Electronics Industry Pallet Specification
Draft Updated Jan. 8, 2001

Objectives:

This document is meant to establish "standardized" parameters and guidelines for usage by pallet designers and manufacturers when specifying and building material handling pallets for use in the electronics industry with primary emphasis at this time on the computer industry.

The purpose is to reduce total supply chain costs by improving the quality and consistency of pallets used within the ***computer industry*** integrated supply chain. It is intended that this will be achieved through the application of this VOLUNTARY specification by the organizations which are part of this supply chain; including, but not limited to the following entities:

Component Suppliers > Manufacturers > Resellers / Distributors > Retailers > Reverse Logistics

a. **Component Suppliers:** Companies which are key to the process since they are often the originator of the pallet that should be used throughout the pipeline. They ship parts, subassemblies, and/or finished goods to other manufacturers or direct to selling organizations. Potential Examples: *Solectron, Liebert, AMP, Intel, and so on.*

b. **Manufacturers/OEMs:** These are the major computer manufacturers or companies contracted by them to manufacture finished goods from parts either supplied or built themselves. Potential Examples: *IBM, HP, Compaq, Apple, Micron, Dell, Acer, Solectron, Celestica, USI, STK, Intel, and so on.*

c. **Resellers / Distributors:** Organizations who buy large quantities of goods from Manufacturers and reconfigure per customer order. Potential Examples: *Ingram Micro, Magirus, CompuNet, Aslan, MicroAge, and so on.*

d. **Retailers:** Organizations that receive finished goods from manufacturers mostly in customer ready condition. Potential Examples: *Circuit City, Best Buy, Sears, CompUSA, and so on.*

e. **Reverse Logistics:** Organizations involved in lease returns, salvage operations, and so on. These organizations may be branches of the large manufacturers or vended operations controlled by them. They may be involved in the end-of-life management of the pallet, reuse, or recycling and so on.

Disclaimer: The companies listed above have not necessarily endorsed this specification.

Preferred Sizes:

Standard Sizes: The following deck sizes are believed to provide the greatest overall efficiency and minimum adverse impact to the computer industry supply chain. The default dimensions shall be **1200x1000mm (or 1000x1200mm**) but industry partners may specify the **800x1200mm** dimension (Euro Pallet) if necessary for their operations. Note: The first dimension listed indicates the stringer board length. It is expected that the 1200x1000mm dimension will be the prevailing size in the US, Latin America, Asia, the UK and most other parts of Europe and therefore will be used to the greatest extent. The 800x1200mm "Euro Pallet" may be the prevailing size and style in some major industrial countries in Europe.

Custom Sizes: Other deck dimensions are approved providing that these dimensions reduce the cost of the supply chain by ensuring better fit to cargo containers relative to the size of packaging placed on the pallets and if performance attributes match that of the standard pallets. Custom pallets should be reserved for situations wherein the pallet load consists of a single package or product or for point to point closed loop situations managed separately from the International Pool System. For bulk shipping or general purpose palletization the preferred sizes highlighted above should be used. Industry partners are to accept shipments from each other on certified pallets of the preferred size and style without question.

Preferred Styles:

The following pallet styles are acceptable and preferred globally:

- **Preferred:** Full 4-way Entry, Non-Reversible, 9-block, with full perimeter bottom deckboards (Fig. 1)
- **Acceptable:** Full 4-way Entry, Non-Reversible, 9 block, with uni-directional base and bottom decking (Fig 2).

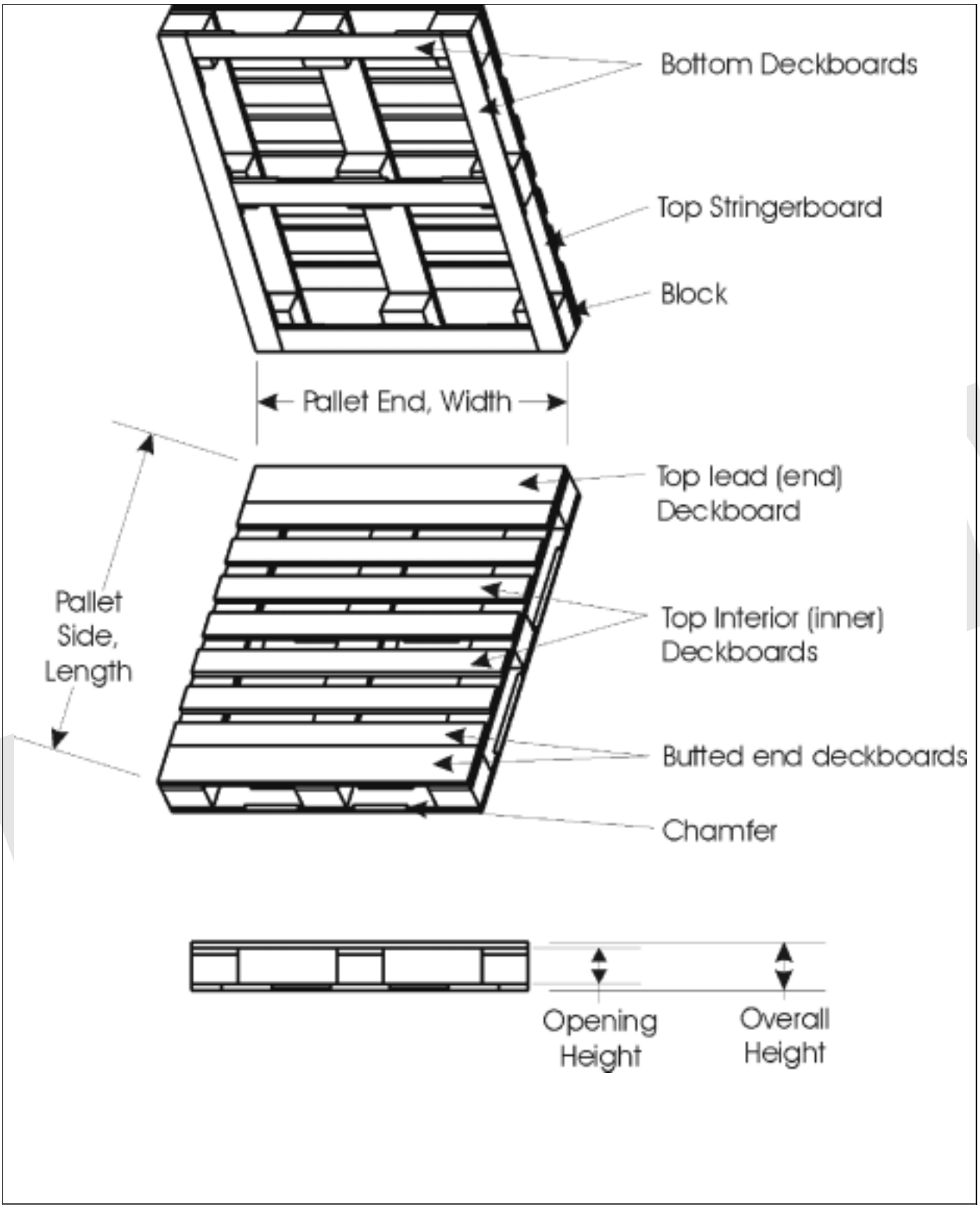


Figure 1: Block Pallet Detail, Full Perimeter Base Shown Above (Preferred)

