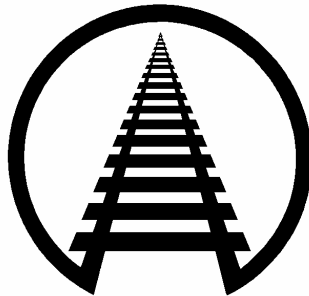


General Information Bulletin No. 9

Product Performance Profile for Pneumatic Dunnage

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



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SECTION I – 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, replacing the Section K – Inflatable Dunnage Material contained in *AAR Pamphlet No. 14, Minimum Loading Standards for Freight in General Purpose and Specially Equipped 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, Level 5 will apply when used in a horizontal application as lengthwise securement in 50” diameter 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 Railinc 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 Railinc website, www.Railinc.com.

The General Rules relating to personal safety and the safe operation of trains, contained in AAR Circular No’s. 42-J and 43-D 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, Railinc, 7001 Weston Parkway, Suite 200, Cary, NC 27513.*

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1.0 INTRODUCTION

1.1 Product Performance Profile 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 be able to withstand 10 dynamic loading cycles of no more than 0.4 seconds per cycle, with maximum dynamic load from 21,900 to 59,600 lbs, dependent on test level.
- Must meet minimum burst strength requirement of 17 to 30 psig, dependent on test level.

2.0 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 used between concave surfaces specific to performance requirements. Pneumatic dunnage meeting Level 2-5 requirements fulfill all Level 1 requirements.

The manufacturer of the pneumatic dunnage submitted for testing and subsequently applying for Association of American Railroads verification will supply all 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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2.1 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".

2.2 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" void.

2.3 Performance Measures

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

Part A:

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:

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

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

Part A:

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:

Five random samples from Part A shall be dynamically loaded. This must be conducted in the appropriate fixture as outlined under "Testing Fixtures." Testing shall be conducted according to those pressures listed in the following Table for Inflation Pressure Part A in a 12" void for Test Levels 2 - 4 and in an 18" void for Test Level 5. A minimum of 10 compression loading cycles is to be applied to the sample. Maximum load shall be in accordance with the value for the desired Test Level in table below. Each cycle must be no more than 400 milliseconds (0.4 seconds) in duration and have a peak dwell at the maximum load for not less than 133 milliseconds (0.133 seconds), as illustrated. The time duration between each compression loading cycle will be one (1) minute. Samples must not burst during dynamic loading and must be within 10% of initial gauge pressure when fixture is returned to 12" spacing for Test Levels 2 - 4 and 18" spacing for Test Level 5.

Part C:

At the completion of the dynamic test each sample tested in Part B shall be further inflated, in appropriate text fixture as outlined in "Testing Fixtures" in a 12" void for Test Levels 2 - 4 and in an 18" void for Test Level 5. Samples are to be inflated to the maximum pressure specified for the desired Test Level in table below. The bag must maintain the specified pressure for one minute.

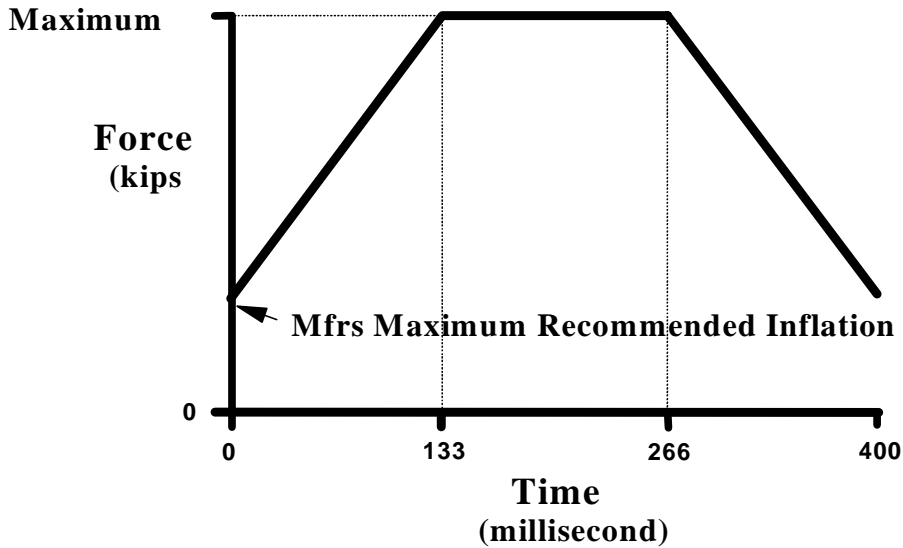
The report must include initial and final gauge pressure measurements for the entire 19 day period for **Part A** and a graphical summary of the dynamic loading results, depicting force versus time for each of the five dynamic test samples in **Part B**. The report must also include the results of testing for **Part C**.

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Performance Requirements for Levels 2 - 5

	Inflation Pressure Part A	Maximum Load in Pounds Part B	Maximum Inflation Pressure in 12" void Part C
Level 2	5 psig	21,900 lbs (Load weights less than 75K lbs)	17 psig
Level 3	8 psig	46,500 lbs (Load weights 75K to 160K lbs)	25 psig
Level 4	10 psig	59,600 lbs (Load weights 160K to 205K lbs)	30 psig
Level 5	10 psig (18" void)	42,500 lbs (Load weights 160K to 205K lbs)	21 psig (18" void)



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3.0 RE-VERIFICATION REQUIREMENT

All pneumatic dunnage that has successfully completed testing, as outlined in this document, will require Association of American Railroads re-verification every three years. Pneumatic dunnage to be re-verified will be obtained on a random basis from various customers' inventory. Failure to re-verify will result in revocation of existing verification.

4.0 PROCEDURES FOR AFTER TEST FAILURES

The following procedures are intended for pneumatic dunnage that successfully completes testing as outlined in this document and subsequently fails during field performance. 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 manufacturer of the submitted dunnage.
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.
3. The pneumatic dunnage will be evaluated and tested by 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 party who requested the evaluation.
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 so 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.

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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 (11/96)
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 (6/01)

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

Best Practices for Loading of Roll Paper in Rail Cars (6/01)

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

General Rules Circulars

- 42-J General Rules Covering Loading of Carload Shipments of Commodities in Closed Cars (1/01)
- 43-D Rules Governing the Loading, Blocking and Bracing of Freight in Closed Trailers and Containers for TOFC/COFC Service (6/01)

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 (7/05)