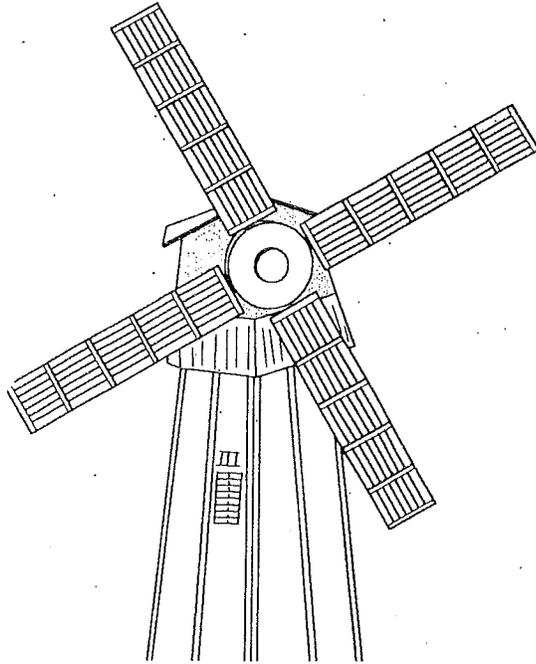
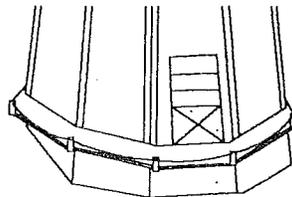


# SET UP & INSTALLATION PROCEDURES

1997



## Dutch Housing, Inc.



P.O. Box 687  
White Pigeon, MI 49099

Keep this booklet with your 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 these 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**

1997

# DUTCH HOUSING, INC.

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# DUTCH HOUSING, INC.

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# DUTCH HOUSING, INC.

## 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 homeowner, 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 may be notified of revised instructions or new products.

**Instructions in this manual cover the following products:**

DUCHESS  
GREAT NORTHERN HOMES  
DUTCH HOMES  
DUTCH LIMITED  
IMPERIAL

# DUTCH HOUSING, INC.

## CHAPTER 2 - DEFINITIONS

**Anchoring Equipment.** Straps, cables, turnbuckles 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.

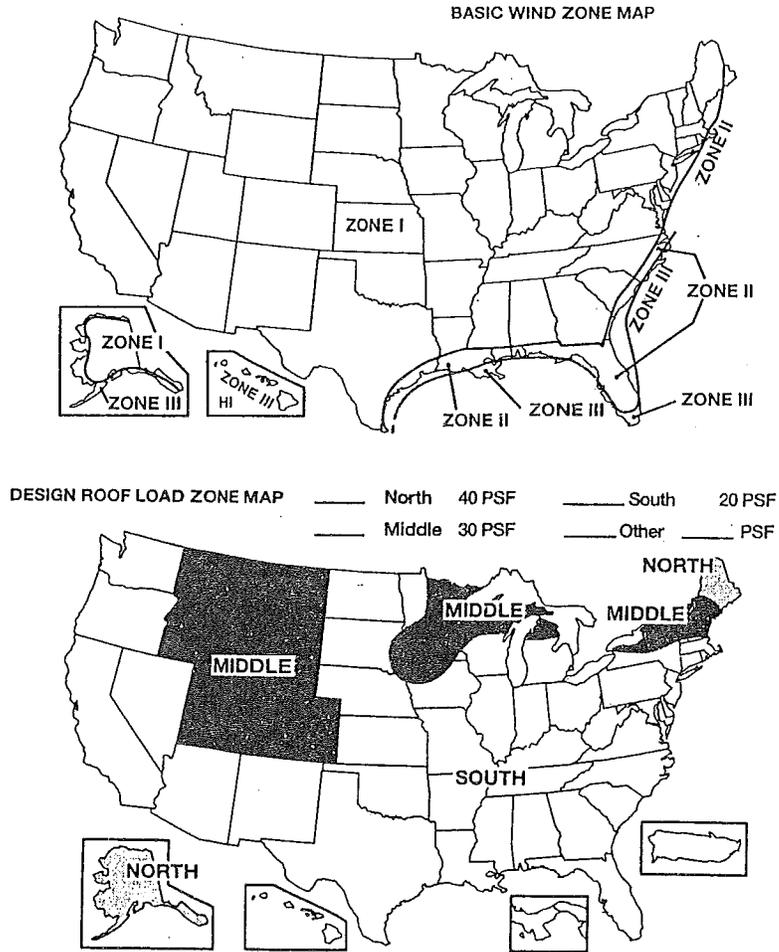
## VENTILATION IMPROVEMENT INFORMATION

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.

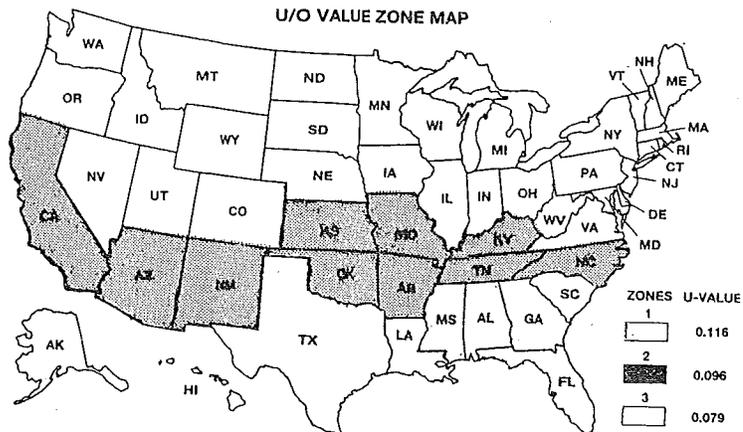
# DUTCH HOUSING, INC.

## ZONE MAPS OF THE UNITED STATES STRUCTURAL DESIGN

FIGURE 3.1



## HEATING AND COOLING DESIGN



# DUTCH HOUSING, INC.

## 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 of 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 raise any overhead wires. Special transportation permits may be required from state, county, or city officials.
- 3.1.3 Encroachments and setback 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 local geologist or professional engineer.
  - 3.2.3 Soil bearing testing methods and equipment. A pocket 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.

# DUTCH HOUSING, INC.

## 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 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 United 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:

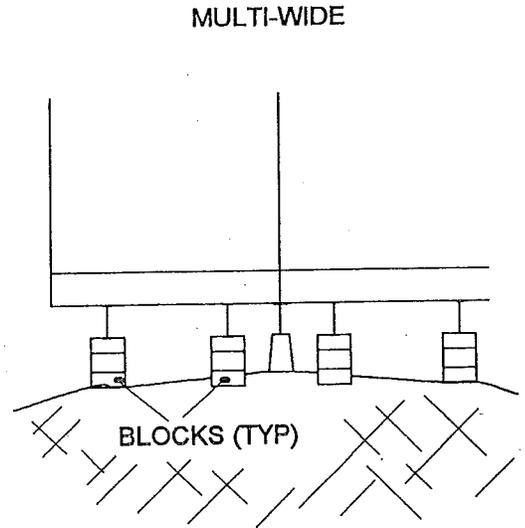
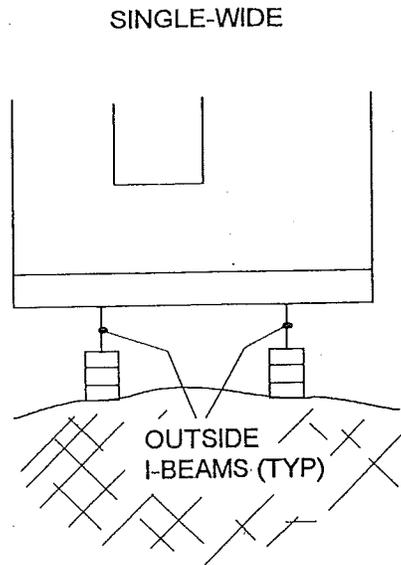
- Soils investigation and analysis of the site.
- Compliance with the local building code.
- Competent opinion by a local engineer or building official.

# DUTCH HOUSING, INC.

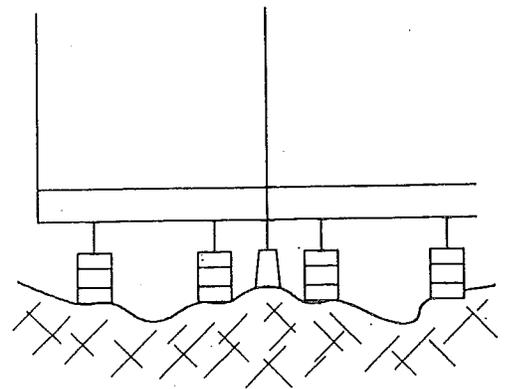
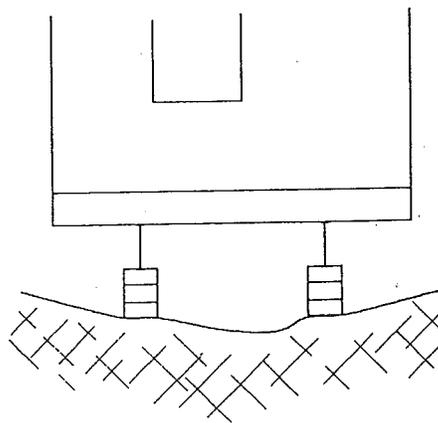
## SITE PREPARATION

FIGURE 3.3  
ELIMINATION OF WATER BENEATH HOME

DO: CROWN AND GRADE SITE TO SLOPE AWAY FROM HOME, AND COVER WITH 6 MIL THICK POLY-ETHYLENE 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.

# DUTCH HOUSING, INC.

## 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 (see 4.1.3.2).

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 piers are constructed of blocks stacked side-by-side, every layer should be at right angles to the previous one (see Fig 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 the same length and width of the pier they rest upon. 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 in any remaining vertical gaps.

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

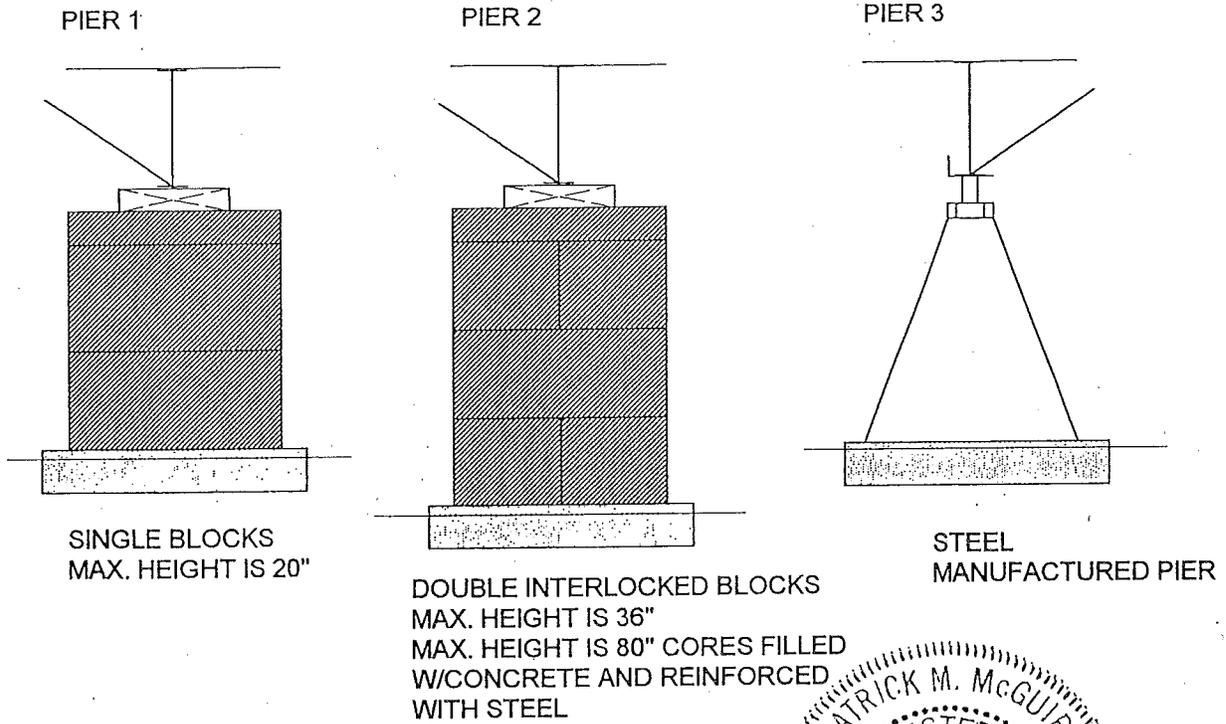
All piers must rest on footings (see paragraph 4.2) that extend below frost line and are placed on either undisturbed or compacted fill.

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

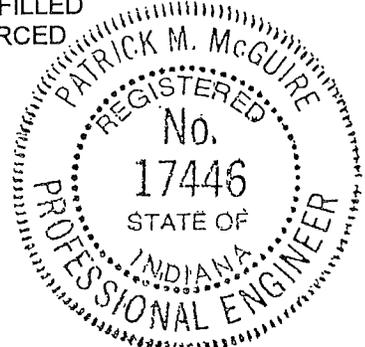
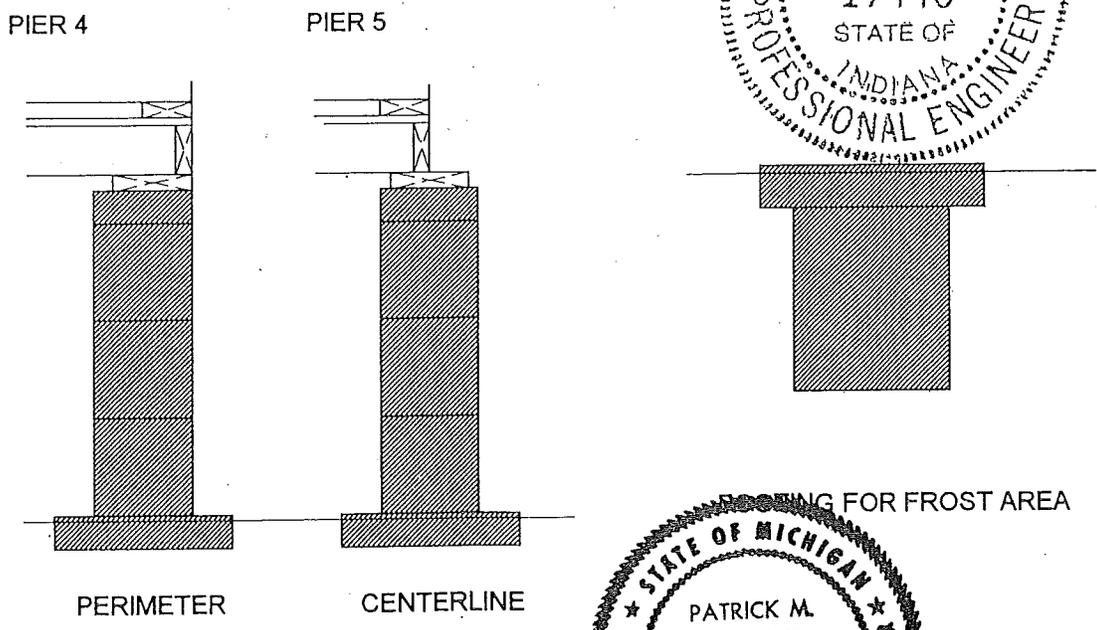
# DUTCH HOUSING, INC.

FIGURE 4.1

## TYPICAL FOOTING AND PIER INSTALLATION

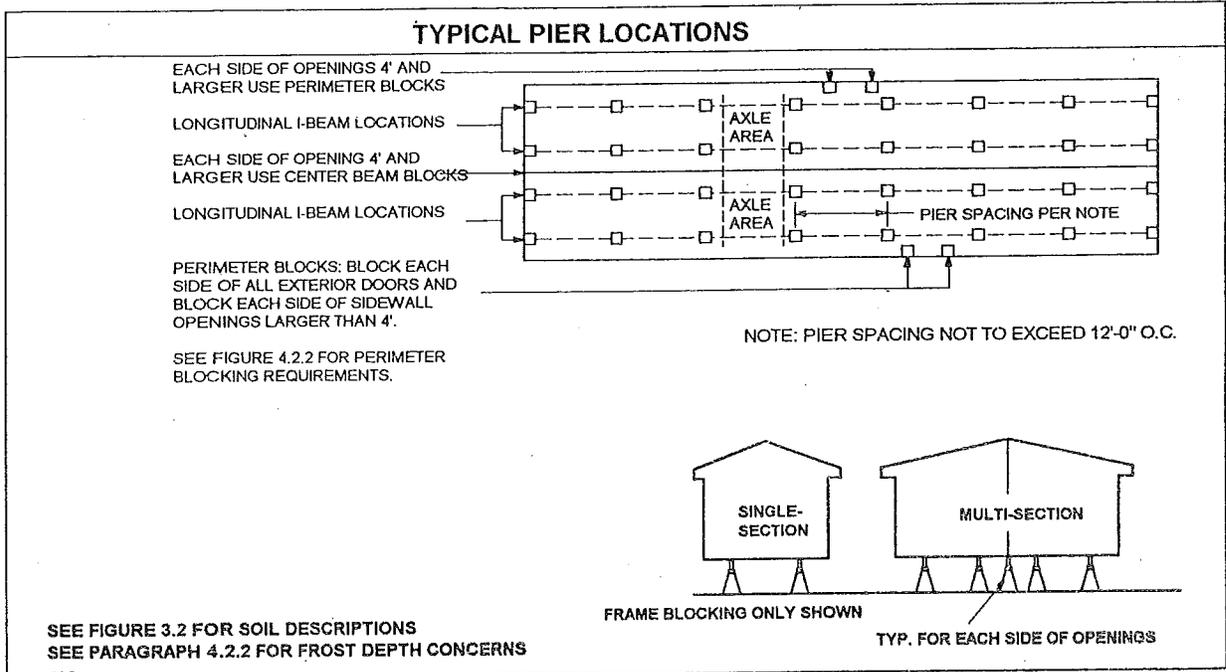


*Patrick M. McGuire 8.5.96*



# DUTCH HOUSING, INC.

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.

*Patrick M. McGuire 8-5-96*

TABLE 4.2.1

### MINIMUM PIER CAPACITY TABLE FRAME BLOCKING ONLY

(SEE FIGURE 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



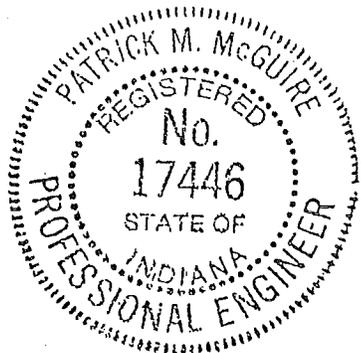
# DUTCH HOUSING, INC.

## 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 FEET	ROOF LIVE LOAD	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	1800	2600	3500	4400	5300	6100
	30	1200	2300	3500	4700	5800	7000	8200
14	20	1000	2000	3000	4100	5100	6100	7100
	30	1400	2700	4100	5400	6800	8100	9500
16	20	1200	2300	3500	4700	5800	7000	8100
	30	1600	3100	4700	6200	7800	9300	10900



*Patrick M. McGuire 8.5.96*

# DUTCH HOUSING, INC.

**NOTE:**

**PERIMETER BLOCKING IS REQUIRED ON DUTCH MODELS AS FOLLOWS**

2000 AND 1400 SERIES: SOUTH (20 PSF) ROOF LOAD ZONE NOT REQUIRED  
MIDDLE (30 PSF) ROOF LOAD ZONE NOT REQUIRED

1600 SERIES: SOUTH (20 PSF) ROOF LOAD ZONE NOT REQUIRED  
MIDDLE (30 PSF) ROOF LOAD ZONE ANY UNIT WITH OSB FLOOR  
DECKING REGARDLESS OF I-BEAM SPACING

**IMPORTANT:** UNITS WITHOUT PERIMETER BLOCKING STILL REQUIRE BLOCKING  
BELOW MATING LINE SUPPORT POSTS AND EXTERIOR DOORS AND  
WINDOW OPENINGS.

**PERIMETER BLOCKING IS REQUIRED ON DUTCH MODELS AS FOLLOWS**

5000 AND 5400 SERIES: SOUTH (20 PSF) ROOF LOAD ZONE NOT REQUIRED  
MIDDLE (30 PSF) ROOF LOAD ZONE NOT REQUIRED

5600 SERIES: SOUTH (20 PSF) ROOF LOAD ZONE NOT REQUIRED  
MIDDLE (30 PSF) ROOF LOAD ZONE ANY UNIT WITH OSB FLOOR  
DECKING REGARDLESS OF I-BEAM SPACING

**IMPORTANT:** UNITS WITHOUT PERIMETER BLOCKING STILL REQUIRE BLOCKING  
BELOW MATING LINE SUPPORT POSTS AND EXTERIOR DOORS AND  
WINDOW OPENINGS.

