

SET UP & INSTALLATION PROCEDURES

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Dutch Housing, Inc.

P.O. Box 687
White Pigeon, MI 49099

KEEP THIS BOOKLET WITH YOUR HOME

DUTCH HOUSING, INC.

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CHAPTER 1 - INTRODUCTION

How to use this manual. This manual contains detailed installation instructions, including 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 discusses 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 and installation crew, and consultation with a registered professional 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 WEIGHTS 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.

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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's 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, and
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's 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.

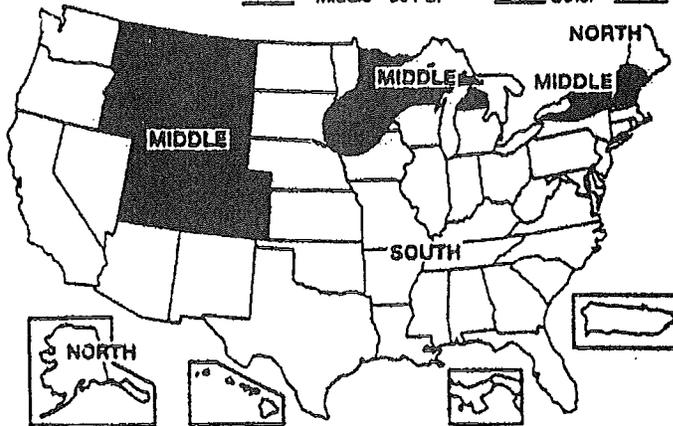
Support System. A combination of footings, piers, caps and shims that will, when properly installed, support the manufactured home.

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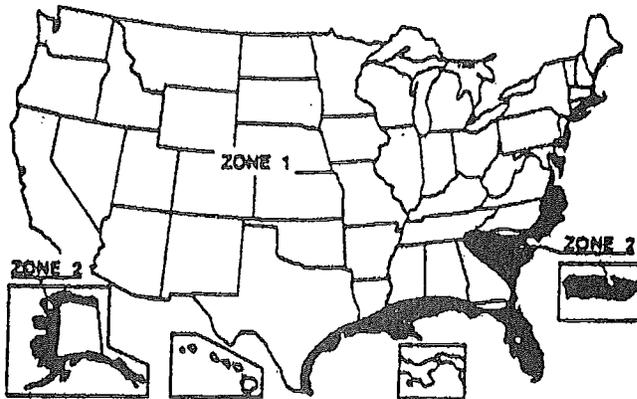
ZONE MAPS OF THE UNITED STATES STRUCTURAL DESIGN

FIG. 3.1

DESIGN ROOF LOAD ZONE MAP — North 40 PSF — South 20 PSF
— Middle 30 PSF — Other — PSF

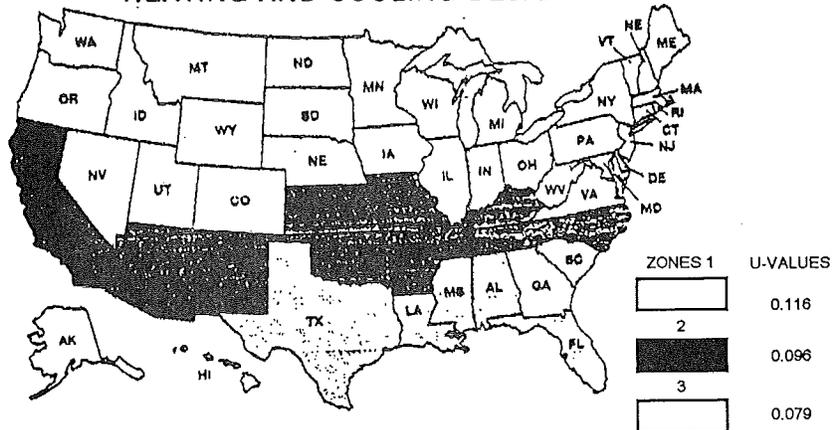


DESIGN ROOF LOAD ZONE MAP
South 20 PSF
Middle 30 PSF
North 40 PSF



DESIGN WIND ZONE MAP
Standard Wind Zone 1 15 PSF Horizontal 9 PSF Uplift
Hurricane Resistive Zone 2 25 PSF Horizontal 15 PSF Uplift

HEATING AND COOLING DESIGN



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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 with 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 (1,000 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.

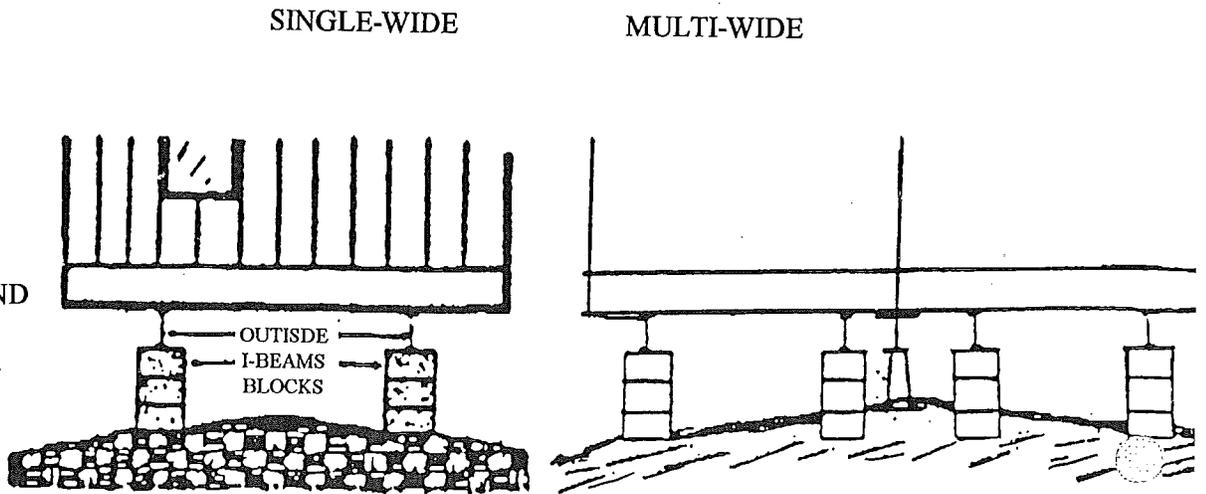
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SITE PREPARATION

FIGURE 3.3

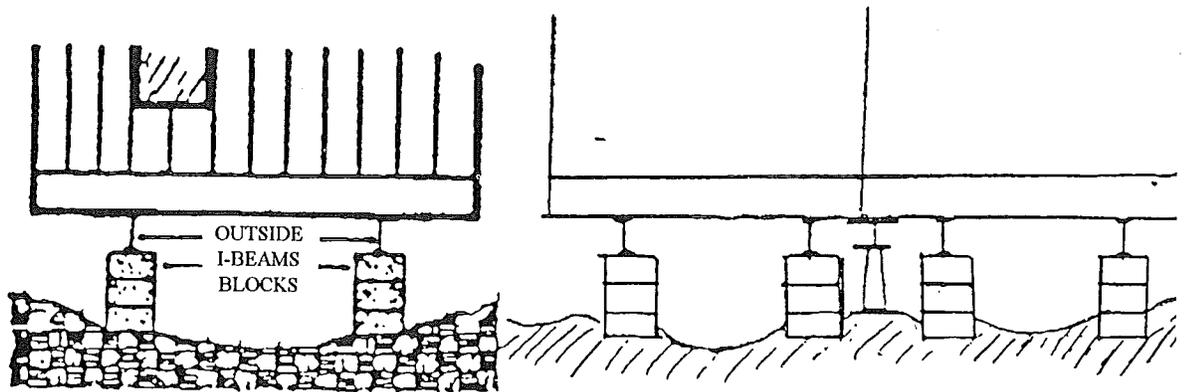
ELIMINATION OF WATER BENEATH THE HOME

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



NOTE: SEE PAGES 11 & 12 FOR LOCATION OF FOOTINGS BELOW FROST LINE DEPTH.

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



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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 Fig. 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 them.

FIGURE 3.2

GENERAL DESCRIPTION OF SOILS	
Soil Type Based on the United Classification System	Allowable Pressure (Pounds Per Square Foot) No allowances made for overburden pressure, embedment, depth, water table height or settlement problems.
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
Uncommitted Fill	Special Analysis is Required
Peat or Organic Clays	Special Analysis is Required

NOTE:

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.

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CHAPTER 4 — FOUNDATIONS

NOTE: This chapter covers only foundations. Setup 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 setup is proper pier installation. Incorrect size, location or spacing of piers may cause serious structural damage to your home. It is important to install piers around the perimeter if required for your home. 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 Figure 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 4.1., 4.2 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 of the same length and width as the piers they rest upon. Avoid soft woods and plywood, as they may lead to unwanted settling.

Use 4" x 6" 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 (see Fig. 4.1). 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.

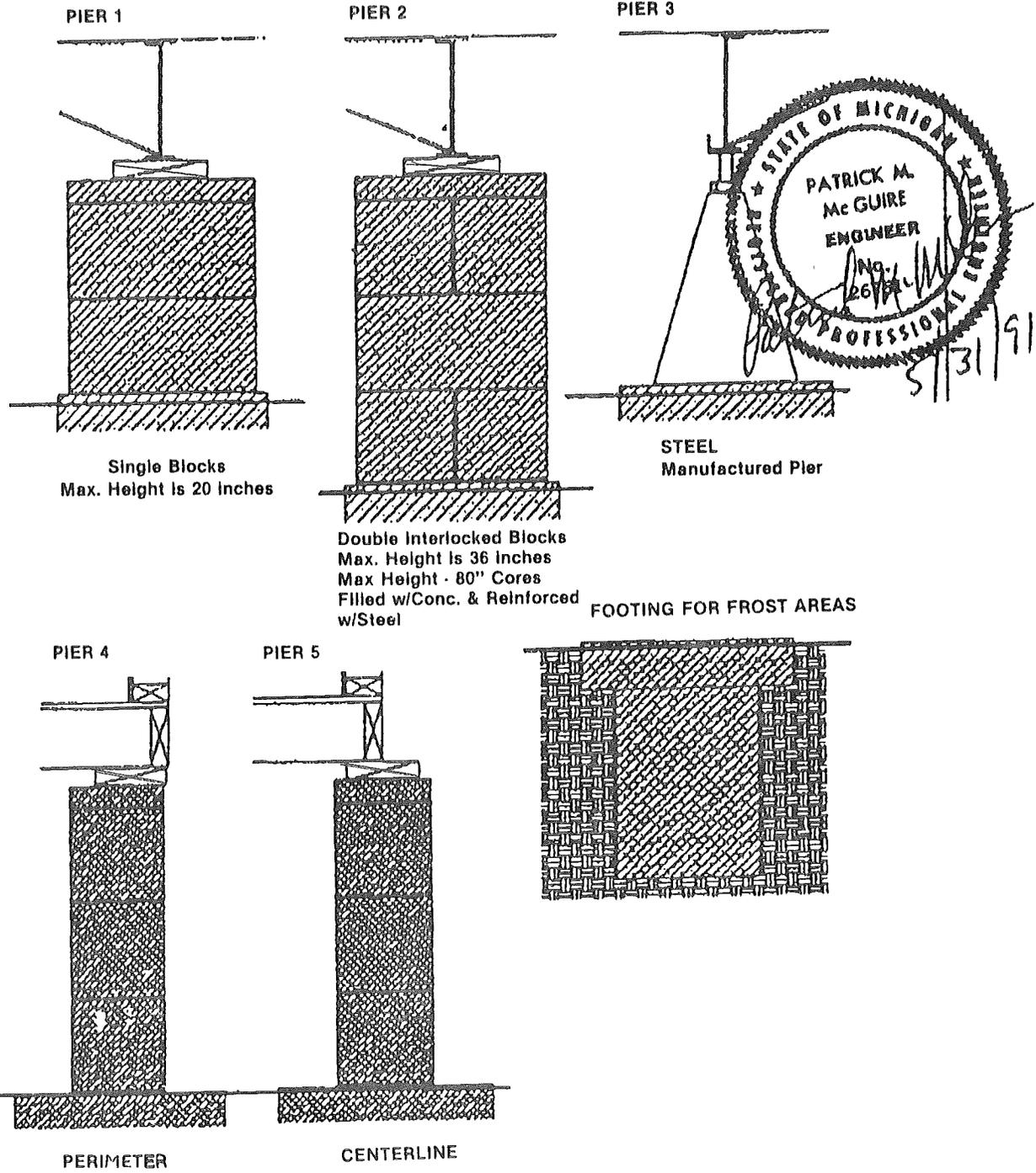
All piers must rest on footings (see paragraph 4.2) that extend below the frost line and are placed on either undisturbed soil or compacted fill.

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

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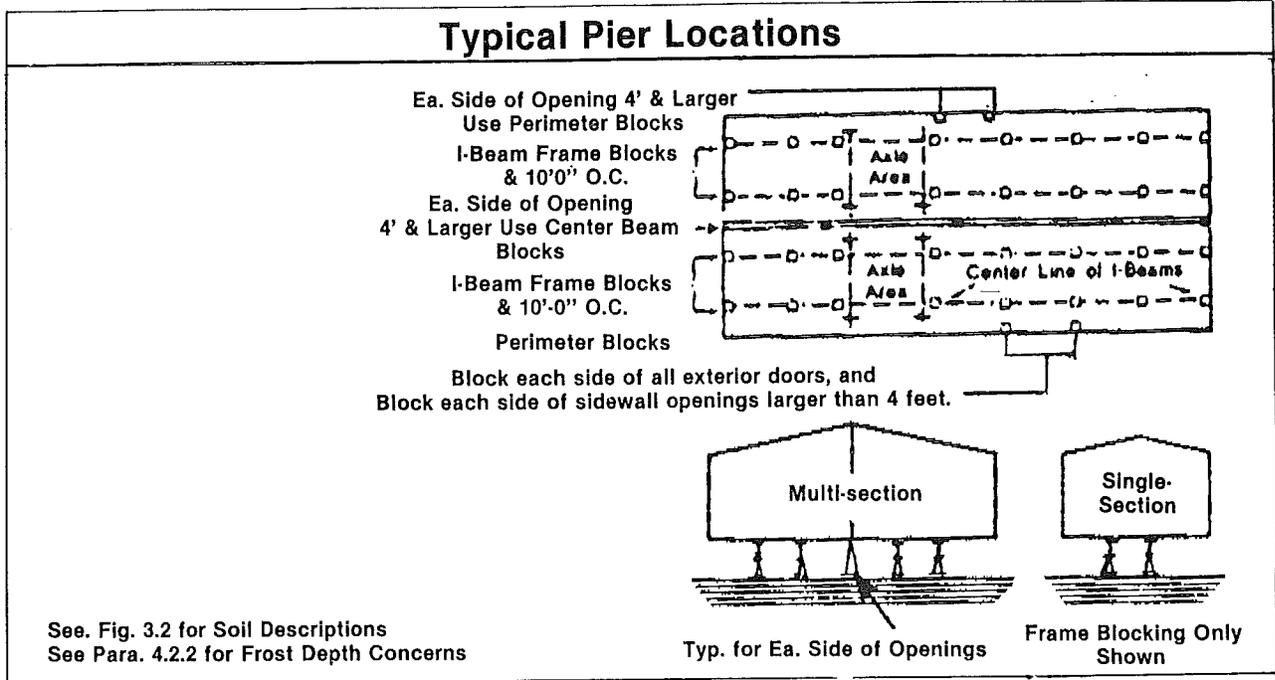
FIGURE 4.1

Typical Footing & Pier Installation



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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 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 Pg. 14 for the footing size.



FIGURE 4.2.1

Minimum Pier Capacity Table		
Frame Blocking Only		
(Perimeter Blocking Not Required Except As Addressed Above)		
Section Width (Ft.)	Roof Live Load (PSF)	Minimum Pier Capacity
		Maximum Pier Spacing — Feet 10
12	30	5800
14	30	6800
16	30	7800

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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 supports 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 on Page 14.

Table 4.3
Minimum Pier Capacity
Multi-Section Center Beam Blocking

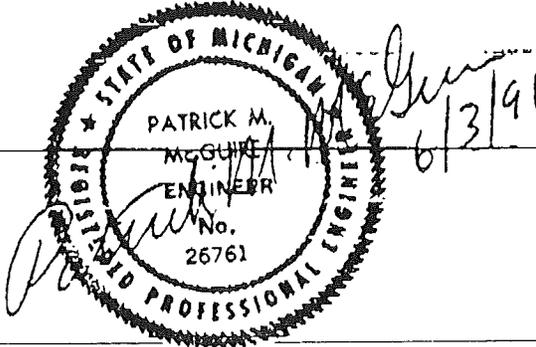
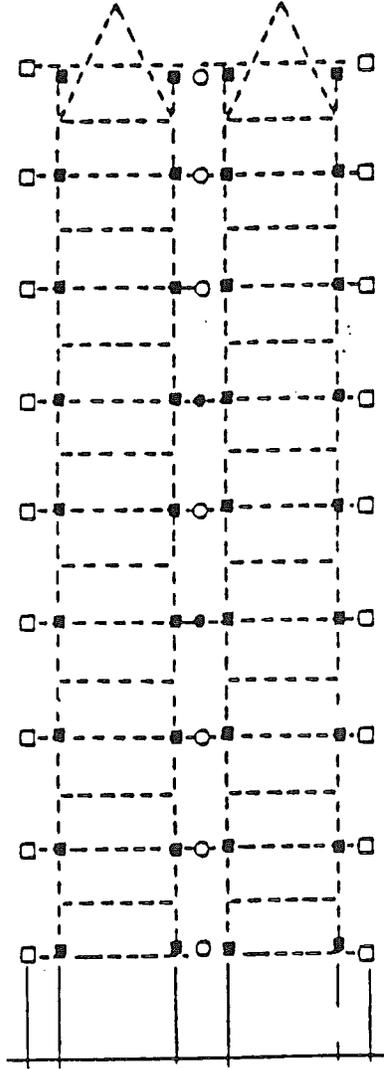
Section Width (Ft.)	Roof Live Load (PSF)	Pier Load & Minimum Pier Capacity Lbs.						
		Maximum Span To The Next Support - Feet						
		5	10	15	20	25	30	35
								
12	30	1200	2300	3500	4700	5800	7000	8200
14	30	1400	2700	4100	5400	6800	8100	9500
16	30	1600	3100	4700	6200	7800	9300	10900

FIGURE 4.2.2

28' WIDE WITH 10" CHASSIS
82-1/2" I-BEAM
SPACING

30 LBS. PER SQ. FT. ROOF LOAD



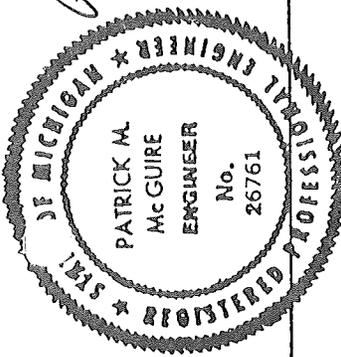
Patrick M. McGuire
2/9/93

APPROVED BY:

NTA FEB 9 1993
INC.

FEDERAL MANUFACTURED HOME
CONSTRUCTION AND SAFETY STANDARDS

SCALE:	DRAWN BY	DRAWING NUMBER	SITE INSTALLATION	Dutch Housing Inc.
DATE:	REVISED			



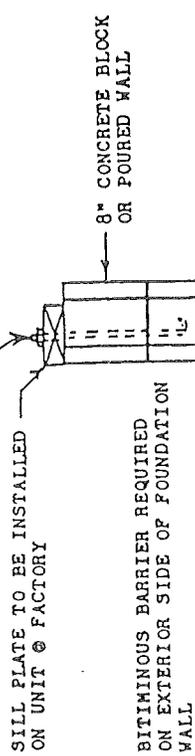
Patrick M. McGuire

NOTE: FOUNDATION DESIGN SHALL BE VERIFIED BY A REGISTERED PROFESSIONAL ENGINEER FAMILIAR WITH LOCAL SOIL CONDITIONS.

