Global Packaging Requirements

Revision	Date	Author	Description
0	2000-Apr-28	Martin, Randy	Original Document Issued by GET Engineering.
A	2003-May-30	Martin, Randy	Update document with a skid / pallet drawing, GET 41C670159 and word changes within document with any reference of pallet to read: skid / pallet per the new drawing and the old nomenclature of pallet. Add photo's, pages 18 and 19 of what happens to products if incorrect skid / pallets are used and examples of oversize parts and how they can be secured to correct skid / pallets. Also, add a revision sheet.
B	2009-Aug-17	Sattora, Chris Spinozzi, Don	Complete rewrite of previous version. Incorporated detailed packaging best practices & other important requirements. Combined Service Parts requirements document, PN 84A220046. This document defines all minimum global packaging requirements for all GET products. This document shall take precedence only if a drawing, purchase specification or other part or assembly specific document has not been defined. This document must still be referenced for important requirements even if a packaging solution is defined.
C	2011-Jun-14	Sattora, Chris	Updated SCP link in all applicable sections. Updated Review Committee names. Section 4.7.1 revised to specify Section 5.1.3for wood regulatory requirements. Added enhanced responsibility statement to Section 5.0. Removed majority of content under section 5.1.3 to simplify with reference to supplemental document 84A225720 and training, eliminating redundancy. Added reference in scope and section 5.1.3 to internal document QSR 7.5.5 "Material Handling, Packaging, and Storage" to enforce applicability of these requirements to internal operations. Added Section 7.2.6, "Proper Pallet/Skid Sizing" to address the quality/safety issues due to overhanging parts.
D	2012-Mar-02	Bekeny, Frank	Section 4.8.1 – Removed EHS approval reference per Packaging & EHS agreement Section 4.8.2.1 – Removed EHS approval reference per Packaging & EHS agreement
E	2013-Jun-10	Bekeny, Frank	Reformat document to eliminate revision markings

F	2013-Nov-08	Taccone, David/ FCA Packaging	Document has been updated by packaging specialists: FCA (7601 John Deere Parkway, PO Box 758, Moline, IL 61266, Fcapackaging.com). All additions reflect current global practices. Edits are in "red."
G	2015-April-13	Leonard Hill / Engr Quality	Document has been updated to add section 10 specifically for clean parts and updated table of contents
M	2022-Apr-06	Damon Frenn/ Shane Kline/ Julio Cesar Morales/ Susan Bell/ Matt Schutz/ Shelley Vybiral/ Stephen Pfister/ Girish Sannapareddy	Update references from GE to Wabtec, Update SCP to SCC, update bar code instructions to suppliers, create a summary section at the front of the document to highlight key requirements as a quick reference, update shelf-life requirements, acknowledge this document via SCC (example annually). Remove delineation between Service parts and Production parts for simplification and removal of redundancy (ex, Shelf Life & Batteries for both Production & Service).

The latest version of this document can always be found in the following locations:
Drawing Retrieval (https://drs.corp.wabtec.com/cgi-bin/start.pl)
Supply Chain Connect (SCC): (https://scc.wabtec.com/dashboards)

The requirements set forth in this document help to establish criteria for the design, distribution and/or manufacture of WABTEC products. The document version in effect at the time a purchase order ("PO") is issued shall apply to any such PO(s). Any subsequent revision of the document shall be applicable to any existing or new PO(s) upon the expiration of 90 days after the final release of such revision.

Annual Review Required?	**Yes**

GET Rev B Review Committee

Organization	Name	Checked Date	Approved Date
Global Logistics	David Kluz	10/09/09	12/15/09
Manufacturing	Douglas Uzarski	10/30/09	12/18/09
EHS	John Craynon	10/30/09	12/11/09
Quality	Charles Ernest	10/30/09	02/08/10
Sourcing Executive	Sheila Tierney	10/09/09	03/08/10
Customs Compliance	Debra Wagner	12/15/09	12/15/09
Materials Management	Aditya K Singh	10/30/09	1/13/09
Legal	Ozell Freeman	10/30/09	3/12/10

GET Rev C Review Committee

Organization	Name	Checked Date	Approved Date
Quality	Dennis Magerle	06/29/2011	07/26/11
Sourcing Executive	Alexander Artman	06/29/2011	07/27/11

GET Rev F Review Committee

Organization	Name	Checked Date	Approved Date
Engineering	David Taccone /Russ Fisher	09/11/2013	09/11/2013
FCA Inc.	Mike Thompson /Jason Dollins	09/11/2013	09/11/2013

GET Rev J Review Committee

AME Packaging Engineering	Donald Spinozzi	2/8/2016	2/8/2016

GET Rev K Review Committee

AME Packaging Engineering	Donald Spinozzi	4/17/17	5/2/17

GET Rev L Review Committee

AME Packaging Engineering	Donald Spinozzi	10/4/17	12/1/17
EHS	Rob Caillet	10/4/17	12/1/17

WABTEC Rev M Review Committee

Shipping Notice Council Meeting	Damon Frenn Shane Kline Julio Cesar Morales Susan Bell Matt Schutz Shelley Vybiral Stephen Pfister Girish Sannapareddy	11/9/21	4/6/22

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1.0 Foreword

The following sections in RED are key international packaging requirements taken from this document. Please read 84A220081 in it's entirity for full clarification.

1.1. Selection of Package Type

Parts shall be packaged as specified in the Wabtec Purchase Order, the Purchase Contract, the Purchase Specification, or Wabtec Drawing. When Sourcing or Engineering documents do not explicitly define packaging requirements, select a package type which protects the product as required by Section 4 of this document, and is suitable for the product type as described in Sections 3.2, 3.3, and 3.4.

When suppliers cannot determine the product type from the purchase or engineering documents, they should contact their Wabtec Sourcing Leader for instructions. See General Reference #12 for additional guidance in the selection of specific packages for different modes of transport and shipping conditions.

1.2. Corrosion Protection

Provide protection for products with exposed, finished metal surfaces that are susceptible to corrosion. Typical methods of protection include:

1.2.1 Metal Coating and Finishes

In most cases, metal surfaces that are susceptible to corrosion should be finished, painted, or coated in some way to provide permanent protection.

1.2.2 Contact Preservatives

Temporary corrosion prevention/protection materials can be applied directly to metal surfaces. Removal of these preservatives may or may not be required. Provide specific instructions if removal is required.

1.2.3 Part Surfaces in Contact with Wood

Part surfaces, either finished or unfinished, should not be in prolonged direct contact with wooden packaging. Moisture barrier materials must be used to isolate parts from all wooden packaging surfaces or components such as crates, blocking or pallets. See Section 4.7 "Lumber & Wood Packaging Materials" for further information on moisture content limitations in wood packaging materials.

1.2.4 Humidity & Moisture Control

Products susceptible to corrosion must be packaged to provide a dry, non-corrosive environment during the expected time of shipment and any storage. Vapor barrier materials from simple plastic bags and films to heavy foil laminated scrims must surround the product and be sealed to prevent moist air from coming in contact with the product. Desiccants must always be used with sealed systems to absorb moisture that is inside the vapor barrier material at time of packing and moisture that migrates through the barrier over time.

Barrier Materials and Desiccant

The type of vapor barrier material used, and the amount of desiccant required are dependent on the size of the package, expected relative humidity and length of exposure time.

Plastic Materials

Plastic materials provide an economical barrier for short-term protection. However, all plastic materials will eventually allow moisture to permeate, which could result in a wet, corrosive atmosphere around the product if exposure time is too long. Time is critical when using plastic barrier materials. Shelf-life should be indicated if critical.

Foil Laminated Barrier Materials

Foil laminated barrier materials are much more expensive than plastic materials but allow moisture to migrate through at a much slower rate, providing protection for much longer periods of time.

Desiccant

Desiccant absorbs moisture and is placed inside of the vapor barrier material but must not be in contact with the product. The quantity required can vary by manufacturer, but the general formula is 1 unit (33g) for each 90 in^2 (580 cm^2) of exposed vapor barrier surface area. The quantity increases when wood, corrugated and other materials that can contain moisture are packed inside the vapor barriers, so the quantity must be adjusted for specific applications.

Vapor Barrier Material and Desiccant Selection Table

The following table provides basic guidelines for barrier material and desiccant selection:

PROTECTION LEVEL (SEE 11.12.2)	DUST COVER OR VAPOR BARRIER MATERIAL	DESICCANT	TYPICAL PROTECTION TIME PERIOD	TYPICAL APPLICATIONS AND USAGES
TRUCK – 1, 2, 3 AIR – 1, 2	UNSEALED PLASTIC DUST COVER	NONE	N/A	AIR & TRUCK SHIPMENT WITH NO STORAGE
TRUCK – 3 AIR – 3 OCEAN – 1, 2	PLASTIC BAG OR SHEET WITH SEAMS HEAT SEALED OR SEALED WITH TAPE	STANDARD QTY PER SUPPLIER INSTRUCTIONS	3 MONTHS	LIGHT DUTY OCEAN SHIPMENT OR SHORT-TERM STORAGE
TRUCK – 3 AIR – 3 OCEAN – 3	FOIL LAMINATED BARRIER MATERIAL WITH HEAT SEALED SEAMS	STANDARD QTY PER SUPPLIER INSTRUCTIONS	12 MONTHS MINIMUM	STANDARD OCEAN SHIPMENT OR LONG-TERM STORAGE

1 = PROTECTION LEVEL 1 2 = PROTECTION LEVEL 2 3 = PROTECTION LEVEL 3

Dust Cover

A dust cover is a simple plastic bag or sheet draped over a product to help keep it clean. It is not designed to prevent corrosion. This type of cover must be kept open to allow air to circulate around the product, or condensation will occur and promote corrosion.

Tape Sealed Joints

Tape can be used to seal barrier joints to provide economical, short-term moisture protection.

Heat Sealed Joints

Heat-sealed joints are more expensive than tape joints but provide greater protection from moisture migration and shall be used for longer-term protection.

Vacuum Pack

When barrier materials are heat sealed, it is most effective to vacuum excess air from inside of the barrier to provide the driest atmosphere possible at time of packing. Desiccant is always required when a vacuum pack is used to absorb moisture that already exists inside the pack, and moisture that migrates through the barrier material over time.

Wood Inside of Barrier

Do not seal green, un-dried wood, or any wood materials with moisture content over 19% (26% for hardwood), inside of a vacuum pack or any other type of airtight cover. The acidic nature of wood moisture could cause severe corrosion.

Vapor Corrosion Inhibitors (VCI)

Parts or entire products can be protected from corrosion by controlling the atmosphere around the item and filling it with vapor corrosion inhibitors. The VCI material is available in paper, plastic film, foam pads, emitters, and many other delivery systems. It vaporizes around a product, condenses on bare metal surfaces, and prevents corrosion.

WARNING: Because VCI materials condense on all bare metal product surfaces they must be tested to insure no negative effects on the electronics or any other sensitive components of the product.

The type and amount of VCI material to be used is dependent on the type of metal to be protected and the style and cubic dimension of the package being used. Follow the manufacturers' recommendations when selecting a VCI material and the required quantity for a specific application.

Protection Level Selection Matrix

Choose your ship from location in the "SHIPPER" column. Then choose your mode of shipment (Truck, Air, Ocean) in the "MODE" column, and then read that row across to your ship to destination in the "RECEIVER" columns. This will give you your Packaging Matrix Protection Level. See 12.12.2 for Packaging Matrix Protection Level definition.

Example:

An item shipping from the USA to Latin America, via Air, would have an "IA2" code. The "IA2" code indicates that this is a standard air shipment using an open wood crate or cardboard box with dust/moisture cover that should be designed to protect for 2 weeks.

Shipping from China to Mexico, via Ocean, would have an "IO2" code. The "IO2" code indicates that this is a standard ocean shipment using a solid wood or plywood crate with a vapor barrier and a desiccant in each box that should be designed to protect for 3 months.

SHIPPER - (SHIP FROM LOCATION)	MODE	RECEIVER - (SHIP TO LOCATION) MINIMUM PACKAGE PROTECTION LEVEL																					
		USA MAINLAND	USA ALASKA	USA HAWAII	CANADA	MEXICO	LATIN AMERICA	COLUMBIA	DOMINICAN REPUBLIC	WESTERN EUROPE **	EASTERN EUROPE **	SCANDANAVIA **	AFRICA	ISRAEL	MIDDLE EAST **	INDIA	INDONEASIA **	HONG KONG	CHINA	KOREA	JAPAN	AUSTRALIA	NEW ZEALAND
USA	Truck (LTL - Non Air Ride)	DT2	DT2		IT2	IT2																	
	Truck (TL - Air Ride)	DT1	DT1		IT1	IT1																	
	Truck (TL - Non Air Ride)	DT1	DT1		IT1	IT1																	
	Truck (Van - Air Ride)	DT1	DT1		IT1	IT1																	
	Air	DA2	DA2	DA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean		IO2	IO2			IO2	IO2	IO2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2
Mexico	Truck (LTL - Non Air Ride)	IT2	IT2		IT2	DT2																	
	Truck (TL - Air Ride)	IT1	IT1		IT1	DT1																	
	Truck (TL - Non Air Ride)	IT1	IT1		IT1	DT1																	
	Truck (Van - Air Ride)	IT1	IT1		IT1	DT1																	
	Air	IA2	IA2	IA2	IA2	DA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean		IO2	IO2			IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2
Japan	Truck (LTL - Non Air Ride)																				DT2		
	Truck (TL - Air Ride)																				DT1		
	Truck (TL - Non Air Ride)																				DT1		
	Truck (Van - Air Ride)																				DT1		
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	DA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2
India	Truck (LTL - Non Air Ride)									IT3	IT3			IT3	IT3	DT3	IT3	IT3	IT3	IT3			
	Truck (TL - Air Ride)									IT1	IT1			IT1	IT1	DT1	IT1	IT1	IT1	IT1			
	Truck (TL - Non Air Ride)									IT1	IT1			IT1	IT1	DT1	IT1	IT1	IT1	IT1			
	Truck (Van - Air Ride)									IT1	IT1			IT1	IT1	DT1	IT1	IT1	IT1	IT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	DA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2		IO2	IO2			IO2	IO2	IO2
China	Truck (LTL - Non Air Ride)									IT3	IT3			IT3	IT3	IT3	IT3	IT3	DT3	IT3			
	Truck (TL - Air Ride)									IT1	IT1			IT1	IT1	IT1	IT1	IT1	DT1	IT1			
	Truck (TL - Non Air Ride)									IT1	IT			IT1	IT1	IT1	IT1	IT1	DT1	IT1			
	Truck (Van - Air Ride)									IT1	IT1			IT1	IT1	IT1	IT1	IT1	DT1	IT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	DA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2		IO2				IO2	IO2	IO2

Continued on next page…

Protection Level Selection Matrix Continued

Korea	Truck (LTL - Non Air Ride)									IT3					IT3	IT3	IT3	IT3	DT3			
	Truck (TL - Air Ride)									IT1					IT1	IT1	IT1	IT1	DT1			
	Truck (TL - Non Air Ride)									IT1					IT1	IT1	IT1	IT1	DT1			
	Truck (Van - Air Ride)									IT1					IT1	IT1	IT1	IT1	DT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	DA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2				IO2			IO2	IO2	IO2
W. Europe	Truck (LTL - Non Air Ride)									DT2	IT3	IT2		IT2	IT3	IT3			IT3			
	Truck (TL - Air Ride)									DT1	IT1	IT1		IT1	IT1	IT1			IT1			
	Truck (TL - Non Air Ride)									DT1	IT1	IT1		IT1	IT1	IT1			IT1			
	Truck (Van - Air Ride)									DT1	IT1	IT1		IT1	IT1	IT1			IT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	DA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2			IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2
E. Europe	Truck (LTL - Non Air Ride)									IT3	DT3	IT3		IT3	IT3	IT3	IT3	IT3	IT3			
	Truck (TL - Air Ride)									IT1	DT1	IT1		IT1	IT1	IT1	IT1	IT1	IT1			
	Truck (TL - Non Air Ride)									IT1	DT1	IT1		IT1	IT1	IT1	IT1	IT1	IT1			
	Truck (Van - Air Ride)									IT1	DT1	IT1		IT1	IT1	IT1	IT1	IT1	IT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	DA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2			IO2	IO2	IO2	IO2		IO2	IO2			IO2	IO2	IO2
Scandanavia	Truck (LTL - Non Air Ride)									IT2	IT3	DT2		IT2	IT3	IT3			IT3			
	Truck (TL - Air Ride)									IT1	IT1	DT1		IT1	IT1	IT1			IT1			
	Truck (TL - Non Air Ride)									IT1	IT1	DT1		IT1	IT1	IT1			IT1			
	Truck (Van - Air Ride)									IT1	IT1	DT1		IT1	IT1	IT1			IT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	DA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2
Israel	Truck (LTL - Non Air Ride)									IT2	IT3	IT2		DT2	IT3	IT3			IT3			
	Truck (TL - Air Ride)									IT1	IT1	IT1		DT1	IT1	IT1			IT1			
	Truck (TL - Non Air Ride)									IT1	IT1	IT1		DT1	IT1	IT1			IT1			
	Truck (Van - Air Ride)									IT1	IT1	IT1		DT1	IT1	IT1			IT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	DA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2				IO2	IO2			IO2	IO2	IO2

Packaging Matrix Protection Level Definitions

Package Protection Level	Description	Type Of Shipment	Package Description (Minimum Required)	Minimum Barrier Around Product	Minimum Desiccant	Typical Protection Period
DOMESTIC						
DA1	Light Duty Air Pack	Controlled shipment, or small parcels with good handling at shipping and receiving end.	Corrugated box	Dust/moisture cover	None	2 weeks
DA2	Standard Air Pack	Std air shipment	Open wood crate, corrugated box with adequate cushioning and stacking strength.	Dust/moisture cover	None	2 weeks
DA3	Heavy Duty Air Pack	Rough handling, Outdoor storage, Wet environment.	Solid wood or plywood crate.	Vapor barrier, 0.15mm (.006 inch) PE	Supplier Spec	3 months
DT1	Light Duty Truck Pack	Van & some TL	Light corrugated boxes, unpackaged items on dollies, items on wheels wrapped for scuff protection, items in open or closed reusable packages.	Dust/moisture cover	None	2 weeks
DT2	Standard Truck Pack	LTL & some TL	Open wood crate, corrugated box with adequate cushioning and stacking strength.	Dust/moisture cover	None	2 weeks
DT3	Heavy Duty Truck Pack	LTL w/rough handling	Solid wood or plywood crate.	Dust/moisture cover	None	2 weeks
DR1	Reusable Pack	Milkrun, Controlled shipment, Supplier delivery	Light corrugated boxes, unpackaged items on dollies, items on wheels wrapped for scuff protection, items in open or closed reusable packages.	Dust/moisture cover	None	2 weeks
INTERNATIONAL						
IA1	Light Duty Air Pack	Controlled shipment, or small parcels with good handling at shipping and receiving end.	Corrugated box	Dust/moisture cover	None	2 weeks
IA2	Standard Air Pack	Std air shipment	Open wood crate or triplewall corrugated crate/box	Dust/moisture cover	None	2 weeks
IA3	Heavy Duty Air Pack	Rough handling, Outdoor storage, Wet environment.	Solid wood or plywood crate	Vapor barrier, 0.15mm (.006 inch) PE	Supplier Spec	3 months
IO1	Light Duty Ocean Pack	Controlled ocean shipment, with good handling at shipping and receiving end.	Light corrugated boxes, unpackaged item on dolly or wood base., items on wheels secured to prevent rolling.	Vapor barrier, 0.15mm (.006 inch) PE	Supplier Spec for each package or for entire container	3 months
IO2	Standard Ocean Pack	Typical ocean shipment, air shipment with rough handling or storage	Solid wood or plywood crate	Vapor barrier, 0.15mm (.006 inch) PE	Supplier Spec for each package or for entire container	3 months
IO3	Heavy Duty Ocean Pack	Rough handling, Outdoor or long term storage	Solid wood or plywood crate	Heat sealed foil liner	Supplier Spec for each package or for entire container	12 months
IT1	Light Duty Truck Pack	Van & Some TL	Light corrugated boxes, unpackaged items on dollies, items on wheels wrapped for scuff protection, items in open or closed reusable packages.	Dust/moisture cover	None	2 weeks
IT2	Standard Truck Pack	LTL & Some TL	Open wood crate, corrugated box with adequate cushioning and stacking strength.	Dust/moisture cover	None	2 weeks
IT3	Heavy Duty Truck Pack	LTL w/rough handling	Solid wood or plywood crate	Vapor barrier, 0.15mm (.006 inch) PE	Supplier Spec	3 months
IR1	Reusable Pack	Milkrun, Controlled shipment, Supplier delivery	Light corrugated boxes, unpackaged items on dollies, items on wheels wrapped for scuff protection, items in open or closed reusable packages.	Dust/moisture cover	None	2 weeks

Packaging Matrix Region Definitions

** The Following Countries Are Included In These Regions

WESTERN EUROPE	EASTERN EUROPE	SCANDINAVIA	MIDDLE EAST	INDONESIA
Ireland	Belarus	Denmark	Afghanistan	Borneo
Austria	Bulgaria	Finland	Bahrain	Burma
Belgium	Croatia	Greenland	Egypt	Cambodia
France	Czech Republic	Iceland	Iraq	Laos
Germany	Estonia	Norway	Israel	Malaysia
Italy	Hungary	Sweden	Jordan	New Guinea
Netherlands	Kazakhstan		Kuwait	Philippines
Portugal	Latvia		Lebanon	Sumatra
Spain	Lithuania		Oman	Thailand
Switzerland	Poland		Pakistan	Vietnam
United Kingdom	Romania		Palestine	
	Russia (CIS)		Qatar	
	Slovakia		Saudi Arabia	
	Turkey		United Arab Emirates	
	Ukraine		Yemen	

2.0 General

2.1 Scope

This document defines the domestic and international packaging requirements for Wabtec products. These requirements apply to Wabtec Manufacturing and Supplier finished good products. They also apply to Service part shipments from Wabtec Manufacturing and Suppliers. Wabtec site leaders MUST meet all applicable requirements as referenced in Quality Management System document, QSR 7.5.5, "Material Handling, Packaging, and Storage".

The purpose of this document is to provide controlled, documented packaging requirements for worldwide distribution of Wabtec products. The requirements specified in this document are **minimum** requirements. They may be exceeded to comply with specific country or local regulations or requirements, but these minimum requirements are mandatory.

This document includes general and specific requirements, general reference information, and refers to other, more detailed specifications that are beyond the scope of this document. The goal is to provide global requirements to help ensure consistent, adequate, and economical product protection, and efficient and safe handling for all inbound and outbound Wabtec products.

2.1.1 Use of Document

This document is to be used to define the requirements for the selection of different types and sub-types of packages and to help determine general protection requirements.

The user will start with the "User Road Map" in Section 2 and Package Type definitions in Section 3. The road map will direct the user to the sections required for the type of material being shipped and the method of shipment.

All materials must comply with the requirements in Sections 4, 5, 6, 7, and 8. Service Parts must also comply with the Service specific requirements in Section 9. The requirements in the Exhibits Section 10 apply as directed from the other sections. Information in General Reference Section 11 is reference only.

2.2 Supplier Responsibility

Wabtec relies on the knowledge & expertise of its suppliers and their packaging/handling agents to ensure items are packaged safely & in compliance with all applicable laws & regulations. These requirements provide a basic understanding of Wabtec packaging requirements, but the ultimate responsibility for safe and compliant packaging (from origin to final destination), validation testing, and all associated costs rest with the supplier. A "Supplier Packaging Request for Information (RFI) Form" and Questionnaire may be required as well as pre-production 1st article inspections via packaging validation, reference Section 10.8, "Exhibit 8". For questions on these requirements, the supplier should contact their Wabtec Sourcing Leader or a Wabtec Packaging Engineer to discuss their concerns.

2.3 List of Symbols, Abbreviations, Definitions, Acronyms

See Appendix A

2.4 Order of Precedence

If there are conflicting requirements, the following order of precedence shall be followed:

1. The drawing, purchase specification or other part or assembly specific document (if applicable)
2. This document
3. Other Wabtec standards referenced
4. Industry standards referenced

Wabtec or industry standards not referenced may apply.

3.0 Document Usage Roadmap

3.1 This document is made up of the following 13 sections:

Section 1	General
Section 2	Document Usage Roadmap
Section 3	Package Type
Section 4	General Packaging Requirements
Section 5	Regulatory and Environmental Requirements
Section 6	Package Testing and Validation
Section 7	Material Handling and Distribution Safety and Efficiency
Section 8	Product Identification, Marking and Labeling
Section 9	Special Requirements for Service Parts
Section 10	Exhibits
Section 11	General Reference
Appendix A	List of Symbols, Abbreviations, Definitions, Acronyms
Appendix B	Example/Reference Documents

3.2 Determine the type of packaging required and the applicable sections in this document.

Step #1 - Define the Type of part: it will be either a **Manufacturing Part,** or a **Service Part**

Step #2 - Define the Sub-Type of part (applies to **Manufacturing Parts** only): a Manufacturing Part, will either be a **Production Part** or a **Finished Good Part**

Step #3 - Use the part type and sub-type to determine the quantity per package and the number of trips per package from the following table and the descriptions in Section 3.

Intended Use		**Quantity Per Package**		**Trips Per Package**	
Part Type	**Part Sub-Type**	**Individual**	**Multiple**	**Single**	**Multiple (Reusable/Returnable)**
Manufacturing	Production	Optional	Preferred	Optional	Preferred
	Finished Good	Preferred	Optional	Preferred	Optional
Service	All	Required		Preferred	Optional

Step #4 - Determine the applicable sections in this document from the following table.

Part Type	Part Sub-Type	These Sections Apply for All Shipments by Sub-Type	Add for Service Only:	Add as Directed by Other Sections	For Reference Only
Manufacturing	Production	**Sec 3** - Package Type **Sec 4** - Requirements **Sec 5** - Regulatory & Environ **Sec 6** - Test & Validate **Sec 7** - Material Handling **Sec 8** - ID, Mark & Label		**Sec 10** - Exhibits	**Sec 11** - General Reference **Appendix A –** Symbols, Abbreviations, Definitions, Acronyms **Appendix B –** Example/Reference Documents
	Finished Good				
Service	All		**Sec 9** - Special Req's for Service Parts.		

4.0 Package Type

4.1 Selection of Package Type

Parts shall be packaged as specified in the Wabtec Purchase Order, the Purchase Contract, the Purchase Specification, or Wabtec Drawing. When Sourcing or Engineering documents do not explicitly define packaging requirements, select a package type which protects the product as required by Section 4 of this document, and is suitable for the product type as described in Sections 3.2, 3.3, and 3.4.

When suppliers cannot determine the product type from the purchase or engineering documents, they should contact their Wabtec Sourcing Leader for instructions. See General Reference #12 for additional guidance in the selection of specific packages for different modes of transport and shipping conditions.

4.2 Package type for Manufacturing "Production Parts"

Ship "line use products" in "reusable/returnable containers" when possible.

Use "reusable/returnable containers" whenever the cost of the containers and the return transportation is justified. Wabtec Sourcing Leaders will provide guidance to select or design containers and assure return to the supplier.

"Multi-pack" "line use products" whenever possible to minimize packaging material cost and waste.

Do not use "individual packages" for "line use products" except when the size, weight, or fragility of the product do not allow "multi-pack."

Use Wabtec "milk run" carriers, when possible, to reduce the cost of delivering products and returning packaging materials.

4.3 Package type for Manufacturing "Finished Good Products"

Unless otherwise specified, always ship "finished good products" in "individual pack, single trip containers", so products do not need repackaging before shipment to customer sites.

When specified, ship "finished good products" in "individual pack, double trip containers" so that the damaged or defective product being replaced can be returned in the same package without additional damage.

4.4 Package type for "Service Parts"

Unless otherwise specified, always ship Service Parts in "individual packages". If applicable, "reusable/returnable containers" can be used, but their usage will most likely be between Wabtec facilities only and an expendable packaging solution for one-way delivery would be used for final customer shipment.

Service Parts will be shipped individually between Wabtec distribution facilities and customer sites and could be unpacked and repacked multiple times. All packages must be capable of multiple shipments and multiple openings and closings.

5.0 General Packaging Requirements

5.1 Basic Protection Requirements

5.1.1 Shock & Vibration

Provide adequate cushioning and dunnage materials to prevent damage from shock and vibration during shipment. The amount of protection required depends upon the fragility of the product and varies by the protective materials and mode of transport used. Cushion small products within their packages. Medium and large products can be protected with cushioned wood bases or special isolation systems built into the product itself. (See Section 6 for validation testing requirements and General Reference # 2 for general distribution environment reference data.)

5.1.2 Crush Protection

Provide adequate compression strength with the package and/or product to prevent crushing during normally anticipated distribution and storage stacking and handling conditions. Some package crushing is acceptable as long as there is no product damage or loss of package integrity, but it should be minimized.

5.1.3 Scuff Protection

Use scuff resistant materials to protect all painted, plastic, and other finished product surfaces that come into contact with wood, untreated corrugated fiberboard, other products, or anything that could potentially damage the part surface.

5.1.4 Labels & Tape on Painted Product Surfaces

Do not apply temporary labels or tape to exposed product surfaces unless the adhesives used are specifically designed to not harm the surface or have been tested and confirmed to release cleanly and not harm the surface. Consideration must be given to the length of time anticipated before removal due to adhesive hardening and bonding over time.

5.1.5 Static Protection

Protect all printed wiring assemblies and products with exposed electronic components from electrostatic discharge (ESD).

Package smaller, ESD sensitive parts in metalized, static shielding bags and seal with a label identifying the contents as ESD sensitive. Do not place any static generating material, such as instruction sheets, tape, or corrugated packing material inside of these bags.

If a part is repacked in a shielding bag after the seal is broken, the seal must be replaced.

Circuit boards with batteries must include an insulator to prevent accidental discharge of the battery.

Wrap and package larger products with exposed electronic components that are susceptible to static damage in antistatic materials. Use static shielding materials as required.

Printed wiring assemblies and printed wiring boards must not be packaged in "pink poly" or other plastic materials that use amines, or animal fats, as the static dissipating medium.

5.1.6 Moisture Protection

Moisture protection requirements apply when such conditions may be encountered during distribution. In a controlled system where rain, standing water, or similar extreme conditions are avoided (i.e., direct shipment from supplier to a manufacturing facility in a dedicated transport vehicle, small package shipping by express carrier, etc.), water resistant materials may not be required. The supplier must make this judgment based on knowledge of the distribution system being used and the needs of the product, as defined by Wabtec and communicated to the supplier.

5.1.6.1 Rain/Heavy Condensation

Cover moisture sensitive products not contained in waterproof boxes with a water-resistant shroud to prevent water damage during distribution.

5.1.6.2 Humidity

Protect products sensitive to damage from high humidity with sealed enclosures and desiccant.

5.1.6.3 Standing Water

Package bases that may be exposed to standing water must not lose their compression strength when submerged in water for up to 48 hours.

5.1.6.4 Rapid Temperature Changes

Rapid temperature changes can occur when aircraft land after prolonged high-altitude flight, or when products are moved from cold delivery vehicles to warm receiving docks. Heavy condensation can form on cold products when they are exposed to warmer air. Protect moisture sensitive products from this condensation with vapor barrier materials and desiccants. Pack non-moisture sensitive products so that the condensation can dry freely as the temperature increases.

5.1.7 Contamination & Cleanliness Protection

Cover larger products that ship on dollies, or loose on wood skids with plastic bags or other acceptable coverings to keep them clean during distribution.

