

# HOMEOWNER'S MANUAL

1/13/08

# HART HOUSING

**A Division of  
Forest River Housing, Inc.**

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

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#### Additional Information "HUD Manufactured Home Dispute Resolution Program"

The steps and information outlined below apply only to the HUD Manufactured Home Dispute Resolution Program that operates in HUD-administered states, as described under the heading "Dispute Resolution Information" in this manual. Under the HUD Manufactured Home Dispute Resolution Program, homeowners must report defects to the manufacturer, retailer, installer, a State Administrative Agency, or HUD within 1 year after the date of the first installation. Homeowners are encouraged to report defects in writing, including, but not limited to, email, written letter, certified mail, or fax, but they may also make a report by telephone. To demonstrate that the report was made within 1 year after the date of installation, homeowners should report defects in a manner that will create a dated record of the report: for example, by certified mail, by fax, or by email. When making a report by telephone, homeowners are encouraged to make a note of the phone call, including names of conversants, date, and time. No particular format is required to submit a report of an alleged defect, but any such report should at a minimum include a description of the alleged defect, the name of the homeowner, and the address of the home. Homeowners are encouraged to send reports of an alleged defect first to the manufacturer, retailer, or installer of the manufactured home, or a State Administrative Agency. Reports of alleged defects may also be sent to HUD at: HUD, Office of Regulatory Affairs and Manufactured Housing, Attn: Dispute Resolution, 451 Seventh Street, SW., Washington, DC 20410-8000; faxed to (202) 708-4213; e-mailed to [mhs@hud.gov](mailto:mhs@hud.gov), or reported telephonically at (202) 708-6423 or (800) 927-2891. If, after taking the steps outlined above, the homeowner does not receive a satisfactory response from the manufacturer, retailer, or installer, the homeowner may file a dispute resolution request with the dispute resolution provider in writing, or by making a request by phone. No particular format is required to make a request for dispute resolution, but the request should generally include the following information: (1) The name, address, and contact information of the homeowner; (2) The name and contact information of the manufacturer, retailer, and installer of the manufactured home; (3) The date or dates the report of the alleged defect was made; (4) Identification of the entities or persons to whom each report of the alleged defect was made and the method that was used to make the report; (5) The date of installation of the manufactured home affected by the alleged defect; and (6) A description of the alleged defect. Information about the dispute resolution provider and how to make a request for dispute resolution is available at <http://www.hud.gov> or by contacting the Office of Manufactured Housing Programs at (202) 708-6423 or (800) 927-2891. A screening agent will review the request and, as appropriate, forward the request

to the manufacturer, retailer, installer, and mediator. The mediator will mediate the dispute and attempt to facilitate a settlement. The parties to a settlement include, as applicable, the manufacturer, retailer, and installer. If the parties are unable to reach a settlement that results in correction or repair of the alleged defect, any party or the homeowner may request nonbinding arbitration. Should any party refuse to participate, the arbitration shall proceed without that party's input. Once the arbitrator makes a non-binding recommendation, the arbitrator will forward it to the parties and HUD. HUD will have the option of adopting, modifying, or rejecting the recommendation when issuing an order requiring the responsible party or parties to make any corrections or repairs in the home. At any time before HUD issues a final order, the parties may submit an offer of settlement to HUD that may, at HUD's discretion, be incorporated into the order. In circumstances where the parties agree that one or more of them, and not the homeowner, is responsible for the alleged defect, the parties will have the opportunity to resolve the dispute outside of the HUD Mediation and Arbitration process by using the Alternative Process. Homeowners will maintain the right to be informed in writing of the outcome when the Alternative Process is used, within 5 days of the outcome. At any time after 30 days of the Alternative Process notification, any participant or the homeowner may invoke the HUD Manufactured Home Dispute Resolution Program and proceed to mediation. The HUD Manufactured Home Dispute Resolution Program is not a warranty program and does not replace the manufacturer's or any other warranty program.

## Dispute Resolution Process

Many states have a consumer assistance or dispute resolution program that homeowners may use to resolve problems with manufacturers, retailers, or installers concerning defects in their manufactured homes that render part of the home unfit for its intended use. Such state programs may include a process to resolve a dispute among a manufacturer, a retailer, and an installer about who will correct the defect. In states where there is not a dispute resolution program that meets the federal requirements, the HUD Manufactured Home Dispute Resolution Program will operate. These are "HUD-administered states." The HUD Manufactured Home Dispute Resolution Program is not for cosmetic or minor problems in the home. You may contact the HUD Manufactured Housing Program Office at (202) 708-6423 or (800) 927-2891, or visit the HUD website at [www.hud.gov](http://www.hud.gov) to determine whether your state has a state program or whether you should use the HUD Manufactured Home Dispute Resolution Program. Contact information for state programs is also available on the HUD website. If your state has a state program, please contact the state for information about the program, how it operates, and what steps to take to request dispute resolution. When there is no state dispute resolution program, a homeowner may use the HUD Manufactured Home Dispute Resolution Program to resolve disputes among the manufacturer, retailer, and installer about responsibility for the correction or repair of defects in the manufactured home that were reported during the 1-year period starting on the date of installation. Even after the 1-year period, manufacturers have continuing responsibility to review certain problems that affect the intended use of the manufactured home or its parts, but for which correction may no longer be required under federal law.

## RETAILER DISPUTE RESOLUTION NOTIFICATION LANGUAGE

The U.S. Department of Housing and Urban Development (HUD) Manufactured Home Dispute Resolution Program is available to resolve disputes among manufacturers, retailers, or installers concerning defects in manufactured homes. Many states also have a consumer assistance or dispute resolution program. For additional information about these programs, see sections titled "Dispute Resolution Process" and "Additional Information—HUD Manufactured Home Dispute Resolution Program" in the Consumer Manual required to be provided to the purchaser. These programs are not warranty programs and do not replace the manufacturer's, or any other person's, warranty program.

**IMPORTANT!**  
***See Page 79***  
***For Homeowner Warranty***  
***Registration Card***

# HART HOUSING INDEX

PAGE NUMBER	DESCRIPTION	APPROVAL DATE
1	Limited Warranty	
2	Furnace Set-Up Check List	
3	Consumer Insulation Information	
4-6	General Information	
7-8	SAA List	
9	Manufactured Home Data Plate	
10	Manufactured Home Data Plate Legend	
11-12	Safety	
13	Foreword	5/11/94
14	Important Health Notice	5/11/94
15	CHAPTER 1 - INTRODUCTION	5/11/94
16	CHAPTER 2 - DEFINITIONS	5/11/94
17-18	CHAPTER 3 - SITE PREPARATION	5/11/94
19	Zone Maps of the United States	5/11/94
20	General Descriptions of Soils	5/11/94
21-22	CHAPTER 4 - FOUNDATIONS	5/11/94
23-23a	Minimum Frame Pier Capacities	1/13/08
24-24a	Minimum Marriage Wall Pier Capacities	1/13/08
24b	Support Pier Location	1/13/08
25	Typical Footing & Pier Installation (Figure 4/1)	5/11/94
26	Pier Plan - Multi - Section (Figure 4/3)	1/13/08
26a	Pier Plan for 16 wide single wide	1/13/08
26b	Pier Plan for 14 wide single wide	1/13/08
26c	Typical Foundation for 8' Full Width Porch	1/13/08
26d	Marriage Wall Connections for 8' Full Width Porch	1/13/08
27	Typical Pier Layout for 40lb. Roof Load (Figure 4.4)	5/11/94
28	Details for Basement Wall & Column Supports (Figure 4.5)	1/13/08
29	Details for Basement Set-Up (Figure 4.5a)	5/11/94
30	Basement Plan (Figure 4.6)	1/13/08
30a-30d	5/12 & 7/12 Set-Up Instructions	1/13/08
30e-30g	Eyebrow Dormer Set-Up Details	1/13/08
30h	High Efficiency Furnace Completion Details	1/13/08
31-34	CHAPTER 5 - SET-UP PROCEDURES	5/11/94
35	Marriage Line Infiltration Barrier (Figure 5.1)	5/11/94
36	Floor Marriage Connections (Figure 5.2)	1/13/08

# HART HOUSING INDEX

PAGE NUMBER	DESCRIPTION	APPROVAL DATE
37	Roof Marriage Connection (Figure 5.6)	1/13/08
38	Reserved	1/13/08
39	Standard Pier Configuration & Tie Down Placement (Figure 5.0)	6/5/06
39a	Tie Down Requirements for Wind Zone III	6/5/06
39b	Tie Down Requirements for 14 & 16 Wide Single Wide	6/5/06
39c	Reserved	1/13/08
39d	Single Wide Vertical Anchors	6/5/06
40	Tie-Down Requirements at all Openings over 4' (Figure 5.0.1)	5/11/94
41	Typical Shear Wall Tie-Down Design (Figure 5.0.2)	5/11/94
42	Typical Cross Section Tie-Down Design (Figure 5.0.3)	5/11/94
43-54	Minute Man Tie-Down	5/11/04
54a-54m	Vector Tie-Down System	1/13/08
55	CHAPTER 6 - INSTALLATION OF OPTIONAL FEATURES	5/11/94
56	Installation of Exterior & Interior Lights (Figure 6.1a, 6.1b)	5/11/94
57-58	CHAPTER 7 - PREPARATION OF APPLIANCES	5/11/94
59	Dryer Vent Installation (Figure 7.1)	5/11/94
60	Fireplace Chimney Assembly (Figure 7.4)	5/11/94
61-66	CHAPTER * - UTILITY SYSTEM CONNECTION & TESTING	5/11/04
67	Typical Water Line Heat Tape Hook-Up (Figure 8.1)	1/13/08
68	Water Line Crossover Connection Marriage Wall (Figure 8.2)	5/11/94
69	Drain Pipe Slopes & Connections (Figure 8.4)	5/11/94
70	Gas Line Crossover Connection (Figure 8.7)	5/11/94
71	Furnace Crown Assembly (Figure 8.8)	5/11/94
72	Typical Under-Side Feeder Assembly (Figure 8.9)	5/11/94
73	Service Entrance Conductors / Junction Box Size (Figure 8.10b)	5/11/94
74	Electrical Crossover Connections for #10 ga. & Larger Wire	1/13/08
74a	Electrical Crossover Connections for #14 & #12 ga. Wire	1/13/08
74b	On Site Test For Smoke Alarms	1/13/08
75	Meter Base Installation (Figure 8.11)	5/11/94

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**HART HOUSING**  
1025 E. Waterford  
P.O. Box 406  
Wakarusa, IN 46573

**LIMITED WARRANTY**

**Hart Housing**, 1025 E. Waterford, P.O. Box 406, Wakarusa, IN 46573 (Warrantor) warrants to the original home owner purchaser (consumer) and any subsequent purchaser for a period of one (1) year from the date of purchase by the original purchaser, that this housing structure shall be free of substantial defects in materials and workmanship attributable to the Warrantor. This Warranty only covers components and parts of the body structure manufactured and assembled by the Warrantor.

The Warrantor shall not be held accountable (responsible) for claims relating to routine maintenance such as leveling, adjusting doors and windows, recaulking, tightening screws or maintaining electrically operated equipment, nor is the Warrantor responsible for claims related to mars, scratches, dents, and chips to surfaces or fabrics or broken glass not caused by the Warrantor. All cosmetic claims must be reported to the warrantor in writing by the original purchaser within thirty (30) Days after delivery to be considered warrantor caused.

Additionally, the warrantor shall not be held accountable (responsible) for claims relating to purchased component items which are separately warranted by their manufacturers, but the warrantor will provide reasonable assistance to you in obtaining ministrations.

The purchaser shall notify the Warrantor at the above address in writing of the defect within 7 days time after discovery of the defect. All expenses incurred by purchaser in obtaining warranty remedy shall be born by purchaser. The purchaser can obtain a list of persons authorized to perform warranty remedy by contacting warrantor at the above address.

The Warrantor shall not be held accountable (responsible) for any damage or temporary bother caused by frost heave as a result of the home being set on a pier foundation which has either the piers installed directly on the ground or on a footing which does not extend below the frost line. This warranty is void if a kerosene or other type of fuel burning portable heater has ever been used in this home.

The Warrantor expressly limits with respect to this home the duration of all implied warranties of merchantability and all implied warranties of fitness for a particular purpose to the warranty period of one (1) year. Warrantor expressly disclaims with respect to this home all implied warranties of merchantability and all implied warranties of fitness for a particular purpose after expiration of the warranty period.

**Warrantor reserves the right to change the parts and design of its home from time-to-time without notice and with no obligation to maintain spare parts or to make corresponding changes in product previously manufactured.**

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

The remedies provided in this warranty are the homeowner's exclusive remedies. The manufacturer is not responsible and shall not be held accountable for any undertaking, representation of warranty made by a retailer or other person beyond those expressly set forth in this warranty.



## FURNACE SET-UP CHECK LIST

**ONLY INDIVIDUALS HAVING PROVEN EXPERIENCE WITH THIS TYPE OF EQUIPMENT SHOULD ATTEMPT TO PERFORM SET-UP.**

- HAS ROOF JACK CROWN BEEN CORRECTLY INSTALLED?
- HAS FURNACE GAS VALVE AND BURNER ORIFICE BEEN CORRECTLY CONVERTED FOR L.P. GAS WHERE APPLICABLE?
- HAS FURNACES GAS VALVE BEEN DE-RATED FOR ALTITUDES ABOVE 2000 FEET WHERE APPLICABLE?
- IS HEAT ANTICIPATOR ON THERMOSTAT PROPERLY SET?
- IS GAS LINE OUTLET PRESSURE PROPERLY SET FOR FUEL TYPE?  
NATURAL GAS IS 3.5" W.C. L.P. IS 10" W.C.
- OIL FURNACE PUMP PRESSURE IS 100 PSI.
- IS PRIMARY AIR PROPERLY ADJUSTED PER INSTALLATION INSTRUCTIONS?
- IS CROSS-OVER TAKE-OFF COLLAR DIRECTLY UNDER FURNACE?
- IS CROSS-OVER DUCT INSTALLED PER INSTALLATION INSTRUCTIONS?
- HAS FURNACE BEEN TEST FIRED, COMPLETING A FULL BURN AND BLOWER CYCLE?
- HAS HOMEOWNER BEEN INSTRUCTED IN THE PROPER OPERATION OF THE FURNACE?

**PROPER FURNACE SET-UP AND ADJUSTMENT IS THE RESPONSIBILITY OF THE RETAILER / HOMEOWNER AND IS NOT COVERED UNDER WARRANTY.**



# CONSUMER INSULATION INFORMATION

BRAND \_\_\_\_\_ MODEL NO. \_\_\_\_\_ SERIAL NO. \_\_\_\_\_

Contains the following insulation specifications:

LOCATION	TYPE OF INSULATION	THICKNESS	"R" VALUE
FLOOR	FIBERGLAS		R _____
EXTERIOR WALLS	FIBERGLAS		R _____
CEILING	CELLULOSE		R _____

This insulation information was furnished by the manufacturer and is disclosed in compliance with the Federal Trade Commission Rule, Labeling, and Advertising of Home Insulation, 16 cfr section 460.16.

DATE: \_\_\_\_\_ RETAILER SIGNATURE \_\_\_\_\_

I hereby understand that a copy of this form will be included with my sales contract.  
I have received The Ventilation Improvement Information Sheet.

DATE: \_\_\_\_\_ CUSTOMER'S SIGNATURE \_\_\_\_\_

Thickness as certified by original supplier of insulation.  
Savings vary. Higher R-values mean greater insulating power.



# GENERAL INFORMATION

## Scope

This Manual has been prepared to acquaint you with general information on the operation and maintenance of your home and to provide important safety information. It is supplemented by other information included with products installed in the home.

We urge you to read all this information carefully and follow the recommendations to help assure enjoyable and trouble free living in your home.

All information, illustrations and specifications contained in this manual and associated material are based on the latest product information available at the time of publication. The right is reserved to make changes at any time without notice.

## Owner/Dealer Final Acceptance Inspection

After completion of the site installation, your retailer is prepared to finalize all details concerning acceptance and possession of your new home. Prior to acceptance, it is normal procedure to make a final inspection of your home, accompanied by your retailer. For your own protection, you are urged to take advantage of this opportunity for final inspection prior to taking possession of your new home. During this inspection, you and your retailer should carefully note any discrepancies, shortages, damage or other conditions not to your satisfaction — both inside and out — and obtain the retailer's commitment for any needed repairs or replacements. Obtaining such a commitment at this time will preclude possible future misunderstandings.

At this time, your retailer will acquaint you with the location, function, and use of all safety devices and systems — all items that will require attention, care and maintenance, as well as other unique features of your new home, in addition, please read this complete manual as soon as convenient to allow you to better understand and care for your new home.

## Warranty Responsibilities & Service Information

### Warranty Information

A written Warranty is enclosed in this manual. This Warranty indicates what it covers and for how long. Services to be obtained under the Warranty can be acquired by contacting your retailer, or us at the address listed on the Warranty or the Data Plate.

Warranty exclusions (items not covered by our Warranty or items covered under a separate warranty) are listed on the

Warranty. The Warranty should be read to determine the coverage of the Warranty.

The various devices and appliances in the home are normally covered by separate warranties provided by the manufacturer of the product. You should contact the manufacturer or his authorized agent directly for any Warranty service.

## Manufacturer's Responsibilities

In addition to high standards of workmanship and quality materials used in the manufacture of your home, it has been subjected to continuous inspections through the various stages of production. These inspections and tests are performed to assure the compliance with the Federal Standards, in addition to our own rigid quality standards.

We do not manufacture nor supply skirting, steps, patio awnings, carports, storage enclosures, etc. Such items are usually available from your retailer. We recommend you purchase all such items through your retailer in order to insure his supervision of their proper installation to prevent damage to the home. Damage caused by such installation is not covered by our Warranty.

## Authorized Retailer's Responsibilities



Your retailer is responsible for the original site installation and set-up, and complete checkout of the home and all systems which includes all utility connections and tests, and for routine on-site repairs. Because each home is carefully inspected prior to shipment, in general, most problems are transit-incurred and very minor in nature. In most instances, such problems are readily identified and repaired on-site by the retailer's personnel. The retailer is responsible to see that all routine repairs are completed promptly and in a professional manner. Should any problems or defects of a substantial nature occur, it should be referred through your retailer to our Service Department for corrective action under the terms of the warranty.

Your retailer is an independent contractor, not our agent and is responsible totally for any alterations, exchanges, additions or attachments made in or to your home after it leaves the factory. Likewise, you are responsible for any such actions effected after you accept possession.

## Appliance/Equipment Manufacturer's Responsibilities

Your new home includes appliances and equipment installed but not manufactured by us. Most are warranted by their respective manufacturers. As these warranties are separate from our Warranty, we pass these through directly to you.

Various warranties, care and maintenance instructions, service information and registration forms (or cards) are enclosed in your Home Owner's Information Envelope. In many cases, these warranties may not be recognized until registered, so please complete and mail these registrations to their respective manufacturers as soon as convenient after moving into your new home.

Service for all appliances and equipment covered under separate warranty usually can only be performed by their manufacturer or their authorized service agencies. Should repair or service be required, follow the instructions furnished by each manufacturer. If you are unable to locate a proper service center, check the yellow pages of your local telephone book or call the nearest regional office of that manufacturer for service information.

Neither we nor our dealers generally are authorized to provide service on these items. However, your retailer or our Service Department will attempt to assist you if, for any reason, you have difficulty in obtaining service.

## Home Owner's Responsibilities

We, your authorized retailer, and the appliance/equipment manufacturers have specifically defined areas of responsibility — so do *you*, the home owner. Generally speaking, the home owner's responsibility is protective and preventive in nature. The owner is responsible to protect his home from being subjected to either interior or exterior abuse, damage or neglect. Modifications, additions to, or other alterations of the home are not covered by our Warranty and are the responsibility of the home owner, as is damage caused by such actions. It is the responsibility of the owner to promptly report, preferably in writing, defects in material and workmanship to his dealer, and if necessary, to notify us.

### WARNING

**CAUTION:** Certain operations such as those dealing with gas, oil and electrical systems, and the set-up of your home can be hazardous if attempted by someone not qualified or licensed in those fields. To avoid possible damage or injury, contact a qualified technician in these fields.

No adjustment or alteration of any kind is to be made on the gas, oil or electrical systems or appliances except by a qualified and licensed technician, as outlined in the Manufacturer's Guide for that item.

Failure to observe these requirements may void your Warranty and could result in serious injury or death.

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**NEA**  
INC  
NATIONAL ELECTRICAL APPLIANCE MANUFACTURERS ASSOCIATION

## Manufactured Home Data Plate

The Manufactured Home Data Plate (See Page 9) This plate is located inside the cabinets located on either side of the rangehood. This Data Plate contains the following information pertinent to your home.

The manufacturer's name and plant address, along with the home's serial number, model number and date of manufacture are listed at the top of the Data Plate.

Under the Factory Installed Equipment section are listed, by manufacturer and model number, the major appliances that were installed in your home at the factory. Elsewhere in this packet is information on the warranties and operating instructions for these appliances. Should the appliances actually in your home at the time it is purchased be different from those on the Data Plate, or be in addition to those on the Data Plate, such appliances and their installation were not provided by us at the factory and are the responsibility of the installer, not the manufacturer of your home.

The Roof Load Zone Map shows which Zone (North, Middle or South) your manufactured home is designed for. Each of these Zones are indicated on the map with the design roof loading for each.

The Wind Zone Map shows which Zone (Standard - Zone 1 or Hurricane - Zone 11) your manufactured home is designed for. Each of these Zones are indicated on the map with the design wind loading for each.

It is important that your home be designed for **AT LEAST** the loads specified for the Zones applicable to the installation site.

### NOTE

Because of the important reference value of the Data Plate **IT SHOULD NEVER BE REMOVED**. It is important that you refer to the information presented on the certificate prior to making any alterations, modifications or additions to your home.

## Equipment & Appliances Installed

The section designated as "F" on the Data Plate shows the equipment and appliances installed when your home was manufactured. Enclosed separately are the manufacturer's instructions, "Use & Care" booklets, and the manufacturer's warranties and registration cards that come with each item. Read these booklets carefully and follow their instructions.

Be sure the Owner Registration Cards are completed and mailed to each manufacturer to register your warranties, as

this will insure that you will receive any notices of defect these manufacturers may ever send to owners.

Be sure these instructions, booklets and warranties are kept in a safe and convenient location for reference. Should you ever sell your home, this information should be passed on to the new owner.

### **IMPORTANT**

Carefully physically check each piece of equipment and each appliance against the data plate and verify they match those in your home (both by model and serial number) and that you have the respective manufacturer's information.

If you or the retailer made alterations, substitutions, eliminations or additions of/to the equipment or appliances shown on the Data Plate, verify that you have been furnished with the proper manufacturer's information and warranties. Conversely, if you find you have the manufacturer's information and warranties on equipment or appliances which have been removed, return these to your retailer.

We retain a copy of the Data Plate installed in each home when manufactured and assume no liability or responsibility whatsoever for any equipment or appliances altered, exchanged, removed or added, nor for any consequential damage resulting from such alterations.

## **Heating & Comfort Cooling Certificate**

The Heating & Comfort Cooling Certificate is included on the Data Plate. It indicates the Climatic Zone for which your home has been designed in accordance with the Federal Manufactured Home Standards. The make and model of the heating equipment provided in your home is also indicated along with information on the lowest outdoor temperature at which the heating equipment should be able to maintain an average indoor temperature of 70°F when the wind does not exceed 15 mph.

Along with the above information is a statement regarding the highest outdoor winter design temperature which should result in maximum furnace economy. Should the design temperature for your area be higher (warmer) than that indicated on the Certificate, it simply means that the heating equipment may be larger than theoretically required to operate at best economy based on specifications in the Federal Manufactured Home Standards. It also means that the furnace should have reserve capacity to heat your home during abnormal cold spells and/or wind conditions in excess of 15 mph.

If your home is provided with an air conditioner, information is provided on the make, model, and capacity of the

equipment. Information is also provided indicating the orientation of your home and the design outdoor temperature used in designing the system.

When your home includes an air distribution system suitable for the installation of central air conditioning later on, the maximum size of the add on equipment is specified on the Certificate along with information which will permit the installer to determine the required cooling capacity of the equipment.

Should your home not be designed for use with a central air conditioning system the Certificate will indicate this.

The Heating & Cooling Design section will have one of three alternate formats contingent on how your home was designed with respect to central air conditioning. Each of the three alternate formats is shown along with a full explanation of the significance of the information presented. (See page 19)

## **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 retailer 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.



## Manufactured Housing and Standards: State Administrative Agencies (SAAs)

All residential manufactured homes (mobile homes) must comply with the Federal Manufactured Home Construction and Safety Standards. Since June 15, 1976, manufacturers have confirmed compliance with the Standards by attaching a red label to the back of each transportable section of a home produced.

The extent to which HUD can help a homeowner resolve a complaint depends on the seriousness of the problem. In cases where safety-related defects in homes create an unreasonable risk of injury or death to the occupants, manufacturers must correct the defect in a short period. HUD cannot require correction unless the defects were introduced into the home during the manufacturing process. The on-site installation of a manufactured home is not regulated by HUD.

If a problem arises with a manufactured home, the first contact should be the retailer. Most problems can be eliminated quickly. If the retailer cannot help, the second contact should be the manufacturer. Manufacturers, for the most part, are quick to respond to consumers.

It is important to put a complaint in writing. Also, make a copy to keep with your records. The letter should include the serial number of the home with a list of the problems. List any known factors that contributed to the problem. Also list any secondary issues related to the problem.

If the retailer and the manufacturer do not resolve your concerns, there are offices within most state governments with staff that are knowledgeable about manufactured housing construction and related issues. There are 37 States participating with HUD in a State and Federal partnership to regulate and enforce the Federal manufactured housing program in their state. Many state governments regulate all, or part, of the manufactured housing industry in the state. Some areas that may be regulated in your state are retailers, transporters and installers.

To find the contact for your state, use the table below and click on your state's abbreviation.

If your state does not participate in the Federal program, or if you cannot get a resolution through these contacts, you may contact the:

Office of Manufactured Housing Programs  
Office of Regulatory Affairs and Manufactured Housing  
US Department of Housing and Urban Development  
451 Seventh Street, SW, Room 9164  
Washington, DC 20410-8000

Telephone: (202) 708-6423 or (800) 927-2891.  
FAX: (202) 708-4213

ALABAMA  
Mr. Jim Sloan, Administrator  
Alabama Manufactured Housing Commission  
350 S. Decatur Street  
Montgomery, AL 36104-4306  
PH: (334) 242-4036 ext. 25  
FAX: (334) 240-3178  
Designee: Tommy Colley

ALASKA - Use HUD address below.

ARIZONA  
Mr. Robert Barger, Director  
Arizona Department of Fire Building and Life Safety  
Office of Manufactured Housing  
1100 West Washington, Suite 100  
Phoenix, AZ 85007-2935  
PH: (602) 364-1003  
FAX: (602) 364-1052  
Designee: Gary Grounds

ARKANSAS  
Mr. Whit Waller, Director  
Arkansas Manufactured Home Commission  
101 E. Capitol, Suite 210  
Little Rock, AR 72201-5705  
PH: (501) 324-9032  
FAX: (501) 683-3538

CALIFORNIA  
Mr. Kevin Cimini, Administrator  
Department of Housing and Community Development  
Manufactured Housing Section  
1800 Third Street, Suite 260  
P.O. Box 31  
Sacramento, CA 95812-0031  
PH: (916) 445-3338(main)  
FAX: (916) 327-4712

COLORADO  
Steve Bernia, Program Manager  
Housing Technology & Standards Section  
Division of Housing  
1313 Sherman Street, #321  
Denver, CO 80203-2244  
PH: (303) 866-4616  
FAX: (303) 866-3072

CONNECTICUT - Use HUD address below.

DELAWARE - Use HUD address below.

DISTRICT OF COLUMBIA (Washington, D.C.) - Use HUD address below.

FLORIDA  
Dr. Dwight F. Davis, Chief  
State of Florida  
Division of Motor Vehicles  
Bureau of Mobile Homes and RV  
2900 Apalachee Parkway, MS66  
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Consumer Complaint: Vicky Ladd PH: (813) 740-4298  
ext. 233

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#2 Martin Luther King Jr. Dr., #620 West Tower  
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1090 E. Watertower Street  
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Designee: Tom Rodgers  
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Mr. John D. Reilly, Jr., Section Chief  
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KENTUCKY  
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Manufactured Housing Division  
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101 Sea Hero Road, Suite 100  
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Manufactured Housing State Administrative Agency  
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Maryland Code Administration  
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Construction Codes and Licensing Division  
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Division of Code Enforcement and Administration  
Department of State  
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Albany, NY 12231-0001  
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FAX: (518) 486-4487  
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North Dakota Department of Commerce  
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Manufactured Housing Division  
TX Department of Housing & Community Affairs  
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Austin, TX 78711-2489  
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FAX: (512) 475-4706

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Construction Trades Bureau  
Div. of Occupational & Professional Licensing  
Department of Commerce  
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FAX: (801) 530-6511

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FAX: (804) 371-7092  
Designee: Lorenzo Dyer

WASHINGTON  
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Compliance and Inspection Manager  
Housing Division  
Department of Community, Trade and Economic Development  
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Office of Manufactured Housing  
WA State Office of Community Development  
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Olympia, WA 98504-2525  
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PH: (800) 964-0852 (Complaints)  
FAX: (360) 586-5880

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Manufactured Housing  
West Virginia Division of Labor  
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Capitol Complex  
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FAX: (304) 558-2447

WISCONSIN  
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Department of Commerce  
Safety & Buildings  
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FAX: (608) 267-9723  
Designee: Leroy Stublaski - PH:(608) 576-6224

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Office of Manufactured Housing Programs  
Office of Regulatory Affairs and Manufactured Housing  
Department of Housing and Urban Development  
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Rm. 9164  
Washington, DC 20410-8000  
Telephone: (202) 708-6423 or (800) 927-2891.  
FAX: (202) 708-4213  
Email:  
<http://www.hud.gov/utilities/Intercept.cfm?mailto:mhs@hud.gov>

Manufacturer Address

Plant Number

Date of Manufacture HUD Label No. (s)

Manufacturer's Serial Number and Model Unit Designation

Design Approval by (D.A.P.I.A.)

This manufactured home is designed to comply with the federal manufactured home construction and safety standards in force at time of manufacture (For additional information, consult owner's manual.)

The factory installed equipment includes:

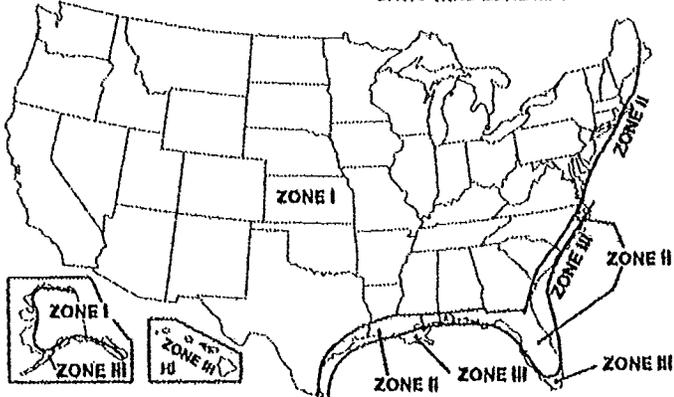
Table with 3 columns: Equipment, Manufacturer, Model Designation. Rows include For heating, For air cooling, For cooking, Refrigerator, Water Heater, Washer, Clothes Dryer, Dishwasher, Garbage Disposal, Fireplace.

HOME CONSTRUCTED FOR Zone I Zone II Zone III

This home has not been designed for the higher wind pressure and anchoring provisions required for coastal areas and should not be located within 1600' of the coastline in Wind Zones II and III, unless the home and its anchoring and foundation system have been designed for the increased requirement outlined for exposure D in ANSI/ASCE 7-88.

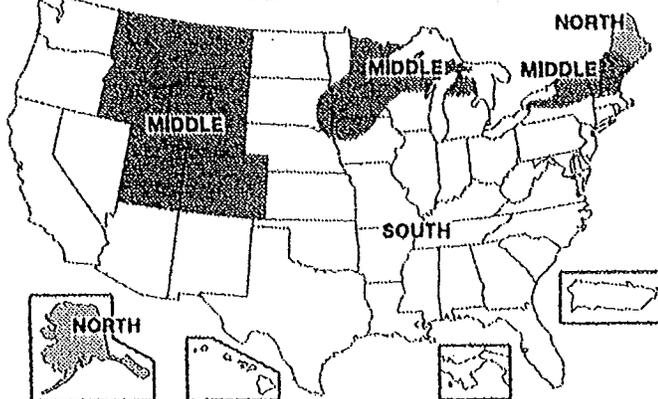
This home has not been equipped with storm shutters or other protective coverings for windows and exterior door openings. For homes designed to be located in Wind Zones II and III, which have not been provided with shutters or equivalent covering devices, it is strongly recommended that the home be made ready to be equipped with these devices in accordance with the method recommended in manufacturer's standard instructions.

BASIC WIND ZONE MAP



DESIGN ROOF LOAD ZONE MAP

North 40 PSF South 20 PSF Middle 30 PSF Other PSF



COMFORT HEATING

This manufactured home has been thermally insulated to conform with the requirements of the federal manufactured home construction and safety standards for all locations

within U/O value zone (See map at bottom) Heating equipment manufacturer and model (see list at left) The above heating equipment has the capacity to maintain an average 70° F temperature in

this home at outdoor temperatures of °F. To maximize furnace operating economy, and to conserve energy, it is recommended that this home be installed where the outdoor winter design temperature (97 1/2%) is not higher than

degrees Fahrenheit. The above information has been calculated assuming a maximum wind velocity of 10 mph at standard atmospheric pressure.

COMFORT COOLING

Air conditioner provided at factory (Alternate I)

Air conditioner manufacturer and model (see list at left).

Certified capacity B.T.U./hour in accordance with the appropriate air conditioning and refrigeration institute standards.

The central air conditioning system provided in this home had been sized assuming an orientation of the front (hitch end) of the home facing °. On the basis the system is designed to maintain an indoor temperature of 75° F when outdoor

temperatures are °F dry bulb and °F wet bulb.

The temperature to which this home can be cooled will change depending upon the amount of exposure of the windows of this home to the sun's radiant heat. Therefore, the home's heat gains will vary dependent upon its orientation to the sun and any permanent shading provided. Information concerning the calculation of cooling loads at various locations, window exposures and shadings are provided in Chapter 22 of the 1989 edition of the ASHRAE Handbook of Fundamentals.

Information necessary to calculate cooling loads at various locations and orientations is provided in the special comfort cooling information provided with this home.

Air conditioner not provided at factory (Alternate II)

The air distribution system of this home is suitable for the installation of central air conditioning.

The supply air distribution system installed in this home is sized for a manufactured home

central air conditioning system of up to B.T.U./hr rated capacity which are certified in accordance with the appropriate air conditioning and refrigeration institute standards, when the air circulators of such air conditioners are rated at 0.3 inch water column static pressure or greater for the cooling air delivered to the manufactured home supply air duct systems.

Information necessary to calculate cooling loads at various locations and orientations is provided in the special comfort cooling information provided with this manufactured home.

Air conditioning not recommended (Alternate III)

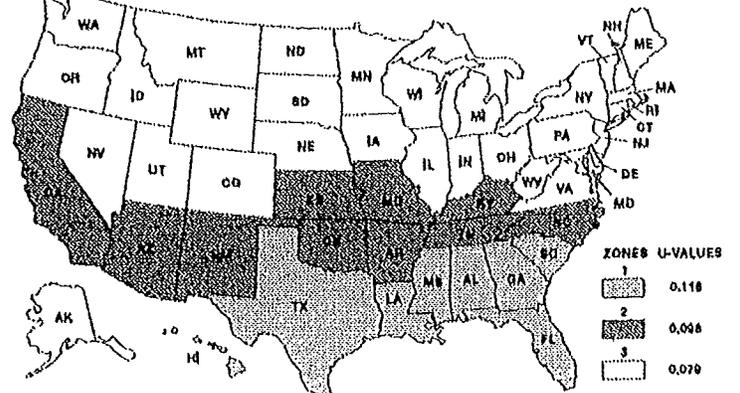
The air distribution system of this home has not been designed in anticipation of its use with a central air conditioning system.

To determine the required capacity of equipment to cool a home efficiently and economically, a cooling load (heat gain) calculation is required. The cooling load is dependent on the orientation, location and the structure of the home. Central air conditioners operate most efficiently and provide the greatest comfort when their capacity closely approximates the calculated cooling load. Each home's air conditioner should be sized in accordance with Chapter 22 of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals 1989 edition, once the location and orientation are known.

INFORMATION PROVIDED BY THE MANUFACTURER NECESSARY TO CALCULATE SENSIBLE HEAT GAIN

- Walls (without windows and doors) °F
Ceilings and roofs of light color °F
Ceilings and roofs of dark color °F
Floors °F
Air ducts in floor °F
Air ducts in ceiling °F
Air ducts installed outside the home °F
The following are the duct areas in this home:
As ducts in floor sq. ft.
As ducts in ceiling sq. ft.
As ducts outside the home sq. ft.

U/O VALUE ZONE MAP



# Manufactured Home Data Plate Legend

- A. Manufacturing plant name and location.
- B. Date your home was manufactured.
- C. Serial number and model unit designation.
- D. Name of agency approving the design of this home.
- E. Manufacturer and model number of all appliances/equipment installed in your home by the home manufacturer. (NOTE: This does not include any appliances/equipment installed by anyone other than the manufacturer of your home.)
- F. The check beside the Design Wind Zones listed shows the zone or zones where your home may be located with respect to the map guide shown. (NOTE: Any zone of a lesser number than the one checked is also approved.)
- G. The check beside the roof loads listed shows the zone or zones where your home may be located. (NOTE: Any zone of a lesser number than the one checked is also approved.)
- H. This section shows the parameters with which your home was designed with respect to the central air conditioning system for heating and cooling.
- I. The zone checked in combination with the printed map shows the zone or zones your home can be located, based upon the climate control design parameters of the home.



# SAFETY

Your new home has been designed and constructed with safety as a prime consideration. Each home which we produce is provided with certain safety features with which you should familiarize yourself. These features are explained below.

No amount of built-in safety, however, can completely guard you against the ever-present dangers inherent in home ownership. Therefore, planning, foresight and preparation on the part of you and your family is the best safety defense you have. This Section includes general information intended to help all the members of your family develop a safety-conscious attitude.

## Windstorm Protection

The installation of an appropriate tie-down system designed for your home cannot be overstressed. It is of utmost importance. Installation of such a system protects your family's safety and guards against the loss of your personal property.

No matter where your home is located geographically, the installation of tie-downs is well worth the investment and strongly recommended.

Even winds that never become hurricanes or tornadoes can be destructive. The winds that accompany thunderstorms, and even sudden gusts, cause damage and occur in every state and in every month. Wind damage to manufactured homes can be minimized and in most cases prevented with the proper installation of an approved tie-down system.

Our homes are designed for use with frame tie-downs. Specific information on tie-down design and installation is given in Section B of this manual.

## Ground Fault Circuit Interrupters

All bathrooms and outdoor receptacles (except the heat tape receptacle) provided by us in your manufactured home are protected by a ground fault circuit interrupter (GFCI).

Should there be a fault in the circuit, the GFCI will trip into the "off" position thus making the receptacle(s) it serves inoperative. The reset button on the GFCI will activate the circuit again.

The GFCI may consist of:

1. A circuit breaker in the Main Electric Panel Box. (This breaker is readily distinguished by the "TEST" button).

2. The GFCI breaker may be built-in to the duplex receptacle in the bathroom nearest the Main Panel Box. The remaining bathrooms and the outdoor receptacles (not including the Heat Tape receptacle) are wired from this receptacle with the built-in GFCI.

To assure proper functioning of either GFCI, it should be subjected to a simple ten-second test once a month. Complete test instructions are provided in the Home Owner's packet.

The test procedure consists of the following:

- Insure that GFCI handle is in "ON" position.
- Push "TEST" button. If handle moves to "OFF" position, breaker is functioning. Return handle to "ON" position for normal use.
- If handle does not move to "OFF" when test button is pushed, contact a licensed electrician immediately to restore your ground fault protection.

### CAUTION

Tripping of the GFCI breaker is usually attributable to one of three causes:

1. **Overload:** Connection of too many or too large devices to the circuit.
2. **A short:** Direct contact between both wires of the circuit or a "hot" wire accidentally touching the ground.
3. **Leakage:** Moisture, wet wires or partial grounding of equipment being used.

If the cause of tripping is readily apparent and the cure is obvious (i.e., disconnecting some devices from an overloaded circuit), the breaker may be turned "ON" again after the cure is accomplished. However, if breaker tripping is a recurrent problem, or the breaker trips immediately after being turned "ON", leave it "OFF" and call a licensed electrician to remedy the problem.

Remember that electricity is extremely dangerous and no amount of safety devices can afford as much protection from electrical shock as fore-thought and caution on the part of you and your family whenever handling any sort of electrical device.

### NOTE

Because the outdoor receptacles in your home are on a GFCI protected circuit which also serves receptacles in a bathroom, you can easily monitor the circuit to determine if the power is off or on by use of a small night light plugged into a bathroom receptacle.

APPROVED BY



# Smoke Detectors

To provide you and your family with early warning in case of fire, your new home is equipped with at least one smoke detector.

A smoke detector is designed to sense a fire or a potential fire in its early stages, before smoke density reaches a dangerous concentration. When smoke is detected, the device sounds an alarm, giving your family time to escape to safety.

All detectors are equipped with an "ON" light indicating that the detector is properly energized. Should this light go off, check the main electrical power distribution panel for a tripped breaker. If all breakers are "ON", consult the manufacturer's instructions for the smoke detector, which can be found in your Home Owner's packet.

In addition to the "ON" light, each detector has a test mechanism, which, when operated, will simulate smoke entering the detector's sensing chamber. (Consult the manufacturer's instructions.) It is recommended that each detector be tested upon moving into your home, in the presence of all family members, allowing them to become familiar with the sound of the detector's alarm. Thereafter, each unit should be tested once a week to insure that it is functioning properly.

Generally, the only maintenance that smoke detectors require, is to vacuum around the detector's smoke entrances once or twice a year. Specific test procedures, maintenance requirements and a detailed description of the operating principle for the detector(s) installed in your home can be found in the detector manufacturer's instructions. Please read these instructions to completely familiarize yourself and all members of your family with the specific smoke detector(s) in your home.

## Emergency Exits

In an emergency, every member of your family should know exactly what to do, based on a well-rehearsed family evacuation plan. The first step in developing such a plan is to become completely familiar with all available emergency exits from your home.

Your home has at least two egress (exit) doors which are "remote" from each other to insure that a fire in any one part of the home will not render both doors useless. The door latch hardware is designed for quick opening, without the use of a key. This fact should be kept in mind if you are planning on installing additional locks on your doors. You should make sure that the hardware you select lends itself to quick operation in emergency situations, that it is mounted at a height within reach of all family members, and that all members are aware of its precise operation.

