BUILD BETTER. BUILD FASTER. BUILD SMART



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 sources on the essentials of a successful Build SMART job.

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It is highly recommended that all jobsite Builder crew members read these instructions thoroughly. Prepare accordingly well ahead of the delivery of the Build SMART Systems to the jobsite. For installation planning, jump to **Appendix below**.



Compliance with these instructions, by reference in the Build SMART Sales Agreement, form baseline requirements of the Build SMART Limited Warranty.

Build SMART assemblies and materials are delivered to the jobsite based on approved Build SMART shop drawings. Immediately notify Owner and Build SMART Project Manager if conflicts are found between construction documents and Build SMART shop drawings.

These instructions in PDF format include several hyperlinks that help you jump to related sections in the instructions and to online resources. If you're holding paper right now, you can download a PDF file of the Installation Instructions with live links on our **resources page** by scanning the following the QR code with your default camera app:



If these instructions don't contain answers to your questions, or require clarification, **call Build SMART at 888-376-3424.**

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INTRODUCITON

Overview

Build SMART provides a system of products are appropriate for any wood frame construction project in the United States and Canada.

The Build SMART System includes products continuously refined over ten years by a multi-disciplinary team of experts: Builders, Engineers, Architects, Code Experts, Industrial Designers and Born This Way Inventers who are driven to apply new building science and new digitally driven industrialized construction in ways that address persistent design and construction industry challenges.

Build SMART products are transformative and yet they support the motives of great designers and builders:

- To make high performance buildings simple to design, fast, efficient to construct and beautiful
- ✔ To add value where the industry is challenged
- To put high energy performance within economic reach of every project

Build SMART is leading the trend toward industrialized construction by providing components that fit specifically each project. It means getting out of the mud. Building with factory assembled components instead of sticks:

- accelerating construction
- reducing pressure on the limited labor pool
- giving designers good tools that are based on new building science and best practice
- providing factory quality and precision
- reducing waste

- demonstrating total project value for Owners
 greasing the wheels of construction for ever
- greater throughput

Simply put, with Build SMART you...

BUILD BETTER. BUILD FASTER. BUILD SMARTER.

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 Inventers. 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 preairtightened 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**

J-Form Insulated Shallow Foundation System

The J-Form System is based on code provisions that allow the use of "horizontal wing" insulation which makes concrete stem walls unnecessary.



J-Form allows for a new approach to frost protected shallow foundations. The J-Form System takes advantage code provisions and optimizes thermal performance, construction cost and speed. The vertical external leg of the J-form is designed to extend a project's Continuous External Insulation down over the slab edge. Combine J-forms with appropriate under-slab insulation, and the building's concrete footings and floor slab become part of the conditioned envelope. That stops significant heat loss through the exposed slab edge in the winter, and avoids heat gain and condensation/decay/mold at the base of the wall in summertime. Concrete frost footings and stem walls are not required!



For more information refer to the J-Form Foundation System Engineering Guide

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**.



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**.



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**

Air Barrier Sealants and Liquid Flashing

In the Build SMART System, the air barrier sealant is to be installed by Builder at butt joints of the inner structural/air barrier sheathing and at the Ceiling LID joints to form a continuous air barrier enclosure all around the building thermal envelope.

✓ For air barrier performance of the Build SMART System, it is critical that all materials are properly aligned, air sealant is applied continuously with ½" diameter bead, and that materials are "wet set". I.e. do not allow sealant to cure prior to setting adjoining components.

If sealant sets up before the adjoining material is placed, scrape off the sealant and re-apply. Scrape off the 2" overage if it sets up before placement of adjacent materials.

Follow manufacturer instructions.

To seal one panel to the next, apply a continuous ½" sealant bead (covering the full edge of the structural/air barrier sheathing) where indicated in these instructions. Apply sealant approximately 2" beyond the length of the panel that is about to be installed. This will ensure that the application is continuous and achieves a full seal for the full length.

Install Build SMART components with pressed butt joints to assure 100% contact and full seal on both sides of the joint.

Also, seal penetrations through the air barrier sheathing that may occur subsequent to E-Wall installation, including screw holes.

PROSOCO R-Guard® Joint & Seam

To assure air barrier performance of the System, Build SMART requires use of PROSOCO R-Guard® Joint & Seam air barrier for non-fire rated panels. It is provided with the Build SMART panel delivery in quantity of sausage tubes needed for panel to panel and panel to band joints.

R-GUARD JOINT & SEAM working time is approximately 10 minutes.





For more information refer to **PROSOCO Joint & Seam literature**

Metacaulk 1200 Firestop Sealant

To assure air barrier performance of 1-hour fire rated assemblies, Build SMART requires use of Metacaulk 1200 firestop sealant. It is provided with the Build SMART panel delivery in quantity of sausage tubes needed for panel to panel and panel to band joints.



For more information refer to **RectorSeal manufacturer literature**



PROSOCO R-Guard® FastFlash®

In the factory, Build SMART applies continuous liquid flashing all around window and door rough openings. If any screw holes, scratches and scrapes occur, repair them with PROSOCO R-Guard® FastFlash®.



For more information refer to PROSOCO FastFlash® Overview Video





Huber Liquid Flash

To comply with the Huber ZIP System warranty, use Huber Liquid Flash to weather seal the outer face of the ZIP System panel to panel joints after E-Wall Exterior Assembly System panels are installed.



For usage examples refer to Build SMART Factory Flashing Video





AirDam®

PROSOCO R-Guard® AirDam® is a gun-grade waterproofing sealant combining the best of silicone and polyurethane properties. Installed as the interior air sealant, AirDam® creates a weather-tight seal that prevents moist outside air from entering, and conditioned indoor air from escaping around window and door assemblies. This ensures wind driven rain and condensed water are diverted to the flashing membrane and water resistive barrier before it can enter the living space.





For more information refer to **PROSOCO AirDam® literature**

Moisture cured polyurethane adhesive

Moisture cured polyurethane adhesive is recommended to adhere EPS/EPS joints in the J-Form system. Apply full coverage at joints with disposable brushes.

Comply with adhesive manufacturer instructions including use of water spray bottle to mist the joint with water. Curing rates will vary based on ambient humidity levels. Use protective gloves.

Follow manufacturer instructions



Example polyurethane moisture cured adhesive



• Example EPS adhesive and joint filler with application gun for filling deep joints.

Expanding Foam

Build SMART minimizes the use of expanding foam for installation. It is handy when filling gaps in or damage to exterior insulation.





RECEIVING, STORAGE AND HANDLING

Build SMART Deliveries

Build SMART optimizes the pallets on each delivery truck. Each pallet is labeled and numbered. Pallets are organized on trucks in sequential order as much as reasonable.

Coordinate delivery with installation time to ensure minimum storage time and avoid overcrowding the construction zone.

Call the Build SMART Team Manager for your project at (888) 376-3424.

- Call the Build SMART Team Manager, if she has not already called you, to confirm the scheduled delivery date(s), coordinate final logistical details for the delivery, and discuss preparations that the Builder should make for delivery truck arrival.
- Notify Build SMART Team Manager if delivery should be postponed due to delays in construction progress. Storage at Build SMART (for an additional fee) may be available if storage space at the jobsite is limited.
- ✓ Note: If a delivery from Build SMART is delayed due to reasons for which the Buyer or builder is liable, the Buyer is liable for related costs incurred by Build SMART including, but not limited to additional shipping costs, storage, insurance and handling.

Build SMART deliveries will arrive wrapped and protected on a 53-foot long step deck or drop deck trailer.

- Shipper does not provide off-loading equipment. To be supplied by customer.
- Upon arrival, customers will have a time limit (usually 2hrs) to unload, so be prepared for receiving the delivery efficiently.



Receiving

On the planned delivery dates, ensure that an all-terrain fork lift or crane operator is at the jobsite, prepared to authorize satisfactory receipt of Build SMART deliveries, and equipped for offloading from the step deck trailer to a designated storage area or floor deck.

Note: Pallets and materials delivered from Build SMART become the responsibility of the Buyer (Builder) the moment they are offloaded from the delivery vehicle.



