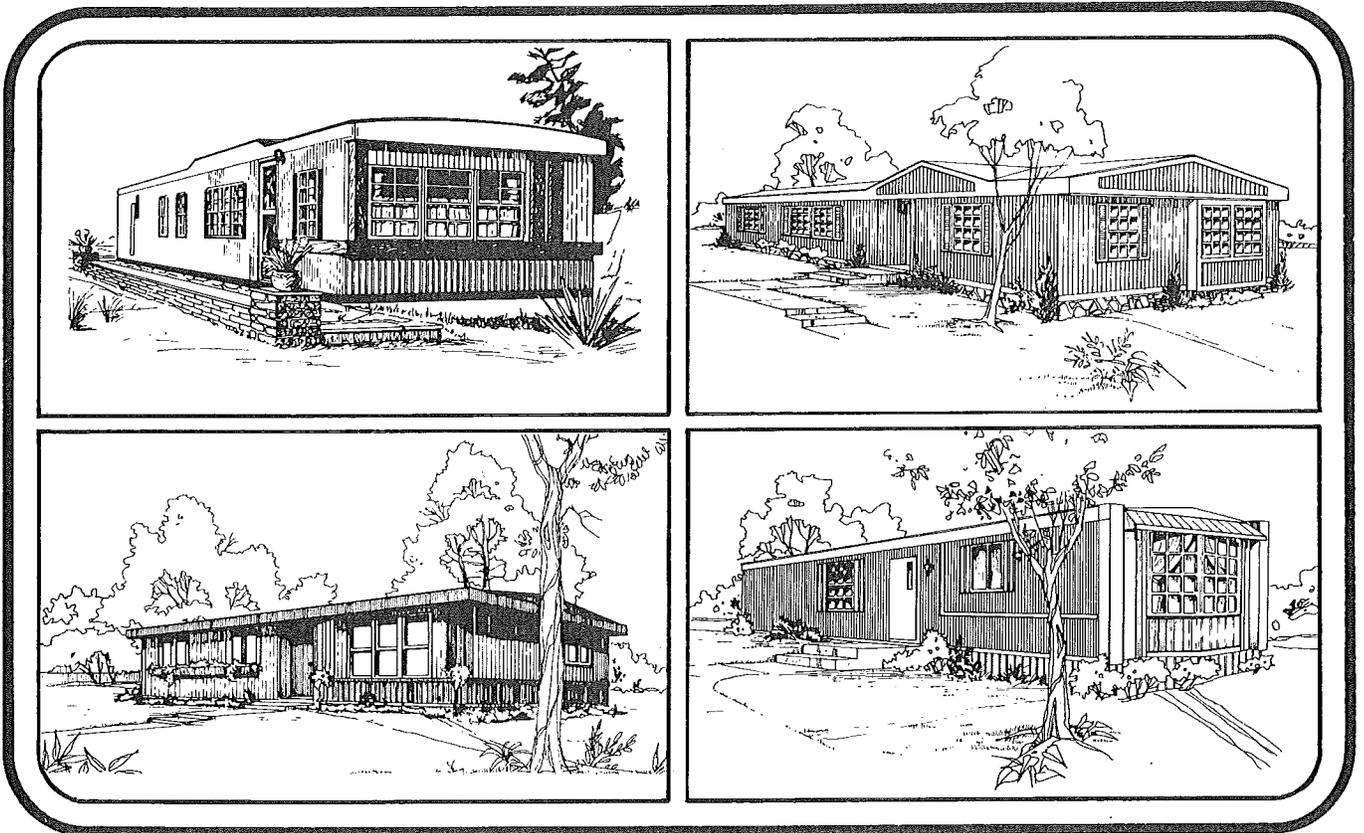


APPROVED
PFS Corporation
HUD Mobile Home Construction
And Safety Standard
Date Dec. 15, 1978

REDMAN FIELD INSTALLATION MANUAL



Redman Homes, Inc.

A Subsidiary of Redman Industries, Inc.



Introduction

This Redman home was engineered, constructed and inspected for conformance to the Federal Mobile Homes Construction and Safety Standards in effect on the date of manufacture. The National Standard sets forth minimal requirements for the design, construction, thermal protection and heating systems, plumbing systems, and electrical systems for mobile homes designed to be used as dwellings.

It is our intention to produce for you affordable housing in accordance with the Federal Standards in addition to our own high quality standards. Each Redman home is inspected at one of our factories—both during and after construction—by qualified plant personnel.

It is extremely important in preparing your home for its occupancy that it be properly set, blocked and leveled by a knowledgeable and experienced mobile home mover, dealer or installer. Preferably the installer should be factory trained and should guarantee his work in writing for a reasonable time. He should agree to relevel the home within sixty (60) days after the initial set up if necessary.

A properly maintained installation will, under normal circumstances, prevent the home from sagging and prevent you from possibly incurring expensive repair bills. If your home is not set and maintained level as it was designed, or if it is not set on a completely firm foundation, certain portions of your home will undergo undue and unnatural structural strain. Such structural strain could lead to problems later.

The following instructions for the installation of your home are minimum requirements and are intended to instruct and assist already qualified and trained personnel in setting up your home. Applicable local or state laws may have more stringent or greater requirements than outlined in this manual and must be complied with to obtain or regain the right to occupy the home. Therefore, we recommend that you consult with regulatory agencies in your area for codes which may require licenses and/or permits or which may affect procedures recommended in this manual.

Because new products and methods are constantly being introduced, additional or revised instructions may be required. Applicable addenda may be found inside the back cover of this manual.

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Section 1

Site Preparation

Site Preparation

General

Redman Homes, Inc. has designed its homes with a steel chassis which will be supported by individual supports, or piers, together with tie down straps and anchors appropriate for local conditions. There are adjustable steel jacks, concrete piers, especially designed for mobile home and sectional home blocking and leveling which are highly recommended. However, depending upon the conditions and judgment of your mobile home installer, cement blocks or other support devices may be adequate. If manufactured loadbearing supports or devices are used, they shall be listed and labeled by an approved testing agency.

Data describing the roof and wind loads for which your home was designed may be found on the data plate in your home. Load zone maps of the United States showing roof load, wind load and thermal zones are also included in the Owner Maintenance Manual. The support system must resist all vertical loads from the weight of your home, plus temporary extra roof loading, and it must resist side loads imposed on the home by wind blowing against it.

All mobile home installations shall comply with the requirements of local zoning ordinances and conditional use permits established by local authorities pertaining to any health and/or safety codes.

The Site

A firm foundation is absolutely necessary before your home is blocked and leveled. This is one very important requirement that should prevent your home from sagging, and it is the requirement that Redman Homes, Inc. must consider before the company is able to honor any apparent foundation related warranty claims.

Your home should most preferably be set on a solid poured concrete slab, pad or wide ribbons of concrete—whichever foundation is suggested and judged best by your mobile home installer. Before pouring the pad, the site should be carefully evaluated to determine if further settling would take place beyond normal expectations.

If the site is on filled soil, it must be compacted to at least 90% of its maximum relative density. In areas which are subjected to freezing and thawing, the pier footings must be designed in compliance with local building code requirements.

You should consult with local building officials to determine location of the frost level. The following general requirements should be carefully considered before placing your home:

That portion of the lot or site intended for placement of the mobile home shall be undisturbed soil or compacted fill.

The mobile home lot or site shall be graded so that there shall be no depressions where surface water will accumulate. The ground shall be sloped to provide storm drainage runoff.

In the absence of a concrete slab or pad, it is recommended to place a layer of polyethylene plastic sheeting or roofing felt on the ground under the home to form a vapor barrier.

It is also very important that the home be properly skirted and that the skirting be properly vented for air circulation under the home.

In freezing climates, the tie down system should provide the owner with means of adjusting the strap tension to compensate for any heaving or settling of the ground.

Footings

Individual footings for loadbearing supports or devices are suggested as follows:

- Two layers of two-inch (2") nominal thickness wood planks, pressure treated with approved preservatives with long dimension of the second layer placed perpendicular to the long dimension of the first layer;
- or
- Precast or poured-in-place concrete footings not less than 3½" in thickness. The concrete shall have a minimum of 28-day compression strength of not less than 2,000 pounds per square inch;
- or
- Other material providing equivalent loadbearing capacity and resistance to decay. Individual footings shall be placed on level, firm, undisturbed soil or compacted fill. The allowable loadbearing capacity of the soil shall not exceed 1,000 pounds per square foot, unless data to substantiate the use of higher values is submitted to the local code agencies.

Piers

All piers used to support your home must have the capacity to carry the vertical load of the home itself, its contents, and temporary roof loads such as snow or ice, to the foundation below. Homes set in geographical locations which are subject to freezing temperatures must have piers with footings and ground anchors which extend below the frost line. If this is not accomplished, and upward heaving occurs, the home can become unlevel and actually damaged. The piers are moved upward while the main frame members are secured by steel ties, resisting the movement. Refer to Figure 1, Page 7.

Soil pressure tables included in this manual show the maximum allowable load per pier, with different sizes of footings. Refer to Tables I–IV.

Clearances

A minimum ground clearance of 18" shall be maintained beneath the underside of the floor joist and 12" beneath the main chassis beams of the mobile home. If it is necessary to construct a non-standard support structure, a minimum clearance of 12" shall be maintained beneath all horizontal members of the structure.

Heights

Individual loadbearing supports or devices shall not exceed 3' in height. Where the topography of the site requires that the main chassis beams of the mobile home be supported at a height of more than 3', the mobile home shall be supported by a permanently constructed platform or support structure.

Support Structures

Support structures shall follow three basic requirements:

- **Permit required.** When a support structure is required to set up a mobile home, a separate permit to construct the support structure may have to be obtained from the local code enforcing agency.
- **Plans and Specifications.** The person submitting the application for a permit to construct a support structure shall submit sets of plans and specifications of the structure as required by the enforcing agency. Engineering calculations and substantiating data, prepared and signed by a registered professional engineer or architect, shall be submitted with the plans and specifications if required.
- **Design Requirements.** A support structure shall be designed and constructed to withstand live and dead loads in a mobile home, in accordance with local code requirements.

How Soils Affect Installation of the Home

Where the bearing capacity of the soil is not definitely known or is in question, local building officials may require load tests or other adequate proof as to the permissible safe bearing capacity at that particular location.

To determine the safe bearing capacity of soil, it shall be tested at the site location by loading an area not less than four (4) square feet to not less than twice the maximum bearing capacity desired for use. Such double load shall be sustained by the soil for a period of not less than forty-eight (48) hours with no additional settlement taking place, in order that such desired bearing capacity may be used.

Foundations should be built upon natural solid ground. Where solid ground does not occur at the foundation depth, such foundation shall be extended down to natural solid ground or piles should be used. Foundations built upon mechanically compacted earth or fill material are subject to the approval of local building officials to show evidence that the proposed loads will be adequately supported.

Tables I through IV describe the kinds of soils usually found and also relate the pad sizes and piers necessary for the various types of soil. These tables should be very closely

followed to insure that problems will not be encountered with top or sub soils which are subject to shifting or movement.

Regarding the capacity of the piers referred to in the blocking tables, they should be labeled. If such labeling does not exist, the contractor from whom they were purchased should be questioned to secure this information. It is of the utmost importance that the maximum capacity of the piers not be exceeded.

Footings and foundations, unless specifically designed otherwise, shall be constructed of masonry, or of reinforced concrete. All footings should extend at least 12" below the finished grade, and in geographical areas subject to severe freezes the bottom of foundations shall extend below the frost line established by local records. Footings shall be so designed that the allowable bearing capacity of the soil is not exceeded. If structural plain concrete, masonry or timber footings are used, they shall rest on undisturbed or minimum ninety percent (90%) compacted soil of uniform density and thickness.

By following this information you will minimize the problems of set up related problems occurring with your Redman home.

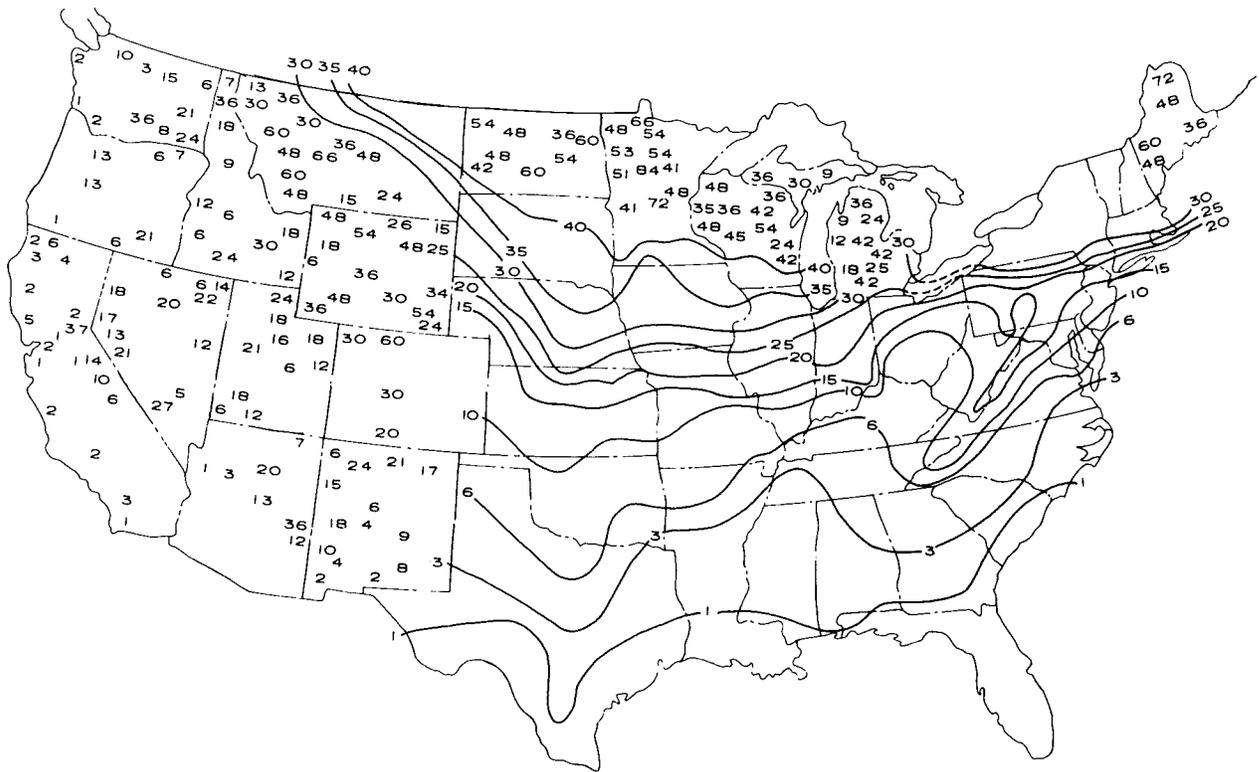
Table I – General Description of Soils (1)

Soil Type (2)	Allowable Pressure (3) (Pounds Per Square Foot)
Rock, Hard Pan	4,000 and up
Sandy Gravel and Gravel	2,000
Sand, Silty Sand, Clayey Sand, Silty Gravel, Clayey Gravel	1,500
Clay, Sandy Clay, Silty Clay, Clayey Silt	1,000
Uncommitted Fill	See Note (4)
Peat, Organic Clays	See Note (4)

Notes:

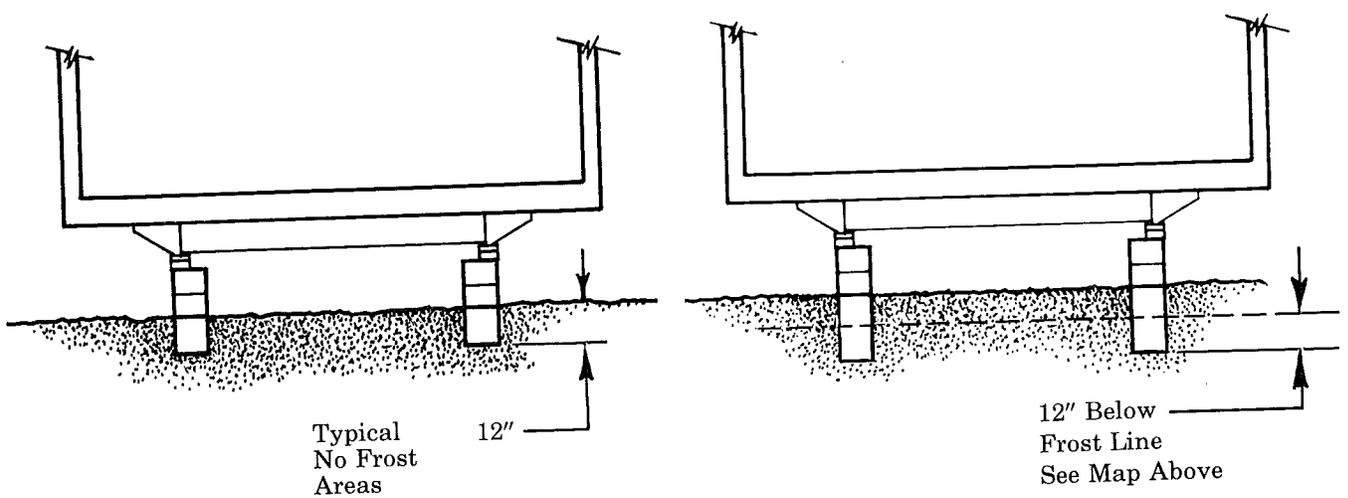
- (1.) To be used only when none of the following is available:
 - a. Soils investigation & analysis of site.
 - b. Compliance with local building code.
 - c. Competent opinion by local engineer or building official.
- (2.) Based on unified classification system.
- (3.) No allowances made for overburden pressure, embedment depth, water table height, or settlement problems.
- (4.) Special analysis required.

