BY KENNOTH Pb. wk. - 6-3-81

Manufactured Homes Installation Manual

DMH HOMES

9-78 / 9-79

INTRODUCTION 1

ZONE MAPS 2

SITE PREPARATION 3

EQUIPMENT REQUIREMENTS 3

SUPPORT REQUIREMENTS 3-4

MANUFACTURED HOME SET UP PROCEDURE

- Blocking and Leveling
- Securing the Home on Blocking
- Securing the Home on a Perimeter Frame Foundation
- Tie-Down Instructions
- Sealing the Home
- Exterior Closure
- Interior Finishing

5-16

UTILITY HOOKUP AND TESTING

- Water
- Drainage
- Gas
- Electrical
- Cross Over Air Ducts
- Dryer Venting

20

BOTTOM BOARD REPAIR INSTRUCTIONS 21

1

Introduction

This DMH home has been engineered, constructed and inspected in accordance with "The Department of Housing and Urban Development" Mobile Home Construction and Safety Standards as published in the Federal Register pursuant to the requirements of the National Mobile Home Construction and Safety Standards Act of 1974 (Title VI of Pub. L. 93-383, U.S.C. 5401 et seq.). With proper installation and reasonable care, it will provide the homeowner with long lasting shelter.

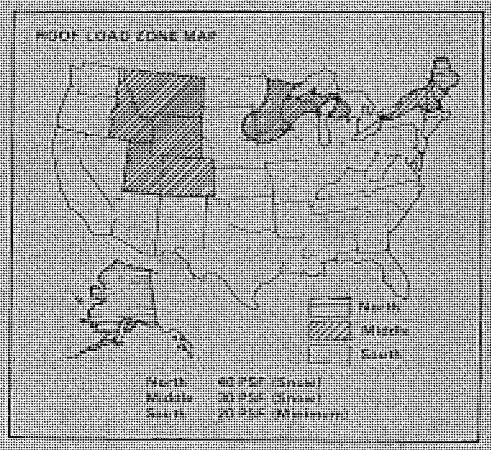
The manual outlines the steps required for proper home installation and should be used by a qualified installation company. Local and state regulations may affect the installation of the home and the homeowner should insist the installation company conform to these regulations.

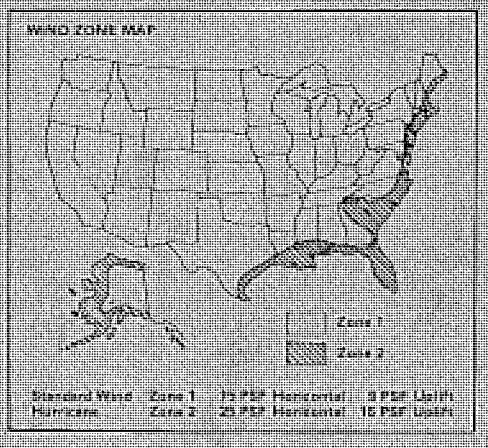
The drawings in this manual are intended to be representative of the homes, however, designs and specifications could change in the interest of product improvement.

2

Zone Maps

The following Zone Maps will help you make other installation determinations with regard to prevailing weather in the Zone where your site is located:





3

Site preparation

The selected home site must be properly graded and sloped to provide for storm drainage run-off; in particular, the area beneath the home must be graded to prevent water accumulation.

Proper support for the home must allow for soil conditions in the immediate area. Pier footings must be placed on firm undisturbed soil (not loose fill) or soil which has been compacted to at least 90 percent of its maximum relative density. Pier supports may also be placed directly on concrete slabs designed for the home's placement.

Climate conditions must also be taken into account. If footings are placed on a frost-susceptible soil, such as clay or silt, heaving and/or settlement may occur. In areas where temperatures go below freezing, it is important that the pier footings be located below the frost line.

Equipment Requirements

The listing below contains only the major items, and adjustments to this listing may be required by individual set-up crews.

Tools:

5 ton hydraulic jacks
6' carpenters level
Ratchet and socket wrenches
Portable electric drill
Hand winch (come-along)
Pipe wrenches
Tin Snips
Adjustable jackpost
Ordinary small hand tools
(Carpentry and electricians)

Other Material:

2" x 12" x 12' planks for skids
Dunnage and wedge-shaped shims
Lubricant for skids
10 pcs. of 2" x 24" steel pipe for rollers

Support Requirements

TABLE I

Minimum Support Capacities in Pounds

Zone	24' Wide		26' and 28' Wide	
	Chassis Supports	Interior Beam Supports	Chassis Supports	Interior Beam Supports
South				
Roof Load 20 PSF	3650	5000	4200	5450
Middle				
Roof Load 30 PSF	4100	6950	4800	7500
North				

4

Outrigger Frame:

Chassis supports must be installed under both ends of the frame not more than one foot from the ends and immediately ahead and behind the spring hangers under each beam. Additional supports must be installed under each beam so that spacing between adjacent supports will not exceed 8 feet.

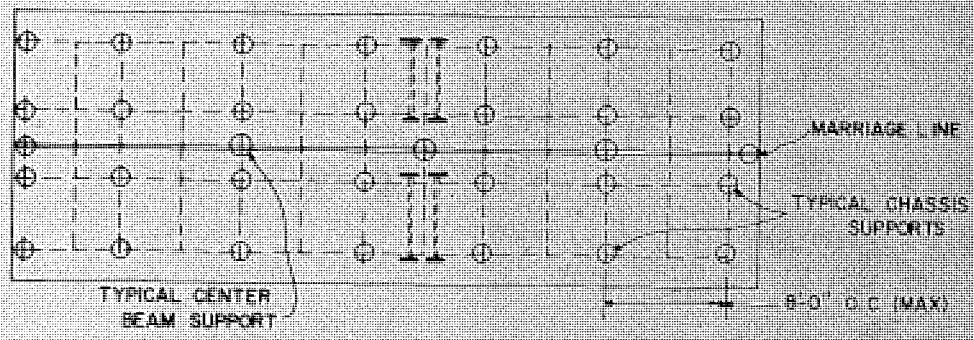
Center beam supports must be installed at the marriage line of the two sections to provide support for the roof ridge beam. Within one foot of each end of marriage line, install supports of same capacity as placed under chassis and install interior center beam supports where indicated with markers on marriage line joists. To achieve required large support capacity two supports closely placed with a total capacity equal to or exceeding the required capacity may be used. (See Figure 1).

