Appendix A

Additional Information

ATTACHING JAMES HARDIE PRODUCTS TO INSULATED CONCRETE FORMS (ICF)

Considering the proprietary nature of Insulated Concrete Forms (ICF) and the number of ICF manufacturers currently selling product in the US and Canada, James Hardie Building Products cannot calculate or determine the proper fastener for each type of plastic or metal cross-tie flange being used in the field. James Hardie offers the following as a guide to determine the correct siding fastening to be used with the respective ICF system chosen for the project in question.

1. Determine the projects basic wind design, including basic wind speed, wind exposure category, and mean roof height.

2. Find the fastener and frame type within James Hardie's CCMC Report that will meet the project's basic wind design.
   - **a.** Take note of the head diameter, shank diameter, and fastener length for the fastener.

Note: Fastener bearing area is equal to the head area less the shank area.

   - **b.** Take note of the frame type and frame spacing.

3. Go to the ICF system manufacturer and find a fastener that is similar in dimension to the fastener from step 2.1 above.
   - **a.** Basically, the bearing area under the ICF fastener head shall be the same as or greater than the bearing area under the James Hardie fastener head from step 2.

4. Since the James Hardie siding product has to be attached to a structural member, in this case the ICF cross-tie flange, the steps below shall be followed.
   - **a.** The onus is on the ICF system manufacturer to demonstrate that their ICF cross-tie flange holds fasteners, screws or nails, the same as wood or steel framing hold screws or nails.
   - **b.** ICF fastener allowable withdrawal load capacity (applicable factor of safety applied) may be found in an ICC-ES Product Evaluation for the given ICF manufacturer's products, OR
   - **c.** The ICF manufacturer may have testing that shows their fastener's allowable withdrawal load capacity (applicable factor of safety applied) from their cross-tie flange.

5. For the fastener from step 2, a registered design professional shall calculate the allowable withdrawal load (factor of safety applied) from the frame type noted in step 2.2.

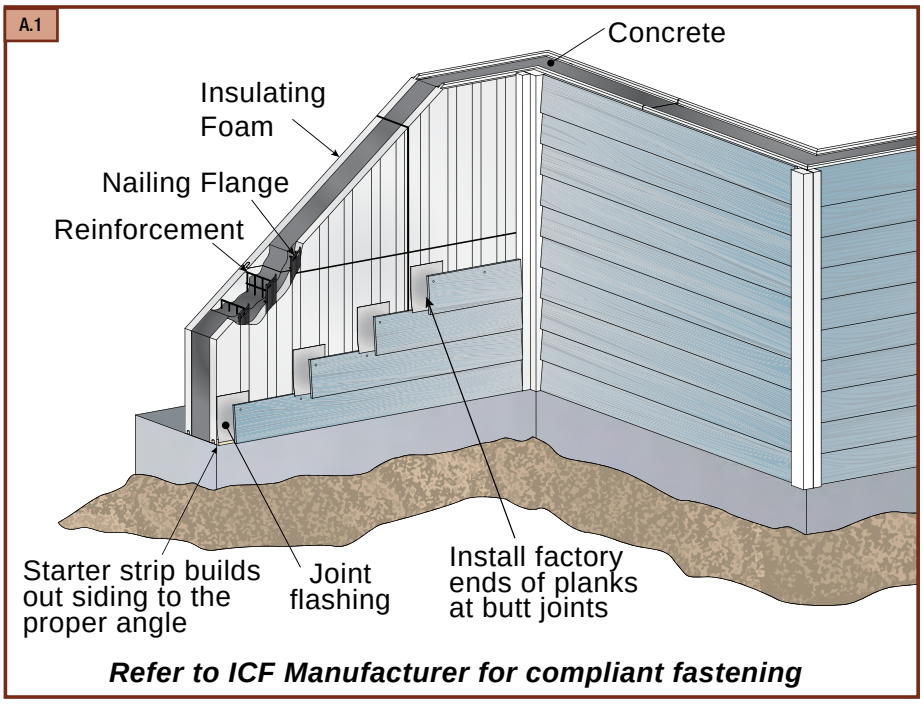
6. A registered design professional shall then make an equivalency statement comparing the ICF fastener withdrawal (step 4.1.1 or step 4.1.2) versus the fastener withdrawal from step 5.

7. When the ICF cross-tie flange spacing differs from the James Hardie frame spacing in step 2.2, a registered design professional shall calculate the maximum siding fastener spacing into the cross-tie flange needed to resist the applicable basic wind speeds published in James Hardie's CCMC Report for the fastener and design from step 2.

Additional Information (continued)

8. When required by the code official and once in possession of the information gathered in the steps above it is the responsibility of the property owner, design professional, contractor, or installer to make his or her case to the Building Official.