Frost Penetration Map, Wall Footings and Grade Beams



AVERAGE DEPTH OF FROST PENETRATION — IN INCHES

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

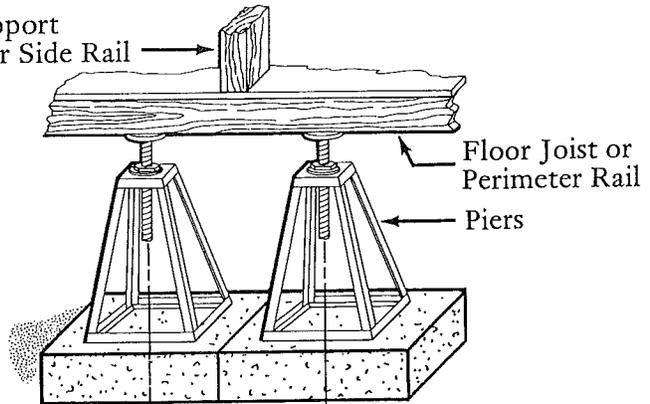
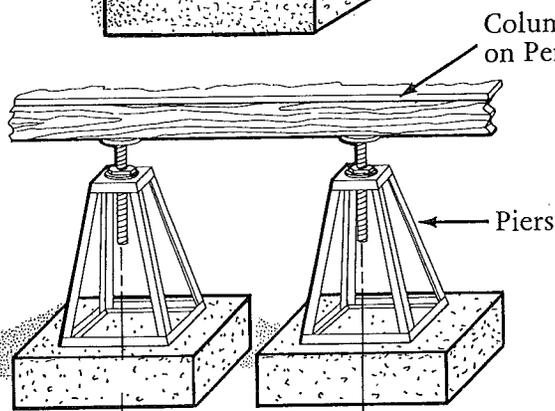
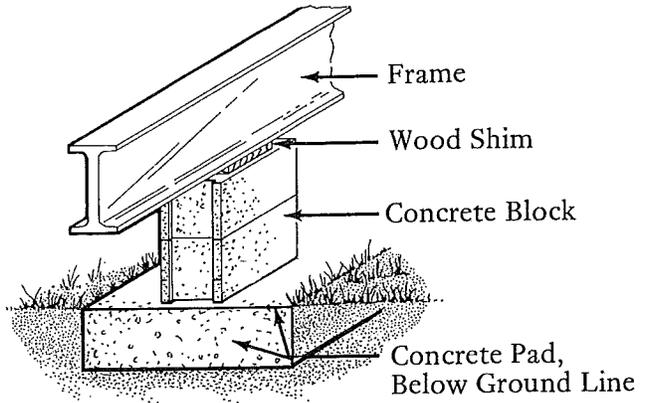
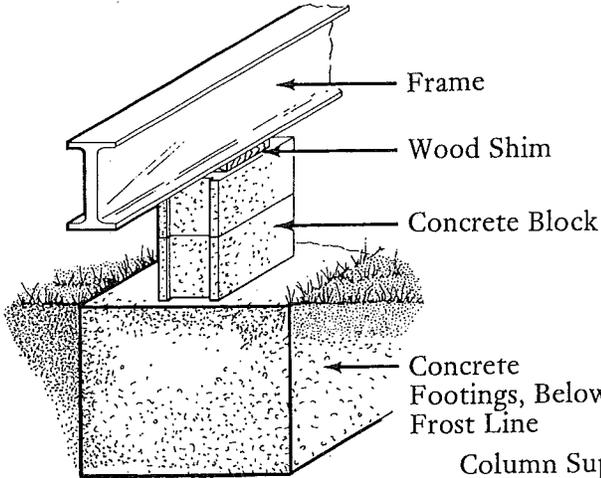
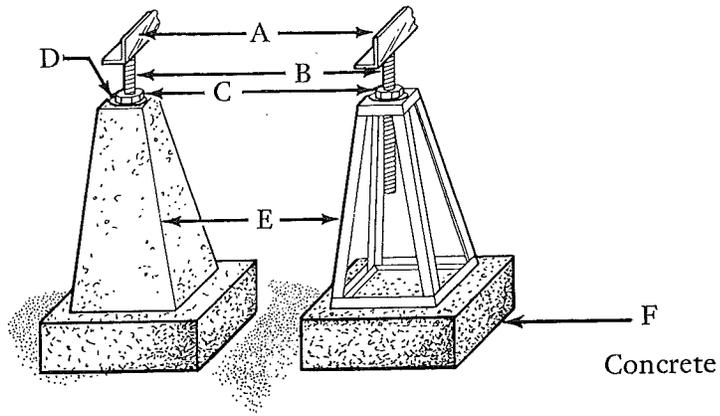


GENERAL NOTES:

1. Adjoining ground to slope away from foundation in all directions and underlying soil to be preferably sand or gravel to reduce to a minimum heaving due to frost action.
2. It is good practice for foundations to extend 12" below frost line; consult local codes.

Typical Pier Installation

- A.) Contact Pad
- B.) Riser
- C.) Adjustable Nut
- D.) Washer (If Required)
- E.) Pier Body or Frame
- F.) Concrete Soil Pads (Footings)



er Spacing Per
oundation Drawing

Marriage Line Floor Rim Joist
Or Perimeter Side Rail
Where Multiple Piers
Are Necessary For
Column Support

Minimum Dimension Permitted
By Pier Base

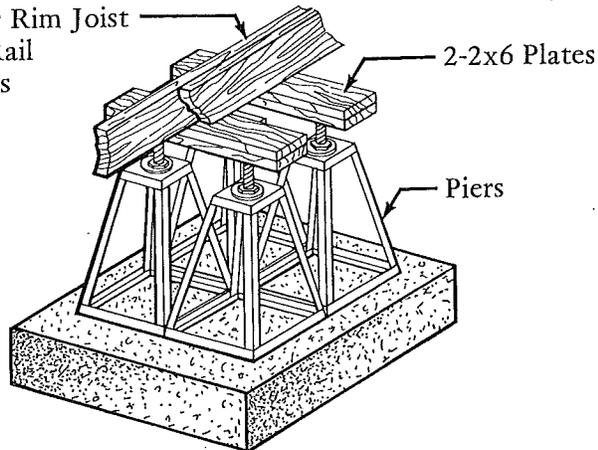
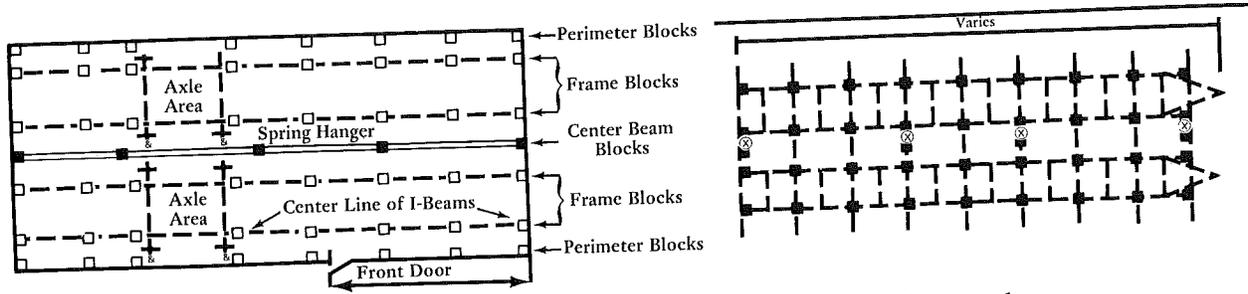


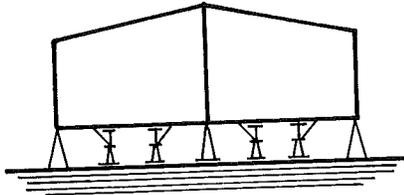
Figure 1

Table II

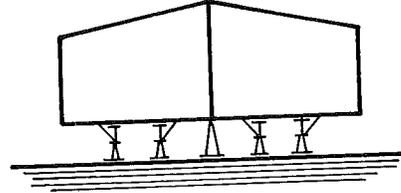
Soil Pressure Tables—20 Pounds Per Square Foot Roof Load



Frame and Perimeter Blocking
(See IIB)



Frame Blocking Only
(With Center Beam Supports)
(See IIA)



Frame Blocking Table – IIA

Soil Capacity (P.S.F.)	12' (&24') Wide Pier Spacing				14' (&28') Wide Pier Spacing				Multi-wide Only Center Beam Supports*	
	8' O.C.**		6' O.C.**		8' O.C.**		6' O.C.**			
	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)
1000	3700	23 X 23	2800	20 X 20	4300	25 X 25	3250	22 X 22	13,800	45 X 45
2000	3700	16 X 16	2800	14 X 14	4300	18 X 18	3250	16 X 16	13,800	32 X 32
3000	3700	13 X 13	2800	12 X 12	4300	15 X 15	3250	13 X 13	13,800	26 X 26

*Worst case is shown

Additional information on Page 12

**On center

Frame and Perimeter Blocking Table – IIB

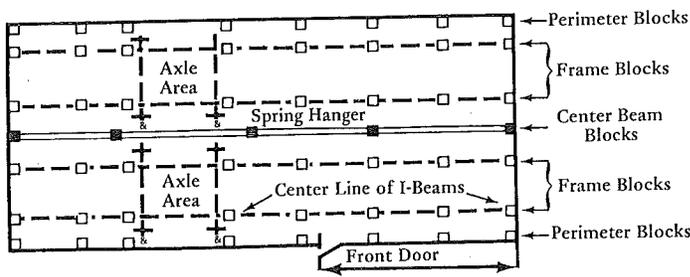
Soil Capacity (P.S.F.)	Pier Location	12' (&24') Wide Pier Spacing				14' (&28') Wide Pier Spacing				Multi-wide Only Center Beam Supports*	
		8' O.C.**		6' O.C.**		8' O.C.**		6' O.C.**			
		Pier Capacity (Lbs.)	Foot. Size (In.)	Pier Capacity (Lbs.)	Foot. Size (In.)	Pier Capacity (Lbs.)	Foot. Size (In.)	Pier Capacity (Lbs.)	Foot. Size (In.)	Pier Capacity (Lbs.)	Foot. Size (In.)
1000	Frame	2200	18 X 18	1700	16 X 16	2600	19 X 19	2000	17 X 17	13,800	45 X 45
	Perimeter	2200	18 X 18	1700	16 X 16	2500	19 X 19	1900	17 X 17		
2000	Frame	2200	13 X 13	1700	11 X 11	2600	14 X 14	2000	12 X 12	13,800	32 X 32
	Perimeter	2200	13 X 13	1700	11 X 11	2500	13 X 13	1900	12 X 12		
3000	Frame	2200	11 X 11	1700	9 X 9	2600	11 X 11	2000	10 X 10	13,800	26 X 26
	Perimeter	2200	11 X 11	1700	9 X 9	2500	11 X 11	1900	10 X 10		

*Worst case is shown

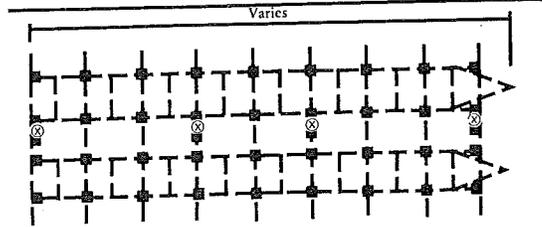
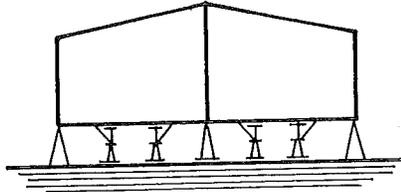
Additional information on Page 12

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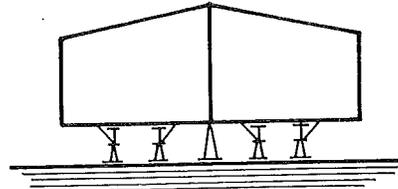
Table III Soil Pressure Tables—30 Pounds Per Square Foot Roof Load



Frame and Perimeter Blocking
(See IIIB)



Frame Blocking Only
(With Center Beam Supports)
(See IIIA)



Frame Blocking Table – III A

Soil Capacity (P.S.F.)	12' (&24') Wide Pier Spacing				14' (&28') Wide Pier Spacing				Multi-wide Only Center Beam Supports*	
	8' O.C.**		6' O.C.**		8' O.C.**		6' O.C.**			
	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)
1000	4000	24 X 24	3000	21 X 21	4600	26 X 26	3500	22 X 22	13,800	45 X 45
2000	4000	17 X 17	3000	15 X 15	4600	18 X 18	3500	16 X 16	13,800	32 X 32
3000	4000	14 X 14	3000	12 X 12	4600	15 X 15	3500	13 X 13	13,800	26 X 26

*Worst case is shown

Additional information on Page 12

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Frame and Perimeter Blocking Table – III B

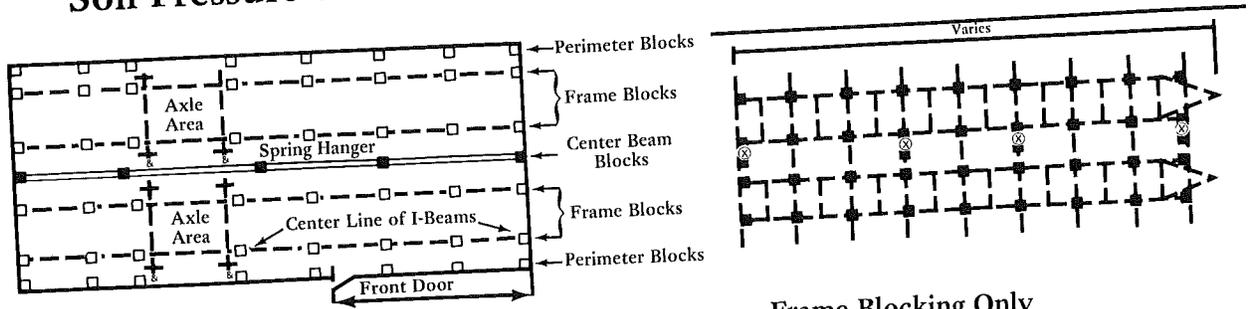
Soil Capacity (P.S.F.)	Pier Location	12' (&24') Wide Pier Spacing				14' (&28') Wide Pier Spacing				Multi-wide Only Center Beam Supports*	
		8' O.C.**		6' O.C.**		8' O.C.**		6' O.C.**			
		Pier Capacity (Lbs.)	Footing Size (In.)	Pier Capacity (Lbs.)	Footing Size (In.)	Pier Capacity (Lbs.)	Footing Size (In.)	Pier Capacity (Lbs.)	Footing Size (In.)	Pier Capacity (Lbs.)	Footing Size (In.)
1000	Frame	2200	18 X 18	1700	16 X 16	2600	19 X 19	2000	17 X 17	13,800	45 X 45
	Perimeter	2500	19 X 19	1850	16 X 16	2800	20 X 20	2100	17 X 17		
2000	Frame	2200	13 X 13	1700	11 X 11	2600	14 X 14	2000	12 X 12	13,800	32 X 32
	Perimeter	2500	13 X 13	1850	12 X 12	2800	14 X 14	2100	12 X 12		
3000	Frame	2200	11 X 11	1700	9 X 9	2600	11 X 11	2000	10 X 10	13,800	26 X 26
	Perimeter	2500	11 X 11	1850	10 X 10	2800	12 X 12	2100	10 X 10		

*Worst case is shown

Additional information on Page 12

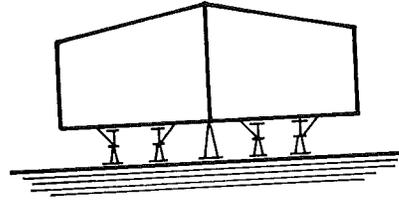
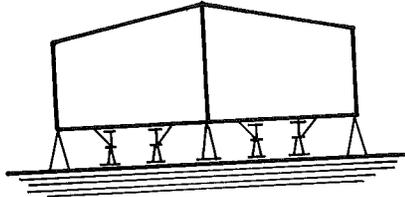
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Table IV Soil Pressure Tables—40 Pounds Per Square Foot Roof Load



Frame and Perimeter Blocking
(See IVB)

Frame Blocking Only
(With Center Beam Supports)
(See IVA)



Frame Blocking Table – IV A

Soil Capacity (P.S.F.)	12' (&24') Wide Pier Spacing				14' (&28') Wide Pier Spacing				Multi-wide Only Center Beam Supports*	
	8' O.C.**		6' O.C.**		8' O.C.**		6' O.C.**			
	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)	Pier Capacity (Lbs.)	Min. Foot. Size (In.)
1000	4600	26 X 26	3400	22 X 22	4900	27 X 27	3700	23 X 23	13,800	45 X 45
2000	4600	18 X 18	3400	16 X 16	4900	19 X 19	3700	16 X 16	13,800	32 X 32
3000	4600	15 X 15	3400	13 X 13	4900	15 X 15	3700	13 X 13	13,800	26 X 26

*Worst case is shown
**On center

Additional information on Page 12

Frame and Perimeter Blocking Table – IV B

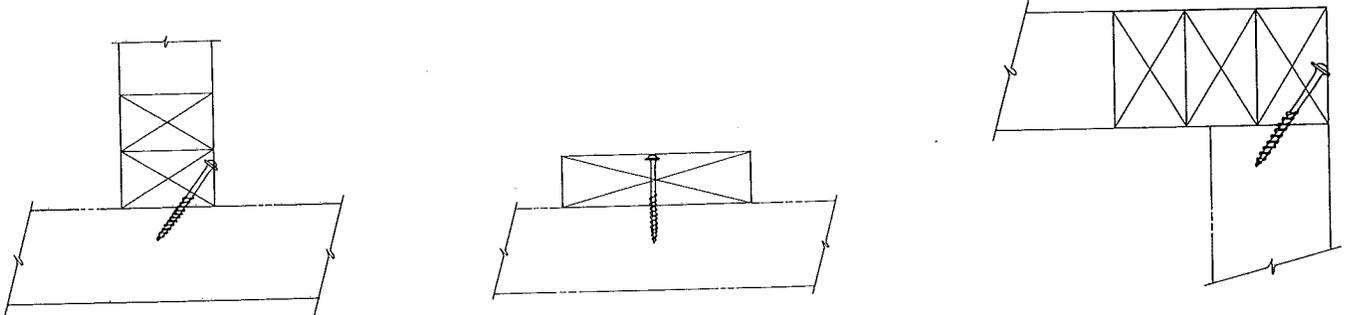
Soil Capacity (P.S.F.)	Pier Location	12' (&24') Wide Pier Spacing				14' (&28') Wide Pier Spacing				Multi-wide Only Center Beam Supports*	
		8' O.C.**		6' O.C.**		8' O.C.**		6' O.C.**			
		Pier Capacity (Lbs.)	Footing Size (In.)	Pier Capacity (Lbs.)	Footing Size (In.)	Pier Capacity (Lbs.)	Footing Size (In.)	Pier Capacity (Lbs.)	Footing Size (In.)	Pier Capacity (Lbs.)	Footing Size (In.)
1000	Frame	2200	18 X 18	1700	16 X 16	2600	19 X 19	2000	17 X 17	13,800	45 X 45
	Perimeter	2700	20 X 20	2000	17 X 17	3100	21 X 21	2300	18 X 18		
2000	Frame	2200	13 X 13	1700	11 X 11	2600	14 X 14	2000	12 X 12	13,800	32 X 32
	Perimeter	2700	14 X 14	2000	12 X 12	3100	15 X 15	2300	13 X 13		
3000	Frame	2200	11 X 11	1700	9 X 9	2600	11 X 11	2000	10 X 10	13,800	26 X 26
	Perimeter	2700	12 X 12	2000	10 X 10	3100	12 X 12	2300	11 X 11		

*Worst case is shown
**On center

Additional information on Page 12

Attachment of Beam Supports

The following illustrations show where fasteners are required at set up to securely attach beam support columns to the structure in the mating half. These fasteners shall be #8 x 2 1/2" wood screws or equivalent fasteners spaced a maximum of 18" on center. Removable labels will establish the location of these columns supports in our multi-unit homes. Refer to Fig. 12, Page 20.