Perimeter Frame

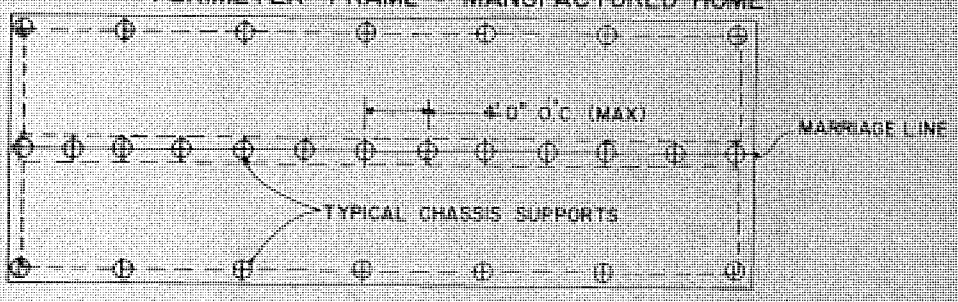
Chassis supports must be installed under both ends of the frame not more than one foot from the ends. Spacing between supports under the outside frame members must not exceed 8 feet. Spacing between interior (marriage line) frame members must not exceed 4 feet and must have a wide top surface to support the full width of both frame members. (See Figure 1).

All supports (piers and blocks) must be placed on supporting structures of proper size and capacity.

OUTRIGGER FRAME - MANUFACTURED HOME



PERIMETER FRAME - MANUFACTURED HOME



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Manufactured Homes Set-up Procedure

In the following instructions, the sections of the manufactured home are referred to as the "A" half and the "B" half. The "A" half is usually the half in which the utilities have been installed.

Prepare the sections prior to placement by removing the running lights and protective covering from the open sides. Install insulation at the matching endwalls, floors and lower part of room beam. Secure insulation with masking tape or staples to hold in position until sections are connected. Proper installation is required to prevent air infiltration.

Blocking and Leveling

1. Setting "A" Half

   a. Position "A" half on previously prepared site, spotting for ease of utility hook-up. The connecting points for electric, water, gas, and drain lines are located in the rear one half of the "A" unit.

   b. With the use of the hitch jack and 5-ton hydraulic jacks positioned under the I-beams axles, raise the section until the wheels are off the ground.

   c. Disconnect the brake wires and remove wheels.

   d. Remove axle assemblies by extracting main spring hanger bolts. (optional)

   e. Position piers or blocks of desired height and required capacity at the support points. On all units, supports must be installed under both ends of frame not more than one foot from the ends of the I-beams and immediately ahead and behind the spring hangers under each I-beam. Remove jacks and lower section to supports.

2. Leveling the "A" Half

   a. With the use of the carpenter's level, adjust the hitch jack to obtain the lengthwise level. Adjust or shim supports to hold level.

   b. Place the level across the I-beam behind the hitch and raise the low side with the jack placed under the I-beam just forward of the spring hangers. Adjust or shim supports to hold level. Repeat with level at rear of home, placing jack just behind the spring hangers.

   c. Recheck both longitudinal and transverse levels and adjust as necessary.

6

3. Setting and Leveling "B" Half

a. Lay down 2" x 12" planks in line with axles of "A" half for use as skids. A lubricant of some type should be applied to skids for ease of moving "B" toward "A". (See Figure 2).

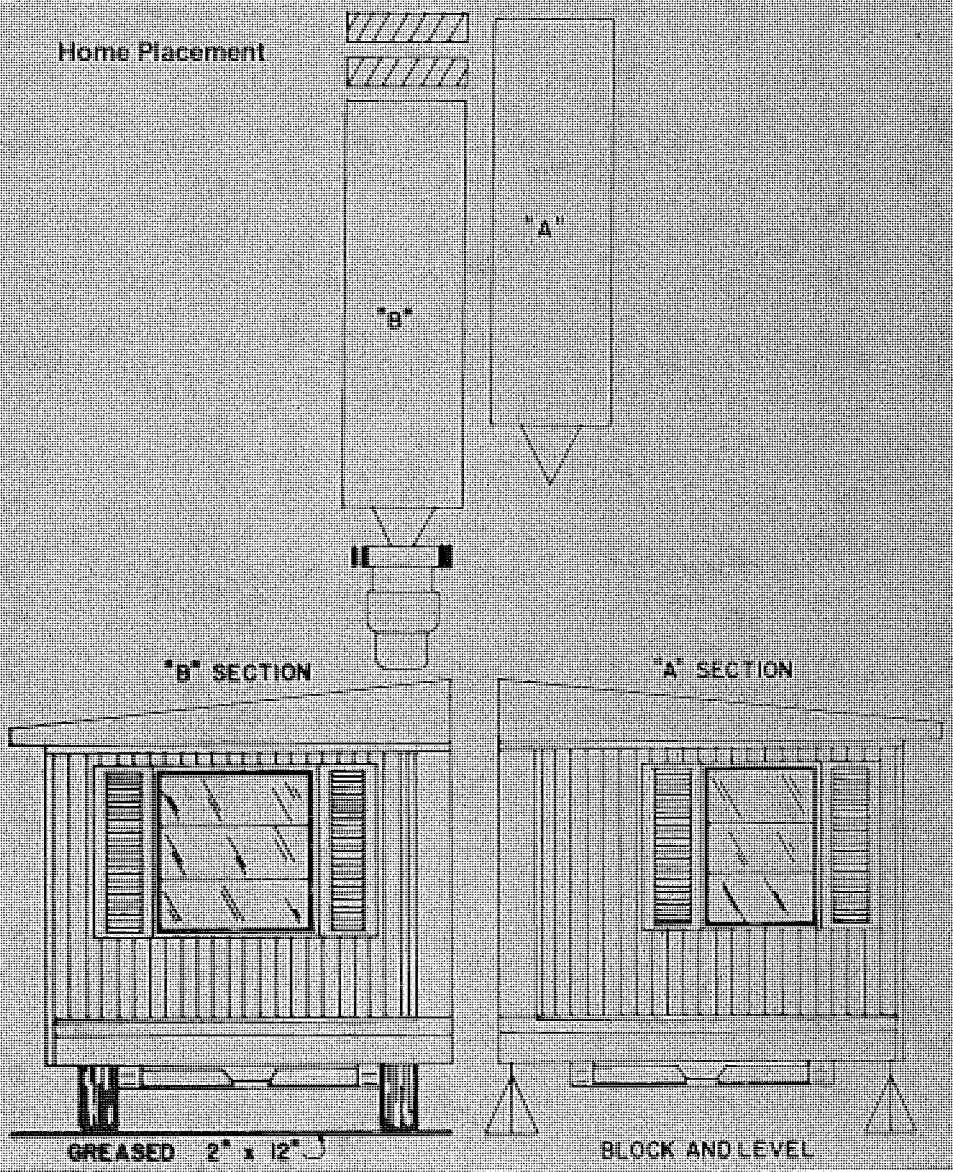
b. With towing vehicle move "B" as close to "A" as possible, using extreme care so as not to damage sections. Position so that bottom of rear walls of both halves are in alignment. Wheels of "B" half should be setting on lubricated planks.

