

SET UP & INSTALLATION PROCEDURES

5/28/02



CHAMPION

MIDWEST DIVISION

Keep this booklet with your manufactured home. Title VI of the Housing and Community Development Act of 1974 provides you with protection against certain construction and safety hazards in your manufactured home. To help assure your protection, the manufacturer of your manufactured home needs the information which the attached cards, when completed and mailed, will supply. If you bought your home from a dealer, please be sure that your dealer has completed and mailed a card for you. If you acquired your home from someone who is not a dealer, you should promptly fill out and send a card to the manufacturer. It is important that you keep this booklet and give it to any person who buys the manufactured home from you.

KEEP THIS BOOKLET WITH YOUR HOME

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CHAPTER 1 - INTRODUCTION

How to use this manual. This manual contains detailed installation instructions, specifications, and procedures for erection and hookup of your manufactured home. It has been written in an objective and easy to understand manner so it can be understood by people without extensive technical training. It covers the set-up of the home from preparing the site through final inspection. It includes many tables and figures giving important data for proper set-up. Careful adherence to this manual by the home-owner, installation crew, and consultation with a registered professional engineer or structural engineer in those unusual circumstances it does not cover, will assure you of a quality, safe, and affordable home for many years to come.

SAFETY. Only trained crews should install the home. Installers should follow the safety instructions provided in this manual.

THIS HOME WEIGHS SEVERAL TONS

USE ENOUGH TEMPORARY WOOD BLOCKING TO SUPPORT THE HOME DURING SET-UP. No one should be allowed under the home unless it is securely in place, even if it is not moving.

CONSUMER INFORMATION CARD. Fill out the CONSUMER INFORMATION CARD and return it to the home's manufacturer, so that you can be notified of revised instructions or new products.

Instructions in this manual are for all homes produced by the Midwest Division of Champion Enterprises, Inc.

CHAPTER 2 - DEFINITIONS

Anchoring Equipment. Straps, cables, tumbuckles and chains, including tensioning devices, that are used with ties to secure a manufactured home to ground anchors.

Anchoring System. A combination of ties, anchoring equipment, and ground anchors that will, when properly designed and installed, resist the wind overturning the home or moving it sideways.

Footing. That part of the support system that sits directly on the ground. At, below, or partly below grade to support the piers.

Pier. That portion of the support system between the footing and the manufactured home, exclusive of caps and shims. Types of piers include, but are not limited to, the following:

1. Manufactured steel stands
2. Manufactured concrete stands
3. Concrete blocks

Site, Manufactured Home. A parcel of land designed and designated for the location of one manufactured home, its accessory buildings or structures, and accessory equipment for exclusive use of the home occupants.

Stabilizing System. A combination of properly installed anchoring and support systems.

Stand, Manufactured Home. That area of a manufactured home site which has been reserved for placement of a manufactured home.

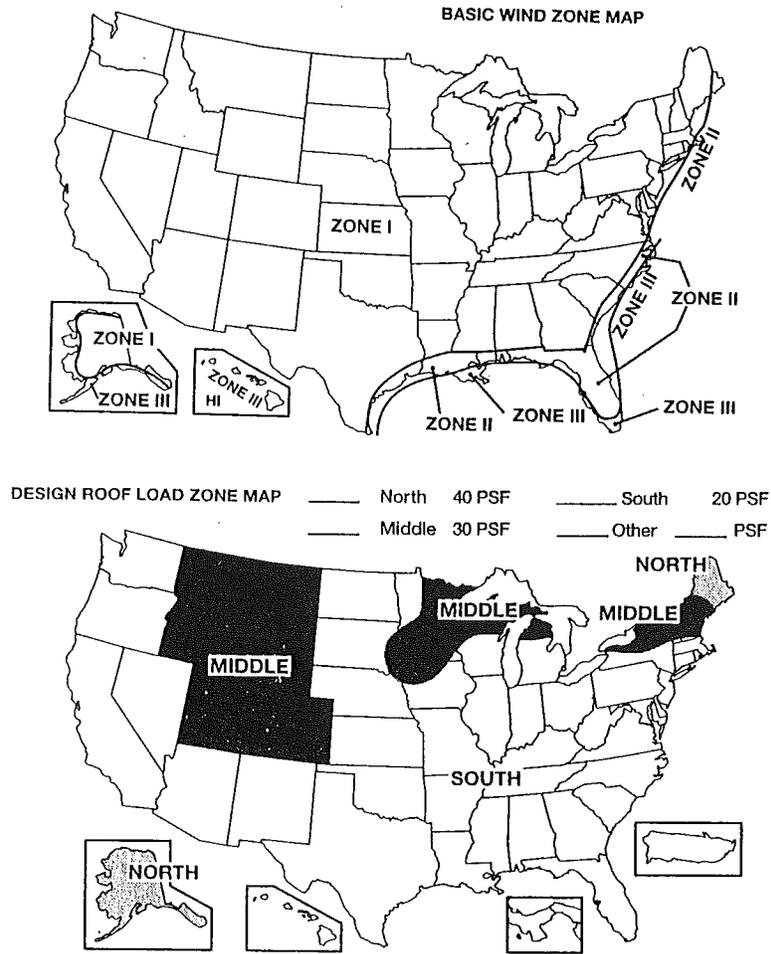
Support System. A combination of footings, piers, caps, and shims that will, when properly installed support the manufactured home.

VENTILATION IMPROVEMENT INFORMATION

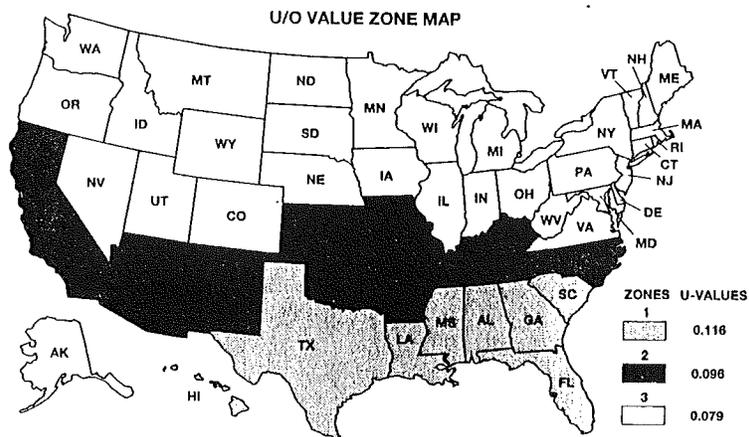
Your home is equipped with a factory installed mechanical ventilation improvement system. This system is designed to improve the indoor air quality of your home. The "STANDARD BLEND AIR 2 7681-8191/A" system's capacity for gas and oil furnaces is 109 CFM. The capacity for electric furnaces is 86 CFM. Instructions from the ventilation system manufacturer are located in your home.

ZONE MAPS OF THE UNITED STATES STRUCTURAL DESIGN

FIGURE 3.1



HEATING AND COOLING DESIGN



CHAPTER 3 - SITE PREPARATION

3.1 Location and Layout

3.1.1 Use of zone maps. Your home is designed for certain weather conditions and roof loads. (See zone maps near home's main electrical panel and in Figure 3.1 of this manual.) Do not site or relocate your home in a zone requiring greater wind, roof load, or heating/cooling capabilities than those for which it was designed. However, it is safe to locate your home in an area with lower load or weather requirements. For example, a home designed for a northern roof load or 40 psf may be sited in the southern roof load zone.

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

3.1.3 Encroachments and setbacks distances. Obey local laws regarding encroachments in streets, yards and courts, and permissible setback distances from property lines and public roads.

3.1.4 Fire separation distance. The distance your home must be sited from other structures depends on its fire resistance rating in conformance to local requirements. Contact the home's manufacturer or the inspection agency identified on the data plate for fire resistance information.

3.1.5 Issuance of permits. Be sure that all necessary local permits have been obtained and fees paid.

3.2 Soil Conditions

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

3.2.2 Bearing capacity. Test the bearing capacity of the soil before designing the foundation (see 3.2.3). If you can't test the soil but can identify its type, use the foundation bearing pressures shown in Fig. 3.2 as a guide. If you cannot identify the soil, use the lowest value (1000 psf) from Fig. 3.2 under unusual conditions, or if the soil appears to be peat or uncompacted fill, consult a geologist or professional engineer.

3.2.3 Soil bearing testing methods and equipment. A hand penetrometer (available from engineering supply houses) is recommended. Other methods acceptable to local jurisdictions may also be used.

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

SITE PREPARATION

3.4 Drainage

3.4.1 Purpose. Drainage prevents water build-up under the home which may cause shifting or settling of the foundation, dampness in the home, damage to siding and bottom board, buckling of walls and floors, problems with the operation of doors and windows, AND COULD VOID YOUR WARRANTY.

3.4.2 Elimination of depressions. Grade the homesite to permit water to drain from under the home. See Figure 3.3.

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

3.5 Ground moisture control (Recommended for well drained soil and required for wet areas)

3.5.1 Importance. Use materials that keep ground moisture out of the home to make it last longer and keep it safe and healthy to live in.

3.5.2 Acceptable types of ground cover. Use six mil. thick polyethylene sheeting or its equivalent.

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

FIGURE 3.2**

GENERAL DESCRIPTION OF SOILS

SOIL TYPE BASED ON THE UNIFIED CLASSIFICATION SYSTEM	ALLOWABLE PRESSURE (POUNDS PER SQUARE FOOT)
ROCK OR HARD PAN	4,000 AND UP
SANDY GRAVEL AND GRAVEL	2,000
SAND, SILTY SAND, CLAYEY SAND, SILTY GRAVEL, OR CLAYEY GRAVEL	1,500
CLAY, SANDY CLAY, SILTY CLAY, OR CLAYEY GRAVEL	1,000
UNCOMPACTED FILL	SPECIAL ANALYSIS IS REQUIRED
PEAT OR ORGANIC CLAYS	SPECIAL ANALYSIS IS REQUIRED

NOTE:

No allowances made for overburden pressure, embedment depth, water table height, or settlement problems.

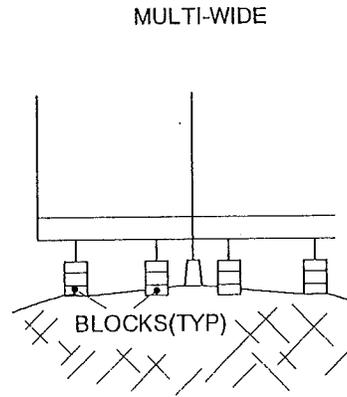
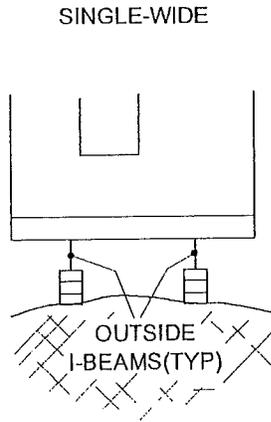
**To be used only when none of the following is available:

- A. Soils investigation and analysis of the site.
- B. Compliance with the local building code.
- C. Competent opinion by a local engineer or building official.

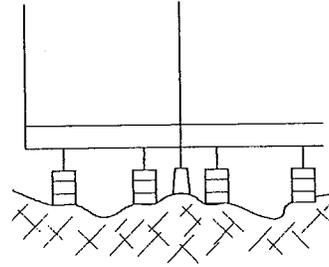
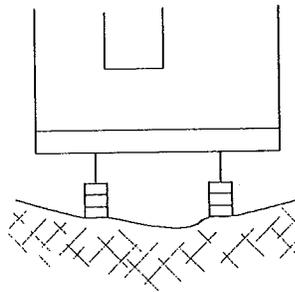
SITE PREPARATION

FIGURE 3.3 ELMINATION OF WATER BENEATH HOME

DO: CROWN AND GRADE SITE TO SLOPE AWAY FROM HOME, AND COVER WITH 6 MIL. THICK POLYETHYLENE SHEETING, OR EQUIVALENT



DON'T: GRADE SITE SO THAT WATER COLLECTS BENEATH HOME



NOTE: SEE PARAGRAPH 4.2.2
FOR LOCATION OF FOOTINGS
BELOW FROST LINE DEPTH.

CHAPTER 4 - FOUNDATIONS

NOTE: This chapter covers foundations only. Set-up procedures and methods for securing the home to its foundation are discussed in Chapter 5.

4.1 Piers

4.1.1 Importance. The most important part of home set-up is proper pier installation. incorrect size, location, and spacing of piers may cause serious structural damage to your home. It is important to install piers around the perimeter of your home (if required). Failure to do so may lead to sagging floors, walls, and roofs.

4.1.2 Acceptable types. Piers may be concrete blocks or pressure treated wood, capped and shimmed with wedges, or adjustable metal or concrete stands (see Fig 4.1). Adjustable devices are more accurate. Manufactured piers should be listed and labeled for the required load capacity.

4.1.3 Design requirements.

4.1.3.1 Load-bearing capacity. The load that each pier must carry depends on factors such as the dimensions of the home, the roof live load, the spacing of the piers, and the way they are used to support the home. Center beam/marriage wall blocking is required for multisection homes.

See Tables 4.2.1 and 4.3 for pier capacities. Manufactured piers must be rated to at least these capacities, and locally constructed piers must be designed to transmit these loads safely.

4.1.3.2 Configuration. Figure 4.1 shows the recommended arrangement of concrete block piers constructed on site. Concrete blocks should have dimensions of at least 8"x16". They must be stacked with their hollow cells aligned vertically. When pairs are constructed of blocks stacked side by side, every layer should be at right angles to the previous one (see Figure 4.1).

Cap hollow block piers, as shown in Fig 4.1, to distribute the structural load evenly across them. Caps may be of solid masonry or hard wood, at least 4" thick, or of steel, and be continuous length between i-beam and pier. Avoid soft woods and plywood, as they may lead to unwanted settling.

Use 4"x6" hardwood shims to level the home and fill any gaps between the base of the I-beam and the top of the pier cap. Always use shims in pairs and drive them in tightly so they do not occupy more than 1" of vertical space. Use hardwood plates no thicker than 2" to fill any remaining vertical gaps.

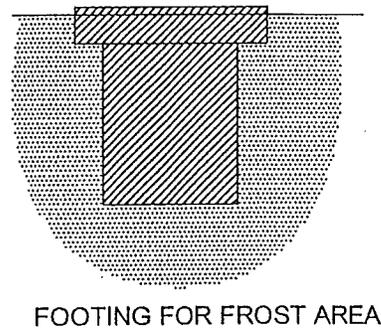
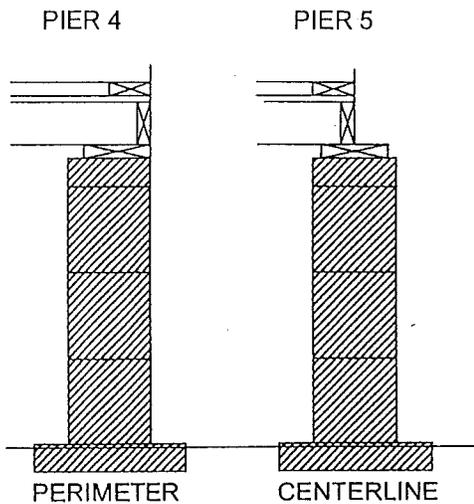
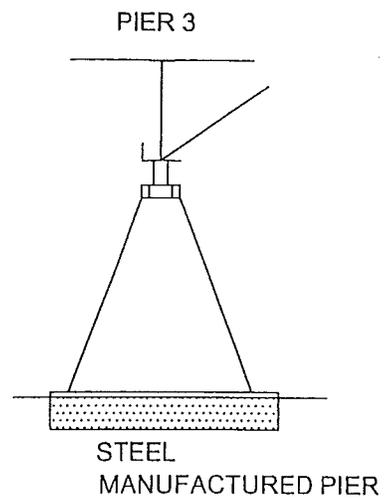
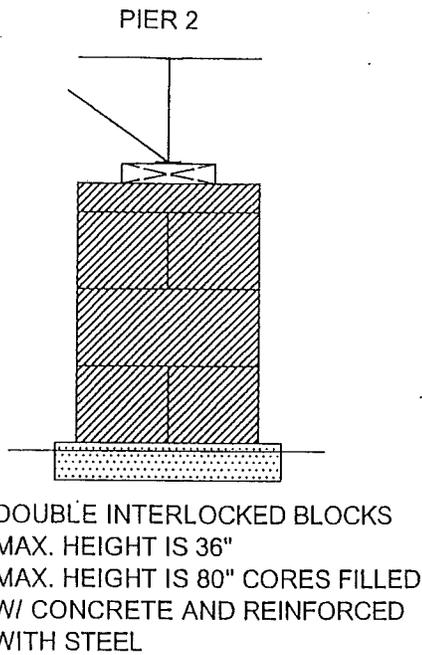
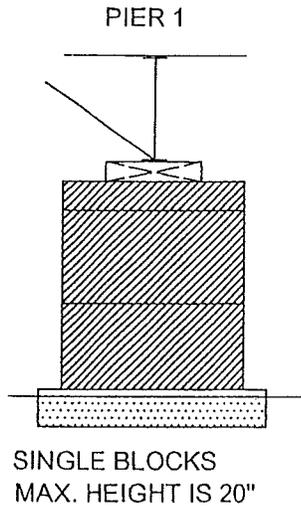
Select manufactured pier heights so that risers do not extend more than 3" when finally positioned.

All piers must rest on footings (see Paragraph 4.2) that extend below frost line and are placed on either undisturbed or compacted fill.

4.1.3.3 Clearance under the home. Allow working room for heating and plumbing connections.

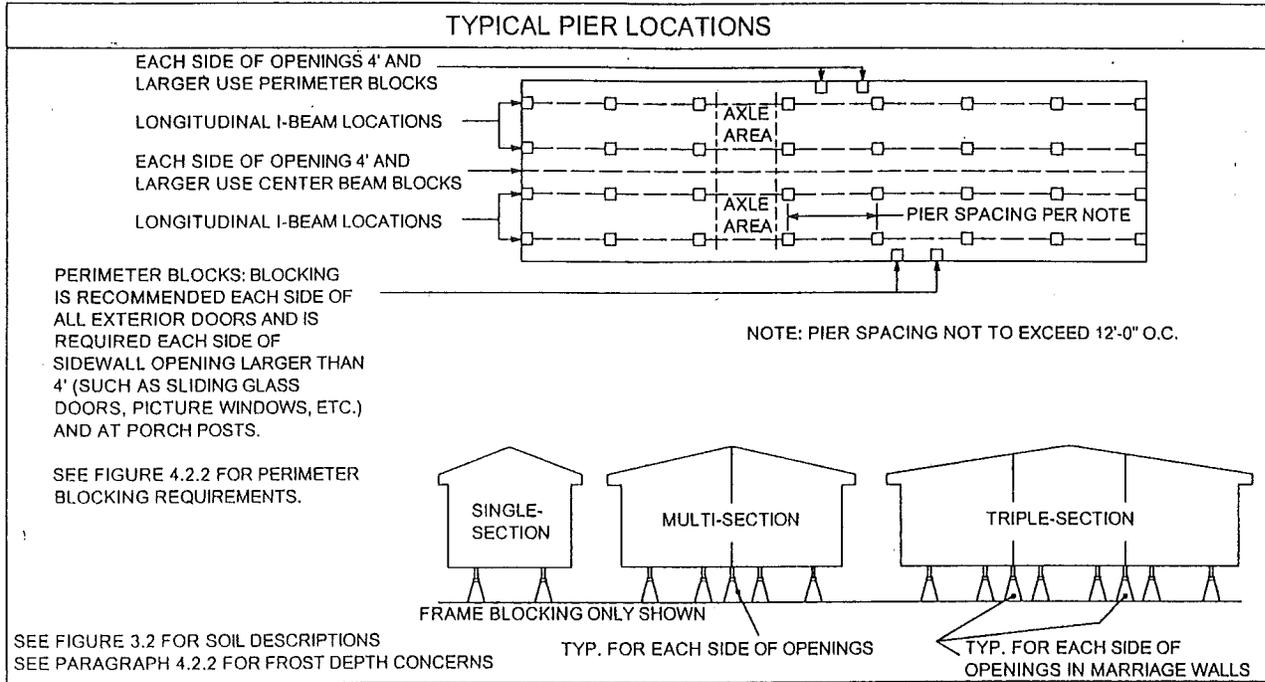
4.1.3.4 Ventilation. Skirting or foundation walls are to be provided with non-closing vents, located at or near each corner as high as possible to cross-ventilate the entire space under the home. The total net free area of these vents must be at least equal to 1/150 of the total floor area of the home. When an approved vapor barrier is installed on the ground beneath the home, the required ventilation may be reduced to 1/1500 of the total floor area of the home.

CHAMPION MIDWEST
 FIGURE 4.1
 TYPICAL FOOTING AND PIER INSTALLATION



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 81-4369
 LICENSED STRUCTURAL ENGINEER
Patrick M. McGuire
 10-15-01

CHAMPION MIDWEST
FIGURE 4.2



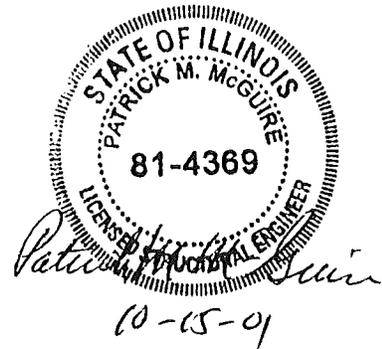
PIER SPACING CAPACITY AND FOOTING SIZE TABLES

TO FIND THE MINIMUM FOOTING SIZE, FIRST DETERMINE THE MINIMUM PIER CAPACITY FROM TABLE 4.2.1 FOR I-BEAM PIERS, TABLE 4.3 FOR CENTER BEAM PIERS. ONCE YOU KNOW THE MINIMUM PIER CAPACITY AND THE SOIL CAPACITY SEE TABLE 4.4 FOR THE FOOTING SIZE.

MINIMUM PIER CAPACITY TABLE 4.2.1
FRAME BLOCKING ONLY

(SEE FIGURE 4.2.2 AND TABLE 4.2.2 FOR PERIMETER BLOCKING)

SECTION WIDTH (FT.)	ROOF LIVE LOAD (PSF)	MINIMUM PIER CAPACITY			
		MAXIMUM PIER SPACING - FEET			
		6'	8'	10'	12'
12	20	3200	4200	5300	6500
	30	3500	4700	5800	7200
14	20	3600	4900	6100	7400
	30	4100	5400	6800	8300
16	20	4200	5600	7000	8000
	30	4700	6200	7800	9000



CHAMPION MIDWEST

TABLE 4.2.2

MINIMUM PIER CAPACITY TABLE FRAME PLUS PERIMETER BLOCKING (BOTH FRAME AND PERIMETER BLOCKING REQUIRED)							
SECTION WIDTH (FT.)	ROOF LIVE LOAD (PSF)	PIER LOCATION	MINIMUM PIER CAPACITY				
			MAXIMUM PIER SPACING - FEET				
			4'	6'	8'	10'	12'
12	40	FRAME	860	1290	1719	2149	2579
		PERIMETER	1714	2571	3428	N/A	N/A
		MATING LINE	3428	5142	6856	N/A	N/A
14	40	FRAME	950	1425	1899	2374	2849
		PERIMETER	2004	3006	4008	N/A	N/A
		MATING LINE	4008	6012	8016	N/A	N/A
16	40	FRAME	1032	1548	2064	2580	3096
		PERIMETER	2270	3405	4540	N/A	N/A
		MATING LINE	4540	6810	9080	N/A	N/A



Patrick M. McGuire 10-15-01

MULTI-SECTION CENTER BEAM SUPPORTS

LABELS OR MARKING LOCATED ALONG THE CENTERLINE ON THE BOTTOM SIDE OF A MULTI-SECTION HOME, SHOW WHERE THE COLUMN SUPPORT MUST BE PLACED. MEASURE THE LONGEST SPAN BETWEEN THESE SUPPORTS AND REFER TO MINIMUM PIER CAPACITY TABLE 4.3. ONCE THE PIER CAPACITY HAS BEEN DETERMINED, THE MINIMUM FOOTING SIZE CAN BE FOUND IN THE FOOTING SIZE TABLE 4.4.

TABLE 4.3
MINIMUM PIER CAPACITY
MULTI-SECTION CENTER BEAM BLOCKING

SECTION WIDTH (FT.)	ROOF LIVE LOAD (PSF)	PIER LOAD AND MINIMUM PIER CAPACITY LBS.						
		MAXIMUM SPAN TO THE NEXT SUPPORT IN FEET						
		5	10	15	20	25	30	35
12	20	900	1700	2600	3400	4300	5100	6000
	30	1200	2300	3400	4600	5700	6800	8000
	40	1500	2900	4300	5700	7100	8500	10000
14	20	1000	2000	3000	4000	5000	6000	7000
	30	1400	2700	4000	5400	6700	8000	9400
	40	1700	3400	5000	5700	8400	10000	11700
16	20	1200	2300	3500	4600	5700	6900	8000
	30	1600	3100	4600	6100	7600	9100	10700
	40	2000	3800	5700	7600	9500	11400	13300

NOTES:

PERIMETER BLOCKING REQUIRED AS FOLLOWS:

- 1) UNITS BEING SET IN 20# ROOF LOAD ZONE DO NOT REQUIRE PERIMETER BLOCKING REGARDLESS OF I-BEAM OR OUTRIGGER SPACING.
- 2) UNITS BEING SET IN 30# ROOF LOAD ZONE DO NOT REQUIRE PERIMETER BLOCKING REGARDLESS OF I-BEAM SPACING WHEN OUTRIGGERS ARE SPACED 4'-0" O.C.
- 3) UNITS BEING SET IN 40# ROOF LOAD ZONE REQUIRE PERIMETER BLOCKING.
- 4) UNITS WITH OUTRIGGERS AT 8'-0" ON CENTER REQUIRE PERIMETER BLOCKING.

IMPORTANT:

UNITS WITHOUT PERIMETER BLOCKING STILL REQUIRE BLOCKING BELOW MATING LINE SUPPORT POSTS AND SIDEWALL OPENINGS GREATER THAN 4'-0". (E.G. SLIDING GLASS DOORS, PICTURE WINDOWS, ETC.)

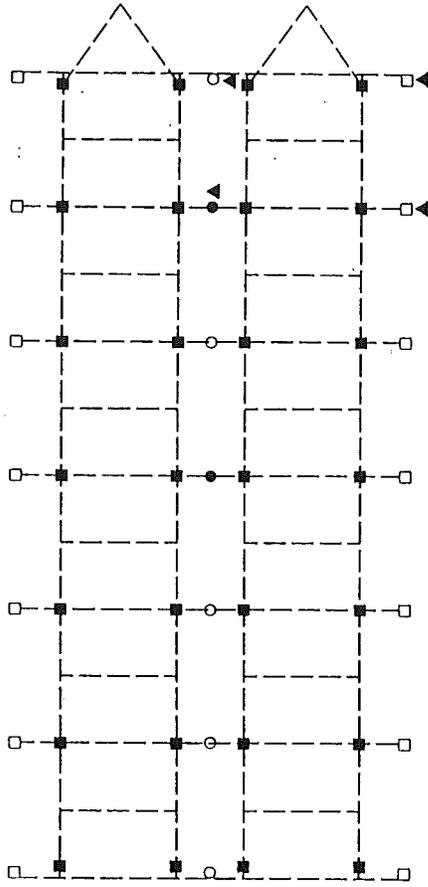


FIGURE 4.2.2

- I-BEAM SUPPORT (SEE NOTE 1)
- PERIMETER SUPPORT (SEE NOTE 2)
- RIDGE BEAM COLUMN SUPPORT (SEE NOTE 3)
- MATING LINE SUPPORT (SEE NOTE 4)
- ▲ END PORCH (SEE NOTE 5)

NOTES:

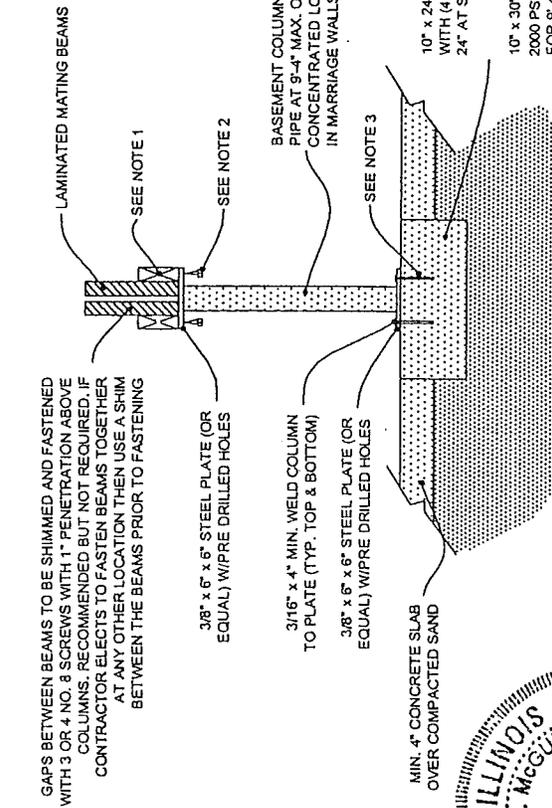
- 1) PIER SPACING SHALL BE MAXIMUM 12'-0" O.C. AND START 2'-0" MAXIMUM AND 1'-0" MINIMUM FROM ENDS.
- 2) PERIMETER SUPPORTS RECOMMENDED EACH SIDE OF DOOR OPENINGS AND REQUIRED EACH SIDE OF ANY SIDEWALL OPENING OVER 4'-0" AND NOT MORE THAN 8'-0" O.C. MAXIMUM. PERIMETER SUPPORTS REQUIRED AT PORCH POSTS.
- 3) THE LOADS AND LOCATIONS OF RIDGE BEAM AND COLUMN SUPPORTS ARE FOUND ON THE FLOOR PLAN AND DATA SHEET.
- 4) MATING LINE SUPPORTS AND BEAM SUPPORTS APPLICABLE TO DOUBLE WIDES ONLY.
- 5) END PORCHES REQUIRE PERIMETER SUPPORTS AT ALL CORNERS AND AT MARRIAGE LINE. PERIMETER SUPPORTS AT CORNERS CAN BE USED FOR POST SUPPORT IF THE PORCH POST IS LOCATED ABOVE CORNER.



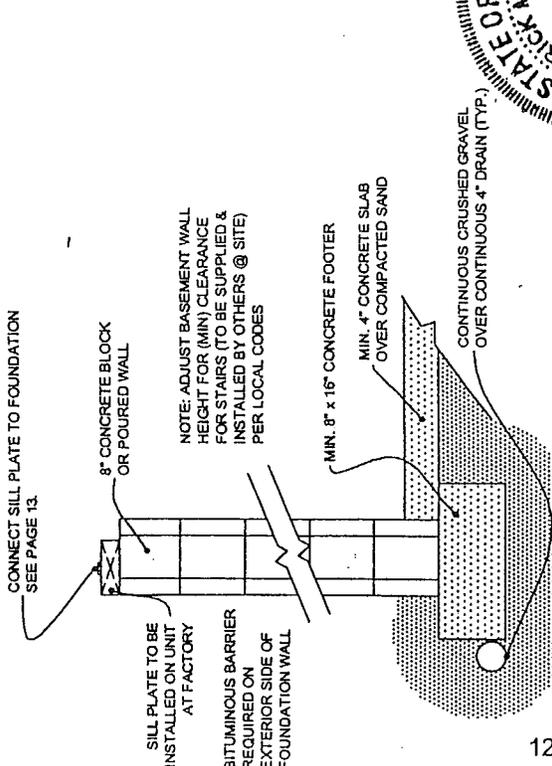
Patrick M. McGuire
10-15-01

DATE: 8-29-2001	REV:	INSTALLATION	CHAMPION MIDWEST	DWG. NO: I-11
		PIER BLOCKING		

NOTES:
 1) INSTALL 2" x 6" x 16" CONSTRUCTION GRADE BLOCKING AT COLUMN LOCATION. FASTENED TO BEAM WITH PVA GLUE AND 16-d NAILS @ 6" O.C. STAGGERED.
 2) PRE DRILL 1/4" PILOT HOLE IN 2" x 6" BLOCKING. INSTALL (4) LAG SCREWS AT EACH COLUMN LOCATION.
 3) FASTEN COLUMN SUPPORT WITH (2) 1/2" x 8" ANCHOR BOLTS.



