

# PALLET DESIGN SYSTEM Version 5.2

## Pallet Specification Sheet

All dimensions in inches

### Customer:

Company Name of Customer  
Address of Customer

### Prepared by:

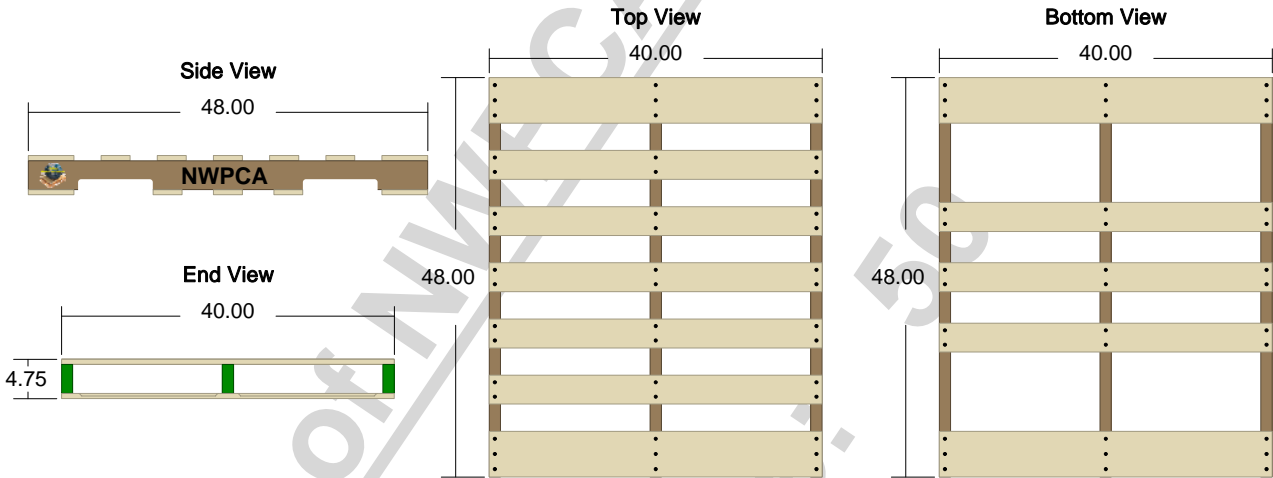
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**Pallet ID:** Stringer-Class Pallet Example

**Drawing Number:** 12345 **Specification Date:** April 1, 2011 **Revision Number:** R-1 **Revision Date:** May 5, 2012

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

**Pallet Treatments:** ISPM-15 Compliance: Heat Treatment (HT)



### Components

#### Top Deck:

Style: Deckboard Type: New Lumber

Number	Thickness	Width	Length
5	0.625	3.500	40.00
2	0.625	5.500	40.00

Volume: 4.9 bd ft

#### Bottom Deck:

Style: Deckboard Type: New Lumber

Number	Thickness	Width	Length
3	0.625	3.500	40.00
2	0.625	5.500	40.00

Volume: 3.7 bd ft

Chamfers - Style: Stop (Depth: 0.313 Loc: 2.12 Length: 16.69)

#### Stringers:

Type: New Lumber

Number	Width	Height	Length
3	1.375	3.500	48.00

Volume: 4.8 bd ft

Partial 4-way Entry Notch:

Depth: 1.250 Length: 9.00 Location: 6.00 Radius: 0.75

### Materials

#### Fasteners:

Fastener ID:	2-1/4 x 11-1/2 Ga. SS
Fastener Type:	Helically Threaded Nail
Fastener Length:	2.25
Thread Length:	1.25
Thread Diameter:	0.124
Wire Diameter:	0.112
Head Diameter:	0.280
Flutes:	4
Helixes:	7.5
Pitch:	0.167
Thread Angle:	60
MIBANT Angle:	36
FWC:	2.58
<b>Total Number:</b>	<b>84</b>

#### New Lumber:

Lumber ID: Mixed Eastern Hardwoods

Species Class	Grade	Lumber Mix
High Density Eastern Hardwoods	Standard &BTR	50 %
Medium Density Eastern Hardwoods	Standard &BTR	25 %
Low Density Eastern Hardwoods	Standard &BTR	25 %

Moisture Content (at manufacture and assembly): Green

**Total New Lumber Volume: 13.5 bd ft**

### Spec Sheet Notes:

Information specific to Customer here

# PALLET DESIGN SYSTEM Version 5.2

## Pallet Structural Analysis (1/2)

**Customer:**

Company Name of Customer

**Prepared by:**

Pallet Professional and NWPCA Member

PDS License: 50 Printed: December 03, 2015

Pallet ID: Stringer-Class Pallet Example

Drawing Number: 12345 Specification Date: April 1, 2011 Revision Number: R-1 Revision Date: May 5, 2012

