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of Canada

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Car Loading Rules

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PREFACE

Safe and efficient loading of railcars is important to both the railway industry and its customers.

Loads, especially on open top cars, must be secured in a manner that will maximize damage free transportation of commodities, and ensure that safe railway operations are not compromised. This will also facilitate the interchange of loaded cars between railways.

The loading of both open top and closed cars is governed by rules and regulations developed by the Railway Association of Canada and the Association of American Railroads. Compliance with **RAC** loading circulars and **AAR** loading rules is mandatory as per Transport Canada's Freight Rules under the Railway Safety Act of Canada.

The AAR, which represents the U.S. and Canadian railroads, is structured to work closely with shippers and suppliers in publishing a safe and economical set of loading rules. AAR member railroads have agreed that cars loaded to these accepted standards will be accepted for unrestricted transportation and interchange between railroads across Canada, the United States and Mexico.

The AAR Open Top Loading rules and RAC circular have many approved figures which illustrate how to load various types of products, i.e., lumber, steel, pipe, machinery, farm equipment, etc. The general rules cover the basic requirements, which are common to all types of loads. RAC circular is available in both French and English version.

Requests for copies of the AAR rules should be addressed to:

Association of American Railroads
Publication Order Processing
50 "F" Street, N.W., 5th Floor COG
Washington, DC, 20001

A complete manual of rules governing the Loading of Commodities on Open Top Cars or individual sections listed below may be obtained:

<http://www.ttc.aar.com/standards/OpenTop.html>

Section #1	General Rules for loading all commodities
Section #2	Loading of Metal Products, including Pipe
Section #3	Loading Construction and Farm Machinery
Section #4	Not available
Section #5	Loading of Forest Products and Miscellaneous Building Materials
Section #6	Loading of US Military Equipment and Material
Section #7	Rules for loading all Commodities on Open Top Trailers and Containers for Rail Transport.

PREFACE

The Railway Association of Canada, for its part, is committed to ensuring that railway service is competitive with highway transport and that loading, unloading, blocking and bracing of rail cars does not add unnecessary delay or costs to railway customers. Railway marketing and operating personnel have a direct interest in safe and efficient loading practices too.

The RAC serves its members and their customers by promoting safe loading procedures, and practices as well as ensuring that the rules are applied consistently by shippers and railway employees. We may also adjudicate disputes between railways or between railways and customers. This activity is handled through the RAC in the most cost-effective manner possible on behalf of the railway industry.

The RAC responsibilities are:

- To monitor rail transportation and promote safe car loading and transportation practices through instructions and advice to shippers and railway personnel responsible for the loading and handling of rail cars;
- To be knowledgeable of loading rules, as issued by The Railway Association of Canada, the Association of American Railroads and Transport Canada in order to provide appropriate interpretation for shippers and member railways, when requested;
- To promote improved loading practices by shippers and within the industry for domestic and international traffic moving by closed or open top freight cars, containers and trailers on flat cars, or any other specially equipped cars or oversize shipments;
- To provide assistance to shippers or railways in developing new loading patterns or revisions to existing rules or procedures;
- To encourage and promote good customer and railway relations.

The RAC car loading rules managers each year inspect thousands of loads of various commodities and car types. Their work includes inspection of loads in railway yards or on customer sidings. Should any loads be considered unsafe or not loaded according to loading rules, they are authorized to prohibit its movement until properly loaded.

The CLR managers participate in the activities of the AAR Open Top Loading Rules Committee and meet with AAR personnel to exchange information of mutual interest.

PREFACE (concluded)

This continued close relationship with their U.S. colleagues is particularly important due to the large volume of transborder interchange traffic.

One of the most important aspects of their duties relates to education. The CLR managers spend a substantial amount of time conducting information seminars for shippers and railway personnel. This educational work is a continuing process due to equipment and personnel changes as well as rules and methods evolve. The RAC has developed manuals and some audio-visual material pertaining to the rules and regulations to support their training programs.

The RAC is pleased to undertake this work on behalf of the railway industry and its customers and we look forward to working with you.

We can be reached at:

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PURPOSE OF THIS MANUAL

The purpose of this manual is to provide both shippers and carriers with the information required to ensure that all loads are prepared in accordance with the regulations.

Ensuring that commodities are loaded on rail equipment in a safe, efficient and economical manner is a critical part of the transportation process. Both shippers and railways share the responsibility for developing logical regulations and then adhering to them.

The regulations applicable to the loading of commodities can be found in the Freight Car Inspection and Safety Rules. These rules require that loading of rail cars be done in accordance with the RAC circular on car loading or the Association of American Railroads (AAR) publication entitled, "Rules Governing the Loading of Commodities on Open Top Cars and Trailers".

The obligation of the shipper to comply with these regulations is defined in Uniform Freight Classification Rule 27, Section No. 3, which reads in part: "Shippers must comply with carriers' rules regulating safe loading of freight and protection of equipment." Adherence to the regulations will ensure that shipments of commodities are delivered to the customer in good condition, with no unnecessary costly delays caused by poor loading.

The obligation of the carrier, as governed by Rule 89, Section of the AAR's Interchange Rules Field Manual, is to only accept loads that are "... loaded in compliance with rules governing the loading of commodities on open top cars." Once inspected and accepted, loads in compliance are the responsibility of the railway.

It is up to the shippers to choose the loading configuration that best suits his products, and then apply the fundamental rules. This manual constitutes a great wealth of information which will be useful to all concerned involved in **LOADING**

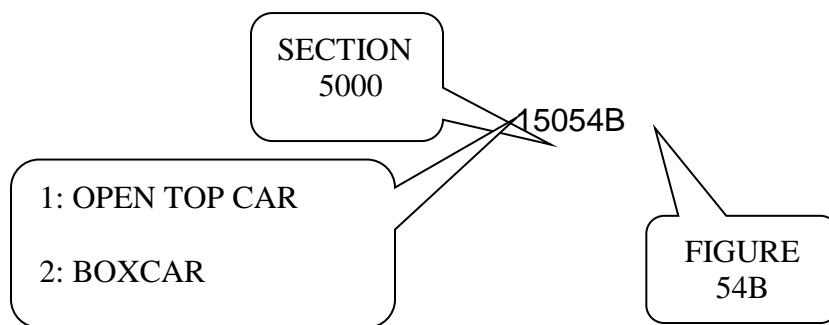
COMMODITIES FOR RAIL MOVEMENT. Latest revisions are available thru RAC or AAR.

HOW THIS BOOK IS ORGANIZED

This manual is divided into seven major sections.

Section #1000	General Rules
Section #2000	Loading of Steel Products, including Pipe
Section #3000	Loading of Road, Grading and Farm Equipment Machinery
Section #4000	Loading of Miscellaneous Commodities
Section #5000	Loading of Forest Products and Building Materials
Section #6000	Loading of Department of Defence Materials
Section #7000	Rules governing the Loading of Commodities of Open Top
	Trailer (TOFC) or container (COFC) Service
Section	TEST CLR LOADS UNDER TEST

THE FIGURES



CLR GENERAL RULES

PURPOSE

Purpose of this section is to highlight the rules and acceptable loading standards common to all open top figures. Many rules are simply common sense, for responsible loading of open top cars, some are demanding. All are critical in building a strong reliable and safe load. We would like to remind you that the Federal Law of Canada sanctions the RAC and AAR rules contained in this pamphlet.

CORRESPONDING AAR OPEN TOP LOADING RULES SECTION 1:

Rule 1. Inspection and Compliance

Rule 2. Required Clearances

Rule 3. Weight Distribution and Load Location on Single Cars and Intermodal Trailers Containers .

Rule 4. Load Dimension and Weight Restrictions

Rule 5. Load Restraint

Rule 6. Machines and Other Lading with Moving Parts

Rule 10. Wood Types and Species

Rule 11. Wood and Wood Substitute Securement Items

Rule 12. Inflatable Dunnage Bags and Pack-out Materials

Rule 13. Lateral Load Protection

Rule 14. Attachment of Securement

Rule 15. Nails, Staples, and Lag Screws

Rule 16. Bolts, Rods, Bar, and Plate

Rule 17. Steel Banding

Rule 18. Protectors for Bands and/or Wire

Rule 19. Nonmetallic Strapping

Rule 20. Synthetic Webbing and Assemblies

Rule 21. Chain, Binders, and Assemblies

Rule 22. Wire Rope/Cable

Rule 23. Turnbuckles, Clevises, and Shackles

Rule 24. Wire—High Tension and Common

Rule 25. Substitution of Securement Items

To ensure the safety of all concerned, the blocking, bracing and tie downs of loads on rail cars originating in Canada must be done in conformity with the “Car Loading Rules” produced by the Railway Association of Canada (RAC) and or “Rules Governing the Loading of Commodities on Open Top Cars” produced by Association of American Railroads (AAR).

Shippers must observe the drawings and specifications of an applicable Loading Figure, where a figure is available, as well as all applicable General Rules regarding the safe loading of freight cars. All items described under the figures for securing loads must be applied as specified. Shippers must also inspect shipments to insure that they are properly and safely secured and that all details of the applicable Figure and General Rules have been complied with, before the shipments are released to carriers.

LOAD RESTRICTIONS

Corresponding AAR Open Top Loading Rule 3

This section contains General Rules, procedures, approved restraint components, as well as specific references from approved figures.

An important first step in developing a load plan is to determine the restrictions on the placement, size and weight and of the load on the rail car. This will aid in maximizing the use of the car deck and space above the car.

When loading long commodities requiring two or more flat cars, an operating handbrake must be maintained on at least one of the combined cars.

Load weight on car must not exceed the load limit stencilled on the car. Total allowable weight on rail is the weight of car and lading, temporary fixtures, dunnage, etc. The weight of load on one truck must not exceed one-half of the load limit stenciled on the car however load has to be evenly distributed on car length. In case of doubt, this must be verified by weighing the car. Also what must be taken into account is the capacity and ability of the handling railroads on which the load will move.

Load must be located so that the weight along both sides of the car is equal for the entire length of the load. If the weight of a load cannot be equally distributed across a car, suitable ballast must be used to equalize the weight. Weight of the counterweight and its securement must be considered part of the total load weight.

Large and heavy material such as ingots, slabs, billets, molds, castings, machines, etc., not covered by individual figures, must be loaded with the largest dimension on the bottom for greater stability, keeping the center of gravity as low as possible.

DIMENSIONAL RESTRICTIONS

Corresponding AAR Open Top Loading Rule 4

Height, width, and length of a load on one car for unrestricted movement must be within the "Outline Diagram for Single Loads, Without End Overhang, On Open Top Cars" as published in the Official Railway Equipment Register. If load exceeds these outlines (Appendix A, Plate C) then shippers and originating carriers must verify clearances over the entire route for any load having one or more dimensions exceeding the above-referenced out-line diagram.

Load restraint, when a specific figure is not involved and when an object or load is secured using applicable securement details listed in these General Rules and the ones of

the AAR Open Top Loading Rules, Section 1., the load restraint values shown below must be observed (except for pivoted bolster loads) unless all carriers involved in the movement agree otherwise.

RESTRAINT VALUES FOR GENERAL COMMODITIES:

Corresponding AAR Open Top Loading Rule 5

Longitudinal----- Total load restraint in each direction should equal **three times** object weight.

Lateral----- Total load restraint in each direction should equal **two times** object weight.

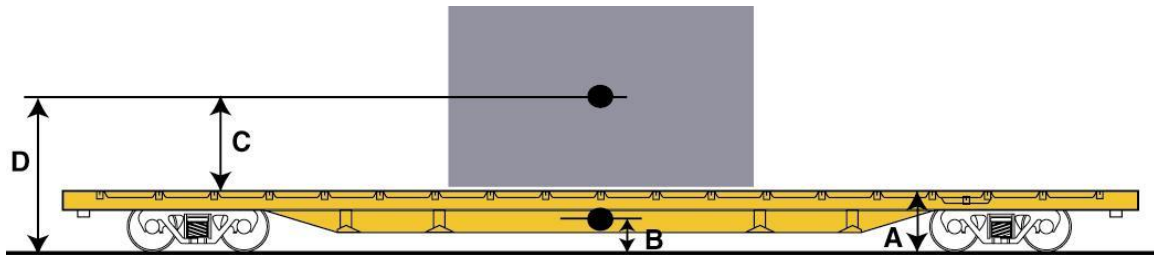
Vertical----- Total load restraint should **equal the lightweight** of the carrying car or **two times** object weight, whichever is less.

CENTER OF GRAVITY

Corresponding AAR Open Top Loading Part 5, Section 1

Rule 89, Section C, found in Field Manual of the AAR Interchange Rules governs acceptable centers of gravity for interchange purposes. Which states “ Acceptable in interchange, loaded cars who’s combined center of gravity of a car and load less than or equal to 98 inches at top of rail (ATR), except for cars that do not comply with AAR Office Manual Rule 88, Section C which must not exceed 90 inches.

Determining Center of Gravity



The following information is necessary to determine the combined center of gravity (CG) of a loaded open top car.

A = Height of car deck in inches from top of rail.

B = CG of car above top of rail (ATR) in inches, obtainable from car owner.

C = CG of load from base of load in inches, obtainable from shipper.

D = Combined height of CG of load, (C), plus height of car deck, (A), that is (C) + (A).

E = Lightweight of car, in pounds, as stenciled on car.

F = Weight of load in pounds, obtainable from shipper.

The calculation to arrive at the center of gravity is as follows:

$$\frac{(B \times E) + (D \times F)}{E + F} = \text{Combined center of gravity above top of rail}$$

Example:

A = 44in.

B = 27in.

C = 60in.

D = (60 + 44) = 104 in.

E = 55,000 lb

F = 120,000 lb

Formula:

$$\frac{(B \times E) + (D \times F)}{E + F} = \text{C.G. A T R}$$

$$\frac{(27 \times 55,000) + (104 \times 120,000)}{55,000 + 120,000} = \text{C.G. ATR}$$

$$\frac{(1,485,000) + (12,480,000)}{175,000} = 13,965,000 = 79.8 \text{ in. ATR}$$

175 000

LOAD BLOCKING AND BRACING

Corresponding AAR Open Top Loading Rule 10 to 25

WOOD TYPE AND SPECIES:

Corresponding AAR Open Top Loading Rule 10

Following species of wood are acceptable for all uses where hardwood, wood, or lumber is specified in various figures contained in this manual and in Sections 2 through 6 and for loads prepared in accordance with General Rules, Section No. 1 of the AAR Open Top Loading Rules Manuals.

Ash (Oregon, pumpkin, blue, green, white)	Magnolia (southern)
Beech (American)	Mangrove
Birch (sweet, yellow)	Maple (red, black, sugar)
Butterbough	Mountain laurel
Button (mangrove)	Oak
Cypress (Arizona)	Tamar i ck
Elm (cedar, rock, winged)	Tupelo (water, black)
Hickory	Pine (South Florida, slash)
Juniper (Utah)	Walnut (black)
Locust (black)	Yew, Pacific
Madrone, Pacific	

Where lumber or wood is specified in various figures contained in this manual and in Sections 2 through 6 of the AAR Open Top Loading Rules Manuals, the following species of woods are acceptable for all uses except stakes and clamping pieces.

Aspen (bigtooth and quaking)	Maple (big leafed and striped)
Bald cypress	Pine (lodge pole, jack, jeffrey, pitch, eastern white, timber, sugar, and ponderosa)
Birch (paper)	

Cedar (southern red, eastern red, Alaska and Port Orford) Cottonwood (black and eastern) †Douglas fir (intermediate, coast, and Rocky Mountain type) Fir (California red, grand, noble, Pacific silver, and white) Hemlock (eastern and western) Juniper (Rocky Mountain) Magnolia (Fraser)	Pinyon Poplar (Canadian western white) (For loading of steel pipe, Section No. 2, Part 3 of the AAR Open Top Loading Rules Manuals) Redwood—old growth Spruce (eastern, englemann, and sitka) Sycamore Yellow— poplar †Douglas fir (coast type) is acceptable for use as bearing pieces and separators under specific figures where hardwood is specified for loads weighing up to 140,000 lb.
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BEARING PIECES AND SEPARATORS:

It is essential for safe transport that the bearing pieces - because they carry and support the load in transit - are correctly located and carefully secured. Bearing pieces must be free from decay and strength-impairing knots. Laminated bearing pieces are not permitted unless AAR approved and stamped. Bearing pieces, separators and vertical stabilizers must be of uniform thickness and width for their entire length, unless otherwise provided for under a specific figure.

The width of its base must not be less than its height. The length must not be less than the width of the car as measured between the inside face of the stake pockets.

VERTICAL STABILIZERS:

Form the backbone of the load. Found mainly in lumber loads, they may be made of 2 in. x 4 in. or 2 in. x 6 in. material.

SEPARATORS:

Lumber, must be placed between layers of the load. Separators are preferably rough, although finished lumber is acceptable. Coated material is not acceptable as separators or bearing pieces. All separators in each layer must be of equal thickness.

The length of each separator must be equal to the width of the load but not extended beyond the side of the car.

It is recommended that all separators be cut to the width of the load as this gives the loading crew greater latitude in the placement of interlacing bands, and removes the possibility of bands snagging on separators if the load shifts in transit.

ATTACHED DUNNAGE:

When it is used, bearing pieces and separators used, must be of sufficient thickness to prevent attached dunnage from contacting car floor or package surface. Attached dunnage must be in one piece and their length must be equal to the width of the package but not wider.

Attached dunnage may be applied to either the top or bottom of packages. If applied to the top of packages, all dunnage in the top layer must have one (1) 10-D nail applied in addition to the package band, to prevent displacement.

STUB STAKES:

When stub stakes are used, they must be placed in the first two stake pockets at each end of the load and every second stake pocket between, on both sides of the car. During the cold weather period, November 1 through March 1, the use of stub stakes or Guide Rail Securement Devices are required for specified lumber loads. The originating carrier may extend the time period of this rule under extreme weather conditions.

Stub stakes must be a minimum 4 in. x 5 in., tapered to fully fit stake pocket. The length is to extend from bottom of stake pocket to 10 in. above the car floor. Laminated stub stakes are permitted. When used, they must be constructed of no more than two pieces 2 in. x 6 in. or greater, secured with four 16-D nails equally spaced. When stub stakes do not completely fill stake pockets, a wedge shape filler piece must be applied to fill void and be secured to prevent displacement. On longer cars with narrow decks, 4 in. x 4 in. stub stakes may be used to provide sufficient width on the car for the load and the guide rails. These stub stakes will require a filler piece nailed on the inside face of the stub stake, extending from the car deck to the bottom of the stake pocket.

DUNNAGE BAGS & VOID FILLER

Corresponding AAR Open Top Loading Rule 12

Inflatable Dunnage Bags may be used in open top loading only when permitted in a specific figure. Bags may be used only for one loading and are not reusable. Effective October 1, 2001, inflatable dunnage bags used in open top loading must be AAR approved. Table of approved dunnage bags may be found on the AAR Web site at <http://www.aar.com/otlr.htm>

Honeycomb or similar Cell Void Filler Material must be AAR approved for use in open top loading. Honeycomb or similar cell void filler material is not acceptable for use in General Rule loads and may only be used in open top loading when permitted in a specific figure and all other requirements are followed. More than one filler piece may be placed together to fill a total void space of not more than 8 in. When permitted in a figure, separate void spaces of no more than 8 in. each may be filled with approved void filler.

SECUREMENT:

Corresponding AAR Open Top Loading Rule 14

Securement items must not be attached to or interfere with a car's safety appliances, which include handholds, handrails, ladders, walkways, handbrakes or wheels, coupler operating levers, etc.

The strength of a securement anchor device, after attachment, must be at least equal to the strength of anchors specified in Standard S-230 in Section C (latest revision) of the AAR Manual of Standards and Recommended Practices. Notwithstanding, any points of attachment must be at least as strong as the securement being attached. This also applies to stake pockets on flatcars and inside gondola cars.

It is prohibited to make holes in any structural member of the car, such as center, side, and end sills, corner posts, top chord angles, car side stakes, and other structural members of the car's underframe, without the explicit permission from the car owner, and then only to the extent permitted by the *AAR Interchange Rules*.

Welding lading directly to a car is prohibited. The welding of such items as rods, flat bars, and straps directly to both the load and car for the purpose of securing the load is prohibited unless otherwise provided for in a specific figure. One end of the aforementioned items may be welded to either the load or car and the opposite end se-cured in an approved manner.

NAILS, STAPLES AND LAG SCREWS:

Corresponding AAR Open Top Loading Rule 15

Where nails are designated by "penny-weight", for example "40-D", in the rules and detailed figures, they may be either common or cement-coated, unless otherwise specified.

SIZE OF COMMON NAILS

8-D	2-1/2	inch
9-D	2-3/4	inch
10-D	3	inch
12-D	3-1/4	inch
16-D	3-1/2	inch
20-D	4	inch
30-D	4-1/2	inch
40-D	5	inch
50-D	5-1/2	inch
60-D	6	inch

SIZE OF CEMENT-COATED NAILS

8-D	2-3/8	inch
10-D	2-7/8	inch
12-D	3-1/8	inch
16-D	3-1/4	inch
20-D	3-3/4	inch
30-D	4-1/4	inch
40-D	4-3/4	inch
60-D	5-3/4	inch

Power driven nails and/or staples may be used but the number specified in the applicable figure must be increased by one-third. The approved size substitution is as follows:

COMMON NAIL	POWER DRIVEN NAIL	POWER DRIVEN STAPLE	
		DIAMETER	LEG LENGTH
8-D	8-D or 10-D	.080	2-1/2 or 2-3/4
10-D	8-D or 10-D	.080	3 or 3-1/4
16-D, 20-D	16-D or 20-D	.080	3-1/2
30-D	30-D		
40-D	40-D		

Manufacturers who have had their power-driven nails and power-driven staples tested by the AAR are listed below with approved nail and/or staple sizes shown.

MANUFACTURER	POWER DRIVEN NAIL SIZES	POWER DRIVEN CEMENT COATED NAIL SIZES	POWER DRIVEN STAPLE SIZE
PASLODE	8D,16D,20D,30D,40D		
SENCO	8D,10D,16D		.080 X 2-1/2 2-3/4, 3, 3-1/4, 3-1/2
DUO-FAST CORP.	8D & 10D	16D,20D,30D,40D	
ACME STEEL CANADA LTD	16D, 20D, 40D		

Lag screws may be used where nails are specified. When used, they must be properly applied by pre-drilling and torque by mechanical means. Lag screws must not be hammer driven. Lag screws 3/8 in. diameter may be used in place of common nails as follows:

- 1) Same number as specified for nails 20-D and greater.
- 2) One-half the number specified for nails less than 20-D.

The length of the Lag screw must be at least two inches longer than blocking being secured. Greater diameter lag screws can be used but using the same number as permitted above.

BOLTS, NUTS, RODS, BANDS, WIRES, WIRE ROPE, CABLE, CHAINS, NON-METALLIC STRAPPING, BAND OR WIRE PROTECTORS, POINTS OF ATTACHMENT, SUBSTITUTIONS PERMISSIBLE, TURNBUCKLES, CLEVISES/SHACKLES AND CONSTANT TENSIONING DEVICES:

Corresponding AAR Open Top Loading Rule 16

BAR, BOLTS, NUTS, RODS AND WASHERS

Rods or bolts, having rolled threads of the same diameter as that of U.S. Standard cut threads, may be used. Bending of threaded portion of rods or bolts is prohibited.

When rods are used for tie-downs passing through large diameter holes in the lading, a plate or plates of sufficient strength to prevent bending must be placed between the lading and the nut of the rod.

When rods, etc., used to secure loads not covered in detailed figures are passed through car floor, a 4 in. x 4 in. x 18 in. hardwood cleat or 1/2 in. x 4 in. x 18 in. steel plate must be placed lengthwise of car under floor on wood, nailable steel floor and composite wood and steel flooring. Length of steel plate may be reduced to 1/2 in. x 4 in. x 6 in. on cars with floors constructed of steel plates. When rods, etc., pass through stake pocket, a 1/2 in. x 4 in. x 10 in. steel plate must be placed lengthwise of car under stake pocket.

The use of rods with open hook ends on load or car is prohibited.

Where bolts, with washers to prevent splitting, are specified for clamping pieces, they may be substituted with 1-1/4 in. tension bands, sealed in conformance with "Minimum Joint Strength - Pounds" shown in table of High- Tension Bands under Paragraph (j) of this rule.

To retain nuts in original position, three or more threads on rods or bolts must be nicked, chisel hacked, flattened or otherwise distorted immediately behind single or double nuts or nuts tack welded to rods to insure that nuts will not back off. When less than three threads extend beyond nuts, there must be sufficient length for rods or bolts to be riveted over to prevent nuts from backing off. Not required when nut locks or lock nuts are used. Lock washers are not acceptable substitutes.

The bending of rods around stake pockets and then welding the overlapping portion to the main rod is prohibited.

Rods should be located so that they are not in contact with each other. When rods do contact each other, suitable means to prevent chafing or wear must be provided.

One splice is permitted for securement items 18 ft. or less in length, made from bars and/or rods. When necessary to increase length, one splice may be added for each additional 18 ft. or less in length.

When necessary to weld threaded rod to flat bar or rods for the purpose of securement or when necessary to splice the tie-down item to increase length, there must be sufficient overlap with continuous weld on both sides to equal the strength of the original securement item. The strength of the weld is to be based on a value of 600 lbs. per 1/16 inch fillet 1 inch long. All welding must be done by a qualified welder.

FLAT BAR AND PLATE DIMENSIONS AND BREAKING STRENGTH *					
Size (in.)	Minimum Breaking Strength (lb)	Size (in.)	Minimum Breaking Strength (lb)	Size (in.)	Minimum Breaking Strength (lb)
1/16 x 2	5,800	1/4 x 10	102,500	1/2 x 3	57,000
1/16 x 3 1/2	10,300	1/4 x 12	123,000	1/2 x 4	76,000
1/8 x 1	5,500	3/8 x 7/8	12,800	1/2 x 5	95,000
1/8 x 1 3/4	9,600	3/8 x 1 1/8	16,500	1/2 x 6	114,000
1/8 x 2 1/2	13,800	3/8 x 1 1/2	22,000	1/2 x 12	228,000
1/8 x 3 1/2	19,300	3/8 x 1 7/8	27,400	5/8 x 1	23,100
1/8 x 4 1/2	24,800	3/8 x 2	29,250	5/8 x 1 1/8	26,000
3/16 x 2	16,100	3/8 x 2 3/8	34,700	5/8 x 1 1/2	34,700
3/16 x 5	40,350	3/8 x 2 7/8	42,000	5/8 x 1 3/4	40,500
1/4 x 1/2	5,100	3/8 x 3	43,900	5/8 x 2	46,300
1/4 x 7/8	9,000	3/8 x 3 1/2	51,200	5/8 x 3	69,400
1/4 x 1 1/4	12,800	3/8 x 4	58,500	3/4 x 3/4	20,300
1/4 x 1 3/4	18,000	3/8 x 5	73,100	3/4 x 1	27,000
1/4 x 2 1/4	23,100	3/8 x 6	87,750	3/4 x 1 1/4	33,800
1/4 x 2 3/4	28,200	3/8 x 12	175,500	3/4 x 1 1/2	40,500
1/4 x 3	30,750	1/2 x 7/8	16,600	3/4 x 1 3/4	46,300
1/4 x 3 3/4	38,500	1/2 x 1 1/8	21,400	3/4 x 2	54,000
1/4 x 4	41,000	1/2 x 1 3/8	26,100	3/4 x 2 1/2	67,500
1/4 x 4 1/4	43,600	1/2 x 1 3/4	33,300	3/4 x 3	81,000
1/4 x 6	61,500	1/2 x 2	38,000	3/4 x 6	162,000
1/4 x 7	71,750	1/2 x 2 1/8	40,400	1 x 6	210,000
1/4 x 9	92,250	1/2 x 2 5/8	50,000	1 1/8 x 6	229,500
* When holes or slots exist in flat bar or plates, breaking strength must be based on sectional area of material measured across the hole or slot.					

RODS AND BOLTS SIZE AND MINIMUM BREAKING STRENGTH	
Diameter (in.)	Minimum Breaking Strength (lb.)*
1/2	5,200
5/8	8,100
3/4	11,700
7/8	16,200
1	21,100
1 1/8	25,800
1 1/4	32,800
1 3/8	38,600
1 1/2	46,900
* At root of thread	

HIGH-TENSION STEEL BANDS:

Corresponding AAR Open Top Loading Rule 17

All banding used in securement of open top loads must be AAR approved. In addition, 1-1/4 in. and 2 in. banding must be marked with an identification number or name. Shippers must be in a position to show that banding used for securement meets AAR requirements.

High-tension bands, less than .031 inch thickness must have a percentage of elongation in 6 inches from 5 to 12 percent inclusive. High-tension bands, .031 inch thickness or over, must have a percentage of elongation in 6 inches from 6.5 to 12 percent inclusive and ductility as contained in the ASTM Specification D3953 (latest edition).

High-tension bands encircling pile must be machine tensioned and sealed on top of the load, when possible, and located as far away from end of load as practical.

High-tension bands attached to stake pockets must be sealed no closer than 18 inches from top of stake pockets.

Free ends of bands must not extend more than 12 inches from seals.

When a long free span exists between points of attachment of high-tension bands, a dampening arrangement to prevent excessive vibration of bands must be applied midway between points of contact, by tying bands to sides of box, crate, lading, etc., with common annealed wire.

High-tension bands must be applied to packages and/or loads with markings facing outward.

The welding of high-tension bands is prohibited except where required in the process of manufacturing.

The use of second hand or reclaimed high-tension bands for such items specified in the rules and detailed figures are prohibited. A high-tension band that has been tensioned and is cut or broken becomes a second hand band and must not be reused in the preparation of new loading or in the readjusting of loads.

1-1/4 in. x .031 in. punched steel anchor banding, minimum breaking strength 3500 lbs. may be used to secure loose or boxed materials to car floors.

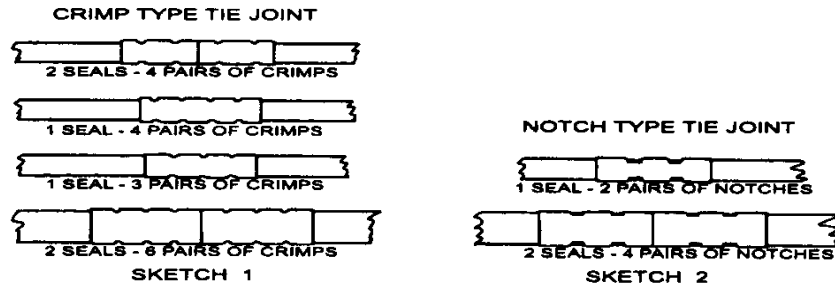
Effective October 1, 2008, notch-type joints may be used only for packaging, unitizing, interlacing, layer, or encircling band applications and may not be used to secure loads to the car or on bands encircling the entire load of a floating load design. Unless otherwise specified, applicable crimp-type joints may be used for all seal-joint banding applications for open top loading.

HIGH TENSION BANDS BREAKING STRENGTH AND SEALING http://www.aar.com/standards/OpenTop.html							
Width & Thickness Inches	Width & Thickness Millimetres	Minimum Breaking Strength-Pounds	Minimum Joint Strength-Pounds	Recommended Minimum No. of Pairs of Notches On Joint (except see note 2)	Recommended Minimum No. of Pairs of Crimps On Joint (except see note 2)		
Packages Bands				Surface Finish All Types	Surface Finish		
					Uncoated Dry	Coated Not Waxed	Waxed
1/2 x .020		1280	960	2	NIL	NIL	NIL
5/8 x .020		1600	1200	2	NIL	NIL	NIL
3/4 x .020		2000	1390	2	NIL	NIL	NIL
3/4 x .022		2280	1710	2	NIL	NIL	NIL
3/4 x .023	19 x .56	2280	1710	2	NIL	NIL	NIL

3/4 x .025		2280	1710	2	NIL	NIL	NIL				
3/4 x .028		2280	1710	2	NIL	NIL	NIL				
3/4 x .029		2850	2140	2	2	3	4				
3/4 x .031	19 x .75	2850	2140	2	2	3	4				
3/4 x .035		2850	2140	2	2	3	4				
1 1/4 x .020		3200	2400	2	NIL	NIL	NIL				
3/4 x .044		4050	3040	2	2	4	4				
3/4 x .050		4050	3040	2	2	4	4				
Securement Bands											
1 1/4 x .029		4750	3565	2	3	3	4				
1 1/4 x .031	32 x .75	4750	3565	2	3	3	4				
1 1/4 x .035		4750	3565	2	3	3	4				
1 1/4 x .044		6750	5065	4	4	4	6				
1 1/4 x .050		6750	5065	4	4	4	6				
1 1/4 x .065		8900	6675	NIL	4	4	6				
					St d.	Gr it	St d.	Gr it	St d.	Gr it	
2 x .044		10600	7950	4	4	4	4	6	4		
2 x .050		10600	7950	4	4	4	4	6	4		
2 x .065		13800	10350	4	4	4	4	6	4		

Table of approved steel band manufacturers may be found on the AAR Web site at <http://www.aar.com/otlr.htm>

A sufficient number of seals must be applied to accommodate the recommended number of pairs of notches or crimps, see sketch 1 & 2.



The recommended minimum number of notches or crimps recommended in the above table is based on current general recommendations of high-tension banding manufacturers on the basis of tensioning and sealing tools being in proper operating condition

WIRE -- HIGH-TENSION AND COMMON:

Corresponding AAR Open Top Loading Rule 24

High-tension wires must have a percentage of elongation in 10 inches from 6.5 to 16 percent inclusive.

When common annealed wire is used for securement purposes, the method of tying, tightening and determining the number of strands is to be in accordance with "Examples For Tying" as shown in General Rule 10. Twist wire taut with rod, bolt, pipe or appropriate length of 2 inch x 2 inch piece of lumber and secure to prevent unwinding.

High-tension wires encircling pile must be machine tensioned and twist ties on top of load, when possible, and located as far away from end of load as practical.

High-tension wire attached to stake pockets, lading strap anchors or other means of attachments must be machine tensioned. The location of the twist tie or washer attachment must not exceed 6 inches from point of anchorage.

The use of second hand or reclaimed high-tension wire or common wire for such items specified in the rules and detailed figures are prohibited.

HIGH TENSION WIRE			
Gauge	Diameter (in.)	Minimum Breaking Strength (lb)	Minimum Joint Strength (lb)
No. 8	.1620	2000	1700
No. 10	.1350	2000	1700
No. 11 ½	.1130	1350	1150
No. 12	.1055	1275	1080

COMMON ANNEALED WIRE		
Gauge	Diameter (in.)	Minimum Breaking Strength (lb)
No. 3	1/4	2200
No. 7	3/16	1100
No. 8	11/64	950
No. 9	5/32	800
No.11	1/8	500

WIRE ROPE/CABLE:

Corresponding AAR Open Top Loading Rule 22

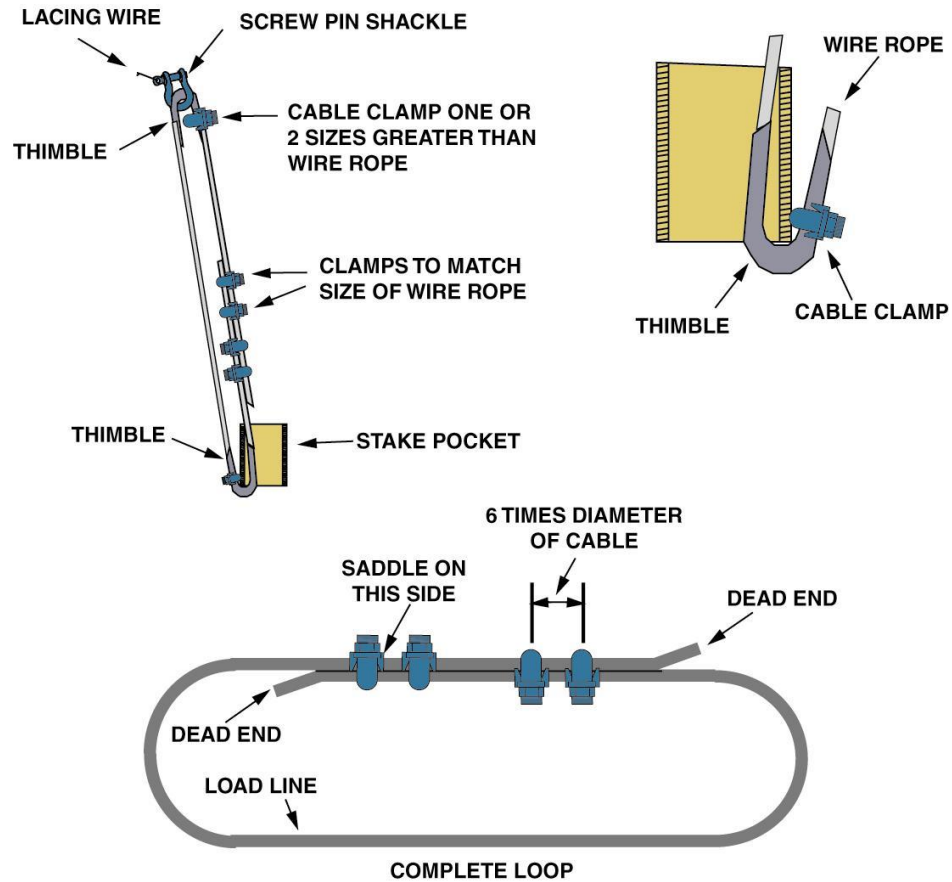
Where wire rope/cable is specified under detailed figures, the ends must be overlapped a minimum of 12 inches and must be secured with the number of "U" bolt cable clips as shown in the tables.

The wire rope/cable must be protected at all sharp corners and/or sharp edges. Where thimbles are used to prevent sharp turns and protect wire rope/cable from sharp edges, they must be secured with a "U" bolt cable clip. Tighten wire rope/cable with turnbuckle or suitable tensioning device or twist taut with rod, bolt or pipe and secure to prevent unwinding.

Wire rope/cable, when used, should be located so that they are not in contact with each other. When cables do contact each other, suitable means to prevent chafing or wear of these items must be provided.

Band and/or wire protectors sufficient to provide a suitable radius must be used to protect bands and wires at stake pockets, slotted holes in car sides and at all points having sharp edges on either equipment or lading. Protectors must be applied so as to prevent dislodgement. High-tension bands, when used as protectors, must be secured to tie bands by sealing.

WIRE ROPE /CABLE			
Plow Steel (6X7) Hemp Centre			
Diameter (in.)	Minimum Strength (lb)	Minimum Joint Strength (lb)	Minimum Number Clips or Clamps
3/8	8,800	7,400	2
1/2	15,500	13,100	3
5/8	24,100	20,400	3
3/4	34,400	29,200	4
7/8	46,400	39,400	4
1	60,000	51,000	4
Plow Steel (6X19) Hemp Centre			
3/8	9,200	7,800	2
1/2	16,200	13,800	3
5/8	25,200	21,400	3
3/4	36,000	30,600	4
7/8	48,700	41,400	4
1	63,000	53,800	4
<p>Note (a). Values shown under “Minimum Breaking Strength” in the above tables are based on 87% of the breaking strength of the wire rope and/or cable as supplied by the manufacturers. The minimum numbers of clips and/or clamps shown are based on manufacturer’s recommendations.</p> <p>Note (b). Cable, 3/8-in. diameter (6X19), may be substituted by 5/16-in galvanized aircraft cable (7X19) strand, using tools designed for securing cable with the following approved aluminium connector using a minimum of two mechanical machined broad crimps; or one 3-in. open sided aluminium connector using a minimum of four mechanical machined crimps</p>			



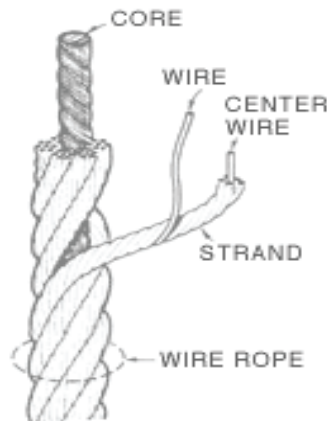
Band protectors, made of formed treated hardboard and/or composition material must not be used under load securement bands and/or unitising bands on loads of steel sheets or plates. Metal protectors only are acceptable for this purpose.

Where reference is made to "Protection angles, 20 gauge, 4 inches wide applied so as to prevent displacement" in the specifications of any figure in Section No. 2 of the AAR Loading Manuals, the use of manufactured edge protectors giving equivalent band protection is permissible except for circumstances described in General Rule 18.4, Section 1 of the AAR Loading Manuals, which states "Unless otherwise specified, only metal edge protectors are to be used under load securement bands and /or unitising bands on loads of steel products".

Description of components in a wire rope

Wire rope components

- 1- Any cable with more than 13 wires broken at any one location or with one broken strand.
- 2- Cable with flattened cross-section or a kink greater than 60°
- 3- Cable whose size is reduced by 1/64 in. (0.4 mm) per each 1/4 in. (8 mm) diameter of cable (e.g., a 1 in. cable worn down more than 1/16 in.)
- 4- Cable with clamp bolts that cannot be tightened (the clamp bolts must be replaced in kind).



Damaged cable

Note: Every wire rope has three basic components:

1. The wires that form the strands and collectively provide rope strength;
2. The strands, which are helically around the core
3. The core, which forms a foundation for the strands

CENTER BEAM TYPE CARS

Corresponding AAR Open Top Loading Rule 22.4

Cable tail must not protrude more than 6 in. outside of ratchet barrel.

Bolted clamp must be properly fitted inside the ratchet barrel and tight against the hole on the barrel.

All cables must be properly secured per manufacturer's recommendation prior to car movement



Properly secured cable for empty movement of railcar



Improperly fitted bolted clamp on ratchet barrel



Properly fitted bolted clamp on ratchet barrel

Cable assemblies must be equipped with non-metallic edge protectors. Existing damaged, broken, or missing metal edge protectors must also be replaced with non-metallic edge protectors. Existing metal edge protectors that are in good condition do not need to be replaced.

Cable assemblies must be replaced when knots cannot be removed and interfere with proper winding of cable.

Cable assemblies must be replaced when cable chain is worn or corroded more than 25%

TURNBUCKLES, CLEVISES, AND SHACKLES

Corresponding AAR Open Top Loading Rule 23

Turnbuckles must meet U.S. Federal Specification FF-T-791, latest revision, and must be an open-body-forged type.

Each turnbuckle must be permanently marked with a working load limit and the manufacturer's name or trademark. If items are not marked, shipper require to supply above pertinent information.

When tensioned, threaded ends must extend a minimum of 1 in. into the barrel and must be locked to prevent working loose. This can be accomplished by using jam nuts or securing the turnbuckle with wire.

Welding turnbuckles, threads, or nuts is prohibited.

Turnbuckles used in tie-down systems in conjunction with cables, chains, or rods must have a minimum breaking strength of not less than the component parts of the securement system.

Turnbuckles using open hooks must have hooks wired unless equipped with a functioning and engaged retaining feature.

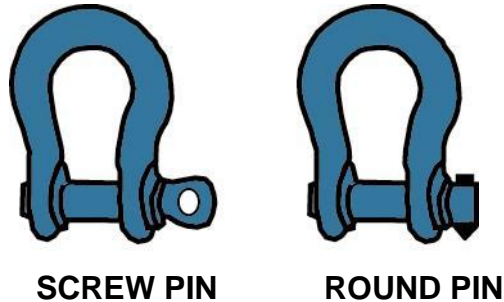
Minimum breaking strength (MBS) for turnbuckles in combination with end attachments used are provided in Appendix D, Table D.19. of AAR Section 1 OTL Manual.



Clevises/shackles must have strength equal to or greater than the securement attached to it.

Clevis/shackle pins must be secured to prevent displacement. When cotter pins are used, the legs of the cotter pins must be fully open.

Clevises/shackles equipped with screw pins must be wired to prevent displacement. Pin must protrude the threaded side of the shackle.



A safety appliance may be temporarily removed to facilitate loading or unloading a commodity when necessary, provided it is replaced immediately following loading or unloading operations and prior to releasing the car into service.

Ensure all winches are in proper direction so that the chain is taken up on the underside of the ratchet wheel.

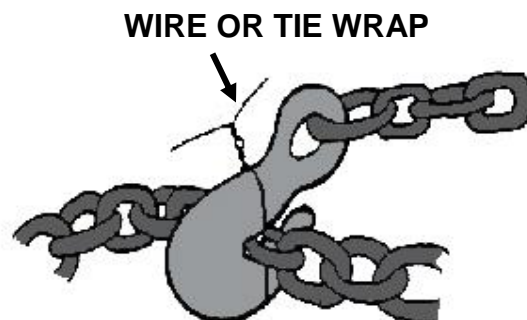
Be sure proper tension of wire rope or chains exists.

After initially tensioning each chain, strike it sharply with a hammer or bar and retighten. This helps the links seat in their longest length and helps prevent loose chains in transit.

Secure excess wire rope or chain to the tension bearing part of the wire rope or chain.

Tie-down equipment should be affixed to designated attachment points on vehicles, not to axles, springs or bumpers.

On chain devices, secure open-faced hooks to the chain link with wire.



NON METALLIC STRAPPING:

Corresponding AAR Open Top Loading Rule 19

All nonmetallic strapping used in the securement of packages and/or load securement must be AAR approved and marked accordingly.

Table 19.1 Approved Type IV polyester strapping

(For the latest update to this table, go to the TTCL Web Site at <http://www.aar.com/standards/OpenTop.html>)

AAR ID	Manufacturer/ Distributor	Approved Through (Mo/Yr)	Approved Size in. (mm)									Approved Joint Type
			5/8 (15.9)		3/4 (19.1)		1 (25.4)		1 1/4 (32.0)			
			.035	.040	.040	.050	.040	.050	.032	.040	.050	
11	Acme ^{a/}	5/13	X	X	X	X	X ^{b/}	X ^{b/}				H, F
11	Acme ^{a/}	12/15	X ^{c/}	X ^{c/}	X ^{c/}				X ^{b/}			H, F
11	Acme ^{a/}	5/15									X	F
82	Allstrap Strapping Systems LLC	2/14									X	F
58	DuBose Strapping Inc.	6/15	X	X	X	X	X ^{b/}	X ^{b/}		X ^{b/}		H, F
58	DuBose Strapping Inc.	6/15	X ^{c/}	X ^{c/}	X ^{c/}					X ^{b/c/}		H, F
59	Cyklop—Brazil	1/15	X	X	X							F, S
59	Cyklop—Germany	1/15	X	X	X							F, S
53	Polychem Corp.	9/13	X	X								H, F
53	Polychem Corp.	2/15			X	X						F
22	Samuel Strapping Sys. ^{d/}	9/15	X	X	X	X						H, F
22	Samuel Strapping Sys. ^{d/}	11/14			X ^{c/}		X ^{b/}			X ^{b/}		H, F
22	Samuel Strapping Sys. ^{d/}	1/13	X ^{c/}					X ^{b/}				H, F
22	Samuel Strapping Sys. ^{d/}	10/13		X ^{c/}								H, F
11	Signode ^{a/}	5/15									X	F
11	Signode ^{a/}	5/13	X	X	X	X	X ^{b/}	X ^{b/}				H, F
11	Signode ^{a/}	12/15	X ^{c/}	X ^{c/}	X ^{c/}					X ^{b/}		H, F
11	Strapex ^{a/}	5/13	X	X	X							H, F
11	Strapex ^{a/}	12/15	X ^{c/}	X ^{c/}	X ^{c/}					X ^{b/}		H, F
11	Strapex ^{a/}	5/15									X	F
14	Itistrap S.r.l.	12/14	X		X	X						F
57	Mallis Strapping Systems—USA	12/15	X	X	X							F
57	Mallis Strapping Systems—USA	7/14	X ^{e/}	X ^{e/}		X ^{b/}		X ^{b/}				H, F
51	Gerrard-Ovalstrapping ^{d/}	9/15	X	X	X	X						H, F
51	Gerrard-Ovalstrapping ^{d/}	11/14			X ^{c/}		X ^{b/}			X ^{b/}		H, F
51	Gerrard-Ovalstrapping ^{d/}	1/13	X ^{c/}					X ^{b/}				H, F
51	Gerrard-Ovalstrapping ^{d/}	10/13		X ^{c/}								H, F
60	Teufelberger GesmbH—Austria	10/12	X	X	X							H, F
63	Hangzhou Fuyang Hua Chen Plastic Co. Ltd. —China	12/15	X	X								F
64	Interpet S.A.	2/15	X ^{b/}	X	X	X ^{b/}	X ^{b/}	X ^{b/}				H, F
64	Interpet S.A.	3/15		X ^{c/}	X ^{c/}							H
65	U.S. Strapping Company	12/15	X	X	X ^{b/}							H, F
66	Strapack Embalagens Ltda.	1/14	X	X	X							F
67	NHXXL Synthetic Fibre Inc.	7/13	X	X								F
67	NHXXL Synthetic Fibre Inc.	2/15			X					X		F
68	Fromm Plastics GmbH Germany	2/15	X ^{b/}	X ^{b/}	X	X		X ^{b/}	X ^{b/}	X ^{b/}	X ^{b/}	H, F
68	Fromm Plastics Asia Co., LTD.	2/15	X ^{b/}	X ^{b/}	X	X		X ^{b/}	X ^{b/}	X ^{b/}	X ^{b/}	H, F
27	Green Span Packaging System - Indonesia	12/12	X									F
12	Haining Tricot Plastic	1/13	X	X								F
40	Yongheng Polyester Strap Co. - China	9/14	X									F

H = Heat-sealed (hot knife) joint
F = Friction-welded joint
S = Seal, approved metal (metal seal joints must be approved systems)

Strapping in the table above may be used only where specified in an approved figure or as an allowable substitution for steel banding under the applicable figures in Sect. 5.

Strapping in the table above is for smooth-sided polyester plastic type strap only unless otherwise denoted.

^{a/}Associated with Illinois Tool Works (ITW) as a manufacturer employing common production procedures and specifications

^{b/}Friction-weld only approved joint type

^{c/}Embossed-type strap

^{d/}Associated with Samuel Manutech Strapping Companies as a manufacturer employing common production procedures and specifications.

^{e/}Heat-sealed only approved joint type

Breaking strength of type IV polyester (PET) strapping

<http://www.aar.com/standards/OpenTop.html>

Nominal Width		Nominal Thickness		Minimum Break Strength (lb) ^{a/}	Minimum Joint Strength (lb)
in.	(mm)	in.	(mm)		
5/8	(15.9)	.035	(0.89)	1300	975
5/8	(15.9)	.040	(1.02)	1500	1125
3/4	(19.1)	.040	(1.02)	1750	1313
3/4	(19.1)	.050	(1.27)	2250	1688
3/4	(19.1)	.055	(1.40)	2400	1800
3/4	(19.1)	.060	(1.53)	2500	1875
1	(25.4)	.040	(1.02)	2300	1725
1	(25.4)	.050	(1.27)	2800	2100
1 1/4	(32.0)	.032	(0.82)	2250	1688
1 1/4	(32.0)	.040	(1.02)	2800	2100

Allowable range of elongation at break is from 5% to 25%.

19.2 Approved Type 1A bonded/woven polyester cord strapping

For the latest update to this table, go to the TTCI Web site at
<http://www.aar.com/standards/OpenTop.html>

Manufacturer/ Distributor	Approved through (Mo/Yr)	Width in. (mm) and Grade						Approved Joint Type
		Grade 3 ^{a/}		Grade 4 ^{b/}		Grade 5 ^{a/, b/}		
		AAR ID (Part No.)		AAR ID (Part No.)		AAR ID (Part No.)		
		MBS (lb) 1,585	MBS (lb) 2,100	MBS (lb) 3,285	MBS (lb) 4,400	MBS (lb) 4,200	MBS (lb) 5,400	
Caristrap Weatherguard	04/15	CW-60 WGHD		CW-105 WOJ			CW-125 WOJ	Buckle
Caristrap Weatherguard	05/15			CW-105 WGSD				Buckle
Carolina Strapping GatorSTRAP	06/13	AAR-80 CS-2025		AAR-80 CS-2400 ^{c/}				Buckle
Carolina Strapping MakoSTRAP	06/15			AAR-80 CS-5080				Buckle
ITW/Signode Avistrap	05/14	AAR-11		AAR-11			AAR-11	Buckle
Pacific Strapping	06/13			AAR-79 (P104)				Buckle
Southern Strapping	07/15			AAR-78 (AW-105)				Buckle
Southern Strapping	07/15			AAR-78 (TY-105)			AAR-78 (AW-125)	Buckle
TAPEX American Corp.	07/14	AAR-1 (65WLMD)						Buckle (170) B6-OT
TAPEX American Corp.	07/14			AAR-1 (105WXH)				Ladder Buckle FCT-10 (FLB)
TAPEX American Corp.	07/14						AAR-1 (125WXH)	Ladder Buckle FCT-12 (FLB)
Cordstrap USA Inc.	08/14			AAR-77 (CC105)				Buckle CB10
R.C. Packaging Systems Inc.	01/15	AAR-38		AAR-38			AAR-38	Buckle
R.C. Packaging Systems Inc.	12/15			AAR-38 (RC105)				Buckle

Approved joint type

Non-metallic Strapping is acceptable for use as a substitution for steel package bands up to and including 3/4 in. x .028 in. only where substitution is specifically permitted in lumber figures.

Strapping is acceptable for use as a substitution for steel bands up to and including 1 1/4 in. x .031 in. under applicable lumber figures where substitution is specifically permitted, unless otherwise specified.

Carolina Strapping CS-2040 is approved only as a substitution for steel package bands up to and including 1 1/4 in. x .025 in. where substitution is specifically permitted in lumber figures.

19.3 Approved Type 1A polyester strapping Grades 6 and 7

For the latest update to this table, go to the TTCI Web site at
<http://www.aar.com/standards/OpenTop.html>

Manufacturer/ Distributor	Approved through (Mo/Yr)	Width in. (mm) and				Approved Joint	Approved Joint
		1 5/8 (41.3)		1 5/8 (41.3)			
		AAR	MBS lb (N)	AAR	MBS lb (N)		
Cordstrap USA Inc.	3/14	AAR-77	X	AAR-77	X	CDB H12 or CDB	HDB 12N, CDB
Carolina	9/13	AAR-	X	AAR-	X	CSB9	CSB90
ITW/Signod	10/13	AAR-11	X	N/A	N/A	FC H-13	FCT-15
Southern	5/14	AAR-	X	AAR-	X	-	SSLB
TAPEX American	7/14	AAR-11	X	N/A	N/A	FC H-13	FCT-13 (FLB)
Caristrap	1/15	Carilash	X	N/A	N/A	-	BN143
Caristrap	12/15			Carilash	X	-	BN143

Strapping in this table is acceptable for use as substitution for ALL 2-in. x 0.044-in. and smaller steel bands indicated in ALL pipe loading figures in Section 2 and for ALL concrete loading figures in Section 4. It also is acceptable for use as substitution for steel bands up to and including 1 1/4 in. x .031 in. under applicable lumber figures in Section 5, unless otherwise specified.

Nonmetallic strapping may not be used on a General Rules load.

Strapping must be applied, tensioned, and sealed consistent with AAR rules and approved items and in accordance with the recommendations and requirements of the manufacturer of the strapping and strapping equipment.

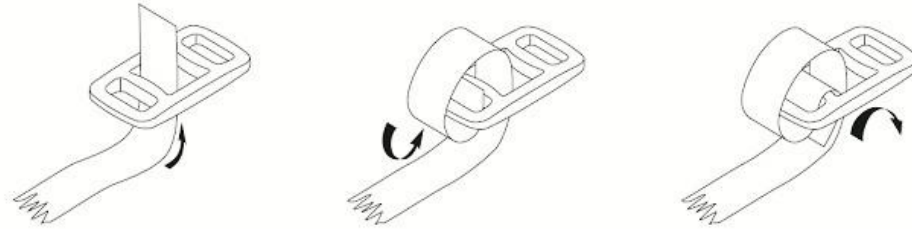
Strapping must be applied with AAR markings facing away from the load to which it is applied.

Except as indicated in Table above, 1 1/4-in. high tension bands may be substituted by an equal number of Type 1A, Grade 6, non-metallic strapping for all figured loads.

Except as indicated in Table above, 2-in. high-tension bands may be substituted by an equal number of Type 1A, Grade 7, non-metallic strapping for all figured loads

Ladder Joints—Type 1A Strap Grades 6 and 7

Strapping listed in Table above must be tensioned with the proper tensioning tool and sealed with the appropriate buckle in accordance with the manufacturer's recommendations. Illustration below shows the proper application of the HDB12N or DBL-12N (1 5/8 in.) buckle.



Step 1. Feed strapping up through center gap

Step 2. Fold strapping over end and up through bottom gap

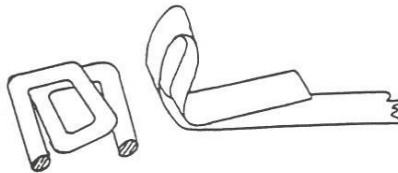
Step 3. Fold end of strap back down through center gap

Buckle Joints—Type 1A Strap Grades 3, 4, and 5

Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate buckle in accordance with the manufacturers recommendations. Following are illustrations depicting the proper application of the CB-10 (1-1/4 in.) buckle.

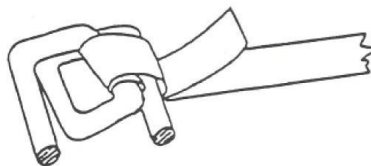
STEP 1

Form a loop in one end of strap. Buckle must be applied with flat surface toward load



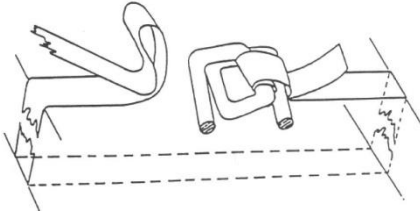
STEP 2

Pass loop through center of buckle. Pass doubled loop over inner bar and slip loop over outer arm.



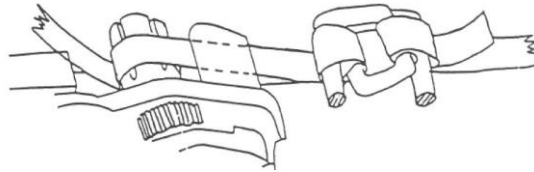
STEP 3

Position strap around lading and attach free end of strap to buckle as shown in STEP 2.



STEP 4

Pull end of strap by hand to remove slack. Complete tensioning of strap using the proper tensioning tool.



STEP 5

Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate buckle in accordance with the manufacturers recommendations. Strapping may not be reused.

METHOD OF IDENTIFICATION AND MARKING

All bands used for load securements or packaging, as specified under appropriate figures or in the General Rules, are to be marked to indicate manufacturer's or supplier's name and the letters "AAR" to show compliance with the requirements of the AAR Rules Governing the Loading of Commodities on Open Top Cars.

Markings shall consist of the letters "AAR", the manufacturer or distributor's name, or abbreviated name, or registered trade mark, or symbol, or AAR code consisting of two digits. Markings shall be clearly legible with characters not less than 1/8 in. high for steel die imprint and not less than 1/4 in. high for paint, ink surface printing or embossing.

Markings applied to high-tension bands manufactured to metric dimensions must be followed by the letter "M" of the same size as the original marking.

The Committee shall have the authority to require retesting of any AAR approved banding if and when it is considered necessary.

SYNTHETIC WEBBING AND ASSEMBLIES:

Corresponding AAR Open Top Loading Rule 20

Scope and Definitions

Working load limit (WLL). The stated capacity of a web strap, specified as a fraction or ratio of the minimum breaking strength (MBS). Example: If the MBS is three times the WLL (or the WLL is one-third of the MBS value), then the design (safety) factor is said to be a ratio of 3:1 or

MBS to WLL = 15,000 lb to 5,000 lb = 3 to 1

Assembly or system. Any items making up the tie-down assembly between each ultimate point of attachment, including all components such as webbing, winches, hooks, links, rings, swivels, shackles, turnbuckles, ratchets, binders, compression units, etc., as well as the method of securing anchorage devices to the railcar. When a working load limit is specified in a figure, all components of the assembly must meet the minimum requirements. It should be noted that the actual WLL of a tie-down assembly is likely to be less when individual components of comparable rating are combined in a system.

Polyester Webbing

Woven polyester webbing may be used for open top loading when permitted in a specific figure.

The use of polyester webbing, is permitted as load securement on a General Rule load, but its application is subject to the limitations detailed in Rule 20.5.

Polyester webbing used in the securement of cargo on open top cars, trailers, or containers must have a minimum design (safety) factor of 3:1.

When designing a load restraint system, the MBS of the assembly, including the webbing, must be used to calculate the number of straps to be used.

Nylon or any material other than the material specified herein for web strapping is not approved for use as securement for open top loading.

The use of nylon sleeves and/or corner protectors is permissible when used with polyester webbing, unless otherwise specified in a figure.

Winches and Other Components

Unless otherwise specified, all web assembly components, including ratchets, winches, hooks, eyes, connecting chain, etc., must be at least equal in minimum breaking strength to the component webbing.

A winch bar such as the one shown in Fig. 20.1, made of steel or other suitable alloy and specifically designed for use with web winches of the type illustrated in Fig. 20.2, is to be used for tensioning web strapping. A typical winch bar, as shown, is to be 30 to 40 in. long. Devices such as “cheater bars,” pipe extensions, etc., must not be used when tensioning web strapping. Tensioning must be performed in accordance with the winch and winch bar manufacturer’s instructions and safety guidelines.



Fig. 20.1 Winch bar

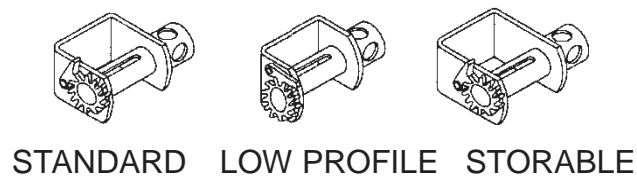


Fig. 20.2 Fixed winch styles

The illustrations in Fig. 20.2 depict three types of permanent-mounted winches. When applied to railcars or trailers, winches must be installed with the car or trailer owner's permission and the attachment must be performed in accordance with Rule 14.13 and the winch manufacturer's recommendations. Installation of winches or other tie-down apparatus must not alter the clearance profile of the car without the car owner's written permission.

Fig. 20.3 illustrates a typical portable web assembly with ratchet buckle and end hook.

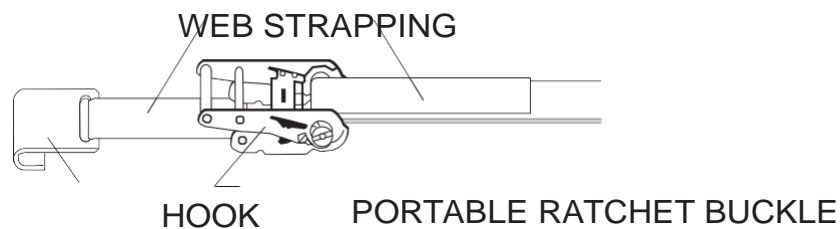


Fig. 20.3 Portable web ratchet assembly

Fig. 20.4 illustrates one type of edge protection that may be made of rubber, plastic, vinyl, metal, or other materials that are highly resistant to abrasion. Slip-on sleeve protectors made of nylon, polyester, and other materials may be effective as well.

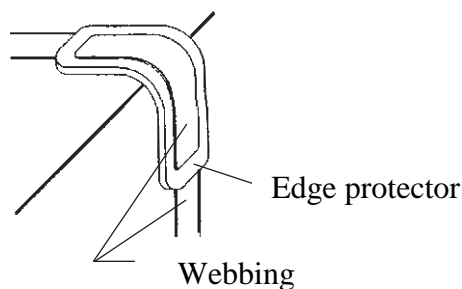


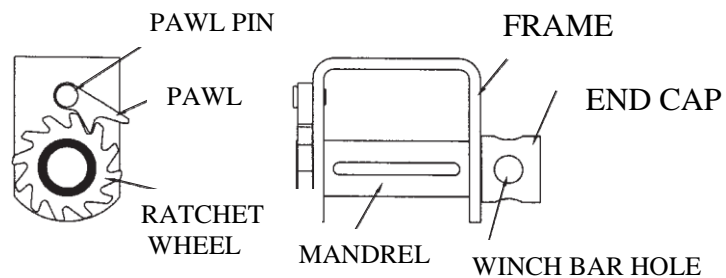
Fig. 20.4 Typical slide-on edge protector

APPLICATION OF WEBBING

During load planning, layout, and web application, sufficient distance must be allowed between the webbing and other securement items such as steel bands, separators, bearing pieces, etc., to avoid interference with and/or damage to webbing should the load shift during transit.

To avoid degrading the yield strength of the webbing, it must be applied flat and uniformly on the winch mandrel, avoiding folds, creases, etc. Webbing that has kinks, overlaps (except on winch mandrels), or folding (unless by design) throughout its length must not be applied.

When secured and/or tensioned using a winch or ratchet buckle, at least 6 in. of webbing is to be inserted into the mandrel or drum slot (see Fig. 20.5). A minimum of two rotations must then be made of the mandrel, resulting in at least two wraps of the webbing on the mandrel when tensioned.



At origin, straps must not be applied at a lateral angle greater than 5° to the point of attachment. Refer to the illustration in Fig. 20.6.

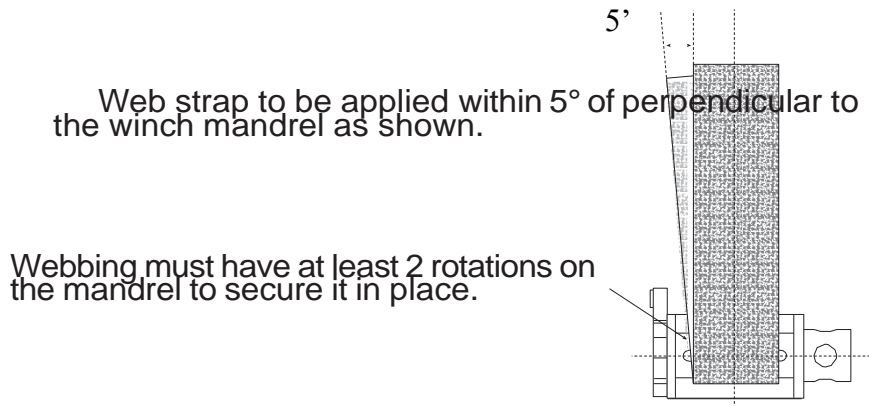


Fig. 20.6 Proper strap application

TENSIONING WEB TIE-DOWNS

When manually tensioning a permanently mounted winch, a winch bar should be used in accordance with Rule 20.3.2. Tension should be applied to the webbing or assembly with reasonable pressure. It is intended that tension be applied by no more than one person using a winch bar until the webbing is taut. To the extent possible, tension should be equalized across the load, over the full length of the tie-down, keeping in mind that the webbing will encounter resistance over every angle it passes.

A power tensioning device may be used on permanently mounted winches provided it is capable of applying smooth and continuous tension. When using a power tensioning device to tension webbing and assemblies, a torque value of **350 to 525 ft-lb** at the mandrel is recommended. Impact or hammer wrenches and the like must not be used.

No knots, splices, or other repairs are permitted to webbing, fittings, or stitching. Webbing may not be secured or anchored by tying, knotting, or clamping other than when lapped as intended on a winch or ratchet device.

Ensure that ratchet pawls or other positive locking systems are properly and completely engaged to prevent inadvertent or unintentional release.

Unused webbing is to be secured or stored in accordance with applicable instructions to prevent webbing from coming loose and hanging from the railcar.

APPLICATION OF WEBBING IN GENERAL RULES LOADS

On General Rules loads, webbing may not be used to provide the required longitudinal or lateral restraint. Approved web tie-down systems may be used to provide only the vertical load restraint. **Note:** An object must be secured with a minimum of two tie-downs.

On a General Rules load, the load must be restrained against longitudinal and lateral movement using blocking and/or securement systems consistent with these rules. The presence of web tie-down systems, applied for vertical securement per Rule 20.5.1, does not constitute lateral and/or longitudinal restraint. The web tie-down systems may not be factored into the calculation of the required lateral or longitudinal restraint. The load must be restrained to meet the requirements of Rule 5.3.1.

Cars used must be equipped with permanently mounted winches on both sides of the car, aligned to allow application of webbing over the top of the load at an approximate right angle (90°) to the side of the car. Webbing may not encircle the lading.

Tension webbing from both sides of a railcar after loading is complete.

INSPECTION OF WEBBING AND TIE-DOWNS

Before any synthetic web tie-down assembly is applied or placed in service, it must be inspected to ensure that the correct assembly is being used and to determine that the assembly meets the requirements of these rules.

A synthetic webbing and/or tie-down assembly must be removed from service if any of the following conditions are present. (Refer to Fig. 20.7 for illustrations of some sample defect conditions.)



HOLES, TEARS,
CUTS, SNAGS
SKETCH 1



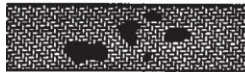
BROKEN, CRUSHED,
THINNING, OR WORN STITCHING
SKETCH 2



EXCESSIVE ABRASSION
OR WEAR
SKETCH 3



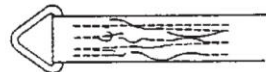
KNOTS, KINKS, OR
PERMANENT CREASES
SKETCH 4



MELTING, CHARRING,
OR WELD SPATTER
SKETCH 5



OVERSTRESSED FIBERS
OR CHEMICAL DAMAGE
SKETCH 6



MELTING, CHARRING,
OR WELD SPATTER
SKETCH 7



WEB DAMAGE
AT FITTING
SKETCH 8

Sample web defects

Holes, tears, cuts, snags, or embedded particles in the webbing.

Broken, crushed, thinning, or worn stitching in the load-bearing stitch patterns.

Excessive abrasion or wear.

Degradation due to ultraviolet radiation as indicated by excessive fading in conjunction with evidence of overall frayed yarn fibers or other detectable fabric deterioration.

Knots in any part of the webbing.

Melting, charring, or weld spatter on any part of the webbing.

Acid or alkali burns or other chemical contamination that inhibits or may inhibit the performance of the webbing.

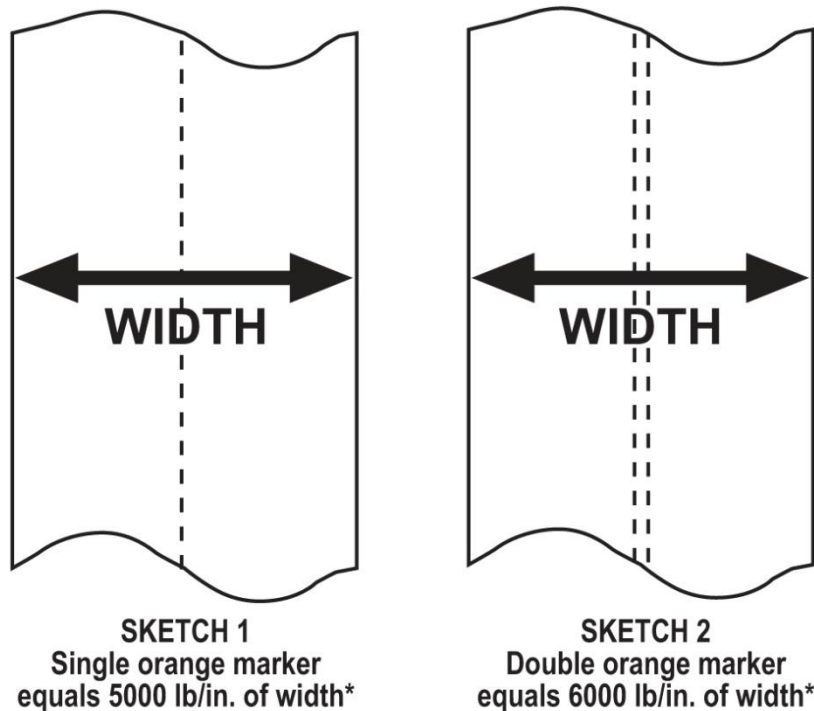
Any other condition that appears to degrade the strength of the webbing or other component of the tie-down assembly (e.g., crushed areas, severe abrasions, etc.).

When a tie-down assembly contains broken or nonfunctioning fittings, tensioning devices, or hardware.

MARKING AAR-APPROVED COMPONENTS

An AAR-assigned identification mark will be issued to a company that receives webbing approval or approval as an assembler. This mark will identify and correspond to the name of the manufacturer, weaver, and/or final assembling company. The applied AAR marking is in addition to any other labeling, marking, warning notices, etc., that may be required by other regulatory bodies or jurisdictions.

In accordance with WSTDA-T4, a high-contrast colored marker or thread, either solid or broken, centered on at least one face of the webbing, shall indicate the strength of the webbing. A single-line colored marker, as pictured in Sketch 1 of Fig. 20.8, indicates a minimum breaking strength of 5,000 lb/in. of web width. A double-line colored marker, as pictured in Sketch 2 of Fig. 20.8, indicates a minimum breaking strength of 6,000 lb/in. of web width. The marker(s) on the webbing is for the purpose of identifying the web strength for renewal purposes and is not to imply the maximum strength or the WLL of the entire assembly, which will likely be less.



***Example:**

A single-line colored marker on a 4-in.-wide web indicates a strap break strength of 20,000 lb ($4 \times 5,000 = 20,000$).

A double-line colored marker on a 3-in.-wide web indicates a minimum breaking strength of 18,000 lb ($3 \times 6,000 = 18,000$).

Fig. 20.8 Web-strength-identifying colored markers

All AAR-approved webbing is to be identified with the weaver's AAR-assigned marking at intervals not more than every 10 ft with the following exception: for webbing that is fabricated to customer-specified lengths, the AAR marking is to be located within 18 in. of the finished end of the strap after assembly of any attachments and must be clearly visible.

All AAR-approved web tie-down assemblies are to be identified with the assembler's AAR-assigned marking and must include the working load limit of the assembly.

The AAR identification marking must be applied at the time of production and may be accomplished by printing, stenciling, attaching a metal tag permanently to an assembly fixture, or affixing a label located within 18 in. from one end of the assembly.

All required identification markings must be clearly and indelibly applied in such a way as to provide permanent identification for the useful life of the component. The company's marking must be preceded by the letters *AAR*, and separated by a hyphen (e.g., *AAR-xxM*) as shown in Fig. 20.9.

AAR-xxMA WLL 6,666 lb (3,024 kg)

ABC MFG. CORP.

Legend for AAR Marking, AAR-xxMA:

AAR = AAR issued approval

xx = AAR-assigned
number to identify

ABC Mfg. Corp. M =
AAR-approved as a
manufacturer

A = AAR-approved as an assembler

Fig. 20.9 Example of AAR marking

Approved Companies and Components

Table 20.1 lists companies that have received AAR approval of their webbing in accordance with these rules.

Table 20.1 Approved webbing companies
 (For the latest update to this table, go to the TTCI Web site at
<http://www.aar.com/standards/OpenTop.html>)

Company	Ref. Part	Type and Width of	Web	AAR Marking	Appro ved Throu
			lb		
Oppermann Webbing Inc.	P/N 6624102-93	4-in.-wide woven polyester, resin coated	20,00 0	AAR- 76M	09/14
Spanset, Inc.	P/N 141534	LoadGard™ woven polyester, uncoated. 4.0 in.	20,00 0	AAR- 72MA	12/13
Spanset, Inc.	P/N 152622	LoadGard™ woven polyester, coated. 4.0 in.	20,00 0	AAR- 72MA	12/13
Southern Weaving Co.	P/N 1257LP0200	2-in. wide woven yellow dyed 40148 polyester	12,00 0	AAR- 73M	01/15
Southern Weaving Co.	P/N 1257LP0300	3-in. wide woven yellow dyed 40148 polyester	18,00 0	AAR- 73M	01/15
Southern Weaving Co.	P/N 1257LP0400	4-in. wide woven yellow dyed 40148 polyester	24,00 0	AAR- 73M	01/15
Southern Weaving Co.	P/N 1527XP020	2-in. wide woven yellow dyed 40148 polyester	10,00 0	AAR- 73M	01/15
Southern Weaving Co.	P/N 1527XP030	3-in. wide woven yellow dyed 40148 polyester	15,00 0	AAR- 73M	01/15
Southern Weaving Co.	P/N 1527XP040	4-in. wide woven yellow dyed 40148 polyester	20,00 0	AAR- 73M	01/15
American Webbing Inc.	P/N 05004TPT	4-in. wide woven yellow dyed polyester	20,00 0	AAR- 77M	06/12
Ribbon Webbing Corp.	P/N P6000- 2-314	2-in. wide woven yellow dyed polyester	12,00 0	AAR- 81MA	01/15
Ribbon Webbing Corp.	P/N P5000- 4-314	4-in. wide woven yellow dyed polyester	20,00 0	AAR- 81MA	01/15
Ribbon Webbing Corp.	P/N P6000- 4-314	4-in. wide woven yellow dyed polyester	24,00 0	AAR- 81MA	01/15

*M = Approved
 weaver/manufacturer MA =
 Approved weaver and
 assembler

Table 20.2 lists those companies that have received AAR approval of their tie-down web assemblies in accordance with these rules.

Table 20.2 Approved web assemblies and/or tensioning devices

(For the latest update to this table, go to the TTCI Web site
<http://www.aar.com/standards/OpenTop.html>

Company	Model or Ref.	Type or Description	Assy. WLL	AAR Marking*	Approved Through
SpanSet, Inc.	P/N 152622 P/N W/S4xxD	4-in.-wide Weargard™ orange premium polyester, PVC impregnated with SY-8449	5,000 (2268)	AAR-72MA	09/13
Pacific Cargo	P/N 45XX-FH-	4-in. Web Assy. with 4-in. Flat Hook	5,500 (2495)	AAR-75A	12/14
Pacific Cargo	P/N 46XX-VR-	4-in. Web Assy. with 4-in. V-ring ends	6,600 (2994)	AAR-75A	12/14
Pacific Cargo	P/N 20521120	2-in. Ratchet Webbing Assy. 4-in. x 48-ft. strap with 4-in. Flat Hook	3,335 (1513)	AAR-75A	09/14
Pacific Cargo	P/N	2-in. Web Assy. w/ Twisted Flat Hook	3,335	AAR-	09/14
Pacific Cargo	P/N	4-in. Ratchet Webbing	5,000	AAR-	09/14
Pacific Cargo	P/N	4-in. Web Assy. Blade Tie-Down	5,000	AAR-	09/14
Holland/Port ec Railway Products	P/N 20189790	2-in. Polyester Web Assy., Looped w/ Sewn Loop Ends and 3 Sleeve Protectors	12,500 (5670)	AAR-70A	05/15
Holland/Port ec Railway Products	P/N 20520900	4-in. Polyester Web Assy. w/ Sewn Loop Ends and "D" Hook	5,000 (2268)	AAR-70A	05/15
Holland/Port ec Railway Products	P/N 20993910	2-in. Polyester Web Assy. w/ Sewn Loop Ends, one having "D" Hook	5,500 (2495)	AAR-70A	05/14
Ribbon Webbing	P/N S-4 X (length)	4-in. Polyester Web Tie-down Assy. w/ Flat Hook.	5,400 (2449)	AAR-81MA	01/15
Ancra Int'l	P/N 41660-18-	3-in. Polyester Web Tie-down Assy. w/ Wire Hook # 41660-08	5,400 (2449)	AAR-74A	01/15
Ancra Int'l	P/N 43795-10-	4-in. Polyester Web Tie-down Assy. w/ Flat Hook # 41766-10	5,400 (2449)	AAR-74A	01/15
Ancra Int'l	P/N 43795-11-xxxR	4-in. Polyester Web Tie-down Assy. w/ Forged Delta Ring # 41632-12	5,400 (2449)	AAR-74A	01/15
Ancra Int'l	P/N 43795-90-xxxR	4-in. Heavy Duty "X-treme" Polyester Web Tie-down Assy. w/ Flat Hook # 41766-	5,400 (2449)	AAR-74A	04/15

*M = Approved weaver/manufacturer
 MA = Approved weaver and assembler
 A = Approved assembler, finisher, or distributor

SUBSTITUTION OF SECUREMENT ITEMS

Corresponding AAR Open Top Loading Rule 25

Approved load securement items specified within these rules must be used. Substitutions may only be made in accordance with the following provisions, unless otherwise specified in the figure.

In addition to the requirements of this rule, the specific rules pertaining to the application of specific securement items must be referenced and complied with.

Steel may be substituted for wooden stakes in accordance with Rule 13.4.

High tension bands and high tension wires may be substituted for each other if of equal or greater breaking strength. (Refer to Rule 24.8 for additional substitution of wire for steel bands in Fig. 61 (Rev. 03/00) of Section 5.)

High tension bands may be substituted by an equal number of high tension bands of lesser dimensions if of equal or greater breaking strength.

Except as indicated in Table 19.3, 1 1/4-in. high tension bands may be substituted by an equal number of Type 1A, Grade 6, non-metallic strapping for all figured loads.

Except as indicated in Table 19.3, 2-in. high-tension bands may be substituted by an equal number of Type 1A, Grade 7, non-metallic strapping for all figured loads.

Approved, high-strength, regular-duty strapping may be substituted for high tension banding in accordance with Rule 17.3.2.

Approved Rotterdam strapping, also referred to as Unit Strap Lifting Method (USLM) strapping, maybe substituted for equal-sized high tension banding. (See Rule 43.1 for more details.)

High tension bands used to secure a load to a car may be substituted by chains and/or cables if of equal or greater breaking strength. When used, chains and/or cables must be properly tensioned.

Nonmetallic strapping may be used for packaging or load securement only when permitted under a specific figure, or as specified in General Rule 19, unless otherwise restricted in the figure.

High tension wires may be substituted by an equal number of high tension wires of lesser diameter if of equal or greater breaking strength.

Common annealed wire may be substituted by wires of other gauge if the total breaking strength is equal or greater.

Common annealed wire may be substituted by wire rope or cable of equal or greater strength.

Rods, bolts, or flat bars with threaded ends must not be substituted by high tension bands, high tension wires, or common annealed wires.

Where a rule or figure specifies a special grade bolt or fastener to be applied, no substitutions are permitted.

Missing or broken chains may be replaced with wire rope or cable of equal or greater breaking strength.

Mechanical brakeman may be substituted with load cushioners.

Wire rope/cable of equal or greater strength may be substituted for steel rod in Section 3 figures.

In forest product figures in Section 5, solid fiberboard lath can be used as stickers where figure calls for stickers as an optional item.

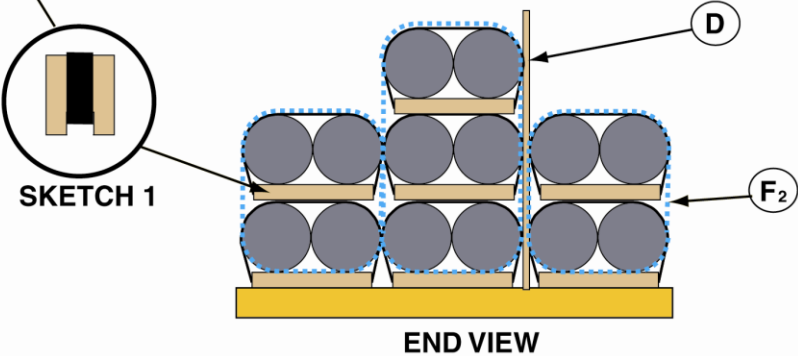
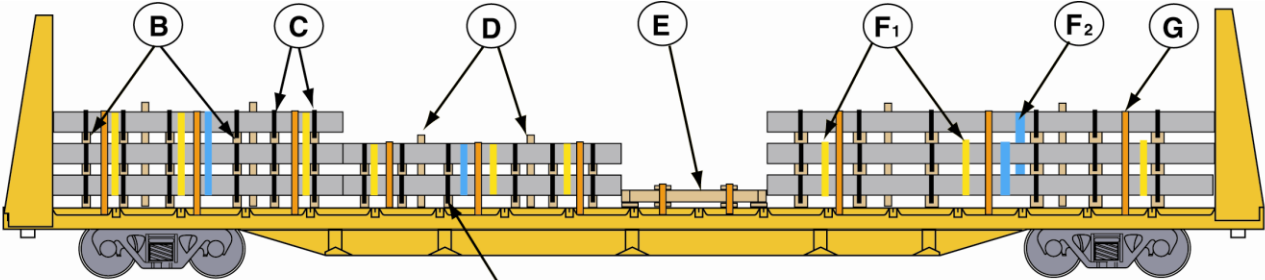
"IMPORTANT NOTICE"

These Circulars are meant to be a guide for shippers loading products on **Canadian Railroads**. It's not intended to be a completely detailed account but is intended to give an overview of the different aspects of some of the loading methods. These Circulars are revised from time to time and the user is cautioned to keep aware of any applicable rule changes.

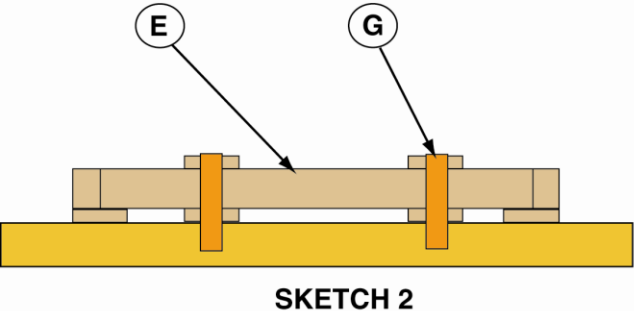
LOGS, ALUMINUM EXTRUSION FLAT CARS WITH PERMANENT END
BULKHEADS

RAC 12001

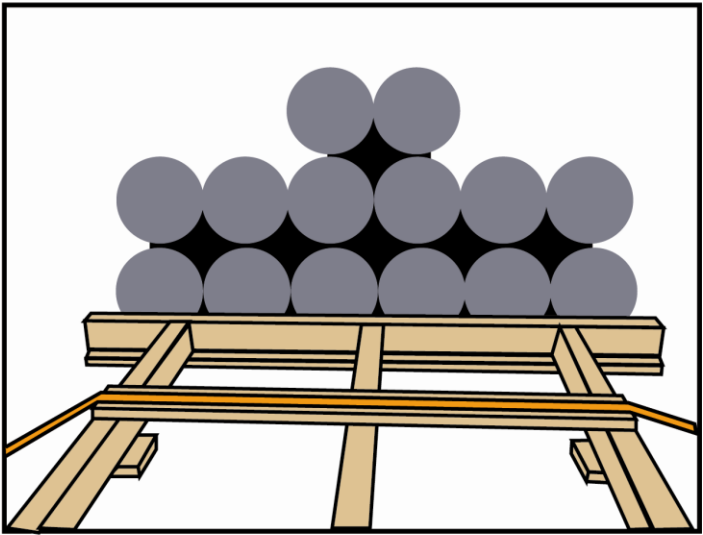
New 7-2006



END VIEW



SKETCH 2



SKETCH 3

LOGS, ALUMINUM EXTRUSION FLAT CAR WITH PERMANENT END
BULKHEADS

RAC 12001 (Concluded)

New 7-2006

Item	No. of Pcs.	Description
A		Vacant
B	6 per package	Dunnage: Hardwood, 3 in. x 3 in. minimum. Locate under each package equally spaced. Secure to package with Item "C" package bands. See SKETCH 1.
C	6 per package	Package Bands: 1-1/4 in. x .035 in. high tension bands to encircle each package. Bands to be equally spaced on package. The bands must encircle logs and dunnage. See END VIEW
D	2 per pile	Vertical stabilizers, lumber, 2 in. x 6 in., length to extend from top to bottom of pile. Locate between side by side columns approximately 2 ft. in from ends of pile. Secure in place.
E	As required	Filler blocking hardwood 4 x 6 bridged with 2 x 6. See SKETCH 2 and SKETCH 3. Secure with 2 Tie-Down bands item G
F1	3 per pile	Encircling bands: 2 in. x .044 in. high tension. Locate one band not less than 12 in. in from each end of pile, with the third one in center of pile.
F2	1 per column	Encircling band: 2 in. x .044 in. high tension. Locate in center of each column.
G	3 per pile	Tie-Down bands: 2 in. x .044 in. high tension. Locate one not less than 12 in. in from each end of pile, with others equally spaced between.

Notes:

1. At origin load must be equally distributed on car.
2. In this figure a column is defined as superimposed packages of two or more logs encircled by item F2.

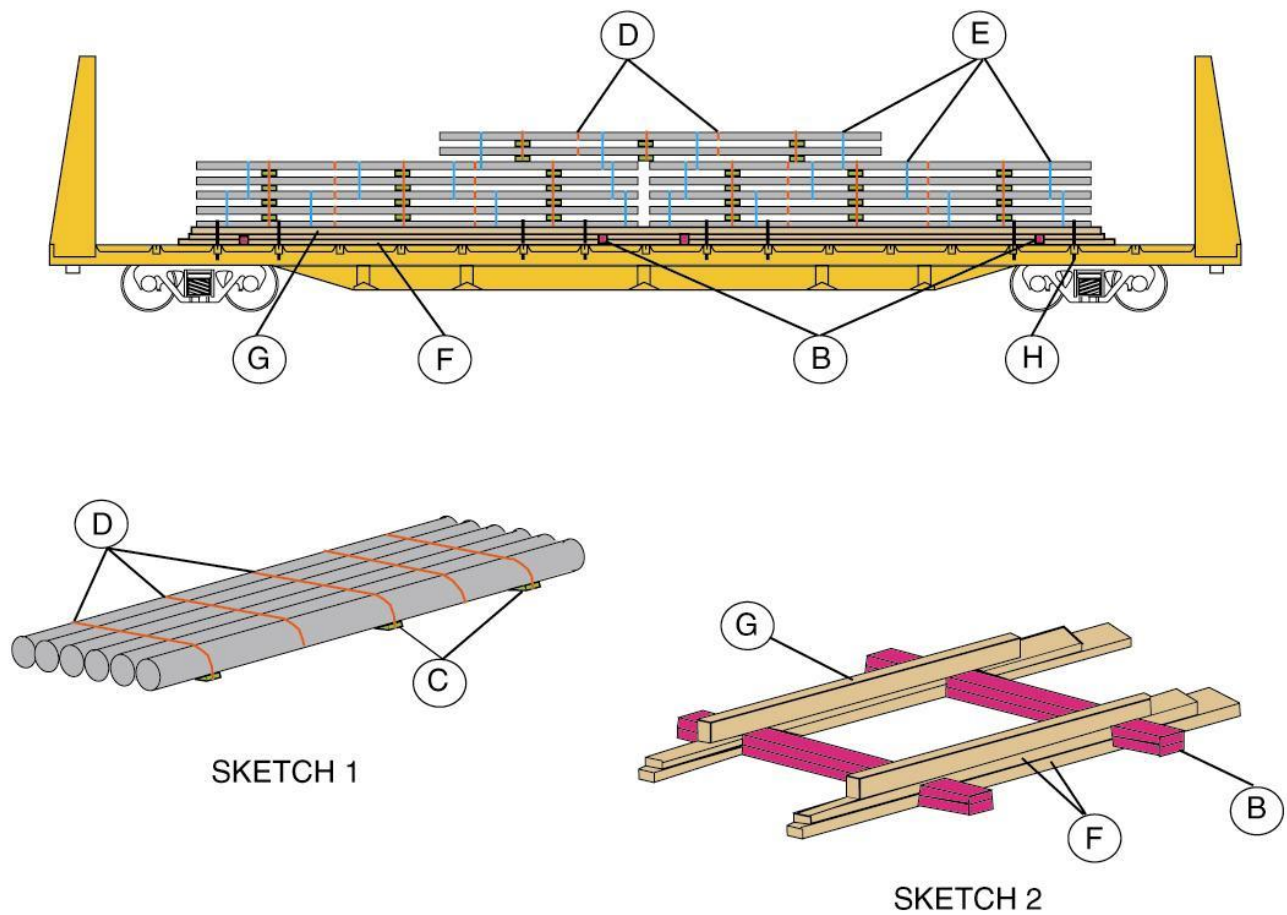
3. Top row may be incomplete in which case the packages must be in the center of the pile.
4. Encircling band item F1 must encircle complete rows only when top row is incomplete this band should be under the top package(s).
5. Tie-down bands must encircle the complete load including incomplete row if applicable.
6. Filler blocking item E must be of sufficient height to come in full contact with bottom layer.

See General Rules for further details.

LOGS, ALUMINUM EXTRUSION PACKAGED, 5 IN. TO 10 IN. IN DIAMETER,
MINIMUM 12 FT. IN LENGTH FLAT CARS OVER 48 FT. IN LENGTH
EQUIPPED WITH PERMANENT END BULKHEADS

RAC 12002

New 3-1997 (Ref: AAR)



LOGS, ALUMINUM EXTRUSION PACKAGED, 5 IN. TO 10 IN. IN DIAMETER,
 MINIMUM 12 FT. IN LENGTH FLAT CARS OVER 48 FT. IN LENGTH
 EQUIPPED
 WITH PERMANENT END BULKHEADS

RAC 12002 (continued)

New 3-1997 (Ref: AAR)

Item	No. of Pcs.	Description
A		Vacant.
B	2 per pile.	Laminated Bearing Pieces: Lumber, 2 in. x 6 in. length to be equal to width of car floor, in one piece and preferably rough. Locate approximately 2 ft. in from ends of pile. Secure bottom piece to car deck with four (4) 16-D nails. Secure top piece on bottom piece with four (4) 16-D nails. See sketch 2.
C	3 per package.	Dunnage: Hardwood, 3 in. x 3 in. minimum. Locate under each package, equally spaced by approximately 80 inches. Secure to package with Item "D" package bands. See sketch 1.
D	5 per package.	Package Bands: 1-1/4 in. x .035 in. high tension bands to encircle each package. Bands to be equally spaced on package but must be placed as far away from bearing pieces as possible. Three (3) of the bands must encircle Logs and Dunnage and two (2) midway between each Items "C" must encircle Logs only. See sketch 1.
E	4 sets per package.	Interlacing Bands: 2 in. x .044 in. high tension bands. Locate lower band of set under bottom layer encircling all logs in first, second and third layers. Locate next band of set to encircle top layer in group below and encircling third, fourth and fifth layers. Repeat until entire load is unitized. Locate each set as far as possible from Item "B" bearing pieces and Item "C" dunnage.
F	1 each side of Package.	Laminated Guide Rail Supports: Lumber, 2 in. x 4 in. minimum, free from decay and strength impairing knots, bottom piece must be continuous and length must be equal to the distance between Items "B". Locate straight, parallel with, and approximately 1/2 in. from base of load. Secure bottom piece to car deck with four (4) 16-D nails. Secure top piece to bottom piece with four (4) 16-D nails. See sketch 2.

LOGS, ALUMINUM EXTRUSION PACKAGED, 5 IN. TO 10 IN. IN DIAMETER,
MINIMUM 12 FT. IN LENGTH FLAT CARS OVER 48 FT. IN LENGTH
EQUIPPED
WITH PERMANENT END BULKHEADS

RAC 12002 (concluded)

New 3-1997 (Ref: AAR)

Item	No. of Pcs.	Description
G	1 each side of package	Guide Rails: Lumber, 2 in. x 4 in. minimum, free from decay and strength impairing knots, must be continuous and length must extend the Bearing Pieces by approximately 12 inches. Locate with largest face against Stub Stakes and secure to each Items "H" with four (4) 16-D nails. See sketch 2.
H	8 pair per car	Stub Stakes: Hardwood, 4 in. x 5 in. Length to extend 10 in. above car deck. Locate end stakes approximately 12 in. from end of outside packages in bottom layer, with intermediate stakes equally spaced.

Notes:

1. Load must be centrally located on car.

Void between stub stakes and guide rails must be filled with suitable filler.

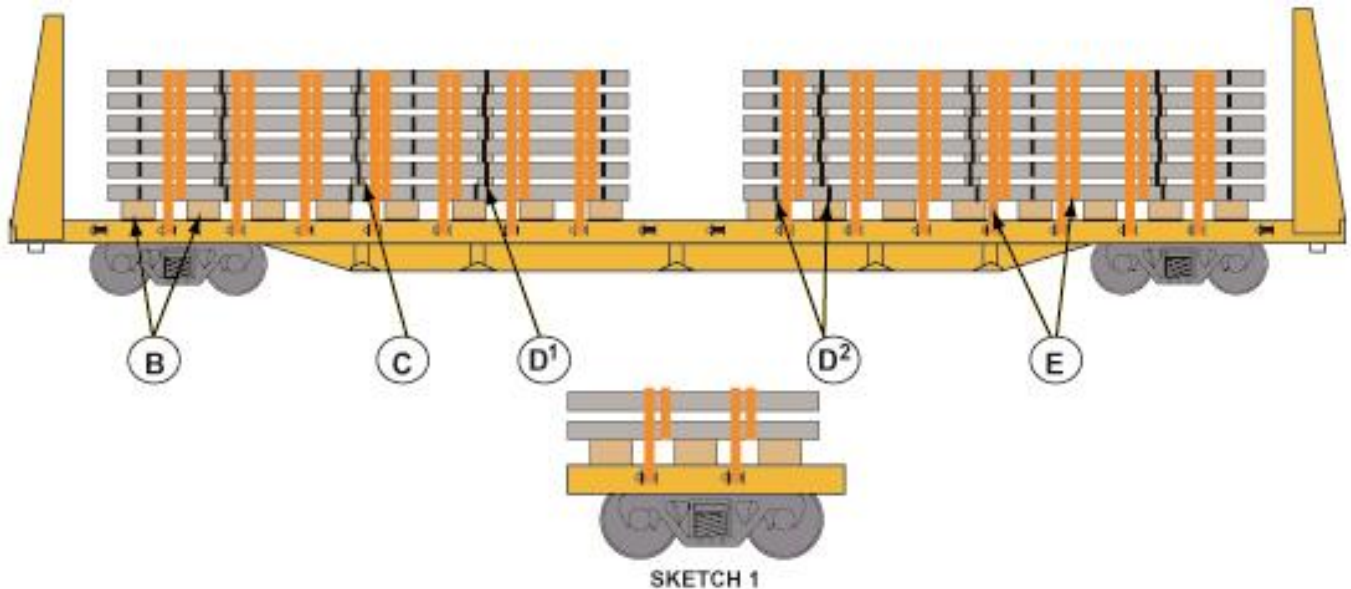
- 2.

See General Rules for further details

LOGS, ALUMINUM EXTRUSION 3 IN. TO 20 IN. OD, 8 FEET LONG AND OVER FLAT CARS EQUIPPED WITH PERMANENT END BULKHEADS AND PVC TREATED POLYESTER WEBBING TIE-DOWN SYSTEM.

RAC 12003

New 02-2008



Item	No. of Pcs.	Description
A		Vacant
B	As required	Bearing pieces: hardwood, 8 in. x 8 in. length equal to width of the car. Space every 3 or 4 feet, stagger location with winches. Each bearing pieces must be bolted or otherwise permanently secured to the car deck to prevent displacement.
C	2 per packages 12ft. long or less, add 1 for each additional 8 feet or less	Attached separators: hardwood, 3in.x 3in. length sufficient to support all logs in a package but no wider than the package. Each separator must be attached with item D1. Not required on bottom layer.
D1	1 per each item C	Attached separator package bands: $\frac{3}{4}$ in. x .029 in. high tension steel band. One band to encircle each item C and all logs in package.

D2	2 per each package 12 ft or less add 1 for each additional 8 feet or less	Package bands: ¾ in. x .029 in. high tension steel band to encircle all logs in a package. Locate one band near each end the other(s) to be placed intermediately between attached separators.
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LOGS, ALUMINUM EXTRUSION 3 IN. TO 20 IN. OD, 8 FEET LONG AND OVER FLAT CARS EQUIPPED WITH PERMANENT END BULKHEADS AND PVC TREATED POLYESTER WEBBING TIE-DOWN SYSTEM.

RAC 12003 (Concluded)

New 02-2008

Item	No. of Pcs.	Description
E	As required per note 4	We tie-down straps: polyester weebing, 4 in. wide a minimum breaking strength (MBS) of 20,000 lbs. Pass strapping over all logs in a pile, pass under load and back across the top of the load and secure to the winch on each side of car. Tension straps from both sides of car using a 30 to 40 in. winch bar or equivalent.

Notes and additional requirements:

1. At origin load must be equally distributed on car.
2. Load can consist of 2 or more piles.
3. Pile height may not exceed 125% of its width.
4. The weight of a pile must not exceed 75 % of the combined rated MBS of all the item E straps restraining that pile. (Example Five item E straps each with a 20,000 lbs. MBS, have a combined restraint rated at 100,000 lbs. The total weight of all ingots in that pile must not exceed 75% of the combined rated restraint of the five straps which is 75,000 lbs in this case).
5. All packages must be comprised of a single layer of logs. Nesting is not permitted. All logs in a layer must be of equal diameter and length.
6. All layers in the pile must be of equal width; except for the top layer in each pile which can be narrower by no more than one log.
7. To avoid contact between items C attached separators and items B bearing pieces in the event of longitudinal shift, item C may be omitted in

the bottom layers. When item C is not applied to the bottom layer packages each item C omitted must be replaced by an item D2 package band. Dunnage or otherwise must not be placed on top of permanent bearing pieces.

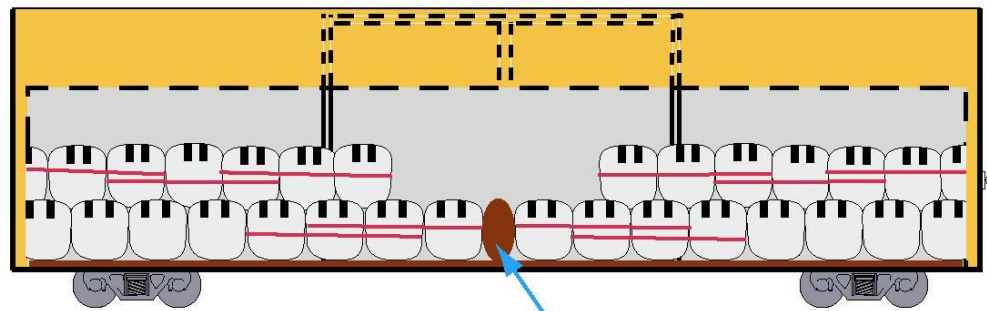
8. To the extent possible item B should be located between ratchets on each side of car to prevent premature web wear.(See **SKETCH 1**)

See General Rules for further details

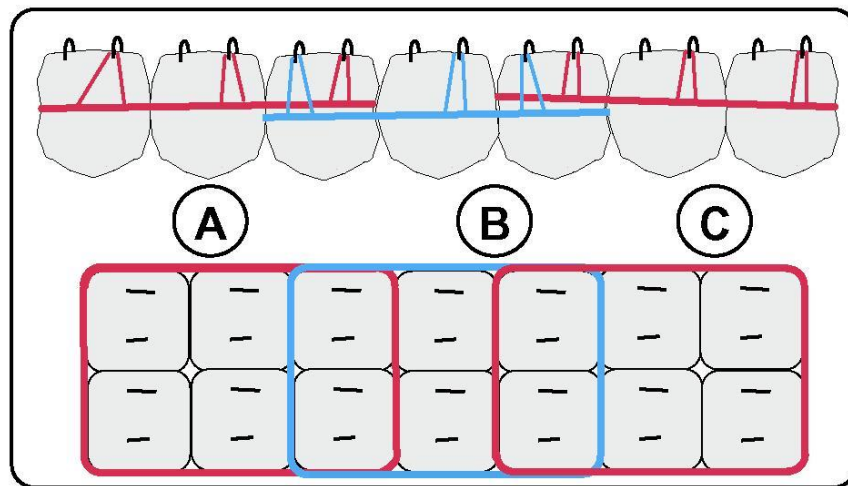
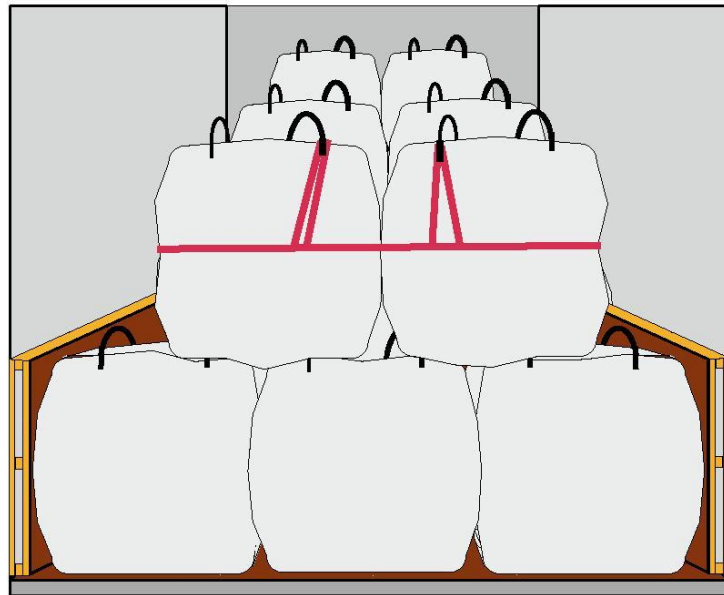
IRON POWDER, QIT SUPER SACKS - MPP LOADED IN BOXCAR

RAC 22003

New 4-2003



INFLATABLE BAG (Note 9)



SKETCH 1

IRON POWDER OF QIT SUPER SACKS - MPP LOADED IN BOXCAR

RAC 22003 (concluded)
New 4-2003

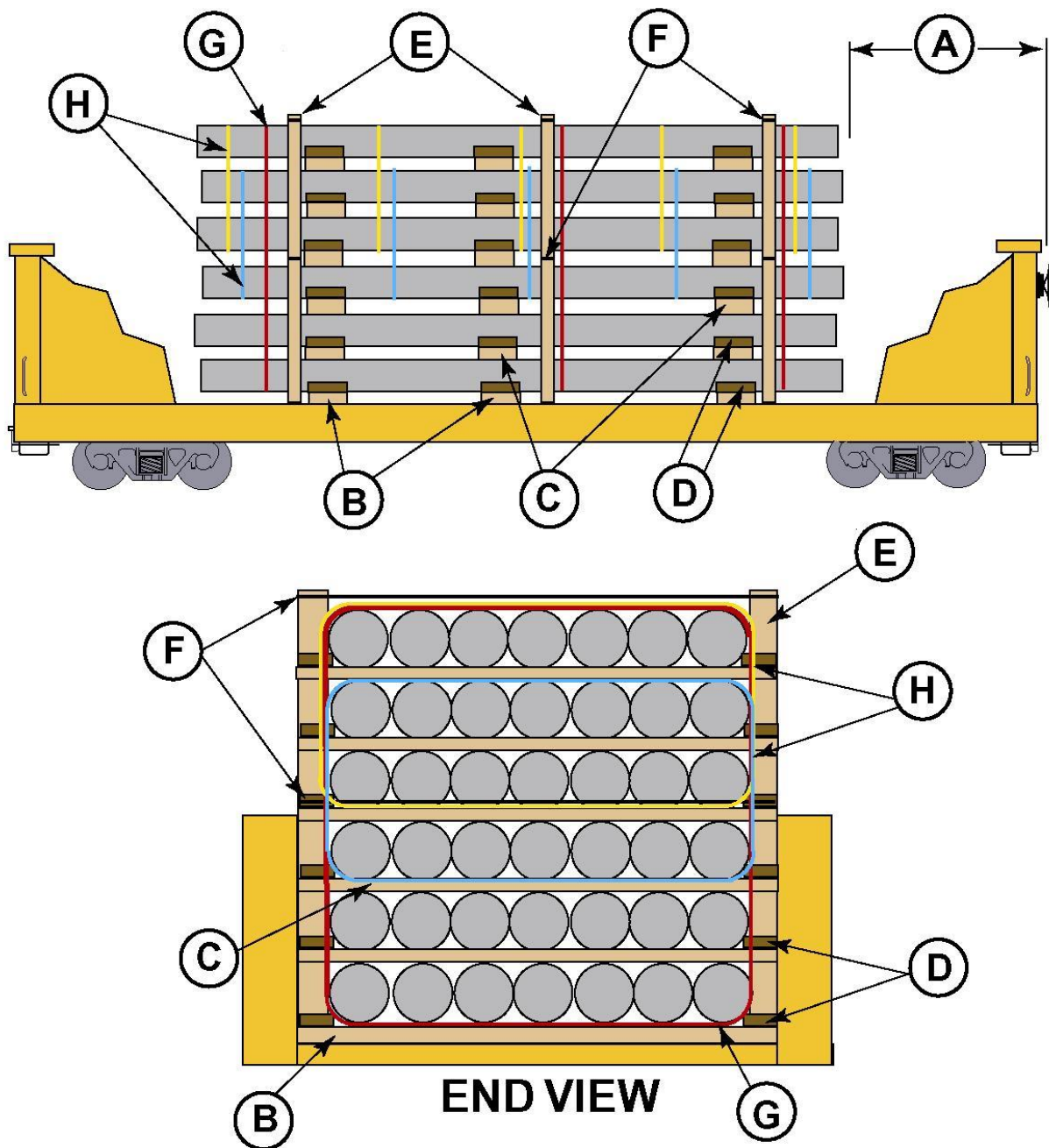
Notes:

1. Floor to be lined with Cardboard to protect bags from tearing on nails or protruding objects.
2. Bags are to be placed 3 wide in bottom row and full length of the car. In the second row 2 bags are to be nested between the bottom three and the number of longitudinal rows to be determined by the car loading capacity.
3. Lateral voids are to be filled by pallets placed standing up against the car's exterior wall. The face of the pallets against the styrene bags must also be lined with a cardboard.
4. Pallets placed in the doorway must be tied with polyester webbing to prevent them from falling when the doors are opened.
5. The bags placed in the second tier must be tied together by passing a 1 ¼ in. polyester webbing around the middle of the body of the bags
6. The first 6 bags (group A) must be encircled by the polyester band, then the next 4 bags (group B) must be encircled and interlaced with the last two bags of group A and so on for the next group C. The same procedure needs to be followed at the other end of the car. See SKETCH 1.
7. The encircling bands should be secured to prevent them from slipping down the side of the bags. This can be done by tying them to the handles of the bag.
8. The bags placed in the doorway must be encircled by 1 ¼ in polyester webbing placed around each groups of 6 bags across the car. These groups must then also be interlaced.
9. When there is a void in the middle of the carload it can be compressed by using an inflatable bag. The bag can then be removed and replaced by wood pallets as long as they are lined with cardboard on the faces touching the styrene bags. If the bag is left as filler it must be tied down with the webbing to prevent it from sliding up.

See General Rules for further details

PIPES, STEEL 26 IN. MAXIMUM DIAMETER, UNIFORM OR MIXED
LENGTHS AND DIAMETERS, WITH HIGHTENSION BANDS—GONDOLA
CARS

RAC 12005
New 11- 2003



PIPES, STEEL 26 IN. MAXIMUM DIAMETER, UNIFORM OR MIXED LENGTHS
AND DIAMETERS, WITH HIGH TENSION BANDS—GONDOLA CARS

RAC 12005 (continued)
New 11- 2003

Item	No. of Pcs.	Description
A		Brake wheel clearance: see General Rules.
B	3 per pile	Bearing pieces: 2 in. x 4 in. lumber. Length must be approximately equal to width of car, but not less than width of load. Space suitably under each pile. All bearing pieces are equipped with top chalks. (Item "D").
C	3 per pile	Separators: lumber, minimum 2 in. x 4 in., width must be at least 1 in. greater than height. Length equal to width of each package plus sufficient space to secure chalks (Item "D"). All separators are equipped with top chalks (Item "D").
D	1 per bearing piece and 1 per each separator on each side.	Chalks: lumber 2 in X 4 in. cut to fit and secured to top of bearing pieces Item "B" and to top of separators Item "C".
E	<p>3 pairs per pile 34 ft long or less, 3 ft. 6 in. or less above car side</p> <p>4 pairs per pile over 34 ft long, 3 ft. 6 in. or less above car side</p> <p>4 pairs per pile 34 ft long or less, over 3 ft. 6 in. above car side</p> <p>4 pairs per pile over 34 ft long, over 3 ft. 6 in. above car side</p>	Side stakes: Hardwood. Stakes must be of sufficient length to allow for placement of stake ties, Item F across top of load. Stakes should be equally spaced. Locate end stakes approximately 3 ft from ends of pipe contacting the stakes. Fill space between stakes and car side of stakes and load by nailing or securing fillers to stakes.

PIPES, STEEL 26 IN. MAXIMUM DIAMETER, UNIFORM OR MIXED LENGTHS
AND DIAMETERS, WITH HIGH TENSION BANDS—GONDOLA CARS

RAC 12005 (continued)
New 11- 2003

Item	No. of Pcs.	Description
F	2 per pile 2 ft. or less above car sides. 3 per pile over 2 ft. to 4 ft. above car sides 4 per pile over 4 ft. above car sides.	Stakes ties: 1 1/4 x .029 high tension band or six strands of No. 11 gauge wire or two strands of No. 8 gauge high tension wire. Place one tie close to top of car side and one across top of load. Intermediate ties required should be equally spaced between top and bottom ties. Can substitute with Polyester straps Grade 6 or 7.
G	3 per pile 34 ft. long or less 3 ft. 6 in. or less above car sides. 4 per pile over 34 ft. long, 3 ft. 6 in. above car sides. 4 per pile 34 ft. long or less, over 3 ft. 6 in. above car sides. 6 per pile over 34 ft. long, over 3 ft. 6 in. above car sides	Encircling bands: 1 1/4 x .029 high tension. Place around entire pile. Locate as far from bearing pieces and stakes as possible. Can substitute with Polyester straps Grade 6 or 7.
H	10	Interlacing bands: 1 1/4 x .029 high tension. Place around pile tying rows located above car side to rows located below top of car sides as per above drawing. Locate as far from bearing pieces and stakes as possible. Can substitute with Polyester straps Grade 6 or 7.

PIPES, STEEL 26 IN. MAXIMUM DIAMETER, UNIFORM OR MIXED LENGTHS
AND DIAMETERS, WITH HIGH TENSION BANDS—GONDOLA CARS

RAC 12005 (concluded)
New 11- 2003

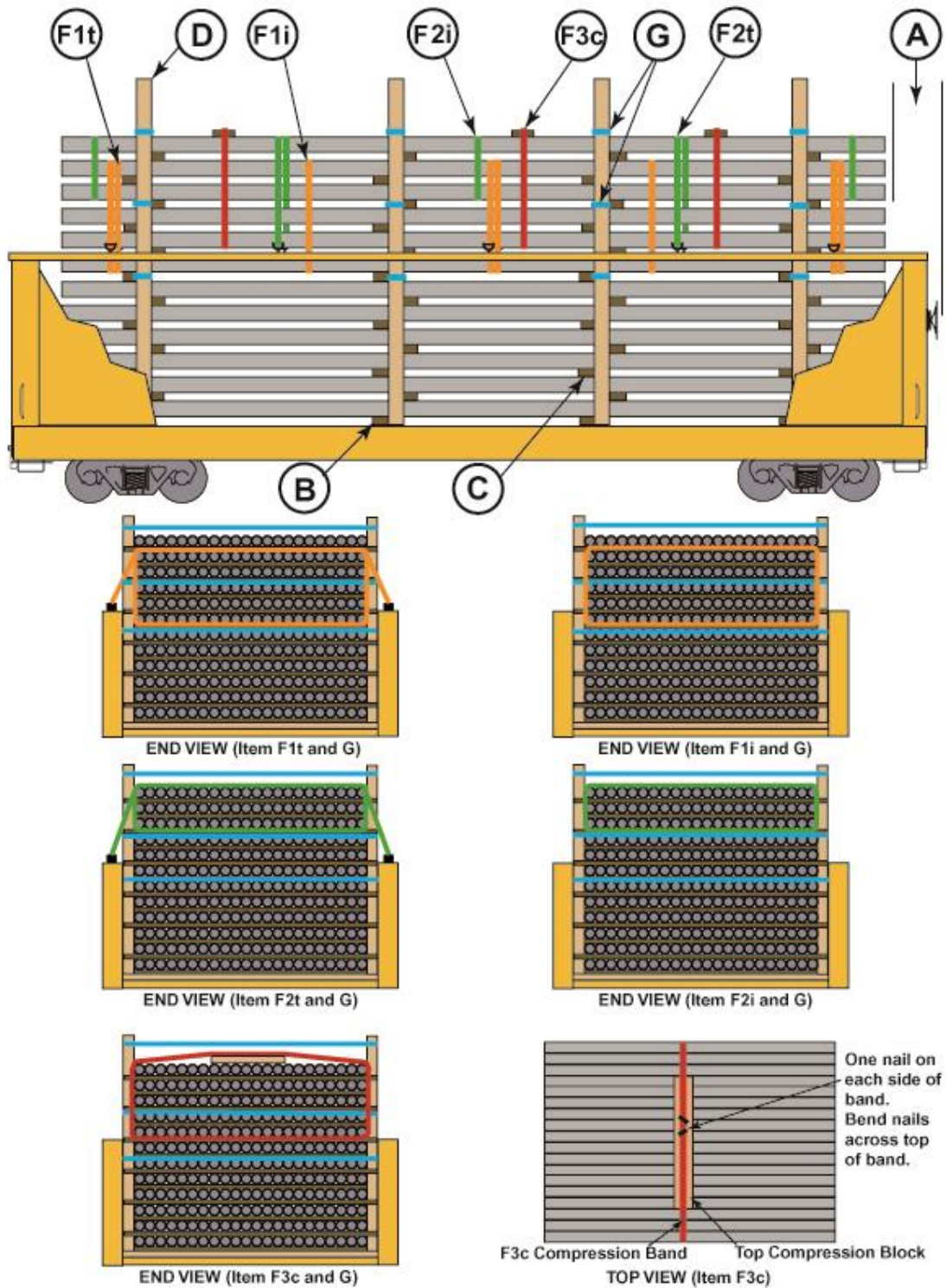
Notes:

1. Height of load above car floor must not exceed 10 ft.
2. If the load extends 5 ft 6 in. above the car side, or the load is 9 ft or higher above car floor, five pairs of stakes are required.
3. On loads 18 in. or less above car sides, space ties not less than 18 in. apart.
4. Pipe under 12 ft long must be loaded below top of car sides.
5. Small-diameter pipe must not be loaded inside larger-diameter pipe, except when loaded below top of car sides.
6. Pipe located on the outside of pile must contact all stakes used on that pile.
7. Suitable nesting, blocking, or securement must be used to fill in crosswise voids.

See General Rules for further details

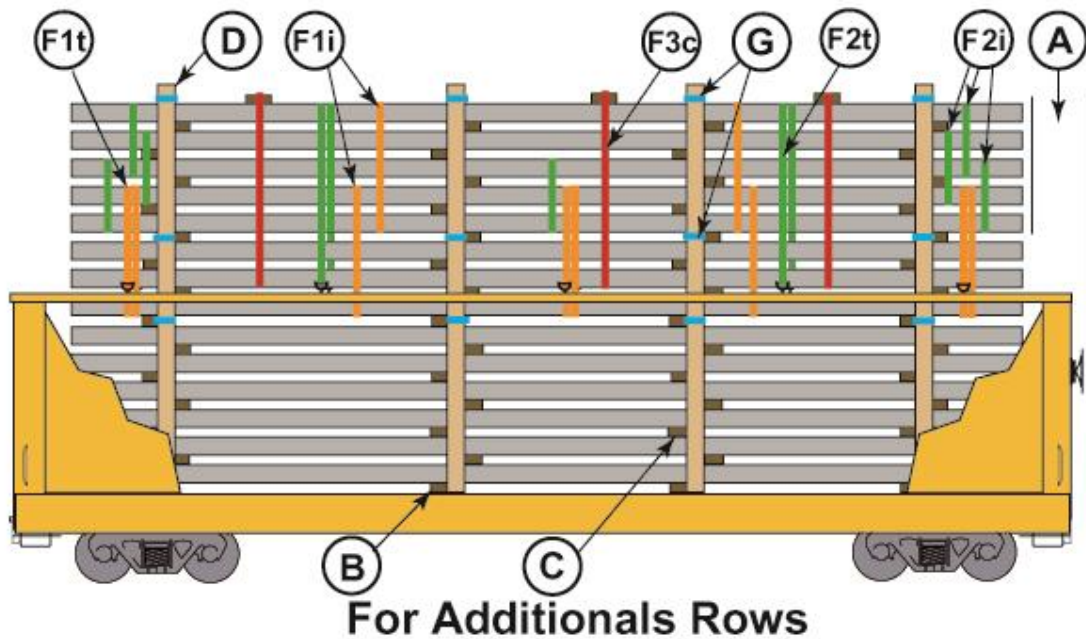
PIPES, STEEL 26 IN. MAXIMUM DIAMETER, MAXIMUM 48 FEET MIXED
DIAMETERS, SECURED WITH WEBBING IN 52 FT. GONDOLA CARS

RAC 12005B
New. 06- 2010



PIPES, STEEL 26 IN. MAXIMUM DIAMETER, MAXIMUM 48 FEET MIXED
DIAMETERS, SECURED WITH WEBBING IN 52 FT.- GONDOLA CARS

RAC 12005B (Continued)
New. 06- 2010



DYNAMIC LOAD BUCKLE



HOOK

Item	No. of Pcs.	Description
A		Brake wheel clearance: see General Rules.
B	3 per pile.	Bearing pieces: 2 in. x 4 in. lumber. Length must be approximately equal to width of car, but not less than width of load. Space suitably under load.
C	3 per pile.	Separators: lumber, minimum 2 in. x 4 in., width must be at least 1 in. greater than height. Length equal to width of load plus width of side stakes.

PIPES, STEEL 26 IN. MAXIMUM DIAMETER, MAXIMUM 48 FEET MIXED
DIAMETERS, SECURED WITH WEBBING IN 52 FT. GONDOLA CARS

RAC 12005B (Continued)
New. 06- 2010

Item	No. of Pcs.	Description
D	3 pairs per pile 34 ft long or less, 3 ft. 6 in. or less above car side 4 pairs per pile over 34 ft long, 3 ft. 6 in. or less above car side.	Side stakes: hardwood. Stakes must be of sufficient length to allow for placement of stake ties, Item F4 across top of load. Stakes should be equally spaced. Locate end stakes approximately 3 ft from ends of pipe contacting the stakes. Fill space between stakes and car side of stakes and load by nailing or securing fillers to stakes.
F1t F1i	3 F1t & 2 F1i per pile over 34 ft. long, over 3 ft. 6 in. above car sides.	Interlacing bands: Type 1A grade 6 non-metallic strapping. Place under sixth row and back across the second row of the load and secure the 3 F1t to the hooks on each side of car and tie the 2 F1i on top of second row with buckle. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations. See END VIEW (Item F1t and F1i) F1t = F1 Tie Down bands F1i = F1 Interlacing bands
F2t F2i	2 F2t and 3 F2i per pile over 34 ft. long, over 3 ft. 6 in. above car sides.	Interlacing bands: Type 1A grade 6 non-metallic strapping. Place under third row and back across the top row of the load and secure the 2 F2t to the hooks on each side of car and tie the 3 F2i on top of upper row with buckle. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations. See END VIEW (Item F2t and F2i)

PIPES, STEEL 26 IN. MAXIMUM DIAMETER, MAXIMUM 48 FEET MIXED
DIAMETERS, SECURED WITH WEBBING IN 52 FT. GONDOLA CARS

RAC 12005B (Concluded)
New. 06- 2010

Item	No. of Pcs.	Description
F3c	3 with compression blocks.	Compression bands: Type 1A grade 6 non-metallic strapping. Apply one compression block on top of the load. Blocks are to be lumber, minimum 2 in. x 4 in., length equal to 1/3 the width of the surface to which they are to be applied. Position each block centrally across the load surface as shown. Encircle last five layers of pipe with the band tying it over the block with buckle. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations. To prevent band displacement nail one nail on each side of band. Band nails across top of band. See END VIEW and TOP VIEW (Item F3c).
G	3 per pair of stakes.	Stakes ties: Type 1A grade 6 non-metallic strapping. Place one tie across top of load circling both stakes. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate buckle in accordance with the manufacturer's recommendations.

Notes:

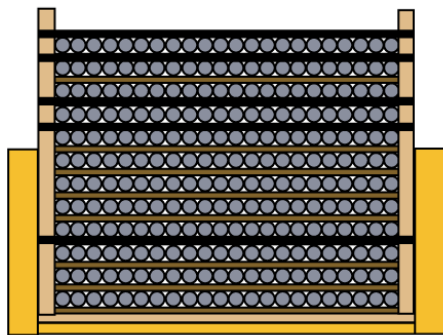
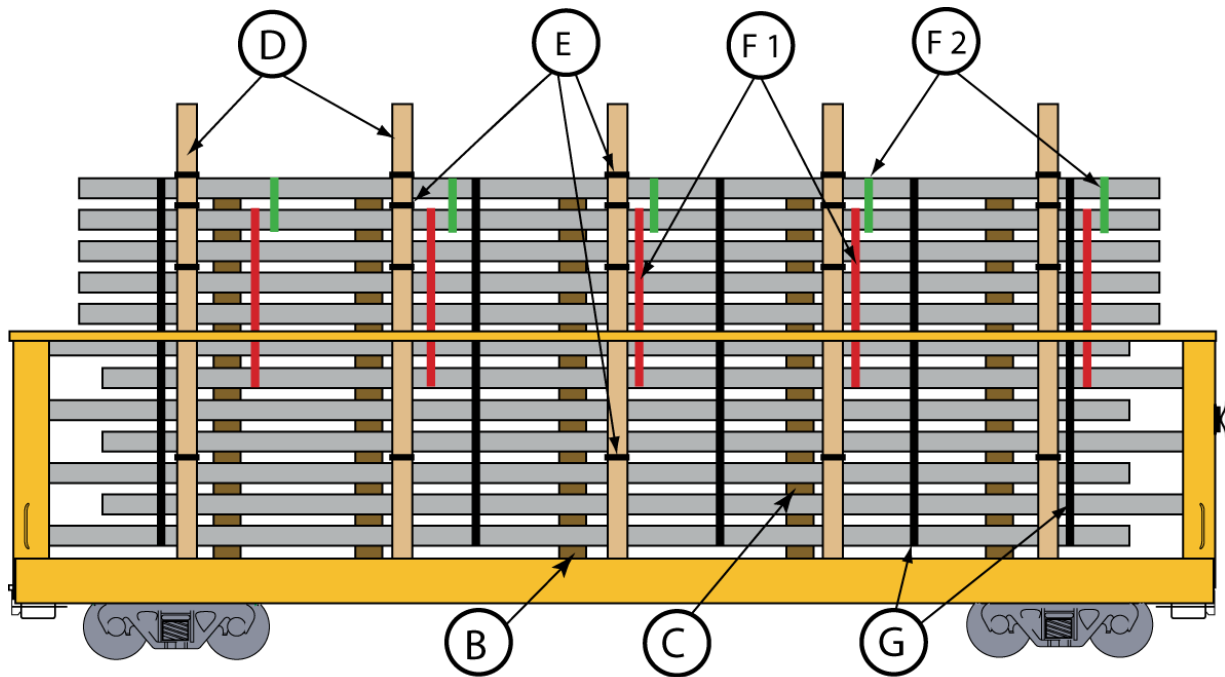
1. Webbing at each end of load must be 8 feet from the end of the car.
2. All tie-down webbing should be as close as possible to separators.
3. Height of load above car floor must not exceed 10 ft.
4. If the load extends 5 ft 6 in. above the car side, or the load is 9 ft or higher above car floor, five pairs of stakes are required.
5. On loads 18 in. or less above car sides, space ties not less than 18 in. apart.
6. Pipe less than 12 ft long must be loaded below top of car sides.
7. Small-diameter pipe must not be loaded inside larger-diameter pipe, except when loaded below top of car sides.
8. Pipe located on the outside of pile must contact all stakes used on that pile.
9. Suitable nesting, blocking, or securement must be used to fill in crosswise voids.