TYPICAL BASEMENT COLUMN SUPPORT



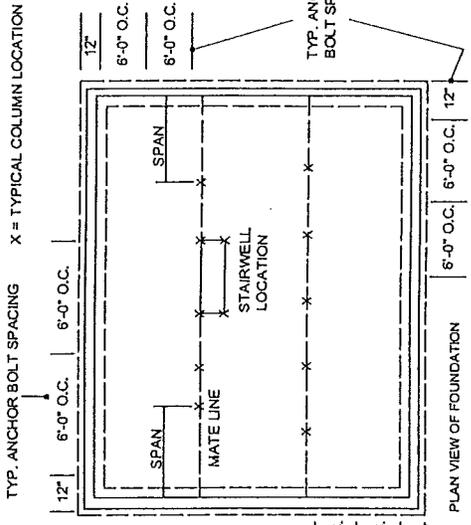
TYPICAL FOUNDATION WALL



Patrick M. McGuire
 10-15-01

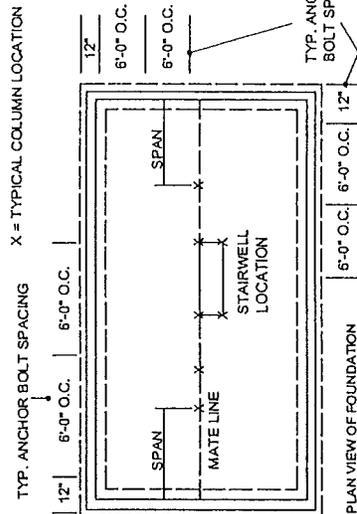
DISCLAIMER:
 IT IS THE RESPONSIBILITY OF THE DEALER AND/OR INSTALLER TO CERTIFY THAT ANY BLOCKING, FOUNDATION PRINTS, OR ANY OTHER DIAGRAM SUPPLIED TO A CONTRACTOR FOR SITE WORK CORRELATE WITH THE UNIT ORDERED. THE MANUFACTURER WILL NOT BE RESPONSIBLE OR LIABLE FOR DAMAGES ARISING FROM FAILURE OF THE DEALER AND/OR INSTALLER TO MAKE CERTAIN THAT THE CONTRACTOR HAS THE CORRECT DIAGRAMS, REGARDLESS OF WHAT WAS SUPPLIED BY THE MANUFACTURER.

NOTE: DETAILS SHOWN ARE TO BE MINIMUM REQUIREMENTS ONLY. ALL SITE WORK MUST MEET LOCAL BUILDING CODES.
NOTE: FOUNDATION DESIGN SHALL BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER FAMILIAR WITH LOCAL SOIL CONDITIONS.



TYP. ANCHOR BOLT SPACING X = TYPICAL COLUMN LOCATION

FOR ALTERNATE STRAP SPACING SEE CHART ON PAGE 13.



TYP. ANCHOR BOLT SPACING X = TYPICAL COLUMN LOCATION

FOR ALTERNATE STRAP SPACING SEE CHART ON PAGE 13.

**FOUNDATION DETAILS
 EXTENDED SPAN FLOOR
 SYSTEM (28, 32, AND 40 WIDES)**

DATE: 8-29-2001
 REV:

DWG. NO. 1-12

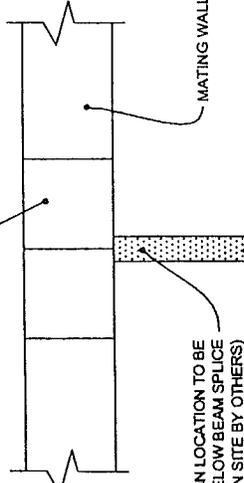
1/2" x 15" ANCHOR BOLTS 12" FROM CORNERS AND 6'-0" O.C. MAX. (BOLTS MAY BE 7' LONG IN POURED WALLS)

FACTORY INSTALLED SILL PLATE



ALTHOUGH IT IS RECOMMENDED THAT INSTALLERS USE STRAPS FOR SILL PLATE CONNECTIONS, THIS DETAIL SHOWS AN ACCEPTABLE ALTERNATIVE. WHEN SETTING THE HOME, HOWEVER, OWNER / CONTRACTOR SHOULD BE AWARE THAT DIFFICULTY MAY BE ENCOUNTERED ALIGNING PRE-DRILLED HOLES IN THE SILL PLATE WITH PRE-SET BOLTS.

MATING WALL BEAM SPURCE FOR EXTENDED SPAN FLOOR SYSTEM (BEAM SPURCE FACTORY INSTALLED)

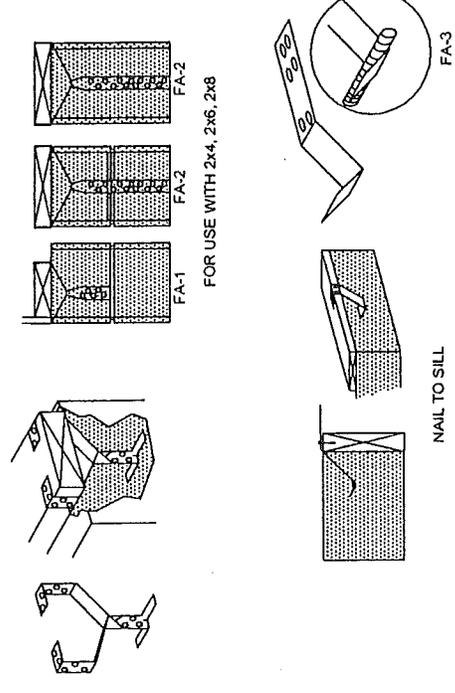


TYPICAL COLUMN LOCATION TO BE CENTERED BELOW BEAM SPURCE (INSTALLED ON SITE BY OTHERS)

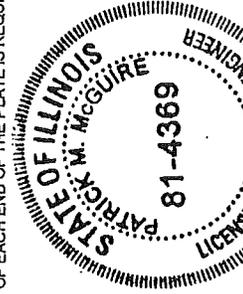
(B) ALTERNATE SILL PLATE CONNECTION

KANT-SAG STOCK NO.	DESCRIPTION	STEEL GAUGE	NAIL SCHEDULE		MAX. SPACING* (FEET)	DESIGN LOADS (LBS)**		
			MUDSILL TOP	MUDSILL SIDE		PARALLEL TO MUDSILL	PERPENDICULAR TO MUDSILL	UPLIFT LBS.
FA-118	14 3/4	18	(4) 8d x 1 1/4	(4) 8d x 1 1/2	3 1/2	500	500	565
FA-1	14 3/4	16	(4) 8d x 1 1/4	(4) 8d x 1 1/2	5 1/2	790	480	780
FA-218	22 3/4	18	(4) 8d x 1 1/4	(4) 8d x 1 1/2	3 1/2	500	500	565
FA-2	22 3/4	16	(4) 8d x 1 1/4	(4) 8d x 1 1/2	5 1/2	790	480	780
FA-3	1 1/2 x 10	16	(4) 10d x 1 1/2	(4) 10d x 1 1/2	4	865	940	1225

* ANCHOR SPACING AND DESIGN LOADS ASSUME TREATED DOUGLAS FIR / SOUTHERN PINE.
 ** LOADS AND INSTALLATION ASSUME NOMINAL 2 x 6 MUDSILL, WHEN USED AS A DIRECT SUBSTITUTION FOR 1/2" ANCHOR BOLT 6'-0" O.C.
 UPLIFT LOADS HAVE BEEN INCREASED 1/3 FOR WIND OR EARTHQUAKE.
 TO ORDER PRODUCT WITH HOT DIPPED GALVANIZED FINISH, ADD HDG TO STOCK NUMBER, AS IN FA-3HDG.
 A MINIMUM OF TWO ANCHORS PER PLATE, WITH ONE ANCHOR LOCATED WITH 12" OF EACH END OF THE PLATE IS REQUIRED



NOTE:
 OTHER STRAPS MAY BE SUBSTITUTED FOR KANT-SAG PROVIDED INSTALLATION IS EQUIVALENT TO 1/2" ANCHOR BOLTS 6'-0" O.C.

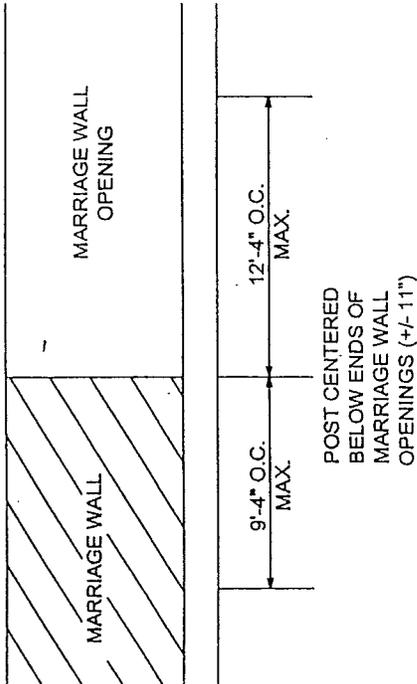


Patrick M. McGuire 10-15-07

(A) BEAM SPURCE SUPPORT

(C) SILL PLATE CONNECTION

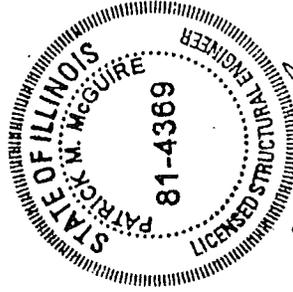
DATE: 8-29-2001	INSTALLATION	CHAMPION MIDWEST	DWG. NO: I-13
REV:	EXTENDED SPAN DETAILS		



14 TOLERANCE SPECIFIED FOR CENTER POST IS FOR A 20'-0" MAXIMUM MARRIAGE WALL OPENING. FOR SMALLER OPENINGS THE TOLERANCE MAY BE INCREASED AS FOLLOWS:

MAXIMUM OPENING SIZE	TOLERANCE
18'-0"	+/-11"
12'-0"	+/-17"
8'-0"	+/-35"
6'-0"	+/-53"

- NOTE:
- 1.) STANDARD POSTS SHOWN MAY ALSO SERVE AS STAIRWELL POST OR POST BELOW FLOOR BEAM SPLICE IF LOCATION COINCIDES.
 - 2.) NO SPECIAL POSTING REQUIRED FOR MARRIAGE WALL OPENINGS LESS THAN 6'-0" PROVIDED SPACING OF POSTS DOES NOT EXCEED 9'-4" O.C.
 - 3.) THIS DRAWING APPLICABLE TO 28" WIDES, 32" WIDES, AND 40" WIDES.



Patrick M. McGuire
10-15-01

DATE: 8-29-2001	INSTALLATION SUPPORTS BELOW MARRIAGE OPENINGS - ES AND OS MODELS	CHAMPION MIDWEST.	DWG. NO: I-14
REV:			

PIERS AND FOOTINGS INSTALLATION PROCEDURES

4.1.4 Piers design procedures

4.1.4.1 Piers less than 20" high. You may construct piers less than 20" high out of a single, open or closed-cell concrete blocks, 8"x8"x16". Install them so that the long side is at right angles to the supported i-beam (see Fig. 4.1). Position open cells at right angles to the footers. Horizontal offsets should not exceed 1/2" top to bottom. Mortar is not normally required. Manufactured piers should be listed and labeled. Do not extend their adjusting studs beyond the limits specified by the manufacturer.

4.1.4.2 Piers 20" to 80" high. Construct all piers between 20" and 80" high, and all corner piers over three blocks high, out of double, interlocked concrete blocks (see Fig. 4.1). Mortar will not normally be required.

4.1.5 Location and spacing. The location and spacing of piers depends upon the dimensions and weight of the home, the roof load zone, the type of construction (single or multisection), and other factors such as the locations of doors or other openings and heavy pieces of furniture. In general, locate piers starting no more than 1'-0" min. or 2'-0" max. from ends.

Place piers for your home as follows:

4.1.5.1 Single-section home. Figure 4.2 shows the location and spacing of piers for your home.

4.1.5.2 Multisection home. Figure 4.2.2 shows the location and spacing of piers for you multisection home.

4.1.5.3 Under doors, porch posts and concentrated loads. Piers are recommended on both sides of exterior doors and required at porch posts and other sidewall openings wider than 4'-0" (such as sliding glass doors). Concentrated loads created by heavy furniture, pianos, organs, waterbeds, fish tanks, site installed fireplaces and wood stoves may cause floor sagging. These types of loads should be analyzed by a professional engineer.

4.1.6 Adjustable outriggers. Listed adjustable outriggers may be used in place of optional or recommended piers. Install adjustable outriggers per the terms of its listing.

4.2 Footings. Support every pier with a properly designed footing, as follows:

4.2.1 Acceptable types of footings.

4.2.1.1 Concrete. Footings may consist of precast or poured in place concrete pads, slabs, or ribbons at least 3 1/2" thick with a 28 day compressive strength of 3,000 psi min.

4.2.1.2 Pressure treated permanent wood. Two layers of 2" thick pressure treated wood planks, with long dimension of the second layer placed perpendicular to that of the first, may also be used.

4.2.1.3 Other materials. You may also use other materials approved for this used by local authorities, if they provide equal load bearing capacity and resistance to decay.

Examples include:

- 1/2" maximum crushed stone,
- 3/8" or 3/4" graduated gravel, or
- coarse sand with grains not smaller than 1/16", placed so it provides a bearing capacity of at least 3,000 pounds per square foot.
- list ABS pier pads installed per their instructions, the terms of their listing, and for the loads specified in this manual.

4.2.2 Placement in freezing climates

4.2.2.1 Conventional footings. In areas subject to ground frost heave, place footings below the frost line. Consult local authorities to determine frost depth. In the absence of local code, use the frost penetration map (Figure 4.4) as a guide.

4.2.2.2 Floating slab system. When properly engineered by a registered professional engineer, a "floating slab system" may be used above the frost line.

4.2.2.3 Insulated foundations. When acceptable to the authority having jurisdiction, interior footings may be placed above the frost line when the home is provided with a perimeter foundation or skirting having insulation properties that will prevent freezing or frost heave under the home. Cross-ventilation must still be provided.

4.2.3 Proper sizing of footings. Proper sizing of footings depends upon the load bearing capacity of both the piers and the soil. See Table 4.4 for recommended sizes for your home.

4.3 **Permanent foundations.** Check local building codes and regulations and consult a registered professional or structural engineer when you are siting your home on a permanent foundation (such as a full basement, crawl space, or load-bearing perimeter foundation). You may find ideas and design guidelines in reference publications listed in Paragraph 4.5.

4.4 **Special considerations.** (See also Section 5.4.3)

4.4.1 Flood prone areas. It is not recommended that you site your home in river or coastal flood prone areas. Special local regulations or floor insurance provisions may apply. Special elevations and anchoring techniques are required when locating in a flood prone area is unavoidable. You should consult a registered professional or structural engineer to make sure that home design and construction conform to applicable federal, state, and local codes and regulations. The FEMA publication listed in Paragraph 4.5 contains design and construction recommendations.

4.4.2 Severe wind areas. Special foundation and anchoring techniques are required when locating in a severe wind area is unavoidable. Consult a registered professional or structural engineer. The HUD foundations design guide listed in Paragraph 4.5 contains recommendations for designing foundations and anchoring systems. Do not place your home in a wind zone more severe than the one indicated on the data plate located in the overhead cabinet above the range or other readily visible location.

4.4.3 Special snow load conditions. Homes designed for and located in heavy snowfall areas or subject to other extreme loading conditions may require special footings or piers. See tables and/or special manufacturer's instructions provided with your home.

4.5 **Important reference documents.** (Order from addresses listed below)

4.5.1 Foundation plans available from manufacturer, or order materials listed below.

"Manufactured Home Installations" NCSBCS/ANSI A225.1-1994 order from:
NCSBCS, Inc., 505 Huntmar Park Dr., Suite 210, Herndon, Virginia 20170

FEMA 85, "Manufactured Home Installation in Flood Hazard Areas"
order from: FEMA, Washington, DC 20472

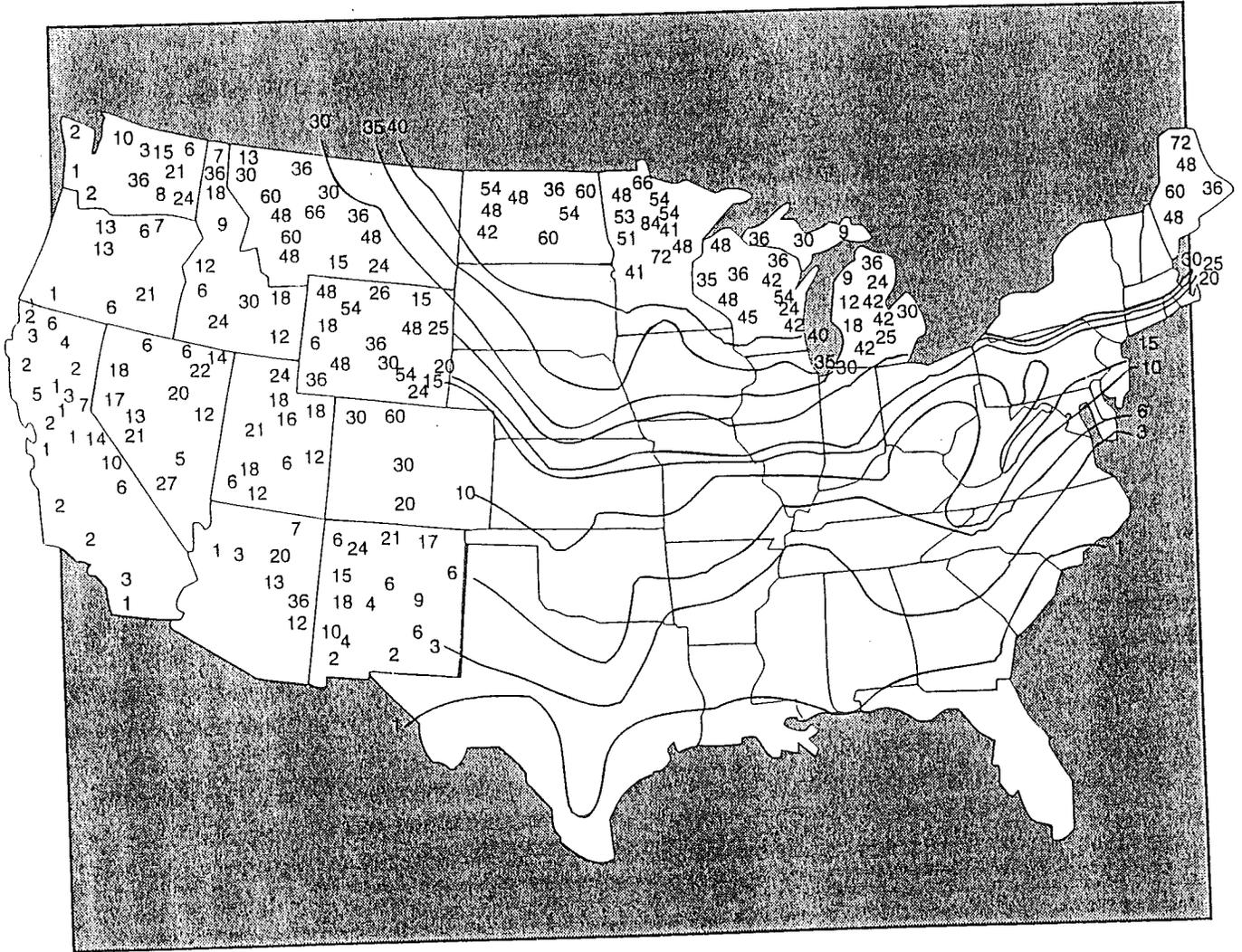
ASCE 7-1988, "Minimum Design Loads for Buildings and Other Structures"
order from: ASCE, 1430 Broadway, New York, NY 10018

HUD Handbook 4930.3 (1989) "Permanent Foundations Guide for Manufactured Housing" order from:
U.S. Department of Housing and Urban Development, 451 7th St., SW, Washington, DC 20410

"Permanent Wood Foundation System - Design, Fabrication, and Installation Manual - 1987"
order from: NFPA, 1250 Connecticut Ave., NW, Washington, DC 20036

FROST PENETRATION MAP

FIGURE 4.4



AVERAGE DEPTH OF FROST PENETRATION
IN INCHES

SOURCE: U.S. DEPARTMENT OF COMMERCE
WEATHER BUREAU

CHAMPION MIDWEST
TABLE 4.4
FOOTING SIZE TABLE

PIER CAPACITY (LBS.)	MINIMUM FOOTING SIZE OR EQUAL AREA (INCHES)			
	SOIL CAPACITY			
	1000 PSF	1500 PSF	2000 PSF	4000 PSF
600	10 x 10	8 x 8	7 x 7	5 x 5
800	11 x 11	9 x 9	8 x 8	6 x 6
1000	12 x 12	10 x 10	9 x 9	6 x 6
1500	15 x 15	12 x 12	11 x 11	8 x 8
2000	17 x 17	14 x 14	12 x 12	9 x 9
2500	19 x 19	16 x 16	14 x 14	10 x 10
3000	21 x 21	17 x 17	15 x 15	11 x 11
3500	23 x 23	19 x 19	16 x 16	12 x 12
4000	24 x 24	20 x 20	17 x 17	12 x 12
4500	26 x 26	21 x 21	18 x 18	13 x 13
5000	27 x 27	22 x 22	19 x 19	14 x 14
5500	29 x 29	23 x 23	20 x 20	15 x 15
6000	30 x 30	24 x 24	21 x 21	15 x 15
6500	31 x 31	25 x 25	22 x 22	16 x 16
7000		26 x 26	23 x 23	16 x 16
7500		27 x 27	24 x 24	17 x 17
8000		28 x 28	24 x 24	17 x 17
8500		29 x 29	25 x 25	18 x 18
9000		30 x 30	26 x 26	18 x 18
10000		31 x 31	27 x 27	19 x 19
11000			29 x 29	20 x 20
12000			30 x 30	21 x 21

NOTE: Footing sizes shown are for square pads and are based on the area (square inches) required for the load. Other footing configurations, such as rectangular, may be used provided the area (square inches) is equal to or greater than the area of the square footing shown in the table. For example, a 12 in. x 22 in. (264 sq. in.) footing may be used in place of a 16 in. x 16 in. (256 sq. in.) footing. Also, two 12 in x 24in. footings may be used in place of one 24 in. x 24 in. footing.

FOOTING THICKNESS	MAXIMUM SIZE	MINIMUM PIER WIDTH
4"	16" x 16"	8"
6"	24" x 24"	12"
8"	32" x 32"	16"



CHAPTER 5 - SET UP PROCEDURES

5.1 Moving home to location. Make sure the following items are completed before placing the home:

- The site is properly prepared. See Chapter 3.
- All concrete necessary to setting the home is finished.
- Utilities are installed.
- Any trenching for crossover drain lines, or for wheels that will be left in place, is complete.
- Items that could be difficult to install after the home is sited (such as anchors and ground moisture retarders) are in their proper locations.
- If your home has a hinged roof system, see Figure 10 BEFORE final positioning.

CAUTION: THE HOME WEIGHS SEVERAL TONS. USE ADEQUATE TEMPORARY BLOCKING TO SAFEGUARD WORKERS. THE MANUFACTURER RECOMMENDS WOOD BLOCKING.

5.2 Positioning home. When not placing the home on a concrete slab or poured in place footings, mark the corners of the home and lay out footings and support devices close to where they will be used. Then move the home or first section into position.

5.2.1 Leveling and blocking. Fig. 5.1 shows the way we recommend you level the home. To prevent tipping or settling, use a firm support under jacks. Use a steel channel or plate between jacks and steel beams to distribute the loads. Work safely whenever you are under, in or around a home that is being set. Use the following jacking sequence.

- Raise the hitch higher than its intended final position. Place a support crib underneath it to prevent the home from falling if the jack or hitch fails. Place jacks in the wheel area on each steel beam and raise the home higher than its final position.
- Place or erect the piers at the locations determined from Chapter 4. Adjust all pier heights using the leveling procedure of Fig. 5.1. Additional support may be required under doors and heavy furniture per Paragraph 4.1.5.3, and failure to install it may void manufacturer warranties.
- Remove the safety supports and lower the home onto the piers.
- Check the soundness of all piers and the operation of windows and doors. adjust piers if needed.

5.2.2 Positioning multisection homes. Follow the positioning and leveling procedures of Paragraph 5.2.1 for the first section. Then set the other section(s) as follows:

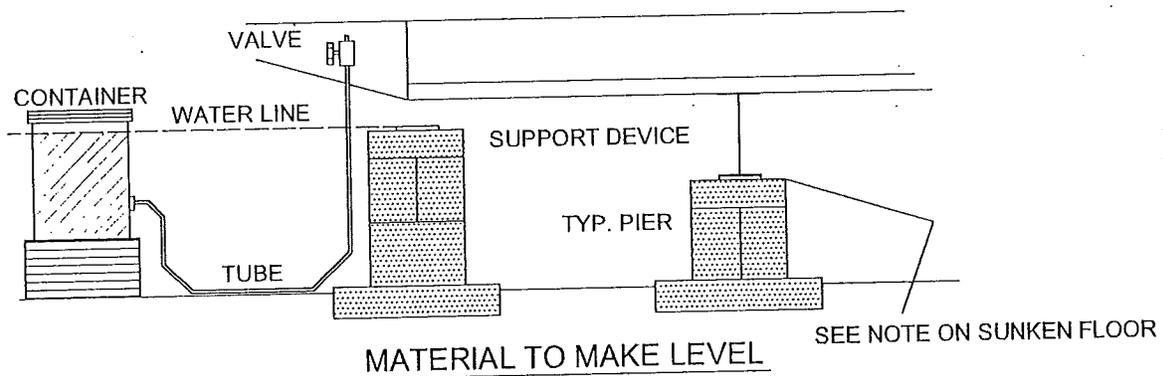
- Place the second section near the first (2-4 feet).
- Remove all shipping materials and items that stick out from the mating surfaces of both sections.
- Position the footings and piers, as before.

5.2.2.1 Leveling and joining sections. Using the jacking procedure described in Paragraph 5.2.1, raise the second section 1" to 2" above the first, and install a moving device under it. Remove shipping braces from both sections and, aided by the water level, install the footings and piers under the second section. Place sealant on mating edges of the floor, end walls, and ceiling (see "Leveling and Joining" section in this manual).

5.2.2.2 Interior closure. See "Interior Closure" section in this manual.

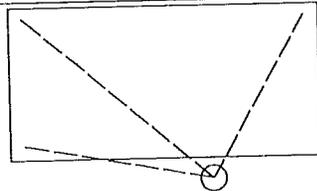
5.2.2.3 Exterior closure. See instructions placed in your home.

FIGURE 5.1
USE OF A WATER LEVEL



- MATERIAL TO MAKE LEVEL**
- FIVE GALLON PAIL WITH LID
 - PLASTIC TUBING - 100 FEET x 3/8" OR 1/2"
 - CORK - 1 1/2"
 - MALE BARBED FITTING - 3/8" x 3/4"
 - STEEL WASHER - 7/8"
 - NUT - 3/4"
 - FEMALE BARBED FITTING - 3/8" x 1/2"
 - MALE VALVE - 1/2"
 - PIPE SEALANT
 - CAKE COLORING - 8 OZ.
 - USE RV SOLVENT IN COLD WEATHER

"HOW TO USE A WATER LEVEL"



UNROLL TUBING: POSITION LEVEL WHERE IT IS TO BE USED. TAKE CARE NOT TO HAVE KINKS IN IT, STEP ON IT, OR LAY ANYTHING ON IT.

CHECK FOR AIR BUBBLES: TO REMOVE ANY; LOWER VALVE BELOW BOTTOM OF CONTAINER AND OPEN. CLOSE VALVE WHEN THEY ARE OUT.

CONTAINER LOCATION: LOCATED SO VALVE CAN REACH ALL AREAS OF HOME. BUILD UP CONTAINER SO WATER LINE IN VALVE END OF TUBING IS AT PREDETERMINED HEIGHT SUPPORT DEVICES WILL BE SET.

LEVELING OF SUPPORT DEVICE: SECURE VALVE ABOVE DETERMINED HEIGHT AND OPEN. ADJUST SUPPORT DEVICE AS NEEDED. CLOSE VALVE AND MOVE TO NEXT SUPPORT DEVICE.

LEVEL ALL SUPPORT DEVICES BEFORE LOWERING HOME.

NOTE: PIERS AT SUNKEN FLOOR WILL BE 10" TO 12 1/2" SHORTER THAN PIERS UNDER STANDARD I-BEAMS. MEASURE SUNKEN FLOOR I-BEAM SIZE AND LOWER PIERS UNDER THESE SUNKEN I-BEAMS ACCORDINGLY.

SET-UP PROCEDURES

5.3 Crossover connections for multisection homes

5.3.1 Utility crossovers. Connect water, drainage, gas, and electricity crossovers. Chapter 8 outlines the correct procedures.

5.4 Anchoring instructions. After blocking and leveling, the installer must secure the home against the wind. The type of installation determines how this should be done, as follows.

5.4.1 Normal installations. Table 5.1 summarizes normal installations. The piers and ground anchors system, described in this manual, is most common. When using another type of installation, consult a registered professional or structural engineer.

5.4.1.1 Installation of anchors. Install the anchors at the locations indicated in Figure 5.3, following the anchor manufacturer's instructions (see Minute Man instructions). Use singlehead anchors at all "frame-tie-only" locations. Line up the shaft of each anchor with its strap or use a stabilizing device in accordance with minute man instructions. See Minute Man Instructions Figures 1 and 3.

NOTE: WHEREVER THE WORDS "SHOULD", "SUGGESTED", OR "RECOMMENDED" ARE USED IN THE MINUTE MAN INSTRUCTIONS REGARDING THE USE OF STABILIZING DEVICES, THE INSTALLATION OF A STABILIZING PLACE SHALL BE CONSIDERED MANDATORY. WHEREVER A CONCRETE COLLAR IS RECOMMENDED AS A STABILIZING DEVICE, A STABILIZING PLATE SHALL BE USED.

5.4.1.2 Alt. anchoring equipment. Equivalent anchoring equipment may be used as long as it is capable of resisting an allowable working load equal to or exceeding 3150# and shall be capable of withstanding a 50 % overload (4,725 pounds total) without failure of either the anchoring equipment or the attachment point on the manufactured home.

5.4.1.3 Optional tie-downs. Optional "hurricane / over the roof straps" may be installed in addition to standard diagonal frame tie down straps. The diagonal frame tie-down straps carry all of the wind loads imposed on the structure. The "hurricane" straps are installed at the option of the manufacturer and at the customers request if local codes apply.

5.4.2 Severe climatic conditions

5.4.2.1 Freezing climates. Be sure anchor augers are installed below the frost line. During periods of frost heave, be prepared to adjust tension on the straps to take up slack.

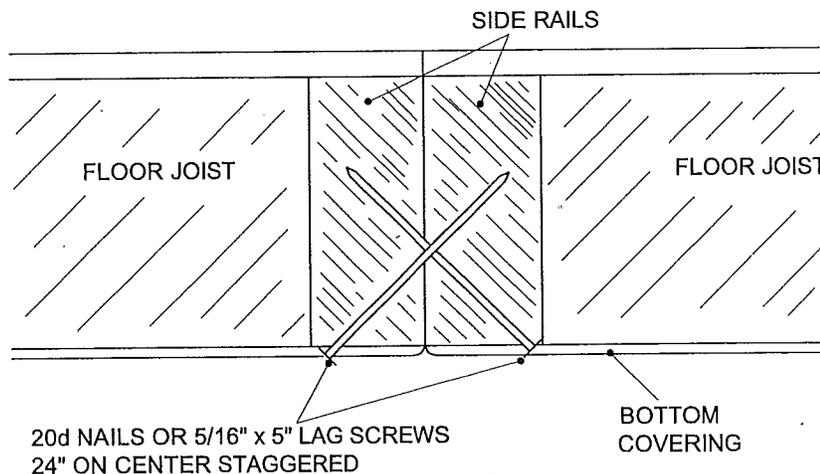
5.4.2.2 Severe wind zones. The manufacturer does not recommend installing your home in an area known to experience severe winds, or in any zone that requires greater wind resisting than those for which it was designed (see data plate). If a home must be installed in such a zone, seek the advice of a registered professional or structural engineer. Have engineered drawings showing foundation, connection, and anchorage details approved by local authorities. Design guidelines may be found in the HUD Permanent Foundations Guidebook (see Paragraph 4.5).

