

2/2008

# PATRIOT HOMES, INC.

## INSTALLATION MANUAL

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## I. INTRODUCTION

The purpose of this manual is to provide the information needed to properly install this manufactured home. Much of the installation is technical in nature, but we have attempted to write this information in an easy to read and understand manner. This manual covers the site through final inspection of the installation. All instructions must be followed to provide the customer with a safe, quality home. In the event that any of the requirements contained within this manual cannot be followed, a registered professional engineer and/or the local building authority must be consulted. The installation shall conform with the requirements of the H.U.D. Federal Manufactured Housing Construction and Safety Standards. Under no circumstances will the home manufacturer be held responsible for any installation deviation from all contents of this manual. If any of this information is not understood or further information is needed, the home manufacturing facility should be contacted.

## II. GENERAL

This home was manufactured for particular geographical areas. A certification sheet was applied to the home showing the home identification, roof (snow) load design, wind zone design, climatic zone design and maximum air conditioning duct design information. Please review this certification sheet and determine that ALL areas of the home design are for the final home site. If any of the designs do not meet or exceed those required for the home site, contact your local building authority and/or the home retailer. In no case shall any home be installed in a geographical area the home has not been designed for. The certification sheet should be located at the electrical panel box or attached to the back of a cabinet door under the kitchen sink. You should verify the home acceptability before beginning any site work.

Prior to performing any installation on the home site, the local building authority should be contacted to ensure the appropriate permits have been acquired and all site inspections can be scheduled. Usually there are restrictions that must be adhered to for the home site to be acceptable. All zoning and restrictive covenants must be known prior to the home installation.

Safety during the installation shall be of utmost importance, this home weighs many tons. Only properly trained personnel should attempt to install this home. Verify that the appropriate equipment, designed for the installation, is available and in proper working order. Adequate safety blocking that can support the weight of the home must be used at all times. No personnel shall be under the home when safety blocking is not in place. Serious injury or death can occur from not following proper safety precautions.

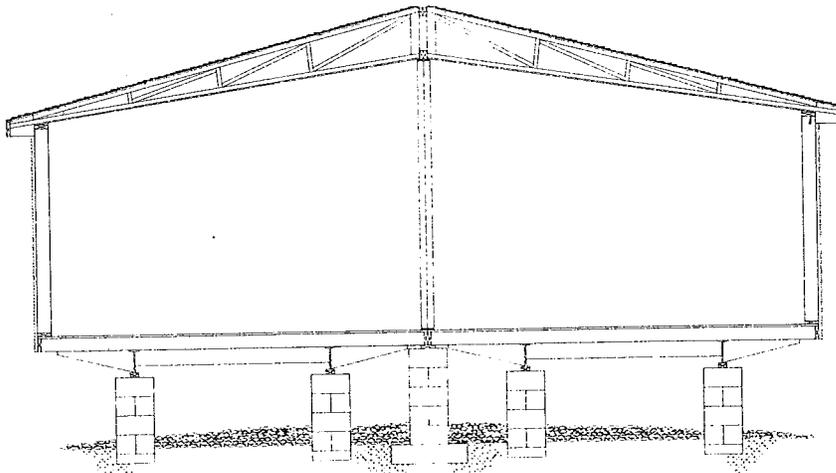
## **WEATHER PROTECTION DURING STORAGE**

If the installation is not started immediately upon delivery, the dealership and/ or installer has the responsibility to ensure the exterior weather protection covering of marriage walls and the roof of homes with hinged roofs has not been damaged during shipment. We advise an inspection immediately upon the delivery of the home and frequent inspections during home storage. Repairs to tears in the home closure materials shall be made to prevent any damage from the elements. Roof shingles and siding shall also be inspected and repairs made as needed.

### III. SITE INFORMATION AND PREPARATION

Several issues about the home site must be considered prior to performing any installation of the foundation and delivery of the home.

- 1.) *ACCESS FOR DELIVERY* is an issue that can trouble installation schedules. The transporter of the home should verify the route to be used is accessible. Contact should be made whether any permits are required to move the home. Verify any obstructions which could damage or prevent transportation, such as low wires and bridges which may be encountered that may not have the strength to support the weight. There should also be enough clearance at the home site for the home to be located as needed to perform the installation and still allow the delivery vehicle to exit.
- 2.) *VERIFY ENCROACHMENTS* and setback requirements with the local building authority. Consider any future buildings that the homeowner may locate on the property when locating the home foundation. Communicate with the homeowner to assure the home is being sited per their satisfaction.
- 3.) *VERIFY PERMITS* have been obtained and that no problems exist with local building codes.
- 4.) *SOIL CONDITIONS OF SITE* shall be determined to be acceptable for proper foundation support. The foundations **MUST** be upon firm, undisturbed soil or fill that has been compacted to 90% of its maximum relative density. All organic matter such as grass and topsoil must be removed from the foundation area. Installation of foundation on inappropriate soil may void the home warranty and cause extensive damage to the home.
- 5.) *FINAL GRADE AND BACKFILL* plans shall assure all surface water will flow away from the foundation. The entire area under the home shall be graded with " a crown " at the center of the foundation, preventing any water from accumulating under the home. Improper grading can create excessive moisture under the home which will affect the foundation performance and create inadequate support of the home.



6.) *SOIL BEARING CAPACITY MUST BE VERIFIED* for foundation design requirements that follow within this manual. The soil bearing capacity shall be determined at the footing depth, below frost level. A pocket penetrometer (available from engineering supply houses) may be used to determine the soil capacity. If the bearing capacity cannot be determined through testing but the soil can be identified, then the following charts may be of some assistance. If you cannot identify the soil type then the lowest design capacity shall be used in foundation design (1000 PSF). If any doubt or unusual conditions exist, consult a local professional engineer or the local building authority for assistance. Generally, they have a knowledge of the local soils. Under no circumstances shall this requirement be ignored.

GENERAL DESCRIPTIONS OF SOILS

<u>SOIL TYPE</u> based on the Unified Classification System	<u>ALLOWABLE PRESSURE</u> Pounds per Square Foot (PSF)
<u>Rock or Hard Pan</u>	<u>4000 +</u>
<u>Sandy Gravel and Gravel</u>	<u>2000</u>
<u>Sand, Silty Sand, Clayey Sand</u>	<u>1500</u>
<u>Silty Gravel or Clayey Gravel</u>	<u>1500</u>
<u>Clay, Sandy Clay, Silty Clay, Clayey Silt</u>	<u>1000</u>
Uncommitted Fill, Peat or Organic Clays (Generally not recommended)	Special Analysis Required

Note: This information is to be utilized only when none of the following is available:

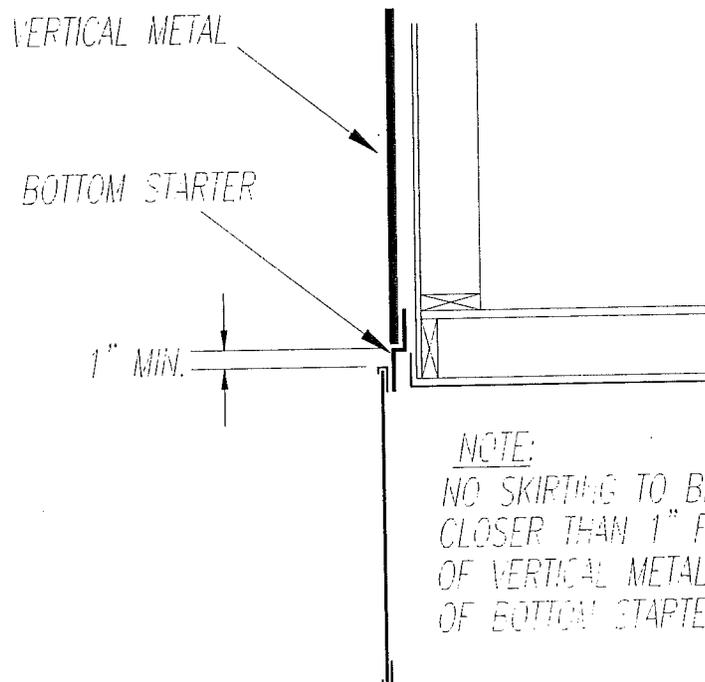
- 1.) Soils investigation and analysis at site
- 2.) Compliance with local building code
- 3.) Competent analysis or judgement of professional engineer or local building official.

7.) *HIGH WATER TABLE* can seriously affect foundation performance. The water table should be verified and taken into consideration when determining footing sizing. Many sites can have varying water tables due to a variety of causes. Consult with the local building authority. The weight bearing capacity of any soil is greatly reduced when water or moisture is present. A good example is to place some packed sand into a container and feel the resistance ( bearing capacity ). Next, add water to the container and feel the resistance that is now present. As you can see, the water dramatically lowers the weight bearing capacity of the soil. Some sites are simply unsuitable for any home without extensive grading, fill, compaction and/or footings. Never make any assumptions as to the suitability of the home site.

## 8.) MISCELLANEOUS REQUIREMENTS:

### SKIRTING / CRAWLSPACE VENTILATION REQUIREMENTS

The space between the bottom of the floor joists and the earth under any building (except such space as is occupied by a basement or cellar) shall be provided with a sufficient number of ventilating openings through foundation walls or skirting to ensure ample ventilation, and such openings shall be covered with a corrosion-resistant wire mesh not less than 1/8 inch in any dimension. The minimum net free area of ventilation openings shall be not less than 1 square foot for each 150 square feet of crawl space area. One such ventilating opening shall be within 3 feet of each corner of said building.



## **CRAWLSPACE WATER VAPOR PROTECTION**

When a home is installed on a crawlspace or a skirted foundation then water vapor that originates from the soil under the home is an issue that shall be reviewed by the installer and/or homeowner. Water vapor can create a variety of problems within the home if it is allowed to enter in high enough levels. Vapor migrates naturally to lower moisture areas and passes through most building materials. The exterior floor covering installed on the home is not a vapor barrier, thus can allow migration into the entire structure. If a high enough moisture level is allowed to enter then the homeowner may experience such problems as mold and mildew, expansion of floor, wall and ceiling panels or condensation forming on exterior surfaces. These are merely a few of the problems that can occur.

The installer and/or homeowner shall review the soil conditions and determine whether the soil type is conducive to moisture vapor. Heavy soils such as clay or a high water table at the home site can be an indication that water vapor could develop, whereas gravelly or sandy type soils are generally well drained when the ground water table is not high.

If the installer and/or homeowner has determined that a vapor retarder is to be installed then a minimum 6-mil thick layer of polyethylene sheeting or equivalent shall be placed under the home. Ensure all sheathing joints overlap a minimum of 12". Any tears are to be repaired with a proper tape that adheres to the sheathing material used. The sheathing shall be without voids under the entire home.

It is required that surface water be directed away from the home. Please refer to Final Grade and Backfill information within Section III of this manual.

Hardboard sided homes shall always have the vapor barrier installed for the siding warranty to be valid. Please verify the siding type used on the home.

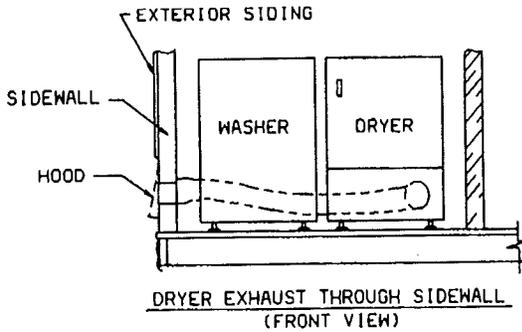
If the installer and/or homeowner cannot make a determination whether water vapor migration is possible then a vapor barrier shall be installed. Patriot Homes, Inc. cannot honor warranty claims that result from water vapor entry into the home, regardless whether a vapor barrier has been installed or not. Some potential home sites simply have too much moisture for home installation.

## **EXTERIOR DOOR PIERS**

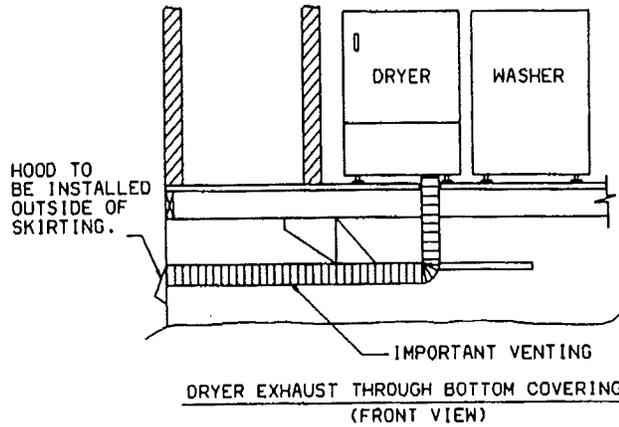
The typical foundation details (without a continuous perimeter foundation wall) refer to pier blocking installed at all exterior doors that are less than four feet in width. The installer shall look for pier blocking instructions on the exterior door(s). If no instructions on the door can be found then the hinge side of the door(s) shall have a pier installed whereas the perimeter floor joist rests upon the pier. As with all piers that support the home, periodic adjusting can be expected.

## CLOTHES DRYER VENTING

The vent for a clothes dryer has been partially installed at our facility. The vent shall be connected per the following instructions. The vent shall always terminate through the foundation perimeter or skirting. In no cases shall a clothes dryer vent terminate under the home. It shall be the homeowner's responsibility to ensure the dryer is connected to the vent system. In no case shall the homeowner discharge into or under the home. Only metallic vent material shall be used. (See detail below)

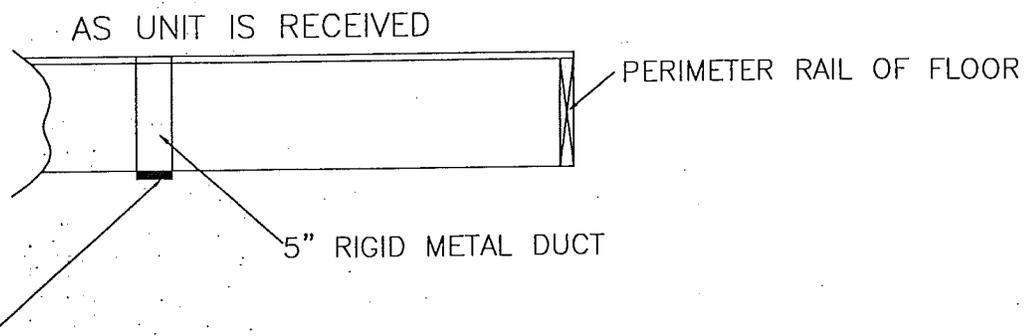


CAUTION: INSTALLATION OF THE EXHAUST SYSTEM MUST BE IN ACCORDANCE WITH THE DRYER MANUFACTURER'S INSTRUCTIONS.

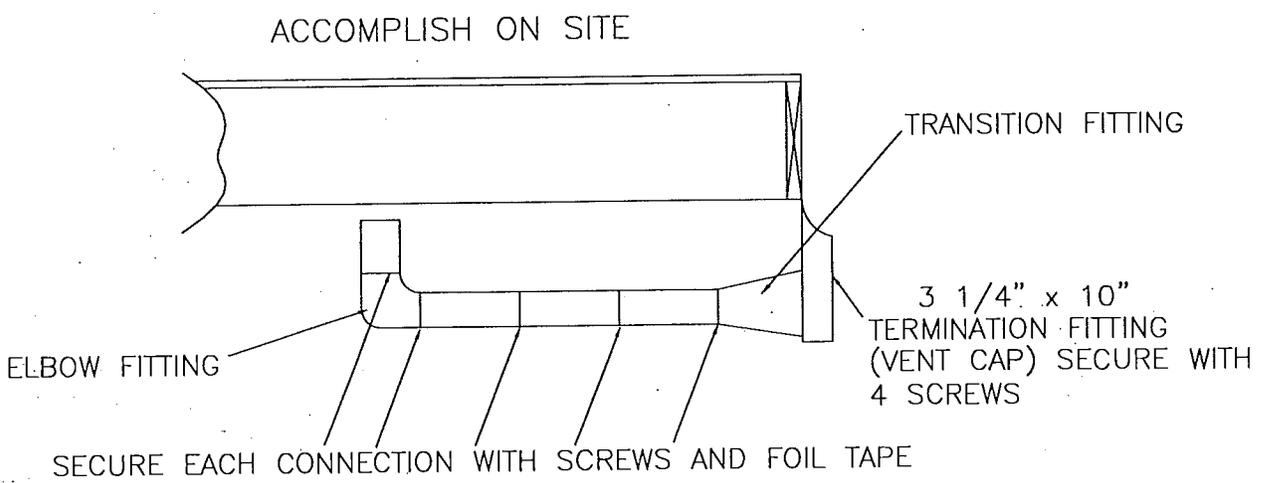


CAUTION: THIS EXHAUST SYSTEM MUST NOT TERMINATE UNDER THE HOME.

NOTE: ANY SPLICE IN DUCT MATERIAL SHOULD BE JOINED TOGETHER WITH EITHER TAPE OR CLAMPS SUITABLE FOR THAT PURPOSE. MECHANICAL FASTENERS WHICH WOULD PENETRATE THE EXHAUST DUCT ARE NOT TO BE USED.



DUCT WILL DROP DIRECTLY BENEATH DOWN DRAFT THROUGH BOTTOM BOARD AND WILL BE COVERED BY TAPE



ALL 5" RIGID METAL DUCT AND FITTINGS

REFER TO APPLIANCE INSTRUCTIONS FOR FASTENING, SUPPORT, ETC. INFORMATION.

ALL DUCT AND FITTINGS SUPPLIED WITH THE HOME

## **BOTTOM BOARD PATCHING**

Below are listed three different patching methods which, depending on such factors as size and/or location of tear, type of tear, location of home, etc. offer the manufacturer, dealer, or home buyer, a reasonable means of resealing the bottom board.

- 1.) Using 3M double face tape #F950, patches may be constructed of any shape and size utilizing scrap pieces of bottom board or other suitable material. The tacky side of the tape is affixed to the patch material and when ready for positioning, the release sheet is removed thereby exposing the other tacky side. The patch should be applied to the damaged area taking care to exert pressure on taped surfaces. Standard stocking size is 3" x 60 yards. It is available in inch increments up to 48" on special order.
- 2.) A 2" pressure sensitive tape, Tuck #91B or equivalent is available for patching the occasional small tears and cuts which occur during manufacture and set up.
- 3.) Outward Flare Tacker – An air operated tool Model LN3045 manufactured by Senco Products, Inc. Suitable for either transverse or longitudinal floor construction. It may be used either in the plant or on erection site. The patch should first be affixed to the bottom using Tuck #91B or equivalent (described in method #2) to secure the perimeter and then fastened on the perimeter at 3" intervals. Use the staples described in Senco Bulletin M-100.

## **INSPECTION PANELS**

The bottom board material may be cut at the factory for the purpose of drain line P-trap inspection panels that are patches as above and marked with a red "X". A patch that has been removed must be replaced with one of the above procedures, or a plywood patch that has been painted or sealed to resist moisture and fastened to floor joist with 4 screws.

## **ALTERNATE METHOD**

If the above materials are not available, plywood that has been painted or sealed to resist moisture may be used for the inspection panel. The plywood panel must be large enough to cover the opening and fastened to the adjacent floor joist with 4 screws.

## IV. *PIER / FOUNDATION DESIGN*

### GENERAL

This section covers pier and footing design. Incorrect size, location or spacing of piers and footings may cause serious structural damage to the home, and possibly void the home warranty. All information that follows shall be reviewed and understood to properly install the home.

Only concrete block piers are addressed within this manual. Other types such as pressure treated wood or manufactured metal types may be used, but the local building authority or a licensed professional engineer shall be consulted for acceptability of use. The home manufacturer cannot endorse any other pier or foundation other than that contained within this manual.

## FOOTING DEPTH (all piers)

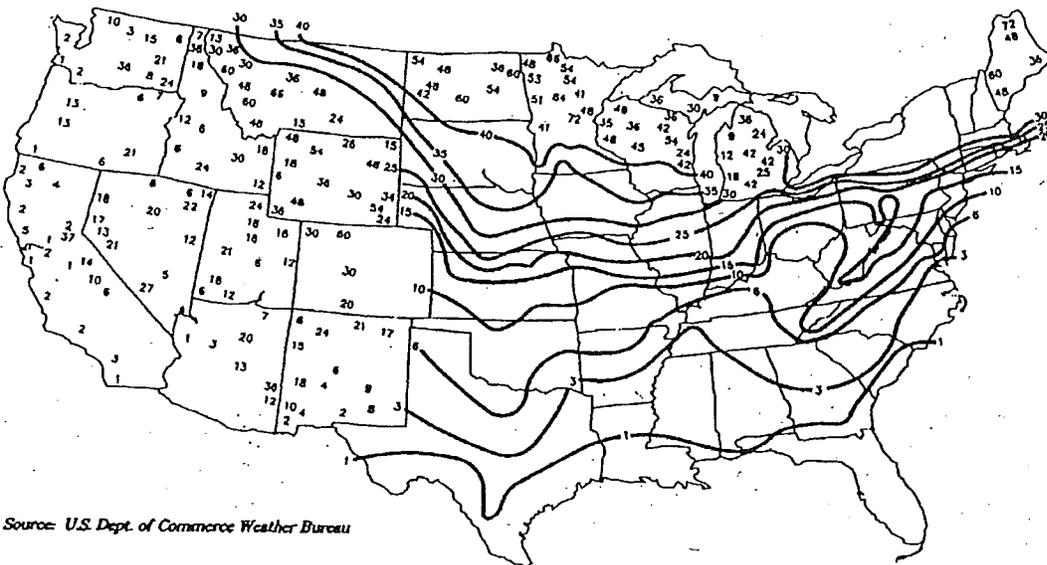
If the soil under a footing freezes, the footing can raise, thus possibly creating damage to the home. This natural phenomenon is known as "frost heave."

Frost depth can vary widely within a geographical area. Actual soil conditions at the home site are what determines footing depth. For frost to develop there must be high levels of soil moisture or a continuous supply of ground water that freezes and over time forms ice lenses under the footing which can develop to a thickness that will raise footings.

If the soil at the home site is well drained, is of a type that does not retain high levels of moisture, and is properly graded to prevent accumulation of surface water near the footings, then frost will be minimal or not form at all. Clay type soils generally hold high levels of moisture and should be considered a frost forming potential, whereas sandy or gravel type soils are generally well drained.

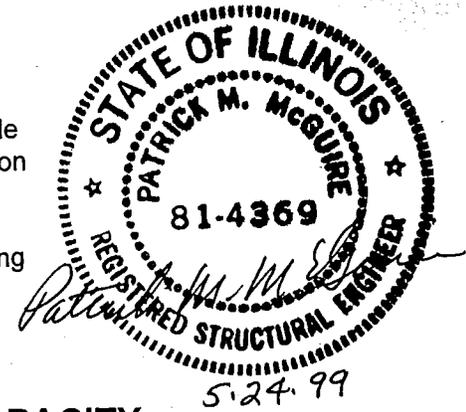
If the installer and/or homeowner cannot make a determination, then footings shall be installed as illustrated by the following chart. Patriot Homes, Inc. cannot honor warranty claims that result from "frost heave" due to footings being set at an insufficient depth, or where soil content contains excessive moisture which accelerates the forming of ice lenses. Some home sites are simply unsuitable for home installation.

*Frost Penetration Map. (Average Depth of Frost Penetration - In Inches)*



Source: U.S. Dept. of Commerce Weather Bureau

This installation manual is generically written. Installation manuals simply cannot take all possible site conditions into consideration without unreasonable requirements for the majority of home installations. It shall be the determination of the home installer to identify the probability of frost affecting footing performance and install them accordingly. Patriot Homes, Inc. cannot honor warranty claims that we determine are the result of footing movement, including "frost heave."



## MAXIMUM PIER SPACING PER SOIL CAPACITY LOCATED UNDER EACH CHASSIS I-BEAM

1000 PSF SOIL CAPACITY			ROOF LOAD AREA (* FOOTING SIZE UNDER PIER)					
			20 PSF		30 PSF		40 PSF	
HOME TYPE	HOME WIDTH	MAX. ROOF OVERHNG	16x16x4	24x24x◆	16x16x4	24x24x◆	16x16x4	24x24x◆
SINGLEWIDE	14' (164")	5"	3'-1"	7'-1"	2'-9"	6'-6"	2'-6"	5'-7"
SINGLEWIDE	16' (184")	5"	2'-9"	6'-4"	2'-6"	5'-7"	2'-3"	5'-0"
DOUBLEWIDE	13 / 26' (156")	12"	3'-2"	7'-1"	2'-9"	6'-3"	2'-6"	5'-7"
DOUBLEWIDE	14 / 28' (164")	15"	3'-0"	6'-9"	2'-7"	5'-11"	2'-4"	5'-3"
DOUBLEWIDE	16 / 32' (184")	12"	2'-9"	6'-3"	2'-5"	5'-6"	2'-2"	4'-11"

1500 PSF SOIL CAPACITY			ROOF LOAD AREA (* FOOTING SIZE UNDER PIER)					
			20 PSF		30 PSF		40 PSF	
HOME TYPE	HOME WIDTH	MAX. ROOF OVERHNG	16x16x4	24x24x◆	16x16x4	24x24x◆	16x16x4	24x24x◆
SINGLEWIDE	14' (164")	5"	4'-8"	10'-7"	4'-2"	9'-4"	3'-8"	8'-5"
SINGLEWIDE	16' (184")	5"	4'-2"	9'-6"	3'-9"	8'-5"	3'-4"	7'-7"
DOUBLEWIDE	13 / 26' (156")	12"	4'-9"	10'-8"	4'-2"	9'-5"	3'-9"	8'-5"
DOUBLEWIDE	14 / 28' (164")	15"	4'-6"	10'-1"	3'-11"	8'-11"	3'-6"	7'-11"
DOUBLEWIDE	16 / 32' (184")	12"	4'-2"	9'-5"	3'-8"	8'-4"	3'-3"	7'-5"

2000 PSF SOIL CAPACITY			ROOF LOAD AREA (* FOOTING SIZE UNDER PIER)					
			20 PSF		30 PSF		40 PSF	
HOME TYPE	HOME WIDTH	MAX. ROOF OVERHNG	16x16x4	24x24x◆	16x16x4	24x24x◆	16x16x4	24x24x◆
SINGLEWIDE	14' (164")	5"	6'-3"	14'-1"	5'-6"	12'-6"	5'-0"	11'-2"
SINGLEWIDE	16' (184")	5"	5'-7"	12'-8"	5'-0"	11'-3"	4'-6"	10'-1"
DOUBLEWIDE	13 / 26' (156")	12"	6'-4"	14'-3"	5'-7"	12'-7"	5'-0"	11'-3"
DOUBLEWIDE	14 / 28' (164")	15"	6'-0"	13'-6"	5'-3"	11'-10"	4'-8"	10'-7"
DOUBLEWIDE	16 / 32' (184")	12"	5'-7"	12'-6"	4'-11"	11'-1"	4'-5"	9'-11"

\* FOOTING SHAPE MAY BE OTHER THAN SQUARE. MAINTAIN EQUAL AMOUNT OF FOOTING AREA  
16x16 = 256 SQ. IN. & 24x24 = 576 SQ. IN.

◆ MIN. THICKNESS TO BE 9" FOR SINGLE BLOCK PIER, 5" FOR DOUBLE BLOCK PIER

FOOTINGS TO BE POURED IN PLACE OR PRECAST CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS

## MARRIAGE LINE AND SIDEWALL OPENING COLUMN PIER LOADS CHART

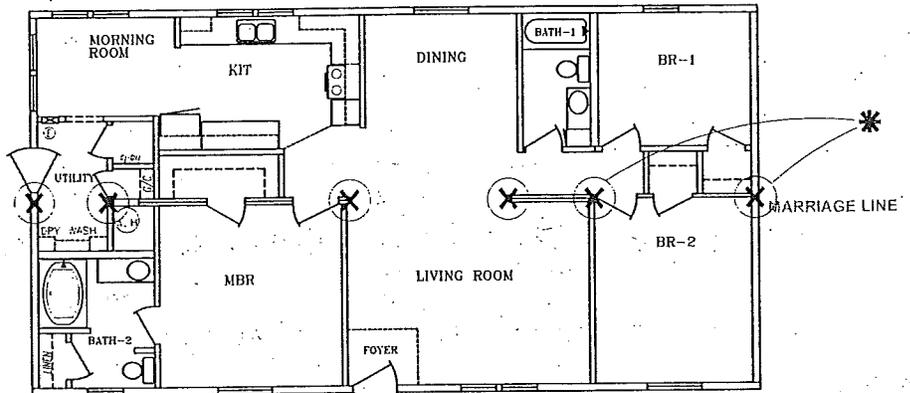
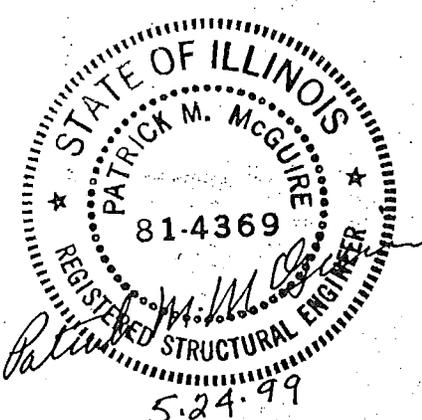
DOUBLEWIDE AND TRIPLEWIDE HOMES MAY REQUIRE MARRIAGE LINE COLUMN PIERS INSTALLED. EACH END OF EVERY OPENING IN THE MARRIAGE WALL WHICH IS 4' OR LARGER SHALL BE CONSIDERED A COLUMN. THESE COLUMNS AND PIERS SUPPORT THE LOADS OF THE ROOF ABOVE THE OPENING(S). CERTAIN HOMES UTILIZE A SINGLE MARRIAGE WALL WHEREAS A COLUMN SITUATION WILL EXIST ON THE HOME HALF WHERE THERE IS NO MARRIAGE WALL. AN EXAMPLE OF THIS IS ILLUSTRATED PER (\*) IN THE FLOORPLAN/COLUMN PIER DIAGRAM BELOW. COLUMN PIERS ARE IN ADDITION TO THE MARRIAGE PIERS AS SHOWN ON THE TYPICAL FOUNDATION DETAILS THAT FOLLOW.

UNIT WIDTH	MAXIMUM MARRIAGE OPENING	ROOF LOADS		
		20#	30#	40#
26'-0" (156")	4'	780	1040	1300
	8'	1560	2080	2600
	12'	2340	3120	3900
	16'	3120	4160	5200
	20'	3900	5200	6500
	24'	4680	N/A	N/A

UNIT WIDTH	MAXIMUM MARRIAGE OPENING	ROOF LOADS		
		20#	30#	40#
28'-0" (164")	4'	820	1094	1367
	8'	1640	2188	2734
	12'	2460	3282	4101
	16'	3280	4376	5468
	20'	4100	N/A	N/A
	24'	4920	N/A	N/A

UNIT WIDTH	MAXIMUM MARRIAGE OPENING	ROOF LOADS		
		20#	30#	40#
32'-0" (184")	4'	920	1226	1533
	8'	1840	2452	3066
	12'	2760	3678	4599
	16'	3680	4904	6132
	20'	4600	6130	N/A
	24'	5520	N/A	N/A

To select the proper footing size for the marriage line columns, look at the Marriage Line Column Pier Load Charts for the width of the home. All marriage wall openings 4' and larger must have a pier installed under each end of the opening. Select the opening(s) in the home from the charts and find the total load for that pier depending on the specified load. (20#, 30# or 40#) look at the Marriage Line Column Pier Footing Size Chart on the following page and select the soil capacity which relates with the pier load needed. After the footing size is determined, refer to the last chart for the footing thickness based on the pier type to be installed.



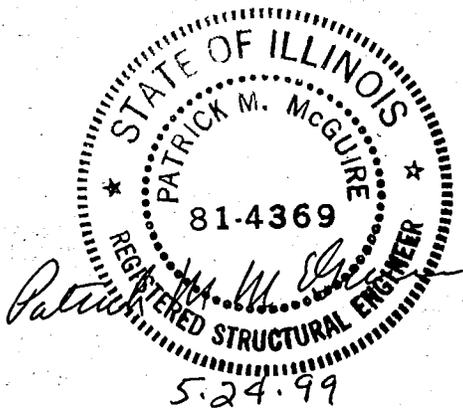
The following charts cover the size and thickness of footings for piers located under marriage wall openings. These piers must be located at openings in the marriage line of four feet and larger, as well as ten foot on center maximum for the entire length of the home.

### MARRIAGE LINE COLUMN PIER FOOTING SIZE CHART (WIDTH X LENGTH)

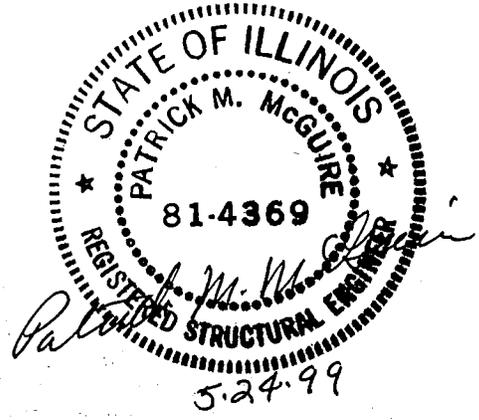
1000 PSF SOIL CAPACITY		1500 PSF SOIL CAPACITY		2000 PSF SOIL CAPACITY	
MAXIMUM MARRIAGE COLUMN PIER LOADS (lbs)	FOOTING SIZE	MAXIMUM MARRIAGE COLUMN PIER LOADS (lbs)	FOOTING SIZE	MAXIMUM MARRIAGE COLUMN PIER LOADS (lbs)	FOOTING SIZE
1000 lbs	12" x 12"	1000 lbs	10" x 10"	1000 lbs	9" x 9"
2000 lbs	17" x 17"	2000 lbs	14" x 14"	2000 lbs	12" x 12"
3000 lbs	21" x 21"	3000 lbs	17" x 17"	3000 lbs	15" x 15"
4000 lbs	24" x 24"	4000 lbs	20" x 20"	4000 lbs	17" x 17"
5000 lbs	27" x 27"	5000 lbs	22" x 22"	5000 lbs	19" x 19"
6000 lbs	30" x 30"	6000 lbs	24" x 24"	6000 lbs	21" x 21"
7000 lbs	32" x 32"	7000 lbs	26" x 26"	7000 lbs	23" x 23"

### MARRIAGE LINE PIER FOOTING THICKNESS CHART

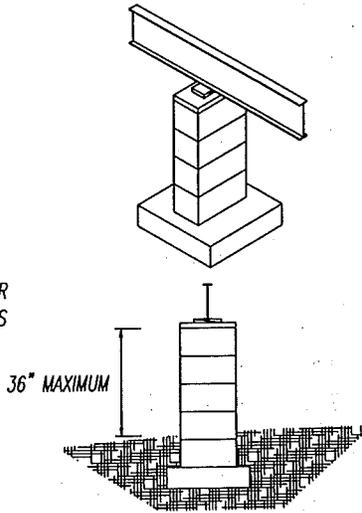
FOOTING SIZE WIDTH x LENGTH (inches)	FOOTING THICKNESS WITH 8" x 8" OR 8" x 16" PIER BLOCKS	FOOTING THICKNESS WITH 16" x 16" PIER BLOCKS
9" x 9" thru 15" x 15"	4"	N/A
16" x 16"	4"	4"
17" x 17"	5"	4"
19" x 19" thru 20" x 20"	6"	4"
21" x 21" thru 22" x 22"	7"	4"
23" x 23"	8"	4"
24" x 24" thru 26" x 26"	9"	5"
27" x 27"	10"	6"
30" x 30" thru 32" x 32"	12"	8"



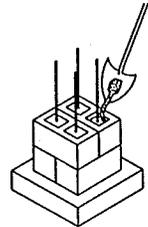
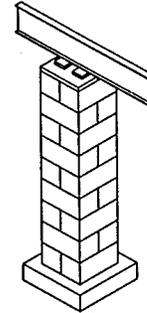
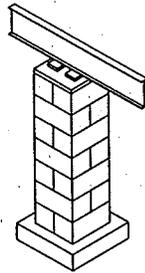
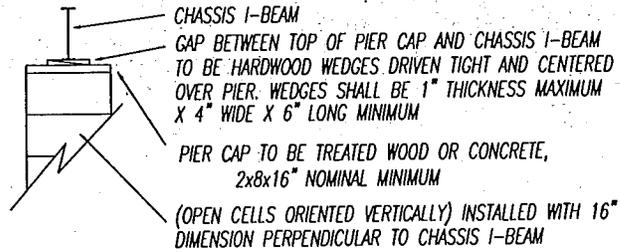
The following foundation details refer to all divisions of Patriot Homes, Inc. Please note the non-specific nature of these details so as to include all plants. Specifications of pier sizing and spacing based on the home size and demographic location can be found on the previous pages. Failure to set the home per these details may void the warranty.



SINGLE "DRY STACKED" OPEN OR CLOSED CELL CONCRETE BLOCKS

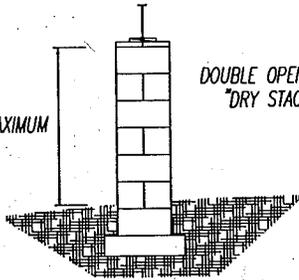


36" MAXIMUM



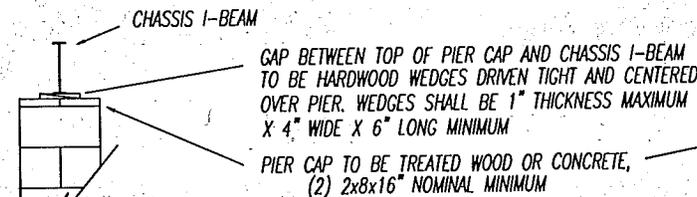
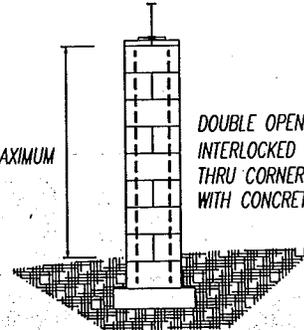
DOUBLE OPEN CELLED CONCRETE BLOCKS, "DRY STACKED" / UNREINFORCED

54" MAXIMUM



80" MAXIMUM

DOUBLE OPEN CELLED CONCRETE BLOCKS, INTERLOCKED AS SHOWN WITH (4) #3 REBAR THRU CORNER CELLS AND ALL CELLS FILLED WITH CONCRETE FULL HEIGHT OF PIER.



