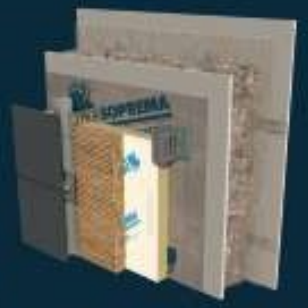
BUILDING A SUSTAINABLE NORTH



BUILD BETTER HIGH PERFORMANCE WALLS

WHITEHORSE 2022 Yukon

MONDAY NOVEMBER 7, 2022

FROM 10 AM TO 2 PM

NORTHLIGHT INNOVATION CENTRE
Newmont Classroom plus
NorthwesTel Event Space

2180 2ND Avenue,
Whitehorse Y.T.

Presented by

SOPREMA

KILRICH BUILDING CENTRES

AGENDA

1. Event Introduction and Introduction to Soprema
2. Wall Assembly Construction Considerations
3. Wall Insulation Types and Material Properties
4. Build Better Wall Initiative
5. Build Better Walls 2nd Edition:
   ACS Clip Systems
   The Protected Assembly
   Fire Testing
6. Critical Issues for the North (GWP, Embodied Carbon, High Performance Tables, Mean Temperature of Insulation, Interface Fires, GWP, Embodied Carbon)
7. Lunch and Additional Soprema Capabilities and Technologies
8. Hands on Demonstration






WHERE INNOVATION AND EXPERTISE WORK FOR YOU





SOPREMA

SOPREMA

Founded in 1908 in Strasbourg, France, SOPREMA is an international manufacturer specializing in the production of innovative products for waterproofing, insulation, soundproofing, and vegetated solutions for the roofing, building envelope and civil engineering sectors.

WATERPROOFING

INSULATION

VEGETATIVE SOLUTIONS

SOUNDPROOFING

ACCESSORY PRODUCTS

THE FOUNDER

In 1908, Charles Geisen – the founder of Les Usines Alsaciennes d'Émulsions in Strasbourg, France – was interested in new technologies, especially those related to bitumen. Mr. Geisen was looking for a flexible and reliable waterproofing process.
He had a great idea: take burlap fabric and dip it in hot bitumen.

WHY A MAMMOTH?

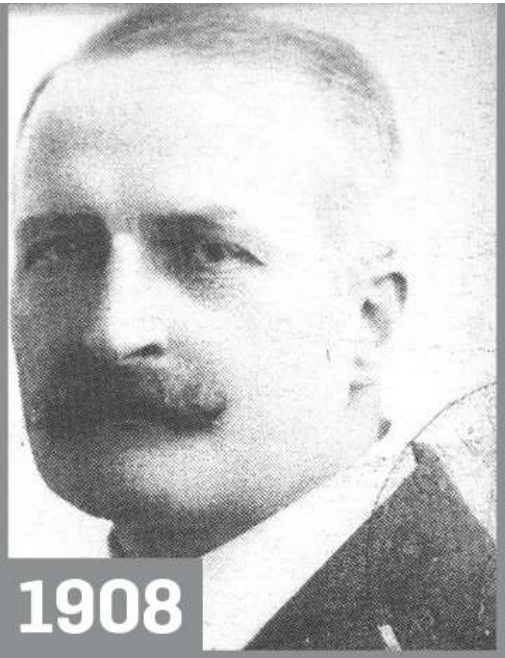
- In the early 1900s, archaeologists discovered a Siberian mammoth fossil in perfect condition, dating back more than 40,000 years.

- Mr. Geisen's finished product, burlap that had been dipped in hot bitumen, resembled the skin of an elephant, and so it was called «MAMMOUTH», the French word for mammoth.

SOPREMA

SOciété des **P**roduits et **R**evêtements d'**É**tanchéité **MA**mmouth

(French for "Mammoth Waterproofing Products and Coatings Company")



1908

Company founded by Charles GEISEN

1933

Pierre GEISEN assumes company presidency

1992

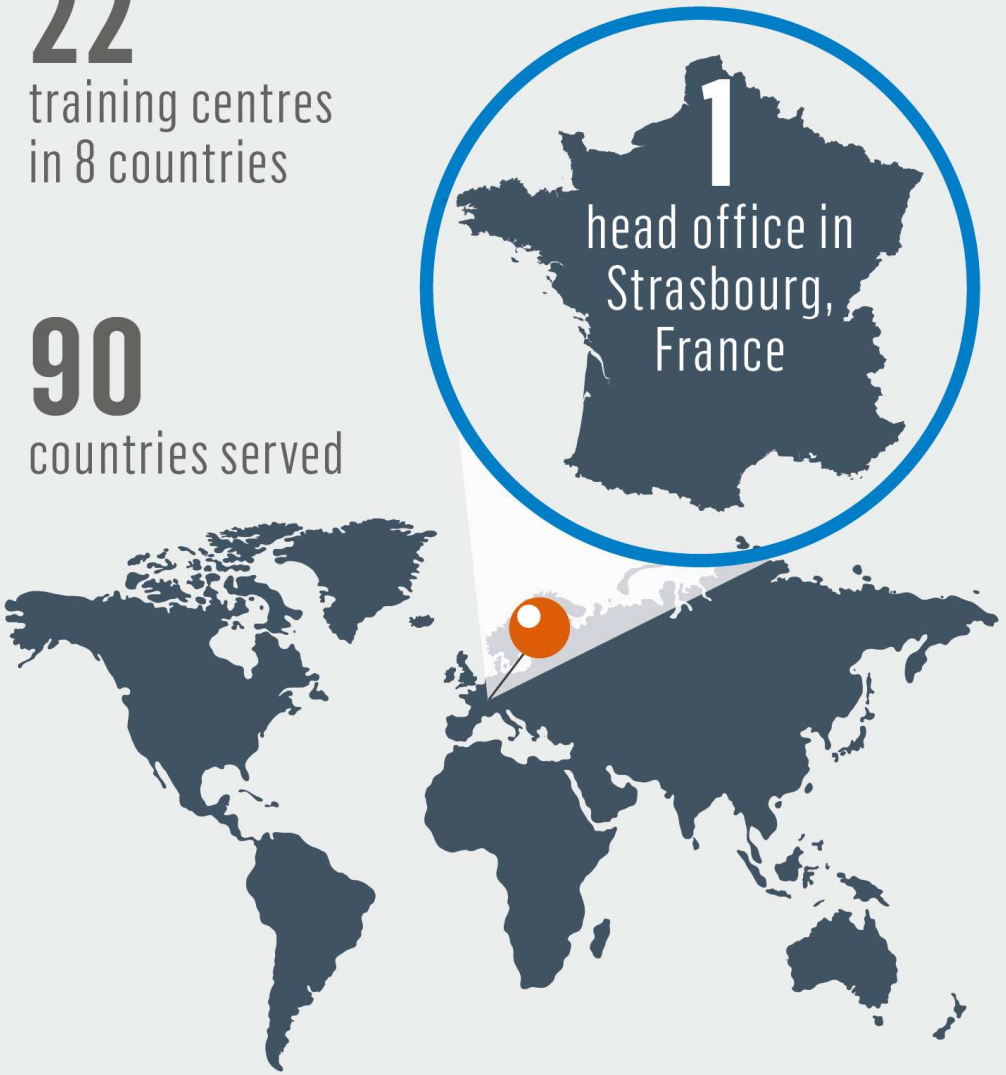
Pierre-Étienne BINDSCHEDLER succeeds his grandfather

A FAMILY BUSINESS

SOPREMA AROUND THE WORLD

22
training centres
in 8 countries

90
countries served



Over **80** plants

17 research centres

Over **90** operating subsidiaries

More than **9,200** employees worldwide

Over **4,000** distributors

SOPREMA
IN CANADA

11
sales offices

1 North American head office in Drummondville, QC

12
production units

9
training centres

More than **70**
technicians and technical representatives

A major research centre located in Drummondville, with more than twenty people working full time.


BRIDGES
ANTIROCK
GREEN ROOFS
SOPRANATURE
ROOFS
SOPRA-ISO, ALSAN RS,
HIGH PERFORMANCE,
FLAMELESS SOLUTION...
WALLS
SOPRASEAL
INDOOR
APPLICATIONS
FLOORS, CEILINGS,
DRAINAGE PIPES
BALCONIES
PLAZA DECKS
FOUNDAINES
PARKING DECKS
ALSAN TRAFIK, TRAFIKROCK
FOUNDATIONS
COLPHENE

WALLS

WATERPROOFING

The SOPRASEAL line includes many of the SOPREMA membranes that ensure air and vapour proofing of the building envelope. SOPRASEAL air and vapour barrier membranes offer durability that can only be obtained with SBS modified bitumen.

WALLS

INSULATION

- In addition to waterproofing products, SOPREMA offers high-performance insulation solutions for walls that meet the needs and requirements of construction professionals across the country.
- SOPRA-ISO V and SOPRA-ISO V PLUS are closed-cell polyisocyanurate foam insulation boards for walls.
- SOPRA-SPF + is a two-component, closed-cell spray-applied polyurethane foam insulation system.
- SOPRA-CELLULOSE is a thermal and acoustic cellulose insulation made of 85% recycled newspapers, and used in interior and exterior walls, attics, floors, and ceilings.

2015

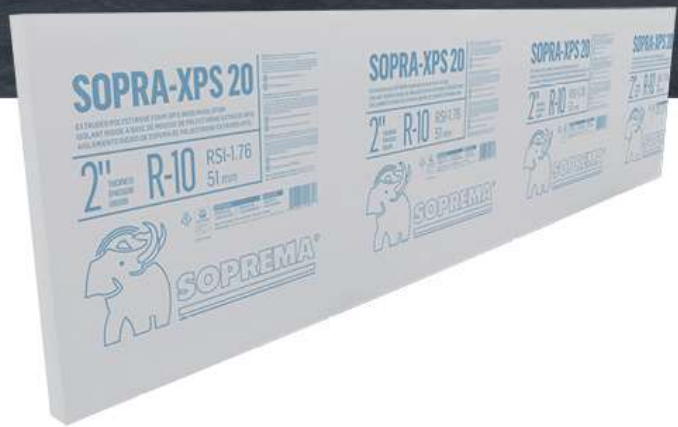
SOPREMA opens a polyisocyanurate plant in Drummondville, Québec.

2016

Acquisition of Benolec, a manufacturer of cellulosic products.

2017

SOPREMA acquires ModulR TS, a company specializing in the development of factory-laminated roof insulation.



2018

SOPREMA opens an extruded polystyrene (**XPS**) plant in Sherbrooke, Québec.

2020

Opening of an SBS modified bitumen membrane plant in Woodstock (Ontario).

Today's Speakers

SPEAKER BIOS

Jean-François Côté, Director, Standards & Scientific Affairs for SOPREMA

Jean-François Côté holds a Bachelor's degree in Chemistry from Université de Sherbrooke and a Ph.D. in Materials Science from INRS-Université du Québec obtained in 1998. He joined Soprema in 1999 as a research chemist where he worked on the development of adhesives and sealants used in roofing and civil engineering. In his current role, he represents Soprema on technical committees of industry associations (ARMA, PIMA, CIMAC) and is actively engaged in various North American standards development organizations (CSA, ASTM, ULC).

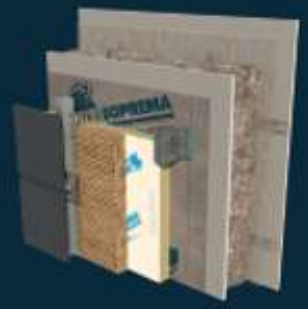
Les Yard, Building Envelope System Development Manager – WesternCanada SOPREMA

Les Yard is a senior building envelope technical professional with over 20 years of experience in the construction industry. Les is a frequent presenter and has co-authored a number of technical articles. As a member of the Strategy and Innovation Group at SOPREMA, Les is committed to developing systems and assemblies that meet and exceed building, fire and energy codes while considering the significant challenges facing our industry today including climate change, durability, resiliency, environmental concerns, cost effectiveness, constructability and a significant impending shortage of experienced trade contractors.

BUILDING
A SUSTAINABLE
NORTH

WHITEHORSE 2022 Yukon

BUILD BETTER
HIGH PERFORMANCE
WALLS



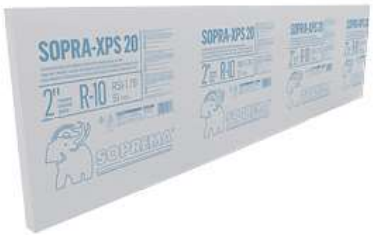
Key Challenges for Construction

SOPREMA

HOW IT STARTED

SOPRA-CELLULOSE

SOPRA-SPF



SOPRA-XPS

2016 2017 2018

SOPRA-ISO V

Between 2016 and 2018, we added four insulation technologies to our product offering.

WE NEEDED TO UNDERSTAND THE INTERACTIONS BETWEEN MATERIALS IN THE WALL ASSEMBLY.

WE REALIZED THAT ARCHITECTS, ENGINEERS AND/OR BUILDING ENVELOPE SPECIALISTS WERE FACED WITH THE SAME CHALLENGES.

GLOBAL PERFORMANCE

- Climate change
- Energy codes
- Achieving R-value
- Thermal bridging
- Air tightness
- Condensation

COMBUSTIBILITY

- Restrict fire risks
- Fire testing
- Restrictions and compartmentalization

INSTALLATION

- Need for training
- Skilled labour
- Cost of labour
- Installation specialty

OTHERS

- Compatibility of materials
- Continuity of air barrier (roof and walls)
- Sustainability
- Durability
- Local purchase
- Product accessibility
- Budget

SOPREMA

KEY DELIVERABLES OF A HIGH-PERFORMANCE WALL

Energy and Material Efficient

Simple and Cost Effective

SOPREMA

KEY DELIVERABLES OF A HIGH-PERFORMANCE WALL

Constructable and Repeatable

Meet or Exceed Sustainability Goals

SOPREMA

KEY DELIVERABLES OF A HIGH-PERFORMANCE WALL

Durable and Responds to the Demands of a Changing Climate

Meet or Exceed Fire Safety Standards

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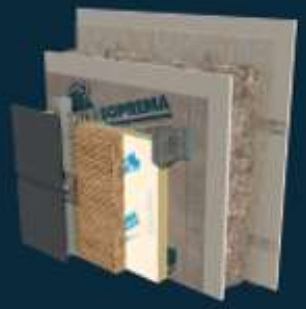
BUILDING
A SUSTAINABLE
NORTH

WHITEHORSE 2022 Yukon

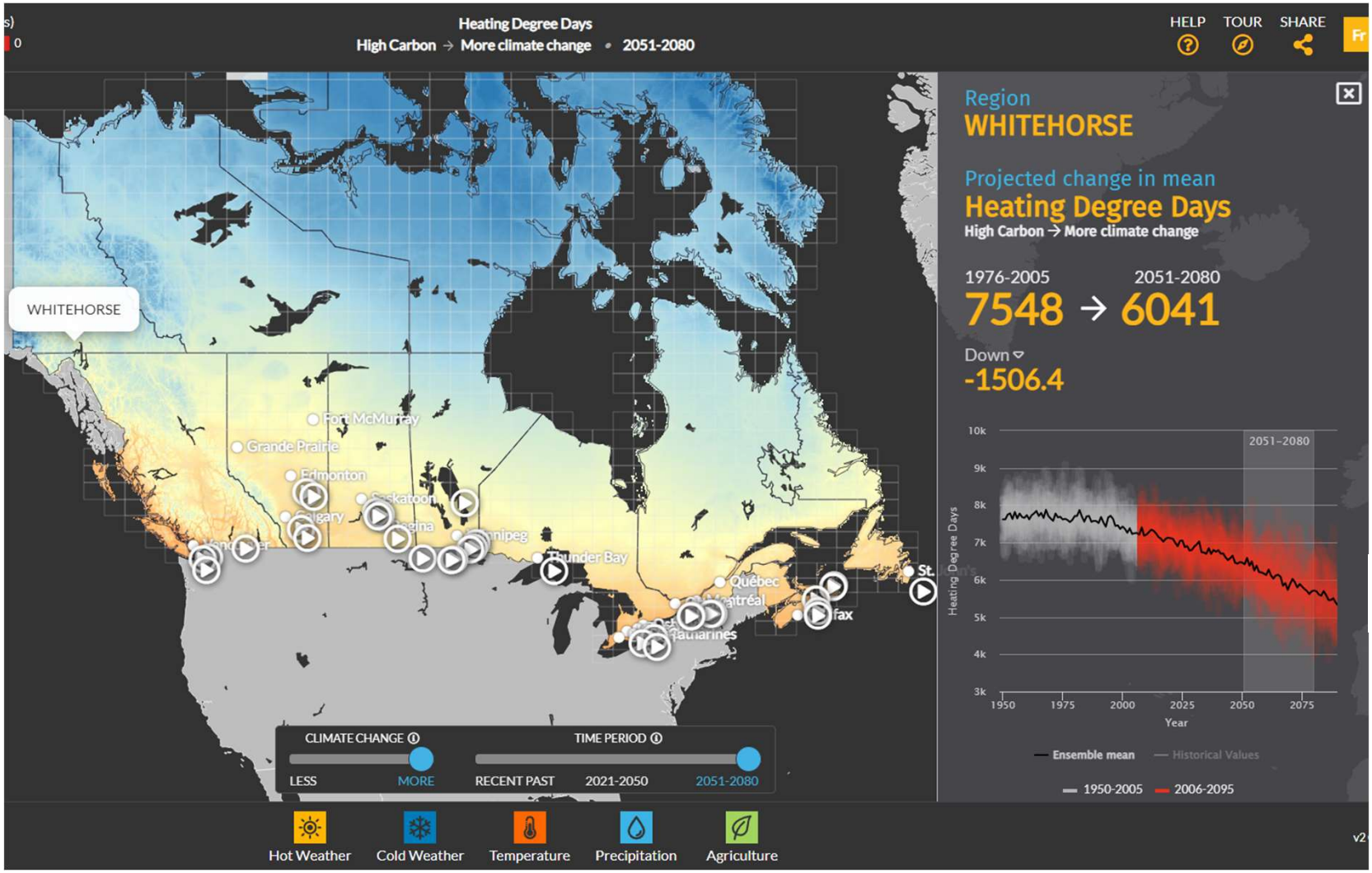
BUILD BETTER
HIGH PERFORMANCE
WALLS



Considerations for the North

SOPREMA

ACCOUNTING FOR CLIMATE CHANGE



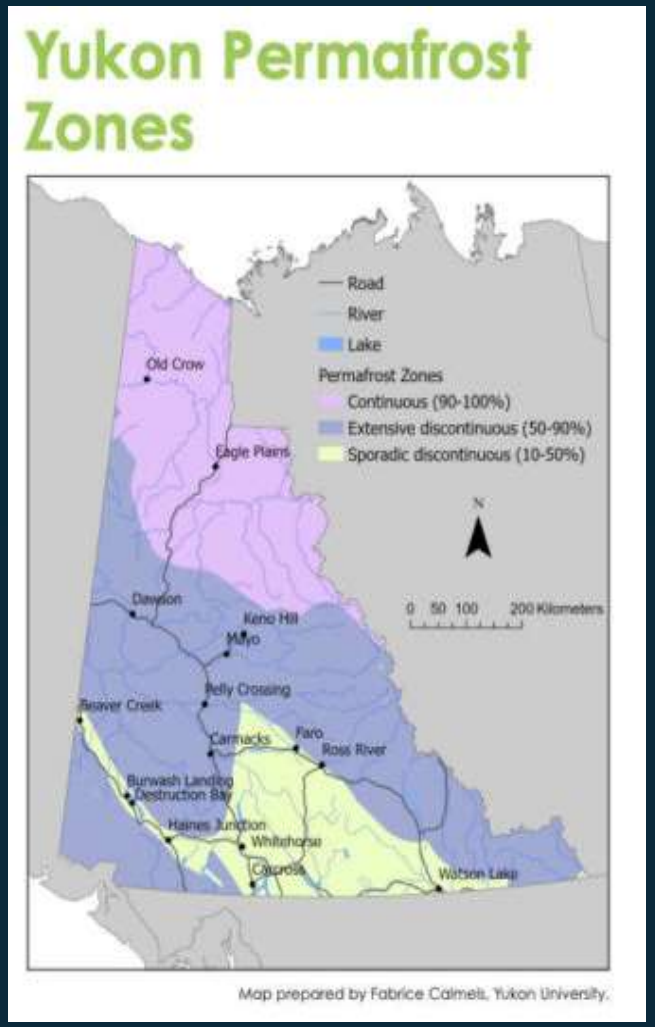
WILL CLIMATE ZONE 7A CLIMB TO WHITEHORSE?

SOPREMA

Northern Construction

The Government of Yukon Design Requirements and Technical Standards Manual states projects (excerpt):

1. Designed to be cost-effective, optimize value, are spatially efficient and easy to maintain.
2. Address conditions specific to the Yukon, including: local climate, the impacts of climate change, cold climate building design, the impacts of energy use, local construction and maintenance capacity, and limitations on material availability.
3. Constructed to be durable and energy efficient, meeting the Yukon government's minimum life expectancy of 60 years for the building structure and consider the service life of all building components from the perspective of life cycle costs.



BUILDING A SUSTAINABLE NORTH

FUTURE OF ARCHITECTURE

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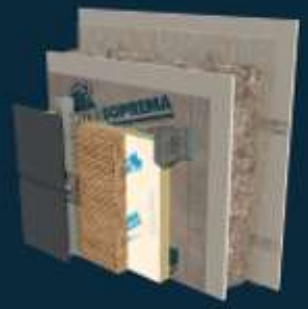
BUILDING
A SUSTAINABLE
NORTH

WHITEHORSE 2022 Yukon

BUILD BETTER
HIGH PERFORMANCE
WALLS



Wall Assembly Construction Considerations

SOPREMA

Six strategies that cost-effectively boost performance

1. BOOST INSULATION
To reduce heat loss, increase insulation in walls, floors, roof, and foundation.

2. VENTILATE SMARTLY
Bring plenty of fresh air into the home and recover heat from the exhaust air leaving the building.

3. MIND YOUR MACHINES
Specify efficient appliances, and ensure your heating system will meet – but not exceed – the home's needs.

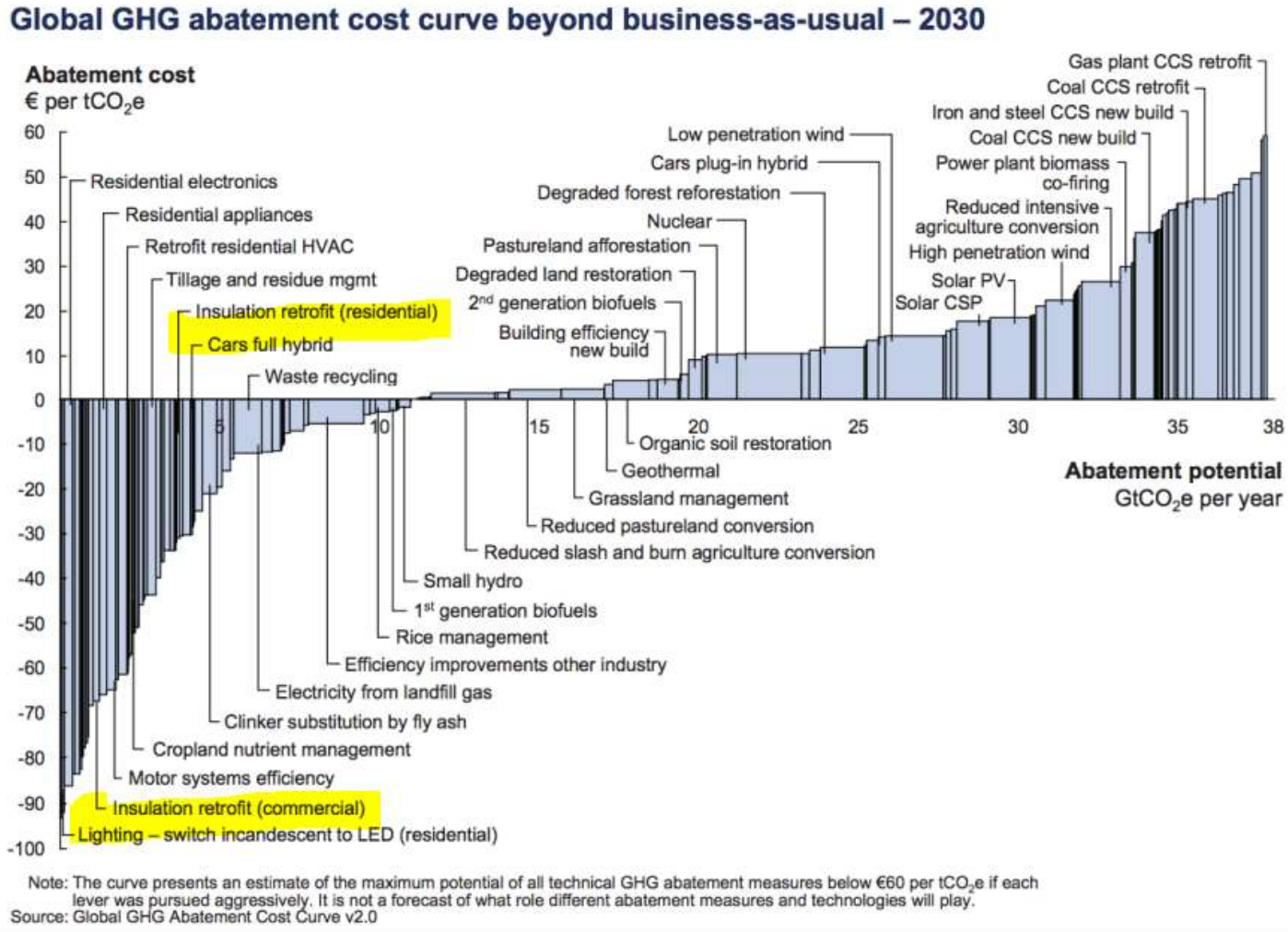
4. MINIMIZE THERMAL BRIDGES A break in your insulation acts like a bridge that carries heat straight out of the house. Take care with corners, junctions, gaps and studs!

5. SEAL IT UP
Air leaks are heat leaks. Wrap the home tightly, taking care to seal around ducts, pipes, fixtures, and wires that pass through walls, ceilings, and roof.

6. THINK ABOUT DOORS & WINDOWS
Carefully consider their energy performance, size, and location.

Graphic from Step 3, Hassle-Free Presentation (PDF)

Figure 1. The McKinsey marginal abatement cost curve



Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO_2e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.
Source: Global GHG Abatement Cost Curve v2.0

Source: McKinsey (2009), reproduced with permission of McKinsey & Company.

