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Mobile Home Construction Requirements

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Standards for Mobile Homes

Most states in the United States require that mobile homes be built to meet or exceed the American National Standards Institute (ANSI) standard A119.1 and the National Fire Protection Association's (NFPA) identical standard 501B. The standards cover four basic parts of the mobile home: construction of the body and frame, plumbing, heating, and electrical systems. The standards were established to provide minimum safety requirements for mobile homes. Many manufacturers exceed the standards in their product.

Besides supplying greater impetus to safety and performance, ANSI A119.1 benefits the home owner in the areas of insurance and financing. Both FHA and VA can guarantee a mortgage on a mobile home that has been constructed to A119.1 requirements. Look for the Mobile Homes Manufacturers Association (MHMA)-Trailer Coach Association (TCA) seal and your state seal indicating the manufacturer's adherence to A119.1 requirements.

Check with your local city or county planning office or Extension Service agent for additional information on state and local codes relative to mobile homes purchased within your state and those brought into the state from other areas for sale within your state.

Frame Construction

When considering a mobile home, visually inspect its structural frame by sighting down the underneath center beams to see if they are straight. In a long, unblocked mobile home there will be a slight downward curve behind the wheels which

indicates built-in flexibility. Also sight along the sides and roof of the unit looking for warp and uneven surfaces. Mobile home roofs, under A119.1 requirements, are designed for a live load of either 20 or 30 pounds per square foot. "Live load" includes wind and snow loads. (The so-called "dead load" is the weight of the home without the superimposed wind and snow loads.)

The United States is divided into three different weather zones in reference to mobile home roof live-load design requirements. The north zone in the western states includes northeastern parts of Washington and Idaho. In this zone, mobile home roofs must be designed for a 30-pound-per-square-foot live load. In the middle zone, which includes all of the rest of Washington and Idaho and all of Oregon, a roof must be designed to withstand a 20-pound-per-square-foot live load. However, if the home is to be located in the higher snowfall areas of the west (more than two feet of snowfall) or in the coastal region of Washington and Oregon where winds greater than 75 miles an hour may be expected, the buyer should request that the mobile home be designed for the hurricane zone (30-pound-per-square-foot roof live load and 20-pound-per-square-foot side loading in place of the standard 15 pounds requirement). In areas where more than three feet of snow is expected on the ground at any one time, consult with the local county building inspector for snow load requirements. High mountain areas may require a roof to withstand snow loads of 100 pounds or more. In these areas, a sturdy "A" frame structure may be necessary to cover the mobile home for protection from the heavy snow pack.

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Foundation and Anchor

It is recommended that facilities be available on the bottom framing of the mobile home to provide for fastening the structure to ground anchors or to concrete slabs. The anchor ties should have a holding capacity of 4,800 pounds each.

Because of the more efficient use of materials, mobile homes are about one-half as heavy as conventional construction. To replace this dead weight, it is absolutely essential that they be firmly anchored to the ground to keep them from rolling over and from sliding sideways. The buyer should secure from the manufacturer data on the location and required capacity of anchorage (stabilizing) devices. Washington's Rules and Regulations require that this data accompany all coaches sold in the state. ANSI provides for 3,000-pound capacity tiedowns spaced at 24 feet on centers, starting at the front of the coach with an anchor not more than six feet from the rear. Hurricane zone spacing is 12 feet in place of 24 feet.

