

APPROVAL PLANS INDEX

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10. 0	HVAC LAYOUT
11. 0	CROSS-SECTION
11. 1	ENERGY CODE COMPLIANCE DETAILS
ATTACHED ONLY WHEN NEEDED	MODEL SPECIFIC CALCULATIONS

N. C. BUILDING DESIGN CRITERIA

CODES:
 NC RESIDENTIAL CODE - 2018 EDITION
 NC PLUMBING CODE - 2018 EDITION
 NC MECHANICAL CODE - 2018 EDITION
 NC ENERGY CONSERVATION CODE - 2018 EDITION
 NC FIRE & FUEL GAS CODES - 2018 EDITION
 NC ELECTRICAL CODE - 2017 EDITION

DUAL LABELED STOCK NOTE:
 WHEN DUAL LABELING A STOCK MODEL: THE HOME WILL BE BUILT TO INCLUDE BOTH REQUIRED CONSTRUCTION METHODS OF BRACING. WHEN OVERLAPPING OCCURS, THE WORSE CASE METHOD WILL GOVERN.

TYPES:
 CONSTRUCTION TYPE: VB, UNPROTECTED
 OCCUPANCY TYPE: RESIDENTIAL

**NOTE: THIS HOME IS DESIGNED FOR A MAXIMUM MEAN ROOF HEIGHT OF 30'.
 LOADS:**
 ROOF LOAD: 30 PSF GSL
 20 PSF DL
 FLOOR LOAD: 40 PSF LL 1st & 2nd FLOOR if applicable
 WIND LOAD: Valt=150 MPH EXPOSURE C
 SEISMIC ZONE: C
 FLOOR, 40 IF HABITABLE ATTIC

NOTE: MEETS CH. 45 REQUIREMENTS!
NOTE: THIS MODEL IS NOT BUILT FOR COASTAL HIGH HAZARD OR OCEAN HAZARD AREAS!

THIRD PARTY AND OTHER APPLICABLE SEALS:

NOTES:
 ATTENTION LOCAL INSPECTION DEPT.
 1) SET-UP INSTRUCTIONS FOR OUR MODULAR HOMES ARE INCLUDED BY ATTACHMENT TO THESE PLANS. ANY PLAN SET WHICH DOES NOT INCLUDE AN ATTACHMENT ENTITLED: "SETUP/CONSTRUCTION GUIDELINES" IS INCOMPLETE. SEE THE X-SECTION FOR ALL REQUIRED PAGE NUMBER REFERENCES.
 2) THIS UNIT MUST BE CONNECTED TO A PUBLIC WATER SUPPLY AND SEWER SYSTEM IF THESE ARE AVAILABLE.
 3) THIS PLAN MAY BE FLIPPED END-TO-END.
 4) STATE LABEL LOCATED INSIDE KITCHEN SINK CABINET.

NOTE TO LOCAL INSPECTION DEPARTMENT:
 IF THIS STRUCTURE IS IN A THERMAL ZONE MORE STRINGENT THAN THAT LISTED ON THESE PLANS, IS SET ON A SLOPE OR PARTIAL ABOVE GROUND IS BASED ON DESIGN WIND SPEED OR COASTAL HIGH HAZARD SITE SUCH THAT WIND OR OTHER DESIGN PARAMETERS ARE INCREASED, THE DESIGN MUST BE DETERMINED TO BE ADEQUATE FOR ACTUAL SITE CONDITIONS. ALTERATIONS MAY BE REQUIRED TO BRING THE HOME INTO COMPLIANCE WITH THE MORE STRINGENT CONDITIONS.

PLAN: <u> </u> N/A	PLANT: <u> </u> N/A
FLOODS: <u> </u> 1	DATE: <u>11/04/2020</u>

2018 NC ENERGY COMPLIANCE			
WORSE CASE CLIMATE ZONE: 4			
ASSEMBLY	CAVITY R-VALUE	GLAZING OR DOOR U-FACTOR	SHGC VALUE
CEILING	R-30		
WALL	R-19		
WINDOWS		0.33	0.27
DOORS		0.19	
DOORS >50% GLASS		0.35	0.30
FLOOR	R-25		

NOTE: PRESCRIPTIVE PER TABLE N1102.1.2 (R402.1.2) AND FOOTNOTES L & M:
 THE FULL HEIGHT OF UNCOMPRESSED R-30 INSULATION EXTENDS OVER THE WALL TOP PLATE AT THE EAVES AND PROVIDES A 1" AIR GAP. SEE DETAIL ON SHEET 11.0.

VENTILATION REQUIREMENTS

Model: 16-CP-830+8' HEAVENLY HOMES SPEC

House Size:

L (ft): 48

W (ft): 29.5

Crawl Space: Vapor barrier required

1416 sq ft

9/44 sq ft of ventilation required

Attic:

203904 sq. in.

Required inlet area: 339.84 sq. in.

Provided inlet area: 1248 sq. in.

1248 sq. in. > 339.84. Therefore, OK.

Required outlet area: 339.84 sq. in.

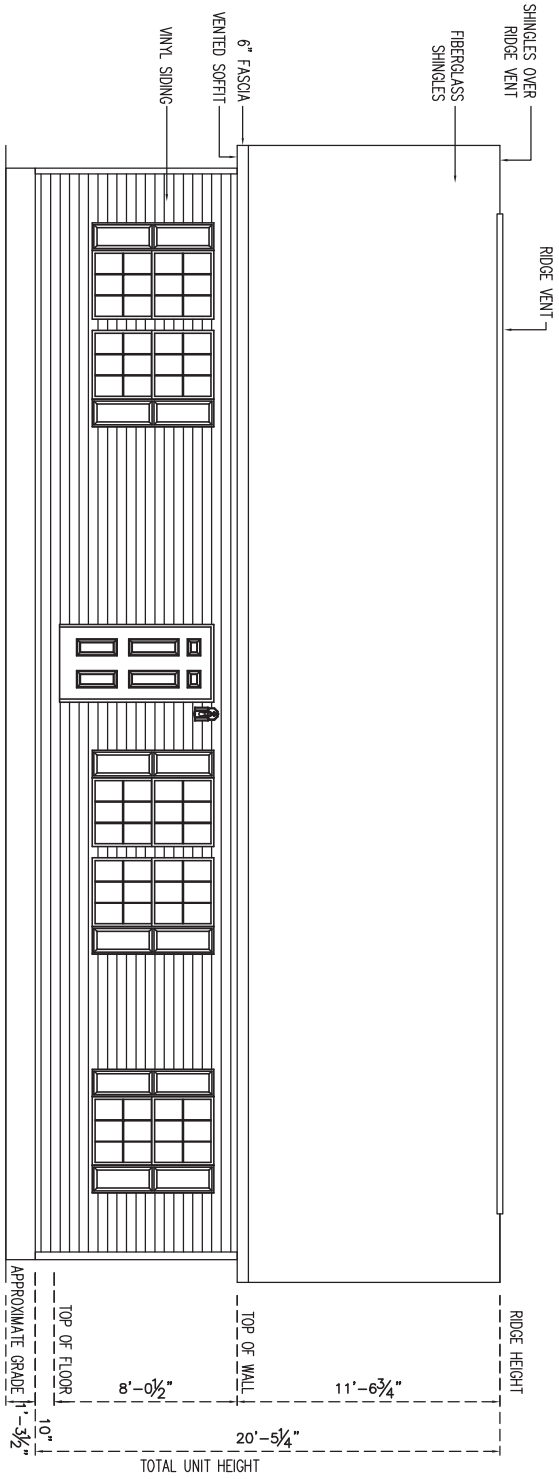
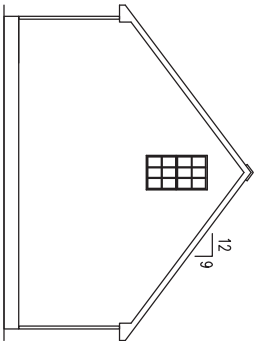
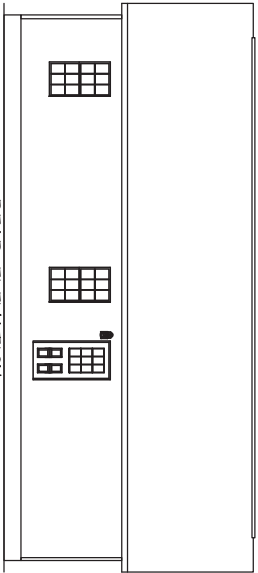
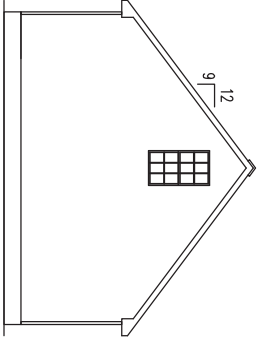
Provided outlet area:

52 sq. in. per 4' piece of Ridge Vent, so

7 Pieces required as

7 X 52 = 364

364 sq. in. > 339.84. Therefore, OK.



130mph NC NOTE FOR 5/12 THRU 9/12 PITCH ROOFS:
 PER SECTION R602.10.5.5, SOLID 2x BLOCKING IS
 INSTALLED BETWEEN TRUSSES, ABOVE BRACED WALL
 PANEL AREAS IN THE EXTERIOR EAVE SIDE WALLS
 ONLY, AND IS ATTACHED TO TOP PLATES WITH 8d
 NAILS @ 6"oc ALONG THE LENGTH.

NOTE:
 EXTERIOR CORNER FRAMING,
 AS REQUIRED, PER THE 2018
 NC ADDENDUM, SECTION
 R602.10.3, FIGURE
 R602.10.3(4)b.

TOTAL OF 29.6' OF OSB BRACED BRACED WALL:
 WALL PANELS ON THIS SIDE, (8) 100% SHEATHED.

NOTE: TRANSOM WINDOWS ARE UN-MULLED
 AND GRIDLESS.
 ALL APPLIANCES ARE SHOWN FOR
 REPRESENTATION ONLY. INSTALLATION
 AND/OR SHIPPING OF APPLIANCES DEPENDS
 ON SALES ORDER.

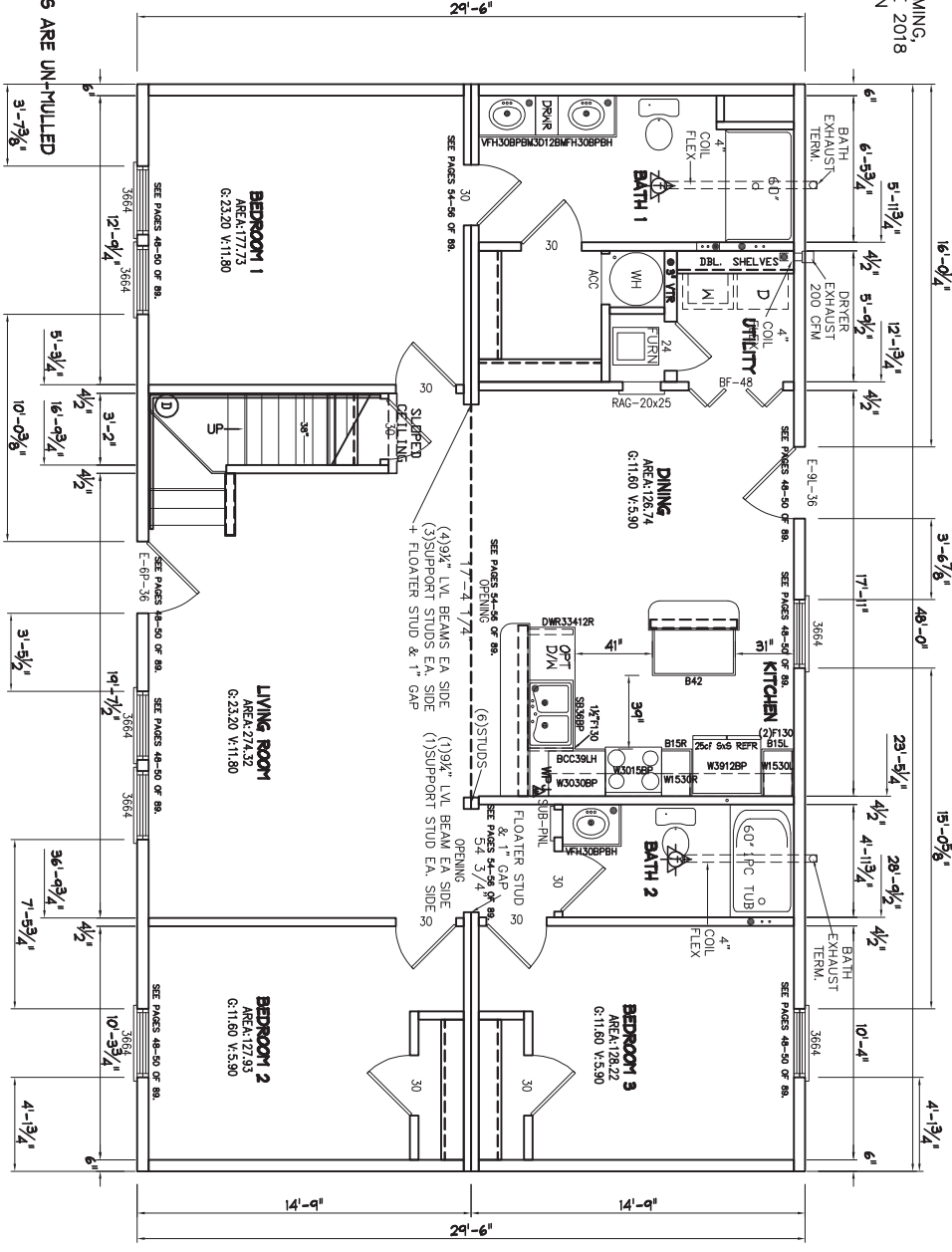
TOTAL AREA = 1416sf

SEE NEXT PAGE FOR ADDITIONAL NOTES!

- NOTES:
- 1) - DENOTES A PLUMBING VENT.
 - 2) AIR ADMITTANCE VALVES ARE USED.
 - 3) 0 - PVC CHASE PIPES ARE FOR FIELD USE ONLY.
 - 4) RANGE HOODS AND FIREPLACES ARE VENTLESS.

TOTAL OF 28.9' OF OSB BRACED BRACED WALL:
 WALL PANELS ON THIS SIDE, (2) 60% SHEATHED.

NC NOTE:
 COMPLETS WITH CH. 45, TABLE 4506.2.
 ATTACHED CALC PAGE ON-1C SHOWS
 ALLOWANCE FOR A STAPLE SUBSTITUTION.



TOTAL OF 29.6' OF OSB BRACED BRACED WALL:
 WALL PANELS ON THIS SIDE, (8) 100% SHEATHED.

- NOTES:
- 1) CLOTHES DRYER TRANSITION DUCTS ARE LIMITED TO 8 FEET IN LENGTH AND MAY NOT BE USED IN ANY PORTION OF THE BUILDING CONSTRUCTION.
 - 2) MUST COMPLY WITH THE 2018 NC MECHANICAL CODE SECTION 504.6.
 - 3) MUST HAVE BACKDRAFT DAMPER REQUIRED PER M1502.3.

120mph NOTES FOR EXTERIOR BRACED WALLS USING THE CS-WSP: CONTINUOUSLY SHEATHED WOOD STRUCTURAL PANEL METHOD:

- 1) ALL EXTERIOR WALLS ARE BRACED WALLS WITH 7/16" OSB SHEATHING FASTENED WITH 7/16"x1 3/4"x15/16" STAPLES AT 2"oc STAGGERED ALONG HORIZONTAL EDGES, 3"oc ALONG VERTICAL EDGES, AND 4"oc IN THE FIELD. ALL EXTERIOR WALLS WITH LESS THAN 50% OF SHEATHING, BUT MORE THAN 25% SHEATHING REQUIRE BLOCKING AT JOINTS AND MUST BE FASTENED WITH 8d NAILS AT 3"oc ALONG THE EDGES AND 6"oc IN THE FIELD. LESS THAN 25% SHEATHING REQUIRES A P.E. DESIGN.
- 2) SEE SHEET 5.1 FOR ADDITIONAL BRACED WALL NOTES AND DETAILS.
- 3) ALL EXTERIOR BRACED WALLS ARE BLOCKED AT JOINTS.

14'-9" MAX	LENGTH OF BRACED WALL	1
PITCH	1/2 w/15" EAVE-TO-RIDGE HT.	(1)
WALL	EAVE 1	(2)
	EAVE 2	(3)
	CABLE 1	(4)
	CABLE 2	(5)
LEGEND	(6)	(7)
LENGTH OF	29.5'	48.0'
MIN. LENGTH	12'	16'
TOTAL	38.9'	29.6'

1. FACTORABLE PER 10.3 WITH A TYPICAL 120 MPH DESIGN USING 1.3 FACTOR FOR EXPOSURE C & 0.95 FACTOR FOR 9' CEILING.
 2. REQUIRED LENGTHS DERIVED FROM W05SE CASE COLUMN FROM TABLE R602.10.3 (D) INTERPOLATION.

8' CEILING

SHEET 5.0

DOOR SCHEDULE

QTY	STYLE	NOMINAL SIZE	R.O. WIDTH	R.O. HEIGHT	GLASS S.F.	VENT S.F.	DESCRIPTION
1	E-9L-36	3'-0"x6'-8"	3'-2"	6'-10 1/2"	5.340	0.000	Exterior 9 lite steel
1	E-6P-36	3'-0"x6'-8"	3'-2"	6'-10 1/2"	0.000	0.000	Exterior six panel steel
1	BF-48	4'-0"x6'-8"	4'-2"	6'-10"	0.000	0.000	Interior bi-fold hollow core
1	ACC		2'-3"	4'-6"	0.000	0.000	Interior cased opening
1	OPENING		4'-6 3/4"	6'-10 1/2"	0.000	0.000	Interior cased opening
1	OPENING		17'-4 1/4"	6'-10 1/2"	0.000	0.000	Interior double six panel hollow core
1	DBL-24	2'-2'-0"x6'-8"	4'-2"	6'-10 1/2"	0.000	0.000	Interior double six panel hollow core
1	24	2'-0"x6'-8"	2'-2"	6'-10 1/2"	0.000	0.000	Interior six panel hollow core
12	30	2'-6"x6'-8"	2'-8"	6'-10 1/2"	0.000	0.000	Interior six panel hollow core

WINDOW NOTE:
WHEN USED: ALL PICTURE, OCTAGON, & TRANSOM WINDOWS ARE SAFETY GLAZED.

WINDOW SCHEDULE

QTY	STYLE	R.O. WIDTH	R.O. HEIGHT	GLASS S.F.	VENT S.F.	DESCRIPTION
9	3664	3'-0 1/4"	5'-4 1/4"	11.600	5.900	?
1	RAG-20x25	1'-8 1/4"	2'-1 1/4"	0.000	0.000	?
1	SUB-PNL	1'-2 1/2"	2'-5 1/2"	0.000	0.000	?

WINDOW DESCRIPTION NOTE:
ALL WINDOWS ARE LOW-E SINGLE HUNG WITH GRIDS UNLESS SPECIFIED OTHERWISE ON THE CUSTOMERS ORDER.
SOME HOME SERIES' USE DOUBLE HUNG WINDOWS AND WILL BE LISTED ON THE CUSTOMERS ORDER.

WINDOW EGRESS NOTE:
ALL WINDOWS WITH 5.0 SQ. FT. OF FREE AREA OR MORE ARE CONSIDERED EGRESS WINDOWS FOR THE GROUND LEVEL FLOOR. UPPER LEVEL WINDOWS SHALL HAVE A MINIMUM OF 5.7 SQ. FT. OF FREE AREA TO MEET EGRESS REQUIREMENTS.

NOTES:
1) COMPLIES WITH R308.4 FOR SAFETY GLAZING.
2) WINDOWS LABELED WITH SG ARE SAFETY GLAZED.
3) ALL SIDELIGHTS AT EXTERIOR DOORS WILL BE SAFETY GLAZED.
4) ALL WINDOWS AND DOORS HAVE A MINIMUM DESIGN PRESSURE (DP) RATING OF 50.

NOTES:
1) MINIMAL ADJUSTMENTS MAY BE REQUIRED FOR BATH COIL FLEX AND WILL BE DETERMINED PER PLAN.
2) FOR VENTED RANGE HOOD USE 100 CFM.
3) EXTEND ALL EXHAUST VENTS THROUGH EAVE SIDES ONLY. AIR FLOW DIRECTION IS TOWARD THE EXTERIOR.
4) EXHAUST VENTS CANNOT TERMINATE OVER DOORS & WINDOWS.
5) EXHAUST FANS SHALL USE CLASS 0 OR CLASS 1 DUCT IN ACCORDANCE WITH UL 181.
6) ALL GLASS SHOWER DOORS ARE TEMPERED.

