



MANUFACTURED HOME SETUP STANDARDS

COR 21.02.040 PERMITS:

No building or structure regulated by this code shall be erected, constructed, enlarged, altered, repaired, moved, improved, removed, converted or demolished unless a separate permit for each building, structure, fences over six (6) feet high, swimming pool, prefabricated, spa or hot tub has first been obtained from the building official.

WASHINGTON STATE STANDARDS FOR FAS INSTALLATION:

WAC 296-150B-230 Foundation System Footings

1. Footings shall be constructed of:
 - a. Solid concrete or an approved alternate that is at least 3 1/2 inches by 16 inches square; or
 - b. Two 8-inch by 10-inch by 4-inch solid concrete blocks that are laid with their joint parallel to the mainframe longitudinal member.
2. Footings shall be:
 - a. Evenly bedded and leveled;
 - b. Placed on firm, undisturbed, or compacted soil that is free of organic material;
 - c. Centered in a line directly under the main frame longitudinal members on both sides of a FAS;

and

 - d. Spaced not more than 8 feet apart and not more than 2 feet from the ends of the main frame. A closer spacing may be required, depending on the load-bearing capacity of the soil.
3. Tie-downs for all new FASs shall be constructed as per manufacturer's specifications or per the design of a WA State registered engineer or architect. Tie-downs for all relocated FASs shall be constructed as per manufacturer's specifications. If the manufacturer's installation instructions are not available, you may use ANSI A225.1 (enclosed) or the instructions of a WA State registered engineer or architect.
4. A FAS with more than one section shall have centerline blocking at end walls and at other point of connection of the sections of the FAS that are a ridge beam bearing support. Blocking is also required at both ends of a door opening that is 6 ft. or more wide in an exterior wall.
5. The load-bearing capacity of a load-bearing support or footing may be not less than the actual live and dead loads combined or 80 psf; whichever is greater, unless a soil analysis justifies a lesser load-bearing capacity. Fill shall be compacted to a minimum of 1500 psf.
6. If a FAS requires footings on its exterior perimeter, the footings shall be installed below the frost line. Footings for the mainframe longitudinal members shall be recessed only if frost heave is likely to occur.
7. Footings shall be constructed so that there is at least 18 inches clearance between the bottom of the main chassis members and the ground level.

WAC 296-150B-235 Foundation System Piers:

An installer shall build and position piers and load-bearing supports or devices to distribute their required loads evenly. An installer may use manufactured piers or load-bearing supports or devices that are listed or approved for the intended use, or may build piers that comply with the following requirements. All blocks shall be concrete blocks.

1. A pier may be made of a single stack of 8-inch by 8-inch by 16-inch blocks if the blocks are not stacked more than three blocks high. A pier made of a single stack of blocks shall be installed at a right angle to the mainframe longitudinal member and shall be capped with a 2-inch by 8-inch by 16-inch wood or concrete block.
2. A pier may be made of a double stack of 8-inch by 16-inch blocks are not stacked more than 5 blocks high. Each row of blocks in such a pier shall be stacked at right angles to the abutting rows of blocks. A wood block shall be of hem-fir, douglas fir, or spruce pine fir. The pier shall be capped with two 2-inch by 8-inch by 16-inch wood or concrete blocks. The pier shall be installed so that the joint between the cap blocks is at right angles to the mainframe longitudinal member.
3. A pier may be made with more than five rows of blocks if the stacked blocks are filled with 2000 psi concrete or mortar. A licensed architect or professional engineer shall approve a foundation system that includes a pier that is higher than 72 inches (9 blocks) high, or in which more than 20 percent of the piers exceed 40 inches (5 blocks) high.
4. All blocks shall be set with the cores placed vertically.