See General Rules for further details

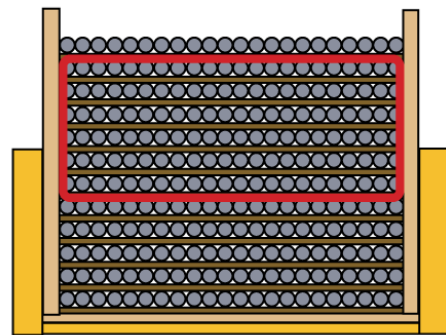
PIPES, STEEL 26 IN. MAXIMUM DIAMETER, UNIFORM OR MIXED
LENGTHS AND DIAMETERS, SECURED WITH NON-METALLIC
STRAPPING—GONDOLA CARS

RAC 12005D

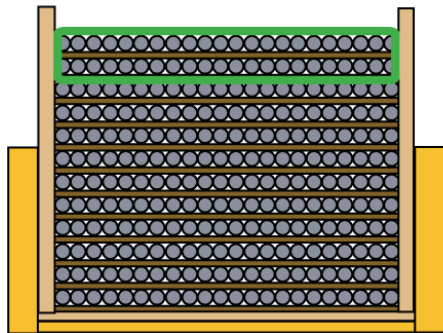
New 04-2013



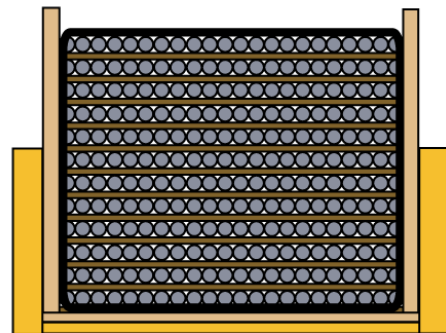
END VIEW (Item E)



END VIEW (Item F1)



END VIEW (Item F2)



END VIEW (Item G)

PIPES, STEEL 26 IN. MAXIMUM DIAMETER, UNIFORM OR MIXED LENGTHS
AND DIAMETERS, SECURED WITH NON-METALLIC STRAPPING—
GONDOLA CARS

RAC 12005D (continued)
New 04-2013

Item	No. of Pcs.	Description
A		Brake wheel clearance: see General Rules.
B	3 per pile	Bearing pieces: 2 in. x 4 in. lumber. Length must be approximately equal to width of car, but not less than width of load. Space suitably under each pile.
C	3 per pile	Separators: lumber, minimum 2 in. x 4 in., width must be at least 1 in. greater than height.
D	5 pairs	Side stakes: Hardwood 4x4 minimum. Stakes must be of sufficient length to allow for placement of stake ties, Item E across top of load. Stakes should be equally spaced. Locate end stakes approximately 3 ft from ends of pipe contacting the stakes. Fill space between stakes and car side of stakes and load by nailing or securing fillers to stakes.
E	4 per pair of stakes.	Stakes ties: 1-1/4 in. Polyester bands with a MBS of 3285 lbs. Place one band midway between the floor and the top cord of the car, one across the top of the load and one every 20 inches above the side of the car circling both stakes. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate buckle in accordance with the manufacturer's recommendations. DO NOT SUBSTITUTE
F1	Min 5	Approved Type 1A polyester strapping Grade 6, MBS of 7,700 lbs. Interlace minimum of two rows of pipe below top of car side to top over the second row of pipe from the top. Locate as far from bearing pieces and stakes as possible. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations. DO NOT SUBSTITUTE.
F2	Min 5	Approved Type 1A polyester strapping Grade 6, MBS of 7,700 lbs. Interlace top two rows of pipe. Locate as far from bearing pieces and stakes as possible. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations. DO NOT SUBSTITUTE.

PIPES, STEEL 26 IN. MAXIMUM DIAMETER, UNIFORM OR MIXED LENGTHS
AND DIAMETERS, SECURED WITH NON-METALLIC STRAPPING—
GONDOLA CARS

RAC 12005D (concluded)
New 11- 2003

Item	No. of Pcs.	Description
G	Min 5	Approved Type 1A polyester strapping Grade 6, MBS of 7,700 lbs. Circle entire load. Locate as far from bearing pieces and stakes as possible. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations. DO NOT SUBSTITUTE.

Notes:

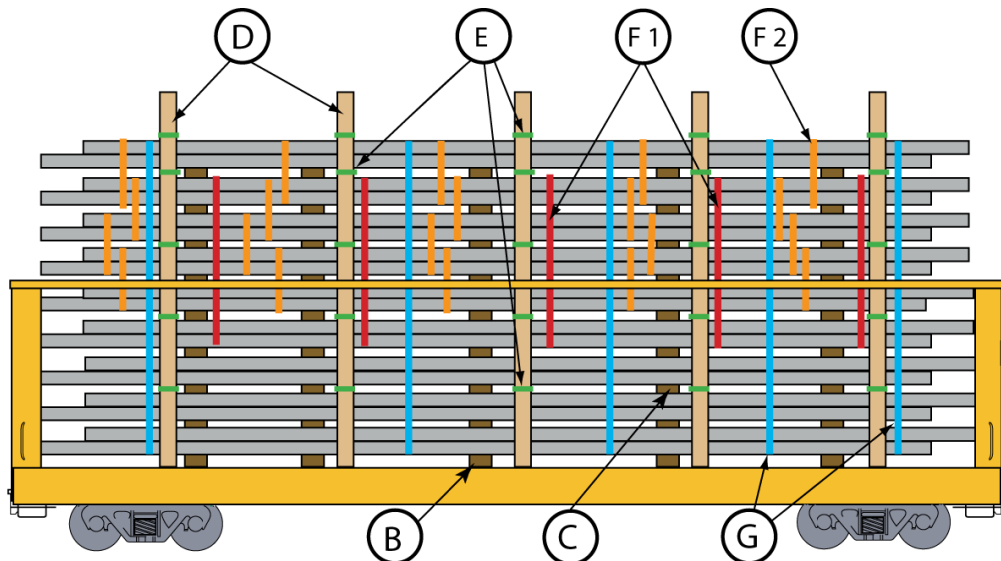
1. Rows of pipe below the sides of the car must be staggered as per drawing minimum 2 feet at each end.
2. Height of load above car floor must not exceed 10 ft.
3. If the load extends 5 ft 6 in. above the car side, or the load is 9 ft or higher above car floor, five pairs of stakes are required.
4. On loads 18 in. or less above car sides, space ties not less than 18 in. apart.
5. Pipe less than 12 ft long must be loaded below top of car sides.
6. Small-diameter pipe must not be loaded inside larger-diameter pipe, except when loaded below top of car sides.
7. Pipe located on the outside of pile must contact all stakes used on that pile.
8. Suitable nesting, blocking, or securement must be used to fill in crosswise voids.

See General Rules for further details

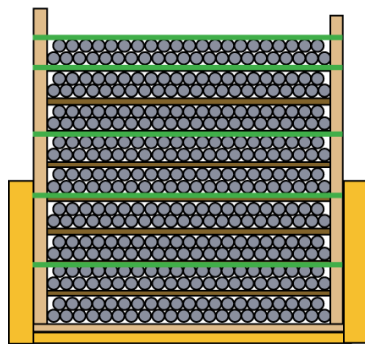
PIPES, STEEL FROM 4.5 IN. TO 7 IN. DIAMETER, UNIFORM OR MIXED
LENGTHS AND DIAMETERS SECURED WITH NON-METALLIC STRAPPING
- GONDOLA CARS

RAC 12005E

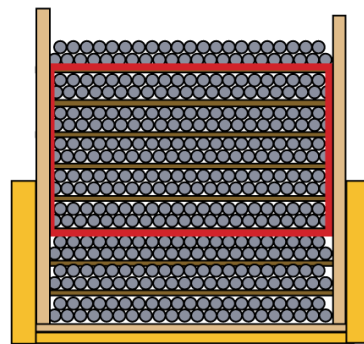
New 03-2017



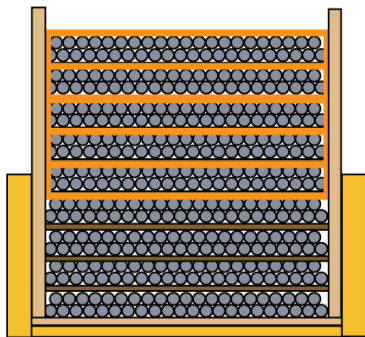
PIPES OF UNIFORM LENGTH AND DIAMETER



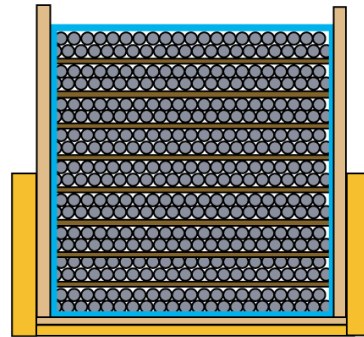
END VIEW (Item E)



END VIEW (Item F1)



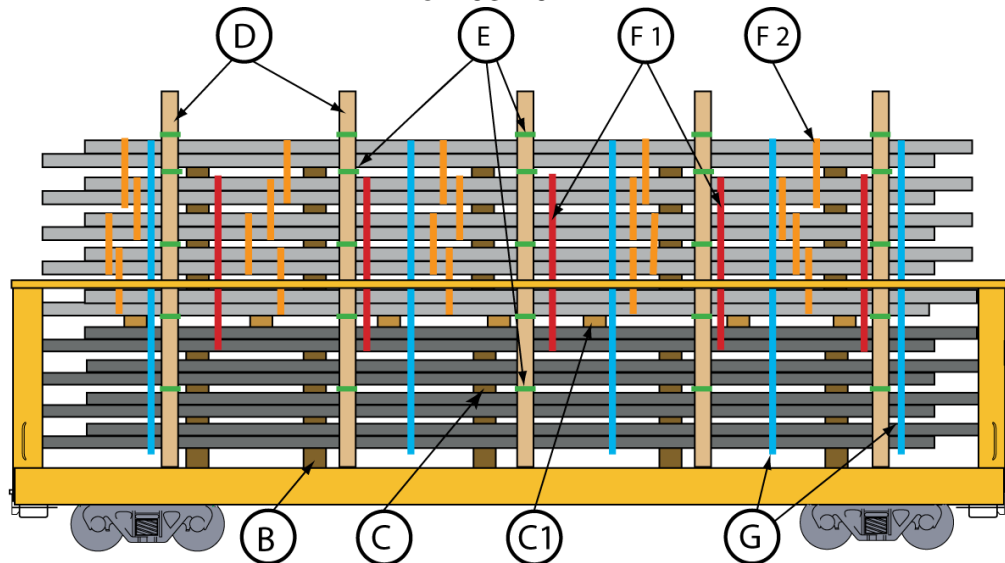
END VIEW (Item F2)



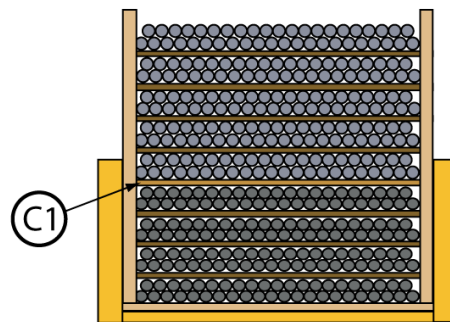
END VIEW (Item G)

PIPES, STEEL FROM 4.5 IN. TO 7 IN. DIAMETER, UNIFORM OR MIXED LENGTHS AND DIAMETERS SECURED WITH NON-METALLIC STRAPPING - GONDOLA CARS

RAC 12005E (Continued)
New 03-2017



SKETCH 1: PIPES OF MIXED DIAMETERS



END VIEW (Item C1)

Item	No. of Pcs.	Description
A		Brake wheel clearance: see General Rules.
B	Minimum 5 per pile	Bearing pieces: 2 in. x 4 in. lumber. Length must be approximately equal to width of car, but not less than width of load. Space suitably under each pile.
C	Minimum 5 per pile	Separators: lumber, minimum 2 in. x 4 in., width must be at least 1 in. greater than height
C1	2	Separators: If pile contains mixed pipes, need to add 2 additional separators when transitioning from one size to another. See SKETCH 1

PIPES, STEEL FROM 4.5 IN. TO 7 IN. DIAMETER, UNIFORM OR MIXED
LENGTHS AND DIAMETERS SECURED WITH NON-METALLIC STRAPPING -
GONDOLA CARS

RAC 12005E (Continued)
New 03-2017

Item	No. of Pcs.	Description
D	5 pairs	Side stakes: Hardwood 4x4 minimum. Stakes must be of sufficient length to allow for placement of stake ties, Item E across top of load. Locate end stakes approximately 3 ft from ends of pipe contacting the stakes. Fill space between stakes and car side of stakes and load by nailing or securing fillers to stakes.
E	5 per pair of stakes.	Stakes ties: 1-1/4 in. Polyester bands with a MBS of 3285 lbs. Place one band midway between the floor and the top cord of the car, one across the top of the load and one every 20 inches above the side of the car circling both stakes. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate buckle in accordance with the manufacturer's recommendations. DO NOT SUBSTITUTE
F1	Min 5	Approved Type 1A polyester strapping Grade 6, MBS of 7,700 lbs. Interlace minimum of two rows of pipe below top of car side to top over the second row of pipe from the top. Locate as far from bearing pieces and stakes as possible. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations. DO NOT SUBSTITUTE.
F2	Min 5	Approved Type 1A polyester strapping Grade 6, MBS of 7,700 lbs. = Interlace from tier 1 to 2 , from tier 2 to 3, from tier 3 to 4 and from tier 4 to 5. Locate as far as possible from bearing pieces and stakes. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations. DO NOT SUBSTITUTE.
G	Min 5	Approved Type 1A polyester strapping Grade 6, MBS of 7,700 lbs. Circle entire load. Locate as far from bearing pieces and stakes as possible. Strapping must be tensioned with the proper tensioning tool and sealed with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations. DO NOT SUBSTITUTE.

PIPES, STEEL FROM 4.5 IN. TO 7 IN. DIAMETER, UNIFORM OR MIXED
LENGTHS AND DIAMETERS SECURED WITH NON-METALLIC STRAPPING -
GONDOLA CARS

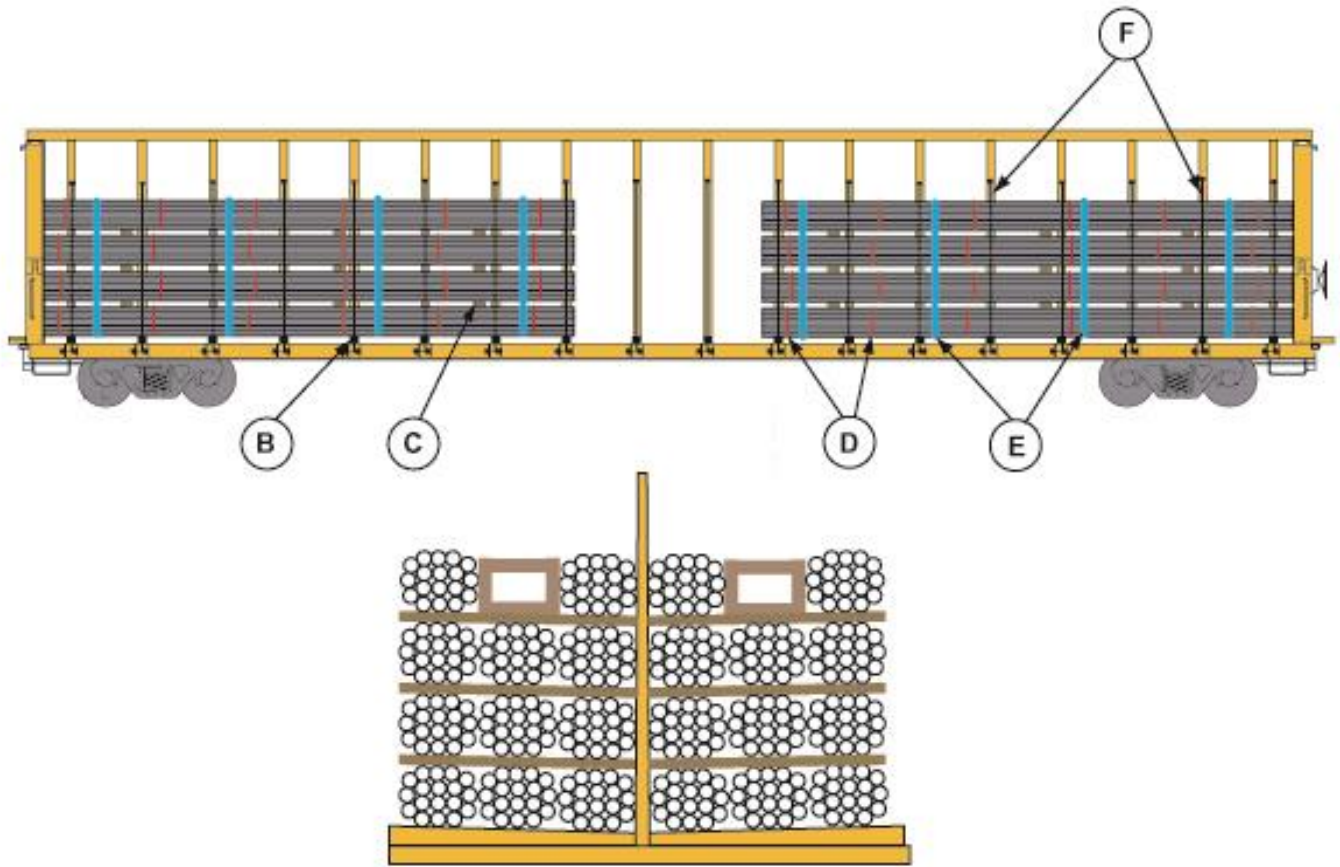
RAC 12005E (Concluded)
New 03-2017

Notes:

1. Rows of pipe below the sides of the car must be staggered as per drawing minimum 2 feet at each end.
2. Height of load above car floor must not exceed 10 ft.
3. On loads 18 in. or less above car sides, space ties not less than 18 in. apart.
4. Pipe less than 12 ft long must be loaded below top of car sides.
5. Small-diameter pipe must not be loaded inside larger-diameter pipe, except when loaded below top of car sides.
6. Pipe located on the outside of pile must contact all stakes used on that pile.

For further details see General Rules

PIPES, STEEL 3 1/2 IN. TO 10 IN. O.D., 10 FT LONG OR OVER FLATCARS
WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE
TIE-DOWN ASSEMBLIES
RAC 12006
New 05-2005



SKETCH 1
(Tie-down not shown)

Item	No. of Pcs.	Description
A		Vacant
B		Cars are equipped with steel bearing pieces wedged at 90° to A-Frame
C	3 per pile 20 ft. Add one for each additional 10 ft. or less	Separators: Hardwood minimum 2 in. X 4 in preferably rough and 2 inches wider than high. Maybe substitute with Douglas Fir minimum 4 in X 6 in rough. Use as substitute for Bearing pieces on riserless cars.

PIPES, STEEL 3 1/2 IN. TO 10 IN. O.D., 10 FT LONG OR OVER FLATCARS
WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-
DOWN ASSEMBLIES

RAC 12006 (Concluded)
New 05-2005

Item	No. of Pcs.	Description
D	1 every 4 feet of pipes	Packages ties: High tension steel bands, AAR approved 3/4 x .020
E	2 per pile 20 ft. Add one for each additional 10 ft. or less.	Encircling bands: Steel bands, AAR approved 1 1/4 x .029 in.
F	All cables	<p>Cables: 3/8 in. diameter, 8,800-lbs minimum breaking strength. Prior to tightening, there must be a minimum of 2 1/2 wraps around the drum of the winch. All cables must be used and they must be free of kinks and tangles. Tension is to be applied with an 18 in. bar or an equivalent to torque at 200 ft/lb. Cables are to be secured to A-frame in slot nearest to top of package.</p> <p>Or</p> <p>Web tie-down: webbing 4 in. wide; 20,000-lbs minimum breaking strength. Prior to tightening, there must be a minimum of 2 wraps around the drum of the winch. All web tie-downs must be used and they must be free of cuts and tangles. Tension is to be applied with an 18 in. bar or an equivalent to torque at 350-525 ft/lb. web straps are to be secured to A-frame in slot nearest to top of package.</p>

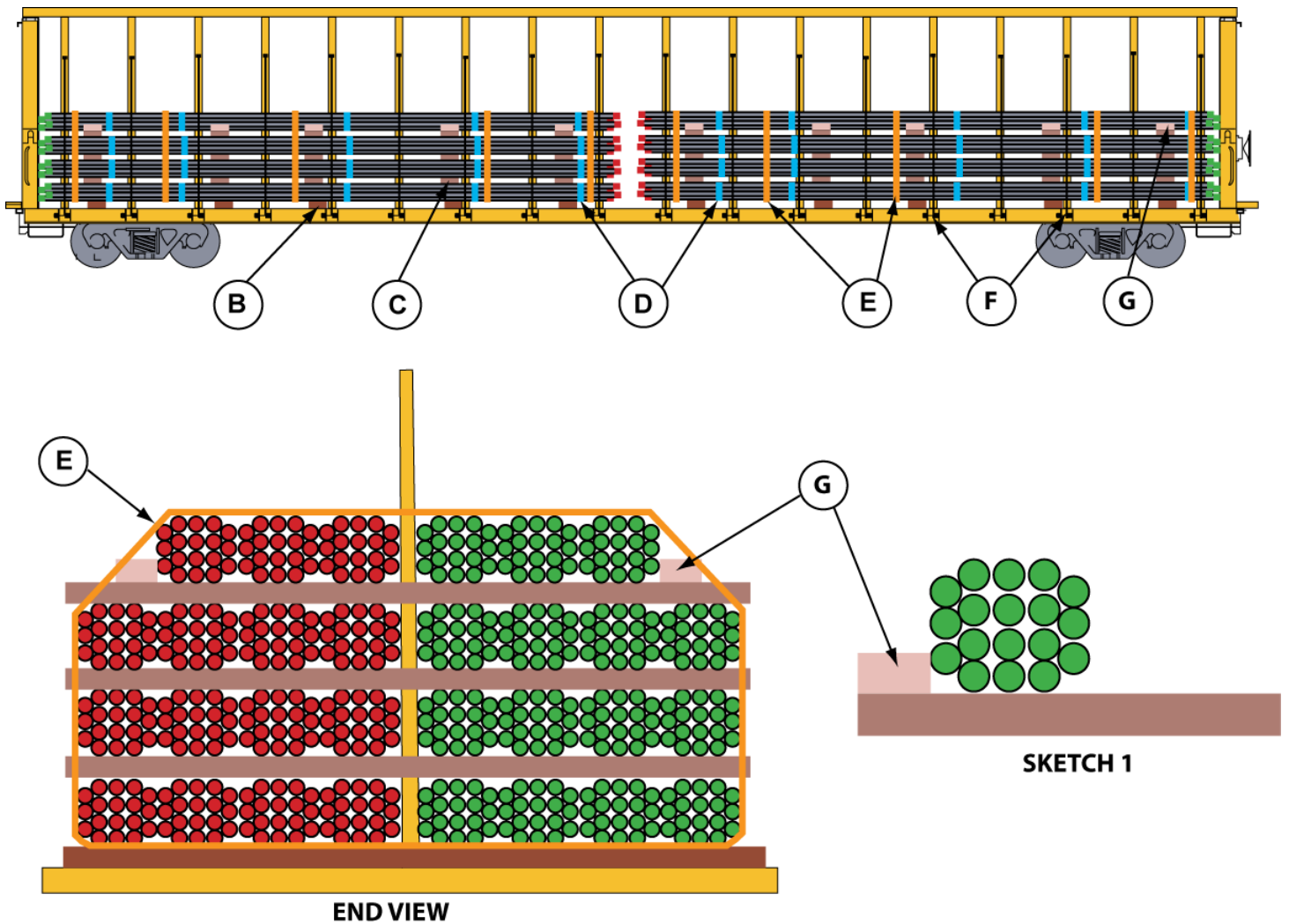
Notes:

1. Pipe packages must be contained inside the bulkhead width.
2. All packages must be tight against center partition or against each other. No space allowed between packages
3. When the top row cannot be full due to weight limits, void space must be filled with a hardwood spacer. There must always be one bundle against the center partition and one at the outside of the row to provide a square load. (See sketch 1)
4. Load must be evenly balanced on the car.
5. Longitudinal void if any must be kept to a minimum and placed in as close to the center of car as possible.

See General Rules for further details

PIPES IN PACKAGES, THREADED BOTH ENDS UP TO 3 1/2" DIAMETER BY
32' LONGLOADED ON RISERLESS CUSHIONED UNDER FRAME CENTRE
'A' FRAME CAR EQUIPPED WITH CABLE TIE DOWNS.

RAC 12006A
New 11-2006



PIPES IN PACKAGES, THREADED BOTH ENDS UP TO 3 1/2" DIAMETER BY
32' LONGLOADED ON RISERLESS CUSHIONED UNDER FRAME CENTRE 'A'
FRAME CAR EQUIPPED WITH CABLE TIE DOWNS.

RAC 12006A
New 11-2006

Item	No. of Pcs.	Description
A		Vacant
B	Minimum 2 per 12 ft and 1 for every 10 ft or less	Bearing pieces: Hardwood minimum 2 in. X 4 in preferably rough and 2 inches wider than hight. Maybe substitute with Douglas Fir minimum 4 in X 6 in rough.
C	Minimum 2 per 12 ft and 1 for every 10 ft or less.	Separators: Hardwood minimum 2 in. X 4 in preferably rough and 2 inches wider than hight. Maybe substitute with Douglas Fir minimum 4 in X 6 in rough.
D	Minimum 2 per 12 ft and 1 for every 10 ft or less.	Packages ties: 1 1/4" high tension steel bands or wire.
E	Min 2 per 12 ft pile and 1 for every 10 ft or less with a maximum of 5.	Encircling bands: 1 1/4" high tension steel bands.
F	All cables to be used.	Cables: 3/8 in. diameter, minimum of 8,800 lbs. breaking strength. Cable assemblies must be equipped with edge protectors. Winch assemblies must be equipped with a device to maintain tension. Prior to tightening, there must be a minimum of 2 1/2 wraps of cable around the winch drum. All cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or 3/4 in ratchet. Cables are to be secured to A-frame in slot nearest to top of top package.
G	As required	Chuck blocks lumber 2 in. x 4 in. Nailed to the top of each end of the separators required on narrow layers. See SKETCH 1

PIPES IN PACKAGES, THREADED BOTH ENDS UP TO 3 1/2" DIAMETER BY 32' LONGLOADED ON RISERLESS CUSHIONED UNDER FRAME CENTRE 'A' FRAME CAR EQUIPPED WITH CABLE TIE DOWNS.

RAC 12006A (Concluded)
New 11-2006

Notes:

1. Load must be equally distributed on both sides of the centre beam partition.
2. Load must be centered on the car leaving voids equally distributed at each end of car. When more than one pile is placed on each side of car, one pile must be placed against each bulkhead with others spaced out evenly on the car.
3. Corner protectors must be used on all cables.
4. Load weight distribution must be in accordance with AAR General Rule 3.4 indicating the percentage of deck length utilized versus correspondent permissible percentage of load limit for that length, see table below.

Allowable load limit on reduced deck length utilized

<i>Percent of deck length utilized</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>
<i>Percent of load limit permitted</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>

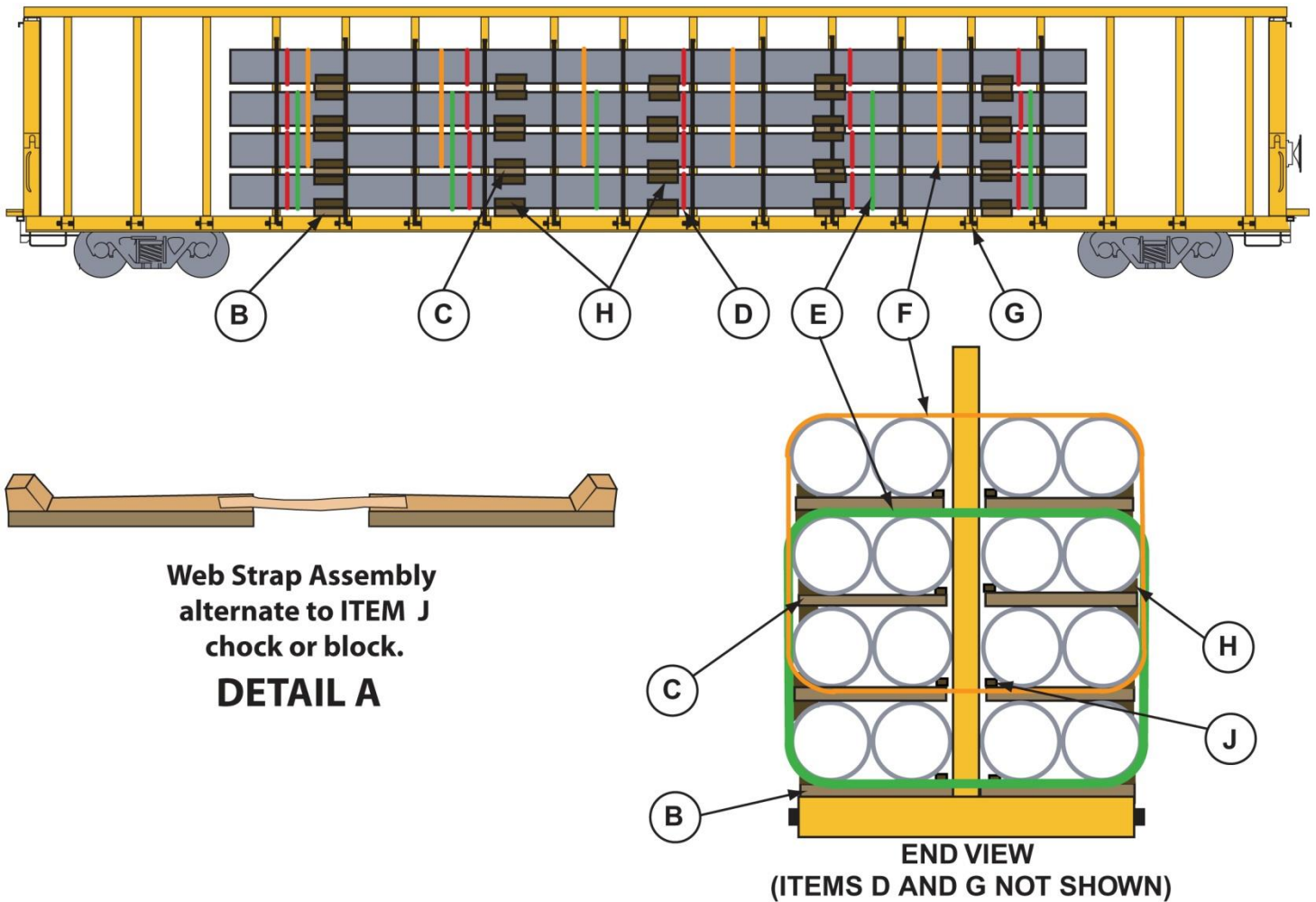
5. Separators must not come in contact with cables and should be located just inboard of cables towards centre of car to offer maximum protection in the event of load shifting.
6. Height of load must not exceed height of bulkhead or centre stake, whichever is less.

See General Rules for further details

PIPES, STEEL 12 to 30 in. O.D. MINIMUM LENGTH 30 FEET, ON RISERLESS
CENTRE 'A' FRAME CAR EQUIPPED WITH CABLE OR WEB STRAP TIE
DOWNS AND CUSHIONED UNDER FRAME.

RAC 12006B

New 11-2011



PIPES, STEEL 12 to 30 in. O.D. MINIMUM LENGTH 30 FEET, ON RISERLESS
CENTRE 'A' FRAME CAR EQUIPPED WITH CABLE OR WEB STRAP TIE
DOWNS AND CUSHIONED UNDER FRAME.

RAC 12006B (Continued)
New 11-2011

Item	No. of Pcs.	Description
A		Vacant
B	Minimum 2 per 12 ft and 1 for every 10 ft or less	Bearing Pieces: Rough full 2"X6" clear Douglas Fir or hardwood
C	Minimum 2 per 12 ft and 1 for every 10 ft or less.	Separators: Rough full 2"X6" clear Douglas Fir or hardwood. Length to be equal to but not greater than width of load.
D	Minimum 2 per 12 ft and 1 for every 10 ft or less.	Packages ties: 1 ¼" X .029 high tension steel bands or wire. Use optional. <u>Must</u> be applied to top layers containing mixed diameter pipes tying in the smaller diameter to the larger.
E	Min 2 per 12 ft pile and 1 for every 10 ft or less.	Encircling bands: AAR 1 ¼" X .029 high tension steel bands may be substituted with Type 1A Grade 6 polyester cord strapping. Item E Interlacing bands encircle the bottom 3 layers (both sides of partition) compressing the three bottom layers from both sides against the center partition.
F	Min 2 per 12 ft pile and 1 for every 10 ft or less.	Encircling bands: AAR 1 ¼" X .029 high tension steel bands may be substituted with Type 1A Grade 6 polyester cord strapping. Item F Interlacing bands encircle from the second layers up to and over top of load (both sides of partition) compressing layers from both sides against the center partition.

PIPES, STEEL 12 to 30 in. O.D. MINIMUM LENGTH 30 FEET, ON RISERLESS
CENTRE 'A' FRAME CAR EQUIPPED WITH CABLE OR WEB STRAP TIE
DOWNS AND CUSHIONED UNDER FRAME

RAC 12006B (Continued)
New 11-2011

Item	No. of Pcs.	Description
G	All cables to be used.	Tie Down Cables: 3/8 in. diameter, of 8,800 lbs. minimum breaking strength. Cable assemblies must be equipped with edge protectors. Winch assemblies must be equipped with a device to maintain tension. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables in load area must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top row of pipes.
Alt. G	All straps to be used.	Web tie-down: polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. The web strap must be routed through the web guide closest to the top of the load, over the load, and then to the fixed winch or securement point on the side sill. Thread at least 6 in. of webbing through the slot in the winch mandrel. Prior to tightening, there must be a minimum of 2 wraps of webbing around the winch mandrel. The strap is to be tensioned by the effort of one person using a winch bar 30 in. to 40 in. long. All straps in load area must be used.
H	One per item B and two per item C	Outboard Chock Blocks: Wood chalk blocks 2 x 6 x 8 wedge shape, cut for maximum contact for particular pipe diameter, one on item B and one on and under item C. Secured to Items B & C with five or six 16-D nails.
J	One per item B and per item C	Inboard Chock Blocks: Wood chalk blocks 2 x 4 x 6, one on item B and one on item C. Secured to Items B & C with five 16-D nails. May be substituted with alternate web strap as per Detail A.

PIPES, STEEL 12 to 30 in. O.D. MINIMUM LENGTH 30 FEET, ON RISERLESS
CENTRE 'A' FRAME CAR EQUIPPED WITH CABLE OR WEB STRAP TIE
DOWNS AND CUSHIONED UNDER FRAME

RAC 12006B (Concluded)
New 11-2011

Notes:

1. Load must be equally distributed on both sides of the centre partition.
2. Centre line of outside pipe must be within inside edge of car side sills
3. Each side by side pile to be made up of same diameter and nominal length pipe (Nominal = plus or minus 2 feet).
4. All pipes in each layer must be of the same diameter with the exception of the top layer. When pipes of different diameters are placed in the top layer the largest diameter is to be to the inside with descending diameters to the outside. Load pattern must be mirrored on opposite side of centre beam to keep weights even.
5. When load consists of different diameter pipes, the widest layers are to be placed in the bottom of the load, with narrower layers placed above.
6. Load must be centered on the car leaving voids equally distributed at each end of car. When more than one pile is placed on each side of car, each pile must be placed against each bulkhead
7. Corner protectors **must** be used on all cables.
8. Load weight distribution must be in accordance with AAR Genera Rule 3.4 indicating the percentage of deck length utilized versus correspondent permissible percentage of load limit for that length, see table below.

Allowable load limit on reduced deck length utilized

<i>Percent of deck length utilized</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>
<i>Percent of load limit permitted</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>

9. Separators must not come in contact with cables and should be located just inboard of cables towards centre of car to offer maximum protection in the event of load shifting.
10. Height of load must not exceed height of bulkhead or centre stake, whichever is less.

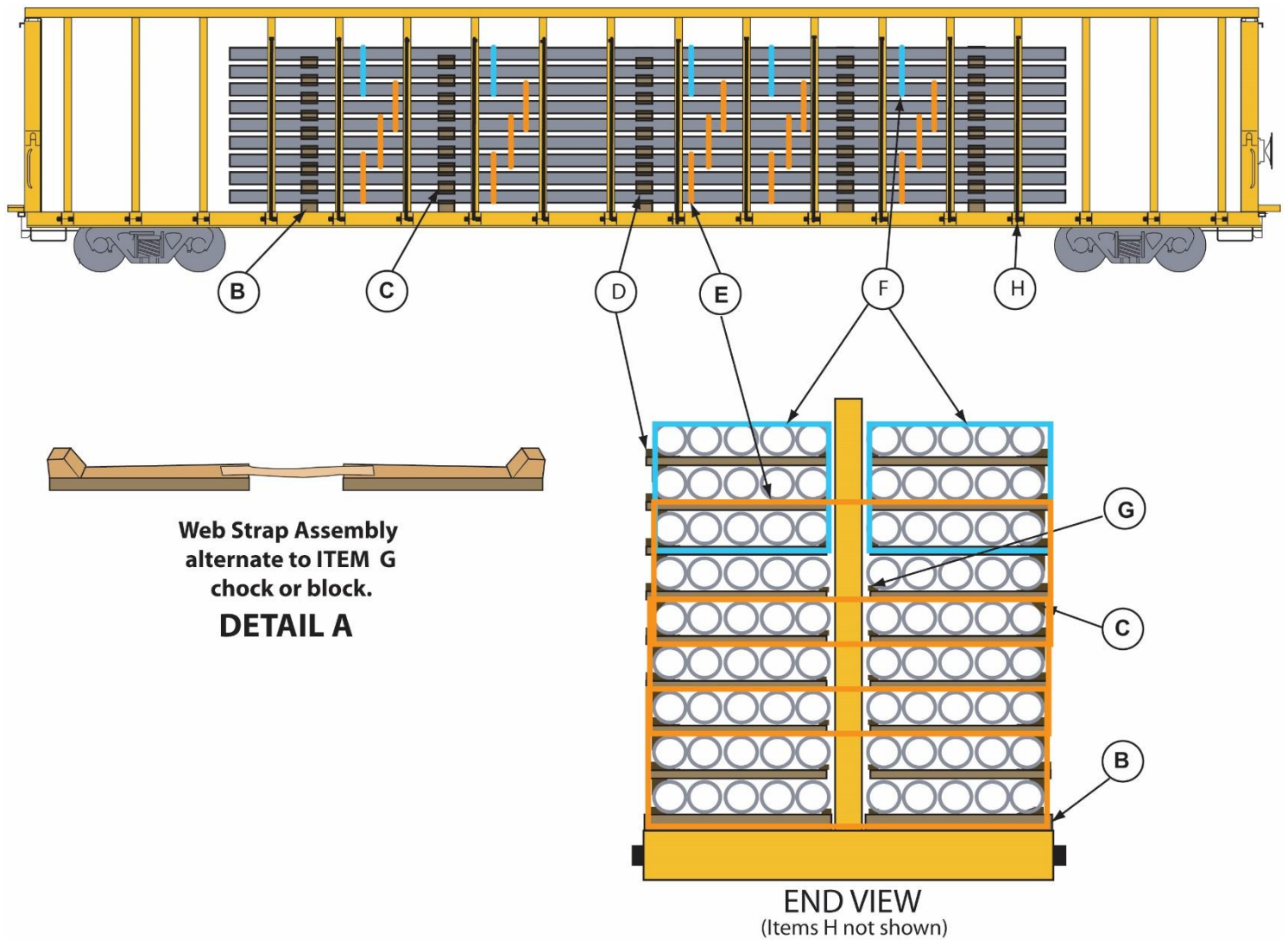
11. This load may be dimensional when loading pipe two across in excess of 24 inches. Car must be checked and proper clearance received from originating railway. If in doubt contact originating railroad.
12. Items E&F Interlacing bands should be placed centered between beams to offer maximum protection and spacing in the event of load shifting. When load consists of two piles per side, Items E&F Interlacing bands on end piles should be placed in such a manner as to afford maximum protection in the event of load shifting.
13. Car floors, bearing pieces and separators must be free of ice snow and other debris prior to loading.

See General Rules for further details

PIPES, STEEL 8 in. TO 20 in. O.D. MINIMUM LENGTH 20 FEET, ON
RISERLESS CENTRE 'A' FRAME CAR EQUIPPED WITH CABLE OR WEB
STRAP TIE DOWNS AND CUSHIONED UNDER FRAME.

RAC 12006C

New 07-2012



PIPES, STEEL 8 in. TO 20 in O.D. MINIMUM LENGTH 20 FEET, ON
RISERLESS CENTRE 'A' FRAME CAR EQUIPPED WITH CABLE OR WEB
STRAP TIE DOWNS AND CUSHIONED UNDER FRAME.

RAC 12006C (Continued)
New 07-2012

Item	No. of Pcs.	Description
A		Vacant
B	Minimum 2 per 12 ft and 1 for every 10 ft or less	Bearing Pieces: Rough full 2"x6" clear Douglas Fir or hardwood
C	Minimum 2 per 12 ft and 1 for every 10 ft or less.	Separators: Rough full 2"x6" clear Douglas Fir or hardwood. Length sufficient for the placement of chocks.
D	One per item B and two per item C	Outboard Chock Blocks: Wood chalk blocks 4 x 6 x 6 wedge shape, cut for maximum contact for particular pipe diameter, one on item B and one on and under item C. Secured to Items B & C with five or six 16-D nails.
E	Min 2 per 12 ft pile and 1 for every 10 ft or less.	Interlacing bands: AAR 1 1/4" X .029 high tension steel bands may be substituted with Type 1A Grade 6 polyester cord strapping. Item E Interlacing bands encircle the bottom 3 layers (both sides of partition) compressing the three bottom layers from both sides against the center partition. Repeat process to interlace 3 rd layer to the next 3 layers immediately above and continue to the top of load.
F	Min 2 per 12 ft pile and 1 for every 10 ft or less.	Encircling bands: AAR 1 1/4" X .029 high tension steel bands may be substituted with Type 1A Grade 6 polyester cord strapping. Encircle the top two rows together separately on both sides of the partition. Item E interlacing bands secures the last 2 layers on top of the load to the third layer.
G	One per item B and per item C	Inboard Chock Blocks: Wood chalk blocks 2 x 4 x 6, one on item B and one on item C. Secured to Items B & C with five 16-D nails. May be substituted with alternate web strap as per Detail A.

PIPES, STEEL 8 in. TO 20 in O.D. MINIMUM LENGTH 20 FEET, ON
RISERLESS CENTRE 'A' FRAME CAR EQUIPPED WITH CABLE OR WEB
STRAP TIE DOWNS AND CUSHIONED UNDER FRAME.

RAC 12006C (Continued)
New 07-2012

Item	No. of Pcs.	Description
H	All cables to be used.	Tie Down Cables: 3/8 in. diameter, of 8,800 lbs. minimum breaking strength. Cable assemblies must be equipped with edge protectors. Winch assemblies must be equipped with a device to maintain tension. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables in load area must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top row of pipes.
Alt. H	All straps to be used.	Web tie-down: polyester webbing, 4 in. wide with a Minimum Break Strength of 20,000 lb. The web strap must be routed through the web guide closest to the top of the load, over the load, and then to the fixed winch or securement point on the side sill. Thread at least 6 in. of webbing through the slot in the winch mandrel. Prior to tightening, there must be a minimum of 2 wraps of webbing around the winch mandrel. The strap is to be tensioned by the effort of one person using a winch bar 30 in. to 40 in. long. All straps in load area must be used.

Notes:

1. Load must be equally distributed on both sides of the centre partition.
2. Centre line of outside pipe must be within inside edge of car side sills
3. For item F depending on the number of rows of pipe, the band can either encircle the top three row or encircle just the top two rows with item E interlacing the second row from the top
4. Each side by side pile to be made up of same diameter and nominal length pipe (Nominal = plus or minus 2 feet).
5. All pipes in each layer must be of the same diameter. Load pattern must be mirrored on opposite side of centre beam to keep weights even.
6. When load consists of different diameter pipes, the widest layers are to be placed in the bottom of the load, with narrower layers placed above.
7. Load must be centered on the car leaving voids equally distributed at each end of car. When more than one pile is placed on each side of car, each pile must be placed against each bulkhead.

PIPES, STEEL 8 in. TO 20 in O.D. MINIMUM LENGTH 20 FEET, ON RISERLESS CENTRE 'A' FRAME CAR EQUIPPED WITH CABLE OR WEB STRAP TIE DOWNS AND CUSHIONED UNDER FRAME.

RAC 12006C (Concluded)
New 07-2012

8. Corner protectors **must** be used on all cables.
9. Load weight distribution must be in accordance with AAR General Rule 3.4 indicating the percentage of deck length utilized versus correspondent permissible percentage of load limit for that length, see table below.

Allowable load limit on reduced deck length utilized

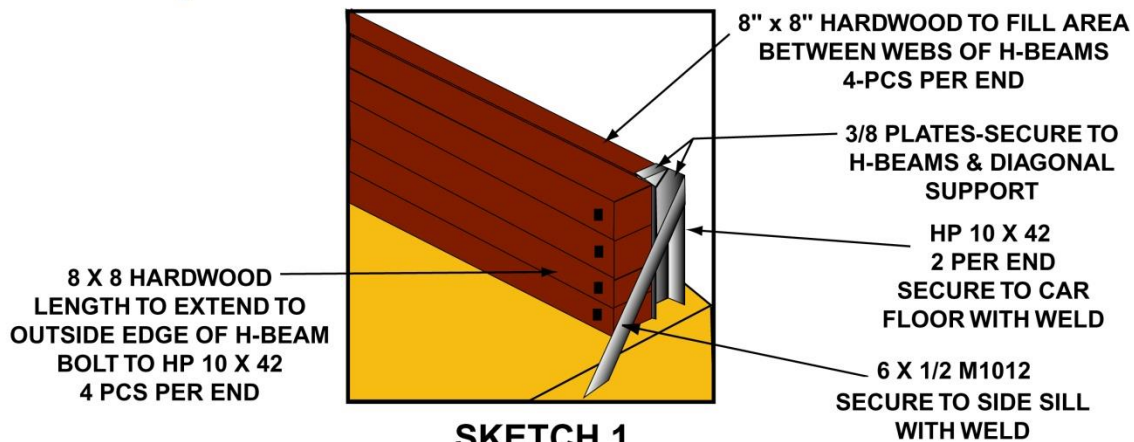
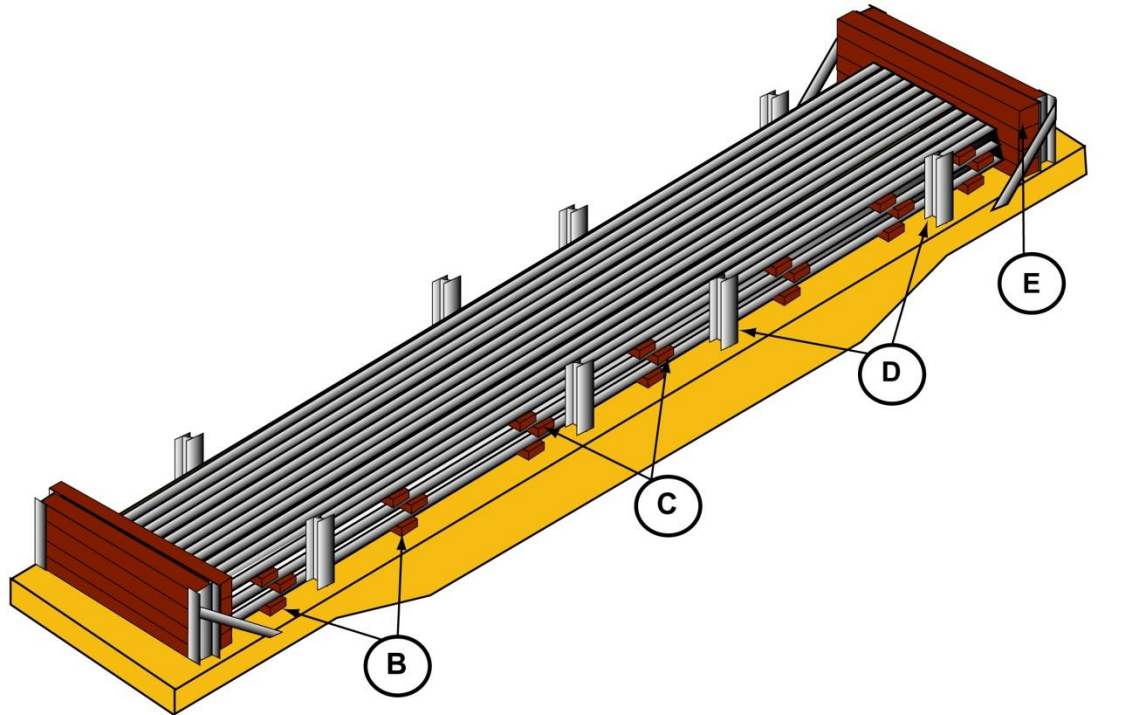
<i>Percent of deck length utilized</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>
<i>Percent of load limit permitted</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>

10. Separators must not come in contact with cables and should be located just inboard of cables towards centre of car to offer maximum protection in the event of load shifting.
11. Height of load must not exceed height of bulkhead or centre stake, whichever is less.
12. This load may be dimensional. Car must be checked and proper clearance received from originating railway. If in doubt contact originating railroad.
13. Item E, Interlacing bands, should be placed centered between beams to offer maximum protection and spacing in the event of load shifting.
14. Car floors, bearing pieces and separators must be free of ice snow and other debris prior to loading.

See General Rules for further details

RAILS, 78 FT TO 80 FT LONG—BULKHEAD FLATCARS, 85 FT AND OVER,
WITH FIXED STEEL SIDE STAKES

RAC 12009
New 02-2012



SKETCH 2

**RAILS, 78 FT TO 80 FT LONG—BULKHEAD FLATCARS, 85 FT AND OVER,
WITH FIXED STEEL SIDE STAKES**

RAC 12009 (Concluded)
New 02-2012

Item	No. of Pcs.	Description
A		Vacant
B	7	Bearing pieces: hardwood, 1 in. x 3 in., length equal to width of car floor. Locate end pieces a minimum of 2 ft in from each end of load, with others equally spaced between.
C	7 each tier	Separators: 1 in. x 3 in., hardwood, length equal to width of load but must not extend beyond car side. Locate in line with Items B.
ALT. B&C	7each	Hardwood bearing pieces and separators may be substituted by West coast type 4 x 4 Douglas Fir.
D	8	Steel side stakes: 10- in. H beams, height, 36 in. above car floor. Locate end stakes approximately 12 ft from ends of car. Locate intermediate stakes approximately 3 ft 6 in. from center of car.
E	1 per each end of car.	Bulkheads: construct as described in Sketch 1

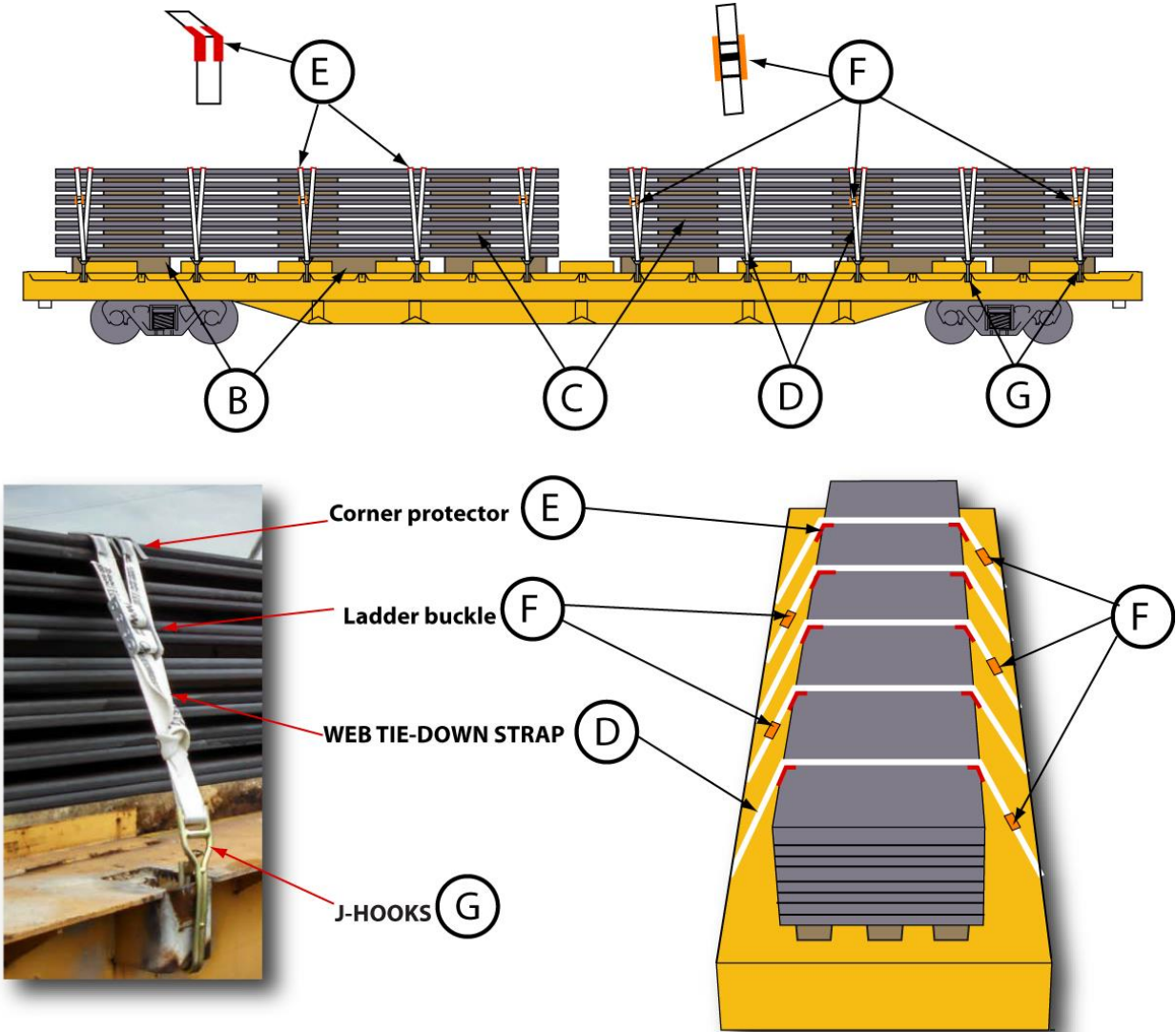
Notes and Additional Requirements:

1. Maximum total amount of longitudinal void must not exceed 4 ft 8 in.
2. Shorter pieces minimum 60 feet long may be loaded in the middle of the load but cannot be in the bottom row or as an outside piece that can contact Item D, the side stakes. The number of short pieces cannot exceed 15% of the total number of pieces in the load.
3. Maximum lateral void must not exceed the base width of one rail in any layer
4. Top layer may be reduced providing void is filled as shown in sketch 2. One spreader block is required for each separator to maintain the requirement of note 3, spreader block should be equal to width of separator and no less than 2 inches in height and secure as per rule 11.9 of the AAR Open Top Loading General Rules Section 1. To maintain balanced load, the number of rail on either side of block must be equal +/- one piece.
5. Height of load must not exceed height of bulkheads or side stakes.

See General Rules for further details

PLATE STEEL HORIZONTAL
LOADED ON FLAT CARS AND SECURED WITH TYPE 1A POLYESTER
STRAPPING GRADE 8

RAC 12014B
New 7-2014



SKETCH 1



J-HOOK
PHOTO 1



LADDER BUCKLE
PHOTO 2



CORNER PROTECTOR
PHOTO 3

PLATE STEEL HORIZONTAL
LOADED ON FLAT CARS AND SECURED WITH TYPE 1A POLYESTER
STRAPPING GRADE 8

RAC 12014B (Continued)
New 7-2014

Item	No. of Pcs.	Description
A	2 feet from handbrake	When car is equipped with a side mounted handbrake, the load can be placed 1 foot from end of car at both ends.
B	Minimum of 2	Bearing Pieces: Hardwood, minimum 1 in. x 3 in. x 8 ft. secured to car floor. Locate pieces longitudinally no more than 3 ft. apart and no more than 12 inches from ends and sides of piles with others equally spaced between but not less than 3 feet apart. When bearing pieces are placed crosswise their surface area must be equivalent to the lengthwise pieces and their length equivalent to the width of the load. (See note 2)
C	As required	Separators: Lumber, 2 in. x 4 in. Locate pieces longitudinally no more than 3 ft. apart and no more than 12 inches from ends and sides of piles with others equally spaced between but not less than 3 feet apart. When separators are placed crosswise their surface area must be equivalent to the lengthwise pieces and their length equivalent to the width of the load.
D	5 per pile 20ft. long add 1 for each additional 4 ft. or less	Web tie-down straps: AAR approved Type 1A polyester Grade 8 strapping, secured to stake pockets with ladder buckles with J-hooks ITEM F . (double tie-down method) Place end straps 12 in. from the end of each pile with others equally spaced between
E	4 per tie-down strap	Corner Protectors: of the type "CEG2" illustrated, must be designed for non-metallic strapping and have sides folded over to prevent strap from sliding. (See drawing ITEM E and PHOTO 3 for example)
F	1 per tie-down strap	Ladder Buckles: (PHOTO 2) AAR approved buckle as per table 19.3 Buckles must be placed alternately side to side. (i.e. first band buckle on right side of load, second band buckle placed on the left side of load and so on. See SKETCH 1).
G	2 per tie-down strap	J-Hook: (PHOTO 1) AAR approved Hook as per table 19.3 or equivalent. Can be substituted by D-rings if car is so equipped.

PLATE STEEL HORIZONTAL
LOADED ON FLAT CARS AND SECURED WITH TYPE 1A POLYESTER
STRAPPING GRADE 8

RAC 12014B (Concluded)
New 7-2014

Notes:

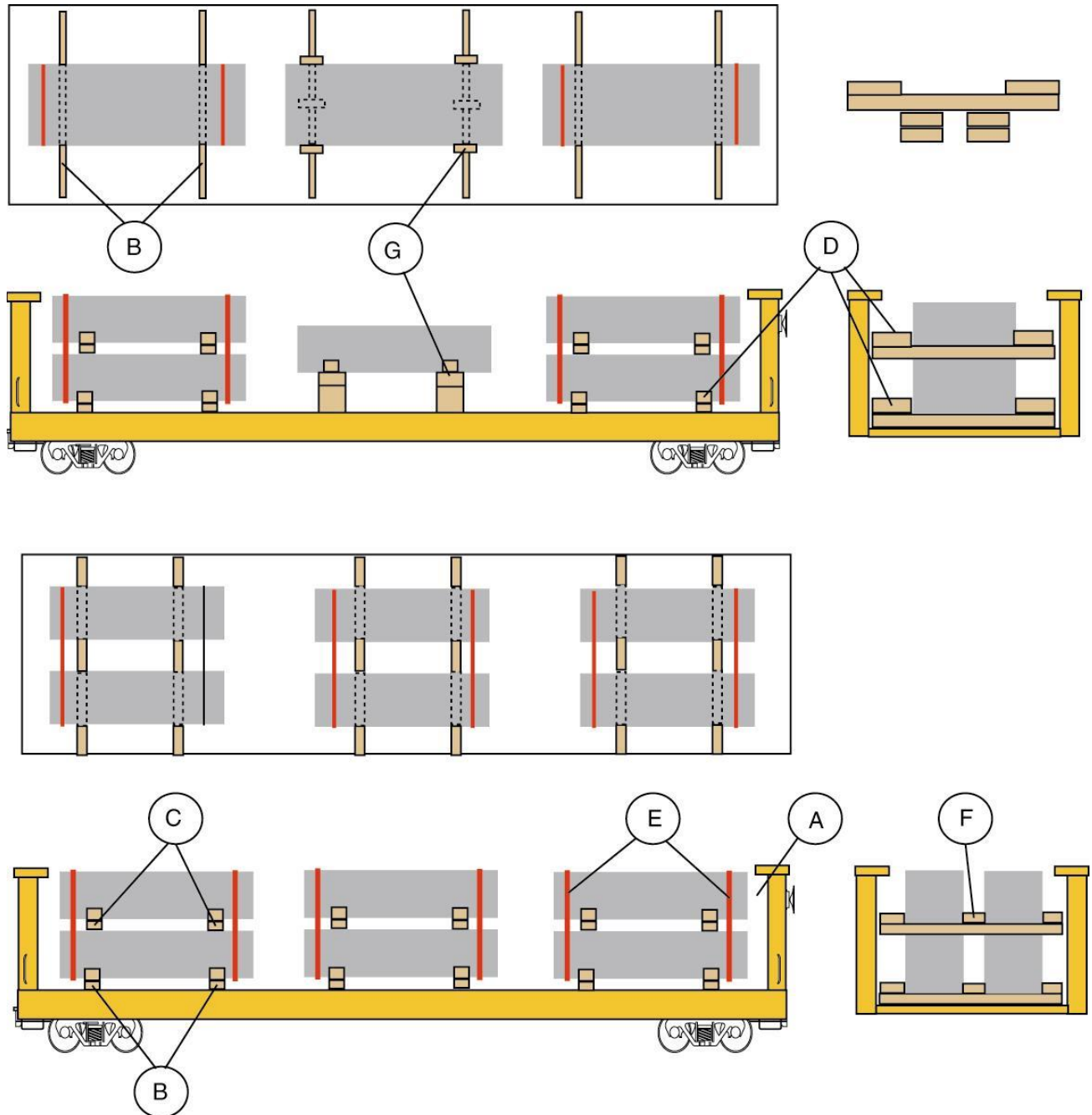
1. Load is to be centered on car at origin.
2. On cars equipped with permanent steel bearing pieces wood bearing pieces must be higher than the steel. Bearing pieces are optional on cars having wooden floors.
3. When using an equivalent J-Hook webbing must be protected against sharp edges.
4. Anchor points on the car must be inspected to ensure their integrity.
5. Corner protectors for steel banding are not acceptable.
6. D-rings in item G must be part of the car structure.

See General Rules for further details

INGOTS ALUMINUM, GONDOLA CARS

RAC 12043C

Revised 09-1986 (Ref: AAR Fig. 43-C)



INGOTS ALUMINUM, GONDOLA CARS

RAC 12043C (concluded)

Revised 09-1986 (Ref: AAR Fig. 43-C)

Item	No. of Pcs.	Description
A		Brake wheel clearance. See Figure 2, Section 1.
B	2 per pile	Bearing pieces, minimum 2 in. high, width 2 in. greater than Height. Length equal to width of car. Locate crosswise in car.
C	2 per pile	Separators, minimum 2 in. high, width 2 in. greater than Height. Length equal to width of car. Locate over item B.
D	2 ea. Item B. 2 ea. Item C	Cleats, minimum 2 in. high, width 2 in. greater than height Length equal to void between ingot and side of car. Secure to Items B and C with minimum of five 16-D nails. Not required if total void is 8 inches.
E	2 per pile	Unitizing straps, 1 ¼ in. x .031 in. high-tension bands. Not required if top ingot does not extend above car side.
F	2 per pile	Vertical spacer, minimum 2 in. x 4 in., length equal to height of pile. Use optional when space is required between adjacent piles.
G	As required	Risers, lumber lengthwise, thickness sufficient to raise top of single ingot higher than bottoms of top ingots in adjacent piles. Minimum length 2 ft. Locate under Items B. Secure items B to risers with suitable length nails.

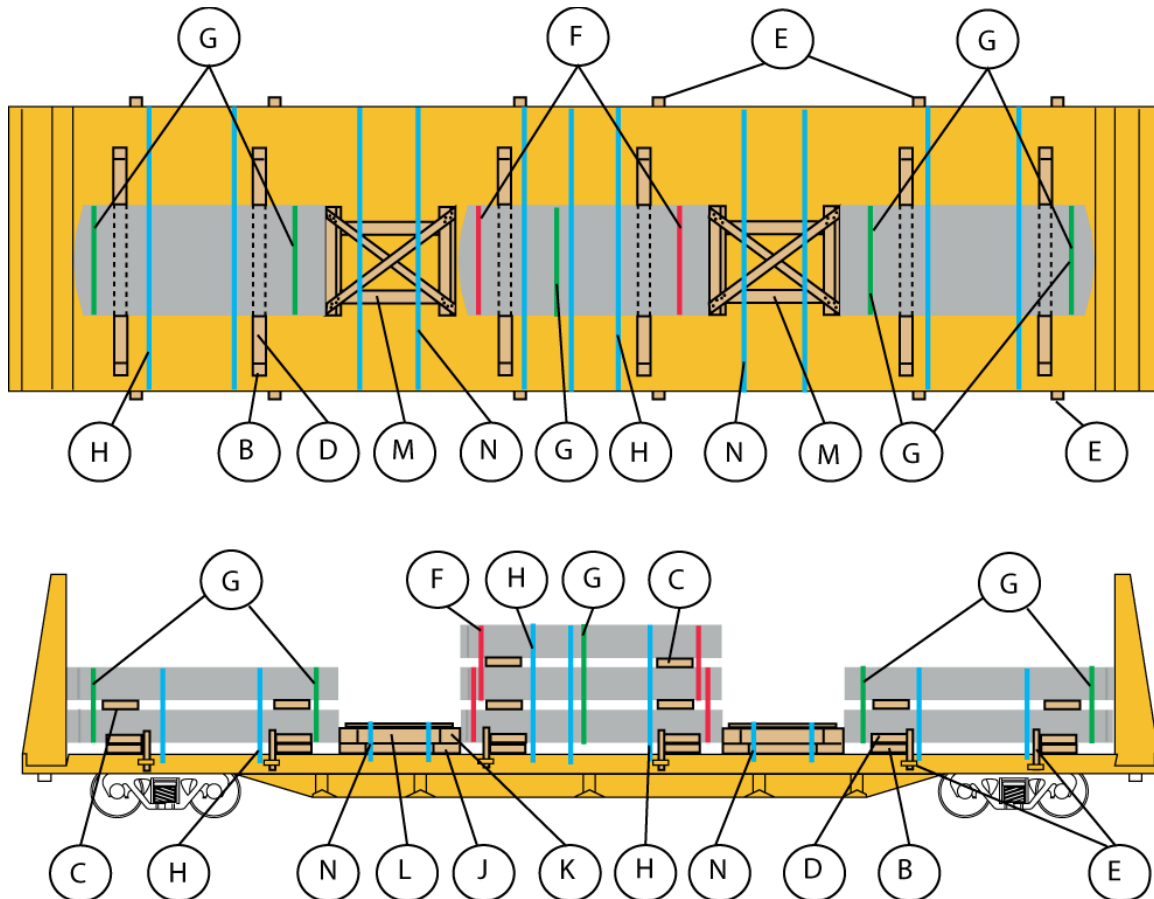
Notes:

- Top ingot in pile must not extend more than 50 per cent of thickness above car sides and ends.
- Items C may be omitted when the size of Item E bands are increased to 2 in. x .044 in. When Item C is omitted, Item E bands must be applied to all loads.

See General Rules for further details.

INGOTS ALUMINUM, MINIMUM WIDTH 53 INCHES FLAT CARS WITH
PERMANENT END BULKHEAD
RAC 12043I

Revised 01-2015



Item	No. of Pcs.	Description
A		Brake wheel clearance. See Figure 2, Section 1.
B	2 per pile	Bearing pieces, minimum 2 in. x 6 in. lumber, length to extend 15 in. beyond each side of pile, or length equal to width of car. Locate minimum 24 in. from end of pile. Secure to car floor with 5, 40-D nails. Pieces at each end of car may be toe nailed to stub stakes.
C	2 per pile	Separators, minimum 2 in. x 6 in. lumber, length equal to width of pile. Locate in line with bearing pieces, Item B.
D	2 ea. Item B.	Side blocking, minimum 4 in. x 6 in. x 12 in. long lumber. Locate against bottom ingot and secure to Items B with 5, 60-D nails each.

INGOTS ALUMINUM, MINIMUM WIDTH 53 INCHES FLAT CARS WITH
PERMANENT END BULKHEAD

RAC 12043I (Continued)

Revised 01-2015

Item	No. of Pcs.	Description
E	4 per car, as required	Stub stakes, 4 in. x 6 in., length to extend 11 in. above car floor. Required only to secure bearing pieces Items B when cars have steel decks between bolsters and end bulkheads.
F	4 per pile 3 ingots high	Interlacing bands. 2 in. x .044 in high-tension bands. Locate 2 bands to encircle lower two ingots and two bands to encircle top two ingots, minimum 12 in. from each end of pile.
G	2 per pile 2 ingots high. 1 per pile 3 ingots high	Encircling bands, 2 in. x .044 in. high-tension bands. Locate 12 in. minimum from each end of pile 2 ingots high and on center of pile 3 ingots high, encircling all ingots in pile.
H	2 per pile 155 in. or less in length 3 per pile over 155 in. in length	Tie-down bands, 2 in. x .044 in. high-tension bands. Locate close to bearing pieces and secure to stake pockets or lading strap anchors on each side of car.
J	2 per center void	Filler blocking, minimum 2 in. x 6 in. lumber, length equal to width of load. Locate against each end of load at voids.
K	2 per center void	Filler blocking, minimum 4 in. x 6 in. lumber, length equal to Item "J". Locate against each end of load at center voids with 6 in. dimension vertical. Toe-nail to Items "J" with 6, 40D nails each.
L	2 per center void when ingot is 60 in. wide or less 3 when ingots over 60 in. wide	Filler blocking, minimum 4 in. x 6 in. lumber, length to fill void between Items K. Space equally and toe nail each end to Items K with 3, 40-D nails.
M	2 each center void	Filler blocking, 1 in. x 6 in. lumber. Apply diagonally over Items L and K. Secure to Items L and K with 2, 10-D nails at each joint.

INGOTS ALUMINUM, MINIMUM WIDTH 53 INCHES FLAT CARS WITH
PERMANENT END BULKHEAD

RAC 12043I (concluded)

Revised 01-2015

Item	No. of Pcs.	Description
N	1 per filler blocking 36 in. or less, 2 over 36 in. in length	Filler blocking tie-down bands 2 in. x .044 in. Secure to stake pockets or lading strap anchors on each side of car.

Notes:

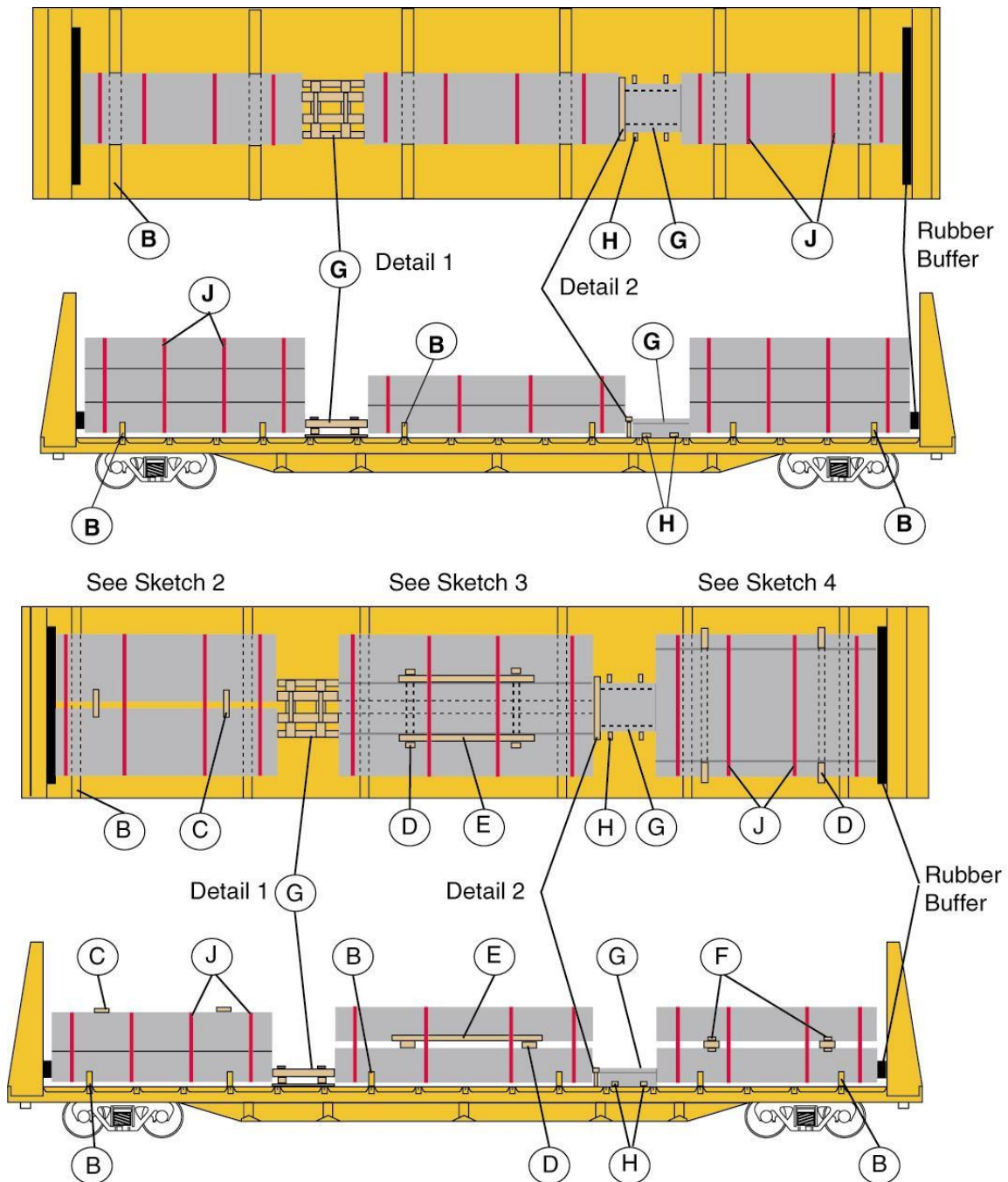
1. The use of item D blocks is optional when load is prepared on flat cars equipped with cushioning devices.
2. Blocking may be used between ingots and end bulkheads if secured to prevent displacement.

See General Rules for further details.

INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT
END BULKHEADS

RAC 12043K

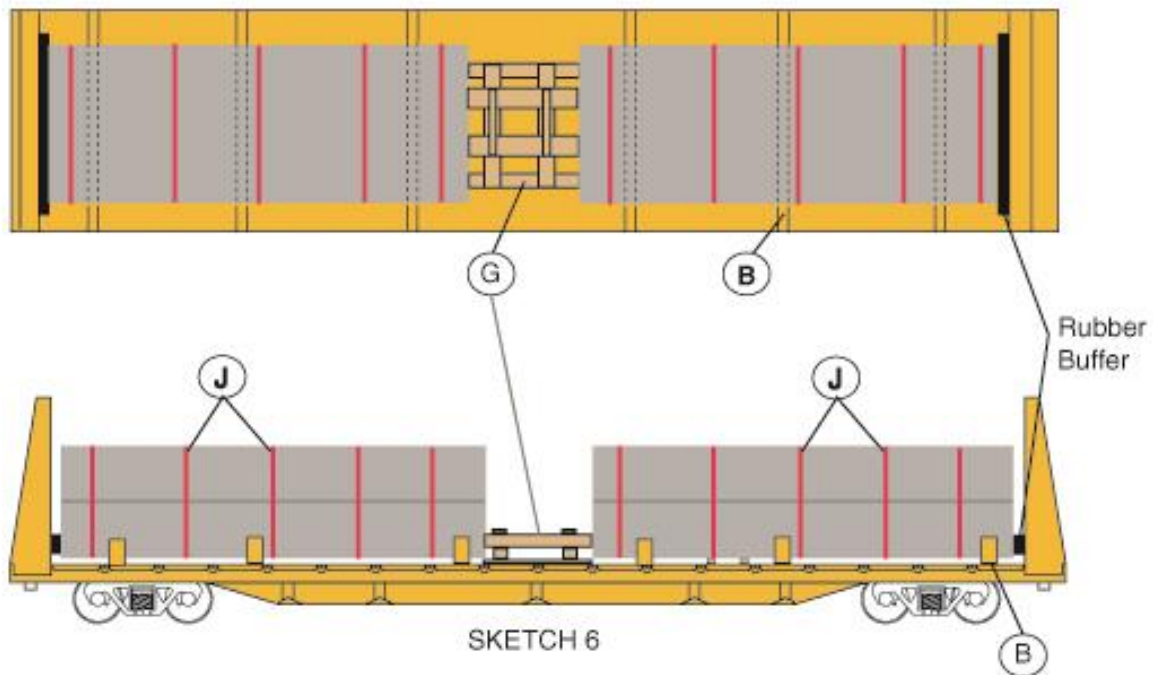
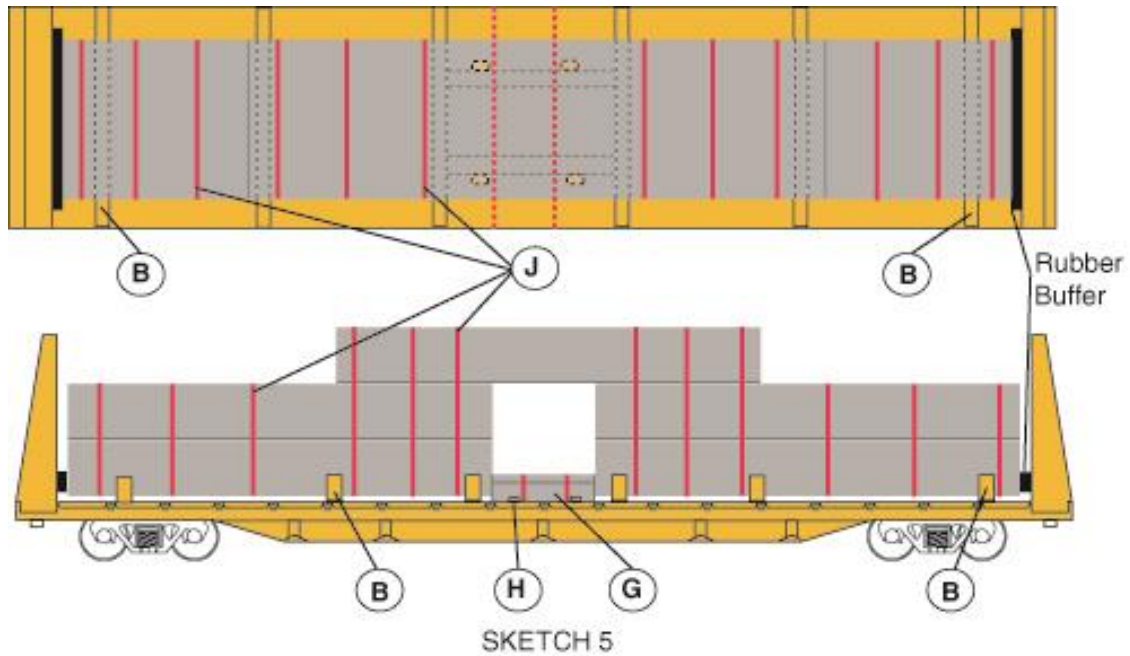
Revised Nov. 06 (Ref: AAR Fig. 43K)



INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT
END BULKHEADS

RAC 12043K (continued)

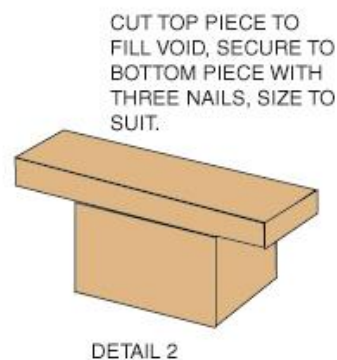
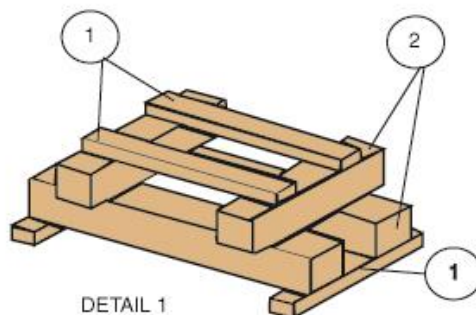
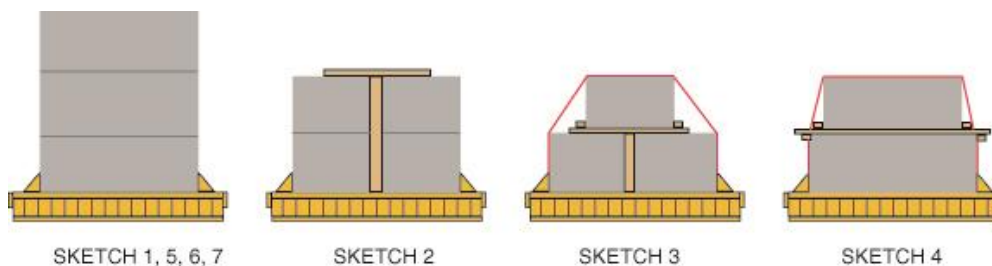
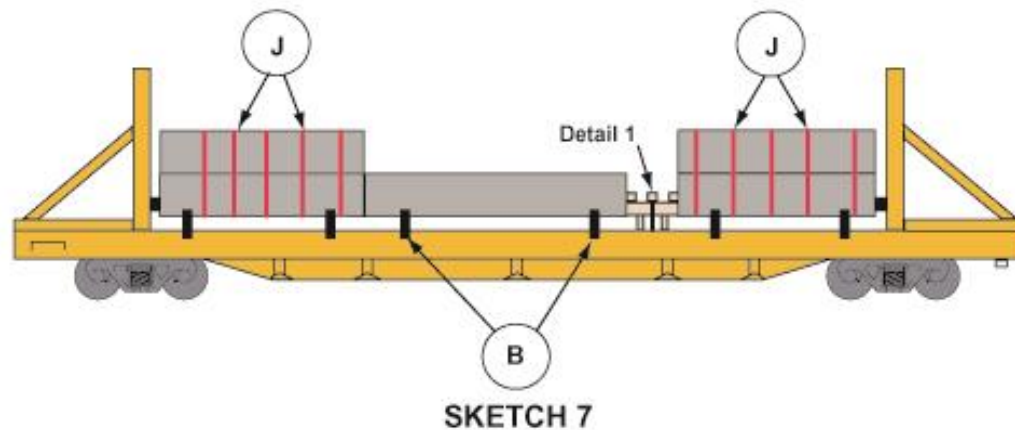
Revised Nov. 06 (Ref: AAR Fig. 43K)



INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT END BULKHEADS

RAC 12043K (continued)

Revised Nov. 06 (Ref: AAR Fig. 43K)



1 4 PIECES, 2"X4" LUMBER, LENGTH TO SUIT. BOTTOM PIECES SECURED TO CAR FLOOR WITH SIX 16-D NAILS, EQUALLY SPACED. SECURE TOP PIECES TO PIECES BELOW WITH SIX 16-D NAILS

2 4 PIECES, 6"X6" HARDWOOD LENGTH TO SUIT, CROSS PIECES SECURED TO FLOOR PIECES WITH EIGHT 40-D NAILS, TWO AT EACH CONTACT POINT. SECURE LENGTHWISE PIECES TO PIECES BELOW WITH EIGHT 40-D NAILS, TWO AT EACH CONTACT POINT.

INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT
END BULKHEADS

RAC 12043K (continued)

Revised Nov. 06 (Ref: AAR Fig. 43K)

Item	No. of Pcs.	Description
A		Vacant
B	Sketch 1, 2, 3 and 4, 7 - 2 per pile	Fabricated steel bearing pieces with moveable side chocks. Locate approximately $\frac{1}{4}$ length from each end of pile. Moveable side chocks must be placed as close to side of ingot as possible.
C	2 between side-by-side ingots	Vertical stabilizers, lumber, 4 in. x 8 in., length to extend from top to bottom of pile. Cross piece, lumber, 2 in. x 4 in. x 24 in. secure to top of vertical piece with 3, 20-D nails. Locate approximately 2 ft. in from ends of pile. See sketch 2. When loading to Sketch 3, crosspiece is omitted.
D	Sketch 3 – 2 per pile Sketch 4 – 2 per pile	Separators, lumber, 2 in. x 6 in. length sufficient for application of Item E guide rails. Secure each to Items C with 6, 20-D nails. Separators, lumber, 2 in. x 6 in. length sufficient for application of Item F side blocks. Locate approximately 2 ft. in from ends of pile.
E	Sketch 3 – 2 per pile	Guide rails, lumber, 2 in. x 4 in. in one piece. Locate longitudinally against each side of ingot and secure to each Item D separator with 4, 16-D nails.
F	Sketch 4 – 4 per each Item D	Side blocks, lumber, 2 in. x 6 in. x 6 in. Locate against ingots, on top and bottom of Item D separators, and secure each with 4, 16-D nails.

INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT
END BULKHEADS

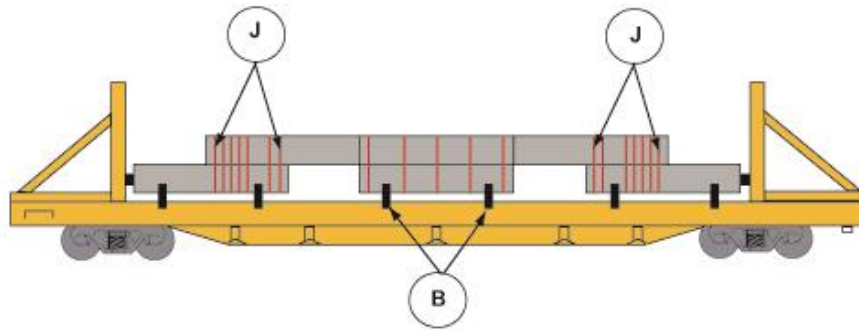
RAC 12043K (continued)
Revised Nov. 06 (Ref: AAR Fig. 43K)

Item	No. of Pcs.	Description
G	As required	<p>Filler blocking. When voids are less than 24 in. between piles, apply as outlined in Detail 1.</p> <p>T-form aluminum ingot blocking, cut to size. Must be used when void between piles is 24 in. or greater. May be placed longitudinally or laterally between ingots. When T-ingot is 48 in. or less in length, secure with 1, 2 in. x .044 in. high-tension band located over t-ingot and secure to stake pockets or lading strap anchors on each side of car. For T-ingot over 48 in. in length, 2 securement bands must be applied. If T-ingots do not completely fill void, blocking per Detail 2 must be applied.</p>
H	<p>4 per T-ingot (2 each side) up to 48 in. in length</p> <p>6 per T-ingot (3 each side) 48 in. and over in length.</p>	Cleats, lumber, 2 in. x 4 in. x 18 in. Locate each perpendicular to and against T-ingot and secure to car floor with 4, 20-D nails.
J	<p>4 per pile up to 155 in. in length</p> <p>5 per pile up to 155 in. and over in length.</p>	Encircling bands, 2 in. x .044 in. high tension. Locate one not less than 12 in. in from each end of pile, with others equally spaced between.

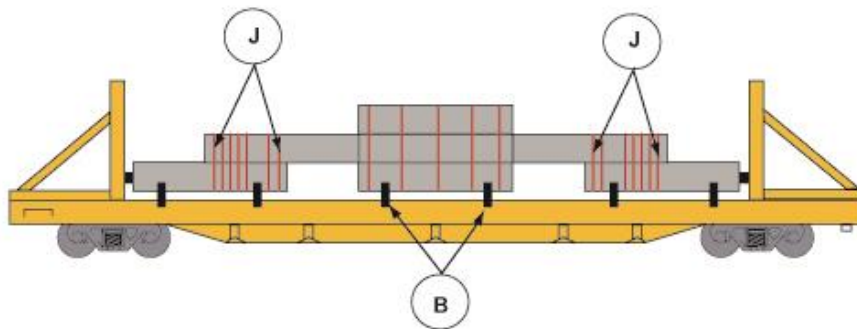
INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT
END BULKHEADS

RAC 12043K (continued)

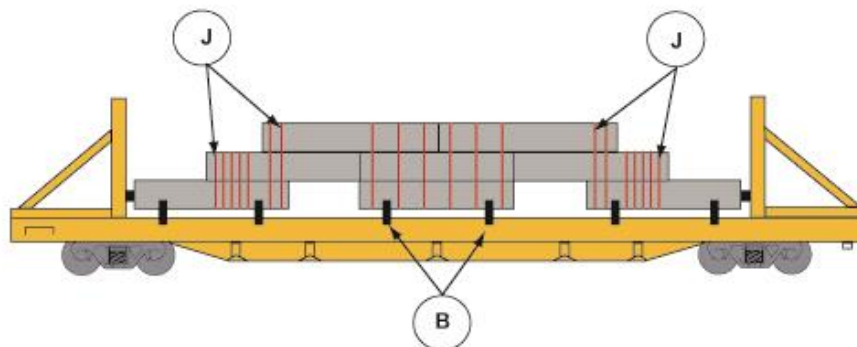
Revised Nov. 06 (Ref: AAR Fig. 43K)



SKETCH A



SKETCH B

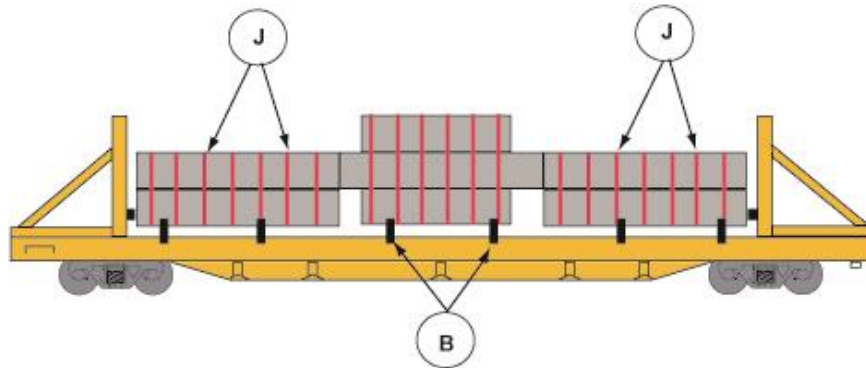


SKETCH C

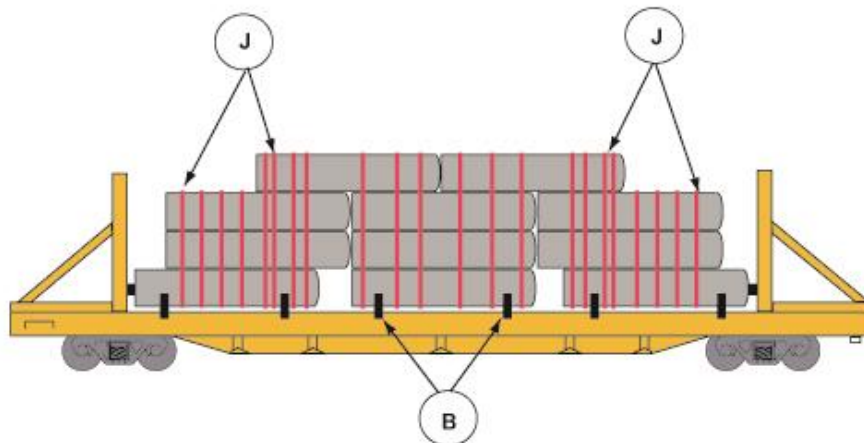
INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT
END BULKHEADS

RAC 12043K (continued)

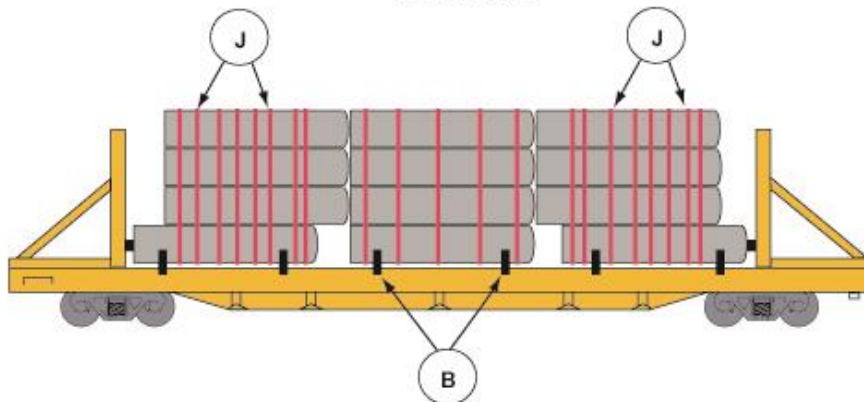
Revised Nov. 06 (Ref: AAR Fig. 43K)



SKETCH D



SKETCH E

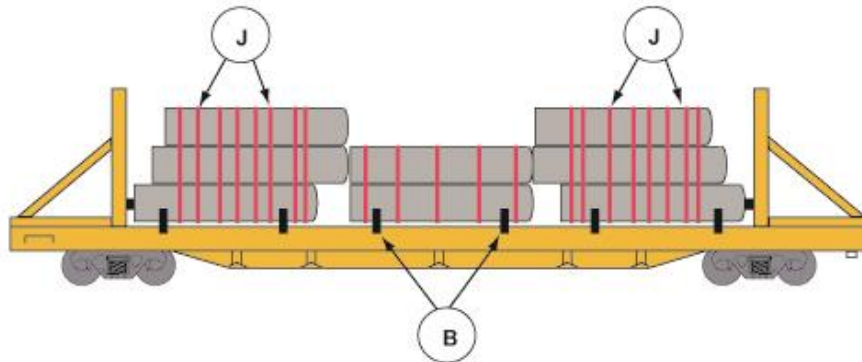


SKETCH F

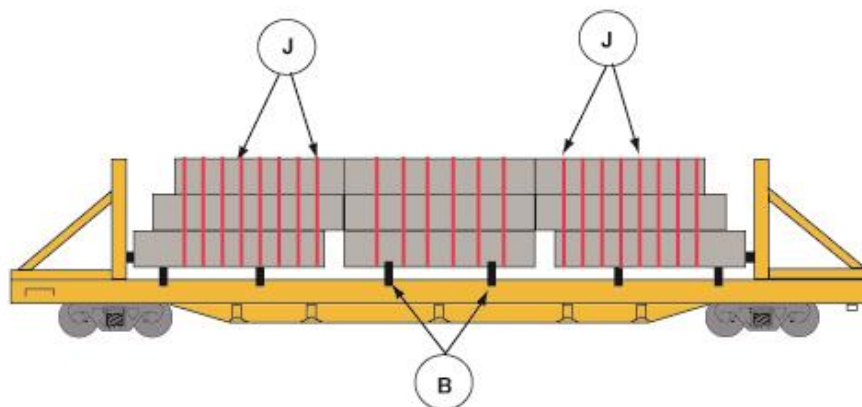
INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT
END BULKHEADS

RAC 12043K (continued)

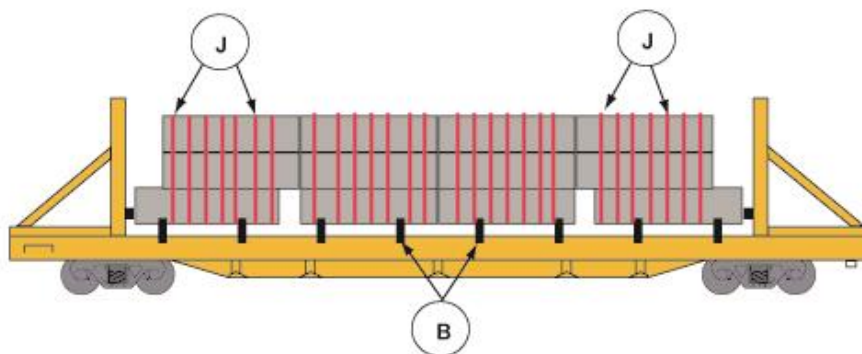
Revised Nov. 06 (Ref: AAR Fig. 43K)



SKETCH G



SKETCH H

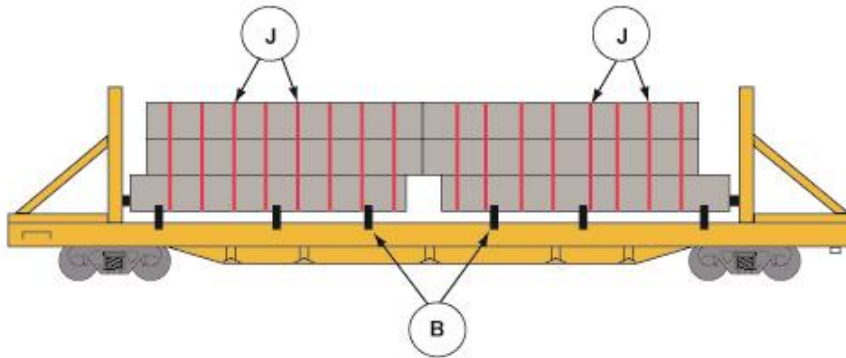


SKETCH J

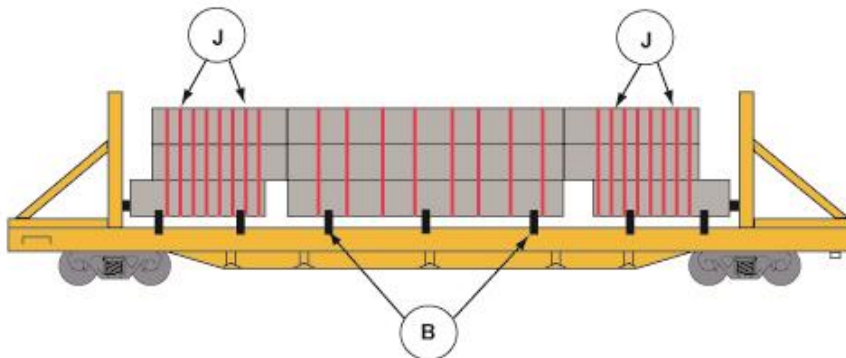
INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT
END BULKHEADS

RAC 12043K (continued)

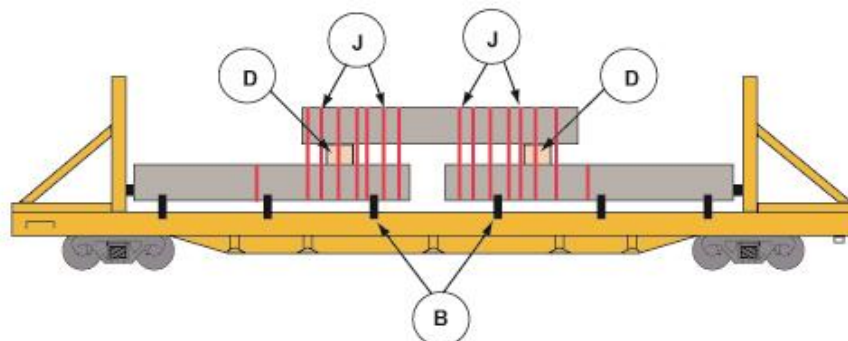
Revised Nov. 06 (Ref: AAR Fig. 43K)



SKETCH K



SKETCH L

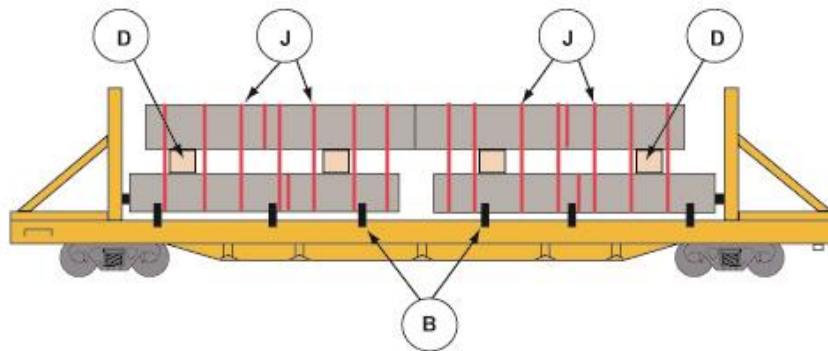


SKETCH M

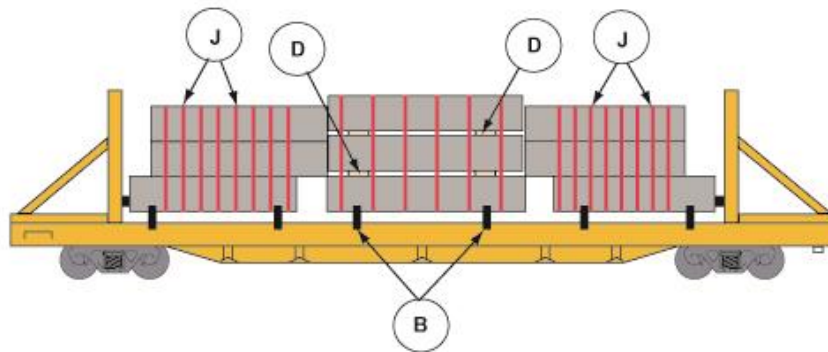
INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT
END BULKHEADS

RAC 12043K (continued)

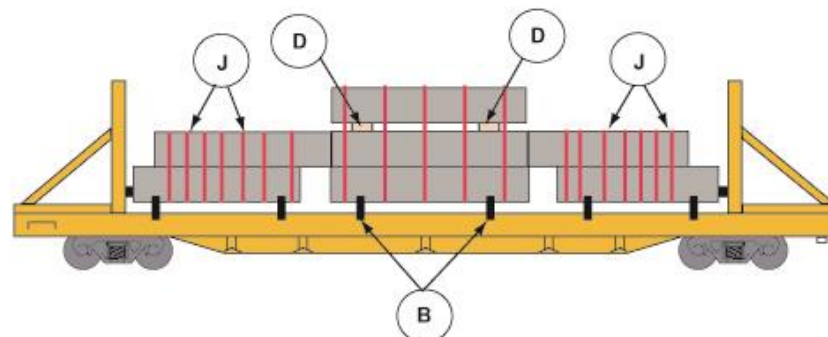
Revised Nov. 06 (Ref: AAR Fig. 43K)



SKETCH N



SKETCH P



SKETCH Q

INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT
END BULKHEADS

RAC 12043K (continued)

Revised Nov. 06 (Ref: AAR Fig. 43K)

Item	No. of Pcs.	Description
A		Vacant
B	Sketch A to J, P and Q: 2 per pile Sketch K, M, N 3 per pile Sketch L: 3 on center pile, 2 on end piles	Bearing pieces: fabricated steel bearing pieces with moveable side chocks. Locate approximately $\frac{1}{4}$ length from each end of pile. Moveable side chocks must be placed as close as possible to side of ingots. For Sketch E and F locate at a minimum distance of 24 in. and at a maximum distance of 30 in. from ends of pile
D	Sketch M, N: 2 per pile Sketch P, Q 2 per pile	Separators, lumber, 5 in. x 5 in. Locate approximately 2 ft. in from ends of pile. Separators, lumber, 2 in. x 6 in Locate approximately 2 ft. in from ends of pile. Do not use separators when loading to Sketch E and F.
J	Sketch A,B,Q 5 per pile and 7 per pile with overhang in length. Sketch C, D 6 and 7 Sketch E,H,P 6 and 8 Sketch F, G 5 and 8 Sketch J,M,N 7 per pile Sketch K, L 8 per pile	Encircling bands, 2 in. x .044 in. high tension. Locate one not less than 12 in. in from each end of pile, with others equally spaced between. At origin, bands must be placed to avoid contact with bearing pieces. On piles with overhang located at each end of the car: Locate 2 bands in front of bearing pieces toward overhang with others bands equally spaced between the bearing pieces. Centre pile: Locate one band not less than 12 in. in from each end of pile, with others bands equally spaced between the bearing pieces.

INGOTS ALUMINUM, SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT END BULKHEADS

RAC 12043K (concluded)

Revised Nov. 06 (Ref: AAR Fig. 43K)

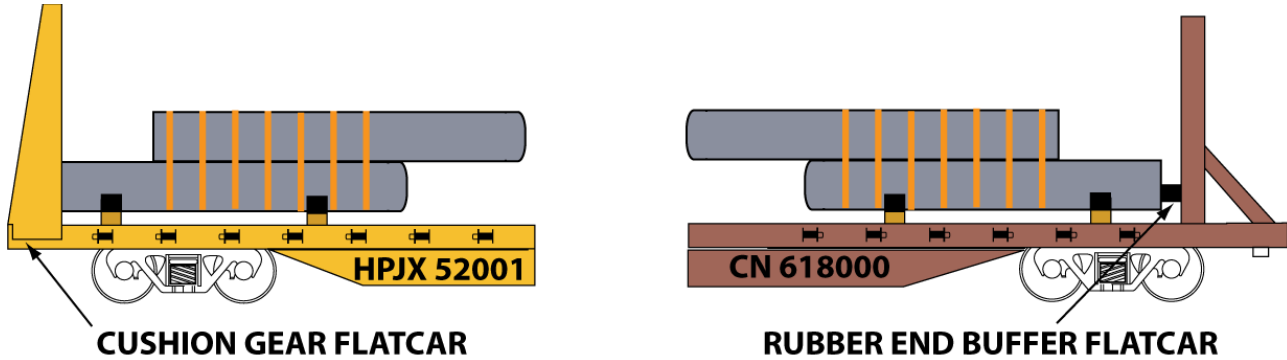
Notes:

1. Flats cars loaded to this configuration must have rubber buffers permanently attached to bulkheads.
2. Overhang method must be used to eliminate voids.
3. Ingots may not overhang or extend supporting ingot by more than 40% of the overhanging ingot length. Overhanging length must include combined overhang.
4. Ingots in center pile must be of equal width.
5. Narrow ingots must be loaded to Sketch Nos. 1 or 2.

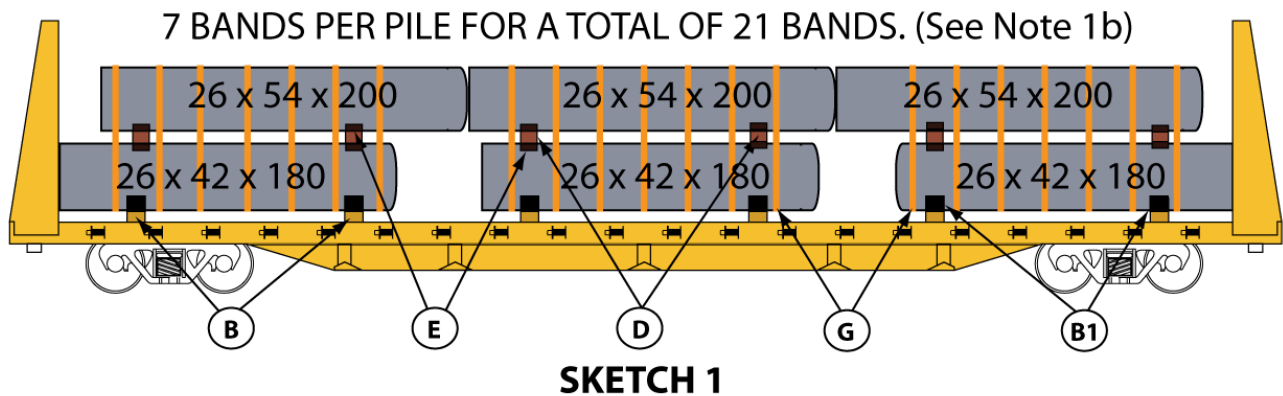
See General Rules for further details.

INGOTS, ALUMINUM-BULKHEAD FLATCARS, WITH RUBBER END BUFFERS
ON BULKHEADS OR CUSHION GEAR

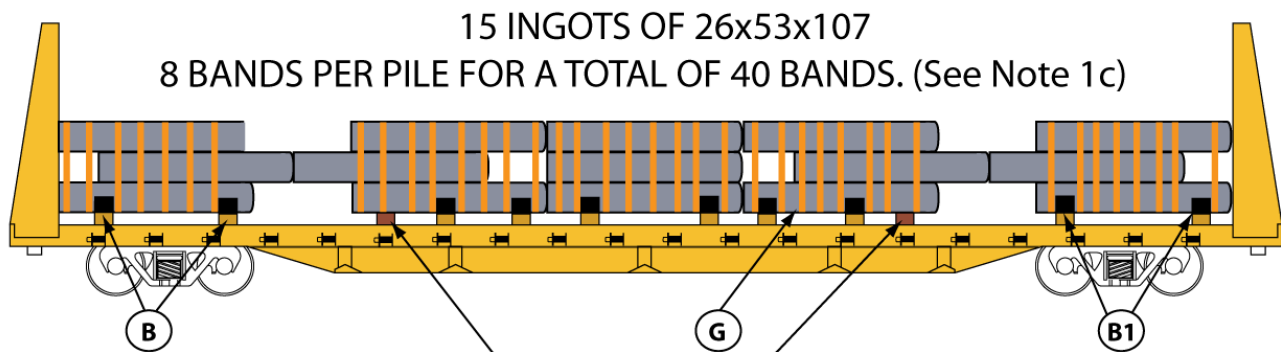
RAC 12043K-1
New 08-2017



VARIOUS LENGTHS:
3 INGOTS OF 26 x 54 x 200
3 INGOTS OF 26 x 42 x 180



SKETCH 1

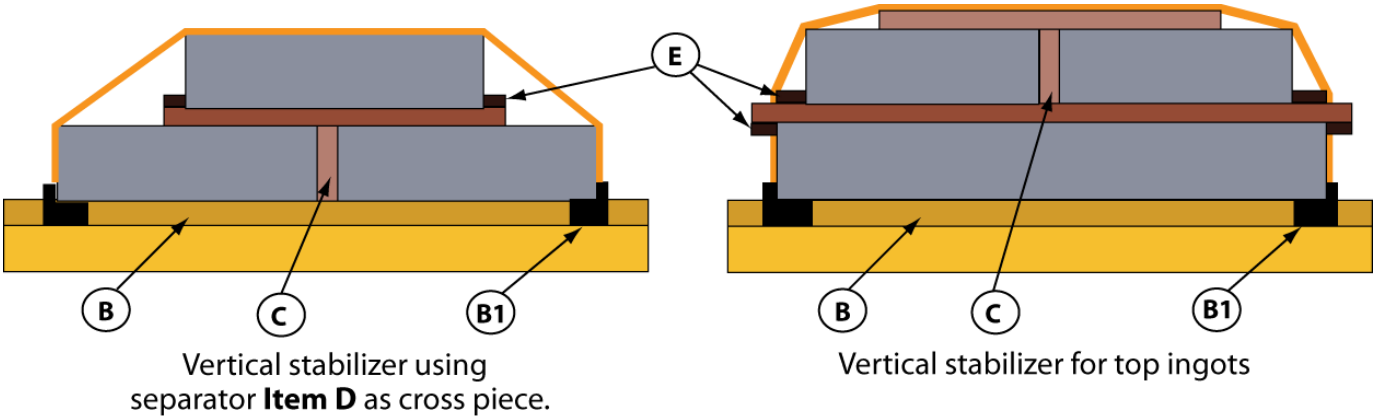


Add a third bearing piece (wood) under pile 2 and 4

SKETCH 2

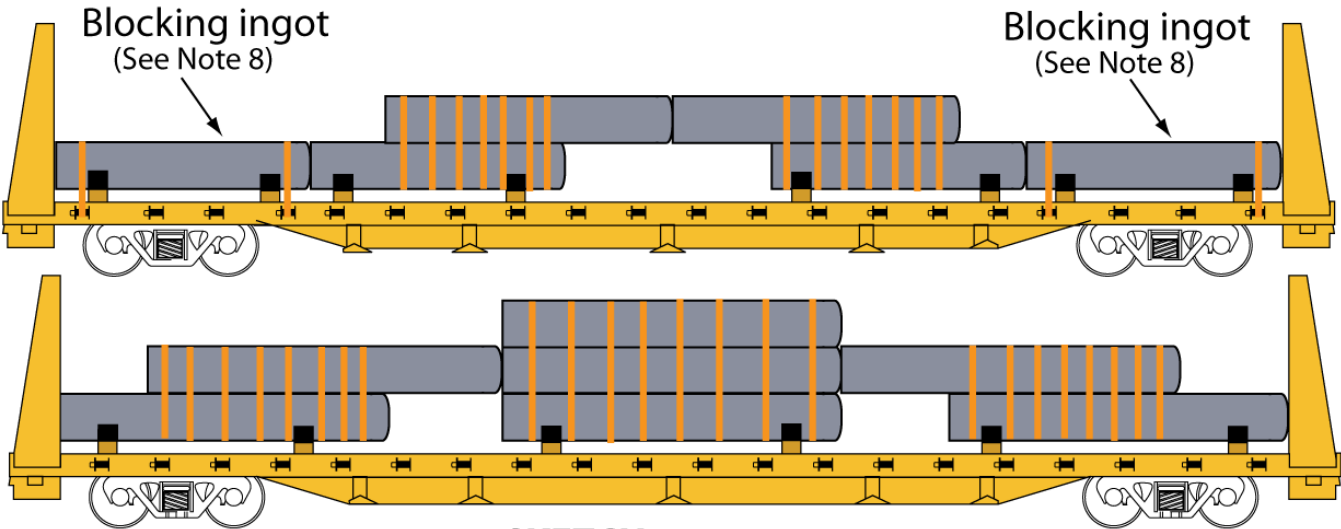
INGOTS, ALUMINUM-BULKHEAD FLATCARS, WITH RUBBER END BUFFERS
ON BULKHEADS OR CUSHION GEAR

RAC 12043K-1(Continued)
New 08-2017

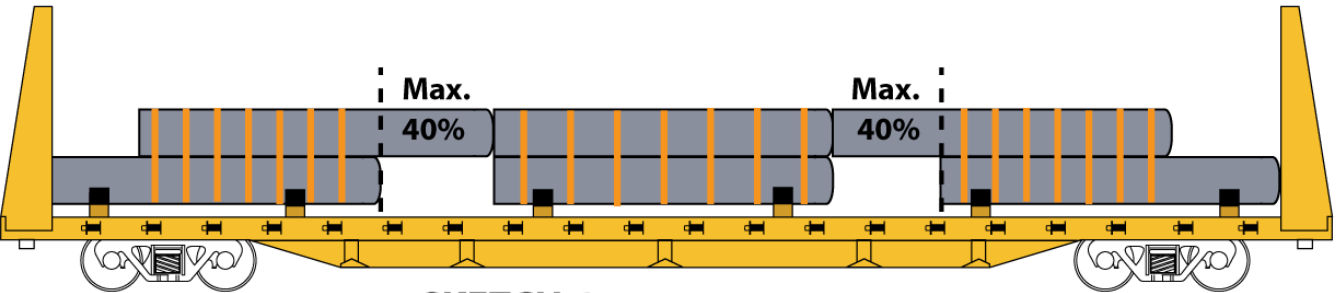


SKETCH 3

SKETCH 4



SKETCH 5 (See Note 1d)



SKETCH 6: OVERHANG (See Note 4)

INGOTS, ALUMINUM-BULKHEAD FLATCARS, WITH RUBBER END BUFFERS
ON BULKHEADS OR CUSHION GEAR

RAC 12043K-1(Continued)
New 08-2017

Item	No. of Pieces	Description
A		Vacant
B	Minimum 2 per pile for ingots 190 inches long or less add 1 for ingots up to 300 inches	Bearing pieces steel fabricated with moveable side chocks: Locate one approximately 24 inches from each end of bottom ingots in each pile with others, when required, equally spaced between.
B1	2 per each Item B	Moveable side chocks must be placed as close to side of ingots as possible.
C	2 between side by side ingots	Vertical stabilizers: lumber 4in.x 4in.length to extend from top to bottom of pile. Cross piece, lumber 2in x 4in.x 24 in. Secure to vertical piece with three 20-D nails. Separator Item D can be used as cross piece. (Sketches 3&4)
D	2 per ingots optional	Separators: Hardwood 2in. x 6in. or 5in. x 5in. minimum length equal to width of pile. Must be long enough to allow for the application of top and bottom side blocks when required. Must be in one piece.
E	4 per each Item D	Side blocks: Minimum 2 in. high, width equal to width of separator. Locate against ingots and secure to top and/or bottom of separators with three 16-D nails.
F	As required	Blocking filler: Hardwood or using aluminum T-ingots required to fill void between 2 piles or end of car. Must be secured to rail car with two 2in. x .044 in. high tension steel bands. (Not required for loads utilizing overhang method to eliminate longitudinal voids.)
G	See Note 1	Encircling bands: Type 1A Grade 7 non-metallic band. Locate one not less than 12 inches from each end of piles with others more or less equally spaced between. (May be substituted by 2in. x .044 in. high tension steel bands)

INGOTS, ALUMINUM-BULKHEAD FLATCARS, WITH RUBBER END BUFFERS
ON BULKHEADS OR CUSHION GEAR

RAC 12043K-1(Suite))
New 08-2017

Alternate Item G for blocking method

Item	No. of Pieces	Description
Alt G	Per top ingot	Encircling bands: Type 1A Grade 7 non-metallic band. Locate one not less than 12 inches from each end of piles with others more or less equally spaced between. (May be substituted by 2in. x .044 in. high tension steel bands).

Notes and Additional Requirements:

- 1- Encircling Bands: All 4 criteria a,b,c,d combined must be met to determine the **MINIMUM** number of encircling bands required on a load.
 - a) Number of bands equal to the weight of the load, divided by the MBS of the band rounded to the next even number (i.e. Load 205000 lbs., band MBS 10,000 lbs. hence $205000/10000 = 20.5$ bands rounded off therefore 21 bands divided into the number of piles on the car.
 - b) Each pile 2 ingots high must have a minimum of 7 bands per pile. See **SKETCH 1**
 - c) Each pile of 3 or more ingots high must have a minimum of 8 bands per pile. See **SKETCH 2**
 - d) The number of bands per pile must be equal for each pile except for a pile consisting of 1 ingot placed against the bulkhead. **See SKETCH 5.**
- 2- All longitudinal voids must be eliminated using blocking or the alternate overhang method.
- 3- When using blocking, filler blocking item must be secured laterally with lumber cleats 2 in. x 4 in. x18 in. secured to car deck
- 4- When loading the overhang method, ingots may not overhang or extend beyond the supporting ingot by more than 40% of the length of the overhanging ingot. Overhangs must be equally distributed over all piles to minimize the overhang length on any pile. **See SKETCH 6.**

- 5- Loads must sit properly on bearing pieces located 18 to 24 inches from the ends of ingots.
- 6- Load must not exceed height of bulkhead by more than half the thickness of top ingot.
- 7- When the number of steel fabricated bearing pieces is insufficient hardwood bearing pieces of same dimensions may be used.
- 8- All blocking items used must be secured to railcar.

INGOTS, ALUMINUM-BULKHEAD FLATCARS, WITH RUBBER END BUFFERS
ON BULKHEADS OR CUSHION GEAR

RAC 12043K-1(Concluded)
New 08-2017

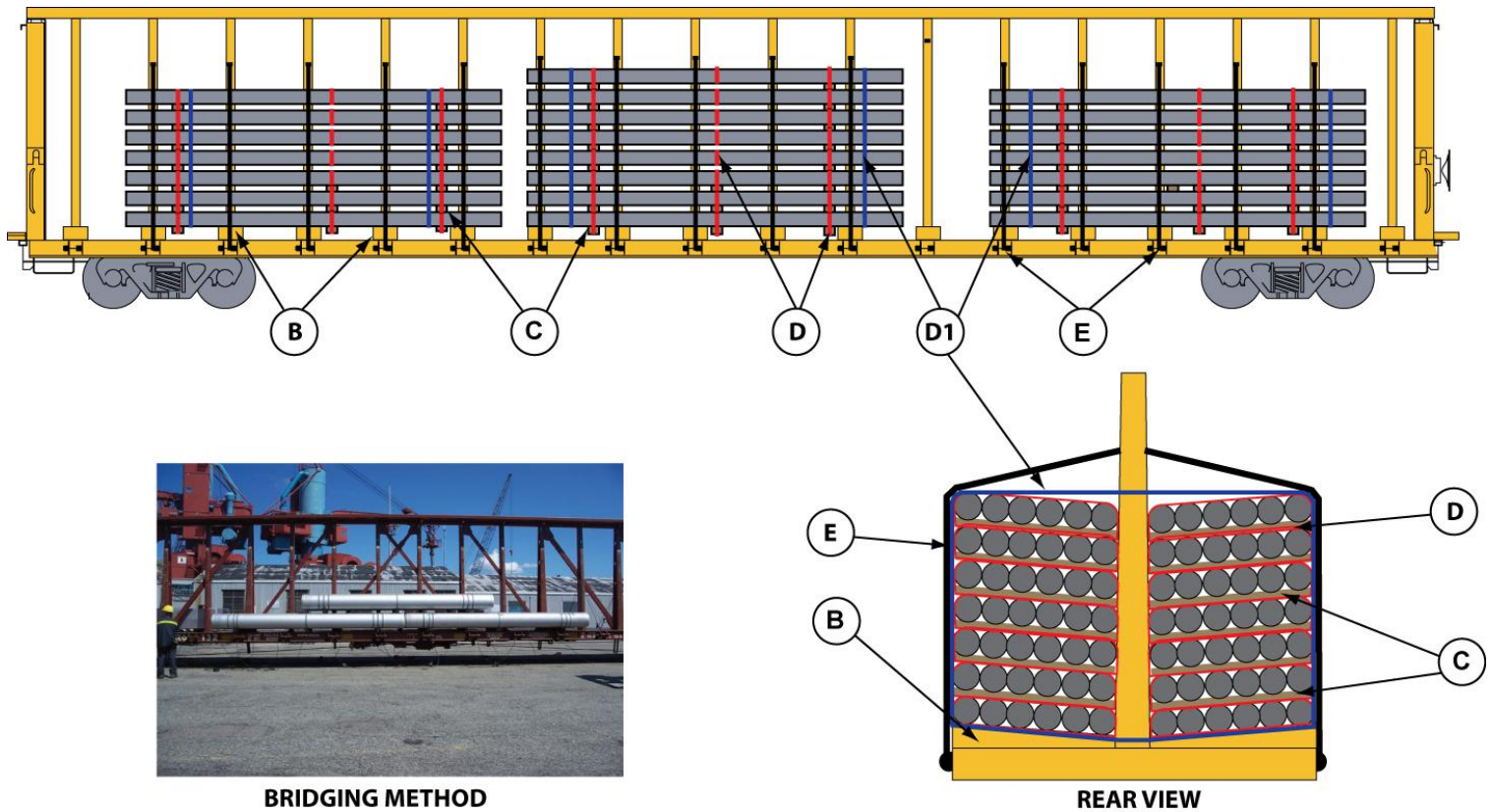
- 9- The total weight of the load must be distributed evenly on the car.
- 10-When a wider ingot is placed on top of a narrower ingot the width of the wider ingot must not exceed the narrow ingot by more than 30% total width. (Ex: bottom ingot 40 in. x 30% = 12 in. therefore top ingot's maximum width may not exceed 52 inches total).

For further details see General Rules.

All loading sketches are available on RAC website www.railcan.ca

LOGS, ALUMINUM, 6 IN. TO 12 IN. O.D., 16 FT LONG AND OVER—CENTER A-
FRAME FLATCARS, WITH CABLE TIE-DOWNS

RAC 12043R
Revised Sept. 03-2015



LOGS, ALUMINUM, 6 IN. TO 12 IN. O.D., 16 FT LONG AND OVER—CENTER A-FRAME FLATCARS, WITH CABLE TIE-DOWNS

RAC 12043R (Continued)

Revised Sept. 03-2015

Item	No. of Pcs.	Description
A		Vacant
B	Minimum 4 per pile 16 ft long. Add 1 for each additional 4 ft of package length.	Bearing pieces: cars are to be equipped with permanent steel bearing pieces or floor risers positioned at a 90° angle to the A-frame and spaced nominally 48 in. on center.
C	Minimum 3 per package 16 ft long for layers two and three. 2 per package in all other layers. Add 1 for each additional 4 ft or less of package length.	Separators: hardwood, minimum 3 1/2 in. × 3 1/2 in., height must not exceed width. Length to equal width of package. Secure each to layer with one Item D band. Locate end pieces 2 ft to 3 ft from end of package. Position additional separator, when required, near the center of the package and in line with the floor bearing piece when possible. When car is equipped with permanent bearing pieces, positioning of separators on bottom layer packages must be planned so as to avoid fouling the bearing pieces.
D	Minimum 3 per package 16 ft long. Add 1 for each additional 4 ft or less of package length.	Package bands: 1 1/4 in. × .029 in. high tension band. Locate one band at each end of the package, encircling logs, including Items C, with additional bands equally distributed between. Type 1 A Grade 4 non-metallic strap may be used to replace 1 1/4 in X 0.029 in high tension bands. When non metallic strapping is used as package bands, Item D1 Encircling band must be added to each pile.

D1	Minimum 2 per pile	Encircling Bands: 1 1/4 in. x .029 in. high tension band. Locate one band 24 inches from each end of the pile, encircling piles on both sides of center partition. (May be substituted by Grade 6 non-metallic strapping)
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LOGS, ALUMINUM, 6 IN. TO 12 IN. O.D., 16 FT LONG AND OVER—CENTER A-FRAME FLATCARS, WITH CABLE TIE-DOWNS

RAC 12043R (Continued)
Revised Sept. 03-2015

Item	No. of Pcs.	Description
E	Minimum 4 per top package 16 ft long. Add 1 for each additional 4 ft of package length.	Cables: 3/8-in. diameter, 8,800-lb minimum breaking strength. Cable assemblies must be equipped with a device to maintain tension. Prior to tightening, there must be a minimum of 2 1/2 wraps of cable around the winch drum. When practical, all cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18-in. bar or 3/4-in. ratchet. Cables are to be secured to A-frame in slot nearest to top package. (See note 10)

Alternate Item B—For cars not equipped with permanent bearing pieces

Item	No. of Pcs.	Description
Alt B	Minimum 5 per pile 16 ft long. Add 1 for each additional 4 ft of package length.	Bearing pieces: hardwood, minimum 3 1/2 in. x 3 1/2 in., length equal to width of package. Locate one approximately 2 ft from each end of package with others equally spaced between. Secure each with one Item D band. When Alt. B is used, the existing Items C on the bottom layer packages may be considered bearing pieces.

Notes and Additional Requirements:

1. Weight on either side of center beam needs to be as close to equal as possible. End piles should be as close to the bulkheads as is practical and remain in compliance with the positioning of Items B and C.

2. Load must be placed tight against the A-frame prior to tensioning Item E cables.
3. A package is defined as a single "lift" and is comprised of logs positioned side by side in the same layer.
4. All logs in the same package must be of the same diameter.
5. All packages in the same pile must be of the same width.
6. Corner protectors attached to Item E cables are not to be used and must be positioned on the cable above the load.
7. A single piece of high-density, fiber-reinforced rubber, no thicker than 1/2 in. and at least the width of the bearing piece, may be used on each permanent bearing piece in contact with the lading.

LOGS, ALUMINUM, 6 IN. TO 12 IN. O.D., 16 FT LONG AND OVER—CENTER A-FRAME FLATCARS, WITH CABLE TIE-DOWNS

RAC 12043R (Concluded)
Revised Sept. 03-2015

8. Loads must be evenly distributed on the car and void, if any, kept to a minimum.
9. The packages of logs in second row (top) that bridge over bottom longitudinal void must overlap piles in bottom layer by at least 50% (e.g., a package 16 ft long can only bridge a void in the bottom row 8 ft long or less).
10. When load is lower than the bottom chain slot in the center partition, all packages must be secured by two encircling steel bands 2 in. x 0.044 in. or approved type 1A grade 7 polyester webbing as a substitute. Banding must encircle piles on both sides of central partition. When items are more than 16 ft long, add one band for each additional 4 ft or less of package length.
11. All cables must be used.
12. Any load exceeding the width of the car deck must have a dimensional clearance from originating carrier prior to moving railcar.
13. Bearing pieces must extend from side sill to center sill.
14. Load weight distribution must be in accordance with AAR General Rule 3.4, indicating the percentage of deck length utilized versus correspondent permissible percentage of load limit for that length; see table below.

Allowable load limit on reduced deck length utilized.

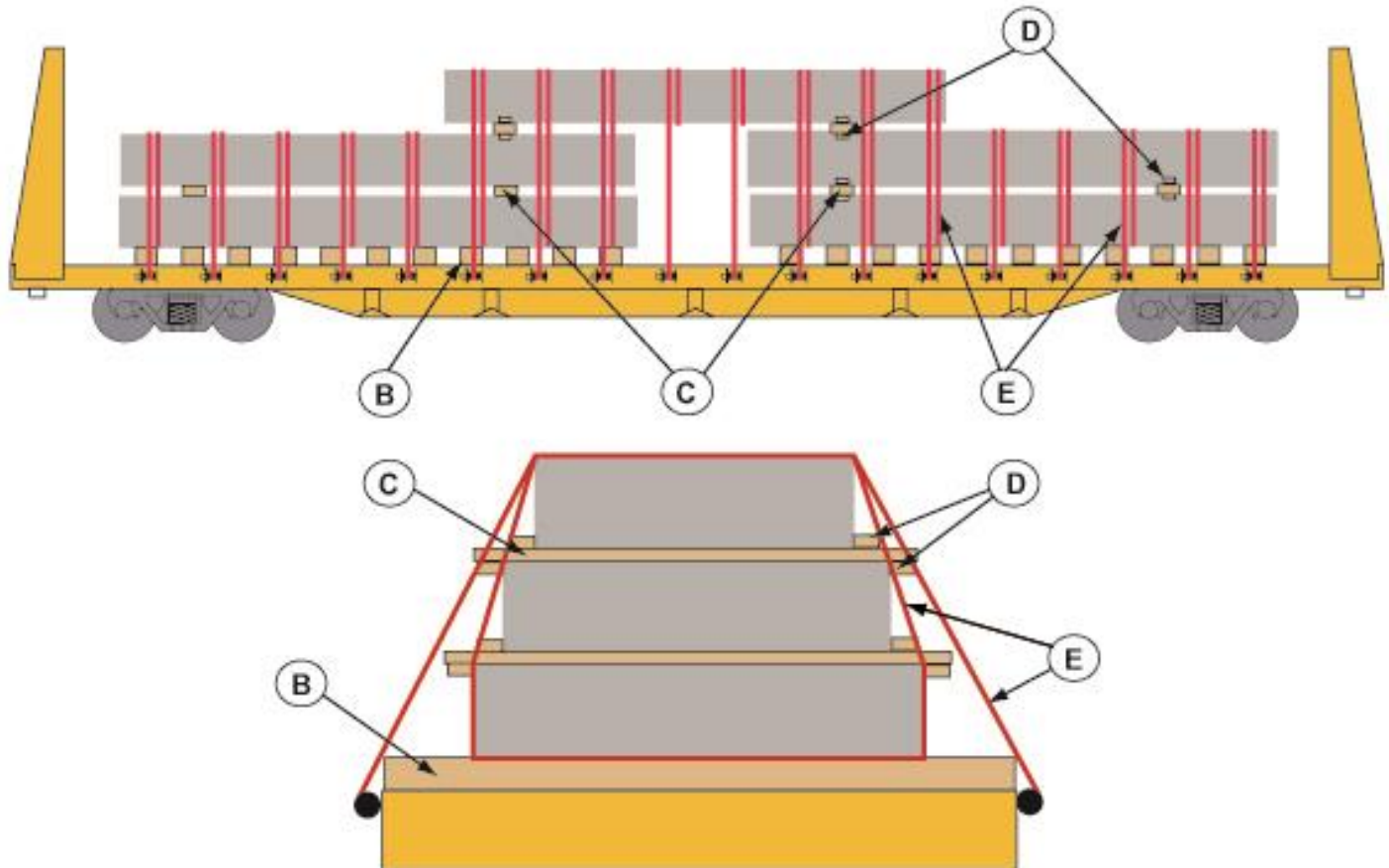
Percentage of deck length utilized	100	75	50	25
Percentage of load limit permitted	100	75	50	25

See General Rules for further details.

