



Driver's Handbook on Cargo Securement

A Guide to the North American Cargo Securement Standard

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Introduction

Purpose of the Handbook

Learn how to:

- ◆ Apply the securement requirements in the North American Cargo Securement Standard.
- ◆ Safely load and secure specific types of commodities.
- ◆ Inspect a secured load for compliance with the North American Cargo Securement Standard.

If you follow the requirements in the North American Cargo Securement Standard, you will be in compliance with provincial (Canada) and Federal (US) regulations.

Local regulations may be more or less stringent.



The section references throughout this Handbook refer to particular sections of the North American Cargo Securement Standard.

How to Use the Handbook

1. For general cargo securement requirements, review:
 - ◆ Section 1: Fundamentals of Cargo Securement
 - ◆ Section 2: Cargo Securement Requirements
2. To correctly secure specific commodities, also review that section:
 - ◆ Section 3: Logs
 - ◆ Section 4: Dressed Lumber
 - ◆ Section 5: Metal Coils
 - ◆ Section 6: Paper Rolls
 - ◆ Section 7: Concrete Pipe
 - ◆ Section 8: Intermodal containers
 - ◆ Section 9: Automobiles, Light Trucks, and Vans
 - ◆ Section 10: Heavy Vehicles, Equipment, and Machinery
 - ◆ Section 11: Flattened or Crushed Vehicles
 - ◆ Section 12: Roll-On/Roll-Off and Hook Lift Containers
 - ◆ Section 13: Large Boulders

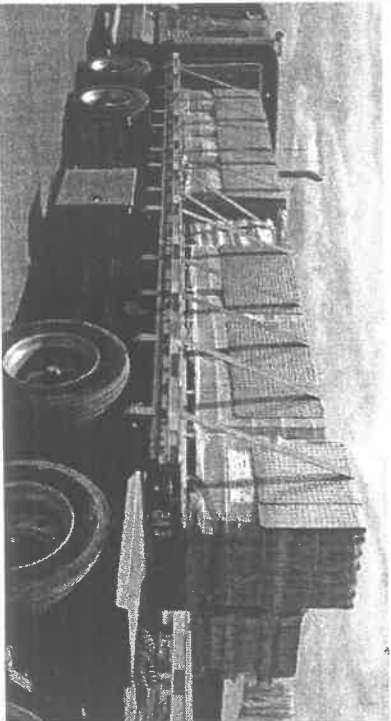
1. Fundamentals of Cargo Securement

North American Cargo Securement Standard

What does the Standard cover? (Section 1.1)

Vehicles

- ◆ Commercial vehicles (including a combination of vehicles) that are operated on a highway and have a gross vehicle rating over 4,500 kg (10,000 lb.)



Gross Vehicle Rating = Greater Than 4,500 kg (10, 000 lb.)

Cargo

- ◆ Any cargo and dangerous goods/hazardous materials, including:
 - All general freight.
 - All equipment carried for vehicle operation.
 - Intermodal containers and their contents.
- ◆ Some specific commodities have additional or different securement requirements (see later sections of this Handbook).
- ◆ Additional requirements under separate regulations may also apply for transportation of certain types of dangerous goods or hazardous materials.



It is assumed that heavy loads carried under special permits would be subject to securement standards contained in the special permit, which may differ from the North American Cargo Securement Standard. Check with Your Federal, Provincial, or State government for any permit requirements.

1. Fundamentals of Cargo Securement

North American Cargo Securement Standard

What does the Standard require of the cargo? (Section 1.2)

Securement Options

All cargo must be contained, immobilized, or secured.

How Well Must Cargo be Secured?

So that it does not:

- ◆ Leak
- ◆ Spill
- ◆ Blow off the vehicle
- ◆ Fall from the vehicle
- ◆ Fall through the vehicle
- ◆ Otherwise become dislodged from the vehicle
- ◆ Shift upon or within the vehicle to such an extent that the vehicle's stability or maneuverability is adversely affected.



No rolling, tipping, sliding, or falling from vehicle.



There can be some movement if it doesn't reduce the effectiveness of the securement system.

2. General Cargo Securement Requirements

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| The Securement System | p. 9 |
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2. General Cargo Securement Requirements

Components of a Securement System

Vehicle structure (Section 2.1.1)

What is included?

- ◆ Floors
- ◆ Walls
- ◆ Decks
- ◆ Tiedown anchor points
- ◆ Headboards
- ◆ Bulkheads
- ◆ Stakes
- ◆ Posts
- ◆ Anchor points.



Generally, the cab shield is not part of the cargo securement system. However, a front-end structure could be used to provide some restraint against forward movement if the cargo is in contact with it.

How strong must the vehicle structure and anchor points be?

All elements of the vehicle structure and anchor points must be strong enough to withstand the forces described on page 7.

- ◆ Forward force: 0.8 g (80%)
- ◆ Rearward force: 0.5.g (50%)
- ◆ Sideways force: 0.5 g (50%)
- ◆ Upward force: 0.2 g (20%)

All elements of the vehicle structure and anchor points must be in good working order:

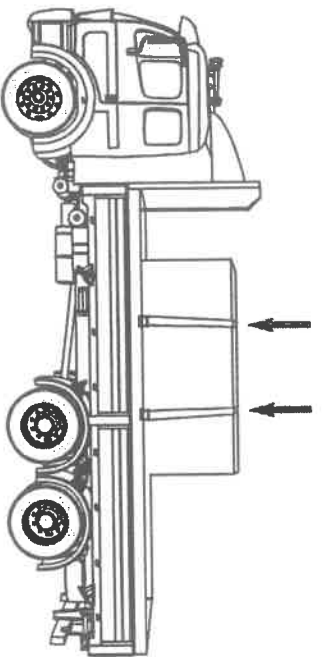
- ◆ No obvious damage.
- ◆ No distress.
- ◆ No weakened parts.
- ◆ No weakened sections.

2. General Cargo Securement Requirements

Components of a Securement System

Securing devices (Section 2.1.3) (continued)

Some tiedowns pass over or through the cargo. They create a downward force that increases the effect of friction between the cargo and the deck. This friction restrains the cargo.



