Closed Car Loading Guide

Part 8
(formerly Pamphlet No. 3)

Minimum Loading Standards for
Bagged and Baled Commodities
in Closed Cars
Minimum Loading Standards for
BAGGED AND BALED COMMODITIES
IN CLOSED CARS

Supersedes Pamphlet No. 3, Published October 1993
(Cancels G.I.S. Nos. 686, 690, 719, and 725)

Issued: July 2014

Published by
Transportation Technology Center, Inc.
55500 DOT Road
Pueblo, CO 81001

(Printed in U.S.A.)
© 2014
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Introduction</td>
<td>1–1</td>
</tr>
<tr>
<td>1.1 Overview</td>
<td>1–1</td>
</tr>
<tr>
<td>1.2 Reference Documents</td>
<td>1–1</td>
</tr>
<tr>
<td>1.3 Rail Transportation Environment</td>
<td>1–2</td>
</tr>
<tr>
<td>2.0 Selection and Preparation of Car.</td>
<td>2–1</td>
</tr>
<tr>
<td>2.1 Overview</td>
<td>2–1</td>
</tr>
<tr>
<td>2.2 Bulkhead Equipment</td>
<td>2–2</td>
</tr>
<tr>
<td>3.0 Load Planning</td>
<td>3–1</td>
</tr>
<tr>
<td>3.1 General Load Planning</td>
<td>3–1</td>
</tr>
<tr>
<td>3.2 Care and Protection of Rail Equipment</td>
<td>3–3</td>
</tr>
<tr>
<td>3.3 General Loading Principals</td>
<td>3–3</td>
</tr>
<tr>
<td>4.0 Packaging and Unitizing</td>
<td>4–1</td>
</tr>
<tr>
<td>4.1 Shipping Containers</td>
<td>4–1</td>
</tr>
<tr>
<td>4.2 Unitized Products—General</td>
<td>4–1</td>
</tr>
<tr>
<td>4.3 Slip-Sheeted Units</td>
<td>4–1</td>
</tr>
<tr>
<td>4.4 Palletized Units</td>
<td>4–2</td>
</tr>
<tr>
<td>4.5 Clamped Units</td>
<td>4–2</td>
</tr>
<tr>
<td>4.6 Dividers</td>
<td>4–3</td>
</tr>
<tr>
<td>4.7 Separators</td>
<td>4–4</td>
</tr>
<tr>
<td>5.0 Blocking and Bracing Materials</td>
<td>5–1</td>
</tr>
<tr>
<td>5.1 Steel Strapping</td>
<td>5–1</td>
</tr>
<tr>
<td>5.2 Nonmetallic Strapping</td>
<td>5–1</td>
</tr>
<tr>
<td>5.3 Lengthwise Filler Material</td>
<td>5–1</td>
</tr>
<tr>
<td>5.4 Crosswise Filler Material</td>
<td>5–2</td>
</tr>
<tr>
<td>5.5 Pneumatic Dunnage</td>
<td>5–3</td>
</tr>
<tr>
<td>6.0 Unit Loading</td>
<td>6–1</td>
</tr>
<tr>
<td>6.1 Palletized Bales in Bulkhead-Equipped Cars</td>
<td>6–1</td>
</tr>
<tr>
<td>6.2 Bagged Products on Pallets Secured with Cargo Nets</td>
<td>6–2</td>
</tr>
<tr>
<td>6.3 Palletized Powder Products, Pressed and Stretch Wrapped, in Cushioned Boxcars</td>
<td>6–4</td>
</tr>
<tr>
<td>6.4 Flour in Paper Bales on Slip Sheets</td>
<td>6–6</td>
</tr>
<tr>
<td>6.5 Bales of Wood Pulp in Boxcars Using Pneumatic Dunnage Bags as Lengthwise Bracing</td>
<td>6–7</td>
</tr>
<tr>
<td>7.0 Manual Loading</td>
<td>7–1</td>
</tr>
<tr>
<td>7.1 Overview</td>
<td>7–1</td>
</tr>
<tr>
<td>7.2 Key Sack Loading</td>
<td>7–1</td>
</tr>
<tr>
<td>7.3 Brick Wall Loading</td>
<td>7–3</td>
</tr>
<tr>
<td>8.0 Doorway Protection</td>
<td>8–1</td>
</tr>
<tr>
<td>8.1 Overview</td>
<td>8–1</td>
</tr>
<tr>
<td>8.2 Unit Loads</td>
<td>8–1</td>
</tr>
<tr>
<td>8.3 Manual Loads</td>
<td>8–1</td>
</tr>
<tr>
<td>8.4 Paper Bales</td>
<td>8–4</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 2.1 Bulkhead doors ................................................................. 2–2
Figure 3.1 Use of crosswise fillers .................................................. 3–2
Figure 3.2 Example of lift truck forks extending beyond unit ............. 3–3
Figure 4.1 Examples of maintaining vertical alignment of unitized containers ........................................ 4–1
Figure 4.2 Taping slip-sheet lips ....................................................... 4–2
Figure 4.3 Unitized double-layer pallet loads ................................. 4–3
Figure 4.4 Unitized double-layer bag or bale loads ......................... 4–4
Figure 5.1 Using lengthwise filler to fill pallet underhang ............... 5–1
Figure 5.2 Using lengthwise fillers .................................................. 5–2
Figure 5.3 Examples of fillers used to fill crosswise space ............... 5–2
Figure 5.4 Pneumatic dunnage ......................................................... 5–3
Figure 6.1 Palletized bales in bulkhead equipped cars .................... 6–1
Figure 6.2 Bagged products on pallets secured with cargo nets .......... 6–2
Figure 6.3 Cargo net attachment—top view ................................. 6–3
Figure 6.4 64 Pallets in a 60-foot boxcar ........................................ 6–4
Figure 6.5 Longitudinal void filler .................................................. 6–5
Figure 6.6 Flour in paper bales on slip sheets ................................. 6–6
Figure 6.7 Load plan—bales of wood pulp ..................................... 6–7
Figure 6.8 Bales of wood pulp ........................................................ 6–7
Figure 7.1 Key sack loading, ends of the car ................................. 7–1
Figure 7.2 Key sack loading, doorway ............................................ 7–2
Figure 7.3 Brick wall loading, ends of the car ............................... 7–3
Figure 7.4 Brick wall setback loading, doorway ......................... 7–4
Figure 8.1 Unitizing method for doorway protection ..................... 8–1
Figure 8.2 Unitizing method (duplex reinforced paper) for doorway protection in shipments of paper bags .......... 8–3
Figure 8.3 Conventional doorway strap application ...................... 8–4
Figure 8.4 Belt-type strap application ............................................ 8–6
Figure 8.5 Doorway unitizing strap application ............................. 8–7
LIST OF TABLES