INGOTS ALUMINUM, 12 FT LONG OR OVER - FLAT CARS EQUIPPED WITH
PERMANENT END BULKHEADS AND PVC TREATED POLYESTER
WEBBING TIE-DOWN SYSTEM.

RAC 12043T

Revised 09-2011



Item	No. of Pcs.	Description
A		Vacant
B	As required	Bearing pieces: hardwood, 8 in. x 8 in. length equal to width of the car. Space every 3 or 4 feet, stagger location with winches. Each bearing pieces must be bolted or otherwise permanently secured to the car deck to prevent displacement.
C	Minimum 2 per layer	Separators: hardwood, 3in.x 5in. length sufficient for the application of item D side blocks. Locate each approximately 45 in. from ends of pile.

INGOTS ALUMINUM, 12 FT LONG OR OVER - FLAT CARS EQUIPPED WITH
PERMANENT END BULKHEADS AND PVC TREATED POLYESTER WEBBING
TIE-DOWN SYSTEM.

RAC 12043T (Concluded)

New 05-2009

Item	No. of Pcs.	Description
D	4 per item C	Side blocks: lumber, 2 in. x 6 in. x 6 in. Locate against ingots on the top and bottom of each Item C separator, and secure each with four (4) 16-D nails. Side blocks to be used only when top layer is narrower than bottom layer.
E	As required	Web tie-down straps: polyester weebing, 4 in. wide with a minimum breaking strength (MBS) of 20,000 lbs. Pass strapping over all logs in a pile, pass under load and back across the top of the load and secure to the winch on each side of car. Tension straps from both sides of car using a 30 to 40 in. winch bar or equivalent. Web tie down can be substitute one to one with Type 1A grade 8 polyester straps.

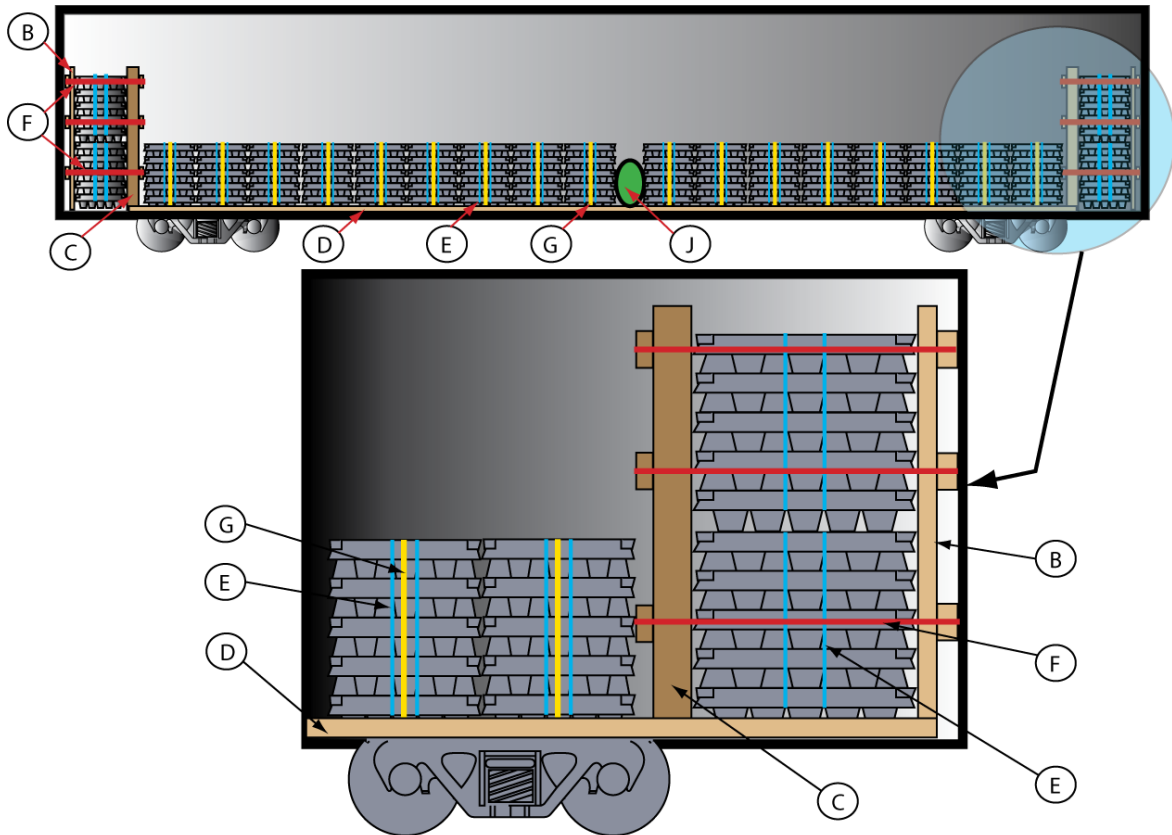
Notes and additional requirements:

1. Load must be centrally and evenly located on car at origin.
2. Maximum void between bottom ingots must not exceed 50% of the length of the top ingot. Top ingot must be centrally located over void.
3. Height of load above Item B bearing pieces may not exceed 170% of base width, including Item C separators.
4. All web tie-down components, including winches and webbing, must be inspected and applied in accordance with General Rule 20.
5. The weight of a pile must not exceed 60 percent of the combined MBS rated restraint of all the Item E straps restraining that pile. (Example: Five Item E straps, each with a 20,000 lb MBS, have a combined MBS restraint rating of 100,000. The total weight of all ingots in the pile may not exceed sixty percent of the combined restraint rating of the five straps, or 60,000 lb in this case.) If necessary, additional strap assemblies may be added with the car owner's permission.

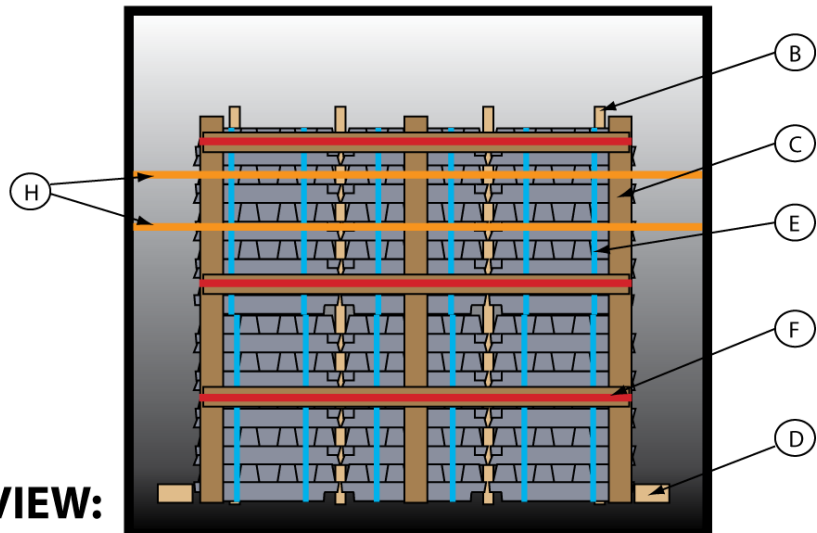
See General Rules for further details.

ALUMINUM INGOTS - BOXCARS

RAC 22043
New 10-2015



LATERAL VIEW



FRONT VIEW:

DOUBLE PILES LOCATED AT BOTH ENDS OF CAR

ALUMINUM INGOTS - BOXCARS

RAC 22043 (Concluded)

New 10-2015

Item	Nbr. of pcs	Description
A		Vacant.
B	2	Bearing wall: softwood 2 in. x 4 in. Two packages piles are placed between the longitudinal load blocking wall ITEM C and the bearing wall. Bearing walls also retain pile's encircling bands.
C	2	Longitudinal load blocking: hardwood 6 in. x 6 in. with 2 in. x 4 in. across pieces. Place as per drawing in front of double piles at each end of car.
D	2	Guide rail: softwood 2 in. x 4in., length equal to length of load. Guide rails are placed against piles and nailed to car's floor eliminating lateral move of the load.
E	4 per package	Package bands: AAR approved polyester Type IV bands. Place one band as illustrated in LATERAL VIEW and FRONT VIEW
F	3	Double unit encircling band: Type IA, Grade 6 polyester band. In two packages high rows located at both end of the car, encircling bands will circle all packages including bearing wall (ITEM B) and longitudinal load blocking (ITEM C). Bands will pass over 2 in. x 4 in. cross pieces nailed to 2 in x 4in.pieces of Item B and over 2 in. x 4 in. cross pieces nailed to 6 in. x 6 in. pieces of Item C
G	1	Simple unit on car floor encircling band: Type IA, Grade 6 polyester band. Encircling bands will pass under package and tied on top of unit encircling the 3 packages.
H	2	Tie-down bands: Type IA, Grade 6 polyester band. Place two bands in front of double units located at each end of the car as illustrated. Bands are secured to anchorage on car's walls.
J	1 as required	Inflating bag: AAR approved level 5 bag used to fill the longitudinal void in the middle of the load.

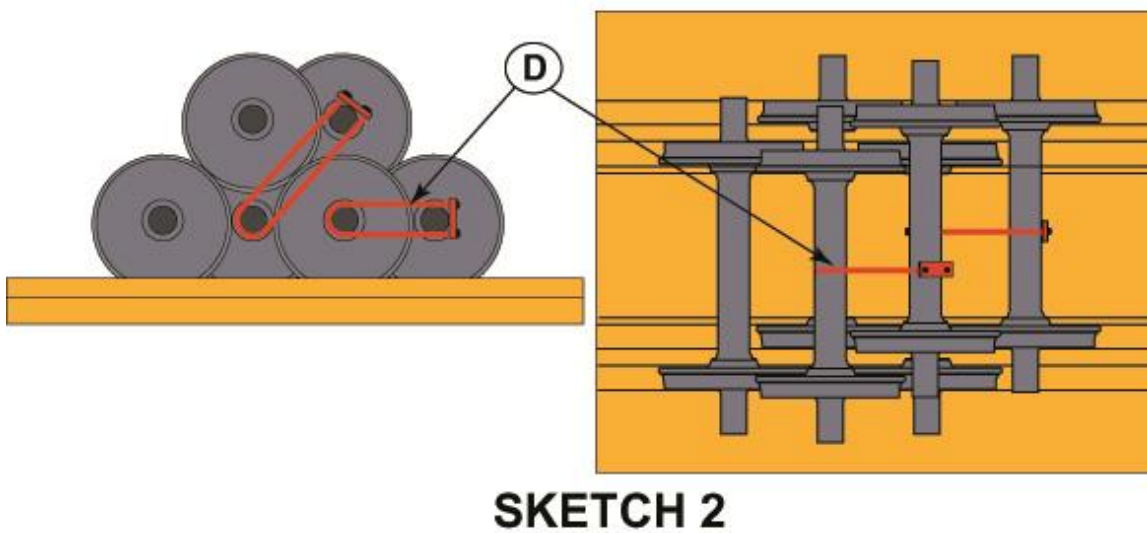
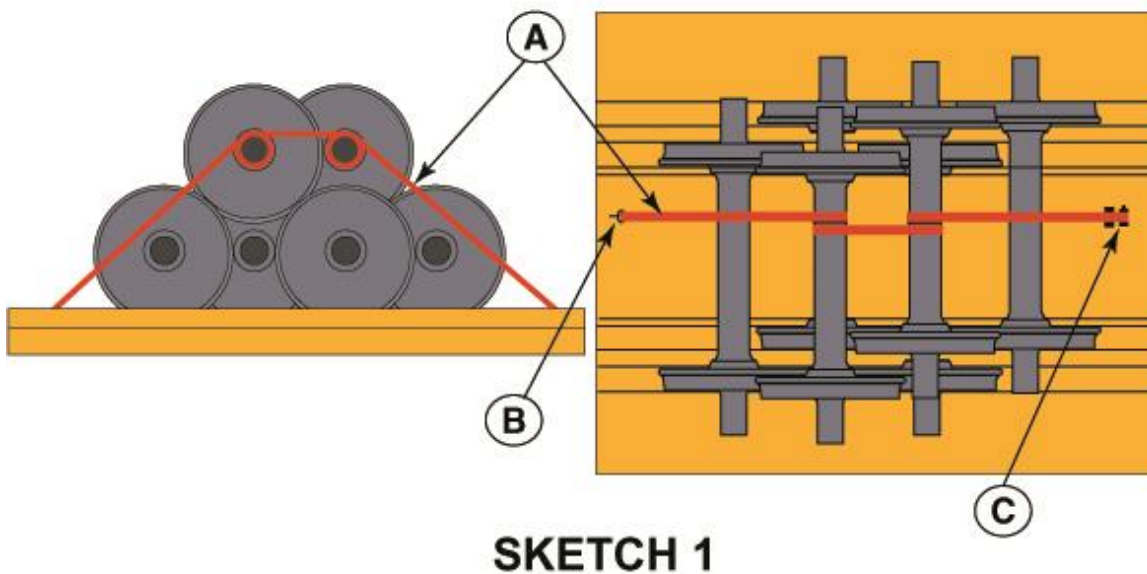
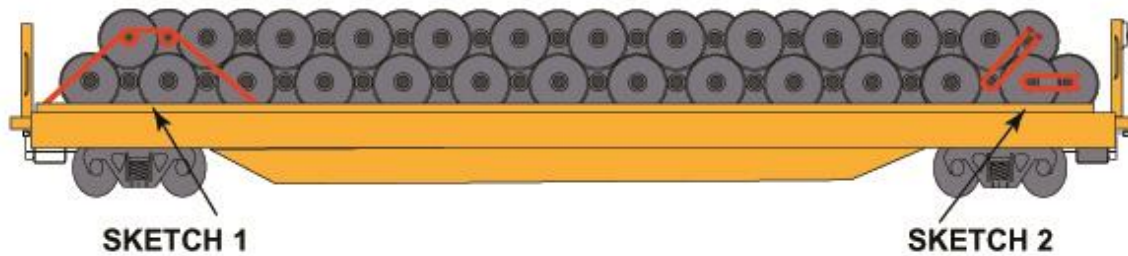
Notes:

1. Load must be centered in car.
2. Number of double piles is determined by the weight of the pieces.
3. Inflatable bags may only be used for one load.

See General Rules for further details.

WHEELS, MOUNTED RAILWAYS, TWO ROWS HIGH, SPECIALLY EQUIPPED
FLAT CAR

RAC 12085
New 05-2010



WHEELS, MOUNTED RAILWAYS, TWO ROWS HIGH, SPECIALLY EQUIPPED
FLAT CAR

RAC 12085 (Concluded)
New 05-2010

Item	No. of Pcs.	Description
A	2	4 in. polyester strap with a minimum breaking strength (MBS) of 20,000 lbs. with D ring.
B	2	U-bolt welded to car.
C	2	Standard strap winch welded to car.
D	4	$\frac{3}{4}$ in. diameter rod bent to U shape secured at end with $\frac{1}{2}$ in. x 2- $\frac{1}{2}$ in. x 10 in. clamp. Applied to axles as shown in sketch.

Notes and Additional Requirements

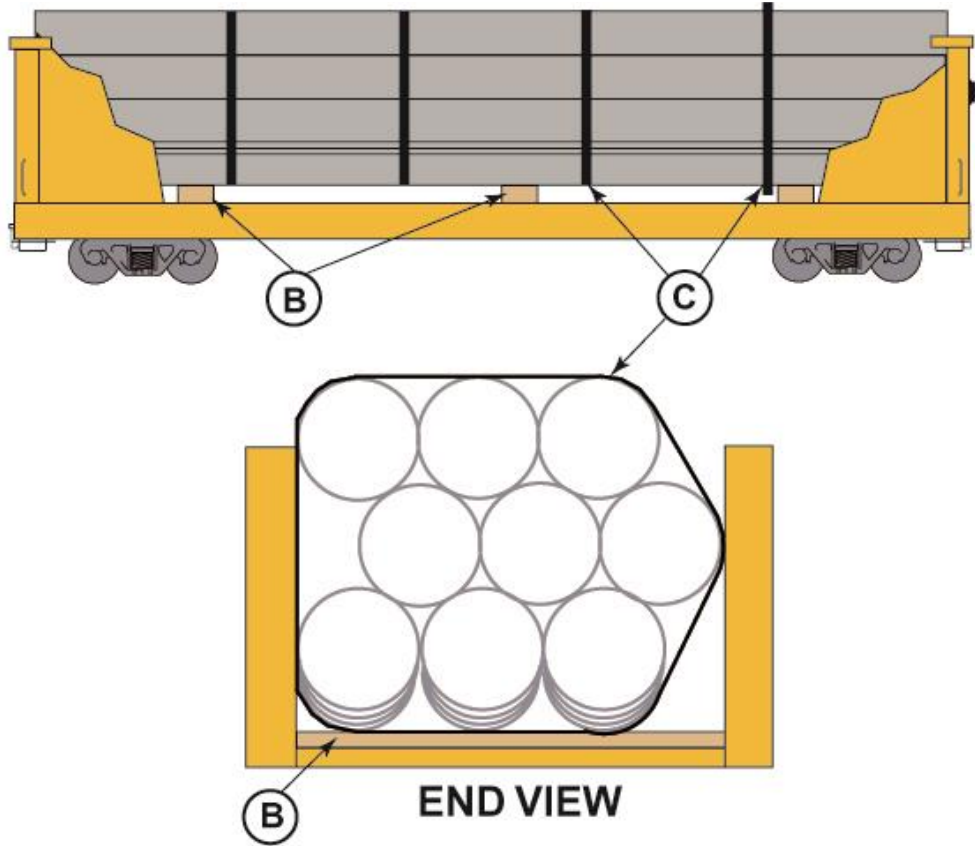
1. Wheelsets sit in support racks which prevent motion.
2. Wheelsets with mounted roller bearings must be handled and positioned in accordance with AAR requirements.
3. Load must be positioned to avoid end-to-end imbalance.
4. Car is not to be humped when loaded to this figure.

See General Rules for further details.

PIPES, STEEL 24 TO 30 IN. O.D. 40 FT LONG OR LESS, GONDOLAS

RAC 12131B

New 04-2010



Item	No. of Pcs.	Description
A		Vacant
B	3 per pile	Bearing Pieces; Hardwood, minimum 2 in. x 4 in. x 9 ft. spaced as shown.
C	4 per pile	High tension bands: 2in. x .044in., encircling entire pile, suitably spaced as shown

Notes and Additional Requirements

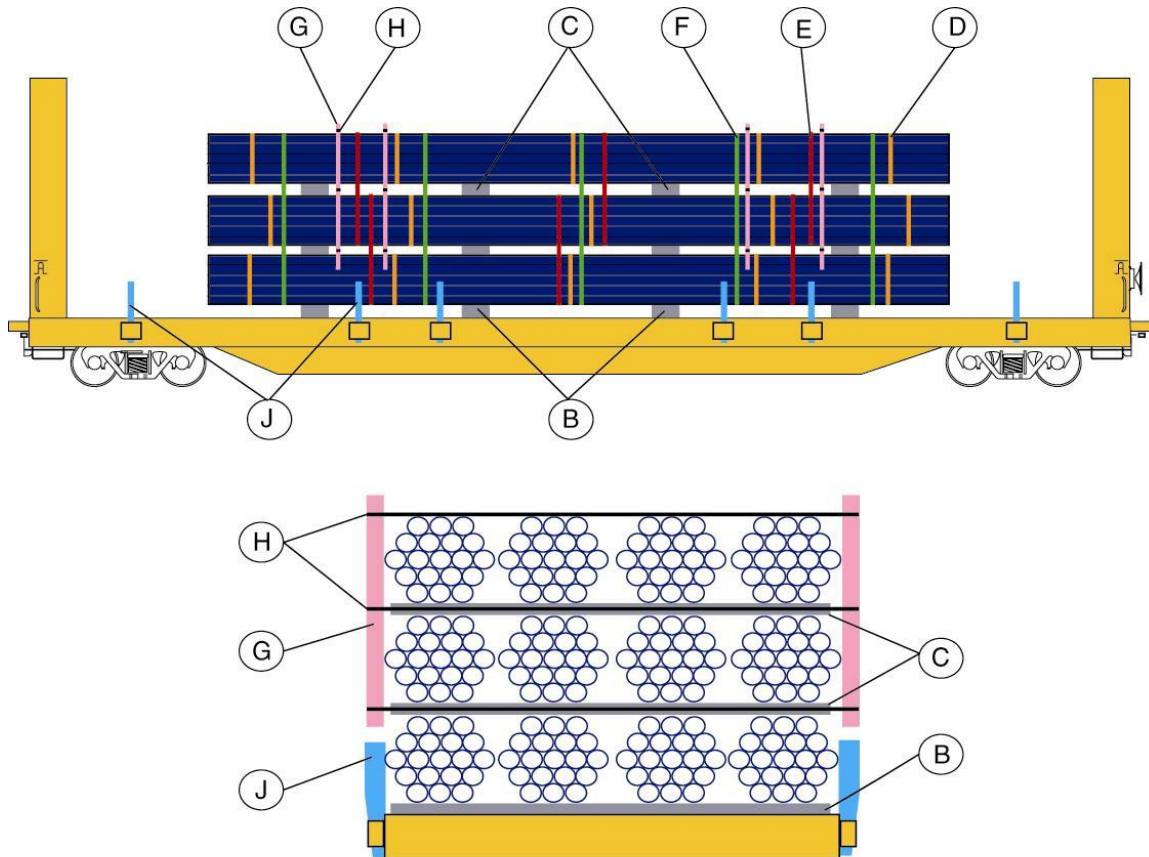
1. Suitable end bulkhead, below top of car ends, may be used to prevent pipe contacting ends of car. Use optional.
2. Pile must be located centrally lengthwise on car.
3. Bottom of pipes in top row must be 1/3 below the top chord of car.

See General Rules for further details.

PIPES, WROUGHT IRON AND STEEL, VARNISH COATED OR UNCOATED
 2-3/8 IN. TO 12-3/4 IN. OUTSIDE DIAMETER, INCLUSIVE, 30 FT. MINIMUM
 TO 38 FT. IN LENGTH, FLAT CARS OVER 48 FT. TO 52 FT. INCLUSIVE IN
 LENGTH EQUIPPED WITH PERMANENT END BULKHEADS

RAC 12135

New 07-1998 (Ref: AAR Fig. 2135)



END VIEW

Item	No. of Pcs.	Description
A	Location of load	Load must be located centrally on car at origin.

B	4 per pile	Floor Bearing Pieces; Hardwood, 4 in. x 4 in., length 4 in. less than car deck, in one piece and preferably rough. Locate end pieces approximately 5 ft. in from end of pile with others equally spaced between. For cars equipped with permanent steel bearing pieces, the size of wood bearing pieces must be increased to prevent load from resting on steel. Width of bearing pieces must not be less than height. Securement of bearing pieces not required.
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PIPES, WROUGHT IRON AND STEEL, VARNISH COATED OR UNCOATED
2-3/8 IN. TO 12-3/4 IN. OUTSIDE DIAMETER, INCLUSIVE, 30 FT. MINIMUM
TO 38 FT. IN LENGTH, FLAT CARS OVER 48 FT. TO 52 FT. INCLUSIVE IN
LENGTH EQUIPPED WITH PERMANENT END BULKHEADS

RAC 12135 (continued)
New 07-1998 (Ref: AAR Fig. 2135)

Item	No. of Pcs.	Description
C	4 per pile	Separators; Hardwood, 2 in. x 3 in. for use with single layers of pipe, 4 in. x 4 in. hardwood must be used for packaged pipe. Dimensions of separators may be increased but width must not be less than height. Length of separators to equal width of load and must not extend beyond inside face of stake pocket. Must be in one piece and preferably rough. Locate between each layer of pipe or packages, and when possible, in line with Items "B" at origin.
D	5 per package	Package Bands; 1-1/4 in. x .031 in. high tension bands to encircle each package. Bands to be equally spaced on package and must be spaced as far away from bearing pieces and separators, as possible. Required when material is packaged.
E	3 sets per pile	Interlacing Bands; 2 in. x .044 in. high tension bands. Locate lower band of set under bottom layer, encircling pipe to approximately 3 ft. of load above. Locate next band of set to encircle top layer in group below and encircling approximately the next 3 ft. of load above. Repeat until entire load is unitized. Locate each set as far as possible from Item "B" bearing pieces and Item "C" separators, as possible.
F	5 per pile.	Encircling bands; 2 in. x .044 in. high tension bands to encircle entire pile. Locate one at each end of pile and others equally spaced, keeping as far as possible from Item "B" bearing pieces as possible.

G	4 pairs per pile	Binders; Hardwood, 4 in. x 4 in., length to extend below bottom of second tier, but not closer than two (2) inches above Item "J" Stub stakes.. Height must be sufficient to allow application of Item "H", but not more than 24 inches above top of load.
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PIPES, WROUGHT IRON AND STEEL, VARNISH COATED OR UNCOATED
2-3/8 IN. TO 12-3/4 IN. OUTSIDE DIAMETER, INCLUSIVE, 30 FT. MINIMUM
TO 38 FT. IN LENGTH, FLAT CARS OVER 48 FT. TO 52 FT. INCLUSIVE IN
LENGTH EQUIPPED WITH PERMANENT END BULKHEADS

RAC 12135 (concluded)
New 07-1998 (Ref: AAR Fig. 2135)

Item	No. of Pcs.	Description
H	As required	Binder Ties; 1-1/4 in. x .031 in. high tension bands. For packaged pipes, secure between each pair of Items "G" between each layer. For unpackaged pipe, locate lower binder tie between second and third layer, but in no case higher than 26 inches above bearing pieces. Repeat application for every 36 inches or less of load height, with final band located not more than 6 inches above top layer.
J	6 pairs	Stub Stakes; Hardwood, 4 in. x 5 in., height to be $\frac{3}{4}$ of bottom tier height for bundled pipe, and $\frac{3}{4}$ of the height of the bottom two tiers for unbundled pipe. Locate a minimum of one (1) pair on each end of lading. Locate two (2) additional pair between end pairs so that a minimum of four (4) pairs are in contact with the lading at all times. Two (2) additional pairs are required (one pair at each end) to be located in void space between bulkhead and end of lading.

Notes:

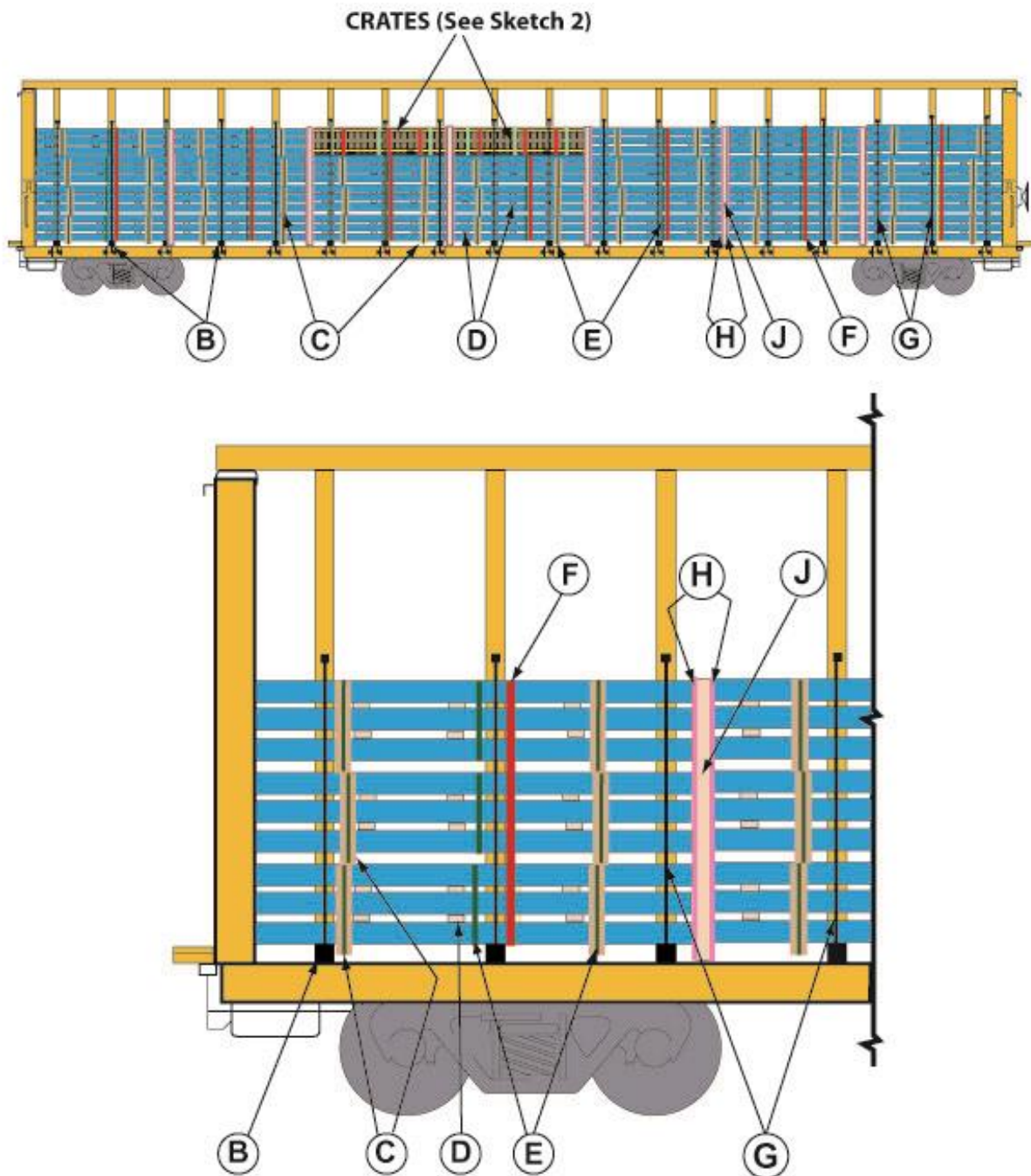
1. Height of load must not exceed 10 ft. above car floor.
2. Crosswise voids must be filled with blocking or shims which must be secured to prevent displacement.
3. When binders are cut after initial application, sufficient material must be removed from binder remaining in stake pocket to avoid fouling binders during transit.

See General Rules for further details.

PIPES, STEEL AND CAST IRON 1 1/2 IN. TO 12 IN. O.D., 10 FT LONG OR
OVER RISERLESS FLATCARS WITH CENTER A-FRAME, PERMANENT
END BULKHEADS AND CABLE TIE-DOWN ASSEMBLIES

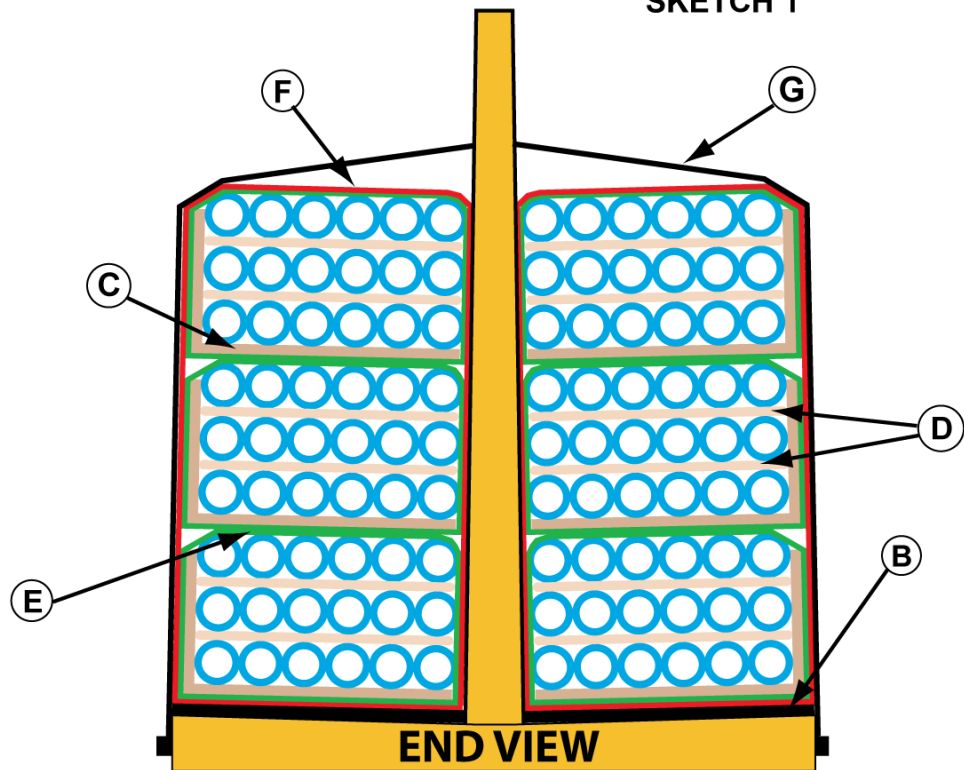
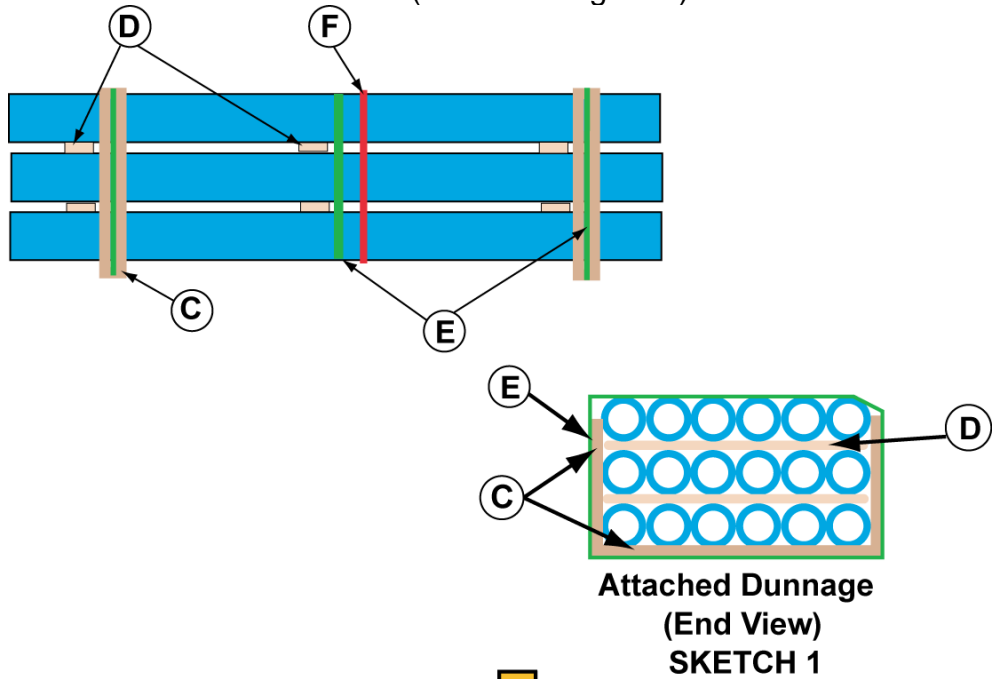
RAC 12155

New 05-2005 2005 (Ref: AAR Fig. 144)



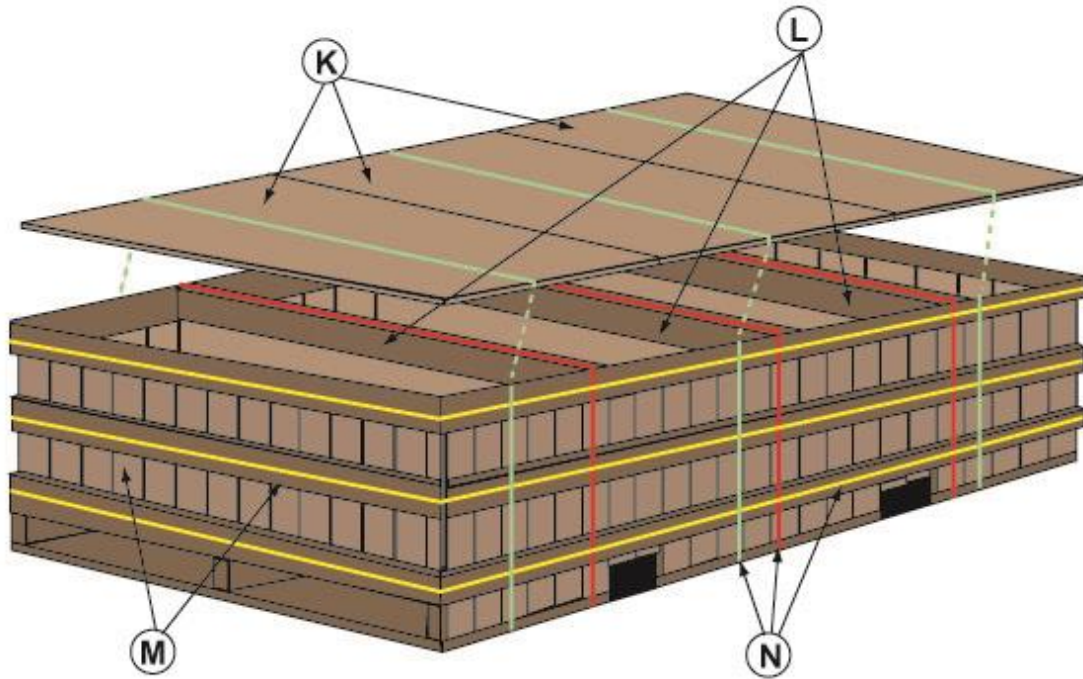
PIPES, STEEL AND CAST IRON, 1 1/2 IN. TO 10 IN. O.D., 10 FT LONG OR
OVER RISERLESS FLATCARS WITH CENTER A-FRAME, PERMANENT
END BULKHEADS AND CABLE TIE-DOWN ASSEMBLIES

RAC 12155 (Continued)
New 05-2005 (Ref: AAR Fig. 144)



PIPES, STEEL AND CAST IRON, 1 1/2 IN. TO 10 IN. O.D., 10 FT LONG OR
OVER RISERLESS FLATCARS WITH CENTER A-FRAME, PERMANENT END
BULKHEADS AND CABLE TIE-DOWN ASSEMBLIES

RAC 12155 (Continued)
New 05-2005 (Ref: AAR Fig. 144)



SKETCH 2
4 ft. x 10 ft. CRATE FOR FITTINGS

Item	No. of Pcs.	Description
A		Vacant
B	Min. 2 per package 12 ft long or less. Add 1 for each additional 4 ft.	Bearing pieces: lumber of one piece, preferably rough. Width must be 2 in. greater than height and the length equal to width of bottom package. Locate approximately 18-24 in. from each end of package with remaining pieces equally spaced. Maybe substituted with attached dunnage as per item C.

PIPES, STEEL AND CAST IRON, 1 1/2 IN. TO 10 IN. O.D., 10 FT LONG OR
OVER RISERLESS FLATCARS WITH CENTER A-FRAME, PERMANENT END
BULKHEADS AND CABLE TIE-DOWN ASSEMBLIES

RAC 12155 (Continued)
New 05-2005 (Ref: AAR Fig. 144)

Item	No. of Pcs.	Description
C	Min. 2 per package 12 ft long or less. Add 1 for each additional 4 ft	Attached dunnage: hardwood, minimum, 2 in. x 4 in., height must not exceed width. Length must be equal to width of package, in one piece and preferably rough. All attached dunnage in same layer separation must be of equal height. Attached dunnages are secured to bottom and sides (Sketch 1) of package with one $\frac{3}{4}$ in. package band. Locate approximately 18 in. from each end of package. Where possible, attached dunnages are to be positioned in line with Item B bearing pieces.
D	3 per package.	Stickers: Lumber minimum $\frac{3}{4}$ in. x 2 in., length must be equal to width of package and must be uniform thickness throughout.
E	Min. 3 per package 10 ft. long. Including 2 Item C.	Package bands: $\frac{3}{4}$ in. x .029 in. high tension steel bands to encircle each bundle of pipe. Locate one band near each end of package with third band in between.
F	1 per pile.	Encircling band: 1 1/4 in. x .029 in. high tension steel bands to encircle all packages in a pile. Locate one band near the center of each pile.
G	Minimum 2 per each top package 12 ft long or less. 3 per each top package over 12 ft long.	Cables: 3/8-in. diameter, 8,800-lb minimum breaking strength. Winch assemblies must be equipped with a device to maintain tension. Prior to tightening, there must be a minimum of 2 1/2 wraps of cable around the winch drum. When practical, all cables must be used, and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or 3/8 in. ratchet. Cables are to be secured to A-frame in slot nearest to top of package.
H	As required	Buffer sheets: plywood, minimum 1/2 in. thick, width and height to equal width and height of adjoining tiers. Position plywood sheet between ends of adjacent tiers of pipe. Secure in place with wire or banding sufficient to prevent displacement. (Not shown in drawings.)

J	As required	Void filler: Inflatable dunnage bag as required. One Item H buffer sheet is to be positioned on each side of filler bag(s). Place bag(s) near the center of the load as the void should be kept to a minimum and located near the center of the load.
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PIPES, STEEL AND CAST IRON, 1 1/2 IN. TO 10 IN. O.D., 10 FT LONG OR
OVER RISERLESS FLATCARS WITH CENTER A-FRAME, PERMANENT END
BULKHEADS AND CABLE TIE-DOWN ASSEMBLIES

RAC 12155 (Concluded)
New 05-2005 (Ref: AAR Fig. 144)

Item	No. of Pcs.	Description
K	3 sheets 48 in. x 42 in.	5/8 po Plywood
L	3	Lumber 2 in. x 4 in.
M	3 per each end	Lumber 1 in. x 3 ½ in. See SETCH 2
N	9	Encircling bands: 5/8 in. high tension steel bands. . See SETCH 2

Notes:

1. Load must be equally balanced on both sides of center partition.
2. All longitudinal void space must be packed out using Items H and J as indicated above. No void at any location may be greater than 8 in. If total lengthwise void space is greater than 8 in., the void must be distributed between pipe stacks beginning from the center of the load, then toward the ends of the car.
3. Pipes must be packaged as shown, with maximum package height of 24 inches.
4. All pipes in a package must be of the same diameter and type.
5. All packages in a layer must be of equal height.
6. All pipes in a stack must be of equal length.
7. Pipes in adjacent packages may be of different diameter, but all packages in a layer must be of equal height.

8. Application of filler:

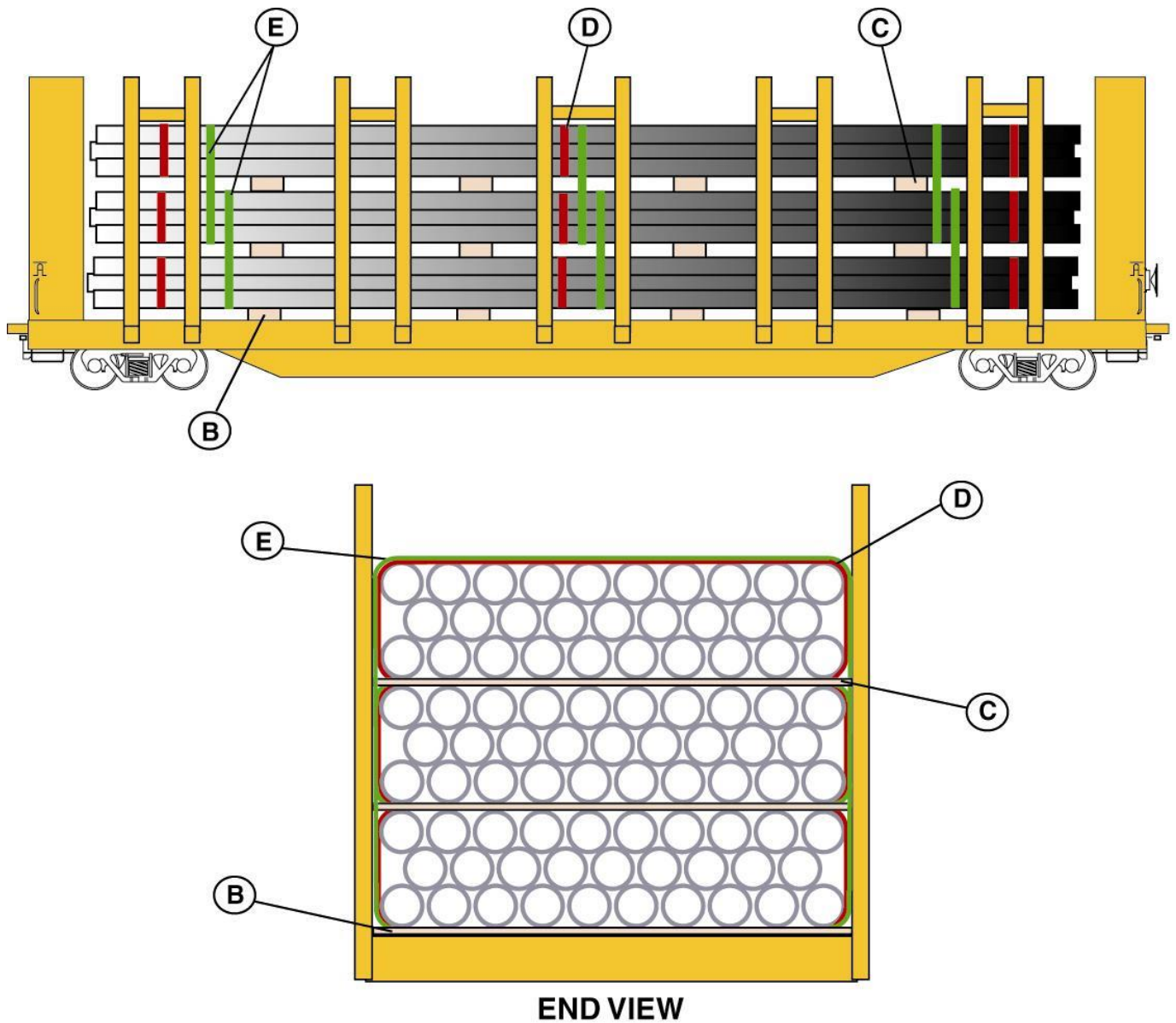
- A. Make the height and width dimensions of the faces of the filler material as near as practicable to the dimensions of the faces of the units they will be separating.
- B. Load voids greater than 8 in. may be spread equally over length of load with no more than 8 in. of void space at any one location and subsequently filled with this material.
- C. Filler must be secured to prevent displacement.
- D. Filler material may not be reused if it has been damaged, subjected to water infiltration, or otherwise is no longer capable of filling the void.

See General Rules for further details.

PIPES, STEEL THREADED OR NOT, BUNDLED, UNCOATED AND VARNISH COATED, 2 IN. TO 8 IN. OUTSIDE DIAMETER INCLUSIVE, FLAT CARS 48 FT. OR OVER EQUIPPED WITH PERMANENT END BULKHEADS AND PERMANENT STAKES.

RAC 12157

New 07-1998 (Ref: AAR Fig. 121)



PIPES, STEEL THREADED OR NOT, BUNDLED, UNCOATED AND VARNISH
COATED, 2 IN. TO 8 IN. OUTSIDE DIAMETER INCLUSIVE, FLAT CARS 48 FT.
OR OVER EQUIPPED WITH PERMANENT END BULKHEADS AND
PERMANENT STAKES.

RAC 12157 (Concluded)
New 07-1998 (Ref: AAR Fig. 121)

Item	No. of Pcs.	Description
A		Vacant
B	4 per pile 38 ft. long. Add 1 for each additional 10 ft. or less	Bearing Pieces; Hardwood, minimum 3 in. x 4 in., width must be 1 in. greater than height, in one piece and preferably rough. Length must be equal to width of car. Locate approximately 5 ft. from each end of load with others equally spaced between. Secure to floor with 4 16-D nails
C	4 per layer 40 ft. long. Add 1 for each additional 10 ft. or less.	Separators; Hardwood, 2 in. x 4 in., must be in one piece and preferably rough. Length to equal width of load.
D	3 per package	Package Bands; 1 1/4 in. x .029 in. high-tension bands. Locate approximately 3 ft. from each end of load, encircling package.
E	3 per pile 40 ft long. Add 1 for each additional 10 ft. or less.	Interlacing bands; 1 1/4 in. x .029 in. high-tension bands. Bands to be located approximately 3 ft in from each end of load with others equally spaced between. Bands are to encircle two packages together, interlocking layers 1 and 2, 2 and 3, 3 and 4 etc.

Notes:

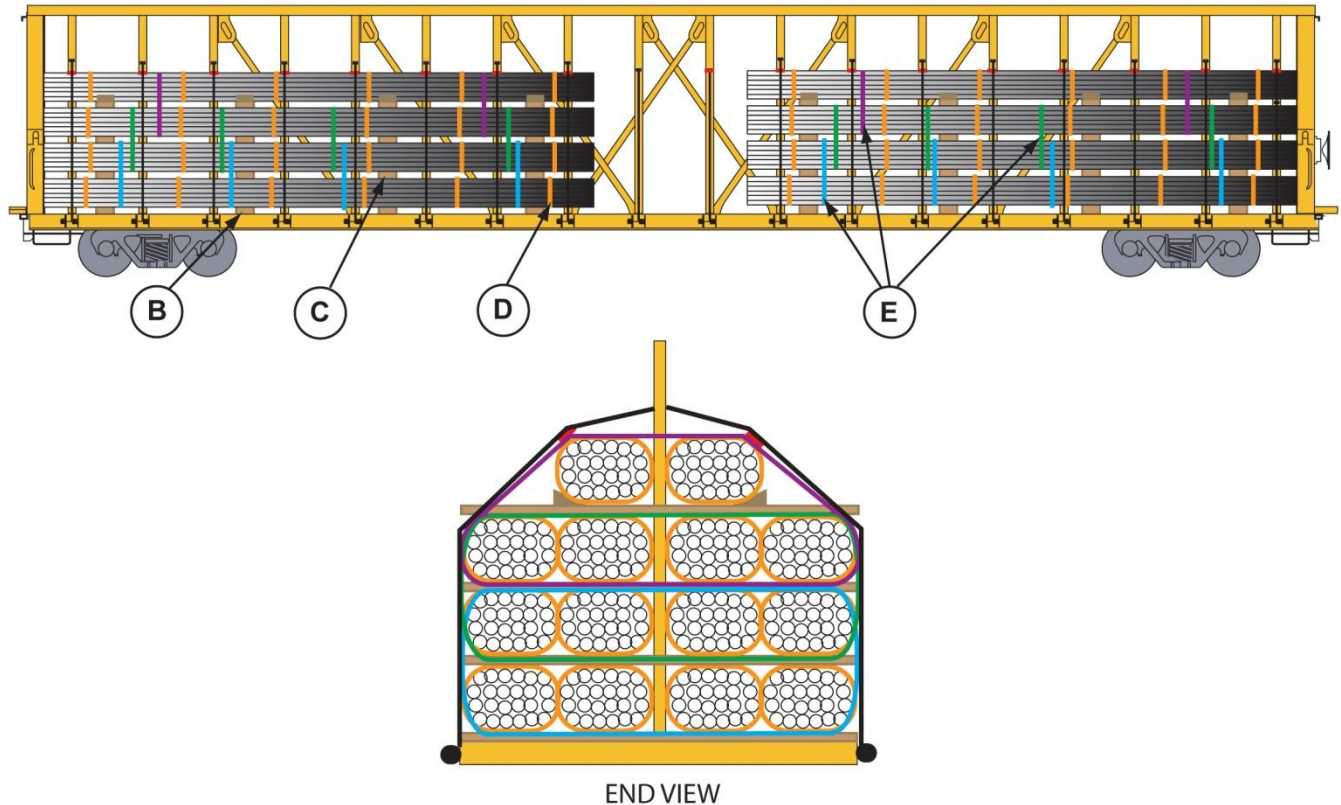
- 1- When cars are equipped with wrap around bulkheads, wood fillers should line the vertical stakes to prevent pipes from hitting the bulkhead flange. Wood fillers must be positioned a minimum of 4 ft. from any separator in a pile.

See General Rules for further details.

PIPES, STEEL 24 TO 35 FEET LONG 3 TO 7 INCHES DIAMETER ON
CENTER BEAM CUSHION CAR 2 OR MORE PILES

RAC 12158

New 11-2012



Item	No. of Pcs.	Description
A		Vacant
B	3 per pile 24 feet long 1 for every additional 10 feet or less	Bearing pieces: hardwood minimum 2 in. by 4 in. full width of load. Maybe substitute with Douglas Fir minimum 4 in X 6 in rough.
C	3 per pile 24 feet long 1 for every additional 10 feet or less	Separators: hardwood minimum 2 in. by 4 in. full width of load.

PIPES, STEEL 24 TO 35 FEET LONG 3 TO 7 INCH DIAMETER ON CENTER
 BEAM CUSHION CAR 2 OR MORE PILES
 RAC 12158(Concluded)
 New 11-2012

Item	No. of Pcs.	Description
D	4 per package 24 ft long 1 additional for every 10 feet or less	Package bands: 5/8 x .029 in. high-tension bands
E	4 per package 24 ft long 1 additional for every 10 feet or less	Interlacing Bands: Non metallic Type 1A grade 6 secure first row to second row, second to third, third to fourth etc. When top row is incomplete and consist of only one package only 2 bands required locations 1-4-5-8
F	All cables must be used	Cables: Cables: 3/8 in. diameter, minimum of 8,800 lbs. Breaking strength. Cable assemblies must be equipped with edge protectors. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top of top package.

Notes:

1. Bearing pieces and interlacing band should be placed as close as possible to center partition post closest to end of car.
2. When separators are not fully supported by package below spacer must be added to fill gap between separator and bottom package.
3. When package bands are broken during loading, broken band must be removed.
4. Load weight distribution must be in accordance with AAR Genera Rule 3.4 indicating the percentage of deck length utilized versus correspondent permissible percentage of load limit for that length, see table below.

5.

Allowable load limit on reduced deck length utilized

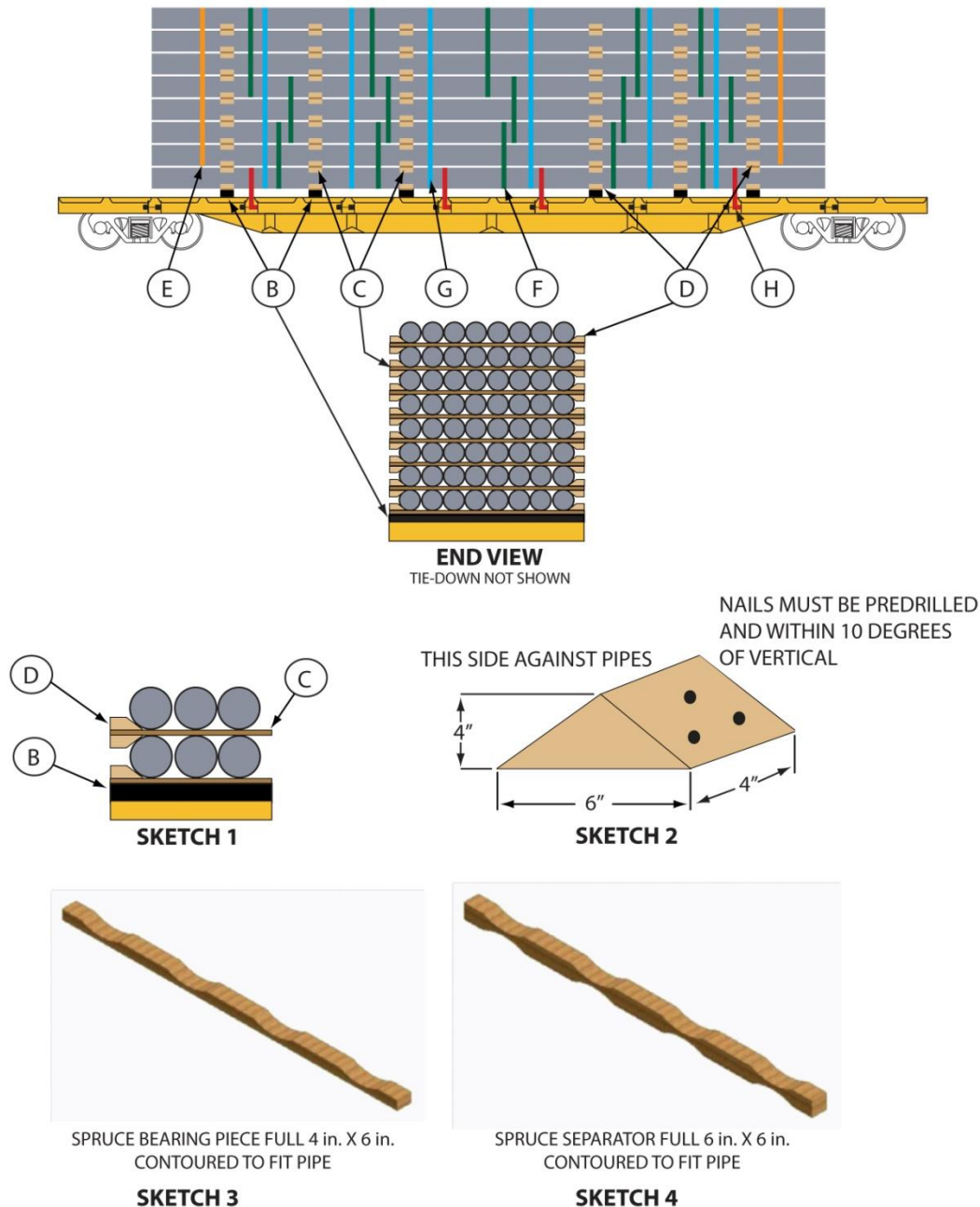
<i>Percent of deck length utilized</i>	100	75	50	25
<i>Percent of load limit permitted</i>	100	75	50	25

See General Rules for further details.

PIPES, STEEL COATED 6-5/8 IN. TO 16 IN. OUTSIDE DIAMETER,
INCLUSIVE, 45 FT. TO 62 FT. IN LENGTH, INCLUSIVE, FLAT CARS 89 FT.
WITH CUSHIONING DEVICES

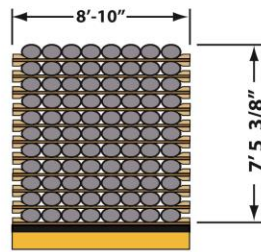
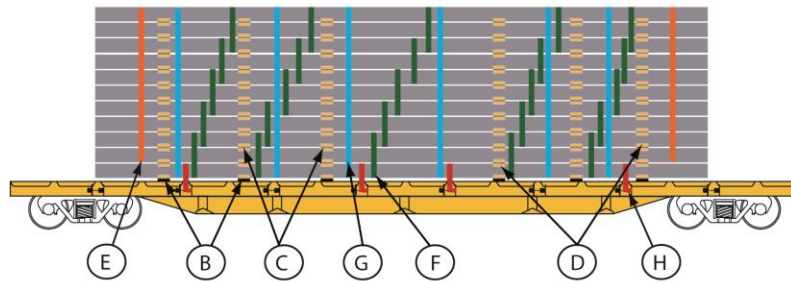
RAC 12159

Revised 01-2015 (Ref: AAR Fig. 267-A)



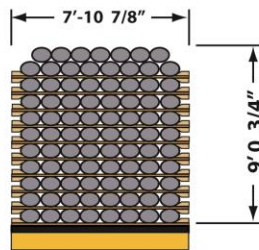
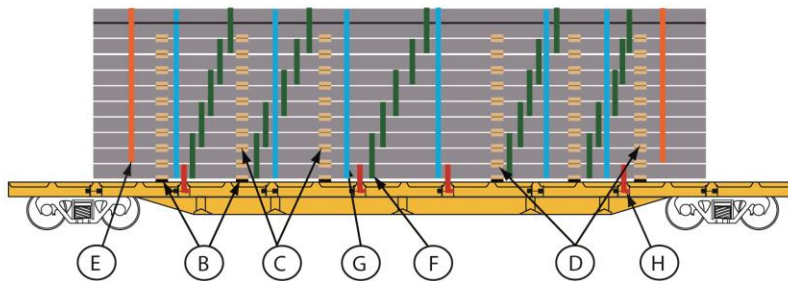
PIPES, STEEL COATED 6-5/8 IN. TO 16 IN. OUTSIDE DIAMETER,
INCLUSIVE, 45 FT. TO 62 FT. IN LENGTH, INCLUSIVE, FLAT CARS 89 FT.
WITH CUSHIONING DEVICES

RAC 12159 (Continued)
Revised 01-2015 (Ref: AAR Fig. 267-A)



END VIEW
TIE-DOWN NOT SHOWN

SKETCH 5 (6-5/8")

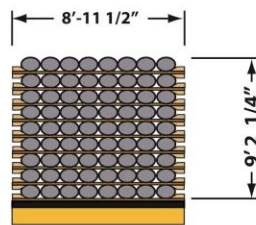
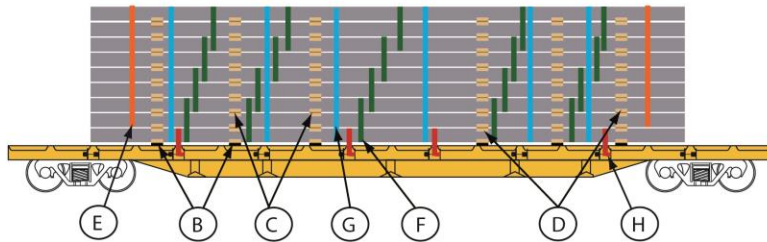


END VIEW
TIE-DOWN NOT SHOWN

SKETCH 6 (8-5/8")

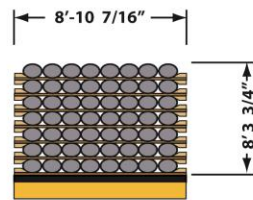
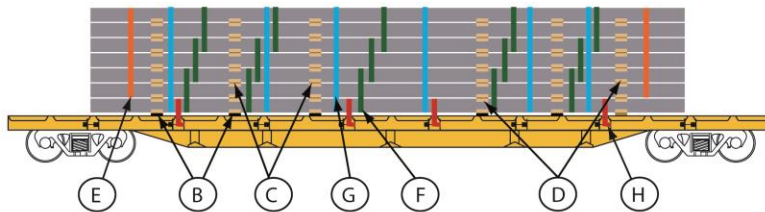
PIPES, STEEL COATED 6-5/8 IN. TO 16 IN. OUTSIDE DIAMETER,
INCLUSIVE, 45 FT. TO 62 FT. IN LENGTH, INCLUSIVE, FLAT CARS 89 FT.
WITH CUSHIONING DEVICES

RAC 12159 (Continued)
Revised 01-2015 (Ref: AAR Fig. 267-A)



END VIEW
TIE-DOWN NOT SHOWN

SKETCH 7 (10-3/4")

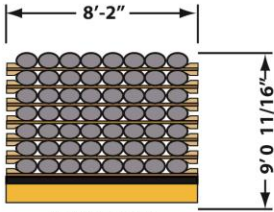
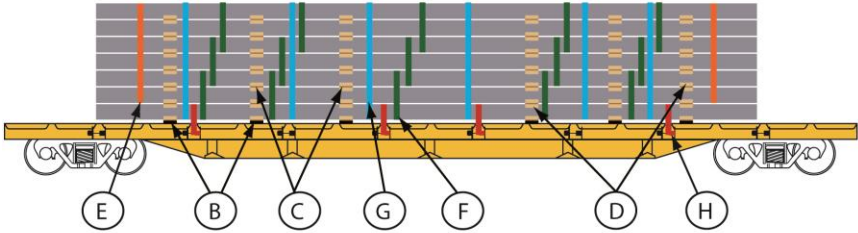


END VIEW
TIE-DOWN NOT SHOWN

SKETCH 8 (12-3/4")

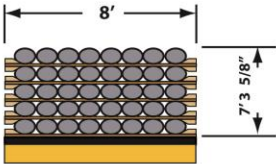
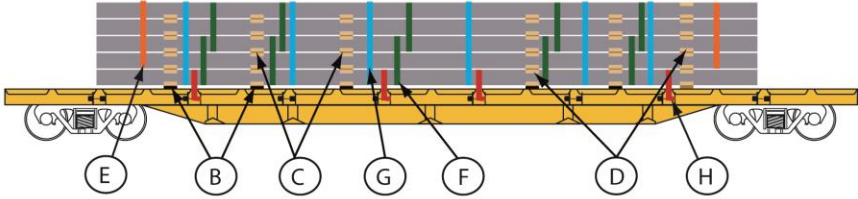
PIPES, STEEL COATED 6-5/8 IN. TO 16 IN. OUTSIDE DIAMETER,
INCLUSIVE, 45 FT. TO 62 FT. IN LENGTH, INCLUSIVE, FLAT CARS 89 FT.
WITH CUSHIONING DEVICES

RAC 12159 (Continued)
Revised 01-2015 (Ref: AAR Fig. 267-A)



END VIEW
TIE-DOWN NOT SHOWN

SKETCH 9 (14")



END VIEW
TIE-DOWN NOT SHOWN

SKETCH 10 (16")

PIPES, STEEL COATED 6-5/8 IN. TO 16 IN. OUTSIDE DIAMETER,
INCLUSIVE, 45 FT. TO 62 FT. IN LENGTH, INCLUSIVE, FLAT CARS 89 FT.
WITH CUSHIONING DEVICES

RAC 12159 (Continued)
Revised 01-2015 (Ref: AAR Fig. 267-A)

Item	No. of Pcs.	Description
A		Vacant
B	Minimum 6 per pile	Bearing Pieces: Hardwood, 2 in. x 6 in., preferably rough, in one piece. Length equal to width of car. Intermediate bearing pieces will be spaced uniformly to support the load. Secure each to car floor with six (6) common nails, the length to be not less than 2 in. greater than thickness of bearing piece.
C	Minimum 6 per pile	Separators: Hardwood, 2 in x 6 in., length equal to width of load but not to extend beyond width of car. Locate between each layer and in line with items "B", when possible.
D	2 per each item "B" 4 per each item "C"	Chock Blocks: Hardwood 4 in. x 4 in. x 6 in., pre-drilled. Locate at each end on top of Items "B", and on top and bottom of Item "C" against pipe and secure each with six (6) 20-D common nails. Not required when items A & B are full contoured.
E	2 per pile	End encircling Bands: 2 in. x .044 in. high tension. Pass between first and second bottom layers encircling all layers above it. Place one at each end of pile and locate 2/3 distance in from end of pipe and first separator. May be substituted with Type 1A Grade 6 polyester cord strapping.
F	5 per each layer	Load interlacing bands: 2 in. x .044in high tension. Interlace entire load together by encircling first, second and third layers then third, fourth and fifth layers etc., to top of load. Top set may consist of 4 layers. May be substituted with Type 1A Grade 6 polyester cord strapping.
G	6	Encircling Bands: 2 in. x .044 in. high tension. Encircle entire load, evenly spaced and locate as far as possible from bearing pieces, separators and other bands. May be substituted with Type 1A Grade 6 polyester cord strapping.

PIPES, STEEL COATED 6-5/8 IN. TO 16 IN. OUTSIDE DIAMETER,
INCLUSIVE, 45 FT. TO 62 FT. IN LENGTH, INCLUSIVE, FLAT CARS 89 FT.
WITH CUSHIONING DEVICES

RAC 12159 (Continued)
Revised 01-2015 (Ref: AAR Fig. 267-A)

Item	No. of Pcs.	Description
H	4 per pile	Tie-down assemblies: consisting of a ratchet and polyester woven straps 4 in. wide with 20,000 lb. minimum breaking strength (M.B.S.) Locate near bearing pieces where practical. Place over bottom layer of pipe and anchor to opposite side of car, securing to prevent displacement. Winch taut using a minimum 30-in bar. Maintain as much clearance from steel bands as possible to avoid damage to straps.

ALTERNATE ITEMS:		
Item	No. of Pcs.	Description
Alt. B	Minimum 6 per pile	Bearing Pieces: Spruce, full 4 in. x 6 in. contoured minimum 2" to fit pipe, preferably rough, in one piece. Length equal to width of car. Intermediate bearing pieces spaced uniformly to support the load. Secure each to car floor with six (6) common nails, the length to be not less than 2 in. greater than thickness of bearing piece. (Sketch 3)
Alt. C	Minimum 6 per pile	Separators: Spruce, full 6 in x 6 in. double contoured minimum 2" to fit pipe, preferably rough, in one piece. Length equal to width of load but not to extend beyond width of car. Locate between each layer and in line with items "B", when possible. (Sketch 4)

Notes:

1. This figure is designed and intended for nominal pipe lengths of 45 to 62 ft. with variances within a load of no greater than **plus or minus (+/-)** 10ft.
2. Longer length pipe must be located on the bottom layer of the load. Place pipe shorter than 45 ft on the top two tiers, unless complying with Note 11. Length of pipe to be no less than 20 ft.
3. Bands are sufficient for loads up to 140,000 lb. Add one band of each designation, on load sketch used, for each additional 20, 000 lb or less of load weight.
4. When short pipe lengths are loaded on the top two tiers (see Note 2), place two extra bands that encircle the top 2/3 of pile to include the shortest pipe length. A short length of pipe is defined as 15 ft less than the longest pipe.

PIPES, STEEL COATED 6-5/8 IN. TO 16 IN. OUTSIDE DIAMETER,
INCLUSIVE, 45 FT. TO 62 FT. IN LENGTH, INCLUSIVE, FLAT CARS 89 FT.
WITH CUSHIONING DEVICES

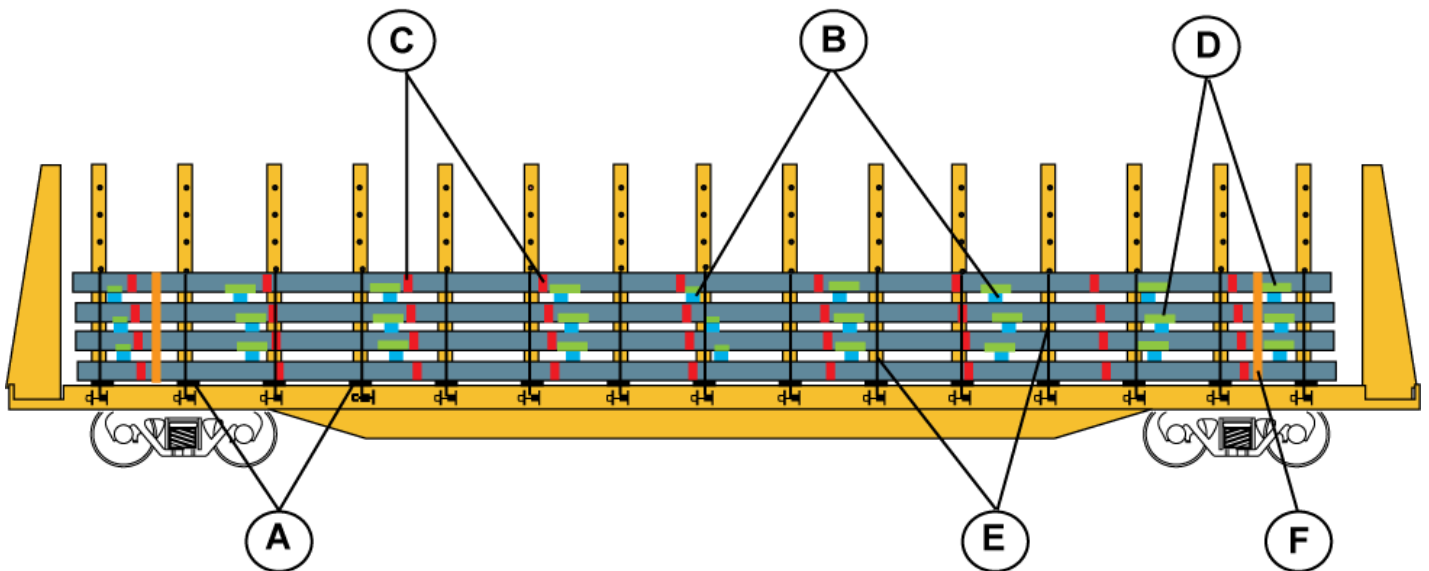
RAC 12159 (Concluded)
Revised 01-2015 (Ref: AAR Fig. 267-A)

5. Bearing pieces and separators, as shown, are sufficient for loads up to 140,000 lb. Add one additional bearing piece and separator for each additional 20,000 lb or less of load weight.
6. Pipe must be centrally located on car. Center line of pipe must be within inside edge of car side sills.
7. When pipe is coated and/or wrapped, adequate padding or protection must be used to prevent chafing at bearing points. (Shipper's discretion to use as optional requirement.)
8. More pieces per tier (width of load) may be loaded if the same end configuration and number of bands required by all sketches are applied as indicated
9. All banding should be equally spaced throughout the entire pile.
10. Maximum two pipe lengths can be loaded end to end (double-ended) on the top two tiers. The distance between the pipes must be a minimum of 12 in. and a maximum of 24 in. Pipe that is double-ended can be no longer than the pieces directly beneath it.
11. Maximum two pipe lengths can be loaded end to end (double-ended) on the bottom layer and must be equal to the length of pipes above it. The distance between the pipes must be a minimum of 12 in. and a maximum of 24 in. Outside pipe must be a single piece and be the full length of the load.
12. Height of load must not exceed 10 ft. above car floor.

See General Rules for further details.

BEAMS, STRUCTURAL STEEL 12 FEET LONG OR MORE LOADED ON A
CUSHIONED UNDERFRAME CENTRE BEAM CAR
RAC 12200

Revised 05-2006



Item	No. of Pcs.	Description
A	Minimum 3 per 12 feet units	Bearing Pieces: Cars are equipped with permanent floor bearing pieces. (Risers). When cars are not equipped with steel bearing pieces, hardwood or Douglas Fir 4x4 bearing must be used.
B	Minimum of 2 per 12 feet units add 1 for each additional 8 feet or less.	Separators: Hardwood, 4 in. x 4 in. Length to be equal to width of packages and in one piece. Locate one per 8 feet. Maybe substitute with Douglas Fir minimum 4 in X 6 in rough.
C	Minimum of 2 per 12 feet units add 1 for each additional 8 feet or less.	Package ties: 1 1/4 in. x .029 in. high-tension steel bands. Locate one tie per 8 feet.
D	2 per separator	Stabilizer End blocks; Lumber 2 in. x 4 in. Nailed to the top of each end of the separators required on narrow layers Item B.

BEAMS, STRUCTURAL STEEL 12 FEET LONG OR MORE LOADED ON A
CUSHIONED UNDERFRAME CENTRE BEAM CAR

RAC 12200 (Concluded)
Revised 05-2006

Item	No. of Pcs.	Description
E	All available cables must be used with a minimum of 3 per unit	Cables: 3/8 in. diameter, minimum of 8,800 lbs. Breaking strength. Cable assemblies must be equipped with edge protectors. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top of top package.
F	Minimum of 2 per 12 feet units add 1 for each additional 8 feet or less.	Encircling bands: 1 1/4 in. x .029 in. high-tension steel bands placed approximately 18 inches from each end and encircling complete load.

Notes:

- 1- Load must be centered on car, leaving voids equally distributed at each end of car.
- 2- When more than one pile is placed on car, end piles must be placed against the bulkheads. Void, if any must be kept to a minimum and should not be greater than the shortest piece on either side.
- 3- The weight of the load must be equally distributed on the car at all times.
- 4- Separators must not come into contact with the cables.
- 5- Edge protectors must be used on all sharp edges coming into contact with the cables.
- 6- The height of each layer must be maintained through out the load.
- 7- The height of load must not exceed the height of the bulkhead or centre stake, whichever is less.
- 8- Load weight distribution must be in accordance with AAR General Rule 3.4 indicating the percentage of deck length utilized versus correspondent permissible percentage of load limit for that length, see table below.

9-

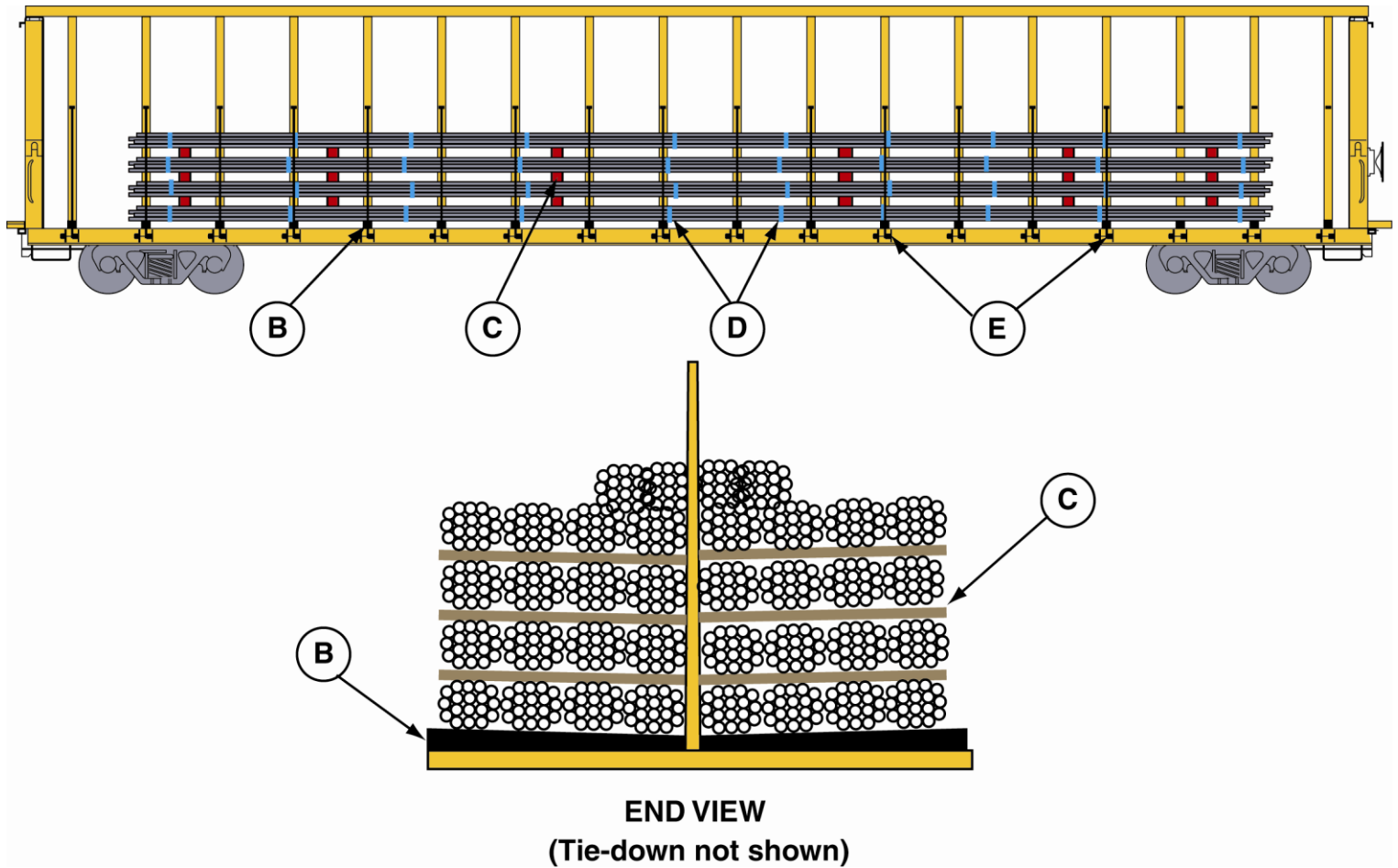
Allowable load limit on reduced deck length utilized

<i>Percent of deck length utilized</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>
<i>Percent of load limit permitted</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>

See General Rules for further details.

REBARS 10 TO 30 MM, LENGTH NO LESS THAN 20 FEET LOADED ON A 73
FT CUSHIONED UNDER FRAME CAR EQUIPPED WITH CABLE TIE
DOWNS.

RAC 12206
New 11-2006



REBARS 10 TO 30 MM, LENGH NO LESS THAN 20 FEET LOADED ON A 73 FT CUSHIONED UNDER FRAME CAR EQUIPPED WITH CABLE TIE DOWNS.

RAC 12206 (Continued)
New 11-2006

Item	No. of Pcs.	Description
A		Vacant
B	Minimum 2 per 12 ft and 1 for every 10 ft or less	Bearing pieces: 4X6 hardwood or Douglas fir.
C	Minimum 2 per 12 ft and 1 for every 10 ft or less.	Separators: 4X6 hardwood or Douglas fir. Length to be equal to but not greater than width of load.
D	Minimum 2 per 12 ft and 1 for every 10 ft or less.	Packages ties: 1 1/4 in. x .029 in. high-tension steel bands or wire.
E	All cables to be used.	Cables: 3/8 in. diameter, minimum of 8,800 lbs. Breaking strength. Cable assemblies must be equipped with edge protectors. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top of top package.

REBARS 10 TO 30 MM, LENGTH NO LESS THAN 20 FEET LOADED ON A
73FT CUSHIONED UNDER FRAME CAR EQUIPPED WITH CABLE TIE
DOWNS.

RAC 12206 (Concluded)
New 11-2006

Notes:

1. Load must be equally distributed on both sides of the centre beam partition.
2. Load must be centered on the car leaving voids equally distributed at each end of car. When more than two piles are placed on a car, each pile must be placed against the bulkheads.
3. Corner protectors must be used on all cables
4. Load weight distribution must be in accordance with AAR General Rule 3.5 indicating the percentage of deck length utilized versus correspondent permissible percentage of load limit for that length, see table below.

Allowable load limit on reduced deck length utilized

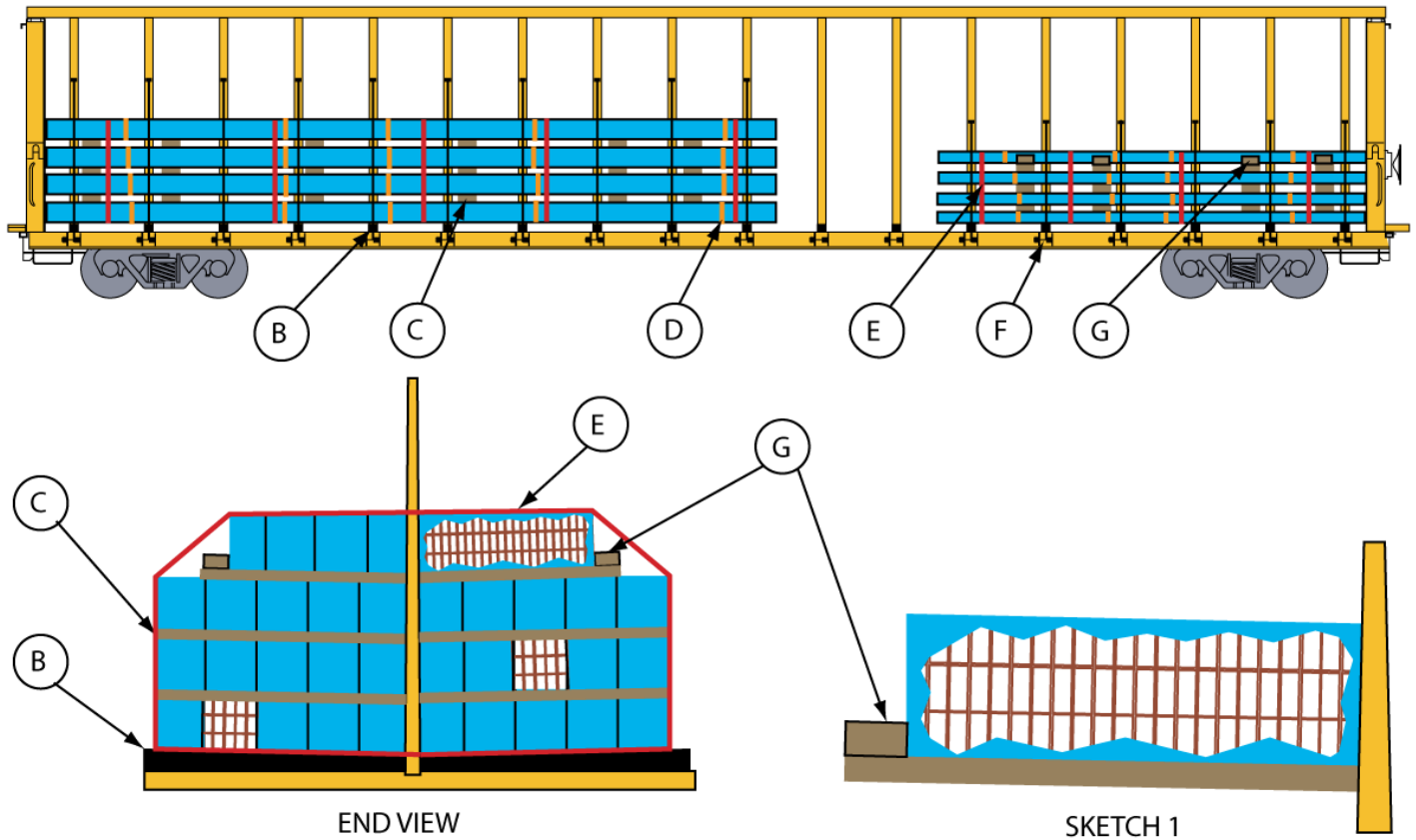
<i>Percent of deck length utilized</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>
<i>Percent of load limit permitted</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>

5. Separators must not come in contact with cables and should be located just inboard of cables towards centre of car to offer maximum protection in the event of load shifting.
6. Nesting of bundles in top row is permitted.
7. Height of load must not exceed height of bulkhead or centre stake, whichever is less.

See General Rules for further details.

TUBING, SQUARE, 20 ft. AND OVER CUSHIONED CENTRE “A” FRAME CAR
EQUIPPED WITH CABLE TIE DOWNS.

RAC 12207
New 11-2006



TUBING, SQUARE, 20 FT. AND OVER CUSHIONED CENTRE "A" FRAME CAR
EQUIPPED WITH CABLE TIE DOWNS.

RAC 12207 (Continued)
New 11-2006

Item	No. of Pcs.	Description
A		Vacant
B	Minimum 2 per 12 ft and 1 for every 10 ft or less	Bearing pieces: 4X6 hardwood or Douglas fir.
C	Minimum 2 per 12 ft and 1 for every 10 ft or less.	Separators: 4X6 hardwood or Douglas fir. Length to be equal to but not greater than width of load.
D	Minimum 2 per 12 ft and 1 for every 10 ft or less.	Packages ties: 1 1/4 in. x .029 in. high-tension steel bands or wire.
E	Min 2 per 12 ft pile and 1 for every 10 ft or less with a maximum of 5.	Encircling bands: 1 1/4 in. x .029 in. high-tension steel bands.
F	All cables to be used.	Cables: 3/8 in. diameter, minimum of 8,800 lbs. Breaking strength. Cable assemblies must be equipped with edge protectors. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top of top package.
G	As required	Chuck blocks: lumber 2 in. x 4 in. Nailed to the top of each end of the separators required on narrow layers. See SKETCH 1

TUBING, SQUARE, 20 FT. AND OVERCUSHIONED CENTRE "A" FRAME CAR
EQUIPPED WITH CABLE TIE DOWNS.

RAC 12207 (Concluded)
New 11-2006

Notes:

1. Load must be equally distributed on both sides of the centre beam partition.
2. Load must be centered on the car leaving voids equally distributed at each end of car. When more than one pile is placed on each side of car, one pile must be placed against each bulkhead with others spaced out evenly on the car.
3. Corner protectors must be used on all cables
4. Load weight distribution must be in accordance with AAR General Rule 3.4 indicating the percentage of deck length utilized versus correspondent permissible percentage of load limit for that length, see table below.

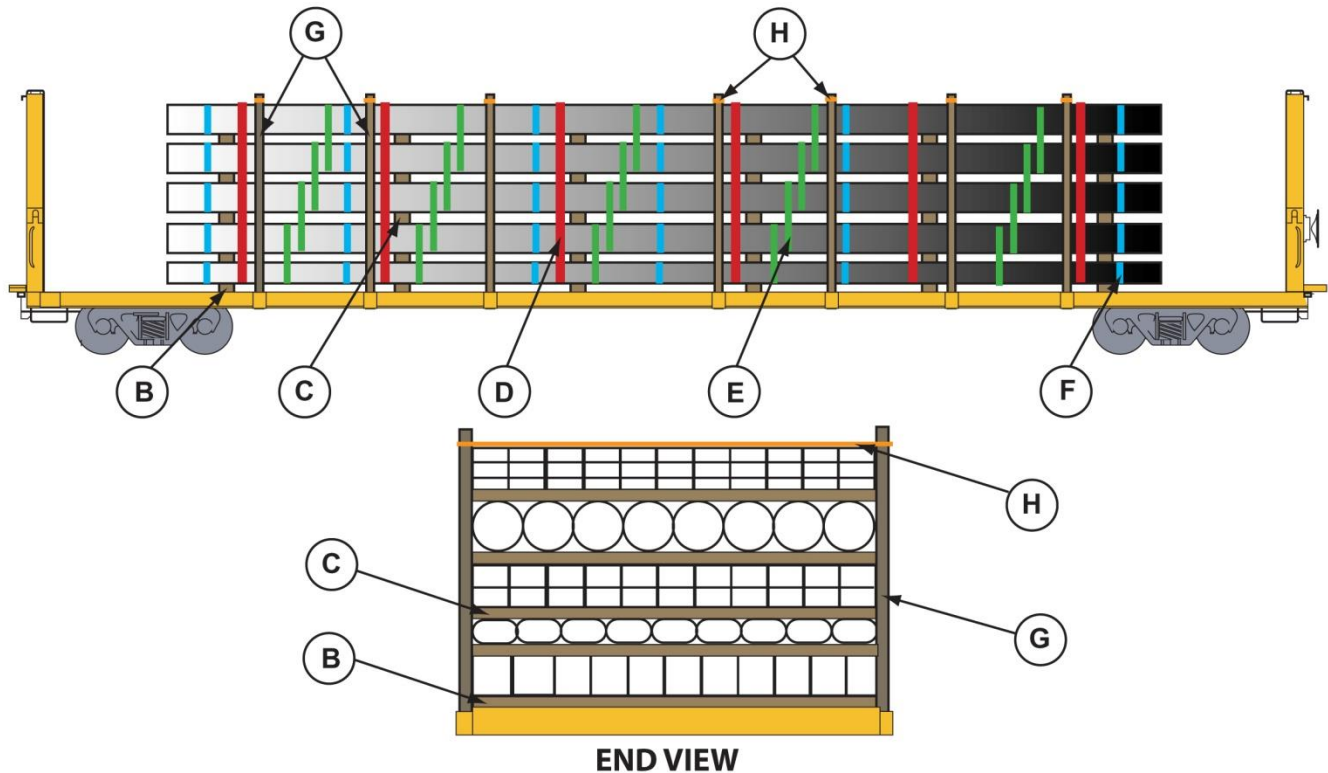
Allowable load limit on reduced deck length utilized

<i>Percent of deck length utilized</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>
<i>Percent of load limit permitted</i>	<i>100</i>	<i>75</i>	<i>50</i>	<i>25</i>

5. Separators must not come in contact with cables and should be located just inboard of cables towards centre of car to offer maximum protection in the event of load shifting.
6. Height of load must not exceed height of bulkhead or centre stake, whichever is less.

See General Rules for further details

TUBING, STEEL, ON BULKHEAD FLATCAR VARIOUS SIZE AND SHAPES
 RAC 12208
 New 02-2012



Item	No. of Pcs.	Description
A		Vacant
B	5 per 50 ft long or less Add 1 additional for each additional 10 ft or less	Bearing pieces: hardwood, 2 in x 4 in, length equal to width of car, equally spaced. Secure to floor with 5 16D nails, evenly spaced. Maybe substitute with Douglas Fir minimum 4 in X 6 in rough.
C	5 per 50 ft long or less Add 1 additional for each additional 10 ft or less	Separators: hardwood, 2 in x 4 in, length equal to width of load. Locate between each layer, in line with bearing pieces, equally spaced. Maybe substitute with Douglas Fir minimum 4 in X 6 in rough.

TUBING,STEEL, ON BULKHEAD FLATCAR VARIOUS SIZE AND SHAPES
 RAC 12208 (Concluded)
 New 02-2012

Item	No. of Pcs.	Description
D	6 per pile	Encircling bands: AAR approved type 1A grade 6. Locate at each end of the pile, and others equally spaced.
E	5 per 50 ft long or less Add 1 additional for each additional 10 ft or less	Unitizing bands: AAR approved type 1A grade 6. Space equally over length of load and as far from Item B bearing pieces as practical.
F	5 per 50 ft long or less Add 1 additional for each additional 10 ft or less	Package bands: 1 ¼ in. x .029 in high tension bands. Space equally over length of package, and avoid contact with dunnage.
G	7 pairs	Stakes: Steel posts, 4 in x 5 in. Spaced evenly. Stakes must be of sufficient length to allow for placement of stake ties, Item G across top of load.
H	1 per pair	Stakes ties: AAR approved Type 1A Grade 4 non metallic strapping. Place one tie across top of load encircling the stakes on each side of car.

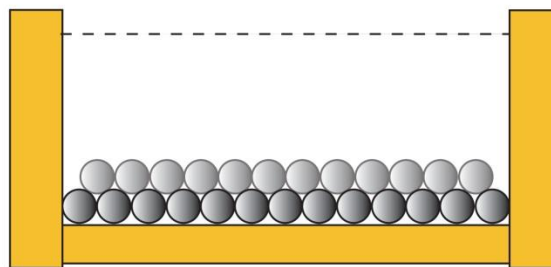
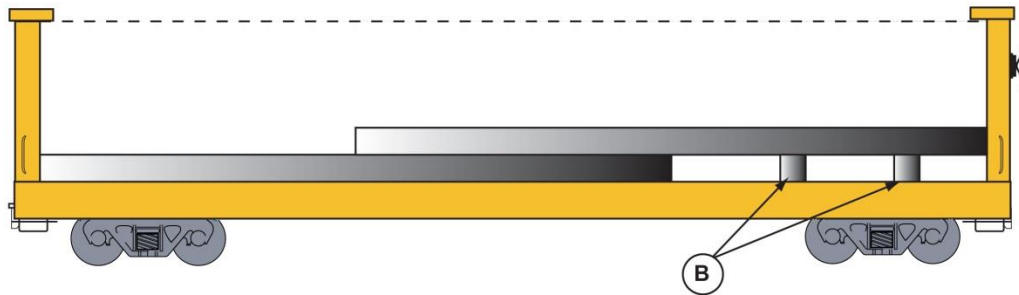
Notes:

1. All outside pieces must be at least 40 foot long.
2. Short pieces cannot be placed in the bottom row.
3. Top row cannot be less than 80% of the full width of the load.
4. Top row must be flat.
5. All pieces in a package must the same shape. (square, round or rectangular)
6. All packages in a row must be of the sane height. (separator may be laminated to level the row)
7. Buckles on the non metallic webbing must be placed so that they do not interfere with stakes or separators.
8. If the load is covered no part of the wrapping or cover can come in contact with the separators or bearing pieces.

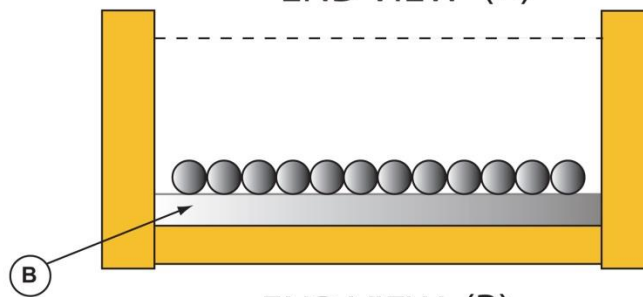
See General Rules for further details.

BILLETS, STEEL 8 ½ IN. O.D. 36 FT. LONG, GONDOLAS

RAC 12209
New 07-2012



END VIEW (A)



END VIEW (B)

Item	No. of Pcs.	Description
A		Vacant
B Optiona l	2 per overhang	Bearing Pieces: 4 in. x 4 in. steel beams spaced as shown.

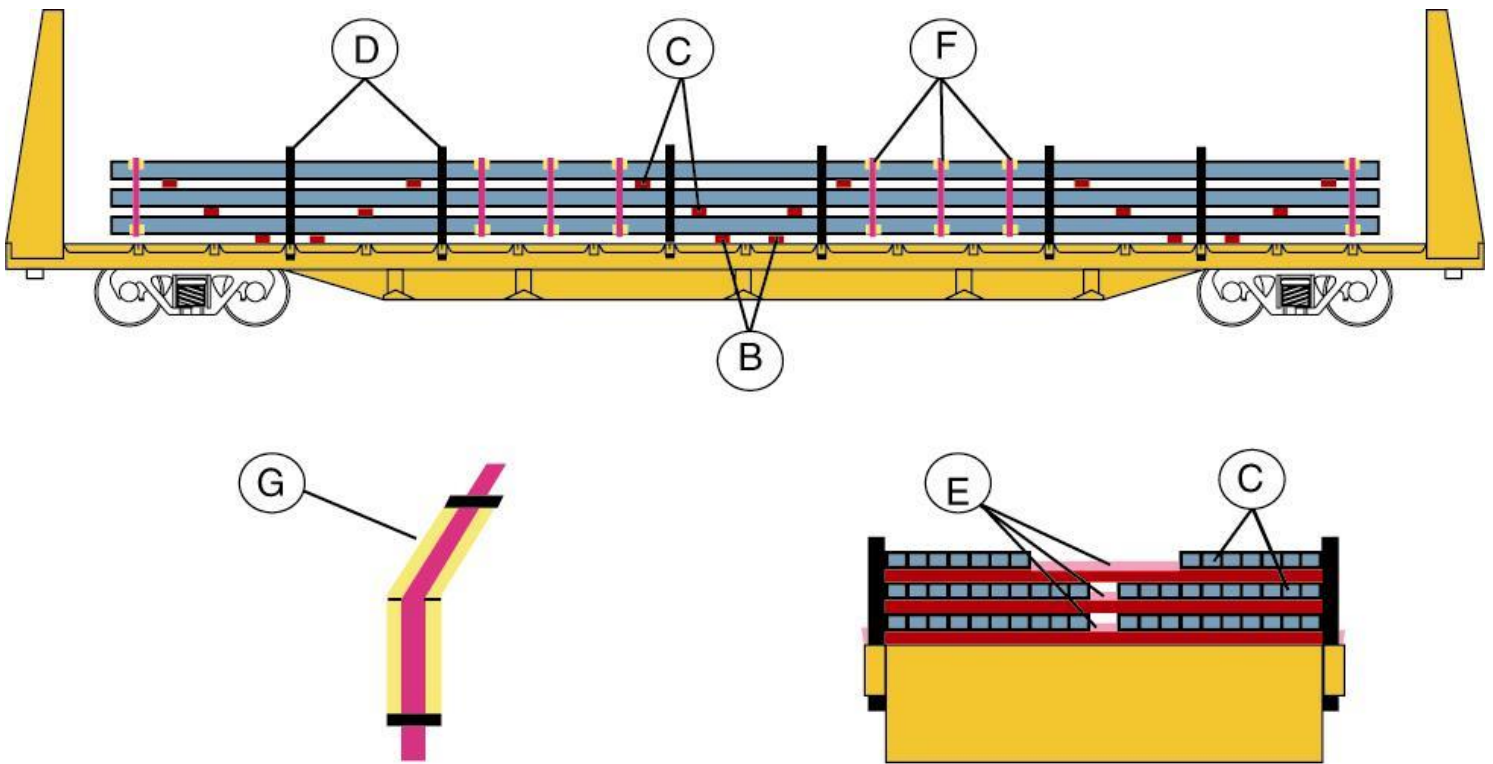
Notes and Additional Requirements:

- Each layer must be staggered against end of car.

See General Rules for further details.

2. BILLETS, STEEL, MINIMUM 45 FT. IN LENGTH FLAT CARS OVER 48 FT. IN LENGTH EQUIPPED WITH PERMANENT END BULKHEADS

RAC 12311
New 9-1997



Item	No. of Pcs.	Description
A		Vacant.
B	6	Bearing Pieces: Hardwood, 4 in. x 4 in. length to be equal to width of car floor, in one piece and preferably rough. Locate as shown in drawing.
C	6 per pile	Separators: Hardwood, 4 in. x 4 in. length to be equal to width of pile. Locate as shown in drawing.
D	12	Stakes: Hardwood, 4 in. x 4 in. extending a minimum of 6 in. above top of load. Locate as shown in drawing.
E	2 per pile.	Laminated Filler blocks: Lumber, length to suit. Locate and secure on the 2 nd and 5 th items "B" and "C".

BILLETS, STEEL, MINIMUM 45 FT. IN LENGTH FLAT CARS OVER 48 FT. IN
LENGTH EQUIPPED WITH PERMANENT END BULKHEADS

RAC 12311 (concluded)
New 9-1997

Item	No. of Pcs.	Description
F	8	Encircling Bands: 2 in. x .044 in. high-tension bands. Locate approximately 2 ft. from each end of load and others spaced equally as shown on drawing.
G	4 per band.	Band protectors: steel corner protectors. Locate as shown on drawing.

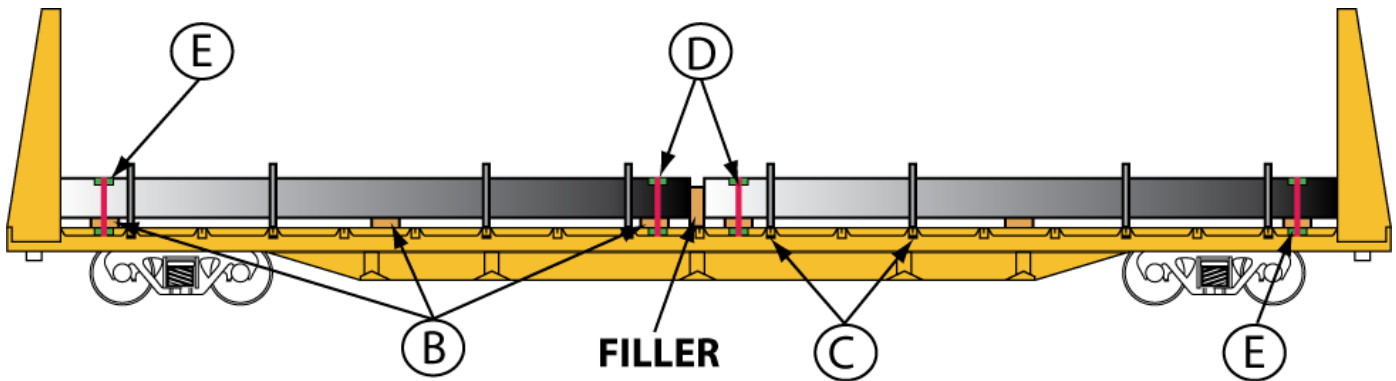
Notes:

1. Load must be centrally located on car.
2. Void between stub stakes and guide rails must be filled with suitable filler.

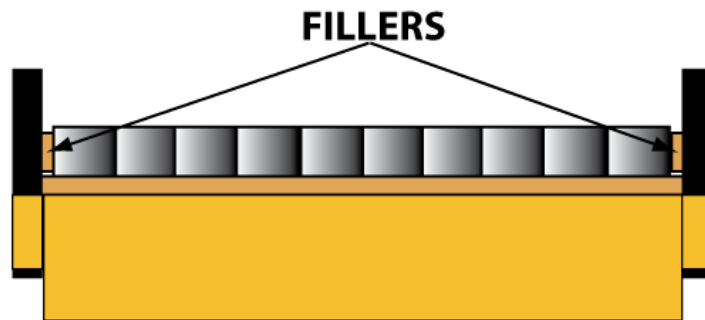
See General Rules for further details.

**BILLETS, STEEL, MAXIMUM 33 FT IN LENGTH ON FLAT CARS EQUIPPED
WITH PERMANENT END BULKHEADS**

RAC 12312
New 6-2015



BAND PROTECTOR



END VIEW

Item	No. of Pcs.	Description
A		Vacant.
B	3 per pile Optional	Bearing Pieces: Hardwood, 4 in. x 4 in. length to be equal to width of car floor, in one piece and preferably rough. Locate as shown in drawing.
C	4 pairs per pile	Stakes: Hardwood, 4 in X 4 in extending a minimum of 12 in above top of car deck, spaced equally.
D	2 per pile	Tie down bands to rail car: 2 in X .044 in high tension steel bands or Type 1 A Grade 7 Polyester bands located approximately 48 in to 60 in from each end of pile.
E	4 per band	Band protectors: steel corner protectors.

BILLETS, STEEL, MAXIMUM 33 FT IN LENGTH ON FLAT CARS EQUIPPED
WITH PERMANENT END BULKHEADS

RAC 12312 (Concluded)
New 6-2015

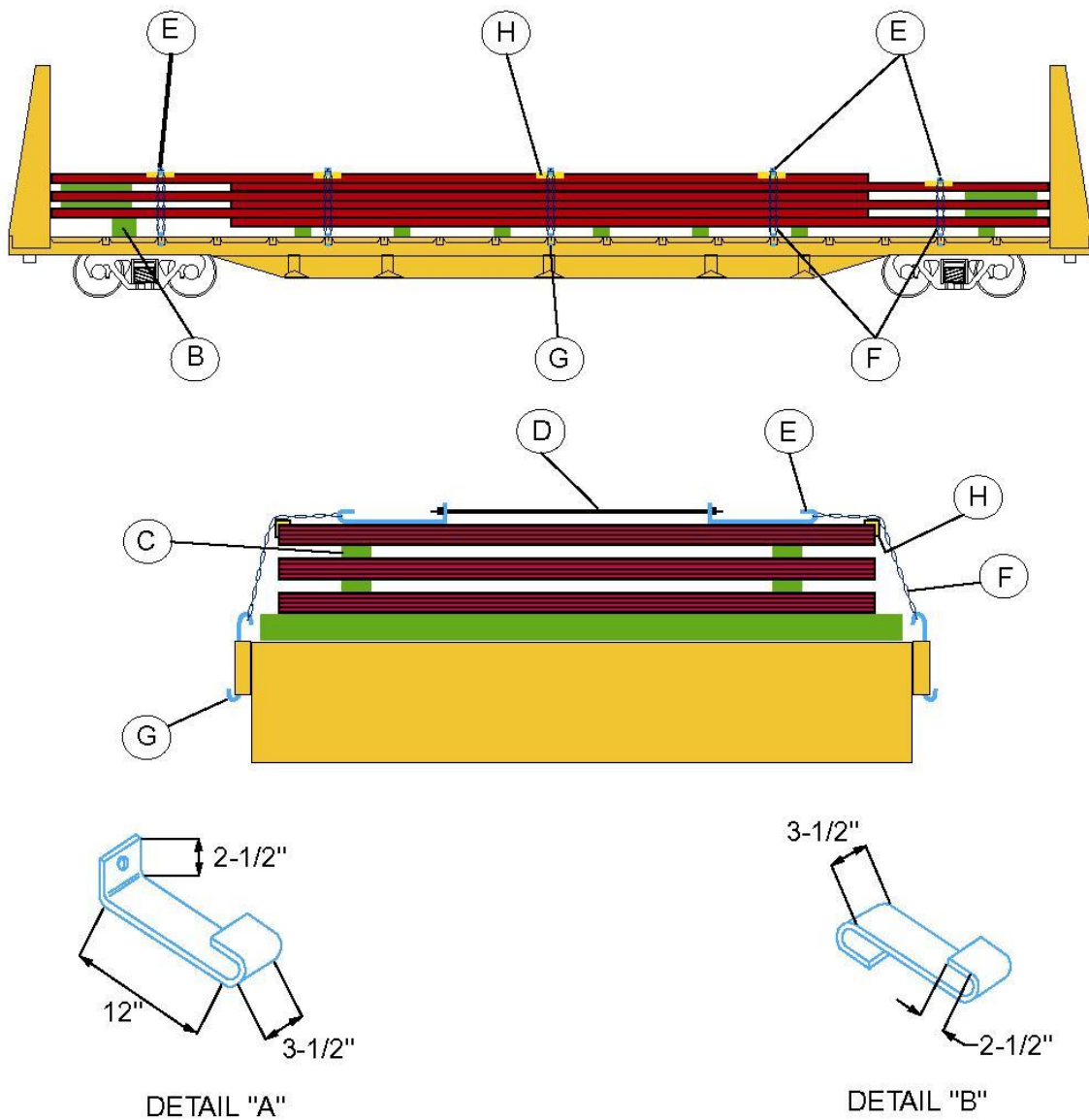
NOTES:

1. Void between stub stakes and billets must be filled with suitable filler (2 in X 4 in or 2 in X 6 in lumber).
2. Billets must be placed against bulkheads any void between 2 piles must be filled with suitable filler (2 in X 6 in hardwood).

See General Rules for further details.

PLATES, WIDE, OVER 93 IN. WIDE 35FT. AND OVER IN LENGTH, OF
UNIFORM WIDTH AND THICKNESS FLAT CARS EQUIPPED WITH
PERMANENT END BULKHEADS AND 52 FT. 6 IN. VOID SPACE BETWEEN
BULKHEADS

RAC 12313
New 6-1998 (Ref: AAR Fig. 14C)



PLATES, WIDE, OVER 93 IN. WIDE 35FT. AND OVER IN LENGTH, OF
UNIFORM WIDTH AND THICKNESS FLAT CARS EQUIPPED WITH
PERMANENT END BULKHEADS AND 52 FT. 6 IN. VOID SPACE BETWEEN
BULKHEADS

RAC 12313 (concluded)
New 6-1998 (Ref: AAR Fig. 14C)

Item	No. of Pcs.	Description
A		Vacant.
B	8	Bearing Pieces: Hardwood, 6 in. x 6 in. length to be equal to width of car floor, in one piece and preferably rough. Locate end pieces approximately 4 ft. in from ends of pile, with others equally spaced between. Height of bearing pieces located under overhanging portion of second lift must be increased to keep load level.
C	2 rows per each void.	Separators: Hardwood, 2 in. x 3 in. Locate longitudinally over side sills between overhanging lifts. Maximum void between separators and bulkhead, separators and end of lift must not exceed 3 ft.
D	5	Rods: $\frac{3}{4}$ in. diameter, threaded, with nuts. Locate across top of load and secure through holes in Items "E".
E	10	J-Hooks: $\frac{1}{2}$ in. x 3-1/2 in. flat steel bar, minimum 12 in. in length. Open end to be drilled to accept Item "D" rod, the other end formed to accept Item "F" chain. See Detail A".
F	10	Chain: $\frac{3}{8}$ in. diameter, grade 70, formed in a 54 in. closed loop. Locate around ends of Items "E" and "G".
G	10	S-Hooks: $\frac{1}{2}$ in. x 3-1/2 in. flat steel bar, (must be made in one piece) length not to extend more than 3 in. above car deck. Locate through inside of stake pocket and secure with Item "F" chain. See detail "B".
H	20	Corner Protectors: $\frac{1}{2}$ in. x 2 in. x 2 in. steel angle, minimum 18 in. in length. Locate at top of pile under each Item "F". Secure entire assembly by tightening Item "D" rods.

Notes:

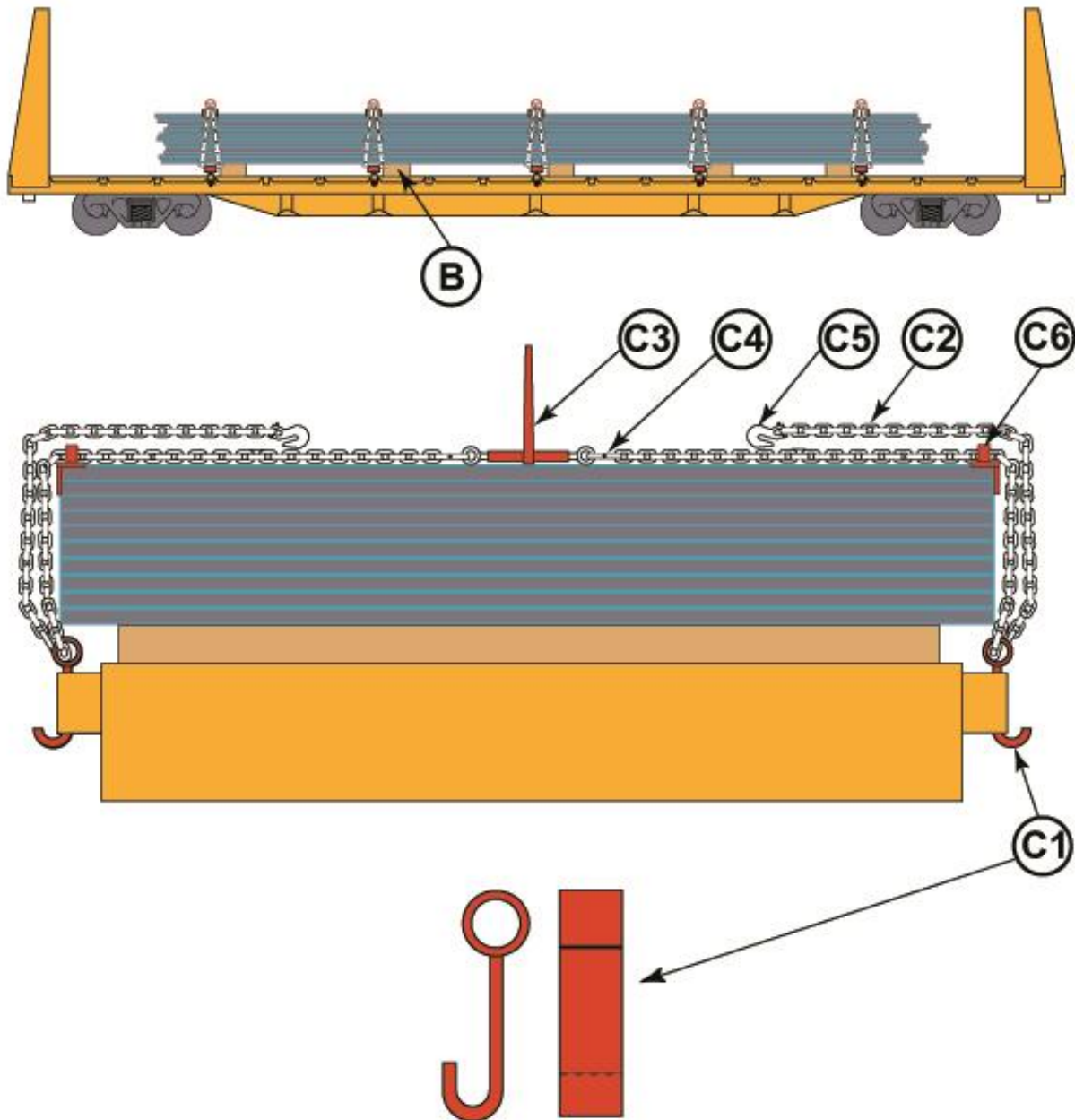
1. Lifts must be staggered alternately against opposite bulkheads..
2. A minimum of three (3) securement assemblies must contact all lifts.
3. A lift, as defined in this figure, is a stack of uniform plates

See General Rules for further details.

PLATE, STEEL, HORIZONTAL MINIMUM ¼ INCH OF UNIFORM WIDTH AND
THICKNESS FLAT CARS EQUIPPED WITH CUSHIONING DEVICES

RAC 12313B

New 6-2010



SKETCH 1

PLATE, STEEL, HORIZONTAL MINIMUM ¼ INCH OF UNIFORM WIDTH AND
THICKNESS FLAT CARS EQUIPPED WITH CUSHIONING DEVICES

RAC 12313B (Continued)
New 6-2010

Item	No. of Pcs.	Description
A		Vacant.
B	5 per 40 ft or less. Add 1 for each additional 8 ft or less.	Bearing Pieces: Hardwood, 4 in. x 4 in. length to be equal to width of car floor, in one piece and preferably rough. Locate end pieces approximately 4 ft. in from ends of pile, with others equally spaced between.
C	5 per 40 ft or less. Add 1 for each additional 8 ft or less.	Chain tie-down assembly comprised of following items. Chain is attached to load binder via connector link. Chain passes through chain corner protector sleeve, runs down, through flat hook sleeve, back up, over flat portion of chain corner protector and is fastened back to chain with hook.
C1	2	Flat hook as per Sketch 1
C2	2	Chains ½ in. GR 70
C3	1	Load binder
C4	2	Connector link
C5	2	Chain hook
C6	2	Corner protector

PLATE, STEEL, HORIZONTAL MINIMUM ¼ INCH OF UNIFORM WIDTH AND
THICKNESS FLAT CARS EQUIPPED WITH CUSHIONING DEVICES

RAC 12313B (Concluded)
New 6-2010

Notes:

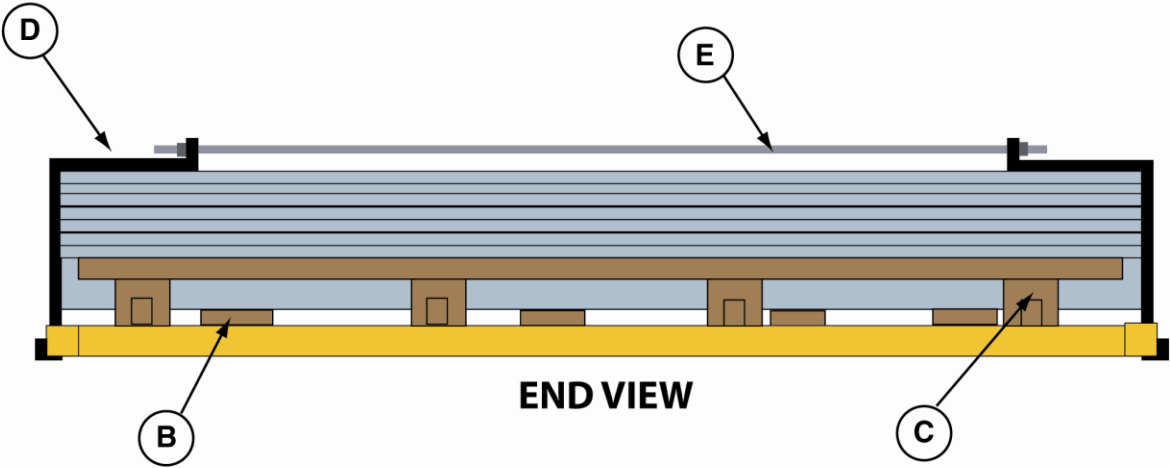
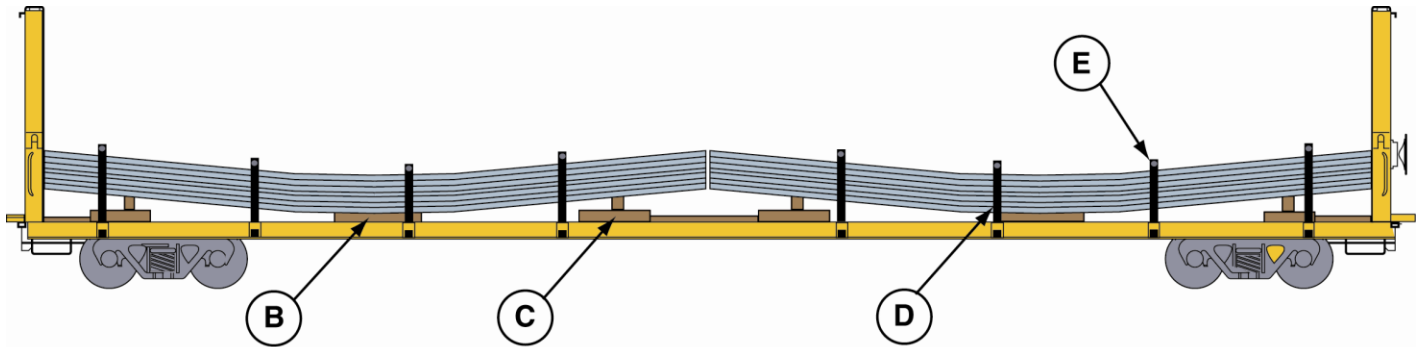
1. Load to be placed on centre at origin.
2. If piles are overlapped or if there are more than one pile each pile or top plate must have the minimum Item C applied.
3. When load consists of mixed thickness plate, heavier plate is to be placed in lower part of pile.
4. Binders: threaded portion of binder must be engaged a minimum of 4 threads prior to tensioning.
5. After tensioning of chains, chains are to be struck with a hammer or bar to eliminate any possible misalignment of links. Inspect flat hook to insure that they are correctly seated into the stake pocket as per sketch.
6. All hooks and Binders to be secured as per Rule 21.7.8 and 21.10.7 of the AAR General Rules Section 1.
7. Height of load including separators not to exceed 42 in. above top of bearing pieces

See General Rules for further details.

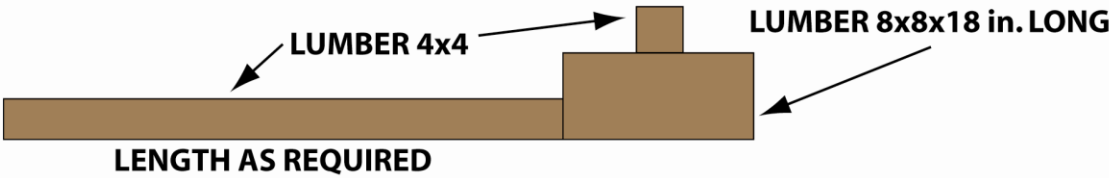
PLATES, ARCHED STEEL CARS EQUIPPED WITH PERMANENT END
BULKHEADS

RAC 12314

New 11-2006



END VIEW



SKETCH 1

PLATES, ARCHED STEEL CARS EQUIPPED WITH PERMANENT END
BULKHEADS

RAC 12314 (Concluded)
New 11-2006

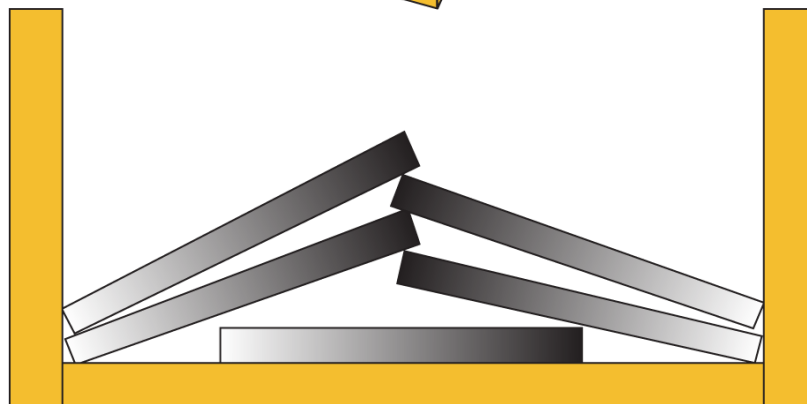
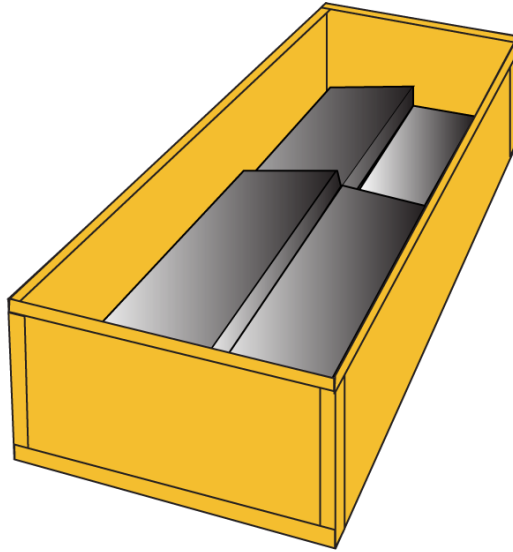
Item	No. of Pcs.	Description
A		Vacant.
B	4	Lengthwise Bearing Pieces: Lumber, 2 in. x 3 in. x 7 ft. long. in one piece and preferably rough. Locate pieces longitudinally under center of piles.
C	1 at each end against bulkheads and 1 in center of car	Blocking: Lumber, 8 in. x 8 in. and lumber 4in. x 4in. Locate longitudinally against each bulkhead and in center of load. Secure to car floor with 20D or 4 in. nails. (See SKETCH 1)
D	4 per pile	Clamping pieces: steel tie-bars 3 ½ in. wide x ½ in. thick, length to suit. Form and secure to stake pocket by bending the exceeding length upward. (See END VIEW)
E	1 per Item "D"	Rods: 1 in. diameter, threaded, length to suit. Locate across top of load and secure through holes in Items "D" with locknuts.

Notes:

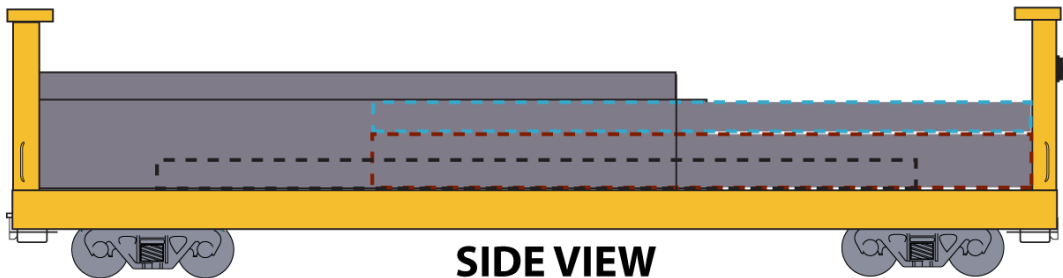
See General Rules for further details

PLATES STEEL-GONDOLA CAR

RAC 12315
New 10-2014



END VIEW



SIDE VIEW

PLATES STEEL-GONDOLA CAR

RAC 12315 (Concluded)
New 10-2014

Item	No. of Pcs.	Description
A		Vacant

Notes:

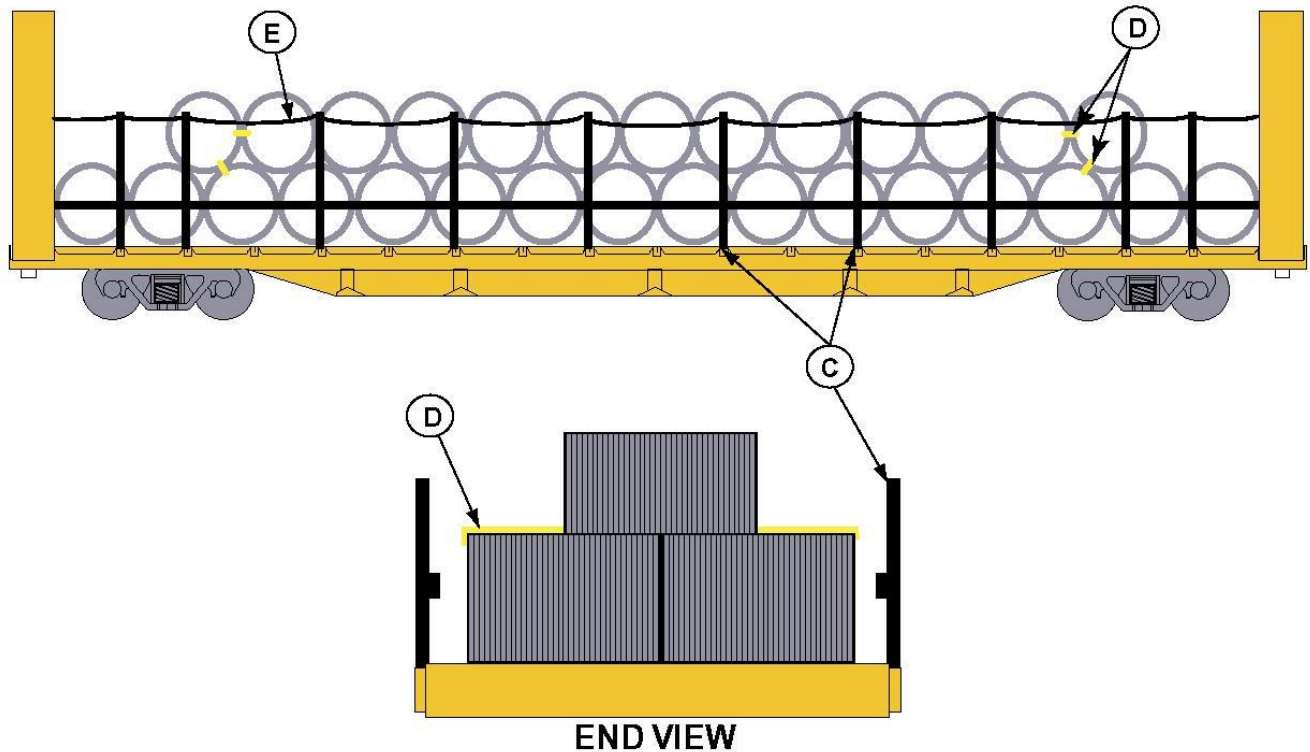
1. Bottom plate must be laterally and longitudinally centered on car's floor. (END VIEW and black dashed plate on SIDE VIEW.
2. Second and third plates must be placed tight against the A end of car. (SIDE VIEW blue and red dashed plates). Fourth and fifth plates must be placed tight against B end of car.
3. The weight of plates in each portion must be equal. Overlapping plates **must contact side of car.**

See General Rules for further details

WIRE COILS, 48 IN. to 54 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM. FLAT
CARS WITH PERMANENT END BULKHEADS

RAC 12405

New 8-2003 (Ref. AAR Fig. 34-H)



Item	No. of Pcs.	Description
A		Vacant
C	10 pairs per car	Steel Side Stakes: 4 in. x 6 in. Locate in stake pockets.
D	2 each per end coils in top row	Unit bands: 1 ¼ in. X .029 in. high tension steel bands. Locate to unitize top coil to bottom coils. Locate bands at 7 and 9 o'clock
E	2 per load	Chains: 3/8 in. attached to Item C side stakes and bulkheads from end to end of car.