RETURN AIR GRILLE DATA CHART

GRILLE SIZE	GRILLE TYPE	FREE AIR AREA	FACE JET VELOCITY	CFM
12" x 12"	LOUVERED	121 sq. in.	DUCT Ps	0.017
14" x 14"	LOUVERED	163 sq. in.	CFM	292
16" x 20"	LOUVERED	269 sq. in.	CFM	404
20" x 25"	LOUVERED	416 sq. in.	CFM	741
				1173

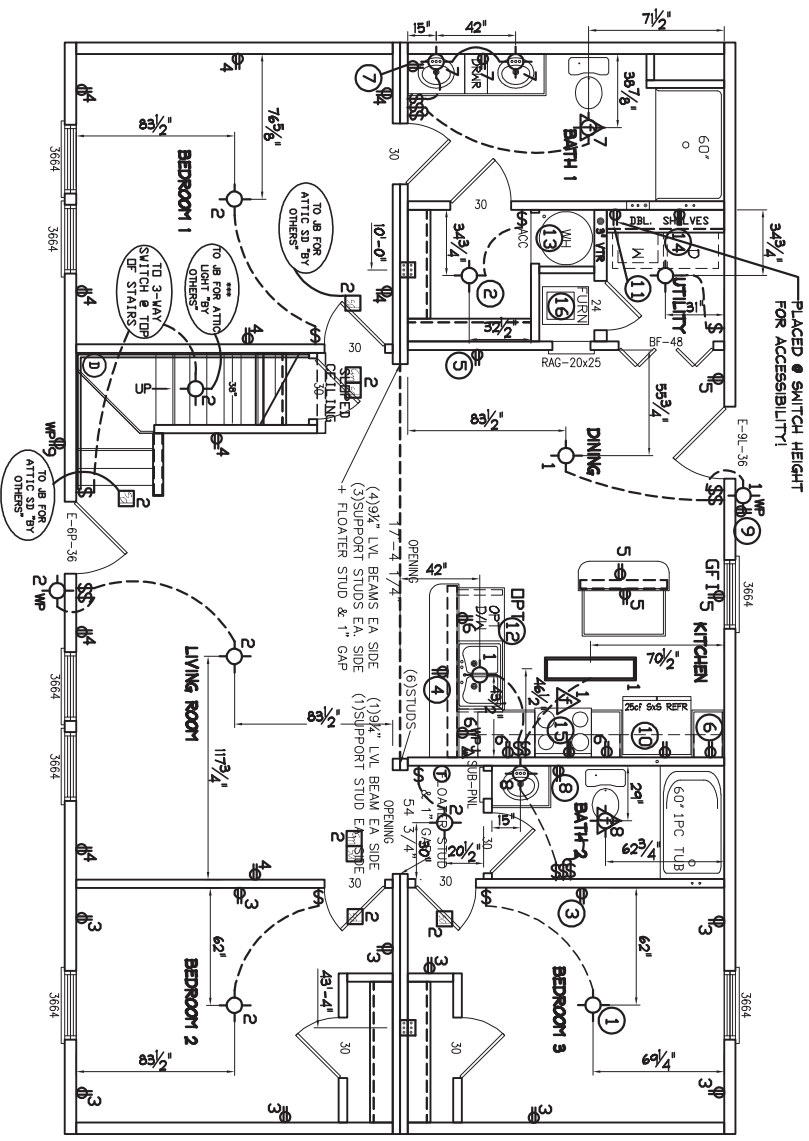
1) Cubic Feet per minute (CFM) based on 2 CFM per square inch of gross filter area.
2) fpm: feet per minute

RETURN AIR GRILLE NOTE:

ISOLATED RETURN AIR GRILLES ARE CONNECTED TO THE HVAC UNIT OR COMPARTMENT WITH R-8 FLEX DUCT OR OTHER APPROVED MATERIALS, ON-SITE BY OTHERS, AND IS SUBJECT TO LOCAL INSPECTION AND APPROVAL.

RETURN AIR GRILLE CHART:
DATA PROVIDED BY TRUaire AND EAST COAST METAL DISTRIBUTORS.

MANUFACTURER	FIXTURE SCHEDULE	MODEL NO.
BAWMINT	TUB/SHOWER COMBD 60" CORNER TUB	5101 / 5102 2E11
MAAX	60" SHOWER	3309
MAAX	22x33 DBL. BOWL SINK	2233
MAAX	TILET	130
MAAX	HANDICAPPED TILET	137
MAAX	CHINA LAV 19x16	N/A
FIAT	UTILITY SINK	1610



* - DENOTES GF1 PROTECTION,
 *** - DENOTES ARC-FAULT PROTECTION,

CIRCUIT	LOCATION	WIRE	BREAKER
*** 1	GEN. LIGHTING	14-2	1-15amp.
*** 2	GEN. LIGHTING	14-2	1-15amp.
*** 3	GEN. LIGHTING	12-2	1-20amp.
*** 4	GEN. LIGHTING	12-2	1-20amp.
*** 5	KITCHEN/DINING	12-2	1-20amp.
*** 6	KITCHEN	12-2	1-20amp.
*** 7	BATH 1	12-2	1-20amp.
*** 8	BATH 2	12-2	1-20amp.
*** 9	OUTSIDE	12-2	1-20amp.
*** 10	REFRIGERATOR	12-2	1-20amp.
*** 11	LAUNDRY	12-2	1-20amp.
*** 12	DW	12-2	1-20amp.
*** 13	WATER HEATER	10-2	2-25amp.
*** 14	DRYER	10-3	2-30amp.
*** 15	RANGE	8-3	2-40amp.
*** 16	FURNACE	6-6-8	2-60amp. 2-30amp.

NOTE: TRANSOM WINDOWS ARE UN-MULLED AND GRIDLESS.
 ALL APPLIANCES ARE SHOWN FOR REPRESENTATION ONLY. INSTALLATION AND/OR SHIPPING OF APPLIANCES DEPENDS ON SALES ORDER.

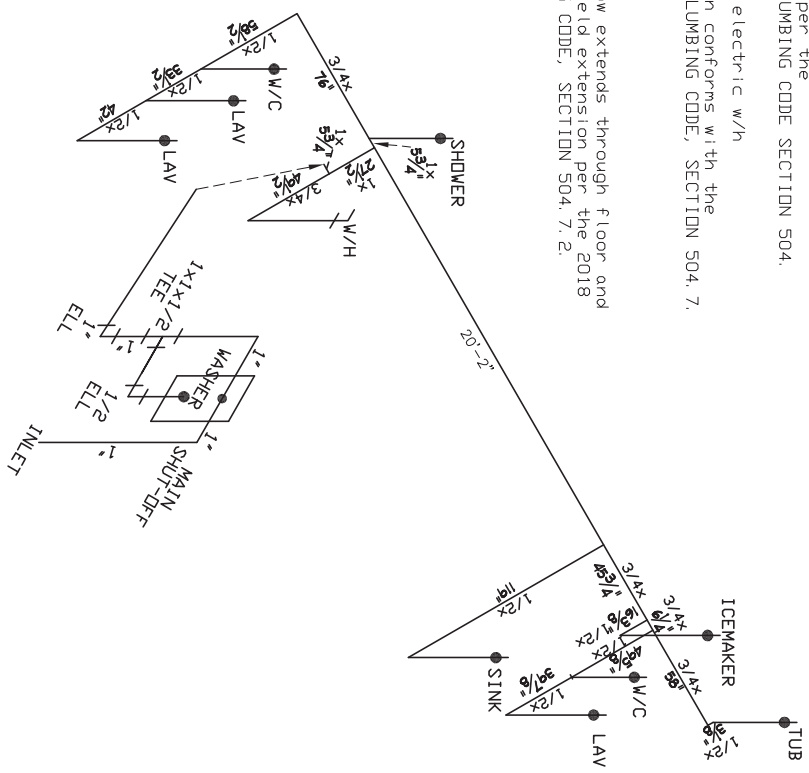
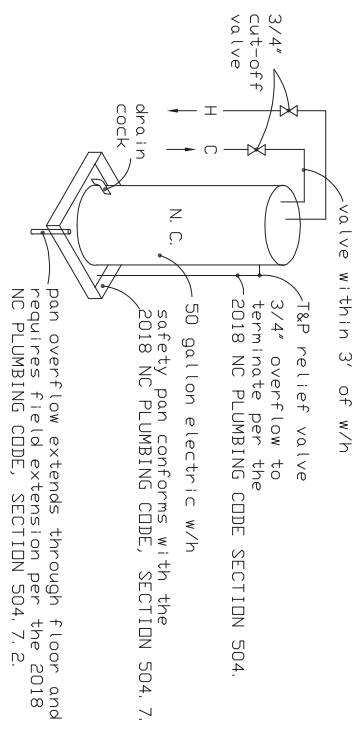
TOTAL AREA = 1416sf

ELECTRICAL FIXTURE SCHEDULE		
MANUF..	HARD-WIRED FIXTURE	PART NO.
BROAN	VENTLESS RANGE HOOD	41300
BRK ELEC.	SMOKE/CARBON DETECTOR	4120SB
BROAN	BATH EXHAUST FAN W/ LIGHT	769RL
KENMORE	DISHWASHER	22-15242

LEGEND	
	110 RECEPTACLE
	220 RECEPTACLE
	SWITCH
	LIGHT FIXTURE
	FAN
	RECESSED CAN LIGHT
	JUNCTION BDX
	BATH FAN W/LIGHT
	SERVICE DISCONNECT
	WIRE RED PHONE JACK
	THERMOSTAT WIRE LOCATION
	SMOKE DETECTOR
	CARBON MONOXIDE DETECTOR
	4' FLUORESCENT FIXTURE
	2' FLUORESCENT FIXTURE
	ELECTRICAL CROSS-OVER

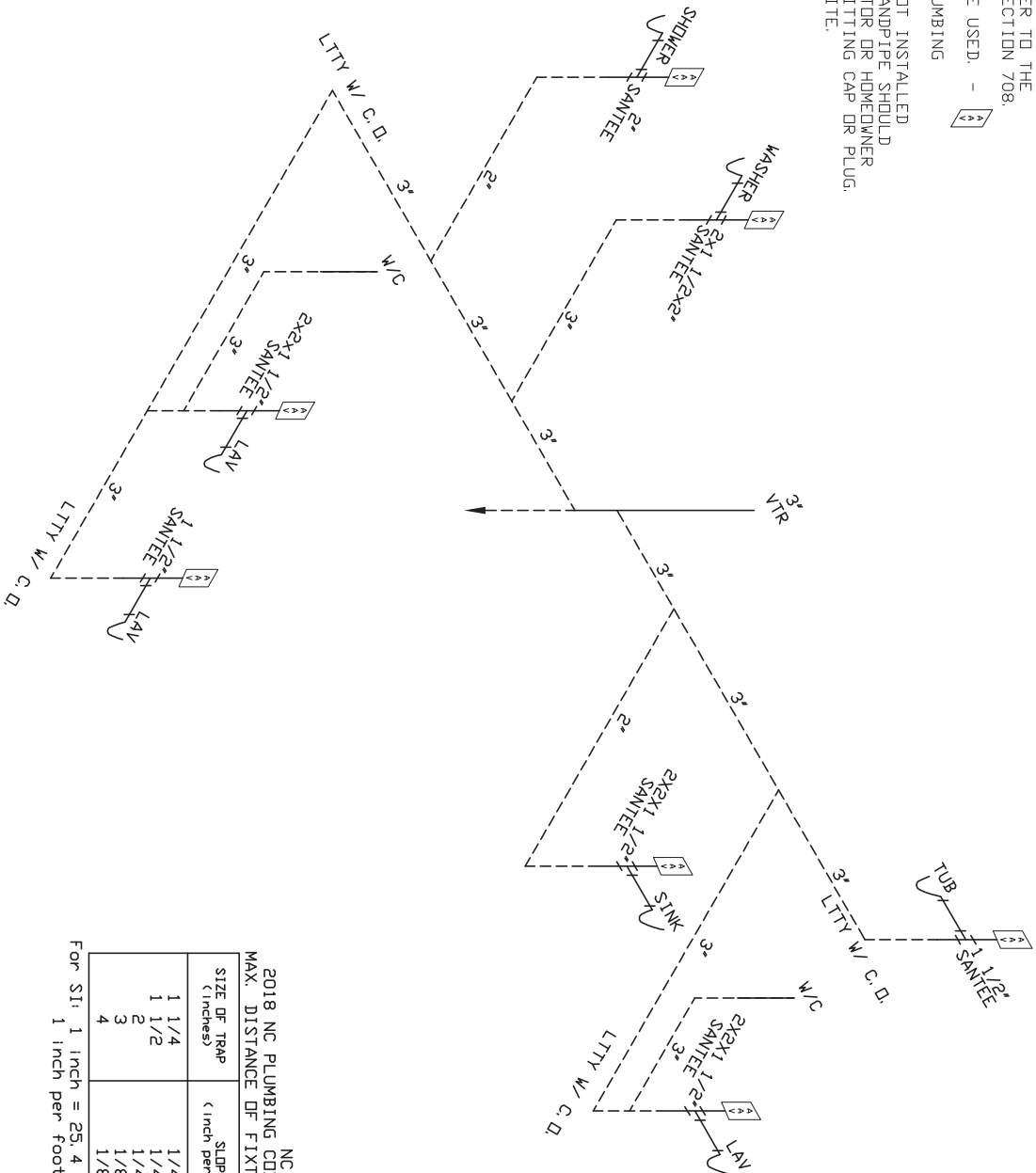
LOAD CALCULATIONS		LEG 'A' & 'B'	
GEN. LIGHTING <1416>x3 =	4248w	GEN. LTNG. & SMALL APPL. =	20.9A
SMALL APPLIANCES : 1500x2 =	3000w	RANGE =	33.7A
LAUNDRY : 1500x1 =	1500w	DRYER =	24.0A
TOTAL =	8748w	FURNACE =	71.3A
FIRST 3000w @ 100% =	3000w	DISHWASHER =	3.4A
REMAINDER @ .35% =	2012w	REFRIGERATOR =	6.5A
TOTAL =	5012w	MICROWAVE =	6.9A
5012w DIV. BY 240 =	20.9A	50.9A L. ELEC. W/H	= 18.8A
		TOTAL STANDARD LOAD	= 185.5A

- NOTES:
- 1) A 200A SINGLE PHASE PANEL BOX IS INSTALLED IN THIS UNIT.
 - 2) A MIN. 12" CLEARANCE IS REQUIRED FROM THE STORAGE AREA TO AN INCANDESCENT LIGHT FIXTURE IN ALL APPLICABLE CLOTHES CLOSETS. 6" CLEARANCE IS REQUIRED FOR FLUORESCENT LIGHT FIXTURES.
 - 3) SMOKE DETECTORS SHALL HAVE A BATTERY BACK-UP. SHALL BE ON THE SAME CIRCUIT, AND SHALL BE INTERCONNECTED FOR SIMULTANEOUS OPERATION USING 14-3 WIRE. A WIRED JUNCTION BOX IS INSTALLED IN THE ATTIC/BASEMENT, WHEN APPLICABLE, TO ALLOW THE CUSTOMER TO ADD A SMOKE DETECTOR, APPROVED FOR SUCH AREAS, AT THEIR DISCRETION.
 - 4) WIRE IS NM TYPE.
 - 5) A 200A PANEL BOX USES 3/4" WIRE WITH A #4 GROUND AND A 2" CONDUIT.
 - 6) ALL 120-VOLT, SINGLE PHASE, 15 AND 20-AMPERE BRANCH CIRCUITS SUPPLYING OUTLETS INSTALLED IN DWELLING UNIT FAMILY ROOMS, DINING ROOMS, LIVING ROOMS, PARLORS, LIBRARIES, DENs, BEDROOMS, SUNROOMS, RECREATION ROOMS, CLOSETS, HALLWAYS, OR SIMILAR ROOMS OR AREAS ARE TO BE PROTECTED BY A "COMBINATION TYPE" ARC-FAULT CIRCUIT INTERRUPTER IN ACCORDANCE WITH THE 2017 NC ELECTRICAL CODE.
 - 7) ***- DENOTES A J-BOX IN THE ATTIC AND/OR BASEMENT FOR SITE INSTALLED LIGHT AND SWITCH. PROVIDED BY OTHERS.
 - 8) FOR VENTED FIREPLACES WITH MOTORS, RUN WIRE FROM NEAREST RECEPTACLE AND PLACE A RECEPTACLE IN THE FIREPLACE AREA FOR A MOTOR.
 - 9) ALL OUTLETS ON 15 AND 20-AMPERE BRANCH CIRCUITS ARE LISTED TAMPER RESISTANT IN ACCORDANCE WITH THE 2017 NC ELECTRICAL CODE.
 - 10) EXTERIOR OUTLETS ARE LISTED WEATHER-RESISTANT PER THE 2017 NC ELECTRICAL CODE.
 - 11) A CARBON MONOXIDE DETECTOR IS REQUIRED TO BE LOCATED OUTSIDE EACH SLEEPING AREA IN ACCORDANCE WITH THE 2018 NC RESIDENTIAL CODE
 - 12) A PROGRAMMABLE THERMOSTAT IS REQUIRED PER THE NC 2018 ENERGY CONSERVATION CODE AND WILL BE PROVIDED ON-SITE BY OTHERS. A THERMOSTAT WIRE WILL BE PULLED TO THE WALL LOCATION FOR SITE USE.
 - 13) ALL KITCHEN COUNTERTOP RECEPTACLES ARE GFI PROTECTED AS WELL AS ANY WALL RECEPTACLES WHICH ARE LOCATED WITHIN 6' OF THE EDGE OF THE KITCHEN SINK.
 - 14) ALL DISHWASHERS, WHEN INSTALLED, ARE DIRECT WIRED.



- NOTES:
- 1) SUPPLY LINES ARE PEX.
 - 2) ● - DENOTES A CUT-OFF VALVE.
 - 3) △ - DENOTES A 1" SHUT-OFF VALVE.
 - 4) SEE PG. 13.2 OF THE INSTALLATION INSTRUCTIONS MANUAL FOR CROSS-OVER CONNECTION INFORMATION.
 - 5) FOR HOT SUPPLY LINES OMIT W/C'S.
 - 6) INLET, EXTERIOR FAUCETS AND ICEMAKER 3/4" SUPPLY PIPE IS USED, ILLD THE 1" SHOWN, FOR THE HOT LINES.
 - 7) SEE SHEET 5.1 FOR THE PLUMBING FIXTURE SCHEDULE.

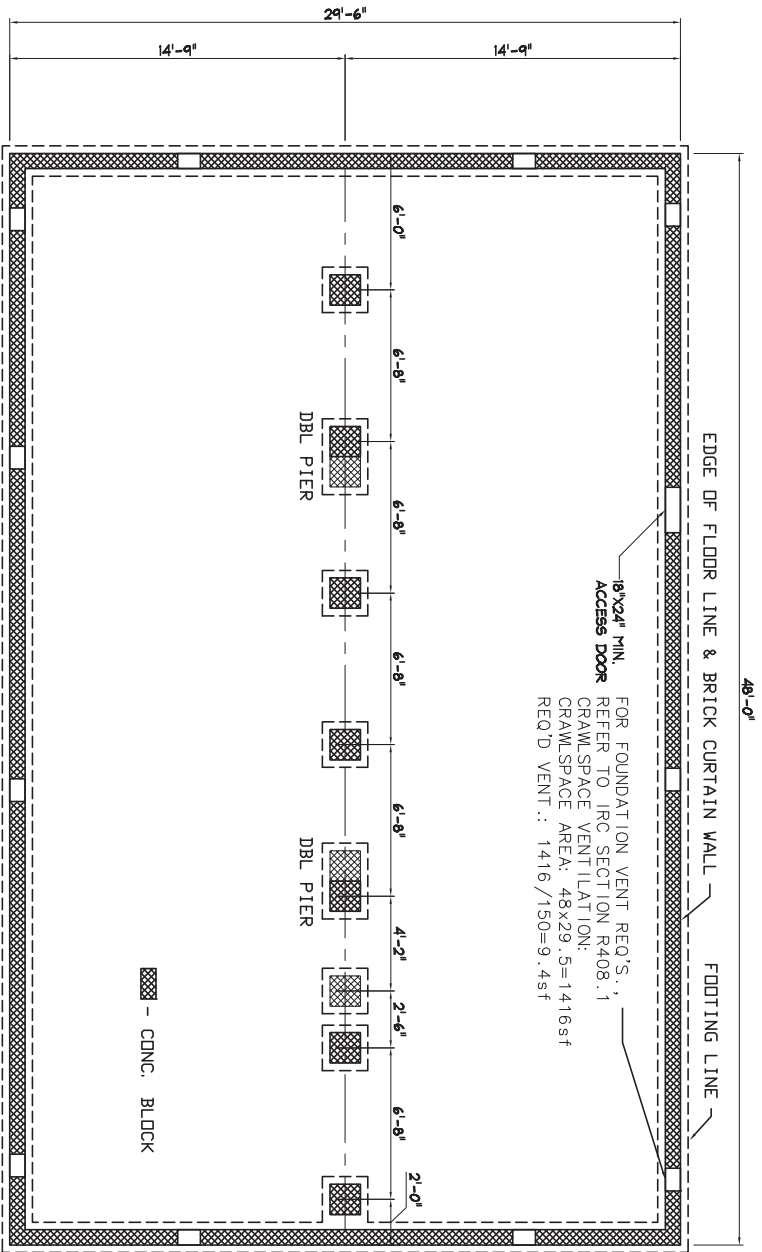
- NOTES:
- 1) FOR STACK CLEANOUTS, REFER TO THE 2018 NC PLUMBING CODE, SECTION 708.
 - 2) P-TRAPS ARE REMOVABLE.
 - 3) AIR ADMITTANCE VALVES ARE USED.
 - 4) PIPE IS PVC.
 - 5) SEE SHEET 5.1 FOR THE PLUMBING FIXTURE SCHEDULE.
 - 6) IF A CLOTHES WASHER IS NOT INSTALLED BEFORE OCCUPANCY, THE STANDPIPE SHOULD BE SEALED BY THE CONTRACTOR OR HOMEOWNER WITH A REMOVABLE TIGHT FITTING CAP OR PLUG.
 - 7) 3" VTR IS INSTALLED ON-SITE.



2018 NC PLUMBING CODE, TABLE # 909.1
 MAX. DISTANCE OF FIXTURE TRAP FROM VENT

SIZE OF TRAP (Inches)	SLOPE (Inch per foot)	DISTANCE FROM TRAP (Feet)
1 1/4	1/4	5
1 1/2	1/4	6
2	1/4	8
3	1/8	12
4	1/8	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8m,
 1 inch per foot = 83.3 mm/m.



NOTE!
 These dimensions reflect the exact design dimensions of the house. No dimensional allowance has been added for set-gap. Space may be added for gaps between modules at the dealer's discretion.

NOTE:
 THIS IS A CRAWLSPACE FOUNDATION WITH A MAXIMUM DESIGN HEIGHT OF 4 FEET. DESIGNS FOR BASEMENTS, PILINGS, AND ALL OTHER FOUNDATION TYPES SHALL BE PROVIDED BY A PROFESSIONAL ENGINEER FAMILIAR WITH LOCAL SOIL CONDITIONS AND ARE SUBJECT TO LOCAL INSPECTION AND APPROVAL.

