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3. Logs

What Does This Section Cover?

The standard defines a log as all natural wood that retains the original shape of the bole (trunk) of a tree whether raw, partiall processed, or fully processed.

- ◆ Raw: All tree species that have been harvested, with bark; may have been trimmed or cut to length
- ◆ Partially processed: Fully or partially debarked, or further reduced in length
- ◆ Fully processed: Utility poles, trated poles, log cabin building components

The specific requirements for logs cover shortwood and longwood.

Shortwood

- ◆ Normally up to about 2.5 m (100 in) in length.
- ◆ No longer than 4.9 m (16 ft) in length.
- ◆ Also called:
 - Cut-up logs
 - Cut-to-length logs
 - Bolts
 - Pulpwood.

Longwood

- ◆ Anything not considered shortwood.
- ◆ Also called:
 - Long logs
 - Treelength.

3. Logs

What Does This Section Cover? (continued)

Exceptions to the specific requirements (Section 3.1.1)

The following types of logs are not covered by the specific logs requirements:

- ◆ Logs unitized by banding or other comparable means.
[Secure according to general cargo securement requirements (Section 2).]
- ◆ Loads of no more than four processed logs.
[Secure according to general cargo securement requirements (Section 2).]
- ◆ Firewood, stumps, debris, other short logs, and longer logs.
[Transport in a vehicle or container enclosed on both sides, the front, and the rear and strong enough to contain them.]

3. Logs

What Does This Section Cover? (continued)

What's in a stack?

- ◆ Some stacks may be made up of both shortwood and longwood.
- ◆ Any stack that includes shortwood must follow the shortwood securement requirements.
 - **Exception:** If shortwood is embedded in load of longwood, it can be treated as longwood.



3. Logs

Components of the Securement System (Section 3.1.2)

Specially designed vehicle

Requirements

- ◆ Vehicle **must** be designed and built, or adapted, for transportation of logs.
- ◆ Vehicle **must** be fitted with a means to cradle the logs and prevent rolling, such as:
 - Bunks.
 - Bolsters.
 - Stakes. OR
 - Standards.
- ◆ All vehicle components must be designed and built to withstand all anticipated operational forces without failure, accidental release, or permanent deformation.

Stakes

Requirement

- ◆ If stakes or standards are not permanently attached to the vehicle, secure the stakes so that they do not separate from the vehicle.

Tiedowns

Requirements

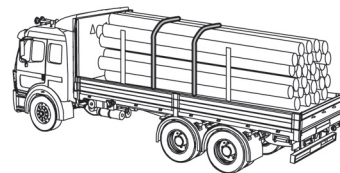
- ◆ Use tiedowns in combination with bunks, stakes, or standards and bolsters to secure the load.
- ◆ All tiedowns must have a working load limit not less than 1,800 kg (4,000 lb.).
- ◆ Tension tiedowns as tightly as possible but not beyond their working load limit.

3. Logs

Use of the Securement System (Section 3.1.3)

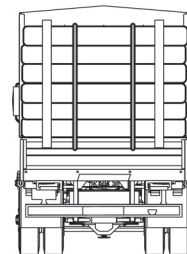
Packing requirements

- ◆ Requirement: Logs must be solidly packed.
- ◆ Requirement: Outer bottom logs must be in contact with and rest solidly against bunks, bolsters, stakes, or standards.
- ◆ Requirement: Each outside log on the side of a stack of logs must touch at least two bunks, bolsters, stakes, or standards. If one end of the log doesn't touch a stake:
 - It must rest on other logs in a stable manner.
 - It must extend beyond the stake, bunk, bolster, or standard.
- ◆ Requirement: The center of the highest log on each side or end must be below the top of each stake, bunk, or standard.



Acceptable Packaging

- ◆ Requirement: There are two options for the upper logs that form the top of the load:
 - Either they must be crowned
 - Or each log that is not held in place by contact with other logs or stakes, bunks, or standards must be held in place by a tiedown.



Acceptable placement of top logs

3. Logs

Use of the Securement System (Section 3.1.3) (continued)

Securement requirements

- ◆ Tighten tiedowns at initial loading.
 - Do not tension beyond the tiedown's working load limit.
- ◆ Check the load and tiedowns at entry onto a public road, in addition to the intervals specified on page x. Adjust load and tiedowns as needed.
- ◆ Use additional tiedowns or securing devices when there is low friction between logs and they are likely to slip on each other (for example, logs are wet or coated with sawdust).