A.1



Refer to ICF Manufacturer for compliant fastening

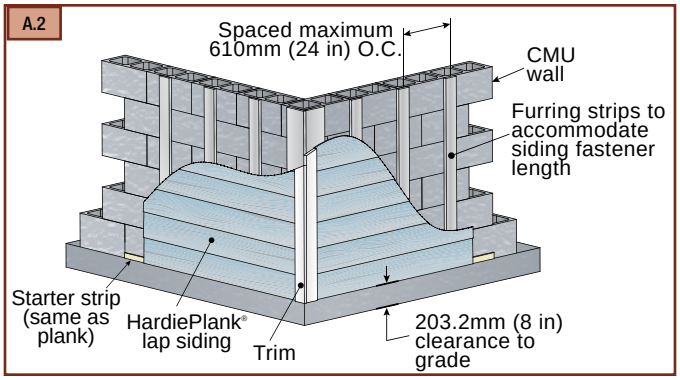
ATTACHING HARDIEPLANK® LAP SIDING AND HARDIETRIM® PRODUCTS TO CONCRETE MASONRY UNITS (CMU)

The application of HardiePlank® Lap Siding and HardieTrim® boards to masonry construction complying with local building codes using Concrete Masonry Units (CMU) complying to ASTM C 90 can be achieved by using one of the following two methods of attachment. All other product specific installation requirements which are not outlined below must be followed.

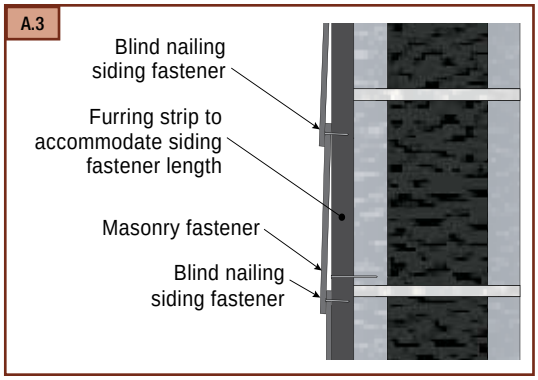
Method 1: Attachment Over Furring

Attach over furring with adequate thickness to allow attachment with approved fastening methods according to local building codes and code compliance documentation. Furring must be attached to ensure it can transfer the wind loads and other necessary forces back to the structure. The mechanical connection of the furring to the structure is the responsibility of the Licensed Design Professional. James Hardie Building Products has no comment on the load carrying capacity of the furring to framing connections.

A.2



A.3

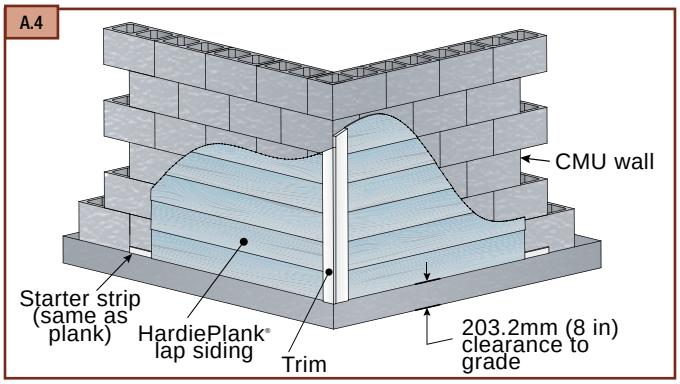


Method 2: Attachment Directly to CMU

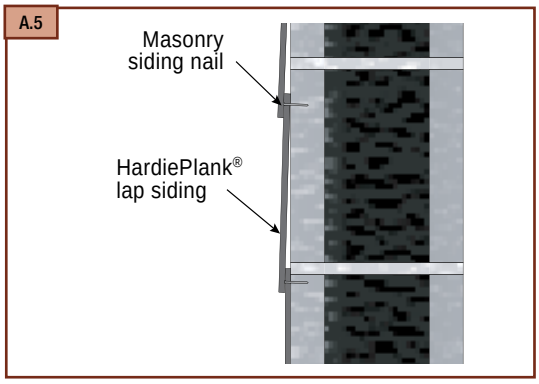
Attach directly to masonry with approved fastening method according to local building codes and code compliance documentation.

Refer to and follow local building codes for water resistive barrier requirements

A.4



A.5



Attachment of HardieTrim® boards

HardieTrim boards can be fastened using hardened finish nails designed for masonry construction. For more information refer to the HardieTrim section of this guide.