Pier Capacity at Doublewide Center Beam Supports

Labels located on the bottom side, at the centerline, of a multi-unit home, show where column supports must be placed. By measuring the widest span between these locations, the distances in the left column can be determined. The pier and pad size can then be located for varying weight conditions.

Maximum Span To Next Support* (FT.)	Soil Capacity (P.S.F.)	24' Wide						28' Wide					
		20 PSF Roof Zone		30 PSF Roof Zone		40 PSF Roof Zone		20 PSF Roof Zone		30 PSF Roof Zone		40 PSF Roof Zone	
		Pier Capacity (LBS)	Min. Ft. Size (IN)	Pier Capacity (LBS)	Min. Ft. Size (IN)	Pier Capacity (LBS)	Min. Ft. Size (IN)	Pier Capacity (LBS)	Min. Ft. Size (IN)	Pier Capacity (LBS)	Min. Ft. Size (IN)	Pier Capacity (LBS)	Min. Ft. Size (IN)
0 to 5	1000	800	11x11	1100	13x13	1400	15x15	900	12x12	1300	14x14	1600	16x16
	2000		8x8		9x9		10x10		8x8		10x10		11x11
	3000		7x7		8x8		9x9		7x7		9x9		9x9
5 to 10	1000	1600	16x16	2200	18x18	2800	20x20	1800	16x16	2500	19x19	3200	22x22
	2000		11x11		13x13		15x15		12x12		14x14		16x16
	3000		9x9		11x11		12x12		10x10		11x11		13x13
10 to 15	1000	2300	19x19	3200	22x22	4100	25x25	2700	20x20	3800	24x24	4800	27x27
	2000		13x13		16x16		18x18		14x14		17x17		19x19
	3000		11x11		13x13		14x14		12x12		14x14		16x16
15 to 20	1000	3100	22x22	4300	25x25	5500	29x29	3600	23x23	5000	27x27	6400	31x31
	2000		15x15		18x18		20x20		16x16		19x19		22x22
	3000		13x13		15x15		17x17		14x14		16x16		18x18
20 to 25	1000	3900	24x24	5400	28x28	6800	32x32	4500	26x26	6300	30x30	8000	34x34
	2000		17x17		20x20		23x23		18x18		22x22		24x24
	3000		14x14		16x16		18x18		15x15		18x18		20x20

*Where beam supports on each half coincide, combine required pier capacity and footing area. Neglect spans where beam is supported by longitudinal wall along centerline.



Section 2

Positioning & Blocking

- a. Single-Unit Homes
- b. Multi-Unit Homes
- c. Slide-A-Bay Rooms
and Accessories

Positioning and Blocking Single-Unit Homes

General

The site should be level and all concrete work completed before positioning your Redman single unit home. All service facilities must be installed. This includes the water, gas, electrical and drain connections.

If any trenching must be accomplished for crossover drain lines or if the wheels are going to be left in place, it should be performed at this time. Any other items which could be difficult to install after the home is positioned such as ground anchors installed at an angle, should be placed in the proper locations. If a concrete pad is not installed and a moisture barrier is to be placed under the home, it is more convenient to place it before the home is set. It can be left folded up and then unfolded after pads and support piers have been positioned under the frame members.

Move the unit into its desired position on the prepared site.

Leveling

NOTE: There are many accepted methods of leveling homes; however, the method used in this manual will utilize a "water level." A "water level" is simply a plastic reservoir holding a colored water with approximately 75' of plastic hose attached. This device operates on the principle that water seeks its own level. See Figure 2.

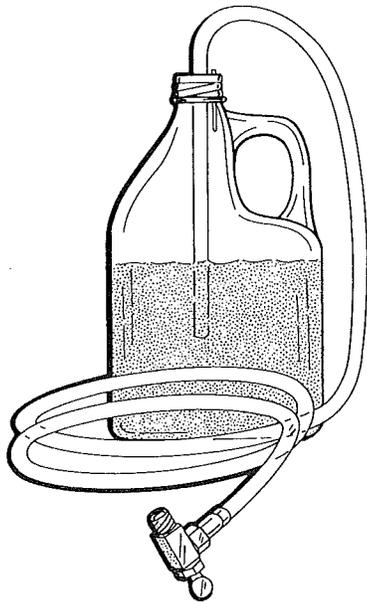


Figure 2

Reminders before jacking:

1. Use only jacks in good working condition with a minimum rating of 12 tons.

2. To distribute the concentrated loads created by the jacks, a steel pad or plate should be placed between the jacks and the steel I-beam or c-channel member. See Figure 3.

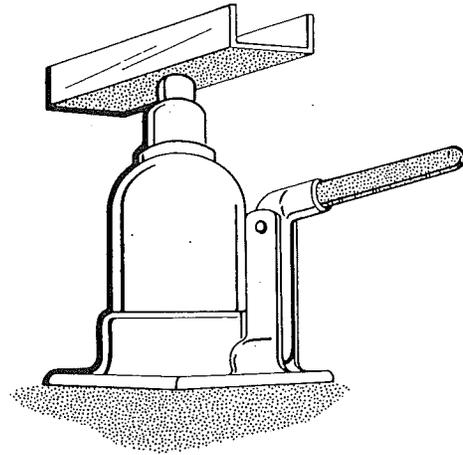


Figure 3

3. Use a firm support under the jack base to prevent tipping or settling of the jack.
4. Always follow the sequence of jacking outlined below to avoid overstressing structural members.
 - a. Excessive or non-uniform jacking during the leveling process can cause the home to be racked and twisted. This could result in serious structural damage to the home, thus voiding your warranty.

Jacking and Leveling Procedure

1. Determine from Table II, III, or IV (on Pages 9–11) the proper spacing for the piers located under the home or for each half of the home for multi-section units. If a concrete slab has not been installed at the site, concrete pads should then be distributed under the main frame members. If it is a multi-section home, a double row of pads is placed in the center to be used on both halves. If any additional piers are needed under column supports, then concrete pads should also be positioned for these items.
2. Raise the hitch of the unit to be blocked and leveled approximately 2" higher than its final position with the screw jack assembly, or a heavy duty hydraulic jack. Adequate blocking should then be placed under the hitch assembly to prevent its falling to the ground in the event the jack stem assembly should fail. Place a 12 ton jack under each main frame member just to the rear of the rear spring hangers. These two jacks should be operated simultaneously to raise the home until it is approximately 2" higher than its final position.
3. If the wheels are to be removed, safety supports should be placed tightly under the frame members at this point to prevent the home from dropping should the jack fail. The wheels are then removed and placed directly under the home for storage or where the customer specifies.
4. The concrete pads for pier supports, previously distributed around the unit, are now located directly under each I-beam adhering to specified spacing. Concrete or metal piers are then placed into position on the pads. These piers have an adjustable bracket placed in the top, on which the steel frame will set.
5. The water level previously referred to is now positioned at a height whereby the level of the water inside the reser-

voir is exactly at the height the bottom of the steel frame will be in its final position. See Figure 4.

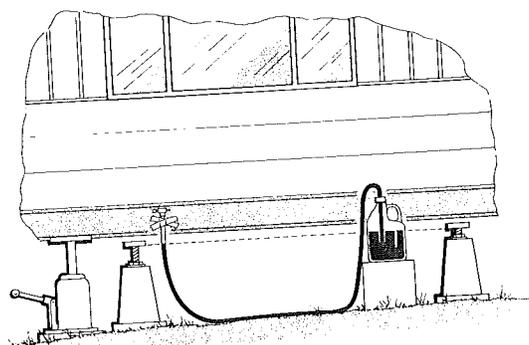


Figure 4

6. By placing a shut-off valve at the end of the plastic tubing, the liquid will be prevented from escaping when the end of the hose is lowered below the level of the fluid in the reservoir.
 7. By pulling the end of the plastic tube to the first pier, the end of the tube is raised above the adjustable clamp and the valve is opened. The top of the adjustable clamp on the pier is then adjusted to match the level of the water in the tube. When this operation is complete, then each succeeding pier is leveled in the same manner.
- NOTE: If a multi-section house is being set up, leave the water level reservoir in its exact location for use on the second half.
8. The safety supports previously placed in the axle area when the wheels were being removed and the support under the A-frame should now be removed.
 9. The jacks are then lowered together, allowing the frame to rest on the brackets of each pier.
 10. The screw jack assembly on the hitch is retracted so that it no longer touches the soil and all jacks are removed from under the frame.
 11. After completion of the leveling and set-up procedure, all doors and windows should be checked to see that they operate freely without binding.

Tie Downs

The tie down straps should now be installed around the frame members and the ground anchors in accordance with the ground anchor manufacturer's instructions. Recommendations and illustrations for this tie down procedure are included in the Support and Anchoring Systems Section on Pages 28 and 29.

If the tie down straps are not properly installed, the frame of the home could actually be damaged or the level of the home changed. The tie down straps should be alternately tensioned on opposite sides of the home to avoid the problems mentioned above.

Final Check out

At this time all furniture, carpet, fixtures, or other loose items should be installed. All shipping blocks, brackets and/or clips installed on appliances for shipment should be removed. All clamps or brackets installed on windows and doors for shipping purposes should be removed and the operation of these items checked.

The utilities should now be connected and tested; however, this will be covered in another section of this manual.

Bottomboard Closure

A special material is fastened to the bottom side of your new home. It has been installed at the factory to protect against moisture, rodents and unconditioned air. This covering was inspected at the factory, but could have been damaged during transit. It is important that the areas that are damaged be resealed.

1. If the covering is a vinyl coated material, use vinyl patching tape designed to repair tears or holes. If a hole is large, use a patch of the same or similar material as the bottom covering and tape the edges for an airtight seal.
2. If the bottom covering is an asphalt impregnated board, use a patch of the same material with beads of adhesive

around the contact edges to insure an airtight seal. When the overlay is positioned over the damaged area, it is then fastened in position using an outward flare tacker. This requires a special tool designed to outward flare a 3/8" crown staple with 1" long legs through both the overlay and the bottomboard. The flaring action of this tool causes both materials to be tightly clenched together, requiring no other support.

3. The spacing of these staples should be no more than six inches (6") apart around the perimeter of the overlay, with the second row placed inside approximating the edge of the damage or cut area.
4. The edge of the overlay should then be taped with a heavy weather-resistant tape used to seal ducts. This will insure that the repaired area is weather-proof.

Consequences of Incorrect Blocking and Leveling

Incorrect blocking and leveling of your home could produce a sagging home and these related conditions:

Buckling and/or loosening of walls, partitions, siding, ceilings, doors, floors, linoleum, carpeting, insulation, wiring, sinks, tubs, toilets, weatherstripping and miscellaneous fixed original fixtures of the home;

Leaking windows, doors, roofs, ceilings, walls, floors, seams, and junctions generally caused from rain, snow or moisture;

Improper closing, binding and sagging of windows, cabinets and inside/outside doors;

Malfunctioning of plumbing, water outlets, lighting fixtures, electric heating and air conditioning systems.

Positioning and Blocking

Multi-Unit Homes

General

As in the single unit home, the site should be totally prepared with concrete work completed before positioning your Redman home. All service facilities must be installed and in a proper position for the water, gas, electrical and drain connections on the home.

Any preparation work that can be done more easily prior to the setting of the homes should be completed. This would include any trenching necessary for drain line or wheel locations and ground anchors that would be installed at an angle. It is also recommended that a moisture barrier be placed on the ground under the home if a concrete slab has not been installed.

Positioning

Remove the polyethylene and wood stripping closure material from both halves of the home.

1. Do not remove temporary structural supports.
2. The two halves of the home are then positioned side by side as close together as possible. Check to make certain that the service connections are located adjacent to the service facilities.

Leveling and Joining Sections

1. Refer to a previous section on single-wide homes under "Leveling and Blocking" for the proper instructions on properly locating the piers and the use of a water level for proper leveling.
2. Before moving the second half into position, a material such as fiberglass insulation, strips of carpet padding or equivalent material should be fastened on the mating edges of the floor, walls and ceiling to prevent the possibility of air infiltration after the home is set up. This material should not be placed in a position that it could restrict air ducts in the heating system or supply over at the floor line or through the ridge beam. If the crossover duct system requires some sort of connection seal, make certain that it is in place prior to joining the two halves.

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

3. Move the second section of the home into position along side of the first. It is recommended that a dollie device utilizing steel rollers be used for this purpose. These dollies, which utilize rollers, are so constructed that hydraulic jacks can be positioned on the rollers and under the frame members so that the frame can be rolled sideways very easily. Most service crews and installers have this equipment. It will minimize any possibility of frame damage which could void your warranty. See Figure 5.

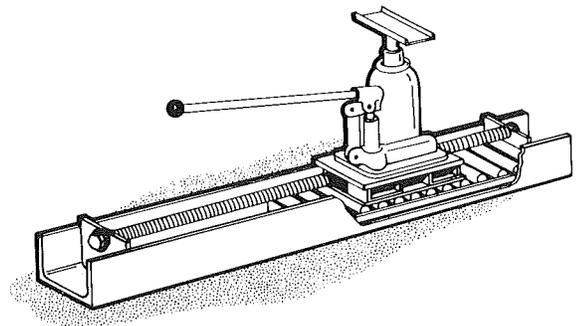


Figure 5

Final Positioning

After the two units are side by side (approximately 10" to 12" apart) the dollie devices are placed behind the axle area and approximately midway in the front span. The unit is then raised using hydraulic jacks until the wheels are clear of the ground. Then by using a hand winch attached at the spring hangers the two units can be pulled tightly together.

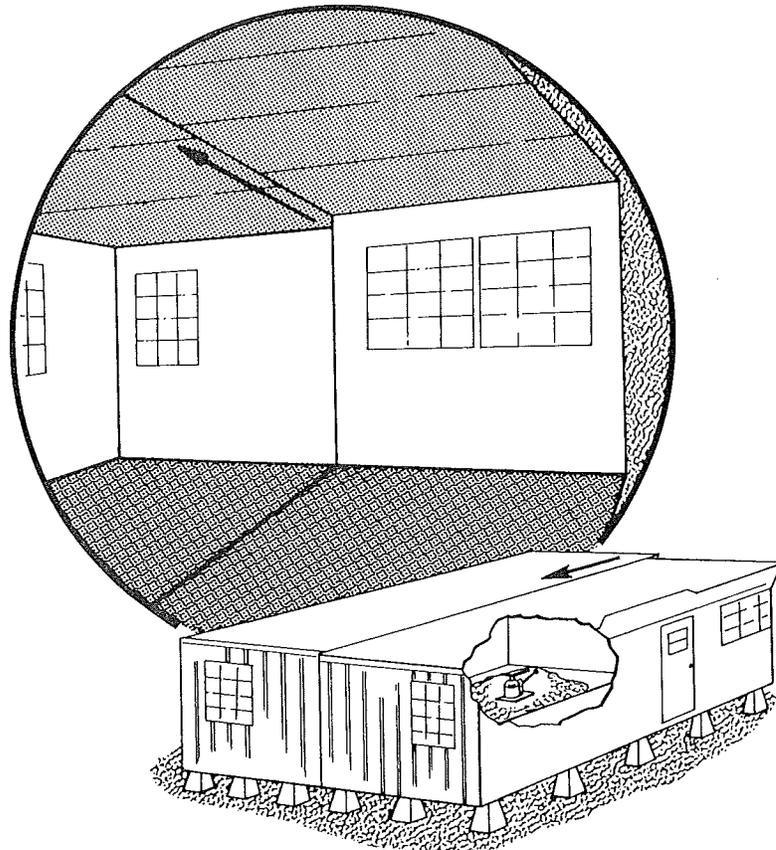
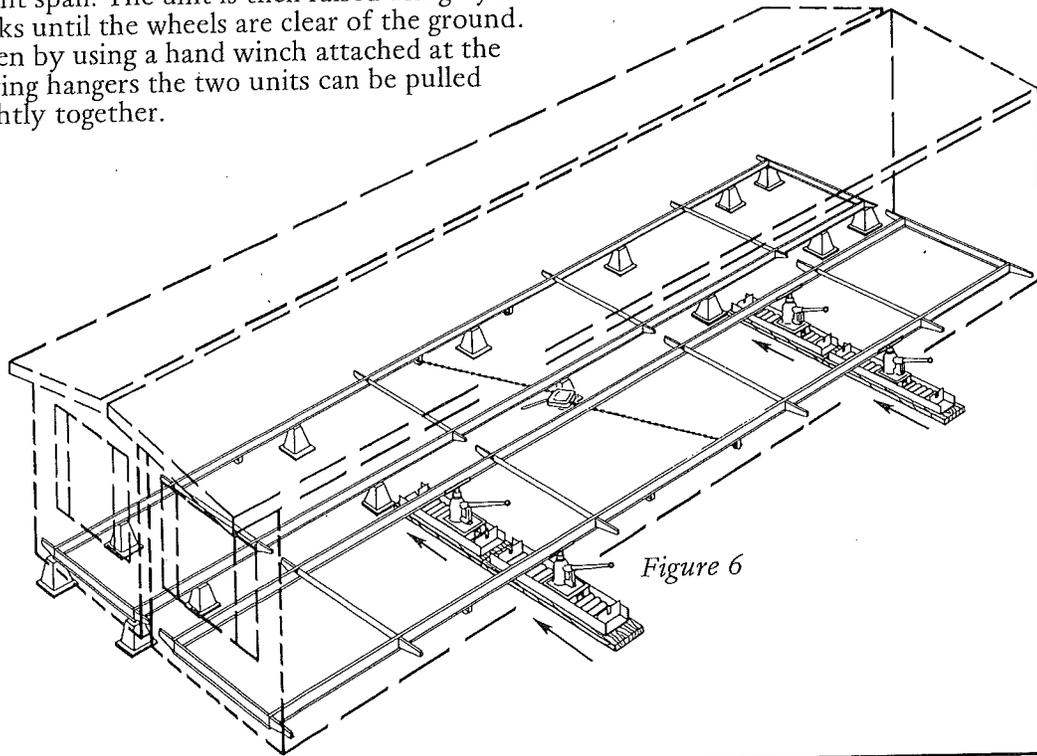


Figure 8
Page 18

4. Raise the second section in the same manner as the first section was raised, as explained in the "Leveling and Blocking" section under "Single Units".
5. Position the pads and piers and level each pier with the water level.
6. When this operation is complete, lower the jacks so that the steel frame members rest on the threaded brackets of the piers.
7. Align the floor sections, bolt the two units together through the adjustable marriage clips which are provided on both halves. Bolts are placed through these clips and then tightened. See Figure 7.