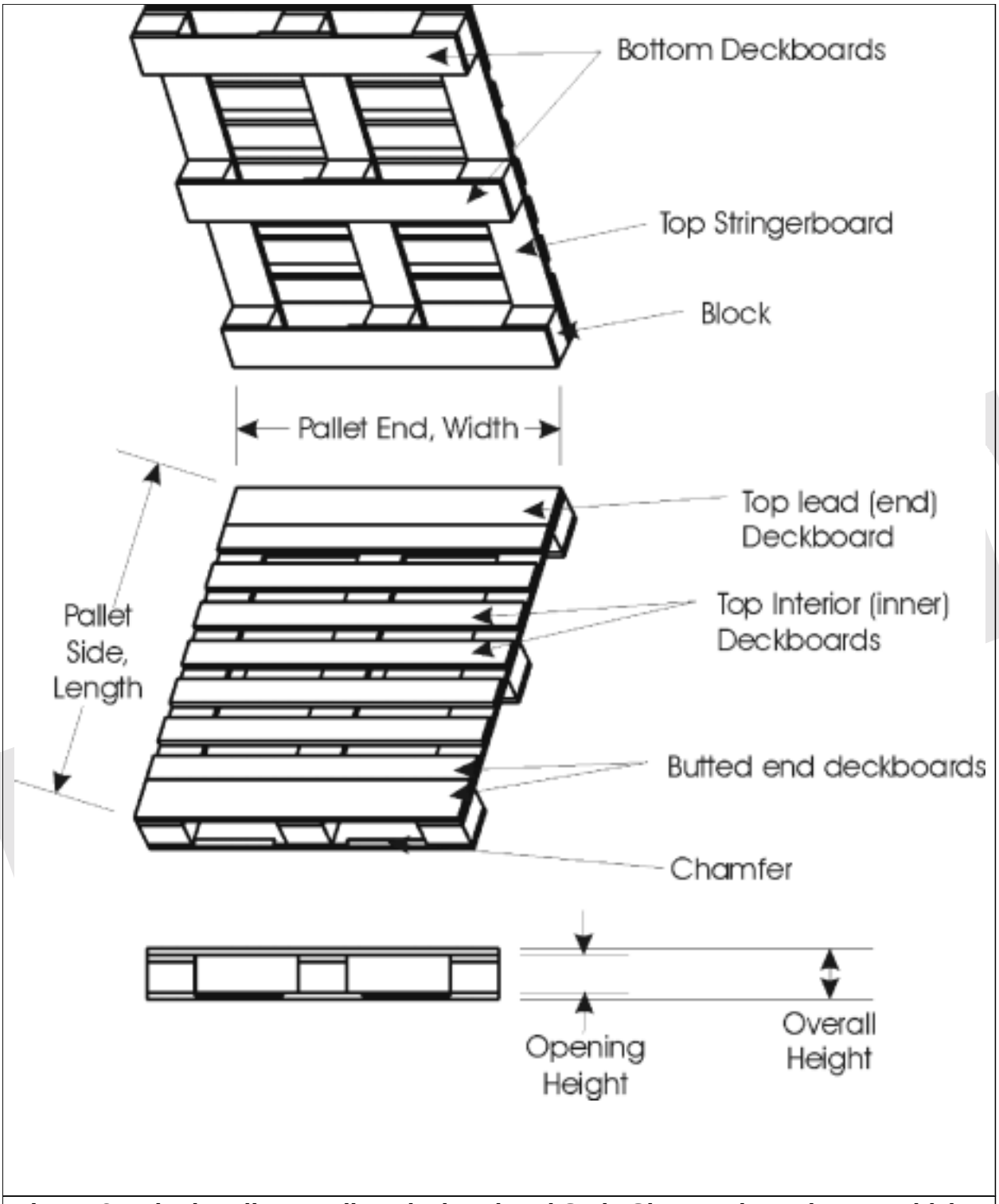


Figure 2: Block Pallet Detail, Uni-Directional Style Shown Above (Acceptable)

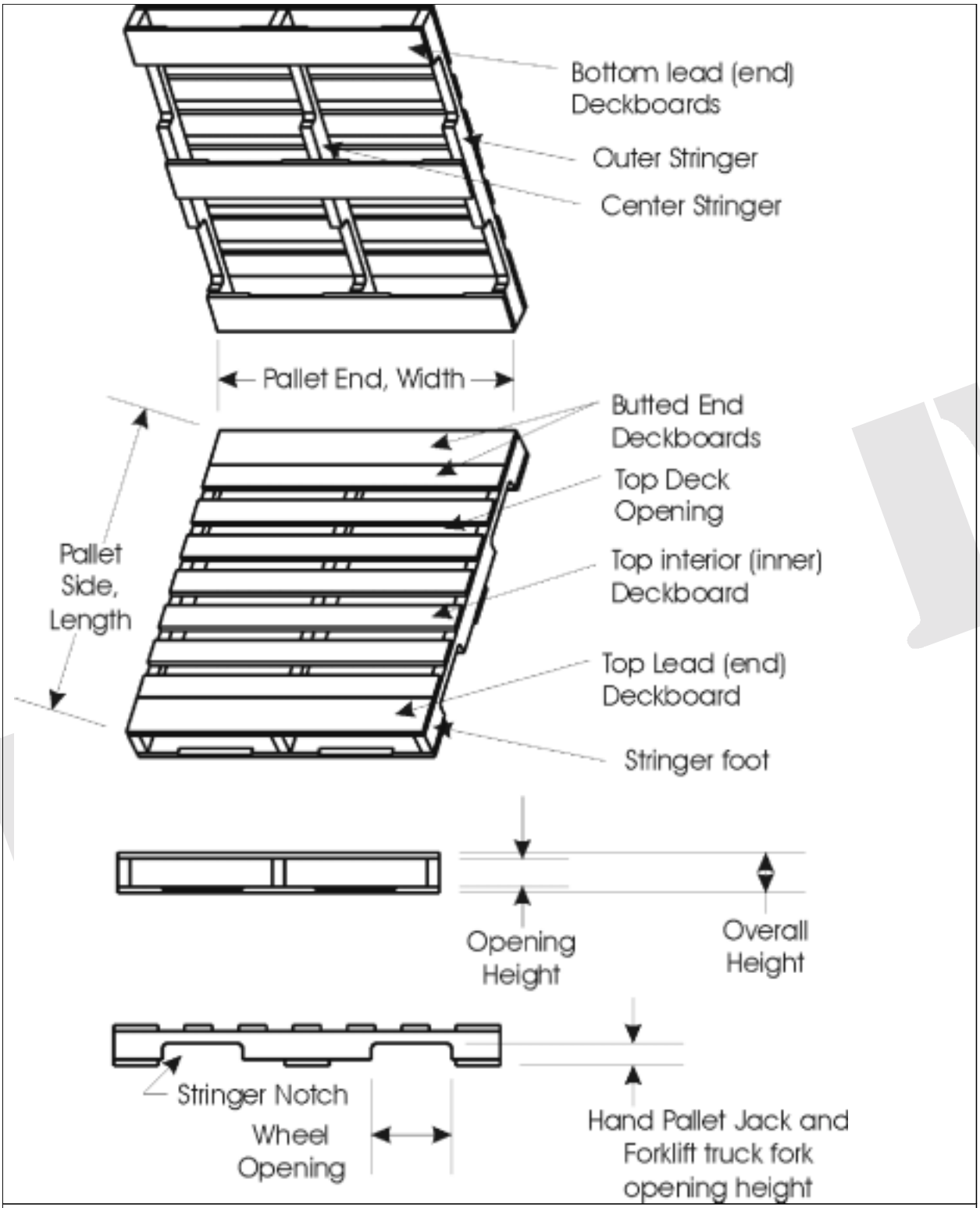


Figure 3: Stringer Pallet Detail, Stringer style acceptable but NOT preferred

Minimum Access Dimensions for Lift Equipment:

Pallets should be designed to ensure maximum flexibility with regard to mechanical equipment used for lifting and moving the load. Fork lifts, motorized pallet jacks, and manual pallet jacks should all be able to lift and move the load.

Expendable vs. Reusable Pallets:

It is preferred that pallets be designed to ensure reusability. The pallet should be capable of surviving at least one complete cycle through the supply chain, not merely one trip to your customer. It is the intention of this committee that pallets be designed in such a manner that scrap pallets be minimized and that the vast majority of pallets be standard such that they can be reused with confidence. Arrangements for the return and reuse of standard and custom pallets should be made where economical and all partners to this effort should be willing to cooperate on a reverse logistics process where appropriate.

Preferred Materials:

While solid wood continues to be the economical choice there are compelling reasons to consider other types of materials for pallet construction. This becomes even more critical if we agree to a worldwide reusable pool system for our industry. Solid wood has many drawbacks including gaps in the decks, nails, splinters, infestation, moisture, mold, and so on. This committee prefers an alternative material that would otherwise meet all the objectives regarding quality and cost effective performance. We recognize that the purchase price of the pallet may be higher than a typical wood pallet but that the cost per use will be viewed as the key measure.