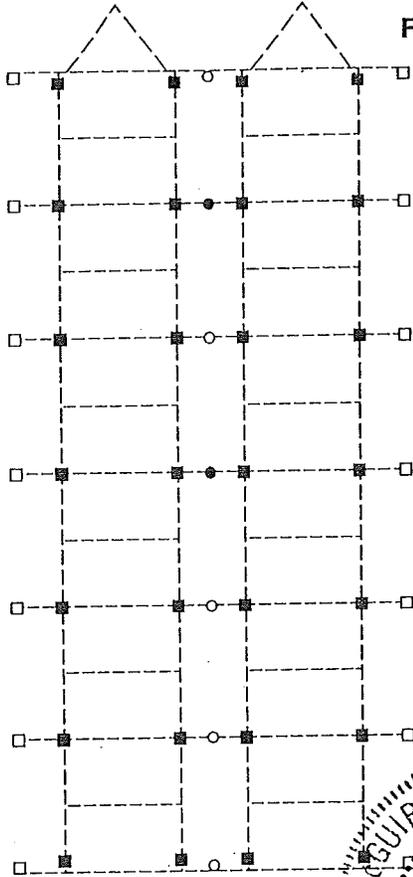
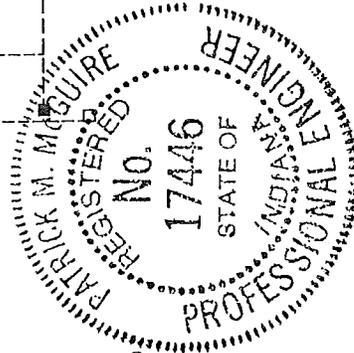


FIGURE 4.2.2

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



**NOTE:**

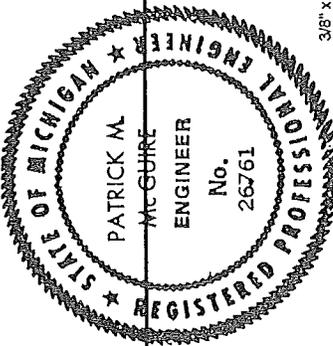
- 1) PIER SPACING SHALL BE MAXIMUM 12'-0" O.C. AND START 2'-0" MAXIMUM AND 1'-0" MINIMUM FROM ENDS.
- 2) PERIMETER SUPPORTS REQUIRED EACH SIDE OF WINDOW AND DOOR OPENINGS AND NOT MORE THAN 10'-0" O.C. MAXIMUM.
- 3) THE LOADS AND LOCATIONS OF RIDGE BEAM AND COLUMN SUPPORTS ARE FOUND ON THE FLOOR PLAN AND DATA SHEET.
- 4) MATING LINE SUPPORTS AND BEAM SUPPORTS APPLICABLE TO DOUBLE WIDES ONLY.



*Patrick M. McGuire 8.5.92*

DATE: 02-09-93	DUTCH HOUSING, INC. 	INSTALLATION	REV: 6-21-96
			DWG NO: I-10.1
		PERIMETER BLOCKING	

# DUTCH HOUSING, INC.



1/2" DIA. ANCHOR BOLTS SPACED 12" FROM CORNER AND 6" O.C. FIELD (INSTALL 1/2" x 15" ANCHOR BOLTS W/CONCRETE BLOCK WALL OR INSTALL 1/2" x 7" ANCHOR BOLTS W/POURED WALL) OR EQUAL USING STEEL STRAPS EQUIVALENT TO ANCHOR BOLTS.

SILL PLATE TO BE INSTALLED ON UNIT AT FACTORY

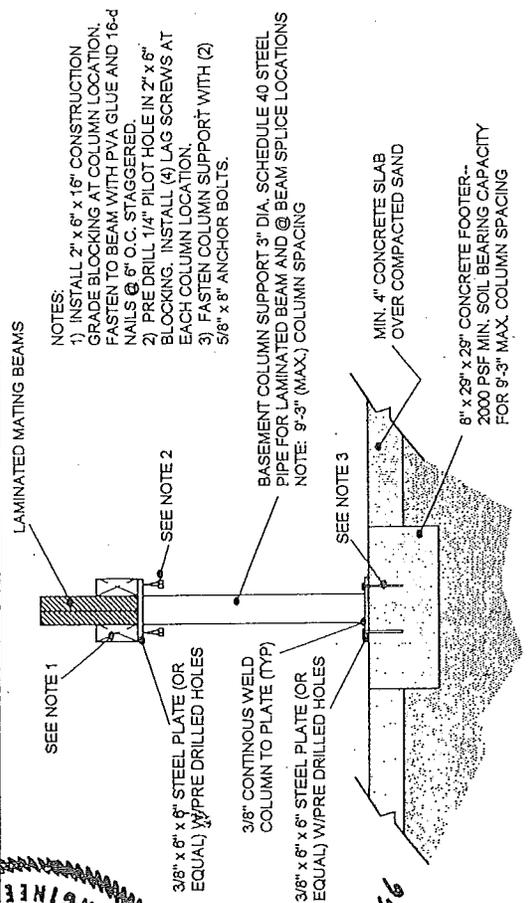
BITUMINOUS BARRIER REQUIRED ON EXTERIOR SIDE OF FOUNDATION WALL

NOTE: ADJUST BASEMENT WALL HEIGHT FOR (MIN) CLEARANCE FOR STAIRS (TO BE SUPPLIED & INSTALLED BY OTHERS @ SITE) PER LOCAL CODES

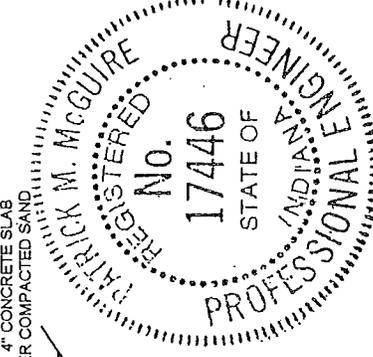
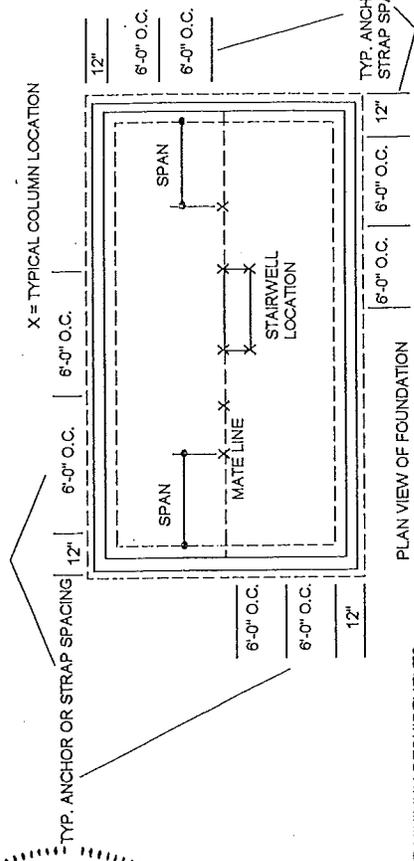
*Patrick M. McGuire 8.5.96*

MIN. 8" x 16" CONCRETE FOOTER  
MIN. 4" CONCRETE SLAB OVER COMPACTED SAND

CONTINUOUS CRUSHED GRAVEL OVER CONTINUOUS 4" DRAIN (TYPICAL)



## TYPICAL BASEMENT COLUMN SUPPORT



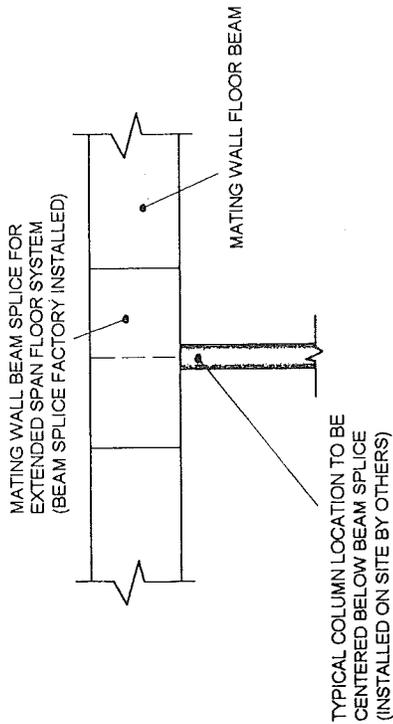
DISCLAIMER:  
IT IS THE RESPONSIBILITY OF THE DEALER AND/OR INSTALLER TO CERTIFY THAT ANY BLOCKING, FOUNDATION PRINTS, OR ANY OTHER DIAGRAM SUPPLIED TO A CONTRACTOR FOR SITE WORK CORRELATE WITH THE UNIT ORDERED. THE MANUFACTURER WILL NOT BE RESPONSIBLE OR LIABLE FOR DAMAGES ARISING FROM FAILURE OF THE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

DATE: 11-93	<p>DUTCH HOUSING, INC.</p>	<p><b>FOUNDATION DETAILS EXTENDED SPAN FLOOR SYSTEM</b></p>	REV: 05-01-96
			DWG NO:

# DUTCH HOUSING, INC.



12A

DATE: 12-92

DUTCH HOUSING, INC.



INSTALLATION  
EXTENDED SPAN DETAILS  
BEAM SPLICE SUPPORT

REV: 8-8-96

DWG NO: 1-12A

# DUTCH HOUSING, INC.

## PIERS AND FOOTINGS INSTALLATIONS 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 block, 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 **Locations 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 multi-section), and other factors such as the locations of doors or other openings and heavy pieces of furniture. In general, locate piers per Table 4.2.1 and 4.2.2, starting no more than 1'-0" min. or 2'-0" max. from ends.

Place piers for Dutch Housing, Inc. home as follows.

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

4.1.5.2 Multi-section home. Fig. 4.2.2 shows the recommended location and spacing of piers for your multi-section home.

4.1.5.3 Under doors and heavy furniture. Place piers on both sides of sidewall exterior doors and other sidewall openings wider than 4' (such as sliding glass doors), under porch posts, fireplaces and wood stoves, and under the expected locations of heavy furniture such as pianos, organs, waterbeds, etc.

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 the 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 use 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 psf.

# DUTCH HOUSING, INC.

## 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 (Fig. 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.
- 4.2.3 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. Dutch Housing, Inc., does not recommend siting your home in river or coastal flood prone areas. Special local regulations or flood 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 22070

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

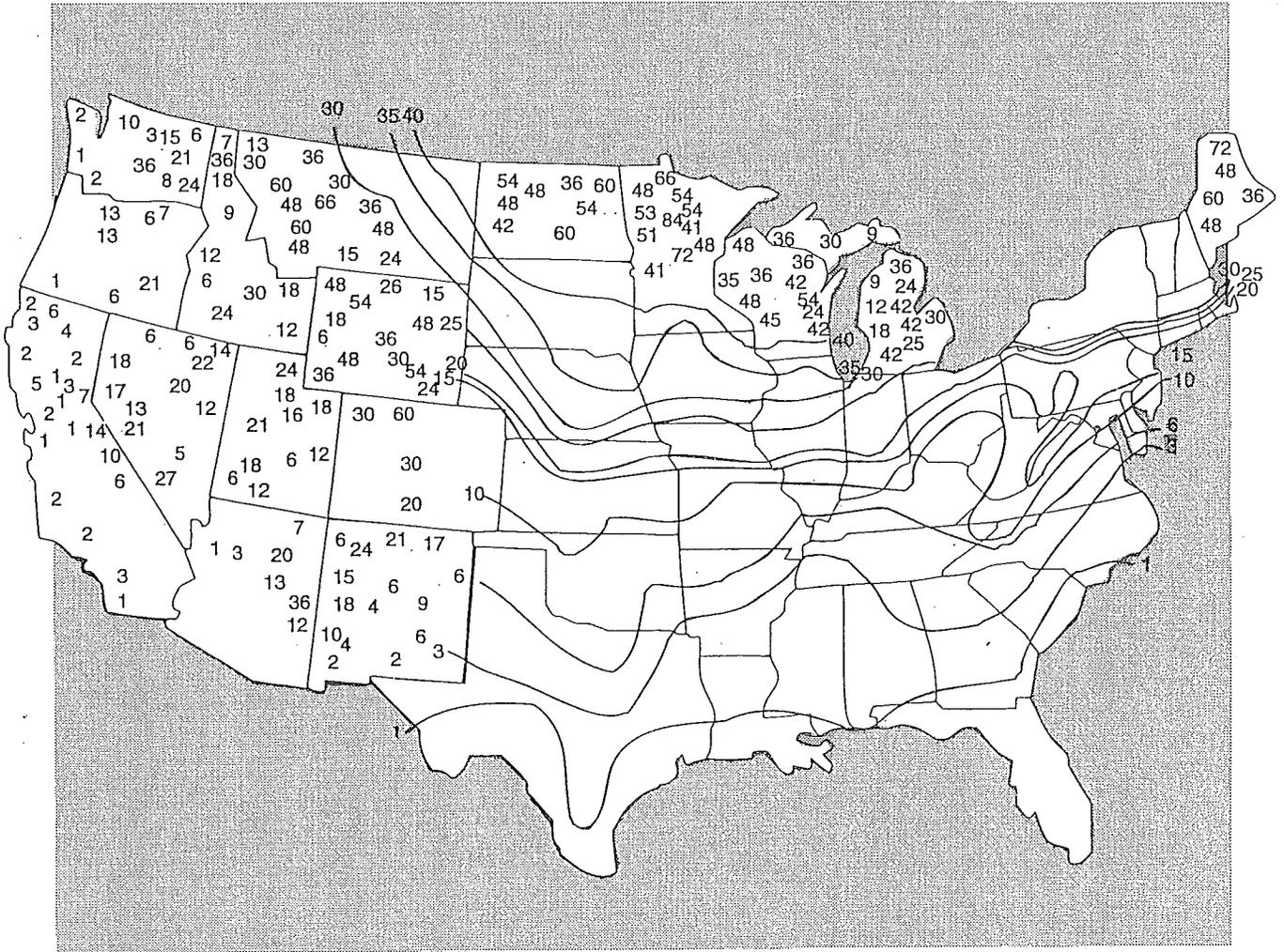
HUD Handbook 4930.3 (1989) "Permanent Foundations Guide for Manufactured Housing" order from:  
U.S. Department of Housing and Urban Development, 451 7th St., SW, Washington, DC 20410

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

# DUTCH HOUSING, INC.

## FROST PENETRATION MAP

FIGURE 4.4



Average Depth of Frost Penetration  
in Inches

Source: U.S. Department of Commerce  
Weather Bureau

# DUTCH HOUSING, INC.

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	9x9	8x8	7x7	5x5
800	11x11	9x9	8x8	5x5
1000	12x12	10x10	8x8	6x6
1500	15x15	12x12	10x10	7x7
2000	17x17	14x14	12x12	8x8
2500	19x19	15x15	13x13	9x9
3000	21x21	17x17	15x15	10x10
3500	22x22	18x18	18x18	11x11
4000	24x24	20x20	19x19	12x12
4500	25x25	21x21	20x20	13x13
5000	27x27	22x22	21x21	13x13
5500	28x28	23x23	22x22	14x14
6000	29x29	24x24	22x22	15x15
6500	31x31	25x25	23x23	15x15
7000		26x26	24x24	16x16
7500		27x27	25x25	16x16
8000		28x28	25x25	17x17
8500		29x29	27x27	17x17
9000		29x29	28x28	18x18
10000		31x31	29x20	19x19
11000			31x31	20x20
12000			32x32	21x21
13000				22x22
14000				22x22
15000				23x23
16000				24x24
17000				25x25
18000				25x25
19000				26x26

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 24 in. footings may be used in place of one 24 in. x 24 in. footing.

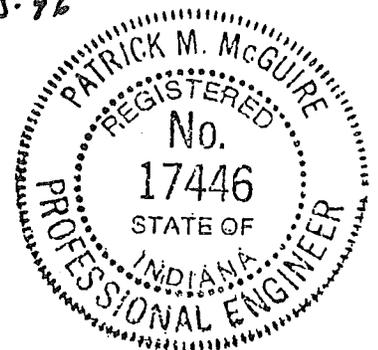
*Patrick M. McGuire 8.5.96*

FOOTING THICKNESS

4"  
6"  
8"

MAXIMUM SIZE

16"x16"  
24"x24"  
32"x32"



# DUTCH HOUSING, INC.

## 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. DUTCH HOUSING, INC., 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 ft.).
- Remove all shipping materials and items that stick out from the mating surfaces of both sections.
- Position the footings and piers, as before.

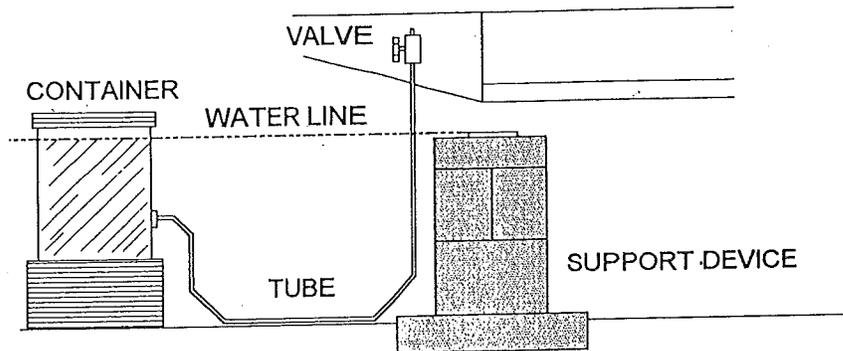
5.2.2.2 Leveling and joining sections. Using the jacking procedures described in paragraph 5.2.1, raise the second section 1" to 2" above the first, and install a moving device under it. Remove shipping braces from both sections and, aided by the water level, install the footings and piers under the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

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

5.2.2.4 Exterior closure. See instructions placed in your home.

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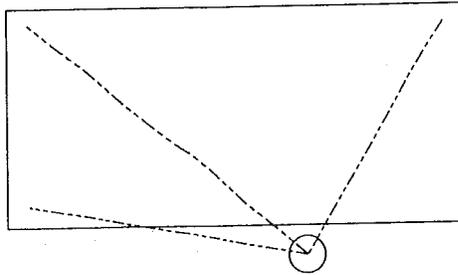
FIGURE 5.1  
USE OF A WATER LEVEL



## 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"



## PLACE AT ANY POINT AROUND HOME

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.

NOTE: LEVEL ALL SUPPORT DEVICES BEFORE LOWERING HOME.

# DUTCH HOUSING, INC.

## 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 should secure the home against the wind unless the local jurisdiction permits otherwise. 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 Number and location of anchors. Select the number and location of straps and anchors from the "Tie Down Details" in Fig. 5.3. Only listed and approved ground anchors shall be used. Ground anchors shall be capable of resisting at least the minimum loads of 3150 pounds and shall be capable of withstanding a 50% overload without failure.

5.4.1.2 Installation of anchors. Install the anchors at the locations indicated in Figure 5.3, following the anchor manufacturer's (see Minute Man instructions. Use singlehead anchors at all "frame-tie-only" locations. Line up the shaft of each anchor with its strap (see Figure 5.3). You must consult a registered professional or structural engineer to determine the correct angles for the anchors, if they cannot be installed as illustrated in Figure 5.3.

### 5.4.3 Severe climatic conditions

5.4.3.1 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.

5.4.3.2 Severe wind zones. Dutch Housing, Inc. 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).

5.4.3.3 Flood prone areas. Dutch Housing, Inc. 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.

# DUTCH HOUSING, INC

## INTERIOR CLOSURE MOULDING

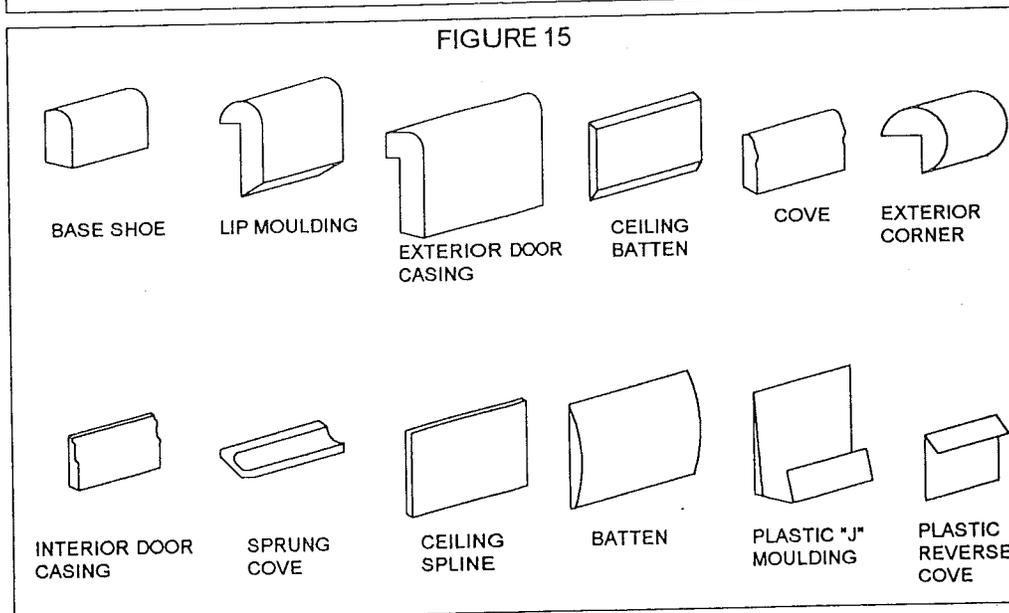
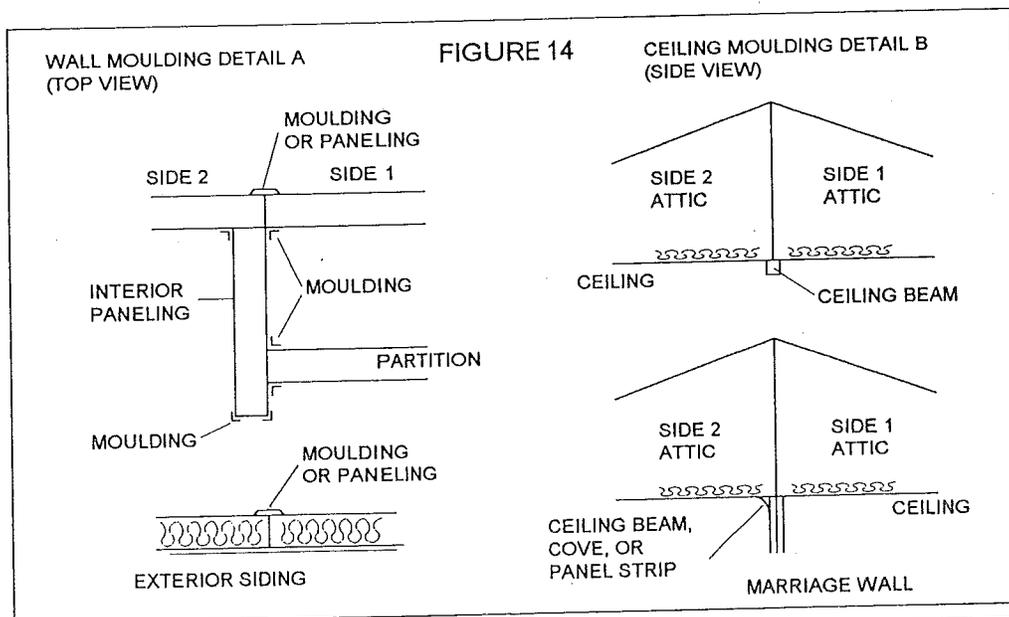
All the materials necessary to trim out the interior of the home can be easily identified by matching the mouldings or paneling with the materials installed by the manufacturer.