In addition to the two remote doors, each bedroom of your

home has one egress (exit) window or door. Egress windows are designed in accordance with Federal requirements specifically for the purpose of providing means for rapid exit in emergency situations. Instructions for operation of the windows are attached to the windows by the window manufacturer and **SHOULD NOT BE REMOVED**. It is imperative that all members of the family are fully aware of the location and operation of the egress (exit) windows.

The following additional facts should be kept in mind with regard to egress windows.

- Make sure that all shipping clips on screens are removed.
- Arrange your furniture so as to keep the egress windows accessible. An egress window blocked by a heavy chest of drawers or a headboard does not allow for rapid exit.
- Make sure exterior areas around and below egress windows are unobstructed to allow evacuation of your family.

## Evacuation Plan

Each smoke detector in your home is designed to give you early warning of potential fire. The emergency exit facilities in your home provide you with means of escape. These provisions built into your home, however, cannot alone guarantee your family's safe escape. That responsibility rests with you. Planning ahead and preparation is the best course of action toward fulfilling that responsibility.

Following are some suggestions that might be helpful in developing a family emergency evacuation plan:

- Sketch a floorplan of your home showing all available emergency exits and plot the possible alternate exit routes for each family member if a fire should break out in a particular section of the home.
- If your family includes members who would be incapable of evacuating the home by themselves in an emergency situation, assign someone the responsibility now of helping them. This will minimize confusion should an emergency arise.
- Determine a meeting place outside the home for your family to gather after evacuation so all members can be quickly and easily accounted for.
- Don't wait until fire strikes to see if your plan works. Hold periodic family fire drills. This practice will supply you with information to revise and refine your plan.

In addition to a well-rehearsed evacuation plan, a basic understanding of the nature of fire is essential for all members of your family to help them act quickly and decisively in an emergency situation



# FOREWORD

Your Hart Housing home has been built with great care. It meets or exceeds the Federal Standards for Manufactured Housing as established by the Department of Housing and Urban Development.

The Federal Standard governs body and frame design construction requirements, and installation of plumbing, heating and electrical systems.

Your home was designed and built as a totally integrated structure. Therefore, it is important that these instructions are closely adhered to and followed if you are to enjoy a comfortable, safe and trouble-free home.

Because the proper installation (set-up) of your new home is of such importance, it should be performed by an experienced and qualified set-up crew. If your purchase agreement with your dealer does not include installation or set-up of your home, he can assist you in locating qualified personnel.

If your state of residence has a manufactured home installation law or regulation, they will generally require your dealer or set-up crew to follow these instructions. Additionally, your state or local regulations may require that the installer be licensed. Many states also require that utilities be connected by a licensed technician. The State Administrative Agency can provide you with this information. See the list of State Administrative Agencies in your Homeowners Manual for the appropriate agency in your state.

If your state does not have an installation law or regulation, you should insist that your dealer or set-up crew follow these instructions.

Before attempting to set up the home, these instructions must be studied so that all work to be performed is clearly understood. Failure to follow these instructions can void your warranty.

If you have any questions or further clarification is desired, please contact your dealer or the factory which produced your home.



# 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.



# CHAPTER 1 — INTRODUCTION

- 1.1 **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 will assure you of a quality, safe and affordable home for many years to come. Consult a registered professional or structural engineer for cases not covered in this manual.
- 1.2 **Pre-installation consideration.** Prior to locating or relocating your home, contact the local authority having jurisdiction for installation to see if permits for such procedures as blocking, anchoring, or utility connections are required. Inspections may be required during installation. On private property, zoning or development covenants may apply and should be taken into consideration. **NOTE: Preparation of the site, when accomplished by other than home installer, may not be in accordance with these instructions.**
- 1.3 **Safety.** Only trained crews should install the home. Installers should follow the safety instructions provided in this manual.

## THIS HOME WEIGHS SEVERAL TONS

**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.

- 1.4 **Consumer information card.** Fill out the CONSUMER INFORMATION CARD and return it to **Hart Housing** so that you may be notified of revised instructions or new products.



## 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 tendency to push and overturn the home.

**Footing.** That part of the support system that sits directly on the ground at, below or partly below grade (or below the frost line where applicable) to support the piers.

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

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

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



# 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 on data plate.) 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 to site.** Before attempting to move your home to the installation site, be sure it 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. Consider future additions, such as awnings and screen rooms.
- 3.1.4 **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 help prevent settling 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 at the depth of the footings after completing any grading and filling (see 3.2.3). If you can't test the soil but can identify its type, use the foundation bearing pressures shown in Figure 3.2 as a guide. If you cannot identify the soil, use the lowest value (1,000 psf) from Figure 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) or other methods acceptable to local jurisdictions may be used.
- 3.3 **Removal of organic material.** Remove all decayable material such as grass, roots and wood scraps from beneath the home, especially in areas where footings are to be placed, to minimize settling of footings and insect damage. Remove shrubs and overhanging branches from the immediate vicinity of the homesite to prevent windstorm damage.

## 3.4 Drainage

- 3.4.1 **Purpose.** Drainage prevents water buildup under the home which may cause 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 WILL VOID YOUR WARRANTY.
- 3.4.2 **Elimination of depressions.** Grade the homesite to permit water to drain from under and away from the home.
- 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**

- 3.5.1 **Importance.** If the crawl space under the home is to be enclosed with skirting or other material, a vapor retarder that keeps ground moisture out of the home must be installed. Failure to place a vapor retarder beneath the home will void the warranty.
- 3.5.2 **Acceptable types of ground cover.** Use polyethylene sheeting or its equivalent, at least six mils thick.
- 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.

APPROVED BY  
**NIA** INC.  
FEDERAL MANUFACTURED HOME  
CONSTRUCTION AND SAFETY STANDARDS



GENERAL DESCRIPTION OF SOILS	
SOIL TYPE Based on the Unified 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	4000 AND UP.
SANDY GRAVEL AND GRAVEL	2,000
SAND, SILTY CLAY, CLAYEY SAND, SILTY GRAVEL, OR CLAYEY GRAVEL.	1,500
CLAY, SANDY CLAY, SILTY CLAY, OR CLAYEY SILT.	1,000
UNCOMMITTED FILL.	SPECIAL ANALYSIS IS REQUIRED.
PEAT OR ORGANIC CLAYS.	SPECIAL ANALYSIS IS REQUIRED.
<p>NOTE:</p> <p>To be used only when none of the following is available:</p> <ol style="list-style-type: none"> <li>Soils investigation and analysis of the site.</li> <li>Compliance with the local building code.</li> <li>Competent opinion by a local engineer, or building official.</li> </ol>	



Figure 3.2  
General Description of Soils.

# CHAPTER 4 — FOUNDATIONS

## 4.1 Piers

4.1.1 **Importance.** 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 manufactured metal or concrete devices (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 and 4.2 for pier capacities. Manufactured piers must be rated 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 nominal dimensions of at least 8" x 16". 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 Figure 4.1).

Cap hollow block piers as shown in Figure 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 plywood, as it may lead to unwanted settling or movement.

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 Figure 4.1). Drive them in tightly so they do not occupy more than 1" of vertical space. When the space to be shimmed is less than the minimum thickness of available caps or concrete blocks, dimension lumber may be used under the caps.

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

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

### 4.1.4 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" x 8" x 16". Install them so that the long side is at right angles to the supported I-beam (see Figure 4.1). Position open cells at right angles to the footers. Horizontal offsets should not exceed 1/2" top to bottom. Mortar is not 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 54" to 80" high.** Construct all piers between 54" and 80" high, as indicated in Figure 4.1.



- 4.1.4.3 **Piers over 80" high.** Where permitted by local codes; lay them in concrete mortar with steel reinforcing bars inserted in the block cells and fill the cells with concrete. Where such construction is not permitted by local codes, have piers over 80" high designed by a registered professional or structural engineer.
- 4.1.5 **Location and spacing.** The location and spacing of piers depends upon the dimensions and weight of the home, the roof load zone, the type of construction (single- or multisection), and other factors such as the locations of doors or other openings and heavy pieces of furniture.
- 4.1.5.2 **Multisection homes.** Figure 4.3 shows the recommended location and spacing of piers for your multisection home.
- 4.2.5.3 **Under doors and heavy furniture.** Place piers on both sides of all exterior doors and other sidewall openings 4' or wider (such as recessed entries, bay windows 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.
- 4.2.5.4 **Multisection Ridgebeam Support Piers.** In addition to piers located along main beams and at exterior openings, piers should be placed at each ridgebeam column location. These piers are necessary to transfer concentrated roof loads safely to the ground. The location of these piers are shown by dimensioned drawings provided by your dealer.
- 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 with a 28-day compressive strength of at least 3,000 psi.
- 4.2.2 **Placement in freezing climates**
- 4.2.2.1 **Conventional Footings.** To preclude the harmful effects of ground frost heave, footings must be placed below the frost line. Consult local authorities to determine frost penetration.
- 4.2.2.2 **Floating Slab Systems.** When properly engineered by a registered professional engineer, compatible with the anchorage requirements of section 5.4, and acceptable to the local authority having jurisdiction, "floating slab system" may be used above the frost line.
- 4.2.3 **Proper sizing of footings.** Proper sizing of footings depends upon the load-carrying capacity of both the piers and the soil. See Tables 4.1 & 4.2 for recommended footing sizes for various pier capacities.
- 4.3 **Special Conditions (See also Section 5.4.3)**
- 4.3.1 **Flood-prone areas.** HART HOUSING does not recommend your home in river or coastal flood prone areas. Special local regulations or flood insurance provisions may apply. Special elevation and anchoring techniques are required when locating in a flood-prone area. Consult a registered professional or structural engineer to make sure that home design and construction conform to applicable federal, state and local codes and regulations.
- 4.3.2 **Special snow load conditions.** Homes designed for and located in heavy snowfall areas or subject to other extreme loading conditions will require special piers or footings. See Figure 4.4.
- 4.4 **Basement Foundations.** If you desire your home to be placed on a perimeter foundation wall without I-Beam piers, refer to Figures 4.5, 4.6 & 4.5(a) for recommended footings and piers. Individual pier plans are available through your dealer.

MINIMUM PIER CAPACITY TABLE  
(FRAME BLOCKING ONLY)  
(CONT.)

Table C - 40 psf Roof Live Load

Pier Spacing  Ft.	Load  Lbs.	Pier Size  in. x in.	Footing Sizes (L x W x D, in inches) Allowable Soil Bearing					
			1000 psf	1500 psf	2000 psf	2500 psf	3000 psf	4000 psf
4	3293	8x16	22x22x7	18x18x5	16x16x4	16x16x4	16x16x4	16x16x4
6	4740	8x16	27x27x10	22x22x7	19x19x6	17x17x5	16x16x4	16x16x4
8	6187	8x16	30x30 11	25x25x9	22x22x7	19x19x6	18x18x5	16x16x4
10	7633	8x16	34x34x13	28x28x10	24x24x8	21x21x7	20x20x6	17x17x5

Notes:

- 1 - Applies to homes that do not require perimeter blocking along the side walls.
- 2 - The minimum footing is 4 inches, if precast of 2500 psi.
- 3 - All footing sizes are based upon the pier load listed, plus a pier weight of 400 lbs. (max.).
- 4 - Based on a box width of 160 inches and a 12 inch eave.
- 5 - All footing must rest on undisturbed soil at or below the frost line.
- 6 - Consult the local jurisdiction for the allowable soil bearing.
- 7 - All footing depths do not take into account the frost line.
- 8 - Max. loading for single block is 8000 lbs.
- 9 - Max. loading for double blocks is 16,000 lbs.

Min. concrete strength (fc) of 2500 psi



## MINIMUM PIER CAPACITY TABLE (FRAME BLOCKING ONLY)

Table C - 40 psf Roof Live Load (32 wide)

Pier Spacing Ft.	Load Lbs.	Pier Size in. x in.	Footing Sizes (L x W x D, in inches) Allowable Soil Bearing					
			1000 psf	1500 psf	2000 psf	2500 psf	3000 psf	4000 psf
4	3610	8x16	23x23x7	19x19x6	16x16x4	16x16x4	16x16x4	16x16x4
6	5215	8x16	27x27x10	22x22x7	19x19x6	17x17x5	16x16x4	16x16x4
8	6820	8x16	31x31x11	26x26x9	22x22x7	20x20x6	18x18x5	16x16x4
10	8425	8x16	35x35x13	28x28x10	25x25x9	22x22x7	20x20x6	17x17x5

**Notes:**

- 1 - Applies to homes that do not require perimeter blocking along the side walls.
- 2 - The minimum footing is 4 inches, if precast of 2500 psi.
- 3 - All footing sizes are based upon the pier load listed, plus a pier weight of 400 lbs. (max.).
- 4 - Based on a box width of 180 inches and a 12 inch eave.
- 5 - All footing must rest on undisturbed soil at or below the frost line.
- 6 - Consult the local jurisdiction for the allowable soil bearing.
- 7 - All footing depths do not take into account the frost line.
- 8 - Max. loading for single block is 8000 lbs.
- 9 - Max. loading for double blocks is 16,000 lbs.

Min. concrete strength (fc) of 2500 psi



# MARRIAGE WALL SUPPORT COLUMN PIERS

Table C - 40 psf Roof Live Load

Column Span Ft.	Load Lbs.	Pier Size in. x in.	Footing Sizes (LxWxD, in inches) Allowable Soil Bearing					
			1000 psf	1500 psf	2000 psf	2500 psf	3000 psf	4000 psf
4	3067	16x16	22x22x4	18x18x4	16x16x4	16x16x4	16x16x4	16x16x4
6	4400	16x16	26x26x5	21x21x4	18x18x4	16x16x4	16x16x4	16x16x4
8	5733	16x16	29x29x7	24x24x4	21x21x4	19x19x4	17x17x4	16x16x4
10	7067	16x16	32x32x8	27x27x6	23x23x4	21x21x4	19x19x4	16x16x4
12	8400	16x16	35x35x10	29x29x7	25x25x5	22x22x4	21x21x4	18x18x4
14	9733	16x16	38x38x11	31x31x8	27x27x6	24x24x4	22x22x4	19x19x4
16	11067	16x16	40x40x12	33x33x9	29x29x7	26x26x5	24x24x4	20x20x4
18	12400	16x16	43x43x14	35x35x10	30x30x7	27x27x6	25x25x5	22x22x4
20	13733	16x16	45x45x15	37x37x11	32x32x8	29x29x7	26x26x5	23x23x4
22	15067	16x16	47x47x16	39x39x12	33x33x9	30x30x7	27x27x6	24x24x4

Notes:

- 1 - Applies to homes that do not require perimeter blocking along the side walls.
- 2 - The minimum footing depths for precast footings are as follows (Min. concrete strength (fc) of 2500 psi):  
4 inches if precast.
- 3 - All footing sizes are based upon the pier load listed, plus a pier weight of 400 lbs. (max.).
- 4 - Based on a box width of 160 inches and a 12 inch eave.
- 5 - All footings must rest on undisturbed soil at or below the frost line.
- 6 - Consult the Local Jurisdiction for the allowable soil bearing.
- 7 - Perimeter supports at openings over four feet are equal to 1/2 of the load of the column span rating.
- 8 - Max. loading for double blocks is 16,000 lbs.
- 9 - All footing depths do not take into account the frost line



# MARRIAGE WALL/CENTERLINE SUPPORT COLUMN PIERS

Table C - 40 psf Roof Live Load (32 wide)

Column Span Ft.	Load Lbs.	Pier Size in. x in.	Footing Sizes (LxWxD, in inches) Allowable Soil Bearing					
			1000 psf	1500 psf	2000 psf	2500 psf	3000 psf	4000 psf
4	3400	16x16	22x22x4	19x19x4	16x16x4	16x16x4	16x16x4	16x16x4
6	4900	16x16	27x27x6	22x22x4	19x19x4	17x17x4	16x16x4	16x16x4
8	6400	16x16	31x31x8	25x25x5	22x22x4	20x20x4	18x18x4	16x16x4
10	7900	16x16	34x34x9	28x28x7	24x24x4	22x22x4	20x20x4	17x17x4
12	9400	16x16	37x37x11	31x31x8	27x27x6	24x24x4	22x22x4	19x19x4
14	10900	16x16	40x40x12	33x33x9	29x29x7	26x26x5	23x23x4	20x20x4
16	12400	16x16	43x43x14	35x35x10	30x30x7	27x27x6	25x25x5	22x22x4
18	13900	16x16	45x45x15	37x37x11	33x33x9	29x29x7	27x27x6	23x23x4

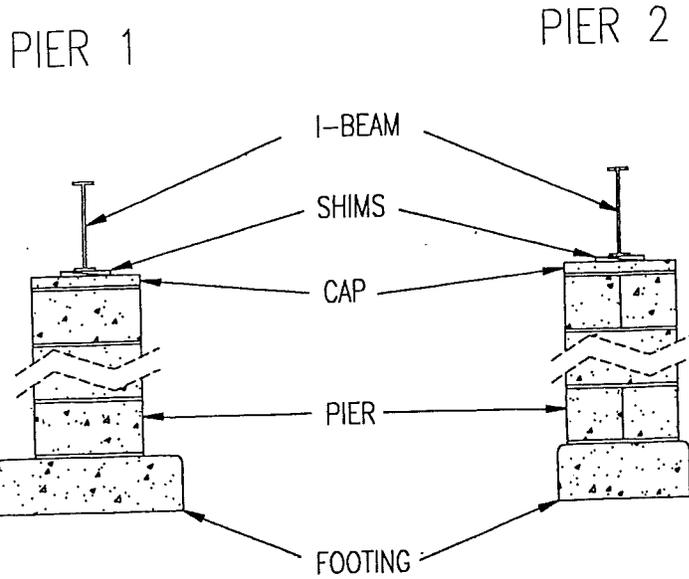
**Notes:**

- 1 - Applies to homes that do not require perimeter blocking along the side walls.
- 2 - The minimum footing depths for precast footings are as follows (Min. concrete strength (fc) of 2500 psi):  
4 inches if precast. **Min. concrete strength (fc) of 2500 psi**
- 3 - All footing sizes are based upon the pier load listed, plus a pier weight of 400 lbs. (max.).
- 4 - Based on a box width of 180 inches and a 12 inch eave.
- 5 - All footings must rest on undisturbed soil at or below the frost line.
- 6 - Consult the Local Jurisdiction for the allowable soil bearing.
- 7 - Perimeter supports at openings over four feet are equal to 1/2 of the load of the column span rating.
- 8 - Max. loading for double blocks is 16,000 lbs.
- 9 - All footing depths do not take into account the frost line





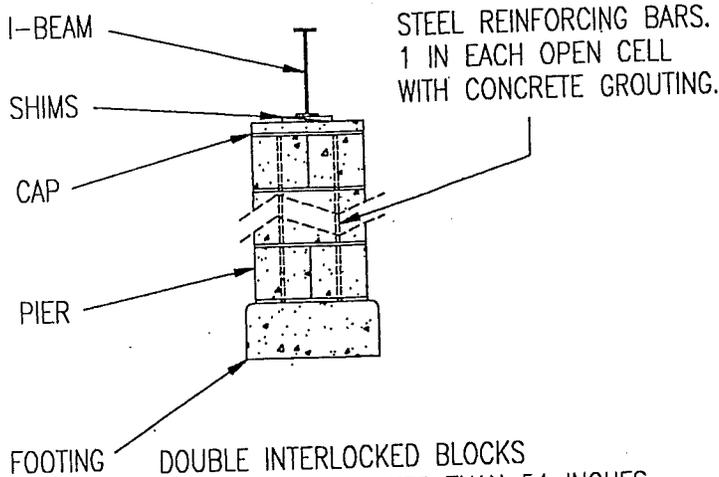
THE ABOVE LABEL ON THE UNDERSIDE OF THE FLOOR INDICATES THE PLACEMENT OF REQUIRED PIERS. THESE WILL BE PLACED APPROXIMATELY 8" IN FROM THE OUTER WALL AND MATING WALL WHERE PIERS ARE REQUIRED. OPENINGS OF 4' OR GREATER REQUIRE PIERS AT EACH END OF THE OPENINGS. THESE LABELS ARE NOT TO BE REMOVED.



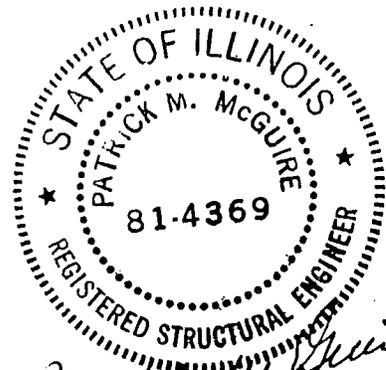
SINGLE BLOCKS WITH  
MAXIMUM HEIGHT OF 36 INCHES.

DOUBLE INTERLOCKED BLOCKS  
MAXIMUM HEIGHT OF 54 INCHES.

PIER 3



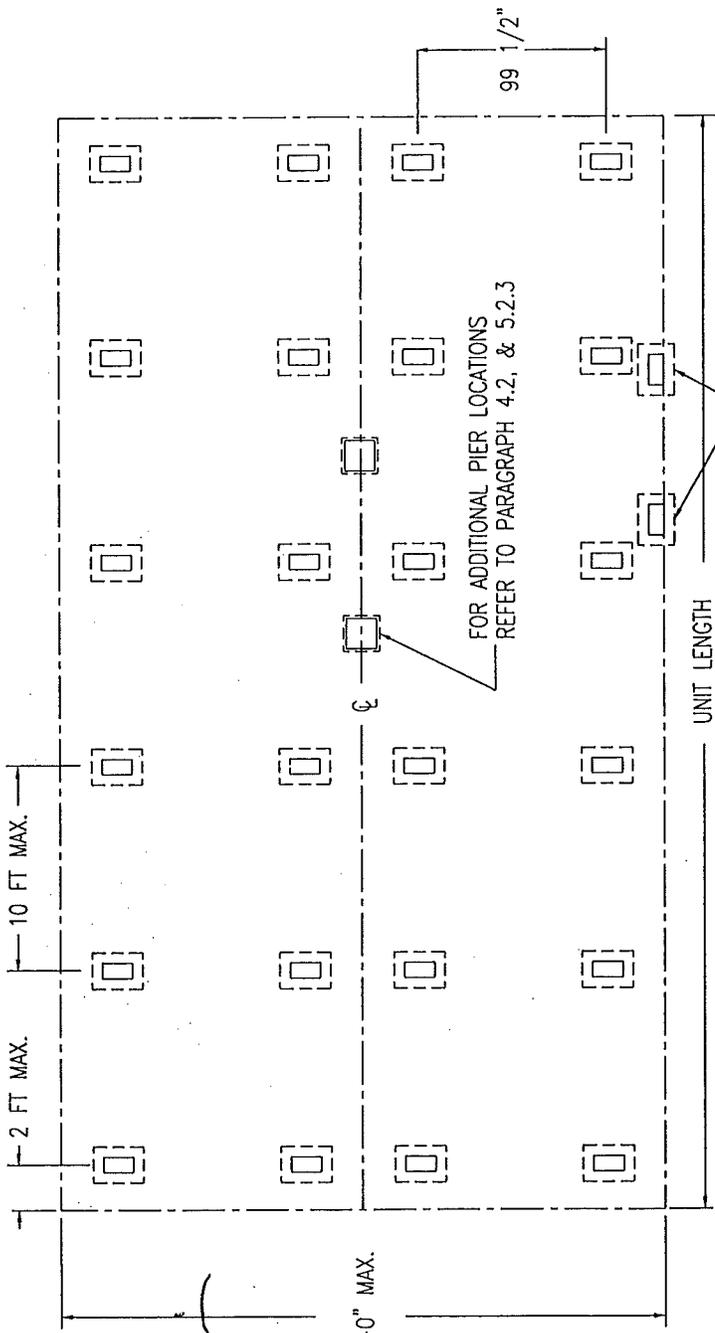
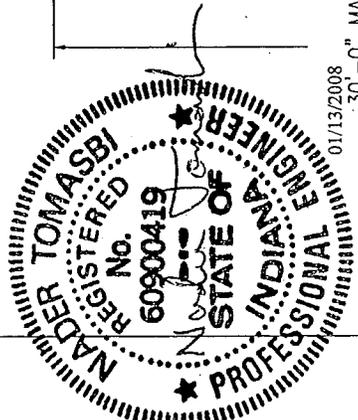
DOUBLE INTERLOCKED BLOCKS  
FOR HEIGHTS GREATER THAN 54 INCHES,  
BUT LESS THAN 80 INCHES.



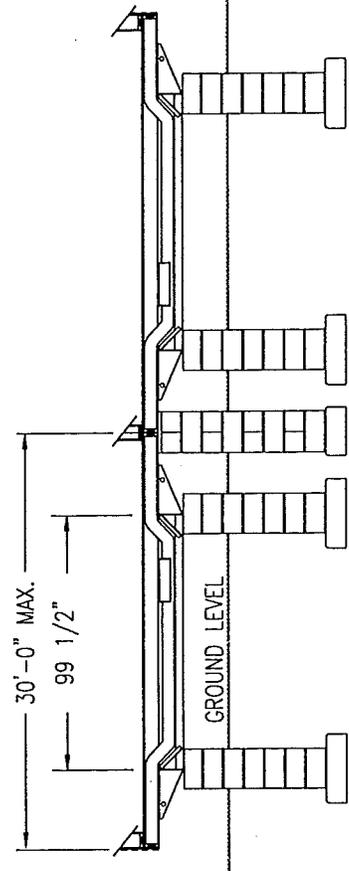
*Patrick M. McGuire*  
1.16.98

TYPICAL FOOTING AND PIER INSTALLATION

FIGURE 4.1



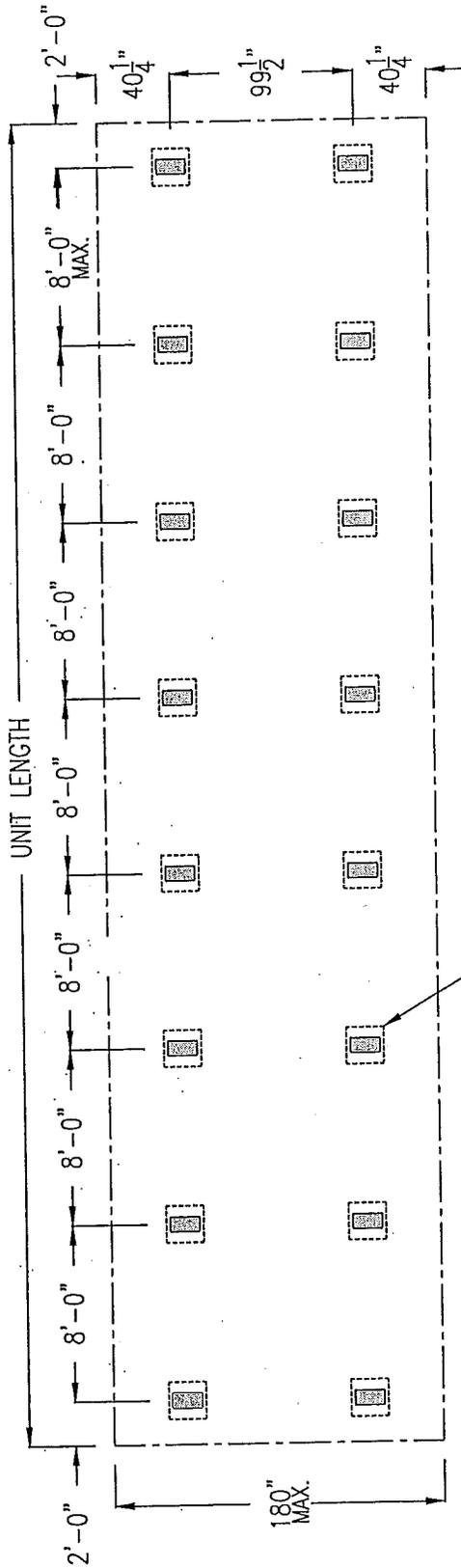
SEE NOTE #9 & #10



- NOTES:
- 1: THE FOUNDATION PLAN SHOWN IS GENERAL AND FURNISHED ONLY TO DEMONSTRATE THE PROPER LOCATION OF PIERS OR OTHER SUPPORT DEVICES. TITLED "TYPICAL CONCRETE BLOCK PIERS" DETAILS TYPICAL PIER CONSTRUCTION TO BE USED UNDER NORMAL CONDITIONS. WHEN ADVERSE CONDITIONS OCCUR SUCH AS REGULATORY FLOOD PLAINS, COASTAL HIGH HAZARD AREAS, OCEAN HAZARD AREAS OF QUESTIONABLE SOIL CONDITIONS, THE SUPPORT MUST BE DESIGNED BY A LOCAL QUALIFIED REGISTERED PROFESSIONAL ENGINEER OR ARCHITECT. IN ALL CASES THE SUPPORT SYSTEM MAY BE SUBJECT TO REVIEW AND APPROVED BY LOCAL BUILDING OFFICIALS.
  - 2: STABILIZING ANCHOR EQUIPMENT SHALL BE CAPABLE OF RESISTING AN ALLOWABLE WORKING LOAD OF 3150 LBS. AND SHALL BE CAPABLE OF WITH STANDING A 50% OVERLOAD (4725 LBS. TOTAL).
  - 3: THE STABILIZING SYSTEM IS DESIGNED TO USE DIAGONAL FRAME TIES ONLY. OVER THE ROOF TIES ARE NOT REQUIRED.
  - 4: DISTANCE BETWEEN INTERMEDIATE TIE-DOWNS SHALL NOT EXCEED 14 FT. O.C.
  - 5: WHEN THE HOME IS INSTALLED SO THAT THE BOTTOM OF THE MAIN FRAME MEMBERS ARE MORE THAN 3 FT ABOVE GROUND LEVEL, THE STABILIZING SYSTEM SHALL BE DESIGNED BY A LOCAL QUALIFIED REGISTERED PROFESSIONAL ENGINEER OR ARCHITECT. IN ALL CASES THE STABILIZING SYSTEM MAY BE SUBJECT TO REVIEW AND APPROVAL BY LOCAL BUILDING OFFICIALS.
  - 6: MINIMUM SOIL BEARING CAPACITY 2000 PSF.
  - 7: SEE TIE-DOWN SECTION FOR LOCATION & METHOD.
  - 8: CONSULT LOCAL PROFESSIONAL ENGINEER FOR APPROVED DESIGNED IF ANY DEVIATIONS TO THESE INSTRUCTIONS ARE INCURRED.
  - 9: PIERS SHALL BE LOCATED AT EACH SIDE OF EACH EXTERIOR DOOR AND ADDITIONAL PIERS SHALL BE REQUIRED AT EACH SIDE OF OPENINGS 4 FEET OR WIDER. THIS WILL INCLUDE DOORS, WINDOWS, RECESSED ENTRIES, PORCHES, ETC.
  - 10: FOR 1-BEAM SPACING AT 82 1/2", PERIMETER PIERS ARE REQUIRED AT 8 FEET O.C. MAX. FOR 40# ROOF LOAD.

THIS PIER PLAN TYPICAL FOR 30# & 40# ROOF LOADS FOR 1' BEAM SPACINGS OF 99 1/2" O.C. SEE NOTE #10 FOR 1' BEAM SPACINGS OF 82 1/2"

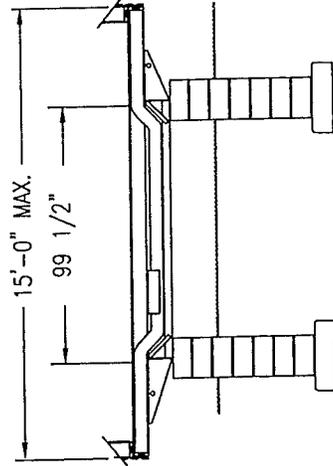
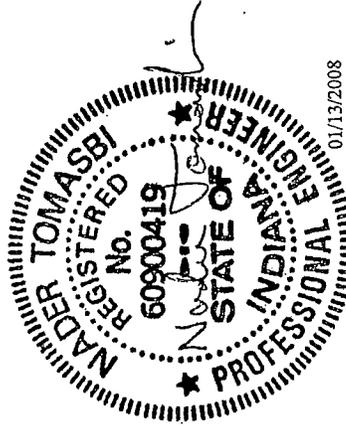
PIER PLAN - MULTI-SECTION  
FIGURE 4.3



FOOTING SIZES TO BE 20" X 20" X 7" DEEP WITH SINGLE 8" X 8" X 16" BLOCK PIERS ORIENTED LONG SIDE PERPENDICULAR TO LENGTH OF HOME AS SHOWN.

NOTES:

- 1: THE FOUNDATION PLAN SHOWN IS GENERAL AND FURNISHED ONLY TO DEMONSTRATE THE PROPER LOCATION OF PIERS OR OTHER SUPPORT DEVICES. TITLED "TYPICAL CONCRETE BLOCK PIERS" DETAILS TYPICAL PIER CONSTRUCTION TO BE USED UNDER NORMAL CONDITIONS. WHEN ADVERSE CONDITIONS OCCUR SUCH AS REGULATORY FLOOD PLAINS, COASTAL HIGH HAZARD AREAS, OCEAN HAZARD AREAS OF QUESTIONABLE SOIL CONDITIONS, THE SUPPORT MUST BE DESIGNED BY A LOCAL QUALIFIED REGISTERED PROFESSIONAL ENGINEER OR ARCHITECT. IN ALL CASES THE SUPPORT SYSTEM MAY BE SUBJECT TO REVIEW AND APPROVED BY LOCAL BUILDING OFFICIALS.
- 2: STABILIZING ANCHOR EQUIPMENT SHALL BE CAPABLE OF RESISTING AN ALLOWABLE WORKING LOAD OF 3150 LBS. AND SHALL BE CAPABLE OF WITH STANDING A 50% OVERLOAD (4725 LBS. TOTAL).
- 3: THE STABILIZING SYSTEM IS DESIGNED TO USE DIAGONAL FRAME TIES ONLY. OVER THE ROOF TIES ARE NOT REQUIRED.
- 4: DISTANCE BETWEEN INTERMEDIATE TIE-DOWNS SHALL NOT EXCEED 7 FT. O.C.
- 5: WHEN THE HOME IS INSTALLED SO THAT THE BOTTOM OF THE MAIN FRAME MEMBERS ARE MORE THAN 3 FT ABOVE GROUND LEVEL, THE STABILIZING SYSTEM SHALL BE DESIGNED BY A LOCAL QUALIFIED REGISTERED PROFESSIONAL ENGINEER OR ARCHITECT. IN ALL CASES THE STABILIZING SYSTEM MAY BE SUBJECT TO REVIEW AND APPROVAL BY LOCAL BUILDING OFFICIALS.
- 6: MINIMUM SOIL BEARING CAPACITY 2000 PSF.
- 7: SEE TIE-DOWN SECTION FOR LOCATION & METHOD.
- 8: CONSULT LOCAL PROFESSIONAL ENGINEER FOR APPROVED DESIGN IF ANY DEVIATIONS TO THESE INSTRUCTIONS ARE INCURRED.
- 9: PIERS SHALL BE LOCATED AT EACH SIDE OF EACH EXTERIOR DOOR AND ADDITIONAL PIERS SHALL BE REQUIRED AT EACH SIDE OF OPENINGS 4 FEET OR WIDER. THIS WILL INCLUDE DOORS, WINDOWS, RECESSED ENTRIES, PORCHES, ETC.



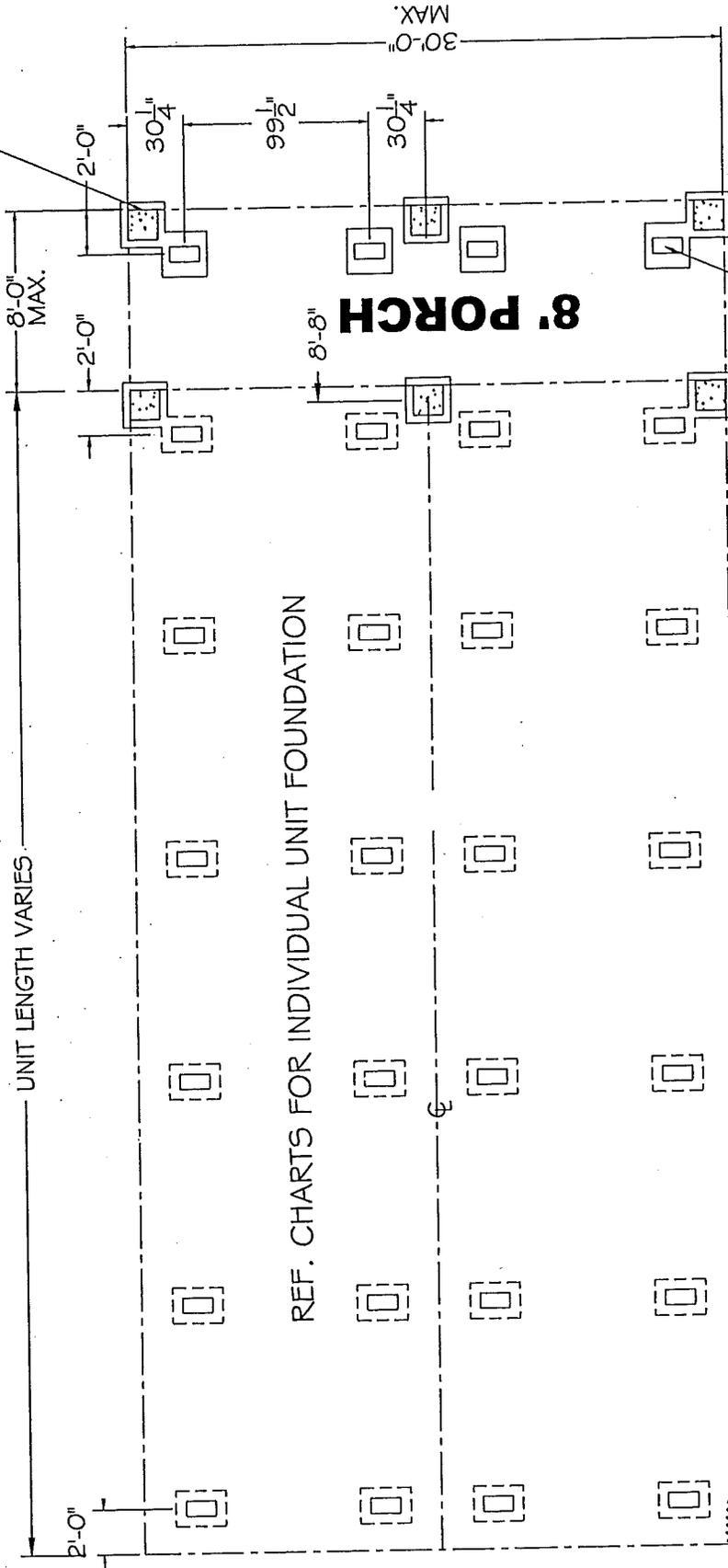
THIS PIER PLAN TYPICAL FOR .30# ROOF LOAD FOR 1" BEAM SPACINGS OF 99 1/2" O.C.

PIER PLAN - SINGLE-SECTION

09-26-05



16" X 16" PIER W/ 24" X 24" X 8" FOOTING  
(6) REQUIRED AS SHOWN.

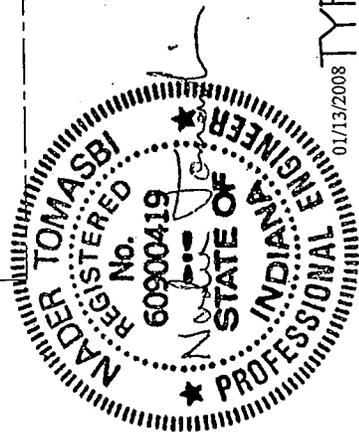


8" X 16" PIER W/ 24" X 24" X 8" FOOTING  
(4) REQUIRED ORIENT PIERS AS SHOWN.

REF. CHARTS FOR INDIVIDUAL UNIT FOUNDATION

# TYPICAL FOUNDATION FOR 8' FULL WIDTH PORCH

FLOOR WIDTH = 30'-0" MAX.  
WALL HGT. = 96" MAX.  
12" O.H. MAX.  
WIND ZONE I



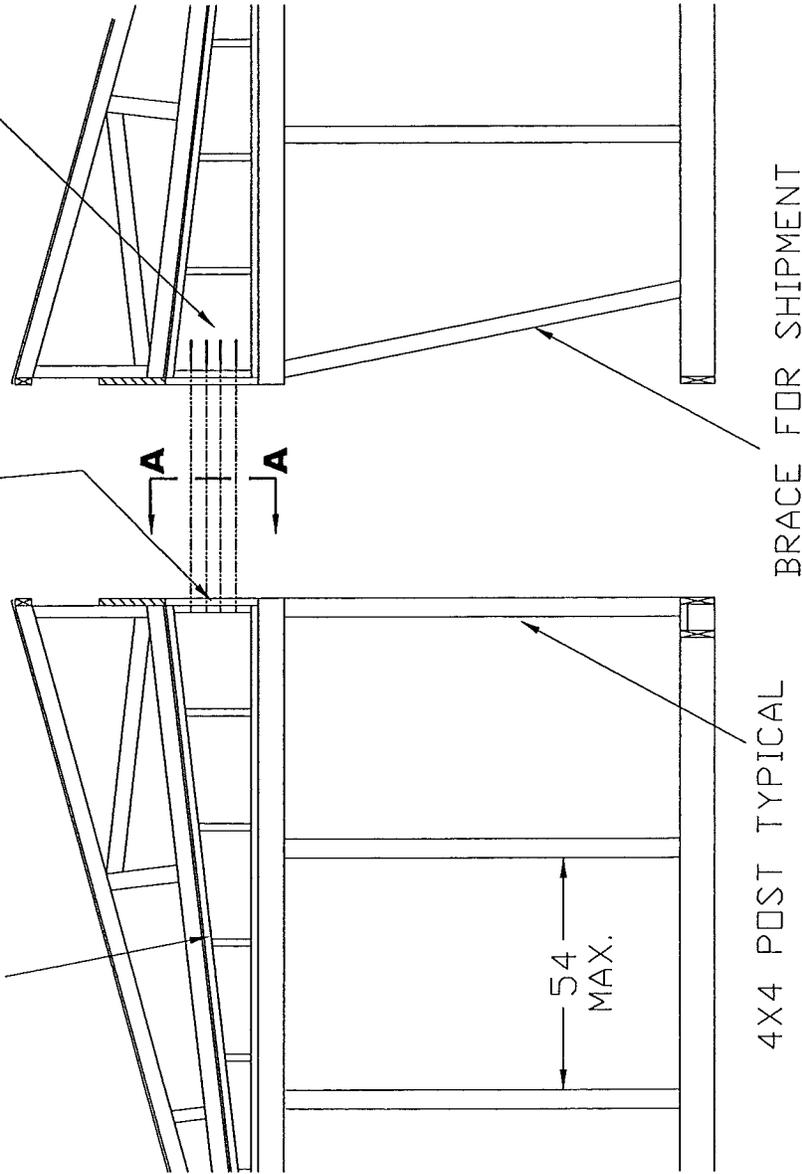
ALL FOOTINGS TO BE BELOW FROST LINE.

