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motor vehicles transporting articles of cargo that are in contact with the front end structure of the vehicle. The front end structure on these cargo-carrying vehicles must meet the performance requirements of this section.

(b) *Height and width.* (1) The front end structure must extend either to a height of 4 feet above the floor of the vehicle or to a height at which it blocks forward movement of any item or article of cargo being carried on the vehicle, whichever is lower.

(2) The front end structure must have a width which is at least equal to the width of the vehicle or which blocks forward movement of any article of cargo being transported on the vehicle, whichever is narrower.

(c) *Strength.* The front end structure must be capable of withstanding the following horizontal forward static load:

(1) For a front end structure less than 6 feet in height, a horizontal forward static load equal to one-half (0.5) of the weight of the articles of cargo being transported on the vehicle uniformly distributed over the entire portion of the front end structure that is within 4 feet above the vehicle's floor or that is at or below a height above the vehicle's floor at which it blocks forward movement of any article of the vehicle's cargo, whichever is less; or

(2) For a front end structure 6 feet in height or higher, a horizontal forward static load equal to four-tenths (0.4) of the weight of the articles of cargo being transported on the vehicle uniformly distributed over the entire front end structure.

(d) *Penetration resistance.* The front end structure must be designed, constructed, and maintained so that it is capable of resisting penetration by any article of cargo that contacts it when the vehicle decelerates at a rate of 20 feet per second, per second. The front end structure must have no aperture large enough to permit any article of cargo in contact with the structure to pass through it.

(e) *Substitute devices.* The requirements of this section may be met by the use of devices performing the same functions as a front end structure, if the devices are at least as strong as, and provide protection against shifting

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articles of cargo at least equal to, a front end structure which conforms to those requirements.

[67 FR 61225, Sept. 27, 2002, as amended at 71 FR 35833, June 22, 2006]

**SPECIFIC SECUREMENT REQUIREMENTS
BY COMMODITY TYPE**

§ 393.116 What are the rules for securing logs?

(a) *Applicability.* The rules in this section are applicable to the transportation of logs with the following exceptions:

(1) Logs that are unitized by banding or other comparable means may be transported in accordance with the general cargo securement rules of §§ 393.100 through 393.114.

(2) Loads that consist of no more than four processed logs may be transported in accordance with the general cargo securement rules of §§ 393.100 through 393.114.

(3) Firewood, stumps, log debris and other such short logs must be transported in a vehicle or container enclosed on both sides, front, and rear and of adequate strength to contain them. Longer logs may also be so loaded.

(b) *Components of a securement system.*

(1) Logs must be transported on a vehicle designed and built, or adapted, for the transportation of logs. Any such vehicle must be fitted with bunks, bolsters, stakes or standards, or other equivalent means, that cradle the logs and prevent them from rolling.

(2) All vehicle components involved in securement of logs must be designed and built to withstand all anticipated operational forces without failure, accidental release or permanent deformation. Stakes or standards that are not permanently attached to the vehicle must be secured in a manner that prevents unintentional separation from the vehicle in transit.

(3) Tiedowns must be used in combination with the stabilization provided by bunks, stakes, and bolsters to secure the load unless the logs:

(i) are transported in a crib-type log trailer (as defined in 49 CFR 393.5), and
(ii) are loaded in compliance with paragraphs (b)(2) and (c) of this section.

(4) The aggregate working load limit for tiedowns used to secure a stack of logs on a frame vehicle, or a flatbed vehicle equipped with bunks, bolsters, or stakes must be at least one-sixth the weight of the stack of logs.

(c) *Use of securement system.* (1) Logs must be solidly packed, and the outer bottom logs must be in contact with and resting solidly against the bunks, bolsters, stakes or standards.

(2) Each outside log on the side of a stack of logs must touch at least two stakes, bunks, bolsters, or standards. If one end does not actually touch a stake, it must rest on other logs in a stable manner and must extend beyond the stake, bunk, bolster or standard.

(3) The center of the highest outside log on each side or end must be below the top of each stake, bunk or standard.

(4) Each log that is not held in place by contact with other logs or the stakes, bunks, or standards must be held in place by a tiedown. Additional tiedowns or securement devices must be used when the condition of the wood results in such low friction between logs that they are likely to slip upon each other.

(d) *Securement of shortwood logs loaded crosswise on frame, rail and flatbed vehicles.* In addition to the requirements of paragraphs (b) and (c) of this section, each stack of logs loaded crosswise must meet the following rules:

(1) In no case may the end of a log in the lower tier extend more than one-third of the log's total length beyond the nearest supporting structure on the vehicle.

(2) When only one stack of shortwood is loaded crosswise, it must be secured with at least two tiedowns. The tiedowns must attach to the vehicle frame at the front and rear of the load, and must cross the load in this direction.

(3) When two tiedowns are used, they must be positioned at approximately one-third and two-thirds of the length of the logs.

