Module 9: Cargo Securements

Commercial Vehicle Safety Compliance
in Alberta

JULY 2022

Alberta

Module 9: Cargo Securement aims to provide carriers with information about proper Cargo Securement. The contents of this module include information about:

Contents

CARGO SECUREMENT STANDARDS

National Safety Code Standard 10

National Safety Code (NSC) Standard 10 was created to ensure the safety of drivers, employees, and the motoring public. Carriers must ensure that any cargo they carry does not shift, move or spill onto the roadway.

The NSC Standard 10 is the Canadian version of the North American Cargo Securement Standard Model Regulations with the U.S. and Mexico adopting similar legislation.

Alberta's Commercial Vehicle Safety Regulation and the NSC Standard 10 require all types of cargo carried by commercial vehicles registered for, or that weigh more than 4,500 kilograms (excluding buses), to be secured in accordance with the NSC Standard 10.

Cargo Securement in Alberta

Section 17(3) of the Commercial Vehicle Safety Regulation (AR 121/2009) states that all cargo must be properly secured by a carrier according to NSC Standard 10 requirements.

Section 17(4)(a) of the Commercial Vehicle Safety Regulation (AR121/2009) states cargo must not leak, spill, blow from, fall from, fall through or otherwise be dislodged from a commercial vehicle, or shift upon or within the commercial vehicle to such an extent that the commercial vehicle's stability or maneuverability is adversely affected.

SECUREMENT DEVICES

Section 3 of Part 1 of NSC Standard 10 requires a driver of a vehicle to inspect the cargo securement system and ensure the cargo is secure, and does not interfere with the driver's ability to drive, or exit the vehicle safely, prior to driving the vehicle. It is also the driver's responsibility to regularly re-inspect the vehicle's cargo and cargo securement systems used and make adjustments to the cargo or cargo securement system as necessary. More information about cargo inspection requirements are shown in NSC Standard 10, Part 1 – Section 3.

According to Division 2 of NSC Standard 10, all vehicle structures, systems and parts used to secure cargo must:

- ☐ Be in proper working order
- ☐ Be used on the correct type of cargo
- ☐ Not have knots, damaged, or weakened parts that may affect their performance
- ☐ Not have any cracks or cuts
- ☐ Be secured in a way that ensures they will not come unfastened while the vehicle operates on a highway

Tiedowns Must be Marked with a Working Load Limit

All tiedowns must be marked by the manufacturer with its working load limit (WLL).

This means tiedowns must have a label, or be marked using some other method. For example: chain and chain components are marked as shown in the NSC Standard 10, Part 4 – Section 7.

Proper Use of Tiedowns

Each tiedown must be secured so that it does not come loose, unfastened, opened or released while the vehicle is moving. This means that the driver of a vehicle must be able to securely tighten a tiedown before transporting their cargo on a highway.

All tiedowns and other parts of a cargo securement system must be located inside any rub rails whenever practical. Edge protection must also be used whenever a tiedown could be subject to wear or cutting at the point where it touches an article of cargo. The edge protection must resist wear, cutting and crushing.

NOTE

According to NSC Standard 10, bungee cords and tarp straps **are not** suitable for use as tiedowns, and are equally unsuited to having an assigned Working Load Limit (WLL). They may still be used, however, as supplementary restraint for lightweight cargo and equipment.

Use of Unmarked Tiedowns

Current standards do not allow the use of unmarked tiedowns. Tiedowns must be marked by the manufacturer with respect to their Working Load Limit (WLL). This ensures that all drivers use the proper equipment for securing a load.

Tiedowns and other securement devices must be strong enough to properly secure a load. Manufacturers test these devices to determine how much force can be applied to them before they will break. The WLL of a securement device refers to the maximum load that may be applied to that device during normal service.

