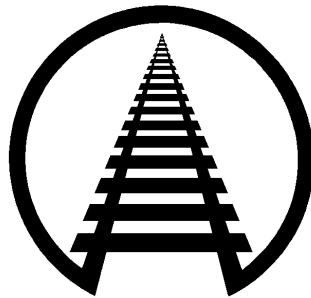


General Information Bulletin No. 9

Product Performance Profile for Pneumatic Dunnage

Approved by
DAMAGE PREVENTION & FREIGHT CLAIM COMMITTEE
Association of American Railroads



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1.0 INTRODUCTION

The Product Performance Profile for Pneumatic Dunnage (PPPPD) was developed with input from the pneumatic dunnage bag manufacturers, and provides an acceptable confidence level regarding the use of pneumatic dunnage bags for shippers, vendors and transportation carriers alike. The performance profile is a North American rail industry standard effective July 1, 2005 and revised January 1, 2012, replacing Section K – Inflatable Dunnage Material contained in *AAR Closed Car Loading Guide, Part 1, Minimum Loading Standards for Freight in General Purpose Boxcars*.

AAR loading publications will in time be revised to specify the applicable new bag level per the PPPPD for each application utilizing a pneumatic dunnage bag. For example: Level 1 pneumatic dunnage will apply to usage as lateral void fillers and/or load securement in certain intermodal applications; Levels 2-5 will apply when used as lengthwise load securement between flat surfaces such as canned goods or flat panel products; and Level 5 will apply when used in a horizontal application as lengthwise securement for rolls of paper.

The Damage Prevention and Freight Claim Committee of the Association of American Railroads endorses the concept of a verification program for pneumatic dunnage. In order for a pneumatic dunnage product to be verified as meeting the requirements of the PPPPD, the product must be successfully tested by AAR/TTCI or test results provided by an independent certified laboratory documenting the successful completion of the Product Performance Profile for Pneumatic Dunnage that is applicable to the performance level(s) being sought for verification. While the performance profile is a rail industry standard effective July 1, 2005, participation in the verification program is *voluntary*. A listing of verified pneumatic dunnage products by manufacturer will also be published separately and made available for reference via the AAR/TTCI website at http://www.aar.com/standards/dpls/pfds/PPPPD_Verification_List.pdf.

Beginning in 2014, suppliers, vendors and distributors have the opportunity to have pneumatic dunnage products that have been verified by a manufacturer listed in this Product Verification List under a separate trade or brand name. To qualify, a supplier must provide written confirmation from the manufacturer identifying their company as an authorized representative of that manufacturer's products, and that the product is the same in both material and method of manufacture as the product verified. Contact DPLS@aar.com for details.

The General Rules relating to personal safety and the safe operation of trains, contained in AAR Circular No's. 42-K and 43-E or supplements thereto, issued by the Association of American Railroads, **must be observed**.

*Loading and bracing methods not presently approved may receive consideration for approval and publication under Section II - Evaluation of New Loading and Bracing Methods and Materials for Closed Cars, Trailers or Containers of **General Information Bulletin No. 2, "Rules and Procedures for Testing of New Loading and Bracing Methods or Materials"**. Submit requests to Director Damage Prevention and Loading Services, AAR/TTCI, 55500 DOT Road, Pueblo, CO 81001.*

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2.0 PRODUCT PERFORMANCE PROFILES FOR PNEUMATIC DUNNAGE

Pneumatic dunnage has two principal applications in rail shipments: 1) as lateral void fillers, primarily in intermodal shipments and, 2) as lengthwise void fillers in boxcar shipments.

1) Attributes for pneumatic dunnage as lateral void fillers are:

- Must be capable of maintaining 0.5 to 3.0 psig in voids from 4" to 12".
- Must not leak or lose significant air pressure.
- Must meet minimum burst strength requirement of 8 psig.

2) Attributes for pneumatic dunnage as lengthwise void fillers are:

- Must be capable of maintaining 5.0 to 8.0 psig in voids from 4" to 12".
- Must not leak or lose significant air pressure.
- Must meet minimum burst strength requirement of 17 to 30 psig, dependent on test level.

2.1 Performance Levels

Five levels of performance are defined: Level 1 for pneumatic dunnage as lateral void fillers (and load securement in certain intermodal applications), and Levels 2-4 for pneumatic dunnage as lengthwise void fillers in flat platen type applications with varied performance requirements. Level 5 pneumatic dunnage used as lengthwise void fillers in horizontal application between cylindrical surfaces. Pneumatic dunnage meeting Level 2-5 requirements fulfill all Level 1 requirements.

