

BUILD BETTER. BUILD FASTER.  
**BUILD SMART™**



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# Designing with Build SMART in Mind

## An Introduction



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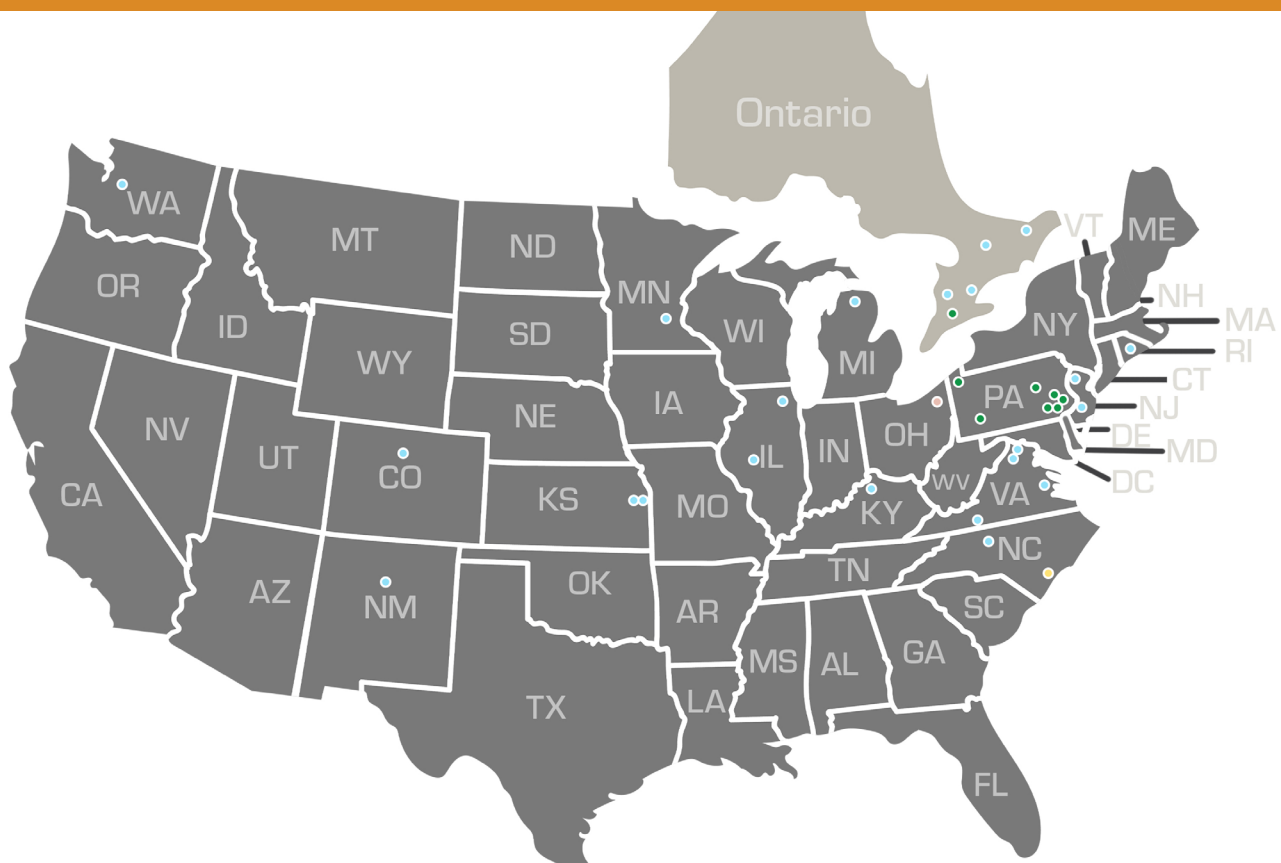


# At Build SMART Good enough isn't.

Providing custom, prefabricated, tight building envelope systems throughout the US and Canada. Any builder that has culled through a stack of 2x4's – separating those that are “good enough” for plates, studs or kings, from those to be cut up for jacks and cripples - often finds themselves staring at a sizable reject pile (15-20%) relegated to ground stakes or firewood.

**Multifamily projects produce an additional \$70/mo per unit revenue!** When that is considered in the context of the prefab savings, shortened construction time, reduced HVAC capital expense, and window replacement savings, the cash flow increase is 60% (assuming a \$200 per unit base line).

In addition, the overall cost of the building is **reduced by 4.8%** compared to stick-building merely to meet code. Build SMART in particular has calculated **it costs 19% less to use our panels than to stick-build the same assembly** – and that is before you consider the above-referenced overall project savings from accelerated construction.

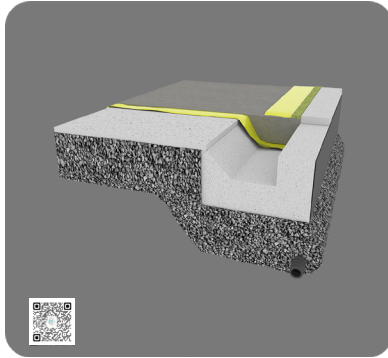


The **Build SMART** System is produced custom for each individual project and can be used wherever traditional construction can be used. With current and past projects spanning across the U.S. and Canada, we aim to ensure efficient construction is within reach for anyone – regardless of targeted performance.