c. Attach come-alongs to I-beams at front and rear and draw "B" snug to "A". Maintain tension on come-alongs.

d. Level both halves as one unit and place supports as instructed for "A" half.

e. Remove detachable hitches.

Home Placement



7

Securing the Home on Blocking

1. With the halves together and the initial leveling completed, check the alignment of the endwalls, interior walls, roof and floor. The joints in the ceiling are an indication of roof position. There, joints should run straight from one half to the other when halves are properly positioned. Alignment of ceilings and walls can be accomplished by very carefully raising outside rear corner and lowering the outside front corner of the "B" half until the sections are in alignment or conversely.

2. With the sections in alignment, tie the floors together with 3/8" x 1½" bolts through angle iron at ends of outriggers. In homes which have frame tie-bolts provided, fasten the frames together by inserting the tie-bolts through the holes in the I-beams and tightening the nuts until snug. Secure the rim joists with 3" wood screws at 36" spacing. (See Figure 3).

Joining Frame

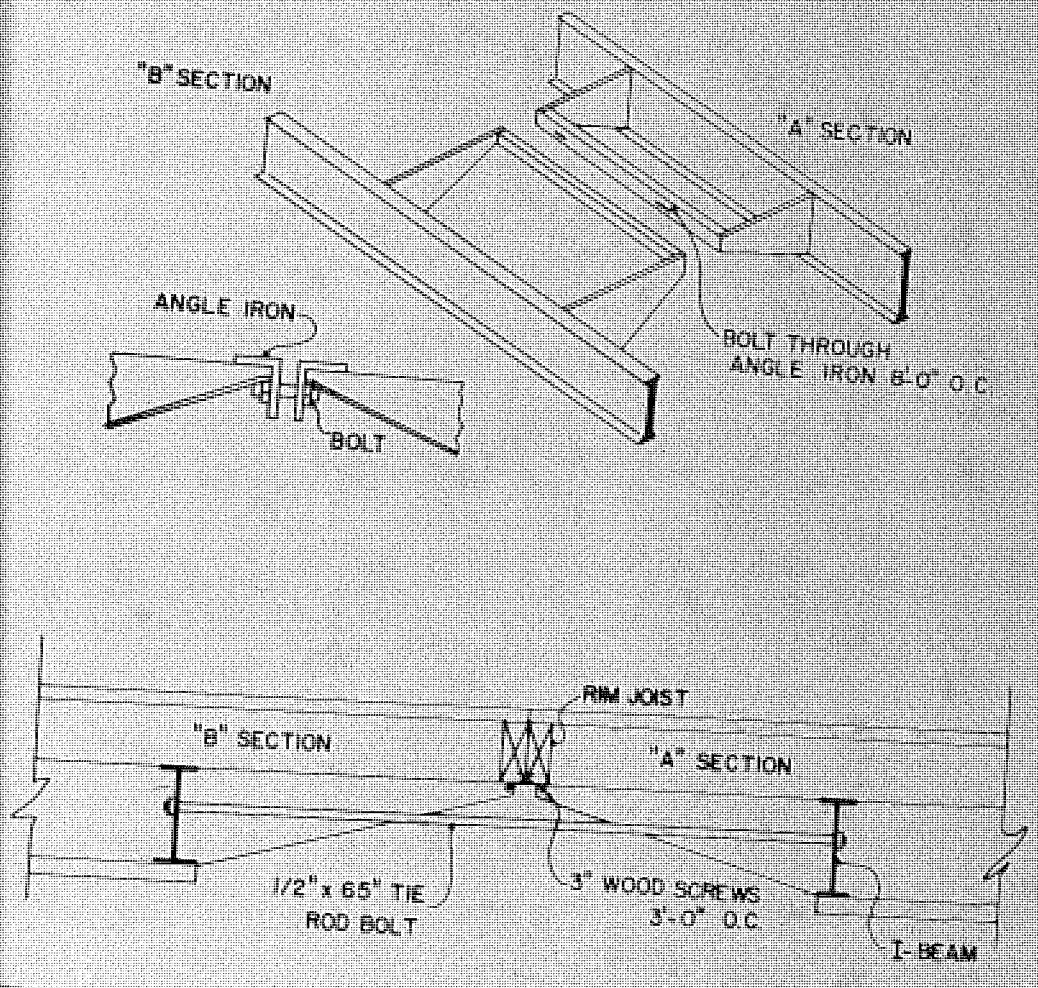


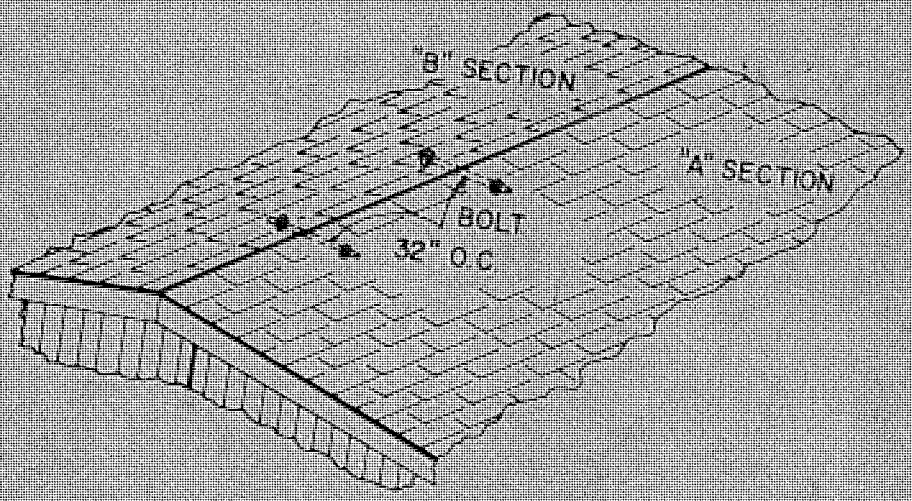
Figure 3