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

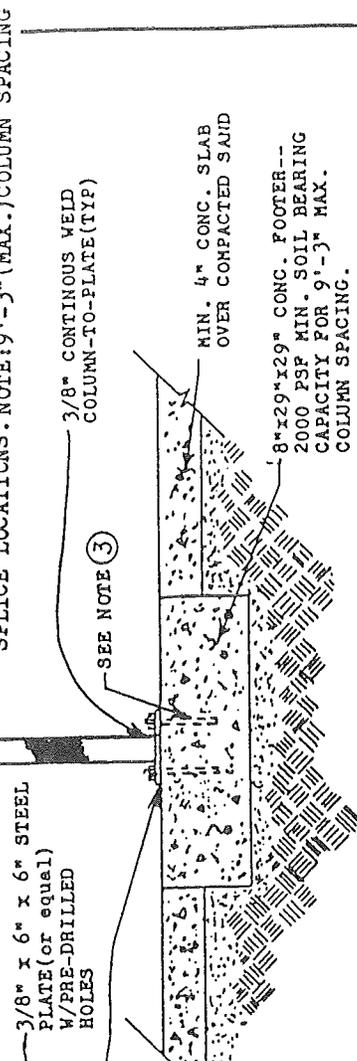
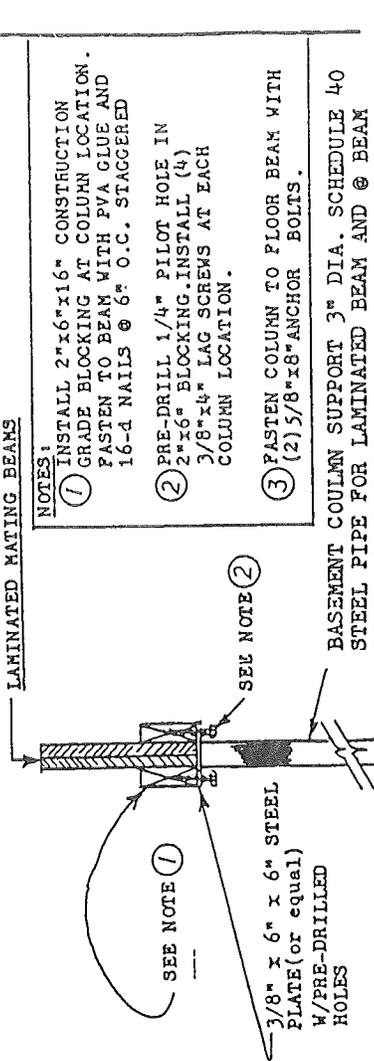
1/2" DIA. ANCHOR BOLTS SPACED 12" FROM CORNER & 6'-0" O.C. FIELD (INSTALL 1/2"x15" ANCHOR BOLTS P/CONCRETE BLOCK WALL OR INSTALL 1/2"x7" ANCHOR BOLTS P/POURED WALL) OR EQUAL USING STEEL STRAPS EQUIVALENT TO ANCHOR BOLTS.



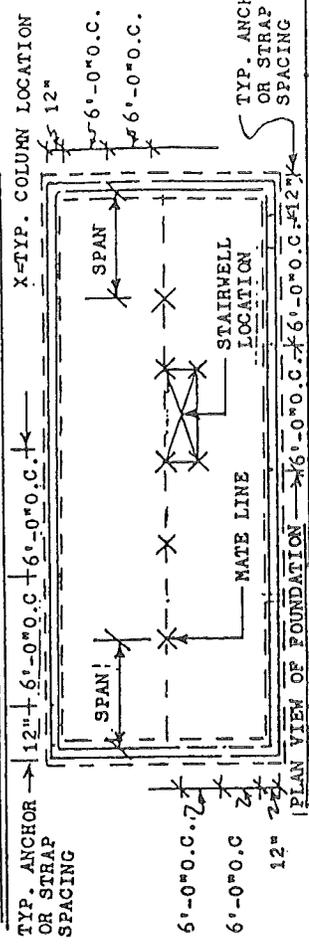
NOTE: ADJUST BASEMENT WALL HEIGHT FOR (MIN.) CLEARANCE FOR STAIRS (TO BE SUPPLIED & INSTALLED PER LOCAL CODES BY OTHERS @ SITE).

TYPICAL FOUNDATION WALL

NOTE: USE SILL PLATE(S) & SHIMS AS REQUIRED FOR HEIGHT ADJUSTMENTS



TYPICAL BASEMENT COLUMN SUPPORT



SCALE: 1/4" = 1'-0"	DATE: 11-93	DRAWN BY: JDR	FOUNDATION DETAILS EXTENDED SPAN FLOOR SYSTEM	White Pigeon, MI 49099 P.O. Box 687 • 68958 U.S. 131 White Pigeon, MI 49099

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PIERS & FOOTINGS INSTALLATION PROCEDURES

4.1.4 Piers design procedures

- 4.1.4.1 Piers less than 36" high. You may construct piers less than 36" high out of single, open or closed-cell concrete blocks, 8"x8"x16". Install them so that the long side is at right angles to the supported I-beam (see Fig. 4.1). Position open cells at right angles to the footers. Horizontal offsets should not exceed 1/2" top to bottom. Mortar is not normally required. Manufactured piers should be listed and labeled. Do not extend their adjusting studs beyond the limits specified by the manufacturer.
- 4.1.4.2 Piers 36" to 80" high. Construct all piers between 36" 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 multisection), and other factors such as the locations of doors or other openings and heavy pieces of furniture. In general, locate piers no more than 1'-0" (min.) or 2'-0" (max.) from either end, and not over 10'-0" center-to-center in between.

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

- 4.1.5.1 **Single-section homes.** Fig. 4.2 shows the recommended location and spacing of piers for your home.
- 4.1.5.2 **Multisection homes.** Fig. 4.3 shows the recommended location and spacing of piers for your multisection 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 entry and sliding glass doors), under porch posts, fireplaces and wood stoves, and under the expected locations of heavy pieces of 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 3½" thick with a 28-day compressive strength of at least 3,000 psi.
- 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" Max. 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.

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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 its depth. In the absence of a local code, use the frost penetration map of Fig. 4.4 as a guide.

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

4.2.3 Proper sizing of footings. Proper sizing of footings depends upon the load-carrying capacity of both the piers and the soil. See Table 4.4 for recommended footing 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 also find useful ideas and design guidelines in reference publications such as those 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 section 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 section 4.5.5 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 piers or footings. See tables and/or special manufacturer's instructions provided with your home.

4.5 Important reference documents

(Note: List most current editions and give a good, working address for ordering, along with price, if any)

4.5.1 Foundation plans available from manufacturer

4.5.2 ANSI/NCSBCS A225.1-1987, "Manufactured Home Installations"

4.5.3 ASCE 7-88, "Minimum Design Loads for Buildings and other Structures"

4.5.4 FEMA 85, "Manufactured Home Installation in Flood Hazard Areas", September, 1985

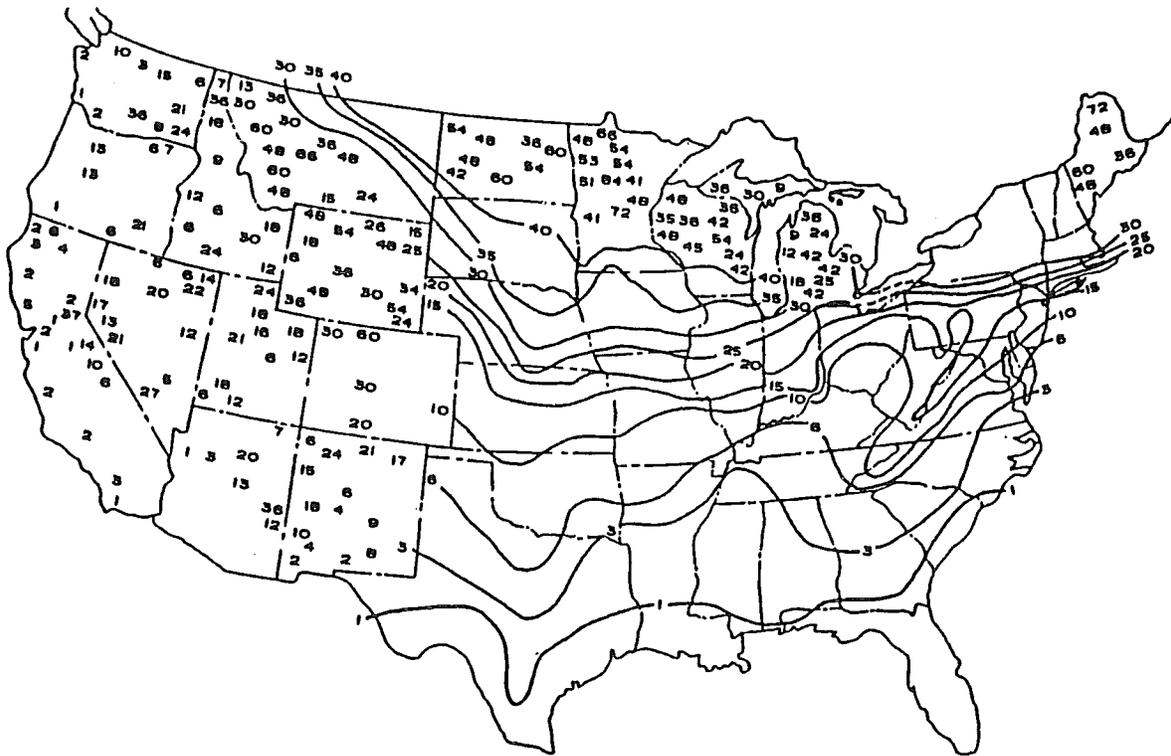
4.5.5 HUD Handbook 4930.3 (1989), "Permanent Foundations Guide For Manufactured Housing:"

4.5.6 "All-Weather Wood Foundation System Manual National Forest Products Association, June, 1976

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FIG. 4.4

Frost Penetration Map



AVERAGE DEPTH OF FROST PENETRATION — IN INCHES

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

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**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	9 x 9	8 x 8	7 x 7	5 x 5
800	11 x 11	9 x 9	8 x 8	5 x 5
1000	12 x 12	10 x 10	8 x 8	6 x 6
1500	15 x 15	12 x 12	10 x 10	7 x 7
2000	17 x 17	14 x 14	12 x 12	8 x 8
2500	19 x 19	15 x 15	13 x 13	9 x 9
3000	21 x 21	17 x 17	15 x 15	10 x 10
3500	22 x 22	18 x 18	16 x 16	11 x 11
4000	24 x 24	20 x 20	17 x 17	12 x 12
4500	25 x 25	21 x 21	18 x 18	13 x 13
5000	27 x 27	22 x 22	19 x 19	13 x 13
5500	28 x 28	23 x 23	20 x 20	14 x 14
6000	29 x 29	24 x 24	21 x 21	15 x 15
6500	31 x 31	25 x 25	22 x 22	15 x 15
7000		26 x 26	22 x 22	16 x 16
7500		27 x 27	23 x 23	16 x 16
8000		28 x 28	24 x 24	17 x 17
8500		29 x 29	25 x 25	17 x 17
9000		29 x 29	25 x 25	18 x 18
10000		31 x 31	27 x 27	19 x 19
11000			28 x 28	20 x 20
12000			29 x 29	21 x 21
13000			31 x 31	22 x 22
14000			32 x 32	22 x 22
15000				23 x 23
16000				24 x 24
17000				25 x 25
18000				25 x 25
19000				26 x 26

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. (288 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. pads may be used in place of one 24 x 24 in. pad.

FOOTING THICKNESS
4"
6"
8"

MAX. SIZE
16" x 16"
24" x 24"
32" x 32"

Patrick M. M. Jones
6/16/92



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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 work 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.

CAUTION: THE HOME WEIGHS SEVERAL TONS. USE ADEQUATE TEMPORARY SUPPORT 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 load. Use equipment in good working condition and strong enough to handle 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 the 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 1-2" 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. Also see page I-23 of this manual, Para. 3.

5.2.2.3 Interior closure. See 5.2.2.3

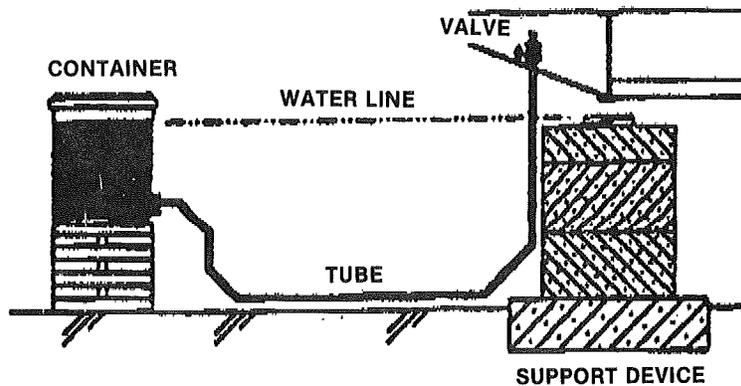
5.2.2.4 Exterior closure. See instructions placed in your home.



DUTCH HOUSING, INC.

FIG. 5.1

USE OF 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 THE PREDETERMINED WEIGHT SUPPORT DEVICES WILL BE SET . . .

LEVELING OF SUPPORT DEVICE: SECURE VALVE ABOVE DETERMINED WEIGHT AND OPEN. ADJUST 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, electricity and telephone utility crossovers. Chapter 8 outlines the correct procedures.

5.3.2 **Ductwork crossovers.** Clamp the flexible air conditioning and/or heating ducts to the sleeves projecting through the bottom covering, seal the ducts' adjustable collars with several wraps of duct tape, and suspend them above the ground (see Fig. 5.2, Page 25)

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:

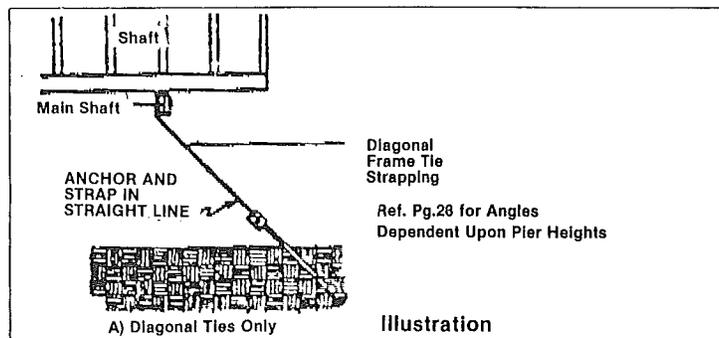
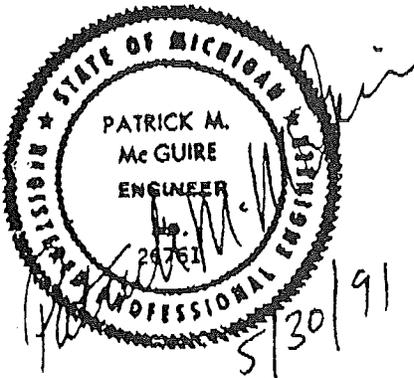
5.4.1 **Normal Installations.** Table 5.1 summarizes normal installations. The piers and ground anchors system, described in this manual, is most common. When using another type of installation, consult a registered professional or structural engineer.

5.4.1.1 **Number and location of anchors.** Select the number and location of straps and anchors from the chart on page 22. 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 on page 22 following the anchor manufacturer's instructions, Page 28 thru 34. Use singlehead anchors at all "frame-tie-only" locations.

Line up the shaft of each anchor with its strap (see illustration below).

You must consult a registered professional or structural engineer to determine the correct angles for the anchors, if they cannot be installed as illustrated here-in.



5.4.3 Several 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 capabilities 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 Para. 4.5.5).

DUTCH HOUSING, INC.

Interior Closure Moulding

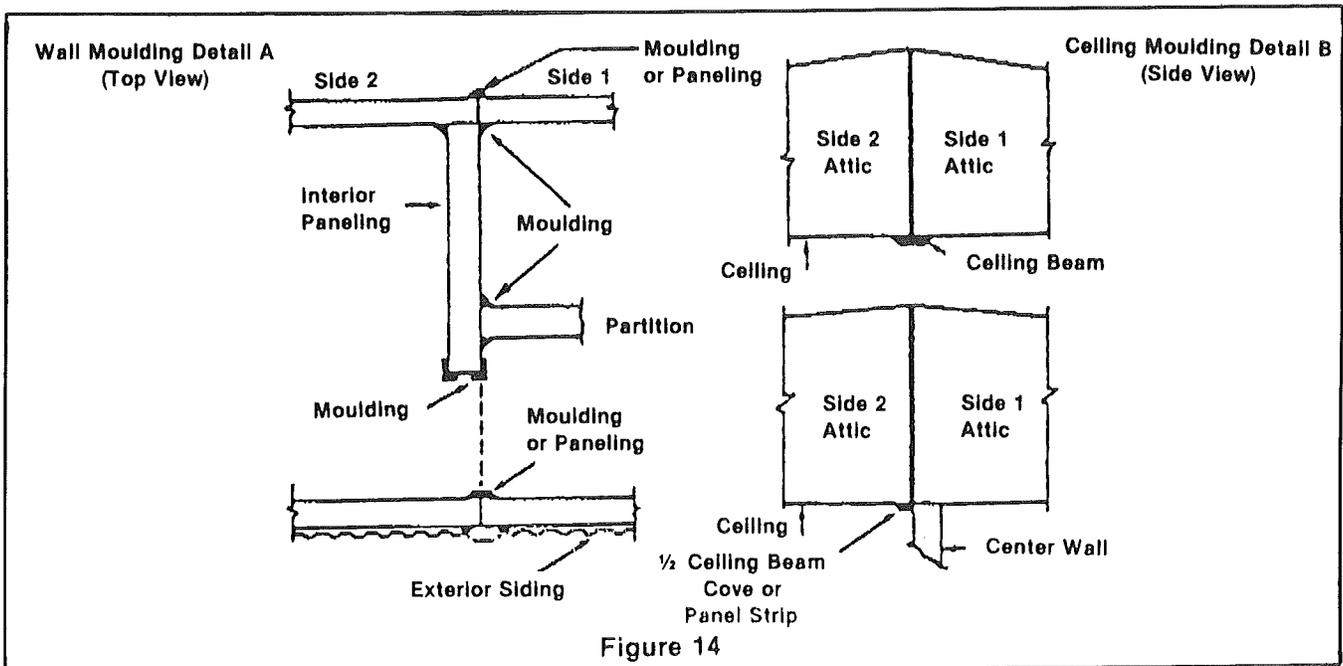
All the materials necessary to trim out the interior of the home are shipped with each home and can be easily identified by matching the mouldings or paneling with the materials installed by the manufacturer.

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

Before installing mouldings, fill all gaps with insulation.