Unrated and Unmarked Anchor Points

Transport Canada requires trailers with a GVWR of 10,000 lbs or more to have 6 or more cargo anchoring devices, but does not require them to be marked. For more information on this device, please see: https://tc.canada.ca/sites/default/files/migrated/905_tm_aug_1998r.pdf

Front End Structures on Commercial Vehicles

A “front end” structure, according to NSC Standard 10, is a vertical barrier that is placed across the front of a deck that prevents cargo from moving forward. Front end structures must be high and wide enough to block the movement of the cargo. It must meet the following requirements:

Height and Width

The height of the front end structure of a vehicle cannot be shorter than:

a) The height at which it prevents cargo from moving forward; and

b) 122 centimetres above the deck.

The width of the front end structure of a vehicle cannot be narrower than:

a) The width of the vehicle; and

b) The width at which it prevents cargo from moving forward.

Strength

The front end structure of a vehicle must be able to withstand a horizontal forward static load equal to 50% of the total weight of the cargo, where:

a) The height of the front end structure is shorter than 1.83 metres; and

b) The cargo is uniformly distributed over all of the front end structure.

The front end structure of a vehicle must be able to withstand a horizontal forward static load equal to 40% of the total weight of the cargo, where:

a) The height of the front end structure is 1.83 metres or higher; and

b) The cargo is uniformly distributed over all of the front end structure.

Penetration Resistance

The front end structure of a vehicle must be able to resist penetration by an article of cargo that contacts it when the vehicle decelerates at a rate of 6.1 metres per second.

GENERAL SECUREMENT

Cargo Placement and Restraint

There are three ways cargo may be transported: cargo may be fully contained, immobilized, or by using general securement methods.

The proper securement of cargo is important not only for the protection of the cargo itself, but also for ensuring the safety of a driver and the motoring public. Cargo that shifts or tips may cause a vehicle to tip or operate in an unsafe manner.

Fully Contained Cargo

- Cargo must be contained in a vehicle of adequate strength;
- Cargo is restrained against horizontal movement by the vehicle structure, other cargo, or by other devices such as tiedowns or webbing;
- Cargo cannot shift, tip, leak, spill, blow off, fall from, fall through or otherwise be dislodged from the vehicle, or shift upon or within the commercial vehicle to such an extent that the commercial vehicle's stability or manoeuvrability is adversely affected.

Immobilized Cargo

- Cargo must be secured by proper tiedowns, blocking or bracing;
- Cargo cannot shift, tip, leak, spill, blow off, fall from, fall through or otherwise be dislodged from the vehicle, or shift upon or within the commercial vehicle to such an extent that the commercial vehicle's stability or manoeuvrability is adversely affected.

General Securement

- All cargo must be secured on or in a vehicle with tiedowns along with:
- Blocking, bracing, friction mats, other cargo, or a combination of these things;
- Cargo cannot shift, tip, leak, spill, blow off, fall from, fall through or otherwise be dislodged from the vehicle, or shift upon or within the commercial vehicle to such an extent that the commercial vehicle's stability or manoeuvrability is adversely affected.

Working Load Limits (WLL)

Tiedowns and other securement devices must be strong enough to properly secure a load. Manufacturers test these devices to determine how much force can be applied to them before they will break. The working load limit of a securement device refers to the maximum load that may be applied to that device during normal service. The aggregate (combined) working load limit is the sum of the working load limits of all devices that are used to secure an article on a vehicle.

The diagram below outlines how to calculate the aggregate (combined) working load limits:

For tiedowns that go from one anchor point to another on the vehicle, add the WLLs of each tiedown to get the aggregate WLL of the load.

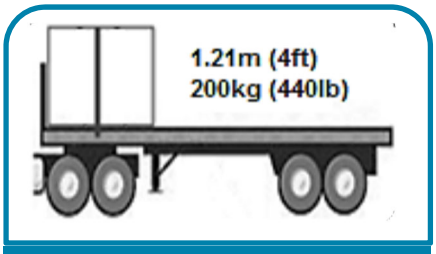
For tiedowns that go from one anchor point on the vehicle to an attachment point on the cargo itself, add together:

- 50% of the WLL of each end section of a tiedown that is attached to an anchor point; plus
- 50% of the WLL of each end section that is attached to the cargo

The total aggregate working load limit of any cargo securement system must be at least half of the weight of the load being secured.

