

# PALLET DESIGN SYSTEM Version 5.0

## Pallet Structural Analysis

**Customer:**  
THE PALLET COMPANY

**Prepared by:**  
THE PALLET COMPANY  
**PDS License: 542 Printed: August 27, 2013**

**Pallet ID:** 1200x1000 Standard Pallet

**Classification:** 1000 x 1200, Stringer-Class, Double-Face Non-Reversible, 2-Way, Multiple-Use, New Manufacture

**General Load Type:** Uniformly Distributed - Full Pallet Coverage

**Custom Load Specification:** Boxes, Interlock Stacked

**Load Stabilizers:** Stretch Wrap, Horizontal Strapping

**Unit Load Weight Variability:** Low

**Service Environment:** Dry Environment (EMC <= 19%)

Support Condition	Safe Maximum Load	Deflection at Maximum Load	User Specified Deflection Limit	Maximum Load for Deflection Limit	Critical Member
<p><b>Racked Across Length</b> <b>2 Beam Support</b></p> <p>Span = 800</p>	2318 kg	4 mm	----	----	Center Stringer
<p><b>Shelf Support</b></p>	3281 kg	3 mm	----	----	Interior Top Deckboard
<p><b>Warehouse Storage</b> <b>Stacked 1 Unit Load High</b></p>	3971 kg	4 mm	----	----	Interior Top Deckboard



### Pallet Design System (PDS)

Developed and owned by:

#### National Wooden Pallet and Container Association (NWPCA)

Research and development for early versions of PDS were conducted in cooperation with:  
Center for Unit Load Design, Virginia Tech Department of Wood Science and Forest Products;  
U.S.D.A. Forest Service and Forest Products Laboratory; APA - The Engineered Wood Association;  
Software Technologies Laboratory, Virginia Tech Department of Industrial and Systems Engineering

The recommendations from PDS are based on the NWPCA's continuing program of laboratory and field research. They represent the best available engineering information compiled to date. However, the quality of workmanship, the input data, and the conditions in which pallets are used may vary widely. Therefore, the Association cannot accept responsibility for pallet performance or design as actually constructed. Wood pallets manufactured to this PDS design are for the sole purpose of storing and/or transporting material.

Under no circumstance should any person stand, step, or lean upon them or otherwise use them for support.

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National Wooden Pallet and Container Association, 1421 Prince Street, Suite 340, Alexandria, Virginia 22314-2805

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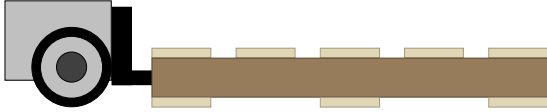
## Pallet Durability Analysis

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### Pallet Damage Rate Analysis

The **Pallet Damage Rate Analysis** simulates a series of forces and impacts applied to the pallet during each handling cycle. The frequency and severity of these impacts are estimates based on laboratory measurements, warehouse observations, and the Virginia Tech FasTrack Handling Cycle. The resistance to damage and the damage level requiring component repair or replacement are based on laboratory testing and the NWPCA Uniform Standard for Wood Pallets.

**Service Environment Conditions:**

Good Handling and Treatment, Medium-Duty Loads, Dry Environment (EMC <= 19%)

#### Results from Handling Cycle Simulation

<b>Pallet Components</b>	<b>Cycles Until Damage Level to Components Warrants Repair or Replacement</b>	<b>Cycles Until Damage Level to Connections Warrants Repair</b>
Top Leadboards (2)	>> 50	1.2
Top InteriorBoards (3)	>> 50	
Bottom Leadboards (2)	> 50	2.1
Bottom InteriorBoards (1)	> 50	2.1
Exterior Stringers (2)	27.3	
Interior Stringers (1)	>> 50	

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## Pallet Physical Property Analysis

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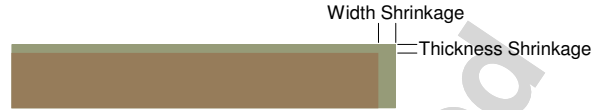
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Average Pallet Weight	At Manufacture	At 25% MC	At 19% MC	At 15% MC	At 12% MC
	30 kg	25 kg	24 kg	23 kg	22 kg

### Dimensional Change due to Wood Drying



Component	Original Dimension	Shrinkage from Manufacture to 19% MC	Shrinkage from Manufacture to 15% MC
Top Deckboards	25 mm Thickness	0.5 mm (+/- 0.1 mm)	0.7 mm (+/- 0.2 mm)
	150 mm Width	2.8 mm (+/- 0.7 mm)	4.1 mm (+/- 1.1 mm)
Stringers	100 mm Height	1.9 mm (+/- 0.5 mm)	2.7 mm (+/- 0.7 mm)
	50 mm Width	0.9 mm (+/- 0.2 mm)	1.4 mm (+/- 0.4 mm)
Bottom Deckboards	25 mm Thickness	0.5 mm (+/- 0.1 mm)	0.7 mm (+/- 0.2 mm)
	150 mm Width	2.8 mm (+/- 0.7 mm)	4.1 mm (+/- 1.1 mm)

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