WALL TYPES

EXTERIOR INSULATED WALL (PERFECT WALL)

HYBRID WALL

EXTERIOR INSULATED WALL

(PERFECT WALL)

FEATURES

- Insulation to the exterior
- Air/vapour/weather barrier in the same plane

BENEFITS

- Simple (less components)
- Easier to address details (penetrations and flashings)
- Works in every climate zone
- No interior vapour retarder (allows drying to the inside)
- Reduces structura thermal bridging

HYBRID WALL

FEATURES

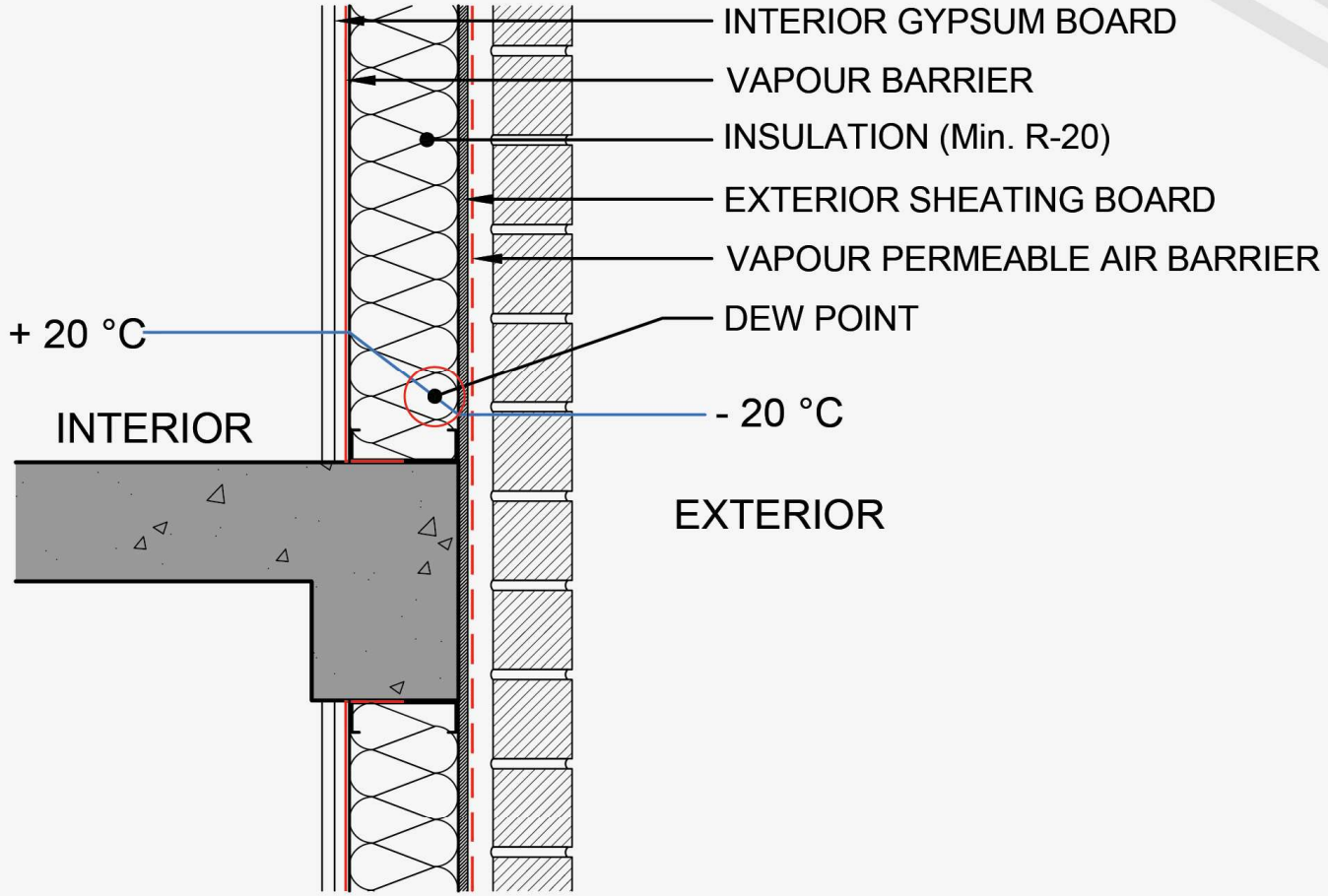
- Maximizes the space for insulation
- Thinner walls

BENEFITS

- Can be less expensive than Perfect Wall
- Increases interior space available for same building foot print (thinner walls)
- Can provide substantial sound attenuation
- Reduces structural thermal bridging

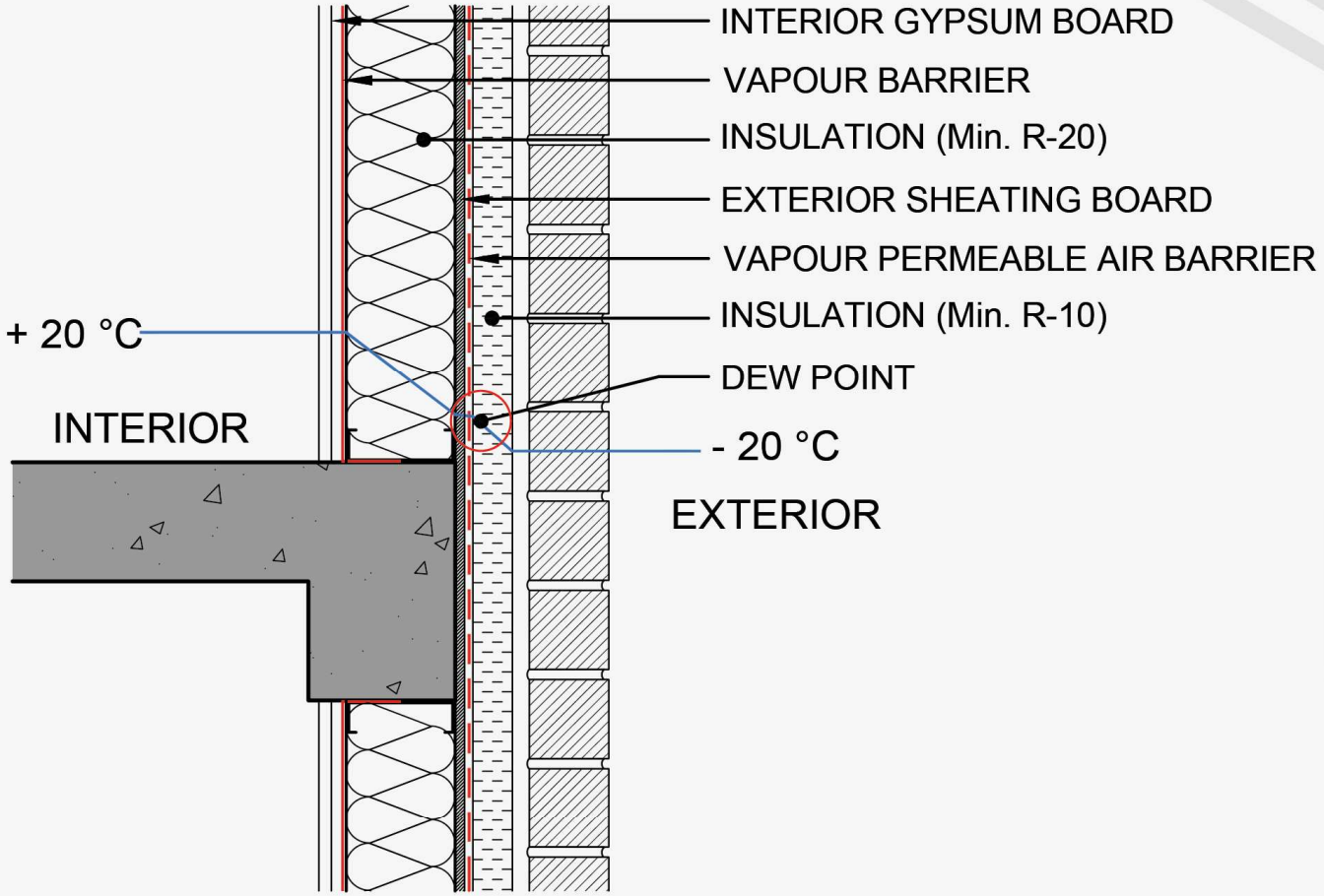
TEMPERATURE GRADIENT ANALYSIS

NO EXTERIOR INSULATION



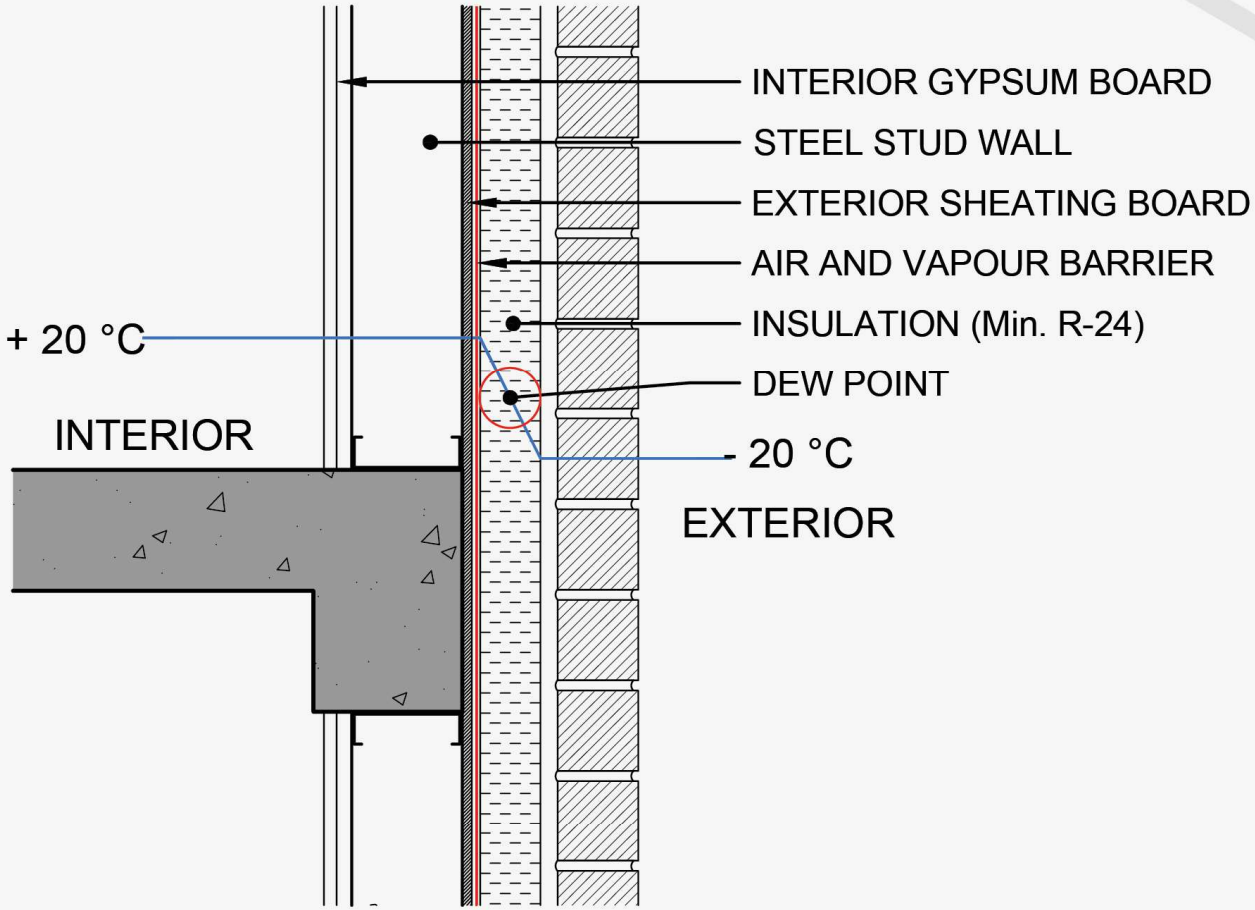
TEMPERATURE GRADIENT ANALYSIS

HYBRID WALL



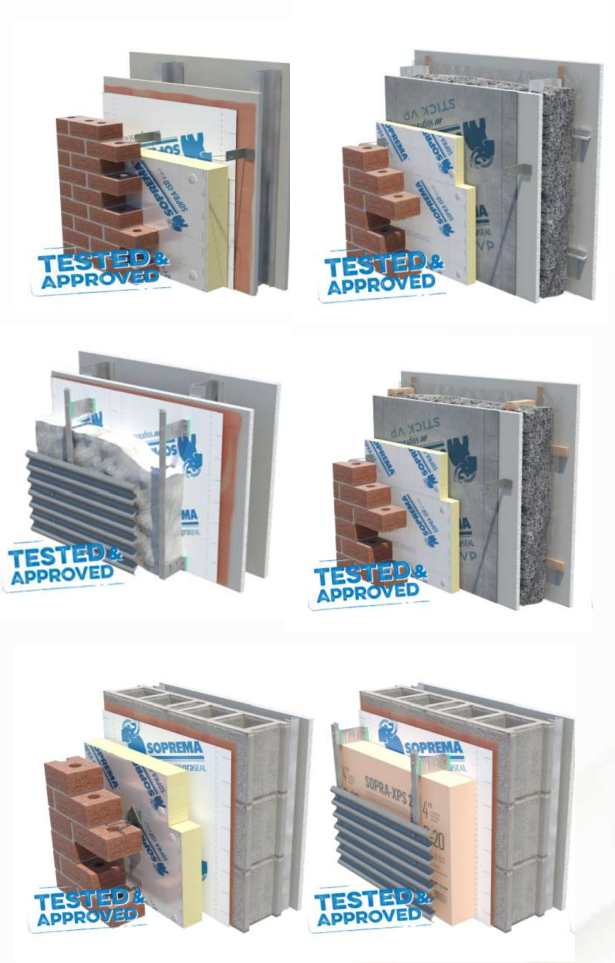
TEMPERATURE GRADIENT ANALYSIS

PERFECT WALL



MOISTURE PERFORMANCE

- Moisture Control in Exterior Insulated Wall Assemblies is straightforward and a well-accepted practice in cold climates and within the building science community
- Moisture Control in Split Insulated Wall Assemblies is more complex and requires a good understanding of the mechanisms of wetting and drying
- Increasing requirements for thermal efficiency provide an opportunity to not only optimize the application of insulation (reducing thermal bridging, increasing performance of insulation choice) but to reduce moisture risk



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MOISTURE PERFORMANCE

INSULATION THICKNESS REQUIRED TO MEET NECB 2017 REQUIREMENTS

CLIMATE ZONE	MAXIMUM ASSEMBLY U-VALUE PER TABLE 3.2.2.2.	MINIMUM ASSEMBLY EFFECTIVE THERMAL PERFORMANCE		REQUIRED NOMINAL EXTERIOR INSULATION		REQUIRED EXTERIOR INSULATION THICKNESS [1]											
	U [W/m².K]	RSI eff. [m².K/W]	R eff. [ft².h.°F/Btu]	RSI [m².K/W]	R [ft².h.°F/Btu]	Protected SOPRA-ISO V PLUS [2]		SOPRA-ISO V PLUS		SOPRA-XPS		SOPRA-SPF 202		SOPRA-SPF 100		STONE WOOL	
						mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
4	0.315	3.2	18.0	1.0	5.5	25	1.0	25	1.0	38	1.5	25	1.0	38	1.5	38	1.5
5	0.278	3.6	20.4	1.4	8.0	25	1.0	38	1.5	51	2.0	38	1.5	51	2.0	51	2.0
6	0.247	4,0	23.0	1.9	10.7	25	1.0	51	2.0	64	2.5	51	2.0	64	2.5	64	2.5
7 (A&B)	0.210	4.8	27.0	2.6	14.9	38	1.5	64	2.5	76	3.0	64	2.5	89	3.5	89	3.5
8	0.183	5.5	31.0	3.4	19.1	51	2.0	89	3.5	101	4.0	89	3.5	114	4.5	114	4.5

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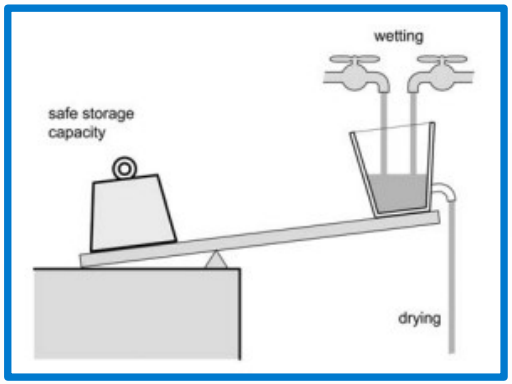
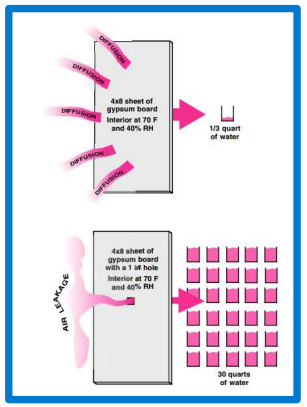
MOISTURE PERFORMANCE

Vapour Control Versus Air Leakage Condensation Control

"The main causes of moisture problems, in order of significance, are bulk water leaks, air leakage condensation, construction moisture, and lastly, water vapour diffusion."

(Source: SOPREMA Sopraseal Stick VP – Vapour Permeance Technical Bulletin – January 29, 2015) RDH





MOISTURE PERFORMANCE

Split Insulated Walls: More Exterior Insulation

Higher Ratio – Lower Moisture Risk

More thermally efficient exterior insulation means stud cavity insulation and vapour control can be reduced or may not be required at all

Hygrothermal Opportunity

Table 1: Classes of Vapour Retardancy

Defining Term	Vapour Retardance Class (Lstiburek, 2011)	US Perm	Material Examples (Perm) (Building Science Corporation, 2015)
Vapour impermeable (vapour barrier)	Class I Vapour Retarder	< 0.1 Perm	Polyethylene "poly" sheet (0.03)
Vapour semi-impermeable	Class II Vapour Retarder	0.1 - 1.0 Perm	VR Primer, Oil-based paints, vinyl coverings
Vapour semi-permeable	Class III Vapour Retarder	1.0 - 10 Perm	Asphalt Felt -#15, OSB, plywood, latex-based paints
Vapour permeable		> 10 Perm	Typar® (9-15), Tyvek® (55)

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MOISTURE PERFORMANCE

Basis of Recent IBC / IRC ABTG Research Report ABTGRR No. 1410-03

US Building Code Basis

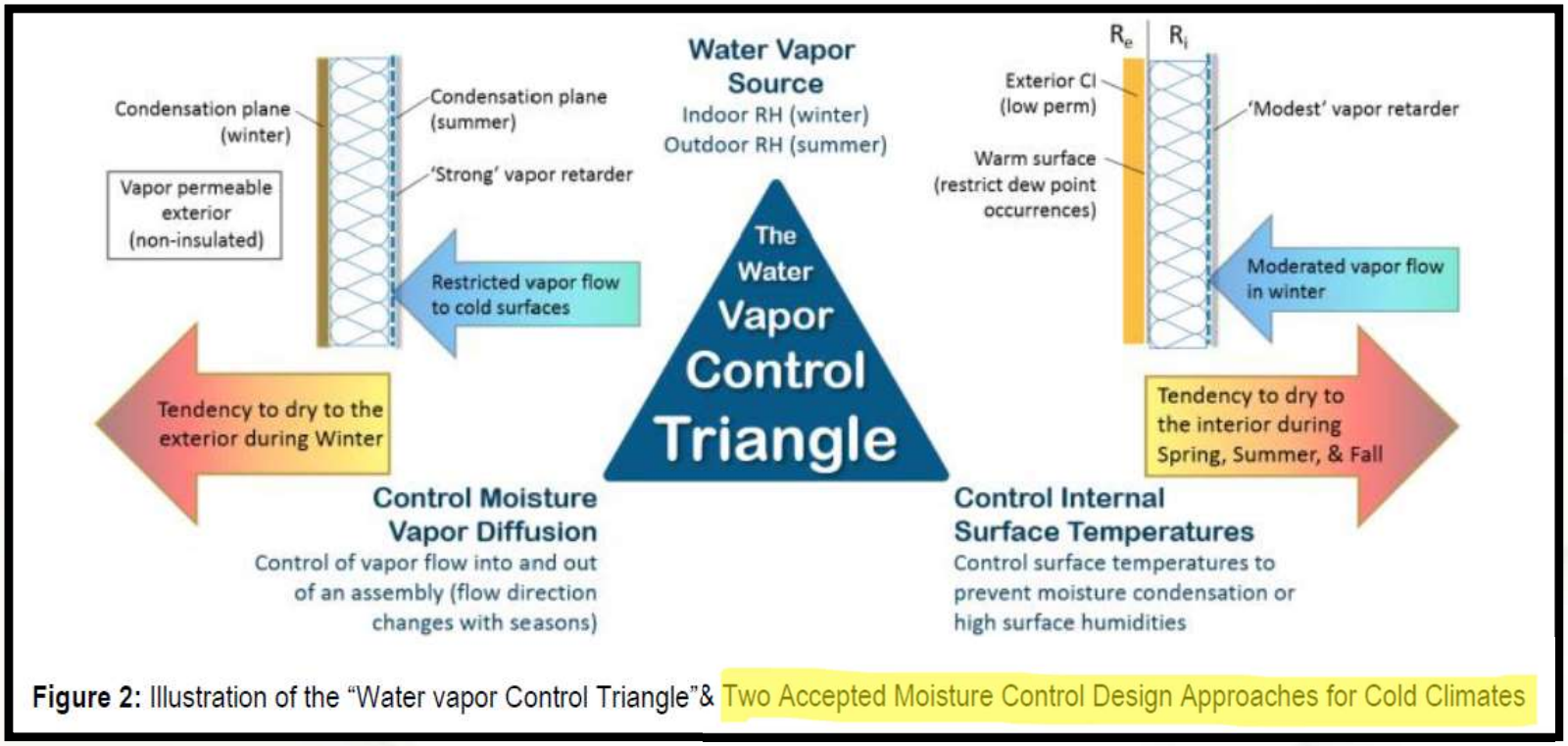

Figure 2: Illustration of the "Water vapor Control Triangle"& Two Accepted Moisture Control Design Approaches for Cold Climates

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MOISTURE PERFORMANCE

Split Insulated Walls – More Exterior Insulation

Higher Ratio – Lower Moisture Risk limited from Air Leakage Condensation

TABLE B-2 – INSULATION RATIO OF EXTERIOR TO INTERIOR INSULATION TO CONTROL AIR LEAKAGE CONDENSATION					
Indoor RH	20%	30%	40%	50%	60%
$T_{outdoor}$ (°C)					
0	0	0.12	0.32	0.47	0.6
-10	0.23	0.4	0.54	0.64	0.73
-20	0.41	0.55	0.65	0.73	0.8
-30	0.53	0.64	0.72	0.78	0.84
-40	0.66	0.70	0.76	0.82	0.86

High Ratio Split Insulated Walls may not require a vapour barrier because even the risk of air leakage condensation is well mitigated.

Source: RDH Optimal Northern Wall Design Guidelines

SOPREMA

AIR TIGHTNESS AND MOISTURE CONTROL

- Air Tightness is increasingly a Code Requirement and Critical Tennant of Passive House Design
- High Performance Buildings also require Efficient Ventilation Strategies to introduce fresh air (seen as a “good” energy expenditure and key to occupant comfort)
- Prudent mechanical designers also realize HRV’s ERV’s are an Opportunity to Control Indoor RH & improve “Drying to the Interior”

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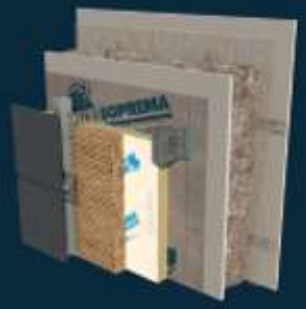
BUILDING
A SUSTAINABLE
NORTH

WHITEHORSE 2022 Yukon

BUILD BETTER
HIGH PERFORMANCE
WALLS



Wall Insulation Types and Material Properties

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INSULATION TYPES ON THE MARKET

SYNTHETIC INSULATION

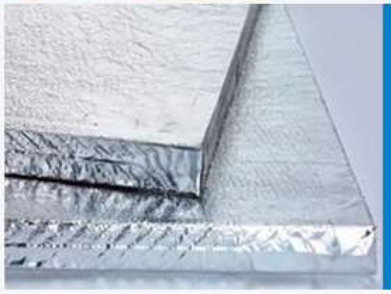
- Polyisocyanurate/polyurethane
- Polystyrene (XPS and EPS)
- Phenolic foam
- Etc.

MINERAL INSULATION

- Mineral wool
- Fibreglass
- Perlite/vermiculite
- Etc.

NATURAL INSULATION

- Cellulose
- Wood fibre
- Cork/hemp
- Etc.



NEW GENERATION INSULATION

- ICF
- Vacuum insulation panels
- Aerogels
- Etc.

WALLS

INSULATION

In addition to waterproofing products, SOPREMA offers high-performance insulation solutions for walls that meet the needs and requirements of construction professionals across the country.

SOPRA-CELLULOSE

is a thermal and acoustic cellulose insulation made of 85% recycled newspapers, and used in interior and exterior walls, attics, floors and ceilings.

SOPRA-XPS

is a rigid thermal insulation board made of extruded polystyrene. It is composed of closed-cell foam. It is mainly used as a thermal insulation for SOPREMA above-grade wall systems and on the inside of foundation walls.

WALLS
INSULATION

SOPRA-SPF 200

is a two-component, closed-cell spray-applied polyurethane foam insulation system.

SOPRA-ISO V ALU and SOPRA-ISO V PLUS

are closed-cell polyisocyanurate foam insulation boards for walls.

INSULATION STANDARDS IN CANADA

CAN/ULC S701.1 – POLYSTYRENE (EPS AND XPS)

CAN-ULC S702 – MINERAL FIBRE (ROCK WOOL AND FIBREGLASS)

CAN/ULC S703 – CELLULOSE

CAN/ULC S704 – POLYISO

CAN/ULC S705.1 AND .2 – SPRAY FOAM

INSULATION STANDARDS

POLYSTYRENE (EPS & XPS)

CAN/ULC-S701 — Standard that covers all applications

Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering

ASTM C578

Standard Specification for Preformed, Rigid, Cellular Polystyrene Thermal Insulation

POLYISOCYANURATE

CAN/ULC-S704

Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced

ASTM C1289

Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

STONE WOOL

CAN/ULC-S702

Standard for Mineral Fibre Thermal Insulation for Buildings

ASTM C726 — Specific standard for the roof

Standard Specification for Mineral Wool Roof Insulation Board

ASTM C612 — Specific standard for walls

Standard Specification for Mineral Fiber Block and Board Thermal Insulation

CELLULOSE

CAN/ULC-S703

Standard for Cellulose Fibre Insulation (CFI) for Buildings

ASTM C739

Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation

SPRAY FOAM

CAN-ULC-S705

Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density

ASTM D7425 — Specific standard for the roof

Standard Specification for Spray Polyurethane Foam Used for Roofing Applications

ASTM C1029 — Specific standard for walls

Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation

SOPRA-CELLULOSE

BENEFITS

SOPRA-CELLULOSE is a thermal and acoustic insulation made up of 85% recycled newspapers and 15% flame-retardant minerals. This product is effective for both new construction and renovation projects.

Environmentally friendly

- Composed of 100% recycled materials
- Eco-friendly manufacturing process

Higher thermal value than other traditional blown-in insulation

- R-value of 3.7 per inch

Exceptional soundproofing properties

Resistant to corrosion, mould, insects, and vermin

Excellent fire retardant properties

Compliant with CAN/ULC S703

SOPRA-XPS

EXTRUDED POLYSTYRENE

SOPRA-XPS is a thermal insulation panel composed of extruded polystyrene. It is made of closed-cell foam and used as thermal insulation for walls, foundations, roofs, and in civil engineering applications.

Excellent water and moisture resistance

Constant long-term thermal performance even at low temperatures

Multipurpose (they can be used in several applications)

Durable, sturdy and non-friable

Can be subject to high compression forces

Compliant with CAN/ULC S701.1

SOPRA-SPF 200

SPRAY APPLIED POLYURETHANE FOAM

SOPRA-SPF 200 is a two-component, closed-cell, spray-applied polyurethane foam insulation system. It is a medium-density closed-cell foam (2 lb/ft³ or 32 kg m³). **SOPRA-SPF 200** is designed for commercial, industrial and residential insulation applications.

One of the best thermal performers on the market (LTTR-6/inch)

The insulation with the best resistance to mould

Monolithic insulation
(without any joints)

- Perfect for irregular or detailed surfaces
- Limits thermal bridging and air infiltration to the maximum

Superior coverage rate

Compliant with CAN/ULC S705.1 and S705.2

SOPRA-ISO V

POLYISO FOR WALLS

SOPRA-ISO V ALU is a closed-cell polyiso foam insulation board laminated with a reflective foil facer on the back side, serving as a radiant barrier, and a non-reflective aluminum facer on the top surface, while **SOPRA-ISO V PLUS** is laminated with a non-reflective glass-mat-facer on both sides.