04-18-06

SPACER BETWEEN TOP OF END WALL HEADER  
AND BOTTOM OF LVL BEAM. 2X6 # 3 SPF

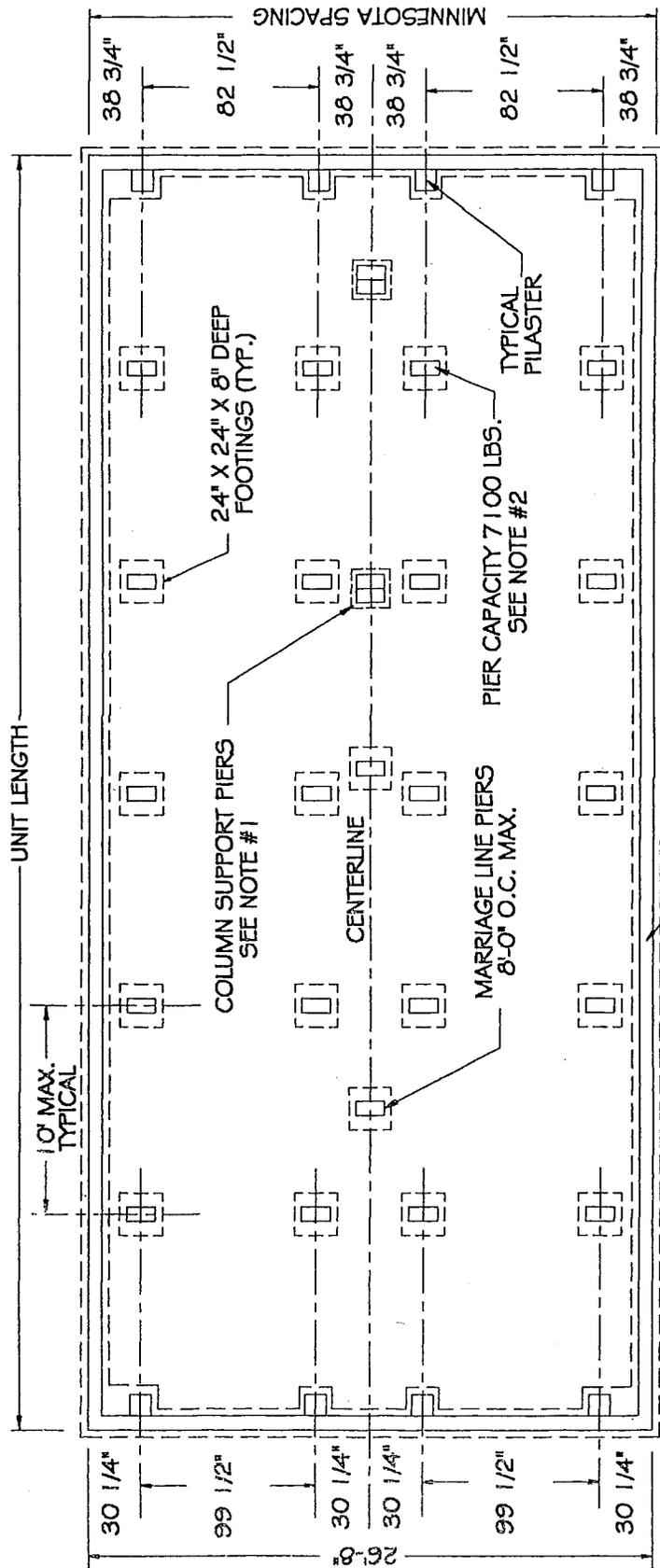
FIELD INSTALL (4) 5/16" X 5" LAG SCREWS  
THRU KNEE WALL UPRIGHT ON ONE SIDE &  
INTO KNEE WALL ON OPPOSITE SIDE.

2X6 # 3 SPF KNEE WALL



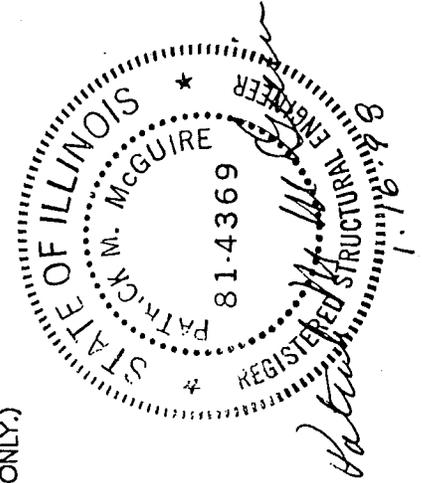
**HART HOUSING GROUP**  
**8' X FULL WIDTH PORCH DETAILS**  
02-03-06

FOR SPECIFIC PIER LOCATIONS REFER INDIVIDUAL MODEL PIER LAYOUT.



- NOTES:
- #1 - COLUMN SUPPORT TO BE SIZED IN ACCORDANCE WITH TABLE 4.2
  - #2 - PIERS MUST EXTEND 6' BEYOND CENTERLINE OF THE FRAME MEMBER.
  - #3 - CALCULATIONS BASED ON A SOIL CAPACITY OF 2000 PSF.
  - #4 - SUPPORTS REQUIRED FOR ALL OPENINGS OVER 4 FT.

(CONTINUOUS FOUNDATION WALL REQUIRED FOR 40# ROOF LOAD ONLY.)



APPROVED BY:

**MA** INC.  
FEDERAL MANUFACTURED HOME  
CONSTRUCTION AND SAFETY STANDARDS

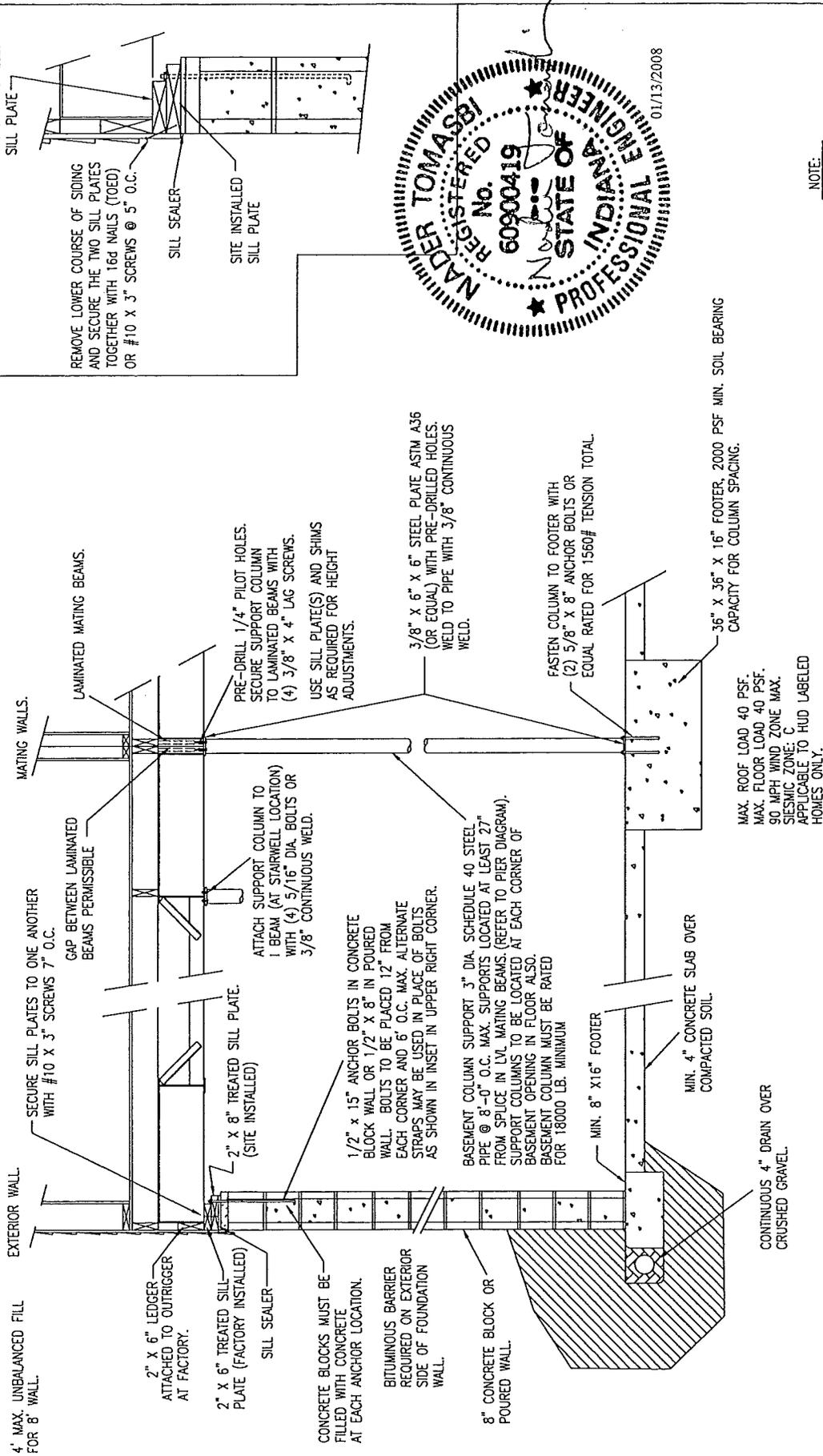
HART HOUSING  
TITLE: TYPICAL PIER LAYOUT FOR 40 LB. ROOF LOAD 1-5-98  
FIGURE 4.4

Refer to installation instructions for all other information and requirements.

Concrete blocks must be filled with concrete (32" x ht. of wall) at each anchor bolt location.

THE RISE AND RUN OF THE STAIRS MUST ACCOMMODATE A HEADROOM CLEARANCE OF 6'-8" WITH A STAIRWELL OPENING OF 9'-0". CHECK YOUR STATE & LOCAL CODES FOR RULES THAT APPLY TO THE CONSTRUCTION OF STAIRWELLS TO INSURE PROPER CLEARANCES.

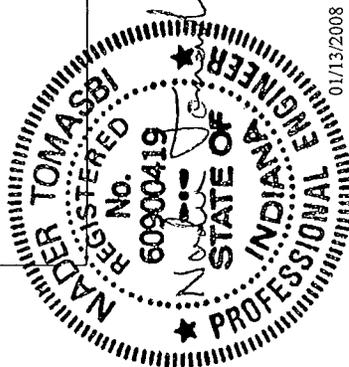
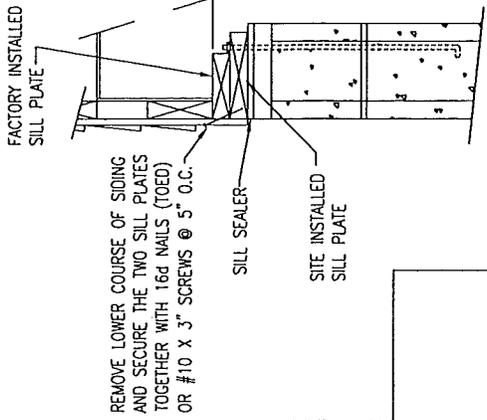
TYPICAL FOUNDATION WALL AND BASEMENT COLUMN SUPPORT DETAILS.



**ALL LAG SCREWS ARE FASTEC**

Min. concrete strength (fc) of 2500 psi

The foundation scheme is pictorial only. Actual design for an individual site shall be provided by a registered design profession familiar with local site conditions. Damp-proofing and foundation drainage shall be provided by others in accordance with good construction practice as site conditions require.



NOTE:

DETAILS SHOWN ARE TO BE MINIMUM REQUIREMENTS ONLY. ALL SITE WORK MUST MEET LOCAL BUILDING CODES.

HART HOUSING GROUP, INC.

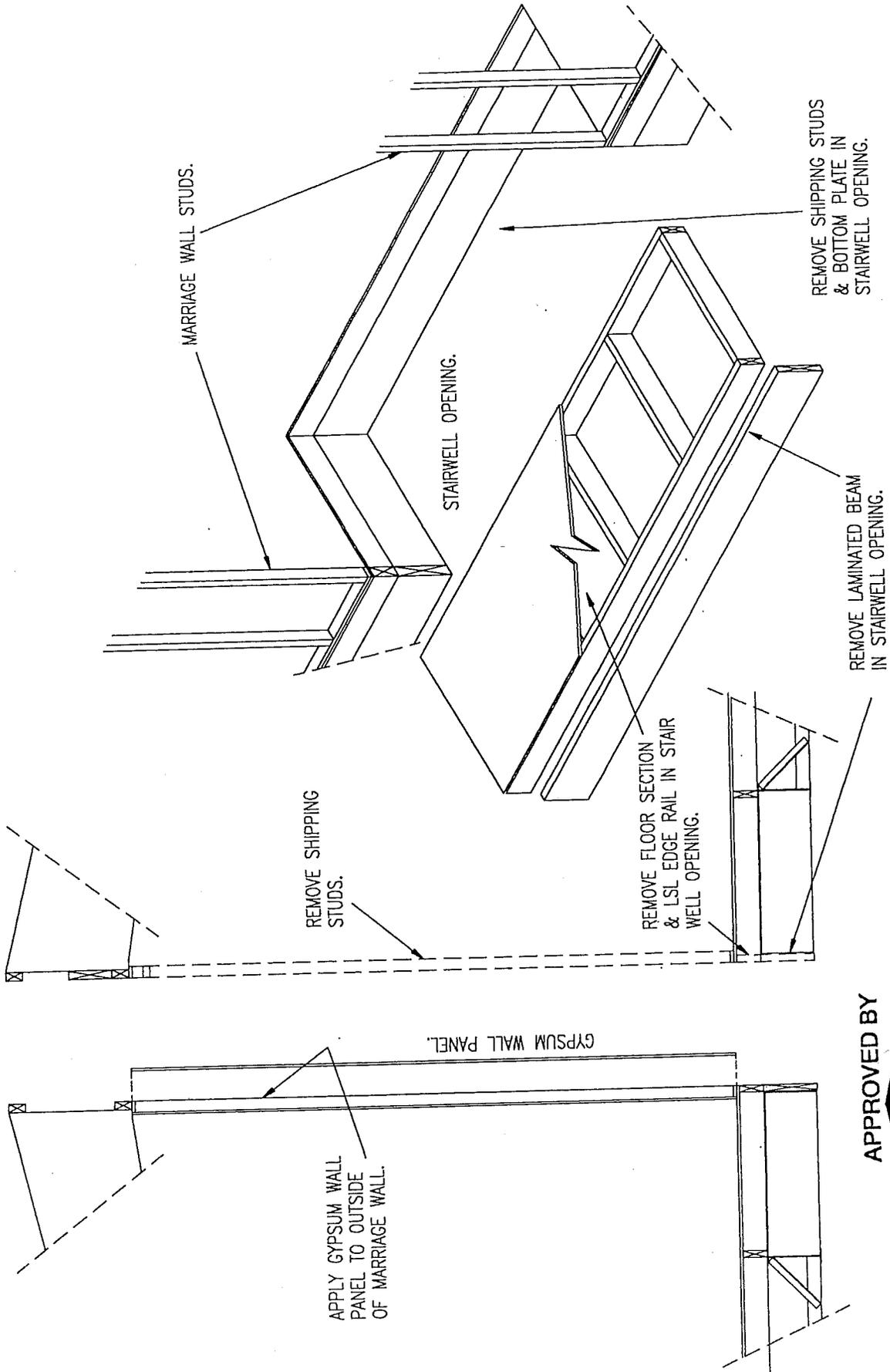
DETAILS FOR BASEMENT WALL & COLUMN SUPPORTS.

01-26-07

FIGURE 4.5

NOTE:

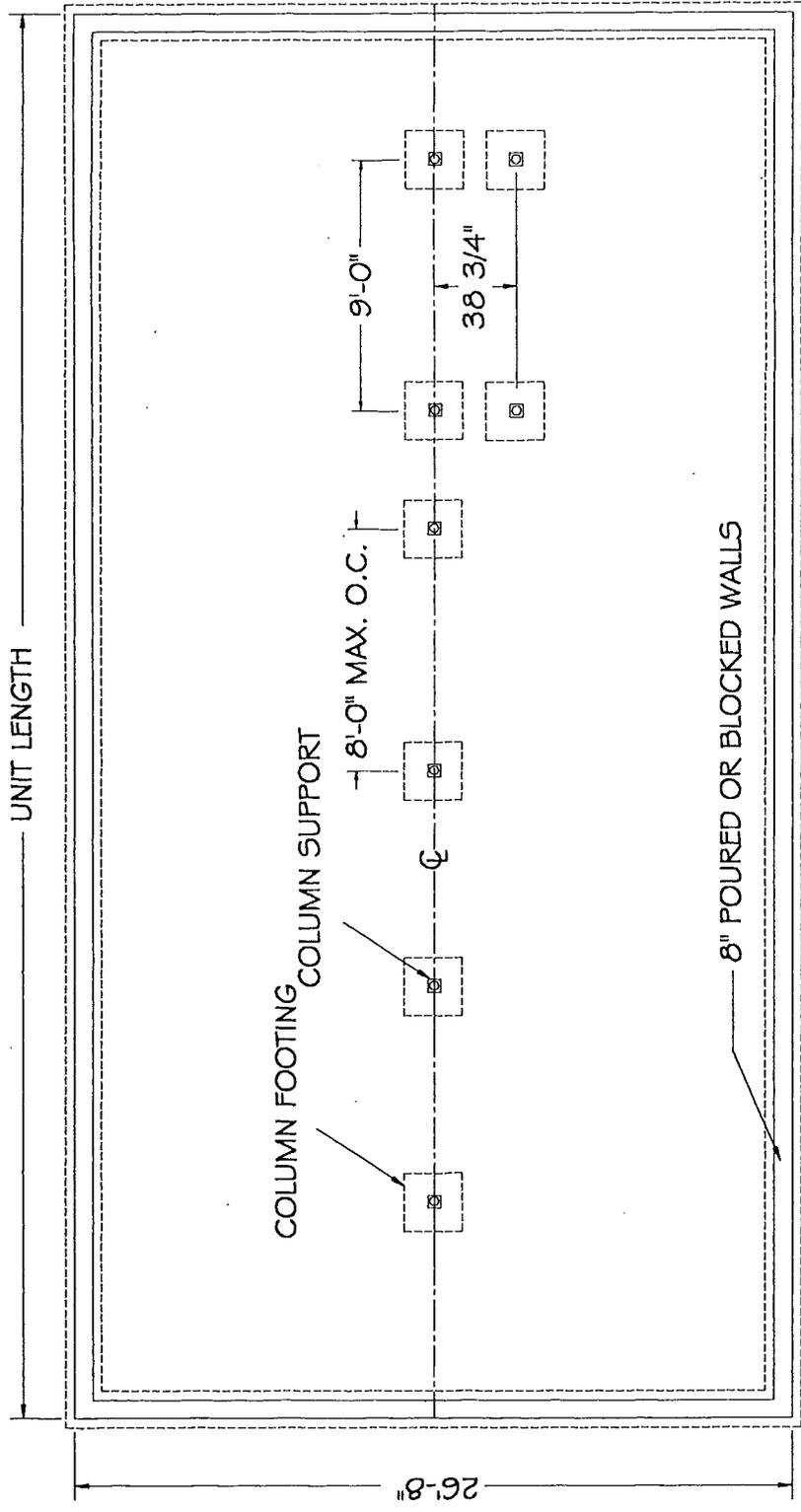
IT IS SUGGESTED THAT THE EDGE RAIL & LAMINATED BEAM BE REMOVED PRIOR TO MATING OF THE UNITS.



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**MTA** INC.  
FEDERAL MANUFACTURED HOME  
CONSTRUCTION AND SAFETY STANDARDS

HART HOUSING  
DETAILS FOR BASEMENT SET-UP

FIGURE 4.5 (a)



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**MTA** INC.  
 FEDERAL MANUFACTURED HOME  
 CONSTRUCTION AND SAFETY STANDARDS

HART HOUSING  
 BASEMENT PLAN

FIGURE 4.6

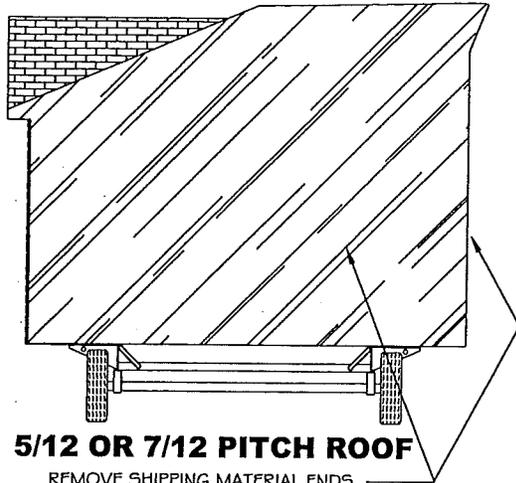
STATE OF ILLINOIS  
 PATRICK M. MCGUIRE  
 31-4369  
 REGISTERED STRUCTURAL ENGINEER  
*Patrick M. McGuire*  
 1.16.98

# **HART HOUSING**

A DIVISION OF FOREST RIVER HOUSING

## **SET-UP INSTRUCTIONS FOR 5/12 AND 7/12 PITCH ROOFS**

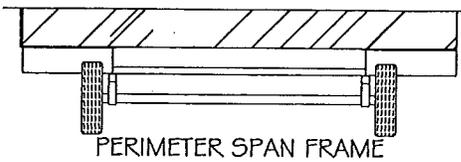
THE FOLLOWING INSTRUCTIONS SHOULD ONLY BE ATTEMPTED BY EXPERIENCED PERSONNEL ONLY.



**5/12 OR 7/12 PITCH ROOF**

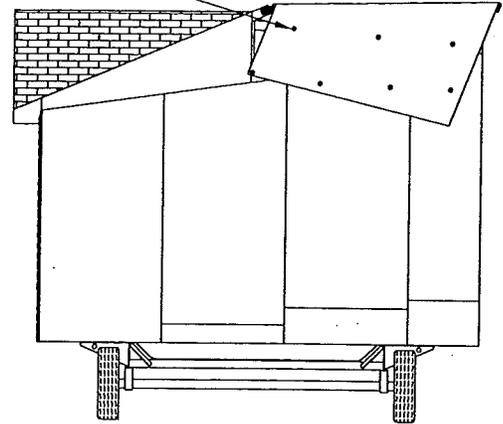
REMOVE SHIPPING MATERIAL ENDS AND MARRIAGE WALL, BOTH HALVES.

FIGURE #1



PERIMETER SPAN FRAME

REMOVE SHIPPING SCREWS.



**5/12 OR 7/12 PITCH ROOF**

FIGURE #2

1. Remove all shipping material from both ends and the marriage wall. Make sure that all staples, nails and broken nailing strips are removed from the marriage wall.
2. The sheathing on the ends of each unit has been permanently secured to the top chord of the hinged section of the truss. Screws have been used to secure the lower portion of the sheathing for shipment (fig. #2). These screws must be removed before the roof can be raised.

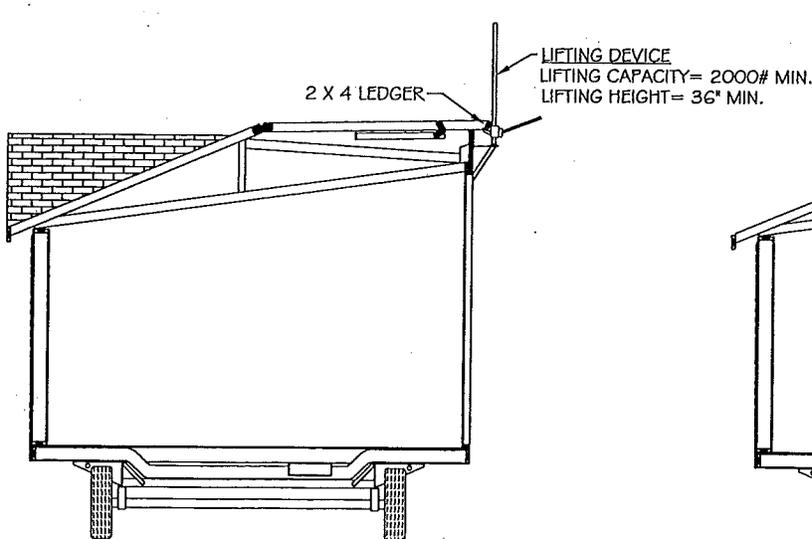


FIGURE #3

**5/12 OR 7/12 PITCH ROOF**

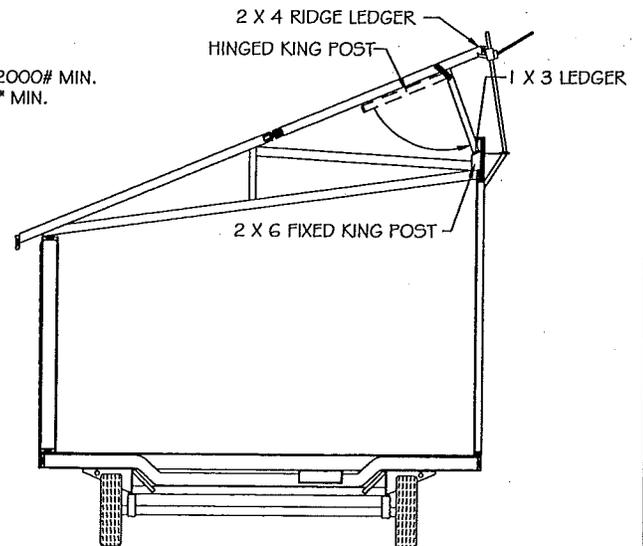
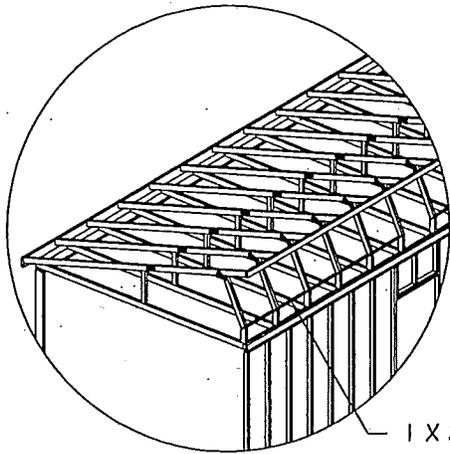


FIGURE #4

3. First remove the small gang nails securing the top chord of the truss to the fixed king post. Using appropriate jacking devices, positioned 6' to 8' apart, and using the 2 x 4 ridge ledger as the pick-up point, (figure #3) raise the roof until the 1 x 3 ledger clears the 2 x 6 fixed king post (figure # 4).

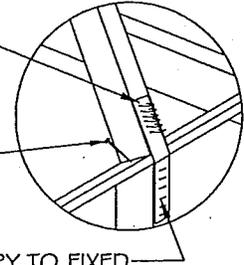


1 X 3 LEDGER CONNECTING THE HINGED KING POSTS TOGETHER IN APPROX. 10' SECTIONS.

FIGURE #5

SECURE STRAP TO HINGED KING POST WITH (6) 1" X 1" X 16 GA. STAPLES OR (6) 8d NAILS.

#8 X 3" TOE SCREW THRU 1 X 3 LEDGER INTO 2 X 6 FIXED KING POST BELOW. (2) EACH SIDE OF 2 X 3 HINGED KING POST.



STRAP SECURED AT FACTORY TO FIXED KING POST.

FIGURE #6

4. The hinged king posts are connected in approximately 10' sections (figure #5). Once the 1 x 3 ledger clears the 2 x 6 king posts, swing the hinged king posts into position, one section at a time. Slowly lower the jacks in that section so that the 1 x 3 ledger rests firmly on the 2 x 6 king posts. Secure the 1 x 3 ledger to the lower 2 x 6 king post with (2) #8 x 3" screws, (1) each side as shown and secure the loose end of the strap with (6) 1" x 1" x 16 GA. staples each strap or (6) 8d nails as shown in figure # 6.

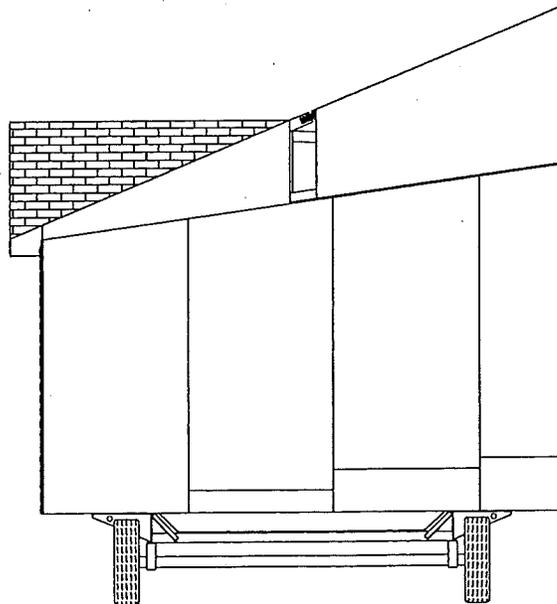


FIGURE #7

**5/12 OR 7/12 PITCH ROOF**

5. Once the roof has been raised the units should appear as shown (figure #7). The units are now properly prepared for setting on the foundation. Secure the units together as

described in Hart Housing's Installation Manual for multi-section homes.

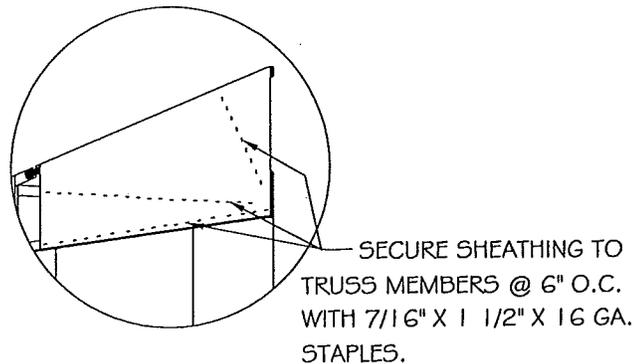


FIGURE #8

6. Secure the sheathing on both ends of each unit as shown (figure #8). It is recommended not to secure these panels until the units have been pulled together and the roof lines up at each end.
7. At this time, the units should be properly blocked, tied down and secured together, using the appropriate foundation plans and details (basement, crawl space or piers) for the specific model.

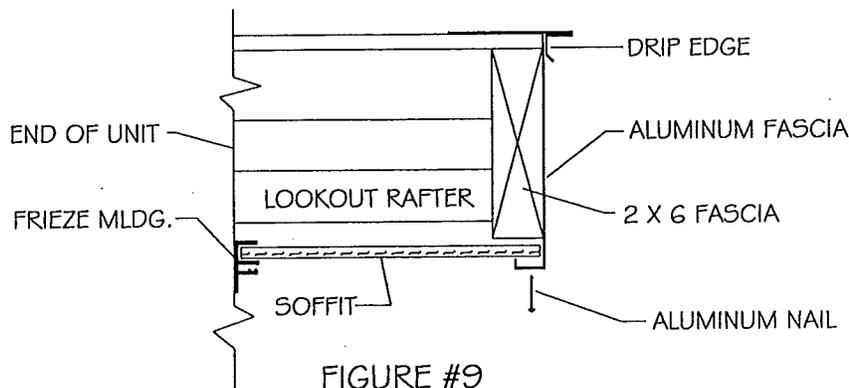
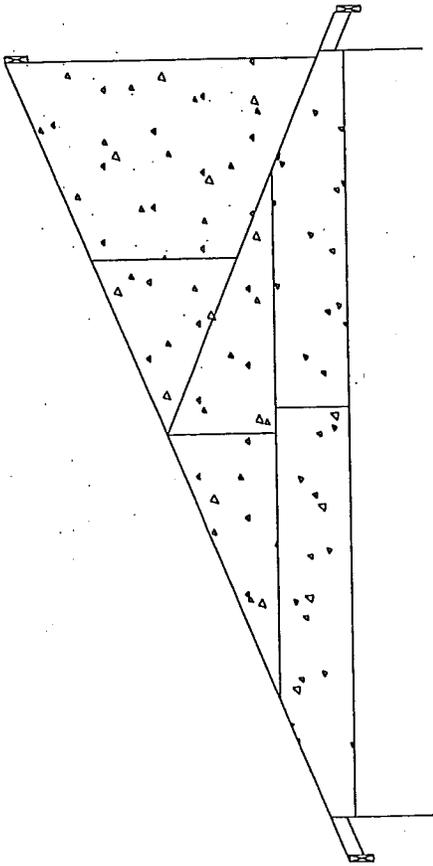


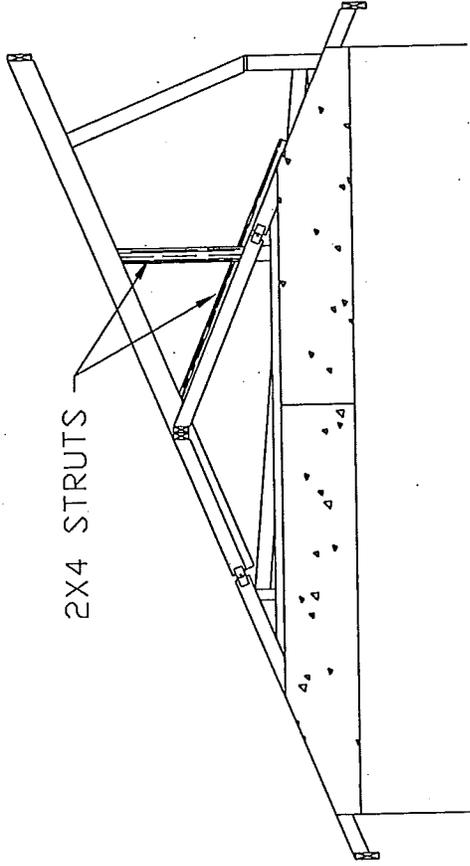
FIGURE #9

8. To complete the end overhangs, first make sure that the soffit panels are properly locked in place at the hinge. Next, slide the aluminum fascia under the drip edge until the bottom flange is snug against the soffit panels. Secure the aluminum fascia to the 2 x 6 fascia with 1" aluminum nails approximately 36" o.c as shown (figure #9). The final step for completing the exterior, is to install the siding. Again refer to the Installation Manual for correct method of installation.

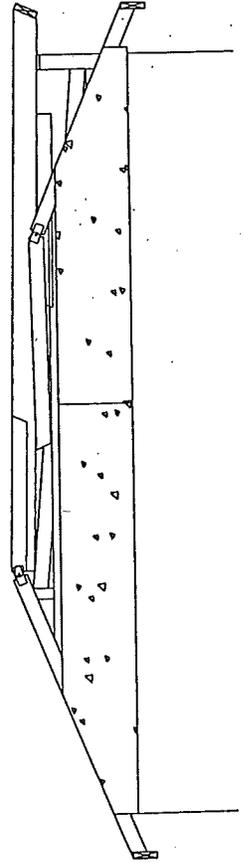
SECURE THE OSB SHEATHING TO THE END TRUSSES WITH 6d NAILS @ 6" O.C. TO ALL THE FRAMING MEMBERS IN THE TRUSS.



2X4 STRUTS

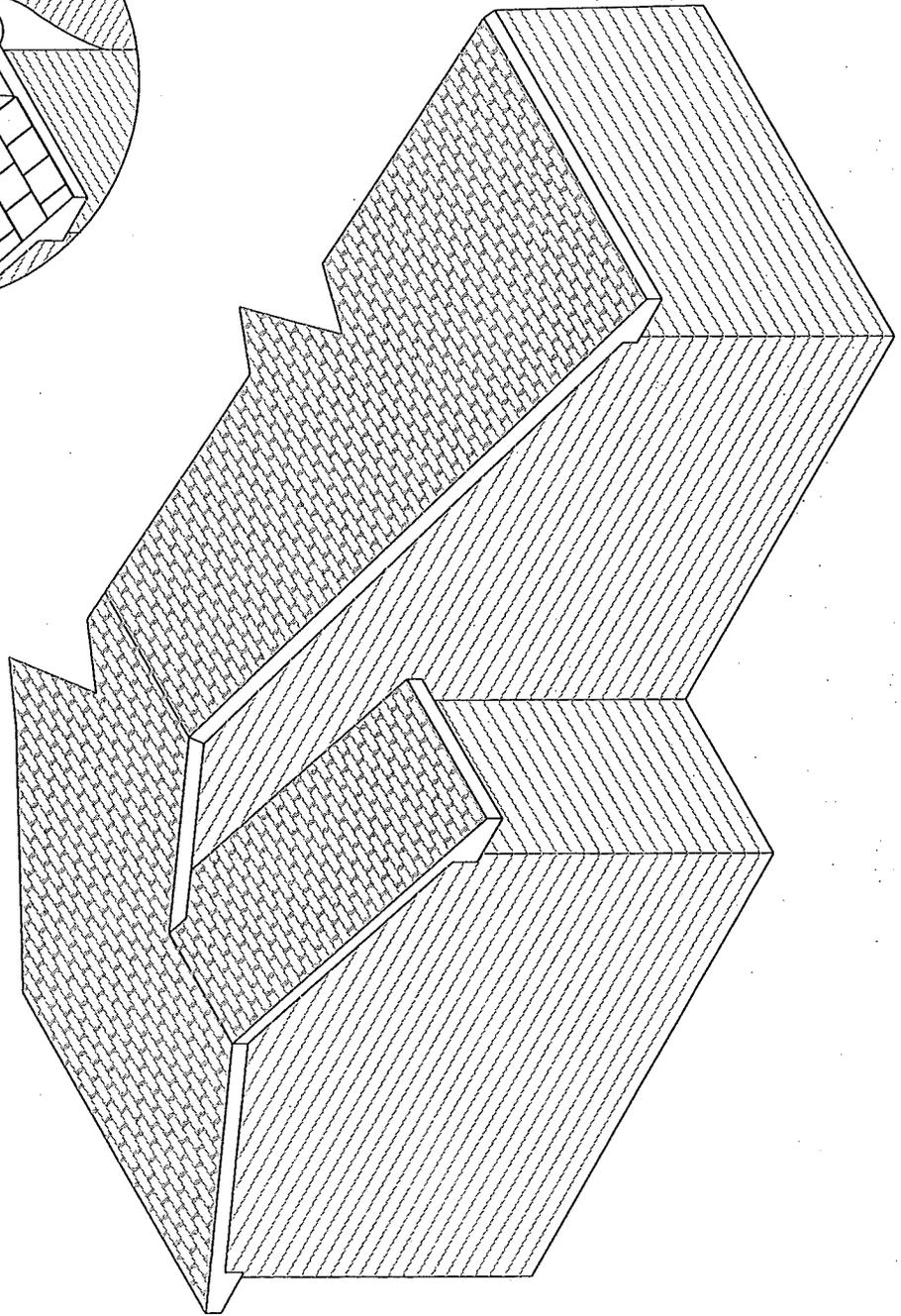
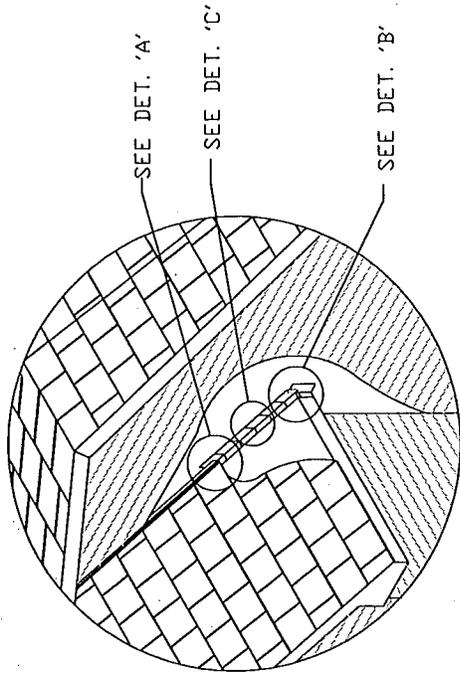


REFER TO 5/12 PITCH ROOF INSTRUCTIONS FOR RAISING THE HINGED PORTION OF THE ROOF. SECURE THE STRUTS TO THE WEBBING OF THE TRUSS WITH #8X3" SCREWS 16" O.C. AS SHOWN. THESE STRUTS ARE NECESSARY FOR THE SECUREMENT OF THE OSB SHEATHING TO THE TRUSSES.

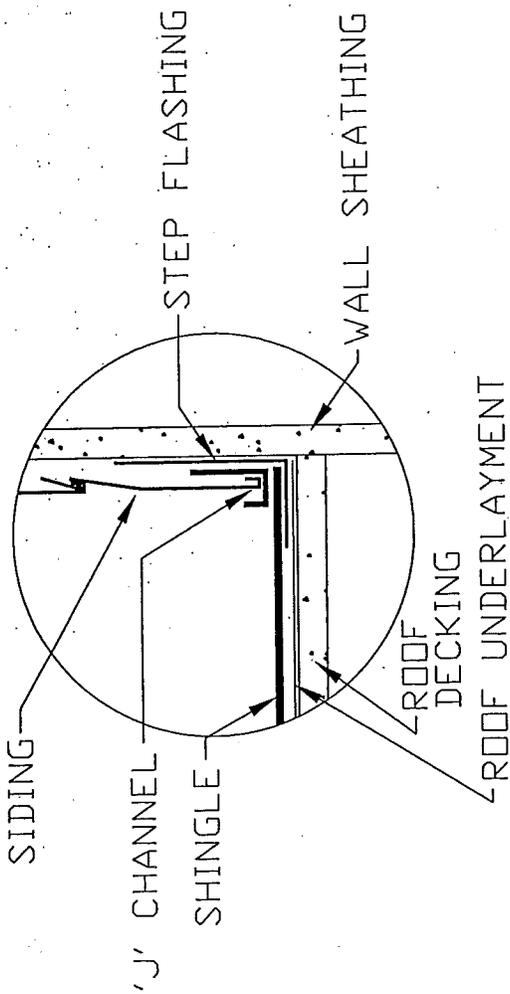


THE UNIT IS SHIPPED WITH THE HINGED TRUSSES IN THE LOWERED POSITION.