Treatment for Infestation Requirements:

If any amount of solid unprocessed wood is used in the construction of the pallet, it must meet the following minimum requirements in order to be certified for International use. These requirements may be superceded by International Regulations.

- **Coniferous Species (C)**, trade term "Softwood": If the pallet contains any amount of solid, unprocessed coniferous wood, those components must be heat treated to a minimum core temperature of 56C (133F) for a minimum of 30 minutes AND have a maximum moisture content at the time of manufacture less than 20% by weight. **Note:** Pallets constructed in this way would also get the "HT-C" marking (ref. Appendix B).

- **Non-Coniferous Species (NC)**, trade term "Hardwood": If the pallet contains any amount of solid, unprocessed hardwoods they must be heat treated to a minimum core temperature of 56C (133F) for a minimum of 30 minutes. No specific maximum moisture content is specified at this time for hardwoods; however, lower moisture content (and therefore lower weight) is preferred. **Note:** Pallets constructed in this way would also get the "HT-NC" marking (ref. Appendix B) provided that no amount of heat treated conifer was used also.

Weight:

The minimum weight within the established performance criteria is the goal. 23kg (50 lbs.) is a target maximum weight for the 1200 x 1000mm and 800 x 1200mm sizes.

Certification Process:

Pallets intended for general usage with the electronics industry which meet the design and performance parameters defined herein may be certified by the pallet manufacturers, and may be marked as such. Nonstandard pallets must not be marked as being certified.

Prior to usage of any certification markings on a given pallet design, detailed specifications, drawings, and test results for pallet to be certified shall be submitted to EIPS for approval.

Pallets should be submitted to one of the approved testing facilities recognized by the EIPS group. The bottom pallet of a pallet stack is often damaged during the rigors of transportation when shipping to test facilities, and therefore it is highly recommended that the bottom pallet of each stack be expendable or an extra sample.

The following are the number of sample pallets recommended for testing;

Prototype Testing:

Three (3) samples should be submitted for preliminary tests of racking, conveyor, and corner drop performance. These are typically the most severe tests for most pallet designs. It is suggested that successful prototype testing be completed before proceeding to certification testing.

Certification Testing:

Thirty-five (35) samples should be submitted. This represents 3 replicate tests for each of the test procedures outlined in this protocol.

Approved Testing Facilities:

Virginia Tech University Center for Unit Load Design Blacksburg, Virginia John Clarke, Director 540-231-5370 E-Mail: unitload@vt.edu http://www.unitload.vt.edu/	**Michigan State University** School of Packaging East Lansing, Michigan S. Paul Singh, Phd. 517-355-9580 E-Mail: singh@msu.edu http://www.pkg.msu.edu	**San Jose State University** College of Applied Sciences San Jose, California Jorge Marcondes, Phd. 408-377-3210 E-Mail: marconde@sjsuvm1.sjsu.edu http://www.sjsu.edu/depts/packtech/index.htm

Environmental Considerations:

In concert with the generally accepted environmental hierarchy of "reduce, reuse, recycle" the pallets should incorporate a relatively high degree of recycled content, preferably post-consumer. Secondly, the designs should be capable of reuse. Lastly, the designs should consider the ultimate disposal and recycling of the materials used to construct the pallet. Avoid permanent commingling of dissimilar materials unless it can be demonstrated that it will not inhibit recycling of the pallet at the end of its useful life. Pallet manufacturers are expected to demonstrate "product stewardship" and be an active partner in the eventual recovery and recycling of the pallets.

Furthermore, the construction or manufacturing processes shall not include the use of CFC's, HCFC's, or halogenated flame retardants, or intentionally introduced heavy metals (mercury, lead, hexavalent chromium, or cadmium). The total composition must not include in excess of 100ppm (0.01%) of incidental amounts of these heavy metals.

Appendix A: Minimum Performance Requirements

Any pallet which otherwise meets the general objectives and the minimum requirements listed in this section will be considered acceptable for use within the electronics industry. We do not intend to exclude any materials or inhibit creative invention. These tests and performance criteria will ensure that the pallets used within the industry are rugged and capable of multiple uses without damage to the products carried on them or resulting in safety concerns. Independent laboratories listed on page 5 are available to conduct these tests at the expense of the pallet manufacturer. Only pallets meeting the test standards and certified are to be used where compliance with this voluntary specification is required.

Table A1: Core Requirements: Applicable to all standard pallets

1	Pallet Size	**1200 x 1000mm or 1000 x 1200mm**	**800 x 1200mm or 1200 x 800mm**
2	Base Configuration	Full Perimeter	Unidirectional
3	Reversible?	No	No
4	Rackable?	Yes	Yes
5	Accessibility (Fork Lifts, Pallet Jacks)	Full 4-way Entry	Full 4-way entry
6	Top Deck Coverage	60% min.	60% min.
7	Bottom Deck Coverage	35% min.	35% min.
8	Minimum Vertical Clearance Under Top Deck	95mm (3.75")	95mm (3.75")
9	Maximum Vertical Clearance Under Top Deck	156mm (6.14")	156mm (6.14")
10	Maximum Width of Center Posts or Stringers	160mm (6.3"), 100mm (4" preferred if possible)	160mm (6.3"), 100mm (4" preferred if possible)
11	Minimum Width between outer Posts/Stringers	720mm (28.3")	720mm (28.3") on 1.2m 590mm (23.2") on 0.8m
12	Maximum Overall Height	165mm (6.5")	165mm (6.5")
13	Target Maximum Gross Weight	22.7kg (50 lbs.)	22.7kg (50 lbs.)
14	Fasteners (if used)	Meet minimum criteria in ASME, MH1, part 3	Meet minimum criteria in ASME, MH1, part 3
15	Racking Performance per ASTM D1185	454kg (1000 lbs.), Max. Deflection 13mm (0.5")	454kg (1000 lbs.), Max. Deflection 13mm (0.5")
16	Forklift Tine Performance per ASTM D1185	454kg (1000 lbs.), Max. Deflection 13mm (0.5")	454kg (1000 lbs.), Max. Deflection 13mm (0.5")
17	Static Stacking Performance (Warehouse) per ASTM D1185	1800 kg (4000 lbs.), Max. Deck Deflection 6mm (0.25")	1800 kg (4000 lbs.), Max. Deck Deflection 6mm (0.25")
18	Conveyor Performance per ASTM D1185	454kg (1000 lbs.), Max. Deck Deflection 6mm (0.25")	454kg (1000 lbs.), Max. Deck Deflection 6mm (0.25")
19	Coefficient of Friction: Top Deck with Cartons	0.40 minimum	0.40 minimum
20	Coefficient of Friction: Under Deck with Forks	0.40 minimum	0.40 minimum
21	Coefficient of Friction: Bottom deck on Steel	0.40 minimum	0.40 minimum
22	Coefficient of Friction: Stacked Empty Pallets	0.40 minimum	0.40 minimum
23	Inertness (related to Infestation Problems): Preference is for constructions not requiring chemical treatments or APHIS certifications to comply with international pest regulations	Required	Required
24	Fire Safety (related to Fire Marshal Reqmts): Preference is for constructions not requiring unusual facilities requirements for fire safety	Required	Required
Note: The suggested load for all strength tests is corrugated boxes (400x600mm) to fill out the pallet completely and stacked 5 layers high. Dead loads may be used for the stack test.			

Table A2: Durability Requirements for Reusable (Pool Type) Pallets

Requirement	1200mm x 1000mm or 1000mm x 1200mm	800mm x 1200mm or 1200mm x 800mm
a. Corner Drop	12 drops at 1m (40"), Maximum Diagonal Deformation of 1.5%	12 drops at 1m (40"), Maximum Diagonal Deformation of 1.5%
b. Tine Tip Impacts on Block or Stringer Ends	3 impacts at 30cm (12"), no failures	3 impacts at 30cm (12"), no failures
c. Tine Heel Impacts on Lead Edges	3 impacts at 120cm (48"), no failures	3 impacts at 120cm (48"), no failures
Note: The suggested load for all strength tests is corrugated boxes (400x600mm) to fill out the pallet completely and stacked 5 layers high. Dead loads may be used for the stack test.		

