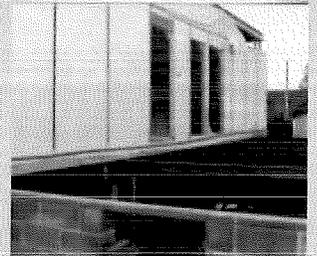




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Commodore Homes



Modular Home Installation Manual



A copy of this manual must remain with the home for reference by the homeowner.

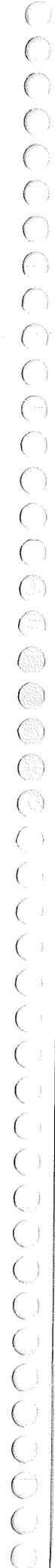


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The drawings in this manual have been prepared and reviewed in accordance with all applicable codes. These instructions are not intended to be all inclusive, nor does this manual detail every code required aspect of the building requirement. Compliance with all applicable codes per local authority having jurisdiction, whether detailed in this manual or not, must be met.

This set up manual is to be used in addition to the individual model plan, foundation, and the permit package.

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CHAPTER 1 - INTRODUCTION

Thank you for purchasing one of our modular homes. Today the modular home is made in many forms and with varying degrees of completion as it leaves the factory. Each style of home requires differing amounts of site work. Your home was designed and approved to conform to state codes in effect on the date of manufacture. These codes set forth the requirements for structural design, fire safety, plumbing, heating, and electrical systems for factory built housing designed to be used as dwellings. This Installation Manual contains instructions that must be followed for the proper installation of your home. Please familiarize yourself with all the requirements contained in this manual. Designs and specifications are subject to change without notice. The illustrations and procedures in this manual are representative of the home at the time of the printing of this manual. The following is a brief explanation of the specific styles of homes that we manufacture:

RANCH:

A ranch style home arrives in two or more modules with a roof pitch from 3/12, 5/12 to 12/12 that is hinged down to comply with shipping restrictions.

CAPE COD:

Cape Cod homes have a modular first floor with a roof pitch from 9/12 to 12/12 that is folded and hinged down to accommodate shipment. The second floor is framed and finished by the builder.

TWO STORY:

Two stories are generally manufactured and shipped as four or more modules. In addition to the same type of work to finish a ranch home, connections between the first and second floors must be made. In some cases, installation of parts between the floors may be necessary before setting the second floor on top of the first floor. NOTE: This applies only to plants that build two story homes.

REGARDING ON-FRAME DESIGNS:

Any reference in this manual to on-frame floor system design are not applicable for the state of New Jersey, Maine, and some other states. Check local codes before setting homes with on-frame designs.

INSTALLATION OF YOUR NEW HOME REQUIRES SKILLS, AND SHOULD BE PERFORMED BY A PROFESSIONAL CONTRACTOR WHO HAS BEEN TRAINED IN SETUP AND INSTALLATION AND SUBJECT TO ALL LOCAL AUTHORITIES AND JURISDICTION. PLEASE READ ALL INSTRUCTIONS PRIOR TO SETUP. NOTE: FAILURE TO FOLLOW THESE INSTRUCTIONS COULD CAUSE INJURY AND/OR DAMAGE TO THE HOME AND MAY ALSO VOID YOUR HOMES WARRANTY.

Chapter 1 - Introduction

1.1. Builder / Installer Considerations

The following guidelines have been prepared to assist the builder / installer in setting up your home. Proper setup will assure the homeowner of a home that is safe and secure for the lifetime of the structure. This installation manual along with provided drawings will show the minimum acceptable practices for field installation. Prior to locating your home, contact the local authority having jurisdiction for installation to see if permits for such procedures as excavating and foundation construction or utility connections are required. Inspections may be required during installation. On private property, zoning rules and regulations and or development covenants may apply and should be taken into consideration.

(NOTE: Preparations of the site, when completed by someone other than the home installer, may not be in accordance with these instructions.) Under no circumstances will the manufacturer be responsible for performing any of the functions listed herein. The Builder / Dealer have responsibility to assure that all of the functions described in this manual are performed adequately and in conformance with all local building codes. In any state that requires a licensed builder / dealer or contractor to erect units or to be present during the erection of units, the builder / dealer is responsible for meeting those requirements. The Builder / Dealer are also responsible for complying with all insulation requirements of the local building code.

1.2. How To Use This Manual

We have written this manual in an objective and easy to understand manner so that the instructions may be accurately followed. This manual is designed to provide information about the setup of your home from delivery of your home through final inspection. This manual MUST be used in combination with your drawing package which provides: foundation plans, tie down specifications, plumbing, electrical and other model specific information for the set up of your home. This manual also contains installation instructions, including specifications and procedures for erection and hookup of your modular home.

CHAPTER 1 - INTRODUCTION CON'T.

Illustrations in this manual are typical and may not depict actual roof lines, exterior treatments, and other specific features of any particular home. Careful adherence to this manual by the homeowner and installation crew and consultation with a registered professional or structural engineer in those unusual circumstances not covered by this manual will assure you of a safe and low maintenance home for many years to come.

1.3. Safety

ONLY TRAINED CREWS SHOULD INSTALL THE HOME. INSTALLERS SHOULD FOLLOW THE SAFETY INSTRUCTIONS PROVIDED IN THIS MANUAL.

THIS HOME WEIGHS SEVERAL TONS. ADEQUATE SAFETY PRECAUTIONS SHOULD BE TAKEN TO SUPPORT THE HOME AT EVERY STEP OF THE INSTALLATION PROCESS. NO PERSONNEL SHOULD BE ALLOWED TO WORK UNDER THE HOME UNLESS IT IS SECURELY IN PLACE.

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Chapter 2 - Site Preparation

2.1 Location and Layout

2.1.1 Use of Zone Maps

Your home is designed for a certain ground snow load, wind load, weather conditions and seismic load (see data sheet near home's main electrical panel or under kitchen sink). Do not site or relocate your home in a zone requiring greater wind, ground snow load, heating/cooling or seismic capabilities than those for which it was designed. However, it is safe to locate your home in an area with lower load or weather requirements. For example, a home designed for a 40 psf ground snow load may be sited in the 30 psf or less ground snow zones. The following charts show the applicable ground snow load, wind speed, design temperature and seismic categories. These charts, per IRC, are often amended by local and state officials therefore your local and state guideline **MUST BE** used to determine the actual requirements.

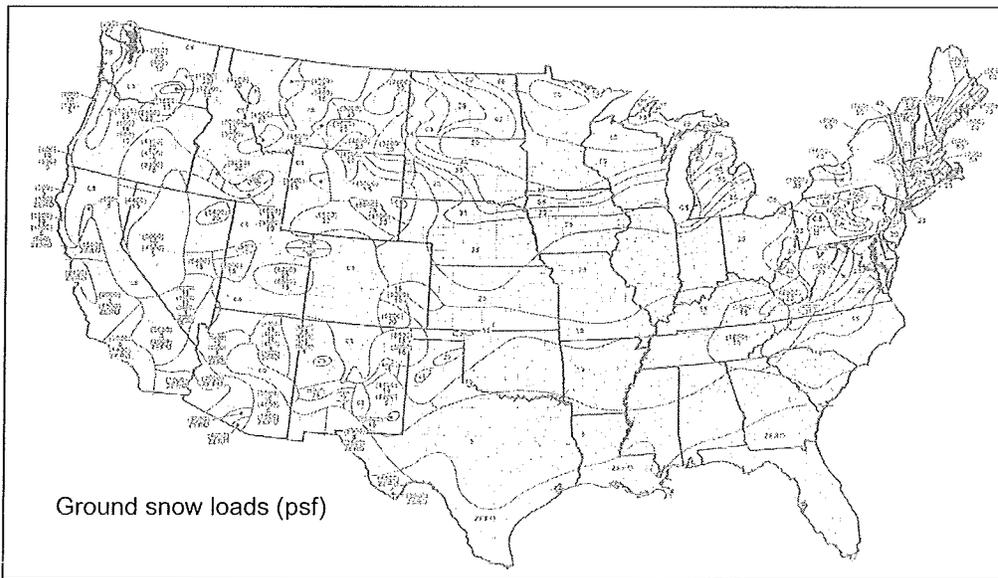


Figure 1 - Zone Map - Snow Loads

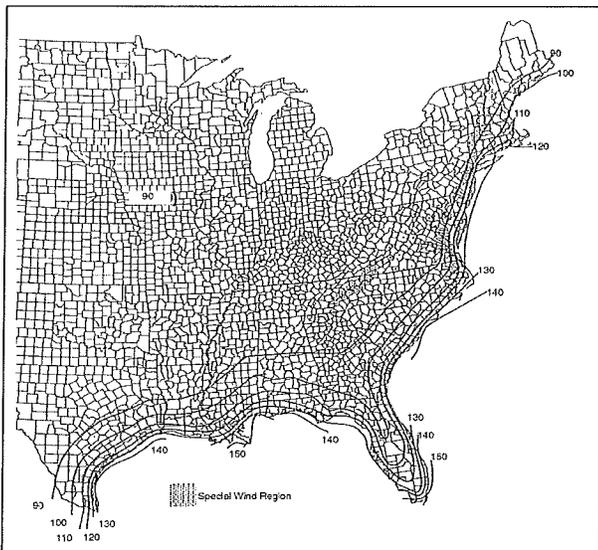
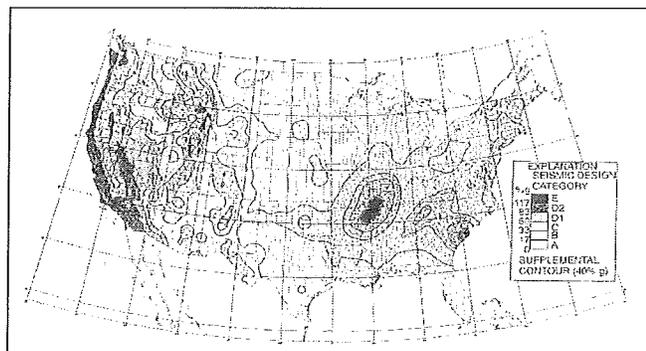


Figure 2 - Zone Map - Wind Speed



Seismic Design Categories-site class D

Figure 3 - Seismic Design Categories

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CHAPTER 2 - SITE PREPARATION

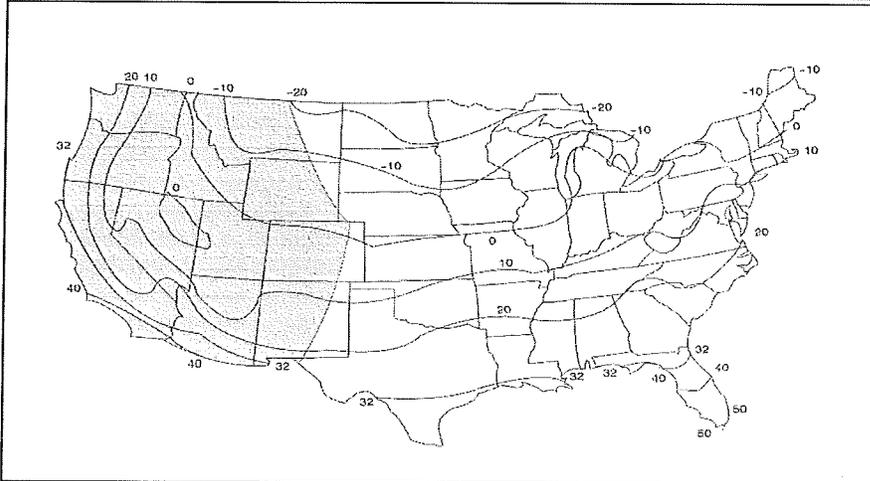


Figure 4 - Design Temperatures

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Design temperature in shaded area must be based on analysis of local climate and topography

2.2 Soil Conditions

SOIL TYPE BASED ON THE UNIFIED CLASSIFICATION SYSTEM ALLOWABLE PRESSURE (POUNDS PER SQUARE FOOT)*

ROCK OR HARD PAN 4,000 AND UP

SANDY GRAVEL AND GRAVEL 2,000

SAND, SILTY SAND, CLAY SAND, SILTY GRAVEL, OR CLAY GRAVEL 1,500

FOUNDATION FOR 1000 PSF OR LESS SOILS, UNCOMMITTED FILL (TYPES OF SOIL NOT LISTED), PEAT OR ORGANIC CLAY MUST BE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER & APPROVED BY LOCAL AUTHORITY.

NOTE: USE THE ABOVE SOIL VALUES ONLY WHEN NONE OF THE FOLLOWING IS AVAILABLE:

- SOIL TESTING INVESTIGATION AND ANALYSIS OF THE SITE.
- COMPLIANCE WITH THE LOCAL BUILDING CODE.
- COMPETENT OPINION BY A LOCAL ENGINEER OR BUILDING OFFICIAL.

* NO ALLOWANCES MADE FOR OVERBURDEN PRESSURE, EMBEDMENT DEPTH, WATER TABLE HEIGHT OR SETTLEMENT PROBLEMS.

FOUNDATION DESIGNS FOR SOIL BEARING CAPACITIES OTHER THAN THE NOTED CAPACITY ON YOUR MODEL SPECIFIC PRINT, MUST BE APPROVED BY A LOCAL AUTHORITY HAVING JURISDICTION.

2.2.1 Requirements

To help prevent settling of your home, site it on firm, undisturbed soil or fill compacted at least 90% of its maximum relative density. Installation on loose, uncompacted fill may invalidate the home's limited warranty.

2.2.2 Bearing Capacity

Test the bearing capacity of the soil at the depth of the footings after completing any grading and filling. Under unusual conditions, or if the soil appears to be peat or Uncompacted fill, consult a local geologist or professional engineer.

2.2.3 Soil Bearing Testing Methods

A pocket penetrometer (available from engineering supply houses) or other methods acceptable to local jurisdictions may be used.

2.2.4 Removal of Organic Material

Remove all decayable material such as grass, roots, and wood scraps from beneath the home, especially in areas where footings are to be placed to minimize settling of footings and insect damage. Remove shrubs and overhanging branches from the immediate vicinity of the home site to prevent windstorm damage.

CHAPTER 2 - SITE PREPARATION

2.3 Drainage

2.3.1 Purpose

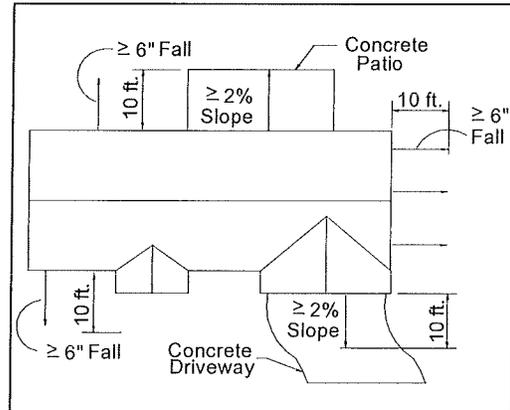
Drainage prevents water buildup under the home which may cause settling of the foundation, dampness in the home, damage to siding, buckling of walls and floors, problems with the operation of doors and windows AND COULD VOID YOUR WARRANTY.

2.3.2 Elimination of Depressions

Grade the home site to permit water to drain from under and away from the home.

2.3.3 Drainage Structures

Depending on the local landscape, ditches and culverts may be needed to drain surface runoff. If so, consult a registered professional engineer.



2.4 Ground Moisture Control

2.4.1 Importance

A vapor retarder that keeps ground moisture out of the home must be utilized.

2.4.2 Acceptable Types of Ground Cover

Use polyethylene sheeting or its equivalent, at least six mils thick. A Class-I vapor retarder is to be used. Such material will provide a permeance rating of 0.1 perm or less.

2.4.3 Proper Installation

Cover the entire area under the home with sheeting and overlap it at least 6" at all joints. Where soil and frost conditions permit placement of footings at grade level, place the sheeting directly beneath them.

NOTICE TO BUILDER / RETAILER

DISPLAY / STOCK HOMES SUPPORT AND MOISTURE PROTECTION REQUIREMENTS

PROPER GRADING OF THE SITE IS ALWAYS OF KEY IMPORTANCE FOR THE PERMANENT SITING PROCESS AND IS EQUALLY IMPORTANT DURING TIMES OF STORAGE AND TEMPORARY DISPLAY. THE FOLLOWING GUIDELINES ARE CRITICAL TO INSURE THE INTEGRITY OF THE STRUCTURE DURING SUCH TIMES :

1. SITE MUST BE GRADED IN A MANNER THAT DOES NOT ALLOW FOR WATER TO COLLECT BENEATH THE HOME WHILE IT IS IN DISPLAY OR STORAGE. IF WATER IS ALLOWED TO SETTLE BENEATH HOME, FOR EVEN SHORT PERIODS OF TIME, THE EVAPORATION OF MOISTURE WILL CAUSE WARPING AND SERIOUS DAMAGE TO DECKING AND FRAMING MEMBERS. THIS WILL SEVERELY JEOPARDIZE THE WARRANTY FOR THE HOME AND CAUSE EXPENSIVE REPAIRS.
2. A SIX MIL THICK POLYETHYLENE SHEETING OR EQUIVALENT MUST BE INSTALLED OVER THE GROUND BENEATH THE HOME TO PREVENT ANY GROUND MOISTURE FROM PENETRATING THE HOME STRUCTURE.
3. HOME MUST BE SUPPORTED WHILE IN DISPLAY OR STORAGE. USE DRY STACKED 8X16 CONCRETE BLOCK PIERS AT 8' ON CENTER AROUND PERIMETER AND BENEATH MARRIAGE LINE OF HOME. WHERE HOME IS SITUATED ON GROUND USE MIN. ABS PAD FOOTINGS BENEATH EACH PIER. (ABS PADS NOT REQUIRED ON CONCRETE FLOORS)
4. IN ADDITION, IF HOME IS TO BE ENCLOSED ABOUT THE PERIMETER WITH SKIRTING OR ANY OTHER CRAWLSPACE ENCLOSURE, CROSS VENTILATION TO THE CRAWLSPACE AREA MUST BE PROVIDED. USE A 96 SQ. IN. VENTILATOR AT EACH CORNER OF THE CRAWLSPACE AREA.

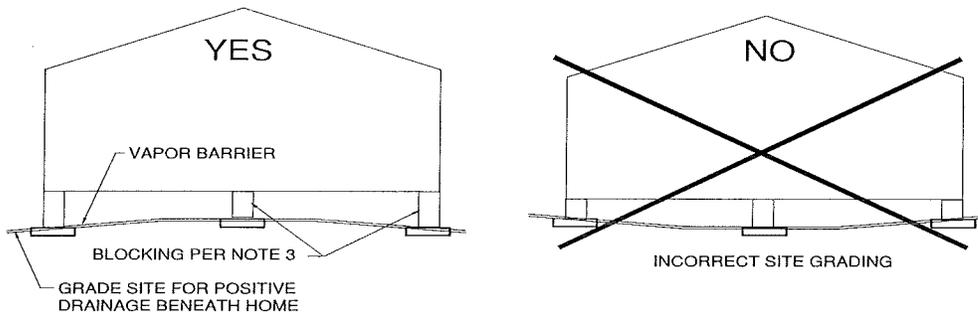
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HOMES WHICH ARE TRANSPORTED ON NON-RETURNABLE CARRIER FRAMES

FOR HOMES THAT ARE DISPLAYED, OR STORED, ATTACHED TO THE NON-RETURNABLE CARRIER FRAME, THE SAME SITE PREPARATIONS APPLY AS DESCRIBED IN NOTES 1 THROUGH 4 FOR THE OFF FRAME DISPLAY SET. TO SUPPORT HOMES ATTACHED TO THE NON-RETURNABLE FRAME DURING DISPLAY OR STORAGE, INSTALL SUPPORTS AT NO MORE THAN 12 FEET ON CENTER BENEATH THE HOME PERIMETER PLUS NO MORE THAN 12 FEET ON CENTER BENEATH THE FRAME MAIN RAILS. SUPPORT THE MATING LINE OF THE HOME BENEATH EACH END OF INTERIOR SPANS EXCEEDING 4 FEET, PLUS INSTALL INTERMEDIATE SUPPORTS SO THAT THERE IS NO MORE THAN 10 FEET WITHOUT SUPPORT BENEATH THE MARRIAGE LINE OF THE HOME.

Chapter 3 - Set-Up Procedures

3.1 Moving Home to Location

Make sure the following items are completed before placing the home:

1. ISSUANCE OF PERMITS. Be sure that all necessary local permits have been obtained and fees paid.
2. Survey the property and prepare a site plan conforming to local code requirements.
3. Excavate and construct a foundation. Insure that footings and piers are properly placed and constructed for the basement or crawlspace. Support columns are to be installed while structure is being set. Check length, width and diagonals of the foundation before set and insure sill plate is installed, and concrete work necessary to setting the home is finished.
4. Install required utility connections. (Water, Gas, Electric etc.)
5. Install items that could be difficult to install after the home is sited (such as ground moisture retarders) are in proper locations.
6. Foundation should not be backfilled until after home is fastened to the foundation. If backfilling is required prior to home installation, foundation walls must be adequately braced from the inside to resist the backfill pressure.

CAUTION: THE HOME WEIGHS SEVERAL TONS. USE ADEQUATE TEMPORARY SUPPORT BLOCKING TO SAFEGUARD WORKERS.

3.1.1 Access for Transporter

Before attempting to move your home to the installation site, be sure the transportation equipment can get through. Remove any overhanging branches and raise any overhead wires. Special transportation permits may be required from state, county or city officials.

3.1.2 Encroachments and Setback Distances

Obey local laws regarding encroachments in streets, yards and courts, and permissible setback distances from property lines and public roads. Consider future additions, such as awnings and screened rooms.

3.1.3 Fire Separation Distance

The distance your home must be sited from other structures depends on its fire resistance rating in conformance with local requirements. Contact the plant of manufacture or the inspection agency identified on the data plate for additional fire resistance rating information.

3.1.4 Positioning Multi-Section Homes

1. Place the second section near the first (2-4) feet.
2. Remove all shipping materials and items that stick out from the mating surfaces of both sections.

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3.2 Set Using a "Roll-On" System

The spreader bars under the floor must be in contact with at least 5 floor joists. A home longer than 60' would require three spreader bars per side (6 per half). Homes with truss joists require reinforcements and extreme care at the contact points. The roll-on cross beams **MUST BE** located at the truss joints with additional 2x10 (2' min. length) attached to trusses for reinforcement. While jacking up the home, make sure it stays level. Refer to foundation layout for attachments and other requirements.

CAUTION: WHEN THE HOME DOES NOT HAVE INSULATION IN THE FLOOR SPACE, THE FOUNDATION WALLS MUST BE INSULATED TO PREVENT CONDENSATION AND HEAT LOSS THROUGH THE FLOOR. FAILURE TO PROVIDE ADEQUATE DRAINAGE COULD AFFECT YOUR HOME AND IT'S WARRANTY.

1. Provide adequate support for the home to be rolled onto the foundation. Utilize enough support beams to insure that the home does not sag between these beams.
2. Where backfilling is necessary prior to home installation, foundation walls must be adequately braced before backfilling to resist backfill pressure.
3. Basement area must be graded level and free of water and obstacles.
4. Level ground on work side is recommended.
5. A flat compacted work area for equipment is recommended. The pad should be equal to length of foundation plus length of dozer or moving equipment.
6. Balance of foundation can be backfilled or graded level to allow a work area for set crew that is free of obstacles such as piles of dirt, holes, etc. If you backfill, assure that basement walls are properly reinforced.
7. Properly sized footings for support columns (jack posts) should be in place before setting the home. Support columns of adequate size should be on site for installation as home is being set. For maximum spacing of support columns refer to foundation plan and floor plan.

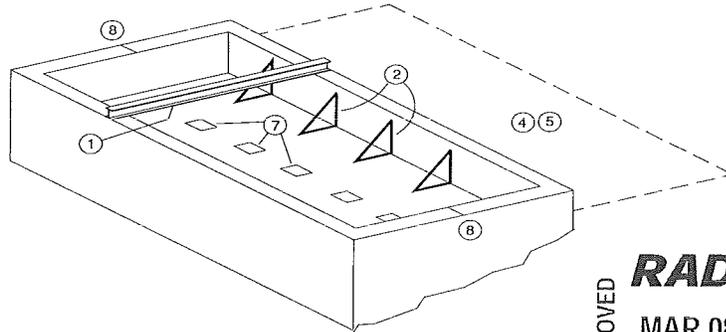
CHAPTER 3 - SET-UP PROCEDURES

8. Mark the center line of each end wall on sill plate. Placement of the first home section to these alignment marks will insure that the house is exactly square on the foundation.
9. Clear out debris in and around foundation
10. Check foundation before set to insure that it is square and level.

NOTE: THE RESPONSIBILITY FOR SET UP BELONGS TO THE DEALER / INSTALLER. ANY DEVIATIONS FROM THE RECOMMENDATIONS IN THIS MANUAL ARE AT THE INSTALLERS OWN RISK.

ROLL ON SITE PREPARATION (NUMBERS ON DIAGRAM RELATE TO CORRESPONDING STEPS IN WRITTEN PROCEDURE ABOVE)

Figure 5 - Roll-on System



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3.3 MOVING UNITS TO FOUNDATION

1. Prepare your support system to roll the home across the foundation. Make sure the structure is properly supported from the carrier all the way across the foundation and that the system is level with or above the sill plate.
2. Reinforce the center of each track from the basement area.
3. Position, next to the foundation, the first home section to be set. Remove all transit wrap (plastic), straps, staples, etc. To insure a close fit between marriage walls, all debris must be removed from mating side of home sections. Remove front and rear angle braces. If the home has a hinged roof, it is recommended that the roof be raised on each home section before setting home. Refer to raising hinged roofs (Chapter 5) for general instructions.
4. Level the carrier with the house on it. After carrier and house are level, block carrier on both sides approximately 10 feet on center.
5. Remove all bolts which connect the modules to the steel transporter (carrier). Lift home section using jack or other lifting apparatus. Raise the house high enough off the carrier to allow clearance for support and dollies.
6. Use an appropriate transfer system to move the house from the carrier into position over the foundation. Use proper equipment as recommended and/or supplied by roll system manufacturer to move home section across foundation. If the home has factory installed duct work or drain lines beneath floor joists, spacer must be used to prevent crushing during roll-on procedure.
7. To set the house exactly square on the foundation, place the first section to the previously marked center alignment marks (see Figure 6).

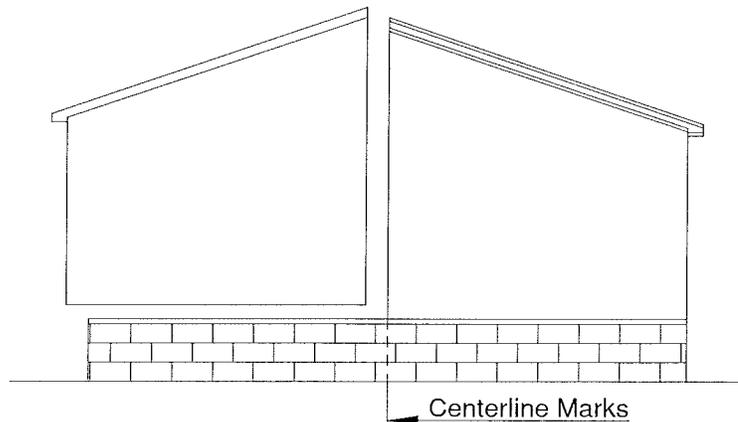


Figure 6 - Centerline Marks

8. After unit is in final position, remove dollies by raising the home with jacks, remove the dollies, then lower the home to the sill plate at the exterior wall. The beam must be wide enough to go under all of the marriage line joists. If it does not, another wider plate has to be put on top.
9. Next, place second half of house as close as possible to the foundation, but allow at least 4 feet of solid ground as working area on both sides of home. Adjoining surfaces of marriage walls must be cleared of all obstructions (transit wrap, nails, wire, etc.) that may hinder mating of the two sections.
10. After cleaning obstructions, insulate or seal around the perimeter of the mating surface and all openings.
11. Repeat steps 4 through 10 with second section of home.
12. Complete closing units together by using come-along and mate the home sections. Care and proper assembly methods will assure a close fit without binding.
13. Use large clamps at each marriage wall opening to draw halves together.
14. Metal straps are shipped in the home to secure roof and marriage wall openings after proper alignment is achieved.
15. When sections are properly mated, they are to be fastened together as described in Chapter 6, using supplied fastenings in ship loose materials. These bolts are to be fastened per your floor plan requirements through the marriage line rim joists. Do not tighten bolts until all openings are properly aligned (refer to section 6.4).
16. After leveling home, secure support columns and sill plate to home sections.
17. Stack carriers after set is complete.
18. For hinged roof close up, see hinged roof setup.