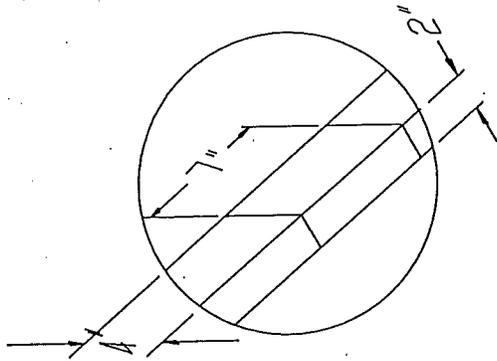
HART HOUSING GROUP, INC.  
TITLE: EYEBROW DORMER SET-UP DETAILS  
DATE: 11-10-03



HART HOUSING GROUP, INC.  
TITLE: EYEBROW DORMER SET-UP DETAILS  
DATE: 11-10-03

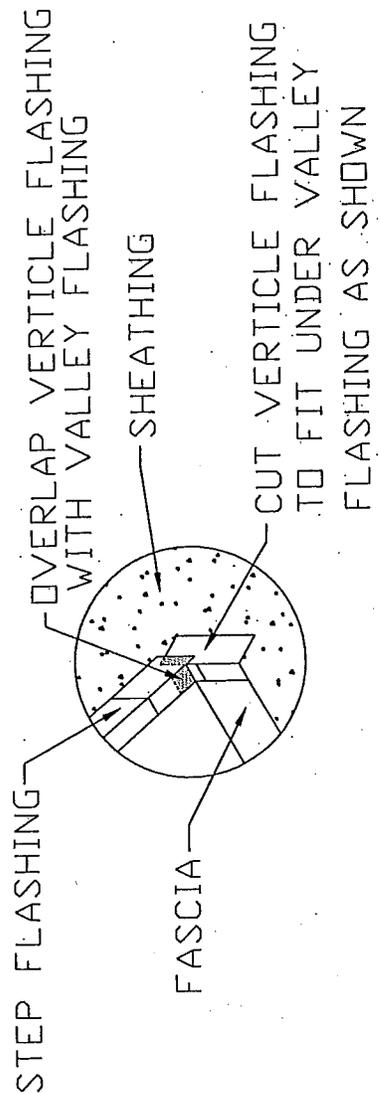


DETAIL 'A'

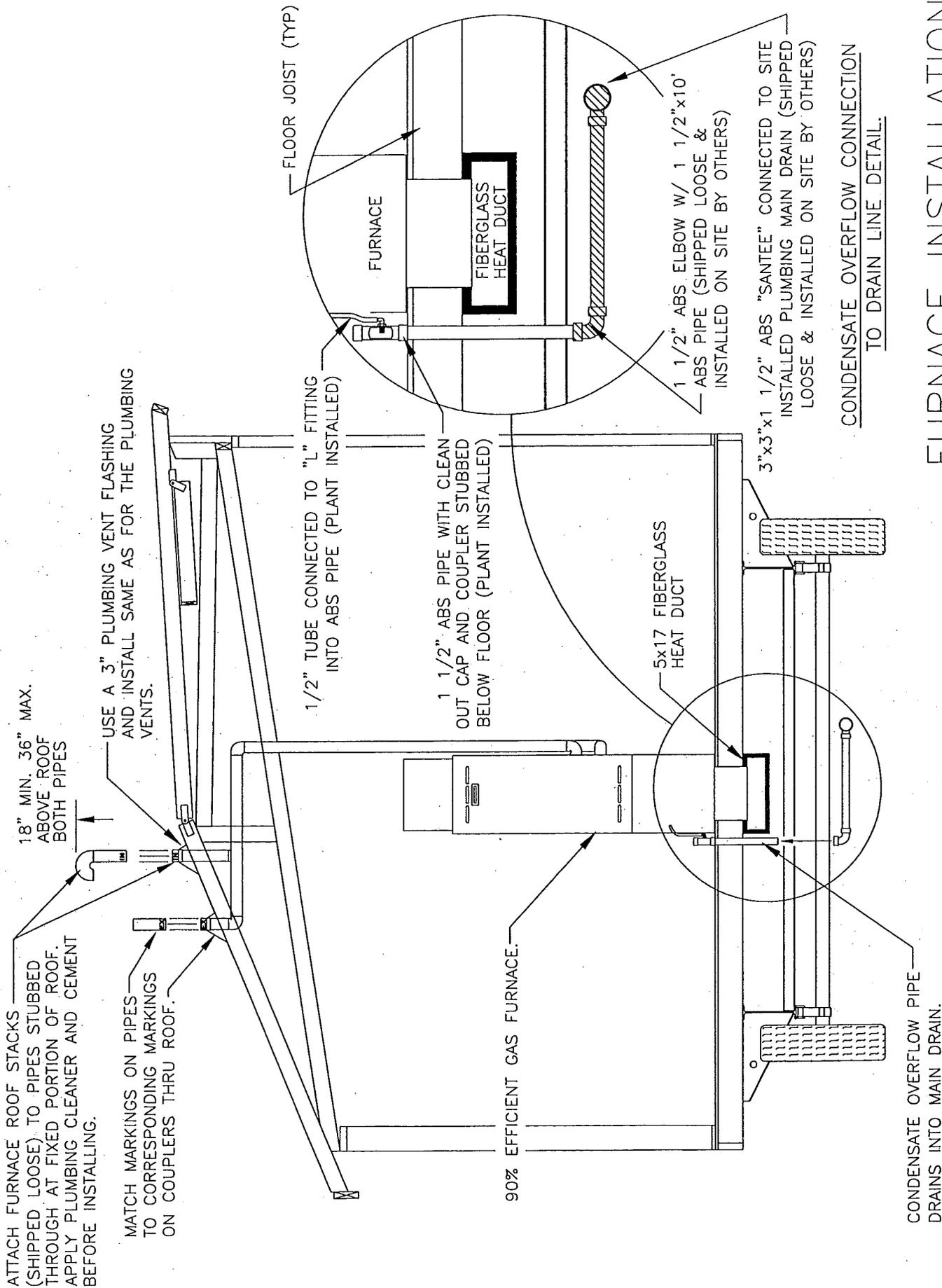


DETAIL 'C'

DETAIL 'B'



HART HOUSING GROUP, INC.  
 TITLE: EYEBROW DORMER SET-UP DETAILS  
 DATE: 11-10-03



CONDENSATE OVERFLOW CONNECTION  
TO DRAIN LINE DETAIL.

# FURNACE INSTALLATION HART HOUSING GROUP

REFER TO MANUFACTURERS INSTALLATION  
INSTRUCTIONS FOR FURTHER DETAILS.

March 4, 2002

# CHAPTER 5 — SETUP 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 or available.
  - 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. HART HOUSING RECOMMENDS WOOD BLOCKING.**

5.2 **Setup Procedure Instructions**  
**Please Read Carefully**

- 5.2.1 It is important that these instructions and precautions are adhered to closely if you are to enjoy the comfortable, safe and trouble free home that has been designed and built for you. The following four items apply to the set-up of all homes. Each step should be checked off as it is completed. The set-up crew should consist of a minimum of two experienced set-up members.

In following the procedures below for set-up, it is recommended that your home be installed as close as possible to the ground as local codes permit, yet still providing a crawl space for periodic inspection. This may require that wheels and tires be removed and that the ground in the axle hub and drum area be "dug out" so the drums can be set lower.

1. After selecting the foundation system desired, select the footing area and load capacity from the information contained in Chapter 4, Foundations, by relating the information in Chapter 4 to the structural load zone for which your home was designed and will be set up in.
2. If the support foundation or tiedown types selected cannot be installed when the home is in its final position, these portions of the support foundation system must be installed before the home is positioned in its final desired location. For example, ground anchors required for a tiedown system normally must be installed before the home is placed in its final position.
3. Upon delivery of your new home, and before placing in its final position, you should inspect both interior and exterior for possible shipment damage. Any damage should immediately be reported to your dealer.
4. Prior to set-up of your home, the soil beneath the final home location should be prepared as outlined in Chapter 3.

5.2.3 **Multiwide Set-up Procedure: Pier Foundation**

1. Strip plastic and wood braces from both units (weather proof covering and temporary supports). Be sure all exposed nails and staples are removed.
2. Position one-half (usually the heaviest half) of the home in its proper final location.
3. "Rough" level this half of your home as outlined in Steps 2 through 12 of the Single Wide Set-Up Procedures. (See Figure 4.3 for spacing and location of individual support piers.)
4. Place an additional support foundation under the floor rim joist at each ridge beam column location (See Figure 4.3)



5. Once the first half of the home is in place, a strip of sill-seal insulation should be attached per Figure 5.1 to the marriage joint of the first half. The sill-seal insulation will fill any gaps between the two halves of the home and help prevent air infiltration.
6. Position second unit along side the first unit being careful not to jar the first unit. Approximately six inches or less should separate the floors. Bring the two floors together using jacks or similar devices. Draw the floors together tight (at this stage the ceiling will usually be open at the center.)
7. Loosely attach the floors together (See Figure 5.2). Predrill holes in the floor rim joist and insert the lag screws. Do not fully tighten.
8. Starting with the inside main beam, rough level the second floor as detailed in the single wide set-up procedure, steps 2 through 11.
9. Close the gap in the center of the ridge beam halves by raising the outside of the second unit. Connect the top of the ridge beam using one of the methods shown in Figure 5.6 It may be necessary to adjust the ceiling joint flush before installing the connections. A jack and tree is used to raise which ever ceiling is low. Start in the front and work through the home to the rear.
10. Tighten the lag screws to securely fasten the floors together.
11. Make a final level adjustment of the home using a standard bubble level or manometer type level. Work from front to rear and side to side to obtain final level conditions throughout the home. Each individual support foundation should be snug and in contact with the home.
12. To finish the roof, install the roll of starter strip along the entire length of the unit and tack in place. The strips are to be overlapped 4" at each seam. Cut the shingles to be used for the ridge cap into (3) sections. Bend the shingle lengthwise so as to have an equal exposure on each half of the ridge. Begin at either end of the ridge and lay the shingle over the top edge and secure on each side with a nail located 11" from the exposed end and 1" up from the edge. Lay the succeeding shingles so as to expose 5".

**NOTE! In cold weather, warm the shingles before bending them; field installed shingles and ridge caps must be hand tabbed using an approved tar and sealer.**

13. Connect gas line flex connector (crossover) where applicable. (See Figure 8.7)
14. Connect electrical crossovers as required with the material provided. (See Figure 8.12)
15. Connect duct crossover. Flexible crossover must be supported so that it does not rest on the ground. (See Figure 5.8)
16. Connect waste line crossover where applicable.
17. Connect hot and cold water line crossover connectors where applicable.
18. The tiedown system must be connected as discussed in Section 5.3 of these instructions, and in accordance with the instructions of the tiedown and anchor manufacturer.
19. In the event of a slight settlement any time after the initial installation, releveling can be accomplished by following the procedures detailed above for "final" leveling.
20. Install all light shades and light fixtures as needed.
21. After connection of utilities is complete test utility systems (electrical, water, drain lines and gas lines, as applicable) as detailed in Chapter 8.

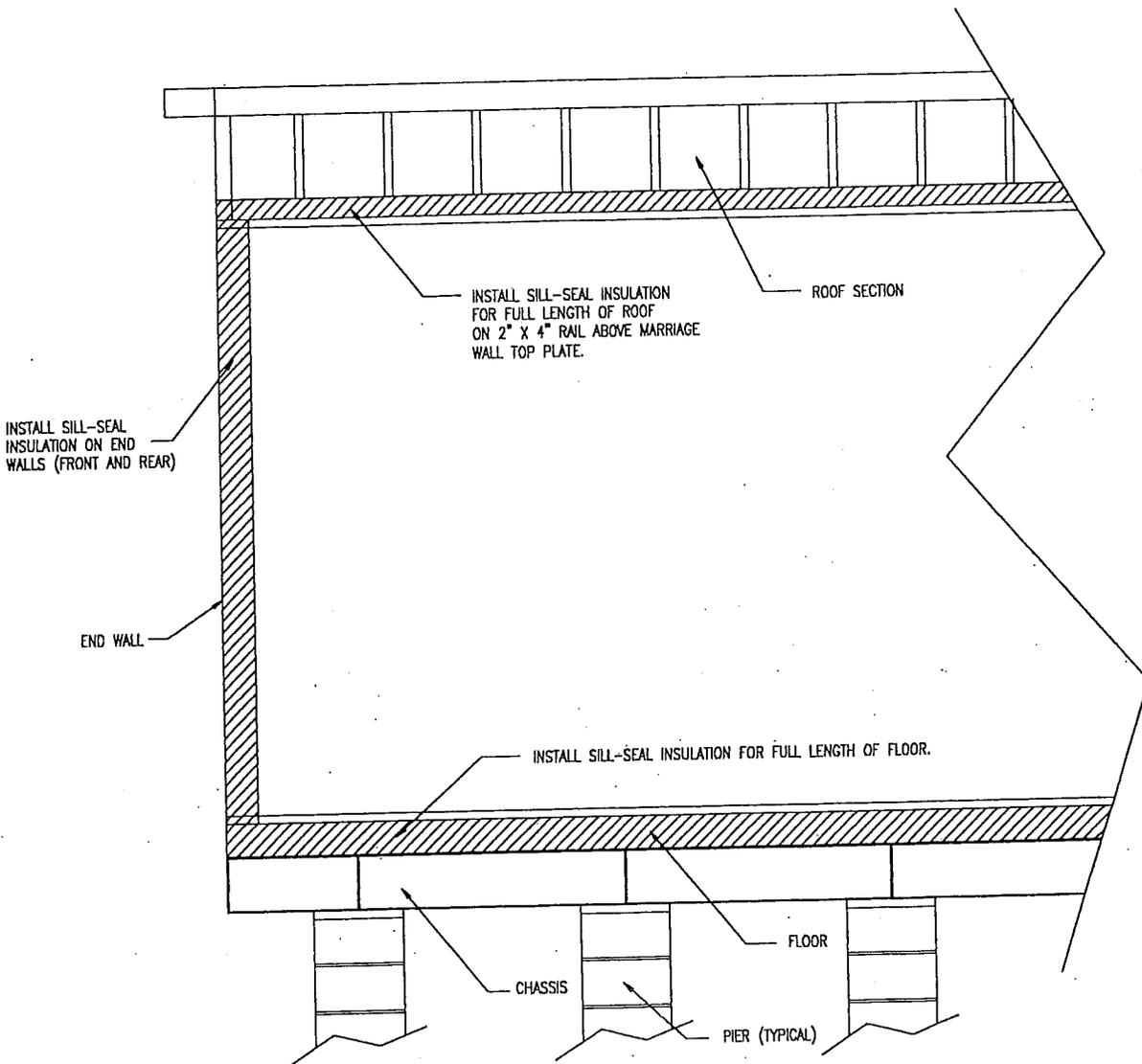


22. Install the ridge beam molding (or finish) over the center joint in the ceiling.
  23. Install carpet, carpet padding and molding where applicable.
  24. Check and adjust the entire home for items which may have become misaligned in transit or during set up, such as the following:
    - a. Adjust passage doors to close easily with proper alignment.
    - b. Realign cabinet doors.
    - c. Adjust drawers to open and close easily.
    - d. Adjust closet doors, aligned and square with walls.
    - e. Adjust exterior doors to close easily and be square with frame, and to lock and unlock easily.
    - f. Adjust all windows to open and shut easily.
    - g. Adjust drapes to operate easily and completely close.
    - h. Recaulk over the top of all windows and doors and other seams as necessary.
    - i. Retack any loose moldings, panel connections, and trim.
    - j. Retighten "p" trap fittings.
  25. On some fireplaces and furnaces it may have been necessary to ship loose appliance vent piping to assure the pipe's safe transportation to the final site. Check all appliances to confirm that all venting is installed per the appliance installation instructions. See Chapter 7.
  26. Install and/or connect all other parts and items shipped loose with the home.
  27. Conduct final clean-up operation in the home.
  28. Your HART HOUSING Multi-Section Home is ready for occupancy.
- 5.3.1 **Anchoring Instructions.** After blocking and leveling, the installer must secure the home against the wind.
- 5.3.1.1 **Number of location of anchors.** Select the amount of anchors required based on 14' max spacing between the tie downs. See Figure 5.0. Use only listed and approved ground anchors capable of resisting at least the minimum loads indicated.
  - 5.3.1.2 **Installation of anchors.** Install the anchors at the locations selected, following the anchor manufacturer's instructions. Install double head anchors at each location except for the four(4) vertical anchors at each end, for shear wall tie down. (See Figure 5.0.2) Also single head anchors are required at all openings, in the mating wall, over four feet. (See Figure 5.0.1) Line up the angle brackets (shipped loose in the home) with the ground anchors and secure to rim joist with (2) 5/16" x 3" full thread lag screws also provided. (See Figure 5.0.3) Repeat this procedure for the angle brackets required at the mating wall.
  - 5.3.1.3 **Strap Tensioning.** If your home is releveled at some date after the initial tensioning of the anchoring straps, the straps must be retensioned as specified in the anchor manufacturer's installation instructions. Check straps periodically to assure proper tension.
- 5.3.3 **Severe climatic conditions**
- 5.3.3.1 **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.
  - 5.3.3.2 **Severe wind zones.** HART HOUSING 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).



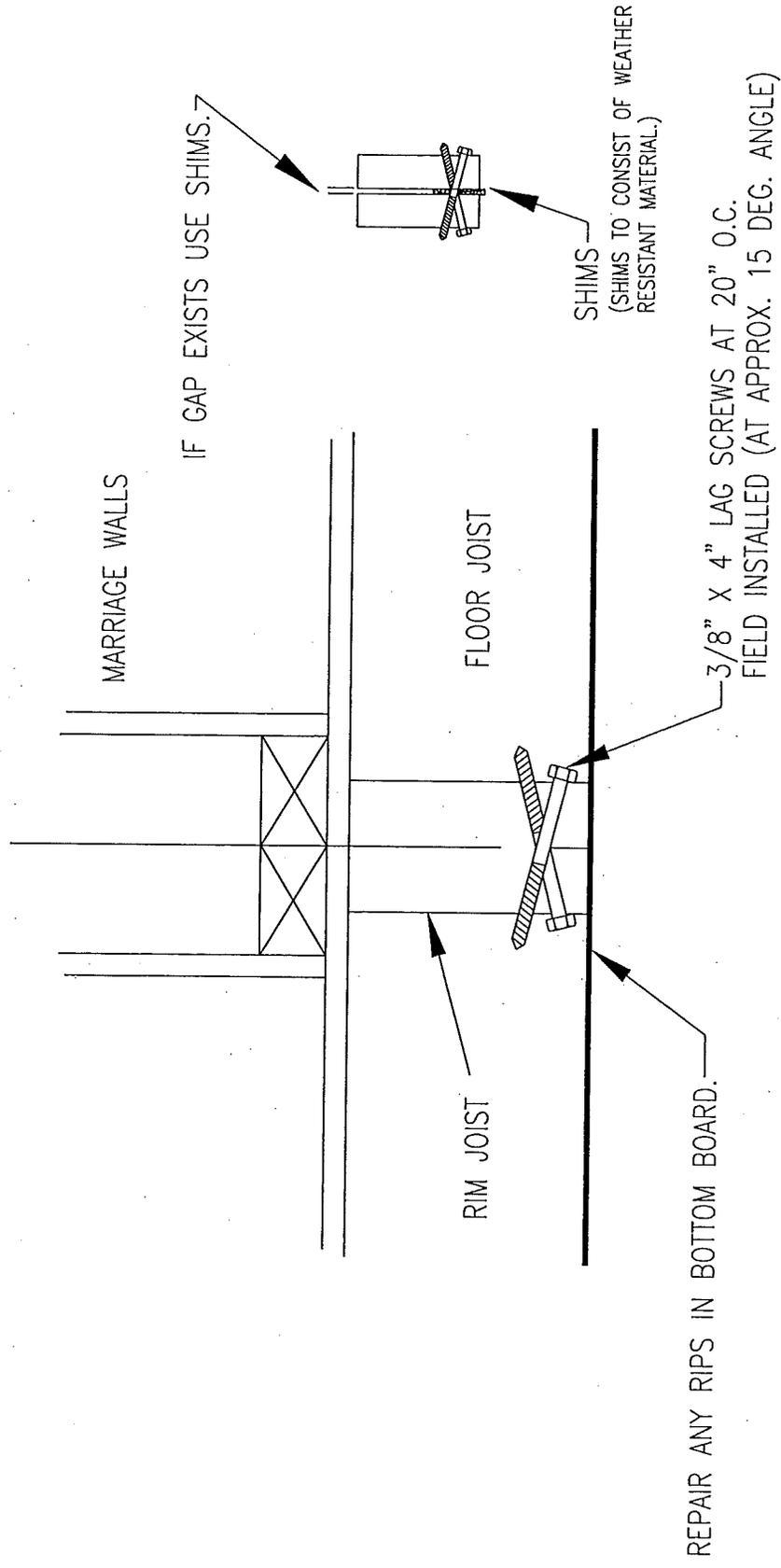
- 5.3.3.3 **Flood-prone areas.** HART HOUSING does not recommend setting manufactured homes in flood-prone areas. Unconventional anchorage and tie-down often are needed in designing and constructing the special elevated foundations that may be required in flood-prone areas. Consult a registered professional or structural engineer.
- 5.4 **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.
- 5.4.1 **Attached garages.** Attached garages must be installed according 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.
- 5.4.2 **Porches.** Site-constructed porches must be constructed and inspected according to applicable local building codes.
- 5.4.3 **Steps, stairways and landings.** Steps, stairways and landings must be constructed and inspected according to applicable local building codes.
- 5.5 **Skirting.** Skirting installed around the home must have nonclosing vents located at or near each corner and as high as possible to cross-ventilate the entire space under the home. Vent free area must be equal to at least one square foot for every 150 square feet of the home's floor area, and this area must be further increased when insect screens, slats, etc. are used over the open vent area. In freezing climates, install skirting so as to accommodate 1-2 inches of frost heave uplift to prevent buckling of floors. Take care that rainwater cannot be channeled or trapped between the skirting and siding.
- 5.6 Due to varying soil conditions which may exist on your homesite, some initial settling may occur. It is recommended that your home be releveled after 90 days of initial set up and checked periodically.





AFTER THE FIRST SECTION OF HOME IS IN PLACE, A STRIP OF SILL-SEAL INSULATION SHOULD BE INSTALLED PER THE DETAIL ABOVE. THIS SILL-SEAL INSULATION WILL FILL ANY GAPS BETWEEN THE TWO SECTIONS OF THE HOME AND ASSIST IN PREVENTING AIR INFILTRATION AND HEAT LOSS OR GAIN.

MARRIAGE LINE INFILTRATION BARRIER  
FIGURE 5.1



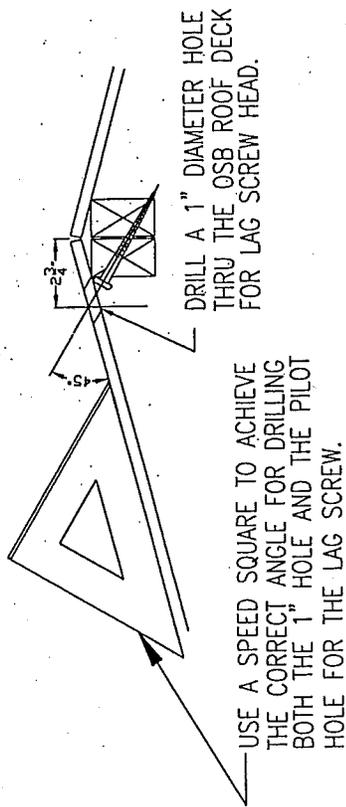
**I-26**

IN PREDRILLED 1/4" PILOT HOLES

**ALL LAG SCREWS ARE FASTEC**

FLOOR MARRIAGE CONNECTIONS

FIGURE 5.2



3/8" X 4" LAG SCREWS  
INSTALL AT 16" O.C.  
AT 45° ANGLE

(PRE-DRILL 1/4" PILOT HOLES)

ROOF CAP INSTALLED ON SITE

9" STARTER STRIP FULL LENGTH  
INSTALLED ON SITE

SHINGLES

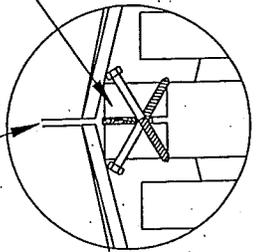
SHEATHING

ROOF TRUSS

ROOF BEAM

SHIMS

IF GAP EXISTS  
USE SHIMS



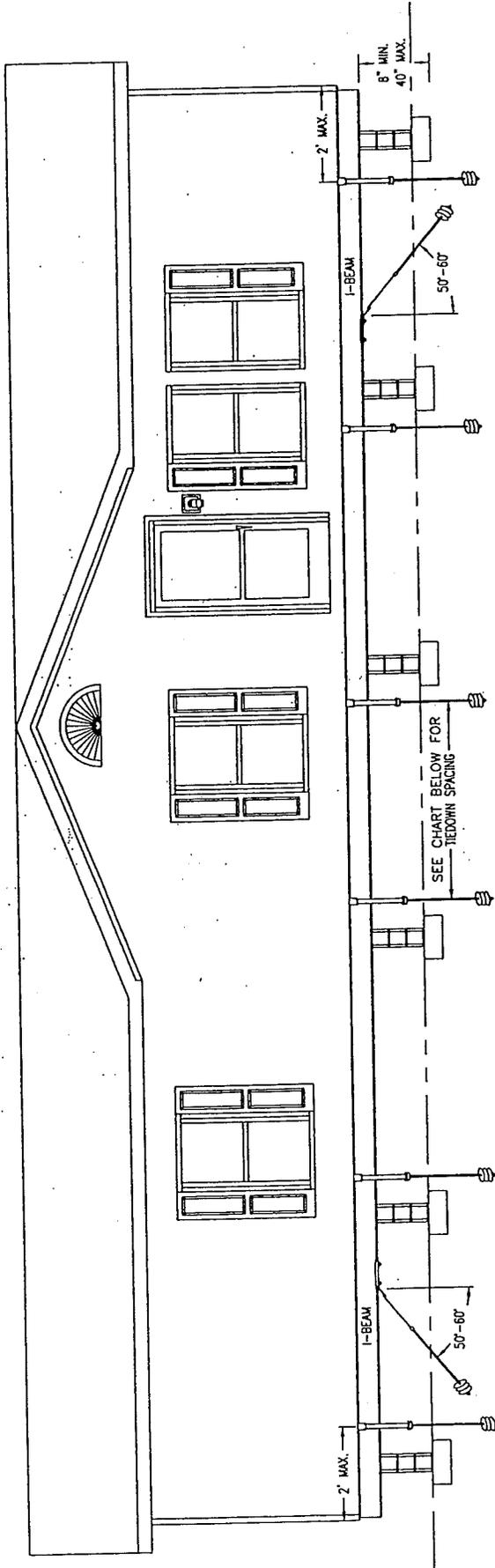
**ALL LAG SCREWS ARE FASTEC**

ROOF MARRIAGE CONNECTION

**I-27**

FIGURE 5.6

**RESERVE**



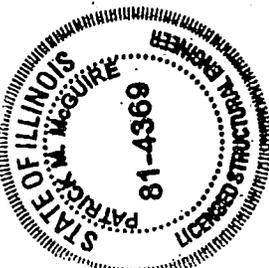
TYPICAL SIDE ELEVATION  
SHOWING TIEDOWN LOCATIONS  
WIND ZONE - 1

NOTES:

1. Use this sheet for TIEDOWN information only. Pier construction shall be as specified elsewhere in this manual.
2. Refer to the Data Plate installed in the home to determine which wind zone the home has been designed for. Space TIEDOWNS for this zone as the charts specify.
3. Ground anchors and frame ties shall be certified by a Professional Engineer, registered Architect, or nationally recognized testing agency, as capable of resisting ultimate tension loads of 3150 lbs. for straps and 6000 lbs. for anchors when tested in accordance with ASTM D3593-91.
4. Ground anchors and frame ties shall be installed in accordance with manufacturer's instructions, and shall be appropriate for the soil conditions at the home site.
5. Ground anchors shall be embedded below the maximum frost penetration depth and 12" above the water table. Ground anchors shall be installed to their full depth and stabilizer plates shall be installed to provide added resistance to overturning and/or sliding.
6. Vertical and diagonal frame ties may be installed to the same ground anchor by using the equipment and installation methods specified by the anchor manufacturer.
7. Any foundation or TIEDOWN system not in accordance with this manual shall be designed and certified by a licensed Professional Engineer familiar with local conditions.
8. Steel anchoring equipment exposed to the weather shall be protected with a coating of at least .3 ounces of zinc per square foot, or equivalent.
9. Four longitudinal tie downs are required at each end. Tie down straps to be attached to main I-beam using a Vector gator beam clamp #59011 or equal.

UNIT WIDTH	MAXIMUM SPACING
13'-4"	14'-0"
15'-0"	10'-6"

NOTE:  
ALL HOMES WITH A 5/12 ROOF PITCH  
SHALL NOT EXCEED 5'-0" SPACING.

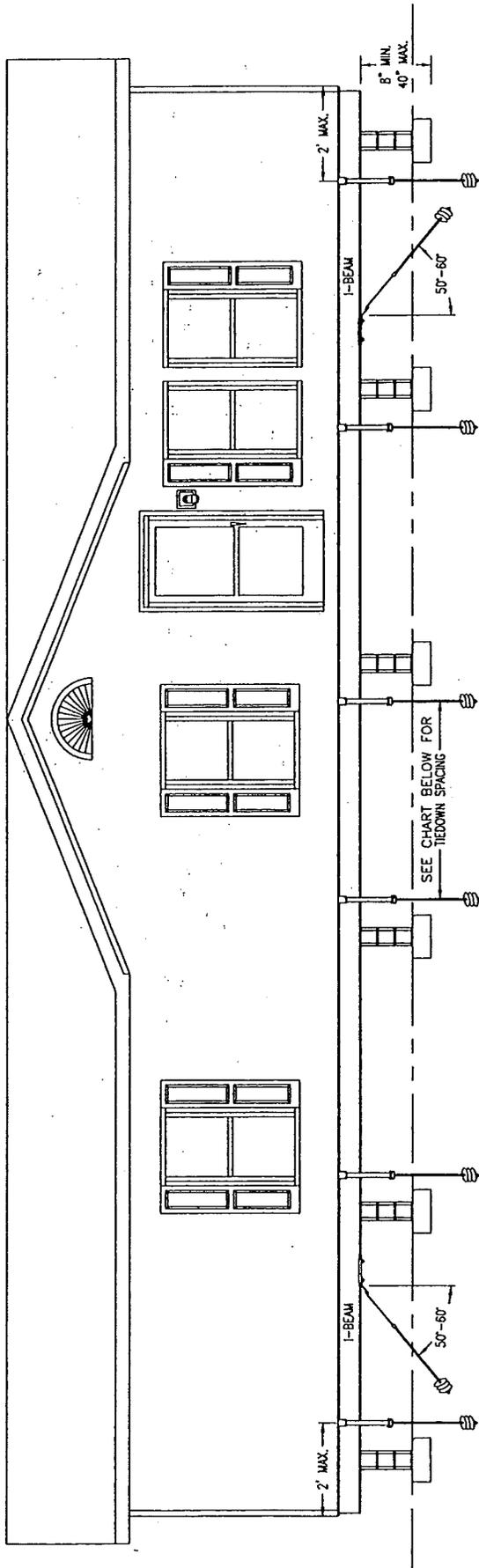


HART HOUSING

*Patrick M. McGuire 6-5-06*

STANDARD PIER CONFIGURATION  
& TIE-DOWN PLACEMENT

FIGURE 5.0

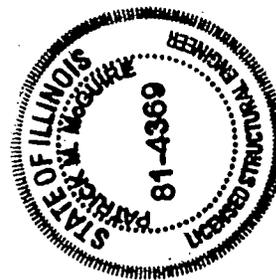


TYPICAL SIDE ELEVATION  
SHOWING TIEDOWN LOCATIONS  
WIND ZONE - III

NOTES:

1. Use this sheet for TIEDOWN information only. Pier construction shall be as specified elsewhere in this manual.
2. Refer to the Data Plate installed in the home to determine which wind zone the home has been designed for. Space TIEDOWNS for this zone as the charts specify.
3. Ground anchors and frame ties shall be certified by a Professional Engineer, registered Architect, or nationally recognized testing agency, as capable of resisting ultimate tension loads of 3150 lbs. for straps and 6000 lbs. for anchors when tested in accordance with ASTM D3593--91.
4. Ground anchors and frame ties shall be installed in accordance with manufacturer's instructions, and shall be appropriate for the soil conditions at the home site.
5. Ground anchors shall be embedded below the maximum frost penetration depth and 12" above the water table. Ground anchors shall be installed to their full depth and stabilizer plates shall be installed to provide added resistance to overturning and/or sliding.
6. Vertical and diagonal frame ties may be installed to the same ground anchor by using the equipment and installation methods specified by the anchor manufacturer.
7. Any foundation or TIEDOWN system not in accordance with this manual shall be designed and certified by a licensed Professional Engineer familiar with local conditions.
8. Steel anchoring equipment exposed to the weather shall be protected with a coating of at least .3 ounces of zinc per square foot, or equivalent.
9. Four longitudinal tie downs are required at each end. Tie down straps to be attached to main I-beam using a Vector gator beam clamp #S9011 or equal.

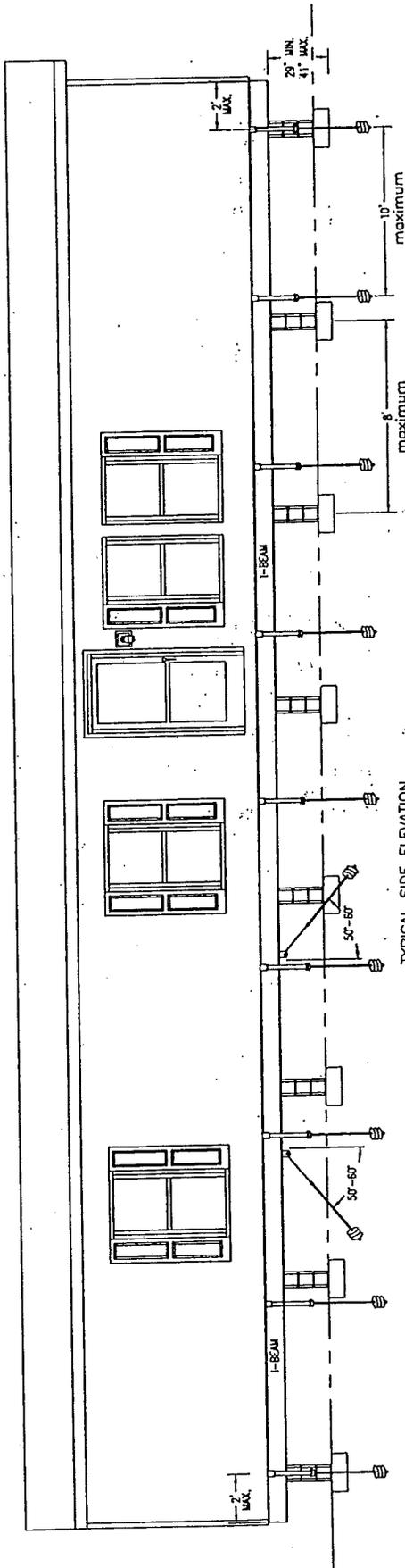
UNIT WIDTH	MAXIMUM SPACING
13'-4"	6'-6"



HART HOUSING  
Patrick M. McGuire 6-5-06

STANDARD PIER CONFIGURATION  
& TIE-DOWN PLACEMENT

FIGURE 5.0.4

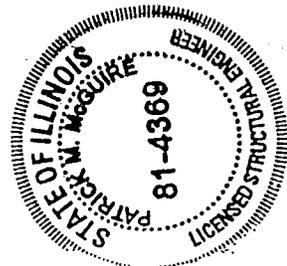


TYPICAL SIDE ELEVATION  
SHOWING TIEDOWN LOCATIONS  
WIND ZONE - 1

**NOTES:**

1. Use this sheet for TIEDOWN information only. Pier construction shall be as specified elsewhere in this manual.
2. Refer to the Data Plate installed in the home to determine which wind zone the home has been designed for. Space TIEDOWNS for this zone as specified.
3. Ground anchors and frame ties shall be certified by a Professional Engineer, registered Architect, or nationally recognized testing agency, as capable of resisting ultimate tension loads of 3150 lbs. for straps and 6000 lbs. for anchors when tested in accordance with ASTM D3593-91.
4. Ground anchors and frame ties shall be installed in accordance with manufacturer's instructions, and shall be appropriate for the soil conditions at the home site.
5. Ground anchors shall be embedded below the maximum frost penetration depth and 12" above the water table. Ground anchors shall be installed to their full depth and stabilizer plates shall be installed to provide added resistance to overturning and/or sliding.
6. Vertical and diagonal frame ties may be installed to the same ground anchor by using the equipment and installation methods specified by the anchor manufacturer.
7. Any foundation or TIEDOWN system not in accordance with this manual shall be designed and certified by a licensed Professional Engineer familiar with local conditions.
8. Steel anchoring equipment exposed to the weather shall be protected with a coating of at least .3 ounces of zinc per square foot, or equivalent.
9. Two longitudinal tie downs are required at each end. Tie down straps to be attached to main I-beam using the front and rear spring hanger and bolt in the axle area.

UNIT WIDTH	MAXIMUM SPACING
15'-0"	10'-0"
13'-8"	10'-0"



STANDARD PIER CONFIGURATION  
& TIE-DOWN PLACEMENT  
05-30-06

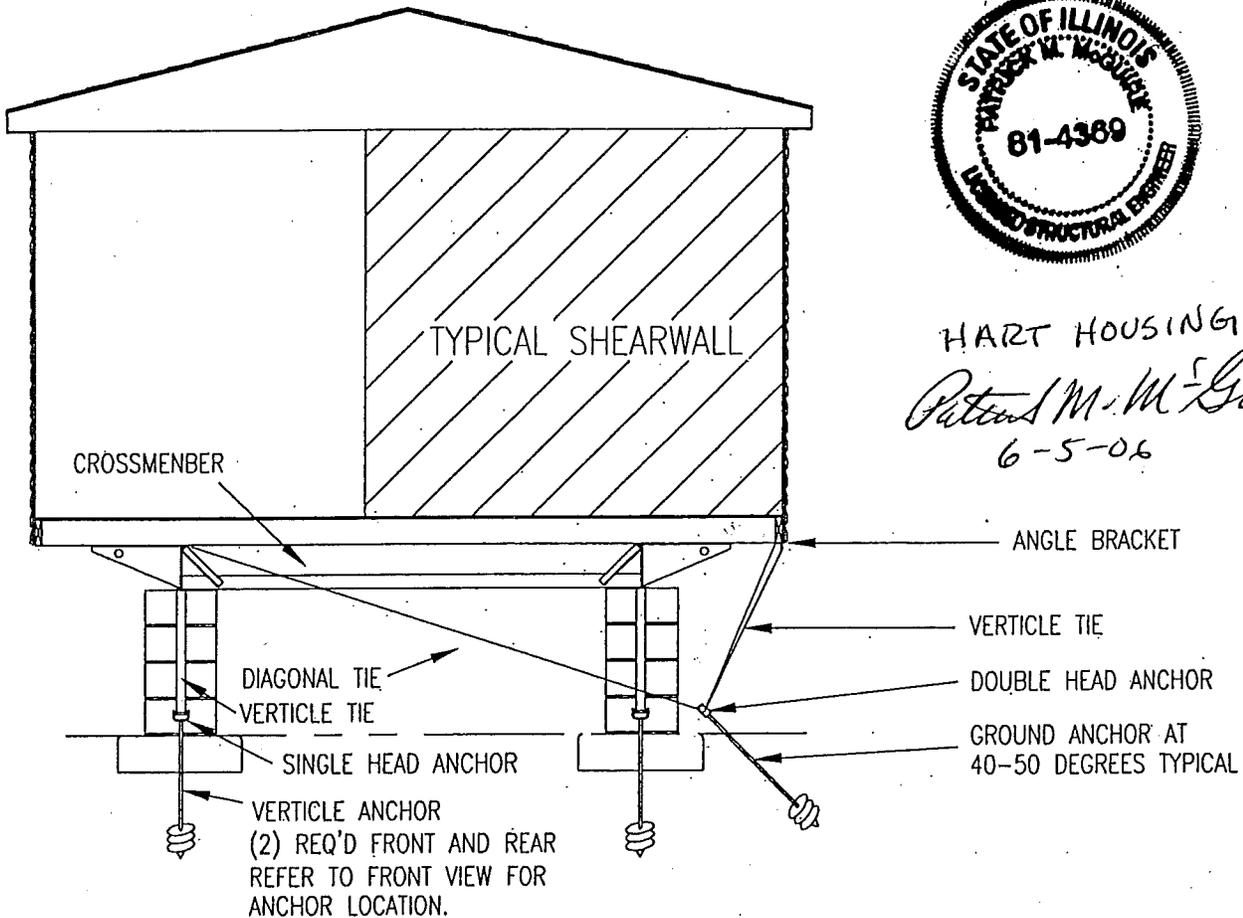
HART HOUSING  
*Patrick W. McGuire 6-5-06*

**RESERVE**

MAXIMUM ROOF SLOPE  
LESS THAN 20 DEGREES.



HART HOUSING  
*Patrick M. McGuire*  
6-5-06



NOTES:

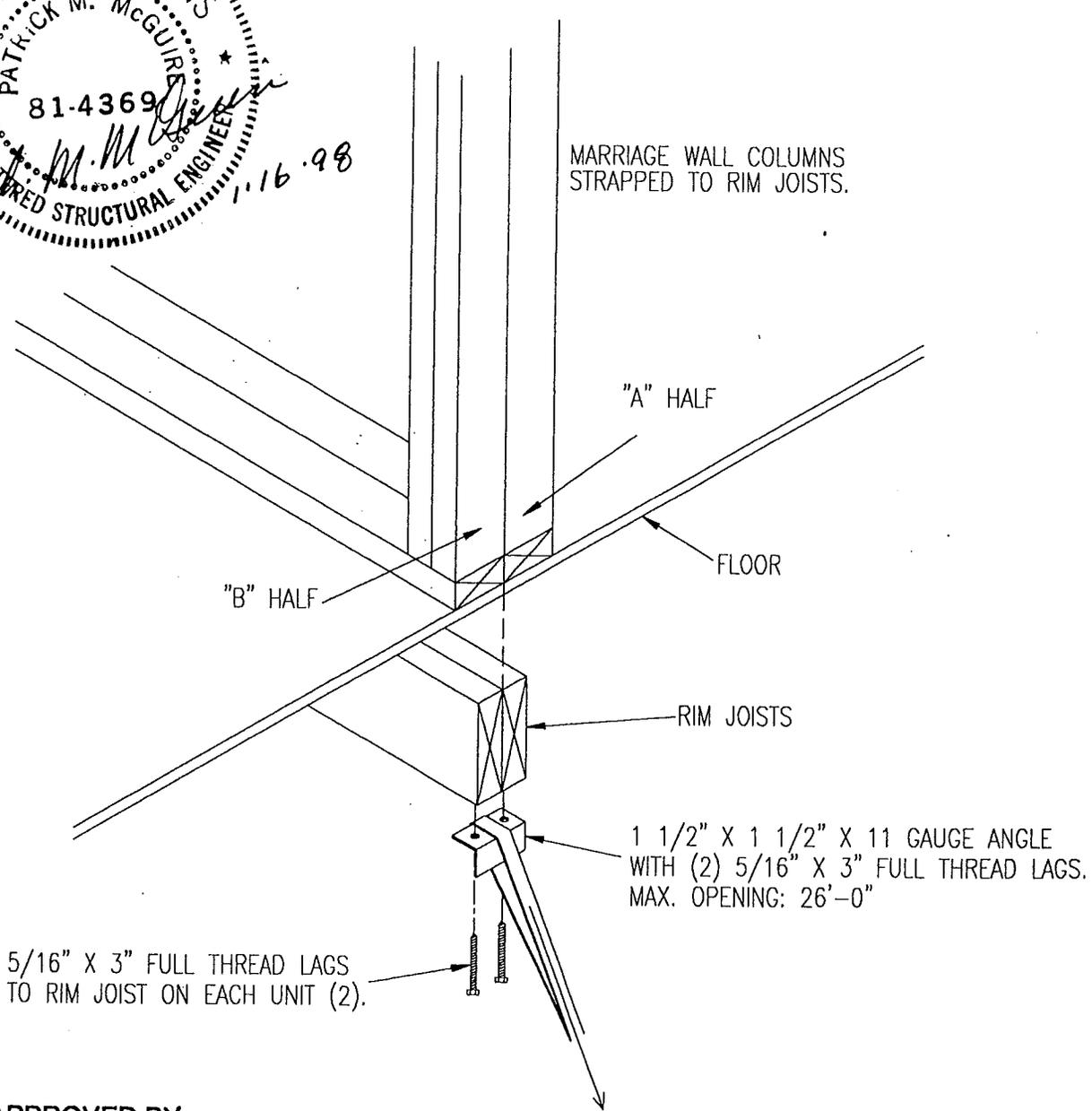
TIE-DOWNS REQUIRED AS SHOWN WITHIN  
TWO FEET OF EACH END OF EACH HALF.