Tiedown passes over cargo

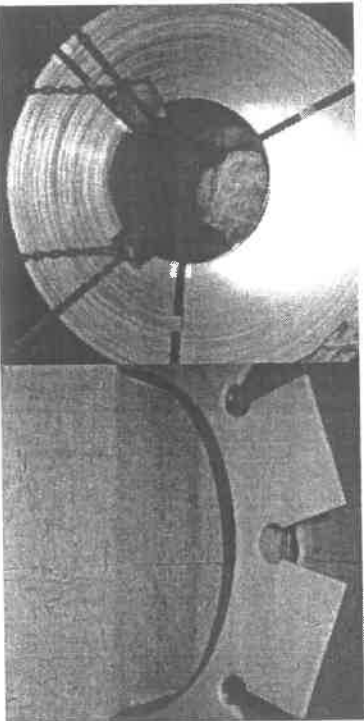
2. General Cargo Securement Requirements

Components of a Securement System

Securing devices (Section 2.1.3) (continued)

Edge protection

Edge protection must be used if a tiedown could be cut or torn when touching an article of cargo. The edge protection itself must also resist crushing, cutting, and abrasion.



Use of edge protection

Edge protector

Blocking and bracing (Section 2.1.4)

Material used

The material used for blocking or bracing and as chocks and cradles must be strong enough to withstand being split or crushed by the cargo or tiedowns.

This requirement also applies to any material used for dunnage.

If wood is used:

- ◆ Hardwood is recommended.
- ◆ It should be properly seasoned.
- ◆ It should be free from rot or decay, knots, knotholes, and splits.

The grain should run lengthwise when using wood for blocking or bracing.


2. General Cargo Securement Requirements

Containing, Immobilizing, and Securing Cargo

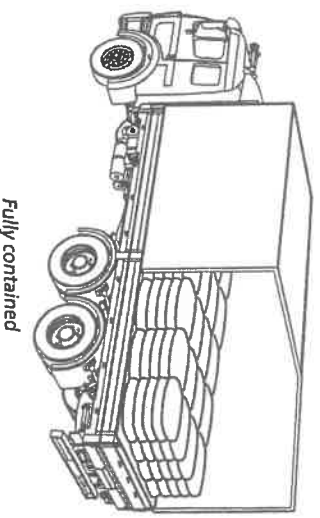
Three ways to transport cargo (Section 2.2.1)

All types of cargo must meet one of three conditions:

- ◆ **Condition 1: Cargo is fully contained by structures of adequate strength.**
 - Cargo cannot shift or tip
 - Cargo is restrained against horizontal movement by vehicle structure or by other cargo. Horizontal movement includes forward, rearward, and side to side.

 If the cargo is contained in a sided vehicle, the vehicle structure **MUST** be strong enough to withstand the forces described on page 7.

- ◆ Forward force: 0.8 g (80%)
- ◆ Rearward force: 0.5 g (50%)
- ◆ Sideways force: 0.5 g (50%)



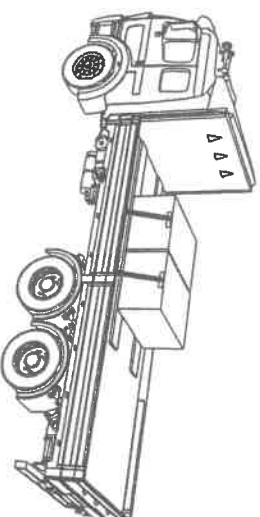
2. General Cargo Securement Requirements

Containing, Immobilizing, and Securing Cargo

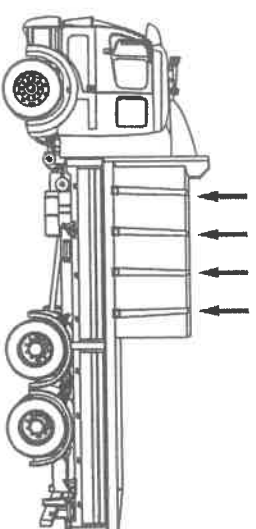
Three ways to transport cargo (Section 2.2.1) (continued)

All types of cargo must meet one of three conditions:

- ◆ Condition 3: To prevent shifting or tipping, cargo is immobilized or secured on or within a vehicle by tiedowns along with:
 - Blocking.
 - Bracing.
 - Friction mats.
 - Other cargo.
 - Void fillers.
 - Combination of these.



Secured on a vehicle



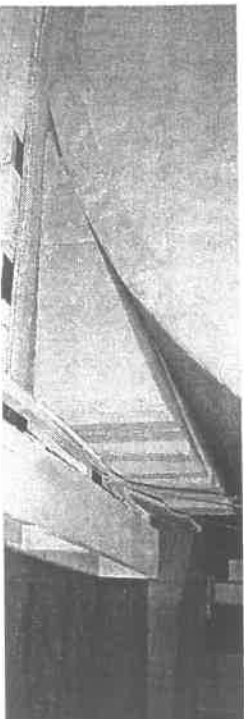
Secured on a vehicle

2. General Cargo Securement Requirements

Containing, Immobilizing, and Securing Cargo Loading the cargo properly (Section 2.2.2) (continued)

Some articles have a tendency to roll. To prevent rolling, provide more than one point of contact:

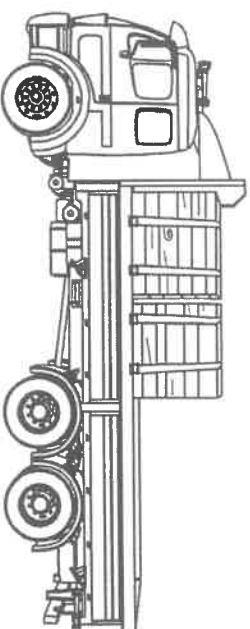
- ◆ Lift the cargo off the deck AND/OR
- ◆ Place chockes, wedges, a cradle, or other equivalent means that prevent rolling. These must be secured to the deck.



The method used to prevent rolling must not become unfastened or loose while the vehicle is in transit.

For articles that have a tendency to tip:

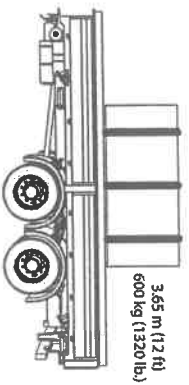
- ◆ Prevent tipping or shifting by bracing the cargo.