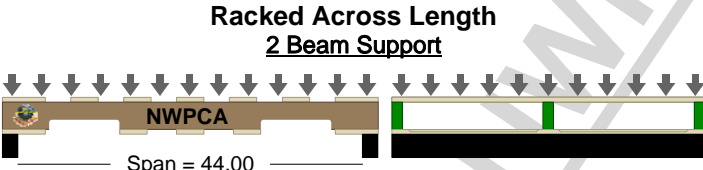
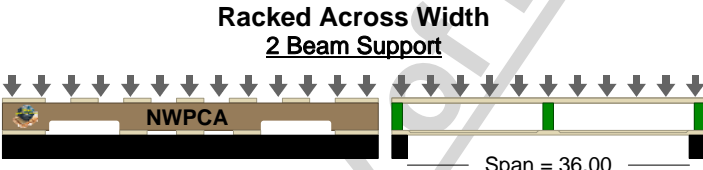
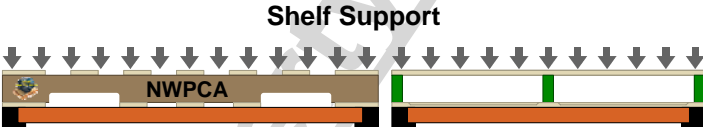
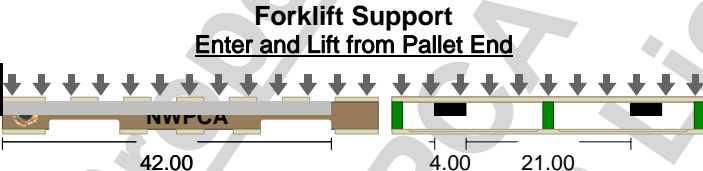
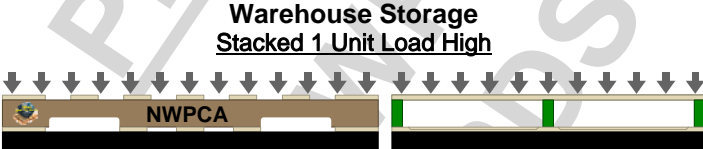
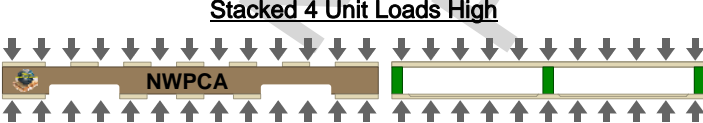
Classification: 48.00 x 40.00, Stringer-Class, Double-Face Non-Reversible, Partial 4-Way, Reusable, New Manufacture

Pallet Treatments: ISPM-15 Compliance: Heat Treatment (HT)

General Load Type: Uniformly Distributed - Full Pallet Coverage

Maximum Weight of Actual Load: 1500 lbs. 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
Side View	End View					
<b>Racked Across Length</b> <b>2 Beam Support</b> 		1558 lbs.	0.51 in.	0.75 in.	NA	Center Stringer
<b>Racked Across Width</b> <b>2 Beam Support</b> 		1630 lbs.	0.90 in.	0.75 in.	1006 lbs.	Interior Bottom Deckbd
<b>Shelf Support</b> 		4225 lbs.	0.16 in.	----	----	Interior Top Deckboard
<b>Forklift Support</b> <b>Enter and Lift from Pallet End</b> 		2504 lbs.	0.32 in.	----	----	Interior Top Deckboard
<b>Warehouse Storage</b> <b>Stacked 1 Unit Load High</b> 		5223 lbs.	0.19 in.	----	----	Interior Top Deckboard
<b>Stacked 4 Unit Loads High</b> 		1934 lbs. per pallet	0.19 in.	----	----	Interior Bottom Deckbd

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 DESIGN SYSTEM Version 5.2

## Pallet Structural Analysis (2/2)

**Customer:**

Company Name of Customer

**Prepared by:**

Pallet Professional and NWPCA Member

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Pallet ID: Stringer-Class Pallet Example

Drawing Number: 12345 Specification Date: April 1, 2011 Revision Number: R-1 Revision Date: May 5, 2012

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

Pallet Treatments: ISPM-15 Compliance: Heat Treatment (HT)



### 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:** 9 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	Yes	████████████████████
Bottom InteriorBoards (3)					██████████
Exterior Stringers (2)	4	9			██████████████
Interior Stringers (1)					████

### 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

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# PALLET DESIGN SYSTEM Version 5.2

## Pallet Physical Property Analysis

**Customer:**

Company Name of Customer

**Prepared by:**

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Pallet Treatments: ISPM-15 Compliance: Heat Treatment (HT)

	At Manufacture	At 25% MC	At 19% MC	At 15% MC	At 12% MC
Average Pallet Weight	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.)
	3.500 in. Width	0.078 in. (+/- 0.023 in.)	0.113 in. (+/- 0.033 in.)
	5.500 in. Width	0.123 in. (+/- 0.036 in.)	0.178 in. (+/- 0.052 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.)
	3.500 in. Width	0.078 in. (+/- 0.023 in.)	0.113 in. (+/- 0.033 in.)
	5.500 in. Width	0.123 in. (+/- 0.036 in.)	0.178 in. (+/- 0.052 in.)

