Screws directly attached into FRP will lose capacity over a combination of time, force, and heat. It's a known **Power Law** phenomenon.

- Given the elevated temperatures found inside wall cavities, it is necessary to conduct tests involving time, force, and heat to ascertain its durability and true capabilities.

- Employing the ASTM D7332 test *(pull-over/pull-out resistance test simulating an extended load situation)* at the high service temperature of a building envelope over a duration of seven days allows for a better determination of an FRP product's ultimate usable fastener retention value.

- This procedure establishes a practical baseline for a product's fastener retention performance in FRP-based products.

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QUESTION:

What is Power Law for FRP?

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ANSWER:

Power Law: The power law is a mathematical relationship between two quantities. When one quantity changes, the other quantity changes at a fixed proportion, but not in a straight-line way. It's often written as $y = ax^K$, where ***y*** and ***x*** are the quantities, ***a*** is a constant, and ***K*** is the power. Power laws can describe how materials behave under different conditions. **<u>For example, it might describe how the strength of a material decreases as temperature increases</u>**.

Thermoset Plastics: Thermoset plastics (such as FRP) are a type of plastic material that becomes permanently hard when heated. Unlike some other plastics, they won't melt if you heat them again. In construction, thermoset plastics are used for a variety of purposes. They can be used in seals, adhesives, and insulation because they resist heat and do not conduct electricity. They're also used to make durable items like countertops and electrical components.

The behavior of thermoset plastics under different conditions, like **<u>temperature and pressure</u>**, might follow a power law relationship. **<u>For example, the way a thermoset plastic's strength or flexibility changes with temperature might be described by a power law.</u>**

By understanding these mathematical and material properties, you can design and build structures that are safe, durable, and efficient.

QUESTION:

What is Screw-Creep?

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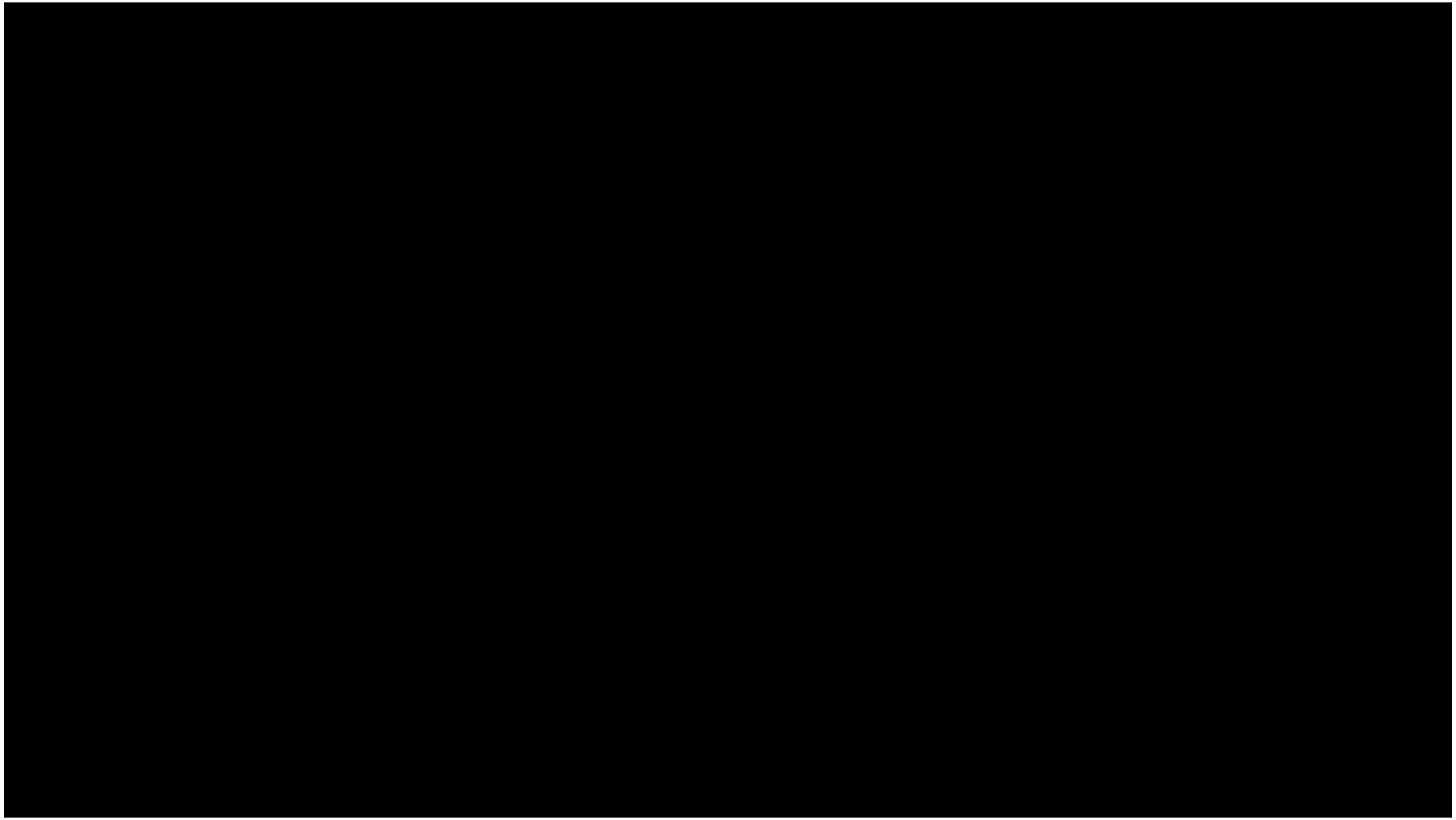
ANSWER:

When there's a constant load or pressure on screws, over time, they might slowly start to stretch or move out of their initial positions in FRP. This gradual stretching or movement under a continuous load is known as “Screw-Creep.”

Building Envelope Service Temperature and Fastener Durability:



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Results:

- GreenGirt® CMH™ is ***NOT*** FRP – it's a Composite Metal Hybrid.
- GreenGirt® CMH™ performs ***EQUAL TO OR GREATER*** than steel.
- Fasteners in FRP should ***ALWAYS*** have a backer plate per ASCE Structural Plastics Handbook.
- ***NEVER*** direct attach to standalone FRP with a screw for structural fastening. Screws in FRP are short-term connections.