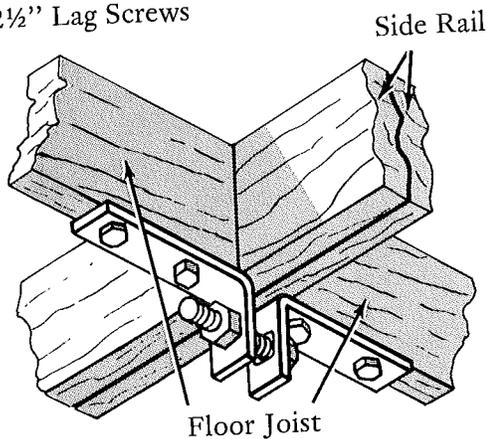
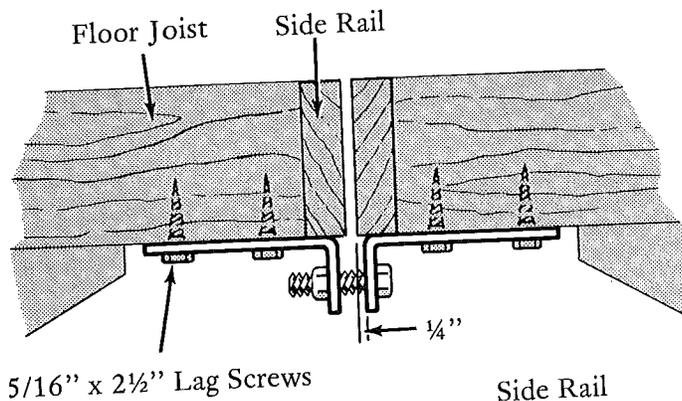


Figure 7

NOTES:

1. Angle brackets to be mounted to floor joist on mating sides of home at 8' O.C. beginning 16" from front.
2. Use 1/2" x 3" hex tap bolt, nut, and washer to fasten brackets together when a multi-wide is set up.

8. Inside the home the ceiling panels and the endwalls on each half must align with each other. If the halves are not in proper alignment they may be adjusted by raising the back corner on one half. This will cause the ceiling on the opposite side to move forward as illustrated in Figure 8.

NOTE: It is imperative that the ceilings on each half be exactly flush before the final fastening of the ridge beams is performed.

9. By carefully inspecting the ceiling or using a straight edge, low points can be determined. To raise the low portion, use a wood member such as a 2 x 4 or a steel pipe placed on the top of a hydraulic jack. A second piece of 2 x 4 properly padded is placed on top the vertical posts and directly underneath the low point. See Figure 9.

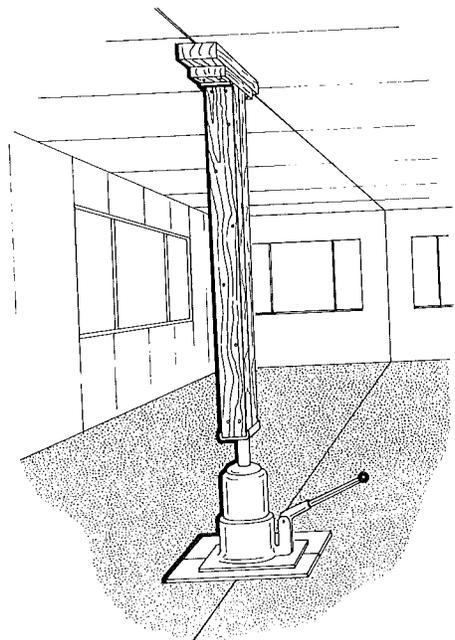


Figure 9

Carefully raise the jack until the two ceiling sections are flush, and then complete fastening the two ridge beams together on the outside of the home. This procedure should be followed at each location if one part of the ceiling is low.

- To secure the roof together, fasten the ridge beam halves with the precut sections of $\frac{1}{2}$ " plywood strips. These strips are 3" in width and 8' in length and are simply placed directly on top of the ridge beam halves. They are then secured with No. 10 x 2" wood screws spaced 12" on center down the entire length of the roof.

Cover the plywood strip with a wide piece of roofing felt which is stapled to the underlying roof decking. The staples should be 1" x 1" x 16 ga. and spaced a maximum of 6" apart.

Shingles used for the ridge cap are to be 36" x 12" cut into three sections. Start from the front of the unit and overlap 6" to the rear of the unit. Secure with 1" x 1" x 16 ga. staples, four per shingle. See Figure 10.

On metal roof applications, use an 8" wide galvanized metal cap to cover the plywood strips and secure it with 1" sheetmetal screws 4" on center down each side. The screws used to attach this cap must penetrate an underlying sealant tape. Screws used in a metal roof application should be covered with a roof mastic. See Figure 11.

- Because certain floor plans do not have loadbearing walls or partitions

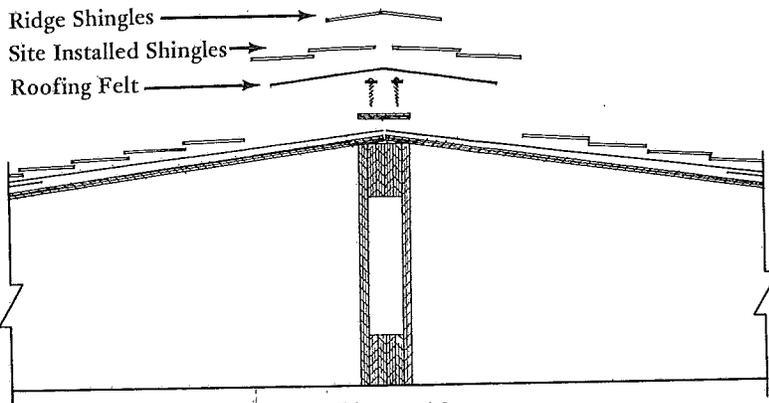


Figure 10

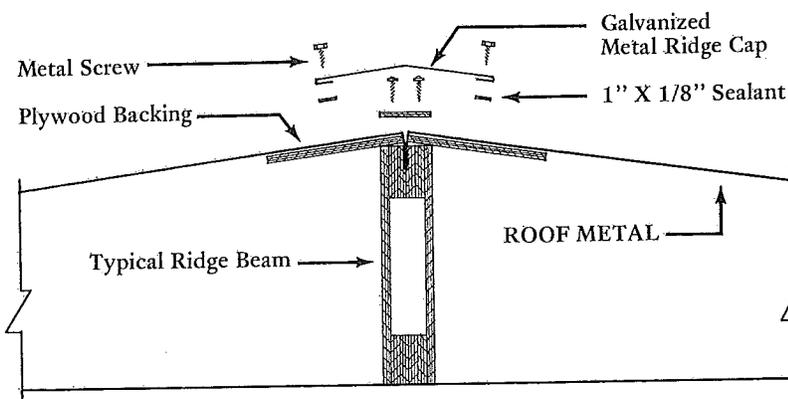


Figure 11

installed at certain critical structural areas, it may be necessary to install a ridge beam column support along the marriage line. The location of the ridge beam column support will be clearly labeled along the floor line of the home. Installation instructions are shown in Figure 12.

NOTE: Before attempting to install the ridge beam column supports, the ridge beam must be properly aligned and completely fastened together.

Because certain floor plans do not have load bearing walls or partitions installed at certain critical structural areas, it may be necessary to install a ridge beam column support along the marriage line. The location of this ridge beam column support will be marked on the bottom board with the words "BLOCK HERE" using readily visible paint color and lettering.

On the inside of the home the beam column support can be positioned by centering it over the 30 gauge steel uplift straps, one each attached to the upper beam and to the outer perimeter of the floor. This is illustrated in Figure 12.

The beam support will be shipped loose with the set-up material and will have a decal attached bearing the notice printed below.

The support column is a 2 X 6 Spruce Pine-Fir #2 grade minimum.

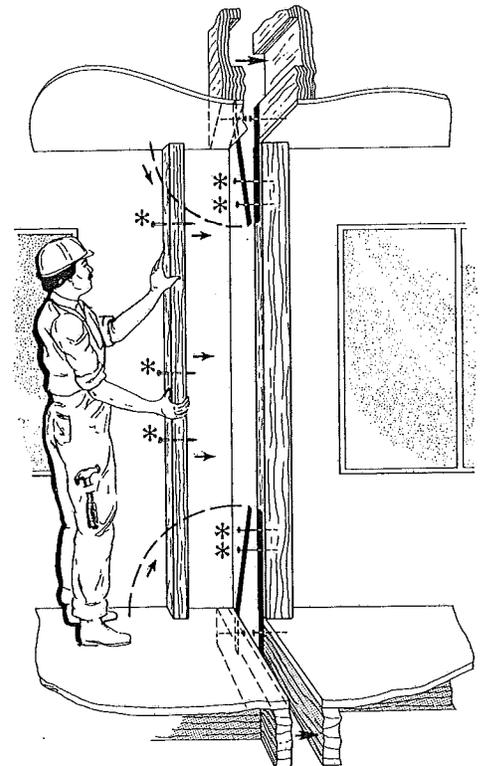


Figure 12

NOTICE

This beam support column must be fastened to structure in mating half with #8 X 2-1/2" screws or equivalent fasteners at 18" O.C.

Interior Closure Moulding

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

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

Before installing mouldings, fill all gaps with insulation.

Then staple or nail mouldings in place and cover staple and nail holes with color coordinated putty (Not supplied by manufacturer).

NOTE: A section of panel may have been shipped loose for installation on site in order to achieve a more desirable finished appearance (See Detail A) Figure 13.

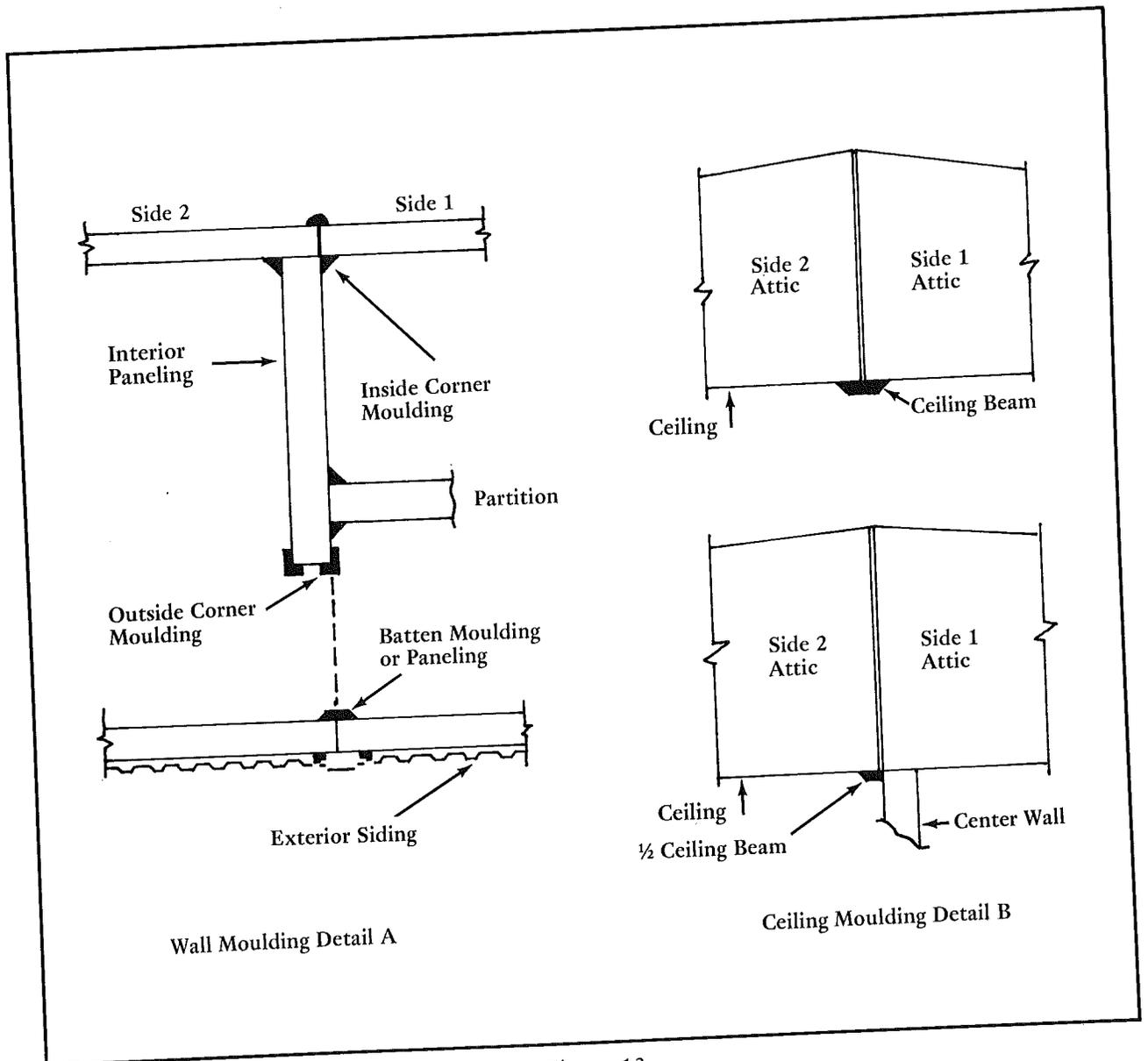


Figure 13

Exterior Closure / Wood or Hardboard Siding

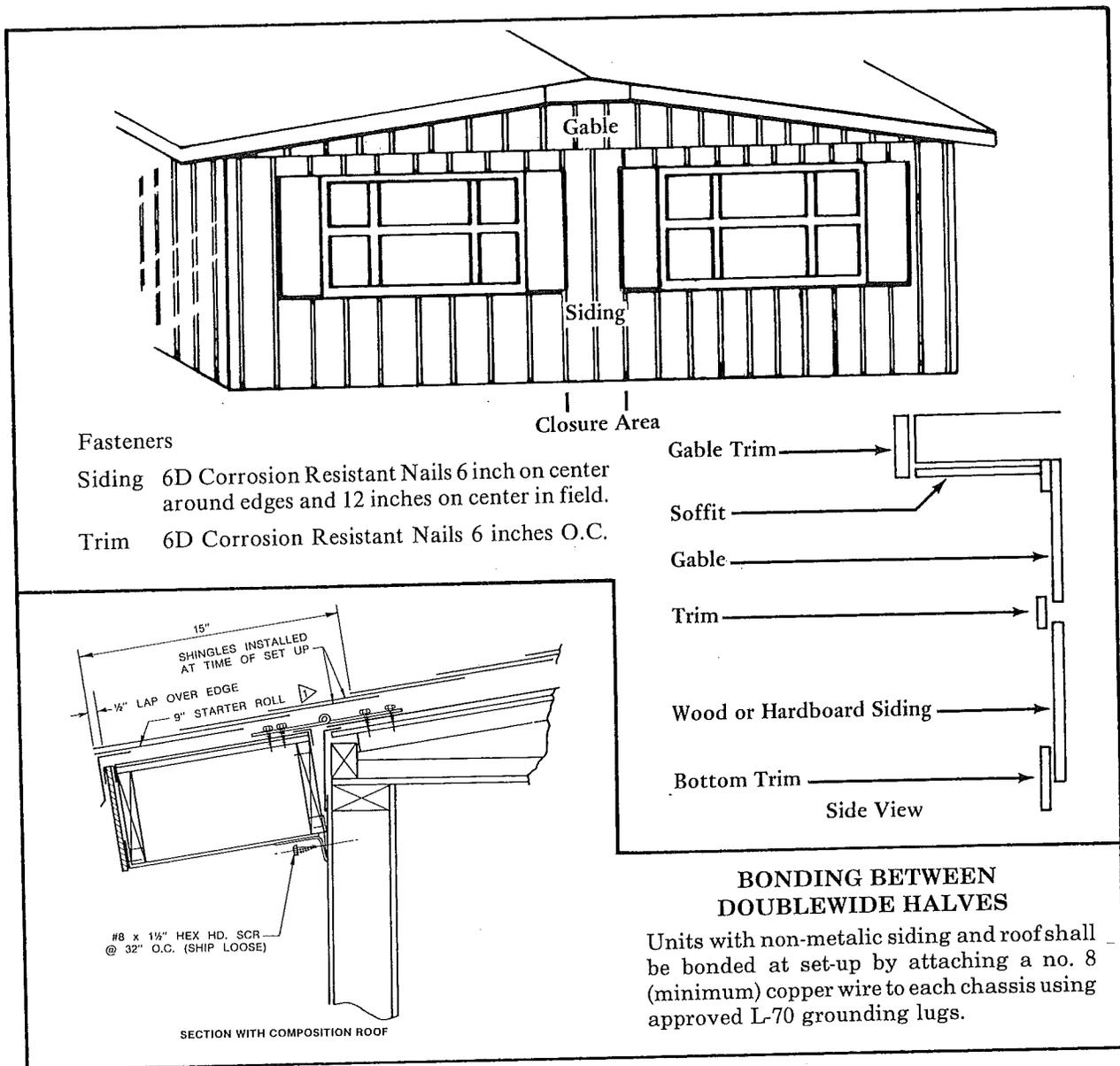


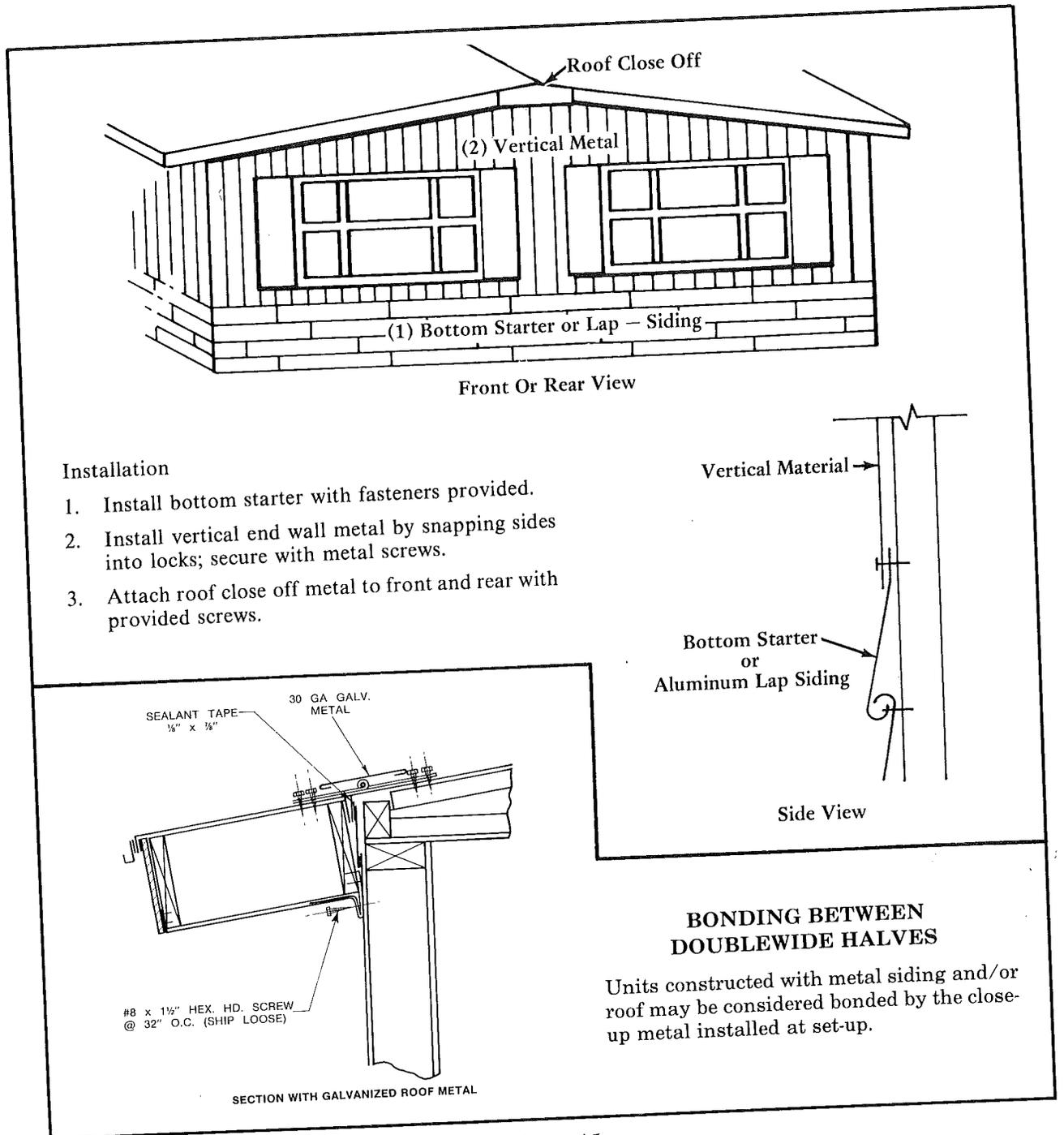
Figure 14

For homes manufactured with *Wood or Exterior Hardboard Siding*, detail drawings shown are typical. The closure material is shipped with the home and is easily identifiable by matching the parts with the front and rear of the home once the home has been positioned together.