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3.4 CRANE SET SITE PREPARATION (Before Crane Arrives)

1. Removal of small sections of sill plate may facilitate removal of straps or lifting cables as each home is set. Location and number of cuts will depend on position and number of straps used in lifting the home sections. Reinstall sill plate after straps are free. (If perimeter joists are drilled for cables as described in Figure 8, removal of plate sections is not applicable.)

NOTE: Some homes may be provided with "crane ready" factory installed cable chases and pre-drilled reinforced pick-up points on the perimeter joists of the home. In this case, the pick-up points have been predetermined. Sill plate notching and perimeter joist drilling for crane cables will not be required by the site installer.

2. Where backfilling is necessary prior to home installation, foundation walls must be adequately braced before backfilling to resist backfill pressure.
3. Basement area must be graded level and free of water and obstacles.
4. Level ground on work side is recommended.
5. A flat compacted work area for equipment is recommended. The pad should be of sufficient area to facilitate the craning procedure. Consult your crane contractor for requirements.
6. Balance of foundation can be backfilled or graded level to allow a work area for set crew that is free of obstacles such as piles of dirt, holes, etc. If you backfill, assure that basement walls are properly reinforced.
7. Properly sized footings for support columns (jack posts) should be in place before setting the home. Support columns of adequate size should be on site for installation as home is being set. For maximum spacing of support columns refer to foundation plan and floor plan.
8. Mark the center line of each end wall on sill plate. Placement of first home section to these alignment marks will insure that the house is exactly square on the foundation.
9. Clear out debris in and around foundation
10. Check foundation before set to insure that it is square and level.

3.5 SET UP PROCEDURE USING A CRANE:

This type of set up must only be done by an experienced installer. The following are the minimum guidelines for craning a standard home only.

1. An approximate weight of the home should be obtained per following procedure:
Area of each section (SQ. Ft.) x 39 (use 47 for Cape Cods & storage roofs) = Approximate weight per section.
For example weight per section of a home 30' wide x 68' long: 15' (width per section) x 68' x 39 = 39,780 pounds.
Note: If this home was constructed with storage type attic (or Cape Cods) the weight would be:
15' (width per section) x 68' x 47 = 47,940 pounds.
2. The rating of the crane and the lifting equipment must exceed the calculated weight of each section.
3. Use of properly rated straps (vs. cables) are recommended to reduce damage at lifting areas. Additional reinforcements and protection are required at edges of floor and roof where lifting straps are in contact with the home. It is the responsibility of the installer to protect the home against damage at pressure points during the craning of the home.
4. Homes 40' in length or less would require two lifting points. Lifting points must be at the ¼ points (length / 4 from each end. For example, lifting points for a 40' long home is at (40'/4) = 10' from each end. Homes longer than 40' would require an additional lifting points at each end. See illustration for location of cables.
5. Use of spreader bars between cables are required to reduce pressure points at the sidewall and floor. Home must be set on a foundation that is level and square. Refer to foundation layout for attachments and other requirements.
6. If home has a hinged roof, it is recommended that the roof be raised after home has been craned onto the foundation. Refer to raising hinged roof (crane set).

NOTE: Homes provided with crane cable chase have conduits for cable or strap pre-located and installed by factory. Feed crane pick-up cable or strap through each conduit provided to facilitate required pick-up of each home section. No locating, drilling or notching is necessary on homes provided with this system. Remove strap or cable after home section is set. Conduits and angle irons are intended to be permanent installations on home.

7. If home being set does not have crane-ready floor system, crane straps/cables should be positioned as shown in figures 7 & 8. Cable holes may be drilled in perimeter joists 2" minimum from bottom of joists (exterior side only). This will prevent lifting straps or cables from being trapped between sill plate and floor system. The rim joists are not to be notched or cut. Install temporary support directly above the drilled cable holes in perimeter joists. This should consist of a 24" 2x4 minimum studwall between ceiling beam and floor where the cable is located in mate line open spans.
8. Lower sling/straps over unit to be set. Place straps under home and attach to sling. Locate straps so that there is solid contact with the floor joists that are under wall studs and roof trusses to insure proper lifting support. If home is equipped with crane-ready floor system, run straps or cables through predetermined chases provided at perimeter floor joists.
9. Lift sling over section until straps are taut. Each half can be lifted at a slight angle to make it easier to position home on foundation. (Lift module off of carrier about 12" to insure correct weight distribution and module connections.)
10. To set the house exactly square on the foundation, place the first section to the previously marked center alignment marks.
11. A length of strap (tag line) should be fastened at the two opposite corners of the section being set. This is to assist the positioning of the section during set from a safe distance.
12. Locate the first unit flush with the rear end wall. A dimension check should be made from the mating wall to the front of the foundation to assure exact placement of the sections. The distance from the center line should be split so that the sheathing overhangs the foundation wall.
13. Place the basement support column jacks with half of the support plate under the mating wall rim joist of the module.
14. After the first section is in final position on the foundation, unhook sling and remove crane straps or cables through wedges cut in sill plates (or through cable chases if factory equipped).
15. Adjoining surfaces of mating walls must be cleared of all obstructions such as transit wrap, nails, wire, etc. that may hinder mating of sections. After clearing obstructions, insure that the perimeter of the mating surface and all openings are sealed as per Figure 11.
16. If home has duct crossovers cut into the mating rim joists these openings must be totally cleared and sealed around. (Not all homes have rim joist crossovers).

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CHAPTER 3 - SET-UP PROCEDURES



NOTE: Temporary support bracing installed at mating line spans is to remain in place until home sections are installed.

NOTE: Some homes will incorporate "crane ready" pre-drilled, reinforced pick-up points on the perimeter joists of the home. This detail is intended for use with homes which do not have factory installed cable chases (see typical detail below).

2-POINT PICK-UP
FOR HOME LENGTH (L)
36'-0" TO 40'-0"

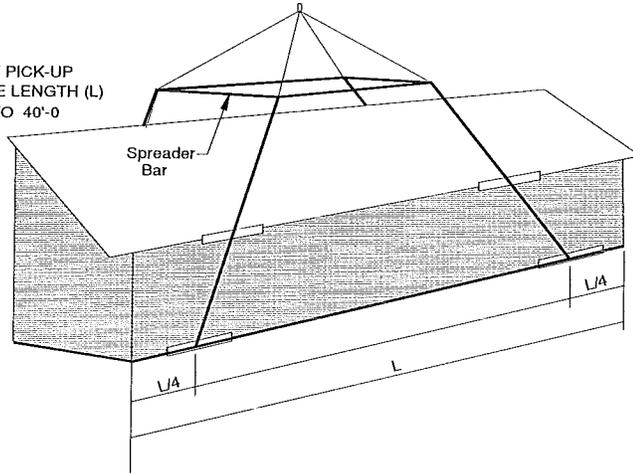


Figure 7 - 2 Point Pick-up

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4-POINT PICK-UP

44'-0" TO 76'-0"

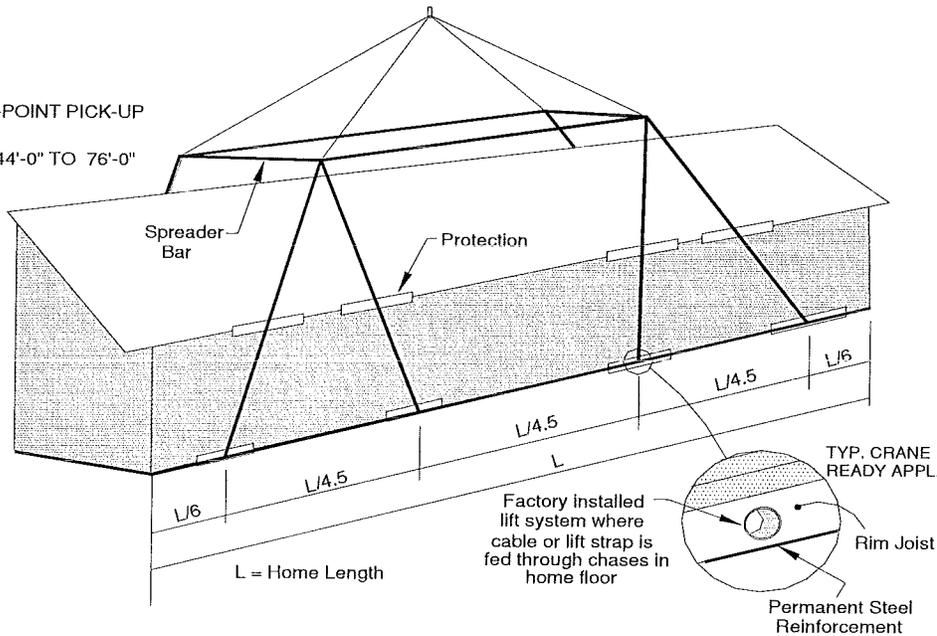


Figure 8 - 4 Point Pick-up

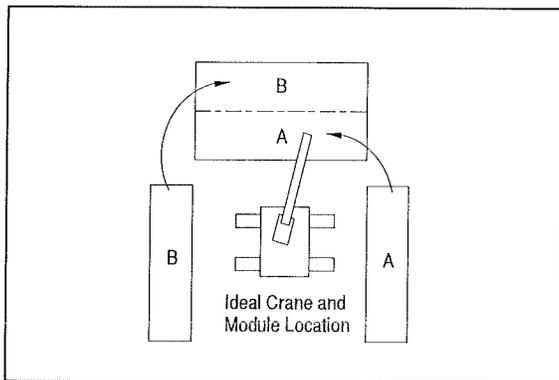
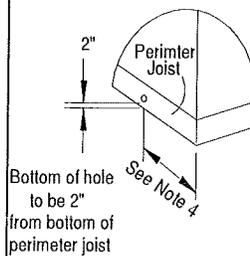


Figure 9 - Ideal Crane and Module Location

Add support studding above cable holes. In open spans install temporary 24" stud wall above cable holes.



Note:
This procedure is not necessary with "Crane-Ready" floor system. (see details on Figure 8)
Refer to Figure 7 and 8 if pick-up points need to be determined on site.

Figure 10 - Cable Holes for Crane Lift

Figure 11 - Sealing of Mate wall

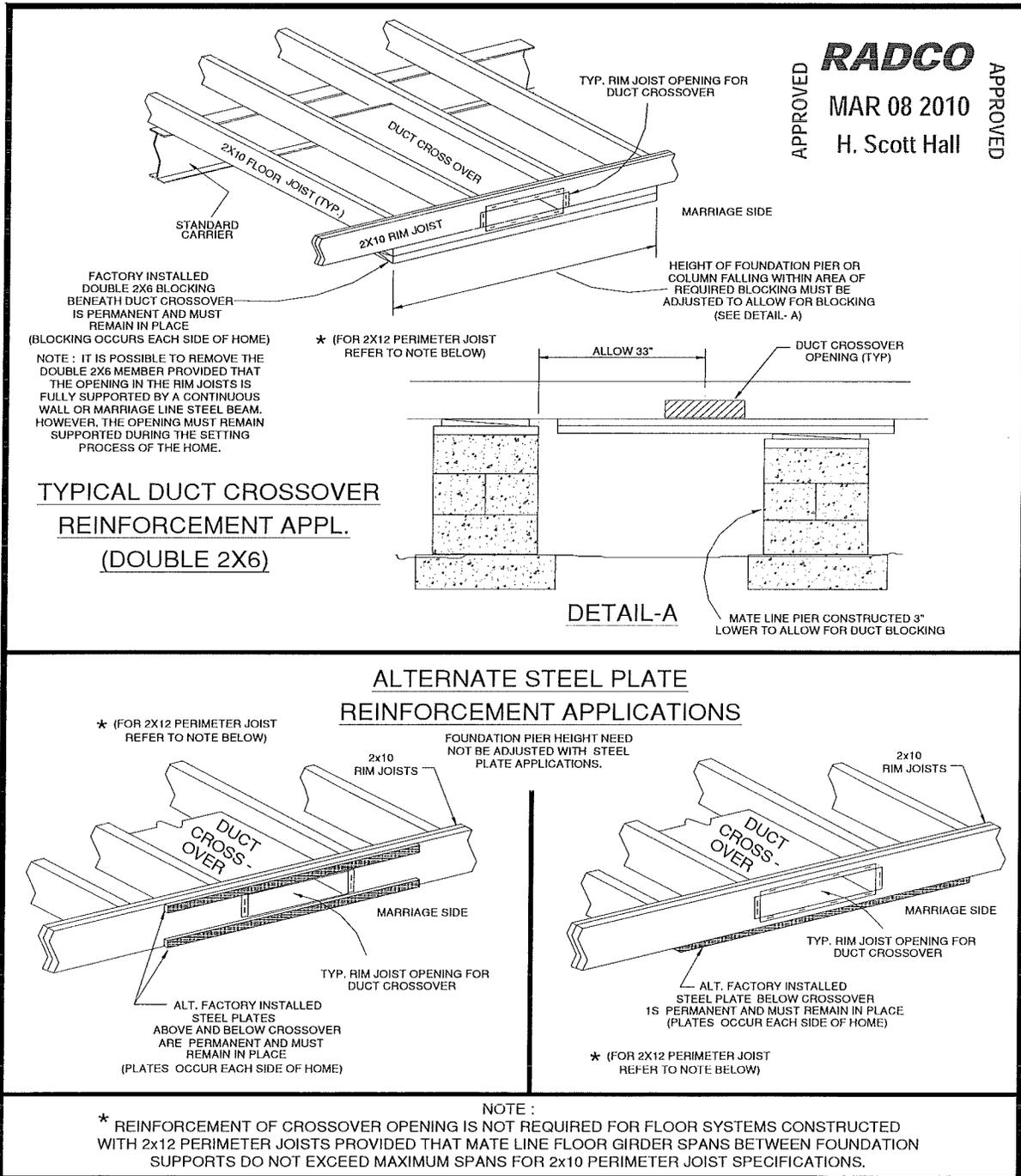
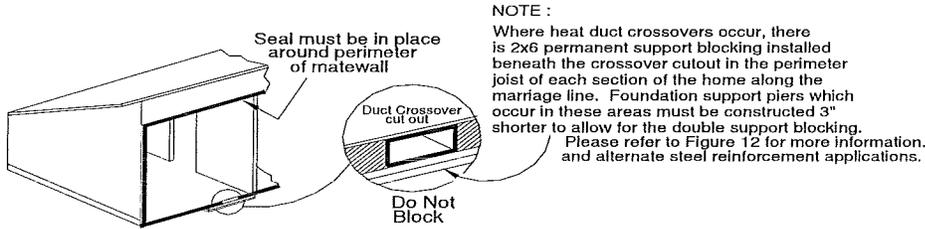
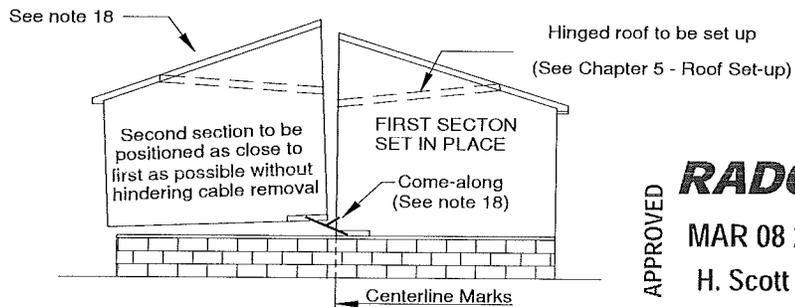


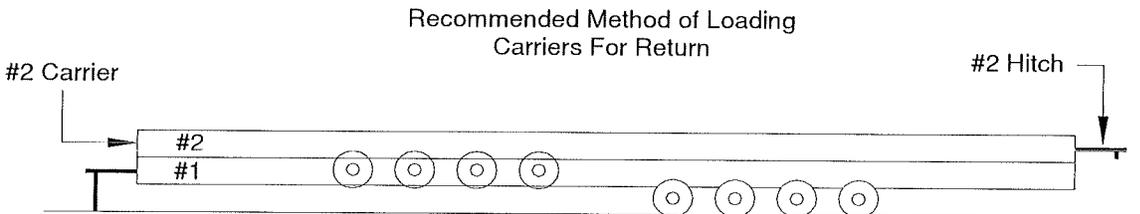
Figure 12 – Rim Joist Heat Duct Crossover Details

Figure 13 -
Set Second Module



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17. Set second module close to the first module using the same procedure. Bring the sections together until they are as close as possible without hindering cable removal. Come-alongs fastened to the exterior corners of home sections can be used to complete the closing of the units. While pulling come-alongs, insure that all parts are coming together properly. They will mate without binding if care and proper assembly methods are applied.
18. Use large clamps at each marriage wall opening to draw halves together.
19. When sections are properly mated, they are to be bolted together using bolts supplied in ship loose materials and per your floor plan requirements through the marriage line rim joists. Do not tighten bolts until all openings are properly aligned (refer to appropriate details in Section 6).
20. Stack carriers after set is complete (see Figure 14).



NOTE : Park carriers as close to highway as possible
Alternately: #2 Carrier may be inverted (wheels up) and rest beam to beam on Carrier #1.

Figure 14 - Loading Carriers for Return
FOR FINAL CLOSE-UP REFER TO APPROPRIATE SECTIONS OF THIS MANUAL.

CHAPTER 4 - FOUNDATION & STRUCTURAL REQUIREMENTS

Chapter 4 - Foundation & Structural Requirements

4.1. CONTRACTOR RESPONSIBILITY

4.1.1 ALTERNATIVE FOUNDATIONS: Typical foundation details provided in this section are designed to give general information. For design deviations to the plan or special requirements, consult a Licensed Professional Engineer locally. When the foundation plans are designed by others, the designer of the building plans shall not be held liable for the foundation design or any related structural damage or structural component systems failure related to a foundation issue. Alternative foundations such as Foundation Works and Superior Walls may be approved as alternate foundations for your home as long as the foundation plans are reviewed and approved by a Professional Engineer.

4.1.2 FOUNDATION CONSTRUCTION: The contractor is responsible for the design and construction of the foundation. This includes temporary bracing and shoring of the structure as required during all phases of the construction process. It is also the Contractor's responsibility to properly size, determine the location or spacing of piers, and install the correct footing. Refer to applicable sections of IRC for requirements to protect exposed wood siding sheathing and other wood based products from decay. Failure to install proper foundation may lead to sagging floors, walls and roofs.

4.1.3 CODES AND STANDARDS: The Contractor is responsible to build the project in full accordance with the most current edition of all applicable codes and standards.

4.1.4 PLAN REVIEW: Contractor is responsible to refer to the Architectural drawings to determine locations for dropped floor areas, floor drains or any related plans that affect the work.

4.1.5 FOOTINGS SUPPORT: Install concrete as required. If additional reinforcement is required it shall be the responsibility of the Contractor to provide support in the footings.

4.1.6 PERIMETER FOUNDATIONS: Perimeter foundation walls and piers may be poured in place with concrete (28-day compressive strength of at least 2,500 psi) OR Concrete Masonry Blocks (CMU's) mortared in place per local codes. Mortar to be type "M" or "S" per ASTM C-90. Piers must be capped and shimmed with wedges and located as specified in foundation layouts.

4.1.7 REBAR AND REINFORCEMENT: The Contractor will be responsible to see all rebar members are properly assigned and tied in place prior to pouring the concrete. All reinforcement must be held in place during the pouring of the concrete.

4.1.8 WEATHER CONDITIONS: The Contractor shall take all precautions when the concrete is being placed and cured during very cold or hot weather conditions. The Contractor shall follow the procedures established by the ACI for hot and cold weather conditions.

4.1.9 STRUCTURAL STEEL: The structural steel contractor shall provide web reinforcement at all openings in steel members including beams, joists and girders.

4.2 ACCEPTABLE TYPES OF FOOTINGS

4.2.1 CONCRETE. Footings may consist of precast or poured-in-place concrete, with a 28-day compressive strength of at least 2,500 psi. All concrete and reinforcing shall be installed to comply with the standards set forth in the latest edition of ACI-318.

4.2.2 OTHER MATERIALS. You may also use other materials approved for this use by local authorities if they provide equal load-bearing capacity and resistance to decay.

4.2.3 PLACEMENT IN FREEZING CLIMATES.

1. CONVENTIONAL FOOTINGS. To help prevent the harmful effects of the ground frost heave, footings should usually be placed below the frost line. Consult local authorities to determine frost penetration.
2. INSULATED FOUNDATIONS. Footings may also be placed above the frost line when the home is provided with a perimeter foundation having insulation properties sufficient to prevent freezing of the soil under or adjacent to every load-bearing component of the foundation and acceptable for this purpose to the local authority having jurisdiction. For this application, the footing and the perimeter foundation walls are insulated. Refer to IRC for provisions to create conditioned air by eliminating the crawlspace ventilation.

CHAPTER 4 - FOUNDATION & STRUCTURAL REQUIREMENTS

4.2.4 PROPER SIZING OF FOOTINGS. (See floor plan specific foundation layout provided with your home for the size of footing [based on standard soils]). Proper sizing of footings depends upon the load-carrying capacity of both the piers and the soil. The foundation design has been prepared in the absence of a soil report; soil conditions should be evaluated prior to commencement of the foundation work.

4.3 SPECIAL CONSIDERATIONS.

4.3.1 DESIGN. The foundation must be designed and built to local codes and ordinances and must be approved and inspected by local building officials.

4.3.2 CRAWLSPACE.

- a. An access to the crawlspace shall be provided according to Section 408 of IRC.
- b. Crawlspace vent required: use minimum per code enforced vents. Number, size, locations and construction of vents shall conform to IRC Section 408.
- c. Minimum crawl space ventilation required:
 1. Per IRC Section 408.
 2. Must meet local code requirements.

4.3.3 SUPPORT POSTS. Foundation steel support posts per local codes provided on site by others. Support post to be secured to concrete floor as shown or a minimum of (2) 5/8" diameter bolts with 1-1/2" min. penetration or equivalent.

4.3.4 FLOOD PRONE AREAS. We do not recommend siting your home close to a river in flood prone areas or other flood prone areas. Special local regulations or flood insurance provisions may apply. Special elevation and anchoring techniques are required when locating in a flood prone area. Consult a registered professional or structural engineer to make sure that home design and construction conform to applicable federal, state and local codes and regulations.

4.3.5 SEVERE WIND AREAS. Special foundation and anchoring techniques are required when locating the home in a severe wind area is unavoidable. Consult a registered professional or structural engineer. Do not place your home in a wind zone more severe than the one indicated on the data plate.

Protection of glazed openings in windborne debris regions must be provided on site according to IRC R-301.2.1.2. This would also include garage door windows.

4.3.6 SPECIAL SNOW LOAD CONDITIONS. Homes designed for and located in heavy snowfall areas or subject to other extreme loading conditions may require special piers or footings. See table and/or special manufacturer's instructions provided with your home. Any required steel connections shall be welded with a fillet all around unless otherwise noted. Weld size shall be the maximum allowed by the latest edition of the "Manual of Steel Construction" based on the thickness of the material. Field cutting and burning is not permitted without the approval of an engineer.

4.4 IMPORTANT REFERENCE DOCUMENTS

4.4.1 Wood Frame Construction Manual (MWFC) - Latest edition.

4.4.2 Applicable International Residential Code (IRC) with applicable state amendments.

4.4.3 Standard for Residential Construction in High Wind Regions, ICC-600.

4.4.4 ASCE 7-05 "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES"

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1801 ALEXANDER BELL DRIVE
RESTON, VA. 20191

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CHAPTER 4 - FOUNDATION & STRUCTURAL REQUIREMENTS

4.5 Typical Foundation

The foundation details in this chapter are for general illustration. Since some states have specific foundation design requirements, always refer to the floor plan package for your home, as well as all local code requirements.

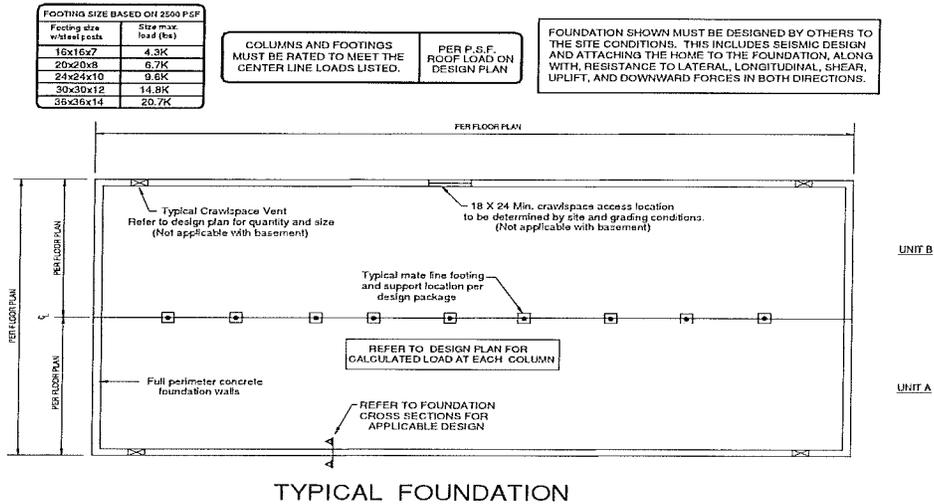


Figure 15 - Typical Foundation

4.5.1 Typ. Ranch foundation details

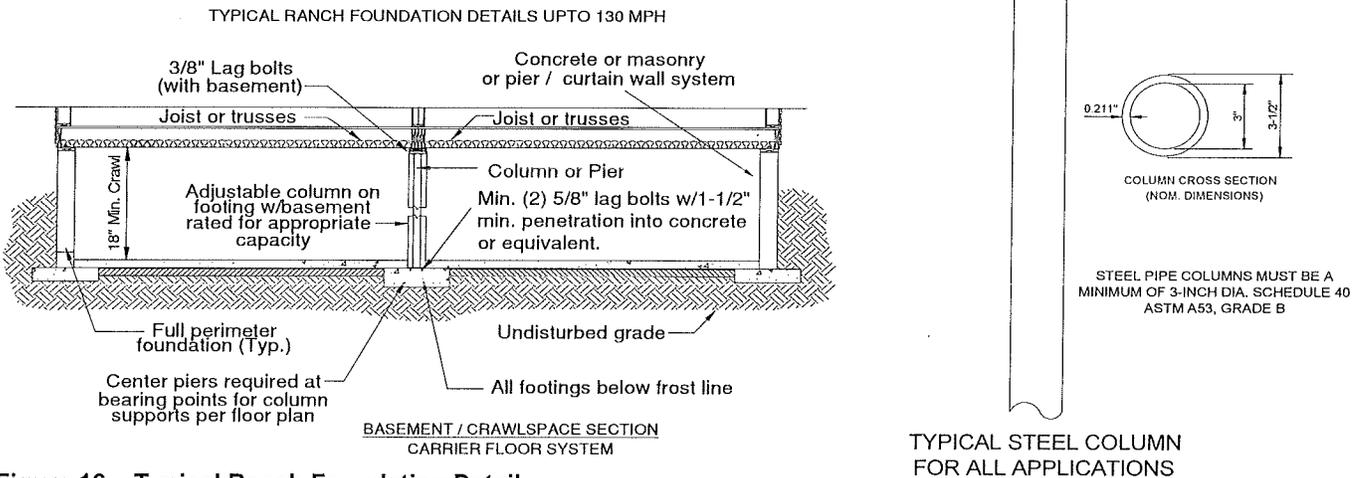
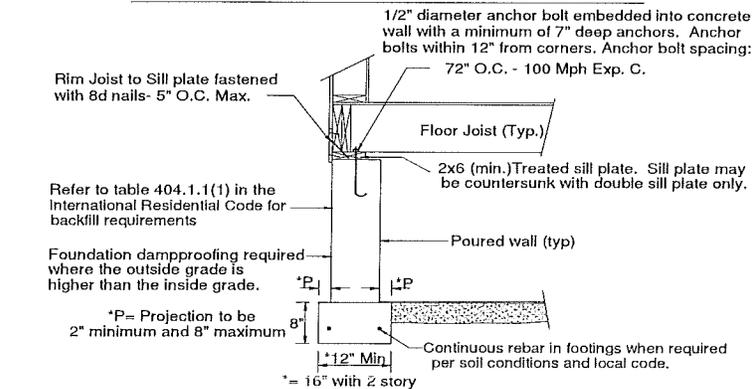


Figure 16 – Typical Ranch Foundation Detail

IRC TYP. FOUNDATION CROSS SECTION - UP TO 100 MPH



Applicable to Seismic Zone C with minimum soil bearing capacity of 2500 PSF. Concrete - 2500 PSI. min. Wind speed up to 100 Mph Exp. C. Refer to Chapter 4 in the International Residential code for specific foundation application or CMU Construction. Refer to the wind bracing pages for additional tie down and braced wall requirements if prescriptive wall bracing is not met.