Step 2

Inspection of Delivery

Confirm that delivered products comply with the Bill of Lading.

Inspect all wrapped bundles prior to offloading. Photograph any apparent impact damage to Build SMART components and/or damage to the weather-tight wrapping.

If damage is found, report to the driver and **call** to notify Build SMART at 888-376-3424. Make notes on the Bill of Lading. Sign the Bill of Lading indicating satisfactory receipt or comment notes of unsatisfactory conditions.



Storage

Storing J-Form System

The J-Form System stands up well to normal short-term weather conditions. Long-term exposure to sunlight causes yellowing of the EPS Geofoam surface which has little effect on mechanical properties. If stored outdoors, cover J-Form under opaque polyethylene, tarps or similar material until time of staging for installation. Store on a flat, firm, well-drained surface.



Storing E-Wall and I-Wall Pallets

Offload pallets directly to the building slab or floor deck for immediate installation or store pallets and materials under cover or in their protective wrapping until time of staging for installation. Store on a flat, firm, well-drained, preferably rain-protected surface in a secured location. Provide braces and ground stakes to stabilize pallets if the site is wind prone. Avoid damaging exposed soft insulation edges.



Store Build SMART accessory items including boxes of sealant, window and door hardware, crated windows and doors for jobsite installation in a secure, dry location.

Step 4

Inspect contents of protectively wrapped wall panel and material pallets within 30 days of delivery.



Protect Build SMART components

- To minimize moisture related shrinkage and to improve quality, Build SMART uses wood framing technology including but not limited to LSL engineered and SPF dimensional lumber The Builder's role in shrinkage minimization it to confirm that Build SMART wall panels and bands have been maintained at less than 17% moisture content.
- Avoid prolonged exposure of Build SMART E-Wall, I-Wall and accessory components. Protect Build SMART materials and panels from weather under cover or in their weather resistive wrap on raised pallets in a well-drained location until installation.
- If Build SMART panels become exposed to rain before the building is dried-in, take adequate measures to dry out the wood elements using methods such as temporarily ventilating the building with a "wild air" system. Measure moisture content of framing and structural sheathing. Confirm that moisture content is less than 17% before considering the building "dried in," and before installation of cavity insulation and interior finishes.





Handling

Off-Loading E-Wall and I-Wall Pallets

Unload pallets from the side of the delivery truck with an all-terrain construction fork lift such as Lull or SkyTrak or use a jobsite crane.

Offload pallets directly to the building slab or floor deck for immediate installation. Position pallets and individual panels for optimal sequential installation.



Staging

When lifting whole pallets onto an upper floor deck, avoid placing full pallets above mid-span floor structure. Place full pallets above bearing walls that have the structural capacity to support the weight of the pallet as approved by the floor system supplier, the project Architect or Engineer.

Moving Panels

Panels can be moved by hand, by crane, skid steer boom or the fork of an all-terrain forklift.

Lifting operations must be coordinated and conducted per regulations by competent, trained personnel.







Example of a lifting plate.

SUBSTRUCTURE PREPARATION

Review and refer to project requirements, site plans, structural and site drainage and details, geotechnical report other project documents.

All substructure preparation and materials are provided by others.

These instructions address only slab on grade foundation systems installation. Refer to project documents and best practices for excavation protection, placement of deep foundations and basement retaining walls.

Install Deep Utilities and Laterals

Locate and install all deep plumbing, electrical, utility laterals and piers. Place deep utility piping, extending piping vertically to allow access for remainder of rough-in work, slab installation and finishes.

Install underslab utility, MEP and systems work per standard means and methods.

Temporarily seal the exposed ends of utility piping to protect against damage.

Excavate for foundation per construction plans and specifications.



Step 7

Prepare Sub-Structure

Install perforated foundation drain pipe in the bottom of the excavation, embedded in a minimum of 3" of free draining gravel, sloped to daylight or sump pit. Typically, #68 or #57 gravel is used. Refer to project structural drawings, specifications or geotechnical report.

Following the structural layout plans and project specifications, spread the free draining gravel bed in excavated areas where the J-Forms, grade beams and spread footings will be located. Place and compact the gravel by using a vibrating compaction equipment.



Step 9

Pile underslab gravel at the center of slab areas. It will be placed and spread at the areas of the slab after placement of J-Forms.

Step 10

Top off the compacted gravel with free draining pea gravel or course sand to allow for easy and accurate leveling of the bed under J-Forms. Ensure accuracy and flatness of the leveling course so that J-Forms will fully foot the bottom and are set true.



J-FORM INSTALLATION

For best jobsite efficiency, plan the sequence of work. Pile underslab gravel in the middle of the slab area. Maintain an "exit" to minimize lifting underslab gravel over the installed J-Form. Install the J-Form System step by step in a flow of work from a corner starting point toward the "exit."

Using good building practices, employ accurately placed batter boards, string lines, laser lines, etc. to ensure that slab forms are laid out accurately. Use a laser level to strike level lines around the upper perimeter and then cut (Sawzall) or belt sand to of J-Form to achieve an accurate pour.

Refer to "Slab Tolerances" below.

Step 11

J-Form Corners

Pre-cut miters and fabricate corners using grade stakes or dowels and walers to fix pieces in place and prevent joint expansion.

After adhesive is cured, confirm that the corner is formed precisely to the required angle.

Place the corners on the prepared bed and stake them securely.



J-Form in place, shown with temporary stakes, before final stakes are driven to secure the installation in place.

Step 12

J-Form Straight Runs

Assemble straight runs of J-Form between corners. Apply EPS polyurethane adhesive in joints. Before five minutes has passed, use dowels and wailers or stakes to hold each assembly in place. If placement will take more than five minutes, or if the work needs to break prior to corner to corner J-Form completion, then temporarily stake or dowel at the end of the J-Form run to prevent adhesive joint expansion.



J-Form straight run placed on carefully prepared bed and aligned to a string line, shown with temporary dowel, before final stakes are placed.

If J-Forms move as joint adhesive cures and the installation goes out of straight and true alignment, cut out the bad joint, reapply adhesive and adjust stakes to hold J-Forms in place.

Stake and brace the J-Form in place with at least two 3' long grade stakes outside of the exterior face of each J-Form piece. Use batter boards as required to secure J-Form assembly during the pour. All J-Forms must be straight and level within tolerances to ensure that the slab is straight and level, and wall panel installation is efficient.



Provide stakes and batter boards to ensure that J-Form will not move. Installing J-Form bracing such as shown above, with corner ties and bracing legs to driven stakes, is time well spent. Every step that comes later will be more stream lined if the concrete slab is straight and true.

 If gaps exist between J-Form pieces after J-Form placement, with all pieces glued and braced in place, apply expanding spray foam in all gapped joints.

Step 13

Install shallow utilities pipes and conduits, etc. Re-confirm accuracy of the layout.

Step 14

Spread Underslab Gravel

Spread underslab gravel bed as the J-Form installation is proceeding. Work toward the "exit."

Maintain thickness and compaction of underslab gravel as required.



Confirm that all pest and termite treatments that may be required by local code, Lender and Owner are applied to underslab soil gravel.



Step 16

Place Underslab Insulation

Working from the starting point to the "exit," place underslab insulation boards on leveled gravel bed with tight joints. If there are multiple layers underslab insulation, stagger the joints of each layer from the layer below.





When all the underslab insulation is installed, check the entire installation and seal any gaps that are 1/8" or greater with spray foam.



DOUBLE CHECK EVERYTHING BEFORE YOU POUR CONCRETE!

Reconfirm that Everything is Dimensionally in Place

- Confirm accuracy of the J-Form slab edge, and all utilities penetrating up through the slab, slab offsets, depressions, grade beams, spread footings, anchors and hold downs, etc. are complete and accurate.
- Confirm that J-Form joints are fully adhered and staked.
- Confirm embeds, hold-downs, etc. are in place per project Engineer, if any.
- Confirm that the thickness of the selected protective finish for the exposed face of J-Form has been considered and coordinated with the outside dimension of Build SMART E-Wall Assemblies that will be installed above the J-Form.