Installation of Exterior Closure Trim

1. Install the vertical siding with provided nails, following nailing pattern (See Figure 14).
2. Install matching bottom trim front and rear with nails provided.
3. Match and install gable trim material (See Figure 14).
4. All SEAMS shall be sealed and/or caulked.

Exterior Closure / Metal or Lap Siding



Installation

1. Install bottom starter with fasteners provided.
2. Install vertical end wall metal by snapping sides into locks; secure with metal screws.
3. Attach roof close off metal to front and rear with provided screws.

Vertical Material

Bottom Starter
or
Aluminum Lap Siding

Side View

BONDING BETWEEN DOUBLEWIDE HALVES

Units constructed with metal siding and/or roof may be considered bonded by the close-up metal installed at set-up.

Figure 15

For homes manufactured with vertical *Metal Siding*, *Lap Aluminum Siding* or combination of metal and lap siding, the detail drawing is typical. The closure metal is shipped with each home and can be identified by matching it with the front and rear of the home. Parts will generally consist of the bottom starter, the vertical metal and the roof metal.

Installation of Exterior Closure Metal

1. Install bottom starter with the provided fasteners. The bottom starter may be either horizontal metal or aluminum lap siding (See Figure 15).
2. Install the vertical end wall metal by snapping the sides into S-Locks; secure with metal screws provided (See Figure 15).
3. Attach roof closure metal to front and rear roof (See Figure 15).

Positioning and Blocking Slide-A-Bay Rooms

1. Completely install the main unit on the selected site using the procedures described under "Positioning and Blocking." Leave the slide-a-bay floor in the shipping position. Do not complete the slide-a-bay checks on the electrical system or any utility which is interconnected with the slide-a-bay room at this time.
2. With the home level and secured, remove any shipping covers or seals to protect the opening during transit.
3. Locate supporting piers in the approximate position they will be required when the slide-a-bay floor has been lowered to a horizontal position.
4. Remove the shipping braces or blocking that retains the slide-a-bay floor in position, in the main structure, during transit.
5. Using a minimum of two men, gradually lower the floor until it makes contact with the supporting piers previously positioned. **TAKE EXTREME CARE THAT THE WORKMEN CAN QUICKLY CLEAR THE SPACE UNDER THE FLOOR SHOULD IT SUDDENLY DROP.** See Figure 16.
6. All supporting piers should now be placed in location and properly adjusted to equally distribute the weight. Refer to Tables II-IV, Pages 9-11 for pier locations.
7. With the floor properly leveled, remove all shipping braces from the slide-a-bay room located inside the main unit.
8. Carefully check the floor of the slide-a-bay to make certain that it is not obstructed with parts that would impair the movement of the room.
9. Carefully slide the slide-a-bay room in position on the floor. See Figure 17.

CAUTION:

10. With the slide-a-bay room in position, lift one side using a small pry bar and place a section of sealant tape or caulking material under the wall. Repeat this operation on the other two sides of the room.
11. Carefully align the walls the floor edges and secure with the proper fasteners as illustrated in Figure 18.

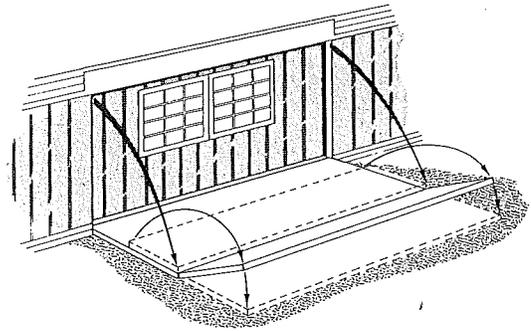


Figure 16

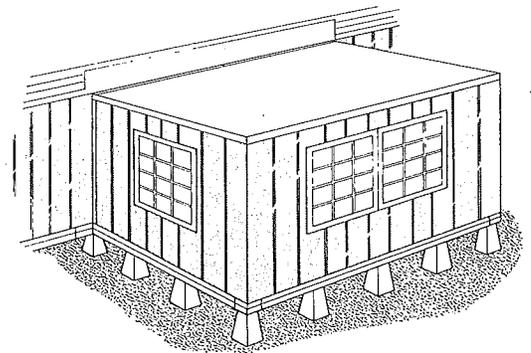


Figure 17

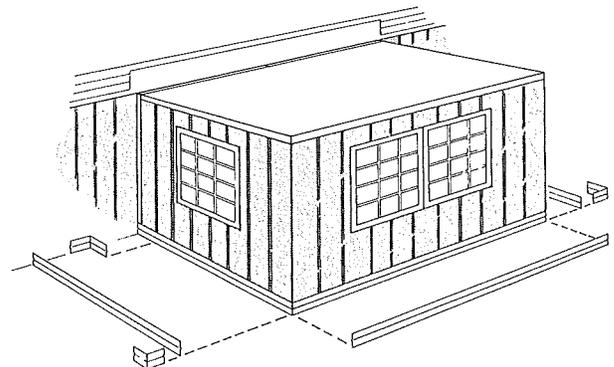


Figure 18

12. Align the walls with the inside wall of the main structure and secure with the appropriate fasteners.
13. Install the bottom skirt metal trim around the lower perimeter of the slide-a-bay room. Secure along the bottom of the vertical siding, See Figures 14 and 15 on Pages 22 and 23.
14. Install vertical flashing in each of the corners of the main unit. Be sure to use sealing tape to attach these trim pieces.
15. Slide the upper edge of the slide-out roof flashing under the header metal of the main unit. Position the lower edge against the slide-a-bay roof. Use sealing tape between the flashing and the roof metal. Secure the slide-out roof flashing with No. 8 x 1" sheet-metal screws on 4" o.c. into the main unit.

NOTE: Details may vary slightly because of variation in metal design; all overlapping pieces should always be cut and installed to provide proper water runoff.

16. Seal all joints with roof coat and sealant. Attach tie down straps to ground anchors in accordance with instructions on Page 28.
17. Connect the electrical wires from the slide-a-bay room into the junction box in the main unit. NOTE: See Figure 25, Page 34 for electrical connection details.

Installation of Accessories

If additional decorative or functional accessories are to be attached to your home, such as utility buildings, carports, skirting, and awnings, the following practices must be observed:

1. Read carefully and follow the instructions for any supplemental accessory which are provided by the manufacturer of such accessory. Always check to determine that the installation conforms to applicable building codes.
2. If direct attachment to the home is necessitated, make certain that solid structural members are behind the

attachment point. In the event a carport or awning is being installed, it should be attached only along the top of the wall or the edge of the roof. Proper size fasteners should always be used, and interlocking parts should be carefully fitted.

3. In installing carports, awning rails, or small storage buildings, try to select a unit that is designed with support columns which will carry its own weight. As little weight as possible should be attached to the home itself.
4. All joints created by attaching accessories to the home should be properly sealed with weatherstripping and covered, if possible, with moulding or flashing. Attaching fasteners should be caulked or sealed. All holes or openings necessitated in the walls or roof of the home should be covered and sealed to insure against leakage.

NOTE: MODIFICATIONS AND/OR ALTERATIONS OF YOUR HOME MAY MAR ITS APPEARANCE AND WEAKEN IT STRUCTURALLY, WHICH COULD VOID YOUR WARRANTY RIGHTS.



Section 3

Support & Anchoring Systems

Support & Anchoring Systems

General

Mobile homes shall be anchored to resist overturning and lifting effect from horizontal winds. A recommended method is to install ground anchors and tie down straps in conjunction with supporting piers.

The main frame members of your home are attached in a manner which will permit tie down straps to be installed to resist side and uplift forces.

Anchoring equipment can be attached to your home by coiling the steel straps around the main frame members. These straps are fastened in place with a strap buckle.

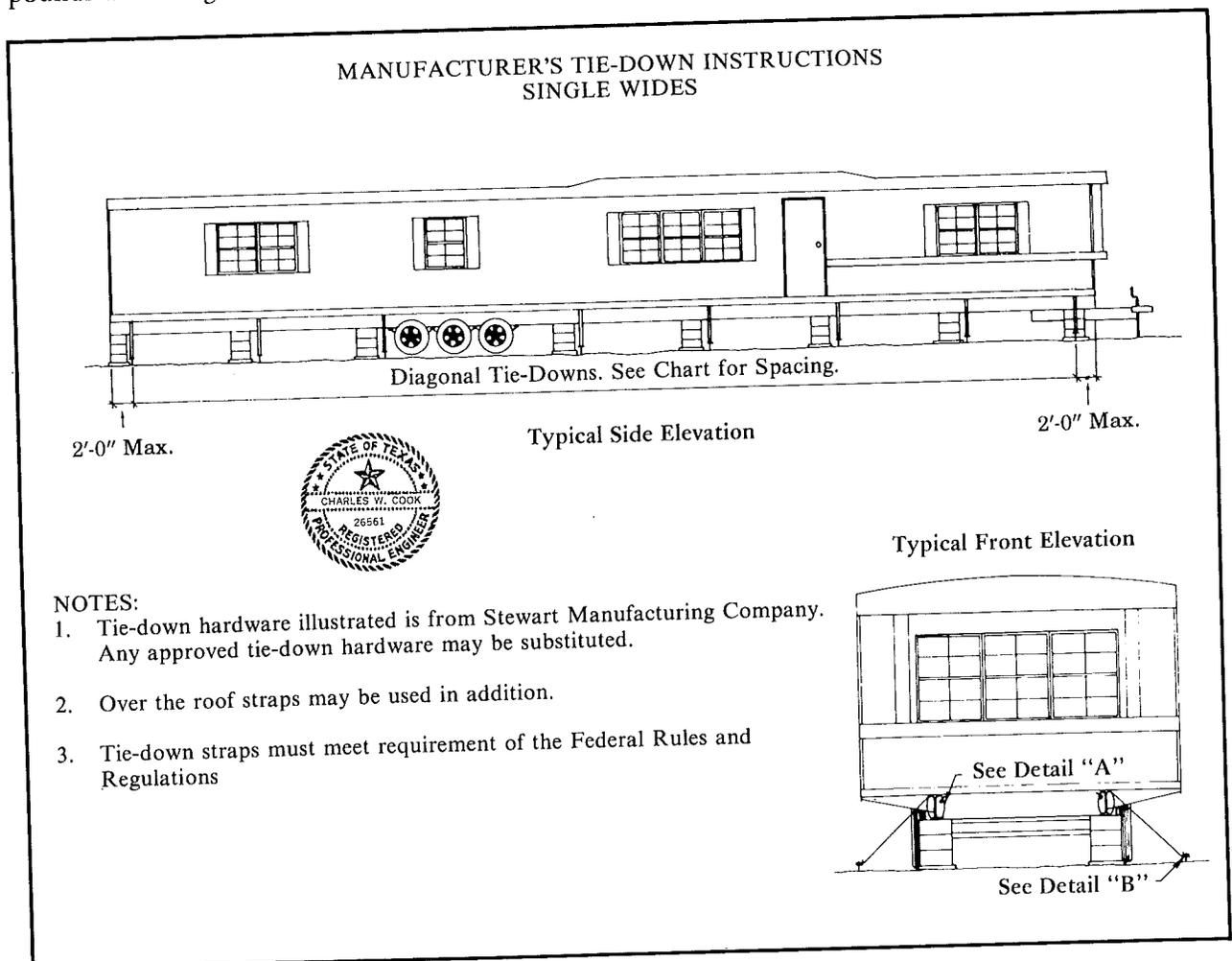
Equipment

The anchoring equipment shall be capable of resisting an allowable working load equal to or exceeding 3150 pounds and shall be capable of withstanding a 50% overload (4725 pounds total) without failure of either the anchoring equipment or the attachment point on the mobile home frame.

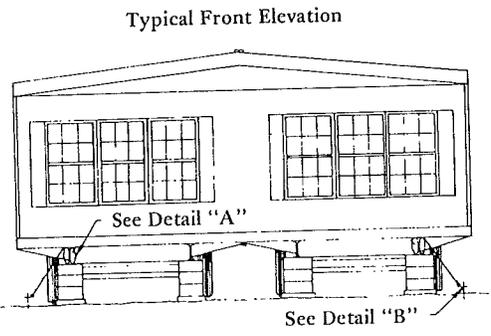
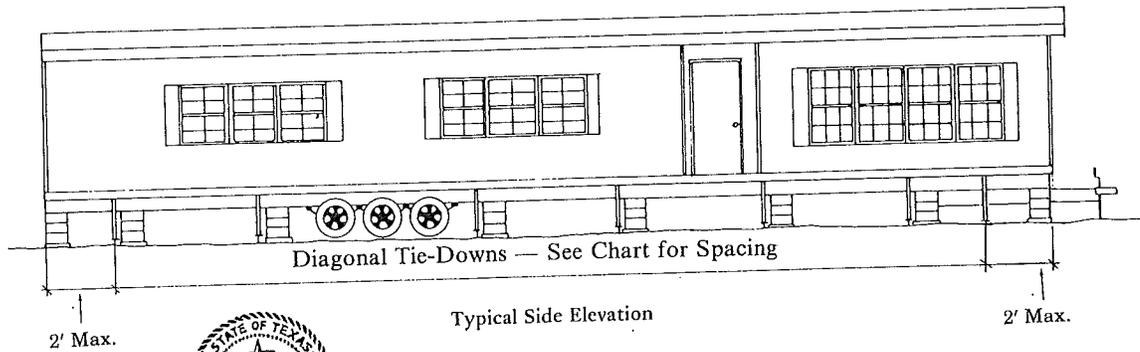
Ground anchors are used with most types of tie down straps. Commercial designs are available through your dealer or contractor. Acceptable anchors can be fabricated from concrete steel rod or cable, or other similar material. Installed ground anchors must have a working load capacity of at least 3150 pounds at an angle of 45° from the vertical.

Anchoring equipment exposed to weathering shall have a coating to resist weather deterioration and must be of Type 1, Finished B, Grade 1 steel strapping, 1-1/4" wide and 0.035 thick, conforming with Federal Specifications, QQ-S-781-H.

Your home is designed for a foundation system which supports the frame members. These are the two steel beams which run the length of the home. Consult the home manufacturer before using a support system which does not directly support the main beams as this may result in damage which could void your warranty.



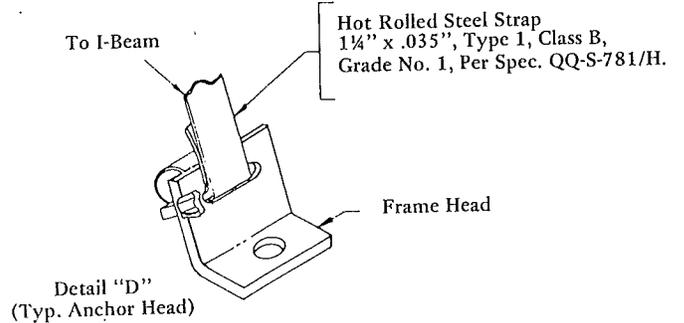
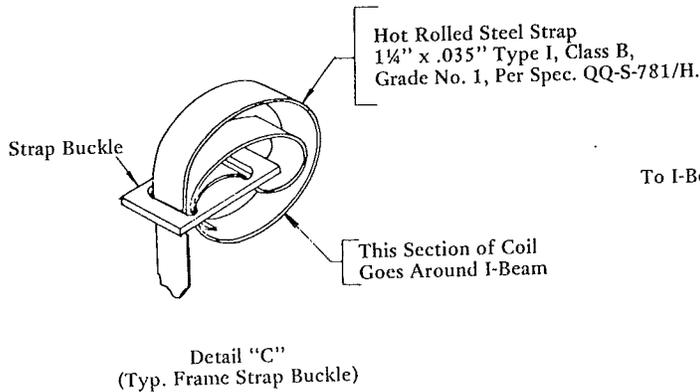
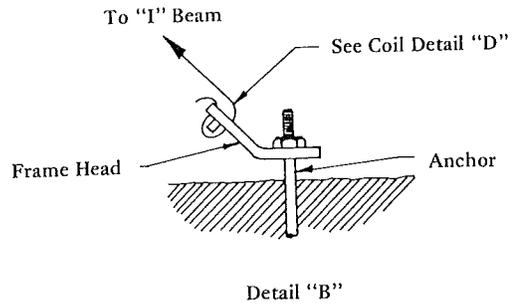
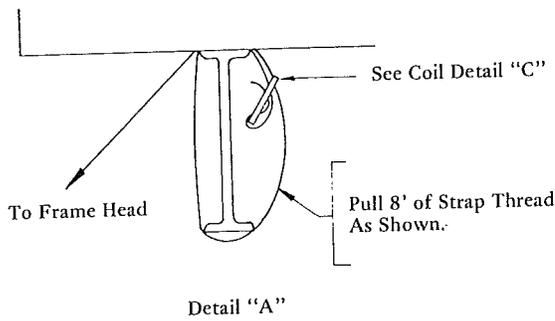
**MANUFACTURER'S TIE-DOWN INSTRUCTIONS
DOUBLE WIDES**



NOTES:

1. Tie-down hardware illustrated is from Stewart Manufacturing Company. Any approved tie-down hardware may be substituted.
2. Tie-down straps must meet requirement of the Federal Rules and Regulations

Figure 20



Windstorm Tie-Down Maximum Strap Spacing, Feet-Inches

Height of Piers under Chassis Beam	12' Wide 90" ceiling	14' Wide 90" ceiling	14' Wide 96" ceiling	14' Wide 108" ceiling	24' Wide 90" ceiling	28' Wide 90" ceiling
Std Wind Zone						
12"	12'-9"	14'-0"	13'-4"	12'-0"	12'-9"	14'-0"
18"	11'-7"	13'-2"	12'-6"	11'-3"	11'-7"	13'-2"
24"	10'-6"	12'-4"	11'-8"	10'-6"	10'-6"	12'-4"
30"	9'-6"	11'-6"	10'-10"	9'-9"	9'-6"	11'-6"
36"	8'-8"	10'-8"	10'-1"	9'-2"	8'-8"	10'-8"
Hurr. Wind Zone						
12"	7'-8"	7'-6"	6'-10"	5'-10"	7'-8"	8'-5"
18"	6'-11"	7'-11"	7'-6"	6'-9"	6'-11"	7'-11"
24"	6'-3"	7'-5"	7'-0"	6'-4"	6'-3"	7'-4"
30"	5'-8"	6'-10"	6'-6"	5'-10"	5'-8"	6'-11"
36"	5'-2"	6'-5"	6'-1"	5'-6"	5'-2"	6'-5"

For installations where pier heights exceed 36", maintain spacing shown for 36" piers without exceeding a groundto-strap angle of 55 degrees for 12' and 24' wides or 45 degrees for 14' and 28' wides.