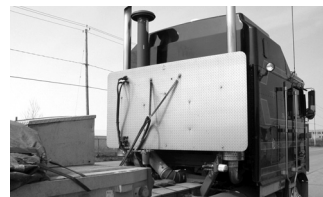
Vehicle Types



Rail Vehicle



Frame Vehicle



Flatbed Vehicle

3. Logs

Special Circumstances: Securing Shortwood Logs Loaded Crosswise on Frame, Rail, and Flatbed Vehicles (Section 3.1.4)

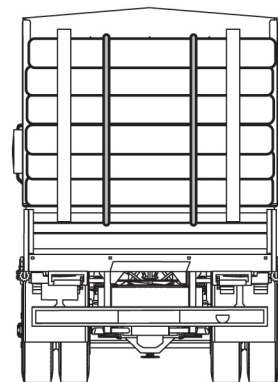
Logs loaded crosswise on these vehicles must meet these requirements in addition to the other logs requirements on pages 38-39.

Lower tier requirements

- ◆ The end of a log in the lower tier must never extend more than 1/3 of the log's total length beyond the nearest supporting structure. This prevents tipping when the vehicle turns.

Tiedowns requirements

- ◆ Use two tiedowns to secure one stack of shortwood loaded crosswise.
 - Attach the tiedowns to the vehicle frame at the front and rear of the load.
- ◆ Position tiedowns approximately 1/3 and 2/3 of the length of the logs.



Acceptable securement of one stack loaded crosswise

3. Logs

Special Circumstances: Securing Shortwood Logs Loaded Crosswise on Frame, Rail, and Flatbed Vehicles (Section 3.1.4) (continued)

Requirements for dividing vehicles over 10 m (33 ft)

- ◆ Vehicles over 10 m (33 ft) must be equipped with center stakes, or comparable devices, to divide it into sections of equal length.
- ◆ Each tiedown **must**:
 - Secure the highest log on each side of the center stake.
 - Be fastened below these logs.

◆ Three securement options:

Option #1:

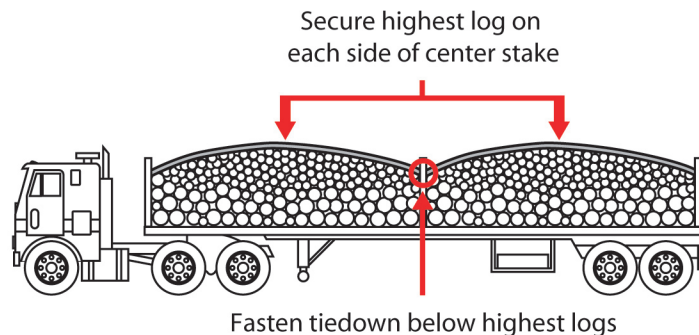
Tiedowns may be fixed at each end and tensioned from the middle.

Option #2:

Tiedowns may be fixed in the middle and tensioned from each end.

Option #3:

Tiedowns may pass through a pulley or equivalent device in the middle and tensioned from one end.



Crosswise stacks on divided vehicle over 10m (33 ft) long

3. Logs

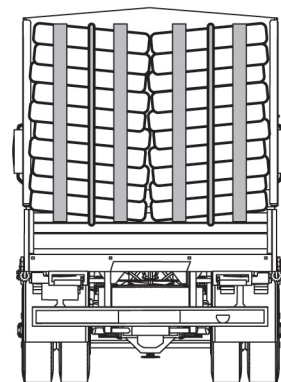
Special Circumstances: Securing Shortwood Logs Loaded Crosswise on Frame, Rail, and Flatbed Vehicles (Section 3.1.4) (continued)

Stakes/structure and tiedowns requirements

Anchor any structure or stake that is being forced upward when the tiedowns are being tensioned.

Additional requirements securement for two stacks side-by-side

- ◆ In addition to the requirements for shortwood loaded crosswise, load two stacks side-by-side so that:
 - There is no space between the stacks of logs.
 - 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 from the side of the vehicle.
 - The highest log is no more than 2.44 m (8 ft) above the deck.
 - At least one tiedown is used lengthwise across each stack.



