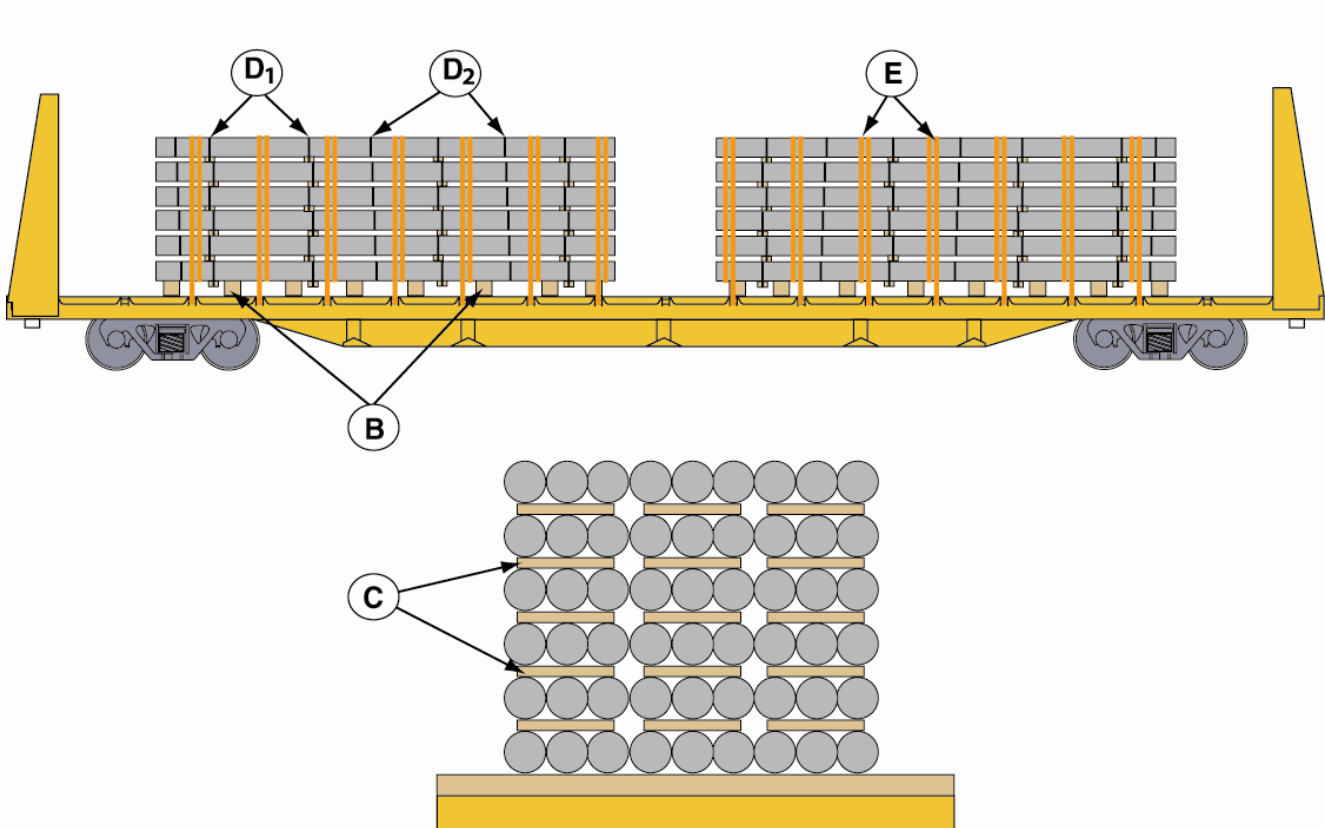


BILLETS OR LOGS, ALUMINUM,
3-IN. TO 11-IN. OD, 12 FT. TO 29 FT. LONG, BULKHEADS FLATCARS WITH
POLYESTER WEB TIE-DOWNS

RAC 12004

New 4-2007



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 to 4 ft on center and stagger location with winches from Item F located midway between bearing pieces as shown. Each bearing piece must be bolted or otherwise permanently secured to the car deck to prevent displacement.