Table A3: Durability Requirements for One-Way Disposable Pallets

Requirement	1200mm x 1000mm or 1000mm x 1200mm	800mm x 1200mm or 1200mm x 800mm
a. Corner Drop	3 drops at 1m (40"), Maximum Diagonal Deformation of 1.5%	3 drops at 1m (40"), Maximum Diagonal Deformation of 1.5%
b. Tine Tip Impacts on Block or Stringer Ends	3 impacts at 15cm (6"), no failures	3 impacts at 15cm (6"), no failures
c. Tine Heel Impacts on Lead Edges	3 impacts at 60cm (24"), no failures	3 impacts at 60cm (24"), no failures
Note: The suggested load for all strength tests is corrugated boxes (400x600mm) to fill out the pallet completely and stacked 5 layers high. Dead loads may be used for the stack test.		

Table A4: Pallet Use Conditions, applicable to all standard pallets

Requirement	1200mm x 1000mm or 1000mm x 1200mm	800mm x 1200mm or 1200mm x 800mm
Temperature (Distribution Environment) [1]	-25C to +60C (-13F to +140F)	-25C to +60C (-13F to +140F)
Stacking (Dynamic / In Transit)	2.5m (100 inches)	2.5m (100 inches)
Stacking (Static / Warehouse Storage)	5.0m (200 inches)	5.0m (200 inches)
Transportation Modes	Air, Ocean, Truck	Air, Ocean, Truck
Food Contact / Refrigerated Storage	No	No
Material Handling: Conveyors	Yes	Yes
Material Handling: Cranes / ASRS	Yes	Yes
Material Handling: Lift Equipment	Yes	Yes
Warehouse Storage: Open Racks	Yes	Yes
Notes: 1. Temperatures ranging from -40C (-40F) to +60C (+140F) may be encountered but the limits for the test laboratories is -25C (-13F) to +45C (113F).		

Appendix B: Pallet Marking Procedures

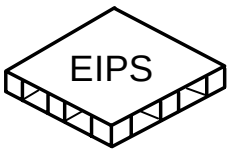
This marking procedure shall be used to mark pallets certified as meeting this specfication.

Scope	Pallets made from any amount or any combination of solid wood and/or processed wood components. See also "Certification Marks" for pallets meeting this specification but which are not made from wooden components.
Objectives	To implement a common marking procedure globally and to identify and use only approved and properly treated materials as required for exports to regulated countries.
Marking Procedure	Mark the pallet, skid, crate, or other wooden packaging assembly a minimum of one time on a visible vertical surface, using **19mm** (0.75") minimum characters which are permanent and indelible. This may be done with ink jet printing, heat stamping, paint stencil, or other similar common method. Mark the information as specified below. If possible, it is recommended to make the font larger and bolder for the material classification than the other data elements (as shown in the examples below). However, this is not required if it prevents a simple one pass printing application. In all cases, the material classification marking shall be equal or larger in size than the other data elements. Redundant markings on the opposite side of the pallet/crate is recommended but optional. If vertical surfaces provide insufficient space for the markings then scale the characters accordingly or apply them to a top horizontal surface provided that at a minimum the material classification is repeated on a vertical surface. It is also allowed to print the information on multiple lines or break up the information, for instance spread the information across three separate blocks on a block style pallet.
Material Classification Markings **(only one applies to any given pallet)** ***Please comment on the new suggested terminology and abbreviations to avoid confusion caused by using trade terms (SW and HW)***	A given item shall only carry ONE classification regardless of how many different materials are included in the construction. Follow this list in sequence, the item should carry the marking of the first scenario that matches exactly. Even if the majority of the construction consists of non-SWPM components, the marking shall relate to the solid wood component that exists (if any) and any permanent treatment that was done. "**C**" (Conifer / Softwood): Pallets marked with this abbreviation contain ANY amount of solid, untreated and unprocessed conifer ("softwood", or needle bearing type species of wood) even if combined with treated components. "**NC**" (Non-Coniferous / Hardwood): Items marked with this abbreviation contain ANY amount of solid untreated and unprocessed non-coniferous wood ("hardwood", or leaf bearing species) and ***no conifer*** even if combined with treated components. "**HT-C**" (Heat Treated Conifer): Items marked with this abbreviation contain ANY amount of solid, properly heat treated conifer (*aka* "softwood", or needle bearing type species of wood) which by definition means that it has been heated to a core temperature of at least 56C (133F) for a minimum of 30 minutes and that documentation certifying that has been provided by the treatment facility to the pallet manufacturer and can be traced to the production of that specific pallet. This also must not contain any amount of untreated softwood. Note: Only use lumber that meets the temperature and duration requirements above. "**HT-NC**" (Heat Treated Non-Coniferous/Hardwood): The same heat treatment rules as with conifers (temperature, duration) except when done for non-coniferous or "leaf bearing" species of wood. "**Chem-C**" (Chemical Treated Conifer/Softwood): For conifers that have been permanently treated with chemicals. Does not include fumigation treatment. "**Chem-NC**" (Chemical Treated Non-Coniferous/Hardwood): For non-conifers that were permanently treated with chemicals. Does not include fumigation treatment. "**NO-SWPM**" (No Solid Wood Packing Material): Items marked with this abbreviation may appear to be made of wood and must contain ANY amount of processed wood components but no solid wood of any type whether treated or not. Example: A pallet or crate made with any amount of Oriented Strandboard (OSB), plywood, strawboard, masonite, Paper-Overlaid-Veneer (POV), particle board, or combination of these and meeting the definition of non-solid wood packing materials as defined by the Animal and Plant Health

Inspection Service (APHIS) ***and*** **which is totally free of solid wood.** Note: Plywood is not considered "solid wood" because it has been processed under extreme heat and pressure.

"XX" Items marked with the XX abbreviation would be items in which the composition cannot be affirmed such as with refurbished pallets. Existing markings may also be covered up with this as needed. This would be a signal that this particular item may require fumigation or other approved treatment. Additional "X's" are optional (more than 2 if needed is acceptable).

Note: There is no marking for fumigation since this is a temporary treatment. Fumigation, if done must be documented with certificates of fumigation generally issued by the fumigator and endorsed by a Government approved Agency..

Supplier Designation	***Required:*** To identify the final assembly supplier of the pallet, package, crate and so on in some manner. This may be done in any **one** of these ways.... 1. A minimum 5 character abbreviation of the supplier's name... -or- 2. A minimum 3 digit abbreviation followed by 2 numeric digits to distinguish unique manufacturing facilities. -or- 3. The supplier's logo if this can be easily distinguished. The logo can also be followed with a two (2) digit number to identify a specific facility if needed. -or- 4. The full name of the supplier if this can be accommodated in the space available. The name shall be that of the final assembly location which built the pallet or package and shipped it for use. Take care to ensure that the code chosen does not resemble one of the material classifications.
Date of Manufacture	***Required:*** Format may be MM-YYYY or YYYY-MM. The specific day is not required. A four digit year is considered important since in some parts of the world the year precedes the month when dates are printed.
Engineering Change Number	***Optional:*** The six digit alphanumeric "EC" number which may distinguish a different design for items with the same part number. This may be important to some locations and it is their prerogative to specify if it if they wish. If the EC level is included, use the prefix "EC" in front of the number to identify it.
Reusable Pool System Symbol	***Optional / Restricted:*** For instance, the familiar "EUR" symbol associated with the European pool system pallets (aka "Euro Pallets") or any other similar program previously established or future program. This marking to be placed as specified by that system. Only pallets meeting the design and construction requirements of the marked pool system are to carry that symbol. Note: Unless the material type is marked on a "Euro Pallet" it should not be exported to a regulated country.
EIPS Certification Symbol / Logo	***Required:*** Graphical symbol provided by the EIPS committee of the Institute of Packaging Professionals (IoPP). This applies to all pallets tested and certified to this specification regardless of material composition. Something like this >>>>>>>>> 
Example Marking of a Supplier's Wooden Pallet	**HT-NC__ONG12__06-2000__ [EIPS Symbol]** **(**Matl. Classification) (Supplier) (Month/Year) (EIPS Certification Symbol) Underscore shown to demonstrate spacing between elements, it is not marked. For plastic, metal, corrugated, or other non-wooden type pallet only the certification symbol is marked. See Figures 4 through 7 on next two pages.