Table 5.1  Performance level application guide ................................. 5–3
Table 8.1  Approved polyester cord strap applications ............................ 8–5
1.0 INTRODUCTION

1.1 Overview

1.1.1 The purpose of this guide is to relate basic good car loading procedures that have been developed through laboratory and field testing, engineering studies, and accumulated experience in rail transportation. Compliance with the “Minimum Loading Standards” contained herein will ensure conformance with Circular No. 42-K rules and provide adequate protection for lading from sources of damage in the normal railroad environment.

1.1.2 The general rules contained in Circular No. 42-K or supplements thereto issued by the AAR are formulated for the purpose of providing safe methods of loading boxcars and must be observed.

1.1.3 The loading rules and/or practices apply to shipments transported in the USA, Canada, and Mexico.

1.1.4 The loading methods in individual closed car loading publications issued by AAR’s Damage Prevention and Loading Services are minimum standards that have been evaluated and approved by the AAR Damage Prevention and Freight Claim Committee. The minimum standards offer practical guidelines on the subjects covered. Because these are minimum standards, it may be necessary to supplement the methods in some instances.

1.1.5 Securement standards in AAR closed car loading publications are intended for safe transit of the railcar from origin to destination and for the prevention of lading and equipment damage. The standards do not address unloading practices.

1.1.6 Loading and bracing methods not currently approved may receive consideration for approval and publication under the Damage Prevention and Loading Services General Information Bulletin, No. 2, “Procedures Governing Evaluation and Acceptance of New Closed Car Loading and Bracing Methods and Materials.” Submit requests to Director, Damage Prevention and Loading Services, Association of American Railroads, Transportation Technology Center, Inc., 55500 DOT Road, Pueblo, CO 81001.

1.1.7 CAUTION: Car rocking motion caused by lift equipment entering and/or exiting the railcar may cause unsupported packages or articles with a high center of gravity to fall to the floor. Minimize access to the car. Exercise caution when inside a partially loaded car. Lift operators should stay on lift equipment, whenever possible, while inside a partially loaded car.

1.2 Reference Documents

1.2.1 Circular No. 42-K (or supplements thereto)
“General Rules Covering Loading of Carload Shipments of Commodities in Closed Cars”—These requirements must be observed in all closed car loading activities to ensure safe transit of the railcar from origin to destination, thereby eliminating hazard to railroad operation.

1.2.2 Circular No. 43-E (or supplements thereto)
“Rules Governing the Loading, Blocking, and Bracing of Freight in Closed Trailers and Containers for TOFC/COFC Service”—This publication contains the requirements covering loads in trailers or containers.
1.3 Rail Transportation Environment

1.3.1 There are inherent characteristics of the rail environment that must be understood to recognize the need for many of the requirements identified in this publication.

1.3.2 Forces encountered within the rail vehicle are induced by shock and/or vibration. In most instances, the force is a complex result of both shock and vibration. Force input due to shock is mainly a result of impacts during switching and train slack action (run-in and run-out during train movement). Force input due to vibration is a result of the movement of the railcar's wheels on the rails. This vibration force can act either in a vertical or lateral plane. These forces are due to the movement of the car wheels on the rails, the truck geometry, rail joints, rail elasticity, nonuniformities of the rail and wheels, and overall track condition. When all these factors are acting on a rail vehicle, the resultant force is very complex.

1.3.3 The lading in a rail vehicle can also generate forces; for instance, in canned commodities, the metal cans can act as springs. For multilayer loads in the rail vehicle, any vertical force input in the bottom layers can be greatly amplified as it travels to the top layers. This is the transmissibility factor due to the harmonics of a particular stack or column of containers.

1.3.4 Uncontrolled movement and/or displacement of the lading in a rail vehicle can cause safety problems, equipment failure, damage, and unloading problems. The following minimum loading standards in conjunction with proper packaging will provide safe arrivals.
2.0 SELECTION AND PREPARATION OF CAR

2.1 Overview

2.1.1 Railroads are responsible for supplying cars that are clean and have sound roofs, sides, and square endwalls; smooth floors; and snug-fitting doors. Any exception is cause for rejection. Shippers are responsible for inspecting interiors of cars to see that they are suitable to carry lading safely and damage-free.

2.1.2 Before attempting to open the doors of any railcar, check to make sure that all hardware is intact so that the doors open safely. Check the door tracks to make sure they are equipped with stops on the ends so that the doors do not fall off when opened.

- It is critical to check locking bars and related hardware to make sure you can safely open plug doors.
- Make sure the doors are operating correctly before fully opening them. There is always the possibility that material or lading may be leaning against the inside doors or is applying pressure.
- Use extreme care when opening any type of railcar door to protect against injury.

2.1.3 Always check the car to see if water entry is possible. Make sure that the car is watertight. Look for light leaks or evidence of new or large amounts of rust, which may indicate recent water entry into the car.

(Note to customers: Notify appropriate carriers immediately if railcars are received with water damage to ensure that the car is shopped and repaired before the car is used again.)

2.1.4 Check the car floors for any holes or rough surfaces that may result in leakage or damage to the product.

2.1.5 Inspect the cars for any protrusions or rough, broken, or bent surfaces that could result in damage to the product. It is important that cars are clean and free from nails, brads, staples, fragments of steel, and dunnage remnants. To prevent damage, cover projections of lining or anchor devices with protective materials taped in place or otherwise adequately secured.

2.1.6 Check the endwalls to make sure they are not bowed. If the endwall is severely bowed, reject the car. If the endwalls are bowed and you need to use the car, use materials of appropriate size and strength to bring the endwalls back to square. This will help to ensure that the load remains tight during its journey.

2.1.7 If the car supplied is not suitable for loading and the shipper elects to load the car rather than reject it, it is the shipper's responsibility to properly prepare the car.