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Figure 17 – Typical Foundation Cross Section

CHAPTER 4 - FOUNDATION & STRUCTURAL REQUIREMENTS

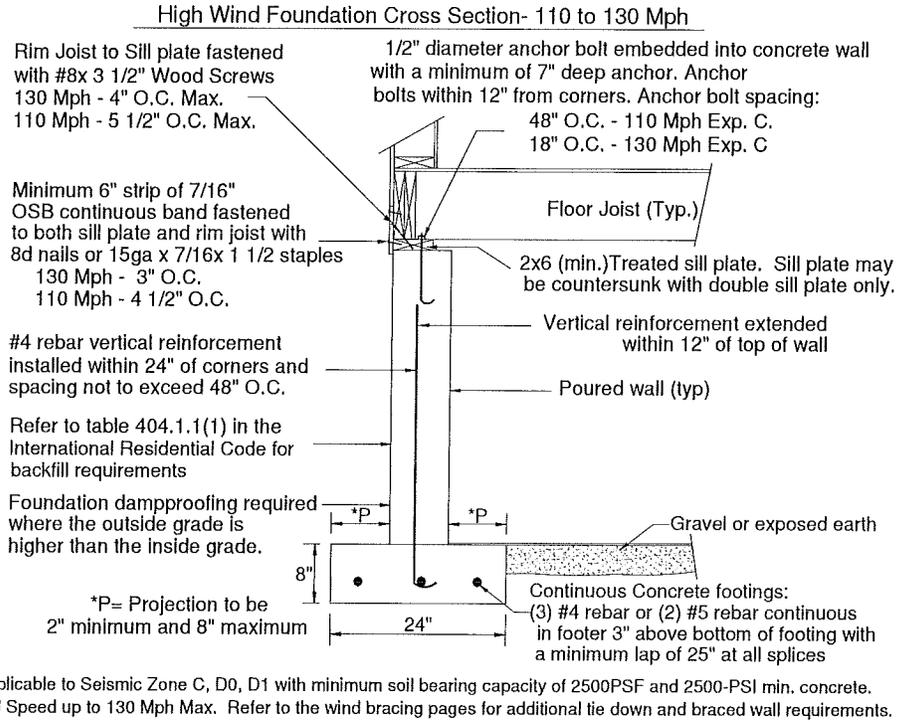
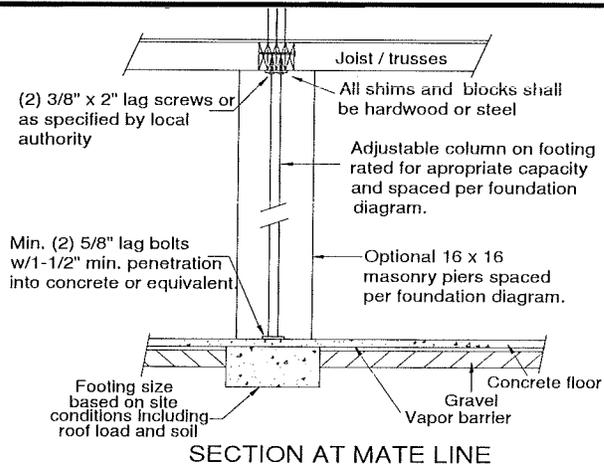


Figure 18 - High Wind Foundation Cross Section



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Figure 19 - Off-Frame Foundation Sections

Ends of stair header must be supported by column for longitudinal stairs (which run parallel to the length of the home). It is important that the support is beneath the header ends and not necessarily the joist that it is attached to. For stairwells running transverse (perpendicular to home length), support is not required beneath the stair header.

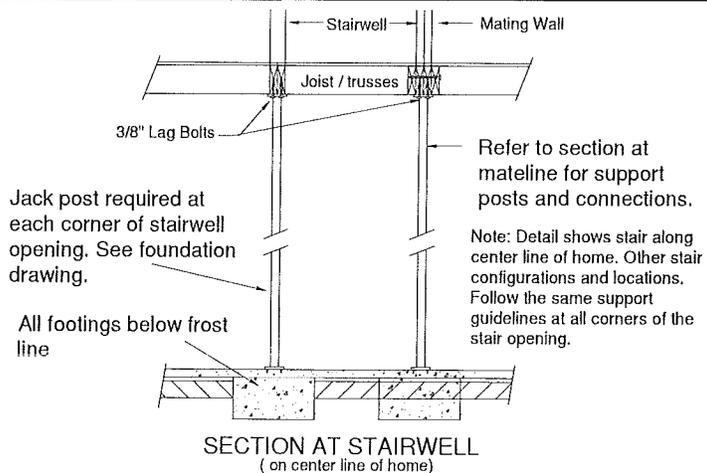
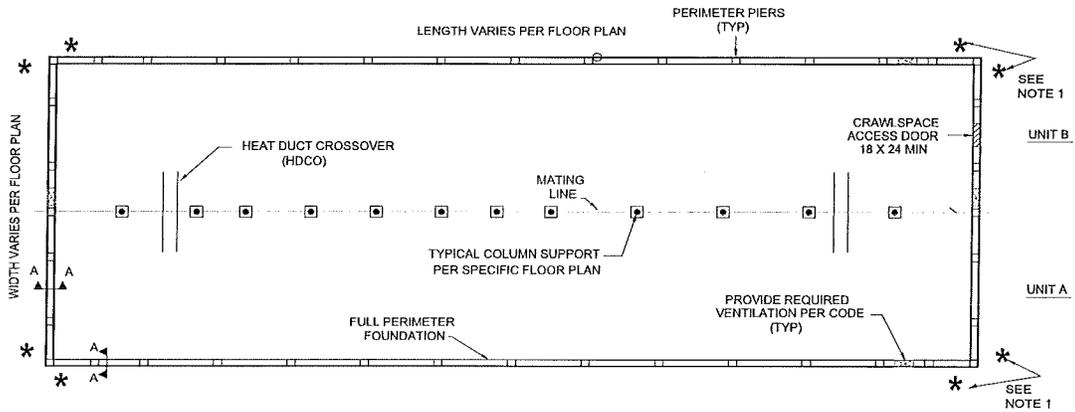


Figure 20 - Cross Section at Stairwell



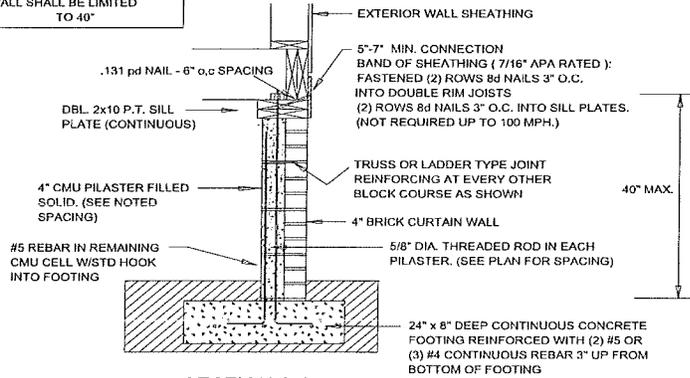
PERIMETER PIER FOUNDATION

SEE SECTION A-A FOR DETAILS AND SPACING

* Note 1: Additional tie down at end walls / sidewalls may be required - see floor plan for loading and / or requirements.

Figure 21 – Perimeter Pier Foundation

FOR PIER SPACING UP TO 6'-0". CURTAIN WALL SHALL BE LIMITED TO 40"



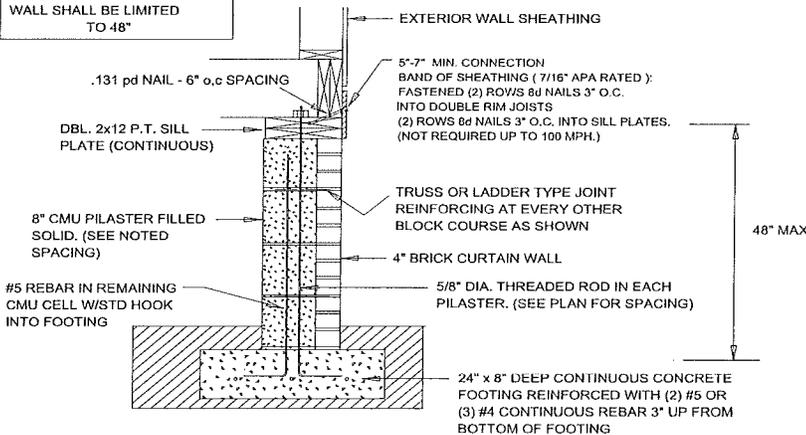
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Consult local requirements regarding flashing, air space and weep hole provisions.

4" CMU PILASTER

APPLICABLE TO:
 WIND LOAD = 130 MPH
 EXPOSURE = C
 FROST DEPTH / MIN DEPTH = 12" BELOW GRADE OR BELOW FROST DEPTH

FOR PIER SPACING UP TO 6'-0". CURTAIN WALL SHALL BE LIMITED TO 48"



8" CMU PILASTER

Figure 22 - Curtain Wall Details

CHAPTER 4 - FOUNDATION & STRUCTURAL REQUIREMENTS

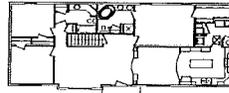
4.5.2 On-frame Typical Foundation Sections

FOOTING SIZE BASED ON 2500 PSF	
FOOTING SIZE W/ STEEL POSTS	SIZE MAX. LOAD (LBS.)
16"x18"x4"	4.9K
20"x20"x4"	6.7K
24"x24"x10"	9.6K
30"x30"x12"	14.8K
36"x36"x14"	20.7K

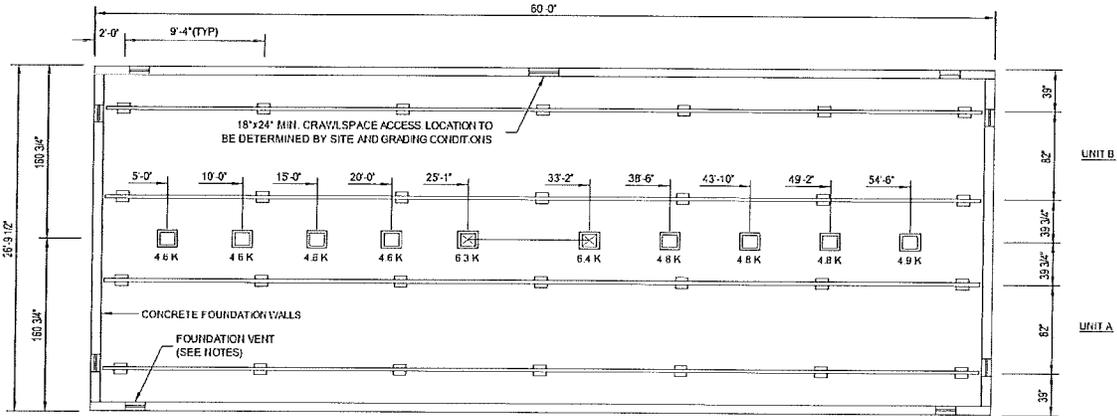
COLUMNS & FOOTINGS MUST BE RATED TO MEET THE CENTER LINE LOADS LISTED

GROUND SNOW LOAD: **30 PSF**

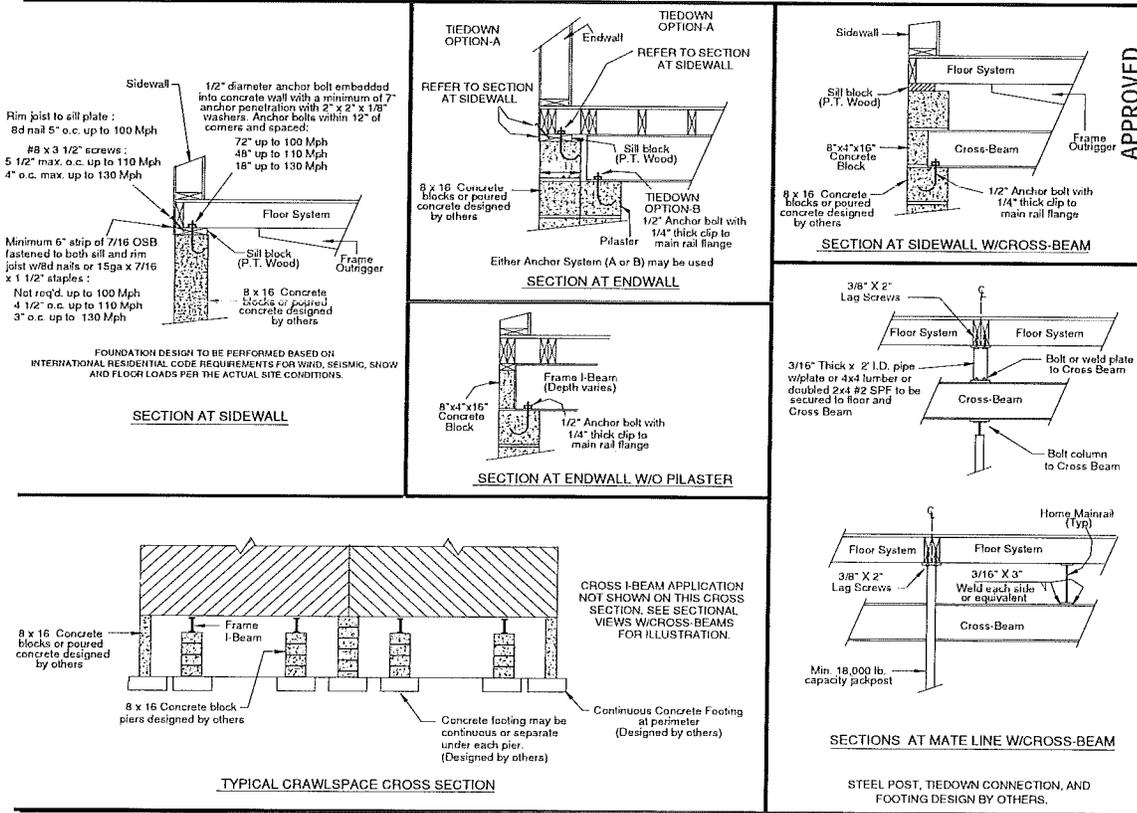
BALANCED ROOF LIVE LOAD: 23.1 PSF



FOUNDATION SHOWN MUST BE DESIGNED BY OTHERS TO THE SITE CONDITIONS. THIS INCLUDES SEISMIC DESIGN AND ATTACHING THE HOME TO THE FOUNDATION, ALONG WITH RESISTANCE TO LATERAL, LONGITUDINAL SHEAR, UPLIFT AND DOWNLIFT FORCES IN BOTH DIRECTIONS.



ON-FRAME TYPICAL FOUNDATION SECTIONS



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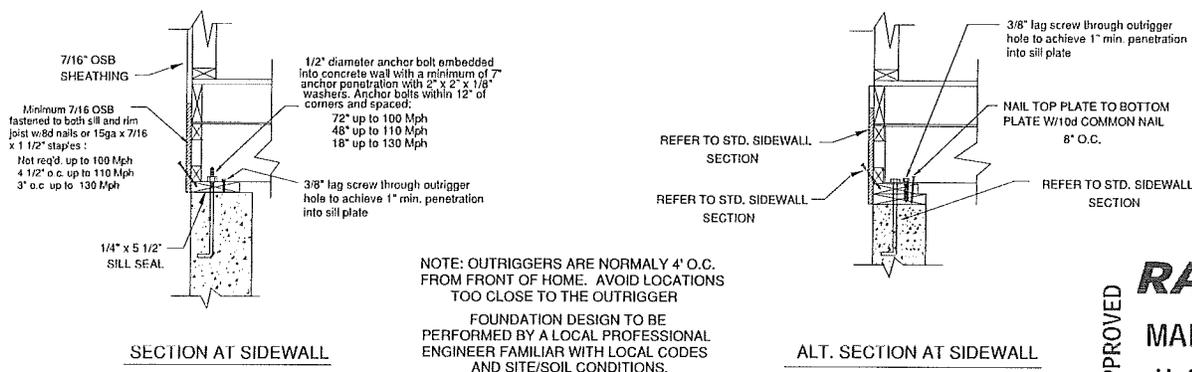
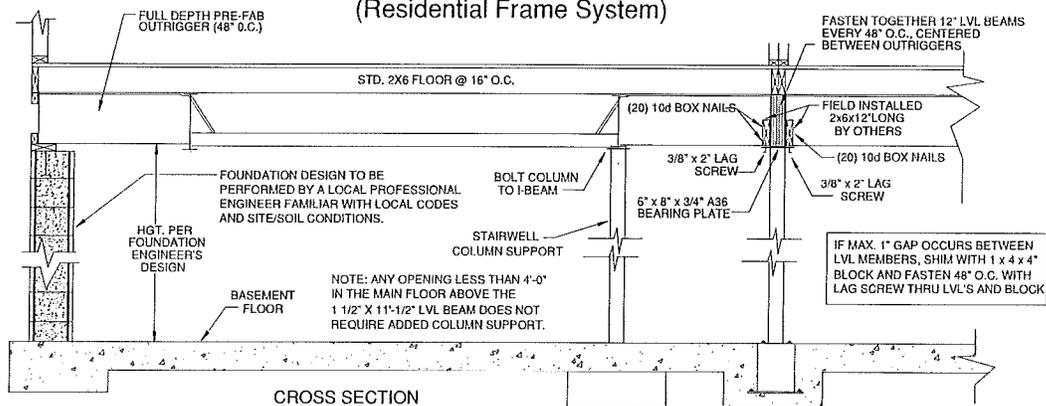
- NOTES -

- THE FOUNDATION MUST BE DESIGNED AND BUILT TO LOCAL CODES AND ORDINANCES AND MUST BE APPROVED AND INSPECTED BY LOCAL BUILDING OFFICIALS.
- AN ACCESS CRAWL HOLE 18 X 24 SHALL BE PROVIDED TO THE CRAWL SPACE.
- ROOF LIVE LOAD DESIGN AS SHOWN ON FOUNDATION LAYOUT.
- FOUNDATION STEEL SUPPORTS PER LOCAL CODES PROVIDED ON SITE BY OTHERS. SUPPORT POST TO BE SECURED TO CONCRETE FLOOR AS SHOWN OR A MINIMUM OF (2) 5/8" DIAMETER BOLTS WITH 1-1/2" MIN. PENETRATION OR EQUIV.
- CRAWLSPACE VENT REQUIRED: USE MINIMUM PER CODE ENFORCED VENTS. NUMBER, SIZE, LOCATION, AND CONSTRUCTION OF VENTS SHALL CONFORM TO IRC SECTION 408.
- BASEMENT STAIRS MUST MEET ALL OF THE LOCAL CODE REQUIREMENTS.
- MINIMUM CRAWL SPACE VENTILATION REQUIRED:
 - PER IRC SECTION 408.
 - MUST MEET LOCAL CODE REQUIREMENTS.
- FOOTERS BELOW FROST LINE.
- EQUIVALENT FOUNDATION SILL STRAP MAY BE SUBSTITUTED FOR ANCHOR BOLTS WHERE ALLOWED BY CODE, AND WHEN INSTALLED PER STRAP MFG. INSTRUCTIONS.

NOTE : NJ, MA and some states do not permit On-Frame designs. Check local codes before siting homes with On-Frame design.

Figure 23 – Typical Standard Frame

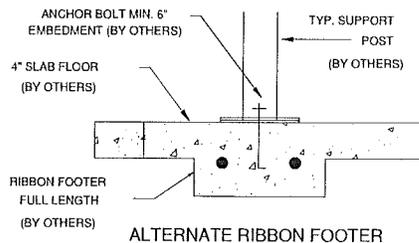
ON-FRAME TYPICAL FOUNDATION SECTIONS
(Residential Frame System)



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FASTENING SCHEDULE		
BUILDING ELEMENT	NAIL OR STAPLE	NUMBER/LOCATION
PERIMETER RAIL TO SILL PLATE	12d NAIL	ALL SIDES @ 12" O.C. - 90 MPH, EXP. C ALL SIDES @ 9" O.C. - 110 MPH, EXP. C ALL SIDES @ 6" O.C. - 120 MPH, EXP. C ALL SIDES @ 4" O.C. - 130 MPH, EXP. C

NOTE: NJ, MA and some other states do not permit On-Frame designs. Check local codes before setting homes with On-Frame design.



DETAILS ON THIS PAGE ARE SITE INSTALLATION AND ARE THE RESPONSIBILITY OF LOCAL AUTHORITY HAVING JURISDICTION FOR DESIGN APPROVAL AND INSPECTION.

THE INDICATED MAXIMUM CLEAR SPANS ARE BASED ON AN ASSUMED 8" LONG BEARING PLATE ON JACKPOST, OR SILL PLATE OF MASONRY PIER.

Figure 24 – Typical Residential Frame

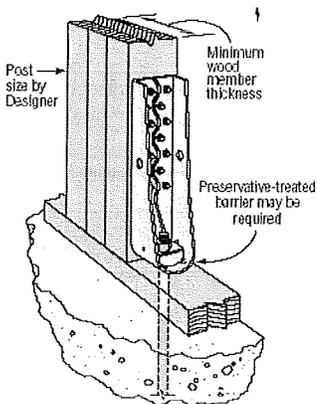
4.5.3 Foundation Tie-Downs

Wind and seismic forces must be transferred to the foundation. They are carried from the walls to the roof and floor diaphragms (sheathing). The floor diaphragm loads are transferred to the foundation by the standard home-to-foundation connections (anchor bolts, etc.) as are called out typical in this installation manual. The loads carried by the roof diaphragm are transferred to the braced wall sections in home. In regions with wind speed of 100mph or less when the home meets prescriptive requirements set forth by the IRC, then the typical connections are adequate to carry those loads as well. However, in any case where High Wind Zones (100mph+) are required, or other facets of the construction preclude the use of the IRC prescriptive design, then a calculated method is used to design the braced walls and additional sheathing, fastening, and foundation tie-downs are required. These will be found in various locations on the Bracing Wall, Foundation Plan, and Floor Plan Sheets in the home's design package.

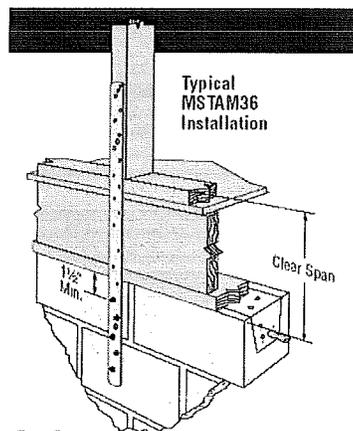
The sheathing and fastening requirements for the factory built portion is addressed during construction, but the additional foundation tie-downs and sliding fasteners at the bracing walls must be provided and installed according to site conditions by others. It is our intent to provide a braced wall design for each home that can be implemented in the field without requiring a technical understanding of bracing wall design. We provide the horizontal (plf's) and the tie-down loads with the locations where they are required. In some cases optional double studs are located near tie-down locations (per floor plan) to facilitate certain types of tie-downs (those able to carry higher loads with greater distance from edge of concrete). All tie-downs and horizontal connections should be chosen by a local engineer or a technical professional as required by local codes. Horizontal connections may be achieved through lag bolts and continuous exterior sheathing and /or sill plates (i.e. Simpson LTP's) per required load. There are three typical tie-down styles that are described below, but there are many others on the market which may be used, provided they meet the loads required by the manufacturer. Below is an overview of these three tie-down types. They are given as examples and are not meant to restrict the installer's choice or to advocate one connection manufacturer over another. (Please see the below for illustrations of each type of tie-down.) They are:

1. Predeflected Hold-downs (i.e. Simpson Strong-Tie HDU) are used with pre-installed anchor bolts in the exterior wall stud cavities. Installation of these types of connectors would require removal of OSB sheathing at the noted load points. Concrete wall must be drilled with application of approved adhesive per manufacturer instructions.
 2. Strap ties (i.e. Simpson Strong-Tie MSTAM) are attached to the exterior wall of the home and foundation. Follow manufacturer fastening and installation method. These straps may be installed over exterior sheathing fastened to studs extending to the foundation (check mfg. instr. for provisions).
 3. Strap tie hold-downs (i.e. Simpson Strong-Tie STHD) are pre-installed in the foundation and attached to the exterior wall of the home. These straps may be installed over exterior sheathing fastened to studs extending to foundation.
- Each of these types of tie-downs have installation requirements that must be closely followed to ensure the loads given by their manufacturers can be effectively transferred. Please scrutinize them closely before installation. NOTE: The capacity of the selected fasteners MUST be in excess of the loads noted on the foundation (or bracing wall) design. Multiple fasteners may be used (where allowed by fastener manufacturer) to meet or exceed specified loads. Consult your local engineer/architect for alternate designs, attachments and options.

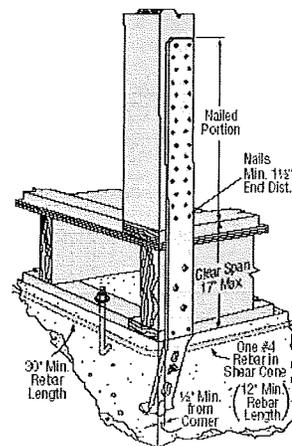
Modular homes designed for 110 - 130 mph wind zones may be installed in areas with lower wind speeds. IRC and your local codes may be used as an alternate for provided foundation and attachment plans where home is located in wind speed areas of 100 mph or less.



Vertical HDU Installation



Typical MSTAM36 Installation



Typical STHD14RJ Rim Joist Application

Refer to fastener installation instructions for load capacity of the fasteners. The allowable fastener capacity must be equal or greater than noted loads. Fasteners must be located at load locations specified on foundation designs.