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Thermal Bridging:

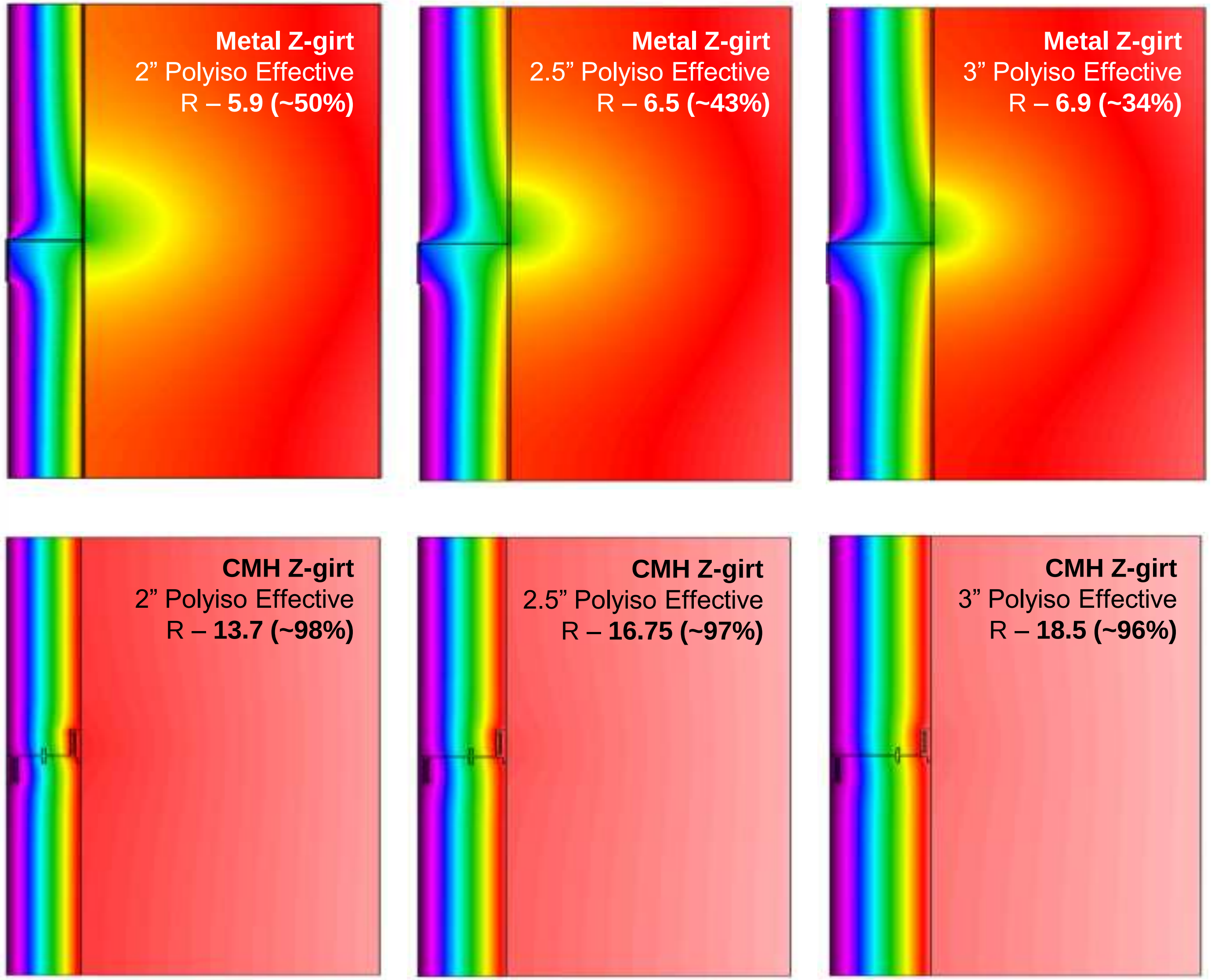
Metal Z-girt vs. CMH Sub-Framing
24” OC with Polyiso Insulation

Efficiency drops off drastically with systems that create conductive paths such as metal sub-framing.

CMH Z-girt Sub-Framing
24” OC with Polyiso Insulation

CMH sub-framing provides the best thermal performance.

Easiest way to meet high performance energy goals.



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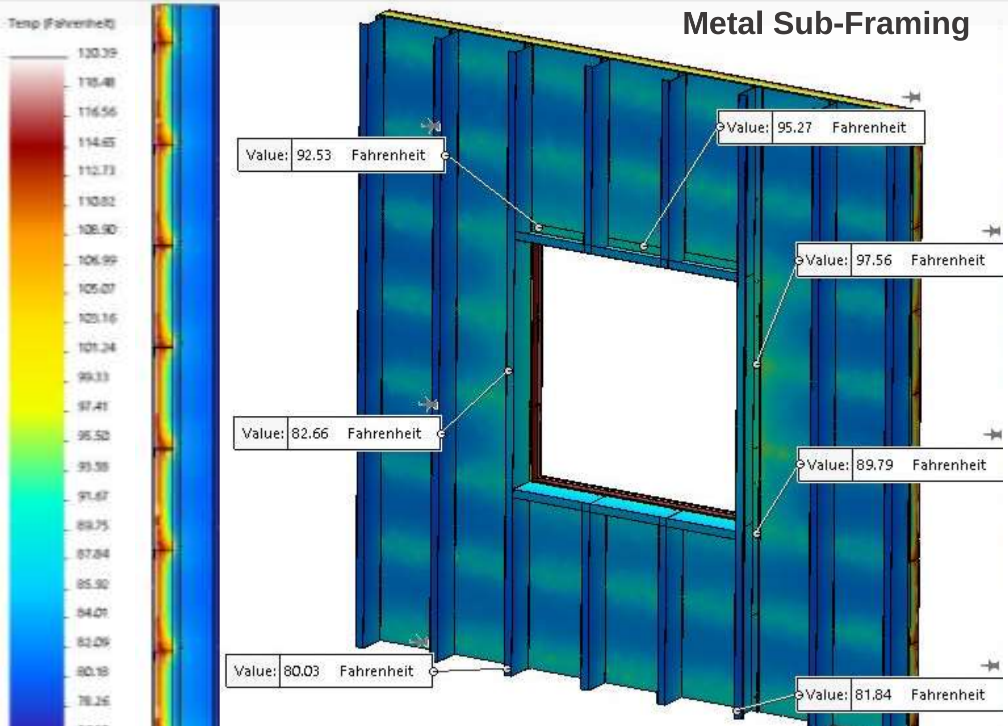
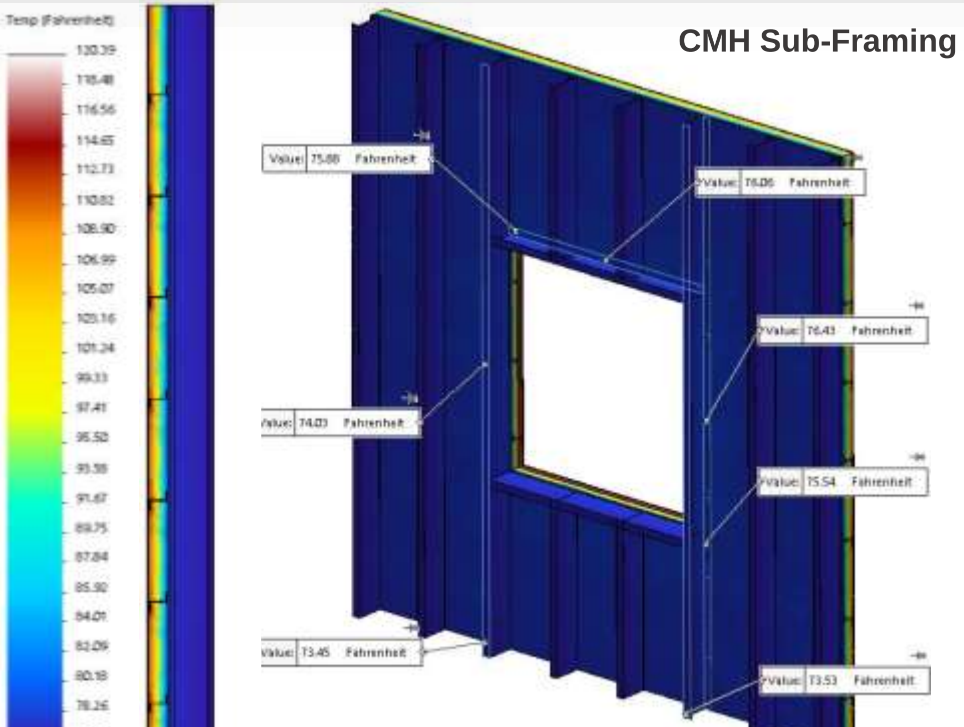
Warm Weather:

Enclosures in warm climates deal with extreme temperatures behind their cladding; **>120°F**
This creates a high differential that the envelope must manage.