MINIMUM FOOTING SIZE TO BE 24" X 24" X 6" REGARDLESS OF PIER SPACING WHEN TALLER THAN 54" PIER IS INSTALLED.

GENERAL NOTES:  
ALL TIEDOWN CRITERIA CONTAINED IN THIS MANUAL MUST BE MAINTAINED AND MAY RESTRICT PIER DESIGN.

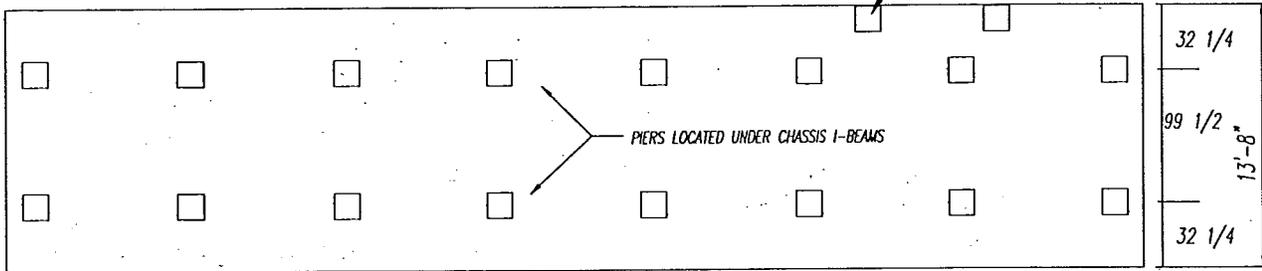
OTHER PIER DESIGNS/TYPES MAY BE UTILIZED WHEN ANALYSIS IS PERFORMED BY LOCAL PROFESSIONAL ENGINEER FAMILIAR WITH CONDITIONS AT SITE.

ALL FOOTINGS TO BE PLACED ON FIRM UNDISTURBED SOIL OR ON COMPACTED CONTROLLED FILL, FREE OF ALL ORGANIC MATERIALS.

NOTE: - 14' WIDE HOMES BUILT FOR 20# AND 30# ROOF LOAD AREAS WITH FLOOR JOIST AT 16" CENTERLINE DO NOT REQUIRE SIDEWALL PIERS, OTHER THAN AT OPENINGS AS NOTED, REGARDLESS OF DECKING TYPE.

- HOMES BUILT FOR 40# ROOF LOAD AREAS WITH FLOOR JOIST AT 16" CENTERLINE AND STURDIFLOOR DECKING REQUIRE SIDEWALL PIERS SPACED 8'-0" MAXIMUM BETWEEN PIER CENTERLINES, AND AT SIDEWALL OPENINGS AS NOTED. 40# ROOF LOAD AREAS WITH PARTICLEBOARD DECKING DO NOT REQUIRE SIDEWALL PIERS OTHER THAN OPENINGS AS NOTED.

PIERS SHALL BE INSTALLED UNDER SIDEWALL AT EACH SIDE OF ALL OPENINGS 4'-0" AND LARGER REGARDLESS OF ROOF LOAD (NOTE: SEE INFORMATION ON DOOR FOR SPECIFIC BLOCKING REQUIREMENTS.)



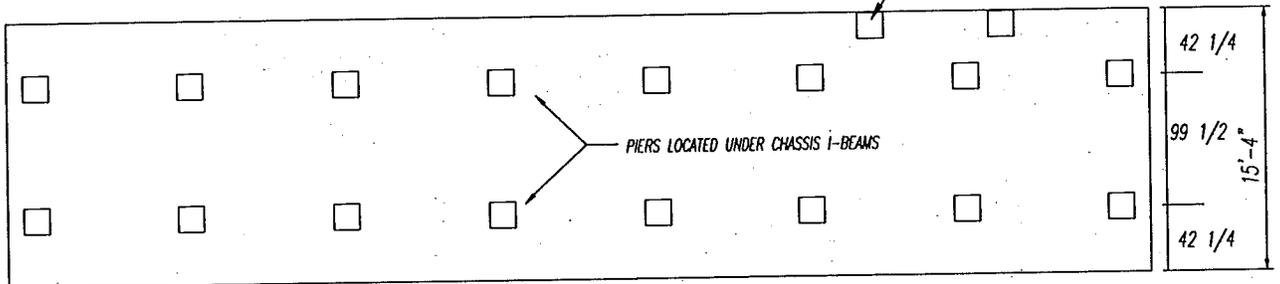
PIERS AND FOOTINGS TO BE REVIEWED BY LOCAL PROFESSIONAL ENGINEER OR LOCAL BUILDING AUTHORITY FAMILIAR WITH CONDITIONS AT SITE.

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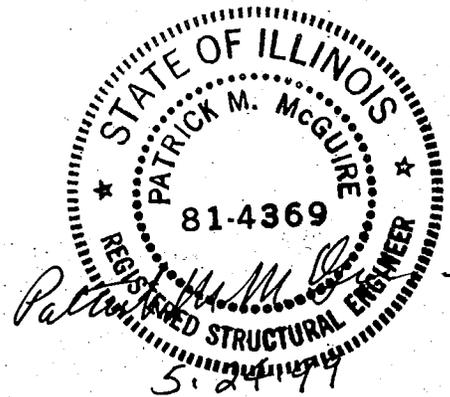
NOTE: - 14' WIDE HOMES BUILT FOR 20# AND 30# ROOF LOAD AREAS WITH FLOOR JOIST AT 16" CENTERLINE DO NOT REQUIRE SIDEWALL PIERS, OTHER THAN AT SIDE-WALL OPENINGS AS NOTED, REGARDLESS OF DECKING TYPE.

- HOMES BUILT FOR 40# ROOF LOAD AREAS WITH FLOOR JOIST AT 16" CENTERLINE AND STURDIFLOOR DECKING REQUIRE SIDEWALL PIERS SPACED 8'-0" MAXIMUM BETWEEN PIER CENTERLINES, AND AT SIDEWALL OPENINGS AS NOTED. 40# ROOF LOAD AREAS WITH PARTICLEBOARD DECKING DO NOT REQUIRE SIDEWALL PIERS OTHER THAN OPENINGS AS NOTED.

PIERS SHALL BE INSTALLED UNDER SIDEWALL AT EACH SIDE OF ALL OPENINGS 4'-0" AND LARGER REGARDLESS OF ROOF LOAD (NOTE: SEE INFORMATION ON DOOR FOR SPECIFIC BLOCKING REQUIREMENTS.)

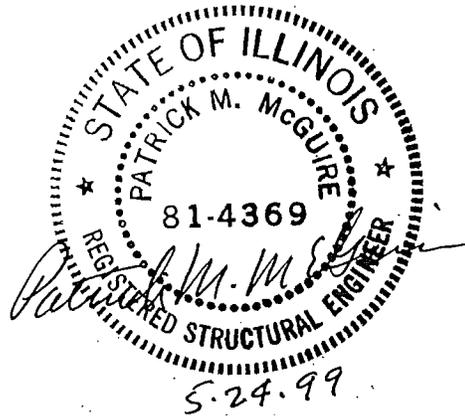


PIERS AND FOOTING TO BE REVIEWED BY LOCAL PROFESSIONAL ENGINEER OR LOCAL BUILDING AUTHORITY FAMILIAR WITH CONDITIONS ON SITE.

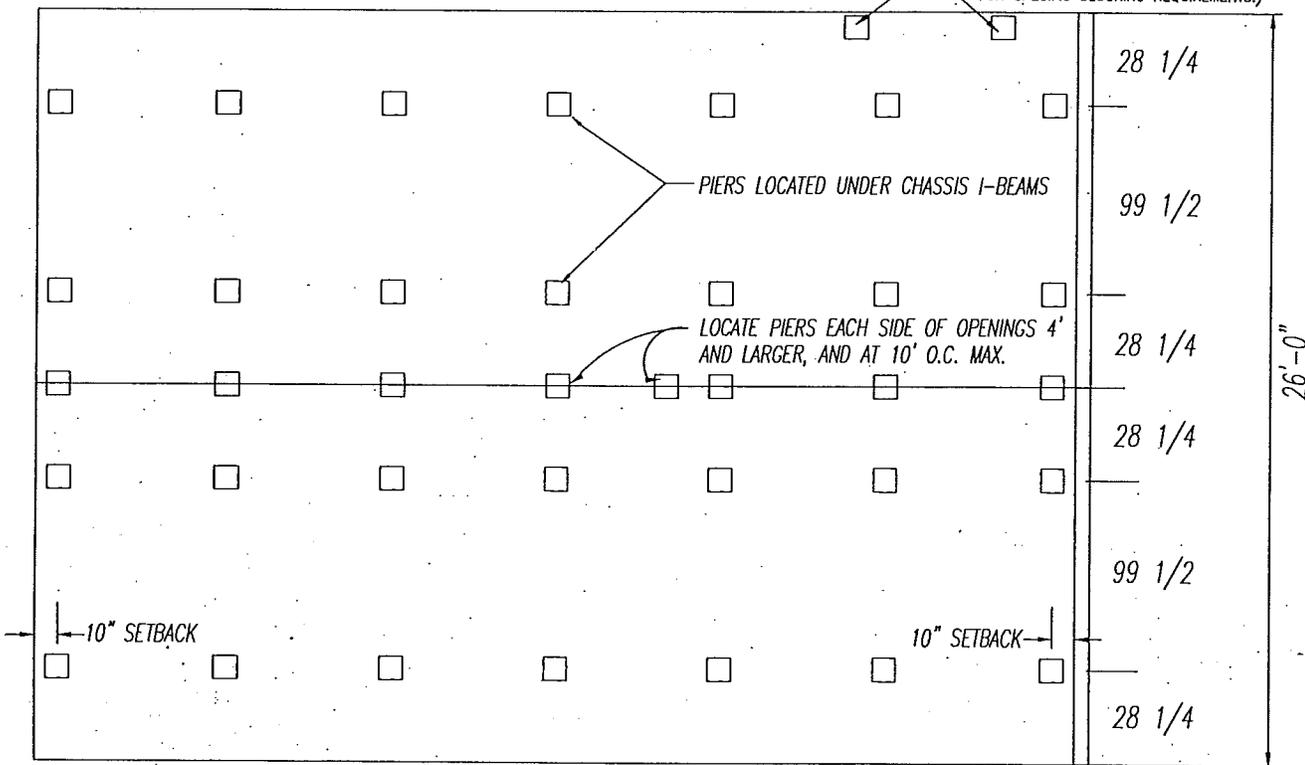


- 26' WIDE HOMES BUILT FOR 20#, 30# AND 40#  
ROOF LOAD AREA WITH FLOOR JOISTS AT 16"  
CENTERLINE DO NOT REQUIRE PIERS UNDER  
SIDEWALL OTHER THAN THOSE AT OPENINGS  
AS NOTED.

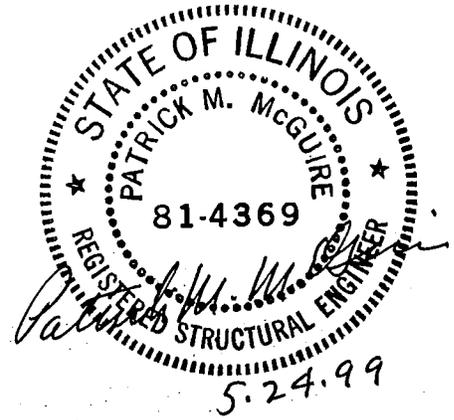
- IF HALF INCH FINISH DRYWALL HAS BEEN INSTALLED,  
SIDEWALL PIERS ARE REQUIRED AT 12'-0"  
MAXIMUM BETWEEN PIER CENTERLINES IN DRYWALL AREAS  
FOR ALL ROOF LOAD AREAS.



PIERS SHALL BE INSTALLED UNDER  
SIDEWALL AT EACH SIDE OF ALL  
OPENINGS 4'-0" AND LARGER  
REGARDLESS OF ROOF LOAD  
(NOTE: SEE INFORMATION ON DOOR  
FOR SPECIFIC BLOCKING REQUIREMENTS.)

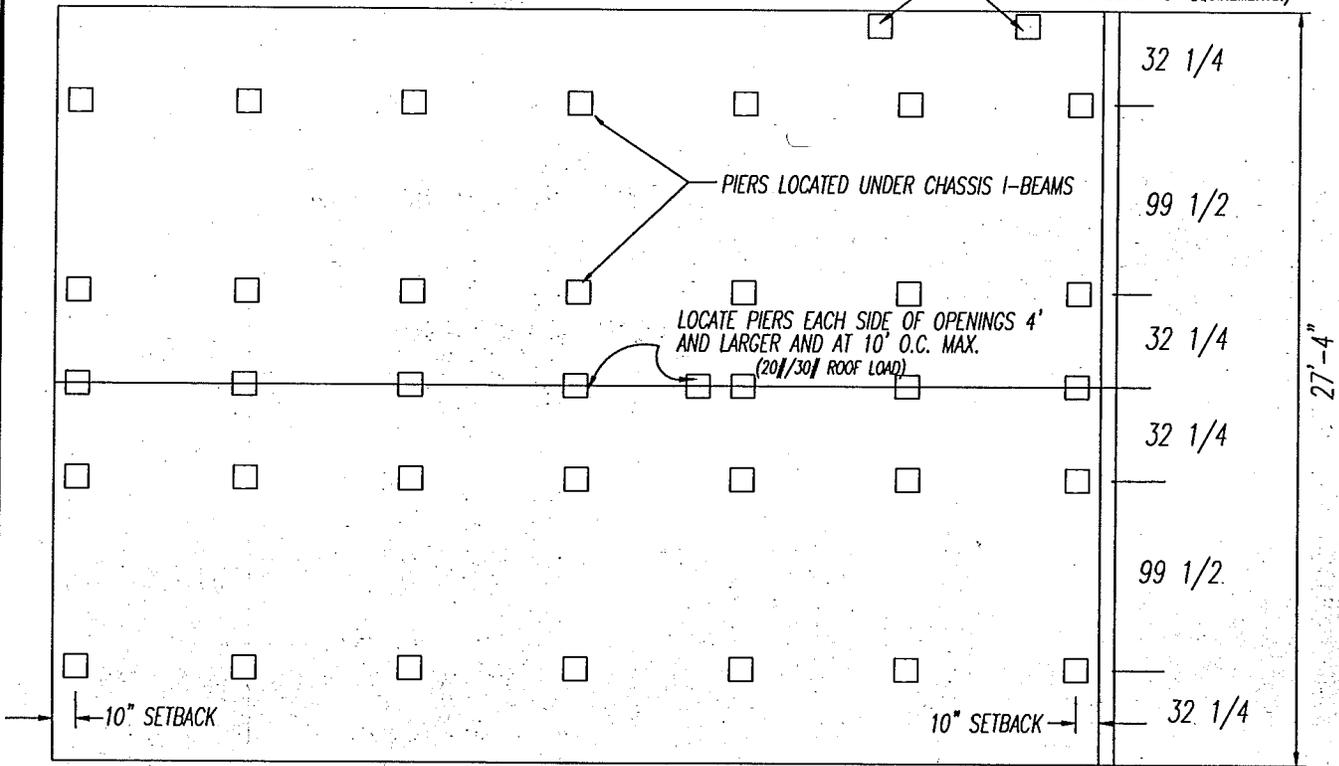


PIERS SHALL BE REVIEWED BY LOCAL PROFESSIONAL ENGINEER OR LOCAL  
BUILDING AUTHORITY FAMILIAR WITH CONDITIONS AT SITE.

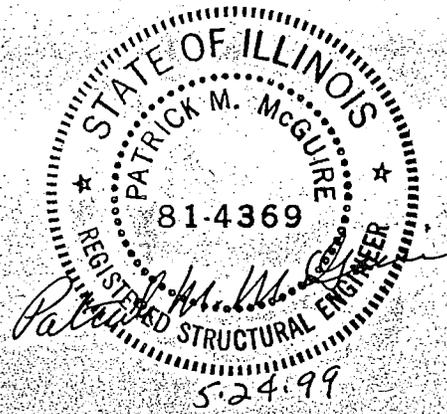


- 28' WIDE HOMES BUILT FOR 20# & 30# ROOF LOAD AREAS WITH FLOOR JOISTS AT 16" CENTERLINES DO NOT REQUIRE PIERS UNDER SIDEWALL
- HOMES BUILT FOR 40# ROOF LOAD AREAS WITH FLOOR JOIST AT 16" CENTERLINES REQUIRE PIERS UNDER SIDEWALL AND MARRIAGE WALL SPACED 8'-0" MAXIMUM BETWEEN PIER CENTERLINES, AND AT SIDEWALL AND MARRIAGE WALL OPENINGS AS NOTED.

PIERS SHALL BE INSTALLED UNDER SIDEWALL AT EACH SIDE OF ALL OPENINGS 4'-0" AND LARGER REGARDLESS OF ROOF LOAD (NOTE: SEE INFORMATION ON DOOR FOR SPECIFIC BLOCKING REQUIREMENTS.)

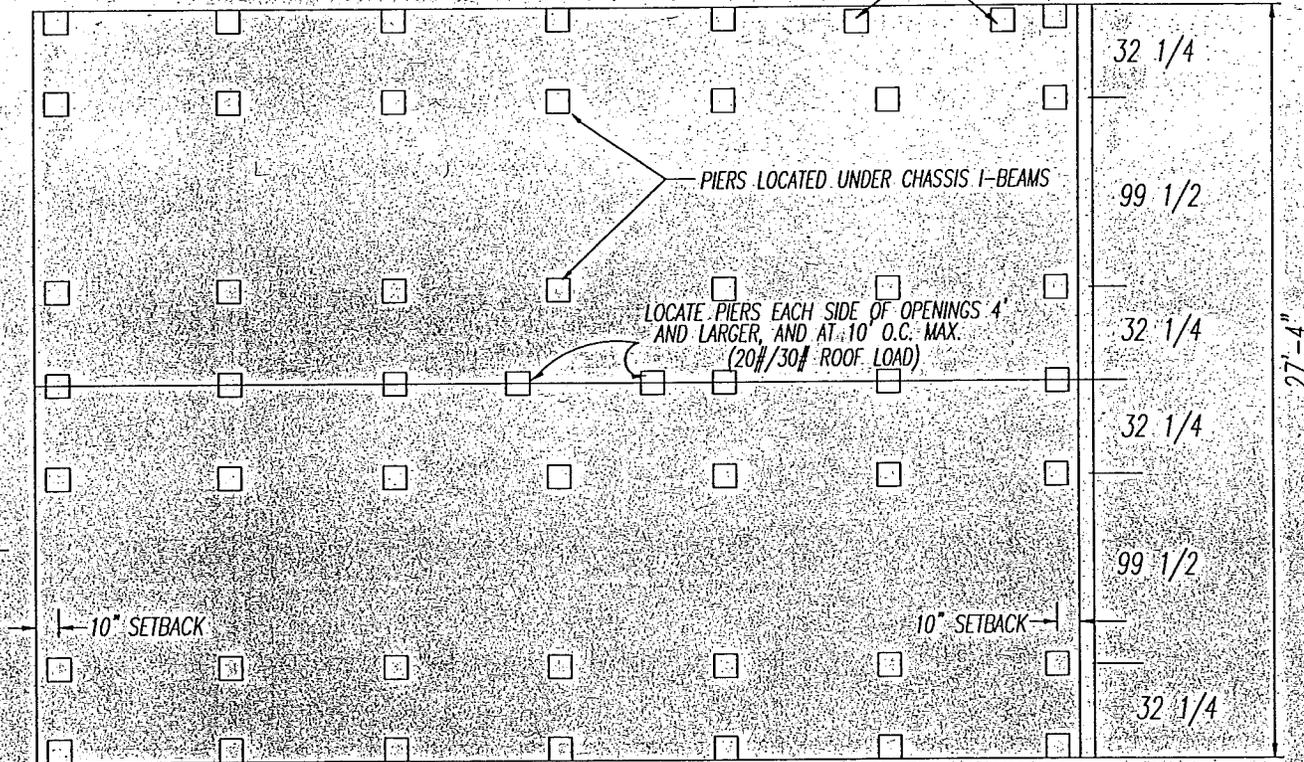


PIERS SHALL BE REVIEWED BY LOCAL PROFESSIONAL ENGINEER OR LOCAL BUILDING AUTHORITY FAMILIAR WITH CONDITIONS AT SITE.



- 20# AND 30# ROOF LOAD AREAS, ALL 28' HOMES WITH HALF INCH FINISH DRYWALL REQUIRE SIDEWALL PIERS AT 12'-0" MAXIMUM AND AT OPENINGS AS NOTED.
- 40# ROOF LOAD AREAS REQUIRE SIDEWALL AND MARRIAGE PIERS SPACED 8'-0" MAXIMUM BETWEEN PIER CENTERLINES, AND AT SIDEWALL AND MARRIAGE WALL OPENINGS AS NOTED.

PIERS SHALL BE INSTALLED UNDER SIDEWALL AT EACH SIDE OF ALL OPENINGS 4'-0" AND LARGER REGARDLESS OF ROOF LOAD (NOTE: SEE INFORMATION ON DOOR FOR SPECIFIC BLOCKING REQUIREMENTS.)



PIERS SHALL BE REVIEWED BY LOCAL PROFESSIONAL ENGINEER OR LOCAL BUILDING AUTHORITY FAMILIAR WITH CONDITIONS AT SITE.

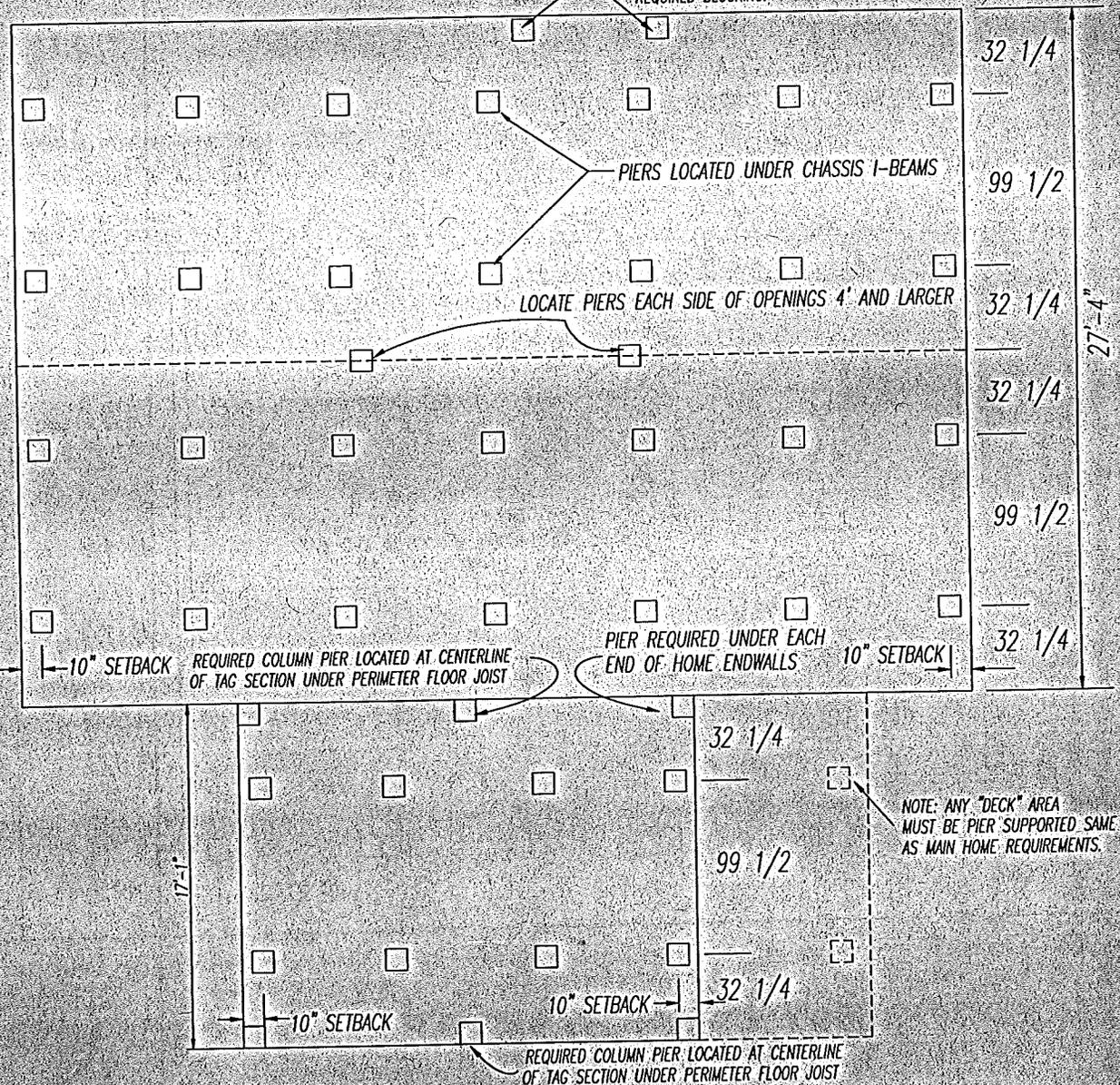
**PATRIOT HOMES**

TYPICAL  
28' WIDE FOUNDATIONS WITH FINISHED DRYWALL

- 28' WIDE HOMES BUILT FOR 20# & 30# ROOF LOAD AREAS WITH FLOOR JOIST AT 16" CENTERLINES DO NOT REQUIRE PERIMETER BLOCKING OTHER THAN AT SIDEWALL AND MARRIAGE WALL OPENINGS AS NOTED.
- HOMES BUILT FOR 40# ROOF LOAD AREAS WITH FLOOR JOIST AT 16" CENTERLINES REQUIRE BLOCKING UNDER SIDEWALL AND MARRIAGE WALL SPACED 8'-0" MAXIMUM BETWEEN PIER CENTERLINES, AND AT SIDEWALL AND MARRIAGE WALL OPENINGS AS NOTED.



PIERS SHALL BE INSTALLED UNDER SIDEWALL AT EACH SIDE OF ALL OPENINGS 4'-0" AND LARGER REGARDLESS OF ROOF LOAD, APPLICABLE TO ALL HOME SECTIONS. REFER TO DOOR STICKER FOR ADDITIONAL REQUIRED BLOCKING.



PIER SHALL BE REVIEWED BY LOCAL PROFESSIONAL ENGINEER OR LOCAL BUILDING AUTHORITY FAMILIAR WITH CONDITIONS AT SITE.



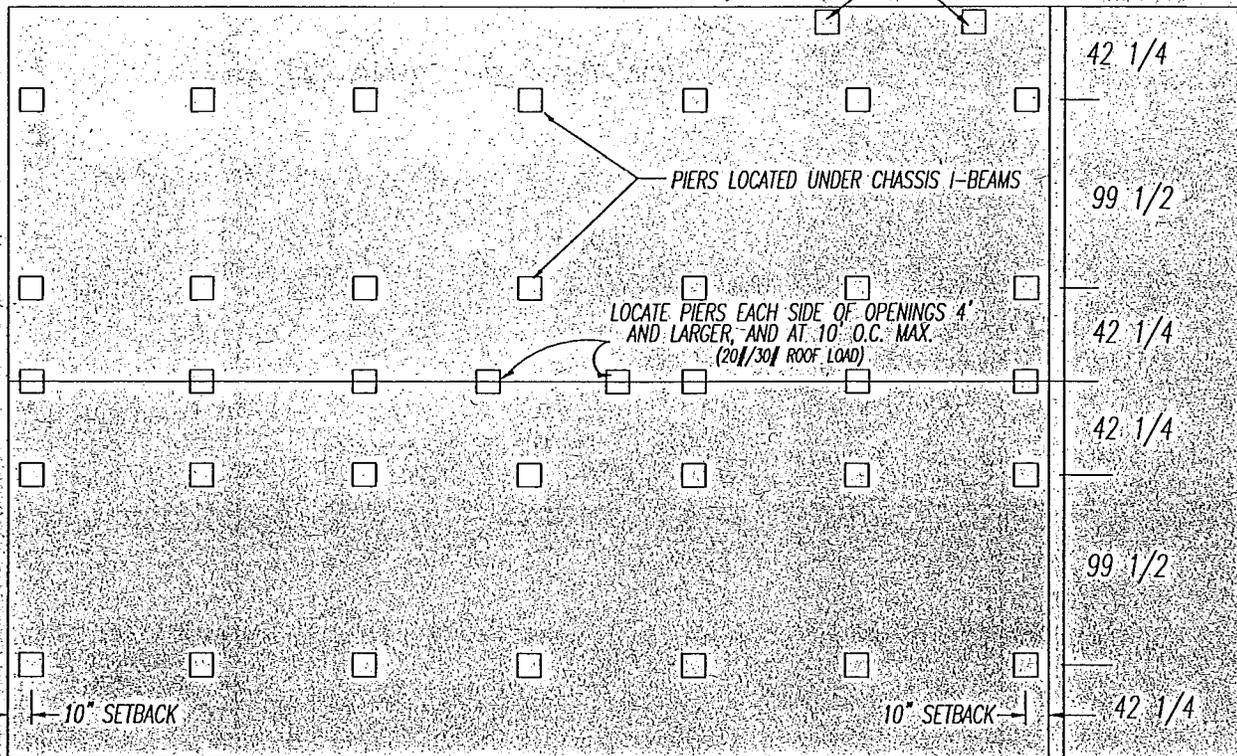
28' WIDE TRIPLEWIDE FOUNDATIONS  
(VINYL WALL PANELS)



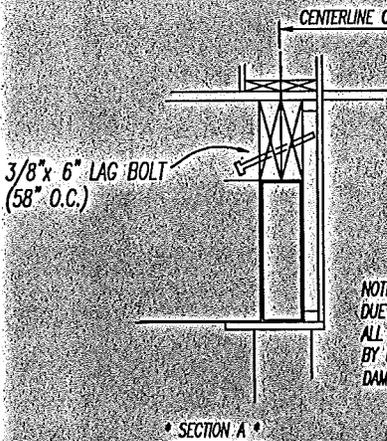
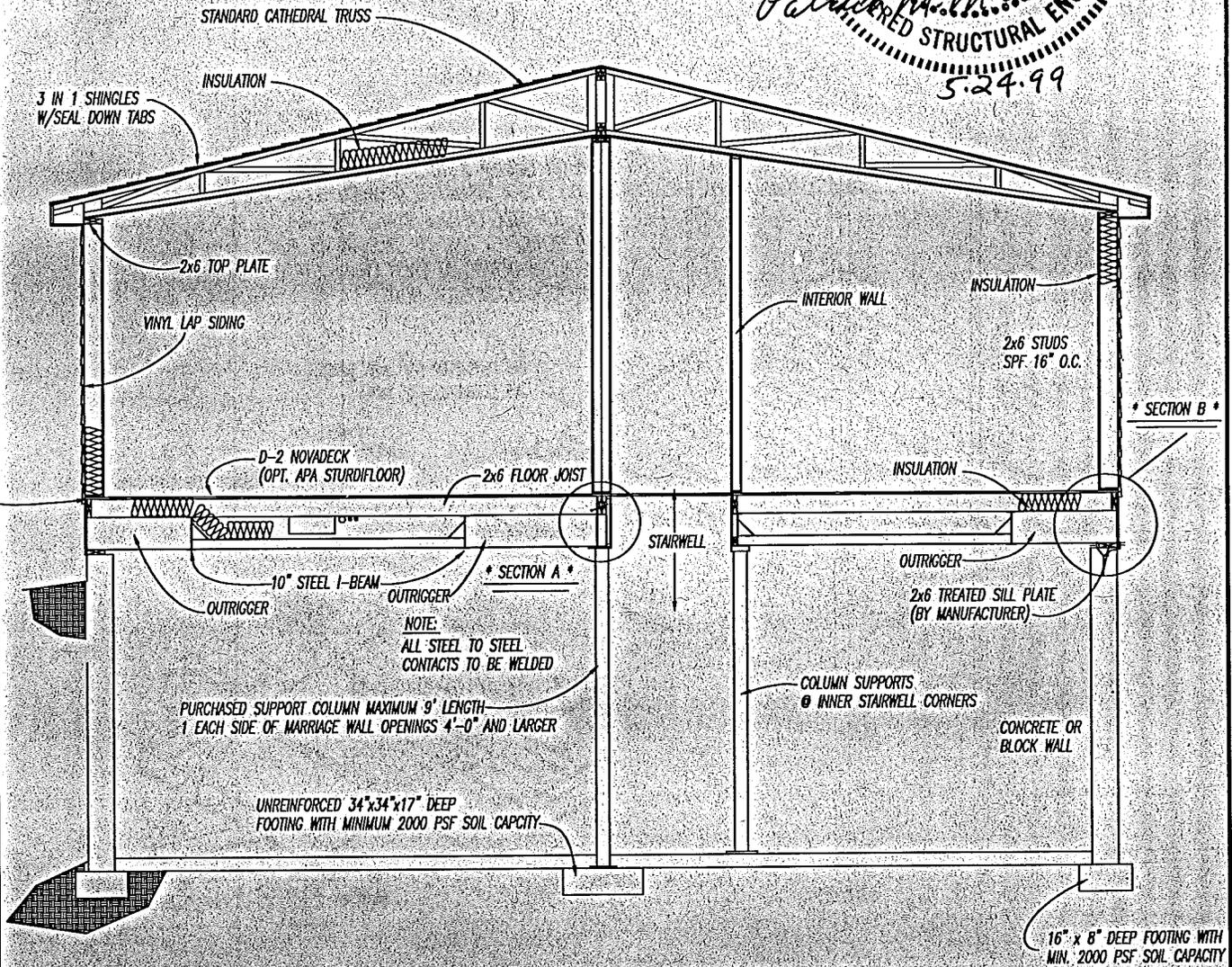
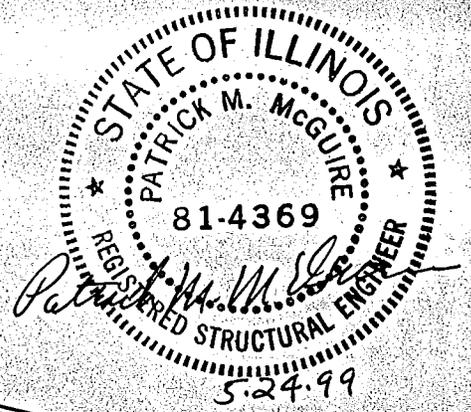
- 32' WIDE HOMES BUILT FOR 20# & 30# ROOF LOAD AREA WITH FLOOR JOISTS AT 16" CENTER-LINE DO NOT REQUIRE SIDEWALL PIERS OTHER THAN AT OPENINGS AS NOTED, REGARDLESS OF DECKING TYPE.

- 40# ROOF LOAD AREAS REQUIRE SIDEWALL AND MARRIAGE PIERS SPACED 8'-0" MAXIMUM BETWEEN CENTERLINES, AND AT SIDEWALL AND MARRIAGE WALL OPENINGS AS NOTED.

PIERS SHALL BE INSTALLED UNDER SIDEWALL AT EACH SIDE OF ALL OPENINGS 4'-0" AND LARGER REGARDLESS OF ROOF LOAD (NOTE: SEE INFORMATION ON DOOR FOR SPECIFIC BLOCKING REQUIREMENTS.)



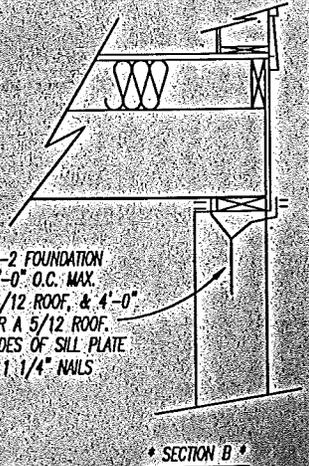
PIERS SHALL BE REVIEWED BY LOCAL PROFESSIONAL ENGINEER OR LOCAL BUILDING AUTHORITY FAMILIAR WITH CONDITIONS AT SITE.

