

Securing the Load

*A Guide to Safe and Legal
Transportation of Cargo and Equipment*

The securement regulations that deal specifically with farmers and commercial pesticide service industries address five major questions.

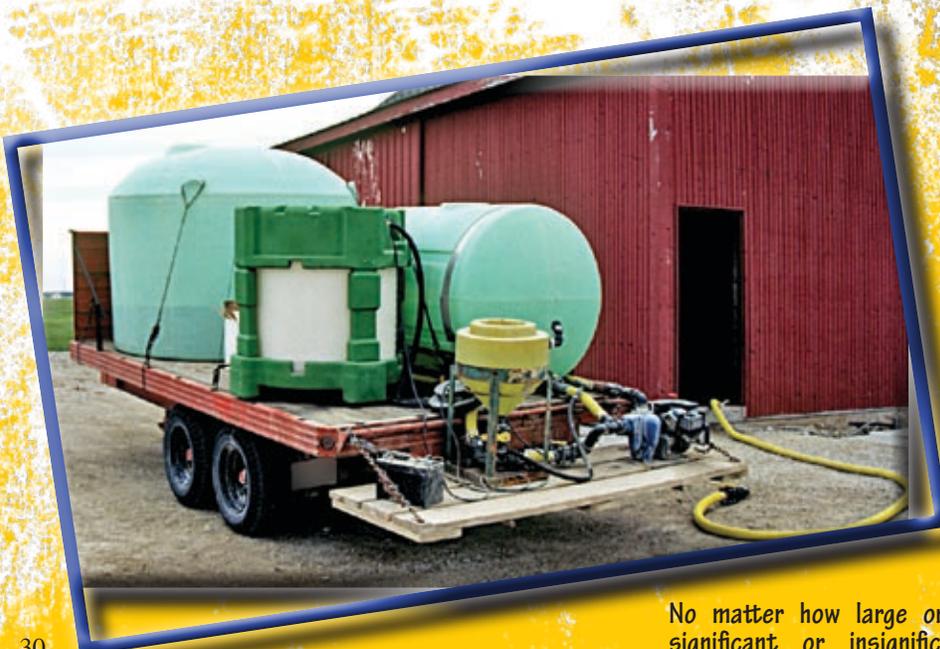
Question 1. How many tie-downs are required?

The answer depends on the vehicle configuration, placement of cargo, and the cargo itself, including dunnage (anything not permanently mounted to the truck body or the trailer chassis, such as extra chains). Determine the length and weight of each piece of cargo and the number of pieces in the load to calculate the minimum number of securement devices required.

Bags of seed or boxes of pesticide on a trailer would constitute one load; that is, the “cargo” would be the collective load of bags or boxes.

When the article is not blocked or positioned to prevent movement in the forward direction (minimum number of tie-downs), follow these guidelines:

- Use one tie-down for articles five feet long or less and 1100 pounds or less.
- Use two tie-downs if the article is five feet long or less and more than 1100 pounds.
- Use two tie-downs if the article is longer than five feet but no longer than ten feet, regardless of weight.
- Use one tie-down for every ten linear feet or fraction thereof for articles greater than ten feet (49 CFR Part 393.100).





Lots of logs.
One web strap.
Not a good idea.



The front pallet in this photo requires an additional tie-down. The load is less than 5 feet wide and greater than 1100 pounds.



The mowers below are blocked, braced, and strapped to the bed of the trailer. This meets or exceeds the securement requirement.

If the load being transported is 33 feet long, calculations based on these criteria would indicate the need for four tie-downs of adequate strength: one for each ten feet, plus one for the three additional feet. The number of tie-downs required is not dependent solely on cargo weight once the load is more than five feet long. The weight of the cargo is relevant to the working load, which will be addressed later.

How many tie-downs would be needed if transporting one 42-inch-wide pallet on a flat bed truck? One tie-down of adequate strength would be required if the load were less than 1,100 pounds, whereas a load greater than 1,100 pounds would require two tie-downs.