2. General Cargo Securement Requirements

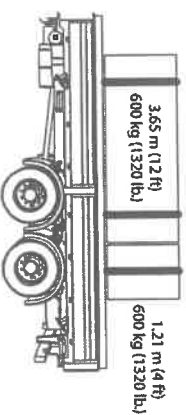
Containing, Immobilizing, and Securing Cargo Restraining the cargo correctly (Section 2.2.3.1) (continued)

| Article Description | Minimum # of Tiedowns |
|----------------------------|--|
| Longer than 3.02 m (10 ft) | 2 + 1 tiedown for every additional 3.02 m (10 ft), or part thereof |



When cargo is prevented from forward movement (for example, by the headboard, bulkhead, other cargo, or tiedown), secure the cargo according to the following requirements:

| Article Description | Minimum # of Tiedowns |
|---------------------|---|
| All Cargo | 1 tiedown for every 3.04 m (10 ft), or part thereof |



Exceptions to the Minimum Tiedown Requirements (Section 2.2.3.2)



A vehicle transporting one or more articles of cargo such as, but not limited to, machinery or fabricated structural items (e.g., steel or concrete beams, crane booms, girders, and trusses, etc.) which, because of their design, size, shape, or weight, must be fastened by special methods.

However, any article of cargo carried on that vehicle must be securely and adequately fastened to the vehicle.

2. General Cargo Securement Requirements

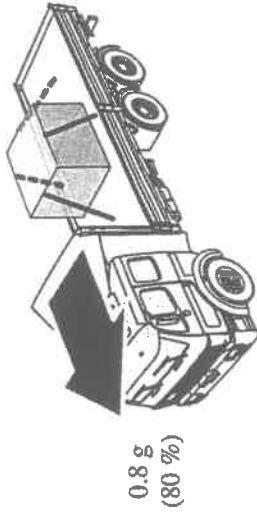
Containing, Immobilizing, and Securing Cargo

Restraining the cargo correctly (Section 2.2.3.1) (continued)

Tiedowns attached to the cargo

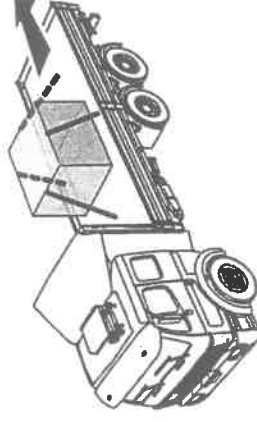
Tiedowns attached to the cargo work by counteracting the forces acting on the cargo.

The angle where the tiedown attaches to the vehicle should be shallow, not deep (ideally less than 45°).



To counteract forward movement, attach the tiedown so it pulls the cargo toward the rear of the vehicle.

0.5 g
(50 %)



To counteract rearward movement, attach the tiedown so it pulls the cargo toward the front of the vehicle.

2. General Cargo Securement Requirements

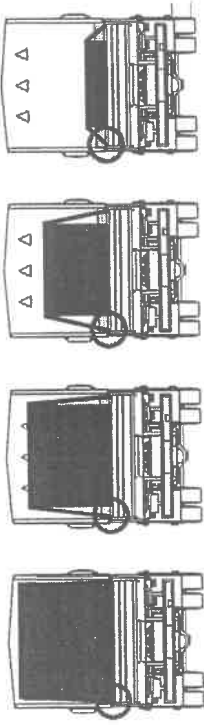
Containing, Immobilizing, and Securing Cargo Restraining the cargo correctly (Section 2.2.3.1) (continued)

Tiedowns that pass over the cargo

Tiedowns that pass over the cargo work by increasing the effective weight of the cargo (make the cargo seem heavier). This increases the pressure of the cargo on the deck and keeps the cargo from shifting.

Tension these tiedowns to as high an initial tension as possible.

The steeper the tiedown angle, the less shifting (ideally more than 45°).



What should you use in low-friction situations?

When there is low friction between the cargo and the deck (for example, with snow, ice, sand, gravel, and oil):

- ◆ Use tiedowns attached to the cargo.
- ◆ Use a means to improve the friction such as friction mats or tiedown that pass over the cargo.
- ◆ Use blocking and tiedowns.

2. General Cargo Securement Requirements

Containing, Immobilizing, and Securing Cargo Using adequate securing devices (continued)

Working Load Limits: marked components (Section 2.1.6)

Some manufacturers mark their manufactured securing devices with a numeric WLL value. The WLL for these devices is equal to the numeric value assigned by the manufacturer.

Other manufacturers mark components using a code or symbol that is defined in a recognized standard. For example:

A piece of grade 7 chain may be marked with a 70 or 700, in accordance with the standard of the National Association of Chain Manufacturers. The standard then gives the WLL for that piece of chain, depending on its size.

Working Load limits: unmarked components (Section 2.1.7)

Any securing device that is not marked by the manufacturer is considered to have a WLL as specified in Appendix A: Default WLLs for Unmarked Tiedowns.

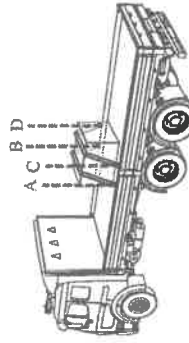
Carriers are recommended to purchase and use components that are rated and marked by their manufacturer. In that way, the carrier, driver, shipper and inspector can all verify that the proper equipment is being used for the job.



Friction mats, which are not marked by the manufacturer, are assumed to provide a resistance to horizontal movement equal to 50% of the cargo weight that is resting on the mat.

2. General Cargo Securement Requirements

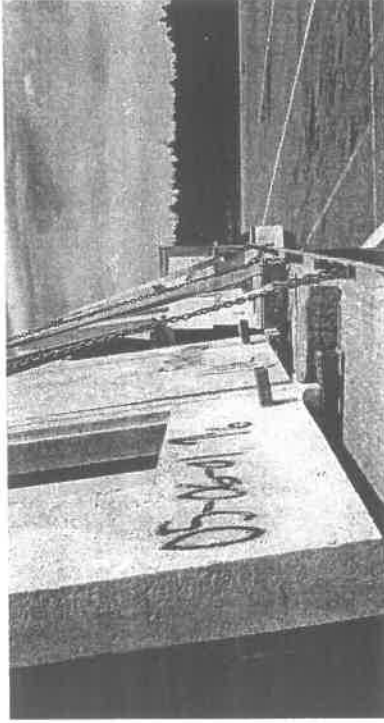
Containing, Immobilizing, and Securing Cargo Aggregate Working Load Limit (Section 2.2.3) (continued)



Example:
50% of A
+ 50% of B
+ 50% of C
+ 50% of D
= Aggregate Working Load Limit

How much should the Aggregate Working Load Limit be?

The aggregate working load limit of any securement system must be at least 50% of the weight of the cargo being secured.



2. General Cargo Securement Requirements

Inspection Requirements (Section 2.3.2) (continued)



(Section 2.3.3) The inspection rules in 2.3.2 do not apply to the driver of a sealed commercial motor vehicle who has been ordered not to open it to inspect its cargo or to the driver of a commercial motor vehicle that has been loaded in a manner that makes inspection of its cargo impracticable.