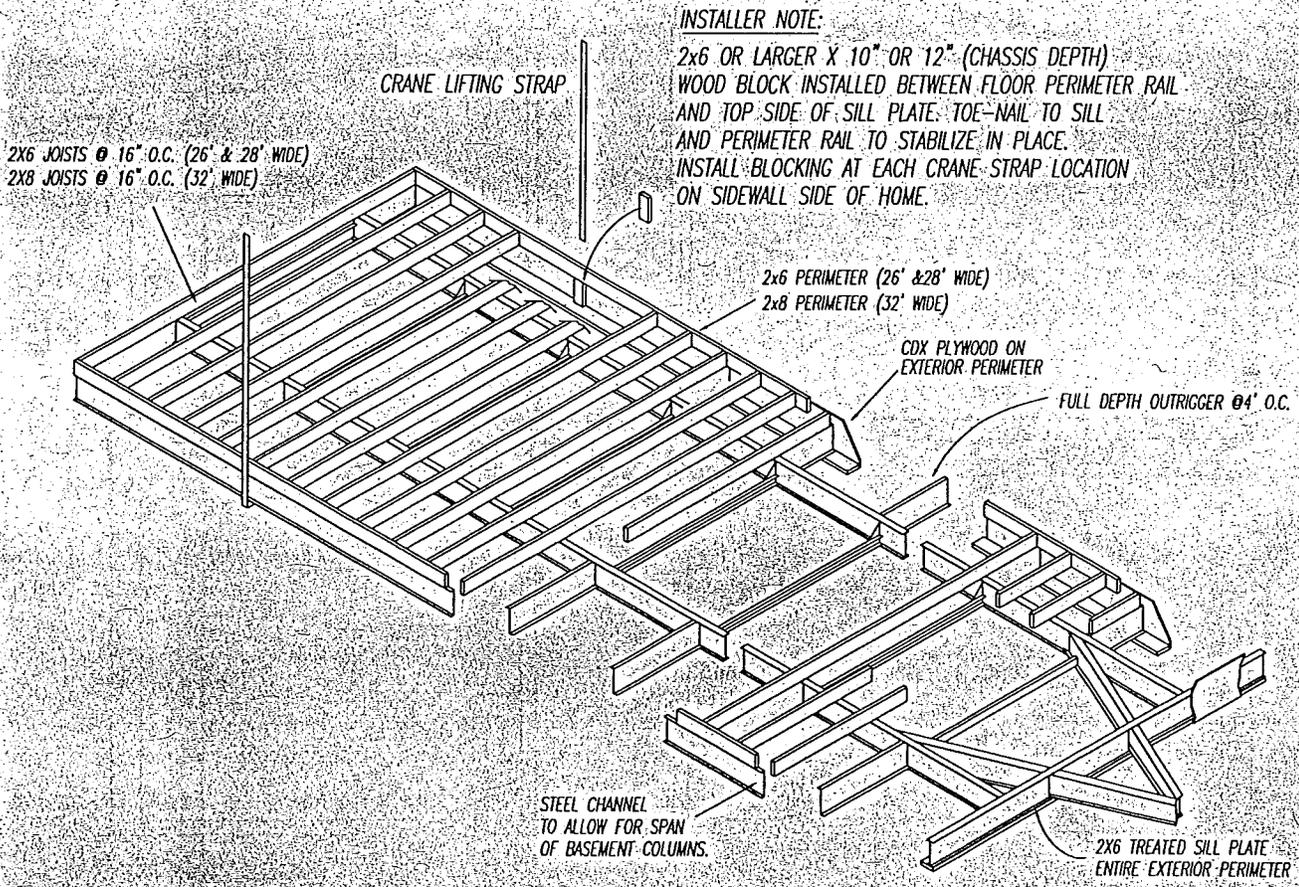


	MAX SPAN BETWEEN COLUMN		COLUMN CAPACITY	
ROOF LOAD	26' & 28' WIDE	32' WIDE	26' & 28' WIDE	32' WIDE
20#	12'-8"	12'-2"	14,517#	15,069#
30#	11'-11"	11'-6"	15,470#	15,979#
40#	11'-3"	10'-11"	16,380#	16,840#

NOTE:  
DUE TO VARIANCES IN LOCAL CODES, SOIL CONDITIONS AND FROST LEVELS ALL FOUNDATION AND FOOTINGS TO BE REVIEWED BY LOCAL ENGINEER AND APPROVED BY LOCAL BUILDINGS COMMISSION.  
DAMP-PROOFING & FOUNDATION DRAINS PER LOCAL REQUIREMENTS

KANT-SAG FA-2 FOUNDATION ANCHOR @ 6'-0" O.C. MAX. FOR UP TO 4/12 ROOF, & 4'-0" O.C. MAX. FOR A 5/12 ROOF. FASTEN TO SIDES OF SILL PLATE W/ (2) Bd x 1 1/4" NAILS EACH SIDE



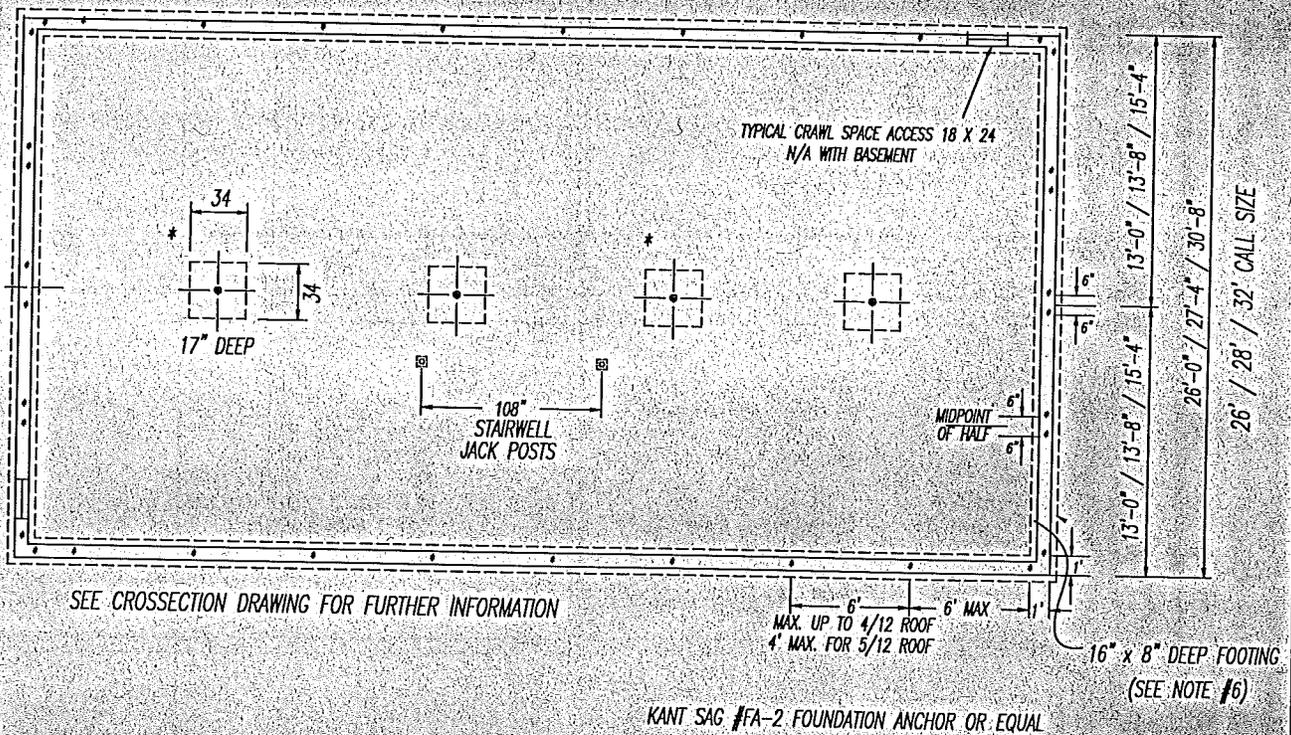
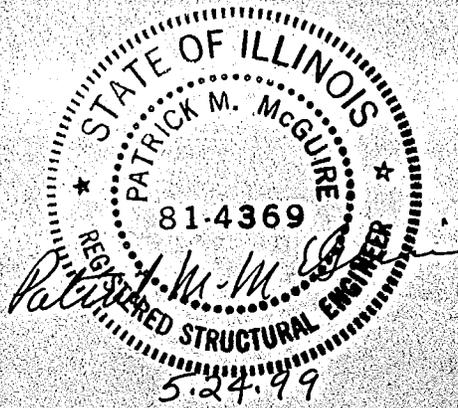


**INSTALLER NOTE:**

2x6 OR LARGER X 10" OR 12" (CHASSIS DEPTH) WOOD BLOCK INSTALLED BETWEEN FLOOR PERIMETER RAIL AND TOP SIDE OF SILL PLATE. TOE-NAIL TO SILL AND PERIMETER RAIL TO STABILIZE IN PLACE. INSTALL BLOCKING AT EACH CRANE STRAP LOCATION ON SIDEWALL SIDE OF HOME.

**INSTALLER NOTE:**

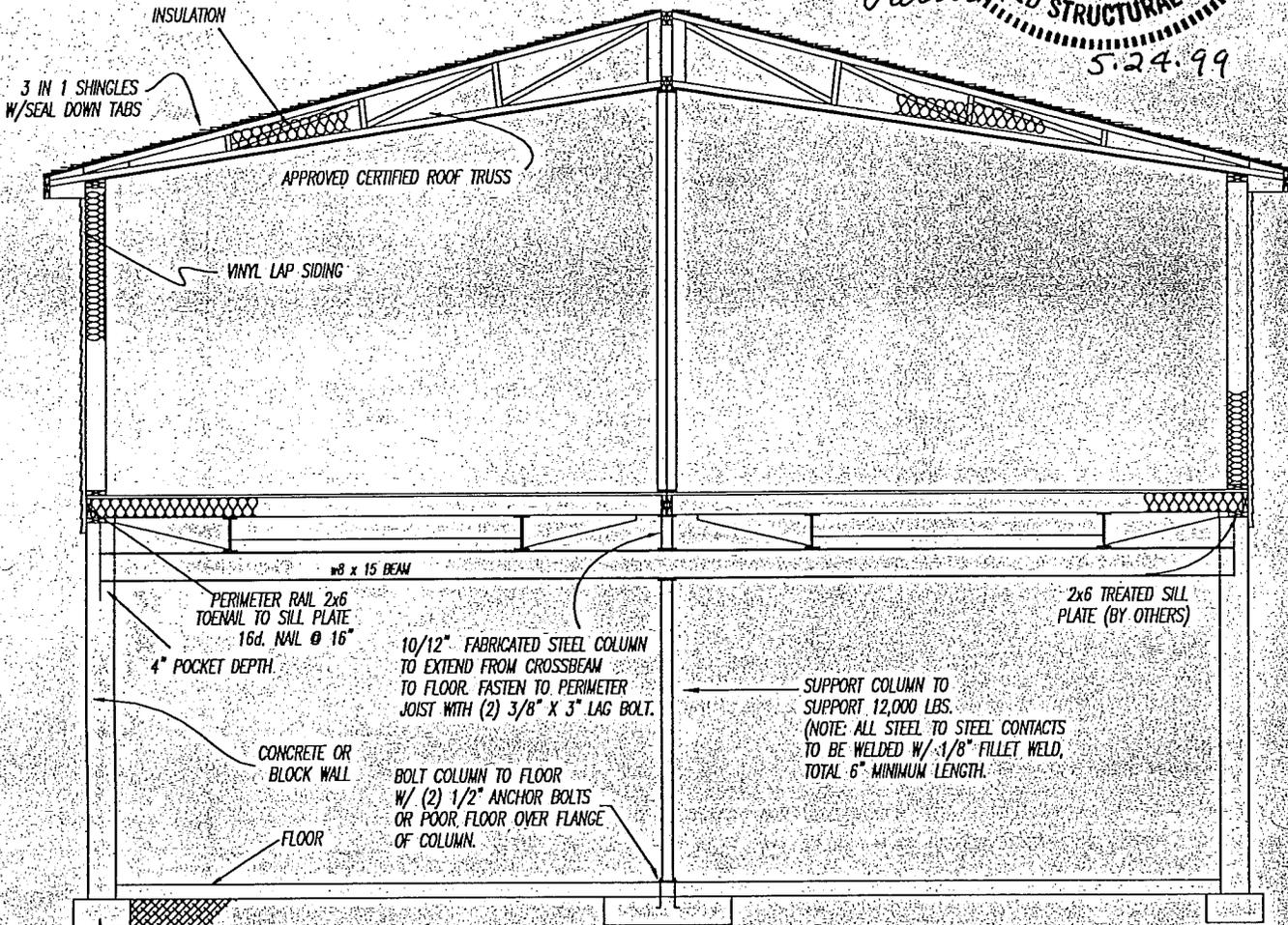
CRANE STRAP LOCATION SHALL BE LOCATED WHERE MARRIAGE WALL AND SIDEWALL DO NOT HAVE OPENINGS. IF THERE IS NO OTHER CHOICE, THERE SHALL BE A TEMPORARY WALL SECTION INSTALLED TO TRANSFER LIFTING FORCES TO ROOF.



- NOTES:
- 1.) COLUMNS LOCATED UNDER EACH SIDE OF OPENINGS IN MATING WALLS 4'-0" AND LARGER.
  - 2.) KANT SAG #FA-2 FOUNDATION ANCHOR @ 1' FROM CORNER & @ 6'-0" O.C. MAX. FOR UP TO 4/12 ROOF PITCH, & AT 4'-0" O.C. MAX. FOR 5/12 ROOF PITCH.
  - 3.) PROVIDE POSITIVE UNDERFLOW DRAINAGE & 6 MIL POLY VAPOR BARRIER.
  - 4.) TYPICAL 8" X 16" FOUNDATION VENTS OR BASEMENT WINDOWS LOCATED WITHIN 3'-0" OF EACH CORNER OF CRAWL SPACE. OPENINGS SHALL BE COVERED WITH A CORROSIVE RESISTANT WIRE MESH NOT GREATER THAN 1/2" NOR LESS THAN 1/4" IN ANY DIRECTION.
  - 5.) VENTILATION PROVIDED EQUAL TO OR GREATER THAN 1 S.F. FOR EACH 150 S.F. OF FLOOR AREA.
  - 6.) DUE TO VARIANCES IN LOCAL CODES, SOIL CONDITIONS AND FROST LEVELS, ALL FOUNDATION AND FOOTINGS TO BE REVIEWED BY LOCAL ENGINEER AND APPROVED BY LOCAL BUILDING COMMISSION.

REFER TO SPANFLOOR REQUIREMENTS PAGE FOR MARRIAGE COLUMN SPANS.

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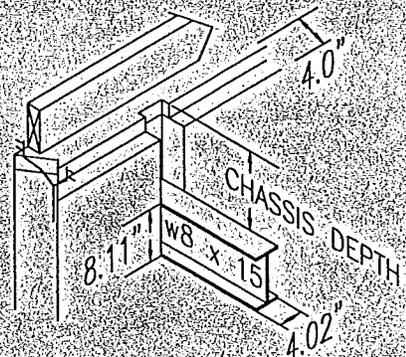


FOOTING

#8 x 4" TOE SCREW @ 6" O.C. FROM PERIMETER RAIL OF HOME INTO SILL PLATE

NOTE: DUE TO VARIANCES IN LOCAL CODES, SOIL CONDITIONS AND FROST LEVELS, ALL FOUNDATION AND FOOTINGS TO BE REVIEWED BY LOCAL ENGINEER AND APPROVED BY LOCAL BUILDING COMMISSION.

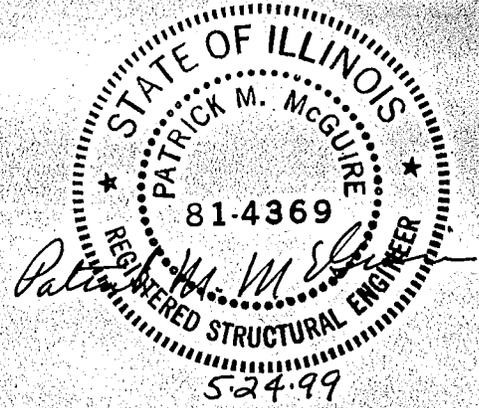
KANT-SAG FA-2 FOUNDATION ANCHOR @ 6'-0" O.C. MAX. FOR UP TO 4/12 ROOF, & 4'-0" O.C. MAX. FOR A 5/12 ROOF. FASTEN TO SIDES OF SILL PLATE W/ (2) 8d x 1-1/4" NAILS EACH SIDE



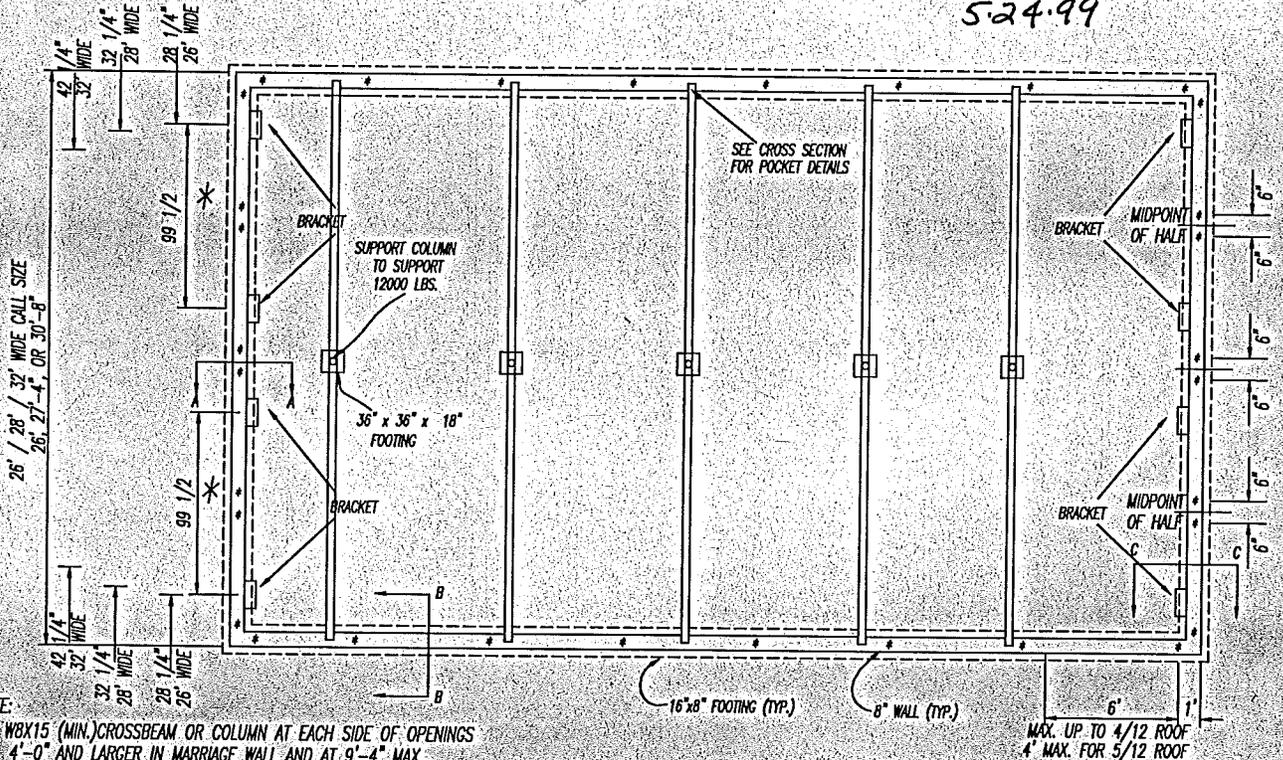
**PATRIOT HOMES**

WIND ZONE 1 ONLY

TYPICAL CROSS BEAM FOUNDATION  
W/ BEAM POCKETS

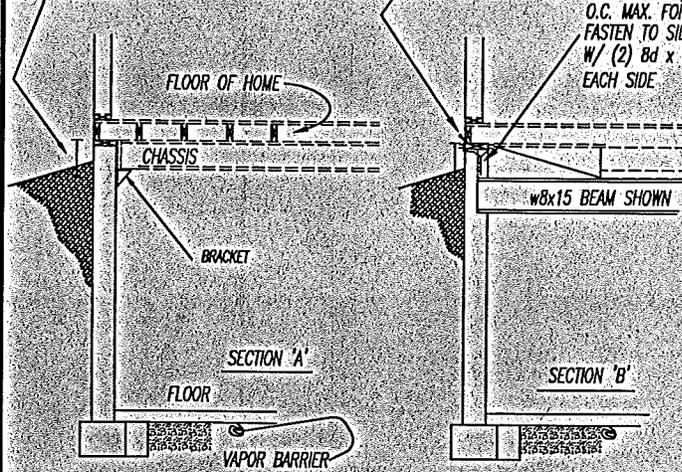


**NOTICE:**  
IT IS THE RESPONSIBILITY OF THE BUILDER/DEALER TO CERTIFY THAT ANY PRINTS OR INFORMATION FOR WORK PERFORMED AT THE HOMESITE CORRELATES WITH THE UNIT ORDERED. PATRIOT HOMES, INC. WILL NOT BE HELD RESPONSIBLE FOR DAMAGES ARISING FROM FAILURE OF THE PROPER INFORMATION BEING MATCHED WITH THE HOME, REGARDLESS OF WHAT WAS SUPPLIED.

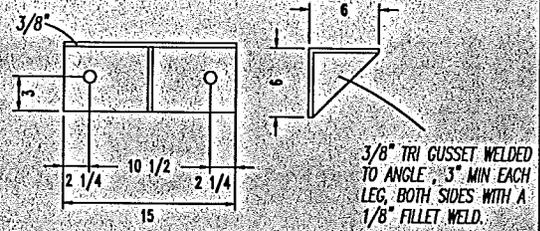


- NOTE:**
1. WBX15 (MIN.) CROSSBEAM OR COLUMN AT EACH SIDE OF OPENINGS 4'-0\"/>

**NOTE:**  
CHASSIS DEPTH VARIES BASED ON FLOOR SIZE. VERIFY DEPTH BEFORE SETTING HOME. ALSO, W8 x 15 CROSSBEAM SHOWN HERE. IF BEAM SIZE IS DIFFERENT, POCKET SIZE AND DEPTH WILL VARY.



**FABRICATED CHASSIS BEAM SUPPORT BRACKET (APPLIES TO GABLE ENDS ONLY)**



**SECTION 'C'**  
FRONT CROSSMEMBER EXTENDS BELOW MAIN I-BEAM APPROX. 1 1/2\"/>

FASTEN WITH (2) WEDGE-ALL ANCHORS (SIMPSON). (REF. CATALOG C-SAS96). SHOWN: (2) 1 1/2\"/>



WIND ZONE 1 ONLY

TYPICAL CROSSBEAM FOUNDATION  
W/ BEAM POCKETS

## V. ANCHORING INSTRUCTIONS

This home has been designed to sustain wind loads specified on the Data Plate which can be located inside the home. Refer to this Data Plate to determine which Wind Zone the home may be sited.

In order to resist the design wind loads, diagonal frame tie-downs are to be installed in accordance with the following instructions provided, or by the instructions of the manufacturer of the tie-down hardware being used.

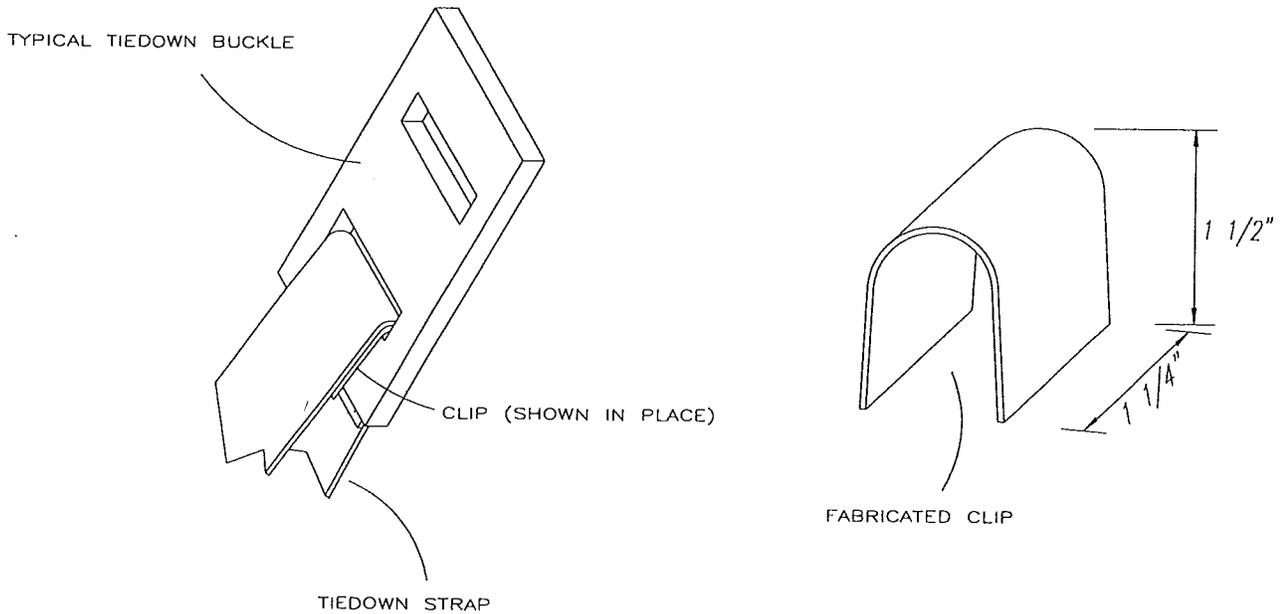
The frame tie-down anchoring devices shall be certified by a registered professional engineer, architect, or a nationally recognized testing laboratory as capable of resisting an allowable working load specified later in this manual and must be installed in full conformance with the anchor manufacturers instructions.

Please note the home should be in its final position prior to installing the tie-down equipment. Precautions should be taken prior to augering metal anchors in the ground to avoid severe shock / electrocution and damage to underground utilities. Contact local utility companies to ensure that utilities are properly and visibly marked. Refer to the following pages for tie-down anchoring type, size, quantity, and specifications as this is crucial to the safety of the home when permanently on site.

**CAUTION:** When re-leveling home, always loosen tie-down straps prior to lifting the home with jacks.

NOTE:

ANY SITUATION WHERE A TIEDOWN STRAP PASSES THROUGH AN ANCHOR OR BUCKLE WHICH MAY CUT OR CAUSE DAMAGE TO THE STRAP, THE INSTALLER IS TO FABRICATE A CLIP USING A STRAIGHT 3" LENGTH OF 1-1/4" x .035" TIEDOWN STRAP. AFTER THE PIECE OF STRAP IS CUT TO LENGTH, INSERT INTO ANCHOR OR BUCKLE SLOT AND MANUALLY BEND THE CLIP TO THE CONFIGURATION OF THE STRAP WHICH IS FASTENED TO THE GROUND ANCHOR OR BUCKLE.



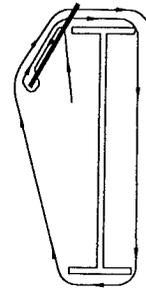
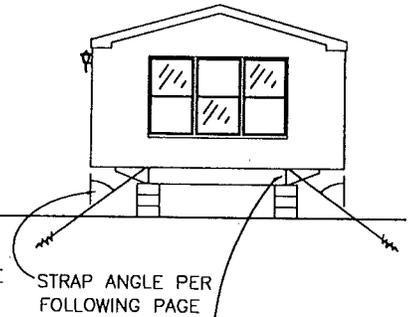
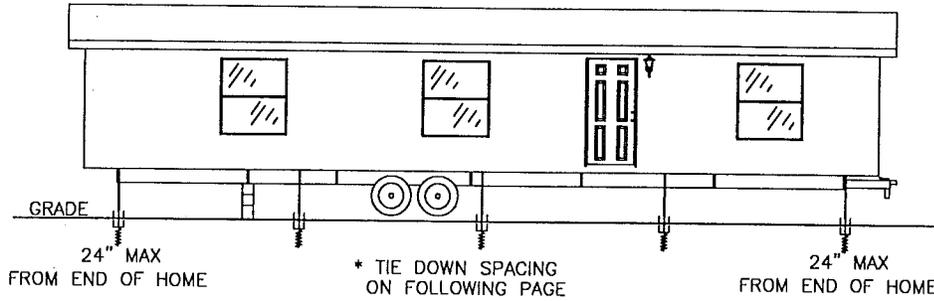
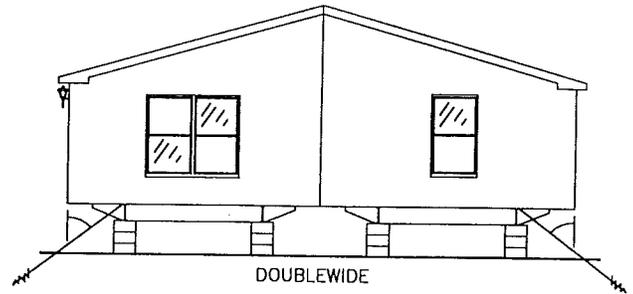
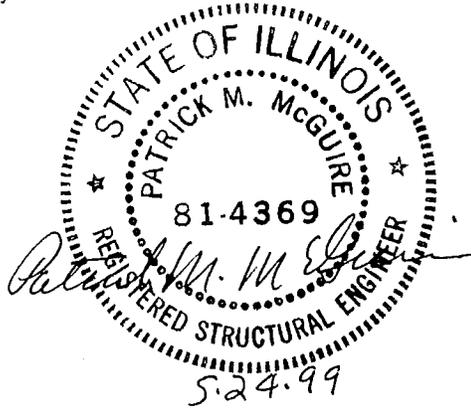


C.) Homes with roof pitch greater than 22.6 degrees thru 30.3degrees (7/12 pitch maximum).

Floor Width	Max Roof Overhang	Sidewall Max. Height	Pier Height		Tie-down Spacing maximum	Strap Angle From Vertical (Degrees)
			min	max		
<u>156"</u> (26' doublewide)	12"	96"	24"	30"	72"	44-50
<u>164"</u> (28' doublewide)	15"	84"	27"	36"	72"	42-50
	15"	90"	27"	34"	72"	44-50
	15"	96"	27"	31"	72"	46-50
<u>184"</u> (32' doublewide)	7"	84"	35"	43"	72"	44-50
	7"	90"	35"	41"	72"	46-50
	7"	96"	35"	38"	72"	48-50
	12"	96"	35"	37"	72"	49-50

D.) All homes require Tie-downs to be located within 2' of each end of the home

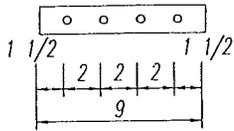




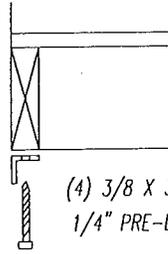
WIND ZONE I : MAXIMUM TIE DOWN SPACING PER FOLLOWING PAGE

- \* Refer to Data Plate installed in home to determine which wind load the home has been constructed to withstand. Space tie-down accordingly.
- \* Within this manual a Minute Man Anchor Installation Manual has been included. Diagonal frame ties are to be installed according to that manual. If frame ties are not installed in accordance with these specs, a local registered engineer shall be consulted for acceptable installation.
- \* Anchors are to be installed per instructions; to full depth, below frost line and augers of tiedowns are to be minimum of 12" above water table. Stabilizer plates to be installed to maximize tie-down holding power.
- \* Over the roof tie-down straps may be installed in addition by either the manufacturer or the installer. These straps are to be located over the roof truss and sidewall studs beneath the exterior finish material of the home. Straps are to be secured in a manner to hold in position over the truss and sidewall studs without penetrating or damaging the strap. Over the roof ties and diagonal ties can attach to the same anchor provided the anchor is designed to withstand the combined forces and installed in a manner that the design requires. Over the roof tie-down strap material must be of the same material as required for diagonal ties. Protection is to be provided at sharp corners to prevent straps from damaging home.
- \* Singlewides require both I-beam diagonal tied as illustrated in cross section drawing above. Doublewides and Triplewides require only I-beams tied nearest the sidewalls only. Marriage wall frame I-beam tiedowns are not required. Marriage wall openings of 4' and larger require a tie-down to be installed at each end on each half of the home. Refer to other details within this manual for installation requirements.

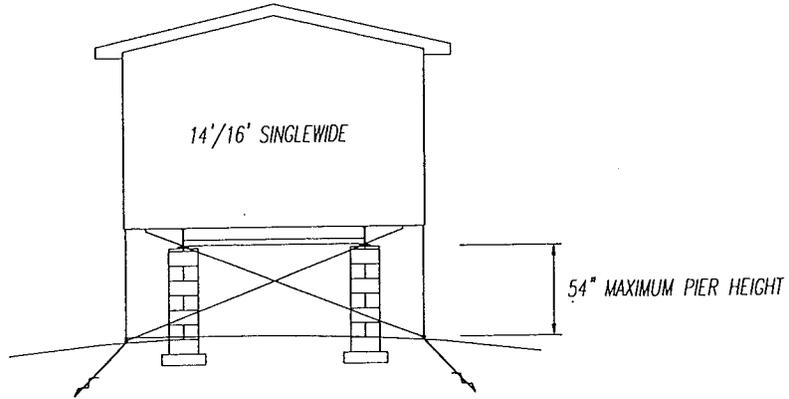
**NOTE:** Any foundation and tie-down system other than these shown shall be designed by a local professional engineer familiar with site conditions.



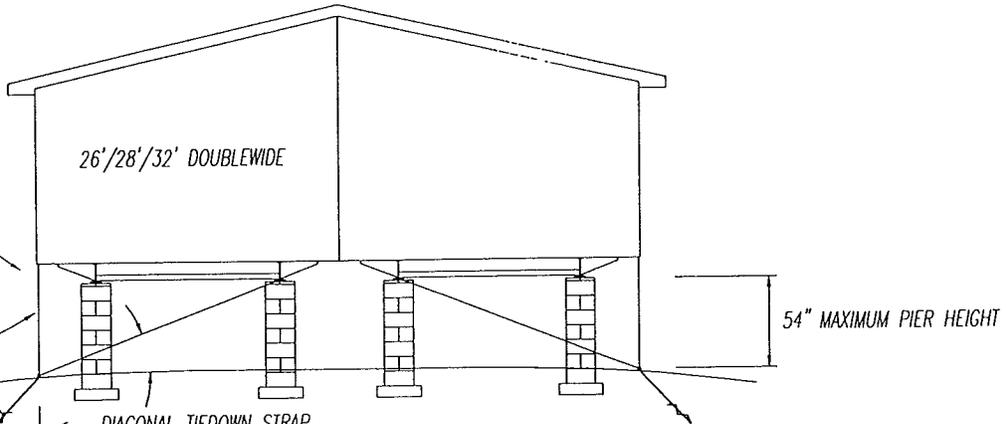
1 1/2" x 9" 11ga ANGLE  
W/7/16" LAG HOLES



(4) 3/8 X 3" FULL THREAD LAGS  
1/4" PRE-DRILL BEFORE INSTALLATION



VERTICAL TIE-DOWN STRAP TO BE INSTALLED PER MINUTE-MAN INSTRUCTIONS, USING #MMA 25 BUCKLE



VERTICAL TIEDOWN

GROUND ANCHOR AT 45-50° MAXIMUM  
STABILIZER PLATES SHALL BE INSTALLED AS SPECIFIED BY ANCHOR MANUFACTURER.

DIAGONAL TIEDOWN STRAP AT 23° MAX ANGLE

THIS ALTERNATE TIE-DOWN METHOD MAY BE UTILIZED ON 14', 16' WIDE AND 26', 28' OR 32' WIDE HOMES WHEN THE PIER HEIGHT DOES NOT EXCEED 54".

TIE-DOWN SHALL BE INSTALLED AS SHOWN AT 12'-0" MAXIMUM SPACING AND WITHIN 2' OF EACH END OF HOME.

DOUBLEWIDE MARRIAGE WALL COLUMN TIE-DOWNS SHALL BE INSTALLED AS INDICATED ELSEWHERE WITHIN THIS MANUAL.

ALL OTHER TIE-DOWN REFERENCES WITHIN THIS MANUAL SHALL BE APPLICABLE.

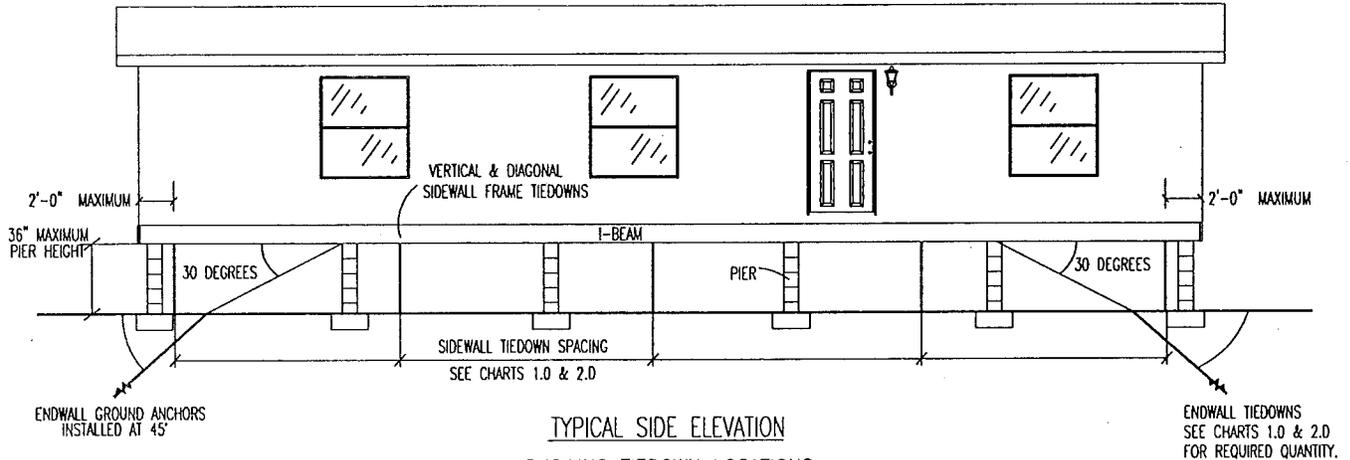
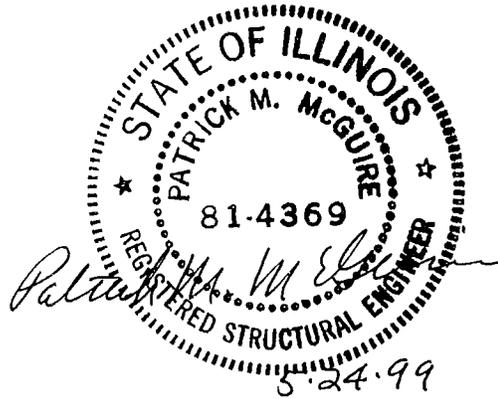
GENERAL NOTES:

1. 90" MAX SIDEWALL HEIGHT
2. 20 DEGREE MAX ROOF SLOPE (4.37/12 PITCH)
3. 99.5" I-BEAM SPACING
4. 36" MIN PIER HEIGHT



# HIGH PIER TIE-DOWN METHOD

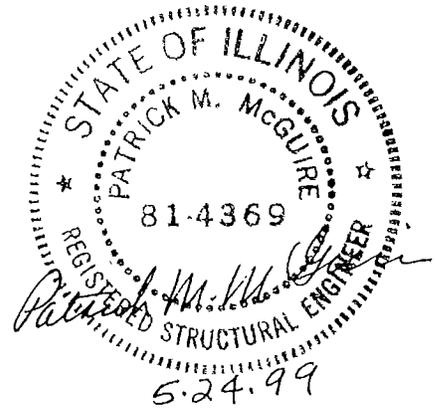
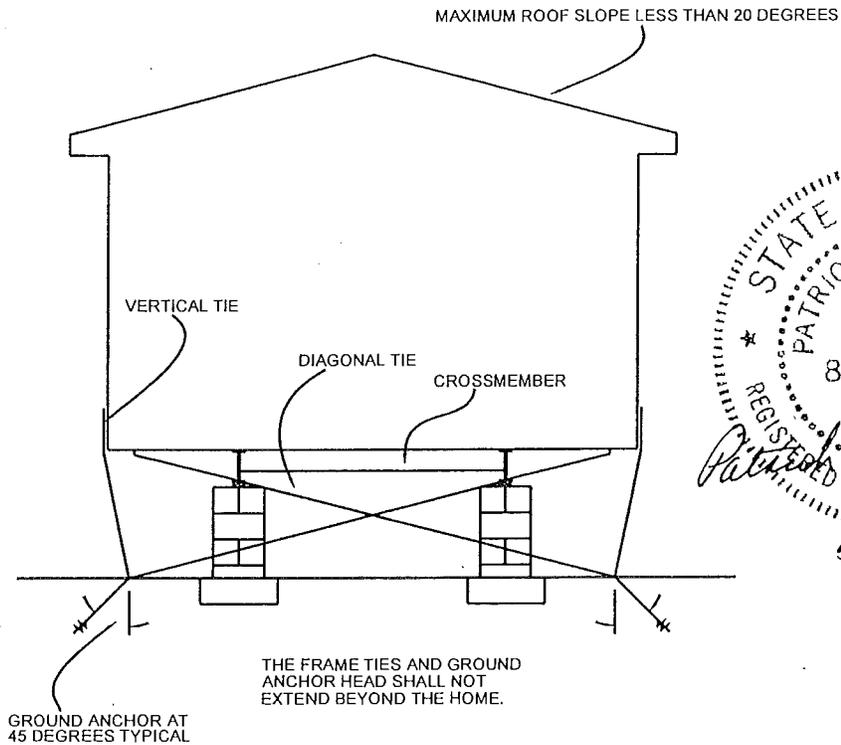
WIND ZONE 1 ONLY



TYPICAL SIDE ELEVATION  
SHOWING TIEDOWN LOCATIONS  
WIND ZONE II

NOTES:

- 1.) Use this sheet for TIEDOWN information only. Pier construction shall be as specified elsewhere in this manual.
- 2.) Refer to the Data Plate installed in the home to determine which wind zone the home has been designed for. Space TIEDOWNS for this zone as the charts specify.
- 3.) Ground anchors and frame ties shall be certified by a Professional Engineer, Registered Architect or notionally recognized testing agency as capable of resisting ultimate tensions loads of 4725# for straps and 6000# for anchors when tested in accordance with ASTM D3593-91.
- 4.) Ground anchors and frame ties shall be installed in accordance with the manufacturer's instructions, and shall be appropriate for the soil conditions of the home site.
- 5.) Ground anchors shall be embedded below the maximum frost penetration depth and 12" above the water table. Ground anchors shall be installed to their full depth and stabilizer plates shall be installed to provide added resistance to overturning and/or sliding.
- 6.) Vertical and diagonal frame ties may be installed to the same ground anchor by using the equipment and installation methods specified by the anchor manufacturer.
- 7.) Endwall TIEDOWNS shall be positioned just inside the chassis beams at a cross member.
- 8.) Any foundation or TIEDOWN system not in accordance with this manual shall be designed and certified by a licensed Professional Engineer familiar with local conditions.
- 9.) Steel anchoring equipment exposed to the weather shall be protected with a coating of at least 3.0 ounces of zinc per square foot.