Best practice CI systems can assist HVAC systems from overworking, increasing their longevity.



Exterior Temp: 125° F
Interior Temp: 70° F



Exterior Temp: 125° F
Interior Temp: 70° F

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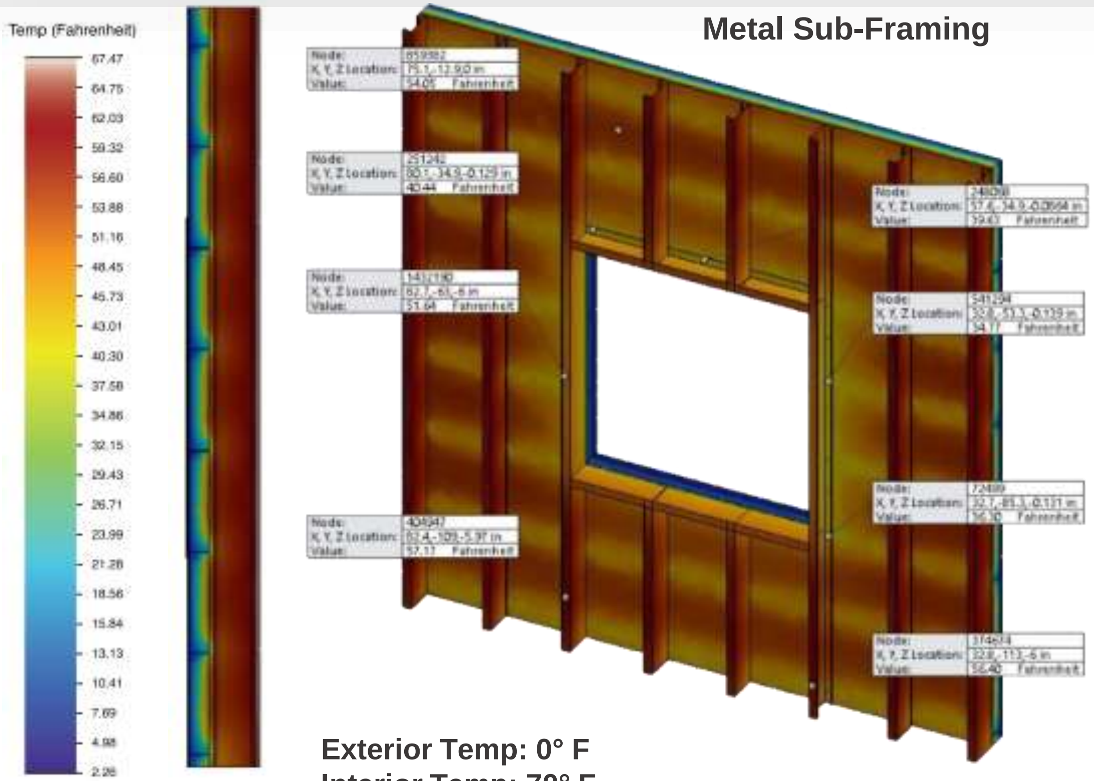
Cold Weather:

Similar to warm climates, enclosures in cold climates deal with extreme temperatures.
This creates a high differential that the envelope must manage.

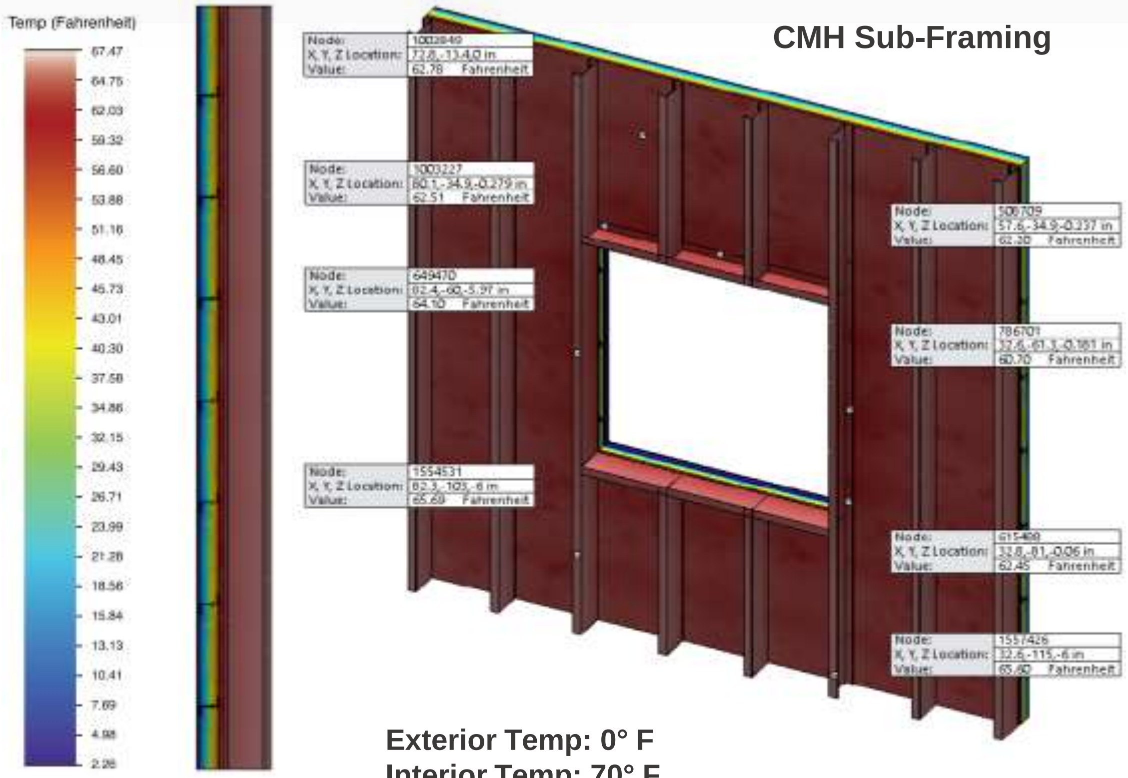
Best practice CI systems can assist in thermal efficiency, decreasing heating costs.

Metal Sub-Framing



Exterior Temp: 0° F
Interior Temp: 70° F

CMH Sub-Framing



Exterior Temp: 0° F
Interior Temp: 70° F

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Status of State Energy Code Adoption Map Summary

Building Energy Code Changes:

The International Energy Conservation Code adoption map as of 6/30/2022 (IECC) reinforcing building envelope requirements, including requirements for **CI systems.**

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Specific & Universal:

Code requirements for CI systems push for more efficient envelopes by requiring continuous insulation in all climate zones.

Requirements for continuous insulation acknowledge benefits in all climate zones.