Driver inspection checklist

Pre-Trip

- ◆ Make sure that cargo is properly distributed and adequately secured (in other words, according to the Standard).
- ◆ Make sure that all securement equipment and vehicle structures are in good working order and used consistent with their capability.
- ◆ Stow vehicle equipment.
- ◆ Make sure that nothing obscures front and side views or interferes with the ability to drive the vehicle or respond in an emergency.

- ◆ Inform carrier if packaging is not adequate. For example:
 - Banding is loose or not symmetrical on package.
 - Banding attachment device(s) are inefficient.
 - Wrapping is broken or ineffective.
 - Pallet are broken.

Periodic inspections during transit

- ◆ Inspect cargo and securing devices.
- ◆ Adjust cargo or load securement devices as necessary to ensure that cargo cannot shift on or within, or fall from, the commercial motor vehicle.
- ◆ As necessary, add more securing devices.

Law enforcement inspections

Law enforcement is responsible for roadside inspections in accordance with federal, state, or provincial laws.

5. Metal Coils

What Does This Section Cover?

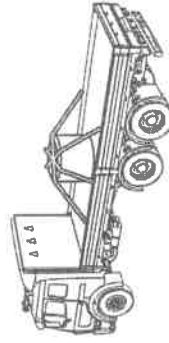
This section applies to coils of rolled sheet metal. Coiled wire is secured using the general cargo securement requirements (section 2).

Size of coil (Section 3.3.1)

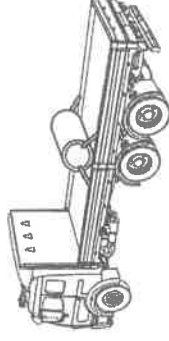
- ◆ All metal coil shipments that, individually or together, weigh 2,268 kg (5,000 lb.) or more must be secured according to the specific requirements in this section.
- ◆ Exception: Metal coils that weigh less than 2,268 kg (5,000 lb.) may be secured according to general securement requirements (Section 2).

Orientation of coil

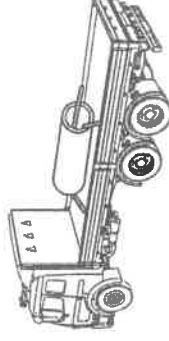
- ◆ Eyes vertical



- ◆ Eyes crosswise



- ◆ Eyes lengthwise



Type of Vehicle

The specific requirements are for metal coils transported:

- ◆ On flatbed vehicles.
- ◆ In sided vehicles with or without anchor points.
- ◆ In intermodal containers with or without anchor points.

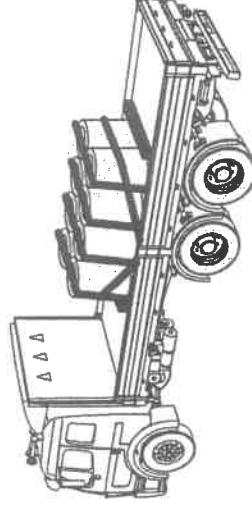
5. Metal Coils

Securing Coils Transported With Eyes Vertical on a Vehicle with Anchor Points (continued)

Requirements for securing a row of coils (Section 3.3.2.2)

- ◆ Attach at least one tiedown against front of row of coils to restrain against forward motion.
 - If possible, angle between tiedown and deck should be less than 45°, when viewed from the side of the vehicle.
- ◆ Attach at least one tiedown against rear of row of coils to restrain against rearward motion.
 - If possible, angle between tiedown and deck should be less than 45°, when viewed from the side of the vehicle.

- ◆ Attach at least one tiedown over top of each coil or side-by-side row of coils to restrain against vertical motion.
 - Tiedowns going over top of coil(s) must be as close as possible to eye of coil.
- ◆ Arrange tiedowns, blocking, or bracing to prevent shifting or tipping in all directions.



5. Metal Coils

Requirements for securing a single coil (Section 3.3.3.1) (continued)



The use of nailed blocking or cleats as the sole means to secure timbers, chocks or wedges, or a nailed wood cradle, is prohibited.

5. Metal Coils

Securing Coils Transported With Eyes Lengthwise on a Vehicle with Anchor Points (Section 3.3.4)

Requirements for securing an individual coil

There are three options for safely securing individual coils that are loaded with their eyes lengthwise. Blocking and supporting the coils is the same. The difference is in the tiedown arrangement.



Eyes Lengthwise

Prevent the coil from rolling

- ◆ Prevent the coil from rolling by supporting it:
 - Timbers, chocks, or wedges held in place by coil bunks or similar devices to prevent them from coming loose.

- A cradle (for example, two hardwood timbers and two coil bunks) that is restrained from sliding by:
 - Placing friction mats under the cradle
 - Using nailed wood blocking or cleats against the front timber
 - Placing a tiedown around the front of the cradle.
- ◆ The support must:
 - Support the coil off the deck.
 - Not become unintentionally unfastened or loose in transit.



The use of nailed blocking or cleats as the sole means to secure timbers, chocks or wedges, or a nailed wood cradle, is prohibited.

5. Metal Coils

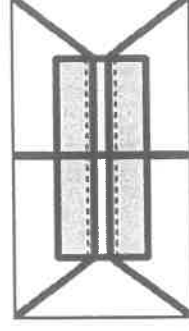
Securing Coils Transported With Eyes Lengthwise on a Vehicle with Anchor Points (Section 3.3.4) (continued)

Tiedowns, Single Coil Option #2 (Section 3.3.4.2)

Option #2 is the same as Option #1, except the tiedowns that attach through the eye of the coil are straight instead of diagonal.

- ◆ Attach at least one tiedown straight from the left side of the vehicle, through the eye, and back to the left side of the vehicle.
 - If possible, the angle between the tiedown and the deck should be less than 45°, when viewed from the side of the vehicle.
- ◆ Attach at least one tiedown straight from the right side of the vehicle, through the eye, and back to the right side of the vehicle.
 - If possible, the angle between the tiedown and the deck should be less than 45°, when viewed from the side of the vehicle.

- ◆ Attach at least one tiedown side-to-side over the top of the coil.
- ◆ Use blocking or friction mats to prevent forward movement.