POURING THE SLAB ON GRADE

All slab installation materials, beyond the Build SMART J-Form and underslab foam forms and insulation are Owner provided materials (not provided by Build SMART).

Step 18

Install the Below-Slab Barrier Membrane

Beginning at the starting point that you have selected, place continuous vapor barrier membrane over the J-Form and underslab insulation.

Extend the membrane over the face of J-Form by at least 12" beyond the perimeter of the J-Form to allow for any membrane that may be pulled into the J-Form turndown during the concrete pour.

At corners, miter cut the VB, neatly fold the corners like a gift package and tape the cut seams.



Use complimenting accessories, tapes and boots per membrane manufacturer instructions to complete the system. Seal all lap seams and seal around all penetration accessories per membrane manufacturer instructions.

✓ Vapor barrier (VB) must be continuous, complete and sealed throughout all vertical and horizontal assemblies of the slabs, footers, pier heads, etc.

✔ Protect VB against damage during construction activities.

For any transitions from slab to other floor assemblies, such as slab to basement foundation, the vapor barrier needs to be turned up and sealed to create a continuous vapor barrier at transition areas.

Step 19 Screed and Sill Plate

Screed at J-Form: The pressure treated 2x sill plate will serve double duty, first as a temporary slab edge screed board and second, after the pour, as the sill plate.

Refer to approved Build SMART shop drawings to confirm if the screed/sill plate is or is not fabricated and supplied by Build SMART.

Build SMART provides treated 2x sill plate/screed board as an alternate accessory. It is ripped to the width of the stud depth plus the thickness of the structural sheathing (typically 7/16").

If treated sill is not provided by Build SMART, Builder provided material should be ripped.



Vapor barrier membrane placed over J-Form and underslab insulation with excess to allow concrete to pull the barrier into the J-Form and inboard grade beams, etc.



Temporarily fasten the screed board (sill plate). Pre-drill countersink holes, minimum of three per J-Form piece. Manually drive temporary

screws in place with 6" course thread countersunk reusable screws into the vertical exterior leg of the J-Form EPS to temporarily hold the screed board in place for the pour. Manually drive the temporary screws to avoid stripping out the J-Form EPS.

Step 20 Builder Provided Slab Reinforcement

Place reinforcement steel (bars and/or woven wire) at turned down thickened edge of the slab per contract documents and structural requirements. Build SMART recommends using plastic chairs to hold rebar at proper level and avoid damage to the vapor barrier membrane.

- ✔ Note: Embedded J-bolts are not recommended. It is difficult to place the wall panels if anchors are protruding from the concrete slab. Instead, threaded anchors are recommended.
- Coordinate anchor type and location with structural drawings and local code requirements.

Pour the Slab on Grade

Flatness of the slab or floor deck is critical. Grind any high points and fill any low points in the slab as necessary to bring the slab into tolerance. See below. Give attention to tighter flatness tolerance at door locations. The Build SMART wall systems can accommodate vertical variances in slab and floor system if they are within tolerances.

Step 21

Pour the concrete slab. Begin by filling the thickened foundation at slab edge turndowns (J-Form), grade beams and isolated footings. This will weight down the formwork.

Pour the slab to top of screed board.

Screed and trowel slab surface within slab installation tolerances, without undulations or crown.



Slab edge turndowns and grade beams are poured. Preparing mesh for the slab.

Slab Tolerances

Refer to project specifications, if any, and the following. Comply with the more stringent tolerance requirements:

The American Concrete Institute provides literature, Specifications for Tolerances for Concrete Construction and Materials and Commentary.

ACI 117 is available for view or download here:



Refer to Section 4 – Cast in Place Concrete for Buildings. To be most efficient and avoid grinding and filling later, concrete slab tolerance requirements for the Build SMART System are as follows:

- ✓ Horizontal deviation at slab edge (layout): ± ½" (ACI 117, 4.1.2)
- ✓ Total vertical deviation (crown): ½"
- Vertical deviation (flatness) of slab surface:
 - o Class B, ¼" below a 5' straightedge (ACI 117, 4.8.3)
- Vertical deviation at exterior wall door thresholds and landing surface within 3'-6" of the threshold:
 - o Class A, 1/8" below a 5' straightedge (ACI 117, 4.8.3)



Remove screed boards when concrete is cured for the specified time. Brush, scrape and stage sill screed boards for reuse as sill plate.



WRAPPING UP THE SLAB EDGE

Step 23

Vapor Barrier Continuity

When concrete is cured for the specified time, wrap the vapor barrier (VB) membrane over the slab edge, neatly folding at corners, taping and sealing the seams.



Step 24

Temporarily Secure the Sill Plate

Wet seal the VB to the slab at a line under the sill plate using a continuous bead of PROSOCO R-Guard Joint & Seam. Set the sill plate and secure it tight before the sealant cures.



Vapor barrier membrane flipped on top of slab. Two beads of Joint & Seam are shown, ready for wet-setting of sill plate.



Seal sill plate butt joints with Joint & Seam. Completely cover the sill end with Joint & Seam to create an air barrier joint (seals from VB to top of sill plate).

Set pressure treated sill plate in two continuous wet sealant beads of PROSOCO R-Guard Joint & Seam on top of the vapor barrier.

Align the sill plate precisely to align with the bottom of the Build SMART wall panels and temporarily fasten in place with Tapcon screws. The final wall hold downs will be installed after Build SMART Envelope System wall panels are installed.



• Wall panel aligned on sill plate

O Two sealant beads

Step 26

EPS Filler

Install Build SMART 3" EPS filler piece onto top of the J-Form using moisture cured polyurethane adhesive. Take care to allow for adhesive expansion and proper final height of the filler piece, flush with the top of treated sill plate.



✔ Adhere the 3" EPS filler piece on top of J-Form

High Density Filler at Slab Edge Door Thresholds

In lieu of EPS Filler, install Build SMART high-density foam inserts at slab edge door threshold locations onto top of the J-Form. High density foam inserts are provided to give support for metal thresholds, sheet metal flashing or other threshold finish materials. Secure in place with moisture cured polyurethane adhesive, taking care to allow for adhesive expansion for proper final height of the filler piece.



High-density foam insert aligned and adhered at a door threshold location, ready for 3" EPS filler piece each side. Sill plate is marked for cutout

Step 28

Protective Surface for Exposed J-Form

Permanent UV and abrasion protection for the exposed EPS face of J-Form is required to extend from the top surface of the 3" EPS filler piece to the exposed face of EPS and extend at least 6" below grade.

Project designers have specified the following per manufacturer's written instructions:

Acrylic co-polymer cement parging with reinforcing mesh

- Veneer "thin" brick or stone adhered to J-Form, or
- Prefinished aluminum flashing

Builders should refer to project construction drawings and specifications. If nothing is indicated in project documentation, consider using acrylic co-polymer cement parging that is compatible with J-Form substrate, Type II EPS per ASTM C578 Standard Specification for Rigid Cellular Polystyrene Thermal Insulation and EPS46 per ASTM D6817 Standard Specification for Rigid Cellular Polystyrene Geofoam.

The following parging products are identified for consideration.

- ♥ **DuROCK B2000 parging** with alkali-resistant fiberglass mesh. Contact DuROCK 905-856-0133
- Parge-All AF is a premixed single component acrylic-cement parging available from WR Meadows. Contact WR Meadows 1-800-342-5976



DuROCK B2000 parging



Comply with selected product manufacturer instructions.

Option: For added impact protection, parging may be applied to impact resistant backer board which has been adhered to the exposed J-Form face: provide and install fiber reinforced concrete (FRC) board designed for below grade applications and extend it at least 6" below grade. The following FRC product options are identified for consideration.

✔ Finex FRC from Foundry Service & Supplies. Contact Foundry 909-284-5000

EPS Foam/Concrete Adhesive. Contact AERVOE 775-783-3100





Finex FRC

EPS Foam/Concrete Adhesive

E-WALL ASSEMBLY SYSTEM INSTALLATION

When concrete slab reaches specified strength, Build SMART *E-Wall panels can be installed*.

Installation Equipment and Tools

Be prepared. Make sure you have everything on hand to keep the installation crew moving efficiently. **Refer to the Jobsite Equipment and Materials Checklist**.