**Railway Association
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3-IN. TO 11-IN. OD, 12 FT. TO 29 FT. LONG, BULKHEADS FLATCARS WITH
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RAC 12004 (Continued)
New 4-2007

Item	No. of Pcs.	Description
C-1	2 per package less than 21 ft in length. Add 2 per package 21 ft and over.	Attached separators: hardwood, 3 in. x 3 in., length sufficient to support all logs in package, but no wider than the package. Locate to evenly distribute package weight. Encircle each separator with one Item D-1. To a practical extent, bottom packages are to be placed to position separators between Item B bearing pieces as shown. Application of Item C to bottom layer packages is optional. See Note 6 for this application
C-2	2 per package less than 21 ft in length. Add 2 per package 21 ft and over.	Separators: hardwood, 4 in. x 4 in., length equal to the full width of pile. Locate adjacent to Items C-1. (Note: Over-the-road testing must be conducted without this piece applied. If favorable, this item can be shown as "optional.")
D-1	1 per each Item C.	Attached-separator bands: 3/4 in. x .029 in. high tension steel band. One band to encircle each Item C and all logs in package.
D-2	3 per package.	Package bands: 3/4 in. x .029 in. high tension steel band. To encircle all logs in package. Locate one band near each end of package with third centered between.
E	As required per Note 9.	Web tie-down straps: polyester webbing, 4 in. wide with a working load limit of 6,666 lb, (MBS of 20,000 lb). Winches are to be located on each side of car and spaced approximately every 36 inches, but no more than every 48 inches. Pass strapping over all logs in pile, pass under load and back across the top of the load to the winch on the opposite side of car. Tension straps from both sides of car to obtain uniform tension using a 30- to 40-in. winch bar.



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3-IN. TO 11-IN. OD, 12 FT. TO 29 FT. LONG, BULKHEADS FLATCARS WITH
POLYESTER WEB TIE-DOWNS**

RAC 12004 (Continued)

New 4-2007

Table 1 – Loading Matrix By Log Diameter (Rev. 12/10/03)																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Log Diameter (in.)	Log Length (in.)	Logs per package	Packages per layer	Layers per H-pile ¹	No. of H-piles ¹	Layers per L-pile ²	No. of L-Piles ²	Package Weight (lb)	H-Pile Weight (lb)	L-Pile Weight (lb)	Total Weight (lb)	No. separators Item	No. of Packages D-1/D-2	No. of Item E Web pile	% Max Pile Height h (Note Erreur ! invariable.)	% Max Pile Weight
3.0 to 3.99	106	23	2	8	6	-	-	1,921	15,368	-	184,416	3	3/	3	49%	51%
	108	12	2	10	6	-	-	1,021	10,210	-	122,520	3	3/	2	81%	52%
	216	12	2	10	3	-	-	2,042	20,420	-	122,520	5	5/	5	81%	40%
4.0 to 4.99	103	9	2	9	6	-	-	1,341	12,069	-	144,828	3	3/	2	84%	60%
	103	17	1	6	6	-	-	2,533	15,198	-	182,376	3	3/	3	89%	50%
	216	9	1	9	3	-	-	2,820	25,380	-	152,280	5	5/	5	168%	50%
5	216	8	2	8	3	-	-	3,465	27,720	-	176,672	4	5/	5	160%	56%
5.2	106	8	1	8	6	-	-	1,782	14,256	-	171,072	2	3/	5	81%	55%
	106	15	1	5	6	-	-	3,341	16,705	-	200,460	2	3/	2	158%	72%
	216	8	1	8	3	-	-	3,639	29,112	-	174,672	4	5/	2	158%	58%
6	144	7	2	9	4	-	-	2,781	50,050	-	200,198	2	2/3	4	93%	63%
	165	7	2	8	4	-	-	3,186	50,976	-	203,905	2	2/3	4	82%	64%
	240	7	2	7	3	-	-	4,634	64,879	-	194,637	2	2/3	6	71%	54%
	288	7	2	9	2	-	-	5,561	100,099	-	200,198	4	4/3	7	93%	71%
	338	6	2	9	2	-	-	5,594	100,695	-	201,390	4	4/3	8	108%	63%
6.7	104	11	2	4	6	-	-	3,980	15,920	-	191,040	2	3/	3	84%	53%
6.9	106	11	2	4	6	-	-	4,240	16,960	-	203,520	2	3/	3	83%	56%
7.0 to 7.99	144	6	2	8	2	7	2	3,244	51,903	45,415	194,637	2	2/3	4	92%	65%
	165	6	2	7	2	6	2	3,717	52,038	44,604	193,285	2	2/3	4	80%	65%
	240	6	2	6	3	-	-	5,407	64,879	-	194,637	2	2/3	6	68%	54%
	288	5	3	6	2	-	-	5,407	97,319	-	194,637	4	4/3	7	54%	70%
	338	4	3	7	1	6	1	5,076	106,600	91,371	197,971	4	4/3	8	80%	67%
8.0 to 8.99	144	5	2	7	4	-	-	3,531	49,432	-	197,727	2	2/3	4	93%	62%
	165	5	2	6	4	-	-	4,046	48,549	-	194,196	2	2/3	4	79%	61%
	240	5	2	6	2	5	1	5,885	70,617	58,847	200,080	2	2/3	6	79%	59%