Additional Information (continued)

ICC – IBC® & IRC®/2006 – ALLOWABLE FASTENER SPACING (in)

HardiePlank® Lap Siding **fastened to ASTM C 90 Concrete Wall**

Basic Wind Speed	Building Height (feet)	<6½-inch wide			7¼- & 7½-inch wide			8- & 8¼-inch wide			9¼- & 9½-inch wide		
		Exposure			Exposure			Exposure			Exposure		
		B	C	D	B	C	D	B	C	D	B	C	D
161 kph	0-15	24	24	24	24	24	24	24	24	21	24	23	19
	20	24	24	24	24	24	23	24	24	20	24	21	18
	30	24	24	24	24	24	21	24	22	19	24	20	17
	40	24	24	23	24	24	20	24	21	18	24	19	16
	50	24	24	22	24	22	19	24	20	17	24	18	15
	60	24	24	22	24	22	19	24	19	17	23	17	15
177 kph	0-15	24	24	22	24	24	19	24	21	17	23	19	15
	20	24	24	21	24	22	18	24	20	16	23	18	15
	30	24	24	20	24	20	17	24	18	15	23	16	14
	40	24	22	19	24	19	16	23	17	15	21	15	13
	50	24	21	18	24	18	16	22	16	14	20	14	12
	60	24	20	18	23	18	15	21	16	14	19	14	12
193 kph	0-15	24	23	19	24	20	17	21	18	15	19	16	13
	20	24	22	18	24	19	16	21	17	14	19	15	12
	30	24	20	17	24	17	15	21	15	13	19	14	12
	40	24	19	16	22	16	14	20	14	12	18	13	11
	50	24	18	16	21	16	13	18	14	12	17	12	11
	60	23	17	15	20	15	13	18	13	11	16	12	10
209 kph	0-15	24	20	16	21	17	14	18	15	12	16	14	11
	20	24	19	15	21	16	13	18	14	12	16	13	11
	30	24	17	14	21	15	12	18	13	11	16	12	10
	40	22	16	14	19	14	12	17	12	11	15	11	9
	50	21	15	13	18	13	11	16	12	10	14	11	9
	60	20	15	13	17	13	11	15	11	10	13	10	9
225 kph	0-15	21	17	14	18	15	12	16	13	11	14	12	10
	20	21	16	13	18	14	12	16	12	10	14	11	9
	30	21	15	12	18	13	11	16	11	10	14	10	9
	40	19	14	12	16	12	10	15	11	9	13	9	8
	50	18	13	11	15	11	10	14	10	9	12	9	8
	60	17	13	11	15	11	10	13	10	9	12	9	8
241 kph	0-15	18	15	12	16	13	11	14	11	9	12	10	8
	20	18	14	12	16	12	10	14	11	9	12	10	8
	30	18	13	11	16	11	9	14	10	8	12	9	7
	40	16	12	10	14	10	9	13	9	8	11	8	7
	50	15	12	10	13	10	9	12	9	8	11	8	7
	60	15	11	10	13	10	8	11	8	7	10	8	7

Notes to Table:

1. Fasteners shall be ET&F Fastening Systems, Inc. ET&F block Nail (ET & F No. ASM-144-125, head dia. = 0.30 in, shank dia. = 0.14 in, length = 1.25-in long) or Max System block Nail (CP-C 832 W7-ICC, head dia. = 0.30 in, shank dia. = 0.15 in, length = 1.3 in).

2. Maximum basic wind speed shall be 250 kph.

3. Interpolation to address building height and other plank widths is permitted.

4. The lap conceals the fasteners of the previous course (Blind Nailed).

5. 1 inch = 25.4 mm, 1 foot = 305 mm, 1 mph = 0.44 m/s

INSTALLING OVER RIGID FOAM INSULATION UP TO 25 MM (1 in) THICK

James Hardie does support the use of its exterior siding products installed over rigid foam insulation, but does not take responsibility for the entire wall assembly or system. James Hardie expects the designer or builder using our components as part of the insulated wall assembly to:

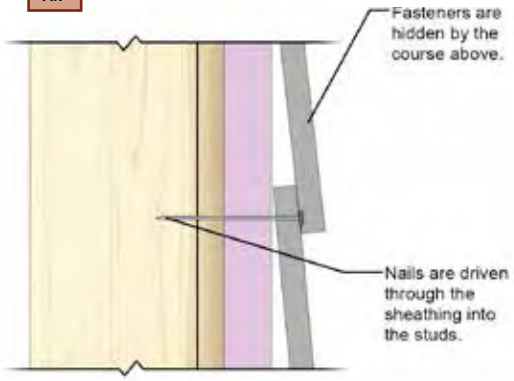
- Adhere to all the installation requirements listed in the relevant product installation instructions.
- Provide adequate details for water management.
- Make the decision about the use and type of rigid foam insulation.
- Understand the interaction between system components and how each of the components in the system interacts.
- Design the building envelope to account for both interior and exterior moisture control.