2.1.8 Cover rough surfaces with fiberboard sheets or other suitable materials. Do not use kraft paper.

2.1.9 In refrigerator cars, cover floor racks with at least a single thickness of corrugated fiberboard, placing the corrugations lengthwise of the car to prevent rolling or bunching. Abut sheets on the floor and do not overlap. Make the interior endwall adjacent to the motor compartment flush with the endwalls by adding several thicknesses of corrugated fiberboard.

2.1.10 When plug doors do not provide a flush surface with the car's sidewalls, use protective material such as corrugated fiberboard.

2.1.11 The loading methods illustrated in this guide have a proven track record of success in specific car types. Please note the type of car for which each method is used. Failure to use the proper loading method in the proper type of equipment will result in damage to the product and a dissatisfied customer (i.e., if a loading method is shown for use in a cushion equipped car, use that loading method only in cushion-equipped cars).
2.2 Bulkhead Equipment

2.2.1 When cars are equipped with bulkhead doors, inspect the doors to determine if they can be moved safely, then move the doors to approximately where they will be located under load. Engage the locking mechanisms to make certain they are operational. Inspect for full extension all locking pins at the top and bottom of the bulkhead doors. Locking pins must penetrate the tracks a minimum of ½ in. Tapered locking pins must penetrate the tracks a minimum of ½ in. beyond the taper (see Figure 2.1).

![Figure 2.1 Bulkhead doors](image)

**Fig. 2.1 Bulkhead doors**

2.2.2 The weight of cargo restrained by each bulkhead must not exceed one-half of the load limit stenciled on the car sides.

2.2.3 Examine all bulkhead doors before loading. This cannot be emphasized too strongly. Before moving a bulkhead door, inspect the overhead assembly to determine if it is in good condition so the door can be moved safely.

2.2.4 Inspect locking handles to determine if they function properly. Inspect locking pins to make sure they penetrate into the holes of the overhead and floor locking tracks. If locking pins do not penetrate, DO NOT LOAD.

2.2.5 After cargo is loaded, place the door squarely (straight up and down) and snugly against the load, and lock into place. If the face of the load is not flush, use filler material to make it flush. If the door’s surface is not smooth, protect the product with fiberboard.

2.2.6 Inspect the locking pins to make sure they have penetrated the overhead and floor locking tracks a minimum of ½ in. Tapered locking pins must penetrate the tracks a minimum of ½ in. beyond the taper.
3.0 LOAD PLANNING

3.1 General Load Planning

3.1.1 Load, block, or brace commodities tightly lengthwise and crosswise to eliminate all void spaces, which are primary reasons for damage. Take up any void spaces remaining in a car. Use blocking, fillers, and other suitable materials, and secure them in accordance with the methods outlined in this guide and other guides listed on the back cover of this book.

3.1.2 Load and secure lading to permit unloading from either side of the railcar, except when dimensions of individual units of freight prohibit unloading from either side of the car.

3.1.3 Inspect lading before loading car. Do not load damaged lading.

3.1.4 Evenly distribute the weight of loads from side-to-side and end-to-end in the car and to a uniform height of lading insofar as lading permits. Always center the units in the doorway area along the lengthwise centerline of the car.

3.1.5 Plan loads so that a combination of endwall fillers, separators, and center bracing will facilitate unloading lengthwise lifts from both sides of cars equipped with staggered doors.

3.1.6 Stow lading in a manner to prevent contact with doorposts.

3.1.7 Fill all lengthwise space with lading and with lading and filler material, or appropriately block and brace.

3.1.8 When there is a possibility of lading falling or rolling out of the doorway or coming in contact with sliding or plug-type side doors, protect openings with wood doorway protection, steel straps, or other material of sufficient strength and number, and adequately secure it.

3.1.9 Apply temporary bracing in partly loaded or unloaded cars that will be switched during the process of loading or unloading.

3.1.10 Plan load so that crosswise space is minimized without exceeding an aggregate of 18 in., unless additional appropriate bracing is used. Maintain vertical alignment to prevent crosswise movement.

3.1.11 Load units in a straight line lengthwise in the car to ensure face-to-face unit alignment. If unit alignment is not maintained, use divider sheets. Crosswise space may be filled with product placed alongsidewalls or down the center with protective material separating hand-stacked and unitized lading, unless other means of maintaining vertical alignment of the units are used.
3.1.12 When cars are pallet or slip-sheet loaded, load the units against the sidewalls and apply lateral void fillers in voids between the unit rows. Units may also be loaded tight against one sidewall and fillers applied between the units and the other sidewall, and alternated in opposite ends (see Figure 3.1).

**Figure 3.1 Use of crosswise fillers**
3.2 Care and Protection of Rail Equipment

3.2.1 Have lift truck operators use extreme care in turning units within cars or backing a lift truck out of car doors to avoid damage to sidewalls and bulkhead doors. Do not use lift equipment to open or close railcar side doors or to position bulkhead doors.

3.2.2 Some lift truck forks are longer than the units being loaded or unloaded. Have lift truck operators use extreme care so that the forks do not protrude through and beyond the units and damage the product or the endwall of the car beyond the unit being handled. See Figure 3.2.

3.2.3 Secure bulkhead doors across the doorposts or as otherwise stenciled, and lock in position before releasing empty cars.

3.3 General Loading Principals

3.3.1 Load is tight crosswise and lengthwise in the car.

3.3.2 Follow proper loading procedures, such as the following:
- Do not load damaged product.
- Place lighter products on top of heavier products.
- Load containers together that combine well into a bonded pattern.
- Load shipping containers with similar characteristics together.
- Avoid floating layers, if possible.
- Use separators and dividers, as necessary. (See paragraphs 4.6 and 4.7.)

3.3.3 When shipments in noninsulated cars are subjected to climatic changes leading to condensation, it may be necessary to use protection over the top of the load.

Figure 3.2 Example of lift truck forks extending beyond unit

FORKS EXTEND BEYOND BOTTOM OF UNIT

Figure 3.2 Example of lift truck forks extending beyond unit

FORKS EXTEND BEYOND BOTTOM OF UNIT
4.0 PACKAGING AND UNITIZING

4.1 Shipping Containers

4.1.1 Do not load either overfilled or under-filled bags. A bag flattener or de-aerating machine is helpful in detecting poor closures. Flattened bags also lend themselves more readily to unitizing and car loading, permitting a more compact and stable load. If stitching is the method of closure, inspect the machine as often as necessary to ensure that proper tension is being maintained and that the spacing and the size of the hole are correct. If heat-sealing is the method of closure, securely close bags to carry contents safely and prevent leaking.