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.

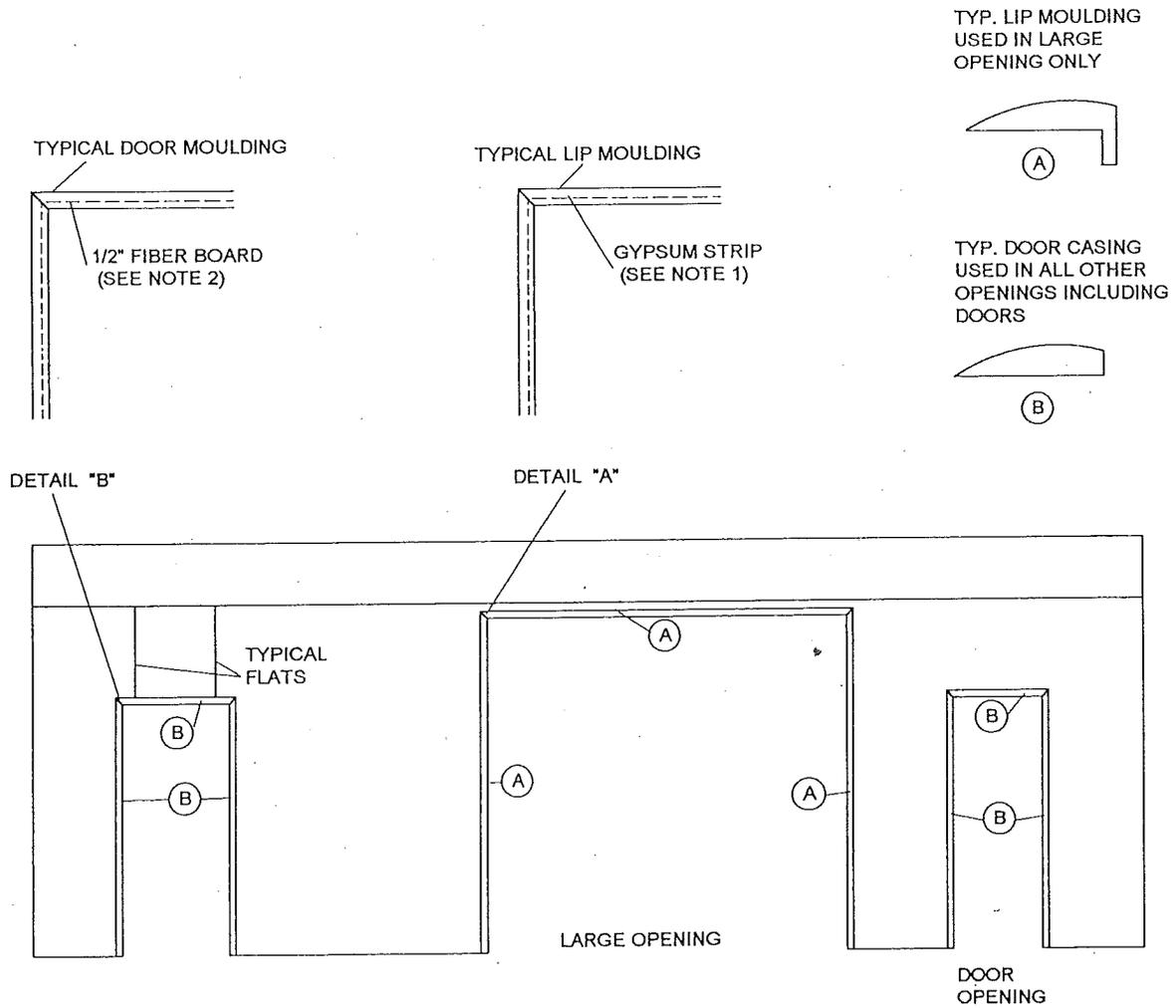


# DUTCH HOUSING, INC.

## 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

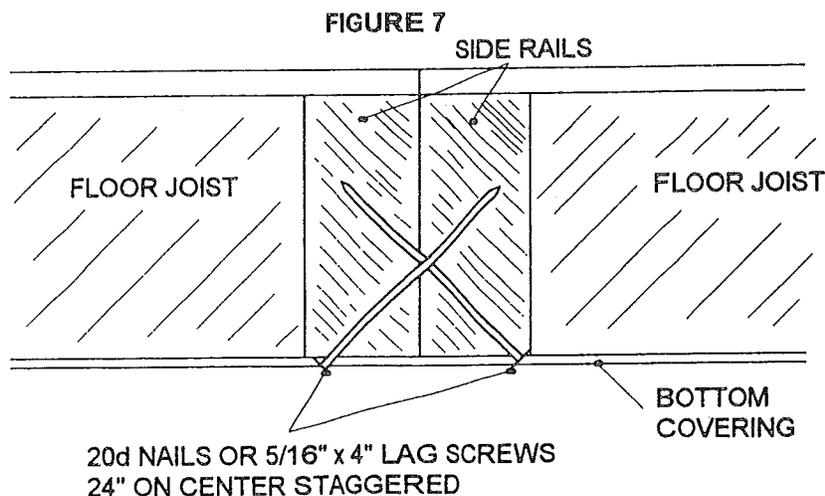
NOTE 2: 1/2" x 7" FIBER BOARD CUT TO PROPER WIDTH AND LENGTH USED IN ALL OTHER OPENINGS (INCLUDING DOORS)

### "TYPICAL" MARRIAGE WALL TRIM OUT DETAIL

# DUTCH HOUSING, INC.

## LEVELING AND JOINING SECTIONS

1. Refer to the previous pages on single-section homes under "Jacking and Leveling" 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 should 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 "Jacking and Leveling" section under "Single-Section Homes", 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 together and aligned, fasten the side rails of the floor together with 20d nails or 5/16" x 4" 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 SECTIONS 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.



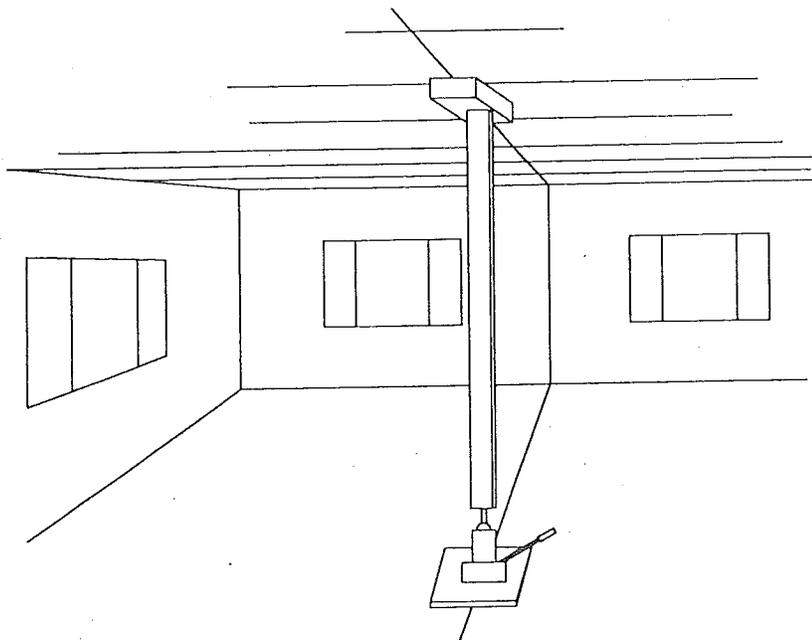
# DUTCH HOUSING, INC.

## 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 a maximum of 4 1/2" on center. 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.
14. On composition shingle roofs, cover the joint with a wide piece of roofing felt which is stapled to the underlying 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 ridge 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



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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.

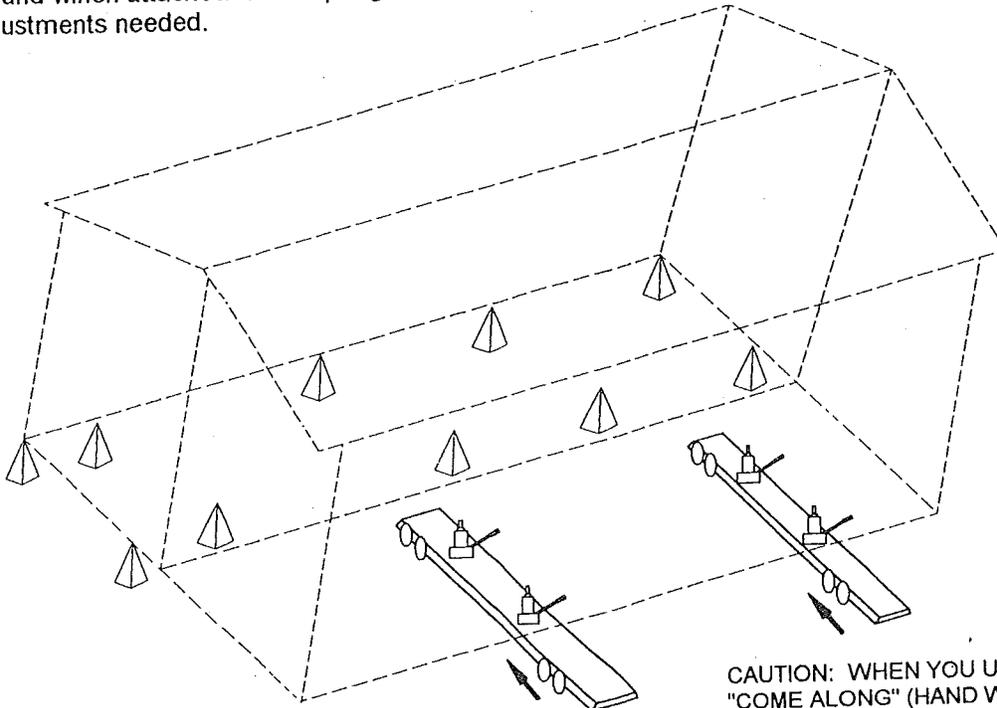
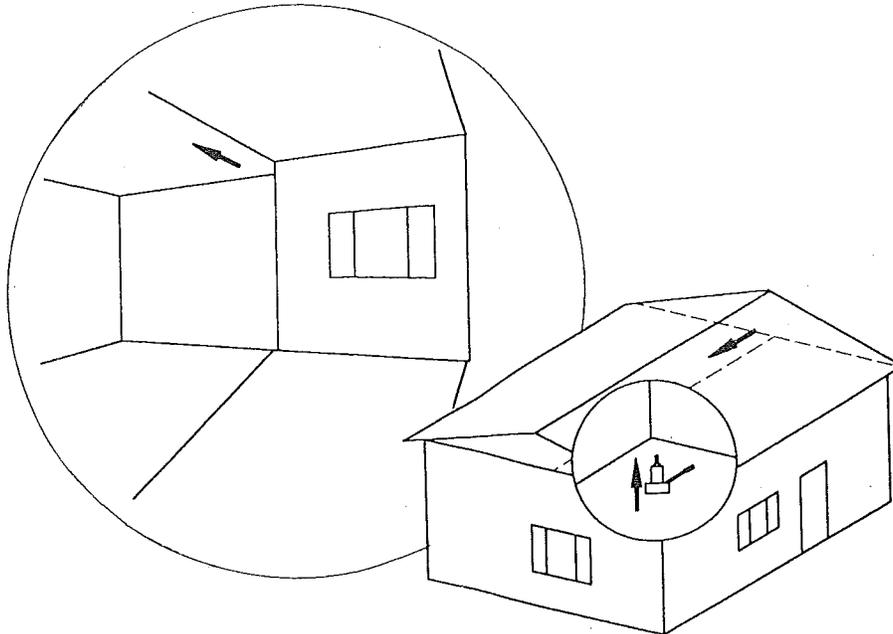


FIGURE 8

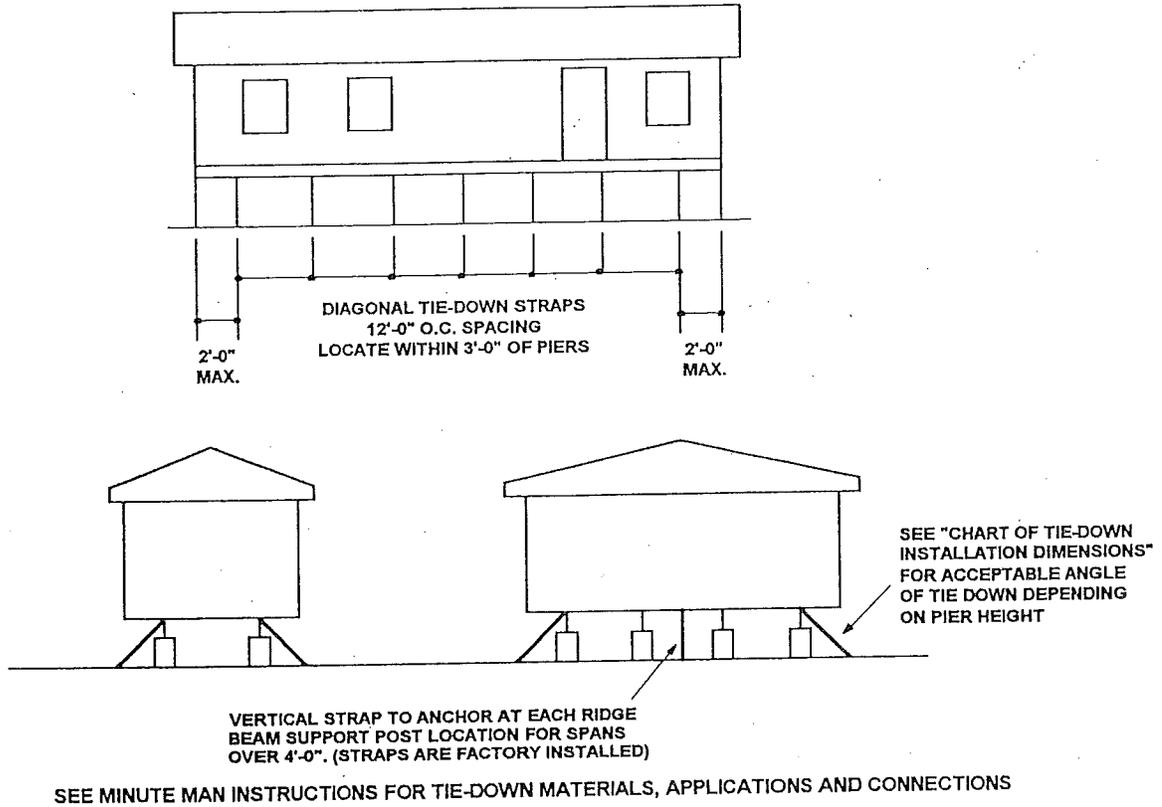
CAUTION: WHEN YOU USE A "COME ALONG" (HAND WINCH) BE CAREFUL AND DON'T EXCEED THE WORKING LOAD LIMIT OF THE DEVICE

FIGURE 9

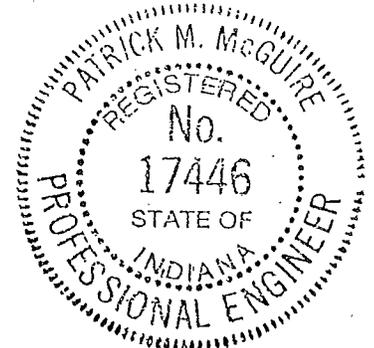
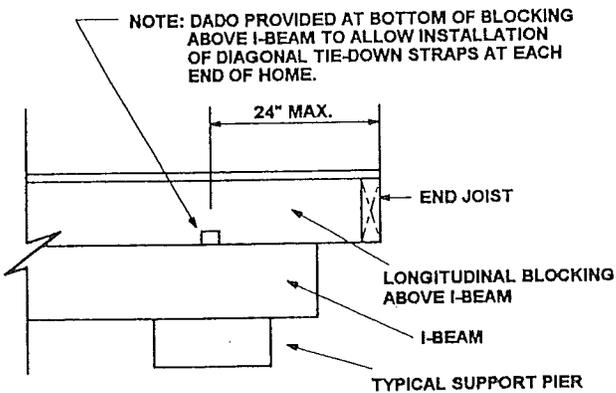


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## TIE-DOWN DETAILS - TYPICAL FIGURE 5.3

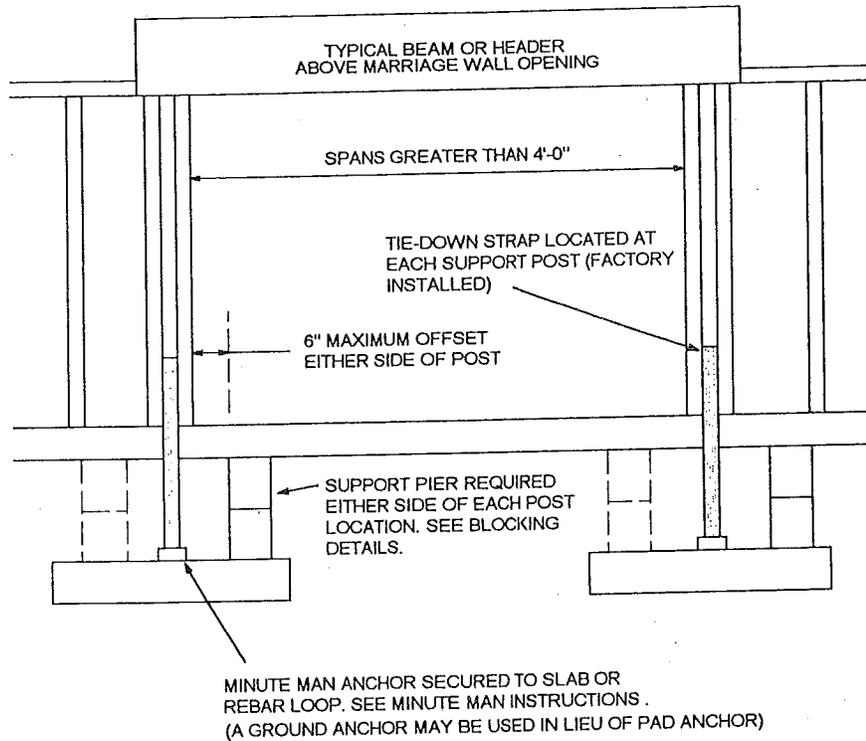


*Patrick M. McGuire*  
8.5.96



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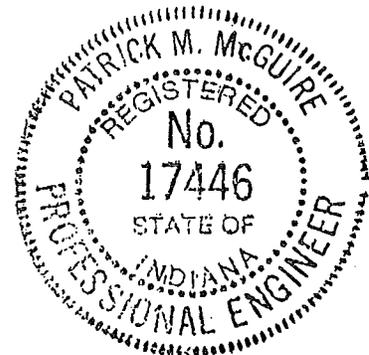
## TIE-DOWN DETAILS - TYPICAL FIGURE 5.3 CONT.



**IMPORTANT: SOME MODELS MAY HAVE A 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.**

### SUPPORT POST TIE-DOWN DETAIL

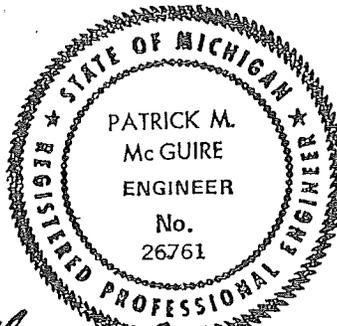
*Patrick M. McGuire*  
8.5.96



# DUTCH HOUSING, INC.

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.



*Patrick M. McGuire 8-18-96*

## 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 piles/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.

# DUTCH HOUSING, INC.

FIGURE 10 - PROCEDURES FOR ERECTING HINGED TRUSS ROOF

1. Remove close-up material (nails, plastic, and strips) from ends of home, marriage wall and roof.
2. Use jacks provided by the dealer or set-up crew, to lift roof to an upright position. Place jacks 10' from each end of the home and approximately every 16' along the marriage line.
3. Jack 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.
4. 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.
5. Remove jacks after backer is secured to the posts.
6. 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 4" o.c. or 15ga. staples 6" o.c. (These may be shipped loose or attached to the hinged overhang.)
7. Install roof shingles per the manufacturers instructions and details in the set-up manual.
8. See doublewide set-up procedures in the set-up manual for remaining instructions on connecting the halves together.