TIE-DOWN ANCHORS INSTALLED PER  
MANUFACTURER'S INSTRUCTIONS AND  
RATED FOR 3150 LBS. ALLOWABLE TENSION.

STABILIZER PLATES SHALL BE INSTALLED AS  
SPECIFIED BY THE ANCHOR MANUFACTURER.

VERTICAL ANCHOR  
WIND ZONE I  
04-25-06

STATE OF ILLINOIS  
 PATRICK M. MCGUIRE  
 81-4369  
 REGISTERED STRUCTURAL ENGINEER  
*Patrick M. McGuire*  
 1.16.98



MARRIAGE WALL COLUMNS STRAPPED TO RIM JOISTS.

"A" HALF

FLOOR

"B" HALF

RIM JOISTS

1 1/2" X 1 1/2" X 11 GAUGE ANGLE WITH (2) 5/16" X 3" FULL THREAD LAGS. MAX. OPENING: 26'-0"

5/16" X 3" FULL THREAD LAGS TO RIM JOIST ON EACH UNIT (2).

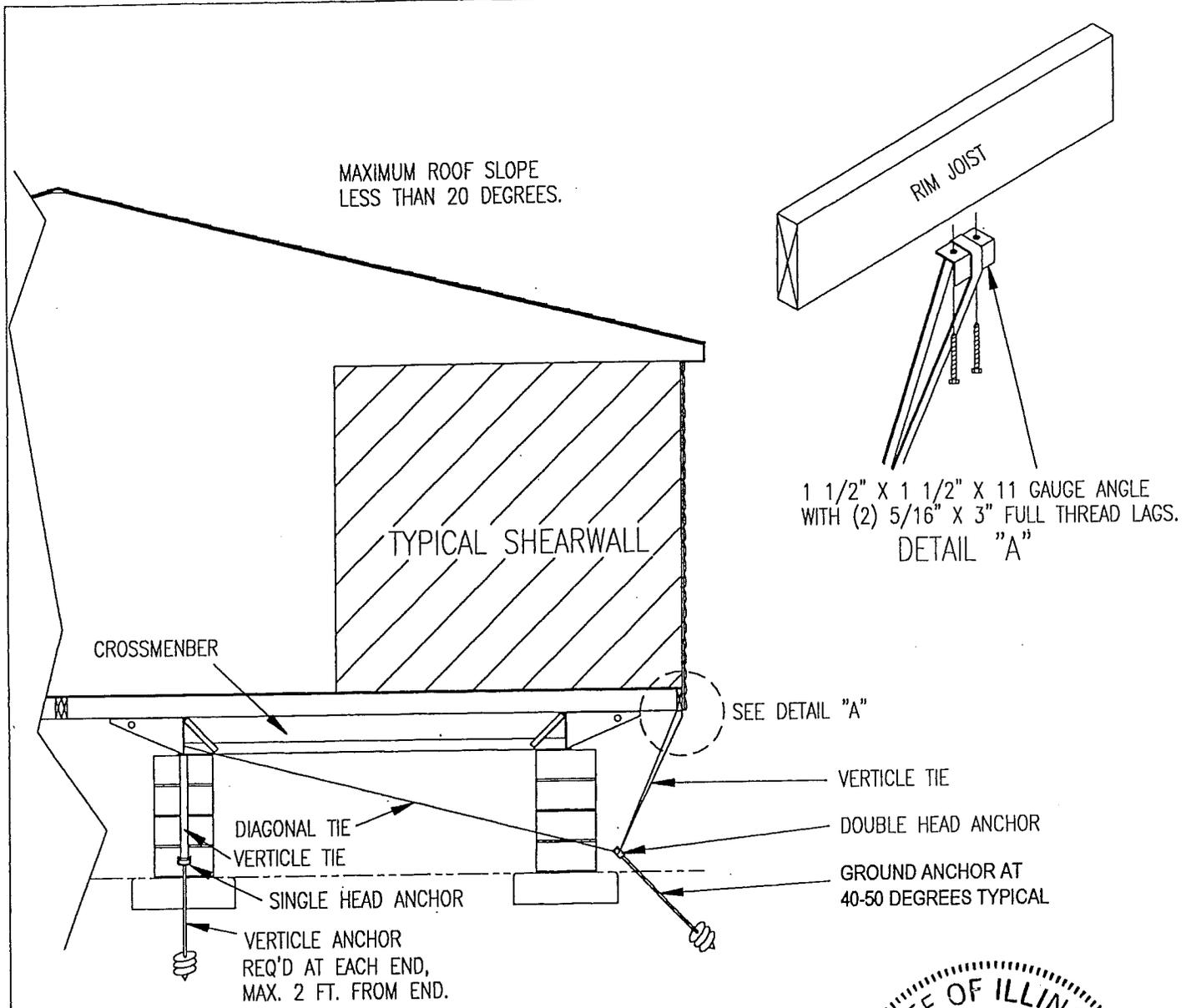
TO TIE-DOWN ANCHOR INSTALLED PER MANUFACTURER'S INSTRUCTIONS AND RATED FOR 3150 LBS. ALLOWABLE TENSION.

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 FEDERAL MANUFACTURED HOME CONSTRUCTION AND SAFETY STANDARDS

TIE-DOWN REQUIREMENT AT ALL OPENINGS OVER FOUR FEET.

WIND ZONE 1

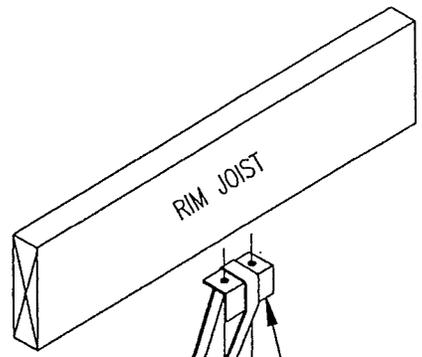
FIGURE 5.0.1



MAXIMUM ROOF SLOPE  
LESS THAN 20 DEGREES.

TYPICAL SHEARWALL

CROSSMEMBER



1 1/2" X 1 1/2" X 11 GAUGE ANGLE  
WITH (2) 5/16" X 3" FULL THREAD LAGS.  
DETAIL "A"

SEE DETAIL "A"

VERTICLE TIE

DOUBLE HEAD ANCHOR

GROUND ANCHOR AT  
40-50 DEGREES TYPICAL

DIAGONAL TIE  
VERTICLE TIE

SINGLE HEAD ANCHOR

VERTICLE ANCHOR  
REQ'D AT EACH END,  
MAX. 2 FT. FROM END.

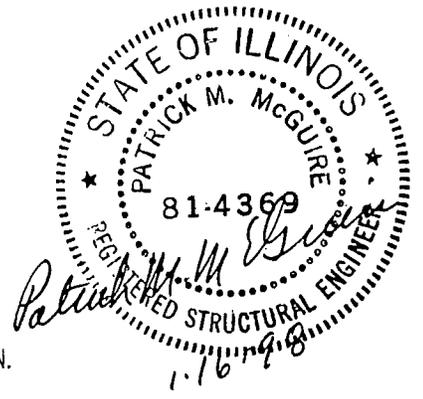


NOTES:

TIE-DOWNS REQUIRED AS SHOWN WITHIN  
TWO FEET OF EACH END OF EACH HALF.

TIE-DOWN ANCHORS INSTALLED PER  
MANUFACTURER'S INSTRUCTIONS AND  
RATED FOR 3150 LBS. ALLOWABLE TENSION.

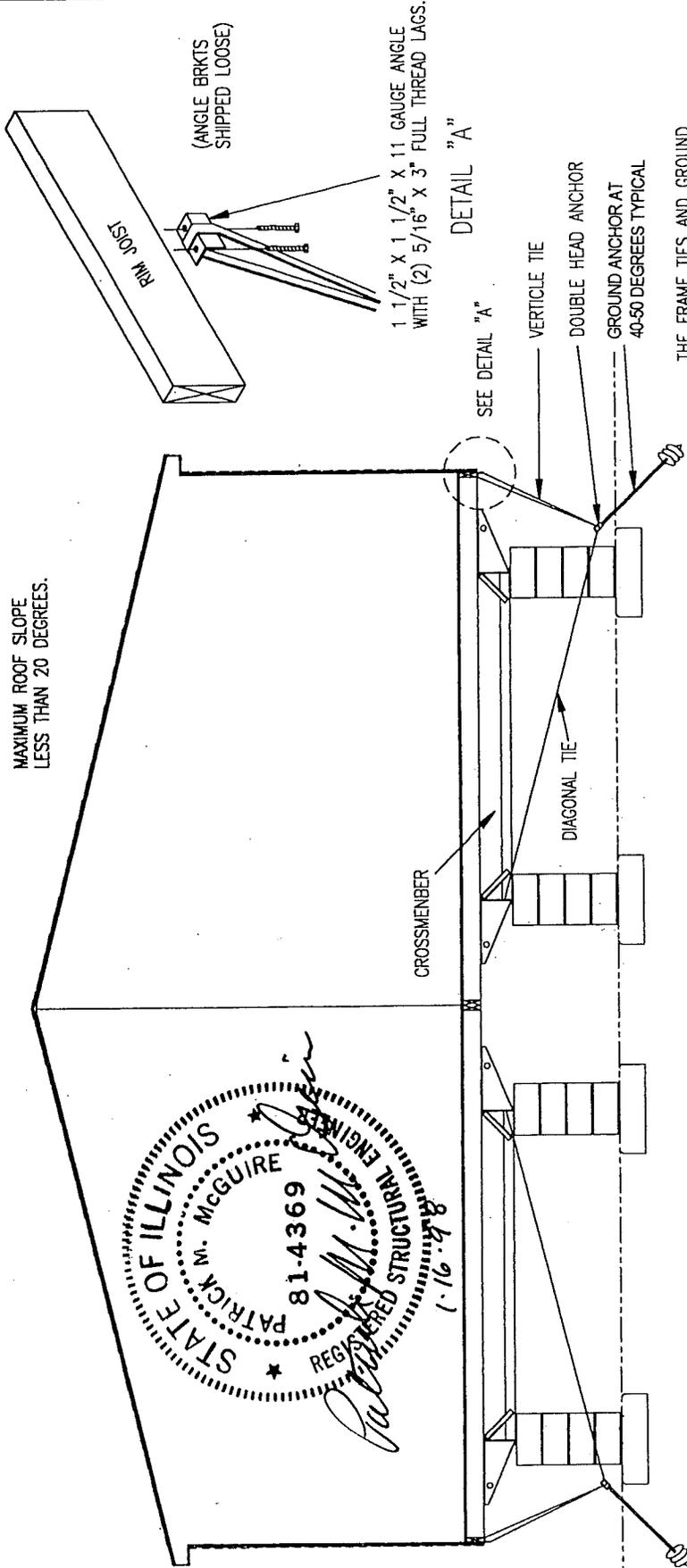
STABILIZER PLATES SHALL BE  
INSTALLED AS SPECIFIED BY  
THE ANCHOR MANUFACTURER.



TYPICAL SHEAR WALL TIE-DOWN DESIGN

FIGURE 5.0.2

MAXIMUM ROOF SLOPE  
LESS THAN 20 DEGREES.



THE FRAME TIES AND GROUND ANCHOR SHALL NOT EXTEND BEYOND THE WALL LINE OF THE HOUSE.

TIE-DOWN ANCHORS INSTALLED PER MANUFACTURER'S INSTRUCTIONS AND RATED FOR 3150 LBS. ALLOWABLE TENSION. STABILIZER PLATES SHALL BE INSTALLED AS SPECIFIED BY THE ANCHOR MANUFACTURER.

HOUSE SPECIFICATIONS:

- HOME WIDTH - 160 INCHES, EACH HALF.
- SIDE OVERHANG - 12 INCHES MAX.
- I-BEAM SPACING - 99 1/2 INCHES O.C.
- SIDEWALL HEIGHT - 84 INCHES.
- WIND ZONE ONE.
- MAX. O.C. TIE-DOWN SPACING - 14'-0".

NOTES:

1. DISTANCE BETWEEN SHEARWALLS NOT TO EXCEED 76'-0".
2. ANCHOR CAPACITY SHALL BE CERTIFIED BY THE MANUFACTURER.
3. ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
4. DOUBLE HEAD ANCHORS REQUIRED WITH DOUBLE STRAPS.
5. 4000LB. MINIMUM ANCHOR CAPACITY REQUIRED UNLESS OTHERWISE NOTED.



TYPICAL CROSS SECTION TIE-DOWN DESIGNS FIGURE 5.0.3

# Minute Maxanchors®

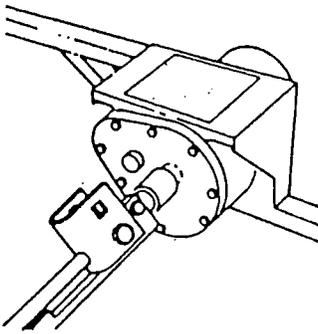


## INSTALLATION

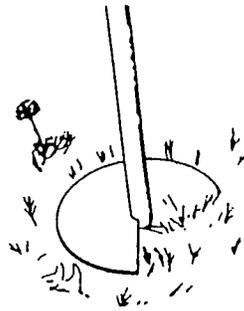
There are two basic methods of installing anchors, each equally effective in properly securing manufactured homes to the ground.

### MACHINE INSTALLATION

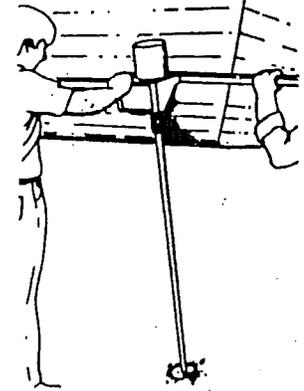
In this method, the anchor is turned four feet (or to full depth) into the ground by an anchor drive machine.



1. Attach anchor to machine.



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

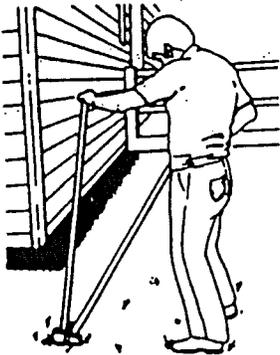


3. Anchor should be installed at a slight angle as shown to assure head being positioned behind future skirting.

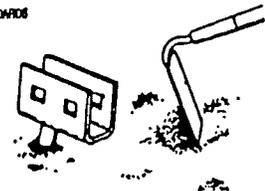
**CAUTION:** The installation of anchors with a drive machine is a two person operation.

### INSTALLATION WITH MANUAL OR MECHANICAL POST HOLE DIGGER

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



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CONSTRUCTION AND SAFETY BOARD

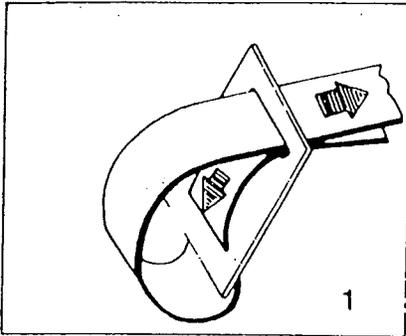


- A hole is dug to a depth of approximately two feet in the proper position as explained under machine installation.
- After the hole is dug to 24" depth, the anchor is turned into the ground by hand, using a rod or length of pipe for leverage.
- After anchor is installed to full depth, earth is repacked,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

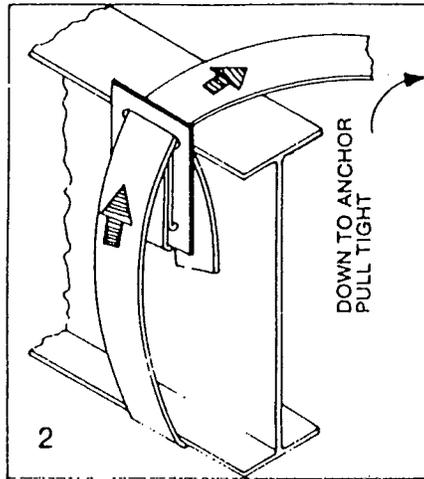
**WARNING:** Be careful to avoid underground water lines, phone lines and power lines using either method.

# POSITIONING FRAME TIE ( WITH DOUBLE-SLOT BUCKLE )

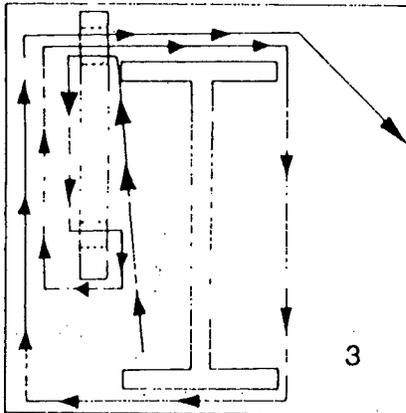
## FRAME TIE INSTALLATION INSTRUCTIONS



1



2

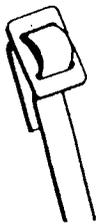


3

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

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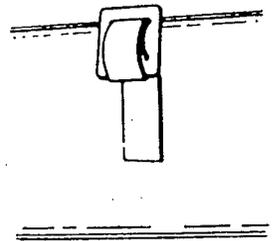
1. See step one in installation instructions.



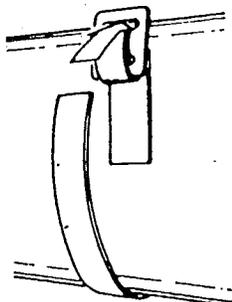
2. Insert strap in position through buckle.



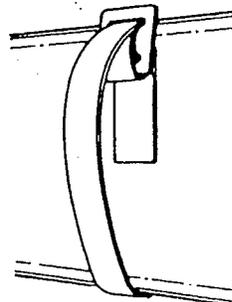
3. Strap should be through buckle in this configuration before installation on frame.



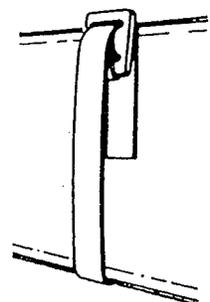
4. Strap should be passed over frame from inside, and buckle pulled into position as shown.



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.

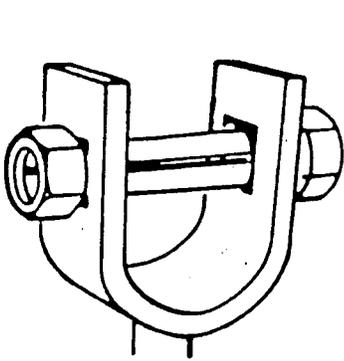


7. Inside of frame tie, properly installed.

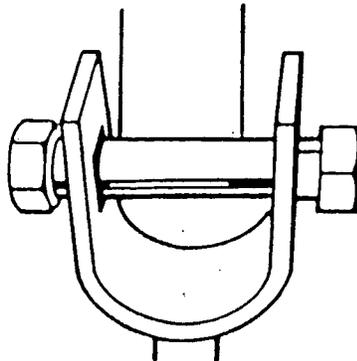
# PROPER TENSIONING OF STRAP TO ANCHOR HEAD

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

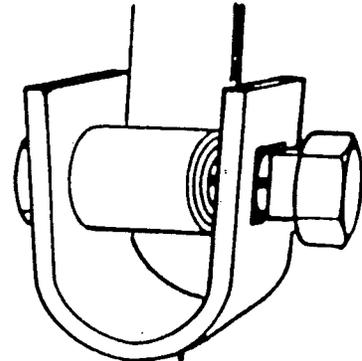
Notice: In areas of severe cold weather where possible damage could occur from frost heave, the homeowner should release some of the tension from the vertical tie each fall.



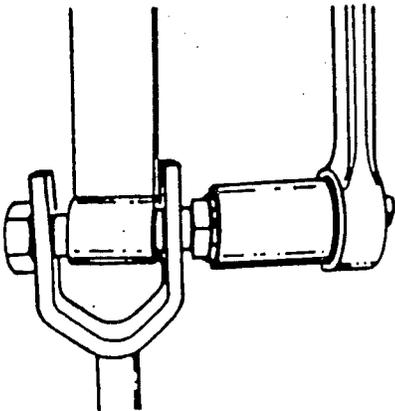
1. Insert bolt into head; attach nut loosely.



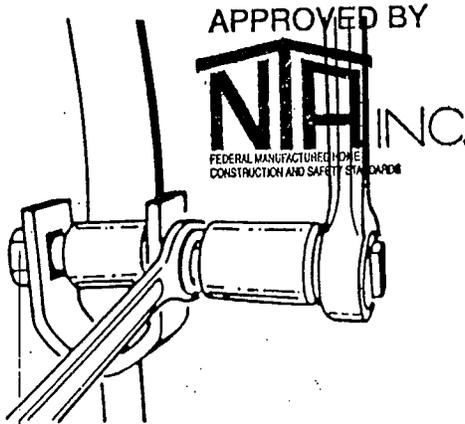
2. Insert strap in slot of bolt 5/8", or until strap is flush with far side of bolt.



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

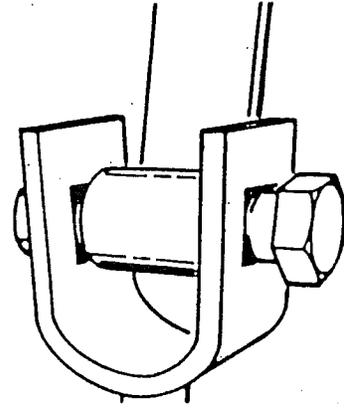


4. Bolt is turned with 15/16" socket wrench, or adjustable wrench, on hex head.

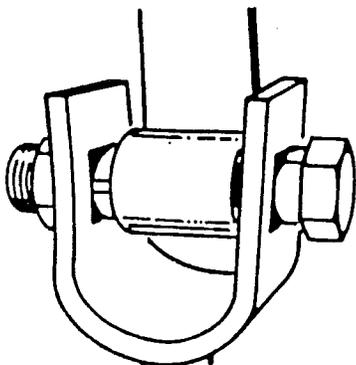


5. To hold bolt under tension while re-positioning wrench, an open-end wrench is placed on 5/8" square shoulders of bolt.

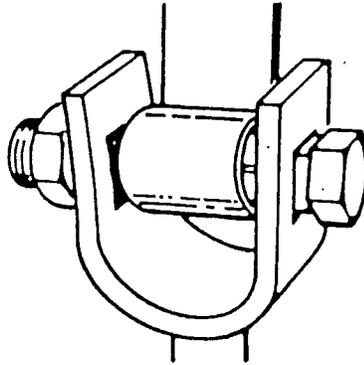
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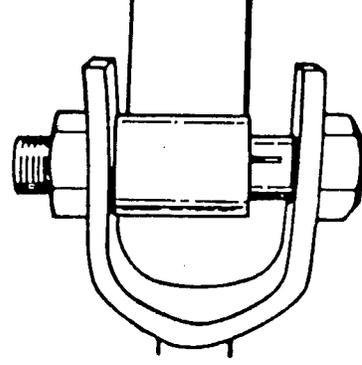
6. Align square shoulders of bolt with square hole in anchor head.



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



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



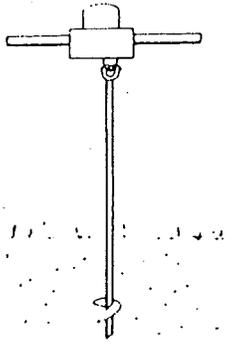
9. Tensioning device is now in locked, secure position.

For clarity, tools not shown on most photos above.

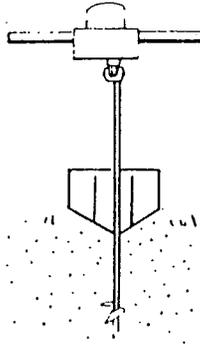
# MINUTE MAN ANCHORS, INC.

## INSTRUCTIONS FOR USING MINUTE MAN STABILIZING DEVICE

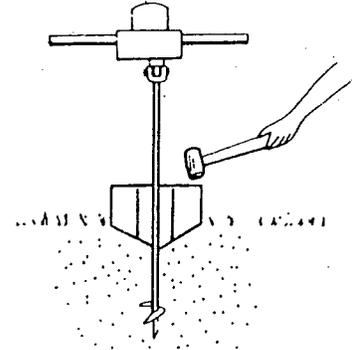
Minute Man stabilizing devices are designed for use with Minute Man anchors and intended to restrict movement of the anchor laterally through the soil.



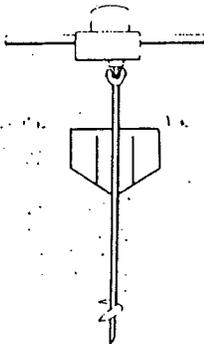
- 1 Install the anchor into the ground leaving 12"-18" of the shaft exposed



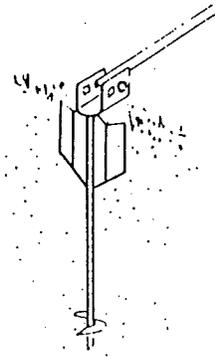
- 2 Place the stabilizing device next to the shaft in the direction of pull



- 3 Drive the stabilizing device into the ground.

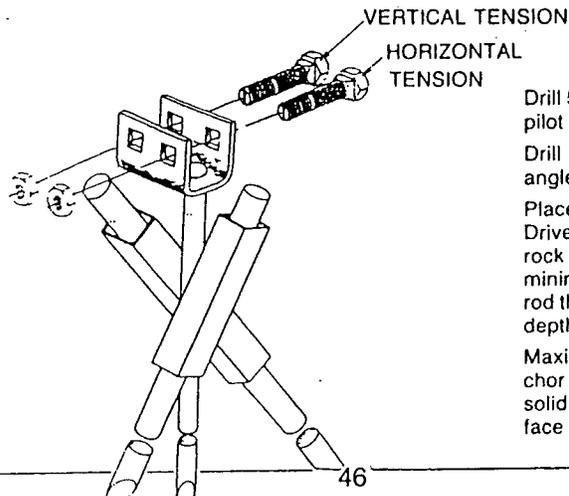


- 4 The anchor is then turned in the rest of the way into the soil until the head of the anchor is flush with the stabilizing device



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

### Installation Instructions for Cross Drive Rock Anchor



#### INSTALLATION INSTRUCTIONS

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

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

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

Maximum pullout resistance is developed when anchor head is low as possible and ground surface is solid rock. Distance from square tubing to rock surface should not exceed 1".

# E-Z Anchor Installation Methods

There are two basic methods for installing the E-Z Anchor. Each method equally effective. The two methods are: (1) Machine Installation (2) Manual Installation.

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

## 1. Machine Installation

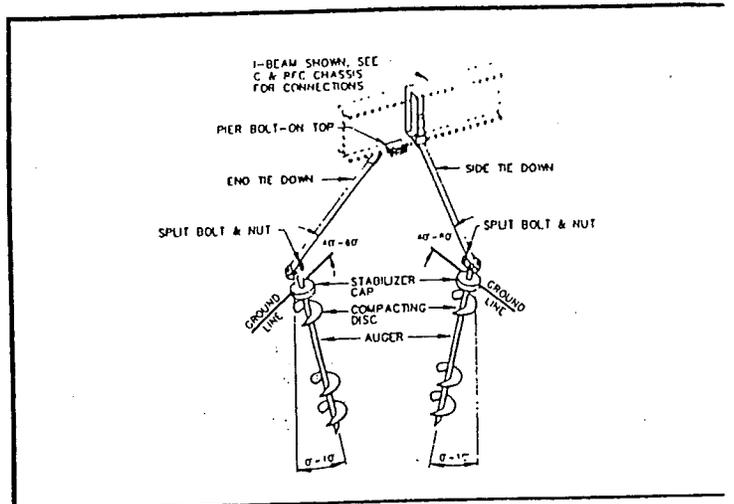
The drive machine is started and the anchor is turned into the ground to a point where the top (stabilizer head plate) is flush with or slightly below ground level. This assures that the E-Z Anchor Stabilizer will be at its required installation position. See Figure A.

For the E-Z Anchor/Stablizer to achieve full potential, install the anchor vertically with no deviation greater than 10 degrees. See Figure A. Note: a slightly greater angle may be used to start anchor to avoid contact with the home and straightened as anchor is ground set. The split-bolt is inserted, strap fastened, and tightening adjustment made.

## 2. Manual Installation

Manual installation can be achieved by placing a rod long enough for sufficient leverage, in the anchor tension head and turning clockwise into the soil. Positioning and setting of the anchor will then flow as noted in machine installation. See Manual Installation elsewhere in manual of instruction.

For additional information, copies of engineering test(s) and reports, contact Minute-Man Anchors, Inc.



### EZDH Earth Auger Tie Down

ENGINEER APPROVAL	STATE APPROVAL
<p>THIS TIE DOWN SYSTEM MEETS THE REQUIREMENTS OF SECTION 1336.3, SUBSECTION (a)</p>	<p>APPROVED</p> <p>SUBJECT TO DEFINITIONS NOTED</p> <p>Reviewed this set of drawings or plans in a position of trustee from requirements of applicable state laws and regulations.</p> <p>State of California</p> <p>Department of Housing and Community Development</p> <p>DIVISION OF CODES AND STANDARDS</p> <p>By: _____ Date: _____</p> <p>SPA NO. _____</p> <p>This Plan Approval Expires: _____</p>
<p><b>PCE</b> PACIFIC CONSULTING ENGINEERS 3150 Red Ave., Suite 115 San Ramon, Calif. 94583 Phone: 916-564-0278</p>	<p><b>MINUTE MAN ANCHORS, INC.</b> Low Price Buy or Sell 1-800-441-1111</p>

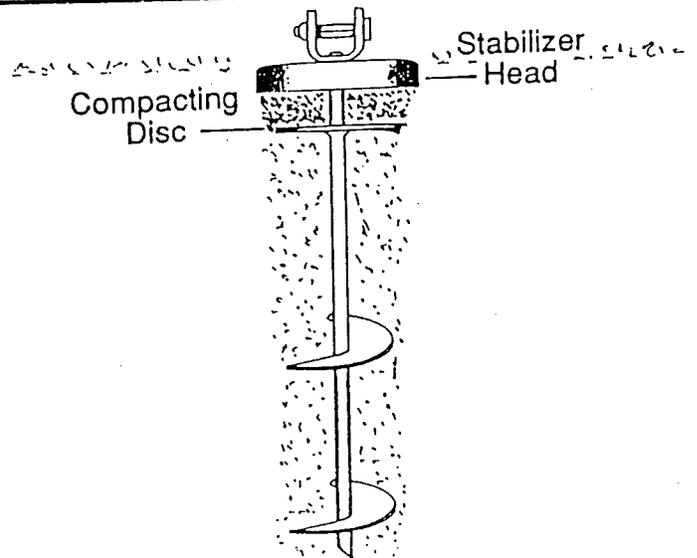
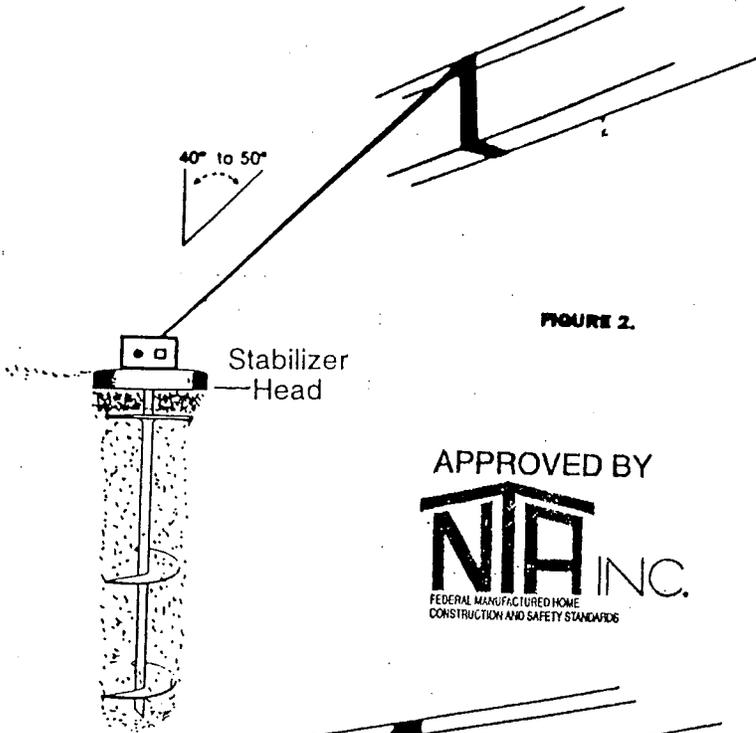
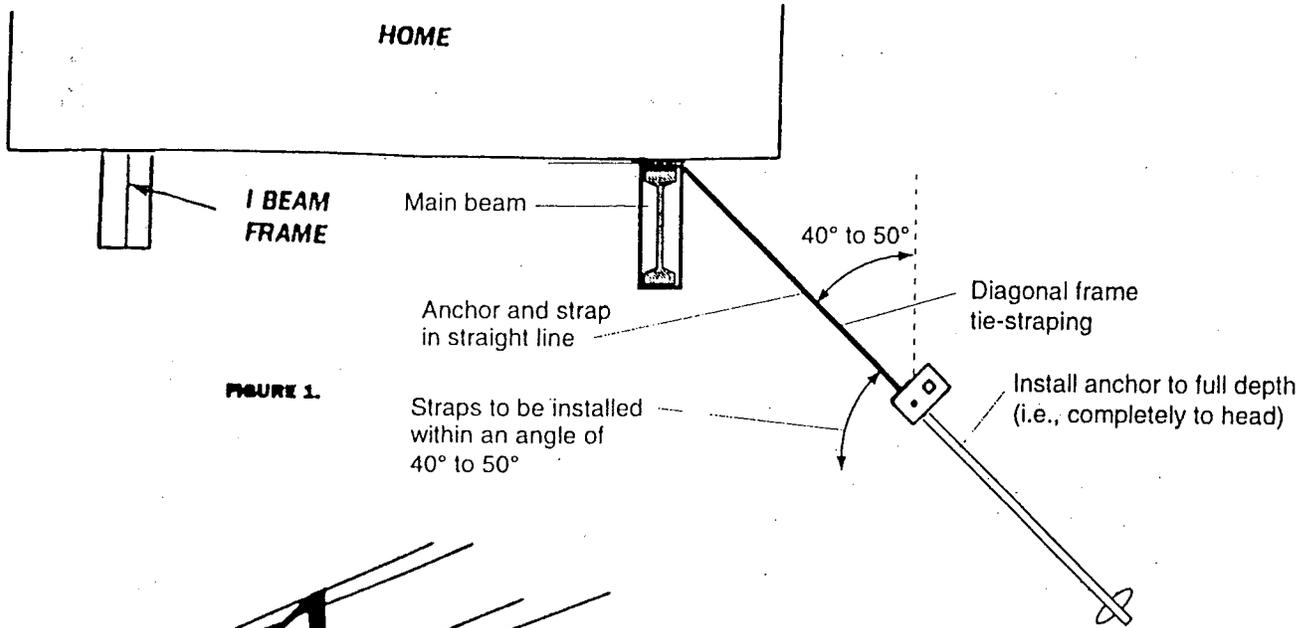


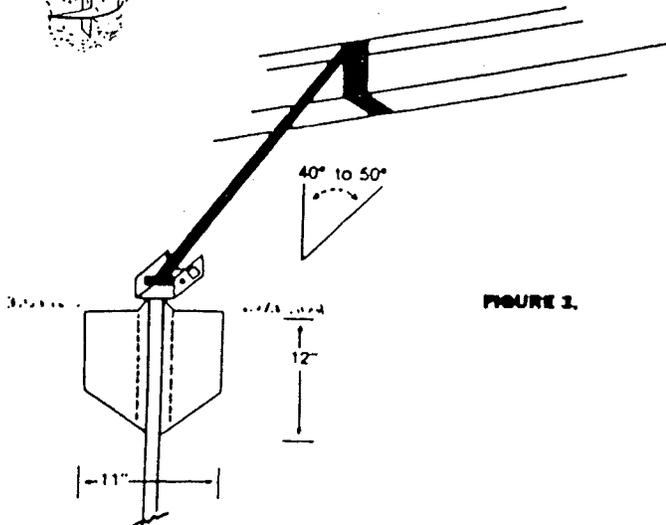
Figure A.



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



APPROVED BY  
**NIA** INC.  
FEDERAL MANUFACTURED HOME  
CONSTRUCTION AND SAFETY STANDARDS



For those homes which are designed to require only diagonal frame ties, the anchor is to be installed in line with the ties. FIGURE 1. When the load on the anchor is not applied in line with the long axis of the anchor, the magnitude and effect of the horizontal movement of the anchor head is to be investigated.

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

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

MARK	MODEL	DESCRIPTION	USE IN SOIL TYPE
MMA-2	650-DH 5/8	6" DISC, 50" ANCHOR	2,3,4
MMA-4	650-DH 3/4	6" DISC, 50" ANCHOR	2,3,4
MMA-38	650-DH 11/16	6" DISC, 50" ANCHOR	2,3,4
MMA-40	636-DH 5/8	6" DISC, 36" ANCHOR	2,3,4
MMA-28	636-DH 3/4	6" DISC, 36" ANCHOR	2,3,4
MMA-30	4430-DH 5/8	DOUBLE 4" DISC, 30" ANCHOR	2
MMA-36	4430-DH 11/16	DOUBLE 4" DISC, 30" ANCHOR	2
MMA-6	4430-DH 3/4	DOUBLE 4" DISC, 30" ANCHOR	2
MMA-35	36-XDH	36" CROSS DRIVE ANCHOR	1
MMA-8	48-XDH	48" CROSS DRIVE ANCHOR	1
MMA-37	38-XDH	38" CLASS 2 CROSS DRIVE	2
MMA-40	636-DH 5/8	6" DISC, 36" ANCHOR	2,3,4
MMA-28	636-DH 3/4	6" DISC, 36" ANCHOR	2,3,4
MMA-65	660-DH 3/4	6" DISC, 60" ANCHOR	2,3,4
MMA-75	660-DH 3/4 5GA	6" DISC, 60" ANCHOR	2,3,4
MMA-84	662-DH 3/4	6" DISC, 62" ANCHOR	2,3,4
MMA-67	668-DH 3/4	6" DISC, 68" ANCHOR	2,3,4
MMA-66	672-DH 3/4	6" DISC, 72" ANCHOR	2,3,4
MMA-44	850-DH 5/8	8" DISC, 50" ANCHOR	2,3,4
MMA-45	850-DH 11/16	8" DISC, 50" ANCHOR	2,3,4
MMA-46	850-DH 3/4	8" DISC, 50" ANCHOR	2,3,4
MMA-85	860-DH 3/4	8" DISC, 60" ANCHOR	2,3,4
MMA-71	1060-DH 3/4	10" DISC, 60" ANCHOR	4b (Fla.)
MMA-52	4636-DH 3/4	4" & 6" DISC, 36" ANCHOR	2,3,4
MMA-50	4442-DH 5/8	DOUBLE 4" DISC, 42" ANCHOR	2,3,4
MMA-53	4450-DH 5/8	DOUBLE 4" DISC, 50" ANCHOR	2,3,4
MMA-54	4450-DH 11/16	DOUBLE 4" DISC, 50" ANCHOR	2,3,4
MMA-55	4450-DH 3/4	DOUBLE 4" DISC, 50" ANCHOR	2,3,4
MMA-91	4430-EZDH 5/8	DOUBLE 4" DISC, 30" EZ ANCHOR	2,3
MMA-92	4430-EZDH 3/4	DOUBLE 4" DISC, 30" EZ ANCHOR	2,3

APPROVED BY



MARK	MODEL	DESCRIPTION	USE IN SOIL TYPE
MMA-94	636-EZDH 3/4	6" DISC, 36" EZ ANCHOR	2,3
MMA-95	660-EZDH 3/4	6" DISC, 60" EZ ANCHOR	2,3
MMA-18	THDH	DOUBLE HEAD TENSION DEVICE	SLAB
MMA-18	THDHL	DOUBLE HEAD TENSION DEVICE W/LAG	SLAB
MMA-10	36-DH	CORAL ANCHOR	CORAL
MMA-12	210-DH	CONCRETE ANCHOR	SLAB
MMA-14	210-PDH	WET CONCRETE ANCHOR	SLAB
MMA-42	210-JDH	SWIVEL HEAD WET CONCRETE ANCHOR	SLAB
MMA-22	100-DH	DOUBLE HEAD TENSION ADAPTER	CONNECT
MMA-SDA2		STABLIZER	
MMA-29	FCIIW/S	FRAME CLAMP II W/STRAP	
MMA-29	FCIW/S	FRAME CLAMP I W/STRAP	
MMA-32	BUC/WS	BUCKLE W/STRAP	
MMA-71	CT/WS	CORNER TIE W/STRAP	
MMA	SBN	STRAP BOLT & NUT	
MMA-25	22 BUCKLE	DOUBLE SLOT BUCKLE	
MMA-32	SS BUCKLE	SINGLE SLOT BUCKLE	
	44 RB	4X4" ROOF BRACKET	
	66 RB	6x6" ROOF BRACKET	
	PERIMETER JACK	PERIMETER JACK	
	JACKING PLATE	I BEAM JACKING PLATE	
MMP-6	6" PIER	STANDARD MOBILE HOME PIER	
MMP-8	8" PIER	STANDARD MOBILE HOME PIER	
MMP-10	10" PIER	STANDARD MOBILE HOME PIER	
MMP-12	12" PIER	STANDARD MOBILE HOME PIER	
MMP-14	14" PIER	STANDARD MOBILE HOME PIER	
MMP-16	16" PIER	STANDARD MOBILE HOME PIER	
MMP-18	18" PIER	STANDARD MOBILE HOME PIER	
MMP-20	20" PIER	STANDARD MOBILE HOME PIER	
MMP-22	22" PIER	STANDARD MOBILE HOME PIER	
MMP-24	24" PIER	STANDARD MOBILE HOME PIER	
MMP-26	26" PIER	STANDARD MOBILE HOME PIER	
MMP-28	28" PIER	STANDARD MOBILE HOME PIER	
MMP-30	30" PIER	STANDARD MOBILE HOME PIER	

APPROVED BY



Propane Anchoring & Tethering Components/Stainless Steel Strapping

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

SOIL CLASS	SOIL DESCRIPTION	BLOW COUNT (ASTM D1586)	TEST PROBE VALUE	RECOMMENDED MINUTE MAN ANCHOR
1	Sound hard rock	NA	NA	Cross Drive or Rock Anchor
2(a)	Very dense &/or cemented sands, coarse gravel and cobbles, caliche, preloaded silts, and clays.	40-up	550 lb. in up	4430DH 650DH
2(b)	Coral	40-up	550 lb. in up	4430DH 650DH
3	Medium dense coarse sands sandy gravels, very stiff silts, and clays	24-39	350 to 550 lb. in.	650DH
4(a)	Loose to medium dense sands, firm to stiff clays and silts alluvial fill	18-23, 3	276 to 350 lb. in.	650DH
4(b)	VERY loose to medium dense sands, firm to stiff clays and silts, alluvial fill	12-17	175 to 275 lbs. in.	1060DH

REMEMBER, THAT EACH STATE, COUNTY OR MUNICIPALITY MAY REQUIRE A SPECIFIC ANCHOR FROM THE GROUPS SHOWN FOR EACH SOIL CLASSIFICATION. CHECK LOCAL REGULATIONS FIRST.