# The Build SMART System

Build SMART's E-Wall Exterior Assembly System is the product of over ten years of refinement by a multi-disciplinary team of experts: Builders, Engineers, Architects, Code Experts, Industrial Designers and Born This Way Inventors. It is developed to make high performance buildings easy to erect, fast and efficient in every way. Simply put, building with preassembled panels is much faster and requires less skill than building with sticks.

**The Build SMART system is the next generation of prefabricated buildings.**



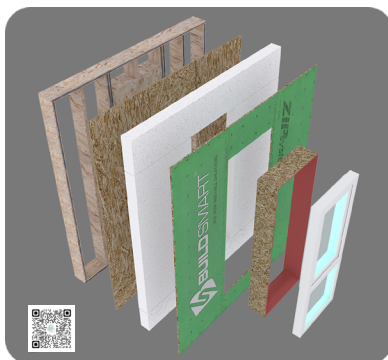
**J-Form Insulated Shallow Foundation System** for insulated slab on grade structures. It makes it unnecessary to form and pour frost footings. Insulation and air barriers are completely integrated with the E-Wall Building Envelope System.

J-Form System can be ordered separately and used with any properly engineered building structure.



**I-Wall Interior Partition System** includes stud frame panels with rough opening bucks, ready for MEP rough-in and finishes.

I-Wall Interior Framing panels help jobsite installation keep pace with with the speed of the E-Wall exterior panels.



**E-Wall Exterior Envelope System** is made up of factory assembled exterior wall panels. It allows jobsite crews to quickly and simultaneously stand up the structural wall with factory assembled air barrier sheathing, exterior insulation, nail base, weather resistant barrier and pre-installed and pre-irtightened windows and doors.

E-Wall panels are assembled using industry standard framing per IRC Chapter 6. The IRC can be viewed on line at this link: <https://up.codes/codes/general>

Exterior wall panels are installed from the deck, so scaffolding is not needed until after the building is dried-in. Pre-assembling the wall in the factory eliminates the time and cost of several 'trips around the building' at the jobsite.

**E-Wall System can be ordered with or without the J-Form System.**



Find additional information at  
[BuildSMARTna.com/Resources](https://BuildSMARTna.com/Resources)



## System Components

Build SMART set out to create the simplest way to achieve the Passive House standard.

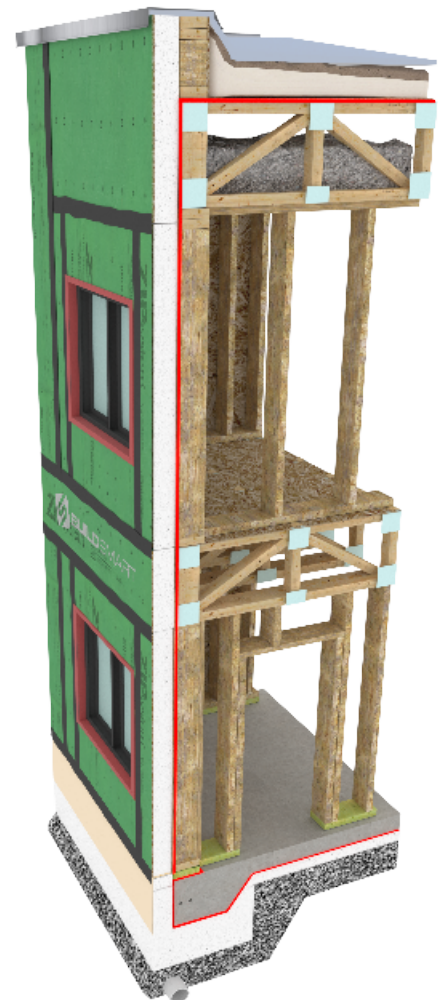
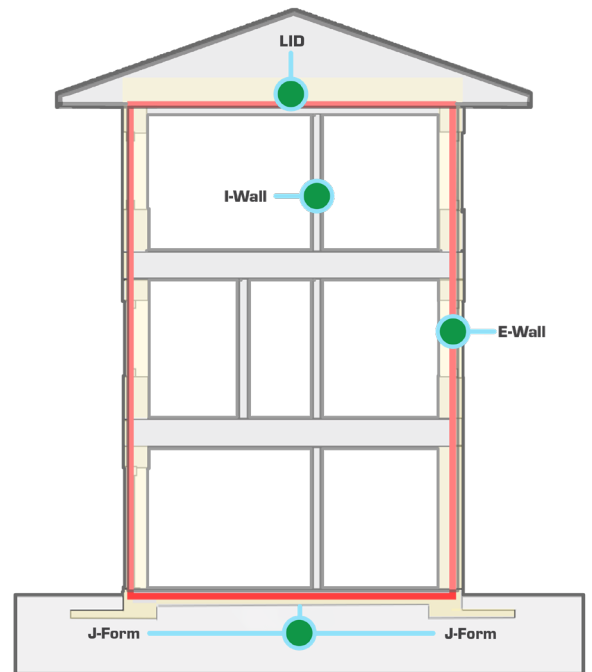
Each Build SMART project is optimized for the local conditions. The Build SMART System provides a comprehensive, six-sided building envelope system. The Contractor's slab on grade, floor and roof complete the building structure.