Acceptable securement of two stacks of shortwood logs loaded crosswise

3. Logs

Special Circumstances: Securing Logs Loaded Lengthwise on Flatbed and Frame Vehicles (Section 3.1.5)

Logs loaded lengthwise on these vehicles must meet these requirements in addition to the other logs requirements on pages 38-39.

Requirements for shortwood loaded lengthwise

- ◆ Shortwood **must** be cradled in a bunk or contained by stakes.
- ◆ Logs should be centered in the bunk.
- ◆ Each outside log bearing against stakes should extend at least 0.15 m (6 in) beyond the stakes at each end.

Shortwood and tiedowns requirements

Two tiedowns

- ◆ Secure each stack of shortwood with at least two tiedowns.

One tiedown

- ◆ A stack can be secured with one tiedown if all logs in the stack less than 3.04 m (10 ft) are:
 - Blocked in the front by a headboard strong enough to restrain the load or by another stack of logs.
 - Blocked in the rear by the vehicle's end structure or another stack of logs.
- ◆ Position the one tiedown about midway between bunks, stakes, or standards.

3. Logs

Special Circumstances: Securing Logs Loaded Lengthwise on Flatbed and Frame Vehicles (Section 3.1.5) (continued)

Requirements for securing longwood loaded lengthwise

- ◆ Longwood **must** be cradled in two or more bunks or contained by stakes.
- ◆ Each outside log should bear against at least two stakes, one near each end of the log.
- ◆ Each end of the log should extend at least 0.15 m (6 in) beyond the stakes.
- ◆ If shorter logs are carried on top of the stack, secure each log with at least two tiedowns.

Longwood and tiedown requirements

- ◆ Secure each stack of longwood with at least two tiedowns at positions along the load that provide effective securement.
- ◆ Secure each outside log of a stack with at least two tiedowns.

Working load limit for longwood and shortwood loaded lengthwise

The aggregate working load limit for all tiedowns must be no less than 1/6 the weight of the stack of logs.



This requirement is much less than the general requirement of an aggregate working load limit equal to $\frac{1}{2}$ the weight of the load. This lowered requirement recognizes that the bunks/stakes help to prevent slippage.

3. Logs

Special Circumstances: Securing Logs Transported on Pole Trailers (Section 3.1.6)

Requirements for logs on pole trailers

- ◆ Secure the load in one of these ways:
 - Either at least one tiedown at each bunk.
 - Or at least two tiedowns used as wrappers that encircle the entire load.

Wrapper requirements

- ◆ Position front and rear wrappers at least 3.04 m (10 ft) apart.

Large logs – shift prevention requirement

- ◆ Use chock blocks to prevent the shifting of large diameter single and double log loads.

Large logs – additional tiedowns requirement

- ◆ Secure large diameter logs that are above the bunks to the underlying load with at least two additional wrappers.



Federal Motor Carrier Safety Administration

49 CFR 393 Parts and Accessories Necessary for Safe Operation

§393.108 How is the working load limit of a tiedown determined?

[Editor's Note: The section heading is revised effective July 24, 2006.]

(a) The working load limit (WLL) of a tiedown, associated connector or attachment mechanism is the lowest working load limit of any of its components (including tensioner), or the working load limit of the anchor points to which it is attached, whichever is less.

(b) The working load limits of tiedowns may be determined by using either the tiedown manufacturer's markings or by using the tables in this section. The working load limits listed in the tables are to be used when the tiedown material is not marked by the manufacturer with the working load limit. Tiedown materials which are marked by the manufacturer with working load limits that differ from the tables, shall be considered to have a working load limit equal to the value for which they are marked.

(c) Synthetic cordage (e.g., nylon, polypropylene, polyester) which is not marked or labeled to enable identification of its composition or working load limit shall be considered to have a working load limit equal to that for polypropylene fiber rope.

(d) Welded steel chain which is not marked or labeled to enable identification of its grade or working load limit shall be considered to have a working load limit equal to that for grade 30 proof coil chain.

(e)(1) Wire rope which is not marked by the manufacturer with a working load limit shall be considered to have a working load limit equal to one-fourth of the nominal strength listed in the Wire Rope Users Manual.

(e)(2) Wire which is not marked or labeled to enable identification of its construction type shall be considered to have a working load limit equal to that for 6 x 37, fiber core wire rope.

(f) Manila rope which is not marked by the manufacturer with a working load limit shall be considered to have a working load limit based on its diameter as provided in the tables of working load limits.