ASHRAE 90.1 2010 Building Envelope Requirements Zones 1-8				
	Stick Built Walls Above Grade		*Assembly U/R-Value Walls Above Grade*	
Zone	**Mass**	**Steel Framed**	**Mass**	**Steel Framed**
1	NR	R13.0	U.580 / R1.73	U.124 / R8.07
2	R5.7ci	R13.0	U.151 / R6.63	U.124 / R8.07
3	R7.6ci	R13.0 + R3.8ci	U.123 / R8.13	U.084 / R11.91
4	R9.5ci	R13.0 + R7.5ci	U.104 / R9.61	U.064 / R15.63
5	R11.4ci	R13.0 + R7.5ci	U.090 / R11.11	U.064 / R15.63
6	R13.3ci	R13.0 + R7.5ci	U.080 / R12.50	U.064 / R15.63
7	R15.2cr	R13.0 + R7.5ci	U.071 / R14.09	U.064 / R15.63
8	R15.2ci	R13.0 + R7.5ci	U.071 / R14.09	U.064 / R15.63

ASHRAE 90.1 2013 Building Envelope Requirements Zones 1-8				
	Stick Built Walls Above Grade		*Assembly U/R-Value Walls Above Grade*	
Zone	**Mass**	**Steel Framed**	**Mass**	**Steel Framed**
1	NR	R13.0	U.580 / R1.73	U.124 / R8.07
2	R5.7ci	R13.0	U.151 / R6.63	U.084 / R11.91
3	R7.6ci	R13.0 + R3.8ci	U.123 / R8.13	U.077 / R12.99
4	R9.5ci	R13.0 + R7.5ci	U.104 / R9.61	U.064 / R15.63
5	R11.4ci	R13.0 + R7.5ci	U.090 / R11.11	U.055 / R18.19
6	R13.3ci	R13.0 + R7.5ci	U.080 / R12.50	U.049 / R20.41
7	R15.2cr	R13.0 + R7.5ci	U.071 / R14.09	U.049 / R20.41
8	R15.2ci	R13.0 + R7.5ci	U.071 / R14.09	U.037 / R27.03

ASHRAE 90.1 2015 Building Envelope Requirements Zones 1-8				
	Stick Built Walls Above Grade		*Assembly U/R-Value Walls Above Grade*	
Zone	**Mass**	**Steel Framed**	**Mass**	**Steel Framed**
1	R5.7CI	R13.0 + R5.0ci	U.151 / R6.63	U.077 / R12.99
2	R7.6ci	R13.0 + R5.0ci	U.151 / R6.63	U.077 / R12.99
3	R9.5ci	R13.0 + R3.8ci	U.123 / R8.13	U.064 / R15.63
4	R11.4ci	R13.0 + R7.5ci	U.104 / R9.61	U.064 / R15.63
5	R13.3ci	R13.0 + R7.5ci	U.090 / R11.11	U.064 / R15.63
6	R15.2ci	R13.0 + R7.5ci	U.080 / R12.50	U.064 / R15.63
7	R15.2cr	R13.0 + R7.5ci	U.071 / R14.09	U.064 / R15.63
8	R25.0ci	R13.0 + R7.5ci	U.061 / R16.39	U.045 / R22.22

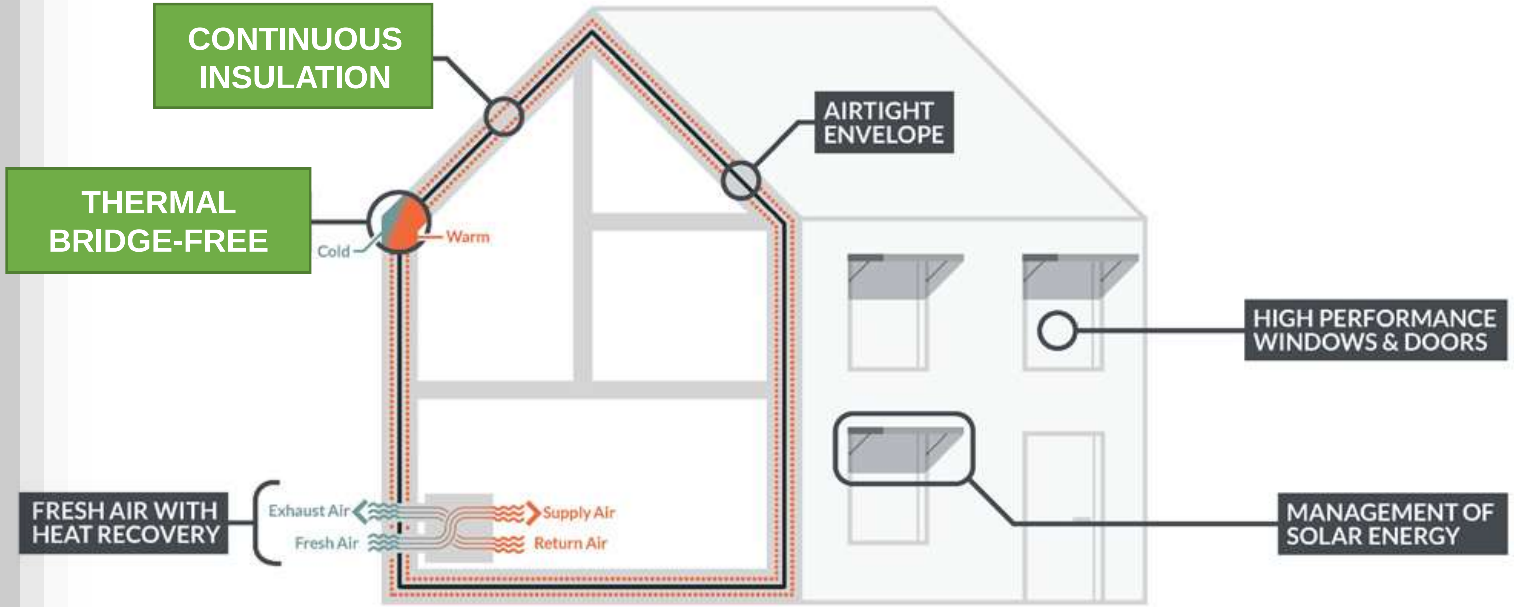
Code Changes:

Continuous insulation has become a mandate for many organizations:

- **USGBC: LEED Silver**
- **USGBC: LEED Gold**
- **USGBC: LEED Platinum**
- **Passive House**
- **Net-Zero**

Continuous insulation can contribute a great amount to resiliency in construction.

A well-designed wall using inert materials should be durable and last a long time.



PASSIVE HOUSE PRINCIPLES

Question:
Have you designed for certification with any of these organizations?

Recladding:

Most CI system provisions are for new construction.

Recladding presents a rare opportunity to increase building performance.