5.4.2.3 Flood prone areas. The manufacturer does not recommend siting manufactured homes in flood prone areas. Foundation considerations are discussed in Section 4.4.1 and the FEMA document referenced in Paragraph 4.5. unconventional anchorage and tie-downs are needed in designing and constructing the special elevated foundations that may be required in flood prone areas. Consult a registered professional or structural engineer.

LEVELING AND JOINING SECTIONS

1. Refer to the previous pages on single-section homes under "Set-Up Procedures" for the instructions on locating the piers and the use of a "water level" for proper leveling.
2. Next, remove any shipping braces from the sections.
Note: It is important to take special note of temporary structural supports and bracing locations, as they must be re-installed for any secondary move.
3. Before the final positioning of the second section, fiberglass insulation or an equivalent material must be fastened on the mating edges of the floor, walls, and ceiling to prevent insulation voids and/or air infiltration after the home is set-up. An alternative method would be to seal the joints with an approved caulk or similar material to prevent insulation voids and/or air infiltration. Material used for this purpose should not be placed in a position where it could restrict air ducts in the heating system, supply ducts, or return air ducts which might cross at the floor line or through the ridge beam. If the crossover duct system requires some sort of connection seal, make certain that it is in place prior to joining sections.
4. If you have a truck, position the second unit within a few inches of the first section and line up floors.
5. Whether the floors are several inches apart or several feet, it is recommended that a roller system be used to complete the positioning of the second section. The roller system consists of dollies which utilize rollers and are so constructed that hydraulic jacks can be positioned on the rollers and under the frame members allowing the frame to be rolled sideways very easily. Many service crews and installers have this equipment. It will minimize any possibility of frame damage which could void your warranty. See Figure 8.
6. Raise the second section the same way as the first section. Refer to the "Leveling and Blocking" section under "Set-Up Procedures", and Figure 8.
7. Position the pads and piers, and level each pier with the water level.
8. When this operation is complete, lower the jacks so that the steel frame members rest on the piers.
9. After the floors have been positioned tightly together and aligned, fasten the side rails of the floor with 20d nails or 5/16" x 5" lag screws driven at approximately a 45 degree angle to penetrate both rails. Drive the fasteners from alternate sides at 24" on center. See Figure 7. Pilot holes are to be drilled for lag screws to avoid splitting the rails. **DO NOT USE THE LAG SCREWS TO PULL THE HOME SECTION TOGETHER.** When one side of the floor is lower than the other, use a jack to raise the side rail of the low side. Once the floors are even, lag or nail the side rails together. Continue to check, level, and fasten the floors together for the length of the home. Any holes cut in the bottom covering must be repaired. Gaps of approximately 1/2" at roof, wall, or floor are acceptable if shims are used at fastener locations. If gap(s) result in less than 1 1/2" penetration then increase fastener size accordingly. Add insulation at gaps to prevent air infiltration.
10. For sunken floors at mating walls fasten the lower 2x3 to the opposite side rail/rim. Follow all of the above fastening and insulating procedures. See Figure 7.

FIGURE 7



LEVELING AND JOINING SECTIONS

10. Inside the home, the ceiling panels and the endwalls on each section must align with each other. If the sections are not in proper alignment, they may be adjusted by racking the house. This is done by raising the corner of an endwall that needs to go in at the top. This will cause the ceiling on the opposite side to move forward as illustrated in Figure 9. When the endwalls become flush, fasten them together at the front and back end of the house with 16d nails, or equivalent, spaced at 12" on center plus or minus 4". Once the endwalls are secured, make sure the roofs are aligned and the ceilings line up. If they are still off, rack the section a little more to bring the roofs and ceiling into alignment.
11. It is recommended that marriage line support posts, at doorways and openings, be toe nailed with 10d nails approximately 6" on center staggered.
12. By carefully inspecting the ceiling or by using a straight edge, low points can be determined. Start in the front and work to the back of the house. To raise the low portion, use a hydraulic jack and a padded tee underneath the low point. See Figure 11. Carefully raise the jack until the two ceiling sections are flush. Then, fasten the two ridge beams together on the outside of the home. This procedure should be repeated at each point where the outside of the ceiling is low.
13. To secure the two roof sections together, drive 5/16" x 5" lag screws at a 45 degree angle so they penetrate both ridge beams. Install the lag screws from alternate sides at 24" on center. Remember, the fasteners are used to keep the sections together and must **NOT** be used as a way to pull the roofs together. Units with optional 5/12 roof pitch require screws. See Figure 12.
14. On composition shingle roofs, cover the joint with a wide piece of roofing felt which is stapled to the underlaying roof decking. The staples should be 16 gauge x 1" x 1" and spaced a maximum of 6 inches apart. Shingles used for the ridge cap are to be 36" x 12" cut into three sections. Start from the end that is opposite the direction of the prevailing winds. overlap each shingle 6" and secure with (4) 16 gauge x 1" x 1" staples. See Figure 12.

NOTE: Certain areas of shingles may be secured with tack strips for transportation. Tack strips must be removed and any visible holes that are left by the tack strip fasteners must be filled with an approved sealer.

FIGURE 11

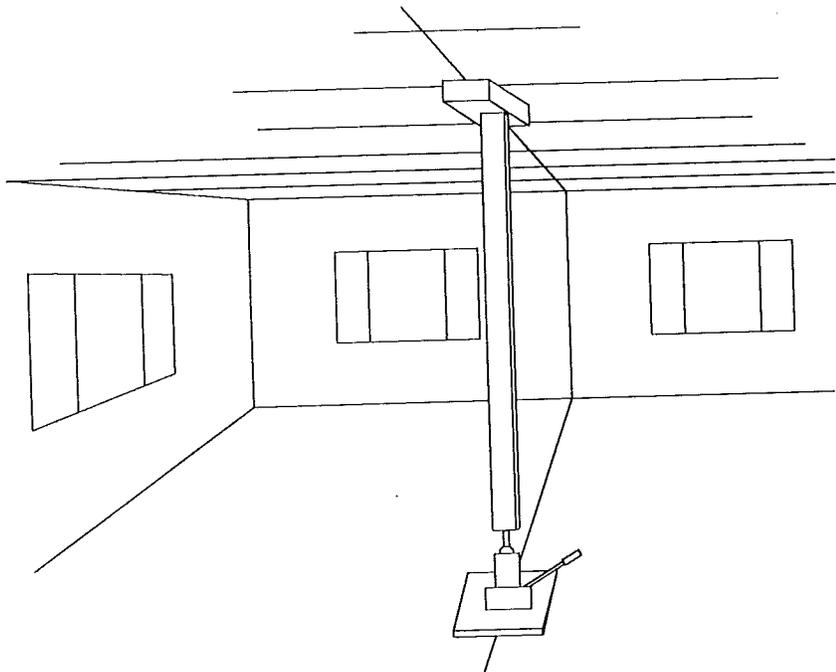
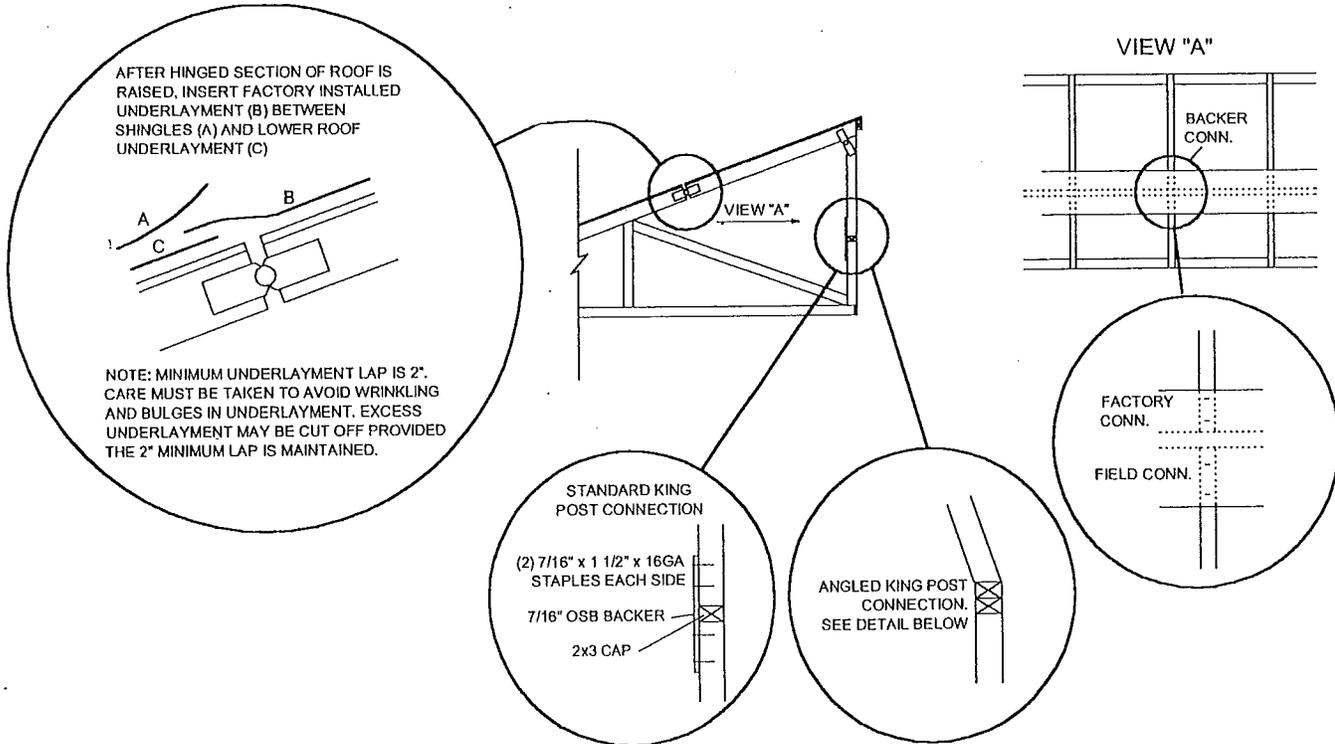
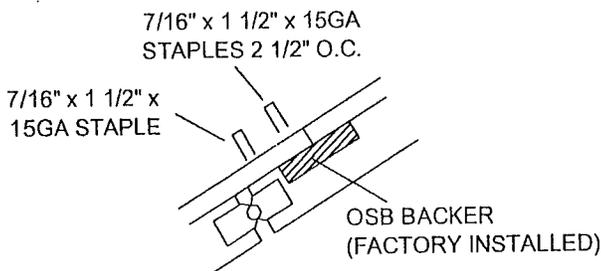


FIGURE 10 - PROCEDURES FOR ERECTING HINGED / HIP TRUSS ROOF

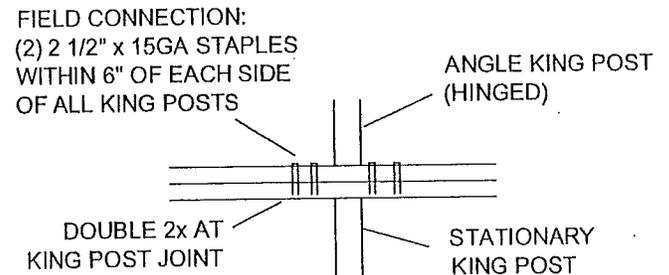
1. Remove close-up material (nails, plastic, and strips) from ends of home, marriage wall and roof.
2. Raise the roof into an upright position, raising it evenly so as not to jack any section higher than another, allowing each hinged post section to swing down and rest on the 2x3 cap along the top of the stationary posts.
3. Check to make sure the hinged king posts are tight to the stationary king post cap and fasten the OSB backer to the stationary king posts per the details shown below.
4. Secure the triangular pieces of 7/16" (or 3/8") OSB supplied to the diagonal end truss chords, top chords, bottom chords, and king posts with 7/16" x 1 1/2" x 16ga staples 2.5" o.c. or 15ga staples 4" o.c. (These may be shipped loose or attached to the hinged overhang.) Does not apply to hip roofs.
5. Install roof shingles per the manufacturers instructions and details in the set-up manual.
6. See doublewide set-up procedures in the set-up manual for remaining instructions on connecting the halves together.



ROOF DECKING FASTENING AT HINGE FOR 5/12 OR 7/12 ROOF PITCH

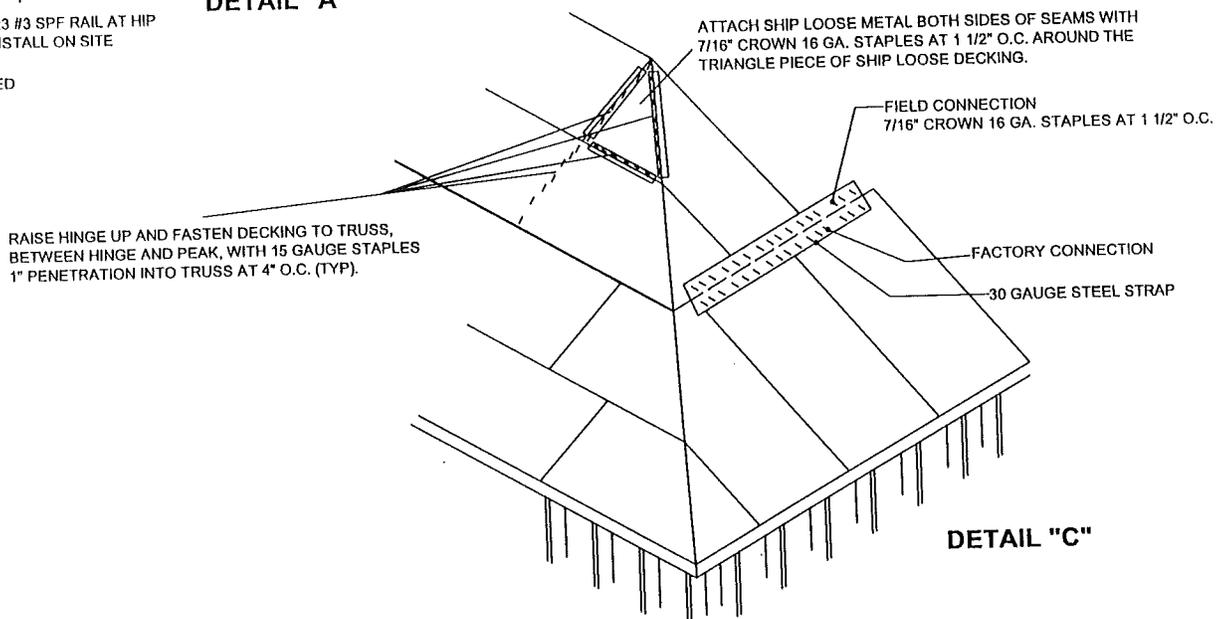
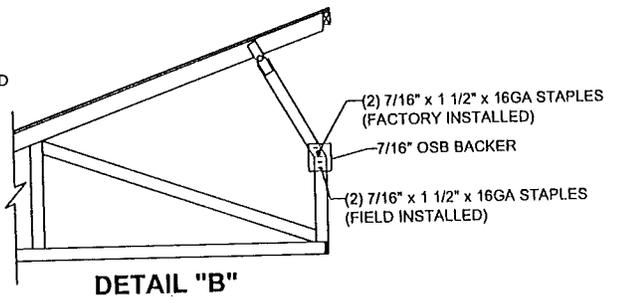
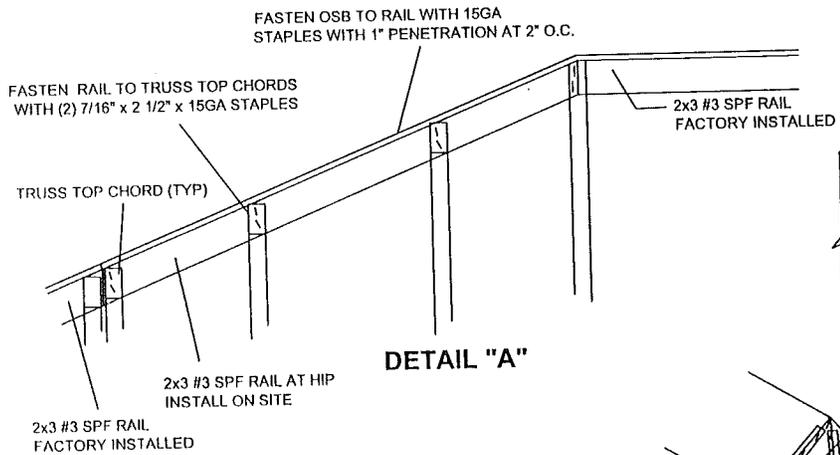
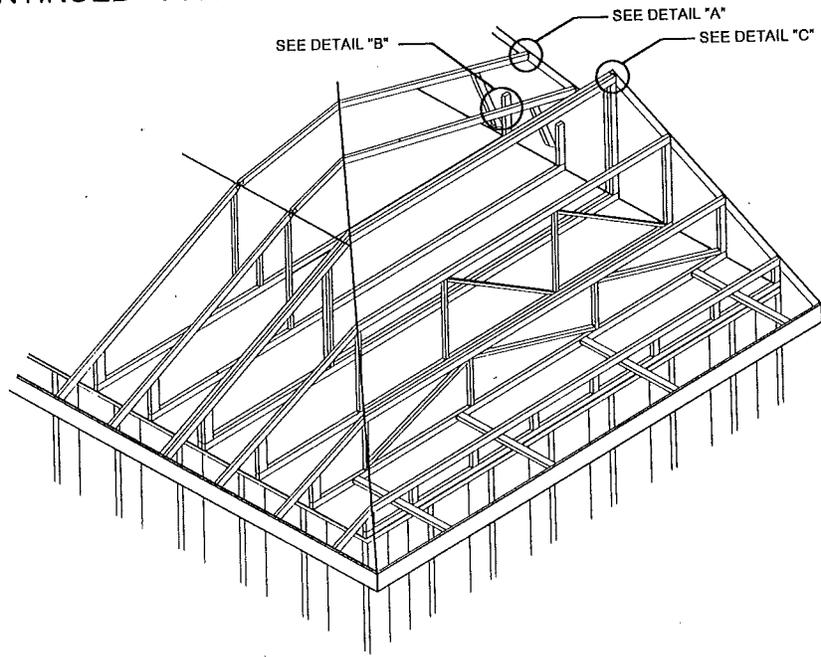


ANGLED KING POST JOINT CONNECTION FOR 5/12 OR 7/12 ROOF PITCH



1. Details not shown in 5/12 or 7/12 pitch same as standard details.
2. Staple roof decking to the OSB backer and rafter chords. The backer may be located above or below the hinge of the rafters.
3. Secure the triangular pieces of 7/16" (or 3/8") OSB supplied to the diagonal end truss chords, top chords, bottom chords, and king posts with 7/16" x 1 1/2" x 15ga staples 2" o.c. (These may be shipped loose or attached to the hinged overhang.)
4. Hip roof details continued on next page.

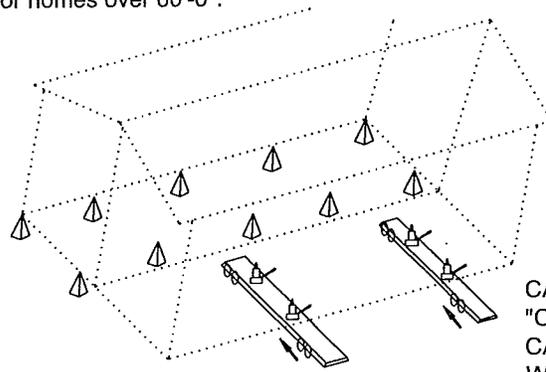
FIGURE 10 CONTINUED - PROCEDURES FOR ERECTING HINGED / HIP TRUSS ROOF



1. RAISE THE HIP ROOF INTO POSITION AND FASTEN 2x3 RAIL PER DETAIL A.
2. FASTEN OSB TO ANGLED KING POSTS (IN THE HIP AREA) PER DETAIL B.
3. FASTEN METAL STRIP PER DETAIL C.
4. DETAILS NOT SHOWN SAME AS DETAILS FOR 5/12 AND HINGED ROOF DETAILS.

FIGURE 8

Final positioning: After the two sections are side by side the dolly devices are placed behind the axle area and approximately midway in the front span of the second section. It is then raised using hydraulic jacks until the wheels are clear of the ground. Then, the two floors can be pulled tightly together by using a hand winch attached at the spring hangers. Check the alignment of the two floors. Make any adjustments needed. (2) dollies are shown we recommend (3) dollies for homes over 60'-0".



CAUTION: WHEN YOU USE A "COME ALONG" (HAND WINCH) BE CAREFUL AND DON'T EXCEED THE WORKING LOAD LIMIT OF THE DEVICE

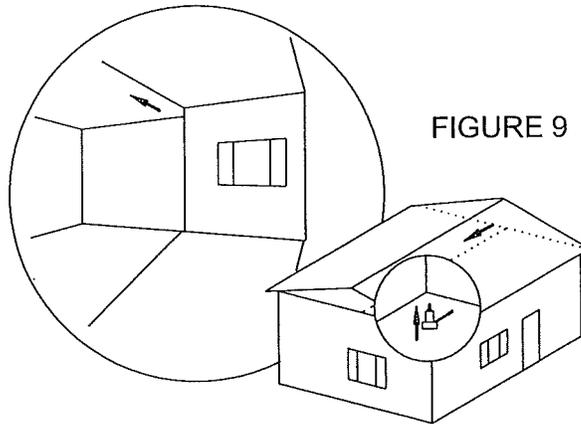
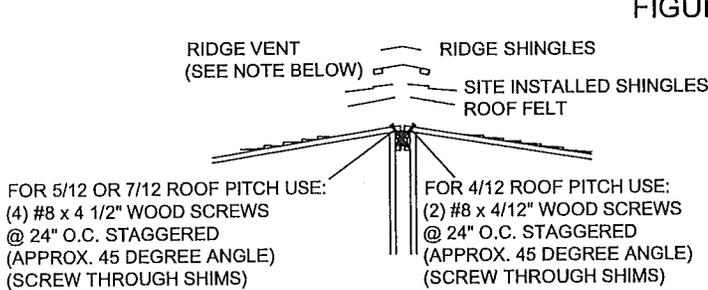


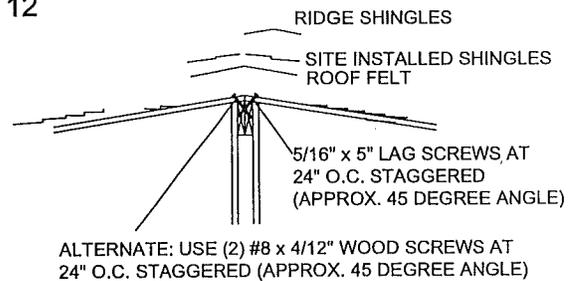
FIGURE 9

FIGURE 12

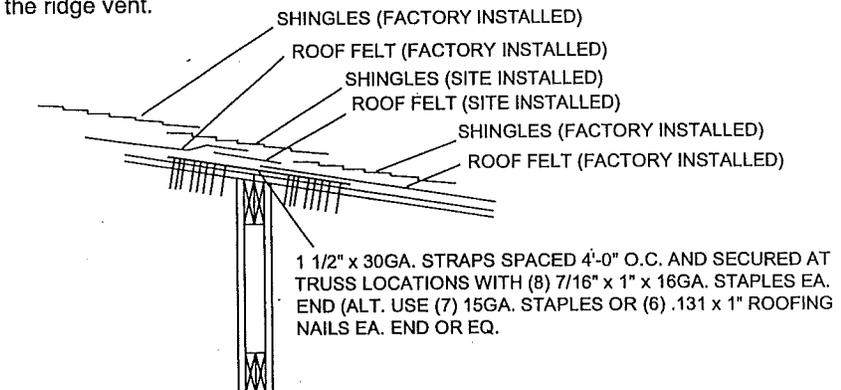


LAGGING HINGED ROOF

If equipped with ridge vents (shipped loose) follow installation instructions shipped with the ridge vent.



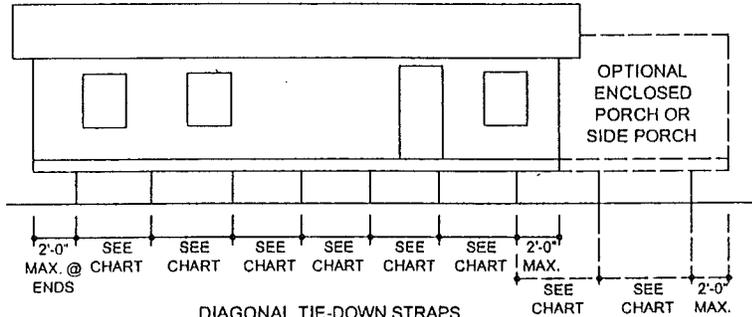
LAGGING STANDARD ROOF



STRAPPING FOR TRIPLE WIDE ROOF (IN PLACE OF LAGS)

CHAMPION MIDWEST TIE-DOWN DETAILS - TYPICAL

FIGURE 5.3

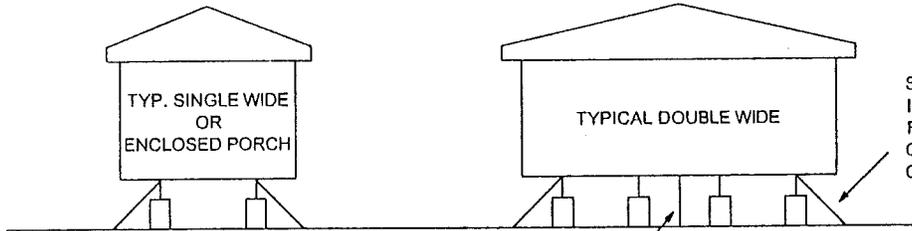
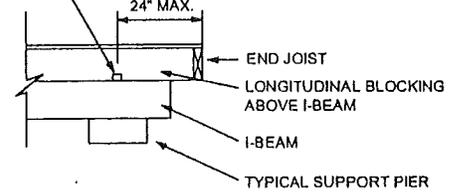


DIAGONAL TIE-DOWN STRAPS
LOCATE WITHIN 3'-0" OF PIERS
SEE CHART FOR SPACING

NOTE: DADO PROVIDED AT BOTTOM OF BLOCKING ABOVE I-BEAM TO ALLOW INSTALLATION OF DIAGONAL TIE-DOWN STRAPS AT EACH END OF HOME.

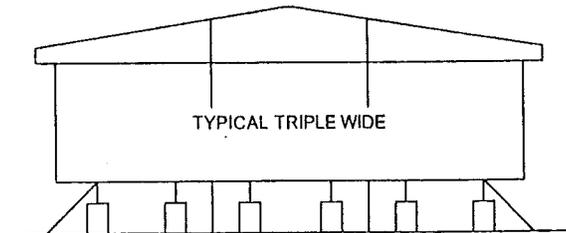
MAXIMUM TIE-DOWN SPACING

MAX. UNIT WIDTH	MAX. ROOF PITCH	MAX. SIDEWALL HEIGHT	MAX. TIE-DOWN SPACING
13'-4" THRU 40'-0"	4.3 / 12	96"	10'-10" O.C.
13'-4" THRU 40'-0"	4.3 / 12	102"	9'-2" O.C.
13'-4" THRU 40'-0"	4.3 / 12	108"	9'-2" O.C.
26'-8"	5 / 12	90"	6'-8" O.C.
26'-8"	5 / 12	96"	6'-5" O.C.
26'-8"	5 / 12	102"	5'-5" O.C.
26'-8"	5 / 12	108"	6'-0" O.C.
26'-8"	7 / 12	96"	5'-6" O.C.
26'-8"	7 / 12	108"	5'-2" O.C.
30'-4"	5 / 12	108"	5'-6" O.C.



SEE "CHART OF TIE-DOWN INSTALLATION DIMENSIONS" FOR ACCEPTABLE ANGLE OF TIE-DOWN DEPENDING ON PIER HEIGHT

VERTICAL STRAP TO ANCHOR AT EACH RIDGE
BEAM SUPPORT POST LOCATION FOR SPANS
OVER 4'-0". (STRAPS ARE FACTORY INSTALLED)

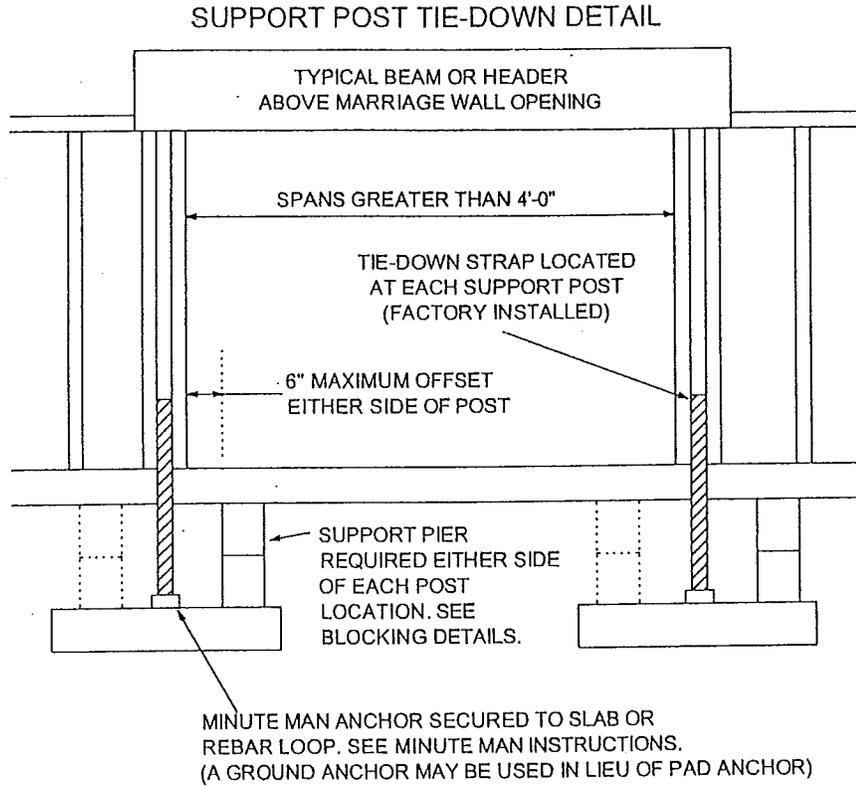


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SEE MINUTE MAN INSTRUCTIONS FOR TIE-DOWN MATERIALS, APPLICATIONS AND CONNECTIONS

CHAMPION MIDWEST
TIE-DOWN DETAILS - TYPICAL

FIGURE 5.3 CONTINUED



IMPORTANT: SOME MODELS MAY HAVE RIM JOIST CUT-OUT ADJACENT TO A SUPPORT POST FOR THE HEAT DUCT CROSSOVER. WHEN THIS OCCURS, THE SUPPORT BLOCKING MUST BE LOCATED ON THE SIDE OF THE SUPPORT POST OPPOSITE THE CUT-OUT.