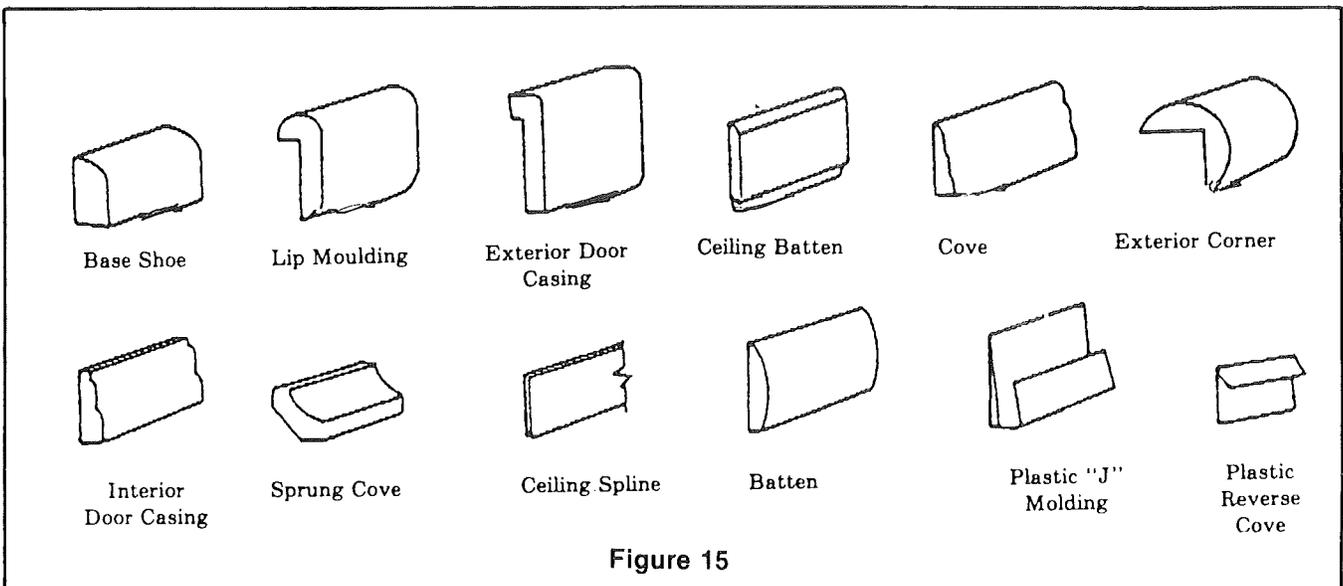
Then staple or nail the mouldings in place. Cover staple and nail holes with color coordinated putty (not supplied by manufacturer).

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. in Figure 14.



Typical Interior Finish Materials

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



DUTCH HOUSING, INC.

NOTE: ALL MOULDING & TRIM TO BE SHIPPED LOOSE & INSTALLED BY OTHERS @ SITE.

RECOMMENDED MOULDING & TRIM INSTALLATION FOR INTERIOR DOORS @ MATE LINE OPENINGS

(A) TYPICAL LIP MLDG

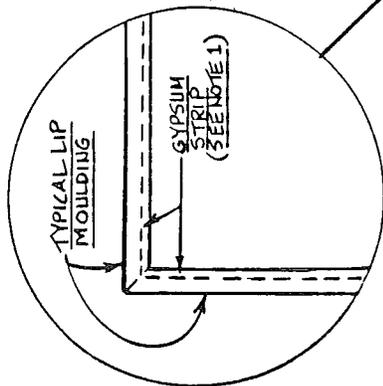
NOTE: USED IN LARGE OPENING ONLY

(B) TYPICAL DOOR CASING

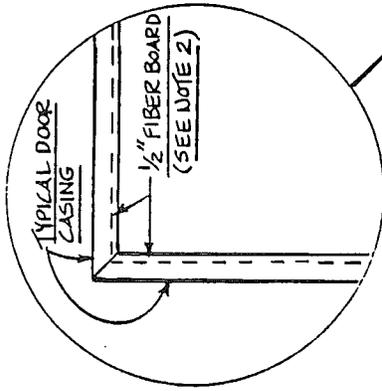
NOTE: USED ON ALL OTHER OTHER OPENINGS INCLUDING DOORS

SITE INSTALLED MOULDING & TRIM

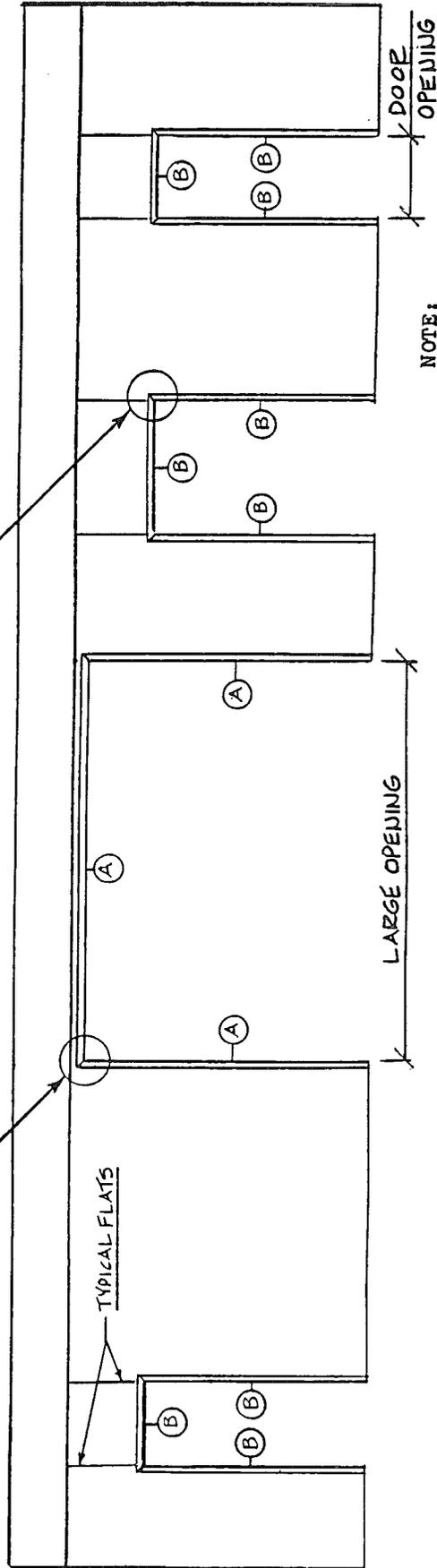
TRIM BOARD (SHIPPED LOOSE) WILL BE CUT OVER WIDTH & THEN CUT TO FIT & INSTALLED BY OTHERS @ SITE. DOOR STOP MOULDING WILL BE SHIPPED LOOSE & INSTALLED BY OTHERS @ SITE.



PROFILE "A"



PROFILE "B"



NOTE:

(1)

7" GYPSUM STRIP CUT TO PROPER WIDTH ON-SITE & USED IN LARGE OPENING ONLY.

NOTE:

(2)

1/2" X 7" FIBER BOARD CUT TO PROPER WIDTH & LENGTH AND 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 between the floors, walls, and ceilings 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, or supply 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 the two sections.

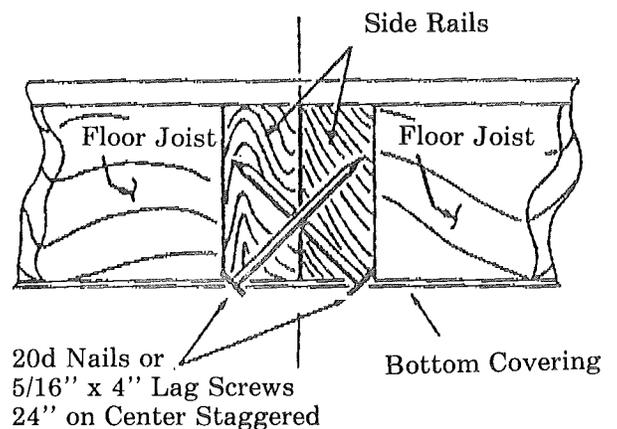
NOTE: The joint formed by the connection of the two sections should be tight to resist any air infiltration. Special care should be taken to assure that this is performed.

4. If you have a truck, position the second unit within a few inches of the first section and line-up the 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 fasteners from alternate sides at 24 inches 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.

Figure 7



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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.

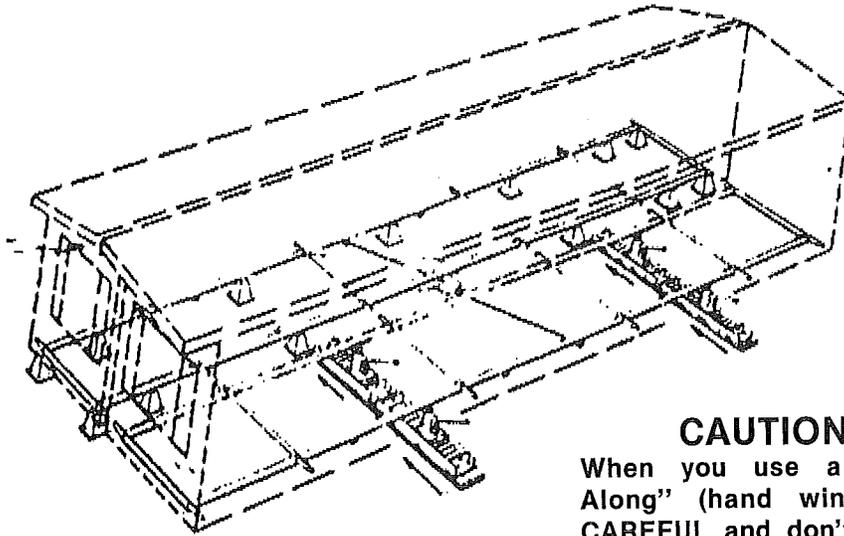
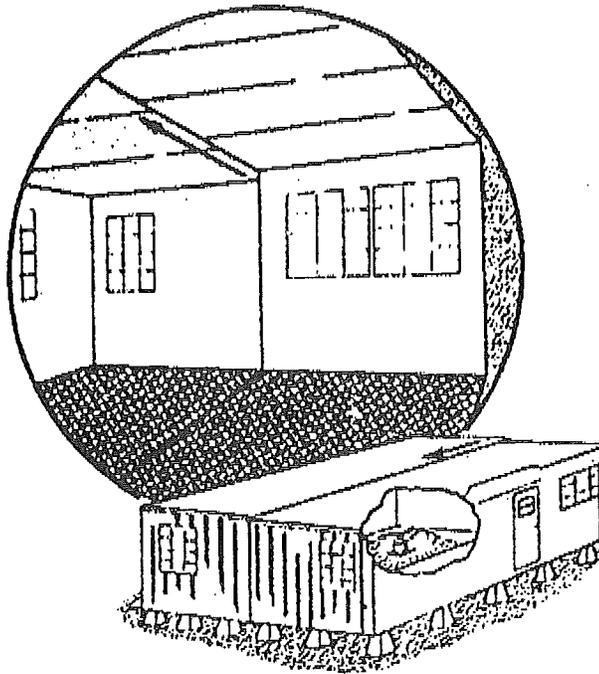


Figure 8

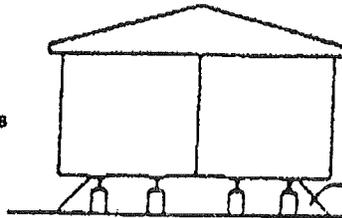
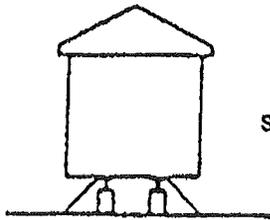
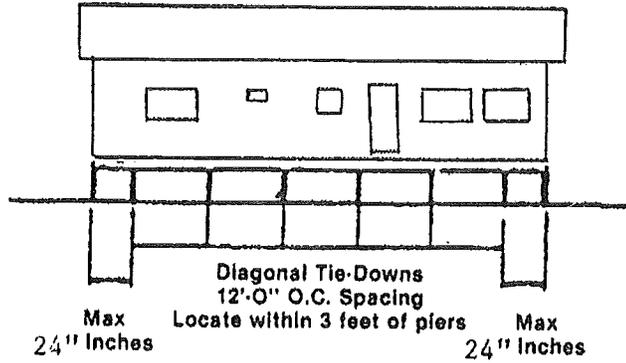
CAUTION:
When you use a "Come Along" (hand winch), BE CAREFUL and don't exceed the working load limit of the device.

Figure 9



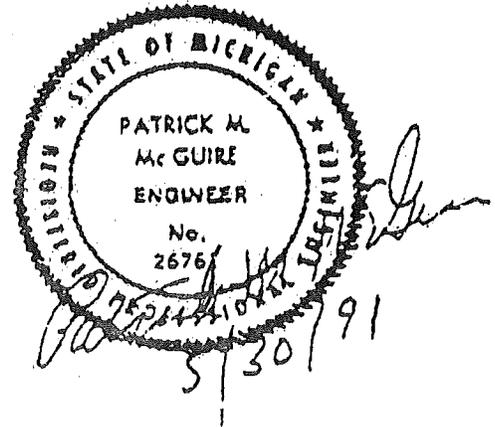
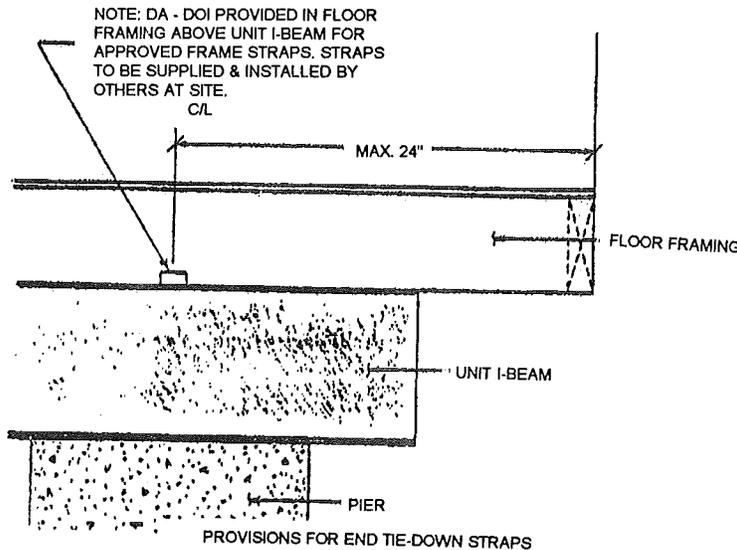
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Tie-Down Details — Typical



SEE PGS. 29 THRU 35 FOR TIEDOWN MATERIALS, APPLICATIONS AND CONNECTIONS

Fig. 5.3



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Effective July 13, 1994, the following criteria shall be adhered to in addition to the tiedown 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.
- * Ground anchors shall be installed to their full depth.
- * 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.



JUN 30 1994

Patrick M. McGuire
Dutch



DUTCH HOUSING, INC.

LEVELING & JOINING SECTIONS (CONTINUED FROM PAGE 21)

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 end-wall 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 4½" inches 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. Inside the house, check along the center line for a label that identifies a support column requiring special attachment. If you find one, fasten that column to the structure of the other section as specified in Figure 10.

NOTE: It is imperative that the ceilings on each section be exactly flush before fastening the ridge beams together.

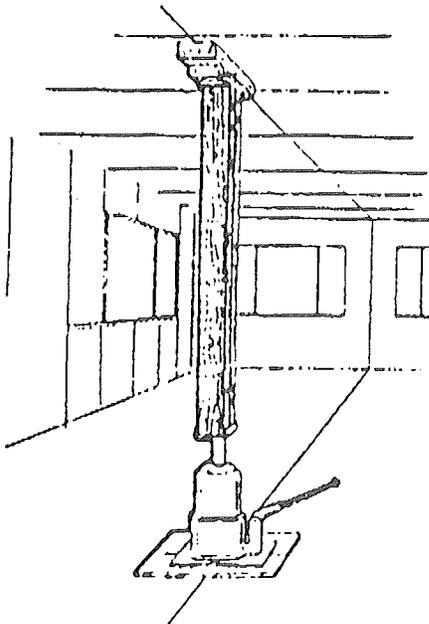


Figure 11

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 on 22 inch centers. 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 Ga. 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 inches and secure with 4-16 Ga. 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.

DUTCH HOUSING, INC.

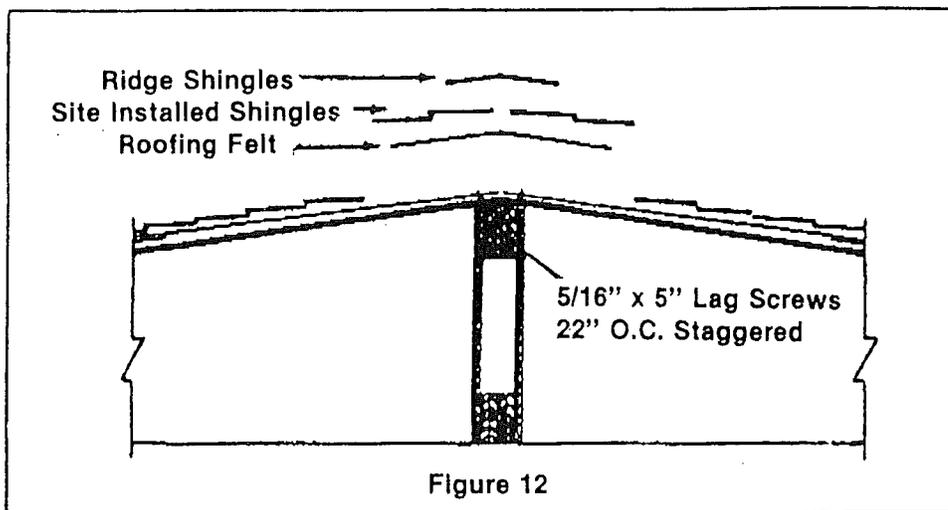


TABLE 5.1 — MANUFACTURED HOME INSTALLATIONS

(Single or multisection homes)

TYPES OF FOUNDATION SYSTEM — 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 slab.
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.

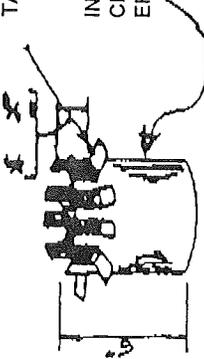
DUTCH HOUSING, INC.

TO INSTALL, FOLD DOWN EVERY OTHER TAB, INSERT REMAINING TABS INTO 1/2" DIA. HOLE W/BOTTOM OF DUCT & FOLD DOWN REMAINING TABS. SEAL SECURELY WITH ALUMINUM TAPE.

INSTALLED AT FACTORY CONNECT CROSSOVER DUCT TO DUCT ADAPTERS IN FIELD W/CLAMPS PROVIDED

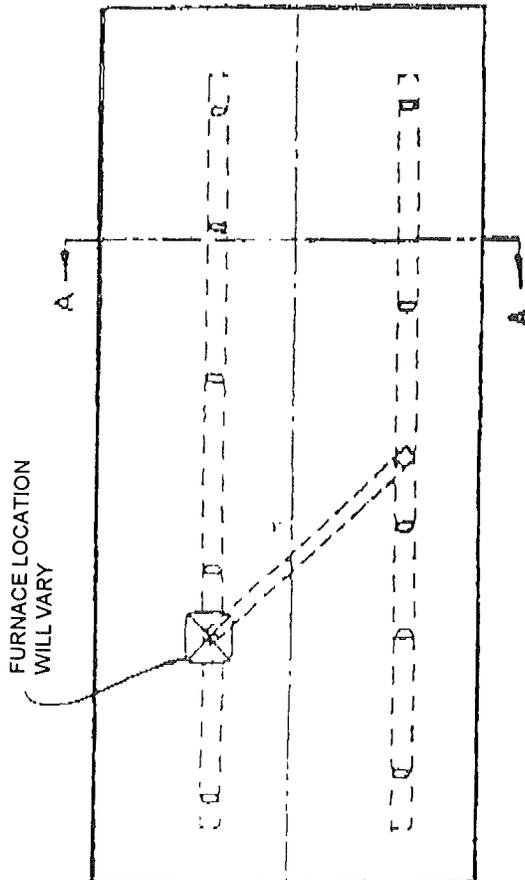
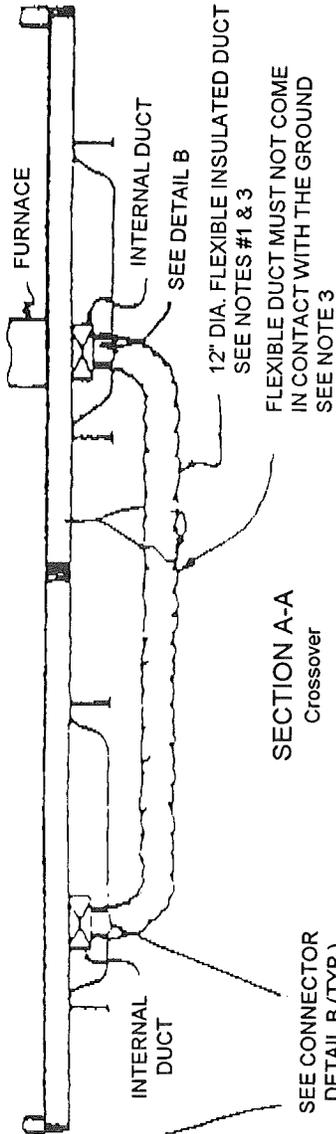
2 LOCATIONS

METAL
DUCT
FRAMING
GLASS
DUCT



12" DIA. DIG. (HOMINAL)
ALUM. OR GALV. STEEL

DETAIL - B
CONNECTOR



NOTES:

1. THE FLEXIBLE ROUND DUCT SHALL BE LISTED CLASS O OR CLASS I AIR DUCT, PER UL-181, INSULATED WITH MINIMUM A-4 INSULATION AND SHALL HAVE A CONTINUOUS VAPOR BARRIER HAVING A PERM RATING NOT GREATER THAN 1.
2. LOCATION OF THE CROSSOVER DUCT INLET WILL VARY WITH FURNACE LOCATION. LOCATION OF THE DISCHARGE OF THE EXTERNAL DUCT INTO INTERNAL DUCT(S) SHOULD BE AS NEAR TO THE CENTER OF THE REGISTERED PATERN AS POSSIBLE.
3. SUPPORT FLEX DUCT AT 24" O.C.