A.6

General requirements and installation guidelines:

- All James Hardie® product specific installation requirements must be followed.
- All national, state, and local building code requirements must be followed. Where they are more stringent than the James Hardie installation requirements, state and local requirements will take precedence.
- James Hardie siding and trim products can be installed over solid-foam insulation board up to 25 mm (1 in) thick. Caution should be taken as irregularities and unevenness in framing, sheathing, foam and other wall assembly components, including under driven nails, can telegraph through to the finished siding and trim. These irregularities should be corrected before the siding is installed.
- When reviewing the following details for attaching over foam, an important consideration is that the fastener chosen must be adequately encompassed by a wood substrate. The foam will not count as part of the necessary penetration, therefore the length of the chosen fastener must be extended by the thickness of the foam.

A.7



Fastener Selection:

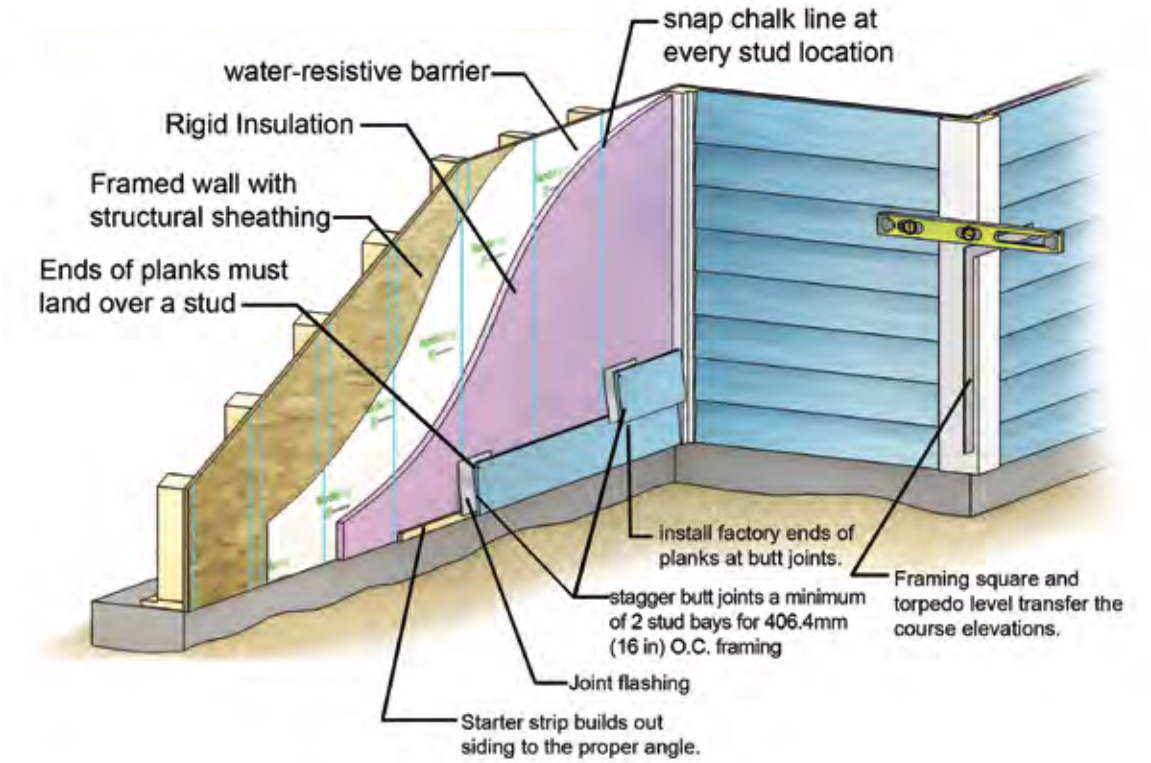
- When attaching lap siding products over foam, the length of the chosen fastener must be extended in length by the thickness of the foam.

Normal Fastener	Fastener for an additional 12.7mm (1/2 in) of Foam
6d common 50mm (**2 in)** long	8d common 63.5mm (**2 ½ in)** long
11 ga. 32mm (**1¼ in)** long roofing nail	11 ga. 44.5mm (**1 ¾ in)** long roofing nail
8-18 x 41mm (**1⅝ in)** x 8.2mm (.323 in) HD ribbed bugle head screw	8-18 x 54mm (**2⅛ in)** x 8.2mm (.323 in) HD ribbed bugle head screw

Refer to the CCMC or other code compliant documentation for proper fastener selection based on specific product, stud spacing, building height, and exposure category.