4.1.2 Use bales that have dimensions that afford a tight fit of contents. Check the closure process periodically to see that the proper amount of adhesive is being applied.

4.1.3 Do not load shipping containers that are fatigued, torn, wet, or severely creased.

4.2 Unitized Products—General

Unitizing shipping containers is an efficient means of handling, storing, loading, transporting, and unloading, which contributes to efficient utilization of carrier equipment. The following guidelines suggest ways to obtain the best stack stability in unit loads.

4.2.1 Form individual units of shipping containers into a bonded block pattern, when practical.

4.2.2 Eliminate all voids within the pattern.

4.2.3 Maintain vertical alignment of shipping containers on wooden pallets by using fillers, corrugated sleeves, corner protectors and strapping, stretch wrapping, shrink wrapping, spot gluing, taping, or other methods proven by shipment (see Figure 4.1).

4.3 Slip-Sheeted Units

4.3.1 Match slip-sheet strength to the weight of the load. For lightweight cases, use corrugated slip sheets (with corrugations running lengthwise to load), lightweight solid fiber, or plastic slip sheets. For heavyweight cases and bagged or baled products, use heavyweight solid-fiber slip sheets to avoid tearing the lips.

4.3.2 Use a slip sheet that is the same size as the footprint of the unit load that it supports.
4.3.3 Tape or secure slip-sheet lips to prevent damaging adjacent units and to facilitate unloading (see Figure 4.2).

4.3.4 Have units provide unit-to-unit contact lengthwise in car.

4.3.5 To facilitate unloading, double sheet the doorway units so that a lip under each unit faces each car door.

4.4 Palletized Units

4.4.1 Ensure that pallets are of sufficient strength for the type of product handled and are in good condition with no broken boards or protruding objects.

4.4.2 When loading, provide palletized units with unit-to-unit contact with minimum overhang of shipping containers on pallets. Pallet under-hang is not permitted lengthwise of the railcar except when filled with approved filler material. (See paragraph 5.3.)

4.4.3 In double-layer pallet loads, have units equal in height to ensure pallet contact both longitudinally and laterally. If this is not the case, separate stacks of units with suitable divider sheets. (See paragraph 4.6.) Use separators between pallet and product. (See paragraph 4.7.)

4.4.4 Load and brace lading to permit unloading from either side of railcar. Use four-way entry pallets in doorway, if possible.

4.5 Clamped Units

4.5.1 When cars are clamp-loaded and side voids exist, apply fillers along both sidewalls in the car and in the center void.

4.5.2 In the doorway area, use fiberboard divider sheets adjacent to each side of the doorway units to facilitate unloading.
4.6 Dividers

4.6.1 The construction and quantity of properly installed divider sheets will vary based on many factors (e.g., density of product and weight of load). The following are the minimum standards for use of divider sheets in cars that do not have cushioning devices or load restraining devices. Shippers are expected to cooperate with carriers when it can be demonstrated that additional use of divider sheets is necessary to avoid excessive damage.

4.6.2 When shipping containers of significant height differences or when bags/bales and boxes are loaded in cars that do not have cushioning devices or load-restraining devices, use corrugated or solid fiberboard divider sheets where these differences occur within the load. The divider sheets may also absorb some of the creasing that would otherwise appear on the shipping containers. Use corrugated or solid fiberboard divider sheets approximately the same width and height as the load. When corrugated divider sheets are used, place the divider sheets so that corrugations are vertical. See Figure 4.3.

Figure 4.3 Unitized double-layer pallet loads

4.6.3 For stretch-wrapped units of fiberboard boxes, use divider sheets between doorway stacks to facilitate unloading. Divider sheets are not required for loads that are stretch-wrapped and meet the following criteria:

- Weight limitation: Floor layer units must not exceed 35,000 lb; double-decked loads must not exceed 70,000 lb.
- No lengthwise void is allowed in unit patterns, except for pinwheel or chimney-stacked units or similar bonded blocks.
4.7 Separators
Use separator sheets to protect the top of units when stacked (see Figure 4.4).

Figure 4.4 Unitized double-layer bag or bale loads
5.0 BLOCKING AND BRACING MATERIALS

5.1 Steel Strapping

5.1.1 Use the proper combination of steel straps, seals, sealing tools, notches, or crimps to provide a minimum breaking strength of 4,725 lb and 75% joint efficiency for all doorway protection straps.

5.1.2 Use metal protectors, such as corner guards or plates, sufficient to provide a suitable radius to protect straps at all points on lading having sharp edges and/or sharp corners.

5.1.3 Use tensioning and sealing equipment properly. Check the tools periodically to ensure their efficiency.

5.1.4 More detailed information regarding steel strapping is available in the Closed Car Loading Guide, Part 1, (formerly Pamphlet No. 14), “Minimum Loading Standards for Freight in General Purpose Boxcars.”

NOTE: For the latest updates of approved strapping, go to the TTCI Web site at http://www.aar.com/standards/open_top_loading_approvals.php.

5.2 Nonmetallic Strapping

5.2.1 Use the proper combination of nonmetallic straps, seals, and sealing tools to provide a minimum breaking strength of 3,285 lb and 75% joint efficiency for all doorway protection straps.

5.2.2 More detailed information regarding nonmetallic strapping is available in the Closed Car Loading Guide, Part 1, (formerly Pamphlet No. 14), “Minimum Loading Standards for Freight in General Purpose Boxcars.”

NOTE: For the latest updates of approved strapping, go to the TTCI Web site at http://www.aar.com/standards/open_top_loading_approvals.php.

5.3 Lengthwise Filler Material

5.3.1 Filler construction: lengthwise void fillers must be of uniform strength over the face of the void filler and capable of withstanding a load of 1,500 lb/ft² (test full-dimension filler sheet), as shown in Figures 5.1 and 5.2.

Fig. 5.1 Using lengthwise filler to fill pallet underhang
5.3.2 Make the height and width dimensions of the faces of the filler material as near as possible to the dimensions of the faces of the units they will be separating.

5.3.3 Do not reuse filler material if it has been damaged and is no longer capable of filling the intended void, or if there is any evidence of creasing or damage to the core, which might reduce the compression strength of the filler.