Points of Emphasis	1. Do not mark pallets which are clearly not of wooden origin unless that assembly does have some wooden components somewhere else in the assembly. For instance, if a package consisted of a plastic pallet and a plywood crate on top of it then the appropriate wood classification marking should be placed on a vertical surface of the wooden crate portion, not the plastic base pallet. It is not necessary to mark corrugated or plastic items. 2. Use the "XX" material classification marking if the species, origin, or treatment cannot be affirmed. By default, anything marked this way or unmarked cannot be used for export to a regulated country. 3. If refurbishing a pallet which has already been marked, obliterate, cover up, or remove the original marking and then instruct suppliers to turn this side to the inside so that it will not likely be observed. Any marking appearing on an inside surface is not to be used for inspection or operational purposes. 4. Every wooden assembly would get some type of marking regardless of composition at the time of manufacture.
References	USDA's APHIS Web site: http://www.aphis.usda.gov/ppq/swp National Wooden Pallet and Container Association http://www.nwpca.com

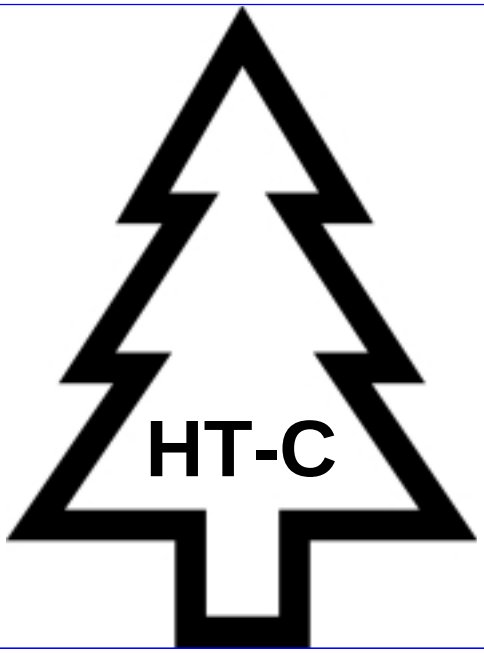


Figure 4: Conifer Symbol. Variations:

HT-C: Heat treated to 56C for 30 minutes.

KD19-C: Kiln dried to <20% moisture only and not meeting 56C for 30 minutes.

HT19-C: Heat treated to 56C for 30 mins. AND dried to <20% moisture content.

CPI-C: Chemical Pressure Impregnated

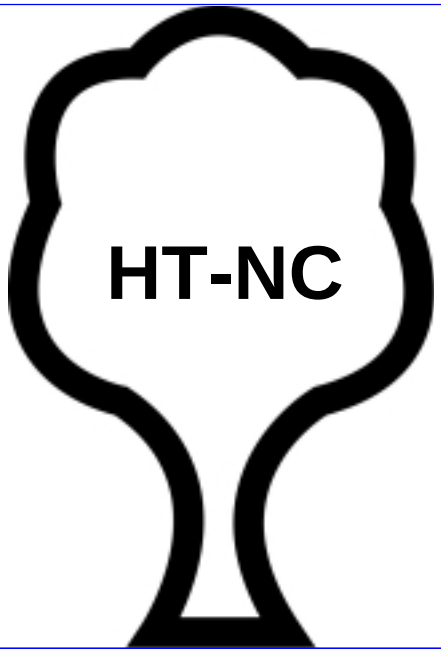


Figure 5: Non-Conifer Symbol. Variations:

HT-NC: Heat treated to 56C for 30 minutes.

KD19-NC: Kiln dried to <20% moisture only and not meeting 56C for 30 minutes.

HT19-NC: Heat treated to 56C for 30 mins. AND dried to <20% moisture content.

CPI-C: Chemical Pressure Impregnated

NO-SWPM

Figure 6: NO SWPM Symbol

To be used for wooden based packaging materials which do NOT meet the definition of solid wood.

Examples: Constructions of any combination of plywood, OSB, masonite, presswood, and non-wooden materials.

Do not use on materials clearly not of wooden based materials (ex: entirely plastic).

Figure 7: Pest-Free Symbol.

To be used on any wooden based packaging that meets 100% of **ALL existing Intl. regulations** restricting solid wood.

Examples: Assemblies made entirely of NON-SWPM or made in combination with any amount of solid wood that has been heat treated AND dried to 20% or less moisture or chemical pressure impregnated.

Appendix C: References and Related Publications:

This list is provided only for convenience and does not necessarily imply that any individual document is a part of this specification unless otherwise specified herein.

Document Number	Description / Title
ISO 3676	Packaging -- Unit Load Sizes -- Dimensions
ISO 3394	Dimensions of Rigid Rectangular Packages, Transport Packages
ISO 6780	Flat Pallets for Materials Handling - Principle Dimensions and Tolerances
JIS Z 0161	Dimensions of Unit Load Sizes
UIC 435-2	Euro Pallet Specification (Copyright by Intl. Union of Railways 16, rue Jean Rey 75015 Paris France)
ASTM D1185	Pallets and related structures Employed in Materials Handling and Shipping
ASME MH1	Pallets, Slip Sheets, and Other Bases for Unit Loads
ASME MH1, Part 1	Definitions of Terminology Covering Pallets and Related Structures
ASME MH1, Part 2	Sizes of Wood Pallets
ASME MH1, Part 3	Wood Pallets
ASME MH1, Part 4	Export Pallets
ASME MH1, Part 8	Slip Sheets
ASME MH1, Part 9	Wood Pallets for US Government Use

Legend / Sources:

ISO = International Organization for Standardization (http://www.iso.ch),
ASTM = American Society of Testing and Materials (http://www.astm.org), 610-832-9585
ANSI = American National Standards Institute, (http://www.ansi.org),
ASME = The American Society of Mechanical Engineers, (http://www.asme.org),
JIS = Japanese Industrial Standard, 1-24, Akasaka 4, Minato-ku, Tokyo 107 Japan
DIN = Deutschland Institute for Normalization (Germany)

Appendix D: Terminology

Following are common terms used in the pallet industry which may or may not be included in this specification.

Term	Definition
Banding Notch	See “strap slot”
Block	Rectangular, square, or cylindrical deck spacer, often identified by its location within the pallet -- corner block, end block, edge block, inner block, center or middle block
Block Pallet	A type of pallet with blocks between the pallet decks or beneath the top deck
Butted Deckboard	An inner deckboard placed tightly against an adjacent lead deckboard.
Bottom Deck	Assembly of deckboards comprising the lower, load bearing surface of the pallet.
Captive Pallet	A pallet intended for use within the confines of a single facility, system or ownership; not intended to be exchanged.
Chamfered Deckboards	Deckboards with edges or one or two faces beveled, either along the full or specified length of board or between the stringers or blocks, allowing easier entry by pallet jack wheels.
Closed Distribution System	Shipping system restricted to moving goods between specified plants and facilities.
Coniferous Wood	Derived from coniferous species of wood which are needle bearing trees such as Pine, Spruce, and Fir. These are also known in the trade as “softwoods” even though it has nothing to do with wood density. Many coniferous species are susceptible to infestation by the pinewood nematode.
Non-Coniferous Wood	Derived from non-coniferous (deciduous) species of wood which are broadleaf bearing trees such as Oak, Aspen, Maple, Alder, and Poplar. These are also known in the trade as “hardwoods” even though it has nothing to do with wood density. Many hardwoods are susceptible to infestation by wood boring insects such as the Asian Longhorned Beetle.
Deck	One or more boards or panels comprising the top or bottom surface.
Deck Mat	Assembly of deckboards and stringerboards, forming the deck of a block pallet.
Deckboard	Element or component of a pallet deck, oriented perpendicular to the stringer or stringerboard.
Deckboard Spacing	Distance between deckboard supports (stringers, stringerboards, or blocks)