FILLER BOARD  
(IF USED BY MFR)

MINUTE MAN FRAME  
CLAMP WITH STRAP

GROUND LEVEL

HOME

1" BEAM FRAME

IF THIS ANGLE EXCEEDS 45°, THE FRAME  
CLAMP MUST BE ATTACHED TO THE OPPOSITE  
BEAM AS INDICATED BY THE DOTTED LINES.

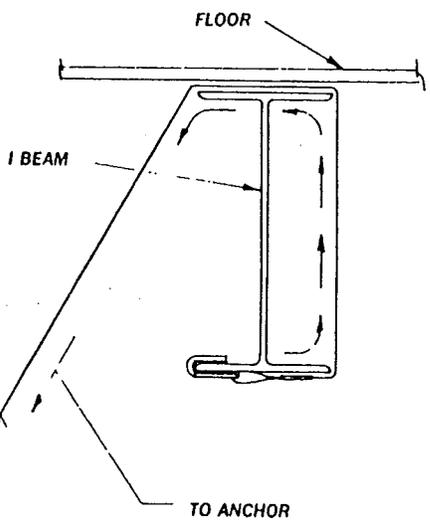
PROPER EARTH  
ANCHOR FOR SOIL  
CONDITION.

### FRAME CLAMP INSTALLATION

APPROVED BY

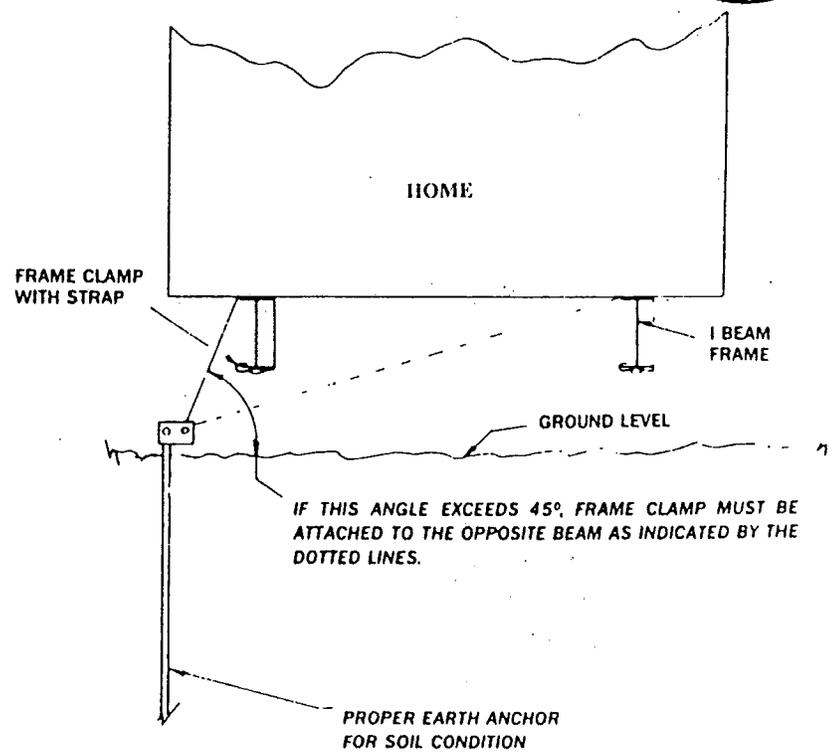


MODEL FCW/S



ENLARGED VIEW  
OF  
FRAME BEAM

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



### FRAME CLAMP WITH STRAP INSTALLATION

IF THIS ANGLE EXCEEDS 45°, FRAME CLAMP MUST BE  
ATTACHED TO THE OPPOSITE BEAM AS INDICATED BY THE  
DOTTED LINES.

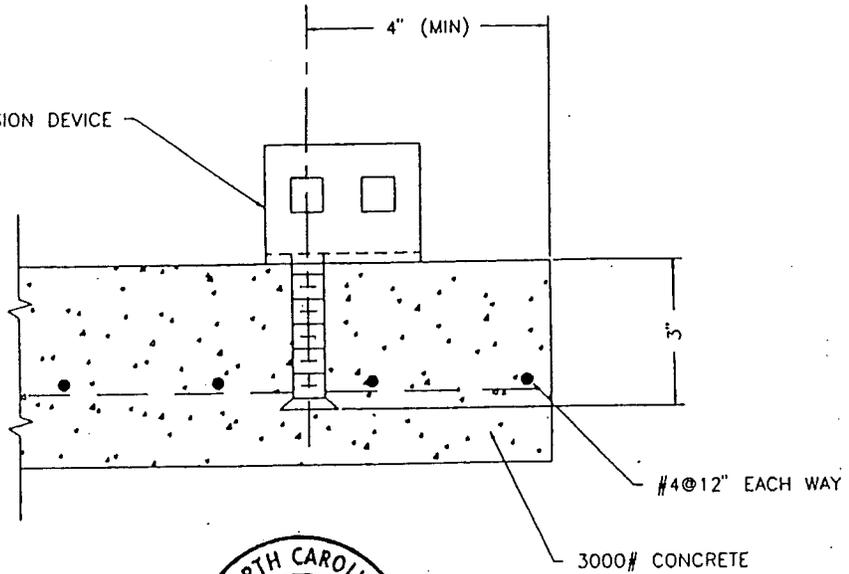
PROPER EARTH ANCHOR  
FOR SOIL CONDITION

DOUBLE HEAD TENSION DEVICE

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

INSTALLATION NOTE

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

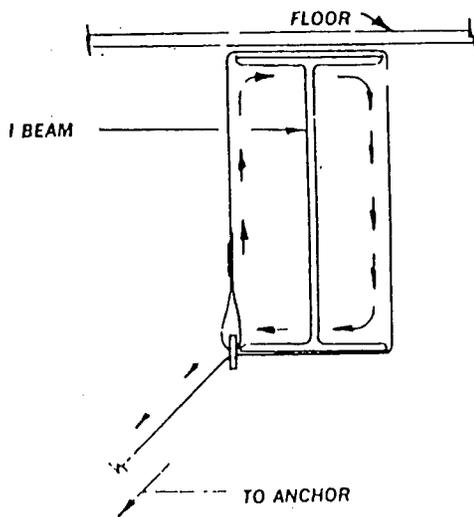


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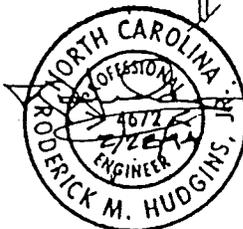
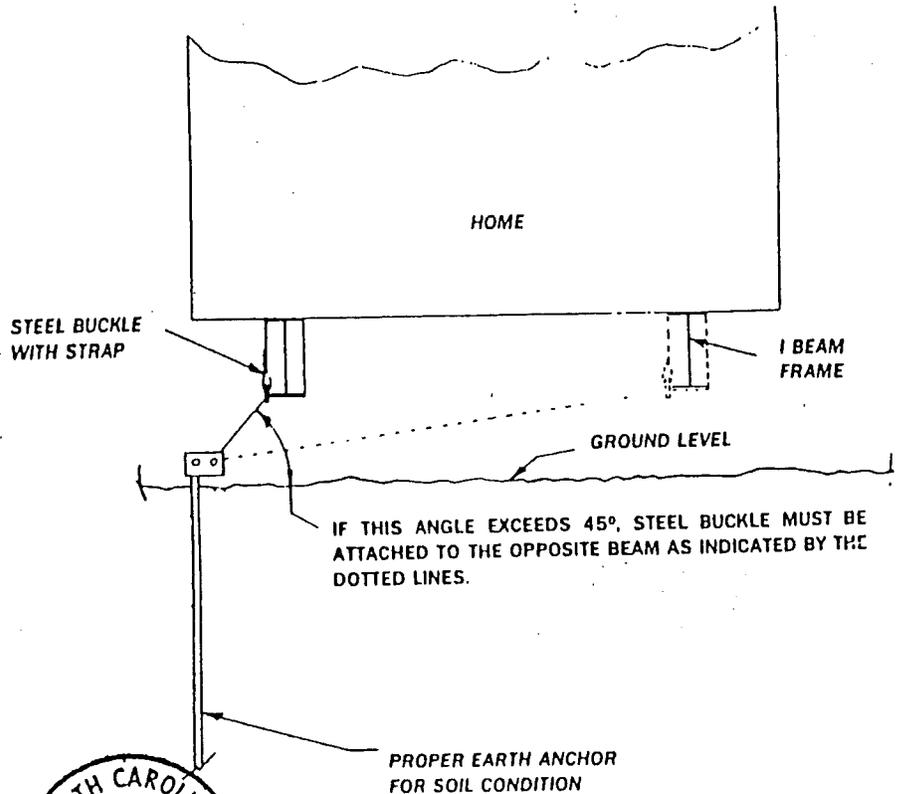
TITLE: DOUBLE HEAD TENSION DEVICE

MODEL: THDHL



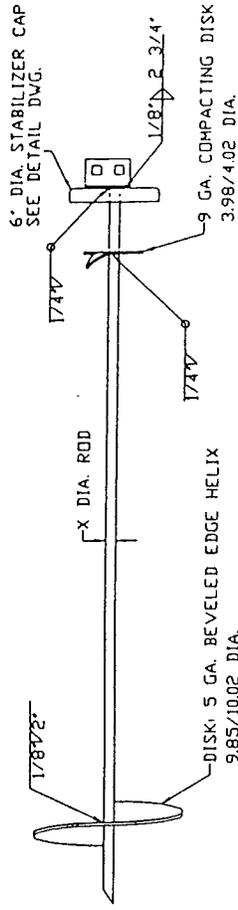
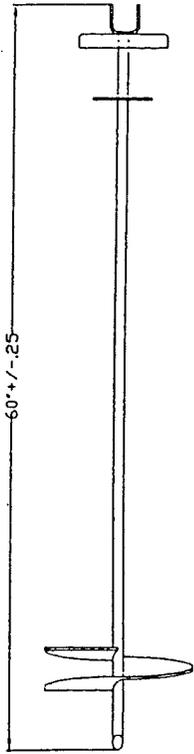
ENLARGED VIEW  
OF  
FRAME BEAM

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



STEEL BUCKLE WITH STRAP INSTALLATION

MODEL BUC. W/S

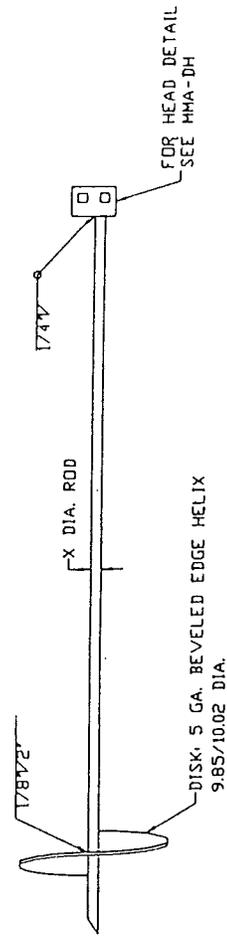
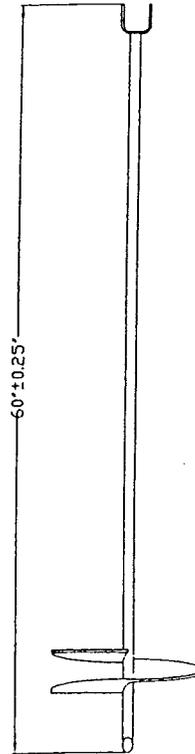


NOTES:  
1. ALL STEEL USED IN ANCHOR ASSY. CONFORMS TO ASTM A-36 M1020

2. X, IN. MARK  
709-755 MHA 72
3. U.S. PAT. NO. 4,923,165

*5/2/86*  
*12/2/86*

REV.	DESCRIPTION OF CHANGE/DATE	MINUTE MAN ANCHORS, INC.	TITLE: 60' STABILIZER HEAD ASSEMBLY	DATE: 12/2/86	BY: [Signature]
		295 WEST 84th STREET	MODEL: MMA-72 - C/DM		
		4411 FLAT ROCK, NC 28174			
		PHONE: (704) 892-8254			
		FAX: (704) 892-8254			

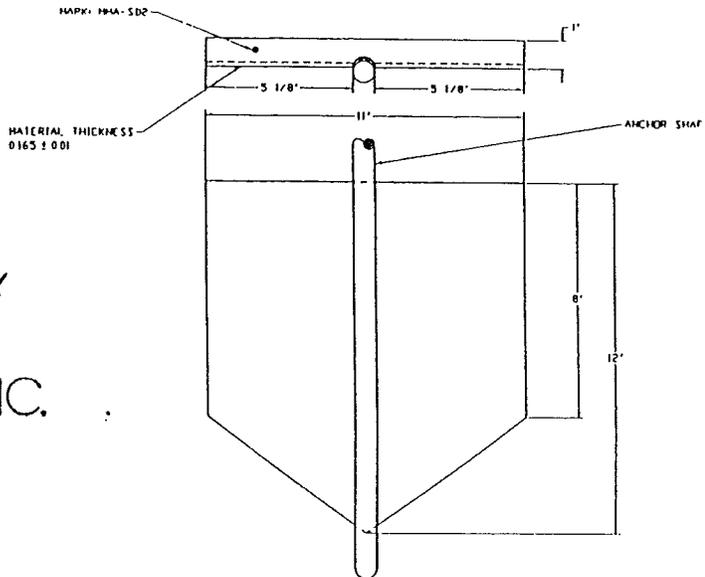


NOTES:  
1. ALL STEEL USED IN ANCHOR ASSY. CONFORMS TO ASTM A-36 M1020

2. X, IN. MARK  
709-755 MHA 71

*5/2/86*  
*12/2/86*

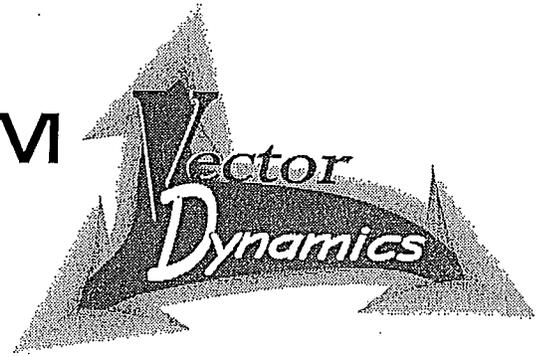
REV.	DESCRIPTION OF CHANGE/DATE	MINUTE MAN ANCHORS, INC.	TITLE: 60' STABILIZER HEAD ASSEMBLY	DATE: 12/2/86	BY: [Signature]
		295 WEST 84th STREET	MODEL: MMA-71		
		4411 FLAT ROCK, NC 28174			
		PHONE: (704) 892-8254			
		FAX: (704) 892-8254			



*5/2/86*

REV.	DESCRIPTION OF CHANGE/DATE	MINUTE MAN ANCHORS, INC.	GROUND STABILIZER PLATE	DATE: 12/2/86	BY: [Signature]
		295 WEST 84th STREET	TYPE: MMA-SD2		
		4411 FLAT ROCK, NC 28174			
		PHONE: (704) 892-8254			
		FAX: (704) 892-8254			

# VECTOR DYNAMICS FOUNDATION SYSTEM HART HOMES



## WIND ZONE 1 INSTALLATION INSTRUCTIONS

Release Date 1/4/99

### INDEX

SECTION	PAGE NUMBER
INTRODUCTION	1
PIER HEIGHTS	2
GENERAL INSTALLATION	3
SET-UP INSTRUCTIONS	4
METAL PIER	5
DOUBLE SECTION DIAGRAM	6
CONCRETE INSTALLATION	7 & 8
SOIL CLASSIFICATION	9
PARTS LIST	10
SHEARWALL TIE DOWN <i>708</i>	11
COLUMN TIES	12
COMPONENT PARTS AVAILABLE UPON REQUEST	

Hart Homes, Inc.

Listed By

For Further Information

TIE DOWN ENGINEERING  
5901 Wheaton Drive  
Atlanta, GA 30336  
404-344-0000  
FAX 404-349-0401

APPROVAL	Hart Homes, Inc.	TIEDOWN SYSTEM VECTOR DYNAMICS Wind Zone I
		<p>PROPRIETARY AND CONFIDENTIAL</p> <p><small>These drawings and specifications are original, proprietary, confidential materials of Hart Homes Inc. Copyright 1999 by Hart Homes, Inc.</small></p>

# VECTOR DYNAMICS INSTALLATION INSTRUCTIONS

## Introduction

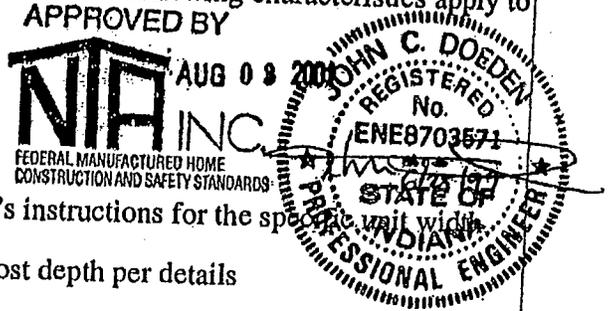
These instructions describe the proper use of the Vector Dynamics Foundation System in Wind Zone I. Additional installation instruction is available in VHS video, from manufactured housing distributors or from Tie Down Engineering, titled, *Vector Dynamics Installation Video version 11/4/98*.

The Vector Dynamics foundation system supports the home by anchoring the two longitudinal main rails. The system is approved in Wind Zone I areas of the Manufactured Home Construction and Safety Standards and Wind Standards; Final Rule 24CFR parts 3280 and 3282 for both single and double section homes.

## General

The Vector Dynamics Foundation System provides the support to resist lateral and over-turning movement of the home as required by the Federal Manufactured Home Construction and Safety Standards in Wind Zone I when the system is used as described in these instructions. The following characteristics apply to both single and double section homes:

- Maximum design load for system is 3150# (4725# ultimate)
- Main rail minimum spacing - SEE PAGE 4
- Nominal 8 foot or less top plate height at side walls.
- Main rail depth of 12 inches or less.
- Maximum pier height under main rail per manufacturer's instructions for the specific pier width and I-Beam spacing.
- Footer at Vector location must be made continuous to frost depth per details (see page 6 for concrete applications).
- Refer to specific design for additional information.
- Min capacity of auger type anchor (where required) is 4725# (ultimate).



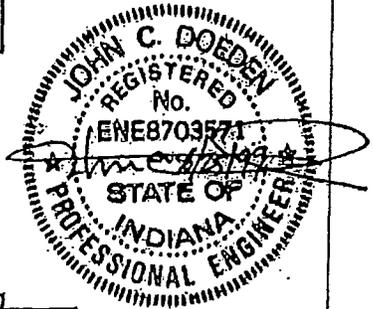
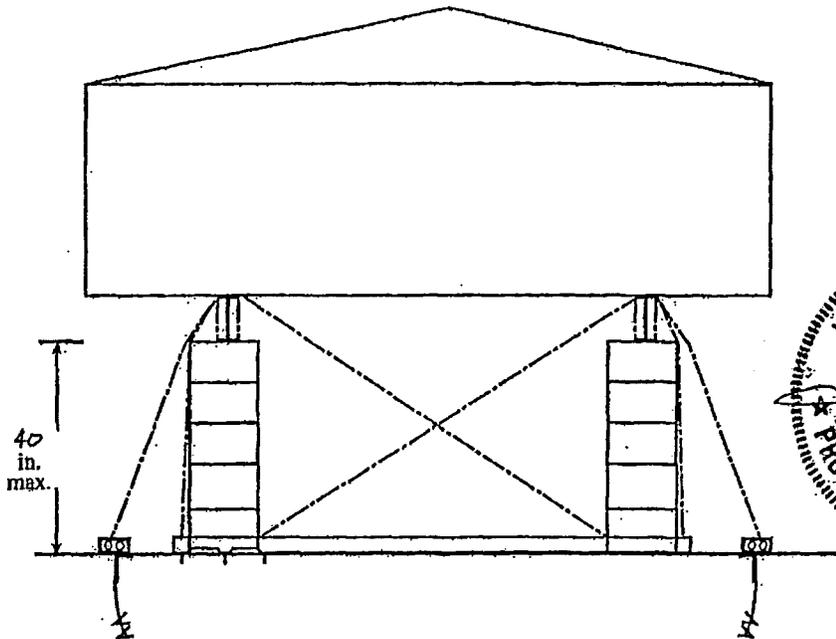
The Vector Dynamics Foundation Systems may be used as a part of the vertical or gravity support system considering that each Vector Dynamic pad (set of 2) has two (2) square feet bearing area. Piers not used as part of the Vector system shall be located and constructed in accordance with the home installation instructions and/or state standards. Refer to specific design for additional information.

To inquire about the use of the Vector Dynamics Foundation Systems with homes of three or more sections or on homes requiring pier heights greater than 40 inches which are not included in these instructions, contact Tie Down Engineering, Inc. at 1-800-241-1806.

The Vector Dynamics Foundation Systems may be used on homes in Wind Zone I which require pier heights not to exceed 49.75 inches under one or both main rail(s). See page 2. Note that a ground anchor must be used at each Vector system location where the pier heights are equal to or exceed 24 inches. The use of interlocked double stacks of concrete blocks may be required by the home manufacturer or your state. Check with the most recent regulations in your state.

The Vector Dynamics Foundation System has not been designed for use on exposure "D" homes within 1500 feet of the coastline.

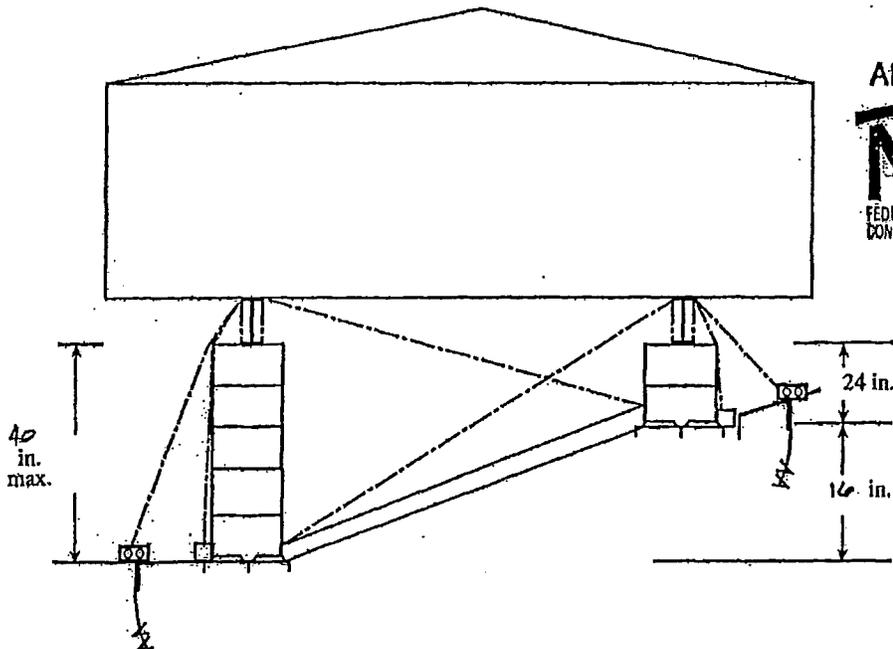
Additional vertical anchor ties that are unique to a home's design may be required by the home manufacturer. These locations include shear walls, marriage line ridge beam support posts, end frame ties and rim plates. The term *end frame ties* refers to the longitudinal ties that are attached to a home to resist wind load on the end walls. If the longitudinal ties are required by the home installation instructions or other state standards, these longitudinal ties must be installed and connected to anchors that are independent of other ties and anchors. The term rim plates refers to the factory brackets fastened onto the perimeter joist or specified as a location for vertical ties.



**Maximum Pier Height**

Figure 1

The Vector Dynamics Foundation Systems may be used on homes in Wind Zone I which require pier heights not to exceed 40 inches under one or both main rail(s). Note that a ground anchor must be used at each side of a Vector system location where the pier heights exceed 24 inches. Piers must be constructed in accordance with the manufacturer's installation instructions and/or state requirements. The use of interlocked double stacks of concrete blocks may be required by the home manufacturer or state. Check with the most recent regulations in your state.



**Unequal Pier Heights**

Figure 2

Vector Dynamics may be used on homes with unequal pier heights of 40" or less under one or both main rails. The difference between the taller pier and the shorter pier cannot exceed 16". Note that a ground anchor must be used at each side of a Vector system installation where either of the pier heights in that location exceeds 24 inches. Only concrete blocks and pressure treated lumber compression members are permitted on unequal pier heights using the Vector system. Piers must be constructed in accordance with the manufacturer's installation instructions and/or state requirements. The use of interlocked double stacks of concrete blocks may be required by the home manufacturer or state. Check with the most recent regulations in your state.

# GENERAL INSTALLATION INSTRUCTIONS

## SITE PREPARATION

It is necessary that the home site be properly graded and sloped to prevent water and moisture from standing or flowing beneath the home. See manufacturer's home installation manual and state requirements for grading and other site preparation.

## FOOTINGS AND FROST LINES

The Vector Dynamics Foundation System can be placed directly on top of the ground after clearing all loose vegetation. Vector Foundation pads must be made continuous to the frost depth by means of connection to a poured footer per details or otherwise protected from the effects of frost heave per local code.

APPROVED BY

## FOUNDATION/FOOTING SPECIFICATIONS FOR VECTOR PADS

AUG 09 2001



The size of the footing for each Vector Foundation pad pier location is two square feet. Vector Pads must be used in place of conventional foundation pads for each Vector foundation system. One set of two Vector Pads provides two square feet of bearing support, while three Vector pads used together provide three square feet of bearing support. Vector Systems should be spaced as evenly as possible along the length of the home, with one Vector systems within two feet of each end of the home. For pier locations in between the Vector Systems, use the foundation pads normally recommended by the home manufacturer and/or state requirements. Pier heights in excess of 24 inches or when unequal must follow instructions printed on page 2 of these instructions. Nominal 3-1/2 Inch Schedule 40 PVC pipe may be used only when the pier heights are similar on fairly level ground. PVC is not permitted when metal pier foundations are used. Foundation pad size and pier spacing must be consistent with home manufacturers' Instructions and/or state requirements.

## LUMBER/MOISTURE - TERMITE SHIELD

To cut lumber (2 - 2x4's or 1 - 4x4 per Vector system) for the center compression section, when using concrete blocks for piers, measure center to center frame (I-beam) distance and subtract 16". When using METAL PIER STANDS, measure center to center frame distance and add 16". Nominal 3-1/2" (4" outside diameter) schedule 40 PVC pipe meeting ASTM D1784 may be substituted for lumber as the center compression strut under certain conditions described above. Pipe adaptor bracket, part #59281 must be used with PVC pipe simultaneously with the Inside Tie Brackets, part number 59276. The pipe adaptor bracket is used on top of the pipe and under the Inside Tie Bracket. The optional Moisture Termite Shield may be required in certain regions installed between the lumber and ground.

## ALL WOOD MUST BE PRESSURE TREATED, GROUND CONTACT RATED .

*Tip: Pre-cut your lumber and mark as to brand or model of homes you will be installing. If frame widths are the same, the pre-cut boards will also be the same length in each Vector set-up.*

## STRAP TENSION

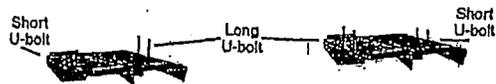
All strapping must be tight upon assembly of the Vector system. Tests have been conducted with "hand tightened" strap in the Vector system to remove the need for specific tension specifications. Hand tight is defined as removing all slack with minimum of movement available when pressing on the strap. While subsequent tightening of the straps is not required, straps should be checked after any strong wind conditions, just as conventional anchor tie down straps should also be checked, to insure the maximum performance of the foundation system.

# Set-Up Instructions for the Vector Dynamics Foundation System



### 1. SET VECTOR FOUNDATION PADS

Clear all loose vegetation from the immediate area where your Vector foundation pads will rest. Place a long U-bolt and a short U-bolt into the Vector pads as shown. Press or hammer pads into the ground. *Tip: Place a 3/8" nut on each U-bolt to keep it in place while you position the Vector pads.*



### 2. SET BLOCKS (OR PIERS) ON VECTOR FOUNDATION PADS

Center the foundation blocks over the Vector pads. Place the pre-cut 4x4 or two 2x4's (side by side) tightly between the blocks, with ends resting on the Vector pads, and centered on each U-bolt.

### 3. OUTSIDE TENSION BRACKETS

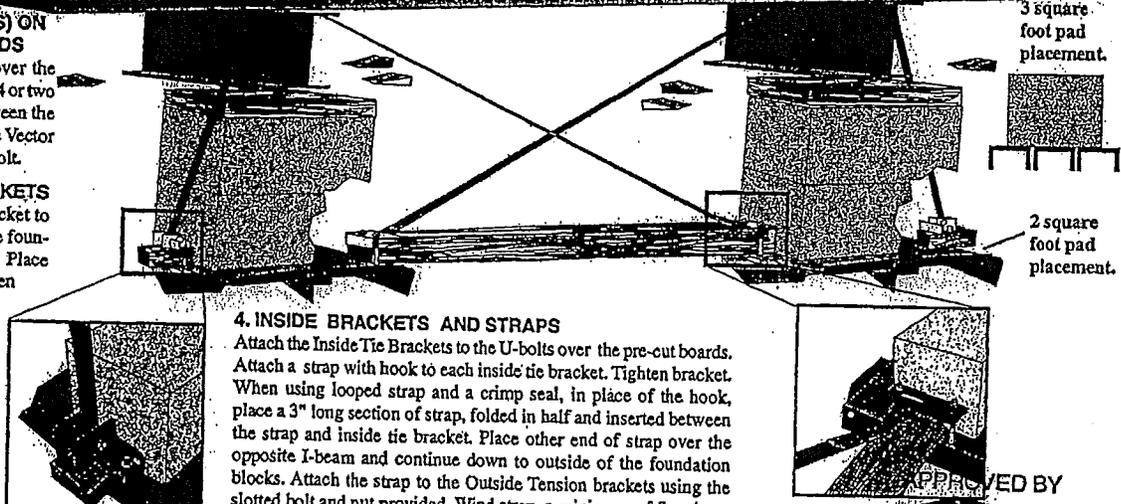
Attach an Outside Tension Bracket to the U-bolts on the outside of the foundation blocks and Vector pads. Place one of the short 6"- 2x4's between the bracket and Vector pad. Adjust the short 2x4 so that it pushes against the foundation blocks, removing any space between the piers and center compression section. Tighten the 3/8" bolts.

### 4. INSIDE BRACKETS AND STRAPS

Attach the Inside Tie Brackets to the U-bolts over the pre-cut boards. Attach a strap with hook to each inside tie bracket. Tighten bracket. When using looped strap and a crimp seal, in place of the hook, place a 3" long section of strap, folded in half and inserted between the strap and inside tie bracket. Place other end of strap over the opposite I-beam and continue down to outside of the foundation blocks. Attach the strap to the Outside Tension brackets using the slotted bolt and nut provided. Wind strap a minimum of five times around the bolt. Continue tightening the slotted bolt until all slack has been removed and the strap is tight.

### 5. SET ANCHORS (Required for Single Section Homes Only)

Place a minimum of 2 each 30" anchors with 12" stabilizer plates connected to the home with a frame tie (two anchors per side - refer to single section home drawings). Preload anchor against stabilizer plate and make certain all slack is removed and strap is tight. For rocky soil conditions (Soil Classifications 2 & 3 only), use minimum of 3 each V-Drive anchors per side. See drawing on page 8 for placement.



3 square foot pad placement.

2 square foot pad placement.



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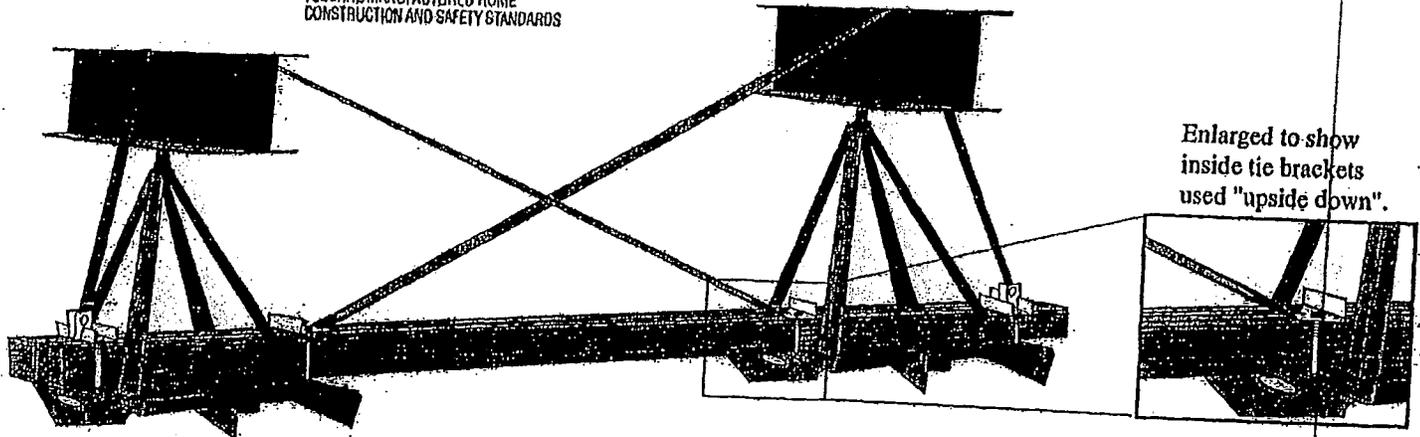
Page 4 Wind Zone I  
Hart Homes

# Vector Dynamics Metal Pier Installation

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For metal piers, place the piers in the center of the Vector pads. Set the single 4x4 or two 2x4's through the piers, centered in the U-bolts, so that the board(s) overhangs the Vector pads on each side by about 2". Outside Tension brackets attach the same. Inside tie brackets mount "upside down" as shown in drawing. **Metal piers using the Vector system can only be used on level ground installation.**

Conventional pier adjusters must be placed under beam with upturned edge directed towards the outside of the home. Pier capacity rating and spacing must be consistent with home manufacturers' installation instructions and/or state requirements.

When using METAL PIER STANDS, cut the lumber (2 - 2x4's or 1 - 4x4 per Vector system) for the center compression section by measuring center to center frame distance and adding 16". Optional Moisture Terminate Shield may be required in certain regions. **ALL WOOD MUST BE PRESSURE TREATED, GROUND CONTACT RATED.** PVC Schedule 40 pipe is not permitted to be substituted for lumber when using metal pier stands.

*Tip: Pre-cut your lumber and mark as to brand or model of homes you will be installing. If frame widths are the same, the pre-cut boards will also be the same length in each Vector set-up.*



# WIND ZONE I Vector Dynamics Systems Required for Double Section Homes



ENGINEER'S CERTIFICATION  
ONLY REQUIRED & GRANTED  
FOR WIND ZONE(S) - 1

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\* Concrete footer thickness per set-up Manual or below frost depth as required.

At outside beams pier & footer\* Design per set-up Manual.

At inside beams space piers & footers\* as follows: (2000 PSF Soil).

30 lb. Roof		40 lb. Roof	
Footer Size	Spacing	Footer Size	Spacing
2 Sq. Ft.	6'-0" O.C.	2 Sq. Ft.	4'-0" O.C.
3 Sq. Ft.	3'-0" O.C.	3 Sq. Ft.	8'-0" O.C.

See Note Below

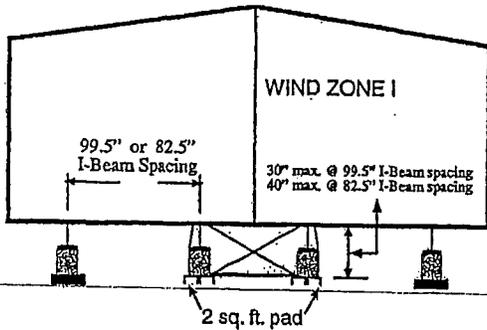
At outside beams pier & footer\* Design per set-up Manual

For Soil Classifications: 2, 3, 4A, & 4B  
Soil Bearing Capacity: 2,000 PSF minimum  
Anchors Required\*: Only at Shear Walls per Other Details.

Vector System Spacing: 16' 0" on center maximum spacing. Starting @ 2' 0" maximum from each end.

Materials: Each Vector Foundation System requires One Vector Kit, 2 Slotted Bolts  
2 ea. 1-1/4in. ties (4725 lb. min. break), length will vary with pier height  
1 ea. 4 x 4 pressure treated wood compression member  
or 2 ea. 2 x 4 pressure treated wood compression member  
or 1 ea. 3 1/2" (4" o.d.) SCH40 Pipe compression member

Applicable to:  
160" Unit width  
12" Max. EAVE  
84" Max. wall height  
20° Max. roof slope



NOTE: Vector Systems should be spaced as symmetrically as possible along the length of the home. Pier spacing must be consistent with home manufacturers' instructions and/or state requirements. In areas subjecting the foundation to frost heave, the Vector pads must be attached to a footer per other detailed instructions.

NOTE: Footer spacings & sizes shown at inside I-Beams are for steel footers on concrete footers (see page 7) included in the design. When steel footers are placed directly on soil (no frost areas), they may not be counted in the number & spacing of footers required in the set-up manual. In this case, use the set-up manual for footer design.



M.H.C.

Page 6 Wind Zone I Hart Homes

I-34-u

# Vector Dynamics System for Concrete Applications

## Instructions

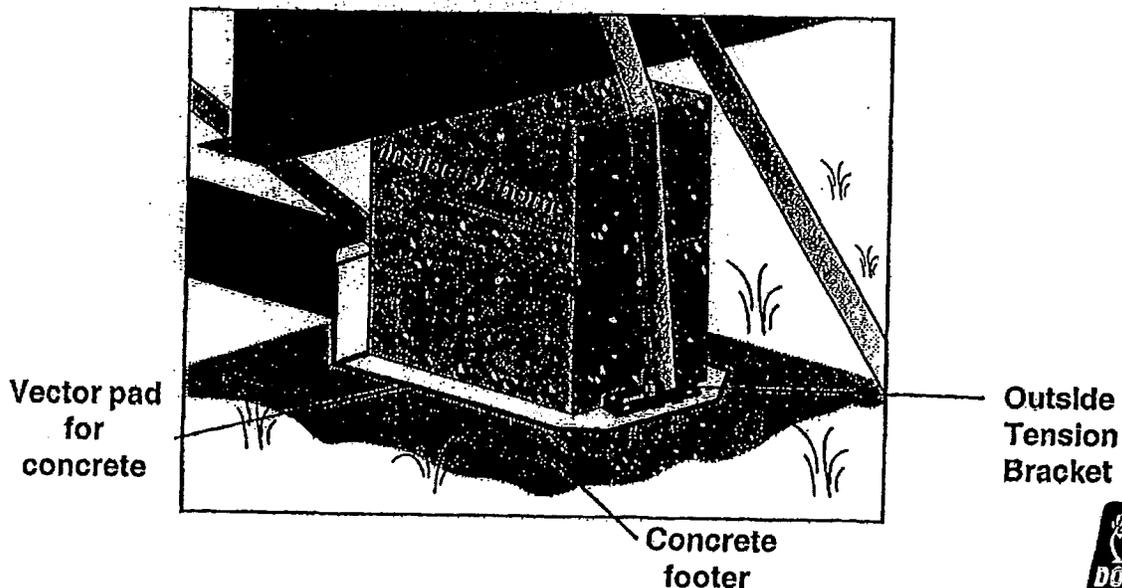
Page 1 of 2

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These instructions are an addendum to the standard Vector Dynamics instructions. Read and follow all applicable instructions and guidelines in the Vector instructions and home installation manual. The Vector system for concrete pads applies to concrete footers, runners and slabs. Minimum size of concrete per Vector pier is 24" x 24" x 4". Concrete must go below ground level by at least 3" for footers and runners. Concrete must be sufficiently cured and set to accommodate an anchor bolt to its' full load resistance.

1. Determine location of pier sets where the Vector systems will be located.
2. Place a Vector concrete pad (galv. metal) on the concrete where the pier will be located, centered under the I-beam of the home. Place the upturned edge towards the center of the home and directed to the opposite Vector pier. Do the same for the opposite Vector pier.
3. Measure the distance between the two Vector system pads at the base where the Vector pad meets the concrete. Cut two ground treated 2x4's this length and place between the piers as shown.
4. Place a long u-bolt under the 2x4's and through the holes of the Vector pad as shown.
5. Place the concrete pier blocks on the Vector pad. Center the blocks under the frame. The upturned edge end of the Vector pads should be up against the inside of the pier blocks.
6. Build your pier but do not wedge at this time.
7. Using a concrete drill bit, drill two holes on each side into the concrete using the holes in the Vector pad as a guide. Drill the 3/8" holes 3 inches deep.