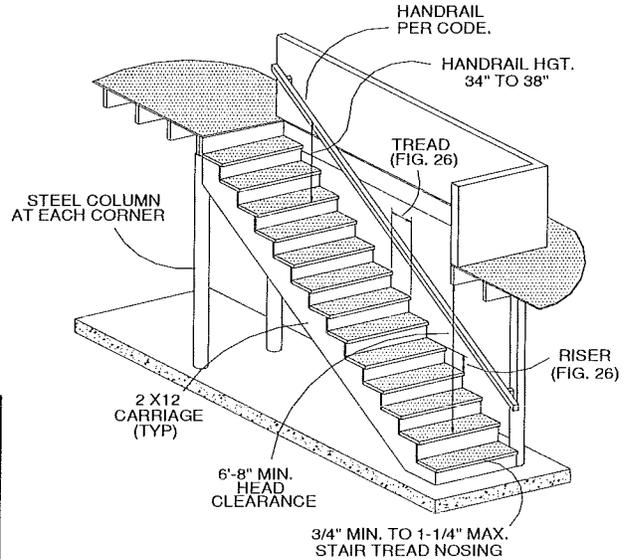
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4.5.4 Typical Stair Construction

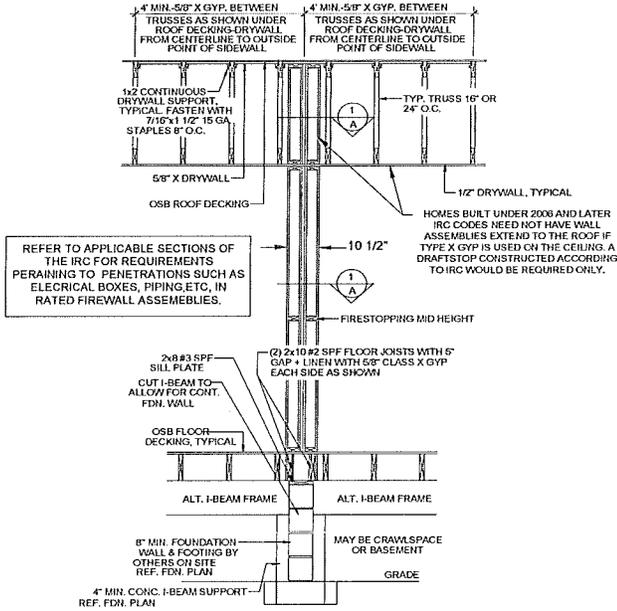
Figure 25 - Typical Stairwell Construction

NOTE: Numerous States have addendums to the International Residential Code which permit the use of CABO code riser and thread dimensions. Figure 26 depicts the rise and run for both a CABO and IRC code stairs. Check state and local codes to determine the appropriate stair geometry to be used.

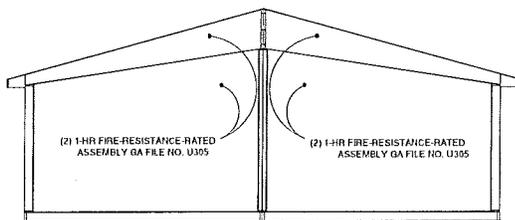
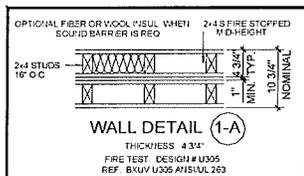
Note: Stairwell enclosure must be insulated when adjacent to unconditional areas.



4.5.6 Fire Separation



(2) 1 HR FIRE-RESISTANCE-RATED WALL CROSS SECTION



1. Nail heads - Exposed or covered with joint compound.
2. Joints - Exposed or covered with fiber tape and joint compound except where required for specific edge configuration, for the tapered, round edge wall board joints covered with joint compound or fiber tape and joint compound.
3. Wall board gypsum- 5/8" thick wallboard paper or vinyl surfaced, with beveled squared or tapered edges, applied either horizontally or vertically, wallboard nailed every 7" o.c. with 6D cement coated nails 1-7/8" long .0915"

4.5.5 Typical Stair Rise & Run

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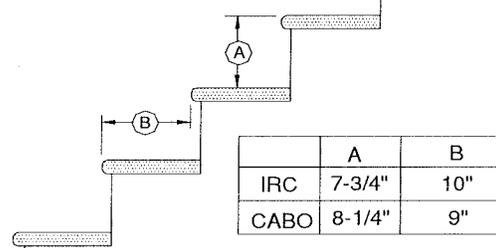


Figure 26 - Typical IRC/CABO Stair Rise & Run

Duplexes or other multi-family dwellings require fire separation by one or two hour fire rated partition assemblies as required by local codes. Garage areas must also be treated for fire separation from the dwelling. Note that these assemblies must provide protection continuous through the attic area of the home as well as the partitions. These must be completed in the field after the roof is raised and set in place by a qualified Installer/Builder.

Figure 27 - Fire Separation

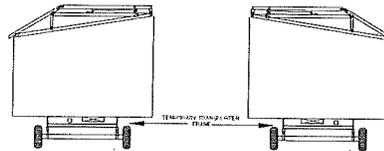
Chapter 5 - Roof Setup

5.1 RAISED HINGE ROOF - ROLL-ON SET

The following procedure is a general application for raising hinged roofs, which have a single hinged support brace for the top chord. The illustration depicts a cathedral ceiling truss, but the procedure is applicable for flat ceiling trusses as well.

1. The home has been shipped with the roof in its collapsed position as shown in Figure 28. Remove all shipping material from the roof, the marriage wall, and both sections of the home. Home may have factory - installed duct and plumbing systems below floor joists. With such conditions, home must be lifted onto a spacer atop the foundation that will allow moving sections across without damaging these elements (or consider crane set application).
2. The hinged top chords of the roof trusses have been connected together in the factory using a 2x tail rail. This rail is continuous and has been permanently fastened to the ends of the top chords in order to maintain proper spacing and facilitate uniform lifting of the roof section.

Figure 28 - Roof - Collapsed Position



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3. Raise the hinged roof simultaneously by use of jacks or other appropriate lifting devices. The lifts or jacks must be placed to allow no more than six feet between the jacks and so there is a jack at each end of the roof. Raise the hinged roof high enough to allow hinged support section to be moved into its support position. Do not over raise the hinged roof section.
4. The lifting devices must be secure and stable. If jacking, the jacks must be positioned over solid structure such as studs or column supports. Never jack against ceiling board alone.

Also refer to Figure 32 for alternate connection applications.

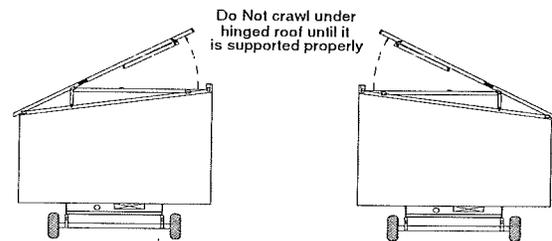
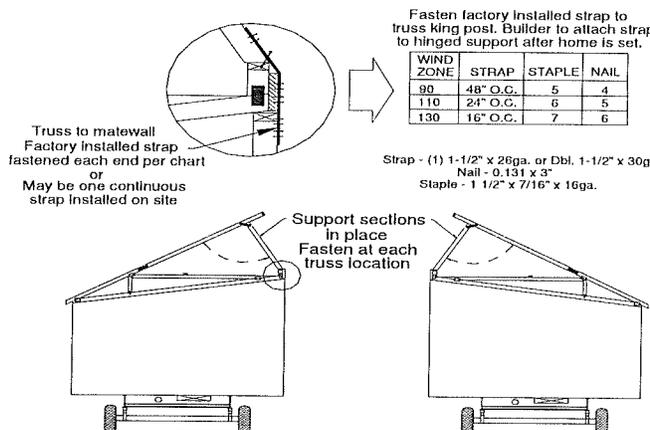


Figure 29 - Roof - Raised Position - Roll On Set

NOTE: SEE ROLL - ON SET INSTRUCTIONS FOR MOVING SECTIONS ONTO FOUNDATION. REFER TO GENERAL CLOSE-UP PROCEDURES FOR ROOF MATING CONNECTIONS.

Figure 30 - Roof - Support Sections in Place - Roll On Set

5. Once the main roof section of the home is elevated, the hinged support sections are positioned to firmly support the roof. The hinged support members are connected together at the ends with a tie member (bottom plate). These are tied together in 8 to 12 foot sections to facilitate ease of placement. See Figure 30.
6. When the support section is in place, toe nail the support section bottom plate to each truss king post with two 16d nails.

5.2 Raised Hinge Roof – Crane Set

5.2.1 Set Procedure

For crane set application, it is recommended to raise roof after home is set onto foundation. However, the roof may be raised prior to craning sections to foundation as well. This may even be necessary if folded down truss members protrude across marriage line. Refer to Raising Hinged Roofs (Roll-On Set) for general guidelines if roofs are to be raised prior to setting sections onto foundation. In either case, with crane onsite, the crane should be utilized in lifting the roof sections as opposed to jacking as described in Roll-On instructions.

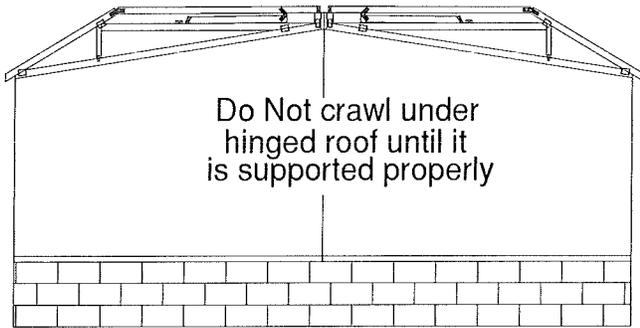


Figure 31 - Roof - Collapsed Position - Crane Set

1. Remove any protective wrap, debris, or other material from between the sections before attempting to raise the hinged portion of the roof.
2. The hinged top chords of the roof are typically connected together at the ends of the top chords in order to maintain proper spacing and to facilitate uniform lifting of the roof section.
3. Using the crane(s) carefully lift the hinged portion of one section of the roof and let the hinged support sections swing free. Do not over extend the hinges.
4. Once the main roof section of the home is elevated, the hinged support sections are positioned to firmly support the roof. The support "struts" are connected together at the ends with a tie member. These are tied together using 8 to 12 foot sections to facilitate ease of placement.

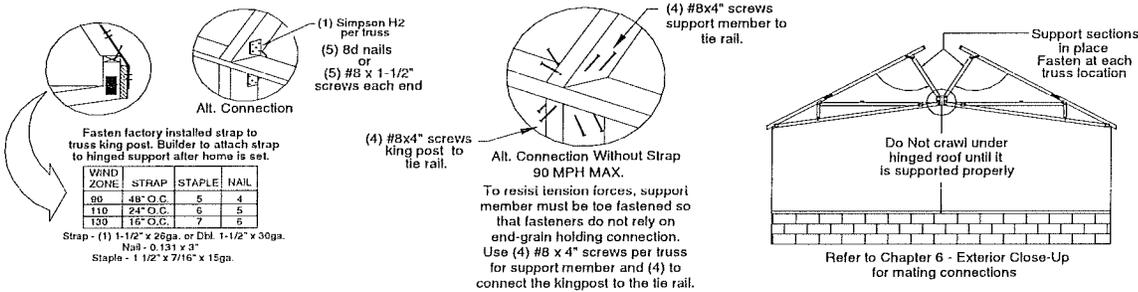


Figure 32 - Roof - Raised Position - Crane Set

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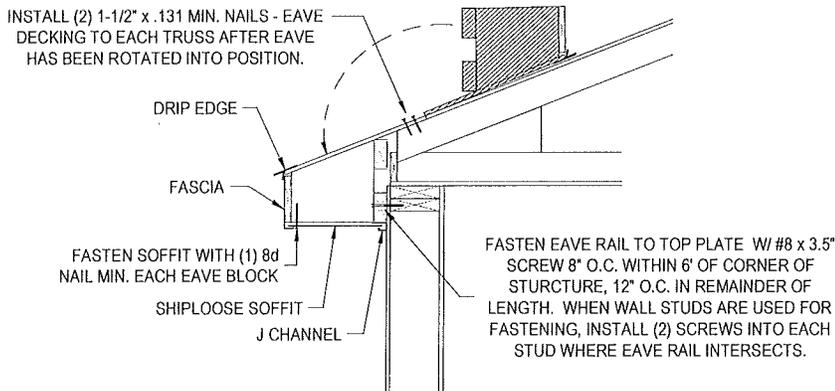


Figure 33 - Roof - Flipped Eave Details

5.4 Cape Roof Set-Up

NOTE: THIS INSTALLATION INCORPORATES THE FACTORY INSTALLED FOLD-UP DORMER PACKAGE. THIS PACKAGE MAY OR MAY NOT BE PRESENT.

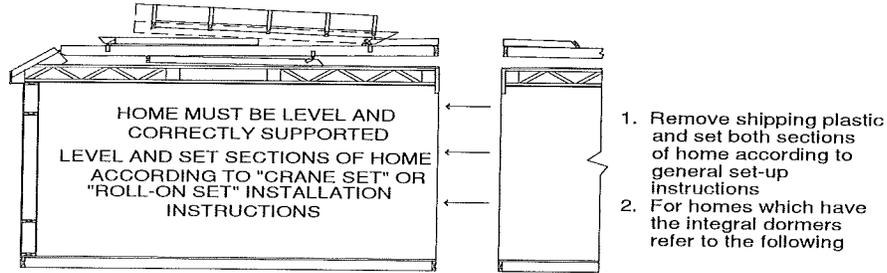
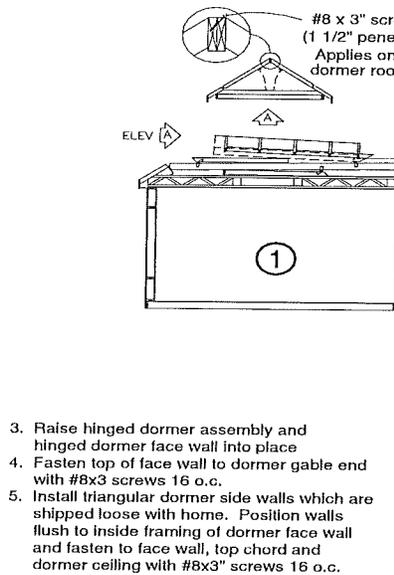
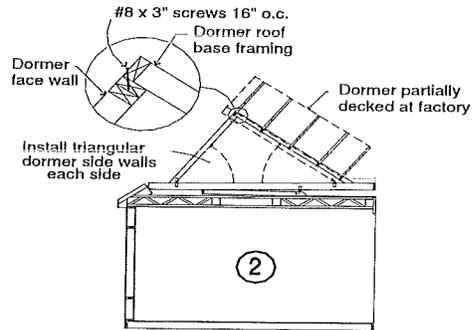


Figure 34 - Roof Dormer Installation - Shipping Position

5.4.1 Roof Dormer Setup



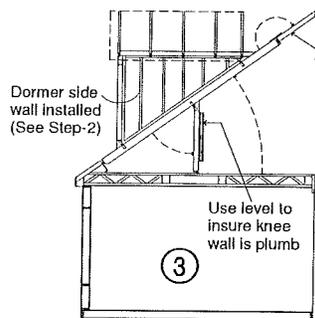
1. Raise the dormer top chords into place as shown in Elevation A.
2. Fasten dormer ridge members together with #8x3" screws 16" o.c. (1 1/2" penetration minimum)



3. Raise hinged dormer assembly and hinged dormer face wall into place
4. Fasten top of face wall to dormer gable end with #8x3 screws 16 o.c.
5. Install triangular dormer side walls which are shipped loose with home. Position walls flush to inside framing of dormer face wall and fasten to face wall, top chord and dormer ceiling with #8x3" screws 16 o.c.

Figure 35 - Roof Dormer Installation - Raise Dormer Top Chords

Figure 36 - Roof Dormer Installation - Rise Dormer Assembly



6. Peak section is integral with truss except for dormer areas.
7. Sections of dormer areas are shipped loose with home and must be installed separately above dormer areas of main roof.
8. Raise main roof top chord section and hinged knee wall section into place.
9. Rotate main roof peak section in place.

Figure 37 - Roof Dormer Installation - Dormer Walls Installed

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5.4.2 Factory Installed Fold-Up Dormer

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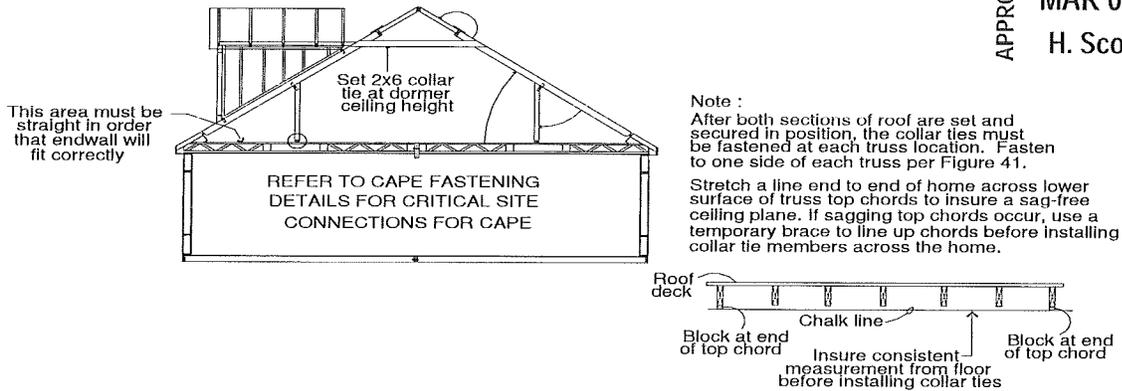
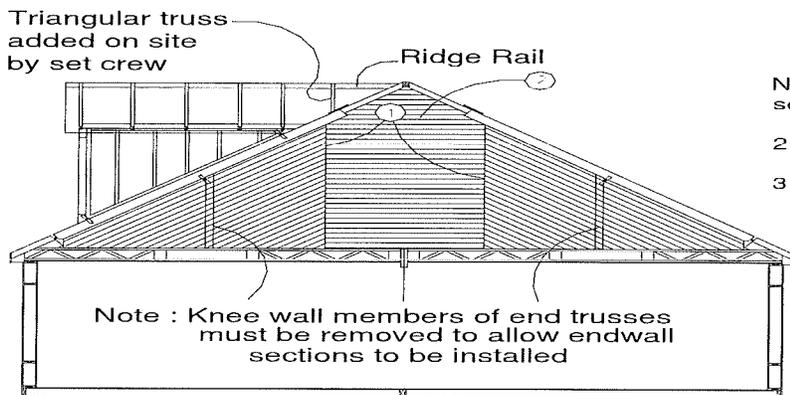


Figure 38 - Roof Dormer Installation - Final Position



ENDWALL SET-UP

1. Position left and right endwall sections which have been shipped loose with the home. Move sections as far as possible towards sides of home.

NOTE: Do not secure in place until center section is set and secured.

2. Position and secure center endwall section.
3. Move left and right sections to butt tight to installed center section and secure left and right sections to center section and to perimeter with 16D nails 16" o.c. or 12D nails 12 o.c.

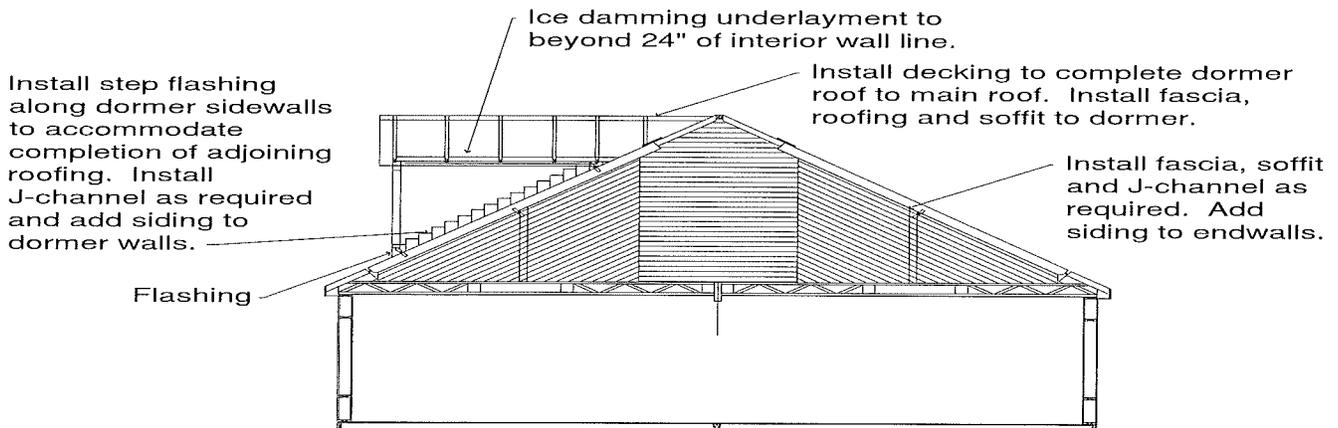
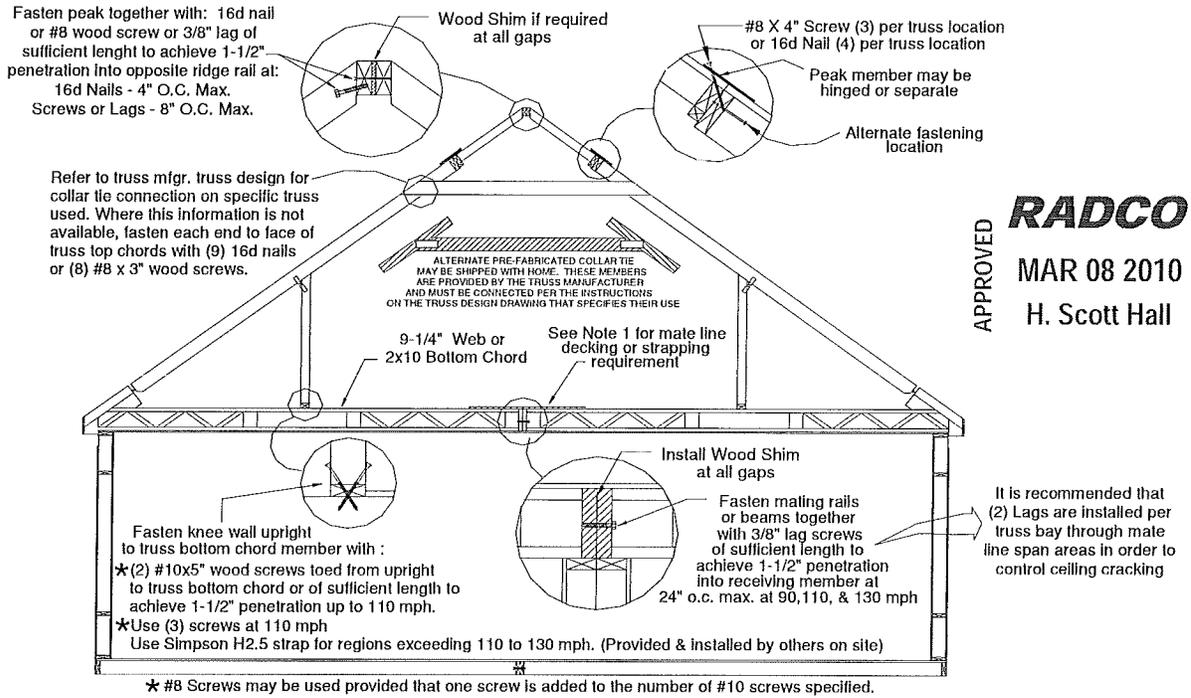


Figure 39 - Second Floor - Final Close-Up

CHAPTER 5 - ROOF SETUP



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Notes :

1. Rated floor sheathing must be installed in such a manner that it is continuous across the mate line of the home or install tension straps at each truss location per tension force load on truss design drawing. In the absence of actual tension data or applied decking, use 300# min. strapping at 90 mph, 450# min. at 110 mph, or 700# min. at 130 mph.