**WIRE COILS, 48 IN. to 54 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM. FLAT
CARS WITH PERMANENT END BULKHEADS**

**RAC 12405 (Concluded)
New 8-2003 (Ref. AAR Fig. 34-H)**

Notes:

1. Load must be centrally located on car.
2. Top layer coils must be properly nested in the bottom layers
3. Load must not exceed two layers high.
4. All coils to be tight against each other to eliminate voids.
5. Longer coils must be placed in the bottom tier.
6. No voids in the middle of the car.
7. Top row must be centered.
8. Wire diameters are: 5.5 to 9.0 MM



5,5 mm

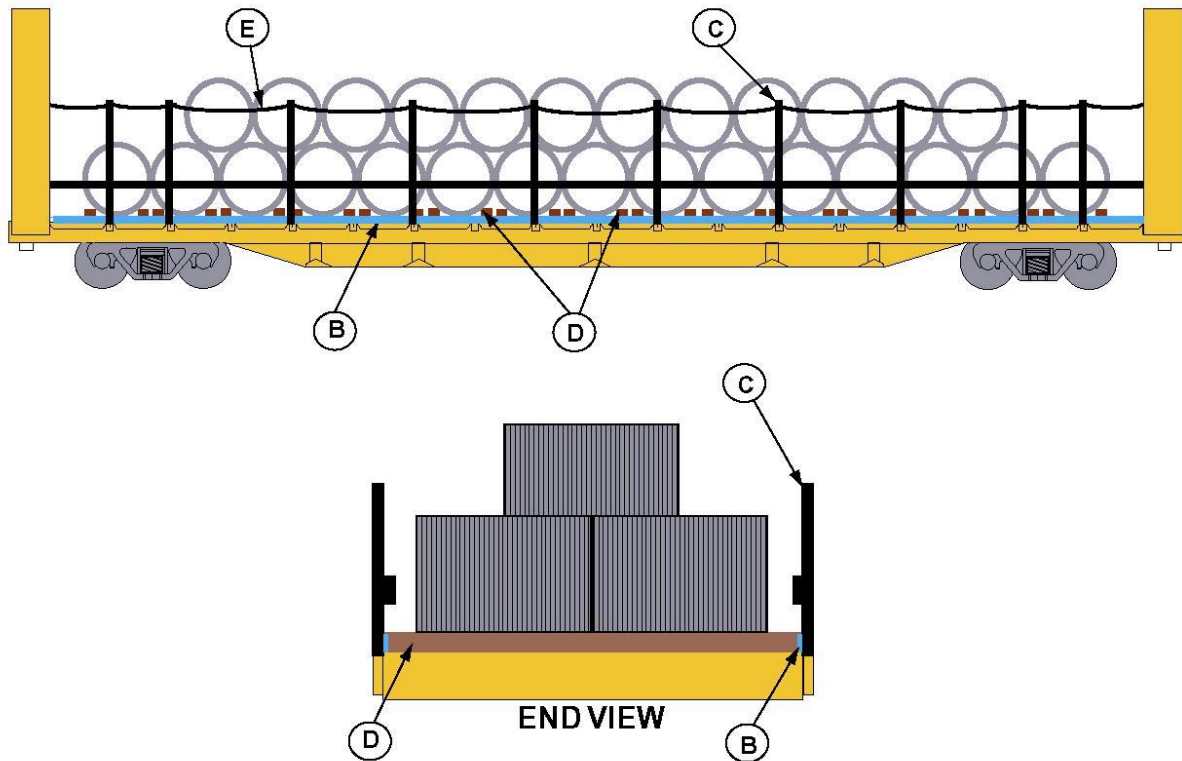


9 mm

THE WIRE DIAMETER IS LIMITED TO THE ABOVE SPECIFICATIONS.

See General Rules for further details

WIRE COILS, 48 IN. to 54 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM. FLAT
CARS WITH PERMANENT END BULKHEADS
RAC 12406
New 8-2003



Item	No. of Pcs.	Description
A		Vacant
B	2 per load	Steel Side Rails: steel rails must be continuous and extend from end to end of the load. They are welded to Item C Side Stakes. Their height must extend beyond the bottom of the coil.
C	10 pairs per car	Steel Side Stake: 4 in. x 6 in. Locate in stake pockets.
D	16 per car	Cradle: 2 pieces of lumber 7in. x 8 in. placed 28 in. apart on each side of wire coils. The lumber pieces are held to the floor by 2 angle irons welded to side sills of car. Cradles are 10 in. apart and maintain the coils 2 in. above car floor.
E	2 per load	Chains: 3/8 in. attached to Item C side stakes and bulkheads from end to end of car.

WIRE COILS, 48 IN. to 54 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM. FLAT
CARS WITH PERMANENT END BULKHEADS

RAC 12406 (Concluded)
New 8-2003

Notes:

1. Load must be centrally located on car.
2. Top layer coils must be properly nested in the bottom layers
3. Load must not exceed two layers high.
4. All coils to be tight against each other to eliminate voids.
5. Longer coils must be placed in the bottom tier.
6. Wire diameters are: 5.5 to 9.0 MM



5,5 mm



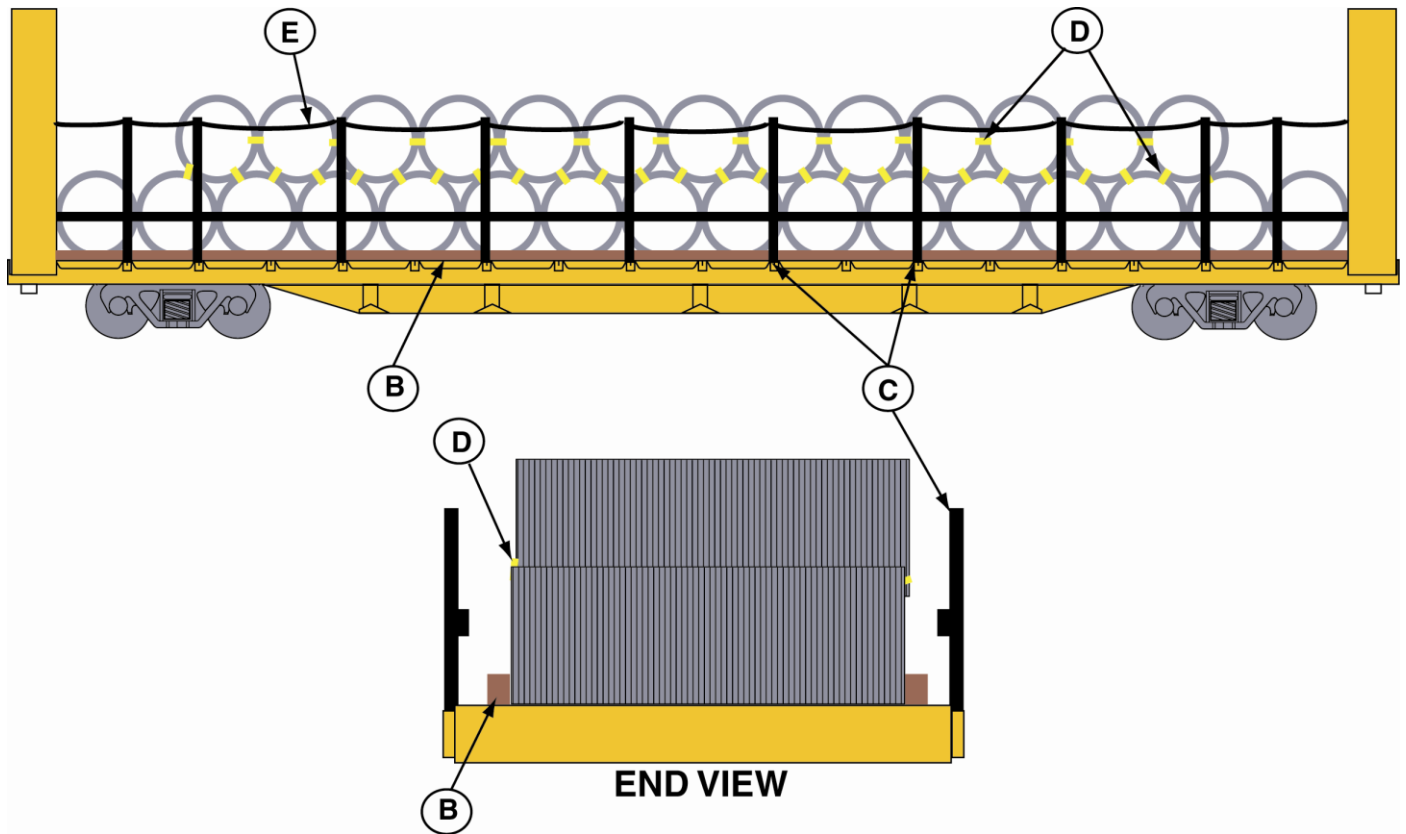
9 mm

THE WIRE DIAMETER IS LIMITED TO THE ABOVE SPECIFICATIONS.

See General Rules for further details

WIRE COILS, 66 IN. to 86 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM FLAT
CARS WITH PERMANENT END BULKHEADS

RAC 12407
New 8-2003



Item	No. of Pcs.	Description
A		Vacant
C	10 pairs per car	Steel Side Stakes: 4 in. x 6 in. Locate in stake pockets.
D	4 each per top layer coils	Unit bands: 1 ¼ in. X .029 in. high tension steel bands. Locate to unitize top coils to bottom coils. Locate bands at 3,5,7 and 9 o'clock
E	2 per load	Chains: 3/8 in. attached to Item C side stakes and bulkheads from end to end of car.

**WIRE COILS, 66 IN. to 86 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM., FLAT
CARS WITH PERMANENT END BULKHEADS**

**RAC 12407 (Concluded)
New 8-2003**

Notes:

1. Load must be centrally located on car.
2. Top layer coils must be properly nested in the bottom layers
3. Load must not exceed two layers high.
4. All coils to be tight against each other to eliminate voids.
5. Longer coils must be placed in the bottom tier.
6. No voids in the middle of the car.
7. Top row must be centered.
8. Wire diameters are: 5.5 to 9.0 MM



5,5 mm

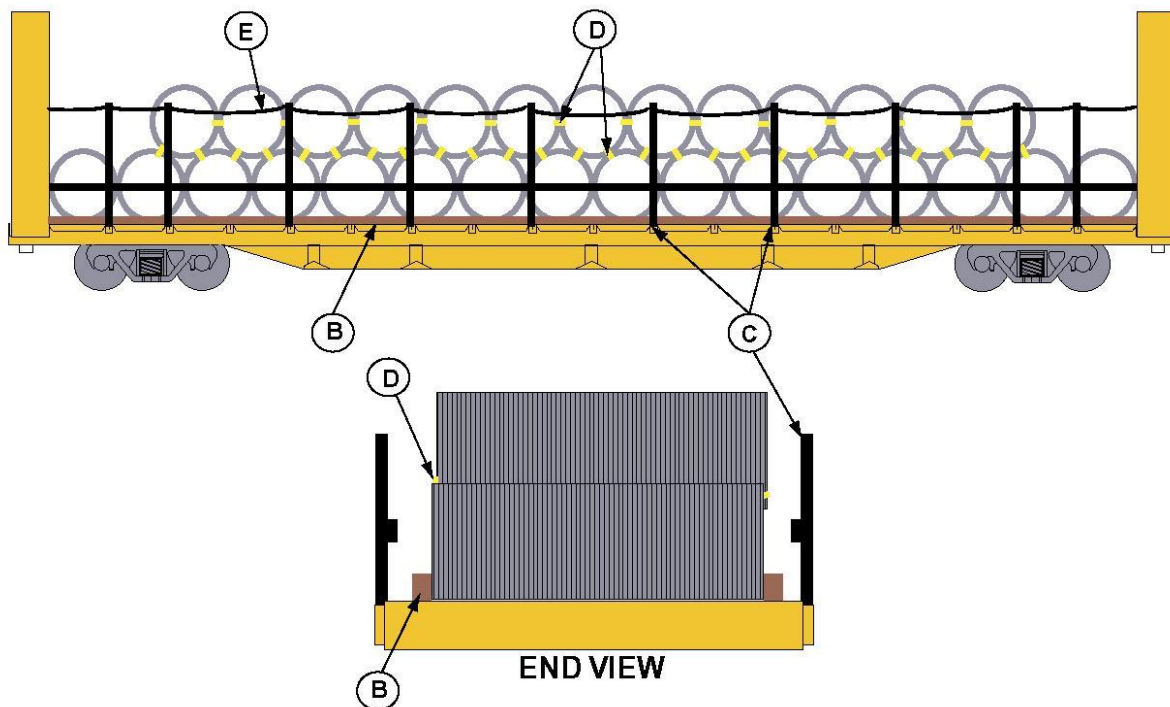


9 mm

THE WIRE DIAMETER IS LIMITED TO THE ABOVE SPECIFICATIONS.

See General Rules for further details

WIRE COILS, 66 IN. to 86 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM. FLAT
CARS WITH PERMANENT END BULKHEADS
RAC 12408
New 8-2003



Item	No. of Pcs.	Description
A		Vacant
B	2 per load	Guide Rail: lumber 4in.x 4in. must be continuous and extend from end to end of the load. Secure to floor with 4 in. nails at 12 in. intervals. Locate ½ in. away from bottom layer coils.
C	10 pairs per car	Steel Side Stakes: 4 in. x 6 in. Locate in stake pockets.
D	4 each per top layer coils	Unit bands: 1 ¼ in. X .029 in. high-tension steel bands. Locate to unitize top coils to bottom coils. Locate bands at 3,5,7 and 9 o'clock
E	2 per load	Chains: 3/8 in. attached to Item C side stakes and bulkheads from end to end of car.

WIRE COILS, 66 IN. to 86 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM. FLAT
CARS WITH PERMANENT END BULKHEADS

RAC 12408 (Concluded)
New 8-2003

Notes:

1. Load must be centrally located on car.
2. Top layer coils must be properly nested in the bottom layers
3. Load must not exceed two layers high.
4. All coils to be tight against each other to eliminate voids.
5. Longer coils must be placed in the bottom tier.
6. Wire diameters are: 5.5 to 9.0 MM



5,5 mm

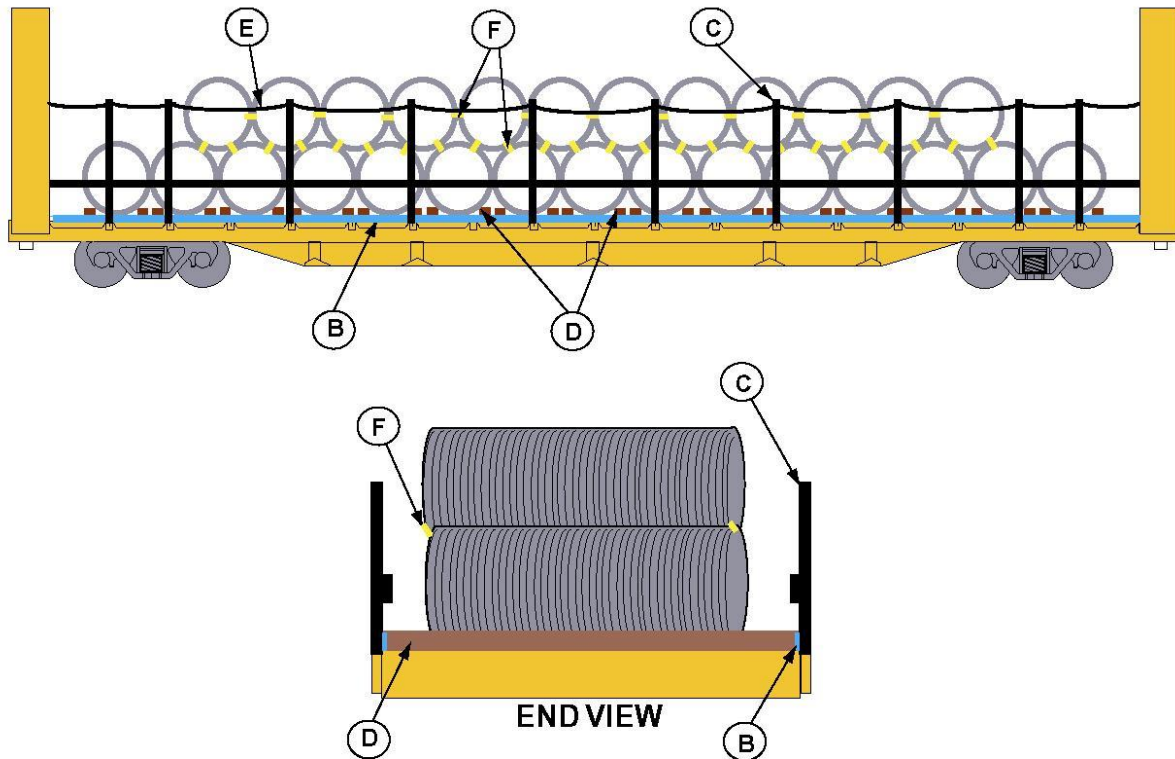


9 mm

THE WIRE DIAMETER IS LIMITED TO THE ABOVE SPECIFICATIONS.

See General Rules for further details

WIRE COILS, 66 IN. to 86 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM. FLAT
CARS WITH PERMANENT END BULKHEADS
RAC 12409
New 8-2003



Item	No. of Pcs.	Description
A		Vacant
B	2 per load	Steel Side Rails: steel rails must be continuous and extend from end to end of the load. They are welded to Item C Side Stakes. Their height must extend beyond the bottom of the coil.
C	10 pairs per car	Steel Side Stake: 4 in. x 6 in. Locate in stake pockets.
D	16 per car	Cradle: 2 pieces of lumber 7in. x 8 in. placed 28 in. apart on each side of wire coils. The lumber pieces are held to the floor by 2 angle irons welded to side sills of car. Cradles are 10 in. apart and maintain the coils 2 in. above car floor.
E	2 per load	Chains: 3/8 in. attached to Item C side stakes and bulkheads from end to end of car.

WIRE COILS, 66 IN. to 86 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM. FLAT
CARS WITH PERMANENT END BULKHEADS

RAC 12409 (concluded)
New 8-2003

Item	No. of Pcs.	Description
F	4 each per top layer coils	Unit bands: 1 ¼ in. X .029 in. high-tension steel bands. Locate to unitize top coils to bottom coils. Locate bands at 3,5,7 and 9 o'clock.

Notes:

1. Load must be centrally located on car.
2. Top layer coils must be properly nested in the bottom layers
3. Load must not exceed two layers high.
4. All coils to be tight against each other to eliminate voids.
5. Longer coils must be placed in the bottom tier.
6. Wire diameters are: 5.5 to 9.0 MM

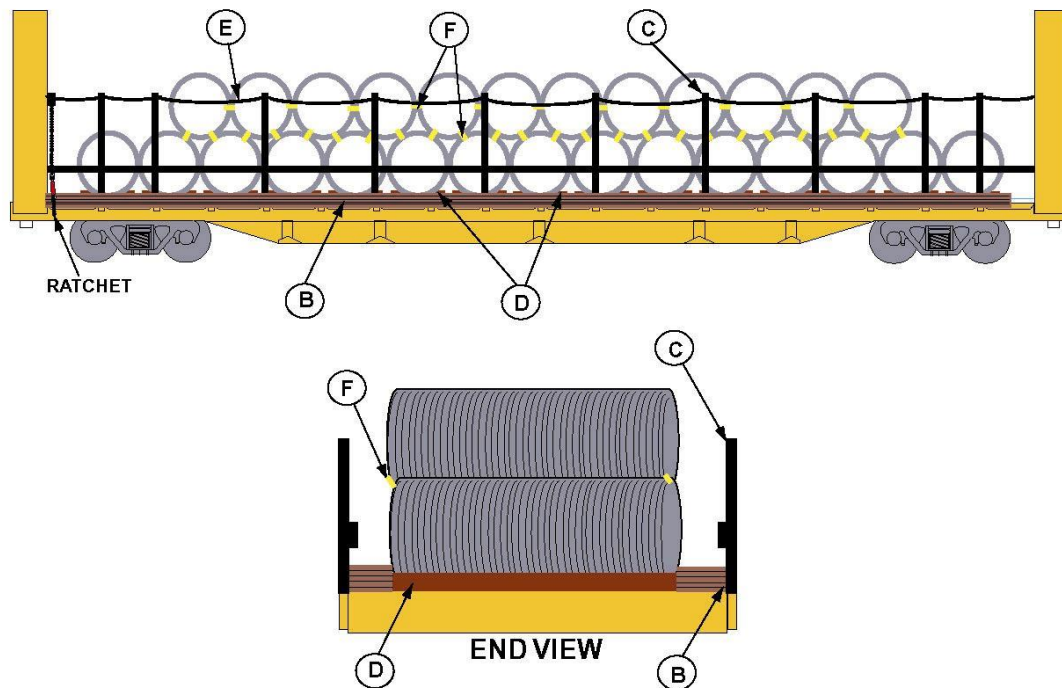


THE WIRE DIAMETER IS LIMITED TO THE ABOVE SPECIFICATIONS.

See General Rules for further details

WIRE COILS, 66 IN. to 86 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM. FLAT
CARS WITH PERMANENT END BULKHEADS

RAC 12410
New 11-2004



Item	No. of Pcs.	Description
A		Vacant
B	2 per load	Side Rails: rails are 5 pieces of lumber 2 in. x 10 in. and extend from end to end of the load. Their height must extend beyond the bottom of the coil.
C	10 pairs per car	Steel Side Stake: 4 in. x 6 in. Locate in stake pockets.
D	16 per car	Cradle: 2 pieces of lumber 6in. x 6 in. placed 24 in. nailed to the car floor apart on each side of wire coils. Cradles are 12 in. apart and maintain the coils 2 in. above car floor.
E	2 per load	Chains: 3/8 in. attached to Item C side stakes and bulkheads from end to end of car. Proper tension is applied with a ratchet.

WIRE COILS, 66 IN. to 86 IN. LONG, WIRE DIAMETER 5.5 TO 9.0 MM. FLAT
CARS WITH PERMANENT END BULKHEADS

RAC 12410 (concluded)
New 11-2004

Item	No. of Pcs.	Description
F	4 each per top layer coils	Unit bands: 1 ¼ in. X .029 in. high-tension steel bands. Locate to unitize top coils to bottom coils. Locate bands at 3,5,7 and 9 o'clock.

Notes:

7. Load must be centrally located on car.
8. Top layer coils must be properly nested in the bottom layers
9. Load must not exceed two layers high.
10. All coils to be tight against each other to eliminate voids.
11. Longer coils must be placed in the bottom tier.
12. Wire diameters are: 5.5 to 9.0 MM



5,5 mm



9 mm

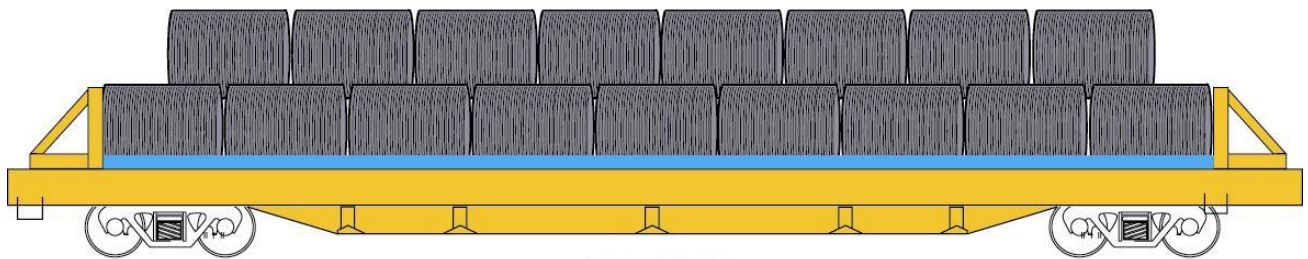
THE WIRE DIAMETER IS LIMITED TO THE ABOVE SPECIFICATIONS.

See General Rules for further details

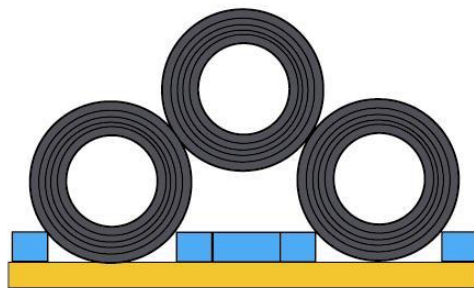
WIRE COILS, 50 IN. IN DIAMETER OR LESS SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT END BULKHEADS, STEEL SIDE RAILS EXTENDING 4 IN. ABOVE CAR DECK, AND 6 IN. X 8 IN. RAIL TIES

RAC 12434D

New 9-1997 (Ref: AAR Fig 34-G)



SIDE VIEW



END VIEW

Item	No. of Pcs.	Description
A		Vacant.

Notes:

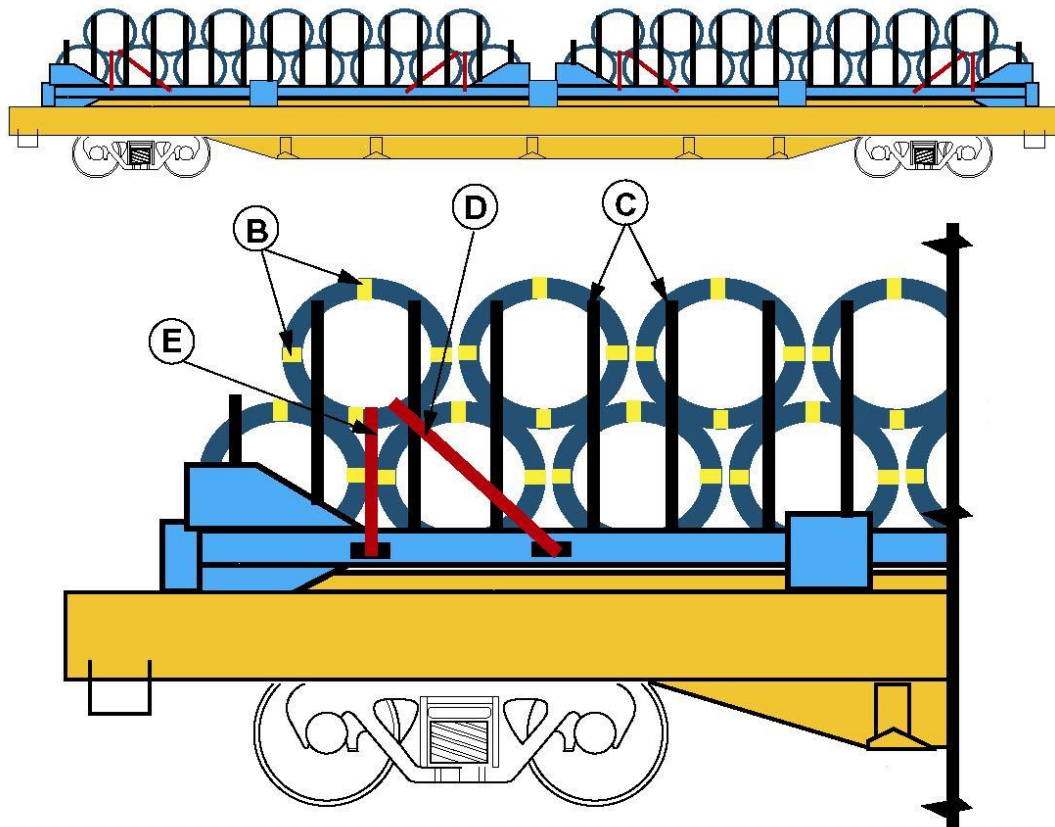
1. Load must be centrally located on car.
2. Each coils is to be tied with 4 (4), ¼ in. diameter wire ties located equally spaced on coil while compressed.
3. All coils to be tight against each other to eliminate voids.
4. Upper row of coils must be nested in the rows below.

See General Rules for further details.

WIRE COILS 6 FT. LONG 48 INCH. O.D. SPECIALLY EQUIPPED
CONTAINER ON FLAT CAR AND PVC TREATED POLYESTER WEBBING
TIE-DOWN SYSTEM

RAC 12434E

New 9-1997 (Ref: AAR)



Item	No. of Pcs.	Description
A		Vacant
B	4 per coil	Package Ties: Wire ties, ¼ in. diameter. Locate equally on coil while compressed.
C	32 pairs per car	Steal side stakes: tubular 4 in. x 4 in. x 3/8 in. thick

D	1 at a 45° angle per each top end coil on the container 4 per car	Tie-Down Straps: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000lbs. Secure strap to winch assembly, insert in the eye of the top coil of load and secure to hook on the opposite side of the car. Straps must be pulled tight. All straps must be used. Tension with the use of a 24 in. to 30 in. bar.
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**WIRE COILS 6 FT. LONG 48 INCH. O.D. SPECIALLY EQUIPPED CONTAINER
ON FLAT CAR AND PVC TREATED POLYESTER WEBBING TIE-DOWN
SYSTEM**

RAC 12434E (concluded)
New 9-1997 (Ref: AAR)

Item	No. of Pcs.	Description
E	1 at a 90° angle per each top end coil on the container 4 per car	Tie-Down Straps: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000lbs. Secure strap to winch assembly, insert in the eye of the top coil of load and secure to hook on the opposite side of the car. Straps must be pulled tight. All straps must be used. Tension with the use of a 24 in. to 30 in. bar.

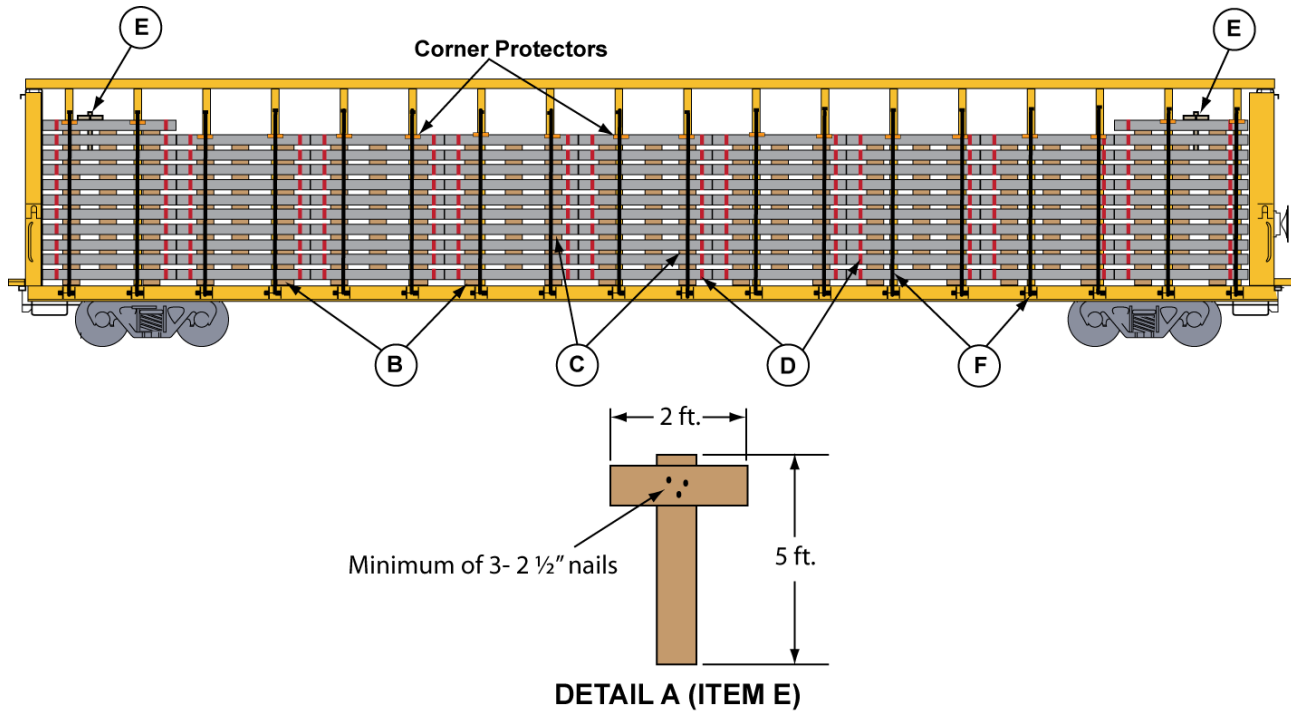
Notes:

1. Coils should sit properly in troughs and have at least 7 in. of the coil below the container side sill.
2. Load must not exceed two layers high.
3. Top layer coils must be properly nested in the bottom layer's.

See General Rules for further details.

HEAVY DUTY WELDED WIRE MESH ON CENTRE A FRAME CAR EQUIPPED
WITH CABLES OR WEB STRAP TIE DOWNS AND CUSHIONED UNDER
FRAME.

RAC 12435
New 07-2016



Item	No. of Pcs.	Description
A		Vacant
B	Minimum 2 per 10 ft and 1 for every 10 ft or less	Bearing Pieces: Rough full 2"X6" clear Douglas Fir or hardwood. Not required on riser style cars.
C	Minimum 3 per 10 ft and 1 for every 10 ft or less.	Separators: Minimum 2"X3" lumber. Length to be equal to but not greater than width of load.
D	Minimum 2 per 10 ft and 1 for every 10 ft or less.	Packages ties: steel bands 3/4 in. X .020 in.(2000 LB MBS)

HEAVY DUTY WELDED WIRE MESH ON CENTRE A FRAME CAR EQUIPPED
WITH CABLES OR WEB STRAP TIE DOWNS AND CUSHIONED UNDER
FRAME.

RAC 12435 (Continued)
New 07-2016

Item	No. of Pcs.	Description
E	1 per each top package either side of a void	T bar: made up of a 5 feet 2 in. X 4 in. with 2 ft. cross T piece secured with a minimum of 3- 2 in. nails. See DETAIL A. . Must penetrate a minimum half way on complete layer package below. Not required on complete layers with no void
F	All cables to be used.	Tie Down Cables: 3/8 in. diameter, of 8,800 lbs. minimum breaking strength. Cable assemblies must be equipped with edge protectors and applied. Winch assemblies must be equipped with a device to maintain tension. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables in load area must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top row of mesh.
Alt. F	All straps to be used.	Web tie-down: polyester webbing, 4 in. wide with a minimum 5,000-lb working load limit. The web strap must be routed through the web guide closest to the top of the load, over the load, and then to the fixed winch or securement point on the side sill. Thread at least 6 in. of webbing through the slot in the winch mandrel. Prior to tightening, there must be a minimum of 2 wraps of webbing around the winch mandrel. Tension to be applied to all winch mandrels; strap is to be tensioned by the effort of one person using a winch bar 30 in. to 40 in. long. All straps in load area must be used. Polyester web straps require heavy duty corner protectors to protect strap from abrasion.

HEAVY DUTY WELDED WIRE MESH ON CENTRE A FRAME CAR EQUIPPED
WITH CABLES OR WEB STRAP TIE DOWNS AND CUSHIONED UNDER
FRAME.

RAC 12435 (Concluded)
New 07-2016

Notes:

9. Load must be equally distributed on both sides of the centre partition.
10. Voids, if any, must be in center of car with ends placed against bulkhead and kept to a minimum. Layers differing in combined length resulting in longitudinal void space are to be configured so as to locate layers with the greatest void at the top of the load and descending in void length toward the bottom. Bridging of packages is not allowed in this figure.
11. Corner protectors **must** be used on all cables and web straps.
12. Load weight distribution must be in accordance with AAR General Rule 3.4 indicating the percentage of deck length utilized versus correspondent permissible percentage of load limit for that length, see table below. Unless car is stenciled otherwise.

Allowable load limit on reduced deck length utilized.

Percent of deck length utilized	100	75	50	25
Percent of load limit permitted	100	75	50	25

14. Separators must not come in contact with cables and should be located just inboard of cables towards centre of car to offer maximum protection in the event of load shifting.
15. This load may be dimensional when loading wider packages. Car must be checked and proper clearance received from originating railway. If in doubt contact originating railroad.
16. Height of load must not exceed height of bulkhead or centre stake, whichever is less.
17. Car floors, bearing pieces and separators must be free of ice snow and other debris prior to loading.

See General Rules for further details.

**CLR 3000 LOADING OF ROAD, GRADING AND FARM EQUIPMENT
MACHINERY**

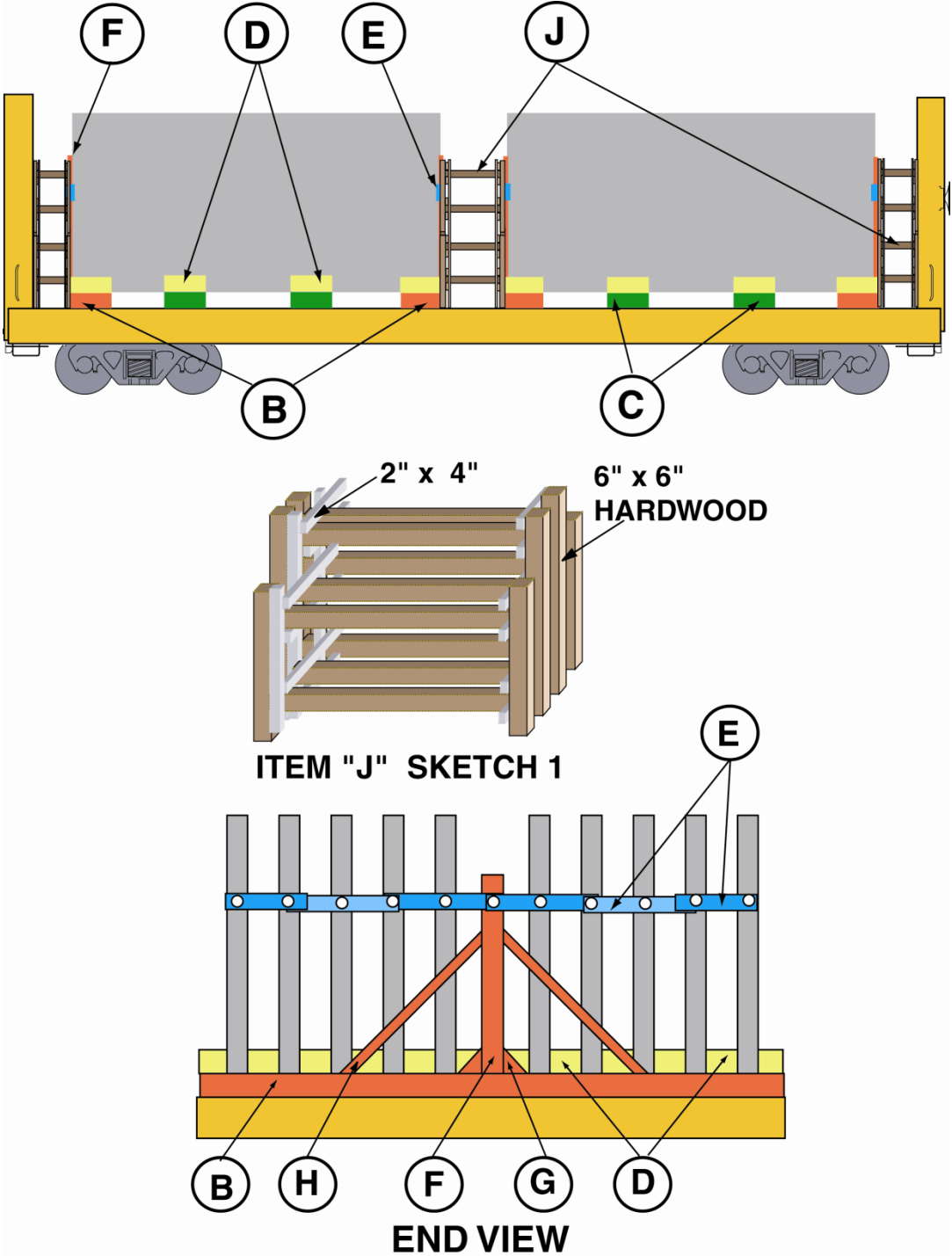
FUTUR USE

CLR 4000 LOADING OF MISCELLANEOUS COMMODITIES

SOUND BARRIER WALLS DURISOL, FLAT CAR WITH PERMANENT END
BULKHEADS

RAC 14000

New-02-2003



SOUND BARRIER WALLS DURISOL, FLAT CAR WITH PERMANENT END BULKHEADS

RAC 14000 (concluded)
New-02-2003

Item	No. of Pcs.	Description
A		Vacant
B	2 per package	Bearing pieces: steel 2 in. x 8 in. by car width. Bearing pieces are part of a "T" rack assembly comprising Item "F", Item "G" and Item "H".
C	2 per package	Intermediate bearing pieces: steel 2 in. x 8 in. by car width.
D	4 between each panel	Spacers: lumber 2 in x 8 in. x 8 in. long. To be placed on top of the bearing pieces Item "B" and Item "C".
E	1 between each panel	Bolted spacers: steel ¼ in. thick x length as required. Spacer bolts ½ in. x 4 in. must be locked in by an approved retainer.
F	1 per bearing piece Item "B"	Center post: steel tubular 6 in. x 6 in. x 6 ft. high.
G	2 per Item "F"	Post gussets.
H	2 per Item "F"	Steel braces at 45 degrees.
J	As required	Filler blocking: as required to fill void in center and at each end of car. (As per sketch 1)

Notes:

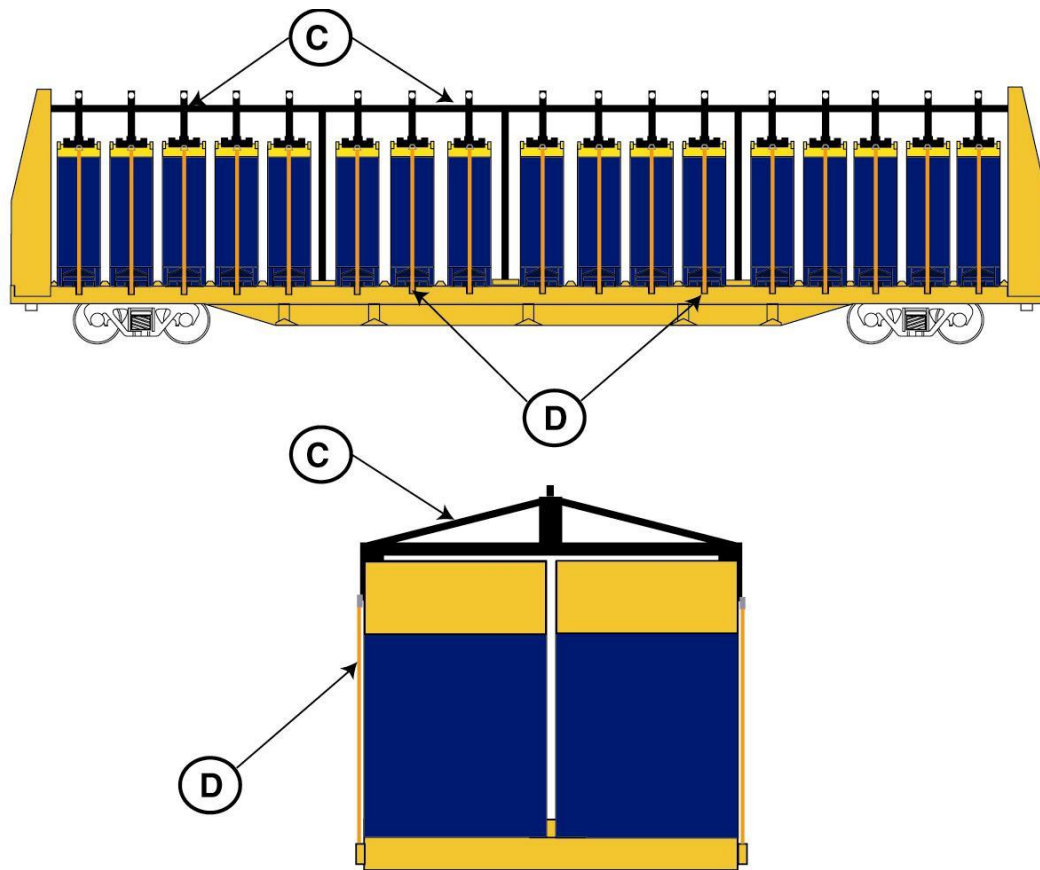
1. Each panel is comprised of a threaded hole to receive ½ in. spacer bolts.
2. Filler blocking is required at each end of car.
3. Center of car blocking must be made of hard wood.
4. Center of car blocking must be up at least 2/3 of the height of the slabs
5. Lateral restraint is also required between side of car and outside slab.

6. No void, lateral or longitudinal is permitted in this load.

See General Rules for further details

CATALYST BINS LOADED ON SPECIALLY EQUIPPED AND END OF CAR
CUSHION BULKHEAD FLAT

RAC 14002
New. 08-2001



Item	Number of pieces	Description
A		Vacant
B		Vacant
C	1 for each pair of side by side bins	Bin Hanger Assembly must be properly seated on top of paired bins

CATALYST BINS LOADED ON SPECIALLY EQUIPPED AND END OF CAR
CUSHION BULKHEAD FLAT

RAC 14002 (concluded)
New. 08-2001

Item	Number of pieces	Description
D	1 per bin secured to above bin hanger assembly	Tie down straps: Polyester webbing 4in. wide with a minimum breaking strength of 20,000lbs. All straps must be secured to ratchet at all times whether car is loaded or empty.

NOTES:

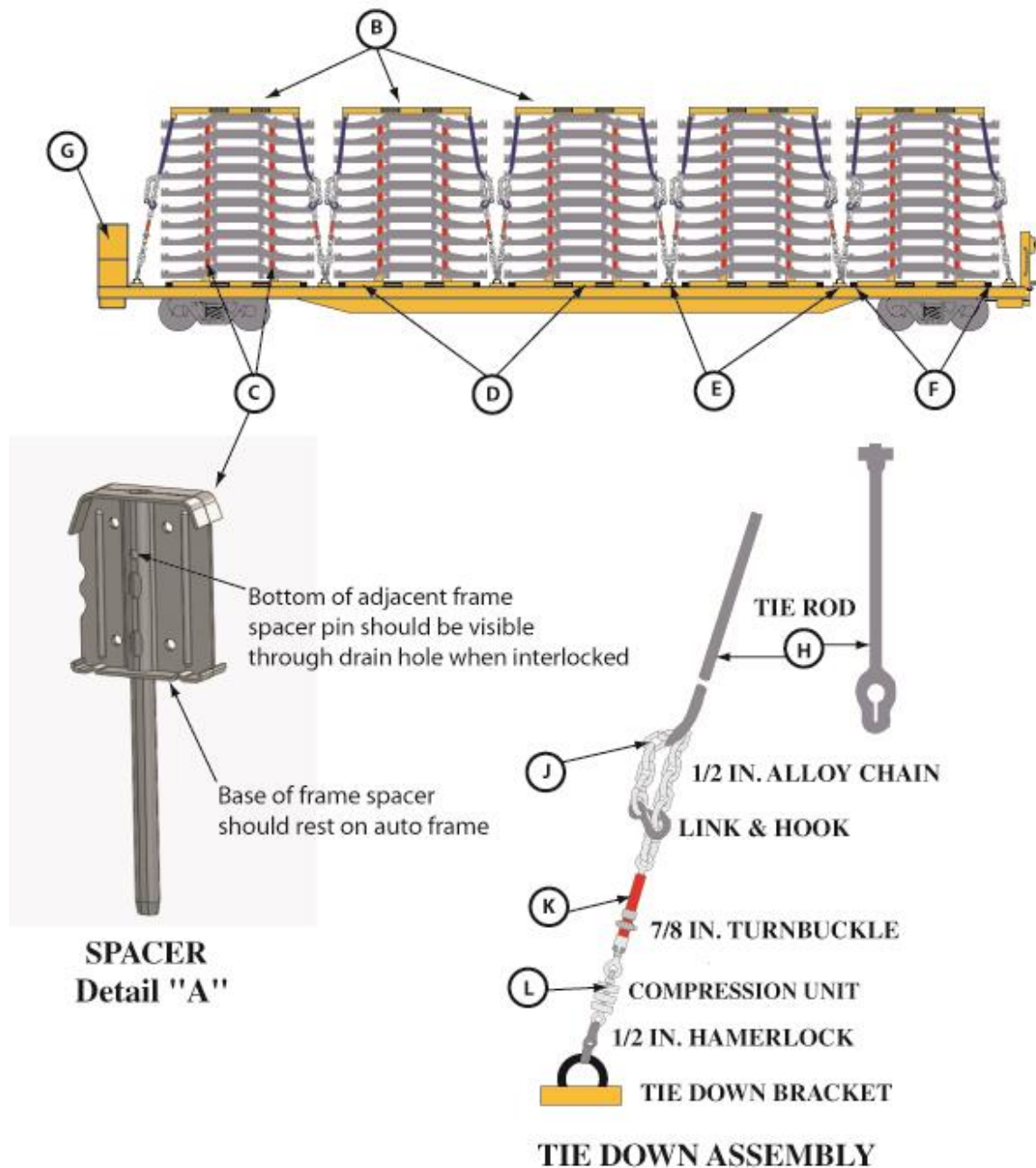
1. Bins empty or loaded should be placed in pairs on car.
2. Paired bins are to be of equal heights
3. Bins should be placed flat and properly seated between separators on floor.
4. Loaded bins must be placed on car to insure that weight is distributed evenly on car floor.
5. Tie down straps, item D, must be secured and tighten on winch to ensure that bin hanger assemblies are tied down at all times.
6. Bin hanger assemblies should always be placed in their lowest position and held down by tie down straps prior to moving car.

See General Rules for further details

TRUCK AND CAR FRAMES LOADED ON SPECIALLY EQUIPPED CUSHIONED FLATCARS

RAC 14004

New 2005-10-08(revised Oct. 09)



TRUCK AND CAR FRAMES LOADED ON SPECIALLY EQUIPPED
CUSHIONED FLATCARS

RAC 14004
New 2005-10-08(revised sept,07)

Item	No. of Pcs.	Description
A	Hand Brake	Handbrake clearance must be provided as per General Rule 2.
B	1 per stack	Top harness assembly to fit frame design.
C	See Note 2	Frame Spacers
D	See Note 3	Frame Pallet
E	4 per stack	Tie down assembly, made up of items H, J, K and L.
F	See Note 4	Pallet Retainers
G	1 per car	Container for storing spacers on return move.
H	1 per assembly	Tie rod.
J	1 per assembly	1/2 in. alloy chain.
K	1 per assembly	7/8 in. turnbuckle must be locked.
L	1 per assembly	Compression unit. Gap to be compressed from 1/16 to 1/8 as per manufacturers specifications.

Notes:

1. Load can be comprised of frame stations equally distributed the length of car. Frame station quantity dependent on manufacturer and product.
2. Item C Frame Spacer for illustration purposes only. Actual spacer design, quantity and configuration based on manufacturer.
3. Item D Frame Pallet for illustration purposes only. Actual pallet design, quantity and configuration based on manufacturer. All designs may not require pallet use.

4. Item F Pallet retainers are considered semi-permanent dunnage and will change in quantity and design per manufacturer. The retainers should be inspected to determine if missing or broken.
5. Material specifications to comply with General Rules section 1.

TRUCK AND CAR FRAMES LOADED ON SPECIALLY EQUIPPED
CUSHIONED FLATCARS

RAC 14004 (Concluded)
New 2005-10-08(revised Oct. 09)

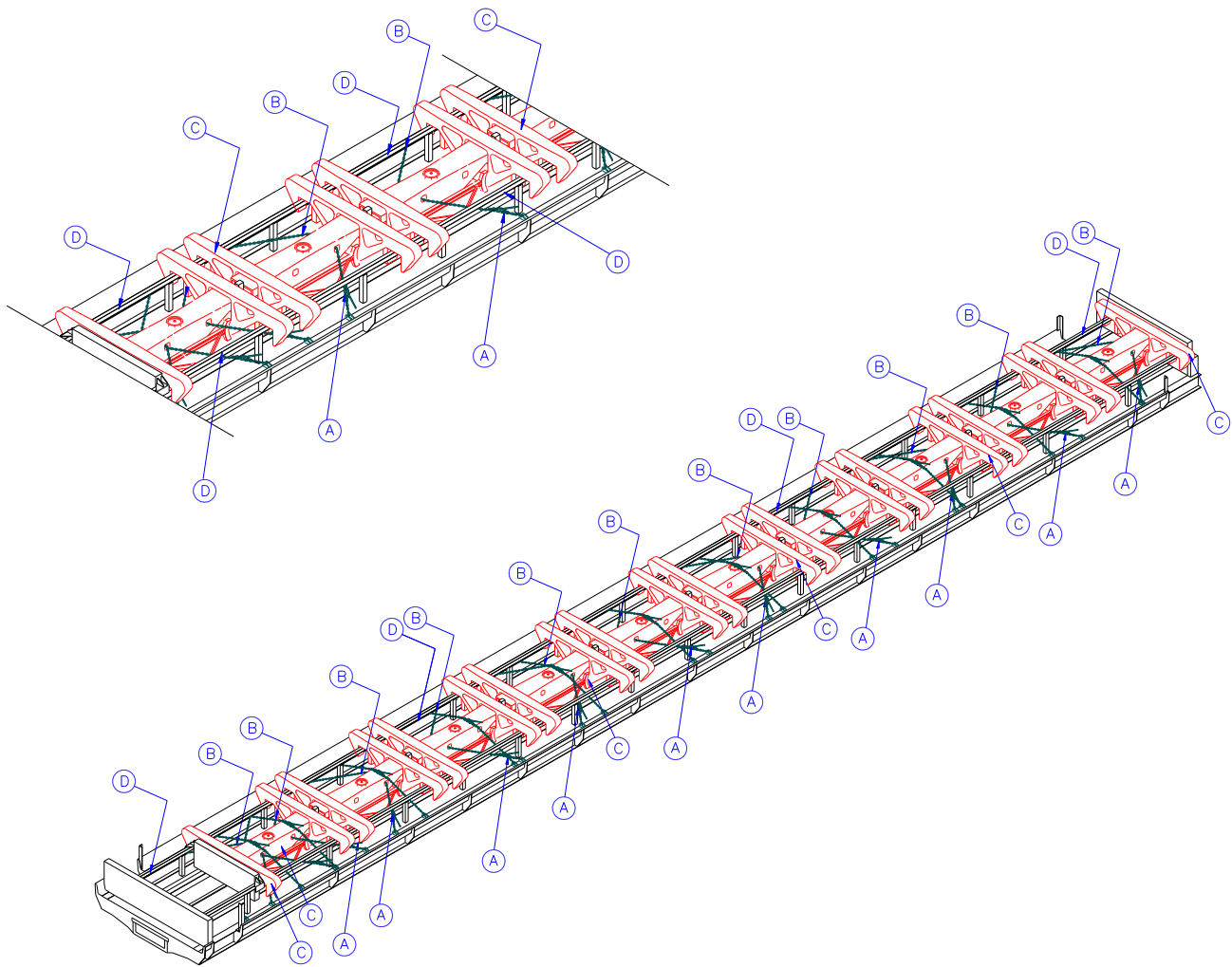
6. Maximum quantity of frames per stack separated by Item C spacers will be depended upon manufacturer, maximum height of stack not exceed 186 inches including top harness.
7. Spacer pins must be engaged and full seated as illustrated in detail "A".
8. Compression unit when tighten must have reserved travel of 1/8 in. (See note 11)
9. Turnbuckle must be locked in place.
- 10.Chain hook must be secured to chain link.
- 11.All loading items must be secured to car when empty

See General Rules for further details

THIS FIGURE IS UNDER AAR TEST AND CANNOT BE USED UNLESS
COVERED BY APPROPRIATE TEST DOCUMENTS.

FREIGHT CAR TRUCK ASSEMBLIES(LESS WHEELS AND ADAPTERS)
SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT END BULKHEADS

RAC 14005
New 3-1997 (Ref: AAR)



FREIGHT CAR TRUCK ASSEMBLIES (LESS WHEELS AND ADAPTERS)
SPECIALLY EQUIPPED FLAT CARS WITH PERMANENT END BULKHEADS

RAC 14005 (concluded)
New 3-1997 (Ref: AAR)

Item	No. of Pcs.	Description
A	11 per car.	Load Binder Tensioner Device: Minimum breaking strength not to be less than 28,400 lb.
B	11 per car.	Chains: 3/8 in. diameter, grade 80 : Minimum breaking strength not to be less than 28,400 lb.
C	10 per car.	Truck Assemblies: Not to include adapters and wheel sets.
D	2 per car.	Longitudinal Side Rails

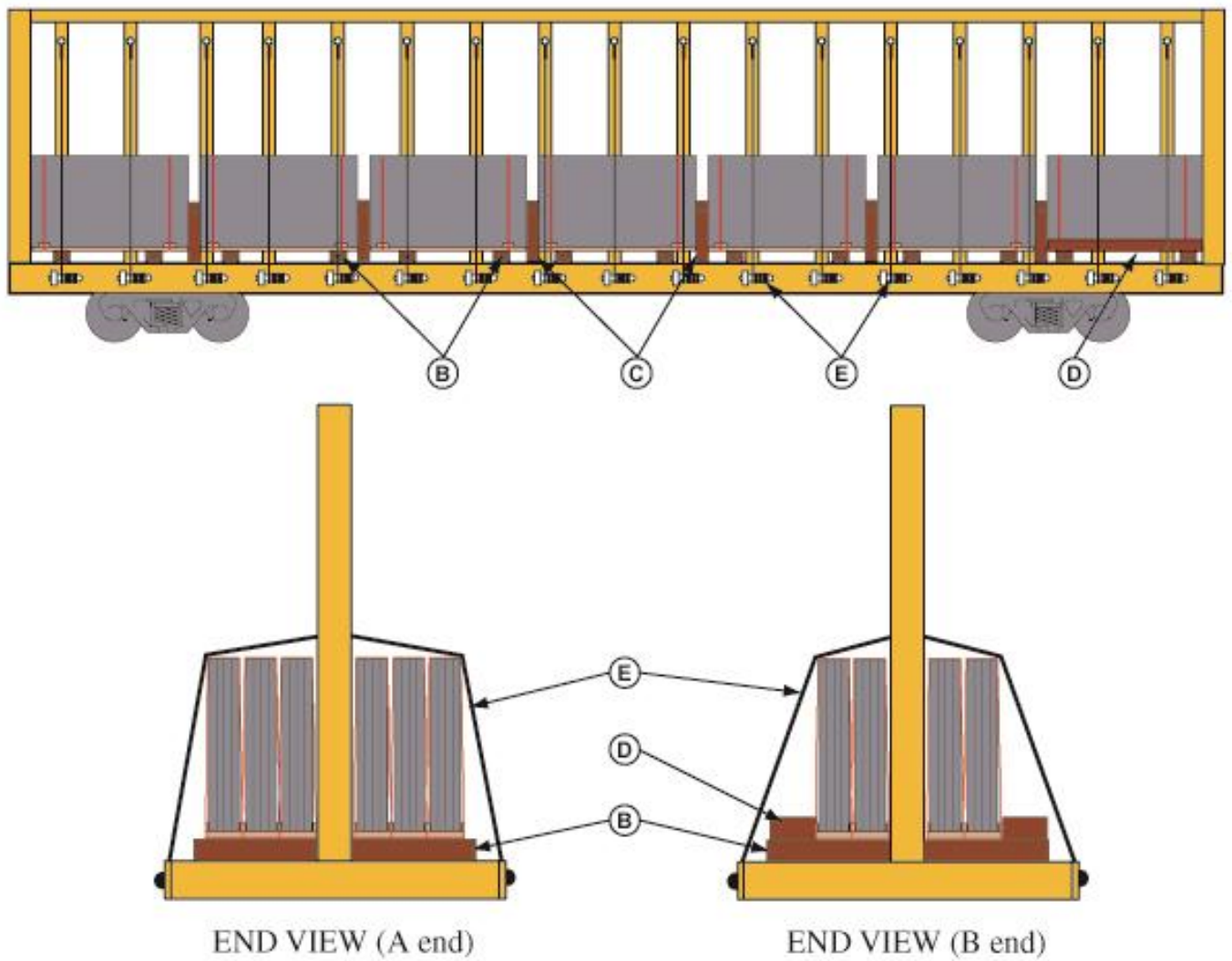
Notes:

1. Loading of trucks assemblies to begin at "A" end of car with the pedestal area of side frames on longitudinal side rails.
2. Truck assembly bolsters to be butted with as little or no space between.
3. Chains are to be placed through opposing bolster brake rod openings as shown with the chain on the first truck assembly through brake rod opening closest to bulkhead.
4. Each assembly will have one chain applied with the exception of the number ten (10) truck which has two (2) chains.
5. Chains on the number ten (10) truck shall be opposing as shown.

See General Rules for further details.

GRANITEX PANELS, 10 FT. LONG FLAT CARS WITH CENTER A-FRAME,
PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 14006
New 02-2006



GRANITEX PANELS, 10 FT. LONG FLAT CARS WITH CENTER A-FRAME,
PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 14006
New 02-2006

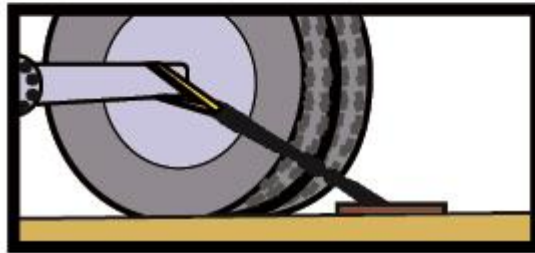
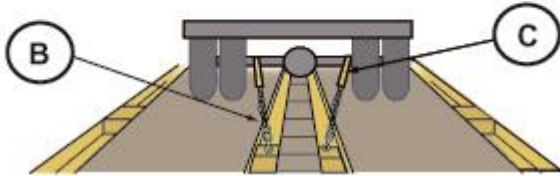
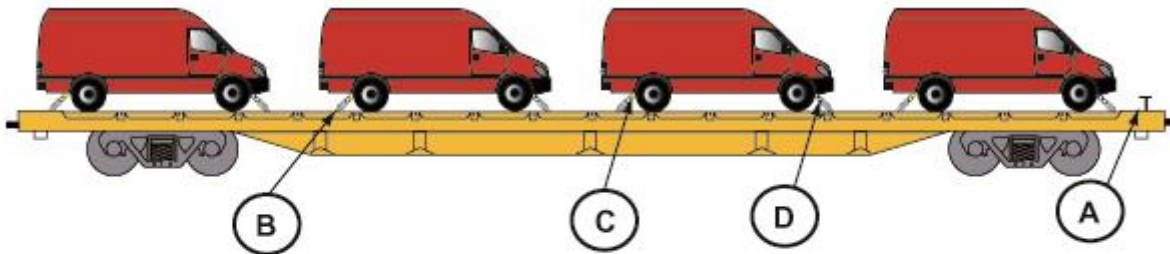
Item	No. of Pcs.	Description
A		Vacant
B	2 per package	Bearing Pieces: Lumber, minimum 1 - 1/2 in. x 3 - 1/2 in., width must be at least 1 in. greater than height. Length must be equal to width of load.
C	1 per package,	Separators: lumber, locate between each packages as filler.
D	1 per row on both sides	Filler: lumber; locate in section of row, on both sides of the car, where there is only 2 packages wide instead of 3.
E	2 per each package	Cables: 3/8 in. diameter, minimum of 8,800 lbs. breaking strength. Prior to tightening, there must be a minimum of 2-1/2 wraps of cable around the winch drum. When practical, all cables must be used, and must be free of kinks and tangles. Apply proper level winding of cable on spool to avoid crossed cables. Tension to be applied with the use of an 18-inch bar or 3/4 inch ratchet. Cables are to be secured to A-frame in slot nearest to top of package.

Notes:

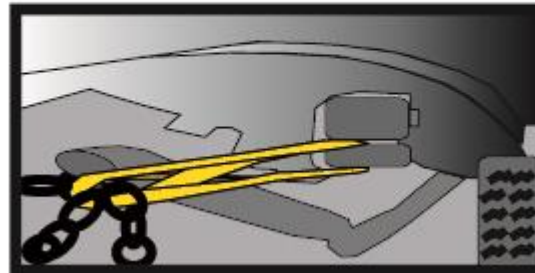
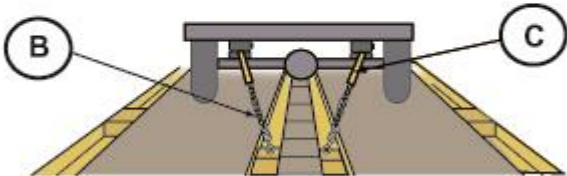
See General Rules for further details

CHRYSLER SPRINTER VAN LOADED ON SPECIALLY EQUIPPED FLATCARS

RAC 14007
New 2007-10-30



SKETCH 1 BACK WHEELS (DOUBLE)



SKETCH 2 BACK WHEELS (SINGLE)



SKETCH 3 FRONT WHEELS

CHRYSLER SPRINTER VAN LOADED ON SPECIALLY EQUIPPED FLATCARS

RAC 14007
New 2007-10-30

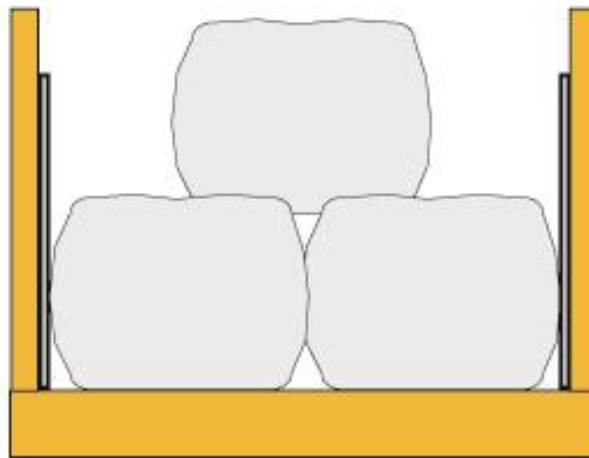
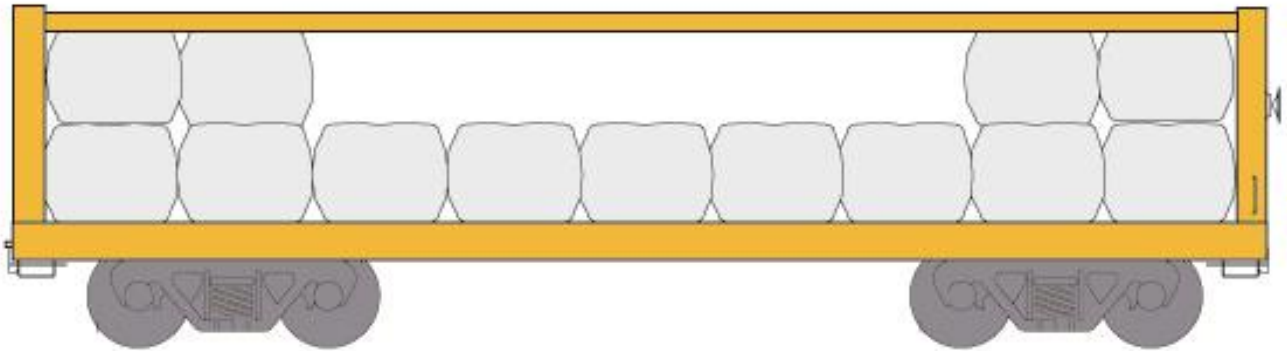
Item	No. of Pcs.	Description
A	Hand Brake	Handbrake clearance must be provided as per General Rule 2
B	4 chains	Chains 3/8 in.
C	As required	Auto tie down straps
D	As required	Special tie down hook

Notes:

See General Rules for further details

CEMENT IN SUPER SACKS LOADED IN GONDOLA CAR

RAC 14008
New 11-2008



SECTION THROUGH CAR

Item	No. of Pcs.	Description
A		Vacant

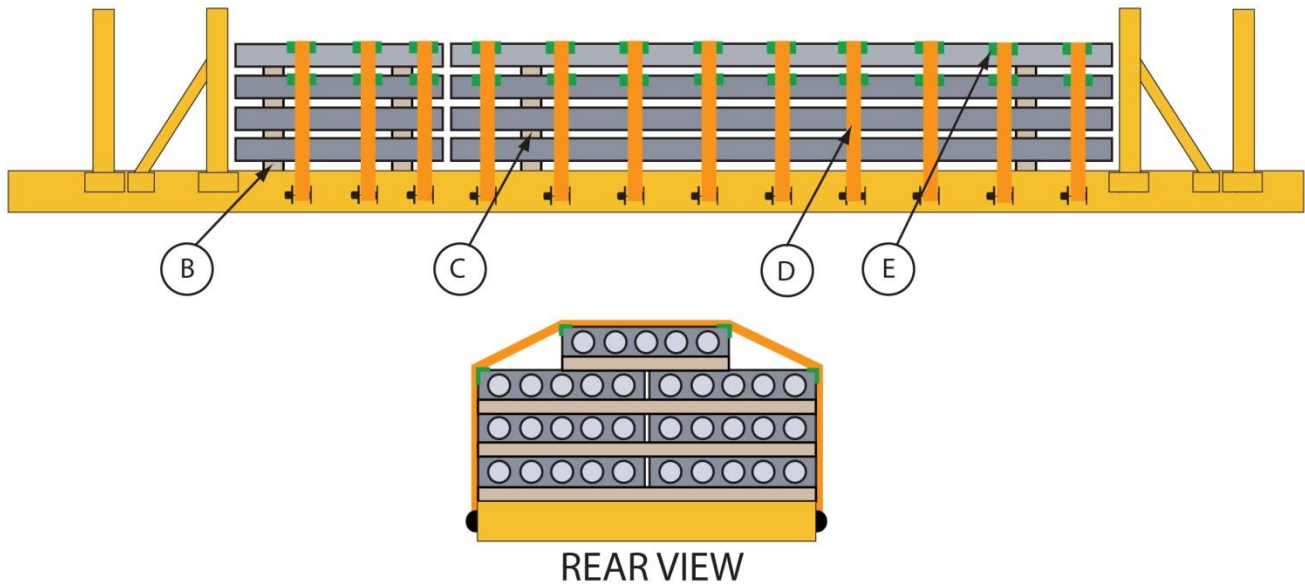
Notes:

1. Load must be evenly distributed side to side and end to end.
2. Sides of cars to be lined with cardboard to protect bags from tearing on protruding objects.
3. Bags are to be placed 2 wide in bottom row and full length of the car. In the second row few bags are to be nested between the bottom bags at each end of car.

See General Rules for further details

CONCRETE HOLLOW STRUCTURE MAXIMUM 8 FEET WIDE 4 TO 40 FEET LONG LOADED ON FLAT RACK EQUIPPED WITH END BULKHEADS.

RAC 14009
New. 09- 2012



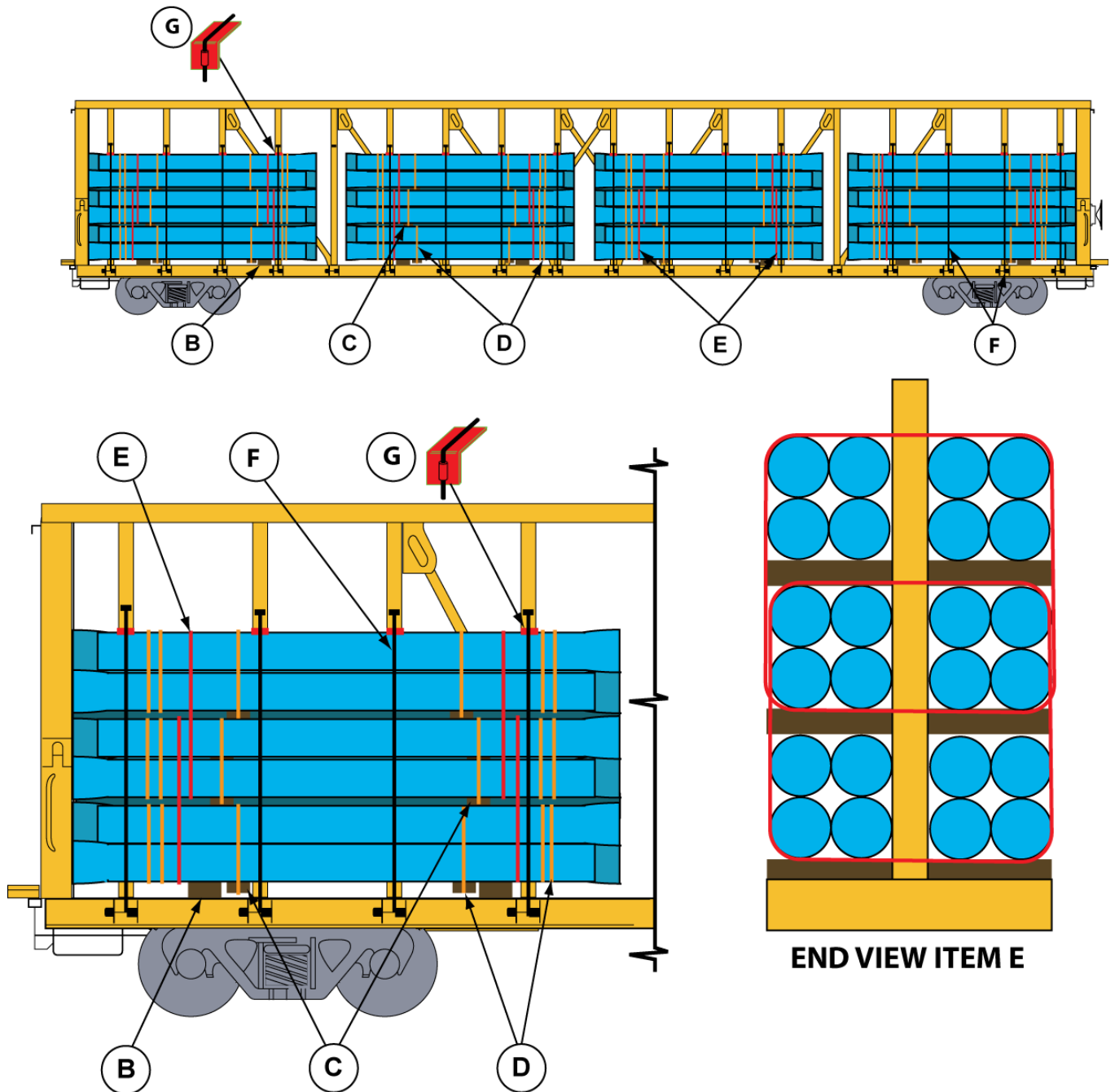
Item	No. of Items	Description
A		Vacant
B	2 per pile	Bearing pieces: hardwood 3 in. x 4 in. Length equal to width of load. Locate pieces 2 feet from each end of pile.
C	2 per pile.	Separators: hardwood 4 in. x 4 in. Length equal to width of load. Locate pieces 2 feet from each end of pile.
D	Minimum 2 per pile or 1 for every 5000 lbs.	Tie-down bands: 3 in. Polyester webbing with a MBS of 1600 lbs. Place across top of load and secure to winches. Strapping must be tensioned with the proper tensioning tool.
E	1 per corner	Corner protector weather resistant: 1 per each corner under web strap.

Notes:

For further details see General Rules

PLASTIC PIPES 6 IN.TO 20 IN. O.D. MINIMUM 10 FEET LONG SECURED
WITH TYPE 1 GRADE 4 POLYESTER CORD STRAPPING ON CENTER BEAM
CAR

RAC 14010
New 05-2013



PLASTIC PIPES 6 IN.TO 20 IN. O.D. MINIMUM 10 FEET LONG SECURED
WITH TYPE 1 GRADE 4 POLYESTER CORD STRAPPING ON CENTER BEAM
CAR

RAC 14010 (Concluded)
New 05-2013

Item	No. of Pcs.	Description
A		Brake wheel clearance: see General Rules.
B	Minimum 2 per pile	Bearing pieces: Lumber 2 in. X 6 in.
C	Minimum 2 per pile	Separators: Lumber 2 in. X 4 in. may be attached to packages with item D.
D	2 per packages 14 feet or less 1 for each additional 10 ft or less	Package bands type IV $\frac{3}{4}$ in. polyester strapping.
E	2 per packages 14 feet or less 1 for each additional 10 ft or less	Interlacing bands type 1A Grade 4 polyester cord strapping, interlace first and second packages of row of pipes on both sides of center partition, then second to third packages of row on both sides of center partition and so on.
F	Minimum 2 per pile	Cables: $\frac{3}{8}$ -in. diameter, 8,800-lb minimum breaking strength. Cable assemblies must be equipped with edge protectors. Winch assemblies must be equipped with a device to maintain tension. Prior to tightening, there must be a minimum of 2 $\frac{1}{2}$ wraps of cable around the winch drum. When practical, all cables must be used, and must be free of kinks and tangles. Tension to be applied with the use of an 18-in. bar or $\frac{3}{4}$ -in. ratchet. Cables are to be secured to A-frame in slot nearest to top of package.
G	1 per cable	Corner protectors: non metallic, weather resistant attach to each cable on top of load to prevent cable from touching outside top corner pipe

Notes:

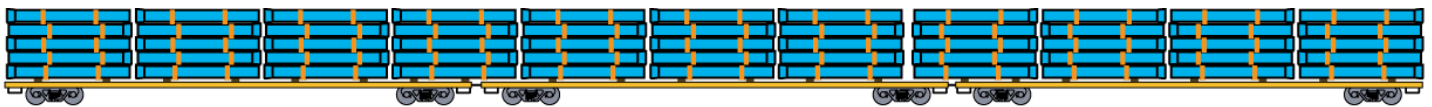
- 1- Load must be placed tight against center partition.

- 2- When optional protection is applied to center partition to prevent pipes from touching, it must be secured adequately to center beams and must not hinder placement of pipe against partition.

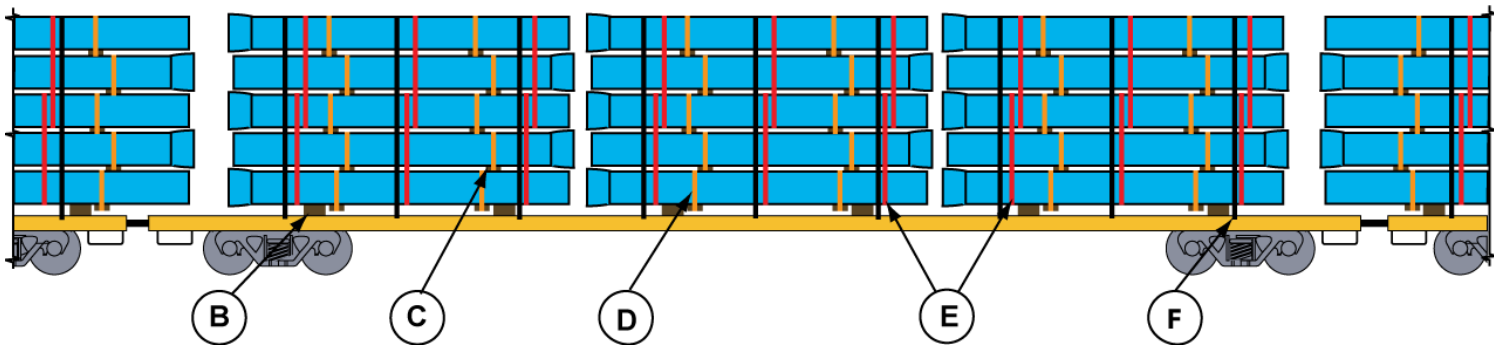
See General Rules for further details

PLASTIC PIPES 6 IN. TO 24 IN. O.D. MINIMUM 10 FEET LONG SECURED WITH TYPE 1A GRADE 7 POLYESTER CORD STRAPPING ON FLAT CAR (WITH OR WITHOUT OVERHANG)

RAC 14011
New 06-2013



TIE-DOWN NOT SHOWN



Item	No. of Pcs.	Description
A		Brake wheel clearance: see General Rules.
B	Minimum 2 per pile	Bearing pieces: Lumber 2 in. X 6 in.
C	Minimum 2 per pile	Separators: Lumber 2 in. X 4 in. may be attached to packages with item D.
D	3 per packages 24 feet or less 1 for each additional 10 ft or less	Package bands type IV polyester strapping.

E	3 per packages 24 feet or less 1 for each additional 10 ft or less	Interlacing bands Type 1A nonmetallic strapping Grade 7, MBS of 11,000 lbs., interlace first, second and third packages or row of pipes, then third, fourth and fifth packages of row of pipes. DO NOT SUBSTITUTE. Strapping must be tensioned with the proper tensioning tool and secured with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations.
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PLASTIC PIPES 6 IN. TO 24 IN. O.D. MINIMUM 10 FEET LONG SECURED WITH TYPE 1A GRADE 7 POLYESTER CORD STRAPPING ON FLAT CAR (WITH OR WITHOUT OVERHANG)

RAC 14011(Concluded)
New 06-2013

F	Minimum 3 per pile	Tie down bands: Type 1A nonmetallic strapping Grade 7, MBS of 11,000 lbs. Circle entire load. Locate as close as possible to separators. DO NOT SUBSTITUTE. Strapping must be tensioned with the proper tensioning tool and secured with the appropriate Dynamic Load Buckle in accordance with the manufacturer's recommendations.
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Notes:

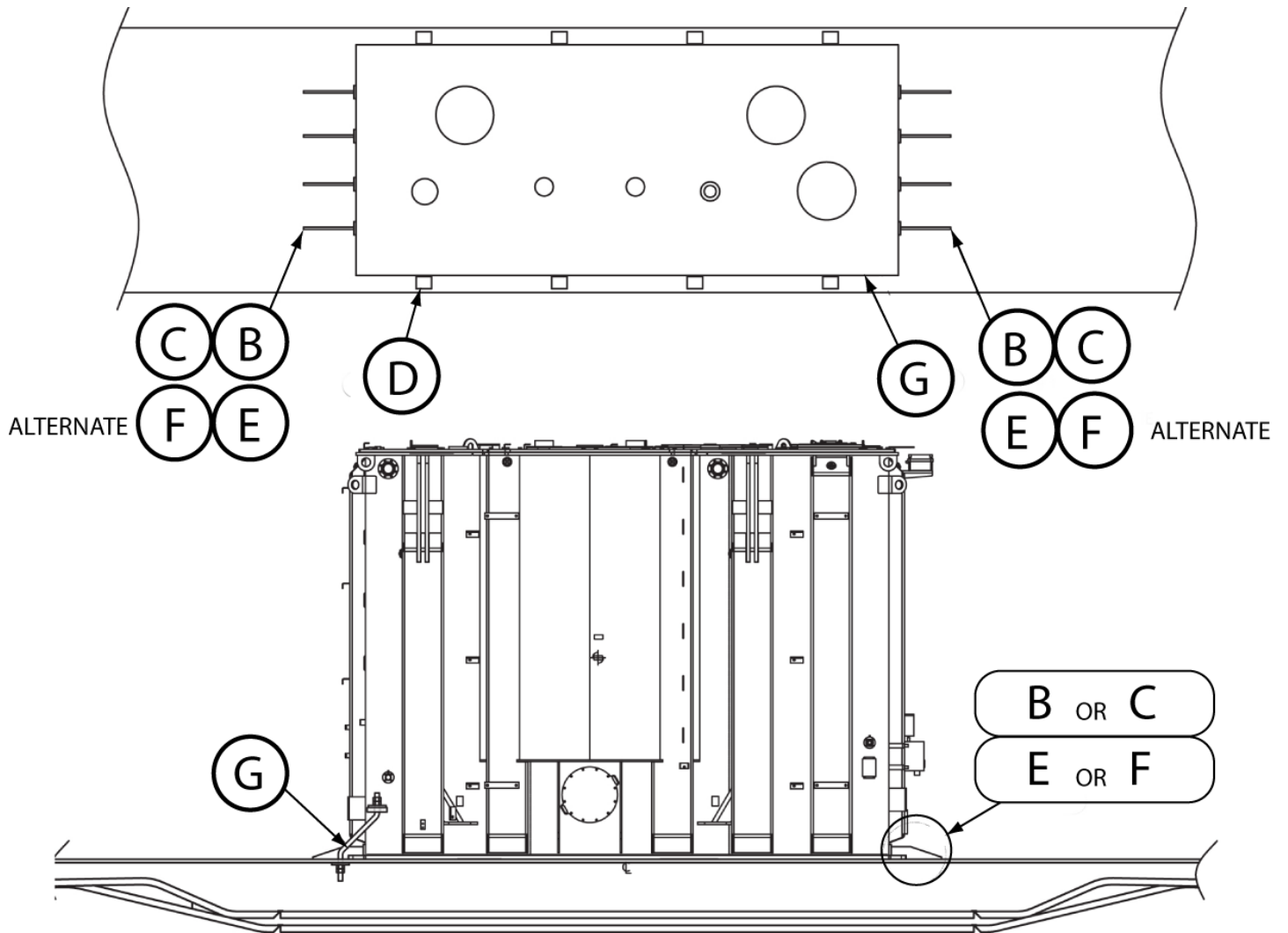
- 1- When the combined length of pipes exceeds the length of the car (over car end sill at either end) overhang must have a minimum of 4 inch clearance above deck of idler car.
- 2- A minimum of 6 feet void space must be left between end of overhang and piles placed on idler car.
- 3- On loads having an overhang the uncoupling levers between cars must be rendered inoperative as per Rule 28.3 Figure 28.1.

See General Rules for further details

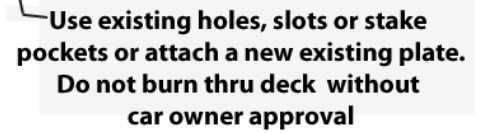
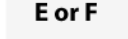
TRANSFORMERS, 1000, 00 LBS OR GREATER - FLATCARS WITH ½ IN. OR THICKER STEEL FLOOR

RAC 14012

New 9-2014 Ref AAR Fig 1-D, Section 3



RAC 14012 (Continued)
New 9-2014 Ref AAR Fig 1-D, Section 3



SKETCH 4

TRANSFORMERS, 1000,00 LBS OR GREATER - FLATCARS WITH ½ IN. OR
THICKER STEEL FLOOR

RAC 14012 (Concluded)
New 9-2014 Ref AAR Fig 1-D, Section 3

Item	No. of Pcs.	Description
A		Brake wheel clearance: see General Rule 2 in Section 1.
B	See table below	Steel blocking: 1 in. x (4 in. + "X") x (10 in. + "Y") with 1 in. x 5 in. x 6 in. end plate. Locate and weld per Sketch 1.
C	See table below	Steel blocking: 1 in. x (4 in. + "X") x (18 in. + "Y") with 1 in. x 5 in. x 6 in. end plate. Locate and weld per Sketch 1.
D	See table below	Angle: 6 in. x 4 in. x 1/2 in. x 7 in. long. Locate against each side of transformer evenly spaced with 6 in. leg down and secure with 1/2 in. fillet weld. See Sketch 4.
E	See table below (Alternate for Item B only)	Steel blocking: 1 in. x 10 in. with a 1 in. x 7 in. end plate locate vertically against ends of transformer, extending 2 in. above height of transformer base. Locate and weld to car deck per Sketch 2.
F	See table below (Alternate for Item C only)	Steel blocking: 1 in. x 18 in. with a 1 in. x 7 in. end plate locate vertically against ends of transformer, extending 2 in. above height of transformer base. Locate and weld to car deck per Sketch 2.
G	2 per each side of transformer	2 in. rod threaded at both ends with hex nuts on ends. See Sketch 3. Required when using Items E or F.

Transformer Shipping Weight (lb)	No. of Item B (Alt. Item E) each end	No. of Item C (Alt. Item F) each end	No. of Item D each side
250,000 or less	4	N/A	4
250,000 to 350,000 inclusive	5	N/A	4
350,000 to 450,000 inclusive	6	N/A	5
450,000 to 550,000 inclusive	N/A	5	6
550,000 to 650,000 inclusive	N/A	6	6
650,000 to 750,000 inclusive	N/A	7	8
750,000 to 850,000 inclusive	N/A	7	8

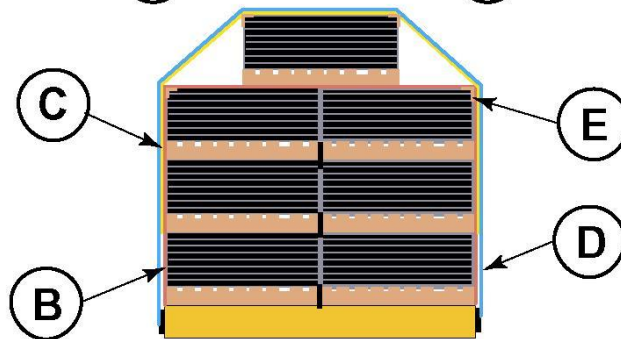
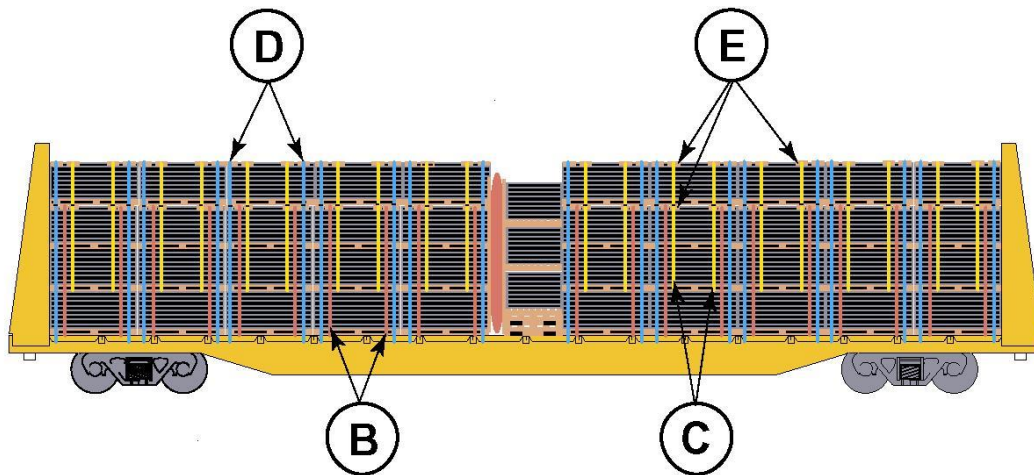
NOTES:

1. Items B or C can be used in place of D if there is room on the car deck.

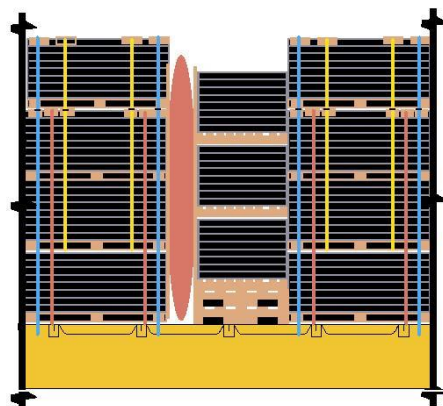
See General Rules for further details

RUBBER MATS ON PALLETS 6 FT. LONG, 22 INCHES HIGH X 48 IN. WIDE
FLAT CARS WITH PERMANENT END BULKHEADS, INSIDE LENGTH 66 FT.

RAC 14020
New. 01-2004



END VIEW



SKETCH 1

RUBBER MATS ON PALLETS 6 FT. LONG, 22 INCHES HIGH X 48 IN. WIDE
FLAT CARS WITH PERMANENT END BULKHEADS, INSIDE LENGTH 66 FT.

RAC 14020 (concluded)

New. 01-2004

Item	No. of Pcs.	Description
A		Vacant
B	2 per package	Layer encircling bands: they are 1-1/4 in. x .031 in. high-tension bands. Encircle all packages from first, second and third layer.
C	2 per package	Layer encircling bands: they are 1-1/4 in. x .031 in. high-tension bands. Encircle all packages from second, third and fourth layer.
D	2 per package	Load interlacing bands: they are 1-1/4 in. x .031 high-tension bands. Encircle load and secure to lading strap anchors.
E	1 per band	Edge protectors: all packages from third and fourth row must be protected with edge protectors.

Notes:

1. SKETCH 1

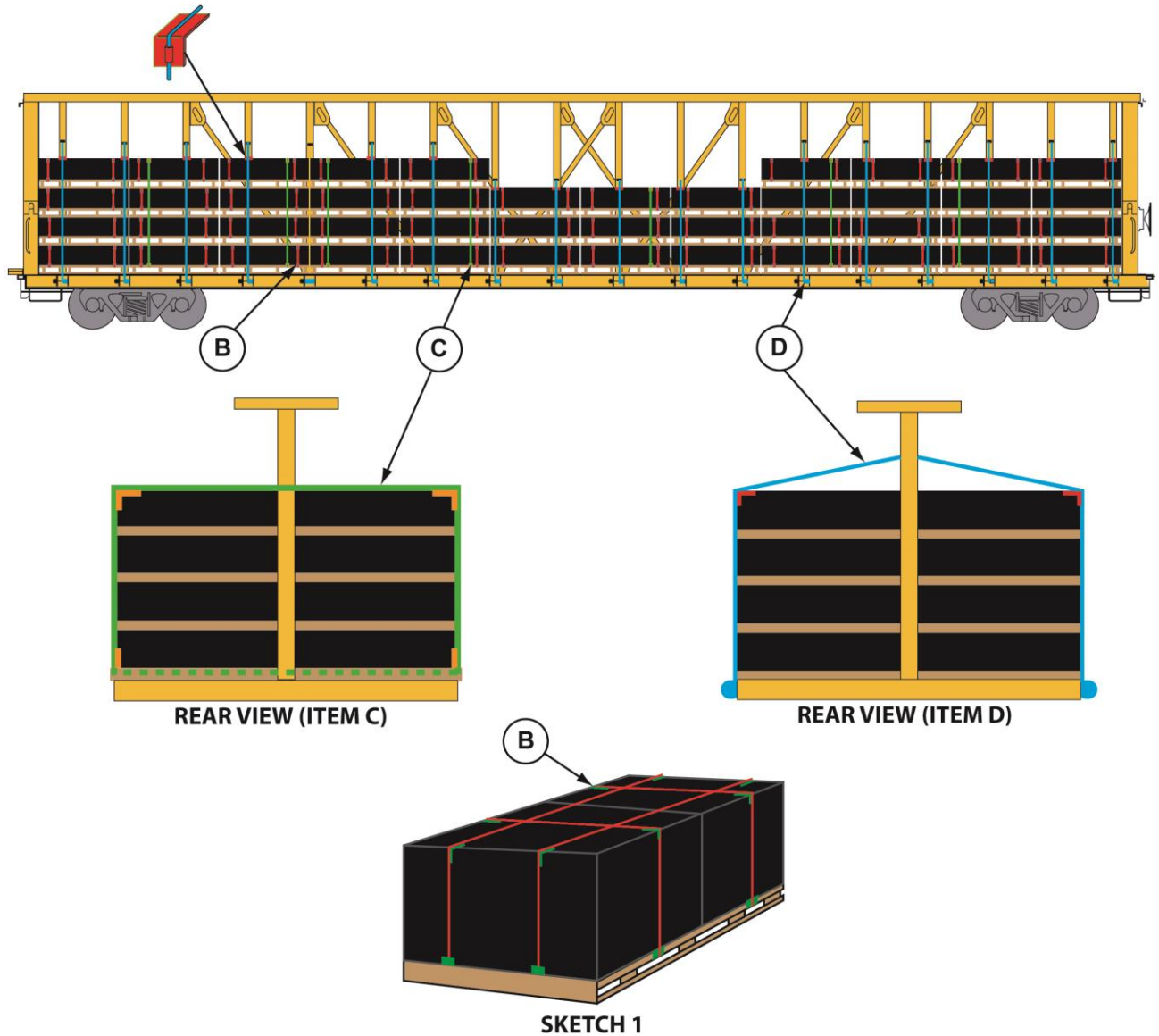
Filler: filler pieces are used to fill void at center of load. Three pallets of rubber mats are loaded crosswise on top of filler pieces such as pallets, in a way that the height of the rubber mats pallets equals half the height of the fourth row.

Void between crosswise and lengthwise pallets may be filled with sheets of particleboard, pallets or an inflatable bag positioned between two sheets of particleboard.

See General Rules for further details

RUBBER MATS ON PALLETTS 4 FT. X 6FT, CENTER BEAM FLAT CARS
WITH PERMANENT END BULKHEADS

RAC 14021
New. 01-2013



Item	No. of Pcs.	Description
A		Vacant
B	2 per package	Package bands: They are 1/2 in. x .058 in. high-tension bands with corner protectors. Bands tie carpets to pallets.

RUBBER MATS ON PALLETS 4 FT. X 6FT, CENTER BEAM FLAT CARS WITH
PERMANENT END BULKHEADS,

RAC 14021 (Concluded)
New. 01-2013

Item	No. of Pcs.	Description
C	1 per pile as necessary	Load encircling bands: they are 1-1/4 in. x .029 in. high-tension bands. When only one cable contacts a pile a steel band encircles piles both side of partition. REAR VIEW (ITEM C)
D	All cables must be used	Cables: Cables: 3/8 in. diameter, minimum of 8,800 lbs. Breaking strength. Cable assemblies must be equipped with edge protectors. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top of top package.

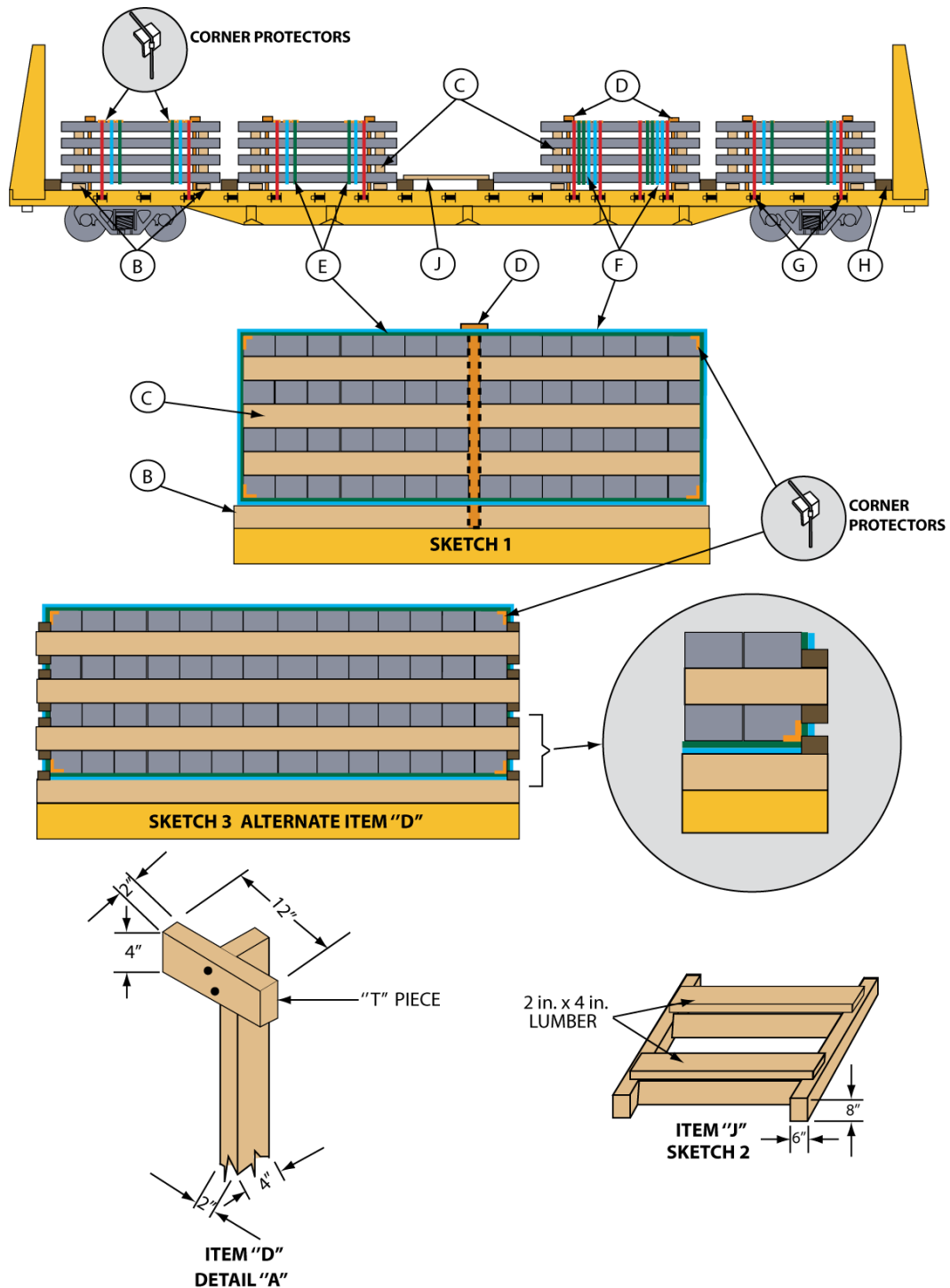
Notes:

1. Packages are 4'x6' or 2 bundles 3'x4' on pallet with 4 package bands 2 across and 2 lengthwise.(**SKETCH 1**)
2. Load consists of 12 piles on each side, 9 piles 4 high and 3 piles 3 high.

See General Rules for further details

TIES, CONCRETE, SWITCH-AND CROSS TIES—BULKHEAD FLATCARS,
WITH OR WITHOUT CONSTANT TENSIONING AND
CUSHIONING DEVICES
RAC 14140

New Oct. 2015 Ref AAR Fig 140, Section 5



TIES, CONCRETE, SWITCH-AND CROSS TIES—BULKHEAD FLATCARS,
WITH OR WITHOUT CONSTANT TENSIONING AND
CUSHIONING DEVICES
RAC 14140 (Continued)

New Oct. 2015 Ref AAR Fig 140, Section 5

Item	No. of Pcs.	Description
A		Vacant
B	2 per pile	Bearing pieces: hardwood, 4 in. x 6 in., length equal to width of load. Locate approximately 12 in. from solid end of pile. An additional bearing piece is to be added under end of bottom layer that extends more than 4 ft beyond solid end of pile.
C	2 per layer.	Separators: hardwood, 4 in. x 4 in., length equal to width of load. Locate in line with Items B when possible.
D	2 per pile	Vertical stabilizers: lumber, 2 in. x 4 in., length to equal height of pile plus 4 in. Locate approximately one-fourth length in from solid ends of pile. T piece, 2 in. x 4 in. x 12 in., must be secured to top of vertical stabilizer with two 16-D nails. See DETAIL A AND SKETCH 1.
Alt. D	2 per bearing pieces, 4 per separators	Side blocks: lumber, 2 in. x 4 in. x 6 in. Locate against ties on the top and bottom of each Item C separator and top of each Item B, and secure each with four (4) 16-D nails. Side blocks to be used as alternate to Item D Vertical Stabilizers. See SKETCH 3.
E	2 per unit 12 ft long or less, 4 (2 pairs) per unit over 12 ft in length.	Unit bands: 2 in. x .044 in. high tension band. Encircle unit and locate approximately one-fourth length in from solid ends of unit. (Each pile consists of two side-by-side units separated by Item D.) See SKETCH 1. May be substituted by Type 1A, Grade 7 non-metallic strapping.
F	2 per pile 12 ft long or less, 4 (2 pairs) per pile over 12 ft long.	Encircling bands: 2 in. x .044 in. high tension band. Encircle pile and locate approximately one-fourth length in from solid ends of pile. See SKETCH 1. May be substituted by Type 1A, Grade 7 non-metallic strapping.
G	2 per pile 12 ft long or less, 4 per pile over 12 ft long.	Tie-down bands: 2 in. x .044 in. high tension band. Locate no closer or less than 8 in. from solid ends of pile. Must be applied through constant tensioning devices, tensioned and sealed on top of load with two seals double crimped or notched. May be substituted by Type 1A, Grade 7 non-metallic strapping.

TIES, CONCRETE, SWITCH-AND CROSS TIES—BULKHEAD FLATCARS,
WITH OR WITHOUT CONSTANT TENSIONING AND
CUSHIONING DEVICES

RAC 14140 (Concluded)

New Oct. 2015 Ref AAR Fig 140, Section 5

Item	No. of Pcs.	Description
H	As required	Load blocking: hardwood, minimum 6 in. x 8 in., length equal to width of load. Locate laterally to fill void between piles, between end piles and steel bulkheads. Secure to prevent displacement.
J	As required	Pack-out filler: hardwood, minimum 6 in. x 8 in., length to suit. Use to fill void between piles where needed. Joints must be spliced with 2 in. x 4 in. lumber, length to suit, using 16-D nails. Assembly must be secured to prevent displacement. See SKETCH 2 .

Notes and Additional Requirements:

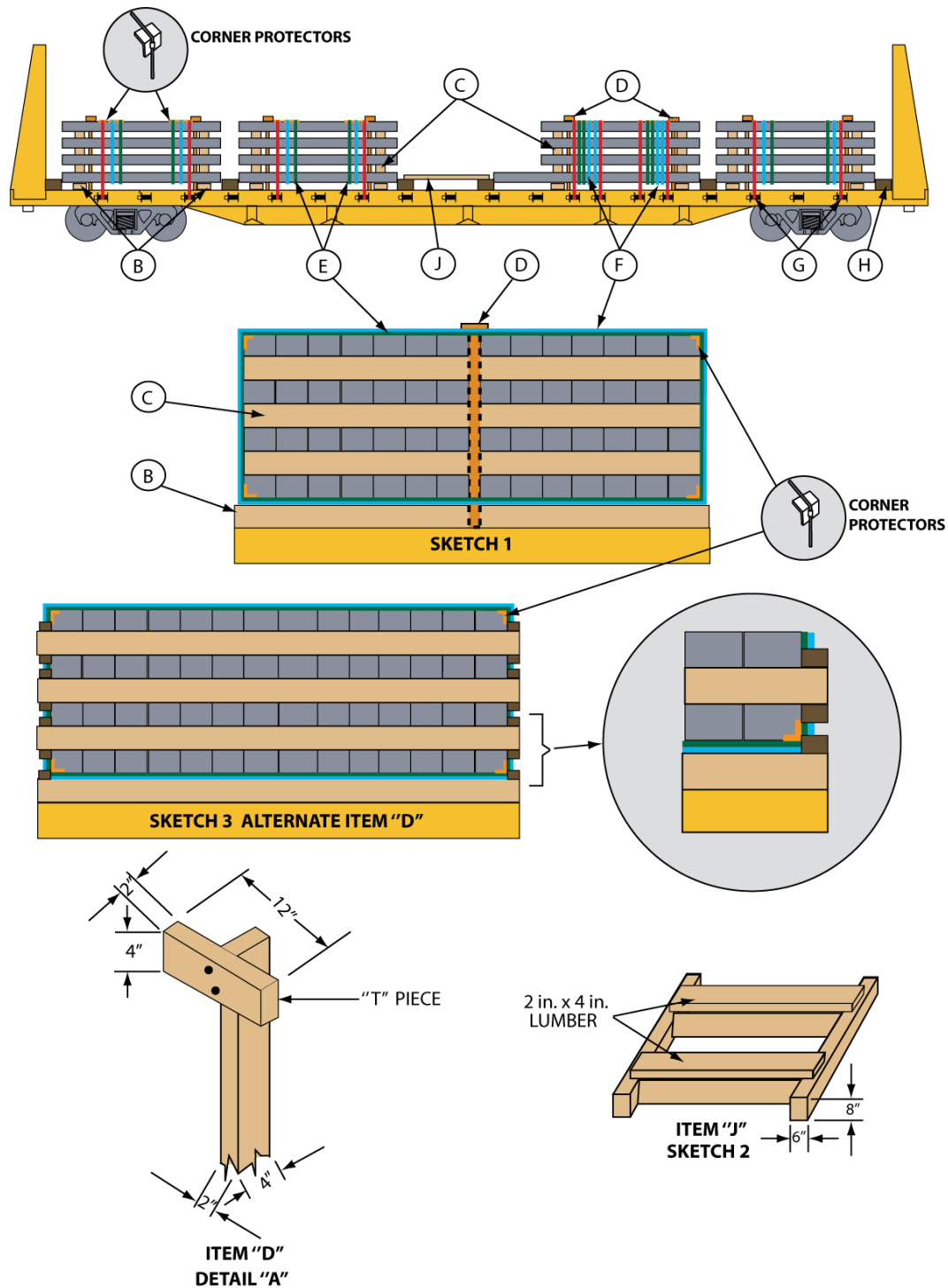
1. Piles 12 ft long and less may contain up to four cross ties over 12 ft long.
2. It is the intent that all longitudinal void space in bottom layer be filled.
3. Corner protectors must be used under Items E, F, and G.
4. Reclaimed timbers may be used for Items H and J provided their condition is such that the structural integrity of the timber does not compromise its effectiveness.
5. Constant tensioning devices that are AAR approved and listed under General Rule 17.11.3 in Section 1 are mandatory with steel banding. They must be applied to car in a manner that the compression unit is not hindered, either by the loaded commodity and/or car structural member, in developing the minimum tension specified. (Not required with non-metallic strapping.)

See General Rules for further details

TIES, CONCRETE, SWITCH-AND CROSSTIES—BULKHEAD FLATCARS,
WITH CUSHIONING DEVICES

RAC 14140A

New Oct. 2015 (Ref. AAR 140-A)



TIES, CONCRETE, SWITCH-AND CROSSTIES—BULKHEAD FLATCARS,
WITH CUSHIONING DEVICES

RAC 14140A (Continued)

New Oct. 2015 (Ref. AAR 140-A)

Item	No. of Pcs.	Description
A		Vacant
B	2 per pile	Bearing pieces: hardwood, 4 in. x 6 in., length equal to width of load. Locate approximately 12 in. from solid end of pile. An additional bearing piece is to be added under end of bottom layer that extends more than 4 ft beyond solid end of pile.
C	2 per layer.	Separators: hardwood, 4 in. x 4 in., length equal to width of load. Locate in line with Items B when possible.
D	2 per pile	Vertical stabilizers: lumber, 2 in. x 4 in., length to equal height of pile plus 4 in. Locate approximately one-fourth length in from solid ends of pile. T piece, 2 in. x 4 in. x 12 in., must be secured to top of vertical stabilizer with two 16-D nails. See DETAIL A AND SKETCH 1.
Alt. D	2 per bearing pieces, 4 per separators	Side blocks: lumber, 2 in. x 4 in. x 6 in. Locate against ties on the top and bottom of each Item C separator and top of each Item B, and secure each with four (4) 16-D nails. Side blocks to be used as alternate to Item D Vertical Stabilizers. See SKETCH 3.
E	2 per unit 12 ft long or less, 4 (2 pairs) per unit over 12 ft in length.	Unit bands: 1 5/8 in. Type IA, Grade 7 polyester cord strap. Encircle unit and locate approximately one fourth length in from solid ends of unit. (Each pile consists of two side-by-side units separated by Item D.) See SKETCH 1.
F	2 per pile 12 ft long or less, 4 (2 pairs) per pile over 12 ft long.	Encircling bands: Type IA, Grade 7 polyester cord strap. Encircle pile and locate approximately one fourth length in from solid ends of pile. See SKETCH 1.
G	2 per pile 12 ft long or less, 4 per pile over 12 ft long.	Tie-down bands: Type IA, Grade 7 polyester cord strap. Locate no closer or less than 8 in. from solid ends of pile. To be used in conjunction with dynamic load buckles as per manufacturer's specification and instruction only.

TIES, CONCRETE, SWITCH-AND CROSSTIES—BULKHEAD FLATCARS,
WITH CUSHIONING DEVICES

RAC 14140A (Concluded)

New Oct. 2015 (Ref. AAR 140-A)

Item	No. of Pcs.	Description
H	As required	Load blocking: hardwood, minimum 6 in. x 8 in., length equal to width of load. Locate laterally to fill void between piles, between end piles and steel bulkheads. Secure to prevent displacement.
J	As required	Pack-out filler: hardwood, minimum 6 in. x 8 in., length to suit. Use to fill void between piles where needed. Joints must be spliced with 2 in. x 4 in. lumber, length to suit, using 16-D nails. Assembly must be secured to prevent displacement. See SKETCH 2 .

Notes and Additional Requirements:

1. Piles 12 ft long and less may contain up to four cross ties over 12 ft long.
2. It is the intent that all longitudinal void space in bottom layer be filled.
3. Corner protectors must be used under Items E, F, and G.
4. Reclaimed timbers may be used for Items H and J provided their condition is such that the structural integrity of the timber does not compromise its effectiveness.

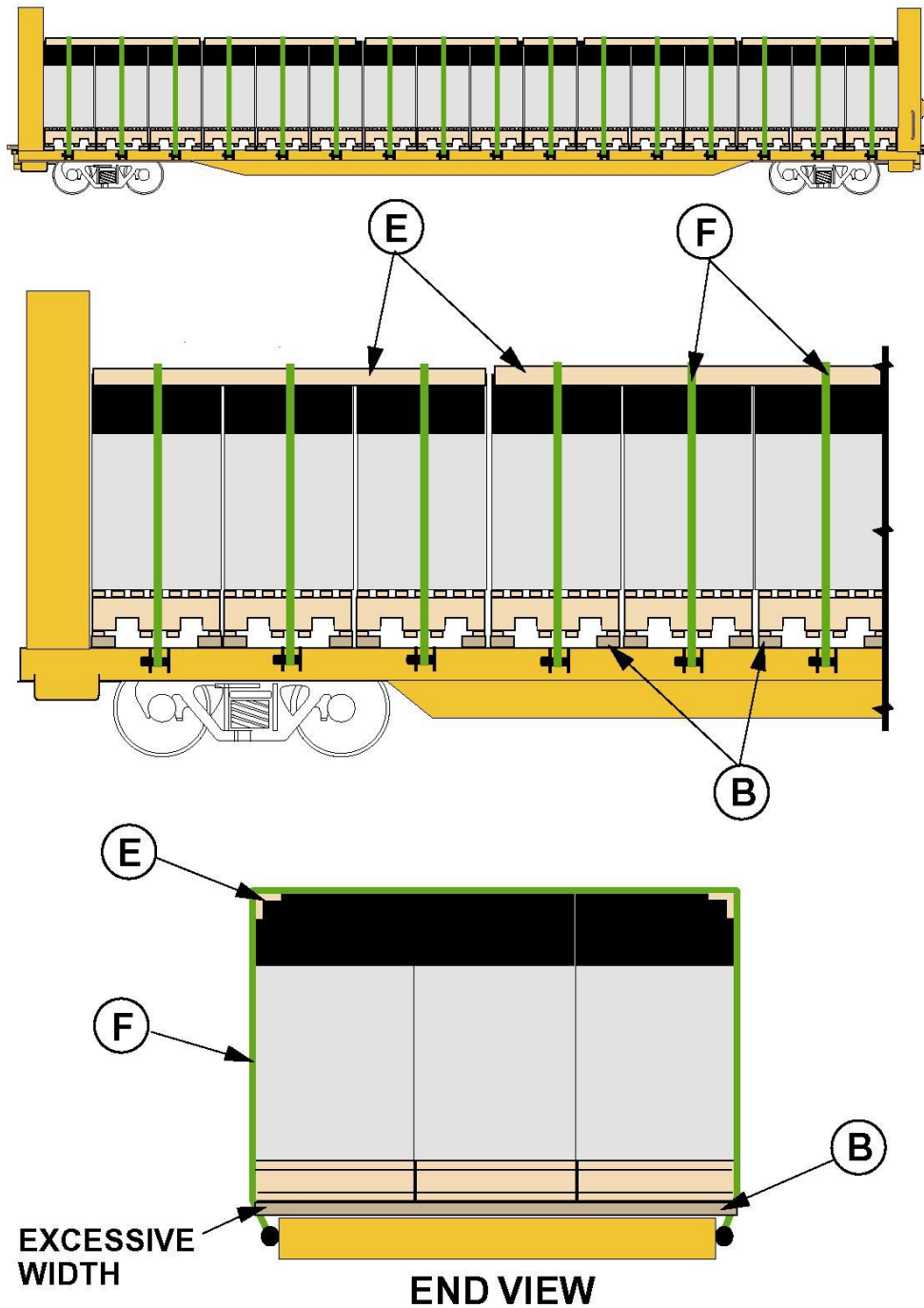
See General Rules for further details

CLR 5000 LOADING OF FOREST PRODUCTS AND BUILDING MATERIAL

MULCH, CEDAR, PALLETIZED BAGGED FLAT CARS EQUIPPED WITH
PERMANENT END BULKHEADS AND PVC TREATED POLYESTER
WEBBING TIE-DOWN SYSTEM.

CLEARANCE FILE MUST BE ISSUED BY ORIGINAL CARRIER IF
DIMENSIONAL

RAC 15000
New. 12-2002



MULCH, CEDAR, PALLETIZED BAGGED FLAT CARS EQUIPPED WITH
PERMANENT END BULKHEADS AND PVC TREATED POLYESTER WEBBING
TIE-DOWN SYSTEM
CLEARANCE FILE MUST BE ISSUED BY ORIGINAL CARRIER IF
DIMENSIONAL

RAC 15000 (Continued)
New. 12-2002 (Rev. 05-2016)

Item	No. of Pcs.	Description
A		Vacant
B	3 per package (Required only if load exceeds width of car)	Bearing Pieces: Lumber, minimum 2 in. x 8 in., width must be at least 1 in. greater than height. Length must be equal to width of load.
E	1 cap per unit.	Top corner cap: All packages in top layer must be protected by Item "E". Cap assembly consists of two pieces of lumber, 2 in. x 8 in. Locate one corner cap on top of every unit of 3 packages.
F	Minimum of 1 per package	Tie-Down Straps: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Secure strap to winch assemblies on each side of the car passing over top of load. Straps must be pulled tight against both sides of load including pallets and top corner caps. All straps must be used. Tension with the use of a 42 in bar.

Notes:

Void, if any in the load, may be filled with a part pallet specially made to occupy the space or by using inflatable bags. NO VOID IS PERMITTED.

Unit detail: each load of cedar mulch bags on a pallet is held by a double thickness of shrink-wrapped. Bags are interlocked on the pallet.

Top of load must be pushed in, with loader, towards center of car before tightening polyester bands. Voids between the tops of longitudinal rows must be eliminated.

When load exceeds plate "C" dimensions, it must be considered as a dimensional load. Proper clearance procedures must be followed.

Web straps maybe substituted by 1 ¼ x .029 high tension steel bands or type 1A grade 6 polyester straps.

MULCH, CEDAR, PALLETIZED BAGGED FLAT CARS EQUIPPED WITH
PERMANENT END BULKHEADS AND PVC TREATED POLYESTER WEBBING
TIE-DOWN SYSTEM
CLEARANCE FILE MUST BE ISSUED BY ORIGINAL CARRIER IF
DIMENSIONAL

RAC 15000 (Concluded)
New. 12-2002 (Rev. 05-2016)

All web straps to be used.

Damage to product bags to be repaired prior to being placed on the rail car.

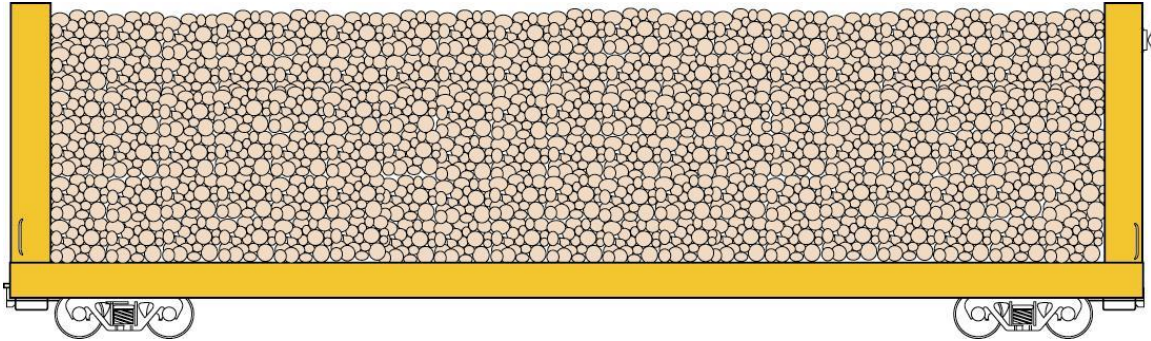
Damage to shrink wraps to be repaired by another layer of shrink wrap prior to placing on rail car.

All pallets to be of acceptable quality and strength and with no nails protruding which may damage product containment during transit.

See General Rules for further details.

LOGS, 8 TO 9 FT. IN LENGTH, HARDWOOD OR SOFTWOOD, FLAT CARS
WITH PERMANENT END BULKHEADS
(Restricted load)

RAC 15004
New 03-1997



- A The car floors must be flat and not equipped with permanent bearing pieces. Width of load must not exceed 9'-0" and must be centrally located at origin.
-In bulkhead flat cars not equipped with floors, logs may be loaded directly on the car stringers.
The bottom layer must be composed of full length logs of a larger diameter.
-Prior to loading, the car must be inspected to remove debris and inspected after loading to ensure that no parts of the load are protruding below the floor level.
- B Logs must be loaded parallel to bulkhead and must not extend above end bulkheads.
- C The minimum length of logs must not be less than 8'-0".
- D The diameter of the logs must not exceed 30 inches nor less than 3 inches.
- E Loads must not be moved at speeds exceeding 40 MPH .
- F At the Loading point and before entering census agglomeration areas, with population of at least 50,000, or any census metropolitan area, there will be a standing inspection to ensure the integrity of the load.

Statistics Canada states that:

A census agglomeration area (CA)

⇒ is delineated around an urban area having a population of at least 10,000.

A census metropolitan area (CA)

⇒ is delineated around an urban area having a population of at least 100,000.

LOGS, 8 TO 9 FT. IN LENGTH, HARDWOOD OR SOFTWOOD, FLAT CARS
WITH PERMANENT END BULKHEADS

(Restricted load)

RAC 15004 (concluded)
New 03-1997

- G In the event that logs are found to exceed the width of the car on inspections before entering census agglomeration areas, the cars shall be moved at speeds not exceeding 15 MPH to the first location where the load can be adjusted.
- H This pattern is only valid for movements that do not exceed 300 miles in Canada.

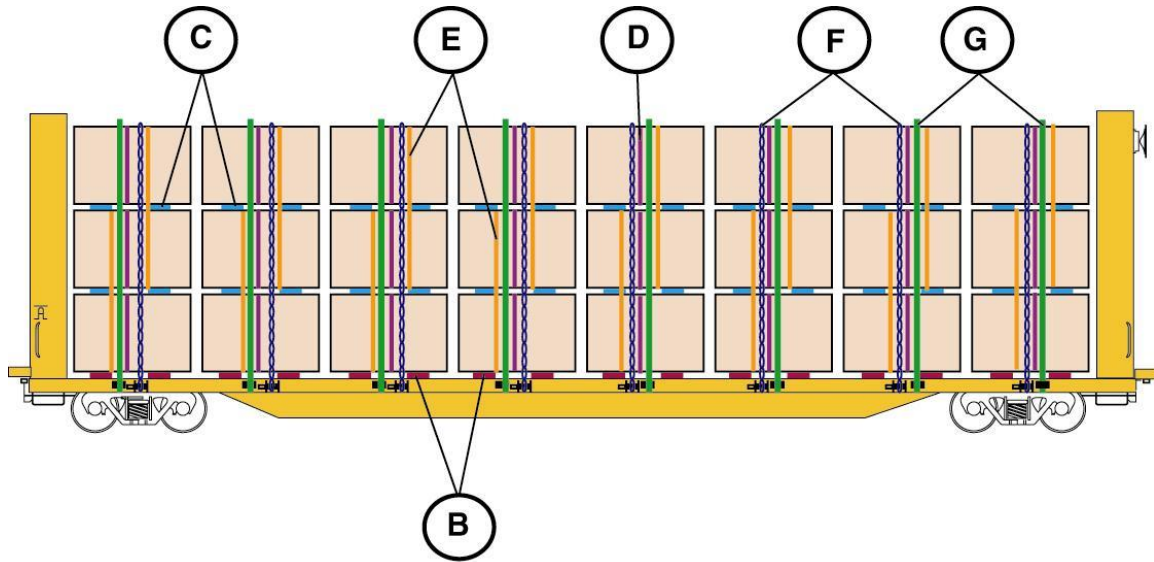
Notes:

1. There will be no voids, open space or loose logs in the body of the load which will allow the load to shift.
2. Large end of logs are to be alternated as required to maintain a level load on entire length of car. Limbs, knots, etc., must be trimmed as close to main stem as possible.
3. All logs must be nested and be of truncated cone shape, mushroom butts are prohibited.
4. Logs must not exceed the width of car en route.

See General Rules for further details

WOOD PACKAGES 6' LONG OR OVER FLAT CARS WITH PERMANENT
END BULKHEADS, STEEL STAKES AND CHAIN TIE-DOWN ASSEMBLY

RAC 15007
(New-03-1997)



Item	No. of Pcs.	Description
A		Vacant.
B	2 per pile.	Bearing Pieces: Lumber, 2 in. x 4 in. length to be equal to width of car floor, in one piece and preferably rough. Locate approximately 1 ft. in from ends of pile. Secure bottom piece to car deck with four (4) 16-D nails.
C	2 per package.	Separators: Lumber, 2 in. x 4 in. length to be equal to width of package, in one piece and preferably rough. Locate approximately 1 ft. in from ends of pile.
D	1 per package.	Package Bands: 1-1/4 in. x .035 in. high tension bands to encircle each package. Locate at center of package.
E	1 per package	Interlacing Bands: 2 in. x .044 in. high tension bands. Locate lower band of set under bottom layer encircling all packages in first and second layers. Locate next band of set to encircle top layer below and encircling third layer. Repeat until entire load is unitized. Locate each set as close as possible to center of package

WOOD PACKAGES 6' LONG OR OVER FLAT CARS WITH PERMANENT END
BULKHEADS, STEEL STAKES AND CHAIN TIE-DOWN ASSEMBLY

RAC 15007 (concluded)
(New-03-1997)

Item	No. of Pcs.	Description
F	1 per pile.	Chains: 3/8 in. diameter, grade 80. Minimum breaking strength 20,000 lbs.
G	1 pair per pile.	Steel stakes: Locate each set as close as possible to center of package.