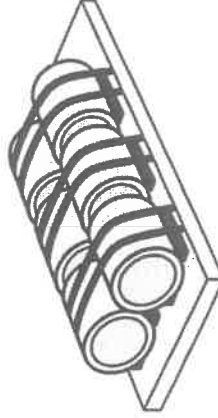
Option #2 Single Coil (Eye Lengthwise)

5. Metal Coils

Securing Coils Transported With Eyes Lengthwise on a Vehicle with Anchor Points (Section 3.3.4) (continued)

Requirements for securing rows of coils (Section 3.3.4.4)

A row of coils is three or more coils loaded in the same way and in a line.



Row of Coils

Prevent the coil from rolling

- ◆ Prevent the coil from rolling by supporting it:
 - Timbers, chocks, or wedges held in place by coil

bunks or similar devices to prevent them from coming loose.

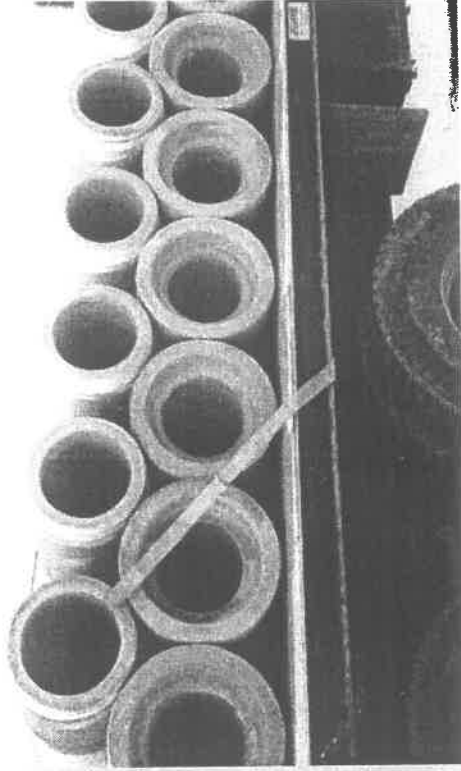
- A cradle (for example, two hardwood timbers and two coil bunks) that is restrained from sliding by:
 - Placing friction mats under the cradle
 - Using nailed wood blocking or cleats against the front timber
 - Placing a tiedown around the front of the cradle.
- ◆ The support must:
 - Support the coil just above the deck.
 - Not become unintentionally unfastened or loose in transit.



The use of nailed blocking or cleats as the sole means to secure timbers, chocks or wedges, or a nailed wood cradle, is prohibited.

7. Concrete Pipe Loaded Crosswise

| | |
|---|-------|
| What Does This Section Cover? | p. 83 |
| Securing Concrete Pipe | p. 84 |
| Arranging the Load | p. 86 |
| Special Circumstances | |
| Securing Pipe with an Inside Diameter up to 1.143 mm (45 in) | p. 90 |
| Securing Large Pipe with an Inside Diameter over 1.143 mm (45 in) | p. 93 |

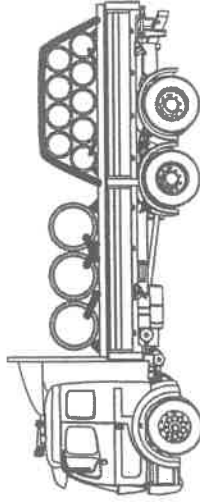


7. Concrete Pipe Loaded Crosswise

Securing Concrete Pipe

To make sure that concrete pipe does not roll or slide:

- ◆ Load pipe as compactly as possible.
- ◆ Immobilize symmetrically stacked pipes by securing them in groups.
- ◆ Use blocking systems and tiedowns to increase the effect of friction.



General tiedown requirements (Section 3.5.2)

- ◆ The aggregate working load limit of all tiedowns on any group of pipe must be more than half the total weight of all pipes in the group.
- ◆ Run a properly tensioned tiedown through a pipe in an upper tier or over lengthwise tiedowns. It will secure all the pipe beneath it on which the tiedown causes pressure.

7. Concrete Pipe Loaded Crosswise

Securing Concrete Pipe (continued)

Blocking requirements (Section 3.5.3) (continued)

- ◆ Blocking must be:
 - Placed against the pipe
 - Secured to prevent it from moving out from under the pipe.
- ◆ Timber blocking must have a minimum nominal dimension of 10 x 15 cm (4 x 6 in).

Arranging the Load (Section 3.5.4)

Requirements for arranging pipe with different diameter (Section 3.5.4.1)

- ◆ Load pipe of more than one diameter in groups that consist of pipe of only one size.
- ◆ Secure each group of pipe separately.



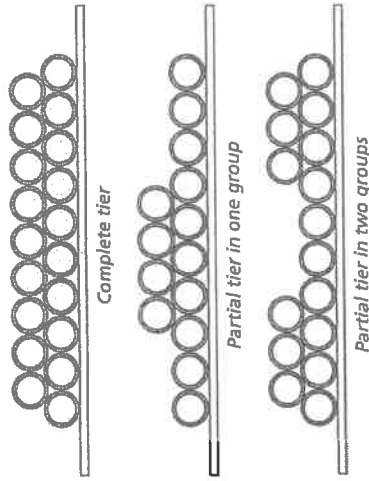
Arranging pipe with different diameter

7. Concrete Pipe Loaded Crosswise

Arranging the Load (Section 3.5.4) (continued)

Requirements for arranging the top tier (Section 3.5.4.4)

- ◆ Arrange the top tier as a complete tier, a partial tier in one group, or a partial tier in two groups.



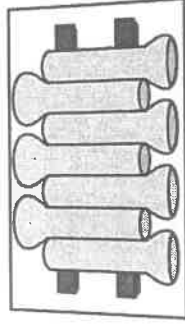
Requirements for arranging bell pipe (Section 3.5.4.5)

On spacers

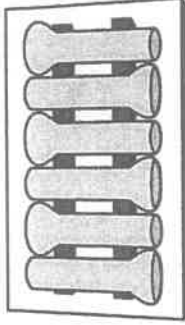
- ◆ Load bell pipe on at least two longitudinal spacers tall enough to ensure that the bell is clear of the deck.

One tier

- ◆ Load bell pipe on one tier so that the bells alternate on opposite sides of the vehicle.
- ◆ If possible, the ends of consecutive pipe must be staggered within the allowable width.
- ◆ If the ends cannot be staggered, they must be aligned.



Staggered ends



Aligned ends

7. Concrete Pipe Loaded Crosswise

Special Circumstances: Securing Pipe with an Inside Diameter Up to 1.143 m (45 in) (Section 3.5.5)

Concrete pipe with an inside diameter up to 1.143 m (45 in) can form a complete single tier on a typical flatbed vehicle. Larger pipe often can only be carried as a partial tier.