Windstorm Tie-Down Maximum Strap Spacing, Feet-Inches

Height of Piers under Chassis Beam	12' Wide 96" Ceiling	24' Wide 96" Ceiling	28' Wide 96" Ceiling
Std Wind Zone			
12"	12'-1"	12'-1"	13'-4"
18"	11'-0"	11'-0"	12'-6"
24"	9'-11"	9'-11"	11'-8"
30"	9'-0"	9'-0"	10'-10"
36"	8'-2"	8'-2"	10'-1"
Hurr. Wind Zone			
12"	7'-3"	7'-3"	8'-0"
18"	6'-7"	6'-7"	7'-6"
24"	5'-11"	5'-11"	7'-0"
30"	5'-5"	5'-5"	6'-6"
36"	4'-11"	4'-11"	6'-1"

Your Notes



Section 4

Utility Connections

Utility Connections

General

Before connecting any utility systems, it is recommended that local, county, and state authorities be consulted. Many localities have special requirements pertaining to the installation and special testing of utility systems.

NOTE: *It must be possible by removeable sections of skirting or through access doors to gain accessibility to all utility hook-ups.*

All utility systems in your Redman home were tested by qualified quality assurance personnel at the manufacturing facility. However, it is possible that during transit damage to these systems could have occurred which would dictate, after service connections are made, that field tests be conducted. Emphasis should be placed on having only qualified service personnel familiar with local code regulations make all utility connections and conduct tests thereon.

Heating System

The gas heating system in your Redman home has been designed to operate effectively on natural gas. The gas piping in this home is designed for a pressure not exceeding 14" water column ($\frac{1}{2}$ psi) and not less than 7" water column ($\frac{1}{4}$ psi). THESE DESIGN LIMITATIONS MUST NOT BE EXCEEDED.

On some sectional homes which incorporate gas appliances in both halves, the gas crossover line will be provided between the home sections. This crossover line will be located below the floor structure and the center line between sections. It will be equipped with an approved metal connector and a quick disconnect device. The final connection of the crossover is made after the dust cover on the quick disconnect device has been removed and snapped on to the two halves, completing the connection. See Figure 21.

After the gas system has been installed, it must be finally checked to insure freedom from leaks.

To avoid possible damage to associated gas valves and regulators incorporated on appliances, do not pressurize the gas line in

excess of 8 ounces maximum after final connections are made.

After final testing of the gas supply lines, the home can be connected by using a listed gas connector of the capacity indicated on the label by the gas inlet.

CAUTION: *All appliances in this home are equipped for natural gas. If LPG (Liquefied Petroleum Gas) is to be used as the gas supply, it is necessary that the appliances be converted to LPG in accordance with instructions provided by the manufacturer of each appliance.*

On multi-section homes, the flow of heat from one section to the other is accomplished by a crossover duct system. This crossover may be either a flexible duct suspended under the floor or a rigid duct which extends at an angle from the bottom of the floor at the mating line of the sections.

The flexible ducts are equipped with adjustable collars which clamp to the sleeves projecting through the bottomboard under the internal ducts. See Figures 22, 23 and 24 on page 33. The flexible ducts should be suspended above ground by wire through the duct grommets to the frame structure.

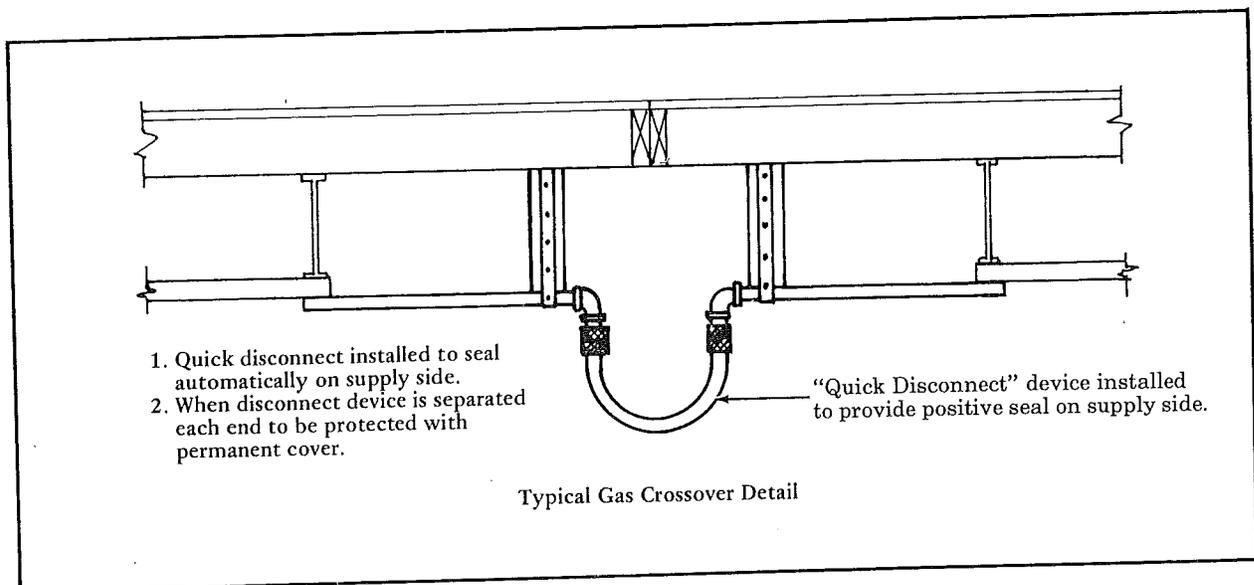


Figure 21

Crossover Duct Installation

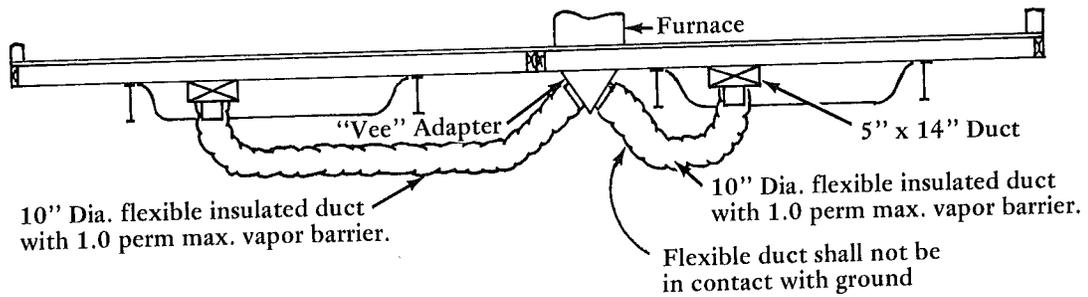


Figure 22

This type of crossover is utilized when there is not a duct built in the floor (Figure 24) and the furnace is outside the I beam. With this type of installation it is necessary that two flexible ducts be run in each direction attaching to the main duct system.

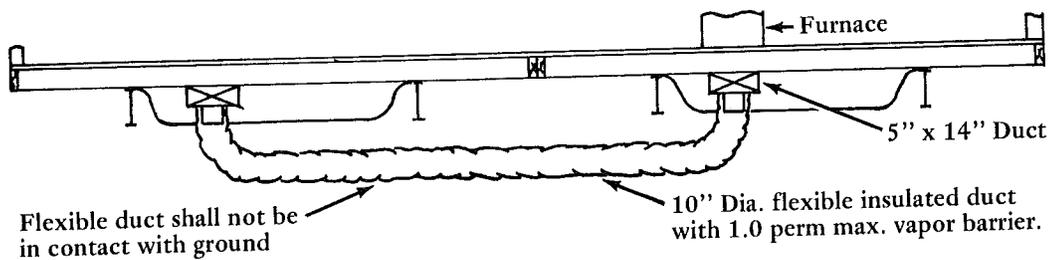


Figure 23

This duct system is used when the furnace is situated directly over the main duct on one-half of the home. The single flexible duct is then used to connect the two halves together.

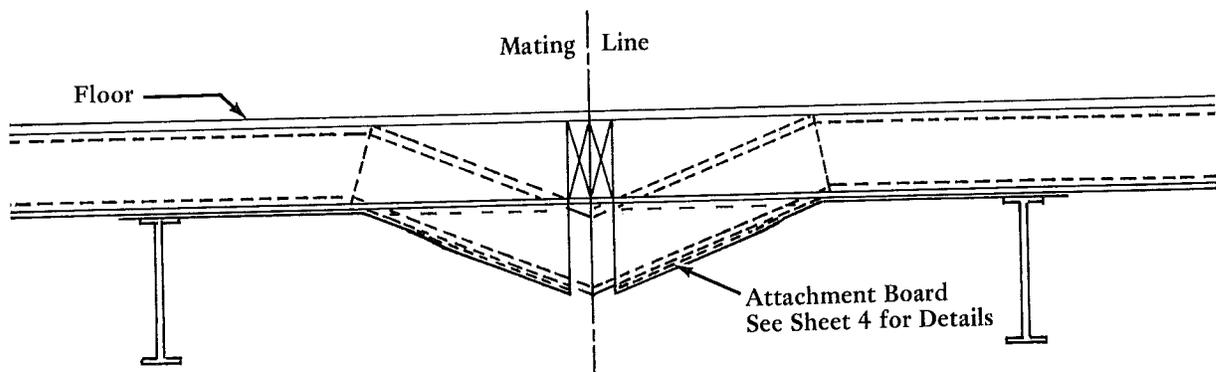


Figure 24

This crossover duct system is actually incorporated in the floor of the home. The connection is made at a point along the center line of the home where the ducts exit from the bottom at an angle. It is then necessary that the connection be sealed to make it airtight.

Electrical System

Your home is designed to be connected to an electrical supply source rated at 115/230 volt, 3-pole, 4-wire with ground system. In making the feeder connections to this power source, it is extremely important that wire of the correct size be used. If wire is incorrectly sized, the ampacity for that wire may be exceeded and you would experience a voltage drop to your home. Ampacity is the safe carrying capacity of a wire expressed in amperes. The greater the amperes flowing, the greater the heat (Doubling the amperes without changing the wire size increases the amount of heat four times.)

Moreover, if the amperage is allowed to become too great, the wire may become so hot that it will damage the insulation or even cause a fire. A voltage drop in your home can cause a drop in the efficiency of all lights as well as appliances. Motors may burn out and you may be paying for electricity you do not use. To avoid these possibilities refer to Table V, Page 36 for proper sized wiring.

It is also vital for the protection of the occupants of the home that it be properly grounded. Grounding to a rod, a water pipe, or through the mobile home or sectional hitch caster, or metal stabilizer will *not* provide this important protection in most cases.

The only safe and approved method of grounding your home is through an electrical-isolated grounding bar in the mobile or sec-

tional home power supply panel which grounds all non-current-carrying metal parts to the electrical system in your home at a single point.

The ground conductor of the power supply cable in turn connects the grounding bar to a good electrical ground back through the power supply system. This means that for 115/230 volt service, you must have a 3-pole, 4-wire service or power supply cable. **IT IS EXTREMELY IMPORTANT THAT THE NEUTRAL CONNECTOR NOT BE GROUNDED IN OR ON THE MOBILE OR SECTIONAL HOME OR THE HOME SERVICE ENTRANCE CABINET.**

Electrical crossovers between halves of section homes are located along the center line between the sections. These crossover locations can be distinguished by metal junction boxes or access cover panels. Remove these panels and connect enclosed wires as illustrated. See Figure 25.

When the mating half contains a bathroom which requires Ground Fault Circuit Interrupter (GFCI) protection for the receptacle, it is important that the bathroom circuit wiring be connected to the proper GFCI protected circuit from the power supply panel.

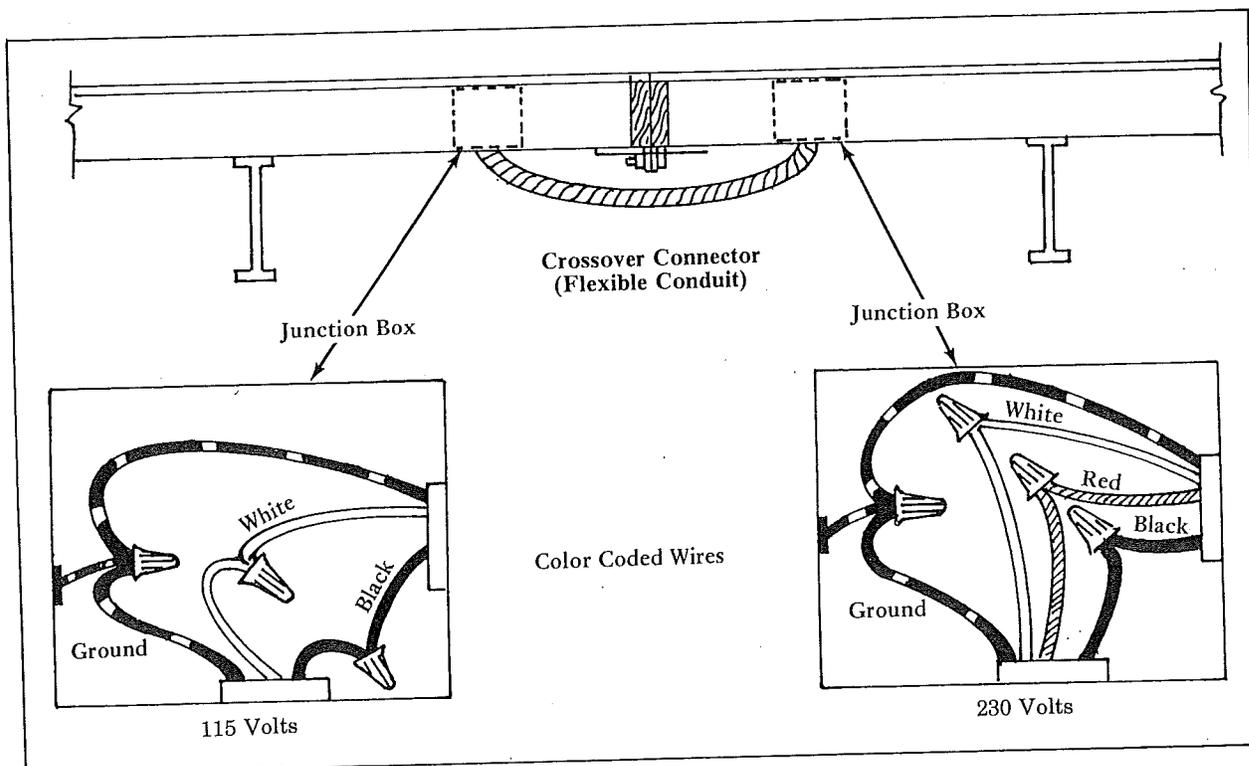
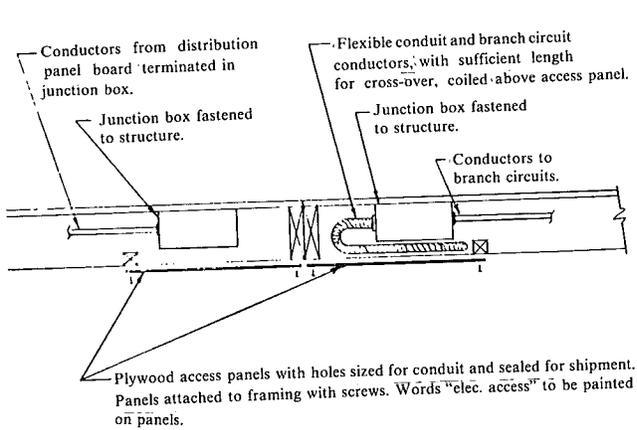


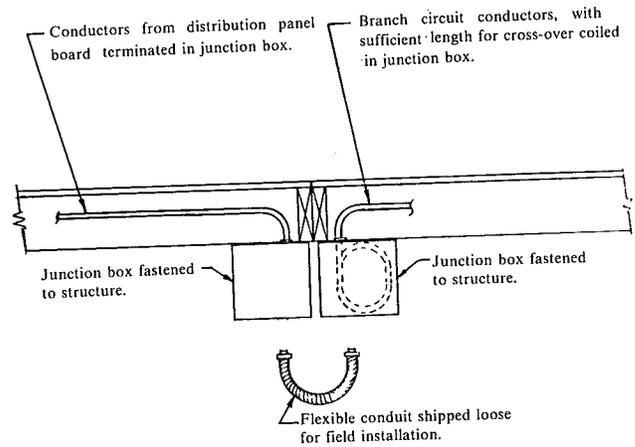
Figure 25

Electrical Cross-Over Provisions

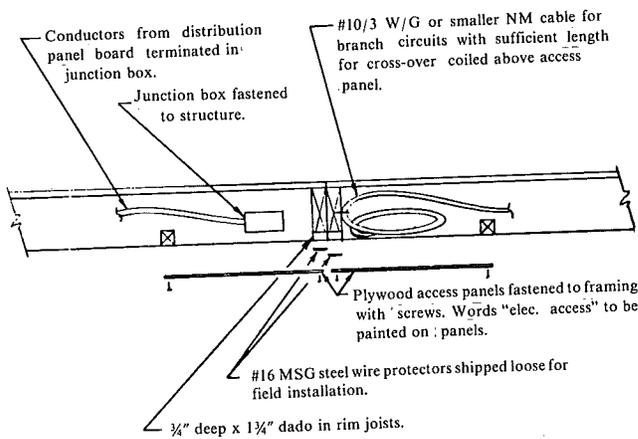
1. Approved junction boxes shall be sized in accordance with N.E.C. article 370-6 or 370-18 as appropriate.
2. Approved flexible conduit shall be sized in accordance with N.E.C. chapter 9 table 3 and shall be equipped with appropriate adapters, locknuts and bushings.
3. Conductors from the distribution panel board shall be terminated in a junction box with approved connectors or terminals.