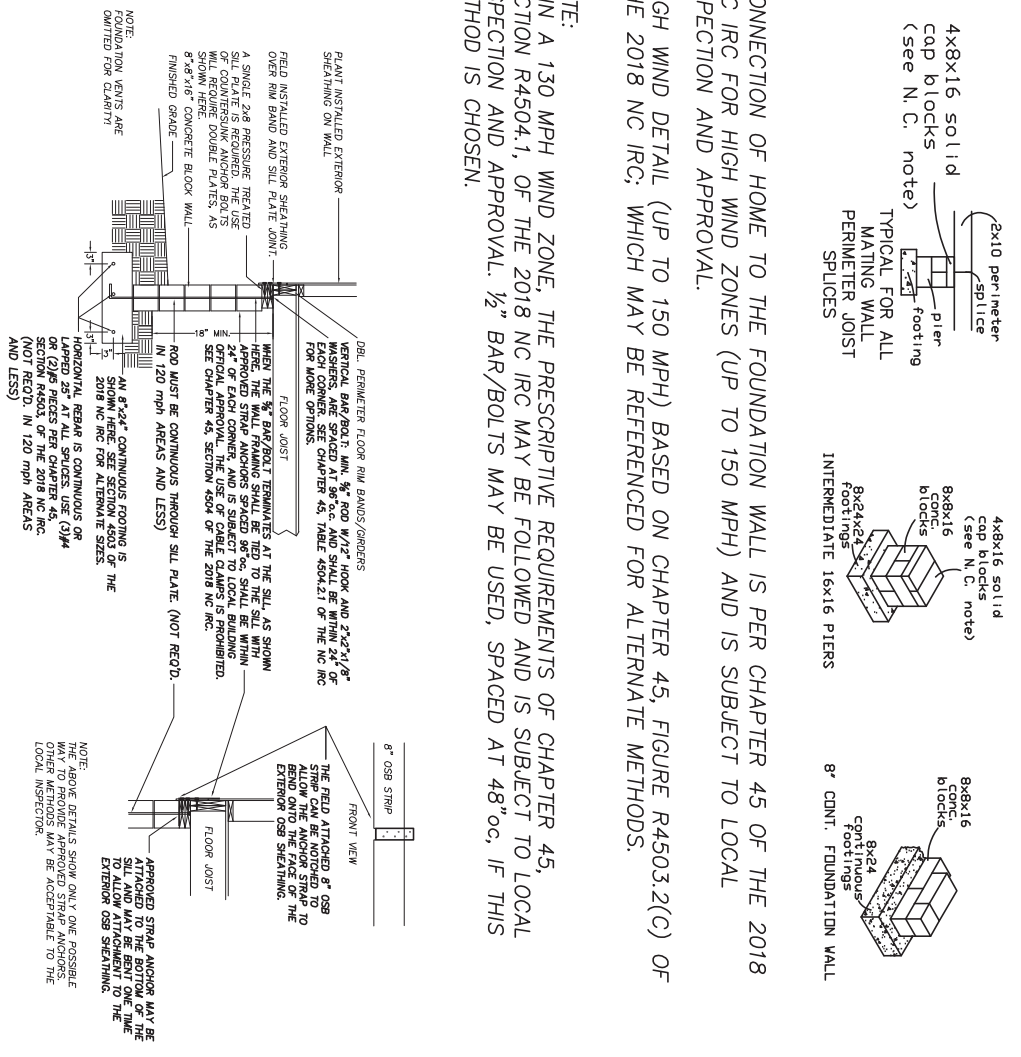
NC REQUIREMENTS FOR SOLID CAP BLOCKS FOR ALL 1 1/2 AND 1 STORY CAGES. A 4" SOLID CAP BLOCK MUST BE USED TO CAP ALL PIERS FOR SALT-BROD MODELS AND 2 STORY (OR GREATER) HOMES. AN 8" SOLID CAP BLOCK MUST BE USED TO CAP ALL PIERS. FOR USE OF SURFACE BONDING CEMENT: MASONRY UNITS FOR STAND ALONE PIERS SHALL BE LAID IN TYPE M OR S MORTAR, OR SHALL BE COVERED WITH SURFACE BONDING CEMENT COMPLYING WITH ASTM C 887. SURFACE BONDING CEMENT SHALL BE APPLIED IN STRICT COMPLIANCE WITH THE CEMENT MANUFACTURER'S INSTRUCTIONS. BOTTOM COURSE SHALL BE LAID IN TYPE M OR S MORTAR OR SURFACE BONDING MORTAR (CEMENT). SURFACE BONDING CEMENT IS NOT PERMITTED FOR PIERS IN PIER AND CURTAIN WALL CONSTRUCTION.

- NOTES:
- 1.) CONCRETE SHALL HAVE A MIN. COMPRESSION STRENGTH OF 2500 PSI.
 - 2.) BOTTOM OF FOOTINGS TO BE A MIN. OF 12" BELOW THE FINISHED NATURAL GRADE OR ENGINEERED FILL AND IN NO CASE LESS THAN THE FROST LINE DEPTH.
 - 3.) FINISH GRADE TO HAVE A MIN. SLOPE OF 6' IN 10'-0".
 - 4.) CRAWL SPACE TO BE CLEAN AND FREE OF DEBRIS. A 6 MIL. POLY VAPDR BARRIER IS REQUIRED FOR VA, FHA, AND IN N.C.
 - 5.) THERE SHALL BE A POSITIVE DRAIN FROM THE CRAWLSPACE.
 - 6.) THE WATER HEATER PAN DRAIN AND THE DRYER VENT SHALL BE EXTENDED THROUGH TO THE EXTERIOR OF THE FOUNDATION.
 - 7.) THERE SHALL BE AN ACCESS (24" W. X 18" H. MIN.) INSTALLED BY OTHERS AT THEIR DESIRED LOCATION.
 - 8.) FOUNDATION WALLS SHALL EXTEND AT LEAST 8" ABOVE GRADE.
 - 9.) MORTAR SHALL BE TYPE 'M' OR 'S'.
 - 10.) FOUNDATION TO BE FURNISHED BY BUILDER AND SHALL COMPLY WITH APPLICABLE LOCAL BUILDING CODES.
 - 11.) THE MIN. ASSUMED SOIL BEARING PRESSURE IS 2000 PSF.
 - 12.) 2x TREATED BLOCKS ARE PLACED UNDER THE UNIT AT THE REQUIRED PIER LOCATIONS AND ALL SHIMS MUST BE TREATED WEDGES SIZED AS NEEDED.
 - 13.) FOR OPENINGS IN MATTING WALL 48" OR GREATER, AN EXTRA PIER IS REQUIRED TO BE CENTERED DIRECTLY UNDER THE SUPPORT COLUMNS ON EACH SIDE OF THE OPENING.
 - 14.) THE FOUNDATION MUST MEET ALL HIGH SEISMIC DESIGN REQUIREMENTS OUT OF THE APPLICABLE BUILDING CODE(S).
 - 15.) FOUNDATION VENTS TO BE LOCATED WITHIN 3'-0" OF CORNERS AND BE EQUAL TO 1 SQ. FT. PER 150 SQ. FT. WITH OPENINGS THAT ARE LOCATED SO AS TO PROVIDE CROSS-VENTILATION.
 - 16.) SEE THE ADJACENT DETAIL AND SHEAR WALL NOTE FOR ZONES GREATER THAN 100 MPH (<3 SEC. WIND GUST).

CONNECTION OF HOME TO THE FOUNDATION WALL IS PER CHAPTER 45 OF THE 2018 NC IRC FOR HIGH WIND ZONES (UP TO 150 MPH) AND IS SUBJECT TO LOCAL INSPECTION AND APPROVAL.

HIGH WIND DETAIL (UP TO 150 MPH) BASED ON CHAPTER 45, FIGURE R4503.2(C) OF THE 2018 NC IRC; WHICH MAY BE REFERENCED FOR ALTERNATE METHODS.

NOTE: IF IN A 130 MPH WIND ZONE, THE PRESCRIPTIVE REQUIREMENTS OF CHAPTER 45, SECTION R4504.1, OF THE 2018 NC IRC MAY BE FOLLOWED AND IS SUBJECT TO LOCAL INSPECTION AND APPROVAL. 1/2" BAR/BOLTS MAY BE USED, SPACED AT 48"OC, IF THIS METHOD IS CHOSEN.



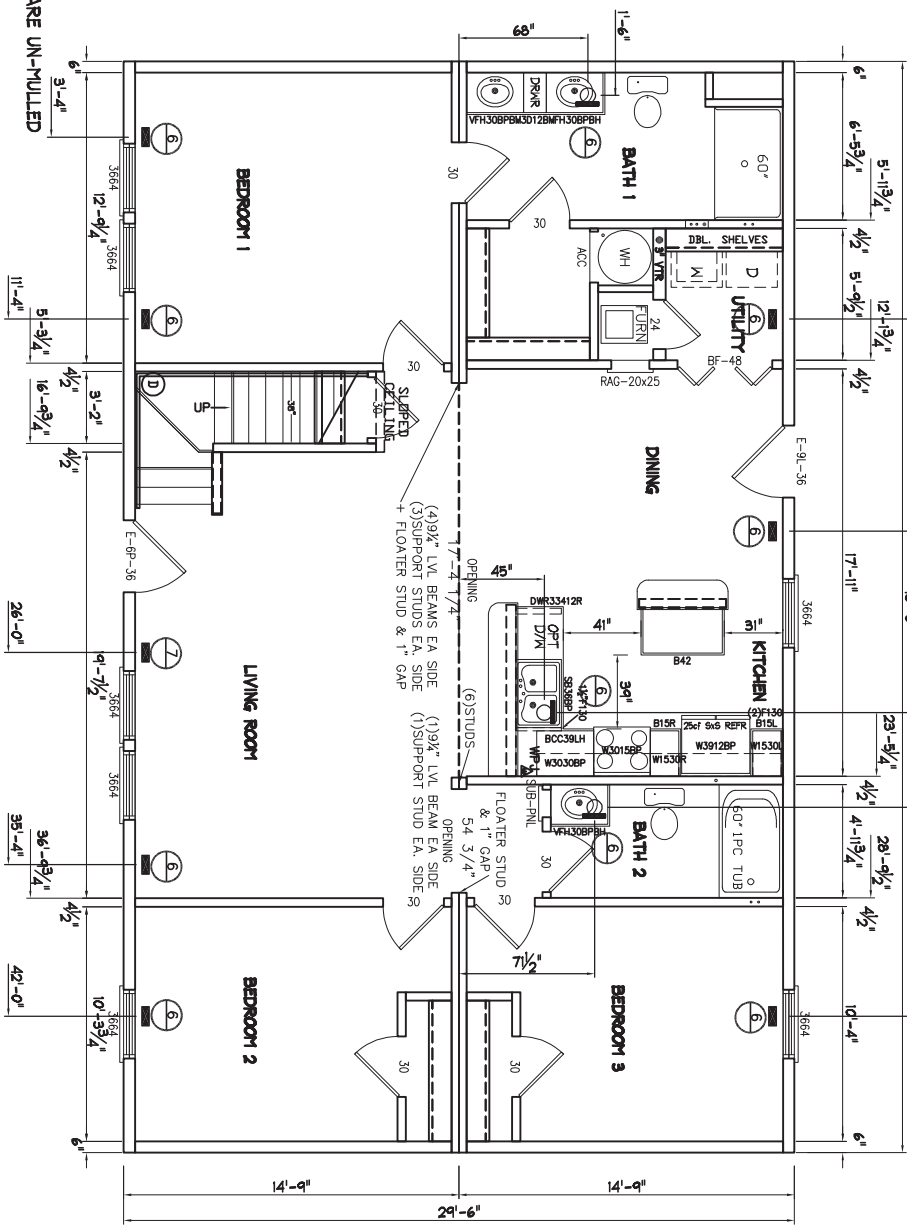
THE FOUNDATION IS BUILT PRESCRIPTIVE TO CODE, PROVIDED ON-SITE BY OTHERS, AND IS SUBJECT TO LOCAL INSPECTION AND APPROVAL.

FOR PERIMETER DUCT

- NOTES:
- 1) RACS, REGISTERS, BOOTS AND INSULATED R-8 FLEX DUCT TO MARRIAGE WALL PROVIDED.
 - 2) RUN FLEX DUCT TO DROP-OUT LOCATION 28" FROM MARRIAGE WALL ON UNIT WITHOUT THE FURNACE. RUN FLEX DUCT TOWARD TRUNK AND DROP OUT OF FLOOR 36" FROM TRUNK CENTRELINE ON UNIT WITH FURNACE.
 - 3) FOR ALL REGISTERS WITHIN 28" OF MARRIAGE WALL, RUN FLEX DUCT TOWARD DUCT TRUNK AND DROP OUT OF FLOOR 36" FROM TRUNK CENTRELINE.

NOTES CONTINUED:

- 4) 4x10 FLAT PERIMETER FLOOR REGISTERS START 7" IN FROM EDGE OF FLOOR. (9" IN FOR 2x6 SIDEWALLS)
- 5) WALL MOUNT REGISTERS START 4.5" IN FROM EDGE OF FLOOR. (6.5" IN FOR 2x6 SIDEWALLS)
- 6) SITE-INSTALLED FLEX DUCT FROM RETURN AIR GRILLES WILL RUN TO THE HVAC COMPARTMENT. SEE HVAC CALCS FOR DUCT SIZE.

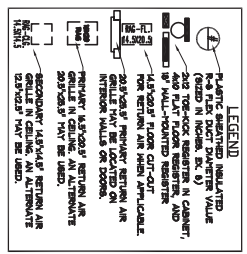


NOTE: TRANSOM WINDOWS ARE UN-MULLED AND GRIDLESS.

ALL APPLIANCES ARE SHOWN FOR REPRESENTATION ONLY. INSTALLATION AND/OR SHIPPING OF APPLIANCES DEPENDS ON SALES ORDER.

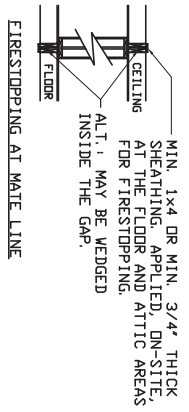
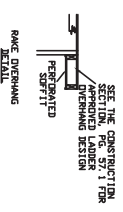
TOTAL AREA = 1416sf

THE HVAC LAYOUT SHOWN *** NOTICE *** MANUFACTURER HAS INSTALLED A TYPICAL NUMBER OF SUPPLY REGISTERS WITH FLEX DUCT RUN-OUTS AND RETURN AIR LOCATIONS. NO OTHER HVAC COMPONENTS HAVE BEEN SHOWN. THE NUMBER OF SUPPLY REGISTERS, HEATING AND COOLING EQUIPMENT SHALL BE DETERMINED BY THE LOAD AND DUCT CALCULATIONS FOR EACH AND EVERY ROOM. THE NUMBER OF SUPPLY REGISTERS, HEATING AND COOLING EQUIPMENT SHALL BE DETERMINED BY THE LOAD AND DUCT CALCULATIONS FOR EACH AND EVERY ROOM. THE NUMBER OF SUPPLY REGISTERS, HEATING AND COOLING EQUIPMENT SHALL BE DETERMINED BY THE LOAD AND DUCT CALCULATIONS FOR EACH AND EVERY ROOM. THE NUMBER OF SUPPLY REGISTERS, HEATING AND COOLING EQUIPMENT SHALL BE DETERMINED BY THE LOAD AND DUCT CALCULATIONS FOR EACH AND EVERY ROOM.



*** NOTICE FOR NORTH CAROLINA *** IT IS REQUIRED THAT A MECHANICAL CONTRACTOR BE RESPONSIBLE FOR THE COMPLETED HVAC SYSTEM.

NOTE:
FOR OPT. COASTAL HIGH HAZARD AREAS, ALL FASTENERS USED ON-SITE ARE TO BE CORROSION RESISTANT AND PROVIDED BY OTHERS.

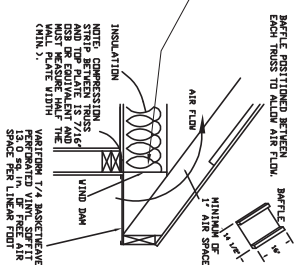


FIRESTOPPING AT MALE LINE

NOTE:
STACKED BLOCKING IS NOT REQUIRED WHEN THE TRUSS BOTTOM CHORD EXTENDS TO MEET THE FASCIA BOARD AND (1) SIMPSON SDWC15600 TOE-SCREW IS ADDED TO SECURE THE BOTTOM CHORD TO EXTERIOR WALL TOP PLATE. SEE ON-16 PG 2-3 OF 4 FOR APPROVED ALTERNATE METHOD.

NOTE: FOR ATTIC INSTALLATION SEE ATTACHED INSTALLATION INSTRUCTIONS MANUAL.

NOTE: APPROVED RIDGE VENTS VENTILATION IN CONNECTION WITH THIS INSTALLATION SEE ATTACHED INSTALLATION INSTRUCTIONS PAGE IN-24.



NOTES:
1) THE CEILING HEIGHT IS 8' FOR THIS PACKAGE.
2) THE STANDARD CONNECTION OF EXTERIOR SHEATHING TO THE WALL STUDS IS BY THE USE OF 7/16" x 1 1/2" x 15 GAUGE STAPLES SPACED AT 3" c.c. ON ALL PANEL EDGES & 6" c.c. IN THE FIELD AREA OF ALL PANELS.
3) THE ADDITION OF CONSTRUCTION ADHESIVE MAY BE USED AT OUR DISCRETION.

NOTE: SEE ATTACHED INSTALLATION INSTRUCTIONS FOR CONNECTIONS BETWEEN SECTIONS.
(1) PLUMBING - PGS IN-13, 1, 2, 13, 8
(2) ELECTRICAL - PGS IN-13, 1, 2, 13, 8
(3) ELECTRICAL - PGS IN-13, 1, 2, 13, 8

NOTE: REFER TO ATTACHED INSTALLATION INSTRUCTIONS FOR CONNECTIONS BETWEEN SECTIONS.
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(3) ELECTRICAL - PGS IN-13, 1, 2, 13, 8

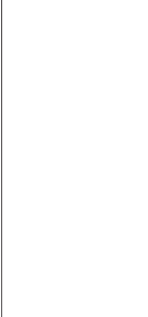
NOTE: REFER TO ATTACHED INSTALLATION INSTRUCTIONS FOR CONNECTIONS BETWEEN SECTIONS.
(1) PLUMBING - PGS IN-13, 1, 2, 13, 8
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(3) ELECTRICAL - PGS IN-13, 1, 2, 13, 8

NOTE: MASONRY PIERS SHALL BE LAYED IN TYPE M OR S MORTAR. THE MIN. ASSUMED SOIL BEARING PRESSURE IS 2000 PSF. THE MIN. REVD. CONCRETE COMPRESSIVE STRENGTH IS 2000 PSF.



MAX 14'-9" WIDE

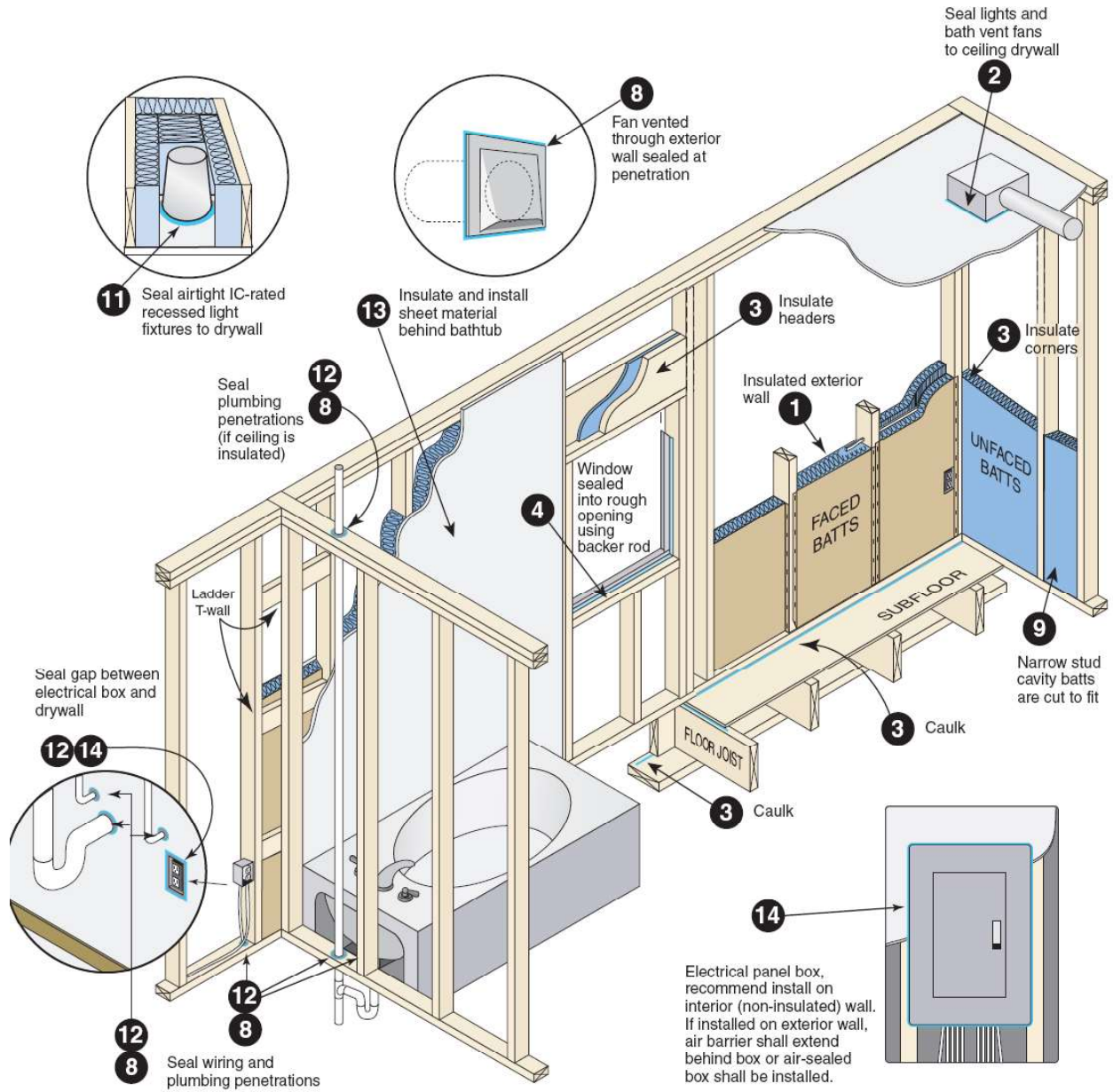
TYPICAL MODULAR OFF-FRAME 9/12 PITCH CROSS-SECTION

AIR SEALING KEY POINTS

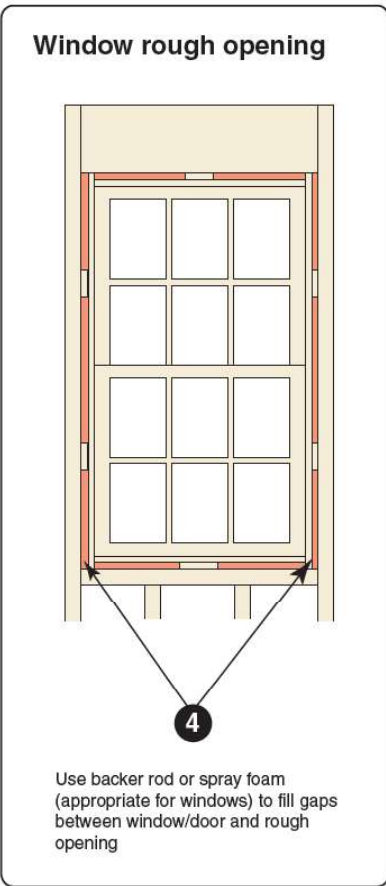
Air Barrier and Insulation Inspection Component Guide

NUMBER	COMPONENT	CRITERIA
1	Air barrier and thermal barrier	Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired. Air-permeable insulation is not used as a sealing material. Air-permeable insulation is inside of an air barrier.
2	Ceiling/attic	Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed. Attic access (except unvented attic), knee wall door, or drop down stair is sealed.
3	Walls	Corners and headers are insulated. Junction of foundation and sill plate is sealed.
4	Windows and doors	Space between window/door jambs and framing is sealed.
5	Rim joists	Rim joists are insulated and include an air barrier.
6	Floors (including above-garage and cantilevered floors)	Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.
7	Crawl space walls	Insulation is permanently attached to walls. Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.
8	Shafts, penetrations	Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed.
9	Narrow cavities	Batts in narrow cavities are cut to fit, or narrow cavities are filled by sprayed/blown insulation.
10	Garage separation	Air sealing is provided between the garage and conditioned spaces.
11	Recessed lighting	Recessed light fixtures are air tight, IC rated, and sealed to drywall. Exception—fixtures in conditioned space.
12	Plumbing and wiring	Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.
13	Shower/tub on exterior wall	Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.
14	Electrical/phone box on exterior walls	Air barrier extends behind boxes or air sealed-type boxes are installed.
15	Common wall	Air barrier is installed in common wall between dwelling units.
16	HVAC register boots	HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.
17	Fireplace	Fireplace walls include an air barrier.