5.3.4 Do not use lengthwise void filler material as a bulkhead or in lieu of a bulkhead.

5.4 Crosswise Filler Material

5.4.1 Plan load so that crosswise space is minimized without exceeding an aggregate of 18 in., unless additional appropriate bracing is used. Maintain vertical alignment to prevent crosswise movement. See Figure 5.3.
5.5 Pneumatic Dunnage

5.5.1 Table 5.1 defines five levels of performance for pneumatic dunnage:
- Level 1 for pneumatic dunnage as lateral void fillers (and load securement in certain intermodal applications)
- Levels 2 to 5 for pneumatic dunnage as lengthwise void fillers in flat platen-type applications with varied performance requirements

Pneumatic dunnage meeting Level 2 to 5 requirements fulfills all Level 1 requirements.

Table 5.1 Performance level application guide

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>For filling lateral voids, primarily in intermodal loads</td>
</tr>
<tr>
<td>Level 2</td>
<td>For filling lengthwise voids in loads weighing up to 75,000 lb</td>
</tr>
<tr>
<td>Level 3</td>
<td>For filling lengthwise voids in loads weighing up to 160,000 lb</td>
</tr>
<tr>
<td>Levels 4 and 5</td>
<td>For filling lengthwise voids in loads weighing up to 216,000 lb</td>
</tr>
</tbody>
</table>

5.5.2 Usage guidelines: follow the manufacturer’s instructions on care and storage of bags prior to use. Inflate bags with an approved inflator, in accordance with the manufacturer’s instructions.

5.5.3 After inflation, check to see that dunnage bags are approximately the same size as the face of the load. Do not extend the dunnage bag beyond the face of the load. See Figure 5.4.

5.5.4 Use buffer material of sufficient strength to prevent it from conforming to dunnage bag contour, to prevent chafing, to prevent dunnage bag from crushing load at proper inflation pressure, and to prevent lading from damaging dunnage bags.

5.5.5 Use buffer material equal or slightly larger in size than face of lading. Have lading adjacent to bag(s) nearly equal in height on each side of bag.

5.5.6 Inflation pressure may vary from 2 psig to 10 psig depending on the nature of lading and the level of air bag used.

5.5.7 Void size after inflation will be from 4 in. to 12 in. See applicable commodity publications for possible exceptions to this limitation.
5.5.8 Use inflatable dunnage to fill lengthwise voids of 4 to 18 in. after inflation for bales and bags. For fiberboard box goods, keep the void as narrow as practical, preferably 4 to 10 in. to a maximum of 12 in. after inflation. Inflate to 3 psi to 6 psi depending on the nature of the lading, and use an air gauge to ensure proper inflation pressure.

5.5.9 Install bag(s) so that the bottom(s) will be a minimum of 1 in. above the floor after inflation. Apply protective material (e.g., fiberboard) between the bag and floor.

5.5.10 Use hold-down methods when necessary to prevent bag displacement from the void area.

5.5.11 Use an air gauge to ensure prescribed air pressure at inflation. Recheck air pressure one-half hour after inflation for leakage.

5.5.12 Use clean and dry air to fill dunnage bags.

5.5.13 Do not use bags in tandem (back-to-back). Do not use dunnage bags to fill more than one lengthwise void in a car.

5.5.14 Use two bag systems unless otherwise specified.

5.5.15 When loading single layer units, use one bag positioned horizontally. For units loaded two layers high, use two bags positioned vertically or horizontally adjacent to each other. Normally a 48- by 96-in. bag is compatible with side-by-side unit loads measuring 48 in. long by 40 in. wide to 54 in. high.

5.5.16 For bags and bales, use a minimum of two sheets of 275-lb double-wall fiberboard buffer material between each side of dunnage and lading.

5.5.17 Reusable dunnage bags intended for use only in filling crosswise (lateral) voids must be prominently marked by the manufacturer to indicate proper application. Never use bags marked for this application to fill lengthwise voids.

5.5.18 Leave the door of the car open after loading is completed, and check bag 30 minutes after installation for leakage.

5.5.19 For further information, refer to AAR General Information Bulletin No. 9, “Product Performance Profile for Pneumatic Dunnage.”

5.5.20 See http://www.aar.com/standards/dpls/pfds/PPPD_Verification_List.pdf for the most current “Product Performance Profile for Pneumatic Dunnage Product Verification List.”
6.0 UNIT LOADING

6.1 Palletized Bales in Bulkhead-Equipped Cars

6.1.1 Fill all lengthwise voids between bulkhead and end walls. See Figure 6.1.

6.1.2 In double-layered loads, divider sheets are not required if bottom layer is equal in height throughout the load.

6.1.3 In double-layered loads, place the units against each sidewall, utilizing authorized cross-car fillers between the units. Extend fillers from the top of the second layer unit to a length at least covering the top third of the bottom layer unit.

6.1.4 Use load-divider bulkhead doors to brace each end of the car. See instructions for bulkhead doors in paragraph 2.2.
6.2 Bagged Products on Pallets Secured with Cargo Nets

6.2.1 Use only cushion-equipped boxcars specially equipped with sidewall anchors to accommodate cargo net straps.

6.2.2 Inspect the cargo net and associated assemblies for suitability prior to loading. Worn, missing, or corroded components and/or stitching may be cause for rejection.

6.2.3 This method involves the use of polyester web strap cargo nets for securement of bagged products stowed on wood pallets loaded in cushioned-equipped boxcars. Use four cargo nets to secure four sections of product, two sections in each end of the boxcar. Secure the cargo nets to each sidewall across the face of each section. Cargo nets (Figure 6.2) are typically 117 in. high by 96 in. wide and constructed of two 12-, five 3- and ten 2-in.-wide straps. The minimum breaking strength of each cargo net assembly is 65,000 lb.

![Diagram of bagged products on pallets secured with cargo nets]

Figure 6.2 Bagged products on pallets secured with cargo nets

6.2.4 Secure all palletized bags loaded by this method with plastic stretch film.
6.2.5 Use this loading method with bagged products stowed on wood pallets and secured with plastic stretch film in specially cushioned-equipped boxcars. The units are generally loaded two wide by two and/or three high. Figure 6.3 shows an example of the load patterns and position of the cargo nets. The number of units actually loaded will depend on product weight and order requirements.