When considering a 'building as a system' it is the building envelope that holds everything together.

The Build SMART System exemplifies ideas that Joe Lstiburek of the Building Science Corporation presented in his paper on "The Perfect Wall" including proper design of the rain control layer, air control layer, vapor control layer, and thermal control layer. It is vapor open and designed for engineered drying by vapor diffusion, i.e. the annual wetting potential (accumulation of moisture inside building envelope assemblies) is lower than the annual drying potential (moisture drawn out of the wall). The small amount of moisture that may be present through vapor diffusion remains harmless. Engineered drying ensures that mold and mildew will not form, and wood will not rot. Occupant health is protected. Premature damage and expensive repairs are avoided.

The Build SMART System works in all climates. Project teams decide thicknesses and performance, customized for design intent, budget, project goals and hygrothermal performance (movement of heat and vapor) of the building envelope.

The Build SMART System carries an air tightness warranty. If built per Build SMART's Installation Instructions, we warrant that air tightness of the building will comply with PHIUS Requirements.



# Project Milestones and Installation

## Builder's Jobsite Activities and Project Milestones

The diagram below illustrates the Builder activities that are concurrent with fabrication of the Build SMART system.



## System Installation Instructions

The information contained in this document is intended to help building professionals ensure quality in their Build SMART installations. It can serve as a planning tool and a reference source on the essentials of a successful Build SMART job.



# Integrated Design Process

**DESIGN PHASE** collaboration with project teams for cost and performance, constructability reviews for best fit and value.

**PROPOSAL** quote based on final construction documents.

**SHOP DRAWINGS** are provided from Build SMART for approval. Every component is documented, numbered and sequenced.

## PRE-INSTALLATION CONFERENCE

Provided for the installation crew as standard procedure (virtual or on-site).

### ARCHITECTURAL DRAWINGS AND SPECS

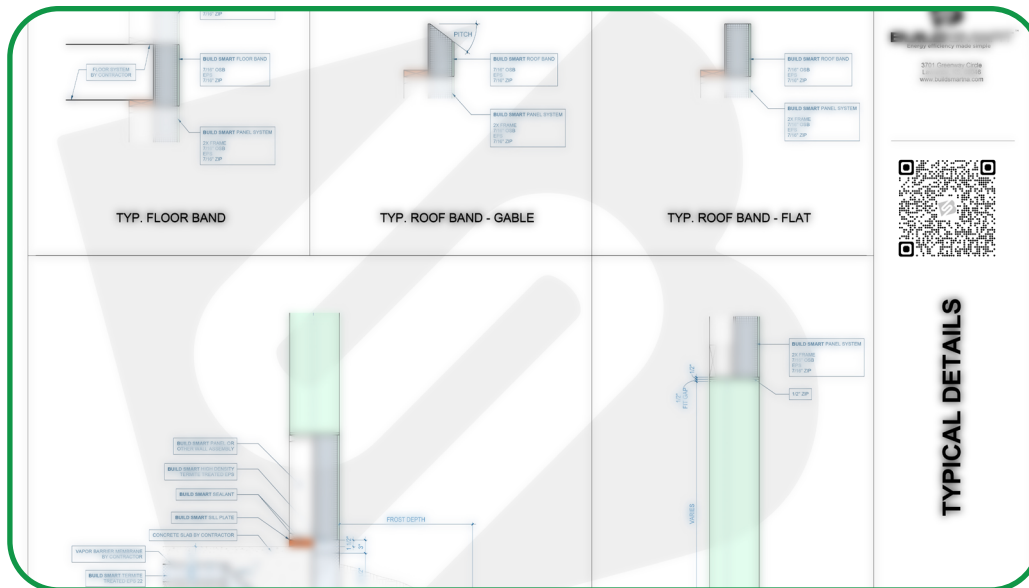
- Collaborative
- Constructability
- Performance
- Cost and Value

### CREATE SHOP DRAWINGS

- 3D BIM Revit Model

### FACTORY PRODUCTION

- Comprehensive QAQC
- Packaged weather resistance



Review Build SMART Typical Details Set

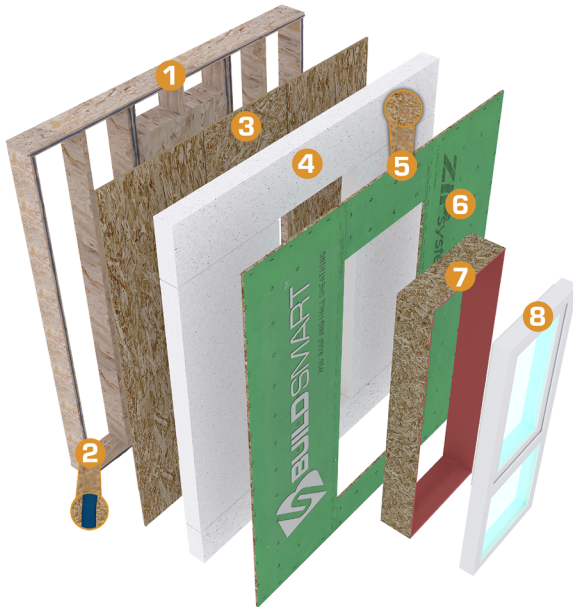
Build SMART panels combine with your roof and foundation system to create a highly efficient, draft free building envelope

# E-Wall Exterior Envelope System

## NON-FIRE RATED EXTERIOR WALL PANEL ASSEMBLIES

Factory assembled exterior wall panels for single family and commercial buildings with construction **Type V-B**.