Preinstallation Layout

Repeat these steps at each floor level

Note: Speedy and efficient installation of the Build SMART Envelope System is directly related to the straightness and flatness of the surface it is bearing on. Inspect the ground slab and floor decks. Confirm that they are placed accurately and within tolerance.

Step 29

Reconfirm horizontal dimensional accuracy (layout) of the slab and floor systems. It is critical that all foundation, slab and floor systems be straight and square. The Build SMART Envelope System is factory fabricated to very tight tolerances.

Step 30

Mark the panel/panel joint locations on the floor.

Plan the Sequence of Erection

Repeat these steps at each floor level

Choose a corner panel as the starting point and the sequencing direction around the building. For some large projects with internal firewall, it may be preferable to break the building into zones. Most projects go up floor by floor, one zone per floor.

Refer to Appendix – Scheduling Build SMART Deliveries

If Build SMART is also providing interior wall panels, it is generally efficient to stage the interior wall pallets to the center of the floor and install the interior wall panels after exterior wall installation is complete. Be sure to get pre-approval of the location where you plan to set the Build SMART pallet to confirm that the structure can carry the load. Generally, set pallets above girders or bearing walls.

Installing the E-Wall Envelope System

✓ Note: The Air Barrier Structural Sheathing forms the air barrier for the building. As panels are being installed all butt joints of the air barrier sheathing must be sealed at all four sides of every panel with a continuous bead of PROSOSO R-Guard Joint & Seam Filler. I.e. apply sealant at edge of air barrier sheathing at all panel to panel and panel to band joints.

Installing the E-Wall Exterior Envelope System

Repeat these steps at each floor level

Step 32

Choose a corner panel as the starting point. Position the E-Wall corner panel.

Apply a bead of PROSOCO R-Guard Joint & Seam Bead on the top outer edge of the sill plate aligned with the air barrier structural sheathing layer of the corner panel. Or, if you at an upper floor level, apply a sealant bead on the upper edge of the air barrier sheathing of the floor band panel below.

✔ Joint & Seam bead is to be approximately ½" Diameter and 100% continuous.



View Example

Stand up the corner panel and lift it into place. As you do, be sure the air barrier structural sheathing layer is directly aligned on the previously applied Joint & Seam bead on the sill plate.



Vote: Air barrier structural sheathing is aligned on top of the treated sill plate.

Step 33

E-Wall Panel Installation

Starting with the panel adjacent to the starter corner panel, install the remaining panels in sequential order. Utilize the following protocol with the installation of each wall panel:

Apply PROSOCO Joint & Seam to one vertical edge of the structural sheathing of the starting corner panel on the side adjacent to the next panel to be installed.

> Prevent "cold joints" in the sealant beads. All assemblies must be wet set into sealants. If there is a work break between wall panel installations be sure sealants are scraped and made ready to receive fresh sealant to properly receive the next adjacent panel.

With the next panel about 1" away from the previous panel, align the edge of sill plate with the edge of panel bottom plate. Smoothly tilt the panel up or lift it into place and prevent sealants from being scraped off.



✔ A 1/2" bead looks like this, covering the full thickness of the sheathing.

- As the panel is coming to vertical, be sure the bottom of the structural sheathing lands squarely on the Joint & Seam sealant at the band or slab sill plate below. Bring to vertical so that the two adjacent panels are flush with one another. Slide the panel 1" any Joint & Seam off any of the vertical or horizontal connections.
- Fasten the panels together starting within 3" from bottom and top plates and at a maximum centers per table below.

Minimum Requirements for Nailing or Screwing Panel to Panel

2015 IRC Table	2015 NDS Table 12N Nail	FastenMaster Screws	GRK Screws ESR-3201
R602.3(1) item 9	Design Values	ESR-1078	
16d common 24" o.c.	141 psi (16d common, G = 0.5) 24" o.c.	240 psi (HeadLOK 2 7/8") 24" o.c.	NA

If there are more than a single stud at the edge of panels, choose framing screw length such that they penetrate adjacent panel framing at least 1 ¹/₄".

Where one or more wall panels are designated as being part of a "braced wall" install screws at maximum 12" o.c.



 If the floor slab or deck is not within tolerance, it may be possible to draw bottom of the panels together by screwing down a temporary block and levering the panel into place.



The top of panels can be drawn together with clip angles and C-clamp to form a tight panel to panel joint.

 Air barrier sheathing must align, panel to panel, and all air barriers and connections must be sealed continuously and completely.

If these instructions are followed, air leaks at panel to panel joints will not be an issue. If air leaks occur, they will be identified later with infiltration/ex-filtration blower door testing. Taking the time to properly apply air barrier sealant and carefully placing wall panels is much more efficient than leak chasing and repairs later.

Caution: Tradesmen may create penetrations through the building envelope as needed for their systems. Penetrations should be sealed with PROSOCO R-Guard FastFlash from the interior at the air barrier structural sheathing and with Huber LiquidFlash at the exterior ZIP weather barrier sheathing.

Best Practice: Conduct the first blower door test immediately after dry-in, before tradesmen create penetrations in the air barrier structural sheathing. Test results will give results of the building envelope. Conduct a second blower door test after rough-in, cladding and trim. This will isolate proper air sealing of penetrations by tradesmen. More on this below in the "After Dry-in" section.

Secure the bottom plate:

- At slab on grade, secure each panel with nails or screws to the sill plate per structural drawings. Refer to table below.
- At upper floor deck levels, fasten bottom plates to subfloor and floor structure with nails or screws at ends of panels and as indicated in the table below.
- Provide hold-down devices where required per code and project drawings and specifications.

Minimum Requirements for Fastening Panels to Bottom Plate

2015 IRC Table	2015 NDS Table 12N Nail	FastenMaster	GRK
R602.3(1) item 15	Design Values	ESR-1078	
16d common 16" o.c. minimum of 2	141 psi (16d common, G = 0.5) 16" o.c.	240 psi (HeadLOK 2 7/8") 16" o.c.	NA

- Once each panel is in place, inspect the complete assembly from all visible sides and correct any breaches or potential penetrations and correct them prior to moving on to the next panel.
- As panels are erected confirm they are plumb and braced from deck to top/side of a stud, not exceeding a 60-degree angle, located at each panel end and no greater than 12'-0" o.c.
 - For panels greater than 10'-0" in height, provide an appropriate length stiff-back brace to prevent excessive brace flexing.



Inspect the Progress

Inspect the installation of every wall panel after it is installed, as follows:



Install Interior Walls

Step 35

Install all interior frame walls on each floor except at the top floor. Use industry standard practices to brace walls plumb and true.

At the uppermost floor, install only load bearing walls, then roof and ceiling structure, then LID panels, then non-bearing walls.

For, refer to I-Wall Installation, below.

Step 36

Install Second Top Plate

Install LSL second top plate with butt joints not less than 24" away from panel to panel joints.

Minimum Requirements for Fastening Panels to Bottom Plate

2015 IRC Table	2015 NDS Table 12N Nail	FastenMaster	GRK
R602.3(1) item 15	Design Values	ESR-1078	
16d common 16" o.c. minimum of 2	141 psi (16d common, G = 0.5) 16" o.c.	240 psi (HeadLOK 2 7/8") 16" o.c.	NA

Concrete Anchors

Some types and sizes of expansion anchors require a minimum distance to the face of concrete. Refer to manufacturer's written instructions.



Install concrete anchors to secure bottom plates to the slab per manufacturer instructions.

Diameter, depth and spacing to be determined by Builder per structural drawings and local code requirements.

1/2" diameter anchors at 48" spacing and 3" anchor embedment:

Concrete Threading Screw	ITW Redhead Powers ITW Tapcon Simson Strong-tie	"LDT" "Wedge Bolt" "Heavy-Duty Tapcon +" "Titen HD"
Adhesive Bonded Anchors	ITW Redhead ITW Redhead Powers Simpson Strong-tie Simpson Strong-tie"	"Epcon A7+" adhesive "C6+" adhesive "AC100+ Gold" adhesive "Set" adhesive AT-XP High-Strength Acrylic" adhesive
	Threaded Rod to be SAE	Grade 2, minimum
Wedge Type Expansion Anchor	ITW Redhead Hilti Powers Concrete Fastening System	"Tru-Bolt "Kwik Bolt" "Power-Stud+ SD1" ms "Thunderstud Wedge Anchor"

Wedge Type Expansion Anchors are only recommended for use with panels with 2x6 or deeper panel studs; do not use wedge type expansion anchors where panel studs are 2x4's; use concrete threading screws or adhesive bonded anchors.