ALTERNATE F:

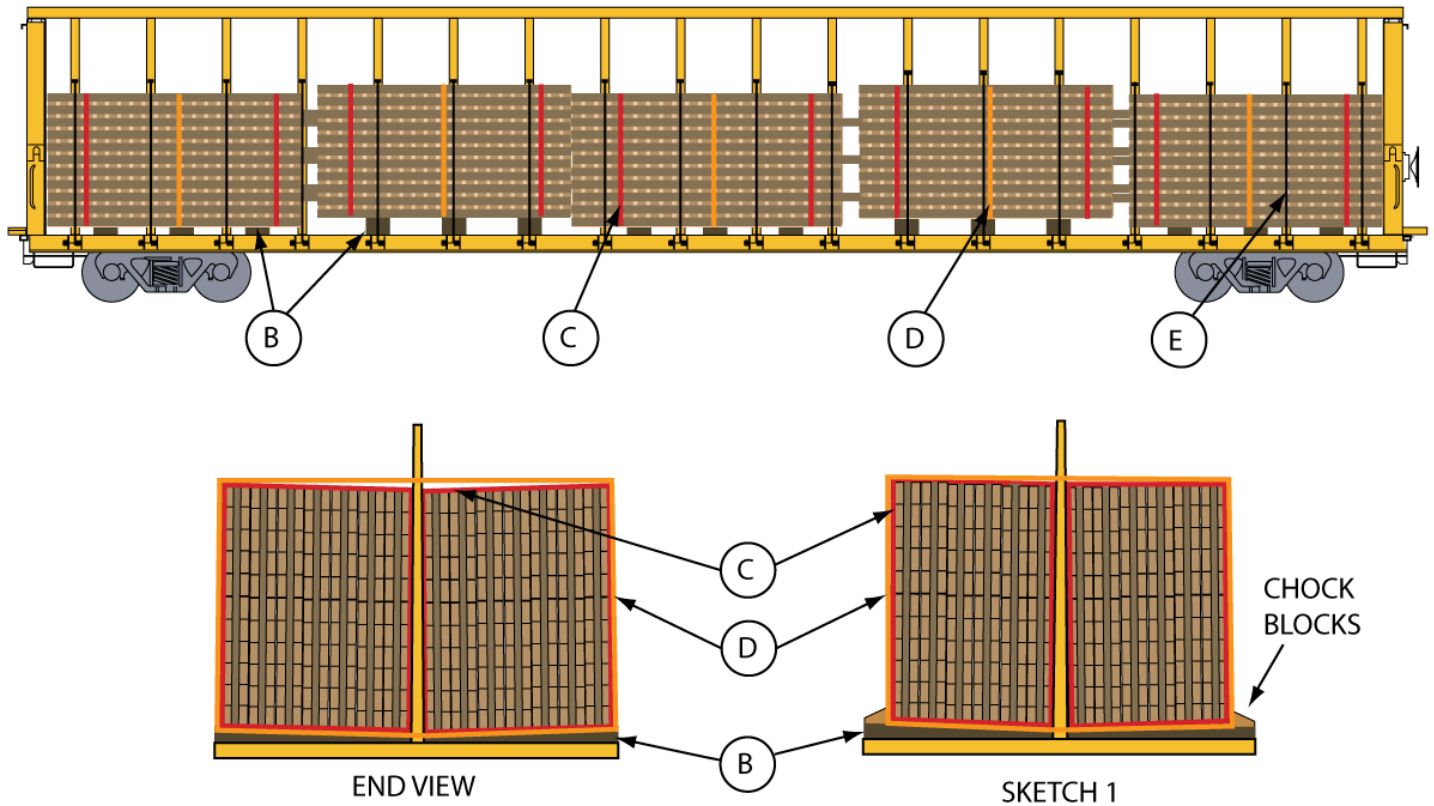
Item	No. of Pcs.	Description
F	1 per pile.	Cable: 3/8 in. diameter, grade 80. Minimum breaking strength 20,000 lbs. Winch assemblies must be equipped with a device to maintain tension. Prior to tightening there must be a minimum of 2 ½ wraps of cable around the winch drum.

Notes:

1. No cars in Canadian Fleet

See General Rules for further details

MATS, TILT-UP HARDWOOD, 8 FT LONG OR OVER CENTER A-FRAME
FLATCARS, WITH CABLE TIE-DOWNS
RAC 15008
Revised 03-2017



Item	No. of Pcs.	Description
A		Vacant
Alt. B	2 per 8' long package. Add 1 for each additional 4 ft.	Bearing pieces: lumber of one piece, preferably rough. Width must be 2 in greater than height and the length equal to width of railcar deck.
C	2 per package	Packages ties: 1 ¼" in. x 0.29 high tension encircling bands. Locate bands approximately 12" from end of mat.

MATS, TILT-UP HARDWOOD, 8 FT LONG OR OVER CENTER A-FRAME
FLATCARS, WITH CABLE TIE-DOWNS

RAC 15008
Revised 03-2017 (Continued)

Item	No. of Pcs.	Description
D	1 per side by side packages	Encircling bands: 1 ¼" in. x 0.29 high tension encircling bands. This band will pass through the centerbeam and encircle the stacks on the opposite side of the car. This band should not be cut until the stack is ready to be removed. It is designed to prevent the packages from tipping when the cables are removed.
E	Minimum 2 per each mat	Cables: Cables: 3/8 in. diameter, minimum of 8,800 lbs. Breaking strength. Cable assemblies must be equipped with edge protectors. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top of top package.

Alternate Item D - For cars equipped with polyester web-strap assembly systems.

Alt. D	2 per package 10 ft long or less. 3 if over 10 ft.	Web tie down straps: polyester webbing, 4-in. wide with 20,000 lb. Minimum Breaking Strength. Winches are to be located on each side of the car and spaced every 48-in. Place over load and secure to side winches at car side sill. Position straps perpendicular to winches. Prior to tightening, there must be at least 2 wraps of web strapping around the winch drum. Tension straps to obtain uniform tension using a 30 – 40-in. winch bar. All web tie-down components, including winches and webbing, must be inspected and applied in accordance with General Rule 20.
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Notes and Additional Requirements:

1. All tie-down cables that come into contact with the product must be used.
2. Tilt-up packages may not be stacked.
3. Packages should not be less than 40" wide.
4. On narrow load sections (less than 48") chocks are to be placed at base of package and secured to the bearing piece to hold base in place. In lieu of these chocks two extra item "D" may be utilized. (See **SKETCH 1**)
5. Voids, if any, must be in center of load

MATS, TILT-UP HARDWOOD, 8 FT LONG OR OVER CENTER A-FRAME
FLATCARS, WITH CABLE TIE-DOWNS
RAC 15008

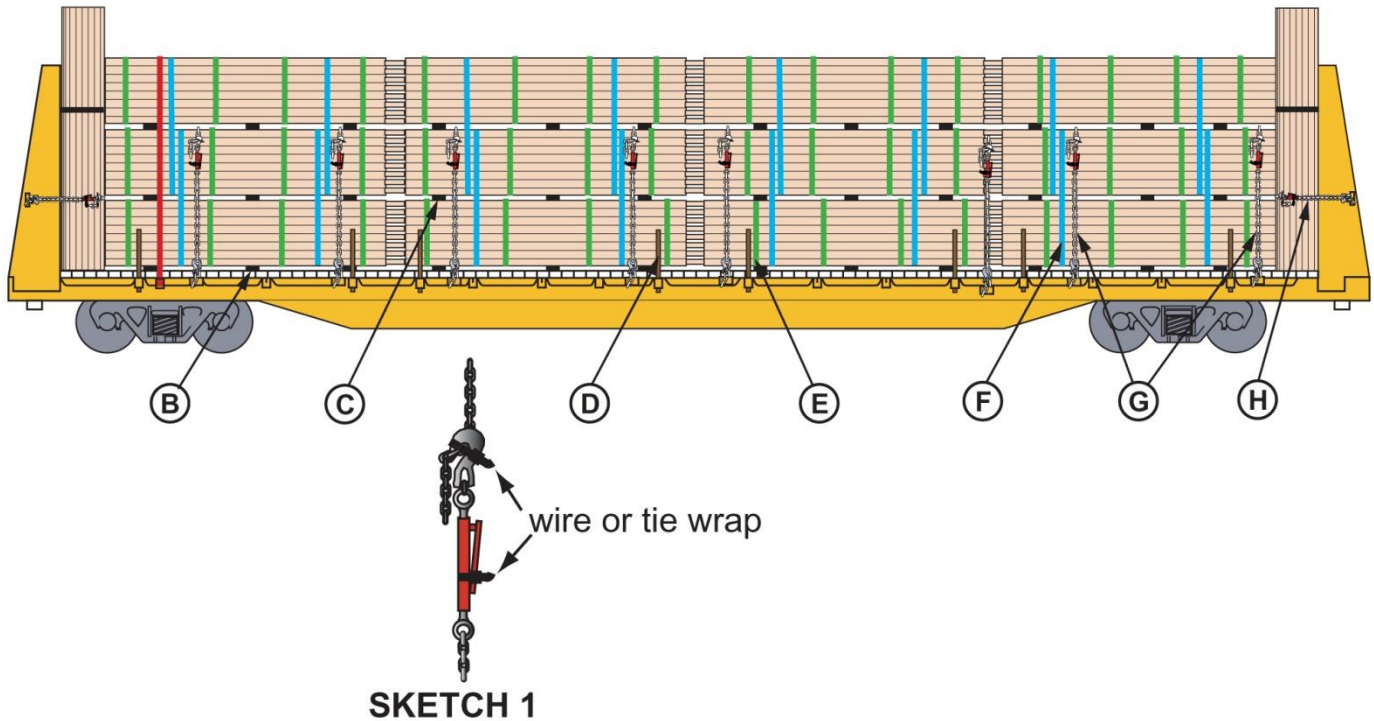
Revised 03-2017 (Concluded)

6. Packages must have sides square and be comprised of pieces of uniform width and thickness.
7. Mats must be placed tight against the A-Frame to prevent loosening of cables.
8. Mats must not overhang the outside edge of permanent bearing pieces by more than one half the width of the outside board in the mat on the bottom layer.
9. Dunnage must not be placed on top of permanent floor risers or bearing pieces.
10. Mats shorter than 8 ft in length are prohibited.

Reference the General Rules in Section 1 of the *Open Top Loading Rules Manual* for additional details.

MATS (SWAMP) PACKAGES LOADED ON FLAT CAR WITH PERMANENT END BULKHEADS

RAC 15009
New 11-2011



Item	No. of Pcs.	Description
A		Vacant
B	3 per pile	Bearing pieces: 2 in. x 4 in. lumber in one piece, preferably rough Length must be 6 in. greater than width of packages on each side but can't extend beyond the outside of stake pocket. Bearing pieces must be of uniform thickness. Two of the bearing pieces must be located between the stub stakes and nailed to the stakes with 3 ½ in. nails.
B1	2 by bearing pieces	Spacers : 2 in x 4 in lumber nailed on bearing pieces, Item B, to fill void between load and stakes.(Not illustrated)
C	3 per pile	Separators: lumber, 2 in. x 4 in. preferably rough. Locate 3 separators equally spaced under each packages.
D	2 per pile	Stub Stakes: They are 2 pieces of lumber 2 in. x 6 in. x 24 in. long nailed together and placed in stake pocket.

MATS (SWAMP) PACKAGES LOADED ON FLAT CAR WITH PERMANENT
END BULKHEAD
RAC 15009 (Concluded)
New 11-2011

Item	No. of Pcs.	Description
E	2 per package	Encircling packages bands: Four 1 ¼" in. x 0.29 high tension encircling bands. As needed, encircle 3 or 4 units to make a package. Seals must be of crimp type and not of notch type
F	2 per row	Encircling bands: 1 ¼" in. x 0.29 high tension encircling bands. Two bands must encircle a package of the bottom row to the package of the second row and two more bands must encircle the package of the second row to the package of the third row and so on. Place a band at least 6 in. from other band or bearing pieces if possible.
G	2 per pile	Tie down chains: 3/8 in. Grade 70 chains rated 26,400 MBS with binder of equivalent strength. Two chains per pile to be applied, chains are to pass between second and third packages in the pile and secured to the car.
H	1 per stand-up package	Tie down chain to end bulkheads: 3/8 in. Grade 70 chain rated 26,400 MBS with binder of equivalent strength. One chain per pile to be applied. Encircle packages and secure to anchorage point on end bulkheads.

NOTES :

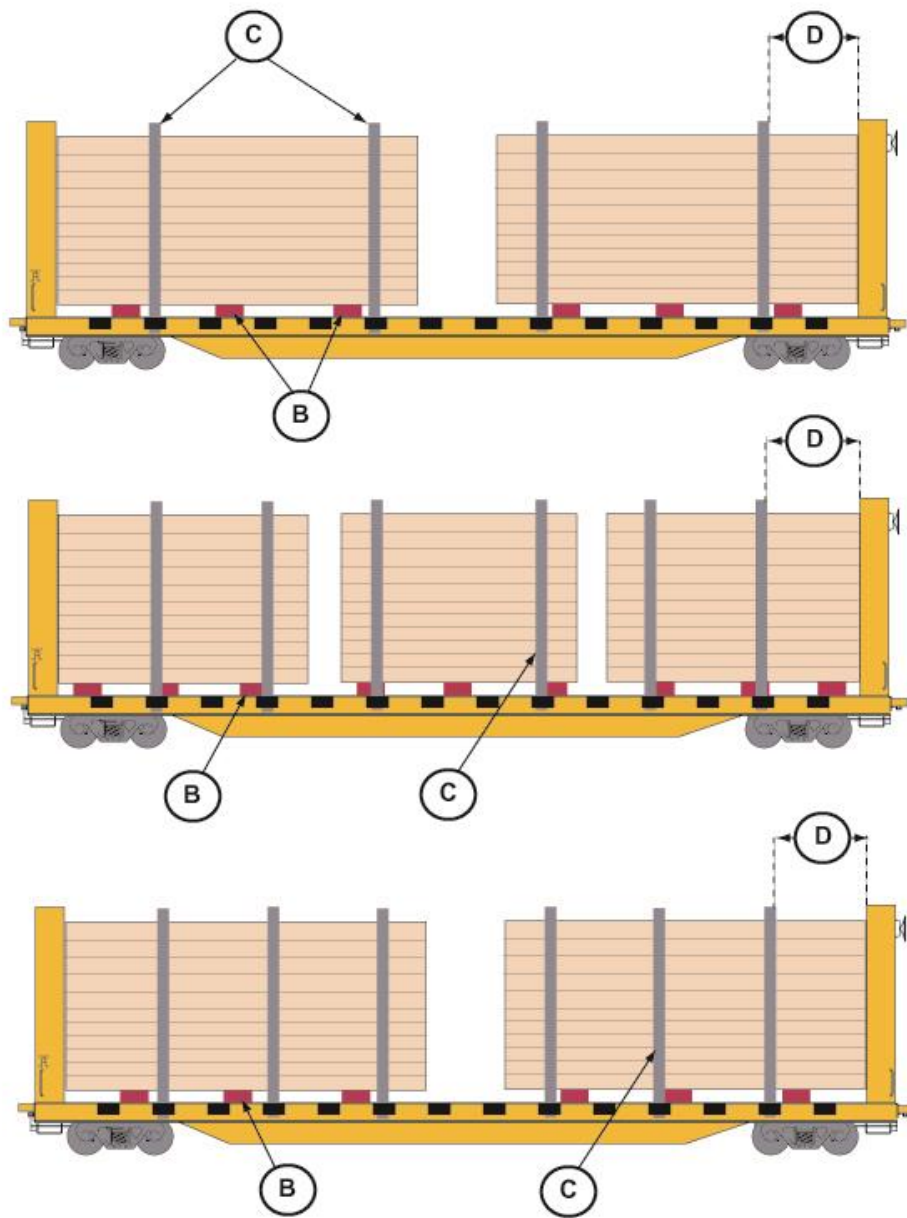
1. Packages consisting of 3 units of more or less 12 in. height with a, maximum package height 48 inches.
2. Pile: 3 packages placed uniformly with separators between each package.
3. Total weight of load must not exceed the capacity of the car.
4. For packages of 3 units placed standing up at each end of the car, chains must not be secured to car's safety appliances. (Handrail, step, coupling device etc...)
5. Ensure there are no kinks in chains and binding in the mats that can cause the chains from coming loose in transit.
6. Ensure chain hooks and binder hooks are wired to prevent them from coming loose.
(See SKETCH 1)
7. Ensure all interlacing bands are tight after chains are applied. If they are not - replace them.

8. Ensure all wood blocking at the stub stakes are in place, effective, and securely fastened.
9. Remove any other broken bands. Don't leave anything on the car that can be considered debris or make someone think there's a load shift.
10. This is a dimensional load. Carrier at origin must be advised before releasing the car.

See General Rules for further details.

LOGS AND/OR PULPWOOD, UNPEELED, HARDWOOD OR SOFTWOOD
8 FEET LONG OF OVER ON BULKHEAD FLATCARS, EQUIPPED WITH
PERMANENT STEEL SIDE STAKES

RAC 15011D
(New-06-2006) (Ref. AAR Fig. 11-D)



LOGS AND/OR PULPWOOD, UNPEELED, HARDWOOD OR SOFTWOOD
8 FEET LONG OF OVER ON BULKHEAD FLATCARS, EQUIPPED WITH
PERMANENT STEEL SIDE STAKES

RAC 15011D (Concluded)
(New-06-2006) (Ref. AAR Fig. 11-D)

Item	No. of Pcs.	Description
A		Vacant.
B	2 per pile. (optional)	Bearing pieces: steel or wood
C	2 pairs per pile.	Side stakes: steel, permanently attached to car.
D	As required.	Distance from face of bulkhead to closest side of first stake

Notes:

1. Total void between all piles must not exceed Item D.
2. Load must be level for entire length of pile.
3. Pieces must be fully nested and butts alternated to equalize load.
4. Pieces up to 4 ft less than pile lengths must be nested within piles 20 ft long or over.
5. Pieces 4 ft shorter than pile length are prohibited.
6. Loads containing two piles must be loaded perpendicular to and against bulkheads.
7. Loads consisting of three or more piles must have end piles loaded against bulkheads and inner pile or piles equally spaced between end piles.
8. All limbs, knots, etc., must be trimmed from main stem of wood.
9. All outside pieces in a pile must contact side stakes.
10. Piles must not exceed height of side stakes and/or end bulkheads.

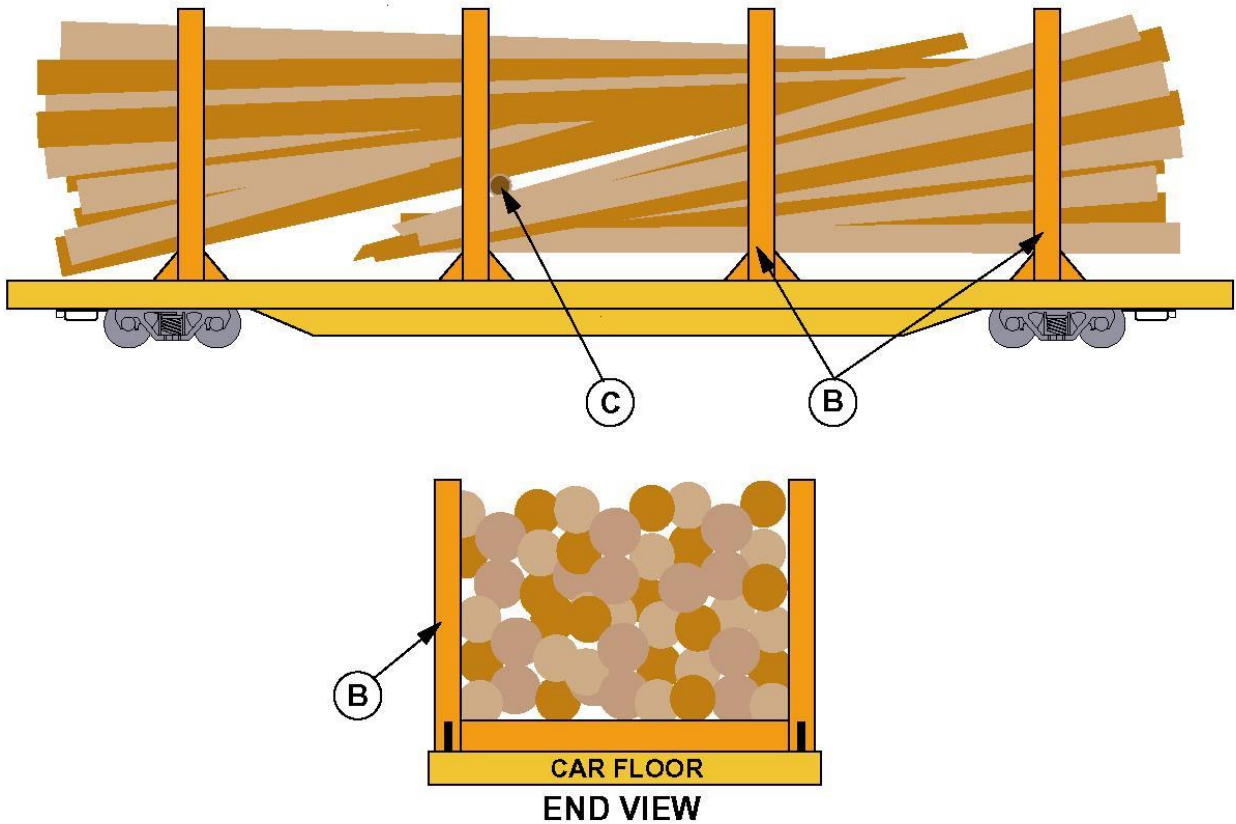
See General Rules for further details

LOGS LOADED ON FLAT CARS WITH PERMANENT BUNKS

RESTRICTED LOAD, 35 MPH

RAC 15012

New 06-2003



Item	No. of pieces	Description
A	Load distribution	Load should be centrally located on car but must not be closer than 2 ft the B end of car and 1 ft from opposite end of car. On flat cars with side-mounted hand brakes, the load may be located no closer than 1 ft from B end of car.
B	4 per pile	Bunks: cars are equipped with permanent bunks.
C	1 per load	Splitter log: splitter log to be placed crosswise between the 2 piles and located between the second and third bunk. It must not exceed the width of the bunk's vertical post.

LOGS LOADED ON FLAT CARS WITH PERMANENT BUNKS
RESTRICTED LOAD 35 MPH

RAC 15012 (Concluded)
New 06-2003

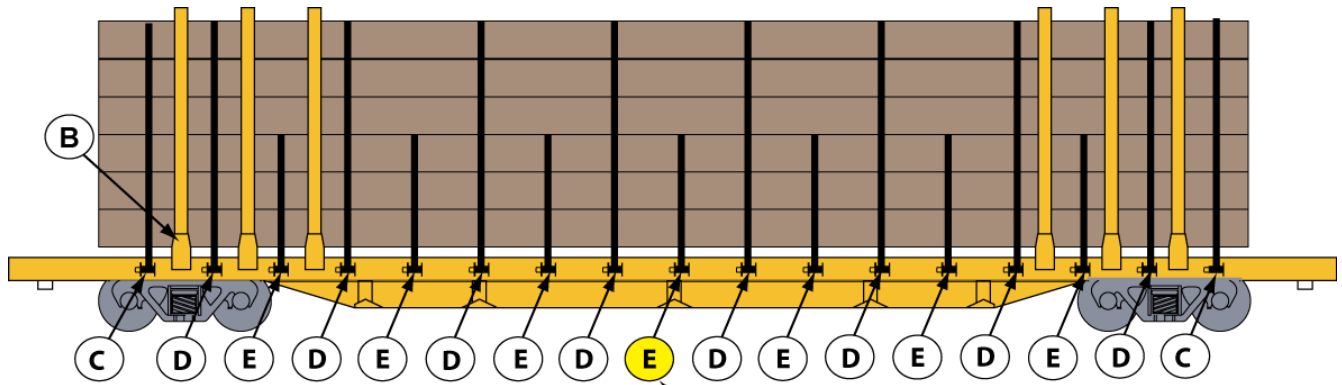
Notes:

1. Stacks of logs must overlap a minimum of 8 ft in center of load.
2. Logs must be loaded parallel to length of car and nested. All voids and open spaces within the load must be kept to a minimum.
3. All outside logs in stack must contact at least three side stakes. Shorter lengths not less than 50% of stack length may be nested within the stacks.
4. All limbs, knots, etc. must be trimmed from main stem of wood.
5. Logs must not be loaded above side stakes.
6. Logs must not extend beyond outside width of bunks.
7. Train speed is restricted to 35 MPH

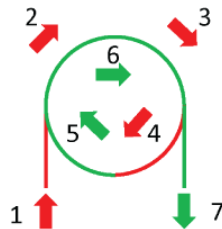
See General Rules for further details

POLES, ROUND STOCK, 89 FT FLATCARS, EQUIPPED WITH CUSHIONED UNDERFRAME, SIX PAIR OF STEEL SIDE STAKES/BUNKS, WEB STRAP AND WINCHES

RAC 15026
Revised May 2017



SEE NOTE 11



SKETCH 1

APPLICATION OF ITEM C

Item	No. of Items	Description
A		Vacant
B	1 per each bunk.	Bearing pieces: hardwood, 4 in. x 8 in. x length equal to car deck width, secured in bunk channel with four 20-D nails at nail hole locations.
C	2 each choker around entire load	Web straps: 4 in. polyester, with a minimum breaking strength of 20,000 lb. End straps: position straps as shown in above drawing. Apply over top of entire load, from winch up and over top to opposite side, run strap under load and over top to opposite winch being careful not to overlay strap on itself. Tension straps from both sides of car using a 30- to 40-in. winch bar or equivalent. See SKETCH 1, "APPLICATION OF ITEM C."

POLES, ROUND STOCK, 89 FT FLATCARS, EQUIPPED WITH CUSHIONED
UNDERFRAME, SIX PAIR OF STEEL SIDE STAKES/BUNKS, WEB STRAP
AND WINCHES

RAC 15026 (Continued)
Revised May 2017

Item	No. of Items	Description
D	8 each over top of entire load	Web straps: 4 in. polyester, with a minimum breaking strength of 20,000 lb. Position straps as shown in above drawing. Apply strapping as follows over entire load, from winch to opposite winch of railcar. Tension straps from both sides of car using a 30 to 40 in. bar or equivalent.
E	6 each over bottom half of load	Web Straps: 4 in. polyester, with a minimum breaking strength of 20,000 lbs. Position straps as shown in drawing. Apply strapping as follows over bottom half of load, from winch to opposite winch of railcar (apply light tension to straps then place the remainder of load on rail car). When loading is completed, tension straps from both sides of car using a 30 to 40 in. bar or equivalent

NOTES:

1. On a single load, no pole may be longer than 80 ft. 0 in. Longer poles require idler cars.
2. Loads to be centered on car when idler car not required.
3. Nest poles fully and alternate butts to equalize load.
4. All outside pieces must contact side stakes with no outside poles to be no shorter than 65 ft.
5. Load to be crowned 18 in. in centre so that maximum use is made of the Web Straps.
6. When load contains poles of varying lengths, longest poles are to be in the lower portion of the load. Non-overhang end of load must maintain 4 ft. of clearance to end of rail car.
7. Poles must extend a minimum of 2 ft. beyond inside edge of end bunks.
8. Excess ends of web straps or unused straps to be secured to prevent hanging or dragging in transit.
9. In the event that car is equipped with insufficient or inoperative winches, Type 1A Grade 8 nonmetallic strap may be used as a supplement for up to 3 locations. On 89 ft cars equipped with only 16 winches, place this strap at the center location (between winch, 8, and 9) as per drawing. Type 1A Grade 8 nonmetallic strap to be secured to a D Ring or Stake Pocket.

POLES, ROUND STOCK, 89 FT FLATCARS, EQUIPPED WITH CUSHIONED
UNDERFRAME, SIX PAIR OF STEEL SIDE STAKES/BUNKS, WEB STRAP
AND WINCHES

RAC 15026 (Concluded)
Revised May 2017

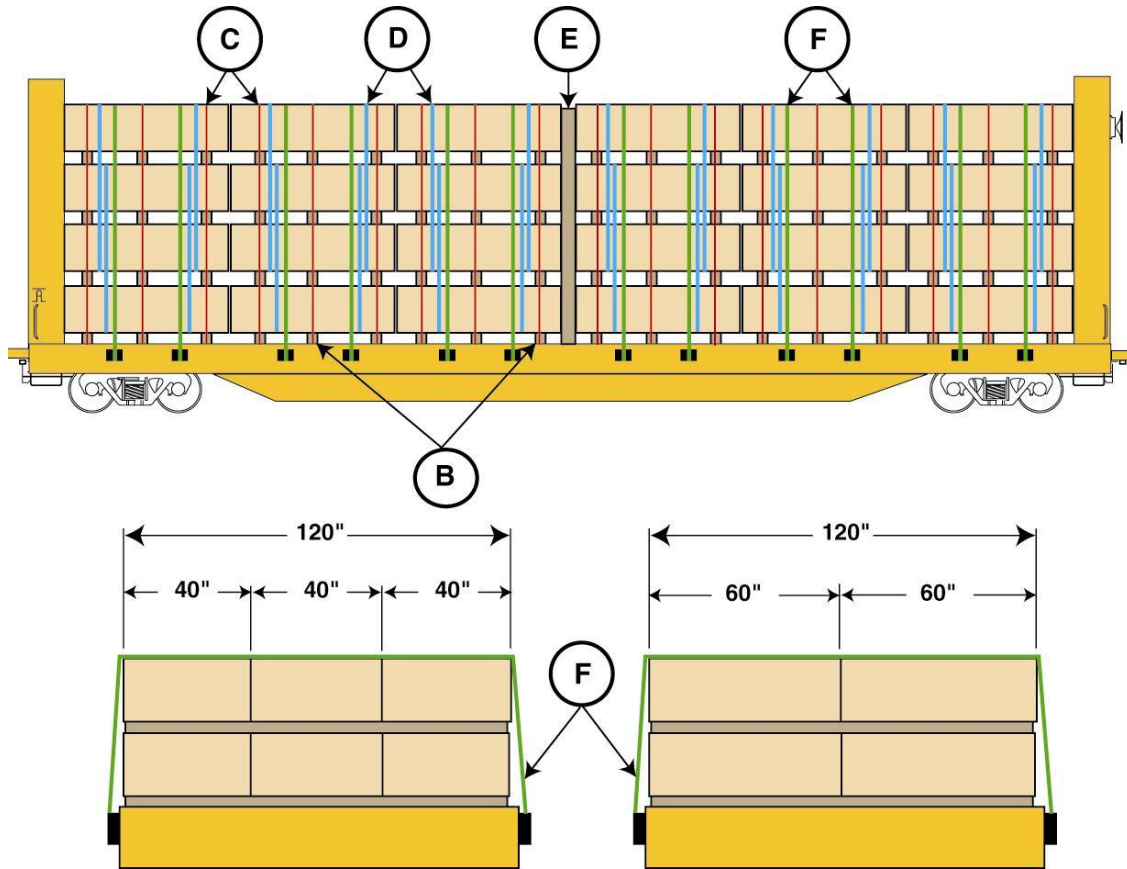
10. For loads requiring idlers, add one 2 in. x 0.044 in. high-tension steel encircling band 3 ft from each overhanging end. May be substituted with approved Type 1A Grade 7 non-metallic strap.
11. On Rail Cars equipped with 17 sets of winches, the centre winch (9) may be utilized for an additional **Item E** web strap as shown in above drawing.
12. On loads 75 ft and longer in length, use all winches with the additional outboard straps applied in the C configuration.
13. For pole lengths 65 ft. to 75 ft., minimum straps to be used is 15 applied in the same order C, D and E as stated above with the exception that a type 1A Grade 8 may be applied at the centre point to make up for shortage of winch. Strap to be secured to a D ring or stake pocket of rail car.

For further details, see General Rules

PANEL PRODUCTS IN PACKAGES, UNIFORM LENGTH, 8 FT OR OVER,
UNIFORM WIDTH PACKAGES, FLATCARS WITH PERMANENT END
BULKHEADS

RAC 15035

Rev. 09-1996 (Ref: AAR Fig.35)



Item	No. of pieces	Description
A		Vacant

B	<p>3 per package 8 ft long.</p> <p>4 per package over 8 to 10 ft or less.</p> <p>5 per package over 10 to 14 ft or less.</p> <p>Over 14 ft add one for each additional 2 ft or less.</p>	<p>Bearing pieces: Lumber or laminated particleboard. The height of bearing pieces may be equal to but no greater than their width and must have a minimum width of 3 in., length equal to width of package. Secure to bottom of each package with one Item C. Laminated particleboard must be fastened together with a minimum of three nails or staples, length equal to thickness of laminated particleboard.</p>
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PANEL PRODUCTS IN PACKAGES, UNIFORM LENGTH, 8 FT OR OVER,
UNIFORM WIDTH PACKAGES FLATCARS WITH PERMANENT END
BULKHEADS

RAC 15035 (continued)
Rev. 09-1996 (Ref: AAR Fig.35)

Item	No. of pieces	Description
C	1 per each Item B.	Package ties: 5/8 in. x .020 in. high tension bands. Locate 12 in. to 24 in. from each end of package with intermediate bands equally spaced between. Apply around package and Item B.
D	2 per each outside top package, 2 per each outside bottom package.	Unitizing bands: : 1 1/4 in. x .029 in. high tension bands. Two tiers: Bind the side-by-side packages in the top tier to the side-by-side packages in the bottom tier by encircling them with two bands spaced approximately 24 in. from ends of packages. Three or more tiers: Bind the side-by-side package in the top tier to the side-by-side packages in the intermediate tier(s) by wrapping them with two bands spaced approximately 24 in. from ends of packages. Then bind the side-by-side packages in the bottom tier to the side-by-side packages in the intermediate tier(s) by wrapping them with two bands spaced approximately 16 in. from the ends of packages.

E	As required	<p>Vertical filler: to be positioned to fill void at centermost part of load. Void 12 in. or under may be filled with upright sheets of particleboard and two inflatable dunnage bags. When total void exceeds 12 in., centermost void may be reduced by sheets of particleboard secured to bulkhead by : 1 ¼ in. x .029 in. bands and/or by one pile loaded crosswise. Top of void to be covered by sheet of particleboard reaching piles on either side of void and secured under unitizing bands.</p> <p>Crosswise pile, when used, to be completely encircled by two 1 1/4 in. x .029 in. high tension bands.</p>
F	2 per pile 8 ft long or less. Add one for each additional 4 ft or less.	<p>Load retaining bands: 1 ¼ in. x .029 in. high tension bands. Secure to lading strap anchors, stake pockets or constant tensioning devices if car is so equipped. Crosswise package less than 4 ft wide must be unitized together by two 1 ¼ in X .029 high tension bands. Crosswise package must be of uniform length and width.</p>
Alt. D	2 per each outside top package.	<p>Encircling bands: 1 ¼ in. x .029 in. high tension bands. Encircle all side-by-side packages in a pile and locate approximately 24 in. from ends of packages. May be substituted for Item D unitizing bands only when load is 3 tiers high or less. Not shown on drawing.</p>

PANEL PRODUCTS IN PACKAGES, UNIFORM LENGTH, 8 FT OR
OVER, UNIFORM WIDTH PACKAGES FLATCARS WITH PERMANENT END
BULKHEADS

RAC 15035 (concluded)
Rev. 09-1996 (Ref: AAR Fig.35)

Item	No. of pieces	Description
Alt. F	2 per 8 ft long or less. Add one for each additional 4ft or less. 1 per pile 4 ft wide or less if loaded crosswise	Web tie down assemblies: Polyester webbing 4 inch wide with a minimum breaking strength of 20,000 lbs. See general rule of AAR section 1.

Notes:

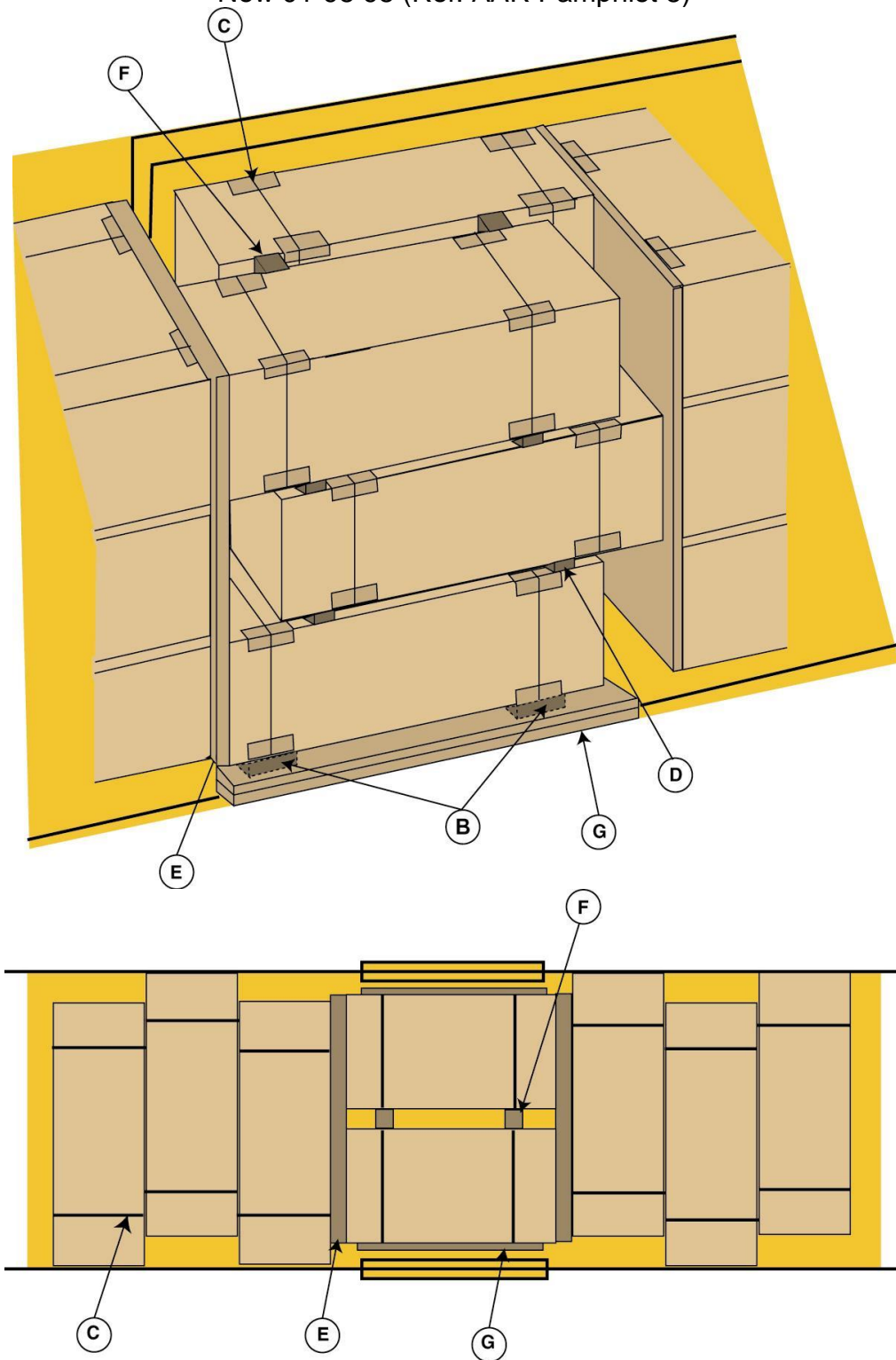
1. Height of load not to exceed height of bulkheads.
2. Disposable pneumatic dunnage adequately secured to prevent displacement may be used when 12 in. or less of lengthwise void remains in the car. Minimum of two bags to be placed upright or crosswise between buffer material. Minimum of two 1/4 in. hardboard sheets extending to height and width of load to be placed each side of bag. Bags to extend 1 in. from floor of car to top of load. Bags to be inflated initially to 8 psi. Bags must be minimum 6 ply. Bags may not be used in tandem (inflated face to inflated face). Bag placement will be between piles nearest the midpoint between bulkheads. Protective cover, if used, must be adequately secured to prevent dislodgement.
3. Packages may not exceed width of car deck.
4. Deck of flat car must be free of debris, snow, and ice before loading
5. MDF is acronym for Medium Density Fibreboard, a wood composite base of sheet product, and is a recognized industry term. When lumber securement items in this figure refer to particle board, MDF product may be substitute. MDF product, if loaded or used with this figure, must be uncoated.

See General Rules for further details

PANEL PRODUCTS IN BOX CARS

RAC 25050

New 01-98 98 (Ref: AAR Pamphlet 8)



PANEL PRODUCTS IN BOX CARS
 RAC 25050 (continued)
 New 01-98 (Ref: AAR Pamphlet 8)

Item	No. of Pcs.	Description
A		Vacant.
B	2 per pile.	Bearing Pieces: Lumber, 2 in. x 4 in. Locate approximately 1 ft. in from ends of pile.
C	2 per package	Package ties: high tension bands or wire with a minimum breaking strength of 1 600 lbs. For packages 26 in. or less in height the minimum breaking strength should be 1,275 lb. Locate one tie about 12 in. from each end of the package.
D	2 per package.	Separators: minimum of two separators per package. They must be made of lumber 2 in. x 4 in. and their height must not be greater than their width. Their length must be equal to the width of the package and they must be in one piece. Locate them approximately 12 in. from each end of the packages. Separators may be secured to the top or the bottom of the packages in the bottom and intermediate layers with packages ties.
E	1 per lengthwise stacks	Separator sheet: install sheets across the face of the last crosswise stack in each end of the car. This will prevent coring and interlocking of lading.
F	2	Vertical stabilizers: place 2 in x 4 lumber in between last two stacks in the second doorway row.
G	1	Risers: place 2 in. x 4 in. lumber under the packages loaded lengthwise in the doorway. This will help to reduce lift coring by tilting the stacks toward the center of the car and away from the doors.

Notes:

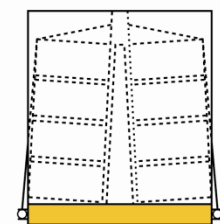
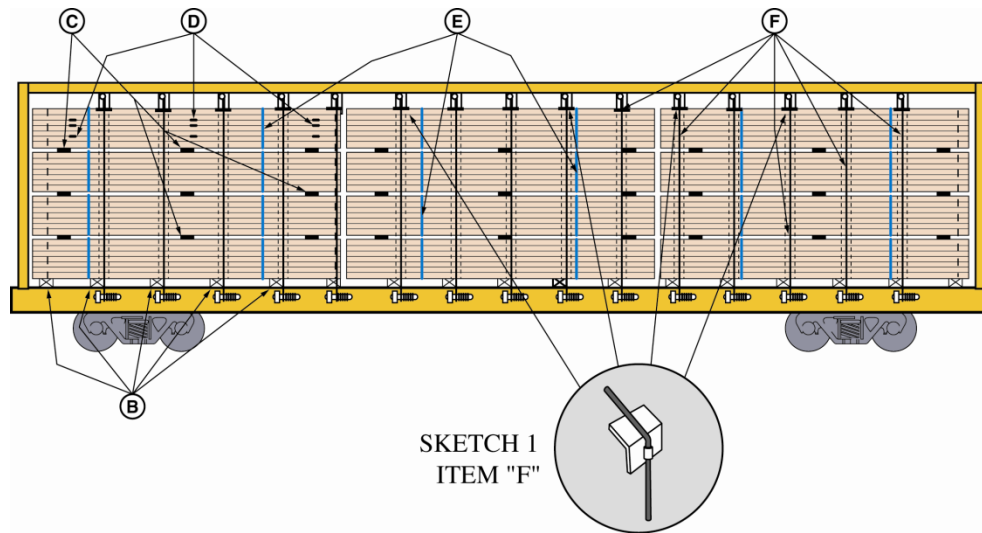
1. Crosswise stacks in the end of the car are alternately loaded against opposite sidewalls. This method has been found to reduce coring of the packages in transit.
2. Load the lengthwise packages in the row opposite the loading doorway so that the layers are alternately placed to opposite ends of the rail car.
3. Load the next doorway row so that the packages are positioned to the opposite end of the car as the corresponding package in the first doorway row.

See General Rules for further details

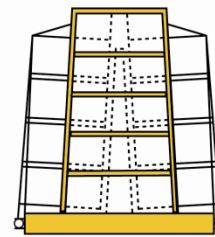
LUMBER IN PACKAGES, 8FT. LONG OR OVER FLAT CARS WITH CENTER
A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN
SYSTEM.

RAC 15054

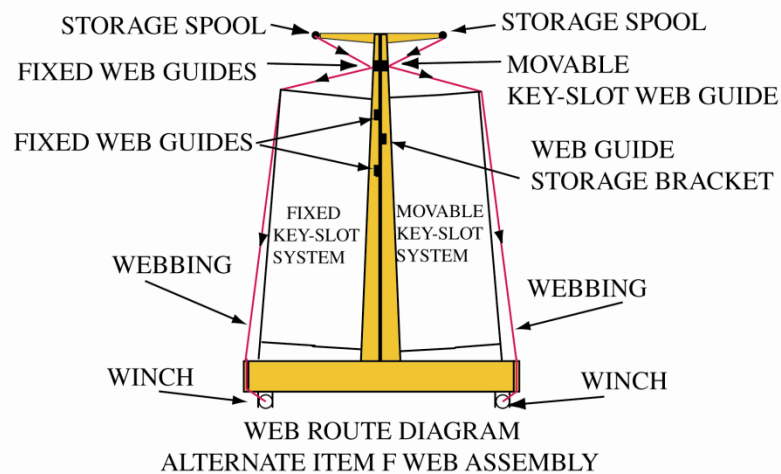
Rev. 03-2007 (Ref: AAR Fig. 54)



END VIEW
FULL BULKHEAD



END VIEW
PARTIAL BULKHEAD



LUMBER IN PACKAGES, 8FT. LONG OR OVER FLAT CARS WITH CENTER
A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN
SYSTEM.

RAC 15054 (continued)
Rev. 03-2007 (Ref: AAR Fig. 54)

Item	No. of Pcs.	Description
A		Vacant
B	2 per package, 8 ft. long or less	Bearing pieces: cars are equipped with permanent floor bearing wedged 90 degrees to the A-frame.
C	2 per package, 16 ft long or less 3 if over 16 ft. long	Separators: lumber, 2 in. x 2 in. minimum. Height must not exceed width. Length must be equal to width of package. All separators in same layer must be in one piece. Locate approximately 18 in. from each solid end of package, with others when needed, equally spaced in between. Separators with minimum width of 3 in. may be secured to top or bottom of package with Item "E" package ties. When attached to top of packages in the top layer of load, each separator must be secured to the package with one 10-D nail. (Use of separators optional.)
D	Optional	Stickers: When used they must be uniform thickness throughout. Length of sticker must be equal to width of package.
E	2 per package	Package Ties: 1600 lbs. minimum breaking strength, high-tension bands or wire, except on 2 ft. x 4 ft. wide package, high-tension bands or wire with minimum breaking strength of 1275 lbs. Locate one tie about one-fourth the length from each end of package. This banding may be substituted with approved non-metallic strapping as permitted in General Rule 19 of Section No.1.
F	2 per each top package 10 ft. or less 3 per each top package over 10 ft.	Cables: 3/8 in. diameter, of 8,800 lbs. minimum breaking strength. Cable assemblies must be equipped with edge protectors (Sketch 1).. Prior to tightening, there must be a minimum of 2-1/2 wraps of cable around the winch drum. When practical, all cables must be used, and must be free of kinks and tangles. Cable must be winded level on spool to avoid crossed cables. Tension to be applied with the use of an 18-inch bar or 3/4 inch ratchet. Cables are to be secured to A-frame in slot nearest to top of package.

LUMBER IN PACKAGES, 8FT. LONG OR OVER FLAT CARS WITH CENTER
A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN
SYSTEM.

RAC 15054 (continued)
Rev. 03-2007 (Ref: AAR Fig. 54)

Alternate Item B—For cars not equipped with permanent bearing pieces

Item	No. of Pcs.	Description
Alt B	Min. 2 per package 8 ft long or less. Add 1 for each additional 4 ft.	Bearing pieces: lumber of one piece, preferably rough. Width must be 2 in. greater than height and the length equal to width of bottom package. Locate approximately 18-24 in. from each end of package with remaining pieces equally spaced. May be attached to package with Item E package ties.

Alternate Item F—For cars equipped with polyester top-mounted web-strap assembly and storage system

Item	No. of Pcs.	Description
Alt F	2 per each top package 10 ft long or less. 3 per each top package over 10 ft.	Web tie-down assemblies: polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Web assembly must be an approved eave- or top-mounted web-strap assembly and storage system as listed in General Rule 20.11. Refer to end view of illustration for application of tie-down strapping. During application, all web strapping must be pulled from the top-mounted anchor and storage spool. The web must be routed through the web guide closest to the top of the load, over the load, and then to the fixed winch on the side sill. The winch directly in line with the top-mounted anchor and storage spool must be used. Thread at least 6 in. of webbing through the slot in the winch mandrel. Prior to tightening, there must be a minimum of 2 wraps of webbing around the winch mandrel. The strap is to be tensioned by the effort of one person using a winch bar 30 in. to 40 in. long. When practical, all straps must be used.

LUMBER IN PACKAGES, 8FT. LONG OR OVER FLAT CARS WITH CENTER
A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN
SYSTEM.

RAC 15054 (continued)
Rev. 03-2007 (Ref: AAR Fig. 54)

Notes and Additional Requirements:

1. Voids, if any, must be in center of load and kept to a minimum. Layers differing in combined length resulting in longitudinal void space are to be configured so as to locate layers with the greatest void at the top of the load and descending in void length toward the bottom. Void spaces in excess of 12 in. must not be bridged or overlapped with package above.
2. Top packages on either side of a void space greater than 4 ft must be protected with the following method to prevent package coring.

Compression package band: 1 1/4 in. x .029 in. high tension band. Apply one band to top packages on either side of a void space greater than 4 ft. Locate near the center of the package as shown in **sketch 3**. In accordance with **sketch 3**, apply two compression blocks, one on top of the package and one on the side of the package facing away from the centerbeam. Blocks are to be lumber, minimum 2 in. x 4 in., length equal to about 1/3 the width of the surface to which they are to be applied. Position each block centrally across the package surface as shown. Secure each block with a minimum of two nails. The nail length must be sufficient to penetrate package material at least 1 in., and have about 3/4 in. remaining above the block. Encircle the package with the band, placing it over both blocks, then bend the nail heads over the band as shown.
(Sketch 3)

3. Finished packages must have sides square and must be composed of pieces of uniform width and thickness. All packages must be loaded with the squared end towards ends of car.
4. The packages must be placed tight against the A-frame to prevent loosening of cables.
5. Packages must not exceed 48 in. in height. Overlapping of mixed height packages is permitted, provided the layer is maintained at an even height without the use of laminated separators.

LUMBER IN PACKAGES, 8FT. LONG OR OVER FLAT CARS WITH CENTER
A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN
SYSTEM.

RAC 15054 (continued)
Rev. 03-2007 (Ref: AAR Fig. 54)

Notes and Additional Requirements:

6. Dunnage, attached or otherwise, must not be placed on top of permanent floor risers or bearing pieces.
7. Bottom packages must not overhang the outside edge of permanent bearing pieces by more than one half the width of the outside board in bottom packages
- 8 Packages 6 ft. long must not be located in the top or bottom layers.
.
- 9 Packages shorter than 6 ft. long are prohibited.
.
10. When lumber of unequal lengths is included in the same package, the following variances are allowable:
 - Solid 6 ft. packages may include 8 ft. lengths.
 - Solid 8 ft. packages may include 10 ft. lengths.
 - Solid 10 ft. packages may include 12 ft. and 14 ft. lengths.
 - Solid 12 ft. packages may include 14 ft. and 16 ft. lengths.
 - Solid 14 ft. packages may include 16 ft. and 18 ft. lengths.
 - Solid 16 ft. packages and over may include additional lengths up to 6 ft. longer.
11. Height of load must not exceed height of A-frame.

12. When load consists of mixed width packages, wide packages must be placed on bottom tiers with narrow packages above.
13. When shipping 2 in. x 2 in. material, 3 ft. or 4 ft. length, in package 6 ft. or 8 ft. in length refer to **Sketch 4** with accompanying specifications and notes.
14. Missing or broken cable and/or winch can be substitute with Type 1A grade 8 Polyester straps
15. Missing or broken cable and/or winch can be substitute with Type 1A grade 8 Polyester straps.

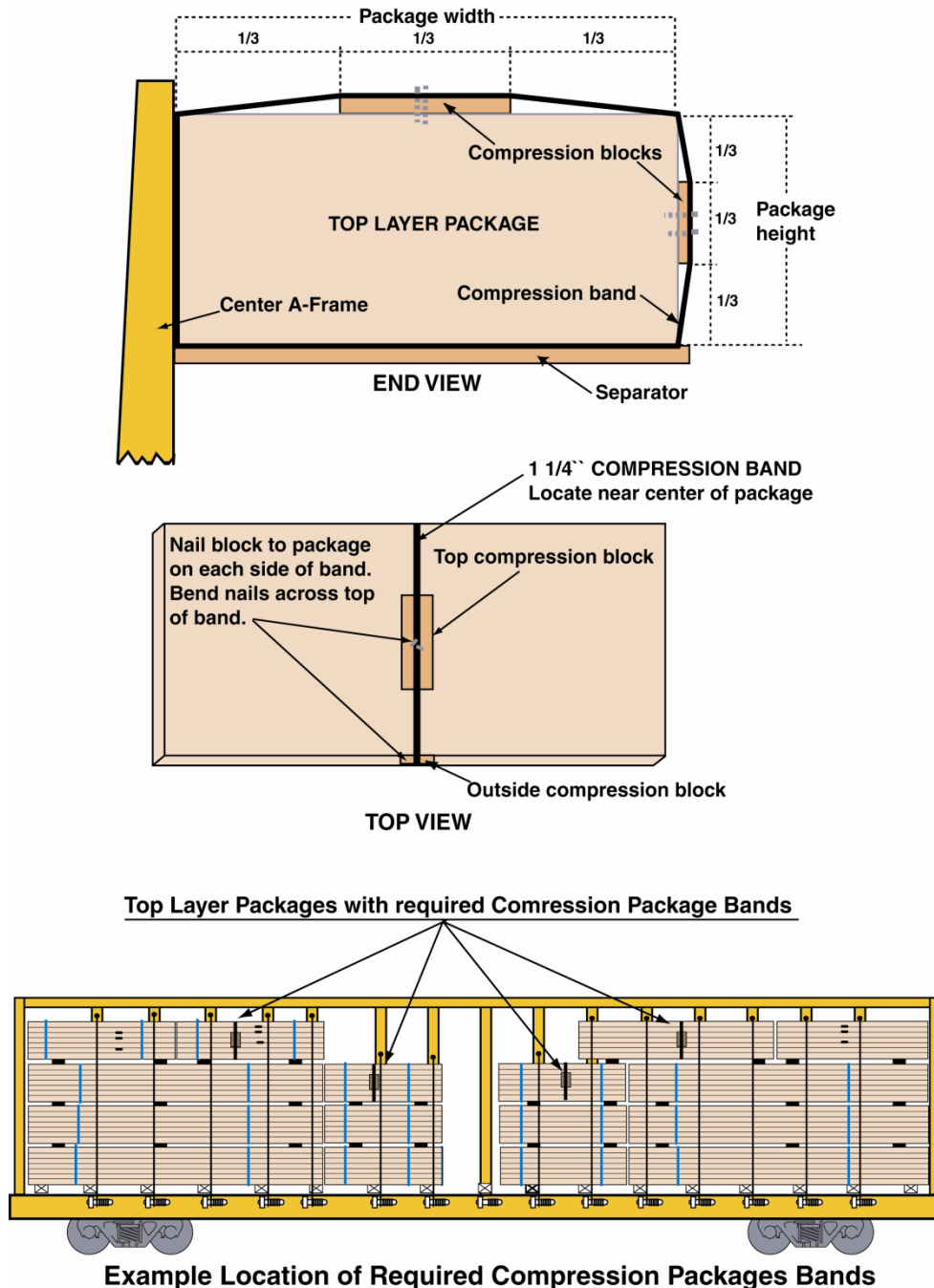
See General Rules for further details.

LUMBER IN PACKAGES, 8FT. LONG OR OVER FLAT CARS WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 15054 (continued)
Rev. 03-2007 (Ref: AAR Fig. 54)

Sketch 3

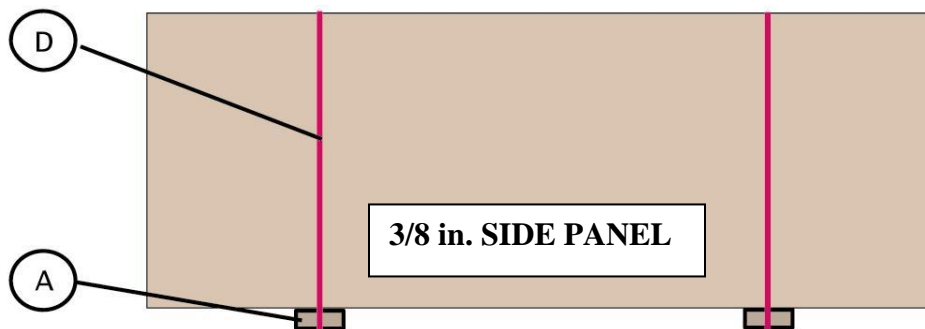
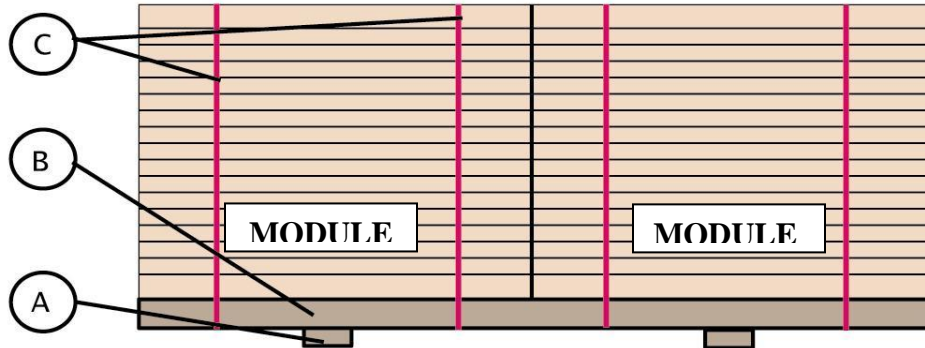
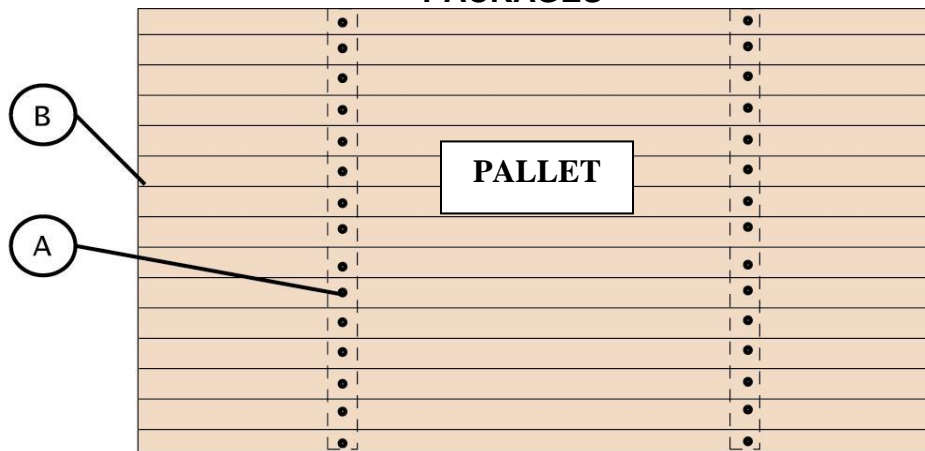
COMPRESSION BAND AND COMPRESSION BLOCKS



LUMBER IN PACKAGES, 8FT. LONG OR OVERFLAT CARS WITH CENTER A-FRAME, PERMANENT ENDBULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 15054 (continued)
Rev. 03-2007 (Ref: AAR Fig. 54)

Sketch 4
METHOD FOR SHIPPING 3 OR 4-FT LUMBER COMBINED IN 6-FT TO 8-FT PACKAGES



**LUMBER IN PACKAGES, 8FT. LONG OR OVERFLAT CARS WITH CENTER
A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN
SYSTEM.**

RAC 15054 (Continued)
Rev. 03-2007 (Ref: AAR Fig. 54)

Pallet Description

Item	No. of Pcs.	Description
A	2 per each package	Lumber, 2 in. x 4 in., length equal to width of package. Locate each approximately $\frac{1}{4}$ length in from each end of Items "B".
B	14	Lumber, 2 in. x 4 in., length equal to length of package. Secure each piece to each Item "A" with one (1) 10-D nail.
C	2 per each module	Each module consists of 30 pieces wide and 15 pieces high. To provide added stability, stickers of uniform thickness must be applied on two levels within the module. Two modules are located end-to-end on pallet and each secured with two (2) $\frac{3}{4}$ in. x .020 in. high tension bands located approximately 6 in. from each end encircling each module and pallet.
D	2 per each package	$\frac{3}{8}$ in. Oriented Strand Board, Chipboard, Aspenite or Plywood. Side panels must be full length and height of packages. Secure each to pallet with four (4) 6-D nails equally spaces. Apply two (2) $\frac{3}{4}$ in. x .020 in. high-tension bands. Located approximately 2 ft. in from each end encircling module, sides and pallet.

Notes:

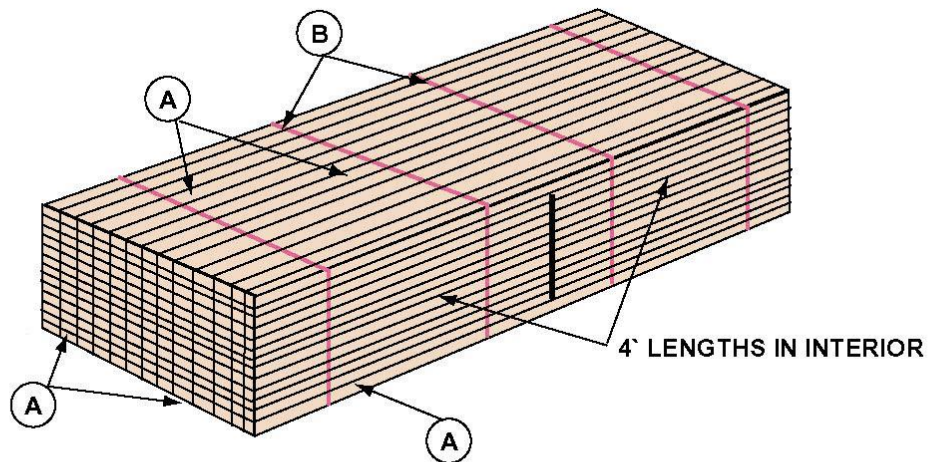
1. Package size not to exceed 2 ft x 4 ft.
2. Packages will consist of a pallet, modules, package sides and be wrapped and marked on the side with the letter S to signify it contains shorts.
3. A maximum of 30% of the load can be made up of these packages. Packages containing shorts are not permitted in the top or bottom layers or next to a void.

LUMBER IN PACKAGES, 8FT. LONG OR OVERFLAT CARS WITH CENTER
A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN
SYSTEM.

RAC 15054 (Concluded)
Rev. 03-2007 (Ref: AAR Fig. 54)

Sketch 5

METHOD FOR SHIPPING 4-FT LUMBER COMBINED IN 8-FT PACKAGES



Module Description

Item	No. of Pcs.	Description
A	As required	Lumber 8 ft long to comprise the top and bottom layers in the combo package as described in Note 1 below.
B	4 per packages	Packages ties: 1275-lb minimum breaking strength, high tension bands or wire. Locate one tie approximately 12 in. and another approximately 36 in. in from each end of combo package.

Notes:

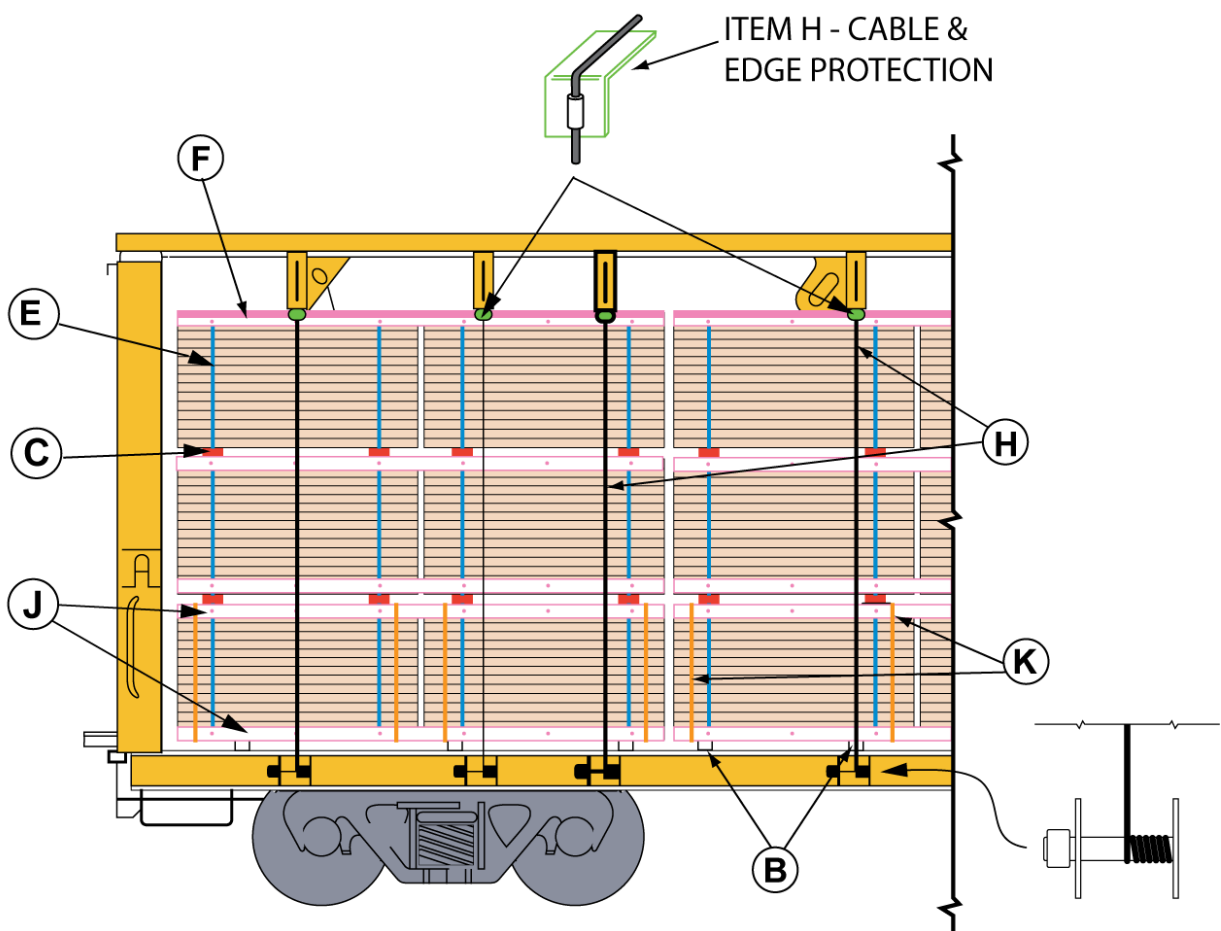
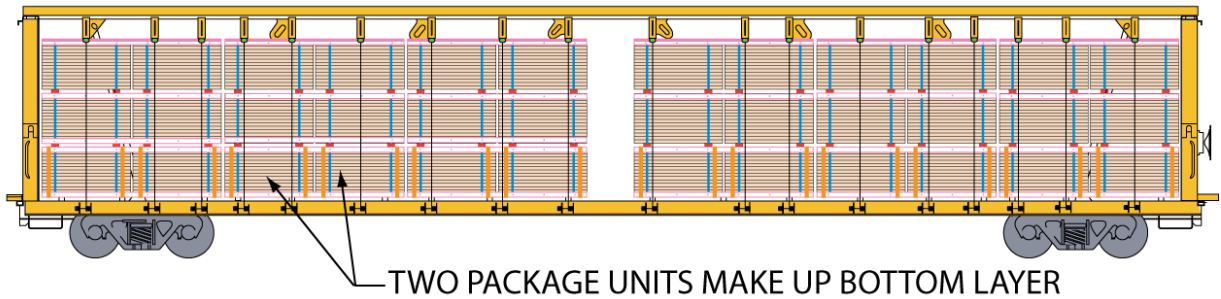
1. Combo packages must be made up with a bottom layer of 8-ft-long lumber, equal to the width of the package. Two stacks of 4-ft-long lumber are to be placed on top of the bottom layer of 8-ft lumber, butted tight end to end with total width to equal the width of the 8-ft-long lumber in bottom layer. A top layer of 8-ft-long lumber is to be placed on top of the two stacks of 4-ft-lumber to complete the combo package. Item B package ties are to be applied to make a solid 8-ft package. See illustration.
2. Height of combo packages must not exceed 24 in.
3. Combo packages must not be located in the top or bottom layers or in any layer where lengthwise void exceed 12 in.

See General Rules for further details

PACKAGED LUMBER, 4 FT. TO 8 FT. IN LENGTH FLAT CARS WITH
CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-
DOWNS

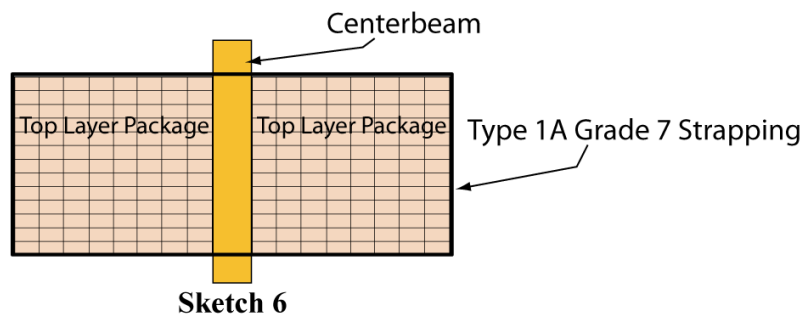
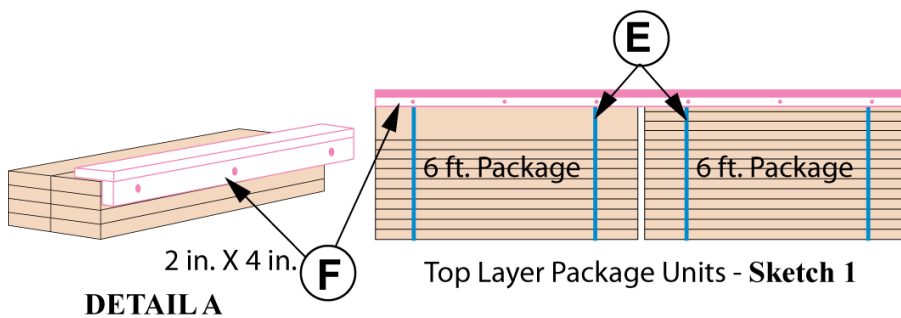
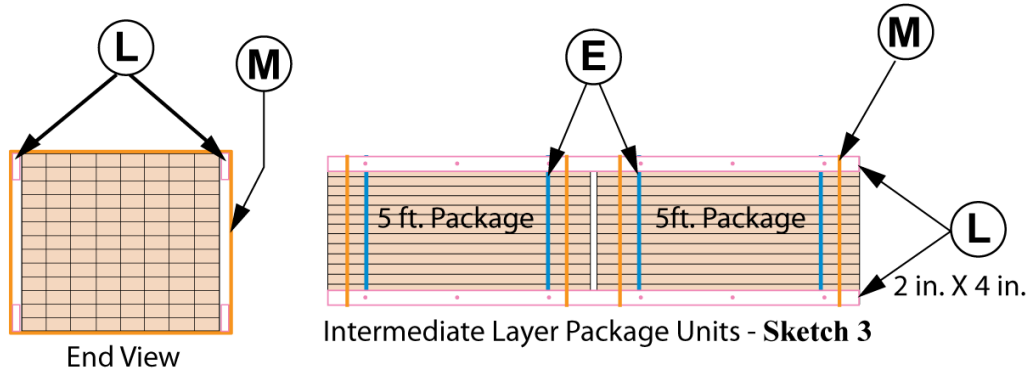
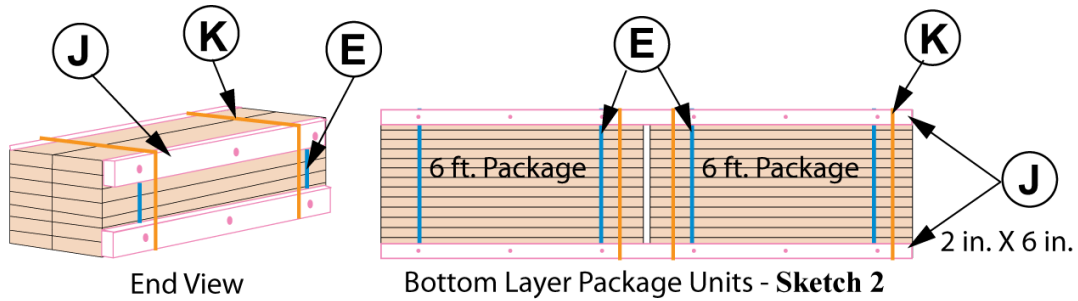
RAC 15054B

Revised 01-2015 (Ref: AAR Fig. 54-B)



PACKAGED LUMBER, 4 FT. TO 7 FT. IN LENGTH FLAT CARS WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

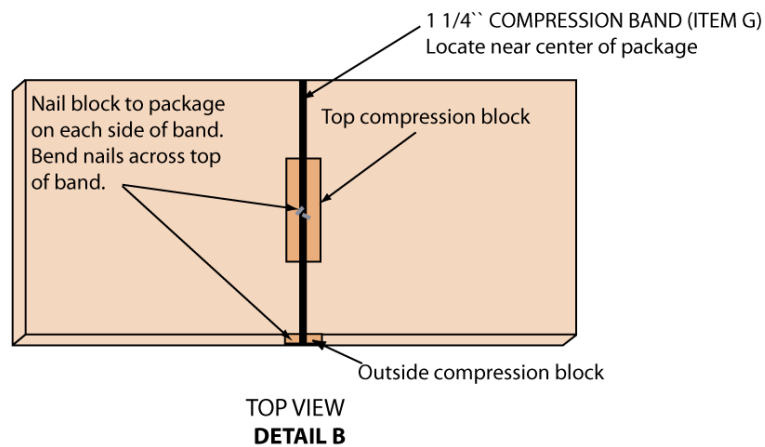
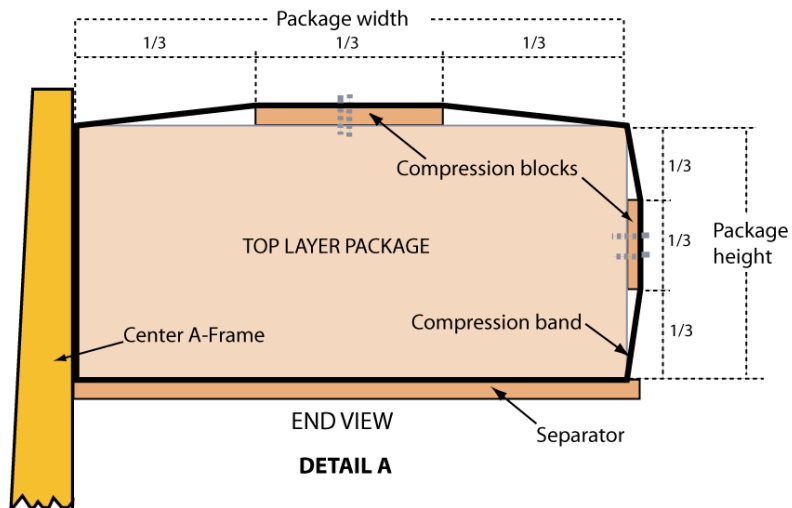
RAC 15054B (continued)
Revised 01-2015 2015 (Ref: AAR Fig. 54-B)



PACKAGED LUMBER, 4 FT. TO 7 FT. IN LENGTH FLAT CARS WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

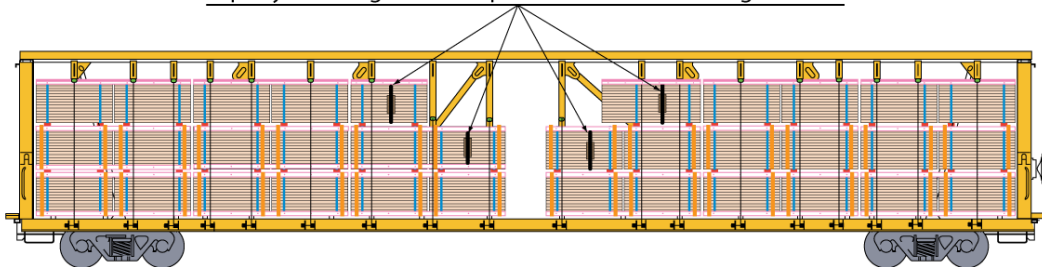
RAC 15054B (continued)
Revised 01-2015 2015 (Ref: AAR Fig. 54-B)

SKETCH 4 DETAILS A AND B



SKETCH 5

Top Layer Packages with required Compression Package Bands



PACKAGED LUMBER, 4 FT. TO 7 FT. IN LENGTH FLAT CARS WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 15054B (continued)
Revised 01-2015 2015 (Ref: AAR Fig. 54-B)

Item	No. of Pcs.	Description
A		When required, all packages in the top and bottom layers must consist of two packages joined end-to end and referred to as units. Refer to drawings and these specifications for details.
B	Min. 3 per unit	Bearing Pieces: Cars are equipped with permanent floor bearing pieces wedged 90 degrees to the A-frame.
Alt. B	Min. 3 per package	<p>Alternate Item B: For cars not equipped with permanent bearing pieces</p> <p>Bearing pieces: lumber of one piece, preferably rough. Width must be 2 in. greater than height and the length equal to width of bottom package. Locate approximately 12–18 in. from each end of package, with remaining pieces, if used, equally spaced. May be attached to package with Item E package ties.</p> <p>Note: When Alt. Item B is required, Items J and K may be omitted provided all packages in the bottom layer are 6 ft long or over. See SKETCH 2.</p>
C	Min. 2 per package.	Separators: Lumber, 2 in. x 2 in. minimum. Height must not be greater than width. Length to be equal to width of pile and in one piece. Locate approximately 12 in. from each end of package. Separators with a minimum of 3 in. may be secured to top or bottom of packages in the bottom and intermediate layers with Item “E” package ties. Separators must not be attached to the top of packages in the top layer. (Use optional)
D	Min 2 per separation in each package.	Stickers: Minimum size 3/8 in. x 1-1/2 in. Length must be equal to, but not greater than width of package. When used, they must be equally spaced over length of package and of uniform thickness throughout. Not shown on drawings. (Use optional)
E	2 per package.	Package ties: 1,600 lbs. minimum breaking strength, high tension bands or wire. Locate one tie about 12 in. from each end of package, but outside of items D stickers. This banding may be substituted with approved non-metallic strapping as permitted in General Rule 19 of Section No.1.

PACKAGED LUMBER, 4 FT. TO 7 FT. IN LENGTH FLAT CARS WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 15054B (continued)
Revised 01-2015 2015 (Ref: AAR Fig. 54-B)

Item	No. of Pcs.	Description
F	1 cap per unit. Unless complying with NOTE 2	Top corner cap: each cap assembly to consist of two pieces lumber, minimum 2 in. x 4 in., length equal to length of unit package. Locate one piece along the top outside edge of one unit (comprised of two end-to-end packages) in top layer, positioning the 4-in. width vertically. Make flush with top and ends of packages and secure to side of packages with 16-D nails spaced about every 12 in. Locate second piece along top of packages and flush with the outside edge of the first piece, forming a corner angle over unit. Secure top piece to edge of lower piece with 16-D nails spaced approximately 24 in. apart as shown in drawings. Any top-layer package that is not fully protected by two Item H cables must be part of unit comprised of two packages, each protected by Item F. See SKETCH 1 and DETAIL A.

G	1 band on top package on either side of a void space greater than 2 ft	<p>Compression package band: 1 1/4 in. x .029 in. high tension band. May be substituted with approved 1 1/4-in.-wide Type IA, Grade 4, polyester strapping per General Rule 19, Section 1. Locate near the center of the package as shown in Detail A. In accordance with Detail A, apply two compression blocks, one on top of the package and one on the side of the package facing away from the centerbeam.</p> <p>Blocks are to be lumber, minimum 2 in. x 4 in., length equal to about one third the width of the surface to which they are to be applied. Position each block centrally across the package surface as shown. Secure each block with a minimum of two nails. The nail length must be sufficient to penetrate package material at least 1 in. and have about 3/4 in. remaining above the block. Encircle the package with the band, placing it over both blocks, then bend the nail heads over the band as shown. See SKETCH 4, DETAIL A and B. See SKETCH 5 for required location of compression package(s).</p>
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PACKAGED LUMBER, 4 FT. TO 7 FT. IN LENGTH FLAT CARS WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 15054B (continued)
Revised 01-2015 2015 (Ref: AAR Fig. 54-B)

Item	No. of Pcs.	Description
H	Minimum of 3 for each individual Item "F" cap.	Cables: 3/8 in. diameter, minimum of 8,800 lbs. Breaking strength. Cable assemblies must be equipped with edge protectors. Winch assemblies must be equipped with a device to maintain tension. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in. ratchet. Cables are to be secured to A-frame in slot nearest to top of top package. See NOTES 1 and 2.

Method A—Bottom Layer Preparation

To be used for combining two packages into a unit for loading on the bottom layer of load.

Units can be formed from the combination of two packages of any length totaling a minimum of 8 ft long.

Item	No. of Pcs.	Description
J	4 per each unit.	Unit boards: lumber, 2 in. x 6 in., length equal to length of the unit. Locate boards flush with the top and bottom of two end-to-end packages, comprising a unit, on the front and back side. Secure each board to each individual package with a minimum of three 16-D nails evenly spaced. All packages in bottom layer less than 8 ft long must be part of a unit comprised of two packages. See SKETCH 2 and END VIEW.
K	4 per each unit.	Unit bands: 3/4 in. x .022 in. high tension bands or type 1A grade 4 strapping. Locate two bands around each package and Items H in each unit, approximately 12 in. from the end of packages. See SKETCH 2 for preparation of units.

PACKAGED LUMBER, 4 FT. TO 7 FT. IN LENGTH FLAT CARS WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 15054B (continued)
Revised 01-2015 2015 (Ref: AAR Fig. 54-B)

Method B—Intermediate Layer Preparation

Required Only for Packaged Lumber Less than 6 ft Long

To be used for combining two packages into a unit for loading on the intermediate layers of load. Units are to be formed from the combination of two packages of any length totaling a minimum of 8 ft.

Item	No. of Pcs.	Description
L	4 per each unit.	Unit boards: lumber, 2 in. x 4 in., length equal to length of the unit. Locate boards flush with the top and bottom of two end-to-end packages, comprising a unit, on the front and back side. Secure each board to each individual package with a minimum of three 16-D nails evenly spaced. All packages less than 6 ft long in the intermediate layers must be part of a unit comprised of two packages. See SKETCH 3.
M	4 per each unit.	Unit bands: 3/4 in. x .022 in. high tension bands or type 1A grade 4 strapping. Locate two bands around each package and Items J in each unit, approximately 12 in. from the end of packages. See drawings in SKETCH 3 for preparation of units.

Notes:

1. This figure is intended for packaged dimensional lumber 4 ft to less than 8 ft in length that, when placed in the top layer, could result in less than two Item H cables protecting the package. Lumber 8 ft long may be included in this figure and should be located in the top layer first to minimize the need for Item F top corner caps, and then in the bottom layer. (Lumber 8 ft long and over may be loaded to Fig. 54 in this Section.)
2. In lieu of item F “top corner caps” top packages that do not accommodate two Item H cables, Item F may be substituted by one approved Type 1A Grade 7 strap with ladder buckle style encircling packages on both sides of centerbeam. Strap to be position one foot from the ends packages they are unitizing. (See detail C).
3. Voids, if any, must be in center of load and kept to a minimum.

4. Finished packages must have sides square and must be composed of pieces of uniform length, width, and thickness.
5. Packages must be placed tight against A-frame to prevent loosening of cables.

PACKAGED LUMBER, 4 FT. TO 7 FT. IN LENGTH FLAT CARS WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 15054B (continued)
Revised 01-2015 (Ref: AAR Fig. 54-B)

6. Packages must not exceed 48 in. in height. All packages in same layer must be of equal height.
7. Bottom units must not overhang the outside edge of permanent bearing pieces by more than one half the width of the outside board in bottom package.
8. All units in the top and bottom layers must be composed of packages of equal width.
9. Any full length package that is not covered by a package above it is considered to be a top layer package and must be protected by Item F.
10. Top packages on either side of a void space greater than 2 ft must be protected using Item G. A top layer package is defined as any package with no packages loaded directly above. A package that is not "completely" covered by a package above is also considered a top package and is required to have a compression package band applied. (See Detail B). Where customer requirements mandate the use of package wrap, the compression package band must be applied over the package wrap.
11. Height of load must not exceed height of A-frame.
12. Intermediate layers are those located between the top and bottom layers. Any packages shorter than 6 ft in an intermediate layer must be prepared in accordance with Method B. If only one package is shorter than 6 ft in such a layer, it must be combined with a 6-ft package as described.
13. When the bottom package is supported by two bearing pieces located not less than 12 in. from the ends of the package, it is not required to join two

packages as a unit. When the top package is secured by two tie-down cables located not less than 12 in. from the ends of the package, it is not required to join two packages as a unit.

14. When it is not possible to get 2 cables over each packages on both sides of the centerbeam, type 1A grade 7 encircling bands maybe use to encircle all packages on both sides of the centerbeam.

See General Rules for further details.

PACKAGED LUMBER, 4 FT. TO 7 FT. IN LENGTH FLAT CARS WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 15054B (concluded)
Revised 01-2015 (Ref: AAR Fig. 54-B)



DETAIL C

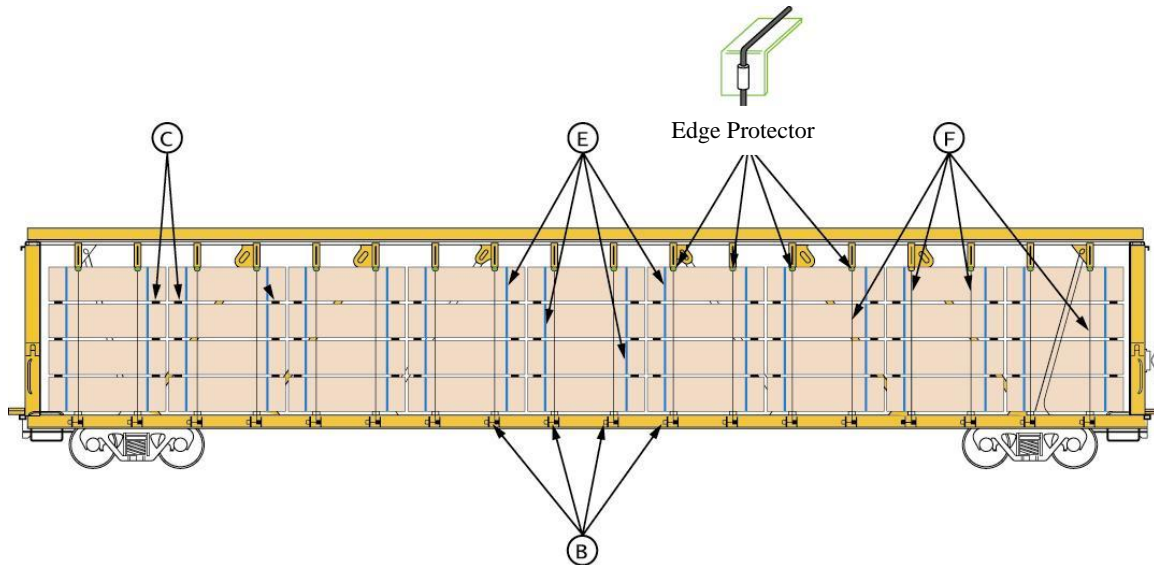
THE SPACING OF THE CABLES AND THE LENGTH OF THE PACKAGES MAKE IT POSSIBLE TO ADD ONLY ONE CABLE TO PACKAGES 1, 3, 5, 7, 9, AND 11. ADD TYPE 1A GRADE 7 STRAP TO THOSE LOCATIONS TO PROPERLY SECURE THE LOAD.



PANEL PRODUCT IN PACKAGES, 8 FT. LONG OR OVER, MAXIMUM HEIGHT 38 INCHES FLAT CARS WITH CENTER A-FRAME, PERMANENT END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 15054C (Ref: AAR Fig. 37)

New. 01-1999



Item	No. of Pcs.	Description
A		Vacant.
B	Min. 2 per package.	Bearing Pieces: Cars are equipped with permanent floor bearing pieces wedged 90 degrees to the A-frame.
C	Min. 2 per package.	Separators: Lumber, 2 in. x 3 in. minimum. Height must not exceed width. Length must be equal to width of package. All separators in same layer separation must be in one piece. Locate approximately 18 in. from each end of package, with others when needed, equally spaced in between separators with a minimum width of 3 in. may be secured to top or bottom packages with Item "E" package ties. When attached to top of packages in the top layer of the load, each separator must be secured to the package with one (1) 10-D nail. (Use of separators is optional).
D		Vacant
E	2 per package.	Package ties: 1,200 lbs. Minimum breaking strength, seal less polyester strapping AAR 11-2040. Locate one tie about one-fourth length from each end package.

PANEL PRODUCT IN PACKAGES, 8 FT. LONG OR OVER, MAXIMUM
HEIGHT 38 INCHES FLAT CARS WITH CENTER A-FRAME, PERMANENT
END BULKHEADS AND CABLE TIE-DOWN SYSTEM.

RAC 15054C (concluded)
New. 01-1999 (Ref: AAR Fig. 37)

Item	No. of Pcs.	Description
F	2 per ea. Top package 10 ft. or less in length. 3 per ea. Top package over 10 ft. in length.	Cables: 3/8 in. diameter, minimum of 8,800 lbs. breaking strength. Cable assemblies must be equipped with edge protectors. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. When practical, all cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in. ratchet. Cables are to be secured to A-frame in slot nearest to top of top package.

Notes:

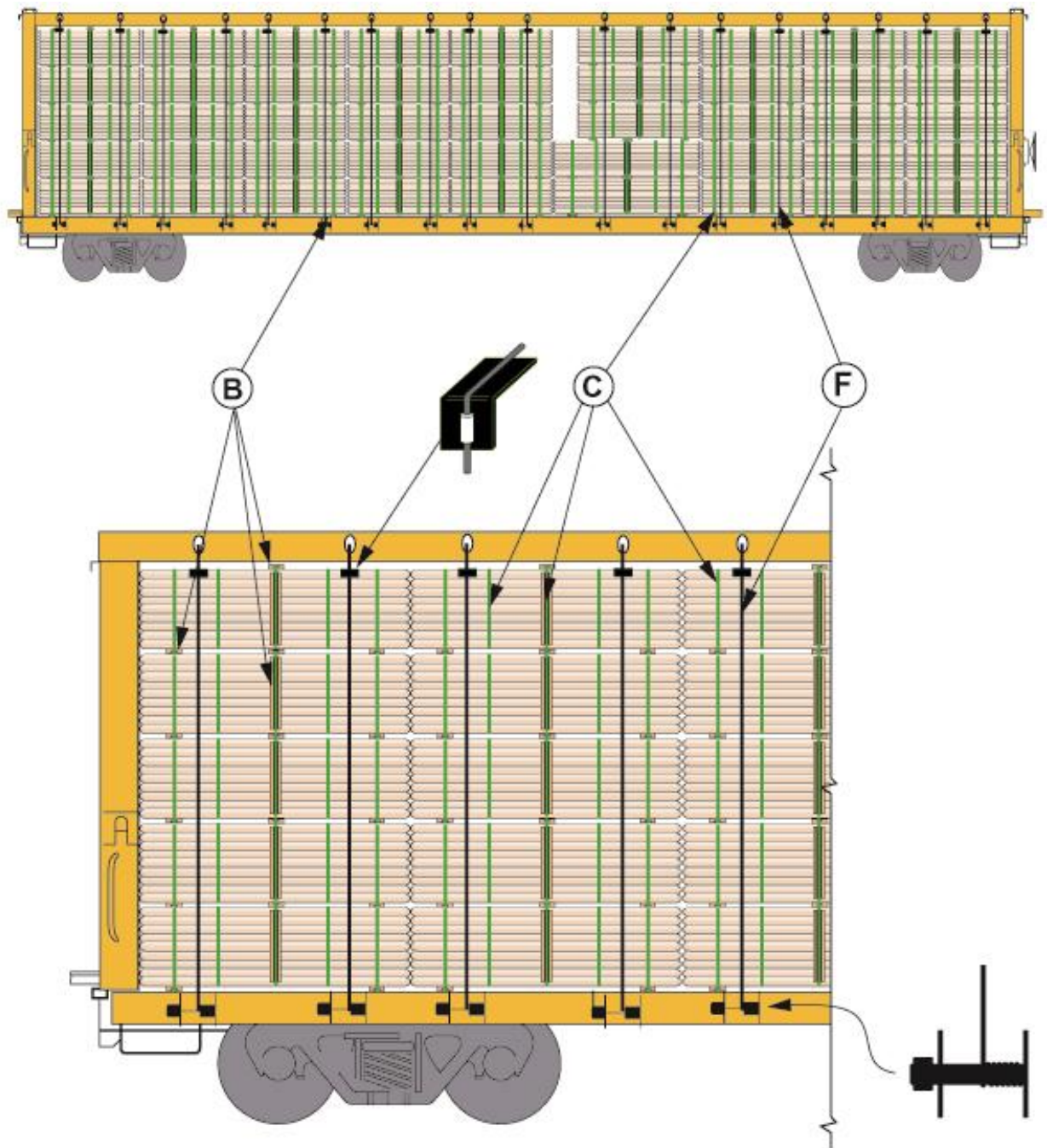
1. Voids, if any, must be in center of load and kept to a minimum.
2. Finished packages must have sides square and must be composed of pieces of uniform length, width and thickness.
3. Packages must be placed tight against A-frame to prevent loosening of cables.
4. Packages must not exceed 38 inches in height. All packages in same layer must be of equal height.
5. Bottom units must not overhang the outside edge of permanent bearing pieces beyond the side of the car.
6. All units in the top and bottom layers must be composed of packages of equal width.
7. Any full-length package that is not covered by a package above is considered to be a top layer package and must be protected by Item "F".
8. Height of load must not exceed height of A-frame

See General Rules for further details.

SHORTS, PALLET STOCK, 42 INCHES MINIMUM LOADED AS UNITS ON
CUSHIONED GEAR CENTER A-FRAME RISERLESS FLAT CARS WITH
PERMANENT END BULKHEADS AND CABLE OR WEB TIE-DOWN.

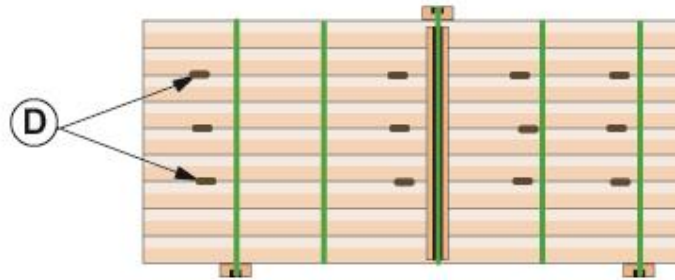
RAC 15054D

New. 11-2009 (Ref: AAR Fig. 54-A)



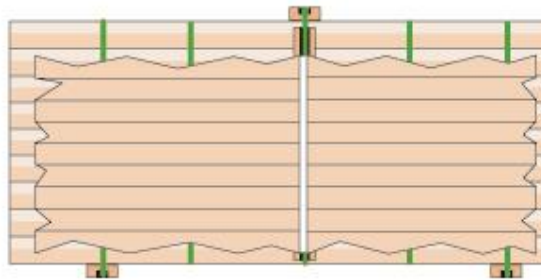
SHORTS, PALLET STOCK, 42 INCHES MINIMUM LOADED AS UNITS ON CUSHIONED GEAR CENTER A-FRAME RISERLESS FLAT CARS WITH PERMANENT END BULKHEADS AND CABLE OR WEB TIE-DOWN.

RAC 15054D (Continued)
New. 11-2009 (Ref: AAR Fig. 54-A)



Package and Unit Dimension

Total maximum width including dunnage 52 inches wide.
Total maximum height including dunnage 36 inches high.
Minimum unit length 84 inches .

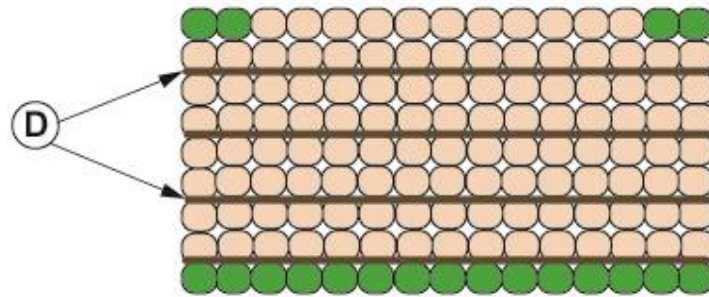


Package and Unit Make Up

Minimum package size within a unit 42"
Minimum Unit (two end to end packages) length 84 inches

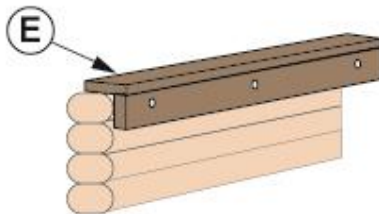
SHORTS, PALLET STOCK, 42 INCHES MINIMUM LOADED AS UNITS ON CUSHIONED GEAR CENTER A-FRAME RISERLESS FLAT CARS WITH PERMANENT END BULKHEADS AND CABLE OR WEB TIE-DOWN.

RAC 15054D (Continued)
New. 11-2009 (Ref: AAR Fig. 54-A)

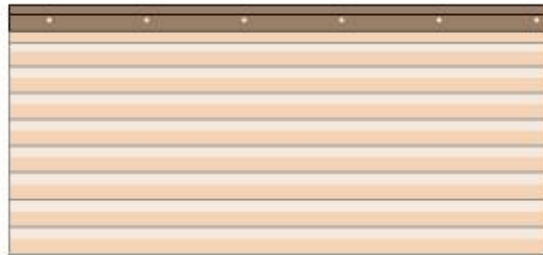


End configuration

End configuration of unit is 15 pieces wide and a maximum of 9 pieces high. Unit is made up by placing two packages onto a base of full length pallet material, also to add strength the two outside pieces in the top layer run full length as well (full length pieces marked with green)



Sketch 1



Top corner cap

Each cap assembly to consist of two (2) pieces lumber, minimum 2 in. x 6 in.. Locate one (1) piece along the top outside edge of units (comprised of two end-to-end packages) in top layer, positioning the 4 in. width vertically. Make flush with top and ends of packages and secure to side of packages with 16-D nails spaced about every 24 inches. Locate second piece along top of packages and flush with the outside edge of the first piece forming a corner angle over unit. Secure top piece to edge of lower piece with 16-D nails spaced approximately apart as shown in drawings. (See note 6 for alternate).

SHORTS, PALLET STOCK, 42 INCHES MINIMUM LOADED AS UNITS ON
CUSHIONED GEAR CENTER A-FRAME RISERLESS FLAT CARS WITH
PERMANENT END BULKHEADS AND CABLE OR WEB TIE-DOWN.

RAC 15054D (Continued)
New 11-2009 (Ref: AAR Fig. 54-A)

Item	No. of Pcs.	Description
A		Vacant
B	4 per unit	Grooved dunnage: lumber 2x3in. place two on the base, one on the outside face and one on the top unit. Top and side dunnage are placed at the point where the two packages in the unit meet. To be secured to unit by item C below.
C	5 per unit	Package ties or unit bands; steel or polyester strapping with a minimum breaking strength of 1275 lbs. One band encircling the centre of the unit where the packages meet with two additional spaced evenly on either side of center of the unit.
D	Min 2 required every second layer of package	Stickers lumber 1/8 in. thick length equal to width of packages. They must be of uniform thickness throughout.
E	1 Cap per unit <u>Sketch 1</u>	Top corner cap: lumber 2 in. X 6 in. length equal to length of unit package. Each cap assembly to consist of two pieces, locate one piece along the top outside edge of one unit in top layer, positioning the 6-in. width vertically. Make flush with top and ends of packages and secure to side of packages with 16-D nails spaced about every 12 in. Locate second piece along top of packages and flush with the outside edge of the first piece, forming a corner angle over unit. Secure top piece to edge of lower piece with 16-D nails spaced approximately 24 in. apart as shown in drawings. Any top-layer package that is not fully protected by two Item D cables must be part of unit comprised of two packages, each protected by Item E. See Sketch 1. If unable to maintain two cables due to unit length then corner caps must be applied. To facilitate the corner caps units will have to be rotated 180 degrees so that the side dunnage faces inboard. If face dunnage comes in contact with A Frame then the side dunnage will have to be removed and unit re-strapped to hold the top dunnage in place. (See note 6 for alternate).

SHORTS, PALLET STOCK, 42 INCHES MINIMUM LOADED AS UNITS ON
CUSHIONED GEAR CENTER A-FRAME RISERLESS FLAT CARS WITH
PERMANENT END BULKHEADS AND CABLE OR WEB TIE-DOWN.

RAC 15054D (Continued)
New 11-2009 (Ref: AAR Fig. 54-A)

Item	No. of Pcs.	Description
F	Min. 2 per top unit.	Tie Down Cables: 3/8 in. diameter, minimum of 8,800 lbs. breaking strength. Cable assemblies must be equipped with edge protectors. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top of top package. If unable to maintain two cables on each top unit, due to unit length then corner caps Item E must be applied.
Alt.F	Min. 2 per top unit.	Web tie-down: polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. The web must be routed through the web guide closest to the top of the load, over the load, and then to the fixed winch on the side sill. The winch directly in line with the top-mounted anchor must be used. Thread at least 6 in. of webbing through the slot in the winch mandrel. Prior to tightening, there must be a minimum of 2 wraps of webbing around the winch mandrel. The strap is to be tensioned by the effort of one person using a winch bar 30 in. to 40 in. long. When practical, all straps must be used. If unable to maintain two web straps on each top unit, due to unit length then corner caps Item E must be applied.

Notes and Additional Requirements:

1. Voids, if any, must not exceed 18 inches and placed as close as possible to centre of load.
2. Load configuration is intended for riserless style centre A Frame bulkhead flat cars with cushioned under frame only.

SHORTS, PALLET STOCK, 42 INCHES MINIMUM LOADED AS UNITS ON
CUSHIONED GEAR CENTER A-FRAME RISERLESS FLAT CARS WITH
PERMANENT END BULKHEADS AND CABLE OR WEB TIE-DOWN.

RAC 15054D (Continued)
New 11-2009 (Ref: AAR Fig. 54-A)

3. This figure is intended for packaged lumber of 42 inches and greater made in to units of no less than 84 inches, when placed in the top layer, could result in less than two Item D cables or Alt D web straps protecting the unit. When less than two cables/web straps protect a top unit, top corner caps as per Item E must be applied.
4. To facilitate the application of corner caps to top units when required. Units will have to be rotated 180 degrees so that the side dunnage faces inboard. If side dunnage comes in contact with A Frame then the side dunnage will have to be removed and unit re-strapped to hold the top dunnage in place.
5. Finished packages must have sides and ends square and must be composed of pieces of uniform length, width and thickness.
6. In lieu of item E "top corner caps" top packages that do not accomodate two Item F cables, Item E maybe substituted by one approved Type 1A Grade 7 strap with ladder bukle style encircling packages on both sides of centerbeam. Strap to be position one foot from the ends packages they are unitizing. (See detail C).
7. Packages must be placed tight against A-frame to prevent loosening of cables in transit.
8. Packages must not exceed 36 inches in height including dunnage. All packages in same layer must be of equal height.
9. Bottom units must not overhang the car deck by more than one half the width of the outside board in bottom packages.
10. Width of units not to exceed 52 in. wide including side dunnage.
11. Height of load must not exceed height of A-frame.

See General Rules for further details

SHORTS, PALLET STOCK, 42 INCHES MINIMUM LOADED AS UNITS ON CUSHIONED GEAR CENTER A-FRAME RISERLESS FLAT CARS WITH PERMANENT END BULKHEADS AND CABLE OR WEB TIE-DOWN.

RAC 15054D (Concluded)
New 11-2009 (Ref: AAR Fig. 54-A)

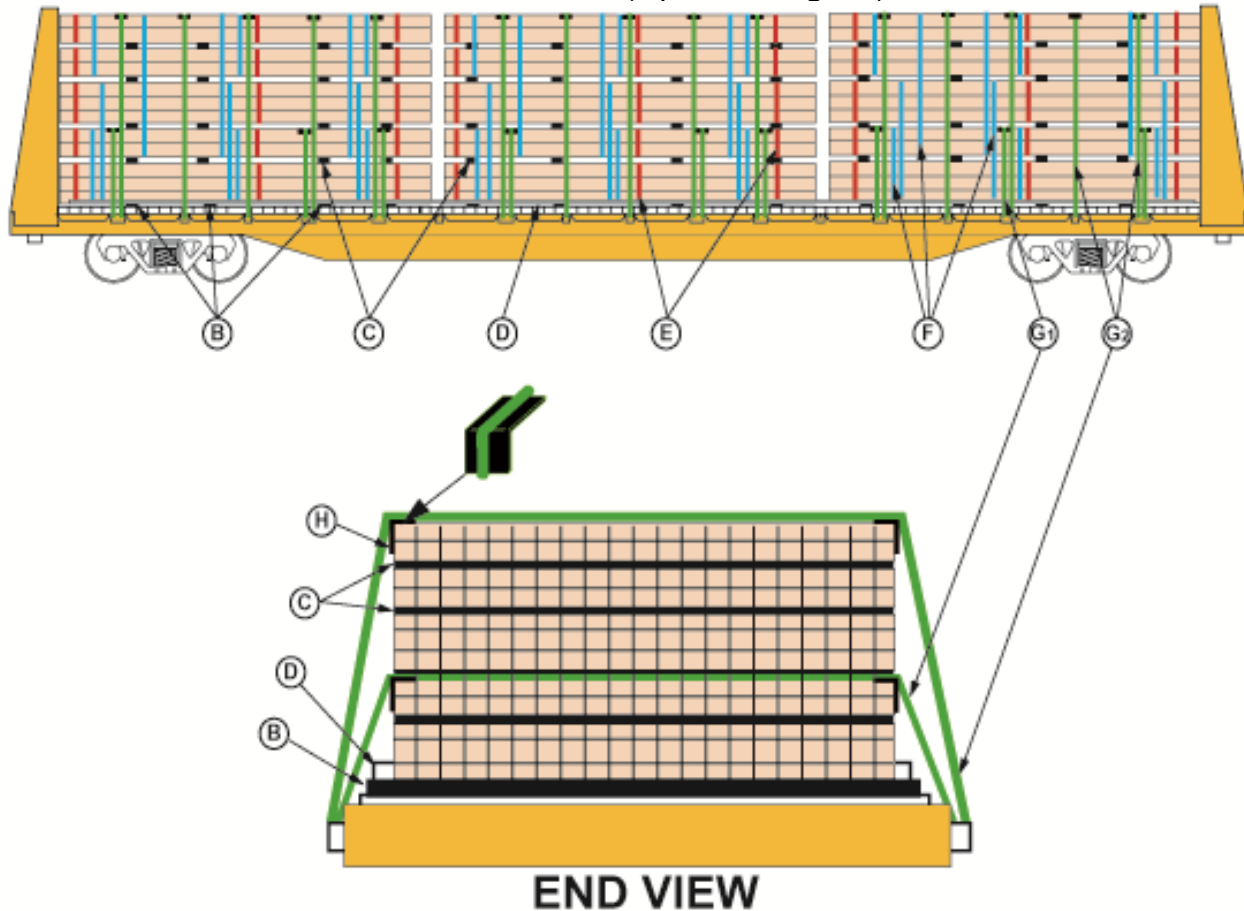
DETAIL C



CROSSTIES UNTREATED IN PACKAGES, 8 FT LONG AND OVER- BULKHEAD FLATCARS

RAC 15057

New 06.2011 (Opt: AAR Fig. 58)



Item	No. of pieces	Description
A		N/A
B	4 per pile	Floor bearing pieces, preferably rough, minimum thickness 2 in., preferably 3 in. and in one piece, width 2 in. greater than thickness. Length must extend a minimum of 6 in. beyond side of pile, but not beyond outside edge of stake pockets. Bearing pieces at all locations to be of equal height. Locate under pile, one about one-fifth of length from each end and others equally spaced between. Secure to floor with a minimum of four (4) common nails, the length to be not less than two inches greater than thickness of bearing pieces.

CROSSTIES UNTREATED IN PACKAGES, 8 FT LONG AND OVER—
BULKHEAD FLATCARS

RAC 15057 (Continued)
New 06.2011 (Opt: AAR Fig. 58)

Item	No. of pieces	Description
C	4 per pile	Separators, preferably rough and in one piece, minimum thickness 2 in., width 2 in. greater than thickness. Length must be equal to width of load, but not to extend beyond deck of car. Separators at all locations to be equal height, place one about 24 in. from each end, and others equally spaced between.
D	1 per each side of load	Guide rails, 2 in. x 4 in., minimum, free from decay and strength impairing knots must be continuous and extend from end to end at bottom of load. Secure to Items "B" with three (3) common nails at least two (2) inches longer than thickness of guide rail. Guide rails must be made up of lengths spanning at least two bearing pieces, Items "B", butted and capped at each butted joint. Caps must be of same dimension material as guide rails, a minimum of 36 inches in length, secured with six (6) 16-D nails, three on each side of guide rail joint. Joint must be made between bearing pieces. Locate straight, parallel with, and approximately 1/2 in. from base of load.
E	3 per package	Package ties, 3/4 in. x .022 in. high-tension band. Locate one tie with edge protectors about 1/4 length from each end of package and one in center.
F	3 per package	Layer unitizing ties, 1-1/4 in. x .029 in. high-tension bands. Locate one tie with edge protectors approximately 24 in. from each end of each package and one in center encircling the bottom and second layers then bottom, second and third layers then second, third, fourth and fifth layers then fourth and fifth layers.
G1	3 per pile, first and second layers	Load interlacing high-tension bands, 1-1/4 in. x .029 in., encircling bottom and second layers. Locate one tie with edge protectors not closer than 6 in. to nearest band, separator or bearing piece, when possible.

G2	3 per pile, all layers	Load interlacing high-tension bands, 1-1/4 in. x .029 in., encircling all layers. Locate one tie with edge protectors not closer than 6 in. to nearest band, separator or bearing piece, when possible.
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CROSSTIES UNTREATED IN PACKAGES, 8 FT LONG AND OVER—
BULKHEAD FLATCARS

RAC 15057 (Concluded)
New 06.2011 (Opt: AAR Fig. 58)

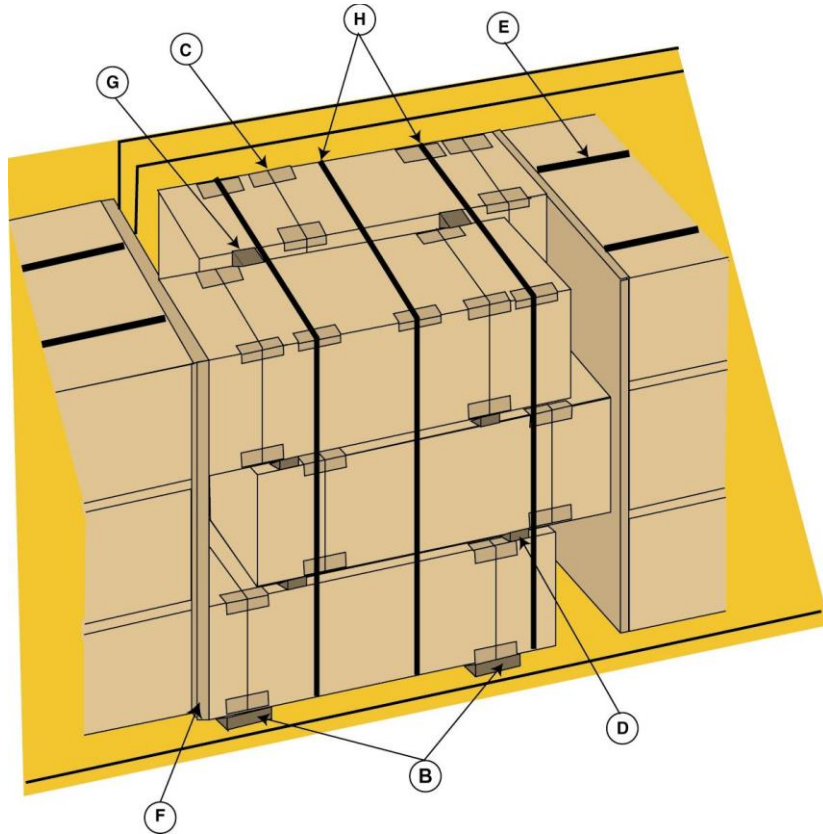
Notes:

1. All packages must be square and uniform in size and length. All packages must overlap the packages in layer below and be loaded tight and without voids except at end of load.
2. Packages must not be larger than nominally 44 in. high x 48 in. wide
3. Load must be centrally located on car at origin with any void between ends of load and bulkhead.
4. Deck of flat cars must be free of debris, snow, and ice before loading.

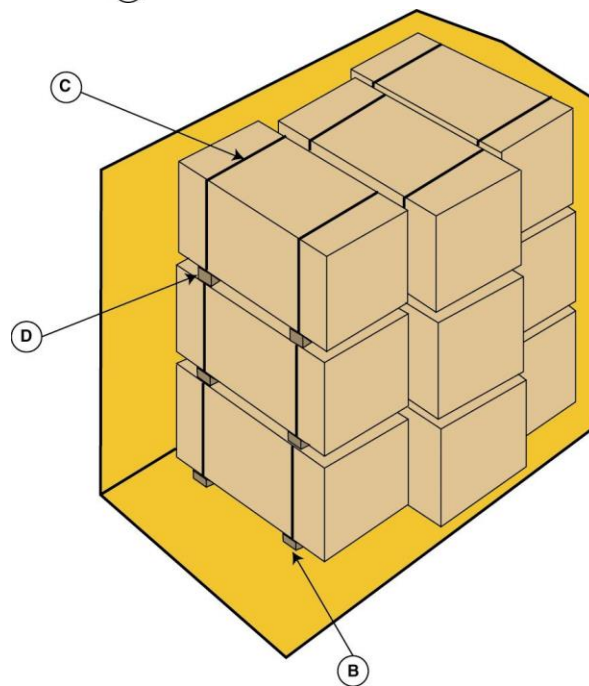
See General Rules for further details

LUMBER IN PACKAGES LOADED IN BOX CARS

RAC 25060



New 01-98



LUMBER IN PACKAGES LOADED IN BOX CARS

RAC 25060 (continued)
New 01-98

Item	No. of Pcs.	Description
A		Vacant.
B	2 per pile.	Bearing Pieces: Lumber, 2 in. x 4 in. Locate approximately 1 ft. in from ends of pile.
C	2 per package.	Package ties: high-tension bands or wire with a minimum breaking strength of 1 600 lbs. For packages 26 in. or less in height the minimum breaking strength should be 1,275 lb. Locate one tie about 12 in. from each end of the package.
D	2 per package	Separators: they must be made of lumber 2 in. x 4 in. and their height must not be greater than their width. Their length must be equal to the width of the package and they must be in one piece. Locate them approximately 12 in. from each end of the packages. Separators may be secured to the top or the bottom of the packages in the bottom and intermediate layers with packages ties.
E	2 per crosswise stack.	Unitizing steel straps: two 1-¼ in. x .031 in. high tension bands will encircle the two crosswise stacks adjacent to the doorway area lading in each end of the car. These two crosswise stacks are to be centered in the car. Separator sheets: nail across the side of the lengthwise stacks. This will prevent coring and interlocking of lading. Vertical stabilizers: nail two 2 in x 4 in lumber per stack in the doorway rows.
F	1 per lengthwise stacks	
G	2 per stack	
H	2 per lengthwise stacks	Drape two 1¼ in. X .031 in. steel straps per stack, crosswise in the doorway area of the car to unitize the lengthwise stacks after the loading is completed.

LUMBER IN PACKAGES LOADED IN BOX CARS

RAC 25060 (concluded)
New 01-98

Notes:

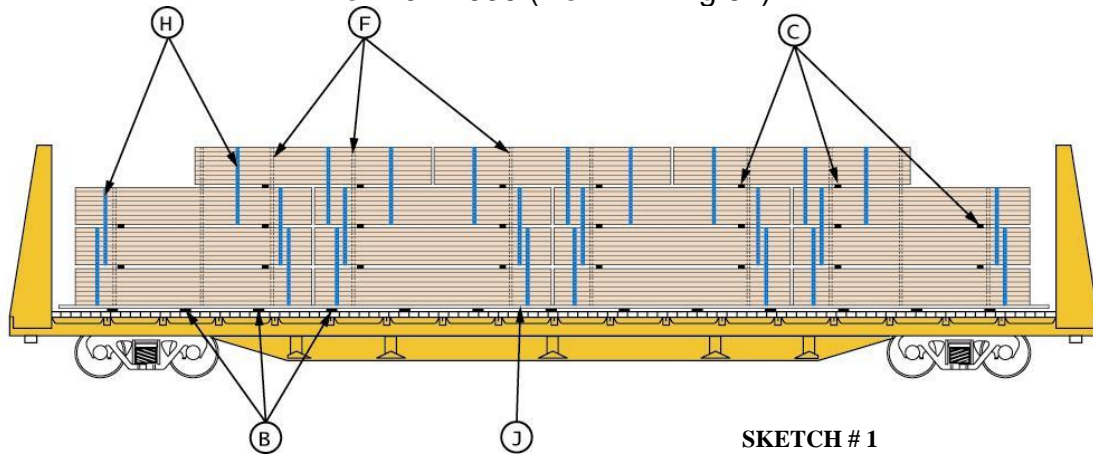
1. Crosswise stacks in the end of the car may be either straight stacked against opposite side walls, or the layers in each stack may be alternately loaded against opposite side walls to reduce coring of the packages in transit.
2. The remaining lengthwise space in the doorway area should not be greater than the length of the packages plus 6 in. The lengthwise space may be filled by nailing 2 in. x 4 in. vertical spacers between the crosswise stacks in each end of the car as required.
3. If it is necessary to fill a void as per the number of rows, load the lengthwise packages in the row opposite the loading doorway so that the layers are alternately placed to opposite ends of the rail car.

See General Rules for further details

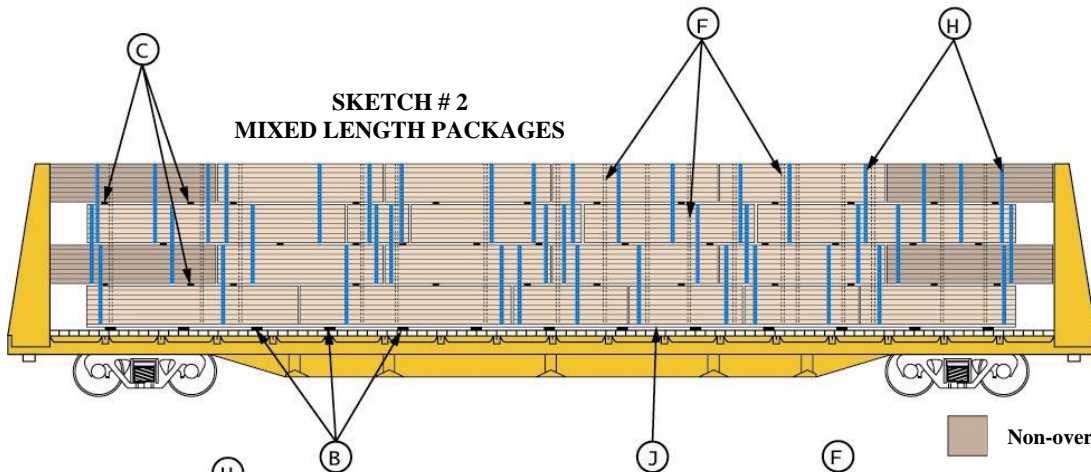
LUMBER IN PACKAGES 7 FT. LONG OR OVER, PACKAGES MAXIMUM
HEIGHT 32 INCHES, MAXIMUM WIDTH 51 INCHES FLAT CAR
(CONVENTIONAL OR BULKHEAD)

RAC 15061

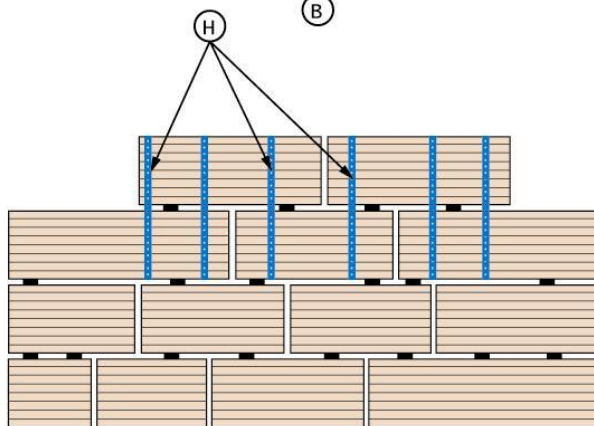
New. 01-1999 (Ref AAR Fig 61)



SKETCH # 1
UNIFORM LENGTH PACKAGES

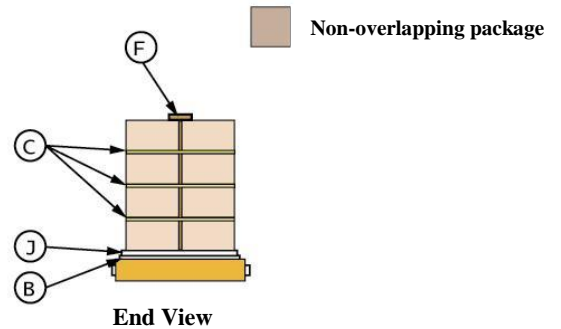


SKETCH # 2
MIXED LENGTH PACKAGES



SKETCH # 3

Note: Sketch # 3 shows the proper application of Item "H" bands to top package only. All other bands omitted for purpose of clarity.



Detail Item "F"

LUMBER IN PACKAGES 7 FT. LONG OR OVER, PACKAGES MAXIMUM
HEIGHT 32 INCHES, MAXIMUM WIDTH 51 INCHES FLAT CAR
(CONVENTIONAL OR BULKHEAD)

RAC 15061 (continued)
New. 01-1999 (Ref AAR Fig 61)

Item	No. of Pcs.	Description
A	Location of load	Load should be located centrally on car but must not be closer than 2 ft. from the "B" end and 1 ft. from the "A" end of car. Conventional flat cars only. When load is prepared on flat cars with side mounted hand brakes, load may be located not closer than 1 ft. from either end of car.
B	Pile 20 ft. or less, 3 per pile. Add one for each additional 10 ft. or less in length	Floor bearing pieces, preferably rough, minimum thickness 2 in., preferably 3 in. and in one piece, width 2 in. greater than thickness. Length must extend a minimum of 6 in. beyond side of pile, but not beyond outside edge of stake pockets. Bearing pieces at all locations to be of equal height. Bearing pieces must be free of decay and strength impairing knots. Locate under pile, one about one-fifth of length from each end and one in the centre of each pile. Secure to floor with a minimum of four (4) common nails, the length to be not less than two inches greater than thickness of bearing pieces.
C	2 each package 16 ft. long or less, 3 if over 16 ft. long.	Separators, preferably rough and in one piece, minimum thickness 2 in., width 2 in. greater than thickness. Length must be equal to width of load, but not to extend beyond deck of car. Separators at all locations to be of equal height. Place one about one-fourth length from each end and one in centre of each package if needed
D		Vacant
E	2 per package	Package ties, 1275 lbs. minimum breaking strength, high-tension bands or wires, except on packages exceeding 26 inches, high-tension bands or wires with minimum breaking strength of 2,000 lbs. Locate one tie about one-fourth length from each end of package. Not required for lumber having a cross sectional area of 36 inches or greater. If dunnage is attached to packages with Item "E" bands, see General Rules.

LUMBER IN PACKAGES 7 FT. LONG OR OVER, PACKAGES MAXIMUM
HEIGHT 32 INCHES, MAXIMUM WIDTH 51 INCHES FLAT CAR
(CONVENTIONAL OR BULKHEAD)

RAC 15061 (continued)
New. 01-1999 (Ref AAR Fig 61)

Item	No. of Pcs.	Description
F	Minimum of 2 between side-by-side packages at load separation when 2 in. x 6 in. are used. Minimum of 3 when 2 in. x 4 in. are used	Vertical load stabilizers, 2 in. x 4 in. or 2 in. x 6 in., free from decay and strength impairing knots, per detail. Length must extend to bottom of bottom layer but not below. Locate approximately one-fourth the distance from end of shortest package where practicable. T-pieces, as shown in Detail Item F, may be omitted when vertical load stabilizers are secured to packages in the bottom layer with two nails, at least 2 in. longer than the thickness of stabilizers.
G		Vacant
H	2 each package 24 ft. long or less except packages in top layer. Add one for each additional 8 ft. or less in length. 3 each top package 24 ft. long or less. Add one for each additional 8 ft. or less in length	Interlcing ties, 1-1/4 x .029 in. high- tension bands. It is the intent that each package in a layer is secured to package or packages in the layer above with a minimum of two bands. Place under bottom layer, encircling each package in first and second layer, locating midway between bearing pieces where practicable on packages on lower two layers only. Place through separation above bottom layer encircling each package in second and third layer, making same application at succeeding separations to encircle each package in third and fourth layer and/or fourth and fifth layer if five packages high. Each package at top of load must be secured to package or packages below with a minimum of three bands (see Sketch 3). When additional ties are required, space equally in between. Bands at the overlap of packages should be placed as close as possible to the centre of overlap.

J	1 per each side of load	Guide rails, 2 in. x 4 in. minimum, free from decay and strength impairing knots, must be continuous and extend to ends of load in bottom layer. Secure to Items "B" with three (3) common nails at least two (2) inches longer than thickness of guide rail. Guide rails must be made up of lengths spanning at least two bearing pieces, Items "B", butted and capped at each butted joint. Caps must be of same dimension material as guide rails, a minimum of 36 inches in length, secured with six 16-D nails, three on each side of guide rail joint. Joint must be made between bearing pieces. Locate straight, parallel with an approximately 1/2 in. from base of load.
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LUMBER IN PACKAGES 7 FT. LONG OR OVER, PACKAGES MAXIMUM HEIGHT 32 INCHES, MAXIMUM WIDTH 51 INCHES FLAT CAR (CONVENTIONAL OR BULKHEAD)

RAC 15061 (continued)
New. 01-1999 (Ref AAR Fig 61)

ALTERNATE METHOD FOR APPLICATION OF GUIDE RAILS ON CARS EQUIPPED WITH PERMANENT STEEL BEARING PIECES.

Item	No. of Pcs.	Description
Alt. J	3 per each outside bottom package	<p>Lumber, 2 in. x 4 in. x 12 in., laminated to equal height of permanent steel bearing piece</p> <p>STEEL FLOOR CARS -- Secure bottom piece to car floor with two (2) 2-1/2 in. bolts, length to suit. Nail top piece to bottom piece with three (3) 10-D nails.</p> <p>NAILABLE STEEL FLOOR CARS -- Secure bottom piece to groove in car floor with four (4) 20-D nails, Nail top piece to bottom piece with three (3) 10-D nails.</p> <p>WOOD FLOOR CARS -- Secure bottom piece to car floor with four (4) 20-D nails. Nail top piece to bottom piece with three (3) 10-D nails.</p>

Notes:

1. On cars equipped with permanent bearing pieces greater than 3 in. in height, additional piece(s) may be added to equal height of permanent bearing piece and secured in the same manner as above.

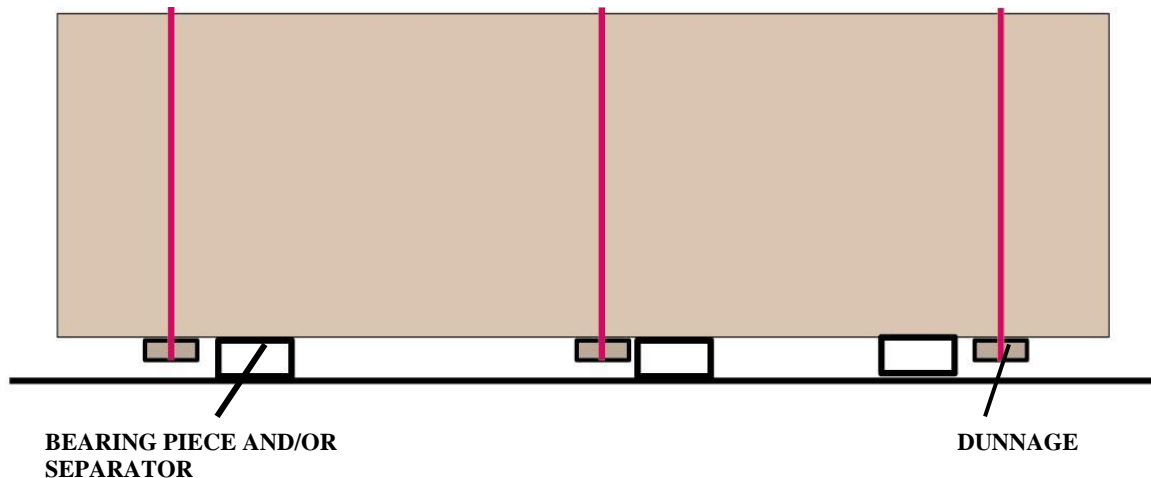
2. When practicable, blocking is to be placed as close as possible to permanent bearing pieces to prevent rolling.