WARM AIR SUPPLY FLEX DUCT CROSSOVER

Fig. 5.2

DUTCH HOUSING, INC.

- 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 4.5.4. Unconventional anchorage and tie-downs often 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.
- 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 fire separation as required by state or local ordinances.
- 5.6.1 Expanding rooms.** Where option offered, manufacturer includes specific instructions and illustrations. 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 to ensure a water-tight seal to the sidewall. Push the wires into the box and secure the light fixture to the junction box. Install the light bulb and attach the globe. Refer to Fig. 6.3(a).
- 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 shown in Fig. 6.3(b), and follow the manufacturer's instructions, as in Fig. 6.4.
- 6.6 Ventilation Options.** Follow the manufacturer's instructions. See, for example, Fig. 6.5.

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 MINIMUM SPECIFIED ANGLE FROM VERTICAL

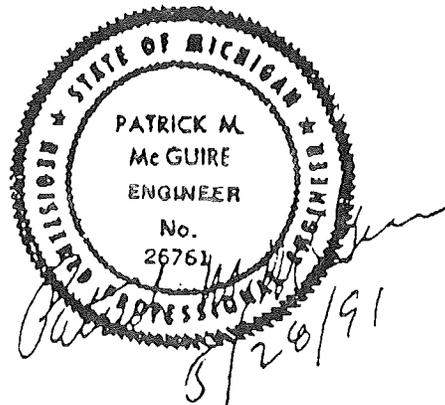
PIER HEIGHT	X MAXIMUM	X MINIMUM
8	9	7
10	11	9
12	14	11
14	16	13
16	19	15
18	21	17
20	23	19
22	26	21
24	28	23
26	30	25
28	33	27
30	35	29
32	38	31
34	40	33
36	42	35

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



DUTCH HOUSING, INC.

Minute Man anchors®

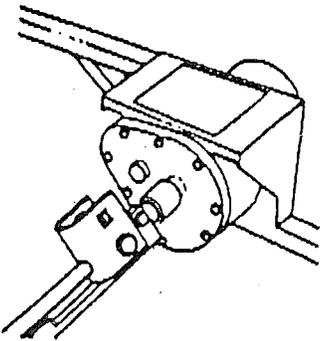


INSTALLATION

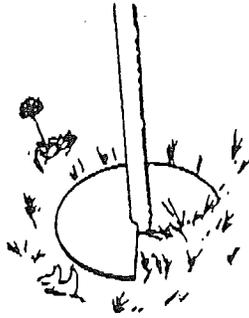
There are two basic methods of installing anchors, each equally effective in properly securing mobile homes to the ground.

Machine Installation

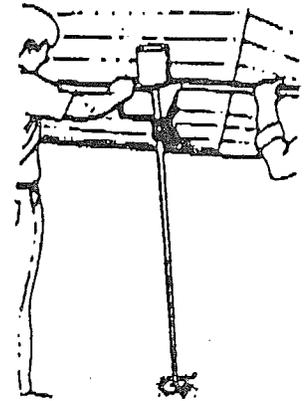
In this method, the anchor is turned the full depth of four feet into the ground by an anchor drive machine.



1. Attach anchor to machine



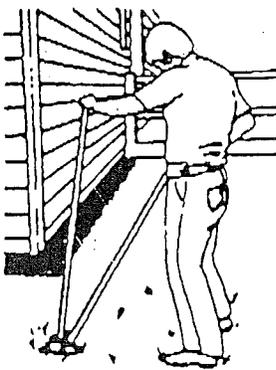
2. Auger is placed in proper position in line with strap, and machine started.



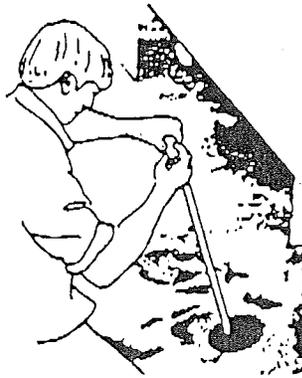
3. Anchor should be installed at a slight angle as shown to assure head being positioned behind future skirting.

Installation with Manual or Mechanical Post Hole Digger

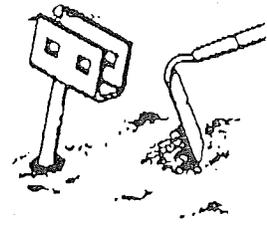
In this method, anchors can be installed with equipment available to the average home owner.



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.



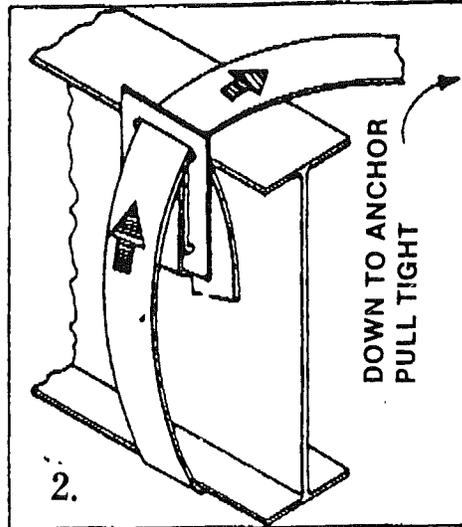
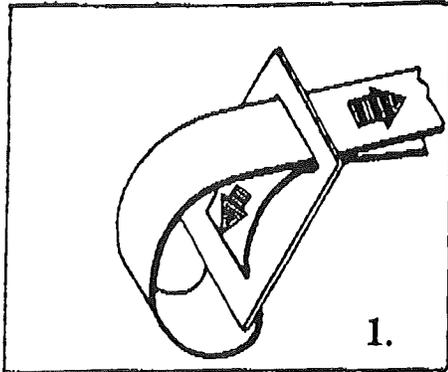
3. After anchor is installed to full depth, earth is repacked, six inches at a time.

WARNING: Be careful to avoid underground water lines, phone lines and power lines.

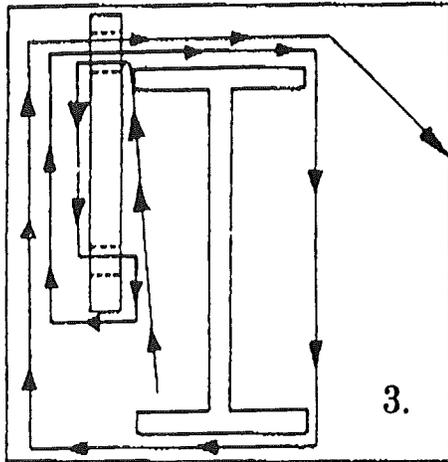
DUTCH HOUSING, INC.

POSITIONING FRAME TIE

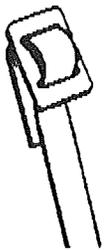
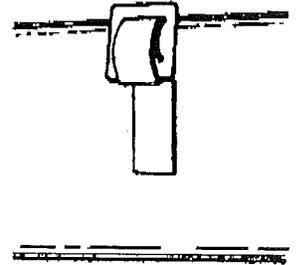
FRAME TIE INSTALLATION INSTRUCTIONS



1. See step one in installation instructions.



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.

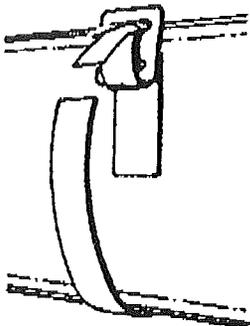


2. Insert strap in position through buckle.

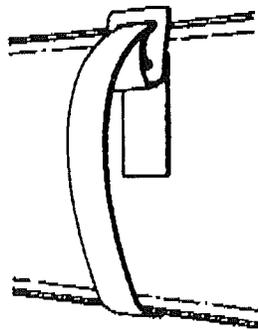


3. Strap should be through buckle in this configuration before installation on frame.

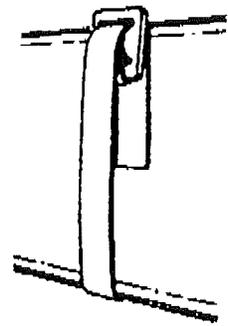
4. Strap should be passed over frame from inside, and buckle pulled into position as shown.



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.

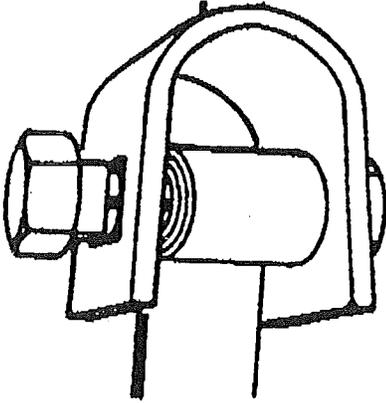
DUTCH HOUSING, INC.

PROPER TENSIONING OF STRAP TO ANCHOR HEAD

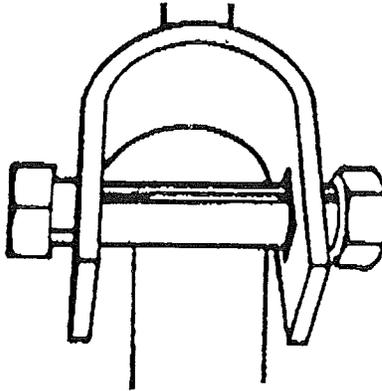
3.

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

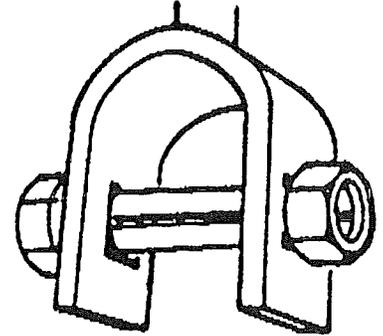
Notice: In areas of severe cold weather where possible damage could occur from frost heave, the homeowner should release some of the tension from the vertical tie each fall.



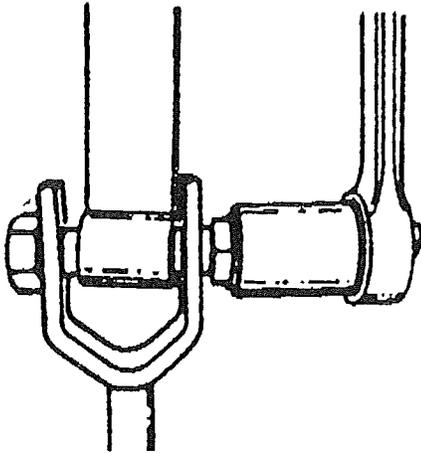
1. Insert bolt into head; attach nut loosely.



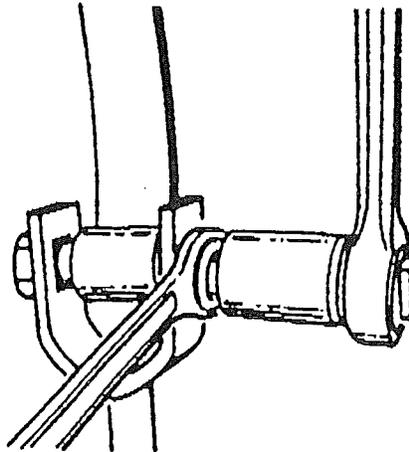
2. Insert strap in slot of bolt 5/8", or until strap is flush with far side of bolt.



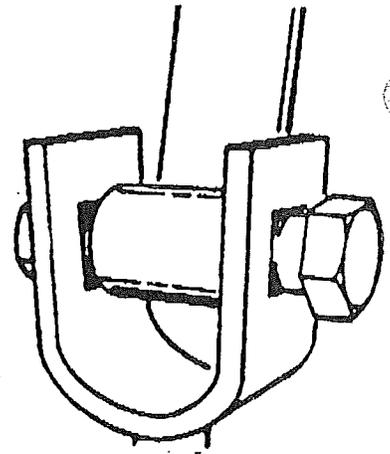
3. Bend strap 90° and take at least four complete turns on bolt until strap is taut.



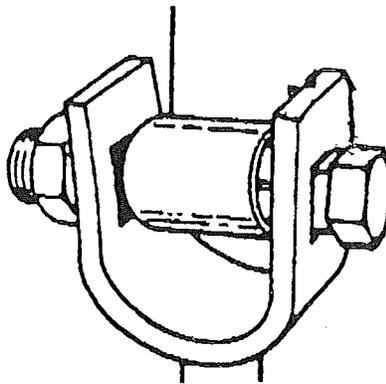
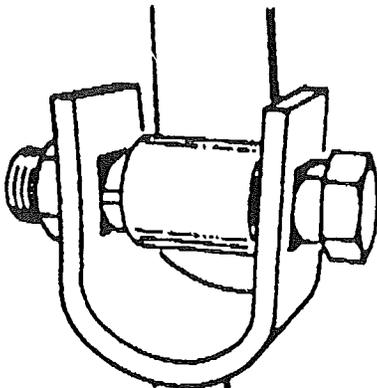
4. Bolt is turned with 15/16" socket wrench, or adjustable wrench, on hex head.



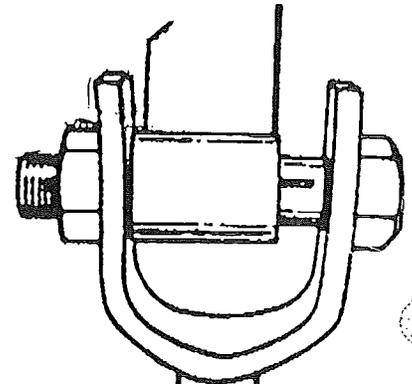
5. To hold bolt under tension while repositioning wrench, an open-end wrench is placed on 5/8" square shoulders of bolt.



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

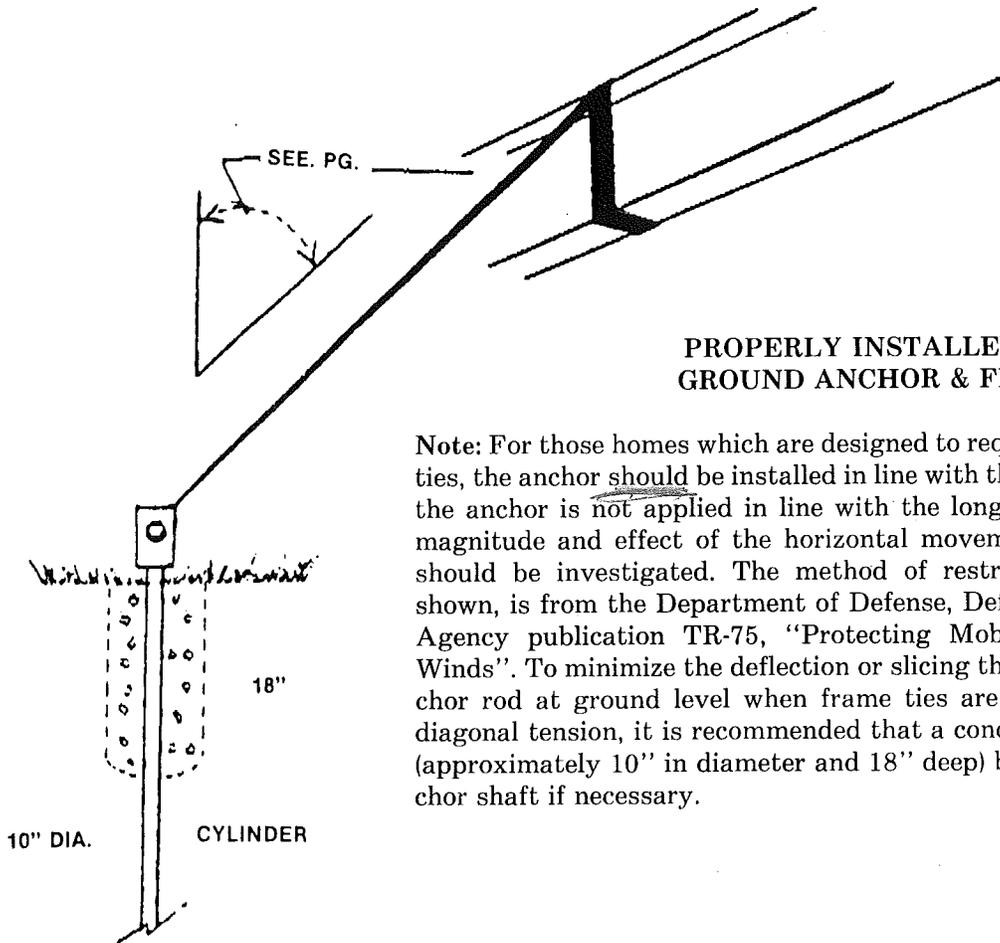


8. Shoulders are now in locking position; continue to tighten nut.



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

DUTCH HOUSING, INC.



PROPERLY INSTALLED AND CONNECTED GROUND ANCHOR & FRAME CONNECTION

Note: For those homes which are designed to require only diagonal frame ties, the anchor should be installed in line with the ties. 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. The method of restricting lateral deflection shown, 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 if necessary.

TYPES OF SOIL

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" NFPA 501A 1975/ANSI A119.3 1976.

1. Sound hard rock.
2. Very-dense and/or cemented sands, coarse gravel and cobbles, preloaded silts, clays, and corals.
3. Medium-dense coarse sands, sandy gravels, very-stiff silts and clays.
4. Loose to medium dense sands, firm to stiff clays and silts, aluvian fill.

NOTE: All Minute Man Anchors tensioning devices are certified and tested to 7,100 pounds (3,220 kg).

DUTCH HOUSING, INC.

MATHESON, HINTZ & ASSOCIATES, INC.
CONSULTING ENGINEERS AND LAND SURVEYORS
ASHVILLE AIRPORT ROAD FLETCHER, N.C. 28732

JOE E. MATHESON, JR., P.L.
WILLARD A. HINTZ, R.L.R.
HARRY E. BYAS, JR., F.E.R.L.S.
R.C. ABERNETHY, P.L.

PHONES: CODE 704
ASHEVILLE 263-8692
ARDEN 684-7417

April 23, 1976

Mr. C. Denson Hutchinson
Minute Man Anchors, Inc.
305 W. Walker Street
East Flat Rock, North Carolina 28726

Dear Mr. Hutchinson:

I have analysed design drawings and physical testing reports for those Minute Man Anchors listed in the tabulation attached. 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 is 1-1/4 x .035 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 axially applied withdrawal load. For the anchors listed on the attached sheet the ultimate holding power is not less than 4,725 pounds when installed in accordance with manufacturer instructions in the soil types indicated in the 'table'. If these anchors are to be installed vertically to resist other than direct withdrawal loads the magnitude and effect of horizontal movement of the anchor head should be investigated.