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# PALLET DESIGN SYSTEM Version 5.2

## 2-D Pallet Drawings

All dimensions in inches

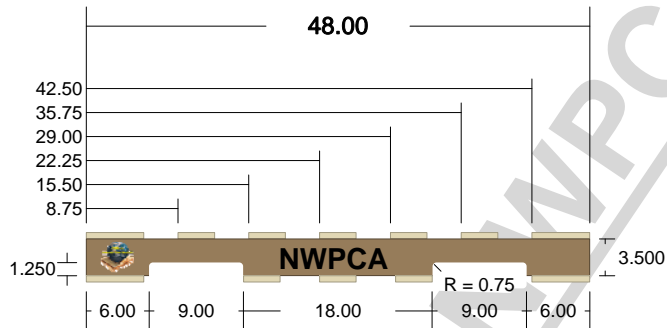
Pallet ID: Stringer-Class Pallet Example

Drawing Number: 12345 Specification Date: April 1, 2011 Revision Number: R-1 Revision Date: May 5, 2012

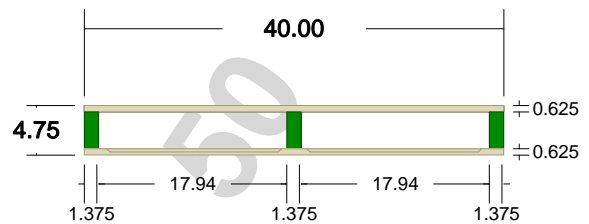
Classification: 48.00 x 40.00, Stringer-Class, Double-Face Non-Reversible, Partial 4-Way, Reusable, New Manufacture

Pallet Treatments: ISPM-15 Compliance: Heat Treatment (HT)

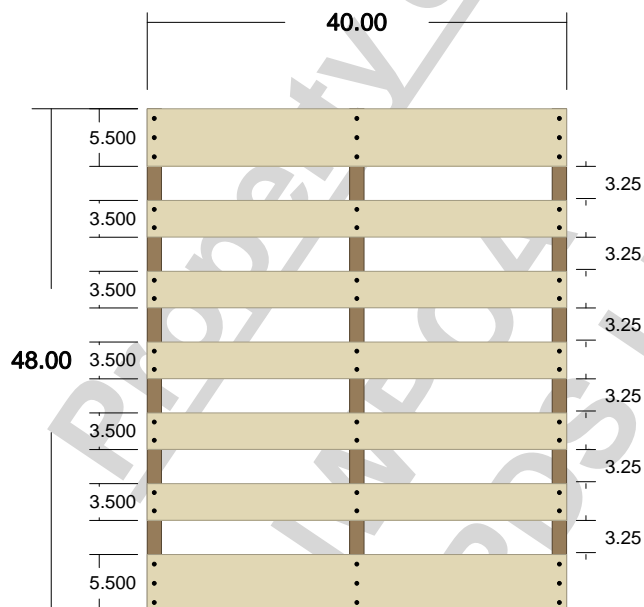
### Side View



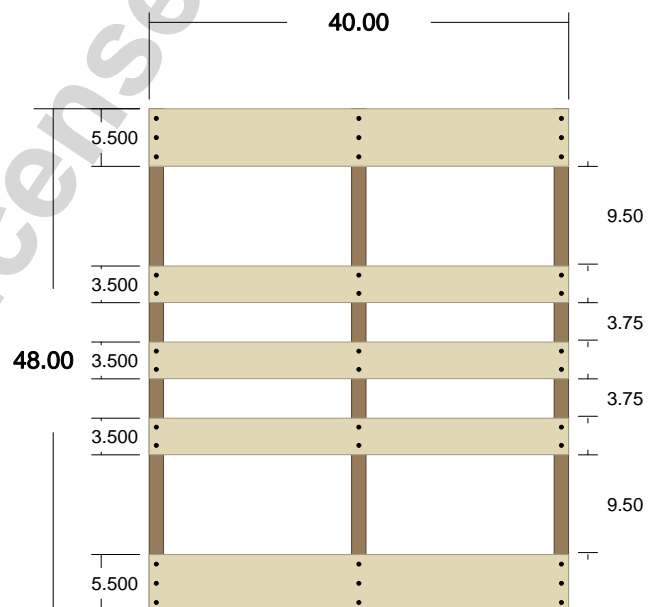
### End View



### Top View



### Bottom View



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### Customer:

Company Name of Customer  
Address of Customer

### Prepared by:

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# PALLET DESIGN SYSTEM Version 5.2