Bag or wrap smaller products that are susceptible to contamination to keep them clean and free from contaminates, including dust from cushioning and dunnage materials.

Do not use cushioning materials if they can break and contaminate a product by releasing small foam pieces inside the package.

5.1.8 Corrosion Protection

Provide protection for products with exposed, finished metal surfaces that are susceptible to corrosion. Typical methods of protection include:

5.1.8.1 Metal Coating and Finishes

In most cases, metal surfaces that are susceptible to corrosion should be finished, painted, or coated in some way to provide permanent protection.

5.1.8.2 Contact Preservatives

Temporary corrosion prevention/protection materials can be applied directly to metal surfaces. Removal of these preservatives may or may not be required. Provide specific instructions if removal is required.

5.1.8.3 Part Surfaces in Contact with Wood

Part surfaces, either finished or unfinished, should not be in prolonged direct contact with wooden packaging. Moisture barrier materials must be used to isolate parts from all wooden packaging surfaces or components such as crates, blocking or pallets. See Section 4.7 "Lumber & Wood Packaging Materials" for further information on moisture content limitations in wood packaging materials.

5.1.9 Humidity & Moisture Control

5.1.9.1 General

Products susceptible to corrosion must be packaged to provide a dry, non-corrosive environment during the expected time of shipment and any storage. Vapor barrier materials from simple plastic bags and films to heavy foil laminated scrims must completely surround the product and be sealed to prevent moist air from coming in contact with the product. Desiccants must always be used with sealed systems to absorb moisture that is inside the vapor barrier material at time of packing and moisture that migrates through the barrier over time.

5.1.9.2 Barrier Materials and Desiccant

The type of vapor barrier material used, and the amount of desiccant required are dependent on the size of the package, expected relative humidity and length of exposure time.

5.1.9.2.1 Plastic Materials

Plastic materials provide an economical barrier for short-term protection. However, all plastic materials will eventually allow moisture to permeate, which could result in a wet, corrosive atmosphere around the product if exposure time is too long. Time is critical when using plastic barrier materials. Shelf-life should be indicated if critical.

5.1.9.2.2 Foil Laminated Barrier Materials

Foil laminated barrier materials are much more expensive than plastic materials but allow moisture to migrate through at a much slower rate, providing protection for much longer periods of time.

5.1.9.2.3 Desiccant

Desiccant absorbs moisture and is placed inside of the vapor barrier material but must not be in contact with the product. The quantity required can vary by manufacturer, but the general formula is 1 unit (33g) for each 90 in^2 (580 cm^2) of exposed vapor barrier surface area. The quantity increases

when wood, corrugated and other materials that can contain moisture are packed inside the vapor barriers, so the quantity must be adjusted for specific applications.

5.1.9.2.3.1 Vapor Barrier Material and Desiccant Selection Table

The following table provides basic guidelines for barrier material and desiccant selection:

PROTECTION LEVEL (SEE 11.12.2)	DUST COVER OR VAPOR BARRIER MATERIAL	DESICCANT	TYPICAL PROTECTION TIME PERIOD	TYPICAL APPLICATIONS AND USAGES
TRUCK – 1, 2, 3 AIR – 1, 2	UNSEALED PLASTIC DUST COVER	NONE	N/A	AIR & TRUCK SHIPMENT WITH NO STORAGE
TRUCK – 3 AIR – 3 OCEAN – 1, 2	PLASTIC BAG OR SHEET WITH SEAMS HEAT SEALED OR SEALED WITH TAPE	STANDARD QTY PER SUPPLIER INSTRUCTIONS	3 MONTHS	LIGHT DUTY OCEAN SHIPMENT OR SHORT-TERM STORAGE
TRUCK – 3 AIR – 3 OCEAN – 3	FOIL LAMINATED BARRIER MATERIAL WITH HEAT SEALED SEAMS	STANDARD QTY PER SUPPLIER INSTRUCTIONS	12 MONTHS MINIMUM	STANDARD OCEAN SHIPMENT OR LONG-TERM STORAGE

1 = PROTECTION LEVEL 1 2 = PROTECTION LEVEL 2 3 = PROTECTION LEVEL 3

5.1.9.2.4 Dust Cover

A dust cover is a simple plastic bag or sheet draped over a product to help keep it clean. It is not designed to prevent corrosion. This type of cover must be kept open to allow air to circulate around the product, or condensation will occur and promote corrosion.

5.1.9.2.5 Tape Sealed Joints

Tape can be used to seal barrier joints to provide economical, short-term moisture protection.

5.1.9.2.6 Heat Sealed Joints

Heat-sealed joints are more expensive than tape joints but provide greater protection from moisture migration and shall be used for longer-term protection.

5.1.9.2.7 Vacuum Pack

When barrier materials are heat sealed, it is most effective to vacuum excess air from inside of the barrier to provide the driest atmosphere possible at time of packing. Desiccant is always required when a vacuum pack is used to absorb moisture that already exists inside the pack, and moisture that migrates through the barrier material over time.

5.1.9.2.8 Wood Inside of Barrier

Do not seal green, un-dried wood, or any wood materials with moisture content over 19% (26% for hardwood), inside of a vacuum pack or any other type of airtight cover. The acidic nature of wood moisture could cause severe corrosion.

5.1.9.2.9 Vapor Corrosion Inhibitors (VCI)

Parts or entire products can be protected from corrosion by controlling the atmosphere around the item and filling it with vapor corrosion inhibitors. The VCI material is available in paper, plastic film, foam pads, emitters, and many other delivery systems. It vaporizes around a product, condenses on bare metal surfaces, and prevents corrosion.

WARNING: Because VCI materials condense on all bare metal product surfaces they must be tested to insure no negative effects on the electronics or any other sensitive components of the product.

The type and amount of VCI material to be used is dependent on the type of metal to be protected and the style and cubic dimension of the package being used. Follow the manufacturers' recommendations when selecting a VCI material and the required quantity for a specific application.

5.1.10 Temperature Protection

5.1.10.1 General

Normal temperature extremes anticipated during distribution are 70° C (158° F) to -40° C (-40° F). Products susceptible to damage within this range shall include packaging with thermal protection and the outside of the package shall be marked or labeled with the safe transport/storage temperature.

5.1.10.2 Low Temperature Protection

Liquids, products containing liquids and other products susceptible to temperature damage above -40° C (-40° F), shall be insulated to increase the time required for the product core temperature to reach the freezing or damage level.

Special precautions must be taken and/or special carrier handling arrangements made when ambient temperatures are expected to fall below the freezing or damage point of the product.

Packaging can delay temperature change, but it cannot stop it. The product core temperature will equalize to the ambient temperature typically within a few hours.

Label or mark packages containing products susceptible to low temperatures with the warning "TEMPERATURE SENSITIVE - DO NOT FREEZE".

Label or mark packages with the exact freezing or damage point temperature if other than 0°C (32°F).

Typically, liquids increase in volume when they solidify. Design liquid packages with adequate headspace to accommodate this expansion when possible.

5.1.10.3 High Temperature Protection

Products susceptible to high temperature damage below 70° C (158° F) shall be insulated to increase the time required for the product core temperature to reach the damage level.

Special precautions must be taken and/or special carrier handling arrangements made when ambient temperatures are expected to exceed the product damage level.

Packaging can delay temperature change, but it cannot stop it. Eventually the product core temperature will equalize to the ambient temperature.

Label or mark packages with high temperature damage point when below 70°C (158°F).

5.1.11 Loss of Small Parts & Packages

Consolidate very small parts with other parts and packing materials to prevent loss and/or misplacement. See Sections 10.1.12 & 10.1.13. Increase package size, if necessary, to prevent loss.

5.2 Package Arrangement for Subassemblies

Package all accessories or items necessary for the assembly of a subassembly together in the same package, or in the case of many small packages, in the same large over-pack, whenever possible.

5.3 Standardization, Size, and Consistency

Minimize the number of different box sizes and other packaging materials used.

Products should be packaged consistently, maintaining the same quantity, orientation, and container type. This will eliminate and avoid confusion on the receiving end.

Select packages that allow adequate space for cushioning and dunnage material but minimize unnecessary space so that the overall package size is as small and compact as possible.

Utilize standard container sizes if possible. Ref. Section 10.7.2 for a listing of some Wabtec developed container sizes.

5.4 Reusable Containers & Materials

Use reusable containers and packing materials when mutually acceptable between shipper and receiver.

Design containers and packing materials to allow the receiver to easily remove the original product without causing damage or loss of integrity to the package.

Reusable containers are usually more expensive than disposable containers, so they should not be shipped directly to a customer site unless a return system is in place.

Always identify the country of origin on reusable containers for customs purposes.

5.5 Reused Containers

Reused containers must provide the necessary protection for the product, and also meet all legal and regulatory requirements/compliance.

Remove or totally obliterate all old labels and markings that do not specifically apply when a container is reused.

Never package materials regulated as hazardous in a used container unless it is the same product the package was originally designed and certified for, and reuse is acceptable in the regulations.

The outer package of a combination package may be reused to ship a non-regulated material as long as all hazardous reference markings and labels have been removed or totally obliterated.

Reused containers must identify the country of origin for customs purposes.

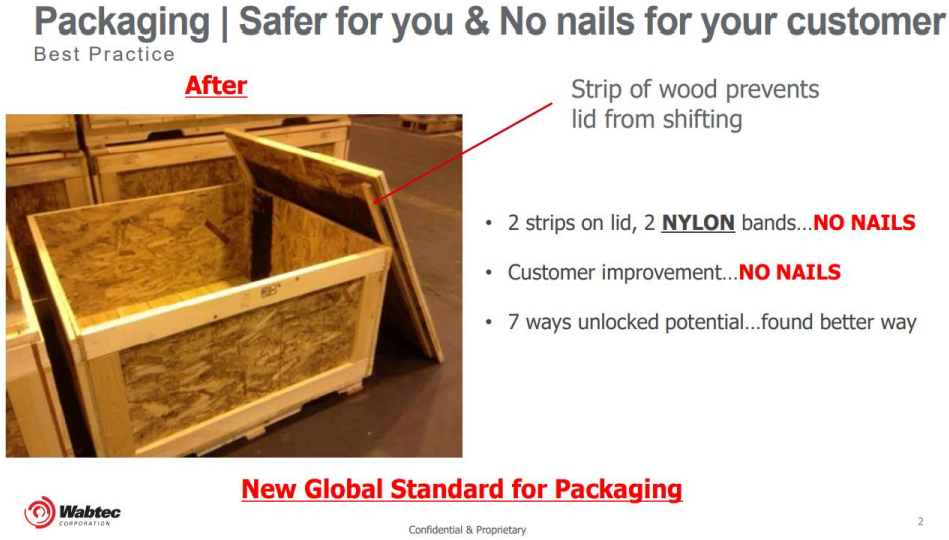
5.6 Packaged Products Containing Liquids

Products and primary packages containing liquids should be sealed in moisture proof bags or liners to create a "Leak-Tight" package that will prevent leakage in case of damage. This requirement does not apply to large machines or assemblies that include components containing liquids.

5.7 Use of Nails, Screws and Other Fasteners in Wood Packaging

5.7.1 Primary Panel Access Fastening

Wabtec **prohibits the use of nails/staples** for primary access panels per Section 7.1.1. A primary access panel is defined as the primary opening where product is removed. Wabtec prefers a trapped, non-fastened lid with banding as an alternative closure method (see below diagram). Only where demonstrated that the banded access panel is not adequate, will Wabtec permit the use of screws or other mechanical fastener to maintain the integrity of the package. Deviations from this shall be reviewed and approved through the supplier quality engineer.



5.7.2 Proper Application of Fasteners in Wood Packaging

All fasteners used in building wood packaging must be embedded in the wood structure to prevent safety risk of injury when handling, opening, or accessing the interior of the package per Section 12.8.2.

5.8 Lumber & Wood Packaging Materials

5.8.1 Conformance

All wood materials must conform to all regulatory and environmental requirements per Section 5.1.3.

5.8.2 Water Content

The water content of lumber used in wooden pallets, crates, or product blocking, must not exceed 19% for softwood, or 26% for hardwood material 5 cm (2 inches) or less. All hardwood lumber and softwood lumber greater than 5 cm (2 inches) thick shall be 26% or less in moisture content.

5.8.3 Defects

Lumber used shall be free from the following defects:

Knots or knot clusters whose diameter exceeds 1/3 of the board width, or knots existing at nail driving positions, or at both ends.

Knots or knot clusters in square timbers of which the diameter exceeds 1/3 of the width of the member, and which penetrates to both surfaces.

Roundness or attached bark whose thickness exceeds 1/2 of that of the member, or whose width exceeds 2 cm (.75 in) of timbers used as stress members. However, where such defects are present at the central part of the timber, the dimensions remaining after subtracting those of such defects shall be not smaller than the specified cross-sectional dimensions of the member.

Knotholes, borer holes, dead knots, loose knots, or the like of 1.2 cm (.5 in) or larger in diameter.

Cracks, mold, decay, warping, or the like, that jeopardizes the integrity of the crate or box.

5.9 Strapping

5.9.1 General

Use break-resistant strapping for crate and package reinforcement, carton closure, securement, unitizing, bundling, bracing, palletizing, and other applications. Use adequate corner protectors, cushioning, etc., as required, to ensure package integrity and product protection.

The use of plastic or plastic cord strapping is preferred. Metal strapping has sharp corners and edges that can cause injury and can be difficult to dispose of at customer sites.

All air cargo over 68 kg (150 lbs.) must be strapped on all sides (i.e., in both directions)

5.9.2 Usage Suggestions for Metal & Plastic Strapping

Use appropriate size and tension rating strapping to control load for transit and in-process handling.

5.9.2.1 Metal Strapping - PROHIBITED FOR USE BY Wabtec EHS

Prohibited for use on all crates, containers, and palletized loads. Wabtec EHS and Manufacturing facilities have deemed the use of metal banding to be a safety concern and dangerous for use.

Recommended alternatives are: Polypropylene banding, polyester banding, and plastic composite banding.

Wabtec EHS has banned the use of metal strapping for all applications. Alternative strapping methods must incorporate protection for corners and sharp edges with plastic or fiberboard protection to ensure poly strapping does not fail. Metal strapping does not stretch when applied and can loosen over time if wood and other package materials shrink if the package.

In addition, under high tension steel banding can spring back and cause serious injury when cut to access package.

In addition, for quality assurance, galvanic contact, such as through wet paper or corrugated fiberboard, will cause corrosion in both ferrous, and non-ferrous metals. Composite strapping, often referred to as "synthetic steel", should be used as an alternative to steel banding when properly used, having similar strength, and holding capabilities without "creep".

5.9.2.2 Plastic Strapping – REQUIRED STRAPPING BY Wabtec EHS

Use plastic strapping for all applications inside of wood crates and boxes, and for reinforcing wood crates, corrugated boxes, and all other applications to secure product in transit.

Select the proper type of plastic/poly strapping that best meets the strength and other requirements of the application.

5.9.2.3 Woven Plastic Cord Strapping

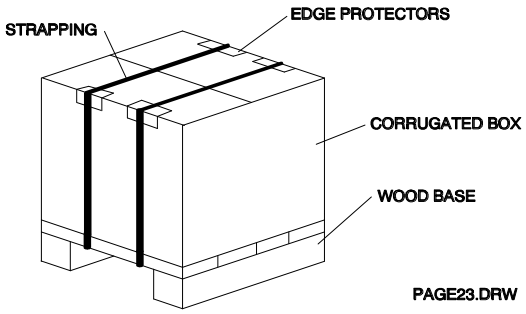
Use woven, plastic cord strapping for applications requiring a softer, less sharp material to prevent product damage or injury. This type of strapping is secured by tying or with a metal or plastic buckle. It is generally for lighter duty applications.

5.9.2.4 Proper Tensioning & Edge Protectors

Do not apply strapping tension directly on a product unless absolutely necessary. Strapping tension must never bear on any unsupported section of a product. Strapping tension must never bend or distort a product.

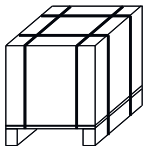
Use edge protectors to prevent strapping from cutting into and/or over-crushing a package corner when used on corrugated boxes or other packages where edge crushing can be a problem. Slight crushing is acceptable and desirable to prevent strap slippage, but excessive crushing will result in loose straps and possibly damaged products inside.

STRAPPING EXAMPLE FOR "NON-AIR SHIPMENT" OR "AIR SHIPMENT UNDER 68kg (150 lbs.)"

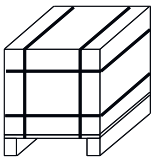


STRAPPING EXAMPLES FOR "AIR SHIPMENT OVER 68kg (150 lbs.)"

With Vertical Side Bands



With Horizontal Side Bands



Note: Vertical Side Bands that go under runners and are in contact with the ground can catch and break and can be hit and cut by fork truck forks and other handling equipment. In these cases, using Horizontal Side Bands is the preferred option.

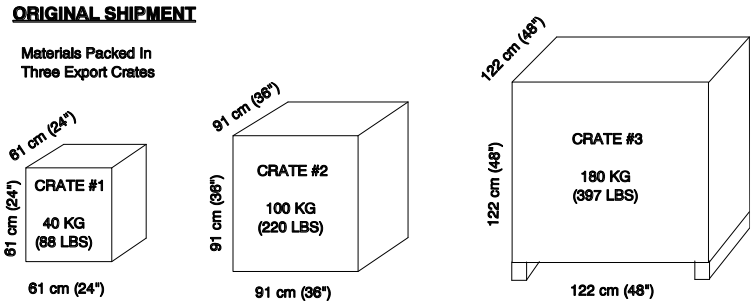
5.10 Loose-Fill Cushioning Material

Do not use loose-fill materials (i.e., "peanuts," "popcorn," etc.) or similar loose cushioning and/or dunnage materials in any package shipping to a Wabtec facility or any direct shipment to a Wabtec customer unless securely sealed in a bag or pouch.

5.11 Package Weight-to-Cube Ratio

Condense products as much as possible in packages and crates to provide a high weight-to-cube ratio. Do not exceed carrier load limits but keep all packages and crates as dense as practical.

Transportation costs are typically determined by weight, but many carriers add additional charges when the weight-to-cube ratio falls below contracted levels. The following example illustrates how increasing the weight-to-cube ratio (i.e., density) can reduce transportation costs:



		Dim Factor		lb./ kg		Dim Weight	Actual Weight
Crate #1	61cm X 61cm X 61cm = 226,981 cm³	/ 7000	=			32kg	40kg
	24" X 24" X 24" = 13,824 in³	/ 194	=	71 lb.	x 0.45 =	32kg	40kg
Crate #2	91cm X 91cm X 91cm = 753,571 cm³	/ 7000	=			108kg	100kg
	36" X 36" X 36" = 46,656 in³	/ 194	=	240 lb.	x 0.45 =	108kg	100kg
Crate #3	122cm X 122cm X 122cm = 1,815,848 cm³	/7000	=			257kg	180kg
	48" X 48" X 48" = 110,592 in³	/ 194	=	570 lb.	x 0.45 =	257kg	180kg
					Total	397kg	320kg

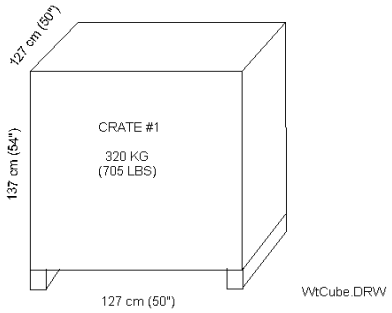
SUMMARY - The Total Dimension weight, 397kg, is 24% greater than the Total Actual weight, 320kg. Transportation costs are based on the higher of the two weights, so this shipment will cost 24% more than the actual weight cost.

Dimension Weight Reduced By Improved Weight To-Cube Ratio

Actual Weight About The Same

CONDENSED SHIPMENT

The Same Products Now More Densely Packaged & Combined in One Export Crate.



							Dim Factor	lb./ kg	Dimension Weight	Actual Weight
Crate #1	127cm	X	127cm	X	137cm	= 2,209,673 cm³	/ 7000 =		313kg	320kg
	50"	X	50"	X	54"	= 135,000 in³	/ 194 =	696 lb. x 0.45	313kg	320kg
								Total	313kg	320kg

SUMMARY - The Total Dimension weight, 313kg, is less than the Total Actual weight, 320kg. Transportation costs will now be based on the actual weight, saving the 24% premium from the original shipment.

5.12 Special Requirements for International Shipments

International shipments require special protection from moisture and contamination and in general, require stronger outer packaging due to rougher handling and to support stacked loads.

Mold infestation on packaging is not acceptable and will become the responsibility of the supplier to clean and repackage with acceptable packaging materials at the supplier's expense.

Air shipments receive multiple handlings and packages will be stacked in containers or tightly secured to air pallets. **Ocean** shipments typically receive less handling but can be exposed to a very wet environment for a long period of time.

5.12.1 Special Requirements for International Air Shipment

Outer Package - The outer package should be wood or heavy corrugated fiberboard to prevent crushing and tearing. When corrugated fiberboard is used, it should be either triple wall or heavy double wall material.

5.12.2 Special Requirements for International Ocean Shipment

Outer Package - The outer package should normally be wood or plywood. Corrugated may be used if it can maintain its strength in a wet environment and adequately protects the product.

Corrosion - Control the atmosphere around the product with desiccants and vapor barriers, such as VCI, or other protective materials to minimize the chance for corrosion. Keep the atmosphere within the package dry (40%RH or less) for the anticipated duration of the distribution cycle. Apply contact

preservatives or other corrosion inhibitors directly to the product itself as necessary to provide adequate protection. See Section 4.1.8 for detailed information on corrosion protection.

Stacking – If additional stacking strength is needed for a corrugated solution, add 1.3cm (1/2 inch) or thicker plywood between unit loads. This will help distribute the weight of the stacked unit loads more evenly on the lower unit load, having a positive effect on the container's stacking strength. **NOTE:** Corrugated boxes will lose 50% or more of their stacking strength in the humid conditions typically found in ocean containers.

Shipping Container Blocking & Bracing - Block and brace shipping container unit loads as necessary to prevent movement during transport. **NOTE:** Responsibility to properly block and brace rests solely on the entity that prepares and loads the shipment.

5.12.3 Special Requirements for Solid Wood Crating

Solid wood crating is required for shipments to some countries due to the severe handling and climatic storage conditions that can exist during product distribution.

See General Reference #12 "*Protection Level Selection Matrix*", for additional reference information on product protection for global distribution if needed to determine level of protection.

5.12.4 Using Multiple Languages

The use of multiple languages is required for some countries (i.e., China and Korea) and is recommended, but not required for others. See Section 8 for specific requirements.

When specific requirements are not defined, it is suggested that multiple languages be used for standard identification type information (i.e., "Packing List Enclosed", "Check List Enclosed", "Technical Publications Enclosed", etc.), and information related to personal and product safety (i.e., "Warning: Top Heavy - Handle With Care", "Caution: Do Not Lift From This End Or Product Damage Will Occur", etc.).

It is recommended that the languages used include the first language of the country of destination, and those where carrier transfers or other special handling is expected to occur. A generic label with multiple languages typically includes: English, French, Japanese, Spanish, Italian, German, Chinese, Russian, and Arabic.

5.12.5 Time Sensitive Materials

Materials that are classified as having a shelf life must have a visible expiration date on the external packaging. The date format shall indicate expiration month and year. Recommended format is: "Expires MM/DD/YYYY" or "Expires MM/YYYY".

Batteries that require recharging must have a visible recharge date on the external packaging. The date format shall indicate recharge date, month, and year. Recommended format is: "Recharge after: MM/DD/YYYY" or "Recharge after: MM/YYYY".

6.0 Regulatory and Environmental Requirements

All packages and packaging materials used for Wabtec products must be in full compliance with all legal and environmental regulations & requirements for all countries where Wabtec products are distributed. Again, all provided information is for guidance only. Packaging suppliers shall only be responsible for providing packaging that meets Wabtec or Wabtec parts suppliers' designated specifications.

6.1 Regulatory Requirements

6.1.1 Hazardous Material/Dangerous Goods

Package, mark, label, and document any material, product and product outer package that is regulated as hazardous by the following groups, or any other regulatory body for the mode of transport being used:

- International Air Transport Association (IATA) & International Civil Aviation Organization (ICAO) for air shipment
- International Maritime Organization (IMO) for marine vessel/ocean shipment
- United States Department of Transportation (DOT) and appropriate in-country regulations for Canada and Mexico for ground shipment

Note: When required by the regulations, packages for these materials must be tested and certified to meet the performance-oriented packaging (POP) UN testing requirements. These special requirements can be found in the applicable documents referenced in General Reference #1 of this document, Section 11.1.4.

For radioactive materials, the packaging must meet the requirements set forth by the International Atomic Energy Agency (IAEA) and all applicable nuclear regulations.

Shipments must be in accordance with Wabtec Standard Work Practices document GP 3.02, "Transportation of Dangerous Goods" available through your Procurement Representative via EHS. The latest version is located in the Standard Work Practices Library.

6.1.2 Safety Data Sheet (SDS)

When required, ship chemicals and materials that present potential health hazards with one copy of their SDS in a pouch, on the outside of the package, and a second copy inside the package with the product. When shipping to a Wabtec manufacturing facility for "Production", necessary paperwork is required for the shipment in accordance with transportation regulations defined in Section 5.1.1.

Note: Many chemicals and materials not regulated under the transportation regulations defined in Section 5.1.1 do require SDS documentation to communicate important safety information.

6.1.3 Wood Packaging Materials

Due to expanding global wood import regulations on unprocessed raw solid wood packaging materials, processed or manufactured wood should be used for all wood packaging shipped to Wabtec whenever possible.

When unprocessed raw solid wood packaging material is used in the construction of bases, pallets, boxes, crates, blocking, and all other packaging materials, it must meet all the treatment and

stamping requirements of the International Standards for Phytosanitary Measures, ISPM #15, issued by the International Plant Protection Convention (IPPC) and any other international or individual country specific requirements. Plywood, OSB, LSL, LVL, PSL, particleboard and corrugated fiberboard are examples of processed wood-based materials that are not included in this regulatory requirement. Please reference the IPPC's ISPM #15 for the complete regulation.

IMPORTANT: The intent of this section is to guide the reader of this document to locations where additional information can be found on regulated wood packaging materials. The requirements are ever-changing and too detailed to be entirely contained within this section. **Wabtec regulated wood packaging material requirements are captured in Wabtec document 84A225720.** A supplemental educational to these requirements has also been provided internally for training purposes. Details for the internal audit tracking and training are located within QSR 7.5.5, "Material Handling, Packaging, and Storage". **ALL Wabtec sites MUST comply with all requirements contained within QSR 7.5.5, "Material Handling, Packaging, and Storage".** The QSR document can be found in Reliance (Link: **https://reliance.wabtec.com:443/reliance/reliance?ETQ$CMD=CMD_OPEN_ATTACHMENT_LAST_REV&ETQ$FILE_NAME=7.5.5+QSR+Material+Handling%2C+Packaging%2C+and+Storage.docx&ETQ$APPLICATION_ID=7&ETQ$FORM_ID=37&ETQ$KEY_VALUE=10671&ETQ$SOURCE_FIELD_ID=1233&ETQ$ORIGINAL_DOC_ID=1645**.) Document 84A22570 can be found in drawing retrieval as well as the Supply Chain Connect (SCC) (Link: **https://scc.wabtec.com/dashboards)**

6.1.4 Restricted Materials

Packaging materials should avoid the use of the following six substances:

1. Lead
2. Mercury
3. Cadmium
4. Hexavalent chromium (Chromium VI or Cr^{6+})
5. Polybrominated biphenyls (PBB)
6. Polybrominated diphenyl ether (PBDE)

Note: (PBB and PBDE are flame retardants used in some plastic materials)

6.1.5 Recycling Marks

Include international and country specific recycling marks and symbols on packaging materials. Recycling marks and symbols are only required on outer packages at this time, but it is recommended they be added to all packaging materials to meet future regulatory requirements.

When an over-pack is used, both the over-pack and the outer package(s) of the materials inside must include the required recycling symbol.

Corrugated fiberboard (cardboard) boxes and crates must be marked with either a Mobius Loop (preferred) or a China Specific symbol per the following examples:

Mobius Loop

China Specific Symbol

Marks must be applied as follows:

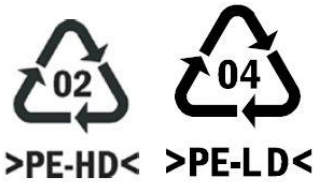
- Minimum of one mark per package
- Size to be 20mm, 40mm, 60mm or 80mm wide
- Easily visible
- The color green is recommended, but not mandatory

These marks can be preprinted on the box or added with a permanent label.

Wood crates and boxes do not require a recycling mark. However, all wood materials do require treatment certification markings as defined in Section 5.1.3.

Plastic outer packages require marks and material codes that will comply with China requirement GB 18455-2001. Examples include:

Material markings according to the international standards ISO 1043 and ISO 11469 may be used if it is confirmed that they will comply with the standard GB 18455-2001. Examples of the ISO codes include:



Metal outer packages require marks and material codes that will comply with China requirement GB 18455-2001. Examples include:

Other outer packages require marks and material codes that will comply with China requirement GB 18455-2001.

Green Point (Dot) Mark is a symbol that indicates the manufacturer has purchased a license for the right to use the symbol and has a process in place for recovering and recycling the material. Do not use this symbol unless all requirements have been satisfied.

6.1.6 China RoHS

Packages must be marked for compliance with China requirement GB 18455-2001.

Only the outer package requires a recycling mark. Plastic wraps, foam cushioning material, corrugated blocking, and other internal packaging materials do not require a mark.

Wood crates and boxes may be marked with an "NW" symbol, but it is not required.

Reference document GB 18455-2001 for all official requirements on products shipping to China.

6.1.7 European Community

If material markings are included on the packages, they must comply with European Community Directive

- 97/129/EC - EC Identification System for Packaging Materials

6.1.8 European Community Packaging

Packages must be designed for compliance with European Community Directive:

- 94/62/EC - EC Directive on Packaging and Packaging Waste
- 94/62/EC - All Follow-Up Addendums

The following standards should be fulfilled

- EN13427 - Use of European Standards
- EN13428 - Source Reduction
- EN13429 - Reuse
- EN13430 - Material Recycling

6.2 Environmental Requirements

6.2.1 Packaging Source Reduction

Design packages with the least amount of materials that will still provide adequate protection for the products contained.

6.2.2 Recyclability by Design

Design packages using materials that promote recyclability.

6.2.3 Waste

When possible, packages should be designed using materials that minimize impact on the waste stream.

6.2.4 Registration and Reporting

A site that engages in packaging may have certain local or country specific obligations, including registration, reporting, and recycling target. Each location must identify and comply with their specific requirements.

6.2.5 Recycling Marking and Identification

Mark packages and packaging materials with the appropriate international recycling symbols.

6.2.6 Environmental Packaging Selection Criteria

The table below shows a list of the most commonly used packaging materials for Wabtec products as well as some additional materials that may be considered in scope. Each is evaluated on a variety of environmental criteria. Shippers are required to use materials, which provide the best overall product protection and value but when all else is equal, choose the material that has the least possible adverse effect on the environment. This is based on practical and regulatory experience with feedback from entities throughout the entire supply chain including customers.

This table lists most commonly used packaging materials. Materials listed by overall score (G, Y, R, B), but no particular order within groupings. See LEGEND at bottom for explanation of coding system.