WAC 296-150B-240 Foundation System Plates and Shims:

1. An installer may fill a gap between the top of a pier and the main frame with a wood plate that is not more than 2 inches thick and two opposing wedge-shaped shims that are not more than 2 inches thick.
2. Wood plates and shims shall be of hem-fir, douglas fir, or spruce pine fir. A shim shall be at least 4 inches wide and 6 inches long.
3. The installer shall fit the shim properly and drive it tight between the wood plate or pier and the main frame to ensure that the FAS is level and properly supported at all load-bearing points. A block that abuts a wedge-shaped shim shall be solid.

WAC 296-150B-255 Assembly:

1. Sections of a multiple section FAS shall be aligned, closed, and securely fastened at the required points along the ridge beam, endwalls, and floor line. Heat ducts, electrical connections, and other fixtures and connections required between sections of a FAS shall be properly installed. The floor of the FAS shall be level with the tolerances given in the following table.

**Tolerances may not exceed the following amounts (L equals the clear span between supports, twice the length of a cantilever):

Floor	L/240
Roof and Ceiling	L/180
Headers, Beams, Girders (Vertical Load)	L/180
Walls and Partitions	L/180

2. The installer shall provide adequate clearance to ensure that the cross-over heat duct does not touch the ground and is not compressed. The installer shall insulate the cross-over duct at the intersection. The installer shall insulate and seal areas of potential water leaks with metal flashing of trim, if required, and with putty tape or other approved caulking to ensure the FAS is water tight.

3. The water pipe connection to the FAS shall have a main shut off valve in compliance with 24 CFR 3280.609 (b) adopted as of April 1, 1982. In all other respects, utility connections to the FAS, including water, sewer, electricity, and gas, shall comply with local codes. Accessory structures attached to or located next to a home, such as awnings, carports, garages, porches, or steps, shall be constructed in conformance with local codes.

WAC 296-150B-245 Foundation Facia:

1. A FAS shall have an approved foundation facia around its entire perimeter. The wood of the facia shall be at least three inches from the ground unless it is pressure-treated wood. Metal fasteners shall be galvanized, stainless steel, or other corrosion-resistance material. Ferrous metal members in contact with the earth, other than those that are galvanized or stainless steel, shall be coated with an asphaltic emulsion.
2. The skirting of a FAS shall be ventilated by an approved mechanical means, or by openings in exterior facia or foundation walls. Such openings shall have a net area of not less than one square foot for each one hundred fifty square feet of under floor area. Openings shall be located as close to corners as practical and shall provide cross ventilation. The required area of such openings shall be approximately equally distributed along the length of at least two opposite sides. They shall be covered with corrosion-resistant wire mesh with openings of one-quarter inch in dimension.
3. Dryer vents and hot water tanks pressure relief valves shall exhaust on the exterior of the foundation facia and point downward. The facia for each section of a FAS shall have an opening of at least eighteen inches by twenty-four inches, with a cover of metal or pressure treated wood, to allow access to the crawl space. The foundation facia shall be installed within thirty days after the FAS is occupied. (Statutory Authority: RCW 43.22.340 through 43.22.445.) 88-16-010 (Order 88-19), Section 296-150B-245, filed 9/9/88. Statutory Authority: RCW 43.22.350 and 43.22.440. 83-01-018 (Order 82.37), Section 296-150B-245, filed 12/6/82. Statutory Authority RCW 43.22.440. 82-09-059, Section (Order 82-12), 296-150B-245, filed 4/19/82.

NCBSCS/ANSI A225.1

Table 5-1 Normal Home Installations: Types of Foundation Systems – Main Components

Piers-Ground anchors:

The manufactured home rests on piers of concrete block; formed in place concrete; permanent wood; or steel pedestals on permanent wood, crushed stone, or concrete footers. The ground anchors in the soil are angled to the resist straps or embedded in dead-men in the soil. Straps are tied to the frame, with or without over-the-top straps.

Concrete slab or continuous footings:

The manufactured home rests on a concrete slab or ribbons of concrete. The straps are tied between the frame and the perimeter footers or concrete slab.