See General Rules for further details

LUMBER IN PACKAGES 7 FT. LONG OR OVER, PACKAGES MAXIMUM
HEIGHT 32 INCHES, MAXIMUM WIDTH 51 INCHES FLAT CAR
(CONVENTIONAL OR BULKHEAD)

RAC 15061 (continued)
New. 01-1999 (Ref AAR Fig 61)

**ALTERNATE METHOD FOR LOADING PACKAGES WITH ATTACHED
DUNNAGE -- BULKHEAD FLAT CARS.**



Item	No. of Pcs.	Description
Alt. B&C	2 each package 14 ft. long or less, 3 if over 14 ft. in length	<p>When attached dunnage is used, bearing pieces and separators must be of sufficient thickness to prevent attached dunnage from contacting car floor or package surface. Attached dunnage must be in one piece and their length must be equal to the width of the package but not wider.</p> <p>Attached dunnage may be applied to either the top or bottom of packages. If applied to the top of packages, all dunnage in the top layer must have one (1) 10-D nail applied in addition to the package band, to prevent displacement.</p> <p>Attached dunnage is not permitted on the bottom of bottom layer packages when loaded on conventional flat cars or on bulkheads flat cars when the total lengthwise void between bottom layer packages and the bulkheads exceeds 24 inches.</p>

LUMBER IN PACKAGES 7 FT. LONG OR OVER, PACKAGES MAXIMUM
HEIGHT 32 INCHES, MAXIMUM WIDTH 51 INCHES FLAT CAR
(CONVENTIONAL OR BULKHEAD)

RAC 15061 (continued)
New. 01-1999 (Ref AAR Fig 61)

Notes:

1. At point of origin, shipper is to locate load per Item "A".
2. Car floors, bearing pieces, guide rails and separators must be free from ice and snow when loads are prepared under this figure. Between November 1 and March 1, stub stakes extending 10 inches above car floor, must be placed in first two stake pockets at each end of load and every other stake pocket between, on both sides of car, except when definitely known movement is in area where icing conditions will not occur. When weather conditions warrant, the originating carrier may require that stub stakes be applied prior to or beyond the dates specified for this figure. If voids between stub stakes and guide rails exceed 2 inches, suitable filler must be applied. Stub stakes, 4 in. x 4 in., may be used to provide sufficient width to accommodate full width of load and guide rails. These stub stakes will require a filler piece applied and nailed between the inside face of stub stake and side sill of car, extending from top of car deck to bottom of stake. Stub stakes may be substituted with guide rail securement devices (GSD). For application see General Rules 10(f), Section No. 1.

3. Laminated bearing pieces, separators and vertical stabilizers are not permitted, unless AAR approved and stamped.
4. Use of stickers within the individual packages is optional. When used they must be uniform thickness throughout. Length of sticker must be equal to width of package.
5. When load consists of two or more packages in any layer, inside ends of packages must be squared and butted as closely as possible together. Additional packages must be butted as closely as possible to adjoining packages with squared end toward center of car.
6. All packages must be overlapped a minimum of 24 inches, except at ends of load. A non-overlapping end package may not be placed directly on top of another non-overlapping end package. When uniform length packages are loaded on bulkhead flat cars and total lengthwise void space does not exceed 24 in., overlap is required on top packages only.
7. When necessary to maintain the overlap throughout the load, the packages at the ends of the load may overhang the packages directly below by not more than 2 ft. No packages are to overhang the packages on the car floor by more than 2 ft. Overhanging packages at ends of load must be a minimum of 10 ft. in length.

LUMBER IN PACKAGES 7 FT. LONG OR OVER, PACKAGES MAXIMUM
HEIGHT 32 INCHES, MAXIMUM WIDTH 51 INCHES FLAT CAR
(CONVENTIONAL OR BULKHEAD)

RAC 15061 (continued)
New. 01-1999 (Ref AAR Fig 61)

8. Wider packages of uniform width should be placed on the bottom layer. Mixed width packages may be included in all layers except the bottom layer. The maximum side overhang must not exceed 6 in. beyond the width of packages on the bottom layer. When side overhang of package is 3 in. or greater, one 1-1/4 in. x .029 in. high-tension band must be applied in center of narrower package, encircling the adjacent side package, binding them tight to the vertical stabilizers.
9. Finished packages must have sides square and be of uniform height and must be composed of pieces of uniform width and thickness. All packages must be loaded with the square ends toward the center of the car.
10. Packages consisting entirely of 6 ft. lumber may be included in any layer except the top, but at least one package in from ends of load.

11. When lumber of unequal lengths is included in the same package, the following variances are allowable.
 - Solid 6 ft. packages may include 8 ft. lengths.
 - Solid 8 ft. packages may include 10 ft. lengths.
 - Solid 10 ft. packages may include 12 ft. and 14 ft. lengths.
 - Solid 12 ft. packages may include 14 ft. and 16 ft. lengths.
 - Solid 14 ft. packages may include 16 ft. and 18 ft. lengths.
 - Solid 16 ft. packages and over may include additional lengths up to 6 ft. longer.
12. Packages must be loaded tightly against vertical stabilizers in initial preparation of load, prior to application of interlacing bands.
13. Top packages must have a minimum height of 12 inches.
14. Height of load, measured from deck of car to top of top packages, must not be more than 3 ft. 8 in. greater than width of load. Vertical stabilizer material, extending more than 5 in. above top of top packages, must be removed.

LUMBER IN PACKAGES 7 FT. LONG OR OVER, PACKAGES MAXIMUM
HEIGHT 32 INCHES, MAXIMUM WIDTH 51 INCHES FLAT CAR
(CONVENTIONAL OR BULKHEAD)

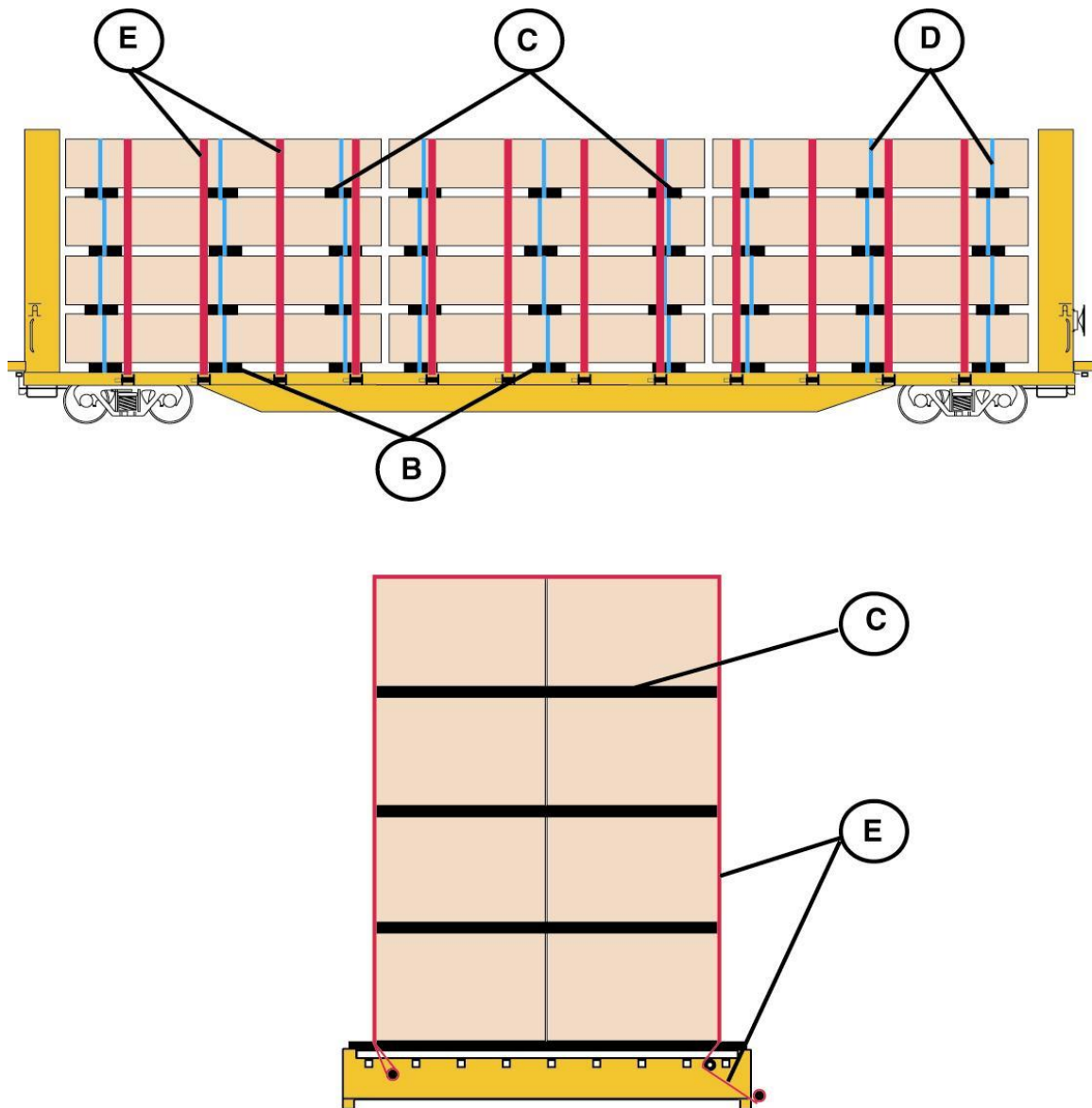
RAC 15061 (concluded)
New. 01-1999 (Ref AAR Fig 61)

15. When cars have steel decks between bolsters and ends of car and/or end bulkheads, the guide rails must be one piece, length sufficient to span at least the three end bearing pieces at each end of car.
16. Partially rounded bearing pieces and separators may be used provided only the top surface width is not reduced by more than 25 percent at any point.
17. Deck of flat cars must be free of debris, snow, and ice before loading.

See General Rules for further details.

LUMBER IN PACKAGES, 8 FT. LONG OR OVER FLAT CARS EQUIPPED
WITH PERMANENT END BULKHEADS AND PVC TREATED POLYESTER
WEBBING TIE-DOWN SYSTEM.

RAC 15068
New-09-1998 (Ref: AAR Fig. 68)



**LUMBER IN PACKAGES, 8 FT. LONG OR OVER FLAT CARS EQUIPPED
WITH PERMANENT END BULKHEADS AND PVC TREATED POLYESTER
WEBBING TIE-DOWN SYSTEM.**

RAC 15068 (continued)
New-09-1998 (Ref: AAR Fig. 68)

Item	No. of Pcs.	Description
A		Vacant
B	2 per package 14 ft. long or less, 3 per package over 14 ft.	Bearing pieces: lumber, minimum 1 ½ in. x 3 ½ in., width must be at least 1 in. greater than height. Length must exceed width of package but must not extend beyond car side if not attached to package. Length must be equal to width of package if secured with Item "D" package ties.
C	2 per package 14 ft. long or less, 3 per package over 14 ft.	Separators: Lumber, minimum 1 ½ in. x 3 ½ in., width must be at least 1 in. greater than height. Length equal to width of each package. May be secured to packages with Item "D" package ties.
D	2 per package 14 ft. long or less, 3 per package over 14 ft.	Package Ties: High tension bands or wires with 2,000 lbs. minimum breaking strength. Locate one tie approximately one fourth of length from each end of package.
E	Minimum 3 per each top package.	Tie-Down Straps: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Strap must be secured to car on side opposite winch, pass over top of load, through belt routing device below car deck and secured to winch assembly. (See Sketch 1). Straps must be pulled tight against both sides of load including bottom layers. All straps must be used. Tension with the use of a 24 in. to 30 in. bar. Refer to end view of illustration for application of tie-down strapping.

Notes:

1. Packages containing unequal lengths are not permitted in the top layer.
2. On loads four packages high, no void is permitted between the load and bulkheads in the bottom or third layer. For loads five packages high, no void is permitted in the bottom, third or fourth layers. In the second layer, a maximum void of 2 ft. at either or both ends of the layer is permitted. Packages in the top layer must be positioned with any void equally spaced at both ends.

LUMBER IN PACKAGES, 8 FT. LONG OR OVER FLAT CARS EQUIPPED
WITH PERMANENT END BULKHEADS AND PVC TREATED POLYESTER
WEBBING TIE-DOWN SYSTEM.

RAC 15068 (concluded)
New-09-1998 (Ref: AAR Fig. 68)

3. Finished packages must have sides square and must be composed of pieces of uniform width and thickness. All packages must be loaded with the square ends towards center of car.
4. Use of stickers within the individual packages is optional. When use, they must of uniform thickness throughout. Length of stickers must be equal to width of package and be in one piece.
5. No void is permitted between side-by-side packages.
6. Packages must not exceed 34 in. in height.
7. Packages shorter than 8 ft. long are prohibited.
8. Packages may not contain pieces more than 2 ft. shorter than the longest length piece s in the package.
9. When load includes packages of various widths, wide packages must be located in the bottom layers with narrower packages on top in order for tie-down straps, Item "E", to remain in contact with side of the load.

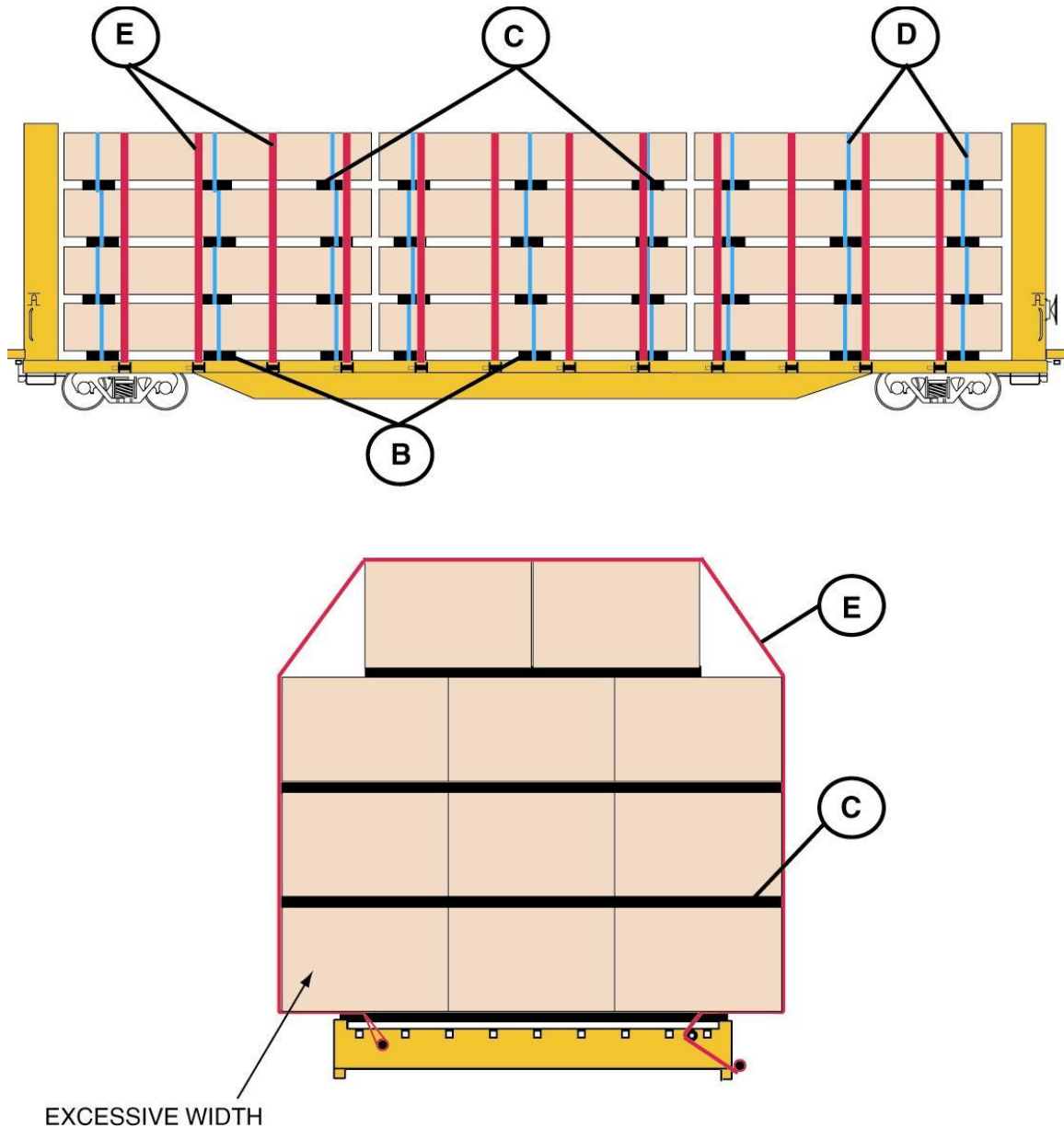
See General Rules for further details.

*****DIMENSIONAL LOAD*****

LUMBER IN PACKAGES, 8 FT. LONG OR OVER UP TO 46 ¼ IN. WIDE FLAT CARS EQUIPPED WITH PERMANENT END BULKHEADS AND PVC TREATED POLYESTER WEBBING TIE-DOWN SYSTEM.

CLEARANCE FILE MUST BE ISSUED BY ORIGINAL CARRIER
RAC 15069

New -01-1995 (Ref: AAR Fig. 69)



SKETCH 1

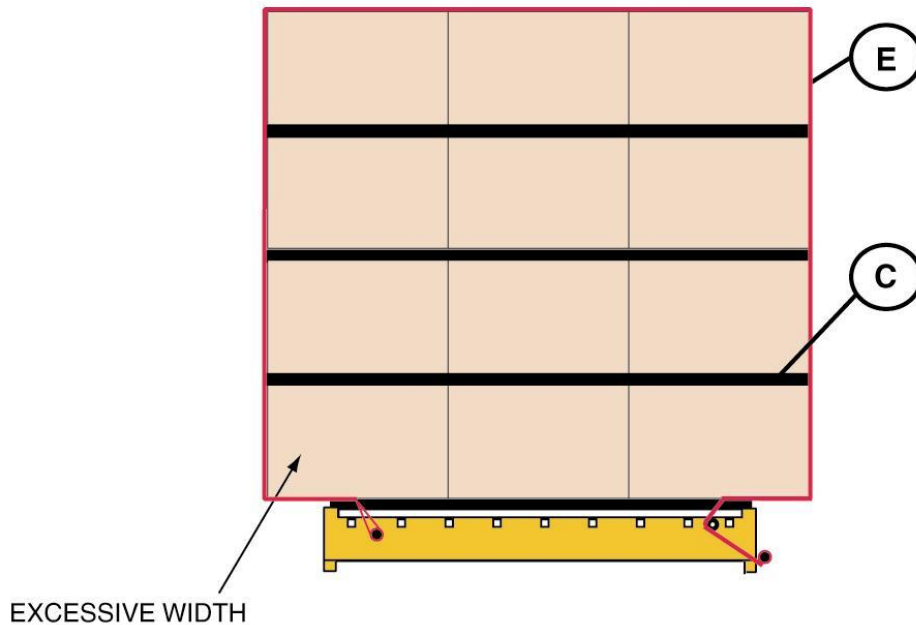
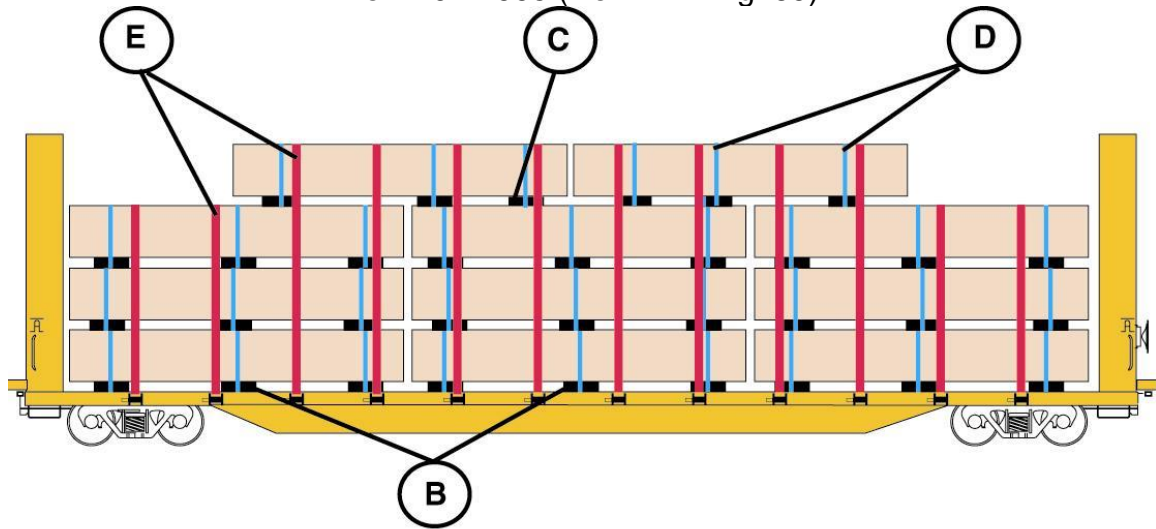
*****DIMENSIONAL LOAD*****

LUMBER IN PACKAGES, 8 FT. LONG OR OVER UPTO 46 ¼ IN. WIDE FLAT
CARS EQUIPPED WITH PERMANENT END BULKHEADS AND PVC
TREATED POLYESTER WEBBING TIE-DOWN SYSTEM.

CLEARANCE FILE MUST BE ISSUED BY ORIGINAL CARRIER

RAC 15069 (continued)

New -01-1995 (Ref: AAR Fig. 69)



SKETCH 2

*****DIMENSIONAL LOAD*****

LUMBER IN PACKAGES, 8 FT. LONG OR OVER UP TO 46 ¼ IN. WIDE FLAT
CARS EQUIPPED WITH PERMANENT END BULKHEADS AND PVC
TREATED POLYESTER WEBBING TIE-DOWN SYSTEM.

CLEARANCE FILE MUST BE ISSUED BY ORIGINAL CARRIER

RAC 15069 (continued)

New -01-1995 (Ref: AAR Fig. 69)

Item	No. of Pcs.	Description
A		Vacant
B	3 per package 14 ft. long or less, 4 per package over 14 ft. up to 24 ft.	Bearing Pieces: Lumber, minimum 1 - 1/2 in. x 3 - 1/2 in., width must be at least 1 in. greater than height. Length must be equal to width of load.
C	2 per package 14 ft. long or less, 3 per package over 14 ft.	Separators: Lumber, minimum 1 - 1/2 in. x 3 - 1/2 in., width must be at least 1 in. greater than height. Length equal to width of load. May be secured to packages with Item "D" package ties in which case the width must be the same as the package.
D	2 per package 14 ft. long or less, Add one band for each additional 6 feet or less.	Package Ties: High tension bands or wires with a minimum breaking strength of 1,275lbs. Locate one tie approximately one fourth of length from each end of package.
E	Minimum 3 per each top package.	Tie-Down Straps: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Secure strap to winch assembly, pass over top of load and secure to opposite side of car. Straps must be pulled tight against both sides of load including bottom layers. All straps must be used. Tension with the use of a 24-in. to 30-in. bar. Refer to end view of illustration for application of tie-down strapping. Because the width of the load exceeds the sides of the car, on the side where the strap is attached to the winch assembly the belt should be secured to the winch without going through the belt routing device.

*****DIMENSIONAL LOAD*****

LUMBER IN PACKAGES, 8 FT. LONG OR OVER UP TO 46 ¼ IN. WIDE FLAT
CARS EQUIPPED WITH PERMANENT END BULKHEADS AND PVC
TREATED POLYESTER WEBBING TIE-DOWN SYSTEM.

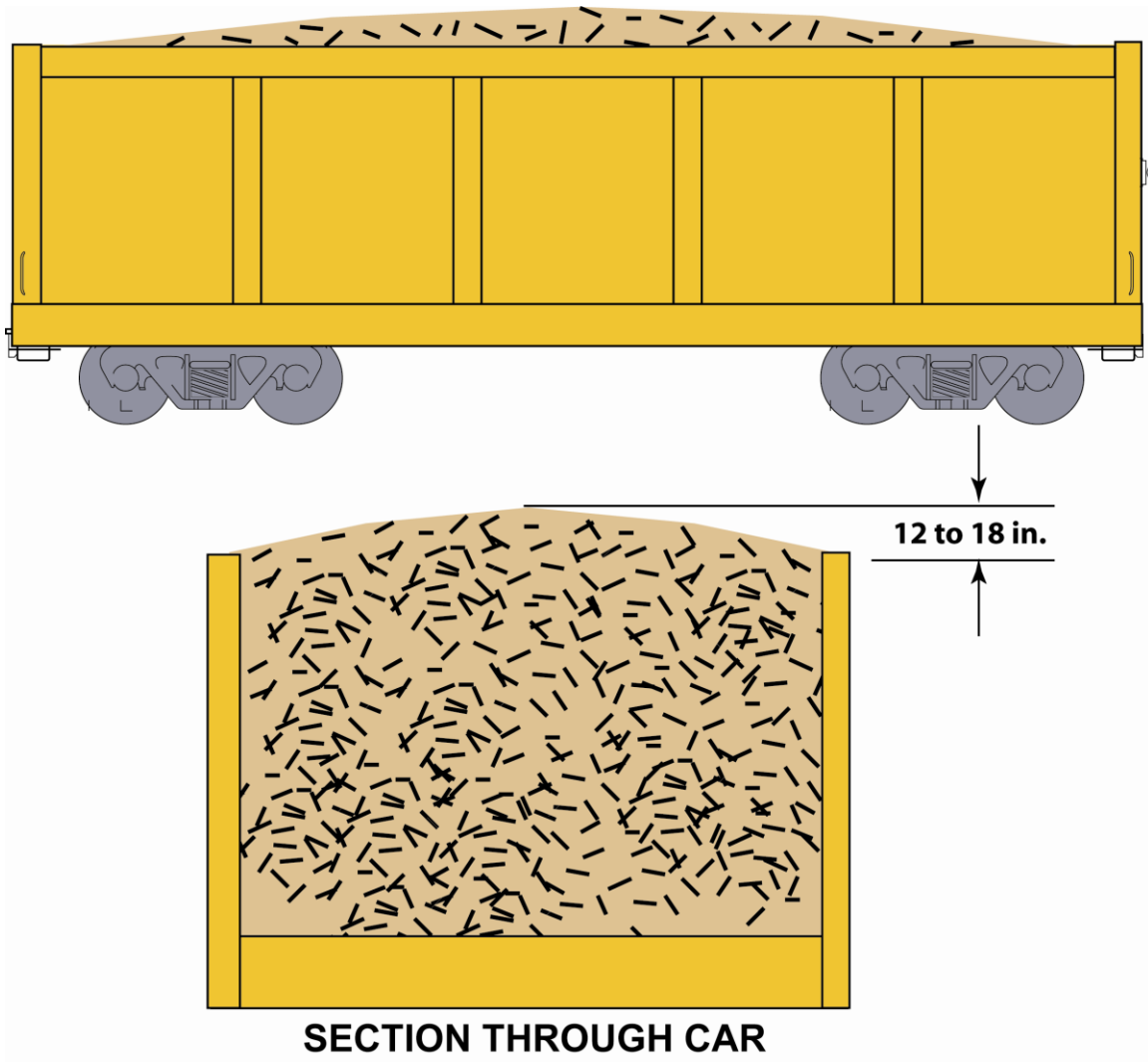
CLEARANCE FILE MUST BE ISSUED BY ORIGINAL CARRIER
RAC 15069 (concluded)
New -01-1995 (Ref: AAR Fig. 69)

Notes:

1. Packages containing unequal lengths are not permitted.
 2. On cars loaded with 4 packages high by 3 wide, a maximum void of 6 feet is permitted in the outside rows. Packages must be centered on the car with the void equally spaced at each end. Center row must be bulkhead to bulkhead. See Sketch 2.
 3. On car loaded with 3 packages high by 3 wide with the top tier loaded 2 wide only, all rows must be loaded bulkhead to bulkhead with the two top rows centered on the width of the car. See Sketch 1.
 4. Use of stickers within the individual packages is optional. When used, they must be of uniform thickness throughout. Length of stickers must be equal to width of package and be in one piece.
 5. No void is permitted between side-by-side packages.
 6. Packages may not exceed 34 in. in height.
 7. Packages shorter than 8 ft. long are prohibited.
 8. When load includes packages of various widths, wide packages must be located in the bottom layers with narrower packages on top in order for tie-down straps, Item "E", to remain in contact with side of the load.
 9. This load exceeds plate "C" dimensions, therefore it must be considered as a dimensional load
 - 10 All winches must be equipped with the appropriate webbing at all times.
- For further details see general rules.

WOODCHIP LOADED IN HIGH SIDE GONDOLA

RAC 15099
New 08-2005



Item	No. of Pcs.	Description
A		Vacant

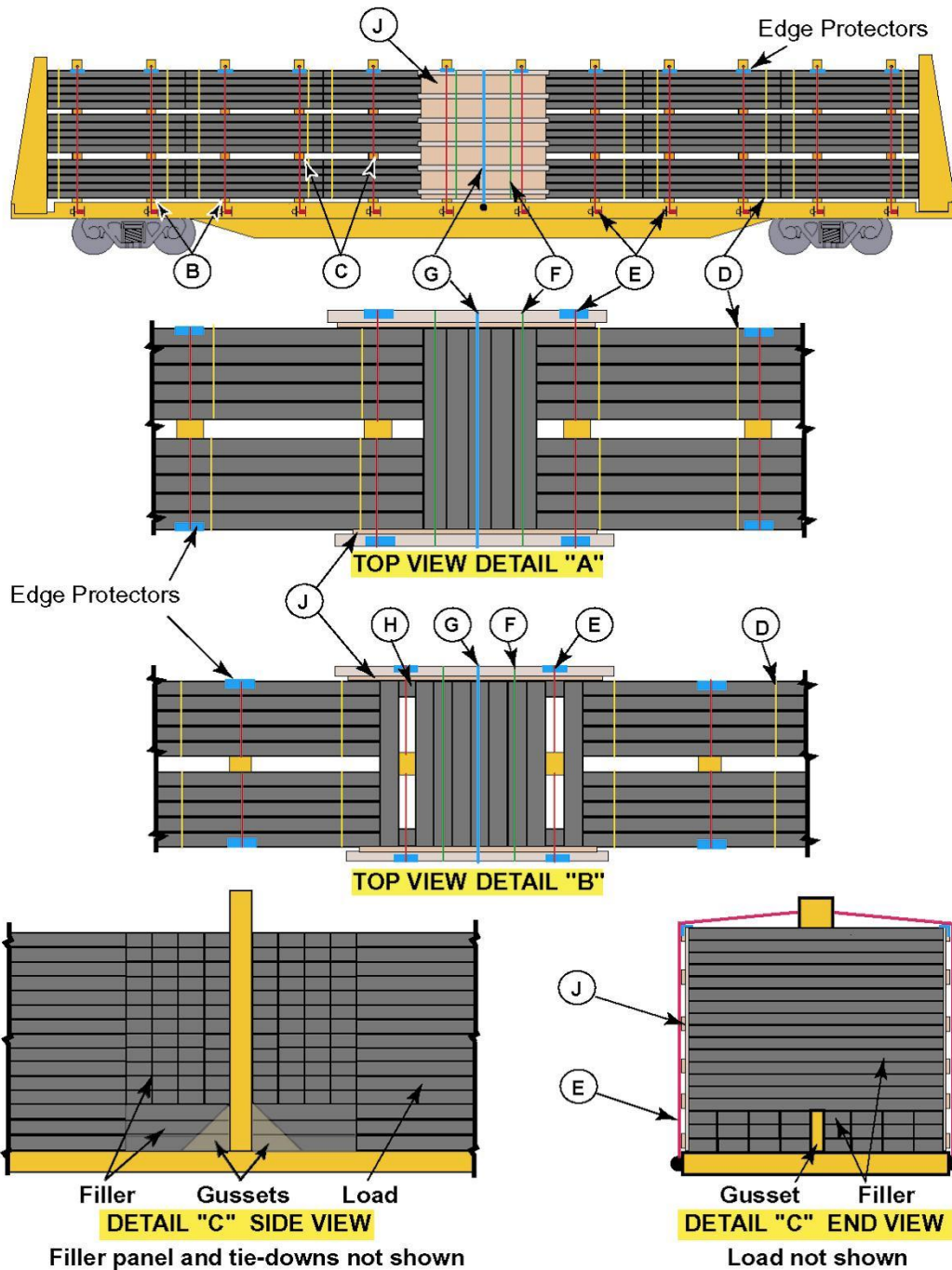
Notes:

1. Load must be evenly distributed side to side and end to end.
2. Maximum height of load must not exceed 18 inches in centre of car sloping even to top cord of car.

See General Rules for further details

RAILROAD TIES, TREATED OR UNTREATED 8-FT LONG AND OVER
PACKAGED-FLATCARS WITH CENTER A-FRAME, PERMANENT END
BULKHEADS AND CABLE TIE-DOWN SYSTEM

RAC 15102
New 07-2003



RAILROAD TIES, TREATED OR UNTREATED 8-FT LONG AND OVER
PACKAGED-FLATCARS WITH CENTER A-FRAME, PERMANENT END
BULKHEADS AND CABLE TIE-DOWN SYSTEM

RAC 15102 (continued)
New 07-2003

Item	No. of Pcs.	Description
A		Vacant
B	Minimum 2 per each bottom layer package.	Bearing pieces: cars are equipped with permanent floor bearing pieces wedged 90 degrees to the A-frame.
C	Minimum 2 per package (Use optional)	Separators: lumber, minimum 2 in. x 4 in., width must be greater than height. All separators in a layer must be of equal height and in one piece. Locate each approximately 12 in. to 18 in. from each end of package. Separators may be attached to top or bottom of packages with Item E package bands.
D	2 per package.	Package bands: 1 1/4 in. x .029 in. high-tension bands. Locate each band about one-fourth-package length inward from each end of package.
E	Minimum of 14 per load	Cables: 3/8 in. dia. minimum 8,800 lbs. breaking strength. Cable assemblies must be equipped with edge protectors. Prior to tightening, there must be a minimum of 2 1/2 wraps of cable around the winch drum. When practical, all cables must be used, and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or 3/4 in. ratchet. Cables are to be secured to A-frame in slot nearest to top of package.
F	2 per void fill	Encircling Bands: 1 1/4 in. x .029 in. high-tension bands. Locate each band about one-fourth-panel length inward from each end of filler panel encircling the void fill.
G	1 per void fill	Tie-down band: 2" band is used to secure void fill to car in addition to cable tie-downs.

H	2 per void	Vertical stabilizers: 1 tie cut to fit on each side of a post creating a void (see DETAIL "B") within a load. Vertical stabilizers should be nailed to filler panel on each side of load.
J	1 per side	Filler Panel: 5/8 in. plywood sheets reinforced with six 2x4's to cover full width and height of void. Both plywood and 2x4's must be nailed to ties.

RAILROAD TIES, TREATED OR UNTREATED 8-FT LONG AND OVER
PACKAGED-FLATCARS WITH CENTER A-FRAME, PERMANENT END
BULKHEADS AND CABLE TIE-DOWN SYSTEM

RAC 15102 (continued)
New 07-2003

Item	No. of Pcs.	Description
Alt B	Min. 2 per each bottom layer package 8 ft long or less. Add 1 for each additional 4 ft..	Alternate Item B-For cars not equipped with permanent bearing pieces. Bearing pieces: lumber of one piece, preferably rough. Width must be 2 in. greater than height and the length equal to width of bottom package. Locate approximately 18-24 in. from each end of package with remaining pieces equally spaced between.

NOTES:

1. Packages must be loaded end to end and the longitudinal void, if any, must be in center of load and kept to a minimum.
2. Should the total longitudinal void space between bulkheads exceed 24 inches but less than 84 inches, a filler assembly must be used to fill the void. The void assembly consists of treated ties loaded laterally on the deck. Plywood is attached to ties adjacent to the void fill and nailed to the ties with 3 inch common nails, six 2" x 4" pieces of lumber to be used to strengthen the plywood and nailed to the plywood and ties with 4 inch common nails. Plywood and 2x4's are banded to load with two 1 1/4 in. bands encircling the load. One 2 in. band must be used to secure void fill to car in addition to cable tie-downs. (See DETAIL "A" and DETAIL "B")
3. Voids created by center post gussets should be filled as per DETAIL "C". On each side of the gussets, ties or appropriate lumber loaded

longitudinally should fill the void up to the gussets level then ties in one piece should be loaded laterally on top to fill the void between piles up to height of load.

4. Partial layers are not permitted in this diagram. If there are insufficient packages to complete the top layer, the size of the packages must be rearranged so as to fill out the layer space between the bulkheads.
5. All ties in a package must be of the same dimension.
6. Packages must not exceed 36 in. in height and 48 in. in width.
7. Packages must be placed tight against A-frame to prevent loosening of cables.

RAILROAD TIES, TREATED OR UNTREATED 8-FT LONG AND OVER
PACKAGED-FLATCARS WITH CENTER A-FRAME, PERMANENT END
BULKHEADS AND CABLE TIE-DOWN SYSTEM

RAC 15102 (concluded)
New 07-2003

NOTES:

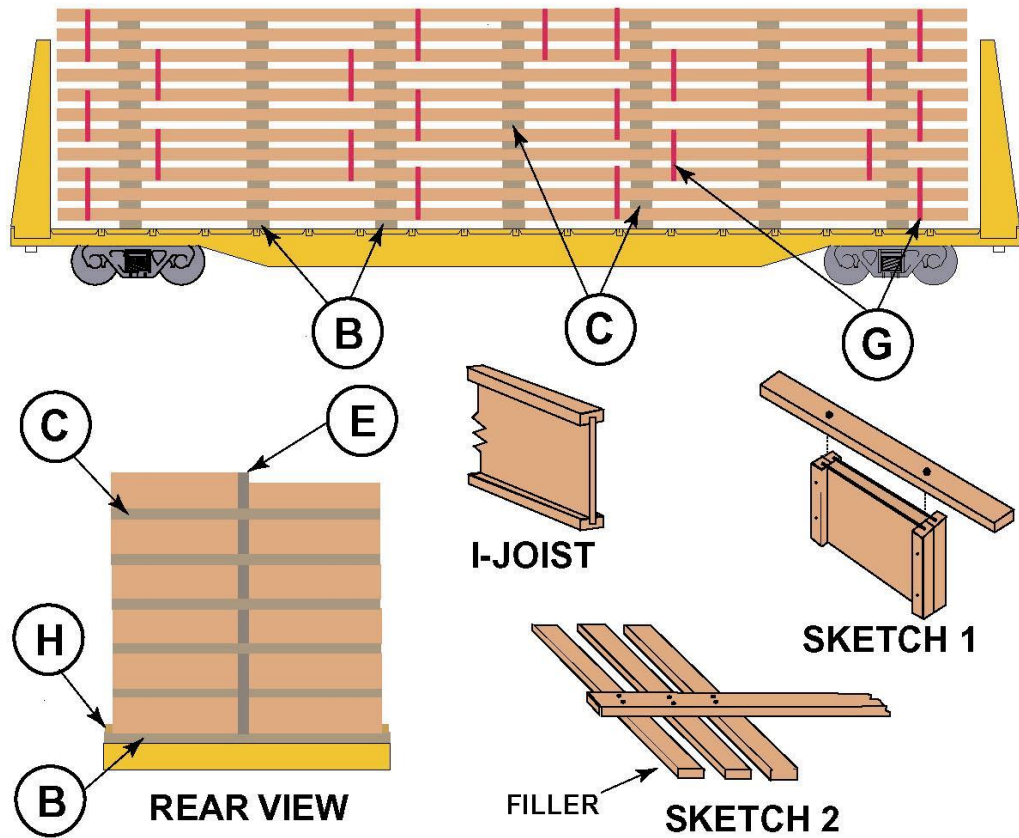
8. Height of load must not exceed height of A-frame.
9. All packages in a layer must be of equal height.
10. All layers on the same side of the center partition must be of equal width.
11. Unless permission has been received from the car owner in writing, the car surfaces are to be protected from creosote contamination. Polyethylene sheeting or other suitable material may be used as an option to protect steel surface from contact with creosote. Protective material must be applied in such a fashion as to avoid displacement. Excess protective material must be removed to avoid extending beyond the car side and presenting a hazard during transit.

See General Rules for further details

ENGINEERED-WOOD PRODUCTS, LVL, PSL AND LSL STRUCTURAL
BEAMS AND I-JOISTS PACKAGED, 8 FT LONG AND OVER —BULKHEAD
FLATCARS, 52 FT LONG AND OVER, WITH CUSHIONING DEVICES

RAC 15112

New 03-2004 (Ref: AAR Fig. 112-A)



48 FT	4 FT	10 FT	17 FT	24 FT	17 FT	10 FT	4 FT
58 FT	5"	12"	20"	28"	20"	12"	5"
60 FT	5"	13"	21"	30"	21"	13"	5"
66 FT	5"	14"	23"	33"	23"	14"	5"
70 FT	5"	15"	25"	35"	26"	15"	5"
FLOOR BEARING PCS	X	X	X	X	X	X	X
VERTICAL STABILIZERS	X		X	X	X		X
SEPARATORS	X	X	X	X	X	X	X

TABLE 1

ENGINEERED-WOOD PRODUCTS, LVL, PSL AND LSL STRUCTURAL
BEAMS AND I-JOISTS PACKAGED, 8 FT LONG AND OVER —BULKHEAD
FLATCARS, 52 FT LONG AND OVER, WITH CUSHIONING DEVICES

RAC 15112 (continued)
New 03-2004 (Ref: AAR Fig. 112-A)

Item	No. of Pcs..	Description
A		At origin, load must be centrally located on car, with the bottom layer no more than 2 ft from the bulk-heads at each end of car.
B	Minimum 2 per package 8 ft long or less. Add one for each additional 10 ft	Bearing pieces: 2 in. x 4 in. lumber, length must extend a minimum of 3 in. beyond each side of pile but not beyond the outside edge of stake pockets. Bearing pieces must be of equal height and free of decay and strength-impairing knots. Secure each to car floor with four common nails, the length to be not less than 2 in. greater than thickness of bearing pieces. Locate and space per Table 1 .
C	Minimum 2 per package 8 ft long or less. Add one for each additional 10 ft	Separators: 2 in. x 4 in. lumber. Length equal to width of layer but not to extend beyond width of car. Locate and space per Table 1. When side-by-side packages are not of equal height, it will be necessary to apply a minimum of three fillers to ensure that separators are on a level plane. Fillers are to be 5 1/2 in. wide by 48 in. long, height to suit. Secure each to separators with two 16-D nails. See Sketch 1. When coated laminated material is located in any layer, a wood block 2 in. x 4 in. x 6 in. must be located on top and bottom of each separator against the side of packages. Secure each block with three 16-D nails.
D	2 per package 30 ft long or less. Add 1 for each additional 20 ft or less.	Spacers: constructed with two adjoining beams, affixed to 1 1/2 in. x 3 1/2 in. x minimum of 24 in. piece of lumber. Spacers must be used within a package when the combined width of packages in one layer varies from the combined width of adjacent packages. Height must be equal to height of packages. See Sketch 2.

ENGINEERED-WOOD PRODUCTS, LVL, PSL AND LSL STRUCTURAL
BEAMS AND I-JOISTS PACKAGED, 8 FT LONG AND OVER —BULKHEAD
FLATCARS, 52 FT LONG AND OVER, WITH CUSHIONING DEVICES

RAC 15112 (continued)
New 03-2004 (Ref: AAR Fig. 112-A)

Item	No. of Pcs..	Description
E	5	Vertical load stabilizers: 2 in. x 4 in., free from decay and strength impairing knots. Length must extend to bottom of bottom layer, but not below and must not exceed height of load. Secure each with a minimum of two nails at least 2 in. longer than the thickness of stabilizers. Locate and space per Table 1 .
F	<p>2 per package 40 ft long or less. Add 1 additional for packages over 40 ft long</p> <p>2 per package 20 ft long or less. Add 1 for each additional 10 ft up to a maximum of 5 per package, up to 60 ft. Add 1 for each additional 20 ft or less over 60 ft long.</p> <p>2 per package 40 ft long or less. Add 1 additional for packages over 40 ft.</p>	<p>I-Joist Package bands: 3/4 in. x .020 in. high tension, on I-joists in packages up to 48 in. wide by 24 in. high. On packages of I-joists over 48 in. wide and/or 24 in. high, 1 1/4 in. x .029 high tension bands must be used.</p> <p>Veneer Lumber or (Solid) Beams in Packages Up to 24 in. Wide and Up to 16 in. High. Package bands: 3/4 in. x .022 in. high tension, on any laminated veneer lumber or beams other than I-beams.</p> <p>Veneer Lumber or (Solid) Beams in Packages Over 24 in. Wide and/or Over 16 in. High. Package bands: 1 1/4 in. x .029 in. high tension, on any laminated veneer lumber or beams, other than I-joists. Must be used on packages over 24 in. wide and/or over 16 in. high.</p>

**ENGINEERED-WOOD PRODUCTS, LVL, PSL AND LSL STRUCTURAL
BEAMS AND I-JOISTS PACKAGED, 8 FT LONG AND OVER —BULKHEAD
FLATCARS, 52 FT LONG AND OVER, WITH CUSHIONING DEVICES**

RAC 15112 (continued)
New 03-2004 (Ref: AAR Fig. 112-A)

Item	No. of Pcs..	Description
G	2 per package except top layer, 3 per package 4 per layer. Add 1 on each package exceeding height of bulkhead.	Interlacing bands: 1 1/4 in. x .029 in. high tension bands. Place underbottom layer encircling each package in the first, second, and third layers, locating midway between bearing pieces. Place through separation between second and third layers encircling third, fourth, and fifth layers. Interlacing must be repeated between each additional group of three layers or less to top of load. Any layer containing coated material having more than 24 in. total void space between the load and bulkheads must have two additional Item G bands applied to each end package.
H	1 per each side of load	Guide rails: 2 1/4 in. x 1 1/2 in. lumber, free from decay and strength impairing knots. Must be continuous and extend to ends of load in bottom layer. Secure to Items B with two 16-D nails. Guide rails must be made up of lengths spanning at least two bearing pieces, Item B, butted and capped with similar material of the same dimension as guide rails, a minimum of 36 in. long, secured with six 16-D nails, three on each side of joint. Joints must be made between bearing pieces. Locate straight, parallel with, and approximately 1/2 in. from base of load. When coated laminated material is located in the bottom layer, full 2 in. x 4 in. guide rails must be applied.

ENGINEERED-WOOD PRODUCTS, LVL, PSL AND LSL STRUCTURAL
BEAMS AND I-JOISTS PACKAGED, 8 FT LONG AND OVER —BULKHEAD
FLATCARS, 52 FT LONG AND OVER, WITH CUSHIONING DEVICES

RAC 15112 (concluded)

New 03-2004 (Ref: AAR Fig. 112-A)

Notes:

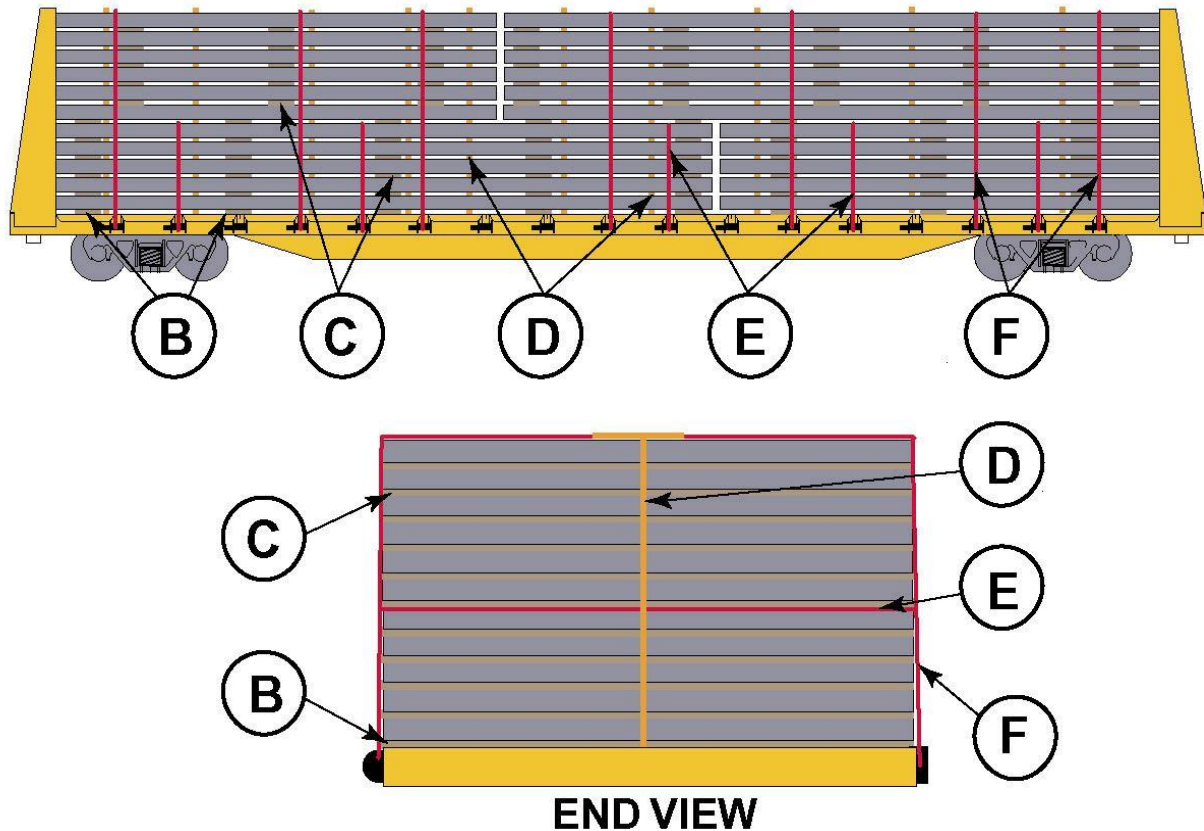
1. For the purposes of this figure, engineered-wood products include LVL (laminated veneer lumber), PSL (parallel-strand lumber), and LSL (laminated-strand lumber). Where veneer lumber is referred to, this includes LVL, PSL, and LSL product.
2. Maximum height of load must not exceed 17 ft 6 in. above top of rail, and combined center of gravity must not exceed 98 in. Any height restrictions stenciled on the car or bulkhead supersede the 17 ft 6 in. height allowance.
3. Height of packages in top layer must not vary more than 12 in.
4. The weight on both sides of load must be as close as possible but must not exceed a 4,000-lb variance.
5. It is the intent that longer layers be located in bottom portion of load.
6. Where the use of lumber is referred to in this figure, it may be substituted with AAR-approved laminated material per General Rule 11.6. Material used for bearing pieces, separators, vertical stabilizers, or guide rails, whether laminated or solid lumber must not be coated.
7. A layer may be no more than 6 in. narrower per side than the layer immediately beneath it with the exception of the top layer which may be 24 in. narrower per side than the layer immediately beneath it.
8. Package height must not exceed package width.
9. I-joists in a single package must be limited to one layer high.
10. When car is equipped with a steel deck or nailable steel floor, shippers must apply five pair of stub stakes with block-out material secured between the guide rails and the stakes. Stakes are to be placed to coincide with the location of Item B bearing pieces. Solid wood 2 x 4 blocking is to be cut to fill the lateral space between the outside of the guide rail and each stub stake. The lateral blocking is to be secured to the top of the bearing piece with at least three common nails, at least 2 in. longer than the thickness of the block. For this application, bearing piece location must be planned in advance to align with stake pockets to support the securement of lateral blocking.

For further details see the General Rules.

ENGINEERED-WOOD PRODUCTS, LVL, PSL, AND LSL STRUCTURAL BEAMS AND I-JOISTS, PACKAGED 8 FT LONG AND OVER—BULKHEAD FLATCARS, 52 FT LONG AND OVER, WITH PVC TREATED POLYESTER WEBBING TIE-DOWN SYSTEM.

RAC 15112B

New 07-2004



Item	No. of Pcs..	Description
A		At origin, load must be centrally located on car, with the bottom layer no more than 2 ft from the bulk-heads at each end of car.
B	Min. 2 per each bottom layer package 8 ft long or less. Add 1 for each additional 8ft.	Bearing pieces: 2 in. x 4 in. lumber, length must extend a minimum of 3 in. beyond each side of pile but not beyond the outside edge of stake pockets.

ENGINEERED-WOOD PRODUCTS, LVL, PSL, AND LSL STRUCTURAL
BEAMS AND I-JOISTS, PACKAGED 8 FT LONG AND OVER—BULKHEAD
FLATCARS,
52 FT LONG AND OVER, WITH PVC TREATED POLYESTER WEBBING TIE-
DOWN SYSTEM.

RAC 15112B (concluded)
New 07-2004

Item	No. of Pcs..	Description
C	Min. 2 per each package 8 ft long or less. Add 1 for each additional 8ft	Separators: 2 in. x 4 in. lumber. Length equal to width of layer but not to extend beyond width of car.
D	Min. 2 per package 8 ft long or less. Add 1 for each additional 8ft	Vertical load stabilizers: 2 in. x 4 in., free from decay and strength impairing knots. Length must extend to bottom of bottom layer, but not below and must not exceed height of load. Secure each with a minimum of two nails at least 2 in. longer than the thickness of stabilizers.
E	5	Interlacing straps: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Strap must be secured to car on side opposite winch, passed over 5th layer and secured to winch assembly. Straps must be pulled tight against both sides of load. Tension with the use of a 24 in. to 30 in. bar.
F	7	Tie-Down straps: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Strap must be secured to car on side opposite winch, passed over top of load and secured to winch assembly. Straps must be pulled tight against both sides of load including bottom layer.

Notes:

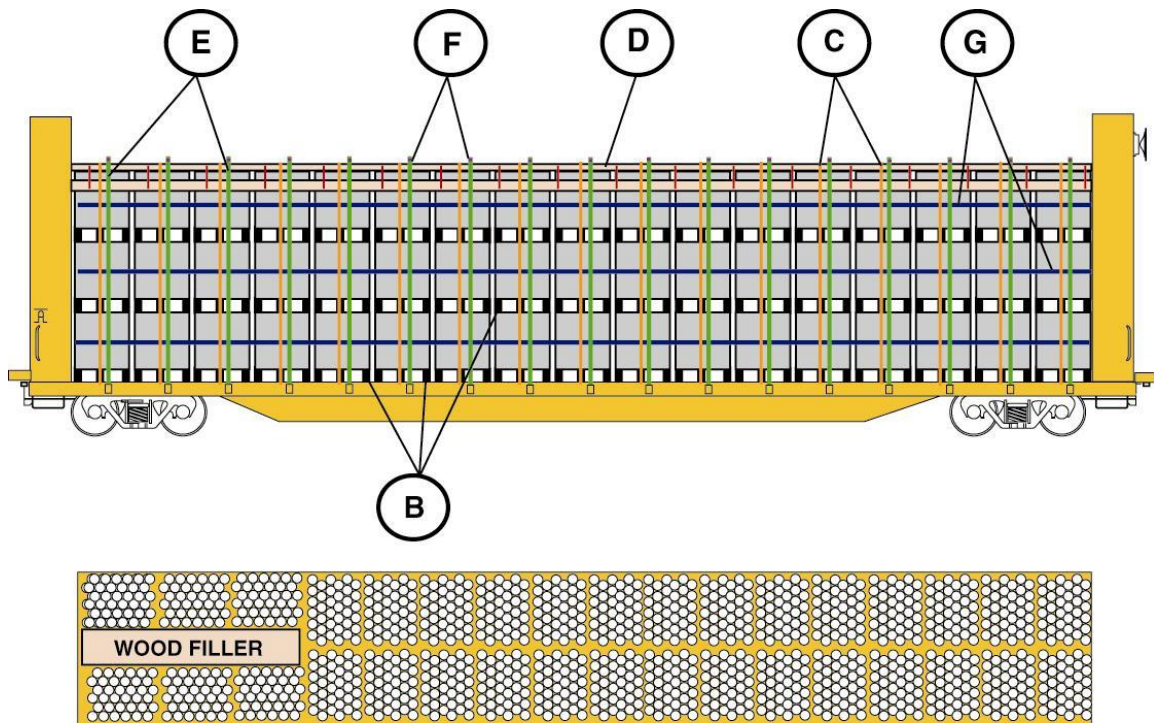
1. Voids, if any, should be distributed at each end of car.

See the General Rules for further details.

ROOF FELT PAPER ROLLS ON PALLETS FLAT CARS WITH PERMANENT END BULKHEADS

RAC 15242

New -04-2000 (Ref: AAR)



Item	No. of Pcs.	Description
A		Vacant
B	1 per package.	Pallets: Rolls are to be placed on a 53 in. x 44 in. x 5 in. high hardwood pallet.
C	1 per each stack of pallets.	Load retaining bands: 1-1/4 in. x .029 in. high tension bands.

ROOF FELT PAPER ROLLS ON PALLETS FLAT CARS WITH PERMANENT
END BULKHEADS

RAC 15242 (concluded)
New -04-2000 (Ref: AAR)

Item	No. of Pcs.	Description
D	1 per outside top package	Top Corner Cap: Lumber, 2 in. x 4 in. placed on each side of the top row. Secure to inside face of stakes (Item E) with one (1) nail.
E	1 per each stake pocket	Side Stakes: One (1) stake per pile made of 4 in. x 4 in. hardwood placed in stake pockets on each side of the car. The stakes must exceed the top of the load by at least 6 in. to allow placement of 1-1/4 in. steel band Stake Ties (Item F)
F	1 per each pair of side stakes.	Stake Ties: 1-1/4 in. x .029 in. high tension bands. To retain side-by-side stakes. Locate as close to load as possible but not less than 5 in. from top of stakes.
G	1 per each layer.	Longitudinal Load Restraining band: 1-1/4 in. x .029 in. high tension bands.

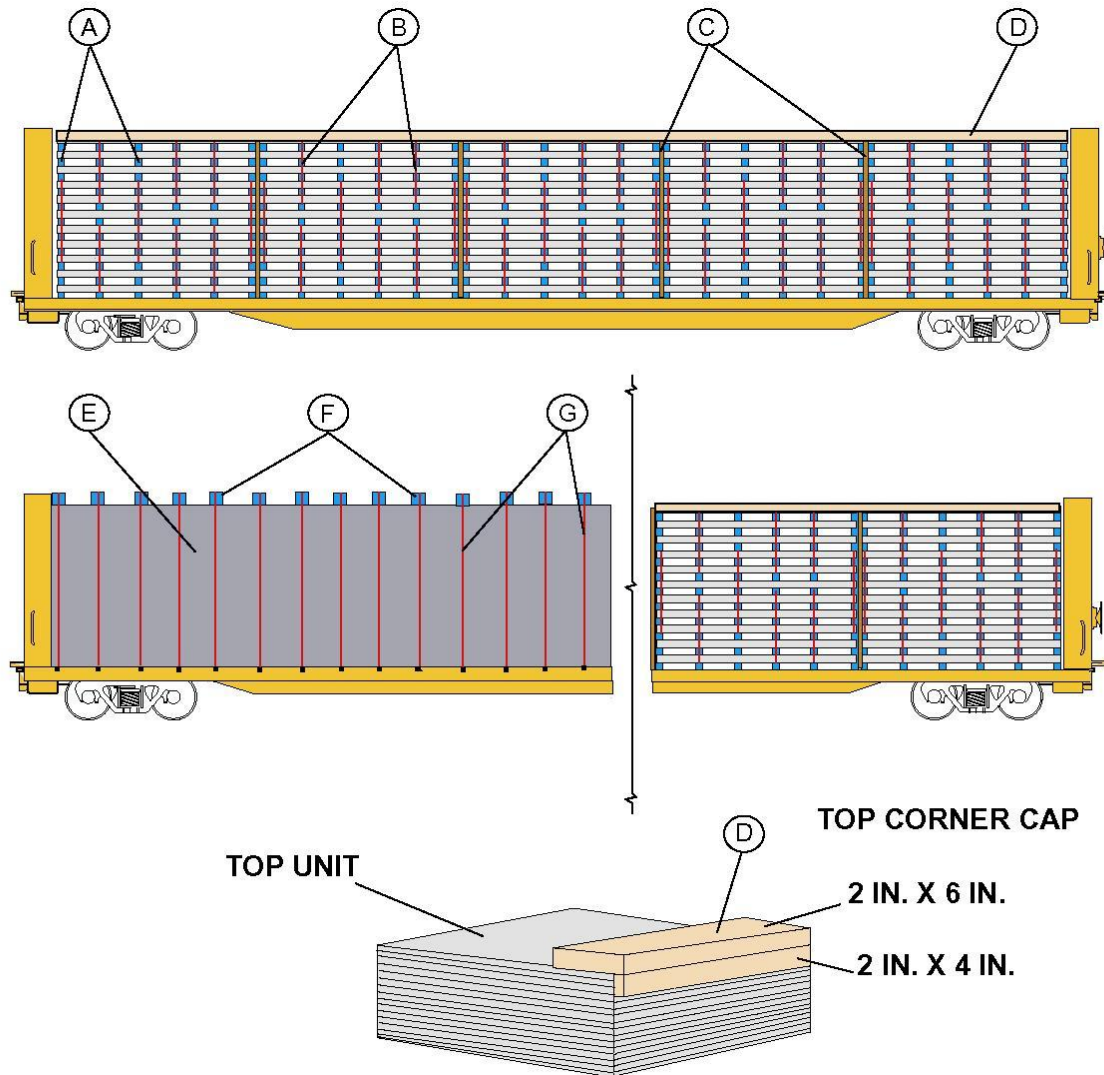
Notes:

1. Height of load not to exceed height of bulkheads.
2. The rolls placed on the pallet must be shrink-wrapped encircled by a ½ in. polyester band. Total height of pallet and roll to be 41 inches.
3. Rolls of Tar Paper must be 36 inches high by 8-1/2 in. diameter.
4. The load shall consist of 3 tiers of pallets placed one on top of the other.
5. Each tier will be made of 28 pallets placed side-by-side with 53 in. side facing the bulkhead and 6 pallets placed side-by-side with the 44 in. side facing the bulkhead. The 18 in. void between the pallets placed lengthwise must be filled with an appropriate wood filler to maintain load at 106 in. wide. No lengthwise void permitted.

See general rules for further details.

**GYPROC PANELS 13 FT. X 8 FT. X ½ IN. OVERSIZED LOADED ON A 66 FT.
FLAT CAR WITH PERMANENT END BULKHEADS**

RAC 15243
New -04-2000



Item	No. of Pcs.	Description
A	Minimum of 6 per units	Separators: Lumber, 4 in. x 4 in. Length to be equal to width of units and in one piece.

GYPROC PANELS 13 FT. X 8 FT. X ½ IN. OVERSIZED LOADED ON A 66 FT.
FLAT CAR WITH PERMANENT END BULKHEADS

RAC 15243 (concluded)
New -04-2000

Item	No. of Pcs.	Description
C	1	OSB: Locate one between units
D	1	Top Corner Cap: Top corner cap: Cap assembly consist of one (1) piece lumber, 2 in. x 4 in. and one (1) piece lumber, 2 in. x 6 in. Locate corner cap along top units.
E	1	Tarp: A tarp should cover the load for protection.
F	Minimum of 6 per units	Unit boards: Lumber 4 in. x 4 in. Locate each 4 x 4 in line with separators on top of the tarp.
G	1 per 4 in. x 4in. lumber	Unitizing straps: Locate one per 4 in. x 4 in. lumber on top of load and secure to the car on each side of the load.

Notes:

1. One unit is 13 ft. long x 8 ft. wide x 11.25 in. high.
2. 15 panels per unit
3. 5 units wide x 11 units high fit on car
4. Load must be centered on car, voids in center of car should be filled.

See general rules for further details.

CLR 6000 LOADING OF DEPARTMENT OF DEFENCE MATERIAL

**SECUREMENT METHODS
FOR
MILITARY RAIL MOVEMENTS
IN CANADA**

**(INCLUDING ALL FOREIGN
MILITARY ESTABLISHMENTS)**

**FOURTH EDITION
JANUARY 2011**

**SAFETY
IS A PRIME CONCERN
TO ALL**

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**RULES FOR LOADING
MILITARY EQUIPMENT**

PRODUCED BY

THE RAILWAY ASSOCIATION OF CANADA

IN COOPERATION WITH

THE DEPARTMENT OF NATIONAL DEFENCE

OF CANADA

BASED ON

THE ASSOCIATION OF AMERICAN RAILROADS

RULES GOVERNING THE LOADING OF MILITARY

EQUIPMENT ON OPEN TOP CARS.

PREFACE

This is the fourth edition and supersedes the earlier edition of this pamphlet. It contains some changes and revised RAC Loading Rules. This pamphlet will aid members of the Canadian Forces and railway inspectors in ensuring safe rail transport of equipment. It contains general information, procedures, and figures for the correct tie-down of military equipment on rail cars.

This pamphlet covers minimum standards; your local railroad may require additional securement based on the condition of the rail car or other factors that cannot be standardized. The pamphlet is not designed to cover every military vehicle in the Canadian Forces inventory or other NATO forces visiting or exercising in Canada under the Status of Forces Agreement (SOFA). The vehicles covered herein are those most commonly transported by rail. When in doubt, check with the Loading Rules of the Railway Association of Canada or with the mechanical personnel of the railroad transporting your equipment.

Remember, all equipment loaded onto rail cars must be firmly and properly secured to counteract longitudinal, lateral, and vertical forces. AAR General Rules require both the rail carrier and the shipper to comply with all applicable loading rules and observe the drawings and specifications of applicable figures.

The law in Canada, clearly defined in The Railway Safety Act which governs the loading regulations on open top cars, shall be complied with by all concerned.

<p>NOTE: NATO visiting forces using the North American Rail System cannot use the NATO tiedown chain system used by their Forces in Europe.</p>

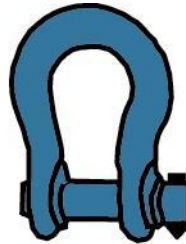
GENERAL GUIDELINES FOR SECUREMENT OF MILITARY VEHICLES ON RAIL FLAT CARS

PREPARING VEHICLES PRIOR TO LOADING

- ◆ Make sure that all lifting and tie-down clevises and shackles are attached to the vehicles.



SCREW PIN



ROUND PIN

1. Clevises/shackles must have strength equal to or greater than the securement attached to it.
2. Clevis/shackle pins must be secured to prevent displacement. When cotter pins are used, the legs of the cotter pins must be fully open.
3. Clevises/shackles equipped with screw pins must be wired to prevent displacement. Pin must protrude the threaded side of the shackle.
4. **On vehicles weighing more than 16,000LBS shackles used must be of the threaded or screwed type**

- ◆ Make sure that fuel tanks are no more than three-quarters full and jerry cans are empty.
- ◆ Remove or band canvas and bows to prevent wind damage. (At the discretion of the military, one of these two options must be used).
- ◆ Protect windshields from damages, i.e. thrown rocks. (Optional).
- ◆ Reduce vehicles to their lowest configuration (for shipping) unless cargo is loaded with military equipment then it must be fully secured, braced and banded.
- ◆ Secure materials or equipment loaded in beds of trucks by banding or any other approved method. Bands should be at least 3/4" by 0.020 inches.
- ◆ Hoods must be secured. (Wind can tear hoods off).
- ◆ Inflate tires to highway pressure. Repair or replace leaking tires. A flat tire on a truck loaded on a moving train can cause a fire.

PREPARING RAILCARS FOR LOADING

- ◆ Inspect rail cars to verify deck suitability.
- ◆ On chain equipped cars, locking channels should not be bent.
- ◆ All chains and tightening devices should be operative.
- ◆ Loading team should have rust retardant oil to free locking devices.
- ◆ All necessary tools should be available at rail site including bridge plates, lumber of various sizes, wire and strapping material.
- ◆ Store unused chains in channels to prevent damage when loading vehicles.
- ◆ Clean debris from locking channels to allow locking devices to be moved the length of channel.
- ◆ Remove any protruding nails from deck of car (safety hazard).
- ◆ Make sure winches or ratchets are in good working condition, at the right place. Ratchets should be positioned on the car prior to loading in order to avoid having them under or behind the vehicles.

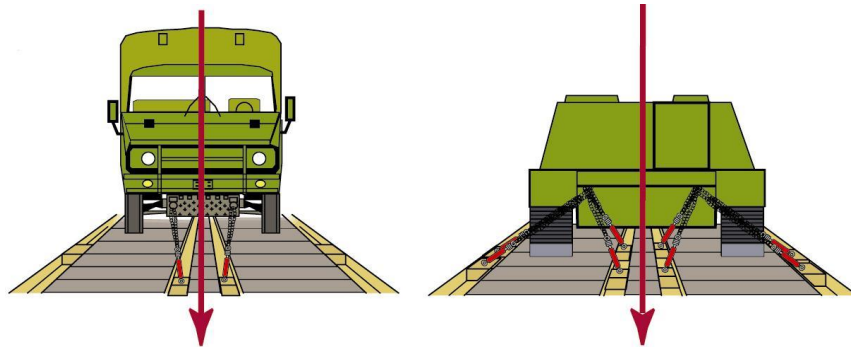
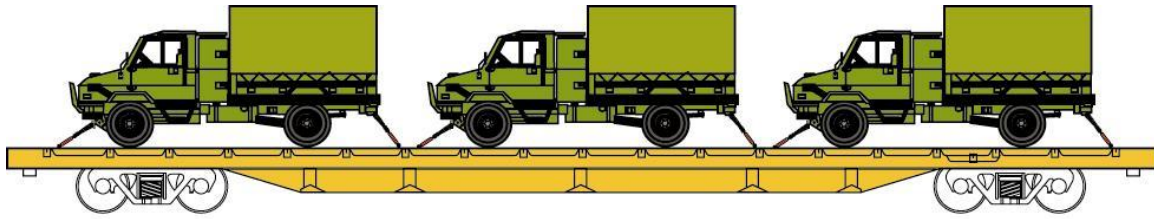
LOADING VEHICLES

- ◆ Set hand brakes on each rail car.
- ◆ Position ramp, secure and brace properly so that vehicles can roll on without slipping and turning.
- ◆ Position bridge plates in between rail cars when loading wheeled vehicles. (Not required when loading tracked vehicles as this could create a safety hazard).
- ◆ When load is prepared on cars with side mounted hand brakes, load maybe located not closer than 1 foot from either end of car.
- ◆ When loading vehicles on a standard rail flat car, allow 12" minimum clearance from the A end of the car, and 24" from the B end (brake end).
- ◆ When loading vehicles, follow the directions of rail and ground guides.
- ◆ Guides should keep one rail car distance between them and the vehicle being loaded.
- ◆ Guides should never walk backwards.

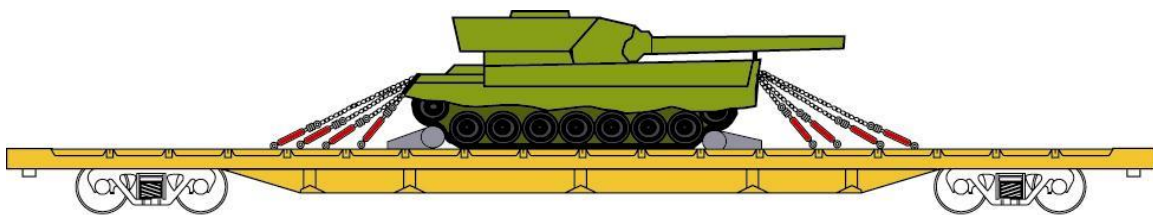
LOADING VEHICLES (concluded)

- ◆ When loading wheeled vehicles on multilevel rail cars, load the bottom deck first, since the upper deck ramp may block the lower deck.

- ◆ Load must be located centrally on the rail car, both laterally and longitudinally. Weight of the load must be distributed evenly.



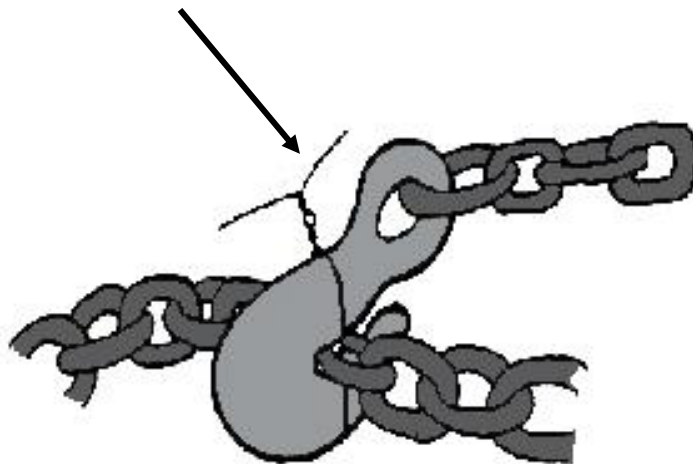
- ◆ When loading military tank on a rail equipped car (i.e.: HTTX) or general purpose flat car, only **ONE** tank must be loaded and centrally located on the rail car. No other vehicles can be loaded to use the vacant space at front and rear of the tank.



SECURING VEHICLES

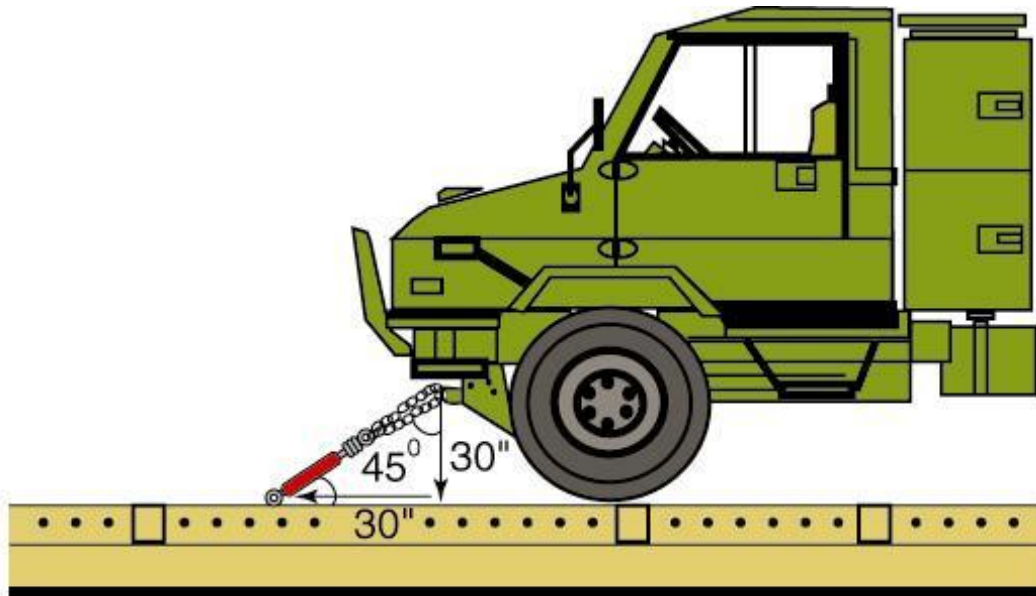
- ◆ A safety appliance may be temporarily removed to facilitate loading or unloading a commodity when necessary, provided it is replaced immediately following loading or unloading operations and prior to releasing the car into service.
- ◆ Ensure all winches are in proper direction so that the chain is taken up on the underside of the ratchet wheel.
- ◆ Be sure proper tension of wire rope or chains exists.
- ◆ Tension chain to achieve a moderate deflection of the vehicle's suspension.
- ◆ After initially tensioning each chain, strike it sharply with a hammer or bar and retighten. This helps the links seat in their longest length and helps prevent loose chains in transit.
- ◆ Secure excess wire rope or chain to the tension bearing part of the wire rope or chain.
- ◆ Tie-down equipment should be affixed to designated attachment points on vehicles, not to axles, springs or bumpers.
- ◆ On chain devices, secure open-faced hooks to the chain link with wire.

WIRE OR TIE WRAP



SECURING VEHICLES

- ◆ All winches/ratchets must be located at equal distances from the vehicles, maintaining a 45-degree angle.
- ◆ The length of chain should be equal to the distance between the top of the deck and the tie-down point on the vehicles. **(See Note).**

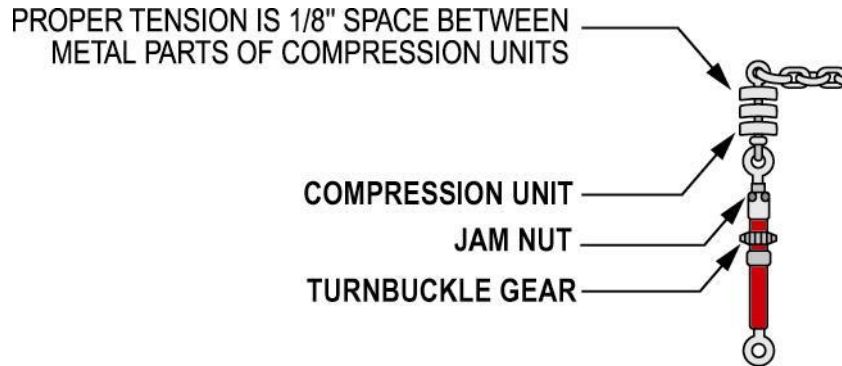


NOTE:	1. MEASURE DISTANCE FROM ATTACHMENT POINT OF VEHICLE TO FLAT CAR DECK IN A VERTICAL POSITION.
	2. TAKE VERTICAL DISTANCE (FROM ATTACHMENT POINT TO DECK OF FLAT CAR) AND MEASURE SAME LENGTH HORIZONTALLY AWAY FROM THE VEHICLE.

- ◆ Before securement, ensure chains are not kinked or twisted and correct position of chain anchor.
- ◆ Do not cross chains.
- ◆ Loose chains are not to be wrapped around shackles and winches or ratchets.

SECURING VEHICLES (concluded)

- ◆ Proper tension is 1/8" space between metal parts of compression units on chain assemblies so equipped.



- ◆ Lock chain-tightening devices with wire.
- ◆ Turnbuckles must have jam nuts tightened wrench tight.
- ◆ When in doubt concerning number of chains required use the following restraint guidelines:

Restraint values for general commodities

Direction of Restraint	G Force to Yield
Longitudinal	3.0 Gs Total load restraint in each direction should equal three times object weight.
Lateral	2.0 Gs Total load restraint in each direction should equal two times object weight.
Vertical	2.0 Gs Total load restraint should equal two times object weight.

TIE-DOWN CONFIGURATIONS FOR SPECIALLY EQUIPPED RAIL FLAT CARS

Now that we have covered the previous sections as an introduction to the actual loading, it is time to get on with the job. You will see in this section that it is very easy to load military equipment on open top cars. By following simple rules as set forth in this section, you, the driver, will be able to load and tie down your own equipment under the direct supervision of the movement control organization and the railway inspector. It is an easy process as the rail cars are already equipped with chain tie-down systems. You have to be careful when loading your vehicle on the rail cars and follow the rules that are of safety to you and the equipment.

This section is divided into three parts:

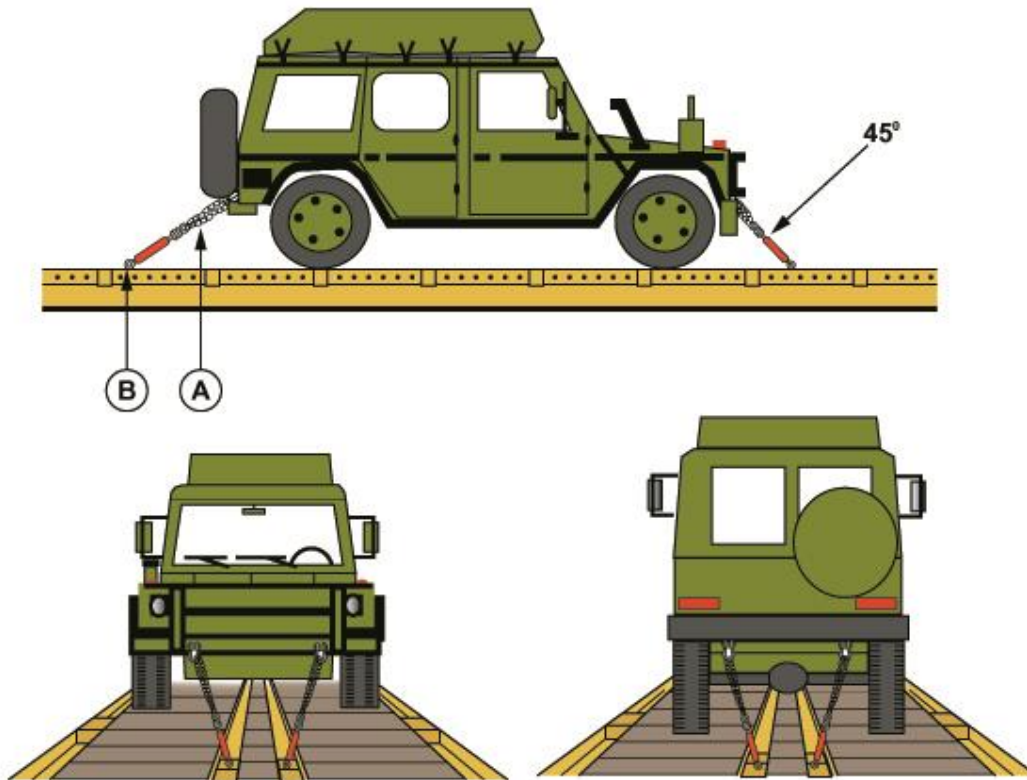
WHEELED VEHICLES TRACKED VEHICLES ENGINEERING EQUIPMENT

WHEELED VEHICLES

1. Transmissions shall be in neutral. Set the parking brake (if it is available and operational) to prevent the vehicle from inadvertently moving during the securement and unloading process.
2. Vehicles must face in the same direction and be uniformly spaced the length of the car to allow sufficient space at each end of car and between vehicles for securement. Tie-downs in the channels are to be in line across the car. The angle of tie-downs must be as close to 45 degrees as possible.
3. Tie-down chains, Items A must be sufficiently tensioned; they must not be crossed and must be free from twisted or kinked links prior to their application to the vehicle.
4. Open hooks must be secured with wire over the opening to prevent hook from becoming disengaged from the chain-link to which it is secured.
5. If equipped, turret gun should be in a straight forward position. If vehicle is not equipped with a workable external locking device, one piece of 3/8" cable extra strength, proof tested to at least 8700 lbs MBS doubled (complete loop), one each side of vehicle. Protection must be applied at tie-down points when sharp edges are present.

WHEELED VEHICLES

LUVW 3/4 TON
RAC 6088B



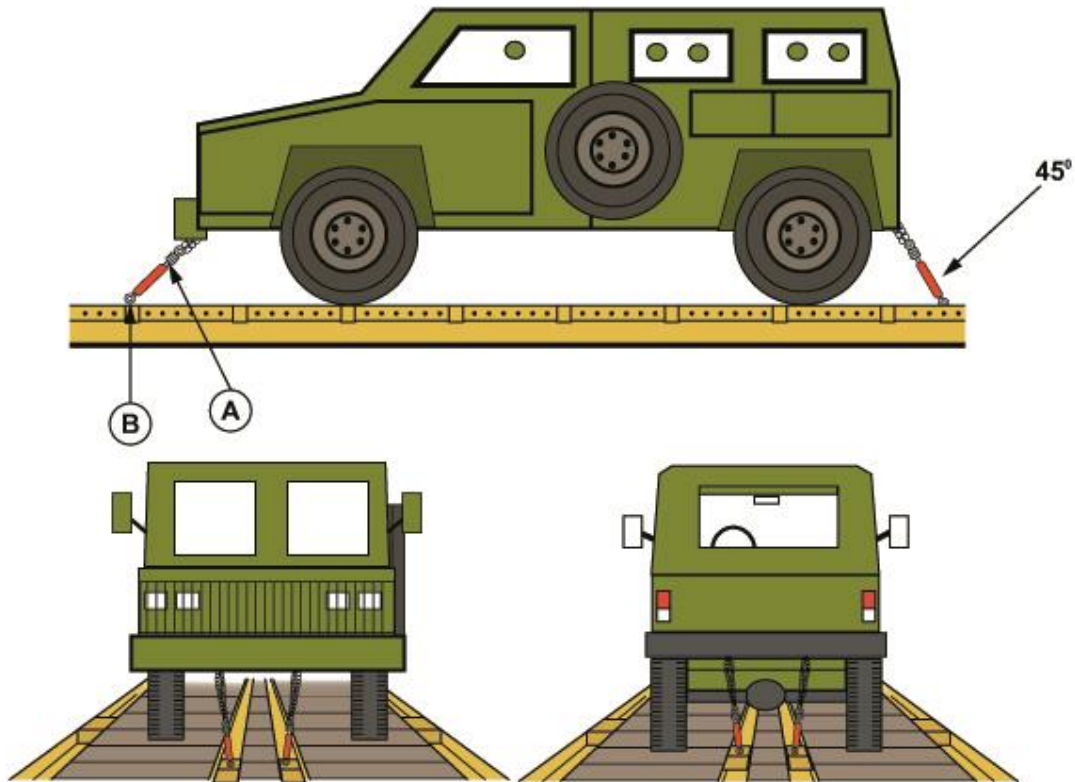
Item	No. of Pcs.	Description
A	4	Chains 3/8" (MBS 27,000 LBS)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

LUVW	10,252 LBS
LUVW 1TM 4X4 MILCOT	8,223 LBS
LUVW ¾ T 4X4 C AND R	10,251 LBS
VTT	851 LBS
AMBULANCE 4X4	15,013 LBS
CREW CAB 4X4	6,113 LBS

WHEELED VEHICLES

RG31 MK3
RAC 6088B

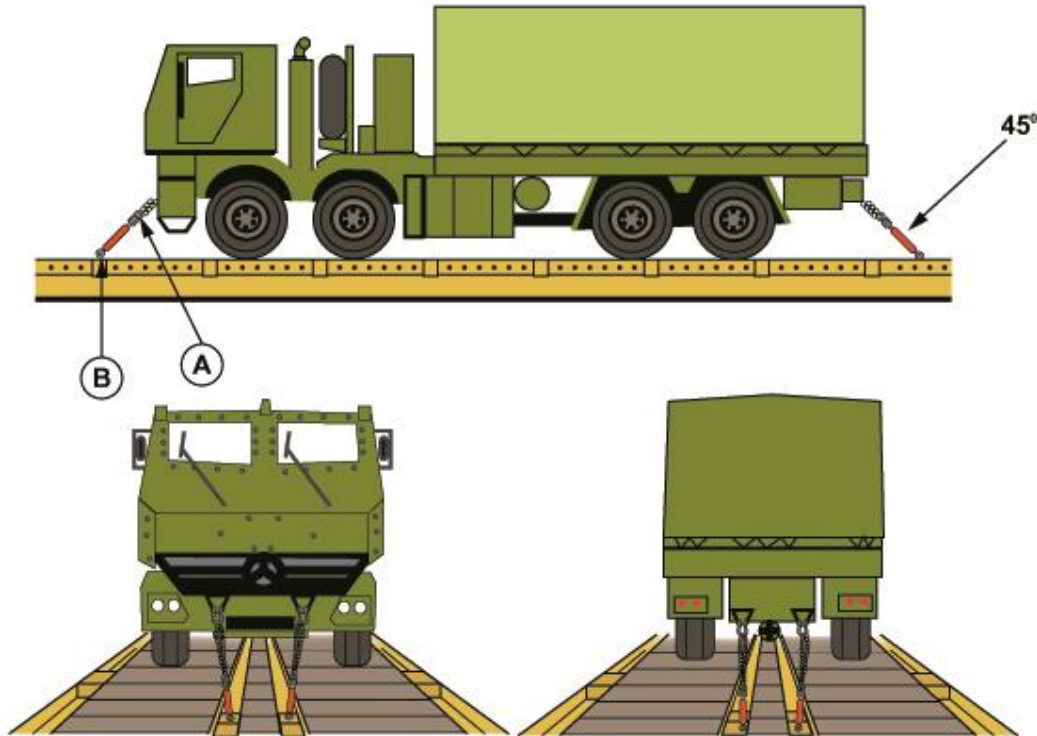


Item	No. of Pcs.	Description
A	8 or 4	Chains 3/8" (MBS 27,000 lbs) Chains 1/2" (MBS 41,250 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: RG31 MK3 23,386 LBS

WHEELED VEHICLES

AHSVS CARGO & CRANE RAC 6088B



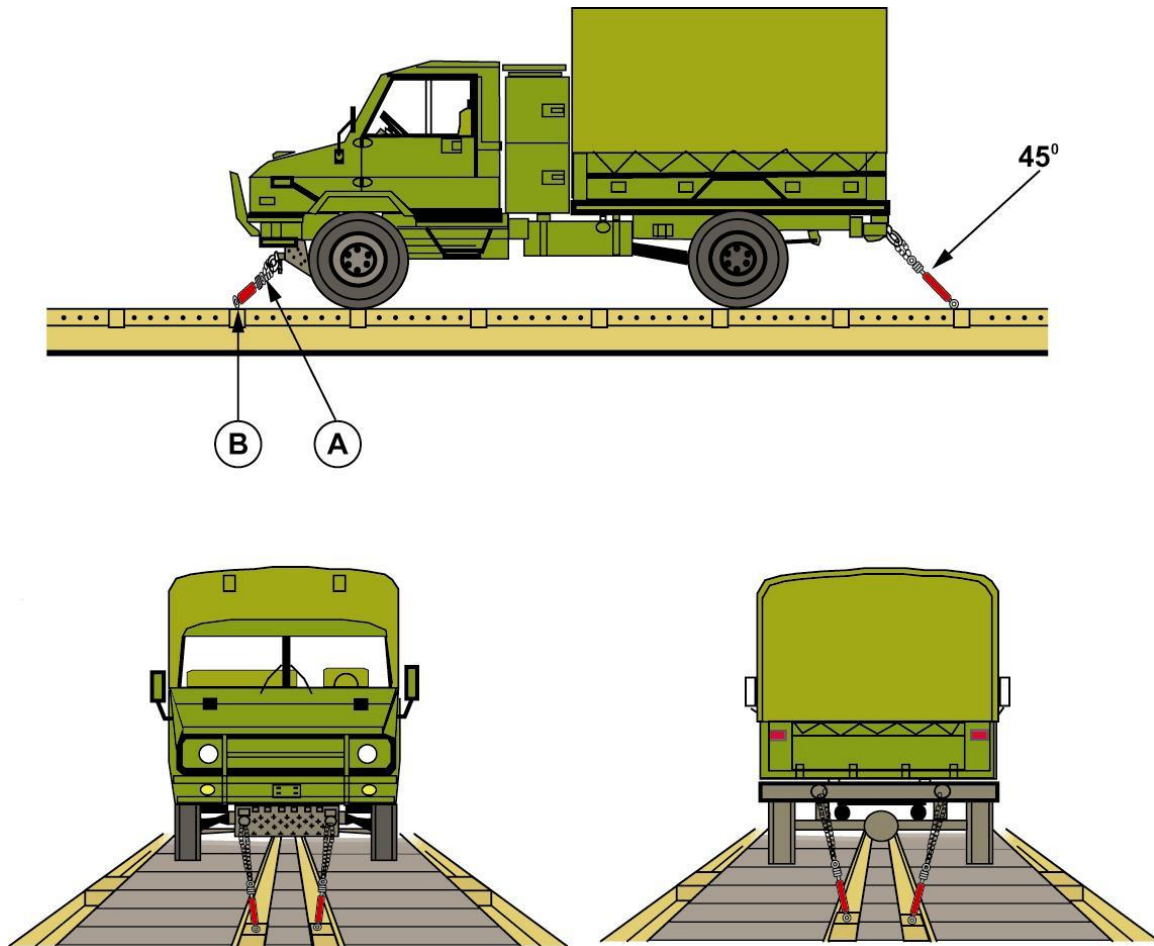
Item	No. of Pcs.	Description
A	4	Chains 1/2" (MBS 41,250 lbs)
	8	Chains 1/2" (MBS 41,250 lbs) Trucks over 40,000 LBS
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

AHSVS	26,500 LBS
AHSVS PALLETIZED	
LOADING SYSTEM 16 TON	54,120 LBS

WHEELED VEHICLES

LIGHT SUPPORT VEHICLE WHEEL (LSVW) RAC 6088B



Item	No. of Pcs.	Description
A	4	Chains 3/8" (MBS 27,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

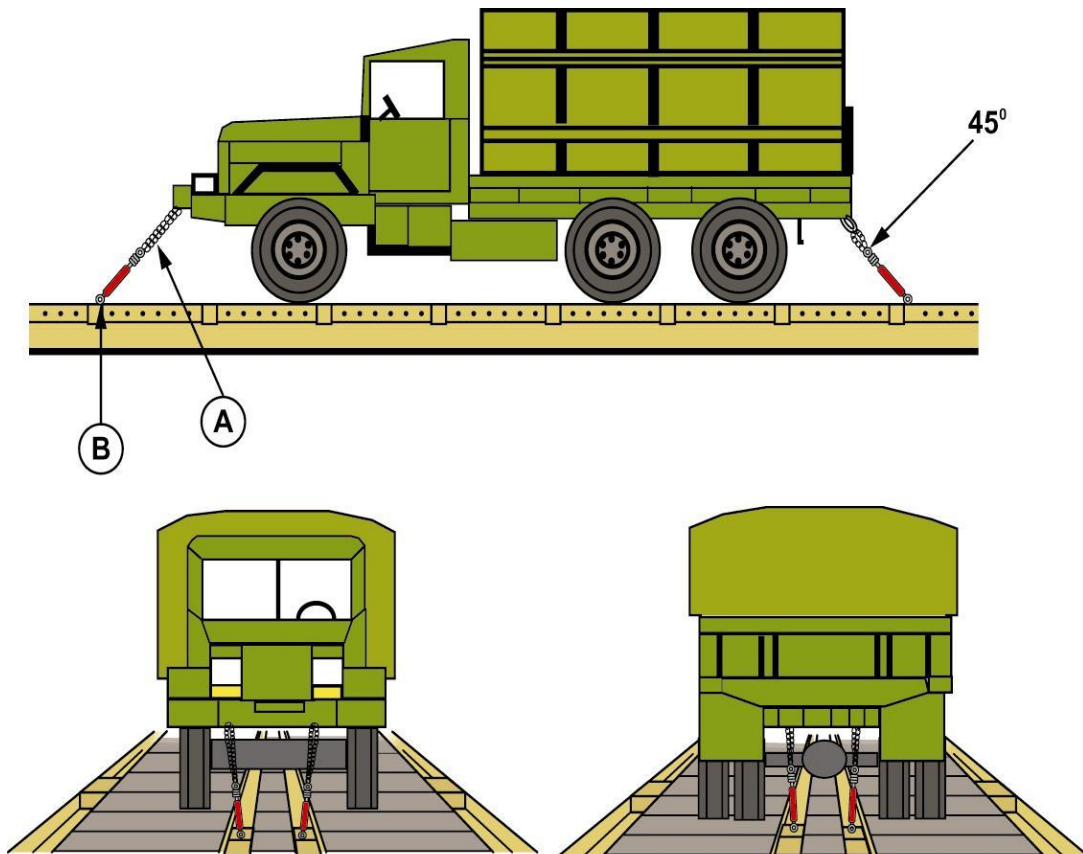
All types of LSVW max. weight:	14,400 LBS
LSVW 1.5 TM	11,574 LBS
LSVW AMBULANCE	11,574 LBS
LSVW 1.5 TM DES	11,575 LBS
LSVW 1.5 TM LAN SERVER	11,618 LBS
LSVW 1.5 TM WITH S805 SHELTER	12,037

LBS

LSVW 1.5 TM RADIO NODE	11,574 LBS
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WHEELED VEHICLES

MLVW (2 ½ TON)
RAC 6088B

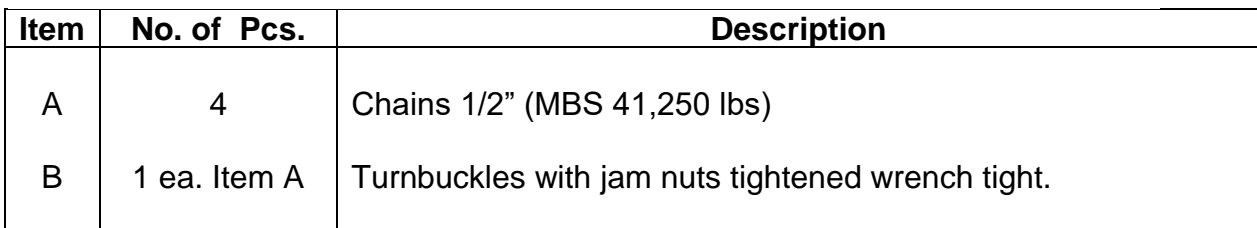


Item	No. of Pcs.	Description
A	8 or 4	Chains 3/8" (MBS 27,000 lbs) Chains 1/2" (MBS 41,250 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

CG (MLVW)	19,309 LBS
VAN (MLVW)	19,309 LBS
BOWSER	19,609 LBS

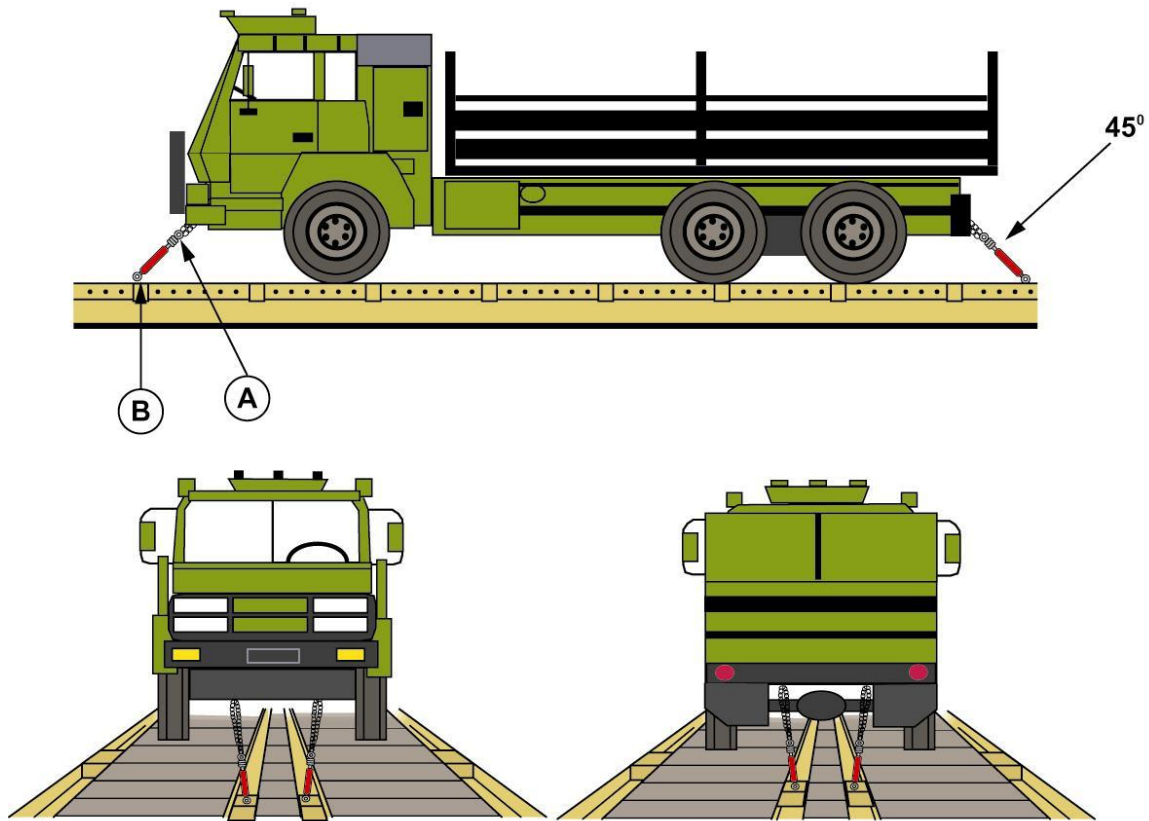
HLVW (10 TON) TRUCK RECOVERY RAC 6088B



DESCRIPTION AND WEIGHT:	HLVW	36,129 LBS
MAINTLINE 4X4	37,077 LBS	

WHEELED VEHICLES

HLVW (10 TON) TRUCK RAC 6088B

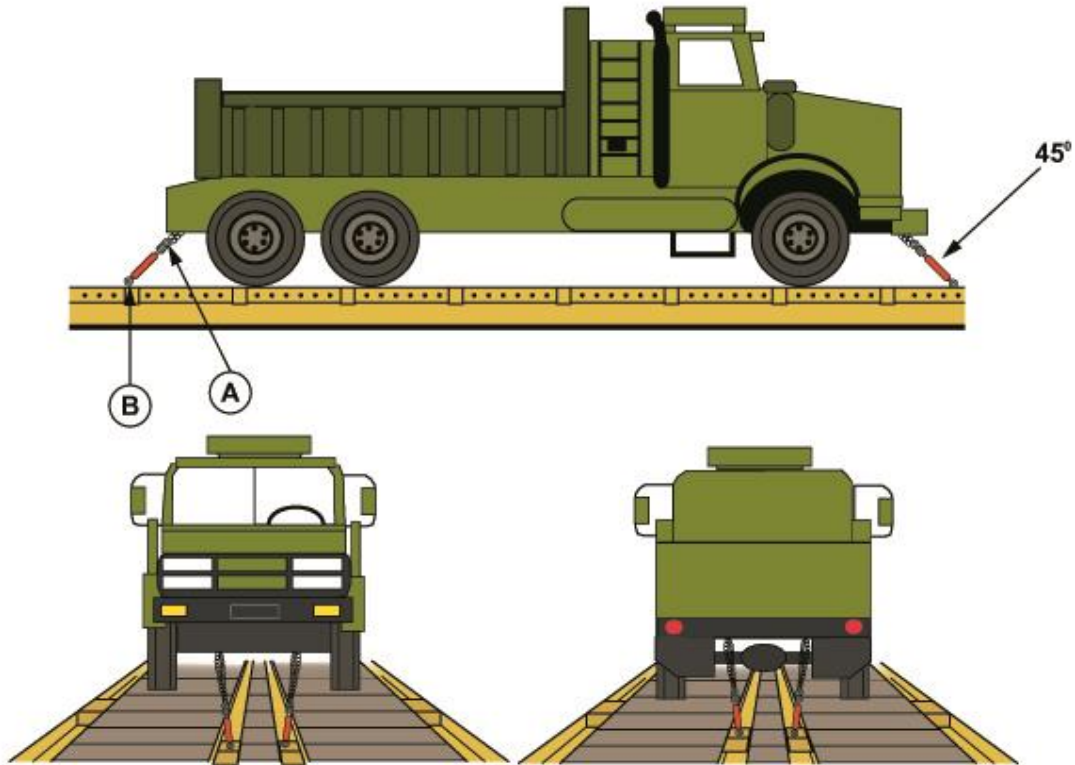


Item	No. of Pcs.	Description
A	4	Chains 1/2" (MBS 41,250 lbs) or
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:	HLVW	27,387 LBS
	HLVW WINCH AND CRANE	30,810 LBS
	HLVW CARGO SCRAN 10 TM	29,542 LBS
	HLVW PLS 16 TM 6X6	35,274 LBS
	HLVW REFUELER	29,983 LBS
	DUMP TRUCK HD 6X6	33,863 LBS

WHEELED VEHICLES

HESV PALLET LOADER / DUMP MODULE RAC 6088B

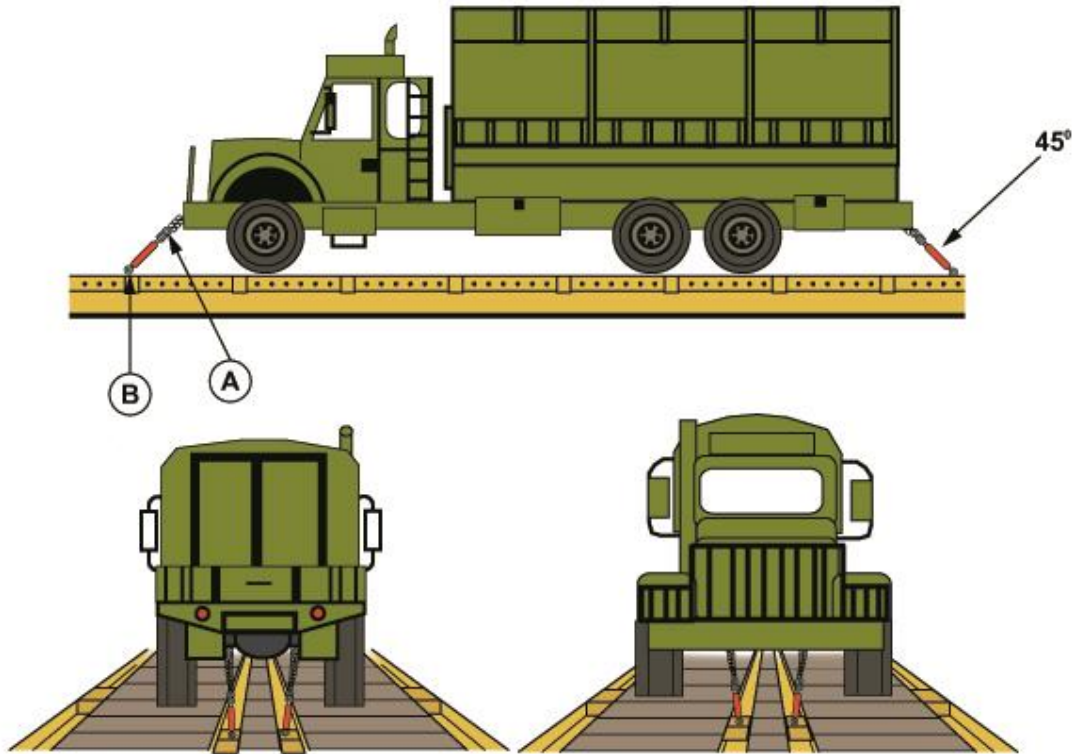


Item	No. of Pcs.	Description
A	4	Chains 1/2" (MBS 41,250 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: HESV 33,000 LBS

WHEELED VEHICLES

MSVS MILCOT (MEDIUM SUPPORT VEHICLE SYSTEM) RAC 6088B

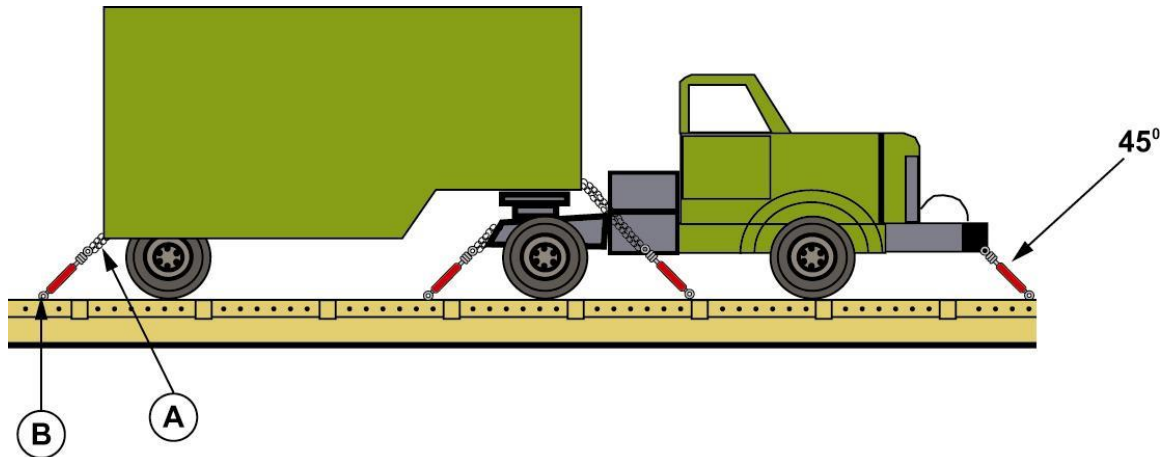


Item	No. of Pcs.	Description
A	4	Chains 1/2" (MBS 41,250 LBS)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: MSVS MILCOT 27,101 LBS

WHEELED VEHICLES

SEMI-TRAILER ATTACHED TO PRIME MOVER RAC 6088B



Item	No. of Pcs.	Description
A	8	Chains 1/2" (MBS 41,250 LBS)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

TRACTOR WITH 20 TON TLR 32,070 LBS

TRACTOR WITH 18,000 LITRE TANK 27,660 LBS

5 TON TRUCK AND TRAILER 38,000 LBS
(PALLET LOADING 63' LONG WITH RACK)

SEMI TRAILER BULL HAULER FUEL DISP 32,000 LITRES 15,256 LBS

SEMI TRAILER LOW BED 35TM VARIABLE DECK DUALS 22,300 LBS

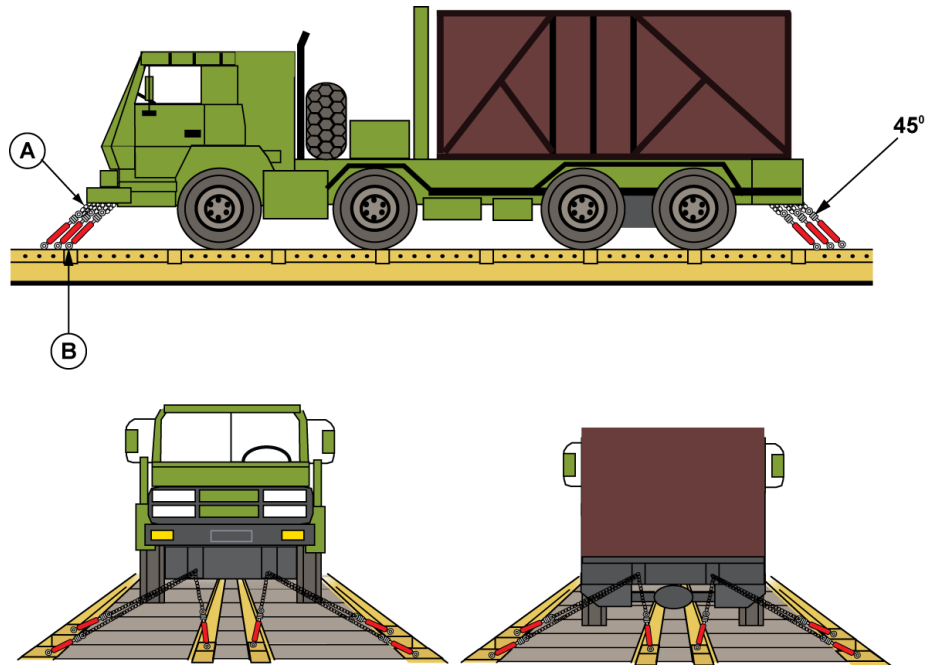
SEMI TRAILER LOW BED 45TM 24FT DECK 24,471 LBS

SEMI TRAILER LOW BED 45T 24FT DECK REM ADJ GOOSENECK
24,471 LBS

NOTE: SECURE THE PRIME MOVER AS IF IT WERE ALONE AND THE TRAILER AS ANOTHER PIECE OF EQUIPMENT.

WHEELED VEHICLES

LHS TRUCK
RAC 6088B
New 08-2016 (Ref: AAR Fig. 88-B)



Item	No. of Pcs.	Description
A	12	Chains 3/8" (MBS 27,000 lbs)
B	1 ea, Item A	Turnbuckles with jam nuts tightened wrench tight

DESCRIPTION AND WEIGHT: LHS TRUCK 66,039 LBS

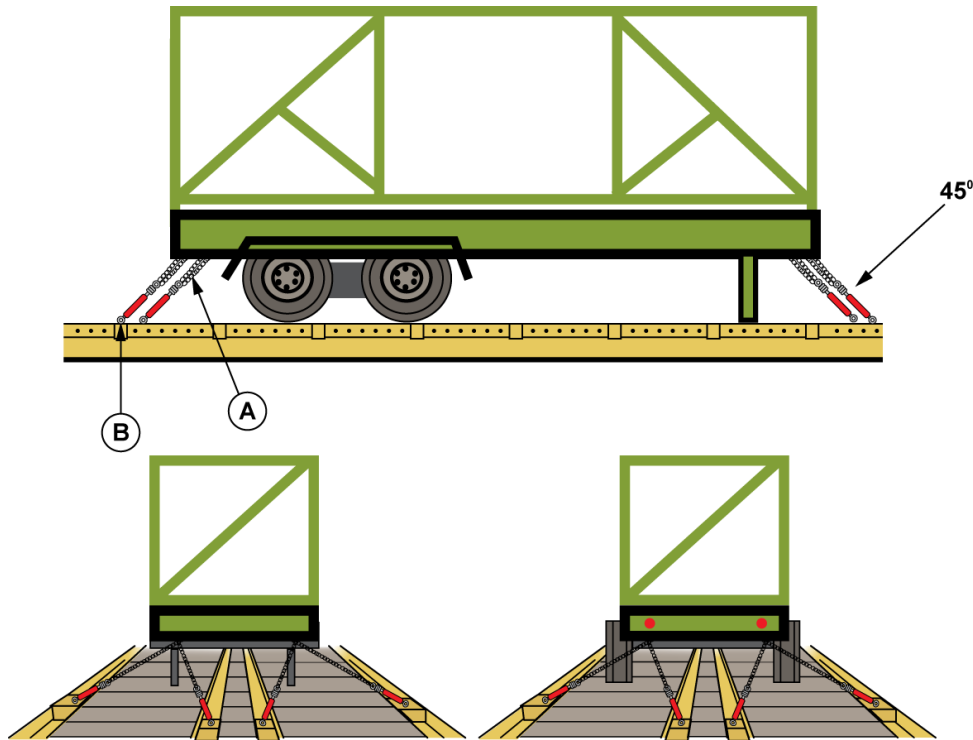
NOTE: THE TIE-DOWN SHACKLES ON THIS VEHICLE MUST BE OF THE THREADED OR SCREWED TYPE ONLY (NSN - 4030-21-907-6585). NO OTHER IN-LIEU SHACKLES ARE PERMITTED AS THE NORMAL SHACKLES WILL SPLIT APART.

WHEELED VEHICLES

LHS TRAILER

RAC 6088B

New 08-2016 (Ref: AAR Fig. 88-B)



Item	No. of Pcs.	Description
A	8	Chains 3/8" (MBS 27,000 lbs)
B	1 ea, Item A	Turnbuckles with jam nuts tightened wrench tight

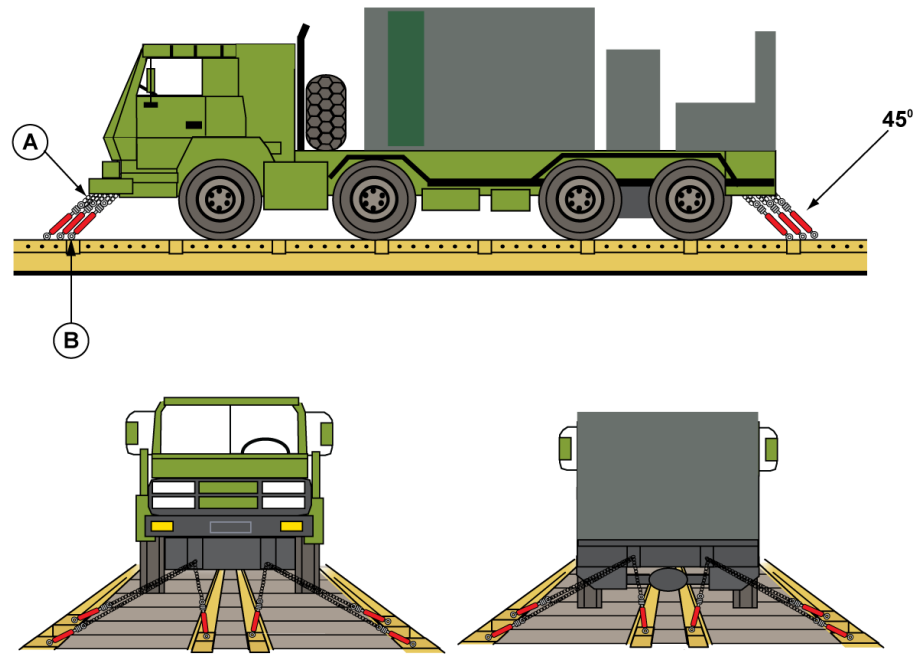
DESCRIPTION AND WEIGHT: LHS TRAILER

34,118 LBS

NOTE: THE TIE-DOWN SHACKLES ON THIS VEHICLE MUST BE OF THE THREADED OR SCREWED TYPE ONLY (NSN - 4030-21-907-6585). NO OTHER IN-LIEU SHACKLES ARE PERMITTED AS THE NORMAL SHACKLES WILL SPLIT APART.

WHEELED VEHICLES

MRT TRUCK
 RAC 6088B
 New 08-2016 (Ref: AAR Fig. 88-B)



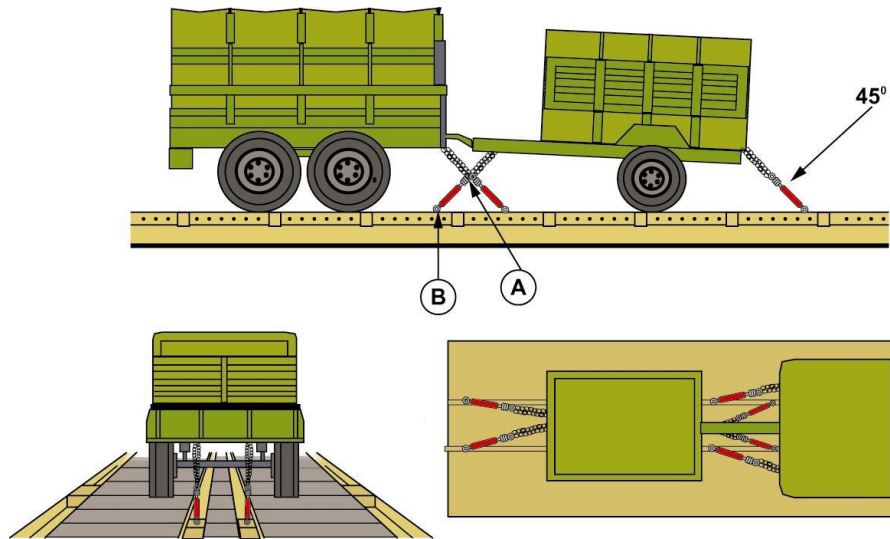
Item	No. of Pcs.	Description
A	12	Chains 3/8" (MBS 27,000 lbs)
B	1 ea, Item A	Turnbuckles with jam nuts tightened wrench tight

DESCRIPTION AND WEIGHT: MRT TRUCK 56,070 LBS

NOTE: THE TIE-DOWN SHACKLES ON THIS VEHICLE MUST BE OF THE THREADED OR SCREWED TYPE ONLY (NSN - 4030-21-907-6585). NO OTHER IN-LIEU SHACKLES ARE PERMITTED AS THE NORMAL SHACKLES WILL SPLIT APART.

WHEELED VEHICLES

TRAILER AND PRIME MOVER (WHEN ATTACHED) RAC 6088B



Item	No. of Pcs.	Description
A	4	Chains 3/8" (MBS 27,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

1/4 TON TLR	1,060 LBS
3/4 TON TLR CG	2,200 LBS
3/4 TON TLR 10 KW LBS	2,520
1 1/2 TON POD TLR LBS	3,451
1 1/2 TON GEN TLR LBS	3,590

1 1/2 TON CG LBS	4,100
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1 1/2 TON KITCHEN TLR	5,489 LBS
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1 1/2 TON ERDALATOR LBS	5,700
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TRAILER 3.5T 2WHL M353 W/HYDRAULIC TOOL SYSTEM 10,121 LBS	
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WHEELED VEHICLES

TRAILER AND PRIME MOVER
(WHEN ATTACHED)

RAC 6088B (Concluded)

TRAILER CARGO 4 WHEELED /SKI AMPH 1000KG PAYLOAD	2,403 LBS
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TRAILER FLATBED BEAVERTAIL TILT DECK 30K LBS	7,785 LBS
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TRAILER FLATBED BEAVERTAIL 40K LBS	9,800 LBS
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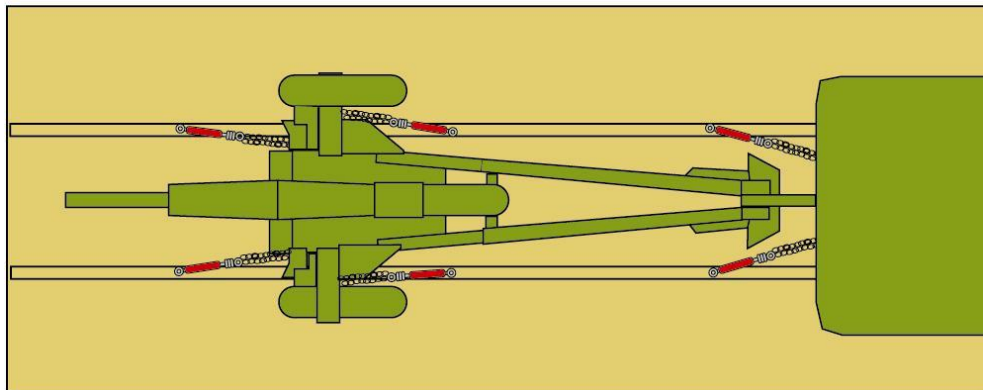
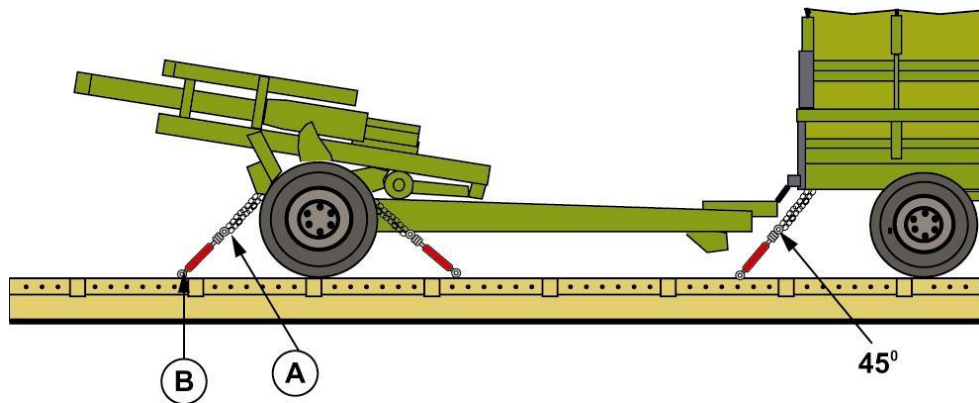
TRAILER PLS FULL 15FT 6,614 LBS	
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TRAILER TANK WATER 1.5TM	2,403 LBS
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NOTE: PINTLES MUST HAVE PINTLE LOCK SECURED WITH COTTER KEY OR WIRE

WHEELED VEHICLES

TOWED ARTILLERY GUN RAC 6088B



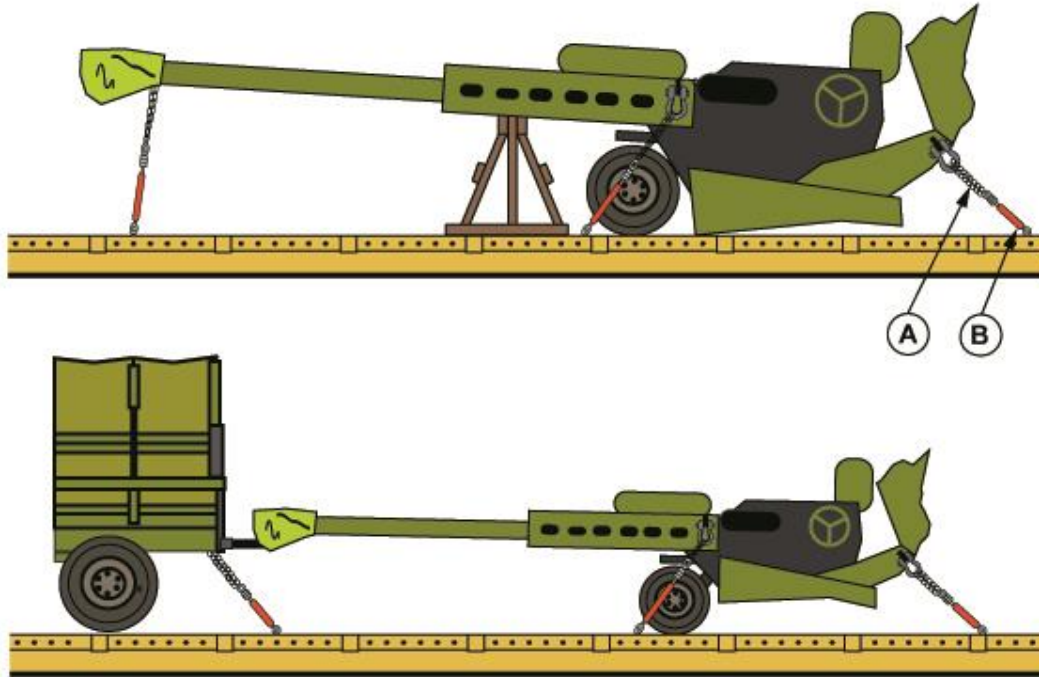
Item	No. of Pcs.	Description
A	4	Chains 3/8" (MBS 27,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

GUN L5 (105MM)	2,440 LBS
GUN C1 (105MM)	4,620 LBS

WHEELED VEHICLES

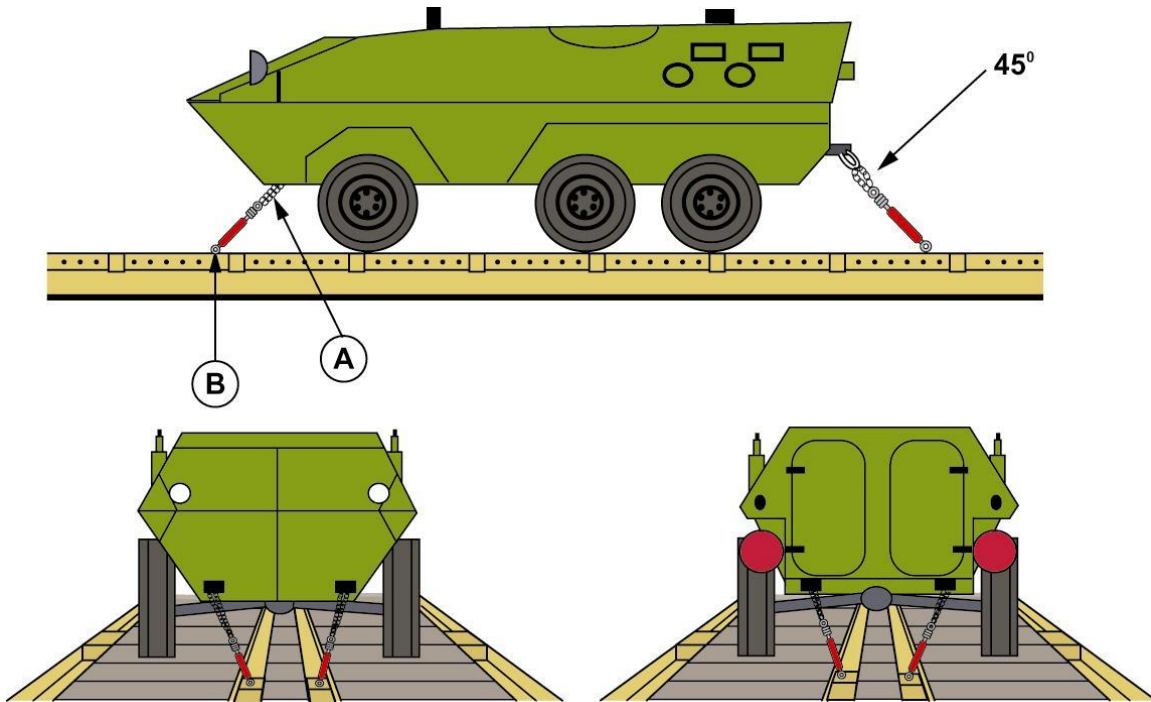
TOWED ARTILLERY GUN M777 A1 RAC 6088B



Item	No. of Pcs.	Description
A	6	Chains 3/8" (MBS 27,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: M777 8,700 LBS

WHEELED VEHICLES
AVGP FAMILY
(ARMED VEHICLE GENERAL PURPOSE)
RAC 6088B



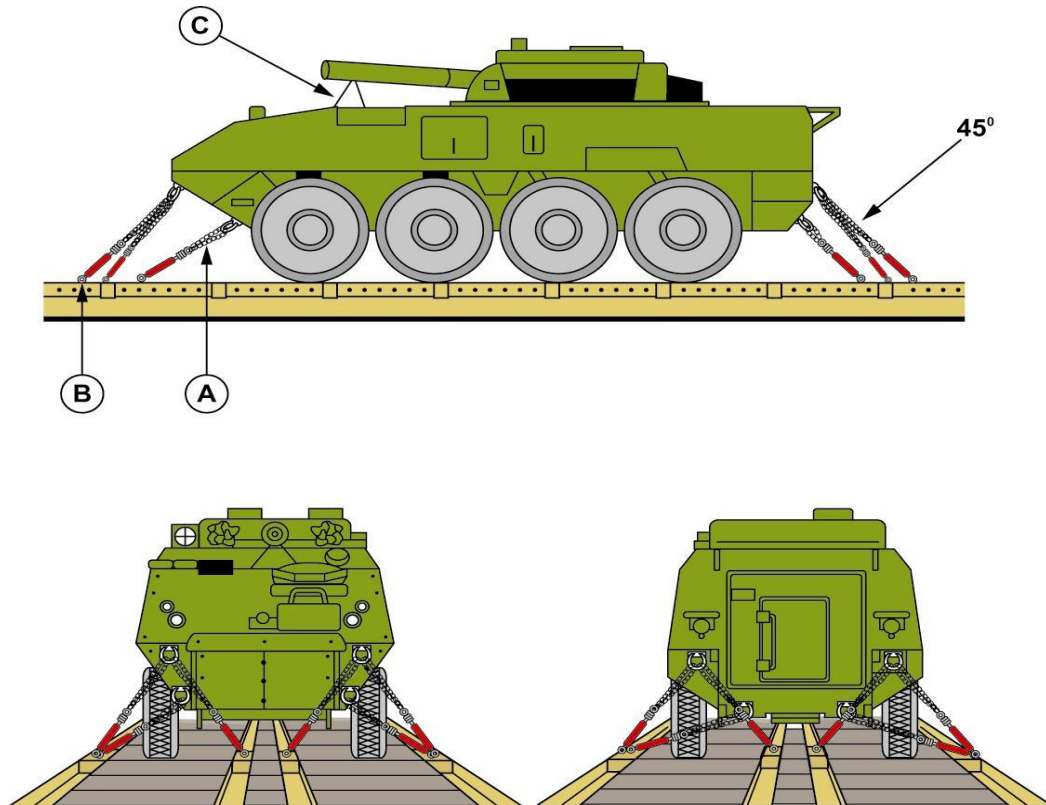
Item	No. of Pcs.	Description
A	4	Chains 1/2" (MBS 41,250 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: LBS	COUGAR	22,540 LBS	BISON AMB	27,999 LBS
	GRIZZLY	21,700 LBS	BISON C31	28,660
	HUSKY	25,240 LBS	BISON MRT	32,066 LBS
	BISON	28,459 LBS	COYOTE MTD	32,827 LBS
	HUSKY MRT	23,589 LBS		

NOTE: SPECIAL PRECAUTIONS SHOULD BE TAKEN ON THE COUGAR TO MAKE SURE THAT TURRET GUN IS IN STRAIGHT FORWARD POSITION (AS AN EXCEPTION) AND TURRET IS LOCKED. GUN BARREL MUST BE SECURELY FASTENED BY PLACING WIRE ROPE LOOPS AROUND THE GUN BARREL AND SECURING ONE LOOP TO EACH SIDE OF THE HULL.