Deflection	The amount of deformation or bending in a pallet or pallet component under load
Double Face Pallet	A pallet with top and bottom decks
Drive Screw Nail	Helically threaded pallet nail
Engineered Wood	Products made from processed or manufactured wood. For instance, plywood and oriented strandboard. Although made from wood these are not considered "solid wood" with regard to quarantine regulations.
Exchange Pallet	A pallet intended for use among a designated group of shippers and receivers where ownership of the pallet is transferred with the ownership of the unit load; common pool pallet.
Expendable Pallet	A pallet designed for a single trip to the receiver wherein it is disposed ("one way").
Fastener	A mechanical device for joining pallet components such as nails, screws, bolts, or staples.
Flush Pallet	A pallet with deckboards flush with the stringers or blocks along the sides of the pallet.
Fork Entry	Opening between the decks, beneath the top deck or beneath the stringer notch to admit forks.
4-Way Block Pallet	A pallet with openings at both pallet ends and along pallet sides sufficient to admit hand pallet jacks; full four-way entry pallet.
Free Span	The distance between supports in a warehouse rack.
4-way Entry (Full)	Implies that it is a block style vs. Stringer style pallet.
4-way Entry (Partial)	Implies that is is a stringer style pallet with fork notches in the stringers.
Full Perimeter Base	A pallet which has bottom deckboards on all four sides on the outside edges of the pallet. See also Uni-Directional base.
Hand (wheel) jack opening	Space provided in the bottom deck to allow pallet jack wheels to bear on the floor.
Hardened Steel Nail	Heat treated and tempered steel pallet nail with a MIBANT angle between 8 and 28 degrees.
Hardwood	An industry term meaning wood from non-coniferous or broad leaved species of trees. This does not mean that it is always harder than some coniferous (softwood) species.
Heat Treated	Implies that the wood has been heated to a specific core temperature and duration. 56C for 30 minutes is typically the minimum termperature and duration in order to be considered "heat treated". Note: "Kiln Dried" may or may not have achieved minimum temperature requirements to be considered heat treated; conversely, something that is heat treated is not necessarily "dry" (< 20% moisture)..
Helically Threaded Nail	Helically (continuous spiral) threaded pallet nail. See also drive screw nail
Joint	Intersection and connection of components, often identified by location within the pallet as the end joint, center joint, and corner joint.
Kiln Dried	Implies that the wood has been dried in a kiln to a moisture content of less than 20% by weight. Usually this also means that the temperature achieved also meets heat treatment requirements but not necessarily.
Length	Refers to the stringer or stringerboard (in block pallets) length; it also refers to the first dimension given to describe the pallet. I.e. 48" x 40", where 48" is the pallet stringer / stringerboard length.
MIBANT Angle	The bend angle in a fastener shank when subjected to a MIBANT test.
MIBANT Test	Morgan Impact Bend Angle Nail Tester: a tool used in the lumber industry as an indication of impact bend resistance of nails and staples.
Non-Reversible Pallet	A pallet with bottom deckboard configuration different from the top deck and therefore should not be inverted for use.
Notch	Cutout in lower portion of the stringer to allow entry for the fork tine, usually 9" in length and 1-1.5" in depth.
Notched Stringer	A stringer with two notches spaced for fork-tine entry. A pallet made with these is considered a partial 4-way entry pallet.
Opening Height	The vertical distance measured between decks, or from the floor to the underside of the top deck, or from the floor to the top of the stringer notch.
Overall Height	The vertical distance measured from the floor to the top of the pallet.
Pallet Jack	Hand-propelled, wheeled platform, equipped with a lifting device for moving palletized unit loads.
Racked Across Deckboards	Maximum load carrying capacity and deflection of a pallet where the rack frame supports the pallet only at the ends of the deckboards.
Racked Across Stringers	Maximum load carrying capacity and deflection of a pallet where the rack frame supports the pallet only at the ends of stringers.

Recycling / Refurbishment	The process of repairing a discarded and salvaged pallet.
Returnable / Reusable Pallet	A pallet designed for multiple cycles requiring infrequent maintenance (Pool Pallets are returnable / reusable).
Reversible Pallet	A pallet with identical top and bottom decks.
Skid	A pallet having no bottom deck.
Softwood	An industry term meaning wood from coniferous or needle bearing species of trees. These are not necessarily softer or lower density than some hardwood species.
Solid Deck Pallet	A pallet constructed with no deckboard spacing.
Solid Wood	Implies that the wood is raw lumber and the processing done to it has been limited to one or more of the following -- dimensional cutting, debarking, heat treatments, chemical treatments, and kiln drying.
Span	The distance between stringer or block supports.
Strap Slot	Recess or cutout on the upper edge of the stringer or the bottom of the top deckboard to allow tie-down or a unit load to the pallet deck with strapping / banding. Also called the banding notch.
Stringer	Continuous longitudinal solid or notched beam component of the pallet used to support deck components.
Stringerboard	In block pallets, the solid board member extending for the full length of the pallet perpendicular to deckboard members and placed between deckboards and blocks. The length of the stringerboard defines the length dimension of the pallet.
Two-Way Entry Pallet	A pallet with unnotched solid stringers allowing entry only from two opposite ends.
Uni-Directional Base	A pallet with bottom deckboards on two parallel outside edges and perhaps in the center and open to the floor on the adjacent sides. (typical of the “Euro Pallet”).
Wing Pallet	A pallet which has deckboards which extend beyond the edge of the stringer.

Appendix E

ELECTRONICS INDUSTRY PALLET SPECIFICATION (EIPS)

PALLET TEST REPORT

Certified Test Laboratory: _____

Address: _____
_____
_____

Test Supervisor: _____

Signature: _____

Pallet ID _____

Pallet Supplier: _____

Address: _____
_____
_____

Date of delivery: _____

Number of samples delivered: _____

Dates of test execution: _____

Date of submission of Final Report: _____

TEST PERFORMANCE SUMMARY RESULTS

Pallet ID _____

Pallet Supplier: _____

Racked Across Length	☐ Pass	☐ Fail
Racked Across Width	☐ Pass	☐ Fail
Fork tines Parallel to Pallet Length	☐ Pass	☐ Fail
Fork tines Parallel to Pallet Width	☐ Pass	☐ Fail
Stacking (Top Deck)	☐ Pass	☐ Fail
Stacking (Bottom Deck)	☐ Pass	☐ Fail
Conveyors Parallel to Pallet Length	☐ Pass	☐ Fail
Conveyors Parallel to Pallet Width	☐ Pass	☐ Fail

Coefficient of Friction

Top Deck	☐ Pass	☐ Fail
Under Top Deck	☐ Pass	☐ Fail
Bottom Deck	☐ Pass	☐ Fail
Stacked Empty Pallets	☐ Pass	☐ Fail

Durability

Corner Drop		
Limited Use	☐ Pass	☐ Fail
Multiple Use	☐ Pass	☐ Fail
Fork tine Tip Impacts to Blocks		
Limited Use	☐ Pass	☐ Fail
Multiple Use	☐ Pass	☐ Fail
Fork tine Heel Impacts to Lead Edges		
Limited Use	☐ Pass	☐ Fail
Multiple Use	☐ Pass	☐ Fail

Certification Level:

EIPS Premium (Intl. Reusable)	☐ Pass	☐ Fail
EIPS Economy (One-Way type)	☐ Pass	☐ Fail

Part A. Physical Properties

Due to the international exchange pallets used by theEIPS group, pallets conforming to this specification should conform to the dimensional sizes and targets outlined in ISO 6780. Attach top and bottom deck photographs and schematic drawings with dimensions and any appropriate material specifications.

1. Pallet size (check one)
   - ☐ 1200 x 1000mm
   - ☐ 1000 x 1200mm
   - ☐ 1200 x 800mm
   - ☐ 800 x 1200mm
   - ☐ Other _____ mm

2. Style (check one)
   - ☐ Block
   - ☐ Stringer

3. Type (check one)
   - ☐ Full 4 way
   - ☐ Partial 4 way
   - ☐ 2 way

4. Base (check one)
   - ☐ Unidirectional
   - ☐ Perimeter
   - ☐ Cruciform
   - ☐ Other _____

5. Top Deck Coverage _____%
   (60% minimum)

6. Bottom Deck Coverage _____%
   (35% minimum)

7. Clearance underneath top deck _____mm
   (minimum 95 mm, maximum 156 mm)

8. Pallet Height _____mm
   (maximum 165 mm)

9. Width of Center Blocks or stringers
   - Along pallet length _____mm
   - Along pallet width _____mm

(maximum 160 mm)

10. Width between outer blocks or stringers
    Along pallet length _____mm
    Along pallet width _____mm
    (minimum 720 mm,500mm on 800 mm sides)

11. Average pallet weight _____ kg
    (maximum 22.7 kg)

12. Type of Fastening*

- ☐ None
- ☐ Adhesives
- ☐ Welded
- ☐ Snap-Fits
- ☐ Nails
- ☐ Staples
- ☐ Screws
- ☐ Bolts

Describe fastening _____
_____

Number of fasteners _____

*Some pallets, such as molded plastic pallets, do not contain fasteners. Fasteners in wood pallets should conform to quality criteria outlined inASME MH1, Part 3, Section 1. Attach the Fastener Quality Analysis.