5.4.3 Cape Collar Tie Details

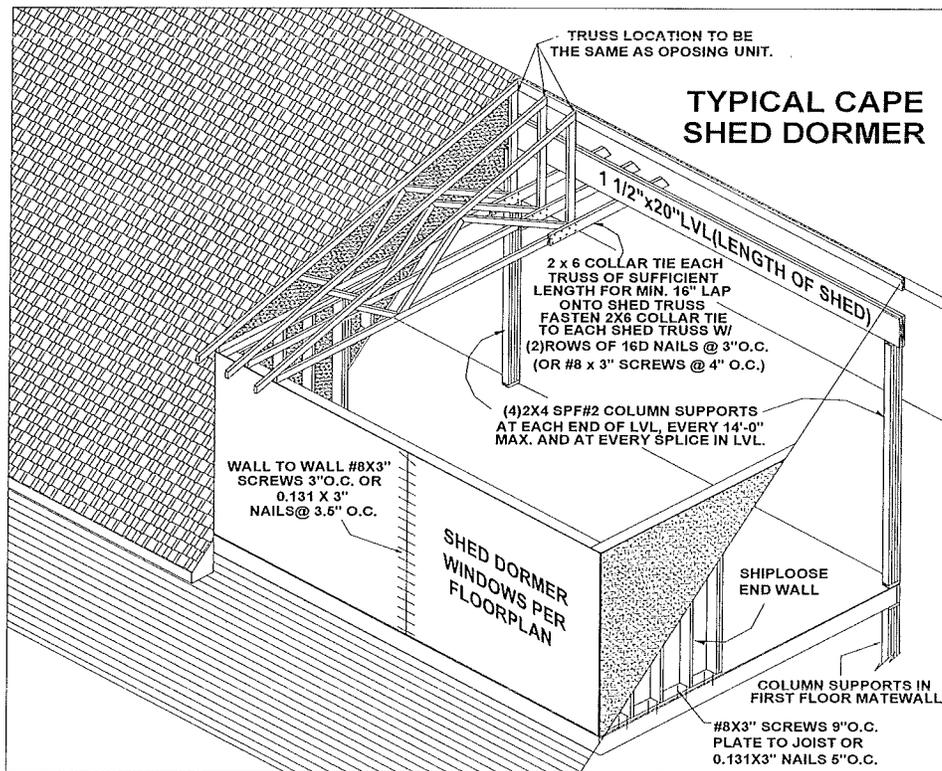
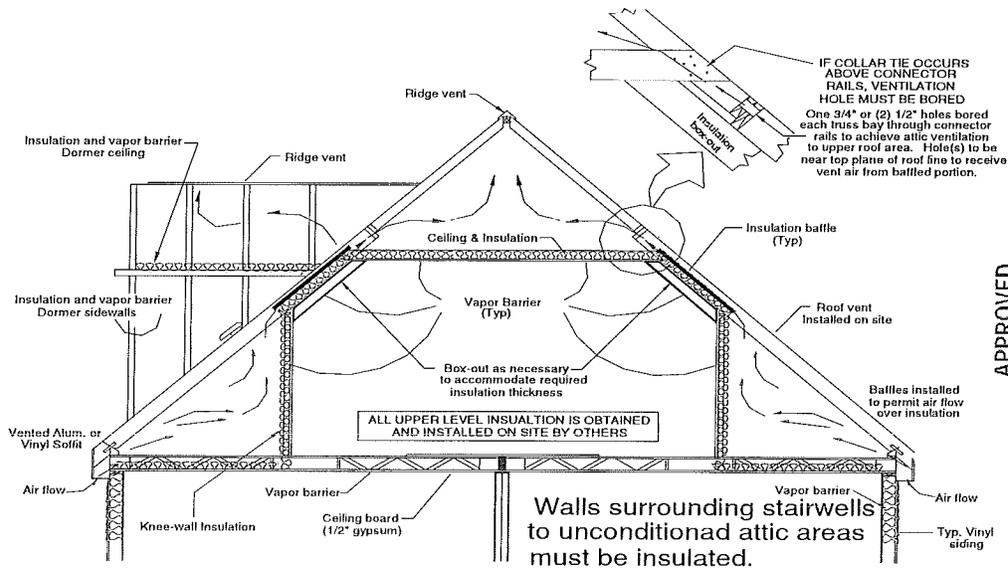


Figure 41 - Typical Shed Dormer

5.4.4



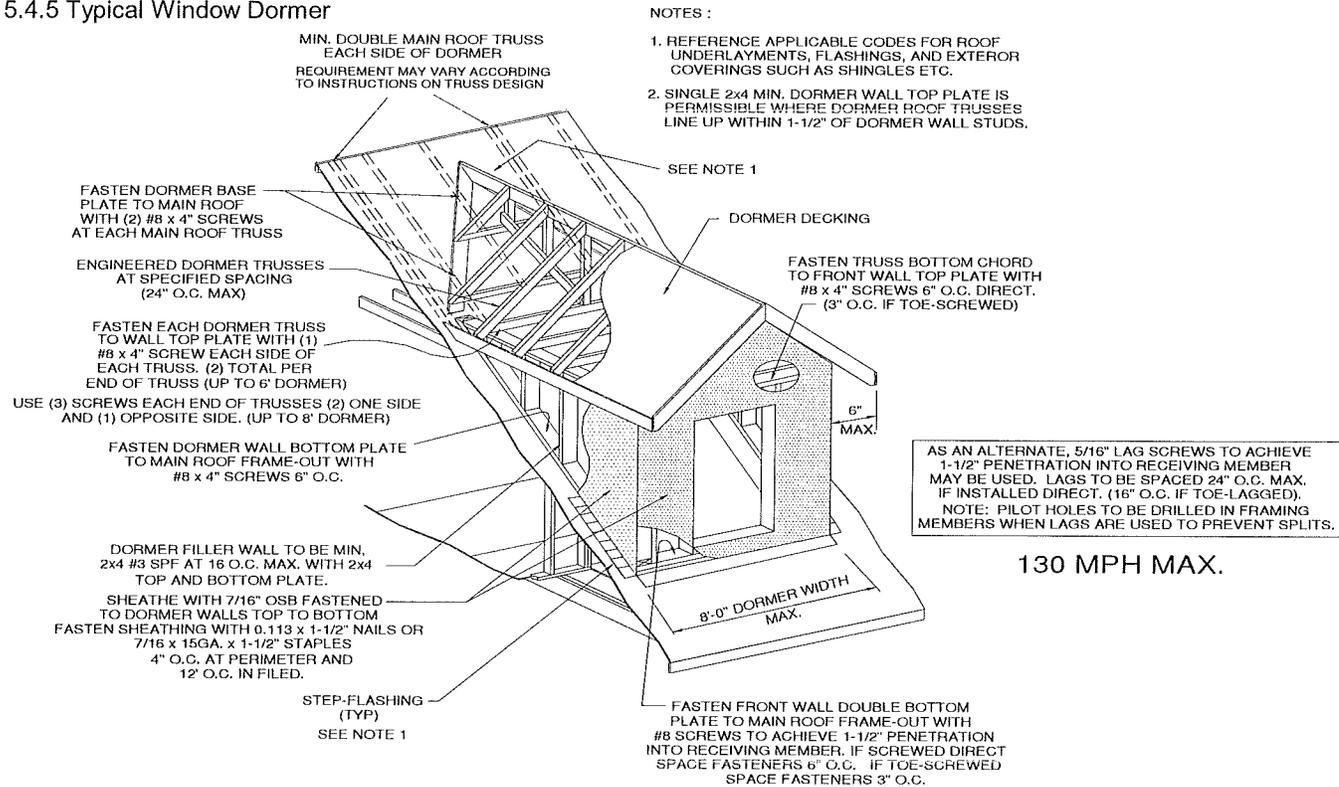
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Figure 42 - Cape Cod Insulation Treatments

TYPICAL CAPE INSULATION TREATMENTS, WHERE STORAGE AREA IS DEVELOPED ON SITE BY OTHERS AS LIVING AREA, MUST COMPLY TO ALL STATE AND LOCAL CODES AND IS THE RESPONSIBILITY OF THE SITE BUILDER.

1. Conformance to all applicable codes for natural light and vent, plumbing, heating, exits and electrical is the responsibility of the site Contractor / Installer of the second level living area.
2. Insulation and required ventilation of unconditioned spaces is according to the local authority and is the responsibility of the site Contractor / Installer.

5.4.5 Typical Window Dormer



AS AN ALTERNATE, 5/16\"/>

130 MPH MAX.

Figure 43 - Typical Window Dormer

5.4.6 Alternate Ship Loose Full Dormer

5.4.6.1 Installation Instructions

1. Mark centerline of dormer all the way up roof deck to peak of roof. Roof deck must be perpendicular to roof ridge line. (Chalk line may be used or some other highly visible marking).
2. Mark dormer outline on roof deck. Reference provided dormer drawing for overall length and width. NOTE: Overall dormer length is twice its depth.
3. Position gable support walls on roof deck, flush with exterior wall framing. Level gable support walls and place temporary bracing to hold them in place. Fasten fascia boards to gable support walls to roof framing members with # 8 X 3.5" wood screws @ 6" o.c.
4. Place fascia boards on top of gable support walls, flush with the outside edge. Fasten fascia boards to gable support walls with # 8 X 5" wood screws @ 8" o.c.
5. Fasten mounting braces to roof deck along dormer outlines. Mounting braces should meet together at the ends. Fasten to roof deck with # 8 X 3.5" wood screws 24" o.c.
6. Place rafters in order 16" o.c. and 4" o.c. at all edges. Rafters should butt up against fascia boards.
7. Install decking as shown on provided dormer drawing. Fasten decking to rafters with 10d nails 6" o.c. at all edges.
8. Install 90# felt paper at valley areas. Install 15# felt paper and shingles per ARMA guidelines or per manufacturer's instructions.

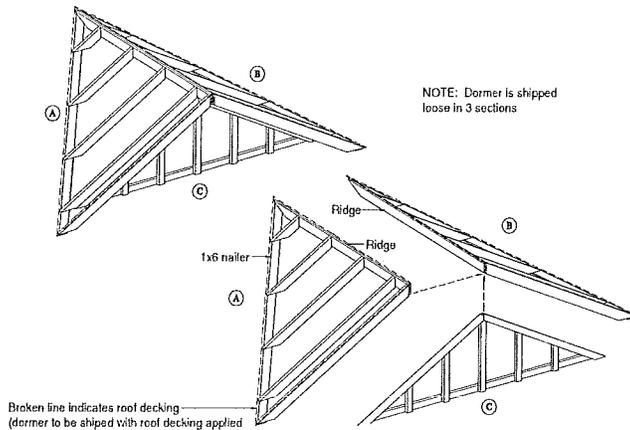


Figure 44 - Ship Loose Full Dormer

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5.4.7 Cricket Kit 12/12 Roof Pitch

NOTE: To tie the bonus box into the roof of the main house you will need to build a cricket with the materials provided. The cricket is basically a large dormer.

1. Once the roofs have been raised you will install the ridge beam from the top of the bonus box to the main roof, making sure it is perfectly level.
2. After the ridge beam has been installed you can begin setting the pre-manufactured or site built trusses onto the roof; beginning with the smallest one. Install the first truss as far up the main roof as possible while keeping the truss level. Each truss comes in two pieces. It may

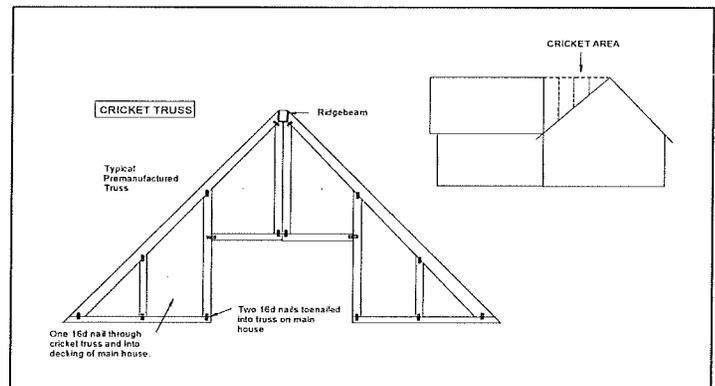
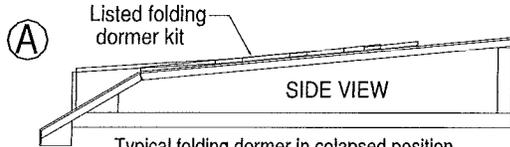


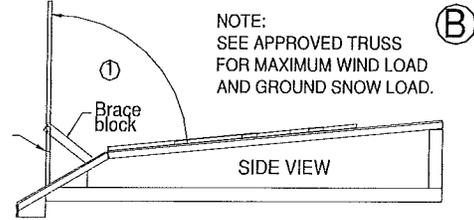
Figure 45 - Cricket Truss

- be easier for you to work with the smaller trusses if you connect them together prior to installation using a 2X as a gusset.
3. Set them on the roof at same spacing as adjoining roof trusses, and toe nail them into the existing roof's trusses using two 16d nail at 24" o.c. or 16"o.c., depending on the truss spacing for the main house. Also nail one 16d nail between each truss and into the decking. This puts the fastening schedule at 8" o.c. Be sure to keep the trusses level.
 4. The top of the truss kit will fit up under the ridge beam.
 5. The header on the trusses should be at the same height as the collar ties.
 6. Once all the trusses have been installed between the main house and the bonus box you can begin sheathing the outside.
 7. After all the sheathing is installed, the felt paper and shingles are installed as normal.

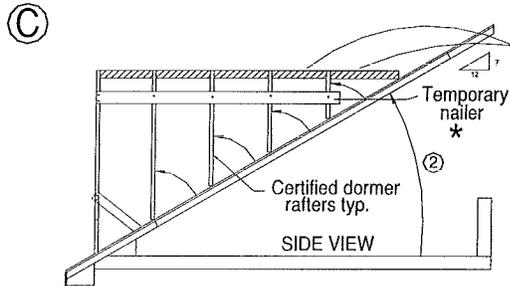
5.4.8 Typical Folding Roof Dormer



Typical folding dormer in collapsed position. Factory installed listed dormer trusses may be installed directly to roof framing members. Fastening for the dormer will require 1 - #8 x 4" wood screws from dormer truss into the main roof truss, at 90 mph. 2 - #8 x 4" wood screws 130 mph.



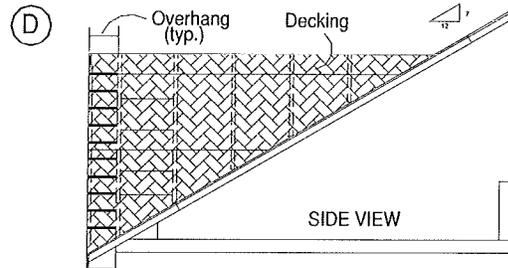
- ① Raise the first hinged rafter on the non-hinged portion of the main roof. Block this rafter into plumb vertical position and also secure bottom chords to the top chord of the vertical member it is hinged to. The example shown has only one hinged rafter located on the non-hinged portion of the main roof. Any additional hinged rafters in this area are to be blocked and secured in the same fashion.
- ② Raise the main roof and set according to standard hinged roof procedures.



- * ③ Mark out a temporary nailer for proper spacing of the hinged dormer rafters. Fasten nailer to the first rafter and to the other hinged dormer rafters as they are raised to the plumb vertical position.

NOTE :

- a. Some dormer rafter kits have a notch designed into the peak for insertion of a 2x4 ridge rail. When this is the case, the temporary nailer and the blocking at the peak is not necessary. The ridge rail serves the function for both of these elements.
- b. Fasten dormer trusses to ridge rail and rail to main roof with (3) .131 nails at each connection.
- c. Add blocks between rafters at peak. Blocks to be toe - fastened each end with (3) .131 x 3" nails.



- ④ If brace blocks must be removed, insure that enough decking is installed to the dormer to stabilize the rafters prior to removing the braces.
- ⑤ Add blocked overhang and fascia board to end of dormer. Overhang must be built with 2x6" blocks - 24" o.c. and fastened with toe nail 3 - 16 d. nails into main truss. @ 90 mph, and (4) #8 x 4" wood screws for up to 130 mph.
- ⑥ Deck the dormer as much as possible before removing the temporary nailer/ spacer board. Then finish decking the dormer per Commodore Installation manual.
- ⑦ Add paper and shingles and finish dormer per Commodore Installation manual.

Figure 46 - Typical Folding Roof Dormer

5.4.9 Typical Plant Built Walls for Hinged Truss

- 1. Framing sections for gable ends fit between truss members. Fasten framing to truss members around perimeter of framing with # 8 X 3" screws or equiv. 12" o.c. 90 mph. 6" o.c. 110 mph, and 4" o.c. for up to 130mph.
- 2. OSB sheathing is factory installed to framing members with overhang at perimeter of framing. Fasten OSB overhang to truss members with 7/16 x 1-1/2 x 16ga. staples or equivalent, 12" o.c. (see also Figure 39).

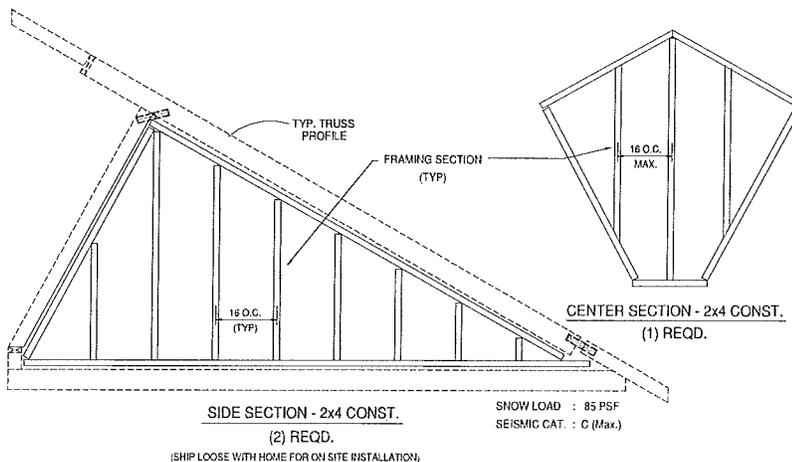
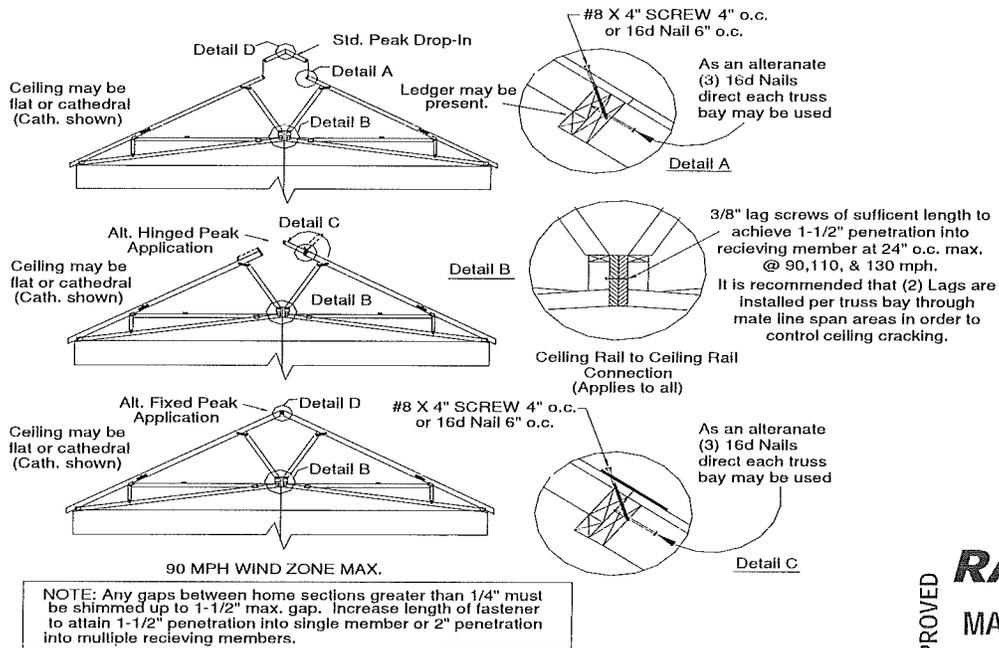


Figure 47 - Typical Folding Roof Dormer

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6.1 Ridge Drop-In Sections

1. Locate one of the ridge drop-in sections. Position this section at one end of the home and fasten it in place through the trusses using #8 X 4" screws toed through the truss tie at 4" on center and no more than 6" from the ends.
2. Position half of the unvented ridge sections at the same end of the home as the first unit and attach using the same method.
3. Follow the same fastening schedule for all of the vented sections and then finish the remaining unvented peak sections.
4. Furnace, water heater or plumbing stacks may be stubbed into ceiling area beneath folding sections of roof. These must be extended to the exterior of the roof and terminated according to manufacturer's instructions.



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Figure 48 - Ridge Drop-In Sections

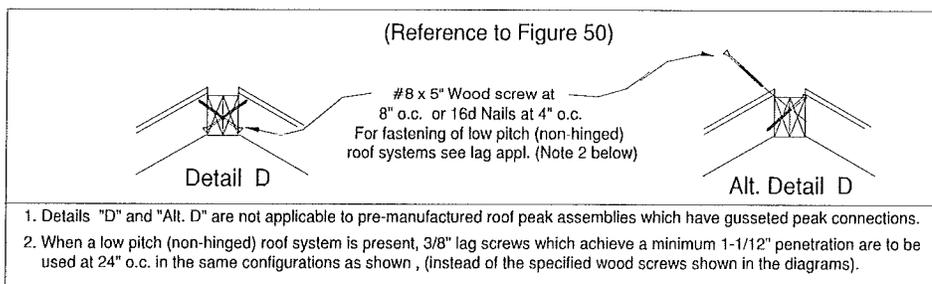
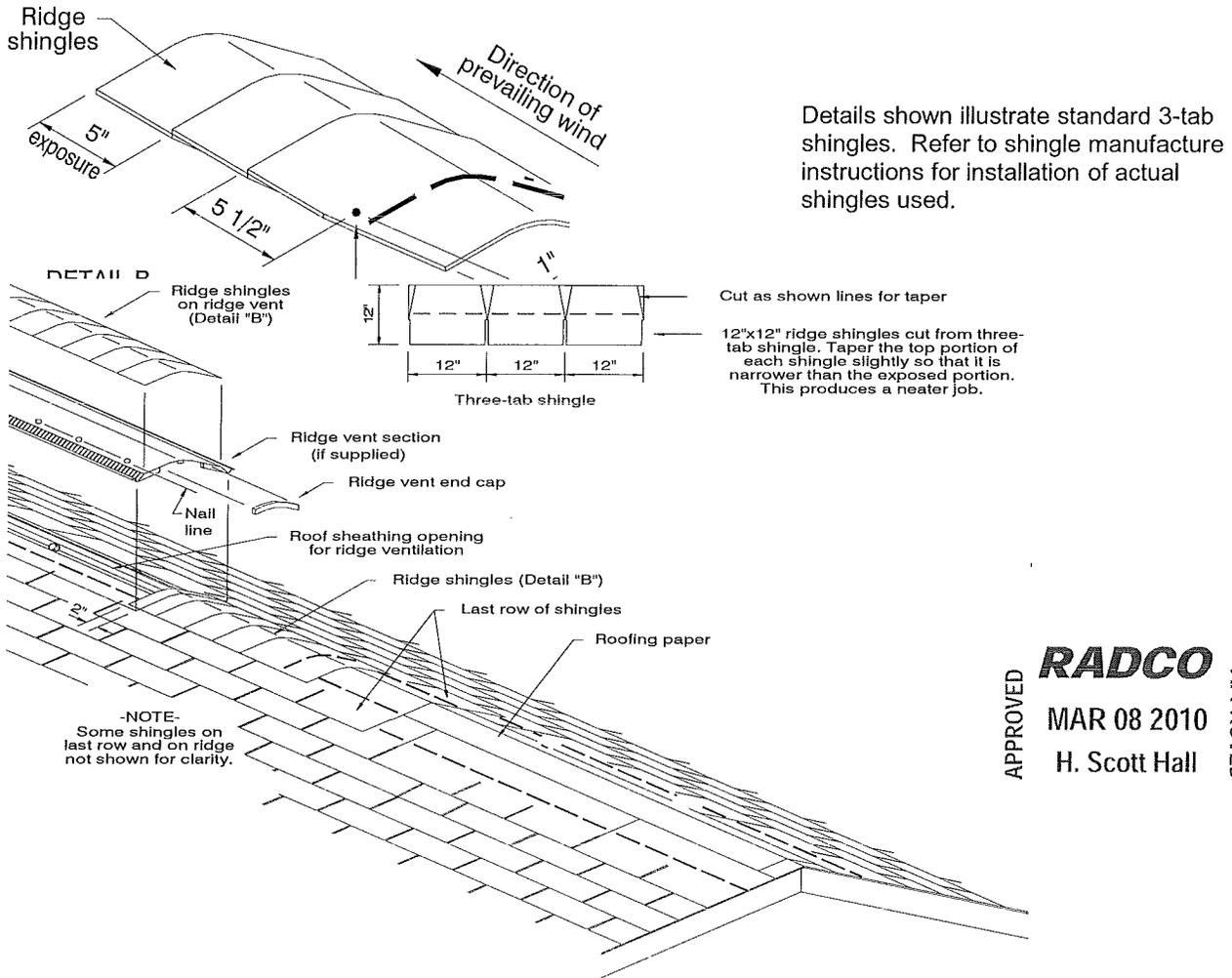


Figure 49 - Roof Peak Connection

6.2 Roof Peak

1. Make sure that the roof peak is even when fastening the roofs together. Apply a #8 X 5" screw at 8" o.c. or 16d nails at 4" o.c. (Refer to Detail D and Alt. Detail D).
2. Lap roofing paper from one section over the other and secure with staples or roof nails.
3. Apply the last row of shingles according to shingle manufacturer's instructions. Do not block ridge vent areas.
4. Ridge vent sections are to be installed so they overlap the vent openings a minimum of 2 inches and according to vent manufacture instructions.
5. Apply ridge cap shingles with 2" roofing nails or of sufficient length to achieve full penetration of roof decking material. Also consult shingle and ridge vent manufacturer's instructions to insure that manufacturer's fastening requirements are met.



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Figure 50- Roof Close-Up

6.3 Shingle Application at Valley

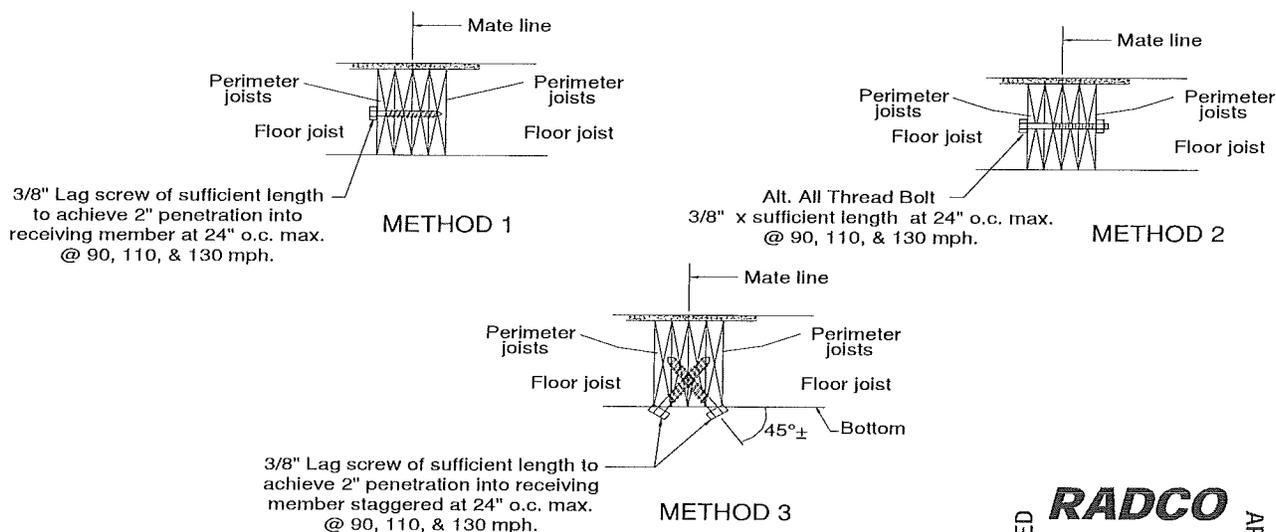
NOTE: Prior to applying the shingles, line the valley by centering and applying 36" wide self - adhering waterproofing shingle underlayment or 50# underlayment directly to the deck.

Begin the valley application method using shingles in the following manner:

1. Lay the first shingle course along the eaves of the first roof plane and across the valley, onto the adjoining roof plane, extend past the valley center line at least 12". Press the shingles well into the valley prior to fastening.
NOTE: The shingles on the deck with the least area of watershed are the shingles which should be applied first, to go under the other shingles on the adjoining deck. The shingles on the adjoining deck (the deck with the greater watershed) are the shingles which should be cut.
2. Follow standard fastening instructions, with the exception that fasteners may not be installed within 6" of the valley's centerline.
3. Follow the same procedure for succeeding courses, going up the valley from one side.
4. Apply the first course of shingles along the eaves of the adjoining roof area, extending it over previously applied shingles. Follow the same procedure for succeeding courses. When complete, snap a chalk line 2" back from the centerline of the side just installed (which is the greater watershed). Neatly cut 2" back from the centerline, following the chalk line as a guide.
5. Cut 2" diagonally off the upper corner of each trimmed shingle (at an approx. 45 degree angle) to direct water into the valley. Take care not to cut into the shingles below.

6.4 Floor Fastening

1. Fasten main floors together with bolts supplied in ship loose materials according to fastening options described on Figure 51.



NOTE: Any gaps between home sections greater than 1/4" must be shimmed up to 1-1/2" max. gap. Increase length of fastener to attain 1-1/2" penetration into single member or 2" penetration into multiple receiving members.

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Figure 51 - Floor Fastening Illustrations

6.5 Mating Walls Fastening

1. Fasten interior mating wall openings (including door openings) together using #8 X 4" wood screws or equivalent. Archways should be strapped together to protect from later cracking.
2. Toe fasten at 12" o.c. w/screws (6" o.c. w/16D nails) alternating from one side of the mating line to the other.
3. As an alternate, 3/8" x 5" lag screws toe fastened at 24" o.c. may be used. When lags screws are used as specified, they do not need to be alternated side to side. It is recommended that members be pre-drilled to avoid splits when driving the lag screws.

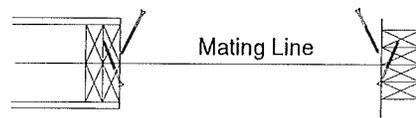


Figure 52 - Mating Walls Fastening

6.6 End wall

1. Fasten end wall sections together with #8 X 4" screws, 16D nails, or lags of adequate length to achieve a minimum 1-1/2" penetration. Any fastener that is exposed to the weather must be galvanized or zinc coated.
2. It is recommended that members are pre-drilled when lag screws are used in order to prevent splitting of members. When securing end wall to end wall, toe fasten alternating side to side along the end wall mate line as shown in Figure 53. Screws should be spaced 12" o.c. max. and nails 6" o.c. max. If lags screws are used, spacing may be 24" o.c. max. alternating side to side, using min. 3/8" X 5" lags.