![Figure 6.3 Cargo net attachment—top view](image)

6.2.6 Prior to commodity loading, secure the cargo nets along one sidewall by connecting the five short 3-in.-wide cross straps into the locator bolts in the channel iron attached at the sidewalls. Securement points are on the sidewall opposite of the sidewall with the ratchets attached. There are multiple bolt holes in the channel to allow adjustment so that nets are properly placed at the corner of the load. Thread the steel rod through the end loop of the strap and through the holes in the channel iron attached to the sidewall. Hang the five long 3-in.-wide cross straps on the sidewall. The cargo net should be above the railcar floor.

6.2.7 Starting at each end wall, load all units tightly together—two units wide with each stack centered in the boxcar—leaving any remaining lateral void between the units and the sidewalls.

6.2.8 After loading three stacks of units, position the first cargo net across the face of this section. Starting at the top, thread each of the five long 3-in.-wide straps behind the locator bolts, located a minimum of 12 in. from face of load, and through the reel bars in the ratchets attached to the sidewalls. (Use any of the positioning holes on the channel iron to achieve the desired distance.) Pull the straps tight to eliminate any slack. Position the 12 in. vertical cargo net corner pieces to achieve a balanced “wrap” at each corner. Operate the ratchet handle back and forth until the cargo net is properly tensioned. Ratchets must have at least two wraps of webbing on the reels to ensure no slippage. Avoid excess wrapping as this may cause the ratchet to jam and become difficult to unlock at destination.

6.2.9 After loading the next three stacks of pallets, position the second cargo net across the face of this section. Secure the cargo net in the same manner as outlined in paragraph 6.2.8.

6.2.10 Continue to load the opposite end of the car in the same manner.

6.2.11 When loading is completed in each section, check that each cargo net strap is properly tensioned.
UNIT LOADING

6.3 Palletized Powder Products, Pressed and Stretch Wrapped, in Cushioned Boxcars

6.3.1 This loading method was tested using pallets measuring 56 in. × 48 in. and stacked with 50 or 56 50-lb bags of talc products.

6.3.2 Compress each pallet vertically in a press before applying stretch wrap.

6.3.3 Load pallets two across and two high throughout the car. See Figure 6.4.

Figure 6.4 64 Pallets in a 60-foot boxcar
6.3.4 Fill remaining space in each row with filler panels having a minimum crush strength of 1,500 lb/ft² and reinforced as shown in Figure 6.5. At a minimum, locate appropriately sized blocks of such strength as illustrated.

![Figure 6.5 Longitudinal void filler](image)

6.3.5 Use dividers and separator sheets as necessary between rows, stacks, and layers to prevent product-to-pallet contact.

6.3.6 Use filler material as needed to fill any remaining crosswise space greater than 18 in.
6.4 Flour in Paper Bales on Slip Sheets

6.4.1 To facilitate unloading, place divider sheets between doorway stacks and double slip sheet doorway units, as shown in Figure 6.6.

6.4.2 Fill all lengthwise voids.

6.4.3 For single layers, load the units down the center of railcar with voids equally divided at sidewalls.

6.4.4 Do not exceed 18 in. for the crosswise void, except for in the doorway area where it is necessary to turn the units to fill the lengthwise void.

6.4.5 Cross-car fillers are not required under these conditions if vertical alignment is maintained during transit.

6.4.6 Use two slip sheets for all units placed in the doorway area of the car to allow unloading from either door of the car. Tape the slip sheet lips on both sides of the units.

6.4.7 Hand-stacked bales must contact a minimum of 75% of the adjacent units.

6.4.8 Use doorway protection for sliding-door cars.

Figure 6.6 Flour in paper bales on slip sheets
6.5 Bales of Wood Pulp in Boxcars Using Pneumatic Dunnage Bags as Lengthwise Bracing

6.5.1 Use this method for loading bales of hardwood or softwood pulp in boxcars with inside lengths of 50 ft to 50 ft 9 in. and accumulated lateral voids of 18 in. or less. Use the appropriate level of pneumatic dunnage for lengthwise bracing, as shown in Figures 6.7 and 6.8.

<table>
<thead>
<tr>
<th>2</th>
<th>1</th>
<th>2</th>
<th>1</th>
<th>2</th>
<th>1</th>
<th>2</th>
<th>1</th>
<th>1</th>
<th>2</th>
<th>1</th>
<th>2</th>
<th>1</th>
<th>2</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

**Figure 6.7 Load plan—bales of wood pulp**

6.5.2 Use facing material as needed to protect dunnage bags or to reduce void (see Figure 6.8).

6.5.3 Alternate any lateral voids from sidewall to sidewall to achieve load balance (see Figure 6.8).
UNIT LOADING

6.5.4 Use doorway protection for both plug- and sliding-type doors. Use steel strapping or approved nonmetallic strapping as doorway protection for baled products. Use one 1¼ × 0.029 in. steel strap per layer in each doorway or the required number of nonmetallic strap substitutes. See paragraph 8.4.4.

6.5.4.1 Evenly distribute the weight of load in the car from side to side and end to end.

6.5.4.2 Begin loading at one end wall working toward the doorway area by alternating void space from sidewall to sidewall to maintain a balanced load. Leave a sufficient turning radius in the car to permit loading the opposite end of the car.

NOTE: If multiple stacks are clamped at one time, load by alternating from sidewall to sidewall to maintain a balanced load throughout the car.

6.5.4.3 Continue to load the opposite end of the car, beginning at the end wall and working toward the doorway area by alternating void space from sidewall to sidewall to maintain a balanced load.

6.5.4.4 It may be necessary to turn one or more doorway stacks to reduce the amount of lengthwise void braced by the horizontal dunnage bags from 4 in. to 12 in. after inflation. Center the doorway stacks on the centerline of the car.

6.5.4.5 Place the dunnage bags in a horizontal position and size to approximate the face of the adjacent lading. The lower bag should be a minimum of 1 in. above the car floor.

6.5.4.6 To prevent pneumatic dunnage bags from being punctured by bale wires or other unitizing materials, face the bags with suitable buffer material.

6.5.4.7 Inflate the Level 4 pneumatic dunnage bags to 8 psi so that the load is tightened lengthwise, reducing the likelihood of crosswise load movement.