13. Materials used (check all that apply)

☐ Coniferous solid wood
Description (species, grade, HT, KD,…)
_____

☐ Non-Coniferous solid wood
Description (species, grade, HT, KD …)
_____

☐ Manufactured wood

- ☐ Plywood
- ☐ OSB
- ☐ Other _____

Description (grade, stamps,....)

_____

☐ Plastic

- ☐ HDPE
- ☐ PP
- ☐ PC
- ☐ PVC (prohibited)
- ☐ Other _____

Description (Structural foam, injection molded, material grade, …)

_____

☐ Paper

- ☐ Corrugated
- ☐ Solid Fiber
- ☐ Honey comb
- ☐ Coatings
- ☐ Other _____

Description (Materials, liner and medium weights, …)

_____

☐ Metal

- ☐ Steel
- ☐ Aluminum
- ☐ Other _____

Description (Materials, gauge, …)

_____

14. Fire Safety

☐ UL Approved (Underwriter's Laboratory)

☐ FM Approved (Factory Mutual)

Attach Fire Test documentation

Notes _____

Part B. Performance

Refer to ASTM D1185, latest edition, for additional details on performance testing procedures. The suggested load is multiple 600x400mm footprint corrugated boxes that fill the pallet footprint and stacked 5 layers high. Dead loads may be used above 2 layers of boxes to attain full test loads. Choose the temperature and moisture conditions that represent the most severe evaluation of the pallet material and design for each test.

1. Racking Performance (See ASTM D1185, Section 8.4)

a. Racked Across Length

Test Load
- ☐ 450 kg (recommended)
- ☐ Other _____

Duration of Load
- ☐ 24 hr. (recommended)
- ☐ Other _____

Test Temperature
- ☐ -25ºC (plastic)
- ☐ +45ºC (plastic)
- ☐ ambient (materials not affected by temperature)
- ☐ other _____

Relative Humidity
- ☐ 90% (paper-based materials)
- ☐ Ambient (materials not affected by humidity)
- ☐ other _____

Support Span
- ☐ 1100 mm (for racking across 1200mm direction)
- ☐ 900 mm (for racking across 1000mm direction)
- ☐ 700 mm (for racking across 800mm direction)
- ☐ other _____

Datum Preload (10% test load) _____ kg

Deflection (maximum deflection per pallet)

replicate 1	_____	mm
replicate 2	_____	mm
replicate 3	_____	mm
Average	_____	mm (13mm maximum)

Rate of deflection decreasing during deflection test Y/N

Maximum Load when loaded to failure following deflection test

replicate 1	_____	kg
replicate 2	_____	kg
replicate 3	_____	kg
Average	_____	kg (900kg minimum)

Racked Across Length Performance ☐ Pass ☐ Fail

b. Racked Across Width

Test Load
- ☐ 450 kg (recommended)
- ☐ Other _____

Duration of Load
- ☐ 24 hr. (recommended)
- ☐ Other _____

Test Temperature
- ☐ -25ºC (plastic)
- ☐ +45ºC (plastic)
- ☐ ambient (materials not affected by temperature)
- ☐ other _____

Relative Humidity
- ☐ 90% (paper-based materials)
- ☐ Ambient (materials not affected by humidity)
- ☐ other _____

Support Span
- ☐ 1100 mm (for racking across 1200mm direction)
- ☐ 900 mm (for racking across 1000mm direction)
- ☐ 700 mm (for racking across 800mm direction)
- ☐ other _____

Datum Preload (10% test load) _____ kg

Deflection (maximum deflection per pallet)

replicate 1	_____	mm
replicate 2	_____	mm
replicate 3	_____	mm
Average	_____	mm (13mm maximum)

Rate of deflection decreasing during deflection test Y/N

Maximum Load when loaded to failure following deflection test

replicate 1	_____	kg
replicate 2	_____	kg
replicate 3	_____	kg
Average	_____	kg (900kg minimum)

Racked Across Width Performance ☐ Pass ☐ Fail

2. Fork tine Support

see ASTM D1185, Section 8.4

a. Fork tines parallel to Pallet Length

Test Load
- ☐ 450 kg (recommended)
- ☐ other _____

Duration of Load
- ☐ 30 min (recommended)
- ☐ other _____

Test Temperature
- ☐ -25ºC (plastic)
- ☐ +45ºC (plastic)
- ☐ Ambient (materials not affected by temperature)
- ☐ Other _____

Relative Humidity
- ☐ 90% (paper-based materials)
- ☐ Ambient (materials not affected by humidity)
- ☐ Other _____

Fork tine Width
- ☐ 100 mm (recommended for all designs)
- ☐ other _____

Fork tine Inside Span
- ☐ 500 mm (recommended for all designs)
- ☐ other _____

Datum Preload (10% test load) _____ kg

Deflection (maximum deflection per pallet)

replicate 1	_____	mm
replicate 2	_____	mm
replicate 3	_____	mm
Average	_____	mm (13mm maximum)

Rate of deflection decreasing during deflection test Y/N

Maximum Load when loaded to failure following deflection test

replicate 1	_____	kg
replicate 2	_____	kg
replicate 3	_____	kg
Average	_____	kg (900kg minimum)

Fork tines Parallel to Length Performance ☐ Pass ☐ Fail

b. Fork tines Parallel to Pallet Width

Test Load ☐ 450 kg (recommended)
☐ other _____

Duration of Load ☐ 30 min (recommended)
☐ other _____

Test Temperature ☐ -25ºC (plastic)
☐ +45ºC (plastic)
☐ Ambient (materials not affected by temperature)
☐ Other _____

Relative Humidity ☐ 90% (paper-based materials)
☐ Ambient (materials not affected by humidity)
☐ Other _____

Fork tine Width ☐ 100 mm (recommended for all designs)
☐ other _____

Fork tine Inside Span ☐ 500 mm (recommended for all designs)
☐ other _____

Datum Preload (10% test load) _____ kg

Deflection (maximum deflection per pallet)
replicate 1 _____ mm
replicate 2 _____ mm
replicate 3 _____ mm
Average _____ mm (13mm maximum)

Rate of deflection decreasing during deflection test Y/N

Maximum Load when loaded to failure following deflection test
replicate 1 _____ kg
replicate 2 _____ kg
replicate 3 _____ kg
Average _____ kg (900kg minimum)

Fork tines Parallel to Width Performance ☐ Pass ☐ Fail

3. Stack Performance
(see ASTM D1185, section 8.5)

a. Top Deck Stacking

Test Load ☐ 1900 kg (recommended)
☐ Other _____

Duration of Load ☐ 24 hr. (recommended)
☐ Other _____

Test Temperature ☐ -25ºC (plastic)
☐ +45ºC (plastic)
☐ Ambient (materials not affected by temperature)
☐ Other _____

Relative Humidity ☐ 90% (paper-based materials)
☐ Ambient (materials not affected by humidity)
☐ Other _____

Datum Preload (10% test load) _____ kg

Deflection (maximum deflection per pallet)
replicate 1 _____ mm
replicate 2 _____ mm
replicate 3 _____ mm
Average _____ mm (6mm maximum)

Rate of deflection decreasing during deflection test Y/N

Maximum Load when loaded to failure following deflection test
replicate 1 _____ kg
replicate 2 _____ kg
replicate 3 _____ kg
Average _____ kg (3800kg minimum)

Top Deck Stacking Performance ☐ Pass ☐ Fail

b. Bottom Deck Stacking

Test Load ☐ 1450 kg (recommended)

☐ Other _____

Duration of Load ☐ 24 hr. (recommended)
☐ Other _____

Test Temperature ☐ -25°C (plastic)
☐ +45°C (plastic)
☐ Ambient (materials not affected by temperature)
☐ Other _____