## Pallet Drawing - Side and End View

All dimensions in inches

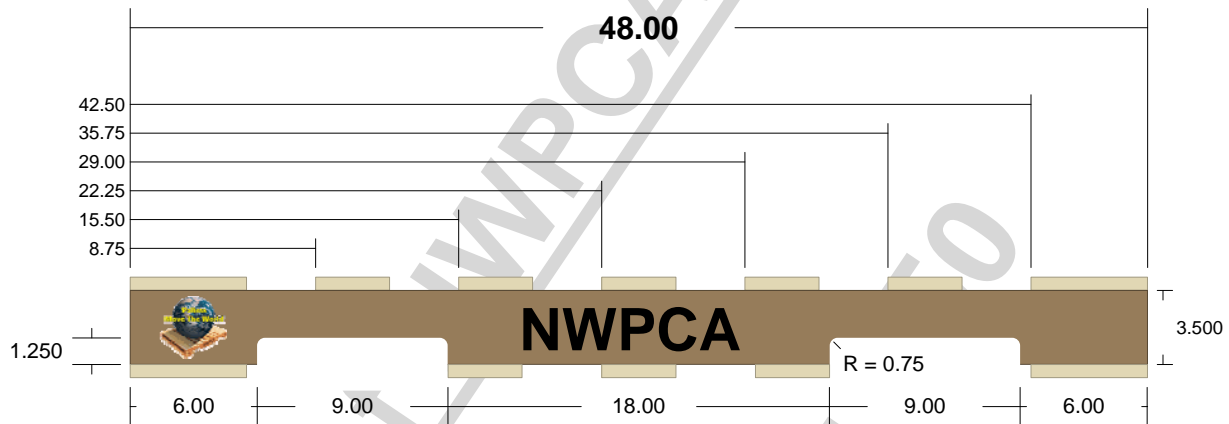
Pallet ID: Stringer-Class Pallet Example

Drawing Number: 12345 Specification Date: April 1, 2011 Revision Number: R-1 Revision Date: May 5, 2012

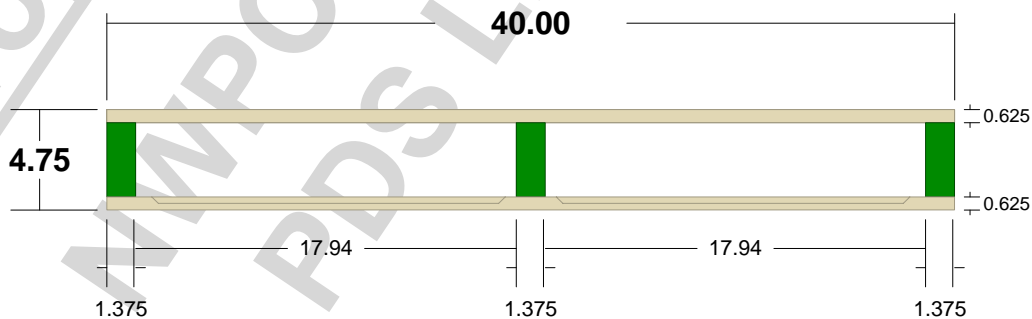
Classification: 48.00 x 40.00, Stringer-Class, Double-Face Non-Reversible, Partial 4-Way, Reusable, New Manufacture

Pallet Treatments: ISPM-15 Compliance: Heat Treatment (HT)

### Side View



### End View



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Address of Customer

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# PALLET DESIGN SYSTEM Version 5.2