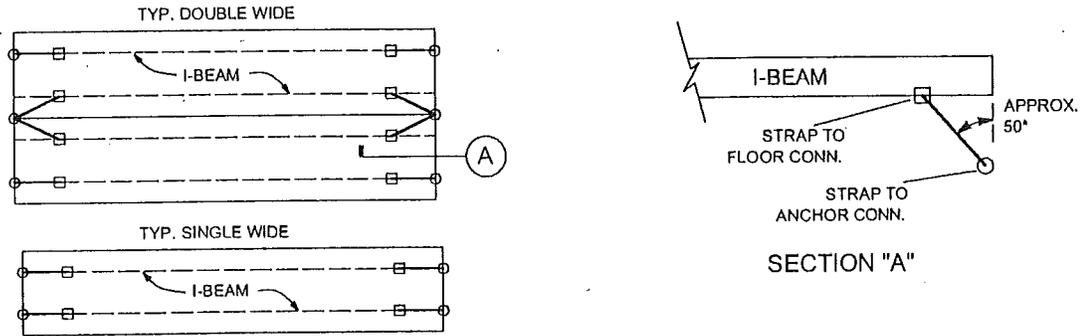


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CHAMPION MIDWEST LONGITUDINAL TIE-DOWN DETAILS - TYPICAL

FIGURE 5.4



- ANCHOR LOCATION
- FRAME CLAMP WITH TIE BRACKET

LONGITUDINAL TIE-DOWN REQUIREMENTS VARY DEPENDING ON PIER TYPE, HEIGHT, AND SPACING. THE SIZE OF THE UNIT WILL ALSO EFFECT LONGITUDINAL TIE-DOWN REQUIREMENTS. THE FOLLOWING CHART IS TO BE USED TO DETERMINE IF LONGITUDINAL TIE-DOWNS ARE REQUIRED. UNIT "BOX" LENGTHS SHOWN ARE THE MINIMUM LENGTHS REQUIRED TO OMIT LONGITUDINAL TIE-DOWNS. SEE "TYPICAL FOOTING AND PIER INSTALLATION" PAGE IN THIS MANUAL.

PIER SPACING	SINGLE WIDES				DOUBLE WIDES (96" SIDEWALL MAX.)			
	UNIT WIDTH/ ROOF PITCH	PIER TYPES (1,2,3,4)			UNIT WIDTH/ ROOF PITCH	PIER TYPES (1,2,3,4)		
		TYPE 1	TYPE 2A	TYPE 2B		TYPE 1	TYPE 2A	TYPE 2B
8' O.C.					24W - 4.3/12	52	52	52
	12W - 4.3/12	46	46	46	28W - 4.3/12	60	60	60
	14W - 4.3/12	52	52	52	28W - 5/12	60	60	60
					28W - 7/12	60	60	60
	16W - 4.3/12	55	55	55	32W - 4.3/12	62	62	62
10' O.C.					32W - 5/12	68	68	68
					24W - 4.3/12	54	54	54
	12W - 4.3/12	46	46	46	28W - 4.3/12	57	57	57
	14W - 4.3/12	54	54	54	28W - 5/12	59	59	59
	16W - 4.3/12	55	55	55	28W - 7/12	58	58	58
12' O.C.					32W - 4.3/12	64	64	64
					32W - 5/12	64	64	64
					24W - 4.3/12	52	52	52
	12W - 4.3/12	46	46	46	28W - 4.3/12	57	57	57
	14W - 4.3/12	52	52	52	28W - 5/12	59	59	59

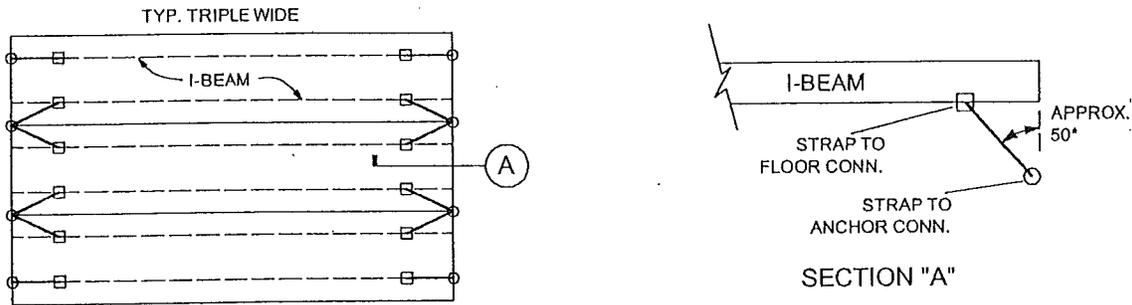
- FOOTNOTES:
 1. TYPE 1 PIERS 20" HIGH MAX.
 2. TYPE 2A PIERS 36" HIGH MAX.
 3. TYPE 2B PIERS 54" HIGH MAX. WITH CORES FILLED
 4. ALL HOMES SUPPORTED WITH TYPE 3 PIERS REQUIRE LONGITUDINAL TIE-DOWNS

PIER SPACING	DOUBLE WIDES (108" SIDEWALL MAX.)			
	UNIT WIDTH/ ROOF PITCH	PIER TYPES (1,2,3,4)		
		TYPE 1	TYPE 2A	TYPE 2B
8' O.C.	28W - 4.3/12	62	62	62
	28W - 5/12	68	68	68
	28W - 7/12	71	71	71
	32W - 4.3/12	68	68	68
	32W - 5/12	70	70	70
10' O.C.	28W - 4.3/12	64	64	64
	28W - 5/12	65	65	65
	28W - 7/12	74	74	74
	32W - 4.3/12	67	67	67
	32W - 5/12	70	70	74
12' O.C.	28W - 4.3/12	64	64	64
	28W - 5/12	65	65	65
	28W - 7/12	71	71	71
	32W - 4.3/12	67	67	67
	32W - 5/12	70	70	76

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LONGITUDINAL TIE-DOWN DETAILS - TYPICAL

FIGURE 5.4



- ANCHOR LOCATION (4 PER END, REQUIRED WHEN UNIT IS UNDER LENGTH IN CHART)
- FRAME CLAMP WITH TIE BRACKET (REQUIRED AT I-BEAM WHEN UNIT IS UNDER LENGTH IN CHART)

LONGITUDINAL TIE-DOWN REQUIREMENTS VARY DEPENDING ON PIER TYPE, HEIGHT, AND SPACING. THE SIZE OF THE UNIT WILL ALSO EFFECT LONGITUDINAL TIE-DOWN REQUIREMENTS. THE FOLLOWING CHART IS TO BE USED TO DETERMINE IF LONGITUDINAL TIE-DOWNS ARE REQUIRED. UNIT "BOX" LENGTHS SHOWN ARE THE MINIMUM LENGTHS REQUIRED TO OMIT LONGITUDINAL TIE-DOWNS. SEE "TYPICAL FOOTING AND PIER INSTALLATION" PAGE IN THIS MANUAL.

40' TRIPLE WIDES				
PIER SPACING	UNIT WIDTH/ ROOF PITCH	PIER TYPES (1,2,3,4)		
		TYPE 1	TYPE 2A	TYPE 2B
8' O.C.	40W - 4.3/12	52	52	52
10' O.C.	40W - 4.3/12	52	52	52
12' O.C.	40W - 4.3/12	52	52	52

- FOOTNOTES:
1. TYPE 1 PIERS 20" HIGH MAX.
 2. TYPE 2A PIERS 36" HIGH MAX.
 3. TYPE 2B PIERS 54" HIGH MAX. WITH CORES FILLED
 4. ALL HOMES SUPPORTED WITH TYPE 3 PIERS REQUIRE LONGITUDINAL TIE-DOWNS



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CHAMPION MIDWEST

Effective July 13, 1994, the following criteria shall be adhered to in addition to the tie-down and anchoring procedures contained in the installation manual:

- Ties shall have no more than 2'-0" space from each end of the home.
- Ground anchors shall be embedded below the frost line.
- Ground anchors shall be at least 12" above the water table.
- Stabilizer plates shall be installed to provide added resistance to overturning or sliding forces
- Protection shall be provided at sharp corners where anchoring system requires the use of external straps or cables.

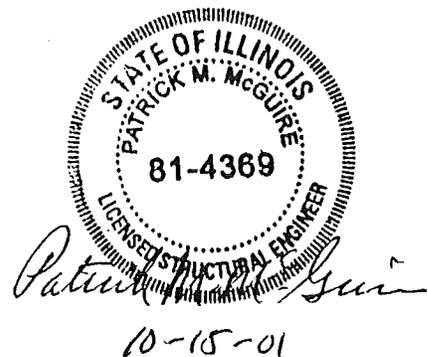


TABLE 5.1 - MANUFACTURED HOME INSTALLATIONS (SINGLE OR MULTISECTION HOMES)

TYPES OF FOUNDATION SYSTEMS - MAIN COMPONENTS*

1. Piers - Ground Anchors. Home rests on piers of concrete block, formed in place concrete, permanent wood or steel pedestals on permanent wood, crushed stone or concrete footers. Ground anchors in soil angled to resist straps or embedded in concrete deadmen in soil. Straps tied to the frame, with or without over the top straps.
2. Concrete slab or continuous footings. Home rests on a concrete slab or ribbons of concrete. Straps tied between frame and perimeter footers or concrete slabs.
3. Pile/post system. Home rests on pile/posts placed sufficiently deep in the ground to resist all wind, snow and earthquake forces. Straps fasten home to the piles/posts or caps placed thereon.
4. Concrete or concrete block load-bearing perimeter walls. Home rests on exterior load-bearing walls which sit on concrete footings, sufficiently heavy to hold down home to resist all external forces. Straps fasten home to walls.

*For multisection homes, the mating wall(s) is (are) supported by piers or wall(s) with straps and ground anchors, so that both downward and uplift forces are properly resisted.

CHAMPION MIDWEST

CHART OF TIE-DOWN INSTALLATION DIMENSIONS

95 1/2" I-BEAM SPACING ONLY

50 DEGREES MAXIMUM SPECIFIED ANGLE FROM VERTICAL
40 DEGREES MINIMUM SPECIFIED ANGLE FROM VERTICAL

UNIT SIZE	0" ANCHOR INSET FROM SKIRT		6" ANCHOR INSET FROM SKIRT	
	PIER HEIGHT MINIMUM	PIER HEIGHT MAXIMUM	PIER HEIGHT MINIMUM	PIER HEIGHT MAXIMUM
14 WIDE (13'-4")	27"	39"	22"	31"
16 WIDE (15'-2")	36"	51"	31"	44"
24 WIDE (22'-8")	17"	24"	12"	17"
28 WIDE (26'-8")	27"	39"	22"	31"
32 WIDE (30'-4")	36"	51"	31"	44"
40 WIDE (40'-0")	27"	39"	22"	31"

PIER HEIGHT - IS THE VERTICAL DISTANCE FROM THE TOP OF THE TIE-DOWN STRAP TO THE GROUND.
IF TIE-DOWN ANGLE EXCEEDS 50 DEGREES SEE PAGE 4 OF ANNEX A.
THE HEAD OF THE ANCHOR SHALL NOT BE INSTALLED OUTSIDE THE SKIRT.

82 1/2" I-BEAM SPACING ONLY

50 DEGREES MAXIMUM SPECIFIED ANGLE FROM VERTICAL
40 DEGREES MINIMUM SPECIFIED ANGLE FROM VERTICAL

UNIT SIZE	0" ANCHOR INSET FROM SKIRT		6" ANCHOR INSET FROM SKIRT	
	PIER HEIGHT MINIMUM	PIER HEIGHT MAXIMUM	PIER HEIGHT MINIMUM	PIER HEIGHT MAXIMUM
14 WIDE (13'-4")	32"	46"	27"	39"
16 WIDE (15'-2")	41"	59"	37"	52"
24 WIDE (22'-8")	22"	31"	17"	25"
28 WIDE (26'-8")	32"	46"	27"	39"
32 WIDE (30'-4")	41"	59"	37"	52"
40 WIDE (40'-0")	32"	46"	27"	39"

PIER HEIGHT - IS THE VERTICAL DISTANCE FROM THE TOP OF THE TIE-DOWN STRAP TO THE GROUND.
IF TIE-DOWN ANGLE EXCEEDS 50 DEGREES SEE PAGE 4 OF ANNEX A.
THE HEAD OF THE ANCHOR SHALL NOT BE INSTALLED OUTSIDE THE SKIRT.



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5.6 Installation of on site attached structures. Design all attached buildings and structures to support all of their own live and dead loads, and to have separation as required by state or local ordinances.

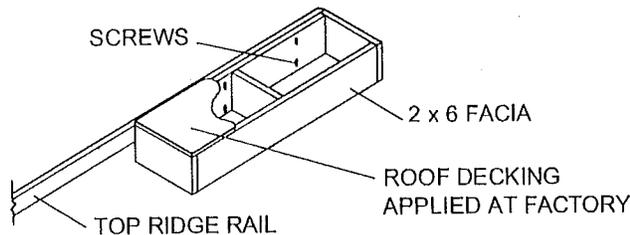
5.6.1 Expanding rooms. Manufacturer does not offer expanding rooms.

5.6.2 Attached garages. Attached garages must be installed according to the manufacturer's instructions and to all applicable local codes. They must be supported independently of the factory built portion of the home. Electrical circuits in garages should be provided with ground fault interruption.

5.6.3 Porches. Site constructed porches must be constructed and inspected according to applicable local building codes.

5.6.4 Steps, stairways, and landings. Steps, stairways, and landings must be constructed and inspected according to applicable local building codes.

5.6.5 Eyebrow or box eave. Use two #8 wood screws with 1 1/4" penetration through the 2 x 6 into the king posts of rafters. See detail below.



CHAPTER 6 - INSTALLATION OF OPTIONAL FEATURES

6.2 Deck and porch railings. When factory installed deck or porch floor is over 30 inches above the grade, install a guardrail 36 inches high. Stairs will require a 34 inch high guardrail measured from the nose of the treads. Check with the local building official having jurisdiction before installing guardrails. Build guardrail to whichever requirements are more restrictive.

6.3 Awnings and carports. Choose free standing products with columns to support their weight.

6.4 Accessory windows. Install accessory windows or components with the installation materials supplied, and follow the manufacturer's installation instructions.

6.5 Miscellaneous lights and fixtures. Some exterior lights, ceiling fans, and chain hung fixtures may not yet be installed when the home is delivered. All of these fixtures must be grounded by a fixture grounding screw or wire. For chain hung fixtures use both methods. When fixtures are mounted on combustible surfaces such as hardboard, install a noncombustible ring to completely cover the combustible surface exposed between the fixture canopy and the wiring outlet box. If siding has not been installed at a fixture location, remove the outlet box and install the siding with a hole for the outlet box. Then reinstall the outlet box and proceed as for other fixtures.

6.5.1 Exterior lights. Remove the junction box covers and make wire to wire connections using wire nuts. Connect wires black to black, white to white, and ground to ground. Caulk around the base of the light fixture and secure the light fixture to the junction box.

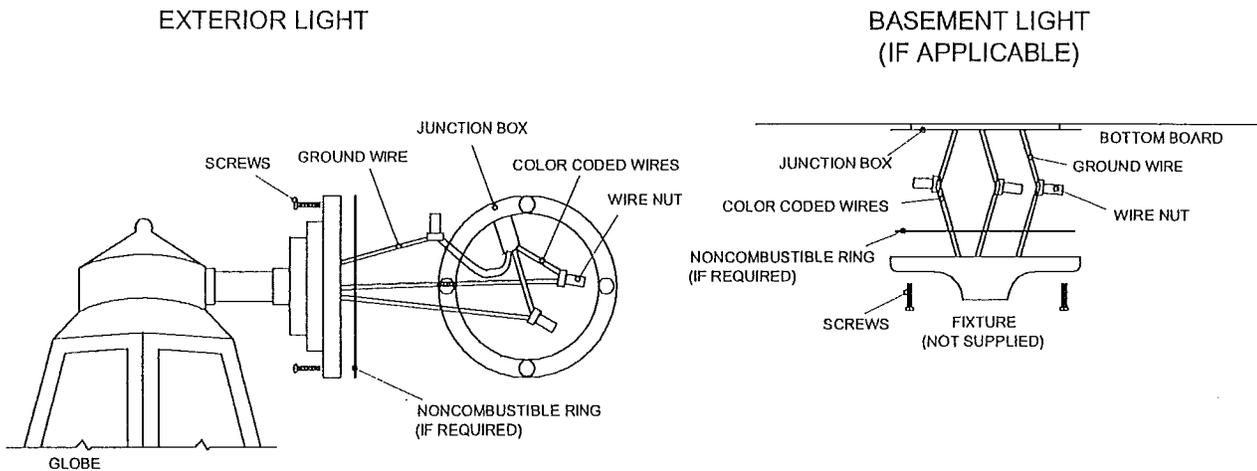
6.5.2 Ceiling fans. To reduce the risk of injury, install ceiling fans with the trailing edges of the blades at least 6'-4" above the floor. Connect the wiring as described in "ceiling fan installation", and follow the manufacturer's instructions, also see Figure 6.4.

6.5.3 Basement light. Some "ES" models come equipped with a junction box in the floor to provide power for a basement light fixture. This box is powered by turning on the switch to the stairwell light fixture. Refer to Figure 6.3.

FIGURE 6.3 - INSTALLATION OF EXTERIOR LIGHTS AND INSTALLATION OF BASEMENT LIGHTS

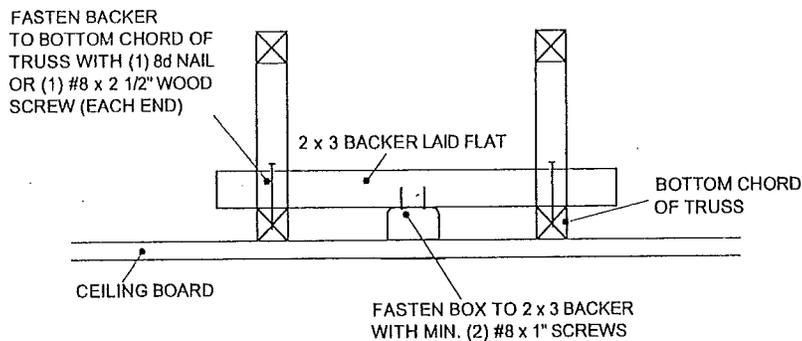
CAUTION:

Before installing electrical fixtures be sure that all power to the wire(s) is off. All electrical connections and installations to be performed by a qualified electrician in accordance with the 1993 edition of the National Electrical Code.



PROVISIONS FOR CEILING FAN

Note: This detail is applicable to U.L. listed paddle fans with a swivel type mounting bracket mounted to the 2 x 3 backer in addition to the box, in accordance with the manufacturer's installation instructions. The maximum paddle fan weight with or without accessories shall not exceed 35 pounds. If the box is to be used as the sole means of support for a fan (not exceeding 35 pounds) the box must be marked suitable for such use.



CEILING FAN INSTALLATION

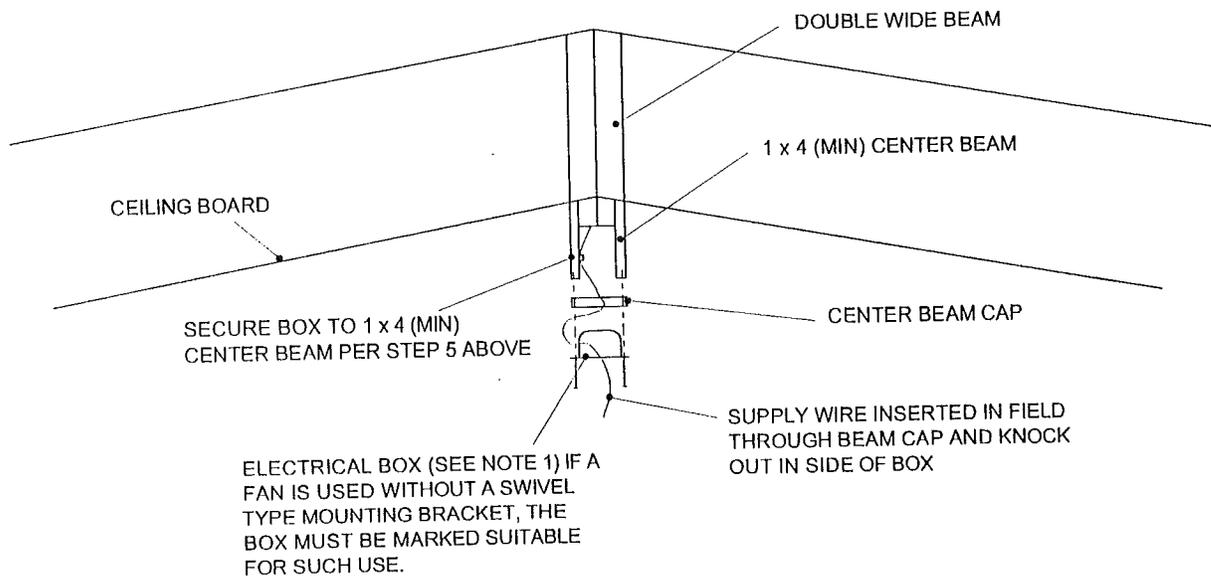
CAUTION: BEFORE INSTALL FAN BE SURE ALL POWER TO THE FAN WIRE IS OFF.

1. Remove the fan manufacturer's installation instructions from the package. Determine the method of fan attachment and refer to Figure 6.4.
2. If the center beam cap (shipped loose) does not contain a precut hole for the electrical box, cut a hole with a hole saw approximately 1/4" larger than the box diameter at the proper location (center of the hole should line up with the supply wire through the ceiling) and centered in the width of the beam.
3. Insert fan wire through the hole in center beam cap and secure to the 1 x 4 (min) center beams. Be sure not to pinch or penetrate the fan wire with the beam cap fasteners.
4. Insert the fan wire through the knock out hole in the side of the electrical box leaving approximately 4" of wire free within the box. Secure the wire to the box with the clamp provided inside the box.
5. Secure the box to the 1 x 4 (min) center beams with (2) #6 x 1 3/8 wood screws into each 1 x 4.
6. Strip about 3/4" insulation from the white and black conductor ends.
7. Follow the fan manufacturer's installation instructions for mounting the fan assembly to the box and for electrical connection of the fan. Use provided electrical connectors for splicing wire. Be certain that the fan is grounded as specified in the manufacturer's instructions and that the wires are connected properly (white to white and black to black).

NOTE: Applicable to U.L. listed paddle fan with a swivel type mounting bracket (also may be used for ceiling light).

Ceiling fan prep may be done inplant or on site by others.

FIGURE 6.4



CHAPTER 7 - PREPARATION OF APPLIANCES

7.1 Clothes dryer vent. Your clothes dryer must exhaust to the exterior of the home, or any perimeter skirting install around it, through a moisture lint exhaust system, as shown in Fig. 7.1.

Important: DO NOT let the exhaust system end under the home where excess moisture or flammable material can accumulate. All required components and fittings are provided with the home. (or, alternatively: install a flex duct after the home is set up at the site. Hold the duct in place with metal straps spaced 2' on center secured to the bottom of the floor joists or frame.) Vent openings are located in either the wall or the floor. After the duct is installed, seal around openings, both inside and outside. Follow the dryer manufacturer's instructions for installing the exhaust system.

If your home did NOT come equipped with a gas dryer, remember that installing one requires substantial alteration to the home. You must provide gas supply piping and adequate venting as specified by the gas dryer manufacturer. Only a trained and experienced person should install a gas dryer. Cutting major structural elements (such as rafters or floor joists) to allow for gas dryer installation is not permissible. Home manufacturer is not responsible for any weakening of the home's structural soundness resulting from dryer installation.

7.2 Fireplace and gas furnace and air inlets. Fireplaces require on site installation of additional section(s) of approved, listed chimney pipe, a spark arrestor, and a rain cap assembly. A gas furnace flue will require assembly of flue and roof jack on site. See Figure 7.5 and manufacturer's instructions included with your home

7.2.1 Minimum extensions above roof. To assure sufficient draft for proper operation, extend the finished chimney at least 3 feet above the highest point where it penetrates the roof and at least 2 feet higher than any building or other obstruction located within a horizontal distance of 10 feet. If the site has obstructions extending higher than the home's roof peak within 10 feet of the chimney, the installer may have to provide an additional section of chimney pipe if required by local codes.

7.2.2 Required components. The required components of a correctly installed chimney or furnace flue are as shown in Figure 7.5.

7.2.3 Install the top sections of fireplace flue and gas furnace flue per the manufacturer's installation instructions.

CHAPTER 8 - UTILITY SYSTEM CONNECTION AND TESTING

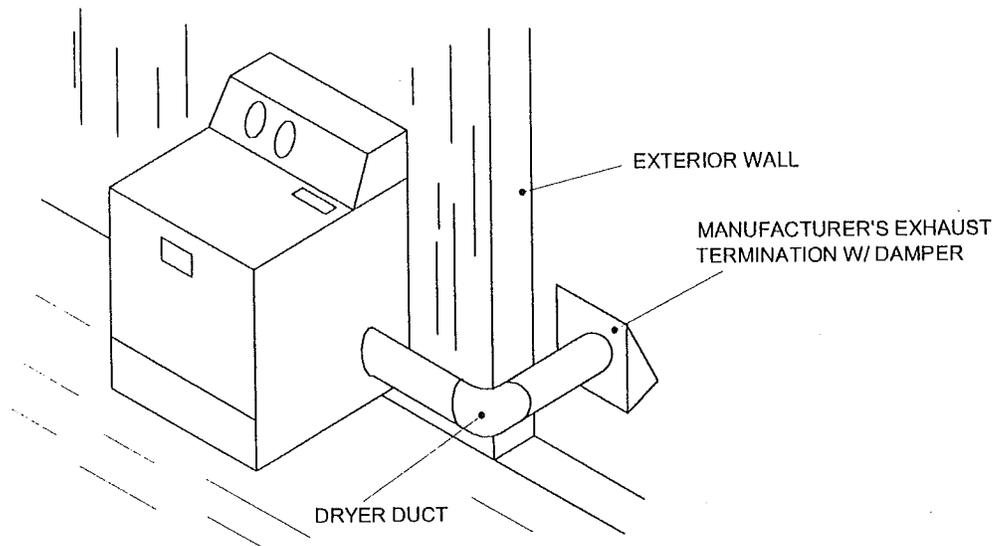
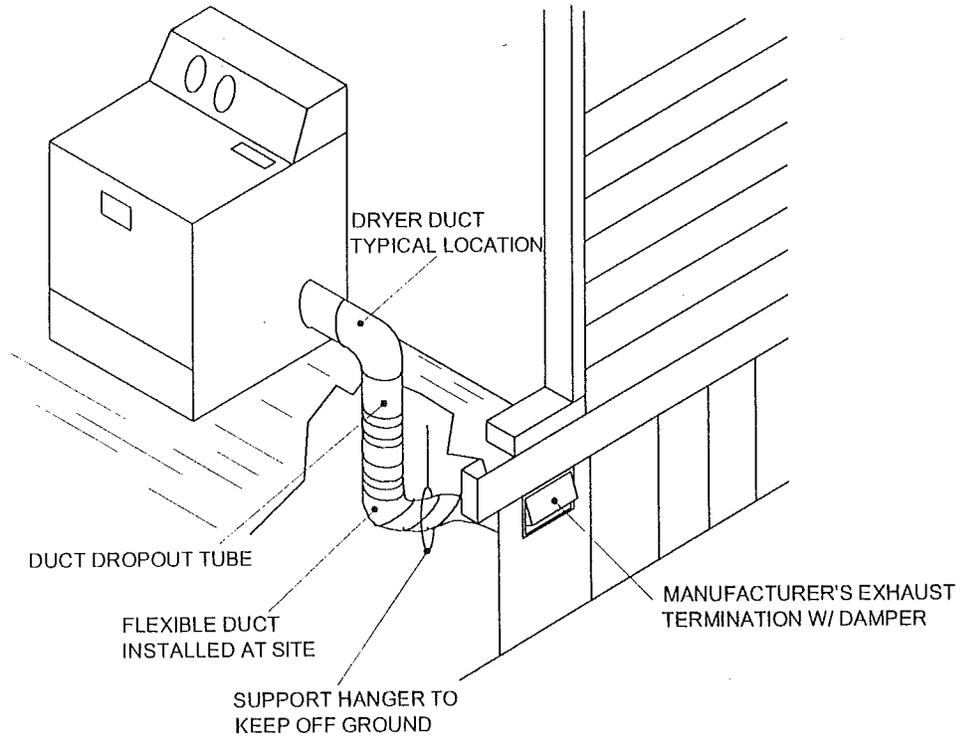
8.1 Proper procedures. Consult local, country, or state authorities before connecting any utilities. Only qualified service personnel, familiar with local codes and licensed where required, should make utility connections and conduct tests.

8.2 Water supply

8.2.1 Maximum supply pressure and reduction. The water systems of your home were designed for a maximum inlet pressure of 80 psi. If you are located in a water district where the local water supply pressure exceeds 80 psi, install a pressure reducing valve.

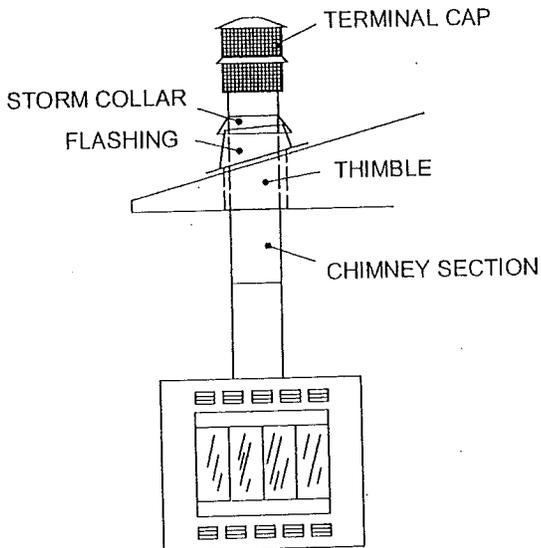
DRYER EXHAUST SYSTEM FIGURE 7.1

CAUTION: INSTALLATION OF THE EXHAUST SYSTEM MUST BE IN ACCORDANCE WITH THE DRYER MANUFACTURER'S INSTRUCTIONS. THE DUCT MATERIAL SHALL BE AS DESCRIBED IN DRYER INSTRUCTIONS. THIS EXHAUST SYSTEM MUST NOT TERMINATE INSIDE THE FLOOR CAVITY OR UNDER THE HOME.



OPTIONAL FIREPLACE CHIMNEY AND FURNACE FLUE INSTALLATION FIGURE 7.5

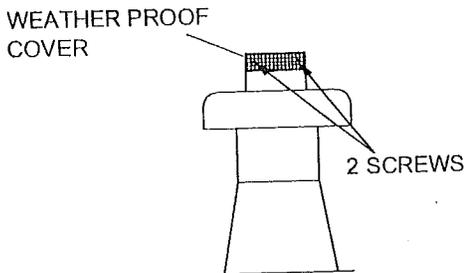
NOTE: PLEASE REFER TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS BEFORE STARTING INSTALLATION AND FOLLOW ALL INSTRUCTIONS CAREFULLY THROUGHOUT THE PROJECT.



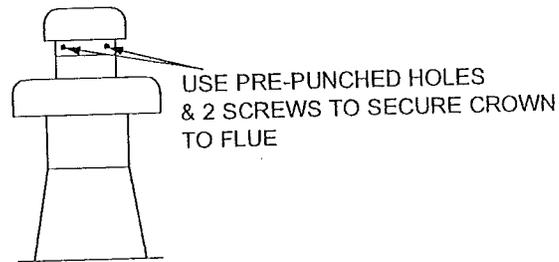
ON-SITE ASSEMBLY TO BE PER THE MANUFACTURER'S INSTRUCTIONS PROVIDED WITH THE HOME.

WARNING !
FIREPLACE CHIMNEY AND FURNACE FLUE PIPE AND TERMINATIONS MUST BE COMPLETE PRIOR TO OPERATION OF EITHER OF THE APPLIANCES.

FIREPLACE CHIMNEY INSTALLATION



SHIPPING MODE



AFTER ASSEMBLY

PROCEDURE

1. REMOVE THE COVER AND 2 SCREWS FROM THE FLUE. SAVE THE SCREWS.
2. SLIDE THE ASSEMBLY OVER THE FLUE, CORRECTLY ALIGNING THE PRE-PUNCHED SCREW HOLES WITH THOSE ON THE FLUE PIPE.
3. SECURE THE ASSEMBLY TO THE FLUE WITH THE 2 SCREWS REMOVED FROM THE FLUE COVER.
4. REMOVE THE WARNING LABELS FROM THE SUPPLY CONNECTION OF THE HOME AND FROM THE THERMOSTAT AND FURNACE.