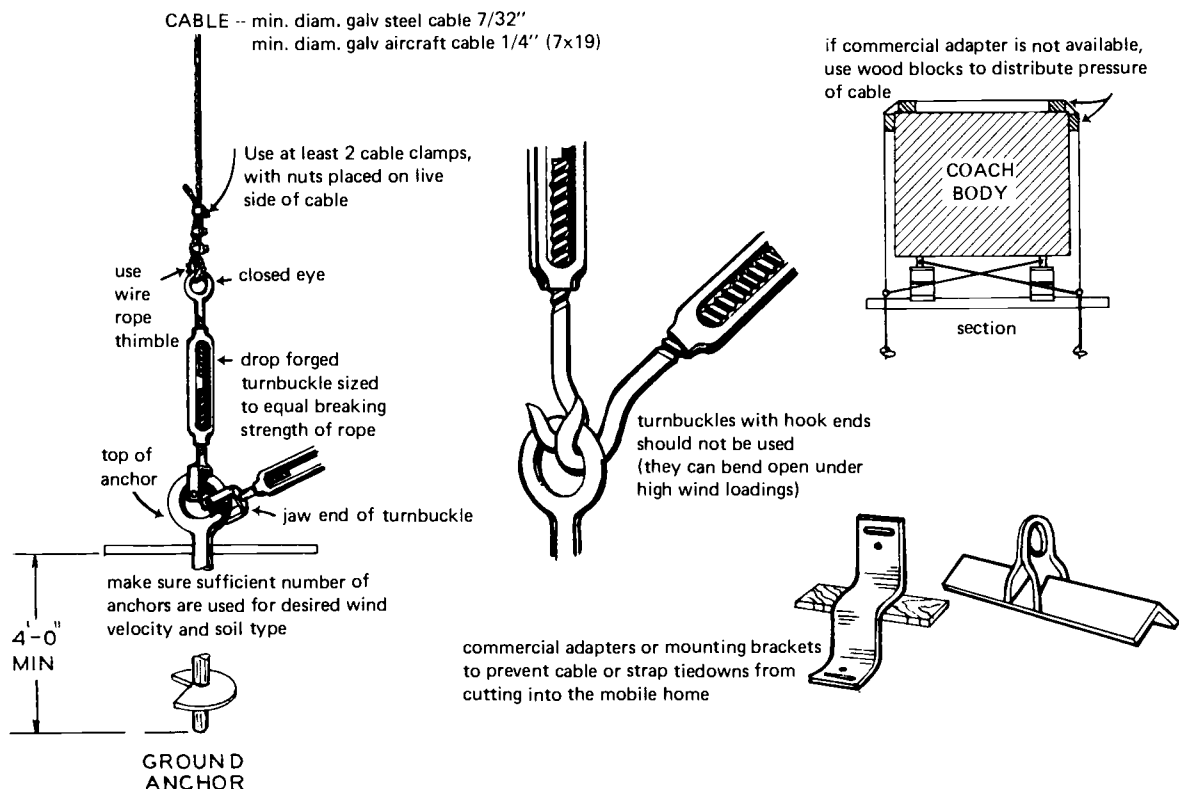
Additional information on anchors and tiedowns can be obtained from a mobile home manufacturer and the Civil Defense Preparedness Agency publication TR-75 entitled, "Protecting Mobile Homes from High Winds," available from

your local County Civil Defense Office or the U. S. Army Publications Center, Civil Defense Branch, 2800 Eastern Blvd. (Middle River), Baltimore, Maryland 21220.

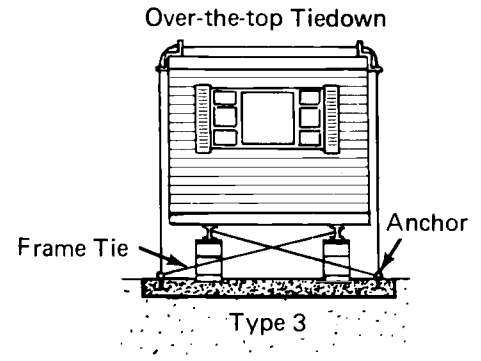
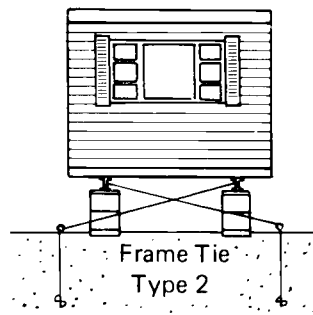
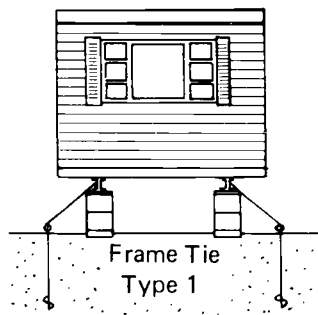
The concrete blocks used for supporting piers under the mobile home should be set on proper concrete pads or slabs. Without adequate support the concrete blocks will settle and thus permit the mobile home floor to slope and to develop structural stresses in the framing members. Recommendations for concrete slab and pier design should be supplied by the mobile home manufacturer. Some loaning agencies may also require a concrete foundation wall around the perimeter of the home in order to qualify for their loans. Check with your loan agency for specific requirements prior to placement of a mobile home.

If a concrete foundation wall is not required, the placement of a skirt around the home between the floor and the ground will reduce heat loss through the floor and improve the appearance of your home. But be certain to place the home on a well-drained site and place vinyl sheeting over the ground that is enclosed by the skirt or foundation wall. Otherwise, moisture escaping from the ground may cause mildew and dry rot problems in humid climates.

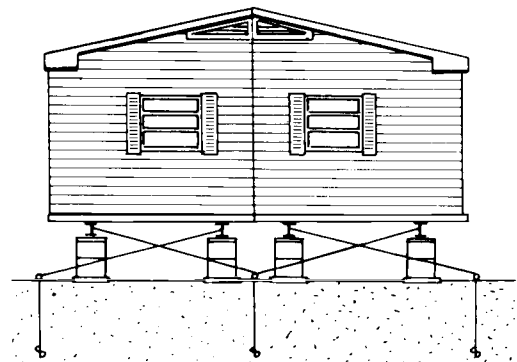
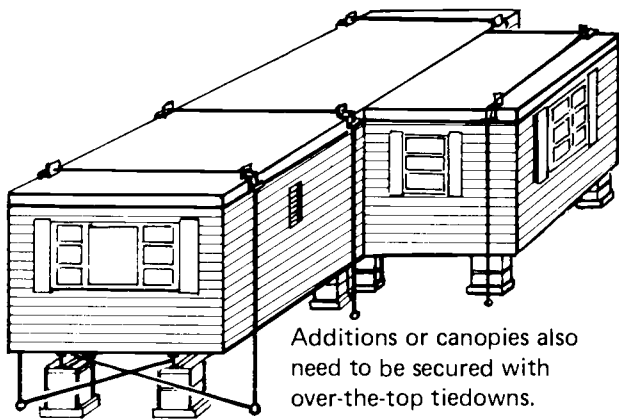
Anchors