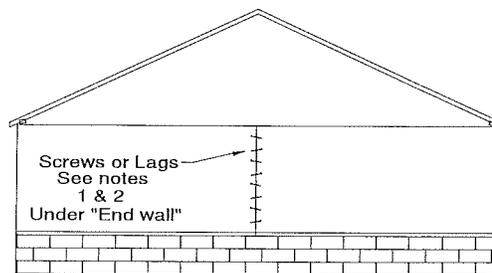
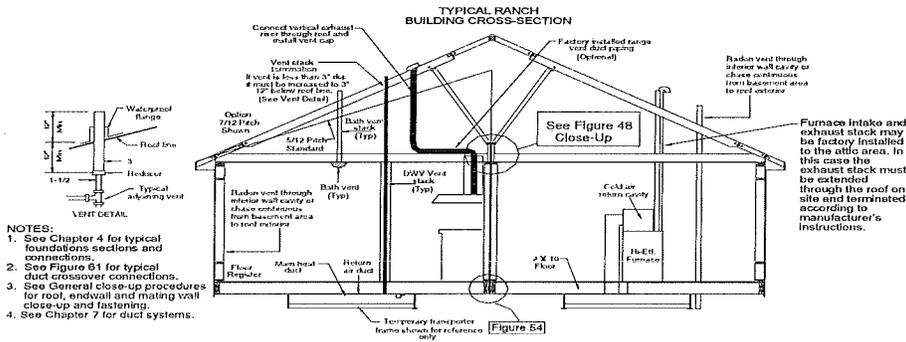


Figure 53 - End Wall Fastening

6.7 Ranch Building Cross Section
Figure 54 – Ranch Cross Section



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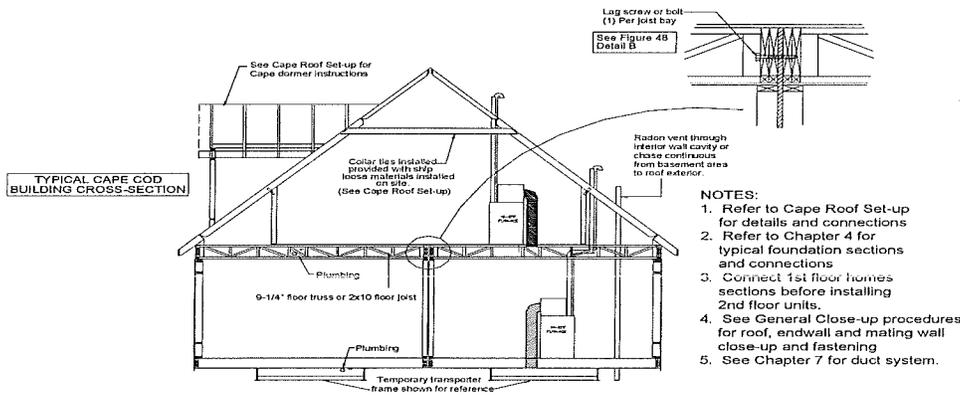
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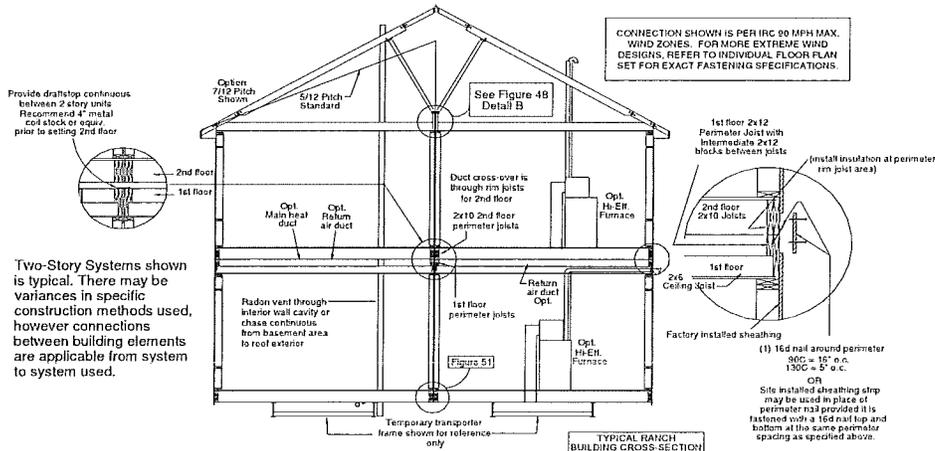
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6.8 Cape Cod Building Cross Section
Figure 55 - Cape Code - Cross Section



6.9 Two Story Building Cross Section
Figure 56 - Two Story - Cross Section



NOTES: Refer to Cape Roof Set - Up for details and connections.

1. See Figure 61 for typical duct crossover connections.
2. Connect 1st floor home sections before installing 2nd floor units.
3. See General Close-Up procedures for roof, end wall, and mating wall close-up and fastening.
4. Heating / Return Air system shown for illustration only. May be partially or totally installed on site.

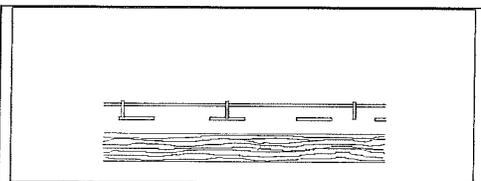
6.10 Roof Vents

Note: Vents, furnace stacks, hot water heater stacks and fireplace stacks that penetrate ceilings must have appropriate fire stopping materials installed at the point of penetration in accordance with code requirements and manufacturers instructions.

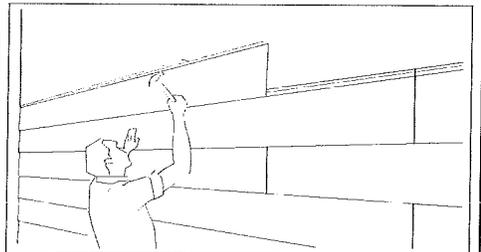
6.10.1 Roof Vents Completion

1. Range hood vent and furnace P.O.S. hose (if provided) may be totally or partially factory installed to the exterior.
2. If vents are not visibly run through the roof decking and terminated with a cap on the exterior, then vents must be installed to the exterior on site.
3. Vent ducting may occur anywhere in the attic area but is preferably routed to an area behind knee walls as shown.
4. Factory installation of plumbing vents may terminate in the joist cavity only. These should be visible and must be routed to the knee wall area and extended to the exterior on site, or connected to the main 3" vent stack.

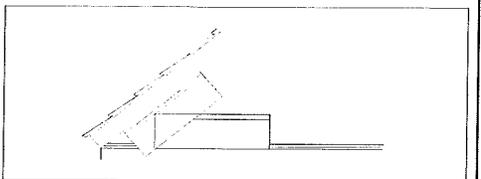
6.11 Vinyl Siding Installation



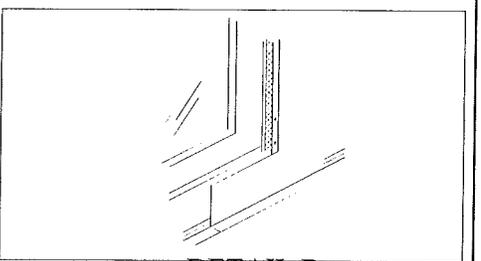
DETAIL A



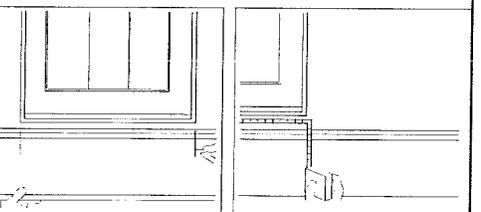
DETAIL B



DETAIL C



DETAIL D



Make sure the seams at the marriage joint of the end walls, for the entire height of the walls, are completely sealed (by a 2" wide strip of duct tape or other sealants). Apply the duct tape or the sealant directly over the home wrap.

The siding panels should be attached using 7/16 x 1 1/2" x 16 gauge galvanized steel or aluminum staples. (6d galvanized nails may also be used.) Staples should be driven so that there is a 1/32" clearance between the siding and staple crown to allow some lateral movement. Fasten to each stud. (See Detail A)

Snap the bottom course of siding into the starter strip and fasten to the wall. Leave a 1/4" space at corner posts and 'J' channels around window and door openings to allow for expansion. Do not fasten within 4" of an accessory. Vertical butt joints in panels should overlap 1". Do not fasten the panel within 4" of the joint. Install vinyl, aluminum, felt or other suitable material for flashing at bottom corners of doors and windows (See - Detail D). Apply caulk around siding and light blocks, water faucets or other small penetrations.

Install successive courses similarly to the first. Butt joints in adjacent courses should be offset by at least 24". Joints in alternate courses should be aligned vertically (See - Detail B).

Panels will have to be cut at headers and sills. A single panel should extend without joints across the width of the opening. When cutting a panel at a sill, measure the distance between the bottom of the opening and the top lock of the lower course, then deduct 1/4" (See - Detail E).

Slide the cut panel into the under sill trim and install. Note that the under sill trim piece may have to be furred to maintain the proper pitch of the siding.

Measure and cut the header panel in the same manner as indicated above. The top sections at the gable will need to be angle cut. Use two scrap pieces of siding to make a pattern (See - Detail C). Interlock one piece with the siding panel below. Hold the other piece on top against the gable. Mark a line on the bottom piece and cut. Use this piece as a pattern for cutting gable pieces. Install the gable pieces by interlocking with the lower course, sliding into the gable 'J' rail and fastening.

(Alternate method for applying first row of siding)

When the metal starter strip has been properly fastened at the bottom, the first piece of siding may be trimmed leaving a 1-3/8" tab to slide between the galvanized metal starter and the first vinyl strip. A finish piece of vinyl siding can be used to complete the bottom row.

House wrap seams and connections to windows and doors must be sealed per manufacturers installation instructions.

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Chapter 7 – Furnace/Duct System & Water Heater Installation

7.1 Type of Heating Systems

The heating system in a Modular home is offered with a number of options and layouts. Your house may have one of these options:

1. Gas (Natural or Liquid Petroleum)
2. Electric (either forced air or base board)
3. Oil

This chapter describes these options and the required on-site completion. It is very important to note, due to the hinged roof construction in modular homes, that the furnace and water heater combustion and exhaust vents WILL require additional site installed items and inspection. A manual covering the maintenance and operating instructions will be found with your furnace. Use this manual for installation instructions and to understand the site connections and inspection.

NOTE: Modular home furnace and duct system options with carriers ("FRAME OFF" installation): Refer to print package provided specifically for your home. Locate the duct layout for basement or crawlspace installation as applicable. Locate the areas for site installed cross over ducts if applicable. NOTE: All supply or return air ductwork which is exposed to unconditional spaces (such as un-insulated crawlspace or ducts located above insulation line in attic), must be insulated to R-8 compliance. Such exposed duct, if not rated at R-8 or better, must be wrapped with insulation to achieve R-8 compliance. This is a site item to be done by installer after supply and return air ducts are complete. See page 38 for example illustrations.

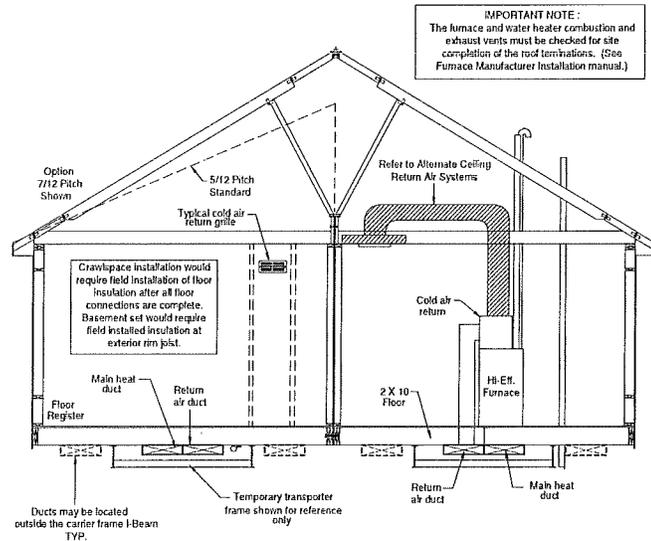


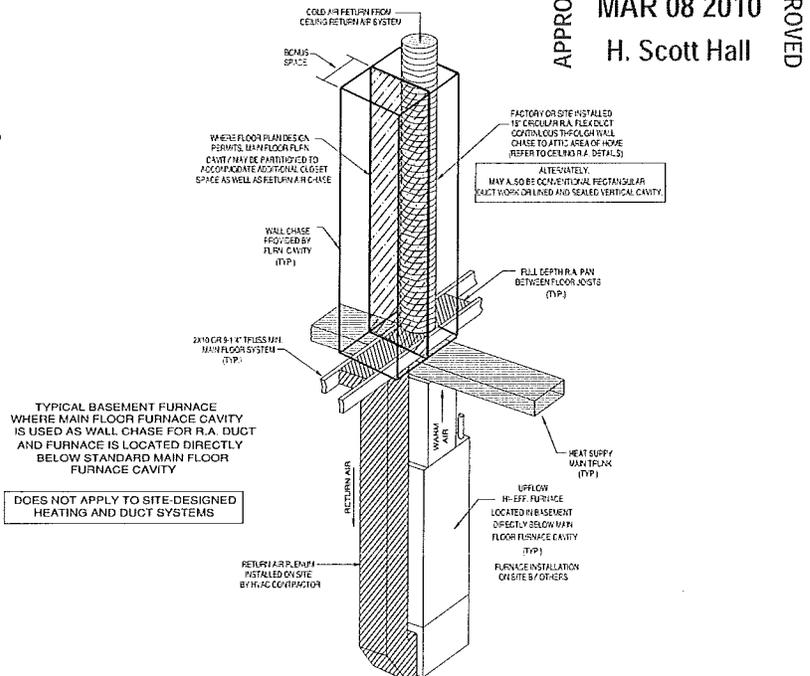
Figure 57 - Furnace and Duct System - Ranch

7.1.1 Furnace and Duct System – Ranch

1. With a Ranch package, the furnace, portions of return air duct, supply air duct, water heater, water lines and some of the drain lines are installed at the factory.
2. Duct cross over(s) are joined at the marriage edge and, for the most part, are completed at the factory. The on-site contractor is responsible to check all connections and assure the duct cross over(s), gas lines, remainder of return air and drain and water lines are hooked up properly.
3. Site installed furnaces should only be installed by qualified personnel. The heating / cooling appliance and the thermostat should be installed according to the manufacturer's instructions and local codes.
4. Your factory installed furnace and water heater may have been installed with the flue and the air combustion intake partially disassembled. Check and complete these items per the manufacturer's installation manual. Basement foundation would require field installed insulation at exterior rim joist and basement wall.

IMPORTANT NOTE:
 FURNACE EXHAUST VENT MUST TERMINATE 6" HIGHER THAN THE OPENING OF THE CANY CANE TERMINATION ON THE CUMBUSTION AIR INLET PIPE.(Refer to furnace mfg. instr. manual).

FIELD INSTALLED FURNACE IN BASEMENT



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CHAPTER 7 - FURNACE / DUCT SYSTEM & WATER HEATER INSTALLATION

7.1.2 Furnace and Duct System – Cape Cod

1. With a Cape Cod package, the furnace, portions of return air duct, supply air duct, water heater, water lines and some of the drain lines are installed at the factory.
2. Duct cross over(s) are joined at the marriage edge and for the most part are completed at the factory.
3. The on site contractor is responsible for checking all connections and assuring the duct cross over(s), gas lines, remainder of return air and drain and water lines are hooked up properly.
4. Site installed furnaces should only be installed by qualified personnel. The heating / cooling appliance(s) and the thermostat should be installed according to the manufacturer's

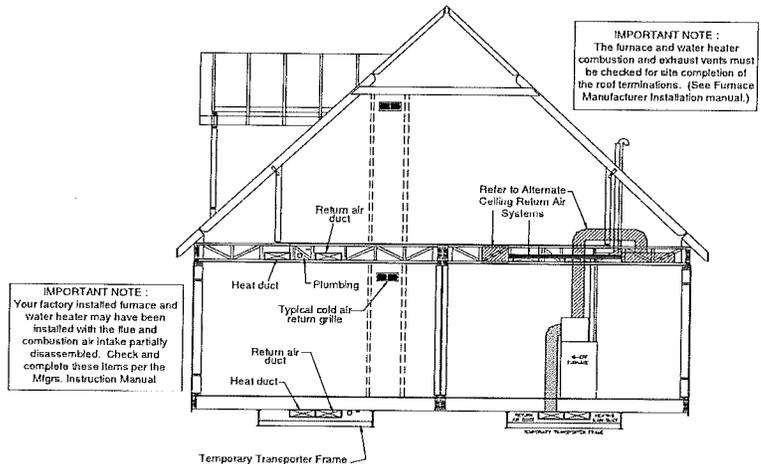


Figure 58 - Furnace and Duct System - Cape Cod

instructions, and local codes.

5. Basement foundation would require field installed insulation at exterior rim joist and basement wall.
6. The plant installed furnace must be located so the combustion and exhaust vents can extend through the roof or an electric furnace must be used.
7. Depending how you ordered your house the entire supply air and return air systems may be supplied by an onsite heating contractor. The print package for each home provides a recommended HVAC system.
8. Crawlspace install would require field installation of floor insulation after all floor connections are complete. Basement set would require field installed insulation at exterior rim joist.
9. In furnaces in Cape Cod homes that are site installed on a crawl space or basement, check the height of the crawlspace to allow for installation of the furnace. Depending how you ordered your house the entire supply air and return air systems may be supplied by an onsite heating contractor. The print package for each home provides a recommended HVAC system.

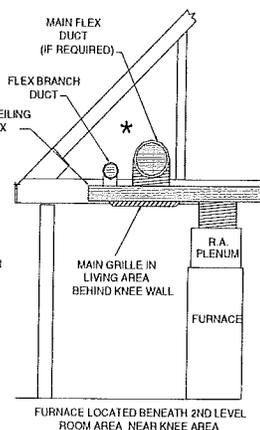
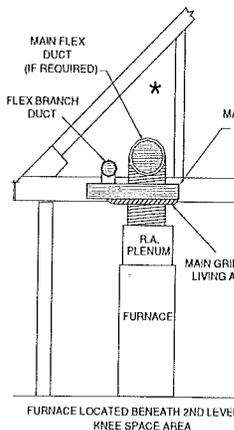
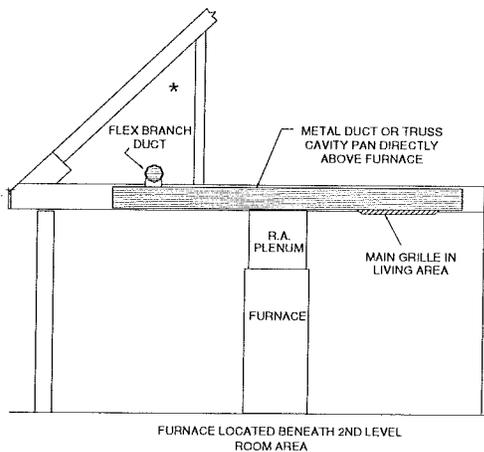
IMPORTANT NOTE:

FURNACE EXHAUST VENT MUST TERMINATE 6" HIGHER THAN THE OPENING OF THE CANY CANE TERMINATION ON

Typical Applications for Storage or Cape Ceiling Return Air

* Flex runs behind knee area requires field connection. Consult return air diagram shipped with home for other required connections behind knee wall area.

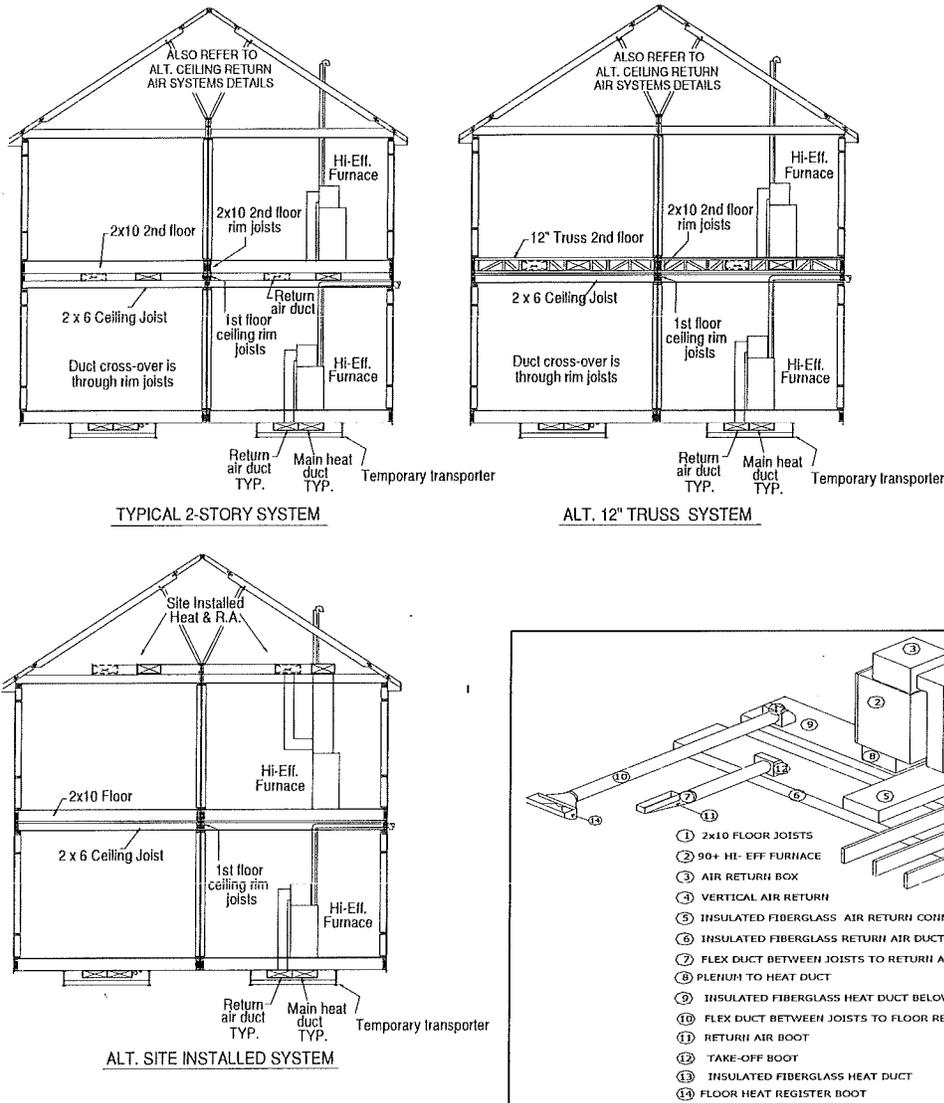
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CHAPTER 7 - FURNACE / DUCT SYSTEM & WATER HEATER INSTALLATION

IMPORTANT NOTE:

The furnace heater combustion and exhaust vents must be checked for site completion of the roof terminations
EXHAUST VENT MUST TERMINATE 6" HIGHER THAN THE OPENING OF THE CANDY CANE TERMINATION ON THE CUMBUSTION AIR INLET PIPE.(Refer to furnance manufacturer instruction manual),



Gas line is coiled between 1st and 2nd floors and must be pulled out prior to set of the 2nd story.

2-Story duct systems shown illustrate varying systems offered according to manufacturing facility. These systems are not universally available at all manufacturing locations.

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Figure 59 - Furnace and Duct System - 2 Story

Figure 60 - Typical Duct System

7.1.3 Furnace and Duct System – Two Story

See alternate ceiling return air systems.

1. With a Two Story, the furnace, portions of return air duct, supply air duct, water heater, water lines and some of the drain lines are installed at the factory.
2. Duct cross over(s) are joined at the marriage edge, and for the most part, are completed at the factory.
3. The on site contractor is responsible for checking all connections and assuring the duct cross over(s), gas lines, remainder of return air and drain and water lines are hooked up properly. Site installed furnaces should only be installed by qualified personnel.
4. The heating / cooling appliance and the thermostat should be installed according to the manufacturer's instructions and local codes.
5. Basement foundation would require field installed insulation at exterior rim joist and basement wall.
6. Crawlspace install would require field installation of floor insulation after all floor connections are complete. Basement set would require field installed insulation at exterior rim joist.
7. In furnaces in two story homes that are site installed in a crawl space or basement, check the height of the crawlspace to allow for installation of the furnace. Depending on how you ordered your house, the entire supply air and return air systems may be supplied by an onsite heating contractor. The print package for each home provides a recommended HVAC system.

CHAPTER 7 - FURNACE / DUCT SYSTEM & WATER HEATER INSTALLATION

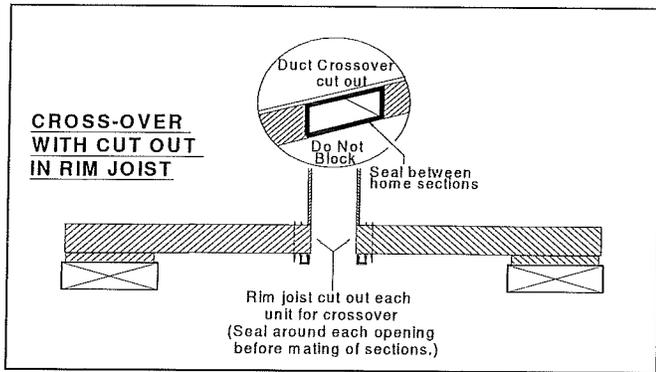
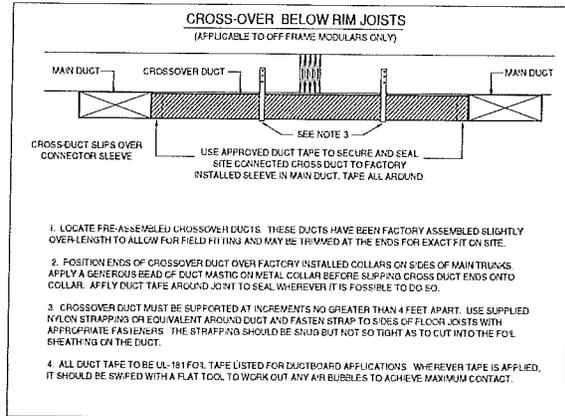


Figure 61 - Duct Crossover



7.1.5 Duct Crossover Connections

The duct crossover connections tie into the heating and return air at the marriage line of the home. See Figure 61 for some of the possible cross over styles available.

7.1.6 Ceiling Return Air (Alternate)

NOTE: Refer to return air diagram shipped with home to insure that all required connections are complete in the field.