(g) Friction mats which are not marked or rated by the manufacturer shall be considered to provide resistance to horizontal movement equal to 50 percent of the weight placed on the mat.

Tables to § 393.108
[Working Load Limits (WLL), Chain]

Size mm (inches)	WLL in kg (pounds)				
	Grade 30 proof coil	Grade 43 high test	Grade 70 transport	Grade 80 alloy	Grade 100 alloy
1. 7 (1/4)	580(1,300)	1,180(2,600)	1,430(3,150)	1,570(3,500)	1,950(4,300)
2. 8 (5/16)	860(1,900)	1,770(3,900)	2,130(4,700)	2,000(4,500)	2,600(5,700)
3. 10 (3/8)	1,200(2,650)	2,450(5,400)	2,990(6,600)	3,200(7,100)	4,000(8,800)
4. 11 (7/16)	1,680(3,700)	3,270(7,200)	3,970(8,750)		
5. 13 (1/2)	2,030(4,500)	4,170(9,200)	5,130(11,300)	5,400(12,000)	6,800(15,000)
6. 16 (5/8)	3,130(6,900)	5,910(13,000)	7,170(15,800)	8,200(18,100)	10,300(22,600)
Chain Mark Examples:					
Example 1	3	4	7	8	10
Example 2	30	43	70	80	100
Example 3	300	430	700	800	1000

Synthetic Webbing

Width mm (inches)	WLL kg (pounds)
45 (1 3/4)	790(1,750)
50 (2)	910(2,000)
75 (3)	1,360(3,000)
100 (4)	1,810(4,000)

Wire Rope (6 x 37, Fiber Core)

Diameter mm (inches)	WLL kg (pounds)
7 (1/4)	640(1,400)
8 (5/16)	950(2,100)
10 (3/8)	1,360(3,000)
11 (7/16)	1,860(4,100)
13 (1/2)	2,400(5,300)
16 (5/8)	3,770(8,300)
20 (3/4)	4,940(10,900)
22 (7/8)	7,300(16,100)
25 (1)	9,480(20,900)

Manila Rope

Diameter mm (inches)	WLL kg (pounds)
10 (3/8)	90(205)
11 (7/16)	120(265)
13 (1/2)	150(315)
16 (5/8)	210(465)
20 (3/4)	290(640)
25 (1)	480(1,050)

Polypropylene Fiber Rope WLL (3-Strand and 8-Strand Constructions)

Diameter mm (inches)	WLL kg (pounds)
10 (3/8)	180(400)
11 (7/16)	240(525)

13 (1/2)	280(625)
16 (5/8)	420(925)
20 (3/4)	580(1,275)
25 (1)	950(2,100)

Polyester Fiber Rope WLL (3-Strand and 8-Strand Constructions)

Diameter mm (inches)	WLL kg (pounds)
10 (3/8)	250(555)
11 (7/16)	340(750)
13 (1/2)	440(960)
16 (5/8)	680(1,500)
20 (3/4)	850(1,880)
25 (1)	1,500(3,300)

Nylon Rope

Diameter mm (inches)	WLL kg (pounds)
10 (3/8)	130(278)
11 (7/16)	190(410)
13 (1/2)	240(525)
16 (5/8)	420(935)
20 (3/4)	640(1,420)
25 (1)	1,140(2,520)

Double Braided Nylon Rope

Diameter mm (inches)	WLL kg (pounds)
10 (3/8)	150(336)
11 (7/16)	230(502)
13 (1/2)	300(655)
16 (5/8)	510(1,130)
20 (3/4)	830(1,840)
25 (1)	1,470(3,250)

Steel Strapping

Width x thickness mm (inches)	WLL kg (pounds)
31.7 x .74 (1 ¼ x 0.029)	540(1,190)
31.7 x .79 (1 ¼ x 0.031)	540(1,190)
31.7 x .89 (1 ¼ x 0.035)	540(1,190)
31.7 x 1.12 (1 ¼ x 0.044)	770(1,690)
31.7 x 1.27 (1 ¼ x 0.05)	770(1,690)
31.7 x 1.5 (1 ¼ x 0.057)	870(1,925)
50.8 x 1.12 (2 x 0.044)	1,200(2,650)
50.8 x 1.27 (2 x 0.05)	1,200(2,650)

[67 FR 61227, Sep. 27, 2002; 71 FR 35833, June 22, 2006]