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POLYESTER WEB TIE-DOWNS**

RAC 12004 (Continued)

Table 1 – Loading Matrix By Log Diameter - continued (Rev. 12/10/03)																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Log Diameter (in.)	Log Length (in.)	Logs per package	Packages per layer	Layers per H-pile ¹	No. of H-piles ¹	Layers per L-pile ²	No. of L-Piles ²	Package Weight (lb)	H-Pile Weight (lb)	L-Pile Weight(lb)	Total Weight(lb)	No. separators Item C	No. of Package Bands Items D-1/D-2	No. of Item E Web Straps per pile	% Max Pile Height to Pile Width (Note 2)	% Max Pile Weight to Strap MBS (Note 9)
9	144	5	2	6	2	5	2	4,469	53,624	44,687	196,623	2	2/3	4	77%	67%
	165	5	2	5	2	4	2	5,120	51,204	40,963	184,334	2	2/3	4	63%	64%
	240	3	3	5	3	-	-	4,469	67,031	-	201,092	2	2/3	6	70%	56%
	288	3	3	6	2	-	-	5,362	96,524	-	193,048	4	4/3	7	85%	69%
10	144	4	2	6	2	5	2	4,414	52,962	44,135	194,196	2	2/3	4	94%	66%
	165	4	2	5	4	-	-	5,057	50,572	-	202,287	2	2/3	4	78%	63%
	240	3	3	4	3	-	-	5,517	66,203	-	198,609	2	2/3	6	54%	55%
	288	3	3	5	2	-	-	6,620	99,305	-	198,609	4	4/3	7	69%	71%
11	144	4	2	5	2	4	2	5,340	53,404	42,723	192,254	2	2/3	4	76%	67%
	148	4	2	5	2	4	2	5,489	54,887	43,910	197,594	2	2/3	4	76%	69%
	165	3	3	4	2	3	2	4,589	55,073	41,305	192,754	2	2/3	4	54%	69%
	240	3	2	5	3	-	-	6,675	66,755	-	200,264	2	2/3	6	102%	56%

¹ H-pile refers to the highest pile on the car.

² L-pile refers to a pile that is one layer lower in height than companion H-piles on the same car.

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3-IN. TO 11-IN. OD, 12 FT. TO 29 FT. LONG, BULKHEADS FLATCARS WITH
POLYESTER WEB TIE-DOWNS**

RAC 12004 (Concluded)

New 4-2007

Note:

Notes and Additional Requirements:

1. This figure is intended for billets or logs, solid cylinders of aluminum ranging from 6-in. to 11-in. in diameter and 12 to 29 ft long and packaged with attached dunnage (Item C). Load must be equally distributed on car. Load must be square with sides vertical.
2. The height of a pile may not exceed 125 percent of its width. Refer to Table 1 for pile configuration according to log diameter.
3. All packages must be comprised of a single layer of logs as shown. Nesting is not permitted. All logs in a layer must be of equal diameter.
4. All logs in a package must be of equal length.
5. All layers in the pile must be equal in width, except the top layer in each pile, which may be narrower by no more than one log. If narrower, remaining logs in the top layer need not be centered laterally.
6. To avoid contact between attached separators and Item B bearing pieces in the event of end shift, Item C attached separators may be omitted on bottom layers. When Item C separators are not applied to bottom layer packages, an additional Item D-2 band must be applied for each omitted Item C.
7. To the extent possible, winches should be located between Items B to avoid web contact leading to premature web wear.
8. All web tie-down components, including winches and webbing, must be inspected and applied in accordance with General Rule 20.
9. The weight of a pile must not exceed 75 percent of the combined MBS rated restraint of all the Item E straps restraining that pile. Refer to Table 1 for load matrix. (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 75 percent of the combined restraint rating of the five straps, or 75,000 lb in this case.) If necessary, additional strap assemblies may be added with the car owner's permission.
10. **THIS LOAD PATTERN IS UNDER AAR EVALUATION AND IS NOT YET APPROVED FOR USE BY ANY PARTY OTHER THAN THOSE AUTHORIZED BY THE AAR.**

Reference the General Rules in Section No. 1 of the *Open Top Loading Rules Manual* for additional details.