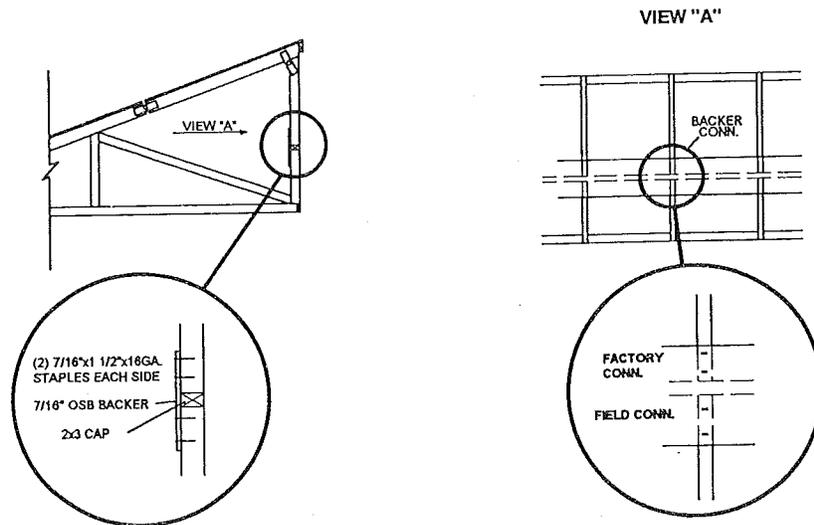
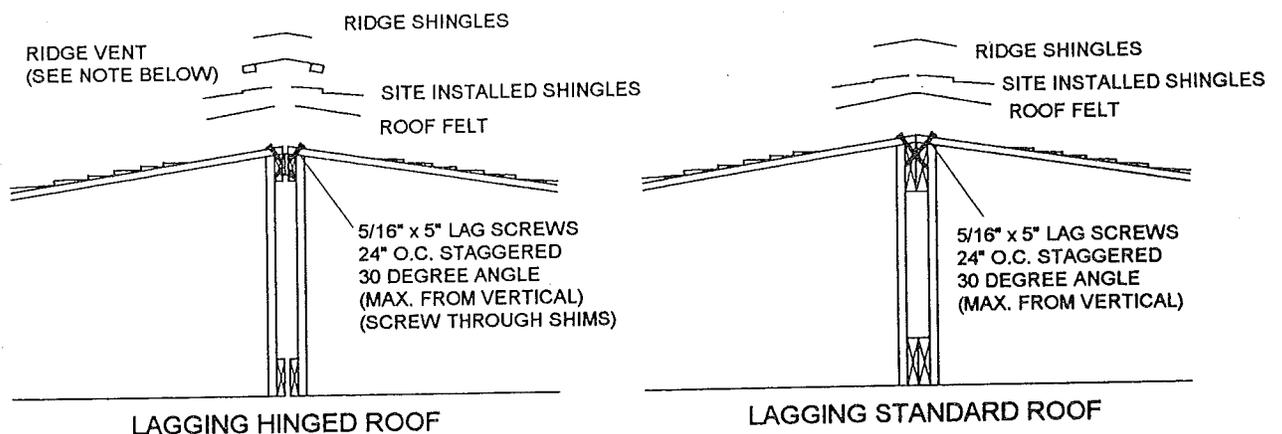


FIGURE 12



**NOTE:**

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

# DUTCH HOUSING, INC.

- 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. Dutch Housing, Inc. 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.

## CHAPTER 6 - INSTALLATION OF OPTIONAL FEATURES

- 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. Install the light bulb and attach the globe. Refer to Figure 6.3.
- 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, see Figure 6.4.

# DUTCH HOUSING, INC.

CHART OF TIE-DOWN INSTALLATION DIMENSIONS  
VERSION 1.2 03/18/91 PATRICK M. McGUIRE  
05/28/1991 COPYRIGHT 1988

50 DEGREES MAXIMUM SPECIFIED ANGLE FROM VERTICAL

45 DEGREES SPECIFIED MINIMUM ANGLE FROM VERTICAL

PIER HEIGHT	X MAXIMUM	X MINIMUM
8	9	7
10	11	9
12	14	11
14	16	13
16	19	15
18	21	17
20	23	19
22	26	21
24	28	23
26	30	25
28	33	27
30	35	29
32	38	31
34	40	33
36	42	35

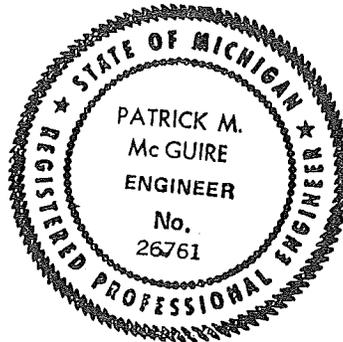
ALL DIMENSIONS ARE IN INCHES

PIER HEIGHT is the vertical distance from the top of the tie down strap to the ground

X (MAX. OR MIN.) is the level horizontal distance from the edge of the I-beam to the head of the anchor

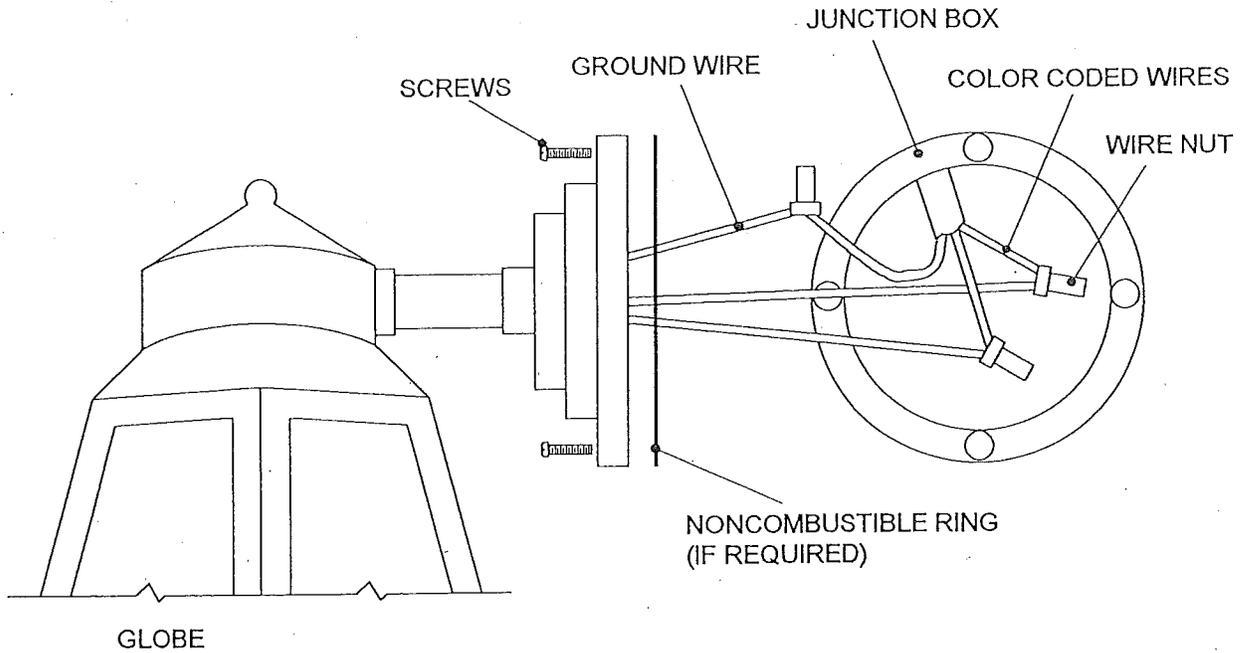
THE HEAD OF THE ANCHOR SHALL NOT BE INSTALLED OUTSIDE THE SKIRT

*Patrick M. McGuire*  
8.5.96



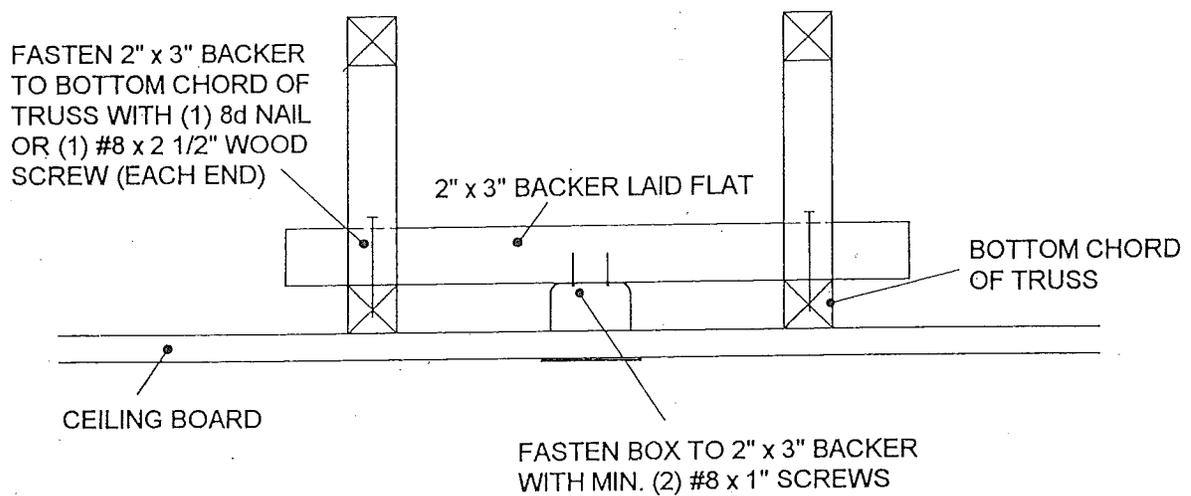
# DUTCH HOUSING, INC.

FIGURE 6.3 - INSTALLATION OF EXTERIOR LIGHTS



## 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.



# DUTCH HOUSING, INC.

## CEILING FAN INSTALLATION

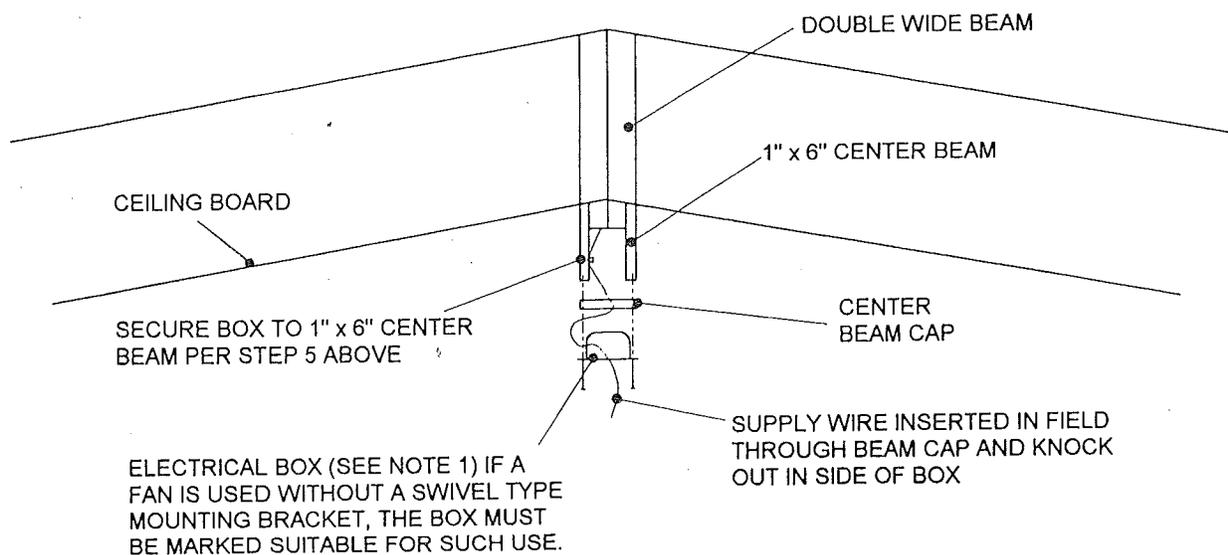
**CAUTION:** BEFORE INSTALLING CEILING FAN BE SURE ALL POWER TO THE FAN WIRE IS OFF.

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 ceiling) and centered in the width of the beam.
3. Insert the fan wire through the hole in the center beam cap and secure to the 1" x 6" 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 6" center beams with (2) #6 x 1 3/8" wood screws into each 1" x 6".
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 in plant or on site by others.

FIGURE 6.4



# DUTCH HOUSING, INC.

## 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 installed around it, through a moisture lint exhaust system, as shown in Figure 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 the 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. Dutch Housing, Inc. is not responsible for any weakening of the home's structural soundness resulting from dryer installation.

- 7.2 **Fireplace and gas furnaces 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 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, county, 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.

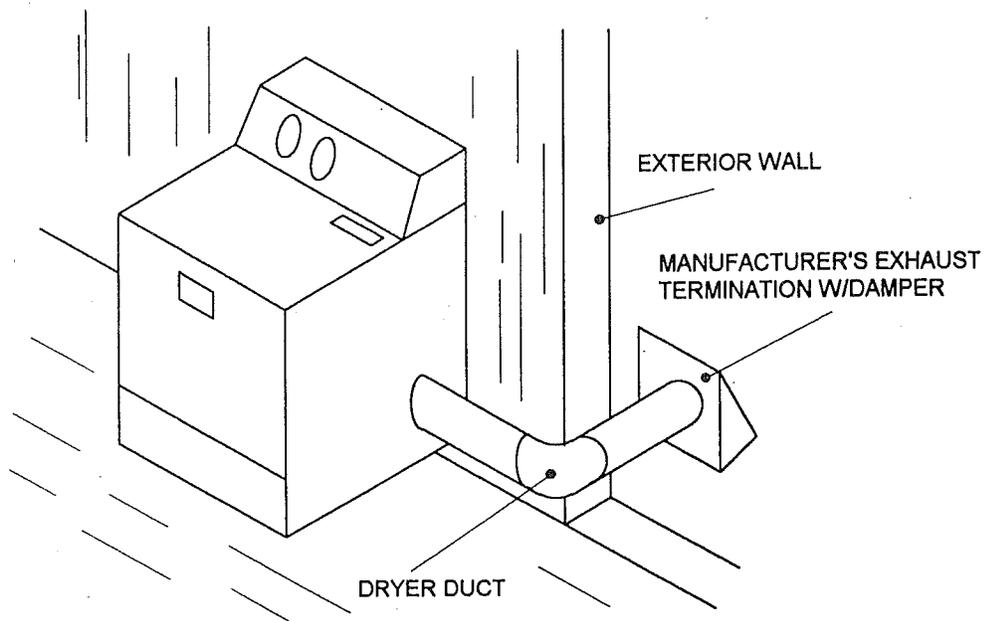
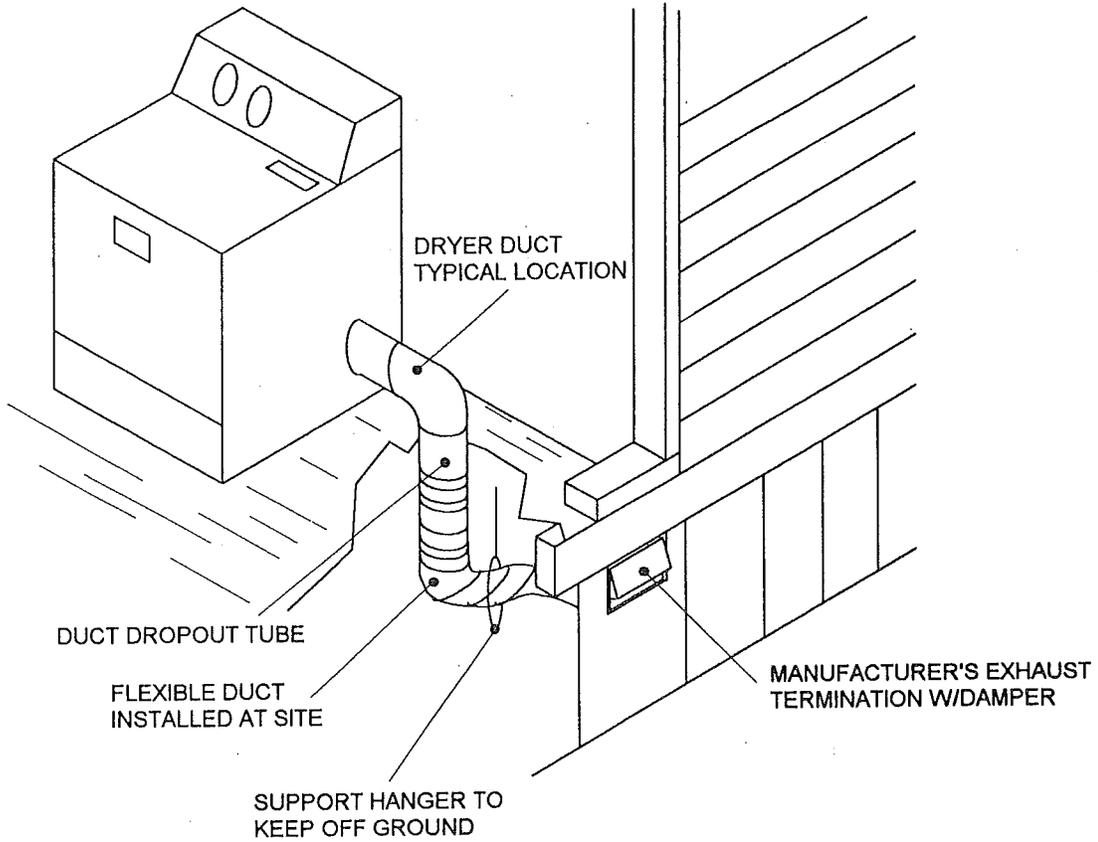
### 8.2 Water supply

8.2.1 Maximum supply pressure end 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.

# DUTCH HOUSING, INC.

## 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.

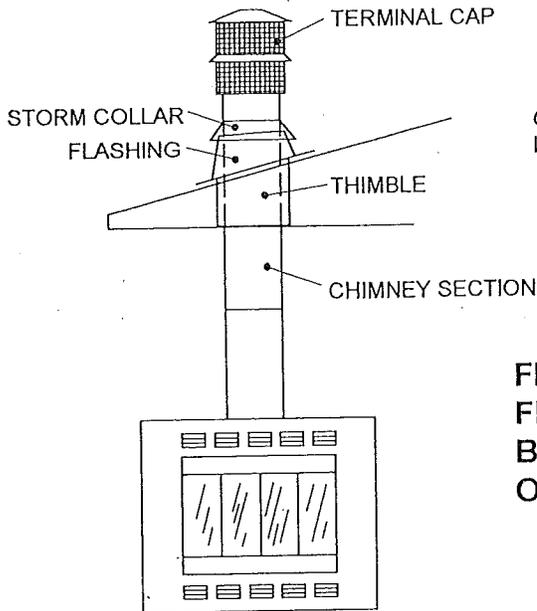


# DUTCH HOUSING, INC.

## 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.

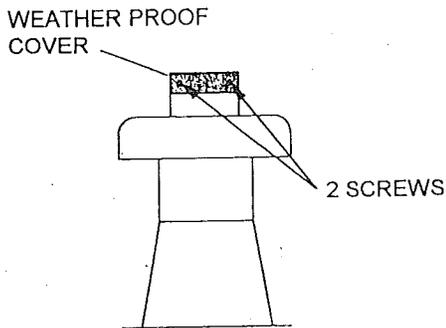


ON-SITE ASSEMBLY TO BE PER THE MANUFACTURER'S INSTRUCTIONS PROVIDED WITH THE HOME.

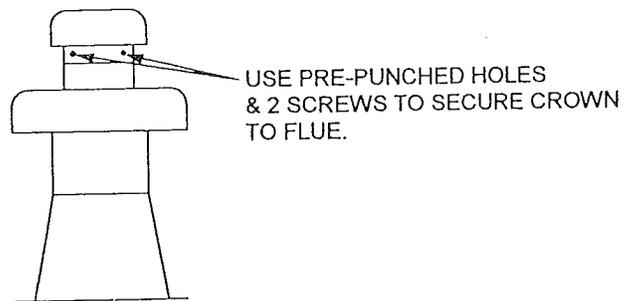
### WARNING !

**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

# DUTCH HOUSING, INC.

## 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 caps 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 3 wire, grounded cordset of the heat tape into the outlet located under the home near the water supply inlet (Fig. 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.
- 8.2.3.3 Freezing protection for unoccupied homes. If the home is to be left unheated in cold weather, drain the water lines and blow them clear with compressed air to prevent damage from freezing.