Pile/post system:

The manufactured home rests on piles or posts placed sufficiently deep in the ground to resist all wind, snow and earthquake forces. Straps fasten to home to the piles or posts or to caps places thereon.

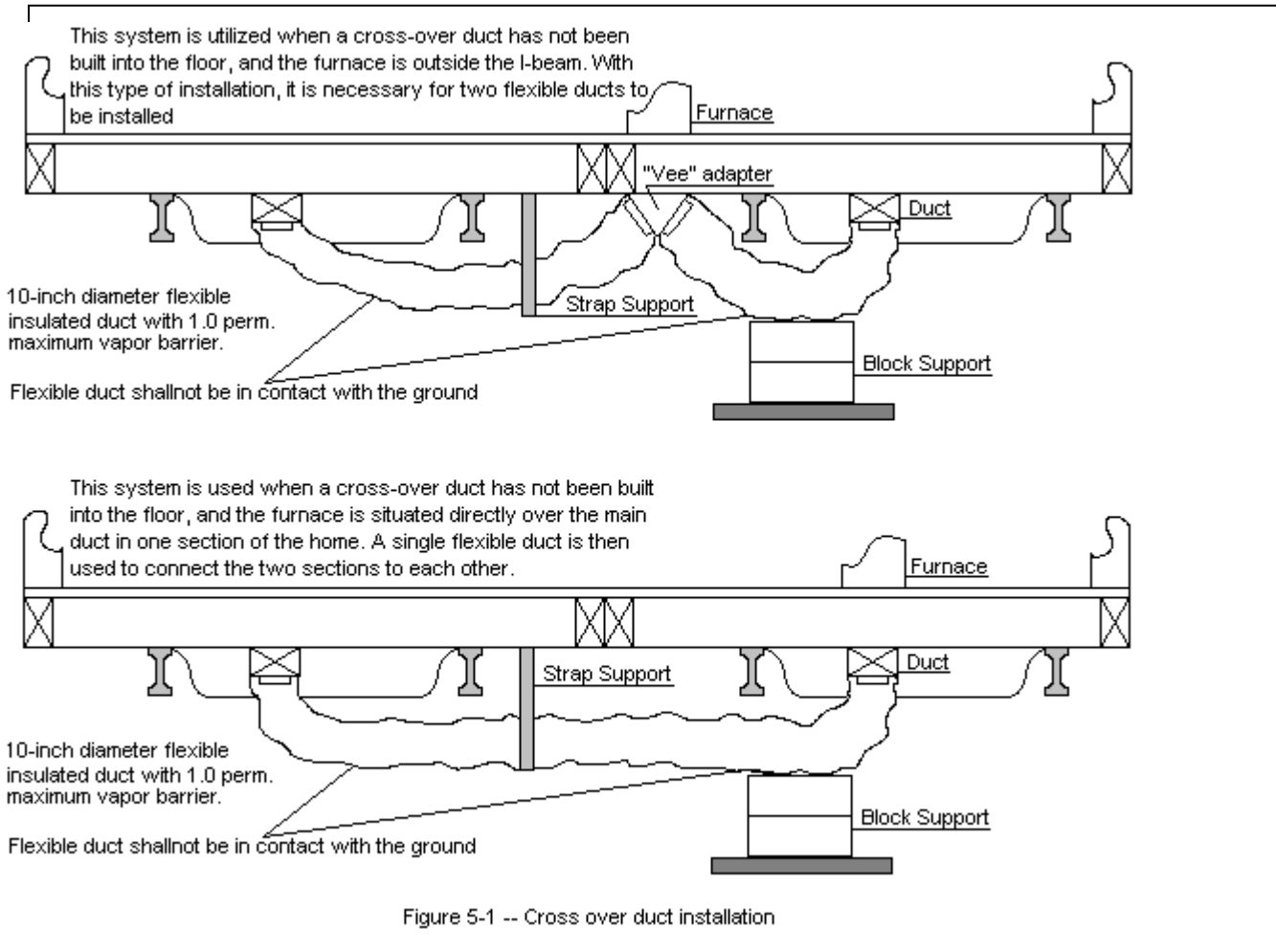
Concrete, concrete block, or wood-foundation, load-bearing, perimeter walls:

The manufactured home rests on exterior load-bearing walls that sit on concrete or gravel footings. Straps fasten the home to the walls to resist all external forces.