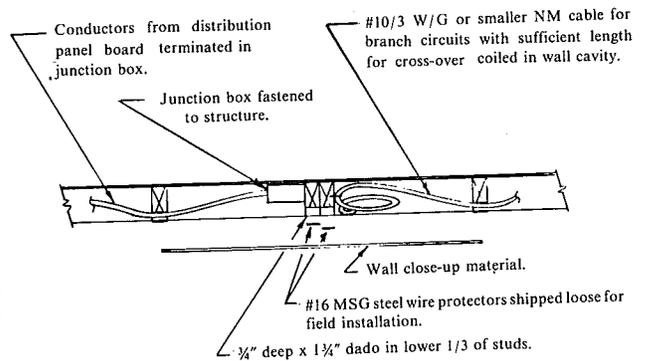
IN FLOOR-ALTERNATE A



IN FLOOR-ALTERNATE B



IN FLOOR-ALTERNATE C



IN WALL

The electrical supply connection to the mobile home may be made by any of the following methods, depending on the mobile home construction and the electrical service:

1. **Listed 50 amp mobile home power supply feeder cord**

If a permanent connected 50 amp feeder cord is provided, it will be secured under the floor of the home below the distribution panel. After recommended tests have been completed, it can be plugged into a 50 amp service receptacle.

2. **Home with under chassis feeder**

A raceway is provided from the distribution panel and is routed to the underside of the home. A junction box or approved fitting must be used to connect the mobile home feeder raceway to the supply raceway beneath the home. The proper feeder conductor sizes and required junction box sizes are given in the table V, Page 36.

3. **Home with overhead feeder**

An overhead entrance with feeder conductors installed through a mast weatherhead assembly. The routing, connection and support of the service drop is to be in accordance with local codes.

Test Procedure for Electrical System

The electrical system should be tested to make certain that there is no reversed polarity, open grounds or shorts in the system. Such tests should be performed after the sectional home has been completely set up and assembled, all metal structural and trim pieces have been installed, and the electrical crossover connections have been made.

1. All exposed noncurrent-carrying metal parts that may become energized shall be effectively bonded. A test to confirm this bonding should be made before the home is connected to 115/230 VAC service.
2. Perform the following checks for proper bonding or continuity using an Ideal No. 61-030 Continuity Tester or equivalent. (This tester is a small pen flashlight using two "AA" batteries and utilizing a long wire lead with an alligator clamp.)
 - a. Using the flashlight continuity tester, connect the alligator clip to a positive ground (metal skin, window frames on metal exterior units, floor duct riser, or a metal screw head on a receptacle or

switch plate) and touch the body of the flashlight to each fixture canopy. The continuity light should light if each fixture is properly grounded.

- b. Using the continuity tester, check all appliances and vent fans. By touching the metal body of the flashlight to the appliance or fan and having the alligator clamp connected to a convenient ground, the light should come on if the appliance or fan is properly grounded.
- c. Using the same procedure, check the bonding between the following:
 - (1) Metal register boot and convenient ground.
 - (2) Between the steel chassis and the metal roof.
 - (3) Between the steel chassis and the metal exterior skin.
 - (4) Between the steel chassis and metal gas piping.
 - (5) Between the steel chassis and water piping.

NOTE: Continuity to ground is not required on metal inlet of plastic water pipe systems.

- (6) Between the steel chassis and the metal EMT raceway below distribution panel.

NOTE: Bonding is not required on plumbing fixtures such as tubs, faucets, shower risers, and metal sinks when connected only to plastic water and drain piping.

- (7) Any indication of an inadequate bond between any of the items listed above will require investigation and correction.

3. After the home is connected to 115/230 VAC service, make the following checks:
 - a. Using a polarity checker, such as a Woodhead Model 1750 or equivalent, plug into each AC receptacle in the home noting an indication of reversed polarity, open grounds or shorts.
 - b. Any reverse polarity, open grounds, or shorts which are located must be investigated and repaired. Using a ground fault tester, check each ground fault breaker for proper operation.
 - c. Any ground fault breaker which does not operate properly should be replaced.
 - d. Install light bulbs and/or fluorescent tubes in all fixtures and check for proper operation by turning on the appropriate switches.
 - e. Repair or replace any defective light switches or fixtures.

Electrical Feeder and Equipment

Electrical entry equipment on home is either overhead or bottom feeder assembly.

Overhead feeder assemblies are prewired and ready to connect to the main power supply. The bottom feeder assembly must have a junction box (sized in accordance with the chart) or suitable fitting attached to the raceway (conduit). The proper sized conductors must be installed from the main power supply to the panelboard. (See feeder conductor table for wire size and type.)

It is the homeowner's responsibility to provide this supply connection.

Redman Homes recommends that all electrical work performed on the finished home be accomplished by a qualified, licensed electrician and in conformance with applicable codes.

After the connection has been made, the following tests must be conducted:

1. Polarity test
2. Continuity test of grounding system.
3. Continuity test of circuit conductors.

(Refer to Page 35 for testing procedure.)

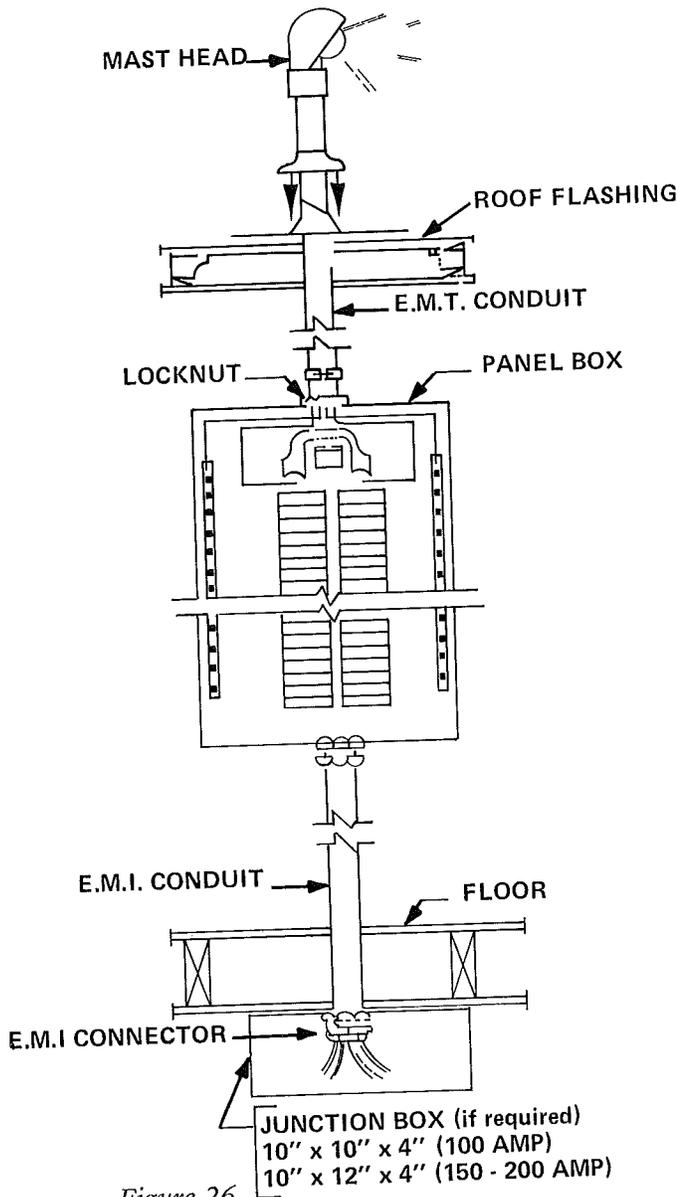


Figure 26

Table V
ELECTRICAL FEEDER AND EQUIPMENT SIZES

Feeder Size (See Main Breaker and label on dis- tribution panel) (AMPS)	Minimum Sizes		Feeder Conductor Sizes Copper Conductors		
	Junction Box (In.)	Conduit (In.)	Red & Black (Power)	White (Neutral)	Green (Grounding)
50		1	No. 6 THW (Cu)	No. 6 THW (Cu)	No. 10 THW (Cu)
100	10 x 10 x 4	1½	No. 3 THW (Cu)	No. 6 THW (Cu)	No. 8 THW (Cu)
150	10 x 12 x 4	1½	No. 1/0THW (Cu)	No. 1 THW (Cu)	No. 6 THW (Cu)
200	10 x 12 x 4	2"	No. 3/0THW (Cu)	No. 1 THW (Cu)	No. 4 THW (Cu)

NOTE: Based on 75^o Cu Wire

Conductor sizes are in accordance with the 1975 National Electric Code, Table 310-16. They do not take into consideration voltage drop.

Water System

The hot and cold water system of your Redman home is designed for a maximum inlet pressure of 80 psi. **IF YOU ARE LOCATED IN A GEOGRAPHICAL AREA WHERE LOCAL WATER PRESSURE EXCEEDS 80 PSI, A PRESSURE REDUCING VALVE MUST BE INSTALLED TO LIMIT THE PRESSURE ON THE SYSTEM.** The water system can be connected to any water supply through a $\frac{3}{4}$ " pipe inlet located below the home and usually under the water heater compartment. A tag on the side of the home indicates this water inlet. A shut-off valve must also be installed between the water supply and the inlet when it is connected. The valve can have either threaded or soldered joints, but must be a full port gate valve or a full port ball valve.

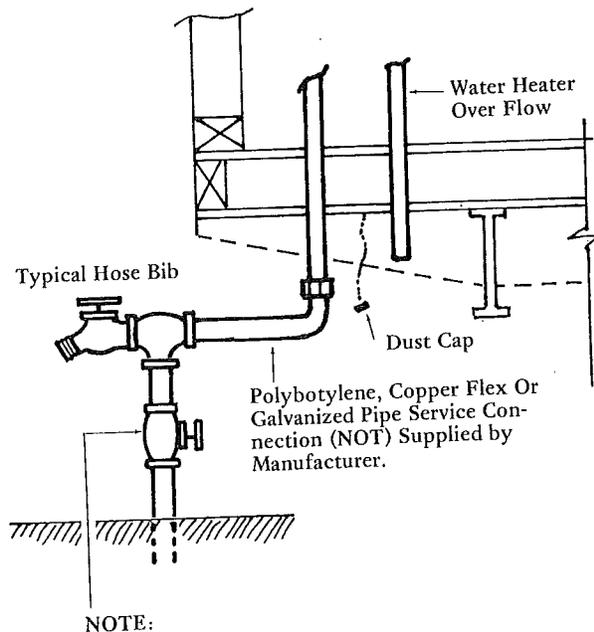


Figure 27

Testing Water System

Testing of the water distribution system can be performed by subjecting this system to a hydrostatic pressure of 80 psi for fifteen minutes without loss of pressure. **CAUTION: IF AIR ONLY IS TO BE USED IN TESTING THE WATER SUPPLY SYSTEM, THE WATER HEATER SHOULD BE ISOLATED FROM THE TEST.** This can be done by disconnecting the hot and cold water lines on the water heater and then joining them together with a flex line. The piping can then be subjected to an air test of 100 psi for a period of fifteen minutes. If the water heater is to be left connected to the system while conducting an air test, the pressure should never exceed 40 psi. Even though water heaters have a working pressure from 125 to 150 psi, it is a hydrostatic or water pressure measurement. Subjecting a water tank to air pressure alone (if it exceeds 40 psi) will create a possibility of damaging the tank or having the tank actually explode. **THEREFORE, NEVER APPLY AIR PRESSURE TO THE WATER SYSTEM UNLESS THE HOT WATER TANK IS ISOLATED FROM THE SYSTEM OR IS FULL OF WATER.** Water crossovers are located along the center line of sectional homes and are connected by approved-type flex connectors or polybutylene pipe. After the hot and cold water lines have been connected and after proper tests have been performed, the crossover is insulated and protected with an enclosure. An illustration of this procedure can be found in Figure 28.

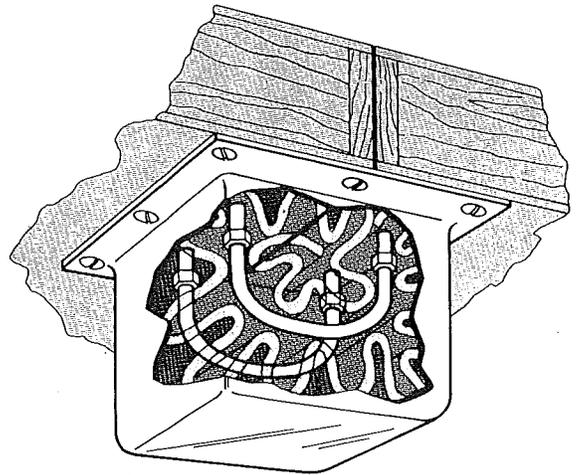


Figure 28

Protection with Heat Tape

When a home is situated in a geographical location that might experience sub-freezing temperatures, all exposed water piping should be protected by installing electric tape on the pipes. This heat tape must be approved for mobile home use by a nationally recognized testing agency. Two types of heat tapes are available and should be installed in the following manner:

1. Automatic heat tape (with thermostat).
 - a. This tape is approved for installation on *all types* of pipe, including plastic pipe.
 - b. If tape is installed in climates where temperatures *do not exceed* -5° Fahrenheit, the tape can be applied in a straight line down the pipe. It should then be taped in place with heat duct tape which can be obtained locally. An alternate method is the use of heat transfer adhesive, and the tape is cemented to the pipe. This adhesive will be specified by the manufacturer of the tape.
 - c. In areas of colder climates, it is recommended that the pipe be wrapped with the heat tape. A specified number of turns per linear foot will be specified in instructions.
 - d. After the heat tape has been permanently affixed to the pipe, it should then be wrapped with a fiberglass insulation with a minimum "R" factor of 4. The fiberglass insulation is then wrapped with a weatherproof vinyl. This can be secured with duct tape to complete the installation.
2. Non-automatic heat tape (without thermostat.)
 - a. This tape *is not* approved for plastic pipe, unless tape is left exposed. (No outer wrap of insulation.)
 - b. The installation of the heat tape is the same as for the automatic tape. It can be wrapped with outer insulation if it is on iron or copper pipe. However, this will shorten the life of the tape due to the continuous existence of heat.

There are currently three heat tapes approved for mobile home use, and following is some data supplied by the manufacturers:

1. Safety Heat Cable by Smith Gates Corp. AMUL (Automatic)
MUL (Non-Automatic)
2. E-Z Heat Wire Craft MT (Automatic)
MN (Non-Automatic)
3. Wrap-On Tape (No Model Data)

Technical Information

Heat tapes draw 6-7 watts per linear foot of length at 120 volts. Tapes can be secured to pipes with duct tape or heat transfer adhesive. Tape must be connected to power source with 3-wire grounded cord set. Tapes come in increments of 6' up to 30', then 10' or 20' increments to 100'. Amount of tape to be used is as follows:

- No wind—No insulation conditions
- 1/2" pipe -15° F run straight on pipe
 -24° F 3 turns per foot
 -45° F 6 turns per foot
- 3/4" pipe -5° F run straight
 -16° F 3 turns per foot
 -40° F 6 turns per foot

Automatic tapes can be covered with insulation—can be used on plastic pipe. Non-automatic tapes—should not be covered with insulation, except on iron or copper pipe.

Material Needed

- 3-wire grounded cord set
- Quantity of R-4 fiberglass insulation
- Vinyl sheet for outer wrap
- Duct tape
- Knife

Instructions For Draining Water Lines

To insure that the water supply lines are completely drained it will be necessary to "blow out" the lines. The air pressure necessary can be delivered by a tire pump, vacuum cleaner, air compressor, etc.

An adapter to fit the center sets can be fabricated from a rubber cone with a tube connected to the end as in Figure 29. The procedure to blow out the lines is as follows:

1. Disconnect the water supply at the water supply inlet and let lines drain for several minutes.
2. Starting at the fixture, the greatest distance from the water supply inlet, slip the rubber cone and hose over the fixture as in Figure 30 and blow thru the hose by making an adapter for the pump, air compressor, air tank, etc.
3. Do this on all fixtures until no more water is discharged from the water supply inlet. At this point no more water remains in the lines and the water supply inlet should be capped.



Figure 29

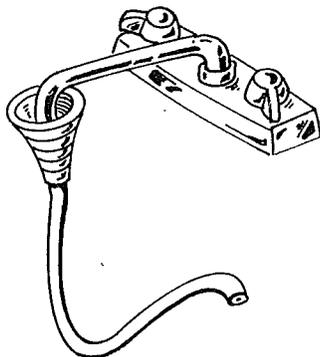


Figure 30

Waste Drainage System

Final drain connections are made at the 3" outlet located in the rear portion of the home. When connecting this drain outlet to the main sewer system, approved 3" connectors should be used at both ends. The drain lines installed on the home must have a slope of 1/4" per foot and be supported at intervals not exceeding 4'. See Figure 31.

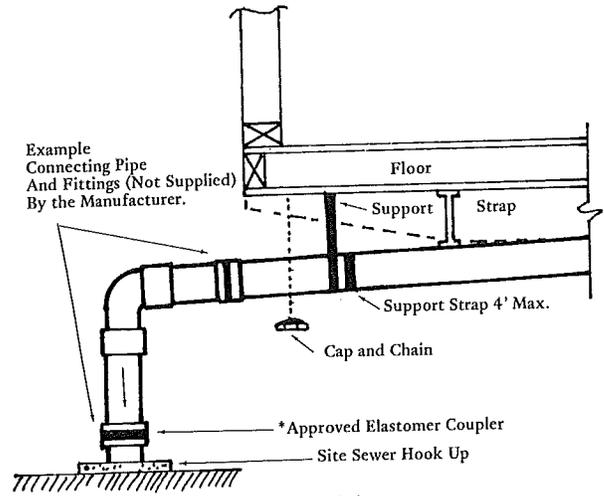


Figure 31

After the system has been connected, all the fixtures in the home should be filled with water and allowed to drain through the newly installed system. Check all joints for visible leaks.