**TYPICAL CROSS SECTIONS SHOWING TIEDOWN DESIGNS**  
 FIGURE 1.0

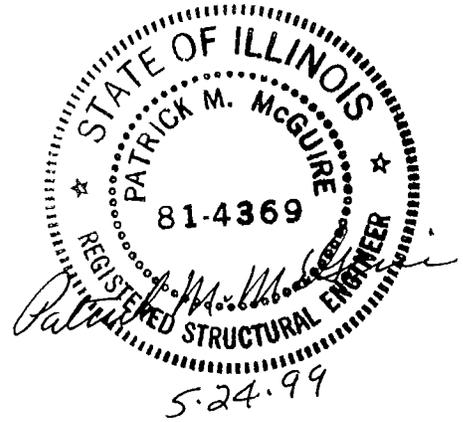
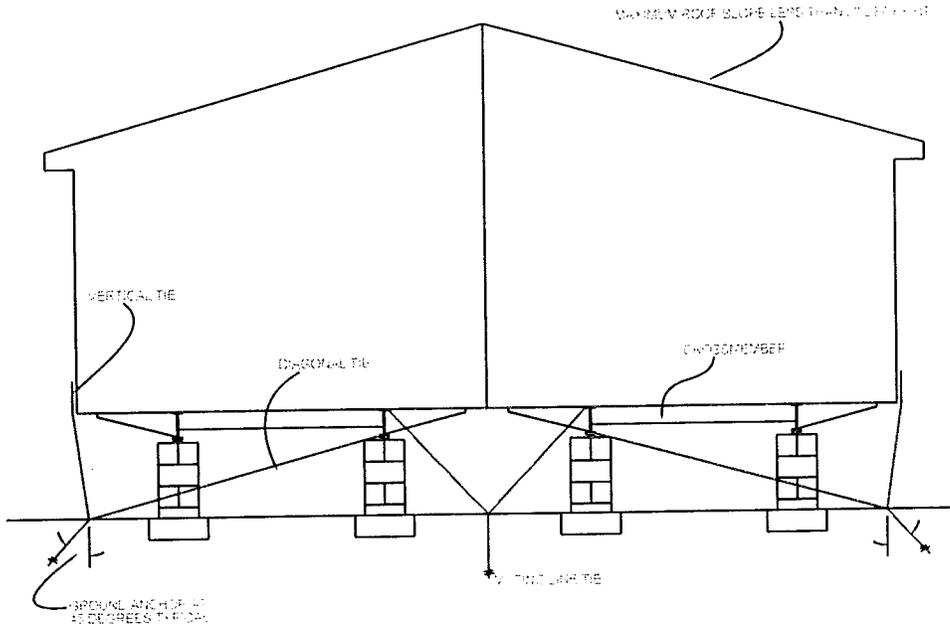
WIND ZONE II

CHART 1.0

SIDEWALL TIEDOWN SPACING				ZONE 2 SPACING	ZONE 3 SPACING
HOME WIDTH	SIDE OVERHANG	I-BEAM SPACING	SIDEWALL HT.		
164"	5"	99 1/2"	96"	8'	N/A
184"	5"	99 1/2"	96"	8'	N/A

NUMBER OF ENDWALL TIEDOWNS					MAX SW SPACE		
HOME WIDTH	SIDE OVERHANG	I-BEAM O.C. SPACING	SIDEWALL HEIGHT	ZONE 2	ZONE 3	ZONE 2	ZONE 3
164"	5"	99 1/2"	96"	2	N/A	44'	N/A
184"	5"	99 1/2"	96"	2	N/A	44'	N/A

USE THIS SHEET FOR TIEDOWN INFORMATION ONLY. SEE TYPICAL SIDE ELEVATION SHEET FOR REQUIRED INFORMATION. FRAME TIES AND THE HEAD OF THE GROUND ANCHOR SHALL NOT EXTEND BEYOND THE WALL LINE OF HOME.



**TYPICAL CROSS SECTIONS SHOWING TIEDOWN DESIGNS**  
FIGURE 2.0

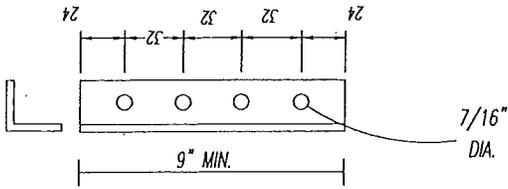
WIND ZONE II

CHART 2.0

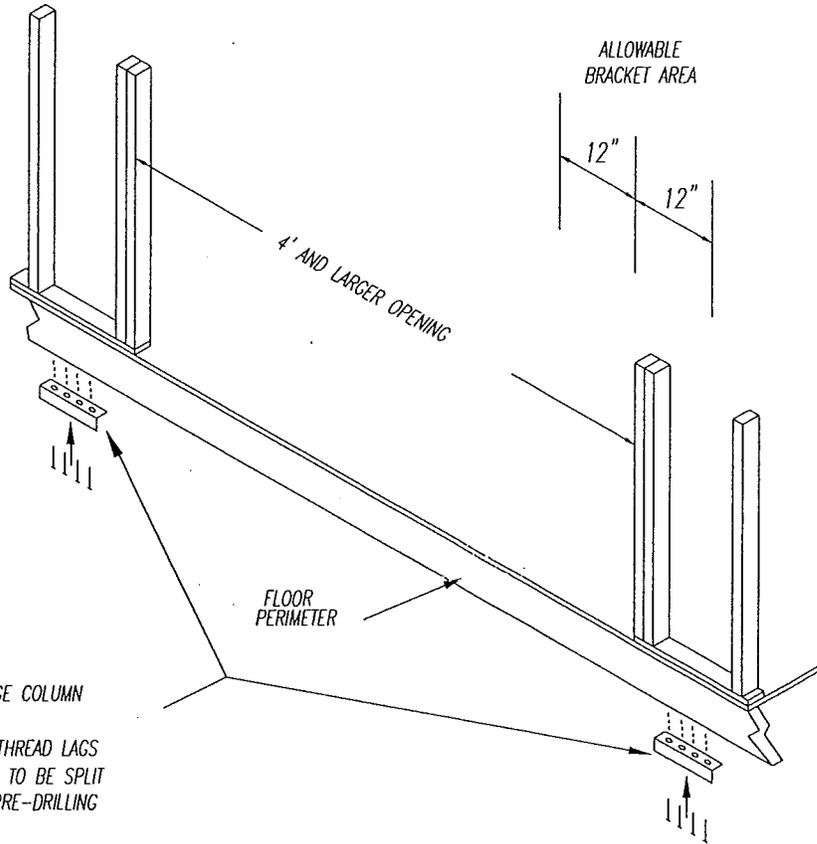
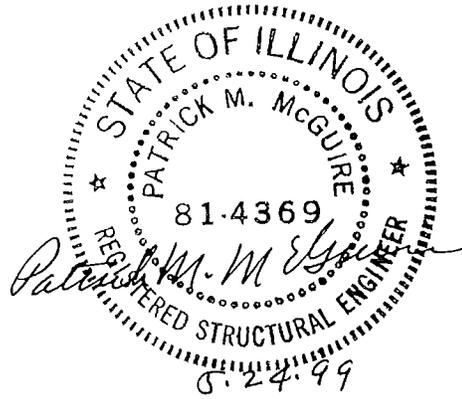
SIDEWALL TIEDOWN SPACING				ZONE 2 SPACING		ZONE 3 SPACING	
HOME WIDTH	SIDE OVERHANG	I-BEAM SPACING	SIDEWALL HT.	SIDES	MAT'G LN	SIDES	MAT'G LN
184"	12"	99 1/2"	90"	83"	83"	N/A	N/A
164"	12"	99 1/2"	90"	8'	8'	N/A	N/A
156"	12"	99 1/2"	90"	8'	8'	N/A	N/A

NUMBER OF ENDWALL TIEDOWNS						MAX S/W SPACE	
HOME WIDTH	SIDE OVERHANG	I-BEAM O.C. SPACING	SIDEWALL HEIGHT	ZONE 2	ZONE 3	ZONE 2	ZONE 3
184"	12"	99 1/2"	90"	4	N/A	36'	N/A
164"	12"	99 1/2"	90"	4	N/A	36'	N/A
156"	12"	99 1/2"	90"	4	N/A	36'	N/A

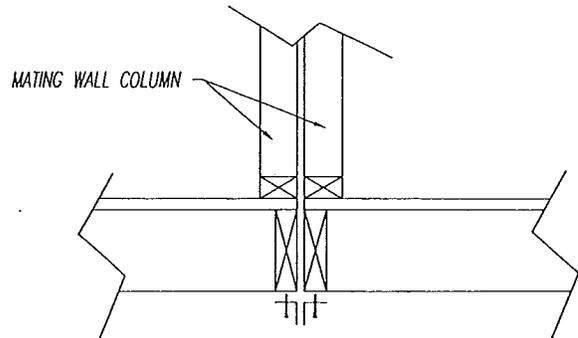
USE THIS SHEET FOR TIEDOWN INFORMATION ONLY. SEE TYPICAL SIDE ELEVATION SHEET FOR REQUIRED INFORMATION. FRAME TIES AND THE HEAD OF THE GROUND ANCHOR SHALL NOT EXTEND BEYOND THE WALL LINE OF HOME.



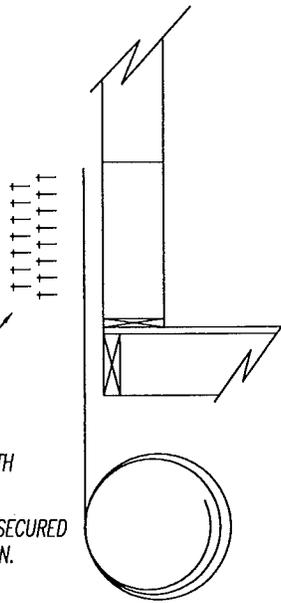
1 1/2" X 9" 11 ga. MIN ANGLE  
W/ LAG HOLES AS SHOWN



LOCATE ANGLE AT EACH MARRIAGE COLUMN  
WHEN SPAN IS 48' OR LARGER  
FASTEN W/ (4)-3/8" X 3" FULL THREAD LAGS  
PERIMETER FLOOR JOIST IS NOT TO BE SPLIT  
IN EFFECTIVE FASTENER AREA, PRE-DRILLING  
MAY BE REQUIRED.



BRACKETS TO BE INSTALLED AT EACH DOUBLEWIDE MARRIAGE WALL COLUMN  
AT OPENINGS 4' AND LARGER. LOCATE BRACKET WITHIN 12" OF  
EACH END OF OPENING. EACH HALF OF HOME IS TO BE TREATED  
INDEPENDENT OF THE OTHER.

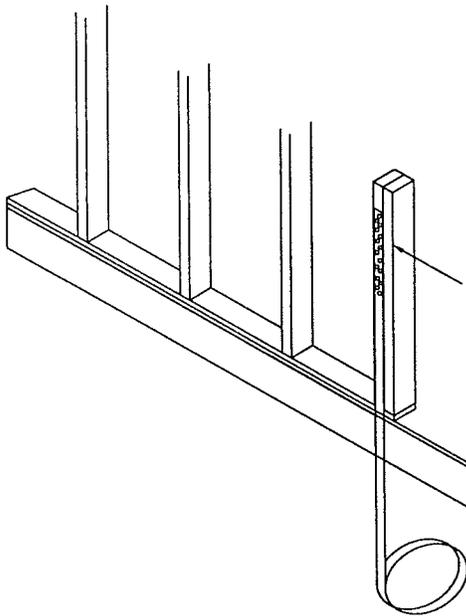
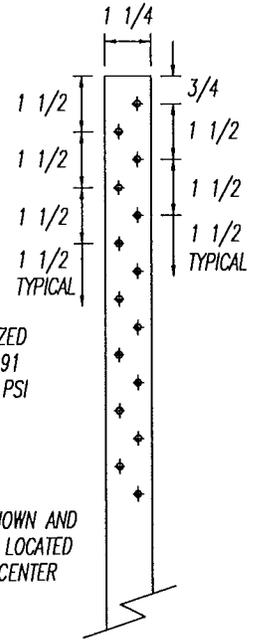


STRAP FASTENED TO COLUMN OR BLOCK WITH  
(13) #8 X 1 1/4" SCREW MIN

STRAP IS TO BE COILED AND SECURED  
TO FLOOR FOR TRANSPORTATION.

STRAP TO BE .035" X 1 1/4" GALVANIZED  
AND MEET SPECIFICATION ASTM D3953-91  
MINIMUM TENSILE STRENGTH OF 90000 PSI  
TYPE1, FINISH B, GRADE 1 STEEL.

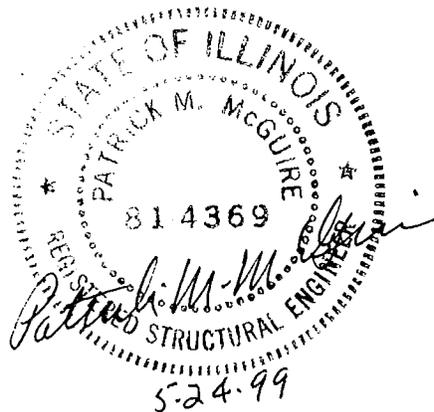
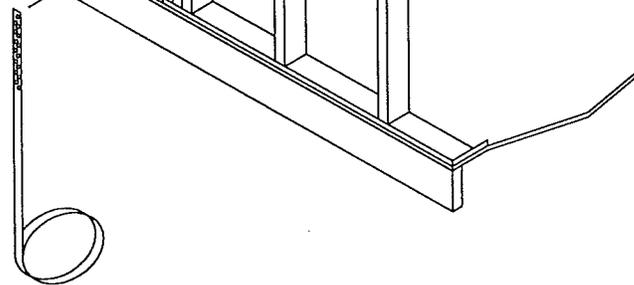
HOLES IN STRAP TO BE LOCATED AS SHOWN AND  
PUNCHED WITH 3/16" FASTENER HOLES LOCATED  
MIN 3/8" FROM STRAP EDGE TO HOLE CENTER



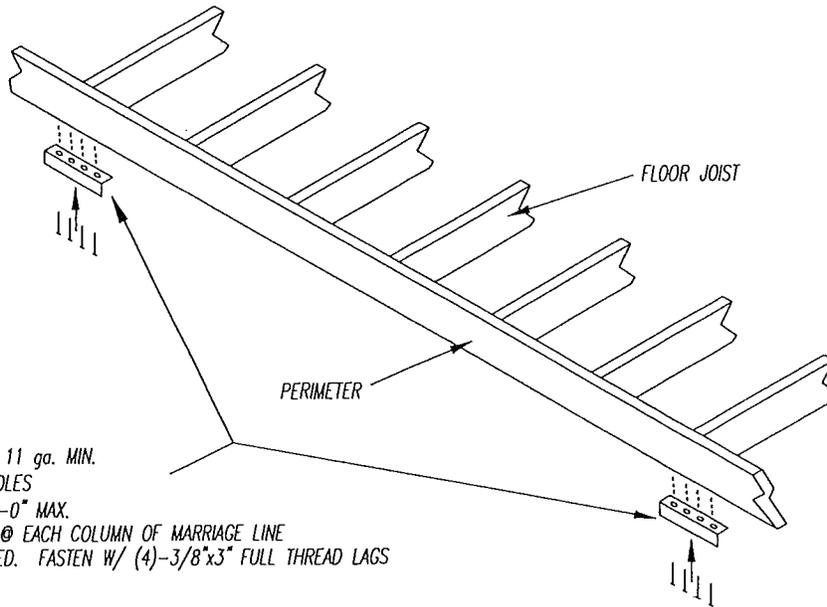
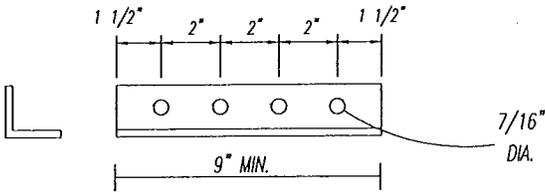
4' OR LARGER OPENING

IF BLOCK IS ELECTED TO BE UTILIZED:  
2X3 SPF #3 X 14" MIN BLOCK ADDED FOR STRAP FASTENING.  
FASTEN BLOCK TO STUD WITH (20) .131 X3" POWER DRIVEN  
NAILS, NO GLUE REQUIRED. BLOCK IS NOT REQUIRED TO BE  
UTILIZED ON MARRIAGE WALL COLUMN TIE-DOWNS.

BLOCK OR STUD MAY NOT HAVE SPLITS  
WITHIN EFFECTIVE FASTENER AREA.

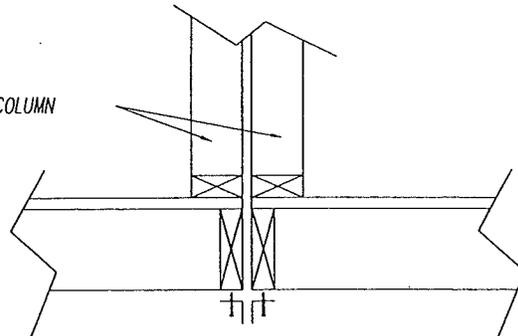


TIE-DOWN STRAP TO BE INSTALLED FOR EVERY SET OF MARRIAGE  
WALL COLUMN STUDS WHEN MARRIAGE WALL OPENING IS 48" OR LARGER.  
STRAP IS TO BE FASTENED TO THE COLUMN ABOVE THE NORMAL  
UPLIFT STRAPS OR TO BLOCK AS SHOWN. EACH HOME HALF IS TO HAVE TIE-DOWN STRAPS  
INDEPENDENT FROM THE OTHER HALF. NO OTHER MARRIAGE WALL  
TIE-DOWN STRAPS NEED BE INSTALLED OTHER THAN AT THESE COLUMN LOCATIONS.  
FASTEN STRAP TO A COLUMN STUD OR BLOCK AS SHOWN WITH (13) #8 X 1 1/4" SCREW MIN.

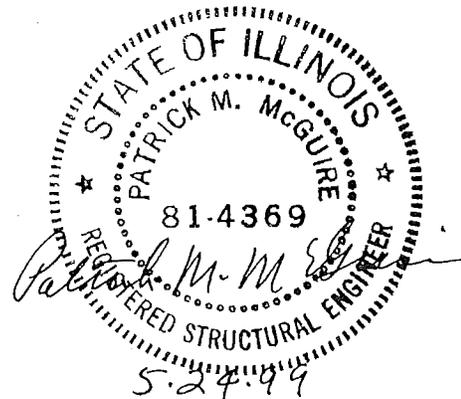


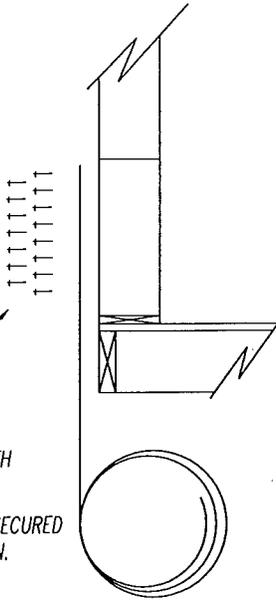
1 1/2" X 9" 11 ga. MIN.  
ANGLE W/ HOLES  
SPACED AT 8'-0" MAX.  
SIDEWALLS & @ EACH COLUMN OF MARRIAGE LINE  
WHEN REQUIRED. FASTEN W/ (4)-3/8"x3" FULL THREAD LAGS

MARRIAGE WALL COLUMN  
SEE NOTE 3.



- 1.) BRACKET INSTALLED @ 8'-0" MAXIMUM AND MUST BE LOCATED WITHIN 2' OF FRAME CROSSMEMBER AND OUTRIGGER
- 2.) BRACKETS TO BE INSTALLED WITHIN 6" OF EACH END OF HOME AND DOWN FULL LENGTH OF SIDEWALLS (NOT ENDWALL OR MARRIAGE WALLS).
- 3.) BRACKETS TO BE INSTALLED AT EACH DOUBLEWIDE MARRIAGE WALL COLUMN AT OPENINGS 4' AND LARGER. LOCATE BRACKET WITHIN 12" OF EACH END OF OPENING. EACH HALF OF HOME IS TO BE TREATED INDEPENDENT OF THE OTHER.

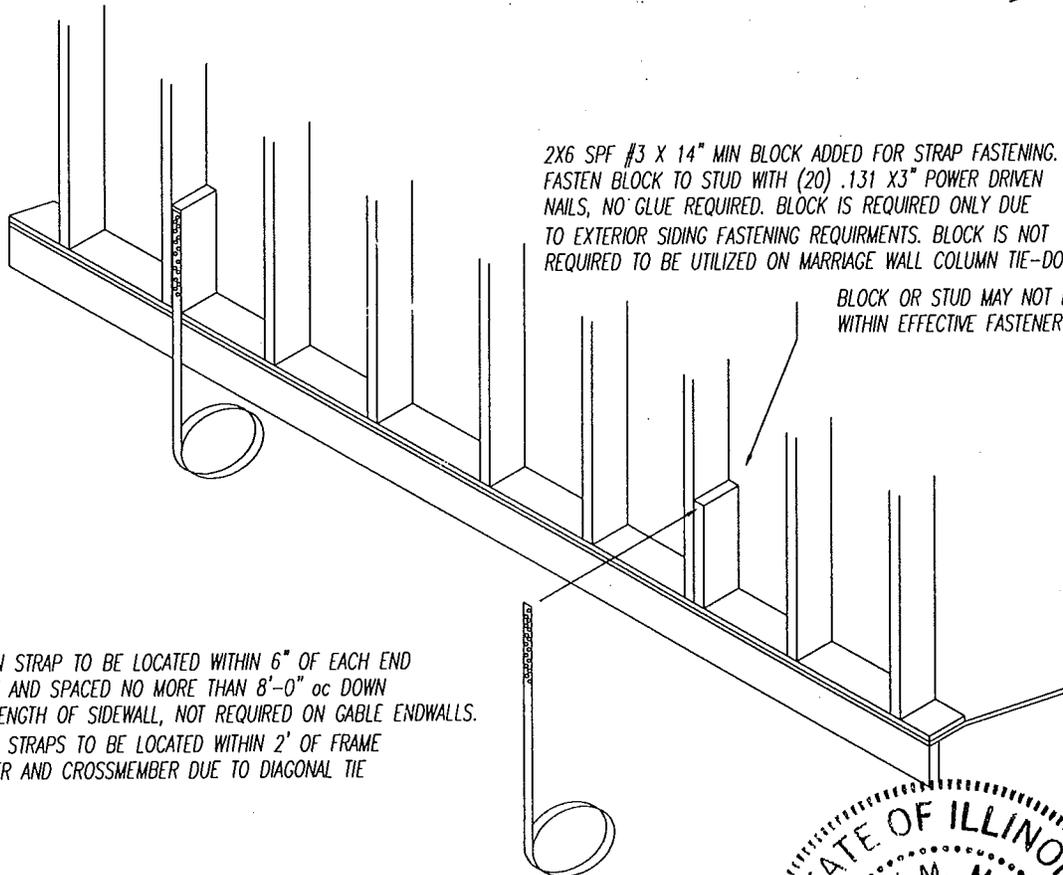
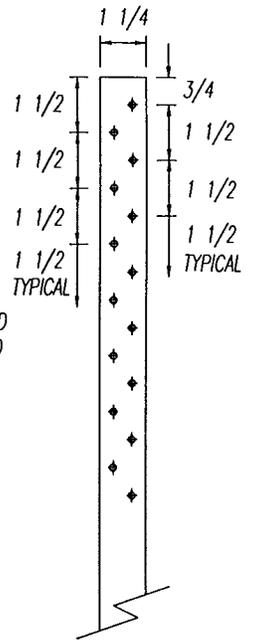




STRAP FASTENED TO BLOCK WITH  
(15) #8 X 1 1/4" SCREW MIN  
STRAP IS TO BE COILED AND SECURED  
TO FLOOR FOR TRANSPORTATION.

STRAP TO BE .035" X 1 1/4" GALVANIZED  
AND MEET SPECIFICATION ASTM D3953-91  
MINIMUM TENSILE STRENGTH OF 90000 PSI  
TYPE 1, FINISH B, GRADE 1 STEEL.

HOLES IN STRAP TO BE LOCATED AS SHOWN AND  
PUNCHED WITH 3/16" FASTENER HOLES LOCATED  
MIN 3/8" FROM STRAP EDGE TO HOLE CENTER



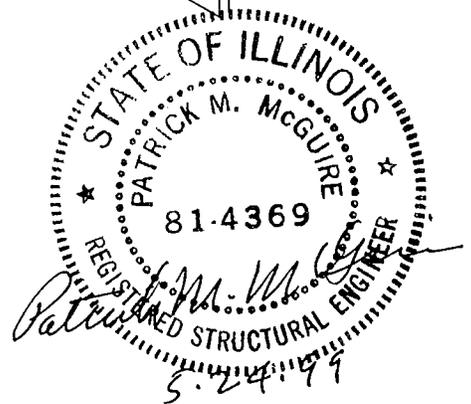
2X6 SPF #3 X 14" MIN BLOCK ADDED FOR STRAP FASTENING.  
FASTEN BLOCK TO STUD WITH (20) .131 X 3" POWER DRIVEN  
NAILS, NO GLUE REQUIRED. BLOCK IS REQUIRED ONLY DUE  
TO EXTERIOR SIDING FASTENING REQUIREMENTS. BLOCK IS NOT  
REQUIRED TO BE UTILIZED ON MARRIAGE WALL COLUMN TIE-DOWNS.

BLOCK OR STUD MAY NOT HAVE SPLITS  
WITHIN EFFECTIVE FASTENER AREA.

TIE-DOWN STRAP TO BE LOCATED WITHIN 6" OF EACH END  
OF HOME AND SPACED NO MORE THAN 8'-0" oc DOWN  
ENTIRE LENGTH OF SIDEWALL, NOT REQUIRED ON GABLE ENDWALLS.  
SIDEWALL STRAPS TO BE LOCATED WITHIN 2' OF FRAME  
OUTRIGGER AND CROSSMEMBER DUE TO DIAGONAL TIE

REQUIREMENTS.

ADDITIONAL TIE-DOWN STRAP TO BE INSTALLED FOR EVERY SET OF MARRIAGE  
WALL COLUMN STUDS WHEN MARRIAGE WALL OPENING IS 48" OR LARGER.  
STRAP IS TO BE FASTENED TO THE COLUMN ABOVE THE NORMAL  
UPLIFT STRAPS. EACH HALF IS TO HAVE TIE-DOWN STRAPS  
INDEPENDENT FROM THE OTHER HALF. NO OTHER MARRIAGE WALL  
TIE-DOWN STRAPS NEED BE INSTALLED OTHER THAN AT THESE COLUMN LOCATIONS.  
FASTEN STRAP TO A COLUMN STUD OR BLOCK AS SHOWN WITH (13) #8 X 1 1/4" SCREW MIN.



## TIE DOWN INFORMATION

The FMHCSS requires manufacturers to include a tie-down system in their installation manuals. The entire Minute-Man system is included in this manual. However, due to unique design and / or construction methods used by Patriot Homes Inc., other details are included to supplement the Minute-Man information and are identified as Patriot Homes Inc.

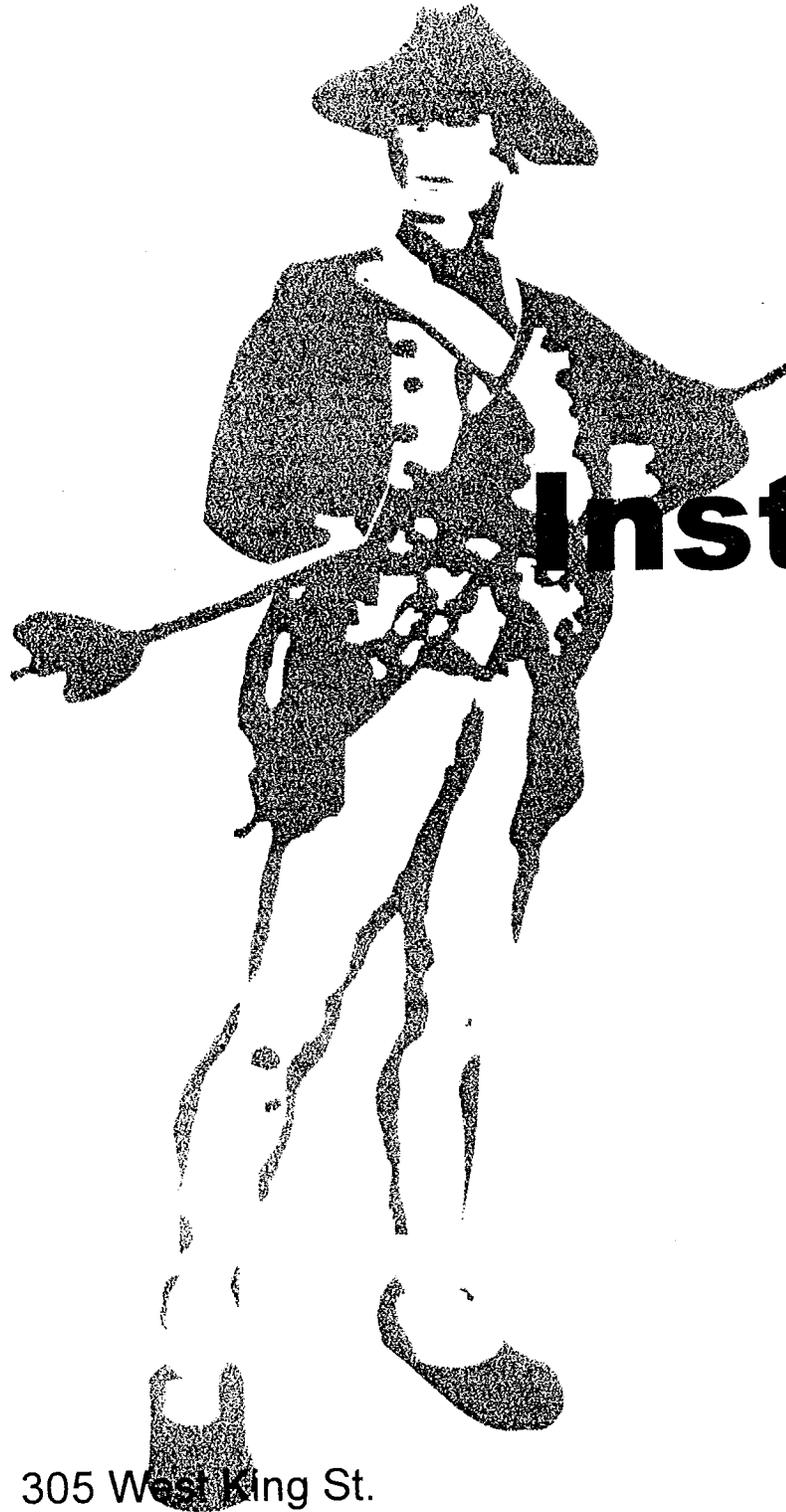
There may be conflicting information between the " generic " Minute-Man and Patriot Homes Inc. details. In all cases the Patriot Homes Inc. details are to be followed and supercedes any Minute-Man information.

The following information applies to homes being sited with Wind Zone I or II. Please verify the appropriate Wind Zone and carefully review the appropriate information. No home is to be sited within Wind Zone III.

Any Minute-Man details that utilize the words "should" or "recommended" must be considered a REQUIRED reference.

Some Minute-Man details illustrate the ground anchor installed vertically. Patriot Homes Inc. details must supercede and be followed which indicate the ground anchors must be installed diagonally.

*Minute Man* **products**® *Inc.*



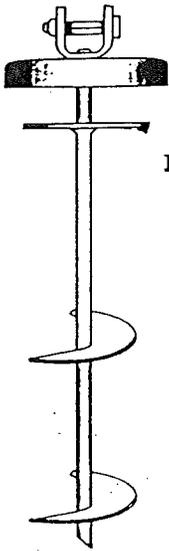
**Product  
and  
Installation  
Manual**

**Revised  
January 1999**

305 West King St.  
East Flat Rock, North Carolina 28726

# Minute Man anchors

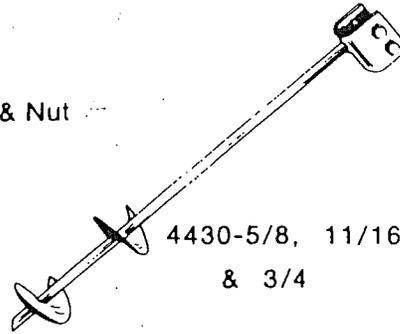
All anchors are "DH" type for use with either one or two tension bolts. Anchors are priced without tension bolt and nut—they must be ordered separately. Tension bolts and nuts will be packed separately from anchors.



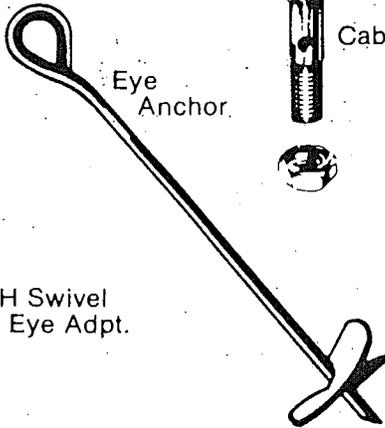
EZDH 5/8, 3/4



Strap Bolt & Nut



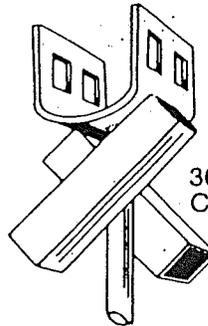
4430-5/8, 11/16 & 3/4



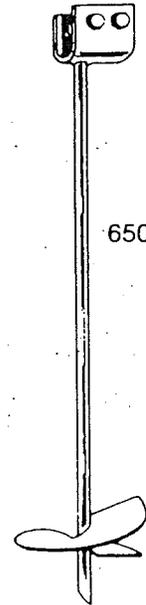
Eye Anchor



Cable Bolt & Nut



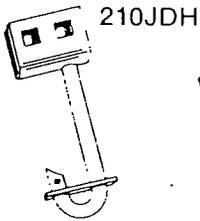
36" & 48" Cross Drive



650 5/8, 11/16 & 3/4



100DH Swivel Head Eye Adpt.



210JDH



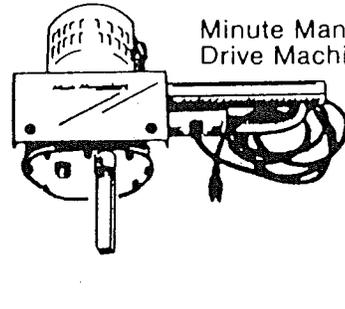
210PDH



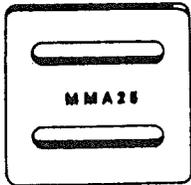
210DH



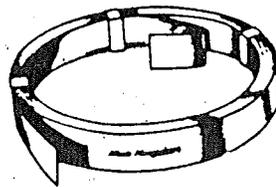
THDHL



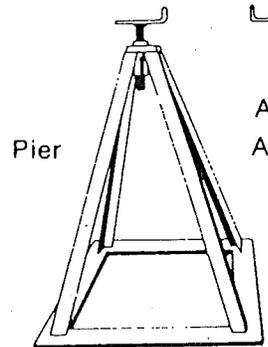
Minute Man Anchor Drive Machine



STRAP BUCKLE



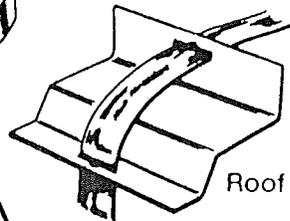
Galvanized Strapping



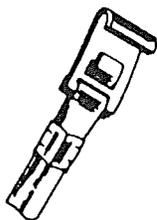
Pier



Also Available



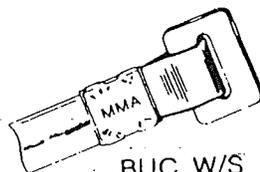
Roof Bracket



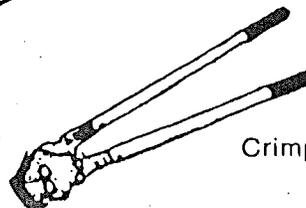
FC W/S



FC II W/S



BUC W/S



Crimping Tool

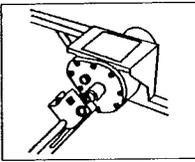
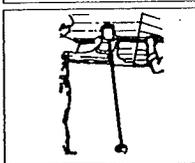
# Minute Man anchors, Inc.

## ANCHOR INSTALLATION

**CAUTION:** The installation of anchors with a drive machine is a two person operation.

### MACHINE INSTALLATION

In this method, the anchor is turned to full depth into the ground by an anchor drive machine.