HIGH R-VALUE BASED ON LTTR
The most thermally efficient insulation for walls

DURABILITY
Rigid board with excellent dimensional stability

CAN BE USED IN A VAPOUR-PERMEABLE ASSEMBLY*

COMPATIBLE WITH MOST SOLVENTS USED IN CONSTRUCTION ADHESIVES

GOOD FIRE AND MOISTURE RESISTANCE THANKS TO ITS FACERS

Compliant with CAN/ULC S704.1

*With SOPRA-ISO V PLUS,1 inch or less

BUILDING
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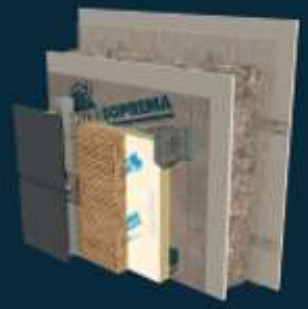
NORTH

WHITEHORSE 2022 Yukon

BUILD BETTER
HIGH PERFORMANCE
WALLS

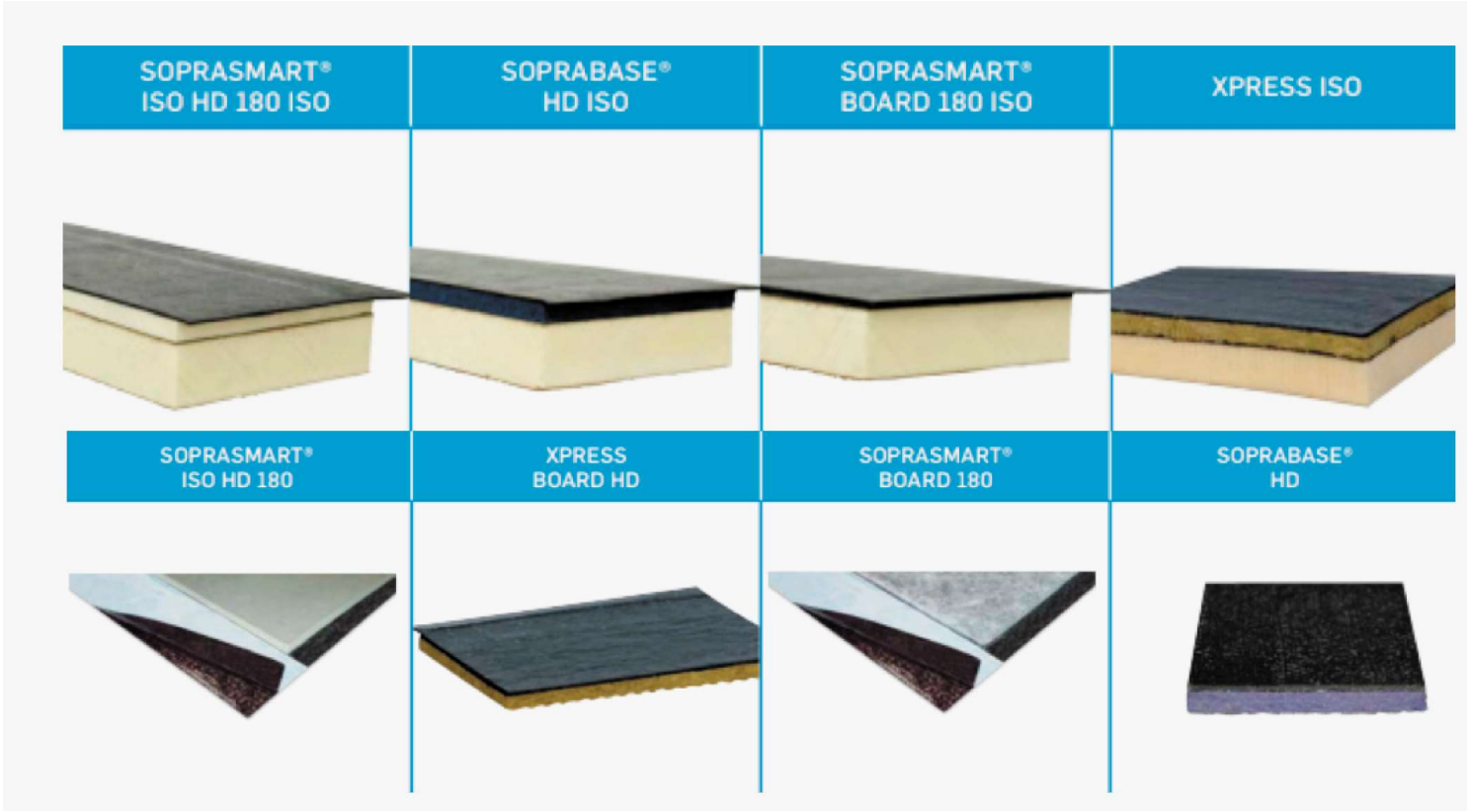


Cold Temperature Performance

SOPREMA

PRE-ASSEMBLED PRODUCTS

Why Not? We have precedent for this …..

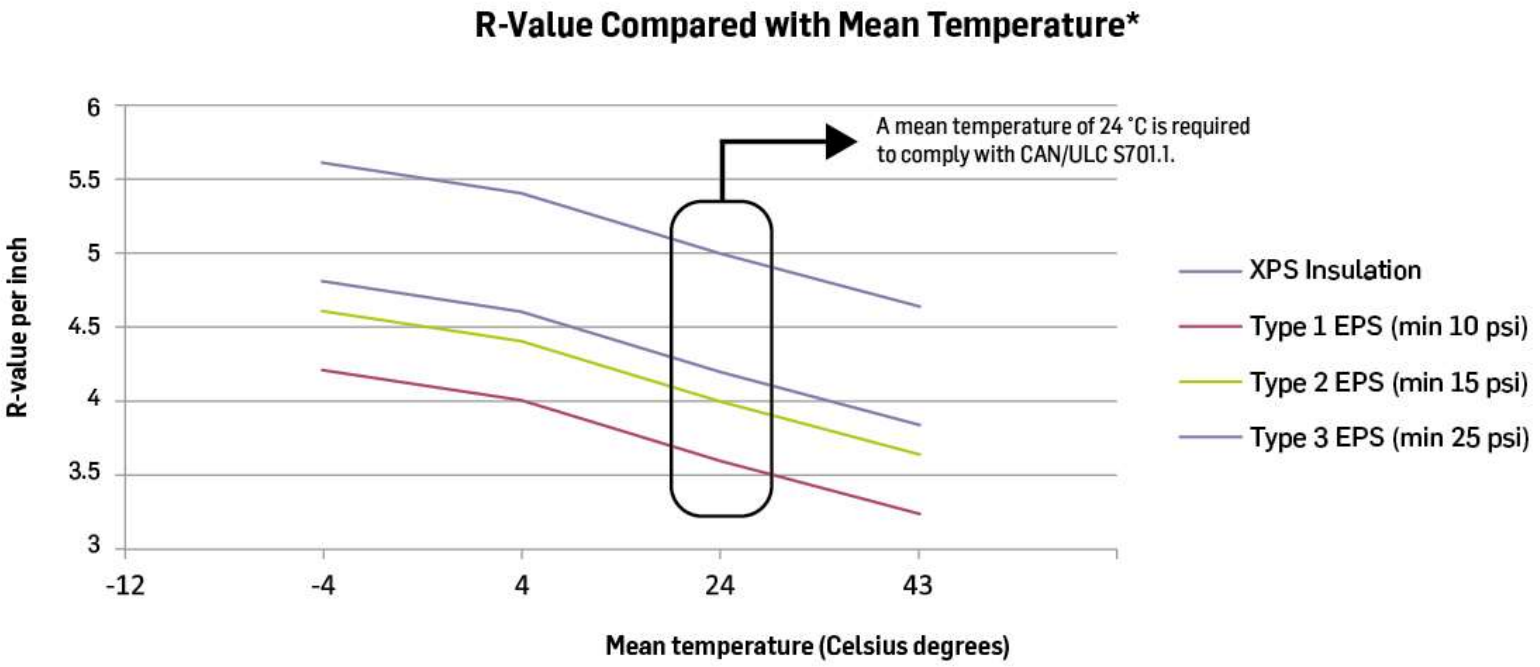


SOPRA-XPS

EXTRUDED POLYSTYRENE

INSULATING PROPERTIES

R-Value per inch of XPS is always greater than that of EPS, regardless of the mean temperature



INFLUENCE OF TEMPERATURE ON PERFORMANCE OF INSULATION

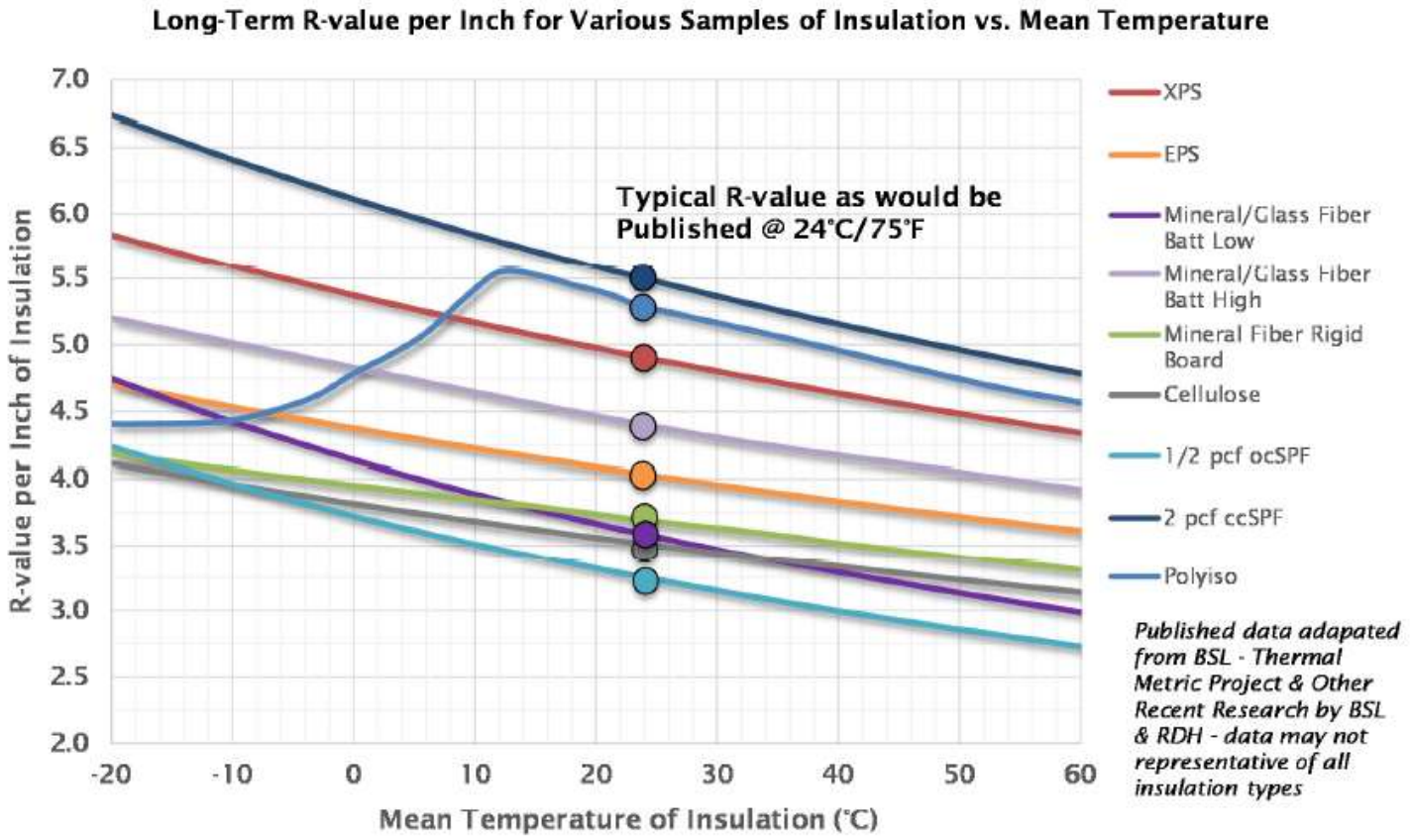


Figure B-1 – Temperature Dependant R-values for Common Insulation Materials

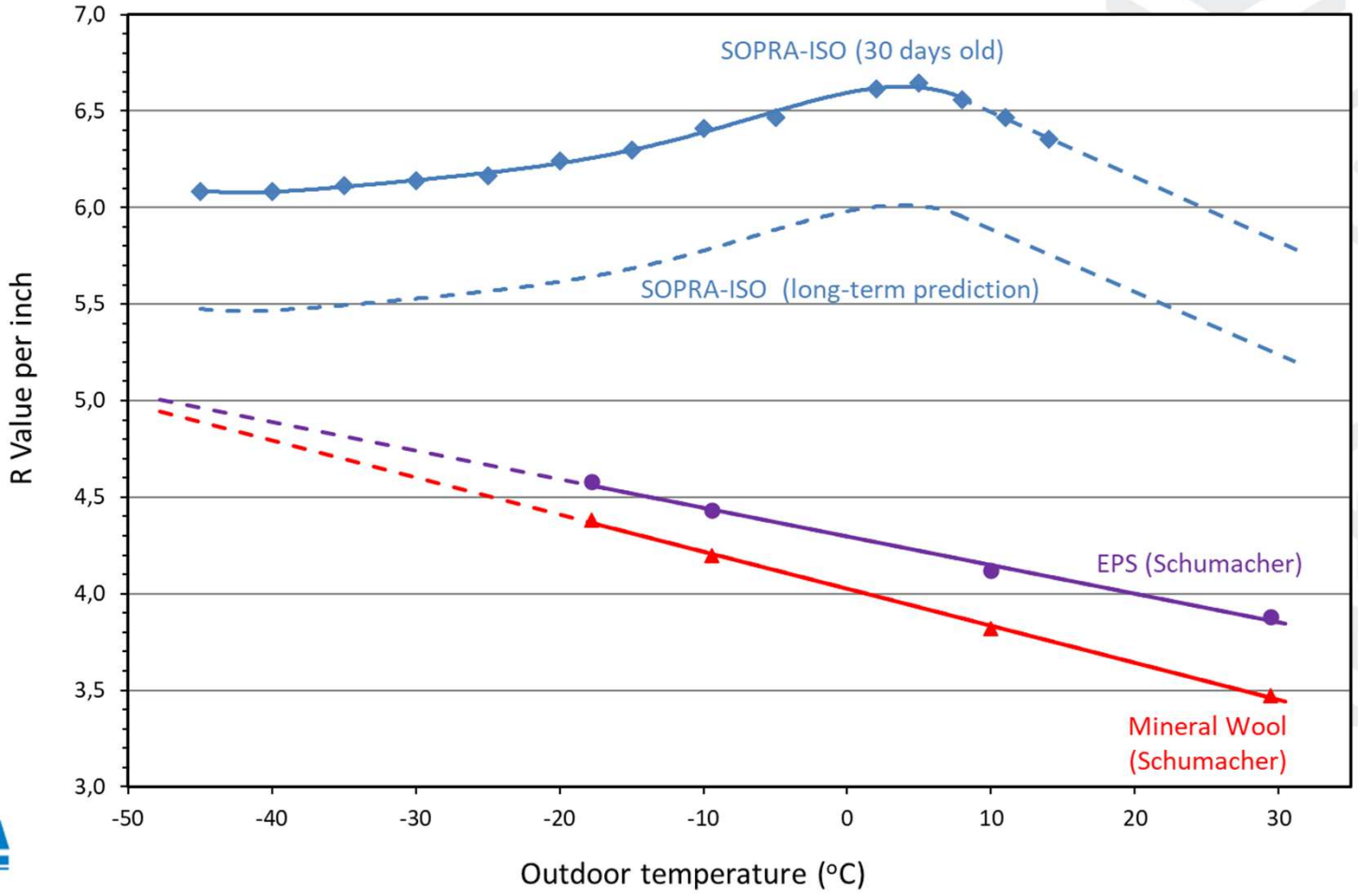
Source: RDH Optimal Northern Wall Design Guidelines

SOPREMA

INFLUENCE OF TEMPERATURE ON PERFORMANCE OF INSULATION

As temperature drops, the R-value of SOPRA-ISO increases to a maximum, then decreases and stabilizes. The R-value of SOPRA-ISO remains higher than that of EPS and Mineral Wool over the entire range of temperatures the building will be exposed to.

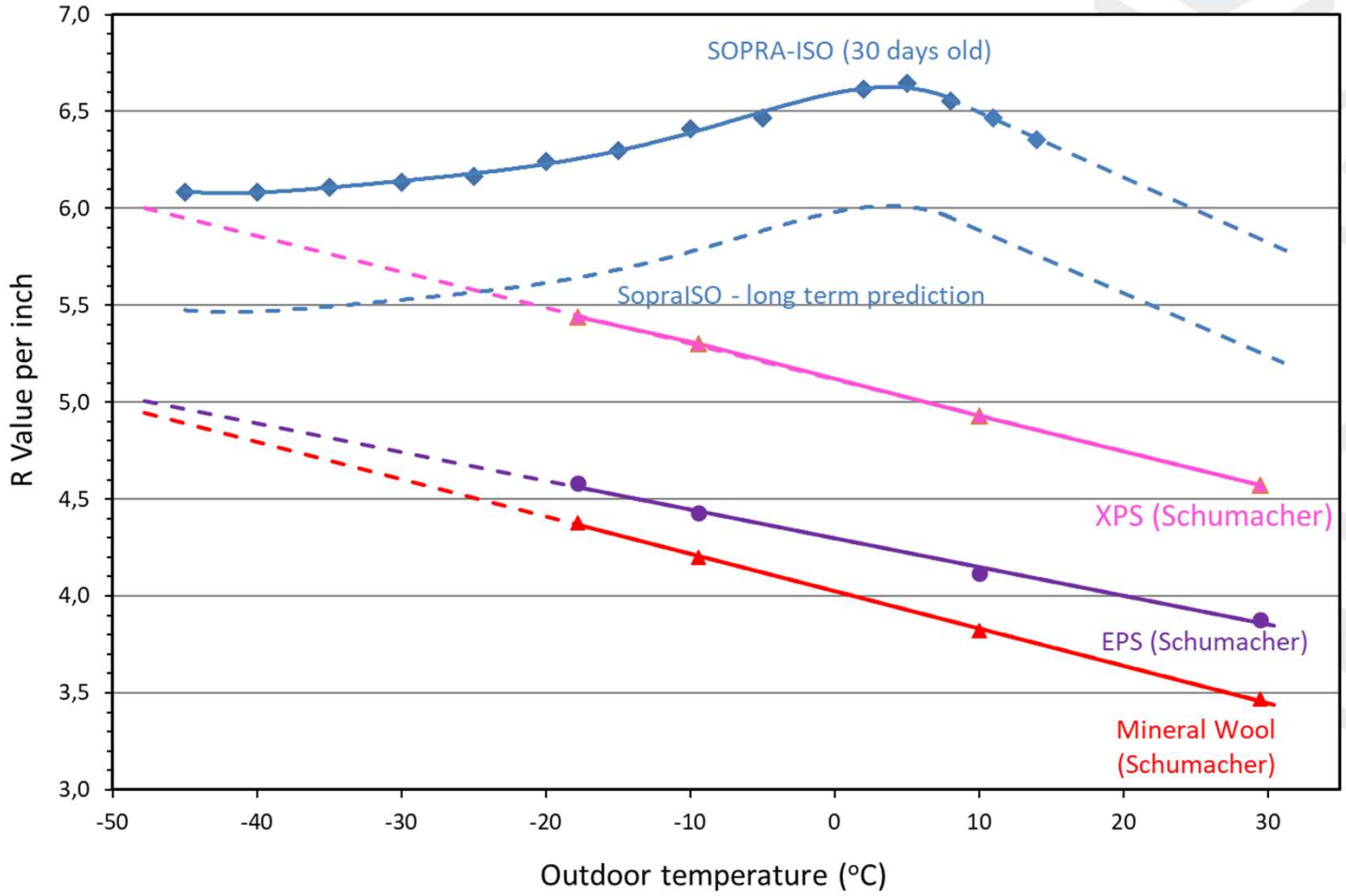
SOPRA-ISO performs better than other insulation products all year, both short and long term.



SOPREMA

INFLUENCE OF TEMPERATURE ON PERFORMANCE OF INSULATION

As temperature drops, the R-value of SOPRA-ISO increases to a maximum, then decreases and stabilizes. The R-value of SOPRA-ISO remains higher than that of EPS and Mineral Wool over the entire range of temperatures the building will be exposed to.



SOPREMA

SOPRA-ISO

R-VALUES: ACTUAL VS. TDS

Taking into account the big picture of the situation over an entire year, SOPRA-ISO provides a thermal performance equal to or greater than that stated in its technical data sheet.

	R-Value of SOPRA-ISO lower than the TDS ▼	R-Value of SOPRA-ISO higher than the TDS ▼	R-Value of all insulation types lower than the TDS ▼
CITY	T° < -12 °C	T° between -12 °C and 18 °C	T° < -18 °C
Vancouver, BC	0	7472 (85.3%)	7 472 (85.3%)
Edmonton, AB	1178 (13.4%)	6493 (74.1%)	1089 (12.4%)
Winnipeg, MB	1284 (14.7%)	5985 (68.3%)	1491 (17.0%)
Toronto, ON	93 (1.1%)	6619 (75.6%)	2048 (23.4%)
Montréal, QC	539 (6.2%)	6522 (74.5%)	2213 (25.3%)
Fredericton, NB	631 (7.2%)	6522 (74.5%)	1607 (18.3%)

R-Value of all insulation materials decreases when temperature is higher than 18 °C

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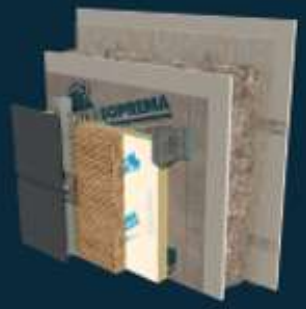
BUILD BETTER
HIGH PERFORMANCE
WALLS



Introduction to Build Better Walls

SOPREMA

WE UNDERTOOK A SERIES OF TESTS AND SIMULATIONS IN PARTNERSHIP WITH EXTERNAL FIRMS.

THERMAL SIMULATIONS

MORRISON HERSHFIELD

EVOKE

HYGROTHERMAL SIMULATIONS

UL CLEB

FIRE TESTING

SENEZ CO. FIRE SCIENCE & ENGINEERING

intertek Total Quality. Assured.

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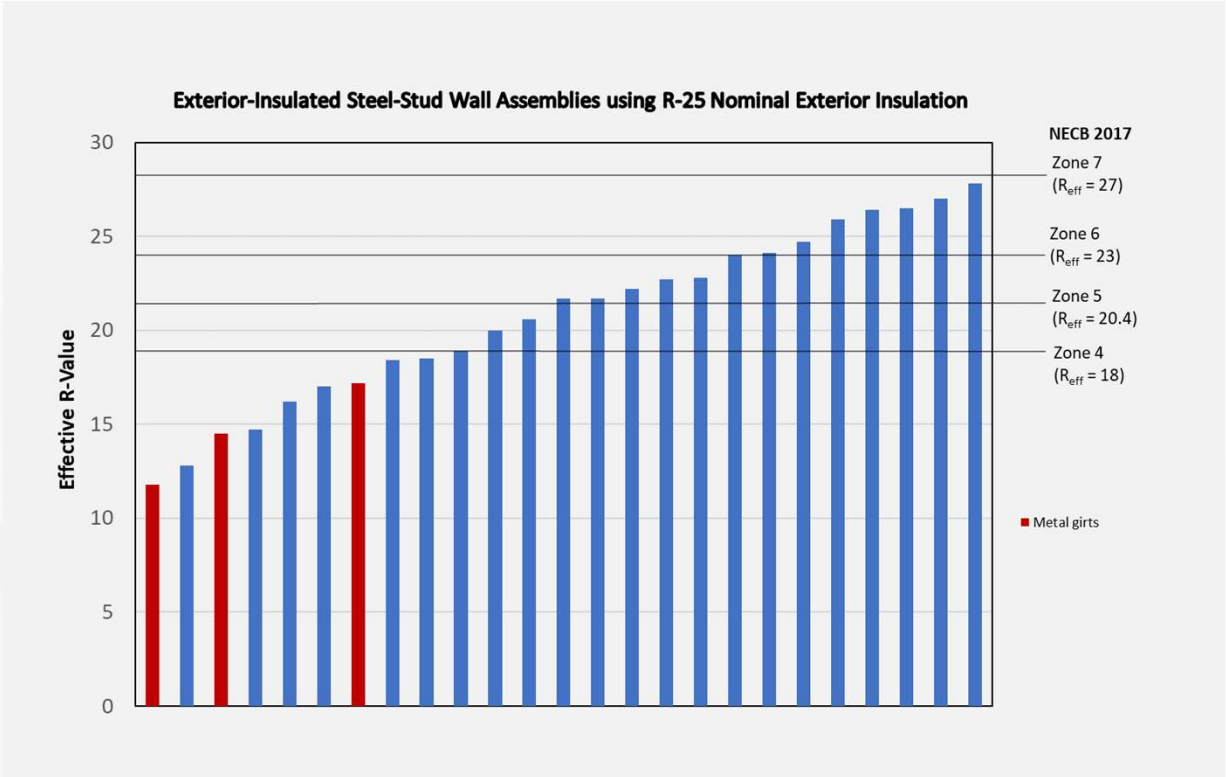
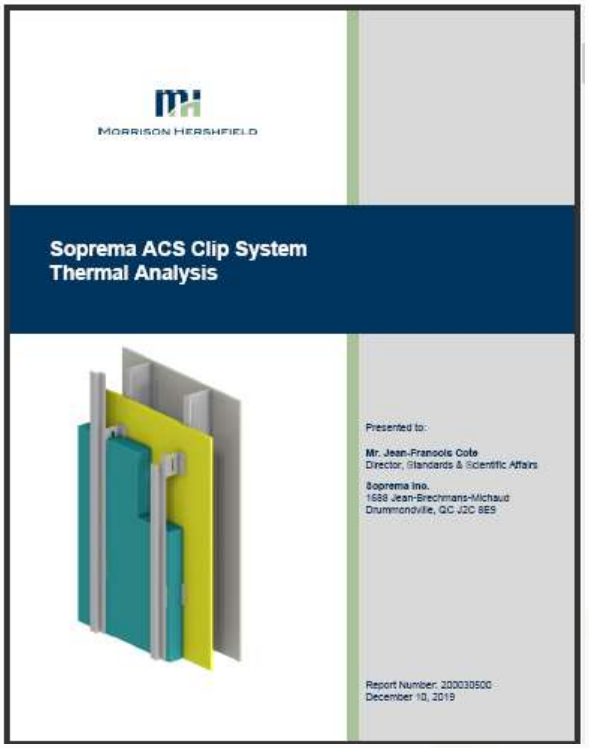
THERMAL PERFORMANCE





THERMAL PERFORMANCE

SOPREMA

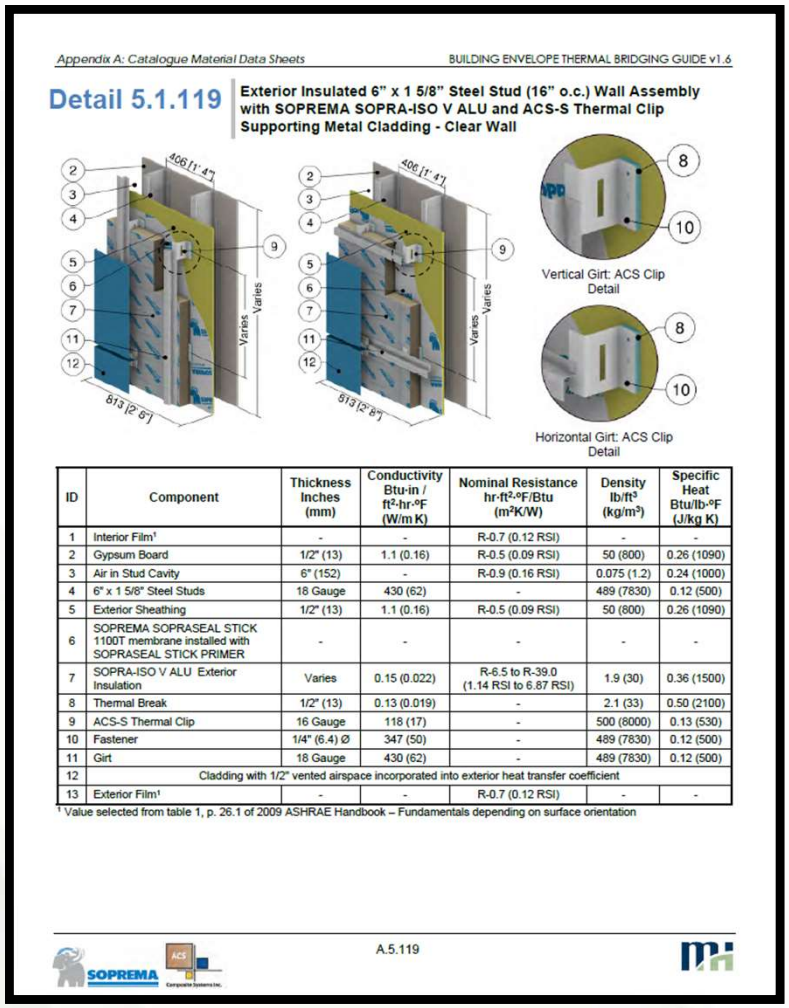
THERMAL PERFORMANCE

Table 3.1: U-Value and Effective R-Value for ACS-S Thermal Clip with **SOPRA-XPS 20** Exterior Insulation: Exterior Insulated Steel Stud Wall Assemblies