This pipe diameter of 1.143 m (45 in) is simply a convenient breaking point between "medium" and "large" diameter pipe.

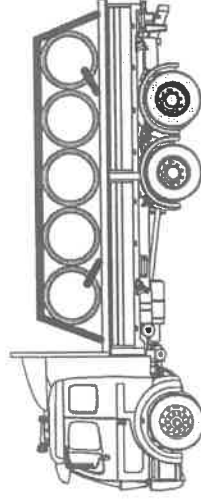


At least one tiedown through the front pipe of the bottom tier must run rearward at an angle not more than 45° with the horizontal when viewed from the side of the vehicle, whenever practical.

At least one tiedown through the rear pipe of the bottom tier must run forward at an angle not more than 45° with the horizontal when viewed from the side of the vehicle, whenever practical.

Requirements for stabilizing the bottom tier (Section 3.5.5.1)

- ◆ Arrange the load properly (see 3.5.4)
- ◆ Immobilize the front and rear pipe with one of the following elements.
 - Blocking
 - Wedges
 - Vehicle end structure
 - Stakes
 - Locked pipe unloader
 - Other equivalent means



Appropriate stabilization of bottom tier

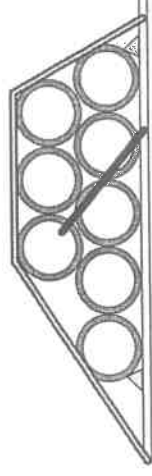
7. Concrete Pipe Loaded Crosswise

Special Circumstances: Securing Pipe with an Inside Diameter Up to 1.143 mm (45 in) (continued)

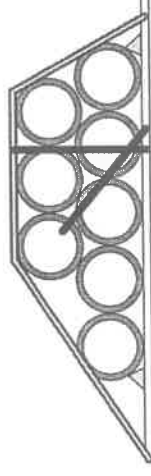
Requirements for stabilizing the top tier (Section 3.5.5.2)

If the first pipe of a group in the top tier is not at the front of the tier beneath:

- ◆ Attach an additional tiedown that runs rearward at an angle not more than 45° to the horizontal when viewed from the side of the vehicle, whenever practicle.
- ◆ Pass tiedown either through the front pipe of the upper tier or outside the front pipe and over both longitudinal tiedowns.



Correct securing of front pipe in partial second tier



Correct securing of front pipe in partial

7. Concrete Pipe Loaded Crosswise

Special Circumstances: Securing Large Pipe with an Inside Diameter over 1143 mm (45 in) (Section 3.5.6) (continued)

Requirements for securing the pipe (continued)

- ◆ Run at least two tiedowns through the front and rear pipe if they are not also in contact with one of the following:
 - Either the vehicle end structure
 - Or the stakes
 - Or a locked pipe unloader
 - Or other equivalent means.



If only one pipe is transported, or if several pipes are transported without contact between other pipes, the requirements of this section apply to each pipe as a single front and rear article. Tiedowns must be used through that pipe.

8. Intermodal Containers

What Does This Section Cover? (Section 3.6.1)

The requirements in this section apply to the transportation of all intermodal containers.



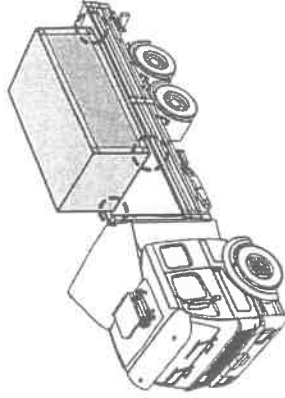
When securing cargo contained within an intermodal container, follow general cargo securement requirements (Section 2) or, if applicable, follow the commodity specific requirements.

8. Intermodal Containers

Special Circumstances: Securing Loaded Intermodal Containers on Non-Chassis Vehicles (Section 3.6.3)

Requirements for positioning the container

- ◆ Position the intermodal container so that:
 - Either all lower corners rest upon the vehicle.
 - Or the corners are supported by a structure capable of bearing the weight of the container. Independently secure the support structure to the vehicle.



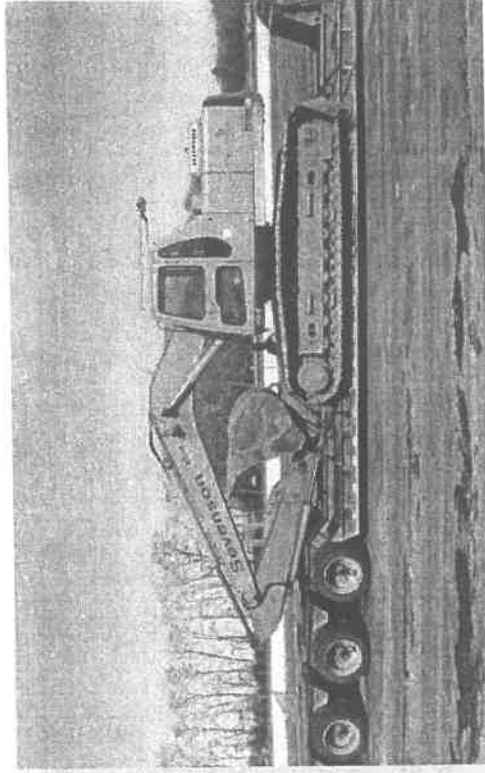
All four corners are resting upon the vehicle

Requirements for securing the container

- ◆ Secure each container to the vehicle by:
 - Either chains, wire ropes, or integral devices that are fixed to all lower corners.
 - Or crossed chains that are fixed to all upper corners.
 - Or both.
- ◆ Secure the front and rear of the loaded container independently.
- ◆ Secure the four corners using tiedowns that are attached to the loaded container.
 - The tiedowns must have an aggregate working load limit of at least 50% of the loaded weight of the loaded container.
- ◆ Attach each chain, wire rope, or integral locking device to the container in a manner that prevents it from becoming unfastened while in transit.