*** 97 BILLION SQUARE FEET** of floor space was constructed in the U.S. between 1979 – 2018.

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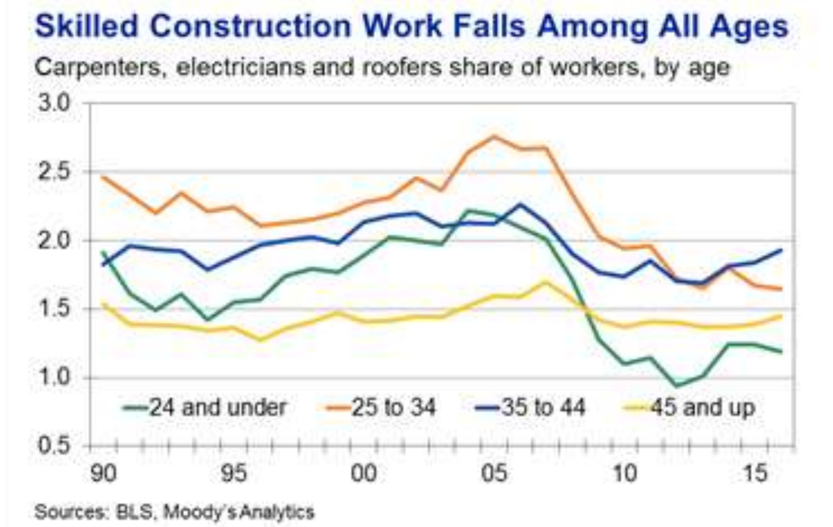
Ease of Application:

Material solutions attempting to solve design and construction problems must also account for the current shortage of skilled labor.



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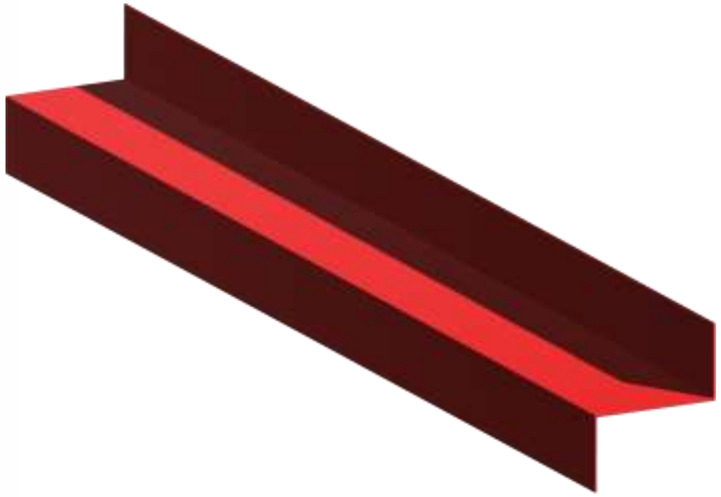
CI System Overview:

CI Systems should be compared based on their achievement the 8-best practices:

- Structural Integrity
- Thermal Efficiency
- Fastener Retention
- Durability
- Fire Resistance
- Environmental Impact
- Building Health
- Ease of Installation

FRP



ADVANCED ARCHITECTURAL PRODUCTS

GreenGirt

SMARTci

THANK YOU.

Contact us to learn more.

GreenGirt.com | (269) 355-1818

Disclaimer: Information in this presentation is based on 2022 market data and is subject to change.

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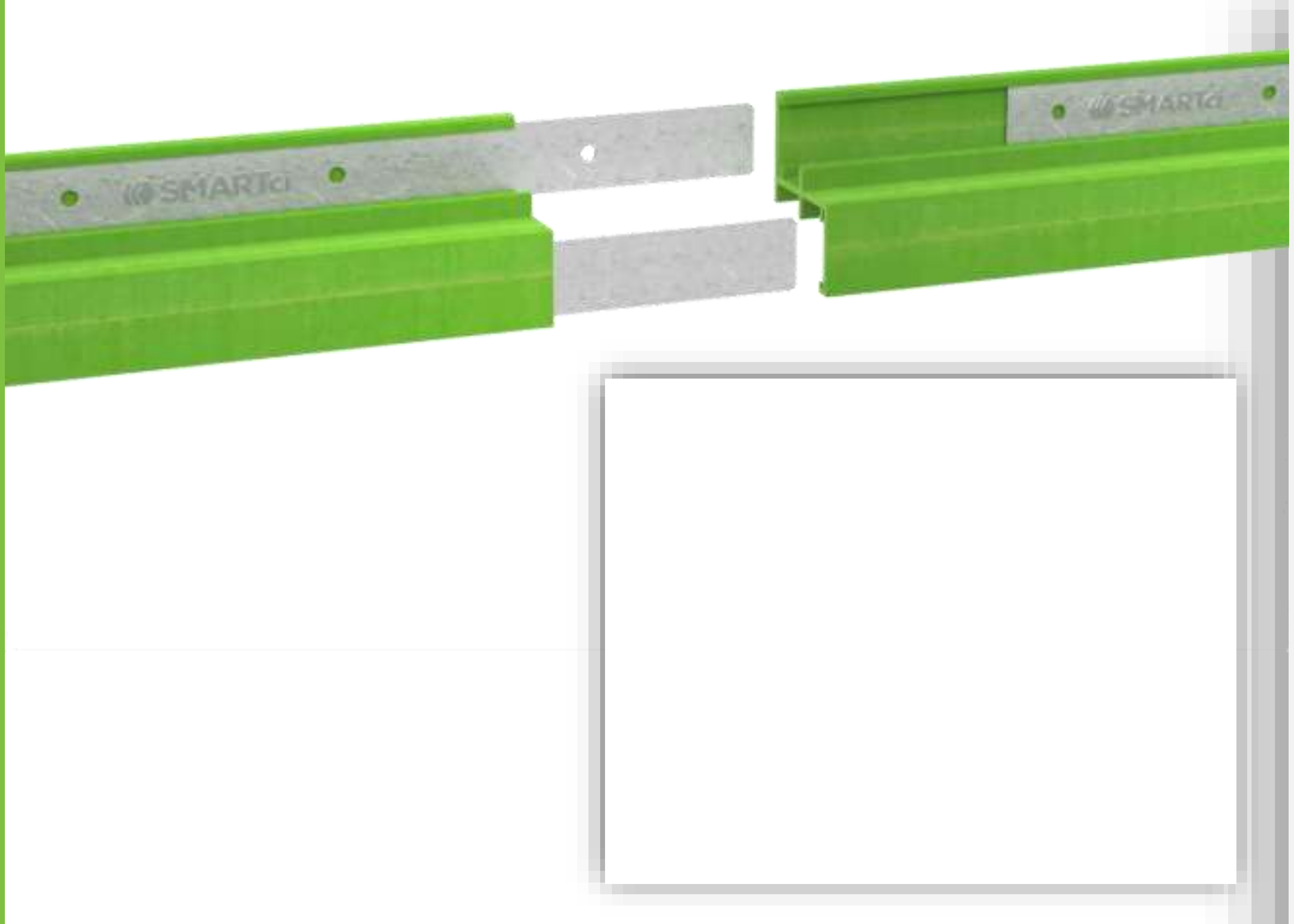
SMARTci™
SMARTER BY DESIGN. PROVEN BY PERFORMANCE.



GreenGirt Composite Metal Hybrid (CMH) Sub-Framing:

- Interlocking system that enables one end of the girt to connect into the adjacent girt
- Receives fasteners into its integral continuous metal inserts for maximum fastener retention and pullout strength
- Cladding connection does not degrade, even when exposed to harsh environmental conditions (equal to or better than steel)
- Eliminates the need for through-metal fasteners, removing thermal bridges and increasing thermal efficiency
- Helps achieve the most stringent energy standards – 92-98% efficiency

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ADVANCED ARCHITECTURAL PRODUCTS

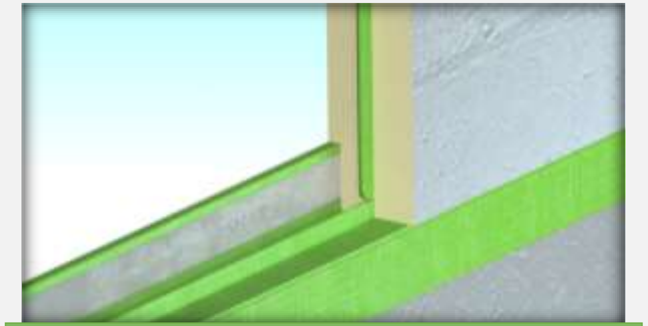
GreenGirt® COMPOSITE METAL HYBRID

SMARTci™ SMARTER BY DESIGN. PROVEN BY PERFORMANCE.