### 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.

# DUTCH HOUSING, INC.

## 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.

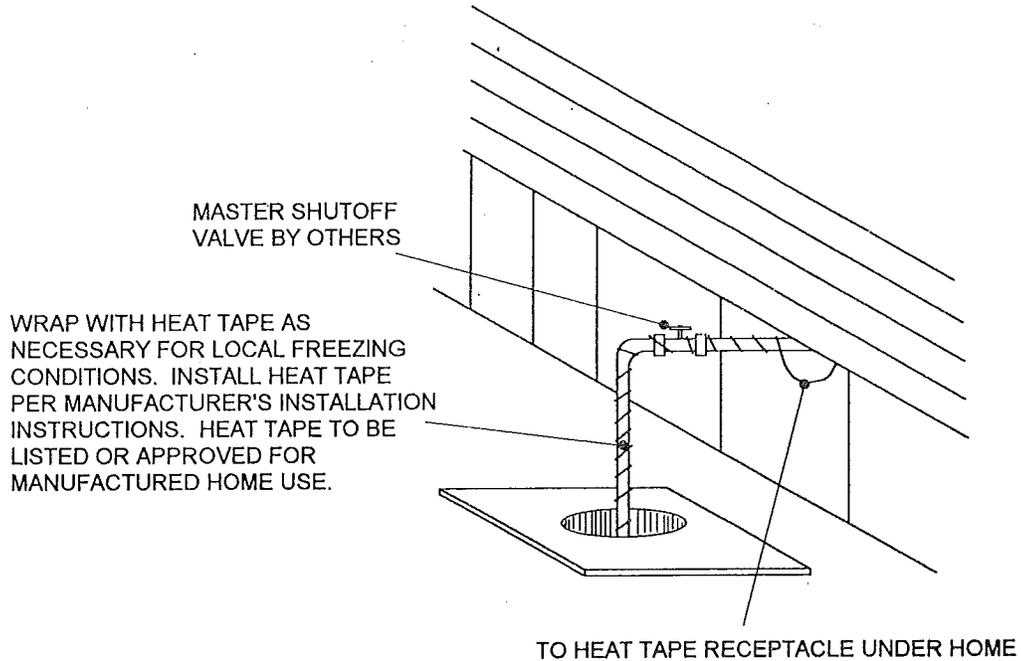
### 8.3 Drainage system

- 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' on center, as shown in Figure 8.3.
- 8.3.2 Proper slopes and connector sizes. Drain lines must slope at least 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 crossovers as shown in specific detail provided with your home.
- 8.3.4 Solvent welding procedures. The solvent cement used 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. Dutch Housing, Inc. has insulated 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 Fig. 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 test 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, connect the drainage piping system to the site water inlet and fill the 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.

# DUTCH HOUSING, INC.

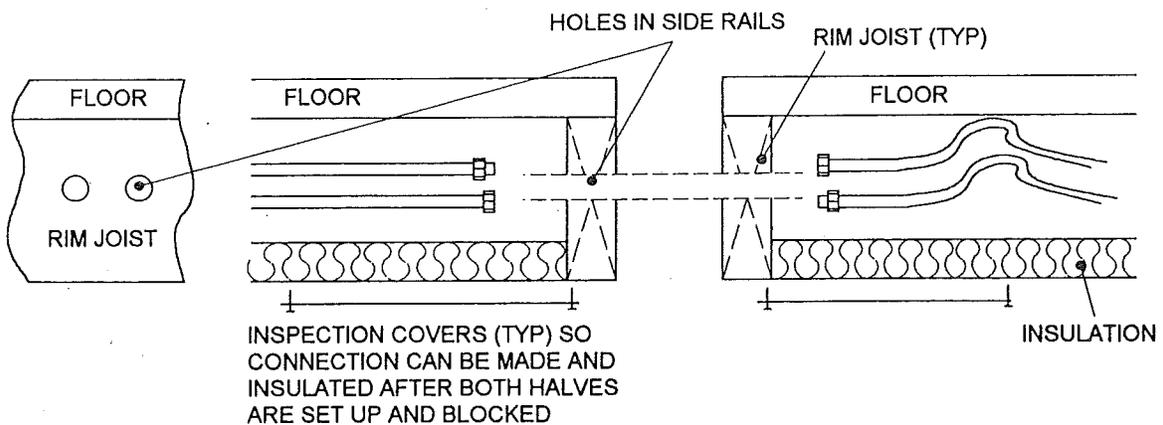
## TYPICAL WATER CONNECTION

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.

# DUTCH HOUSING, INC.

## DRAIN PIPE SUPPORT METHODS

FIGURE 8.3

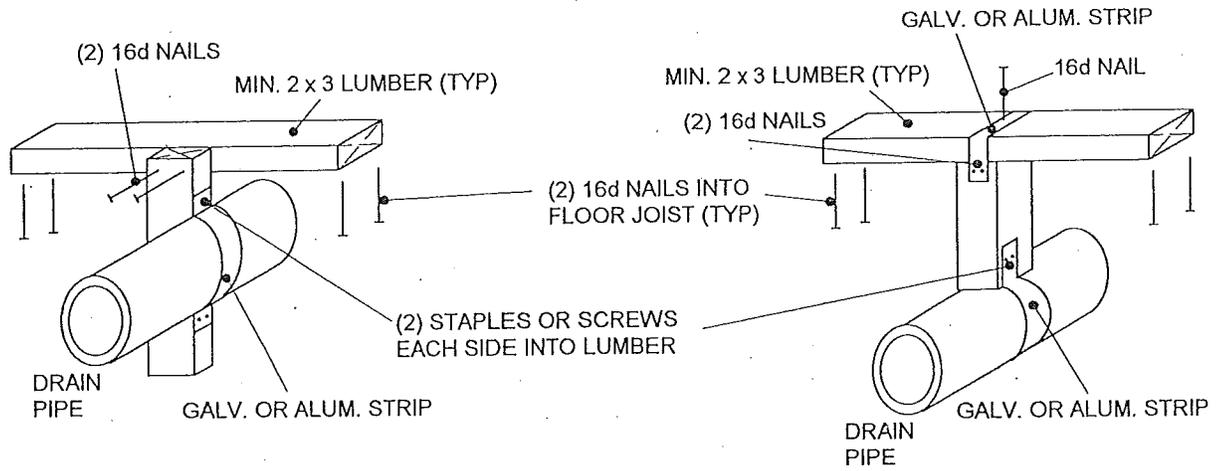
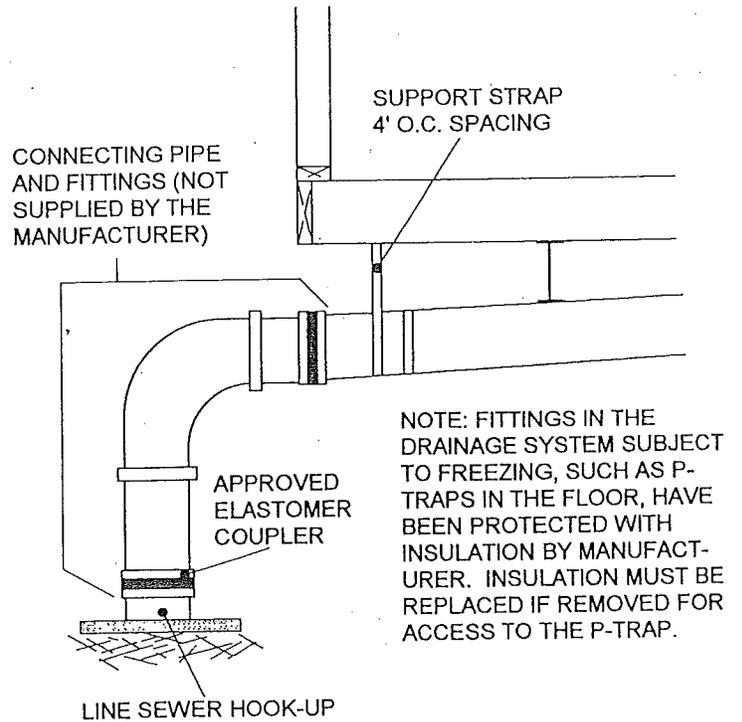
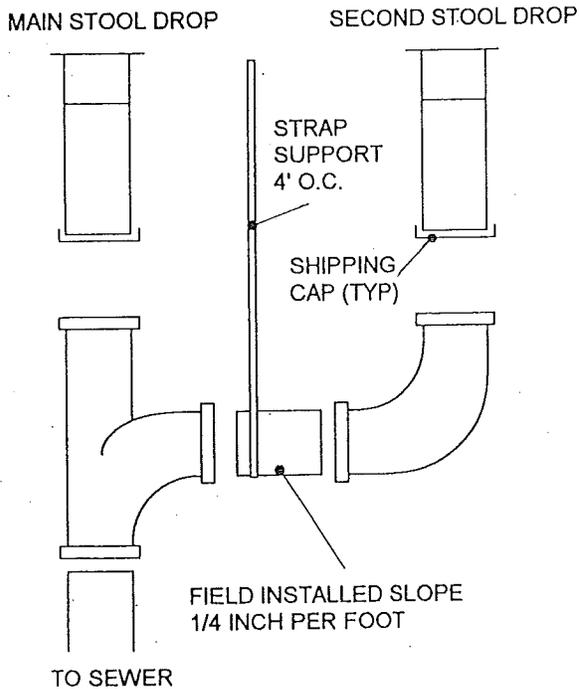


FIGURE 8.4 DRAIN PIPE

FIGURE 8.5 CONNECTION TO SEWER



NOTE: FITTINGS IN THE DRAINAGE SYSTEM SUBJECT TO FREEZING, SUCH AS P-TRAPS IN THE FLOOR, HAVE BEEN PROTECTED WITH INSULATION BY MANUFACTURER. INSULATION MUST BE REPLACED IF REMOVED FOR ACCESS TO THE P-TRAP.

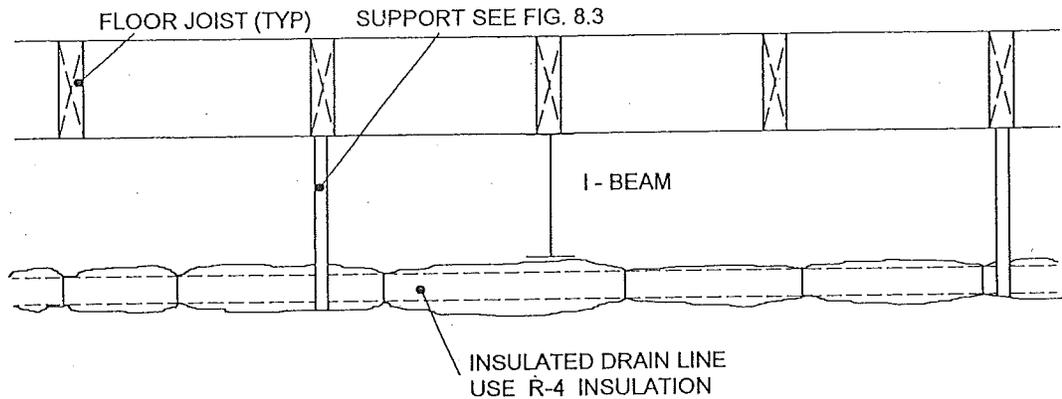
SLOPES AND CONNECTIONS: SEE ACTUAL DRAWING FOR YOUR HOME

# DUTCH HOUSING, INC.

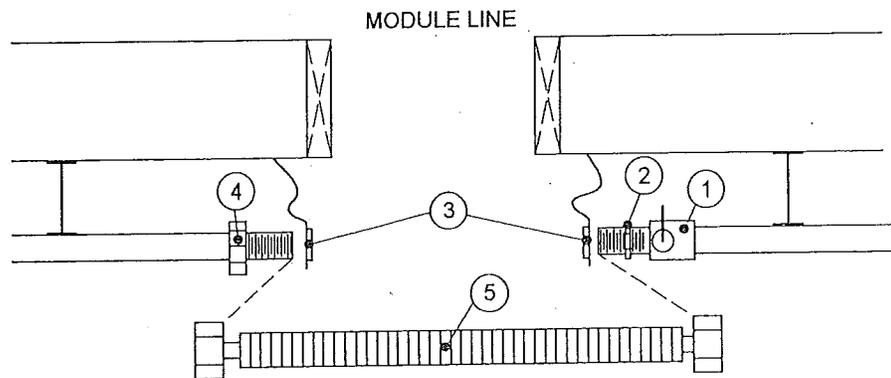
<p><b>(A)</b></p>	<p><b>(B)</b></p>	<p><b>FIELD INSTALLED DRAIN LINES BELOW FLOOR</b> ALL REQUIRED PIPE, GLUE, AND SUPPORTS NECESSARY TO COMPLETE FIELD INSTALLED DRAINS ARE SHIPPED WITH THE HOME.</p> <p><b>PROCEDURE</b></p> <ol style="list-style-type: none"> <li>1) LOCATE THE OUTLETS BELOW THE HOME USING THE APPLICABLE DRAWING. LOCATE THE NECESSARY FITTINGS FOR EACH OUTLET AND SECURE THE FITTINGS TO THE OUTLETS.</li> </ol> <p>NOTE: a) POSITION FITTINGS ON DROPS TO ROUTE DRAINS PERPENDICULAR TO FRAME MEMBERS SPACED 4\"/&gt; </p>
<p><b>(C)</b></p>	<p><b>(D)</b></p>	<ol style="list-style-type: none"> <li>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.</li> <li>3) AFTER FITTINGS ARE INSTALLED AND PIPE SECTIONS ASSEMBLED, CONNECT THE ASSEMBLY TO THE FITTINGS AT THE OUTLETS USING THE GLUE PROVIDED.</li> <li>4) SUPPORT THE DRAIN LINES 4\"/&gt; </li></ol>
<p><b>(E)</b></p>	<p><b>(E)</b></p> <p>5006</p>	<p><b>DWG. (A) APPLICABLE MODELS</b> 2001, 2011, 2401, 2411, 2003, 2013, 2006, 2016, 2007, 2017</p> <p><b>DWG. (B)</b> 2002, 2012,</p> <p><b>DWG. (C)</b> 2009, 2419, 2019, 2409, 2005, 2415, 2015, 2405, 2033, 2083, 2433, 2483, 2034, 2064</p> <p><b>DWG. (D)</b> 2031, 2081, 2032 5007, 5008, 5010 2432</p>
<p><b>(E)</b></p> <p>TYPICAL CHASSIS MEMBER (TRANSVERSE 4\"/&gt; </p>		<p><b>DWG. (E)</b></p> <p>5006</p>
<p>DATE: 10-93</p>	<p>DUTCH HOUSING, INC.</p>	<p>NOTE: ES MODELS USE SAME DRAWING AS STANDARD MODELS.</p>
<p>ON-SITE DWV INSTALLATION</p>		<p>REV: 7-12-96</p> <p>DWG NO: 1-40</p>

# DUTCH HOUSING, INC.

## DRAIN LINE FREEZE 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 TO 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.

# DUTCH HOUSING, INC.

## 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 LPG conversion and orificing. SPECIAL ORIFICES AND REGULATORS ARE REQUIRED WHEN LPG IS USED. SEE THE INSTRUCTIONS ACCOMPANYING EACH GAS BURNING APPLIANCE. CONNECTIONS TO THE SITE SUPPLY, CHECK THE INLET ORIFICES OF ALL GAS APPLIANCES TO ENSURE THEY ARE CORRECTLY SET UP FOR THE TYPE OF GAS TO BE SUPPLIED.

8.4.4 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.

8.4.5 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.

8.4.5.1 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.

8.4.5.2 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.

8.4.6 Connection procedures. Inspect gas appliance vents to ensure 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.

# DUTCH HOUSING, INC.

8.4.7 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 IT'S PILOT. Check the operation of the furnace and water heater thermostats and set them 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 Dutch Housing, Inc. Consult the oil furnace manufacturer's instruction 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 is 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 of 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. Dutch Housing, Inc. also 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.

# DUTCH HOUSING, INC.

8.6.2 Proper feeder wire and junction box material and size. The main breaker and the label on the electrical distribution panel give 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 properly 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 8.4.6.1, 8.4.6.2, or 8.4.6.3 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 panel board, in ranges, clothes dryer, and counter mounted cooking units, from the equipment enclosure. Bonding screws, straps, or buses in the distribution panel board 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.

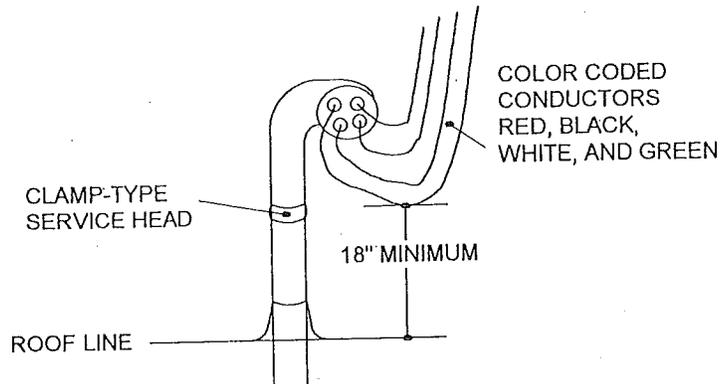
# DUTCH HOUSING, INC.

## TYPICAL OVERHEAD FEEDER ASSEMBLY FIGURE 8.9

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"x10"x4"
200	#000	#6	#0	2"	12"x12"x4"

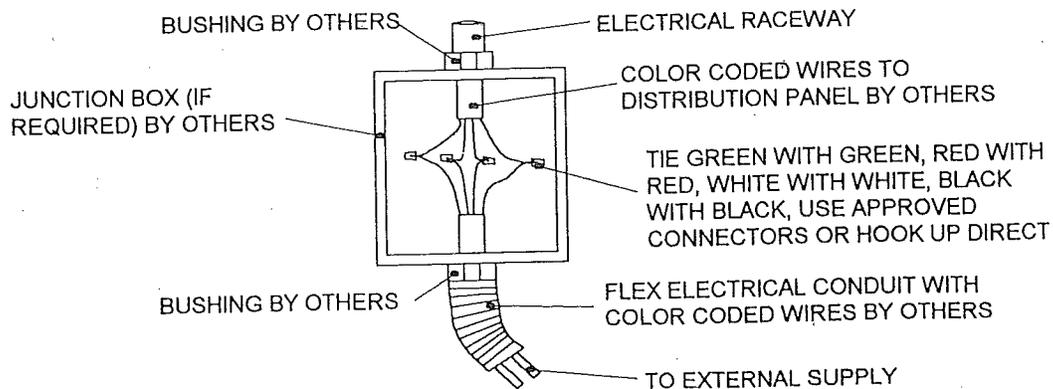


## TYPICAL UNDERSIDE FEEDER ASSEMBLY FIGURE 8.10

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"x10"x4"
200	#000	#6	#0	2"	12"x12"x4"

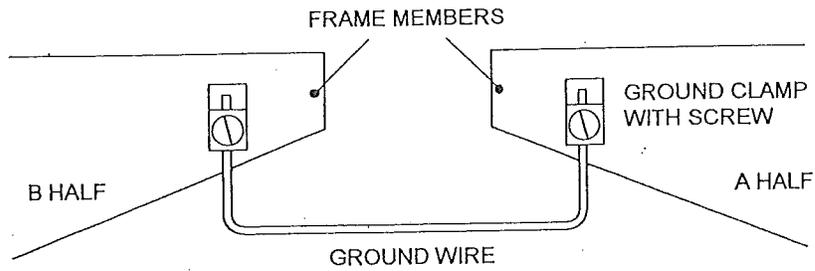


# DUTCH HOUSING, INC.

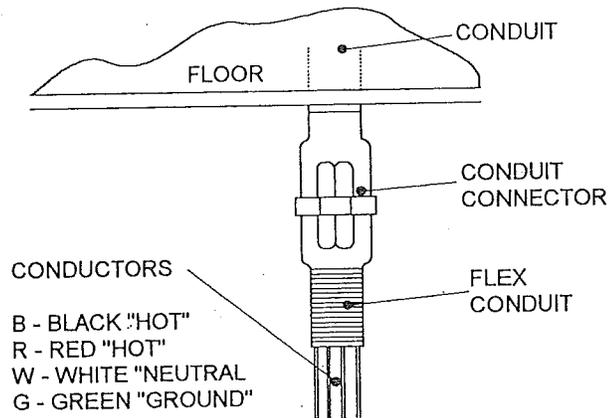
- 8.6.4.1 50 A feeder cord. Your home may be equipped with a permanently connected 50 amp. feeder cord stored in a compartment under the floor. If so, it is ready to be plugged into a 50 amp., 3-pole, 4-wire, 120/240 volt grounding service receptacle after electrical tests have been completed (see 8.6.6). **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 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, ground rings, additional ground rods, etc. to prevent the buildup of hazardous voltages.

# DUTCH HOUSING, INC.

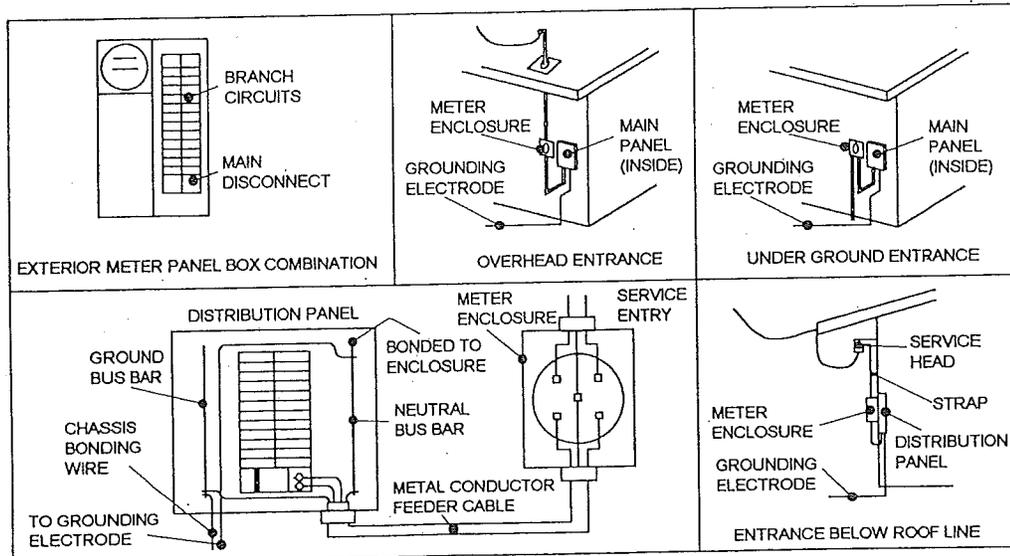
MULTISECTION FRAME GROUNDING (BONDING)  
FIGURE 8.11



TYPICAL UNDER SIDE 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.