5.4 Cross-over connections for multi-section manufactured homes

5.4.1 Utility cross-overs: Connect water, drainage, gas, electricity, and telephone utility cross-overs.

5.4.2 Duct –work cross-overs: Clap the flexible air conditioning or heating ducts or both to the sleeves projection through the bottom covering, seal the ducts' adjustable collars with several wrappings of duct tape, and suspend/support them above the ground. (See figure 5-1)



5.5 Anchoring instructions

After blocking and leveling, the installer should secure the manufactured home against the wind, unless the jurisdiction permits otherwise. The type of installation is the determining factor in deciding how this should be done, as is described in the following sections.

5.5.1 Normal installations: The pier and ground anchor system, as provided in this standard, is most common. When using another type of installation, consult a registered engineer. NOTE- The anchoring or foundation system shall be capable of meeting the loads required by the MHCSS.

5.5.1.1 Number and location of anchors: Select the number and location of straps and anchors from the chart and diagram in figure 5-2. Use either the single- or the double-strap method. Use only approved ground anchors capable of resisting at least the minimum loads given in the chart for the method selected.

5.5.1.2 Installation of anchors: The following is one example: install the anchors at the locations selected from figure 5-2 when the home manufacturer's installation instructions are not available. Follow the anchor manufacturer's instructions. Use single-headed anchors at all "frame-tie-only"

locations when using the single-strap method, and double-headed anchors when employing the double-strap method. Install single- or double-headed anchors at all over-the-roof-tie locations. When using a single strap, line up the shaft of each anchor with its strap (figure 5-3). When connecting more than one strap to a single anchor, line the shaft of the anchor with the results achieved by calculating the combined forces (figure 5-4). The ground anchors must be sized for the direction of the load and the type of soil. (See figures 5-3 and 5-4 for additional information on the installation of anchors and tiedowns.)

Strap Method	Anchor Min. Ultimate Load Capacity	Maximum Anchor Spacing		
		Zone I	Zone II ³	Zone III ³
Single Strap	4725 lbs.	11'-0"	6'-0"	4'-6"
Double Strap	4725 lbs. ¹	11'-0" ²	6'-0" ²	4'-6" ²

Note - -

- 1 Unless listed/labeled for a higher capacity by the anchor manufacturer.
- 2 Unless a greater spacing is specified by the anchor manufacturer.
- 3 All homes located in Wind Zones II and III shall have a vertical tie installed at each diagonal tie location.