WHEELED VEHICLES

LIGHT ARMORED VEHICLE (LAV) AND SIMILAR VEHICLES FROM 31,000 LBS TO 42,000 LBS RAC 6088B

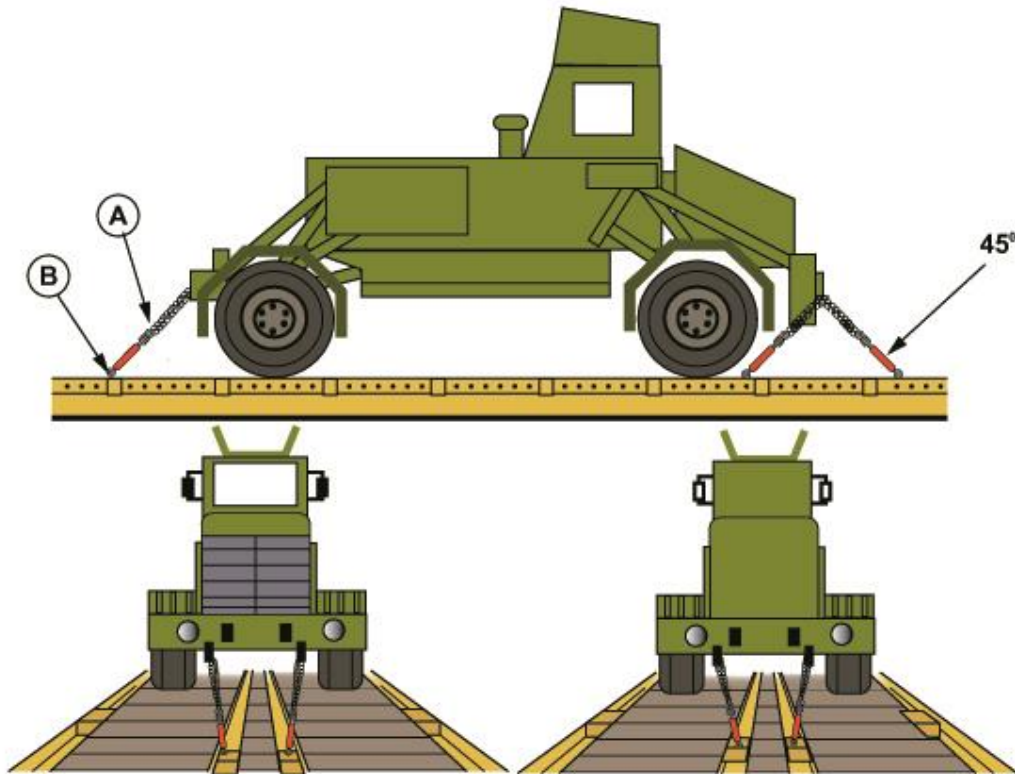


Item	No. of Pcs.	Description
A	12	1/2" diameter alloy steel chain, extra strength, (MBS 41,250 lbs) for vehicles weighing over 31,000 lbs. to 64,000 lbs., inclusive.
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
C	1	3/8" cable extra strength, (MBS 8700 lbs), doubled (complete loop), one each side of vehicle. NOTE: When vehicle is equipped with blade, add 2 additional 1/2" chains to the blade.

DESCRIPTION AND WEIGHT: LAV 31,000 LBS TO 42,000 LBS
COUGAR ENGINEER RAPID , RESPONSE VEHICLE
64,000 LBS

WHEELED VEHICLES

HUSKY MKIII TOWING MINE DETECTION VEHICLE RAC 6088B

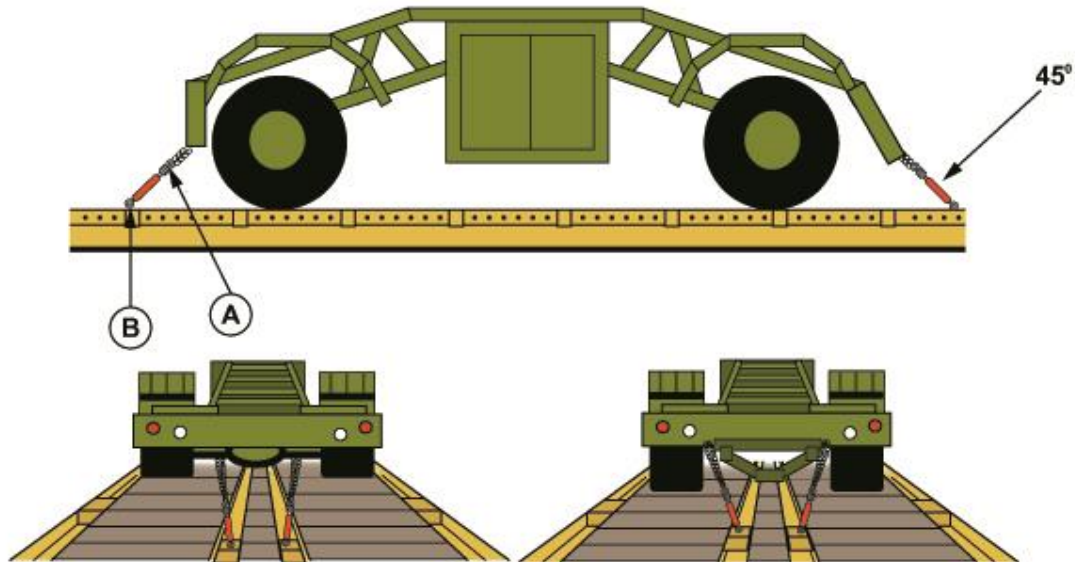


Item	No. of Pcs.	Description
A	4	Chains 3/8" (MBS 27,000 lbs)
	12	Chains 1/2" (MBS 41,250 lbs) on MIV
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:	HUSKY MKIII	19,140 LBS
	MIV BUFFALO 6X6	
	MINE INVESTIGATION	
	VEHICLE	83,824 LBS

WHEELED VEHICLES

HUSKY TOWING MINE DETECTION VEHICLE RAC 6088B

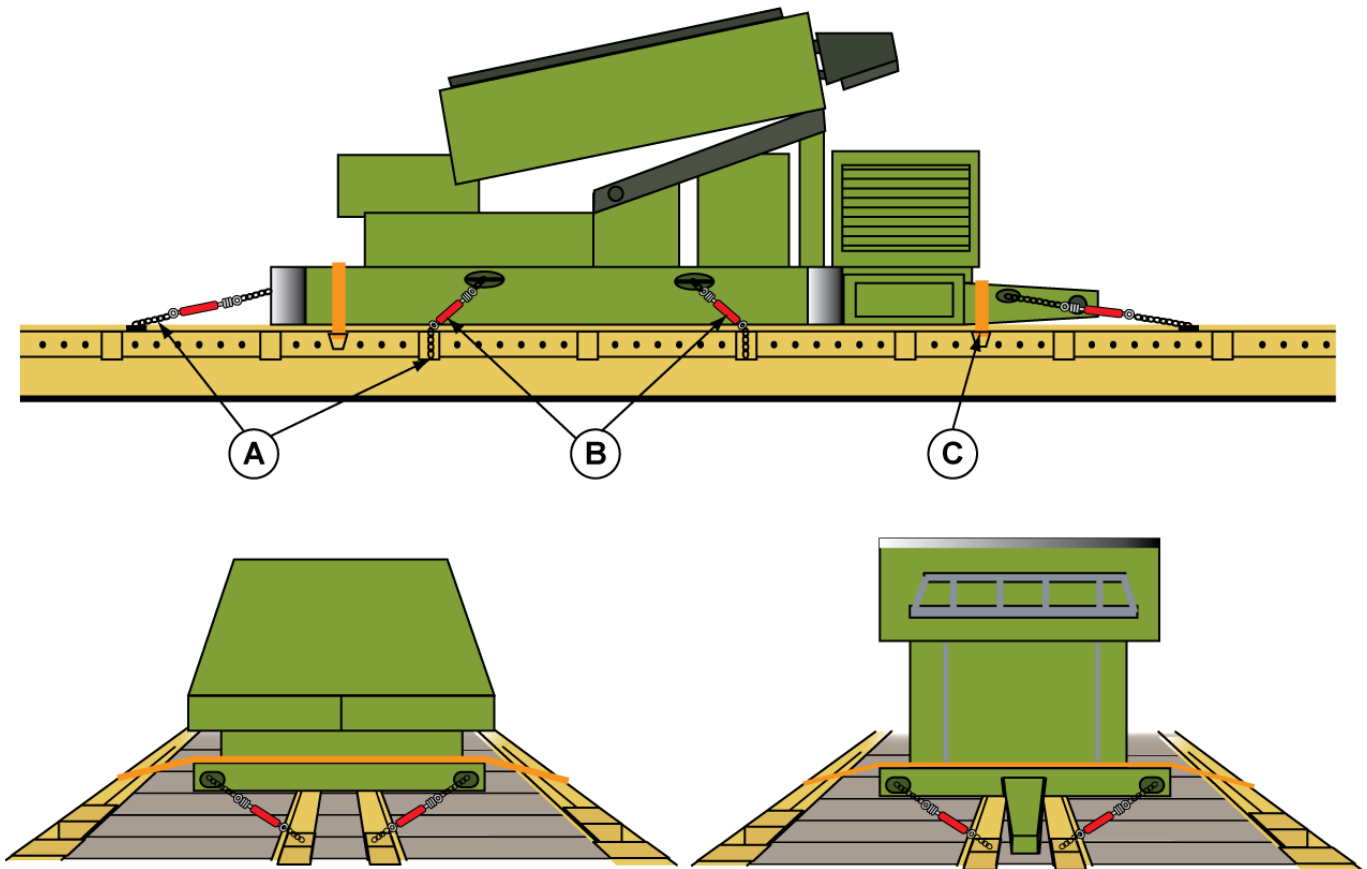


Item	No. of Pcs.	Description
A	4	Chains 3/8" (MBS 27,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: HUSKY 12,026 LBS.

WHEELED VEHICLES

MRR (MEDIUM RANGE RADAR)
RAC 6088B
New 08-2017 (Ref: AAR Fig. 88-B)



Item	No. of Pcs.	Description
A	8	Chains 3/8" (MBS 27,000 lbs), 2 at each end of car, 2 on each side of car.
B	1 ea, Item A	Turnbuckles with jam nuts tightened wrench tight.
C	2	4 inch web strap with a MBS of 20,000 lbs place from side pocket to other side pocket.

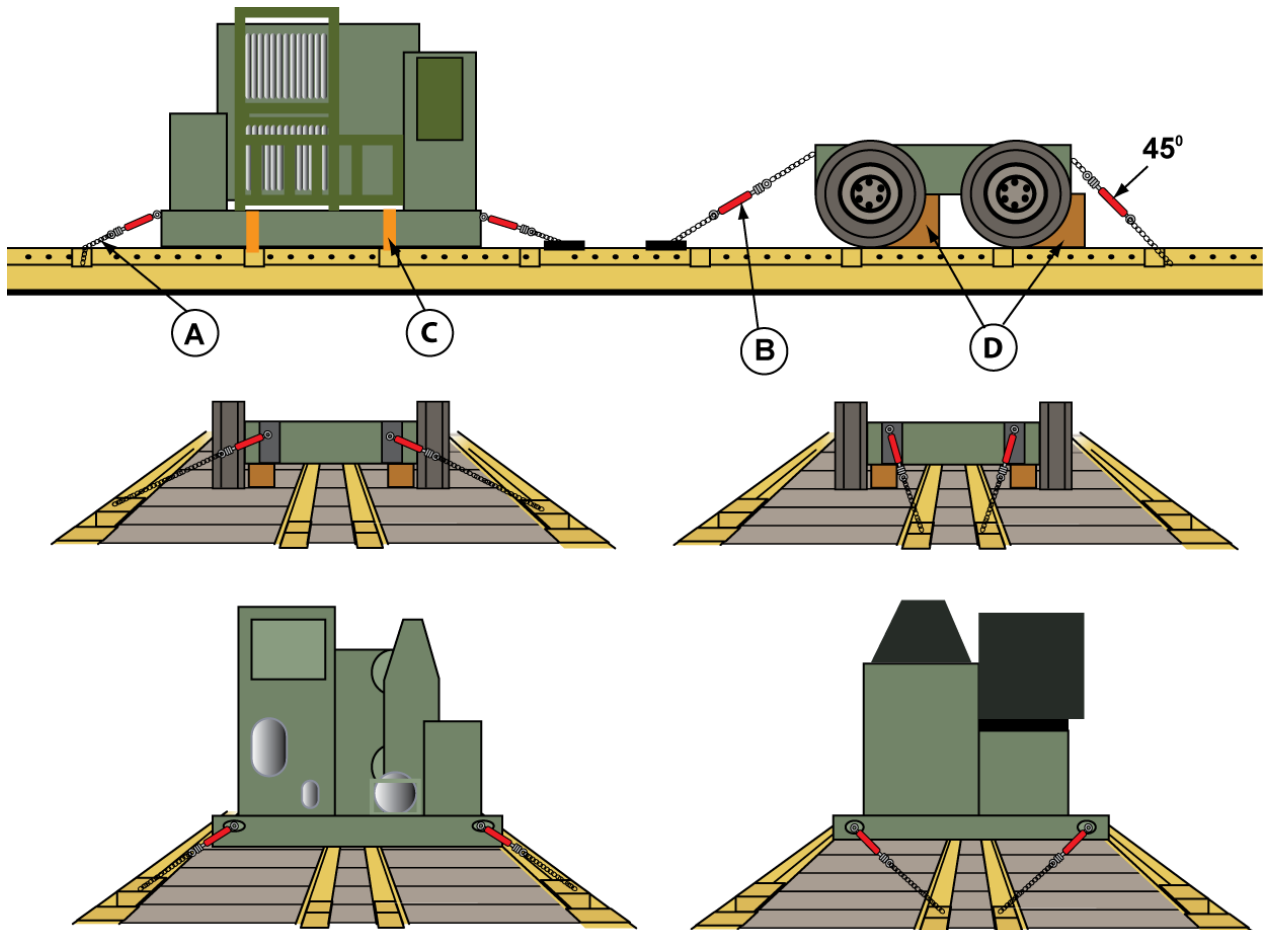
DESCRIPTION AND WEIGHT: MRR 22,000 LB

WHEELED VEHICLES

PDB (POWER DISTRIBUTION BOX AND WHEEL TRUCK)

RAC 6088B

New 08-2017 (Ref: AAR Fig. 88-B)



Item	No. of Pcs.	Description
A	4	Chains 3/8" (MBS 27,000 lbs) 2 at each end of car.
B	1 ea, Item A	Turnbuckles with jam nuts tightened wrench tight.
C	2	4 inch web strap with a MBS of 20,000 lbs place from side pocket to other side pocket.

DESCRIPTION AND WEIGHT: PDB

10,000 LBS

WHEELED VEHICLES

PDB (POWER DISTRIBUTION BOX AND WHEEL TRUCK) (Concluded)

RAC 6088B

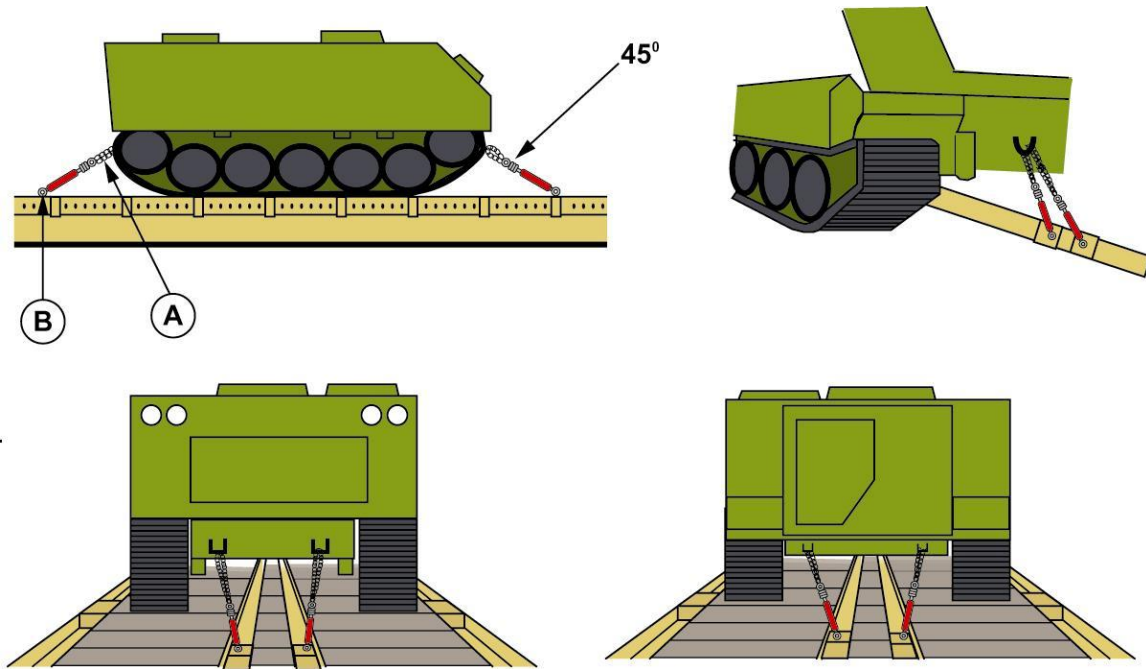
New 08-2017 (Ref: AAR Fig. 88-B)

Item	No. of Pcs.	Description
A	4	Chains 3/8" (MBS 27,000 lbs) 2 at each end of car.
B	1 ea, Item A	Turnbuckles with jam nuts tightened wrench tight.
D	4	4 wooden blocks 20 in. high x 20 in. wide x 24 in. long. Place beneath axles as shown.

DESCRIPTION AND WEIGHT: WHEEL TRUCK 10,000 LBS

TRACKED VEHICLES

APC (ARMOURED PERSONNEL CARRIER) M113 FAMILY Including M548 and M577 RAC 6087B

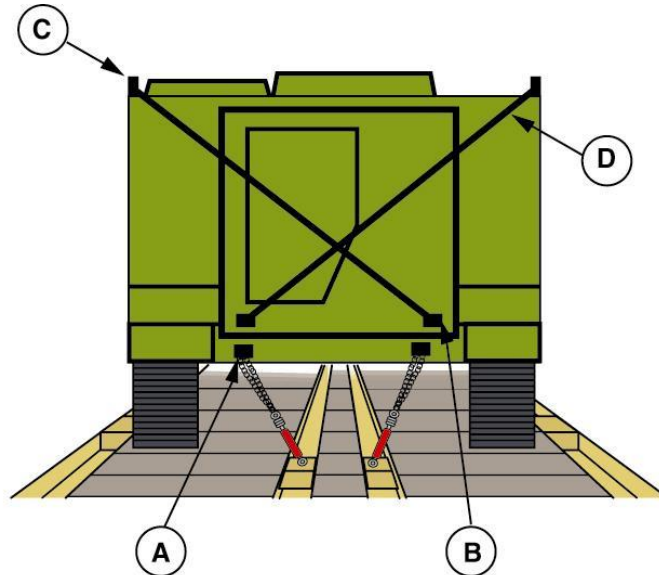


Item	No. of Pcs.	Description
A	4 or 8	Chains 1/2" (MBS 41,250 lbs) Chains 3/8" (MBS 27,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:	APC (M113)	19,775 LBS
	APC DOZER	22,900 LBS
	APC MRT	22,500 LBS
	APC ARVL	22,440 LBS
	BV206 CARRIER	13,977 LBS

TRACKED VEHICLES

APC (ARMoured PERSONNEL CARRIER)
M113 FAMILY Including M548 and M577
RAC 6087B (concluded)



Item	No. of Pcs.	Description
A	2	Hull-mounted tie-down provisions.
B		Ramp-mounted tie-down provisions.
C		Lifting provisions
D		Complete loops ½" wire loop each with 4 clamps.

Notes:

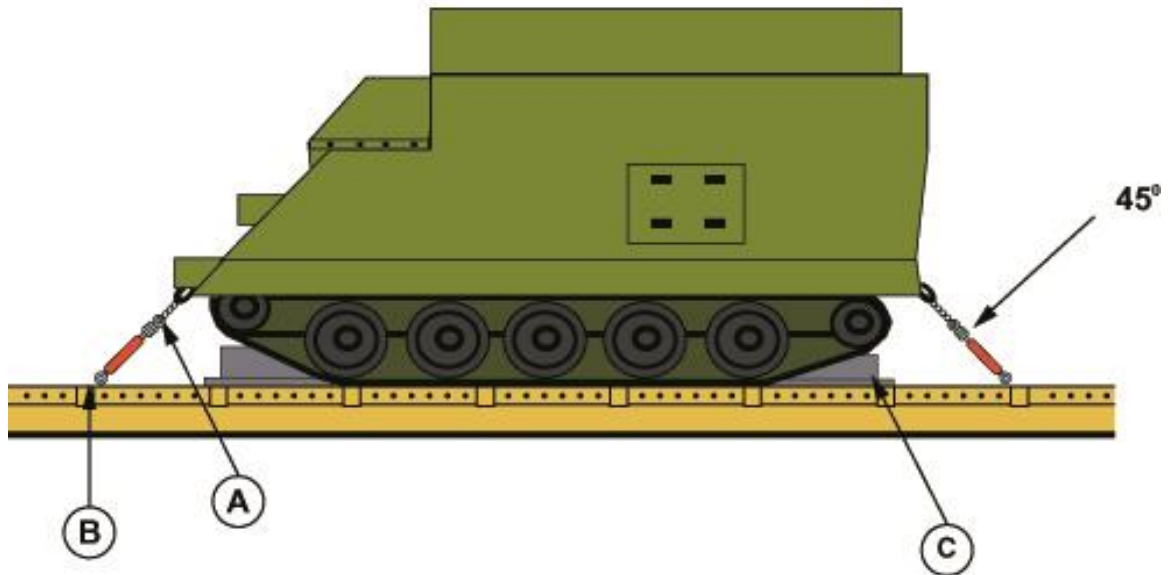
1. This applies to all M577 vehicles on which the tie-down provisions used to secure the vehicle are mounted on the ramp. The wire rope is not required on vehicles that have the rear tie down provisions mounted on the hull used for securement rather than those on the ramp.
2. Fully engage ramp latches.
3. The wire ropes must be crossed as shown. The wire ropes are routed from the lifting provision to the tie down shackle. The point where the two wire rope loops touch must be protected from chafing. Scrap rubber hose or sheet metal fastened in place will meet this requirement.
4. This securement method is a procedural fix for M577 with inadequate transportability. Do not allow transportability approval for these vehicles unless this procedure for safe transportation is applied.

TRACKED VEHICLES

LIGHT ARMoured VEHICLE M577 (T-LAV)

RAC 6078B

Rev. 06-1996 (Ref: AAR Fig., 78-B)



Item	No. of Pcs.	Description
A	8	Chains 1/2" (MBS 41,250 lbs) or
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
C	4	Chock blocks under each track front and back. Metal chock blocks may be used.

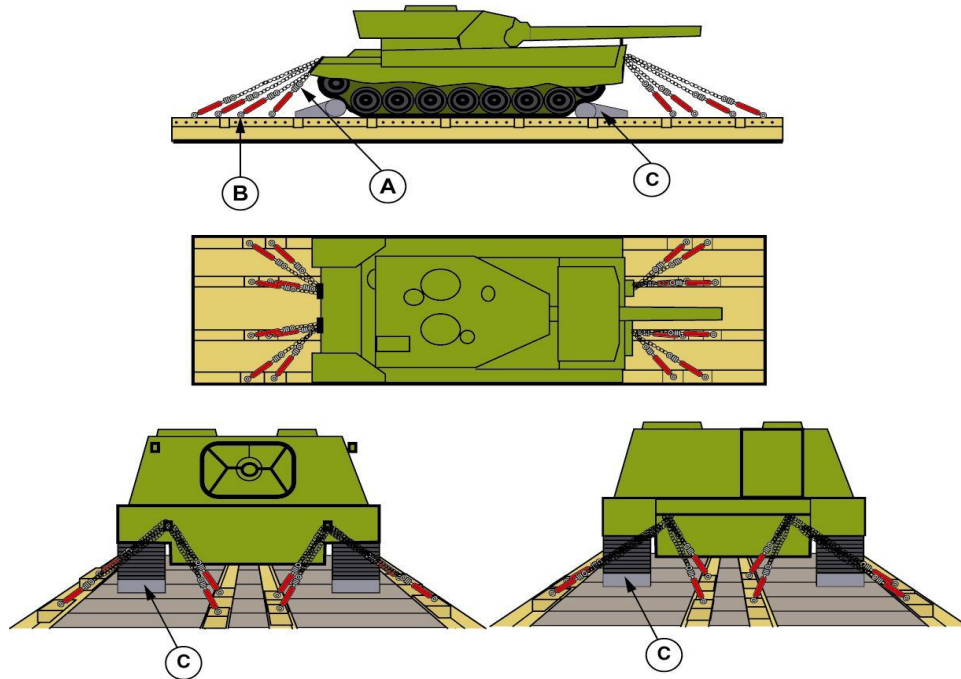
DESCRIPTION AND WEIGHT:

T-LAV M577	30,999 LBS
T-LAV WITH TURRET	36,156 LBS
T-LAV MAINTENANCE	40,124 LBS

NOTE: SHACKLE - USE THE 21-TON (NSN 4030-21-256-2423) CAPACITY BOLT TYPE SHACKLES TO SECURE THE T-LAV BY ITS LOWEST TIE-DOWN POINTS. LEVEL PLATFORMS ARE TO BE USED FOR LOADING. PROTECTION FOR TURRET IS REQUIRED FOR WINDSHIELDS, IE WOODEN PLANKS AROUND VULNERABLE POINTS.

TRACKED VEHICLES

LEOPARD RAC 6078B



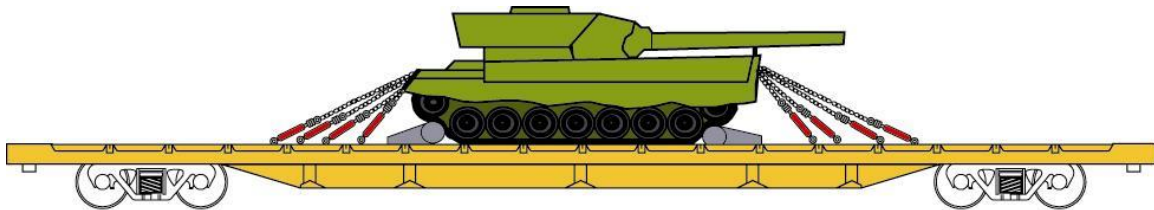
Item	No. of Pcs.	Description
A	16	Chains 1/2" (MBS 41,250 lbs)
	20	Chains 1/2" (MBS 41,250 lbs) on Leopard 2 A6M
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
C	4	Chock blocks under each track front and back for wooden floor.
NOTE: Steel floor add 4 chains 1/2" (no chock block)		

DESCRIPTION AND WEIGHT:	LEOPARD	89,065 LBS
	LEOPARD BRIDGE LAYER	94,054 LBS
	LEOPARD ARVL	92,600 LBS
	LEOPARD C1 AND C2	93,696 LBS
	LEOPARD 2 A6M	143,000 LBS

NOTE: TURRET GUN MUST BE IN THE AFT (REAR) TRAVEL POSITION. TURRET ROTATION AND GUN ELEVATING CONTROL MUST BE ENGAGED AND WIRE TIED TO PREVENT MOVEMENT OF TURRET AND GUN. THE GUN MUST BE LOWERED INTO THE SADDLE BLOCK AND SECURED.

TRACKED VEHICLES

LEOPARD
RAC 6078B (concluded)



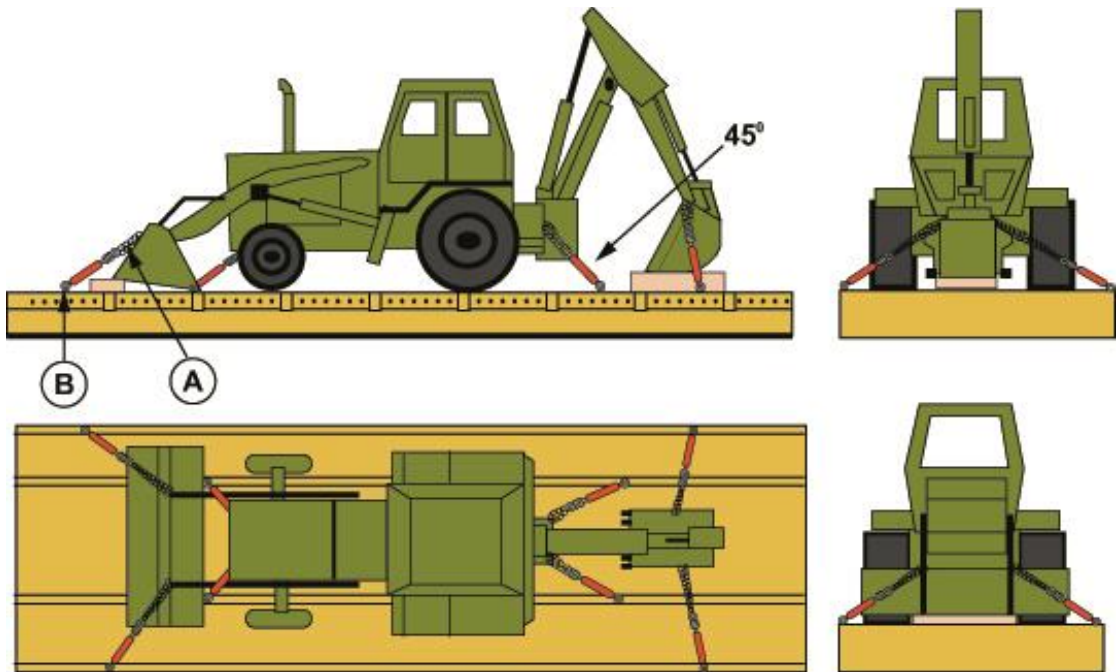
NOTE: When loading military tank on a rail equipped car (i.e.: HTTX) or general purpose flat car, only **ONE** tank must be loaded and centrally located on the rail car. No other vehicles can be loaded to use the vacant space at front and rear of the tank.



NOTE: To properly secure a tank on a rail flat car, use the 21-ton capacity bolt shackle (NSN 4030-21-256-2423) to secure the tank. No other type of shackles (i.e.: towing hook, as in above graphic) is allowed to secure the tank.

SPECIALIZED ENGINEERING EQUIPMENT WHEELED

EXCAVATOR
RAC 6054A



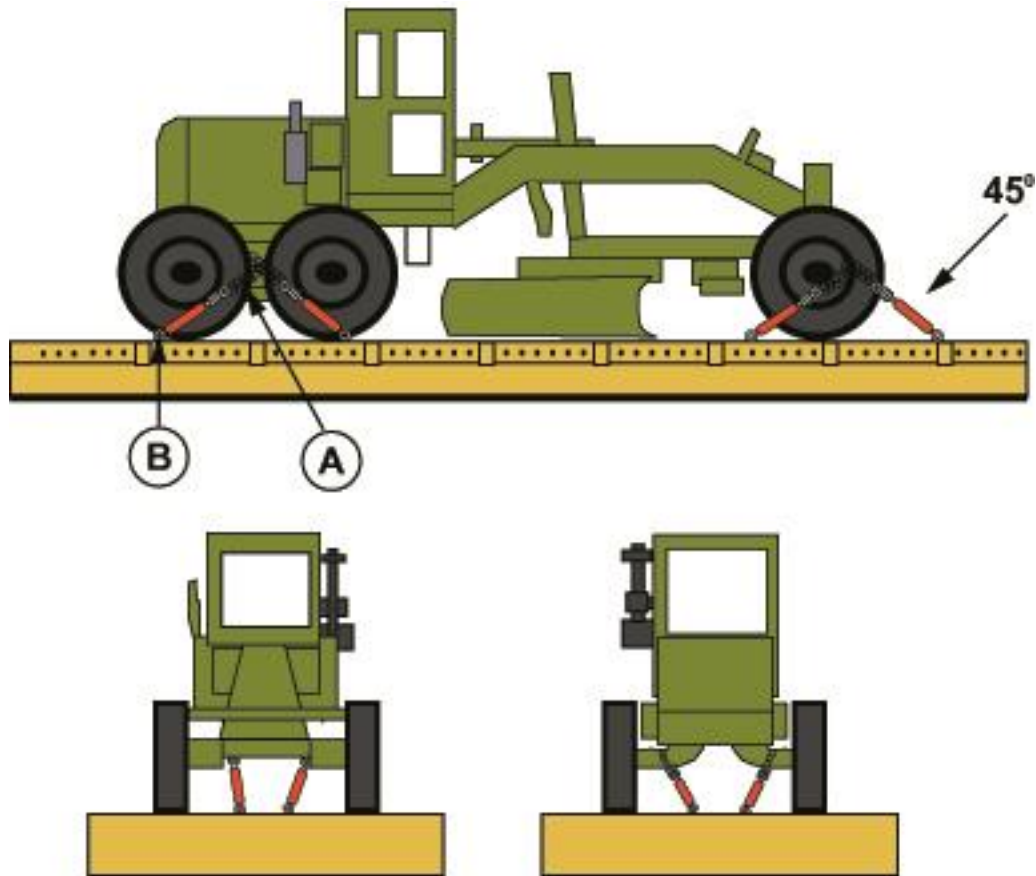
Item	No. of Pcs.	Description
A	8	Chains 1/2" (MBS 41,250 lbs)
	4	Chains 3/8" (MBS 27,000 lbs) for vehicles less than 15,000 LBS
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: EXCAVATOR 30,000 LBS
SCOOP LOADER 4X4 30,159 LBS
SCOOP LOADER 4X4 SKID STEER 7,068 LBS

NOTE :
A PIECE OF LUMBER MUST BE PLACED UNDER BOTH BUCKETS.
RIGGERS MUST BE SECURED WITH 3/8" CHAINS OR VISIBLE LOCKING PIN.

SPECIALIZED ENGINEERING EQUIPMENT WHEELED

GRADER ROAD MOTORIZED
RAC 6054A

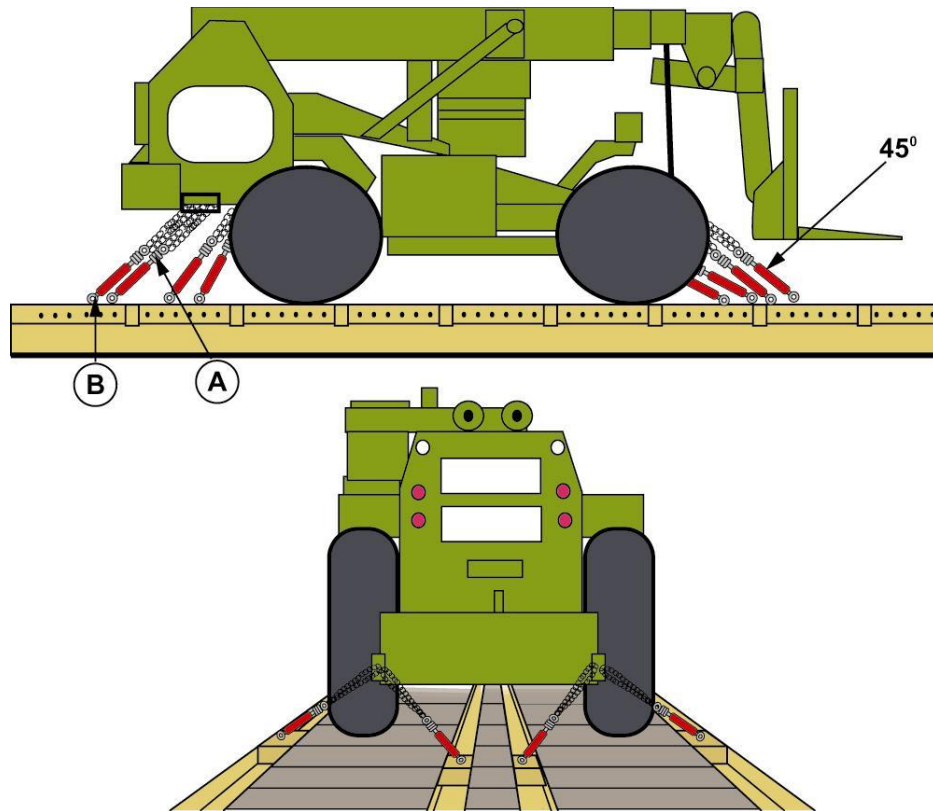


Item	No. of Pcs.	Description
A	8	Chains 1/2" (MBS 41,250 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: GRADER ROAD MOTORIZED 30,000 LBS

ENGINEERING EQUIPMENT WHEELED

FORKLIFT VARIABLE REACH RAC 6054A



Item	No. of Pcs.	Description
A	4	Chains 1/2" (MBS 41,250 lbs) for vehicles less than 40,000 lbs.
B	8	Chains 1/2" (MBS 41,250 lbs)
	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

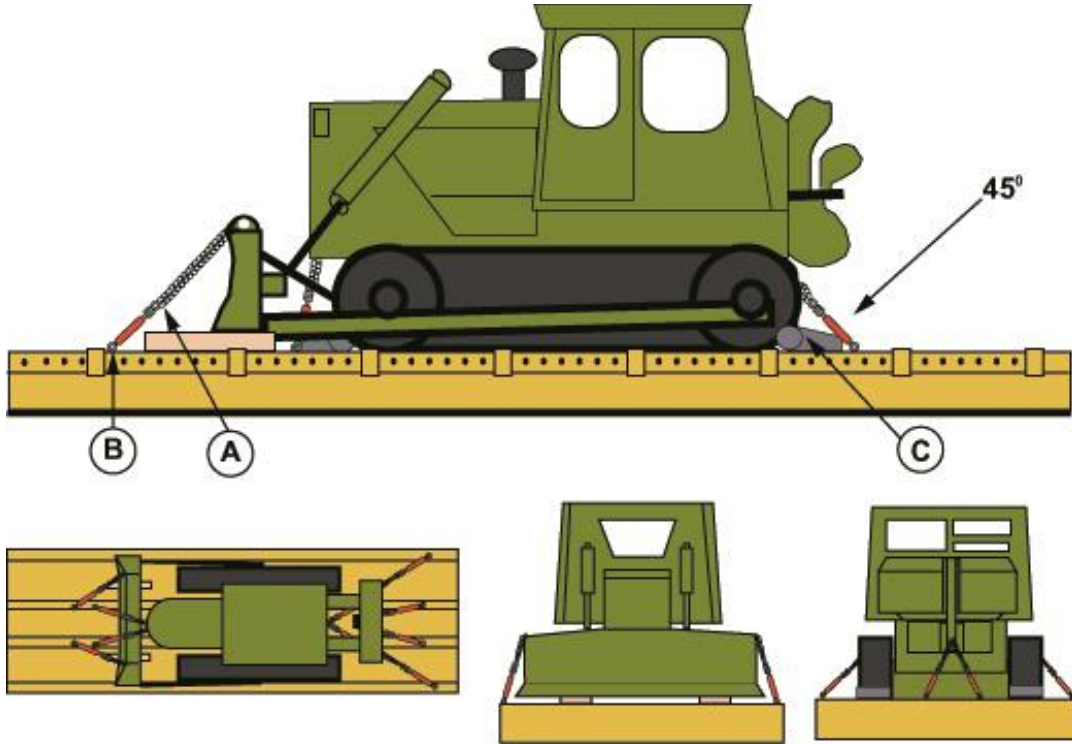
FEL (FRONT END LOADER)	27,260 LBS
RTFL (ROUGH TERRAIN FORKLIFT)	17,030 LBS
FORKLIFT 4X4	33,691 LBS
CRANE ALL TERRAIN 4X4 WITH HYDRAULIC BOOM	

53,612 LBS

NOTE: FOR ADDITIONAL PIECES OF ENGINEERING EQUIPMENT THAT REQUIRE LOADING SPECIFICATIONS, RULES GOVERNING THEIR PECULIAR ASPECT OF LOADING CAN BE FOUND IN AAR SECTION 3.

SPECIALIZED ENGINEERING EQUIPMENT TRACKED

BULLDOZERS UP TO 59,000 LBS
RAC 6054A



Item	No. of Pcs.	Description
A	10	Chains 1/2" (MBS 41,250 lbs) Including 2 on blade
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
C	4	Chock blocks under each track front and back for wooden floor.

DESCRIPTION AND WEIGHT:	INDUSTRIAL TRACTOR	16,920 LBS
	DOZER HD 11	36,920 LBS
	EXCAVATOR 6.4M DIGGING BUCKET	44,313 LBS
	TRACTOR FULL TRACK LOW SP	44,520 LBS

NOTE: 4"X 8" X 30" LUMBER, (2 REQUIRED) STACKED UNDER CENTER RIPPER. DRILL AND TOENAIL FIRST BLOCK TO CAR FLOOR WITH FOUR 30-D (4 1/2") NAILS. THEN NAIL SECOND BLOCK TO FIRST IN THE SAME MANNER. LOWER RIPPER ONTO BLOCKS. APPLY SAME PROCEDURE TO FRONT BLADE

TIE-DOWN CONFIGURATIONS FOR STANDARD RAIL FLAT CARS

Usually, the Canadian Forces move their equipment on specially equipped rail cars. However, when there is a shortage of such equipment, standard flat cars have to be used.

In this section, we will cover very briefly different commonly used figures to load military equipment on standard flat cars which require different types of tie-down and additional blocking and bracing.

The HLVW (10 Ton Truck), the TLARS (Track way Launching and Recovery System) and the APC (Personnel Carrier) will be used in this presentation as basic information to describe the proper procedures.

Furthermore, when loading vehicles on a standard flat rail car, allow 12 inches minimum clearance from the A end of the car and 24" from the B end (brake end).

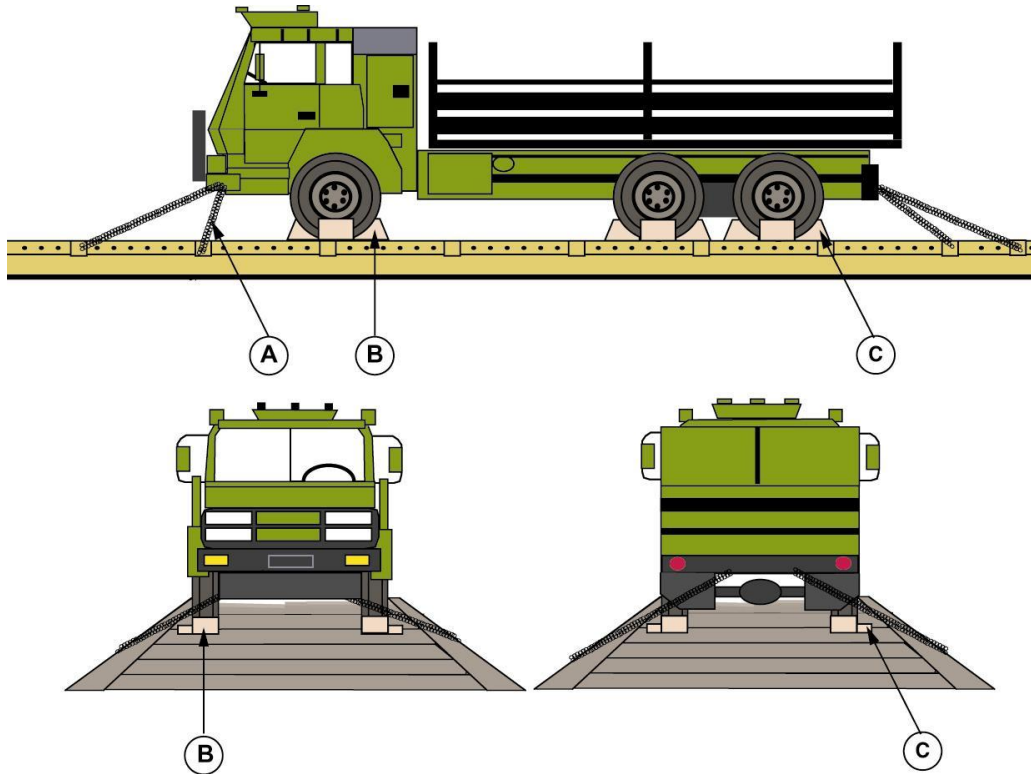
SECUREMENT STEPS

NOTE: WHEN ATTACHING BLOCKING AND BRACING ON STANDARD FLAT RAIL CARS, USE THE FOLLOWING ORDER TO GET THE BEST RESULTS.

- 1) NAIL FRONT CHOCK BLOCKS TO DECK IN FRONT OF EACH WHEEL.
- 2) ATTACH AND TENSION WIRE ROPE TO FRONT OF VEHICLE.
- 3) NAIL REAR CHOCK BLOCKS TO DECK IN BACK OF EACH WHEEL
- 4) ATTACH AND TENSION WIRE ROPE TO REAR OF VEHICLE.
- 5) APPLY SIDE BRACING/BLOCKING TO THE OUTSIDE OF EACH WHEEL
BUT BE SURE TO APPLY PROTECTIVE MATERIAL BETWEEN THE
SIDE
BRACING AND TIRE TO PREVENT CHAFING WHILE IN TRANSIT.

WHEELED VEHICLES ON STANDARD RAIL FLAT CAR

HLVW (10 TON TRUCK)
RAC6088A



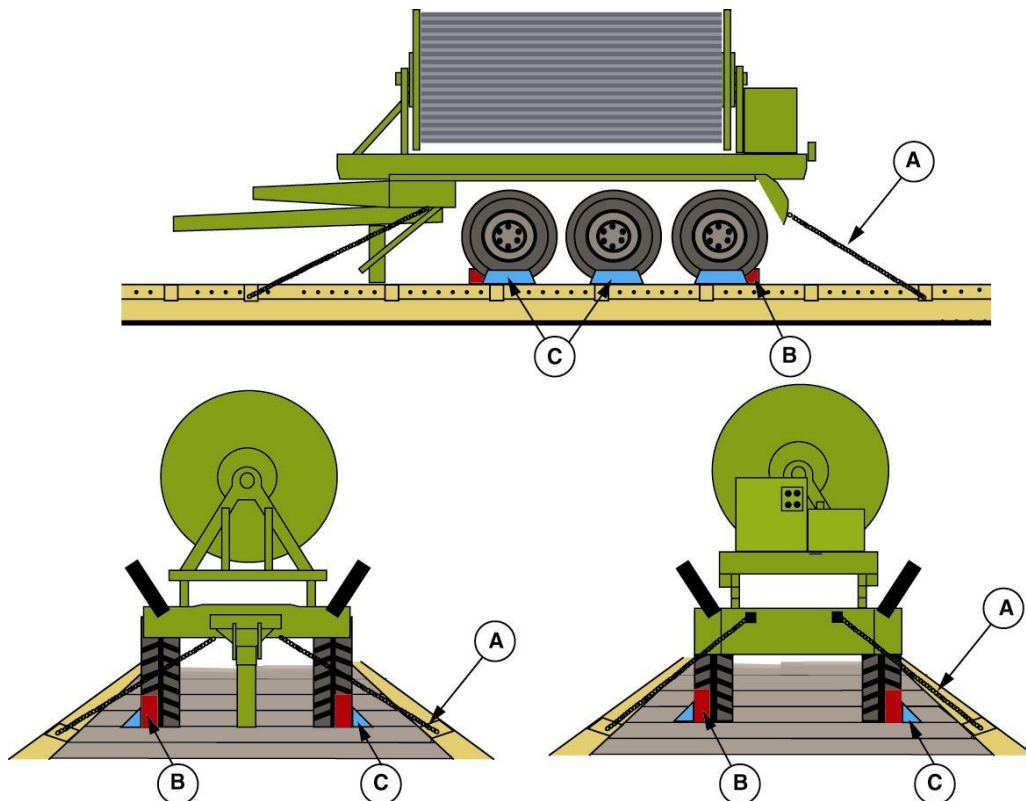
Item	No. of Pcs.	Description
A	4	Chains (13mm - 1/2") (MBS 41,250 lbs) or
	4	Cables 5/8" (6 x 19 wire rope)
		Complete loop for vehicles weighing 25,000 lbs to 40,000 lbs inclusive.
B	8 or 12	Blocks, pattern #16 will be required. Metal chock blocks may be used.
C	4 to 6	Blocks, pattern #89 of Section 6. Apply as side or lateral blockings. Metal blocks may be used.

DESCRIPTION AND WEIGHT: HLVW 25,000 lbs – 40,000 lbs

NOTE: THIS FIGURE WILL COVER MOST OF THE 4 OR 6 WHEEL TRUCKS
(SINGLE OR DUAL AXLE)

WHEELED VEHICLES ON STANDARD RAIL FLAT CARS

TRACKWAY LAUNCHING AND RECOVERY SYSTEM (TLARS) RAC6012



Item	No. of Pcs.	Description
A	4	Chain tie-downs: ½ in. alloy chains with a MBS of 41,250 lbs. Secure two outboard chains to the towing shackle at each end of the trailer. After tie-down chains are tensioned, they shall be hit sharply with a hammer to relieve any binding and tie-down chains re-tensioned, if necessary. There must be at least one full wrap of chain around the tensioning device drum.
B	4	Longitudinal metal chock blocks. Locate and secure as shown in drawing.
C	6	Lateral metal chock blocks. Locate and secure as shown in drawing.

DESCRIPTION AND WEIGHT: TLARS

25,000 lbs – 40,000 lbs

NOTES:

1. LOAD MUST BE CENTRALLY LOCATED ON CAR
2. ADEQUATE BRACING MUST BE ADDED TO SECURE DIESEL ENGINE AT REAR OF UNIT.

TRACKED VEHICLES ON STANDARD RAIL FLAT CAR

In general, the Army inventory of tracked vehicles shares a similar track assembly configuration. The differences between vehicles are mostly the weights.

Many tracked vehicles are wider than the rail car. Therefore, when loading tracked vehicles onto flat cars, be sure to center the vehicle on the flat car. The overhang of the vehicle on each side of the flat car must be equal to avoid rail clearance difficulties.

Once the tracked vehicle is in place on the flat car do not set the brakes until chock blocks are in place (see paragraph 1 below). Wire the turret lock and elevating mechanisms in place, and engage any hull-mounted barrel lock. Put two complete wire rope loops around the barrel and secure one to each side of the hull. This procedure provides positive visible protection against the barrel elevating or the turret turning.

The following general procedures apply to figures in the tie-down guide:

1) CHOCK BLOCKS

Locate appropriate chock block against the front of the track and secure to the deck. Instruct the driver to pull forward until the tracks are up on the front blocks a few inches, and set the brake. Next, place the appropriate block against the rear of the track, and nail it to the deck. Release the brake, and allow the vehicle to settle against the blocks.

2) SIDE OR LATERAL BLOCKING

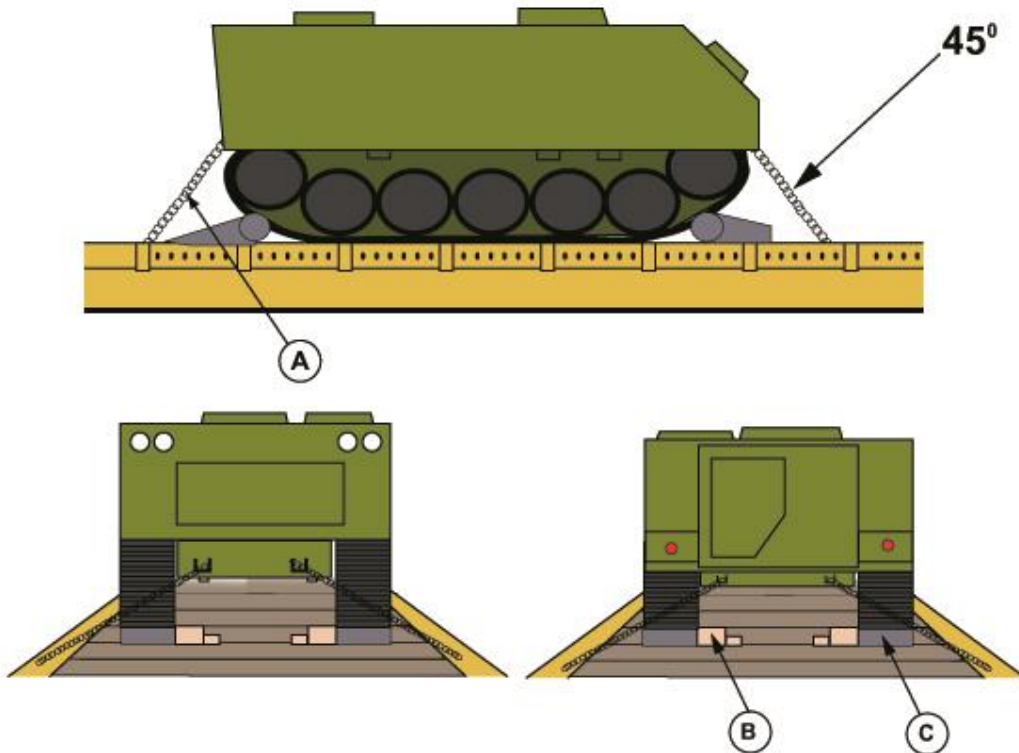
When possible, apply side blocking to the outside of the treads. When side blocking is not possible, apply lateral blocking on the interior of the treads. The lateral blocking frame may be put on the floor and secured before loading the tracked vehicle. To do this, measure the inside distance between the treads, cut the lumber and nail it to the flatcar deck. Then, carefully guide the vehicle onto the flat car. Interior lateral blocking can be deleted when the vehicle is shipped in controlled train service, which is generally short distance over rails owned or controlled by a single carrier. You will have to get the inspector's approval for this type of service.

3) WIRE ROPE

Attach wire rope from the tie-down shackle on the vehicle to the side stake pocket, and secure with four clamps of the same diameter as the cable. Two pieces of wire rope are normally attached at each end of the vehicle, but both the size and number of cables will depend on the weight of the vehicle. Apply a thimble and a cable clamp at the point where the wire passes around the side stake pocket, to prevent the wire rope from chafing. Also, overlap the wire rope at least 24 inches.

TRACKED VEHICLES ON STANDARD RAIL FLAT CARS

APC (ARMOURED PERSONNEL CARRIER)
M113 FAMILY Including M548 and M577
RAC 6087B



Item	No. of Pcs.	Description
A	4 or 4	Chains (13 mm - 1/2") (MBS 41,250 lbs) or Wire Rope Cables (6 x 19) 5/8" Doubled (Complete loops)
B	6	Lateral restraints (inside), 3 each side, or lateral blocking.
C	4	Blocks - 2 pattern #30 at front and 2 pattern #31 at rear. Metal chock blocks may be used.

DESCRIPTION AND WEIGHT: APC (M113) 19,775 lbs

GENERAL INFORMATION CHAIN REQUIREMENTS

The general guidelines for securing wheeled vehicles on chain-equipped cars by diameter of chains are as follows:

4 chains 3/8-inch with a maximum breaking strength of 27,000 lbs for vehicles weighing less than 16,000 pounds.

8 chains 3/8-inch with a maximum breaking strength of 27,000 lbs for vehicles weighing 16,000 pounds to 25,000 pounds.

4 chains 1/2-inch with a maximum breaking strength of 41,250 lbs for vehicles weighing 25,000 pounds to 40,000 pounds.

8 chains 1/2-inch with a maximum breaking strength of 41,250 lbs for vehicles weighing 40,000 pounds to 55,000 pounds.

12 chains 1/2-inch with a maximum breaking strength of 41,250 lbs for vehicles weighing 55,000 pounds to 80,000 pounds.

However, the user must realize that it yields the least number of chains required. If the resulting number of chains required does not provide for the symmetrical configuration, add chains such that each tie-down has the same number. For example, if the formulated number of chains required is 9, use 12 to establish symmetry about the four tie-down provisions.

VEHICLE SUMMARY TIE-DOWN TABLE

VEHICLE TYPE	VEHICLE WEIGHT (LBS)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS)	Number of Chains per vehicle
AHSVS	26,500	1/2	41,250	4
AHSVS 16 Ton Palletized Loading	54,120	1/2	41,250	8
Ambulance 4X4	15,013	3/8	27,000	4
APC M113 family including M548 and M577	19,775	1/2	41,250	4
ATV	851	3/8	27,000	4
Bison	28,459	3/8	27,000	4
Bison AMB	27,999	3/8	27,000	4
Bison C31	28,660	3/8	27,000	4
Bison MRT	32,066	1/2	41,250	4
BV-206	13,977	3/8	27,000	4
COUGAR Engineer rapid response	64,000	1/2	41,250	12

Cargo Body SEV SEC SCRN 6ft	19,181	3/8	27,000	8
Coyote MTD	32,827	1/2	41,250	4
Crane Wheeled MTD DED All Terrain 4X4 hydraulic Boom	53,612	1/2	41,250	8
Crew Cab 1.5T 4X4	6,113 Empty	3/8	27,000	4

VEHICLE TYPE	VEHICLE WEIGHT (LBS)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS)	Number of Chains per vehicle
Dump Truck HD	33,863 Empty	1/2	41,250	4
Excavator Tracked 6.4M Digging Bucket	44,313	1/2	41,250	8
Excavator wheeled with Digging Bucket	30,000	1/2	41,250	8
Forklift 4X4 9,000 lbs	33,691	1/2	41,250	4
Grader Road Motorized	30,159	1/2	41,250	4
HLVW 10TM with Winch and Crane	30,810 Empty	1/2	41,250	4

HLVW Cargo SCRN 10TM	29,542 Empty	1/2	41,250	4
HLVW PLS 16TM	35,274	1/2	41,250	4
HLVW Refueller (FAR)	29,983 Empty	1/2	41,250	4
HLVW Wrecker	42,990 Empty	1/2	41,250	8
Husky MRT	23,589	3/8	27,000	4
Husky MKIII	19,140	3/8	27,000	8
Husky towing	19,140	3/8	27,000	8
Kitchen trailer MTD 1.5TM	5,631 Empty	3/8	27,000	4

VEHICLE TYPE	VEHICLE WEIGHT (LBS)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS)	Number of Chains per vehicle
LAV III APC CP	38,000	1/2	41,250	8

LAV III Engineer APC	42,000	1/2	41,250	8
LAV III ICS	42,000	1/2	41,250	8
Leopard C1	93,696	1/2	41,250	16
Leopard C2	93,696	1/2	41,250	16
Leopard A6M	143000	1/2	41,250	20
LHS	66,039	1/2	41,250	12
LHS Trailer	34,118	1/2	41,250	8
LSVW 1.5TM	11,574	3/8	27,000	4
LSVW 1.5TM Ambulance SEV	11,574	3/8	27,000	4
LSVW 1.5TM DES	11,575	3/8	27,000	4
LSVW 1.5TM LCSS HQ LAN Server	11,618	3/8	27,000	4
LSVW 1.5TM MCT with S805 Shelter	12,037	3/8	27,000	4
LSVW 1.5TM Radio Node	11,574	3/8	27,000	4
LUVW 1TM 4X4 MILCOT Basic	8,223	3/8	27,000	4
LUVW 3/4 C and R	10,251	3/8	27,000	4

LUVW 3/4T	10,252	3/8	27,000	4
M777 A1	8,700	1/2	41,250	6
VEHICLE TYPE	VEHICLE WEIGHT (LBS)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS)	Number of Chains per vehicle
Maintline 4X4	37,077	1/2	41,250	4
MIV Buffalo	83,824	1/2	41,250	16
MLVW 2.5TM	14,349 Empty	1/2	41,250	4
MRR	22,000	3/8	27,000	8
MRT	56,070	1/2	41,250	12
MSVS MILCOT	27,101	1/2	41,250	4
PDB and WHEEL TRUCK	10,000	3/8	27,000	4
RG31 MK3	23,386	3/8	27,000	4
Roller Towed Pneum Tires Hopper 13 WHL	53,196	1/2	41,250	8
Roller Towed Sheep foot Type SGL/DBL Roller	6,736	3/8	27,000	4

Roller Towed Vibrating DED Smooth Faced	12 ,980	3/8	27,000	4
Semi-trailer attached to prime mover	32,070	1/2	41,250	8
Scoop Loader	30,159	1/2	41,250	4
Scoop Loader type Wheeled 4X4 Skid Steer	7,068	3/8	27,000	4
Semi Trailer Bull Hauler Fuel disp 32000L	15,256 Empty	3/8	27,000	4
Semi trailer Low Bed 35TM Variable deck duals	22,300 Empty	3/8	27,000	8
VEHICLE TYPE	VEHICLE WEIGHT (LBS)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS)	Number of Chains per vehicle
45TM 24Ft deck	Empty			
Semi Trailer Low bed 45T 24ft Deck REM ADJ Gooseneck	24,471 Empty	3/8	27,000	8
Snow blower Self Contained	11,475	3/8	27,000	4
	6,420	3/8	27,000	4

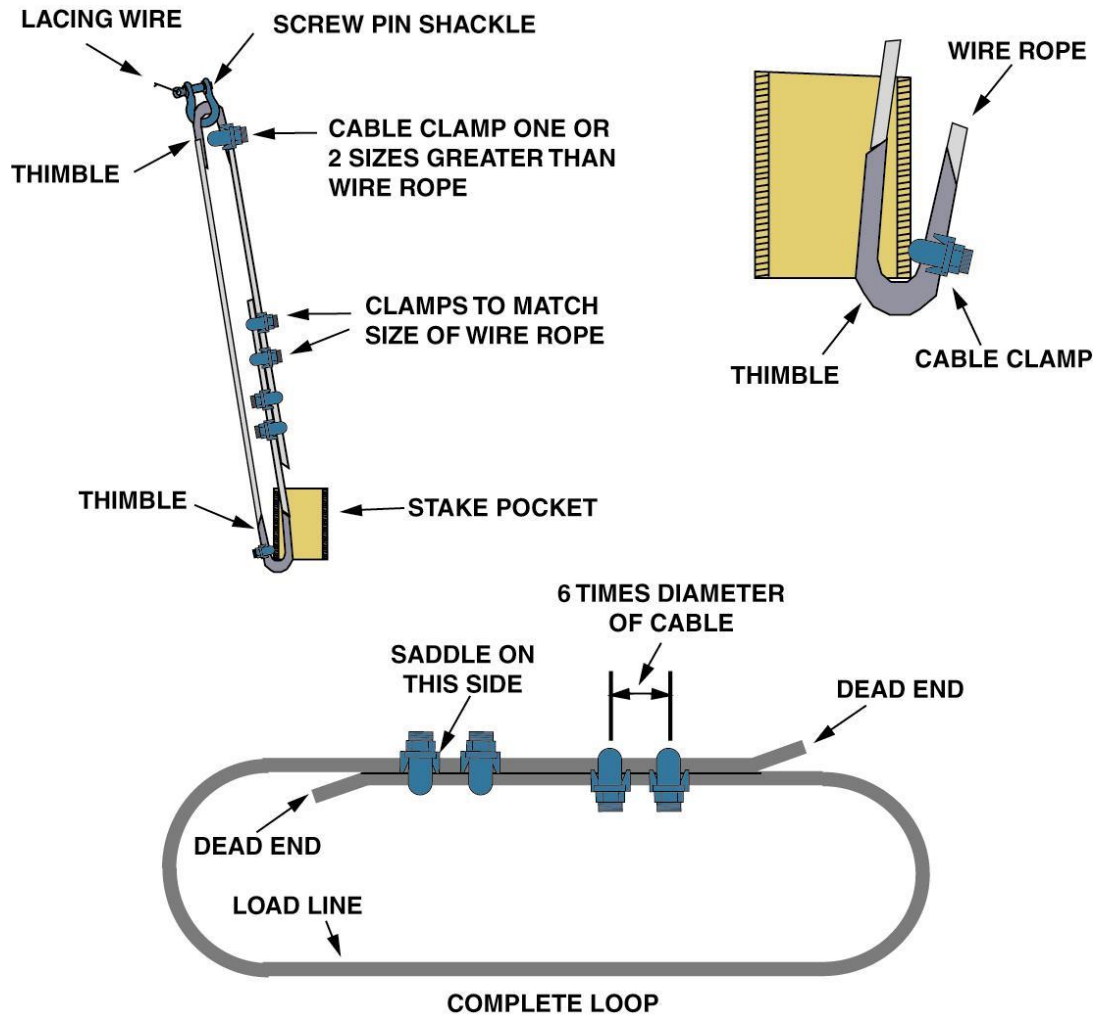
Spreader Sandbagger	Empty			
Towed artillery gun	2,440	3/8	27,000	4
Trailer Tank 2.5T Self contained FAR (TFAR)	5,199 Empty	3/8	27,000	4
T-LAV M577	30,999	1/2	41,250	12
T-LAV Maint Vehicle (Engineer)	40,124	1/2	41,250	12
T-LAV Maint Vehicle with Turret (Engineer)	36,156	1/2	41,250	12
Trackway Surfacing Outfit Vehicle Mounted	33,523	1/2	41,250	8
Tractor Full Track Low Speed 152to250 Net FLYW	44,520	1/2	41,250	8
Tractor Wheeled Industrial High Mobility 4X4	59,730	1/2	41,250	8
Trailer 3.5T 2WHL M353 w/Hydraulic Tool System	10,121	3/8	27,000	4

VEHICLE TYPE	VEHICLE WEIGHT (LBS)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS)	Number of Chains per vehicle
Trailer cargo 850lbs	1,477 Empty	3/8	27,000	4
Trailer Cargo 4 wheeled /ski Amph 1000Kg Payload	2,403 Empty	3/8	27,000	4
Trailer Cargo Combat Engineer ATV Trailer	1,650	3/8	27,000	4
Trailer Flatbed Beavertail Tilt Deck 30K lbs	7,785 Empty	3/8	27,000	4
Trailer Flatbed Beavertail 40K lbs	9,800 Empty	3/8	27,000	4
Trailer PLS Full 15ft	6,614 Empty	3/8	27,000	4
Trailer Tank water 1.5TM	2,403 Empty	3/8	27,000	4
Truck Multi Stop Delivery 2.0T	5,190 Empty	3/8	27,000	4
Truck Tractor 50K lbs	27,337 Empty	1/2	41,250	4

GENERAL INFORMATION

WIRE ROPE

Apply wire rope through the tie-down provisions on the vehicle and through the side stake pockets on the flat car in a complete loop, as shown. Application and diameter of wire rope will depend on the weight of the vehicle. Be sure that the vehicle weight includes any cargo on the vehicle. Apply a thimble under the side stake pocket to prevent chafing of wire rope, as shown. Secure the thimble to the wire rope with a cable clamp one or two sizes larger than the wire rope being used.



GENERAL INFORMATION

PROPER SECUREMENT OF HOOK AND CHAIN LINK

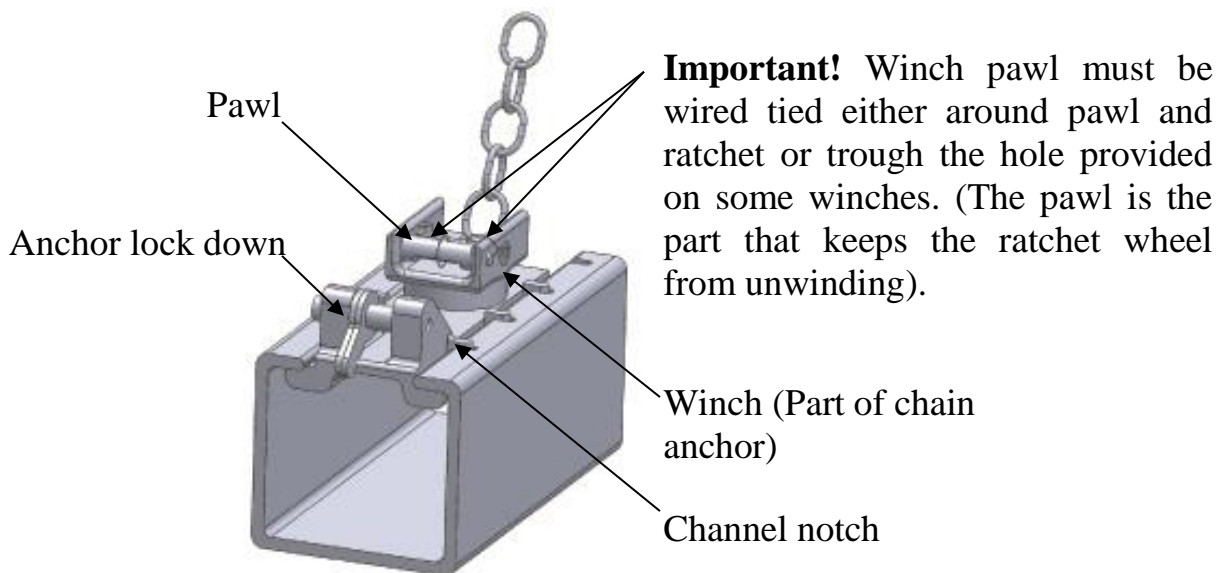
Most **COMMON** chain-equipped flat cars have either 3/8 - or 1/2- inch steel alloy chains. Apply chain hooks over the vehicle tie-down shackles, rather than under. Wire the hook to the chain link, as shown, to prevent disengagement. On chain cars equipped with outboard chain channels, use such channels when possible. Side bracing may be required on center rail chain-equipped cars.

TIE-DOWN EQUIPMENT

If turnbuckles (used to tighten chains) are not equipped with jam nuts or a locking device, they must be wired to prevent them from loosening.

Apply tie-down chains symmetrically around the vehicle with an angle from deck to chain of about 45 degrees. **When 45 degree angle cannot be met additional chains can be required by the inspector.** Do not cross chains. Completely seat the chain anchors in the channels, as shown.

WHEN ATTACHING CHAINS TO THE VEHICLE, SECURE THE SHORTEST CHAINS FIRST AND THE LONGEST CHAINS LAST.



GENERAL INFORMATION

BLOCKING

Although other blocking patterns exist, the most commonly used are the following. The pattern numbers correspond to the numbers used in AAR Sections 1 and 6.

A. PATTERN 16

Chock block used mainly on wheeled vehicles.

B. PATTERN 30

Front chock block used mainly on tracked vehicles.

C. PATTERN 31

Rear chock block used mainly on tracked vehicles.

D. PATTERN 89

External side blocking used when flat car width allows.

E. PATTERNS 90 AND 91

Front supports, or stanchions, used with trailers and semi trailers on flat cars.

F. ROAD WHEEL BLOCKS

One or two pieces of lumber 2" by 4" on top. Also called bogie wheel blocks, these are used on tracked vehicles to block the road wheels.

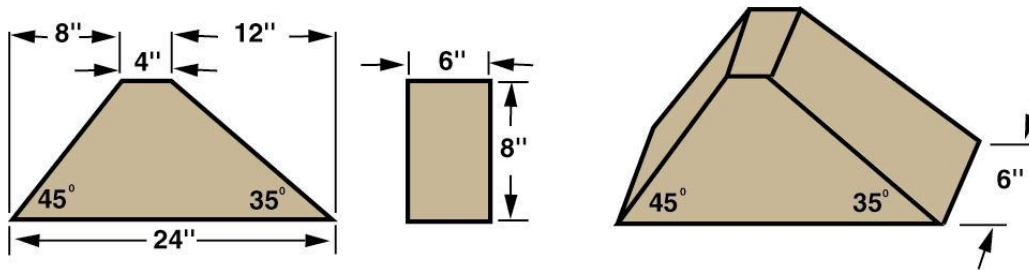
G. LATERAL BLOCKING

Usually used when the width of the flat car does not allow for side blocks. Often called interior side blocking since it provides lateral support on the inside of the tires or tracks.

NOTE: BLOCKING MAY BE FABRICATED USING ROUGH OR COMMERCIAL DRESSED LUMBER OF THE NOMINAL SIZES INDICATED ON EACH DRAWING.

GENERAL INFORMATION

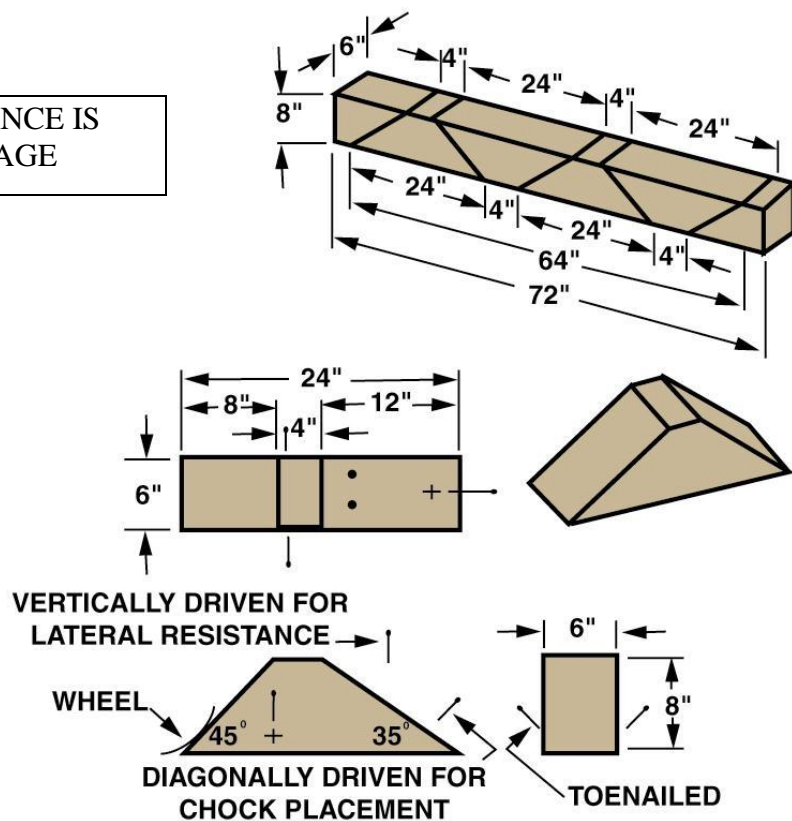
PATTERN 16



NOTE: LOCATE 45 DEGREES PORTION OF BLOCK AGAINST FRONT AND REAR OF WHEELS. SECURE HEEL OF BLOCK TO FLOOR WITH THREE 40-D (5'') NAILS AND TOENAIL THAT PORTION UNDER TIRE WITH TWO 40-D (5'') NAILS. USUALLY, 2 BLOCKS PER WHEEL ARE REQUIRED.

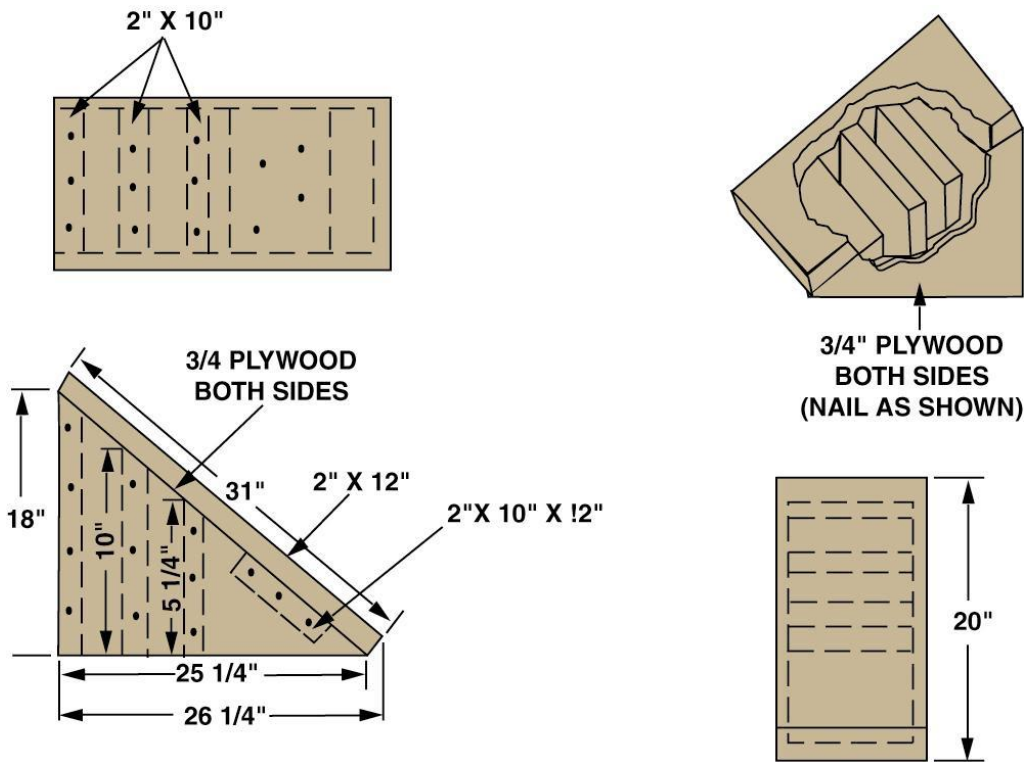
NOTE: PREDRILLING IS ADVISED TO PREVENT SPLITTING.

NOTE: AN 8" ALLOWANCE IS PROVIDED FOR WASTAGE

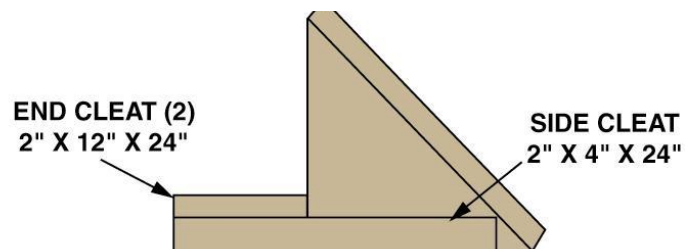


GENERAL INFORMATION

PATTERN 30

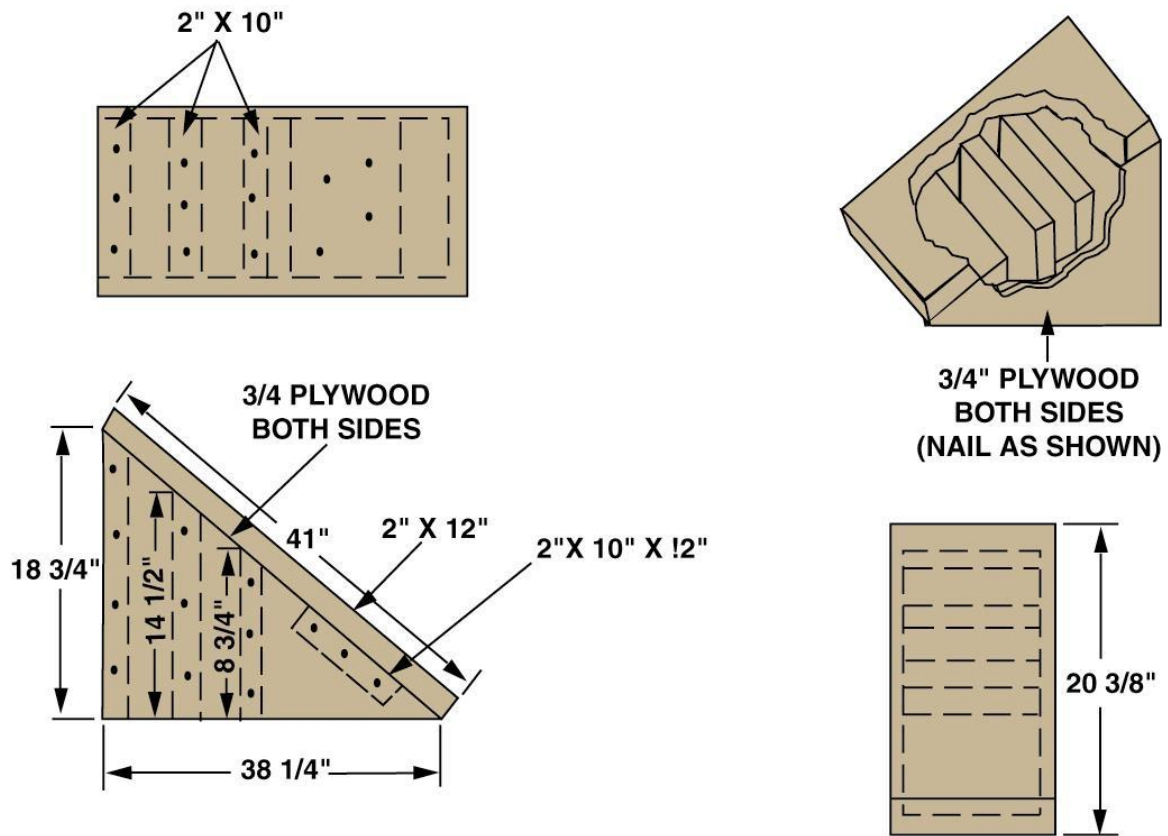


NOTE: AFTER ASSEMBLING THE BLOCK AS SHOWN, LOCATE THE INCLINED FACE OF THE BLOCK AGAINST THE TRACK, EVEN WITH THE INBOARD EDGE, AT THE FRONT OF THE VEHICLE. NEXT, CONSTRUCT 2 END CLEATS: EACH CONSISTING OF 2 PIECES OF 2" X 12" X 24" LUMBER. SECURE THE LOWER PIECE TO THE FLOOR WITH FOUR 20-D (4") NAILS. THEN, CONSTRUCT 2 SIDE CLEATS: EACH CONSISTING OF ONE PIECE OF 2" X 4" X 24" LUMBER. LOCATE ON THE OUTSIDE OF THE BLOCK AND SECURE TO THE FLOOR WITH FOUR 20-D (4") NAILS, (SEE BELOW)

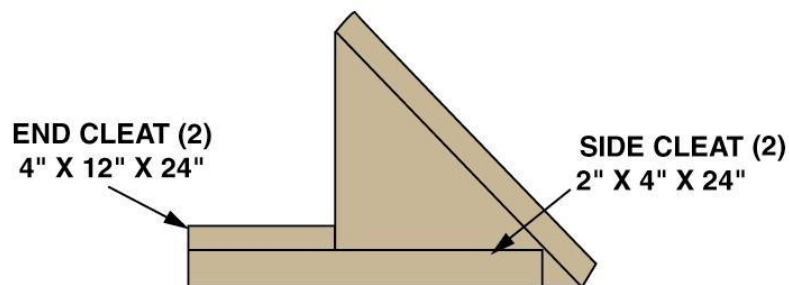


GENERAL INFORMATION

PATTERN 31

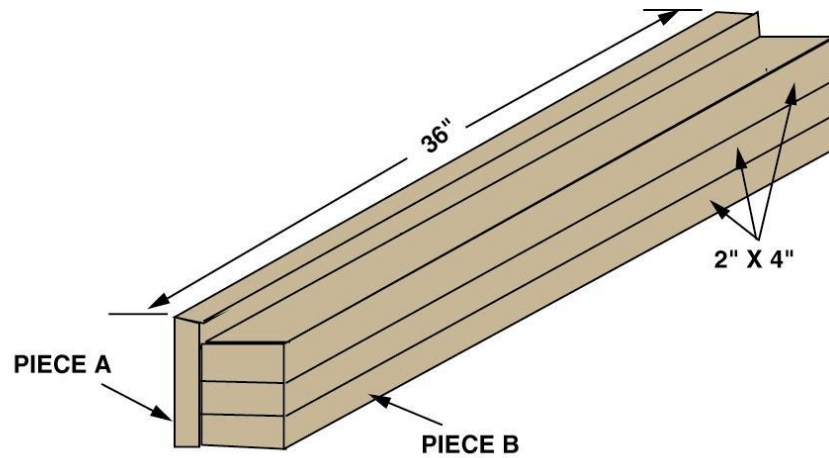


NOTE: AFTER ASSEMBLING THE BLOCK AS SHOWN, LOCATE THE INCLINED FACE OF THE BLOCK AGAINST THE TRACK, EVEN WITH THE INBOARD EDGE, AT THE REAR OF THE VEHICLE. NEXT, CONSTRUCT 2 END CLEATS: EACH CONSISTING OF 2 PIECES OF 2" X 12" X 24" LUMBER. SECURE THE LOWER PIECE TO THE FLOOR WITH FOUR 20-D (4") NAILS AND THE TOP PIECE TO THE ONE BELOW, WITH FOUR 20-D (4") NAILS. THEN, CONSTRUCT 2 SIDE CLEATS: EACH CONSISTING OF ONE PIECE OF 2" X 4" X 24" LUMBER. LOCATE ON THE OUTSIDE OF THE BLOCK AND SECURE TO THE FLOOR WITH FOUR 20-D (4") NAILS. (SEE BELOW)

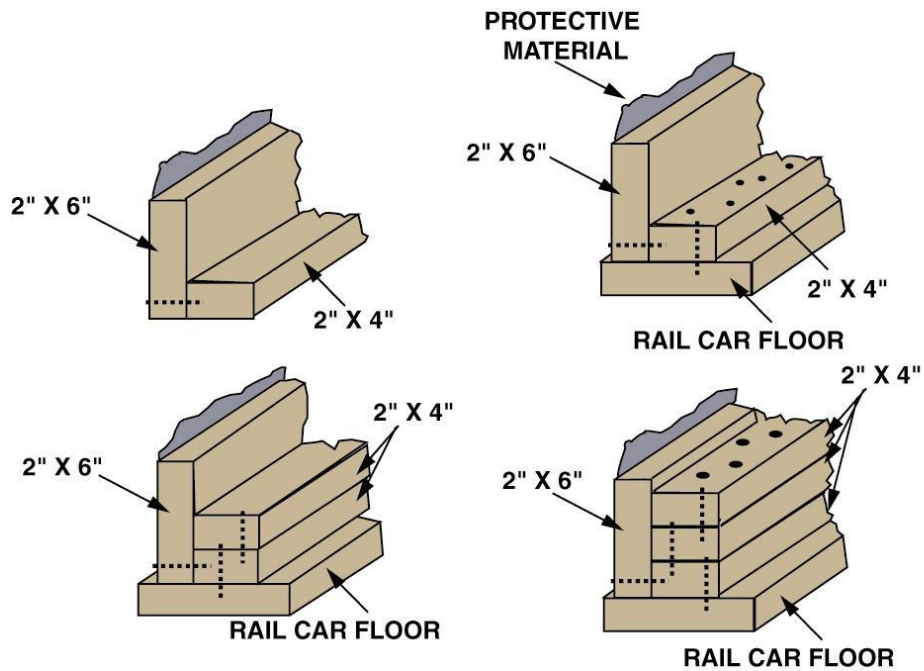


GENERAL INFORMATION

PATTERN 89



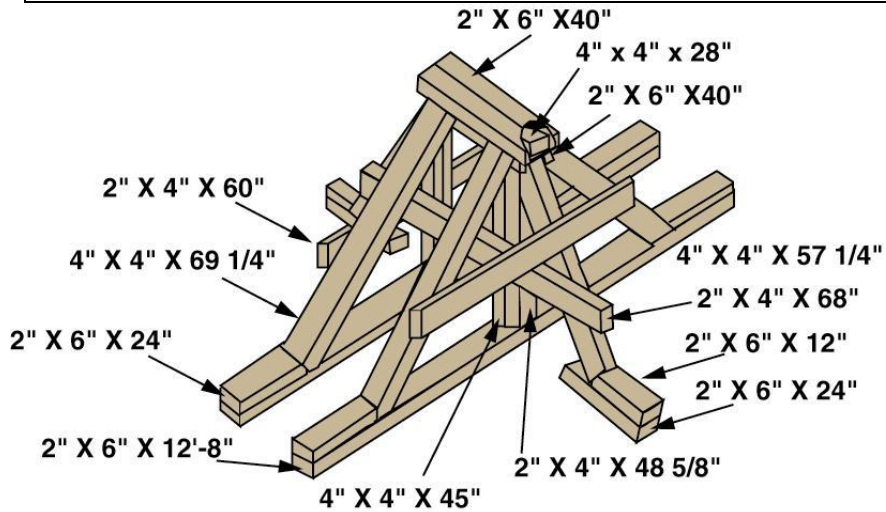
NOTE: NAIL PIECE A TO PIECE B WITH FIVE 12-D (3 ¼") NAILS. NAIL PIECE B TO THE CAR FLOOR WITH FIVE 20-D (4") NAILS. NAIL THE OTHER 2" X 4" PIECES TO THE ONE BELOW IN THE SAME MANNER



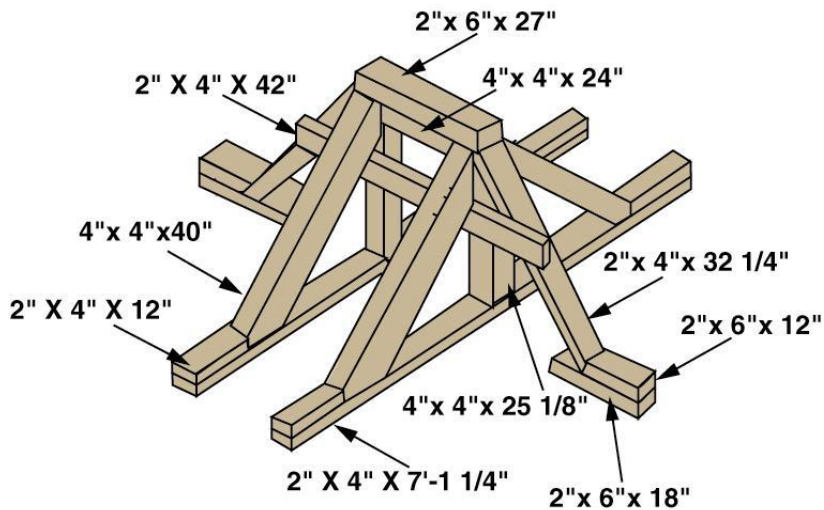
GENERAL INFORMATION

PATTERN 90 AND 91

NOTE: PATTERN 90 HEIGHT, USING DRESSED LUMBER DIMENSIONED AS SHOWN, WILL BE ABOUT 51 5/8"



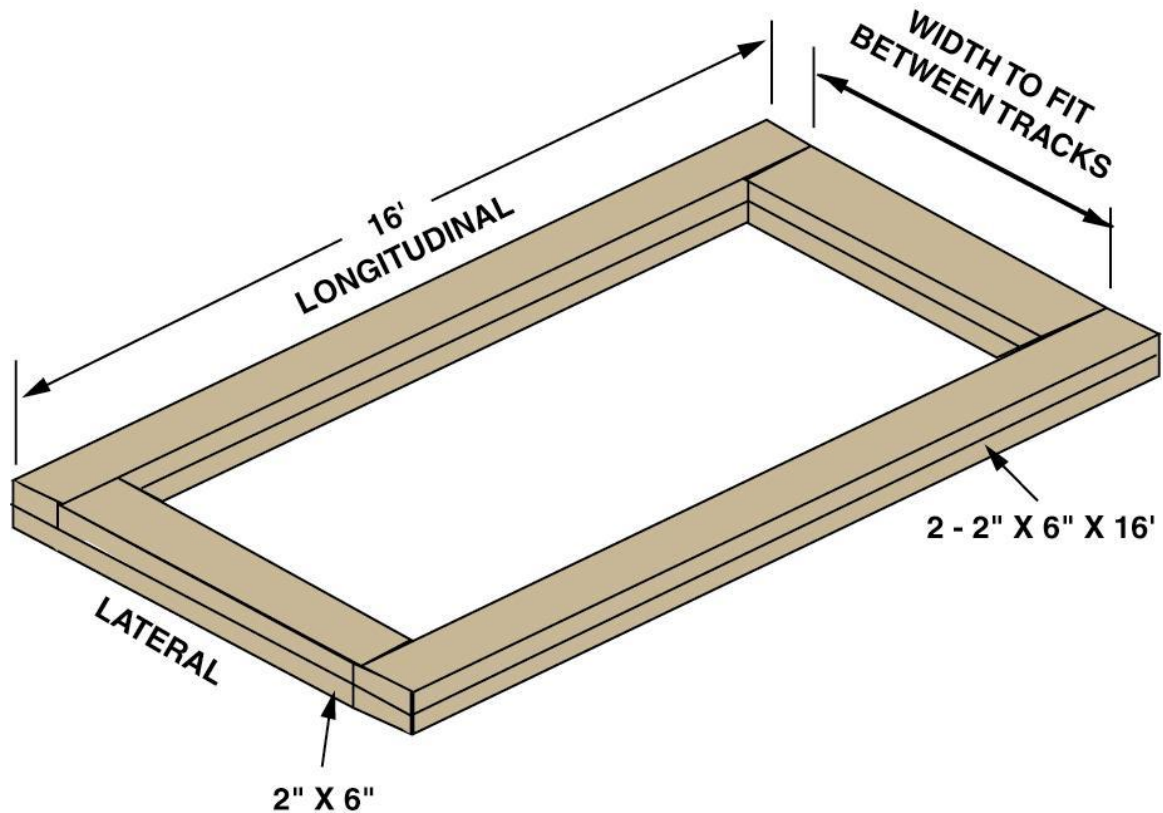
NOTE: PATTERN 91 HEIGHT, USING DRESSED LUMBER DIMENSIONED AS SHOWN, WILL BE ABOUT 28 1/8"



NOTE: LENGTH OF SUPPORT MEMBERS AND OTHER COMPONENTS MAY VARY TO SUIT TRAILER TYPE AND HEIGHT.

GENERAL INFORMATION

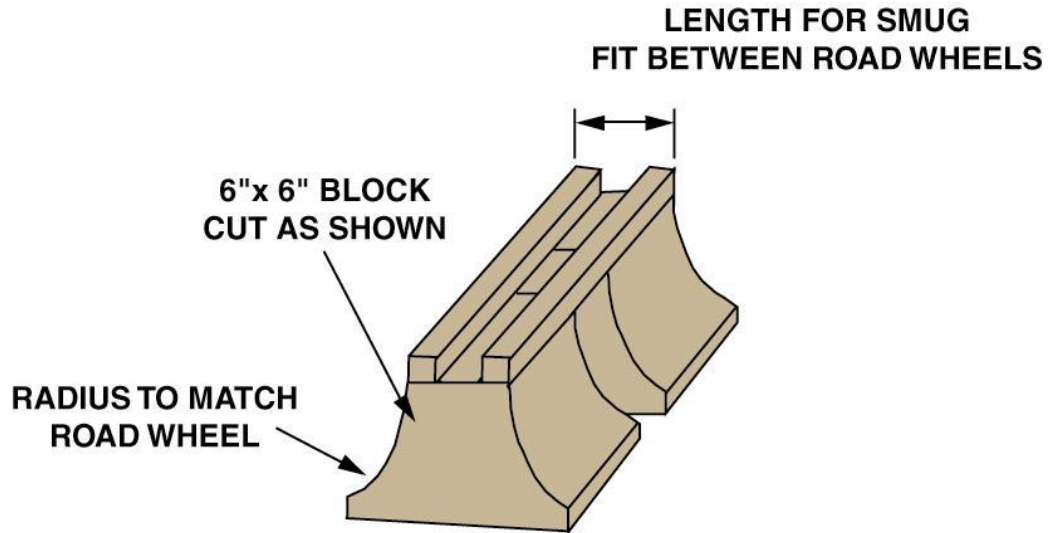
LATERAL BLOCKING



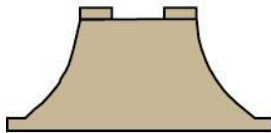
NOTE: FRAMEWORK TO CONSIST OF 4 PIECES OF LUMBER 2" X 6" X 16". LOCATE LOWER PIECES ON CAR FLOOR AGAINST INSIDE EDGE OF EACH CRAWLER THREAD. SECURE TO CAR FLOOR WITH TWELVE 20-D (4") NAILS. SECURE TOP PIECE TO LOWER PIECE IN LIKE MANNER. APPLY NAILS IN STRAGGERED PATTERN. FOUR PIECES OF 2" X 6" LUMBER CUT-TO-FIT SHALL BE PLACED BETWEEN THE LONGITUDINAL PIECES. SECURE LOWER PIECES TO CAR FLOOR WITH FOUR 20-D (4") NAILS. SECURE TOP PIECE TO LOWER PIECE IN LIKE MANNER.

GENERAL INFORMATION

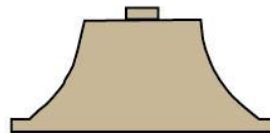
ROAD WHEEL BLOCK



NOTE: 2" X 4" - TWO PLACES IF POSSIBLE (SKETCH 1) TIGHT AGAINST ROAD WHEELS. FASTEN EACH WITH FOUR 20-D (4") NAILS AFTER PUTTING 6" X 6" BLOCKS IN PLACE.



SKETCH 1



SKETCH 2

NOTE: IF TWO 2" X 4" PIECES WILL NOT FIT AS SHOWN IN SKETCH 1, USE ONE 2" X 4" AS SHOWN IN SKETCH 2. FASTEN WITH FOUR 20-D (4") NAILS AFTER PUTTING 6" X 6" BLOCKS IN PLACE.

FINAL RECOMMENDATIONS

1. When ordering specialized railroad freight equipment, shippers should specify cars equipped with tie-down devices in the quantity required for proper attachments of their vehicles.
2. Vehicles must face in the same direction and be uniformly spaced along the length of the car to allow sufficient space at each end of the car and between the vehicles for securement. The angle of the tie-down must be as close to 45 degrees as possible. Quarter/ton trucks loaded on Bi-Level cars may have approximately 10" space between each vehicle and maintain a 45 degree angle for the tie-down, however, bigger vehicles will need more space to achieve the same target.
3. Tie-downs **ARE NOT** to be secured to axles, springs or bumpers of vehicles.
4. Gearshift levers on vehicles equipped with automatic or standard transmissions should have the gearshift lever wire-tied in the neutral position if necessary.
5. Open hooks must be secured over the opening to prevent the hook from becoming disengaged from the chain link to which it is secured. Clevises/shackles equipped with screw pins must have additional securement (wire).
6. Do not mix wheeled and tracked vehicles as a serious accident could occur when loading a tracked vehicle with the bridge plates installed.
7. Tank gun barrels must be placed in the tank gun brace and securely fastened. If gun brace is missing or broken, two 3/8-inch wire rope loops must be placed around the gun barrel, securing one loop to each side of the hull. Substitution of wire or banding is prohibited.
8. Hand brakes on vehicles must be set, except when stated otherwise in the individual vehicle-operating handbook.

FINAL RECOMMENDATIONS (concluded)

9. Height and width of the load should not exceed railway line clearances. If it does, acceptance of the railroad must be obtained.
10. Loaded vehicles should not exceed the load limit specified on the car and/or the weight limit in a specific figure.

FINAL INSPECTION

It should be remembered that the loading priority and the positioning of the vehicles on the car belongs to the Armed Forces. **THE CARRIER'S INSPECTOR SHOULD BE PRESENT WHEN THE ACTUAL LOADING IS PERFORMED. A FINAL INSPECTION MUST** be made by the railroad inspector accepting the load and a representative of the Armed Forces. The railroad inspector has the final word concerning the acceptance of the loads. In case a disagreement concerning the Loading Rules occurs, it must be reported to the Managers of Car Loading Rules of The Railway Association of Canada (RAC tel: 613-564-8095) who will provide authoritative interpretation on proper loading practices and regulations.

LOAD AND TIE-DOWN CHECKLIST
FOR VEHICLES ON CHAIN TIE-DOWN FLAT CARS

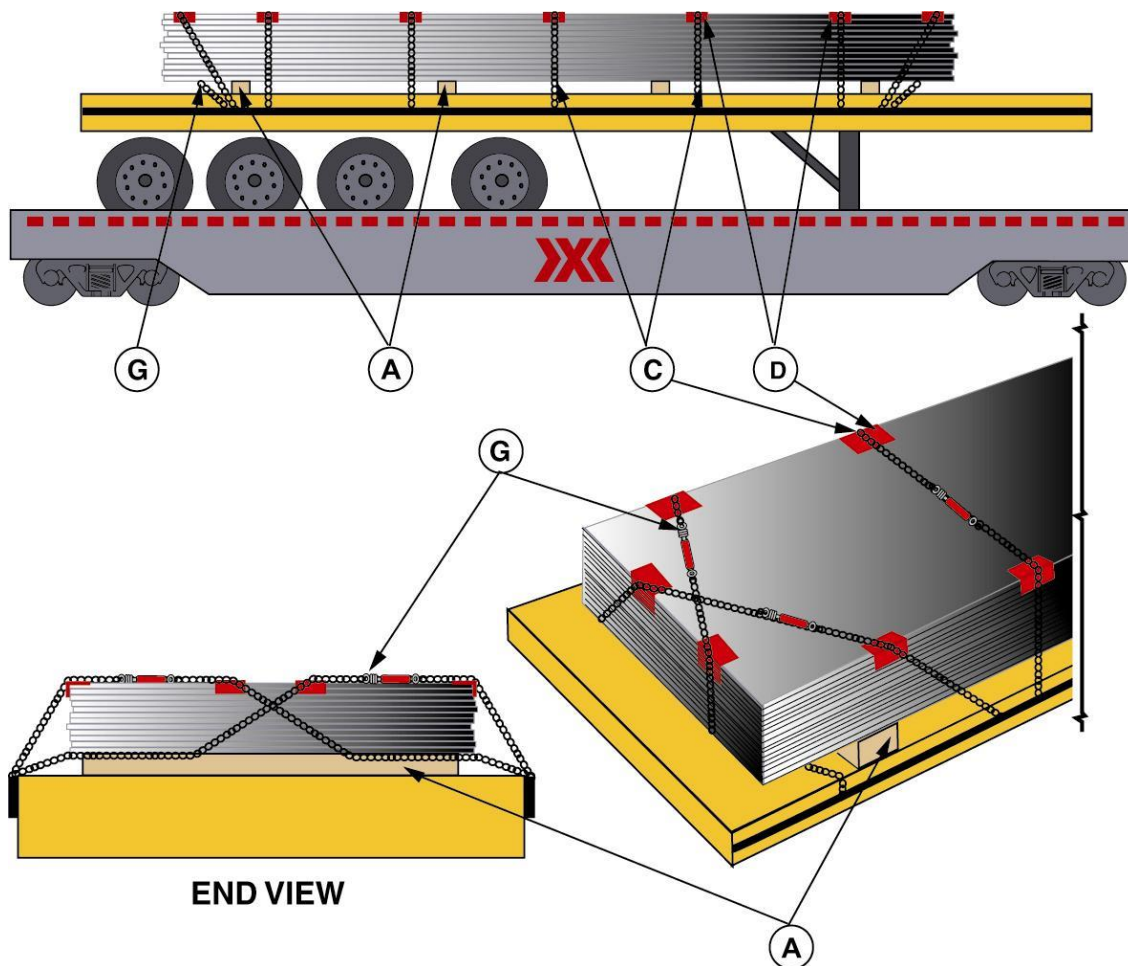
- ◆ Make certain all hood latches are secured.
- ◆ Face vehicles in same direction.
- ◆ Sufficient space should be left between vehicles to allow a **45-degree** angle for chain tie-down. **(Consideration must be given to the height of tie-down point in the planning of vehicle placement)**
- ◆ On multi level cars, a minimum space of 10 inches should be left between vehicles.
- ◆ Check for proper brake wheel clearance.
- ◆ Do not cross chains.
- ◆ Use symmetrical tie-down patterns.
- ◆ Seat and lock chain anchor or winch.
- ◆ Secure shackle in tie-down position with wire tie or cotter pins.
- ◆ Pull chain tight and attach hook above the compression unit.
- ◆ Tighten chain.
- ◆ Use appropriate tool
- ◆ Make sure chain is not kinked or bind.
- ◆ Secure hooks with wire.
- ◆ Make sure turnbuckles are wired or locked.
- ◆ Wrench tighten jam nuts.
- ◆ Do not secure chains to axles, springs or bumpers.
- ◆ Make certain turrets and guns, radiator doors, side skirts, outriggers, mirrors, crane booms, expansible van bodies, and so forth are secured from extending up or over the side of the flat car.
- ◆ All unused chains and binders must be stored properly in tracks.
- ◆ All tools must be removed from cars.

<p>NOTE: COPIES OF THIS PAGE SHOULD BE DISTRIBUTED TO LOADING TEAMS</p>
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**CLR 7000 OPEN TOP TRAILERS TO BE HANDLED IN “TRAILER ON FLAT
CAR” (TOFC) SERVICE**

FLAT ROLLED, STEEL, WITHOUT SKIDS, FLATBED TRAILERS ON EXPRESSWAY CARS

RAC 17001
New. 10-2001



Item	No. of pieces	Description
A	<p>2 per pile 20 ft. or less</p> <p>3 per pile 20 ft. to 40 ft.</p> <p>4 per pile over 40 ft.</p>	<p>Bearing pieces: hardwood 3 X 4 in. located either lengthwise or crosswise. When oriented crosswise must be one-piece full width and extend past edges of pile. Must not be nearer than 12 in. from end of deck. The wider edge must bear against the deck when loading practice permits. Bearing pieces are not secured to deck.</p>

FLAT ROLLED, STEEL, WITHOUT SKIDS, FLATBED TRAILERS ON
EXPRESSWAY CARS

RAC 17001 (concluded)
New. 10-2001

Item	No. of pieces	Description
C	<p>2 per pile up to 18000 lb</p> <p>3 per pile 18800-28200 lb</p> <p>4 per pile 28200-37600 lb</p> <p>5 per pile 37600-47000 lb</p> <p>6 per pile 47000-56400 lb</p> <p>7 per pile 56400-65800 lb</p> <p>8 per pile 65800-75200 lb</p>	Chains, 5/16 in. grade 7. Approved chain binders required which are secured from opening. When crossed chains are used (Item C) they shall be counted as contributing to the total number of chains applied.
D	1 per corner	Corner protectors, required wherever a chain contacts the edge of a plate
G	4 per pile	Crossed chains, 5/16 in. grade 7. Required when no other means of preventing longitudinal movement is provided. Two per end are required. Must be applied so that chains do not contact bearing pieces.

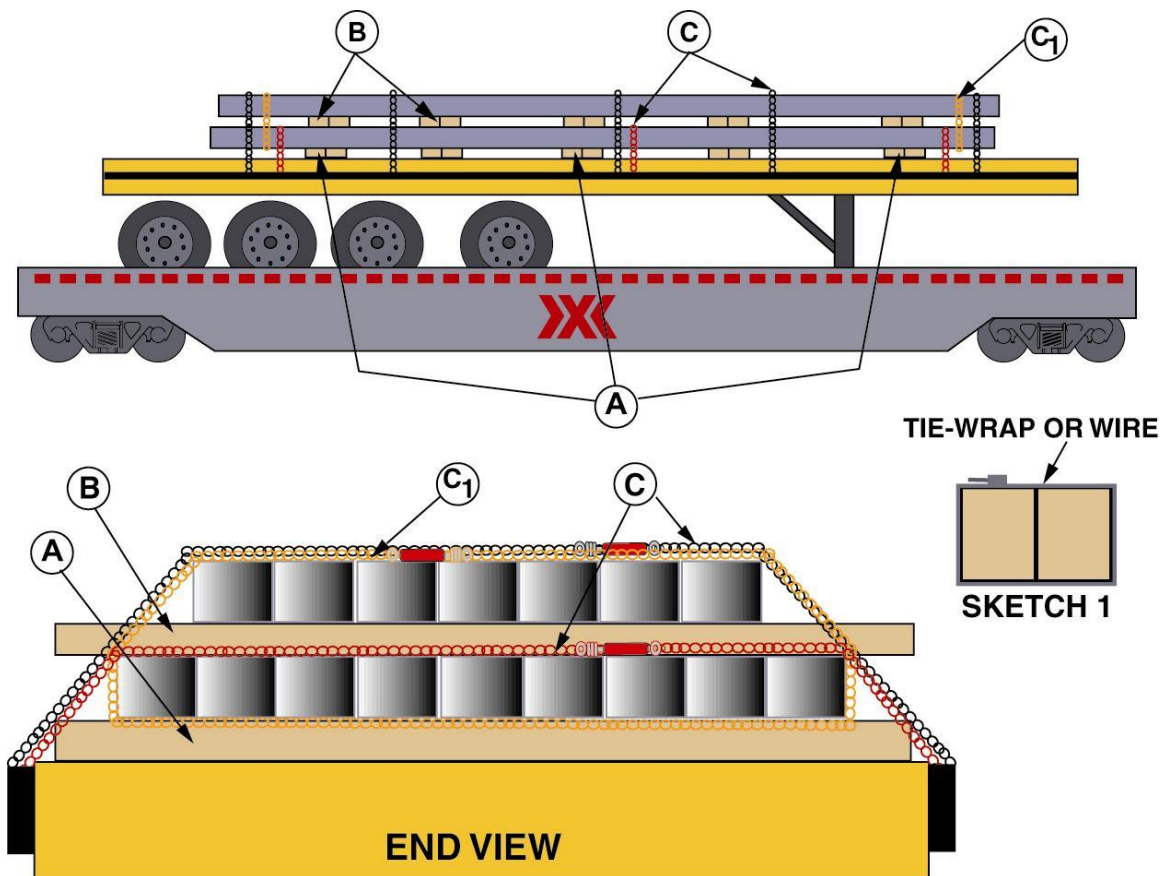
Notes:

1. If two piles are butted tightly against each other, the ends that are butted do not require crossed chains. A total chain required is as per Item B above.
2. If one or more longer plates are placed on top or within two or more piles, an additional chain is required. If the longer plate (s) extend beyond the end of a trailer, another chain is required. Overhanging plates must be supported with a bearing piece or separator no further than 12 in. from the end of the trailer.

See General Rules for further details.

BILLETS, STEEL, FLATBED TRAILERS ON EXPRESSWAY CARS

RAC 17002
New. 10-2001



Item	No. of pieces	Description
A	5 per pile	Bearing pieces: hardwood, consist of 2 pieces of 3 in. x 4 in. each. The two boards are to be placed and attached to each other as shown in sketch 1. The wider edge is to be horizontal. All boards must be one continuous piece and must extend the full width of the deck. End pieces shall be no closer than 12 in. from the end of the deck. The 3 remaining pieces are equally positioned between the end pieces. Boards are not secured to the deck.
B	5 per pile	Separators Blocks: hardwood 6 X 4 in. length to be full width of load. Blocks are to be made of 2 pieces of 3 in. x 4 in. each laminated or secured to each other as shown in sketch 1. To be positioned above bearing pieces (Item A).

BILLETS, STEEL, FLATBED TRAILERS ON EXPRESSWAY CARS

RAC 17002 F (concluded)
New. 10-2001

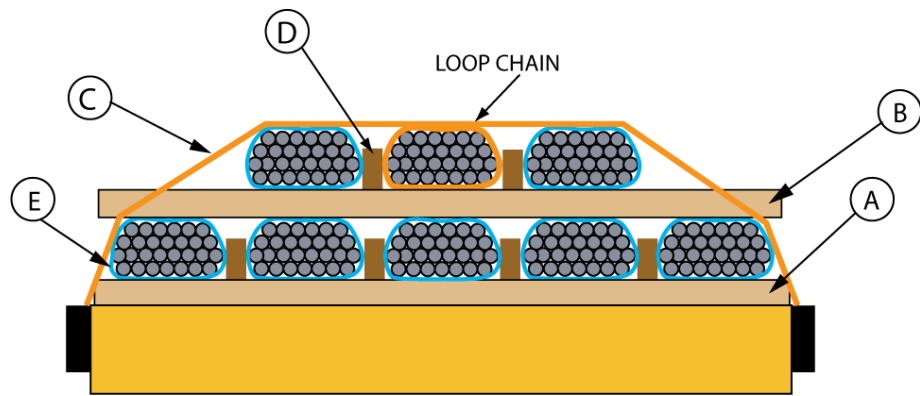
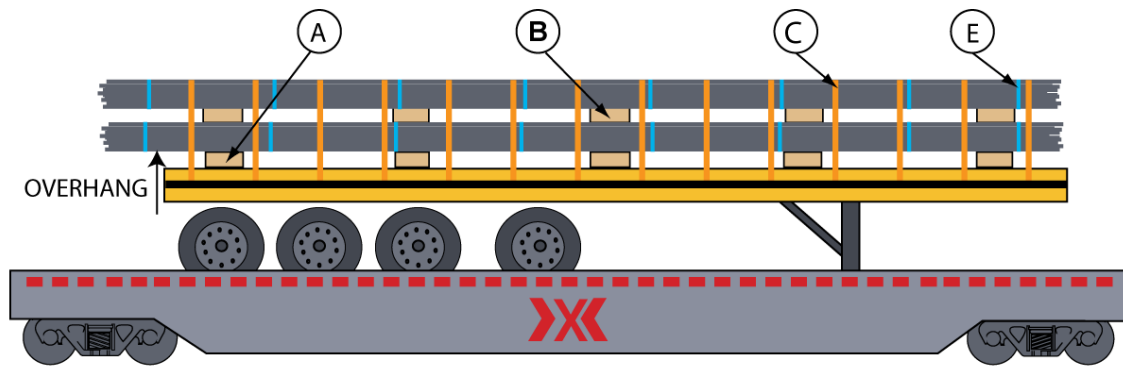
Item	No. of pieces	Description
C	2 ea. per pile over first row and 6 ea. Per pile over second row	Binder Chain Tie Down: 5/16 in. grade 7. Must pass over the load laterally (not diagonally) and are secured in a stake pocket on each side. They shall be no closer than 12 in. from the end of the pile. Chains must not contact bearing pieces or separators. Wire chain binder handle in locked position.
C1	2 ea. per pile	Interlacing Binder Chains: 5/16 in. grade 7. Must encircle the two layers and are secured on top of the second layer. They shall be no closer than 12 in. from the end of the pile. Chains must not contact bearing pieces or separators. Wire chain binder handle in locked position.

Notes:

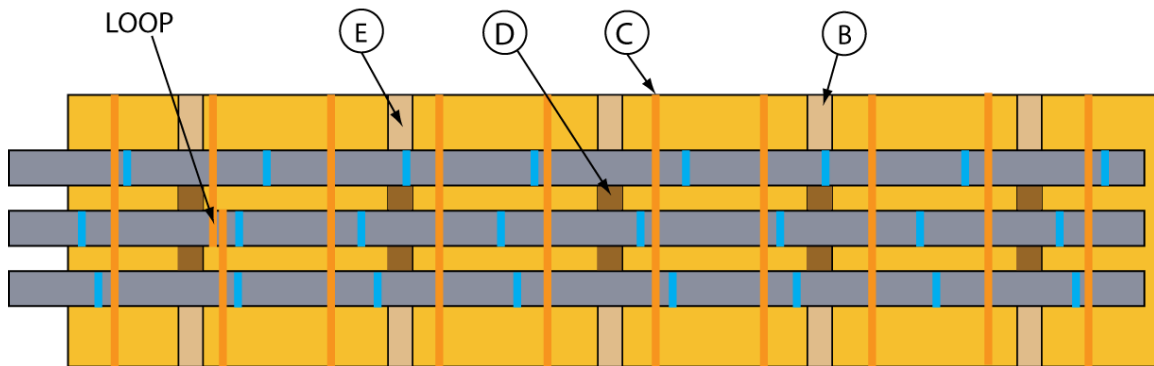
1. Boards in sketch 1 should be tied together.
2. Only approved chain binders can be used.

See General Rules for further details.

REBAR, FLATBED TRAILERS ON EXPRESSWAY CARS
RAC 17003
Revised June 2016



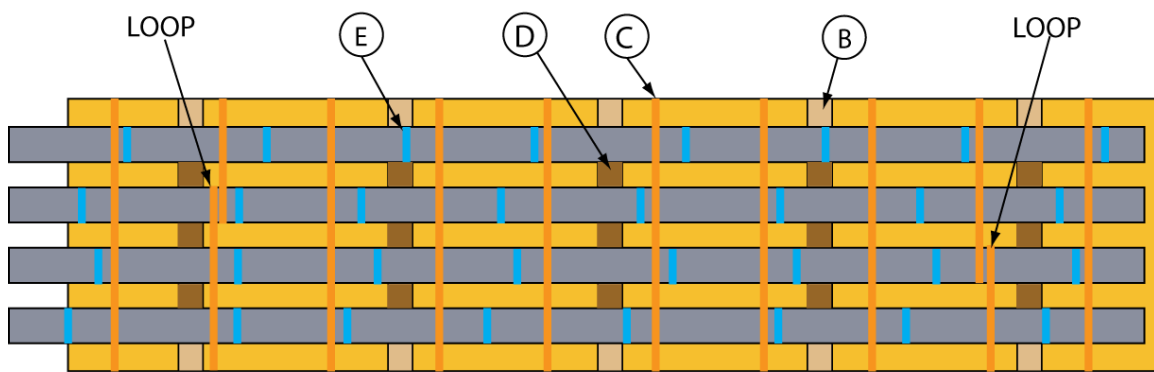
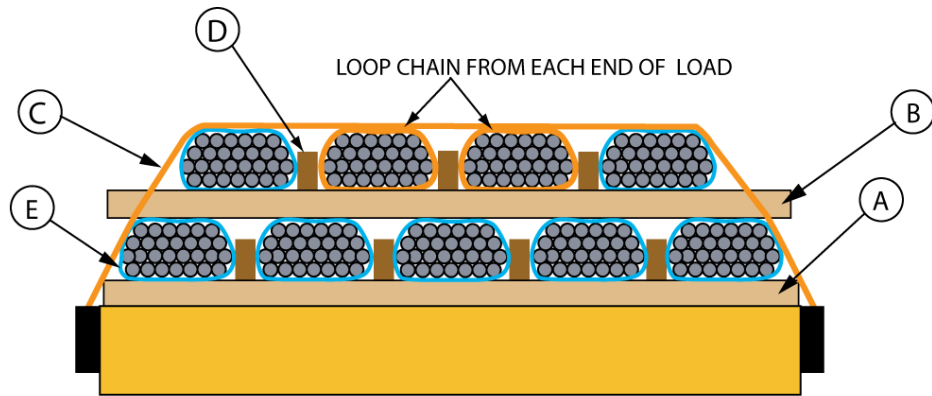
SKETCH 1 REAR VIEW



SKETCH 1 TOP VIEW

REBAR, FLATBED TRAILERS ON EXPRESSWAY CARS

RAC 17003 (continued)
Revised June 2016



Item	No. of Pcs.	Description
A	5 per pile	Bearing pieces: hardwood 3 X 4 in. Wider edge of bearing piece must bear against deck when loading and unloading permits. Bearing pieces are not secured to deck. They should be placed not nearer than 12 in. from the ends of the deck or any possible interference, except for overhanging loads where the outer bearing piece must not be closer than 5 in. to the end of the deck at the overhanging end.
B	5 per pile	Separators: hardwood 3 X 4 in. To be positioned above bearing pieces (Item A).

REBAR, FLATBED TRAILERS ON EXPRESSWAY CARS

RAC 17003 (concluded)
Revised June 2016

Item	No. of Pcs.	Description
C	At least 10 per pile	Chains or polyester straps may be used. The trailer must be equipped with at least 10 chains or straps and each chain or strap must be used, except if the length of the load is such that a chain or strap will not contact the load when passing laterally over the deck. Chains or straps are not to be secured diagonally across the load. Approved chain binders required and they must be secured to prevent from opening. Some chains will require to be looped around one or two packages depending on the number of packages loaded on second row. See SKETCH 1 , SKETCH 2 and TABLE below.
D	Add as per number of packages	Spacer blocks 3 X 3 X 12 IN. To be positioned between each packages above each bearing pieces and each separators
E	8 per pile	Package bands: high tension 1-1/4 in. x .029 in.

Notes:

1. Use of corner protectors is optional for both chains and straps.
2. Overhanging must not exceed 20 % of the total length of the load.
3. Overhang is only permitted for full-length pieces.

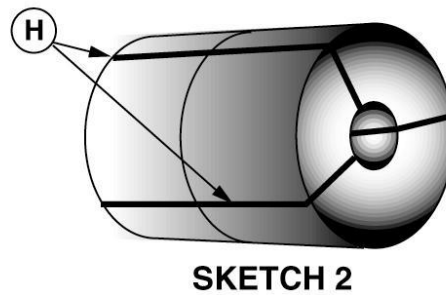
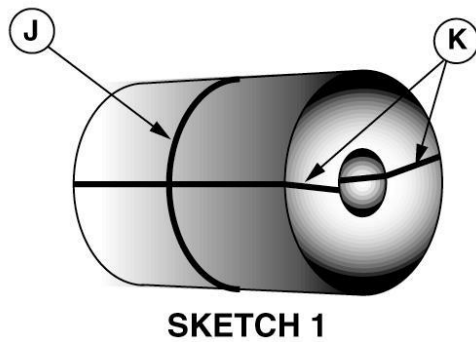
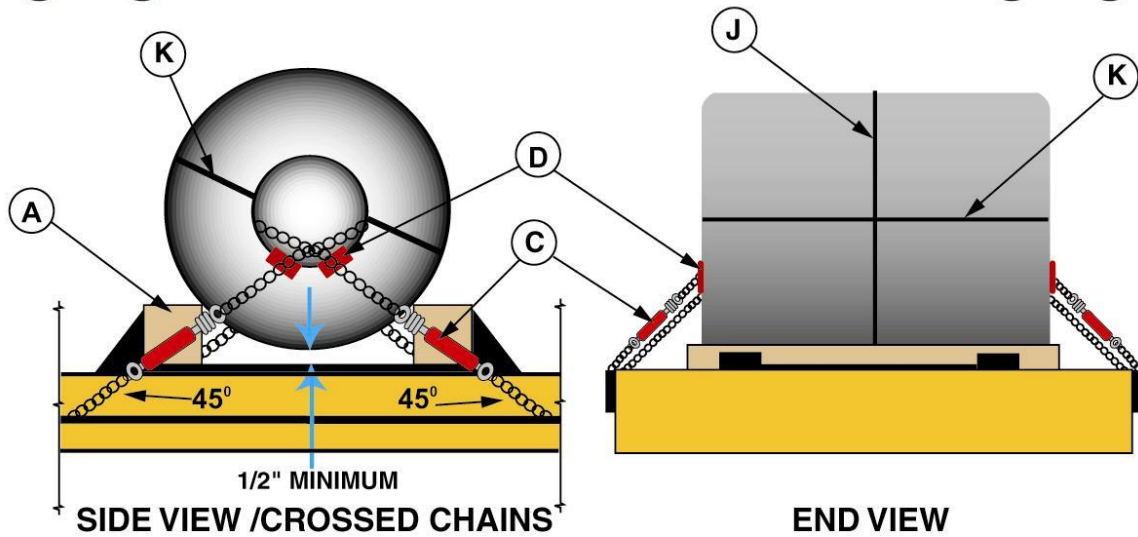
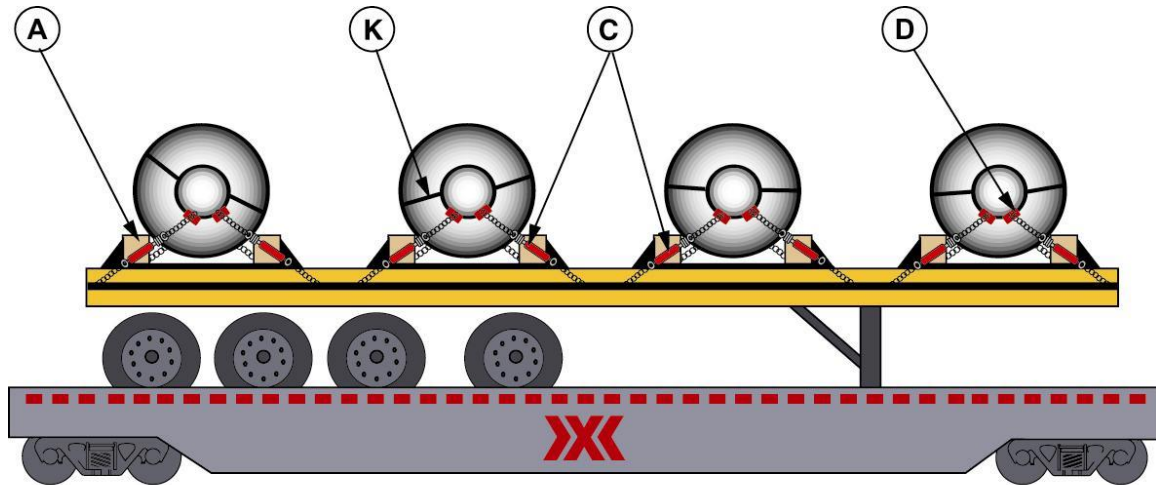
TABLE:

<u>Number of packages on second row</u>	<u>Number of packages to be encircled with chain(s)</u>
2	No package encircled.
3	1 chain encircles the middle package.
4	2 chains encircle second and third packages. (1 chain in front of the trailer and 1 chain at the back of the trailer.)