3. Place jacks under outside I-beam of "B" half and raise enough to bring the roof beams together. Adjust the jacks to provide a tight and flush ceiling joint. If matching halves of ceiling are not flush, use a jack and post with a pad to raise low side until flush prior to fastening roof beam. Place 1/2" x 5" bolts with washers in predrilled holes at 32" spacing and tighten until snug (See Figure 4) or install galvanized straps across roof beams on alternate rafters with 8d nails, or angle lag with a 3/8" x 5" lag screw at 20" o.c.

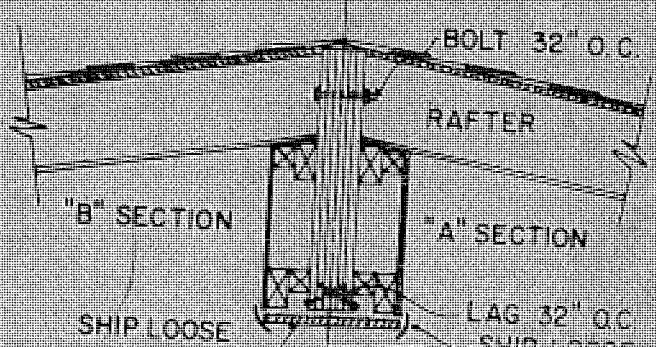
4. From the exterior, fasten the endwalls together with 16d nails, or 3" wood screws (#10). Drive the nails in a toe nail manner from alternate sides at 12" on center spacing so that nails will be spaced at 6" on center or install 3½" diameter bolts.

5. After the halves are secured, it is necessary to install supports of required capacities and locations as indicated in Table I and relevel the entire home. First level the halves in both directions beginning in the "A" half and follow by checking and leveling the entire home as a unit. Adjust piers as necessary.

Joining Roof



OPTIONAL VAULTED CEILING



9

Securing the Home on a Perimeter Frame Foundation

For proper installation, the foundation must be level and laid to the proper specifications in regard to size and load bearing capacity. An approved method should be provided in the foundation for anchoring the home. (See Figures 5 and 6 for suggested foundation configuration.)

Typical Perimeter Foundation

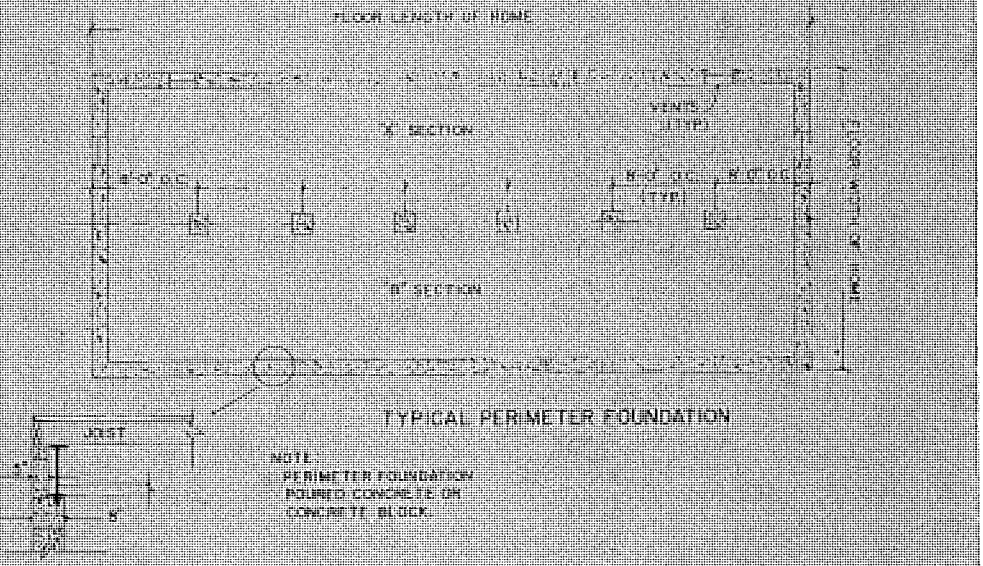
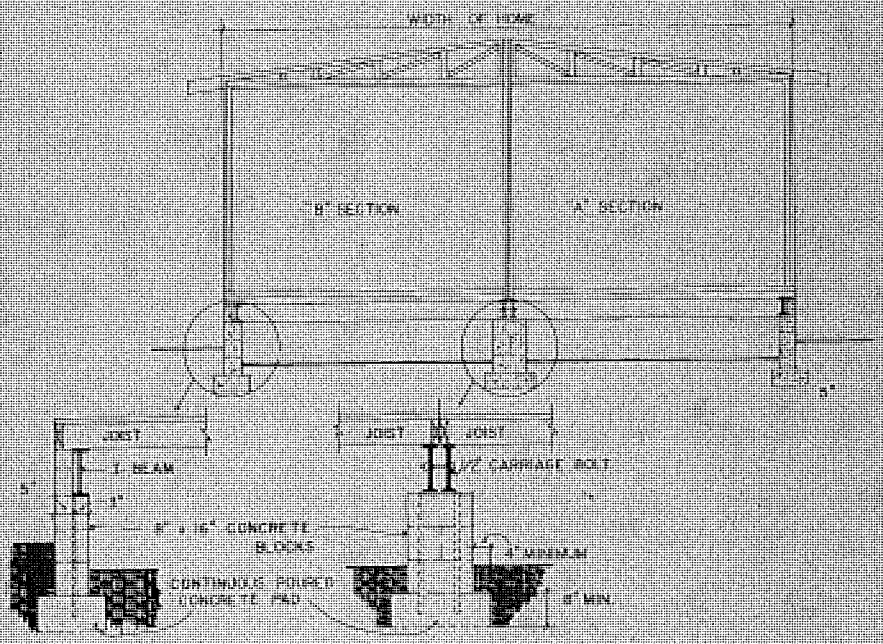