6.5.4.8 Check the dunnage bag pressure again 30 minutes after inflating and before closing the car doors.
7.0 MANUAL LOADING

7.1 Overview

7.1.1 When practical, load mixed loads involving more than one size/type container and/or bags/bales in separate bonded block patterns and locations. Load the different blocks to approximately the same height.

7.1.2 Plan load in equipped cars so that all lengthwise space is taken up with product, divider sheets, or bulkheads. When loading two or more differently sized containers, it may help to place a guide row with the number of containers in each section along one sidewall.

7.1.3 Line floor, ends, and sidewalls with paper or fiberboard protection to reduce chafing or abrasion damage to the lading.

7.1.4 Apply paper or fiberboard lining to a sufficient height to provide adequate protection for number of layers to be loaded.

7.1.5 Whenever possible, load bag tops facing to the walls of the car to afford additional protection against chafe damage.

7.1.6 Whenever practical, use an interlocking pattern such as brick wall, key sack, or bonded block.

7.1.7 Setback loading may be utilized in the doorway area.

7.2 Key Sack Loading

In this arrangement, key bags are loaded in the lengthwise direction of the car against the sidewalls (Figures 7.1 and 7.2). Bags loaded on top of the key bags are loaded crosswise. Where necessary, line car walls and floor.
Figure 7.2 Key sack loading, doorway
7.3  Brick Wall Loading
In this arrangement, layer patterns are alternated so that rows are interlocked (Figures 7.3 and 7.4). Where necessary, line car walls and floor.

Figure 7.3 Brick wall loading, ends of the car
Figure 7.4 Brick wall setback loading, doorway
8.0 DOORWAY PROTECTION

8.1 Overview

8.1.1 Doorway protection is required to prevent lading from falling or shifting out of the doorway or coming in contact with sliding or plug-type doors. Protect opening with wooden guide rails, steel straps, or other materials of sufficient strength, and adequately secure.

8.1.2 Use flush doorway protection in boxcars with sliding doors to prevent the lading from coming into contact with the side doors or to prevent the weight of the lading bearing against the side doors.

8.2 Unit Loads

Protect openings with 1¼ x 0.029 in. steel straps or equivalent, covered with corrugated fiberboard secured so as not to fall out of position (see paragraph 5.1). If lading is unitized by stretch wrap, shrink film, gluing, or other means, one strap is required for the bottom-layer units and two straps are required for the top-layer units.

8.3 Manual Loads

8.3.1 Protect openings with four Type 1A Grade 4 or equivalent nonmetallic straps evenly spaced to protect the full height of the lading. Cover the straps with corrugated fiberboard placed with corrugations vertical. Secure the fiberboard by threading a doorway strap through slots cut in the fiberboard or by using a V-cut in the fiberboard hooked over the strapping.

8.3.2 Unitizing Method (Tape) for Doorway Protection in Shipments of Paper Bags

The following procedures have been tested and found successful for delivering bags unitized by pressure sensitive tape used for doorway protection. Reference Figure 8.1.
DOORWAY PROTECTION

8.3.2.1 Load the ends of the car tightly, both crosswise and lengthwise.

8.3.2.2 Limit bags to a multiwall construction with a capacity of 25 lb to 100 lb.

8.3.2.3 Load to the same height throughout the car, with a maximum of 10 layers and a minimum of three layers.

8.3.2.4 Load the doorway area using a setback pattern, with setback being a minimum of approximately half the length of bag at each door opening. Begin the setback pattern approximately one bag length before the doorpost area of the car.

8.3.2.5 Use pressure-sensitive, glass-reinforced filament tape in the doorway of the car to unitize the bags. Apply the tape so that at least one strip of tape is placed on each crosswise stack of setback bags. Use enough tape so that at least the top three layers of bags are unitized in each doorway opening.

8.3.2.6 Use filament tape that meets Standard D 5330 of the American Society for Testing and Materials (ASTM) for Type II tape. This includes the following requirements:
- a minimum tensile of 300 lb/in.
- adhesion minimum of 25 oz/in. before or after aging
- maximum thickness 12 mil
- an elongation between 3% and 8%.

Use tape that has a polyester film, is glass reinforced and unidirectional, and has a capacity to perform over a range of −54 °C to +65 °C (−65 °F to +150 °F).

8.3.2.7 At place of unloading, use caution in removing the filament tape so that paper bags are not torn.
8.3.3 Unitizing Method (Duplex Reinforced Paper) for Doorway Protection in Shipments of Paper Bags

The following procedures have been tested and found successful for delivering bags unitized by duplex reinforced paper that is used for doorway protection. Refer to Figure 8.2.

8.3.3.1 Before loading the bags, place paper on the car floor, letting the ends hang out of the car door.

8.3.3.2 Load the bags on top of the paper, in a setback manner, until the load is completed, except for the bags in the top two layers of the middle row or rows.

8.3.3.3 Next, pull the paper taut over the load, overlapping in the center unfilled row or rows. Then load the remaining bags on top of the lapped paper.
8.4 Paper Bales

8.4.1 Use steel strapping as doorway protection in boxcar shipments of baled paper products.

8.4.2 Use one $1\frac{1}{4} \times 0.029$ in. steel strap per layer in each doorway.

8.4.3 Conventional Doorway Strap Application

In this application, steel straps are anchored to opposite doorposts and brought together under tension and sealed. Install straps on the doorposts of the loading-side doorway before loading. Drape straps outside the car until loading is completed. After loading, tension and seal the straps across the doorway. See Figure 8.3.

![Figure 8.3 Conventional doorway strap application]
8.4.4 Polyester Cord Strapping

Use the approved polyester cord strapping/buckle systems listed in Table 8.1 as doorway protection in boxcar shipments of baled paper products. These applications are approved as alternatives to using one 1¼ × 0.029 in. steel strap per layer in each doorway.