G=Green (positive), Y=Yellow (caution), R=Red (warning), B=Black (stop)

OR=Overall Rating, GA=Global Availability, SR=Source Reduction, RP=Reuse Potential, GR=Global Recyclability, DC=Disposition Cost

Material Description	OR	GA	SR	RP	GR	DC	Comments/Suggested Substitutes
Corrugated Fiberboard	G	G	G	Y	G	G	Good recycling and value, poor for reuse
Recycled and remolded PE (LD/HD)	G	Y	G	G	G	G	Excellent dunnage & pallet application

Paperboard / Chipboard	G	G	G	Y	G	G	This is 100% recycled content material
Paper Dunnage / Wraps	G	G	G	Y	G	G	Preferred over bubble due to recycling
Steel Containers / Racks	G	G	G	G	G	G	100% recyclable, returnable solution
EPU: Polyurethane Foam / PU	Y	G	Y	G	Y	G	Good recycling market (US only)
Plywood / Oriented Strand Board	Y	G	Y	G	Y	Y	Decent reusability.
Solid Wood	Y	G	Y	G	Y	Y	Fumigation may be required (bad for env.)
EPS/EPE Co-polymer (i.e., Arcel)	Y	G	Y	Y	Y	Y	> Integrity than EPS, greater chance of reuse
EPS: Polystyrene Foam	Y	G	Y	Y	Y	Y	Very inexpensive but poor reusability
EPE: Polyethylene Foam	Y	Y	Y	G	Y	Y	Capable of reuse but expensive to return
EPP: Polypropylene Foam	Y	Y	Y	G	Y	Y	Capable of reuse but expensive to return
Plastic Bubble Wrap	Y	G	G	G	R	R	Fair performance, not easily recycled
Stretch / Shrink Wrap, Bags	Y	Y	Y	R	Y	Y	No good substitutes for these
Pressure Sensitive Tape	Y	G	Y	R	Y	Y	Carriers prefer this over gummed tape
Corrugated Plastic	Y	Y	Y	G	R	R	Excellent durability reuse potential
Commingled Foam / Corrugate	R	G	G	Y	R	R	Not approved unless package is reused
Commingled Foam / Wood	R	G	Y	G	R	R	Not approved unless package is reused
VCI Products (Paper, plastic, emitter)	R	G	Y	R	R	R	If required for corrosion prevention
ESD Static Shielding Bags	R	G	R	Y	R	R	If required for ESD items
Foam-in-place, Foam-in-bag	R	Y	R	R	R	R	Suggest molded starch in bags for substitute
Padded bags with plastic bubble core	R	G	Y	Y	R	R	Suggest 100% paper construction instead
HD Fiber / Particle Board containers	B	B	B	B	B	B	Prohibited. Moisture/Mold issues
Burlap-Lined corrugated	B	B	B	B	B	B	Prohibited. Moisture/Safety issues

PVC Plastics	**B**	**B**	**B**	**B**	**B**	**B**	Legal and customer concerns in some areas
Foams with CFCs, HCFCs	**B**	**B**	**B**	**B**	**B**	**B**	Prohibited by Montreal Protocol
All loose fill type materials (peanuts)	**B**	**B**	**B**	**B**	**B**	**B**	Banned due to nuisance factor (scattering)

Legend

Overall Rating (OR)	Green (G)=Preferred, no restrictions, Yellow (Y)=Acceptable, it may be a concern in some countries or to some customers, Red (R)=Restricted, use is approved only where technically required and no G or Y alternative exists. Black (B)=Unacceptable in all situations.
Global Availability (GA)	Green (G)=Globally available, Yellow (Y)=available in some countries, Red (R)=very limited availability around the world
Source Reduction (SR)	Green (G)=Contains significant amount of recycled content (>20%), Yellow (Y)=some recycled content (<20%) is possible, Red (R)=includes no recycled content typically
Reuse Potential (RP)	Green (G)=capable of >5 reuses, Yellow (Y)=capable of 1-5 reuses, R=Incapable of reuse
Global Recyclability (GR)	Green (G)=commonly recycled worldwide, Yellow (Y)=technically capable of being recycled but not done in most places. Red (R)=recycling channels severely limited or not available.
Disposition Cost (DC)	Green (G)=earns money when recycled/disposed, Yellow (Y)=breaks even when recycled/disposed, Red (R)=costs money to recycle or dispose.

7.0 Package Testing and Validation

7.1 Package Validation Testing

7.1.1 Manufacturing "Production" & "Finished Good" Parts

The parts supplier is responsible for ensuring that the packaging used for these products provides adequate protection for safe delivery to the Wabtec manufacturing facility.

7.1.2 Customer "Finished Good" & "Service" Parts

The parts supplier is responsible for all testing and/or validation required ensuring their packaged products are in compliance.

7.1.3 Package Validation Test Documentation – As Required

All package validation tests must be documented and must include as a minimum:

- Test conditions (temperature & humidity)
- Test methods (vibration, drop, etc.)
- Test procedure (duration, frequency, orientation, height, etc.)
- Results (pass, fail, comments)
- Test equipment (model, serial number)
- Name of person who performed test and date performed
- Name of person who approved test and date approved

Suppliers may use their own report form as long as it includes the minimum required information. A Wabtec Packaging Validation Form is available and is referenced in Section 10.8, Exhibit 8 "Supplier Required Information". Supplier shall maintain test reports. Supplier reports must be able to be submitted to Wabtec upon request.

7.1.4 Mechanical Testing

Mechanical testing consists of using mechanical devices to expose packaged products to damaging forces similar to those expected in the distribution environment.

Typical tests include: Drop, Shock, Classical Shock, Random Vibration, Compression, and Horizontal Impact.

Collect as much information as possible on the product, packaging and expected distribution environment before scheduling testing.

Basic information includes:

- Product specifications, including size, weight, and fragility level in all orientations
- Any known weak points on the product, or damage history
- Packaged product specifications, including size and weight
- Information on how the product will be shipped (air, truck, ocean, etc.)
- Information on destinations product will be shipped to
- Define "Failure." The test engineer must know exactly what is and what is not considered failure to successfully complete the testing.

Select tests and test levels to match the product and any unique distribution requirements. This is typically a combined effort between requester and test engineer.

When the testing is complete and successful collect all test reports and any written correspondence related to the testing and the package design and add this information to the project file. This information will then act as the validation for the package.

Products that were physically tested must not be shipped to Wabtec as new or repaired material unless they pass all original inspections and testing.

7.1.5 Trial Shipment Testing

When mechanical testing is not appropriate due to the size, weight or other characteristics of a packaged product, trial shipments may be used for validation testing.

A typical trial shipment validation test involves:

1. Shipper communicates information on the new or redesigned packaging to the receiver.
2. Receiver provides comments and general feedback to the shipper.
3. Shipper & receiver work together to select an Order and trial quantity and agree on timing and number of distribution cycles of the shipment.
4. Shipper prepares the shipment and ships the new or redesigned package.
5. Shipper provides receiver with shipment information, including AWB No. (air shipment) or PRO No. (truck shipment) and estimated date of arrival.
6. Receiver inspects the shipment on arrival and may follow it through the delivery process if necessary.
7. Receiver provides feedback in the form of written comments, photographs, video, or whatever is necessary to communicate any problems or concerns.
8. If no problems, the receiver gives shipper approval to implement the change on future shipments.
9. If there are problems, shipper makes necessary changes and initiates another trial shipment, or if the problems are very serious, the proposed new or redesigned packaging may be canceled.
10. When the trial is complete, shipper collects all written correspondence on the trial, especially feedback from receiver and adds to the project file. This information will then act as the validation for the package.

7.1.6 Altered Supplier Package Validation

When a supplier's package is opened and changed by adding or removing a part or parts, the integrity of the original package design may be lost.

To validate an altered package, the package must be either, retested following the processes defined above, or the supplier must confirm in writing that the change will not affect the original validation, and must provide rationale and approval.

If there is any question as to the integrity of the altered package, it shall be retested.

8.0 Material Handling and Distribution Safety and Efficiency

8.1 Safety

The primary consideration for all Wabtec products is for the safety of the products and the people handling them. All packaging must be designed to allow safe handling globally.

8.1.1 Use of Nails and Screws in Wood Packaging

Wabtec **prohibits the use of nails/staples** in primary access panel securement due to safety. Wabtec recommends the use of screws or other mechanical closure fasteners to maintain the integrity of the package. This includes all methods of securing primary access panels from the top/side for crate design. This restriction is to ensure that nails/staples are not protruding from the primary access panel upon removal, which could cause injury to an operator.

8.1.2 Non-Fastened Primary Access Panel Method

Wabtec prefers wood crating with a top primary access panel to use a non-fastened lid with banding as a securement method. This can be achieved by framing the underside of the lid and strapping it against the inside walls of the crate. Reference Sections 12.4-12.6.

8.2 Handling

8.2.1 Crate/Package Base or Pallet

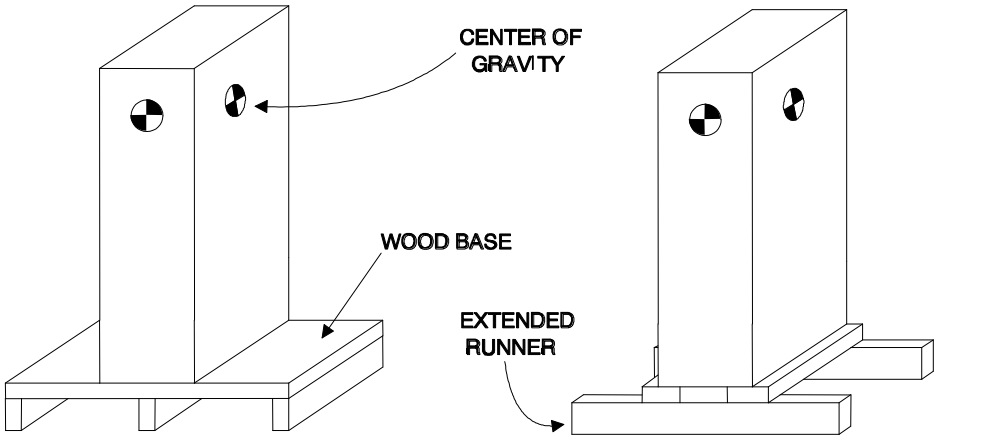
All crates and packages over 18 kg (40 lbs.) gross weight shall include a pallet or base that can be handled with standard manual and powered mechanical handling equipment available globally.

Wabtec manufacturing and distribution facilities may have specific requirements for size and style of pallet for internal handling and racking. Each facility will communicate their specific requirements for inbound materials directly to the supplier.

8.2.2 Stability

All crates and boxes that are tall, top heavy, or otherwise unstable, shall have wood bases designed to prevent accidental tipping during shipping and handling. Unstable is typically defined as an item 122 cm (48") tall and greater, having a center of gravity higher than one half its standing height or having a height of 2 times or greater of the shorter base dimensions. A standard test to determine stability is the **22-degree tip test**. (Tip the product 22 degrees from vertical and release. It should right itself without tipping over in either direction). The maximum tilt angle expected during distribution is 20 degrees. This can occur when a product is moved from a truck bed to the ground using a ramp. Reference diagrams below for typical examples of wood base designs that can be used to increase stability:

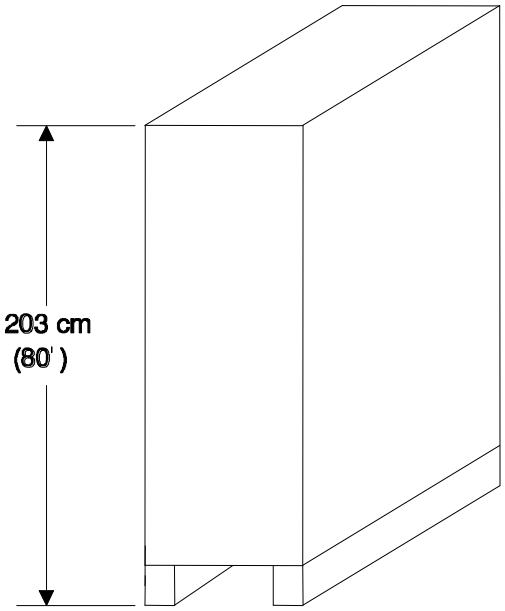
Crate Base for Stability



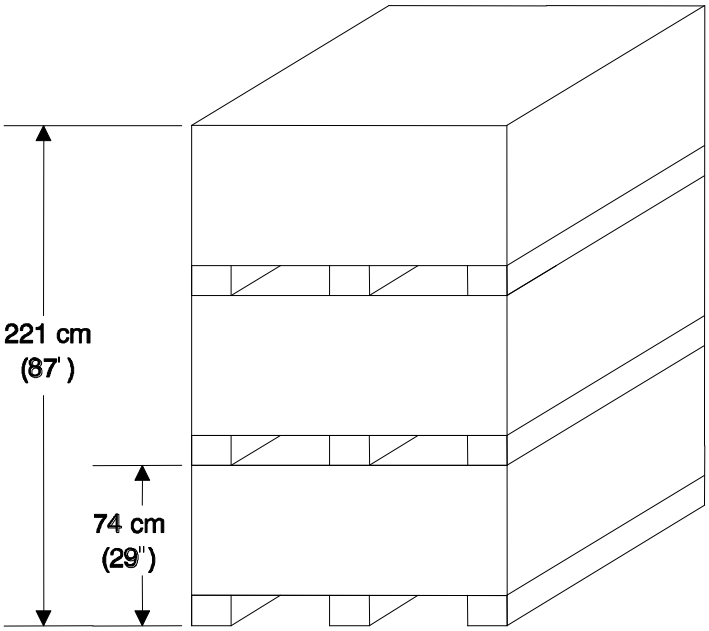
8.2.3 Stacking

Unit Loads must be designed with sufficient strength to allow stacking of like items up to a height of 228 cm (90 inches) for International Shipping and 259 cm (102 inches) for Domestic. This rule does not apply to items that should not be stacked due to their weight, or the location of their center of gravity. These items, and others with limitations, shall be clearly marked "Do Not Stack", "Do Not Stack Over 2 High", "Do Not Top Load", "Very Heavy - Floor Load Only," etc. Reference diagrams below for typical examples:

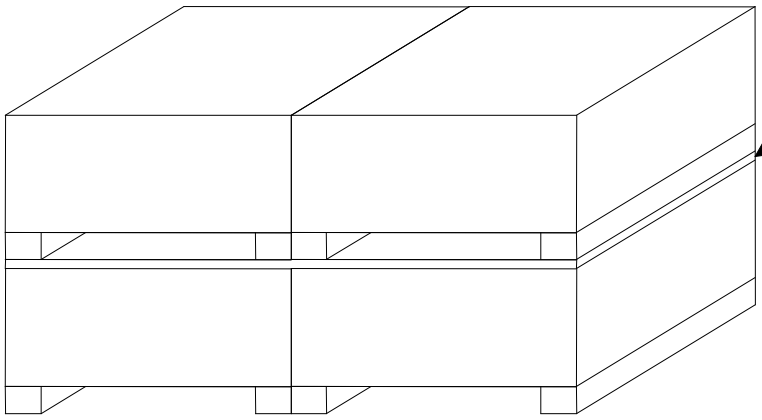
Crate and Package Stacking



STACKING NOT REQUIRED



THREE HIGH
STACKING REQUIRED



CORRUGATED ONLY USE AS NEEDED

PLYWOOD SHEET

TO INCREASE STACKING STRENGTH, ADD A SHEET OF PLYWOOD BETWEEN PRODUCT LAYERS.

8.2.4 Package Opening & Product Removal

Easy opening and product removal shall be incorporated into the designs of wood crates and boxes to minimize uncrating time and the chance for product damage at the receiving pole and/or customer site.

In all cases, if there is a specific method for safely opening a crate or removing a product, instructions/markings shall be included on the outside of the crate to provide guidelines for the person doing the uncrating.

8.2.5 Ergonomic Package Designs

Include ergonomic considerations in all packaging and handling practices. Design packages to minimize strain on people during product removal and repacking. Design items weighing over 18 kg (40 lbs.) to be handled by two people or with mechanical handling equipment (forklift or hoist accessible).

8.2.6 Proper Pallet/Skid Sizing

When shipping and handling product throughout the supply chain it is extremely important to have the pallet/skid sized properly for the given application. When utilizing a pallet, you may not be able to get a perfect fit for your product, but a minimum 85% cube efficiency is a MUST. When building a custom skid for shipment you should be able to achieve greater utilization. In either case, it must be sized for the given needs of the shipment, limiting any needs for blocking, and bracing in your shipping container. Overhanging of the part/package on a pallet or skid is NOT allowed. Overhang may lead to potential damage of the part when being handled by non-manual means. Products palletized without protection by a box/crate must maintain a 1" (inch) buffer between the edge of the pallet and the product on all sides. This helps prevent impact to the product when being moved by fork truck.

9.0 Product Identification, Marking, and Labeling

9.1.1 Bar Code Label Requirements

All individual packages must be labeled with a bar code label that specifies the following:

- Wabtec Part Number
- Part Description
- Country of Origin
- Purchase Order (PO) Number and PO Release Number
- Serial Number if required by Wabtec
- Supplier Name
- Shelf-Life Expiration Date if Applicable for the Part

The medium to be used shall be **white adhesive labels with printing in black ink**. The size of the characters must be **greater than 6mm (1/4")** high.

Labels must be placed in a visible location where they are protected from being torn off during handling.

Labels must not be placed on top of other labels or markings unless the information being covered is not applicable to the product or current shipment.

All **bar codes** on the label are to be **CODE 39** or sometimes referred to as CODE 3 OF 9 as specified by the Uniform Code Council (UCC) bar code guidelines. All Bar codes must also have human readable characters below the code. Minimum height for the bar code is 0.375" high.

Label Placement: When using overnight carrier services or other express delivery systems, the address and bar code labels should be applied to the top of the package to allow reading by automatic scanning equipment.

Reference all Bar Code Label Requirements via Supply Chain Connect (SCC): https://scc.wabtec.com/dashboards

9.1.2 Package Seal

All boxed or crated material must be properly sealed for shipment to final destination.

Packing List: Include a packing list that includes:

- Wabtec Part Number
- PO Number
- PO Release Number
- Quantity of Parts In The Shipment
- Country of Origin (Use country code, not EU)
- Delivery Address (# from bill-to address)
- Shelf Life (If Applicable)
- Hazardous Information & Safety Sheet (If Applicable)

Any documentation needed to receive the part(s) at the distribution center must be on the outside of the package so opening is not required.

Attach the packing list on the outside of one of the packages in an envelope or pouch labeled "Packing List Enclosed" or similar.

9.1.3 Marking Instructions

9.1.3.1 Method of Marking

Use labels, stencils, printing or tagging to mark the exterior of packages. Handwriting or lettering is not acceptable.

9.1.3.2 Security

Do not include the product name, description, or graphics on the outside of the package if it will encourage theft or any other security risk during distribution for high value items.

9.1.4 Use of Graphics on Packaging Materials

Supplier contact information (address, phone number, web site, etc.) or branding information (logos, slogans, etc.) shall not be visible on the package or be contained on any marketing materials within the package.

9.1.5 General Requirements for "Production" and "Finished Good" Parts

Identify products contained in all packages with the following as a minimum, on narrow end of shipping container.

- Wabtec order number
- Part number or Catalog number (as referenced on the order)
- Description
- Quantity on outer package(s) and inner package(s)
- Shelf-Life Expiration Date if Applicable

Include any additional information required for reshipment or direct shipment to a Wabtec customer or any special information as specified in the Wabtec order.

9.1.5.1 Packing List

Include a packing list that identifies the major components of the shipment and a cross-reference to the catalog number of the item that they are a part of. Reference the example provided in Section 10.4, "Exhibit 3 & 4" for specific details.

Attach the Packing List on the outside of one of the packages in an envelope or pouch labeled "Packing List Enclosed" or similar.

Attach the Packing List on a side of the package rather than the top if possible.

9.1.6 Specific Requirements for Barcode labeling Part Shipments

9.1.6.1 Bar Coded Receiving Label

Every shipment from a supplier to Wabtec shall have a Barcode label that is generated from SCC. Only labels approved by Wabtec can be utilized to ensure compliant with Wabtec's receiving systems and processes.

In the event that SCC will not generate a Barcode Label, contact the Buyer on the PO for an Emergency Barcode.

Reference all Bar Code Label Requirements via Supply Chain Connect (SCC): https://scc.wabtec.com/dashboards

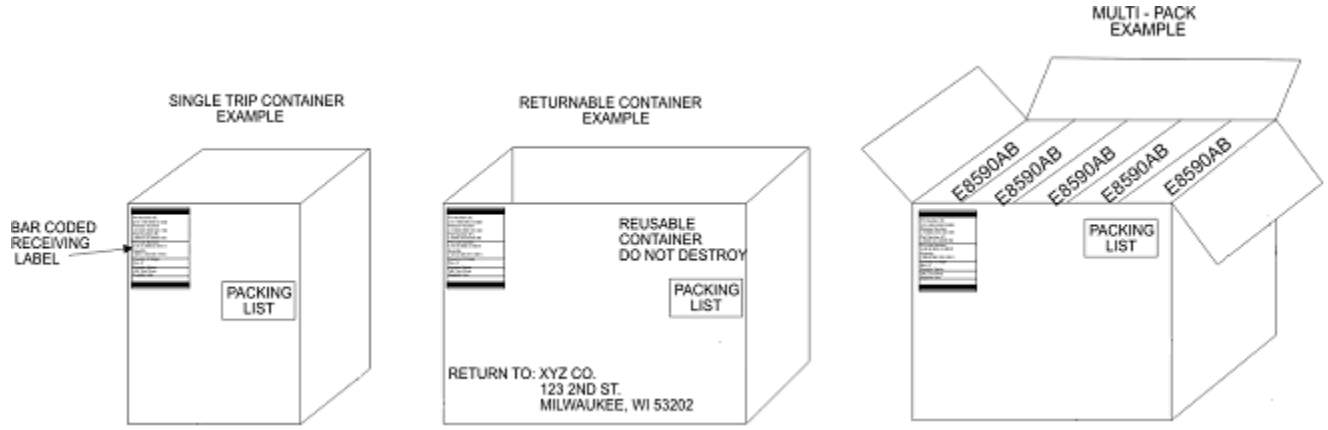
9.1.6.2 Packing List for "Production Parts"

Each shipment to Wabtec must include a minimum of (1) packing list including the following information (as a minimum):

- Wabtec ship-to address
- Wabtec modality (Bldg. #, Rad Cab Asm., etc.)
- Wabtec PO+RELEASE number (13-digit number)
- Wabtec part/catalog number, (as referenced in the Wabtec PO)
- Wabtec part/catalog description
- Quantity
- Shelf-Life Expiration Date if Applicable

Section 10.5 "Exhibit 5" provides a typical example of supplier packing list.

"Production" Identification Examples



9.1.6.3 Multiple Packages

When making a shipment that has multiple boxes on the same Purchase Order, us the Master Barcode label that is generated in SCC. The Master Barcode label indicated the total quantity that is in the shipment. The master barcode needs to be placed on 1 box along with "Box 1 of 4" label. This helps facilitate the receipt of supplier material. Make sure the Master Barcode is visible from the outside if the shipment is banded to a skid as an example.

Clearly identify the outside of each package as "Box 1 of 4", "Box 2 of 4", etc., when more than one box or package is used to contain an item. Position the box number close to the product identification number to avoid confusion with other multiple package items and the case numbers used to identify an entire system.

9.1.6.4 Multi-Pack

The outside of all multi-packs must clearly identify the number of pieces contained.

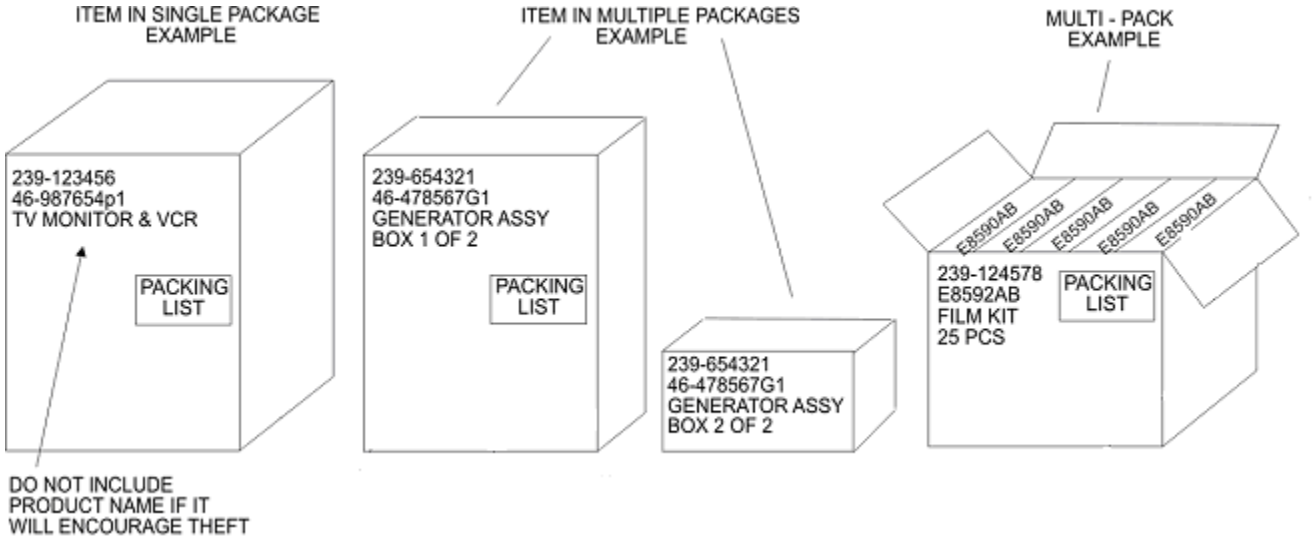
Do not mix part/catalog numbers. Each multi-pack must contain only similar items.

Each individual package contained in a multi-pack must be identified with the part/catalog number as a minimum and any additional information as specified in the order.

Include a packing list that identifies the Order number and product identification information for all materials included with the shipment. Reference Section 10.3, "Exhibit #3" for a typical example.

Clearly identify items shipped in multiple packages. Include a reference on the packing list for the Case/Box #(s) in which each item is packed.

"Finished Good" Identification Examples



9.1.6.5 Packing List for "Kitted Shipments"

Include a packing list that identifies the components of the shipment and a cross-reference to the part/catalog number of the parent item. Include a reference to the Order number and/or customer order number, as specified in the purchase agreement. Reference Section 10.3, "Exhibit 3" of this document for a typical packing list example.

Attach the Packing List to Case #1 of the Kitted shipment.

9.1.7 Shipping Container Marking & Labeling

9.1.7.1 General Requirements

Include the general shipping information contained in the purchase order. This typically includes: shippers name and address, Wabtec ship-to address and any required precautionary

information (i.e., fragile, handle with care, static sensitive, etc.). Avoid abbreviations as much as possible.

Information on the shipping container, product, and shipping documents must match. All information must match country specific licensing and registration.

When using overnight carrier services or other express delivery systems; the carrier labels should be applied to what is considered the top of the package. These carriers use automatic scanning systems that require their barcodes to be face up. Placing the labels on the top of the package will aid in keeping the package in the desirable upright orientation.

All prior shipment and other non-required markings and labels shall be removed covered or otherwise obliterated.

When an over pack or consolidation pack is used, it is acceptable for the outer packaging to cover the markings and labels on the individual packages. Safe handling information (Fragile, This End Up, etc.) and other information critical to the safety of the shipment (i.e., temperature limits, "Do Not Freeze", etc.) needs to be duplicated on the outer packaging. All regulatory and environmental marks and labels defined in Section 5 must also be included.

9.1.7.2 Special Requirements for Direct Shipments To Wabtec Customer

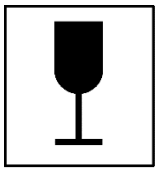
Mark systems shipped directly to Wabtec customers with the same information as those shipped to a Wabtec facility, plus additional information that will be required by the customer. The special information will typically include the Wabtec order number, customer PO number and the customer ship-to address. The buyer will provide this information in the purchase agreement or through special communications.

9.1.7.3 Special Labeling Requirements for International Kitted Shipments

Fully kitted shipments require specific information in Import Country characters.

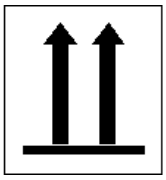
Warning and handling information (i.e., "Fragile", "This End Up", "Sling Here", etc.) on the outer package must include language of country of import. International symbols and other languages may also be included in addition to the shipping label per the following examples.

Chinese Example:



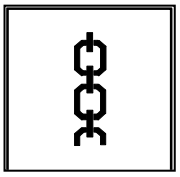
FRAGILE

易碎物品



THIS END UP

此端向上



SLING HERE

由此吊起

9.1.7.4 Marking

9.1.7.4.1 Method of Marking

Use labels, stencils, printing or tagging to mark the exterior of packages and shipping containers. Handwriting or lettering should be avoided.

9.1.7.4.2 Stenciling

Stencil by brushing, rolling, or spraying a sharply cut stencil with waterproof, black stencil ink.

9.1.7.4.3 Labels

Print, type or reproduce the required marking on labels.

9.1.7.5 Labeling

All labels must be securely affixed with water resistant, permanent adhesive.

Add staples or other mechanical fasteners as required when attaching to wood or other surfaces where adhesive alone may not permanently hold the label.

Print labels with permanent ink on a contrasting background. Avoid using inks in the red tones unless the ink is specifically designed to be fade resistant.

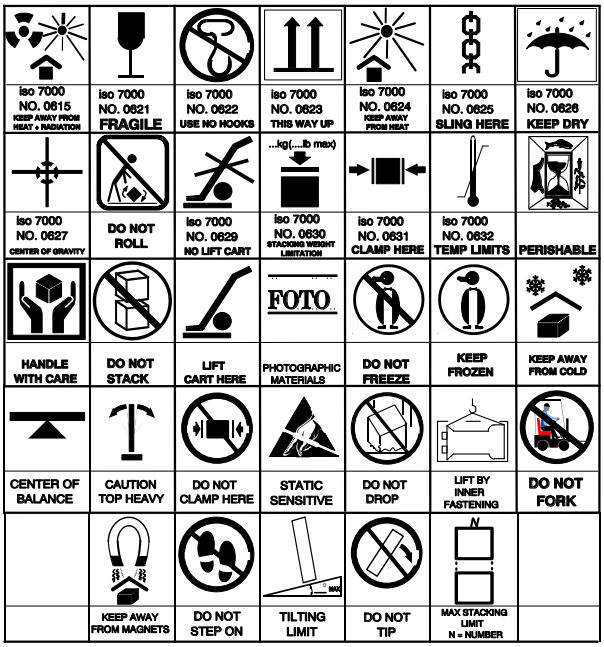
9.1.7.5.1 Warning and Information Labels

When possible, use labels with international symbols per ISO 780.

When a symbol is required that is not included in ISO 780, it is acceptable to use a custom design symbol, as long as that symbol communicates a globally recognizable message.

The following are typical examples of ISO 780 symbols and commonly used custom design symbols:

International Warning and Information Symbols



9.1.7.5.1.1 Standard Hazard Warnings

Include the following common hazard warning symbols on the outside of all packages that contain fragile or sensitive products:

- **This End Up** - Use On All Crates That Include A Wood Base And Any Package That Should Not Be Tipped.

- **Do Not Get Wet** - Use On All Crates.

- **Fragile** - Use On All Crates.

9.1.7.5.1.2 "As Required" Hazard Warnings

Include the following hazard warning symbols on the outside of package as required:

9.1.7.6 Marking and Labeling Layouts for Shipping Packages and Crates

- **Shockwatch** Label - Use On Crates Where Product Could Be Damaged By Dropping Or Strong Shock. One Label Required.

- **Tiltwatch** Label - Use On Crates Where Product Could Be Damaged By Tipping. Two Labels Required On Adjacent Side & End.