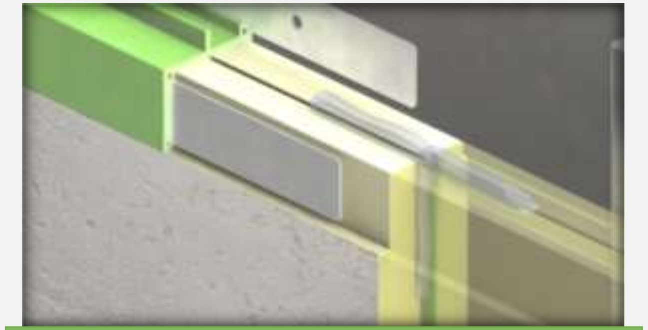
Continuous Insulation Systems with Composite Metal Hybrid (CMH)

SMARTci 1 in 1 System
(GreenGirt Only)

SMARTci 2 in 1 System
(GreenGirt + Rigid Insulation)



SMARTci 2.5 in 1 System
(GreenGirt + Rigid Insulation + FRP Splines)



SMARTci 3 in 1 System
(GreenGirt + Rigid Insulation + WRB)

GreenGirt Clips
(CMH 6" Clip)

GreenGirt Delta Adjustable System
(CMH Base Bracket + Rail + Mineral Wool)

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ADVANCED ARCHITECTURAL PRODUCTS

Transitions & Details:

Systems should be designed for durability and consistency.

Failures often occur at details or transitions between systems.

SMARTci systems with CMH GreenGirt sub-framing are a best practice solution for details and transitions.

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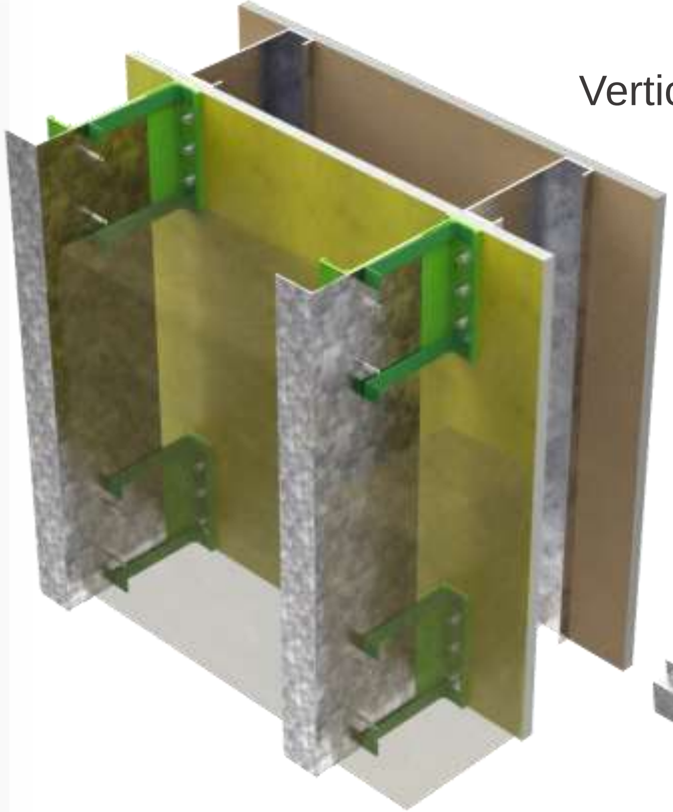
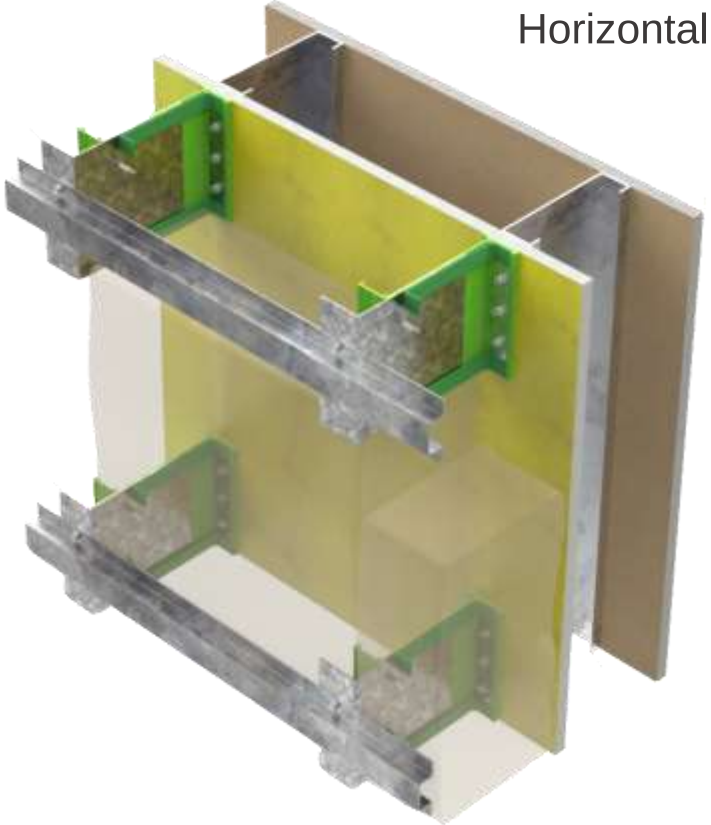
GreenGirt Delta Adjustable System:

The GreenGirt Delta CI System with CMH sub-framing integrates adjustability to assist in creating an even, plumb attachment surface for cladding and framing.

GreenGirt Delta can level as an entire system and can be installed vertically or horizontally.





ADVANCED ARCHITECTURAL PRODUCTS

Environmental Sustainability:

CMH is produced using different materials.

Utilize composites that are certified **Red List-Free.**

Make sure any composites you are using are **Halogen/Bromine-Free.**

Insist on certified product reporting:

- Environmental Product Declaration (EPD)
- Declare Label
- Living Building Challenge
- Mindful Materials

Declare.

GREENgirt
Advanced Architectural Products

Final Assembly: Allegan, Michigan, USA; Hamilton, Michigan, USA
Life Expectancy: Life of Structure Year(s)
End of Life Options: Salvageable/Reusable in its Entirety

Ingredients:

Cured Polyester Resin: Polyester; Alumina Trihydrate; Styrene; Tall oil, esters with ethylene glycol; **GreenGirt Pultrusion:** Fiberglass; **Steel Reinforcement:** Galvanized Steel; **Green Colorant:** Diethylene Glycol; Ethanediol; Ethylene Glycol; Silica, Crystalline (Quartz); Talc; Magnesium Silicate Hydrate

Living Building Challenge Criteria: Compliant

I-13 Red List:

■ LBC Red List Free	% Disclosed: 100% at 100ppm
☐ LBC Red List Approved	VOC Content: Not Applicable
☐ Declared	

I-10 Interior Performance: Not Applicable
I-14 Responsible Sourcing: Not Applicable

AAP-0001
EXP. 01 OCT 2024
Original Issue Date: 2016

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San Francisco International Airport
San Francisco, CA

Category: Airport

Size: 114,000 SF

System: SMARTci 1 in 1

Girt Size | Orientation | OC: 2” | H | 16”

Insulation Type: Mineral Wool

Cladding: ACM

Substrate: Steel Studs

Architect: Gensler

Contractor: Hensel Phelps

Installer: K.T. Mancini Co., inc.