Horizontal Clip Spacing	Exterior Insulation Thickness in (mm)	Exterior Insulation 1D R-value² (RSI)	24" Vertical Spacing		36" Vertical Spacing		48" Vertical Spacing	
			R_o ft²·hr·°F / Btu (m^2 K / W)	U_o Btu/ft² ·hr ·°F (W/m^2 K)	R_o ft²·hr·°F / Btu (m^2 K / W)	U_o Btu/ft² ·hr ·°F (W/m^2 K)	R_o ft²·hr·°F / Btu (m^2 K / W)	U_o Btu/ft² ·hr ·°F (W/m^2 K)
16	3.0 (76)	R-15.0 (2.64)	R-17.2 (3.03)	0.058 (0.33)	R-17.5 (3.09)	0.057 (0.32)	R-17.7 (3.11)	0.057 (0.32)
	4.0 (102)	R-20.0 (3.52)	R-21.6 (3.81)	0.046 (0.26)	R-22.1 (3.89)	0.045 (0.26)	R-22.4 (3.94)	0.045 (0.25)
	5.0 (127)	R-25.0 (4.40)	R-25.9 (4.56)	0.039 (0.22)	R-26.6 (4.68)	0.038 (0.21)	R-27.0 (4.75)	0.037 (0.21)
	6.0 (152)	R-30.0 (5.28)	R-30.2 (5.32)	0.033 (0.19)	R-31.1 (5.48)	0.032 (0.18)	R-31.6 (5.57)	0.032 (0.18)
	7.0 (178)	R-35.0 (6.16)	R-34.3 (6.04)	0.029 (0.17)	R-35.5 (6.25)	0.028 (0.16)	R-36.1 (6.36)	0.028 (0.16)
24	3.0 (76)	R-15.0 (2.64)	R-17.5 (3.09)	0.057 (0.32)	R-17.7 (3.12)	0.056 (0.32)	R-17.8 (3.14)	0.056 (0.32)
	4.0 (102)	R-20.0 (3.52)	R-22.1 (3.90)	0.045 (0.26)	R-22.5 (3.96)	0.045 (0.25)	R-22.6 (3.99)	0.044 (0.25)
	5.0 (127)	R-25.0 (4.40)	R-26.6 (4.69)	0.038 (0.21)	R-27.1 (4.78)	0.037 (0.21)	R-27.4 (4.82)	0.037 (0.21)
	6.0 (152)	R-30.0 (5.28)	R-31.1 (5.48)	0.032 (0.18)	R-31.8 (5.60)	0.031 (0.18)	R-32.1 (5.65)	0.031 (0.18)
	7.0 (178)	R-35.0 (6.16)	R-35.5 (6.26)	0.028 (0.16)	R-36.3 (6.40)	0.028 (0.16)	R-36.8 (6.48)	0.027 (0.15)

SOPREMA

THERMAL PERFORMANCE



Appendix A: Catalogue Material Data Sheets BUILDING ENVELOPE THERMAL BRIDGING GUIDE v1.6

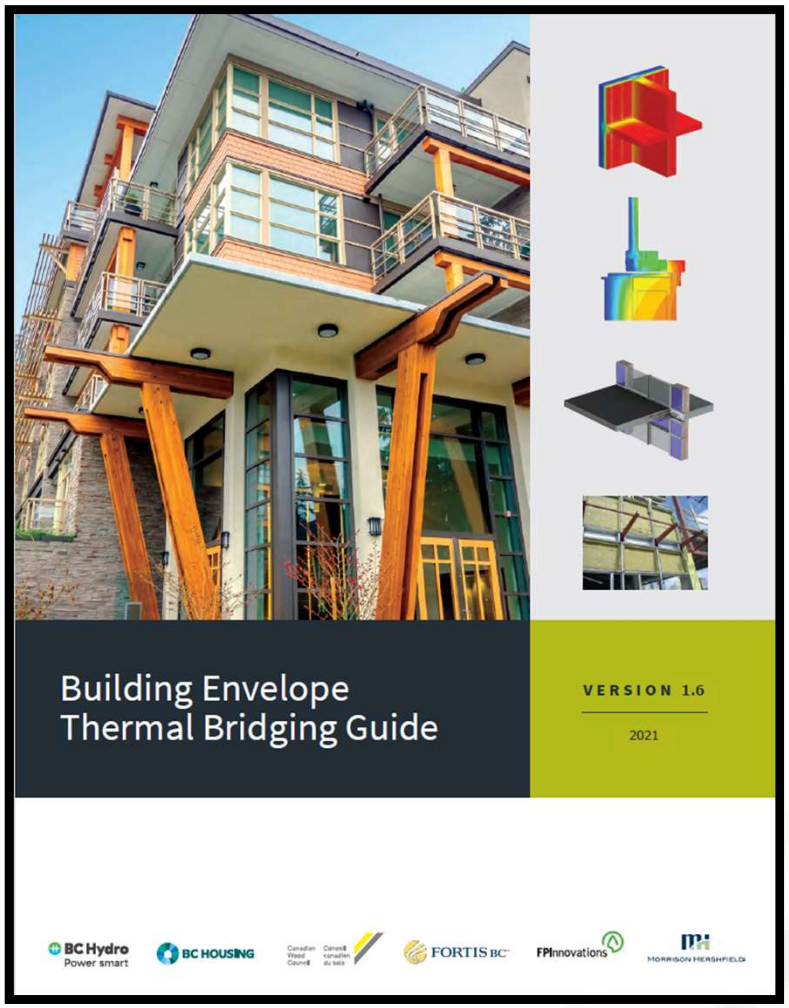
Detail 5.1.119 **Exterior Insulated 6" x 1 5/8" Steel Stud (16" o.c.) Wall Assembly with SOPREMA SOPRA-ISO V ALU and ACS-S Thermal Clip Supporting Metal Cladding - Clear Wall**

ID	Component	Thickness Inches (mm)	Conductivity Btu-in / ft²-hr-°F (W/m K)	Nominal Resistance hr-ft²-°F/Btu (m²K/W)	Density lb/ft³ (kg/m³)	Specific Heat Btu/lb-°F (J/kg K)
1	Interior Film[1]	-	-	R-0.7 (0.12 RSI)	-	-
2	Gypsum Board	1/2" (13)	1.1 (0.16)	R-0.5 (0.09 RSI)	50 (800)	0.26 (1090)
3	Air in Stud Cavity	6" (152)	-	R-0.9 (0.16 RSI)	0.075 (1.2)	0.24 (1000)
4	6" x 1 5/8" Steel Studs	18 Gauge	430 (62)	-	489 (7830)	0.12 (500)
5	Exterior Sheathing	1/2" (13)	1.1 (0.16)	R-0.5 (0.09 RSI)	50 (800)	0.26 (1090)
6	SOPREMA SOPRASEAL STICK 1100T membrane installed with SOPRASEAL STICK PRIMER	-	-	-	-	-
7	SOPRA-ISO V ALU Exterior Insulation	Varies	0.15 (0.022)	R-6.5 to R-39.0 (1.14 RSI to 6.87 RSI)	1.9 (30)	0.36 (1500)
8	Thermal Break	1/2" (13)	0.13 (0.019)	-	2.1 (33)	0.50 (2100)
9	ACS-S Thermal Clip	16 Gauge	118 (17)	-	500 (8000)	0.13 (530)
10	Fastener	1/4" (6.4) Ø	347 (50)	-	489 (7830)	0.12 (500)
11	Girt	18 Gauge	430 (62)	-	489 (7830)	0.12 (500)
12	Cladding with 1/2" vented airspace incorporated into exterior heat transfer coefficient					
13	Exterior Film[1]	-	-	R-0.7 (0.12 RSI)	-	-

[1] Value selected from table 1, p. 26.1 of 2009 ASHRAE Handbook – Fundamentals depending on surface orientation

SOPREMA ACS

A.5.1.19



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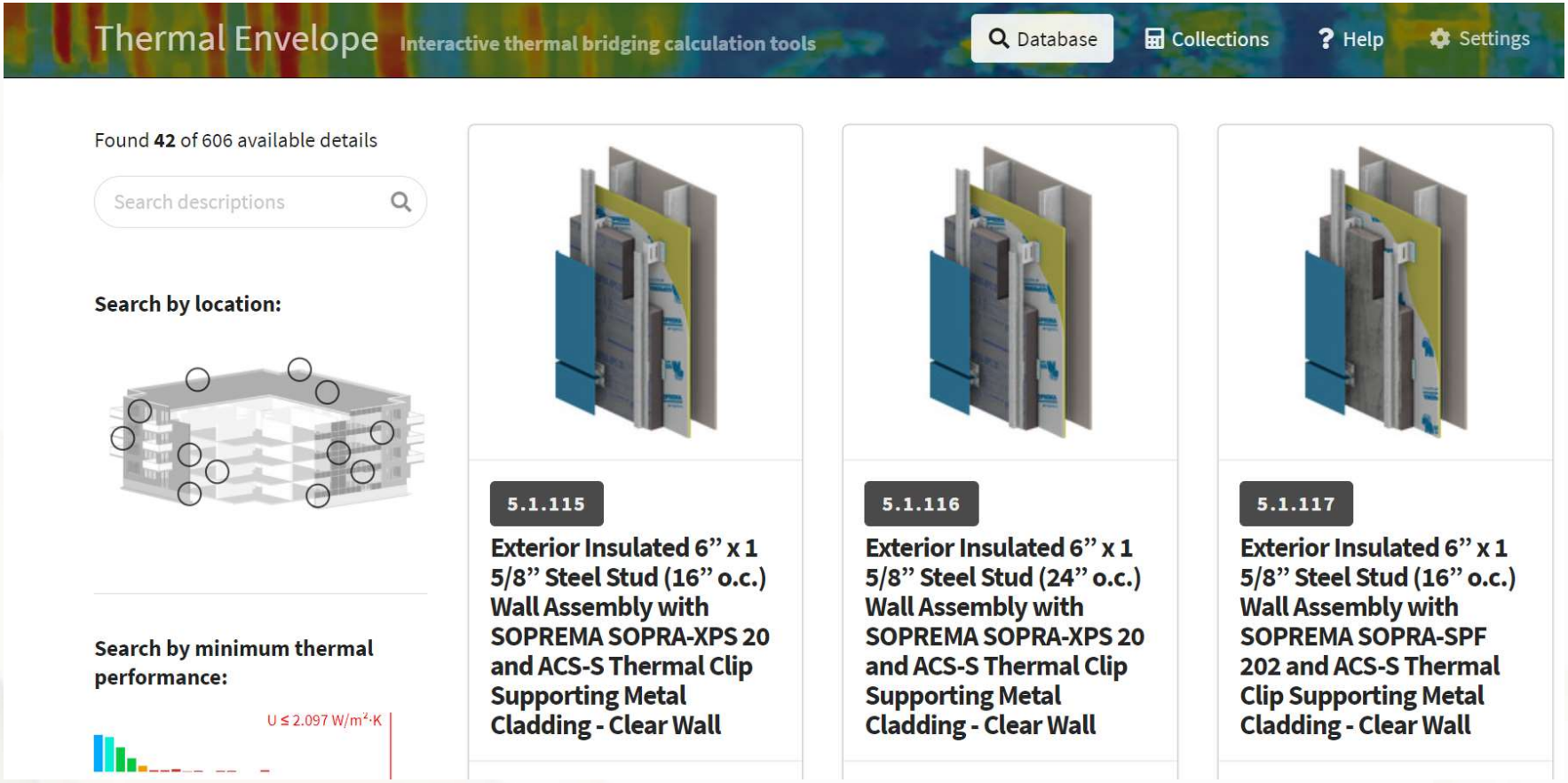
THERMAL PERFORMANCE



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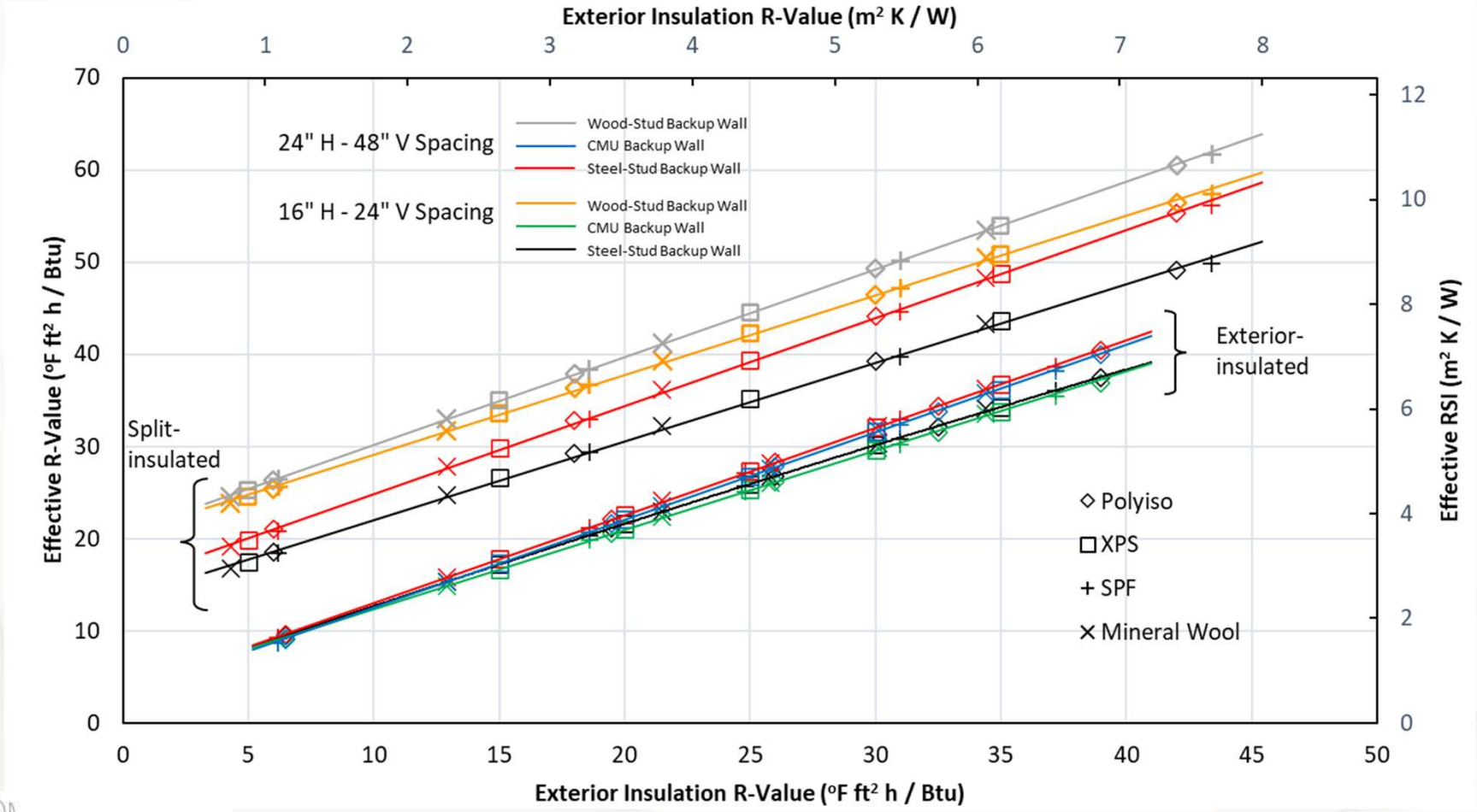
THERMAL PERFORMANCE



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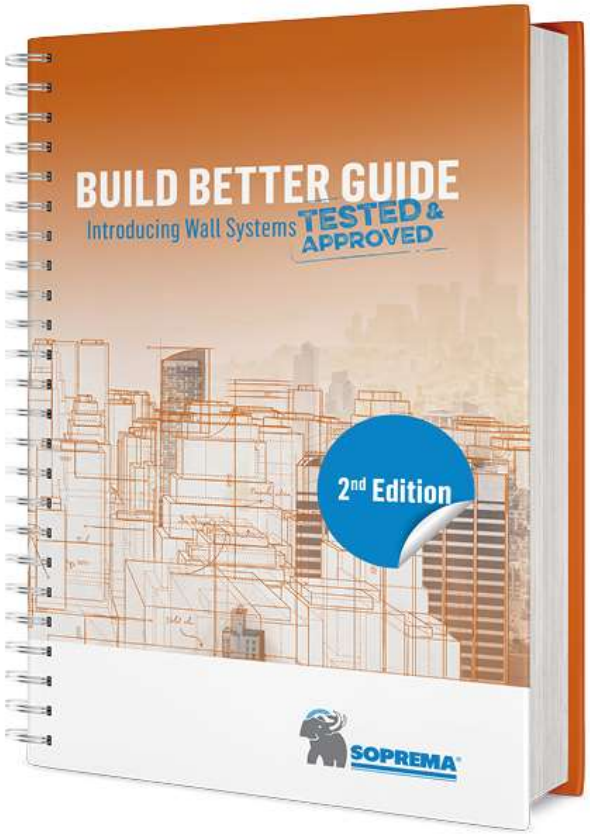


BUILD BETTER GUIDE

SOPREMA

NEW TO BUILD BETTER – SECOND EDITION

ATTACHMENT SYSTEM FOR PANELLIZED EXTERIOR CLADDING

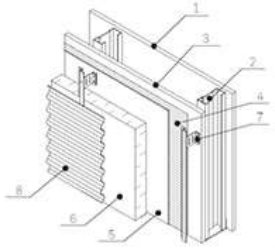
SOPREMA'S PROTECTED ASSEMBLY

THE BUILD BETTER GUIDE PRESENTS THE THERMAL PERFORMANCE OF DIFFERENT WALL ASSEMBLIES

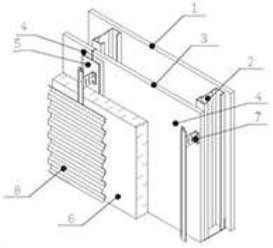
EXTERIOR INSULATED WALL - STEEL STRUCTURE

4.2.2. ACS THERMAL CLIP

WITH FULL MEMBRANE



TAPE ON SUBSTRATE JOINTS
SOPRA-SPF 202 ONLY



Gypsum board (1) (2) Uninsulated 6 in. steel studs
Exterior Sheathing (3) (4) Primer
Air/vapour barrier membrane (5) (6) Exterior insulation
ACS thermal clip (7) (8) Exterior cladding

INSULATION THICKNESS REQUIRED TO MEET NECB 2017 REQUIREMENTS

CLIMATE ZONE	MAXIMUM ASSEMBLY U-VALUE PER TABLE 3.2.2.2.	MINIMUM ASSEMBLY EFFECTIVE THERMAL PERFORMANCE		REQUIRED NOMINAL EXTERIOR INSULATION		REQUIRED EXTERIOR INSULATION THICKNESS (1)									
	U	RSI eff.	R eff.	RSI	R	Protected SOPRA-ISO V ALU (2)		SOPRA-ISO V ALU		SOPRA-XPS		SOPRA-SPF 202		STONE WOOL	
						mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
4	0.315	3.2	18.0	2.7	15.3	38	1.5	64	2.5	89	3.5	64	2.5	101	4.0
5	0.278	3.6	20.4	3.2	17.9	38	1.5	76	3.0	101	4.0	76	3.0	114	4.5
6	0.247	4.0	23.0	3.6	20.7	51	2.0	89	3.5	114	4.5	89	3.5	127	5.0
7 (AB)	0.220	4.5	27.0	4.4	25.0	76	3.0	101	4.0	140	5.5	114	4.5	152	6.0
8	0.183	5.5	33.0	5.2	29.4	89	3.5	127	5.0	152	6.0	127	5.0	178	7.0

(1) 16" horizontal and 48" vertical clip spacing.
(2) SOPRA-ISO V ALU thickness indicated. An additional 51 mm (2 in.) of stone wool protects SOPRA-ISO V ALU.

INSULATION THICKNESS REQUIRED TO MEET VARIOUS PERFORMANCE TARGETS

PERFORMANCE TARGET			REQUIRED NOMINAL EXTERIOR INSULATION		REQUIRED EXTERIOR INSULATION THICKNESS (1)							
U	RSI eff.	Reff	RSI	R	Protected SOPRA-ISO V ALU (2)		SOPRA-ISO V ALU		SOPRA-XPS		SOPRA-SPF 202	
					mm	in.	mm	in.	mm	in.	mm	in.
0.284	3.5	20.0	3.1	17.5	38	1.5	76	3.0	89	3.5	76	3.0
0.227	4.4	25.0	4.0	22.9	64	2.5	101	4.0	127	5.0	101	4.0
0.189	5.3	30.0	5.0	28.1	89	3.5	114	4.5	152	6.0	127	5.0
0.167	6.2	35.0	6.0	33.8	101	4.0	140	5.5	178	7.0	140	5.5
0.142	7.0	40.0	6.9	39.4	127	5.0	165	6.5	203	8.0	165	6.5
0.126	7.9	45.0	7.9	44.8	152	6.0	178	7.0	229	9.0	190	7.5

(1) 16" horizontal and 48" vertical clip spacing.
(2) SOPRA-ISO V ALU thickness indicated. An additional 51 mm (2 in.) of stone wool protects SOPRA-ISO V ALU.

TESTED AND APPROVED SOPREMA WALL ASSEMBLIES

SOPREMA PRODUCTS
Primer:
SOPRASEAL STICK PRIMER
Air/vapour barrier membrane:
SOPRASEAL STICK 1100 T
Attachement system:
ACS THERMAL CLIP
Exterior insulation:
SOPRA-ISO V ALU

SOPREMA PRODUCTS
Primer:
SOPRASEAL STICK PRIMER
Air/vapour barrier membrane:
SOPRASEAL STICK 1100 T
Attachement system:
ACS THERMAL CLIP
Exterior insulation:
SOPRA-XPS

SOPREMA PRODUCTS
Primer:
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ACS THERMAL CLIP
Exterior insulation:
SOPRA-ISO V ALU

SOPREMA PRODUCTS
Primer:
SOPRASEAL STICK PRIMER
Air/vapour barrier membrane:
SOPRASEAL STICK 1100 T
Attachement system:
ACS THERMAL CLIP
Exterior insulation:
SOPRA-SPF 202

SOPREMA

HOW TO READ THE TABLES – EXTERIOR INSULATED WALL ASSEMBLIES

1	2	3		4		5									
CLIMATE ZONE	MAXIMUM ASSEMBLY U-VALUE PER TABLE 3.2.2.2.	MINIMUM ASSEMBLY EFFECTIVE THERMAL PERFORMANCE		REQUIRED NOMINAL EXTERIOR INSULATION		REQUIRED EXTERIOR INSULATION THICKNESS (1)									
	U [W/m²·K]	Eff. RSI [m²·K/W]	Eff. R [ft²·h·°F/BTU]	RSI [m²·K/W]	R [ft²·h·°F/BTU]	Protected SOPRA-ISO V ALU (2)		SOPRA-ISO V ALU		SOPRA-XPS		SOPRA-SPF 202		STONE WOOL	
						mm	in	mm	in	mm	in	mm	in	mm	in
4	0.315	3.2	18.0	2.7	15.3	38	1.5	64	2.5	89	3.5	64	2.5	101	4.0
5	0.278	3.6	20.4	3.2	17.9	38	1.5	76	3.0	101	4.0	76	3.0	114	4.5
6	0.247	4.0	23.0	3.6	20.7	51	2.0	89	3.5	114	4.5	89	3.5	127	5.0
7 (A and B)	0.210	4.8	27.0	4.4	25.0	76	3.0	101	4.0	140	5.0	114	4.5	152	6.0
8	0.183	5.5	31.0	5.2	29.4	89	3.5	127	5.0	152	6.0	127	5.0	178	7.0

(1) 16-inch horizontal and 48-inch vertical clip spacing.
(2) SOPRA-ISO V ALU thickness indicated. An additional 51 mm (2 inches) of stone wool protects SOPRA-ISO V ALU.

SOPREMA

HOW TO READ THE TABLES – HYBRID INSULATED WALL ASSEMBLIES

1	2	3		4		5											
CLIMATE ZONE	MAXIMUM ASSEMBLY U-VALUE PER TABLE 3.2.2.2.	MINIMUM ASSEMBLY EFFECTIVE THERMAL PERFORMANCE		REQUIRED NOMINAL EXTERIOR INSULATION		REQUIRED EXTERIOR INSULATION THICKNESS (1)											
	U [W/m²·K]	Eff. RSI [m²·K/W]	Eff. R [ft²·h·°F/BTU]	RSI [m²·K/W]	R [ft²·h·°F/BTU]	Protected SOPRA-ISO V PLUS (2)		SOPRA-ISO V PLUS		SOPRA-XPS		SOPRA-SPF 202		SOPRA-SPF 100		STONE WOOL	
						mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
4	0.315	3.2	18.0	1.0	5.5	25	1.0	25	1.0	38	1.5	25	1.0	38	1.5	38	1.5
5	0.278	3.6	20.4	1.4	8.0	25	1.0	38	1.5	51	2.0	38	1.5	51	2.0	51	2.0
6	0.247	4.0	23.0	1.9	10.7	25	1.0	51	2.0	64	2.5	51	2.0	64	2.5	64	2.5
7 (A and B)	0.210	4.8	27.0	2.6	14.9	38	1.5	64	2.5	76	3.0	64	2.5	89	3.5	89	3.5
8	0.183	5.5	31.0	3.4	19.1	51	2.0	89	3.5	101	4.0	89	3.5	114	4.5	114	4.5

(1) 16-inch horizontal and 48-inch vertical clip spacing.
(2) SOPRA-ISO V PLUS thickness indicated. An additional 51 mm (2 inches) of stone wool protects SOPRA-ISO V PLUS.

NOTE: Coloured sections highlight assemblies using exterior insulation with low water vapour diffusion rates, therefore limiting the drying potential to the exterior. The most appropriate nature and position of the vapour control layer may be different than what is presented here. Consult an expert to determine the best moisture management strategy for these assemblies.

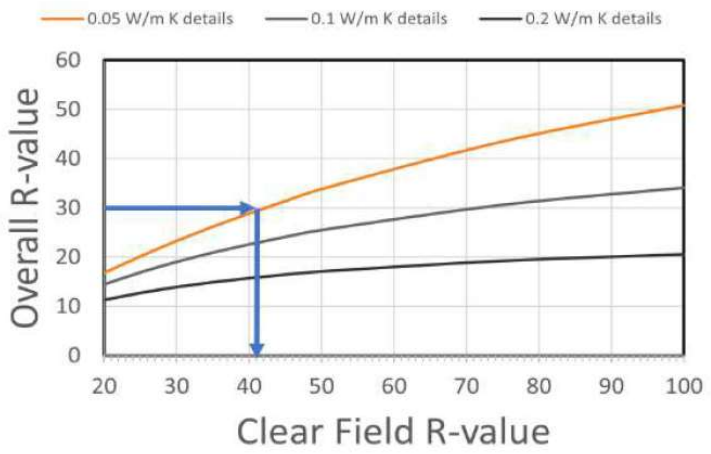
SOPREMA

IMPORTANCE OF INTERFACE DETAILS

Interface Details can account for as much as 60% of heat flow

A good target to mitigate thermal bridging is less than 30%

WHAT ARE INTERFACE DETAILS?