-  Attach anchor to machine.
-  Placed anchor in proper position in line with strap and machine.
-  Anchor should be installed at a slight angle as shown to assure head being positioned behind future skirting.

There are two basic methods of installing anchors, each equally effective in properly securing manufactured homes to the ground.

**Warning:** Before ground anchor installation, determine that the anchor locations around home will not be close to any underground electrical cables, water lines or sewer piping. Failure to determine the location of electrical cables may result in serious personal injury.

### MANUAL INSTALLATION

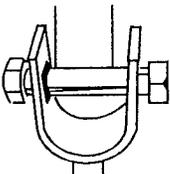
A hole is dug to a depth of approximately two feet in the proper position as explained under machine installation.

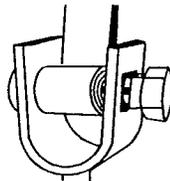


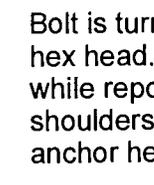
After the hole is dug to 24" depth, the anchor is turned into the ground by hand, using a rod or length of pipe for leverage.

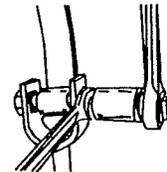
After anchor is installed full depth, earth is repacked, six inches at a time.

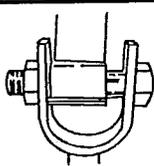
### PROPER TENSIONING OF STRAP TO ANCHOR HEAD

-  Insert bolt into head; attach nut loosely. Insert strap in slot of 5/8" bolt, or until strap is flush with far side of bolt.

-  Bend strap 90° and take at least three complete turns on bolt until strap is taut.

-  Bolt is turned with 15/16" socket wrench, or adjustable wrench, on hex head. With square hole in anchor head, hold bolt under tension while repositioning wrench: Place open-end wrench on 5/8" square shoulders of bolt. Align square shoulders of bolt with square hole in anchor head.



-  Holding hex head of bolt in position, tighten nut to draw square shoulders into square hole. Shoulders are now in locking position; continue to tighten nut. Tensioning device is now in locked, secure position.

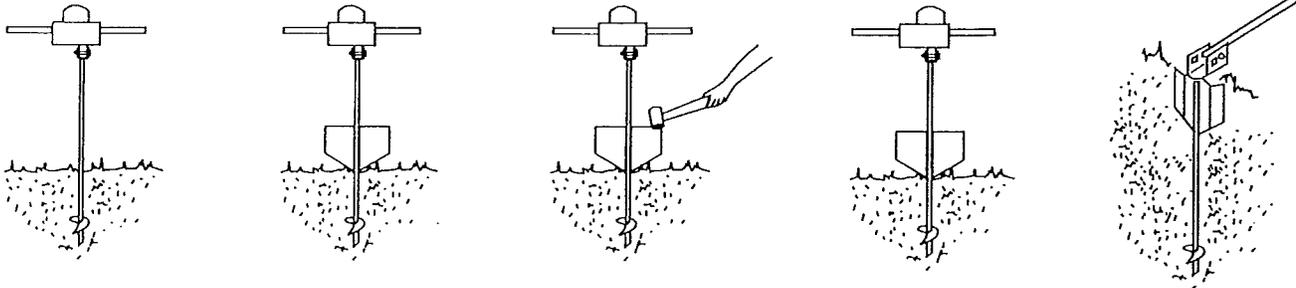
**Note:** The tensioning bolt can be inserted in the head from either side.

**Notice:** In areas of severe cold weather, where possible damage could occur from frost heave, the homeowner should be prepared to adjust tension on the straps to take up slack.

# MINUTE MAN ANCHORS, INC.

## INSTRUCTION FOR USING MINUTE MAN STABILIZING DEVICE

Minute Man stabilizing devices are designed for use with Minute Man anchors and intended to laterally restrict movement of the anchor through the soil.



1. Install the anchor into the ground leaving 12" - 18" of the shaft exposed.
2. Place the stabilizing device next to the shaft in the direction of pull.
3. Drive the stabilizing device into the ground.
4. The anchor is then turned in the rest of the way into the soil until the head of the anchor is flush with the stabilizing device.
5. As the frame tie is tightened the anchor will be pre-loaded against the stabilizing device preventing lateral movement of anchor through the soil.

## FRAME TIE INSTALLATION INSTRUCTIONS

### Frame Tie With Buckle

1.

2.

3.

Thread sufficient length of frame tie strap through buckle as shown.

Next, thread long end of strap between frame and floor of home. Bring strap through buckle as shown in diagram and fasten to anchor head.

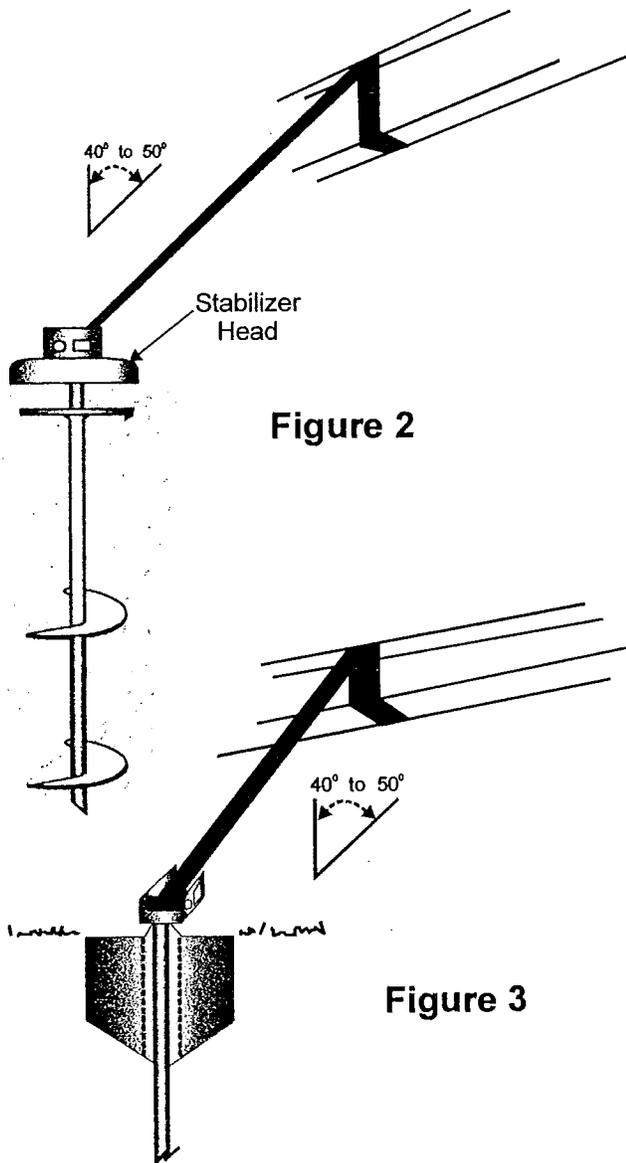
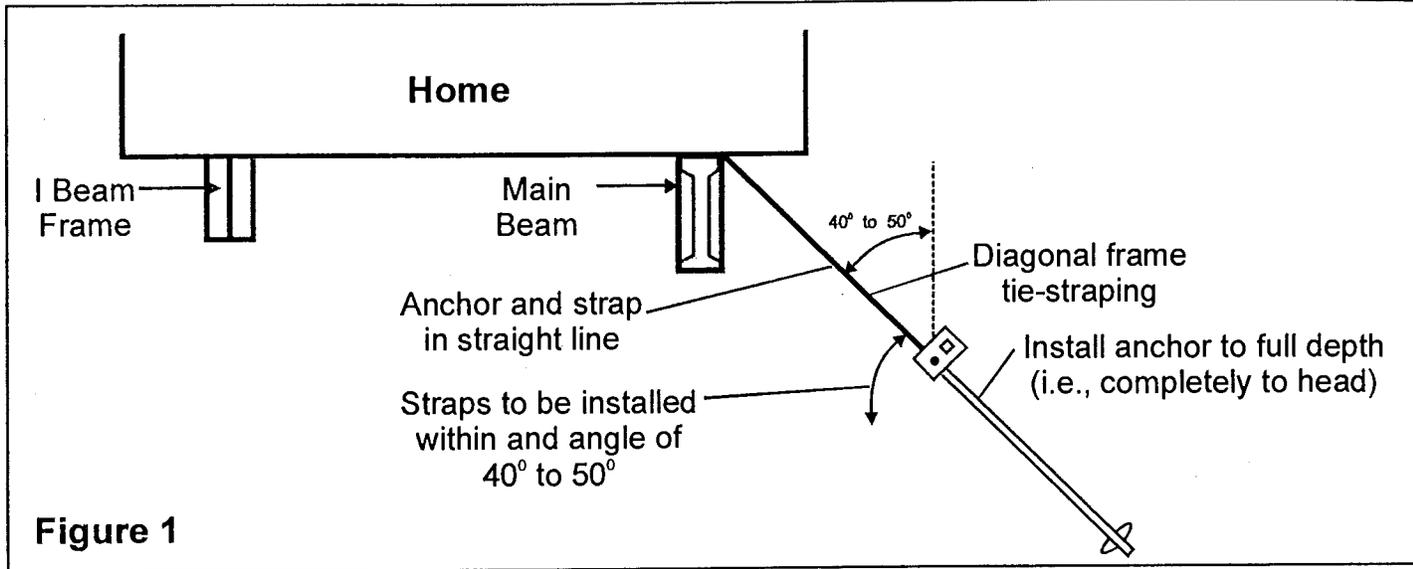
Diagram showing strap in position around frame and through buckle. It is important to remove all slack from system.

### Frame Tie With Hook

#### Enlarged View of Frame Beam

Attach Frame Clamp (Hook) inside top flange of home frame. Place strap between frame and home as shown in sketch. Pull strap tight and attach to anchor tension head.

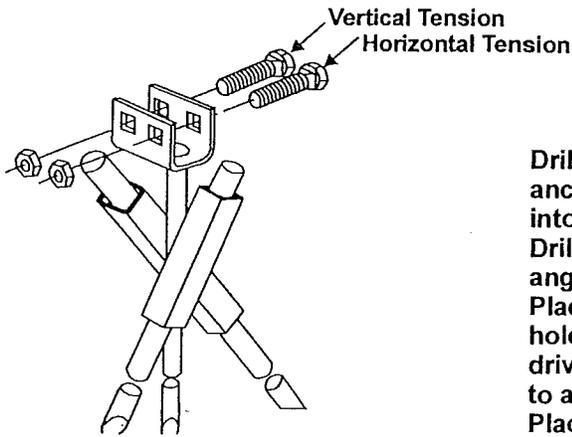
## PROPERLY INSTALLED AND CONNECTED GROUND ANCHOR AND FRAME CONNECTION



For those homes which are designed to require only diagonal frame ties, the anchor is to be installed in line with the ties.

**Figure 1.** When the load on the anchor is not applied in line with the long axis of the anchor, the magnitude and effect of the horizontal movement of the anchor head is to be investigated.

Another accepted way to limit lateral deflection is by use of a tested and approved Metal Stabilizing Device. **Figure 2 and 3.** In **Figure 2**, the Stabilizer is a part of the anchor. In **Figure 3**, the plate is driven in front of the anchor's direction of pull and will act to minimize the anchor rod deflection.

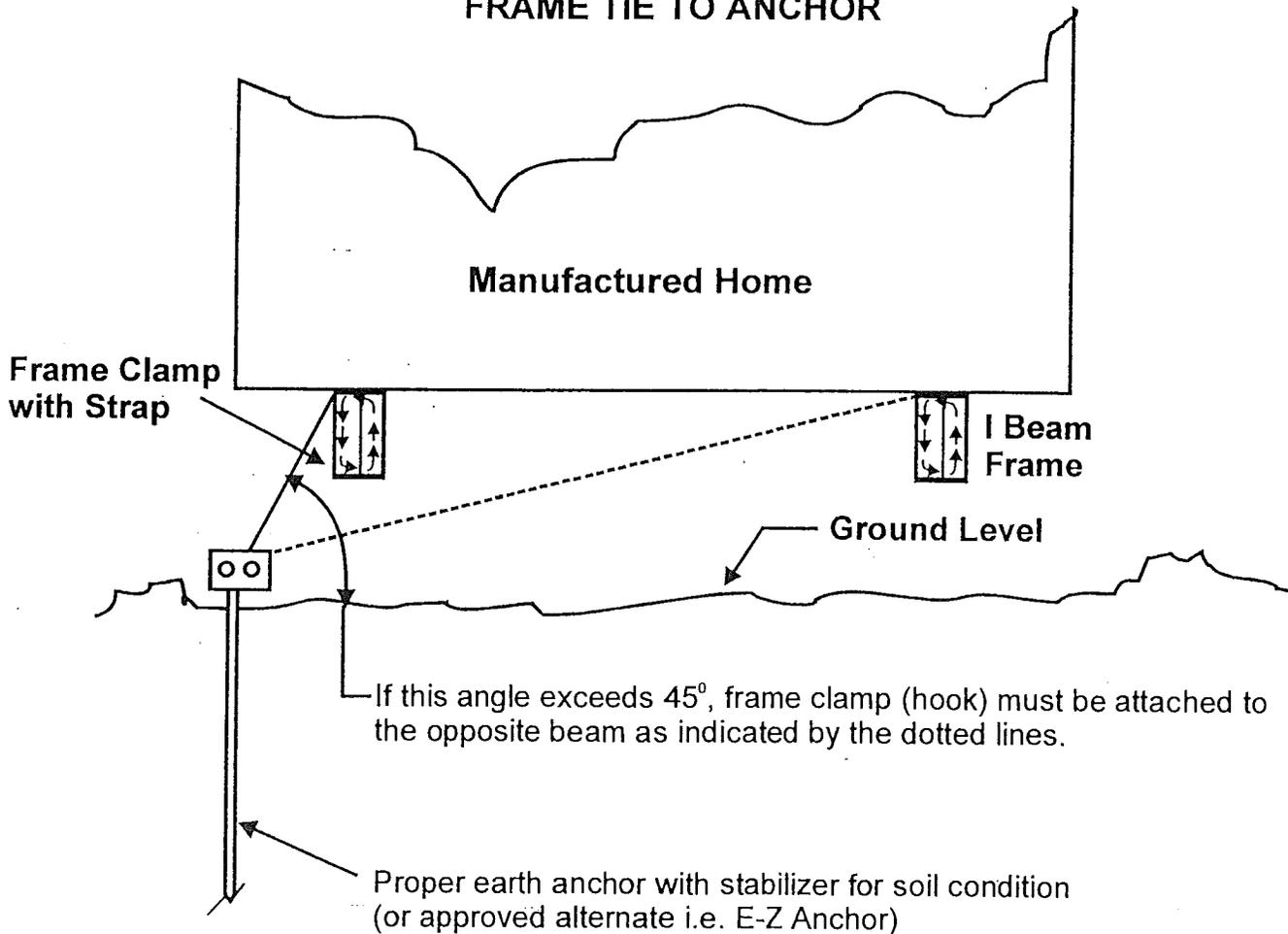


**Installation  
Instructions  
for  
Cross Drive  
Rock Anchor**

**INSTALLATION INSTRUCTIONS**

Drill 5/8" diameter hole 5 1/2" deep, in center of anchor location, for pilot stud. Insert pilot stud into hole.  
 Drill two - 3/4" diameter holes in rock at 45 degree angles, using anchor head as a locating guide.  
 Place rod through top of (1) square tube and into hole. Drive rod to desired depth. (Rod must be driven into rock at least 80% of its length in order to achieve minimum allowable pullout resistance.)  
 Place second rod through top of remaining tube. Drive rod to desired depth to lock.  
 Maximum pullout resistance is developed when anchor head is low as possible and ground surface is solid rock. Distance from square tubing to rock surface should not exceed 1".

**FRAME TIE TO ANCHOR**



# EZ ANCHOR WITH VERTICAL STABILIZER INSTALLATION INSTRUCTIONS

*Note: With machine installation, a Minute-Man adapter designed to fit both the anchor head and drive machine shaft is available. Installers do not need additional or special equipment for E-Z Anchor Installation.*

## 1. MACHINE INSTALLATION

Using a drive machine, turn the anchor into the ground so that the **vertical stabilizer** is approximately 2" below ground level and the stabilizer head is 1/4" to 1/2" below ground level.

For the E-Z Anchor/Stabilizer to achieve full potential install the anchor **vertically**. See Figure A.

*Note: A slightly greater angle may be used to start anchor to avoid contact with the home and straightened as anchor is ground set. The splitbolt is inserted, strap is fastened, and tightening adjustment made.*

**Caution:** The installation of anchors with a drive machine is a two person operation.

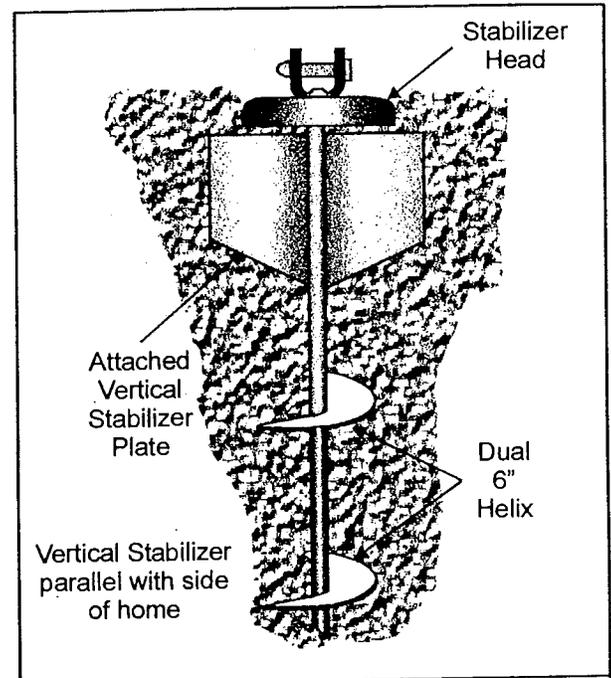
## MINUTE MAN EZ ANCHOR WITH VERTICAL STABILIZER

MODEL: MMA 6650 EZDH W/STABILIZER

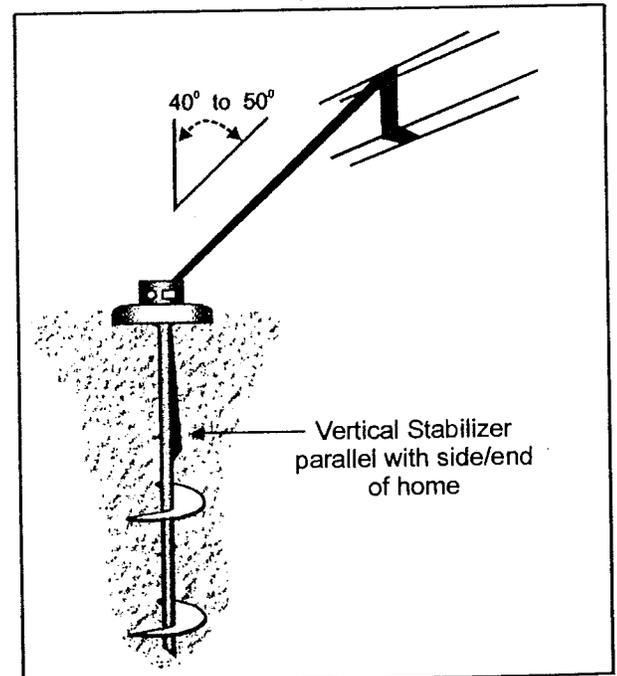
*Stabilizer pulled into ground by anchor installation - no sledge hammer needed*

## 2. STANDARDS OF INSTALLATION

- E-Z Anchors and all components are to be installed per manufacturer's instructions.
- E-Z Anchors are approved for designated Soil Class 4-A.
- Consult manufactured home set up instructions for number of frame tie downs, over the roof tie downs, and tie down spacing.



**Figure A** *Note: Before insertion, make sure vertical stabilizer is parallel with direction of pull.*

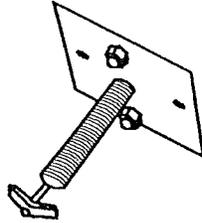
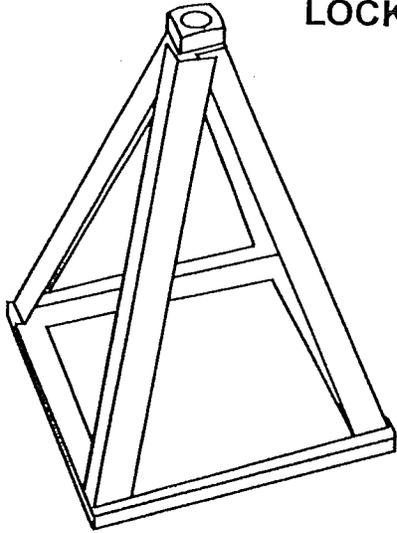


**FLORIDA APPROVED**

For additional information, copies of engineering test(s) and report, Contact Minute-Man Anchors, Inc. (Revised: November 1998)



## LOCKING HEAD HEAVY DUTY PIER

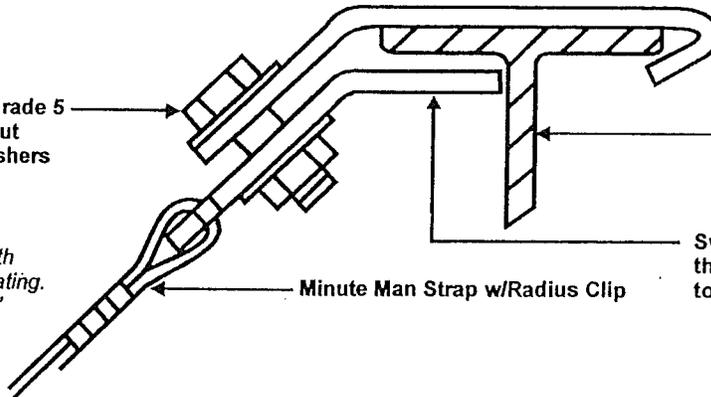


MDP-16	16" DELUXE PIER
MDP-20	20" DELUXE PIER
MDP-24	24" DELUXE PIER
MDP-28	28" DELUXE PIER
MDP-32	32" DELUXE PIER

*Available painted or hot dip galvanized*

## LOCKING FRAME CLAMP II MMA-33 ASSEMBLED UNIT

1/2 x 1" Grade 5  
Bolt & Nut  
with Washers

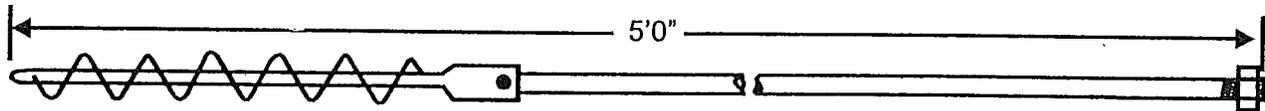


Home Frame

Minute Man Strap w/Radius Clip

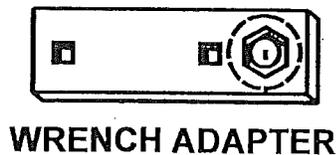
Swivel Clip must not vary more  
than 10 Deg. from Perpendicular  
to Beam.

*Note: Galv. Or Painted with  
Black Water Resistant Coating.  
All Dimensions +/- 0.0625"*



5'0"

## EARTH PROBE



WRENCH ADAPTER



600 lb. In. TORQUE WRENCH

**FLORIDA APPROVED**

**Pocket Penetrometer Kits Available**



## NUMBER AND LOCATION OF STRAPS AND GROUND ANCHORS

Strap Method	Anchor Min. Ultimate Load Capacity	Maximum Anchor Spacing		
		Zone I	Zone II <sup>3</sup>	Zone III <sup>3</sup>
Single Strap	4725 lbs. <sub>1</sub>	11' - 0" <sub>2</sub>	6' - 0" <sub>2</sub>	4' - 6" <sub>2</sub>
Double Strap	4725 lbs.	11' - 0"	6' - 0"	4' - 6"

**Note:**

1. Unless listed/labeled for a higher capacity by the anchor manufacturer
2. Unless a greater spacing is specified by the anchor manufacturer
3. All homes located in Wind Zones II and III shall have a vertical tie installed at each diagonal tie location

### SOIL CLASSIFICATION CHART

Soil Class	Soil Description	Blow Count (ASTM D1586)	Test Probe Value	Recommended Minute Man Anchor
1	Sound hard rock	NA	NA	Cross Drive or Rock Anchor
2(a)	Very dense &/or cemented sands, coarse gravel and cobbles, caliche, preloaded silts, and clays.	40-up	551 lb. in. Up	4430DH 650DH 4430 EZDH 636 EZDH 24 BA
2(b)	Coral	40-up	551 lb. in. up	4430 DH 650DH 24 BH
3	Medium dense coarse sands, sandy gravels, very stiff silts, and clays.	24-39	351 to 550 lb in.	4430 DH 4430 EZDH 636 EZDH 650DH
4(a)	Loose to medium dense sands, firm to stiff clays and silts alluvial fill.	18-23,3	276 to 350 lb. in.	650DH 6650 EZVDH Fla.
4(b)	VERY loose to medium dense sands, firm to stiff clays and silts, alluvial fill.	12-17	175 to 275 lbs. in	1060DH

**Remember:** Each state, county or municipality may require a specific anchor from the groups shown for each soil classification. Check local regulations first.

*Note:* Many anchors are designed for particular soil condition(s) and are unacceptable for use in other type soils. We have listed the soils for which each anchor is designed and approved. Soil classifications are taken from the "standard for the installation on mobile homes". Each anchor listed meets ANSI A225.1 and ASTM D3953.91 codes.



# E-Z ANCHOR INSTALLATION METHOD

*Note: With machine installation, a Minute-Man adapter designed to fit both the anchor head and drive machine shaft is available. Installers do not need additional or special equipment for E-Z Anchor Installation.*

## 1. MACHINE INSTALLATION

The drive machine is started and the anchor is turned into the ground to a point where the top (stabilizer head plate) is flush with or slightly below ground level. This assures that the E-Z Anchor Stabilizer will be at its required installation position. **See Figure A.**

To achieve full potential, install the E-Z Anchor vertically. A  $10^\circ$  deviation from vertical is acceptable. **See Figure A.**

*Note: A slightly greater angle may be used to start anchor to avoid contact with the home and straightened as anchor is ground set. The splitbolt is inserted, strap is fastened, and tightening adjustment made.*

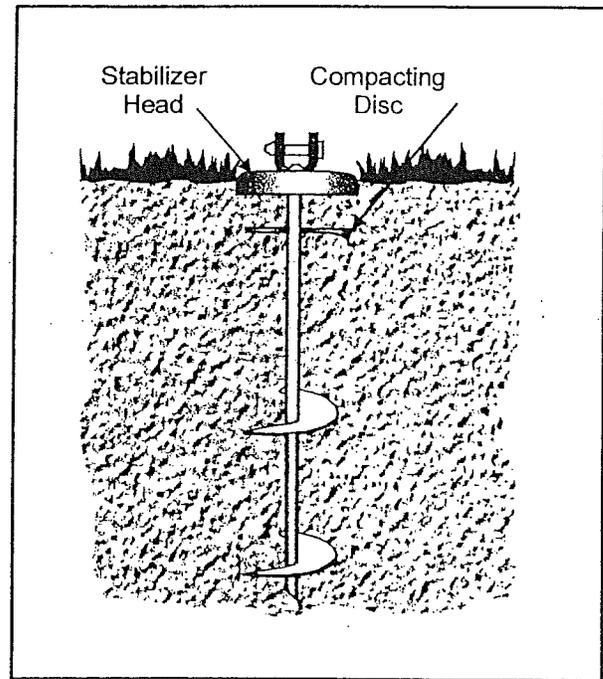


Figure A

## 2. STANDARDS FOR INSTALLATION

- E-Z Anchors and all components are to be installed per manufacturer's instructions.
- E-Z Anchors are approved for designated Soil Class III.
- E-Z Anchor working load capacity is 3,150 pounds for a single tie or the load of (2) ties combined which is 40 to 50 degrees from vertical. **See Figure B.**
- Consult manufactured home set up instructions for number of frame tie downs, over the roof tie downs and tie down spacing.
- Proper site preparation required removal of grass and sod prior to installation.

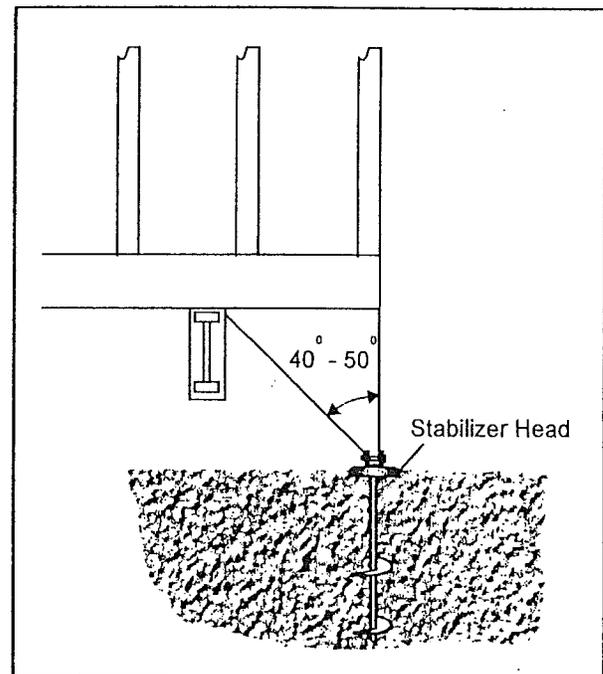


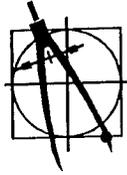
Figure B

*For additional information, copies of engineering test(s) and report, Contact Minute-Man Anchors, Inc. (Revised: November 1998)*

Following is a list of Minute-Man Anchors with a minimum holding power of 4,725 pounds (2143 kg.).

MARK	MODEL	DESCRIPTION	USE IN SOIL TYPE
MMA-2	650-DH 5/8"	6" DISC, 50" ANCHOR	2,3,4
MMA-4	650-DH 3/4	6" DISC, 50" ANCHOR	2,3,4
MMA-38	650-DH 11/16	6" DISC, 50" ANCHOR	2,3,4
MMA-40	636-DH 5/8	6" DISC, 36" ANCHOR	2,3,4
MMA-28	636-DH 3/4	6" DISC, 36" ANCHOR	2,3,4
MMA-30	4430-DH 5/8	DOUBLE 4" DISC, 30" ANCHOR	2
MMA-36	4430-DH 11/16	DOUBLE 4" DISC, 30" ANCHOR	2
MMA-6	4430-DH 3/4	DOUBLE 4" DISC, 30" ANCHOR	2
MMA-35	36-XDH	36" CROSS DRIVE ANCHOR	1
MMA-8	48-XDH	48" CROSS DRIVE ANCHOR	1
MMA-71	1060-DH 3/4	10" DISC, 60" ANCHOR	4b (Fla.)
MMA-50	4442-DH 5/8	DOUBLE 4" DISC, 42" ANCHOR	2,3,4
MMA-52	4636-DH 3/4	4" & 6" DISC, 36" ANCHOR	2,3,4
MMA-54	4450-DH 11/16	DOUBLE 4" DISC, 50" ANCHOR	2,3,4
MMA-55	4450-DH 3/4	DOUBLE 4" DISC, 50" ANCHOR	2,3,4
MMA-92	4430-EZDH 3/4	DOUBLE 4" DISC, 30" EZ ANCHOR	2,3
MMA-94	636-EZDH 3/4	6" DISC, 36" EZ ANCHOR	2,3
MMA-95	660-EZDH 3/4	6" DISC, 60" EZ ANCHOR	2,3
MMA-96	650-EZDH 3/4	6" DISC, 50" EZ ANCHOR	2,3,4
MMA-98	650 EZVDH 3/4	DOUBLE 6" DISC, VERT. STABILIZER	2,3,4A (Fla.)
MMA-18	THDH	DOUBLE HEAD TENSION DEVICE	SLAB
MMA-18	THDHLS	DH TENSION DEVICE W/LAG	SLAB
MMA-10	36-DH	CORAL ANCHOR	CORAL
MMA-12	210-DH	CONCRETE ANCHOR	SLAB
MMA-14	210-PDH	WET CONCRETE ANCHOR	SLAB
MMA-42	210-JDH	SWIVEL HEAD WET CONCRETE ANCHOR	SLAB
MMA-BR	24 BA	BARB ROCK ANCHOR	1
MMA-22	100-DH	DOUBLE HEAD TENSION ADAPTER	
MMA-SDA2		STABILIZER	
MMA-SD2		STABILIZER	FLA.
MMA-29	FCIW/S	FRAME CLAMP II W/STRAP	
MMA-29	FCIW/S	FRAME CLAMP I W/STRAP	
MMA-31	FRAME TIE	LONGITUDINAL FRAME TIE	FLA.

MARK	MODEL	DESCRIPTION	USE IN SOIL TYPE
MMA-32	BUC/WS	BUCKLE W/STRAP	
MMA-33	FCII (LOCKING)	LOCKING FRAME CLAMP II	FLA.
MMA-71	CT/WS	CORNER TIE W/STRAP	
MMA-71	CT/WS	CORNER TIE II W/STRAP	FLA.
MMA	SBN	STRAP BOLT & NUT	
MMA-25	22 BUCKLE	DOUBLE SLOT BUCKLE	
MMA-32	SS BUCKLE	SINGLE SLOT BUCKLE	
	44RB	4X4" ROOF BRACKET	
	66 RB	6X6" ROOF BRACKET	
	POCKET PENETROMETER	POCKET PENETROMETER	
	SOIL TEST PROBE	SOIL TEST PROBE	
	PERIMETER JACK JACKING PLATE	PERIMETER JACK I BEAM JACKING PLATE	
MMP-6	6" PIER	STANDARD MOBILE HOME PIER	
MMP-8	8" PIER	STANDARD MOBILE HOME PIER	
MMP-10	10" PIER	STANDARD MOBILE HOME PIER	
MMP-12	12" PIER	STANDARD MOBILE HOME PIER	
MMP-14	14" PIER	STANDARD MOBILE HOME PIER	
MMP-16	16" PIER	STANDARD MOBILE HOME PIER	
MMP-18	18" PIER	STANDARD MOBILE HOME PIER	
MMP-20	20" PIER	STANDARD MOBILE HOME PIER	
MMP-22	22" PIER	STANDARD MOBILE HOME PIER	
MMP-24	24" PIER	STANDARD MOBILE HOME PIER	
MMP-26	26" PIER	STANDARD MOBILE HOME PIER	
MMP-28	28" PIER	STANDARD MOBILE HOME PIER	
MMP-30	30" PIER	STANDARD MOBILE HOME PIER	
MDP-16	16" DELUXE PIER	LOCKING HEAD HEAVY DUTY PIER	FLA.
MDP-20	20" DELUXE PIER	LOCKING HEAD HEAVY DUTY PIER	FLA.
MDP-24	24" DELUXE PIER	LOCKING HEAD HEAVY DUTY PIER	FLA.
MDP-28	28" DELUXE PIER	LOCKING HEAD HEAVY DUTY PIER	FLA.
MDP-32	32" DELUXE PIER	LOCKING HEAD HEAVY DUTY PIER	FLA.



**ROD M. HUDGINS, JR. P.E.**

**P.O. BOX 5070**

**ASHEVILLE, N.C. 28813-5070**

Phone (828) 274-9244 Fax (828) 274-9525

ROD M. HUDGINS, JR. P.E. - PRINCIPAL

DENNIS R. PONDER - ASSOCIATE

December 21, 1998

Minute Man Anchors, Inc.  
305 West King Street  
East Flat Rock, North Carolina 28726

Dear Sir:

I have analyzed design drawing, physical testing reports and installation instructions for the Minute Man products listed as follows:

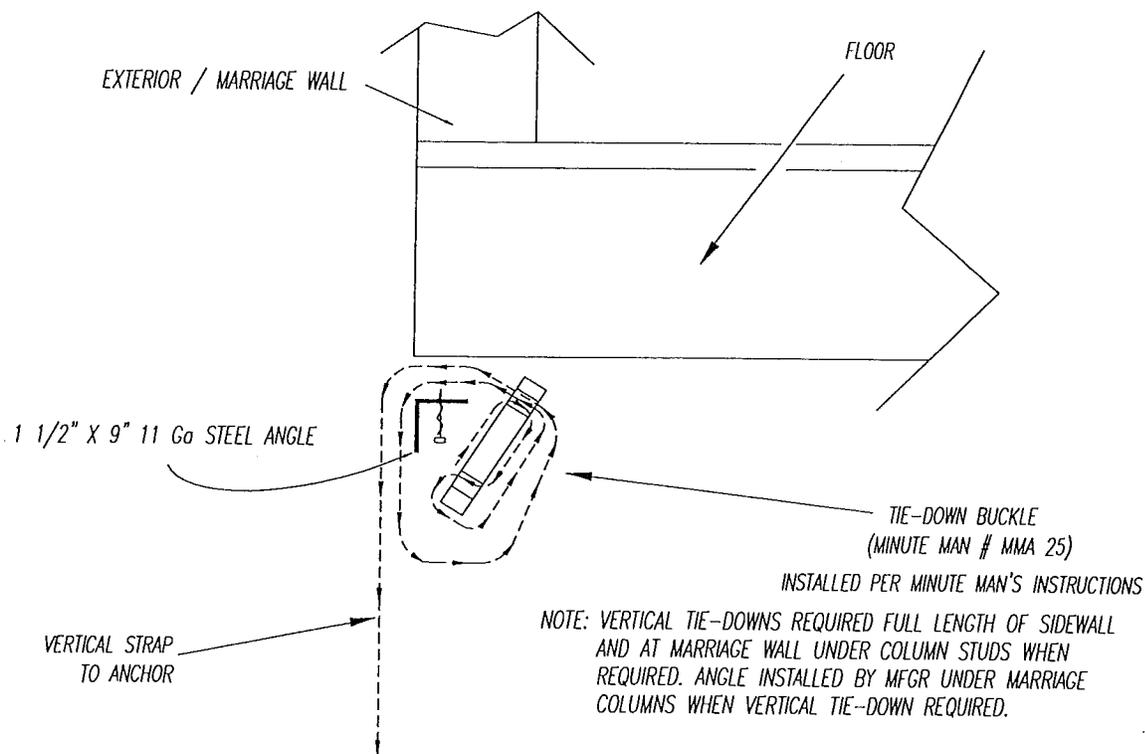
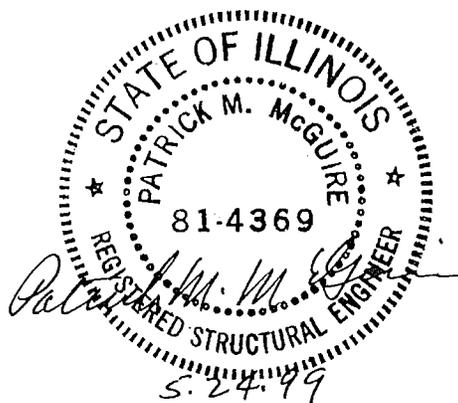
650 DH 5/8	4430 DH 5/8	36 XDH	THDH
650 DH 11/16	4430 DH 11/16	48 XDH	THDHL
650 DH 3/4	4430 DH 3/4	36 DH	
		24 BA	FCI W/S
636 DH 5/8	4442 DH 5/8	210 DH	FCII W/S
636 DH 3/4		210 PDH	BUC W/S
	4450 DH 11/16	210 JDH	SBN
4636 DH 3/4	4450 DH 3/4	100 DH	MMASD2
			MMASDA2
4430 EZDH 3/4			CT/WS CORNER TIE II
636 EZDH 3/4			
650 EZDH 3/4			MMA 31 LONGITUDINAL FRAME TIE
660 EZDH 3/4			MMA 33 LOCKING FRAME CLAMP II
6650 EZDH 3/4 W/ VERT. STABILIZER			

My analysis of the physical test reports define the breaking strength of each of these anchors and their components to be in excess of 5,000 pounds. The strapping meets Federal Specification QQ-S-781H for Type I, Class B, Grade I Strapping. The strapping also meets with ANSI 225.1 standards and ASTM D3953-91 standards. The strapping is 1 1/4 x .035 minimum, hot dip galvanized steel.