Install Floor Structure

Install the specified floor framing system and subflooring (provided by Builder). It is critical that the floor system be square and level. Confirm that the floor structure has sheathing, rim board or ribbon boards

(*illustrated right*) that allow Build SMART Floor Bands to be fastened from the interior.



Step 39

Install Floor Bands

Install the first Floor Band, beginning at an inside corner.

Note that Floor Bands are not numbered for location-specific 1 installation. Cut Floor Bands to length as needed. Prepare for installation of Floor Bands at corners by cutting sheathing 9 to create a tight-seam lapped corner without thermal bridging. Sheathing, insulation and ZIP board should contact each other. Fill gaps in the exterior insulation between the two pieces of floor Construction "DSMAR" band. Use appropriate filler material. For example, if the exterior adhesive insulation is EPS, use expanding polyurethane foam sealant. Seal the sheathing corner joints with PROSOCO R-Guard Joint & Seam. Apply Huber Liquid Flash to the ZIP corners. Apply PROSOCO Joint & Seam to the top edge of the lower panel Joint & Seam $\mathbf{\Theta}$ structural sheathing. Wet set the Floor Band to the panel(s) below. bead Screw Floor Bands in place per structural drawings, floor structure 4 shop drawings or the table below, whichever is most stringent. Screw from the inside through floor framing members into the inner sheathing of the Floor Band, pulling the Floor Band tight to the floor structure.

Minimum Requirements for Floor Band to Rim or Ribbon Boards

2015 IRC Table R602.3(1) item 30	2015 NDS Table 12N Nail Design Values	FastenMaster ESR-1078	GRK
6d common 6" o.c. at edges 12" o.c. at inner	90 psi (G = 0.5)	160 psi (TimberLOK 2 ½", hex) 6" o.c. edges and 12" o.c.	97 psi (R4 10x2 ½", star bit) 6" o.c. edges and 12" o.c.

- **(b)** Where floor structure is installed directly on top of a foundation wall, apply PROSOCO FastFlash at exposed underside of Band Panel continuously covering the sheathing, CEI and WRB layers.
- **6** Install vertical furring strips (if applicable on the project) aligned with the factory installed furring strips on the panels below using SIP screws in a length that provides 2" penetration into studs.
- Proceed around the building, installing Floor Bands.
- ✔ Repeat at upper floors.

Jobsite Installation of Windows and Doors

Windows are typically factory installed by Build SMART in the Exterior Envelope System wall panels. The following steps apply to "loose shipped" windows and doors that require jobsite installation.

Install windows and doors per manufacturer installation procedures with the following variances to accommodate Build SMART's rough opening FIT System.

Note: This section most commonly applies to installation of large windows that were not factory installed. <u>Jump to Window Adjustments</u> below if all windows and doors on your project were factory installed.

Build SMART rough openings for windows and doors are lined with 1/2" OSB and fully flashed with PROSOCO R-Guard FastFlash.

Review the Build SMART shop drawings and the Build SMART label on the window to determine which loose shipped window goes in which wall panel.



Provide temporary top blocking to ensure that window glass is aligned with the air barrier structural sheathing.

2x4 framing: 5 7/8" from interior face of stud to interior face of temp head block

2x6 framing: 7 7/8" from interior face of stud to interior face of temp head block

Installation of Alpen Windows:



 Install temporary blocking at the head of the window using two screws long enough to penetrate at least ½" into rough opening.

Prepare the window. Taking care to avoid scratching or impacting the selected window, move it to the wall panel. Remove protective shipping strips. Clean the window edges with denatured alcohol to ensure good adhesion of the air sealant.





 Twist/snap mounting clips into the window recess at approximately 16" o.c. around the sides and top of the window.



Set the window. With two people (more for larger windows), place the bottom window recess on the factory installed sill block. Tilt window vertically into place, being sure that the window recess fully receives the sill block. Confirm that the window is resting against the temporary head blocking and that the window is plumb.



Center and secure the window in place using ½" thick temporary wood shims to hold the window centered in the rough opening. Flat plastic "U" shaped or "horse shoe" shims are also recommended.



Apply a dab of PROSOCO R-Guard AirDam at the location of a mounting clip at the head of the window. Secure it with a #6 1" GRK screw or equal to hold the window in place while you complete the installation.



Use a pry bar to bend remaining mounting clips away from the rough opening as necessary to allow room for the sealant gun tip between the mounting clip and the rough opening. Secure them all with a #6 1" GRK screw.

Remove the temporary shims, taking care not to scratch the FastFlash liquid flashing.

Check the window for square:

- Measure the diagonal distances from corner to corner. These measurements must be within 1/16" of each other.
- The height of the frame at the center must be the same as the height at each end.
- Margins around the window should be even at all sides.



Insert backer rod. Press backer rod, using a screen spline setting tool with roller (or small flat bar), all around the interior perimeter of the window. Avoid gaps. Be sure backer rod is pushed back approximately ¼" to 3/8" from interior face of the window frame.

The purpose of the backer rod is to create an hourglass sealant bead. This is critical for every long service sealant bead. It allows the sealant to properly stretch without losing adhesion to the adjoining surfaces.





10 On the interior side, apply PROSOCO R-Guard Air Dam all around the window perimeter to fully and completely seal the window jamb to the pre-flashed window rough opening. Cut the sausage tip flat just shy of 1/2".



Create a consistent concave sealant bead all around the window. Using a sealant spatula tool, remove any proud spots and fill any thin spots in the sealant bead all around the window. Tool the bead in both directions to "activate" the sealant. Check for thin spot inconsistency by looking at sunlight coming through the bead. Clean up any inconsistencies that may occur and retool the bead.



12 Remove the temporary top blocking. Repair screw holes and any other exterior flashing damage using PROSOCO R-Guard FastFlash and a small spatula.

✓ It is possible to install windows in panels that have not yet been installed in their final location. If the Wall Panel is not secured into the building, allow minimum of 24 hours after window installation before moving the wall panel into position to allow R-Guard Air Dam to cure.

Step 42

Window Adjustments

1 Inspect the rough opening, inspect Flashing and Connections:

If any exposed factory applied PROSOCO R-Guard Fast Flash has been damaged at the Window FIT Rough Opening, repair with PROSOCO R-Guard Fast Flash using a small flexible trowel.

Adjust Windows

Lateral adjustment



Gasket-compression adjustment



Sash adjustment:

0

- With the window installed plumb, level, square, and secured within the rough opening, adjust the sash to ensure proper window operation.
- The diagrams illustrate the functionality of the hardware adjustment mechanisms for Tilt and Turn windows.





Step 44

Install Window Screens

I-WALL INSTALLATION

Lower Floors

At lower floors, install Interior Wall Frame panels as convenient with the flow of exterior wall panel installation.

At the Uppermost Floor

The simplest and most efficient way to install walls and to achieve a continuous air barrier at the top of the building enclosure is to follow the following steps.

- After exterior walls, install load bearing interior wall panels.
 Install and seal RIP Strips (*explained below in LID System Installation*)
 Install roof structure.
 Install and seal LID panels (explained below in LID System Installation).
 Install non-load-bearing interior walls.
- ✔ Instructions describe installation of the LID System with typical sloped roof truss with air barrier LID at the bottom cord.
- ✔ Low-slope roof structure is shown below in I-Wall instructions.
- Mark the layout of Interior Wall panels on the floor deck.

Step 45

Utilize the following protocol with the installation of Interior Wall panels.

 Review project drawings and specifications. Provide acoustic, air barrier and fire sealants accordingly as interior walls are set.