Overall Opaque R-value

	Thermal Quality of Interface Details		
	Excellent 0.05 W/m K	Efficient 0.1 W/m K	Mitigated 0.2 W/m K
R-22.5 Clear Field Assembly	R-18.5 (3.26 RSI)	R-15.7 (2.77 RSI)	R-12.0 (2.11 RSI)
R-41 Clear Field Assembly	R-29.4 (5.18 RSI)	R-22.9 (4.03 RSI)	R-15.9 (2.80 RSI)
	R-11	R-7	R-4

Figure 11: Relationship between the clear field assembly and overall effective R-value for different thermal quality of interface details.

Source: White Paper “Optimizing Walls Today to Build a Better Tomorrow” EVOKE and MH (Roppel)

SOPREMA

BUILDING
A SUSTAINABLE
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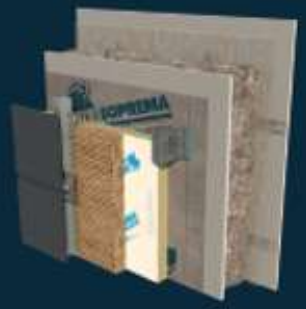
WHITEHORSE 2022 Yukon

BUILD BETTER
HIGH PERFORMANCE
WALLS



The Protected Assembly

SOPREMA

WHAT IS THE SOPREMA PROTECTED ASSEMBLY?

The Protected assembly encapsulates SOPRA-ISO V behind a layer of MW insulation to pass CAN/ULC S134 fire test :

- Benefit from the use of a high R-Value (or thermally efficient) thermoset insulation (SOPRA-ISO V)
- Encapsulate the combustible SOPRA-ISO V insulation with a protective layer of non-combustible MW insulation.
- The low conductivity of the ACS CLIPS allows the R-value of the SOPRA-ISO V and MW insulation to be preserved with high thermal efficiency (90% and more).
- The ACS CLIPS allow easy installation of both the rigid SOPRA-ISO V and semi-rigid MW insulation.
- The combination of ACS CLIP, SOPRA-ISO V and MW with an effective air barrier provides a robust and cost-effective systemic approach to a wall assembly.

BENEFITS OF THE PROTECTED ASSEMBLY

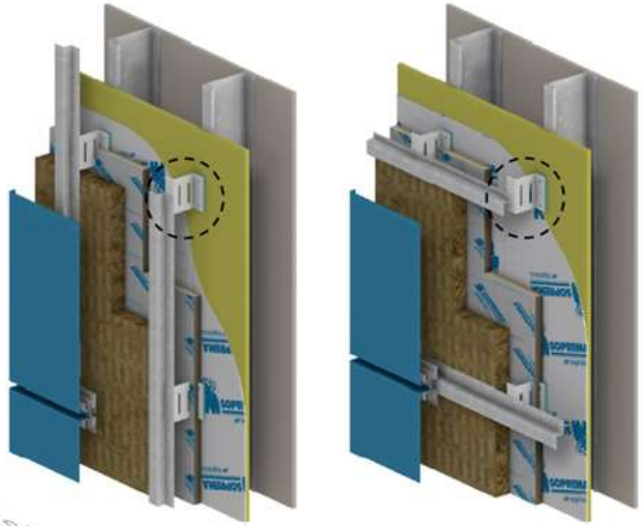
- THINNER WALLS
- CONSTRUCTABILITY
- DURABILITY, RESILIENCE, AND STRENGTH
- COMPLIANCE WITH THE CODE AND FIRE SAFETY STANDARDS
- COST EFFICIENCY
- DESIGN FLEXIBILITY

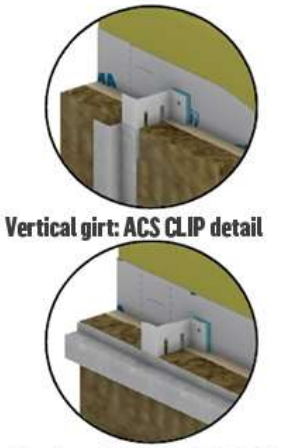
LET'S EXPLORE THESE IN DETAIL...

SOPREMA

THINNER WALLS

- Thermally efficient cladding attachment system (ACS THERMAL CLIPS)
- Ability to install multiple insulation products with higher thermal performance and in combination to receive other performance benefits (ACS THERMAL CLIPS)
- Less sub-girt steel to support cladding (ACS THERMAL CLIPS)





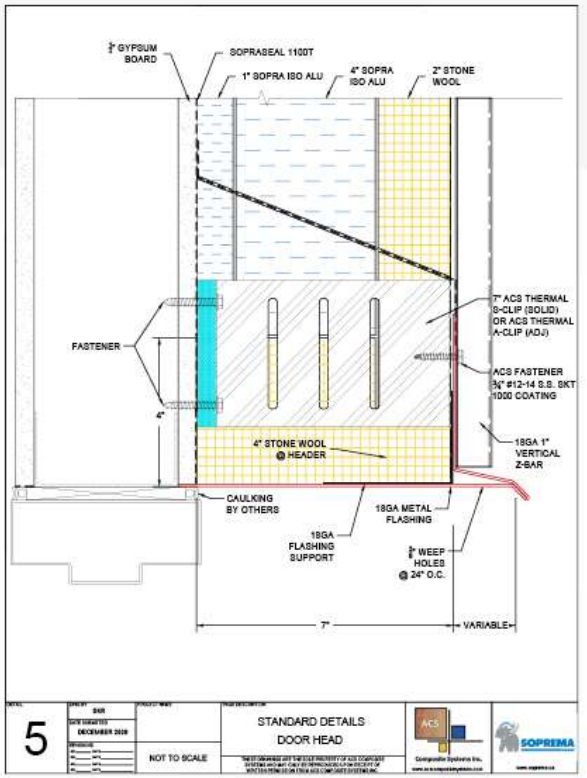
Vertical girt: ACS CLIP detail

Horizontal girt: ACS CLIP detail

SOPREMA

CONSTRUCTABILITY

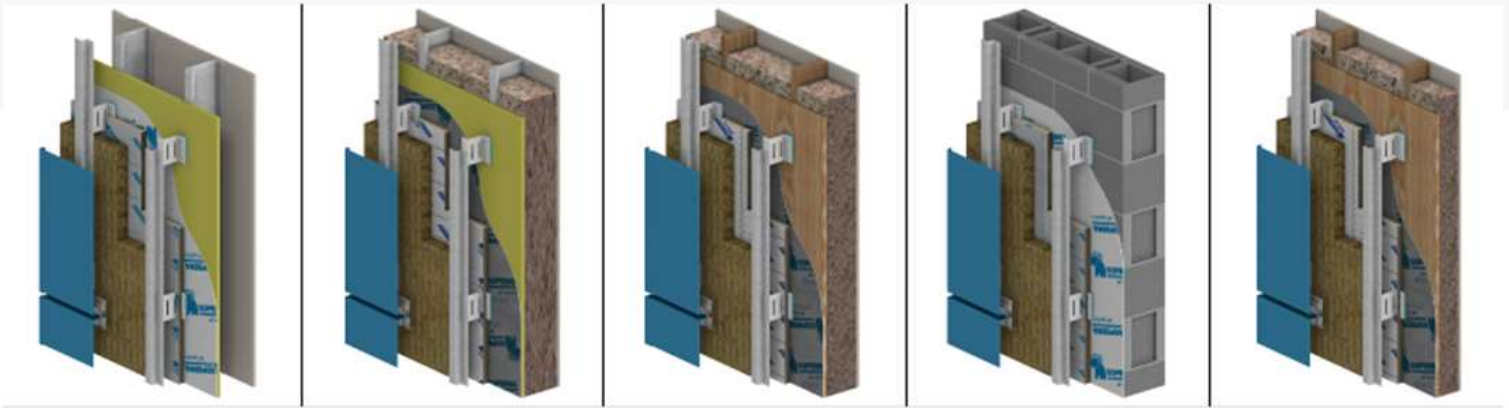
- Once the first layer of insulation is installed (over the base of the clip), additional layers follow in line.
- Friction fit of the final mineral wool layer improves the ease of installation.




INSTALLATION OF ACS THERMAL CLIPS
WITH SOPREMA PROTECTED ASSEMBLY
SOPREMA

CONSTRUCTABILITY

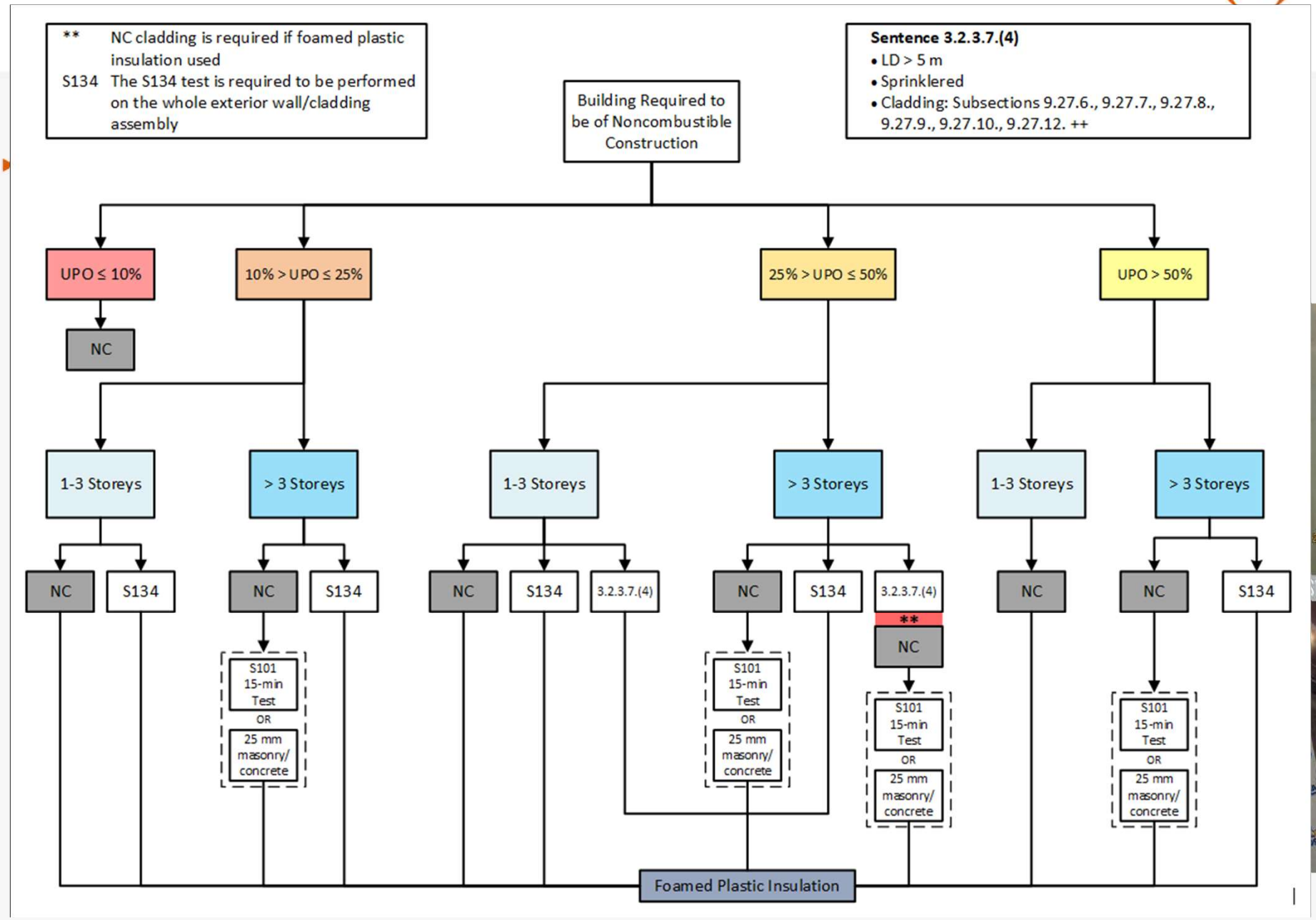
- Works with multiple back-up wall assemblies
- Minimal or no fasteners required; reduced blind fastening
- Easy to install using common techniques and methods



Exterior Insulated Steel Stud Assembly	Split Insulated Steel Stud Assembly	Split Insulated 2 × 6 Wood Frame Assembly	Concrete Block Wall	Split Insulated 2 × 4 Wood Frame Assembly

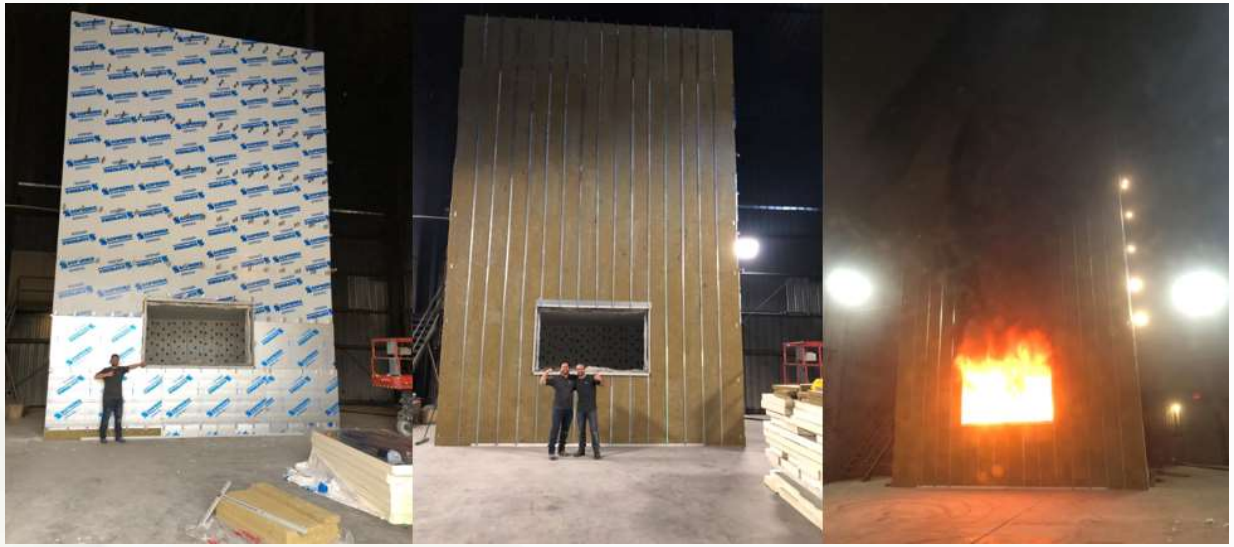
SOPREMA

COMPLIANCE WITH THE CODE AND FIRE SAFETY STANDARDS



THE PROTECTED ASSEMBLY

Protected Wall Assembly successfully passed CAN/ULC S134 test

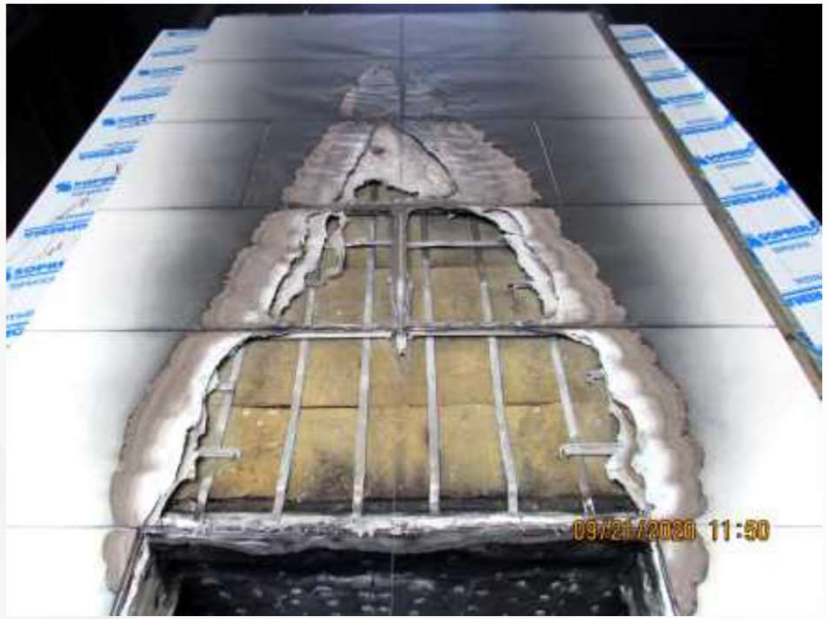


Success!

SOPREMA

THE PROTECTED ASSEMBLY

We also had unsuccessful tests…

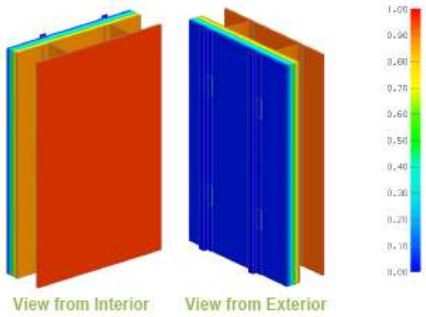


SOPREMA

DURABILITY, RESILIENCE, AND STRENGTH

- Staggered layers of rigid and semi-rigid insulation over dedicated air barrier.
- Minimal or no fasteners required, reduced blind fastening – less of a chance to have unintended negative impact on air barrier from fasteners.

- The exterior mineral wool layer moderates temperature differential over the SOPRA-ISO V insulation layer, enhancing mean temperature performance of SOPRA-ISO V.



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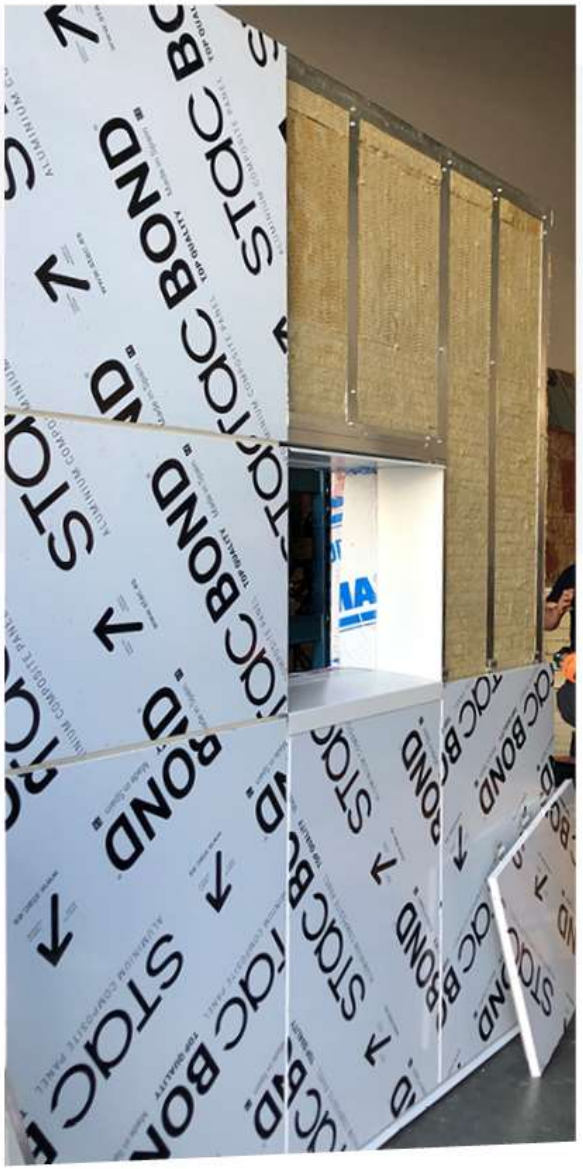
COST EFFICIENCY

- Highly efficient clips require less insulation to produce the same effective thermal performance (ACS CLIPS).
- Thermally efficient thinner wall assemblies require less materials, including insulation, sub-girt steel, flashing materials, etc.
- Increased use of SOPRA-ISO V ALU is 50% more nomimal R-value per inch than mineral wool at R4.3 and SOPRA-ISO V PLUS is 40% more nominal R-value than mineral wool at R4.3.
- Less material requires less labour to install.

SOPREMA

DESIGN FLEXIBILITY

- Protected assemblies can be utilized with multiple cladding systems, including non-combustible and ACM (N/C core) panels.



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ACS THERMAL CLIPS

SOPREMA

- **ACS-S CLIP (solid)**
  Available in 1.5, 2, 3, 4, 5, 6, 7, 8, 9 and 10 inches

- **ACS-A CLIP (adjustable)**
  Available in 2.5–3, 3–4, 4–5, 5–6, 6–7, 7–8, 8–9 and 9–10 inches

ACS THERMAL CLIPS

ATTACHMENT SYSTEM FOR PANELLIZED EXTERIOR CLADDING

BENEFITS

STRUCTURAL PERFORMANCE

THERMAL PERFORMANCE

EASE OF CONSTRUCTION

COST EFFICIENCY

SOPREMA

STRUCTURAL PERFORMANCE

SAFETY BEFORE EVERYTHING ELSE!

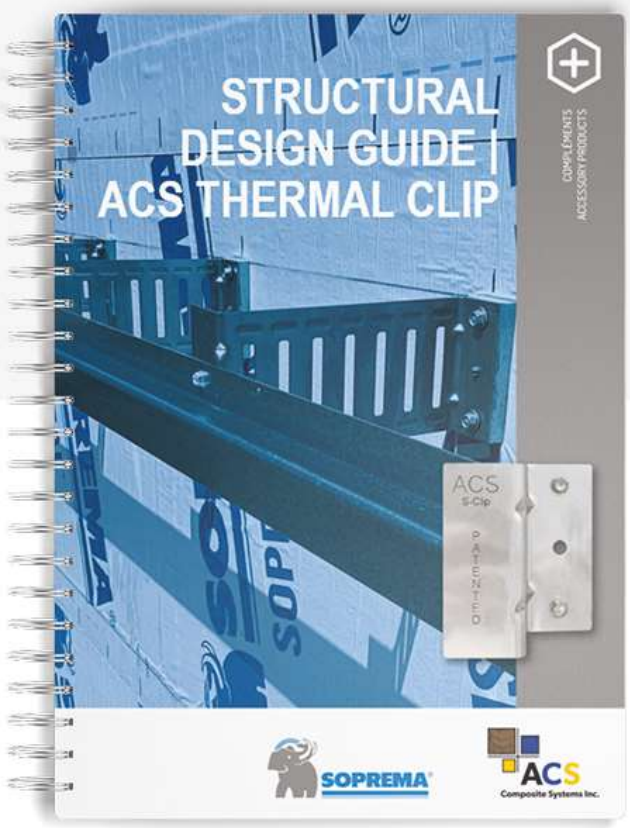
Steel Stud/Concrete Wall Substructure – Up to 30 psf Specified Wind

7-inch wall assembly – Vertical clip spacing (inches) – Two attachment screws

Cladding weight (psf)	18 ga. steel studs/concrete		20 ga. steel studs	
	16 in horizontal spacing	24 in horizontal spacing	16 in horizontal spacing	24 in horizontal spacing
3	48	32	46	31
4	48	32	42	28
5	48	32	38	25
6	47	31	35	23
7	43	29	33	22
8	40	27	31	20
10	36	24	27	18
15	28	18	21	14

ACS THERMAL CLIPS are made of 16 gauge stainless steel.

Note: A professional must be involved in determining the optimal spacing of the clips for the project.



SOPREMA

THERMAL PERFORMANCE

ACS CLIPS PROVIDE **90% TO 95%** THERMAL EFFICIENCY

- THE CLIP DESIGN MINIMIZES THERMAL BRIDGES.
- STAINLESS STEEL HAS LOW THERMAL CONDUCTIVITY.
- THE THERMAL PAD HAS AN R-VALUE OF 3.

+ THEY CAN BE INSTALLED WITH RIGID INSULATION PANELS, WHICH USUALLY PROVIDE HIGHER THERMAL PERFORMANCE PER INCH.

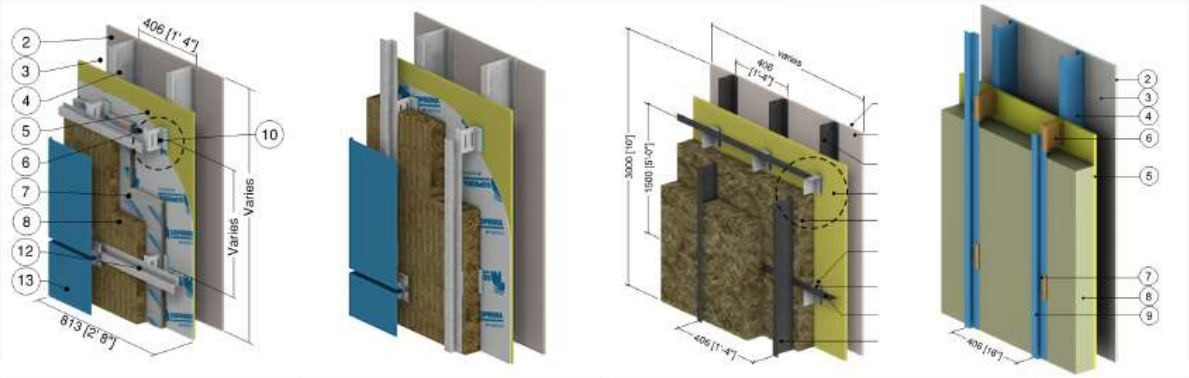
Note: Once you know the spacing of the clips, you'll know the effective R-value for the opaque wall assembly using the BUILD BETTER GUIDE. The guide provides information for 16-inch (O.C.) and 48-inch vertical spacing. If you are using a different spacing, please refer to https://thermalenvelope.ca/catalogue/.