10. Heavy Vehicles, Equipment, and Machinery

| | |
|---|--------|
| What Does This Section Cover? | p. 104 |
| Preparing Equipment Being Transported | p. 105 |
| Securing Heavy Vehicles, Equipment, and Machinery | p. 106 |



10. Heavy Vehicles, Equipment, and Machinery

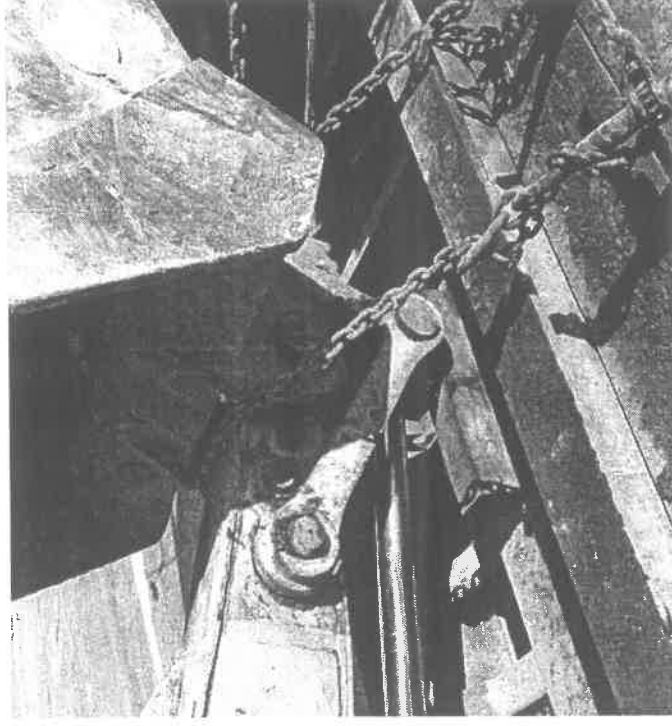
Preparing Equipment To Be Transported (Section 3.8.2)

Requirements

- ◆ Lower and secure to the vehicle all accessory equipment (hydraulic shovels, booms, etc.).
- ◆ Restrain articulated vehicles to prevent articulation while in transit.

Parking Brake

- ◆ Set the parking brake on the equipment being transported.



Appendix A: Default WLLs for Unmarked Tiedowns



Appendix A: Default WLLs for Unmarked Tiedowns

| MANILA ROPE | |
|-----------------|-------------------|
| Diameter | WLL |
| 10 mm (3/8 in) | 90 kg (205 lb.) |
| 11 mm (7/16 in) | 120 kg (265 lb.) |
| 13 mm (1/2 in) | 150 kg (315 lb.) |
| 16 mm (5/8 in) | 210 kg (465 lb.) |
| 20 mm (3/4 in) | 290 kg (640 lb.) |
| 25 mm (1 in) | 480 kg (1050 lb.) |

| WIRE ROPE (6 x 37, Fiber Core) | |
|--------------------------------|---------------------|
| Diameter | WLL |
| 7 mm (1/4 in) | 640 kg (1400 lb.) |
| 8 mm (5/16 in) | 950 kg (2100 lb.) |
| 10 mm (3/8 in) | 1360 kg (3000 lb.) |
| 11 mm (7/16 in) | 1860 kg (4100 lb.) |
| 13 mm (1/2 in) | 2400 kg (5300 lb.) |
| 16 mm (5/8 in) | 3770 kg (8300 lb.) |
| 20 mm (3/4 in) | 4940 kg (10900 lb.) |
| 22 mm (7/8 in) | 7300 kg (16100 lb.) |
| 25 mm (1 in) | 9480 kg (20900 lb.) |

Appendix A: Default WLLs for Unmarked Tiedowns

| NYLON ROPE | |
|-----------------|--------------------|
| Diameter | WLL |
| 10 mm (3/8 in) | 130 kg (278 lb.) |
| 11 mm (7/16 in) | 190 kg (410 lb.) |
| 13 mm (1/2 in) | 240 kg (525 lb.) |
| 16 mm (5/8 in) | 420 kg (935 lb.) |
| 20 mm (3/4 in) | 640 kg (1420 lb.) |
| 25 mm (1 in) | 1140 kg (2520 lb.) |

| DOUBLE BRAIDED NYLON ROPE | |
|---------------------------|--------------------|
| Diameter | WLL |
| 10 mm (3/8 in) | 150 kg (336 lb.) |
| 11 mm (7/16 in) | 230 kg (502 lb.) |
| 13 mm (1/2 in) | 300 kg (655 lb.) |
| 16 mm (5/8 in) | 510 kg (1130 lb.) |
| 20 mm (3/4 in) | 830 kg (1840 lb.) |
| 25 mm (1 in) | 1470 kg (3250 lb.) |

Appendix B: Glossary

| A | |
|------------------------------|---|
| Aggregate Working Load Limit | The summation of the working load limits or restraining capacity of all devices used to secure an article on a vehicle. |
| Anchor point | Part of the structure, fitting, or attachment on a vehicle or cargo to which a tiedown is attached. |
| Article of cargo | A unit of cargo, other than a liquid, gas, or aggregate that lacks physical structure (e.g. grain, gravel, etc.), including articles grouped together so that they can be handled as a single unit or unitized by wrapping, strapping, banding, or edge protection device(s). |
| B | |
| Banding | A strip of material that may be used to unitize articles and is tensioned and clamped or crimped back upon itself. (same as "Strapping") |
| Bell Pipe Concrete | Pipe whose flanged end is of larger diameter than its barrel. |
| Binder | A device used to tension a tiedown or combination of tiedowns. |
| Blocking | A structure, device, or another substantial article placed against or around an article to prevent horizontal movement of the article. |
| Bolster | A transverse load bearing structural component, particularly a part of a log bunk. |
| Boulder | A large piece of natural rock that may be rounded if it has been exposed to weather and water, or is rough if it has been quarried. |
| Bracing | A structure, device, or another substantial article placed against an article to prevent it from tipping that may also prevent it from shifting. |

Appendix B: Glossary

| C | |
|-------------------------------|--|
| Crosswise | Same as "Lateral" |
| Crown | The rounded profile of the top of a stack of logs, when viewed from the ends of the stack. |
| Cut-to-length logs | Included in shortwood. |
| D | |
| Deck | The load carrying area of a truck, trailer, or intermodal container. |
| Direct tiedown | A tiedown that is intended to provide direct resistance to potential shift of an article. |
| Direct tiedown | All loose materials used to support and protect cargo. |
| Dunnage bag | An inflatable bag intended to fill otherwise empty space between articles of cargo, or between articles of cargo and the wall of the vehicle. |
| E | |
| Edge protector | A device placed on the exposed edge of an article to distribute tiedown forces over a larger area of cargo than the tiedown itself, to protect the tie-down and/or cargo from damage, and to allow the tiedown to slide freely when being tensioned. |
| Eye (of a cylindrical object) | The hole through the centre of the article. |