Very truly yours,

MATHESON, HINTZ & ASSOCIATES, INC.

H.C. Abernethy, P.E.

Attachment

HCA: ps



DUTCH HOUSING, INC.

ALL OF 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, pre-loaded 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, alluvial fill. (Probe torque value range - 200-349 inch pounds)

<u>MARK</u>	<u>MODEL</u>	<u>DESCRIPTION</u>	<u>USE IN SOIL TYPE*</u>
MMA-1	650-S	Single Head, Earth Auger Anchor 5/8" Shaft	2,3,4
MMA-2	650-DH-S	Double Head, Earth Auger Anchor 5/8" shaft	2,3,4
MMA-3	650-H-S	Single Head, Earth Auger Anchor 3/4" Shaft	2,3,4
MMA-4	650-H-DH-S	Double Head, Earth Auger Anchor 3/4" Shaft	2,3,4
MMA-5	4436-S	Single Head, Double Disk, Earth Auger Anchor 5/8" shaft	2
MMA-6	4436-DH-S	Double Head, Double Disk, Earth Auger Anchor 5/8" Shaft	2
MMA-7	48-X-S	Single Head Drive Anchor	2
MMA-8	48-X-DH-S	Double Head Drive Anchor	2
MMA-9	36-S	Single Head Coral Anchor	CORAL
MMA-10	36-DH-S	Double Head Coral Anchor	CORAL
MMA-11	210-S	Single Head Tension Device for Slab	SLAB
MMA-12	210-DH-S	Double Head Tension Device for Slab	SLAB
MMA-13	210-P-S	Single Head Tension Device for Concrete	SLAB
MMA-14	210-P-DH-S	Double Head Tension Device for Concrete	SLAB
MMA-15	30-ER-S	Single Head Expand Rock Anchor	1
MMA-16	30-ER-DH-S	Double Head Expand Rock Anchor	1
MMA-17	TH-S	Single Tension Head	SLAB
MMA-18	TH-DH-S	Double Tension Head	SLAB
MMA-21	100-S	Single Head Tension Device Adapter	CONNECT
MMA-22	100-DH-S	Double Head Tension Device Adapter	CONNECT

***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" NFPA 501A 1975/ANSI A119.3 1976.

DUTCH HOUSING, INC.

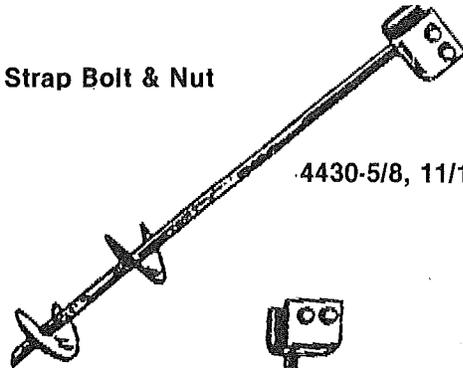
Minute Man anchors

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

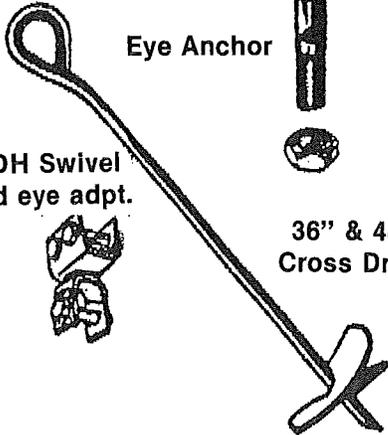


Cable Bolt & Nut

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



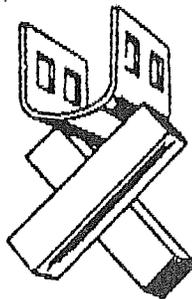
Eye Anchor



100DH Swivel head eye adpt.



36" & 48" Cross Drive



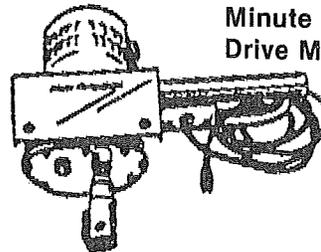
210PDH



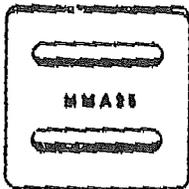
210DH



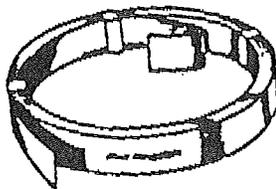
THDHL



Minute Man Anchor Drive Machine

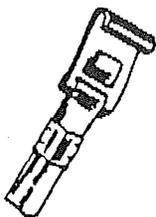
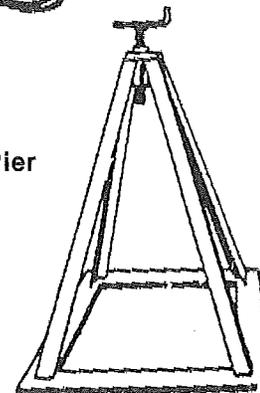


Strap Buckle

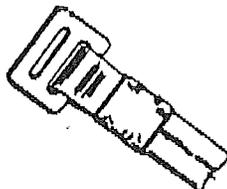


Galvanized Strapping

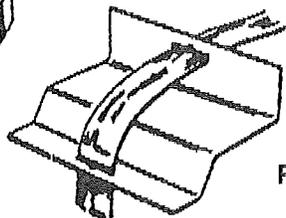
Pier



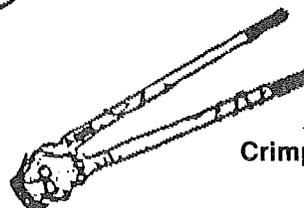
EC W/S



BUC W/S



Roof Bracket



Crimping Tool

DUTCH HOUSING, INC.

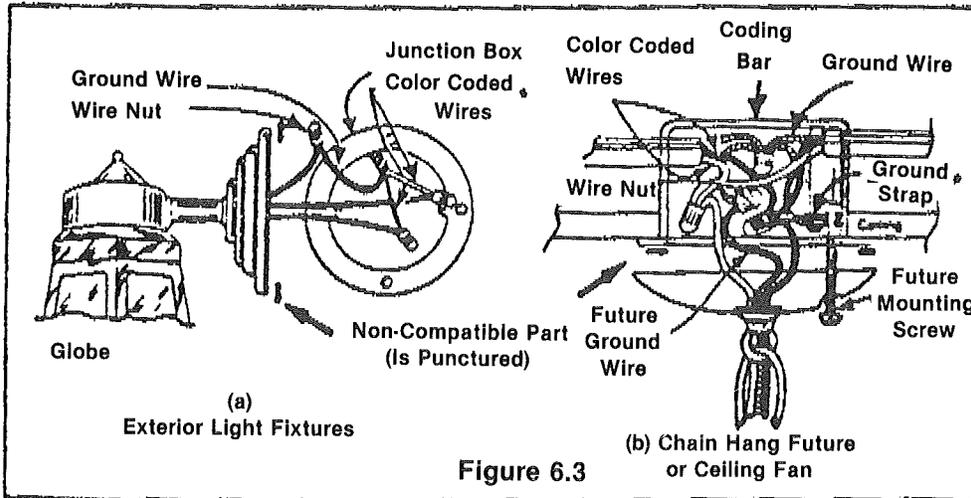
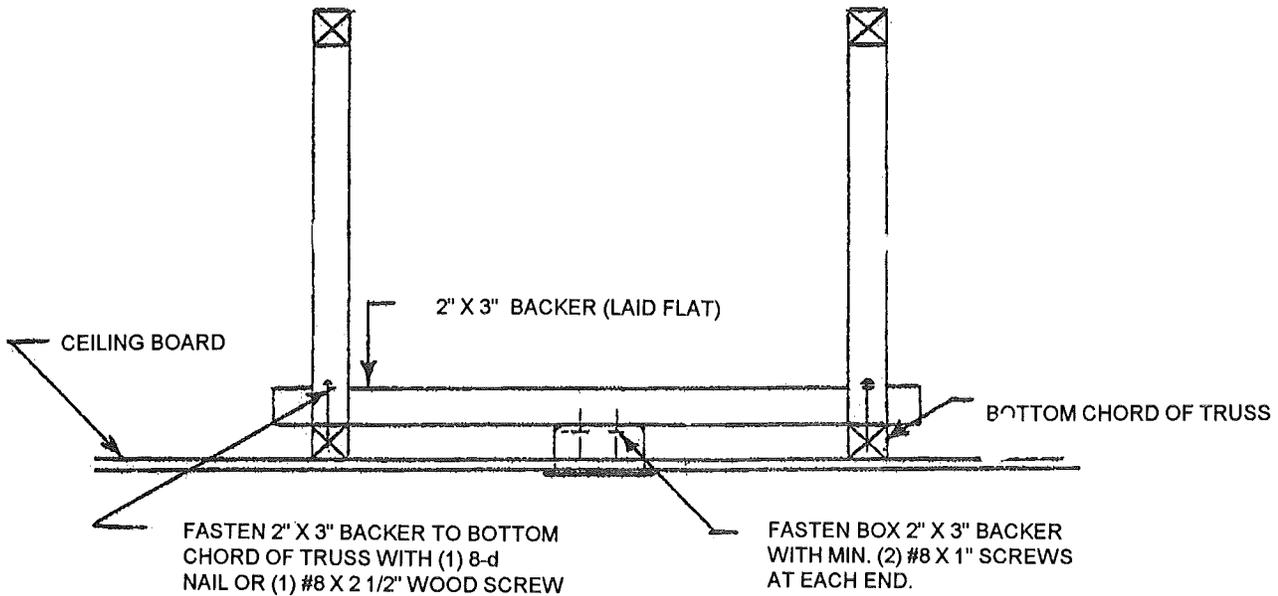


FIG. 6-3 - INSTALLATION OF EXTERIOR LIGHTS



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 INSTRUCTION. THE MAXIMUM PADDLE FAN WEIGHT WITH OR WITHOUT ACCESSORIES SHALL NOT EXCEED 35#. IF THE BOX IS TO BE USED AS THE SOLE MEANS OF SUPPORT FOR A FAN (NOT EXCEEDING 35#.) THE BOX MUST BE MARKED SUITABLE FOR SUCH USE.

PROVISIONS FOR CEILING FAN

DUTCH HOUSING, INC.

Ceiling Fan Installation

CAUTION: BEFORE FOLLOWING THE STEP-BY-STEP PROCEDURE, BE SURE THAT POWER TO FAN WIRE IS OFF.

CAUTION: BEFORE FOLLOWING THE STEP-BY-STEP PROCEDURE, BE SURE THAT POWER TO FAN WIRE IS OFF.

1. Remove the fan manufacturer's installation instructions from the package and determine the method of fan attachment to the beam (Also, see Fig. 6.4 below)

5. Secure the center beam in place over the center line joint. Be sure that supply wire is not pinched or penetrated with beam fasteners.

2. If the center beam (shipped loose) does not contain a pre-cut 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 line of hole should line up with location of supply wire through ceiling) and centered in the width of the beam.

6. Secure electrical box to ridge beam with #8 x 1" wood screws through the two holes in the side of the box.

3. Install the box in the hole and secure flange to the center beam with (4) # 6 x 1" wood screws.

7. Strip about 3/4" of insulation from the white and black conductor ends.

4. a. Insert the ceiling wire through a knock out hole in the side of the electrical box. NOTE: It may be necessary to cut notch from the top on the supply wire side to be inserted in electrical box without binding against center beam during installation.

8. Position the non-combustible flash ring (provided) over the electrical box so that finished surface (adjacent to electrical box) which is to be covered by fan canopy is not exposed (comb. surface only.)

b. Leave approximately 4" of wire free in the box.

9. Follow the manufacturer's installation for mounting the fan assembly to the box and for electrical wiring of the fan. Use provided electrical connectors for splicing wire. Be certain that fan is grounded as specified in manufacturer's instructions and that 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.

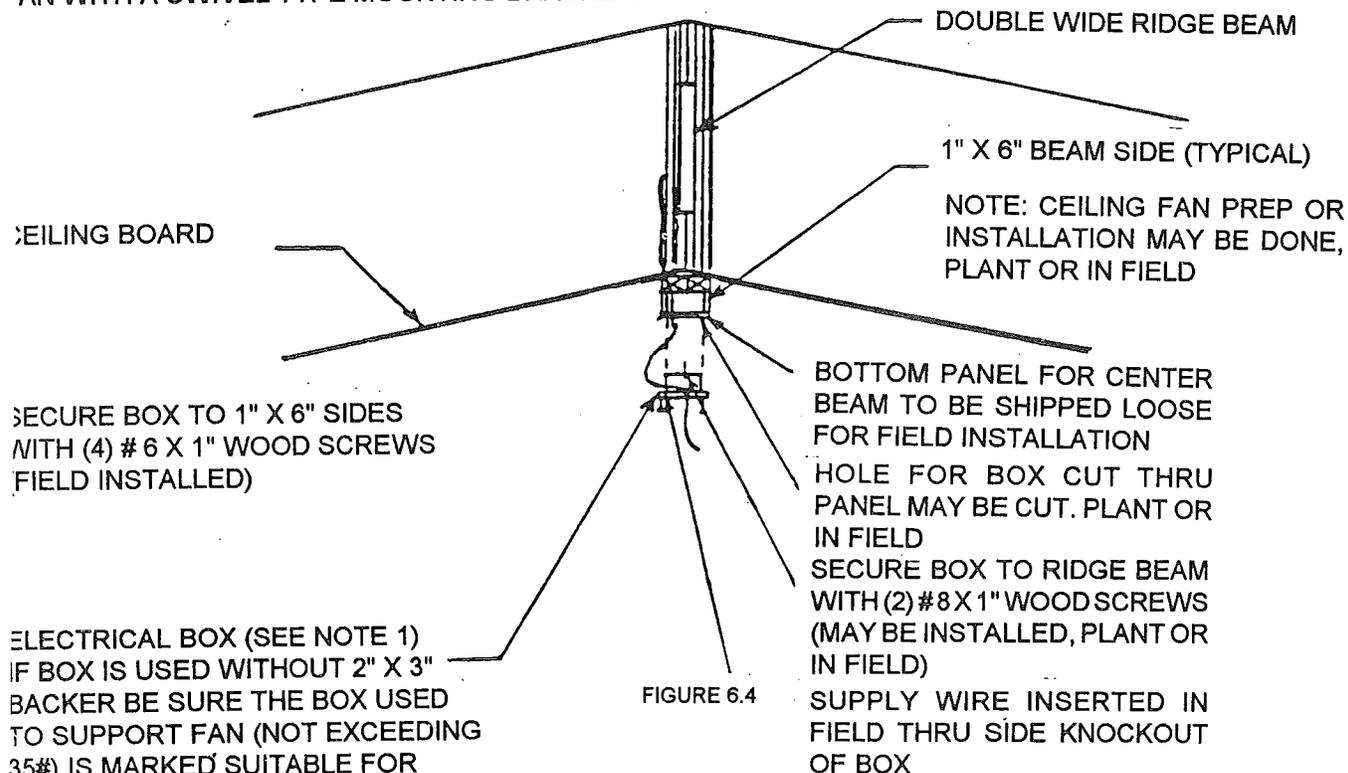


FIGURE 6.4

NOTE: WIRE PROTECTOR SLEEVE REQUIRED ON SUPPLY WIRE (PER NEEC CODE)

FIG. 6.4, CON'T.

DUTCH HOUSING, INC.

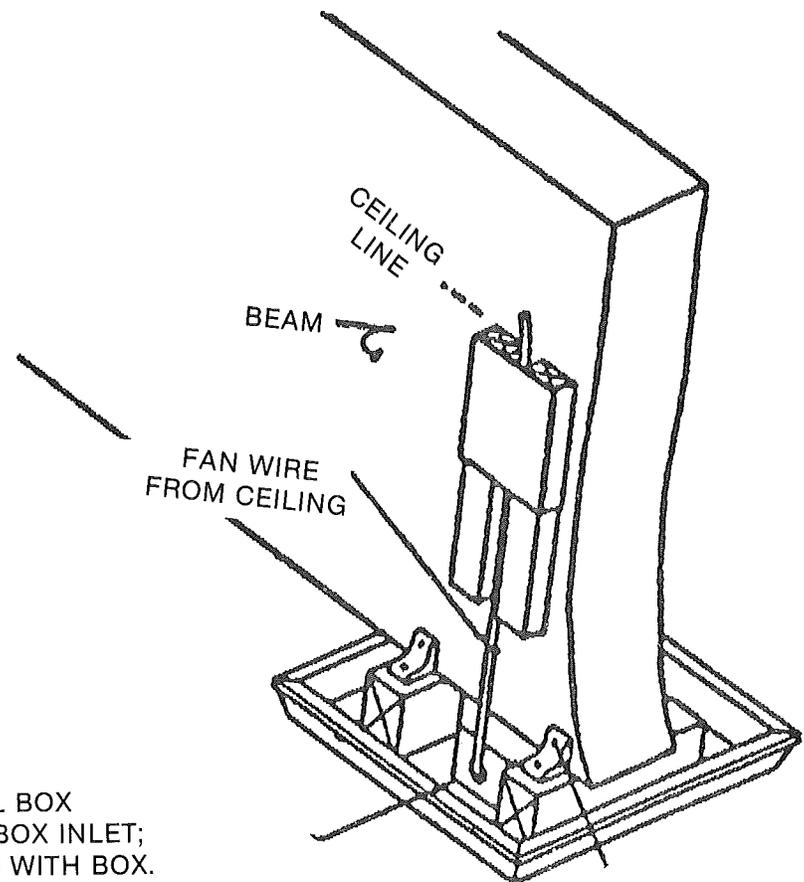
3. PROTRUDING RIDGE BEAM

For proper ceiling fan installation, a prefabricated box has been provided and includes the electrical box for containment of the spliced wires with their connectors.

The prefab box is also designed to conceal the wire which is run through the ceiling where the fan is to be located. CAUTION: BEFORE FOLLOWING THE STEP-BY-STEP PROCEDURE, BE SURE THAT POWER TO FAN WIRE IS OFF.

1. Remove the fan manufacturer's installation instructions from the package and determine the method of fan attachment to the beam.
2. Insert the ceiling wire through a side knock out hole in the electrical box. Secure the wire in the electrical box clamp at a point approximately 4" from its end.

3. Place the prefab box in its final position on the beam and secure the box to the beam with #6x2" wood screws (provided) in the metal corner braces.
4. Strip about 3/4" of insulation from the white and black conductor ends.
5. Position the non-combustible flash ring (provided) over the electrical box so that finished surface (adjacent to electrical box) which is to be covered by fan canopy is not exposed.
6. Follow the manufacturer's installation instructions for mounting the fan assembly to the box and for electrical wiring of the fan. Use provided electrical connectors for splicing wires. Be certain that fan is grounded as specified in manufacturer's instructions and that wires are connected properly (white-to-white and black-to-black).