Additional Information (continued)

A.8



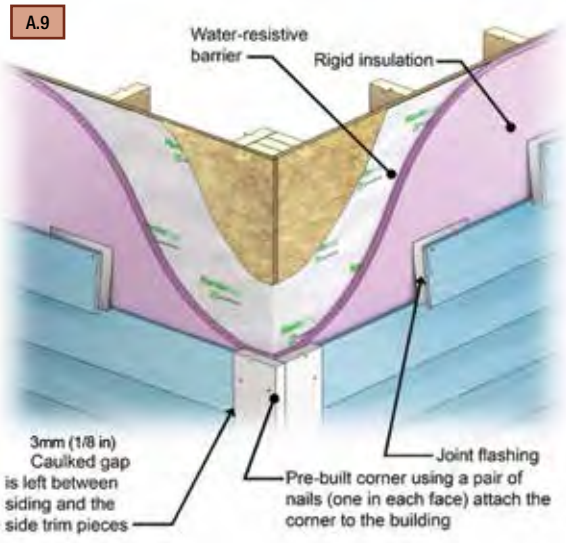
TIP: With some types of foam it is possible to use the rigid foam as the water resistive barrier by taping and sealing all of the joints. Refer to specific manufacturers installation requirements when considering this type of application.

Note: When attaching lap siding products over foam the length of the chosen fastener must be extended by the thickness of the foam to achieve the same required holding power.

WEATHER BARRIER & RIGID FOAM

- When using a weather resistive barrier (WRB) in conjunction with rigid foam insulation, the WRB can be installed underneath the foam as shown, or over the top if more convenient
- Regardless of where the WRB is placed, all flashings must be incorporated into the WRB and drainage plane.
- Some rigid foam insulation products are manufactured with tongue & groove or shiplap joints and can be used as the WRB when properly installed and sealed. When using rigid foam insulation as the WRB refer to manufacturers installation instructions.

A.9



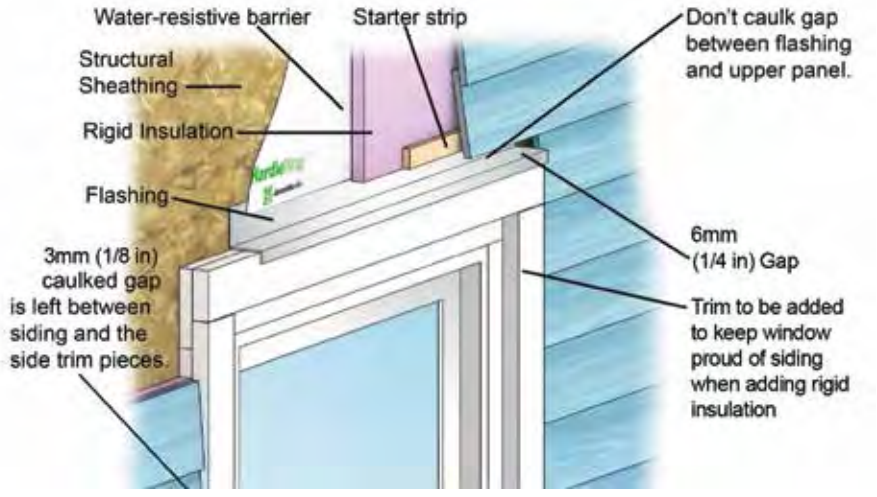
Trim

Depending upon the reveal around windows, doors, and penetrations, the thickness of foam, and the type and thickness of trim used, there will be different techniques to install the siding and trim to ensure the foam is completely concealed.

Flashings

The Z flashing above all horizontal trim must be incorporated into the WRB regardless of WRB position. If the foam is being used per manufacturers instructions as the WRB, all flashings must be incorporated into the drainage plane such that it allows moisture to drain down and out.

A.10



Note: It is recommended to layout the rigid foam insulation such that vertical joints do not occur at the corners of window and door openings or over window heads if possible.

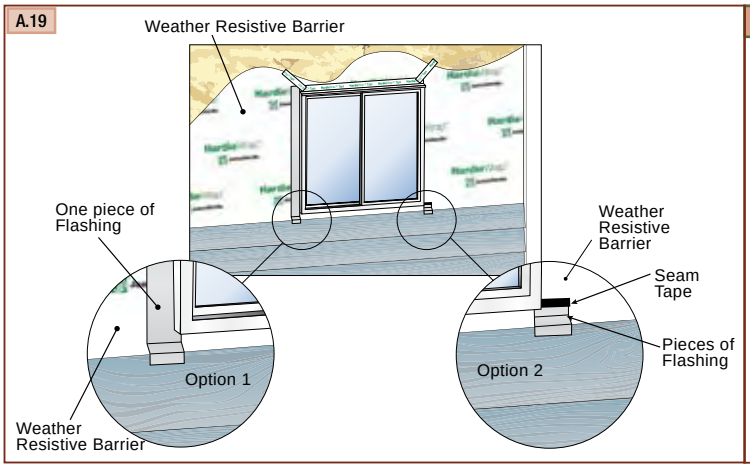
Additional Information (continued)