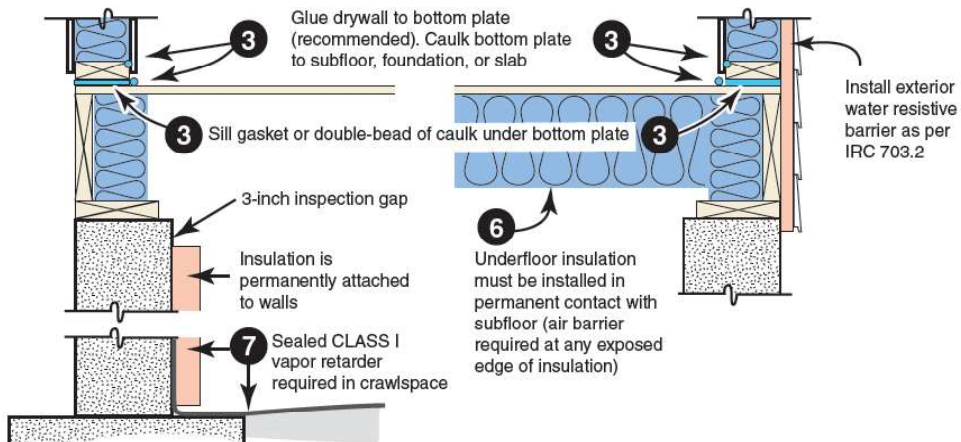
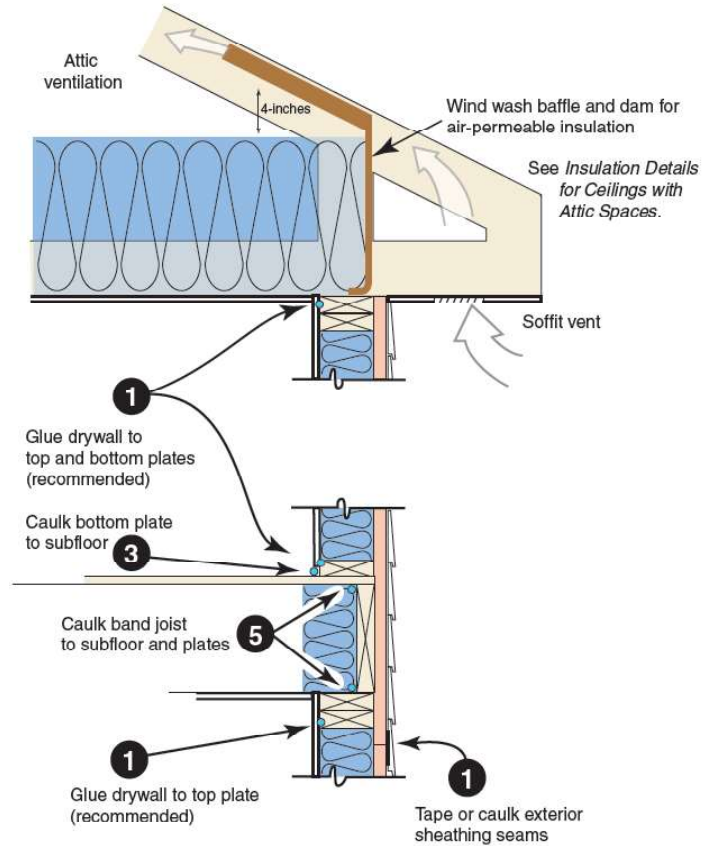
Air sealing key points



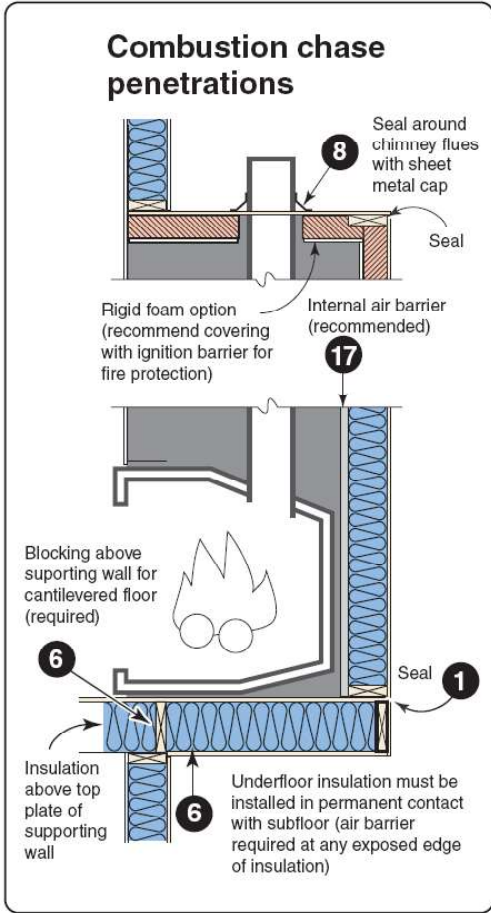
Air sealing key points *continued*



Wall cross-section

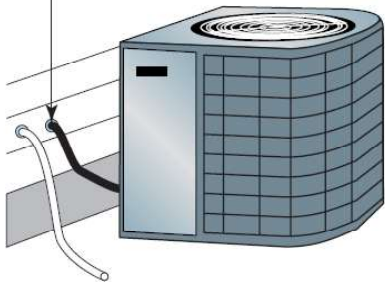


Air sealing key points *continued*



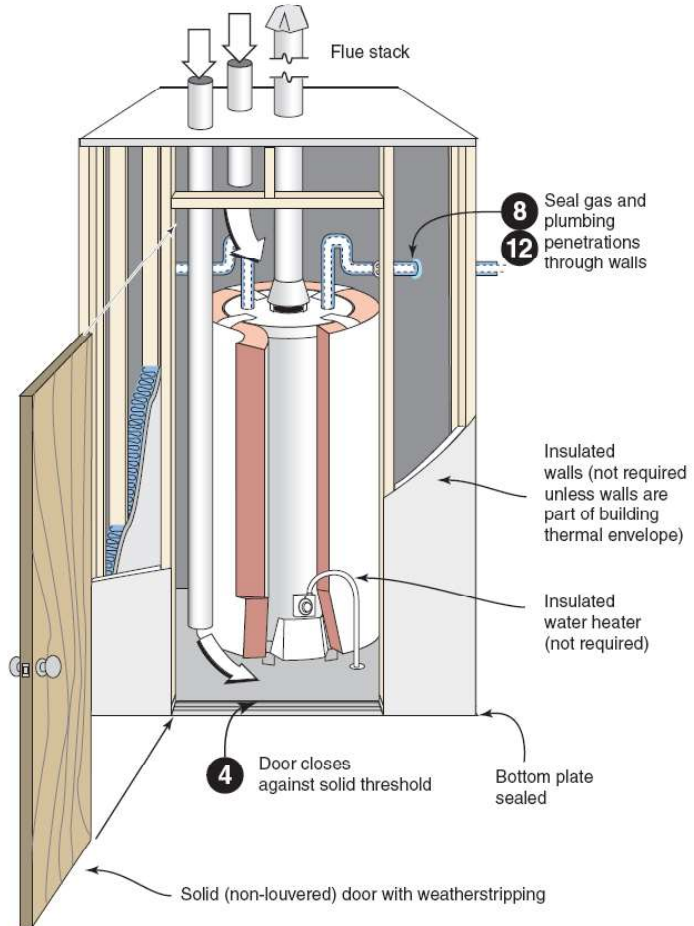
Exterior penetrations

8 12 Caulk exterior wall penetrations for refrigeration lines, condensate line, etc.

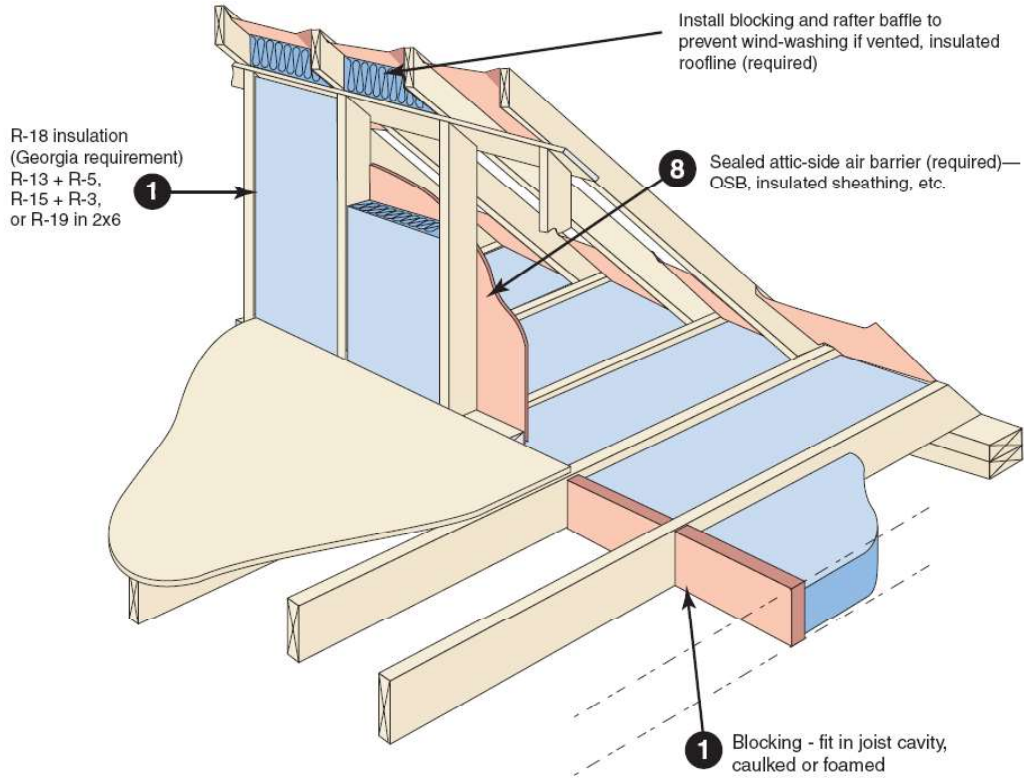


Combustion closet

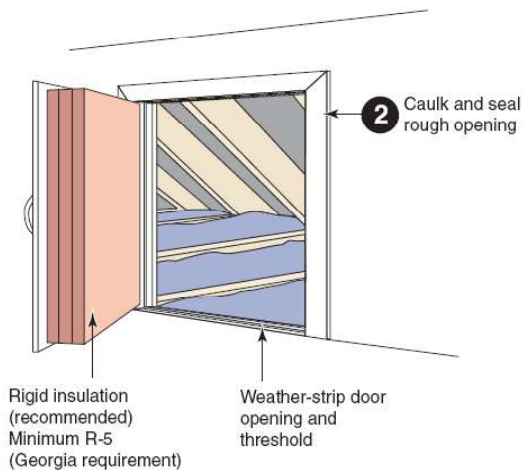
Combustion air inlets
as per mechanical and/or fuel gas code



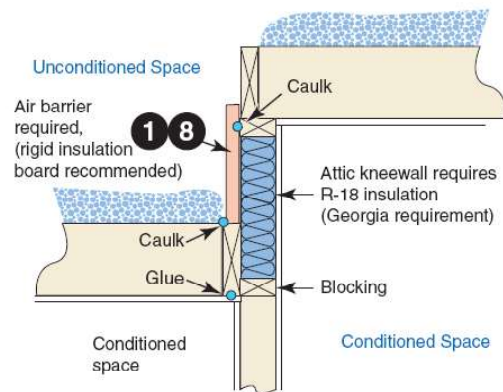
Air sealing key points *continued*



Attic knee-walls

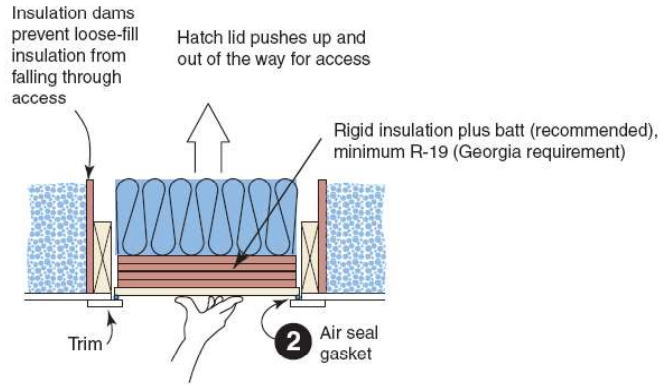


Two-level attic

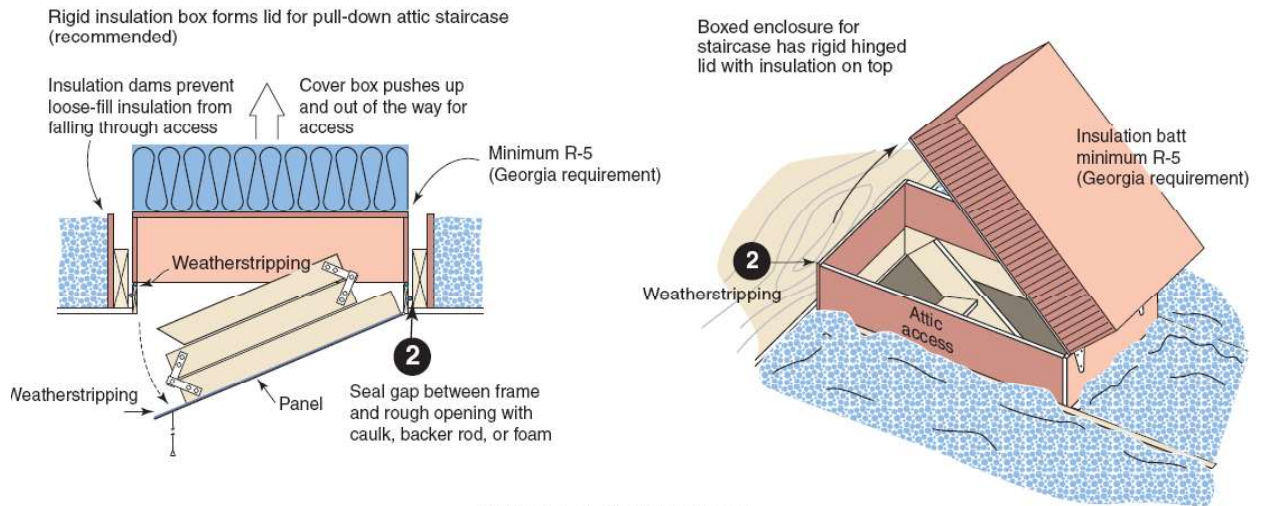


Air sealing key points *continued*

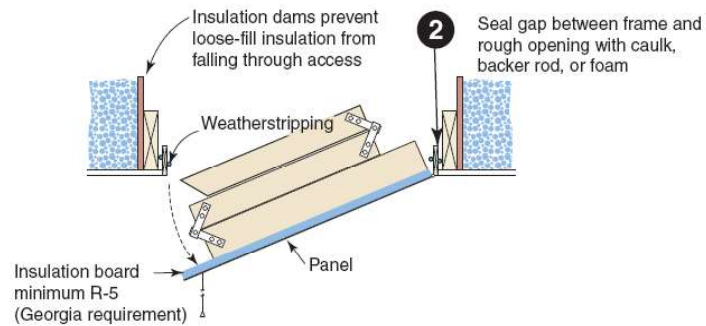
Attic scuttle



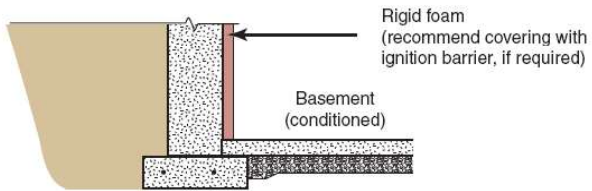
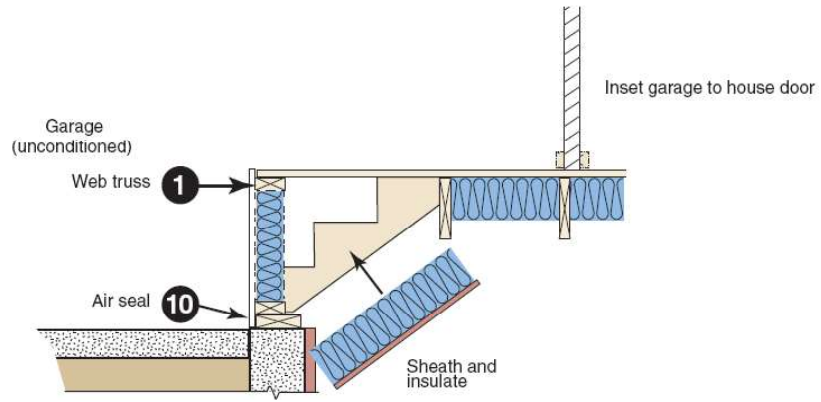
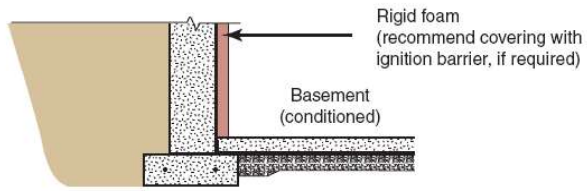
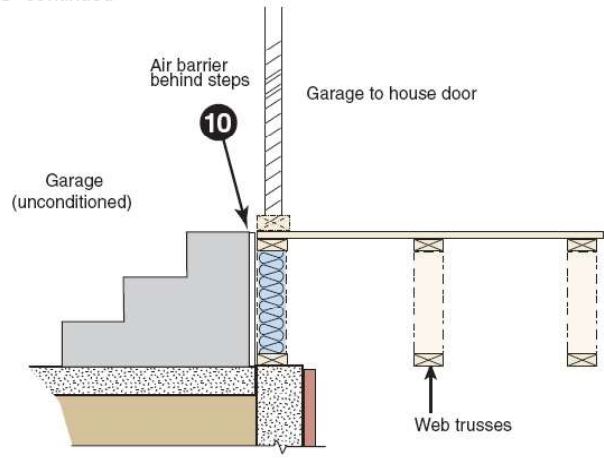
Attic pull-down stairs



Attic pull-down stairs



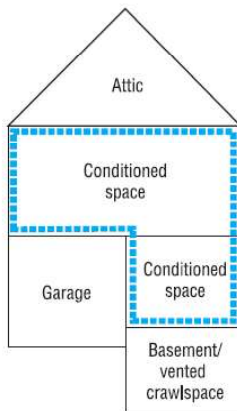
Air sealing key points *continued*



Building Thermal Envelope — The basement walls, exterior walls, floor, roof, and any other building element that enclose conditioned space. This boundary also includes the boundary between conditioned space and any exempt or unconditioned space.

The *building thermal envelope* is the barrier that separates the conditioned space from the outside or unconditioned spaces. The building envelope consists of two parts - an air barrier and a thermal barrier that must be both continuous and contiguous (touching each other). In a typical residence, the building envelope consists of the roof, walls, windows, doors, and foundation. Examples of unconditioned spaces include attics, vented crawlspaces, garages, and basements with ceiling insulation and no HVAC supply registers.