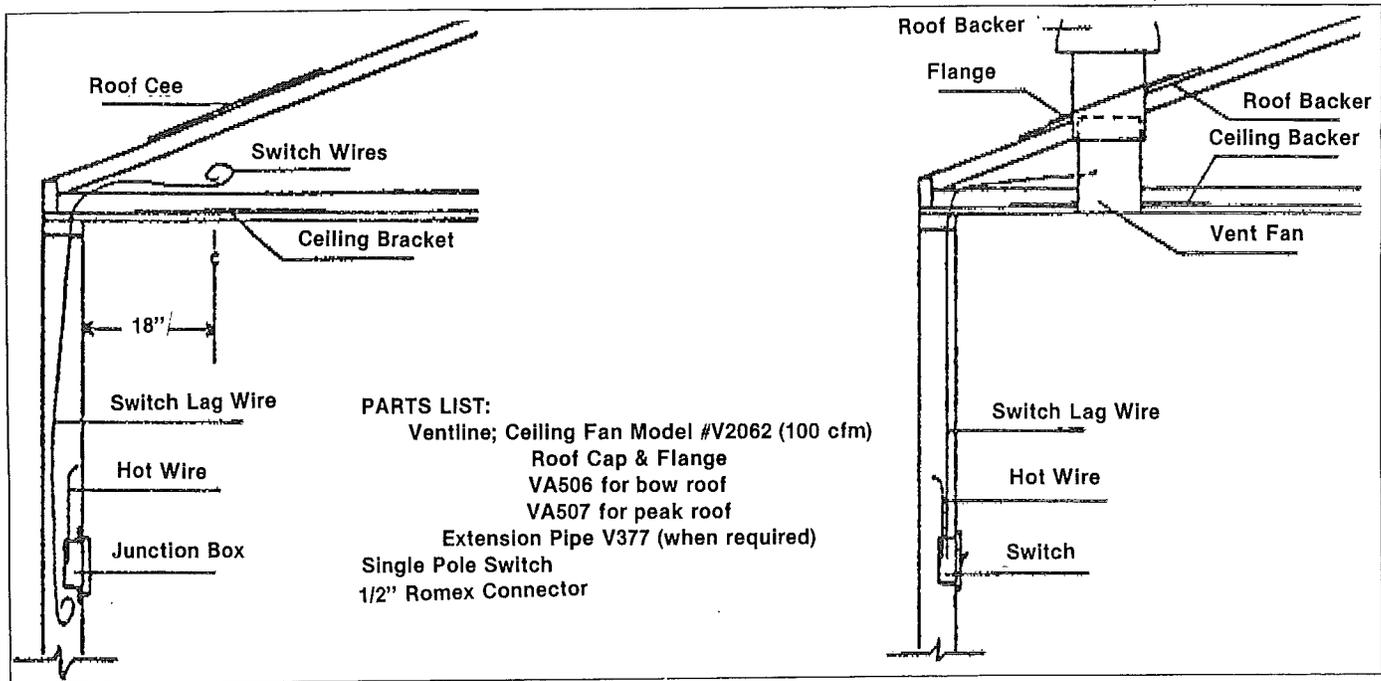


ELECTRICAL BOX CLAMP WIRE AT BOX INLET; CLAMP PROVIDED WITH BOX. (4" MIN. FREE CABLE IN BOX)

PRE-FAB BOX FASTENED TO BEAM w/2-#6x2" SCREWS EACH SIDE

DUTCH HOUSING, INC.

VENTILATION IMPROVEMENT INSTALLATION



INSTALLATION INSTRUCTIONS

NOTE: The following instructions are to assist a person qualified and experienced with construction and electrical wiring. They are not intended to enable someone unfamiliar with electrical wiring and construction to perform the installation.

1. Ceiling backer for fan is mounted directly in line with junction box mounted in wall of hallway. Measure approximately 18" out from wall into hallway for backer center.
2. Cut an 8" diameter hole using location from step (1) as center through ceiling board and backer.
3. Using a plumb bob find center of hole and mark on roof backer. Drill small hole through roof backer and roof to mark center of opening from exterior (roof backer omitted with shingle roof).
4. Switch off main circuit breaker in panel box. Remove J.B. cover from fan. Install 1/2" Romex connector through hole in side of fan.
5. Find free end of switch leg wire located in roof cavity to be connected to fan. Insert switch leg wire through Romex connector.
6. All connections to be properly made with wire nuts.
 Connect: Black wire from switch leg to black wires from fan.
 White wire from switch leg to white from fan.
 Ground wire (bare) from switch leg to green ground screw in fan.
7. Close fan junction box with "C" bracket and secure with nut supplied.
8. Remove blank cover from junction box in wall.

9. Connect hot wire and switch leg wire to switch follows:
 - A. Connect white wires together using a wire tape.
 - B. Connect black wires from hot wire and switch to terminals on switch.
 - C. Connect ground wires (bare) together using permanent connector. Run a jumper for ground connection to ground screw on switch.
10. Install switch in junction box and install switch cap plate.
11. From exterior of home cut an 8" diameter hole through roof using hole made in step (3) as center.
12. Slide fan up through hole in ceiling and secure w/(4) #8x1-1/4 (min.) wood screws through ceiling beam and into ceiling backer.
13. Apply Butyl rubber tape to underside of predrilled holes or area where screws are to be installed. Put roof cap down around fan from exterior of hole. (Due to changes in roof height, an extension may be required.)
14. Screw roof cap down to roof and roof backer #8 x1 sheet metal screws. Cover screws and finish ends with roof coating.
15. Install ceiling fan cover to fan. Turn circuit breaker back on and check fan for proper operation.
16. The vent is activated by simply flipping the switch to the on position.

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 of any perimeter skirting installed around it, through a moisture-lint exhaust system, as shown in Fig. 7.1. **IMPORTANT:** Do NOT let the exhaust system end under the home where excess moisture or flammable material can accumulate. All required components and fittings are provided with the home. (Or, alternatively: Install a flex duct after the home is set up at the site. Hold the duct in place with metal straps spaced 2' on centers 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 wood stove chimneys and air inlets.** Fireplaces and wood stoves require on-site installation of additional section(s) of approved, listed chimney pipe, a spark arrestor and a rain cap assembly. See Fig. 7.5.

7.2.1 Minimum extensions above roof. To assure sufficient draft for proper operation, extend the finished chimney at least 3' above the highest point where it penetrates the roof and at least 2' higher than any building or other obstruction located within a horizontal distance of 10'. If the site has obstructions extending higher than the home's roof peak within 10' 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 are as shown in Fig. 7.5.

7.2.3 Install top sections of fireplace flue per the manufacturers installation instructions.

- 7.3 Range, cooktop and oven venting.** If your home is equipped with a combination range (cook-top)/grill or oven that contains its own exhaust system, route the exhaust so that it does not end under the home. Connect flexible metallic duct between the elbow protruding from the floor and the termination fitting, and support it according to the manufacturer's installation instructions.

CHAPTER 8 — UTILITY SYSTEM CONNECTION AND TESTING

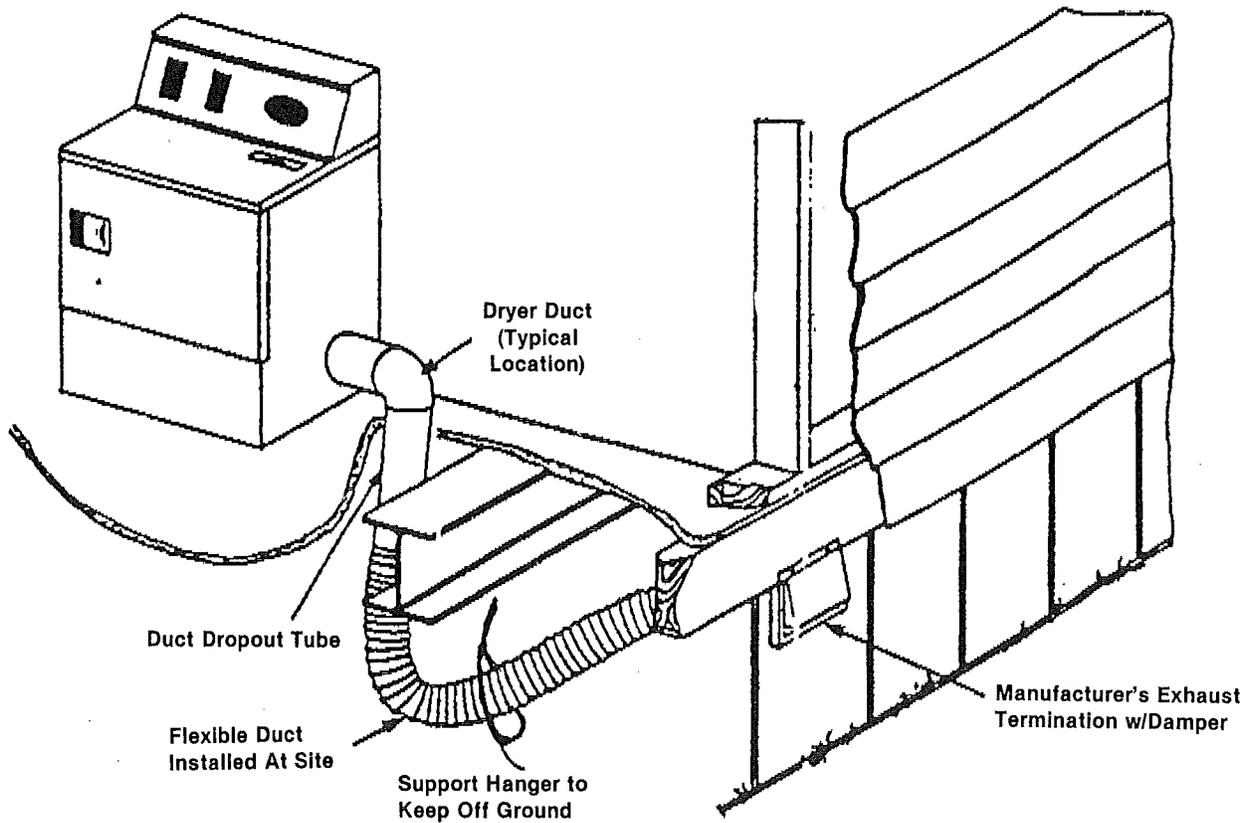
- 8.1 Proper Procedures.** Consult local, county or state authorities before connecting any utilities. Only qualified service personnel, familiar with local codes and licensed where required, should make utility connections and conduct tests.

8.2 Water Supply

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

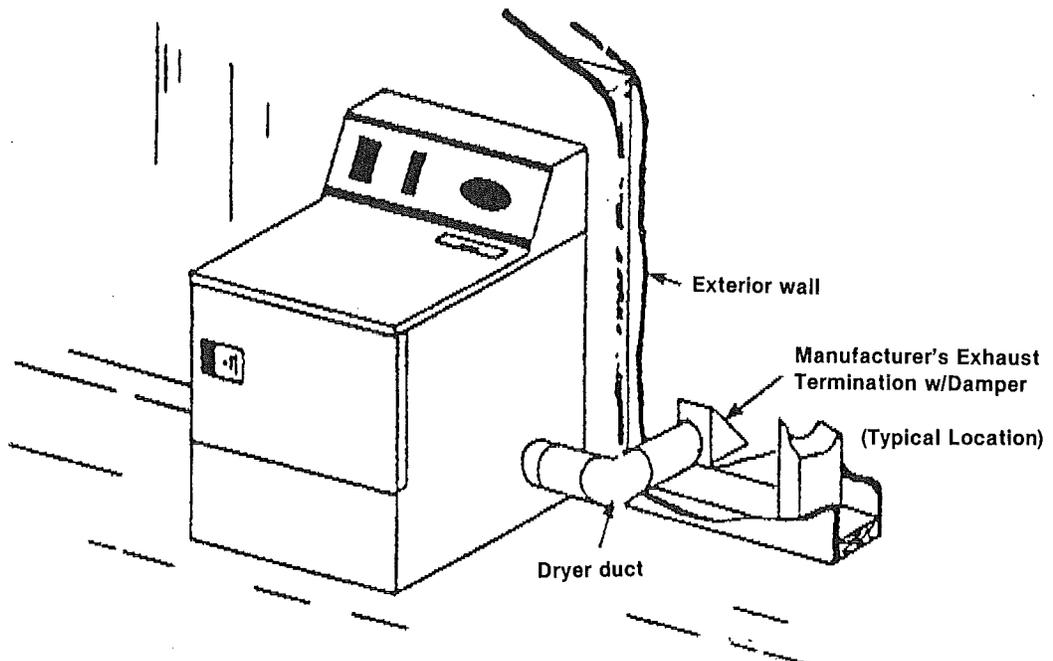
DUTCH HOUSING, INC.

DRYER EXHAUST SYSTEM — FIG. 7.1



CAUTION: INSTALLATION OF THE EXHAUST SYSTEM MUST BE IN ACCORDANCE W/THE DRYER MANUFACTURER'S INSTRUCTIONS. THE DUCT MATERIAL SHALL BE AS DESCRIBED IN DRYER INSTRUCTIONS.

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



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

OPTIONAL FIREPLACE/WOOD STOVE CHIMNEY AND AIR INTAKE INSTALLATION

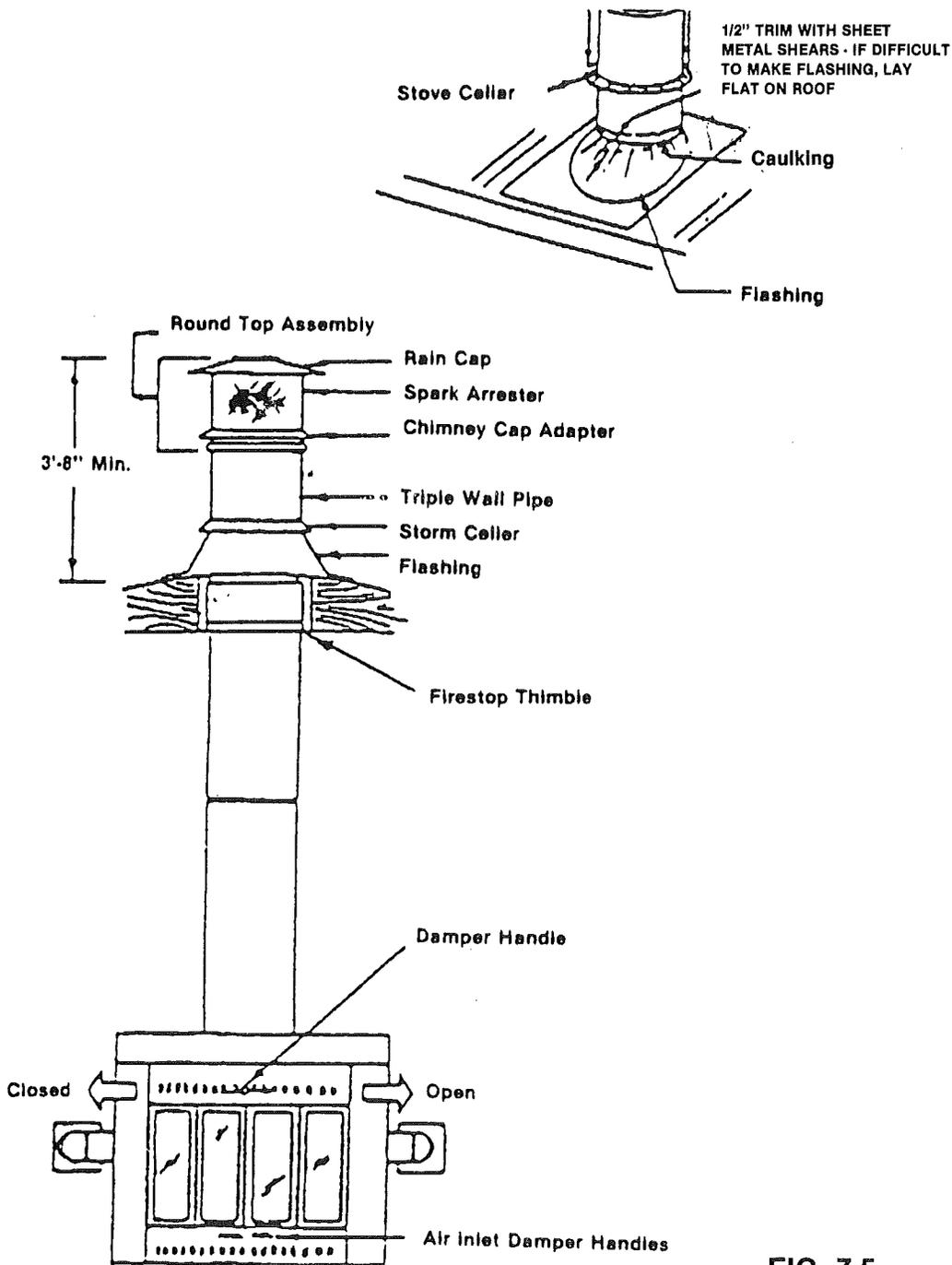


FIG. 7.5

DUTCH HOUSING, INC.

UTILITY SYSTEM CONNECTION & 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 Fig. 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 cross-connections, as shown in Fig. 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, shut-off 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 weatherproof 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.
- 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 & TESTING

8.2.4.2 Pneumatic. CAUTION: IF THIS PROCEDURE IS USED, YOU MUST BYPASS THE HOT WATER TANK BY HOOKING ITS COLD INLET AND HOT OUTLET LINES TOGETHER. THIS PROCEDURE WILL PROTECT THE APPLIANCE FROM DAMAGE 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, repeating the procedure until all have been eliminated. Reconnect the water heater and the 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 Fig. 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 (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.

Fig. 8.1

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TYPICAL WATER CONNECTION

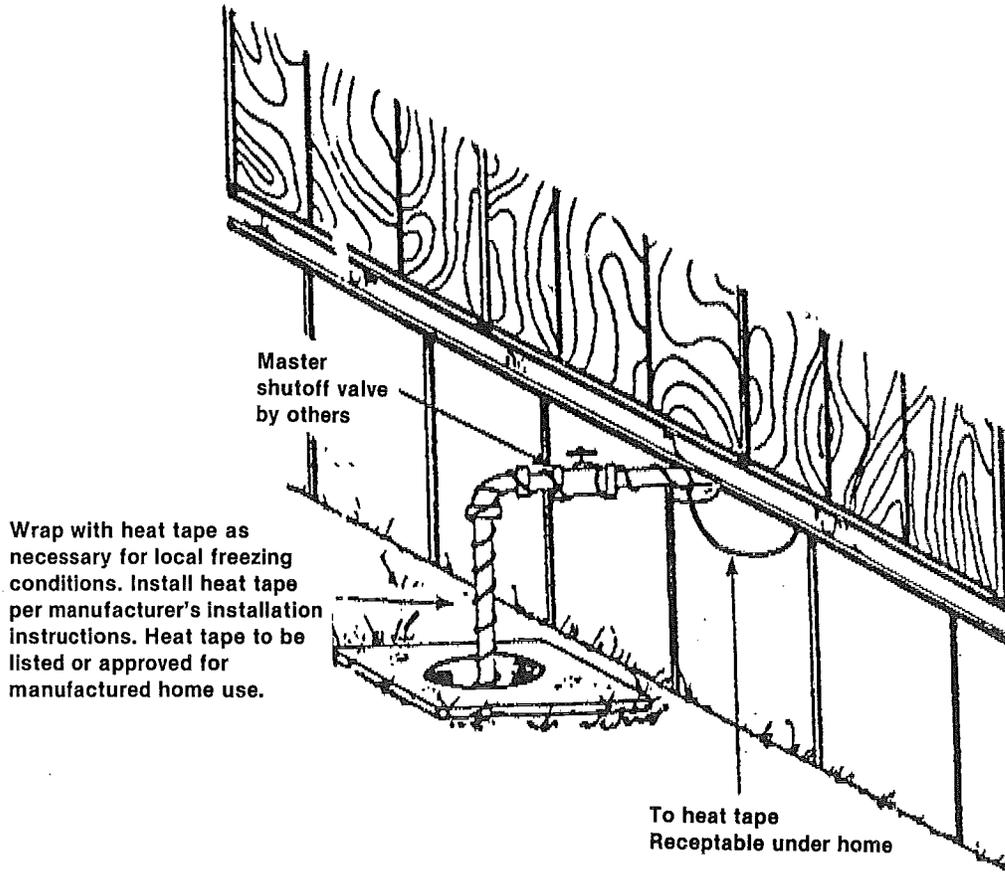
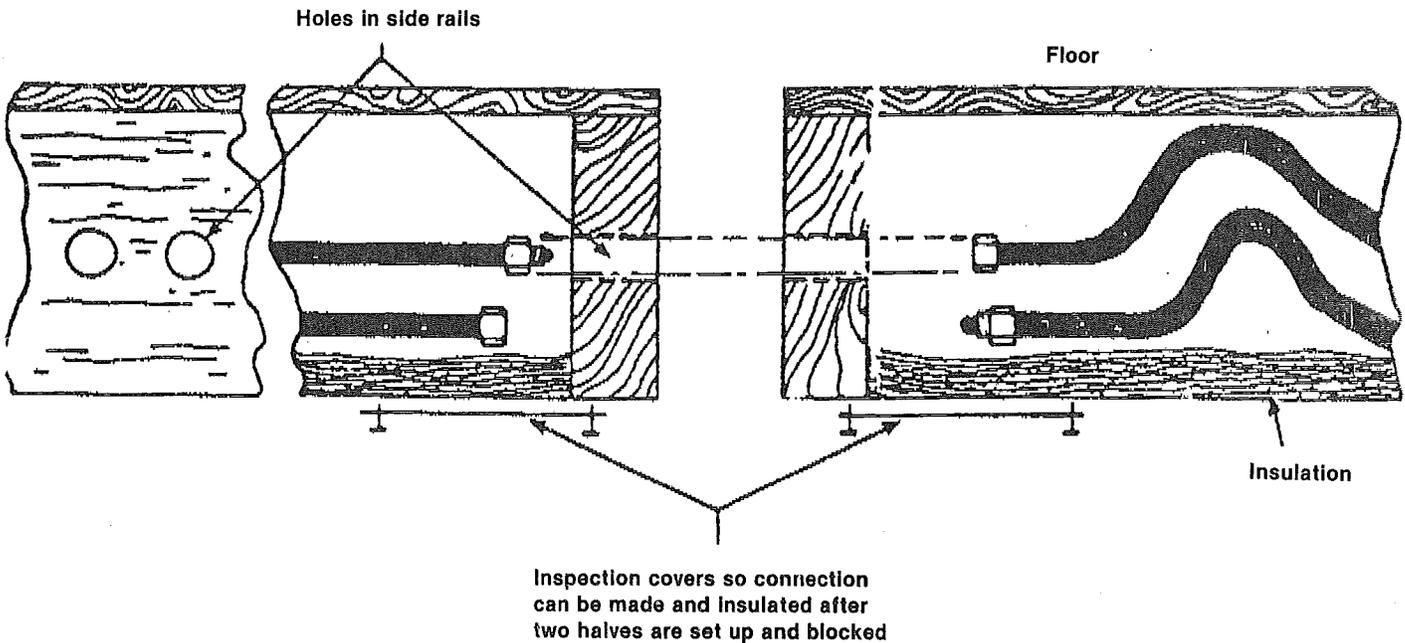