- Screw the vertical joint of adjacent panels together using standard framing screws within 3" of the top and bottom plates and at 2'-0" o.c. maximum.
- 2 Anchor wall panels in place with project specified fasteners and hold-downs.
- Provide deflection devices at top of non-bearing partitions, if any, per construction drawings.
- As panels are erected confirm they are plumb and properly braced per industry standard practice.

Install second top plates. Splice second top plate at least one stud space away from a panel to panel joint.

Install Floor Structure (instructions above) for the next floor above or continue to LID System Installation (instructions below) if you are topping out.

LID System

Build SMART has developed the following methodology on projects over the years. It is the easiest, fastest, most cost effective and consistent way of minimizing leaks in the air barrier under roof structure, with the minimum number of penetrations and the minimum amount of time devoted to making those penetrations leak-free.

LID System, an option that can be prefabricated by Build SMART, includes the following:



Install and seal the air barrier under roof structure per construction documents and details. The following LID System installation instructions apply only if the optional LID System is part of the Build SMART order for the project. If the LID is not part of the Build SMART order, the following can be used as recommendation.

✓ The LID: "LID" System is the air barrier layer under the roof structure and forms the air barrier across the top of the building. Build SMART's LID System typically uses 7/16" OSB sheathing.

Confirm Structural Requirements

Refer to project structural drawings. Ensure that the following instructions comply with structural requirements. For example, if the Ceiling LID or roof sheathing is meant to be a structural diaphragm, consult the Project Engineer. If so, Rip Strips at the edge of the Ceiling LID may require specific dimensions or nailing.

Low-Slope Roof Conditions

If the air barrier sheathing is above the roof structure, as is common in low-slope roof with parapet configurations, consult project details to confirm conditions for a continuous air barrier across the top of the building.

Projects with low slope roof sheathing can be air sealed from above as shown in the following detail. In this case, LID sheathing, furring and electrical chase are not required since ceiling penetrations will not affect the air barrier, however, care should be taken to thermally isolate any penetrations of the ceiling thermal barrier.





- E-Wall Parapet Panel
- 2 E-Wall Floor Band
- Air Barrier LID above flat roof structure
- 4 E-Wall Panel with Rough Opening
- Low-slope roof and parapet with continuous air barrier shown as a red dashed line from the wall panel, through the Roof Band to the roof sheathing. Seal all air barrier joints.

Install RIP Strips at Bearing Walls

The following instruction assumes the LID is a sheathing layer under the roof structure/above the ceiling.

Ceiling RIP Strips are the first components of the LID System to be installed. They are located atop the second top plates of exterior walls and bearing walls at the uppermost floor.

RIP Strips are cut from LID material in strips that project 6" beyond the face of framing. Ceiling RIP Strips can be factory prepared and shipped to the jobsite by Build SMART. Refer to your Build SMART shop drawings to confirm if RIP Strips should be included in your Build SMART delivery. Otherwise they can be cut at the jobsite by the Builder.

Before RIP Strips, install uppermost level exterior walls and the load bearing walls and their second top plates. Do not install non-bearing partitions until after installation of the LID Panels and air sealing the LID joints.

Step 47

Install RIP Strips at top of uppermost exterior walls and interior load bearing walls.

- Apply a bead of PROSOCO Joint & Seam to the top of the second top plate.
- Before the Joint & Seam has set, screw the RIP Strip in place using #9 1 5/8" wood screws.

At Exterior Walls: Place RIP Strip flush to the outside face of top plate and projecting 6" inboard of the face of frame.

At interior bearing walls: projecting 6" on both sides.

Step 48

Install Roof Structure and Dry-In

Install roof structure, roof decking and roofing membrane per construction documents and manufacturer's instructions.



Install Builder supplied, specified hold-down devices and rim or ribbon boards.

Step 50

Install LID Panels

After the building is dried in, install LID panels to complete the installation of the air barrier LID throughout the uppermost parts of the building.

Screw LID Panels inboard of the previously installed RIP Strips to the roof structure.

Remove any fasteners that missed a roof framing member (shiners) and seal the penetrations.

Step 51

Seal the air barrier Ceiling LID joints with face applied PROSOCO Joint & Seam.

Give time and attention to sealant application the first time. Improper application of sealant is challenging to rectify.

Minimize penetrations of the air barrier. Where they are necessary, use accessories and liquid applied sealant at all penetrations. Deep can recessed lights are not recommended. If they are used, follow can light manufacturer's air sealing measures for a non-ventilated installation.

Build SMART recommends the following to avoid Ceiling LID penetrations.

Step 52

Install 2x2 furring strips using $3 \frac{1}{2}$ " wood screws at 16" o.c. Run 2x2 furring strips perpendicular to roof framing. The purpose is threefold.

- Provide a horizontal chase area for wiring under the LID.
- ✔ Protect the integrity of the air barrier by minimizing electrical penetrations of the LID.
- ✔ Provide nailers for ceiling gyp board.
- ✔ Best Practice: Use surface mount or very low-profile recessed LED light fixtures that fit in the LID chase area.

Install Interior Non-Load-Bearing Walls

Install uppermost floor non-bearing partition walls.

Install Build SMART Roof Bands

Typically, shear resistance at the end of heal trusses can be provided by the Build SMART Roof Band sheathing. Follow requirements of the building code and project structural drawings. It is typically acceptable to apply horizontal beads of construction adhesive to the exterior face of ribbon boards or vertically to the heal truss ends and then fasten Roof Bands from the interior through the structural members with construction screws. Confirm with project Engineer.



Apply PROSOCO Joint & Seam to the top edge of the wall panel structural sheathing.

If the air barrier sheathing is above the roof structure as illustrated above in <u>Low-Slope</u> <u>Roof Conditions</u>, seal around the perimeter of Roof Bands.



Step 55

Before construction adhesive and Joint & Seam are set, install Build SMART prefabricated Roof Band using screws and the fastening schedule per Build SMART shop drawings from the inside. Screw through the ribbon boards and into the inner structural sheathing of the Roof Band, pulling the Roof Band to the sealant and structural members.

Dry-In

You have reached a major milestone in the project when the building is weathertight "Dried-in." Congratulations!

Step 56

It is highly recommended to conduct the first air test after all building envelope air barrier structural sheathing joints are continuously sealed, and any loose shipped windows and doors are installed. Prior to any MEP rough-in penetrations of the building envelope exterior walls.

In addition to running blower door infiltration testing, additional thermal barrier and air barrier performance can be inspected through infrared camera testing by creating a minimum 18-degree ΔT for a minimum of 18 hours.

Step 57

Weather Seal WRB Panel to Panel Joints

Seal all exterior panel to panel and panel to band, joints in the ZIP System weather resistive barrier (WRB) at the exterior face of the panel using Huber Liquid Flash.

Build SMART applies Huber Liquid Flash at ZIP seams within each panel at the factory. Builder must apply Liquid Flash at the exterior face of all panel to panel joints and the joints shown here at Floor and Roof Bands.

This is the final step before the building is dried in and the final step of the Build SMART installation.



Cladding

Install cladding to suit project, as drawn and specified.

Avoid installation of expanding foam or exterior cladding details that prevent the $\frac{1}{2}$ " space around the windows, outboard of the factory installed sealant and backer rod, from draining freely. Window and door rough openings are continuously flashed with PROSOCO FastFlash membrane. This space between the flashing and window/door unit is designed to drain freely down the jambs and out at the sill to the drainage plane.

Interior Finishes

- Install blocking as required.
- Install cavity insulation.
- Drywallers, tile setters, and cabinet installers will appreciate the flat, accurate Build SMART framing.
- Comply with code requirements. The following is from 2015 IRC.