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Page 7 Wind Zone I Hart Homes

I-34.7

# Vector Dynamics System for Concrete Applications



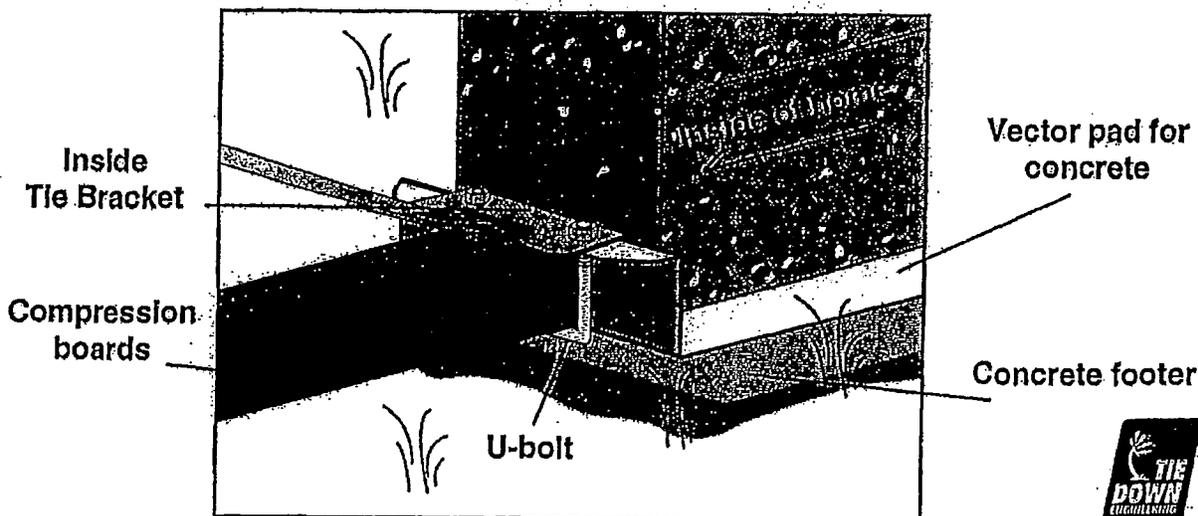
Page 2 of 2

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8. Place an outside tension bracket on the Vector pad as shown in picture one. Line up the holes in the bracket, Vector pad and concrete pad.
9. Put a washer and nut on one of the 3/8" x 3-3/4" wedge anchors. The nut should be screwed on enough to have 1 or 2 threads showing on the top of the bolt. Place the wedge end of the bolt into one of the holes, going through the outside tension bracket, metal Vector pad and into the concrete.
10. Using a hammer, tap the wedge bolt into the hole leaving the nut flush with the bottom of the outside tension bracket.
11. Repeat for the other hole in the outside tension bracket and the two holes on the other Vector system pier set.
12. Place a inside tie bracket over the u-bolt so that the lip of the bracket is between the Vector plate and concrete blocks. Place a washers and nuts on each U-bolt. Do not tighten yet.
13. Attach a strap with hook or crimp seal to the inside tie bracket, with sufficient length to go over the opposite pier and down to the outside tension bracket, plus 12 inches for wrapping the slotted bolt. Repeat for the opposite side.
14. Tighten inside u-bolts at this time.
15. Use the outside tension brackets to remove any space between the outside tension brackets, concrete blocks and the inside edge of the Vector pad, by tapping the brackets with a hammer.
15. Wedge the pier set at this time.
16. Using a 9/16" socket wrench tighten the all of the wedge/anchor bolts, securing the outside tension bracket and Vector pad to the concrete.
17. Using a slotted bolt in the outside tension brackets, turn slotted bolt until straps are tight with at least five turns on the slotted bolts.



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Page 8 Wind Zone I Hart Homes

I-34.8

## VECTOR DYNAMICS INSTALLATION DESIGN INSTRUCTIONS

This Vector Dynamic Foundation system instruction is applicable only on homes set on soils classified as Class 4A 4B, 3 and 2 as described in the table below. For separate instructions for sub-soil, class 5 conditions (above 50 in. lbs.), contact Tie Down Engineering.

### SOIL CLASSIFICATIONS

Soil Class	Types of Soils	Blow Count (ASTM D1586)	Soil Test Probe (1) Torque Value (2)
1	Sound hard rock.....	NA	NA
2	Very dense and/or cemented sands, coarse gravel and cobbles, preloaded silts, clays, and corals	40-up	More than 550 in. lbs.
3	Medium-dense coarse sands, sandy gravels, very stiff silts and clays	24-39	350-549 in. lbs.
4A	Loose to medium dense sands, firm to stiff clays and silts, alluvian fill	14-23	275-349 in. lbs
4B			175-275 in. lbs
5	Peat, organic silts, inundated silts, loose fine sand, alluvium, loess, varied clays, fill, fly ash.	0-14	175 in. lbs and lower

- (1) The purpose of the soil test probe is to gage the strength of the soil below the surface and near the anchor's helical plate. The strength of the soil is estimated in terms of its' resistance to penetration (flow) under load by means of the torque probe and is measured in inch lbs. The test probe has a helix on it. The overall length of the helical section is 10.75 in.; the major diameter is 1.25 in.; the minor diameter is 0.81 in.; the pitch is 1.75 in. The shaft must be of suitable length for anchor depth.
- (2) A measure synonymous with moment of a force when distributed around the shaft of the test probe.

Information about geographical areas of termite infestations which might require the optional termite and moisture shield when a wood compression member is used may be obtained from the local building official or may be found in Fig. 310.2f of the 1995 edition of the One and Two Family Dwelling Code.

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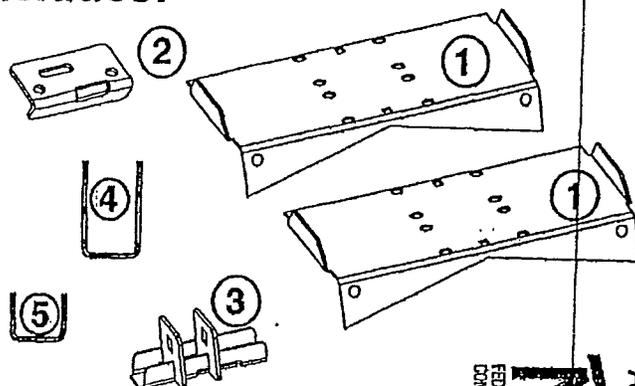
Page 9 Wind Zone I Hart Homes

I-34.9

# Stock numbers and description of parts used in/with the Vector Dynamics System.

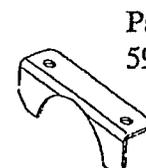
Each Vector Dynamics package includes:

1. 59275 4 - Galvanized Vector Pads, 9" x 16", (used in pairs)
2. 59276 2 - Inside Tie Brackets
3. 59282 2 - Outside Tension Brackets
4. 10973 2 - Long U-bolts, w/nuts & washers, 4" x 4-1/2" x 3/8"
5. 10999 2 - Short U-bolts, w/nuts & washers, 4" x 2-1/2" x 3/8"



## Anchors and stabilizer plates used with Vector Dynamics.

STOCK NO.	DESCRIPTION
59095*	30" Tie Down Anchor with 2 - 4" helixes
59292**	12" Tie Down Stabilizer Plate
59269	V-Drive Anchor (includes 3- 30" drive rods)
30 DHC2*	30" Stylecrest Anchor with 2 - 4" helixes
48233**	12" Stylecrest Stabilizer Plate
59281	Adaptor Bracket for 4" o.d. Schedule 40 Pipe
n/a	Schedule 40 PVC pipe
n/a	Ground contact rated 2x4 or 4x4 lumber

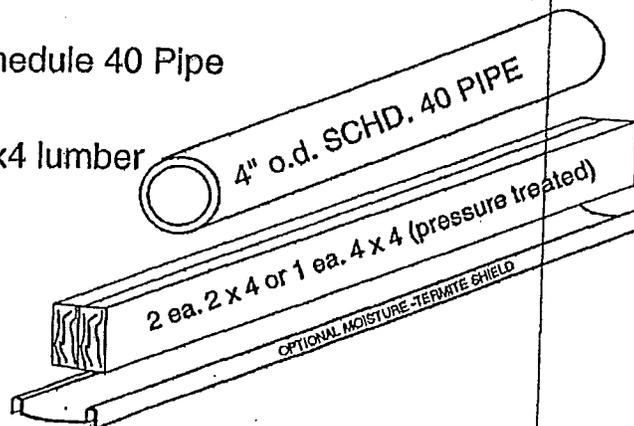


Part #  
59281

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### Hardware items:

10973	Long U-bolts
10999	Short U-bolts
59135	Slotted Bolt
Strap	1-1/4" x 0.035 thick - Steel, per ASTM D3953-91, Type 1, Grade 1, Finish B, Galvanized, Minimum Break Strength 4725 lbs.



\* TDE 59095 and Stylecrest 30 DHC2 (30" anchors) are interchangeable.

\*\* TDE 59292 and Stylecrest 48233 (12" stabilizer plate) are interchangeable.

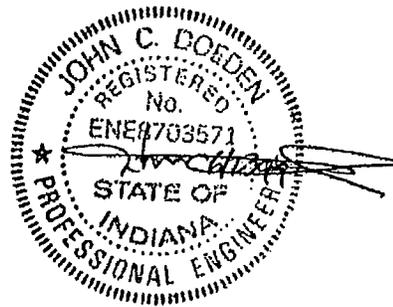
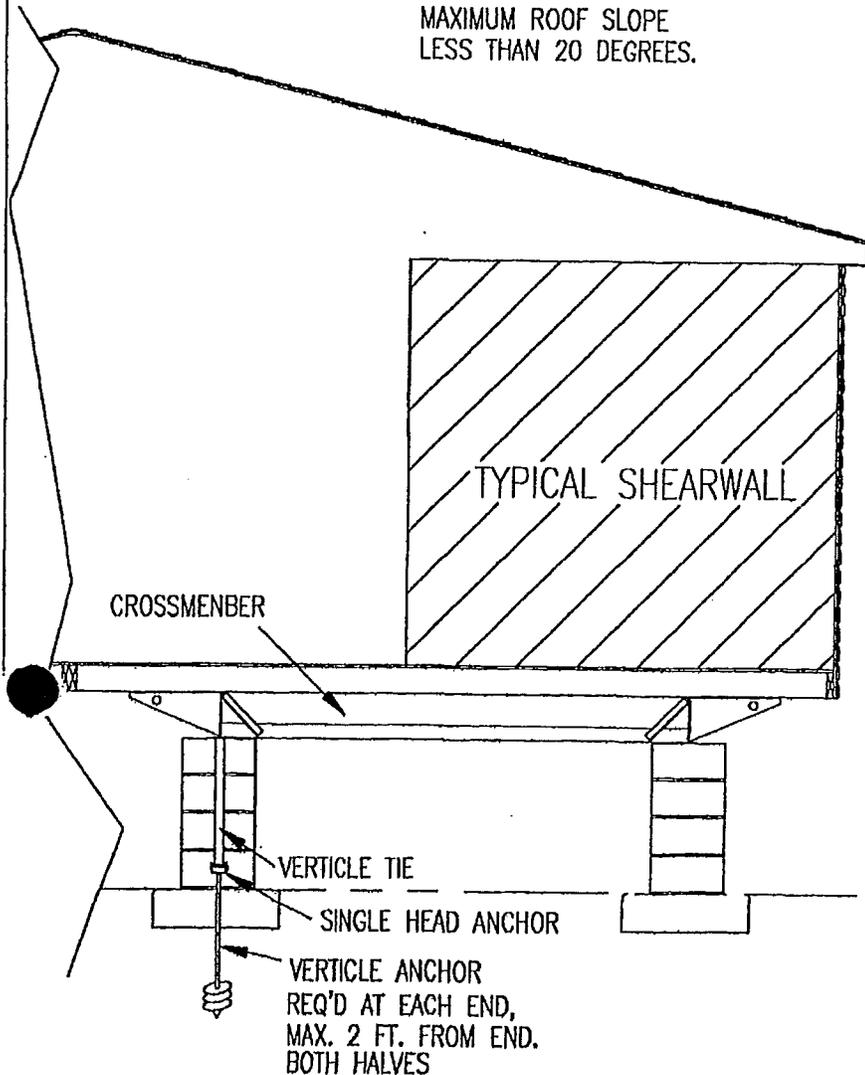
A. Schedule 40 PVC pipe: 3-1/2 inch schedule 40 polyvinyl chloride pipe or conduit made from type 1, grade 1, with cell classification 12454 as defined in ASTM D1784. Compound dimensions and tolerances in accordance to the requirements of ASTM D1785D. color can be gray or white. Outside diameter is 4 inches.

B. Ground Contact Rated Wood: No. 2 yellow pine or equivalent, pressure treated to AWPACI-1990 minimum, stamped "Ground Contact Rated" on wood or on label attached to the wood when purchased.

NOTE:

THIS TIEDOWN REQUIREMENT TO BE USED WITH THE VECTOR SYSTEM ONLY.

MAXIMUM ROOF SLOPE  
LESS THAN 20 DEGREES.



NOTES:

TIE-DOWNS REQUIRED AS SHOWN WITHIN TWO FEET OF EACH END OF EACH HALF.

TIE-DOWN ANCHORS INSTALLED PER MANUFACTURER'S INSTRUCTIONS AND RATED FOR 3150 LBS. ALLOWABLE TENSION.

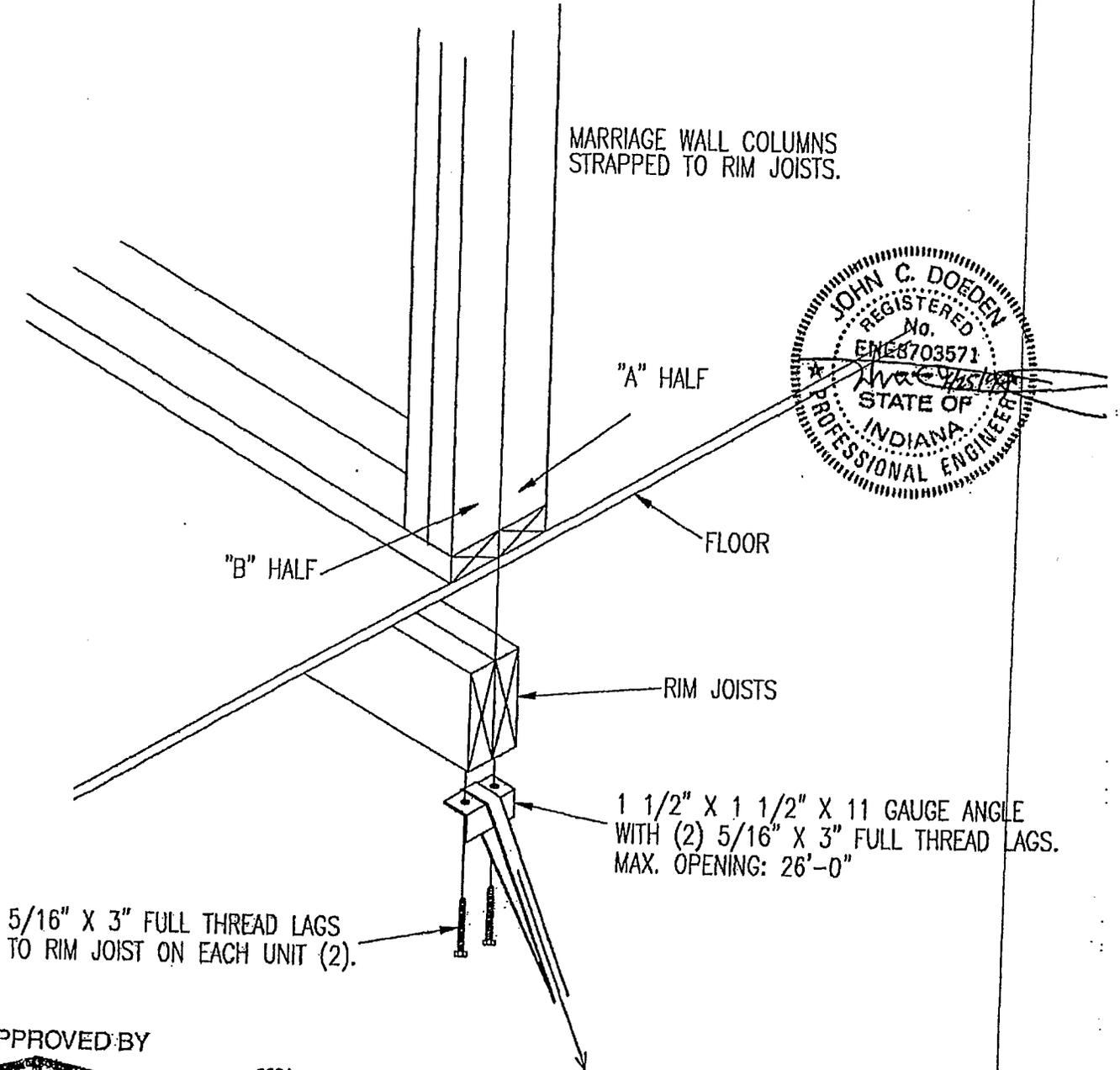
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TYPICAL SHEAR WALL TIE-DOWN DESIGN

FIGURE 5.0.2a

**NOTE:**

THIS DETAIL IS NOT REQUIRED WHEN USING THE VECTOR TIE DOWN SYSTEM.



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TO TIE-DOWN ANCHOR INSTALLED PER MANUFACTURER'S INSTRUCTIONS AND RATED FOR 3150 LBS. ALLOWABLE TENSION.

TIE-DOWN REQUIREMENT AT ALL OPENINGS OVER FOUR FEET.

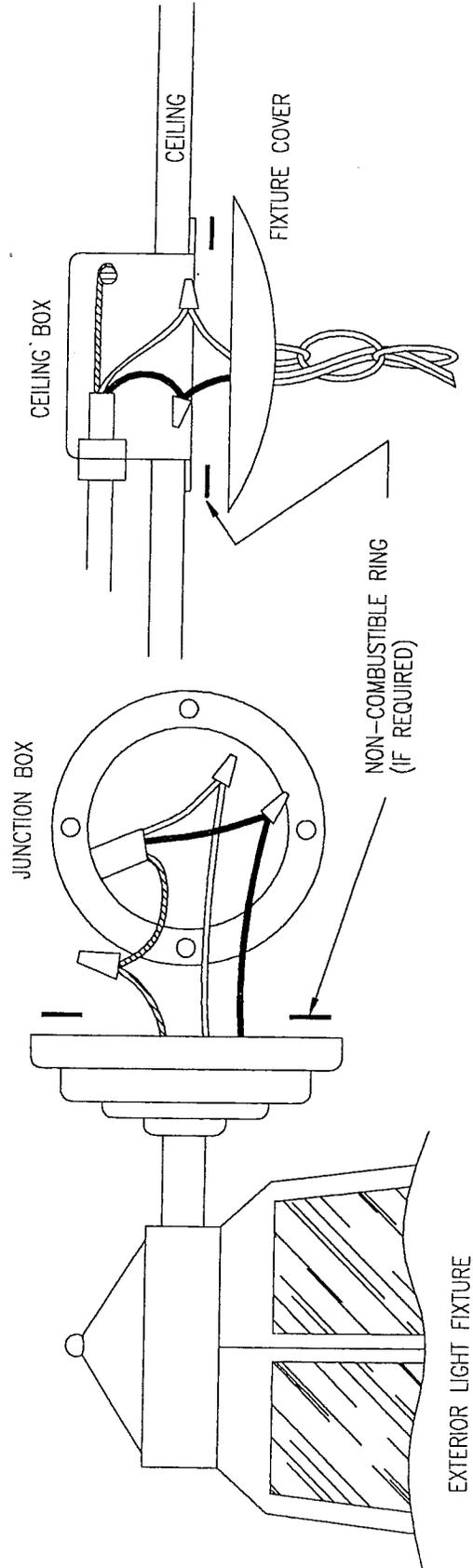
WIND ZONE 1

FIGURE 5.0.1a  
Page 12 I-34.12

# CHAPTER 6 — INSTALLATION OF OPTIONAL FEATURES

- 6.3 **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.
- 6.3.1 **Exterior lights.** Remove the junction box covers and make wire-to-wire connections using wire nuts. Connect wires black to black, 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 Figure 6.1 (a).
- 6.3.2 **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. Follow the manufacturer's instructions. If no instructions are available, connect the wiring as shown in Figure 6.1 (b).
- 6.4 **Ventilation Options.** See ventilation improvement option instructions provided with your home.
- 6.6 **Special Set-up Manual Addendums/and Supplements.** Your home may require special Dapia Approved instructions in addition to those included in this manual to properly set-up the home. Listed below are several of the most common special options. These are provided by HART HOUSING separately.
- Installation Manual Supplement (Special Pier/Footing Designs)
- Basement Foundation Designs
- 6.7 **Manufacturer Installation Instructions.** Provided separately are Dapia Approved Installation Instructions provided by the anchoring devices manufacturer which must be followed. The instructions provided may not be the same as the anchoring devices you are using. If this is the case, use the instructions which are provided with you anchors.





CHAIN HUNG FIXTURE  
OR CEILING FAN

FIGURE 6.1 (b)

FIGURE 6.1 (a)

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# 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 Figure 7.1. **IMPORTANT! Do NOT let the exhaust system end under the home where excess moisture or flammable material can accumulate.** 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. Failure to follow these instructions will void your warranty.

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. HART HOUSING is not responsible for any weakening of the home's structural soundness resulting from dryer installation.

- 7.2 **Comfort cooling systems.** Only qualified personnel may install any comfort cooling system not provided with the home. Follow the manufacturer's installation instructions and conform to all local codes.

- 7.2.1 **Air conditioners.** The air distribution system of this home has been designed for a central air conditioning system. Equipment you install must not exceed the rating shown on the home's compliance certificate.

Electrical circuits within the home may not have been sized for the additional load of non-factory installed air conditioning, and a separate, outside electrical supply may have to be provided.

Any field-installed wiring beyond the junction box must include a fused disconnect located within sight of the condensing unit. The maximum fuse size is marked on the condenser data plate. Local codes will determine the acceptability of the air conditioning equipment, rating, location of disconnect means, fuse type branch circuit protection, and connections to the equipment.

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

- 7.3 **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 storm collar. See Figure 7.4.
- 7.3.1 **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.
- 7.3.2 **Required components.** The required components of a correctly - installed chimney are as shown in Figure 7.4.
- 7.3.3 **Assembly and sealing sequence.** Assemble and seal your fireplace or wood stove chimney per fireplace manufacturer's instruction.
- 7.3.4 **Combustion air duct inlets.** Combustion air intake ducts end just below the bottom covering of the floor. You must extend them to the outside when your home has a basement or crawl space. These added ducts are supplied, or may be purchased at your local hardware store. The fireplace manufacturer's instructions for installing combustion air ducts are in the fireplace/stove or with the chimney parts. Do not allow the combustion air inlet to drop material from the hearth beneath the home. Locate its inlet damper above expected snow level.

- 7.4 **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 exit 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.
- 7.5 **Window Air Conditioner Installation.** Do not plug a window air conditioner unit into one of your home's lighting or appliance circuit receptacles. The majority of window air conditioners require that a separate circuit be installed for the connection of the unit. See the air conditioner manufacturer's installation instructions for the electrical requirements for your specific model. The circuits installed in the home are for standard lighting and small appliance fixtures only.

**CAUTION:** Use of these receptacles for other purposes may cause an overload and the possibility of a potential fire hazard arises.

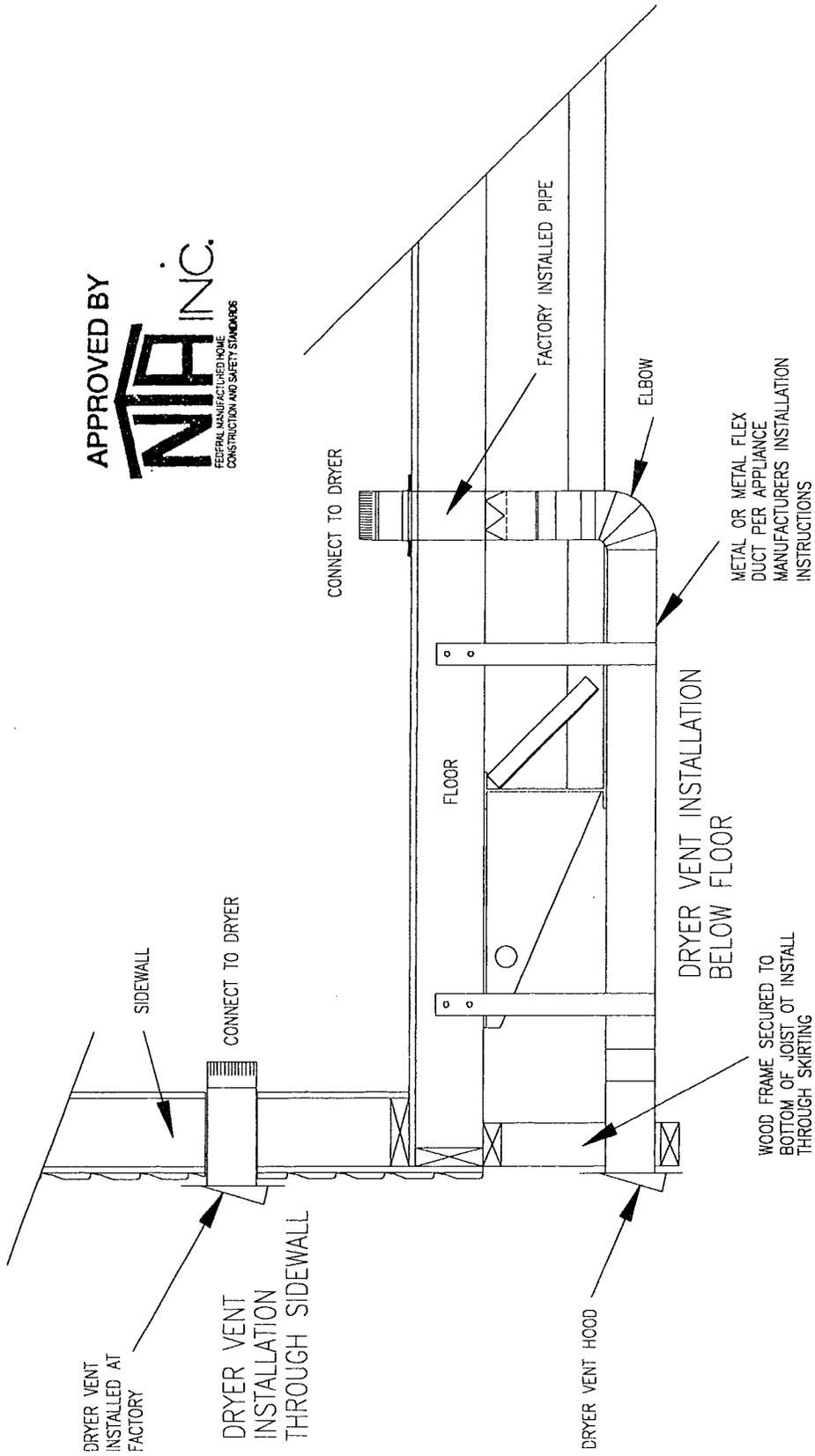
The only exception to the above is if there is a separate circuit installed and labeled in the main panel box as being for the use of an air conditioner unit. All wiring which is to be installed for an air conditioner unit must be performed by an authorized electrician and in conformance with all applicable codes.

- 7.6 **Furnace Deration.** If your home is located at 4500 feet or more above sea level, or as indicated in the manufacturer's instructions, your gas furnace must be derated for the altitude. This must be done by a qualified serviceman. A licensed technician may be required. Check with your local authorities.

**CAUTION:** Failure to derate the furnace can cause the furnace to over-heat, operate poorly and cause excessive sooting. Dangerous levels of carbon monoxide could accumulate in the home.

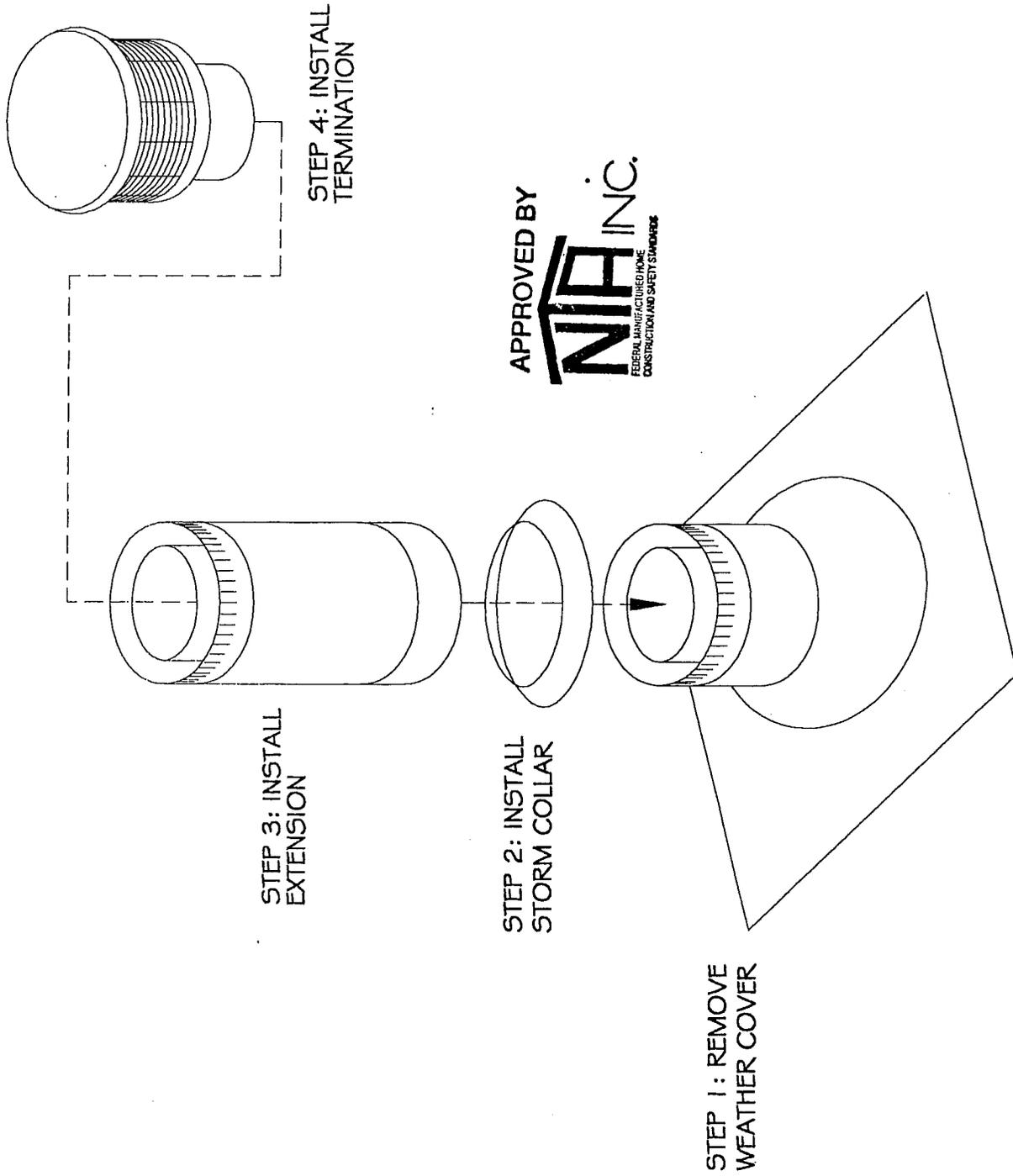


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DRYER VENT INSTALLATION

FIGURE 7.1



FIREPLACE CHIMNEY ASSEMBLY  
 FIGURE 7.4

# 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.**
- 8.2.2 **Connection procedures**
- 8.2.2.1 **To supply main.** Connect the home's water system to the water source through the inlet located under the home, usually below the water heater compartment. A tag on the side of the home marks its location.
- 8.2.2.2 **Mandatory Shutoff Valve.** You must install an accessible shutoff valve between the water supply and the inlet, as shown in Figure 8.1. It must be a full flow gate or ball valve.
- 8.2.2.3 **Crossovers.** Multisection homes with plumbing in both sections require water line cross-connections, as shown in Figure 8.2. Remove the shipping caps from the water lines and install the crossover connectors provided with the home.
- 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 MOBILE 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 (Figure 8.1).
- 8.2.3.2.1 **Automatic Heat Tape.** This tape (with a thermostat) is approved for installation on all types of water pipe, including plastic. Secure it to the pipe, insulate it, and 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. **NOTE:** Leaving home unheated will cause floor problems.
- 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.
- 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 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 specific instructions and diagrams provided with the home. Start at the most remote end and work toward the outlet, supporting the piping with temporary blocking to achieve the proper slope (see paragraph 8.3.2) When the entire system has been completed, install permanent drain line supports at 4' on center, as shown in Figure 8.3.
- 8.3.2 **Proper slopes and connector sizes.** Drain lines must slope at least 1/4" fall per foot of run unless otherwise noted on the schematic diagram (see Figure 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.
- 8.3.3 **Crossovers.** Connect multisection home drainage line crossovers as shown in Figure 8.4.
- 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.** HART HOUSING 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 (optional). If the home is to be left unheated in cold weather, pour an approved antifreeze into P-traps at all fixtures and stools. Antifreeze used must not be corrosive to plastic or fixture material.
- 8.3.6 **Flood level test procedure.** You must conduct a flood level test on the completed drainage system before connecting it to the site sewer. 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.
- 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 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 **Orificing for specific gases. SPECIAL ORIFICES AND REGULATORS ARE REQUIRED FOR EACH KIND OF GAS, AND AT ALTITUDES ABOVE 3,000 FEET. SEE THE INSTRUCTIONS ACCOMPANYING EACH GAS-BURNING APPLIANCE FOR MODIFICATION INSTRUCTIONS. BEFORE MAKING ANY 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. 8.7 before performing any system tests or connecting the system to the gas supply. All crossovers and fittings are factory installed on the supply side and are listed for manufactured housing exterior use. 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 for 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. Some furnace roof caps have been left off at the factory for transportation purposes. A warning label at the furnace will tell you that the venting system is incomplete. The roof cap (supplied by the Home Manufacturer) must be installed using the installation instructions and reference to Figure 8.8. Have the gas system connected to the gas supply only by an authorized representative of the gas company.
- 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 the manufacturer. Consult the oil furnace manufacturer's instructions for proper pipe sizing and installation procedures. **ALL OIL STORAGE TANK AND PIPING INSTALLATIONS MUST MEET ALL APPLICABLE LOCAL REGULATIONS AND SHOULD BE MADE ONLY BY EXPERIENCED, QUALIFIED PERSONNEL.**

- 8.5.1 **Tank installation requirements.** Unless the home 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-fed) furnaces.** Install oil tanks that feed vaporizing-type oil furnaces so that oil flows freely by gravity. To achieve efficient 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.** Since the furnace includes a fuel pump, the tank may be installed above or below ground. For tanks installed below ground, do not exceed the lifting capacity of the pump, and extend the filler neck 1' above grade and provide a 1-1/4" diameter minimum vent pipe extending at least 2' above grade.
- 8.5.1.3 **Sloping and draining requirements.** Regardless of the type of oil furnace or the tank location, install the tank to provide a gradual slope toward the fill end or drain plug (if so equipped). This facilitates pumping or draining of water or sludge.
- 8.5.2 **Shut-off valve and fuel line filter.** Install an accessible and approved manually-operated shut-off valve at the oil tank outlet. Hart Housing also recommends installing a suitable filter in the fuel line near the tank to trap dirt and water.
- 8.5.3 **Leak test procedure.** Before operating the system, check for leaks in the tank and supply piping. Fill the tank to capacity with fuel and examine all joints in the system for leakage.
- 8.6 **Electricity.** A large enough power supply must be available at the site. An inadequate power supply may result in improper operation of, and possible damage to, motors and appliances. It may also increase your electricity costs. The current rating in amperes of your home can be found on the tag located outside next to the feeder or service entrance and also on the electrical distribution panel.
- 8.6.1 **Description and rating of house wiring.** Your home is designed for connection to an electrical wiring system rated at 115/230 volt AC. **PROPER AND SAFE CONNECTION DEPENDS ON THE TYPE OF SUPPLY SYSTEM YOUR HOME IS EQUIPPED WITH.** The connection to this home is a feeder requiring wiring at the site, 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.
- 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 86°F. and do not take voltage drop into consideration.
- 8.6.2.1 **Overhead Feeders.** Homes equipped with overhead (mast weatherhead) feeder entrances contain all necessary conduit to the electrical distribution panel and feeder conductors. Refer to Figure 8.11.
- 8.6.2.2 **Underside Feeders.** Homes with an under-the-floor entrance come with a permanently-attached conduit raceway that runs from the electrical distribution panel to a point under the floor. Install an approved conduit fitting or junction box at the termination point. Refer to Figure 8.9.
- 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, -3 to achieve proper grounding. **(Exception: When a meter base is installed on the home it 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.

- 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:

- 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:

- 8.6.4.3 **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. Install properly-sized conductors from the main power supply to the panelboard. Refer to Figure 8.10 (a) and (b) for conductor and junction box requirements. The homeowner or installer must provide the supply connection including the feeder conductors, junction box and raceway connectors. Protect conductors emerging from the ground from a minimum of 18" below grade to 8' above grade, or to the point of entrance to the home. The distance measured from the top surface of a buried cable, conduit or raceway to the finished grade must meet minimum burial requirements outlined in the National Electric Code. Use a moisture-proof bushing at the end of the conduit from which the buried cable emerges.

- 8.6.4.4 **Service equipment meter base.** Either an overhead or underground entrance may be provided. The exterior equipment and enclosure must be weatherproof, and conductors must be suitable for use in wet locations. When a meter base is installed on the home, a main bonding jumper is to be installed to connect the equipment grounding conductor and the service-equipment enclosure to the grounded conductor of the system within the service equipment. The main bonding jumper may be a wire, bus, or a screw. A grounding electrode conductor shall be used to connect the equipment grounding conductors, the service-equipment enclosures and the grounded service conductor to the grounding electrode as shown in Figure 8.11. The homeowner must provide the grounding electrode conductor(s) which should be #4 (minimum) copper in one piece (not spliced). The grounding electrode should be an 8 foot length of 1/2 inch diameter copper rod or 3/4 inch galvanized steel pipe. Drive it into the ground at least 12 inches below the surface and 2 feet from the foundation, or bury it horizontally in a 2-1/2 foot deep trench. Connect the grounding conductor wire to the grounding electrode with a grounding clamp and cover with 12 inches (min.) of earth. For added protection, homes with metal frames or siding should be connected to the 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.

8.6.5 **Crossover connections.** Refer to Figure 8.12 (a) & (b) 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.

#### 8.6.6 System test procedures and equipent

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

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

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

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

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

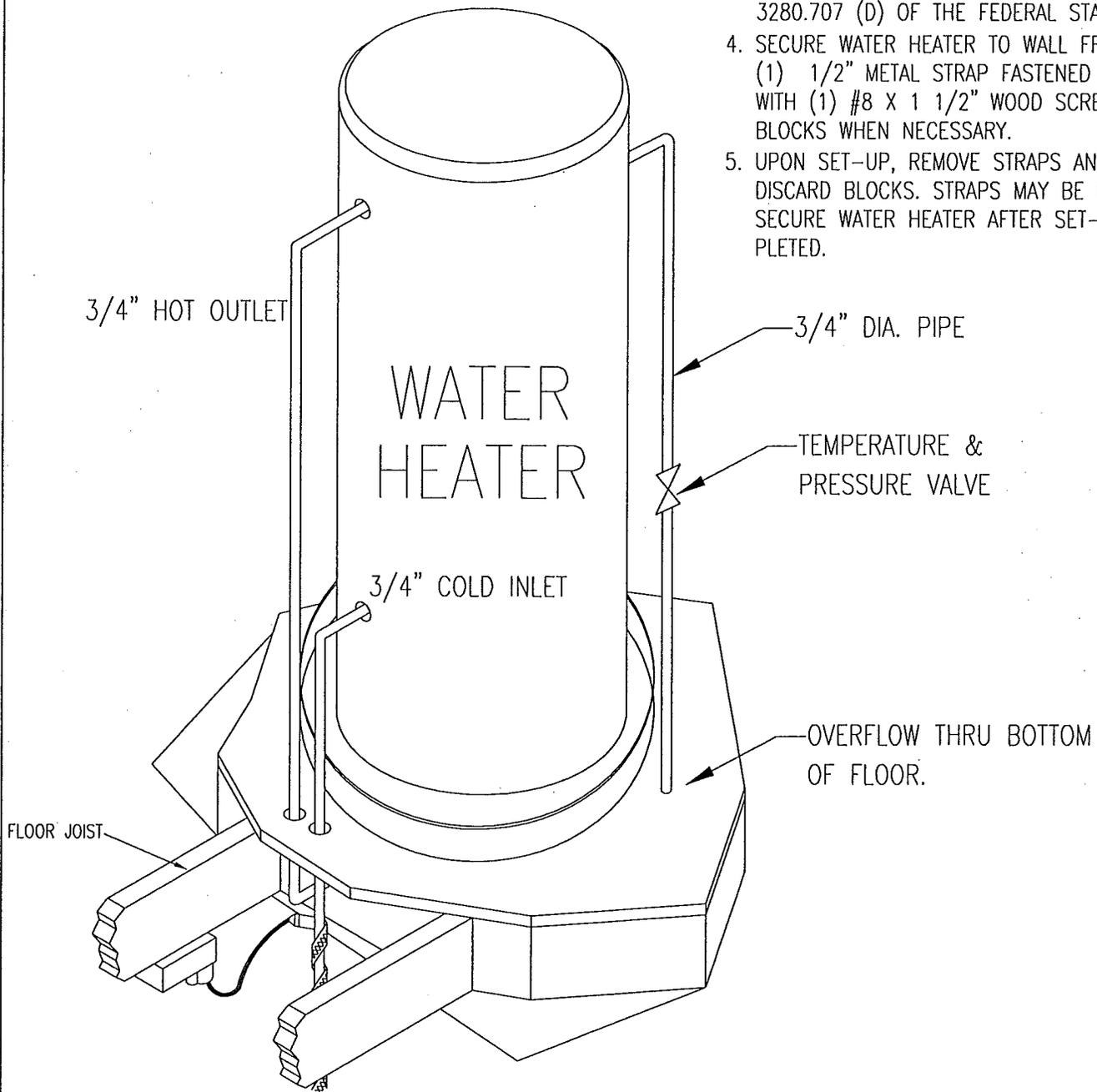
8.6.6.2 **Post-connection tests.** Conduct the following three tests after turning on the main circuit breaker and each individual circuit breaker. **CAUTION: ALLOW THE WATER HEATER TO FILL COMPLETELY BEFORE ACTIVATING THE WATER HEATER CIRCUIT. FAILURE TO DO SO WILL CAUSE THE WATER HEATER ELEMENT TO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

8.6.6.2.1 **Polarity and grounding of receptacles.** With 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 converison 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.

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 must be assured. Failure of electrical wiring or fixtures requires repair and retesting.