Fig. 8.2

TYPICAL WATER LINE CROSSOVER



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

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FIG. 8.3 — DRAINPIPE SUPPORT METHODS

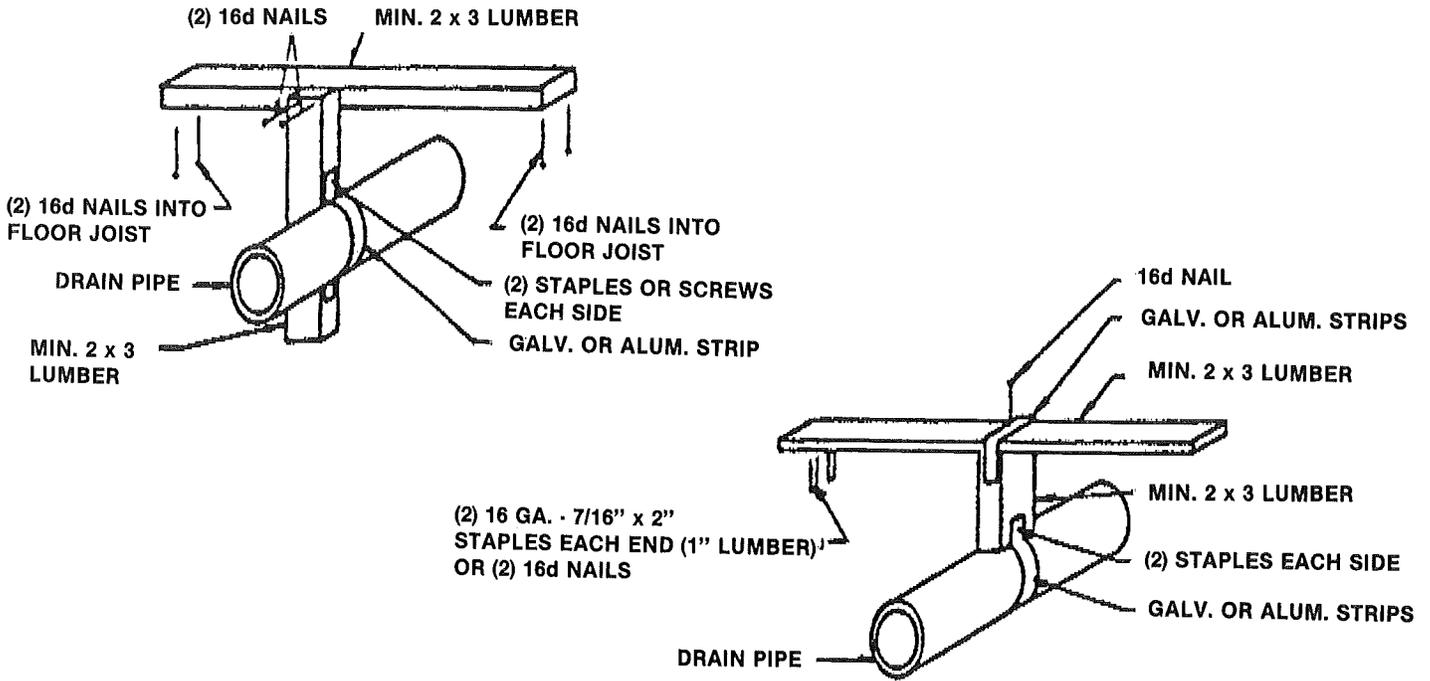


FIG. 8.4 — DRAINPIPE

SLOPES & CONNECTIONS — SEE ACTUAL DRAWING FOR YOUR HOME

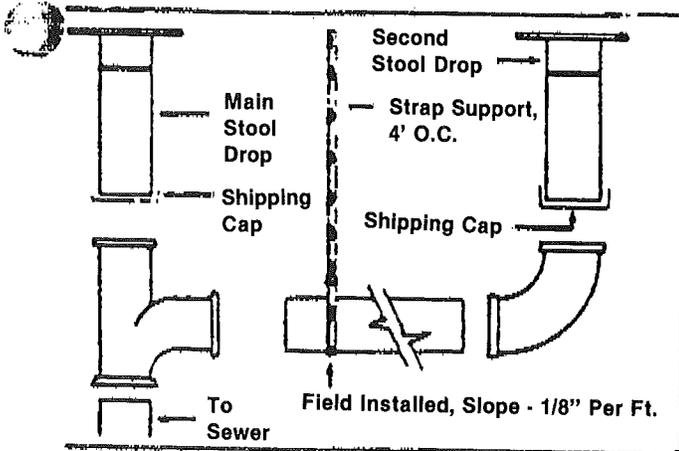
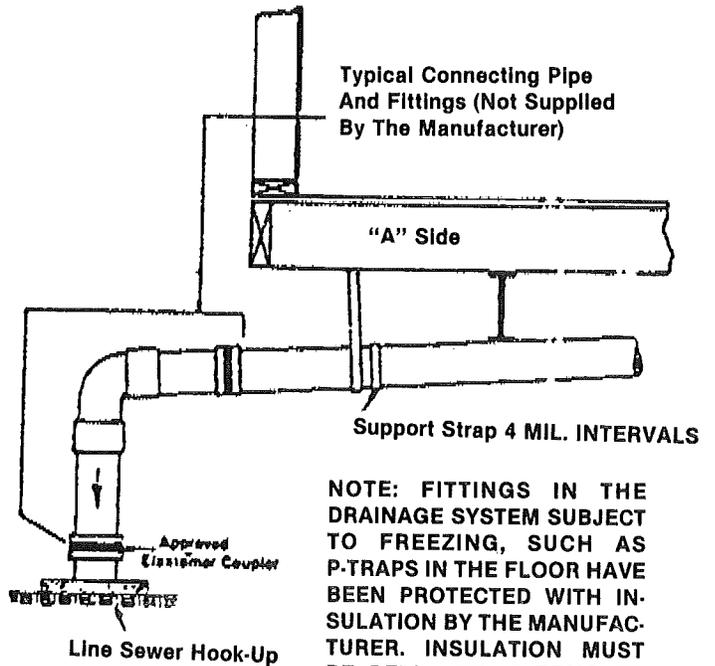


FIG. 8.5 — CONNECTION TO SITE SEWER



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

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FIG. 8.7 - DRAIN LINE FREEZE PROTECTION

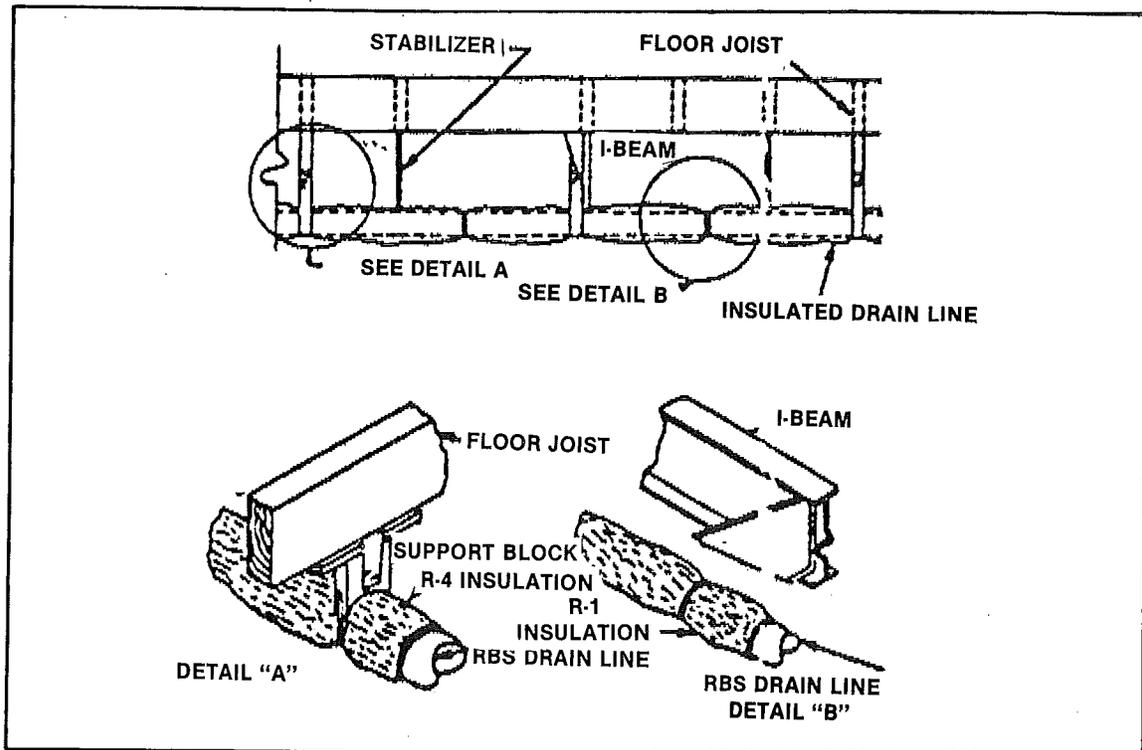
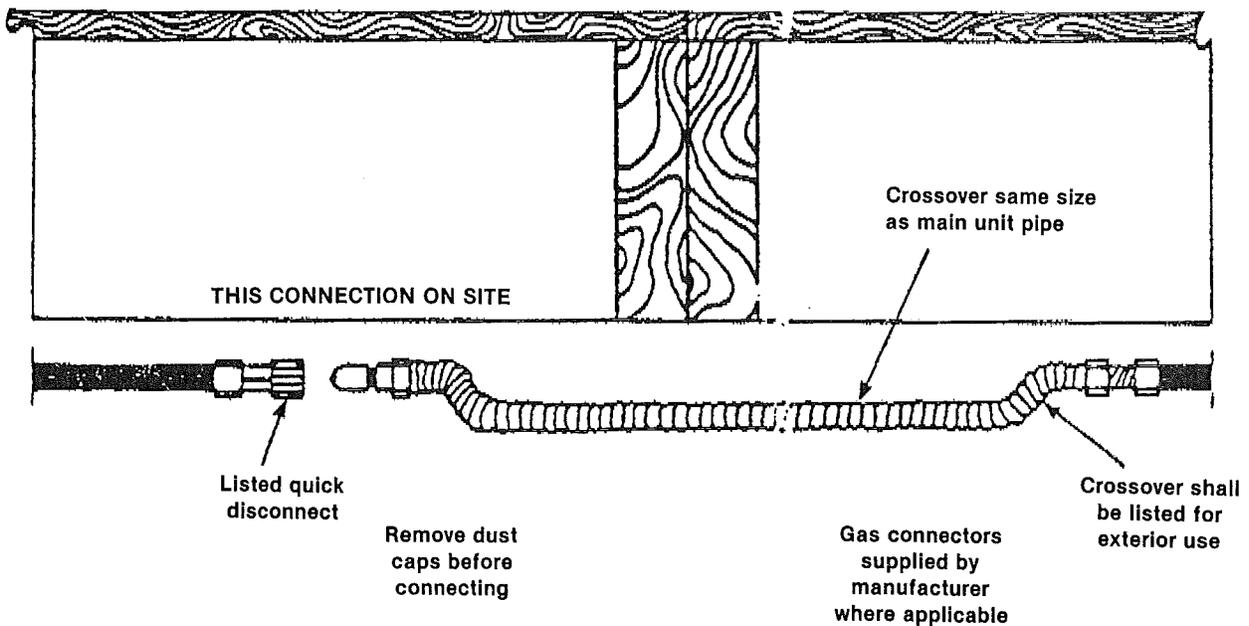


FIG. 8.8

TYPICAL GAS LINE CROSSOVER



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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. Do not use tools to connect or remove the flexible connector quick disconnect.

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.

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- 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 ITS 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 instructions for proper pipe sizing and installation procedures. **ALL OIL STORAGE TANK AND PIPING INSTALLATIONS MUST MEET ALL APPLICABLE LOCAL REGULATIONS AND SHOULD BE MADE ONLY BY EXPERIENCED, QUALIFIED PERSONNEL.**
- 8.5.1 Tank installation requirements.** Unless the home 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's oil control and its top is within 8' of the oil control level.
- 8.5.1.2 Gun (pump-fed) furnaces.** For gun-type oil 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" Dia. 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 draining of water or sludge.
- 8.5.2 Shutoff 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 connectin 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.** (Manufacturer to insert correct description at this point: The connection to this home is a feeder requiring wiring at the site, or, the connection to this home is a factory-installed service meter base.) The following paragraphs describe the wiring and grounding of electrical feeders; if your home is equipped with a service meter base, skip directly to section 8.6.4.4.

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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 from the following tables. These sizes are based on an ambient temperature of 86F. and do not take voltage drop into consideration. See individual manufacturer's setup and installation guide for specific requirements.

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 Fig. 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 Fig. 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 at a single point.

8.6.3.2 Procedure. The ground conductor of the power supply feeder cable connects the grounding bar to a good electrical ground. Follow the feeder connection procedures described in 8.6.4.1., -.2, or -.3 to achieve proper grounding. (Exception: homes with a factory-installed service meter base must be grounded differently. Refer to the specific instructions in 8.6.4.4 if applicable.

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 - and in ranges, clothes dryers, 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 and discarded 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:

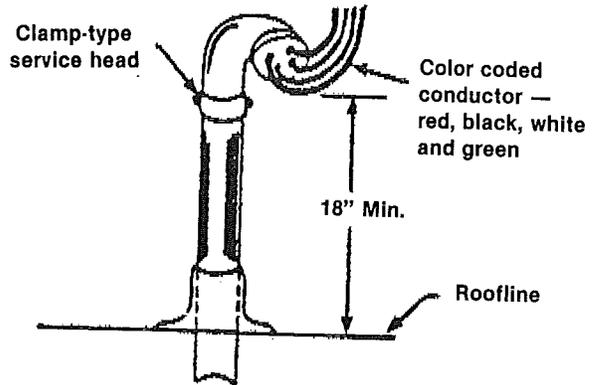
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TYPICAL OVERHEAD FEEDER ASSEMBLY

COPPER CONDUCTOR SIZE (75" WIRE)

SERVICE AMPS	WIRE SIZE			CONDUIT SIZE
	FEEDER	GROUND	NEUTRAL	
40	#6	#8	#6	3/4"
50	#6	#8	#6	3/4"
60	#6	#8	#6	3/4"
80	#4	#6	#4	1"

CAUTION: BE SURE TO CONNECT DOUBLE-SECTION CHASSIS TOGETHER WITH BONDING WIRE AND LUG. CONNECT EACH END TO ONE I-BEAM ON EACH HALF OF THE DOUBLE-SECTION HOME. SEE FIG. 8-11.



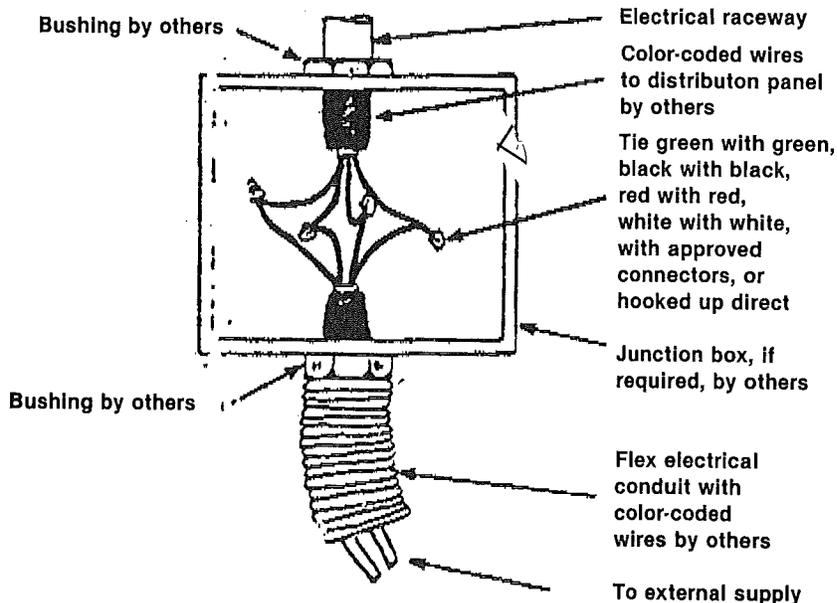
COPPER CONDUCTOR SIZE (75" WIRE)

SERVICE AMPS	WIRE SIZE			CONDUIT SIZE
	FEEDER	GROUND	NEUTRAL	
100	#3	#8	#3	1 1/2"
125	#1	#6	#3	1 1/2"
150	#0	#6	#3	1 1/2"
200	#000	#6	#3	2"

FIG. 8-10

TYPICAL UNDERSIDE FEEDER ASSEMBLY

CAUTION: BE SURE TO CONNECT DOUBLE-SECTION CHASSIS TOGETHER WITH BONDING WIRE AND LUG. CONNECT BONDING WIRE WITH SCREW TERMINALS ON EACH END TO ONE I-BEAM ON EACH HALF OF THE DOUBLE-SECTION HOME. SEE FIG. 8-11.