## Pallet Drawing - Top View

All dimensions in inches

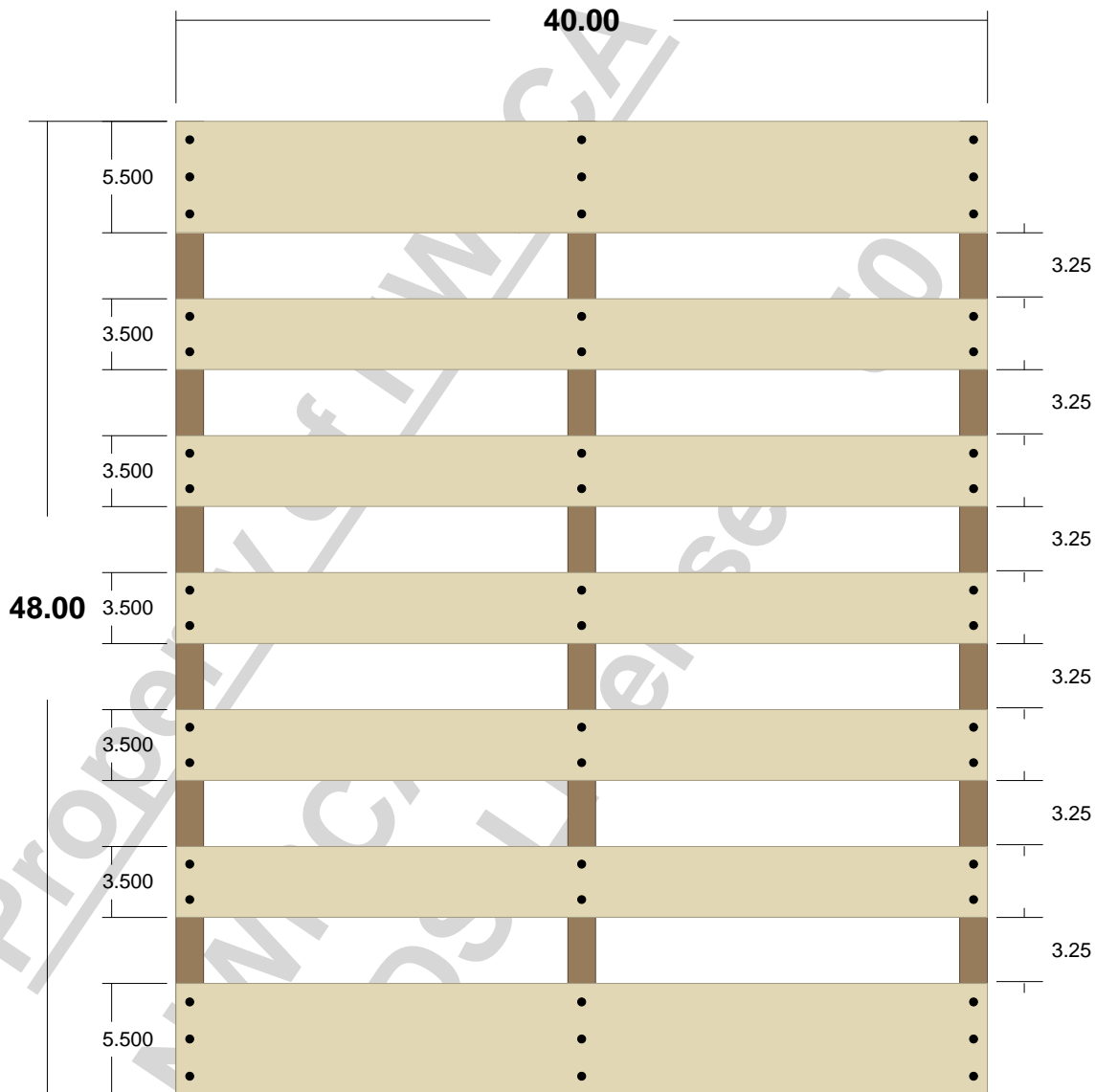
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Classification: 48.00 x 40.00, Stringer-Class, Double-Face Non-Reversible, Partial 4-Way, Reusable, New Manufacture

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### Top View



#### Customer:

Company Name of Customer  
Address of Customer

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# PALLET DESIGN SYSTEM Version 5.2

## Pallet Drawing - Bottom View

All dimensions in inches

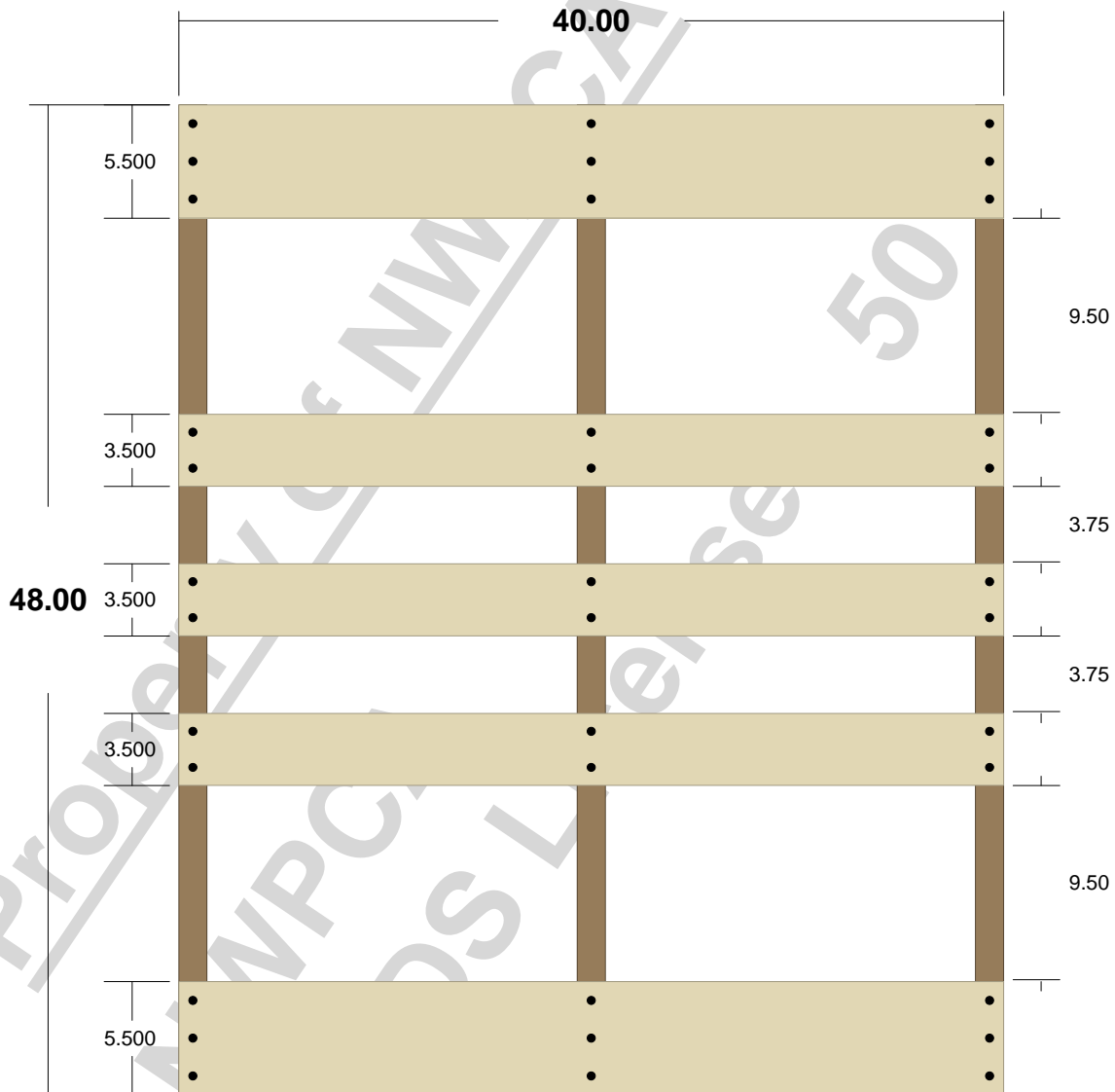
Pallet ID: Stringer-Class Pallet Example