- **Do Not Tip** - Use On Crates Where Products Could Be Damaged By Tipping. See "Top Heavy & Do Not Tip Label Guidelines.

- **Caution Top Heavy** - Use On Crates That Meet The Definition Of Top Heavy. See "Top Heavy & Do Not Tip" Label Guidelines.

- **Center of Gravity** - Use on Crates When The Center Of Gravity Is Known And Is Important For Stability And/Or Safe Handling.

- **Do Not Freeze** - Use On Crates That Include Packages Marked Or Labeled As "Do Not Freeze".

- **Temperature Limit** - Use On Crates That Include Packages Marked With Temperature Limits. Copy Temperature Limit Information From Product Marks/Labels To Crate Label.

- **Do Not Stack** - Use On Crates Or Packages That Will Be Damaged If Other Crates Or Packages Are Stacked On Top.

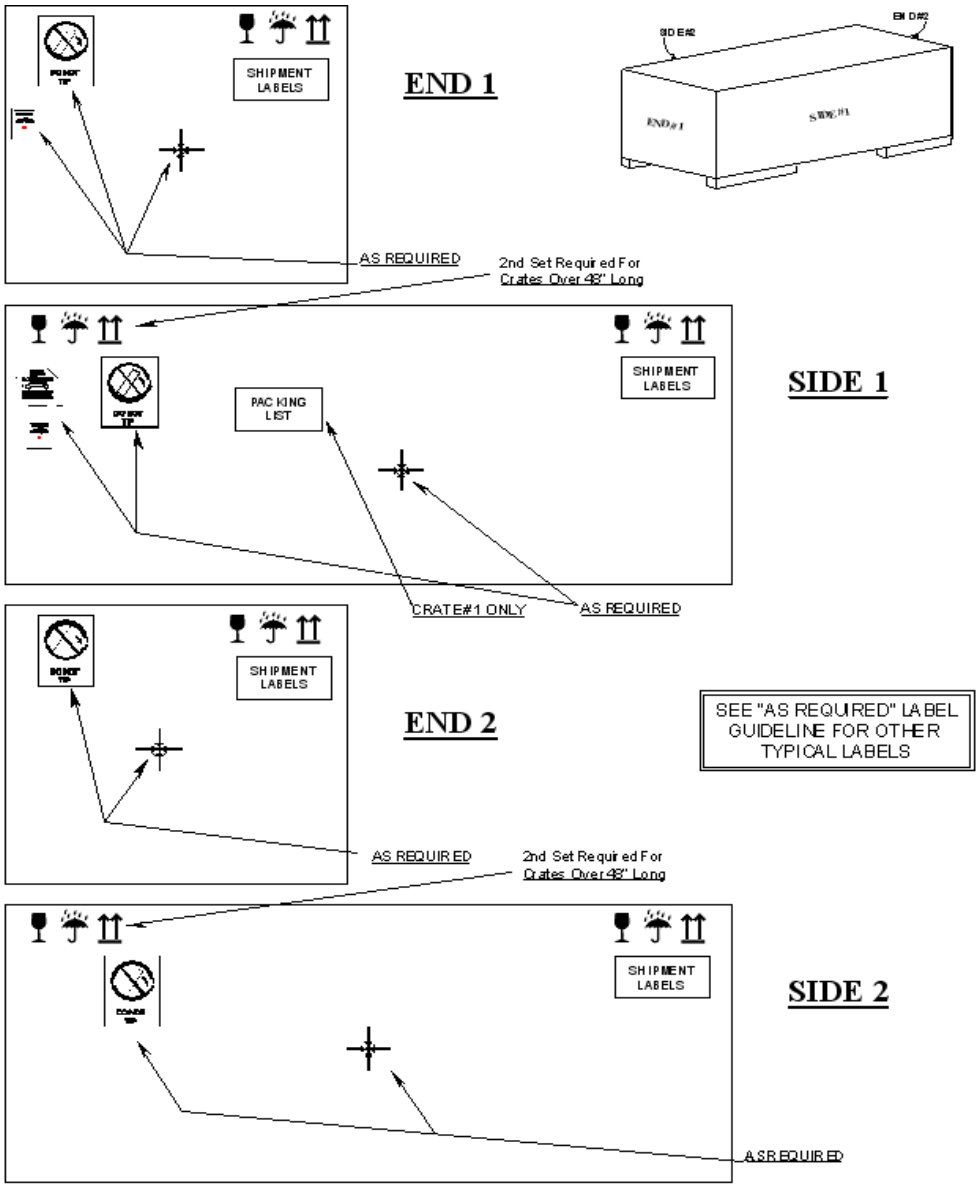
- **Do Not Drop** - Use On Crates Or Packages That Will Be Damaged If Dropped Under Normal Handling Conditions.

- **Do Not Fork This Side** - Use On The Sides And/Or Ends Of Crates When They Can Not Safely Be Lifted By A Fork Truck.

- **Sling Here** - Use On Crates To Show Where It Is Safe To Lift The Crate With A Chain Or Other Overhead Lifting Device.

9.1.7.6.1 Domestic Shipment

Mark and label packages as closely as possible to the following layouts:



Some products may ship on a dolly or pallet and not include a shipping container. For these products, only the shipment labels and other shipment related information is required.

9.1.7.6.2 International Shipment

9.1.7.6.2.1 Standard Export Marks

The standard marking requirements for international packed and containerized units shall include the following information:

From: Shippers Name & Address

Ship To: Consignee Name & Address

Shipment Info:
- Purchase Order Number:
- Order Number:
- Invoice Number:
- Manifest Number:
- Catalog Number:

Container Data:
- Item Number:
- Outside Dimensions:
- Net Weight:
- Gross Weight:

Made In: Country of Origin

9.1.7.6.2.2 Net Weight and Gross Weight

The weight value shall be followed by the unit of measure (pounds or kilos) in capital letters. All weights shall be rounded to the nearest whole number.

9.1.7.6.2.3 Outside Dimensions

Outside dimensions shall be shown on all shipping containers, having a cube of 493 cubic cm (30 cubic inches) or over, or having any single dimension of 183 cm (72 inches) or over. Outside dimensions shall be shown in the order of length, width, and height. Dimensions shall be rounded to the nearest cm/inch.

9.1.7.6.2.4 Location of Marking

It is assumed that the container will have two ends, two sides, a top and a bottom. Open crates and other irregular containers shall be marked to conform to this specification as closely as available space and shape of the container permit.

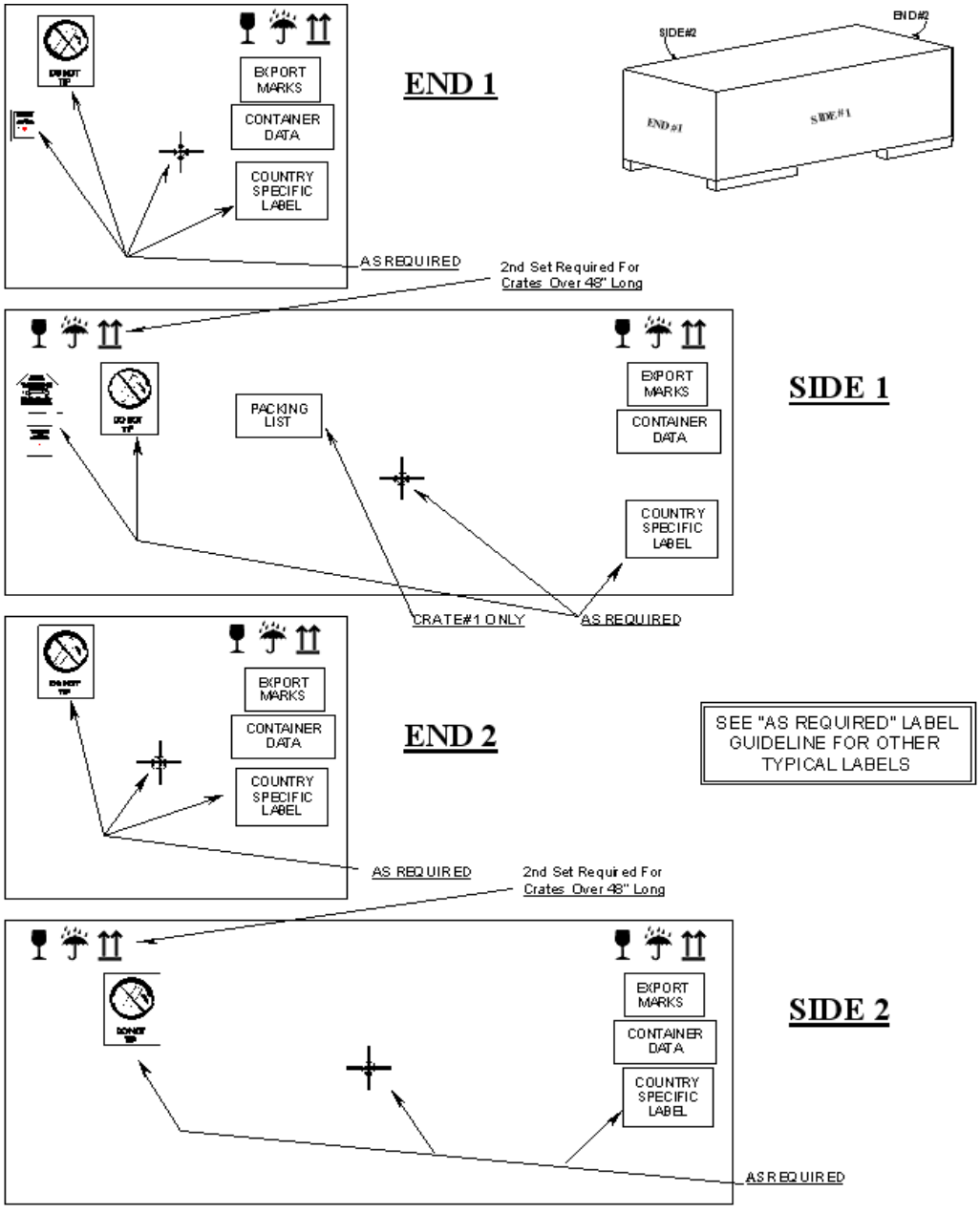
9.1.7.6.2.5 Container End Marking

When the container is .3 cubic meters (10 cubic feet) or under, the container data marking, and destination address may be omitted from the end.

9.1.7.6.2.6 Marking and Labeling Layout

Mark and label packages as closely as possible to the following layouts:

International Shipment Marking and Labeling Layout



9.1.8 Use of Graphics on Packaging Materials

Supplier will not include logos and/or supplier names, internally or externally, on master or secondary packaging materials. This includes labels and banding.

Do not include the product name, description, or graphics on the outside of the package if it will encourage theft or any other security risk during distribution.

9.1.9 Warning Labels

9.1.9.1 Passive Labels

Apply passive labels as required to provide necessary caution warnings and instructions. Specific examples include:

- All liquids shall have "Up-Arrows", "This Side UP" and "Contains Liquid" on the package.
- Delicate items shall have "Fragile or Fragile Glass" warnings.
- Tall or top-heavy items shall be identified with "Top Heavy" warnings.
- Items subject to damage at low temperatures shall have "Do Not Freeze" warnings.
- Static sensitive materials shall have "Anti-Static" warnings.
- Sterile materials shall be identified.

Use international symbols (Ref: Section 8.2.4.5.1) in addition to written words whenever possible.

9.1.9.2 Active Labels (Use only as required)

9.1.9.2.1 Shock Indicator

Use Shock indicator labels on products that are sensitive to shock damage. Use a minimum of one label on each package. Apply the labels in recessed areas of the package whenever possible, to avoid contact with other freight and transport equipment during distribution.

Note: The purpose of shock indicator labels is to alert people handling the product that it is sensitive to shock damage and that it should be handled carefully. It is basically an active "Fragile" label that turns red if a shock does occur. Because the labels can be activated by a low impact shock directly on the label, an activated label should not be interpreted as a sure sign of product damage. It simply means that the receiver should note on the shipping papers at the time of receipt that the label was activated, and the product should be inspected for possible hidden damage. Conversely, a high level, product damaging, shock could occur to the package in a way that does not activate the label, so a non-activated label does not ensure that the product is not damaged.

9.1.9.2.2 Tilt Indicator

Use Tilt indicator labels on all products that are susceptible to damage if tipped 90 degrees or more during shipment. This is in addition to the "DO NOT TIP" written warning or label on the package. Apply two labels per package, on two adjacent sides (i.e., one side and one end). Apply the labels in recessed areas of the package whenever possible, to avoid contact with other freight and transport equipment during distribution.

9.1.10 Shelf-Life Material

Shelf Life remaining upon delivery shall not be less than 70% of the shelf-life period.

Parts that are classified by the OEM as having a shelf life must have a visible expiration date on the part's external packaging. The date format shall indicate expiration month and year. Recommended label format is: "Expires MM/DD/YYYY" or "Expires MM/YYYY".

Batteries that require recharging must have a visible recharge date on the part's external packaging. The date format shall indicate recharge date, month, and year. Recommended format is: "Recharge after: MM/DD/YYYY" or "Recharge after MM/YYYY".

9.1.11 Special Requirements for Batteries

All batteries must be packaged to comply with the IATA regulations to allow reshipment by air whenever possible. Batteries that are forbidden for air shipment must be plainly labeled "Forbidden For Air Shipment."

Lithium batteries may be regulated as hazardous material and must be packaged in accordance with all applicable HMT regulations. They must always be packaged to ensure the leads cannot touch and short. Due to recently implemented regulations with these batteries, consulting with EHS prior to packaging and shipping is recommended.

10.0 Special Packaging Requirements for Service Parts

10.1 General

This procedure applies to **all parts** supplied to Service, both new and repaired parts **when no other specific document is associated with the parts**.

Some high value, parts will have **specialty packaging** that will be **defined by part number on the drawing or in the purchase specification**. The speciality packaging requirements take precidence over the general requirements of this guideline.

10.2 Scope

Most Wabtec Service parts will be reshipped individually. This environment produces greater shock levels and compression loads than most other types of transportation, so compliance with the requirements of this document is critical.

10.3 Basic Requirements

10.3.1 Individually Packaged

All parts must be individually packaged from manufacture in compliance with the requirements of this document except where multi-packing is specifically approved. This provides for re-distribution without risk to handling parts multiple times.

The only exception to this is for very small, low-cost parts such as wire leads and hardware. These parts should be unitized (bagged) with the enclosed quantity and part number clearly marked.

10.3.2 Reusable/Returnable Containers – Wabtec Facilities Only

All parts must be packaged in reusable/returnable containers.

Service Parts will be shipped individually between Wabtec distribution facilities and customer sites and unpacked and repacked multiple times. All packages must be capable of multiple shipments and multiple openings and closings.

When possible, it is recommended that a tube and slide type package be used. The slide includes foam or other cushioning material. It is the more expensive part of the package and can be reused multiple times. The tube forms the outer shell of the package. It is the less expensive part of the package and is easy to replace when it becomes damaged or covered with prior shipment labels.

Note: Use of foam-in-place packaging is discouraged due to the reusability and recycling concerns. When foam-in-place type packing is used, the foam must be formed in a way that will allow removal and repacking of the part multiple times without damaging the foam.

10.3.3 Protection for Express/Courier Shipment

All parts will be shipped individually globally by express/courier carrier. Packaging must provide adequate protection for the rough handling that is normal for express and courier type shipments.

10.3.4 Packaging Assemblies & Multi-piece Items

When multiple pieces are required for a part or an assembly that is considered a single part, the entire assembly must be individually packaged in a SINGLE package so that no repacking is required at the Wabtec facility.

10.3.5 Palletized Shipments

All palletized shipments must be designed to be stackable, per the stacking guidelines in section 7.2.3. Express carriers such as FedEx **will** stack palletized loads, so they must be designed to support stacked loads.

10.4 General Packaging Requirements for Service Parts

1. Packages shall be reusable to withstand return & restock and other multiple shipments.
2. Corrugated containers must not be reused if they are ripped, damaged, or have any signs of exposure to water. They must be able to hold all inner pack in a proper manner.
3. Hazardous materials shall be packaged, marked, labeled, and documented in full compliance with the regulations applying to the mode of transport being used. Please reference section 5.1.1 Hazardous Material/Dangerous Goods regulatory requirements.
4. An SDS shall be included with all chemicals and other parts that are regulated as potential hazards. Please reference section 5.1.2 Safety Data Sheet (SDS) regulatory requirements.
5. Weight restrictions - Units over 25 kg (50 pounds) shall be banded to a pallet with reusable banding or reusable banding must be included to allow reshipment and they shall have special handling hazards marked on the outside, using international symbols.
6. Size of package shall be adapted to the size of the part, as small as possible, while maintaining adequate protection.
7. Packages shall provide basic protection from moisture, crushing, paint scuffing, corrosion, temperature, and other product specific needs as required.
8. Do not use any loose fill type cushioning materials in the package.
9. Shelf-life material: OEM expiration date must be visible on the outside of the part packaging (i.e., "Expires: 9/12/2010").
10. Repairable/Unit Exchange parts: Repairable parts must be packaged in a manner to protect the part(s), which facilitate their return to repair centers, without incurring additional damage. The packaging must be replaced after each repair to obtain a clean package ready for the next shipment except if the package is considered as a Reusable package (see next paragraph)
11. Reusable packaging: Reusable package may be used for expensive parts. The main and expensive parts of the package can be reusable. This can be achieved easily by using a low-cost, replaceable external case. The external packaging must be replaced after each delivery to obtain a clean package ready for the next shipment.
12. Protection from static electricity: All electronic boards and parts containing sensitive, accessible components must be protected from damage due to electrostatic discharge (ESD). ESD sensitive parts shall be wrapped in a conductive antistatic bag or film. The bag must be closed using a tamper-proof label.

10.5 Catagories of Packaging

The following catagories were created to give examples of the minimum necessary requirements. Components may still need specially designed packaging to be able to meet testing standards.

1. **Electronic Components**

   a. Fragile 1 – ESD bag with ESD foam individually boxed. The component shall fit snug in the box with approximately 38mm (1 ½") space between part and edge of container.

   b. Fragile 2 – ESD bag with ESD bubble pack individually boxed, with approximately 1" of bubble wrap between product and edge of container.

2. **Cables**
   Individually packaged in a bag with connectors bubble wrapped. The bags shall be labeled.
3. **Mechanical/Plastic components**
   Individually boxed and packaged in bubble pack or foam.
4. **Batteries**
   Shall be treated as a hazardous material and shall meet all government regulations unless otherwise stated as exempt.
5. **Power Supplies/Transformers**
   Flexible foam shall be used to protect the units. A minimum double wall corrugated shall be used for the outer package.
6. **Pressurized Cans**
   Shall be treated as a hazardous material and shall meet all government regulations, unless otherwise stated as exempt.
7. **Oversized items**
   Follow the general requirements of this document.
8. **Computers/monitors**
   Packaged with foam inserts in a corrugated container with optional access holes for lifting.
9. **Components and hardware**
   These parts should be unitized (bagged) with the enclosed quantity and part number clearly marked.
10. **Kits**
    Packaged and labeled in compliance with the above standards.

11.0 Special Packaging Requirements for Clean Parts

11.1 General

This procedure applies to **all parts** calling for the 84A214647 and 84A236094 cleanliness specifications, both new and repaired parts **when no other specific packaging document is associated with the parts**. The intention of this packaging requirement is to ensure and maintain the required manufacturing cleanliness specification for the part from origin to destination point of use.

Some highly critical parts will have **unique packaging** that will be **defined by part number on the drawing or in the purchase specification**. The unique packaging requirements will be in addition to general packaging requirements described below.

Any acceptations to these requirements must be agreed upon with the SQE/QTA and documented in the PPAP for the part.

11.2 Basic Requirements

11.2.1 Individually Packaged

All parts must be individually packaged in compliance with the requirements of this document except where multi-packing is specifically approved through the PPAP process.

11.2.2 Preparation of Clean Parts to Prevent Corrosion

Parts susceptible to corrosion must be protected with a RPI or VCI as agreed upon with the SQE/QTA per the RPI/VCI supplier recommendations. Application and usage of corrosion preventatives must not interfere with the manufacturability of the part and meet Wabtec and be EHS approved materials. Parts must be sealed and encapsulated in virgin plastic bags and/or containers to maintain corrosion protection.

NOTE: Use of multiple VCI supplier products can counter the effects of protection. It is recommended to use the same manufacture of VCI products when applying this solution.

11.2.3 Clean Parts Protection Not Requiring Corrosion Protection

All part should be encapsulated in bags, containers or wrapped in plastic to maintain the cleanliness of the part. A sealed environment is required to avoid contamination of the parts from origin to destination point of use.

11.2.4 Clean Parts Protection of Large Parts

All parts that are too big or bulky for bagging must maintain a clean environment with a custom fit protection system. Shrink wrap of entire product meets this requirement.

11.2.5 Clean Parts Protection of Piping and Critical Passages

Large pipes and critical passages that require internal cleanliness must have caps/plugs that can show tamper evidence if removed. It is recommended that these parts be sealed if applicable to size. Plugs must have a large retention flange to prevent being pushed into the passage and be left in the part.

11.2.6 Marking of Clean Parts

All parts should have a decal identifying they are clean parts. The decal should not be on the part, but on the wrapping or bag. The decal should be 6 inches by 5 inches and have the same wording and similar graphics as the following example:

11.2.7 Certificate of Conformance

Submission of cleanliness conformance should be loaded to the Wabtec system electronically prior to shipment or other form of acceptable submission.

Example Certificate Information:

GE Transportation
Certification of Cleanliness

Date of Test
_____

Supplier
_____

Part Number
_____

Millipore Test Results Reference Number (keep Millipore test results on file for audit purposes)
_____

Wabtec

11.3 Preparation of Shipment for Clean Parts

Clean parts should be shipped similar to other parts but must be separated from part-to-part contact or contact with other packages. Damaged packaging could allow for contamination and cause the parts to be rejected as the sealed environment could be compromised. Examples of damaged packaging include: Ripped plastic bags/wrap, missing caps or plugs, tamper evident indicators, crushed or broken containers.

12.0 Exhibits

12.1 Exhibit #1 - Package Type Descriptions

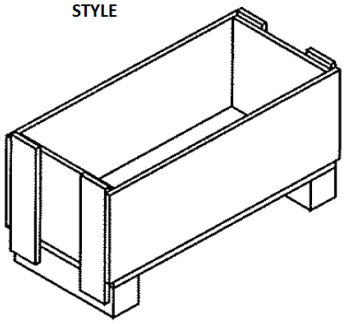
The following package descriptions provide general information about the different types of packages available for international shipment and a brief summary of typical applications for each.

12.1.1 Wood Box - Application Summary

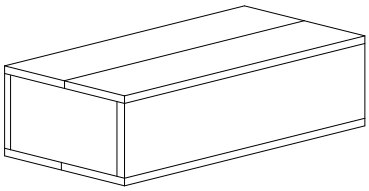
Wood boxes are typically used to package smaller products for international shipment. Many styles and designs are available to accommodate the different size, weight, and type of product to be contained. Wood boxes provide good product protection and offer excellent stacking strength. They can be used for air and ocean shipments to both good and poor receiving points.

Typical Nailed Wood Box with Screwed Primary Access Panels - Examples

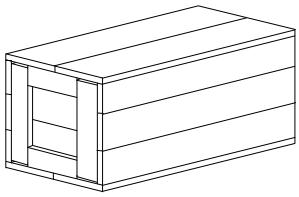
CLEATED PANEL STYLE



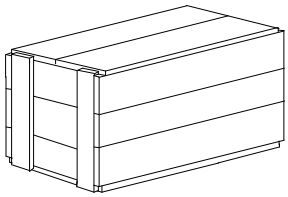
Style 1



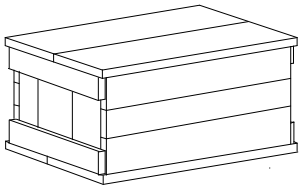
Style 2



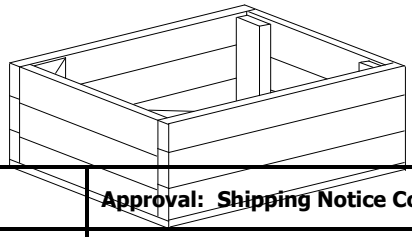
Style 4



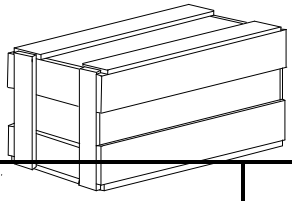
Style 4-1/2



Style 5



Open Style



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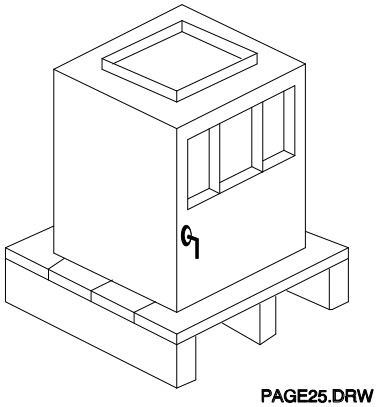
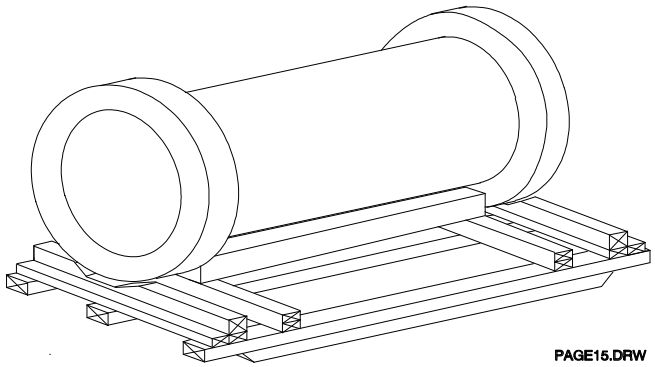
12.1.2 Product on Wood Base - Application Summary

With this type of minimum pack, the product typically has very little if any protective packaging. It is secured to a wood base that provides a means for mechanical handling. This type of packaging typically would only apply in Pole-to-Pole Shipments that occur in very controlled environments. Mutual consent and coordination is always required. See the following figures for examples of products on wood bases and Section 10.2, Exhibit #2 for wood base design criteria.

Product on Wood Base Examples

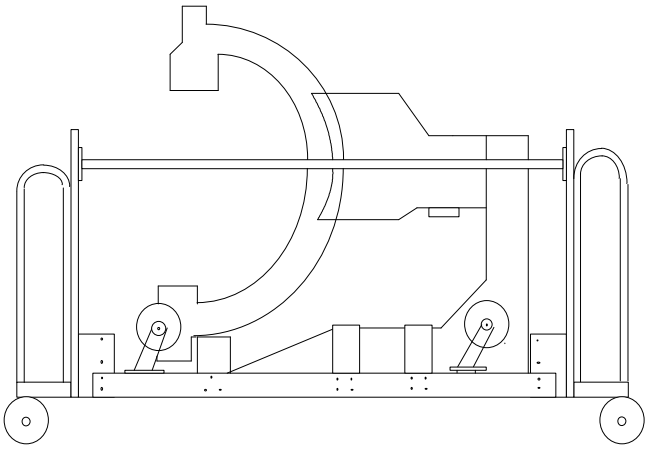

PAGE25.DRW


PAGE15.DRW

12.1.3 Product on Shipping Dolly – Wabtec Facility Only

With this type of minimum pack, again the product typically has very little if any protective packaging. It is secured to a shipping dolly that provides some protection for the product and provides a means for handling. This type of packaging would also typically only apply in Region-to-Region Shipments that occur in very controlled environments. Mutual consent and coordination is always required.

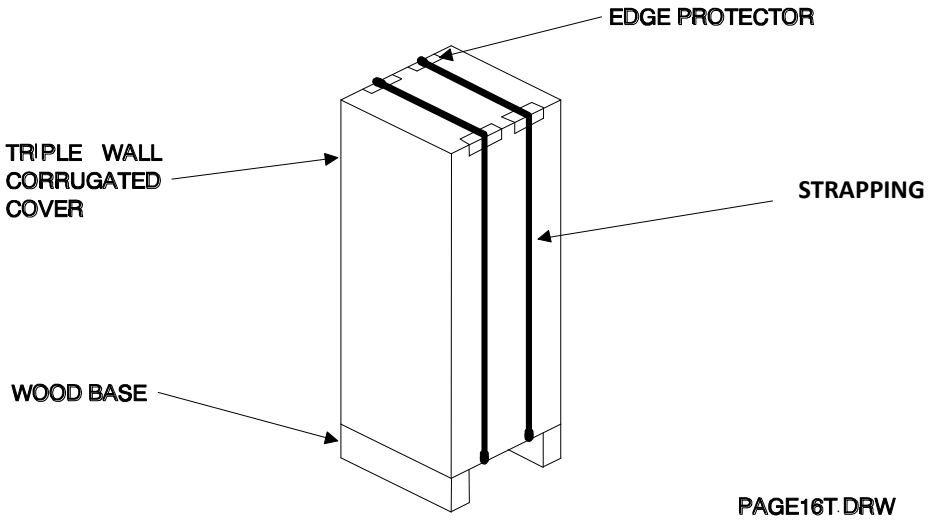
Typical Product on Shipping Dolly



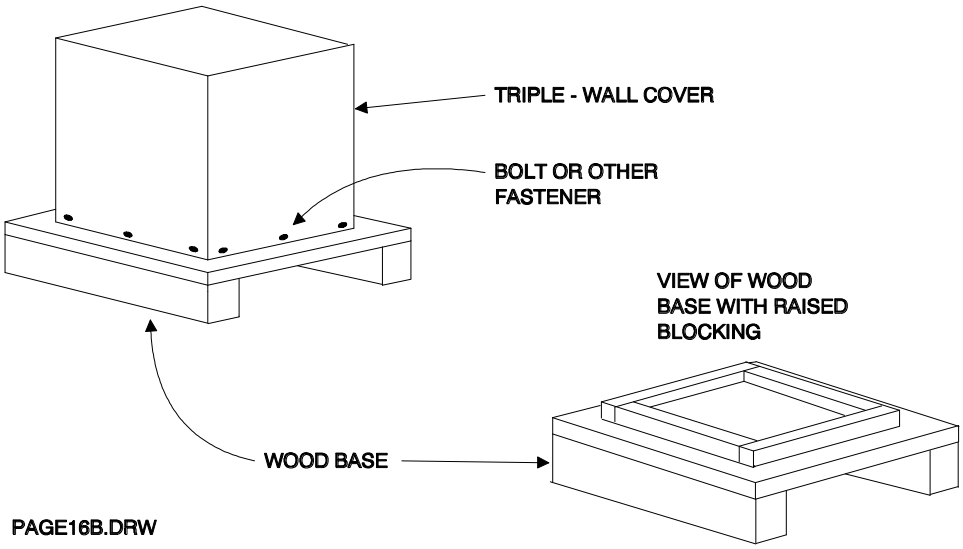
12.1.4 Triple-Wall Corrugated Cover on Wood Base - Application Summary

Some products can be shipped on a wood base with a triple-wall corrugated cover for air and ocean shipments. This type of package can be used for medium to large products, usually at a lower cost and shipping weight than wood boxes or crates. The product must be secured to the wood base or held securely within the package. The package provides some stacking strength, but if stacking is expected, internal blocking and/or the product must provide additional stacking strength. The following figures show typical examples of a triple-wall cover secured with bands and a cover secured with fasteners to raised blocking on the wood base. Both options are reusable.