# DUTCH HOUSING, INC.

8.6.5 Crossover connections. Refer to Fig. 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.

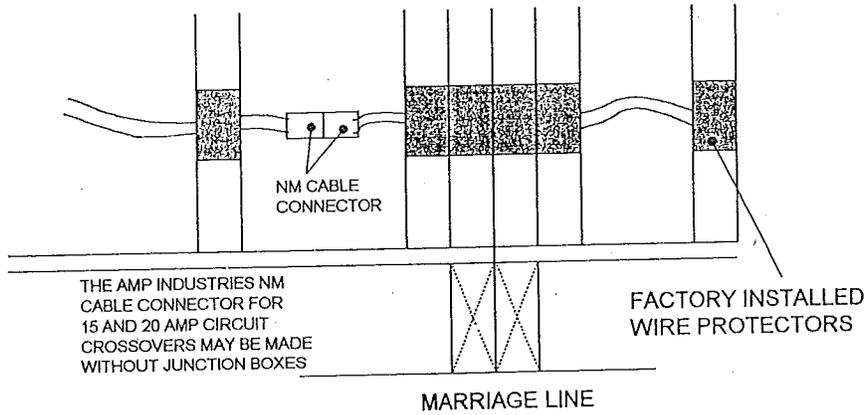
8.6.6.2.2 Ground fault circuit interruption (GFCI). Make certain that all receptacles requiring GFCI protection are in fact on the correct circuit(s). Check each GFCI device by pushing the test button to determine if the power route to the receptacle has been interrupted, or follow the manufacturer's 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.

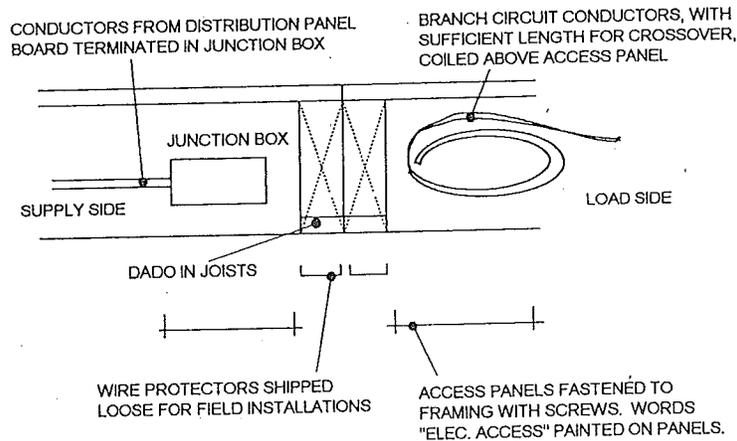
# DUTCH HOUSING, INC.

## TYPICAL ELECTRICAL CROSSOVERS FIGURE 8.14

### IN WALL ALTERNATIVE

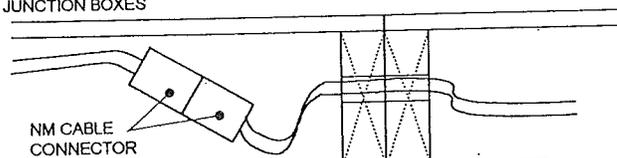


### IN FLOOR ALTERNATIVE



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

### IN FLOOR ALTERNATIVE

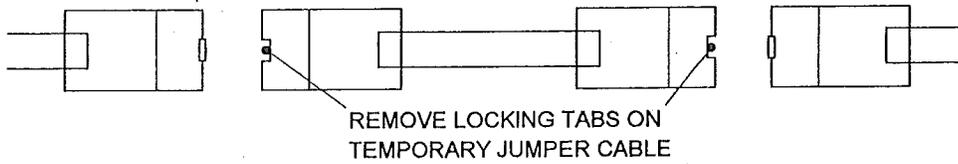


THIS HOME MAY BE SHIPPED WITH ONE OR MORE PLUG IN CONNECTORS. THESE CONNECTORS ARE TO BE SNAPPED TOGETHER ON SET UP. CONNECTORS WILL BE COLOR CODED AND/OR TAGGED TO PREVENT MIXING OF CIRCUITS.

# DUTCH HOUSING, INC.

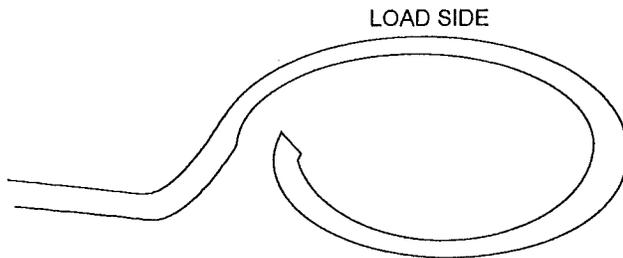
## TYPICAL ELECTRICAL CROSSOVERS FIGURE 8.14, CONTINUED

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.

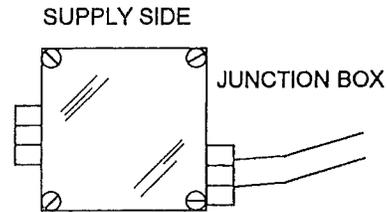


NOTE: THIS TEMPORARY JUMPER CABLE IS FOR DEALER LOCATIONS AND TESTING PURPOSES. IT CAN NOT BE USED AT THE PERMANENT HOME SITE.

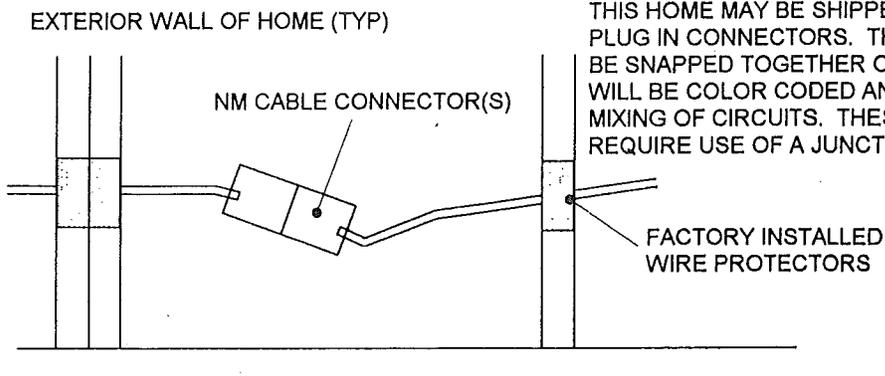
## ALTERNATE ELECTRIC CROSSOVERS



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



CONDUCTORS FROM DISTRIBUTION PANEL BOARD TERMINATED IN JUNCTION BOX



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.

# DUTCH HOUSING, INC.

## 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 insect 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 molding, 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.

# DUTCH HOUSING, INC.

## 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.
- 10.1.3 Appliances. Secure appliances to prevent movement during transportation.
- 10.1.4 Dust caps. Place dust capes on the ends of all pipe connections.
- 10.1.5 Blocking during storage. Any home placed in storage must be immediately 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, setup 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 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.

DUTCH HOUSING, INC.

## 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 efficient 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.

# DUTCH HOUSING, INC.

## 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 the corners).
2. Do not nail too 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*

# DUTCH HOUSING, INC.

## 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 (GI), 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. FLEX-MEND Peel and Stick Bottom Closure Repair 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 Ga. 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.



# Minute Man anchors®

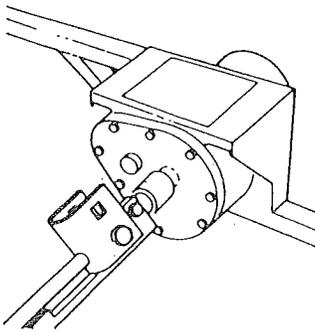


## INSTALLATION

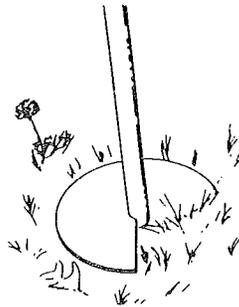
There are two basic methods of installing anchors, each equally effective in properly securing mobile homes to the ground.

### MACHINE INSTALLATION

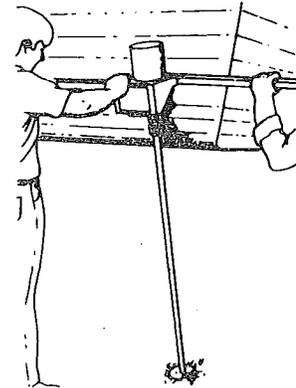
In this method, the anchor is turned four feet (or to full depth) into the ground by an anchor drive machine.



1. Attach anchor to machine.



2. Auger is placed in proper position in line with strap, and machine started.

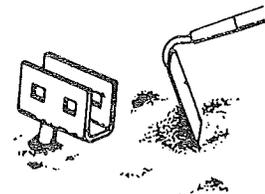
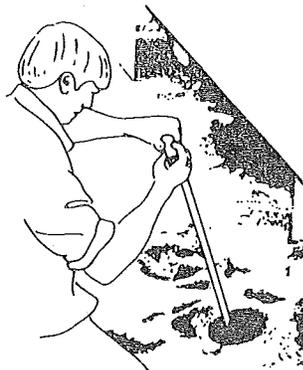
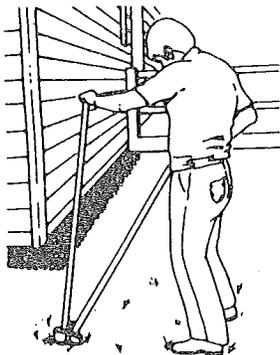


3. Anchor should be installed at a slight angle as shown to assure head being positioned behind future skirting.

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

### INSTALLATION WITH MANUAL OR MECHANICAL POST HOLE DIGGER

In this method, anchors can be installed with equipment available to the average homeowner.

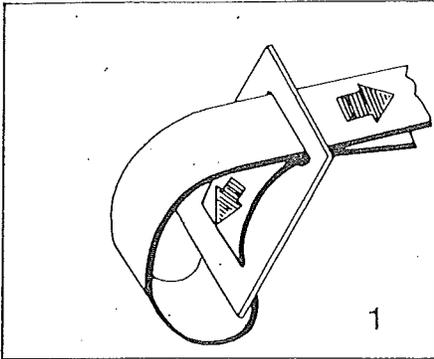


1. A hole is dug to a depth of approximately two feet in the proper position as explained under machine installation.
2. After the hole is dug to 24" depth, the anchor is turned into the ground by hand, using a rod or length of pipe for leverage.
3. After anchor is installed to **full depth**, earth is repacked, six inches at a time.

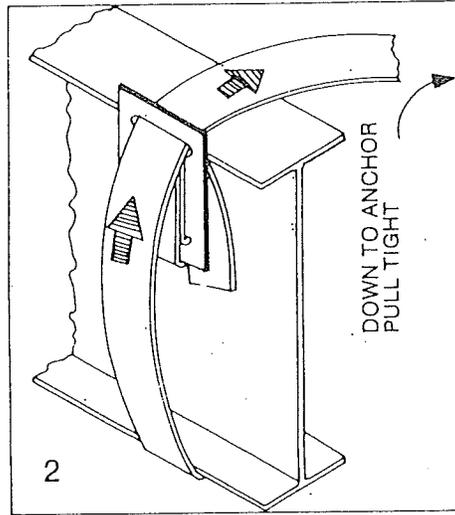
**WARNING:** Be careful to avoid underground water lines, phone lines and power lines using either method.

# POSITIONING FRAME TIE

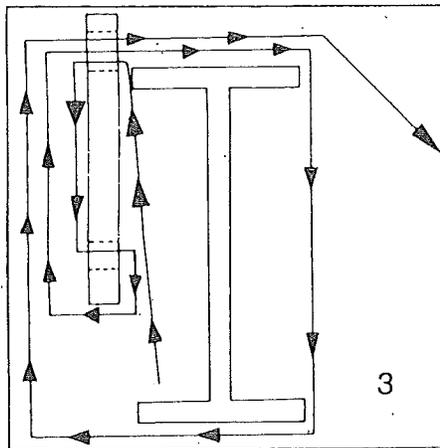
## FRAME TIE INSTALLATION INSTRUCTIONS



1



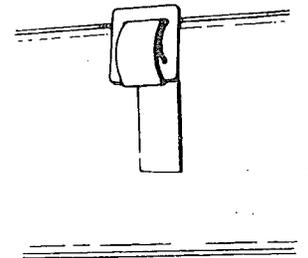
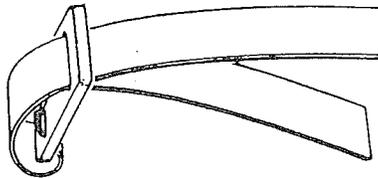
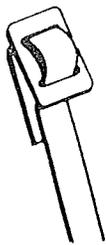
2



3

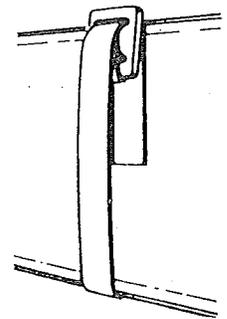
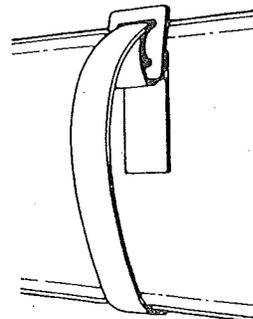
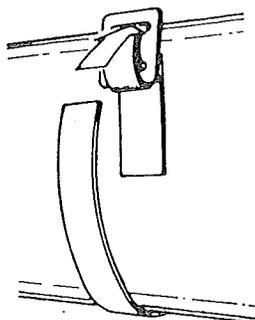
1. Thread 7' length of frame tie strap through buckle as shown.
2. Next, thread long end of strap between frame and floor of home. Bring strap through buckle as shown in diagram and fasten to anchor head.
3. Diagram showing strap in position around frame and through buckle. It is important to remove all slack from system.

1. See step one in installation instructions.



3. Strap should be through buckle in this configuration before installation on frame.
4. Strap should be passed over frame from inside, and buckle pulled into position as shown.

2. Insert strap in position through buckle.

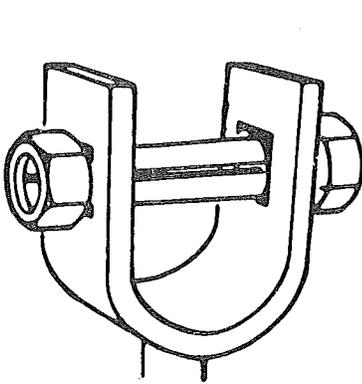


5. Strap should encircle frame and pass through buckle for the second time and over the frame.
6. Strap is pulled tight from outside, or anchor side, of frame.
7. Inside of frame tie, properly installed.

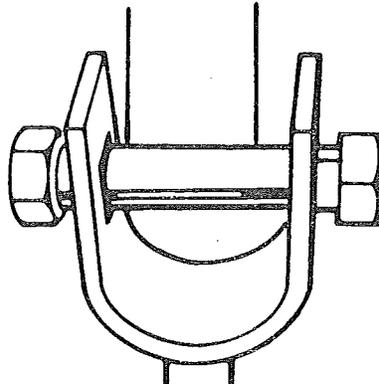
# PROPER TENSIONING OF STRAP TO ANCHOR HEAD

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

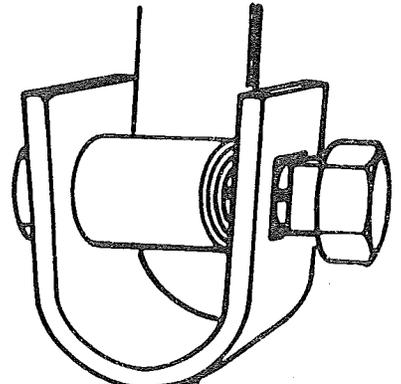
Notice: In areas of severe cold weather where possible damage could occur from frost heave, the homeowner should release some of the tension from the vertical tie each fall.



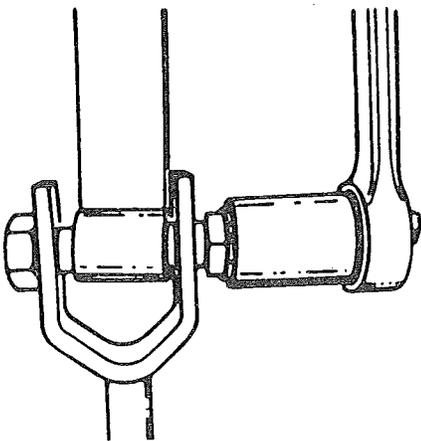
1. Insert bolt into head; attach nut loosely.



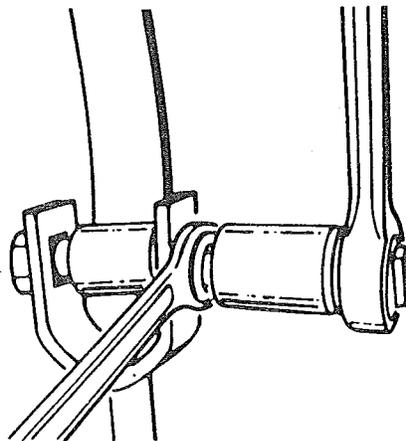
2. Insert strap in slot of bolt 5/8", or until strap is flush with far side of bolt.



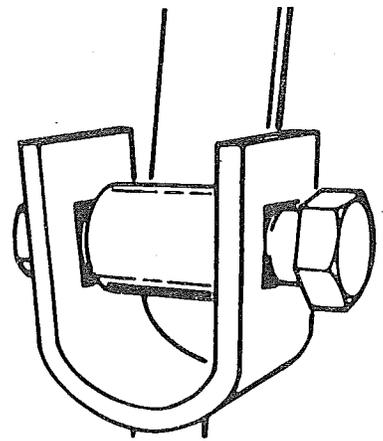
3. Bend strap 90° and take at least four complete turns on bolt until strap is taut.



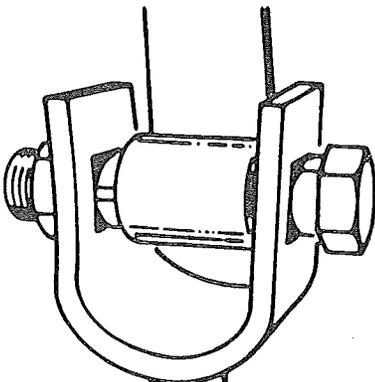
4. Bolt is turned with 15/16" socket wrench, or adjustable wrench, on hex head.



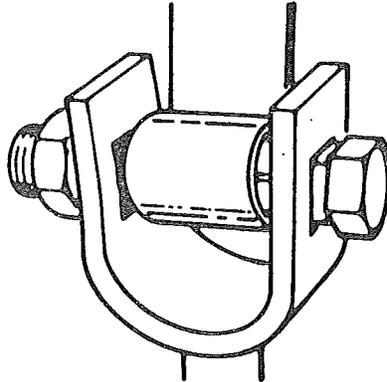
5. To hold bolt under tension while re-positioning wrench, an open-end wrench is placed on 5/8" square shoulders of bolt.



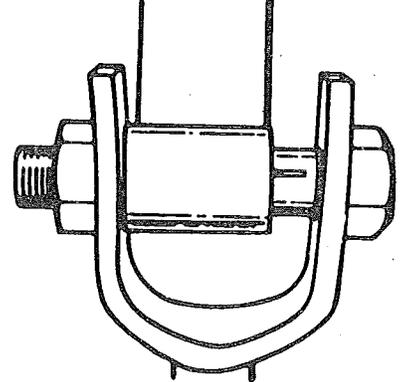
6. Align square shoulders of bolt with square hole in anchor head.



7. Holding hex head of bolt in position, tighten nut to draw square shoulders into square hole.



8. Shoulders are now in locking position; continue to tighten nut.



9. Tensioning device is now in locked, secure position.

For clarity, tools not shown on most photos above.

### PROPERLY INSTALLED AND CONNECTED GROUND ANCHOR AND FRAME CONNECTION

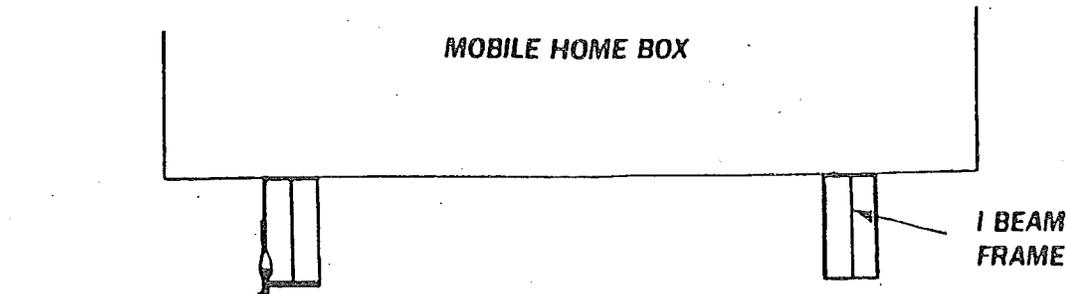


FIGURE 1.