Figure 5

Note: Check local building and zoning requirments before locating the home on a foundation.



1. Setting the First Half

a. Position half to be set on rear of foundation at side of foundation, generally the "A" unit.

b. Place blocking and jacks at each end and at even spacing to allow 4 supports under each side of section. Raise section to relieve weight on axle springs. Remove axles and A-Frame (optional). Raise section until the bottom of perimeter frame is above level of foundation.

c. Place 2" x 8"s on top of foundation width.

d. Position blocking under section up to the foundation level so that (2) 2" x 12"s laid on top will be flush with 2" x 8"s laying on foundation thus forming a bridge. This bridging must support the full weight of the section. Use sufficient blocking under the 2" x 12"s to hold the weight.

e. Place 24" pieces of 2" diameter pipes on bridging and lower section onto pipes; 10 pcs. of pipe should suffice.

f. To move section across foundation use two come-alongs attached to a deadman anchor. The come-alongs must move in unison. To maintain alignment with the foundation as it moves across bridging and the foundation, the pipes can be angled on the sides of section, and changing direction of travel. This can be done by striking them with a sledge hammer. When the section is back in alignment, the pipes can be adjusted so that travel will continue in the desired direction.

g. Remove pipes as the section passes over them and place them ahead of the unit so that section is continually on the pipe. Start pipes at 36" intervals for rolling unit.

h. When the section is properly positioned, block, remove pipe and boards, and lower to foundation.

2. Setting Last Half

a. Follow procedure as in 1-a thru h above.

b. Use the first half as an anchor when moving the second half until within four feet of joining. At this point a deadman anchor must be used.

c. When halves are adjacent secure and seal as described on Page 8 3 thru 5, use 1/2" x 9" bolts provided to tie interior frames together.

d. Anchor frame with an approved anchoring system.

e. For basement installation, supports must be installed at center I-beams to support interior framing.

See Table I for Required Support Capacities and Locations. See Table II for tiedown instructions.

Tie-down Instructions

The home is to be anchored using the following information. Consult the wind zone requirements. Units built for Zone I and/or Zone II may be diagonally anchored by wrapping tie-down strap material around the I-beam, using an approved buckle and connecting to a suitable ground anchor. Consult the appropriate zone table for the proper amount of diagonal ties to use. You will find a method of anchoring the home to the ground provided by the instructions included with the anchoring system that is selected. This information provides the set-up crew and homeowner an approved method. (See Figure 7)

TABLE II

Wind Zone I Requirements

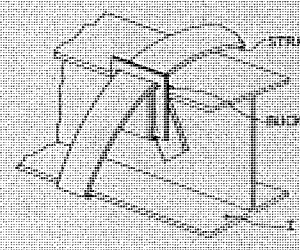
	Length of Home		
	Up to 40'	41' to 60'	61' to 80'
Diagonal ties per side	3	5	8
Minimum number of anchors per home	6	10	12

Wind Zone II Requirements

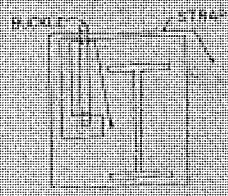
	Length of Home		
	Up to 40'	41' to 60'	61' to 80'
Diagonal ties per side	4	6	8
Minimum number of anchors per home	8	12	16