Triple-wall Cover Secured with Bands



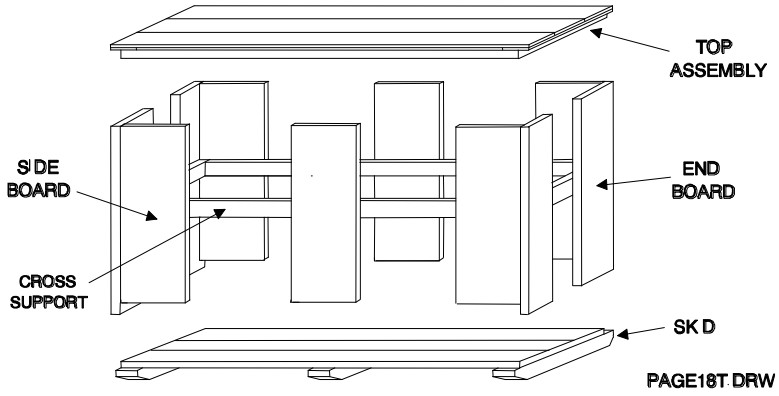
Triple-wall Cover Secured to Base with Fasteners



12.1.5 Open Wood Crate - Application Summary

Open wood crates can be used for shipment of large products where weight and stability can be incorporated through the product being packaged. Open crates protect the product from other freight and provide some stacking strength in addition to the product. They do not provide the same strength and security as a solid crate but reduce material costs and shipping weight.

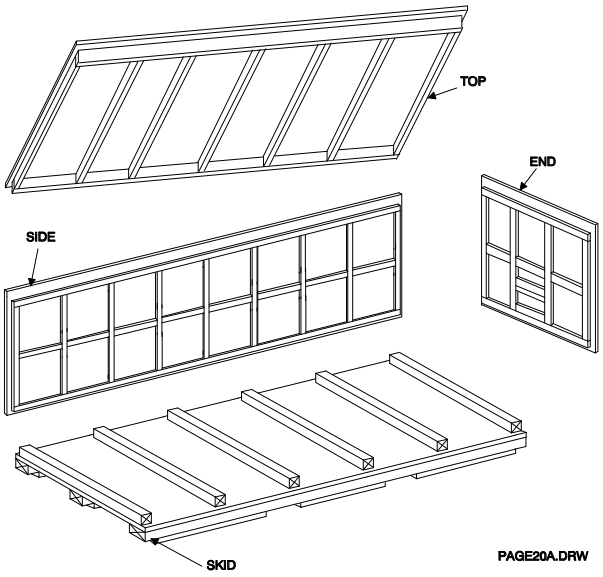
Typical Open Wood Crate Example



12.1.6 Solid Wood Crate - Application Summary

Solid wood crates provide a high level of product protection and stacking strength. They are used for large products for air and ocean shipment. The negative factor with these crates is their high cost, weight, and the problems with disposal of the large amount of wood at the receiving end.

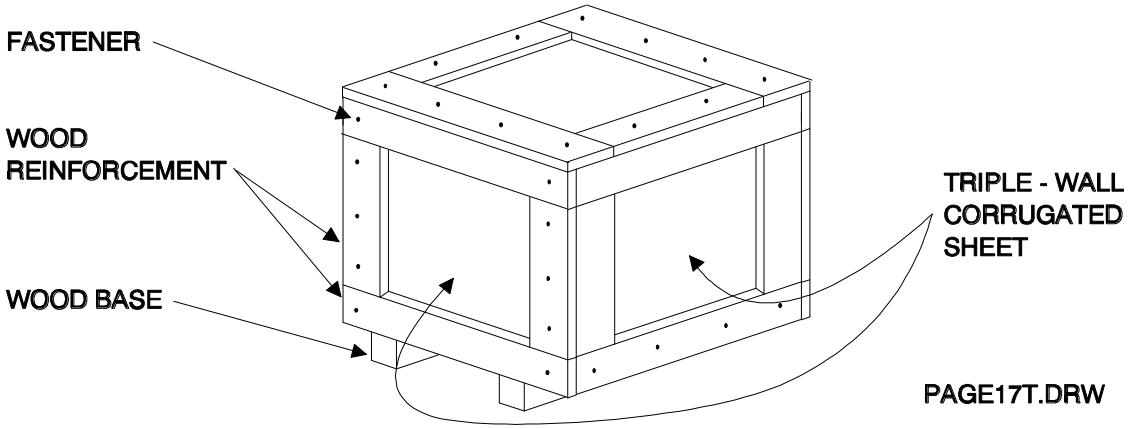
Typical Solid Wood Crate Example



12.1.7 Plywood Crate - Application Summary

A plywood crate is very similar to a solid wood crate, with the exception that plywood or a similar sheet type material is used in place of boards for the side, end, and top panels. These crates are used for large products for air and ocean shipment.

Typical Plywood Crate Design



12.1.8 Corrugated Box, Loose

12.1.8.1 Single & Double Wall Corrugated Boxes

Do not ship single and double wall, corrugated boxes loose internationally by air or ocean, except under special conditions.

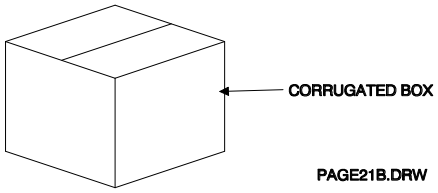
Boxes under 0.25 cubic meters (8 cubic feet) can be shipped loose by an express carrier like Federal Express, as long as the box and internal blocking provide adequate product protection and stacking strength. Do not ship boxes of this size loose as part of a system shipment.

12.1.8.2 Triple Wall Corrugated Boxes

Triple wall boxes of any size with a minimum burst strength of 900# can be shipped loose internationally by air as long as the box and its internal blocking provide adequate product protection and stacking strength.

These boxes can also be shipped as part of controlled containerized ocean shipments. The box and its internal blocking must provide adequate product protection, moisture protection, and stacking strength, to support stacking weights anticipated during distribution.

Typical Corrugated Box



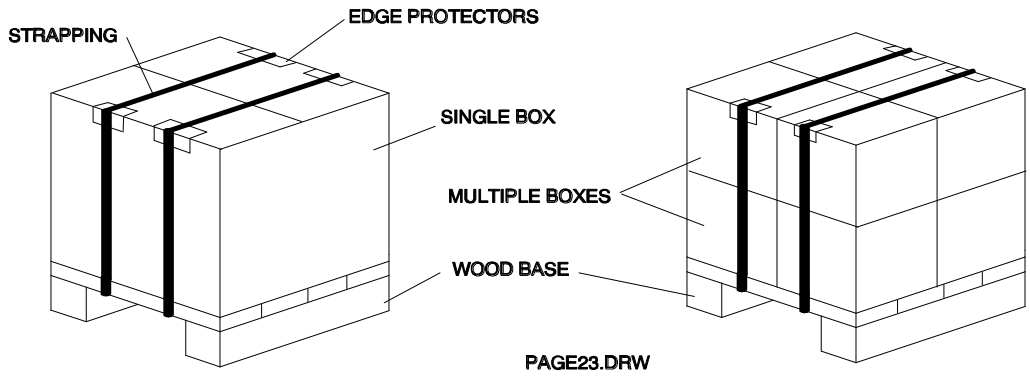
12.1.9 Corrugated Box on Wood Base

When the gross weight of a corrugated box exceeds 32 kg (70 lbs.) for finished goods and 25 kg (50 lbs.) for service parts, or for other reasons that make manual handling difficult, secure it to a wood base to allow mechanical handling. Corrugated boxes meeting the criteria from Section 10.1.10 and shipping on wood bases, can be shipped internationally by air when going to a good receiving point or when part of a controlled shipment. They should only be shipped by ocean when part of a controlled containerized shipment. The box and internal blocking must provide adequate product protection and stacking strength.

Multiple corrugated boxes meeting the criteria from Section 10.1.10 may be unitized on a wood base and secured with strapping, stretch wrap, shrink-wrap, or other adequate material. The wood base must be the same length and width as the box(s), or larger, and strong enough to support the gross weight of the pallet load.

The corrugated box(s) should not overhang the wood base.

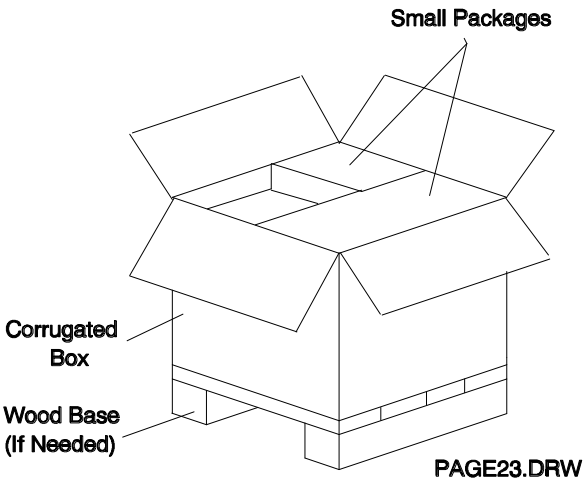
Typical Examples of Single & Multiple Corrugated Box(s) on a Wood Base



12.1.10 Small Packages Consolidated In a Larger Corrugated Box - Application Summary

Consolidate small packages shipping together into a larger package to help prevent loss and damage. A large, corrugated box, meeting the criteria described in Section 10.1, Exhibit #1, Paragraphs 10.1.10 and 10.1.11, can be used to accomplish this for air transport to good and/or controlled receiving points and controlled containerized ocean shipments. The package provides some stacking strength, but internal blocking and/or the inner packages may be required to support stacking weight.

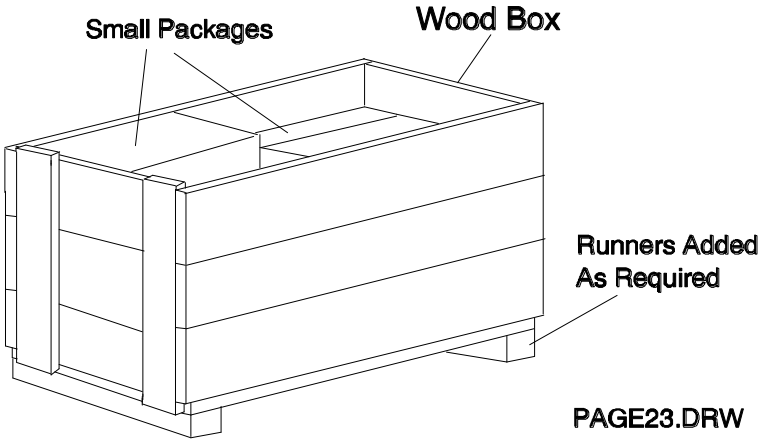
Small Package consolidation in Large Corrugated Box Example



12.1.11 Small packages Consolidated in a Larger Wood Box - Application Summary

Consolidating small packages in a wood box is similar to consolidating them in a corrugated box, except that it provides a much stronger, more secure package. It can be used for all air and ocean shipments. Inner blocking is normally not required.

Small Package Consolidation in Wood Box Example



12.1.12 Lean Packaging

Lean Packaging utilizes visual management and simplification to present components and finished products to manufacturing and the installation site in an efficient and logical order.

Typical Manufacturing Lean Cart

12.2 Exhibit #2 - Wood Base/Pallet Design Criteria

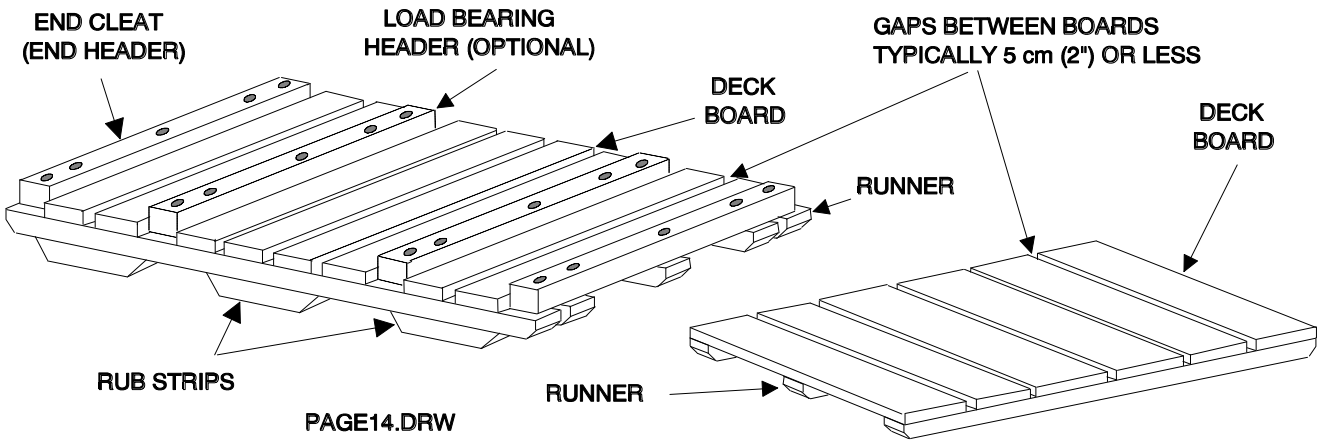
12.2.1 General

The design of the wood base is very important, because it provides the basis of the strength of the entire package, and it also provides the means for mechanical handling and securement of the product.

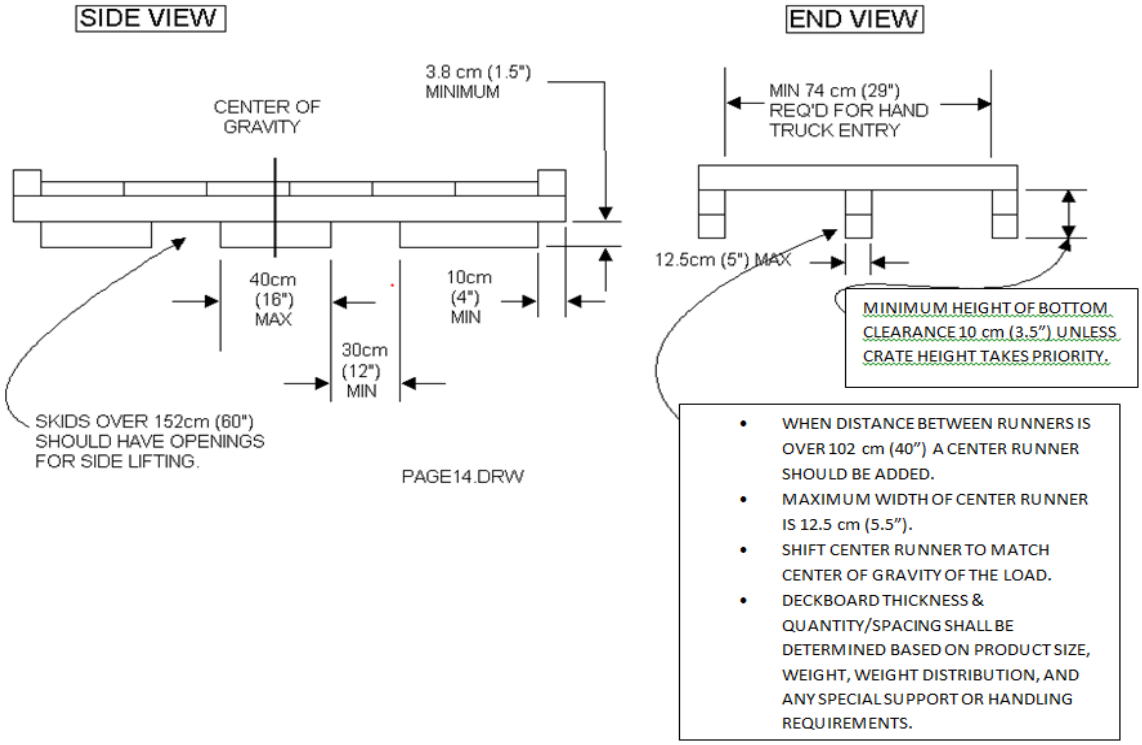
12.2.2 Standard Design Characteristics

Some characteristics of the base design are consistent for all products, including height of runners, runner spacing, fork hole openings, etc. See the following figures for typical base designs and specifications.

Typical Skid (Base) Designs



Typical Skid (Base) Specifications

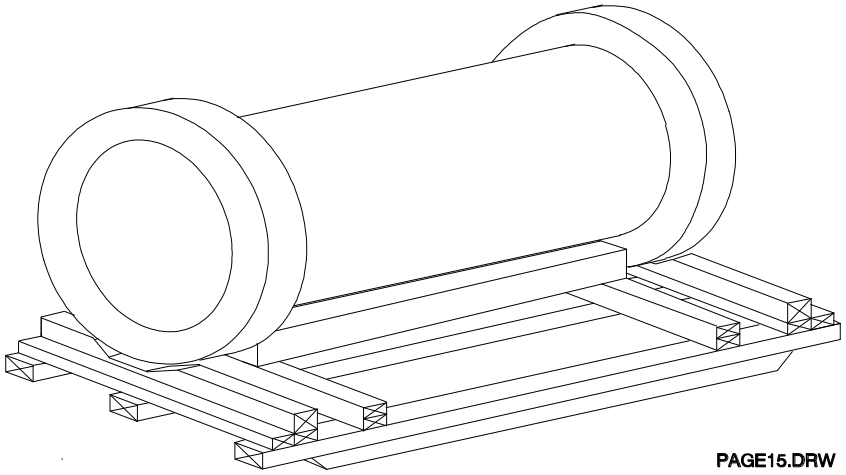


12.2.3 Special Design Wood Base

Most wood bases are designed specifically to match a certain product. This takes into consideration the products size, weight, center of balance, and any special support or handling requirements. The following is an example of a wood base designed for a specific product.

Note: The standard design characteristics described above.

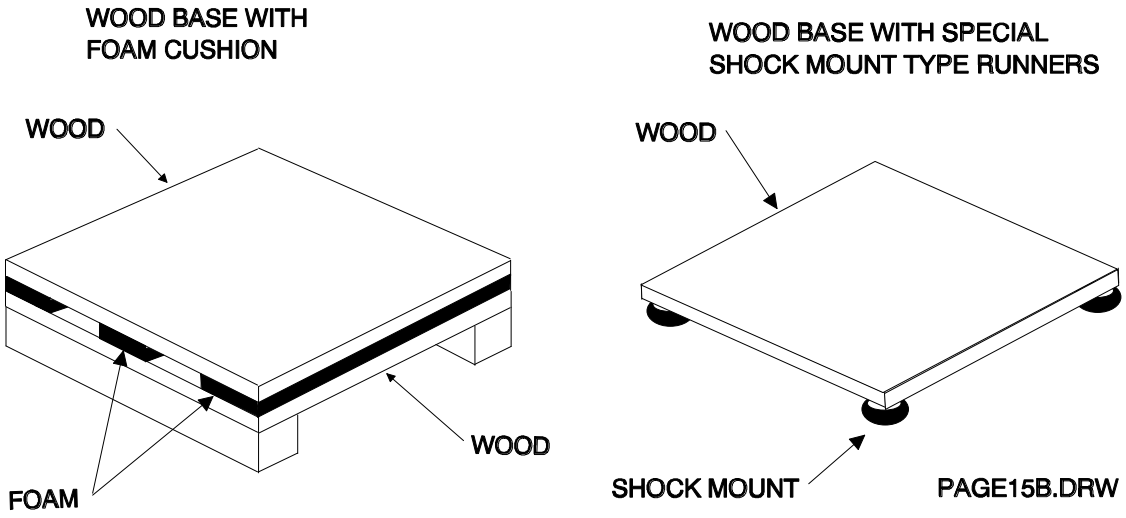
Special Design Wood Base Example



12.2.4 Cushioned Base

Special cushioning materials can be incorporated into the design of a wood base to provide protection from shock and vibration. The base is specifically designed to bring anticipated shock and vibration levels within the fragility limits of the product. Typical examples include:

Cushioned Base Examples

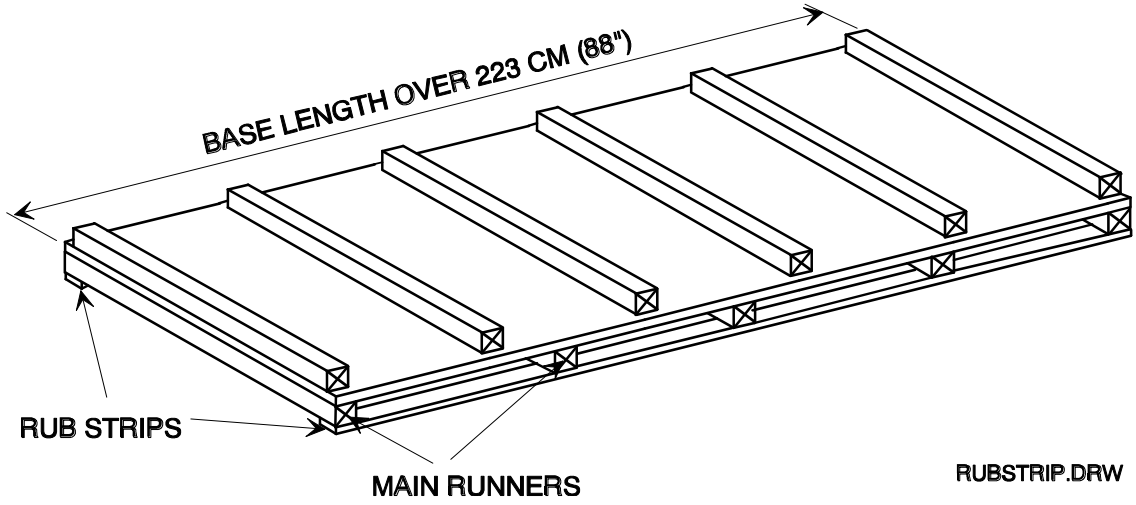


Note: When plastic "Shock Mount" type cushions are used as exposed runners, they must be bolted to the wood base. Experience shows that wood screws typically tear out.

12.2.5 Long Bases with Rub Strips

Add rub strips under the main runners of bases that are over 223 cm (88") long. Crates over this length are often lifted from one end then pushed and dragged. Rub strips will help prevent the main runners from catching and tearing torn off.

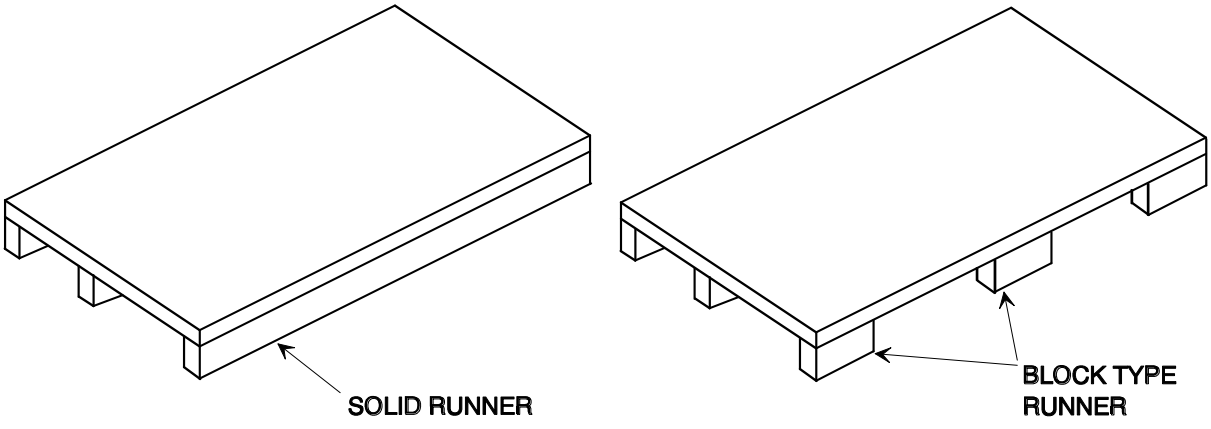
Long Base With Rub Strips Example



12.2.6 Solid Runners vs. Block Style Runners

Solid runners are preferred over block type runners when possible because block runners tear off more easily during transport.

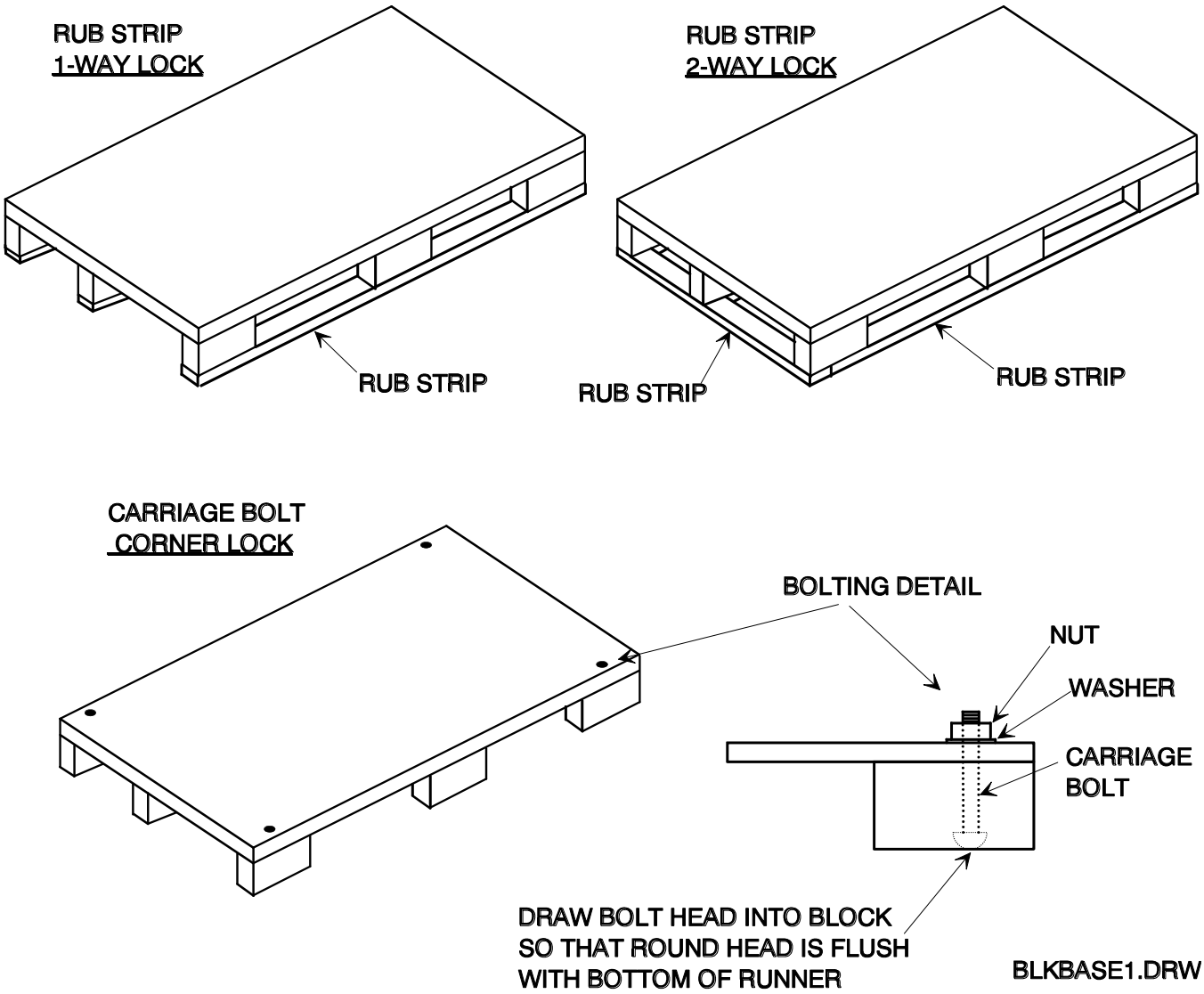
Solid Runner and Block Runner Examples



12.2.7 Block Runner Securement

Block runners must be securely attached to the base to prevent them from tearing off during fork truck handling. When nailed, they must be secured with ring shank nails. For added support, it is recommended that rub strips be added under the blocks. One-way locking rub strips are good, but two-way locking rub strips are best. If rub strips cannot be added, secure the four corner blocks with carriage bolts.

Block Runner Securement Examples



12.3 Exhibit #3 - Typical Export Packing List Example

Erie Parts Warehouse
3601 Main South Ave.
Building 63

Erie,PA 16531

Customer Order: NH 688

Ship To:
RIFT Valley Railways
PACK & HOLD HANOVER PARK

HANOVER PARK,IL 60103

03/26/09 01:32 PM | GE Order: 10593244 | Delivery: **10586570** LPN: **ERI26890**

Cust Line	Customer Item Number	Quantity Shipped	UOM	GE Line	GE Item Number	GE Description
14		5	EA	14	41B532610P1	Shaft (horizontal)

*** End Of Packing List -- 1 Items.

Page: 1 Packing List 03/26/09 01:32 PM

12.4 Exhibit #4 - Typical Supplier Packing List Example

5400 Hallein
PHONE

ATTN. WIRE REP.SYSTEMS

METRO PKWY. 4211
US 33906-9545 FT. MEYERS, FL

DS
ATU14719303

If queries please specify customer and delivernote no. 3) **Delivery note no** **1093066466** Page 1

1) Customer: 019004 | 5) Supplier No. | LNR: 20 | 2) Receiver note | 4) Dispatchdate: 06/26/2009

Delivery/installation is made by property reservation according to our conditions, which underlie the contractual relationship.

6) Freight: Free | Unfranked | Waggon | Carrier | Fr.Gut | Vehic.foreign | Express | Vehic. own | Post
7) Delivery: Creationday 06/26/2009

10) Your sign | 11) Your Order No. 345562562 | Date 12/10/2008 | 15) additional data customer | 17) Dispatch place | 14) Our Order-No. 30125948

19) Shipping type: sea freight | 20) Incoterms: Free Carrier | 21) Packing type: 5 PBP | 22) Dispatch sign | 23) Total weight kg 24) gross 2.047,0 net 1.825,2

Destination

MAIN SOUTH AVENUE 3517 US 16531 ERIE, PA

26) Receipt-/unload-point: Building 63, Parts WHS

27) Pos	28) Bosch-Order-No.	Index	Partnumber customer	29) Description of delivery	30) Quantity	40) Receiver notes: Quty.(to)	+/-	Notes
1	B416.810.387	1G1	84E901259G5	Solid Wood packing materials are totally free from Bark and apparently free from live plant pests. We declare that there is no other invoice differing from this one and that all statements contained in this invoice an declaration are true and correct. FUEL-INJECTION PUMP; AA.205-20080111	206			

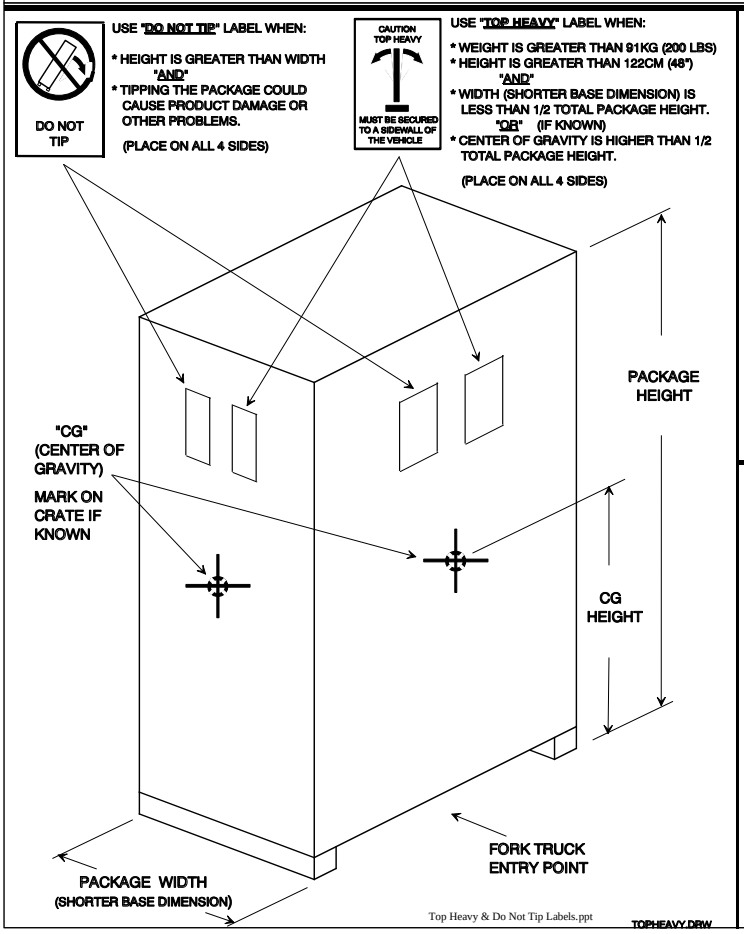
Rotation | Receiver notes | Date | Name | brw.Nr. | 42) Entry notes | 43) Quantity check | 44) Quality check/Testreport | 45) Receiver | 46) Invoice check

12.5 Exhibit #5 - Typical Example of Shipping Label

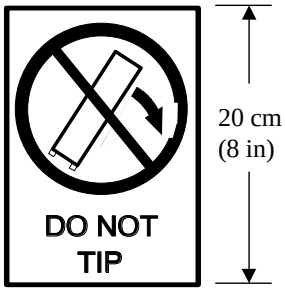
Note: Label shown is for example only. "Made in" requirements vary by country. Check local requirements for the appropriate wording for your site.