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ADVANCED ARCHITECTURAL PRODUCTS

Malcolm X College
Chicago, IL

Category: Education

Size: 40,000 SF

System: SMARTci 1 in 1

Girt Size | Orientation | OC: 5” | V | 24”

Insulation Type: Mineral Wool

Cladding: Metal Panels

Substrate: Metal Studs

Architect: Moody Nolan

Contractor: CMO

Installer: Tuschall Engineering Company

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Warner Mixed-Use Building **Kalamazoo, MI**

Category: Commercial & Residential

Size: 60,000 SF

System: SMARTci 1 in 1

Girt Size | Orientation | OC: 3” | H | 24”

Insulation Type: Mineral Wool

Cladding: Terracotta

Substrate: Metal Studs

Architect: TowerPinkster

Contractor: CSM Group

Installer: Architectural Glass & Metal

MGM Springfield Resort & Casino **Springfield, MA**

Category: Hospitality

Size: 177,000 SF

System: SMARTci 2 in 1

Girt Size | Orientation | OC: 4” | H | 16”

Insulation Type: Polyiso

Cladding: 7 Types

Substrate: Studs

Architect: Friedmutter

Contractor: Tishman Construction Corp.

Installer: H. Carr & Sons Co.

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Advocate Outpatient Center
Huntley, IL

Category: Healthcare

Size: 7,500 SF

System: SMARTci 1 in 1

Girt Size | Orientation | OC: 4” | V | 16”

Insulation Type: Mineral Wool

Cladding: Metal Panels / Brick / Stone

Substrate: Metal Studs / GYP

Architect: HDR Architecture

Contractor: Boldt

Installer: Rockwell Group

ADVANCED ARCHITECTURAL PRODUCTS

Summa Health West Tower **Akron, OH**

Category: Healthcare

Size: 60,000 SF

System: SMARTci 2 in 1

Girt Size | Orientation | OC: 3” | V | 16”

Insulation Type: Polyiso

Cladding: Terracotta, Metal Panels

Substrate: Steel Studs

Architect: Hasenstab Architects, In.

Contractor: Donely-Shook

Installer: OCP Contractors Inc.

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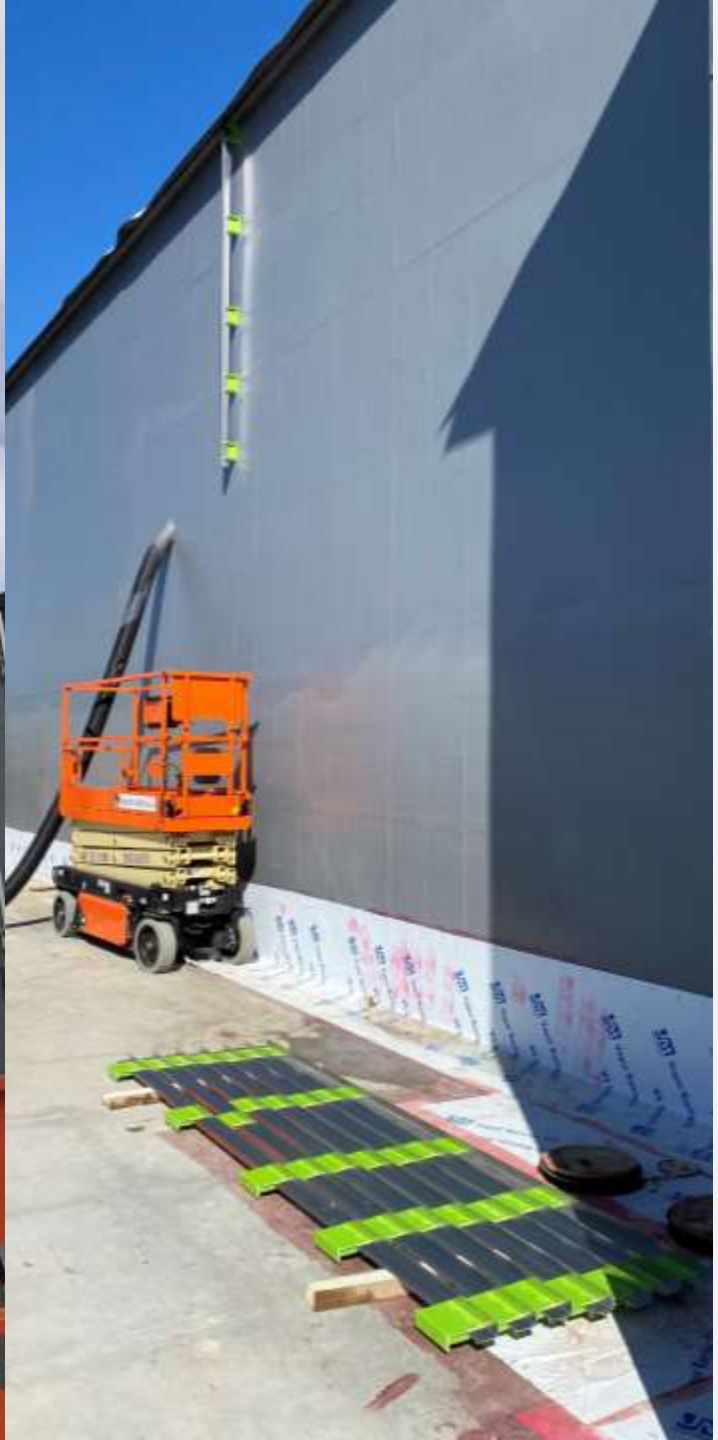


Revolution Labs
Lexington, MA

Category: Healthcare

Size: 36,500 SF

System: GreenGirt Delta Adjustable

Girt Size | Orientation | OC:

5” | V | 16” H x 32” H OC

Insulation Type: Mineral Wool

Cladding: Fiber Cement, Metal Panels

Substrate: Metal Studs

Architect: SGA

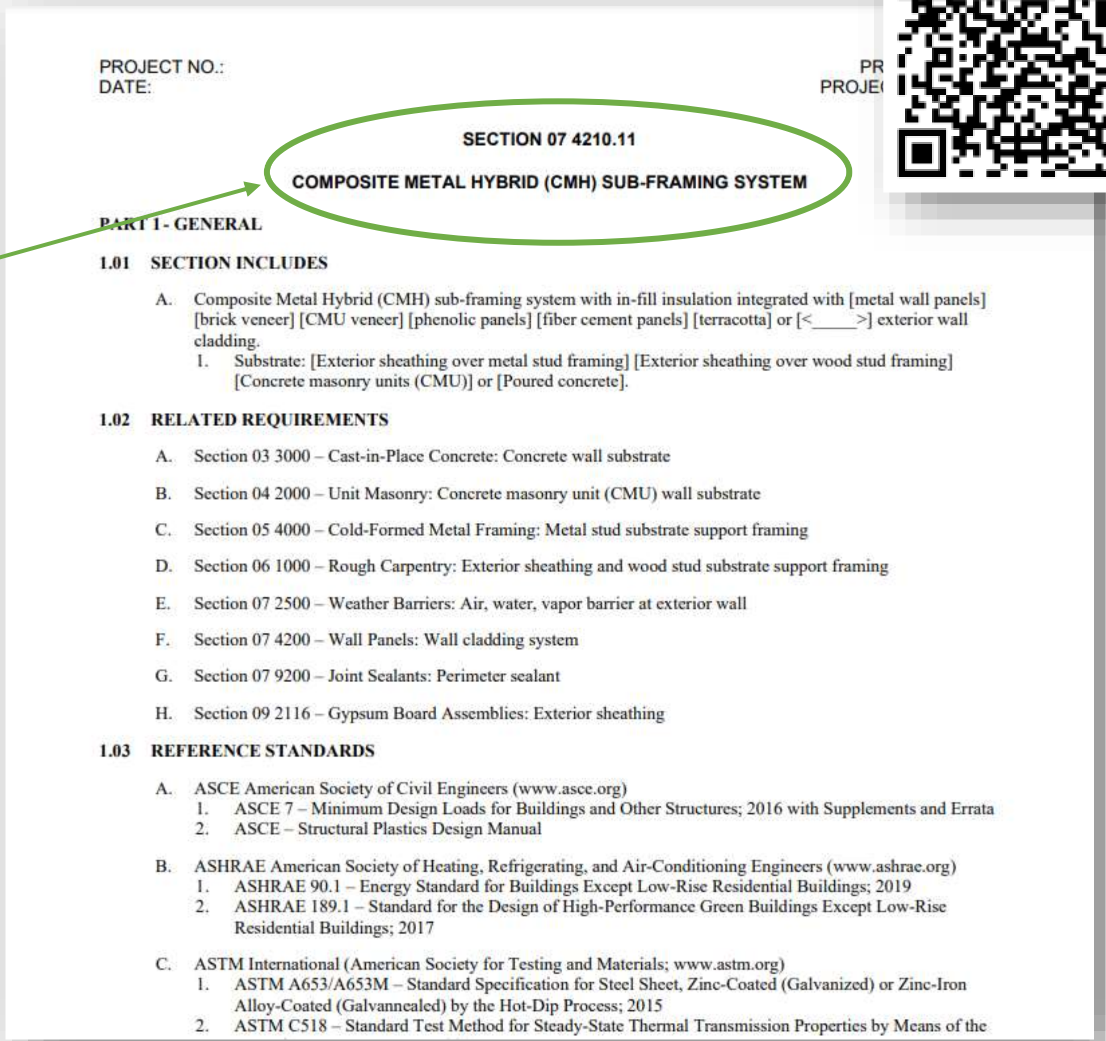
Contractor: Callahan Construction

Installer: Lockheed Architectural Solutions, Inc.

How do you properly spec, GreenGirt CMH or SMARTci Systems?

View our Specifications!

- 3-part specifications are available at GreenGirt.com, MasterSpec, and SpecLink
- Our specifications can be found in:
- Each product/system has its own 3-part specification, including:
  - *GreenGirt Delta Adjustable System*
  - *SMARTci 1 in 1 System*
  - *SMARTci 2 in 1 System*
  - *SMARTci 2.5 in 1 System*
  - *SMARTci 3 in 1 System*
  - *GreenGirt Clips*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SECTION 07 4210.11

COMPOSITE METAL HYBRID (CMH) SUB-FRAMING SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Composite Metal Hybrid (CMH) sub-framing system with in-fill insulation integrated with [metal wall panels] [brick veneer] [CMU veneer] [phenolic panels] [fiber cement panels] [terracotta] or [<_____>] exterior wall cladding.
1. Substrate: [Exterior sheathing over metal stud framing] [Exterior sheathing over wood stud framing] [Concrete masonry units (CMU)] or [Poured concrete].

1.02 RELATED REQUIREMENTS

A. Section 03 3000 – Cast-in-Place Concrete: Concrete wall substrate
B. Section 04 2000 – Unit Masonry: Concrete masonry unit (CMU) wall substrate
C. Section 05 4000 – Cold-Formed Metal Framing: Metal stud substrate support framing
D. Section 06 1000 – Rough Carpentry: Exterior sheathing and wood stud substrate support framing
E. Section 07 2500 – Weather Barriers: Air, water, vapor barrier at exterior wall
F. Section 07 4200 – Wall Panels: Wall cladding system
G. Section 07 9200 – Joint Sealants: Perimeter sealant
H. Section 09 2116 – Gypsum Board Assemblies: Exterior sheathing

1.03 REFERENCE STANDARDS

A. ASCE American Society of Civil Engineers (www.asce.org)
1. ASCE 7 – Minimum Design Loads for Buildings and Other Structures; 2016 with Supplements and Errata
2. ASCE – Structural Plastics Design Manual

B. ASHRAE American Society of Heating, Refrigerating, and Air-Conditioning Engineers (www.ashrae.org)
1. ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings; 2019
2. ASHRAE 189.1 – Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings; 2017

C. ASTM International (American Society for Testing and Materials; www.astm.org)
1. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015
2. ASTM C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the

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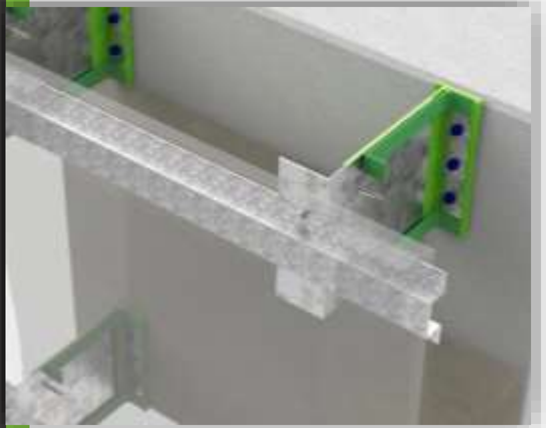
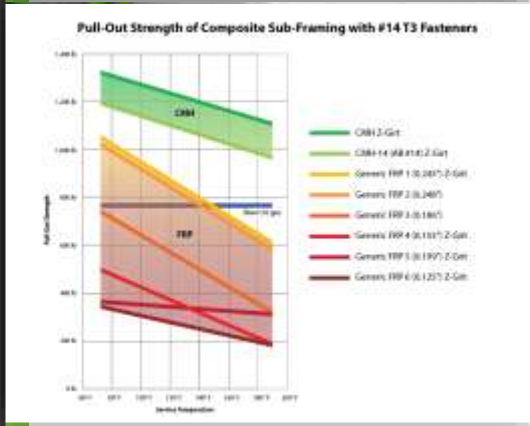
Additional AIA Courses Available!



Features & Benefits of Continuous Insulation Systems with Adjustable Composite Metal Hybrid (CMH) Sub-Framing

AIA HSW CES Presentation
Course: A2P301



Best Practice Series for Composite Sub-Framing Part 1: Introduction & Fastener Performance

AIA HSW CES Presentation
Course: A2P401

Visit our website for more information:
GreenGirt.com