Drawing Number: 12345 Specification Date: April 1, 2011 Revision Number: R-1 Revision Date: May 5, 2012

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

Pallet Treatments: ISPM-15 Compliance: Heat Treatment (HT)

### Bottom View



#### Customer:

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Address of Customer

#### Prepared by:

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# PALLET DESIGN SYSTEM Version 5.2

## 3-D Pallet Drawings

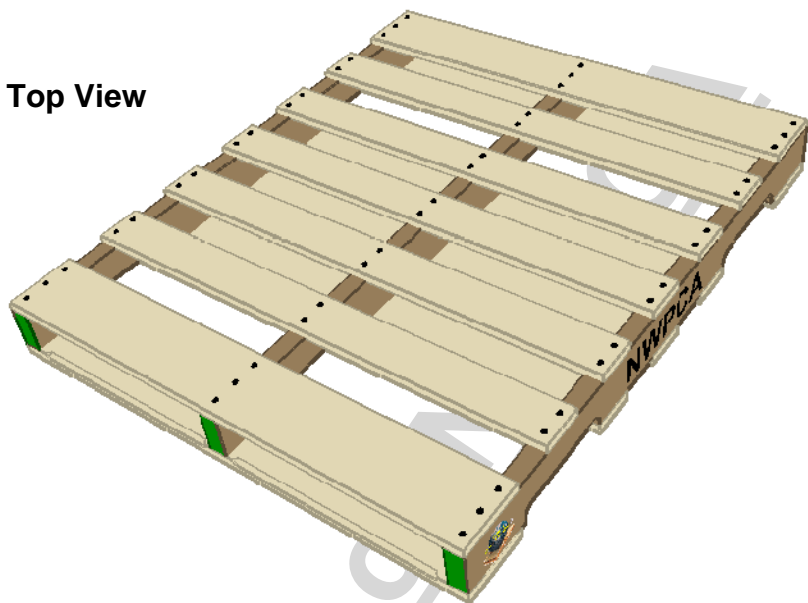
Pallet ID: Stringer-Class Pallet Example

Drawing Number: 12345 Specification Date: April 1, 2011 Revision Number: R-1 Revision Date: May 5, 2012

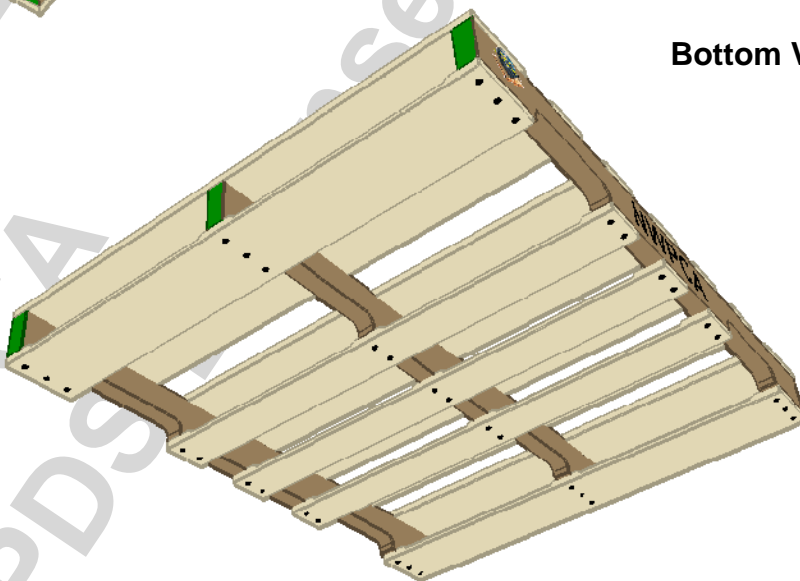
Classification: 48.00 x 40.00, Stringer-Class, Double-Face Non-Reversible, Partial 4-Way, Reusable, New Manufacture