The pallets of copper sulfate were pushed to the front of this trailer and held together by one over the middle and one on the back side. The two straps combine the three pallets as a single load rather than three separate articles. Two additional straps are required (but not applied in this photo). AND: Because the headboard is less than four feet high and not as tall as the load, yet another securement device should have been applied over the front pallet (see page 78).

If you were transporting four pallets of bagged materials (each pallet weighing less than 1100 pounds) you would need one tie-down of adequate strength, per pallet. A minimum of two tie-downs would be required, provided the pallets are attached to each other and secured with a beam running the full combined length of the pallet.

When the article is blocked, braced, or immobilized to prevent forward movement (minimum number of tie-downs), it must be secured by at least one tie-down for every 10 feet of length and any fraction thereof.

Question 2.
How should the tie-downs be spaced along the cargo?

Tie-downs must be positioned to hold the cargo securely. Indiana law requires one strap each in the front, middle, and rear for loads more than 10 feet long.



“Officer! I didn’t mean to draw your attention!”

Question 3.
How is the working load limit applied?

The collective WLL for all tie-downs must equal at least half the weight of the secured cargo; i.e., 10,000 pounds of cargo must be secured with chains and/or straps with a collective WLL of at least 5000 pounds.



Skill is needed to immobilize and secure this tree on the trailer.

Remember that attachments such as hooks and ratchets play a major role in the calculation of WLLs. Working Load Limits are calculated for each securement assembly. For example, let's say a binder with a 4700-pound WLL is used with a 3/8" Grade 43 chain that has a WLL of 5400 pounds. The lesser WLL (4700 pounds) is the official WLL of the assembly.

Question 4. **Are there special rules for transporting heavy machinery?**

Additional regulations apply when transporting front end loaders, bulldozers, tractors, and power shovels that operate on wheels or tracks. The following four-point rule applies only when such equipment weighs more than 10,000 pounds:

- Accessory equipment must be completely lowered and secured to the transport vehicle.
- Equipment on articulated vehicles shall be restrained to prevent any change of position during transit.
- Equipment must be restrained against movement by using at least four tie-downs.
- Two tie-downs each must be affixed as close as possible to the front and as close as possible to the rear of the vehicle being transported, or to specifically designed mounting points on the vehicle.



Buckets that are not pinned (above and below) must be secured to the deck.



Equipment heavier than 10,000 pounds must be secured at four independent points, and each point of attachment must have its own binder. A separate, appropriate grade chain connected to each corner meets that requirement. But hooking the chain to the trailer and equipment and driving forward to tighten the chain, then using a binder just on the front, is not allowed. Note that the dozer below is totally unsecured!

A unit that weighs 10,000 pounds or more requires four adjustable securement devices, one on each corner. This load would also require a fifth to secure the hydraulic blade to the deck. The driver of this rig was pulled over for not having the dozer secured.





The machine on the trailer above weighs less than 10,000 pounds and measures between five and ten feet long, so at least two securement devices are required.

In the example above, a chain hook is attached to the trailer, run through a single attachment such as a clevis or hitch hole, and hooked on the other side. In this case, there is only one attachment on the equipment; it does not meet the regulations for equipment heavier than 10,000 pounds.

Drivers may use a single chain to make two separate attachments. Here is an example using a single chain with two separate and independent connections to the equipment:

One hook on the side of a trailer is attached with a binder to a single spot around the right front. The hook on the other end of the chain is attached to the left front, and a binder is applied to that section. The extra length lies loose in the middle; it should be secured if it could pose a risk during transportation.

Question 5. What is prohibited?

The regulations specify safety criteria for tie-downs:

- Cargo securement devices must be in proper working order with no damaged or weakened components.
- Tie-downs and other securement devices cannot contain knots.
- Securement devices (other than steel strapping) must have a means of tightening during the trip.
- Devices used to tighten chains, such as ratchets, must be secured to prevent opening during transport. The means of satisfying this requirement are left to the discretion of the transporter. The rules say only that tie-downs must be secured in a manner to prevent loosening or opening during transport.