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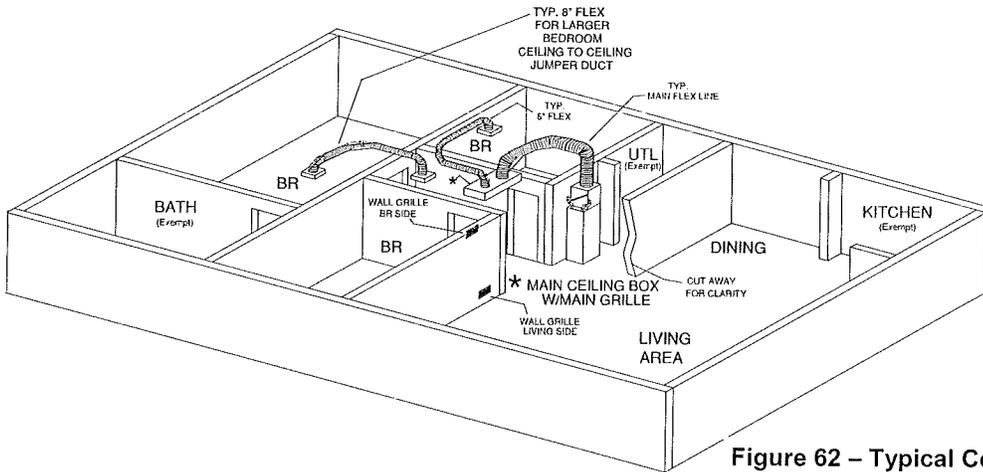
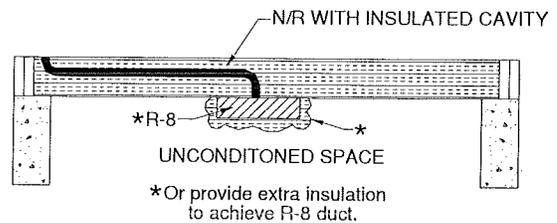
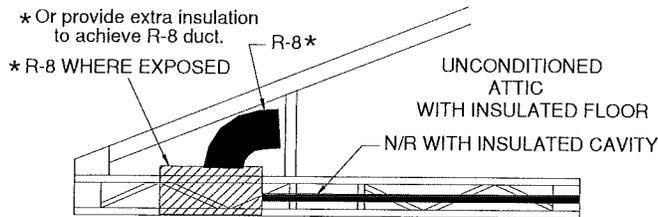


Figure 62 - Typical Ceiling Return Air

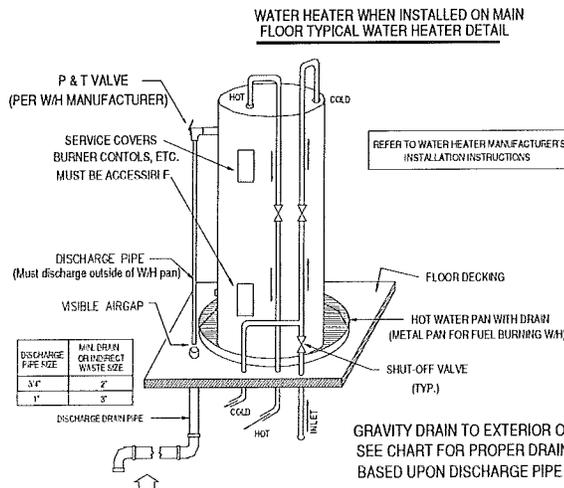


Typical Duct Insulation Requirements

IMPORTANT

CHECK LOCAL CODE AND WATER HEATER INSTRUCTIONS PRIOR TO WATER SERVICE HOOK-UP. PRESSURE REDUCING VALVE, CHECK VALVE, EXPANSION TANK, OR COMBINATION OF THESE MAY BE REQUIRED TO ACCOMMODATE EXCESSIVE WATER PRESSURES GENERATED BY LOCAL WATER UTILITY OR BY PRIVATE WELL SERVICE

80 p.s.i. is generally accepted as the maximum operating pressure for residential water distribution systems.



NOTES:

- ELECTRICAL CONNECTION AND NAMEPLATE MARKINGS MUST BE ACCESSIBLE.
- PROVIDE DOOR OR PANEL LARGE ENOUGH TO REPLACE WH
- INSTALLATION SHALL BE PROTECTED FROM FREEZING
- INSTALLATION IN ACCORDANCE TO THE MANUFACTURER'S LISTING

Figure 63 - Typical Water Heater

The water heater will arrive on site, installed if it is on the main floor of the home.

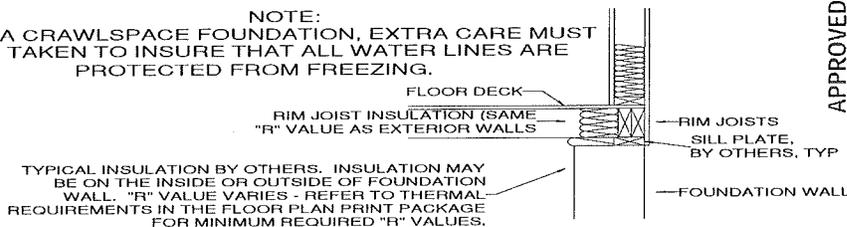
7.1.7 Typical Water Heater

1. In basements, depending on how the house was ordered, the entire water heater may be the responsibility of an on-site heating contractor.

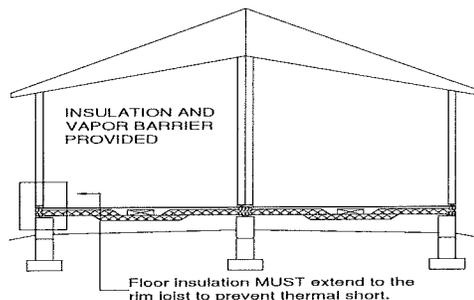
7.1.8 Floor Insulation

1. CRAWLSPACE – If the home floor is insulated either from the factory or in the field, there will be a vapor barrier present that must be intact. The contractor will be responsible to repair areas of vapor barrier that become compromised in the process of making connections or that have been damaged in transit. For un-insulated floor cavity, refer to requirements for un-insulated floor crawlspace areas (see Figure 65).
2. BASEMENT – The basement wall must be insulated, the minimum required insulation will vary depending on the location. Refer to the print package provided with your home for required amount of insulation. Special attention must be given to insulating the rim joist on the perimeter of the home. Install prescribed R-19 batten insulation between the floor joists against the rim joists around the perimeter of the home (see Figure 64).

NOTE:
IN A CRAWLSPACE FOUNDATION, EXTRA CARE MUST BE TAKEN TO INSURE THAT ALL WATER LINES ARE PROTECTED FROM FREEZING.



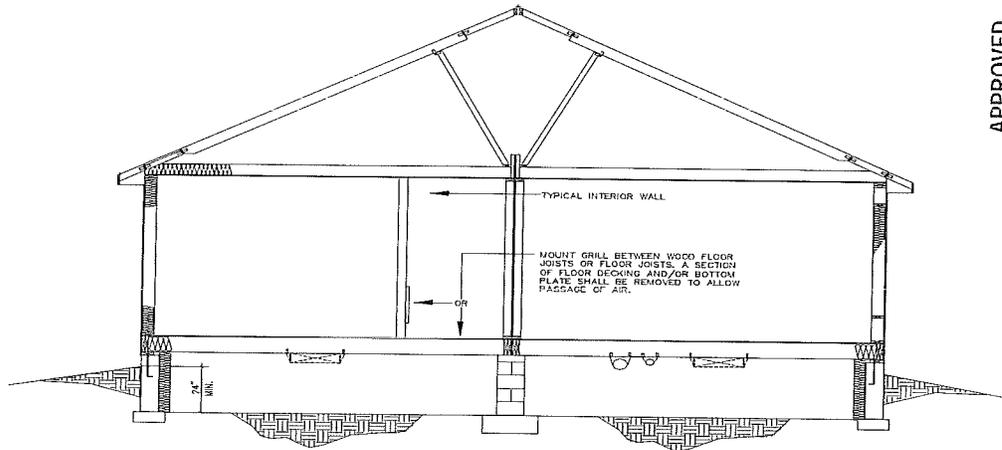
RIM JOIST SECTION VIEW



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Figure 64 - Floor Insulation

7.1.9 Uninsulated Floor



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Figure 65 – Uninsulated Floor

Insulation application for homes on crawl space using the perimeter foundation insulation method (refer to IRC Chapters 4 and 11 under floor ventilation):

Where floor above the crawl space is uninsulated, insulation shall be installed on the crawl space walls. When the crawl space is not ventilated to outside air, this type of installation must first be approved by local officials. The following is a summary of the required steps to provide proper thermal protection.

- 1) Eliminate all ventilation openings in the perimeter foundation stem walls.
- 2) The exposed earth in all crawl space foundations shall be covered with a continuous vapor retarder having a maximum permanent rating of 1.0 perm.
- 3) Insulate the rim joist around the perimeter of the home with R-19 batt insulation.
- 4) Insulate the perimeter foundation walls. The minimum required insulation will vary depending on the site. Refer to the print package provided with your home. The required insulation will vary depending on the site (may use the basement thermal page to obtain the required "R"). As an alternate, IRC chapter 10 table N1102.1 may be used to obtain the required "R" value needed. See Figure 65 above for min. insulation below grade.
- 5) Install heat register(s) and return grille to condition the air in the crawl space. Generally 1-4x10 grille for supply air and 1-4x10 grille for return air is adequate to accommodate conditioning the air in the crawl space, unless the home is located in areas with extreme temperatures. Locate the return air register away from supply air to allow for circulation of air in the crawl space. Consult your local official for requirements and/or other acceptable methods.
- 6) Inspect and protect water lines that could be subject to freezing.
- 7) Provide proper drainage for crawl space and foundation system as applicable per local codes.

Chapter 8 – Options

8.1 Attached Garages or Similar Structures (Tags, Porches, Carports, etc.)

Attached structures must be installed according to the manufacturer's instructions and to all applicable local codes including 309.1 of the 2006 IRC. They must be supported independently of the factory-built portion of the home. Electrical circuits in garages should be provided with ground fault interruption. See below for additional details and requirements.

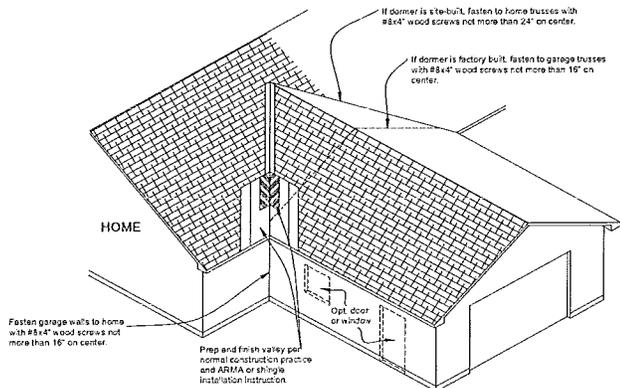


Figure 66 - Typical Garage Detail

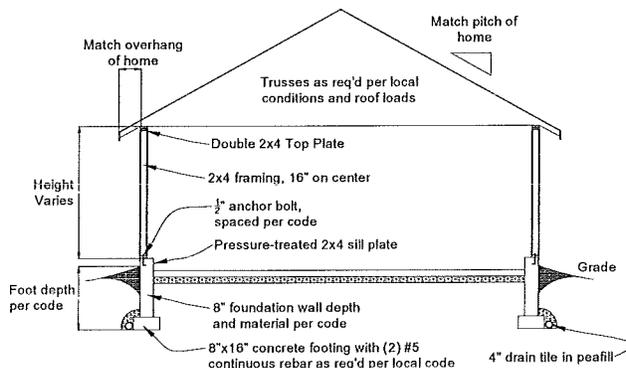


Figure 67 - Garage Cross Section

8.2 Option Adjustable Peak Assembly

1. After home sections are pulled tight together, lift roof sections and set up roof according to standard hinged roof set-up instructions.
2. Start with the half of the home which has the factory installed stop - blocks attached to the movable peak chords. Remove any straps holding the extensions inward. Fully extend the pull - out peak assembly until stop-blocks on the pull - out chords hit the continuous rafter tie member. Temporarily tack the pull-out chords to the top chord of the truss when they are flush.
3. Extend the peak assembly on the other side of the home until the ridge rails meet and are flush to each other. Insure that the ridge is straight along the total length of the home and secure the ridge rails together per standard installation instructions.
4. Permanently fasten each chord of the pull-out assembly to the truss top chords where they lap each other. Insure that the ridge is straight along the total length of the home and secure the ridge rails together per standard installation instructions.
5. Install shipped loose gable end overhang facia boards at adjustable peak areas.
6. Install the shipped loose decking to the extension area. Apply felt paper, shingles and ridge vent as required.

MUTI-SECTION HOMES WITH HORIZONTAL LAP SIDING MAY BE SHIPPED WITH NO SIDING ON THE FRONT AND REAR END WALLS. THE FOLLOWING ITEMS WOULD BE INSTALLED: DOORS/WINDOWS, CORNER TRIM AND COVER WITH PLASTIC SHEETING FOR TRANSIT. ALL SIDING, STARTER TRIM, FASTENERS AND VENTS WILL BE SHIPPED LOOSE IN THE HOME FOR INSTALLATION ON SET UP.

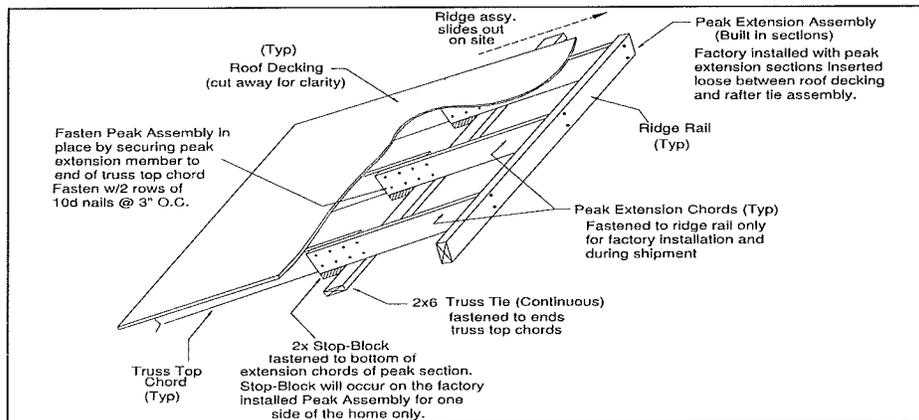
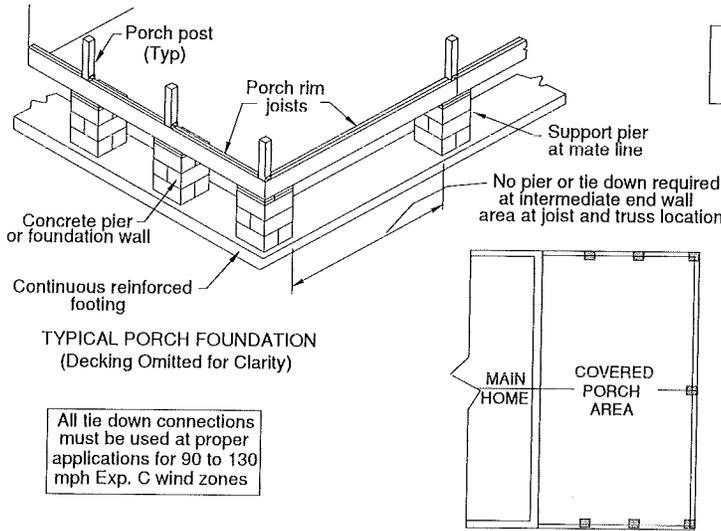


Figure 68 - Adjustable Peak Assembly

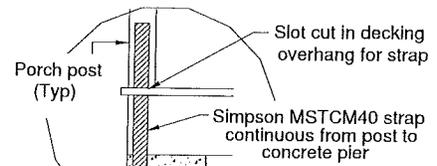
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8.3 Porch Option



All tie down connections must be used at proper applications for 90 to 130 mph Exp. C wind zones

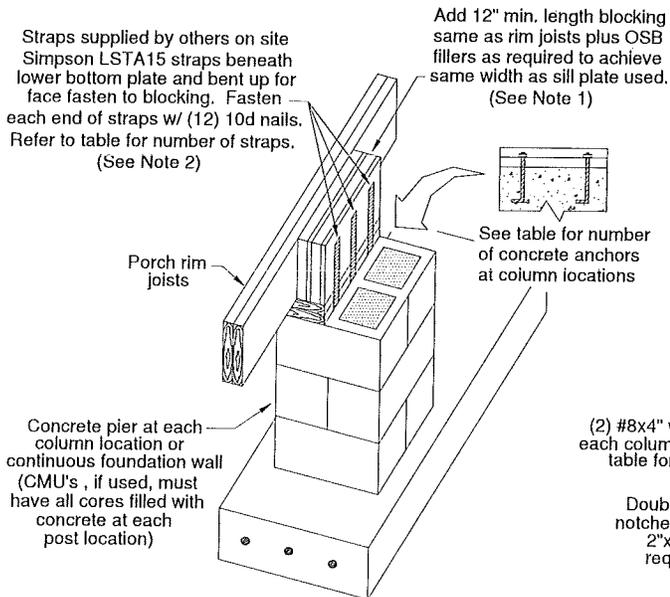
TIE DOWN METHODS OTHER THAN SHOWN MUST BE DESIGNED BY LOCAL ENGINEER AND APPROVED BY LOCAL BUILDING AUTHORITY



THIS TIE DOWN MUST BE USED IF PORCH POSTS WERE NOT CONNECTED WITH POST BASE CONNECTORS AT FACTORY

STANDARD TIE DOWN METHOD

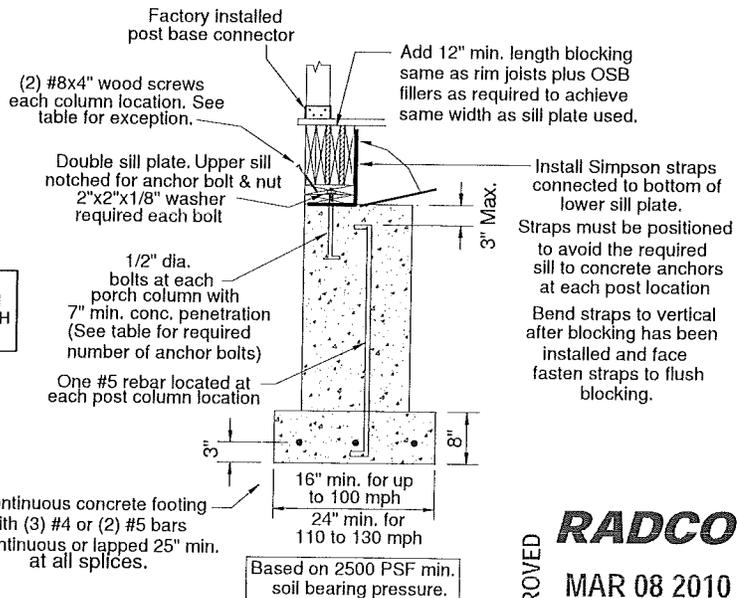
ALTERNATE TIE DOWN METHOD



THIS TIE DOWN METHOD IS ONLY APPLICABLE WITH FACTORY INSTALLED PORCH BASE CONNECTOR

Required number of Straps & Anchor Bolts per porch post (column) location.		
Wind Speed	5/12 Max. Roof Pitch	7/12 Min. Roof Pitch
90 mph max	2	*
110 mph max.	3	*
130 mph max.	3	1

* Use (2) #8 x 4" wood screws from rim joists to sill plates @ 90 mph & (5) #8 x 4" screws up to 130 mph. (1) 1/2"x7" min. Anchor Bolt is required at each column pier for up to 110 mph 7/12 roof pitch.



SITE ADDED COLUMN NOTES :

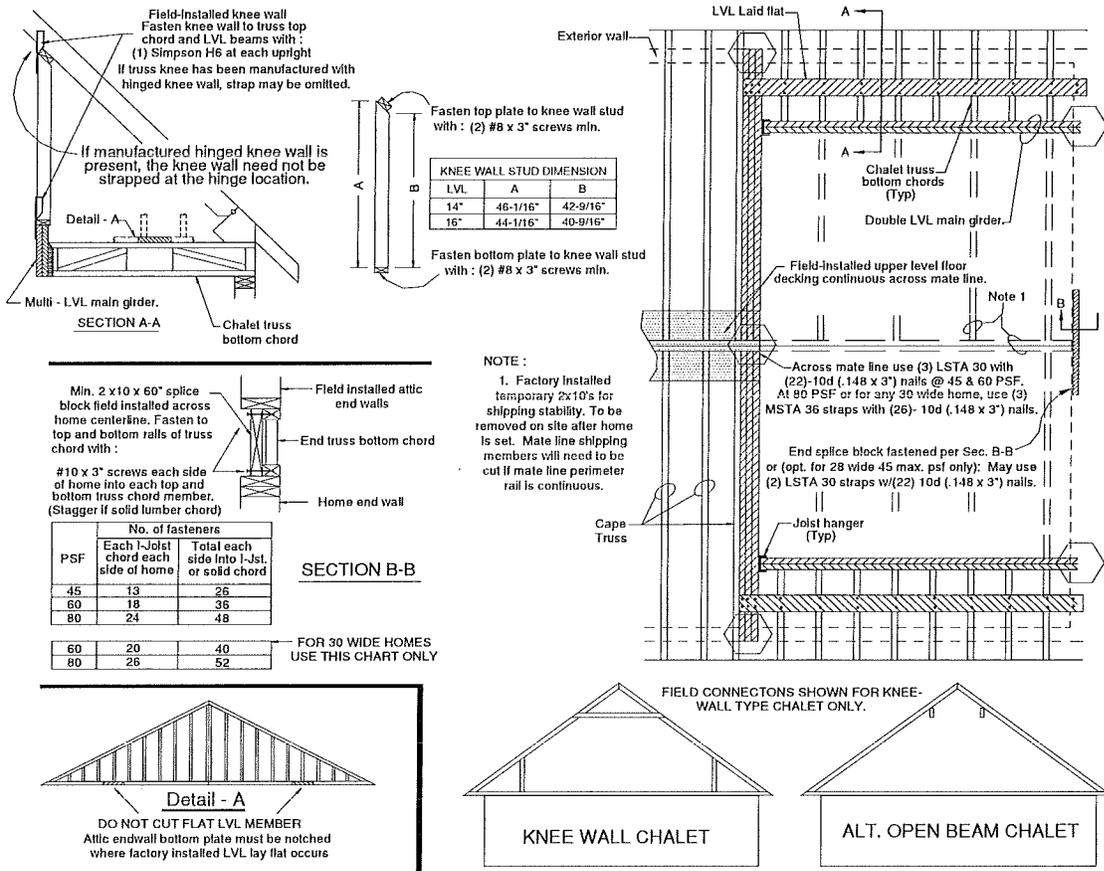
1. Fasten 1st block to rim joist with structural glue and (3) rows of 16d nails (5 nails each row) - 15 nails total. Subsequent blocks and fillers fastened together in the same manner as block to rim joist.
2. Straps are to be of sufficient length to cover 5" min. on bottom face of lower sill plate plus a minimum vertical length of 11". (Min. 16" total length)
3. All materials used: Lumber, straps, connectors, screws, nails, etc. must be treated and intended for exterior use.

Figure 69 - Porch Option

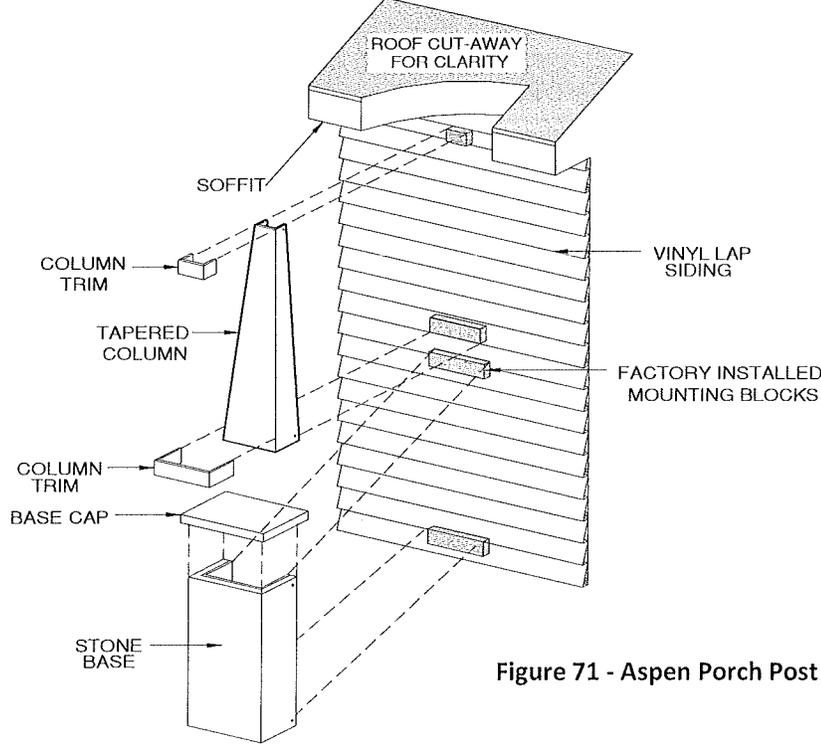
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8.4 Chalet Close - Up detail

Figure 70 - Chalet Close-Up Details



8.5 Aspen Porch Post Decorative



- SPLIT ASPEN COLUMN INSTALLATION**
1. PLACE TAPERED COLUMN OVER FACTORY INSTALLED MOUNTING BLOCKS TO PUSH TIGHT TO SOFFIT. SECURE EACH SIDE OF TAPERED COLUMNS TO MOUNTING BLOCKS WITH TWO 3" PAN-HEAD SCREWS.
 2. GLUE BASE CAP TO TOP OF STONE BASE WITH ALL-PURPOSE CONSTRUCTION ADHESIVE.
 3. PLACE CAP & BASE UP TIGHT TO BOTTOM OF TAPERED COLUMN AND SECURE EACH SIDE OF BASE TO MOUNTING BLOCKS WITH TWO 3" PAN-HEAD SCREWS.
 4. SECURE TOP AND BOTTOM COLUMN TRIM WITH CLEAR PVC CEMENT. HOLD TRIM IN PLACE APPROXIMATELY ONE MINUTE TO ALLOW CEMENT TO SET.

Figure 71 - Aspen Porch Post

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Chapter 9 – Appliance Set-Up

9.1 Appliance Installation

NOTE: The appliances in your home should all be set up in strict accordance with the requirements set forth in the installation instructions provided by their manufacturer. Such instructions are written to insure code compliance, and proper installation techniques.

9.1.1 Clothes Dryer Vent

The clothes dryer must exhaust to the exterior of the home, if the dryer is close to an exterior wall, the exhaust vent may already be installed. If the dryer is at a more central location in your home, then the flexible duct that is supplied will have to be routed to the outside air. The exhaust duct cannot terminate in the crawlspace, or anywhere inside the home or structure of the home where moisture or flammable material could accumulate. The flexible duct provided shall not be more than 8 feet in length before terminating to the outside. If a length greater than 8 feet is required to reach the outside air, then a transition flex duct 8 feet long may be used to tie into a metal exhaust duct system. See Figure 72 - also refer to Section M of International Residential Code.

Caution: Installation of the dryer vent system must be in accordance with the dryer manufacturer's instruction. Vented exhaust must be routed to exterior of home and shall not exceed 25 feet.

9.1.2 Range Hoods, Cook Tops and Oven Venting.

If your home has a range hood, cook top/grill or oven that has its own exhaust system, a vent should not terminate in the attic or anywhere inside the structure of the home where moisture or vapors could accumulate. A roof vent needs to extend through the roof to the outside air. If the exhaust is routed through the floor, the duct work shall not

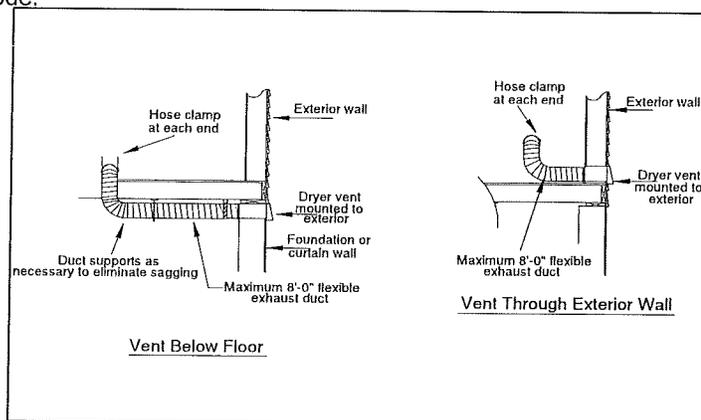


Figure 72 - Clothes Dryer Vent

terminate in the crawlspace, basement or anywhere inside the structure of the home. Use flexible metallic duct work between the elbow protruding from the floor and the termination fitting. Follow the manufacturer's installation instructions carefully.