SOPREMA

THERMAL PERFORMANCE

EXAMPLE

- Exterior insulated; steel studs (16-inch O.C.)
- Target: Effective **R-23**



Insulation	SOPREMA's protected assembly	Mineral wool	Mineral wool	Mineral wool
Clip system	ACS THERMAL CLIPS	ACS THERMAL CLIPS	ISO Clips	Cascadia Clips
Vertical clip spacing	48 in	48 in	40 in + (girt spacing: 40 in)	48 in
Thickness required	2 in mineral wool + 2 in SOPRA-ISO V ALU = 4 in	5 in	7 in	6 in
R-value	24	23.7	26	26.6
Detail #	5.1.131	5.1.121	5.1.45	5.1.53

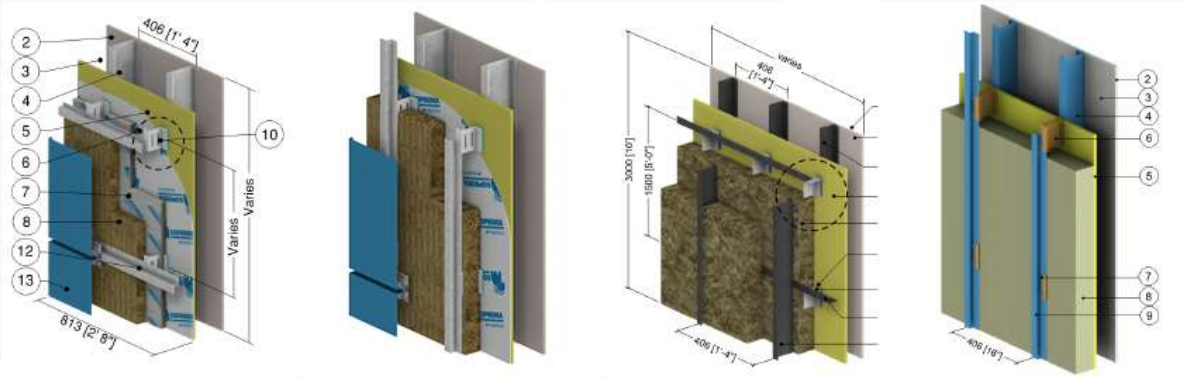
Source: https://thermalenvelope.ca/catalogue/

SOPREMA

THERMAL PERFORMANCE

EXAMPLE

- Exterior insulated; steel studs (16-inch O.C.)
- Target: Effective **R-27**



Insulation	SOPREMA's protected assembly	Mineral wool	Mineral wool	Mineral wool
Clip system	ACS THERMAL CLIPS	ACS THERMAL CLIPS	ISO Clips	Cascadia Clips
Vertical clip spacing	48 in	48 in	40 in + (girt spacing: 40 in)	48 in
Thickness required	2 in mineral wool + 2.5 in SOPRA-ISO V ALU = 4.5 in	6 in	8 in	8 in
R-value	27	27.8	28.1	33.9
Detail #	5.1.131	5.1.121	5.1.45	5.1.53

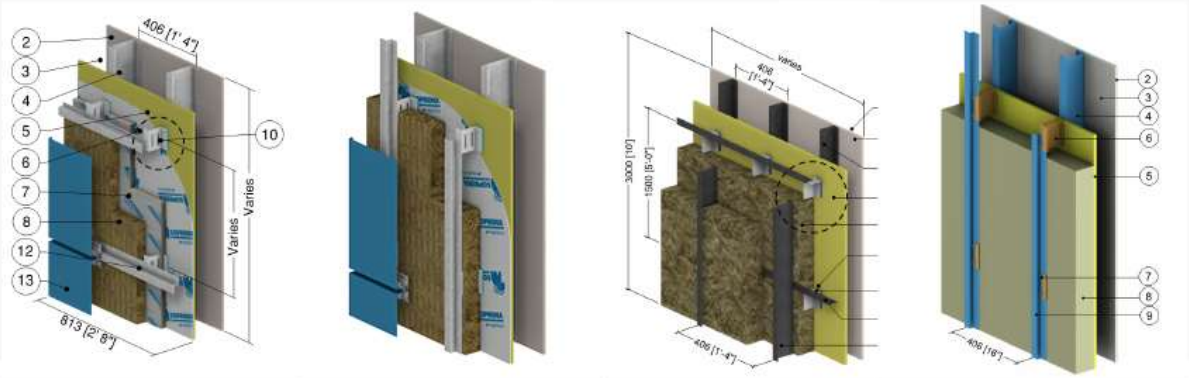
Source: https://thermalenvelope.ca/catalogue/

SOPREMA

THERMAL PERFORMANCE

EXAMPLE

- Exterior insulated; steel studs (16-inch O.C.)
- Target: Effective **R-41**



Insulation	SOPREMA's protected assembly	Mineral wool	Mineral wool	Mineral wool
Clip system	ACS THERMAL CLIPS	ACS THERMAL CLIPS	ISO Clips	Cascadia Clips
Vertical clip spacing	48 in	N/A	N/A	N/A
Thickness required	2 in mineral wool + 5 in SOPRA-ISO V ALU = 7 in	N/A	N/A	N/A
R-value	41.7	N/A	N/A	N/A
Detail #	5.1.131	5.1.121	5.1.45	5.1.53

Source: https://thermalenvelope.ca/catalogue/

SOPREMA

THERMAL PERFORMANCE

EXAMPLE

- Target: Effective **R-41**

Min. eff. R-value	Insulation strategy	Stud framing type	Cladding attachment	Exterior insulation type	Cavity insulation type	Exterior insulation thickness	Interior insulation thickness	Total insulation thickness	Relative complexity level
41	Hybrid insulated	Wood 2 × 6	Furring	Mineral wool	Mineral wool	6 (152)	5.5 (140)	11.5 (292)	Medium
41	Hybrid insulated	Wood 2 × 6	ACS THERMAL CLIPS	Mineral wool + SOPRA-ISO V	Cellulose	4.5 (114)	5.5 (140)	10 (254)	Medium
41	Hybrid insulated	Wood 2 × 4	ACS THERMAL CLIPS	Mineral wool + SOPRA-ISO V	Cellulose	5.5 (140)	3.5 (89)	9 (229)	Medium
41	Exterior insulated	Wood or steel 2 × 6	ACS THERMAL CLIPS	Mineral wool + SOPRA-ISO V	None	7 (178)	None	7 (178)	Simple
41	Exterior insulated	Wood or steel 2 × 4	ACS THERMAL CLIPS	Mineral wool + SOPRA-ISO V	None	7 (178)	None	7 (178)	Simple

SOPREMA

COST EFFECTIVE

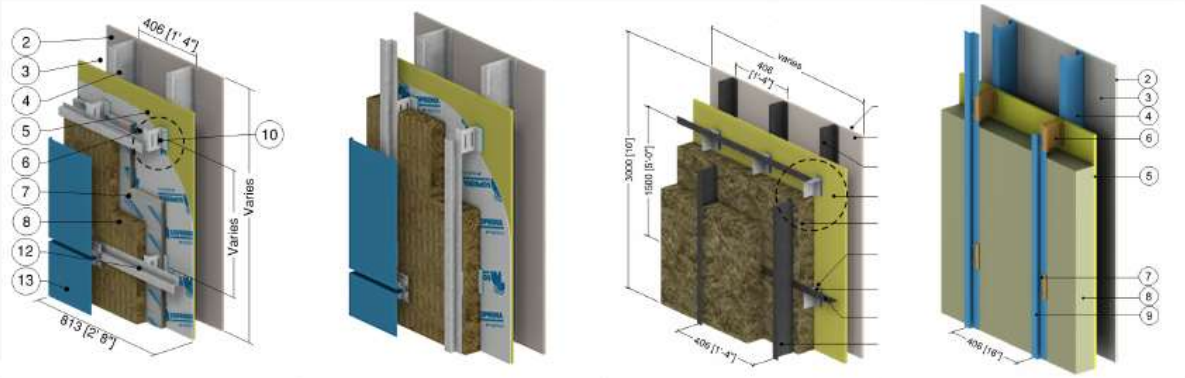
- **STRUCTURAL PERFORMANCE:** Can maximize vertical spacing = less clips needed.
- **THERMAL PERFORMANCE:** Optimizes thermal bridging = less insulation needed to reach the effective R-value of the project.
- **AVERAGE NOMINAL R-VALUE/INCH OF EXTERIOR INSULATION:** Can be installed with rigid insulation panels that offer better thermal performance (SOPRA-ISO V ALU at R-6.5 per inch, or mineral wool at R-4.3 per inch).
- **EASE OF INSTALLATION:** No need for additional materials = less material and less labour to install the system.

SOPREMA

COST EFFECTIVE

EXAMPLE

- Exterior insulated; steel studs (16-inch O.C.)
- Target: Effective **R-23**



Source: https://thermalenvelope.ca/catalogue/

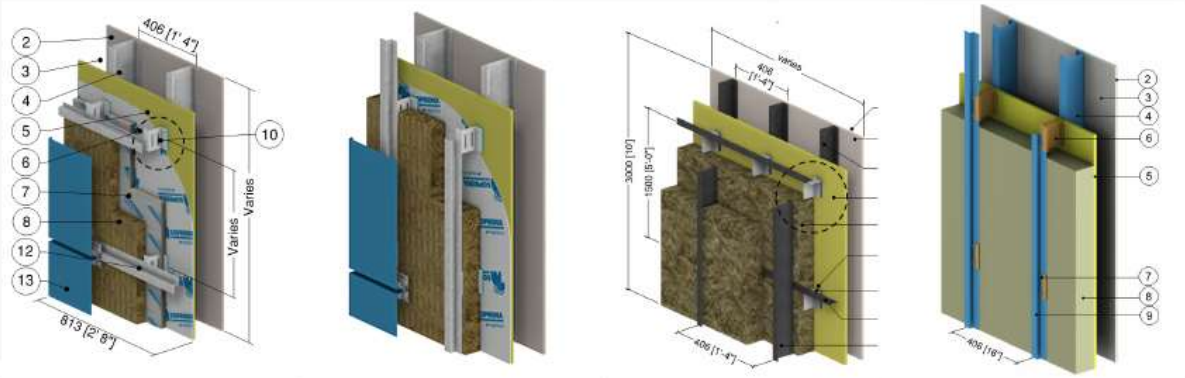
Insulation	SOPREMA's protected assembly	Mineral wool	Mineral wool	Mineral wool
Clip system	ACS THERMAL CLIPS	ACS THERMAL CLIPS	ISO Clips	Cascadia Clips
Thickness required	2 in MW + 2 in SOPRA-ISO V ALUPRA-ISO V ALU = 4 in	5 in	7 in	6 in
R-value	24	23.7	26	26.6
Avg. price for insulation and attachment system (materials only) for 10,000 ft²	$60,000	$72,500	$95,000	$90,000
Avg. price/ft²	$6.00	$7.25	$9.50	$9.00

SOPREMA

COST EFFECTIVE

EXAMPLE

- Exterior insulated; steel studs (16-inch O.C.)
- Target: Effective **R-27**

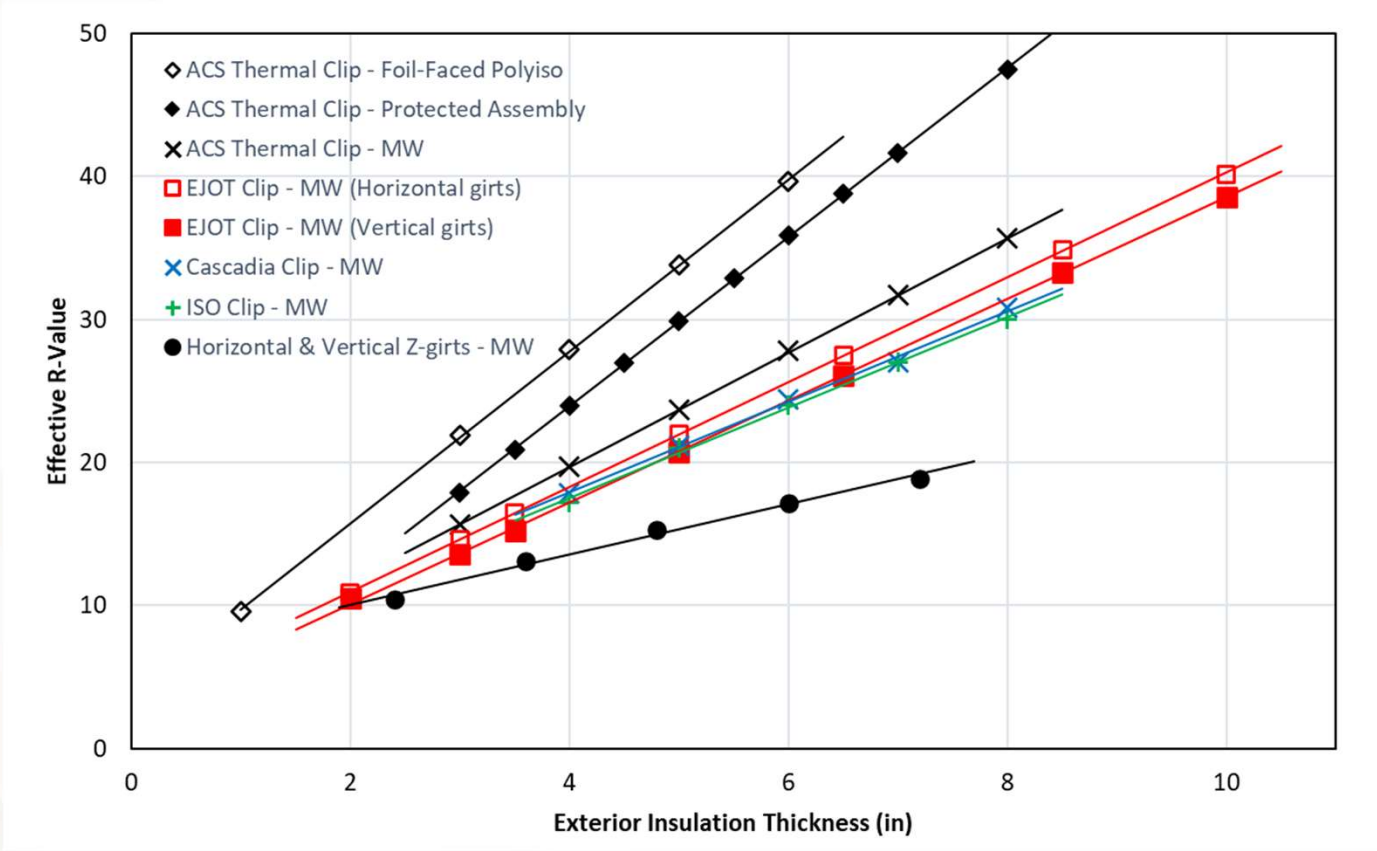


Source: https://thermalenvelope.ca/catalogue/

Insulation	SOPREMA's protected assembly	Mineral wool	Mineral wool	Mineral wool
Clip system	ACS THERMAL CLIPS	ACS THERMAL CLIPS	ISO Clips	Cascadia Clips
Thickness required	2 in MW + 2.5 in SOPRA-ISO V ALU = 4.5 in	6 in	8 in	8 in
R-value	27	27.8	28.1	33.9
Avg. price for insulation and attachment system (materials only) for 10,000 ft²	$62,500	$82,500	$105,000	$117,500
Avg. price/ft²	$6.25	$8.25	$10.50	$11.75

SOPREMA

THE PROTECTED ASSEMBLY



COST EFFECTIVE

EXAMPLE

- Target: Effective **R-41**

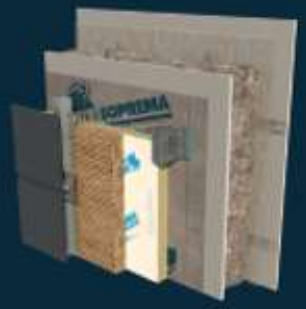
Min. eff. R-value	Insulation strategy	Stud framing type	Cladding attachment	Exterior insulation type	Cavity insulation type	Exterior insulation thickness	Interior insulation thickness	Total insulation thickness	Relative complexity level	Relative wall assembly cost
41	Hybrid insulated	Wood 2 × 6	Furring	Mineral wool	Mineral wool	6 (152)	5.5 (140)	11.5 (292)	Medium	Highest
41	Hybrid insulated	Wood 2 × 6	ACS THERMAL CLIPS	Mineral wool + SOPRA-ISO V	Cellulose	4.5 (114)	5.5 (140)	10 (254)	Medium	$$$$
41	Hybrid insulated	Wood 2 × 4	ACS THERMAL CLIPS	Mineral wool + SOPRA-ISO V	Cellulose	5.5 (140)	3.5 (89)	9 (229)	Medium	$$$
41	Exterior insulated	Wood or steel 2 × 6	ACS THERMAL CLIPS	Mineral wool + SOPRA-ISO V	None	7 (178)	None	7 (178)	Simple	$$
41	Exterior insulated	Wood or steel 2 × 4	ACS THERMAL CLIPS	Mineral wool + SOPRA-ISO V	None	7 (178)	None	7 (178)	Simple	Lowest

SOPREMA

BUILDING
A SUSTAINABLE
NORTH

WHITEHORSE 2022 Yukon

BUILD BETTER
HIGH PERFORMANCE
WALLS



Cost and Case Studies

SOPREMA

SOPREMA

STONY PLAIN CENTRAL SCHOOL

EDMONTON, AB

SOPREMA

EXTERIOR INSULATED WALL ASSEMBLY

BASIS OF DESIGN:

- Effective **R-23**

6 in mineral wool + thermally broken clips

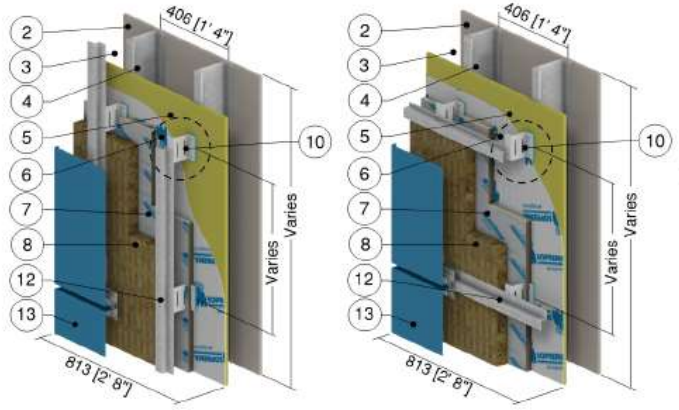
SOPREMA'S PROTECTED ASSEMBLY:

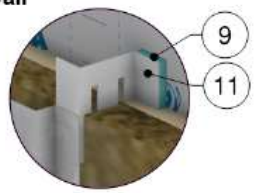
- Effective **R-24***

4 in (2 in mineral wool + 2 in SOPRA-ISO V ALU) + ACS THERMAL CLIPS

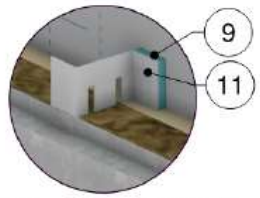
*Considering clip spacing of 16" o.c horizontal and 48" vertical.

Detail 5.1.131 **Exterior Insulated 6" x 1 5/8" Steel Stud (16" o.c.) Wall Assembly with Protected SOPREMA SOPRA-ISO V ALU and ACS-S Thermal Clip Supporting Metal Cladding - Clear Wall**





Vertical girt: ACS CLIP detail



Horizontal girt: ACS CLIP detail

Nominal (1D) vs. Assembly Performance Indicators

Exterior Insulation 1D R-value (RSI)	R_{1D} ft²·hr·°F / Btu (m² K / W)	24" Vertical Spacing		36" Vertical Spacing		48" Vertical Spacing	
		R_o ft²·hr·°F / Btu (m² K / W)	U_o Btu/ft² ·hr ·°F (W/m² K)	R_o ft²·hr·°F / Btu (m² K / W)	U_o Btu/ft² ·hr ·°F (W/m² K)	R_o ft²·hr·°F / Btu (m² K / W)	U_o Btu/ft² ·hr ·°F (W/m² K)
R-15.1 (2.66)	R-18.3 (3.22)	R-17.5 (3.08)	0.057 (0.32)	R-17.8 (3.13)	0.056 (0.32)	R-17.9 (3.15)	0.056 (0.32)
R-18.4 (3.23)	R-21.5 (3.79)	R-20.3 (3.58)*	0.049 (0.28)*	R-20.7 (3.65)*	0.048 (0.27)*	R-20.9 (3.69)*	0.048 (0.27)*
R-21.6 (3.80)	R-24.8 (4.36)	R-23.2 (4.08)	0.043 (0.24)	R-23.7 (4.17)	0.042 (0.24)	R-24.0 (4.22)	0.042 (0.24)
R-24.9 (4.38)	R-28.0 (4.93)	R-26.0 (4.57)*	0.039 (0.22)*	R-26.6 (4.69)*	0.038 (0.21)*	R-27.0 (4.75)*	0.037 (0.21)*
R-28.1 (4.95)	R-31.3 (5.51)	R-28.7 (5.05)	0.035 (0.20)	R-29.5 (5.19)	0.034 (0.19)	R-29.9 (5.27)	0.033 (0.19)
R-31.4 (5.52)	R-34.5 (6.08)	R-31.4 (5.54)*	0.032 (0.18)*	R-32.4 (5.71)*	0.031 (0.18)*	R-32.9 (5.79)*	0.030 (0.17)*
R-34.6 (6.09)	R-37.8 (6.65)	R-34.2 (6.02)	0.029 (0.17)	R-35.3 (6.22)	0.028 (0.16)	R-35.9 (6.32)	0.028 (0.16)
R-37.9 (6.67)	R-41.0 (7.22)	R-36.8 (6.48)*	0.027 (0.15)*	R-38.1 (6.71)*	0.026 (0.15)*	R-38.8 (6.83)*	0.026 (0.15)*
R-41.1 (7.24)	R-44.3 (7.80)	R-39.4 (6.94)	0.025 (0.14)	R-40.9 (7.20)	0.024 (0.14)	R-41.7 (7.34)	0.024 (0.14)
R-47.6 (8.38)	R-50.8 (8.94)	R-44.6 (7.85)**	0.022 (0.13)**	R-46.5 (8.18)**	0.022 (0.12)**	R-47.5 (8.36)**	0.021 (0.12)**

*Indicates interpolated value

**Indicates extrapolated value

Source: https://thermalenvelope.ca/catalogue/5.1.131/

SOPREMA

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Stantec

OLD CROW HEALTH AND WELLNESS CENTRE

Yukon

YUKON GOVERNMENT

Basis of Design
Steel Stud Back-up Wall

PROJECT TEAM:

ARCHITECTURAL

Stantec Architecture Ltd.
202-107 Main Street, Whitehorse, YT, Y1A 2A7

STRUCTURAL

Stantec Consulting Ltd.
202-107 Main Street, Whitehorse, YT, Y1A 2A7

MECHANICAL

Stantec Consulting Ltd.
202-107 Main Street, Whitehorse, YT, Y1A 2A7

ELECTRICAL

Stantec Consulting Ltd.
202-107 Main Street, Whitehorse, YT, Y1A 2A7

CIVIL

Stantec Consulting Ltd.
202-107 Main Street, Whitehorse, YT, Y1A 2A7

DRAWING LIST

NO.	DRAWING NAME
ARCHITECTURE	
A-000	COVER
A-001	GENERAL NOTES, CONSTRUCTION ASSEMBLIES
A-101	MAIN FLOOR PLAN
A-102	ROOF PLAN / PENTHOUSE FLOOR PLAN
A-200	EXTERIOR ELEVATIONS
A-201	BUILDING SECTIONS
A-400	DOOR & FRAME SCHEDULE
A-500	PERSPECTIVE VIEWS
A-100	ARCHITECTURAL SITE PLAN
A-A-100	GARAGE
STRUCTURAL	
S-001	MAIN FLOOR PLAN
S-002	MAIN ROOF PLAN / PENTHOUSE FLOOR & ROOF PLAN
S-003	ISOMETRIC VIEWS
MECHANICAL	
M-100	MECHANICAL ROOM PLAN
M-101	PENTHOUSE FAN ROOM PLAN
M-102	MAIN FLOOR PLUMBING
ELECTRICAL	
E-001	ELECTRICAL SITE PLAN HEALTH CARE
E-100	PATIENT CARE AREA CLASSIFICATION
E-600	DIAGRAMS
CIVIL	
C-100	EXISTING SITE CONDITIONS
C-101	SITE GRADING PLAN

ISSUED FOR TENDER
JUNE 24, 2020

OLD CROW, YUKON

SOPREMA

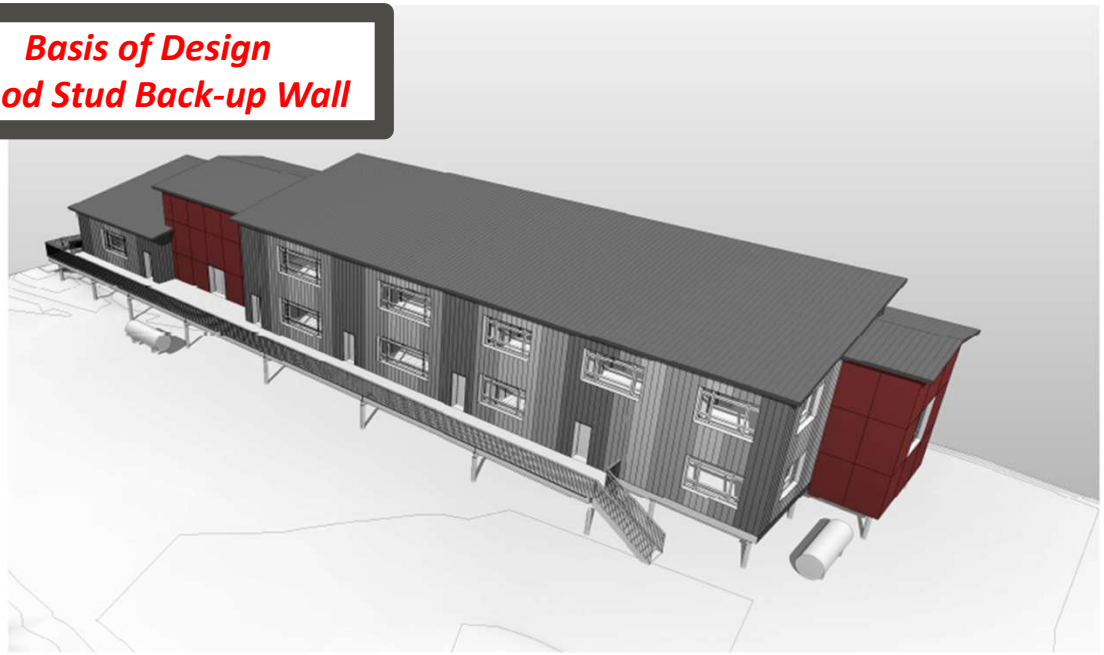
Stantec

OLD CROW 10-PLEX HOUSING UNIT

Yukon

YUKON GOVERNMENT

Basis of Design
Wood Stud Back-up Wall



PROJECT TEAM:

ARCHITECTURAL

Stantec Architecture Ltd.
202-107 Main Street, Whitehorse, YT, Y1A 2A7

STRUCTURAL

Stantec Consulting Ltd.
202-107 Main Street, Whitehorse, YT, Y1A 2A7

MECHANICAL

Stantec Consulting Ltd.
202-107 Main Street, Whitehorse, YT, Y1A 2A7

ELECTRICAL

Stantec Consulting Ltd.
202-107 Main Street, Whitehorse, YT, Y1A 2A7

CIVIL

Stantec Consulting Ltd.
202-107 Main Street, Whitehorse, YT, Y1A 2A7

DRAWING LIST	
NO.	DRAWING NAME
ARCHITECTURE	
A0-000	COVER
A0-001	GENERAL NOTES, CONSTRUCTION ASSEMBLIES
A0-100	FLOOR PLANS
A0-101	ROOF PLAN
A0-103	FIRE SEPARATIONS & EVACUATION PLANS
A0-201	EXTERIOR ELEVATIONS - OPTION 1
A0-202	EXTERIOR ELEVATIONS - OPTION 2
A0-301	BUILDING SECTIONS
A0-401	DOOR & FRAME SCHEDULE
A0-501	PERSPECTIVE VIEWS - OPTION 1
A0-502	PERSPECTIVE VIEWS - OPTION 2
A0-100	ARCHITECTURAL SITE PLAN
A0-100	STORAGE FACILITY
STRUCTURAL	
S-101	MAIN FLOOR PLAN VIEW
S-102	SECOND FLOOR PLAN VIEW, ROOF PLAN
MECHANICAL	
M-100	MECHANICAL PLAN
ELECTRICAL	
E-001	ELECTRICAL SITE PLAN
E-600	DIAGRAMS
CIVIL	
C-100	EXISTING SITE CONDITIONS
C-101	SITE GRADING PLAN

SOPREMA

EXTERIOR WALL ASSEMBLIES

1. TARGET RSI = 8.0, EFFECTIVE
2. REFER TO EXTERIOR ELEVATIONS DRAWINGS FOR CLADDING AND COLOUR.

EXTERIOR WALL ASSEMBLY - OPTION 1

- EXTERIOR CLADDING AS PER SCHEDULE AND ELEVATIONS
- STRAPPING FASTENED WITH LONG (330+mm) STAINLESS-STEEL SCREWS THROUGH THE INSULATION, A/V BARRIER AND STRUCTURAL SHEATHING INTO THE BEARING STUDS
- 300mm SEMI RIGID STONEWOOL INSULATION (**RSI~8.7 EFFECTIVE**)
- SELF ADHERED, PERMEABLE AIR/VAPOR BARRIER
- 16mm TYPE "X" FIBERGLASS MAT GYPSUM BOARD (DENSGLASS), STRUCTURAL TO CHECK
- WIND BEARING S… D AS A SERVICE WALL FOR ELEC…
- 16mm TYPE "X" G…