Table 8.1 Approved polyester cord strap applications

<table>
<thead>
<tr>
<th>Width</th>
<th>ASTM Type⁹</th>
<th>Company/Strap Designation</th>
<th>Strap ID</th>
<th>Application (See Figures)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1¾ in.</td>
<td>Type IA Grade 4</td>
<td>Caristrap International CW105WGSD Buckle: CB-32</td>
<td>CW105WGSD</td>
<td>Belt-type application One strap per layer</td>
</tr>
<tr>
<td>1¾ in.</td>
<td>Type IA Grade 4</td>
<td>Cordstrap BV CC-105, Buckle: CB-10</td>
<td>AAR CORDSTRAP CC-105</td>
<td>Belt-type application One strap per layer</td>
</tr>
<tr>
<td>1¾ in.</td>
<td>Type IA Grade 4</td>
<td>Cordstrap BV CC-105, Buckle: CB-10</td>
<td>AAR CORDSTRAP CC-105</td>
<td>Doorway unitization See Figure 8.5</td>
</tr>
<tr>
<td>1¼ in.</td>
<td>Type IA Grade 3</td>
<td>RC Packaging Systems, Inc. Magna Cord 114XHD Buckle: APWB 114</td>
<td>RC114XHD</td>
<td>Belt-type application Two straps—top layer One strap each lower layer</td>
</tr>
<tr>
<td>1¼ in.</td>
<td>Type IA Grade 4</td>
<td>Signode Packaging Systems PW100EH Buckle: AVB-10A</td>
<td>AAR 11-Avistrap</td>
<td>Belt-type application One strap per layer</td>
</tr>
<tr>
<td>1¼ in.</td>
<td>Type IA Grade 3</td>
<td>Tapex American Corp. TEXband 105WHD Buckle: B-10XTS</td>
<td>TEXband 105 WHD</td>
<td>Belt-type application Two straps—top layer One strap each lower layer</td>
</tr>
<tr>
<td>1¼ in.</td>
<td>Type IA Grade 4</td>
<td>Tapex American Corp. TEXband 105WXH Buckle: B-10XTS</td>
<td>TEXband 105 WXH</td>
<td>Belt-type application One strap per layer</td>
</tr>
<tr>
<td>1½ in.</td>
<td>Type IA Grade 5</td>
<td>Tapex American Corp. TEXband 125WXH Buckle: FCT-12</td>
<td>TEXband 125 WXH</td>
<td>Belt-type application One strap per layer</td>
</tr>
</tbody>
</table>


8.4.4.1 Approved strap must be clearly marked by the manufacturer with the strap ID in accordance with the strap-marking requirements of AAR Circular 42-K, “General Rules Covering the Loading of Carload Shipments of Commodities in Closed Cars.”

8.4.4.2 Tension and join the straps using the correct buckle and tensioning tools in accordance with the manufacturer’s instructions. Apply the buckle properly to maintain strap tension.
8.4.5 Belt-Type Application
In this application, a strap is threaded through anchor points on opposite doorposts and brought together under tension at a buckle or seal. The loading-side straps cannot be installed until loading has been completed. See Figure 8.4.

8.4.5.1 If bales are in contact with the doorposts on the loading side after loading is completed, it may be difficult to install the doorway straps after loading. If this is the case, install individual pieces of strap through the anchors on both doorposts at the appropriate heights prior to loading adjacent to the doorposts. After completing loading, bring one end of each strap at a given height together in a buckle, and then tension the remaining two ends and apply a second buckle.

8.4.5.2 Insert a short length of strap between the doorpost anchors and the doorway straps to act as a buffer.

Figure 8.4 Belt-type strap application
8.4.6 Doorway Unitizing Application
This application is limited to loads where the lengthwise doorway stacks fill the entire door opening. Use a minimum of two vertically oriented straps as shown in Figure 8.5 for a single stack in the doorway area. If there is more than one stack completely in the doorway area, use two straps per stack.

Figure 8.5 Doorway unitizing strap application
(This Page Left Blank Intentionally)
# CLOSED CAR LOADING STANDARDS

<table>
<thead>
<tr>
<th>Part</th>
<th>Subject/Title</th>
<th>Publication Date</th>
<th>Formerly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Minimum Loading Standards for <strong>Freight</strong> in General Purpose Boxcars</td>
<td>01/2014</td>
<td>Pamphlet No. 14, Minimum Loading Standards for Freight in General Purpose and Specially Equipped Boxcars (12/84)</td>
</tr>
<tr>
<td>3</td>
<td>Minimum Loading Standards for <strong>Plywood and Similar Building Products</strong> in Closed Cars</td>
<td>03/2014</td>
<td>Pamphlet No. 8, Minimum Loading Standards for Sanded and Sheathing Plywood in Closed Cars (11/85)</td>
</tr>
<tr>
<td>4</td>
<td>Minimum Loading Standards for <strong>Lumber</strong> in Closed Cars</td>
<td>06/2014</td>
<td>Pamphlet No. 20, Minimum Loading Standards for Lumber in Closed Cars (10/87)</td>
</tr>
<tr>
<td>5</td>
<td>Minimum Loading Standards for <strong>Building Brick</strong> in Closed Cars</td>
<td>06/2014</td>
<td>Pamphlet No. 6, Minimum Requirements for Loading, Bracing and Blocking Carload Shipments of Building Brick in Closed Cars (8/83)</td>
</tr>
<tr>
<td>6</td>
<td>Minimum Loading Standards for <strong>Prepared Food and Similarly Packaged Products</strong> in Closed Cars</td>
<td>02/2014</td>
<td>Pamphlet No. 17, Minimum Loading Standards for Packaged Food Products in Closed Cars and TOFC/COFC (10/88)</td>
</tr>
<tr>
<td>7</td>
<td>Minimum Loading Standards for <strong>Intermediate Bulk Containers</strong> in Closed Cars</td>
<td></td>
<td>New</td>
</tr>
<tr>
<td>8</td>
<td>Minimum Loading Standards for <strong>Bagged and Baled Commodities</strong> in Closed Cars</td>
<td>07/2014</td>
<td>Pamphlet No. 3, Minimum Loading Standards for Bagged and Baled Commodities in Closed Cars (10/93)</td>
</tr>
<tr>
<td>9</td>
<td>Minimum Loading Standards for <strong>Coiled Metal Products</strong> in Closed Cars</td>
<td></td>
<td>Pamphlet No. 23, Minimum Standards for Loading Steel Products in Closed Cars, Trailers or Containers (4/95)</td>
</tr>
<tr>
<td>10</td>
<td>Minimum Loading Standards for <strong>Primary Metal Products</strong> in Closed Cars</td>
<td></td>
<td>Pamphlet No. 37, Minimum Standards for the Safe Loading of Ingots, Pigs, Anodes, Rods and Similar High Density Metallic Commodities in Closed Cars (11/84)</td>
</tr>
</tbody>
</table>

See also:
- *Open Top Loading Rules Manual, Sections 1–7*