12.6 Exhibit #6 – "Top Heavy" and "Do Not Tip" Labeling Guidelines

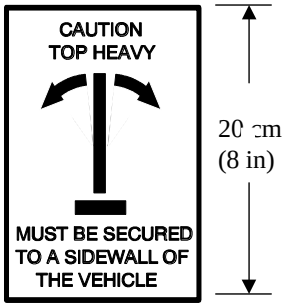
TOP HEAVY & DO NOT TIP LABEL GUIDELINES



DO NOT TIP LABEL



TOP HEAVY LABEL



NOTE:
Label Dimensions Shown Are The Minimum Size.

12.7 Exhibit #7 – Size and Weight Limits for Efficient Distribution and Delivery

12.7.1 Efficient Transport & Delivery

12.7.2 Product and Package Height

12.7.3 Estimating Total Shipping Height

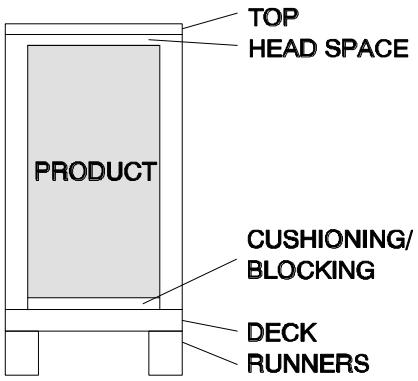
The key height dimensions referenced are "Total Shipping Height" which is the height of the product plus the additional height added by the export, shipping crate.

TOTAL SHIPPING HEIGHT = PRODUCT HEIGHT + SHIPPING CRATE

ADDITIONS

Use the figure and table below to help estimate total shipping height. Crate designs vary, but the design referenced can be considered very typical.

Typical Export Crate Component Identification



Height Addition for Export Shipping Crate Components

	Standard Height Addition
Base Runner	10 cm (3.5″)
Base Deck	3.8 cm (1.5″)
Crate Top Assembly	3.8 cm (1.5″)
Head Space	1.3 cm (.5″)
Cushioning & Blocking	As Required
Total Height Addition	19 cm (7.5″) **

** Plus, any required cushioning and/or special blocking

Standard Total Shipping Height = Product Height + 19cm (7.5″) + Cushioning & Blocking
Minimum Total Shipping Height = Product Height + 5.7cm (2.3″) + Cushioning & Blocking

Note: To achieve the minimum crate height additions, special base designs and other special design features are required, typically at a much higher cost than a standard export crate. Reducing the height of the base runner below the 10 cm (3.5″) standard will also result in increased handling problems, extra costs, and delays during worldwide distribution.

12.8 Global Transport Size and Weight Limits

12.8.1 General

Arrangements can be made to transport products of almost any size and weight to any location in the world. However, exceeding specific size and weight limits reduces carrier selection flexibility and often results in increased transportation costs and slower delivery times.

The size and weight information supplied in this section is typical for global carriers. It is intended to act as a guide to avoid delivery delays and to help minimize costs. It should be used as a design and planning tool but should not be considered exact data for any one carrier or any one specific shipment. Contact the Logistics Specialist in your region for specific information and guidance.

12.8.2 Global Air Shipment

The key limitation factor for air shipment is height. For efficient shipment by air, packages and crates should be held to a maximum of 300cm (118") long X 226cm (89") wide X 206cm (81") tall. A more efficient and sometimes more economical height limit is 160cm (63”). This allows belly loading in all cargo and most passenger aircraft.

The overall height dimension can be increased to 241cm (95") for DC10 and 300cm (118”) for 747 cargo aircraft. However, many large markets of the world, including much of Latin America and Asia do not have DC10 or 747 service, so products over 206cm (81”) tall cannot be shipped by air to these locations. Products over 300cm (118”) tall **cannot** be shipped by air.

Air carriers are likely to tip over packages and crates that are over 206cm (81") tall to facilitate loading on smaller aircraft. It is also common practice for air carriers to tip over packages and crates that are over 160cm (63”), to facilitate lower deck loading on passenger and cargo aircraft.

There is no actual weight limitation for cargo aircraft. The limiting factor will be the capacities of available mechanical handling equipment to load and unload the aircraft and the weight limitations of air pallets used. See Section 10.10.2.2.2 for air pallet size and weight limitations.

12.8.3 Key Height Limits for Efficient Air Transport

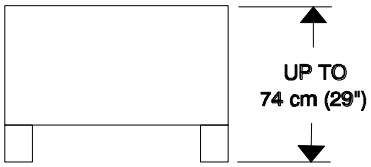
Crate height is the key factor for efficient air transport. The following summarizes the key height dimensions that affect cost and cycle time for air transport:

1. **74 cm (29 Inches)** - Most efficient and economical air service.
2. **160 cm (63 Inches)** - Still very good efficiency and economy.
3. **206 cm (81 Inches)** - Point where problems and costs increase greatly.
4. **241 cm (95 Inches)** - 747 cargo aircraft only possible carrier above this height.
5. **300 cm (118 Inches)** - Maximum height limit for air transport.

Hold "Total Shipping Heights" below each increasing dimension as product and package height allows.

Note: Aircraft door openings are actually 76.2cm (30″), 162.5cm (64″), 208.2cm (82″), 243.8cm (96″) & 302.3cm (119″) high. However, crates shall be 2.5 cm (1″) less than the opening to allow for thickness of air pallets and other factors associated with aircraft loading.

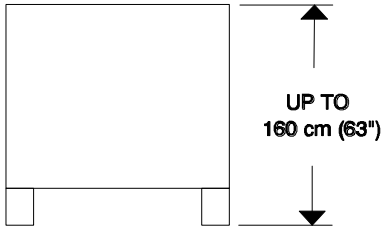
Key Height Limits For Air Transport



BELLY LOADING ALL PASSENGER AIRCRAFT FOR NEXT FLIGHT OUT EMERGENCY SERVICE

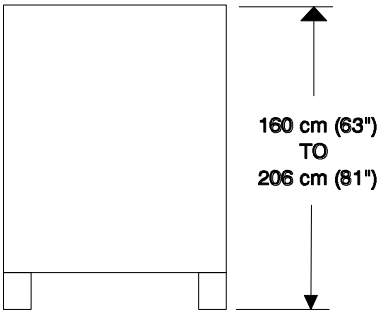
MAXIMUM EFFICIENCY, FLEXIBILITY AND LOWEST COST POTENTIAL

74 CM (29") APPLIES ONLY TO MD 80 AIRCRAFT (AFFECTS 6% OF TOTAL). ALL OTHERS, (94%) CAN USE 79 CM (31").



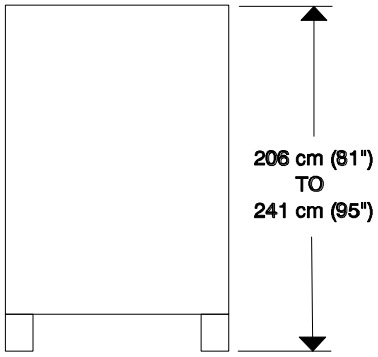
BELLY AND UPPER DECK LOADING ALL CARGO AIRCRAFT AND BELLY LOADING MOST PASSENGER AIRCRAFT

GOOD EFFICIENCY, FLEXIBILITY AND LOW COST POTENTIAL



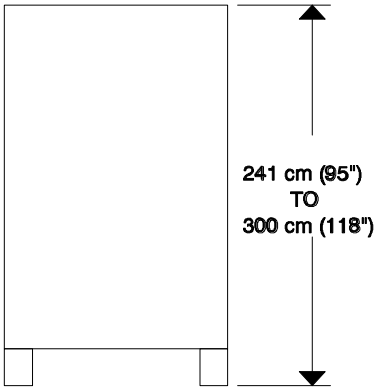
UPPER DECK LOADING ON MOST CARGO AIRCRAFT

REDUCED EFFICIENCY AND FLEXIBILITY. SERVICE LIMITED TO DESTINATIONS WITH CARGO AIRCRAFT SERVICE. SOME DELAYS CAN BE EXPECTED

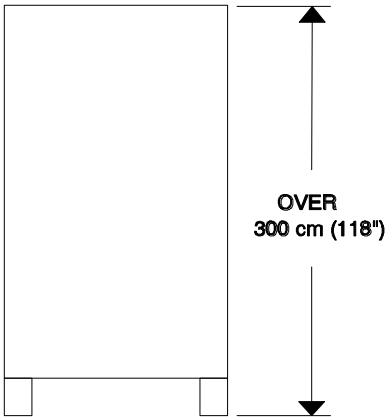


UPPER DECK LOADING ON DC-10 AND 747 CARGO AIRCRAFT ONLY

GREATLY REDUCED EFFICIENCY & FLEXIBILITY AT HIGHER COSTS. LIMITED SERVICE TO MOST DESTINATIONS, WITH NO SERVICE TO SOME DESTINATIONS, INCLUDING MUCH OF LATIN AMERICA AND MANY POINTS IN ASIA. EXPECT DELAYS



VERY RESTRICTED, 747 CARGO ONLY POSSIBLE CARRIER



CAN NOT SHIP AIR. MUST SHIP BY TRUCK OR OCEAN

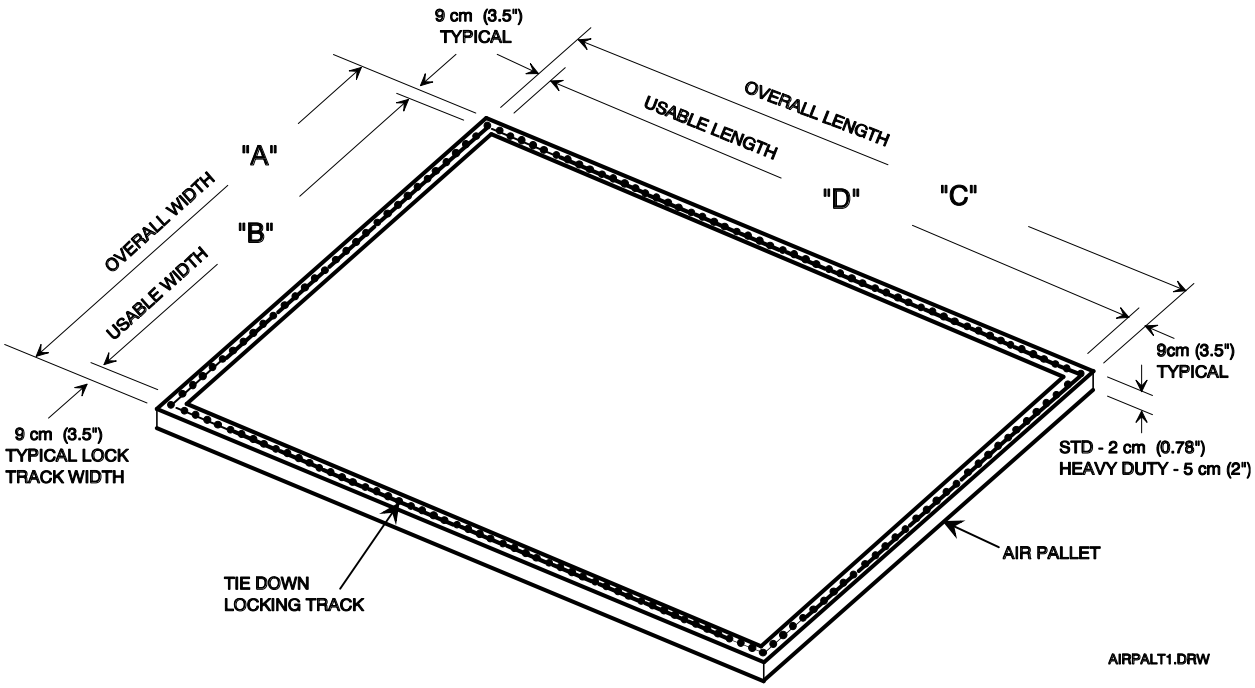
KEY-HT.DRW

12.8.4 Large Products on Air Pallets

Large products shipping by air will be secured to an air pallet by the airlines. Specific air pallet specifications and loading requirements are different for each airline. The following information is provided as a general guideline and all dimensions referenced are typical.

12.8.4.1 Air Pallet Specifications

Typical Air Pallet Specifications



Usable Air Pallet Load Area and Maximum Weight

PALLET TYPE	"A"	"B"	"C"	"D"	Max Weight
3 m (10') Pallet	243.8cm (96")	226cm (89.0")	317.5cm (125")	300cm (118.0")	6,668 kg (14,700 lbs.)
6 m (20') Pallet	243.8cm (96")	226cm (89.0")	605.8cm (238.5")	588cm (231.5")	10,795 kg (23,800 lbs.)

Air Pallet Loading Weight Distribution

PALLET TYPE	Max Pallet Loading
STD 2cm (0.78") Thick	1465kg/Sq m (300 Lbs./Sq Ft)
Heavy Duty	4882.7kg/Sq m (1000 Lbs./Sq

6cm (2.0") Thick	Ft)

12.8.4.2 Air Pallet Loading and Securement

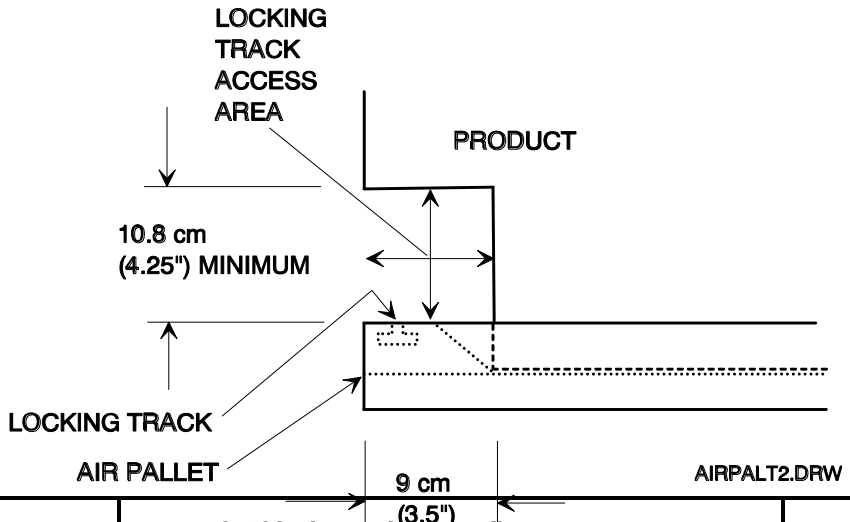
The air pallet will be locked to the floor of the aircraft cargo bay, so it is critical that the product(s) are adequately secured to the pallet to prevent all horizontal and vertical movement. The following are typical requirements of all airlines.

1. Product weight must be distributed as evenly as possible on the air pallet.
2. Products on wheels shall be blocked or supported in some manner to prevent rolling.
3. Large products must be secured both at the base and over the top.
4. Base straps are angled in opposite directions to eliminate all horizontal movement.
5. Top straps are used to eliminate vertical movement. Top straps can also be angled to help eliminate horizontal movement.
6. Tie-down straps are typically 5 cm (2") wide and are tensioned and secured with clamp type ratchet assemblies.
7. Tie-down straps are secured to the air pallet with devices that attach to a locking track on the edge of the air pallet.
8. Products must be positioned to allow access to the locking track along the edge of the air pallet.
9. Products on the pallet will be covered with plastic sheeting for moisture protection.
10. The number of base and top straps is dependent on the weight of the product(s) and varies by airline.
11. Most airlines require that a cargo net be applied over the load after the straps and plastic shroud are in position.
12. The cargo net is secured to the same locking track on the air pallet as the straps.
13. Straps and cargo nets are tensioned manually, so the tension forces applied to the product are totally dependent on the person doing the work.

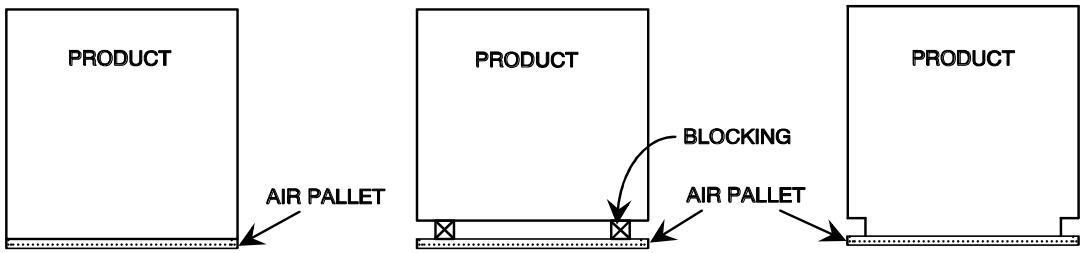
12.8.4.3 Air Pallet Locking Track Access

Allow access to the locking track when positioning products on an air pallet. Products can be extended to the edge of the air pallet, if an access area is provided over the locking track.

Air Pallet Locking Track Access Requirements



Typical Air Pallet Locking Track Access Examples



NOT ACCEPTABLE

PRODUCT COVERS LOCKING TRACKS.

ACCEPTABLE

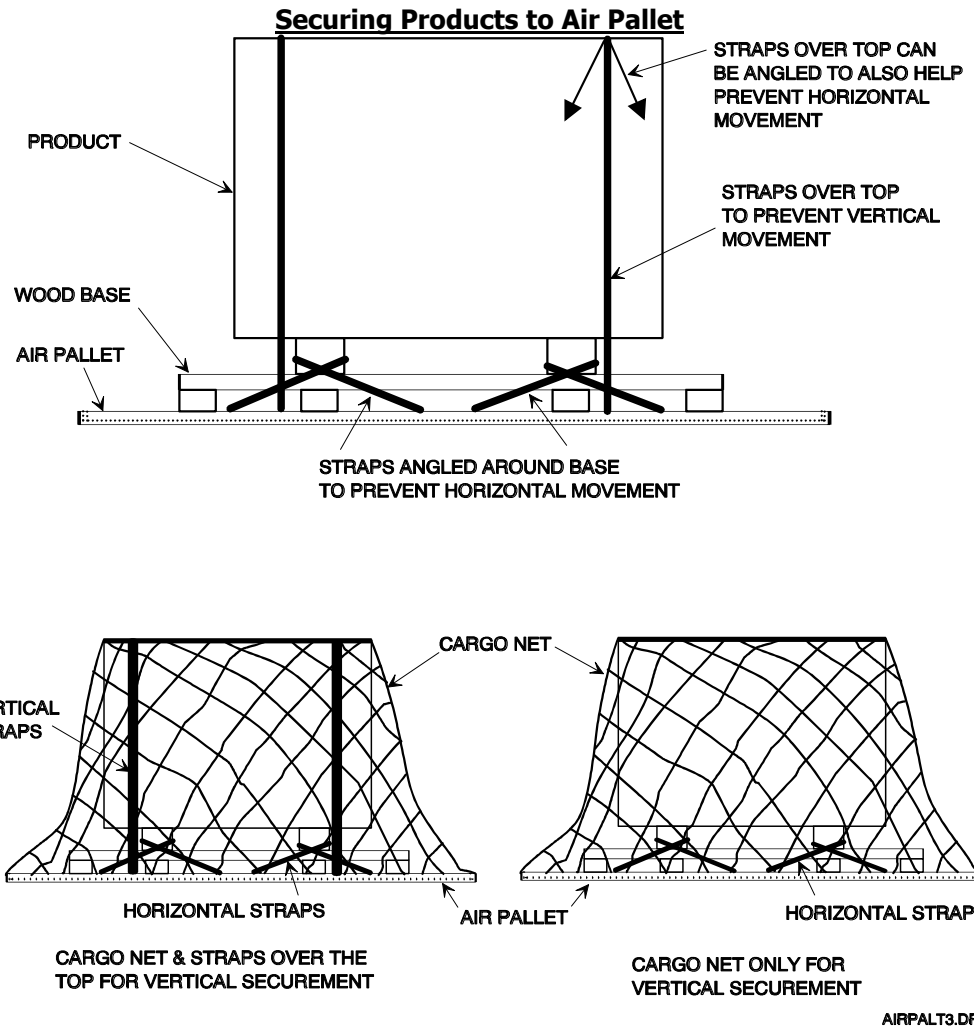
BLOCKING UNDER PRODUCT ALLOWS ACCESS TO LOCKING TRACKS.

ACCEPTABLE

PRODUCT DESIGN ALLOWS ACCESS TO LOCKING TRACKS.

AIRPALT2.DRW

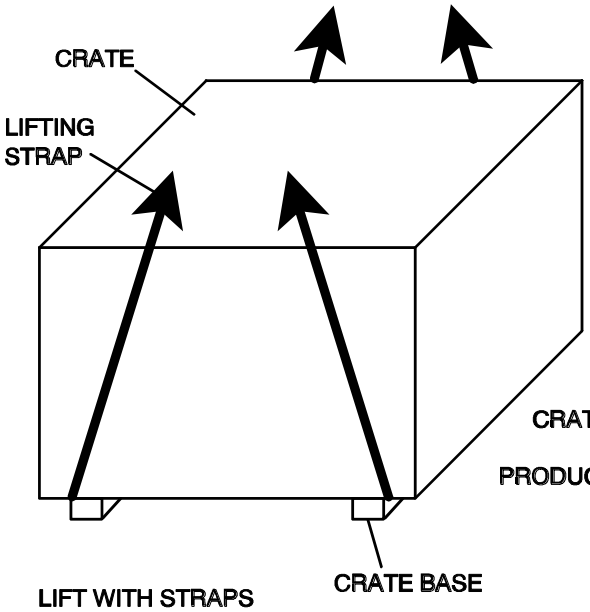
12.8.4.4 Air Pallet Securement



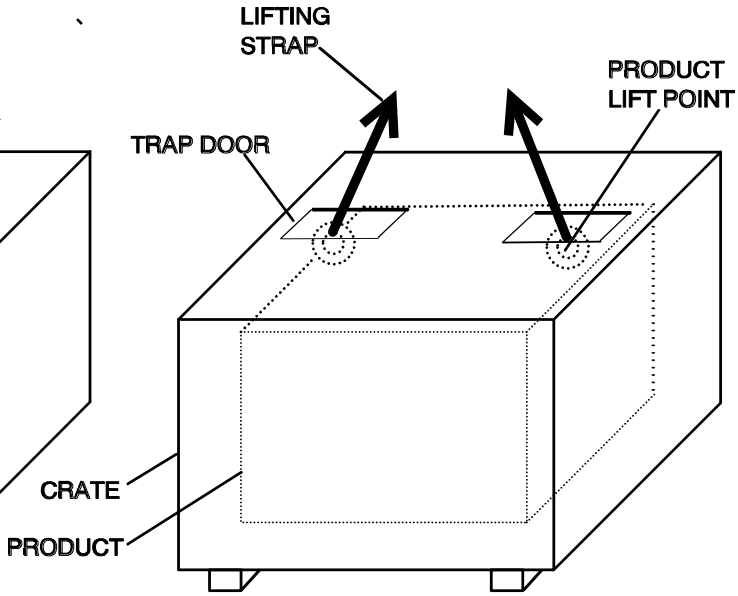
12.8.4.5 Crane Lifting for Large Products

Crane Lifting Crated and Uncrated Products

CRATED PRODUCTS

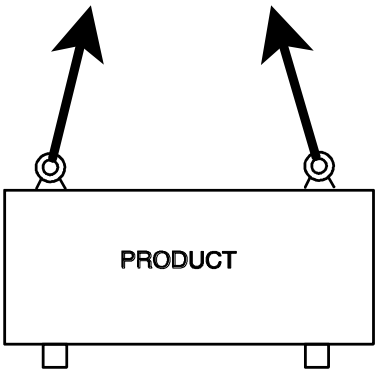


LIFT WITH STRAPS UNDER CRATE BASE

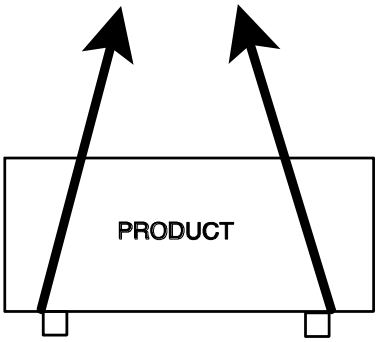


LIFT USING PRODUCT LIFT POINTS. TRAP DOORS ON TOP OF CRATE ALLOW ACCESS TO PRODUCT.

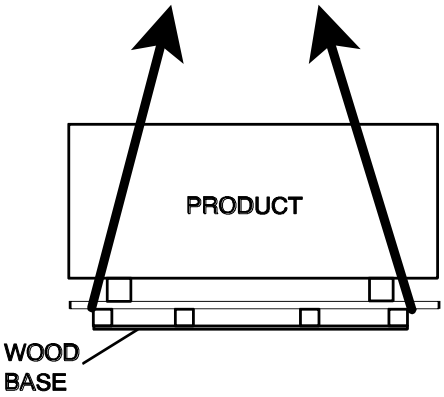
CRATELESS PRODUCTS



LIFT USING PRODUCT LIFT POINTS.



LIFT WITH STRAPS UNDER PRODUCT.



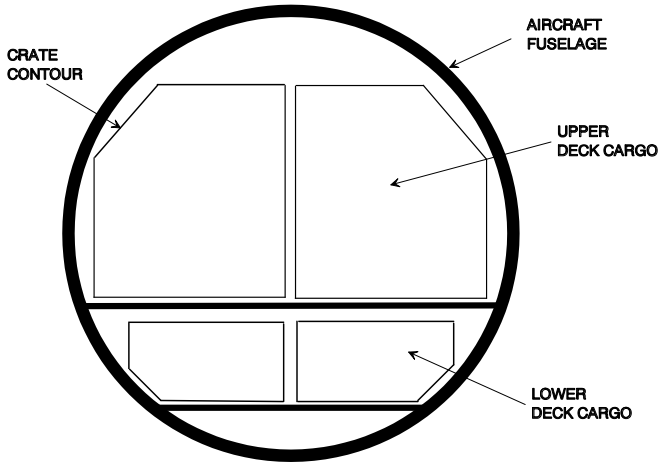
SECURE PRODUCT TO WOOD BASE AND LIFT WITH STRAPS UNDER WOOD BASE.

AIRPALT4.DRW

12.8.4.6 Matching Large Crates and Loads to Aircraft Contours

Due to the cylindrical shape of an aircraft fuselage, large crates and pallet loads with heights close to the maximum height limit often require a contour to match the aircraft. The following figure shows how contoured freight is positioned in upper and lower deck compartments.

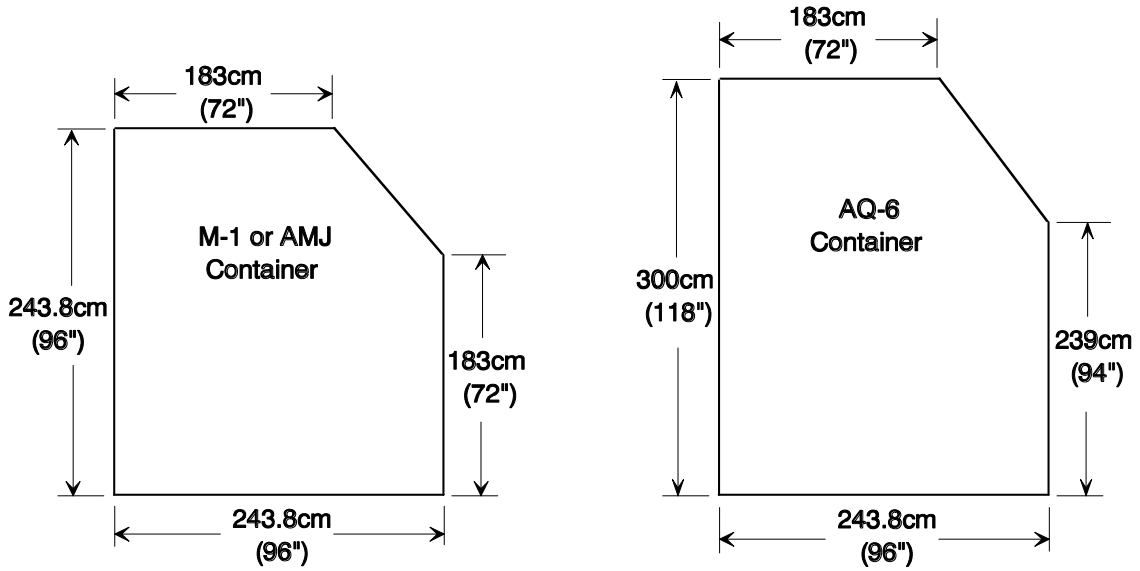
Freight Contoured to Fit Aircraft Fuselage



The maximum dimensions and contour requirements for both upper and lower deck shipments vary greatly by carrier, aircraft type and position on the aircraft.

Air cargo containers provide good examples of maximum size and contour dimensions. The figure below provides typical examples of large cargo containers. Note: These should not be considered exact dimensions for any specific shipment. It is highly recommended that anyone with products in these size ranges consult with your Logistics department for specific information.

Large Air Cargo Container Examples



12.9 Global OCEAN Shipment

12.9.1 General

Products shipping by ocean are typically loaded in Standard Containers (solid top & open top), Flat Rack Containers, and Non-containerized wood crates. Standard containers can be loaded below or on the deck of the vessel. Flat rack containers are typically loaded above deck. Non-containerized wood crates are almost always loaded above deck.

12.9.2 Containerized Shipments

12.9.2.1 Closed Container

Most ocean shipments use standardized containers that are either 12.2m (40 ft) or 6.1m (20 ft) in length.

Typical inside dimensions for a 12.2m (40 ft) container are 12 m (39 ft, 6 in) long X 2.3m (7 ft, 7 in) wide X 2.36m (7 ft, 9 in) high.

There are also high cube containers that are 2.7m (8 ft, 10 in) high, but their availability can be limited.

Typical inside dimensions for a 6.1 m (20 ft) container are 5.9m (19 ft, 4 in) long X 2.3m (7 ft, 7 in) wide X 2.36m (7 ft, 9 in) high.

High cube containers are not available in the 6.1m (20 ft) length.