Pallet Treatments: ISPM-15 Compliance: Heat Treatment (HT)

Top View



Bottom View



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### Customer:

Company Name of Customer  
Address of Customer

### Prepared by:

Pallet Professional and NWPCA Member  
Licensed to Perform PDS Design Work

# Pallet Production Order

(All dimensions in inches)

# Pallet Professional and NWPCA Member

(created with The Pallet Design System V5.2)

**Order Number:** 54321  
**Production Date:** December  
**Delivery Date:** December  
**Number of Pallets:** 1000

**Customer:**  
 Company Name of Customer  
 Address of Customer

**Production Order Notes:**  
 Notes specific to Production or Delivery

## Pallet Design

**Pallet ID:** Stringer-Class Pallet Example  
**Drawing Number:** 12345 **Specification Date:** April 1, 2011  
**Revision Number:** R-1 **Revision Date:** May 5, 2012  
**Pallet Size:** 48.00 x 40.00  
**Class:** Stringer-Class, Double-Face Non-Reversible, Partial 4-Way  
**Pallet Treatments:** ISPM-15 Compliance: Heat Treatment (HT)

**Top Deck:** **Style:** Deckboard **Type:** New Lumber  
 5 - 5/8 x 3-1/2 x 40  
 2 - 5/8 x 5-1/2 x 40

**Bottom Deck:** **Style:** Deckboard **Type:** New Lumber  
 3 - 5/8 x 3-1/2 x 40  
 2 - 5/8 x 5-1/2 x 40  
 Chamfers - **Style:** Stop (Depth: 0.313 Location: 2.12 Length: 16.69)

**Stringers:** **Type:** New Lumber  
 3 - 1-3/8 x 3-1/2 x 48  
 Partial 4-way Entry Notch:  
 Depth: 1-1/4 Length: 9 Location: 6 Radius: 3/4

## Materials

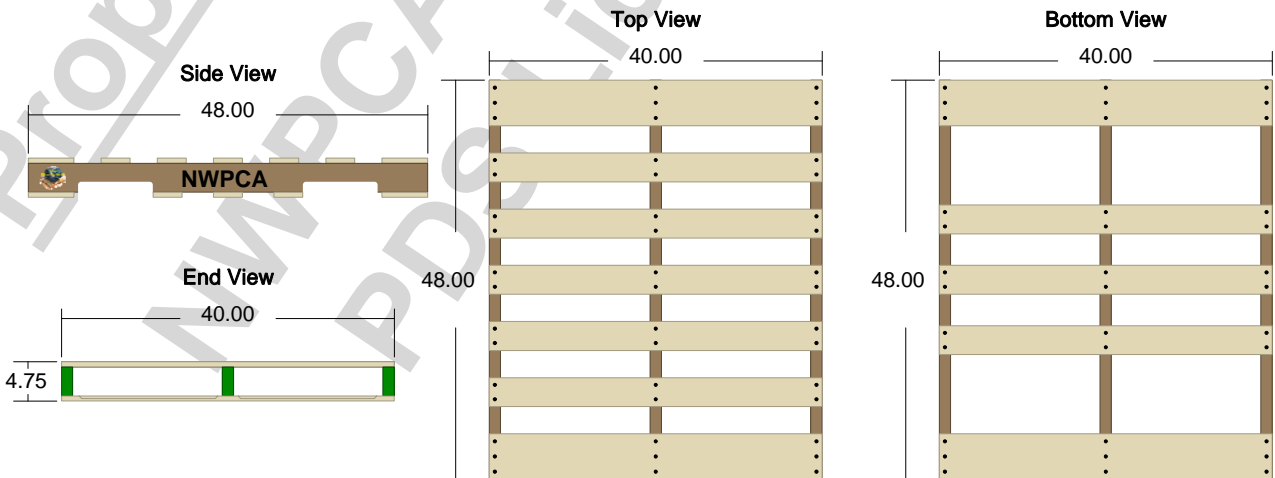
**Fasteners:**  
**Fastener ID:** 2-1/4 x 11-1/2 Ga. SS  
**Fastener Type:** Helically Threaded Nail  
**Fastener Length:** 2.25  
**Wire Diameter:** 0.112  
**Total Number:** 84  
**Production Count:** 84000

**New Lumber:**  
**Lumber ID:** Mixed Eastern Hardwoods  
 High Density Eastern Hardwoods Standard &BTR 50 %  
 Medium Density Eastern Hardwoods Standard &BTR 25 %  
 Low Density Eastern Hardwoods Standard &BTR 25 %  
**Moisture Content** (at manufacture and assembly): Green