9.1.3 Air Conditioners

1. Any equipment that you install should not exceed the air duct capacity rating listed on the homes compliance certificate. The installation of window air conditioning units is not recommended.
2. On-site installed wiring beyond the junction box must include a fused disconnect located within sight of the air condensing unit. The maximum fuse size is marked on the condenser data plate. All site work must conform to state and local codes for mechanical and electrical work.
3. "A Coil" air conditioning units must be compatible and listed for use with the furnace in the home. Follow the air conditioner manufacturer's installation instructions.
4. Remote units or a self-contained, packaged air conditioner is to be connected to the heating supply duct, then an automatic damper between the furnace and the home's air duct system, and another between the remote unit and the home's air duct system.
 - a. Secure the duct system leading from the remote unit to the home and do not allow it to touch the ground.
 - b. Insulate ducts with material of thermal resistance as prescribed by IRC and a perm rating of not more than 1 perm.
 - c. Connect the duct carrying air to the home to the main duct at a point where there are approximately as many registers forward of the connection as there are to the rear.
 - d. Locate the return air duct in the center of the home.
 - e. Do not cut or damage floor joists.
 - f. Replace insulation removed during the installation.
 - g. Direct all condensation runoff away from the home by using a hose to the equipment runoff outlet or as specified by the equipment manufacturer.

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CHAPTER 9 - PREPARATION OF APPLIANCES

9.1.4 Heat Pumps

If you plan to install a heat pump then follow the manufacturer's guidelines carefully. The home manufacturer will not be responsible for the efficiency of a heat pump system installed by others.

9.1.5 Oil Burning Furnaces

Homes that are equipped with oil burning furnaces must have the oil supply piping installed on-site (piping is not supplied). Follow the furnace manufacturer's installation instructions carefully.

9.1.6 Flues

Flues for fireplaces, wood burning, gas burning, or oil burning appliances may have been partially installed at the factory. Flues must be inspected on site to insure that they are properly installed according to the appliance manufacturer's installation instructions before the appliance is used.

9.1.7 Stack Extensions

Appliances with a stack or chimney may be extended into the ceiling or through the roof in the factory. It is important to extend these stacks to assure sufficient draft for proper operation and to comply with the appliance manufacturer's requirements. Finished chimneys should be extended a minimum of 3 feet above the highest point, where they penetrate the roof, and at least 2 feet higher than any other building or obstruction located within a horizontal distance of 10 feet (see Figure 73).

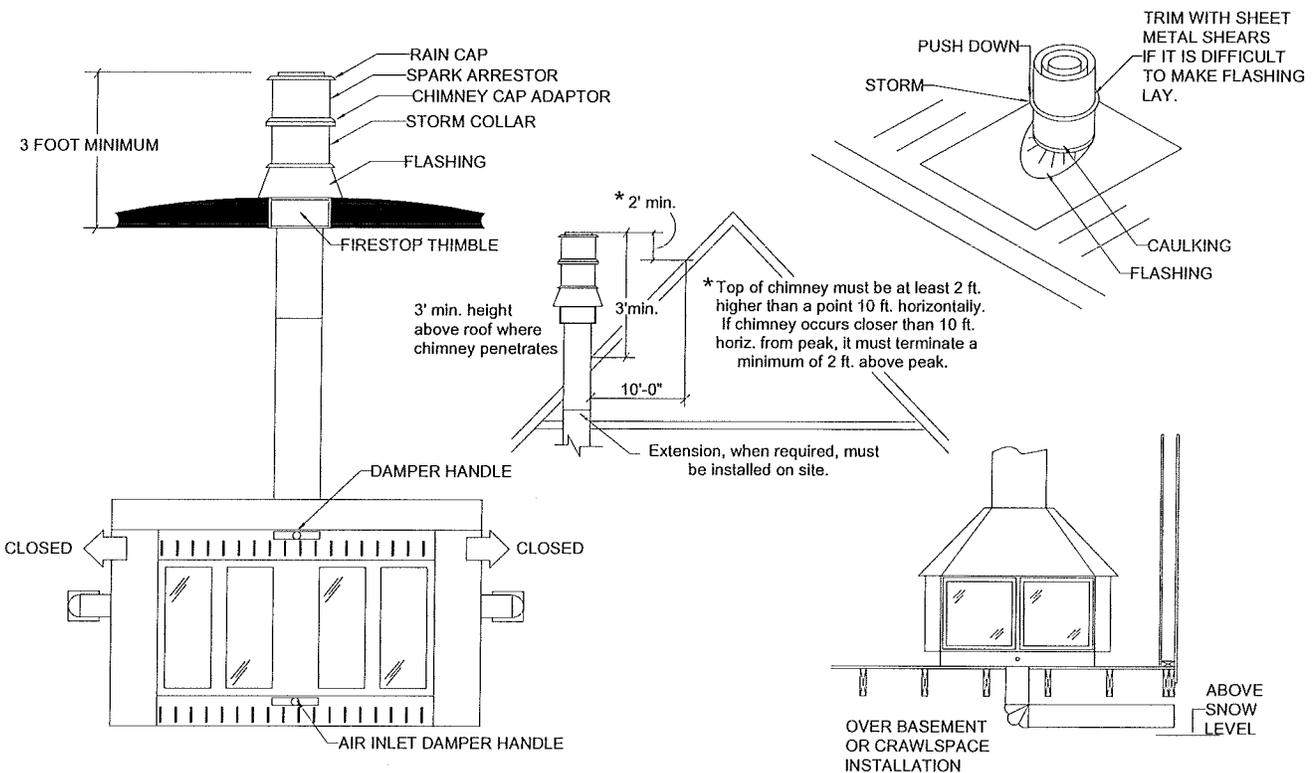


Figure 73 - Fireplace and Chimney Installation

IMPORTANT NOTICE:

Check the termination of your Fireplace fresh air. If the termination is below the floor into an unventilated crawlspace or basement, it MUST be extended to exterior of home. Refer to Fireplace installation instructions for requirements.

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Chapter 10 – Utility System Connection and Testing

10.1 Utility Connections and Testing Procedures

The following will describe connections and testing procedures for plumbing and electrical utilities. The utility systems of your home were subjected to stringent testing before leaving the factory. However, that does not provide guarantee against damage during transit. Therefore, it is imperative that the test procedures described in this chapter are carried out onsite.

NOTE: All utility crossovers must be connected before utility supply lines are connected on site. Only qualified Contractors/ Installers should install utility connections. Improper connections could result in health and life safety problems.

10.1.1 Electrical Connections

Trained professional electricians should make the following electrical connections. All connections should be performed in accordance with state and local codes. Your home was designed in accordance with the National Electrical Code and it is recommended that connections be made in accordance to the same code. Contact the local building authority for applicable codes.

10.1.2 Circuit Connectors

15 or 20 AMP lighting or appliance circuits may be connected using these specifically designed crossover connectors that have been provided with your home. Remove the electrical access panels and locate the circuits to be connected. Then route the wire(s) through the pre-drilled hole in the rim joist and install the connectors (see Figure 74). The connectors must be installed in strict accordance with the manufacturer's installation instructions. When connections are completed replace the insulation and access panel.

10.1.3 Junction Boxes

Any circuit may be connected at a properly sized junction box, which has been mounted on the floor joist, on the same section as the panel box. Remove the electrical access panels and locate the circuits to be connected. Now route the coiled up cable(s) through the pre-drilled holes in the rim joist or under the rim joist.

10.1.4 Electrical Service Entrance Connections

Crossover connections should all be completed before electrical service is connected. A qualified electrician should connect the service entry in accordance with the NEC and any applicable local ordinance. A sufficient power supply must be available at the site. The amperage rating of the electrical distribution panel main disconnect is shown on the tag located outside the home, next to the service entrance and also on the distribution panel. See Figure 75 for service entrance details to distribution panel.

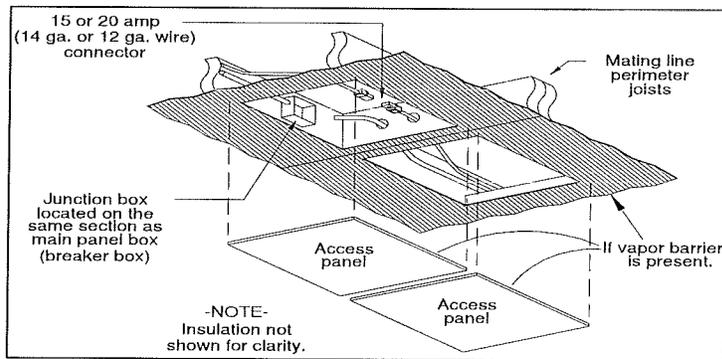


Figure 74 - Circuit Connectors

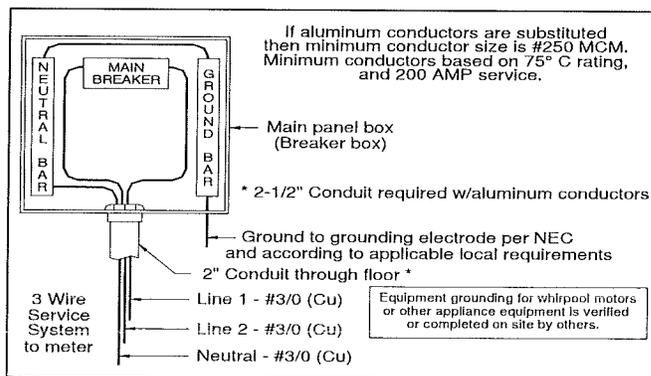


Figure 75 - Electrical Service Entrance Connection

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CHAPTER 10 - UTILITY SYSTEM CONNECTION AND TESTING

10.1.7 Electrical System Testing

A Grounding Continuity Test should be done before the power to the home is turned on. This test should be performed by a qualified electrician familiar with the testing equipment and continuity results. Check continuity at each of the following locations:

1. Each receptacle, light or fan fixture in the home.
2. Each directly connected appliance, hard wired, and receptacle base.

If there is a failure of ground continuity found, it should be investigated and corrected before the power supply is turned on. A simple operational test should be performed after the main breaker has been turned on. Install the light bulbs at each fixture, turn the main breaker on and then follow these steps:

1. Use a current tester at each receptacle outlet to check for reversed polarity, open grounds and shorts.
2. Check every light fan and receptacle that is by a wall switch.
3. Turn all of the switches off and test each smoke alarm according to the manufacturer's instructions. Any failures found during the operational checks should be investigated and corrected.

10.2 Waterline Connections

Trained professional plumbers should make the following connections in accordance with state and local codes. Your home was designed to conform to the International Plumbing Code, or the state adopted code derived from the International Code family and it is recommended that connections be made in accordance to the same. Contact the local building authority for applicable codes.

10.2.1 Crossover Connections

The water line crossovers are ready to be connected using the fittings provided. Remove the water line access panels and locate the lines to be connected. Route the water lines through the pre-drilled holes in the rim joist (see Figure 77). After the fittings have been tightened, make sure that the lines are supported at even intervals and then replace the insulation and access panels.

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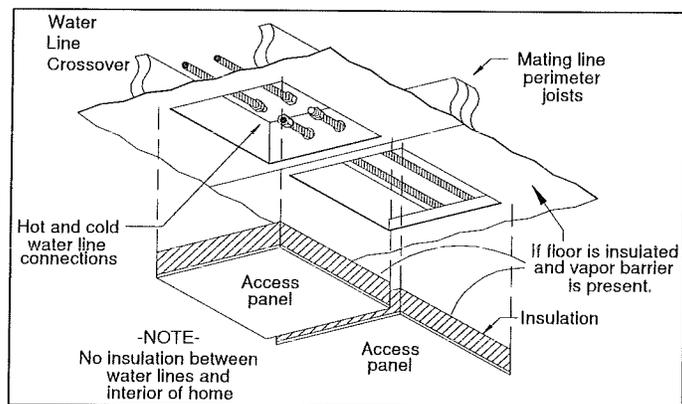


Figure 77 - Water Line Crossover Connection

10.2.2 Main Inlet Connection

Assure that waterline crossover connections have been made before connecting to water main. The water system in your home is designed for a maximum inlet pressure of 80 psi. If you are located in a district where the local water supply pressure exceeds 80 psi, then you must install a pressure reduction valve. The inlet for the installed water supply system is labeled. It is usually located directly off of the water heater. Connect the labeled inlet to the water main off the street. Any water lines beneath the home that are exposed to weather conditions should be insulated to protect from freezing.

10.2.3 Water System Testing

Even though the water system was tested at the factory, it shall be tested again after site connections are made in order to rule out leaks that may occur during transit or set. The most common test is a 15 minute pressure test. All system tests shall be carried out in accordance with the International Plumbing Code or the state adopted plumbing code. Contact the local building code authority for required testing procedures.

CHAPTER 10 - UTILITY SYSTEM CONNECTION AND TESTING

10.2.4 Drain Crossover Connections (If home is equipped with factory installed drain system)

Drain piping and fittings to complete the drain system are to be provided and installed on site by others. The drain line diagram included with the house is not always ideal for a finished basement or other obstacles occurring on site, therefore additional pipe and fittings may sometimes need to be supplied on site by others. Crossovers may need to be connected for both drain lines below the floor and vent lines in the attic, and all drain lines must maintain 1/4" slope per foot continuous to the outlet. See the specific drain diagram for notes and locations. When the lines have all been connected, make sure that all pipes are supported at the correct intervals.

10.2.5 Vent Connections

The vent stacks from each plumbing fixture are extended into the attic. The vent system may be interconnected to reduce the number of extensions through the roof. The 3" main vent, as it is called out on the specific DWV drawing, must extend through the roof to outside air. If other vent stacks extend through the roof they must have a minimum diameter of 3" where they extend to the outside; however if desired, all the vent stacks may be connected to the main vent through the roof.

10.2.6 Drain, Waste, Vent System Testing

The completed drain system must be tested in accordance with the International Plumbing Code, or the state adopted plumbing code's regulation and procedures for testing rough or finished drains, waste and vent systems. Contact the local authority having jurisdiction for required testing procedures. (PC Section 312-Tests and Inspections). Any failures or leaks found during testing shall be investigated and repaired.

10.2.7 Sewer/Septic Connections

When testing has been completed, connect the drain outlet to the building drain. The minimum size pipe for the building drain is 3" and the minimum slope that must be maintained is 1/4" per foot. A qualified plumber should make the final building drain connections.

10.2.8 Gas Line Connections

Trained professional mechanical or fuel gas experts should make the following connections. All connections should be performed in accordance with state and local codes. Your home was designed to conform to the International Fuel Gas Code, or the state adopted code derived from the International Code Family and it is recommended that connections be made in accordance to the same code. Contact the local building authority for applicable codes.

10.2.9 Gas Crossover Connections

The gas lines are usually installed on the underside of the floor. Crossover connections should be completed as illustrated in Figure 78. The proper fittings and flex connectors have been shipped with the house. The fittings should be installed exactly as illustrated, and the direction of flow should be noted, as it is critical to this assembly. All connections must be readily accessible from under the house and should not be concealed. Pipe should be supported as required.

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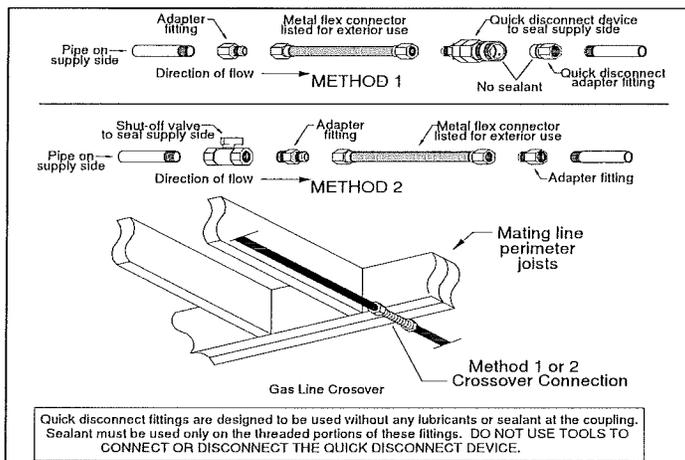


Figure 78 - Gas Crossover Connection

CHAPTER 10 - UTILITY SYSTEM CONNECTION AND TESTING

10.2.10 Gas System Testing

Before the gas piping system is put in service or concealed, it shall be tested to insure that it is gas tight. Testing shall be performed in accordance with the International Gas Code or the state adopted fuel gas code's regulations and procedures. (IFGS Section 406-Tests and Inspections). Any failures or leaks found during testing shall be investigated and repaired.

NOTE: All the gas appliances in this home, including the heating system, are equipped for natural gas. If LP gas is to be used, then the appliances must be converted using proper Natural to LP conversion equipment. Follow the appliance manufacturer's installation instructions carefully. Conversions shall only be made by a qualified mechanical or fuel gas professional. Do not try any appliance pilot light until it has been checked to insure that the vent is completely installed, and all test and connections have been made properly.

10.3 Appliance and Mechanical Set-up

10.3.1 Bathroom Exhaust Fan

Bathroom exhaust fans have been attached to flexible duct that will need to be routed to the outside air on site. The exhaust duct shall not terminate inside the attic, or anywhere inside the structure of the home where moisture could accumulate. The exhaust should be ducted through the roof to the outside (see Figure 79).

10.3.2 Range Hood

If the range hood installed is the vented type, the vent will need to be extended through the roof or thru wall to the outside air. The vent should not terminate in the attic or anywhere inside the structure of the home where moisture or vapors could accumulate.

10.3.3 Down Draft Cook Top

If the home has a cook top with a down draft exhaust system, then the exhaust must be ducted to the outside air. The exhaust duct shall not terminate in the crawlspace, basement or anywhere inside the structure of the home. Follow the manufacturer's installation instructions carefully.

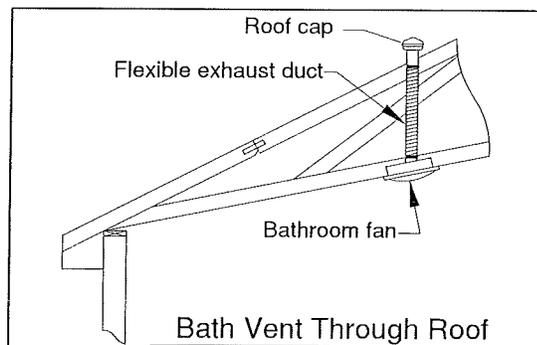


Figure 79 - Bathroom Exhaust Fan

10.3.4 Air Conditioners

The air distribution system of your home has been designed for a central air conditioning system. Any equipment that you install should not exceed the air duct capacity rating listed on the home's compliance certificate. The installation of window air conditioning units is not recommended.

10.3.5 A/C Wiring

Any field installed wiring beyond the junction box must include a fused disconnect located within sight of the air conditioning unit. The maximum fuse size is marked on the condenser date plate. All site work must conform to state and local codes for mechanical and electrical work.

10.3.6 "A Coil" A/C

"A Coil" air conditioning units must be compatible and listed for use with the furnace in the home. Follow the air conditioner manufacturer's installation instructions.

10.3.7 Remote Units

If a remote, self contained, packaged air conditioner is to be connected to the heat supply duct, then an automatic damper must be installed between both appliances (furnace and air conditioner) and the home's supply duct system. Secure the duct system leading from the remote unit to the home and do not allow the duct to touch the ground. Insulate ducts with material having a thermal R-value of not less than 4 and a perm rating of not more than 1. Connect the duct that carries air to the home directly to the main supply duct at a point where there is approximately the same number of registers on either side of the connection. Locate the return air duct in the center of the home. Direct all condensation run off away from the home using a hose or as specified by the manufacturer's installation instructions.

CHAPTER 11 INSPECTION CHECK SHEET

Chapter 11 – Inspection Check Sheet

11.1 Pre-installation Checks

- Permit has been obtained and any special requirements have been communicated to plant of manufacture.
- Utility planning, hook-ups and notifications.
- Ground snow load, wind speed, seismic load and thermal requirement are within limitations noted on prints.
- Site has been graded to permit water to drain from under the home.
- Access to the site for the home and the crane (if applicable) has been checked.
- Soil condition checked and the bearing capacity of the minimum required on the print.

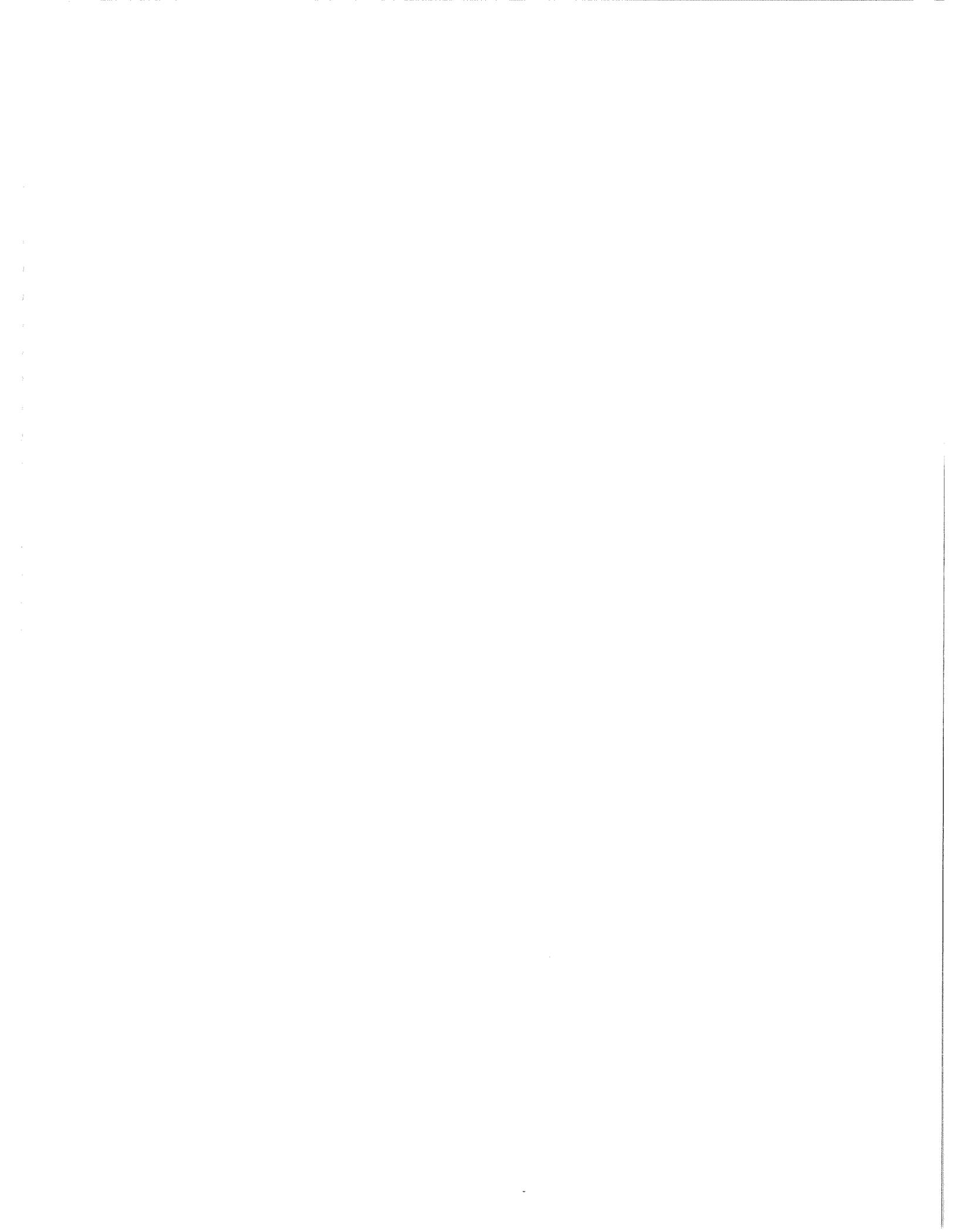
11.2 Installation Checks

- Perimeter foundation wall dimensions have been checked for proper fit and square.
- Shingle close - up and ridge cap per applicable details.
- Ground vapor barrier has been installed on homes with a crawlspace.
- Home to foundation connections are per prints and applicable wind and / or seismic loads.
- Ridge vent roof ventilation is installed per specifications.
- Hinged roof is properly raised and completed and king posts fastened per specifications.
- Footing placement and design per specifications and applicable ground snow load.
- Interconnection of the halves at roof, floor and walls are per specifications.
- Return air duct connection from main grill(s) to furnace has been completed.
- Furnace, water heater and fireplace fresh air intake and exhaust air have been completed per specifications.
- Dryer vent exhausts to outside of home.
- Crawlspace stem walls or floor system have been properly insulated per print package.
- Rim joist insulation at the perimeter of the home is completed per specifications.
- Electrical crossover(s) and bonding strap(s) connected, checked for more than one.
- AC - condensation drains out of the home or into drain system.
- Drain lines connected, sloped and supported.
- Entire plumbing vent system at hinged roof is completed.
- Heating and return air duct cross over are installed properly.
- Water line cross over connected and tested (insulated when applicable).
- Unsure that water heater has been filled with water prior to ignition or before electric power is activated to the water heater.

11.3 Final Installation Checks

Inspect and evaluate the home for complete and proper setup. A final walk through inspection should be made to ensure that all items have been completed. Review of the following "checklist" items is important:

- Test gas lines.
- Test water lines.
- Test drain lines.
- Test electrical.
- Floors are level.
- Test all appliances and make sure they work properly.
- Evaluate windows, doors and drawers for proper operation.
- Interior details. Inspect for, and correct, all interior finishing details, such as loose molding, carpet seams, etc. The retailer's representative should inspect the home with the homeowner.
- Vent pipes, flashing and stack heads. All stack head or vent pipe flashings are properly attached and sealed.
- Roofing. All shingles are properly attached, none are loose or missing and all holes are filled.
- Trees and Bushes. Remove any obstacles that can cause damage to the house such as low hanging trees or bushes that can scrap the house during high winds or heavy snow.
- Exhaust fan operates and has proper air flow. Check all exhaust fans for proper operation and air flow.
- Ground cover. Repair any cuts or tears in the ground cover or vapor barrier with tape.
- Exterior siding and trim. There are no gaps, voids and all fasteners and seams are sealed and secured.
- Window fall prevention guards by others where sill of operable windows is less than 24" from floor and more than 72" from grade per IRC.

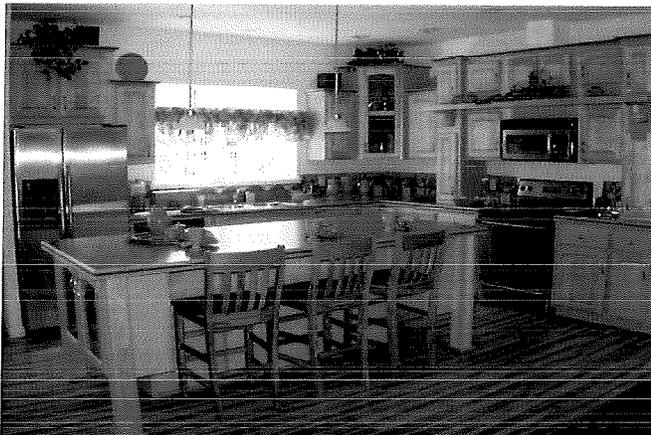


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