On file are testing reports of the direct withdrawal strength of these anchors. These test evaluate the anchorage strength of Minute Men Anchors installed resisting an axial and 45 degree angle applied withdrawal load. For the anchors listed on pages 10 and 11, the average holding power meets and/or exceeds the required minimum of 4,725 pounds, when installed in accordance with manufacturer instructions in the soil types and class shown.



# TIE-DOWN SUPPLIMENT



ANGLE INSTALLED BY MFGR. WILL NEED TO BE LOOSENED  
FOR STRAP AND BUCKLE INSTALLATION AND RE-TIGHTENED  
WHEN COMPLETED. STRAP AND BUCKLE SUPPLIED BY INSTALLER.

APPLICABLE TO WIND ZONE 2 ONLY

## VI. SET-UP PROCEDURES

**GENERAL.** It is important that you adhere to the following instructions and precautions in order to insure a safe and proper set and to allow the customer a safe and trouble free home. Also refer back to Sections I through IV for pre set-up requirements.

1. Remove shipping materials (double wide section) from both units. Make sure all nails and staples are removed.
2. Position one unit of the home in its final location.
3. Place a jack at the hitch end approximately 2' from the front and "rough" level this section.
4. Position a jack just forward of the front spring shackle directly under one of the two main beams of the house.
5. Position a second jack just to the rear of the spring shackle closest to the rear of the home and directly under the same beam as the first jack.
6. Lift this side of the unit using both jacks simultaneously and place a pier next to both lifting points. **IT IS IMPERATIVE BOTH JACKS LIFT THE HOME A EQUAL AMOUNT TO PREVENT DAMAGE TO THIS SECTION.**
7. Compare the spacing of the first two piers with the maximum pier spacing as allowed in Section IV. If the maximum spacing has been exceeded, place an additional pier approximately halfway between the first two piers.
8. Place an additional pier at each end of this unit approximately 10" from the front and rear. This side of the unit may now be lowered onto the piers under the first main beam of the house.
9. Lift the main beam on the other side of the unit as outlined above and "rough" level the unit by placing piers directly opposite those placed on the first side.
10. Complete the "rough" leveling by placing additional piers under both main beams at the maximum spacing.
11. Insulate around ends, floors, and ceiling line with the insulation provided in the unit. If the crossover duct for the heating system runs through the rim joist, check the gasket and alignment with the other section to insure a proper seal when both halves are mated.
12. Position the second unit along side the of the first as close as possible. Using jacks, come-a-longs or other similar devices bring the two units together to where the floors are snug.
13. Starting with the main beam nearest the first unit, place all the piers and "rough" level the second unit using the procedures as outlined in steps 3 through 10 above.

14. Align the floors of both units both end to end at the decking level. Tighten the floors together with come-a longs and lag the perimeter joist of both units together with 3/8" x 6" lag screws, toe fastened with a minimum 1 1/2" penetration of lag spaced at 58" O.C maximum for Wind Zone I and 22" O.C. maximum spacing for Wind Zone II.

15. Close the gap along the ceiling centerline by raising the outside of the second unit. It may be necessary to adjust the ceiling joint of both units by slightly racking the second unit. Lag bolt the 2x4 ridge boards at the roof peak together with 3/8" x 6" lag screws, toe fastened with a minimum 1 1/2" penetration of lag spaced at 32" O.C. for Wind Zone I and 20" O.C. for Wind Zone II.

16. Complete the "final" leveling of the units by using a standard bubble level working from front to the rear and from side to side of the units. Check the windows and doors for proper operation. It may be necessary to adjust the units slightly "off Level" for proper operation of the windows and doors.

17. Place additional piers along the marriage line and around the perimeter at the locations as required in Section IV.

18. Install the tie-down and anchoring system as described in Section V of this manual.

19. Complete the shingle application at the ridge following instructions on the shingle package shipped with the home and instructions included in Section XIII. Holes in the shingles resulting from fastening of close-up material must be sealed with a silicone or asphalt based sealant.

20. Connect and test the utility crossovers as outlined in Section VIII.

21. Install the siding, seam the carpet and install doors at the marriage line where necessary.

22. Re-caulk with a high quality, flexible sealant around all windows and doors as necessary.

## **MARRIAGE LINE TIGHT-FITTING**

The floor, endwalls and roof of doublewide units are to be tight fitting. The fastener interconnection between home sections at these areas area structural requirements and must be effectively installed. If for any reason a gap is present, it shall be filled to full depth of the framing members with ripped lumber, plywood, oriented strand board, wooden panels or equal. These fillers must be used anywhere a mechanical fastener is used. No required fastener is to "reach through air", and any that do are to be considered ineffective. The installer is to review the required fastener penetration into the intended members. The fastener may need to be lengthened by the filler thickness, unless the original fastener still fully penetrates the member.

## **PERIODIC RE-LEVELING OF HOME**

There is always the possibility that the home may settle after it has been in position for a period of time. When settling does occur, it can affect the proper operation of windows and doors. When these conditions are apparent, re-leveling of the home will give the desired results and alleviate future problems.

## VII. PROCEDURE FOR ERECTING HINGED ROOF

1. Remove close-up material.
2. Remove fasteners that hold the hinged kingpost member to fixed section of the king post. Care should be taken to not damage any lumber members or plates.
3. Using lifting jacks or similar equipment, lift roof into upright position. Care should be taken to jack the roof evenly. **DO NOT JACK ANY AREA HIGHER THAN THE OTHER OR DAMAGE WILL OCCUR.** Jacks should be placed 10' from the ends and approximately 16' between jacks. (See FIG. A)
4. You will notice that the hinged vertical member of the truss, with the 2x4 plate secured to the end of the top section of the king post will basically fall into position when the truss is raised. (See FIG. B)

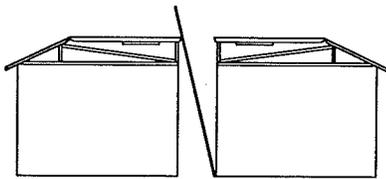


FIG A.

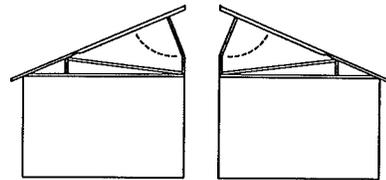


FIG B.

5. Adjust hinged vertical member so that it is in direct alignment with the vertical 2x3 lower fixed king post.
6. Remove jacks. Be sure that the hinged section is stable on the lower member.
7. Fasten (1) 1 1/2" x 12" x 30 GA. strap with (6) 8d nails or (6) 15 GA. staples each side of strap to each truss.
8. Splice fascia board with 1 x 6 x 16" long at hinged joint with 8d nails, (4) each side of connection.
9. Repeat procedure for other unit.

NOTE: Roof must be in upright position before joining units.

10. The home may now be set following the set-up procedures as outline in Section VI.
11. Complete the shingle application at the ridge following instructions on the shingle package shipped with the home and instructions included in Section VIII. (See FIG. C)
12. Complete installation of the roof edge, fascia, and soffit at hinged area.

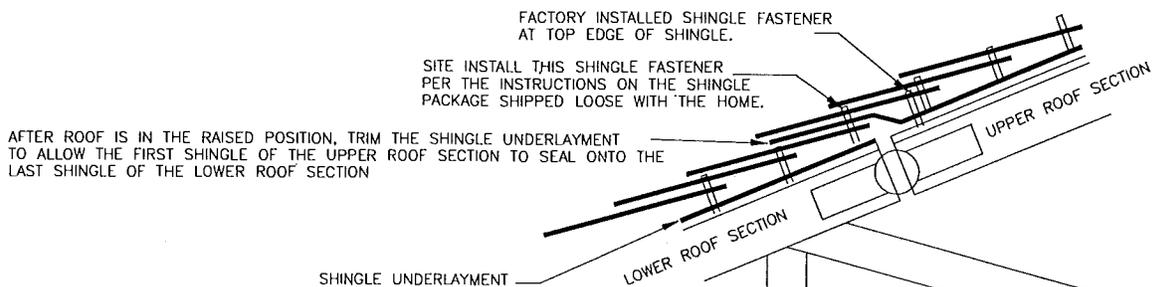
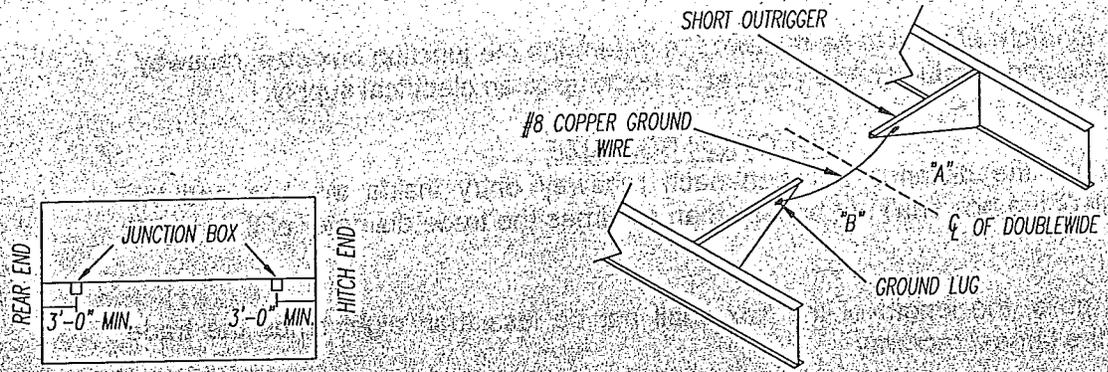
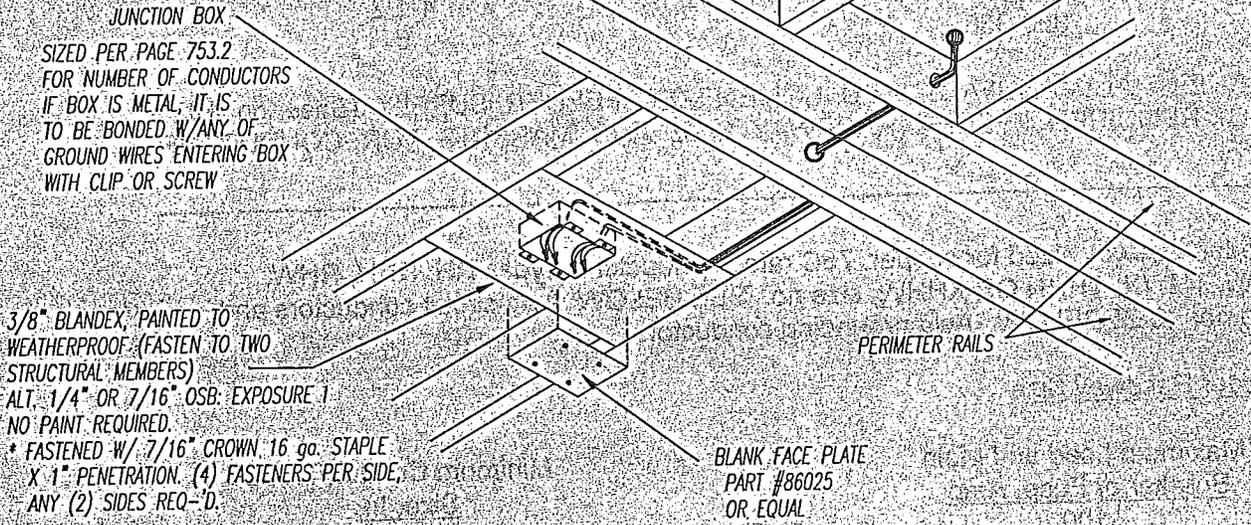


FIG. C



NOTE: JUNCTION BOXES MAY BE LOCATED AT ANY POINT ALONG MARRIAGE LINE A MIN. OF 3'-0" FROM EITHER END.

GROUNDING BETWEEN DOUBLEWIDES

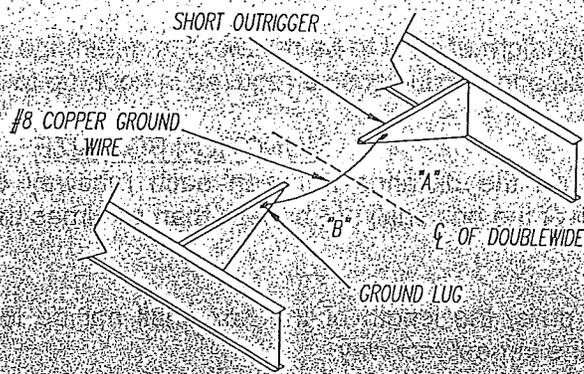
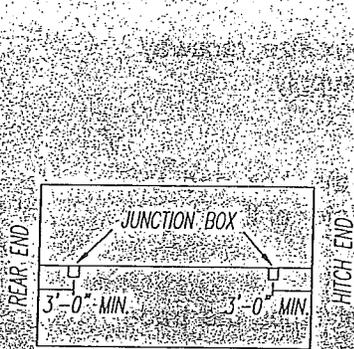


JUNCTION BOX SIZED PER PAGE 753.2 FOR NUMBER OF CONDUCTORS IF BOX IS METAL, IT IS TO BE BONDED W/ANY OF GROUND WIRES ENTERING BOX WITH CLIP OR SCREW

3/8" BLANDEX, PAINTED TO WEATHERPROOF (FASTEN TO TWO STRUCTURAL MEMBERS)  
ALT. 1/4" OR 7/16" OSB: EXPOSURE 1 NO PAINT REQUIRED.  
\* FASTENED W/ 7/16" CROWN 16 ga. STAPLE X 1" PENETRATION. (4) FASTENERS PER SIDE, ANY (2) SIDES REQ'D.

BLANK FACE PLATE PART #86025 OR EQUAL

NOTE: DRILL ON SITE 1" DIA HOLES IN CENTER OF PERIMETER RAIL OF EACH HALF (MAKE CERTAIN THAT HOLES ALIGN WITH EACH OTHER) REMOVE BLANK FACE PLATE FROM JUNCTION BOX AND FEED WIRES FROM OTHER HALF OF HOME THRU HOLES IN PERIMETER RAILS INTO JUNCTION BOX AND MAKE PROPER CONNECTIONS. REPLACE FACE PLATE AND PATCH BOTTOM BOARD PER HOME OWNER MANUAL.



NOTE: JUNCTION BOXES MAY BE LOCATED AT ANY POINT ALONG MARRIAGE LINE A MIN. OF 3'-0" FROM EITHER END.

GROUNDING BETWEEN DOUBLEWIDES

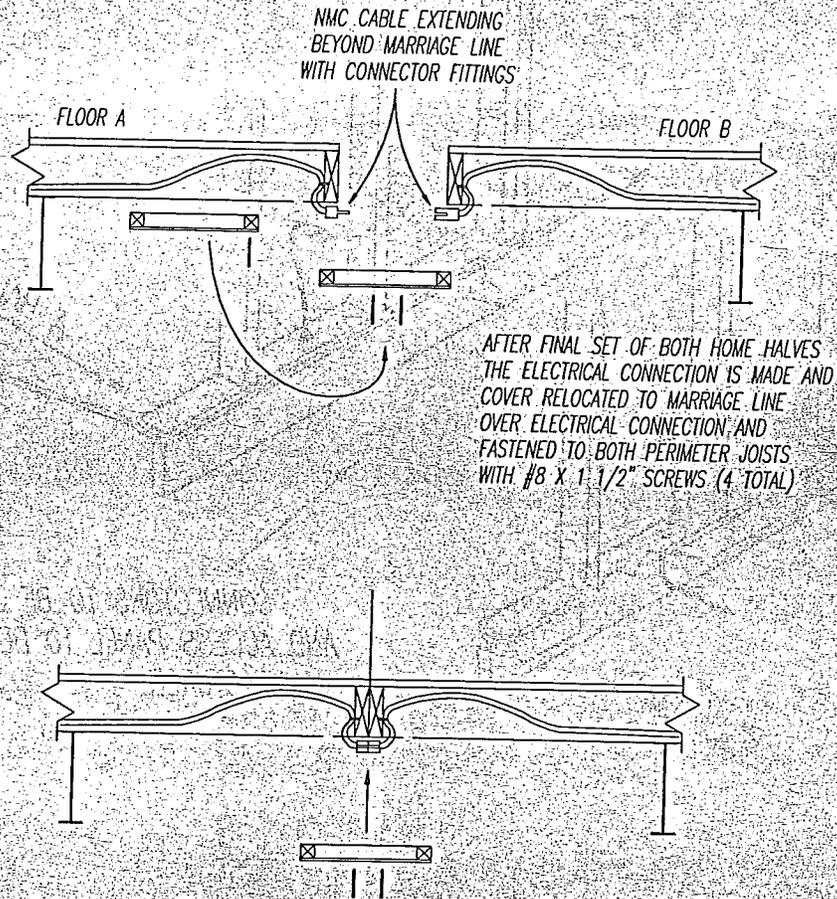
JUNCTION BOX  
SIZED PER PAGE 753.2 FOR NUMBER OF CONDUCTORS IF BOX IS METAL IT IS TO BE BONDED W/ ANY OF GROUND WIRES ENTERING BOX WITH CLIP OR SCREW

3/8" BLANDEX, PAINTED TO WEATHERPROOF (FASTEN TO TWO STRUCTURAL MEMBERS)  
ALT. 1/4" OR 7/16" OSB EXPOSURE 1 NO PAINT REQUIRED

\* FASTENED W/ 7/16" CROWN 16 ga. STAPLE X 1" PENETRATION (4) FASTENERS PER SIDE ANY (2) SIDES REQ'D

BLANK FACE PLATE PART #86025 OR EQUAL

NOTE:  
DRILL ON SITE 1" DIA HOLES IN CENTER OF PERIMETER RAIL OF EACH HALF (MAKE CERTAIN THAT HOLES ALIGN WITH EACH OTHER) REMOVE BLANK FACE PLATE FROM JUNCTION BOX AND FEED WIRES FROM OTHER HALF OF HOME THRU HOLES IN PERIMETER RAILS INTO JUNCTION BOX AND MAKE PROPER CONNECTIONS REPLACE FACE PLATE AND PATCH BOTTOM BOARD PER HOME OWNER MANUAL



NOTES:

THE CROSS-OVER COVER IS ASSEMBLED WITH 1" X 2" MINIMUM LUMBER (ANY GRADE) FRAMING AROUND PERIMETER, AND IS COVERED WITH BOTTOM BOARD MATERIAL, OR PAINTED (OR WEATHER RESISTANT) PANELING AT BOTTOM OF COVER.

INSULATION BLANKET IS NOT REQUIRED TO BE INSTALLED IN CROSS-OVER COVER.

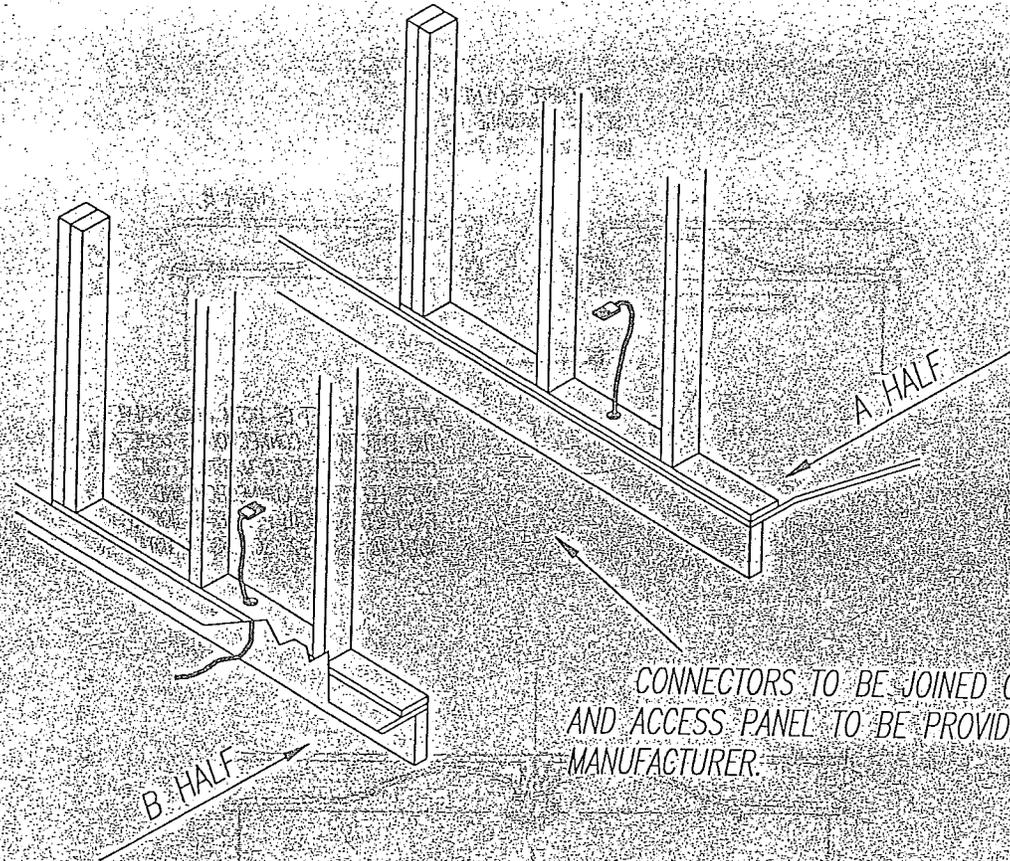
TEMPORARY PLACEMENT OF CROSS-OVER COVER IS ACCEPTABLE ON EITHER HALF OF THE HOME.

MOLEX COC-1 OR COC-2 CONNECTOR FITTINGS LISTED FOR MULTIPLE PLUG-UNPLUG APPLICATIONS ARE INTERCHANGABLE BETWEEN HALVES, AS LONG AS THE APPROPRIATE CONNECTIONS CAN BE MADE FOR SET-UP. (CIRCUIT NUMBERS ARE IDENTIFIED WHEN REQUIRED).

THE ELECTRICAL CROSS-OVER COVER WILL BE IDENTIFIED WITH "EC" MARKED ON THE COVER WITH PAINT, LABEL, OR OTHER PERMANENT MEANS OF IDENTIFICATION. CIRCUIT IDENTIFICATION IS TO BE IDENTIFIED WITH PERMANENT MARKER ON BOTH CONNECTOR ENDS.

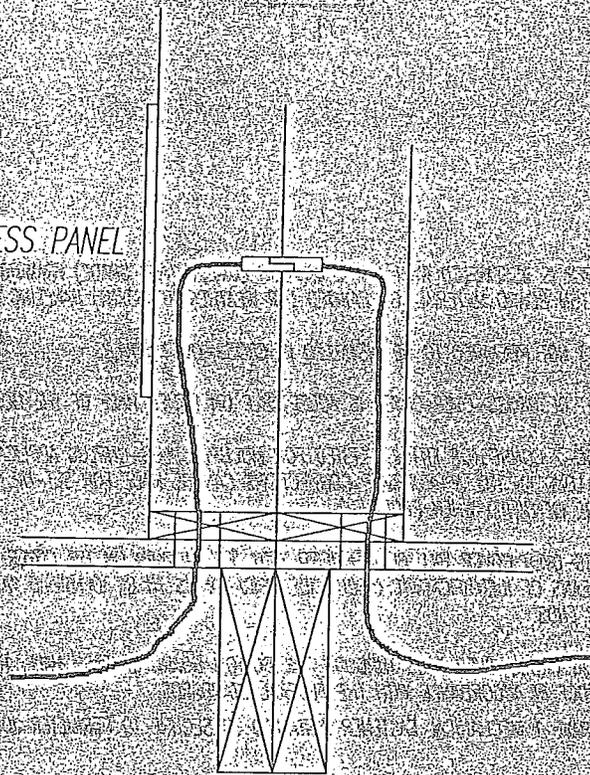
WHERE NMC CABLES AT CROSS-OVER PASS THROUGH THE BOTTOM BOARD OF EACH HALF, THE PENETRATION WILL BE MADE RODENT PROOF IN ACCORDANCE WITH THE FEDERAL STANDARDS.

CONNECTORS SHALL HAVE 1 MECHANICAL FASTENER INSTALLED TO SECURE TO PERIMETER JOIST FOR TRANSPORTATION.



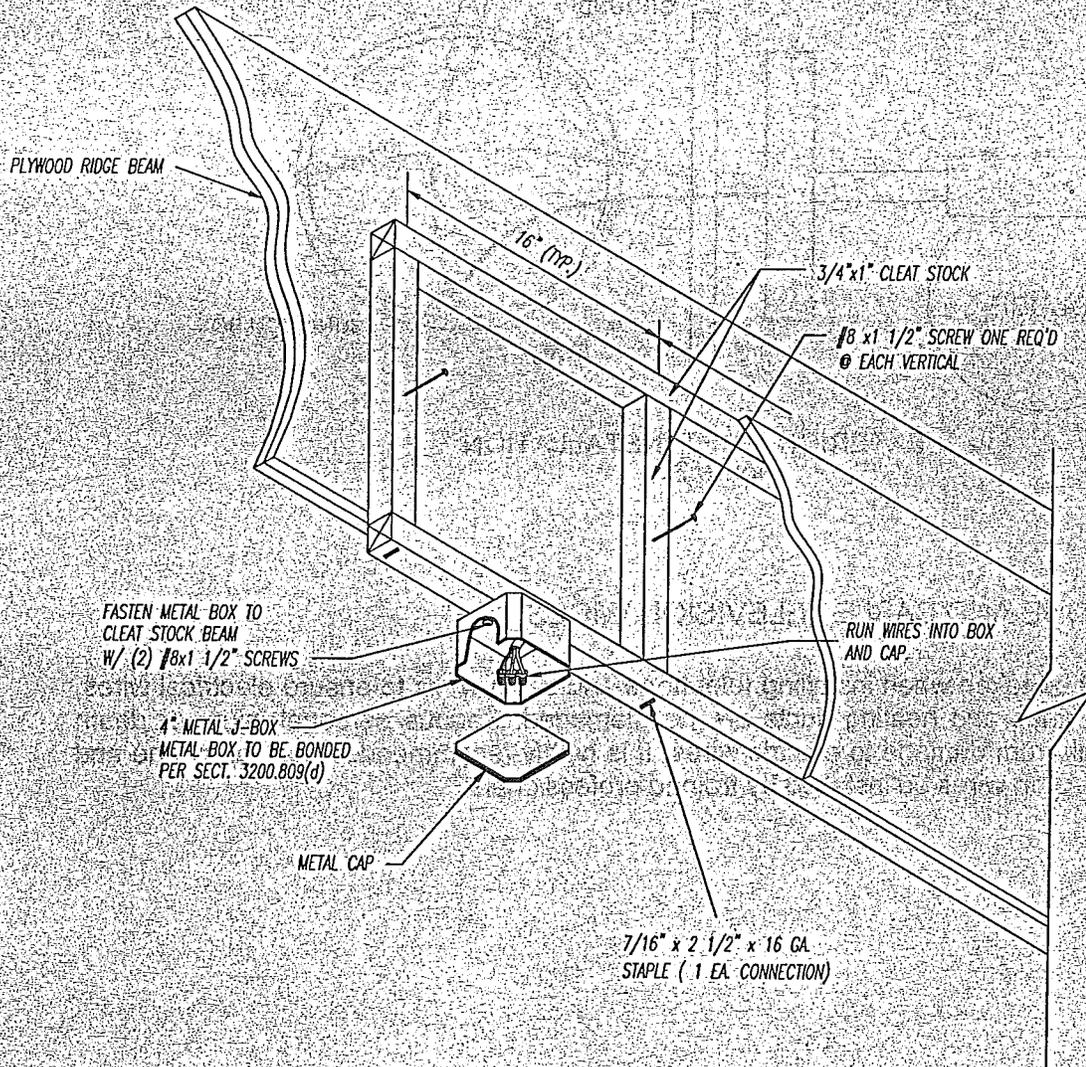
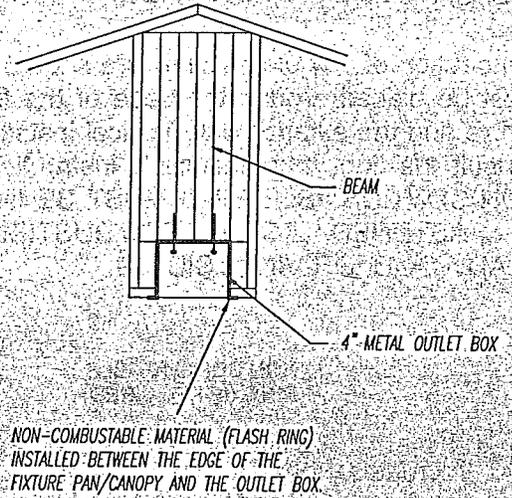
CONNECTORS TO BE JOINED ON-SITE,  
AND ACCESS PANEL TO BE PROVIDED BY  
MANUFACTURER.

ACCESS PANEL



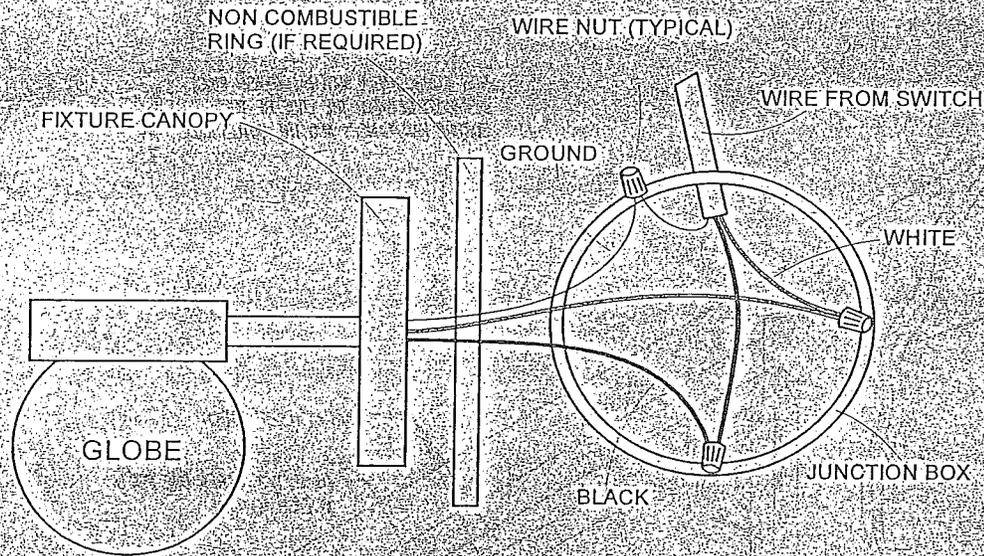
**NOTES:**

- THE OUTLET BOX MUST BE RELOCATED AND SECURED TO A STRUCTURAL MEMBER BEFORE THE FAN IS INSTALLED.
- 1.) IN ORDER TO INSURE PROPER SUPPORT, USE (4) WOOD (#8x3") SCREWS TO SECURE THE OUTLET BOX TO THE BEAM OR STRUCTURAL MEMBER.
- 2.) OUTLET BOX MUST BE ABLE TO SUPPORT A HANGING WEIGHT OF 40 LBS. MINIMUM.
- 3.) FAN SHOULD BE MOUNTED WITH AT LEAST A 6" - 4" OF BLADE CLEARANCE FROM FLOOR.
- 4.) FOLLOW INSTALLATION INSTRUCTIONS SUPPLIED WITH CEILING FAN.
- 5.) ANY FAN INSTALLED OUTSIDE OF THE HOME (PORCH CEILING) SHALL BE LISTED FOR WET LOCATIONS AND INSTALLED PER INSTRUCTIONS.



## EXTERIOR LIGHT FIXTURES

Connection of any electrical fixture should be performed by a qualified electrician. Caulk must be placed around the base of the fixture to ensure water-tight seal between the fixture and the exterior wall. Typical installation procedures are depicted below. Always consult the light manufacturer's instructions before attempting to install any fixture. A NON-COMBUSTIBLE RING MUST BE INSTALLED WITH THE LIGHT FIXTURE IF IT IS FASTENED TO A COMBUSTIBLE SURFACE SUCH AS HARDWOOD, CLADWOOD, OR VINYL SIDING.

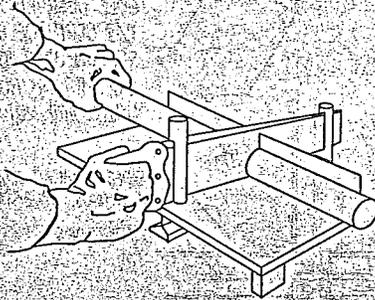


EXTERIOR LIGHT INSTALLATION  
Figure 3.1

## TELEPHONE AND CABLE TELEVISION WIRES

Care must be taken when installing telephone and cable wires to ensure electrical wires, plumbing lines and heating ducts are not damaged. Serious personal injury or death could result from damage to electric wires. It is highly recommended that telephone and cable television wires be installed by trained professionals.

## DWV PIPE SYSTEMS SOLVENT WELDING INSTRUCTIONS FOR ABS



### INSTALLATION: ABS

JOINT STRENGTH—PROPERLY JOINED, ABS PIPE AND FITTINGS PRODUCE PRESSURE TIGHT JOINTS, EITHER IN SHOP OPERATIONS OR IN THE FIELD. HOWEVER, SKILL AND KNOWLEDGE ARE REQUIRED IN ORDER TO OBTAIN GOOD QUALITY JOINTS. THE FOLLOWING INSTALLATION PROCEDURE SHALL BE UTILIZED.

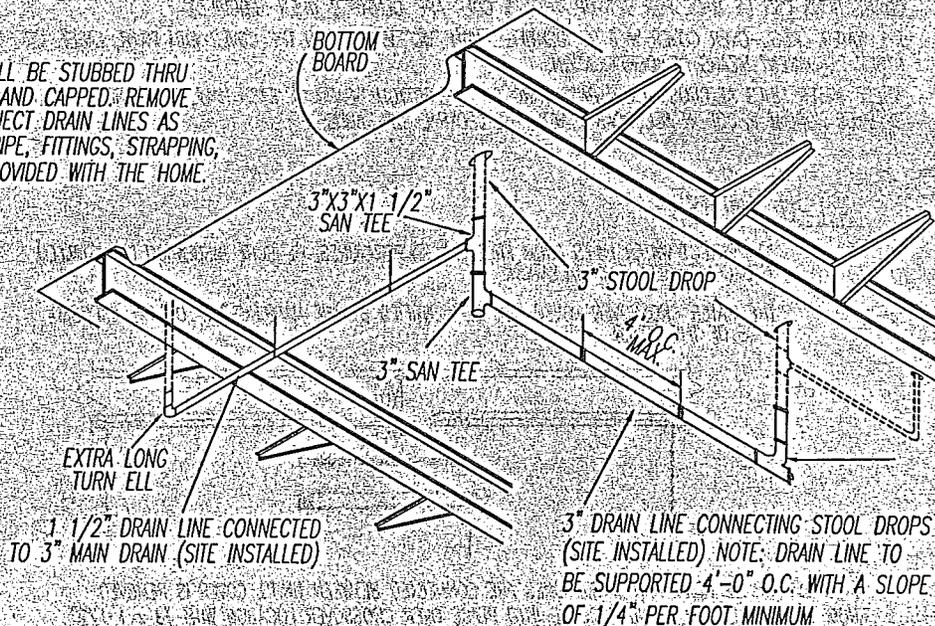
1. CUT PIPE SQUARE. USE SAW AND MITRE BOX OR PLASTIC TUBE CUTTER. REMOVE ALL BURRS FROM BOTH THE INSIDE AND OUTSIDE OF THE PIPE WITH A KNIFE, FILE OR REAMER. REMOVE DIRT, GREASE, AND MOISTURE. CHECK DRY FIT. FOR PROPER INTERFERENCE FIT, PIPE SHOULD GO EASILY INTO FITTING 1/4 TO 3/4 OF THE WAY.

2. USING A SUITABLE APPLICATOR, APPLY A MODERATE EVEN COAT OF CEMENT TO THE FITTING SOCKET. (CARE SHOULD BE TAKEN NOT TO ALLOW SOLVENT CEMENT TO PUDDLE IN FITTING SOCKET.) APPLY A LIBERAL COAT OF CEMENT TO THE PIPE EQUAL TO THE DEPTH OF THE FITTINGS SOCKET. CEMENT MUST BE APPLIED IN SUFFICIENT QUANTITIES TO FILL THE JOINT.

3. WITHOUT DELAY, ASSEMBLE WHILE CEMENT IS STILL WET. USE SUFFICIENT FORCE TO INSURE THAT PIPE BOTTOMS IN SOCKET. IF POSSIBLE, TWIST THE PIPE OR FITTING 1/8 TO 1/4 TURN AS ASSEMBLED. HOLD TOGETHER ABOUT 30 SECONDS TO MAKE SURE JOINT DOES NOT SEPARATE. WITH A RAG, WIPE OFF EXCESS CEMENT. AVOID DISTURBING THE JOINT.