Appendix B: Glossary

| I | |
|----------------------------|---|
| Indirect tiedown | A tiedown whose tension is intended to increase the pressure of an article or stack of articles on the deck of the vehicle. |
| Integral Locking Device | A device that is purposely designed and used to restrain an article of cargo on a vehicle by connecting and locking attachment point(s) on the article to anchor point(s) on the vehicle. |
| Integral Securement System | A feature of roll-on/roll-off containers and hook-lift containers and their related transport vehicles in which compatible front and rear hold down devices are mated to provide securement of the complete vehicle and its cargo |
| Intermodal Container | A reusable, transportable enclosure that is especially designed with integral locking devices that secure it to a container chassis trailer to facilitate the efficient and bulk shipping and transfer of goods by, or between various modes of transport, such as highway, rail, sea, and air. |
| J | |
| K | |
| L | |
| Lateral | Sideways, transverse, crosswise, or across a vehicle. |
| Lengthwise | Same as "Longitudinal" |
| Lift | A tier of dressed timber, steel, or other materials. |
| Load binder | A binder incorporating an over-centre locking action. |

Appendix B: Glossary

| R | |
|-----------------|--|
| Rail vehicle | A vehicle whose skeletal structure is fitted with stakes at the front and rear to contain logs loaded crosswise. |
| Restrained | An article that is not contained, but is prevented from tipping or shifting. |
| Rub Rail | A rail along the side of a vehicle that protects the side of the vehicle from impacts. |
| S | |
| Secured | Means by which cargo is contained or restrained. |
| Securing Device | Any device specifically manufactured as a means to attach or secure cargo to a vehicle or trailer. |
| Shackle | A U-shaped metal coupling link closed by a bolt. |
| Shift | A change in the longitudinal or lateral position or orientation of an article. |
| Shoring bar | A structural section placed transversely between the walls of a vehicle to prevent cargo from tipping or shifting. |
| Shortwood | All logs typically up to 4.9 m (16 feet) long. Such logs are often described as cut-up logs, cut-to-length logs, bolts, or pulpwood. Shortwood may be loaded lengthwise or crosswise, though that loaded crosswise is usually no more than 2.6 m (102 inches) long. |
| Sided Vehicle | A vehicle whose cargo compartment is enclosed on all four sides by walls of sufficient strength to contain cargo, where the walls may include latched openings for loading and unloading, and includes vans and dump bodies, and includes a sided intermodal container carried by a vehicle. |
| Skid | A platform or tray on which cargo is placed so that it can be handled as an article. (Same as "Pallet") |
| Spacer | Material placed beneath an article or between tiers of articles to |

Appendix B: Glossary

| T | |
|----------------------|---|
| Tractor-pole trailer | A vehicle that carries logs lengthwise so that they form the body of the vehicle. The logs are supported by a bunk located on the rear of the tractor and another bunk on the skeletal trailer. The bunks may rotate about a vertical axis, and the trailer may have a fixed, scoping, or cabled reach, or other mechanical freedom, to allow it to turn. |
| Transverse | (Same as "Lateral") |
| Twist lock | A device designed to support and fasten one corner of an intermodal container to a container chassis vehicle. |
| U | |
| Unitized load | A number of articles grouped together with sufficient structural integrity that they can be handled, transported and secured as a single article. |
| V | |
| Vehicle | A truck, truck tractor, trailer, or semitrailer individually or in combination. |
| Void Filler | Material used to fill a void between articles of cargo and the structure of the vehicle that has sufficient strength to prevent movement of the articles of cargo. |
| W | |
| Wedge | A tapered piece of material, thick at one end and thin at the other. |
| Well | The depression formed between two cylindrical articles when they are laid with their eyes horizontal and parallel against each other. |
| Winch | A device for tensioning a webbing or wire rope tiedown that is fitted with means to lock the initial tension. |

3/8 x 16 FT. G-70 BINDER CHAIN

WLL 6,600 Lbs.

Price each

G7TC375X16 \$33.00

<http://store.treecarehardware.com/chain-accessories--binder-chains--g-70.html>



<http://www.bairstow.com/chain1.htm>

Chain

[next >](#)

Welded Chain Grade 30, 43, 70, 80

G-80 Alloy Sling Chain

Tested and rated for overhead lifting.



| CODE NO. BLACK | CHAIN SIZE | WORKING LOAD LIMIT(LBS.) | DIA. | INSIDE WIDTH | INSIDE LENGTH | WEIGHT PER 100 FT. (LBS.) |
|-------------------|---------------|--------------------------------|------|-----------------|------------------|------------------------------|
| 140G80 | 1/4" | 3,500 | .28 | .39 | .83 | 74 |
| 380G80 | 3/8" | 7,100 | .39 | .55 | 1.2 | 151 |
| 120G80 | 1/2" | 12,000 | .51 | .71 | 1.5 | 253 |
| 580G80 | 5/8" | 18,100 | .63 | .87 | 1.9 | 382 |
| 340G80 | 3/4" | 28,300 | .75 | 1.0 | 2.2 | 524 |
| 780G80 | 7/8" | 34,200 | .87 | 1.2 | 2.6 | 738 |
| 100G80 | 1" | 47,700 | 1.0 | 1.4 | 3.1 | 996 |
| 114G80 | 1-1/4" | 72,300 | 1.26 | 1.7 | 3.8 | 1575 |

G-70 Premium Tie Down Chain

Not for overhead lifting.



| CODE NO. GOLD | CHAIN SIZE | WORKING LOAD LIMIT (LBS.) | DIA. | INSIDE WIDTH | INSIDE LENGTH | WEIGHT PER 100 FT. (LBS.) |
|---------------------|---------------|---------------------------------|------|-----------------|------------------|---------------------------------|
| 140G70 | 1/4" | 3,150 | .281 | .48 | .84 | 74 |
| 516G70 | 5/16" | 4,700 | .327 | .47 | .99 | 100 |
| 38G70 0 | 3/8" | 6,600 | .406 | .54 | 1.15 | 156 |
| 120G70 | 1/2" | 11,300 | .531 | .73 | 1.45 | 259 |

NOTE: G-70 Transport Chain has a gold dichromate finish.

DRIVER ACKNOWLEDGEMENT STATEMENT

I acknowledge receipt for the G&G Specialized Carriers Driver's Handbook on Cargo Securement, A Guide to the North American Cargo Securement Standard. This manual shows different types of loads G&G accepts as well as working load limits for chains and example of a G-70 chain. It was downloaded from the Federal Motor Carrier Safety Administration's Education and Technical Assistance website.

Applicant's Printed Name

Applicant's Signature

Date

Sign and turn this page into the G&G for recordkeeping purposes.