### E-Wall Panelized Building Envelope System



Customized to suit every project

#### 1 LSL Structural Wall Assembly

- Better precision, dead-flat walls, reduced shrinkage, tighter tolerances.
- 2 x 4 or 2 x 6 studs at 16" or 24" o.c.

#### 2 Air Barrier

- Utilizes industry-leading fluid applied air barrier materials.

#### 3 Structural Sheathing

- Code-required fasteners, Quality inspected. Perimeter adhesive adds panel strength and air sealing

#### 4 Continuous External Insulation Thermal Barrier

- Maximizes R-Value. Eliminates thermal bridging and condensation at structural sheathing.

#### 5 External Nailbase

- Simplifies field-installed exterior finishes.

#### 6 Weather Resistive Barrier

- Factory-applied WRB and panel joint detailing.

#### 7 Factory-Prepared Rough Opening

- Fully flashed and air sealed. Properly locates windows and doors in thermal plane.

#### 8 Factory-Installed and Air Sealed High Performance Window (optional)

- Plumb level and square factory installation of your high performance windows.

Build SMART's E-Wall assemblies can be ordered in a variety of exterior wall options to meet your budgetary restrictions and building performance expectations.

The exterior wall of your building – the part that separates outside from in, conditioned space from hot and wet or cold and dry external conditions – is considered by building scientists to be your Building Envelope. That's where effective air sealing and higher performing windows are so important, Build SMART uses a Red List Free lamination adhesive based on Silyl terminate poly ether, in addition all adhesives and air sealing sealants used in Build SMART E-Wall panels are free of phthalates. Most Sips producers use moisture cure polyurethane adhesives catalyzed with toxic isocyanates. Where continuous exterior and stud bay insulation strategies combine to create an envelope that's optimized for your design and climate zone.



For more information refer to the **E-Wall Video Overview**

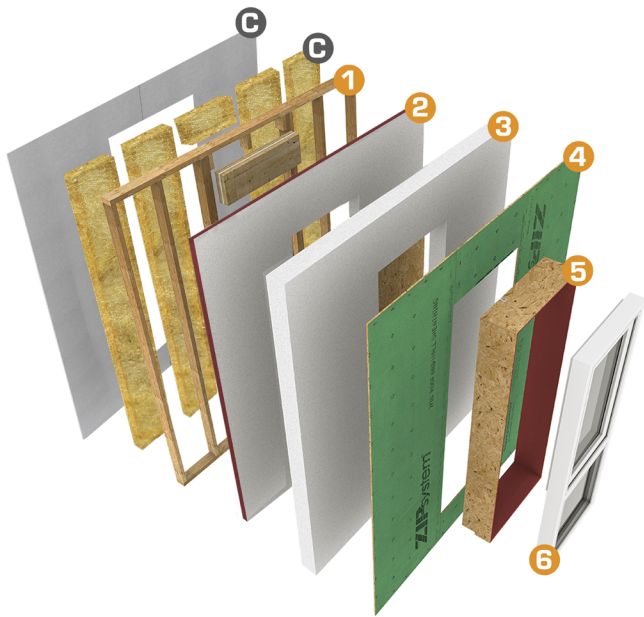


# Fire Rated E-Wall Exterior Envelope System

## 1-HOUR FIRE RATED EXTERIOR WALL PANEL ASSEMBLIES

Fire-rated, factory assembled exterior wall panels for multifamily and commercial buildings above 3 stories in construction Type V-A.

### E-Wall FIRE RATED Panelized Building Envelope System



Based on Intertek LP Wall Design No. LPB/WPPS 60-01, per PAC letter  
Designed for 1-hour fire exposure from interior, 1-hr from exterior.

- 1 LSL Structural Wall Assembly**
  - Better precision, dead-flat walls, reduced shrinkage, tighter tolerances
  - 2 x 4 or 2 x 6 studs at 16" or 24" o.c.
- 2 Structural Sheathing & Air Barrier**
  - 7/16" fire resistive FlameBlock nailed and sealed to framework at panel edges (for air-tightness)
  - Code-required fasteners, Quality inspected. Perimeter adhesive adds panel strength and air sealing
- 3 Continuous External Insulation**
  - Maximizes R-Value. Eliminates thermal bridging and condensation at structural sheathing. EPS, R-Sheathing, PIC or Phenolic
- 4 External Nailbase & Weather Resistant Barrier**
  - Simplifies field-installed exterior finishes
  - Factory-applied WRB and panel joint detailing
- 5 Factory-Prepared Rough Opening**
  - Fully flashed and air sealed. Properly locates windows and doors in thermal plane
- 6 Factory-Installed and Air Sealed High Performance Window (optional)**
  - Plumb level and square factory installation of your high performance windows
- C External Nailbase & Weather Resistant Barrier**
  - Type X fire rated gyp board by contractor
  - Mineral Wool Cavity Insulation by contractor

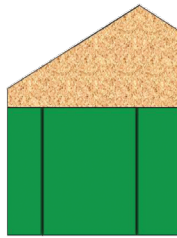
Build SMART's Fire Rated E-Wall assemblies can be ordered in a variety of exterior wall options to meet your budgetary restrictions and building performance expectations.