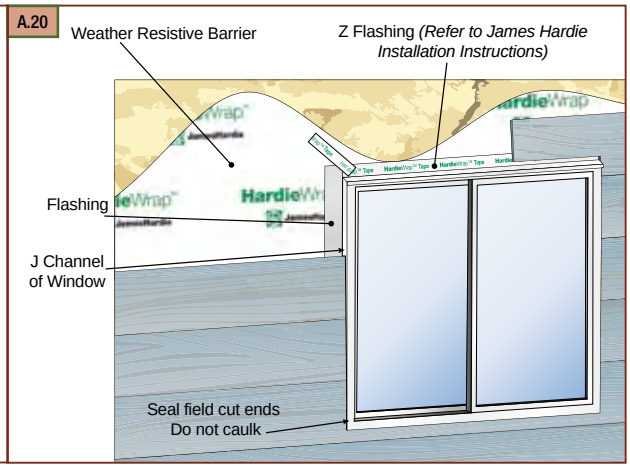
INSTALLING HARDIEPLANK® LAP SIDING AROUND WINDOWS WITH AN INTEGRATED J-CHANNEL

When installing fiber cement around a window with a "J" channel there are a few guidelines which should be followed to control water flow:

1. All windows must be installed per manufacturers installation instructions and must incorporate all necessary flashings.
2. At the bottom sides of the window, a flashing must be installed that will redirect any water that runs down the inside of the "J" channel out and away so that it does not run down the wall assembly and behind the plank below the window.
   - **a.** This can be done by inserting a flashing that runs the entire length of the window (option 1) or by cutting the weather resistive barrier towards the bottom of the window and inserting a smaller flashing and taping with seam tape to reseal the weather resistive barrier (option 2).
   - **b.** This flashing would then be lapped over the last plank at the bottom of the window, similar to a joint flashing, to direct water down and out to the front of the cladding.
3. A "z" flashing must be installed and integrated into the weather resistive barrier at the top of the window. The "z" flashing will allow water to be drained away from the window and wall, opposed to being captured in the "J" at the top of the window. (Refer to JamesHardie Installation Instructions for further "z" flashing details).
4. Seal all field cut non factory ends with an exterior grade paint, primer, or sealer.
   - **a.** Insert ends of plank into the "J" channel of the window.
   - **b.** Do not try to squeeze caulk into the "J" channel.
   - **c.** Plank integrated into "J" channel must be primed, painted or caulked.

Typical "J" Channel Window





JOINT FLASHING WITH HARDIEPLANK® LAP SIDING

One or more of the following joint treatment options are required by code (as referenced 2009 IRC R703.3.2)

A. Joint Flashing (James Hardie recommended)

B. Caulking* (Caulking is not recommended for ColorPlus for aesthetic reasons as the Caulking and ColorPlus will weather differently. For the same reason, do not caulk nail heads on ColorPlus products.}

C. "H" jointer cover Flashing behind butt joints provides an extra level of protection against the entry of water at the joint.

James Hardie recommends 6 in. wide flashing that overlaps the course below by 1 in. Some local building codes may require different size flashing. Joint-flashing material must be durable, waterproof materials that do not react with cement products. Examples of suitable material include finished coil stock and code compliant water-resistive barriers. Other products may also be suitable.

The reasons for this are:

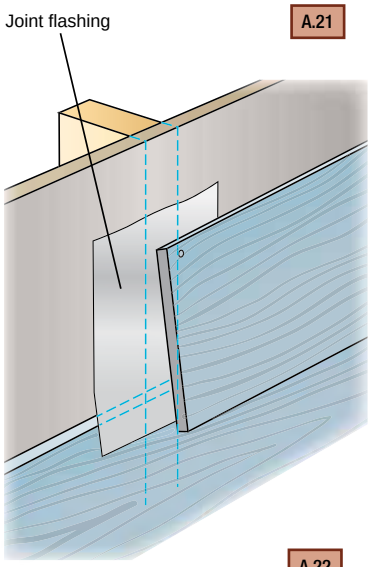
1. The use of joint flashing behind field butt joints is an approved joint treatment method as described in the 2006 International Building Code and is recognized by James Hardie and experts across the building industry to be a superior method.

> ***"1405.17.2 Horizontal lap siding.*** *Lap siding shall be lapped a minimum of 1 1/4 inches (32 mm) and shall have the ends sealed with caulking, covered with an Hsection joint cover or located over a strip of flashing."*

Experts across the industry recognize flashings as an effective and responsible method for draining a wall system:

> *"The fundamental principle of water management is to shed water by layering materials in such a way that water is directed downwards and outwards out of the building or away from the building. The key to this fundamental principle is drainage. The most elegant expression of this concept is a flashing. Flashings are the most under-rated building enclosure component and arguably the most important."*
>
> *EEBA (Energy & Environmental Building Association™) Water Management Guide By Joseph W. Lstriburek, Ph.D., P.eng. June 2004.*