Example 1

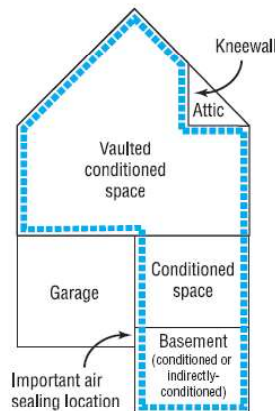


This is a conventional approach that likely locates all ductwork in unconditioned spaces.

Example R-values¹

- Flat ceiling: R-30
- Exterior walls: R-13 + R-3 sheathing
- Floor over garage and basement/crawl: R-19
- Ductwork sealed with mastic and insulated to R-8 in attic, R-6 in basement/crawlspace
- Garage⁵, attic and basement/crawl are unconditioned spaces

Example 2

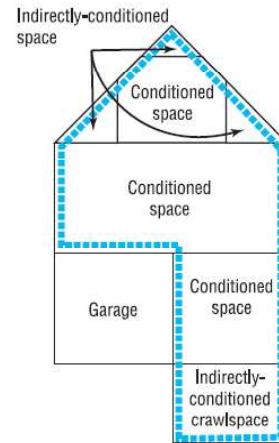


If supply registers deliver conditioned air to basement, it is considered conditioned. With no supply air, it is considered an indirectly-conditioned space.

Example R-values¹

- Flat ceiling: R-38
- Kneewalls²: R-18 (required) (R-13+ R-5, R-15 + R-3, R-19 in 2x6)
- Vaulted ceiling³: R-19 air-permeable insulation plus R-5 rigid foam board
- Exterior walls: R-13
- Basement masonry walls: R-5
- Ductwork sealed with mastic and insulated to R-8 in attic, R-6 in basement
- Garage⁵ and attic are unconditioned spaces

Example 3



The top conditioned floor functions as a vaulted ceiling with interior walls although it appears to have kneewalls and a flat ceiling. An advantage of this approach is that all upstairs ductwork is located inside the building envelope.

The crawlspace walls are insulated and do not contain vents. The crawlspace ground is covered with concrete or 100% plastic and functions as a "mini-basement."

Example R-values¹

- Vaulted ceiling³: R-19 air-impermeable foam insulation
- Exterior walls: R-13 + R-3 sheathing
- Crawlspace walls: R-5
- Ductwork sealed with mastic and insulated to R-6
- Garage⁵ is unconditioned space

¹ R-values shown are examples and not code requirements.

² An *attic kneewall* is any vertical wall that separates conditioned space from an unconditioned attic.

³ Requires trade-off (such as REScheck) since prescriptive ceiling requirement is R-30 / R-38, see roofline installed insulation options and section 806.4 of the 2012 NCRC.

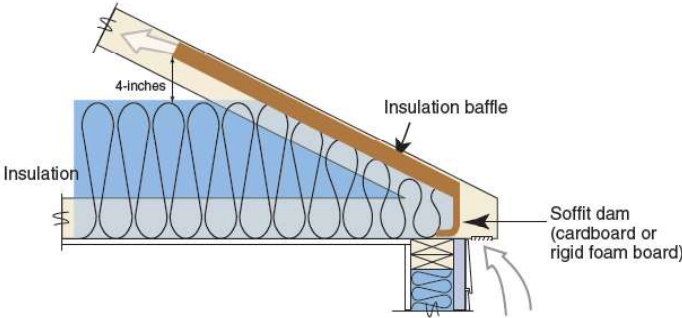
⁴ n/a

⁵ Although there is nothing to prevent the garage walls from being insulated, due to indoor air quality concerns, the garage should never be considered inside the building envelope.

Insulation Details for Ceilings with Attic spaces

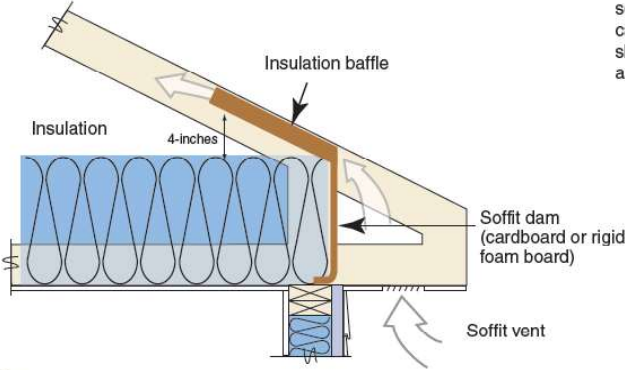
Rafter and Truss

Standard Truss with tapered insulation depth

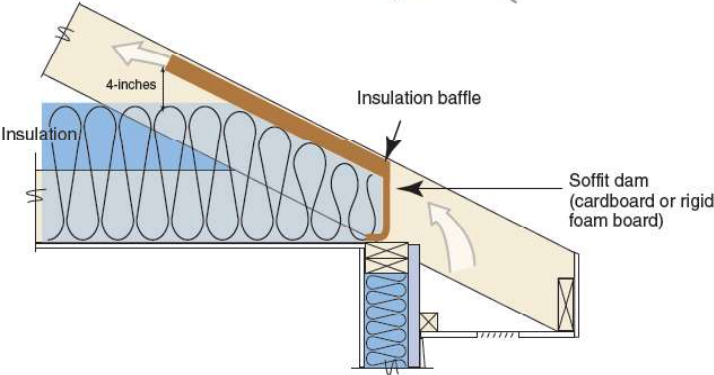


Note: Wind wash baffle and air-permeable insulation dam. For air permeable insulation in vented attics, baffles shall be installed adjacent to soffit and eave vents. A minimum of a 1-inch of space shall be provided between the insulation and the roof sheathing and at the location of the vent. The baffle shall extend over the top of the insulation inward until it is at least 4 inches vertically above the top of the insulation. Any solid material such as cardboard or thin insulating sheathing shall be permissible as the baffle.

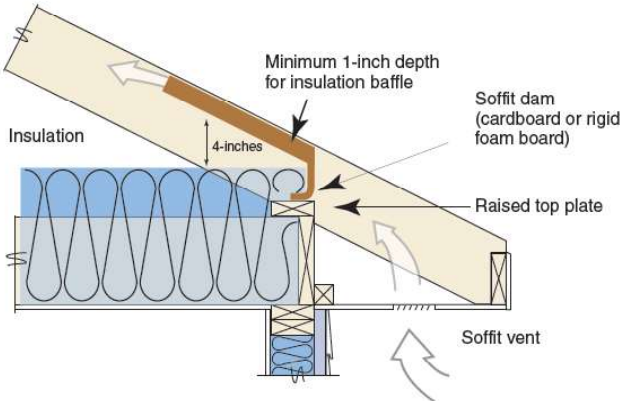
Energy Truss with full height insulation (recommended)



Standard rafter and top plate with tapered insulation depth



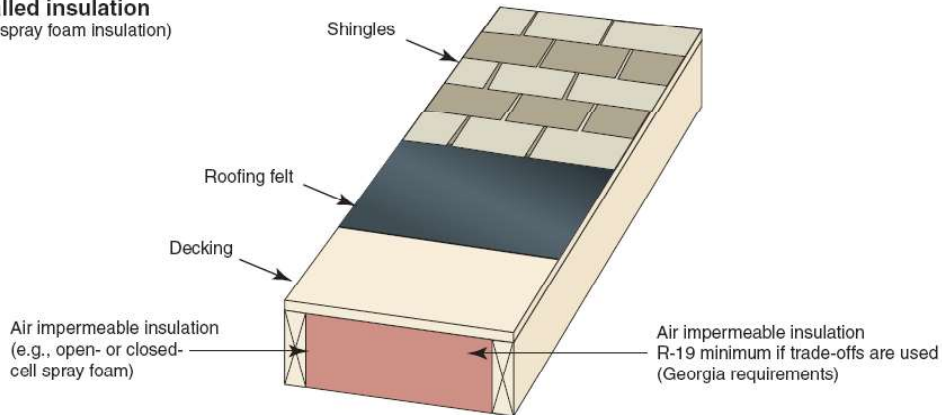
Rafter on raised top plate with full height insulation (recommended)



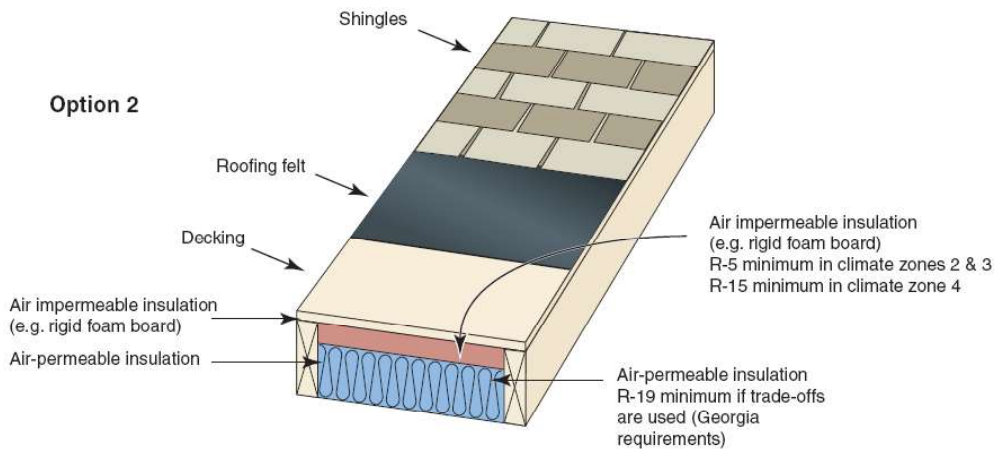
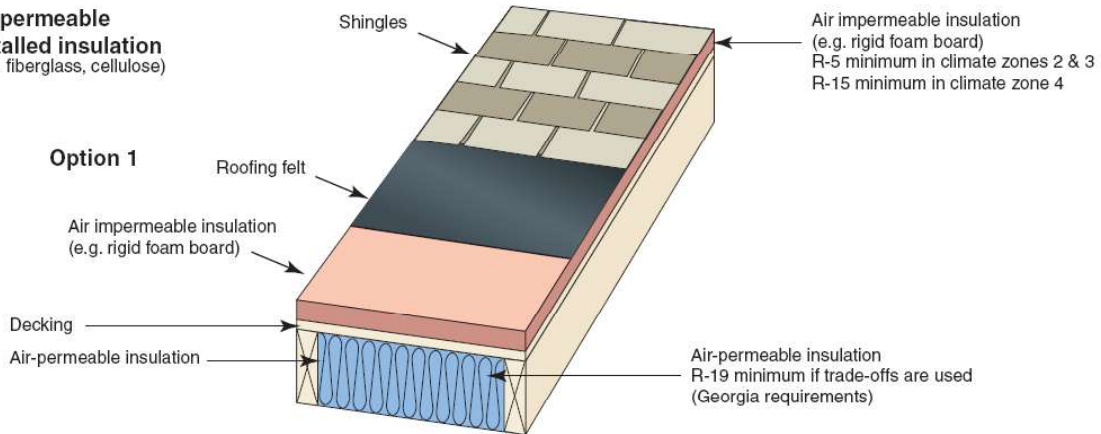
Roofline Installed Insulation Options

Reference Table 402.1.4 in Georgia amendments to the 2009 IECC and Section 806.4 "unvented attic assemblies" in the Georgia Amendments to the 2006 IRC

Air impermeable installed insulation
(e.g., spray foam insulation)



Air-permeable installed insulation
(e.g. fiberglass, cellulose)



Job 84929	Truss CC265918	Truss Type HINGED ATTIC	Qty 1	Ply 1
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Universal Forest Products Inc., Grand Rapids, MI 49525, Mike Patten 7.640 e Apr 22 2016 MiTek Industries, Inc. Thu Sep 22 15:55:40 2016 Page 1 of 2

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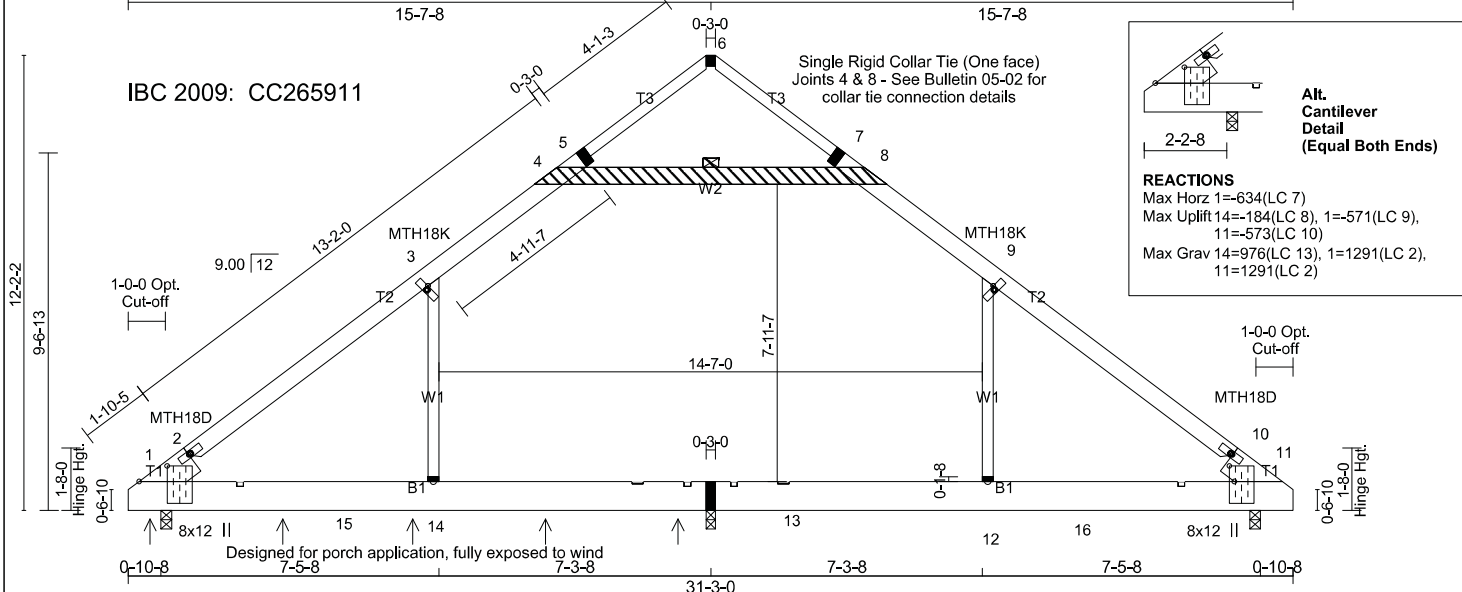


Plate Offsets (X,Y)-- [1:0-5-0-0-9-1], [2:0-0-11-0-0-0], [3:0-0-11-0-1-2], [9:0-0-11-0-1-2], [10:0-0-11-0-0-0], [11:0-5-0-0-1-10]

SPACING- 2-0-0 LOADING (psf) TCLL 23.1 (Ground Snow=30.0) TCDL 10.0 BCLL 0.0 * BCDL 10.0	SPACING- 1-4-0 LOADING (psf) TCLL 34.7 (Ground Snow=45.0) TCDL 15.0 BCLL 0.0 * BCDL 15.0	Plate Grip DOL 1.15 Lumber DOL 1.15 Rep Stress Incr YES Code IBC2012/IBC2015/ TPI2014	CSI. TC 0.72 BC 0.70 WB 0.67 (Matrix)	DEFL. in (loc) l/defl L/d Vert(LL) 0.61 14 >287 240 Vert(CT) 0.56 14 >311 180 Horz(CT) 0.02 11 n/a n/a Attic -0.28 13-14 637 360	PLATES GRIP MT20 197/144 MT18HS 197/144 Weight: 191 lb FT = 0%
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LUMBER-
TOP CHORD 2x10 SP No.1 or 2x10 SPF No.2 *Except*
T2: 2x6 SP No.1 or 2x6 SPF No.2, T3: 2x4 SP No.1 or 2x4 SPF No.2
BOT CHORD 2x10 SP No.1 or 2x10 SPF No.2
WEBS 2x4 SPF Stud *Except*
W2: 2x6 SPF No.2

BRACING-
TOP CHORD Structural wood sheathing directly applied or 5-7-1 oc purlins. [P]
BOT CHORD Rigid ceiling directly applied or 6-6-8 oc bracing.
WEBS 1 Row at midpt 4-8

REACTIONS. (lb/size) 1=1133/0-3-8 (min. 0-1-15), 11=1133/0-3-8 (min. 0-1-15), 13=405/0-3-0 (min. 0-1-8)
Max Horz 1=634(LC 7)
Max Uplift 1=524(LC 9), 11=526(LC 10), 13=194(LC 8)
Max Grav 1=1235(LC 2), 11=1235(LC 2), 13=996(LC 13)

FORCES. (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-2=-1182/771, 2-3=-1069/730, 3-4=-980/823, 4-5=-315/154, 5-6=-189/173, 6-7=-187/171, 7-8=-318/154, 8-9=-980/853, 9-10=-1069/697, 10-11=-1182/720
BOT CHORD 1-19=-347/864, 17-19=-347/864, 17-18=-347/864, 18-20=-347/864, 15-20=-347/864, 14-15=-347/864, 14-23=-347/864, 21-23=-347/864, 21-22=-347/864, 22-27=-347/864, 24-27=-347/864, 24-25=-347/864, 25-26=-347/864, 13-26=-347/864, 13-28=-347/864, 28-29=-347/864, 29-33=-347/864, 30-33=-347/864, 30-31=-347/864, 31-32=-347/864, 32-34=-347/864, 12-34=-347/864, 12-16=-347/864, 16-37=-347/864, 35-37=-347/864, 36-38=-347/864, 11-38=-347/864
WEBS 9-12=-260/440, 3-14=-316/442, 4-8=-745/869

REQUIRED FIELD JOINT CONNECTIONS - Maximum Compression (lb)/ Maximum Tension (lb)/ Maximum Shear (lb)/ Maximum Moment (lb-in)
4=745/869/116/6194, 5=2911/158/144/0, 6=154/175/144/0, 7=292/157/144/0, 8=745/869/87/6281, 12=260/440/0/0, 13=347/864/519/0, 14=316/442/0/0

- NOTES-**
- 1) Dado: 0-3-8 length x 0-0-12 deep dado, 1-8-4 to right edge from joint 13 on the top face.
 - 2) Dado: 0-2-0 length x 0-1-8 deep dado, 0-5-0 to right edge from joint 13 on the top face.
 - 3) Dado: 0-2-0 length x 0-1-8 deep dado, 12-5-0 to right edge from joint 13 on the top face.
 - 4) Dado: 0-2-0 length x 0-1-8 deep dado, 0-5-0 to left edge from joint 13 on the top face.
 - 5) Dado: 0-3-8 length x 0-0-12 deep dado, 1-8-4 to left edge from joint 13 on the top face.
 - 6) Dado: 0-2-0 length x 0-1-8 deep dado, 12-5-0 to left edge from joint 13 on the top face.
 - 7) Wind: ASCE 7-10; Vult=150mph (3-second gust) Vasd=119mph @24in o.c.; TCDL=4.0psf; BCCL=4.0psf; (Alt. 180mph @16in o.c.; TCDL=6.0psf; BCCL=6.0psf); h=30ft; Cat. II; Exp C; enclosed; MWFRS (envelope) gable end zone and C-C Exterior(2) zone; cantilever left and right exposed; porch left exposed; C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
 - 8) TCLL: ASCE 7-10; Pg=30.0 psf (ground snow); Ps=23.1 psf (roof snow); Category II; Exp C; Partially Exp.; Ct=1.1
 - 9) Roof design snow load has been reduced to account for slope.
 - 10) Unbalanced snow loads have been considered for this design.
 - 11) All plates are MT20 plates unless otherwise indicated.
 - 12) See HINGE PLATE DETAILS for plate placement.
 - 13) Provisions must be made to prevent lateral movement of hinged member(s) during transportation.
 - 14) All additional member connections shall be provided by others for forces as indicated.
 - 15) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
 - 16) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-6-0 tall by 2-0-0 wide will fit between the bot chord and any other members, with BCCL = 10.0psf.
 - 17) Ceiling dead load (5.0 psf) on member(s). 3-4, 8-9, 4-8

The professional engineering seal indicates that a licensed professional has reviewed the design under the standards referenced within this document, not necessarily the current state building code. The engineering seal is not an approval to use in a specific state. The final determination on whether a truss design is acceptable under the locally adopted building code rest with the building official or designated appointee.



WARNING - Verify design parameters and READ NOTES

Truss shall not be cut or modified without approval of the truss design engineer.