Featuring integrated moisture, air and thermal protection.



For more information refer to the  
**Fire Rated E-Wall Table**

Gables and non-rectilinear walls are framed and sheathed by Contractor at the jobsite, ready to Build SMART nail base installation



The maximum panel height is 10'-0" from panel bottom plate to top plate. The minimum panel height is 6'-0" plate to plate. This is the optimized range for factory mechanization and truck loading.

Project teams don't need to give time or attention to panel widths. Panel widths average up to 10'. Build SMART will optimize them on each project for factors such as complying with the architectural design and window placements, manageable panel weights, mechanized fabrication, material efficiencies, and optimized truck layout.

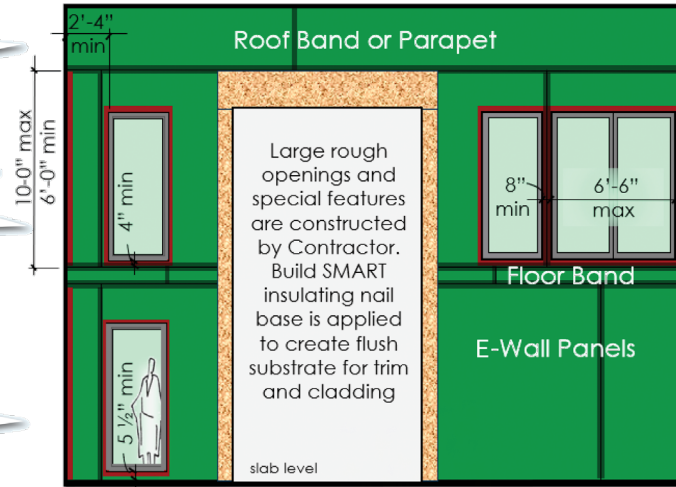
Select window and door dimensions (out to out) that you want and Build SMART will size the rough openings accordingly.

Minimum distance from building corner to window or door unit: 2'-4" min

Maximum panel height from bottom plate to top plate: 10'-0"

Minimum window sill height above framed floor deck: 4"

Minimum window sill height above concrete slab: 5 1/2"

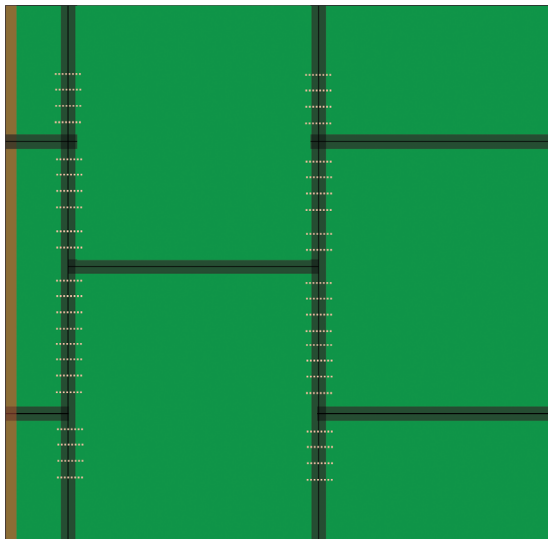


Minimum window to window dimension at a panel joint: 8"

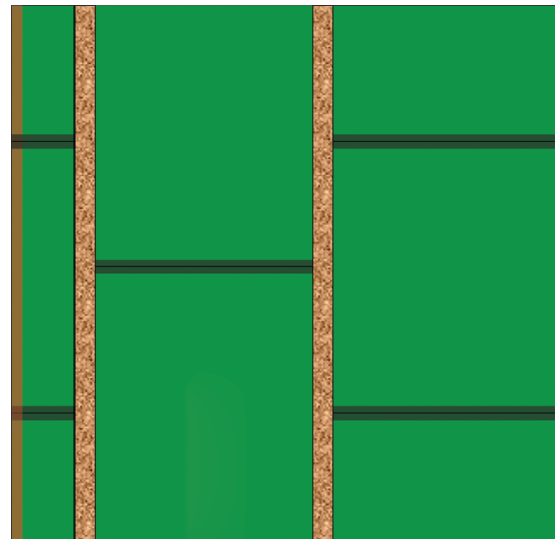
Maximum factory installed window unit width: 6'-6"

Rectilinear E-Wall panels: cost effective automated production

Large openings and special building envelope shapes are framed and sheathed by the Contractor at the jobsite, ready for Build SMART insulating nail base which completes the water control layer of the wall flush with surrounding panels.



"Stitch" panel edge studs together with construction screws to form a full height horizontal load resistance.






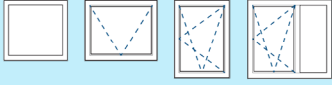

PSL columns designed for Contractor jobsite installation between Build SMART panels. Columns are then covered with Build SMART insulating nail base.