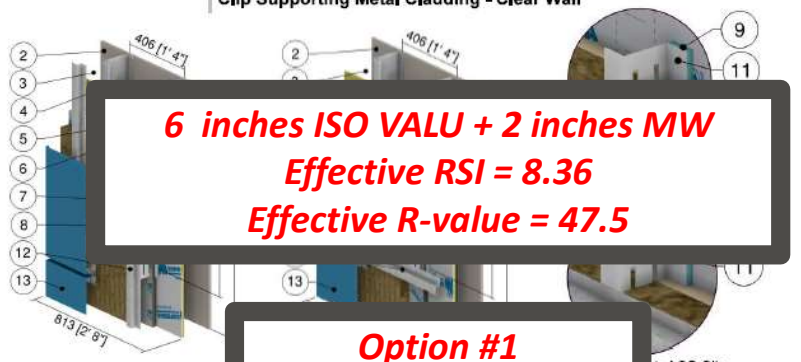
EXTERIOR WALL ASS…

(NOTE RSI~7.3 EFFEC… …LUE AND THERMAL BRIDGING IS AN ISSU…

- EXTERIOR CLADDING AS PER SCHEDULE AND ELEVATIONS
- STRAPPING AS REQUIRED
- 203mm CASCADIA CLIPS @ 406mm HORIZ. AND 914mm VERTICAL SPACING
- 203mm 2 LAYERS SEMI RIGID STONEWOOL INSULATION (CAVITY ROCK) (**RSI~5.8 EFFECTIVE**)
- SELF ADHERED, PERMEABLE AIR/VAPOR BARRIER
- 16mm FIBERGLASS MAT GYPSUM BOARD (DENSGLASS)
- WIND BEARING STEEL STUD WALL AS PER STRUCTURAL, ALSO USED AS A SERVICE WALL FOR ELECTRICAL ETC.
- MINERAL WOOL BATT INSULATION IN THE STUD CAVITIES (APPROX. **RSI~1.5 EFFECTIVE** FOR 203mm INSULATION AND 406mm STUD SPACING AND STRUCTURAL ELEMENTS)
- 16mm TYPE "X" GYPSUM WALL BOARD, PAINTED AS PER SCHEDULE

Health Centre and 10-Plex Target
Effective RSI = 8.0
Effective R-value = 45.4

Detail 5.1.131 **Exterior Insulated 6" x 1 5/8" Steel Stud (16" o.c.) Wall Assembly with Protected SOPREMA SOPRA-ISO V ALU and ACS-S Thermal Clip Supporting Metal Cladding - Clear Wall**



6 inches ISO VALU + 2 inches MW
Effective RSI = 8.36
Effective R-value = 47.5

ID	Component				Density lb/ft³ (kg/m³)	Specific Heat Btu/lb·°F (J/kg K)
1	Interior Film[1]					-
2	Gypsum Board				0 (800)	0.26 (1090)
3	Air in Stud Cavity				075 (1.2)	0.24 (1000)
4	6" x 1 5/8" Steel Studs				9 (7830)	0.12 (500)
5	Exterior Sheathing				0 (800)	0.26 (1090)
6	SOPREMA SOPRASEAL STICK 1100T membrane installed with SOPRASEAL STICK PRIMER	-	-	-	-	-
7	SOPRA-ISO V ALU Exterior Insulation				.9 (30)	0.36 (1500)
8	Exterior Mineral Wool Insulatio				.8 (28)	0.29 (1220)
9	Thermal Break				.1 (33)	0.50 (2100)
10	ACS-S Thermal Clip				0 (8000)	0.13 (530)
11	Fastener				9 (7830)	0.12 (500)
12	Girt				9 (7830)	0.12 (500)
13	Cladding				nt	
14	Exterior Film[1]				-	-

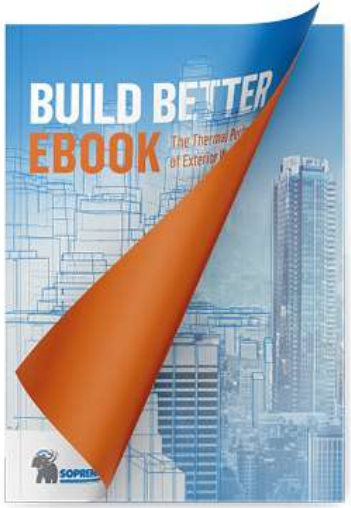
[1] Value selected from table 1, p. 26.1 …tation

Option #1
+2 R_{eff} over original basis of design with 4-inches less insulation

Option #2
+6 R_{eff} over original basis of design with 6-inches less insulation

SOPREMA

TOOL BOX – BUILD BETTER



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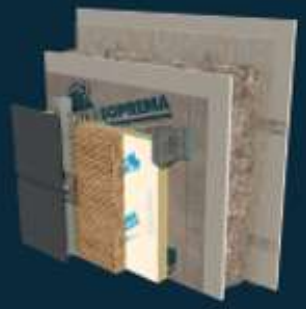
BUILDING
A SUSTAINABLE
NORTH

WHITEHORSE 2022 Yukon

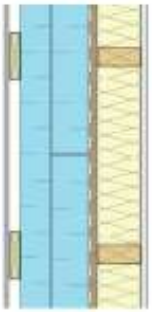
BUILD BETTER
HIGH PERFORMANCE
WALLS



Critical Issues for the North

SOPREMA

NORTHERN RESIDENTIAL WALL - RDH

S4-XPS	XPS Split Insulated Wall Assembly on 2x4 Framed Wall		
	• Cladding • ½" Air Space • 5" XPS • Housewrap • ½" Plywood • 2x4 S-P-F stud framing with R-13 Fibreglass Batt • ½" Gypsum Drywall		
Structure:	2x4 stud framing with plywood or OSB sheathing.		
Control	Precipitation	Rain-screen cavity with housewrap installed against sheathing, fastened with capnails.	
	Air	Taped sheathing (or alternately taped sheathing membrane)	
	Vapour	The sheathing operates as the vapour control layer. An interior polyethylene vapour barrier is not recommended otherwise a double vapour barrier situation will be created.	
	Heat	5" extruded polystyrene insulation @ R-5.0/inch at FTC @ R-6.3/inch at -20°C mean 3.5" fibreglass batt insulation @ R-3.7/inch at FTC @ R-4.0/inch at -20°C mean	
		R-value at 25°C	37.9 Nominal 36.5 Effective
		R-value at -20°C	44.5 Nominal 43.1 Effective

PERFORMANCE RATINGS		
Performance	Rating	Notes
Durability/Hygrothermal	Pass	Exterior insulation at the prescribed levels protects the walls from humidity
Thermal Performance	Excellent	Attention to the optimization of cladding attachment fasteners is required.
Constructability:	Excellent	Attention to wall penetration detailing is required.
Cost	Excellent	The high cold-weather performance of the XPS requires less material than other walls.

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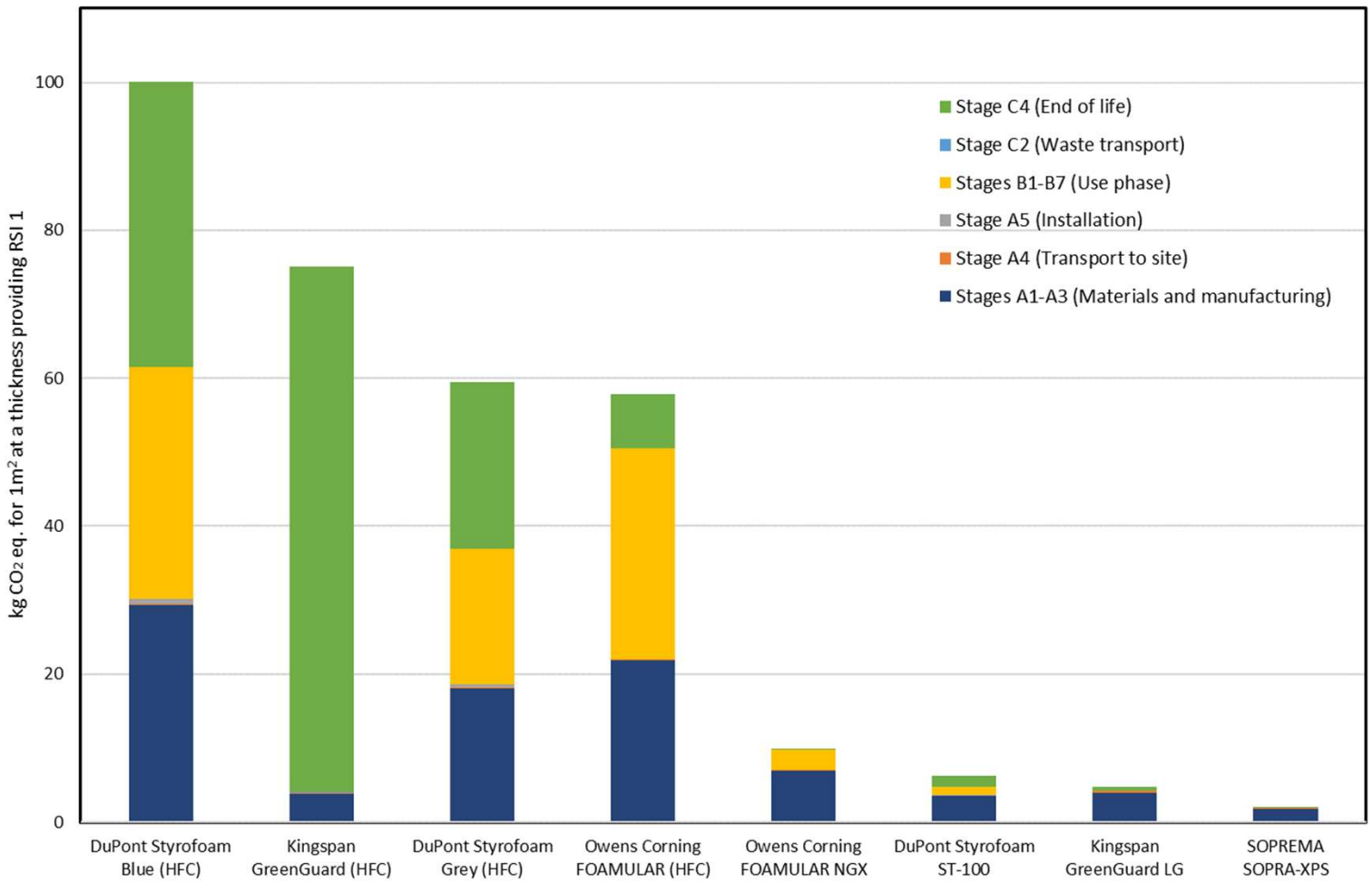
NORTHERN RESIDENTIAL WALL – SERVICE CAVITIES

ENVIRONMENTAL IMPACTS OF THERMAL INSULATION

Global Warming Environmental Impact

Complete Life Cycle

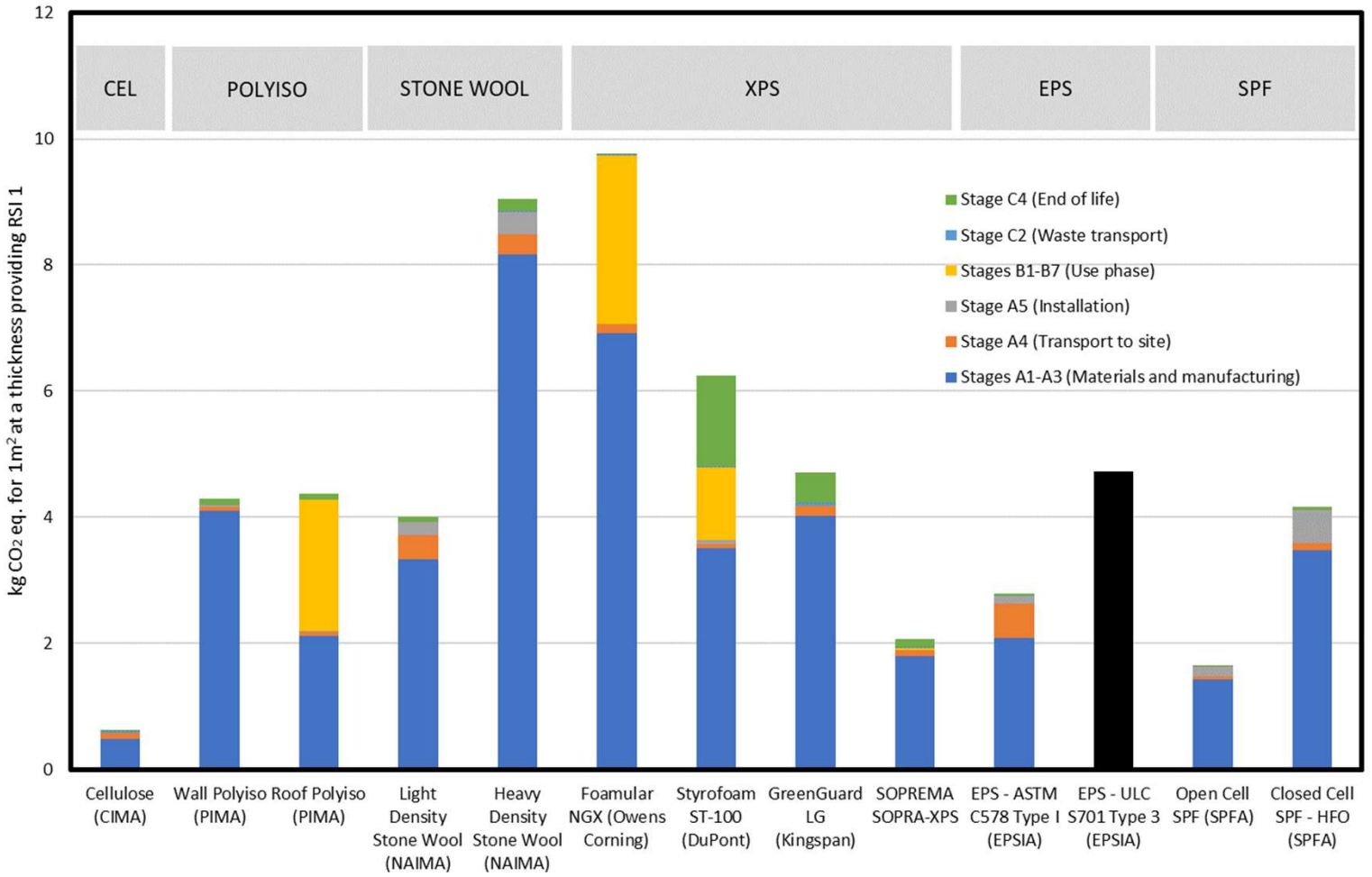


XPS

ENVIRONMENTAL IMPACTS OF THERMAL INSULATION

Global Warming Environmental Impact

Complete Life Cycle



Various types

SOPREMA

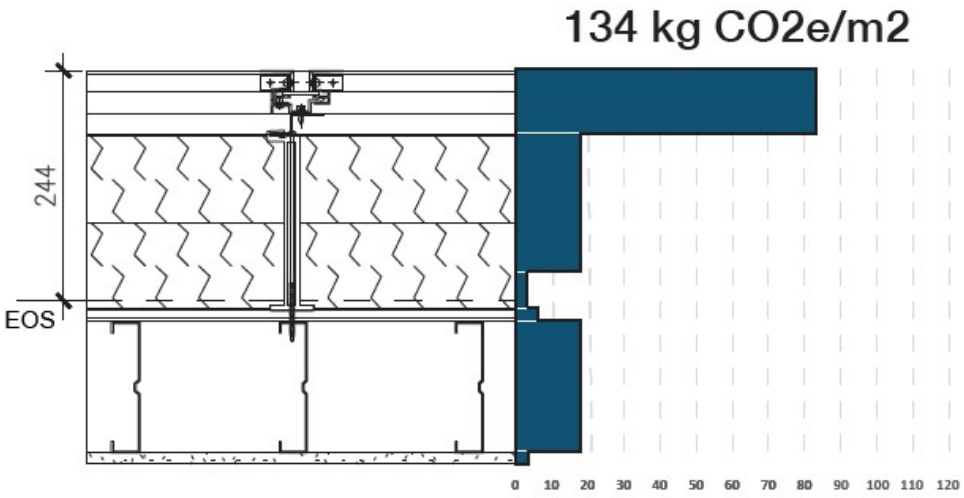
ENVIRONMENTAL IMPACTS IN A WALL ASSEMBLY

TOTAL GWP (kg CO_2e / m^2)
Aluminum Cladding

2.6 Aluminium Architectural Cladding, Steel Stud Backup

3mm	Prefinished aluminium panel system c/w panel frame and wall clips
25mm	Vertical GALV Z-girts or horizontal hat-track (as required)
203mm	Fiberglass thermal spacer clips
100mm	Semi-rigid mineral wool insulation (RSI = 3.0)
100mm	Semi-rigid mineral wool insulation (RSI = 3.0)
13mm	Exterior sheathing
152mm	GALV structural steel studs @ 400mm OC
13mm	GWB

Thickness = 417mm
Nominal RSI = 6.0 (R = 34.0)



TOTAL GWP (kg CO2e) per m2	134
Effective RSI =	5.81
GWP : RSI	23 : 1

SOPREMA

Source: BDP Quadrangle "Embodied Carbon in High Performance Walls"

ENVIRONMENTAL IMPACTS IN A WALL ASSEMBLY

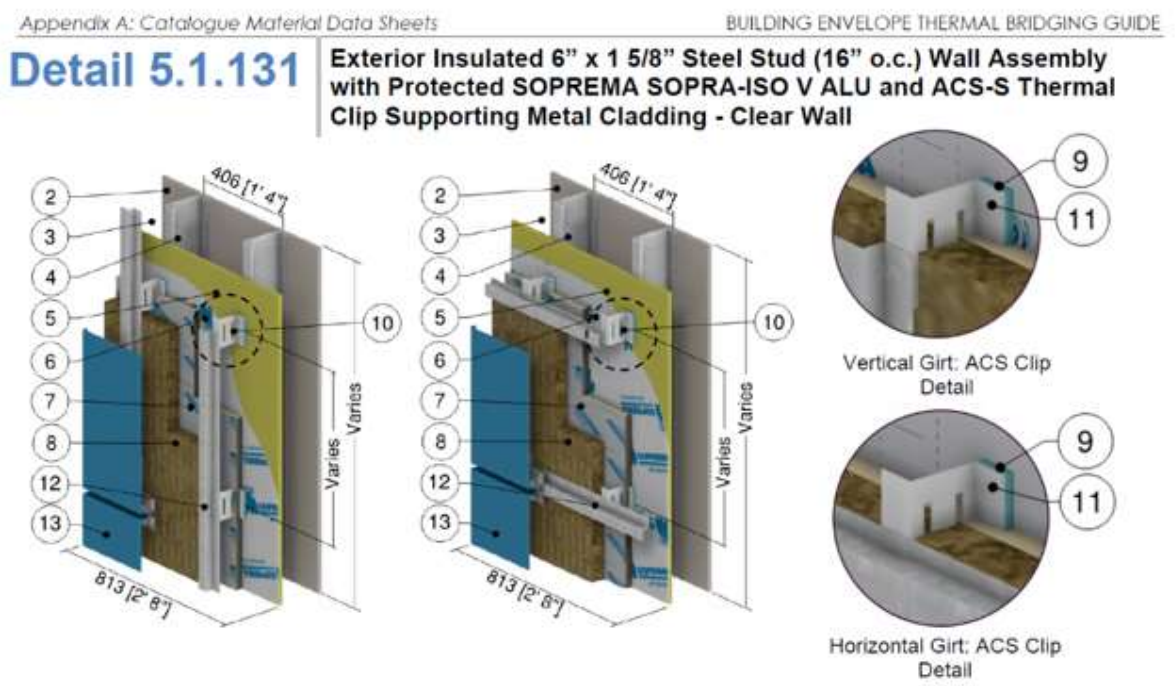
TOTAL GWP (kg CO_2e / m^2)
Aluminum Cladding

137 kg CO_2e/m^2

3mm	Prefinished aluminum panel system c/w panel frame and wall clips
25mm	Vertical GALV Z-girts or horizontal hat-track (as required)
152mm	ACS Thermal Clips
50mm	Semi-rigid mineral wool insulation (RSI=
102mm	ISO VALU rigid insulation
13mm	Exterior sheathing
152mm	GALV structural steel studs @ 400mm OC
13mm	GWB

Thickness = 358 mm

Nominal RSI = 6.09 (R = 34.6)



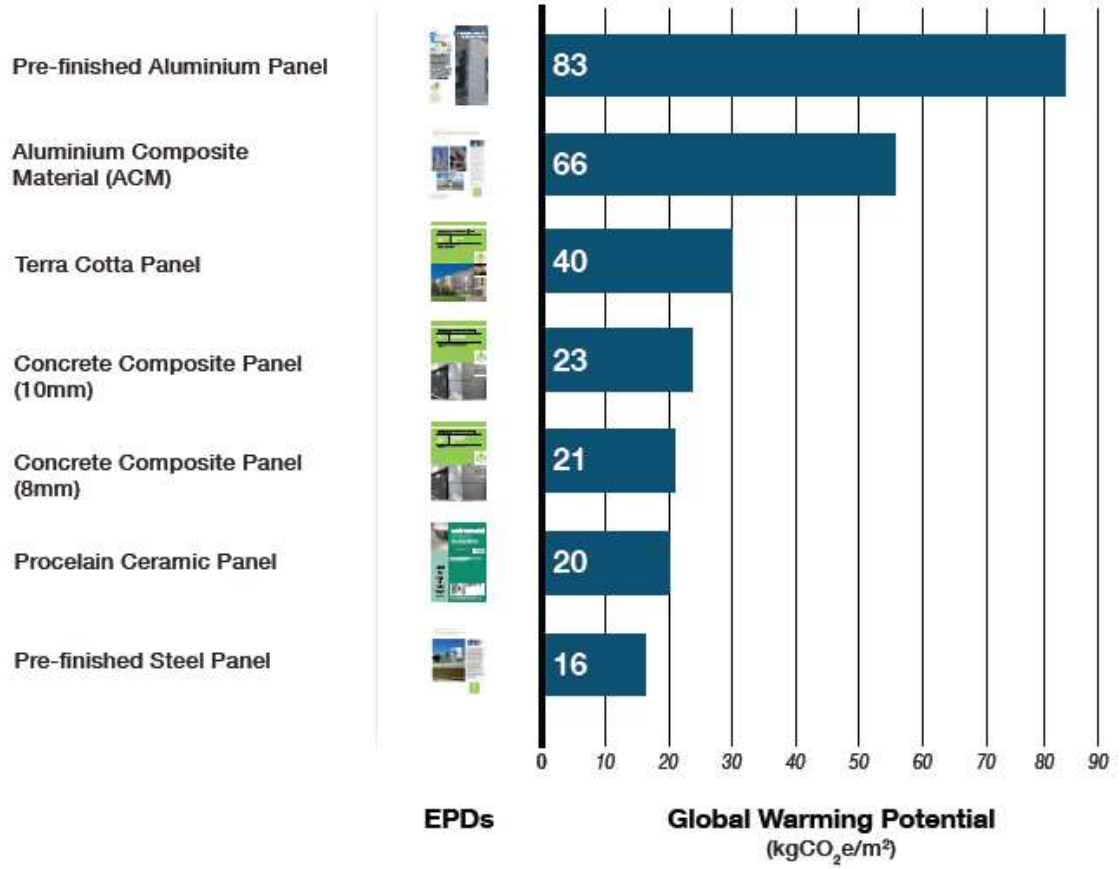
TOTAL GWP (kg CO2e) per m2	137
Effective RSI (R-Value)	6.32 (35.9)
GWP : RSI	21.7 : 1

SOPREMA

ENVIRONMENTAL IMPACTS IN A WALL ASSEMBLY

3.3 Material Carbon Emission of Cladding Only

Any of these cladding materials can be substituted for the pre-finished aluminum cladding. They range significantly in value from 16 kg c02e/m² to 83 kg c02e/m² which can make a significant different to a cladding system.



BDP. Quadrangle

Material Carbon Emission of Cladding Only

SOPREMA

Source: BDP Quadrangle "Embodied Carbon in High Performance Walls"

ENVIRONMENTAL IMPACTS IN A WALL ASSEMBLY

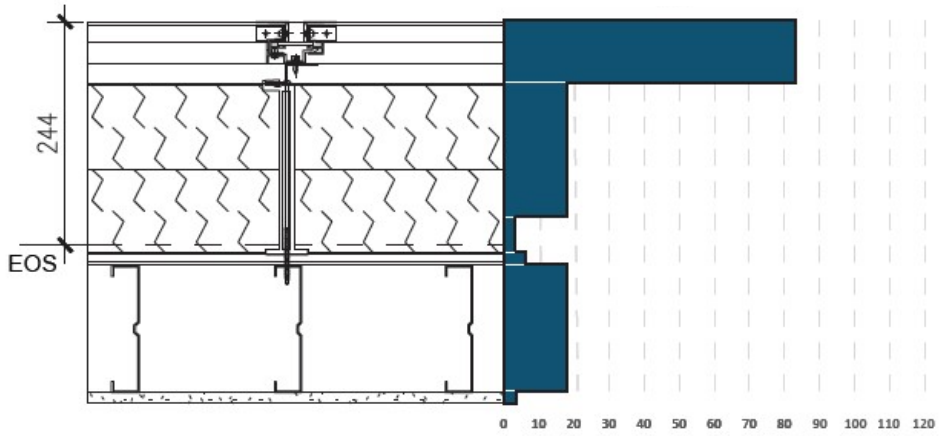
TOTAL GWP (kg CO_2e / m^2)
Steel Cladding

2.6 Aluminium Architectural Cladding, Steel Stud Backup

3mm	Prefinished aluminium panel system c/w panel frame and wall clips
25mm	Vertical GALV Z-girts or horizontal hat-track (as required)
203mm	Fiberglass thermal spacer clips
100mm	Semi-rigid mineral wool insulation (RSI = 3.0)
100mm	Semi-rigid mineral wool insulation (RSI = 3.0)
13mm	Exterior sheathing
152mm	GALV structural steel studs @ 400mm OC
13mm	GWB

Thickness = 417mm
Nominal RSI = 6.0 (R = 34.0)

66 kg CO_2e/m^2



TOTAL GWP (kg CO2e) per m2	66
Effective RSI	5.81
GWP : RSI	11 : 1

SOPREMA

Source: BDP Quadrangle "Embodied Carbon in High Performance Walls"

ENVIRONMENTAL IMPACTS IN A WALL ASSEMBLY

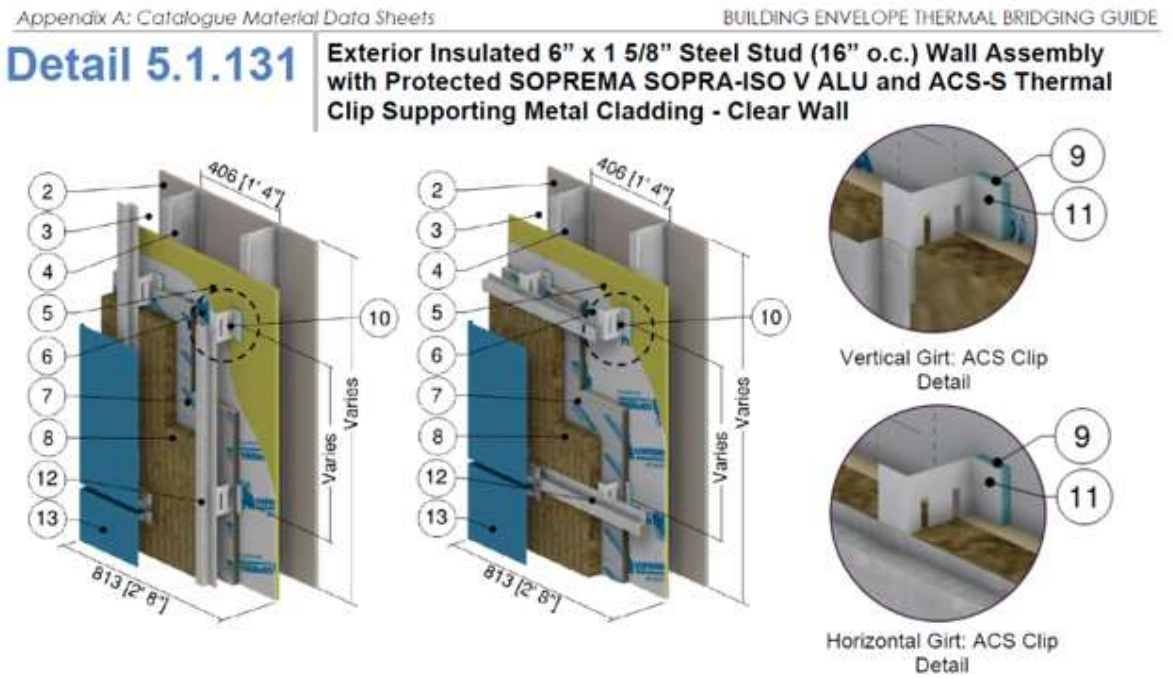
TOTAL GWP (kg CO_2e / m^2)
Steel Cladding