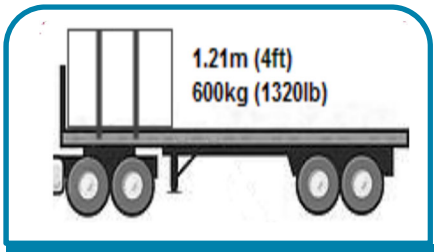
Minimum Number of Tiedowns

A carrier may need a certain number of tiedowns to keep their cargo secure. When a piece of cargo is not blocked or positioned to prevent movement in the forward direction, the number of tiedowns needed depends on the length and weight of that cargo.



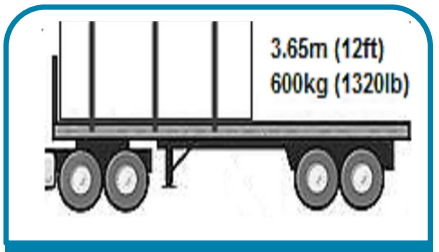
1 Tiedown

- For cargo 1.52 m or shorter and 500 kilograms or less in weight



2 Tiedowns

- For cargo 1.52 m or shorter and more than 500 kilograms
- For cargo greater than 1.52 m in length but less than 3.04 m, regardless of weight



3+ Tiedowns

- For cargo longer than 3.04 m
- 2 tiedowns for the first 3.04 m and 1 extra tiedown for each additional 3.04 m, or fraction of 3.04 m

The following cargo securement devices are required when a piece of cargo is not blocked or positioned to prevent forward movement:

- One tiedown where the article is 1.52 metres or shorter and weighs no more than 500 kilograms.
- Two tiedowns where the article is:
  - 1.52 metres or shorter and weighs more than 500 kilograms, or
  - Longer than 1.52 metres but not longer than 3.04 metres regardless of its weight.
- Where the article is longer than 3.04 metres:
  - Two tiedowns for the first 3.04 metres of length, and
  - 1 extra tiedown for each additional 3.04 metres or fraction of 3.04 metres.

If cargo is blocked or braced to prevent forward movement by a header-board, bulkhead, or by other means, then it must be secured by at least:

- One tiedown for the first 3.04 metres of length; plus
- One extra tiedown for every 3.04 metres of length, or fraction of, beyond the first 3.04 metres (if cargo is longer than 3.04m).

Commodity-Specific Requirements

Part 2 of the NSC Standard 10 contains nine divisions detailing securement methods for common commodities. These requirements apply in addition to and not instead of the general requirements:

Applicability

27(1) This Part applies in addition to and not instead of Part 1.

(2) Where a requirement for containing, immobilizing or securing cargo transported by a vehicle required under this Part differs from a requirement under Part 1, the provisions of this Part apply.

Commodity-specific securement requirements are available for:

- Logs;
- Dressed lumber;
- Metal coils;
- Paper rolls;
- Concrete pipe;
- Intermodal containers;
- Vehicles and Crushed (small, large, crushed);
- Roll-on/roll-off or hook lift containers; and
- Large boulders.

For the complete requirements for these specific commodities, see NSC Standard 10. A carrier must secure each of these commodities according to the rules found in the standard.

COMMODITY SPECIFIC SECUREMENT

Logs

Special rules apply to the transportation of logs. A carrier must not only have a vehicle that was built specifically for hauling logs, but must also secure those logs according to the requirements in Part 2,Division 1, NSC Standard 10.

The rules for the transportation of logs apply in most circumstances, except:

- Loads of no more than four logs;
- Firewood, stumps, log debris or logs that are transported in a vehicle or container that is enclosed on all sides and strong enough to contain them.

In these special cases, logs may be transported using the general cargo securement rules.

Dressed Lumber

Dressed lumber is lumber that has been surfaced or planed smooth on four sides. Special rules for the securement of dressed lumber apply to:

- Bundles of dressed lumber and packaged lumber; and
- Building products including plywood, gypsum board or other materials of similar shape.

These items must be secured according to the requirements in Part 2, Division 2, NSC Standard 10. Lumber or building products that are not bundled or packaged must be treated as loose items and transported using the general cargo securement rules.