12.9.2.2 Flat Rack Container

A flat rack is an open, "U" shaped vehicle, with a bulkhead at each end. These containers are also, either 12.2 m (40 ft), or 6.1 m (20 ft) in length.

Typical maximum product dimensions for a 12.2m (40 ft) container are 11.8m (38 ft, 9 in) X 2.148 m (7ft) X 2.095m (6 ft, 10.5 in).

Typical maximum product dimensions for a 6.1m (20 ft) container are 5.7m (18 ft, 8.5 in) X 2.438m (8 ft) X 2.327m (7 ft, 7.5 in).

The flat rack container is open on the sides and top, so the width and height of the product can be greater than the standard maximum dimensions. However, costs increase when the product size exceeds the standard maximum dimensions and cycle time may be affected.

12.9.2.3 Non-Containerized Shipments

Products in wood crates that are too large for standard containers or flat racks can also be shipped by ocean through special arrangements with the forwarder/carrier. These shipments will require special handling and securement on the deck of the ocean vessel. This space is limited, so costs will be higher and cycle time may be affected.

12.9.2.4 Weight Limitations

Weight limitations for closed containers are determined by the limitations of the surface movement in the exporting and importing countries. Special permits and certain transportation lanes allow capability of moving heavy payloads. These lanes should be utilized as much as possible as Wabtec products are extremely heavy and dense, usually weighing out shipping containers before cubing out. Proper utilization of heavy transportation lanes is critical in sending Wabtec products at the lowest possible rate. Please check with Wabtec Packaging and Logistics teams to find out if a heavy payload shipping lane exists for your shipments.

12.9.2.4.1 Weight limitations for flat rack containers are determined by the maximum payload allowed for the container during the ocean voyage. Products are typically transferred between flatbed trucks and the flat rack containers at the port, so highway transport limits do not apply.

12.9.2.5 Typical weight limits for closed container surface movement in the United States

6.1m (20 ft) Closed Container (Note: Average Container Weight = 2,041 kg (4500 lbs.))

	Maximum Gross Weight	Maximum Net Weight
- Standard Chassis	17,797 kg (39,235 lbs.)	15,755 kg (34,735 lbs.)
- Tri Axle Chassis	21,773 kg (48,000 lbs.)	19,732 kg (43,500 lbs.)

12.2m (40 ft) Closed Container (Note: Average Container Weight = 3,856 kg (8500 lbs.))

	Maximum Gross Weight	Maximum Net Weight
- Standard Chassis	17,797 kg (39,235 lbs.)	13,941 kg (30,735 lbs.)
- Tri Axle Chassis	21,773 kg (48,000 lbs.)	17,917 kg (39,500 lbs.)

12.9.2.6 Typical weight limits for flat rack containers

6.1m (20 ft) Flat Rack Container

- Average Container Weight = 2,330 kg (5,137 lbs.)
- Max Payload Weight = 21,670 kg (47,773 lbs.)

12.2m (40 ft) Flat Rack Container

- Average Container Weight = 5,260 kg (11,596 lbs.)
- Max Payload Weight = 25,220 kg (55,600 lbs.)

12.9.3 General Guide – Standard Packaging Container Sizes for Handling & Distribution

Note: This data is typical for carriers & customer facilities worldwide. It is intended to act as a guide to help minimize costs & delays. It should not be considered exact data for any one particular shipment.

WABTEC STANDARD CONTAINER SIZES FOR PALLETS, CORRUGATED AND WOOD CONTAINER PLANNING INTERNATIONAL OCEAN SHIPMENT ONLY

CORRUGATED CONTAINERS

OUTSIDE DIMENSIONS			
LENGTH	WIDTH	HEIGHT	PALLET STYLE
30	22	22	2 OR 4-WAY ENTRY
30	22	30	2 OR 4-WAY ENTRY
30	30	22	2 OR 4-WAY ENTRY
30	30	30	2 OR 4-WAY ENTRY
36	30	22	2 OR 4-WAY ENTRY
36	30	30	2 OR 4-WAY ENTRY
47	30	22	2 OR 4-WAY ENTRY
47	30	30	2 OR 4-WAY ENTRY
47	30	45	2 OR 4-WAY ENTRY
47	45	22	2 OR 4-WAY ENTRY
47	45	30	2 OR 4-WAY ENTRY
47	45	45	2 OR 4-WAY ENTRY
52	45	22	2 OR 4-WAY ENTRY
52	45	30	2 OR 4-WAY ENTRY
52	45	45	2 OR 4-WAY ENTRY
58	30	22	2 OR 4-WAY ENTRY
58	30	30	2 OR 4-WAY ENTRY
58	30	45	2 OR 4-WAY ENTRY
58	45	22	2 OR 4-WAY ENTRY
58	45	30	2 OR 4-WAY ENTRY
58	45	45	2 OR 4-WAY ENTRY
67	45	22	2 OR 4-WAY ENTRY
67	45	30	2 OR 4-WAY ENTRY
67	45	45	2 OR 4-WAY ENTRY
78	45	22	2 OR 4-WAY ENTRY
78	45	30	2 OR 4-WAY ENTRY
78	45	45	2 OR 4-WAY ENTRY

WOOD CONTAINERS
PALLET FOOTPRINTS (SHADED)

OUTSIDE DIMENSIONS			
LENGTH	WIDTH	HEIGHT	PALLET STYLE
30	30	22	2 OR 4-WAY ENTRY
30	30	30	2 OR 4-WAY ENTRY
36	30	22	2 OR 4-WAY ENTRY
36	30	30	2 OR 4-WAY ENTRY
47	30	22	2 OR 4-WAY ENTRY
47	30	30	2 OR 4-WAY ENTRY
47	30	45	2 OR 4-WAY ENTRY
47	45	22	2 OR 4-WAY ENTRY
47	45	30	2 OR 4-WAY ENTRY
47	45	45	2 OR 4-WAY ENTRY
52	45	22	2 OR 4-WAY ENTRY
52	45	30	2 OR 4-WAY ENTRY
52	45	45	2 OR 4-WAY ENTRY
58	30	22	2 OR 4-WAY ENTRY
58	30	30	2 OR 4-WAY ENTRY
58	30	45	2 OR 4-WAY ENTRY
58	45	22	2 OR 4-WAY ENTRY
58	45	30	2 OR 4-WAY ENTRY
58	45	45	2 OR 4-WAY ENTRY
67	45	22	2 OR 4-WAY ENTRY
67	45	30	2 OR 4-WAY ENTRY
67	45	45	2 OR 4-WAY ENTRY
78	45	22	2 OR 4-WAY ENTRY
78	45	30	2 OR 4-WAY ENTRY
78	45	45	2 OR 4-WAY ENTRY
78	45	22	2 OR 4-WAY ENTRY
58	45	30	2 OR 4-WAY ENTRY
58	45	45	2 OR 4-WAY ENTRY
67	45	22	2 OR 4-WAY ENTRY
67	45	30	2 OR 4-WAY ENTRY
67	45	45	2 OR 4-WAY ENTRY
78	45	22	2 OR 4-WAY ENTRY
78	45	30	2 OR 4-WAY ENTRY
78	45	45	2 OR 4-WAY ENTRY
94	45	22	2 OR 4-WAY ENTRY
94	45	30	2 OR 4-WAY ENTRY
94	45	45	2 OR 4-WAY ENTRY
94	45	88	2 OR 4-WAY ENTRY
94	88	88	2 OR 4-WAY ENTRY

12.10 Exhibit #8 – Supplier Required Information

Wabtec Suppliers may be required to submit a Supplier Packaging Request for Information (RFI) Form, Questionnaire, and Validation form. This is necessary for Wabtec to limit non-value add expenses to our business. This baseline information provides important details that drive logistics spend and lean process improvements within our facilities. Based on internal criteria, Supplier packaging solutions may undergo further evaluation and approval by the Package Engineering and Logistics team. Communications can be sent to the Package Engineering Team via email: packaging@ge.com.

The examples below are for reference only and does not necessarily represent the latest level of forms, so please check with your Sourcing representative before filling out any other versions you have access to.

Wabtec reserves the right to investigate and/or market-test your packaging pricing throughout the given term of the business relationship. You will also be required to undergo 1st article inspections of your packaging before you can ship parts for production. This can be incorporated into a trial shipment used for validation.

SUPPLIER REQUEST FOR INFORMATION (RFI) ***GET COMPONENT PACKAGING AND SHIPPING***

A					Individual Part Dimensions - (LxWxH) Inches:		
	GET PN:		Part Description:				
	Piece Price:		Supplier Name:				
	Annual Volume:		Supplier Contact:		Cubic feet:	Cubic Meters:	Part Wt (lbs):
	Supplier Location:		Supplier Email:		0.00	0.00	

COLOR CODE		
		Manual ***INPUT REQUIRED***
		Auto ***NO INPUT REQUIRED***

B	Parts/ Package:		Packages/ Unit Load:		Parts/ Unit Load:	0	Total Per Part Packaging Cost (USD)		#DIV/0!		
	Component Material Type	Component Description Please be as detailed as possible	PCS/ Package	PCS/ Unit Load	Single Component Cost (USD)	Per Package Costs (USD)	Per Unit Load Costs (USD)	Single Component Weight Lbs	Package Empty Lbs	Unit Load Empty Lbs	Total Gross Weights *Part Included*
Per Package PNs				0		$0.00	$0.00		0.00	0.00	
				0		$0.00	$0.00		0.00	0.00	Total Gross Package Weight
				0		$0.00	$0.00		0.00	0.00	
				0		$0.00	$0.00		0.00	0.00	0.00
				0		$0.00	$0.00		0.00	0.00	
				0		$0.00	$0.00		0.00	0.00	Total Gross Unit Load Weight
				0		$0.00	$0.00		0.00	0.00	
Per Unit Load PNs							$0.00			0.00	0.00
							$0.00			0.00	
							$0.00			0.00	Total Gross Per Part Weight
							$0.00			0.00	#DIV/0!
							$0.00			0.00	
					TOTALS	0.00	0.00	TOTAL PKG Wts	0.00	0.00	

C	PACKAGING LOAD/UNLOAD INSTRUCTIONS	INDIVIDUAL PACKAGE - LOADED	FINAL UNIT LOAD - LOADED
	LOADING INSTRUCTIONS:	Please provide pictures showing the orientation of the product and any other views vital to understanding the individual part packaging solution. Please be prepared to provide any packaging component specifications if requested.	Please provide pictures showing the final package assembly as a unit load. Loaded Container views are also appreciated. Please be prepared to provide any packaging component specifications if requested.
1			
2			
3			
4			
5			
6			
	UNLOAD INSTRUCTIONS		
1			
2			
3			
4			
5			
6			

Shipping Container Type (Main Portion of Shipment):		Individual Package Size - OD (LxWxH) Inches:			Unit Load Size - OD (LxWxH) Inches:		
MAX Number of Unit Loads in a Stack (Warehouse):							
MAX Number of Unit Loads in a Stack (Shipping):		Cubic Feet	Cubic Meters	Density(lb/cuft)	Cubic Feet	Cubic Meters	Density(lb/cuft)
MAX Number of Unit Loads in Shipping Container:		0.000	0.000	#DIV/0!	0.000	0.000	#DIV/0!
Weight of stack in Warehouse (lbs):	0.00	Shipping Container Load Wt (lbs):		0.00	Parts Per Shipping Container:		-

D	Supplier Logistics Analysis (Optimized) - USD (**Other includes Hubbing, JIT, Inventory Carrying Costs, Customs etc..)				Total / Part:	#DIV/0!
	Shipment Details	Shipping Cntr Cost	Other / Cntr**	Total Cost / Year	Cost / lb	Details: mode, storage requirements/restrictions, handling costs, etc..
	Origin - Destination	$0.00	$0.00	#DIV/0!	#DIV/0!	
	Origin - Destination	$0.00	$0.00	#DIV/0!	#DIV/0!	

E	Critical Questions	Answers
1	If this part ships as a mixed load, what other parts ship with it?	
2	Are there any restrictions on qtys per package or unit load? Established by GET?	
3	Does this part share a packaging with another part? Example: Left/Right side parts	
4	Are there any part manufacturing restrictions / batch limitations?	

Author: Damon Frenn **Approval: Shipping**

GET PN: **SUPPLIER:** **DATE:**

SUPPLIER PACKAGING QUESTIONNAIRE

The following questions are based on the GET Global Packaging Requirements document, 84A220081. The intent of this questionnaire is to ensure safe, secure, and proper packaging of GET products. Document 84A220081 must still be reviewed in its entirety prior to shipment.

1. Have you reviewed the supplier responsibility statement and order of precedence? ANSWER
    a. Was packaging solution pre-defined by GET? ANSWER If Yes, Skip to Question 6.
2. Did you select the proper packaging type for the product you are supplying GET (Production, Finished, or Service)? ANSWER
3. Standard container sizes were utilized for the given transportation mode the part is shipping? ANSWER
    a. If NO, please select reason. ANSWER
4. Is a returnable container system currently being utilized for this part? ANSWER
    a. If YES, did you consult the GET package engineering team? ANSWER
    b. If NO, what is your reasoning? ANSWER
5. Is the part within the perimeter of the skid/pallet, while considering stability, stack-ability, and ergonomic design? ANSWER
6. Did you submit the required Packaging RFI Form to your GET Sourcing Representative? ANSWER
7. Is the part properly secured to its packaging solution with non-metallic banding or other approved means? ANSWER
8. Is the packaging in-line with all potential country specific and international packaging material related standards (i.e. ISPM-15) including Hazmat/Dangerous goods requirements if applicable? ANSWER
9. Are the packaging materials properly identified with the material type and containers are marked with proper handling marks and shipping documentation? ANSWER
10. Has the packaging solution been validated by mechanical means or trial shipment and did you submit a packaging pre-production 1st article for package engineering approval? ANSWER
11. Were prohibited packaging materials outlined in Section 5.2.6, "Environmental Packaging Selection Criteria" of 84A220081 avoided in the packaging solution? ANSWER
12. Do you perform routine audits for proper packaging prior to shipment? ANSWER
    a. If YES, how often are the audits performed? ANSWER
    b. If NO, when will you start performing appropriate audits? ANSWER

GET Sourcing Representative:

Supplier Representative:

GET Packaging Engineer:

The following questions are based on the Wabtec Global Packaging Requirements document,

Wabtec products. Document 84A220081 must still be reviewed in its entirety prior to shipment.

Wabtec Packaging Validation Plan Form

Project Name: Validate packaging for (Insert Product Name).

Scope: This document defines the validation plan for packaging that will be used to ship (Insert Product Name) by (Insert "truck/ocean/rail/air" as applicable).

Wabtec Part No.: (Fill-In If Applicable)

Supplier Part No.: (Fill-In If Applicable)

Project Description: Ensure the packaging used will provide adequate protection for safe, damage free shipment.

Program Number: (Fill-In If Applicable)

Air Package: (Insert Part/Spec Number If Applicable)

Ocean Package: (Insert Part/Spec Number If Applicable)

Truck Package: (Insert Part/Spec Number If Applicable)

Rail Package: (Insert Part/Spec Number If Applicable)

Requirement: (Insert Plan Requirement Numbers Performed)

Author:	(Fill-In)	Signature:	Date:	(Fill-In)
Reviewer:	(Fill-In)	Signature:	Date:	(Fill-In)
Packaging Eng:	(Fill-In)	Signature:	Date:	(Fill-In)
Product Eng:	(Fill-In)	Signature:	Date:	(Fill-In)
Quality:	(Fill-In)	Signature:	Date:	(Fill-In)
Approval:	(Fill-In)	Signature:	Date:	(Fill-In)

(Revise Approval List as Appropriate)

Plan Requirements

Requirement (1) – Mechanical Testing

(Required unless product is unable to be tested by mechanical means)

Shock & Vibration - Survive the Shipping and Handling tests for vibration, classical shock and drop defined in Wabtec document 84A220081. Products vibration tested as part of the product validation do not require a repeat of the vibration or classical shock tests but do require drop testing.

Test Plan

Package the product as it will be packed for production. Test the packaged product per the requirements of document 81A220081.

Vibration - (Fill In Requirements)
Classical Shock - (Fill In Requirements)
Drop Test - (Fill In Requirements)
Testing Facility – (Name of facility, Contact, & Location)

Expected Results

A.) Product must be free of damage.
B.) Product must function properly.
C.) Damage to the packaging is acceptable, but it must be intact and functional.

Actual Results

A.)
B.)
C.)

Requirement (2) – Moisture Sensitivity Testing

(Required for Ocean if Product is moisture sensitive, Optional For Truck & Air)

Moisture - Humidity level the product is exposed to in the package not to exceed 40% RH.

Test Plan

Ship a minimum of two trial shipments and include a device that records the maximum humidity level. Place the recording device inside the innermost packing material where it will be exposed to the same environment as the product. Secure the device as necessary to prevent free movement in the package. Capture the recording device at the end of the trial and document the data.

Expected Results

A.) Humidity level must not exceed 40% RH beginning two hours after package is sealed.

Actual Results

A.)

Requirement (3) – Trial Shipment

(Required if Mechanical mean are not possible or if additional validation is needed/requested)

Trial Shipment - Survive a trial shipment in the new packaging following the standard shipping and handling processes that will be used for production.
(Note: Requirements 2 & 3 may be combined in the same trial shipments)

Test Plan

Record the physical condition, functionality, and serial number of the product. Package the product in the defined packaging. Ship packaged products following the standard process that will be used for production. Receiver provides feedback (See Table # 1) on the condition of the product and package on arrival.

Picture 1 – Pre-shipment	Picture 2 – Pre-shipment

Expected Results

A.) Product must be free of physical damage.
B.) Product must function properly.
C.) The overall package must still be intact and functional.

Actual Results

A.)
B.)
C.)

Picture 1 – Post-shipment	Picture 2 – Post-shipment

Table # 1

Shipping Package Detail & Trial Results			
	Description	**Detail / Result**	**Reference**
GENERAL	Product Name / Serial No:		
	Shipped From / To / Mode:		
	Order Number:		
	Date & Place Inspected:		
	Inspected by:		
PACKAGE	Style (Box, Crate, Etc.):		
	Gross Weight (kg/lb.):		
	Dimensions (cm/in): (LxWxH)		
	Opened Before Inspection?		
	Package Damaged / Functional?		
	Crate Panels or Nails Loose?		
	Shock Label Activated?		
	Tilt Label Activated?		
	Cushioning Still Functional?		
	Overall Evaluation:		
PRODUCT	Visible Product Damage?		
	Product Shift/Move In Pkg?		
	Dropped or Loose Parts?		
	Function Properly?		
	Recommended Changes:		

Note: Duplicate table if multiple packages are included in the trial.

CONCLUSION

DID THE PACKAGING PASS THE VALIDATION TEST?

☐ Yes - As Shipped ☐ Yes - With Recommended Changes ☐ No - See Comments

Other Comments/Summary:

13.0 Reference Documents

The following references provide very detailed design specifications, material selection criteria, governmental regulations, and other information that applies to these packaging guidelines, but is beyond the scope of this document:

13.1 General Reference #1 - Package Design Specifications

13.1.1 Japanese Industrial Standard (JIS)

JIS Z 1403 - Wooden Framed Boxes For Export Packing
Covers - Detailed design specifications and material selection guidelines for wooden framed boxes for contents of 500 kg (1100 lbs.) or more

13.1.2 U.S. Department of Agriculture

Handbook No. 252 - Wood Crate Design Manual
Covers - Detailed design specifications and material selection guidelines for wooden framed crates

13.1.3 U.S. Federal Specification

PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner
Covers - Detailed design specifications and material selection guidelines for wood boxes.

13.1.4 Hazardous Material Shipping Regulations

13.1.4.1 Air Transportation

IATA Dangerous Goods Regulations
International Air Transport Association
2000 Peel Street
Montreal, Quebec
CANADA H3A 2R4

13.1.4.2 Ocean Transportation

International Maritime Dangerous Goods Code (IMDG)
International Maritime Organization
4 Albert Embankment
London SE1 7SR

13.1.4.3 U.S. Domestic Surface Transportation

United States Code of Federal Regulations, CFR 49, Parts 100 to 199.
U.S. Department of Transportation
Washington, DC 20402
USA

13.1.5 Package Testing

13.1.5.1 ISTA (International Safe Transit Association) Procedures 2A & 2B

13.1.5.2 ASTM (American Society for Testing & Materials) Standard D4169

13.2 General Reference #2 - Distribution Environment Reference Data

13.2.1 General Industry Data

NOTE: This information is provided as a reference only. It covers the global distribution system and is not limited to the Wabtec distribution system.

13.2.1.1 Approximate Fragility of Typical Packaged Products

Extremely Fragile
Aircraft altimeters, Winchester hard disc drives---------- 15 - 25 G's

Very Delicate
Medical diagnostic apparatus, x-ray equipment---------- 25 - 40 G's

Delicate
Computer display terminals and printers, electric typewriters -------- 40 - 60 G's

Moderately Delicate
Stereos and television receivers, floppy disc drives ---------- 60 - 85 G's

Moderately Rugged
Major appliances and furniture ---------- 85 - 115 G's

Rugged
Table saws, sewing machines, machine tools ---------- 115 G's & up

13.2.1.2 Typical Drop Heights

Weight Range (Gross Wt. kg (lbs.))	Type of Handling	Drop Height cm (Inches)
0 - 4.5kg (10 lbs.)	1 person throwing	106cm (42in)
4.5kg (10lbs) - 9kg (20lbs)	1 person carrying	91cm (36in)
9kg (20lbs) - 22.5kg (50lbs)	1 person carrying	76cm (30in)
22.5kg (50lbs) - 45kg (100lbs)	2 people carrying	61cm (24in)
45kg (100lbs) - 112.5kg (250lbs)	Light mechanical handling	45cm (18in)
112.5kg (250lbs) and greater	Heavy mechanical handling	30cm (12in) **

** Palletized products may receive drops of 15cm (6 inches)

13.2.1.3 Typical Vibration Forcing Frequencies of Carriers

Carrier	Frequency Range	Conditions
Truck (Spring Ride)	2 - 7 HZ (Suspension) 15 - 20 HZ (Tires) 50 - 70 HZ (Structural)	Normal Highway Travel
Truck (Air Ride)	Typically ½ that of a Spring Ride	Normal Highway Travel
Aircraft	2 - 1000+ HZ (Engine Turbine)	On aircraft floor during flight
Ship	0.1 - 11 HZ (On Deck) 5 - 200 HZ (Bulkheads)	Vibrations caused by the flow of water and propeller system
Rail	1-4 HZ Main 0.034 RMS Peak Mean @ 3.5 HZ (Longitudinal) 0.640 RMS Peak Mean @3.5 HZ (Vertical) 0.100 RMS Peak Mean @ 4.8 HZ (Vertical) 0.003 RMS Peak Mean @ 2.5 HZ (Lateral) Typical Rail Shock Loads 0.95 G to 1.4 G Vertical 10 G 30ms Horizontal 2.3 G 250ms Horizontal	Rail joints and crossings Crossings Coupling Coupling

13.2.1.4 Typical Aircraft Main Deck Cargo Area Temperature and Pressure Ranges

Temperature (Air France Data)
- Normal → 20C to 25C (68F to 77F)
- Minimum → 5C to 10C (41F to 50F)
- Maximum → 25C to 30C (77F to 86F)

Pressure
- Maintained at 2700M (8000 FT) → 73kPa (10.6 lb./sq. in)

Temperature (JAL Data)
- Normal → 15C to 20C (60F to 68F)
- Minimum → 2C to 7C (35F to 45F)
- Maximum → 21C to 27C (70F to 80F)

13.2.1.5 Temperature Extremes for All Modes

+75C (+167F) to -56C (-70F)

13.2.1.6 Altitude Extremes for All Modes

Sea Level to 5200m (17,000 ft) →101.5 kPa (14.7 lb./sq. in) to 52.7 kPa (7.6 lb./sq. in)

13.3 General Reference #3 - Wood Box Design Criteria

13.3.1 Methods of Construction

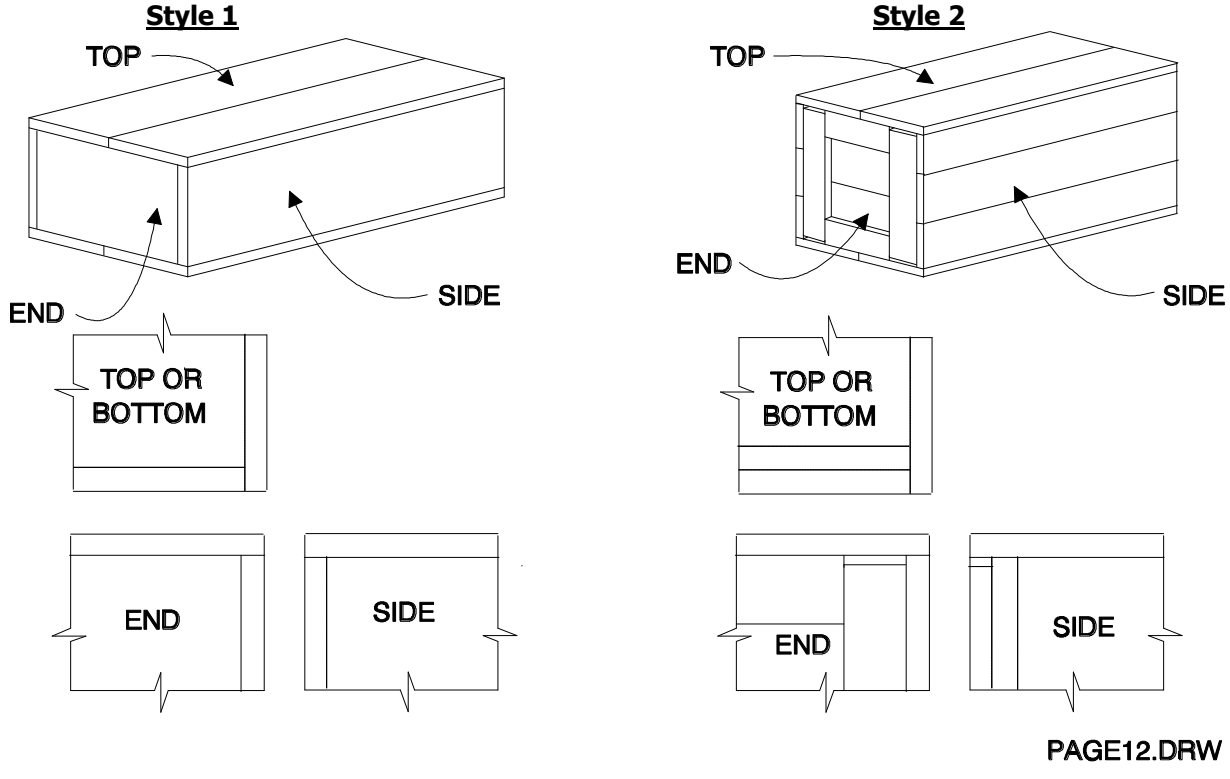
The selection of materials and methods of construction shall be made after a consideration of the products weight, size, physical characteristics, final destination, mode of transport and the existence of special requirements.

13.3.2 Wood Box Designs

For the general packaging of small items, reference the examples below for typical nailed wood box designs and applications with screwed primary access panels:

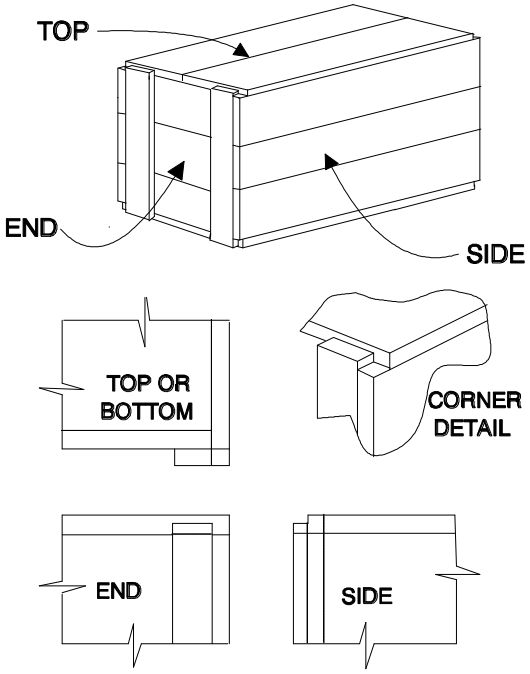
- Nominal 2.5cm (1") lumber can be used to construct boxes up to 270kg (600 lbs.).
- Nominal 5cm (2") lumber shall be used to construct boxes over 270kg (600 lbs.).
- Boxes over 50 kg (110 lbs.) gross weight require the addition of bottom runners to provide a minimum of 10 cm (4.0"), clearance for forklift and pallet truck entry.