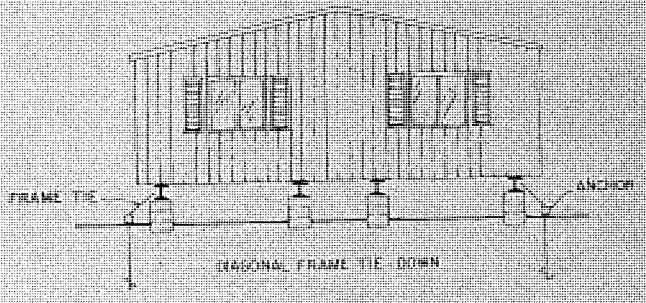
Frame Tie Detail

Frame Strap and Buckle



Frame Tie Side View





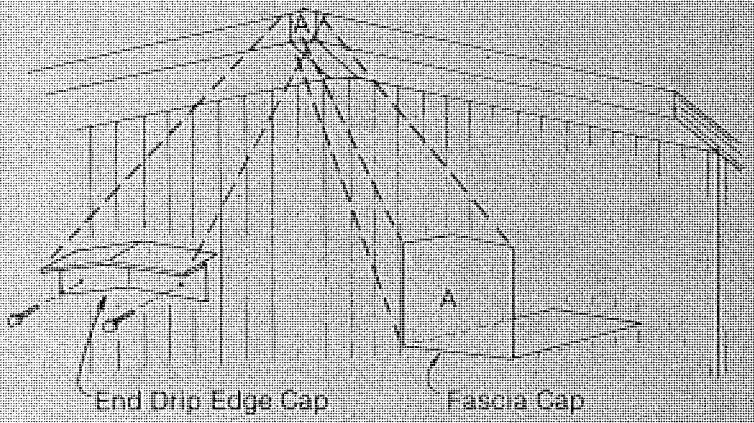
12

Sealing the Home

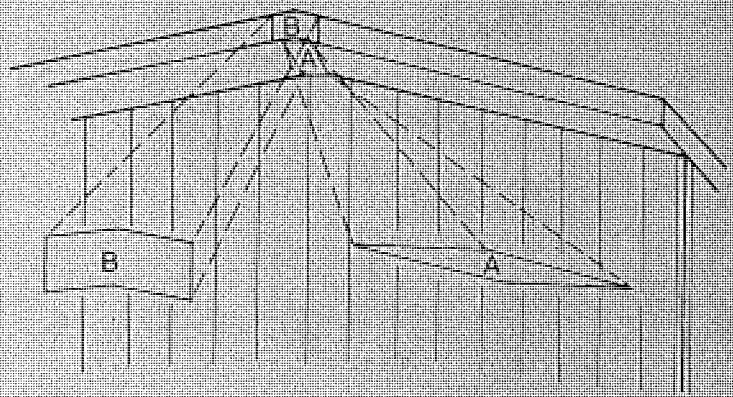
1. Front and Rear Overhang Close-up

Apply putty tape to edges and fasten the fascia cap assembly over the point of joining the sections. Use #8 x 3/4" hex head screws or 8d nails. (See Figure 8).

Overhang Close-up



Metal

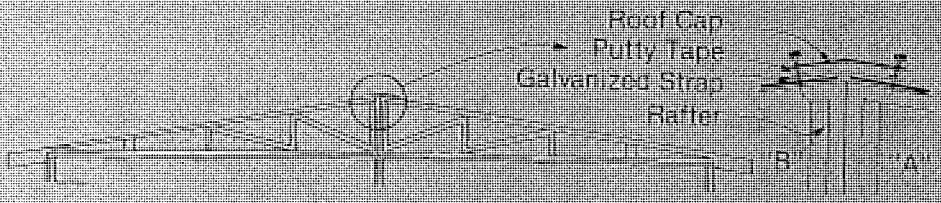


Hardboard

2. Roof Ridge Close-up — Metal Roof

Attach ridge cap to the roof joint applying putty tape at edges and cap joints. Use #8 x 3/4" hex head screws with 6" spacing. Apply roof coat to all edges. (See Figure 9).

Metal Roof

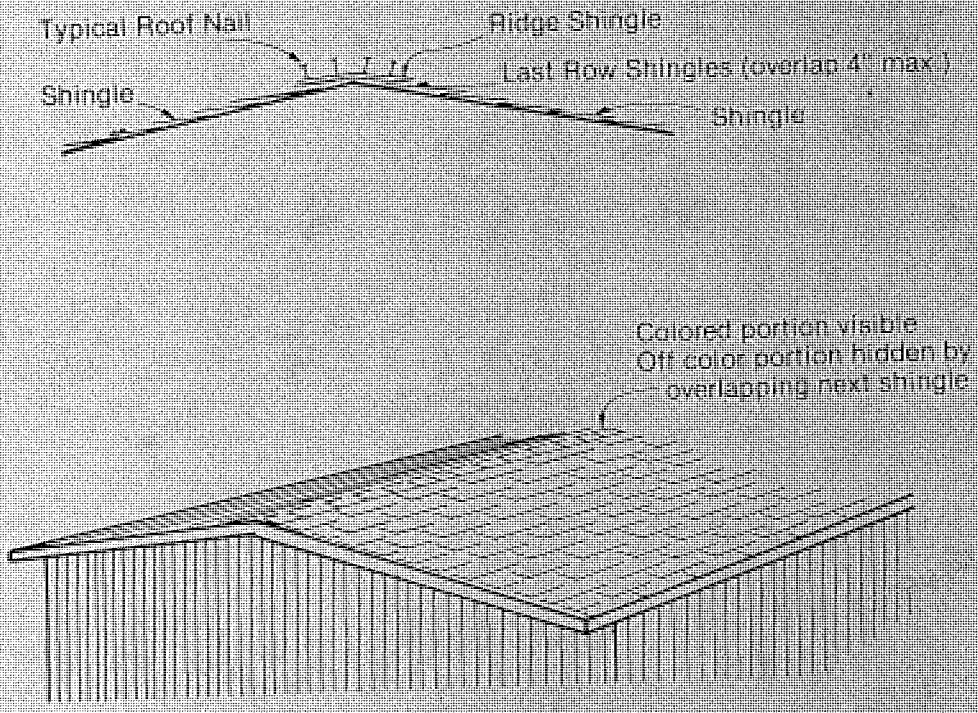


Note: Use galvanized sheet metal provided to cover ridge beam access bolt holes prior to close-up.

3. Roof Ridge Close-up — Shingled Roof

Nail the last rows of shingles in place at both sides of ridge; let last row of shingles from one side overlap no more than 4" on opposite side or roll out 2 layers of 15 lb. felt over entire length of roof joint. Felt should not exceed width of ridge shingles. Cut square ridge shingles (3 or 4 from each 36" piece) with a utility knife and lay shingles across the peak evenly spaced on both sides. Begin application of shingles by placing the first ridge shingle with its exposed edge at the end of the roof overhang and nail so that the next ridge shingle will cover it. At the last ridge shingle, the nails will not be covered and should be sealed with plastic cement. (See Figure 10).

Shingled Roof Close-up



15

Exterior Closure

Prior to installing exterior covering, apply the paper sealing strip provided, or masking tape, over the full length of the joints in the end walls to prevent air infiltration.