FURNACE ROOF JACK CROWN ASSEMBLY

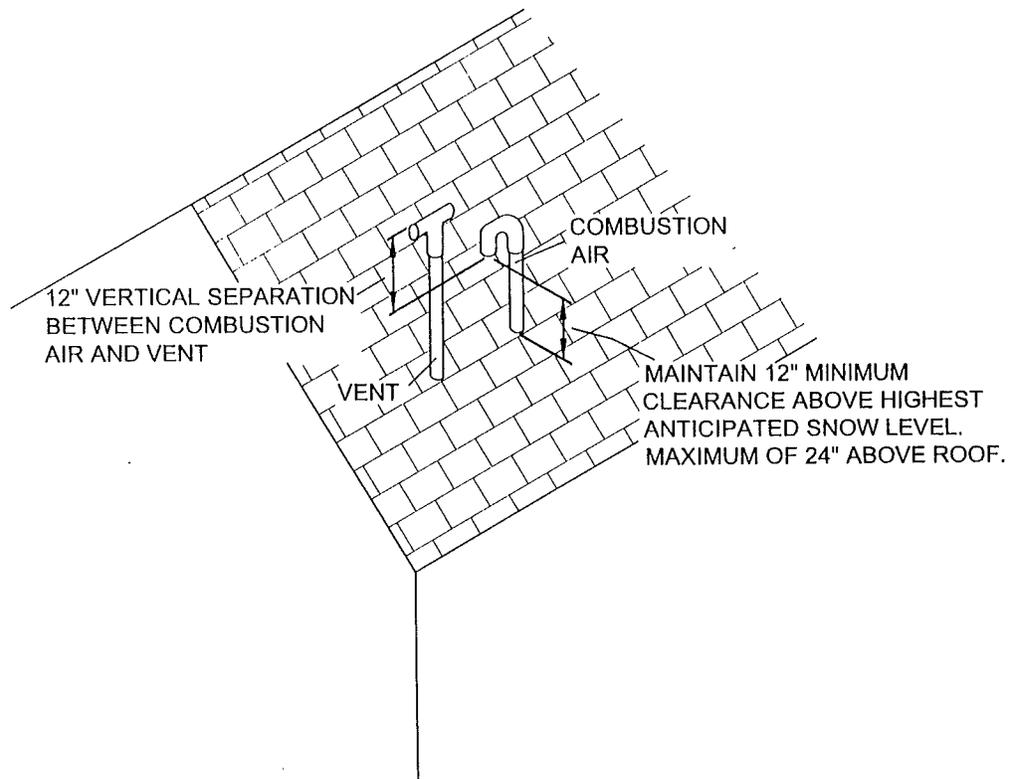
OPTIONAL FIREPLACE CHIMNEY AND FURNACE FLUE INSTALLATION FIGURE 7.5 CONTINUED

Note: Please refer to the manufacturer's installation instructions before starting installation and follow all instructions carefully throughout the project.

Note: Ensure termination height is above anticipated snow level (see diagram).

Note: If assembly is too short to meet height requirement, replace the 2 pipes supplied in the kit with the same diameter and material pipe. Maintain 12" minimum clearance above the highest anticipated snow level, maximum of 24" above roof.

1. Vent termination (2-pipe), standard PVC, SDR, or ABS pipe and fittings may be used.
2. Primer and cement must conform to ASTM D2564 for PVC, or ASTM D2235 for ABS piping.
3. Operate furnace through one heat cycle to verify proper system operation.



UTILITY SYSTEM CONNECTION AND TESTING

8.2.2 Connection procedures

- 8.2.2.1 To supply mains. Connect the home's water system to the water source through the inlet located under the home, usually below the water heater compartment. A tag on the side of the home marks its location.
- 8.2.2.2 Mandatory shutoff valve. You MUST install an accessible shutoff valve between the water supply and the inlet, as shown in Figure 8.1. It must be a full flow gate or ball valve.
- 8.2.2.3 Crossovers. Multisection homes with plumbing in both sections require water line crossovers as shown in Figure 8.2. Remove the shipping cap from the water lines and install the crossover connectors provided with the home. If freezing can occur, wrap water connectors with insulation.

8.2.3 Freezing protection

- 8.2.3.1 Necessity. In areas subject to subfreezing temperatures, protect exposed sections of water supply piping, shutoff valves and pressure reducers, and pipes in water heater compartments with uninsulated doors, from freezing. Otherwise, burst pipes and costly damage may result.
- 8.2.3.2 Use of heat tapes. Heat tapes (either automatic or non-automatic) can protect exposed plumbing from freezing. USE ONLY HEAT TAPES LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY FOR USE WITH MANUFACTURED HOMES, AND INSTALL THEM ONLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. Plug the three wire, grounded cordset of the heat tape into the outlet located under the home near the water supply inlet (Figure 8.1).
 - 8.2.3.2.1 Automatic heat tape. This tape (with a thermostat) is approved for installation on all types of water pipe, including plastic. Secure it to the pipe, insulate it, and waterproof it, according to the manufacturer's instructions.
 - 8.2.3.2.2 Non-automatic heat tape. This tape (without a thermostat), may not be approved for plastic pipe unless it is left exposed, with no outer wrap of insulation. Installation is otherwise the same as with automatic heat tape. Always use manufacturer's instructions.

8.2.4 Testing procedures. Even though the water system was tested at the factory, it must be rechecked for leaks at the installation site. Close all water faucets, spigots and stool tank float valves, and use one of the following procedures:

- 8.2.4.1 Hydrostatic. Be sure the water heater tank is full of water. Pressurize the system with water at 100 psi, and then isolate it from the pressure source. The system must hold this pressure for at least 15 minutes without any loss. If the pressure falls off repressurize the system and locate and correct leaks.

UTILITY SYSTEM CONNECTION AND TESTING

8.2.4.2 Pneumatic. CAUTION: IF THIS PROCEDURE IS USED, YOU MUST BYPASS THE HOT WATER TANK BY HOOKING THE INLET AND HOT OUTLET LINES TOGETHER. THIS PROCEDURE WILL PROTECT THE APPLIANCE AND PROTECT THOSE INVOLVED IN THE TEST FROM POSSIBLE INJURY. Connect an air pump and pressure gauge to the water inlet and pressurize the system to 100 psi. Isolate the pressure source from the system. The gauge must stand for at least 15 minutes with no drop in pressure. Correct any leaks indicated by bubbles from soapy water, rinse off soap from any fittings and wipe, repeating the procedure until all have been eliminated. Reconnect the water heater and water supply.

8.3 Drainage system

8.3.1 Assembly and support. If portions of the drainage system were not installed at the factory, all materials and diagrams required to complete it have been shipped as loose items in the home. Assemble the drainage system following the manufacturer's specific instructions and diagrams. Start at the most remote end and work toward the outlet, supporting the piping with temporary blocking to achieve the proper slope (see Paragraph 8.3.2). When the entire system has been completed, install permanent drain line supports at 4 feet on center, as shown in Figure 8.3.

8.3.2 Proper slopes and connector sizes. Drain lines must slope 1/4" fall per foot of run unless otherwise noted on the schematic diagram (see Fig. 8.4). Exception: 1/8" fall per foot is allowed when a cleanout is installed at the upper end of the run. Connect the main drain line to the site sewer hookup using an approved elastomer coupler (see Fig. 8.5).

8.3.3 Crossovers. Connect multisection home drainage line crossover as shown in specific detail provided with your home.

8.3.4 Solvent welding procedures. The solvent cement to connect drain lines must be compatible with the pipe installed in the home. Follow the manufacturer's instructions on the container.

8.3.5 Protection from freezing. Manufacturer has insulated the fittings in the drainage system subject to freezing, such as P-traps in the floor. Replace this insulation if removed during assembly or testing. Insulate drain lines installed below the bottom board in areas subject to freezing as shown in Figure 8.7. If the home is to be left unheated in cold weather, pour an approved antifreeze into p-traps at all fixtures and stools.

8.3.6 Flood level procedure. You must conduct a flood level test on the completed drainage system. With the home in a level position, all fixtures connected, and all tub and shower drains plugged, cap the drainage piping system at the outlet, and then fill the drainage system with water to the rim of the toilet bowl. Release all trapped air. Allow the system to stand for at least 15 minutes. Check for leaks. drain the system. Plug all fixtures, sinks, showers, and tubs, and fill with water. Release the water in each fixture simultaneously to obtain the maximum possible flow in the drain piping. Check all P-traps and the drain system for possible leaks. Repair any leaks and retest.

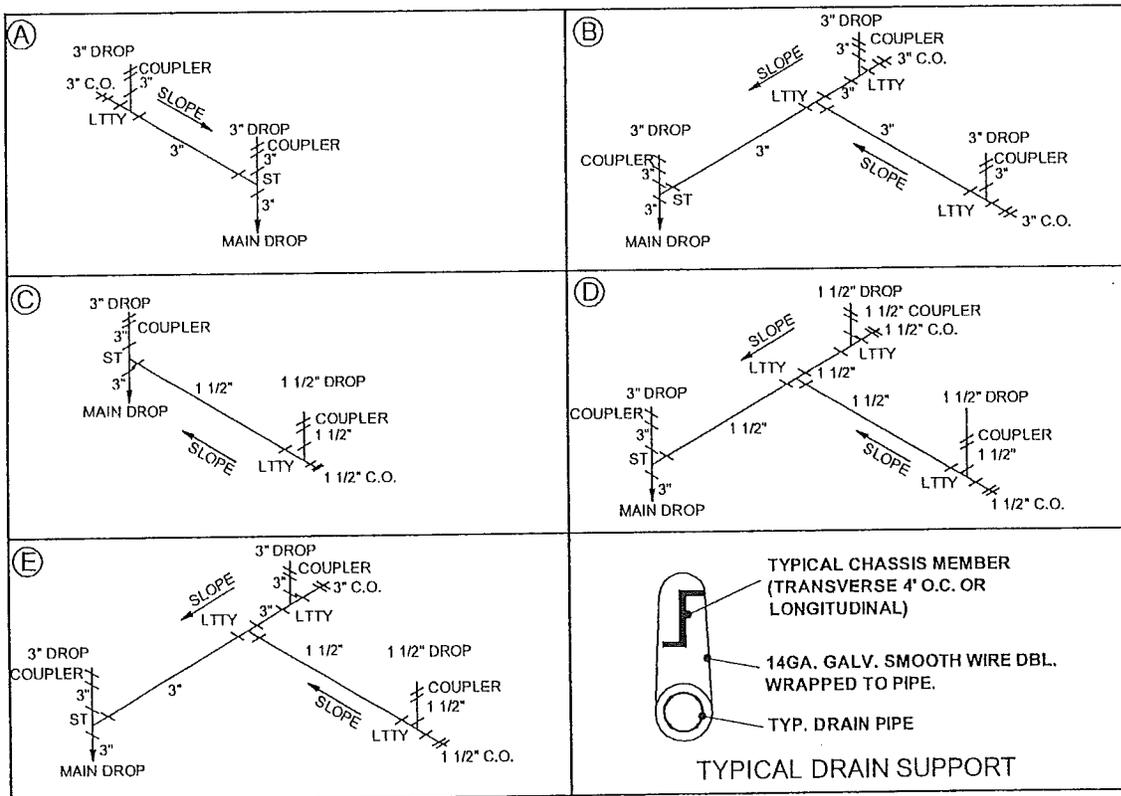
ON-SITE DWV INSTALLATION

FIELD INSTALLED DRAIN LINES BELOW FLOOR

ALL REQUIRED PIPE, GLUE, AND SUPPORT NECESSARY TO COMPLETE FIELD INSTALLED DRAINS ARE SHIPPED WITH THE HOME.

PROCEDURE

- 1) LOCATE THE OUTLET BELOW THE HOME. USING THE APPLICABLE DRAWING, LOCATE THE NECESSARY FITTINGS FOR EACH OUTLET AND SECURE THE FITTINGS TO THE OUTLETS.
 - A) POSITION FITTINGS ON DROPS TO ROUTE DRAINS PERPENDICULAR TO FRAME MEMBERS SPACED 4' O.C. OR DIRECTLY BELOW TRANSVERSE FRAME MEMBERS FOR INSTALLATION OF DRAIN SUPPORTS.
 - B) FITTINGS MUST BE POSITIONED TO ALLOW 1/4" PER FOOT SLOPE TOWARD THE MAIN OUTLET. (IF A CLEAN-OUT IS LOCATED AT THE UPPER END, A MINIMUM SLOPE OF 1/8" PER FOOT IS ACCEPTABLE).
 - C) ALL FITTING CONNECTIONS SHALL BE PER THE INSTRUCTIONS PRINTED ON THE GLUE CONTAINER.
- 2) STANDARD LENGTHS OF PIPE ARE PROVIDED. CUT PIPE AS REQUIRED FOR LENGTH OF RUN. (CUT ENDS MUST BE DE-BURRED BEFORE BEING CONNECTED) COUPLINGS ARE PROVIDED TO JOIN LENGTHS OF PIPE IF NECESSARY.
- 3) AFTER FITTINGS ARE INSTALLED AND PIPE SECTIONS ASSEMBLED, CONNECT THE ASSEMBLY TO THE FITTINGS AT THE OUTLETS USING THE GLUE PROVIDED.
- 4) SUPPORT THE DRAIN LINES 4' O.C. USING THE HANGERS PROVIDED. AS AN ALTERNATE, 30GA x 3/4" STEEL OR SIGNODE 1/2" STRAPS MAY BE USED IN PLACE OF THE ONES PROVIDED WITH THE HOME. ALTERNATE HANGERS AND FASTENERS MUST BE PROVIDED BY THE OWNER OR CONTRACTOR. SECURE ALTERNATE STRAPS TO FRAMING WITH #8 x 1" SCREWS 4' O.C. SELF TAPPING SCREWS MAY BE USED WHEN STRAPS ARE SECURED TO CHASSIS MEMBERS.
- 5) IF YOUR HOME IS LOCATED IN AN AREA SUBJECT TO EXTREME COLD, PROVISIONS SHOULD BE TAKEN TO PREVENT LINES FROM FREEZING BY WRAPPING DRAINS WITH INSULATION.

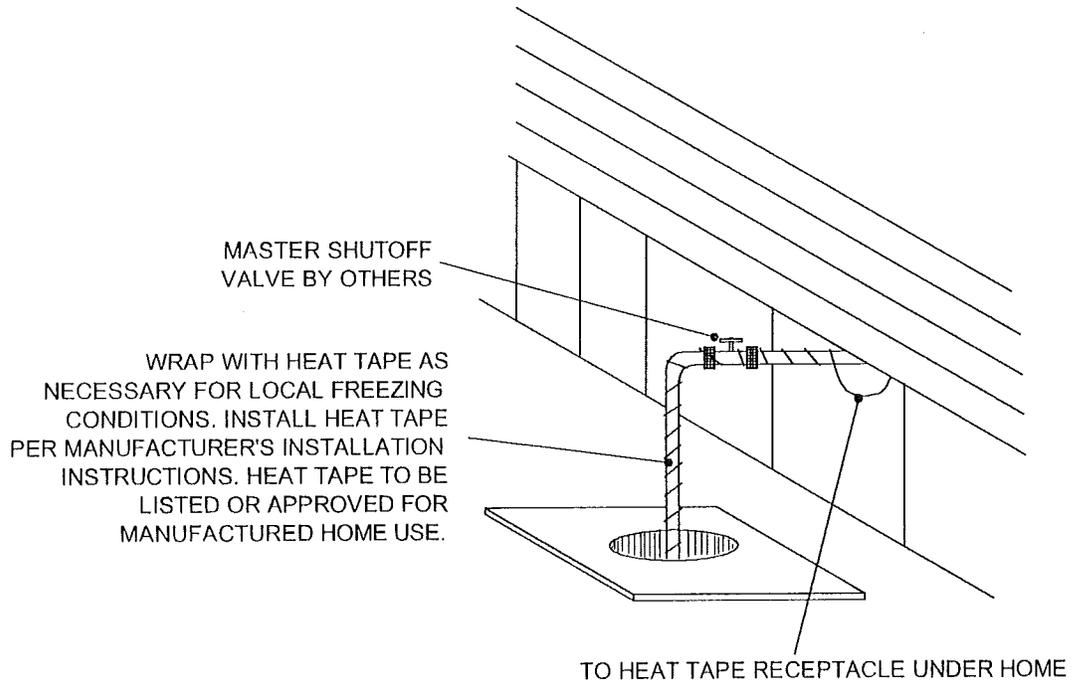


FOR HOMES WITH TWO 3" DROPS USE DETAIL A.
 FOR HOMES WITH THREE 3" DROPS USE DETAIL B.
 FOR HOMES WITH A 1 1/2" AND A 3" DROP USE DETAIL C.
 FOR HOMES WITH TWO 1 1/2" DROPS AND A 3" DROP USE DETAIL D.
 FOR HOMES WITH TWO 3" DROPS AND A 1 1/2" DROP USE DETAIL E.

DUE TO CLEANOUTS BEING PROVIDED AT DROPS, FIELD INSTALLERS CAN DECIDE WHICH DROP WILL BE THE MAIN DROP ON SITE. THE CLEANOUTS AT UPPER END FACILITATE PIPE BEING SLOPED FROM THAT END.

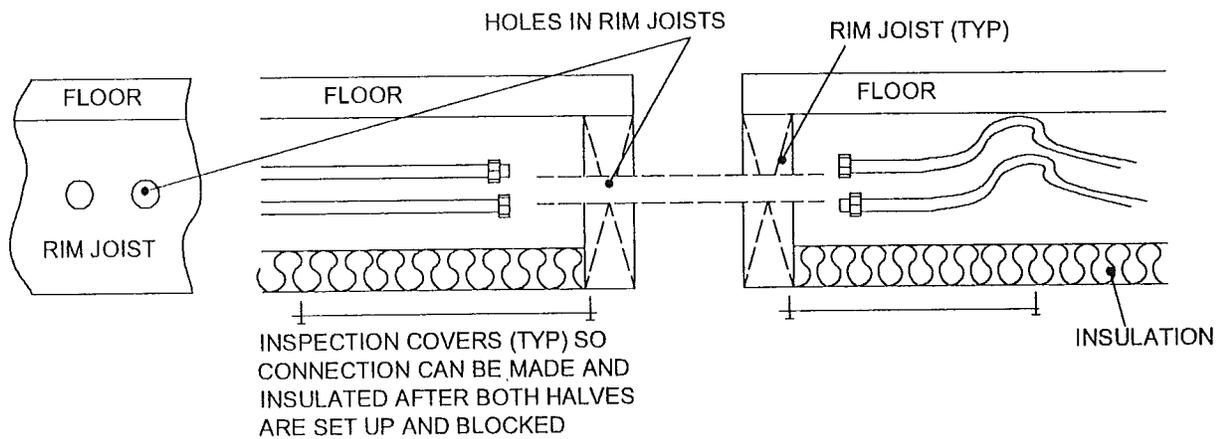
TYPICAL WATER CONNECTION

FIGURE 8.1



TYPICAL WATER LINE CROSSOVER

FIGURE 8.2



CAUTION: IF FREEZING CONDITIONS EXIST, WRAP WATER CONNECTOR WITH INSULATION. USE WATER CONNECTORS SUPPLIED BY MANUFACTURER WHERE APPLICABLE.

DRAIN PIPE SUPPORT METHODS

FIGURE 8.3

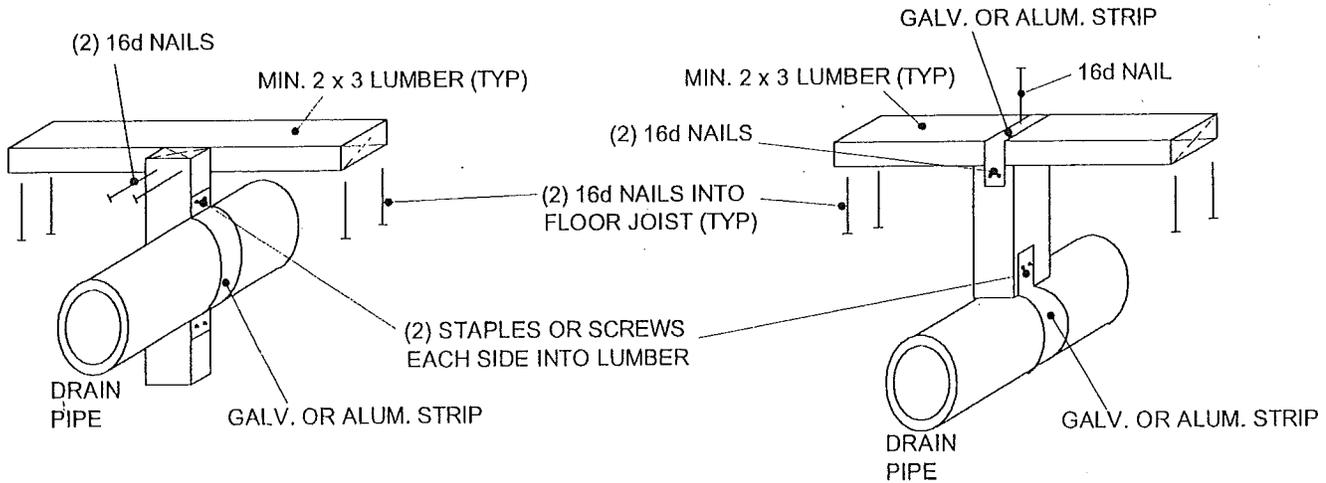
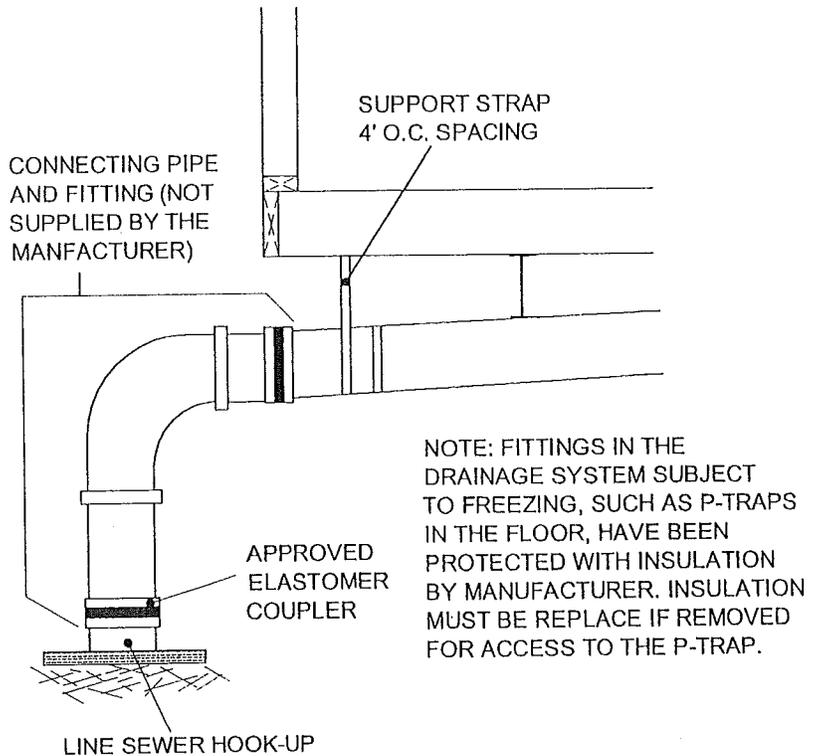
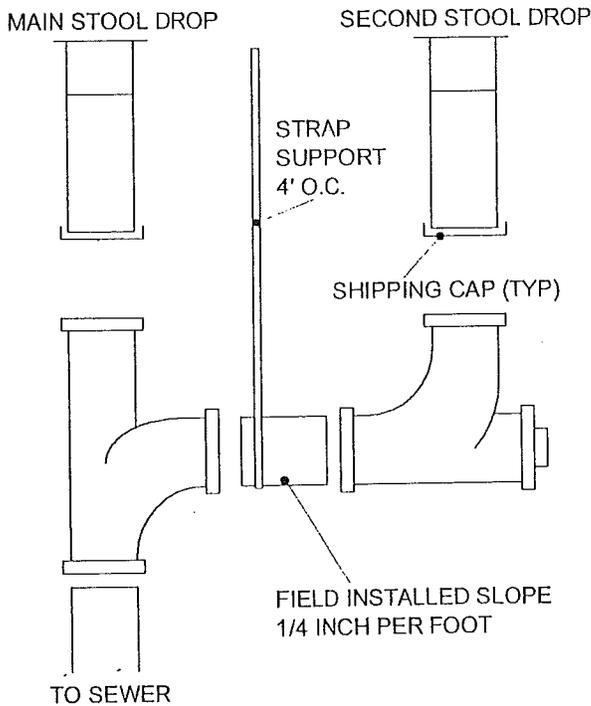


FIGURE 8.4 DRAIN PIPE

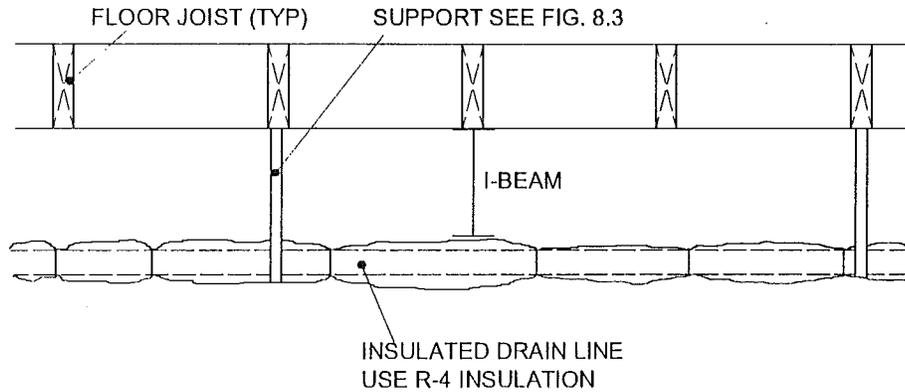
FIGURE 8.4 CONNECTION TO SEWER



SLOPES AND CONNECTIONS: SEE ACTUAL DRAWING FOR YOUR HOME

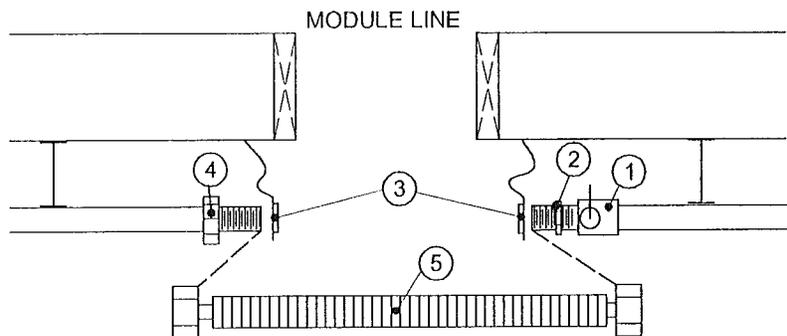
DRAIN FREEZING PROTECTION

FIGURE 8.7



TYPICAL GAS LINE CROSSOVER

FIGURE 8.8



- 1.) SHUTOFF VALVE WITH NONDISPLACEABLE ROTOR SUITABLE FOR OUTDOOR USE.
- 2.) FLARE ADAPTER
- 3.) CAPS SECURED TO EITHER THE UNDERSIDE OF THE FLOOR OR THE THE BLACK PIPE
- 4.) FEMALE / MALE FLARE ADAPTER
- 5.) FLEX CONNECTOR LISTED FOR OUTDOOR USE (SHIPPED LOOSE)

NOTE: GAS VALVE SHALL BE OPEN FOR THE 3 PSI GAS TEST AFTER FLARE ADAPTERS ARE INSTALLED. VALVE TO BE CLOSED AFTER 3 PSI TEST FOR SHIPMENT. FLEX CONNECTOR TO BE LISTED FOR EITHER LP OR NATURAL GAS.

8.4 Gas supply

8.4.1 Type of gas system furnished with home. All gas appliances in this home, including the heating system, are equipped for natural (or LP) gas. If LP (or natural) gas is to be used as the gas supply instead, a qualified service person must convert the appliances to LP (or natural) gas following the instructions provided by each appliance manufacturer.

8.4.2 Proper supply pressure. THE GAS PIPING SYSTEM IN YOUR HOME HAS BEEN DESIGNED FOR A PRESSURE NOT TO EXCEED 14" OF WATER COLUMN (8 OZ. OR 1/2 PSI). IF GAS FROM ANY SUPPLY SOURCE EXCEEDS, OR MAY EXCEED, THIS PRESSURE, YOU MUST INSTALL A PRESSURE REDUCING VALVE. To operate gas appliances safely and efficiently, do not exceed the design pressure limitations. For natural gas systems, the incoming gas pressure should remain between 6" and 8" of water column. For LPG systems, the pressure should lie between 12" and 14" of water column.

8.4.3 Crossovers. Install the gas line crossover in multisection homes as shown in Fig. 8.8 before performing any system tests or connecting the system to the gas supply. All crossovers and fittings must be listed for exterior use and the same size as the main unit pipe.

8.4.4 Testing prior to connection to mains. Even though the gas system was tested at the factory, it is essential that it be rechecked for leaks at the site. DO NOT APPLY PRESSURE IN EXCESS OF THOSE SPECIFIED BELOW OR YOU MAY DAMAGE GAS VALVES AND/OR PRESSURE REGULATORS. Conduct one of the following two tests when the air and piping temperatures are nearly equal and will remain stable.

8.4.4.1 Piping only test. Close all appliance shut-off valves. Attach a pressure gauge calibrated in ounces at the home gas inlet. Pressurize the system with air to at least 3 psi (48 oz.). Isolate the pressure source from the system. The gauge must stand for at least 10 minutes with no drop in pressure.

If any pressure loss occurs, check all joints in the piping system and at all shut-off valves with soapy water or bubble solution until the leaks are located. Repair the leaks and retest until the pressure holds.

8.4.4.2 Test of entire system. Close all gas equipment controls and pilot light valves according to the individual gas equipment manufacturer's instructions. Assure that gas shut-off valves for all gas equipment are in the open position. Attach a pressure gauge calibrated in ounces at the home gas inlet. Pressurize the system with air to at least 6 oz. check all gas shut-off valves and flex line connections to valves and appliances for leaks, using soapy water or bubble solution. Do not bubble check brass fittings with solutions containing ammonia. Repair any leaks found, and retest. Close all equipment shut-off valves upon completion of testing.

8.4.5 Connection procedures. Inspect gas appliance vents to ensure that they have been connected to the appliance, and make sure that roof jacks are installed and have not come loose during transit. Have the gas system connected to the gas supply only by an authorized representative of the gas company.

8.4.6 Gas appliance startup procedures. One at a time, open each equipment shut-off valve, light pilots and adjust burners according to each appliance manufacturer's instructions. MAKE SURE THE WATER HEATER IS FILLED WITH WATER BEFORE LIGHTING ITS PILOT. Check the operation of the furnace and water heater thermostats and set to the desired temperatures.

8.5 Heating oil systems. Homes equipped with oil burning furnaces must have their oil supply tankage and piping installed on site. These items are not supplied by manufacturer. Consult the oil furnace manufacturer's instructions for proper pipe sizing and installation procedures. ALL OIL STORAGE TANK AND PIPING INSTALLATIONS MUST MEET ALL APPLICABLE LOCAL REGULATIONS AND SHOULD BE MADE ONLY BY EXPERIENCED, QUALIFIED PERSONNEL.

8.5.1 Tank installation requirements. Unless the home installed in a community with a centralized oil distribution system, you must install an oil storage tank outside the home. Locate the tank where it is accessible for service and supply and safe from fire and other hazards.

8.5.1.1 Vaporizing (gravity feed) furnaces. Install oil tanks that feed vaporizing type oil furnaces so that oil flows freely by gravity. To achieve gravity flow, install the tank so that its bottom is at least 8" above the level of the furnace oil control and its top is within 8' of the oil control level.

8.5.1.2 Gun (pump fed) furnaces. For gun type furnaces, locate the oil storage tank where the homeowner wants it. Since the furnace includes a fuel pump, the tank may be installed above or below ground. For tanks installed below ground, extend the filler neck 1' above grade and provide a 1 1/4" diameter minimum vent pipe extending at least 2' above grade.