Types of Tiedowns



These sketches illustrate various methods for connecting frame ties to the mobile home frame. Type 2 system can resist greater horizontal forces than Type 1. Type 3 system involves placement of mobile home on concrete slab. Anchors embedded in concrete slab are connected to ties.



Double wides do not require over-the-top tiedowns.

Insulation

The total calculated heat loss from the mobile home at the outdoor design temperature should not exceed 40 Btu/hr/ft² of the total floor area or 275 Btu/hr/lineal foot of the perimeter of the space to be heated to 70°F, whichever is greater. The minimum total resistance value (R), excluding framing, of the wall (less windows and doors), ceiling, and floor shall not be less than:

| | |
|---------------|------|
| Wall | 8.0 |
| Ceiling | 16.0 |
| Floor | 10.0 |

Table 1 shows the required thickness of fiberglass insulation (R = 3.5 per inch of thickness) to obtain the above minimum R value. Allowance is made in Table 1 for the R value of uninsulated space, as shown.

To conserve even more on heating or cooling energy costs, it would be highly desirable to have insulation R values for mobile homes as suggested for conventional, on-site-built, electrically-heated

Table 1

| | R Value | | Thickness of Insulation Required* |
|---------------|-------------|-----------|-----------------------------------|
| | Uninsulated | Insulated | |
| Walls | 2.0 | 8.0 | 2 inches |
| Ceiling | 3.0 | 16.0 | 4 inches |
| Floor | 3.0 | 10.0 | 2 inches |

* Fiberglass R = 3.5 per inch (approximately) of thickness.

homes. These standards suggest approximately 6 inches of insulation (R = 19) in the ceiling, 3 inches on the walls (R = 11) and 3 inches under the floor (R = 13). This assumes the use of fiberglass insulation with an R value per inch of approximately 3.5.

The insulation in mobile home walls, ceiling, and floor must be protected with a vapor barrier on the warm (room side) of the insulation of walls, ceiling, and floor. This vapor barrier is necessary to protect the insulation from moisture penetration from the inside of the home. Some mobile homes are still built without the use of a proper vapor

barrier or rely on inadequate vapor ventilation systems.

Storm Windows

Normal, single-pane, window glass provides very little insulation to the loss or gain of heat. Homes in the northwest should have double-pane or storm windows to reduce winter heating costs. Storm windows provide a second pane over the conventional, single-pane window. The air space between the two panes reduces the rate of heat flow through the window.

The Heating System

When a mobile home is built according to A119.1 code requirements, the standard sets minimum requirements for safety and performance. Manufacturers complying with the standards must display a certificate which is normally found in the furnace room. This certificate states the lowest outside temperature at which the furnace will maintain a 70°F inside temperature with a 15-mile-per-hour outside wind. Consult your local building inspector for the recommended outside design temperature for your specific area. The value will vary from plus 10°F in the warm coastal areas to a low of minus 50°F in the colder regions.

The Plumbing System

Normally homes meeting A119.1 code requirements have adequate plumbing systems. One item beyond code requirements to check in the plumbing system is the drains. It is suggested that all double-compartment sinks, bathtubs, dishwashers, laundry, and washing machines have 2-inch drain lines and that single-compartment sinks have 1 1/2-inch drains. All water pipes should be insulated if

exposed to freezing weather conditions. A 40-gallon, gas-heated water tank should be the minimum size to use. When using electrically-heated water tanks, a 52-gallon tank with quick recovery heating elements will assure adequate amounts of hot water for larger families.

The Electrical System

The electrical system of an ANSI-built mobile home is comparable to that of a conventional home. A single-wide, electrically-heated home should have a 150-ampere entrance panel, and a double-wide should have a 200-ampere panel. This will provide sufficient circuits for such things as electric dryers, stoves, ovens, etc. The service wires leading to your mobile home must be of ample size to efficiently carry the home's electrical load. Consult with the local electrical wiring inspector or power company representative for service entrance requirements.

Look for the Underwriters Laboratories "UL" seal. It is affixed to the outside of the mobile home, usually near the door. The seal indicates that the mobile home has had Underwriters Laboratories conduct a thorough investigation to determine that the design of the home meets recognized safety requirements as published in American National Standard A119.1.

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