

PALLET DESIGN SYSTEM Version 3.5

Pallet Structural Analysis

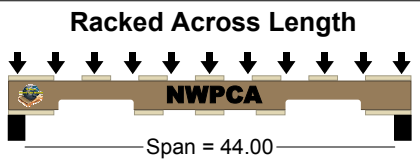
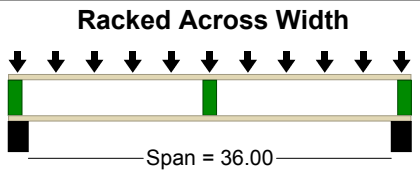
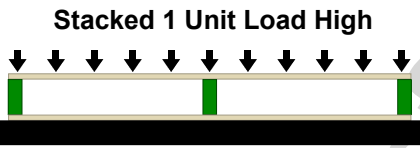
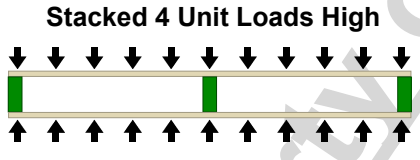
Pallet ID: Stringer-Class Pallet Example

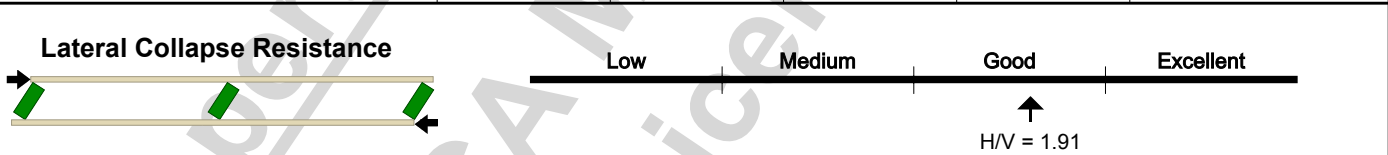
Classification: 48.00 x 40.00, Stringer-Class, Double-Face Non-Reversible, Partial 4-Way, Multiple-Use, New Manufacture

Unit Load Type: Uniformly Distributed - Full Pallet Coverage

Unit Load Weight Variability: Medium

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
Racked Across Length 	1710 lbs.	0.46 in.	0.40 in.	1234 lbs.	Center Stringer
Racked Across Width 	1595 lbs.	0.76 in.	0.50 in.	770 lbs.	Bottom Deckboard
Stacked 1 Unit Load High 	4713 lbs.	0.19 in.	----	----	Top Deckboard
Stacked 4 Unit Loads High 	1813 lbs. (each pallet)	0.19 in.	----	----	Top Deckboard



Pallet Design System (PDS)

Developed by:

National Wooden Pallet and Container Association (NWPCA)

In cooperation with:

Pallet and Container Research Laboratory, 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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Pallet Durability Analysis

Pallet ID: Stringer-Class Pallet Example

Classification: 48.00 x 40.00, Stringer-Class, Double-Face Non-Reversible, Partial 4-Way, Multiple-Use, New Manufacture



Pallet Service Life Analysis

The **Pallet Service Life 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:

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

Predicted Service Life: 8 Cycles

Predicted Cycles until First Repair: 3

Results from Handling Cycle Simulation

Pallet Components	Cycles To First Repair	Cycles To First Replacement	Number of Times Replaced	Limits Pallet Service Life	Relative Component Damage during Simulation
Top Leadboards (2)	3	5	1	Yes	
Top InteriorBoards (5)					
Bottom Leadboards (2)	3	5	1		
Bottom InteriorBoards (3)					
Exterior Stringers (2)	4				
Interior Stringers (1)					

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Pallet Physical Property Analysis

Pallet ID: Stringer-Class Pallet Example

Classification: 48.00 x 40.00, Stringer-Class, Double-Face Non-Reversible, Partial 4-Way, Multiple-Use, New Manufacture

Average Pallet Weight	At Manufacture	At 25% MC	At 19% MC	At 15% MC	At 12% MC
	59 lbs.	41 lbs.	39 lbs.	38 lbs.	37 lbs.



Component	Original Dimension	Shrinkage from Manufacture to 19% MC	Shrinkage from Manufacture to 15% MC
Top Deckboards	0.625 in. Thickness	0.014 in. (+/- 0.004 in.)	0.020 in. (+/- 0.006 in.)
	5.500 in. Width	0.123 in. (+/- 0.036 in.)	0.178 in. (+/- 0.052 in.)
	3.500 in. Width	0.078 in. (+/- 0.023 in.)	0.113 in. (+/- 0.033 in.)
Stringers	3.500 in. Height	0.078 in. (+/- 0.023 in.)	0.113 in. (+/- 0.033 in.)
	1.375 in. Width	0.031 in. (+/- 0.009 in.)	0.044 in. (+/- 0.013 in.)
Bottom Deckboards	0.625 in. Thickness	0.014 in. (+/- 0.004 in.)	0.020 in. (+/- 0.006 in.)
	5.500 in. Width	0.123 in. (+/- 0.036 in.)	0.178 in. (+/- 0.052 in.)
	3.500 in. Width	0.078 in. (+/- 0.023 in.)	0.113 in. (+/- 0.033 in.)

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