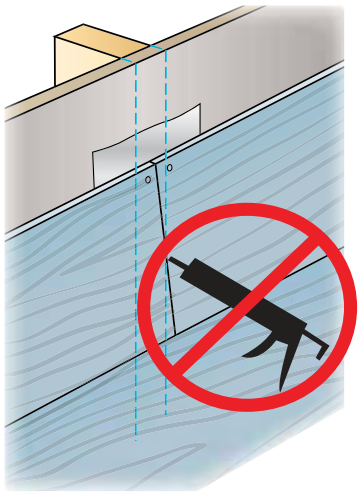
A.21



2. Reduced maintenance required by the home owner – It is recognized by James Hardie, several caulking manufacturers, experts across the industry, and experienced home owners that when caulking is used at field butt joints, maintenance will be required. Depending on the specific product and the application, caulked field butt joints will need to be maintained to guarantee continued performance over the life of the building. In addition, several sealant/caulking manufacturers recommend against using their products at butt joints in fiber cement siding for many of the reasons discussed here.

3. Improved appearance – When installed properly, flashing at a field butt joint can create a better looking joint. James Hardie recommends butting field joints together in moderate contact which achieves a more continuous looking joint. When utilizing a caulked butt joint, a gap specified by the caulk manufacturer must be left at the joint. Over time as the caulk ages, this joint can become pronounced on the wall and stand out.

A.22



Do not use caulk on HardiePlank® lap siding with ColorPlus® technology

JAMES HARDIE REQUIREMENTS FOR ALTERNATE FASTENERS AND METHODS OF FASTENING

The fastening requirements for each product are stated in one or more of the following technical documents and in some cases fastener products may be referenced. Below are the steps that can be used to demonstrate an alternate fastener's equivalency to the James Hardie published fastening requirements.

1. It is the responsibility of either the property owner, design professional, contractor, or installer to consult:

- **a.** The fastener Manufacturer for a Product Listing Specification or Code Compliance report that covers the installation method in question, or;
- **b.** A licensed Architect or Professional Engineer to make an equivalency statement linking the alternate fastener (or fastening method) to the fastening requirements published within the relevant James Hardie technical document;

2. Once in possession of the information gathered in step one it is the responsibility of the property owner, design professional, contractor, or installer to make his or her case to the Building Official[1]

[1] The Building Official reserves the right to approve alternate materials, design and methods of construction, 2006 International Building Code® Section 104.11, 2006 International Residential Code Section R104.11, and 1997 Uniform Building Code Section 104.2.8.

All national, state, and local building code requirements must be followed and where they are more stringent than the James Hardie installation requirements, state and local requirements will take precedence.

Appendix B

Estimating

Siding

All houses can be broken down to triangles, rectangles, and squares. Using these simple shapes it is very easy to estimate the amount of siding required.

1. Break down the portions of the house to be sided into the simple shapes (squares, rectangles, triangles) Figures 12.1 - 12.4.
2. Determine the height and width of each shape.
3. Multiply height x width to determine square footage. For triangles divide the total by 2.
4. Add all of the square footage numbers together.
5. Subtract large items such as garage doors, large doors, large windows, and banks of windows from total.
   Do not remove small windows, doors, vents, or other small areas not being sided.
6. Total all numbers. This gives you the total covered area.
7. Use the coverage charts located in this section to determine the number needed.
8. Add a minimum of 5% for waste. If there are multiple (3 or more) gables, chases, bump outs, or dormers add 10%.*

** Material for starter strip is included in the calculation for waste.*

Trim

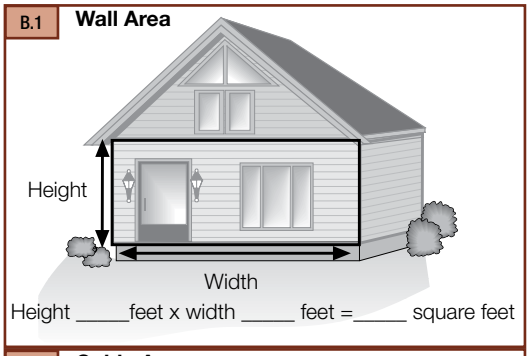
Number of HardieTrim® Boards:

Trim is applied to corners and around doors and windows. Trim is also used for fascia board, rake board, band board, frieze board and other details.

1. Determine which areas are to be trimmed.
2. Measure all openings to be trimmed including doors, windows, vent openings, corners (inside and outside), and other areas.
3. Measure for fascia, rakes, and frieze boards.
4. Add the lengths for corners, fascia, rakes, and frieze and add 5% for waste.
5. Add the lengths for window and door trim and add 10% for waste.
6. Add the total from lines 4 and 5 to determine the amount of trim needed.