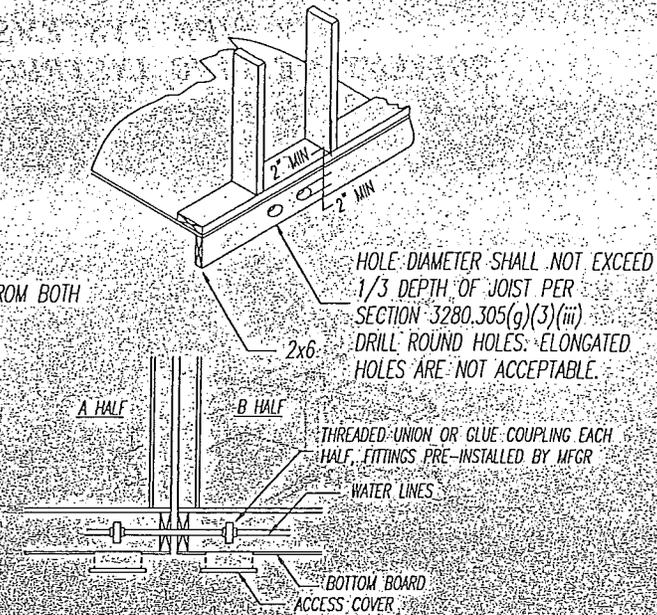
### NOTE:

1.) DRAIN LINES WILL BE STUBBED THRU BOTTOM BOARD AND CAPPED. REMOVE CAPS AND CONNECT DRAIN LINES AS SHOWN USING PIPE, FITTINGS, STRAPPING, AND CEMENT PROVIDED WITH THE HOME.



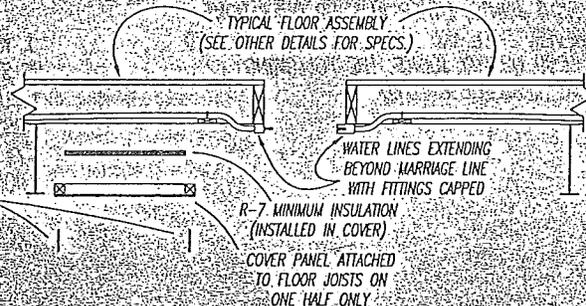
**METHOD "A"**

REMOVE BOTTOM BOARD ACCESS COVER FROM BOTH HALVES OF HOUSE. LOCATE WATER LINES AND FEED LINE THRU PRE-DRILLED HOLES IN SIDE RAIL INTO FLOOR CAVITY OF MATING HALF. MAKE UNION CONNECTIONS, CHECK FOR LEAKS AND THEN REINSTALL INSULATION AND ACCESS COVER.



**METHOD "B"**

#8 x 1 1/2" SCREWS MIN. AT EACH CORNER OF CROSS-OVER PANEL



**NOTES:**

THE CROSS-OVER COVER IS ASSEMBLED WITH 1" X 2" MINIMUM LUMBER (ANY GRADE) FRAMING AROUND PERIMETER, AND IS COVERED WITH BOTTOM BOARD MATERIAL, OR PAINTED (OR WEATHER RESISTANT) PANELING AT BOTTOM OF COVER.

R-7 MINIMUM INSULATION BLANKET IS INSTALLED WITH NO VOIDS PERMITTED AT CROSS-OVER COVER.

TEMPORARY PLACEMENT OF CROSS-OVER COVER IS ACCEPTABLE ON EITHER HALF OF THE HOME.

MALE AND FEMALE WATER LINE FITTINGS ARE INTERCHANGABLE BETWEEN HALVES, AS LONG AS THE APPROPRIATE CONNECTIONS CAN BE MADE FOR SET-UP. (HOT & COLD ARE IDENTIFIED WHEN REQUIRED).

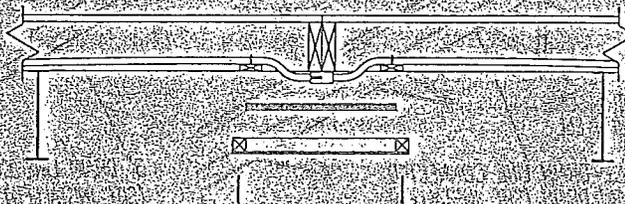
THE WATER CROSS-OVER COVER WILL BE IDENTIFIED WITH "WC" MARKED ON THE COVER WITH PAINT, LABEL, OR OTHER PERMANENT MEANS OF IDENTIFICATION.

WHERE WATER LINES AT CROSS-OVER PASS THROUGH THE BOTTOM BOARD OF EACH HALF, THE PENETRATION WILL BE MADE RODENT PROOF IN ACCORDANCE WITH THE FEDERAL STANDARDS.

**SET-UP NOTES:**

TO PROTECT WATER LINES FROM FREEZING TEMPERATURES, BE SURE INSULATION IS INSTALLED INTO COVER BEFORE INSTALLATION.

THE WATER CROSSOVER COVER CAN BE IDENTIFIED BY THE MARKING "WC" ON THE EXPOSED FACE OF THE COVER.



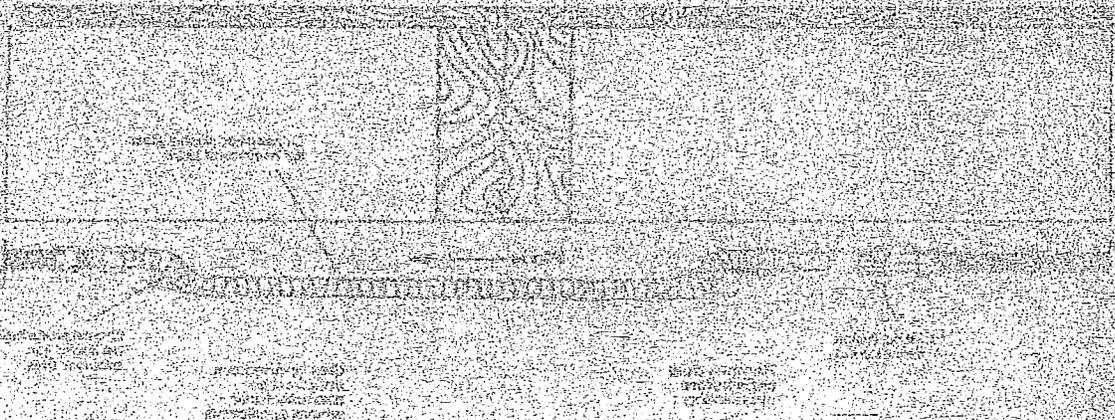
AFTER SET-UP OF HOME AND WATER LINES ARE CONNECTED BETWEEN UNITS, COVER IS REMOVED FROM SHIPPING LOCATION AND SECURED INTO PLACE OVER CROSSOVER LOCATION WITH #8 x 1 1/2" SCREWS IN EACH CORNER TO JOISTS.

## WATER CONNECTION

The hot and cold water system of your home is designed for a maximum inlet pressure of 80 psi. If you are located in an area where the local water pressure exceeds 80 psi, a pressure reducing valve must be installed to limit the pressure on the system.

The water system can be connected to any water supply through a 3/4" pipe located below the home. This pipe is usually located under the water heater compartment. A tag on the side of the home will indicate the location of this pipe. A shut-off valve must be installed, if one is not already installed, between the water supply and the inlet. The valve must be a full port gate valve or full port ball valve.

All water supply plumbing that is exposed to freezing shall have sufficient insulation wrapped around or heat tape installed on site to prevent pipes from freezing. A receptacle is located at the inlet location for the purpose of heat tape installation. The heat tape must be listed for use for manufactured homes and only installed per the instructions supplied with the heat tape.



## GAS SUPPLY SYSTEM

Gas may supply power for many home appliances such as the water heater, furnace, oven, range, heaters and others. The homeowner should never attempt to service the gas lines in his home. In most areas the local gas company will service the gas system.

The gas supply system in your home is designed for a supply pressure of between 7 and 14 inches of water column (1/4 to 1/2 psi). A regulator must be installed if the pressure is outside of this range.

The gas appliances in your home are designed to operate on natural gas. If the gas supply in your area is liquefied petroleum gas (LPG) you must consult the appliance manufacturer's instructions to determine which changes need to be made in order to a LPG gas supply.

In some cases your appliances may require a different orifice if your home is located in altitudes above 3,000 feet. Consult the appliance manufacturer's instructions before you connect your home to the gas supply system.

### WARNING

IT IS HIGHLY RECOMMENDED THAT YOUR GAS SYSTEM BE INSTALLED BY A QUALIFIED INDIVIDUAL. DO NOT LIGHT THE PILOT LIGHT ON ANY APPLIANCE THAT HAS NOT BEEN THOROUGHLY CHECKED TO INCLUDE THE INSTALLATION OF ANY VENTS AND/OR FLUES THAT MAY HAVE BEEN SHIPPED WITH THE HOME.

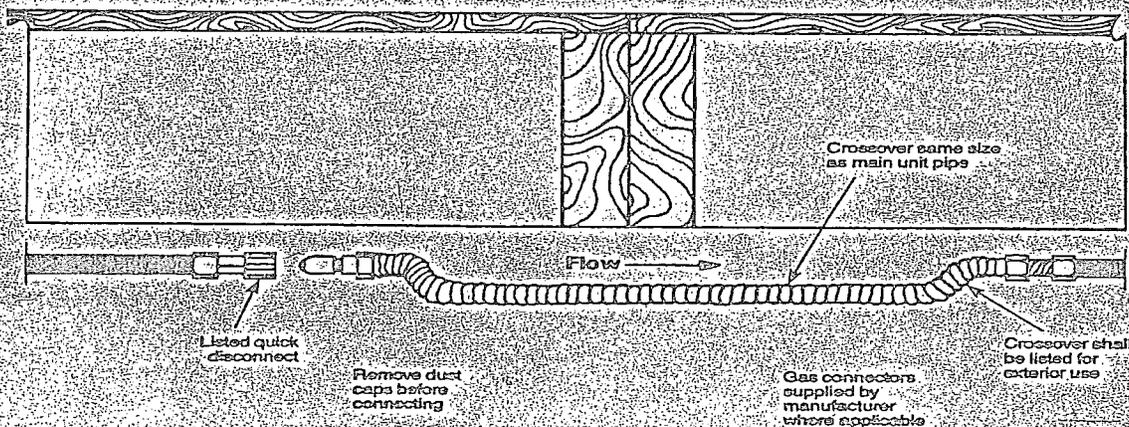
## GAS SYSTEM TESTS

Before your system is connected to your gas supply line perform the following checks.

- 1.) To check the gas system for leaks, consult your appliance manufacturer instructions to determine how to close all appliance controls and pilot light valves.
- 2.) Open the gas shut off valve to each appliance.
- 3.) Attach an ounce gauge to the main gas inlet to the home.
- 4.) Pressurize the system to not more than a maximum of 8 ounces of pressure. More than 8 ounces of pressure may damage your appliances or gas supply lines.
- 5.) Apply an ammonia free soapy water solution to the joints at the ends of the appliance connector. If bubbles form, tighten the connection and recheck the soapy water.

NOTE: DO NOT CHECK BRASS FITTINGS WITH SOAPS THAT CONTAIN AMMONIA

After completion of the above checks, have your home connected to the gas supply lines. Check the connections as described above for leaks. Ensure water heater is filled before lighting the pilot light.



TYPICAL GAS LINE CROSSOVER

## HEATING/COOLING/DUCT SYSTEM MODIFICATIONS

Sizing of the heating/cooling equipment and duct system are designed to perform only as the home was originally built in our facility. No on-site modifications have been included in the design of our installation including homes built with stairwells for a basement foundation. Any on-site modifications shall be properly reviewed by a knowledgeable heating/cooling contractor or Professional Engineer and shall meet all requirements of the FMHCSS. The Certification Sheet contains thermal information that can assist if analysis is needed. It shall be their responsibility that the modifications meet all requirements.

## MULTIPLE SECTION DUCT CROSSOVER

Patriot Homes, Inc. utilizes either an "in-floor" duct connection or an exterior flex duct on multiple section homes. The in-floor connection is complete from our facility and joins when the home sections are mated. There will be two or three points where the duct penetrates through the marriage floor perimeter joist and a fiberglass gasket is applied to one of the mating home sections to form a seal. The installer shall inspect these crossover points and verify they are in alignment and that the gasket has not been damaged during the home installation. Inspect the seal effectiveness after the home sections have been mated.

For homes that utilize an exterior flex duct the following information shall be followed.

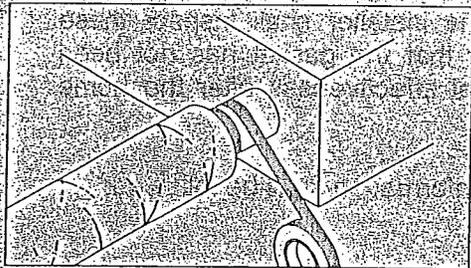
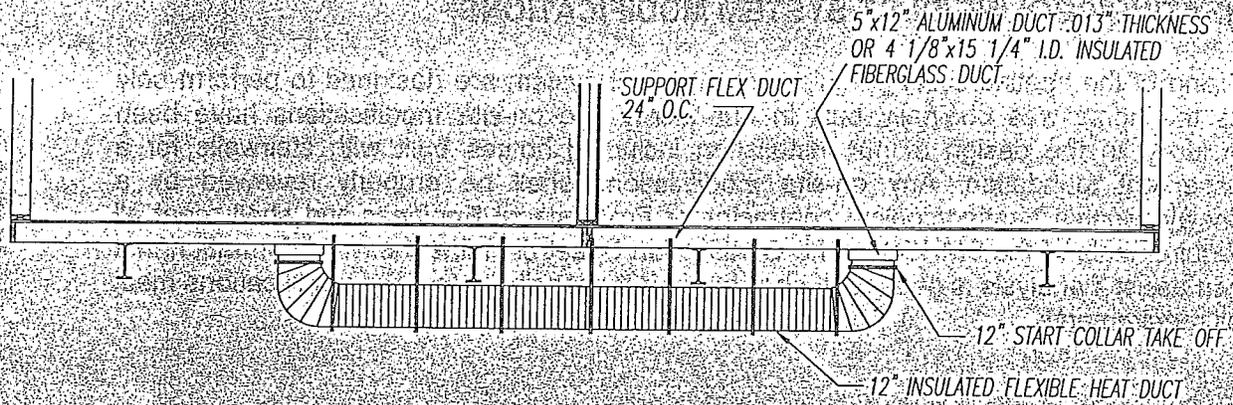


FIGURE A

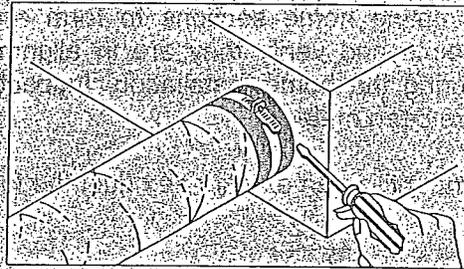


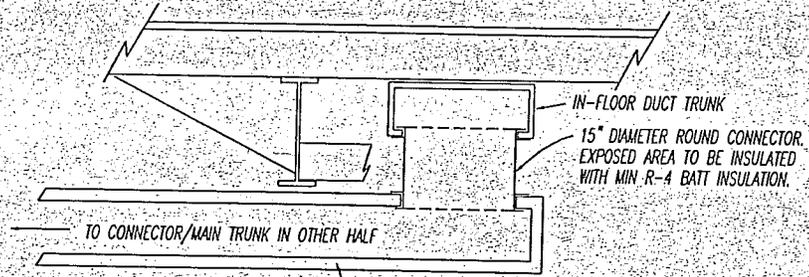
FIGURE B

INSTALLATION INSTRUCTIONS:

- 1.) AFTER DESIRED LENGTH IS DETERMINED, CUT COMPLETELY AROUND & THROUGH DUCT WITH KNIFE OR SCISSORS, SO ONLY THE HELIX WIRE REMAINS. CUT WIRE WITH SNIPS OR SIDE CUTTERS.
- 2.) PEEL BACK JACKET & INSULATION FROM CORE. SLIDE AT LEAST 3" OF CORE OVER COLLAR PIPE OR FITTING & TAPE WITH AT LEAST 2 WRAPS OF DUCT TAPE. (SEE FIGURE A)
- 3.) PULL JACKET & INSULATION BACK OVER CORE. TAPE JACKET WITH 2 WRAPS OF DUCT TAPE. SECURE WITH 1/2" MIN. METAL BAND CLAMP (SEE FIGURE B)

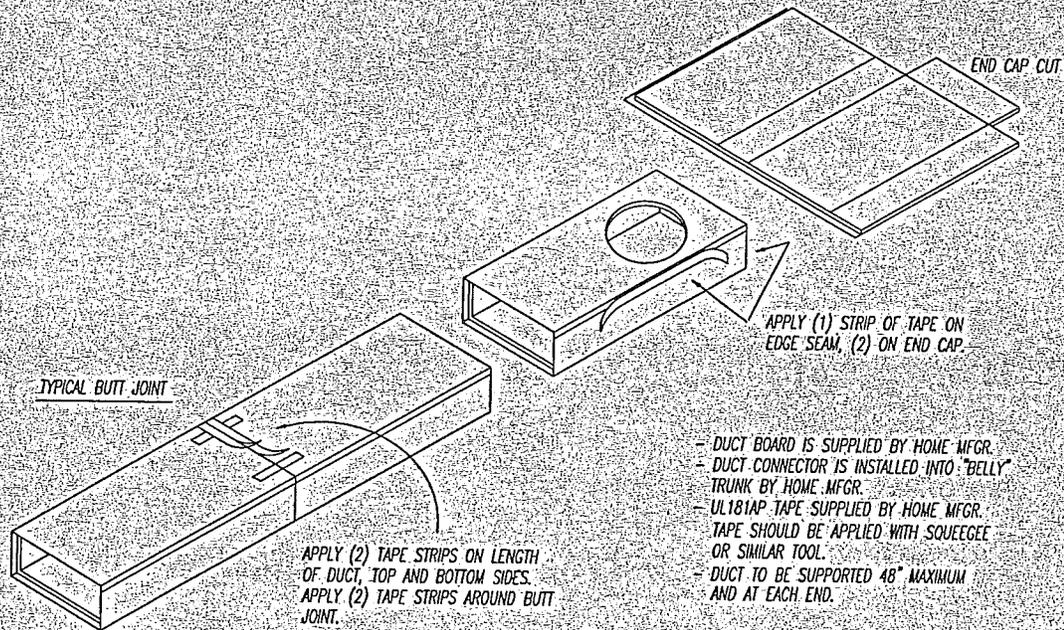
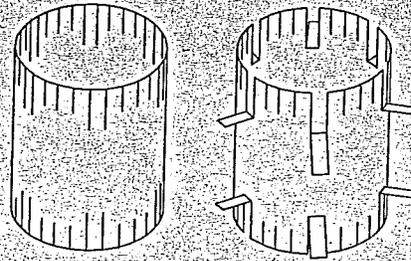
SPLICING TWO LENGTHS:

INSERT PROPER DIAMETER STEEL (28 GA. MIN.) COUPLING INTO END OF EACH DUCT AT LEAST 2". LEAVING A MINIMUM OF 2" SPACE BETWEEN DUCT SECTIONS. PERFORM THE ABOVE PROCEDURE ON END OF END DUCT STARTING THE TAPE FROM THE COUPLING END. REPEAT PROCEDURE ON END OF SECOND DUCT.



8" X 22" FIBERGLASS DUCT (R-4.3, 1" WALL)  
FABRICATED ON-SITE BY BUILDER/DEALER

15" DIAMETER GALV DUCT CONNECTOR.  
EVERY FIFTH DEEP SLOT FORMS THE OUTER FLANGE.  
ALL OTHERS FORM THE INNER FLANGE WITH  
THE DUCT WALLS SANDWICHED BETWEEN.  
CONNECTOR SLIT FOR 1" ON ONE END AND 13/16"  
ON OTHER TO PROPERLY FIT DUCT WALLS.  
CONNECTOR INSTALLED AT PLANT AND LOCATED  
TO CORRESPOND WITH DUCT CAPACITY CALCULATIONS.



TYPICAL BUTT JOINT

END CAP CUT

APPLY (1) STRIP OF TAPE ON  
EDGE SEAM, (2) ON END CAP.

APPLY (2) TAPE STRIPS ON LENGTH  
OF DUCT, TOP AND BOTTOM SIDES.  
APPLY (2) TAPE STRIPS AROUND BUTT  
JOINT.

- DUCT BOARD IS SUPPLIED BY HOME MFR.
- DUCT CONNECTOR IS INSTALLED INTO "BELLY" TRUNK BY HOME MFR.
- UL181AP TAPE SUPPLIED BY HOME MFR. TAPE SHOULD BE APPLIED WITH SQUEEGEE OR SIMILAR TOOL.
- DUCT TO BE SUPPORTED 48" MAXIMUM AND AT EACH END.

THIS DUCT TO BE INSTALLED ONLY WITH CRAWLSPACE OR BASEMENT FOUNDATIONS.

1954

1954

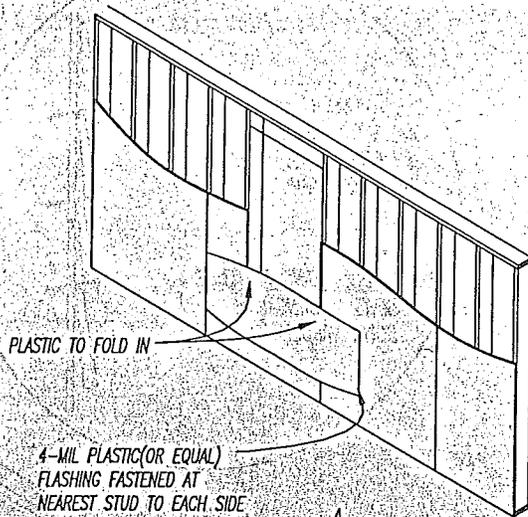
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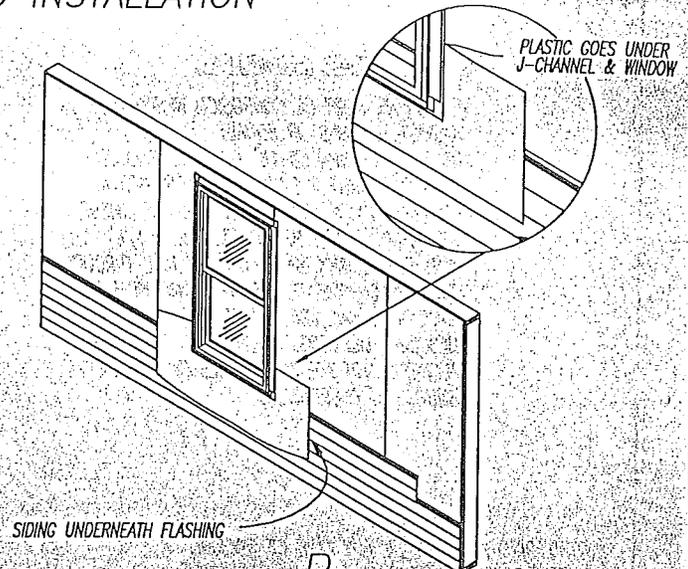
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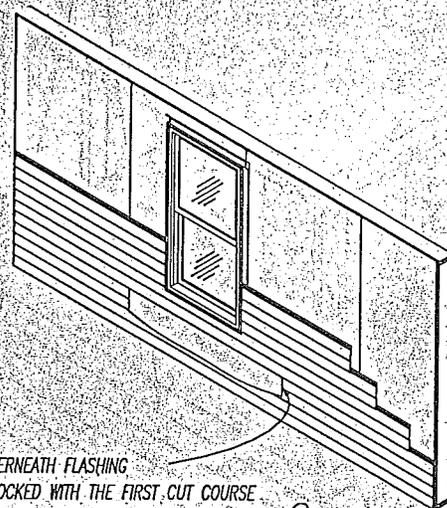
# IX. SIDING INSTALLATION



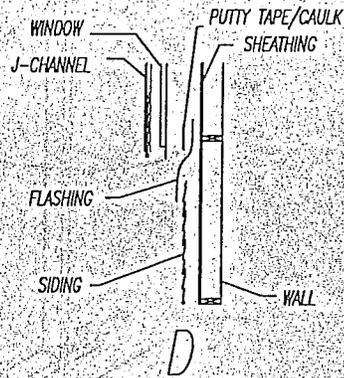
A



B



C



D

EXTERIOR SHEATHING TO BE ANY THICKNESS OSB / PLYWOOD WITH EXTERIOR GLUES OR A WATER RESISTANT FACED SHEATHING MATERIAL

NON-OSB/PLYWOOD SHEATHING MATERIALS TO BE FASTENED WITH MIN 7/16" CROWN X 16 ga X 1" PENETRATION INTO FRAMING AT 6" PERIMETER AND 12" FIELD. EDGE JOINTS MAY BE STITCH STAPLED WITH 1 1/4" CROWN X 16 ga X 1" PENETRATION AT 6" OC MAX.

ANY JOINTS IN SHEATHING UNDER OR WITHIN 6" OF SIDE OF OPENING TO BE CAULKED AT SHEATHING JOINTS UNDER OPENING WITH ACRYLIC LATEX CAULK OR EQUAL TO PREVENT ENTRY OF ELEMENTS INTO SIDEWALL CAVITY

E

**NOTE:**

1. DETAILS A THRU D ARE REQUIRED ONLY WHEN EXTERIOR SHEATHING IS NOT MOISTURE RESISTIVE SUCH AS A PAPER OR WOOD PRODUCT THAT IS NOT MFG'D WITH EXTERIOR GLUES. REFER TO DETAIL E FOR ACCEPTABLE SHEATHINGS WHEN FLASHING AS ILLUSTRATED IN A THRU D IS NOT REQUIRED.
2. WINDOW DRAWN FOR CLARITY. DOORS OR ANY OTHER OPENINGS IN VINYL EXTERIOR TO BE FLASHED AS ILLUSTRATED OR CAULKED TO PREVENT ENTRY OF ELEMENTS.
3. FLASHING TO EXTEND MINIMUM 2" ABOVE BOTTOM EDGE OF J-CHANNEL WHEN REQUIRED.
4. J-CHANNEL MAY BE "INTEGRAL" WITH FRAMEWORK OF WINDOW OR DOOR. EXPOSED LEG OF INTEGRAL J-CHANNEL TO BE 1/2" MINIMUM.

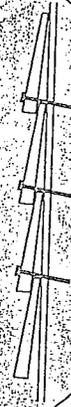
THIS DETAIL APPLIES TO ALL VINYL SIDING APPLICATIONS.

**FASTENING REQUIREMENTS**

FASTENERS MUST BE CORROSION RESISTANT GALVANIZED NAILS OR EQUAL. NAILS TO BE SPACED 16" O.C. AND SHOULD PENETRATE INTO A STUD, BLOCK OR INTO A COMBINATION OF WOOD SHEATHING AND THESE MEMBERS 1 1/2". PENETRATION IS 1 1/4" WITH RING SHANK NAILS. DO NOT NAIL THROUGH TWO OVERLAPPING PIECES OF SIDING WITH THE SAME NAIL. NAIL JOINTS INTO THE STUDS OR BLOCKING MEMBERS. NAILING INTO SHEATHING ALONE IS NOT ADEQUATE. NAILS SHOULD BE SNUG, NOT OVERDRIVEN.

RECOMMEND 1" OVERLAP. ONE SIDING OR BOX NAIL PER BEARING, JUST ABOVE THE 1" OVERLAP.

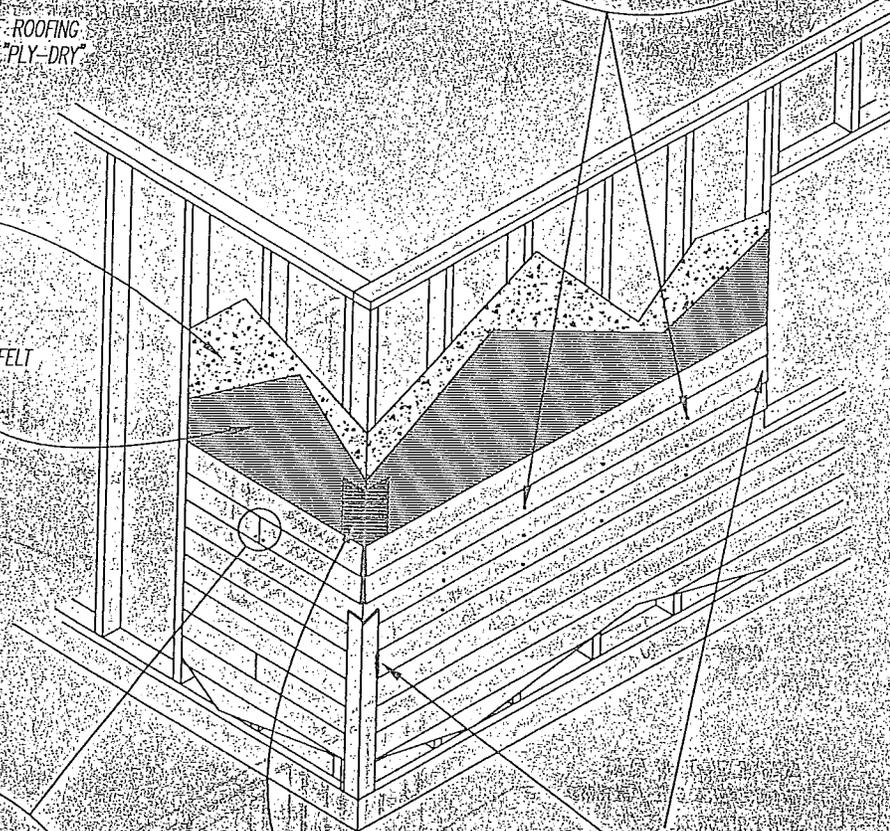
ACCEPTABLE SIDING PATTERNS  
BEVEL / BUNGALOW  
DOLLY VARDEN



BUILDING FELT MAY BE ANY TYPE OF ROOFING FELT APPROVED PRODUCT SUCH AS PLY-DRY

TYPICAL WOOD OR FOAM SHEATHING UNDERLAYMENT AT MFG. OPTION

BUILDING FELT



CORNER APPLICATIONS ALSO GET CAULKED. CORNER MAY BE APPLIED OVER SIDING OR SIDING ABUTS TO CORNER EDGE.

ADDITIONAL LAYER OF BUILDING FELT TO ALL OUTSIDE OR INSIDE CORNER APPLICATIONS.

NOTE: ALL SIDING TO BE WEATHER PROOFED WITH EITHER PAINT, STAIN, OR A CLEAR WATER REPELLENT.

ALL BUTT JOINTS TO BE LOCATED ON A STUD, AND CAULKED.

ACCEPTABLE CAULKS ARE LATEX-SILICONE BLENDS, POLYURETHANE AND POLY SULFIDE. DO NOT USE 100% SILICONE CAULKS.

## X. DRYWALL FINISHING

### Blue Nailed Drywall Finishing Procedures

#### First Coat (Flat joints, Inside corners, Fasteners, Bead & Trim)

##### Step 1 (Flat joints)

**Fiberglass Mesh Tape** (fig.1) apply tape centered over the joints and press in place using a 4"-5" joint knife. Apply compound over the tape using sufficient pressure to force the compound through the tape into firm contact with the gypsum board. **Paper Tape** (fig. 2) start with butt joints. Apply an even, thin coat of joint compound for the length of the joint with a 5" finishing knife. Center and lightly press tape into wet joint compound with fingers. Draw 5" knife firmly along joint to tightly embed tape. Be sure there is sufficient joint compound under tape to prevent blistering of the tape. While embedding the tape, (fig 3) remove excess joint compound from edge and apply as a thin coat over the tape. To finish tapered joints, follow same steps as butt joints. Tape should overlap tape applied to butt joints (fig. 4).

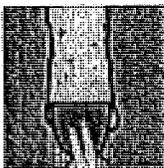


Fig. 1



Fig. 2

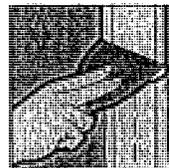


Fig. 3

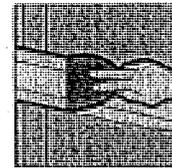


Fig. 4

##### Step 2 (Inside corners)

**Fiberglass Mesh Tape** (fig.5) fold the tape in half lengthwise and push the tape into the corner; unfold against the drywall and press in place using an inside-corner trowel. Apply joint compound as in step 1 (fig. 6).

**Caution:** It is difficult to fold fiberglass tape to achieve a straight interior corner. The use of paper tape in corners is recommended. **Paper Tape** (fig. 7) Use a 5" joint finishing knife to apply thin layer of joint compound on both sides of corner. Extend compound slightly beyond area to be covered by tape. Fold tape along center crease and lightly press into position with your fingers. Tightly embed tape as with other joints (fig. 8).

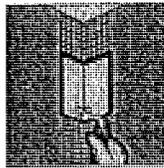


Fig. 5

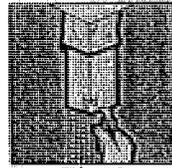


Fig. 6

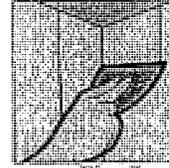


Fig. 7

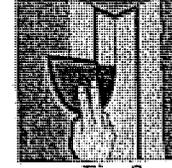


Fig. 8

##### Step 3 (Fasteners)

For each fastener depression, apply joint compound with 5" knife. Holding the blade almost flush with the panel, draw the joint compound across a fastener head and the dimple surrounding it (fig. 9). Then raise the knife blade to a more upright position and scrape off excess with a second stroke at a right angle to the first stroke. Compound should be level with panel surface (fig. 10). **Tip:** To determine if fasteners are properly seated prior to finishing, draw clean knife over each fastener. If metallic ring occurs, drive fastener below surface, being careful not to break paper (fig. 11).

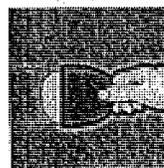


Fig. 9



Fig. 10

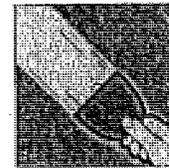


Fig. 11

##### Step 4 (Bead and Trim)

**Paper-Faced Metal Corner Bead and Trim (Tape On)** To apply follow step 2 (paper tape). After inside corner is applied, using a 6" taping knife, apply a coat of joint compound to both sides of the corner. Keep this coat as smooth as possible, feathering it out 5"-6" on each side. Let dry. Sand sides lightly where necessary (fig. 12).

**Metal Corner Bead and Trim** apply joint compound with 8" knife onto one flange of corner bead. Work down the entire length of the bead. Hold knife at 45 degree angle and smooth compound - one edge of knife riding the metal, the other on the surface of the panel. Compound should extend onto panel a minimum of 4". Repeat application for other flange (fig. 13). Tip: After filling first flange, the metal corner edge may have some lumps of joint compound. To remove, run 8" blade up the bead while also moving it to the side (fig. 14).

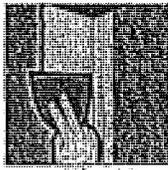


Fig. 12

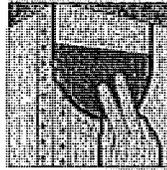


Fig. 13

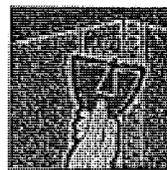


Fig. 14

**Important:** Allow the first coat to set completely and to dry as much as possible before proceeding to second coat.

### **Second Coat** (Flat joints, Inside corners, Fasteners, Bead & Trim)

#### **Step 5** (Flat joints and Fasteners)

Scrape off bumps, ridges, and other imperfections with knife. Be careful not to damage surface of the gypsum board. Apply lightweight joint compound to tapered joints using an 8" knife the length of the joint (fig. 15). Apply pressure to knife edge farthest from the joint and lift the other edge just slightly above the surface. Draw knife down the joint. Repeat for the opposite edge. This technique is called feathering. Joint compound should extend beyond first coat for a total width of 7" or 8". Apply a 7"-8" coat of joint compound to each side of butt joints and feather. Compound should extend beyond first coat for a total minimum width of 14" (fig. 16). Apply a second coat to fasteners in the same manner as first coat (fig. 17).

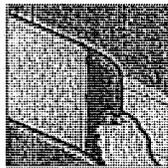


Fig. 15

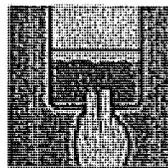


Fig. 16

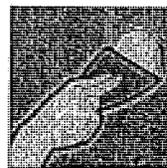


Fig. 17

#### **Step 6** (Inside Corner and Outside Bead and Trim)

Apply lightweight joint compound on one side of inside corner using a 5" knife for the length of the corner. Scrape off any compound that laps onto the second side. Feather out beyond first coat and allow to dry. After first side is dry, apply compound on the other side of inside corner and feather (fig. 18). Apply second coat of lightweight joint compound to outside bead and trim with 8" knife, feathering slightly beyond first coat (fig. 19).

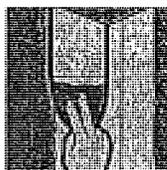


Fig. 18

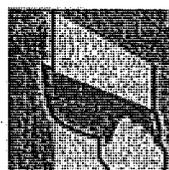


Fig. 19

**Important:** Allow the second coat to set completely and to dry as much as possible before proceeding to third coat.

### **Third Coat** (Flat joints, Inside corners, Fasteners, Bead & Trim)

#### **Step 7** (Flat joints, Fasteners, Inside corners & Outside Bead & Trim)

Apply a thin finishing coat of lightweight joint compound with a 12" knife to the flat joints and a 5" knife to the fastener heads. Press knife firmly so joint compound fills depressions but does not significantly add to thickness. Feather edges at least 2" beyond second coat (fig. 20). Before applying the final coat, check to see if tapered joints are level with surface. Hold the 10" blade across the joint, straight out from the wall. If the blade can be rocked across the joint, the joint is crowned. It must be hidden by feathering the final coat out as far as possible (fig. 21). When applying earlier coats, minor depressions and grooves were not a problem. However, **Do Not** leave any during the application of this final coat or they will mar the finished surface (fig. 22). Apply third coat of lightweight joint compound to outside corners and metal trim with 10" knife, feathering slightly beyond second coat (fig. 23).