Metal Coils

Special rules for the transportation of metal coils apply to a vehicle that is transporting one or more metal coils that, individually or grouped together, have a total weight of 2,268 kilograms or more.

These coils must be secured according to the requirements in Part 2, Division 3, NSC Standard 10.

Shipments of metal coils that weigh less than 2,268 kilograms may be secured using the general cargo securement rules.

Paper Rolls

Special rules for the transportation of paper rolls apply to a vehicle that is transporting one or more paper rolls that, individually or grouped together, have a total weight of 2,268 kilograms or more. These rolls must be secured according to the requirements in Part 2, Division 4, NSC Standard 10.

Shipments of paper rolls that weigh less than 2,268 kilograms may be secured using the general cargo securement rules.

Concrete Pipe

Special rules may apply to vehicles, flatbed trailers and lowboy trailers that are transporting concrete pipe. The pipe being transported must be secured according to the requirements in Part 2, Division 5, NSC Standard 10.

Concrete pipe bundled tightly together into a single rigid piece with no tendency to roll and concrete pipe loaded into a sided container must be secured using the general cargo securement rules.

Intermodal Containers

Intermodal containers are freight containers that are designed to be transported in more than one way (for example, by road, rail or sea). These containers must either be transported on a chassis vehicle or must be secured on a different vehicle according to the requirements in Part 2, Division 6, NSC Standard 10.

Cargo that is inside an intermodal container may be secured using the general cargo securement rules unless another commodity specific rule applies.

Vehicles as Cargo

Special rules apply to the transportation of light vehicles, heavy vehicles and flattened or crushed light vehicles. These vehicles must be secured according to the requirements in Part 2, Division 7, NSC Standard 10.

"Light" vehicles are automobiles, trucks or vans that have a mass of 4,500 kilograms or less. "Heavy" vehicles are vehicles, equipment, or machinery on wheels or tracks that weigh more than 4,500 kilograms.

Roll-On/Roll-Off and Hook Lift Containers

Special rules apply to the transportation of roll-on/roll-off containers and hook lift containers. Hook lift containers are primarily used to transport materials in the waste, recycling, construction, demolition and scrap industries. These containers are handled by specialized vehicles in which the container is loaded and unloaded onto a tilt frame body by a moveable hook arm.

These containers must be secured according to the requirements in Part 2, Division 8, NSC Standard 10.

Boulders

Special rules apply to the transportation of:

- Boulders on a flatbed vehicle;
- Boulders in a vehicle that is not designed to contain them;
- A piece of natural, irregularly shaped rock that weighs more than 100 kilograms but less than 5,000 kilograms;
- A piece of natural, irregularly shaped rock of any size that may be contained within a vehicle that is designed to carry it; and
- A piece of rock of any size that is artificially formed or cut into shape and has a stable base for securement.

These boulders must be transported according to the requirements in Part 2, Division 9, NSC Standard 10. Some exemptions may apply to boulders that may be secured using the general securement rules.

For the complete requirements for these specific commodities, see NSC Standard 10. A carrier must secure each of these commodities according to the rules found in the Standard.

RESOURCES FOR CARRIERS

The following web links may be helpful in assisting a carrier in meeting all required Cargo Securement standards relevant to their operations.

NSC Standard 10:
www.ccmta.ca/web/default/files/PDF/NSC_Standard_10-_June_2013.pdf

NSC Standard 10 Interpretations:
Guidance and Interpretations: www.ccmta.ca/web/default/files/PDF/Interpretations_and_Guidance_2016.pdf

Securement of Dressed Lumber and Similar Building Materials on Flatbed Trucks and Trailers
www.ccmta.ca/web/default/files/PDF/Dressed_Lumber_Guidance_2011.pdf

The Alberta Commercial Vehicle Safety Regulation (AR121/2009)
www.qp.alberta.ca/1266.cfm?page=2009_121.cfm&leg_type=Regs&isbncln=9780779821426

The Alberta Motor Transport Association
www.amta.ca