This component has only been designed for the loads noted on this drawing. Construction and lifting forces have not been considered. The builder is responsible for lifting methods and system design. Builder responsibilities are defined under TPI1. This design is based only upon parameters shown, and is for an individual building component to be installed and loaded vertically. Applicability of design parameters and proper incorporation of component is responsibility of building designer - not truss designer. Bracing shown is for lateral support of individual web members only. Additional temporary bracing to insure stability during construction is the responsibility of the erector. Additional permanent bracing of the overall structure is the responsibility of the building designer. For general guidance regarding fabrication, quality control, storage, delivery, erection and bracing, consult BCSI 1-06 from the Wood Truss Council of America and Truss Plate Institute Recommendation available from WTCA, 6300 Enterprise LN, Madison, WI 53719 J:\support\MitekSuppl\templates\ufp.tpe

Universal Forest Products, Inc. 2801 EAST BELTLINE RD, NE
PHONE (616)-364-6161 FAX (616)-365-0060 GRAND RAPIDS, MI 49525



Job 84929	Truss CC265918	Truss Type HINGED ATTIC	Qty 1	Ply 1	
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Universal Forest Products Inc., Grand Rapids, MI 49525, Mike Patten

7.640 e Apr 22 2016 MiTek Industries, Inc. Thu Sep 22 15:55:40 2016 Page 2 of 2

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- 18) Bottom chord live load (40.0 psf) and additional bottom chord dead load (0.0 psf) applied only to room. 13-14, 12-13
- 19) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 524 lb uplift at joint 1, 526 lb uplift at joint 11 and 194 lb uplift at joint 13.
- 20) Fixity of member 4 - 8 has been changed.
- 21) This truss is designed in accordance with the 2015 International Building Code section 2306.1 and referenced standard ANSI/TPI 1.
- 22) Attic room checked for L/360 deflection.
- 23) In the LOAD CASE(S) section, loads applied to the face of the truss are noted as front (F) or back (B).
- 24) Take precaution to keep the chords in plane, any bending or twisting of the hinge plate must be repaired before the building is put into service.
- 25) The field-installed members are an integral part of the truss design. Retain a design professional to specify final field connections and temporary supports. All field-installed members must be properly fastened prior to applying any loading to the truss. This design anticipates the final set position.
- 26) This truss is designed in accordance with the 2012 IBC Sec 2306.1 and referenced standard ANSI/TPI 1
- 27) Based on CC265912
- 28) Added IBC 2015

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WARNING - Verify design parameters and READ NOTES

Truss shall not be cut or modified without approval of the truss design engineer.
 This component has only been designed for the loads noted on this drawing. Construction and lifting forces have not been considered. The builder is responsible for lifting methods and system design. Builder responsibilities are defined under TPI1. This design is based only upon parameters shown, and is for an individual building component to be installed and loaded vertically. Applicability of design parameters and proper incorporation of component is responsibility of building designer - not truss designer. Bracing shown is for lateral support of individual web members only. Additional temporary bracing to insure stability during construction is the responsibility of the erector. Additional permanent bracing of the overall structure is the responsibility of the building designer. For general guidance regarding fabrication, quality control, storage, delivery, erection and bracing, consult BCSI 1-06 from the Wood Truss Council of America and Truss Plate Institute Recommendation available from WTCA, 6300 Enterprise LN, Madison, WI 53719 J:\support\MitekSupp\templates\ufp.tpe

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Universal Forest Products®

Job	Truss	MFG	
84929	CC265918	315	

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Design Method	Allowable Stress Design (ASD)
Connection Type	Lateral loading
Fastener Type	Nail
Loading Scenario	Single Shear

Main Member Type	Spruce-Pine-Fir
Main Member Thickness	2.5 in.
Side Member Type	Oriented Strand Board (OSB)
Side Member Thickness	7/16 in.
Nail Type	Common Wire
Nail Size	6d (D = 0.113 in.; L = 2 in.)
Load Duration Factor	C _D = 1.6
Wet Service Factor	C _M = 1.0
End Grain Factor	C _{eg} = 1.0
Temperature Factor	C _t = 1.0
Diaphragm Factor	C _{di} = 1.1

Connection Yield Modes

Im	473 lbs.
Is	184 lbs.
II	166 lbs.
III _m	179 lbs.
III _s	92 lbs.
IV	116 lbs.

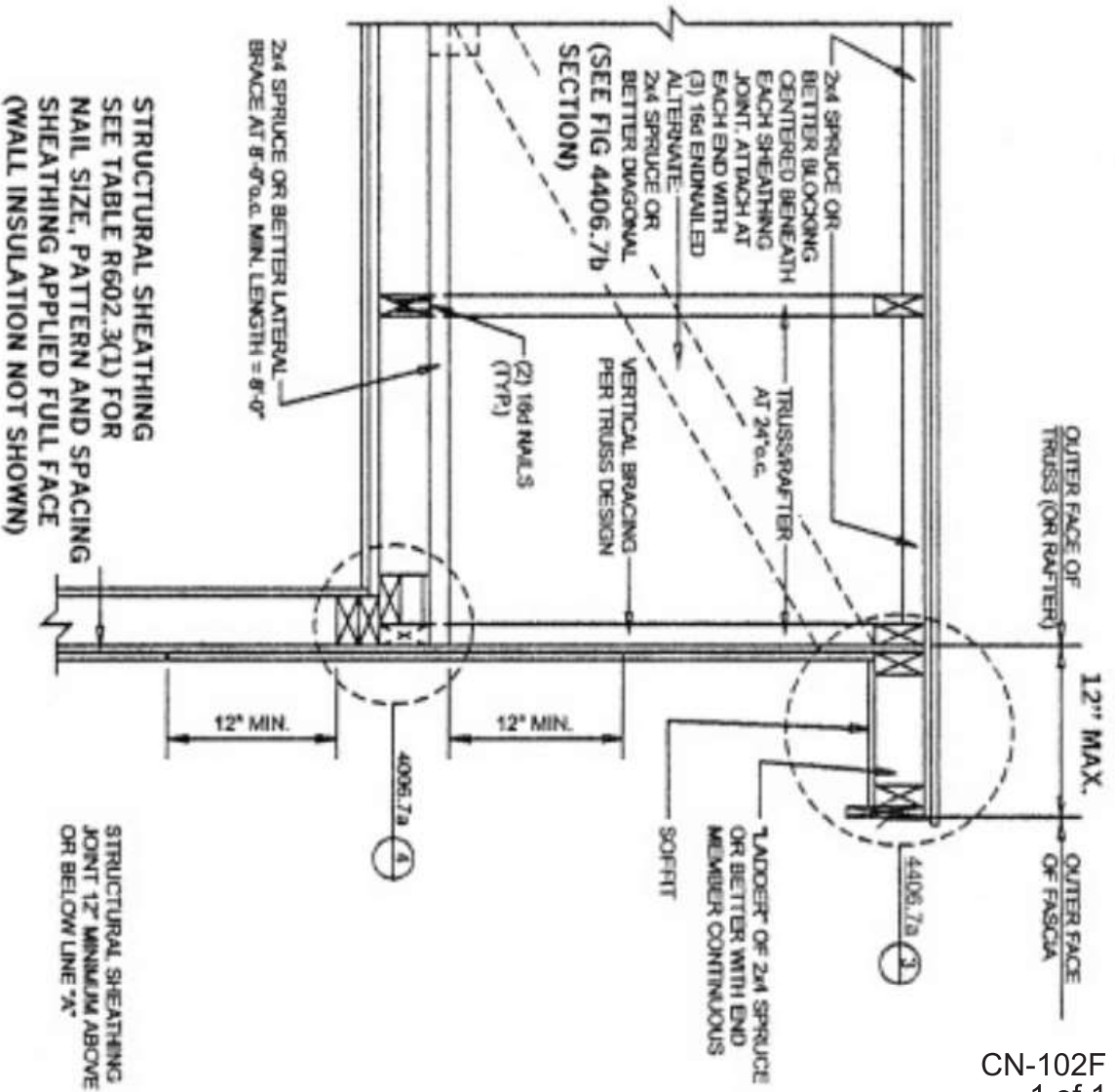
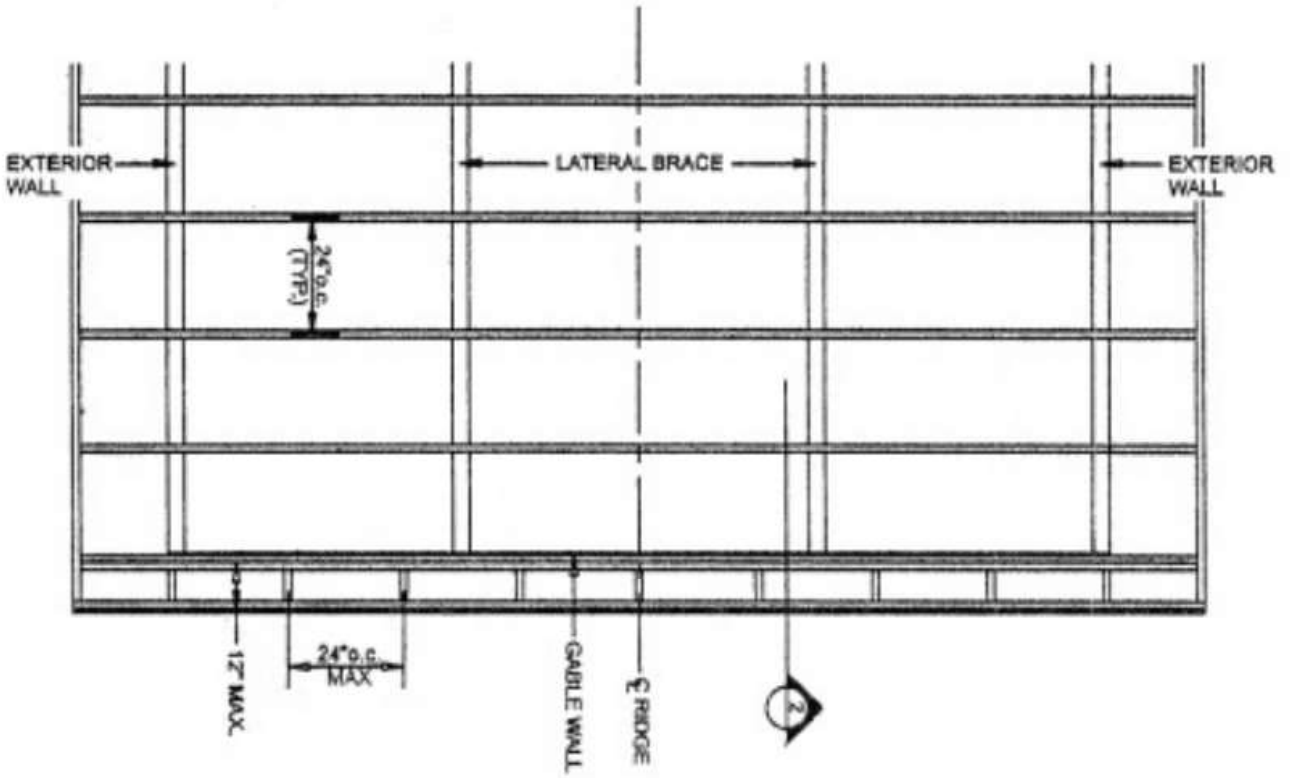
Adjusted ASD Capacity	92 lbs.
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- Nail bending yield strength of 100000 psi is assumed.
- The Adjusted ASD Capacity does not apply for toe-nails installed in wood members.
- Length of tapered tip is assumed to be two times the nail diameter for calculating dowel bearing length in the main member.
- The Adjusted ASD Capacity only applies for nails that have been driven flush with the side member surface. It does not apply for nails that have been overdriven into the side member.

While every effort has been made to insure the accuracy of the information presented, and special effort has been made to assure that the information reflects the state-of-the-art, neither the American Wood Council nor its members assume any responsibility for any particular design prepared from this on-line Connection Calculator. Those using this on-line Connection Calculator assume all liability from its use.

The Connection Calculator was designed and created by Cameron Knudson, Michael Dodson and David Pollock at Washington State University. Support for development of the Connection Calculator was provided by [American Wood Council](#).





REFERENCE FROM NCRC
CHAPTER 45, SECTION R4506.7
GABLE END BRACING

Setup / Construction Guidelines

4. Roof

4.1. General

4.1.1. It is suggested that prior to raising the roof, that roof jacks be installed on the roof in the down position, and that shingles be placed on the jacks for ease of shingling at a later time.

4.1.2. Lift points – Refer to Section 1.4.2

4.1.3. Crane Positioning / Direction

4.1.3.1. Direct the crane operator such that the crane, when lifting, is very slightly pulling the rim rail attached to the top chord of the truss against the end of the top chord. **Note:** It **must not** be positioned such that it is pulling away from the top chord. Failure to adhere to this warning may result in separation of the rim rail from the top chord and ultimately the collapse of the roof.

4.1.4. When the roof is raised high enough allowing the kneewalls to swing freely, pull the kneewalls into place. Never place yourself or any part of your body under the roof of the home prior to the kneewalls being fully extended.

4.1.5. Once the kneewalls are in place, align them left to right directly over the stiff knee or bottom chord of the truss. Do not use the plate nailed to their ends for alignment.

4.1.6. Prior to the roof being closed up, using the crane, lift any plywood, sheetrock, endwalls or desired fixtures into the open space.

4.1.7. Starting at one end of the house, place the first pair of foldbacks into position. [Depending upon the truss design, the foldbacks may be secured on the roof with straps, hinges and screws, or they may be shipped loose in the house or on a carrier.]

Note: At this time the straps or hinges, if used, MUST be removed, they cannot be shingled over.

4.1.8. Visually check the slope of the roof, hinged area and overhang for alignment, ensuring there is no hip or dip. Make any necessary corrections prior to continuing to close in the roof. Any misalignment at this point will get worse as it propagates across the roof. A string can be pulled to check the alignment. Dependent upon the

Setup / Construction Guidelines

spacing between the sections of the home it may be necessary to install filler 1x or 2x at the ridge to straighten the roofline from the raised portion to the foldback.

- 4.1.9. Once you are satisfied with the alignment, secure the foldback to the top chord of the truss and at the ridge as detailed in the stamped plan approval section on installation instructions.
- 4.1.10. Continue across the roof, one pair at a time, removing the hinges, ensuring the alignment and securing the roof.
- 4.1.11. Once the roof is secured and aligned, complete the securement of the house by referring to the details in the stamped plan approval section on installation instructions. This may or may not consist of fastening at the kneewall, marriage line, end walls, wind beams and lateral bracing.
- 4.1.12. A common problem encountered on the gable ends at the bird box is a visual misalignment of the overhang from below to above the hinge line. This not a structural problem, the gable end overhangs are built separately and attached to the end trusses. This problem is corrected by aligning / wedging the overhang below the hinge line with that above and securing the two sections together with nails prior to installing drip edge or fascia on the gable ends.

4.2. Dormers

- 4.2.1. Once the roof is raised, identify the location of the dormers and remove the shingles, felt paper, and OSB. Remove the shingles approximately 18” on either side of the opening and valley where the dormer will be placed.
- 4.2.2. Using the crane, place the dormer into location.
- 4.2.3. After ensuring that the dormer sits square on the lower header and is not tilted, secure the dormer to the roof trusses by referring to the detail in the stamped plan approval section on installation instructions.
- 4.2.4. Completion of the dormer installation is accomplished by following the standard instructions published by the Asphalt Roofing Manufacturers Association in the Residential Asphalt Roofing Manual.
 - 4.2.4.1. Felt paper [15#] is installed over the bare OSB
 - 4.2.4.2. Asphalt roofing [50# minimum] is laid in valleys formed by the intersection of the roof and dormer.
 - 4.2.4.3. The dormer is step flashed along the vertical walls

Setup / Construction Guidelines

4.2.4.4. The shingles are woven through the valley, extending at least 12” beyond the centerline of the valley.

4.3. Pod Tie-In and Accent Dormer Construction

4.3.1. Materials and details are provided to build these items. Use the appropriate state Residential Building Code for all connection requirements.

4.4. Gable Ends / Drip Edge

4.4.1. Drip edge is not installed at the plant on the gable ends of the homes. This is due to the distance at the gable end from the eave to the hinge point of the truss. The drip edge, if installed would be a short piece, which oftentimes is bent during setup and esthetically is not pleasing to the homeowners. The drip edge must be installed and the shingles along the gable end fastened during setup.

To facilitate this, the shingles are not fastened approximately 18” from the gable ends of the roof. Therefore they can be lifted, the drip edge installed in full-length sections, and the shingles secured. [Fasten per the shingle manufacturer’s instructions for high wind zones]

4.5. Sealing Roof Penetrations

4.5.1. Nail Holes / Damage

4.5.1.1. Replace the shingle(s). There is no other acceptable repair.

4.5.2. Vents / Chimneys

4.5.2.1. Proper Flashing

4.5.2.1.1. Refer to the flashing and shingle manufacturer’s installation instructions for fastening and sealing

5. Windows

5.1. Installation

5.1.1. The procedure for field installing windows is as follows:

5.1.1.1. Ensure window is closed and locked

5.1.1.2. Apply ¼” [minimum] continuous bead of exterior caulking to the backsides of the mounting flange.

Setup / Construction Guidelines

- 5.1.1.3. Place the window in the opening, resting on the sill and while holding it flat against the opening, install fasteners in the top left and right corners.
- 5.1.1.4. Verify square installation by diagonal measurements
- 5.1.1.5. Install fasteners in the bottom left and right corners, then in the center of the top and bottom.
- 5.1.1.6. Complete the fastening by installing the remaining fasteners, spaced 6" or less.
- 5.1.1.7. Seal the window from the outside by use of window /door sealant tape, installing the sides first and the top of the window last.

6. Electrical

- 6.1.** Homes are wired in compliance with the National Electrical Code. 12-gauge wire is used as a minimum for receptacle circuits and 14-gauge wire for lighting circuits. Appliances drawing a heavier load [dryers, stoves, etc.] are wired as detailed by the code.
- 6.2.** Electrical circuits that cross over from one section of the home to the other, do so through a junction box that is located behind an access panel whose location is identified on the electrical print.
 - 6.2.1. The wires on one section of the home terminate in a junction box. The wires on the other section are left in the bay directly opposite the junction box in the mating half.
 - 6.2.2. The wires are identified with the number of the circuit that is shown on the electrical print. Each wire in the junction box has a mate in the opposite bay.
 - 6.2.3. The wires are joined by the use of appropriately sized wire nuts that twist the wires together.
- 6.3.** A complete electrical test is performed at MCB on every circuit in each house.
 - 6.3.1. Operational
 - 6.3.2. Polarity
 - 6.3.3. Continuity
 - 6.3.4. High Pot – High potential test to identify any penetrations of the electrical cable by a staple or nail

Setup / Construction Guidelines

6.3.5. Ground Fault

6.3.6. Arc Fault

7. Plumbing

7.1. With the exception of some 2nd floor fixtures all drain lines [DWV plumbing] are dropped straight through the floor of the house for interconnection by a licensed plumber after the house is set. The work that is done on site is identified in the plumbing diagram for the house by dashed lines.

7.1.1. These drop outs and the fixtures they're attached to are tested at the factory for leaks. However they may loosen due to movement during transportation, setting or while being plumbed after setup.

Therefore, it is important that after interconnection of the DWV is complete that it be tested as required by the International Residential Plumbing Code Section 312.2.

7.1.2. The most common problems encountered with these interconnections are:

7.1.2.1. A pipe, which was installed in the wall as a chase for 2nd floor electrical or refrigerant lines, is plumbed as a vent pipe. Result: Sewer smell in the 2nd floor.

7.1.2.2. A commode's wet vent is not plumbed. Result: Bubbling when flushed

7.2. Supply line plumbing consists of 1", 3/4" and 1/2" lines. These are leakage tested at the factory to ensure proper operation.

7.2.1. Mating male and female connections are installed at the marriage walls when there are wet sections on more than one portion of the home.

7.2.2. Common problems encountered with the supply lines are:

7.2.2.1. Water not being hot enough for the homeowner in the shower/tub. This is typically due to a scald-proof faucet, which the homeowner must adjust to their liking.

7.2.2.2. Shut-off valves not being open either under a fixture or at the hot water tank.

Setup / Construction Guidelines

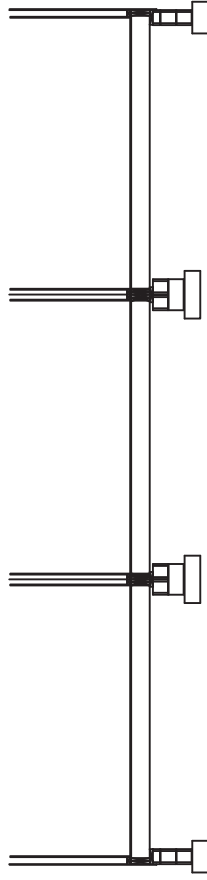
8. Mechanical

- 8.1. Given the requirements of the area where the home may be located and the preference of the builder or homeowner, either perimeter floor registers or overhead registers may be installed. In either case both supply and return air must be properly sized and ducted.
- 8.2. When applicable, CCB installs a typical number of supply registers with flex duct run-offs and return air locations. No other HVAC components are installed. This is subject to change based on the model series, the floor plan, and the customer order. All equipment is sized based on loads calculated in accordance with ACCA Manual D or SMACNA Installation Standards for Residential Heating and Air Conditioning Systems. Additional supply registers may be required as determined by the load and duct calculations. These calculations have not been performed by CCB and must be performed by a heating contractor licensed by the applicable State Board of Examiners of Plumbing, Heating, and Fire Sprinkler Contractors.
- 8.3. Dependent upon the layout, the size of the home, the state and local jurisdictions, and the roof truss selected, the manner in which either the return air or supply air is ducted may vary. It is important that the HVAC Licensed Installer follows the duct diagram provided with the home as close as possible to avoid any alterations in the register quantities and locations.
- 8.4. It is not uncommon after a down draft perimeter floor system is installed to have a homeowner state that they have no airflow from some of their registers. This normally is due to the flex from the register not being connected to the trunk line.
 - 8.4.1. In the section of the home where the furnace or air handler would normally be located, the flex duct that connects to the boots of the registers is left in the belly of the house for transportation. This is due to the short length normally required to connect with the trunk line. The area where they are located is marked with a painted circle. A hole needs to be cut in the silver board in that location and the flex duct pulled out to make that connection. The other section of the house has a box of flex secured to the frame for transportation.

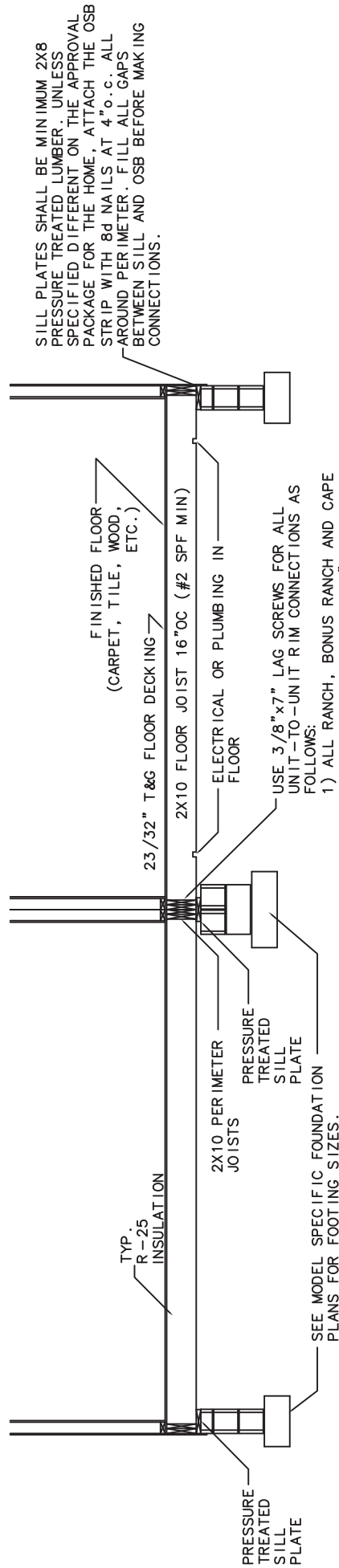
9. Uncovered Decks / Porches

- 9.1. Uncovered decks or porches must be built at least 6” below the threshold of the door. Failure to do this **voids the warranty** of the door manufacturer against deterioration and leakage of the door.