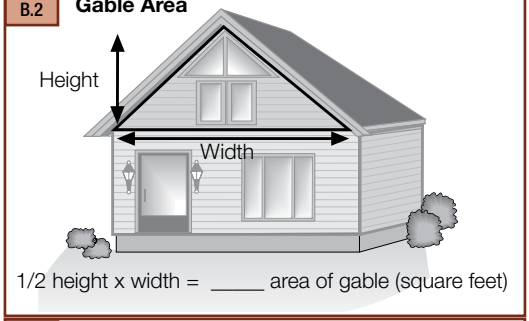
Disclaimer: The estimation methods in this section are meant as a guide. James Hardie does not assume responsibility for over or under ordering of product.

B.1 **Wall Area**



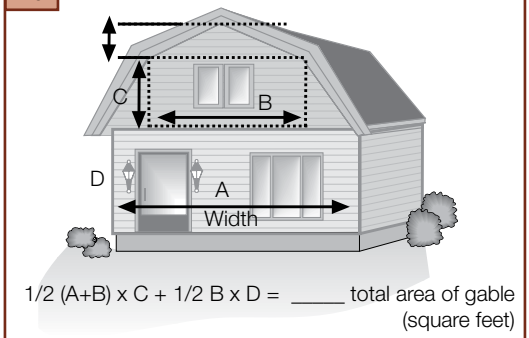
Height _____feet x width _____ feet =_____ square feet

B.2 **Gable Area**



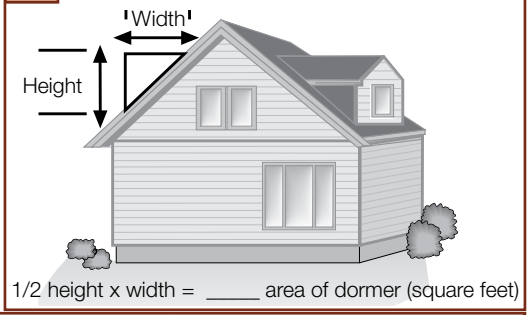
1/2 height x width = _____ area of gable (square feet)

B.3 **Gambrel Roof House**



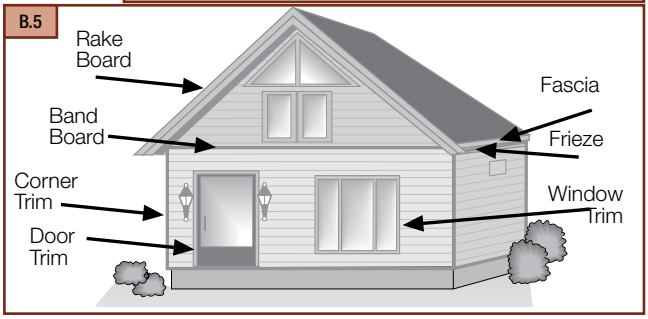
1/2 (A+B) x C + 1/2 B x D = _____ total area of gable (square feet)

B.4 **Dormer Area**



1/2 height x width = _____ area of dormer (square feet)

B.5



HardiePlank® Lap Siding Coverage Chart* (number of planks)

Coverage Area (square feet)	Plank Width (in)					
Width (in)	5.25	6.25	7.25	8.25	9.25	12
Exposure (in)	4	5	6	7	8	10.75
100	25	20	17	14	13	9
200	50	40	33	29	25	19
300	75	60	50	43	38	28
400	100	80	67	57	50	37
500	125	100	83	71	63	47
600	150	120	100	86	75	56
700	175	140	117	100	88	65
800	200	160	133	114	100	74
900	225	180	150	129	113	84
1000	250	200	167	143	125	93
1100	275	220	183	157	138	102
1200	300	240	200	171	150	112
1300	325	260	217	186	163	121
1400	350	280	233	200	175	130
1500	375	300	250	214	188	140
1600	400	320	267	229	200	149
1700	425	340	283	243	213	158
1800	450	360	300	257	225	167
1900	475	380	317	271	238	177
2000	500	400	333	286	250	186
2100	525	420	350	300	263	195
2200	550	440	367	314	275	205
2300	575	460	383	329	288	214
2400	600	480	400	343	300	223
2500	625	500	417	357	313	233
2600	650	520	433	371	325	242
2700	675	540	450	386	338	251
2800	700	560	467	400	350	260
2900	725	580	483	414	363	270
3000	750	600	500	429	375	279

Nail Coverage Chart** (number of nails)

Coverage Area (square feet)	Plank Width (in)					
Width (in)	5.25	6.25	7.25	8.25	9.25	12
Exposure (in)	4	5	6	7	8	10.75
100	250	200	166	143	125	93
500	1250	1000	830	715	625	465
1000	2500	2000	1660	1430	1250	930

Disclaimer

The estimation methods in this section are meant as a guide. James Hardie does not assume responsibility for over or under ordering of product.

** Coverage chart does not include waste. ** Number of nails given are for building framed 16 in. o.c.*