Performance Level Application Guide

Level 1:	For filling lateral voids, primarily in intermodal loads.
Level 2:	For filling lengthwise voids in loads weighing up to 75,000 lbs.
Level 3:	For filling lengthwise voids in loads weighing up to 160,000 lbs.
Level 4:	For filling lengthwise voids in loads weighing up to 216,000 lbs., and horizontal applications in approved roll paper loading methods weighing up to 190,000 lbs.
Level 5:	For filling lengthwise voids in loads weighing up to 216,000 lbs., and horizontal applications in approved roll paper loading methods.

The manufacturer of the pneumatic dunnage submitted for testing and subsequently applying for Association of American Railroads verification will supply all material specifications of the dunnage. If specifications are of a proprietary nature, indicate such at the time of submission.

The outermost ply of pneumatic dunnage bags must be moisture resistant with a minimum Moisture Vapor Transmission Rate (MVTR) of 1.4 grams/100 square inch/24 hours.

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2.2 Sample Pre-Conditioning Requirements - All Levels

Uninflated sample dunnage shall be held in the same environment as the test fixtures for a minimum 48 hours prior to testing. Samples must be separated for full exposure. Sample air bag size must be: **Level 1** - 48"(+/- 2") x 96"; **Levels 2 through 5** – Ranging between 48"(+/- 2") x 102" and 48"(+/- 2") x 108".

2.3 Testing Fixtures

Test fixtures for levels 1 - 4 must be able to accommodate all samples with 12" void between flat platens. Test fixture for level 5 must be able to accommodate samples in a horizontal orientation which will simulate horizontal installation between four 50" diameter rolls of paper loaded on the centerline of a boxcar with an 18" center void.

2.4 Performance Measures

2.4.1 Level 1, Pneumatic Dunnage as Lateral Void Fillers and/or Load Securement in Certain Intermodal Applications

Part A, Leak Test:

Ten samples shall be inflated to 2.5 psig in a 12" void and remain thus for 19 days. Record the temperature and barometric pressure at the start and end of the test.

After 19 days pneumatic dunnage must retain a minimum of 1.5 psig, and the gauge pressure standard deviation of the 10 samples must not be greater than 0.15.

Part B, Burst Test:

Five random samples from Part A shall be inflated to 8 psig in a 12" void. The bag must maintain 8 psig for one minute.

The report must include initial and final gauge pressure measurements for the entire 19 day period for **Part A** and also the results of testing for **Part B**. The report must also relate the ambient temperature and relative humidity for the entire testing period.

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2.4.2 Levels 2-5, Pneumatic Dunnage as Lengthwise Void Fillers and/or Load Securement

Part A, Leak Test:

Ten samples shall be inflated to the pressure specified for the desired Test Level in the table below, in a 12" void for Test Levels 2 - 4 and in an 18" void for Test Level 5, and remain thus for 19 days. Record the temperature and barometric pressure at the start and end of the test.

After 19 days pneumatic dunnage must lose no more than 1.0 psig, and the gauge pressure standard deviation of the 10 samples must not be greater than 0.15.

Part B, Burst Test:

Five randomly selected samples tested in Part A shall be further inflated, in appropriate test fixture as outlined in 2.3 Testing Fixtures, in a 12" void for Levels 2 - 4 and in an 18" void for Level 5. Samples are to be inflated to the maximum pressure specified for the desired level in following table.

Performance Requirements for Levels 2 - 5

	Inflation Pressure Part A	Maximum Inflation Pressure Part B
Level 2	5 psig	17 psig
Level 3	8 psig	25 psig
Level 4	10 psig	30 psig
Level 5 (18" void)	10 psig	21 psig

The bag must maintain the specified pressure for one minute.

The report must include initial and final gauge pressure measurements for the entire 19 day period for ***Part A*** and also the results of testing for ***Part B***. The report must also relate the ambient temperature and relative humidity for the entire testing period.

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3.0 PROCESS SUMMARY

- 1) Manufacturers of pneumatic dunnage request verification testing from the AAR Damage Prevention & Loading Services.
- 2) Manufacturer submits a minimum of 12 samples for each level that verification is requested plus 2 inflator nozzles for each different valve type.
- 3) Manufacturers' request will be placed in a queue based on date of receipt and manufacturer will be notified by the AAR of the anticipated test commencement and completion date. (Leak testing requires 19 days to complete; burst testing requires 1 day; the entire process requires a minimum of 3 to 4 weeks to complete.)
- 4) Sample air bags will be leak tested.
- 5) Sample air bags will then be burst tested.
- 6) A report of the results will be written and sent to the manufacturer and the AAR Damage Prevention & Freight Claim Committee.
- 7) An invoice for testing will be issued by TTCI to the manufacturer.
- 8) Once payment is received, verified pneumatic dunnage will be added to the on-line PPPPD Verification List at <http://www.aar.com>.