(4) A vehicle that is more than 10 meters (33 feet) long must be equipped with center stakes, or comparable devices, to divide it into sections approximately equal in length. Where a vehicle is so divided, each tiedown

must secure the highest log on each side of the center stake, and must be fastened below these logs. It may be fixed at each end and tensioned from the middle, or fixed in the middle and tensioned from each end, or it may pass through a pulley or equivalent device in the middle and be tensioned from one end.

(5) Any structure or stake that is subjected to an upward force when the tiedowns are tensioned must be anchored to resist that force.

(6) If two stacks of shortwood are loaded side-by-side, in addition to meeting the requirements of paragraphs (d)(1) through (d)(5) of this section, they must be loaded so that:

(i) There is no space between the two stacks of logs;

(ii) The outside of each stack is raised at least 2.5 cm (1 in) within 10 cm (4 in) of the end of the logs or the side of the vehicle;

(iii) The highest log is no more than 2.44 m (8 ft) above the deck; and

(iv) At least one tiedown is used lengthwise across each stack of logs.

(e) *Securement of logs loaded lengthwise on flatbed and frame vehicles—(1) Shortwood.* In addition to meeting the requirements of paragraphs (b) and (c) of this section, each stack of shortwood loaded lengthwise on a frame vehicle or on a flatbed must be cradled in a bunk unit or contained by stakes and

(i) Secured to the vehicle by at least two tiedowns, or

(ii) If all the logs in any stack are blocked in the front by a front-end structure strong enough to restrain the load, or by another stack of logs, and blocked in the rear by another stack of logs or vehicle end structure, the stack may be secured with one tiedown. If one tiedown is used, it must be positioned about midway between the stakes, or

(iii) Be bound by at least two tiedown-type devices such as wire rope, used as wrappers that encircle the entire load at locations along the load that provide effective securement. If wrappers are being used to bundle the logs together, the wrappers are not required to be attached to the vehicle.

(2) *Longwood.* Longwood must be cradled in two or more bunks and must either:

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(i) Be secured to the vehicle by at least two tiedowns at locations that provide effective securement, or

(ii) Be bound by at least two tiedown-type devices, such as wire rope, used as wrappers that encircle the entire load at locations along the load that provide effective securement. If a wrapper(s) is being used to bundle the logs together, the wrapper is not required to be attached to the vehicle.

(f) *Securement of logs transported on pole trailers.* (1) The load must be secured by at least one tiedown at each bunk, or alternatively, by at least two tiedowns used as wrappers that encircle the entire load at locations along the load that provide effective securement.

(2) The front and rear wrappers must be at least 3.04 meters (10 feet) apart.

(3) Large diameter single and double log loads must be immobilized with chock blocks or other equivalent means to prevent shifting.

(4) Large diameter logs that rise above bunks must be secured to the underlying load with at least two additional wrappers.

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§ 393.118 What are the rules for securing dressed lumber or similar building products?

(a) *Applicability.* The rules in this section apply to the transportation of bundles of dressed lumber, packaged lumber, building products such as plywood, gypsum board or other materials of similar shape. Lumber or building products which are not bundled or packaged must be treated as loose items and transported in accordance with §§ 393.100 through 393.114 of this subpart. For the purpose of this section, “bundle” refers to packages of lumber, building materials or similar products which are unitized for securement as a single article of cargo.

(b) *Positioning of bundles.* Bundles must be placed side by side in direct contact with each other, or a means must be provided to prevent bundles from shifting towards each other.

(c) *Securement of bundles transported using no more than one tier.* Bundles carried on one tier must be secured in ac-

cordance with the general provisions of §§ 393.100 through 393.114.

(d) *Securement of bundles transported using more than one tier.* Bundles carried in more than one tier must be either:

(1) Blocked against lateral movement by stakes on the sides of the vehicle and secured by tiedowns laid out over the top tier, as outlined in the general provisions of §§ 393.100 through 393.114; or

(2) Restrained from lateral movement by blocking or high friction devices between tiers and secured by tiedowns laid out over the top tier, as outlined in the general provisions of §§ 393.100 through 393.114; or

(3) Placed directly on top of other bundles or on spacers and secured in accordance with the following:

(i) The length of spacers between bundles must provide support to all pieces in the bottom row of the bundle.

(ii) The width of individual spacers must be equal to or greater than the height.

(iii) If spacers are comprised of layers of material, the layers must be unitized or fastened together in a manner which ensures that the spacer performs as a single piece of material.

(iv) The arrangement of the tiedowns for the bundles must be:

(A) Secured by tiedowns over the top tier of bundles, in accordance with the general provisions of §§ 393.100 through 393.114 with a minimum of two tiedowns for bundles longer than 1.52 meters (5 ft); and

(B) Secured by tiedowns as follows:

(1) If there are 3 tiers, the middle and top bundles must be secured by tiedowns in accordance with the general provisions of §§ 393.100 through 393.114; or

(2) If there are more than 3 tiers, then one of the middle bundles and the top bundle must be secured by tiedown devices in accordance with the general provision of §§ 393.100 through 393.114, and the maximum height for the middle tier that must be secured may not exceed 6 feet about the deck of the trailer; or

(i) Otherwise, the second tier from the bottom must be secured in accordance with the general provisions of §§ 393.100 through 393.114; or