NOTCHING AND BORED HOLE LIMITATIONS FOR EXTERIOR WALLS AND BEARING WALLS

APPENDIX

Jobsite Equipment and Materials Checklist

For installation of the Build SMART System.

ltem	Quantity	Options that may be supplied by Build SMART	Notes
Review Build SMAR below are to be fabri	۲ shop drawings. Confirn icated by Build SMART o	n approved optional acce r provided by Builder.	essory components listed
Screed board / pressure treated LSL sill plate*	Equal to linear feet of wall	O By Build SMART O By Builder	2x slab edge screed board must be used with Build SMART J-Forms. Refer to <u>Screed and</u> <u>Sill Plate above</u> .
PROSOCO Joint & Seam	Calculated mfr's. application rate	𝒞By Build SMART ○ By Builder	For air sealing wall and band panel to panel joints.
Second LSL top plate*	Equal to linear feet of wall	O By Build SMART O By Builder	Same size as framing. Refer to <u>Install Second Top</u> <u>Plate above</u> .
Ceiling LID Rip Strips*	Per Builder	O By Build SMART O By Builder	OSB or ZIP Board. Refer to <u>LID System</u> Installation.
Ceiling LID panels *	Per Builder	O By Build SMART O By Builder	OSB or ZIP Board. Refer to <u>LID System</u> <u>Installation</u> .
LID System furring strips	As needed	O By Build SMART O By Builder	2x2 Refer to <u>LID System</u> <u>Installation</u> .
Rain Screen Furring Strips*	Per Builder	O By Build SMART O By Builder	To create a drainage plane and as substrate for Builder provided siding.

* Miscellaneous material can potentially be supplied by Build SMART. Refer to Build SMART Shop Drawings.

Jobsite installation crew needs standard compliment of carpentry power tools, hand tools and accessory materials.

Item	Quantity	To be Supplied by Builder	Notes
		Safety	
Safety and MSDS Program, Training and Equipment	Equal to linear feet of wall		Specific to Project, implemented by Builder
Fall Protection Program	Calculated mfr's. application rate		Specific to Project, implemented by Builder
Miscellane	ous Materials for Install	ation of the Build SMAR	T J-Form System
Moisture cured polyurethane glue	Per Builder	O Required	Titebond Polyurethane Glue 8oz. bottles. <u>Refer to J-Form</u> Installation above.
Water Spray Bottle	2	O Required	For moistening moisture cured adhesive.
Spray Foam & Foam Gun	Per Builder	O Required	To fill voids at underslab and panel to panel joints that are greater than 1/8". <u>Refer to EPS Adhesive, above</u> .
Vapor Barrier Membrane	As needed	O Required	Per project specifications. To block movement of ground moisture to the ground slab.
Vapor Block Tape	Per Builder	O Required	Enough for seams and boots.
Vapor Block Boots	Per Builder	O Required	Enough for penetrations.

Item	Quantity	To be Supplied by Builder	Notes
Protective parging at exposed face of J-Form	Per mfr's coverage rate	O Required	Refer to project drawings and specifications. For convenience, compatible products are shown in section <u>Protective Surface for</u> <u>Exposed J-Form, above</u> .
Miscellaneo	ous Materials for installa	tion of the Build SMART	Envelope System
PROSOCO FastFlash *	Per Builder	O Required	Where Build SMART Band Panel occurs directly above a foundation wall, apply PROSOCO FastFlash continuous at underside of Band Panel sheathing, CEI and WRB. <u>Refer to Install</u> <u>Floor Bands above</u> .
Ribbon lumber or ribbon sheathing	Per Builder	O Required	Per project structural drawings and floor or roof structure manufacturer. Substrate for Build SMART Nail Base. <u>Refer to Install Build SMART</u> <u>Roof Bands above</u> .
Huber Liquid Flash *	Per Builder	O Required	To provide a weather barrier at the face of exposed WRB panel to panel joints. <u>Refer to Weather Seal Wall</u> <u>Panel Joints above</u> .
	Eq	uipment	
Crane or All Terrain Forklift	Per Builder	O Required	Capable of lifting 4000 lb. pallets from the delivery truck to the staging area and large panels from staging area to the floor deck.
Hand Truck	Per Builder	O Recommended	For moving wall panels on the deck from staging to install location.
Miscellaneous Small Tools			
Sealant gun type to be coordinated with sealant tube type and manufacturer instructions.			

Item	Quantity	To be Supplied by Builder	Notes
20 oz. Sausage Gun(s)	2	O Required	
20 oz. Cordless Sausage Tube Gun(s)			Use of cordless caulk guns has proven to produce better air sealing results.
32 oz. Large Tube Caulk Gun(s)	2	O Required	
32oz Cordless Large Caulk Gun(s)		O Recommended	Figure 1 below Use of cordless caulk guns has proven to produce better air sealing results.
Extra Sausage Gun Tips		O Required	Figure 2 below Aluminum sausage guns use yellow or black tips. Steel sausage guns use orange or green tips.
Long awl	2		For cleaning out sausage gun tips. Can be a screwdriver or any rod to remove cured material.
Rags		O Recommended	
Spray Foam & Foam Gun		O Required	To fill voids at underslab and panel to panel joints that are greater than 1/8".
Lifting Straps *	2	O Required	Assorted sizes including 8' sling
Lifting Plates*	4	O Required	Figure 3 below The following or similar for panel lifting: Upgear temporary fall protection Model #A210402 (5000lb capacity).
DuraRasp	1	O Required	Figure 4 below For cleaning and adjusting EPS surfaces.
Flat Bars	2	O Recommended	
Leveraging Bar	1	O Recommended	Digging bar, 5' or longer, to help lever panels into place.
Crow Bars	2	O Recommended	Various sizes, to help lever panels into place.
6" C-Clamps	2	O Recommended	To position and pull panels together for installation. Refer to Wall Panel Installation above.
8" C-Clamps	2	O Recommended	To position and pull panels together for installation.
12" C-Clamps	2	O Recommended	To position and pull panels together for installation.

Item	Quantity	To be Supplied by Builder	Notes
Simpson Strong Tie 12 3/8" x 2 ½" HTT4, 18" threaded rod, washer and nuts *	4	O Required	Figure 5 below Mount to opposing panel plates – as needed - to position and pull plates together for installation.
Step Ladder-6'	Per Builder	O Required	
Step Ladder-8'	Per Builder	O Required	
Step Ladder-10'	Per Builder	O Required	
3-legged Ladder	Per Builder	O As Needed	
Cordless Drill Driver & Assorted Bits	Per Builder	O Recommended	
Driver bits	10	O Required	For all types of fasteners
Impact Drill	2	O Recommended	Cordless preferred
Hammer Drill	1	O Recommended	For drilling concrete anchors
Impact bits	1 set	O Required	Sizes required for project specified concrete anchors.
Battery Syringe	1	O Recommended	To clean out drilled holes.
Shop vac	1	O Recommended	To clean debris and to clean out drilled holes.
	Fasteners	and Adhesives	
16D Nails	25 lbs.	O Required	
8D Nails	25 lbs.	O Required	
Pneumatic Gun Nails	Per Builder	O Required	16D, 8D type per Carpenter's equipment
Fasteners per lifting plate or rigger's specifications and instruction *	100	O Required	For extra lifting plate screws
Concrete Anchors	Per Builder	O Required	For setting the sill plate onto concrete slab. Confirm compliance with project structural requirements. Diameter, depth and spacing to be determined by Builder per project structural drawings and local code requirements. <u>Refer to Concrete Anchors above</u> .

Item	Quantity	To be Supplied by Builder	Notes
GRK Brand "R4-10x2-3/4" or Similar *	Per Builder	O Required	For securing panel to panel and second top plates.
Tapcon screws – ¼" x 3" Hex Head	Per Builder	O Required	For temporarily securing Sill Plate to concrete slab. <u>Refer to Temporarily Secure</u> the Sill Plate above.
#9 x 2 ½″ Wood Screws	10 lbs.	O Required	For securing Build SMART Floor System Bands, Perpendicular to trusses.
#9 x 3" Wood Screws	10 lbs.	O Builder	For securing Build SMART Floor Bands, Perpendicular to trusses
Simpson Strong Tie "SWDC truss screw"	Per Builder	O Required	Figure 6 below Spaced per roof truss design and construction documents.
Large Tube Construction Adhesive	Case of 12	O Required	For adhering Build SMART Bands to floor and roof structure.





Hold-Downs

Hold-down devices are used keep the structure intact during severe weather and earthquakes. Building code compliance is a baseline requirement. Project design and build teams should consider structural design provisions beyond code minimum in project locations that may experience high winds and severe weather. For example, consult the assessment report by FEMA regarding design for extreme winds.1

Through-plate/through-bolt hold-downs are required. Since the sheathing is concealed by exterior insulation, hold-down straps that are fastened to the face of structural sheathing cannot be used with Build SMART's fully assembled wall panels.