Use roofing nails to hold the strip.

1. Front and Rear End Walls — Close-up

   a. Metal Siding

      Set in bottom starter of required width over joint and fasten with nails. Trim vertical metal to desired width and snap in S-locks of adjoining panels. Fasten with hex head metal screws along the screw lines.

   b. Hardboard Siding

      Install vertical close-up piece provided to cover joints on front and rear end walls. Also install trim on horizontal joints if not factory installed. Use nails provided and touch-up paint and caulking as needed for minor repairs and sealing.

   c. Lap Siding

      Lap siding is shipped loose for installation after "A" and "B" sections are joined. Using nails included apply siding starting with first row installed in the metal track at bottom. Work upwards overlapping with succeeding pieces and staggering the joints for best appearance. Use molding provided at joints and corners.

16

Interior Finishing

1. Ceiling

Install ceiling close-up beam over joint of ceiling board, as provided, with nails. When using ceiling board, install white outside corner with white nails to edges. (See Figure 11).

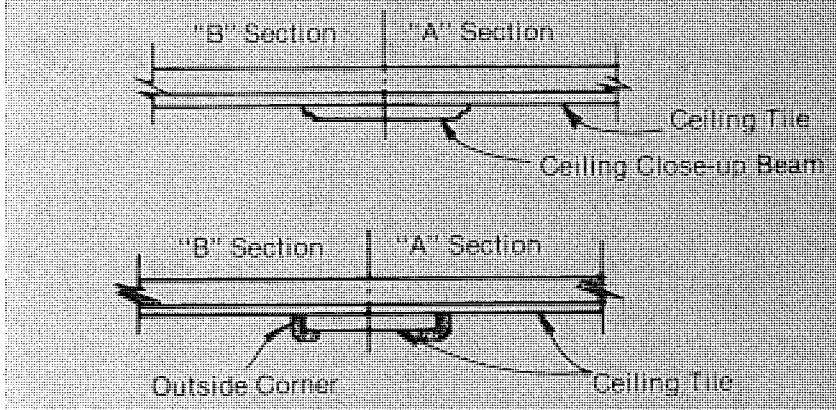


Figure 11

2. Front and Rear End Walls

Install matching panel to cover and apply moulding at joints in panel. (See Figure 12).

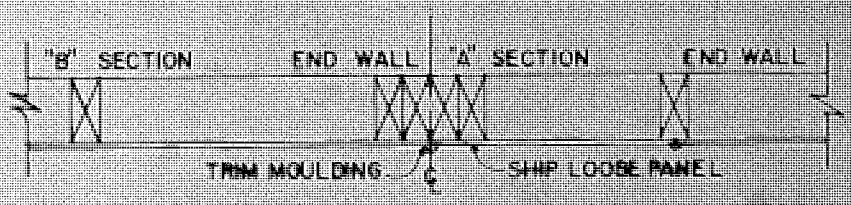


Figure 12

3. Interior Walls

a. Cover joints when walls are joined at center with moulding provided.

b. At end of common joint wall, install panel caps and corner mould.

17

UTILITY HOOKUP AND TESTING

All utility connections must be made by qualified service personnel who are knowledgeable of local and state regulations. Testing of all utilities must be satisfactorily performed before occupancy.

WATER

This home has been designed for an inlet water pressure of 80 PSI. If this home is installed in an area when the water pressure exceeds 80 PSI, a pressure reducing valve should be installed.

A tag affixed to the exterior of the home will indicate the location of the fresh water connection. If the home is not equipped with a master water-shut valve, a full flow valve must ber installed on the water supply line in an accessible location adjacent to the home. Remove the plug on the inlet and connect the fresh water supply line. After completing connections, turn on all faucets until water flows full at all hot and cold outlets. Shut off all faucets and check for leaks. Any leaks should be easily repaired with minor tightening at joints.

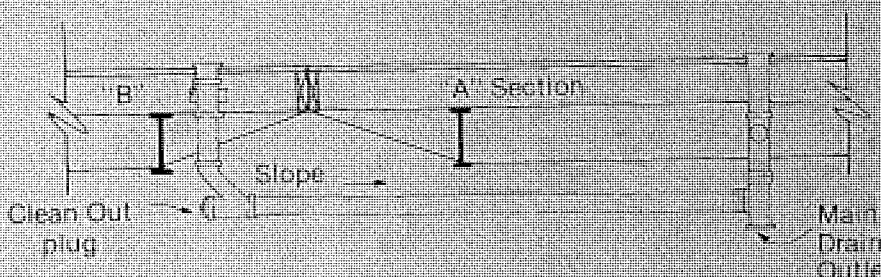
Exposed water lines must be wrapped with insulation or protected with heat tape to prevent freezing. If heat tape is used, it must be listed for use with mobile homes and installed in accordance with the manufacturer's instructions.

DRAINAGE

Remove the cap and connect the home drain outlet to the drain inlet at the site with the flexible coupling provided or with the required length of drain pipe, fittings and cement.

When connecting drain lines always maintain a uniform slope of not less than 1/4 inch per foot toward the drain outlet.

Drain Line Hookup



When connecting drain lines always maintain a uniform slope of not less than 1/4 inch per foot toward the drain outlet.

Gas

The factory installed gas piping has been designed for a pressure not exceeding 14 inch water column (1/2 PSI) and not less than 7 inch water column (1/4 PSI). Check with the gas supplier to assure your pressure is within these limits. IF PRESSURE EXCEEDS THIS LIMIT, A LISTED REGULATOR MUST BE INSTALLED.

Locate the tag affixed to the home at the gas supply connection and follow the instructions carefully for proper hookup and testing.

For homes with gas appliances located in both sections, locate the "quick-disconnect" fitting and the flexible crossover at the rear half of the home and connect the fittings. Do not use tools on the quick-disconnect device.