Relative Humidity ☐ 90% (paper-based materials)
☐ Ambient (materials not affected by humidity)
☐ Other _____

Datum Preload (10% test load) _____ kg

Deflection (maximum deflection per pallet)
replicate 1 _____ mm
replicate 2 _____ mm
replicate 3 _____ mm
Average _____ mm (6mm maximum)

Rate of deflection decreasing during deflection test Y/N

Maximum Load when loaded to failure following deflection test
replicate 1 _____ kg
replicate 2 _____ kg
replicate 3 _____ kg
Average _____ kg (2900kg minimum)

Bottom Deck Stacking Performance ☐ Pass ☐ Fail

4. Conveyor Performance

See ASTM D1185, Section 8.4 Conveyor supports are 15 mm wide and located under bottom deck at midspan between blocks or stringers.

a. Conveyors Parallel to Pallet Length

Test Load
- ☐ 450 kg (recommended)
- ☐ Other _____

Duration of Load
- ☐ 24 hr. (recommended)
- ☐ Other _____

Test Temperature
- ☐ -25ºC (plastic)
- ☐ +45ºC (plastic)
- ☐ Ambient (materials not affected by temperature)
- ☐ Other _____

Relative Humidity
- ☐ 90% (paper-based materials)
- ☐ Ambient (materials not affected by humidity)
- ☐ Other _____

Datum Preload (10% test load) _____ kg

Deflection (maximum deflection per pallet)

replicate 1	_____ mm	
replicate 2	_____ mm	
replicate 3	_____ mm	
Average	_____ mm	(6mm maximum)

Rate of deflection decreasing during deflection test Y/N

Maximum Load when loaded to failure following deflection test

replicate 1	_____ kg	
replicate 2	_____ kg	
replicate 3	_____ kg	
Average	_____ kg	(900kg minimum)

Conveyor Parallel to Length Performance ☐ Pass ☐ Fail

b. Conveyors Parallel to Pallet Width

Test Load
- ☐ 450 kg (recommended)
- ☐ Other _____

Duration of Load
- ☐ 24 hr. (recommended)
- ☐ Other _____

Test Temperature
- ☐ -25ºC (plastic)
- ☐ +45ºC (plastic)
- ☐ Ambient (materials not affected by temperature)
- ☐ Other _____

Relative Humidity
- ☐ 90% (paper-based materials)
- ☐ Ambient (materials not affected by humidity)
- ☐ Other _____

Datum Preload (10% test load) _____ kg

Deflection (maximum deflection per pallet)

replicate 1	_____ mm	
replicate 2	_____ mm	
replicate 3	_____ mm	
Average	_____ mm	(6mm maximum)

Rate of deflection decreasing during deflection test Y/N

Maximum Load when loaded to failure following deflection test

replicate 1	_____ kg	
replicate 2	_____ kg	
replicate 3	_____ kg	
Average	_____ kg	(900kg minimum)

Conveyor Parallel to Width Performance ☐ Pass ☐ Fail

5. Coefficient of Friction

COF = weight to initiate pallet movement on surface

weight of pallet

Method: attach steel cable to pallet at midheight. Pull cable at 25mm/min. and record load at which pallet movement was initiated. Pull in several directions for each pallet to determine average pull weight per pallet. Test conducted at ambient temperature.

a. Top deck (pallet inverted) on corrugated sheet

	Pull weight	Pallet weight	COF
replicate 1	_____ kg	_____kg	_____
replicate 2	_____ kg	_____kg	_____
replicate 3	_____ kg	_____kg	_____

Average COF _____ (minimum 0.40 recommended)

☐ Pass ☐ Fail

b. Under Top Deck on Fork tines

	Pull weight	Pallet weight	COF
replicate 1	_____ kg	_____kg	_____
replicate 2	_____ kg	_____kg	_____
replicate 3	_____ kg	_____kg	_____

Average COF _____ (minimum 0.40 recommended)

☐ Pass ☐ Fail

c. Bottom Deck on Steel

	Pull weight	Pallet weight	COF
replicate 1	_____ kg	_____kg	_____
replicate 2	_____ kg	_____kg	_____
replicate 3	_____ kg	_____kg	_____

Average COF _____ (minimum 0.40 recommended)

☐ Pass ☐ Fail

d. Stacked Empty Pallets

	Pull weight	Pallet weight	COF
replicate 1	_____ kg	_____kg	_____
replicate 2	_____ kg	_____kg	_____
replicate 3	_____ kg	_____kg	_____

Average COF _____ (minimum 0.40 recommended)

☐ Pass ☐ Fail

6. Durability

a. Corner Drop
(See ASTM D1185, section 9.3)
Method: Consecutive drops on 1 corner from 1 meter drop height. To pass, pallet should have less than 1.5% diagonal deformation after 6 (Limited use) or 12 drops (Multiple use) and exhibit no structural failures or damages that limit pallet functionality.

Test Temperature
☐ -25°C (plastics)
☐ +45°C (plastics)
☐ Ambient (materials not affected by temp.)
☐ Other _____

(1) Limited Use Durability
Diagonal deformation after 3 drops
replicate 1 _____ %
replicate 2 _____ %
replicate 3 _____ %
Average _____ % (< 1.5% to pass Limited Use)
☐ Pass Limited use ☐ Fail Limited use

(2) Multiple-Use Durability
Diagonal deformation at 12 drops
replicate 1 _____ %
replicate 2 _____ %
replicate 3 _____ %
Average _____ % (< 1.5% to pass Multiple Use)
☐ Pass Multiple use ☐ Fail Multiple use

b. Tine Tip Impact on Block or Stringer Ends
Pallets should be subjected to tine tip impacts at mid-height on the block or stringers. To pass, a pallet shall not exhibit structural failures or damage that limits functionality. (See ASTM D1185, Section 9.4)

Test Temperature
- ☐ -25ºC (plastics)
- ☐ +45ºC (plastics)
- ☐ Ambient (materials not affected by temp.)
- ☐ Other _____

(1) Limited Use Durability

Three (3) Impacts to Blocks along Pallet Length at 150 mm dolly travel

	Structural Failure (Y/N)
Replicate 1	_____
Replicate 2	_____
Replicate 3	_____

Three (3) Impacts to Blocks along Pallet Width at 150 mm dolly travel

	Structural Failure (Y/N)
Replicate 1	_____
Replicate 2	_____
Replicate 3	_____

☐ Pass Limited use ☐ Fail Limited use

(2) Multiple –Use Durability

Three (3) Impacts to Blocks along Pallet Length at 300 mm dolly travel

	Structural Failure (Y/N)
Replicate 1	_____
Replicate 2	_____
Replicate 3	_____

Three (3) Impacts to Blocks along Pallet Width at 300 mm dolly travel

	Structural Failure (Y/N)
Replicate 1	_____
Replicate 2	_____
Replicate 3	_____

☐ Pass Multiple use ☐ Fail Multiple use

c. Fork Tine Heel Impacts to Lead Edges

Pallets should be subjected to tine heel impacts at on the pallet top deck edges. To pass, a pallet shall not exhibit structural failures or damage that limits functionality. (See ASTM D1185, Section 9.4)

Test Temperature
- ☐ -25ºC (plastics)
- ☐ +45ºC (plastics)
- ☐ Ambient (materials not affected by temp.)
- ☐ Other _____

(1) Limited-Use Durability

Three (3) Impacts to Lead Edge along Pallet Length at 600 mm dolly travel

	Structural Failure (Y/N)
Replicate 1	_____
Replicate 2	_____
Replicate 3	_____

Three (3) Impacts to Blocks along Pallet Width at 600 mm dolly travel

	Structural Failure (Y/N)
Replicate 1	_____
Replicate 2	_____
Replicate 3	_____

☐ Pass Limited use ☐ Fail Limited use

(2) Multiple –Use Durability

Three (3) Impacts to Blocks along Pallet Length at 1200 mm dolly travel

	Structural Failure (Y/N)
Replicate 1	_____
Replicate 2	_____
Replicate 3	_____

Three (3) Impacts to Blocks along Pallet Width at 1200 mm dolly travel

	Structural Failure (Y/N)
Replicate 1	_____
Replicate 2	_____
Replicate 3	_____

☐ Pass Multiple use ☐ Fail Multiple use

Notes:

End of Document