Coordinate structural requirements for hold-downs (specific to each project) with requirements of the building code, project design professionals, and project construction documents.

The protective exterior weather resistive ZIP board is not structural and is NOT appropriate for anchoring hold-downs.

Builder's Jobsite Activities and Project Milstones

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



Builder's Jobsite Logistics Plan

It is the Buyer's (Builder's) responsibility to plan jobsite logistics.

Within **15 days** after Agreement date, send a Site Logistics Plan (drawing or detailed narrative) to Build SMART Project Manager, including the following Jobsite Logistics:

0	Site access overhead restrictions, tight turns, steep grades, bridges with weight or clearance limitations, gravel or dirt roads, etc. that might not be navigable by a cab tractor pulling 48 to 53-foot step deck, drop deck or similar contract flatbed equipment.
0	If necessary, provide a vicinity map showing an unobstructed route to the jobsite.
3	Jobsite entry point instructions (narrative or site drawing).
4	Jobsite hazards to avoid, if any (narrative or site drawing).
6	Offloading area with side access for offloading by a Lull or similar jobsite all-terrain forklift or crane capable of lifting over 4,000 lb pallets.
6	Level and dry storage area. Provide for anticipated number of Build SMART pallets and loose ship items.
0	Jobsite exit point instructions (narrative or site drawing).

✔ Note: Additional shipping charges may be due to the shipping company for extended off-loading time (typically beyond 2-hours) and additional handling in case the delivery cannot reach the jobsite due to impassable roads.

Jobsite Labor Planning

The most efficient crew size is 3 or 4 people including an experienced carpenter crew chief.

Historically, with a normal number of corners and construction complications, Contractors have reported an average installation rate of 31 linear feet of exterior wall installed per hour.

Build SMART

Distance training on the installation of the Build SMART System is available for the jobsite build team. An online conferencing service such as GoToMeeting, Facetime or Zoom will be used.

Since the Build SMART warranty applies only to components that are installed in accordance with Build SMART Installation Instructions, it is prudent to schedule a training session. Training will be coordinated with the Builder and scheduled on an agreed date. Before scheduled deliveries, schedule the training session through the Build SMART Project Manager.

Training Session 1:TJ-Form InstallationE

Training Session 2: E-Wall and I-Wall Installation **Option:** Onsite training is available on a per diem basis at additional charge for trainer's time, travel and expenses.

Glossary of Terms

Alkali-resistant fiberglass: Glass fiber coated with an alkali-resistant macromolecule latex for use in concrete and cementitious mortars and as a woven mesh that is troweled into base coat parging.

Anchor bolt: A type of hold-down used to anchor superstructure to a concrete foundation. Anchor bolts can be embedded and protruding from the concrete pour or post drilled and fixed by expansion or application of non-shrink epoxy grout.

Backer rod (backer material or back-up rod): A compressible foam product used where joint that is subject to thermal, moisture related and structural movement is anticipated. Backer rod is installed behind sealants to ensure that the sealant is hourglass shaped when applied in a concave joint. A properly placed backer rod ensures sealant elasticity so that the sealant joint can withstand the anticipated movements without losing bond and water tightness. Poor workmanship of movement joints is a chronic point of failure and degradation in modern buildings.

Bill of Lading: A document issued by a trucking company to itemize the type, quantity, and destination of the goods being carried.

Butt joint: The interface where two pieces of material are installed, typically in a flush condition.

Cold joint: A material joint (most commonly associated with concrete installation) where the Work is interrupted. Special instructions and prohibitions apply to cold joints. The same concept applies for sealants. Materials adjoining a sealant joint be placed and secured before the bead of sealant that has begun to set up.

Deep utilities and laterals: Plumbing and electrical, the customer connection to an underground distribution system is usually called a "service lateral". Conductors of a service drop or lateral are usually owned and maintained by the utility company, but some are installed and owned by the customer.

Defection detail: A construction detail that provides for structural movement (deflection) so that a nonstructural partition, for example, can be fixed in place without risk of taking structural loads.

Delta T: A term used to designate the difference between two temperatures, usually used when comparing interior and exterior temperatures.

Dowel: A cylindrical rod.

Expanding foam: A product which is designed to expand and harden upon contact with moisture or air. It is readily available in canisters with spray nozzles, making it easy to apply the foam in a wide variety of situations.

Geotechnical: A body of knowledge, technical documentation of project site soil and ground water conditions, and advisory reports that may affect the Work.

Geofoam EPS: A type of expanded polystyrene (EPS) rigid insulation manufactured for use in earth-contact conditions for thermal insulation or lightweight fill material.

Heal truss (energy heal truss, raised-heel truss): A roof truss configured with a vertical leg above faces of the thermal building envelope. The purpose of a heal truss is to allow roof lines to match up or to provide space at the building envelope line for thermal attic insulation.

Hold-downs (holddown, hold down): Steel devices to anchor the structural frame to the foundation and to tie together elements of the wood frame. Hold-downs are required to resist wind and seismic loads. Several types of hold-downs are available, suitable for various structural conditions. In the Build SMART E-Wall Assembly, common strapping cannot be used at the concealed exterior face of structural sheathing. Through plate hold-downs should be specified.

Lap Seam: A seam in which the edges overlap. Usually used to shed water, in association with flashing, cladding and roofing.

LID: In the Build SMART System, the "LID" forms the air barrier across the top of the building, under the roof structure, typically made up of 7/16" OSB and joint sealant. The LID can be modified to also serve project specific structural needs, as identified in an engineered solution.

MEP Systems: mechanical, electrical and plumbing (MEP) systems interface with E-Wall Assemblies where studs are drilled and where MEP penetrations through the exterior walls are required.

Miter: A joint or cut made by beveling each of two parts to be joined to form a corner, usually at a 45° angle to form a 90° corner.

Parging: A thin coat of a cementitious or polymeric mortar applied to concrete, masonry or exposed EPS Geofoam surface to protect the substrate from water and ultraviolet (UV) sunlight.

Partition wall: A non-load bearing wall.

Polyisocyanurate (PIC): A type of rigid board thermal foam insulation. PIC is one option for continuous exterior insulation in E-Wall Exterior Assemblies.

Proud spot: A place where material protrudes out past a flush condition.

Ribbon Board: A type of rim board, installed by framers, for rigidity at the end of floor and roof framing members.

Rigid Insulation: Rigid thermal insulation made from expanded polystyrene, polyisocyanurate, phenolic, wood fiber, mineral wool and other materials.

RIP Strip: RIP Strips are part of the Build SMART "LID" System. They are factory cut at proper width and shipped to the jobsite for installation on top of upper most structural walls.

Screed board: A straight board placed on edge forms to aid the concrete installation crew in maintaining a straight and level slab on grade. Typically, screed boards are removed after concrete is set.

Screen spline setting tool with roller: A small hand tool designed to press screen mesh into window frames and can also be used when installing backer rod.

Substrate: The material upon which other materials are installed. The word substrate comes from the Latin sub - stratum meaning 'the level below'.

Tapcon screws: A proprietary, readily available brand of concrete fasteners.

Turndown: The thickened edge of a concrete slab on grade. A turndown edge, usually designed by a structural engineer with reinforcing bars, stiffens the slab edge and spreads the dead load of superstructure above.

Waler: A plank of wood, block of concrete, etc. used for temporary support or to maintain straight and true position of components until permanent conditions are achieved. Commonly associated with concrete formwork.

Wet Set: A time sensitive installation requirement where material is fastened in its permanent position before applied sealant cures or dries. Refer to manufacturer instructions for each type of sealant used.

Wild Air: The activity and temporary system to supply ventilation air to a building under construction, sometimes including air conditioning, depending on humidity levels of summer days. Wild air is provided to control interior relative humidity within specified limits, often to protect wood products and to speed the installation of interior finishes. The term "wild air" is used because the air delivery throughout the building is not controlled by permanent ductwork and registers.