COPPER CONDUCTOR SIZE (75" WIRE)

SERVICE AMPS	WIRE SIZE			CONDUIT SIZE	BOX SIZE
	FEEDER	GROUND	NEUTRAL		
40	#8	#8	#8	3/4"	4x4x4
50	#6	#8	#6	3/4"	4x4x4
60	#6	#8	#6	3/4"	4x4x4
80	#4	#8	#4	1"	4x4x4

COPPER CONDUCTOR SIZE (75" WIRE)

SERVICE AMPS	WIRE SIZE			CONDUIT SIZE	BOX SIZE
	FEEDER	GROUND	NEUTRAL		
100	#3	#6	#3	1-1/4"	10x10x4
125	#1	#6	#3	1-1/2"	10x12x4
150	#0	#6	#3	1-1/2"	10x12x4
200	#000	#6	#3	2"	12x12x4

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- 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 three 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; and (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 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 Figs. 8.10 and 8.12). Install properly-sized conductors from the main power supply to the panelboard. Refer to Fig. 8.10 for conductor and junction box requirements. The homeowner or installer must provide the supply connection including the feeder conductors, junction box and raceway connectors. Protect conductors emerging from the ground from a minimum of 18" below grade to 8' above grade, or to the point of entrance to the home. The distance measured from the top surface of a buried cable, conduit or raceway to the finished grade must meet minimum burial requirements outlined in the National Electric Code. Use a moisture-proof bushing at the end of the conduit from which the buried cable emerges.
- 8.6.4.4 Service equipment meter base.** Either an overhead or underground entrance may be provided. The exterior equipment and enclosure must be weatherproof, and conductors must be suitable for use in wet locations. When a meter 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 Fig. 8.13 for typical meter base installations and one method of grounding the service equipment. The homeowner must provide the grounding electrode conductor(s). The grounding electrode should be an 8' length of 1/2" dia. 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.

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FIG. 8.11 - MULTISECTION FRAME GROUNDING (BONDING)

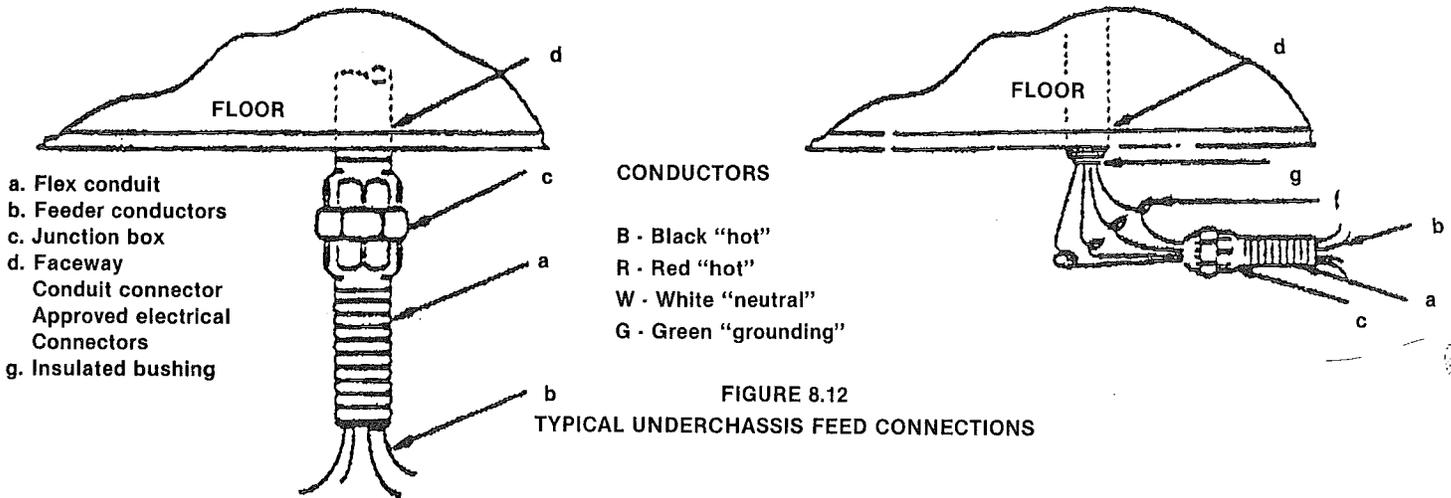
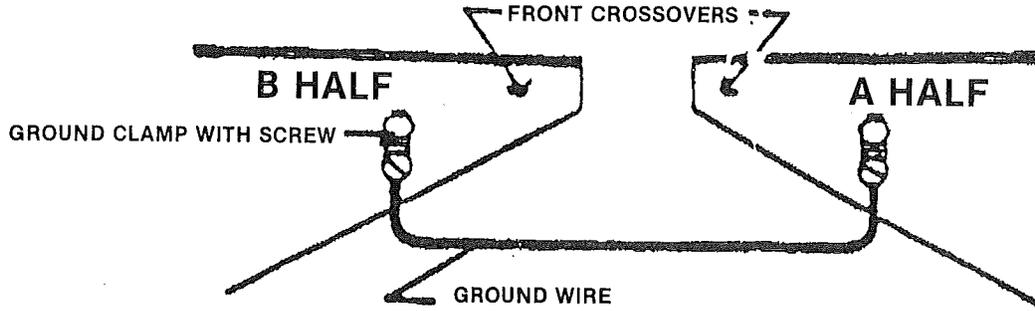
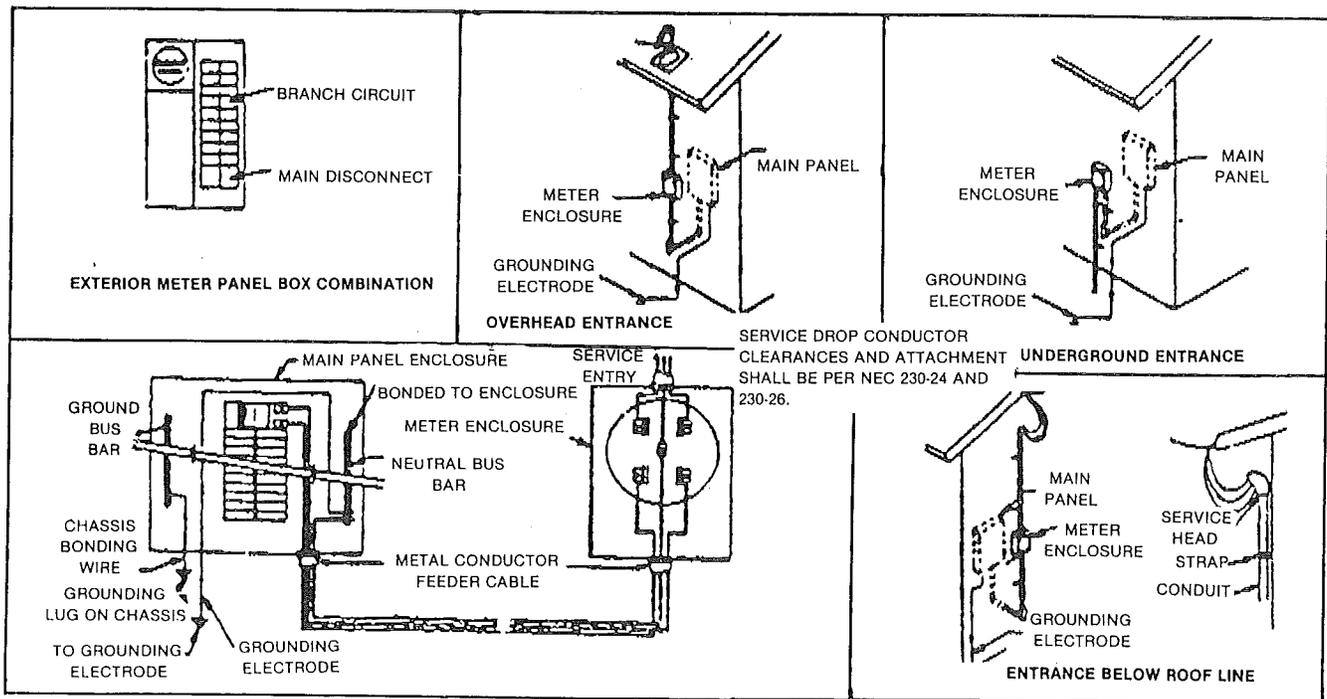


FIGURE 8.12
TYPICAL UNDERCHASSIS FEED CONNECTIONS

FIG. 8.13 — TYPICAL METER BASE INSTALLATIONS & GROUNDING



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8.6.5 Crossover connections. Refer to Fig. 8.14 for typical crossover wiring connections, for multisection homes (located along the 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:

6.6.1.1 Circuit conductor continuity. Conduct a continuity test by placing all branch circuit 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.

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.**

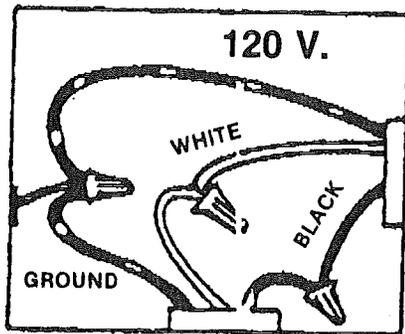
8.6.6.2 Post-connection tests. Conduct the following three tests after turning on the main circuit breaker and each individual circuit breaker. **CAUTION: ALLOW THE WATER HEATER TO FILL COMPLETELY BEFORE ACTIVATING THE WATER HEATER CIRCUIT. FAILURE TO DO SO WILL CAUSE THE WATER HEATER ELEMENT TO BURN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

8.6.6.2.1 Polarity and grounding of receptables. With receptacle 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 bulb sizes and outlet configurations. Investigate any indication of reversed polarity, open grounds or shorts and correct it.

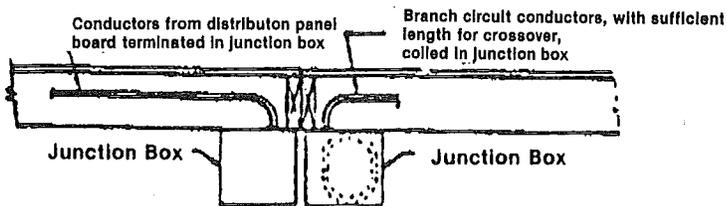
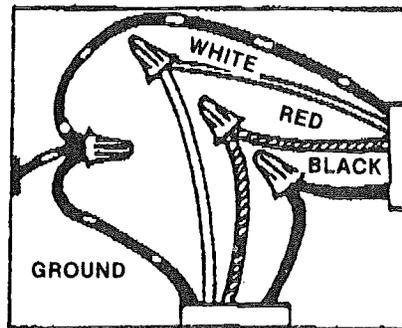
8.6.6.2.2 Ground Fault Circuit Interruption (GFCI). Make certain that all receptacles requiring GFCI protection are in fact on the correct circuit(s). Check each ground fault circuit interrupter device by pushing the test button to determine if the power route to the receptacle has been interrupted,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

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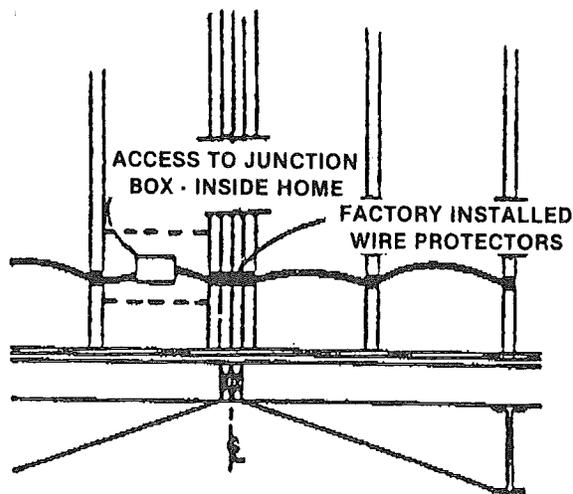
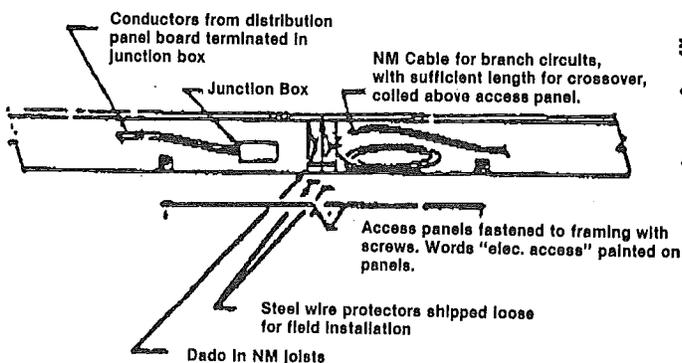
FIG. 8.14 — ELECTRICAL CROSS-OVERS



OR



IN-FLOOR ALTERNATE A (SIDE VIEW)

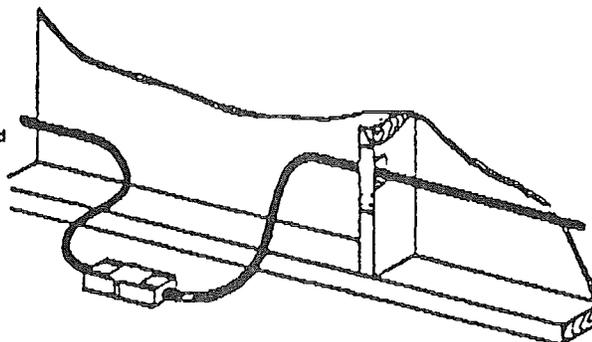
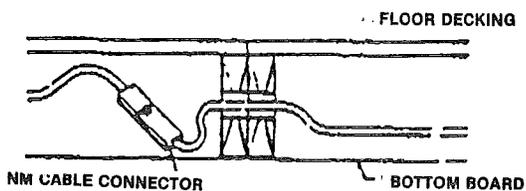


IN WALL-ALTERNATE

The AMP Industries NM Cable connector for 15 and 20 amp circuit crossovers may be made without junction boxes

IN-FLOOR ALTERNATE

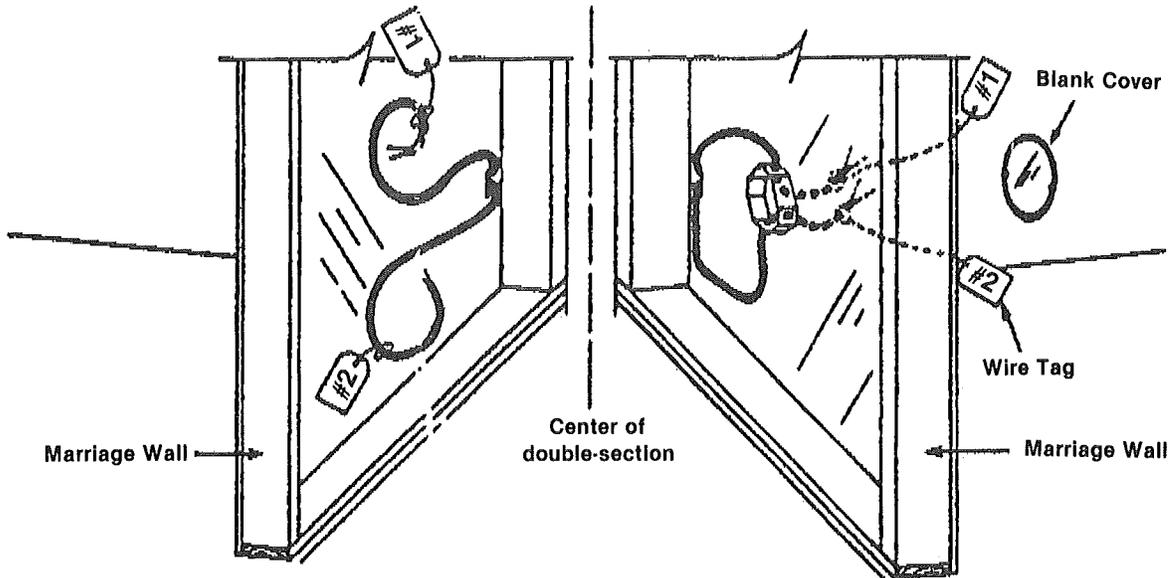
This home may be shipped with one or more plug-in connectors. These connectors are to be snapped together on set-up. Connectors will be color-coded and/or tagged to prevent mixing of circuits.



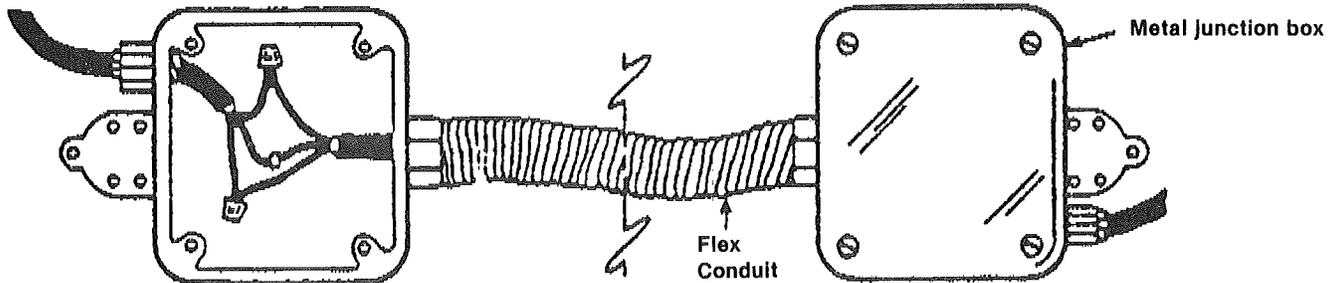
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FIG. 8.14, CON'T. — TYPICAL ELECTRIC CROSSOVERS

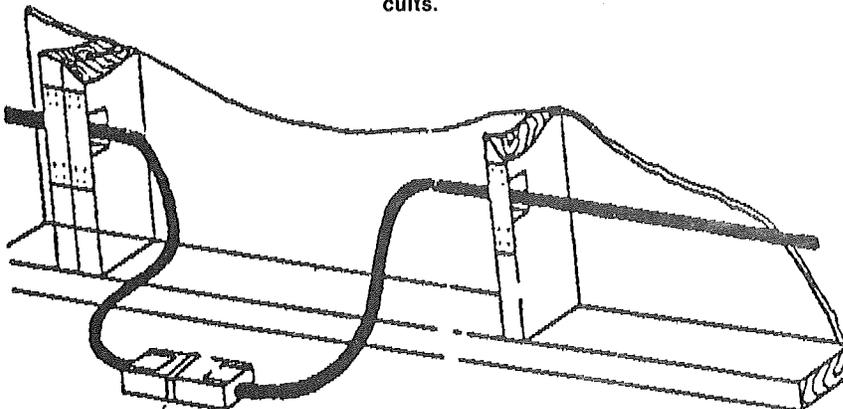
The wires are coiled up under the shipping seal. Before the units are pulled together, place the wires from "B" half into junction box on "A" half. Wires will be color coded and/or tagged to prevent mixing of circuits. Make final connections after units are pulled together.



ALTERNATE ELECTRIC CROSSOVER



Connect the flex conduit to the junction box on the "A" half. Then make the wire connections using approved wire connectors. Wires will be color coded and/or tagged to prevent mixing of circuits.



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.

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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.

CHAPTER 9 — FINAL INSPECTION

Make a 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.

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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.

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 caps 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.

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IMPORTANT

HEALTH NOTICE

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

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

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

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

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 panel 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

I. MATERIAL

- A. Material used to cover the floor underside must comply with the provisions of Section 32 BO.305 (q)(4) 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 II, Mobile Flex-K and Mobile Flex-C.	RADCO #1028
3. FIRSTLINE CORPORATION Seal-Tite Green Label (GR), Green Label II (GI), Orange Label (OR), RK II (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-I (Clear Plastic) or #CO-I (Black Cloth)
2. SCOTCH/3M #471 (Clear Plastic)
3. SHURRAPE #PC-600 (Black Cloth)
4. GAME BROTHERS #145 (Black Cloth)
5. TUCK #TUC338918 (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. 1-800-467-1775 (May be cut in 2" Strips and Used as Tape)

I. 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" O.C. (Max. I - See Fast. Sched.)

I. 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 patch. Pull off paper back and press patch in place.
 2. Spray adhesives or staples may be used.