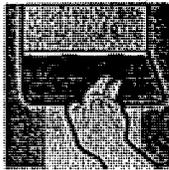


Fig. 20

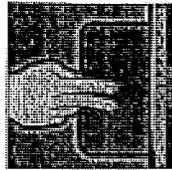


Fig. 21

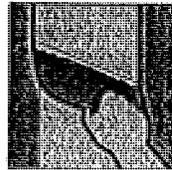


Fig. 22

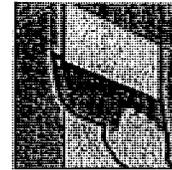


Fig. 23

## Final Steps (Sanding, Storage & Cleanup, Priming & Painting)

### Step 8 (Sanding)

Allow third coat to dry. **Dry Sanding**, lightly sand imperfections in finished joints, corners and over fastener heads. Carefully remove sanding dust with damp sponge (fig. 24). **Tip:** use a fine-grit sand screen in a tool designed for drywall sanding so you don't dig into the joint compound. Avoid roughening the surface paper when sanding. If you do roughen it by accident, repair the damage by applying a little joint compound with a 5" knife. **Wet Sanding**, when only minimal sanding is needed, try wet sanding with a sponge. It eliminates dust and does not scuff the surface paper. Use a small-celled polyurethane sponge similar in appearance to carpet padding. Saturate sponge and wring to prevent dripping. Rub joints to remove high spots, using as few strokes as possible. Clean the sponge frequently during use (fig. 25).

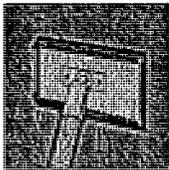


Fig. 24

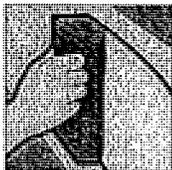


Fig. 25

### Step 9 (Storage & Cleanup)

Before storing unused joint compound, clean sides and lid of container so no dried compound falls into mixture. Level joint compound surface with knife and cover container tightly. If storing for a long time, cover surface of joint compound with approximately 1/2" of clean water and cover container. **Do Not** store in direct sunlight or where freezing conditions may occur. Pour off water before using stored joint compound. Clean tools with warm, soapy water.

### Step 10 (Priming & Painting)

Prior to painting, apply a flat latex paint as a prime coat. Follow the manufacturer's recommendations. For best results, use airless spray equipment. Closely follow equipment manufacturer's instructions and all safety precautions. After prime coat is dry, apply a good quality interior paint. Follow the recommendations on the container.

### Tips for Successful Finishing

- Drywall should be clean of foreign material (such as drywall dust) prior to application of tape and joint compound. Tape and joint compound applied over dusty surfaces will not adhere adequately to the drywall paper. This can result in joint cracking and tape delamination.
- Mix joint compound according to bag and/or pail directions. Joint compound consistency greatly affects the joint strength of the finished system. Overthinning of the joint compound can cause joint cracking.
- The set time of the joint compound is affected by mix consistency, mixing time, and water temperature. A loose initial mix of the joint compound and/or the use of cold water will lengthen set time. A heavier initial mix and/or the use of hot water will shorten the joint compound set time. Excessive drill-mixing of joint compounds will also reduce the set time.
- Push joint compound through mesh tape. Inadequate contact of the compound to the drywall surface will result in cracking of the joint or delamination of tape from the drywall.
- Joint compound should be allowed to set prior to force drying with fans or heaters. Force drying of the joint compound prior to set will result in strength loss, delayed shrinkage, and starved appearance at the joint.
- Keep application tools clean. Small pieces of dry compound can dislodge from the tools and prevent smooth application of the compound.
- Keep mixing equipment clean. Set compound from previous batches of material will accelerate the setting action of the new batch. This will reduce working time available and can lead to wasted material.

# XI. RIDGE VENT INSTALLATION



2529 LINCOLNWAY WEST, MISHAWAKA IN 456544

## COR-A-VENT V-300 3 PLY INSTALLATION INSTRUCTIONS

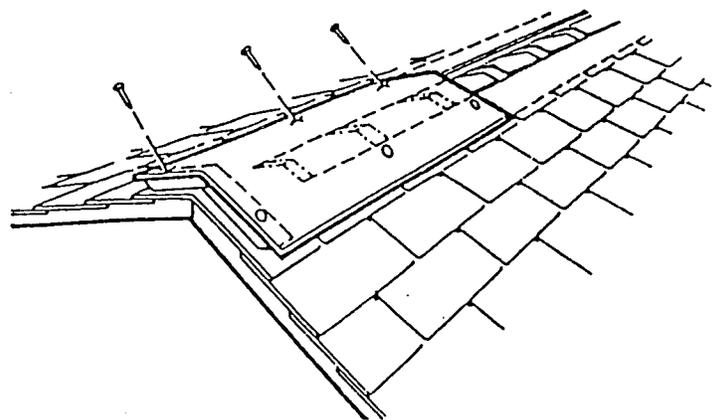
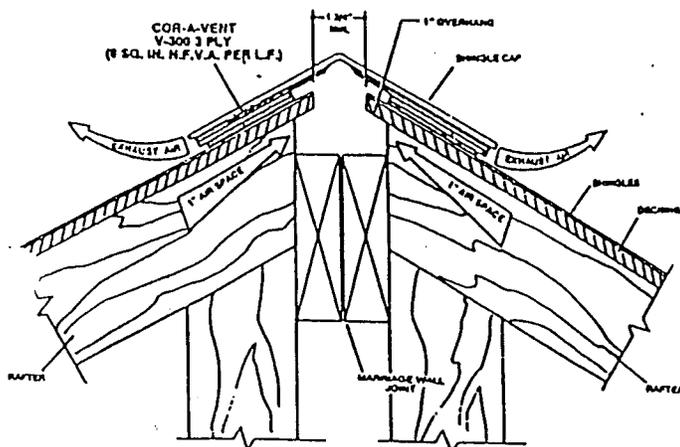
### DETERMINING VENTILATION REQUIREMENTS

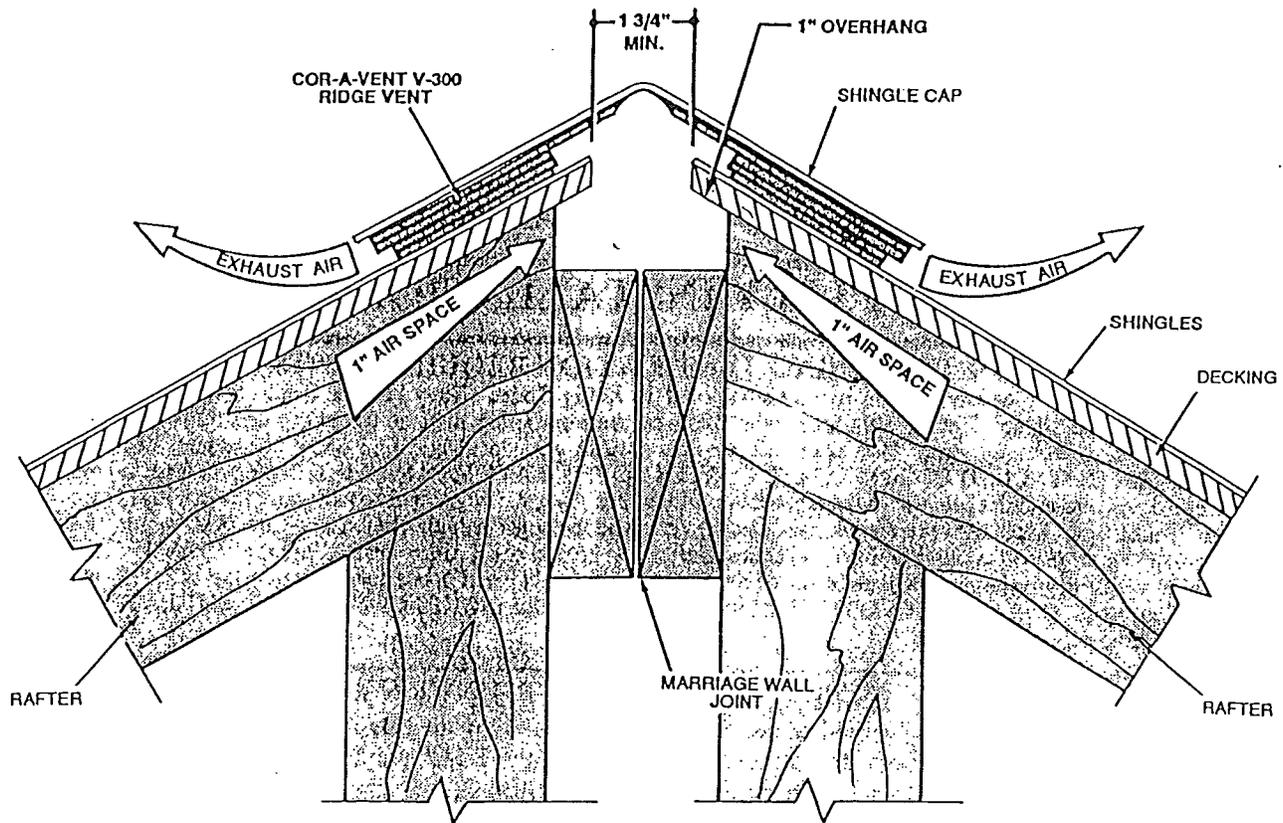
Ventilation requirements for roof cavities are based on National Building Codes. They call for a ratio of 1:300, i.e., 1 square foot of ventilation for every 300 square feet of attic area, with 50% of the ventilating area at the eaves and 50% at the ridge. **NOTE:** Interpretation of these codes may vary. For exact information consult your local building code department. **THE RIDGE VENT MUST ALWAYS BE INSTALLED IN COMBINATION WITH SOFFIT/EAVE VENTS!** If the ridge vent were to be installed alone, then part of it could serve as an inlet because of the air pressure differences along the ridge. This could cause weather infiltration. The air passageway or "Ventilation Chute" between the inlet (soffit/eave) vents and the outlet (ridge) vent must not be blocked or restricted. Should this condition exist, then the ridge vent could function as without soffit/eave vents and could cause weather infiltration. **CALCULATION RULE:** Intake (soffit/eave) vents may be larger in square inches of Net Free Vent Area (N.F.V.A.), but never less than the N.F.V.A. of the exhaust provided by the ridge vent. COR-A-VENT V-300 3 PLY PROVIDES 9 SQUARE INCHES OF NET FREE VENTILATION PER LINEAL FOOT OF VENT USED.

### INSTALLATION OF THE VENT

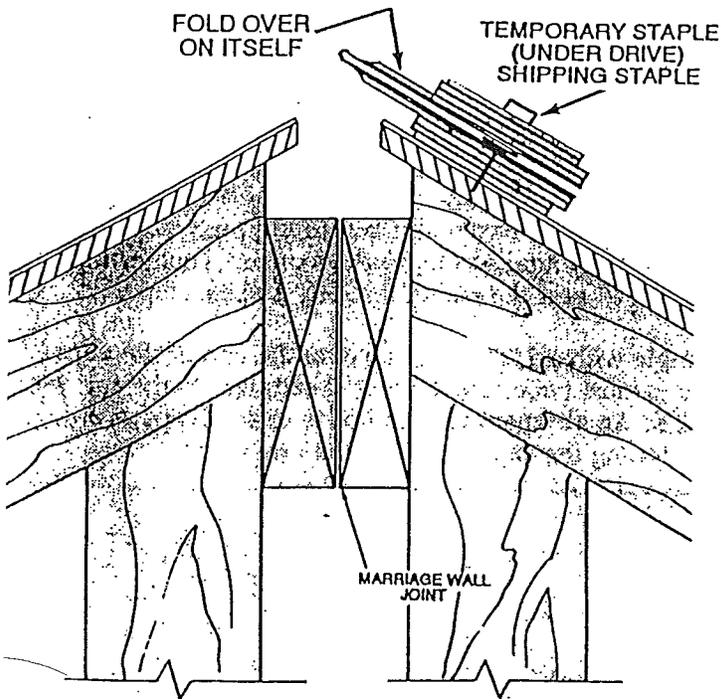
Please read all instructions before installing the ridge vent.

- STEP 1.** If the slot has not been factory cut, snap a chalk line 1 1/2" each side of the center line of the ridge. Cut back plywood and or shingles to this line. Stop slot 6" short of where the vent will start. If slot has been cut at the factory it may be necessary to install the last course or two of shingles. Trim last course of shingles flush with slot. Do not cover-up slot with shingles. Run shingle caps up to the slot on both ends. **NOTE:** See step 4 for an alternate cap method.
- STEP 2.** Caulk the end of the ridge vent to prevent weather and insects from entering. Use a good grade roof cement or caulking. The folded end cap detail may also be used (see back side of this brochure).
- STEP 3.** On roof pitches less than 3/12 a bead of caulk should be placed on the outside bottom edge of the Cor-A-Vent between the ridge vent and the shingles. Starting 6" beyond the end of the slot at one end of the roof, center the first piece of Cor-A-Vent on the ridge and attach it where it is marked "Nail" with 1 3/4" nails or staples. Make sure vent is aligned at the same pitch as the roof. Fasten firmly but do not over drive fastener. Fasteners must penetrate the roof sheathing. Failure to penetrate the roof sheathing will void the warranty. It is very important that the Cor-A-Vent be fastened down at the indicated nail points. Fasten the remaining pieces of Cor-A-Vent in the same manner, butting each piece tightly against the previous one and centering on the ridge. Let the last piece of Cor-A-Vent run 6" past the end of the slot. Repeat step 2 at this end of the ridge.
- STEP 4.** Cap the ridge vent by starting the first cap shingle with a 1/2" overhang over the end of the vent and centered on the ridge. The nails or fasteners must penetrate the roof sheathing. Failure to do so could cause cap shingles to blow off. **NOTE:** An alternate cap method is to start caps at one end of the roof and run them to the other end, letting the caps step over the ridge vent.

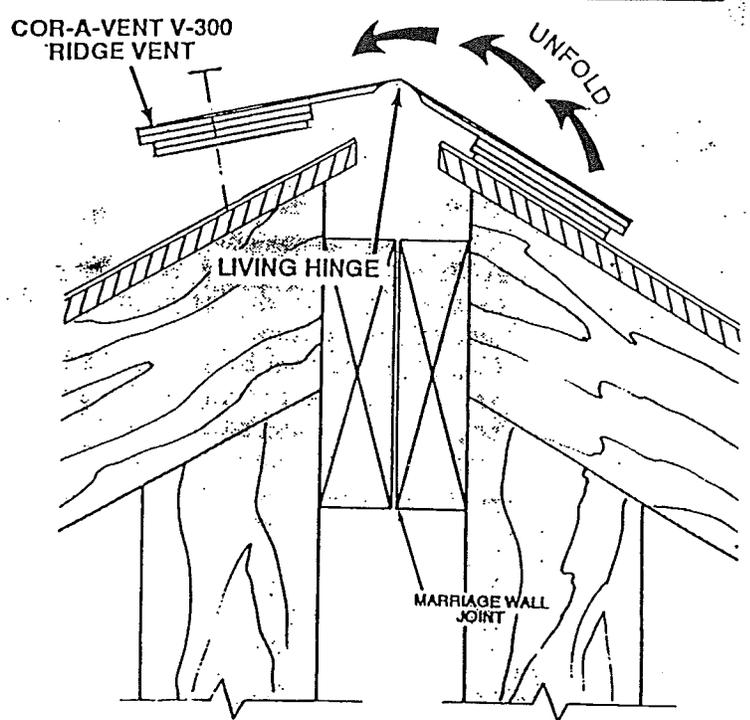




**COR-A-VENT V-300 RIDGE VENT  
FOR MANUFACTURED HOUSING  
INSTALLED MODE**



**DETAIL NO. 1  
ALTERNATE SHIPPING MODE**

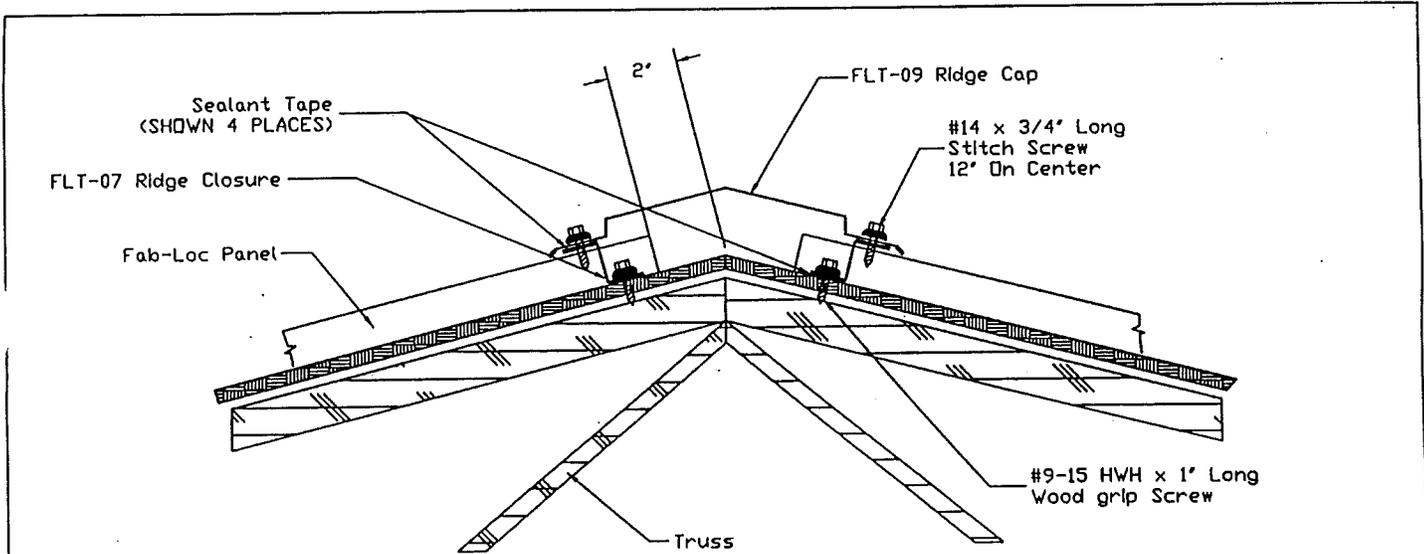


**DETAIL NO. 2  
FIELD INSTALLATION**

# FABLOC METAL ROOF RIDGE CAP

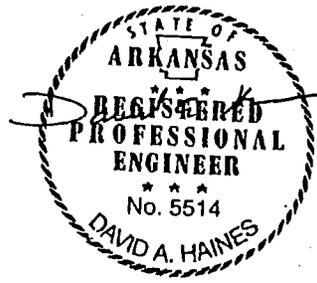
The following detail shall be utilized for installation information on the ridge cap/closure for homes that have the optional Fabloc metal roof.

The installer shall review the information and install the ridge only as shown. The fasteners and sealants shall only be used to ensure a weather tight fit.



**Installation Procedure:**

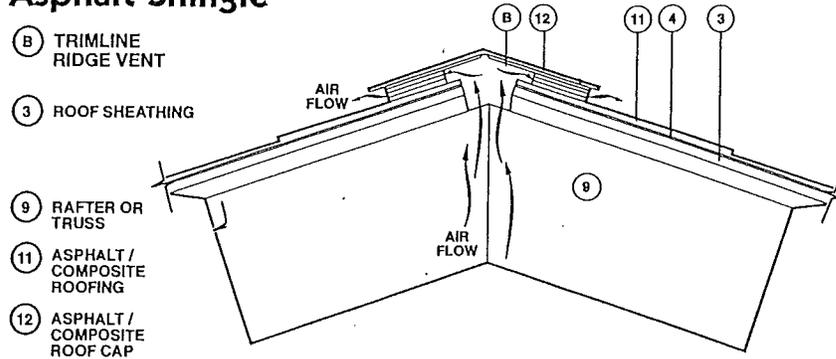
1. Insure that all panels are placed properly, insuring that panels end 2' down from the ridge.
2. Begin the ridge cap installation by installing a bead of 7/8" wide sealant tape 3" down from the ridge across all panels. Insure that the sealant tape follows the panel's contour.
3. Place the metal Z ridge closure FLT-07 on top of the sealant tape and fasten into place using two (2) #9-15 x 1' long wood grip screws per panel.
4. After all Z closures have been installed, place a second layer of 7/8" wide sealant tape on the top of the closure. Sealant tape should extend the entire length of the house.
5. Place the ridge cap FLT-09 over the metal Z closures and fasten to the closure using a #14 x 3/4" long stitch screw placed every 12" on each side of the ridge. Ridge cap trims should be end lapped a minimum of 3'.



2	CHANGED INSTALLATION INSTRUCTIONS	12/17/97		
1	Redesign Ridge Cap	6/18/97		
Rev.	Revision Notes	Checked By	Approved By - Date	Project No.
				Date
				Signature
				Scale
	Designed By	Checked By	Approved By - Date	Project No.
	D. Haines			4/24/97
	ABWEL, Inc.	Fab-Loc Installation		Sheet
		Ridge Cap Detail		1 of 2
				Sheet
				1 of 2

# Ridge Vent Installations

## Asphalt Shingle

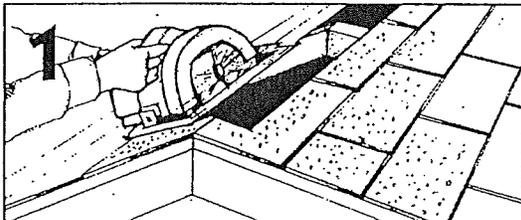


For 5/8" thick Trimline® and Rigid Roll™ (12.5 square inches net free air per foot)

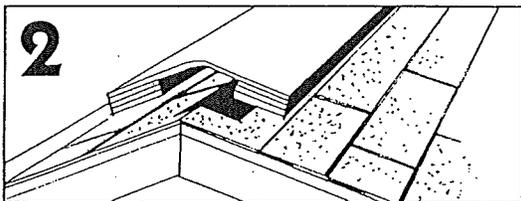
1" thick Trimline™ (19 square inches net free air per foot)

## Ridge Preparation and Installation Instructions

The amount of ventilation is controlled by the length of slot cut along the roof ridge. See "Determining Your Ventilation Needs". Remember, for a very attractive roof line, it is recommended that the Trimline® ridge vent be installed along the entire ridge of the roof.

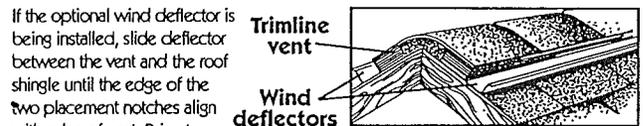
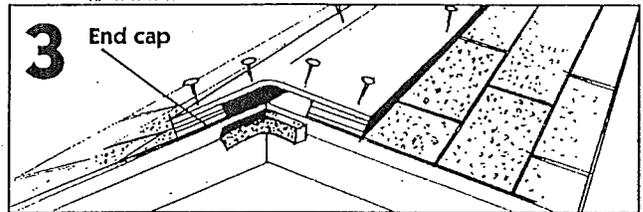


1 The slot may be pre-cut on a new roof before shingle installation or as in a retrofit, the slot can be cut from the pre-shingled roof using a circular saw with a carbide tip blade. (Protective eye goggles should be worn during this process.) Cut a 3-1/2" wide slot (1-3/4" on each side) of the ridge(s). If installing 7" Trimline the slot should be 3" wide (1 1/2" on each side). A minimum of 6 inches must be left uncut on each end of the ridge. Once the slot is cut and any overlapping shingles covering the ridge are trimmed and removed, the ridge is ready for vent installation.

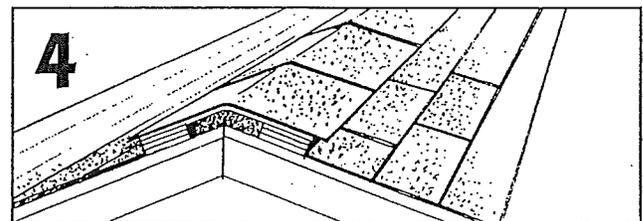


2 Place the Trimline vent (or roll out the Rigid Roll), routed side down along entire length of slot also covering the 6" minimum uncut ridge on both ends. Multiple lengths of vent can be joined by butting them tightly together.

3 Pull apart a 3" or 5 1/4" pre-cut section of the foam endcap. Using construction adhesive or sealant caulk, insert the endcap into the end of the vent. (See illustration #3.) Using four 2" galvanized roofing nails, attach vent to the roof deck by driving a nail in each of the two corners on both ends of the vent. If the 96" or longer vent is being installed, drive two additional nails, one on each side of the vent, spaced every 4 ft. On the ends of the ridge, drive two nails through the vent and foam endcap to hold foam in place. For the fastest installation, it is recommended that a coil nail gun be used to install the low profile 5/8 inch thick ridge vents.



If the optional wind deflector is being installed, slide deflector between the vent and the roof shingle until the edge of the two placement notches align with edge of vent. Drive two additional 2" roofing nails on each side of vent to hold the deflector in place. If the 96" or longer vent is being installed, then repeat this process along the entire length of the vent.



4 After the vents have been installed, cut ridge shingles, preform, and nail with roofing nails in a common overlapping pattern. Nails should be approximately 5" apart and long enough to penetrate the wood roof deck at least 1/2 inch. Repeat this procedure until vents have been installed over all roof ridges. It is important when installing this vent that you maintain the pitch of the roof. The vent has been installed properly if the bottom of the vent is flat on the roof and the peak is slightly rounded.

**Testing** Trimline® ridge vents, when used with wind deflectors, can withstand wind speeds up to 100 MPH with rainfall of 8.8" per hour with NO RAIN INFILTRATION. Without wind deflectors, the vent had leakage at 50 MPH wind speed with 8.8" per hour rainfall, the lowest wind speed tested on a 3/12 pitch roof.

Testing was done by Construction Research Laboratory of Miami, Florida, which is accredited by the AAMA, ICBO, Metro Dade County, city of Los Angeles and the state of New York, Division of Housing and Community Renewal. Additional testing was conducted by Architectural Testing, Inc (ATI). ATI is recognized or accredited by the AAMA, ICBO, Metro Dade County and the Standards Council of Canada.

- FM Certified
- BOCA Evaluation Services, Inc., Research Report No.97-97



# DESIGN 1 SHUTTERS FOR WOOD-FRAME BUILDINGS

One of the best ways to protect a home from damage in wind storms is to install shutters over all large windows and glass doors. Shutters protect doors and windows from wind-borne objects. They also prevent damage caused by sudden pressure changes when a window or door is broken.

This design guide from APA – *The Engineered Wood Association* describes how to construct structural panel shutters for attachment to wood-frame buildings. It also includes basic design considerations for all structural panel shutters. Additional designs from APA provide details for shutters that can be attached to masonry or concrete block buildings.

## Design Considerations

### General

Most building codes currently do not include provisions for storm shutters. For those codes that do, or have had provisions in the past, the design requirements for these shutters generally call for a deflection of less than the shutter span (in inches) divided by 30 (for instance, a 40-inch span should not bend more than

40/30 = 1.33 inches when the wind blows). They also should bend less than 2 inches maximum and should remain at least one inch away from the window when under full wind force.

The easiest designs are those that simply cover the opening with a wood structural panel. In wood-frame construction, panels can be nailed over the openings when a

hurricane approaches. Buildings made with concrete blocks, however, require advance preparation.

In some cases, stiffeners may be necessary to limit deflection of the shutter against the glass. Stiffeners function best if the 2 x 4s are on the outside of the shutter and oriented with the narrow edge against the shutter.

TABLE 1  
MAXIMUM SPAN WITHOUT STIFFENERS

APA Panel Span Rating	Approximate Weight (lb./ft. <sup>2</sup> )	Maximum Shutter Span	Approximate Deflection (in.) at 120 mph Design Wind Speed at 15-ft. Height
32/16	1.5	30	0.5
40/20	2	36	0.5
48/24	2.4	48	0.9
48 oc	3.6	72	1.5

TABLE 2  
ESTIMATED DEFLECTION AT 120 MPH DESIGN WIND SPEED AT 15-FT. HEIGHT FOR SHUTTERS WITH 2 X 4s AT 16 INCHES o.c.

APA Panel Span Rating	Approximate Weight (lb./ft. <sup>2</sup> )	Shutter Span (in.)							
		24	36	48	60	72	84	96	
32/16	2.5	0.2	0.2	0.3	0.4	0.5	0.8	-	
40/20	2.9	0.1	0.1	0.2	0.2	0.4	0.7	1.1	
48/24	3.4	-	-	0.1	0.2	0.3	0.6	1.0	
48 oc	4.6	-	-	0.1	0.1	0.3	0.5	0.9	

*This APA hurricane shutter design is based on pressures associated with a design fastest-mile wind speed of 120 mph. Building codes are currently being reviewed for possible changes. Before constructing shutters, therefore, it is important to check with your local building department for an update on current code requirements.*

**Note:** The shutter design shown herein will provide significant protection from hurricane-force winds. This publication contains recommendations to serve as a guide only. It does not include all possible shutter, anchor and fastening systems, and the installer must adjust all dimensions to compensate for particular installations and hardware used. These shutter designs by no means represent all possible workable designs and can always be upgraded to provide even greater margins of safety and protection. All shutter designs herein are intended to be temporary, and mounted and removed from outside the building. All designs are based on wind pressure capacities only.

While the design wind pressures used are based on ASCE 7-95, the building owner/installer must still carefully evaluate each system and then, if necessary, make any modifications consistent with good design and building practices.

### Steps to Constructing Shutters

1. Review Tables 1 and 2 in the Design Considerations section to determine if stiffeners are needed. Attach stiffener as shown in Figure 2.

2. Cut APA wood structural panels with adequate edge overlap to receive nails. Orient long panel axis (strength axis) of the panel as shown in Figure 2.

3. Use a long brad or finishing nail to locate the framing behind the wood siding. The nails used to attach the shims and the shutters must hit the framing to be fully effective.

4. Nail shims to the framing with 12d nails. Use 16d nails for shims over 3/4 inch thick. For spans up to 5 feet, space the nails 6 inches o.c. at each shim. For spans over 5 feet, space nails 4 inches o.c. at each shim. (Figures 3a and 3b)

5. Attach the shutters with double-headed nails for ease of later removal. (Figures 3a and 3b) Use 12d nails for shutters up to 3/4 inch thick and 16d nails for shutters over 3/4 inch thick. For spans up to 5 feet, space the nails 6 inches o.c. at each end of the shutter panel. For spans over 5 feet, space nails 4 inches o.c. at each end of the shutter

FIGURE 1

### SHUTTER STIFFENER ATTACHMENT – IF REQUIRED

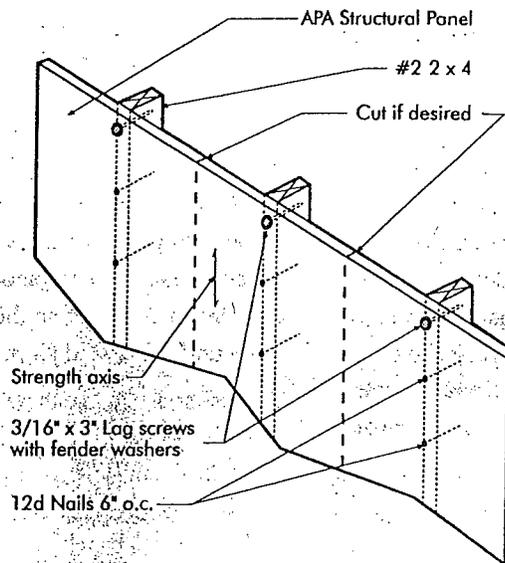


FIGURE 2

### SHUTTER ATTACHMENT – VIEW FROM OUTSIDE

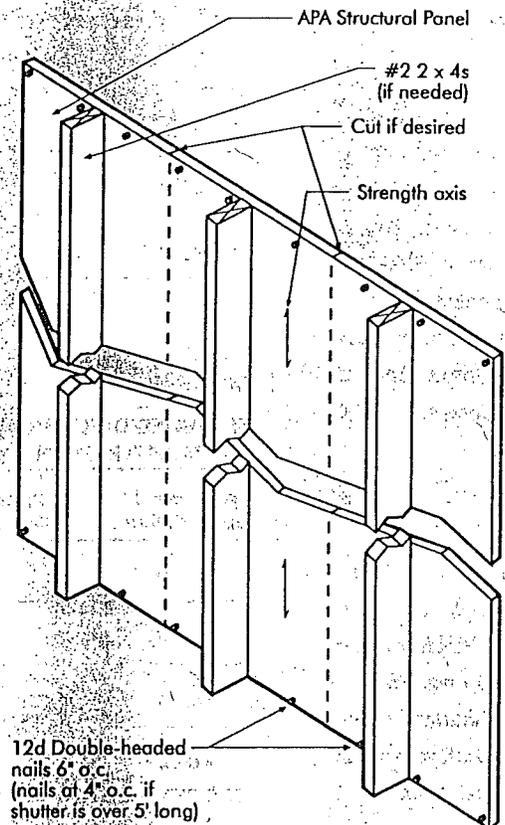


FIGURE 3A

SHUTTER ATTACHMENT - TOP

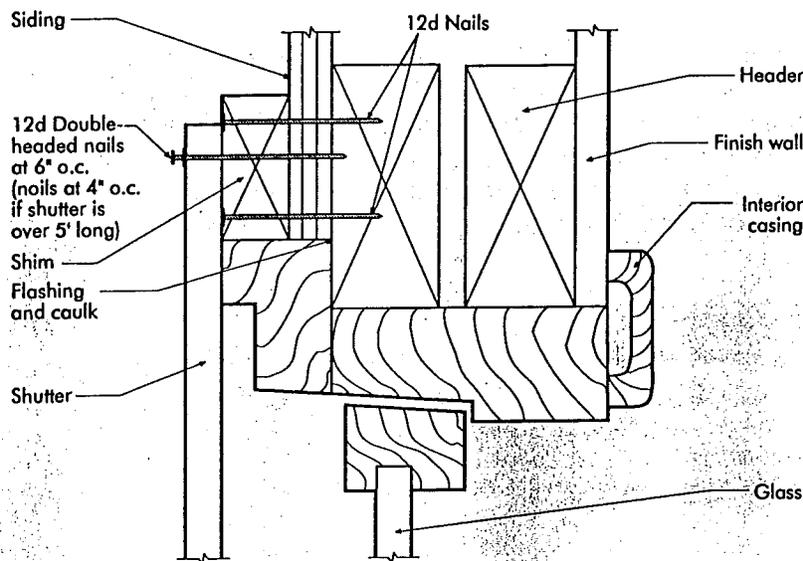
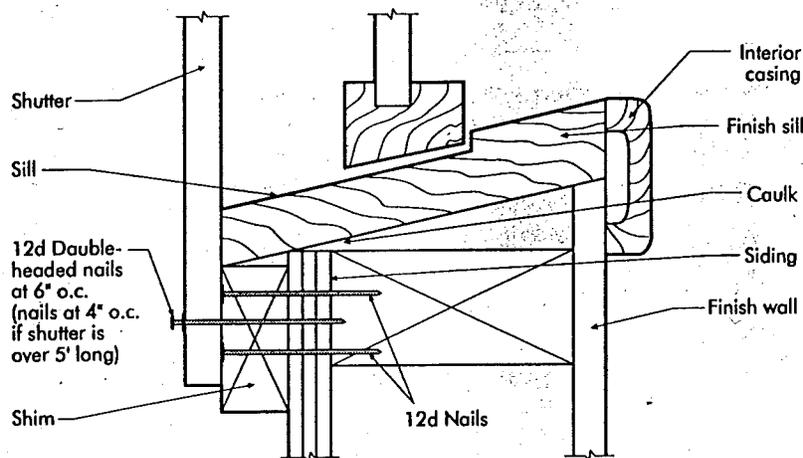


FIGURE 3B

SHUTTER ATTACHMENT - BOTTOM



panel. Nailing the panel on all four sides, instead of just the two ends, will further limit deflection and maximize strength.

6. Any permanently installed hardware, shims or fastening devices must be installed using standard/acceptable methods of waterproofing. All abandoned holes must be sealed.

7. After fabrication each shutter should be marked for orientation and location to simplify installation.

8. If shims are to be left in place, use galvanized nails and finish like siding or exterior trim.

**Hurricane Shutter Designs from APA – The Engineered Wood Association**

APA offers a series of Hurricane Shutter Designs. They include:

Design 1: Shutters for Wood-Frame Buildings

Design 2: Shutters for Masonry Block Structures, *Barrel Bolt Latch Supports*

Design 3: Shutters for Masonry Block Structures, *Steel or Aluminum Angle and Screw Supports*

Design 4: Shutters for Masonry Block Structures, *Shutters Attached to Outside Wall with Permanently Mounted Brackets*

Design 5: Shutters for Masonry Block Structures, *For Openings Wider than 8 Feet*

Each design is available from APA – The Engineered Wood Association for \$1.

Designs may also be ordered as a complete set for \$5. To order, contact APA – The Engineered Wood Association, P.O. Box 11700, Tacoma, Washington 98411-0700. Phone: (206) 565-6600. Fax: (206) 565-7265.

## XII. *WIND PROTECTION*

This home has not been equipped by the manufacturer with storm shutters or other window and door protection from high wind conditions. The following drawings are provided to assist the homeowner in installing window and door protection. These coverings are intended to provide temporary protection from high winds. Because the installation of these coverings prevents emergency egress from the home it is recommended that the home remain unoccupied as long as the protection is installed.

### XIII. *FINAL INSPECTION*

To make sure that no items have been overlooked and that all work was done properly, make a final inspection when the home installation is complete. Place a special emphasis on the following "checklist" items:

**Water and drain systems.** All water and drain systems work properly and do not leak.

**Appliance function and operation.** Appliances have been tested and work properly.

**Windows, doors and drawers.** All windows, doors and drawers work properly.

**Exit windows.** One window in each bedroom is designated as a secondary exit (egress) to be used in case of emergency. Each exit window is labeled as such with operating instructions. All shipping hardware should be removed, and the window should operate as explained in the window manufacturer's instructions. Check each window to assure it opens properly.

**Exterior siding and trim.** There are no gaps, voids, or missing fasteners, all seams are sealed, and hardboard edges are sealed.

**Stack heads and vent pipe flashing on the roof.** All stack head or vent pipe flashings are properly attached and sealed.

**Composition roof.** All shingles are properly attached, none are loose or missing, and all holes are filled.

**Exhaust fan operation and airflow.** Check all exhaust fans for proper operation and airflow.

**Bottom covering.** Carefully inspect the bottom covering of the home for loosening or tears from the installation of pipes or wires.

**Bottom covering repair.** A special material is fastened to the bottom side of your new home, to provide a protective covering. This covering was inspected at the factory, but could have been damaged later. It is important that any areas that are damaged be sealed. Refer to homeowner's information manual for repair method.

**Ground vapor barrier (if installed).** Repair any cuts or tears in the ground cover with tape.

**Anchors and straps.** Be sure the correct number of anchors have been installed at the proper angle, and that all straps are tight.

**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 and brief the homeowner about maintaining the home.