See General Rules for further details

COILS, FLAT STEEL, INDIVIDUAL COILS, FLATBED TRAILERS ON
EXPRESSWAY CARS

RAC 17004
New. 10-2001



COILS, FLAT STEEL, INDIVIDUAL COILS, FLATBED TRAILERS ON
EXPRESSWAY CARS
RAC 17004 (concluded)
New. 10-2001

Item	No. of pieces	Description
A	2 per coil	Bearing pieces: hardwood 3 X 4 in., held by steel cradles. Length must exceed width of coil by at least 3 in. with coil centered between bearing pieces. Wider edge of bearing piece must sit against deck when clearance of coil above deck permits. Minimum ½ in. clearance between the coil and the deck. Bearing pieces are not secured to deck. Steel cradles are not secured to deck
C	2 per coil up to 18000 lb 4 per coil 18000-37600 lb 6 per coil 37600-56400 lb 8 per coil 56400-65800 lb	Binder chains: 5/16 in. grade 7. Pass trough eye and secure to stake pocket on each side. Chains must make an appropriate 45-degree angle with trailer deck when viewed from side. An equal number are required oriented in forward and backward direction. Approved chain binders required must be secured to prevent them from opening.
D	1 per corner	Corner protectors: required wherever a chain contacts the edge of a coil.
H	3 per package	Package bands, 1-1/4 in. x .029 in. high-tension steel
J	1 per coil	Package band, 1-1/4 in. x .029 in., high-tension steel.
K	2 per coil	Eye band, 1-1/4 in. x .029 in., high-tension steel

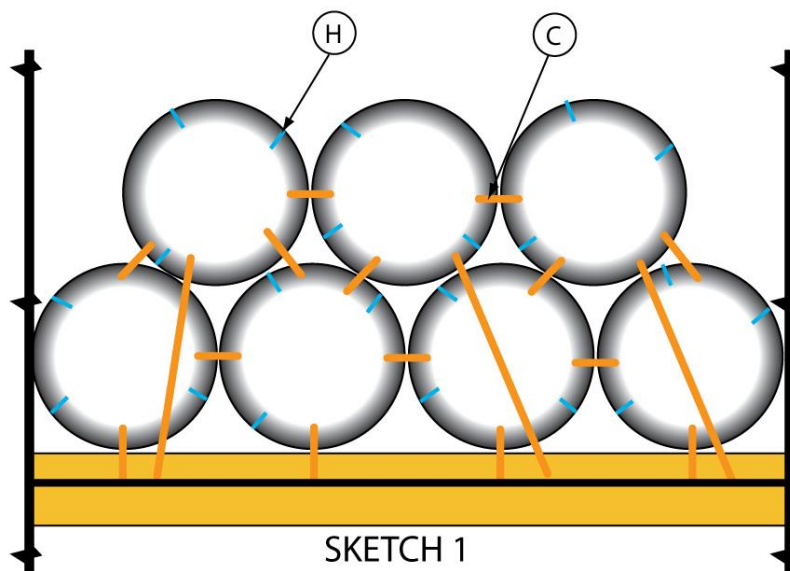
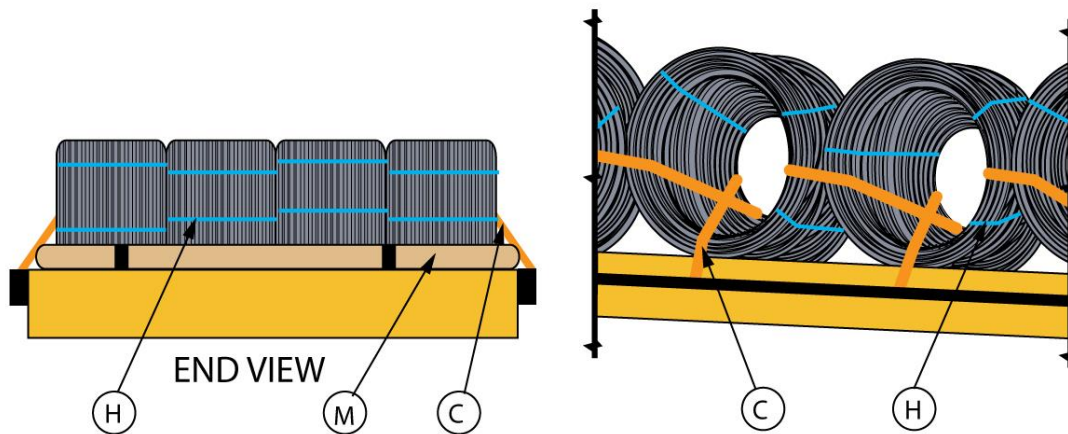
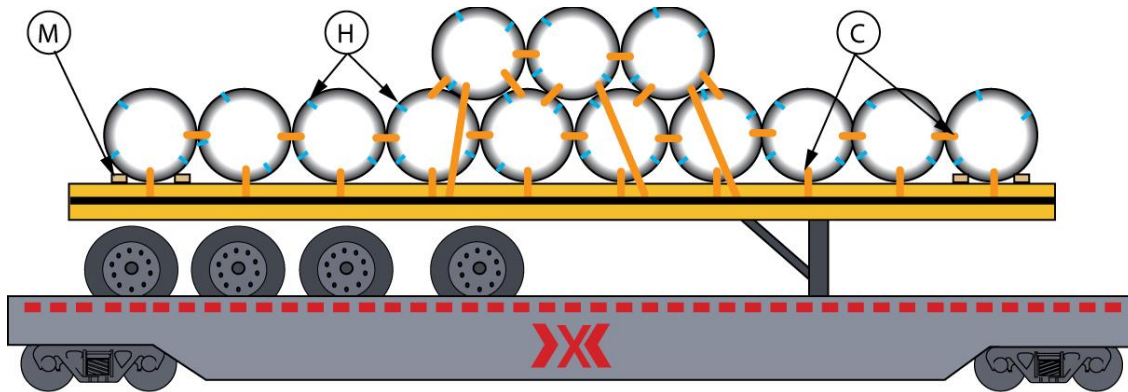
Notes:

1. A single coil in a bunk shall be banded according to sketch 1.
2. Two or more coils or slits in a bunk shall be banded according to sketch 2.
3. Maximum two chains per coil may be crossed.

See General Rules for further details.

WIRE COILS, EYE LATERAL, FLATBED TRAILERS
ON EXPRESSWAY CARS
RAC 17005

Revised. 10-2014



WIRE COILS, EYE LATERAL, FLATBED TRAILERS
ON EXPRESSWAY CARS

RAC 17005 (concluded)
Revised. 10-2014

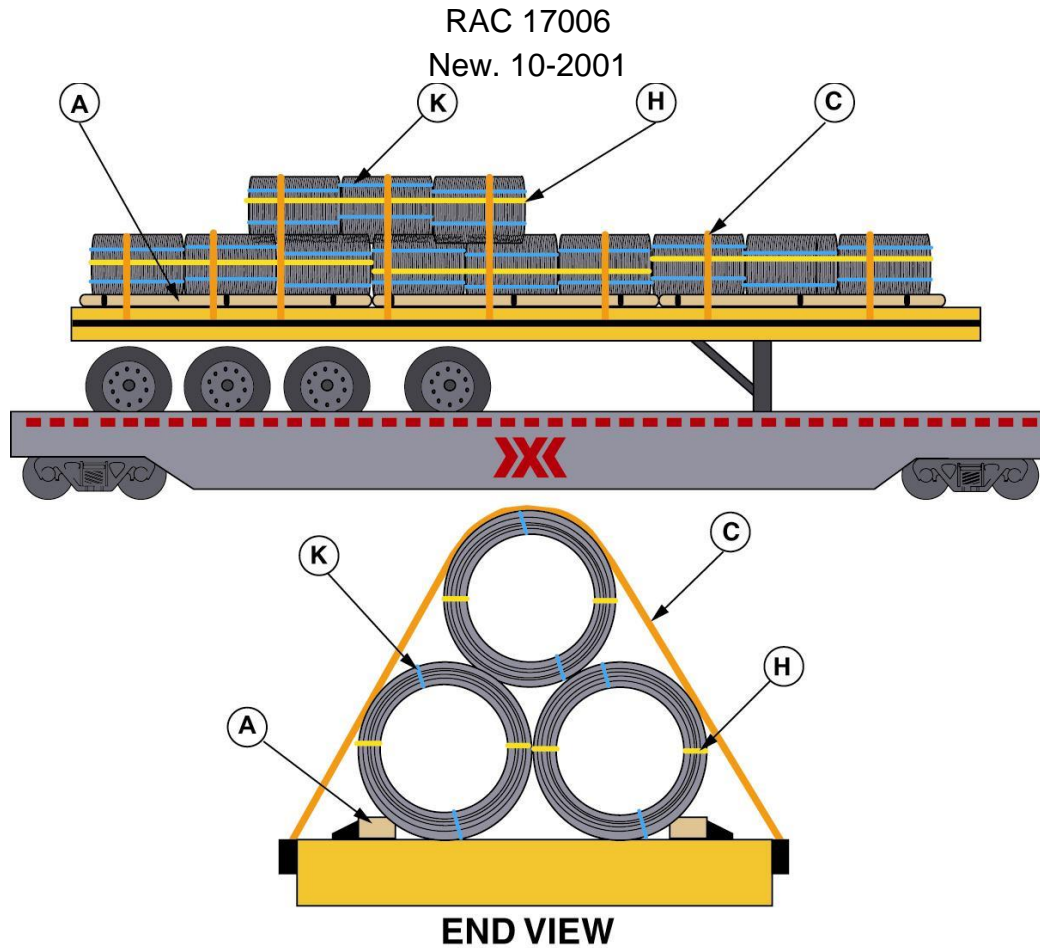
Item	No. of pieces	Description
C	2 per coil	Tie down: Polyester straps 3 in. wide with a minimum working load limit of 5000 lb.
H	3 per coil	Package eye bands: high-tension. 1- 1/4 in. x .029
M	2 per package at each end of the load	Blocking, lumber 4x4, length to suit packages width.

Notes:

1. Coils of wire with eyes oriented laterally do not require bearing pieces
2. Straps are to be used to secure the load. A single strap is to pass through the eye of one coil, back through the eye of an adjacent coil and then again through the eye of the first coil. No coil is to be secured on its own.
3. If the load contains coils on a second row, each coil must be secured to a coil on the lower row and also to an adjacent coil on the upper row by the method described above. **See SKETCH 1.**
4. Corner protectors are not required.

See General Rules for further details.

WIRE COILS, STEEL, EYE LONGITUDINAL, FLATBED TRAILERS ON EXPRESSWAY CARS



Item	No. of pieces	Description
A	2 per unit	Bearing pieces, 3 X 4 in. hardwood, held by steel brackets.
C	2 per unit of 3 coils	Tie down straps: Polyester webbing 3 in. wide with a minimum breaking strength of 15,000 lbs.
H	2 per unit of 3 coils	Unitizing bands, 1- 3/4 in. x .029 high-tension steel. Bands must be placed at 3 and 9 o'clock on the coils.
K	2 per package	Package eye bands: high tension bands 1-1/4 x .029.

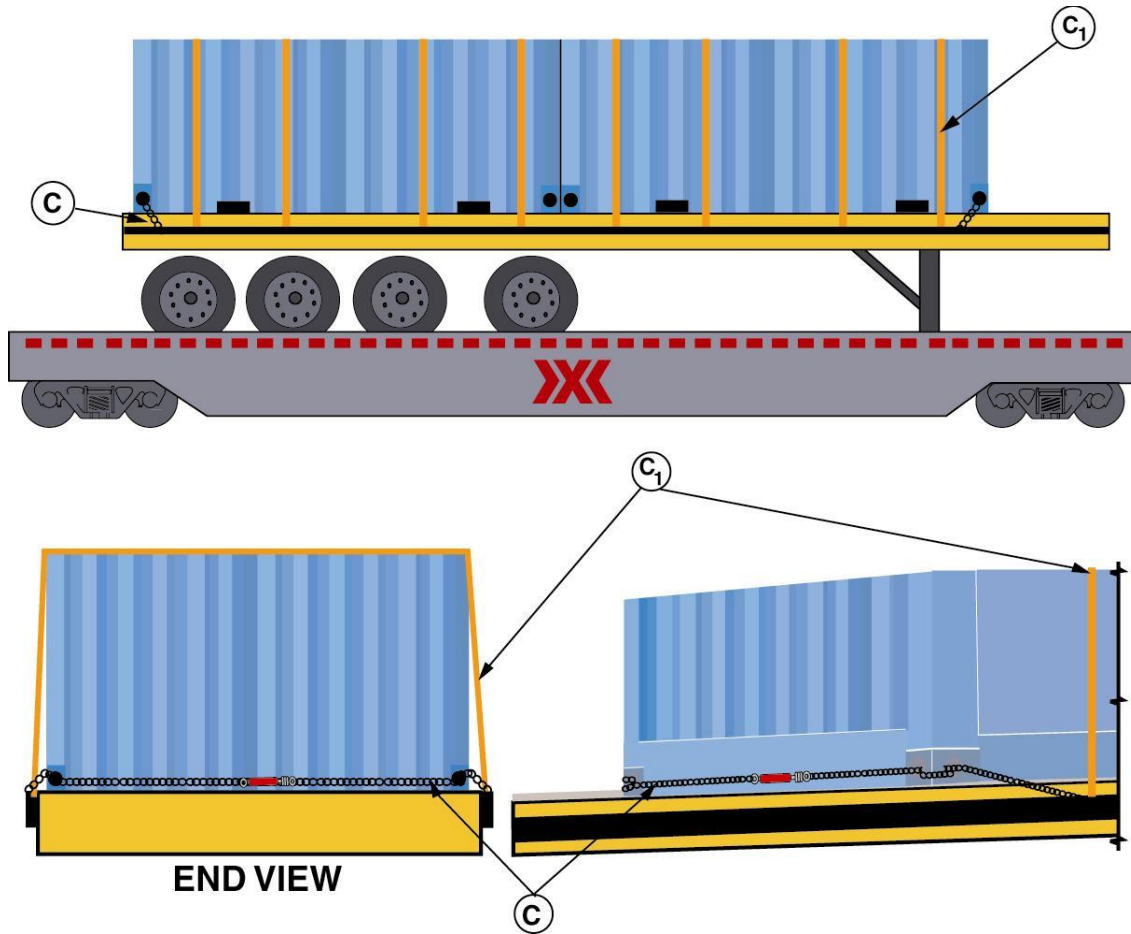
Notes:

1. Top tier coils should be properly nested between coils in bottom row.
2. Top tier units must have at least one tie down band over each coil.

See General Rules for further details.

EMPTY CONTAINERS, FLATBED TRAILERS ON EXPRESSWAY CARS

RAC 17007
New. 10-2001



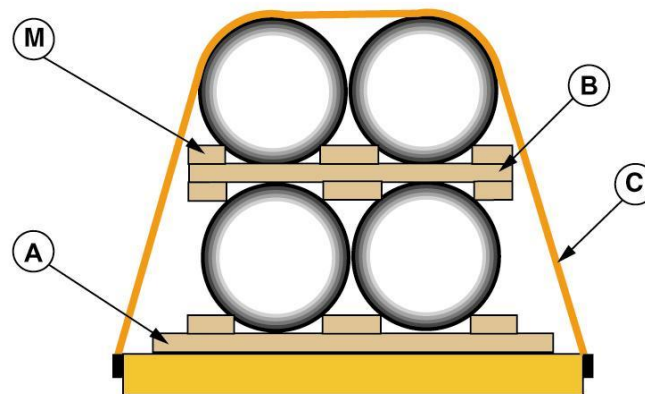
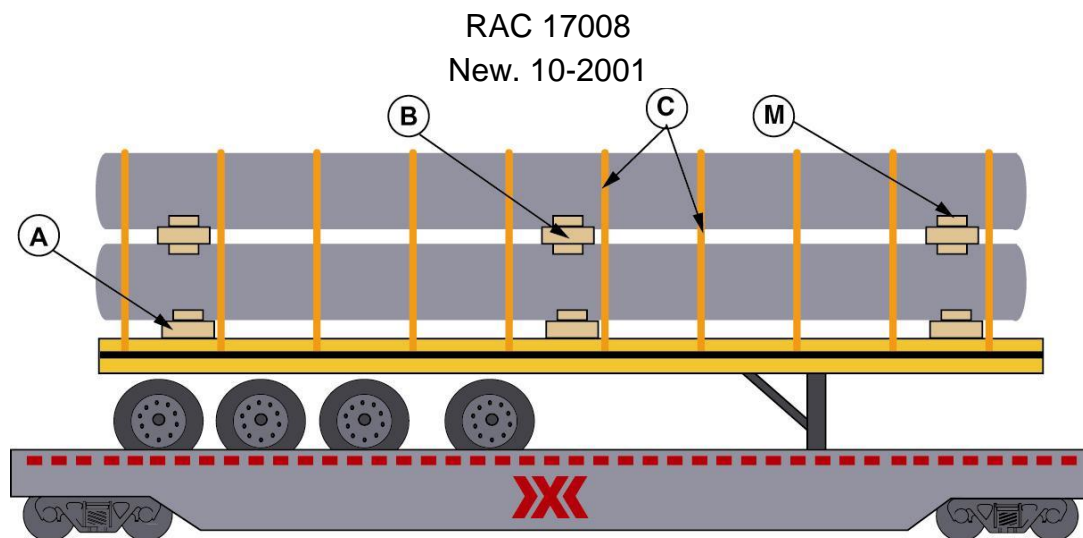
Item	No. of pieces	Description
C	2	Chain pass through the corner casting, wrap around and pass again through the same casting. Similarly for the other side. The two chains are secured in the middle of the end of the container
C-1	2 per 20 feet container 4 per 40 feet container	Tie down: Polyester straps 3 in. wide with a minimum breaking strength of 15,000 lbs.

Notes:

1. When two containers are butted tightly against each other, chains are not required at the butted ends.

See General Rules for further details.

PIPES, CONCRETE, FLATBED TRAILERS ON EXPRESSWAY CARS



END VIEW

Item	No. of pieces	Description
A	3 per pile	Bearing pieces: hardwood 3 X 4 in. Wider edge of bearing piece must bear against deck when loading and unloading permits. Bearing pieces are not secured to deck. They should be placed not nearer than 12 in. from the ends of the deck or any possible interference. End chocks are required (Item M).
B	3 per pile	Separators: hardwood 3 X 4 in. To be positioned above bearing pieces (Item A). End chocks are required (Item M).

C	10 per pile	Tie down: Chains or polyester straps 3 in. wide with a minimum breaking strength of 15,000 lbs.
M	2 per Item A and 4 per Item B	Blocking, lumber 4x4.

PIPES, CONCRETE, FLATBED TRAILERS ON EXPRESSWAY CARS

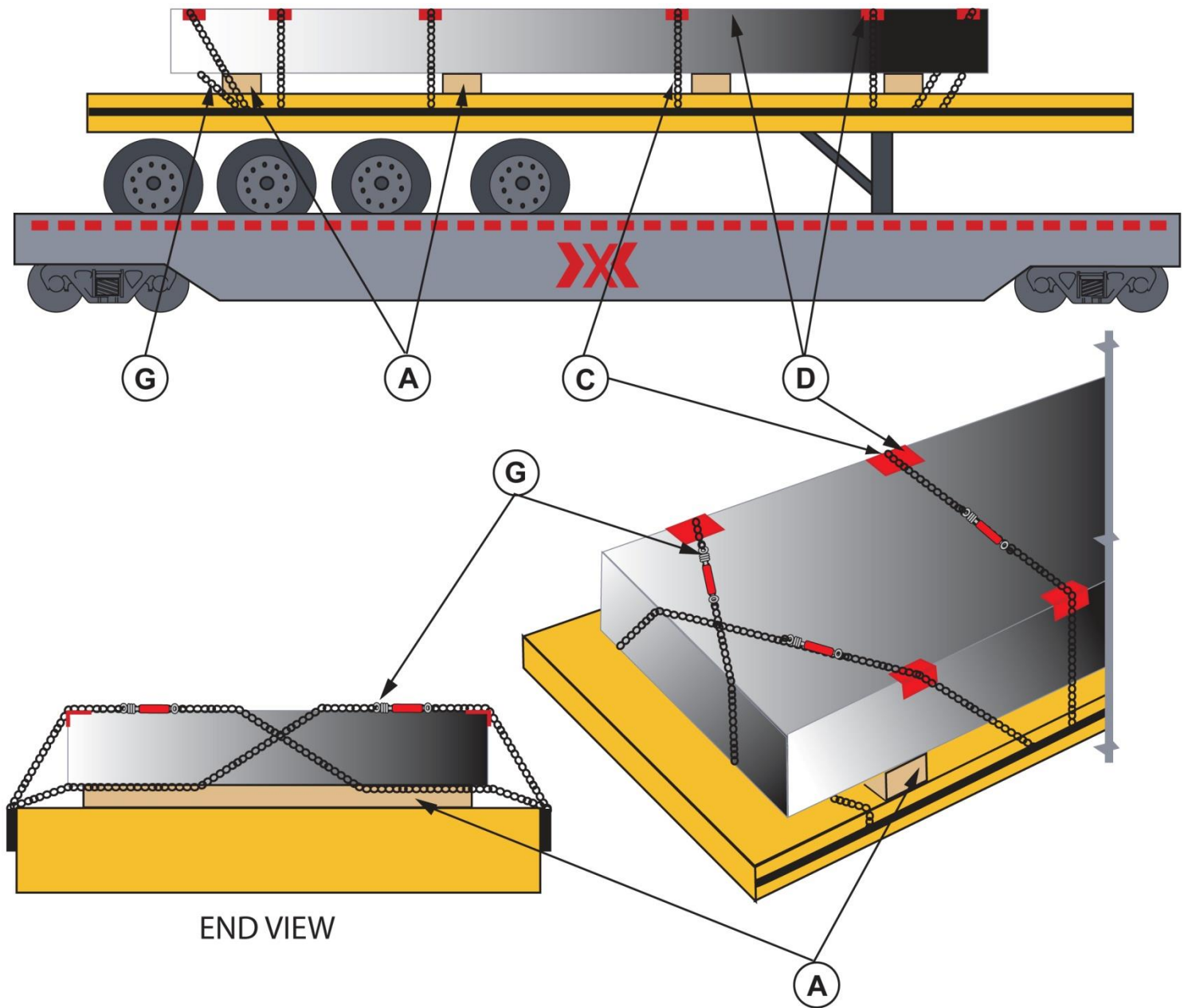
RAC 17008 (concluded)
New. 10-2001

Notes:

1. A maximum of 2 layers of pipe is permissible.
2. When 2 layers are present, the lower row must be secured to the deck separately from the upper row. An equal number of chains or straps must secure both the lower and the upper layers.
3. Chains or straps are not to be secured diagonally across the load.
4. The use of corner protectors is optional for both chains and straps.

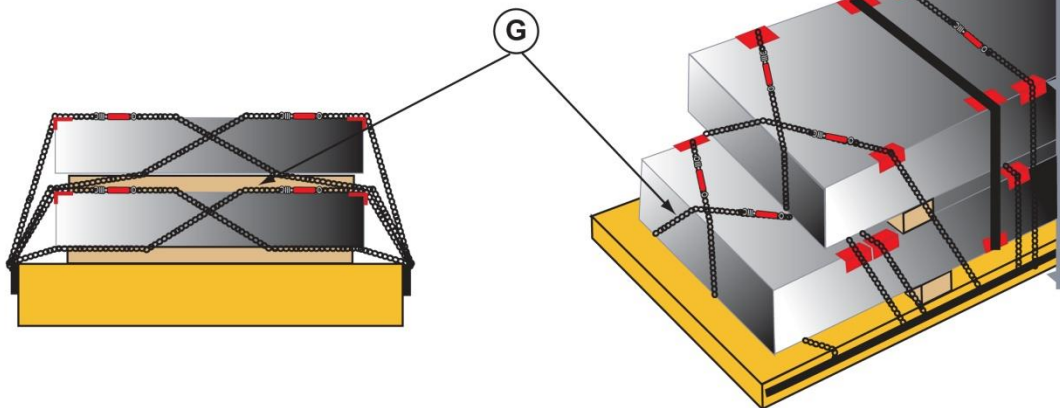
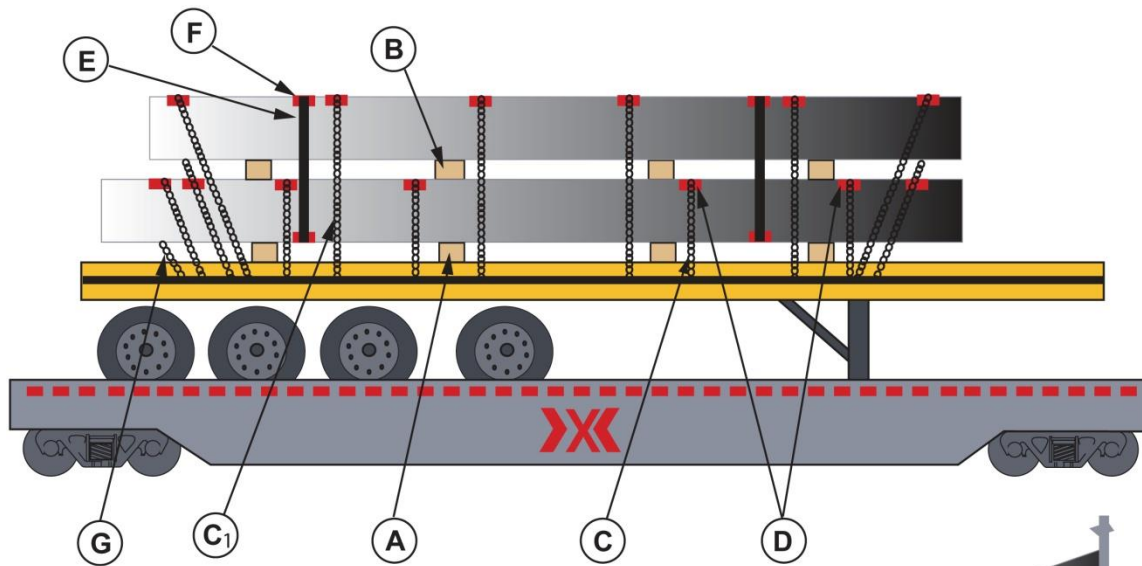
See General Rules for further details.

STEEL INGOTS - FLATBED TRAILERS ON EXPRESSWAY CARS
RAC 17009
Revised 08-2016

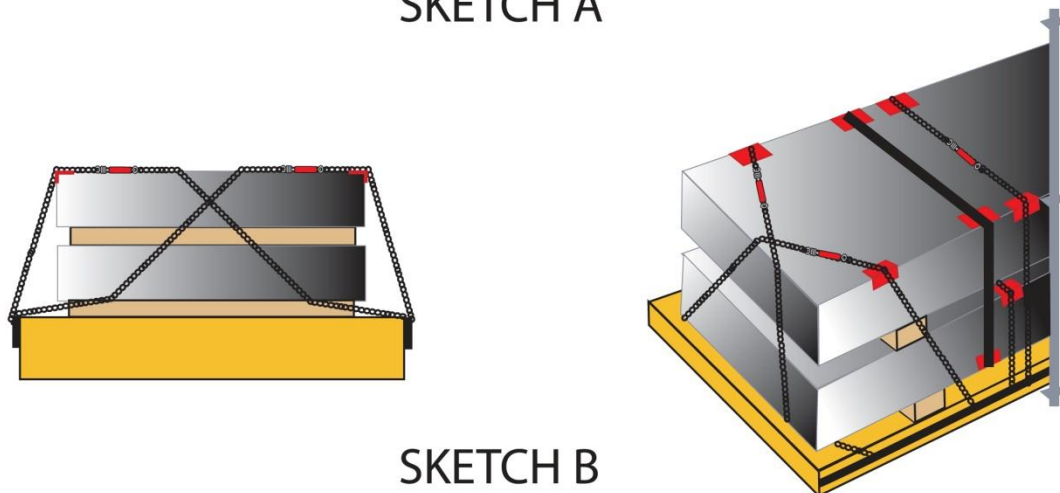


STEEL INGOTS - FLATBED TRAILERS ON EXPRESSWAY CARS

RAC 17009 (Continued)
Revised 08-2016



SKETCH A



SKETCH B

STEEL INGOTS - FLATBED TRAILERS ON EXPRESSWAY CARS

RAC 17009 (Continued)
Revised 08-2016

Item	No. of pieces	Description
A	4 per pile	Bearing pieces: hardwood 4 X 6 in. located crosswise. They must be one-piece and their length must be equal to the width of pile. The end pieces should be placed not nearer than 12 in. from the ends of piles and the remaining pieces are equally positioned between them. The wider edge must bear against the deck. Bearing pieces are not secured to deck.
B	4 per pile	Separators: hardwood 4 X 6 in. to be positioned above bearing pieces (Item A). They must be one-piece and their minimum length must be equal to the width of pile. The wider edge must bear against the ingot located in the lower pile. The end pieces should be placed not nearer than 12 in. from the ends of piles and the remaining pieces are equally positioned between them.
C	4 per bottom pile 27ft. to 35 ft. Add 1 chain for each additional 5 ft.	Binder Chain Tie Down: 3/8 in. grade 70 with a MBS of 26,400 lbs. Pass chains laterally (not diagonally) over bottom pile and secure in a stake pocket on each side of the trailer. They shall be placed no closer than 12 in. from the end of the pile. Chains must not contact bearing pieces or separators.
C1	4 per top pile 27ft. to 35 ft. Add 1 chain for each additional 5 ft.	Binder Chain Tie Down: 3/8 in. grade 70 with a MBS of 26,400 lbs. Pass chains laterally (not diagonally) over top pile and secure in a stake pocket on each side of the trailer. They shall be placed no closer than 12 in. from the end of the pile. Chains must not contact bearing pieces or separators.
D	1 per corner	Corner protectors: required wherever a chain contacts the edge of a plate. (Except on chains crossed at each end of the ingots).

STEEL INGOTS - FLATBED TRAILERS ON EXPRESSWAY CARS

RAC 17009 (Concluded)

Revised 08-2016

Item	No. of pieces	Description
E	2 per pile	Encircling bands: 2 in. x .044 in. high tension. Locate one band not less than 12 in. in from each end of pile and secure them on top of the top pile. (Maybe be substituted by 3/8 in. grade 70 chains with a MBS of 26,400 lbs or by Type 1 Grade 7 polyester strap.)
F	1 per corner	Corner protectors, required wherever a steel band contacts the edge of a plate.
G	2 at each end when end of ingots are of equal length and 2 additional at the end where the length is different.	Crossed chains, 3/8 in. grade 70. Required when no other means of preventing longitudinal movement is provided. Two per end are required.(See SKETCH "B"). When ends of ingots are not even, four cross chains must be applied two on the bottom ingot and two additional on the top ingot. (See SKETCH "A"). Chains must be applied so that they do not contact bearing pieces. Secure chains in a stake pocket on each side of the trailer.

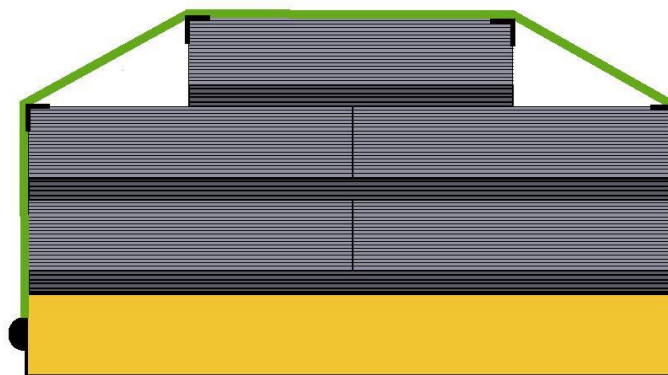
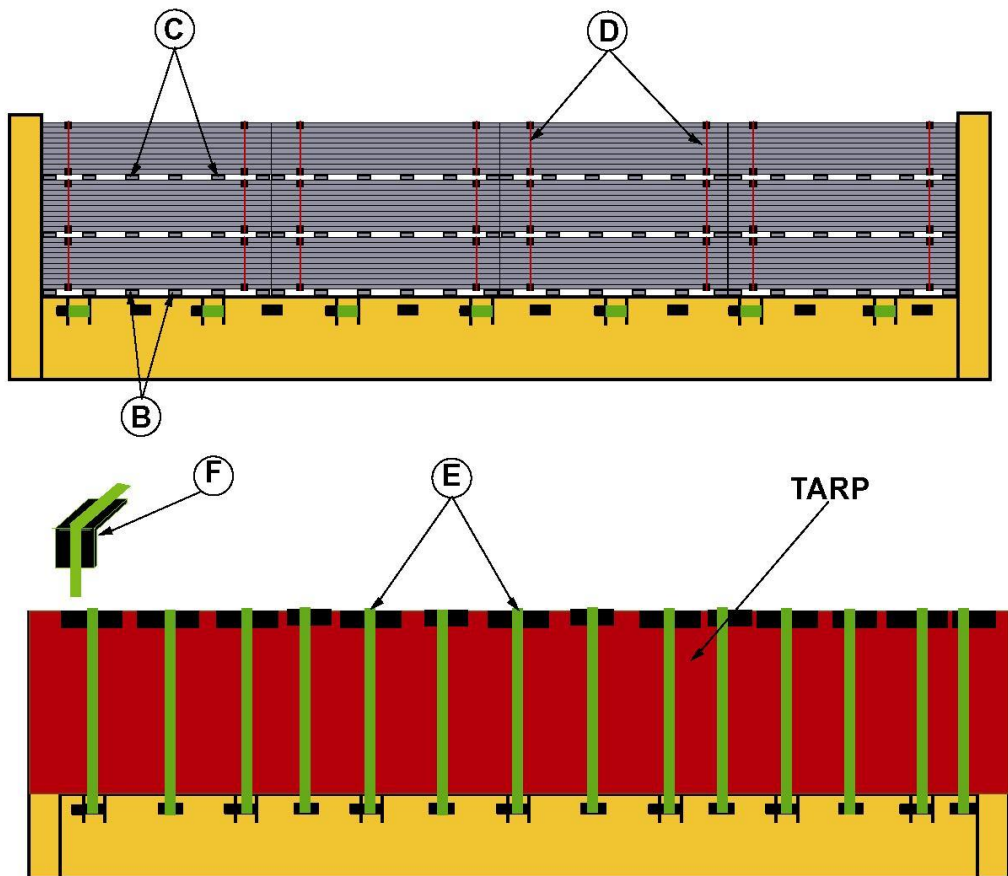
Notes:

1. Load must be laterally centered on trailer.
2. Bearing pieces and separators must be two inches wider than high and must contact ingots and floor at all time.
3. Piles must be equally superposed before applying encircling bands
4. Superposing a shorter ingot on a longer one is permitted as long as the difference in length doesn't exceed 8 ft. (4 ft. at each end). Piles must be centered if possible.
5. Chains and encircling bands must be square to the load. Crossed chains must be placed at an angle as near as 45 degrees when possible.
6. Only one chain per stake pocket. It is stated by the trailer builder to use pipe spools instead of stake pockets if possible. Pass chain through stake pocket and secure hook to a chain link above stake pocket.

See General Rules for further details

GYPSUM PANELS 8 FT. TO 14 FT. IN LENGTH
SPECIALLY EQUIPPED
CONTAINERS WITH MOVEABLE BULKHEADS AND PVC TREATED
POLYESTER WEBBING TIE-DOWN SYSTEM

RAC 17501
New. 6-2002



REAR VIEW WITHOUT TARP

**GYPSUM PANELS 8 FT. TO 14 FT. IN LENGTH SPECIALLY EQUIPPED
CONTAINERS WITH MOVEABLE BULKHEADS AND PVC TREATED
POLYESTER WEBBING TIE-DOWN SYSTEM**

RAC 17501 (Concluded)
New. 11-2002

Item	No. of Pcs.	Description
B	<p>4 per pile 4ft. x 8ft. to 4ft. x 9ft. sheets</p> <p>6 per pile 4 ft. x 12 ft. sheets</p> <p>8 per pile 4ft. x 14ft. sheets</p>	Bearing Pieces: Laminated strips of gypsum ½ in. x 3 in. x 4 ft.
C	<p>4 per pile 4ft. x 8ft. to 4ft. x 9ft.sheets</p> <p>6 per pile 4ft. x 12ft. sheets</p> <p>8 per pile 4 ft. x 14 ft. sheets</p>	Separators: Laminated strips of gypsum ½ in. x 3 in. x 4 ft.
D	2 per package.	Package ties: 1,200 lbs. Minimum breaking strength, high-tension bands with corner protectors. Locate one tie about 12 in. from each end of package.
E	Minimum of 2 tie-down bands per pile.	Tie-Down Bands: PVC treated polyester webbing, 3 in. wide with a minimum breaking strength of 15,000 lbs. Pass over top of load and secure to lading strap anchors on each side of container. Straps must be pulled tight. All 14 straps must be used. Tension with the use of a 24 in. to 30 in. bar.
F	1 cap per tie-down strap	Top corner cap: All packages in top layer must be protected by Item "F"

Notes:

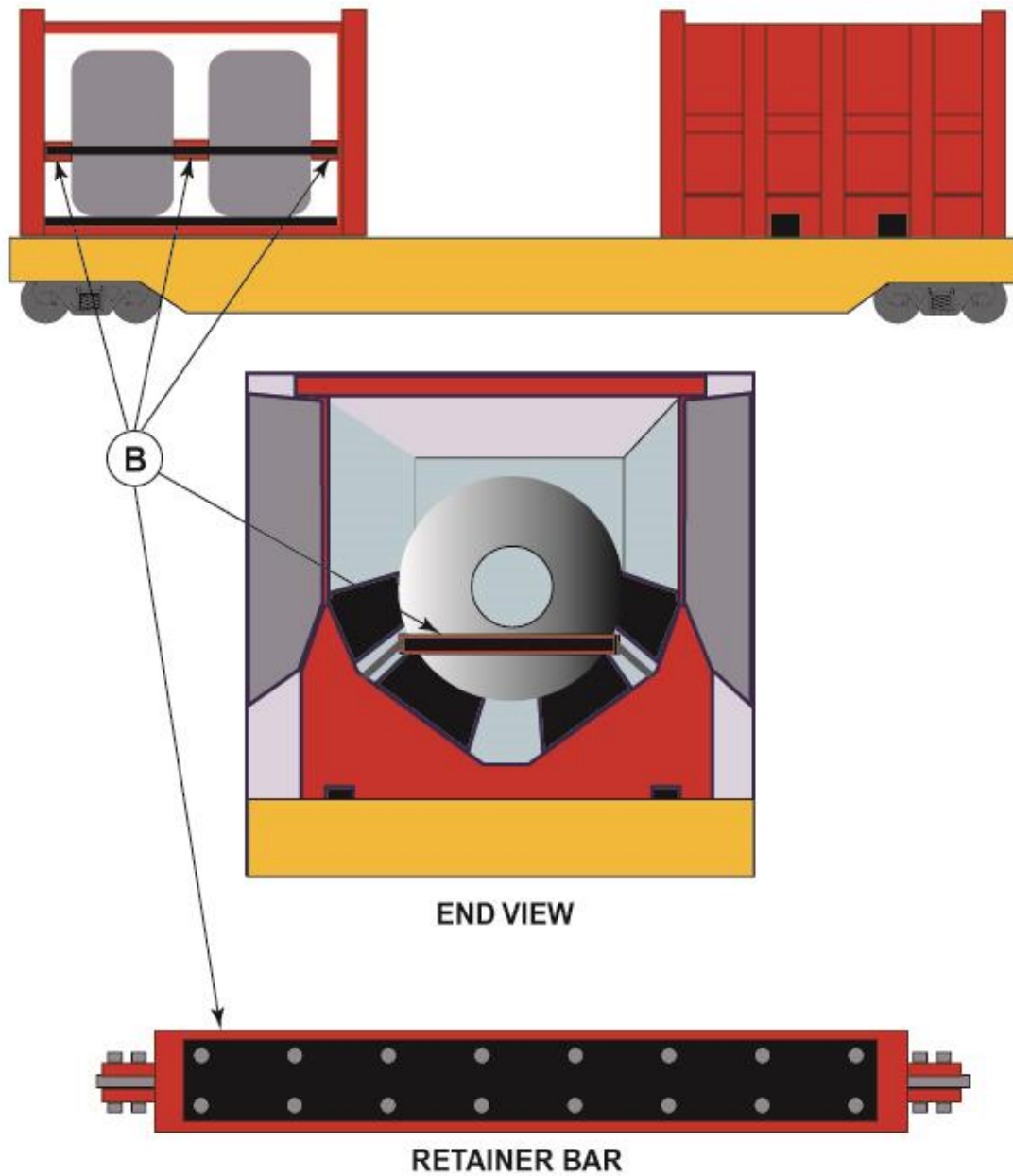
1. Packages in opposite rows must be placed tight against each other to prevent loosening of cables.
2. All packages must be butted as close together as possible.
3. All packages in same layer must be of equal height.
4. Height of load must not exceed height of bulkhead.
5. All polyester webbing tie-downs on the trailer must be used.

See General Rules for further details.

COIL CRADLE CONTAINER LOADED ON FLAT CAR

RAC 17502

New. 08-2010 Ref. AAR fig 615, section 7



COIL CRADLE CONTAINER LOADED ON FLAT CAR

RAC 17502 (Concluded)
New. 08-2010 Ref. AAR fig 615, section 7

Item	No. of pieces	Description
A		Vacant
B	2 per coil	Retainer bar

Note:

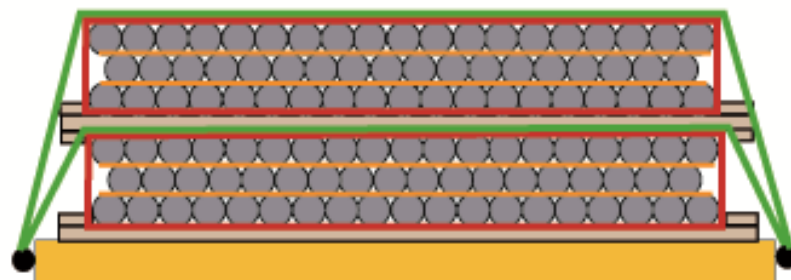
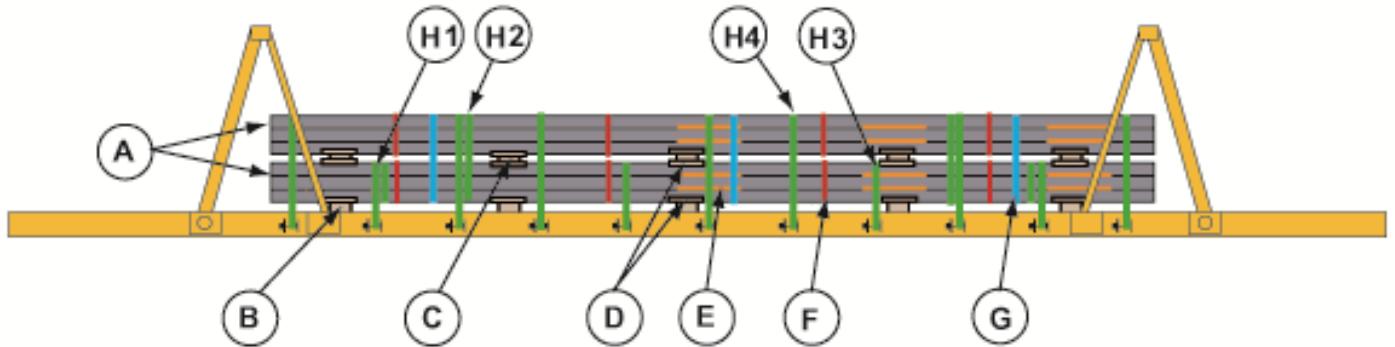
1. Containers loaded to this figure must comply with carrying road's weight limits
2. Coils must be placed in the container so as to ensure the weight is distributed evenly

See General Rules for further details.

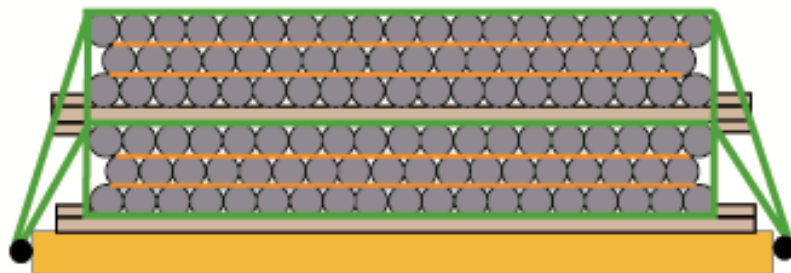
PIPES, STEEL, DRILLING FOR PETROLEUM INDUSTRY, 5 IN. TO 20 IN. O.D.
32 FT. TO 44 FT. LONG LOADED AS TWO UNITS ON A FLAT RACK

RAC 17503

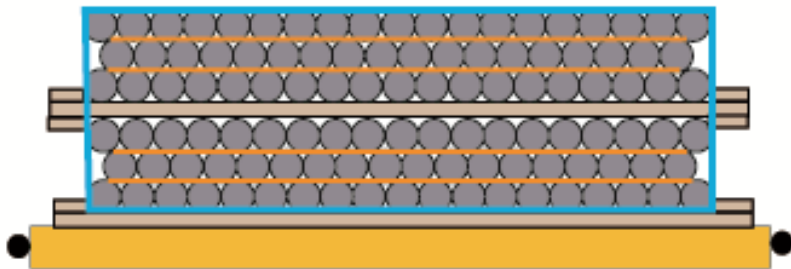
New. 06- 2011 (Ref AAR Fig 700)



SKETCH 1: END VIEW (Items E - F -H3 - H4)



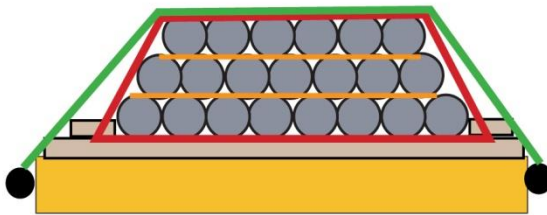
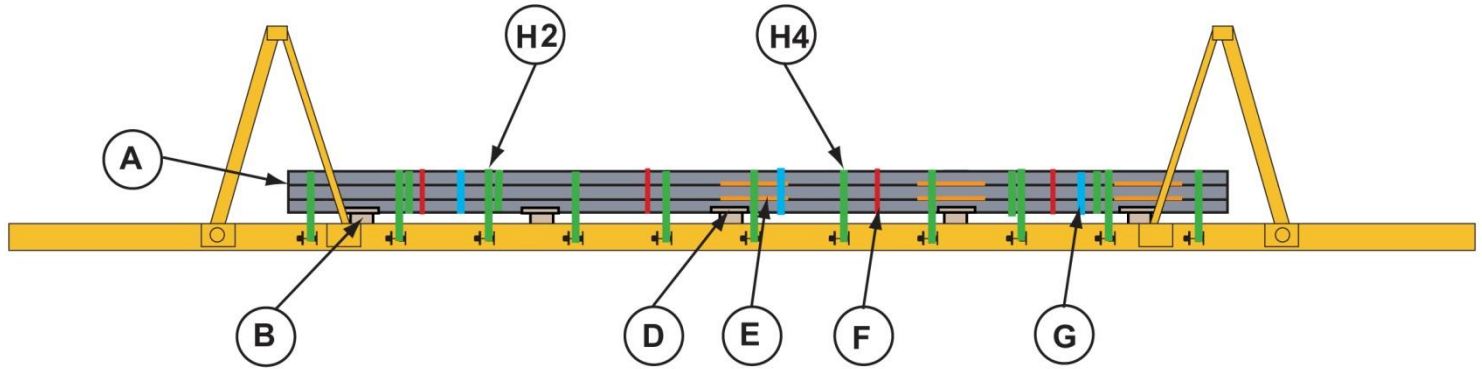
SKETCH 2: END VIEW (Items E - H1 - H2)



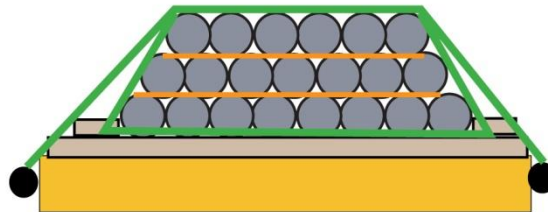
SKETCH 3: END VIEW (Items E - G)

PIPES, STEEL, DRILLING FOR PETROLEUM INDUSTRY, 5 IN. TO 20 IN. O.D.
32 FT. TO 44 FT. LONG LOADED AS TWO UNITS ON A FLAT RACK

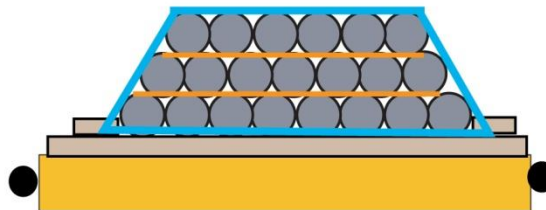
RAC 17503 (continued)
New. 06- 2011 (Ref AAR Fig 700)



SKETCH 1: END VIEW (Items E - F - H4)



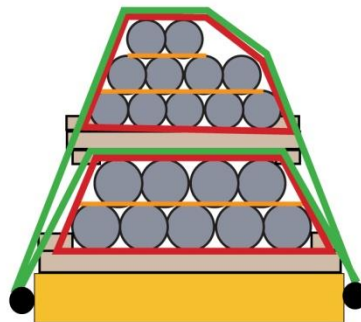
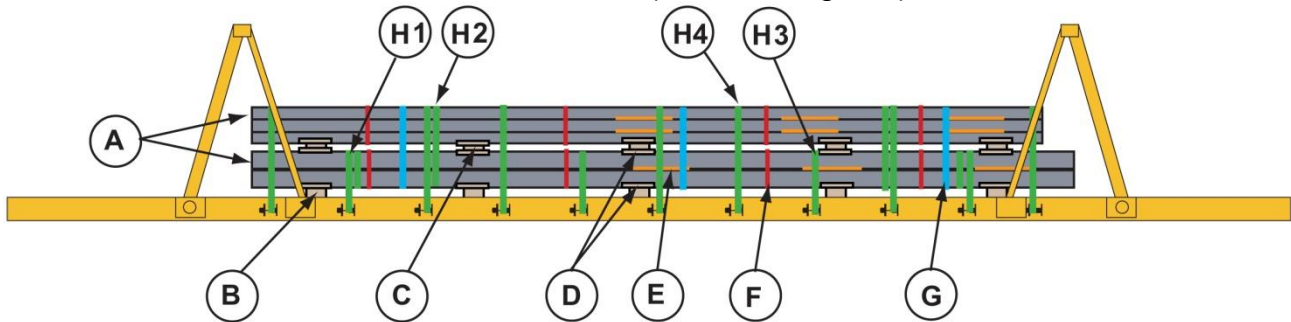
SKETCH 2: END VIEW (Items E - H2)



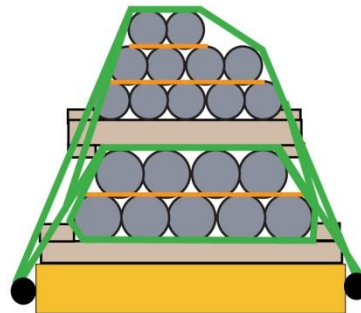
SKETCH 3: END VIEW (Items E - G)

PIPES, STEEL, DRILLING FOR PETROLEUM INDUSTRY, 5 IN. TO 20 IN. O.D.
32 FT. TO 44 FT. LONG LOADED AS TWO UNITS ON A FLAT RACK

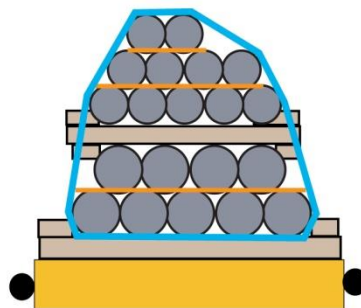
RAC 17503 (continued)
New. 06- 2011 (Ref AAR Fig 700)



SKETCH 1: END VIEW (Items E - F -H3 - H4)



SKETCH 2: END VIEW (Items E - H1 - H2)



SKETCH 3: END VIEW (Items E - G)

PIPES, STEEL, DRILLING FOR PETROLEUM INDUSTRY, 5 IN. TO 20 IN. O.D.
32 FT. TO 44 FT. LONG LOADED AS TWO UNITS ON A FLAT RACK

RAC 17503 (continued)
New. 06- 2011 (Ref AAR Fig 700)

Item	No. of Items	Description
A	Maximum 2 Units	Units may consist of 1 to 3 layers of pipes with the intermediate (middle) layer nested between the top and bottom layers
B	5 per load	Bearing pieces: hardwood 4 in. x 4 in. secured to deck floor. Length must be minimum 6 inches wider than the load on both sides. Locate end pieces 2 feet from each end of load with the others spaced out evenly in between.
C	5 per pile.	Separators: hardwood 4 in. x 4 in. Length must be minimum 6 inches wider than the load on both sides. Locate end pieces 2 feet from each end of load with the others spaced out evenly in between.
D	15	Chock blocks: hardwood 4 in. x 6 in. long nailed with five 16 D nails to top of bearing pieces Item B and to the top and bottom of the separators Item C.
E	5	Rubber mat 12 in. wide of length sufficient to go across the full width of the load. To be inserted between nested rows 1 and 2 and rows 2 and 3 of each unit.
F	8 (4 per unit)	Unit encircling bands: 2 in. high tension steel bands encircling each unit. (May be substituted by Type 1A Grade 7 woven polyester cord strapping) See SKETCH 1.
G	3	Load encircling bands: 2 in. high tension steel bands evenly spaced encircling the load. (May be substituted by Type 1A Grade 7 woven polyester cord strapping) See SKETCH 3.
H1	2	Tie-down bottom unit choker webbing: 4 in. Polyester webbing with a MBS of 16500 lbs. Place under load and back across the top of first unit and secure to winches. Strapping must be tensioned from both sides with the proper tensioning tool. See SKETCH 2.

H2	2	Tie-down top unit choker webbing: 4 in. Polyester encircling bands with a MBS of 16500 lbs. Place under load and back across the top of load and secure to winches. Strapping must be tensioned from both sides with the proper tensioning tool. See SKETCH 2.
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PIPES, STEEL, DRILLING FOR PETROLEUM INDUSTRY, 5 IN. TO 20 IN. O.D.
32 FT. TO 44 FT. LONG LOADED AS TWO UNITS ON A FLAT RACK

RAC 17503 (concluded)
New. 06- 2011 (Ref AAR Fig 700)

Item	No. of Pcs.	Description
H3	2	Tie-down bands: 4 in. Polyester webbing with a MBS of 16500 lbs. Place across top of first unit and secure to winches. Strapping must be tensioned with the proper tensioning tool. See SKETCH 1.
H4	5	Tie-down bands: 4 in. Polyester webbing with a MBS of 16500 lbs. Place across top of load and secure to winches. Strapping must be tensioned with the proper tensioning tool. See SKETCH 1.

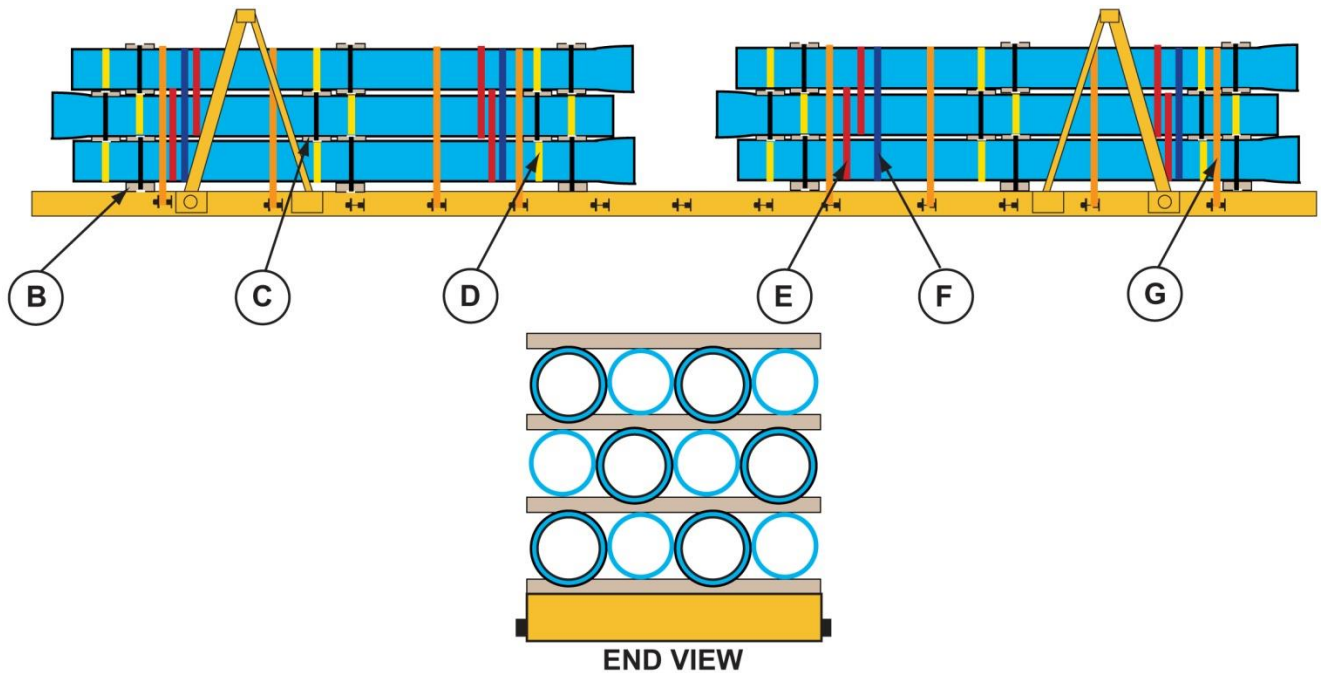
Notes:

1. When possible it is recommended that the end caps be staggered.
2. Rubber mats should be placed away from the end caps to ensure proper contact with pipes
3. When short and long pipes are placed in the same load, shorter pipes must be in the top row.

See General Rules for further details.

PIPES, PLASTIC, 20 FT. to 24 FT LONG 20 IN. TO 24 IN. O.D. ON A FLAT RACK

RAC 17504
New. 03-2012



Item	No. of Items	Description
A		Vacant
B	3 per pile	Bearing pieces: lumber 2.in x 4 in. may be secured to package with Item D package bands.
C	3 per pile	Separators: lumber 2 in. x 4 in. may be secured to package with Item D package bands.
D	3 per packages	Package bands: 1 1/4 in. x .029 in. high-tension bands to tie one row of pipes as a unit.
E	4 per pile.	Interlacing bands: 1 1/4 in. x .029 in. high-tension bands. Bands are to encircle the packages interlocking layers 1 and 2 and 2 and 3 and so on.
F	2 per pile	Encircling-bands: 1 1/4 in. x .029 in. high-tension bands. Bands are to go around the complete pile.

PIPES, PLASTIC, 20 FT. to 24 FT LONG 20 IN. TO 24 IN. O.D. ON A FLAT
RACK

RAC 17504 (Concluded)
New. 03-2012

Item	No. of Items	Description
G	4 per pile	Tie-Down bands: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Straps must be secured to flatrack on side opposite winch, pass over top of load and secured to winch assembly. Tension with the use of a 24 in. to 30 in. bar.

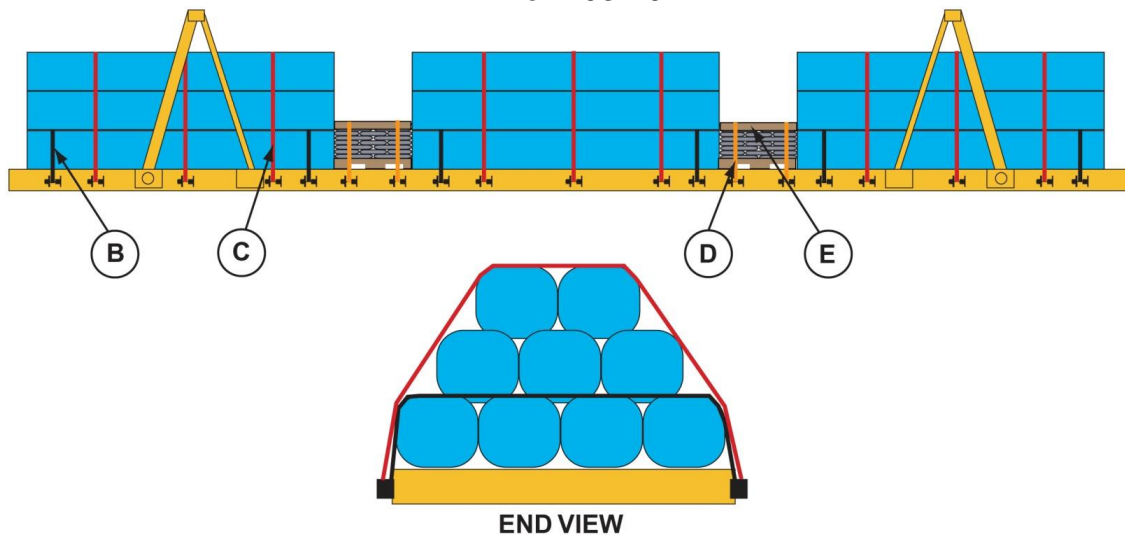
Notes:

1. Bearing pieces: lumber 2.in x 4 in. may be laminated to facilitate loading. When laminated pieces must be nailed together.
2. Packages must have a compression block attached to the top of each package secured with Item D package bands.
3. When pipes have a bell or flared end, pipes must be staggered and alternated to avoid contact and to equalize the load. (See **END VIEW**).

See General Rules for further details.

LANDFILL MATTING, ROLLS LOADED ON A FLAT RACK

RAC 17505
New. 03-2012



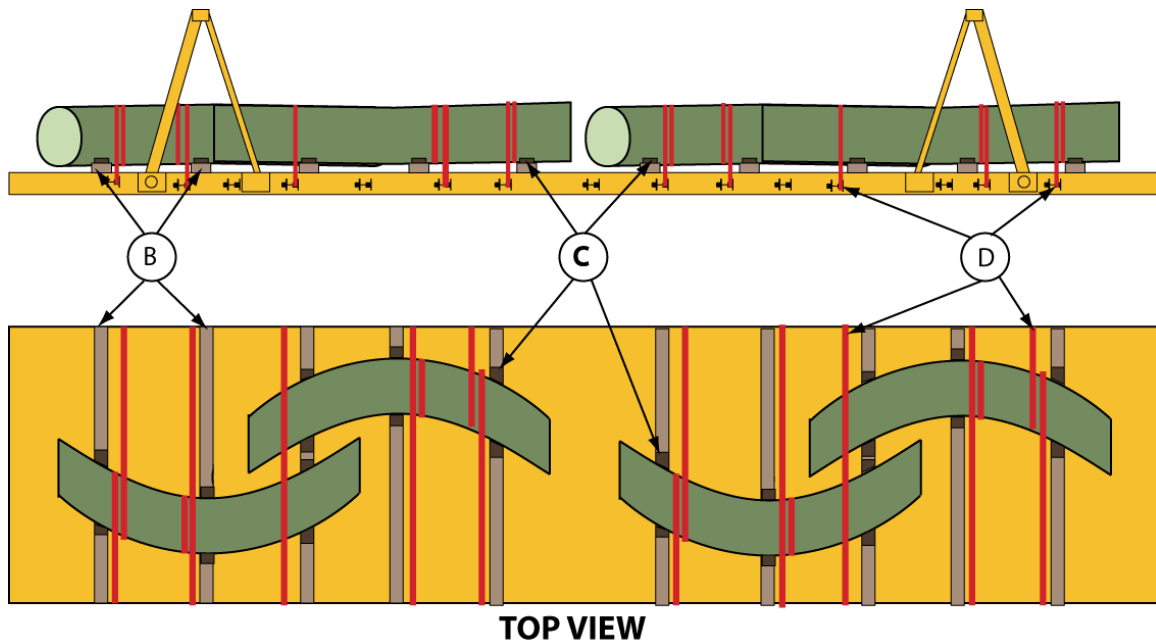
Item	No. of Items	Description
A		Vacant
B	2 per first layer	Tie-Down bands: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Straps must be secured to flatrack on side opposite winch, pass over top of first layer and secured to winch assembly. Tension with the use of a 24 in. to 30 in. bar.
C	3 per pile.	Tie-Down bands: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Straps must be secured to flatrack on side opposite winch, pass over top of load and secured to winch assembly. Tension with the use of a 24 in. to 30 in. bar.
D	2 per skid	Tie-Down bands: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Straps must be secured to flatrack on side opposite winch, pass over top of skid and secured to winch assembly. Tension with the use of a 24 in. to 30 in. bar.
E	2 per skid	Corner protectors: Each cap assembly to consist of two (2) pieces lumber, 2 in. x 4 in. forming a corner angle over skid.

Notes:

- 1- Load will be tarped
- See General Rules for further details.

PIPE STEEL ELBOWS COATED 36 IN. DIAMETER, 10 FT. LONG AND OVER
AT 30 TO 60 DEGREE BEND ON A FLAT RACK

RAC 17506
New. 07-2013



Item	No. of Items	Description
A		Vacant
B	3 per piece	Bearing pieces: hardwood 4 in x 3 in
C	6 per piece	Chocks: wood chocks on each side of elbows attached to Item B bearing pieces.
D	3 per piece 16 feet or less add 1 for each additional 6 feet or less	Tie-Down bands: PVC treated polyester webbing, 4 in. wide with a minimum of 20,000 lbs breaking strength. Straps must be secured to flatrack on side opposite winch, pass around elbows and secured to winch assembly. Where pipes overlap, pass strap over both pipes securing to deck. Tension with the use of a 24 in. to 30 in. bar.

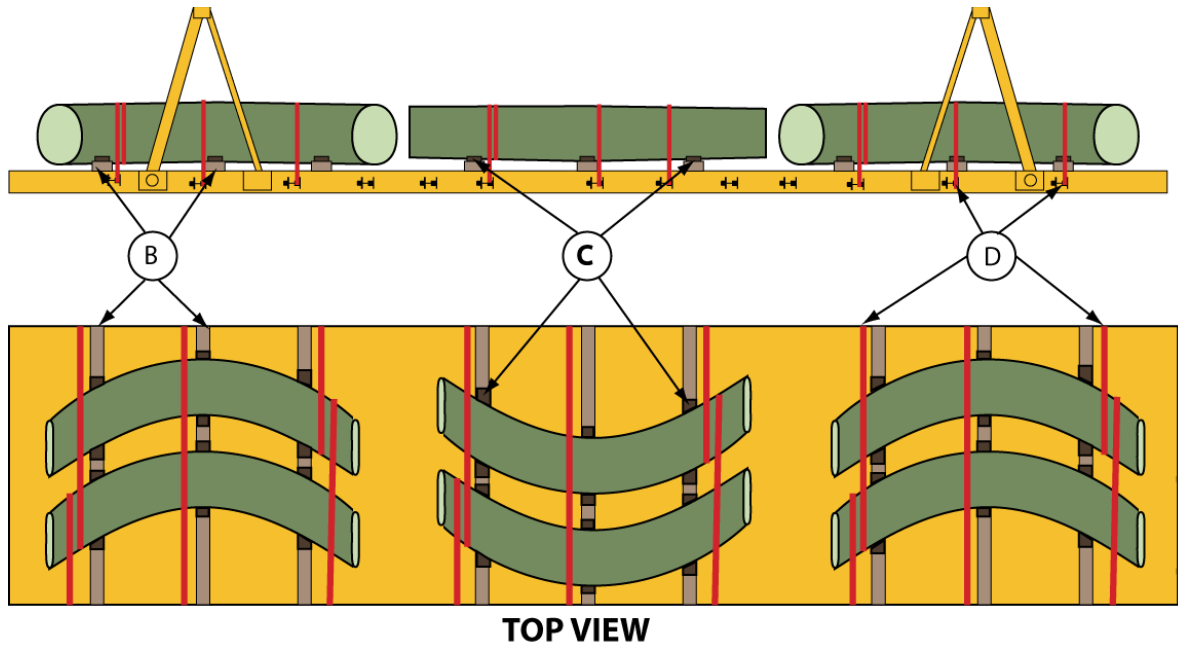
Notes:

1. Load to be evenly distributed over the length of the deck and side to side.
2. When it is possible to nest pipes together Item D straps are to encircle both pipes tying them together.

3. When pipes are longer than 16 feet all bands must be applied in the choker configuration.
See General Rules for further details.

**PIPES STEEL ELBOWS COATED 36 IN. DIAMETER, 10 FT. LONG AND OVER
AT 30 TO 60 DEGREE BEND ON A FLAT RACK**

RAC 17506B
New. 09-2013



Item	No. of Items	Description
A		Vacant
B	3 per set of pipes	Bearing pieces: hardwood 4 in x 3 in
C	4 per bearing pieces	Chocks: wood chocks on each side of elbows attached to Item B bearing pieces.
D	3 per set of pipes 16 feet or less add 1 for each additional 6 feet or less	Tie-Down bands: PVC treated polyester webbing, 4 in. wide with a minimum of 20,000 lbs minimum breaking strength. Straps must be secured to flatrack on side opposite winch. Tension with the use of a 24 in. to 30 in. bar. Each pipe in the load must have at least one of the straps completely encircling (choking) the pipe.

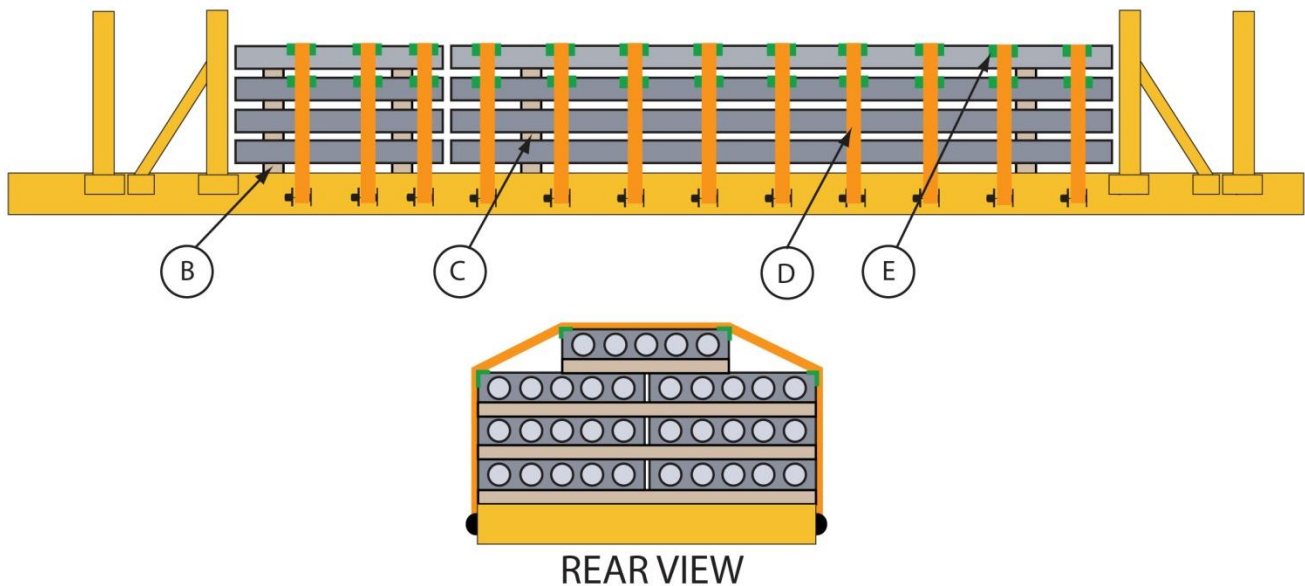
Notes:

1. Load to be evenly distributed over the length of the deck and side to side.

2. When it is possible to nest pipes together Item D straps are to encircle both pipes tying them together.
 3. When pipes are longer than 16 feet all bands must be applied in the choker configuration.
- See General Rules for further details.

CONCRETE HOLLOW STRUCTURE MAXIMUM 8 FEET WIDE 4 TO 40 FEET LONG LOADED ON FLAT RACK EQUIPPED WITH END BULKHEADS.

RAC 17508
New. 09- 2012



Item	No. of Items	Description
A		Vacant
B	2 per pile	Bearing pieces: hardwood 3 in. x 4 in. Length equal to width of load. Locate pieces 2 feet from each end of pile.
C	2 per pile.	Separators: hardwood 4 in. x 4 in. Length equal to width of load. Locate pieces 2 feet from each end of pile.
D	Minimum 2 per pile or 1 for every 5000 lbs.	Tie-down bands: 3 in. Polyester webbing with a MBS of 1600 lbs. Place across top of load and secure to winches. Strapping must be tensioned with the proper tensioning tool.

E	1 per corner	Corner protector weather resistant: 1 per each corner under web strap.
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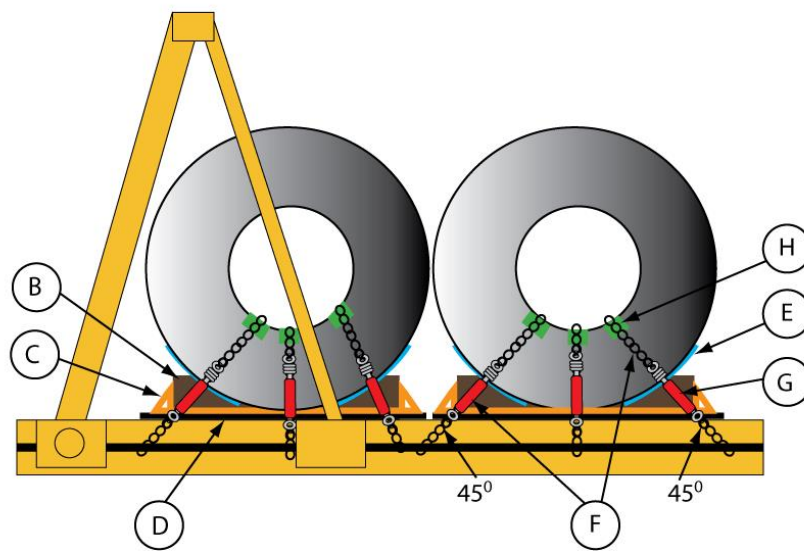
Notes:

See General RulesfFor further details.

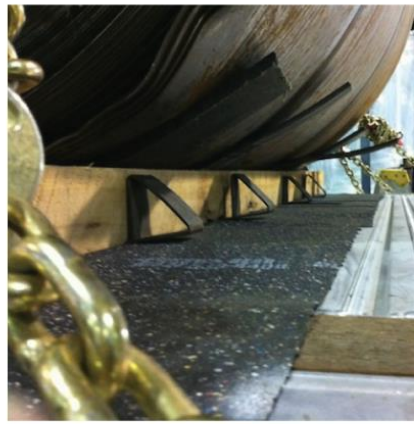
COIL, STEEL TARPED ON A FLAT RACK

RAC 17509

New. 08-2013 (Ref AAR Fig 617)



COIL BEDDING
(INSIDE VIEW)



LOAD
(OUTSIDE VIEW)

COIL, STEEL TARPED ON A FLAT RACK

RAC 17509 (Concluded)
New. 08-2013 (Ref AAR Fig 617)

Item	No. of Items	Description
A		Vacant
B	2 per coil	Bearing pieces: hardwood 4 in. x 4 in. with 45 degree bevel.
C	4 per coil	Metal racks: metal racks holding bearing pieces (Item B) in place.
D	1 per rack	Mat: 1/8 inch thick industrial friction mat for the floor under the racks.
E	As requested	Rubber pieces: 1/2 inch x 8 inch x 4 feet rubber pieces between the coil and the bearing pieces (Item B).
F	3 per coil	Chain Tie Down: 3/8 in. grade 70 with a minimum breaking strength of 6 400 lbs. Pass chain through the eye of coil and secure to a stake pocket on each side of the trailer. Two chains must make an appropriate 45-degree angle with trailer deck when viewed from side. Chain hooks
G	1 per chain	Load Binder: tighten chains with approved chain binders. They must be secured (wire and/or tie-wrap) to prevent them from opening. Chain hooks must also be secured.
H	2 per chain	Corner protectors: 1/2 inch thick rubber corner protectors.

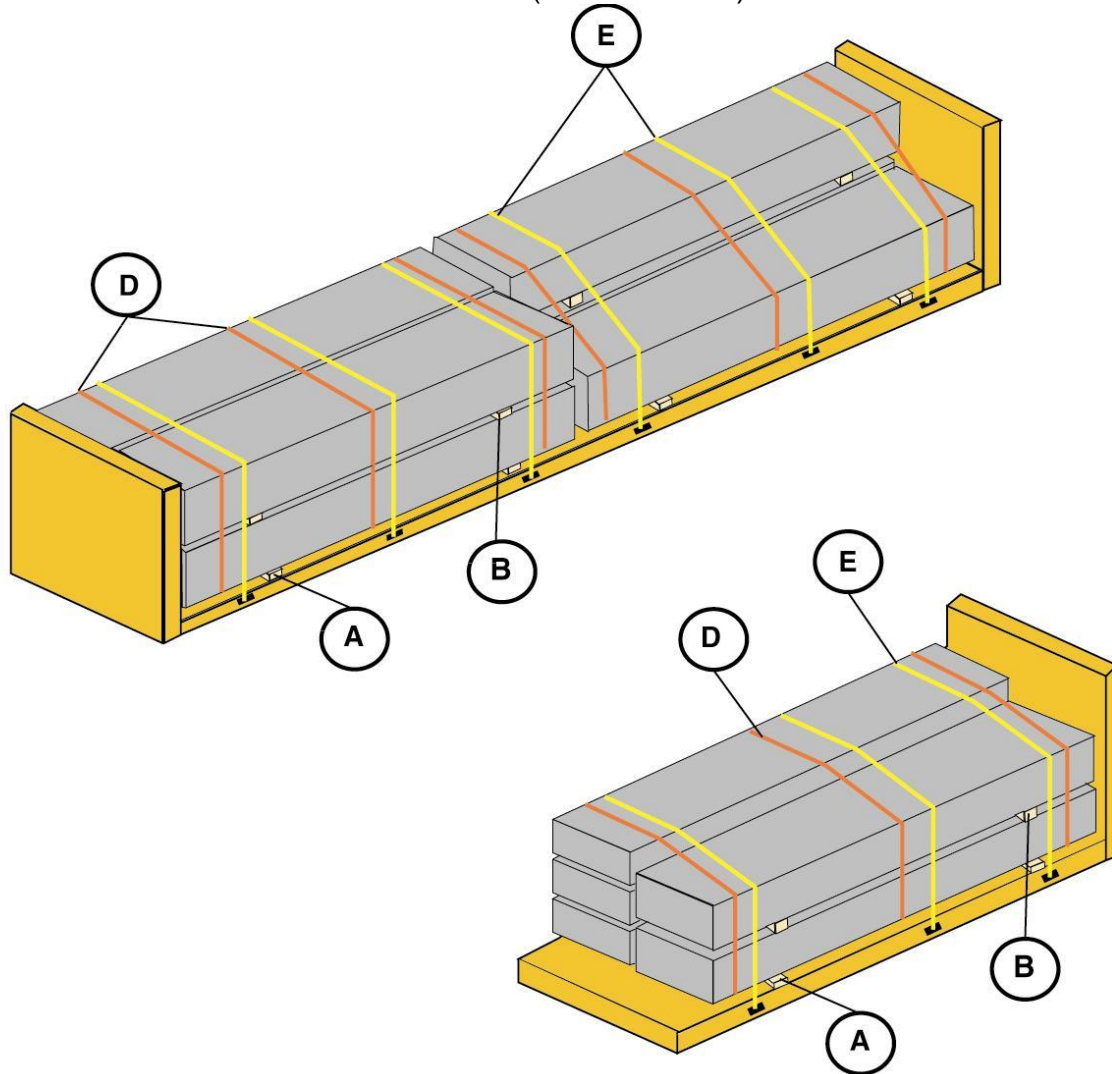
Notes:

1. Coils are wrapped in protective paper.
2. Metal banding for coils: 3/4 inch x .031 thickness, 3500 lb minimum breaking strength.
3. Coils can be loaded open end down.
4. Coils are approximately 15-20,000lb each, tarped.
5. Coils will be loaded as per drawing with 2 coils over the 40ft area at each end.

See General Rules for further details.

LUMBER IN PACKAGES, 6 FT. LONG OR OVER, FLAT RACK CONTAINERS
WITH BULKHEADS

RAC 17850
Rev. 01-1995 (Ref: AAR 902)



Item	No. of Pcs.	Description
A	2 per package	Bearing pieces, lumber, 2 in. x 4 in., in one piece, length to extend beyond sides of load, but not beyond container sides.
B	2 per package	Separators, lumber, 2 in. x 4 in., in one piece, length equal to width of package.

LUMBER IN PACKAGES, 6 FT. LONG OR OVER, FLAT RACK CONTAINERS
WITH BULKHEADS
RAC 17850 (concluded)
Rev. 01-1995 (Ref: AAR 902)

Item	No. of Pcs.	Description
C	2 per package	Package bands, 3/4 in. x .022 in. high-tension bands. Locate one about one-fourth length from each end of package. If dunnage is attached to packages with Item "C" bands, see General Rule 9(m), Section No. 1 of this manual.
D	2 per pile 10 ft. long or less 3 per pile over 10 ft. long up to and including 16 ft 4 per pile over 16 ft. long	Encircling bands, 1-1/4 in. x .029 in. high- tension, encircling entire pile. Locate not less than 9 inches in from ends of pile when possible.
E	2 per pile 10 ft. long or less 3 per pile over 10 ft. long up to and including 16 ft 4 per pile over 16 ft. long	Tie-down bands, 1-1/4 in. x .029 in. high- tension. Pass over top of load and secure to lading strap anchors on each side of container.

Notes:

1. Maximum width of package must not exceed 4 ft., height must not exceed width.
2. All packages within the load must be loaded perpendicular to bulkheads.
3. At point of origin, load must be centered on container.
4. All packages must be butted as close together as possible.
5. Use of stickers within the individual packages is optional. When used they must be uniform thickness throughout. Length of stickers must not exceed width of packages.
6. Packages must not exceed height of bulkhead.
7. All packages must be composed of pieces of uniform width, length and thickness.
8. Laminated bearing pieces and separators are not permitted unless AAR approved and stamped.

See General Rules for further details.

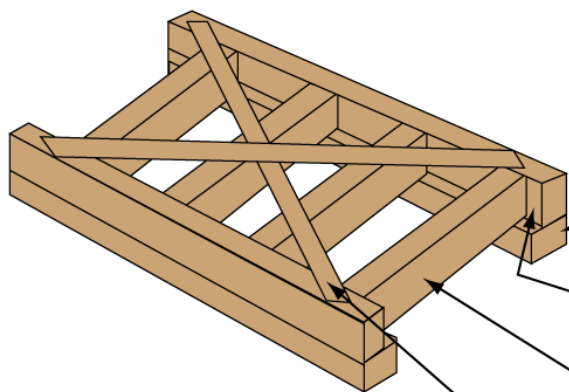
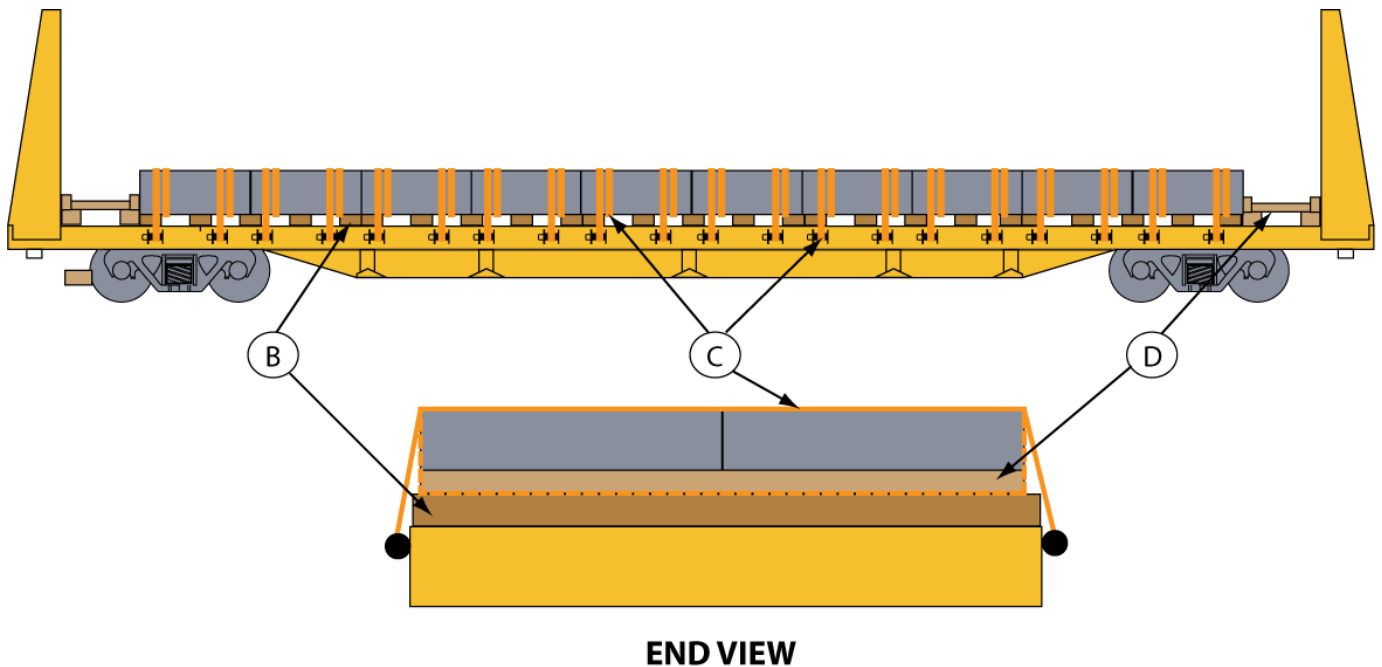
CLR LOADS UNDER TEST

INGOTS, ALUMINUM, LESS THAN 12 FT LONG – LOADED SIDE BY SIDE ON
BULKHEADS FLATCARS, WITH CUSHION DEVICES AND WEB TIE-DOWN
SYSTEM

RAC 12043Q

New 02-2017

Load Under Test Do Not Use Without Authority of RAC



SKETCH 1 (Item D)

- ① 2 pieces 4" x 6" x full width of load. Must be 2 in. thicker than Item B set on 6 in. dimension
- ② 2 pieces 4" x 6" x full width of load set with 6 in. dimension vertical. Secure to ① with 6 - 40D nails.
- ③ 4 pieces 4" x 6" x spreader length as required. Set with 6 in. dimension vertical. Secure to ② with 3 - 40D nails each end.
- ④ 2 pieces 1" x 6" to form cross bracing.

INGOTS, ALUMINUM, LESS THAN 12 FT LONG LOADED SIDE BY SIDE ON
BULKHEADS FLATCARS, WITH CUSHION DEVICES AND WEB TIE-DOWN
SYSTEM

RAC 12043Q (Concluded)

New 02-2017

Item	No. of Pcs.	Description
A		Vacant
B	Minimum 2 per ingots	Bearing pieces: hardwood, 8 in. x 8 in. length equal to width of the car. Space every 3 or 4 feet, stagger location with winches. Each bearing pieces must be bolted or otherwise permanently secured to the car deck to prevent displacement.
C	Minimum 2 per ingots	Web tie-down straps: polyester webbing, 4 in. wide with a minimum breaking strength (MBS) of 20,000 lbs. Pass strapping over logs, pass under load and back across the top of the load and secure to the winch on each side of car. Tension straps from both sides of car using a 30 to 40 in. winch bar or equivalent.
D	1 at each end	Filler block as per SKETCH 1 , minimum 4 in. x 6 in. lumber to fill void between car bulkhead and ingots. Blocking must be toenail to bearing pieces.

Notes and additional requirements:

1. Load must be centrally and evenly located on car at origin.
2. Height of load above Item B bearing pieces may not exceed 170% of base width.
3. All web tie-down components, including winches and webbing, must be inspected and applied in accordance with General Rule 20.
4. The weight of a pile must not exceed 60 percent of the combined MBS rated restraint of all the Item E straps restraining that pile. (Example: Five Item E straps, each with a 20,000 lb MBS, have a combined MBS restraint rating of 100,000. The total weight of all ingots in the pile may not exceed sixty percent of the combined restraint rating of the five straps, or 60,000

lb in this case.) If necessary, additional strap assemblies may be added with the car owner's permission.

5. This load may be dimensional when loading ingots side by side. Car must be checked and proper clearance received from originating railway. If in doubt contact originating railroad.
6. Maximum side overhang of Ingots on bearing pieces must not exceed 6 inches

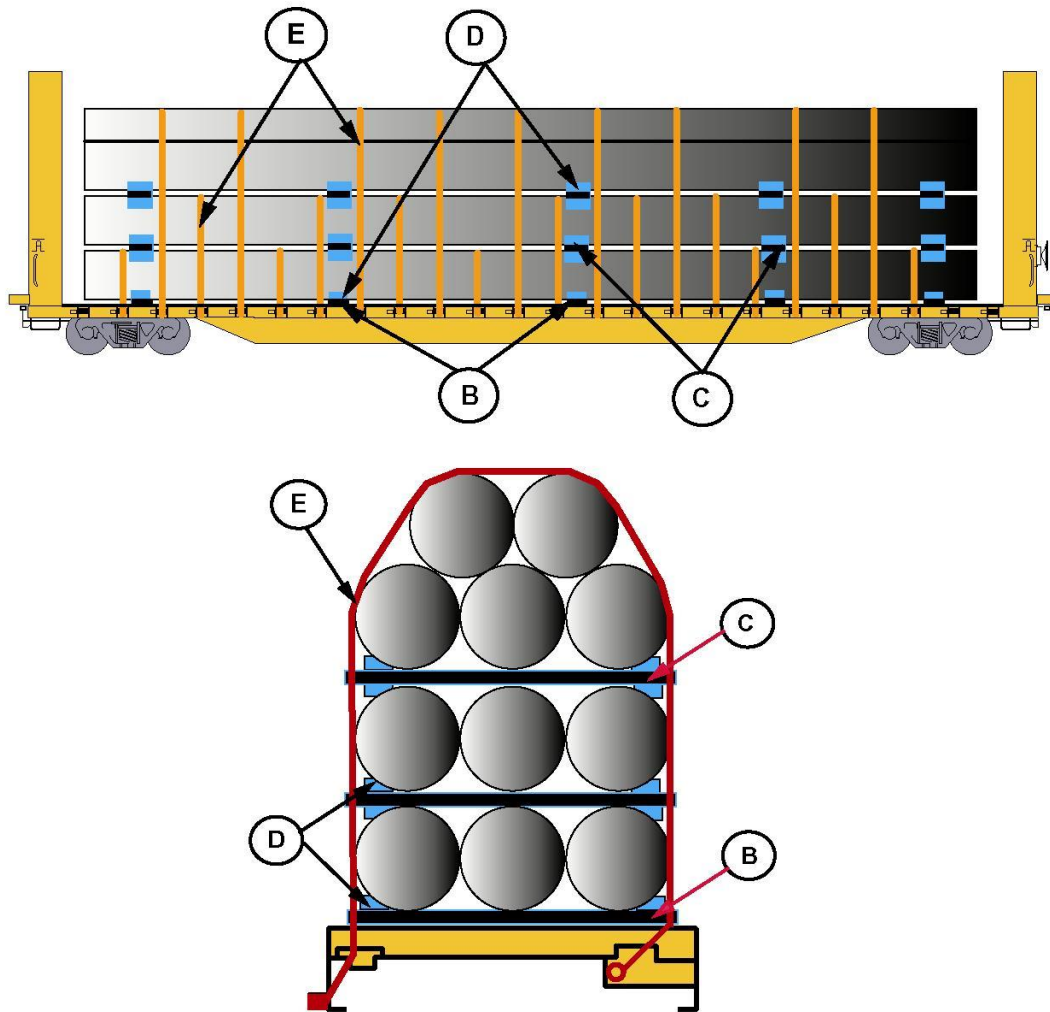
See General Rules for further details.

PIPES LOAD ON FLAT CARS EQUIPPED WITH PERMANENT END
BULKHEADS AND PVC TREATED POLYESTER WEBBING TIE-DOWN
SYSTEM.

(LOAD IS UNDER TEST, CONTACT RAC BEFORE USING)

RAC 12100

New-01-2003



SKETCH 1: WEB ROUTE

Item	No. of Pcs.	Description
A		Vacant
B	5 per package	Bearing pieces: hardwood, minimum 1 ½ in. x 3 ½ in., width must be at least 1 in. greater than height. Length must exceed width of package but must not extend beyond car side. All bearing pieces are equipped with chocks (Item "D")

PIPES LOAD ON FLAT CARS EQUIPPED WITH PERMANENT END
BULKHEADS AND PVC TREATED POLYESTER WEBBING TIE-DOWN
SYSTEM.

(LOAD IS UNDER TEST, CONTACT RAC BEFORE USING)

RAC 12100 (concluded)

New-01-2003

Item	No. of Pcs.	Description
C	5 per package	Separators: hardwood, minimum 1 ½ in. x 3 ½ in., width must be at least 1 in. greater than height. Length equal to width of each package. All separators are equipped with top and bottom charks (Item "D").
D	1 per bearing piece on each side. 2 per separators on each side.	Charks: hardwood 2 in X 4 in. cut to fit and secured to top of bearing pieces Item "B" and to top and bottom of separators Item "C".
E	All straps.	Tie-Down Straps: PVC treated polyester webbing, 4 in. wide with a minimum breaking strength of 20,000 lbs. Strap must be secured to car on side opposite winch, pass over top of load, through belt routing device below car deck and secured to winch assembly. (See Sketch 1). Straps must be pulled tight against both sides of load including bottom layers. All straps must be used. Tension with the use of a 24 in. to 30 in. bar. Refer to sketch 1 for application of tie-down strapping.

Note:

1. Top layer of pipe is nested.

See General Rules for further details

Load Under Test Do Not Use Without Authority of RAC

Please contact:

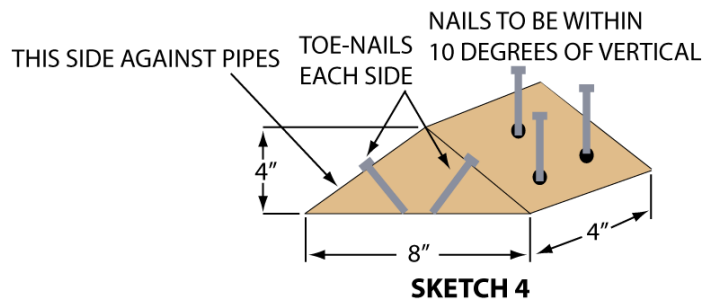
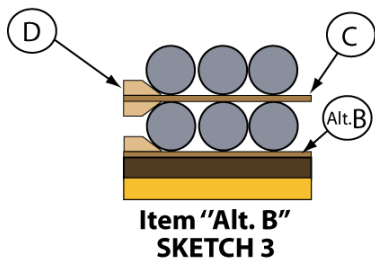
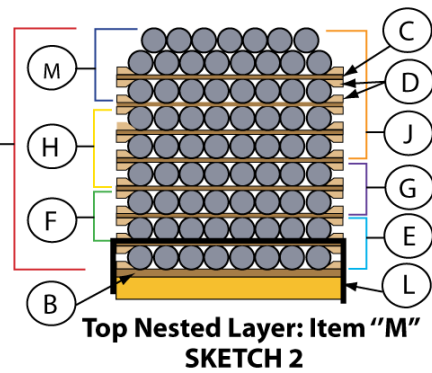
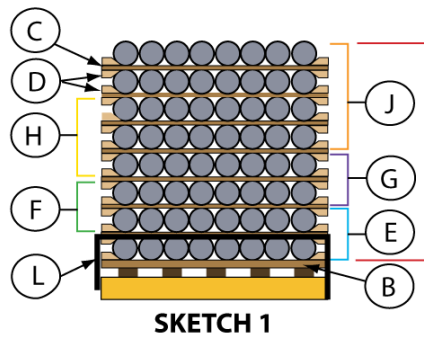
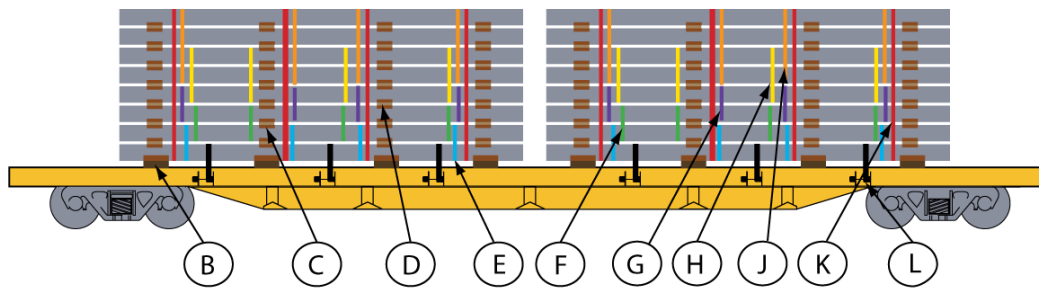
Email: Mechanicalservices@railcan.ca

Claude Gagnon, Tel: 438-827-5110 or

Robert Corfield, Tel: 604-532-1084

PIPE, STEEL COATED 6- 5/8 IN. TO 16 IN. OUTSIDE DIAMETER, 40 FT LONG, TWO PILES, FLAT CARS 89 FT WITH CUSHIONING DEVICES
Load Under Test Do Not Use Without Authority of RAC

RAC 12140
 New June 2016



SPRUCE BEARING PIECE FULL 4 in. X 6 in.
 CONTOURED TO FIT PIPE
SKETCH 5



SPRUCE SEPARATOR FULL 2 in. X 6 in.
 CONTOURED TO FIT PIPE
SKETCH 6

PIPE, STEEL COATED 6- 5/8 IN. TO 16 IN. OUTSIDE DIAMETER, 40 FT
LONG, TWO PILES, FLAT CARS 89 FT WITH CUSHIONING DEVICES

RAC 12140 (Continued)
New June 2016

Item	No. of Pcs.	Description
A		Vacant
B	Minimum 4 per pile	Bearing pieces: hardwood 4 in. x 6 in. minimum, in one piece and preferably rough. Length equal to width of car floor and secured to floor with three ¾ in. diameter bolts, one at each end and one as close as possible to centerline of car (holes are not permitted in car center sill). Locate end piece approximately 4 ft. from each end, with others equally spaced between.
Alt. B	Minimum 4 per pile	Alternate Item B (for cars equipped with permanently installed bearing pieces or when car has wood or nailable steel floor). Bearing pieces caps: hardwood 2 in. x 6 in. in one piece and preferably rough. Length equal to, but not greater than, permanent bearing piece. Secured to permanent bearing piece with six 20-D nails. If necessary to extend beyond the end of permanent bearing piece to apply Item D, alternate Item B must be increased to 4 in. x 6 in. and is not permitted to extend more than 10 in. beyond the end of the permanent bearing piece unless adequately supported. See SKETCH 3 .
C	Minimum 4 per pile	Separators: Hardwood, 2 in x 6 in., in one piece and preferably rough. Length sufficient to apply full length of Item D chock blocks. Locate between each layer not nested and in line with Items B or alternate Items B, where practical.
D	2 per each item B or Alt. Item B 4 per each item "C"	Chock Blocks: Hardwood 4 in. x 6 in. x 8 in., located to contact pipe and nailed to bearing pieces and top and bottom of separators with five 16-D nails. See SKETCH 4 .

E to L	See below	Banding: 2 in. x .044 in. High tensile steel banding. Bands must not be placed closer than 24 in. from ends of pipes. Space bands equally over length of pipe. All bands passing around bottom layer must be located as far as possible from Item B, or Alternate Item B and Item C.
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PIPE, STEEL COATED 6- 5/8 IN. TO 16 IN. OUTSIDE DIAMETER, 40 FT LONG, TWO PILES, FLAT CARS 89 FT WITH CUSHIONING DEVICES

RAC 12140 (Continued)
New June 2016

Item	No. of Pcs.	Description
E	4 per pile	To encircle layers one and two.
F	4 per pile	To encircle layers two and three.
G	4 per pile	To encircle layers three and four.
H	4 per pile	To encircle layers four through six, or top of load if more than four but less than six layers or if any of these layers are nested.
J	4 per pile	To encircle layers five through top of load.
K	4 per pile	Overall encircling all layers.
L	3 per pile	Tie-Down assemblies: consisting of a ratchet and polyester woven strap 4 in. wide with 20,000 lbs. MBS. Locate near bearing pieces where practical. Place over bottom layer of pipes and anchor to opposite side of car, securing to prevent displacement. Winch taut using a minimum 30 in. bar. Maintain as much clearance from steel bands as possible to avoid damages to straps. If insufficient winches available Type 1A Grade 8 polyester strap is acceptable.
M	4 per pile	When top layers are nested, encircle all nested layers and the supporting separated layer below. See SKETCH 2 .

Notes:

1. At origin, load must be tight and centrally located on car. Centerline of pipe must be within inside edge of car side sills. Pipes must have a minimum of 4 ft. of void space between each end of the car and the load, plus a minimum of 10 in. clearance between piles.

2. Bearing pieces and separator are sufficient for each pile up to half the load limit of the railcar.
3. Douglas Fir Coastal is acceptable as an alternate for hardwood in this figure for use as bearing pieces and separators as per Rule 10.1 Note 3. Of the AAR General Rules Section 1 and must be a full 3X4 in. rough cut.
4. Spruce may be used as an alternate for hardwood in this figure for the bearing pieces and separators. When substituted, bearing pieces must be a full 4X6 in. contoured and separators a full 6X6 in. double-contoured to fit pipe diameters. Contours in bearing pieces and separators must be at least 2 in. deep. (As per **SKETCH 5&6**)

PIPE, STEEL COATED 6- 5/8 IN. TO 16 IN. OUTSIDE DIAMETER, 40 FT
LONG, TWO PILES, FLAT CARS 89 FT WITH CUSHIONING DEVICES
RAC 12140 (Continued)
New June 2016

5. This figure is intended for pipes that are nominally 40 ft. long (+ 0 ft. – 12 ft.).
6. Item B bearing pieces may extend beyond width of car floor to accommodate the application of Item D chock blocks. Any unsupported extension greater than 10 in. must be adequately braced to support impending loads.
7. The end pattern is restricted to loading up to the same numbers of layers equaling the number of pipes in a layer, plus one row of pipes nested on top. Example: Seven pipes wide may be loaded seven separated layers high with an additional eighth layer nested on top as in **SKETCH 2**. Height of load must not exceed 10 ft. above car deck
8. All separated layers must be equal in width except the top layer, which may be narrower.
9. This figure is designed for a total load weight of 150,000 lb. For loads greater than 150,000 lb. (but less than the load limit of the car), add additional bearing pieces and separators as described in **TABLE 1**.

Table 1. Load weights vs. Bearing pieces and separators		
Load Weight	No. Bearing Pieces per Pile	No. Separators per pile
150,000 or less	4	4
150,001-170,000	5	5
170,001-190,000	6	6
190,001-210,000	7	7

10. Longer length pipe must be located in the bottom layer of the load. Place pipes shorter than 35 ft. on the top two tiers. Length of pipes can be no shorter than 28 ft.
11. When short pipe lengths are loaded on the top two tiers, place two extra encircling bands on the top 2/3 of the pile to include the shortest pipe length. A short length of pipe is defined as 8 ft. or more less than the longest pipe.

PIPE, STEEL COATED 6- 5/8 IN. TO 16 IN. OUTSIDE DIAMETER, 40 FT
LONG, TWO PILES, FLAT CARS 89 FT WITH CUSHIONING DEVICES

RAC 12140 (Concluded)
New June 2016

12. All banding must be equally spaced throughout the entire pile.
13. More pieces per tier (width of load) may be loaded if the same end configuration and number of bands required by all sketches are applied as indicated

See General Rules for further details.

Load Under Test Do Not Use Without Authority of RAC

Please contact;

Email: Mechanicalservices@railcan.ca

Claude Gagnon, Tel: 438-827-5110 or

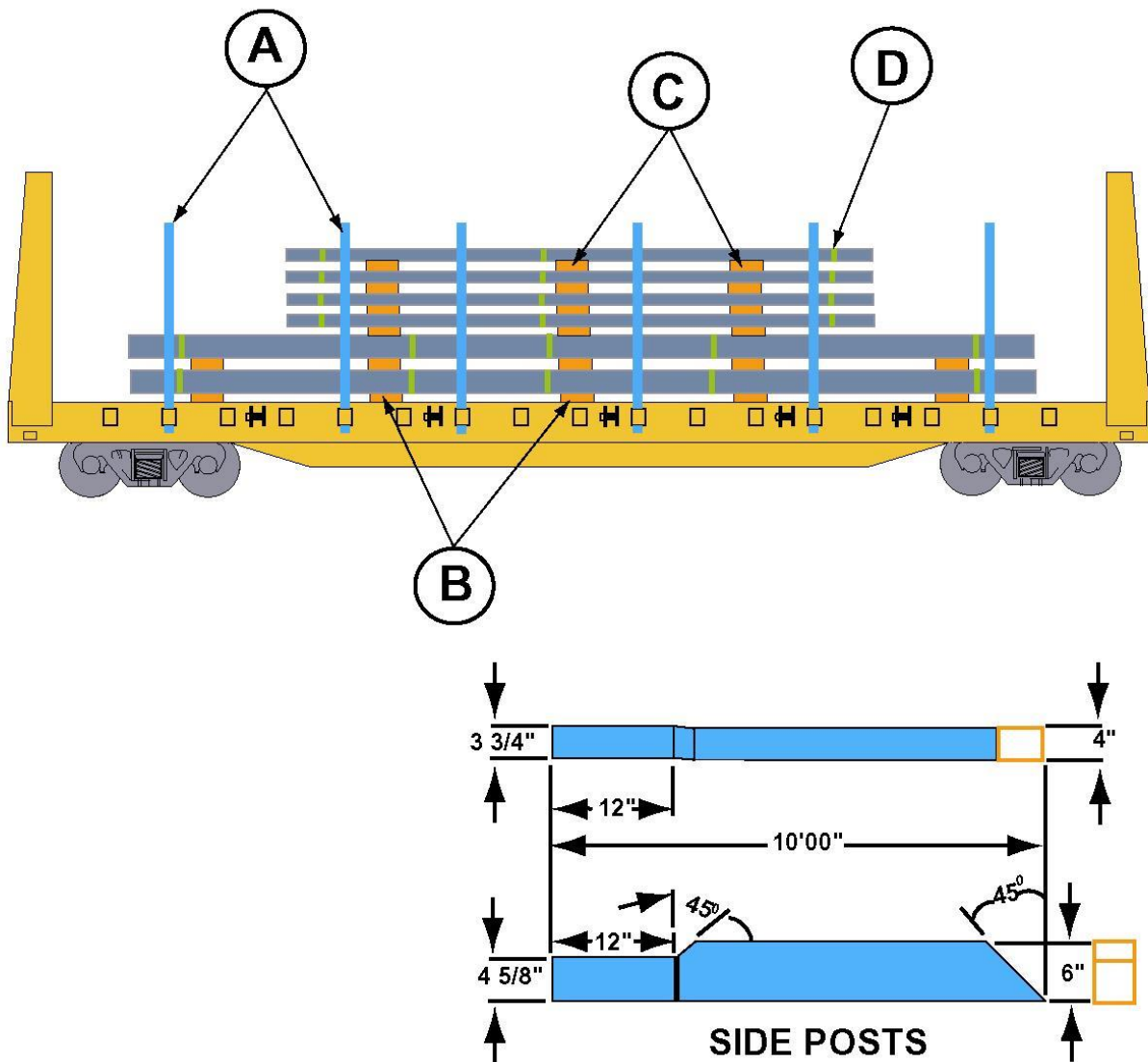
Robert Corfield, Tel: 604-532-1084

I-BEAMS LOADED ON FLAT CAR EQUIPPED WITH PERMANENT END
BULKHEADS

(LOAD IS UNDER TEST, CONTACT RAC BEFORE USING)

RAC 12203

New 4-2003



I-BEAMS LOADED ON FLAT CAR EQUIPPED WITH PERMANENT END
BULKHEADS
(LOAD IS UNDER TEST, CONTACT RAC BEFORE USING)

RAC 12203 (continued)

New 4-2003

Item	No. of Pcs.	Description
A	6 pairs per car minimum	Steel side stakes: 4 in. x 6 in. x 120 in., placed in second stake pocket from each end and in every third they're after. Distance between stakes to be no more than 10 ft on cars loaded with 20-foot beams.
B	3 per 40 ft pile 40 ft long or less, add 1 for each additional 10 ft or less	Bearing pieces: lumber rough and preferable hardwood 4in X 6in minimum, length equal to width of car. Locate end bearing pieces a minimum of 4 ft in from ends of load. Center bearing pieces must be spaced equally distributed between end bearing pieces. Secure to deck to prevent displacement.
C	3 per 40 ft pile 40 ft long or less, add 1 for each additional 10 ft or less	Separators: lumber 2in X 6in. Length of each must extend a minimum of 4in beyond side of load, but not more than 6in. Locate end separators a minimum of 4ft from each end of load with others equally spaced between. Locate in line with items B when possible. Place in a manner to avoid contact with item's A during movement of load in transit.
D	3 per package 40 ft long or less, add 1 for each additional 10 ft or less	Package ties (shipping ties) 1 ¼ in. X .029 in. high tension steel bands or wire ties.

Notes:

1. Load must be centrally located on car at origin, if load consists of two separate piles loads are to be place against opposing bulkheads.
2. Height of load must not exceed 100 in above bearing pieces.
3. All packages are homogeneous. They are beams of same length, width and height.

4. When mixed length packages are loaded in a layer, shorter packages must be located in center of layer.
5. When a single package is longer than remaining packages in a layer, the longer package must be located in the center of the layer.

I-BEAMS LOADED ON FLAT CAR EQUIPPED WITH PERMANENT END
BULKHEADS

(LOAD IS UNDER TEST, CONTACT RAC BEFORE USING)

RAC 12203 (Concluded)
New 4-2003

Notes:

6. Outside packages in a layer must be of equal length and height and in vertical plane with all other outside packages
7. When mixed height packages are loaded in a layer, shorter height packages must be located in the center of the layer.
8. When mixed height packages are loaded in a layer, item C separators must be laminated to fill void in load. Laminated material must be lumber, 2in. X 4in. secured with a minimum of four 16-D nails equally spaced per each lamination.
9. Material within each package must be effectively interlocked.
10. Packages less than 35ft long may not be loaded in the top layer.
11. When layer is narrower than layer below, side chocks are to be secured to separators to hold layer centered. No side overhang of layer below is permitted.
12. Heavy packages are to be placed in bottom layers and to centerline of rail car.
13. Separators that overhang the outside package must be trimmed off so as not to interfere with item's A during any movement of the load.

See General Rules for further details.

Load Under Test Do Not Use Without Authority of RAC

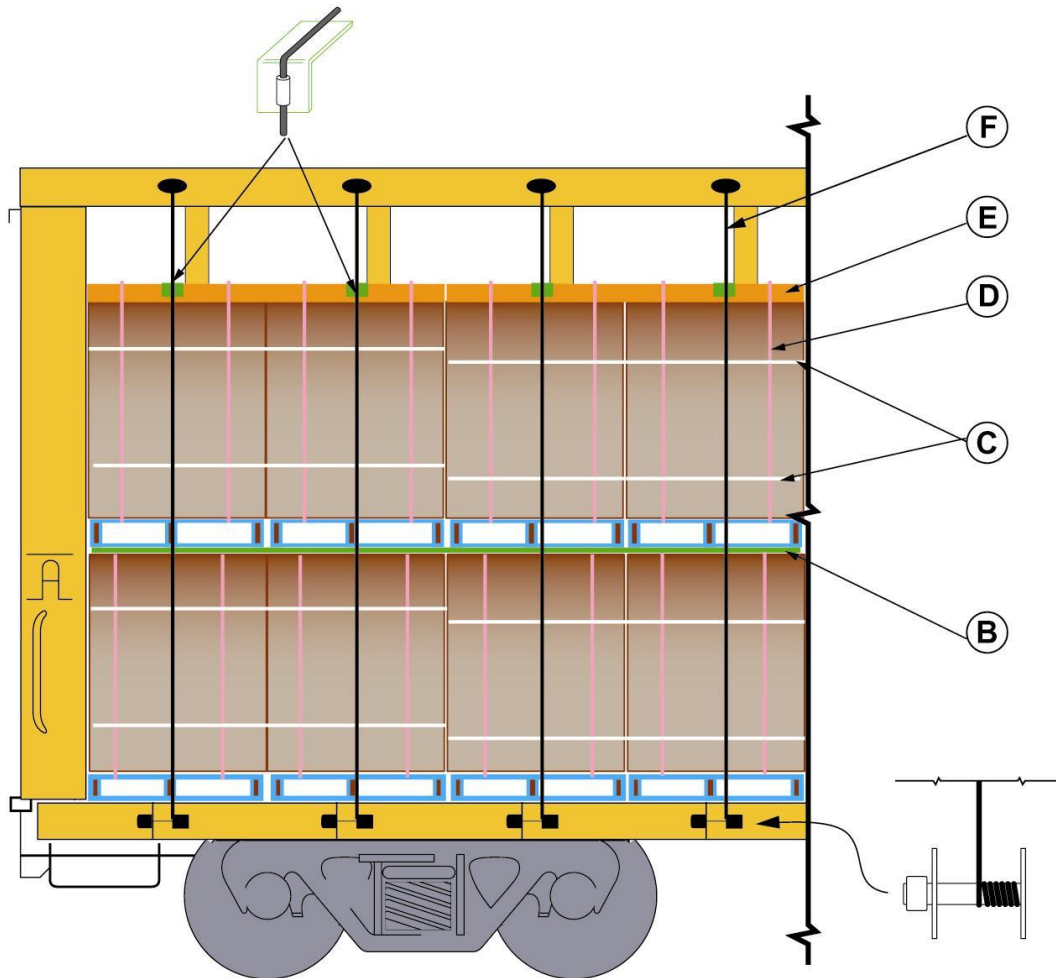
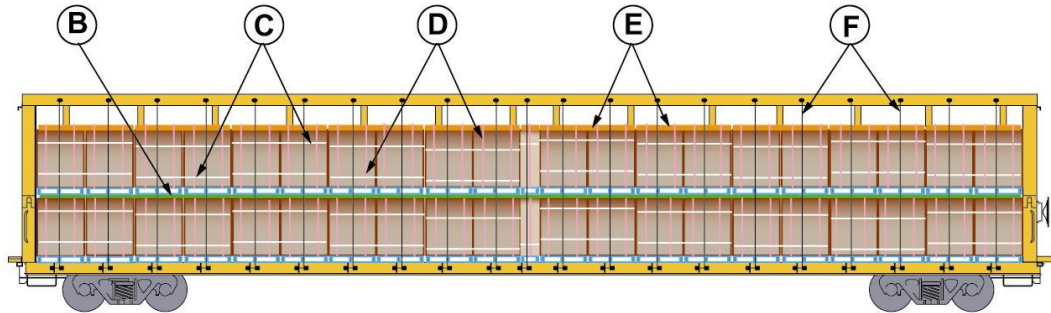
Please contact:

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New. 10-2002



**WOOD PELLETS, PALLETIZED BAGGED, RISERLESS CENTER "A" FRAME
FLAT CAR WITH CUSHION UNDERFRAME AND CABLE TIE-DOWN SYSTEM.**

RAC 14003 (continued)

New. 10-2002

Item	No. of Pcs.	Description
A		Vacant
B	As required	MDF boards: ½ in. to ¾ in. thick, providing level surface and placed in between layers. (See Notes.)
C	Min. 2 per package.	Package ties: Type 1A Grade 4 straps. Applied vertically over package passing through pallet securing the package and the pallet together. Straps will also secure the 2 in. X 4 in. angle protector board in the second layer.
D	Min 2 per package.	Unit ties: Type 1A Grade 4 straps. Applied horizontally encircling two pallets to form a unit.
E	1 cap per unit.	Top corner cap: Locate one angle corner protector board before steel cable application.
F	Minimum of 2 per unit	Steel cables: Cables: 3/8 in. diameter, minimum of 8,800 lbs breaking strength with corner caps. Cables must make full contact with the four pallet block contained in the first and second opposing layers. Winch assemblies must be equipped with a device to maintain tension. Prior to tightening, there must be a minimum of 2½ wraps of cable around the winch drum. All cables must be used and must be free of kinks and tangles. Tension to be applied with the use of an 18 in. bar or ¾ in ratchet. Cables are to be secured to A-frame in slot nearest to top of top unit.

Notes:

MDF boards ½ in. to ¾ in. thick, provide level floor on car equipped with steel floor risers. Whenever required, MDF boards will have to be cut to insure junctions between adjacent sheets of board are over the EXACT CENTER of the steel risers on the railcar deck.

Void, if any in the load, is taken up with a part pallet specially made to fill the space.

1. Unit detail: each load of 65 bags of product on a pallet is shrink wrapped, and a plastic shroud or "hat" placed over top. Unit is unitized with a 2 ¼ in. AAR approved nylon straps, tensioned vertically over unit and pellet. Every two adjacent palletized units in each layer, is unitized in a horizontal direction, with the same type of strapping.

See General Rules for further details

WOOD PELLETS, PALLETIZED BAGGED, RISERLESS CENTER "A" FRAME
FLAT CAR WITH CUSHION UNDERFRAME AND CABLE TIE-DOWN SYSTEM.

RAC 14003 (concluded)
New. 10-2002

Load Under Test Do Not Use Without Authority of RAC

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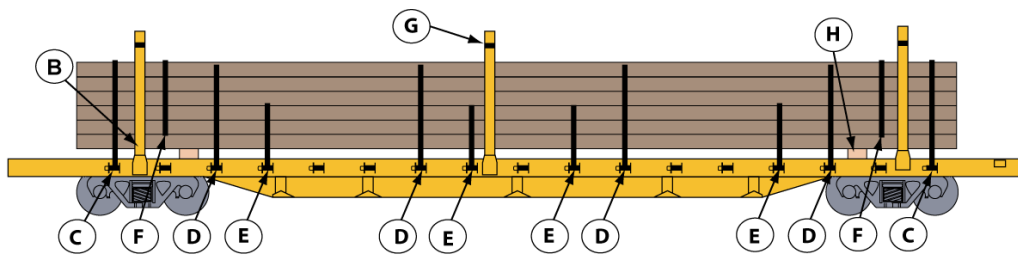
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POLES OR ROUND STOCK, UNTREATED OR TREATED – SINGLE LOADS ON FLATCAR

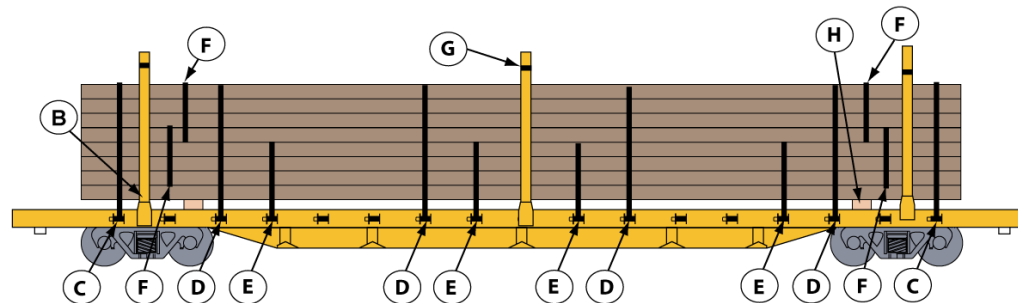
RAC 15024

Revised May 2017

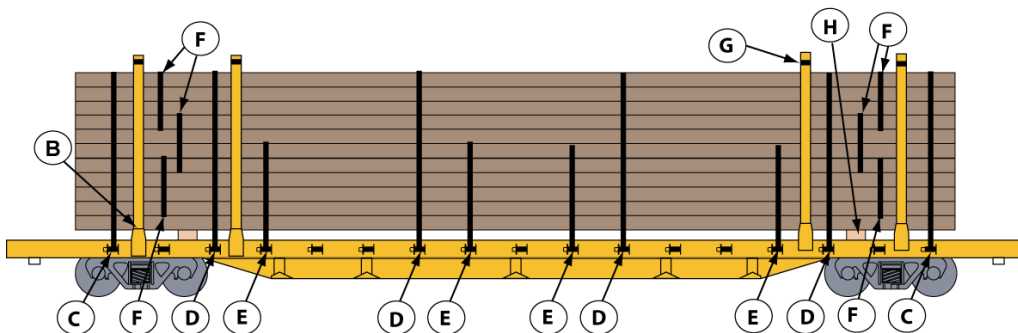
Load Under Test Do Not Use Without Authority of RAC



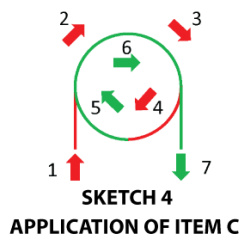
SKETCH 1: LOADS UNDER 4 FEET.



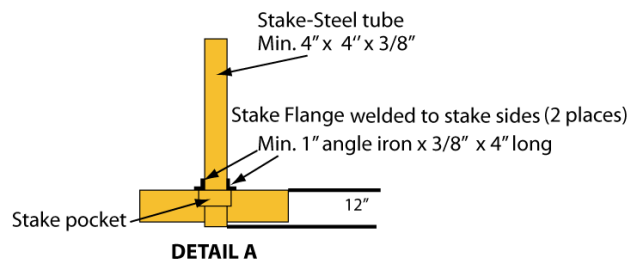
SKETCH 2: LOADS 4 FEET TO 7 FEET



SKETCH 3: LOADS 7 FEET AND OVER



SKETCH 4
APPLICATION OF ITEM C



POLES OR ROUND STOCK, UNTREATED OR TREATED – SINGLE LOADS
ON FLATCAR

RAC 15024 (Continued)
Revised May 2017

Item	No. of Items	Description
A	All sketch numbers	Load should be centrally located on car but must be no closer than 2 ft from the B end of car and 2 ft from opposite end of load to end of car. On flatcars with side-mounted hand brakes, the load may be located not closer than 2 ft from the B end of car.
B	Sketches 1 and 2: 3 pairs minimum Sketch 3: 4 pairs minimum	Side stakes: steel tubes, minimum 4 in. x 4 in. x 3/8 in., to fit stake pocket. Weld flanges (minimum 1" angle iron by 3/8" x 4" long) each side of stakes 12 in. from bottom of stake to bottom of flange to prevent stake from falling through stake pocket. See DETAIL A . On loads per SKETCHES 1 and 2 , locate stakes as shown on sketches; on loads per SKETCH 3 , locate two pair of stakes not less than 2 ft no more than 4 ft apart near each end of load.
C	2 each choker around entire load	Web Straps 4 in. polyester, with a minimum breaking strength of 20,000 lbs. End Straps: position straps as shown in drawing. Apply over top of entire load, from winch up and over top to opposite side, run strap under load and over top to opposite winch being careful not to overlay strap on itself. Tension straps from both sides of car using a 30 to 40 in. bar or equivalent. See SKETCH 1: "APPLICATION OF ITEM C."
D	4 each over top of entire load	Web straps: 4 in. Polyester, with a minimum breaking strength of 20,000 lb. Position straps as shown in above drawing. Apply strapping as follows over entire load, from winch to opposite winch of railcar. Tension straps from both sides of car using a 30 to 40 in. bar or equivalent.
E	4 each over bottom half of load	Web Straps: 4 in. polyester, with a minimum breaking strength of 20,000 lbs. Position straps as shown in drawing. Apply strapping as follows over bottom half of load from side winch to opposite side winch of car (apply light tension to straps then place the remainder of load on rail car). When loading is completed, tension straps from both sides of car using a 30 to 40 in. bar or equivalent

POLES OR ROUND STOCK, UNTREATED OR TREATED – SINGLE LOADS
ON FLATCAR

RAC 15024 (Continued)
Revised May 2017

Item	No. of Items	Description
F	Sketch 1: 2 per pile. Sketch 2: 4 per pile. Sketch 3: 6 per pile	Interlacing bands: 1 1/4 in. x .044 in. high-tension bands suitably spaced. Loads under 4 ft. locate 2 straps as shown in SKETCH 1 . Load 4 ft. to 7 ft high to be banded into two approximately equal units as shown in SKETCH 2 ; loads 7 ft high and over to be banded into three approximately equal units as shown in SKETCH 3 . Top layer of poles in lower banded unit is included and becomes the bottom layer of poles in banded unit above. May be substituted with approved Type 1A Grade 6 polyester strapping.
G	1 each pair Items B.	Stakes ties: One-strand 3/4 in. x .029 in. high-tension bands; chains or 1/2 in. cable if required .
H	Sketches 1, 2 and 3: 2 per pile	Bearing pieces: of equal width top and bottom; length equal to width of car; high enough to maintain 4 in. clearance between load; and carrying car. Height not to exceed width. Minimum width on loads per Sketches 1, 2, and 3 is 6 in. Use optional .

NOTES:

1. Placement of Items F and H may be altered from that shown in sketches to maintain maximum practical distance between these items.
2. Separators: hardwood, minimum rough 2 in. x 4 in., in one piece, at least two per layer, suitably placed with length equal to width of load, but not extending beyond inside face of stakes, Items B, optional may be applied to facilitate unloading.
3. Treated poles cannot be loaded higher than 8 ft above car floor. Measure height of load from top of floor to top of load. When load contains poles of various lengths, place longer poles in lower portion of the load.
4. When poles are interlaced, poles on outside of load must extend a minimum of 2 ft. beyond the stakes nearest the outer ends of cars, and Item F bands be applied to solid body of load so that they include all poles of each unit (not applied around the interlace overhang on either end on any unit).
5. When loading to any sketch, poles must extend a minimum of 2 ft beyond the inside edge of side stakes and outside poles to contact all side stakes

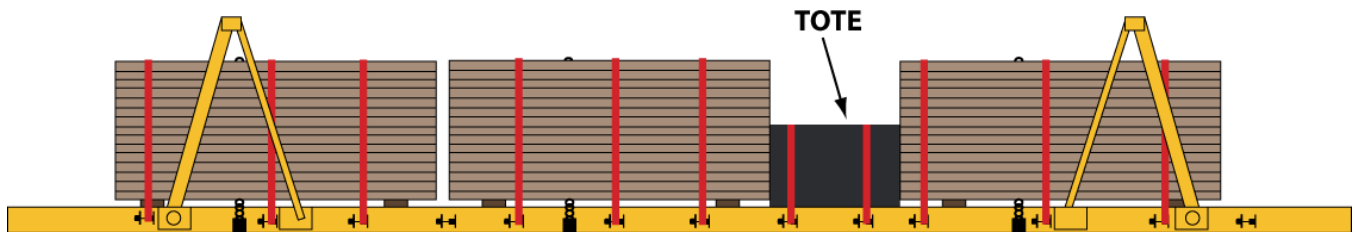
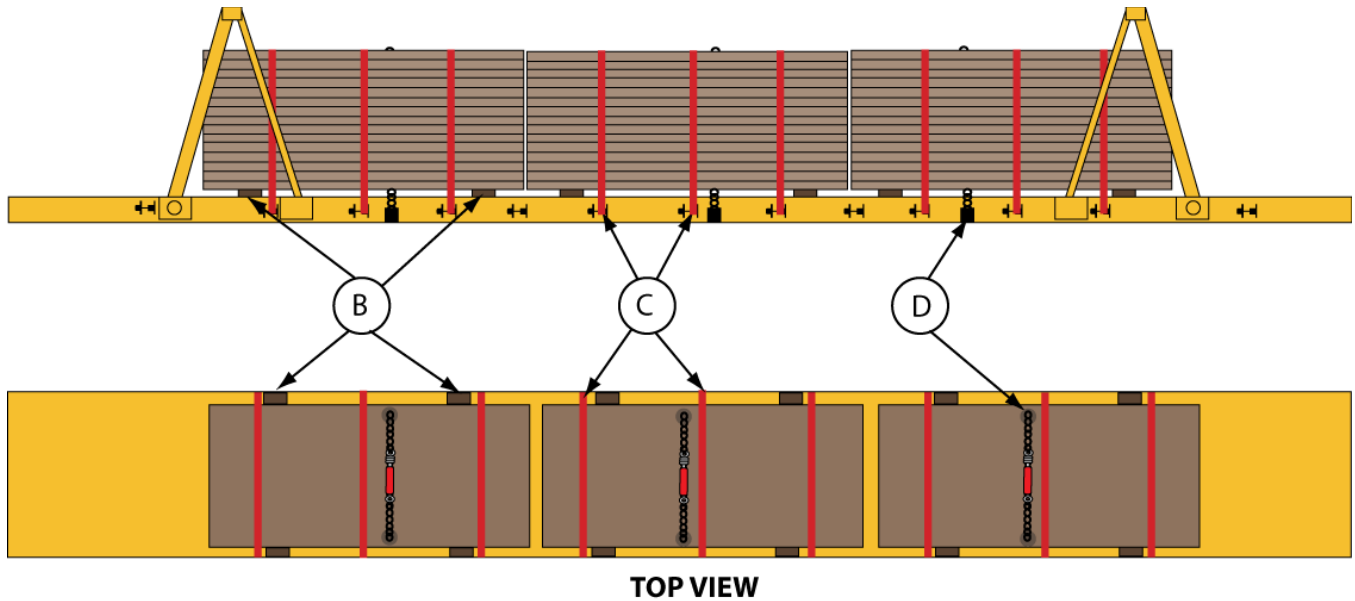
POLES OR ROUND STOCK, UNTREATED OR TREATED – SINGLE LOADS
ON FLATCAR

RAC 15024 (Concluded)
Revised May 2017

6. Nest poles fully, and when poles are not interlaced, butts should be alternated to equalize load.
7. Load to be crowned 18 in. in centre so that maximum use is made of the Web Straps.
8. In the event that railcar is equipped with insufficient or defective winches Type 1A Grade 8 non metallic strap may be used as a supplement for up to 3 locations. Web strap to be secured to D Ring or stake pocket.

For further details see General Rules.

POLYETHYLENE RIG MATTING ON A FLAT RACK
 (LOAD IS UNDER TEST, CONTACT RAC BEFORE USING)
 RAC 17507
 New. 07-2013



Item	No. of Items	Description
A		Vacant
B	2 per pile	Bearing pieces: hardwood 3 in. x 4 in.
C	3 per pile	Tie-Down bands: PVC treated polyester webbing, 4 in. wide with a minimum of 5,400 lbs. working load limit. Straps must be secured to flatrack on side opposite winch, pass around piles and secured to winch assembly. Tension with the use of a 24 in. to 30 in. bar.
D	1 per pile	Binder Chain Tie Down: 3/8 in. grade 70 with a Minimum breaking strength 28,400 lbs. Pass chains over the pile through holes in the mats and secure in a stake pocket on each side of the trailer. They shall be placed as close as possible to center of the pile. Wire chain hooks and chain binder handle in locked position

POLYETHYLENE RIG MATTING ON A FLAT RACK
(LOAD IS UNDER TEST, CONTACT RAC BEFORE USING)

RAC 17507 (Concluded)
New. 07-2013

Notes:

- 1- At origin load must be centered on rack
- 2- Height of pile must not exceed 66 inches including bearing pieces
- 3- When tote is loaded on car it must be placed between two piles and secured with 2 tie-down bands or chain.(items C or D)

See General Rules for further details.

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