8.5.1.3 Sloping and draining requirements. Regardless of the type oil furnace or the tank location, install the tank to provide a gradual slope toward the fill end or drain plug (if so equipped). This facilitates pumping or drainage of water or sludge.

8.5.2 Shut-off valve and fuel line filter. Install an accessible and approved manually operated shut-off valve at the oil tank outlet. Manufacturer recommends installing a suitable filter in the fuel line near the tank to trap dirt and water.

8.5.3 Leak test procedure. Before operating the system, check for leaks in the tank and supply piping. Fill the tank to capacity with fuel and examine all joints in the system for leakage.

8.6 Electricity. A large enough power supply must be available at the site. An inadequate power supply may result in improper operation of, and possible damage to, motors and appliances. It may also increase your electricity costs. The current rating in amperes of your home can be found on the tag located outside next to the feeder or service entrance and also on the electrical distribution panel.

8.6.1 Description and rating of house wiring. Your home is designed for connection to an electrical wiring system rated at 120/240 volt AC. PROPER AND SAFE CONNECTION DEPENDS ON THE TYPE OF SUPPLY SYSTEM YOUR HOME IS EQUIPPED WITH. The connection to this home is a feeder requiring wiring at the site. The following paragraphs describe the wiring and grounding of electrical feeders.

8.6.2 Proper feeder wire and junction box material and size. The main breaker and the label on the electrical distribution panel gives the feeder current capacity in amperes. Using this information, determine the required feeder size (see Figure 8.10).

8.6.2.1 Overhead feeders. Homes equipped with overhead (mast weatherhead) feeder entrances contain all necessary conduit to the electrical distribution panel. However, you must install feeder conductors (not provided) on site. Refer to Figure 8.9.

8.6.2.2 Underside feeders. Homes with an under the floor entrance come with a permanently attached conduit raceway that runs from the electrical distribution panel to a point under the floor. Install an approved conduit fitting or junction box at the termination point. Refer to Figure 8.10.

8.6.3 Grounding of homes with feeder connections.

8.6.3.1 Necessity. The home must be grounded to protect the occupants. The only safe and approved method of grounding your feeder connected home is through the grounding bar in the electrical distribution panel. This bar grounds all noncurrent carrying metal parts of the electrical system to a single point.

8.6.3.2 Procedure. The ground conductor of the power supply feeder cable connects the grounding bar to a good electrical ground. Follow the feeder connection procedures described in 8.6.4.1, 8.6.4.2, or 8.6.4.3 to achieve proper grounding.

Insulate the grounded circuit conductor (neutral or white wire) from the grounding conductors (green wires) and from equipment enclosures and other grounded parts. Insulate neutral circuit terminals in the distribution panelboard, and in ranges, clothes dryer, and counter mounted cooking units, from the equipment enclosure. Bonding screws, straps, or buses in the distribution panelboard or in appliances should have been removed at the manufacturing facility.

You may provide the required continuity of ground between sections of multisection homes through a metallic roof or siding or by bolting outriggers together. When the outriggers or other overlapping metal joints of adjoining units are not bolted together on houses with shingle roofs and non-metallic siding, install a ground wire connection between the chassis. This bonding connection is commonly made with an #8 AWG bare copper wire or other approved positive connection between the parts (Fig. 8.11) using approved grounding lugs with bolts, star washers and nuts, or self-tapping screws that are shipped with the home.

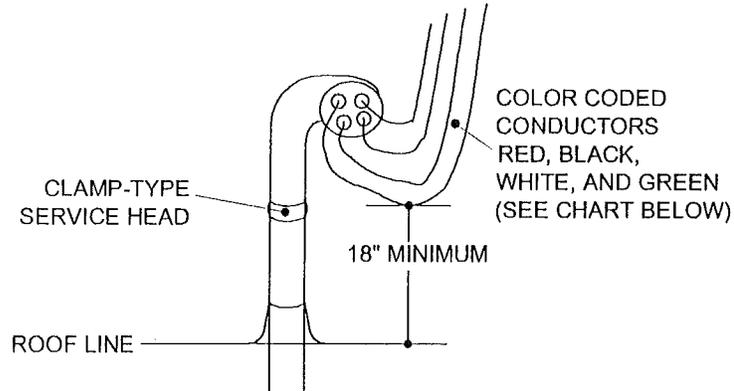
8.6.3.3 Unacceptable methods of grounding homes. Grounding to a rod, a water pipe, or through the home's hitch caster will not satisfy the important grounding requirement. Never use the neutral conductor of the feeder cable as a ground wire. Do not ground the neutral bar in the electrical distribution panel.

8.6.4 Connection procedures. Connections should be made only by a qualified electrician using one of the following methods:

TYPICAL OVERHEAD FEEDER ASSEMBLY

FIGURE 8.9

CAUTION: BE SURE TO CONNECT MULTI-SECTION CHASSIS TOGETHER WITH BONDING WIRE. SEE FIGURE 8.11.



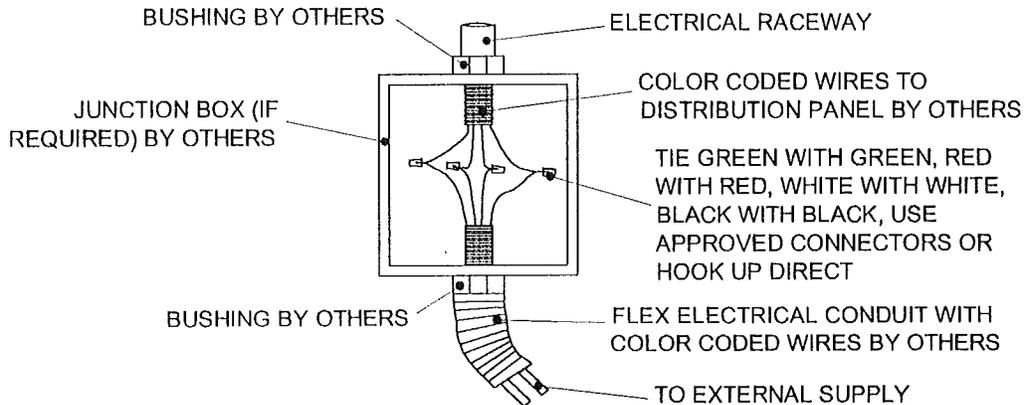
TYPICAL UNDERSIDE FEEDER ASSEMBLY

FIGURE 8.10

CAUTION: BE SURE TO CONNECT MULTI-SECTION CHASSIS TOGETHER WITH BONDING WIRE. SEE FIGURE 8.11.

COPPER CONDUCTOR SIZES (75 DEGREE WIRE)

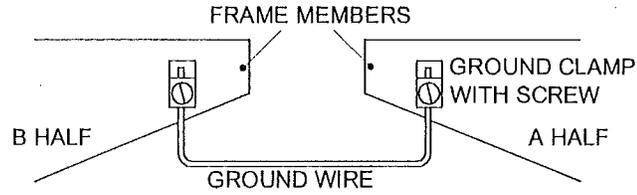
SERVICE AMPS	WIRE SIZE			CONDUIT SIZE	BOX SIZE
	FEEDERS	GROUND	NEUTRAL		
100	#3	#8	#3	1 1/4"	10" x 10" x 4"
200	#000	#6	#0	2"	16" x 16" x 4"



- 8.6.4.1 50 A feeder cord. Your home may be equipped with a permanently connected 50 amp. feeder cord stored in a compartment under the floor. If so, it is ready to be plugged into a 50 amp., 3-pole, 4-wire, 120/240 volt grounding service receptacle after electrical tests have been complete (see 8.6.6). **WARNING: MANY HOMES ARE EQUIPPED FOR 100 AMP. OR GREATER SERVICE. UNLESS YOUR HOME IS EQUIPPED FOR ONLY 50 AMP. SERVICE, DO NOT ATTEMPT TO USE A FEEDER CORD OR "PIGTAIL" CONNECTION.** Connect homes equipped for 100 amp. or greater service by one of the following methods:
- 8.6.4.2 Mast weatherhead feeder. The routing, connecting, and support of the service drop must meet local codes. Homes equipped this way contain all necessary conduit to the electrical distribution panel. However, feeder conductors (not provided) must be installed on site in accordance with Fig. 8.9. If the masthead is located above the roof overhang, allow a minimum 8' clearance above all roof points the conductors pass over. There are two exceptions to this rule: 1) The vertical clearance may be reduced to 3' if the roof has a minimum slope of 4 in 12. 2) The vertical clearance may be reduced to 18" if no more than 4' of service drop conductors pass above the roof overhang, and if they terminate at a through the roof raceway or approved support. A minimum of clearance must also be provided from the final grade to the service drop conductors. This measurement may vary from 10' to 18' depending on the types of traffic anticipated below the service drop (refer to the National Electric Code). Unless impractical, locate service heads above the point of attachment of the service drop conductors and make them rain tight. If individual conductors do not extend downward, form drip loops.
- 8.6.4.3 Underside junction box feeder. A raceway from the main panelboard to the underside of the home allows for installing an approved junction box or fitting, which must be used to connect it to the supply raceway (see Figures 8.10 and 8.12). Install properly sized conductors from the main power supply to the panelboard. Refer to Figure 8.10 for conductor and junction box requirements. The homeowner or installer must provide the supply connection including the feeder conductors, junction box, and raceway connectors. Protect conductors emerging from the ground from a minimum of 18" below grade to 8' above grade, or to the point of entrance to the home. The distance measured from the top surface of a buried cable conduit, or raceway to the finished grade must meet minimum burial requirements outlined in the National Electric Code. Use a moisture proof bushing at the end of the conduit from which the buried cable emerges.
- 8.6.4.4 Service equipment meter base. Either an overhead or underground entrance may be provided. The exterior equipment and enclosure must be weatherproof, and conductors must be suitable for use in wet locations. When a meter base is provided on the home, connect the neutral (white) conductor to the system grounding (green) conductor on the supply side of the main disconnect. Refer to Figure 8.13 for typical meter base installations and one method of grounding the service equipment. The homeowner must supply the grounding electrode conductor(s). The grounding electrode should be an 8' length of copper rod or 3/4" galvanized steel pipe. Drive it into the ground at least 12" below the surface and 2' from the foundation, or bury it horizontally in a 2 1/2' deep trench. Connect the grounding conductor wire to the grounding electrode with a grounding clamp. For added protection, homes with metal frames or siding should be connected to earth by means of additional bonding jumper ground fault return paths to underground metallic water pipes, grounding rings, additional ground rods, etc. to prevent the buildup of hazardous voltages.

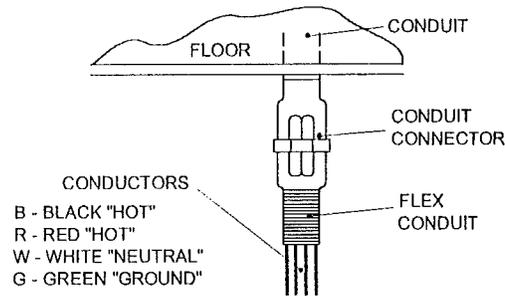
MULTISECTION FRAME GROUNDING (BONDING)

FIGURE 8.11



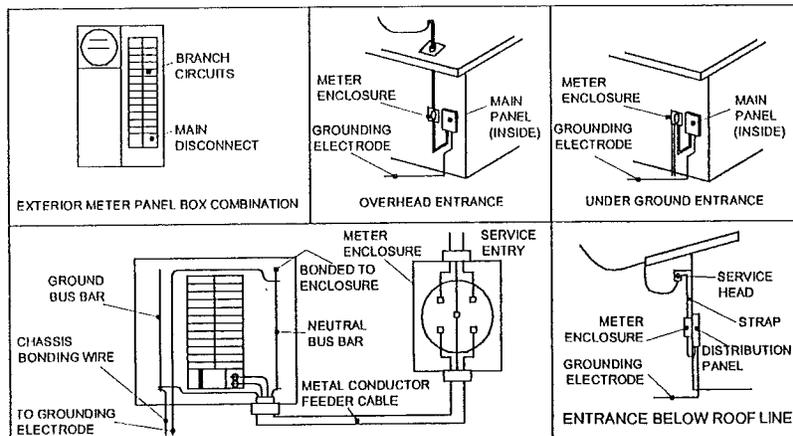
TYPICAL UNDERSIDE FEED CONNECTION

FIGURE 8.12



TYPICAL METER BASE INSTALLATION AND GROUNDING

FIGURE 8.13



SERVICE DROP CONDUCTOR CLEARANCES AND ATTACHMENT SHALL BE PER NEC 230-24 AND 230-26.

8.6.5 Crossover connections. Refer to Figure 8.14 for typical crossover connections, for multisection homes (located along centerline between the sections). Crossover locations can be distinguished by metal junction boxes or access cover panels. Remove these panels and connect the enclosed wires as illustrated. Some crossover connectors plug together and do not require junction boxes.

8.6.6 System test procedures and equipment.

8.6.6.1 Pre-connection tests. Conduct both of the following tests before any electrical power is supplied to the home:

8.6.6.1.1 Circuit conductor continuity. Conduct a continuity test by placing all branch circuit breakers and switches controlling individual outlets in the "on" position. The test should give no evidence of a connection between any of the supply conductors (including the neutral) and the grounding circuit. You may use a flashlight continuity tester.

8.6.6.1.2 Grounding continuity. Using a continuity tester, test all noncurrent carrying metal parts to assure continuity to ground. The parts to be checked include:

- appliance enclosures, including fans;
- fixture enclosures and canopies;
- metal siding and roofs;
- metal water supply and gas lines;
- metal ducts (except foil covered insulated ducts);
- the home's frame.

On multisection units, perform this test only after completing all electrical and bonding connections between the units. NOTE: GROUNDING IS NOT REQUIRED ON THE METAL INLET OF A PLASTIC WATER SYSTEM OR ON PLUMBING FIXTURES SUCH AS TUBS, FAUCETS, SHOWER RISERS, AND METAL SINKS WHEN THEY ARE CONNECTED ONLY TO PLASTIC WATER AND DRAIN PIPING.

8.6.6.2 Post-connection tests. Conduct the following three tests after turning on the main circuit breaker and each individual circuit breaker. CAUTION: ALLOW THE WATER HEATER TO FILL COMPLETELY BEFORE ACTIVATING THE WATER HEATER CIRCUIT. FAILURE TO DO SO WILL CAUSE THE WATER HEATER ELEMENT TO BURN OUT, AN EVENT NOT COVERED BY THE WARRANTY.

8.6.6.2.1 Polarity and grounding of receptacles. With receptacles and lighting circuits energized, check the polarity and grounding of each 120 volt receptacle and light socket using a polarity tester capable of determining an incorrect wiring configuration. A conversion device may be required to test various fixture bulbs sizes and outlet configurations. Investigate any indication of reversed polarity, open grounds or shorts, and correct it.

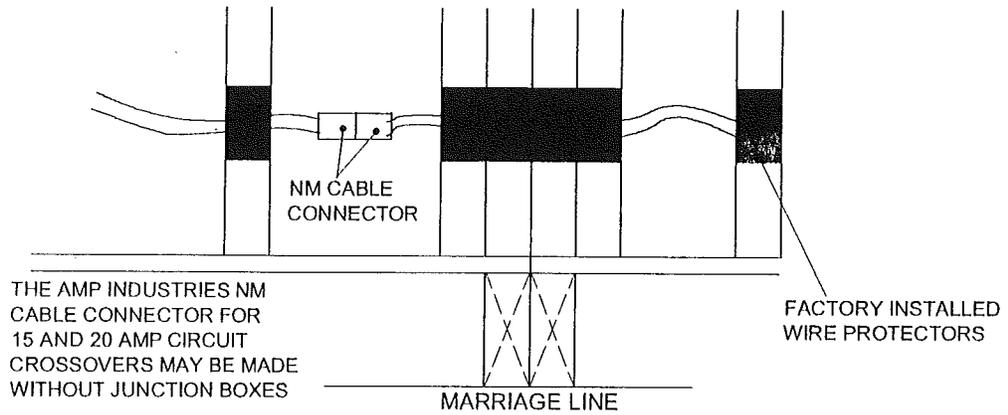
8.6.6.2.2 Ground fault circuit interruption (GFCI). Make sure that all receptacles requiring GFCI protection are in fact on the correct circuit(s). Check each GFCI device by pushing the test button to determine if the power route to the receptacle has been interrupted, or follow the manufacturer's instructions. Replace any GFCI that does not operate properly.

8.6.6.2.3 Operational checks. Check all light fixtures by placing a bulb in the socket and turning the switch on and off. Using a pigtail light, check all 240 volt receptacles to determine if both legs of the circuit are powered. Check all 120 volt receptacles to be sure that each is operational. Switched receptacles require the switch to be turned on and off. It is not necessary to check appliances, but their power sources may be assured. Failure of electrical wiring or fixtures requires repair and retesting.

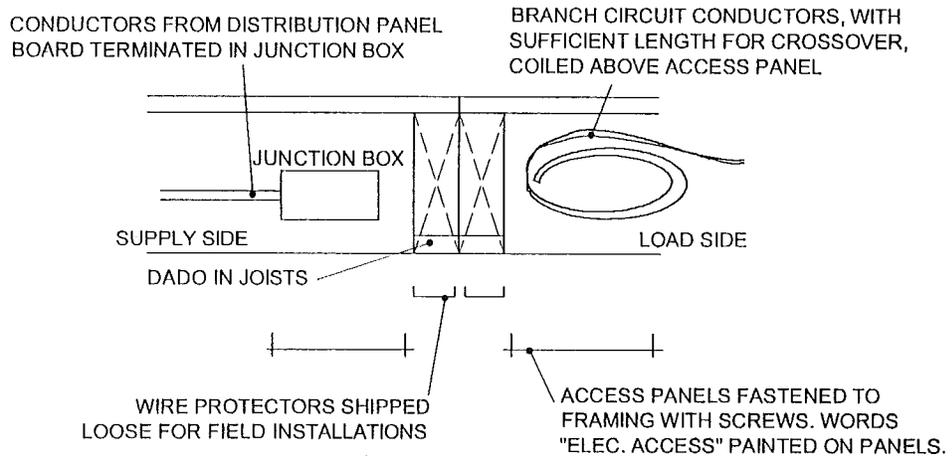
TYPICAL ELECTRICAL CROSSOVERS

FIGURE 8.14

IN WALL ALTERNATIVE

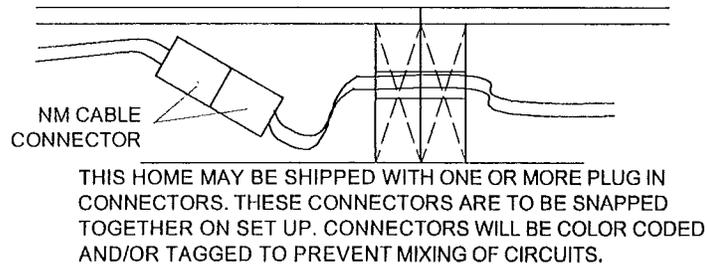


IN FLOOR ALTERNATIVE



THE AMP INDUSTRIES NM CABLE CONNECTOR FOR 15 AND 20 AMP CIRCUIT CROSSOVERS MAY BE MADE WITHOUT JUNCTION BOXES

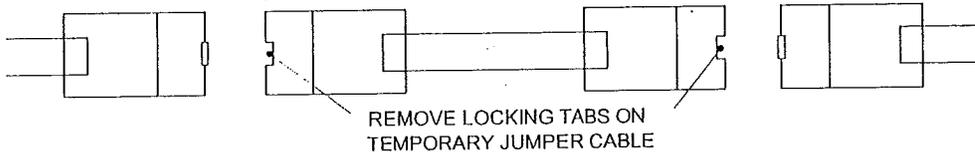
IN FLOOR ALTERNATIVE



TYPICAL ELECTRICAL CROSSOVERS

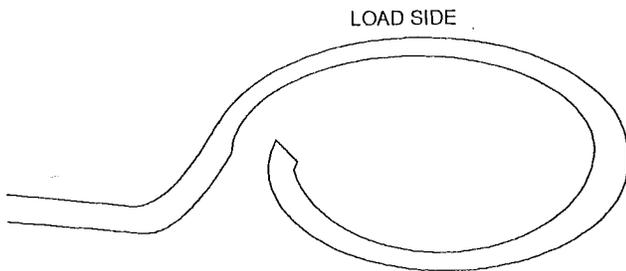
FIGURE 8.14, CONTINUED

FOR TEMPORARY HOOK UP OF AMP CONNECTORS USE A TEMPORARY JUMPER CABLE WITH LOCKING TABS REMOVED FROM THE HOUSINGS OF THE SPLICES ON THE JUMPER CABLES.

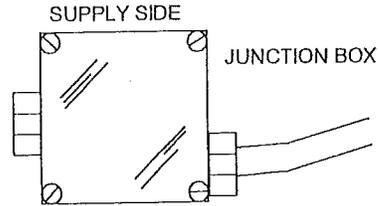


NOTE: THIS TEMPORARY JUMPER CABLE IS FOR DEALER LOCATIONS AND TESTING PURPOSES. IT CAN NOT BE USED AT THE PERMANENT HOME SITE.

ALTERNATE ELECTRIC CROSSOVERS

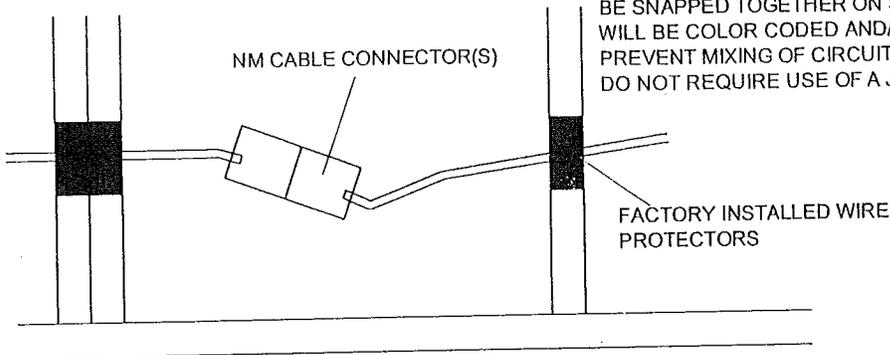


WIRES COILED ABOVE ACCESS PANEL ON LOAD SIDE WITH SUFFICIENT LENGTH FOR CONNECTION TO JUNCTION BOX ON SITE



CONDUCTORS FROM DISTRIBUTION PANEL BOARD TERMINATED IN JUNCTION BOX

EXTERIOR WALL OF HOME (TYP)



THIS HOME MAY BE SHIPPED WITH ONE OR MORE PLUG IN CONNECTORS. THESE CONNECTORS ARE TO BE SNAPPED TOGETHER ON SET UP. CONNECTORS WILL BE COLOR CODED AND/OR TAGGED TO PREVENT MIXING OF CIRCUITS. THESE CONNECTORS DO NOT REQUIRE USE OF A JUNCTION BOX.

INTERIOR CLOSURE MOULDING

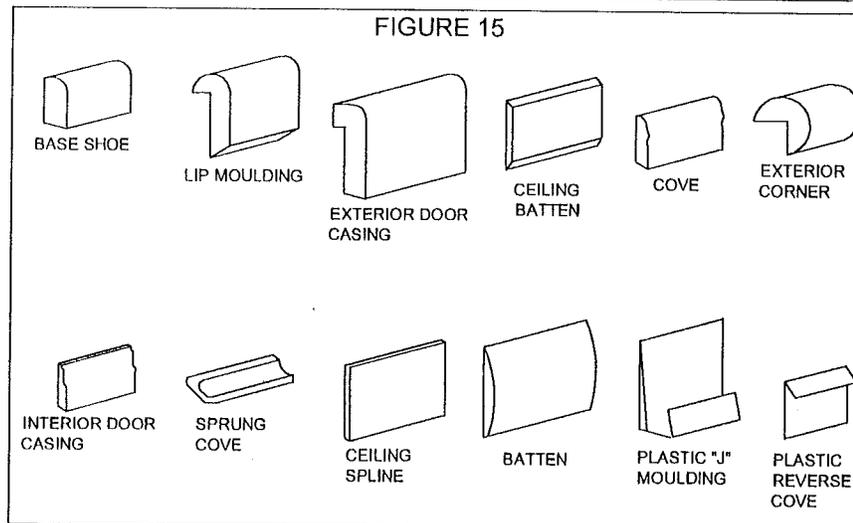
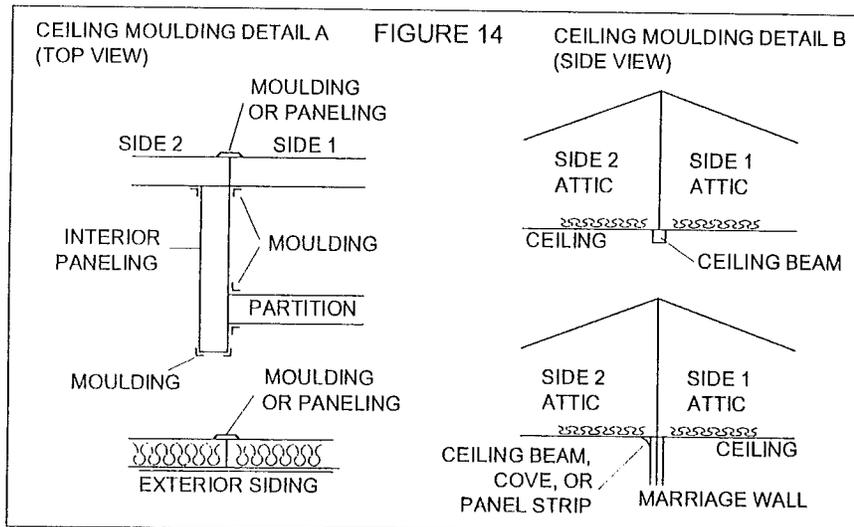
All the materials necessary to trim out the interior of the home can be easily identified by matching the mouldings or paneling with the materials installed by the manufacturer.

The illustrations below are typical moulding installations, Detail A - wall moulding and Detail B - ceiling moulding.

Before installing mouldings, fill all gaps with insulation. Then staple or nail the mouldings in place. Cover staple or nail heads with color coordinated putty (not supplied by manufacturer).

Note: A section of panel may have been shipped loose for installation on site in order to achieve a more desirable finished appearance. See Detail A.

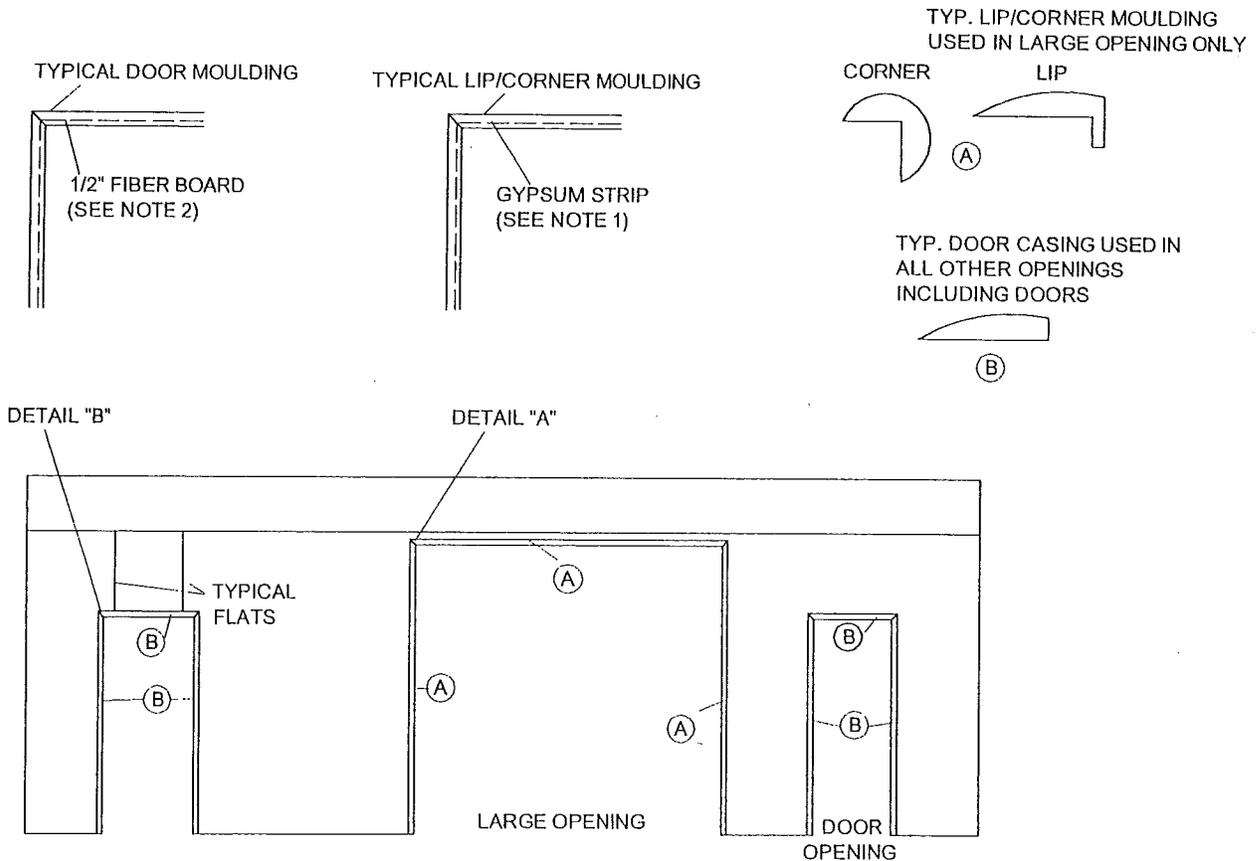
Typical interior finish materials. Trim materials to be installed during installation are shipped with the home. Some of the common types, which may be referenced in the text, are shown in Figure 15.



SITE INSTALLED MOULDING AND TRIM

Recommended moulding and trim installation for interior doors and mating line openings.
All mouldings and trim to be shipped loose and installed on site by others.

Trim board (shipped loose) will be cut over width and then cut to fit and installed by others on site.
Door stop moulding will be shipped loose and installed by others on site.



NOTE 1: 7" GYPSUM STRIP CUT TO PROPER WIDTH ON SITE AND USED IN LARGE OPENING ONLY. IF GYPSUM NOT SUPPLIED USE FIBER BOARD AND LIP MOULDING IN LARGE OPENINGS.

NOTE 2: 1/2" x 7" FIBER BOARD CUT TO PROPER WIDTH AND LENGTH USED IN ALL OTHER OPENINGS (INCLUDING DOORS).

"TYPICAL" MARRIAGE WALL TRIM OUT DETAIL

DRYWALL FINISHING INSTRUCTIONS

THE FOLLOWING INSTRUCTIONS FOR FINISHING DRYWALL ARE BASED ON THE MANUFACTURER'S INSTRUCTIONS FOR U.S. GYPSUM'S READY MIXED "PLUS 3 LIGHTWEIGHT ALL PURPOSE JOINT COMPOUND". IF A DIFFERENT JOINT COMPOUND IS USED, FOLLOW THE INSTRUCTIONS PROVIDED WITH THE PRODUCT USED.

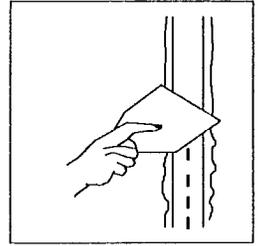
NOTE: HEED ALL WARNINGS AND NOTICES PROVIDED ON THE CONTAINERS. FOLLOW ALL INSTRUCTIONS REGARDING SURFACE PREPARATION, COVERAGE, DRYING TIME, CLEANUP, STORAGE AND OPTIONAL TEXTURE FINISHES.

APPLICATION OF JOINT COMPOUND:

TOOLS REQUIRED: JOINT TAPE, 3 WIDE BLADE APPLICATION KNIVES (5", 8", 10"), AND SPONGE.