69 kg CO_2e/m^2

3mm	Prefinished steel panel system c/w panel frame and wall clips
25mm	Vertical GALV Z-girts or horizontal hat-track (as required)
152mm	ACS Thermal Clips
50mm	Semi-rigid mineral wool insulation (RSI=
102mm	ISO VALU rigid insulation
13mm	Exterior sheathing
152mm	GALV structural steel studs @ 400mm OC
13mm	GWB

Thickness = 358 mm

Nominal RSI = 6.09 (R = 34.6)



TOTAL GWP (kg CO2e) per m2	69
Effective RSI (R-Value)	6.32 (35.9)
GWP : RSI	10.9 : 1

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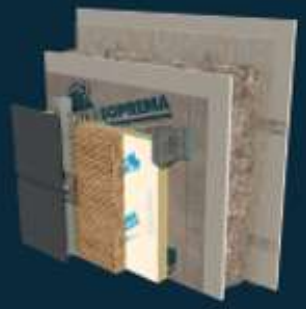
BUILDING
A SUSTAINABLE
NORTH

WHITEHORSE 2022 Yukon

BUILD BETTER
HIGH PERFORMANCE
WALLS



High Performance / Passive House / Net Zero for the North

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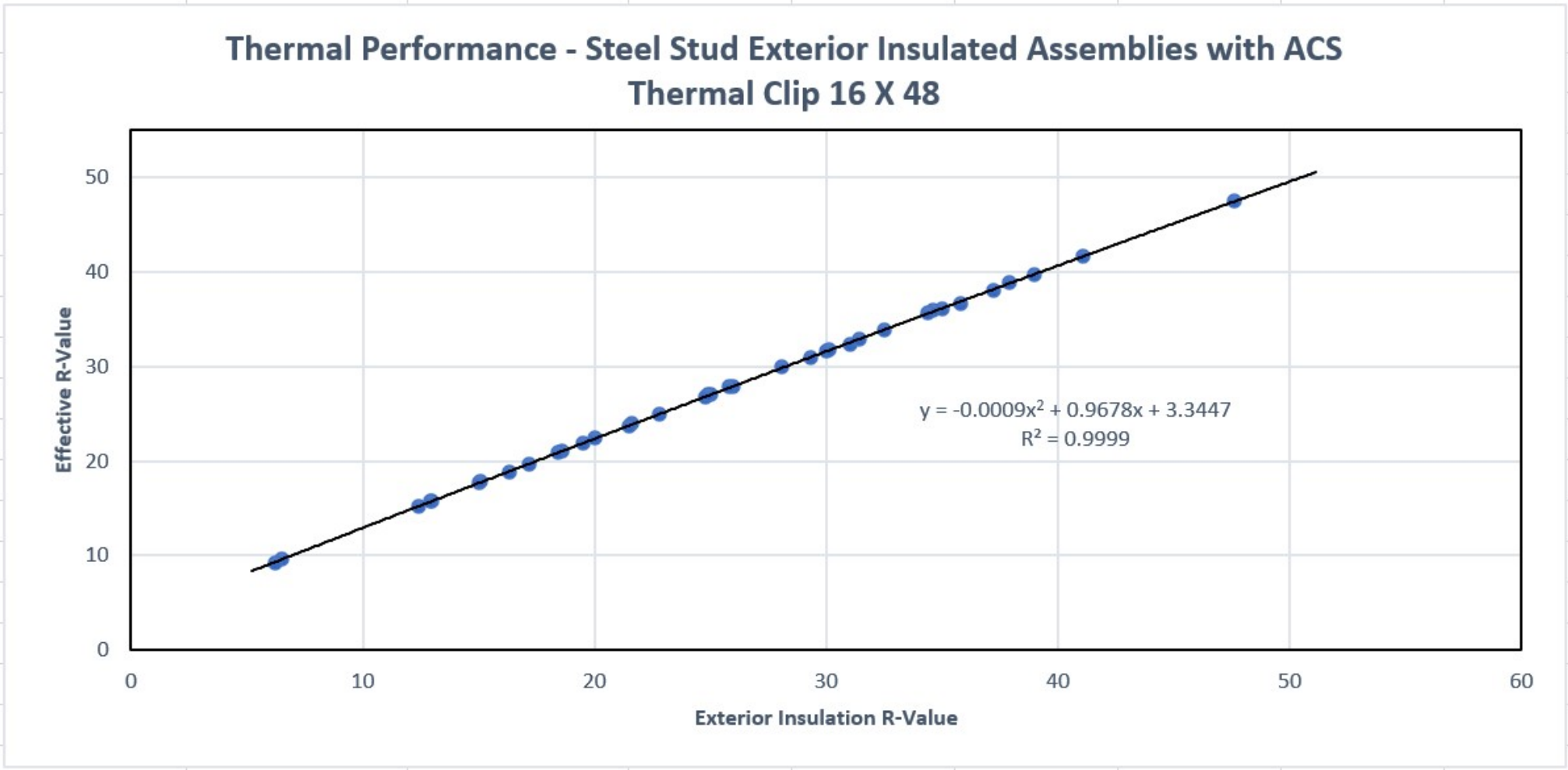
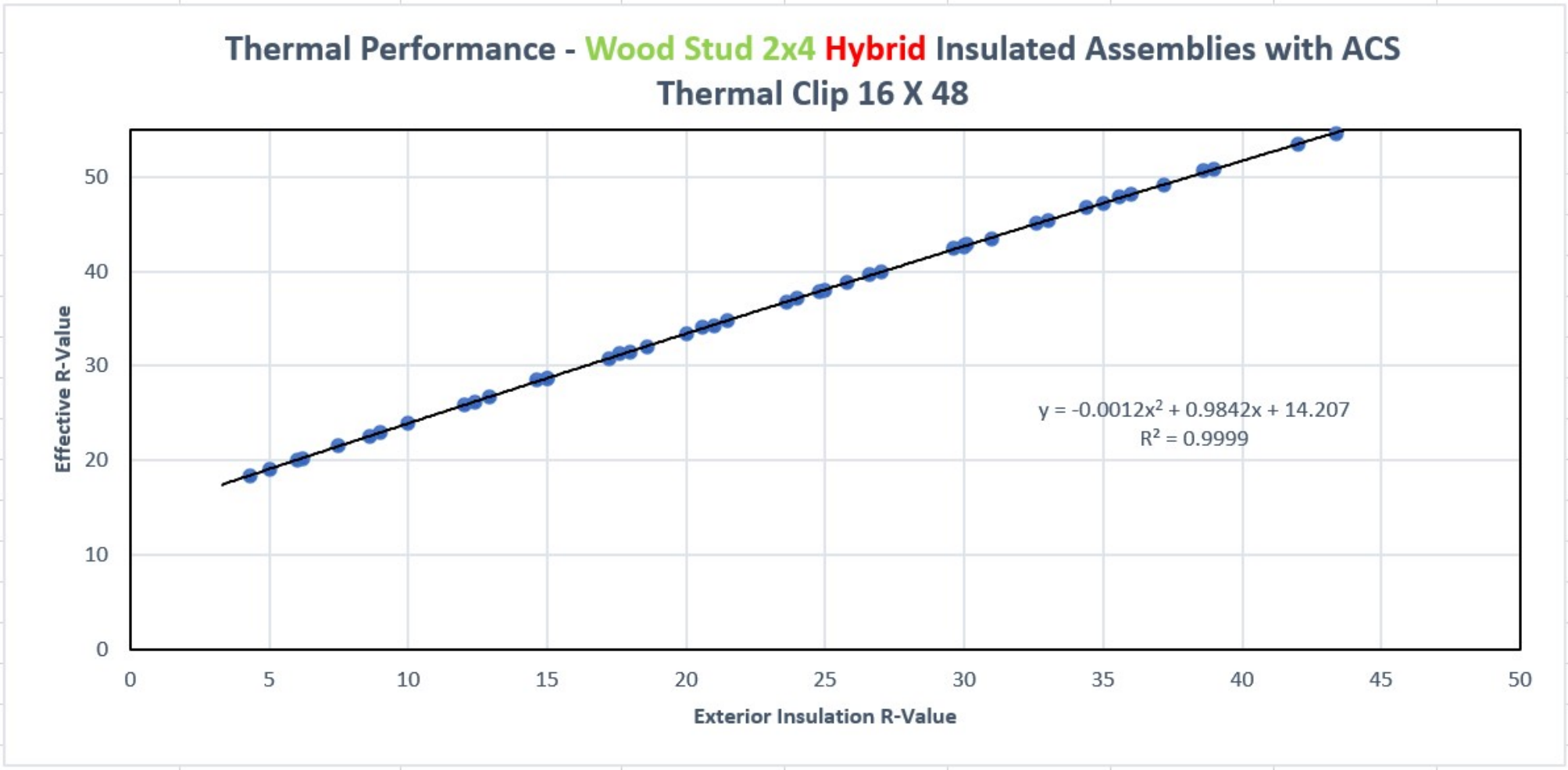
HIGH PERFORMANCE / PASSIVE HOUSE / NET ZERO FOR THE NORTH



SOPREMA

HIGH PERFORMANCE / PASSIVE HOUSE / NET ZERO FOR THE NORTH



SOPREMA

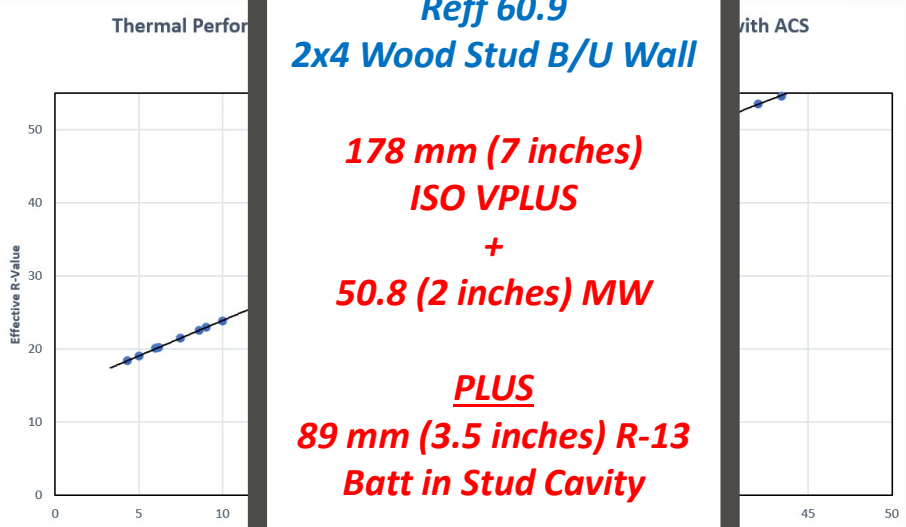
HIGH PERFORMANCE / PASSIVE HOUSE / NET ZERO FOR THE NORTH

Nunavut Project Example

Material	Framing	Cavity
Steel siding	0.11	0.11
25 mm rigid (XPS)	0.880591758	0.880592
25 mm hor. z girts	0.0004025	
152 mm v		
204 mm fi		
356 mm s		14.79394
16 mm ply		0.135
89 mm wo		
89 mm spr		3.698485
16 mm gyp		0.09699
Nominal R		19.71501
RSI to R		111.9418
% wall		90.17
Effective R	**60.94**	
100/((framing%/RSIf)+(cavity%/RSIc))		

Basis of Design
Reff 60+
2x4 Wood Stud B/U Wall

445 mm (17.5 inches)
2 lb SPF
PLUS
25 mm (1 inch)
XPS



Soprema Alternative
Reff 60.9
2x4 Wood Stud B/U Wall

178 mm (7 inches)
ISO VPLUS
+
50.8 (2 inches) MW

PLUS
89 mm (3.5 inches) R-13
Batt in Stud Cavity

		Rext	Reff	RSIext	RSIeff
HW-WS PA	7"ISOVPLUS+2"MW	50.6	60.9	8.91	10.73

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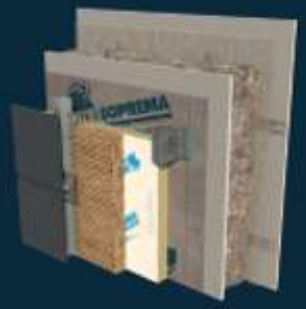
BUILDING
A SUSTAINABLE
NORTH

WHITEHORSE 2022 Yukon

BUILD BETTER
HIGH PERFORMANCE
WALLS



Fire Safety and the North

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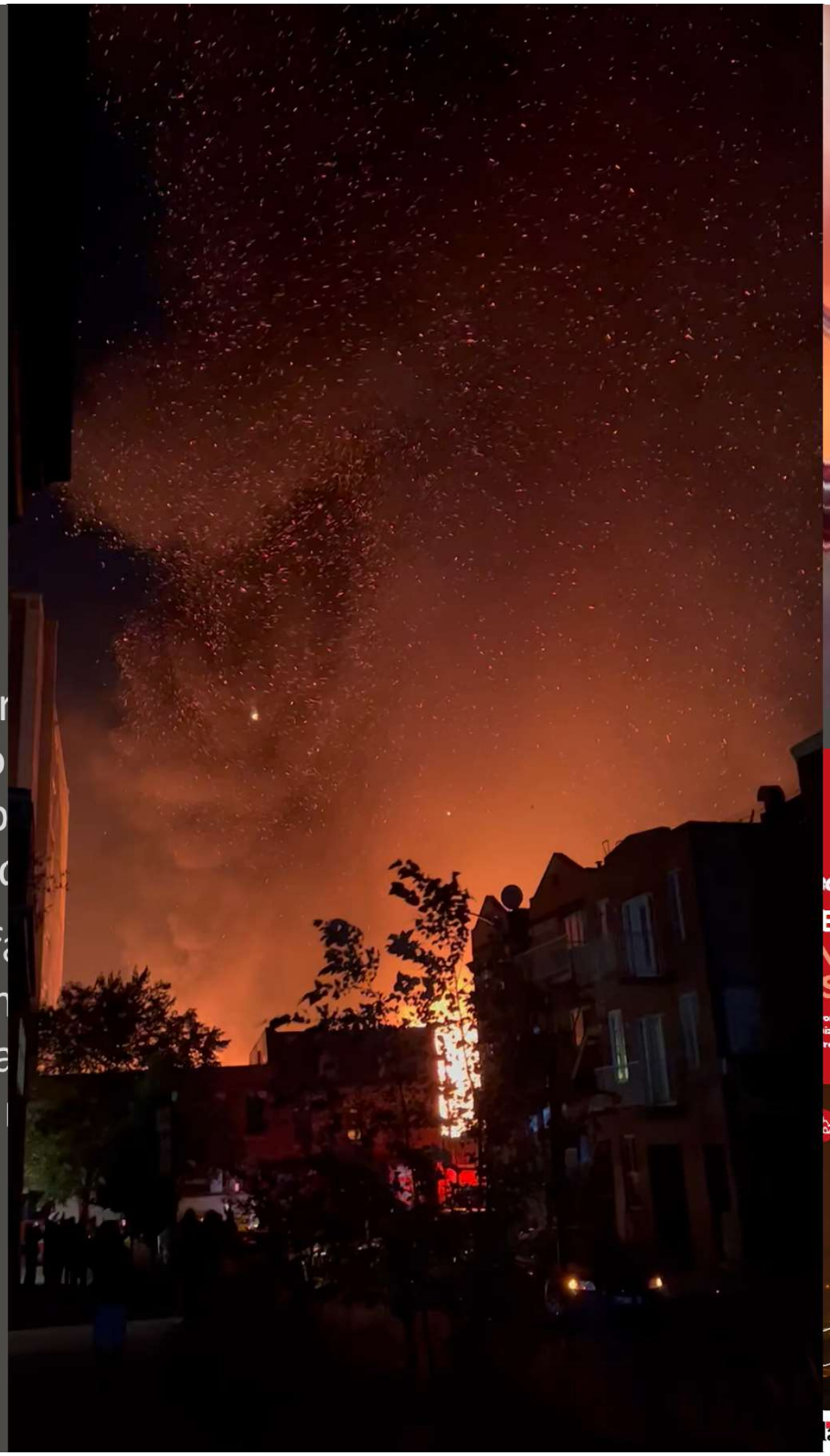
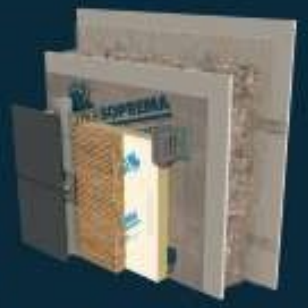
Fire Safety the North

- Risk reduction for under constructio protected assemb (laminated produc
- Concern of Interfa with Climate Chan to build better tha help improve fire



BUILDING A SUSTAINABLE NORTH



BUILD BETTER HIGH PERFORMANCE WALLS

WHITEHORSE 2022 Yukon

MONDAY NOVEMBER 7, 2022

FROM 10 AM TO 2 PM

NORTHLIGHT INNOVATION CENTRE
Newmont Classroom plus
NorthwesTel Event Space

2180 2ND Avenue,
Whitehorse Y.T.

Presented by

SOPREMA

KILRICH BUILDING CENTRES


BRIDGES
ANTIROCK
GREEN ROOFS
SOPRANATURE
ROOFS
SOPRA-ISO, ALSAN RS,
HIGH PERFORMANCE,
FLAMELESS SOLUTION...
WALLS
SOPRASEAL
INDOOR
APPLICATIONS
FLOORS, CEILINGS,
DRAINAGE PIPES
BALCONIES
PLAZA DECKS
FOUNDAINES
PARKING DECKS
ALSAN TRAFIK, TRAFIKROCK
FOUNDATIONS
COLPHENE

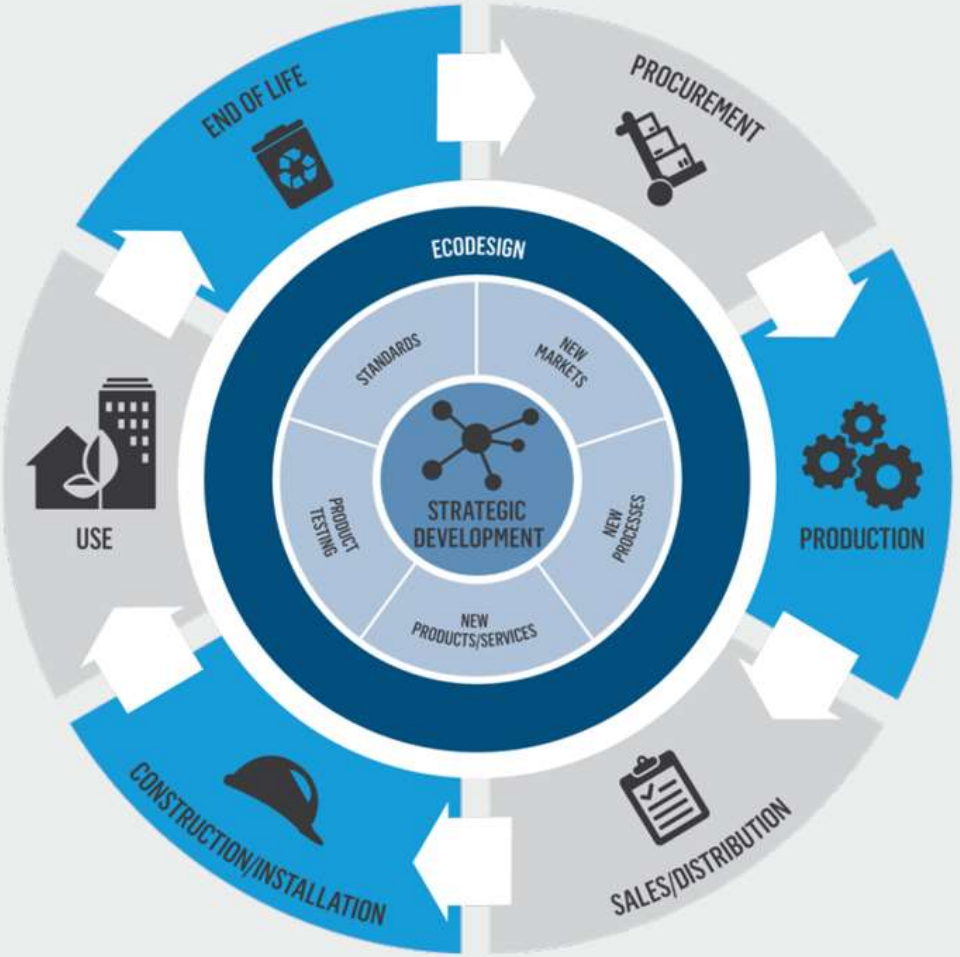
SUSTAINABLE DEVELOPMENT APPROACH

OUR VISION IS CLEAR:

WE WANT TO TRANSFORM THE CONSTRUCTION INDUSTRY WITH OUR SUSTAINABLE SOLUTIONS FOR BUILDINGS.

SUSTAINABLE DEVELOPMENT APPROACH

OUR APPROACH, WHICH IS BACKED BY CONCRETE COMMITMENTS, IS INSPIRED BY THE LIFECYCLE CONCEPT, COMPRISES ALL THE ASPECTS OF THE COMPANY, AND INVOLVES BOTH OUR ACTIVITIES AND OUR PRODUCTS.



SUSTAINABLE DEVELOPMENT APPROACH

OUR COMMITMENTS COVER THREE MAJOR OBJECTIVES INTENDED TO ALIGN OUR STRATEGIES AND REALIZE OUR SUSTAINABLE DEVELOPMENT POLICY.

SUSTAINABLE DEVELOPMENT APPROACH

Here are some of our major initiatives:

- Promoting local purchasing and vendors who are recognized for their good practices.
- Targeting zero waste for our extruded polystyrene insulation panel manufacturing plant in Sherbrooke, Québec.
- Obtaining the LEED Silver certification for our polyisocyanurate insulation panel manufacturing plant in Drummondville, Québec.

COMPREHENSIVE SERVICE

- Recognized for the expertise and availability of its technical team: more than 70 technicians and technical representatives across Canada work with and support construction professionals on their projects, from design to build.

- In addition to providing great technical support and service to customers, SOPREMA provides training to over 1,000 installers annually in the eight training centres in Canada.

SOPREMA IS MORE THAN JUST A MANUFACTURER – IT IS ALSO A PARTNER!

SLOPE DESIGN
SERVICE AND SPECIALIZED PRODUCTS

- Choosing the right slope on a roof is essential because it will ensure adequate drainage and thus prevent the risks associated with the accumulation of stagnant water or ice.

- At SOPREMA, a team of estimators and drafters is dedicated entirely to the production of adapted plans, in addition to offering validation on site.

DESIGN SERVICE FOR EXPANSION JOINTS

SOPREMA professionals can produce custom plans and perform field validation for SOPRAJOINT PLUS, monolithic, expansion and waterproofing joints.

SPIRIT OF INNOVATION

- SOPREMA is recognized as a pioneer for its initiatives to develop new products that meet customer needs and make their work more efficient.
- Innovation at SOPREMA also means active participation in the development of new industry standards.
- Its Canadian research and development centre is located in Drummondville, where dedicated professionals work to develop and improve products, all while keeping SOPREMA's R&D sustainable development policy at the forefront.

TECHNOLOGIES

Over the years, SOPREMA has developed and marketed the best technologies in the industry with the constant objective to provide high-quality products.

- **SBS:** SOPREMA has mastered SBS modified bitumen technology since 1975. SBS products offer peace of mind with their excellent durability and resistance to severe weather conditions and can be installed using various techniques.

  SBS technology is also very versatile: it can be used for waterproofing roofs, walls, foundations, bridges, parking decks, etc.

TECHNOLOGIES

- **PVC:**
  Polyvinyl chloride (also known as PVC) is used for roofing and waterproofing. This technology is easy to install, provides long-term durability, and is proven to offer fire resistance.

SOPREMA Group has been manufacturing PVC membranes for over 40 years.

TECHNOLOGIES

- **PMMA:** This range of cold liquid-applied roofing and waterproofing membranes is based on methacrylate chemistry. PMMA offers ultra-high-performance, flexible, seamless reinforced systems featuring fast cure time that can accommodate tight construction schedules.
- **PU:** This range of cold liquid-applied membranes is based on polyurethane (PU) chemistry. PU offers robust, flexible, seamless systems that are ideal for protecting concrete structures against corrosion as well as traffic.

TECHNOLOGIES

- **POLYISOCYANURATE:** High-performance insulation technology (closed-cell hydrophobic foam) with multiple applications including roof and wall insulation.

- **STONE WOOL:** It is a natural product that utilizes recycled materials like slag and natural materials such as basalt rock. It is very durable and possesses stable insulating values in cold climates.

TECHNOLOGIES

- **CELLULOSE:** Thermal and acoustic insulation made of 85% recycled newspapers, and used in interior and exterior walls, attics, floors, and ceilings.

- **XPS:** Extruded polystyrene foam (also known as XPS) is a rigid, high-performance closed-cell insulation. Its high water and moisture resistance and versatility make XPS the insulation of choice for every application need.

- **POLYURETHANE FOAM:** Two-component polyurethane foam with a closed-cell structure. This high-quality product is designed for interior and exterior insulation applications, whether commercial, industrial, or residential.

COMMITMENT TO QUALITY

SOPREMA developed around the idea that the quality, durability and reliability of materials should be the main deliverable attributes to our end users. So, the company continuously works to develop a variety of high-quality products for every type of construction project.

ROOFS WALLS FOUNDATIONS PARKING DECKS BRIDGES ADDITIONAL EXPERTISE

ONE-STOP SHOP

SOPREMA offers solutions for the entire building envelope: roofs, walls, foundations, and more. This consistency ensures material compatibility and tie-in solutions.

No more confusion at transitions!

SOPREMA is the only company to offer vertical integration from waterproofing and vegetative solutions to insulation, in addition to all accessory products (adhesives, primer, etc.). This means you can get everything you need from one manufacturer.

SOPREMA's solutions ensure the integrity of the system with an optimal warranty.

ROOFS

WATERPROOFING

SOPREMA offers a wide range of waterproofing, vegetative solutions and insulation products for roofs.

SOPREMA's High Performance roof waterproofing systems are designed with one basic criteria in mind: durability.

- COLPLY
- SOPRASTAR
- SOPRAPLY
- SOPRASMART
- ALSAN RS
- COLVENT
- SOPRAFIX
- SENTINEL

SOPREMA has given the roofing industry classic performance utilizing the proven performance of SOPRALENE and ELASTOPHENE.

FOUNDATIONS

WATERPROOFING

The COLPHENE line includes all products involved in foundation waterproofing, from self-adhered to thermofusible SBS modified bitumen membranes.

There are several systems that can protect all types of foundations:

- Conventional waterproofing directly installed on the foundation walls;
- Blindside waterproofing installed on the shoring for projects in dense urban areas.

ADDITIONAL EXPERTISE

SOUNDPROOFING

SOPREMA soundproofing products bring together a variety of innovations to offer peace and quiet. The acoustic panels and membranes were specially designed to allow soundproofing of several types of floor coverings, walls, ceilings and drainage pipes.

WARRANTY PROGRAMS

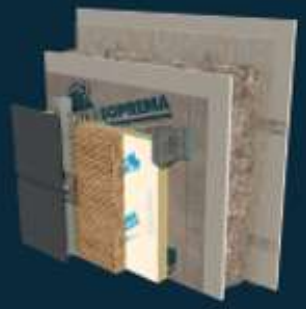
As proof of the unique quality and performance of its products, SOPREMA offers several comprehensive warranty programs of up to 20 years for waterproofing membranes in the High Performance category, without any hidden fees.

THANK YOU

BUILDING
A SUSTAINABLE
NORTH

WHITEHORSE 2022 Yukon

BUILD BETTER
HIGH PERFORMANCE
WALLS



Hands on Wall Construction and Demonstration

SOPREMA

KILRICH BUILDING CENTRES

SOPREMA