Wherever it is necessary to install a drain line from one section to another, only approved couplers should be used to make the connection. This is illustrated in Figure 32.

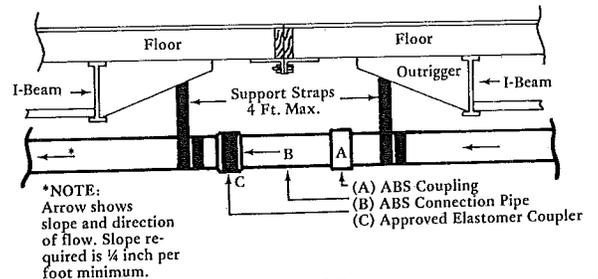
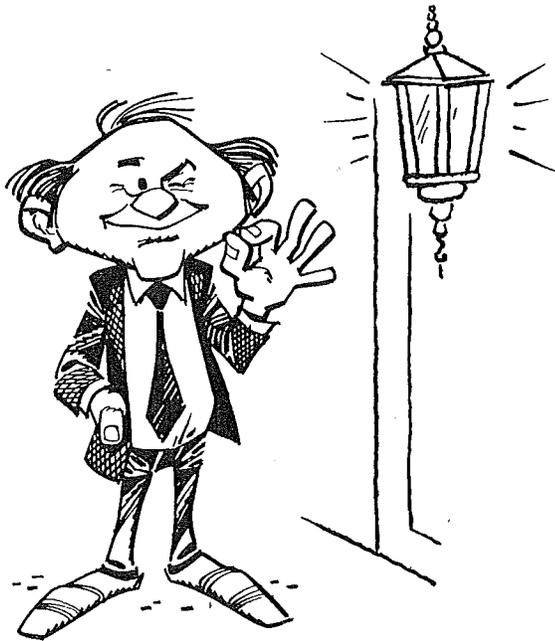


Figure 32

Your Notes



Section 5

Fixture & Appliance Installation

Optional Dryer Venting Installation

General Requirements

A gas or electric clothes dryer installed in the home must be exhausted on the outside by a moisture lint exhaust duct and termination fittings. Ducts shall not terminate beneath the home.

A moisture lint exhaust system will be roughed in by the manufacturer if dryer or receptical for dryer is furnished by the manufacturer. This will be noted on the data plate.

Installation

1. An access panel is located in the dryer area to provide access to the dryer end of duct system.
2. Access to rough in from outside may be located on the bottom side of the floor or on an exterior wall.
3. The exhaust system shall be completed on site as shown with materials provided by the owner. See Figure 33 and 34.

Exhaust duct and termination fittings must be listed by an approved testing agency or certified as components of the dryer.

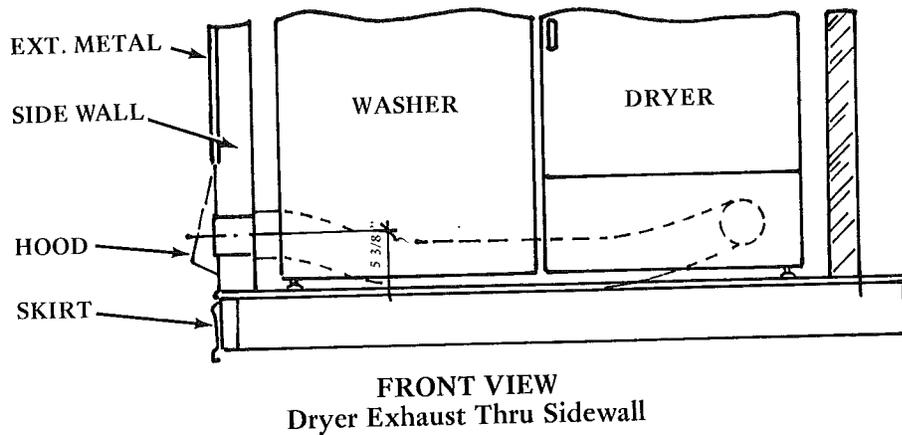


Figure 33

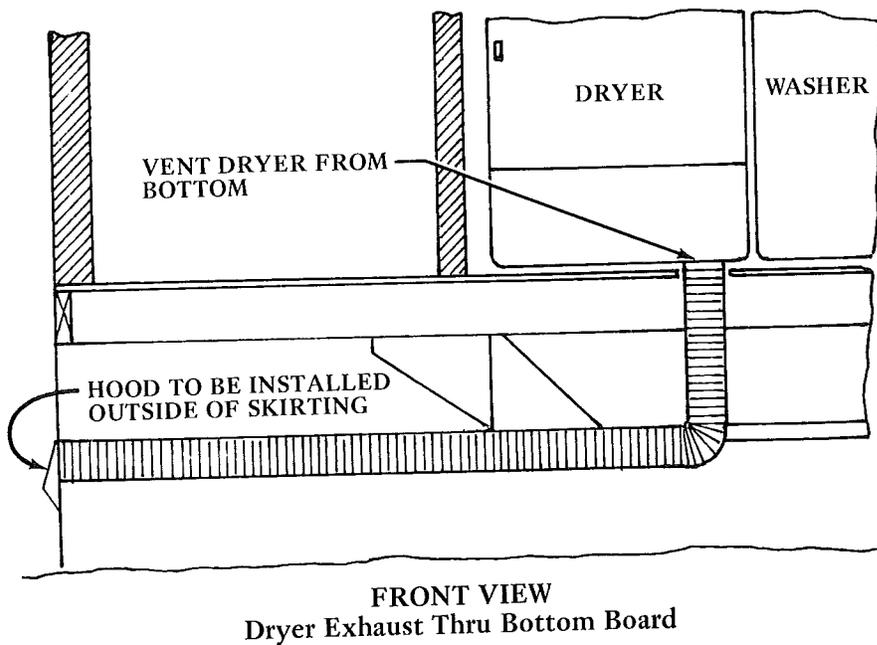


Figure 34

Air Conditioning

NOTE: Electrical connections made to energize air conditioning equipment should be made only by qualified personnel. The completed installation must conform to Article 440 of the National Electric Code and applicable local codes.

Branch circuits installed at the factory for the purpose of energizing air conditioning equipment, will have a junction box located on the bottom side of the home. A data plate will be placed on the side of the home adjacent to this box, outlining the maximum full load ampere draw for the indicated branch circuit. In installing air conditioning equipment, it must not exceed the indicated circuit rating.

“A” coil air conditioning units installed must be listed for use with the furnace in this home, and the instructions shipped with the air conditioner should be closely followed in making the installation.

If a self-contained air conditioner is to be installed and connected to the heating supply ducting, the installation must include a listed damper beneath the furnace to prevent cool air from “backing up” into the fur-

nace during the cooling mode and a listed damper at the air conditioner supply to prevent heated air from “backing up” into the air conditioner during the heating mode.

When the electrical connection is made via a junction box beneath the home, the field installation wiring beyond the junction box must incorporate a fuse disconnect (size in accordance with NEC Article 440) located within sight of the condensing unit. The maximum fuse size to be used with the fuse disconnect is marked on the condenser data plate.

The acceptability of the air conditioning equipment, rating the location of the disconnect, fused type branch circuit protection, and connections to the equipment are to be determined by the local inspection authorities.

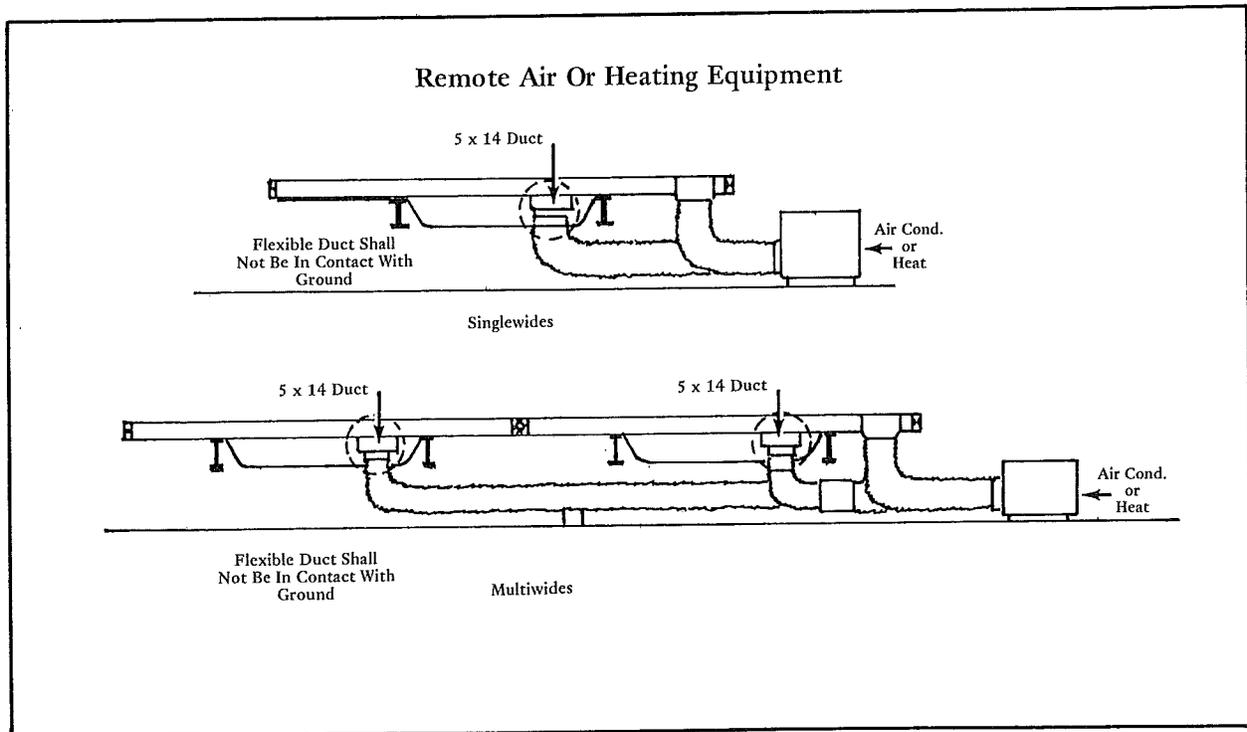


Figure 35

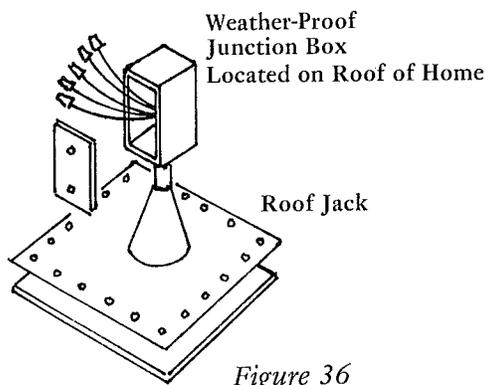
Electrical Connection of Evaporative Cooler

NOTE: The electrical connection should be made only by qualified personnel.

On Models equipped for installation of optional evaporative cooler, install the roof mounted cooler according to the instructions with the cooler.

Remove the cover from roof mounted junction box and make the connection of the color coded wires using the provided wire nuts. See Figure 36.

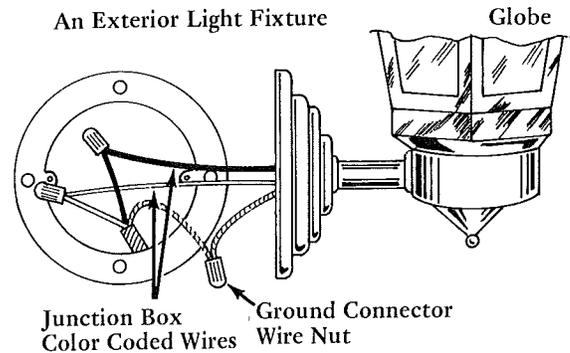
NOTE: Coolers rated at 16 Amps to be installed on 20 Amp circuit. Coolers rated at 12 Amps to be installed on 15 Amp circuit.



Exterior Light Connection

Remove Junction Box cover. Make wire to wire connections using wire nuts appropriately sized for connection.

Secure light fixture to Junction Box. Furnish bulb and attach globe.





Section 6

Final

Inspection

Final Inspection

General

After your Redman home has been completely set up, a final inspection should be made to insure that no items have been overlooked which could cause a service problem. Special emphasis should be placed on the following items:

Exterior Siding & Trim

A thorough check should be made of all portions of the exterior siding to make certain that it is not cracked or split, buckled, or loose in any manner. Any siding observed to be in this condition should be repaired or replaced.

All fasteners that are loose should be re-tightened or replaced.

All decorative trim pieces or moulding strips—including J-rail or moulding along the edge of the roof—should have special attention to make certain there are no gaps or voids in the sealant tapes or caulking material. If any such places are observed, they should be resealed.

Roofs

The roofs should be checked to make certain that all stack head or vent pipe flashings are in place, properly attached, and properly sealed.

If your home has a metal roof installed, it should be carefully observed for any signs of cracks or holes.

All of the splice strips across the metal roof should be sealed with a caulking material at the roof edge, and any seam that has been cut through to install a stack head or a vent pipe flashing should be sealed the entire width of the roof.

In the event your home has a composition roof, the shingles should be checked for proper attachment, making certain that none are loose or have been displaced during transit.

NOTE: On metal roof applications, the roofs do not have a solid sub roof material. If it is necessary to walk on the roof for repairs or inspections, plywood sheets or

boards should be used to equally distribute your weight over rafters. If required to step directly on the metal roof, care should be taken to avoid placing your weight directly between rafters. You should always attempt to step directly on top of a rafter. If this is not done, the seams on the metal roof could be damaged.

Clearances

If there are any low-hanging trees or bushes adjacent to your home which could damage the exterior or the roof, they should be trimmed or cut accordingly. Future growth of these bushes or trees should be considered in connection with their possible movement during wind conditions or under snow or ice loads.

Caulking and/or Sealers

There are many good brands of caulking material and roof sealers which can be purchased from local retail stores. Whatever brand of caulking and/or sealer is purchased, the instructions regarding application should be read closely. This will include any special preparation of the surface to be coated. Observe the labeling on this material for any notes concerning resistance to running or streaking the sides of the home. This can be very unsightly and in many cases extremely difficult to remove.

Special detergents or etching agents may be required in some cases to clean the metal surfaces on which caulking or sealers are to be applied. Again, the manufacturer's instructions should be followed to the detail to prevent damaging roof and side metals.

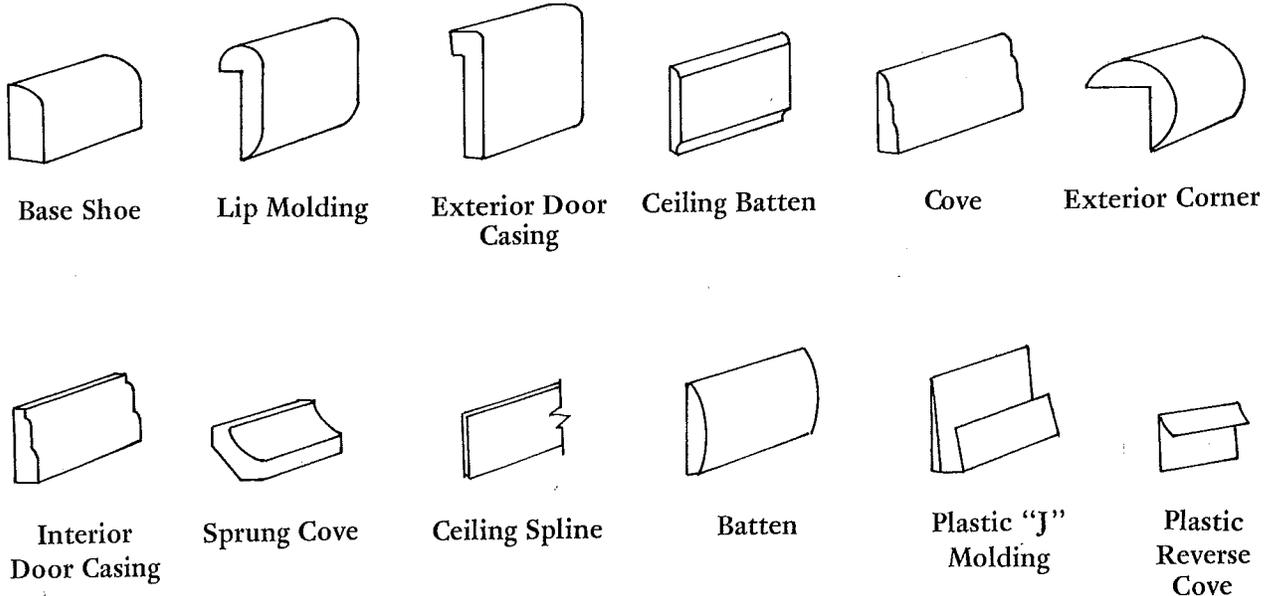
Suggested Minimum Set-Up Tools

Power screw gun for standard
 ¼" Hex attachments
 No. 2 Phillips bits, and ¼" socket bits.
 No. 3 Phillips bits, and ¼" socket bits
 2-12 ton Hydraulic Jacks
 16 oz. Claw Hammer
 Drill Motor w/3/16", ¼", 3/8", ½"
 drill bits.
 24" nail bar or carpenter (pry) bar.
 Molding Saw (Dovetail)
 Mitre Box
 16' Step Ladder
 8" Pliers
 20" Hand Saw 10 tooth.
 4" Awl
 10" Crescent Wrench
 2-Sheetmetal Snips (L.H. & R.H.)
 Foundation Supports (Piers)
 50' Garden Hose (for water check)
 2-Jacking Reinforcing Plates
 3" Brush (to apply roof coat)
 100' HD Extension Cord No. 12 wire
 w/Ground
 6' Carpenter Level
 3/32" nail set

8" Standard Blade Screwdriver
 8" Phillips Screwdriver
 16' Steel Measuring Tape
 Hand Winch (Come-Along)
 Straight Edge (carpet cutting)
 Carpet Stretcher
 Carpet-Heat Bond Seaming Tool
 (Roberts or equiv.)
 Carpet Heat Bond Tape
 Utility Knife (carpet cutting)
 Putty Stick Touch-up Kit
 Electrical—High Potential Tester
 0 to 1100 volts AC (an example
 is Slaughter, A106/064-2.5 or
 equivalent)
 Continuity and polarity Tester—
 Circuit and receptacle.
 Gas System—Leak Tester (air pump)
 0 to 10 ounce with ¾
 and 1 inch female fittings.
 Water System—Leak Tester (air pressure)
 0 to 100 psi, w/¾" fittings.
 G.F.I. Tester

Typical Interior Finish Materials

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



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