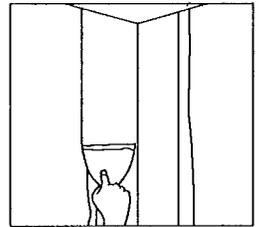
STEP 1. JOINT FINISHING:

FILL SPACE BETWEEN PANELS WITH COMPOUND (5" KNIFE). CENTER AND PRESS IN JOINT TAPE. TIGHTLY EMBED WITH KNIFE. REMOVE EXCESS COMPOUND AND APPLY IT AS A THIN COAT OVER TAPE. SPREAD SMOOTH WITH LONG PARALLEL STROKES. APPLY COMPOUND TO FASTENERS. WHEN DRY, IF NECESSARY, USE WET SPONGE TO SMOOTH SURFACE BETWEEN COATS. APPLY SECOND COAT ALONG JOINTS (8" KNIFE), AND OVER FASTENERS (5" KNIFE), SMOOTHING OUT 2" BEYOND FIRST COAT. APPLY THIN FINISH COAT TO JOINTS (10" KNIFE) AND FASTENERS (5" KNIFE). BECAUSE OF LOW SHRINKAGE, AVOID CROWNING JOINTS, ESPECIALLY ON BUTT EDGES. WHEN DRY, SPONGE SMOOTH IF NECESSARY.



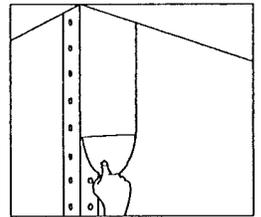
STEP 2. TO FINISH INSIDE CORNERS:

APPLY COMPOUND TO BOTH SIDES (5" KNIFE). CREASE AND POSITION TAPE. EMBED WITH KNIFE. REMOVE EXCESS COMPOUND AND APPLY IT AS A THIN COAT OVER THE TAPE. WHEN DRY, SMOOTH HIGH SPOTS WITH A WET SPONGE. APPLY SECOND COAT TO ONE SIDE ONLY. LET DRY, THEN COVER OTHER SIDE. WHEN DRY, SPONGE SMOOTH IF NEEDED.



STEP 3. TO FINISH OUTSIDE CORNERS:

APPLY COMPOUND TO CORNER BEAD. LET DRY AND SPONGE SMOOTH BETWEEN COATS, IF NEEDED. EXTEND FIRST COAT 4" - 6" ONTO PANEL (8" KNIFE). FEATHER SECOND COAT SLIGHTLY BEYOND FIRST COAT (10" KNIFE).



STEP 4. SANDING:

AVOID SANDING IF POSSIBLE. IF SANDING IS NEEDED, SAND WITH A WET SPONGE TO ELIMINATE DUST AND SCUFFING OF PAPER. AFTER COMPOUND FEELS DRY, WRING OUT ONLY ENOUGH WATER FROM SPONGE TO ELIMINATE DRIPPING. USE A GENTLE, SWEEPING MOTION TO REMOVE HIGH SPOTS, USING AS FEW STROKES AS POSSIBLE. CLEAN SPONGE OFTEN. IF DRY-SANDING, USE 150-GRIT SAND PAPER. WRAP AROUND WOOD BLOCK. AVOID SCUFFING PAPER.

STEP 5. DECORATING:

ALL SURFACES (INCLUDING JOINT COMPOUND) MUST BE DRY, DUST FREE AND NOT GLOSSY. APPLY PRIME COAT OF "SHEETROCK FIRST COAT" OR GOOD QUALITY LATEX FLAT WALL PAINT BEFORE PAINTING OR TEXTURING. STRICTLY FOLLOW PAINTING AND DECORATING DIRECTIONS OF MATERIAL MANUFACTURER'S.

STEP 6. INSTALL TRIM:

INSTALL TRIM SHIPPED WITH THE HOME AS FOLLOWS:

1. COVE (WALL/CEILING JOINTS) - NAIL WITH 2" x 15GA. FINISH NAIL OR EQUAL APPROX. 12" O.C.
2. LIP (AROUND WINDOWS) - 1 1/4" x 18GA. FINISH NAILS OR EQUAL APPROX. 6" O.C.
3. CASING (AROUND DOORS) - 1 1/4" x 18GA. FINISH NAILS OR EQUAL APPROX. 6" O.C.

CHAPTER 9 - FINAL INSPECTION

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

- 9.1 Water and drain systems. All water and drain systems work properly and do not leak.
- 9.2 Appliances function and operation. Appliances have been tested and work properly.
- 9.3 Windows, doors, and drawers. All windows, doors, and drawers work properly.
- 9.4 Exit windows. One window in each bedroom is designated as a secondary exit 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.
- 9.5 Exterior siding and trim. There are no gaps, voids, or missing fasteners, and all seams are sealed.
- 9.6 Stack heads and vent pipe flashings on roof. All stack heads or vent pipe flashings are properly attached and sealed.
- 9.7 Composition roof. All shingles are properly attached, none are loose or missing, and all holes are filled.
- 9.8 Skirt venting. The skirting around the home has nonclosing vents, located at or near each corner as high as possible to cross-ventilate the entire space under the home. The free area of these vents must be equal to at least one square foot for every 150 square feet of floor area of the home. The vent size must be increased to allow for screens, slats, louvers, etc. used over the open vent area.
- 9.9 Low hanging trees and bushes. If there are any low hanging trees or bushes near your home, trim or cut them. Think about the plants possible movement during windy conditions or under snow or ice loads in limiting their future growth.
- 9.10 Exhaust fan operation and air flow. Check all exhaust fans for proper operation and air flow.
- 9.11 Bottomboard. Carefully inspect the bottom covering of the home for loosening or tears from installation of pipes or wires. Seal openings around the floor perimeter, pipes or pipe hangers, and splits or tears with weather resistant tape.
- 9.12 Ground cover. Repair any cuts or tears in the ground cover with tape.
- 9.13 Anchors and straps. Be sure the correct number of anchors have been installed at the proper angle, and that all straps have been tightened.
- 9.14 Interior details. Inspect for, and correct, all interior finishing details, such as loose moulding, carpet seams, etc.

The retailer's representative should inspect the home with the homeowner, give the homeowner a copy of the Homeowner's Manual, and brief the homeowner about maintaining the home.

CHAPTER 10 - RELOCATING THE HOME

- 10.1 Relocation of the home. If it is necessary to move your home, HAVE IT MOVED BY A PROFESSIONAL MANUFACTURED HOME MOVER, MAKE SURE HE USES ENOUGH TEMPORARY WOOD BLOCKING, and check the following items:
- 10.1.1 New zones. Check the roof and wind load and the temperature requirements at the new location. If the new requirements are greater than those shown on your home's compliance certificate, check the cost of adapting the home before moving. Otherwise, any resulting damages will not be covered under your warranty, and you may be held liable for any failures. Check with your contractor, home retailer, or a qualified manufactured home mover about making these home improvements.
 - 10.1.2 Tires and axles. Replace any removed tires or axles as required by the manufacturer. be sure tires are inflated correctly, have at least 1/16" tread, and do not have any cracks or splits. Check and repair bearings and brakes as necessary.
 - 10.2.3 Appliances. Secure appliances to prevent movement during transportation.
 - 10.1.4 Dust caps. Place dust caps on the ends of all pipe connections.
 - 10.1.5 Blocking during storage. Any home placed in storage must immediately be blocked under each I-beam, both at the rear of the home and midway between axles and hitch, to prevent excessive deflection and possible structural damage.
 - 10.1.6 Transit of furniture and belongings. Substantial damage may result if furniture, personal belongings, set-up materials or other items are stored in the home during transit. **TRANSIT DAMAGE IS NOT COVERED UNDER YOUR WARRANTY.**
 - 10.1.7 Multisection homes. Re-install temporary structural supports and bracing materials before moving the home. Cover the open sides of sections with weather proof material such as 6 mil plastic sheeting. After the sections have been separated, secure 2" x 6" shipping braces at the front end and in the axle area. Place ridge beam supports in open areas per manufacturer's instructions, or at a maximum of 12' on center if manufacturer's instructions are unavailable. For 28 wide extended span units see Figure 8.15.

ADD TEMPORARY 2 x 4'S AROUND STAIRWELL FLOOR OPENING AND COVER WITH 1/2" PLYWOOD OR OSB SHEATHING TO KEEP WATER AND DEBRIS FROM ENTERING HOME DURING RELOCATION.

2 x 6 RIM JOIST & LAMINATED BEAM

SHIPPING BRACES

STAIRWELL WALLS

2 x 6 & LAMINATED BEAM REMOVED ADJACENT TO STAIRWELL DURING INITIAL SET-UP OF HOME.

(TOP VIEW OF STAIRWAY)

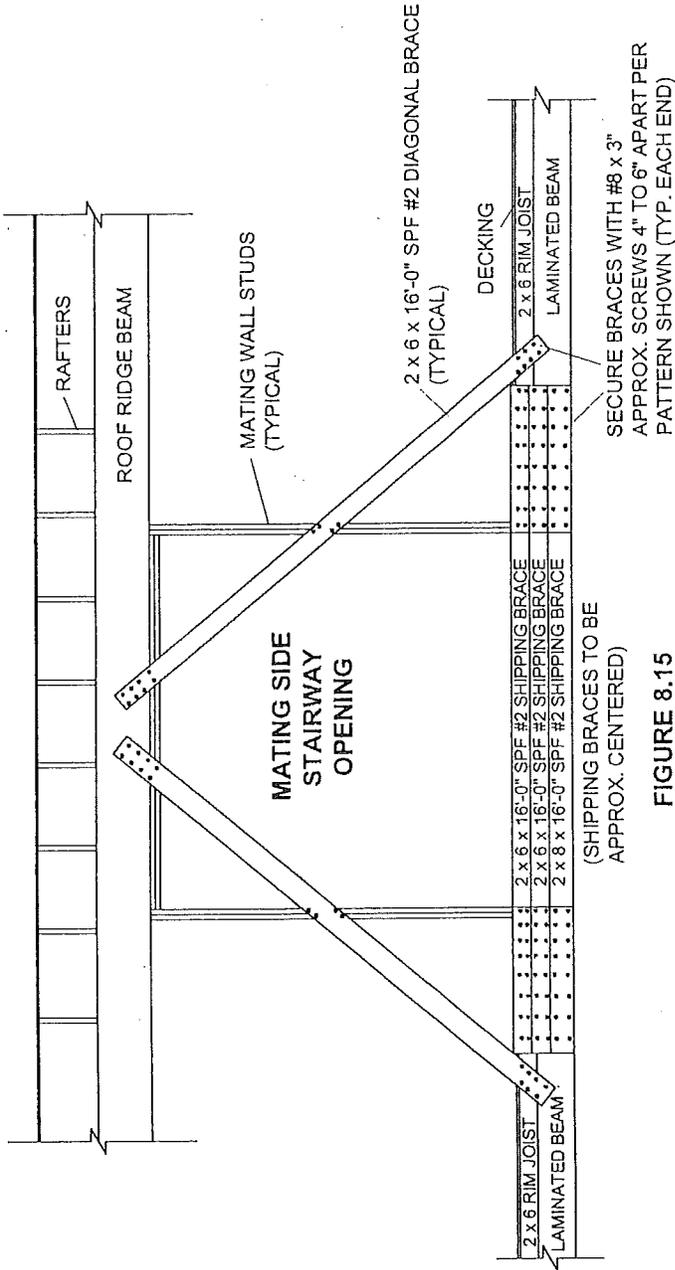


FIGURE 8.15

DATE: 8-29-2001	STAIRWELL DETAILS SECONDARY MOVE OF EXTENDED SPAN FLOOR	DWG. NO: I-58

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ATTENTION INSTALLERS

VINYL SIDING MUST BE INSTALLED LOOSELY TO ALLOW FOR EXPANSION AND CONTRACTION DUE TO TEMPERATURE CHANGE.

BE SURE TO FOLLOW THESE BASIC RULES:

1. Nail or staple in center of slot (not in comers).
2. Do not nail to tight (panel must be allowed to move - check this by sliding with hand after installation).
3. Do not face nail (nailing must be done in slots or punch outs).
4. Leave a minimum of 1/4" clearance at all openings and stops to allow for normal expansion and contraction.
5. Do not pull siding up tight when applying (allow it to hang without strain).
6. Overlap seam areas approximately 1".
7. When cutting vinyl siding use a fine tooth plywood blade. Reverse the direction of the blade for ease in cutting. Snips can also be used.

IMPORTANT: CHECK EACH PANEL TO SEE THAT IT SLIDES
1/4" IN EACH DIRECTION AFTER INSTALLATION

BOTTOM CLOSURE

1. MATERIAL:

A. Materials used to cover the floor underside must comply with the provisions of section 3280.305(g)(5) of the federal standard. The use of material not shown will require proof of compliance to the inspecting agency. The following materials comply with these requirements:

MANUFACTURER AND PRODUCT	LISTING
1. SIMPLEX INDUSTRIES, INC. Simplex #40, #60, PS-70 and PS-70-2 Barricade, PFC-200 and PPF-250 Roll Bottom Closure Board, #60 AND #90 Thermo-ply roll sheathing.	RADCO #1026
2. SHEPHERD PRODUCTS COMPANY Mobile Flex, Mobile Board, Utility Board, Polyback, Typar, AND Typar 2, Mobile Flex-K and Mobile Flex-C.	RADCO #1028
3. FIRSTLINE CORPORATION Seal-tite Green Label (GR), Green Label 2 (GT), Orange Label (OR), RK 2 (RI), "P" Series consisting of PT, PN, PV, and Plymax HT and HW.	RADCO #1034
4. FORTIFIBER CORPORATION CB-1, CB-3, CB-6, AND CB-6L.	RADCO #1020
5. STO-COTE PRODUCTS, INC. Fabrene Type "S".	PFS #613

B. Tape approved for installation and repair:

1. SHEPHERD INDUSTRIES - #DW-1 (clear plastic) OR #CO-1 (black cloth)
2. SCOTCH/3M - #471 (clear plastic)
3. SHURTAPE - #PC-600 (black cloth)
4. GAME BROTHERS - #145 (black cloth)
5. TUCK - #TUC538918 (black cloth)
6. ADHESIVE TAPE PRODUCTS - #OPP-22C (black plastic)
7. FLEX-MEND - Peel and Stick Bottom Board Closure Material a product of:
V.P. PRODUCTS 115 South Memorial Drive, Suite 140
Prattville, Alabama 36067, PH. 1-800-462-1775 (May be cut in 2" strips and used as tape.)

2. INSTALLATION:

A. Align the bottom closure material with one siderail allowing 4 to 6 inches excess on front and rear of the floor.

B. Fasten bottom closure material to the floor framing with 15 gauge x 1" x 5/8" weather resistant staples spaced at 6 inches O.C. maximum, see fastening schedule.

3. REPAIR:

A. Cuts or holes in bottom closure material:

1. Clean the area where the tape or repair material is to be applied.

A. When the sides of the cut touch, use a piece of tape 8" longer than the cut, center the tape over the cut and press in place.

B. When there is a hole or the sides of the cut do not touch, cut a patch out of listed bottom closure material 4" larger than the hole on all sides, apply tape to all edges of the patch, center the patch over the hole and press in place. Flex-Mend Peel-N-Stick bottom board repair material cut 3" larger than the hole on all sides may be used. Peel paper back several inches on one side, center the patch over the hole and press the exposed edge to locate the patch. Pull off paper back and press patch in place.

2. Spray adhesives or staples may be used.

IMPORTANT HEALTH NOTICE

Some of the building materials used in this home emit formaldehyde. Eye, nose, and throat irritation, headache, nausea, and a variety of asthma-like symptoms, including shortness of breath, have been reported as a result of formaldehyde exposure. Elderly persons and young children as well as anyone with a history of asthma, allergies, or lung problems, may be at greater risk. Research is continuing on the possible long-term effects of exposure to formaldehyde.

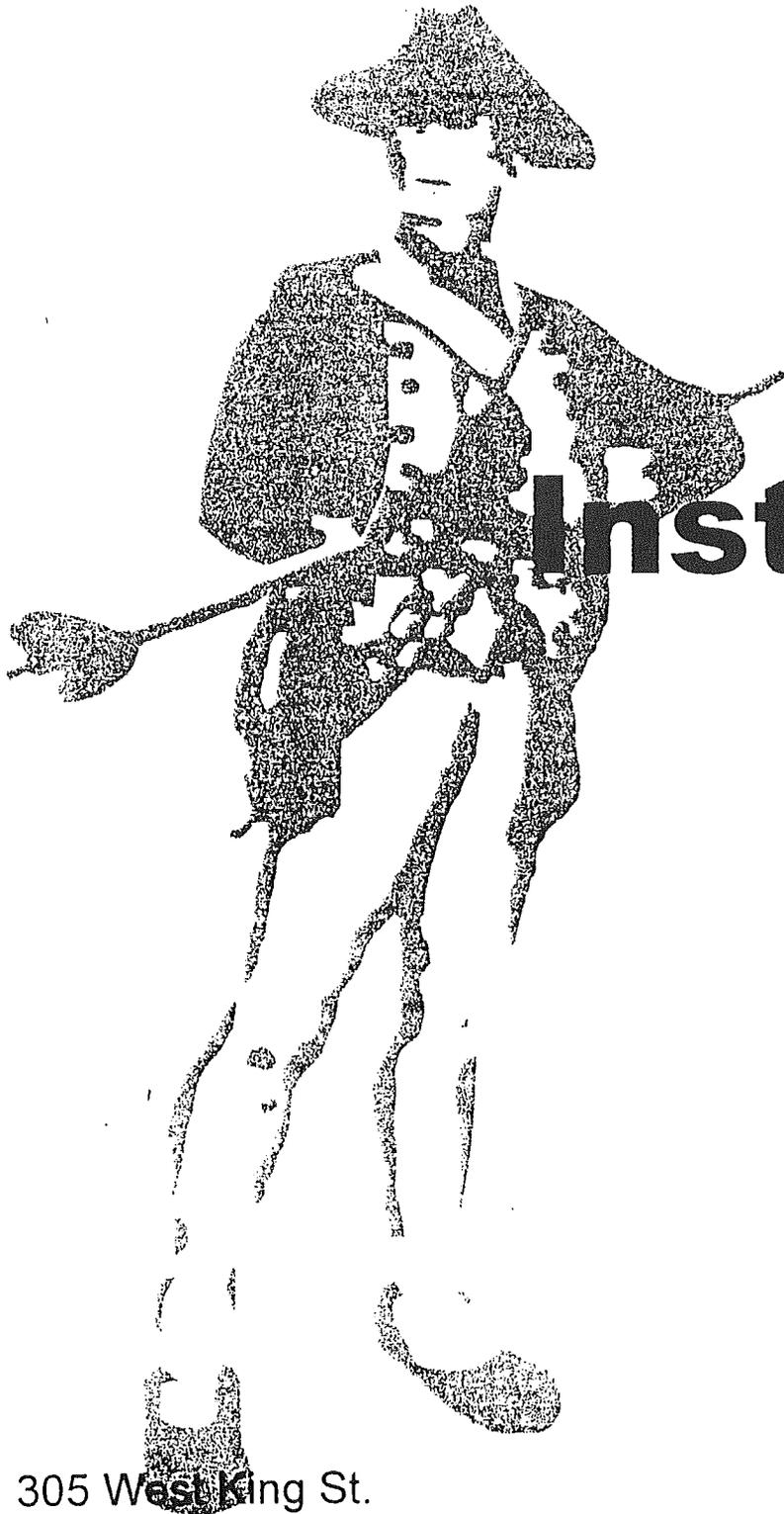
Reduced ventilation resulting from energy efficiency standards may allow formaldehyde and other contaminants to accumulate in the indoor air. Additional ventilation to dilute the indoor air may be obtained from a passive or mechanical ventilation system offered by the manufacturer. Consult your dealer for information about the ventilation options offered with this home.

High indoor temperatures and humidity raise formaldehyde levels. When a home is to be located in areas subject to extreme summer temperatures, an air-conditioning system can be used to control indoor temperature levels. Check the comfort cooling certificate to determine if this home has been equipped or designed for the installation of an air-conditioning system.

If you have any questions regarding the health effects of formaldehyde, consult your doctor or local health department.

ANNEX A

Minute Man **products**®, Inc.



**Product
and
Installation
Manual**

**Revised
January 1999**

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

To Our Customers:

This Product and Installation Manual is provided, as a source of reference and product information.

Minute-Man Anchors, Inc., Having pioneered anchoring for the manufactured home industry, continues in our efforts to provide new and innovative products. In so doing, we are committed to the highest quality materials, workmanship and total customer satisfaction.

If you are a longtime Minute-Man customer, "thank you" for your continued trust and patronage. If you are a new customer, "welcome!" We look forward toward serving you in this ever growing industry.

Questions?

Regardless of your level of association with the Manufactured Housing market, if you have questions or we may be of service, please contact our office.

1-800-438-7277

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Pacific Consulting Engineers

2150 Bell Ave, Suite 145 • Sacramento, CA 95838 • (916) 564-6028 • Fax: (916) 564-6029

February 6, 1999

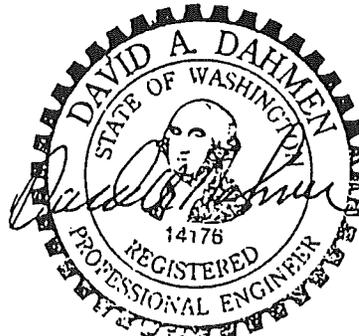
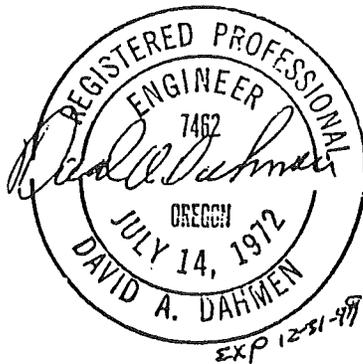
Mr. Abby Moreno
Minute Man Products, Inc.
305 West King Street
East Flat Rock, North Carolina, 28726

Dear Mr. Moreno,

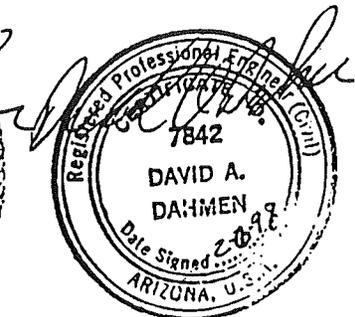
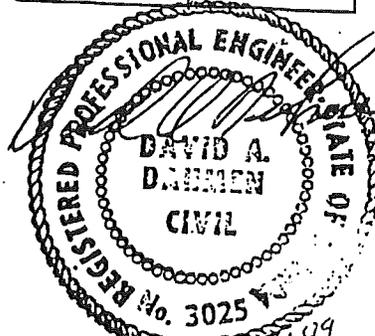
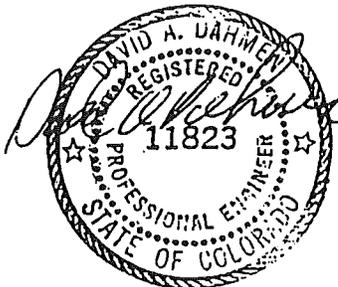
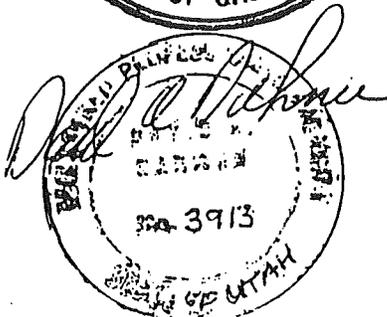
I have reviewed the information contained in the Minute Man Products, Inc., PRODUCTS AND INSTALLATION MANUAL, Revised January, 1999. The products comply with the specifications and load requirements shown on the Minute Man Anchors, Inc., Engineered Tie Down System plans prepared by my office for the states of California, Oregon, Washington, Idaho, Utah, Colorado, Nevada and Arizona.

Sincerely,

David A. Dahmen P.E.



EXPIRES: 7/17/99



Minute Man anchors, Inc.

ANCHOR INSTALLATION

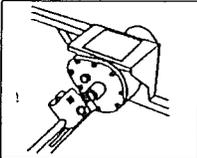
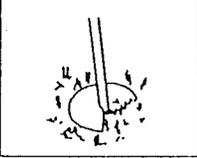
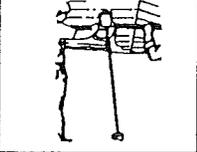
CAUTION: The installation of anchors with a drive machine is a two person operation.

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.

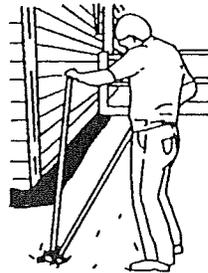
MACHINE INSTALLATION

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

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

MANUAL INSTALLATION

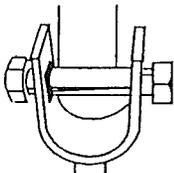
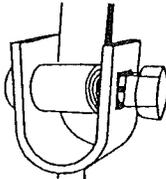
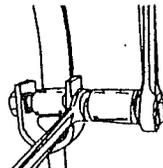
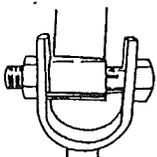
A hole is dug to a depth of approximately two feet in the proper position as explained under machine installation.



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

1.  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.
2.  Bend strap 90° and take at least three complete turns on bolt until strap is taut.
3.  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.
4.  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.

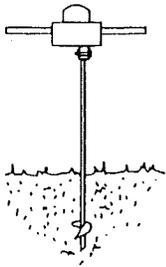
Note: The tensioning bolt can be inserted in the head from either side.

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.

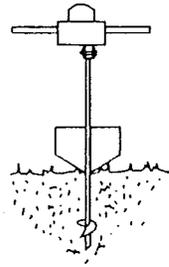
MINUTE MAN ANCHORS, INC.

INSTRUCTION FOR USING MINUTE MAN STABILIZING DEVICE

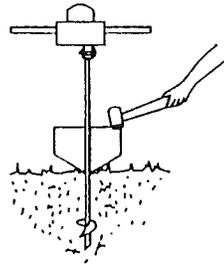
Minute Man stabilizing devices are designed for use with Minute Man anchors and intended to laterally restrict movement of the anchor through the soil.



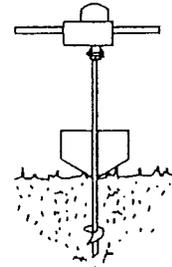
1. Install the anchor into the ground leaving 12" - 18" of the shaft exposed.



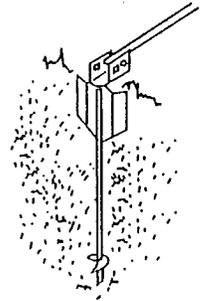
2. Place the stabilizing device next to the shaft in the direction of pull.



3. Drive the stabilizing device into the ground.



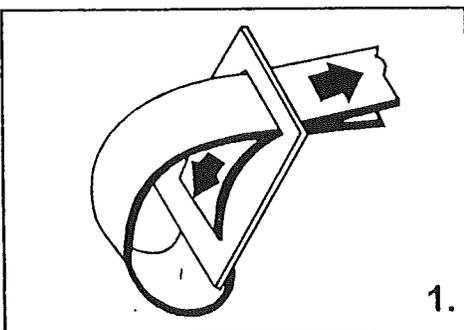
4. The anchor is then turned in the rest of the way into the soil until the head of the anchor is flush with the stabilizing device.



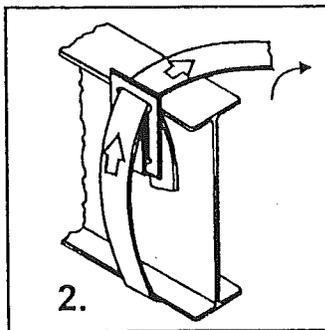
5. As the frame tie is tightened the anchor will be pre-loaded against the stabilizing device preventing lateral movement of anchor through the soil.

FRAME TIE INSTALLATION INSTRUCTIONS

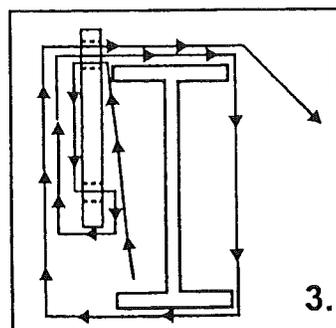
Frame Tie With Buckle



1.



2.



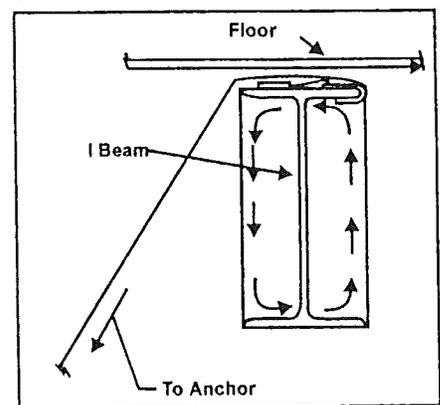
3.

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.

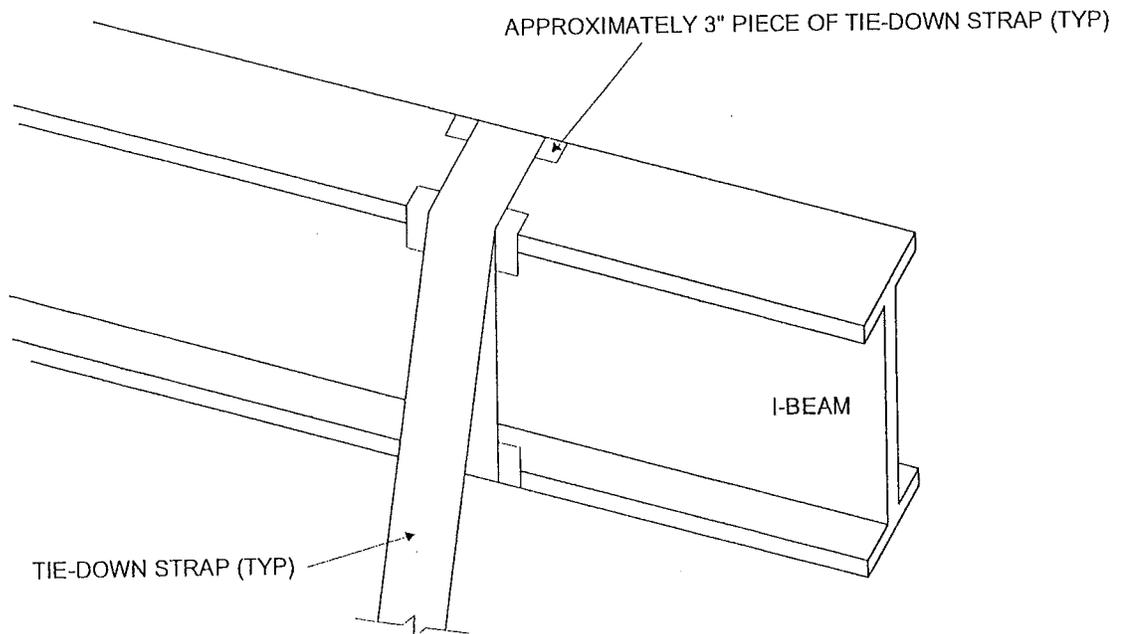
Frame Tie With Hook



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.

TIE-DOWNS DETAILS - TYPICAL STRAP PROTECTION



NOTE 1) CUT APPROX. 3" PIECE OF TIE-DOWN STRAPPING TO PROVIDE PROTECTION BETWEEN SHARP CORNERS AND MAIN TIE-DOWN STRAP(S). USE SELF TAPPING SCREW IF NECESSARY TO HOLD IN PLACE.

NOTE 2) AS AN ALTERNATE USE MINUTE MAN PART MMA-33 FOR SHARP CORNER PROTECTION.