NOTE: REFER TO THE MODEL SPECIFIC FOUNDATION PLAN AND/OR THE SHEAR WALL CALCULATIONS FOR OTHER RELATED DETAILS AND FOR ALL APPLICABLE, HIGH WIND AND SHEAR -DESIGN, TIE -DOWN REQUIREMENTS.



TYPICAL BONUS RANCH CROSS -SECTION



SILL PLATES SHALL BE MINIMUM 2X8 PRESSURE TREATED LUMBER, UNLESS SPECIFIED DIFFERENT ON THE APPROVAL PACKAGE FOR THE HOME, ATTACH THE OSB STRIP WITH 8d NAILS AT 4\"/>

USE 3/8\"/>

- 1) ALL RANCH, BONUS RANCH AND CAPE MODELS ARE SPACED AT 48\"/>
- 2) ALL SALT-BOX, 2-STORY AND SIMILAR MODELS ARE SPACED AT 12\"/>

NOTES:

- 1) FLOOR JOISTS SHALL BE A MINIMUM OF 18\"/>
- 2) WOOD GIRDERS SHALL BE A MINIMUM OF 12\"/>
- 3) WOOD SIDING SHALL BE A MINIMUM OF 6\"/>
- 4) ACCESS PANELS ARE PROVIDED IN FLOORS AND/OR CEILINGS FOR PLUMBING & ELECTRICAL CONNECTIONS BETWEEN FLOORS.
- 5) 2x12's AND 9 1/4\"/>
- 6) REFER TO THE CROSS -SECTION IN THE APPROVAL PACKAGE FOR ADDITIONAL INFORMATION.

NOTE!

REFER TO THE INSTALLATION INSTRUCTIONS FOR UTILITY CONNECTIONS BETWEEN SECTIONS:

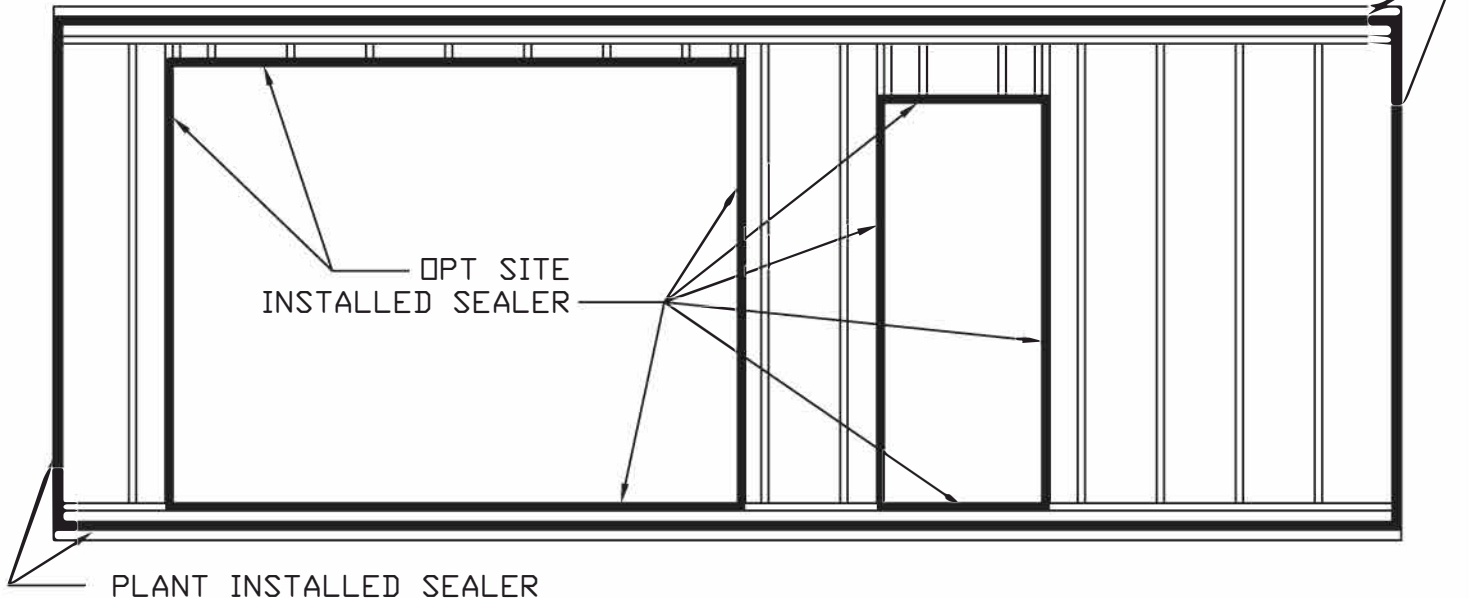
- 1) PLUMBING -PGS. IN -13.1 - 13.2
- 2) MECHANICAL -PGS. IN -13.2 - 13.3
- 3) ELECTRICAL -PG. IN -13.1. ALSO, WHERE APPLICABLE, SEE THE NOTES ON THE ELECTRICAL PRINT TO DETERMINE THE WIRE CONNECTIONS FROM THE 2ND FLOOR SUB -PANEL TO THE 1ST FLOOR MAIN PANEL BOX.

ON-SITE APPLICATION OF MATING WALL INSULATION SEALER

CHM CUSTOM BUILDERS INSTALLS AN INSULATION SEALER THAT IS USED TO CREATE A BARRIER FROM OUTSIDE AIR INFILTRATION. THIS WILL REDUCE THE LOSS OF CONDITIONED AIR FROM INSIDE THE HOUSE AND GIVE THE CUSTOMER A MORE ENERGY EFFICIENT HOME.

THE SEALER IS ATTACHED TO THE MATING WALL EXTERIOR EDGES AS DEPICTED BY THE BOLD OUTLINE IN THE DETAIL SHOWN BELOW. BEFORE THE MULTIPLE SECTIONS OF THE HOME ARE JOINED TOGETHER, INSURE THE SEALER IS INTACT AROUND THE ENTIRE PERIMETER OF THE HOME. AFTER THE SECTIONS ARE TOGETHER, CHECK FOR ANY VOIDS THAT MAY HAVE OCCURRED AND PROMPTLY FILL THEM WITH SEALER, INSULATION, OR AN APPROVED CAULKING MATERIAL. THE SAME MAY BE DONE AT ALL MATING WALL PENETRATIONS, DOORWAYS, AND OPENINGS AT THE DISCRETION OF THE BUILDER OR HOMEOWNER, BUT IS NOT REQUIRED. MATERIALS ARE PROVIDED BY OTHERS.

PLANT INSTALLED SEALER



MODULAR	TYPICAL
DWG. TITLE: MATING WALL INSULATION SEALER	
MODEL SIZE: N/A	REV'D.: 2/23/18
SCALE: NONE	SHT.: 1 OF: 1

DATE: 10/29/08

CMH's standard home is designed and built to a 150 MPH ultimate wind speed criteria, which is defined by the International Residential Code [IRC]. With additional modifications, they also comply with the 150 MPH ultimate wind speed criteria. The states' adoption of the IRC as the accepted building code has affected parts of the design and some of the components and fastening schedules for a Crestline home. The following pages, which consist of detailed setup instructions, identify the significant changes that must be adhered to. There are fourteen (14) specific items throughout the following pages and are addressed as follows:

1. Staples are no longer allowed as a means of fastening shingles. Standard fastening criteria requires the use of galvanized or stainless steel, aluminum or copper nails. Given that our minimum design is to a 150 MPH wind zone, six (6) fasteners must be used per shingle.
2. N.C. Only: This note is to alert you to the fact that any home, which is located in a 150 MPH wind zone in North Carolina, must comply with the requirements of the Coastal and Flood Plain Standards, Chapter 45 of the N.C. IRC, regardless of where it is located. This directly affects shingle fastening, item #3.
3. In a 150 MPH wind zone, shingles must be fastened with a "hot dipped galvanized" nail. There is a 1 1/4" hot dipped galvanized nail sold under the name of "Mave" which can be shot through a Senco nail gun. This is the nail we presently are using at Crestline for this application.
4. Pages IN-18 and IN-20 show the fastening at the ridge and fold-back for 7/12, 9/12, and 12/12 pitch roofs in 150 MPH wind speed zones.
5. Page IN-18 explains the fastening of the collar ties with the exception of those on either side of a dormer. [Refer to item #14].
6. Page IN-18 requires that the bottom chord of the trusses at the marriage line, on 7/12, 9/12, and 12/12 pitch roofs, be decked and secured with both nails and GLUE.
7. Page IN-18 also shows multiple options on how to secure the knee walls on 7/12, 9/12, and 12/12 pitch roofs to the bottom chord of the truss. However, one (1) of the three (3) must be used for each and every knee wall.
8. Page IN-19 shows how a single 4x8x7/16" piece of sheathing must be secured with

nails to either the top or bottom of the collar ties at each gable end.

9. Page IN-19 identifies 1/8" as the amount of allowable gap between the end-wall and top chord of the truss before shimming is required.

10. Page IN-19 details the securement of the end-wall to the top chord of the truss.

11. Page IN-19 defines the shimming [1/8" maximum gap] and fastening in the area where the end-wall is secured to the fold-back.

12. Page IN-19 also contains the following collar tie details:

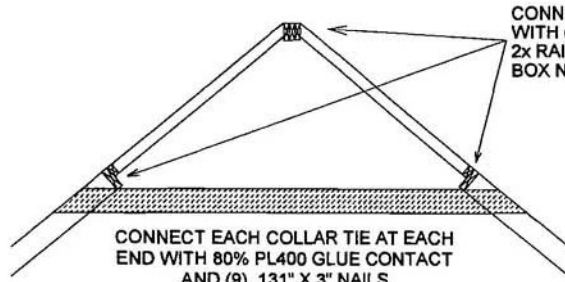
- A collar tie must be secured to each stud on the end wall and the top chord of the truss.
- Two inches of blocking must be secured to the end truss in order that the collar tie can be fastened.

13. Page IN-20 explains how to secure the dormers to the roof truss framing on the house with the lag screws provided; which were taped to one of the dormer rafters. Each individual dormer has it's own quantity of screws necessary for attaching that specific dormer.

Job CRC08144	Truss CAPE CONNECTION DETAILS	Truss Type HINGED ATTIC	Qty 1	Ply 1	Standard Cape Connection Details
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150 Vult WIND SPEED

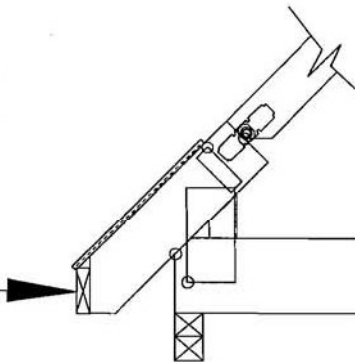
CONNECTION DETAILS FOR ALL 7/12, 9/12
AND 12/12 STANDARD (2 BOX) CAPE TRUSSES.
30 LB GROUND SNOW LOAD
LOAD AT 24" OR 16" C/C.



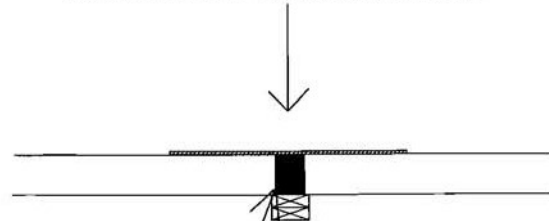
CONNECT 2x RAILS TO EACH END OF CHORDS WITH (4) .131" X 3" BOX NAILS AND CONNECT EACH 2x RAIL TO THE OTHER WITH (2) ROWS OF .131" X 3" BOX NAIL AT 12" c/c.



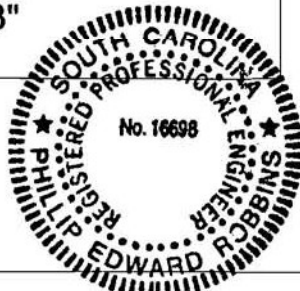
Attach 2x6 fascia to end of truss overhang with a minimum of (2) .131" x 3" nails each truss.



SITE INSTALLED 3/4" THICK 24" WIDE 48/24 APA RATED OSB OR EQUIVALENT CENTERED OVER MATE LINE AND ATTACHED TO TOP CHORD WITH .099" X 2 1/4" NAILS @ 3" o.c. AND 100% GLUE CONTACT. GLUE MUST MEET OR EXCEED ASTM C-577-73 SPECS AND A DESIGN SHEAR VALUE OF 180 PSI OR GREATER.

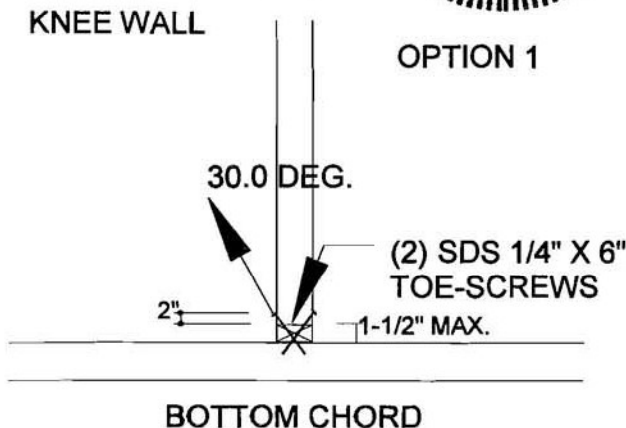


Face nail inner ply of adjacent header into end grain of truss bottom chord with (9) .131" x 3" at marriage line each box. For 2-ply marriage beam face nail ply to ply with (3) rows of .131" x 3" nails at 12" c/c. For 3-ply and 4-ply marriage beams laminate beams together with (2) rows of Simpson SDS 1/4" x 4.5" (3-ply) or 1/4" x 6" (4-ply) screws at 12" c/c.



KNEE WALL

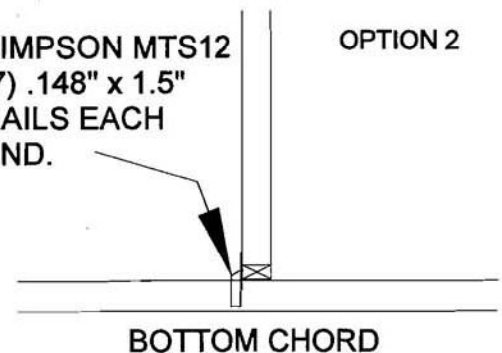
OPTION 1



KNEE WALL

SIMPSON MTS12 (7) .148" x 1.5" NAILS EACH END.

OPTION 2



150 Vult WIND SPEED

GABLE END FRAMING

7 / 12, 9 / 12 AND 12 / 12 ROOF PITCH

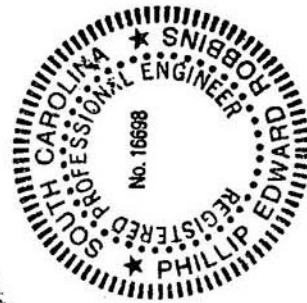


SECURE WALLS TO TRUSS USING (1) ROW 16d NAILS OR .131" X 3" @ 6" C/C TOP AND BOTTOM.

TOP AND BOTTOM WALL PLATE SPLICES MAY BE ALIGNED FOR GABLE END FRAMING. PLATES MAY BE DOUBLE OR SINGLE.



GABLE WALL ASSEMBLY AND SECUREMENT APPLIES TO 7 / 12, 9 / 12, AND 12 / 12 TRUSS DESIGN.



Roof Truss

ATTACH 4" DEEP X WIDTH OF OPENING X 7/8" 24 / 16 APA RATED SHEATHING TO TOP OR BOTTOM EDGE OF COLLAR TIES, CENTERED WITH (1) ROW OF .099 X 2 1/2" NAILS AT 6" C/C.

0" TO 1/2" — NO SHIM
 1/2" TO 3/4" — SHIM
 3/4" TO 2" — (1) #8 X 5" SCREWS

SHIM WITH 2 X 4 AND 3/4" SHEATHING AS NECESSARY, CONNECTED TO TRUSS AND TO TOP PLATE WITH (1) ROW OF 16d NAILS OR .131" X 3" NAILS AT 6" C/C

ATTACH COLLAR TIE TO EACH END WALL STUD WITH (2) # 8 X 3" SCREWS. SHIM ENDS OF COLLAR TIE TO TRUSS WITH 2 X 4 BLOCKS AND 3/4" SHEATHING AND ATTACH WITH (7) # 8 X 5" SCREWS EACH END.

CONNECT EACH STUD TO PLATES WITH (3) .131" X 3" NAILS EACH END

REMOVE WALL POSTS



ALL FRAMING DIMENSION VALUES ARE DEPENDENT ON THE APPLICATION.

150 Vult WIND SPEED

GABLE END FRAMING

30 PSF GROUND SNOW LOAD AND 130 MPH ,
 EXPOSURE C, HEIGHT = 30'

DATE : 11 / 03 / 08

JOB # : CRC 08135
 DISCRPTION: GABLE END FRAMING
 PREPARED BY : PIR

P. E. ROBBINS, P. E.
 105 WEST MAIN ST.
 VICTORIA, ILLINOIS
 61485

FLEX ROLL RIDGE VENT

Overview

Flex Roll is a soft roll, low-profile ridge vent made of non-wicking and non-woven material that resists clogging. Lightweight and easy-to-install; no complicated fitting, wrapping or connectors.

Quarrix Flex Roll works to vent warm, moist attic air out while preventing insects, birds, bats, snow and dust from getting in. Installs under metal and asphalt shingles (pitches from 3/12 to 20/12). Coil nails included.



Lifetime Warranty

Quarrix Flex Roll Ridge Vent Benefits

- Proven Performance**
 Low-profile design virtually disappears on the roof when installed, yet exhausts warm attic air to create a balanced system. Fibers prevent dust and debris from clogging the vent.
- Strong and Durable**
 Material is non-wicking and non-woven, and helps **keep rain, snow and insects from filtering through**. Flex Roll will not degrade or corrode from rain, wind, snow or ice.
- Product Versatility**
 Installs on ridge for exhaust or behind fascia for intake. Works with metal and asphalt shingles.
- Ecologically Friendly**
 Helps reduce landfill waste through the use of 100% recycled material.



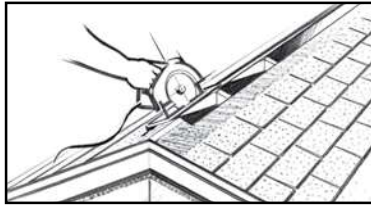
FLEX ROLL SPECIFICATIONS 1 3/4" (44 mm) Coil Nails Included

Part #	Series	Width	Length	Profile Height	Certified NFA	Pitches	Warranty
70000	F105	10-1/2" (26.7 cm)	20' (6 m) Roll				
70006	F105	10-1/2" (26.7 cm)	50' (15.2 m) Roll	3/4" (1.9 cm) Low Profile	17.2 sq in/lin ft (364.1 cm ² /lin m)	3/12 to 20/12	Lifetime Warranty
70003	F120	11-3/4" (29.8 cm)	20' (6 m) Roll				
70005	F80	8" (20.3 cm)	20' (6 m) Roll				IN-24

SS-FLEX09-2.2.17

QUARRIX FLEX ROLL RIDGE VENT INSTALLATION INSTRUCTIONS

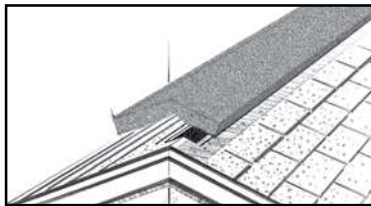
Quick & Easy Installation



1 Cut a 2" Slot

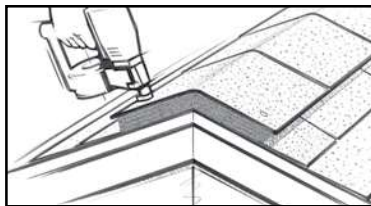
Cut a 1" slot on each side of the ridge. Length of slot should be determined by the amount of required ventilation. See ventilation table below.

A minimum of 12" must be left uncut on each end of the ridge.



2 Roll out Quarrix Flex Roll

Roll out the Flex Roll along entire ridge. Multiple lengths may be butted together. Nail both ends of vent, nails must penetrate sheathing $\frac{3}{4}$ ". If using nail gun, adjust the air pressure so the ridge vent is not over-compressed.



3 Nail Ridge Caps

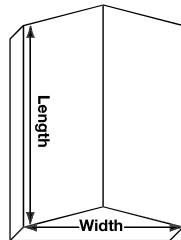
Nail ridge caps directly over the Flex Roll, using a coil nail gun or hand nail. Nails must penetrate sheathing $\frac{3}{4}$ ".

Recommended for roof slopes 3:12 to 20:12

1 $\frac{3}{4}$ " (44 mm) Coil Nails Included

Determining Ventilation Needs

For $\frac{3}{4}$ " thick Quarrix Flex Vent (17.2 square inches net free area (NFA) per foot) and Soffit Vents or Quarrix Multi-Use Vent (6.35 square inches net free ventilation area (NFVA) per foot)



Attic Square Footage	Square Inches NFVA at Ridge	Min. Feet of Quarrix Flex Vent Soft Roll	Min. Square Inches NFA Soffit
1000	240	14	240
1100	264	16	264
1200	288	17	288
1300	312	18	312
1400	336	20	336
1500	360	21	360
1600	384	23	384
1700	408	24	408
1800	432	25	432
1900	456	27	456
2000	480	28	480
2100	504	30	504
2200	528	31	528
2300	552	33	552
2400	576	34	576

* Double these numbers when using the 1:150 ratio.