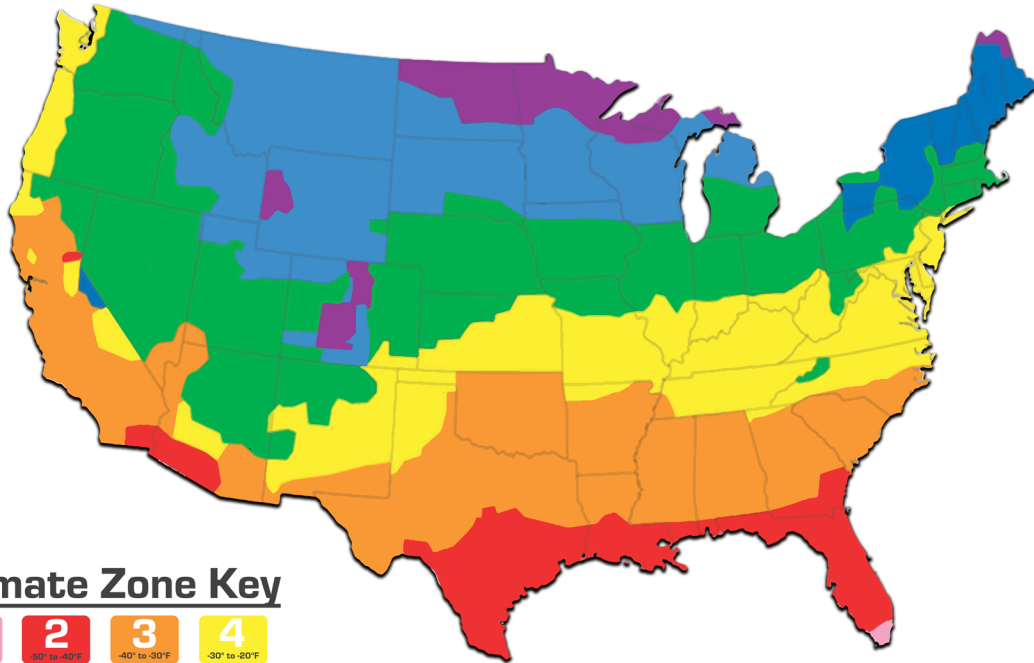
## If you have double height walls

Structural Engineers may choose from at least two primary ways to design double height Build SMART walls. E-Wall panels can be fabricated from 6'-0" to 10'-0" height, plate to plate.



# Selection of Factory Pre-Installed Windows

<b>WINDOWS</b>	 Alpen Windows   Tyrol Series uPVC Frame	 Alpen Windows   Zenith Series Fiberglass Frame
<b>COLORS</b>	<div style="display: flex; justify-content: space-around;"> <div style="background-color: white; padding: 5px; border: 1px solid black;"> <b>White</b>  <small>(Standard)</small> </div> <div style="background-color: black; color: white; padding: 5px; border: 1px solid black;"> <b>Black</b>  <small>(Upgrade)</small> </div> <div style="background-color: #4b3621; color: white; padding: 5px; border: 1px solid black;"> <b>Bronze</b>  <small>(Upgrade)</small> </div> </div>	
<b>OPERATION</b>	 <div style="display: flex; justify-content: space-around; font-size: small;"> <span>Fixed Window</span> <span>Hopper Window</span> <span>Tilt Turn/ Hopper Window</span> <span>Combination Units</span> </div>	 <div style="display: flex; justify-content: space-around; font-size: small;"> <span>Fixed / Picture</span> <span>Awning Window</span> <span>Casement Window</span> <span>Combo Units</span> </div>



### Climate Zone Key



### Climate specific recommendations

	Alpen Tyrol		Alpen Zenith		
	TR-6	TR-9	ZR-6	ZR-7	ZR-9
7		★			
6		★			★
5		★			★
4	★	★	★	★	★
3	★	★	★	★	★

# Custom For Any Application

The Build SMART System is produced custom for each individual project and can be used wherever traditional construction can be used. With current and past projects spanning across the U.S. and Canada, we aim to ensure efficient construction is within reach for anyone – regardless of targeted performance.

## Multifamily and Student Living

Developers and Architects come to Build SMART for multifamily projects to control costs, accelerate construction and ensure quality.

*IBC Occupancy Group R-2 | Type V-A: 1-hr fire rated  
(-1 story for nonsprinkled) Up to 4 stories | 70' height | 36k sf per story*

## Low-Rise Hotels

Low-rise hotels are a great fit for Build SMART with their repetitive elements, tight timeframes and indoor air quality demands.

*IBC Occupancy Group R-1 | Type V-A: 1-hr fire rated  
(-1 story for nonsprinkled) Up to 4 stories | 70' height | 36k sf per story*



"You just install piece after piece, with Build SMART having the ability to design and layout how the puzzle goes together and giving a detailed schedule, you just follow the schedule."

*-Donald Crenshaw, Developer, PSC East LLC  
Parade Street Commons East  
Erie, PA*

## Assisted Living

Residents and families want the highest levels of comfort and fresh allergen free air. E-Wall meets the most stringent performance standards. Repetitive sleeping rooms, flexibly for food service and ancillary rooms make Build SMART a great choice.