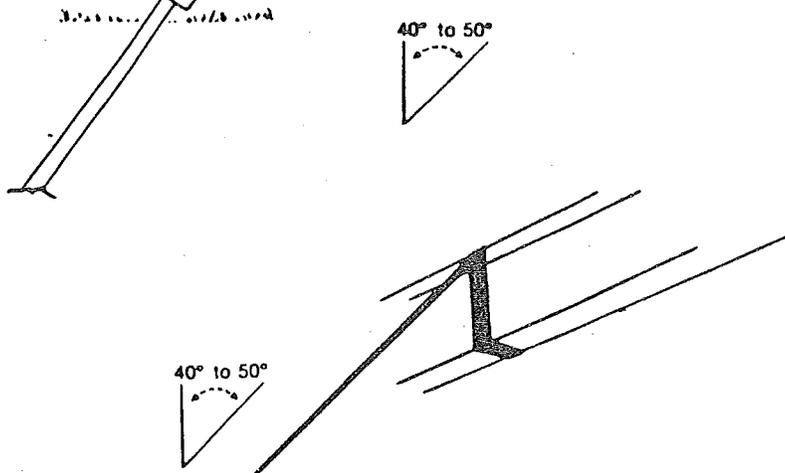


FIGURE 2.

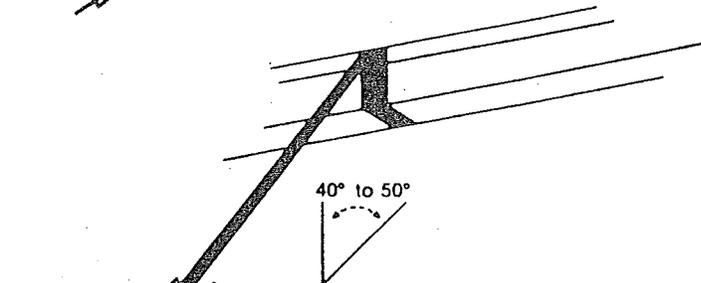
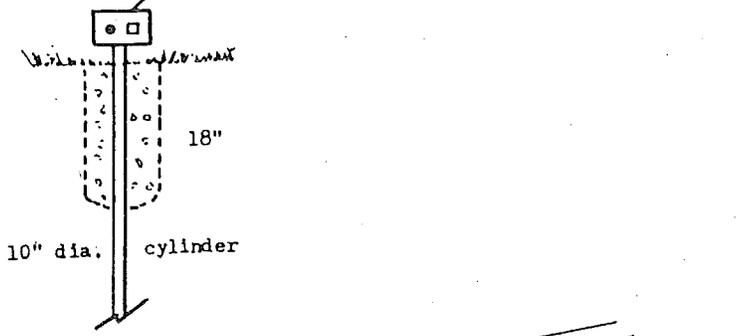
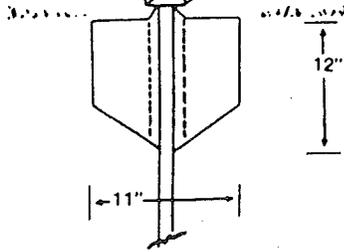


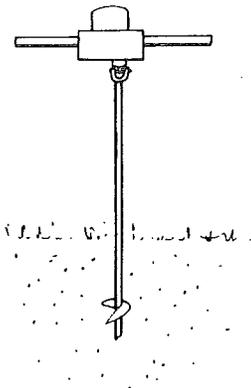
FIGURE 3.



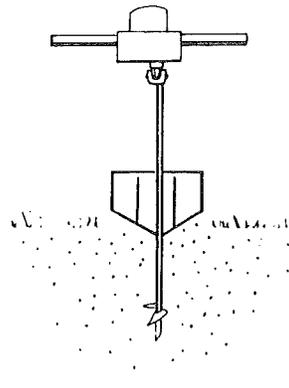
For those homes which are designed to require only diagonal frame ties, the anchor should be installed in line with the ties. (FIGURE 1) When the load on the anchor is not applied in line with the long axis of the anchor, the magnitude and effect of the horizontal movement of the anchor head should be investigated. One method of restricting lateral deflection is shown in (FIGURE 2.) This is from the Department of Defense, Defense Civil Preparedness Agency publication TR-75. "Protecting Mobile Homes From High Winds". To minimize the deflection or slicing through the soil by the anchor rod at ground level when frame ties are connected to provide a diagonal tension it is recommended that a concrete cylindrical "collar" (approximately 10" in diameter and 18" deep) be poured around the anchor shaft. Another accepted way to limit lateral deflection is by use of a tested and approved "Metal Stabilizing Device" (Figure 3). This plate is driven in front of the anchor's direction of pull and will act to minimize rod deflection.

**INSTRUCTIONS FOR USING MINUTE MAN STABILIZING DEVICE**

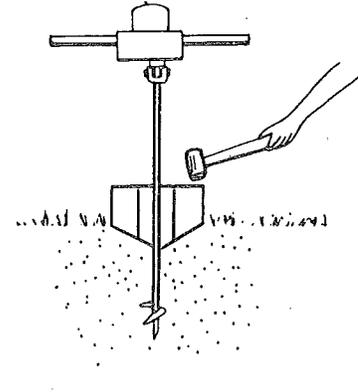
Minute Man stabilizing devices are designed for use with Minute Man anchors and intended to restrict movement of the anchor laterally through the soil.



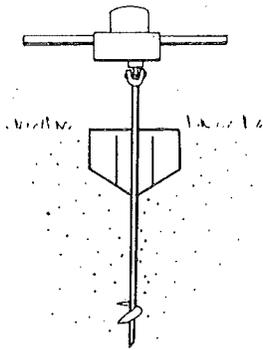
1. Install the anchor into the ground leaving 12"-18" of the shaft exposed.



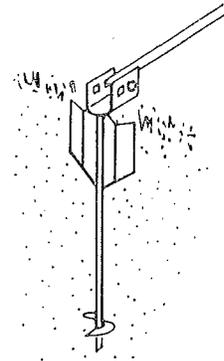
2. Place the stabilizing device next to the shaft in the direction of pull.



3. Drive the stabilizing device into the ground.

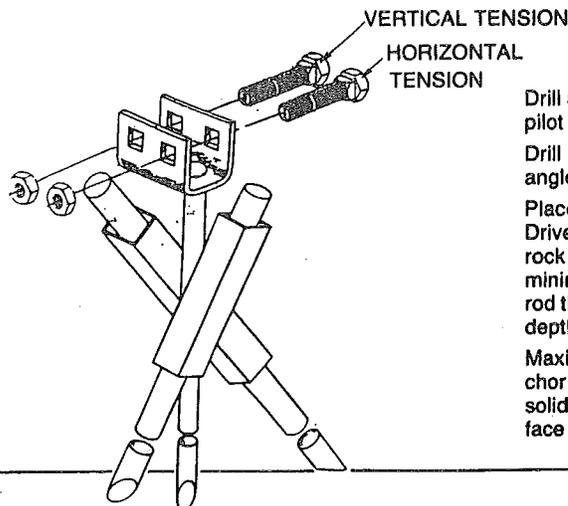


4. The anchor is then turned in the rest of the way into the soil until the head of the anchor is flush with the stabilizing device.



5. As the frame tie is tightened the anchor will be snugged against the stabilizing device for safe, secure protection against lateral movement.

**Installation Instructions for Cross Drive Rock Anchor**



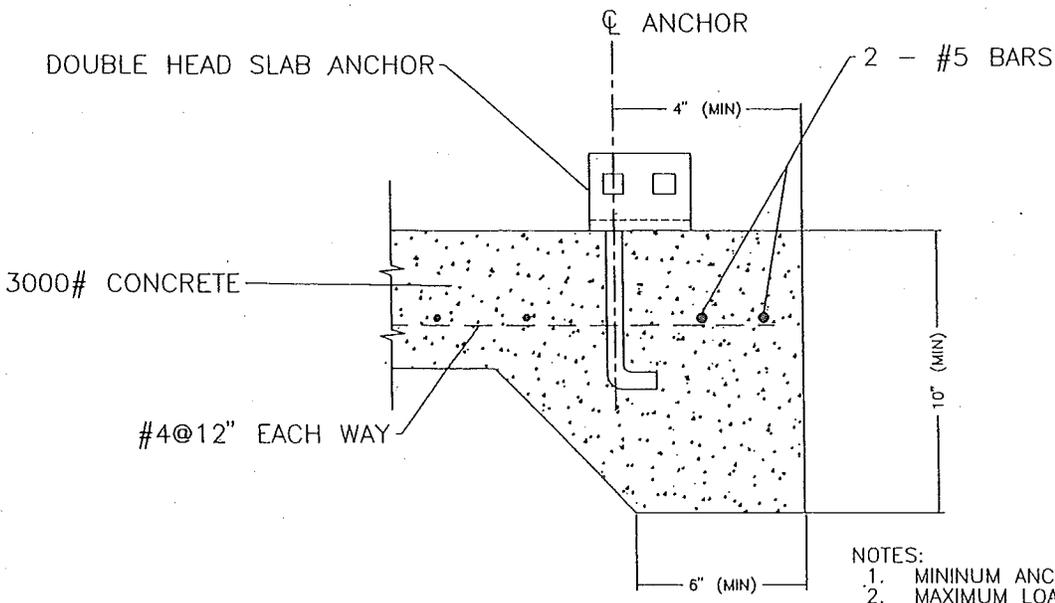
**INSTALLATION INSTRUCTIONS**

Drill 5/8" diameter hole 5 1/2" deep for pilot stud. Insert pilot stud into hole.

Drill 2 - 3/4" diameter holes in rock at 45 degree angles, using anchor head as a locating guide.

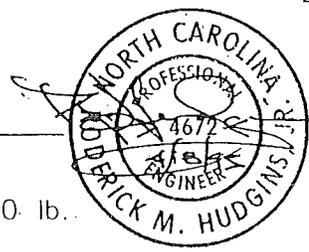
Place rod through top of (1) square tube and into hole. Drive rod to desired depth. (Rod must be driven into rock at least 80% of its length in order to achieve minimum allowable pullout resistance.) Place second rod through top of remaining tube. Drive rod to desired depth to lock.

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".



- NOTES:
1. MINIMUM ANCHOR EMBEDMENT = 6"
  2. MAXIMUM LOAD PER ANCHOR = 4750 lb.
  3. MINIMUM SLAB PER ANCHOR:
    - 4" SLAB = 95 S.F.
    - 6" SLAB = 65 S.F.
    - 8" SLAB = 48 S.F.
  4. MARK: MMA-14

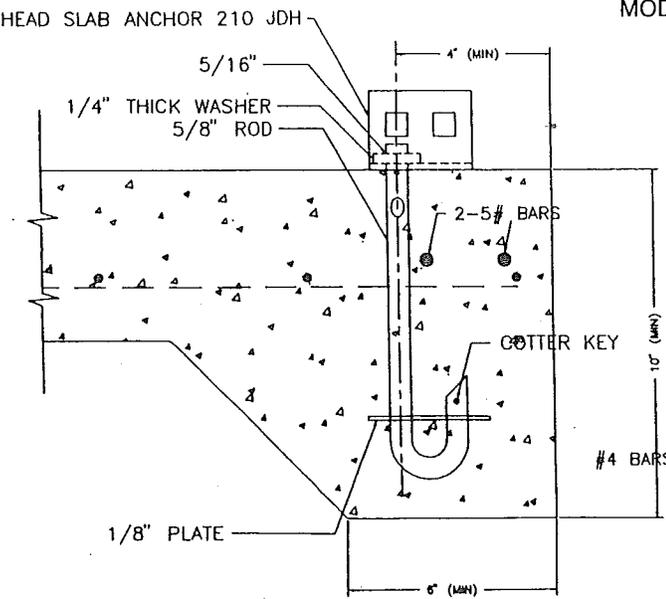
TITLE: DOUBLE HEAD SLAB ANCHOR  
MODEL: 210 - PDH



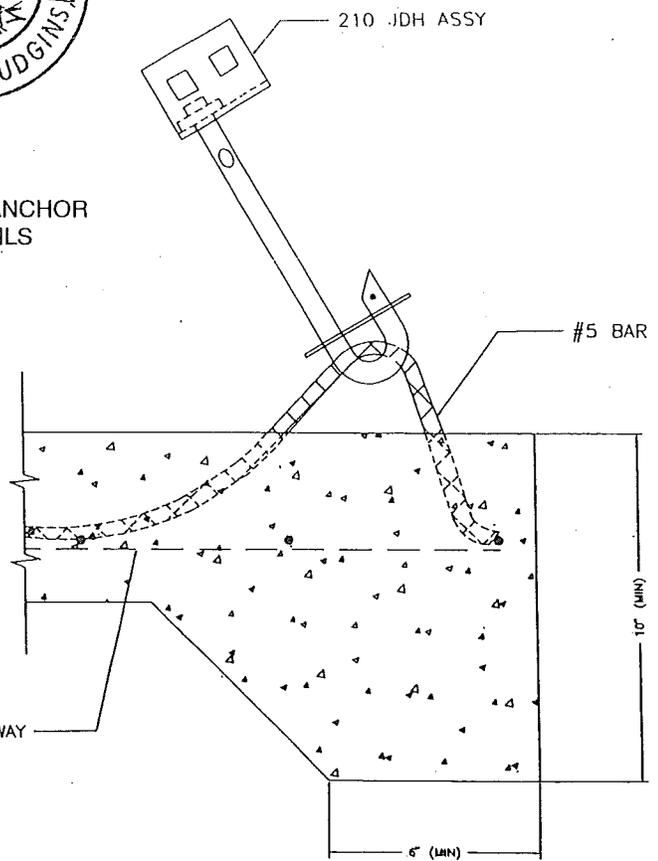
- NOTE!
1. MINIMUM ANCHOR EMBEDMENT = 6"
  2. MAXIMUM LOAD PER ANCHOR = 4750 lb.
  3. MINIMUM SLAB PER ANCHOR:
    - 4" SLAB = 95 S.F.
    - 6" SLAB = 65 S.F.
    - 8" SLAB = 48 S.F.
  4. MARK: MMA 42

TITLE: DBL. HEAD SLAB ANCHOR  
INSTALLATION DETAILS

MODEL: 210 JDH



ALT.#1 - ANCHOR PLACED IN FRESH CONCRETE



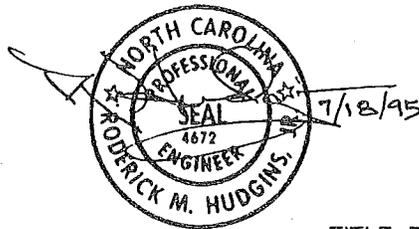
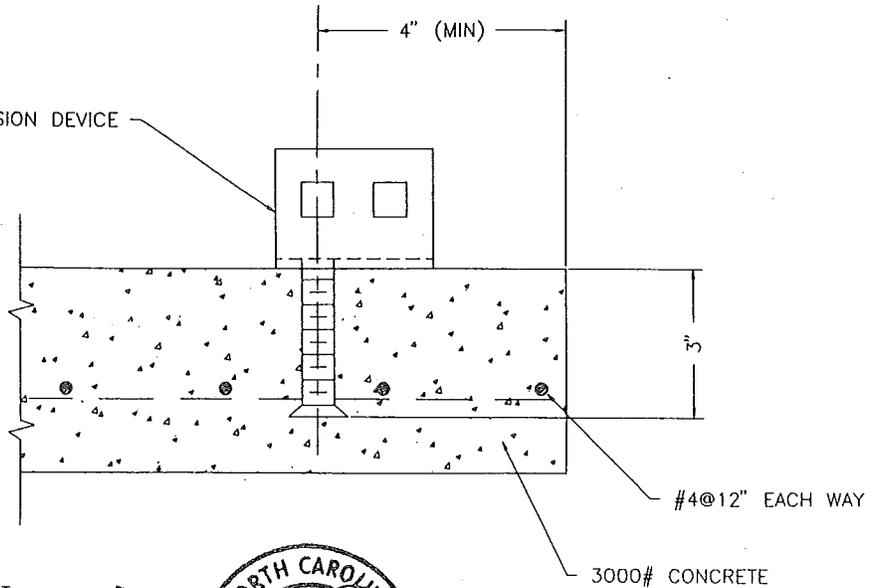
ALT.#2 - ANCHOR HOOKED TO REBAR LOOP

DOUBLE HEAD TENSION DEVICE

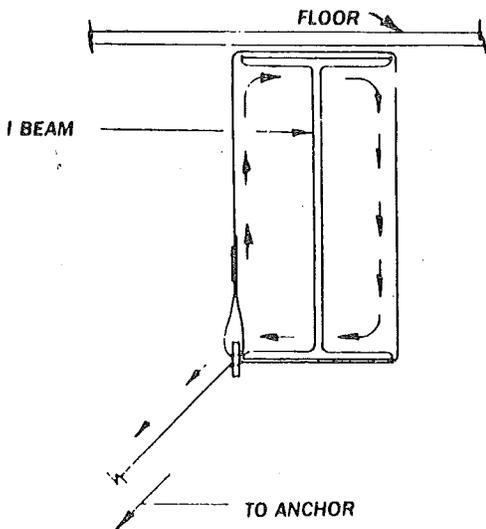
1. MAXIMUM LOAD PER ANCHOR = 4750lb.
2. MINIMUM SLAB AREA PER BOLT
  - 4" SLAB = 95 S.F.
  - 6" SLAB = 65 S.F.
  - 8" SLAB = 48 S.F.
3. MARK: MMA 18

INSTALLATION NOTE

1. DRILL 21/32" diam. HOLE 4" FROM EDGE OF SLAB AND INSERT SHIELD PER MANUFACTURER'S INSTRUCTIONS
2. PLACE TENSION HEAD ON SLAB AND INSTALL 5/8" diam. BOLT-TORQUE BOLT PER MANUFACTURER'S INSTRUCTIONS

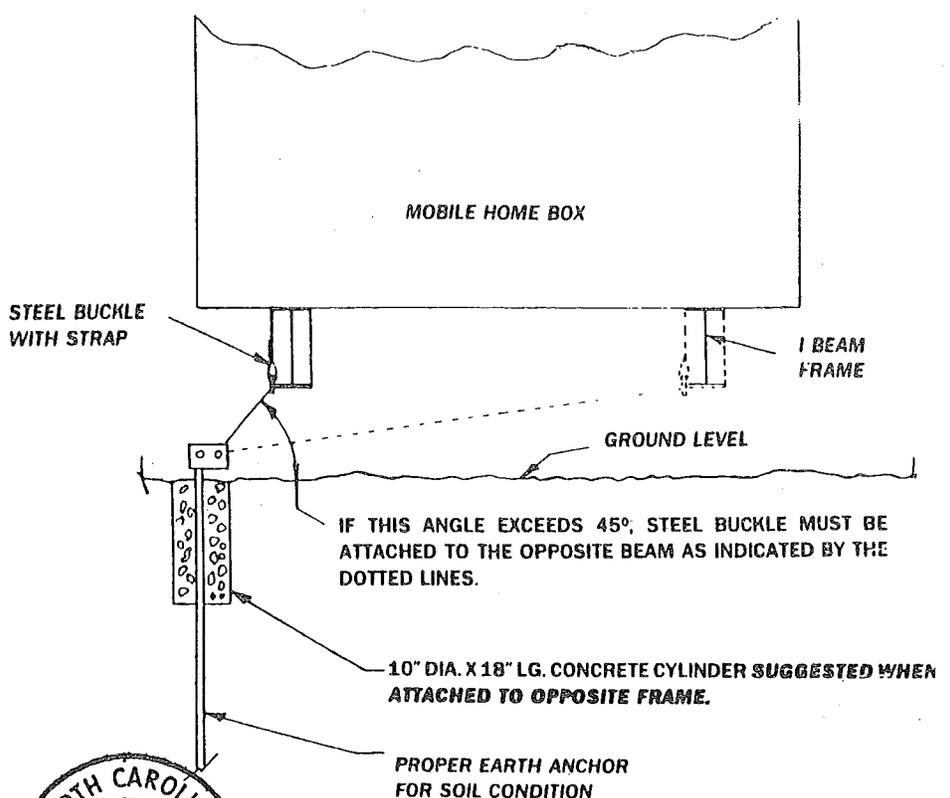


TITLE: DOUBLE HEAD TENSION DEVICE  
MODEL: THDHL5



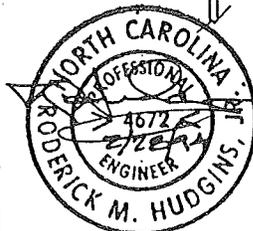
ENLARGED VIEW  
OF  
FRAME BEAM

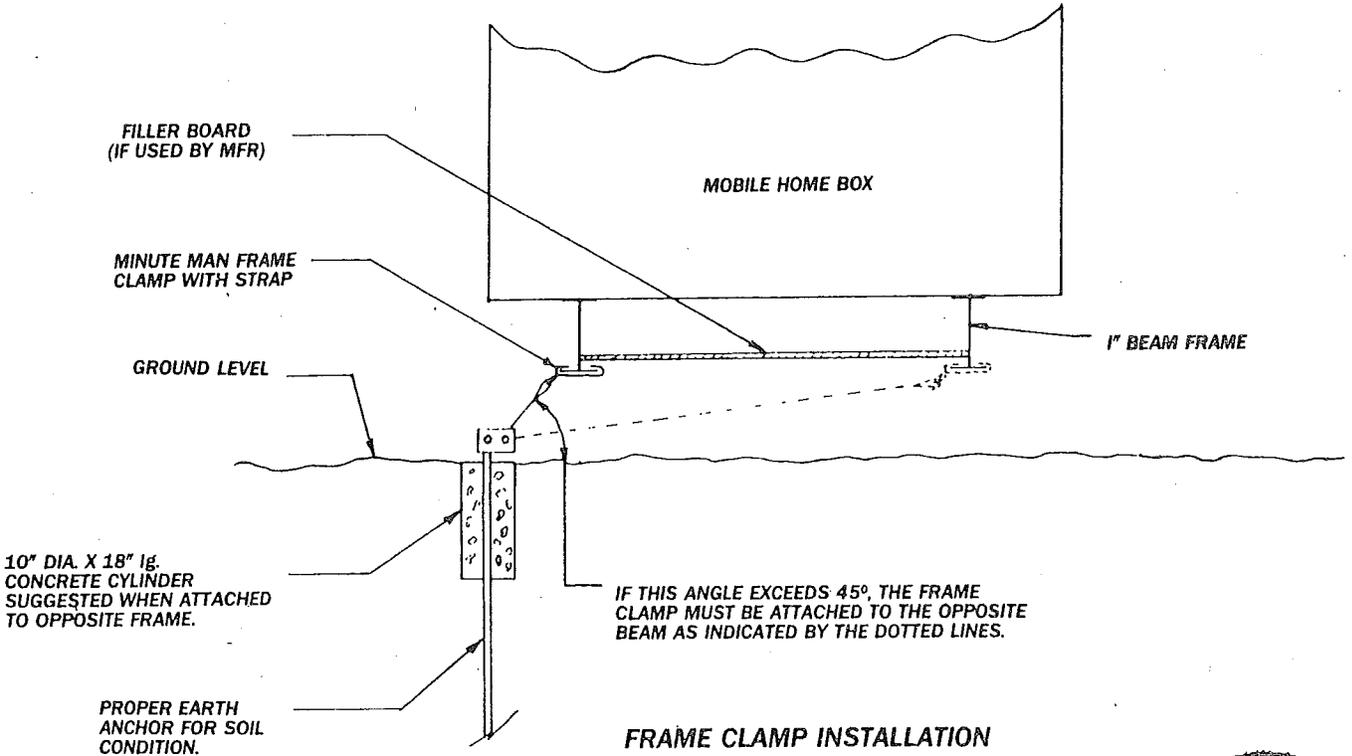
PUSH STRAP END BETWEEN FRAME "I" BEAM AND FLOOR. LEAVE BUCKLE AT LOWER END OF BEAM. THREAD END OF STRAP BACK THRU BUCKLE AS SHOWN. PULL STRAP TAKING CARE TO KEEP BUCKLE IN POSITION. ATTACH STRAP END TO ANCHOR TENSION HEAD.