Made from 100% recycled material

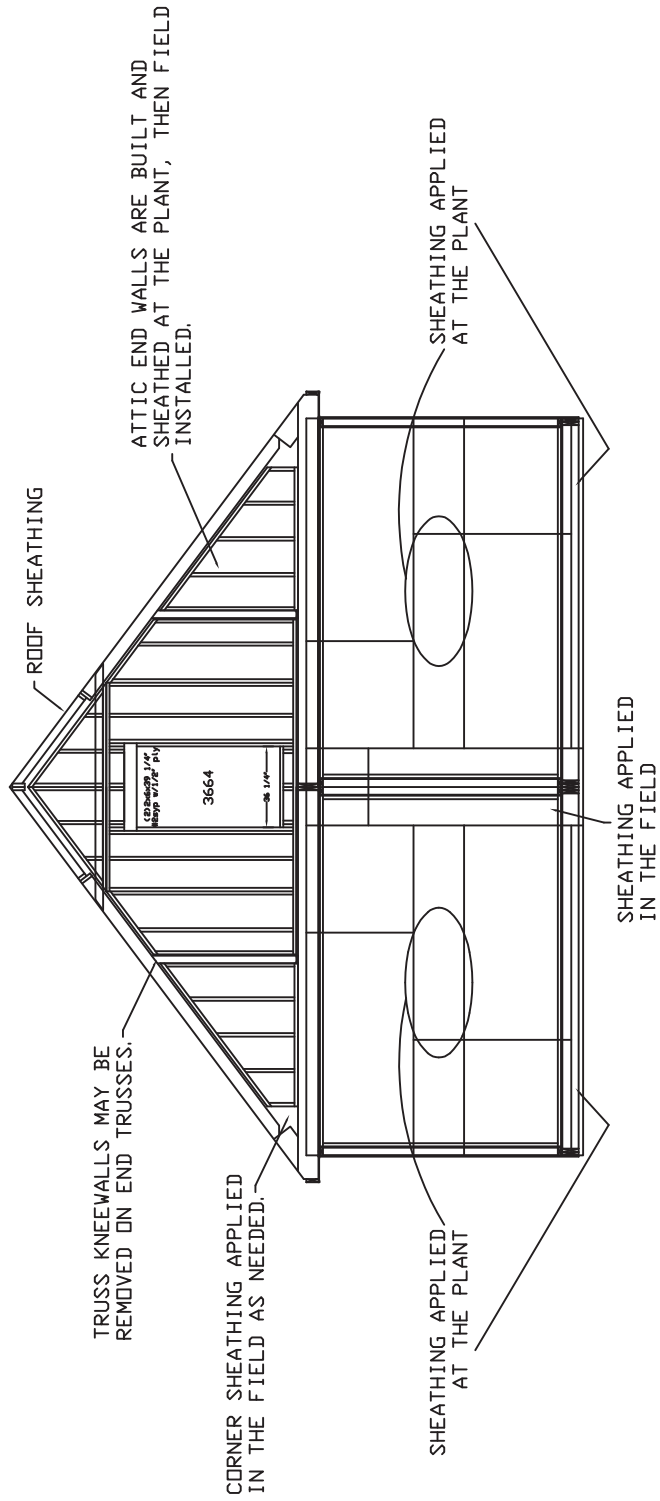
IN-24.1

DRYER VENT AND BATH EXHAUST INSTRUCTION

- A. “Residential dryer exhaust ducts which are not designed for a specific dryer shall be constructed of minimum 0.0157 inch galvanized steel or other noncombustible material of equivalent strength and corrosion resistant.” (Section M1502.4.1 of the 2018 NCIRC)
- B. The dryer exhaust “ducts shall have a smooth interior finish with the joint running in the direction of the airflow.”
- C. “The minimum size of the exhaust duct shall be 4 inches.”
- D. “Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a back draft damper.”
- E. The back draft damper must be unscreened and a minimum of 4 inches.
- F. “Ducts shall not be connected or installed with sheet metal screws.”
- G. “The entire system shall be properly secured in place and shall terminate not less than 12” above finished grade.”
- H. A listed and labeled clothes dryer transition duct must be used to connect the appliance to the exhaust duct.
- I. “Transition duct shall not be concealed within construction.”
- J. “Transition ducts must remain entirely within the room the dryer is installed.”
- K. “Transition ducts are to be cut to length and may not exceed 8’ in length.”
- L. “All penetrations.... Through the building thermal envelope shall be caulked, gasketed, or otherwise sealed...”
- M. The maximum length of the rigid metal duct shall be in accordance with section M1502.4.5 of the 2018 NCIRC.

GABLE END INSTALLATION:

1. USE 7/16" OSB INSTALLED VERTICALLY OR HORIZONTALLY.
2. PER CH. 45, TABLE 4506.2, USE 8d NAILS AT 6" o.c. @ VERTICAL EDGES, 3" o.c. @ HORIZONTAL EDGES AND @ 6" o.c. IN THE FIELD.



150 Vult WIND SPEED

MAX. 150 MPH Vult WIND ZONE

MODULAR TYPICAL

DWG. TITLE: CAPE GABLE END DETAIL

Pei Evaluation Service® is an accredited ISO Standard 17065 Product Certifier, accredited by the IAS. This **Product Evaluation Report** represents a product that **Pei ES** has Evaluated. This product has a Product Evaluation Service Agreement & Follow-up Inspection Service Agreement. This **Product Evaluation Report** in no way implies warranty for this product or relieves **Alpha Systems, Inc.** of their liabilities for this product. This **PER** is an official document if it is within one year of the initial or re-approval date.

Initial Approval
September, 2000

Re-Approved
April, 2020

See all **Pei ES** Listings at: www.p-e-i.com

Report Owner

Alpha Systems, Inc.

5120 Beck Drive
Elkhart, IN 46516

Approved Manufacturing Location

Alpha Systems, Inc.

5120 Beck Drive
Elkhart, IN 46516

Product

**AlphaSeal 5200 Two-Part Polyurethane
Foam Adhesive**

For Evaluation Report Questions

www.alphasystemsinc.com

Alpha Contact: Joe Merryman - V.P. of Product Development
Phone: 574-295-5206

General Details

AlphaSeal 5200 adhesive is used to attach gypsum board to wood lumber framing in walls and ceilings without the use of mechanical fasteners. The manufacturing location listed above has an approved Quality Control Manual to manufacture the **AlphaSeal 5200 Two-Part Polyurethane Foam Adhesive** and is inspected quarterly by *Progressive Engineering Inc. (Pei)*.

Product Description

AlphaSeal 5200 is a two-part polyurethane foam adhesive system. It is applied by pumping two components at a 1 to 1 volumetric ratio under pressure through heating equipment to produce one continuous bead. The two components are an "A-ISO" and a "B-RESIN". The A-ISO component is a purchased material and the B-RESIN component is manufactured by **Alpha Systems, Inc.** The **AlphaSeal 5200** adhesive does not off-gas Formaldehyde into the air.

Containers and Storage

The A and B components are shipped in 330 gallon caged totes or in 55 gallon steel drums. Storage of these containers shall be in an indoor dry place between 40°F. and 110°F. Unopened containers will have a storage life of up to six months in these conditions.

General Product Use and Limitations

The gypsum board being used shall be in compliance with ASTM C 1396. The lumber shall be kiln dried and graded. For proper application, both substrate surfaces shall be between temperatures of 50°F. and 105°F. Surfaces shall be clean and dry, free of dust, ice and loose particles. **AlphaSeal 5200** adhesive shall be applied in an ambient temperature range of 50°F. to 105°F. The adhesive is applied along the intersection of the gypsum and the lumber according to **Alpha Systems** Application Instructions. The adhesive temperature at the heater block shall be between 100°F. and 125°F. After the last bead is applied, the structure shall not be moved for a minimum of two minutes. The structure shall stay in the same ambient conditions for the first 24 hours.

AlphaSeal 5200 adhesive shall be used on a maximum wood framing spacing of 16" o.c. for walls and 24" o.c. for ceiling applications. The adhesive beads are applied along one side of field framing and along both sides at gypsum seams. Adhesive bead size for ceilings shall be as shown in Figure 1. Adhesive bead size for walls shall be as shown in each test report per design. A bead shall never be greater than 2" in width.

- The **AlphaSeal 5200** adhesive shall be applied according to **Alpha Systems** Application Instructions. A copy of these instructions must be made easily available at the assembly areas.
- This **PER** is for **AlphaSeal 5200** to be applied in an indoor manufacturing facility and shall not be applied in an outdoor uncontrolled environment.
- **AlphaSeal 5200** adhesive is to be manufactured at the **Alpha Systems** plant in Elkhart, Indiana following their approved Quality Control Manual with unannounced Inspections by *Progressive Engineering Inc.*
- The use of **AlphaSeal 5200** adhesive in a fire rated assembly is not addressed in this **PER**.
- A vapor barrier shall not be used between the adhesive and the substrates.
- **AlphaSeal 5200** shall be applied to the back side of standard raw gypsum and shall not be applied to other gypsums such as foil backed, moisture resistant or water resistant gypsums.
- **AlphaSeal 5200** adhesive shall not be used for insulation or be considered insulation.

Building Code Compliance

Must be used with an approved thermal barrier not less than 1/2-inch gypsum wallboard or approved material equivalent in compliance with the requirements of the 2006 **IRC**, Section R314.4 and the 2009, 2012, 2015 and 2018 **IRC**, Section R316.4.

Must be used with an approved thermal barrier not less than 1/2-inch gypsum wallboard or approved material equivalent in compliance with the requirements of the 2006, 2009, 2012, 2015 and 2018 **IBC**, Section 2603.4

The HUD code does not require a thermal barrier for adhesives.

August 1, 2017 - Texas Industrialized Housing and Buildings Administrative Rules - Section: 70.103. (c) (2)

NC Residential Code, 2012 Edition - Section R316.6

ASTM E-84 - Class B Fire Rating: Flame Spread Index - 30 and Smoke Development Index - 360

Meets or exceeds Acceptance Criteria of UL-1715 for use with 3/8-inch Gypsum Wallboard after 15 Minute Exposure Requirements, where flames shall not extend to the extremities or through the doorway opening of the tested specimen.

Meets or exceeds Acceptance Criteria of UL-1715 for use with 1/2-inch Gypsum Wallboard after 15 Minute Exposure Requirements, where flames shall not extend to the extremities or through the doorway opening of the tested specimen.

Meets or exceeds adhesion of gypsum panels to wood for 200°F Stability and 30 Minute Exposure Requirements of the 2018 IBC, Section 803.14 Stability.

Test Standards

Pei Standard No. 89-1 - Simple Span Ceiling or Roof Diaphragm Shear Resistance Test Procedure for Manufactured Homes

Pei Standard No. 93-7 - Performance Requirements for Fastening Gypsum Board to Wood Framing using a Two-Part Urethane Adhesive

Pei Standard No. 94-9 Large Scale Ceiling Board Dead Load Test Procedure

ASTM C 557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing

ASTM D 5582 - Standard Test Method for Determining Formaldehyde Levels from Wood Products Using a Desiccator

ASTM D 6464 - Standard Specification for Expandable Foam Adhesives for Fastening Gypsum Wallboard to Wood Framing

ASTM E 72 - Standard Test Method of Conducting Strength Tests of Panels for Building Construction

ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials

UL 1715 - UL Standard for Safety Fire Test of Interior Finish Material

Table 1: Wall Shear Designs with Gypsum Board

Framing				Gypsum Orientation	Gypsum Brand	Single or Double Sided	Ultimate Load PLF ³	Test Report #
Top Plate	Bott. Plate	Studs	Stud Spacing					
1x3	1x3	2x3	16" o.c.	5/16" Vertical	Georgia Pacific	Single	737.5	1998-2966A
					USG Gypsum	Single	707.4	1998-2966B
					Gold Bond	Single	656.6	1998-2966C
				1/2" Horizontal	USG Gypsum	Single	750.9	1998-3236A
					Gold Bond	Single	727.4	1998-3236B
					Georgia Pacific	Single	590.4	1998-3236C
					USG MH UltraLight	Single	675.0	2012-1569M
					USG MH UltraLight	Single	760.0	2012-1569O

Notes:

1. See actual test reports for wall construction details including adhesive bead sizes
2. Tested in Accordance to ASTM E72 - Static Wall Racking Tests
3. Ultimate load does not include any required safety factors

Table 2: Wall Shear Designs with 7/16" OSB and 1/2" Gypsum

Framing				Sheathing			Ultimate Load PLF ³	Test Report #
Top Plate	Bott. Plate	Studs	Stud Spacing	OSB Orientation	Gypsum Orientation	Single or Double Sided		
2x3	2x3	2x3	16" o.c.	Rough Side Up	Horizontally	Double	756.0	2018-6252A
2X4	1x4	2X4	16" o.c.	Rough Side Up	Horizontally	Double	965.0	2018-6252b

Notes:

1. See actual test reports for wall construction details including adhesive bead sizes
2. Tested in Accordance to ASTM E72 - Static Wall Racking Tests
3. Ultimate load does not include any required safety factors

Design Values

Ceiling Diaphragm Design Load = **203 plf** (11'-9" minimum width x 48ft. Maximum diaphragm span)

Ceiling Dead Load Resistance = **15.3 psf**

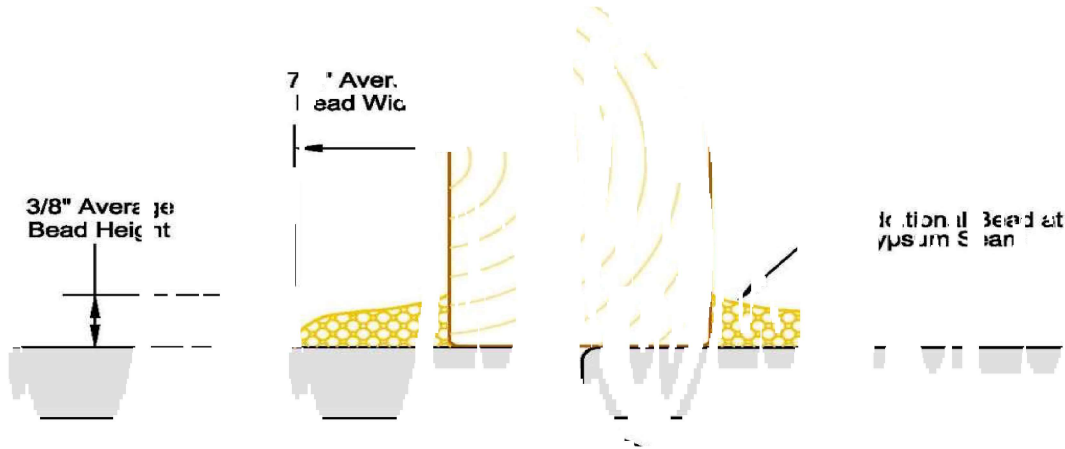
Note:

Ceiling Diaphragm and Dead Load Resistance testing is valid for all gypsum boards listed below, as long as the gypsum manufacturer maintains a third party product Evaluation Program showing compliance to ASTM C1396.

Gypsum and Cement Board Tested for Ceiling Use

1/2" USG Fiberock Brand MH Gypsum Fiber Board	1/2" American Gypsum Ceiling Board
1/2" Durock® Cement Board Next Gen (Dead Load use only)	1/2" CertainTeed Gypsum Easi-Lite™ Gypsum Board
5/16" USG Sheetrock MH Gypsum Board	1/2" CertainTeed Gypsum Interior Ceiling Board
5/8" USG SHEETROCK® Firecode Core Type X Gypsum (Dead Load use only)	1/2" Georgia-Pacific Gypsum Board
1/2" USG SHEETROCK® Brand MH UltraLight Ceiling Panels ULTRA-BASE™	1/2" USG ULTRA-BASE™ Ceiling Board

Figure 1 - Ceiling Use Average Bead Sizes



Product Labeling

Each container shipped of **AlphaSeal 5200**, that is covered by this **PER**, must have a label attached with at least the following information:

- | | |
|---|--|
| 1. Alpha Systems, Inc. Name and Address. | 4. This PER Number & Pei ES Logo |
| 2. Date of manufacture | 5. Smoke and Flame Spread Ratings |
| 3. Shelf life information | 6. Component name |

Acceptable Evaluation Marks



Product Documentation

- | | |
|---|------------------------------------|
| A Product Evaluation Service Agreement between Pei Evaluation Service® and Alpha Systems, Inc. | |
| A Follow-up Inspection Service Agreement between Progressive Engineering Inc. and Alpha Systems, Inc. | |
| A signed Quality Control Manual - Dated: April 30, 2019 | |
| Alpha Systems, Inc. AlphaSeal 5200 Technical Data Sheet - Dated: 1/21/2019 | |
| SDS for Alpha Systems, Inc. 5200A - Dated: 5/19/2015 | |
| SDS for Alpha Systems, Inc. 5200B - Dated: 4/28/2016 | |
| Opinion Letter - Dated: 8/17/2000 | Opinion Letter - Dated: 8/7/2006 |
| Opinion Letter - Dated: 8/24/2000 | Opinion Letter - Dated: 12/31/2012 |
| Opinion Letter - Dated: 10/17/2001 | Opinion Letter - Dated: 1/5/2012 |
| Opinion Letter - Dated: 11/15/2001 | Opinion Letter - Dated: 1/20/2014 |
| Opinion Letter - Dated: 8/31/2004 | Opinion Letter - Dated: 2/8/2019 |
| Opinion Letter - Dated: 8/31/2006 | Opinion Letter - Dated: 2/14/2019 |
| | Opinion Letter - Dated: 5/7/2019 |

Ceiling Diaphragm Test Reports

A *PEI* test report no. 1998-1028 - Full Scale Cathedral Ceiling Diaphragm Test 11'-9" x 48'-0" Using ALPHASEAL 5200 - Dated: 6/30/1998 - Latest Revision: 5/24/2013 Addendum K

A *PEI* test report no. 1998-1030 - Full Scale Ceiling Diaphragm Test on an 15'-6" x 48'-0" Flat Ceiling using ALPHASEAL 5200 - Dated: 7/6/1998

A *PEI* test report no. 1998-1032 - Full Scale Ceiling Diaphragm Test 15'-6" x 48'-0" Using ALPHASEAL 5200 - Dated: 7/7/1998

A *PEI* test report no. 1998-1558 - Full Scale Ceiling Diaphragm Test on an 11'-9" x 48'-0" Flat Ceiling using ALPHASEAL 5200 - Dated: 6/26/1998

A *PEI* test report no. 2004-0607 - Full Scale Ceiling Diaphragm Test on a 13'-6" x 24'-0" Using Alphaseal 5200 - Dated: 5/4/2004

Ceiling Dead Load Test Reports

A *PEI* test report no. 1998-0998 - Ceiling Dead Load Test using ALPHASEAL 5200 - Dated: 7/2/1998

A *PEI* test report no. 2000-0326 - Ceiling Dead Load Tests using 1/2" Fiberock - Dated: 2/28/2000

A *PEI* test report no. 2002-0358(A) - Ceiling Dead Load Tests using 5/16" USG Sheetrock MH - Dated: 3/1/2002

A *PEI* test report no. 2000-0358(B) - Ceiling Dead Load Tests using 5/8" USG Sheetrock Firecode Core Type X - Dated: 3/2/2002

A *PEI* test report no. 2013-0272 - PEI Standard No. 93-8 Ceiling Board Dead Load Test on 1/2" DUROCK® Cement Board Next Gen Parallel to 16" o.c. Lumber Framing using AlphaSeal 5200 - Dated: 2/14/2013 - Revised: 7/23/2013

Ceiling Sag Test Report

A *PEI* test report no. 2001-0955(C) - Ceiling Sag Test using 1/2" American Gypsum and Alphaseal 5200 Two-Part Adhesive - Dated: 6/18/2001

PEI Standard No. 93-7 Test Report

A *PEI* test report no. 2011-0675 - PEI Standard No. 93-7 Evaluation of Alphaseal 5200 With a New Polyol - Dated: 10/17/2011

Stability at 200°F Test Report

A *PEI* test report no. 2012-1394 - 2012 IBC 803.10 Wall and Ceiling Finishes Stability at 200°F Using AlphaSeal 5200 - Dated: 10/25/2012

ASTM D 6464 Test Reports

A *PEI* test report no. 2018-6262 (A) - ASTM E72 Evaluation of Sheathing Materials Double Sided Racking Load on Clayton Homes Side Wall Design using 7/16" OSB Sheathing on the Exterior Side with Mechanically Fastened OSB Strips at the Plates & 1/2" Gold Bond HS Lite on the Interior Side - Dated: 9/25/2018

A *PEI* test report no. 2018-6262 (B) - ASTM E72 Evaluation of Sheathing Materials Double Sided Racking Load on Clayton Homes Side Wall Design using 7/16" OSB Sheathing on the Exterior Side with Adhered OSB Strips at the Plates & 1/2" Gold Bond HS Lite on the Interior Side - Dated: 9/24/2018

ASTM E84 Test Report

A test report file no. FH-1150 - Surface Burning Characteristics ASTM E-84 Alpha Systems Inc. - Dated: 10/16/1998

UL-1715 Test Reports

A test report no. RCB 0307 - UL-1715 Fire Test of Interior Finish Material, dated: 12/29/2003

A test report no. RCB 0308 - UL-1715 Fire Test of Interior Finish Material, dated: 12/29/2003

ASTM D 5582 Test Report

A *PEI* test report no. 2008-1748 - ASTM D 5582 Determining Formaldehyde Levels from Wood Products using a Desiccator - Dated: 11/21/2008 - Revised: 1/12/2010

Small Scale Test Reports

A *PEI* test report no. 1999-1208 - Small Scale Shear Comparison Strength Tests - Dated: 5/5/1999 - Revised: 5/19/1999

A *PEI* test report no. 2004-1834 - Small Scale Aging Tests - Dated: 10/5/2004

Product Labels



Figure 2 - AlphaSeal 5200 A-ISO Drum Label



Figure 3 - AlphaSeal 5200 B-RESIN Tote Label



Figure 4 - AlphaSeal 5200 330 Gallon Caged Totes



Figure 5 - AlphaSeal 5200 55 Gallon Steel Drums