*IBC Occupancy Group I-2 | Type V-A: 1-hr fire rated  
(-1 story for nonsprinkled) Up to 4 stories | 70' height | 31.5k sf per story  
Nursing Homes: 1 story | 50' height | 28,500 sf per story*

## Restaurants and Night Clubs

*It is much more cost effective than concrete and masonry to build restaurants and night clubs using wood frame. Build SMART can help you get it done faster, contain the noise and eliminate many headaches and surprises.*

*IBC Occupancy Group A-2 | Type V-A: 1-hr fire rated  
(-1 story for nonsprinkled) Up to 3 stories | 70' height | 34.5k sf per story*

## Day Care

When low operation budgets and indoor air quality are priorities for administrators and occupants, the E-Wall system delivers. Highly insulated walls and high-quality windows make nap time simply dreamy!

*IBC Occupancy Group I-4 | Type V-A: 1-hr fire rated  
(-1 story for nonsprinkled) Up to 2 stories | 70' height | 55k sf per story*

## Retail Stores

Strip centers and pad site retail with the E-Wall system gives developers flexibility and proven performance.

*IBC Occupancy Group M | Type V-A: 1-hr fire rated  
(-1 story for nonsprinkled) Up to 4 stories | 70' height | 42k sf per story*



## Single Family and Residential

Homeowners create the house of their dreams using the E-Wall system. Energy efficient, airtight walls with factory installed windows that make it fast and simple for the builder.

*IBC Occupancy Group R | Type V-A: 1-hr fire rated (-1 story for nonsprinkled)*

## Libraries and Worship

**Quiet!** In libraries, churches and worship buildings the sound levels and operating budgets are key considerations. Build SMART's energy efficient building envelopes are the baseline for satisfying the most stringent standards of comfort, quiet and humidity control.

*IBC Occupancy Group A-3 | Type V-A: 1-hr fire rated (-1 story for nonsprinkled) Up to 3 stories | 70' height | 34.5k sf per story*



"By the time a novice builder like me, and honestly my retired relatives who were most of the crew on this project, got our hands on these panels, it all made sense."  
- Mark & Lydia Allen + Family

## Banks, Clinics and Small Office

Build SMART gives free-standing small business projects a move-in date months earlier. That's added income, improved NOI and cash flow! Build SMART produces the project while your team is getting city approvals and signing leases. Your Contractor saves general overhead, labor and time by building with fully assembled panels instead of sticks.

*IBC Occupancy Group B | Type V-A: 1-hr fire rated (-1 story for nonsprinkled) Up to 4 stories | 70' height | 45k sf per story*

## Performing Arts

Small halls can be built with Build SMART even in this most restrictive occupancy. For tight budgets in noisy urban environments, the Build SMART building envelope brings all the benefits mentioned in other project types: time savings, labor savings, affordability, ambient noise reduction, accelerated construction, sustainability, etc.

*IBC Occupancy Group A-1 | Type V-A: 1-hr fire rated (-1 story for nonsprinkled) Up to 4 stories | 70' height | 34.5k sf per story*

## Pre-Schools and K-12 Schools

When facing a tight summer construction period you need great planning, no surprises and on-time delivery. School administrations and designers often don't consider wood frame construction even though it is significantly faster, more cost effective and sustainable than typical concrete and masonry.

*IBC Occupancy Group E | Type V-A: 1-hr fire rated (-1 story for nonsprinkled) Up to 2 stories | 70' height | 55.5k sf per story*

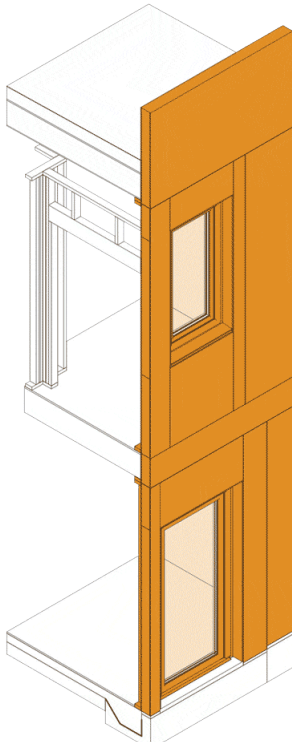
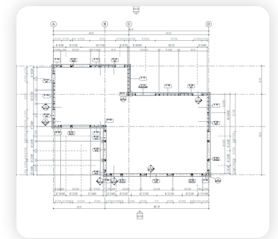
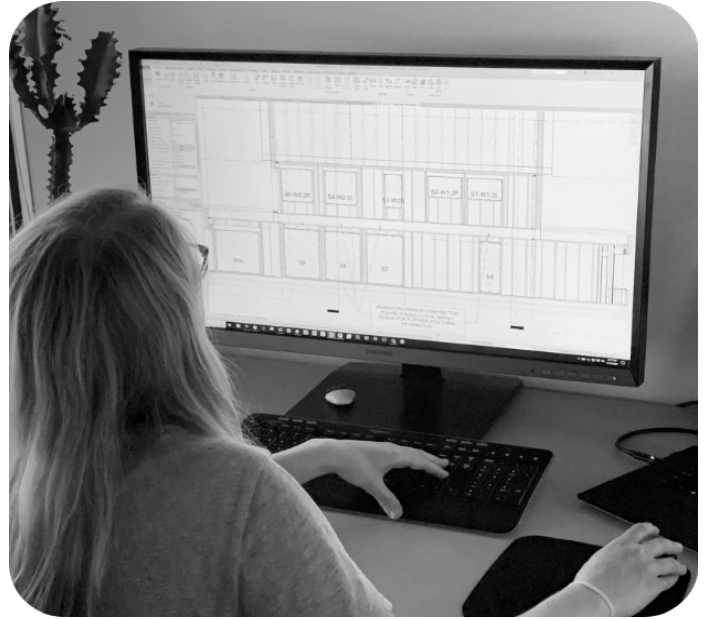