4.0 PERFORMANCE RE-VERIFICATION

All pneumatic dunnage that has successfully completed testing, as outlined in this document, will require Association of American Railroads re-verification every three years. Failure to re-verify will result in revocation of existing verification. Pneumatic dunnage may remain listed on the PPPPD Verification List after the expiration date only if the pneumatic dunnage is in the process of being re-verified.

5.0 IN THE EVENT OF FAILURE

The following procedures are intended for pneumatic dunnage that successfully completes testing as outlined in this document and subsequently fails during field use. These procedures will be followed in evaluating pneumatic dunnage that is submitted for testing due to failure.

1. The submission of pneumatic dunnage for evaluation will only be accepted from shippers, consignees, railroads, or the dunnage manufacturer.
2. The pneumatic dunnage submitted for evaluation will be the actual pneumatic dunnage that has failed due to leakage, or in the case of a failure due to a rupture, pneumatic dunnage from the same manufacturing lot.

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3. The pneumatic dunnage will be evaluated and tested by material specifications. The test results will be compared to those specifications submitted at the time of the most recent verification by the Association of American Railroads.
4. The pneumatic dunnage manufacturer will be notified that their product is being evaluated, the reason(s) for testing and that a copy of the final report will be provided to them.
5. A copy of the final report will be submitted to the requesting party.
6. The final report will state whether the pneumatic dunnage as evaluated and tested met or failed to meet the specifications submitted at the time of the most recent verification by the Association of American Railroads.
7. If evaluation and testing shows that a pneumatic dunnage fails to meet the specifications of the most recent verification, the manufacturer will be advised. If two subsequent failures and retests within a 90-day period show the pneumatic dunnage does not meet the specifications of the most recent verification, the existing verification will be revoked.

Closed Car/Trailer Loading Pamphlets

- 1** Freight Forwarder (2/80)
- 3** Bags, Commodities In (10/93)
- 4** Barrels, Drums or Kegs (11/65), Includes Special Supplement (6/74)
- 6** Building Brick in Closed Cars (8/83)
- 8** Plywood in Closed Cars (11/85)
- 14** Minimum Loading Standards for Freight (12/84)
- 15** Furniture (7/79)
- 17** Packaged Food Products (10/88)
- 20** Lumber in Closed Cars (10/87)
- 21** Machinery (5/95)
- 23** Steel Products in Closed Cars (4/95)
- 25** Flat Paper Stock in Closed Cars & Trailers & Containers for TOFC/COFC Service (5/93)
- 29** Household Appliance (10/79)
- 37** High Density Metallic Commodities (11/84)
- 39** Supplemental Loading Standards for Roll Paper/Pulpboard in Closed Cars (4/11)
 Also see **Best Practices for Loading of Roll Paper in Rail Cars** for additional information.
- 41** Dictionary of Standard Terms (7/82)
- 42** Glass, Flat (6/94)

Intermodal Loading Guide (ILG) for Products in Closed Trailers and Containers (7/11)

Intermodal Loading Guide (ILG) for Paper Products in Closed Trailers and Containers (8/01)

Best Practices for Loading of Roll Paper in Rail Cars (4/11)

Includes Pamphlet No. 39, **Supplemental Loading Standards for Roll Paper/Pulpboard in Closed Cars**

General Rules Circulars

- 42-K** General Rules Covering Loading of Carload Shipments of Commodities in Closed Cars (11/10)
- 43-E** Rules Governing the Loading, Blocking and Bracing of Freight in Closed Trailers and Containers for TOFC/COFC Service (7/11)

General Information Bulletins (G.I.B.)

- 1** Handling and Shipping Fresh Fruits and Vegetables by Rail (5/76)
- 2** Rules and Procedures for Testing of New Loading and Bracing Methods of Materials (1/98)
- 3** Instructions for Applying Polyethylene Sheets as Weather Protection in Boxcars (11/91)
- 4** Weather Protection for Open Top Wallboard Shipments (4/93)
- 5** Overloaded or Unbalanced Hopper Cars are Unsafe (8/93)
- 6** Measurement Requirements for Remote Ride Quality Monitoring (9/96)
- 7** Evaluating and Loading Auto Parts Racks in Railcars for Transportation Via the North American Rail System (2/99)
- 8** Practical Guidelines for Stretch Film Roping of Steel Coils Shipped Eye Vertical in Boxcar and Intermodal Shipments (4/03)
- 9** Product Performance Profile for Pneumatic Dunnage (1/12)