



# Quebec Pallet and Container Manufacturers Association

## Manufacturing

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### Assembly

Different types of nails and fasteners are used to assemble wood pallets and containers. Choosing appropriate fasteners is crucial to optimize pallet performance, and so is selecting the appropriate length, diameter, type and thermal treatment.



In general, the nail should penetrate one third of its length into the piece to be nailed and two thirds into the other piece, with a 1 - 1/4" minimum penetration in stringers or blocks.

There should not be any nail within 1/2" of the edge or extremity of any piece and nails should be spread every 2" maximum. To minimize splitting any stringer, nails should be staggered. Nail heads should be countersunk by 1/16" to 1/8", so they won't resurface during the drying process, to avoid damaging the goods.

Pallets with larger extremity planks or in higher density wood



will be more resistant. It is correctly assumed that abuse damages pallets, not handling. No matter how well-assembled is the pallet, it cannot withstand abusive use. Thus, to optimize pallet performance, it is essential to carefully handle them.

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## Designation

Members of the A.M.P.C.Q. have approved that the length of the stringer should be the first dimension mentioned to designate a pallet. Therefore, a 48 x 40 pallet has 48 inch long stringers and 40 inch-wide planks.

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## Wood Species

In general, wood used to manufacture pallets is divided in three categories: high density hardwood, low density hardwood and soft wood (or resinous).



### 1- High Density Hardwood or Leafy Hard Wood Includes:

- Birch
- Beech
- Cherry Tree
- Wild Cherry Tree
- Oak

- Maple
- Elm
- Ash
- Red Maple

## **2- Low Density Hardwood or Leafy Soft Wood Includes:**

- Walnut
- Linden
- Poplar
- Aspen
- Willow

## **3- Soft or Resinous Wood Includes:**

- Cedar
  - Pine
  - Cypress
  - Hemlock Spruce
  - Spruce
  - Fir
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## **Tolerances**

### **A) Components Dimensions**

Components must have uniform thickness and width and 50% of components must meet or exceed dimensions targeted during the manufacturing process.

Good Manufacturing Practices imply that the thickness of any plank may not vary by more than + or - 1/32".

Here are margins acceptable in pallet manufacturing:

#### **1) Planks and Stringers**

Thickness: + or - 1/16"  
Width: + 1/2" - 1/4"  
Length: + 1/8" - 1/4"

#### **2) Blocks and Stringers**

Width: + or - 1/16"  
Height: + or - 1/16"  
Length: + 1/8" - 1/4"

These tolerances are acceptable for general pallet manufacturing. For some pallets (such as C.P.C., CHEP, G.M.A., etc.), tolerances may vary. We suggest you check the specifications for these pallets.

## **B) Quality of Re-Usable Pallet Components**

Wood used to manufacture pallets should be reasonably exempt of defects which could affect its use and its performance.

### **Knots**

The diameter of the knot should not exceed one third of the plank's width.

### **Warping**

A maximum deviation of 1/4" over a 48 " length is considered acceptable.

### **Depression or Flitch**

Flitch at the corner of the plank should not exceed one sixth of the plank's width and one third of its thickness.

### **Overheated Wood**

Wood overheated during the nailing process is not tolerated. Elsewhere, a maximum of one quarter of the plank's length is admissible.

### **Splits or Cracks**

The length of the split should not exceed the width of the plank.

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## **Types of Nails**



*Common Nail*



*Spiral Nail*



*Ringed Nail*

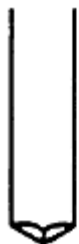
Most pallets are assembled with steel spiral type nails. The shank may vary from 0.090" to 0.132", according to its length which may vary from 1-1/2" to 3". Nails may be resin-coated to increase their resistance to a vertical force or may have thermal treatment, to increase their resistance to a lateral force.

## Types of Nail Points



### *Diamond Point*

The most frequently used; its very sharp end reduces to a minimum any fibre breakage when the nail is hammered in.



### *Chisel Point*

Reduces the risk of splitting the plank, especially in hardwood.

### *Blunt Point*



Requires great force to penetrate hardwood; this type of point practically eliminates all risks of splitting the plank.

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## ISPM 15 Thermal treatment

Since the beginning of 2001, international law has required thermal heat treatment for all wood packaging that is shipped overseas. All pallets, boxes, containers and dunnage used for exportation must respect phytosanitary norms required by law. For more information, please visit the Canadian Food Inspection Agency (CFIA) website at [www.inspection.gc.ca](http://www.inspection.gc.ca)

The goals of thermal heat-treatment are:

- To destroy all parasites such as insect and larva
- To reduce the amount of humidity and weight of wood packaging
- To facilitate the handling of wood packaging

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## Repairing Pallets

If wood pallets are adequately repaired and recycled, they can increase efficiency and contribute to reducing costs for pallet users.

### Repair Categories

	<b>A</b>	<b>B</b>	<b>C</b>
Stringer replaced	Accepted		
Stringer entirely doubled	Refused	Accepted	

Stringer partially doubled	Refused	Refused	Accepted
New wood, same size	Accepted		
Used wood, same size	Refused	Accepted	
Used wood, variable size	Refused	Refused	Accepted

### **Category "A"**

Repairs for premium quality multiple use pallets. Low cost solution to prolong pallet life and improve its appearance.

### **Category "B"**

Standard repairs for multiple use pallets.

### **Category "C"**

Acceptable repairs for non-returnable pallets only.

For these three repair categories, nails and fasteners exceeding the surface of the pallet should be hammered in, to avoid damaging the goods placed on the pallet. Any exposed nail point will not be tolerated.

Using metal plates to repair stringers is accepted, as long as stringers are not completely separated or have pieces missing.

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## **Factors to Consider when Purchasing Wood Pallets**

You should always carefully evaluate packaging and handling systems before determining the specifications of the wood pallets to be purchased. Here are a few of the numerous elements to be considered:

### **1- Unit Load**

- What is the value of the merchandise to be handled ?
- What is its weight ?
- What type of packaging is being used (bags, cardboard boxes, barrels, etc.) ?
- What is the size of the merchandise to be handled ?

- What type of fasteners will be used (steel straps, plastic film, etc.) ?

## **2- Storage and the Environment**

- Are unit load/pallet assemblies placed in a compartment storage system ?
- If pallets are simply stacked, is there a need for a bottom deckboard ?
- Is it better to have 2 entry pallets, 4 entry pallets or block pallets ?
- What type of handling equipment will be used ?
- What clearance is required under the face of the top deckboard ?
- What tolerances are required for storage, palletization and transportation systems ?

## **3-Shipping and the Environment**

- Can we optimize the cubic space available (interior dimensions of the transportation vehicle compared with the unit load and its weight) ?
- Is it profitable to return pallets ?
- Should we participate in a pallet exchange program (C.P.C. or others) ?

## **Conclusion**

Once you have determined pallet size, style, type and model, you must prepare specifications and precise plans which should include details like pallet dimensions and components, types of nails or fasteners to be used, and all codes and markings which will have to be affixed to each pallet.

As you can see, the process to establish and estimate for a simple material handling pallet can be laborious. That is why we strongly recommend that you work with a member of the A.M.P.C.Q. (Quebec Pallet and Container Manufacturers Association).

Each member has the experience and qualifications to ensure a quality



product. Also, he voluntarily follows every practice revealed in this manual, because he knows that your satisfaction and his future are at stake.

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