For more information refer to the International Building Code

# Design + Engineering Coordination

Our in-house staff of design professionals have experience creating engineering plan approvals and shop drawings using the latest CAD and BIM Technology software.

Our Design Team collaborates and coordinates with your Project Designer to ensure an integrated product delivery. We develop detailed shop drawings and resolve open questions about desired energy performance of your building envelope. By coordinating Build SMART's off-site construction with site prep and foundations at your building site, you'll achieve a MUCH higher quality building AND a shorter build time. Your design team needs to think through all of your design details BEFORE construction begins. We'll adapt your team's final construction details to a high-performing Build SMART envelope. Fully developing your design details before construction begins means your professional fees peak earlier in the build process ... but your total cost and build time will reduce.



Build SMART uses a Red List Free lamination adhesive based on Silyl terminate poly ether, in addition all adhesives and air sealing sealants used in Build SMART E-Wall panels are free of phthalates. Most Sips producers use moisture cure polyurethane adhesives catalyzed with toxic isocyanates. Where continuous exterior and stud bay insulation strategies combine to create an envelope that's optimized for your design and climate zone.

- Sustainable forestry
- Reduced maintenance
- PHI Certified Product
- Reduced Noise pollution
- 95% reduced construction waste

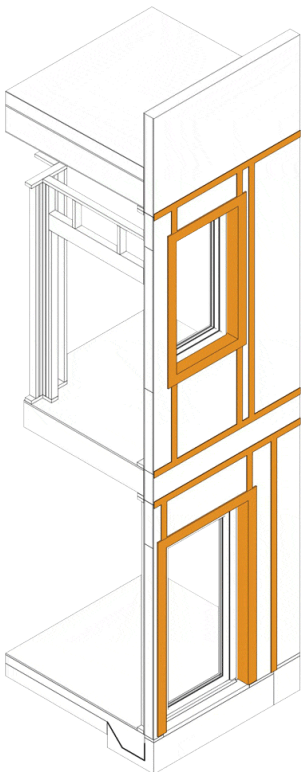
## Options for continuous exterior insulation

- **EPS**  
R-4.2 per inch | No HCFC | ODS: 2.2E-08 | GWP: 3.77
- **Polyiso**  
R-6.0 per inch | No HCFC | ODS: 2.3E-08 | GWP: 6.5E-01
- **Rigid Phenolic**  
R-8.0 per inch | Fire resistive | ODS: 6.56E-3 | GWP: 1.39

# Climate + Health



In 2019, Build SMART became an official corporate signer of the Kansas Climate + Health Declaration, an initiative to “increase awareness of the impacts of climate change on public health, to increase civic engagement on climate action in Kansas, and to advance policies that build community resilience and safeguard the future of our state.” Enduring and resilient buildings should be the rule to guide our decisions about the built environment.



Build SMART uses sealant materials that were engineered specifically for the construction industry for field use, Build SMART benefits from the experiences of industry veterans who have worked the first half of their career building the traditional way as well as by utilizing factory fabrication, allowing sealing and flashing that is protected from the elements, every day, every season, every project.

- Indoor Advantage™ Gold and Declare
- LBC Red List Free
- No formaldehyde
- healthy indoor air quality

### Optional types of continuous exterior insulation

- **EPS**  
R-4.2 per inch | No HCFC | ODS: 2.2E-08 | GWP: 3.77
- **Polyiso**  
R-6.0 per inch | No HCFC | ODS: 2.3E-08 | GWP: 6.5E-01
- **Rigid Phenolic**  
R-8.0 per inch | Fire resistive | ODS: 6.56E-3 | GWP: 1.39

### Various Framing Options

- Low Embodied Carbon
- Emission: <0.10 ppm



# Integrated Systems

By producing exterior walls in a climate-controlled factory setting, we can ensure a level of quality assurance and quality control that is just not possible in the field, while also significantly compressing construction schedules as permitting, site preparation, and foundation work take place concurrently.

Prefabricated E-Walls incorporate framing, structural sheathing, air control layer, continuous exterior insulation, weather resistive barrier, window installation and flashing for you in the factory eliminating multiple laps around the building, therefore saving time and money and eliminating opportunities for error.



A Build SMART representative will coordinate with your project team to schedule delivery to your job site and to coordinate virtual or in-person consultation to ensure a smooth installation.

Build SMART provides on-site installer training and step-by-step Installation Instructions to ensure your build proceeds smoothly. No special training or installation equipment is required. The system is so simple and efficient that most projects are dried-in in half the time of a traditional stick built structure.