1. THE INSTALLATION OF POTABLE WATER SUPPLY PIPING OR FIXTURE OR APPLIANCE CONNECTIONS SHALL BE MADE IN SUCH A MANNER TO PRECLUDE THE POSSIBILITY OF BACKFLOW.
2. MASTER COLD WATER SHUT OFF VALVE TO BE SITE INSTALLED BY OTHERS.
3. WATER HEATER MUST CONFORM TO SECTION 3280.707 (D) OF THE FEDERAL STANDARDS.
4. SECURE WATER HEATER TO WALL FRAMING WITH (1) 1/2" METAL STRAP FASTENED AT EACH END WITH (1) #8 X 1 1/2" WOOD SCREWS & WOODEN BLOCKS WHEN NECESSARY.
5. UPON SET-UP, REMOVE STRAPS AND BLOCKS. DISCARD BLOCKS. STRAPS MAY BE USED AGAIN TO SECURE WATER HEATER AFTER SET-UP IS COMPLETED.

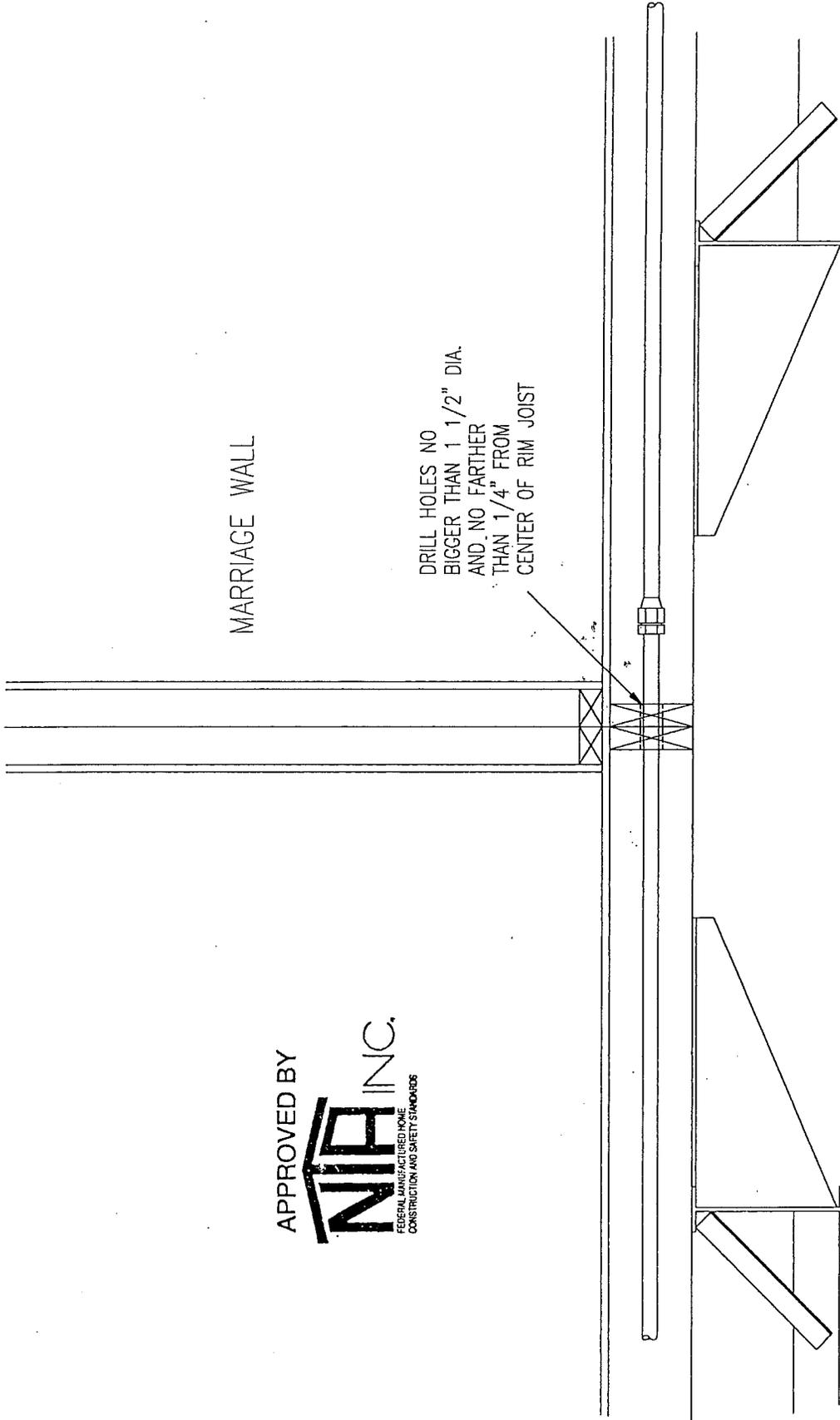


TYPICAL WATER HEATER INSTALLATION

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CONSTRUCTION AND SAFETY STANDARDS

MARRIAGE WALL

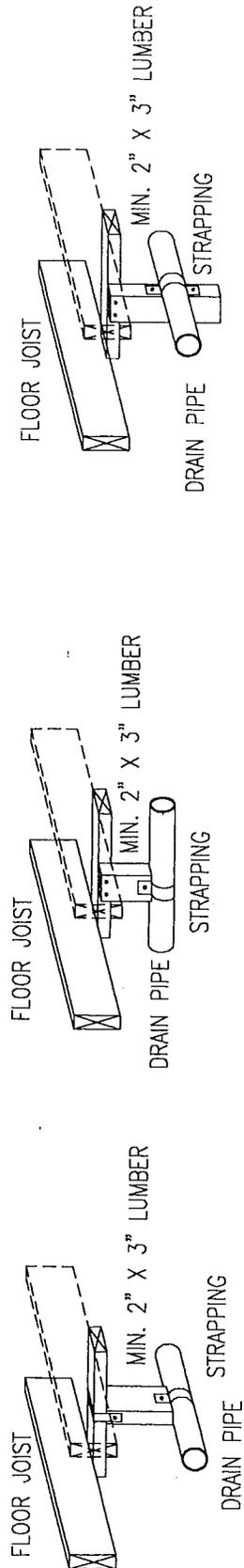
DRILL HOLES NO  
BIGGER THAN 1 1/2" DIA.  
AND NO FARTHER  
THAN 1/4" FROM  
CENTER OF RIM JOIST



WATER LINE CROSSOVER CONNECTION

MARRIAGE WALL

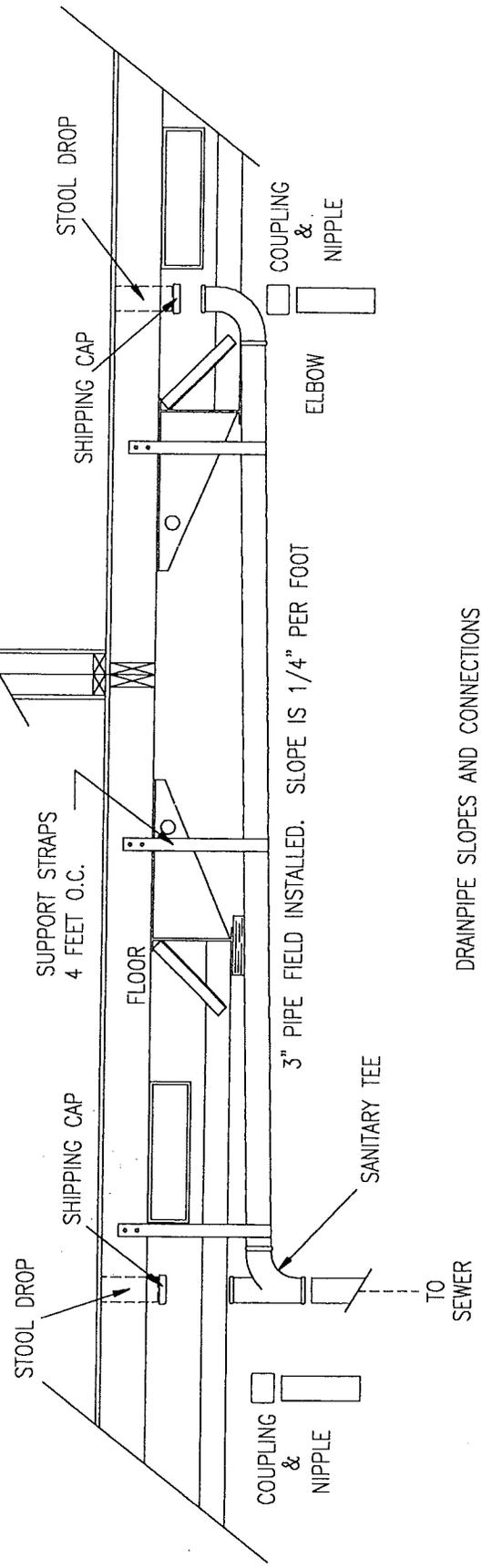
FIGURE 8.2



APPROVED BY



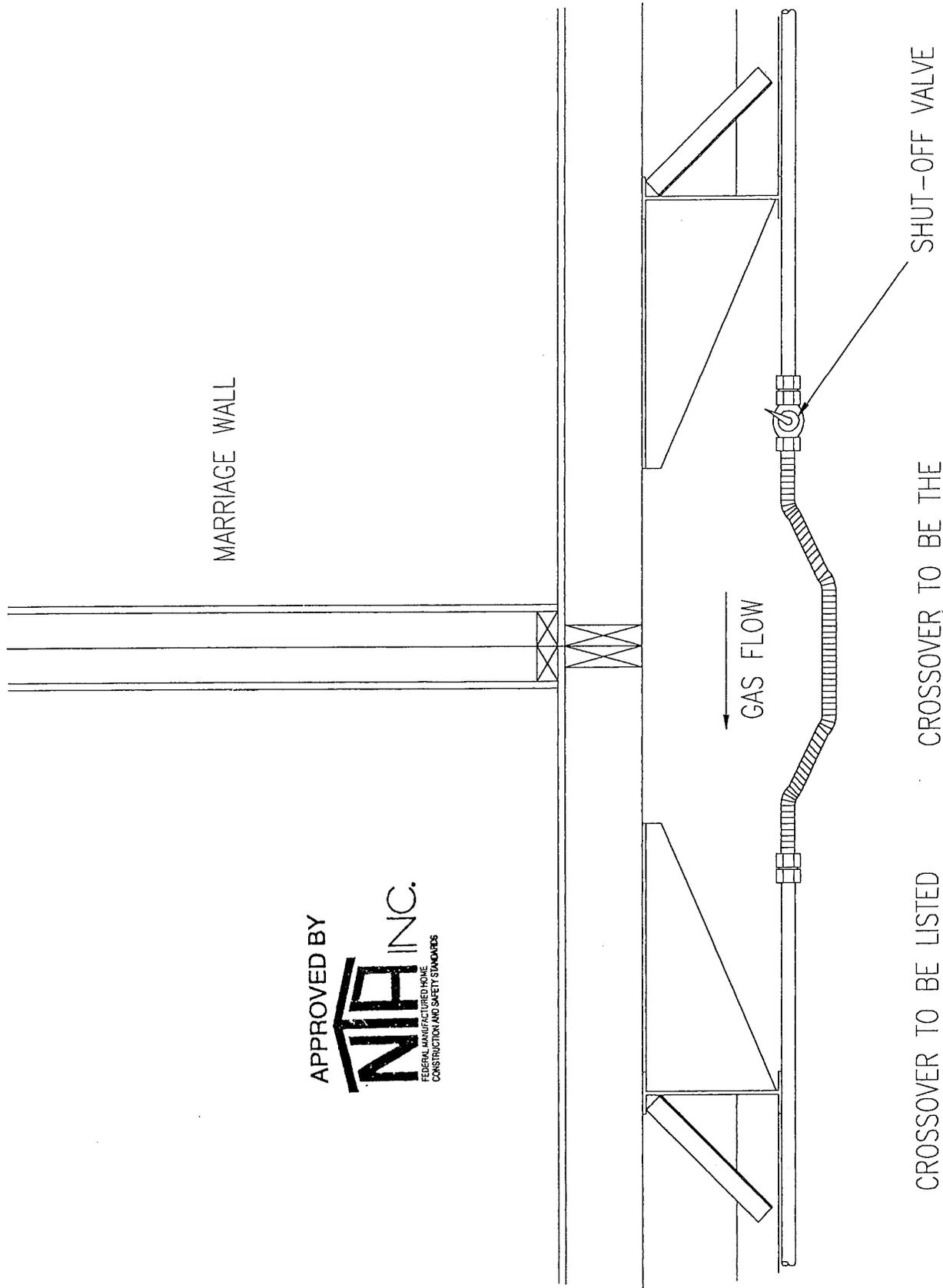
DRAINPIPE SUPPORT METHODS  
FIGURE 8.3



DRAINPIPE SLOPES AND CONNECTIONS

FIGURE 8.4

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CONSTRUCTION AND SAFETY STANDARDS



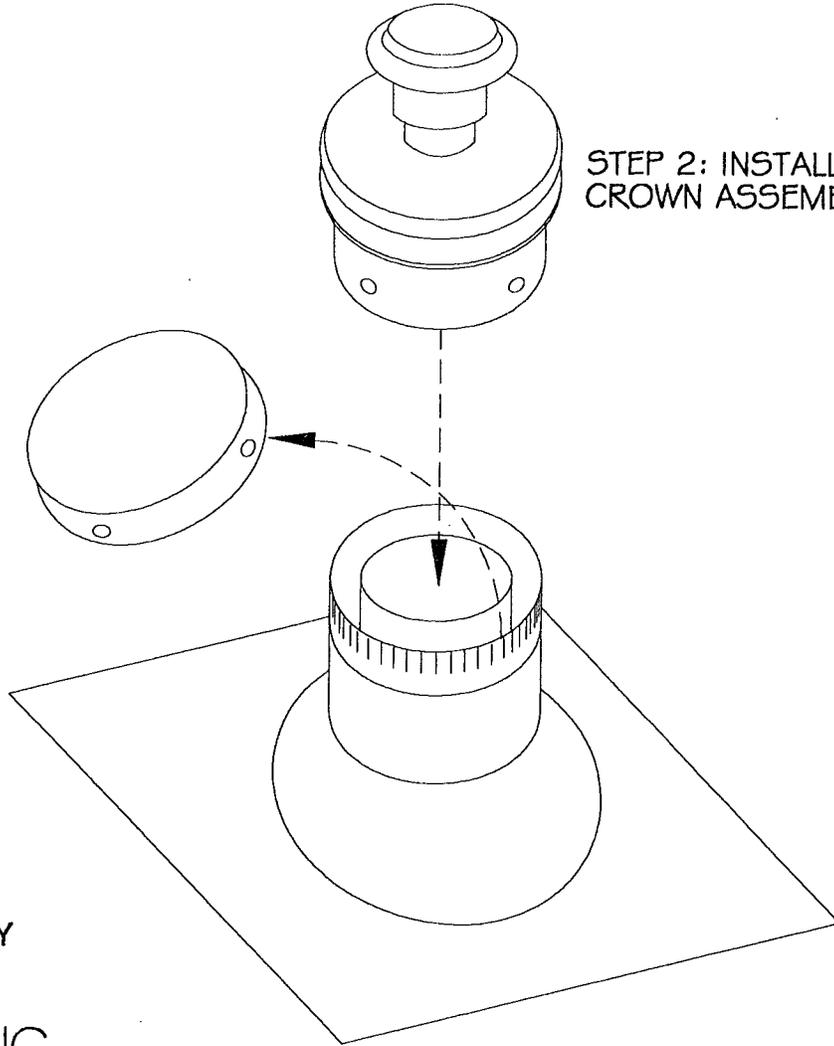
CROSSOVER TO BE LISTED  
FOR EXTERIOR USE.

CROSSOVER TO BE THE  
SAME SIZE AS GAS PIPING

GAS LINE CROSSOVER CONNECTION

FIGURE 8.7

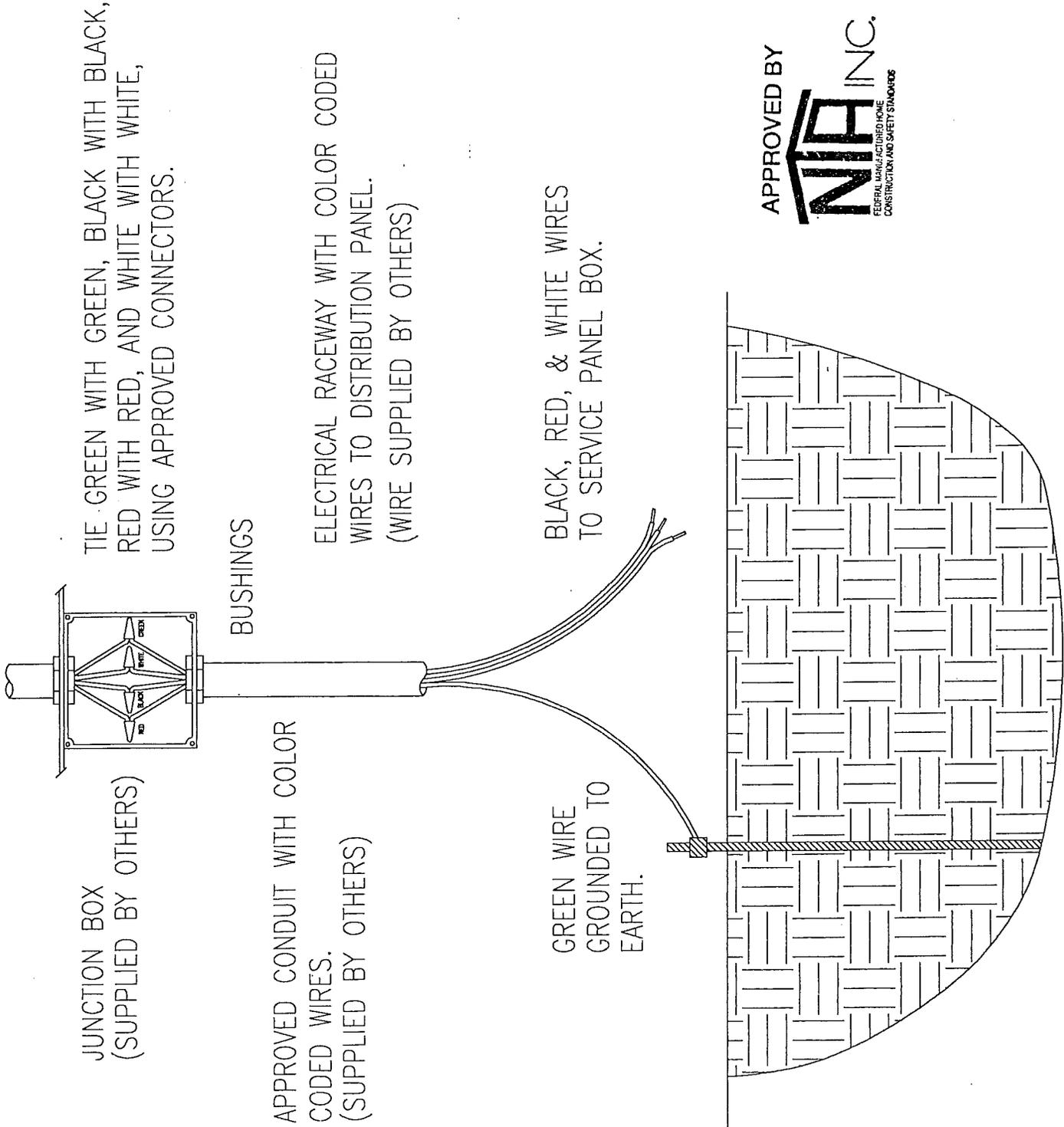
STEP 1: REMOVE  
WEATHER COVER



STEP 2: INSTALL  
CROWN ASSEMBLY

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CONSTRUCTION AND SAFETY STANDARDS

FURNACE CROWN ASSEMBLY  
FIGURE 8.8



JUNCTION BOX  
(SUPPLIED BY OTHERS)

TIE GREEN WITH GREEN, BLACK WITH BLACK,  
RED WITH RED, AND WHITE WITH WHITE,  
USING APPROVED CONNECTORS.

BUSHINGS

APPROVED CONDUIT WITH COLOR  
CODED WIRES.  
(SUPPLIED BY OTHERS)

ELECTRICAL RACEWAY WITH COLOR CODED  
WIRES TO DISTRIBUTION PANEL.  
(WIRE SUPPLIED BY OTHERS)

GREEN WIRE  
GROUNDED TO  
EARTH.

BLACK, RED, & WHITE WIRES  
TO SERVICE PANEL BOX.

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FEDERAL MANUFACTURED HOME  
CONSTRUCTION AND SAFETY STANDARDS

# SERVICE-ENTRANCE CONDUCTORS

SERVICE AMPS	FEEDER	WIRE SIZE		CONDUIT SIZE	BOX SIZE
		GROUND	NEUTRAL		
100	#4	#8	#8	1 1/4"	10 X 10 X 4
125	#2	#8	#4	2"	10 X 12 X 4
150	#1	#6	#3	2"	10 X 12 X 4
200	#2/0	#6	#1	2"	10 X 12 X 4

Refer to notes 1 & 2 for minimum box size.

All service cable to be copper conductor and shall be a 75°C (Minimum) temperature rating. Figure 8.10 (a).

Conductor Types: RH-RHH-RHW-THHW-THW-THWN-THHN-XHHW-USE

## JUNCTION BOX SIZE

Notes:

- 1: For straight pulls the length of the box shall not be less than eight times the trade diameter of the largest raceway.
- 2: For angle pulls the distance between each raceway entry inside the box and the opposite wall of the box shall not be less than six times the trade diameter of the largest raceway.

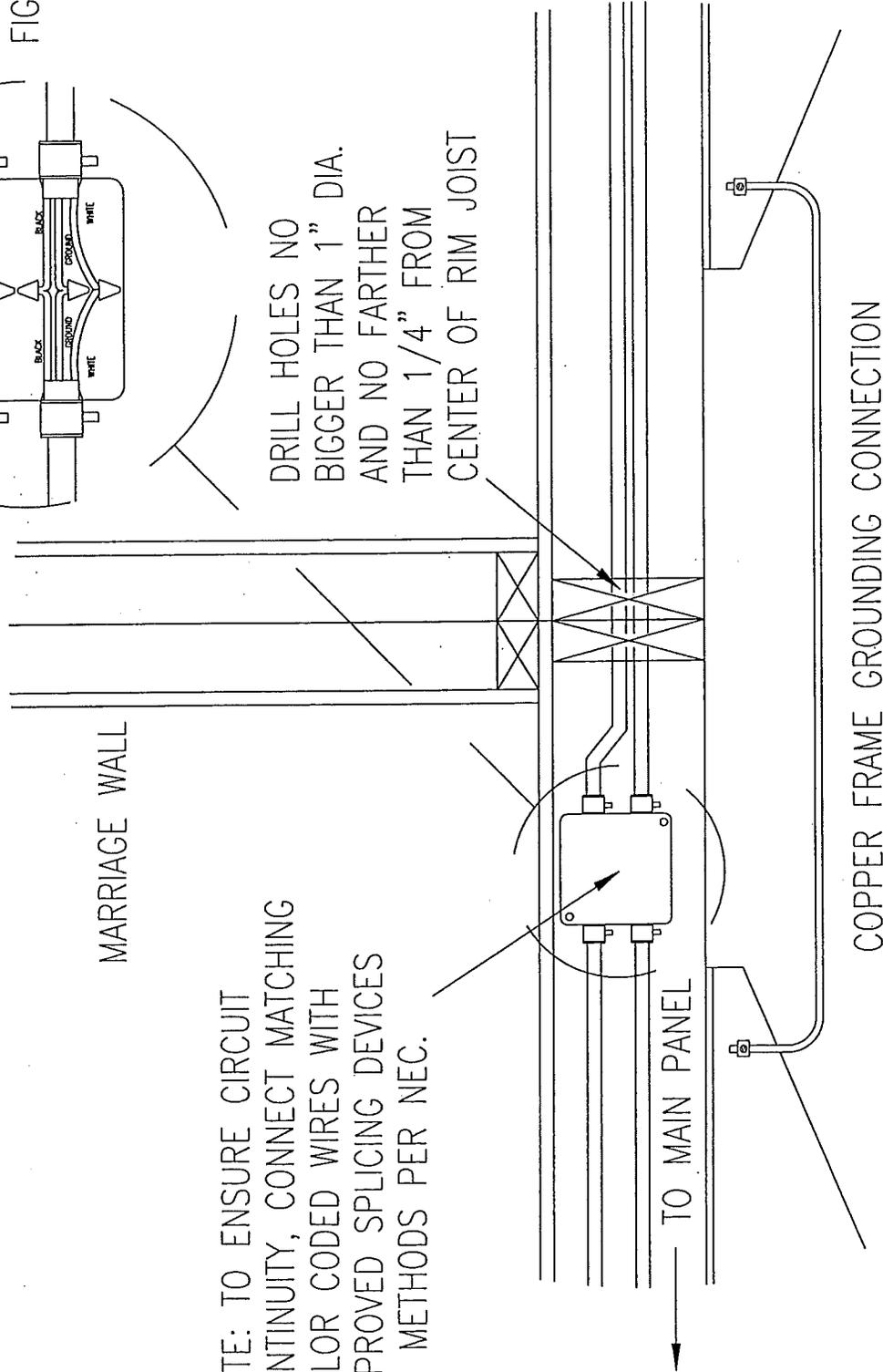


SIZE OF FEEDER CONDUCTORS TO BE INSTALLED, AWG, OR MCM	DISTANCE RACEWAY ENTRY TO WALL OR BARRIER
4 - 3	2"
2	2 1/2"
1	3"
1/0 - 2/0	3 1/2"
3/0 - 4/0	4"
250	4 1/2"
300 - 350	5"

Figure 8.10 (B)

ACCESS TO THE CONNECTIONS ARE PROVIDED BY THE MANUFACTURER THRU ZIPPERS IN THE BOTTOM BOARD.

NOTE: TO ENSURE CIRCUIT CONTINUITY, CONNECT MATCHING COLOR CODED WIRES WITH APPROVED SPlicing DEVICES OR METHODS PER NEC.



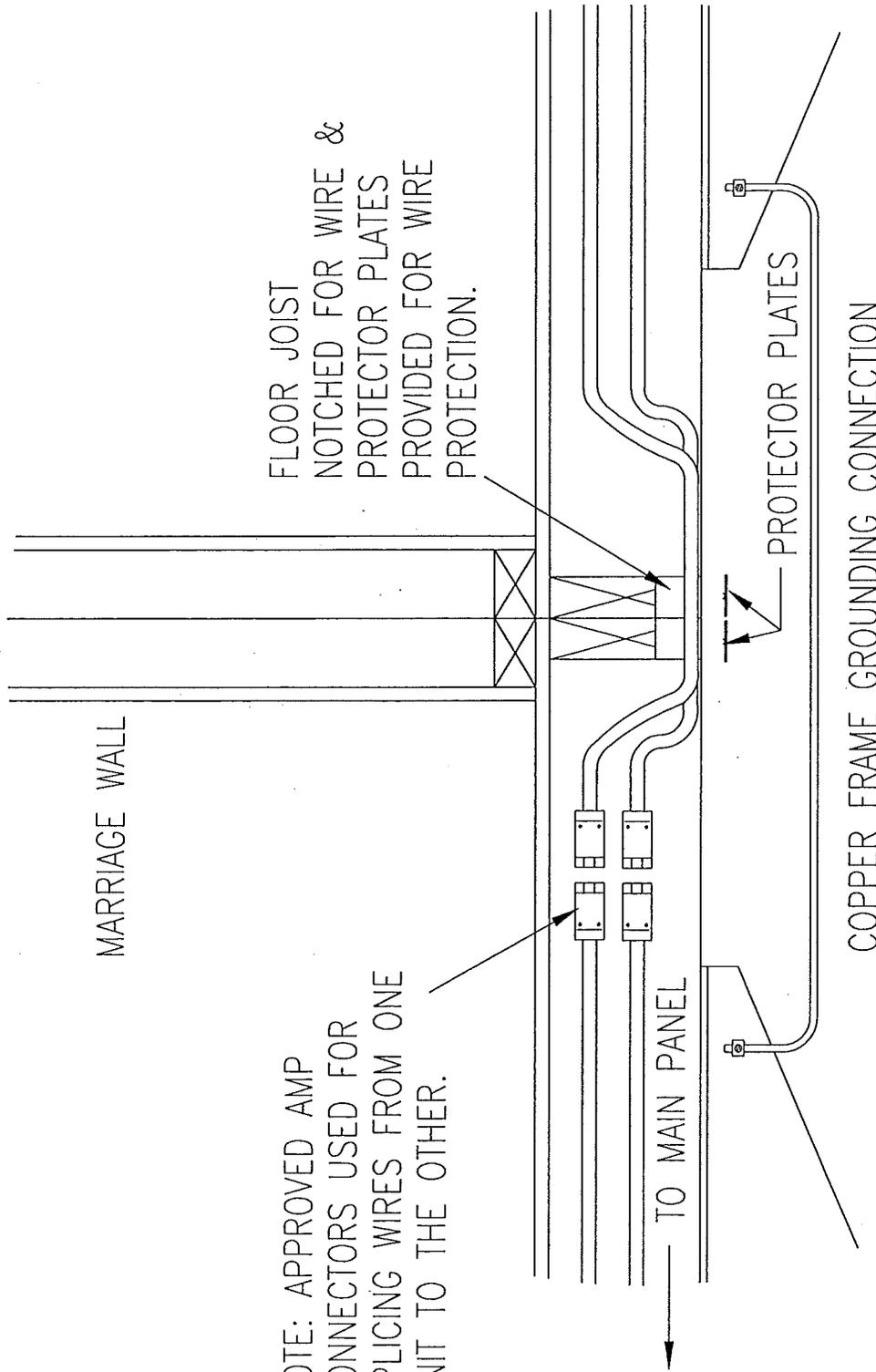
COPPER FRAME GROUNDING CONNECTION

ELECTRICAL Crossover CONNECTIONS for wire sizes #10 ga. and larger

FIGURE 8.12 (b)

FIGURE 8.12

ACCESS TO THE CONNECTIONS ARE PROVIDED BY THE MANUFACTURER  
THRU ZIPPERS IN THE BOTTOM BOARD.



NOTE: APPROVED AMP  
CONNECTORS USED FOR ONE  
SPlicing WIRES FROM ONE  
UNIT TO THE OTHER.

FLOOR JOIST  
NOTCHED FOR WIRE &  
PROTECTOR PLATES  
PROVIDED FOR WIRE  
PROTECTION.

ELECTRICAL CROSSOVER CONNECTIONS  
for wire sizes #12 and #14 ga.

FIGURE 8.12a

## REQUIRED ON SITE OPERATIONAL TEST ON SMOKE ALARMS

AFTER THE UNITS HAVE BEEN SET-UP AND ALL THE ELECTRICAL CONNECTIONS HAVE BEEN COMPLETED, PROCEED TO TEST THE SMOKE ALARMS.

TESTING PROCEDURE IS AS FOLLOWS:

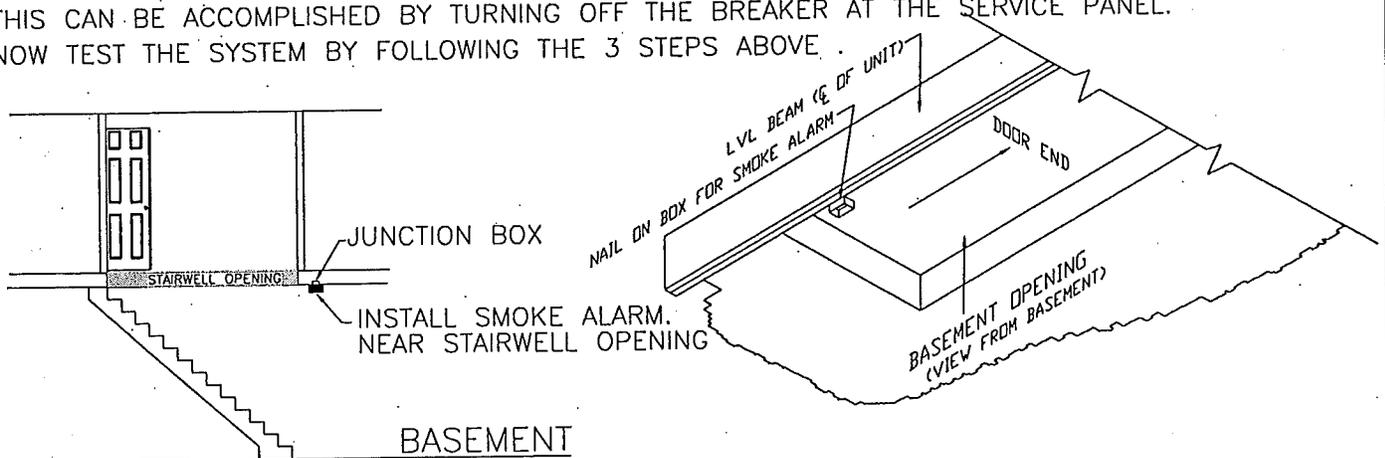
1. START WITH ANY SMOKE ALARM AND PRESS AND HOLD THE TEST BUTTON UNTIL THE ALARM SOUNDS.
2. MAKE SURE THAT ALL OTHER ALARMS SOUND.
3. REPEAT THIS PROCESS FOR ALL OTHER ALARMS INCLUDING THE BASEMENT, IF APPLICABLE.

A SMOKE ALARM THAT DOES NOT FUNCTION AS DESIGNED DURING THE TEST, MUST BE REPLACED AND THE SYSTEM RETESTED.

### OPTIONAL

TESTING OF THE BATTERY BACK-UP FEATURE IS NOT REQUIRED, HOWEVER, IT IS SUGGESTED BY THE MANUFACTURER THAT THE HOMEOWNER IS MADE AWARE OF THIS FEATURE AND THE TESTING PROCEDURE.

TO TEST THE BATTERY BACK-UP FEATURE, FIRST TURN OFF THE POWER SOURCE. THIS CAN BE ACCOMPLISHED BY TURNING OFF THE BREAKER AT THE SERVICE PANEL. NOW TEST THE SYSTEM BY FOLLOWING THE 3 STEPS ABOVE.



ALL BASEMENT UNITS ARE PRE-WIRED FOR A SMOKE ALARM. THE JUNCTION BOX (NAIL ON BOX) IS LOCATED ON THE LVL BEAM IN THE BASEMENT OPENING AT THE MARRIAGE WALL. THE SMOKE ALARM IS SHIPPED LOOSE IN THE HOME. THE SMOKE ALARM SHOULD BE INSTALLED AS CLOSE TO THE OPENING AS POSSIBLE.

14-3 W/G ROMEX NONMETALIC CABLE IS PROVIDED IN THE JUNCTION BOX FOR CONNECTION TO THE SMOKE ALARM. THE BLACK AND WHITE WIRES ARE THE TWO POWER LEADS AND ARE TO BE CONNECTED TO THE BLACK AND WHITE LEADS, RESPECTFULLY, ON THE SMOKE ALARM. THE THIRD (RED) WIRE IS TO BE CONNECTED TO THE INTERCONNECT WIRE AS INDICATED ON THE SMOKE ALARM.

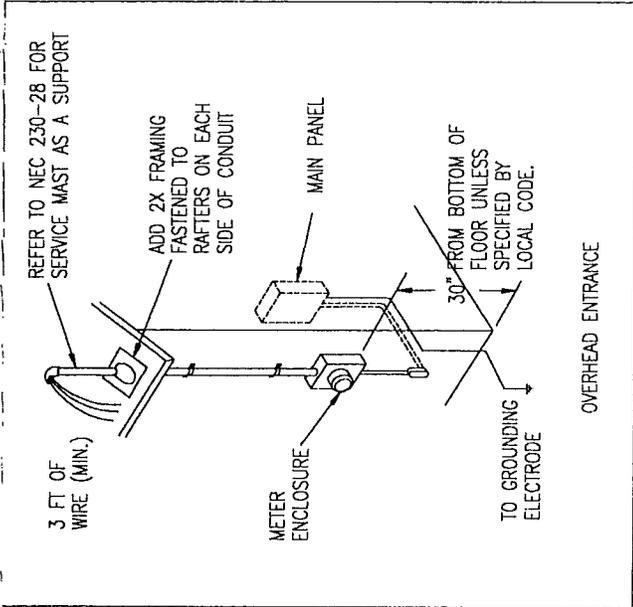
ALL WIRING MUST BE DONE BY A LICENCED INDIVIDUAL AND CONFORM TO NEC CODE IN EFFECT AT THE TIME OF INSTALLATION.

AFTER INSTALLATION IS COMPLETE, TEST THE SYSTEM AS DESCRIBED ABOVE.

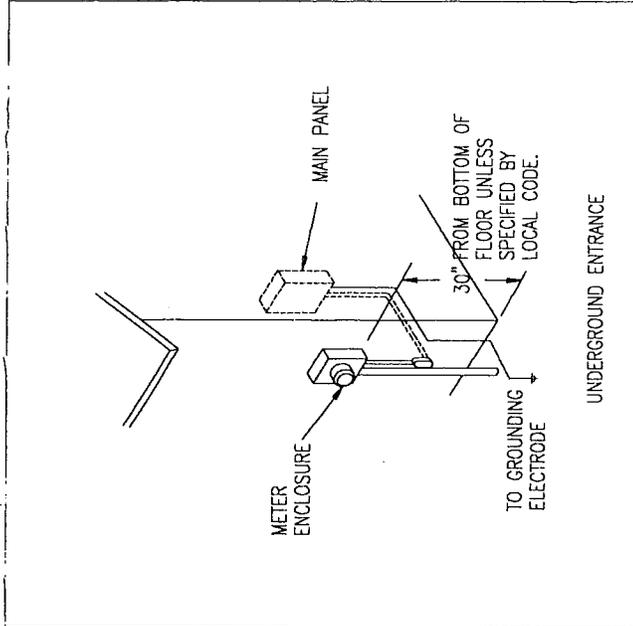
HART HOUSING GROUP, INC.

NOVEMBER 13, 2003

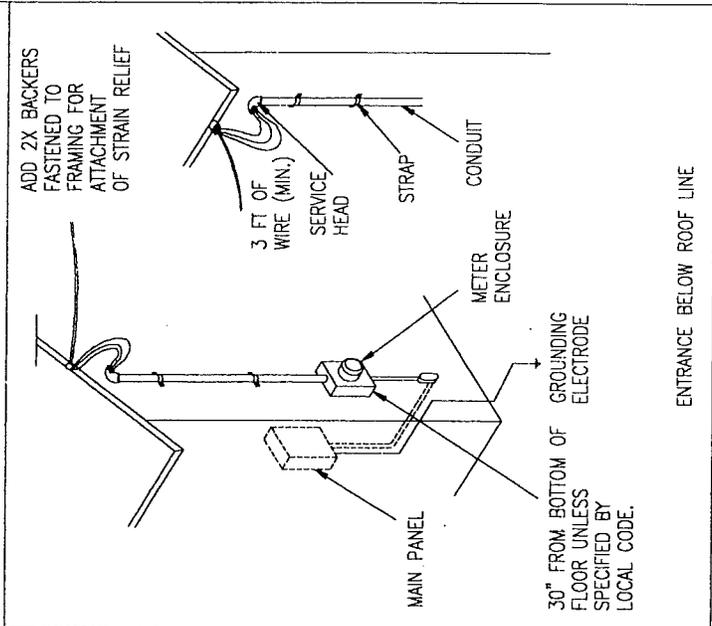
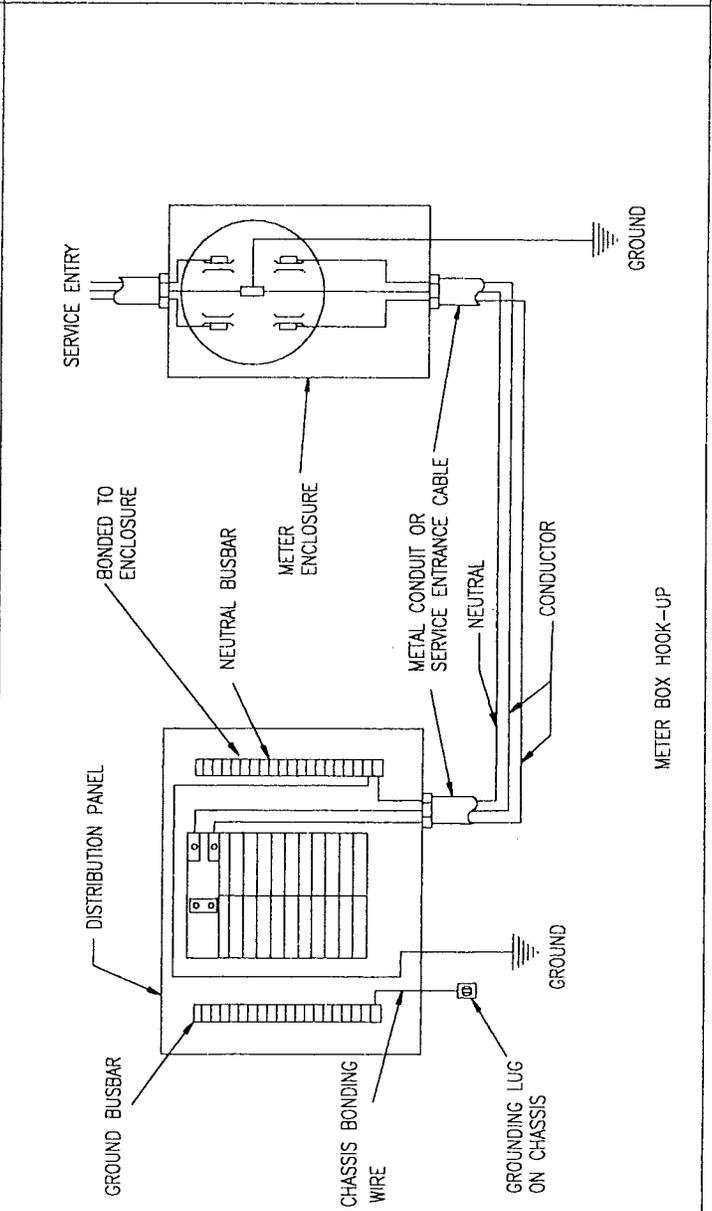
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OVERHEAD ENTRANCE



UNDERGROUND ENTRANCE



ENTRANCE BELOW ROOF LINE

SERVICE EQUIPMENT INSTALLED ON THE MANUFACTURED HOME

FIGURE 8.11

# 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 **Appliance 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 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 head 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 **Bottom board.** 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. See bottom board manufacturers patching and repair instructions for proper methods (separately provided with this manual).
- 9.12 **Ground cover.** Repair any cuts or tears in the ground cover with tape.
- 9.13 **Anchors and straps.** Be sure the correct number of anchors have been installed at the proper angle, and that all straps have been tightened.
- 9.14 **Interior details.** Inspect for, and correct, all interior finishing details, such as loose molding, carpet seams, etc.

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



## **BOTTOM BOARD REPAIR**

Repairs — small cuts or tears may be repaired by using CP-1 pressure sensitive tape or equivalent. For larger holes use additional pieces of Mobile Flex which extend at least 2” beyond the damaged area. Secure the large patch with either a mechanical fastener, CP-1 pressure sensitive tape, High Tack Adhesive 76 manufactured by 3M contact cement or equivalent.



# NOTES