**Production Order Cut List:**  
**Boards**  
 8000 - 5/8 x 3-1/2 x 40  
 4000 - 5/8 x 5-1/2 x 40  
**Stringers**  
 3000 - 1-3/8 x 3-1/2 x 48

## Assembly Setup Data:

**Top Deckboard Locations (from Pallet End):**  
 0.00 8.75 15.50 22.25 29.00 35.75 42.50; Reversed: 48.00 39.25 32.50 25.75 19.00 12.25 5.50  
**Stringer Locations (from Pallet Edge):**  
 0.00 19.31 38.63; Reversed: 40.00 20.69 1.38  
**Bottom Deckboard Locations (from Pallet End):**  
 -0.00 15.00 22.25 29.50 42.50; Reversed: 48.00 33.00 25.75 18.50 5.50  
**Fasteners per Connection:**  
 Top Deck: 3 2 2 2 2 2 3  
 Bottom Deck: 3 2 2 2 3



# PALLET DESIGN SYSTEM Version 5.2

## Unit Load Specification and Drawings

All dimensions in inches, weights in lbs.

### Customer:

Company Name of Customer  
Address of Customer

### Prepared by:

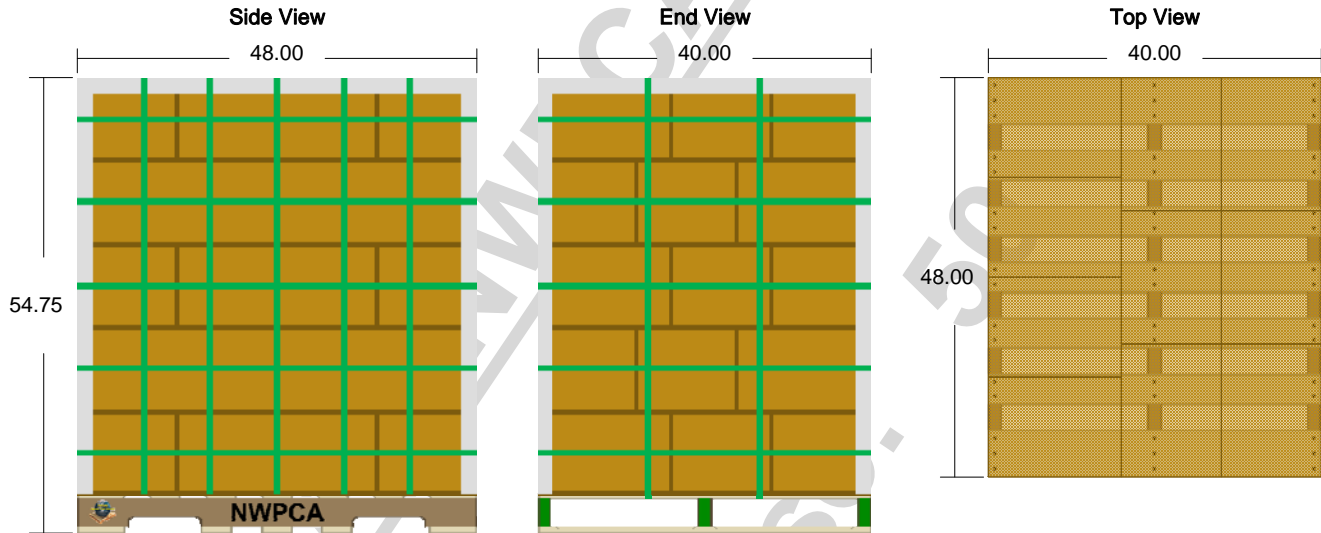
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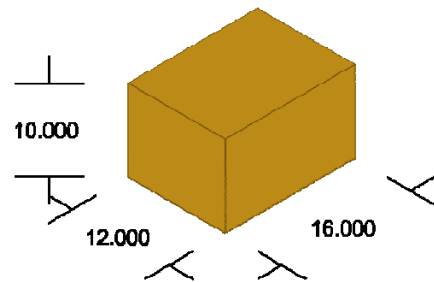
### Container Type: Corrugated Box

**Box Style:** Regular Slotted Container (RSC) #0201  
**Combined Board Type:** Singlewall  
**Flute Profile:** C-Flute  
**Caliper:** 0.156  
**ECT:** 32.000

**Outside Dimensions:**  
**Length:** 16.000  
**Width:** 12.000  
**Depth:** 10.000 \*

**Weight per Box:** 20 lbs.

**Number of Boxes per Layer:** 10  
**Number of Layers per Unit Load:** 5 **Interlock Stacked**  
**Number of Boxes per Unit Load:** 50  
**Total Weight of Load:** 1000 lbs.  
**Total Height of Load:** 50.000 in.



### Load Stabilizers

**Horizontal Straps** Type: Plastic  
**Parallel Straps** Type: Plastic  
**Perpendicular Straps** Type: Plastic  
**Corner Protectors** Type: Plastic  
**Top Edge Protectors** Type: Plastic