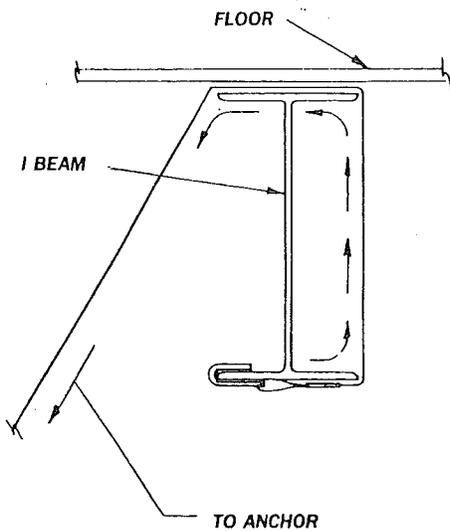
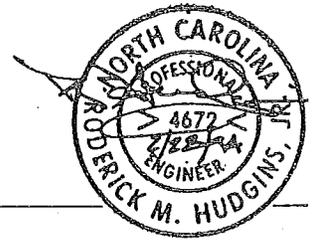
STEEL BUCKLE WITH STRAP INSTALLATION

MODEL BUC. W/S



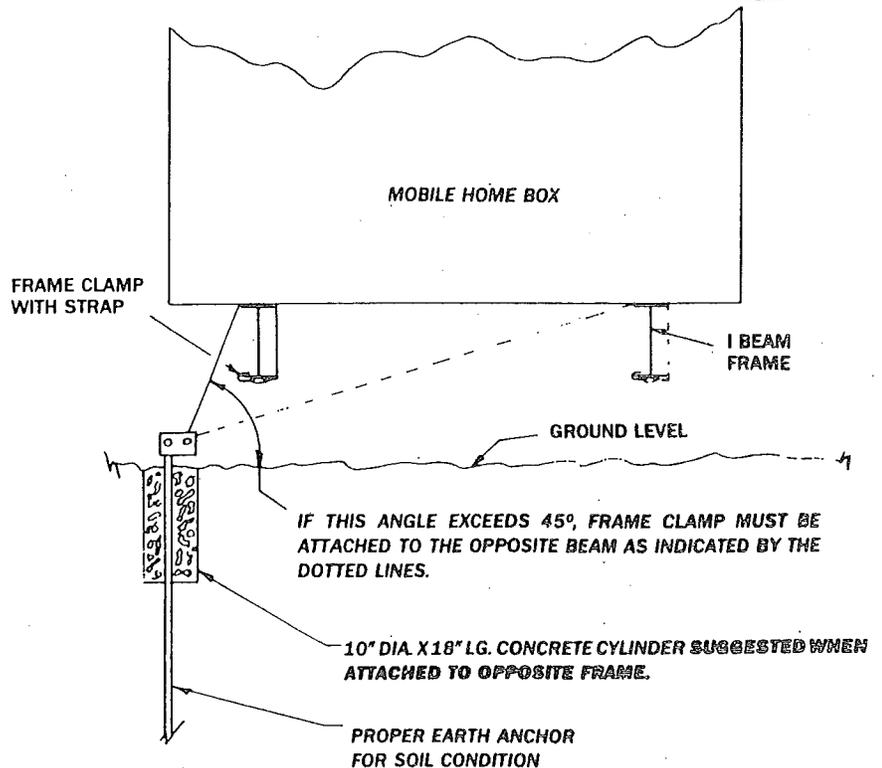


MODEL FCW/S



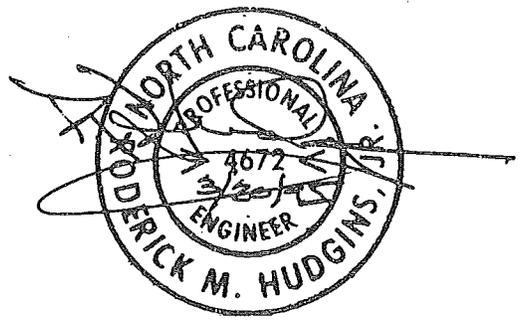
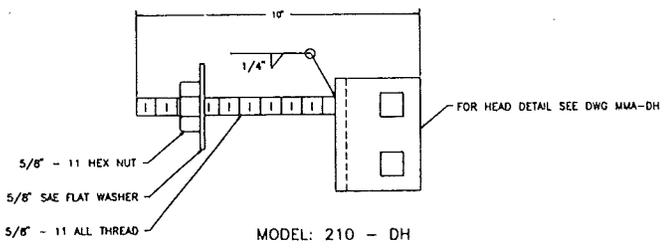
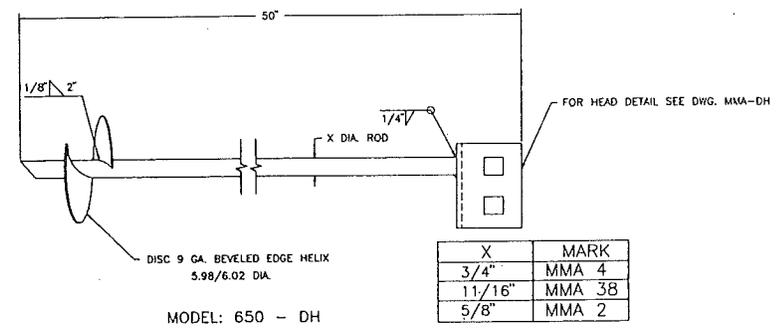
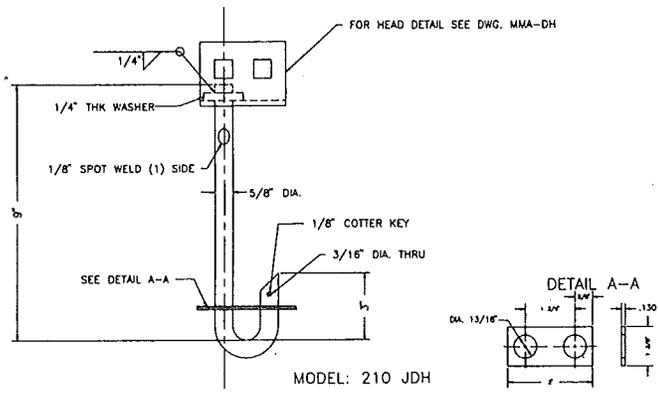
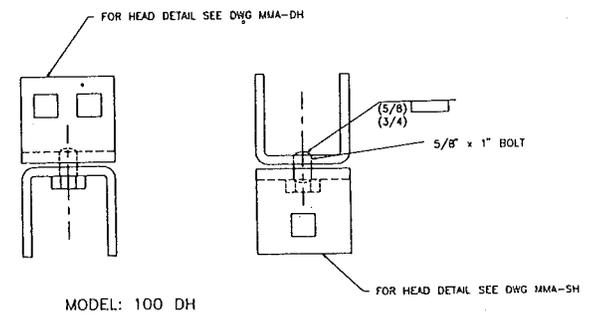
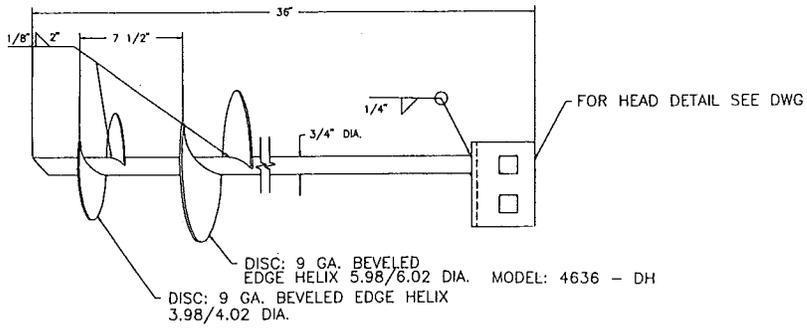
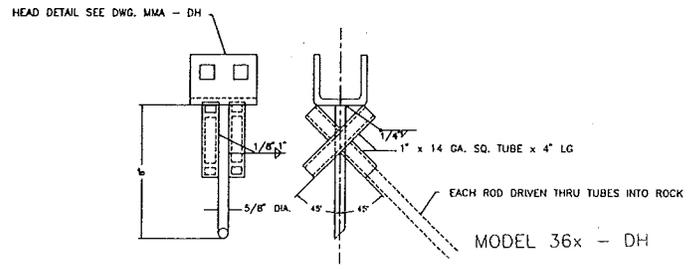
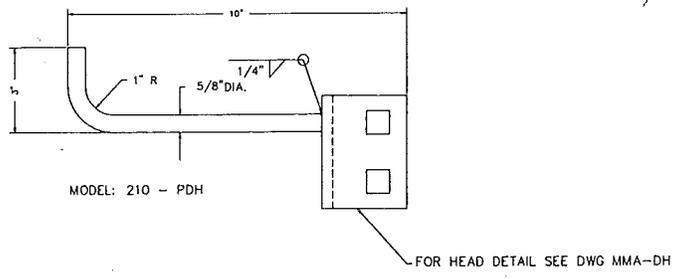
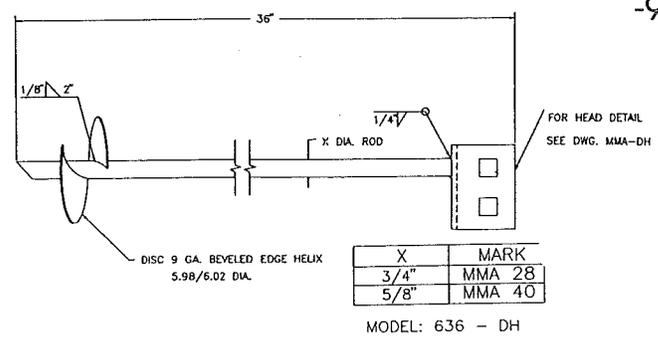
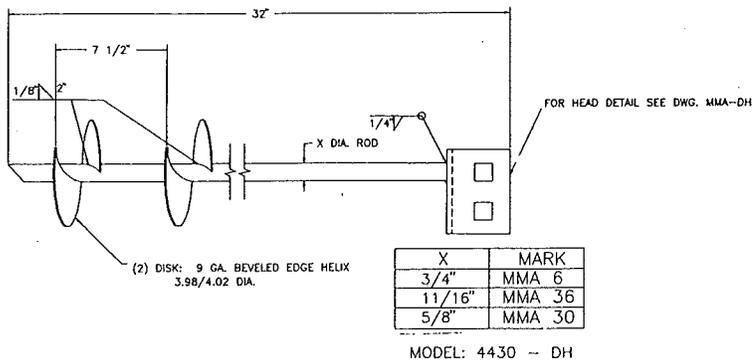
**ENLARGED VIEW OF FRAME BEAM**

HOOK FRAME CLAMP ON OUTSIDE BOTTOM FLANGE OF MOBILE HOME FRAME. PLACE STRAP BETWEEN FRAME AND HOME AS SHOWN IN SKETCH. PULL STRAP TIGHT AND ATTACH TO ANCHOR TENSION HEAD.



**FRAME CLAMP WITH STRAP INSTALLATION**

MODEL FCIW/S



Minute Man anchors®

R.M. Hudgins, Jr., P.E.  
P.O. Box 5070  
Asheville, N.C. 28813  
704-274-9244

August 3, 1994

Mr. Tom Hackney  
Minute Man Anchors, Inc.  
305 West King Street  
East Flat Rock, N.C. 28726

Dear Mr. Hackney:

I have analyzed design drawings, physical testing reports, and installation instructions for the Minute Man products listed below:

650-DH 5/8	4636-DH 3/4	36X-DH	THDH
650-DH 3/4	4430-DH 5/8	48X-DH	THDHLs
650-DH 11/16	4430-DH 11/16	36-DH	FCI W/S
636-DH 5/8	4430-DH 3/4	210-DH	FCII W/S
636-DH 3/4	4450-DH 5/8	210-PDH	BUC W/S
672-DH 3/4	4450-DH 11/16	210-JDH	SBNB
860-DH 3/4	4450-DH 3/4	100-DH	MMASD2
			MMA STRAP

My analysis and 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 1 strapping. The strapping also meets with ANSI 225.1 standards and ASTM D 3953-91 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 tests evaluate the anchorage strength of Minute Man Anchors installed resisting an axial and 45 degree angle applied withdrawal load. For the anchors listed on the attached sheet, the average ultimate holding power is not less than 5,433 pounds when installed in accordance with manufacturer instructions in the soil types indicated in the "table".

Very truly yours,

*9/12/94*

R.M. Hudgins, Jr., P.E.

LIST OF CERTIFIED MINUTE-MAN ANCHORS WITH A MINIMUM HOLDING POWER OF 4,725 POUNDS (2143 kg).

1. Sound Hard Rock.
2. Very-dense and/or cemented sands, coarse gravel and cobbles, preloaded silts, clays, and corals. (Probe torque value range-greater than 550 inch pounds).
3. Medium-dense coarse sands, sandy gravels, very-stiff silts and clays, (Probe torque value range- 350-550 inch pounds).
4. Loose to medium dense sands, firm to stiff clays and silts, alluvium fill. (probe torque value range- 200-349 inch pounds).

MARK	MODEL	DESCRIPTION	USE IN SOIL TYPE*
MMA-2	650-DH 5/8	Double Head, Earth Auger Anchor	2,3,4
MMA-4	650-DH 3/4	Double Head, Earth Auger Anchor	2,3,4
MMA-38	650-DH 11/16	Double Head, Earth Auger Anchor	2,3,4
MMA-40	636-DH 5/8	Double Head, Earth Auger Anchor	2,3,4
MMA-28	636-DH 3/4	Double Head, Earth Auger Anchor	2,3,4
MMA-30	4430-DH 5/8	Double Head, Double Disk, Earth Auger Anchor	2
MMA-36	4430-DH 11/16	Double Head, Double Disk, Earth Auger Anchor	2
MMA-6	4430-DH 3/4	Double Head, Double Disk, Earth Auger Anchor	2
MMA-52	4636-DH 3/4	Double Head, Double Disk, Earth Auger Anchor	2,3,4
MMA-53	4450-DH 5/8	Double Head, Double Disk, Earth Auger Anchor	2,3
MMA-54	4450-DH 11/16	Double Head, Double Disk, Earth Auger Anchor	2,3
MMA-55	4450-DH 3/4	Double Head, Double Disk, Earth Auger Anchor	2,3
MMA-35	36-XDH	36" Double Head Cross Drive Anchor	1
MMA-8	48-XDH	48" Double Head Cross Drive Anchor	1
MMA-18	THDH	Double Tension Head	SLAB
MMA-18	THDHLS	Double Tension Head W/Lag & Shield	SLAB
MMA-10	36-DH	Double Head Coral Anchor	CORAL
MMA-12	210-DH	Double Head Threaded Concrete Anchor	SLAB
MMA-14	210-PDH	Double Head Anchor for Concrete	SLAB
MMA-42	210-JDH	Swivel Double Head Anchor W/base for Concrete	SLAB
MMA-22	100-DH	Double Head Tension Device Adaptor	CONNECT
MMA-SD2		Stabilizing Device	2,3,4

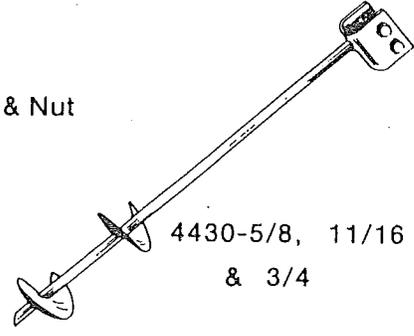
\*NOTE: MANY ANCHORS ARE DESIGNED FOR PARTICULAR SOIL CONDITIONS AND ARE UNACCEPTABLE FOR USE IN OTHER TYPE SOILS. WE HAVE THEREFORE LISTED THE SOILS FOR WHICH EACH ANCHOR IS DESIGNED AND APPROVED. SOIL CLASSIFICATIONS ARE TAKEN FROM THE "STANDARD FOR THE INSTALLATION OF MOBILE HOMES". THE ANCHORS LISTED MEET ANSI A225.1 AND ASTM 3953.91 CODES.

# 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.



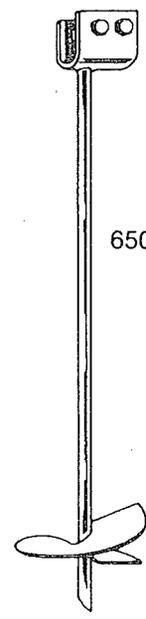
Strap Bolt & Nut



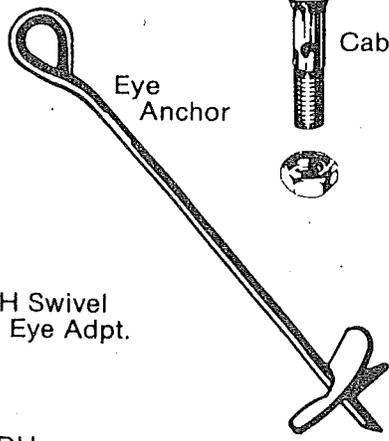
4430-5/8, 11/16 & 3/4



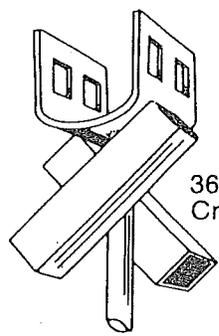
Cable Bolt & Nut



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



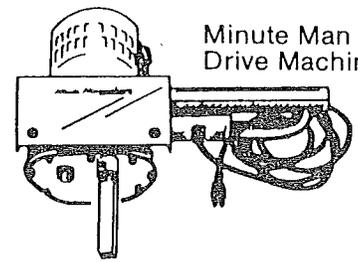
Eye Anchor



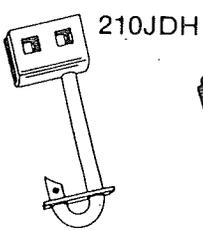
36" & 48" Cross Drive



100DH Swivel Head Eye Adpt.



Minute Man Anchor Drive Machine



210JDH



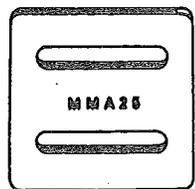
210PDH



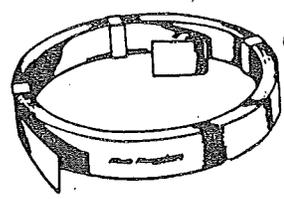
210DH



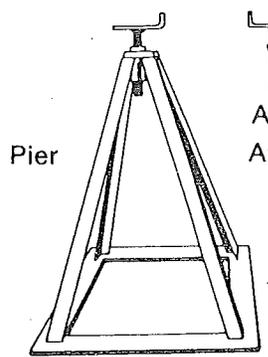
THDHLS



STRAP BUCKLE



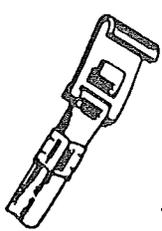
Galvanized Strapping



Pier



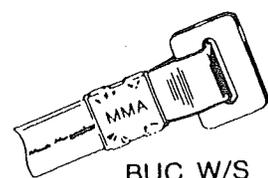
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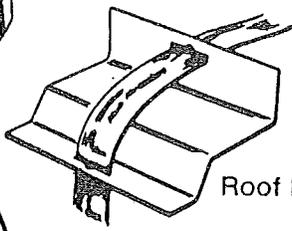
FC W/S



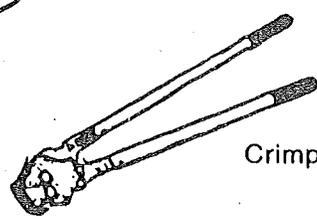
FC II W/S



BUC W/S



Roof Bracket



Crimping Tool