PROPERLY INSTALLED AND CONNECTED GROUND ANCHOR AND FRAME CONNECTION

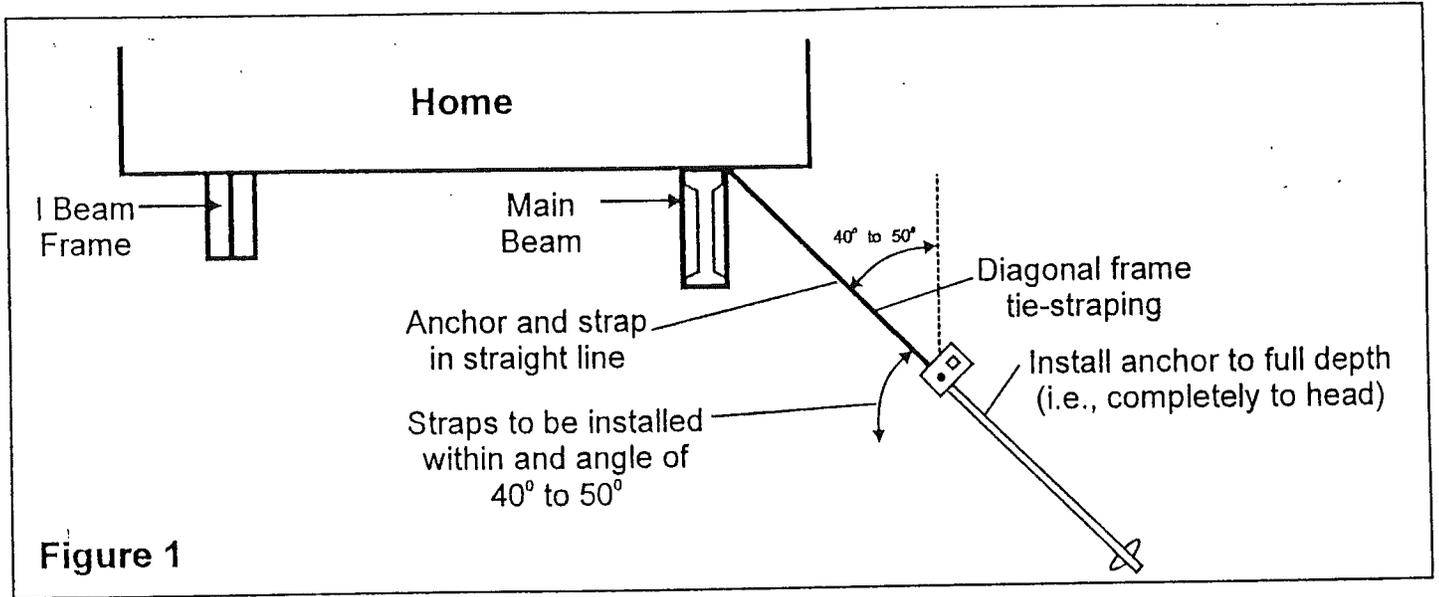


Figure 1

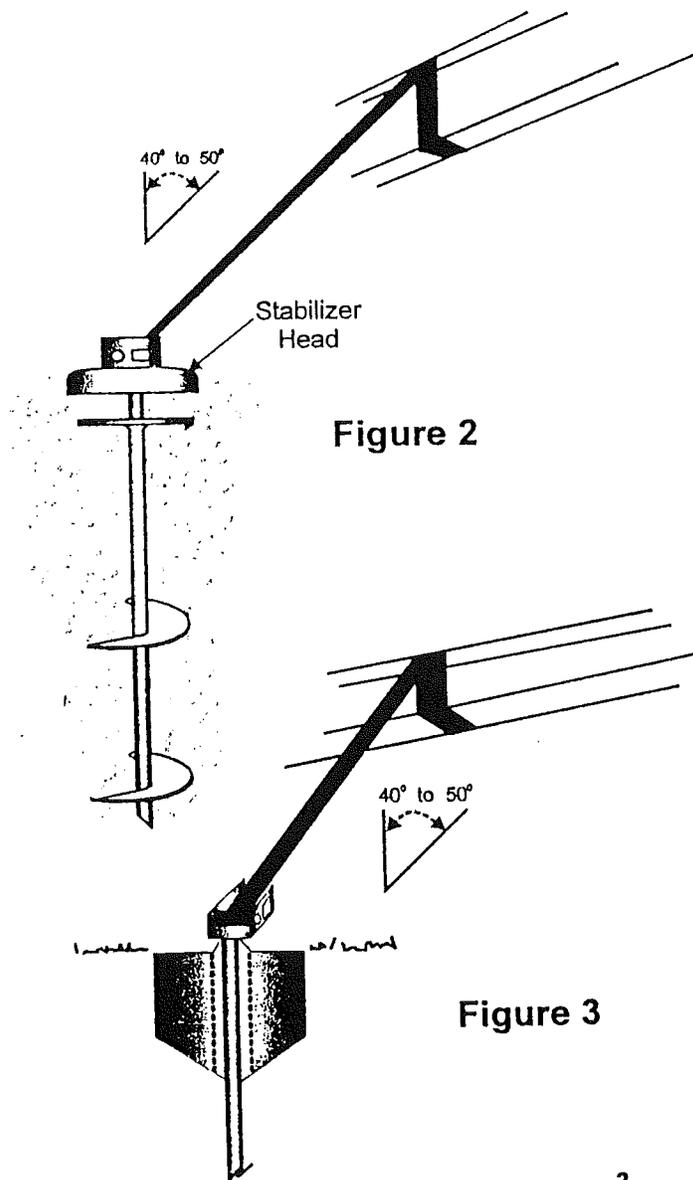


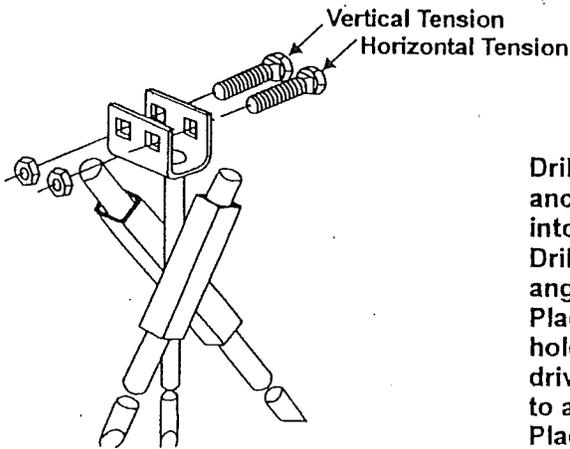
Figure 2

Figure 3

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.

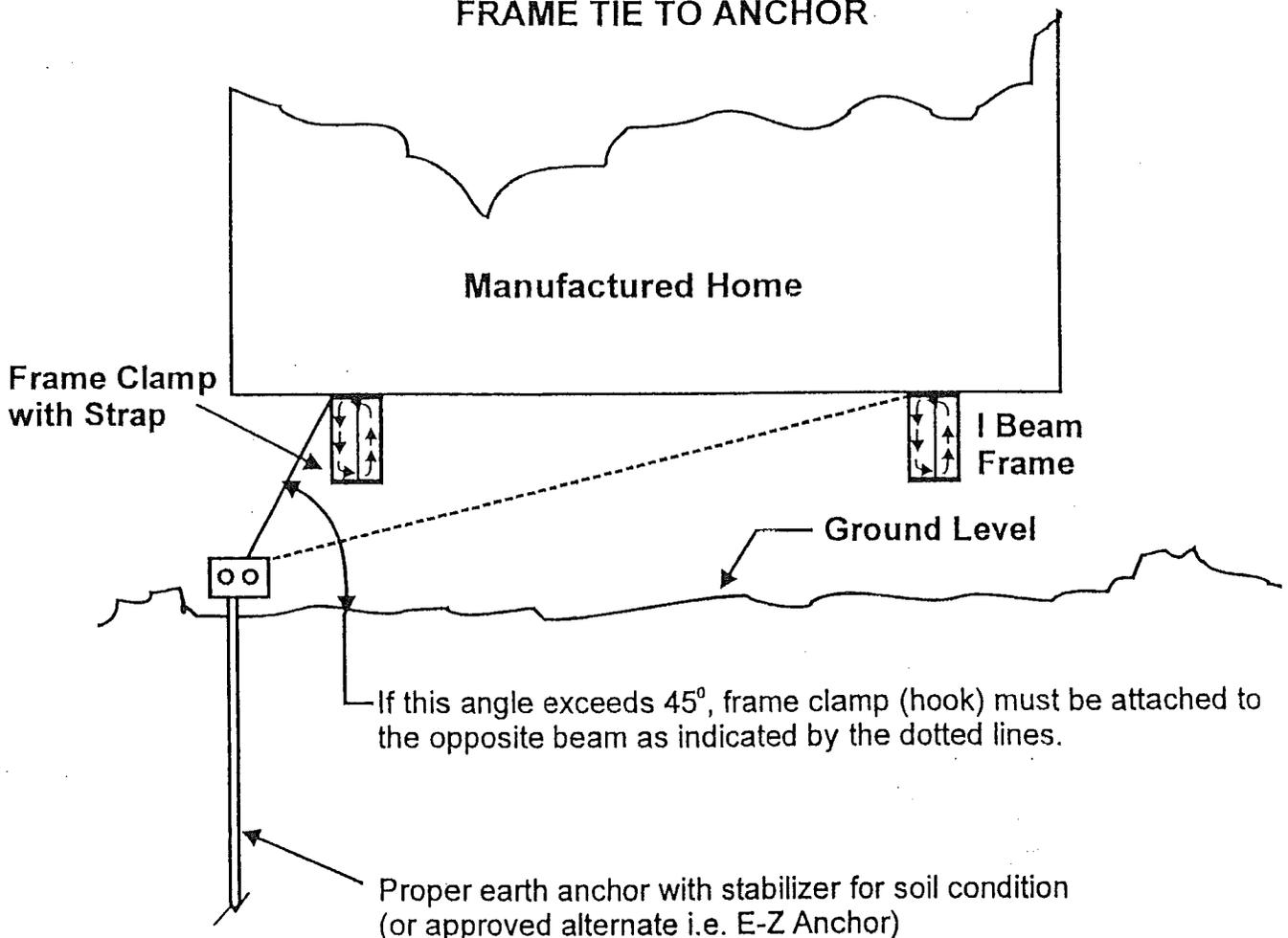


**Installation
Instructions
for
Cross Drive
Rock Anchor**

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.

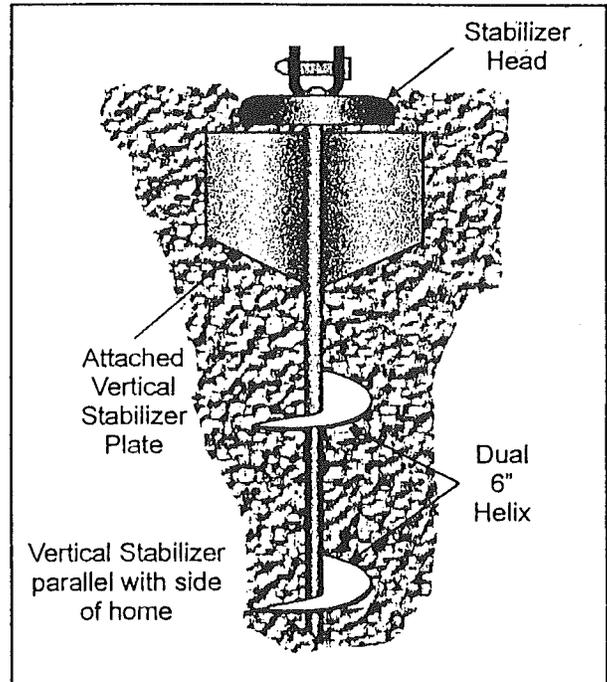
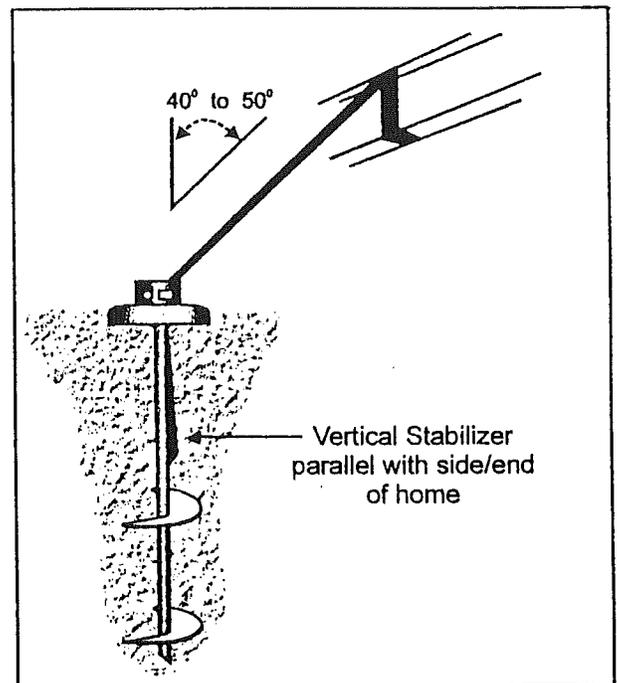


Figure A *Note: Before insertion, make sure vertical stabilizer is parallel with direction of pull.*

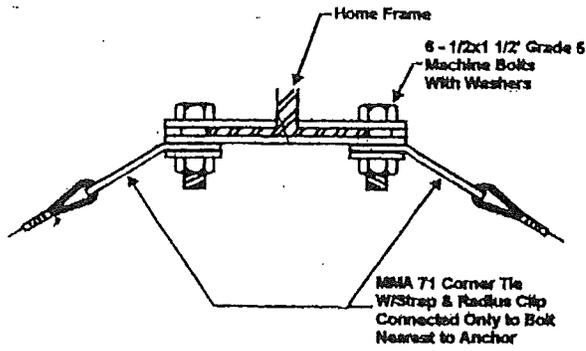


FLORIDA APPROVED

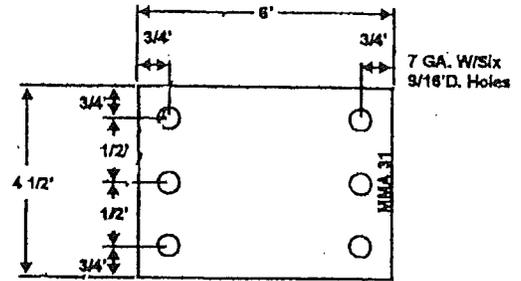
For additional information, copies of engineering test(s) and report, Contact Minute-Man Anchors, Inc. (Revised: November 1998)



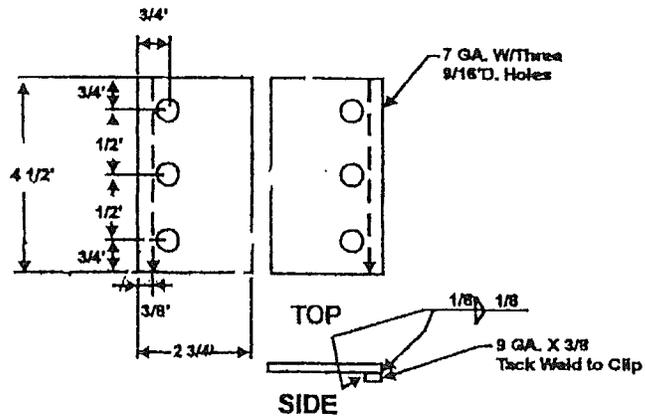
LONGITUDINAL FRAME TIE AND CLAMP (Florida Approved)



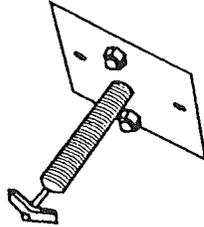
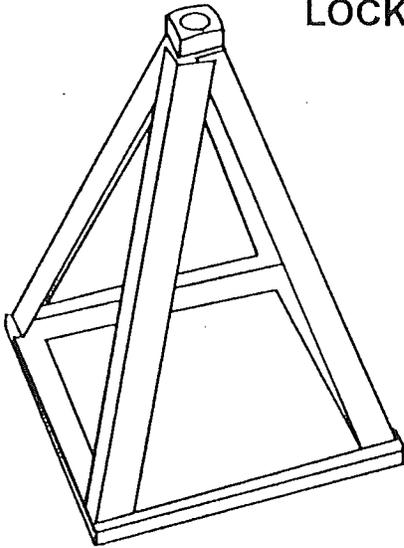
MMA 31 ASSEMBLY UNIT



TOP



LOCKING HEAD HEAVY DUTY PIER

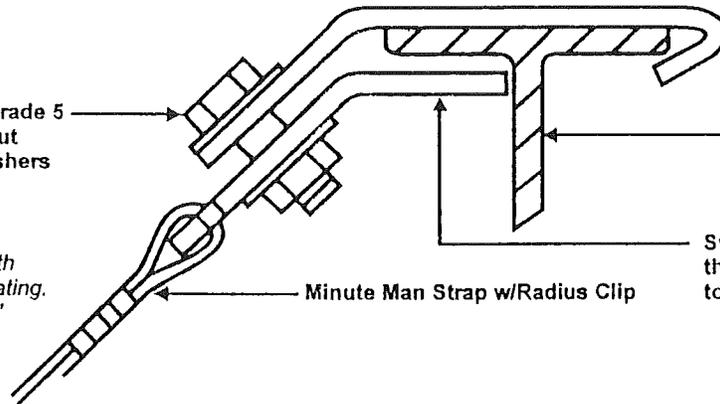


MDP-16	16" DELUXE PIER
MDP-20	20" DELUXE PIER
MDP-24	24" DELUXE PIER
MDP-28	28" DELUXE PIER
MDP-32	32" DELUXE PIER

Available painted or hot dip galvanized

LOCKING FRAME CLAMP II MMA-33 ASSEMBLED UNIT

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

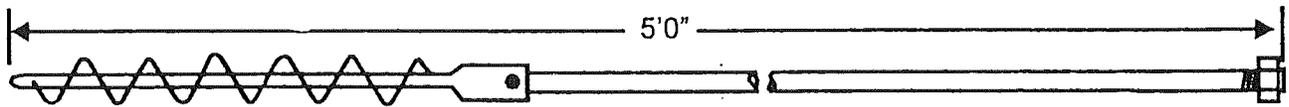


Home Frame

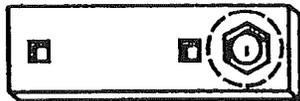
Note: Galv. Or Painted with
Black Water Resistant Coating.
All Dimensions +/- 0.0625"

Minute Man Strap w/Radius Clip

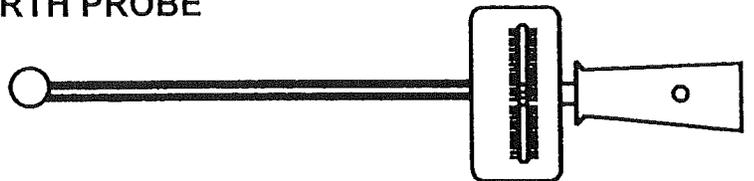
Swivel Clip must not vary more
than 10 Deg. from Perpendicular
to Beam.



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 ³	Zone III ³
Single Strap	4725 lbs. ₁	11' - 0" ₂	6' - 0" ₂	4' - 6" ₂
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° 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.

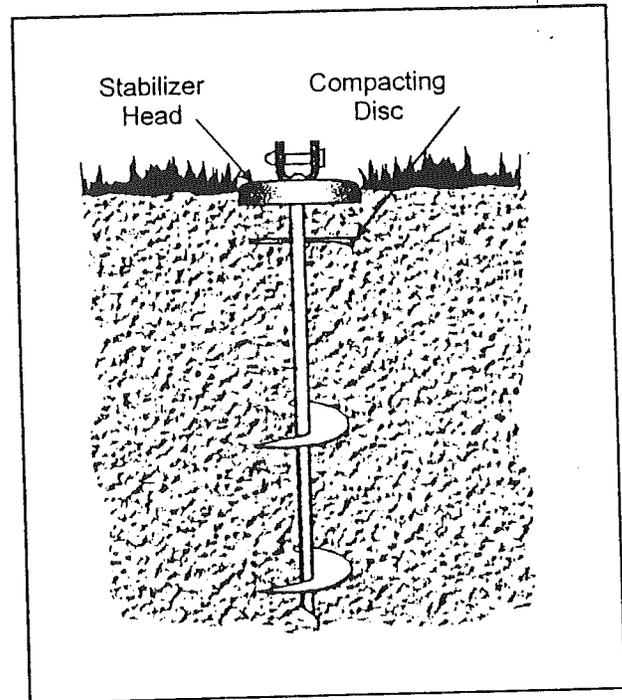


Figure A

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.

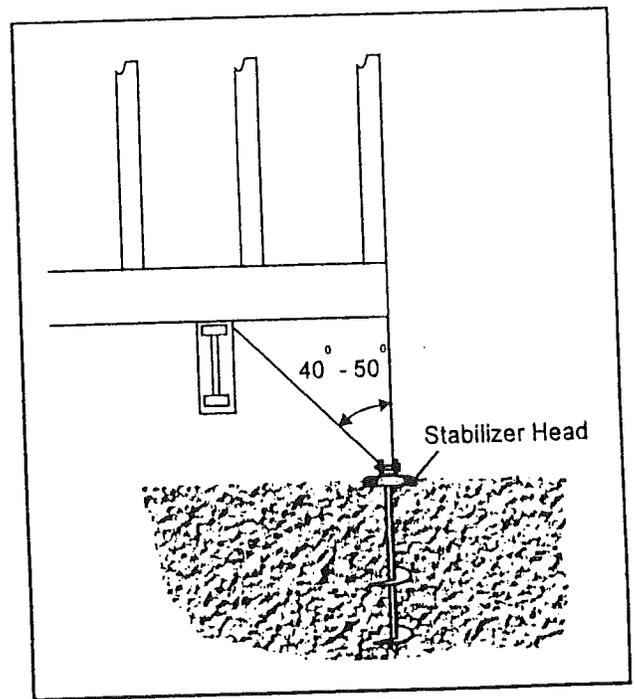


Figure B

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	FLA.
MMA-SD2		STABILIZER	
MMA-29	FCIIW/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	FLA.
MMA-33	FCII (LOCKING)	LOCKING FRAME CLAMP II	
MMA-71	CT/WS	CORNER TIE W/STRAP	FLA.
MMA-71	CT/WS	CORNER TIE II W/STRAP	
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

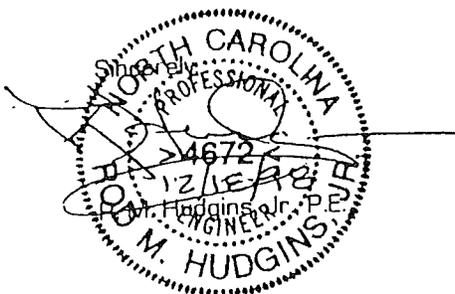
Dear Sir:

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

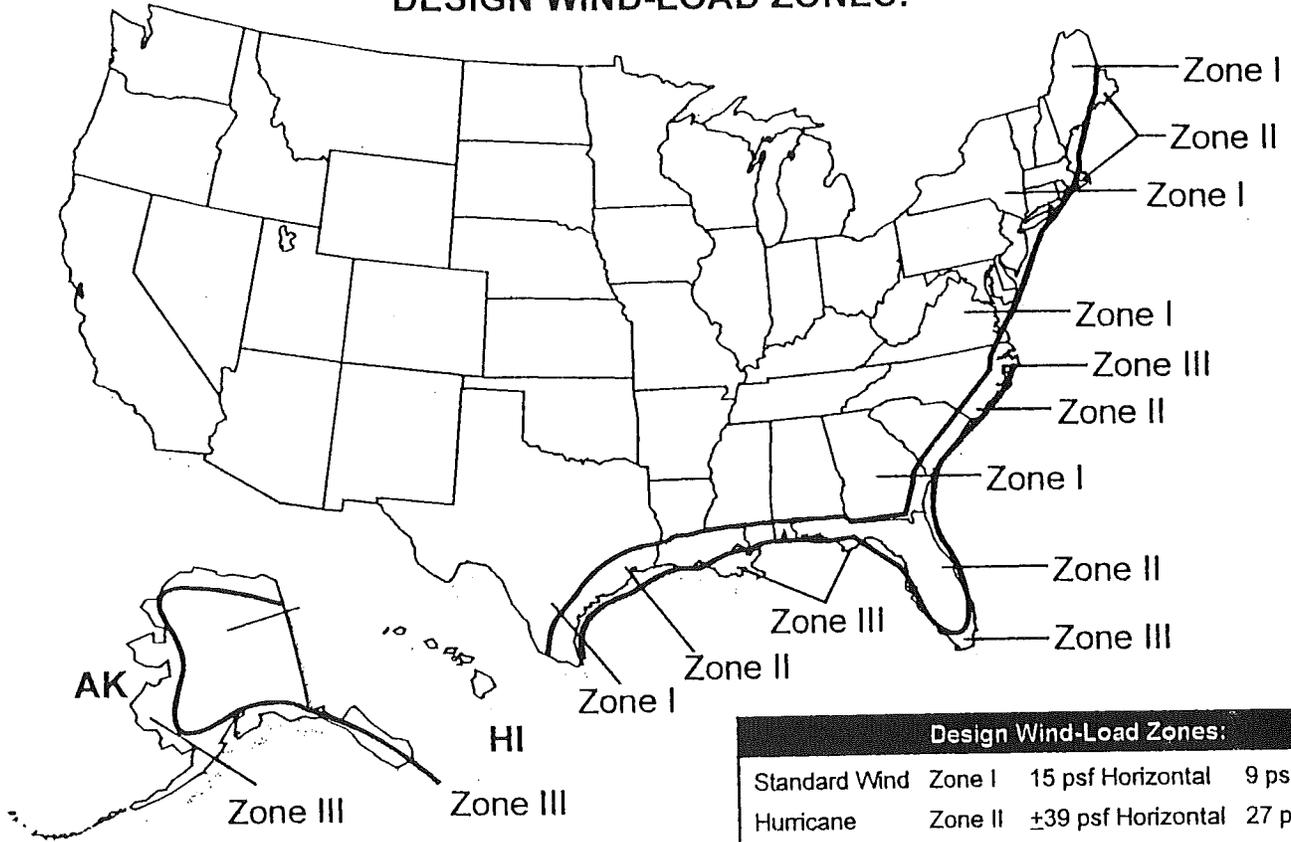
650 DH 5/8	4430 DH 5/8	36 XDH	THDH
650 DH 11/16	4430 DH 11/16	48 XDH	THDHLS
650 DH 3/4	4430 DH 3/4	36 DH	
		24 BA	FCI W/S
636 DH 5/8	4442 DH 5/8	210 DH	FCII W/S
636 DH 3/4		210 PDH	BUC W/S
	4450 DH 11/16	210 JDH	SBN
4636 DH 3/4	4450 DH 3/4	100 DH	MMASD2
			MMASDA2
4430 EZDH 3/4		CT/WS CORNER TIE II	
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.



DESIGN WIND-LOAD ZONES:



Design Wind-Load Zones:			
Standard Wind	Zone I	15 psf Horizontal	9 psf uplift*
Hurricane	Zone II	±39 psf Horizontal	27 psf uplift
Hurricane	Zone III	±47 psf Horizontal	32 psf uplift
			*net uplift
Note: psf: pounds per square foot			

Notes

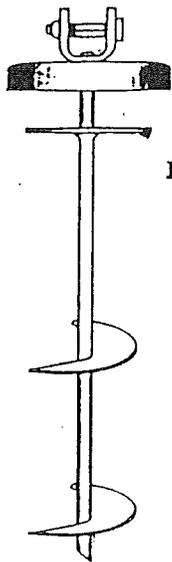
Note: Prior to installation, refer to any local, state and federal regulations, to assure proper compliance.
 Soil test probe the anchor location in order to match the soil classification with the proper anchor.

Minute Man anchors, Inc.

Anchor • Drive Anchors • Anchor Kits • Anchor Drive Machines • Strapping
 Mobile Home Piers • Entrance Steps • Platforms • Decks

Minute Man anchors

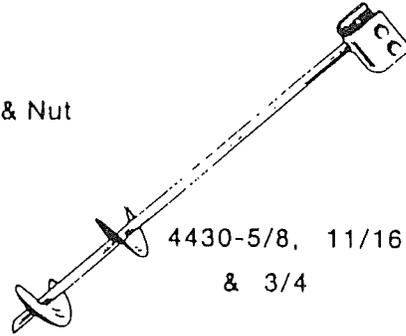
All anchors are "DH" type for use with either one or two tension bolts. Anchors are priced without tension bolt and nut—they must be ordered separately. Tension bolts and nuts will be packed separately from anchors.



EZDH 5/8, 3/4



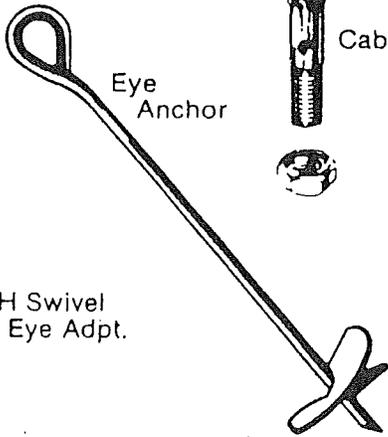
Strap Bolt & Nut



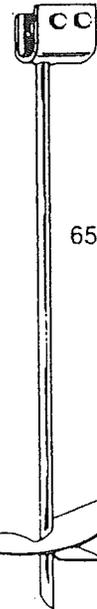
4430-5/8, 11/16 & 3/4



Cable Bolt & Nut



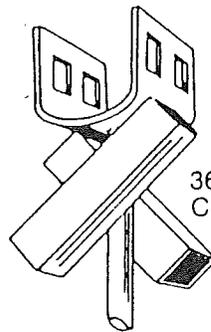
Eye Anchor



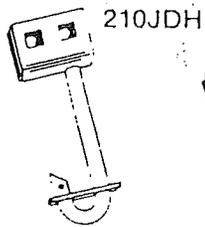
650 5/8, 11/16 & 3/4



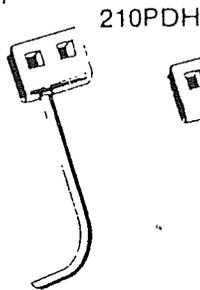
100DH Swivel Head Eye Adpt.



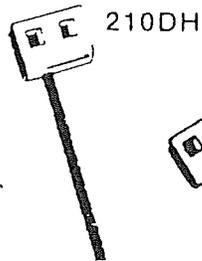
36" & 48" Cross Drive



210JDH



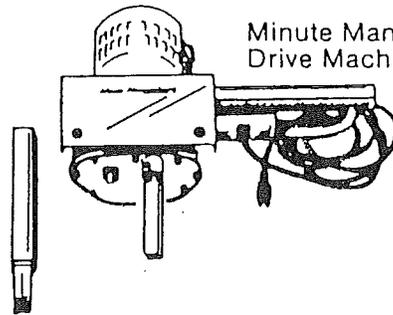
210PDH



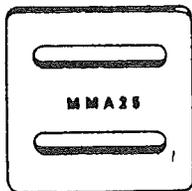
210DH



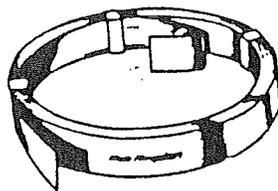
THDHLS



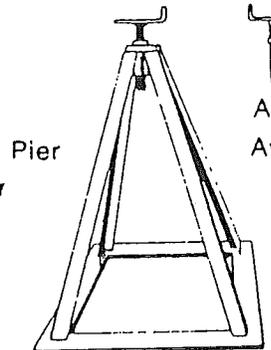
Minute Man Anchor Drive Machine



STRAP BUCKLE



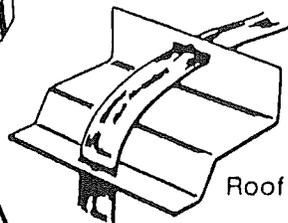
Galvanized Strapping



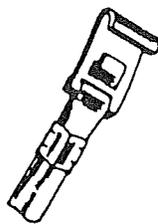
Pier



Also Available



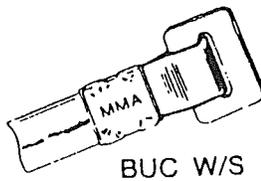
Roof Bracket



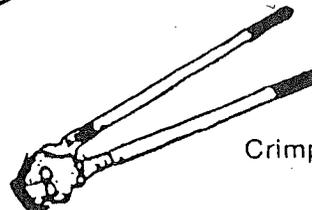
FC W/S



FC II W/S



BUC W/S



Crimping Tool



BUSINESS REPLY MAIL

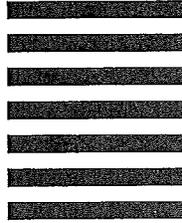
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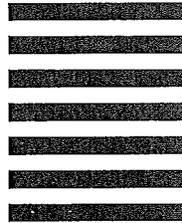
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