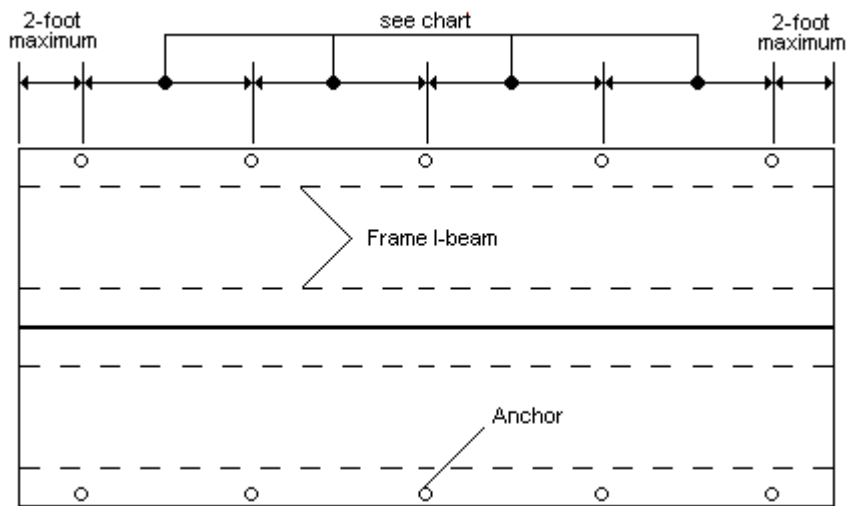


Figure 5-2 -- Number and location of straps and ground anchors

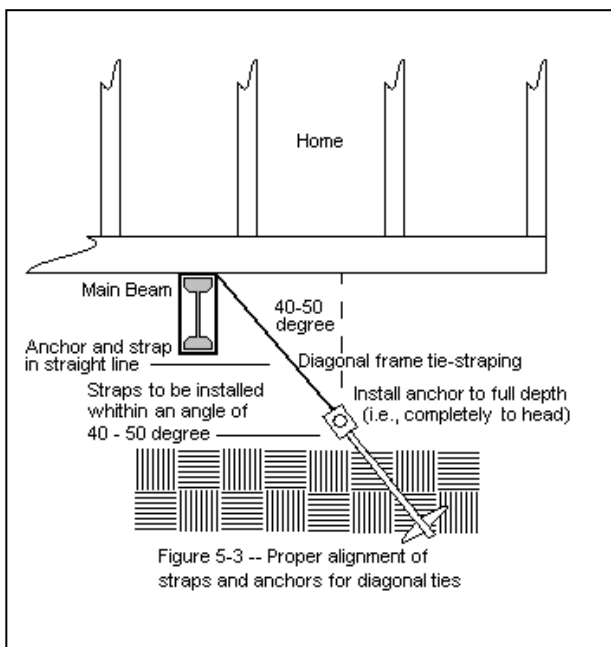


Figure 5-3 -- Proper alignment of straps and anchors for diagonal ties

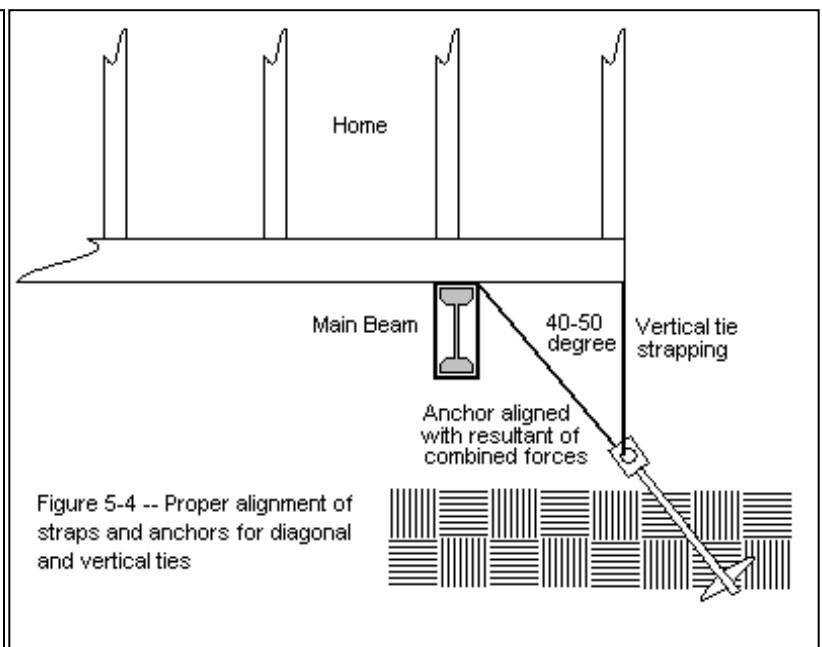


Figure 5-4 -- Proper alignment of straps and anchors for diagonal and vertical ties