Electrical

The metal nameplate adjacent to the feeder assembly entrance indicates the ampere rating of the electrical system. The electrical connection should be made only by qualified personnel using the materials listed below for the Feeder Entrance Assembly installed in the home:

TABLE III

Feeder Entrance Assembly Rating	Conduit Size	Conductor Size (3 Conductors)	Grounding Conductor Size	Junction Box Size
100 amp	1¼"	#3	#6	10" x 10" x 4"
125 amp	1½"	1	6	10" x 10" x 4"
150 amp	1½"	1/0	6	10" x 10" x 4"
200 amp	2"	3/0	6	10" x 12" x 4"

The feeder assembly is designed for use with three 75°C rated copper conductors: Types THW or XHHW and a bare copper grounding conductor.

To connect electrical from "A" section to "B" section:

1. Connect wire in front end wall from "A" section to the receptacle in the wall of the "B" section.

2. In the common wall, locate junction box and connect wires from "A" and "B" sections with wire nuts in the junction box.

3. Connect romex to receptacles having no wires with nearest wire in common wall to complete circuit.

In some homes, only one main crossmember is provided and should be connected by joining like colored wires to the junction box installed with wire nuts or splice lugs.

After the electrical connection has been completed, the following tests should be conducted using approved test equipment:

1. Continuity test of circuit conductors.

2. Polarity test.

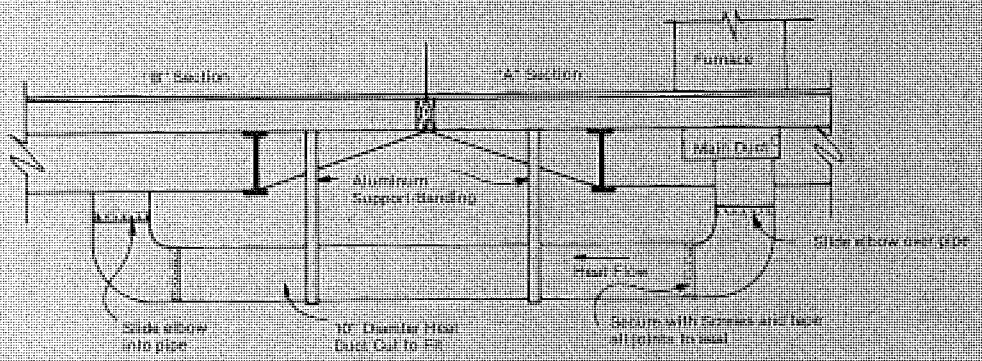
3. Continuity test of electrical grounding system.

19

Crossover Air Ducts

Install crossover heat duct as shown below (See Figure 14). Secure joints with duct tape and wrap with insulation provided. Cover with polyethylene moisture barrier and support as shown to hold at least 4 inches above ground level.

Heat Duct Crossover



For those models with cold air return ducts, install in same manner.

When flexible ducts are provided, they are prewrapped and require supports only.

20

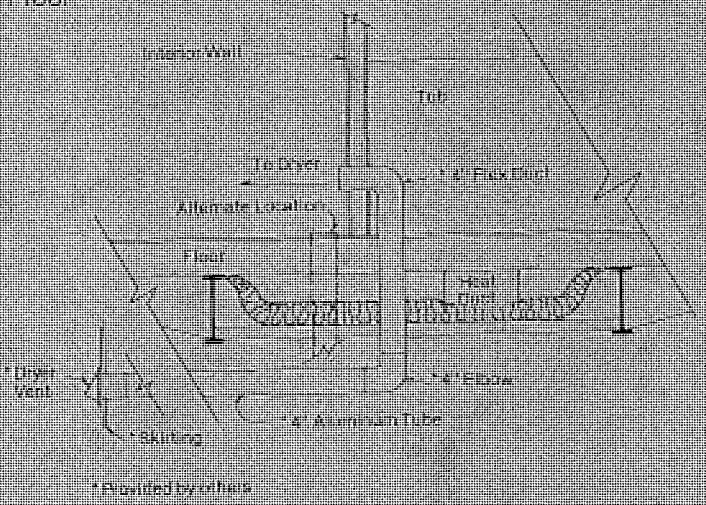
Dryer Venting

The following drawing is provided for use in venting of clothes dryers. (See Figure 15).

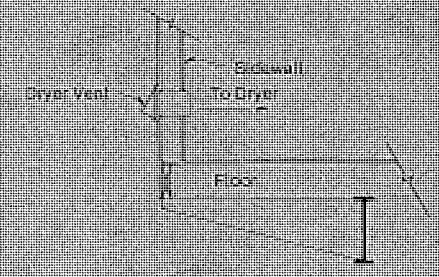
The aluminum tube and/or elbows may be replaced with a flexible vent duct, intended for this purpose, after consulting the appliance manufacturer's installation instructions and only in accordance with these instructions.

Dryer Venting

Floor



Exterior Wall



Bottom Board Patch Instructions

The following recommended procedures should be followed for repair of bottom board material:

1. Holes or Punctures in Bottom Board

Apply Seal-Tite #360, #520, #740 or equivalent tape over area, insuring a complete seal around the area.

2. Cuts or Rips in Bottom Board Required for Maintenance Work

Draw edges together with 4" strips of tape perpendicular to the direction of opening every 4" - 6". Finish applying lengthwise strips of tape over the joined edges insuring a complete edge seal.

3. Large Holes or Cutouts

A patch may be cut from bottom board material and taped in place per Item 2 above. Large patches may require stapling to adjacent joists to ensure the patch will stay in place. In either case, edge taping should be done should there be any question of not having an edge seal.

4. Should bottom board material or tape not be available, .019 inch thick aluminum may be nailed, stapled or screwed over damaged area and putty or caulk used to ensure an edge seal.

Frame Painting Instructions

Any areas of the frame where the paint has deteriorated and that may be exposed to corrosion during the life of the mobile home should be repainted by using one of the following types of paint: Zinc Chromate, Asphaltic Base, or other paints providing equal protection against corrosion.

DMH COMPANY

Diversified Manufactured Housing

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