Typical Nailed Wood Box with Screwed Primary Access Panels Designs

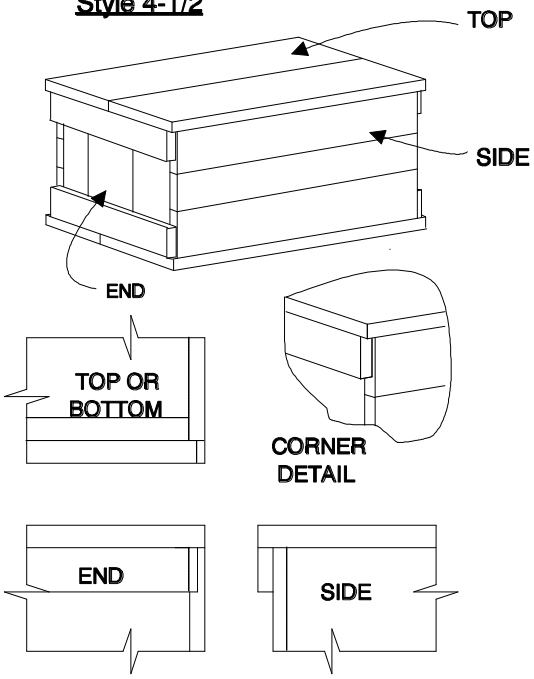


Typical Nailed Wood Box with Screwed Primary Access Panels Designs (continued)

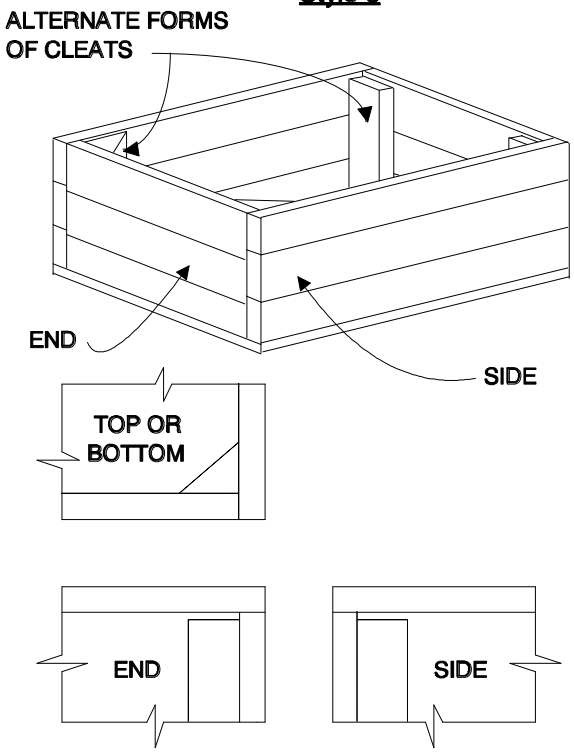
Style 4



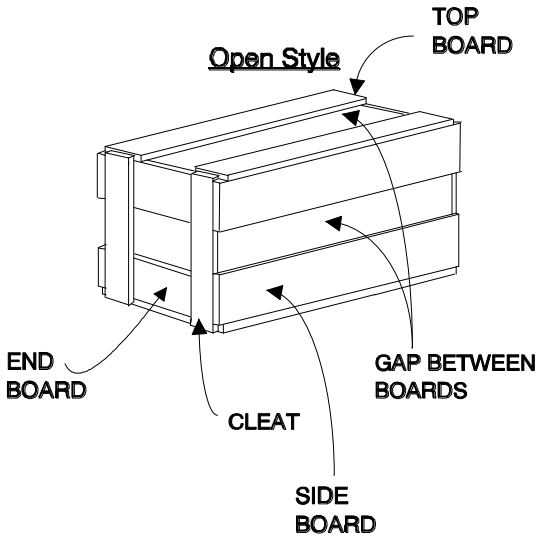
Style 4-1/2



Style 5



Open Style



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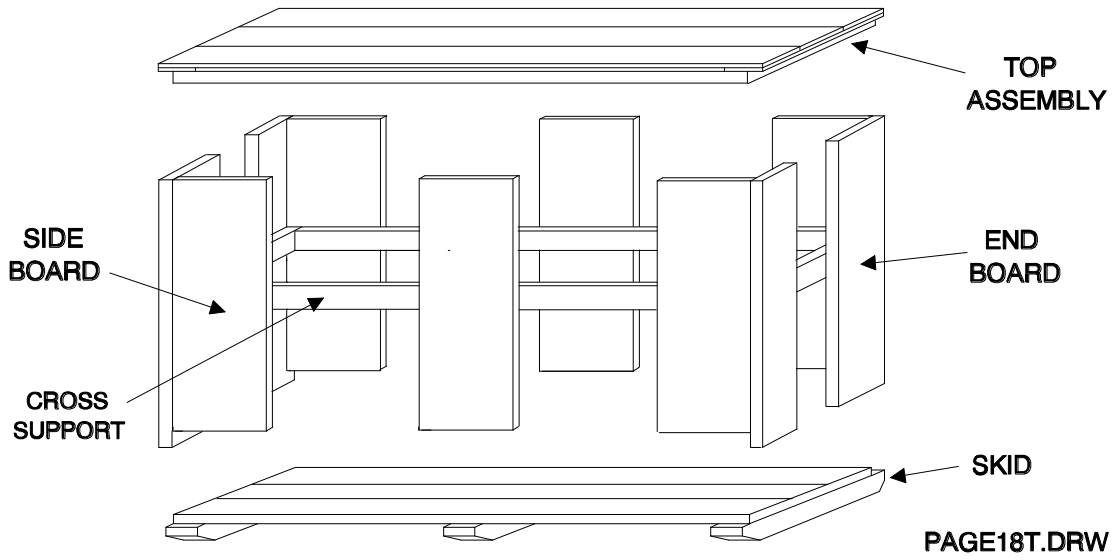
13.4 General Reference #4 - Open Wood Crate Design Criteria

13.4.1 Example #1

A typical design consists of a top assembly with individual boards making up the sides and ends, or complete side, end, and top assemblies. The following example shows individual boards for the sides and ends, and includes a 5 cm (2") cross support to add strength and rigidity.

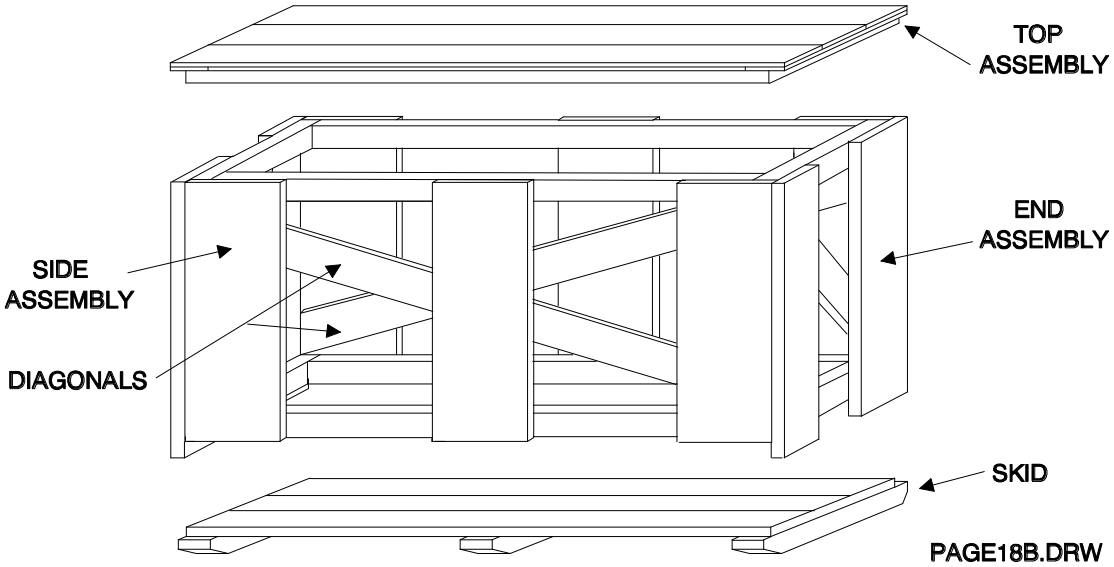
Open Wood Crate Design Example



13.4.2 Example #2

The following example shows a crate with side, end, and top assemblies, and also diagonals for added strength and rigidity.

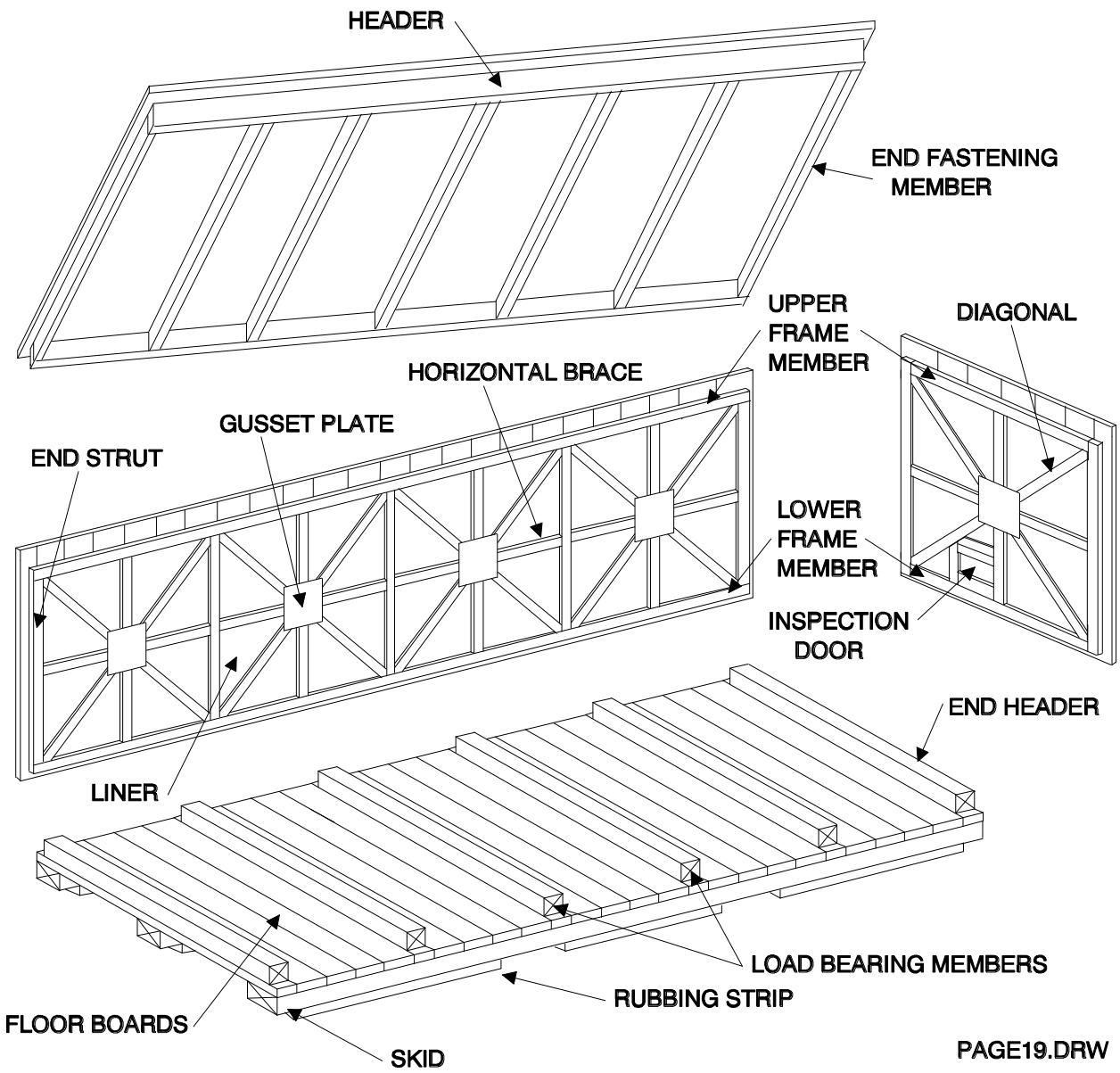
Prefabricated Panel Crate Design Example



13.5 General Reference #5 - Solid Wood Crate Design Criteria

A typical solid wood crate consists of a skid base, sides, ends and a top. The construction of the solid wood crate and material selections are dependent on the size and gross weight of the completed package and on any special handling requirements anticipated during distribution.

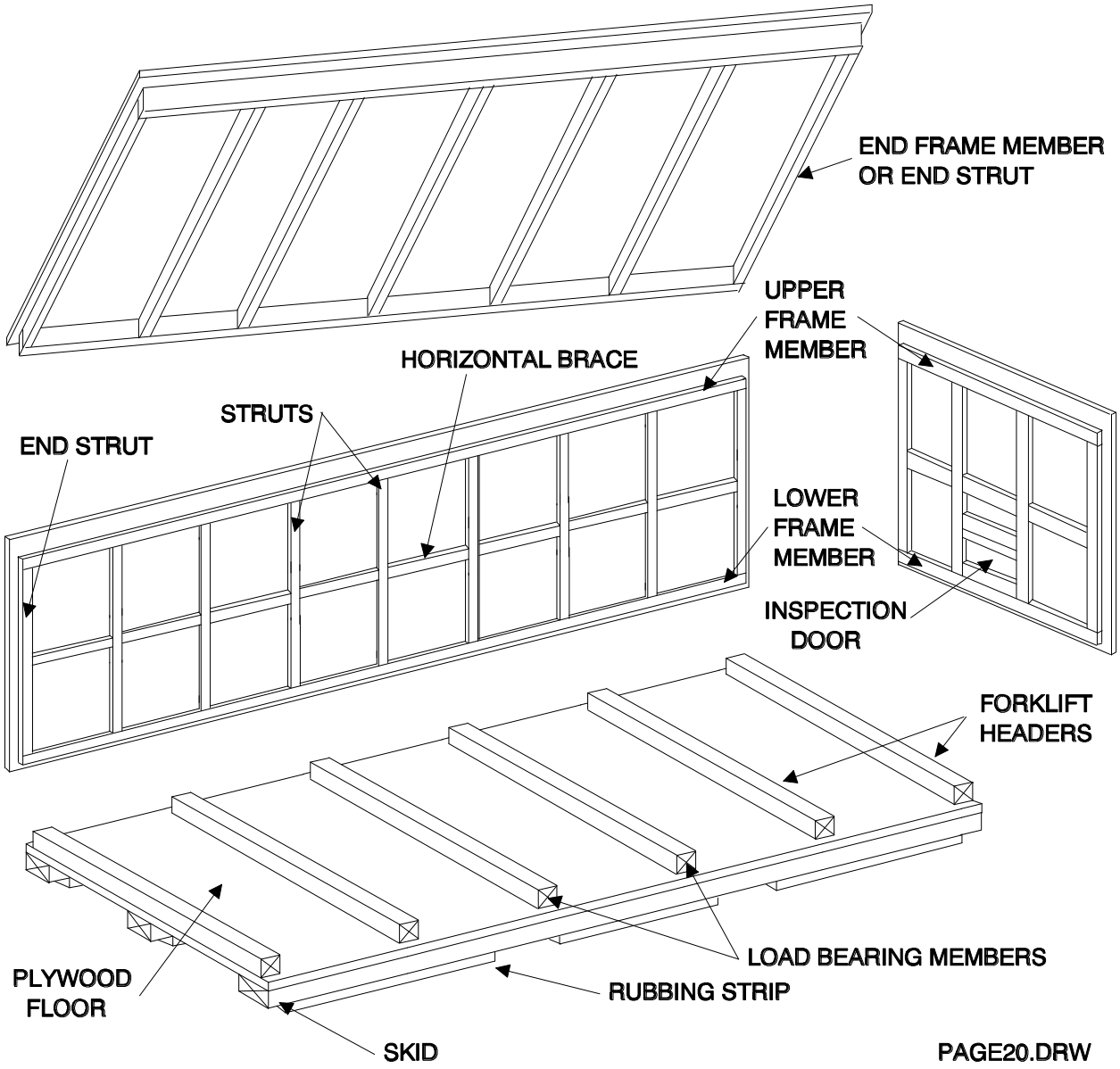
Solid Wood Crate Design Example



13.6 General Reference #6 - Plywood Crate Design Criteria

A typical plywood crate consists of a skid base, sides, ends, and a top. The construction of the plywood crate and material selections are dependent on the size and gross weight of the completed package, and on any special handling requirements anticipated during distribution. Sheet materials other than plywood, such as chipboard, particleboard, hardboard, and other similar products, may be used in place of plywood, as long as they provide adequate strength and durability, and do not jeopardize, in any way, the integrity of the crate.

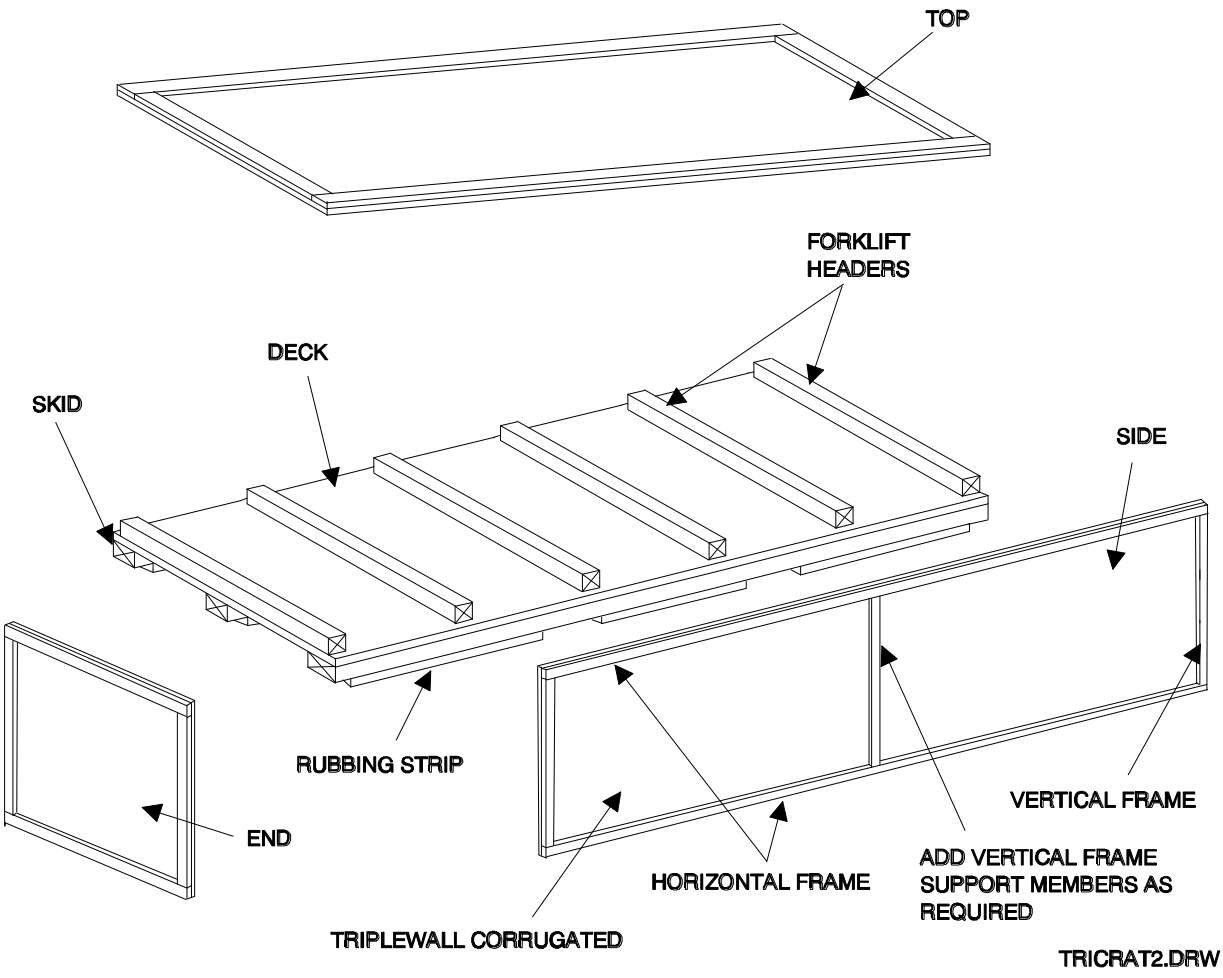
Plywood Crate Example



13.7 General Reference #7 - Wood Reinforced Corrugated Crate Design Criteria

A typical triple-wall corrugated crate consists of a skid base, sides, ends, and a top. The construction of the triple-wall crate, number of vertical frame members and material selections are dependent on the size and gross weight of the completed package, and on any special handling requirements anticipated during distribution. Wood frame members are required along the edges of the corrugated sheets and at the corners of the crate to provide a solid surface for the crate fasteners.

Wood Reinforced Triple-wall Corrugated Crate Example



13.8 General Reference #8 – Fastening Methods

13.8.1 Nail/Screw Length Requirements

Nail/Screw Length Requirements Per Material Thickness

Thickness of Material Holding Head of Nail/Screw	Thickness of Material Holding Point of Nail/Screw (Actual Dimensions)				
(Actual Dims.)	19mm (3/4″)	38mm (1-1/2″)	63.5mm (2-1/2″)	89mm (3-1/2″)	140mm & Up (5-1/2″)
9.5mm & 13mm (3/8″ & 1/2″) Plywood	32mm (1-1/4″)	38mm (1-1/2″) 44.5mm (1-3/4″)			
19mm (3/4″)	38mm (1-1/2″	51mm (2″) 57mm (2-1/4″)	51mm (2″) 63.5 mm (2-1/2″)	51mm (2″) 63.5 mm (2-1/2″)	51mm (2″) 63.5 mm (2-1/2″)
38mm (1-1/2″)		76mm (3″) 82.5mm (3-1/4″)	76 mm (3″) 82.5 mm (3-1/4″)	76 mm (3″) 82.5 mm (3-1/4″)	76 mm (3″) 82.5 mm (3-1/4″)

13.8.2 Application of Nails and Screws - The method shall be as follows:

13.8.2.1 Primary access panels and final closure panels **must not use nails**. Nails are prohibited for use.

13.8.2.2 Screws may be used to attach primary access panels. Preferred styles of wood screws (in order) are Torx, Square (Robertson), or Philips #2.

13.8.2.3 Drive nails/screws through the thinner member into the thicker member whenever possible.

13.8.2.4 Drive nails/screws so that neither the head nor the point project above the surface of the wood.

13.8.2.5 Drive nails/screws not less than the thickness of the piece from the end nor one-half the thickness of the piece from the side edge of the piece, unless assembly requires closer end spacing.

13.8.2.6 Drive nails/screws in rows and staggered slightly within the row to prevent splitting. Nail/screw each member to each mating member with not less than two nails/screws unless specified otherwise.

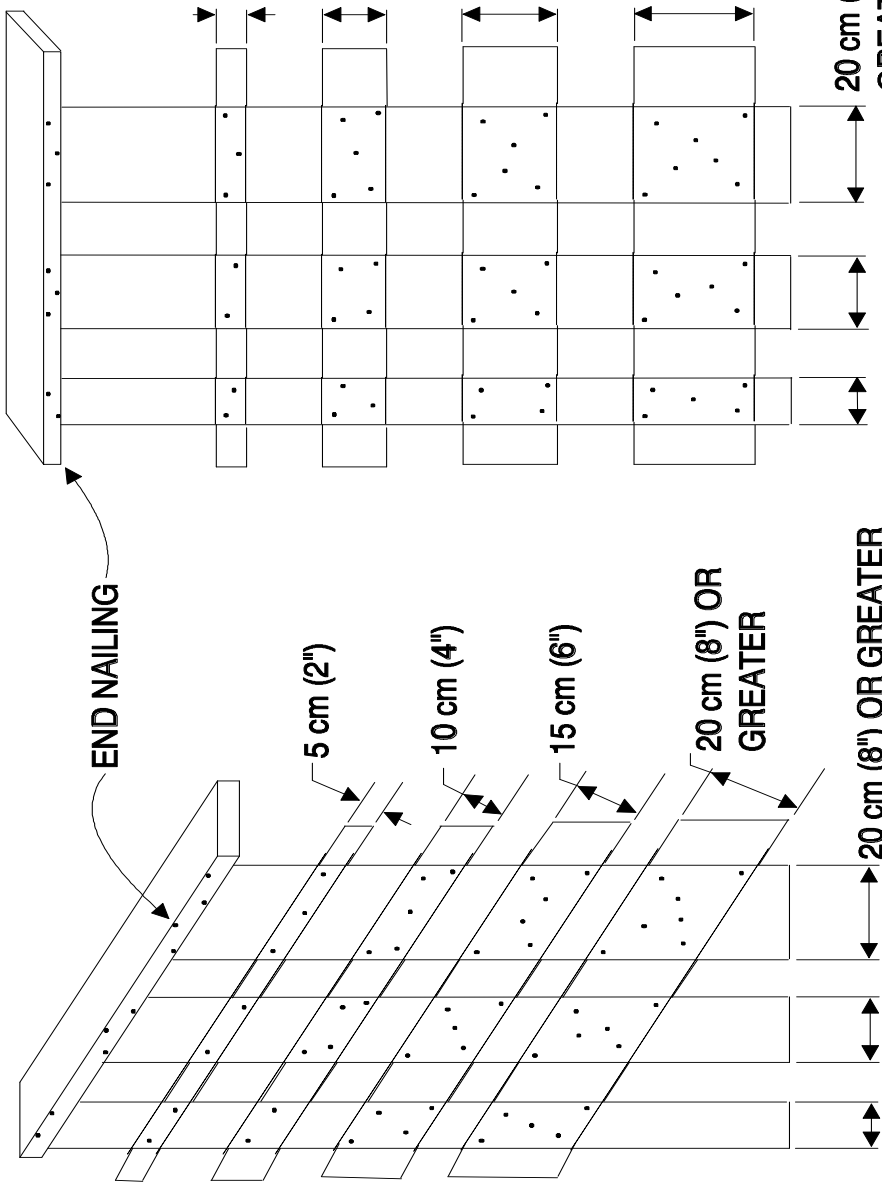
13.8.2.7 When attaching two members not having parallel grains use the fastening pattern and number of nails/screws shown in "Right Angle" and "Diagonal" examples below.

13.8.2.8 Typical fastening pattern to be used for various types of wood boxes is shown below.

13.8.3 Nail Type - Use "ring shank" nails for maximum holding strength.

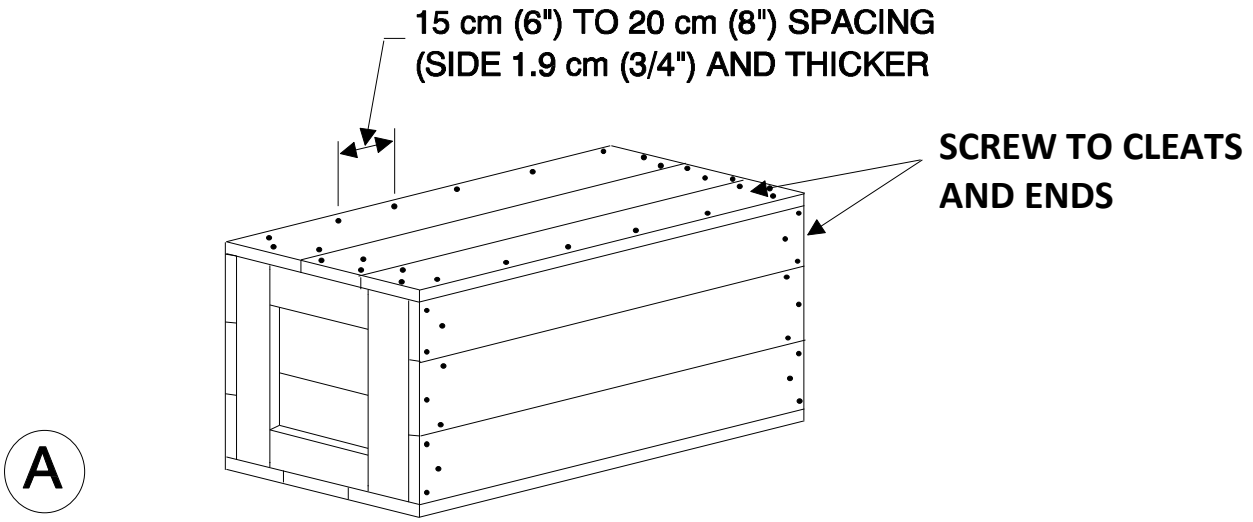
Nailing Patterns for General Crate Construction with Screws for Primary Access Panels

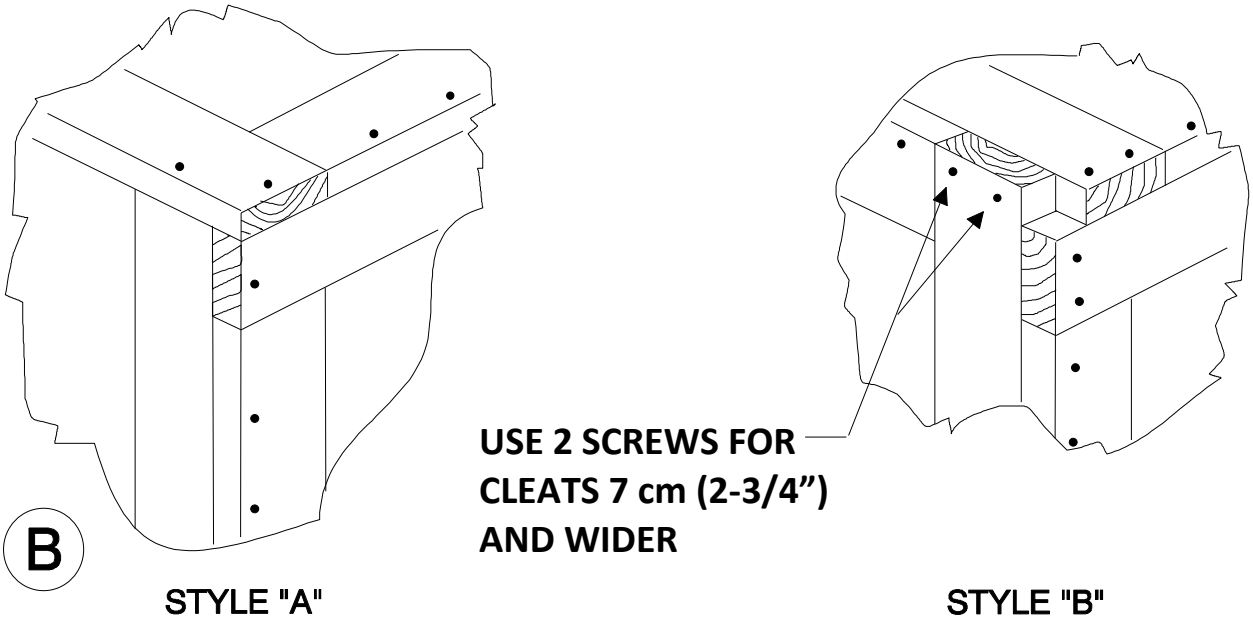
NOTE: NAILS DRIVEN WITHIN 10 cm (4") OF EACH OTHER SHALL NOT BE IN THE SAME LINE OF GRAIN ON EITHER OF THE MEMBERS BEING NAILED.



Typical Wood Box Fastening Patterns with Nails and Screws

For "A", Nailed Wood Boxes and "B", Cleated Panel Boxes
All primary access panels must be secured with screws.





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13.9 General Reference #9 - Guide for Minimum Packaging Protection for Steel Sheeting, Beams, and Similar Metal Materials for Air Shipment

This section provides guidance for packaging loose steel sheets, beams, studs, and other similar materials, to meet minimum airline safety requirements. The main concerns of the airlines are that the bundles allow access for easy handling, there are no exposed metal corners to damage the aircraft during loading and unloading, and that all materials are adequately secured so that no bundle or individual piece can shift during flight. The minimum requirements vary by airline, but the following are typical:

- Materials must be secured to a wood base or wood runners that allow mechanical handing access. See Figures "A" & "B".
- Bundles must not have any exposed metal corners. The wood base must extend out beyond all corners of the metal materials or wood blocking must be added around the metal corners. See Figures "A" - "D".
- All pieces must be adequately secured on all sides and ends. See Figures "A" - "D".
- Bundles of long pieces with small cross sections (i.e., beams, studs, pipes, etc.) must have wood blocking covering the ends to prevent any pieces from sliding out. See Figure "D".
- Bundles containing pieces of different size must have blocking around the smaller pieces to prevent any shifting. See Figures "C" & "D".
- Bundles must not exceed 2268 kg (5000 lbs.) gross weight.

Figure "A" - Steel Bundle on Wood Base

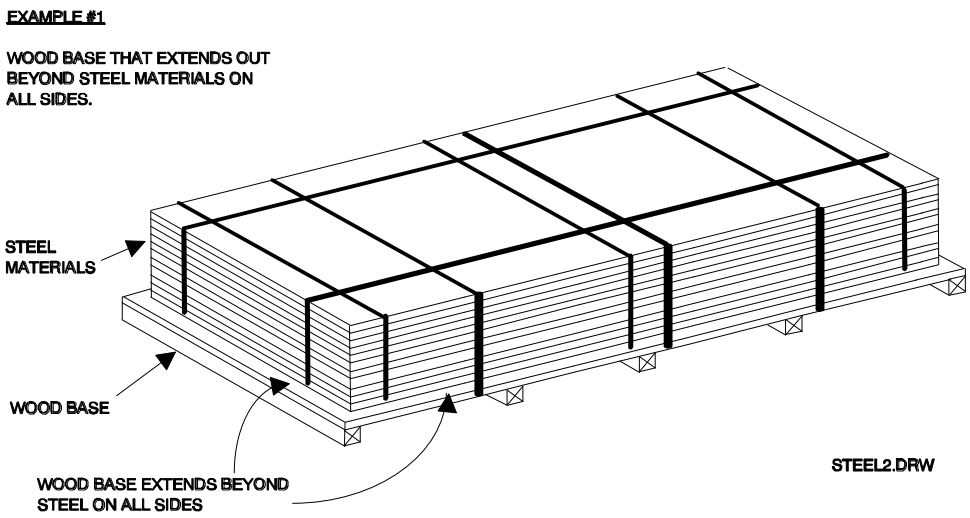

Figure "B" - Steel Bundle on Wood Runners with Wood End Caps

EXAMPLE #2

WOOD END CAPS THAT COVER ALL STEEL CORNERS AND EXTEND OUT BEYOND STEEL MATERIALS ON ALL SIDES.

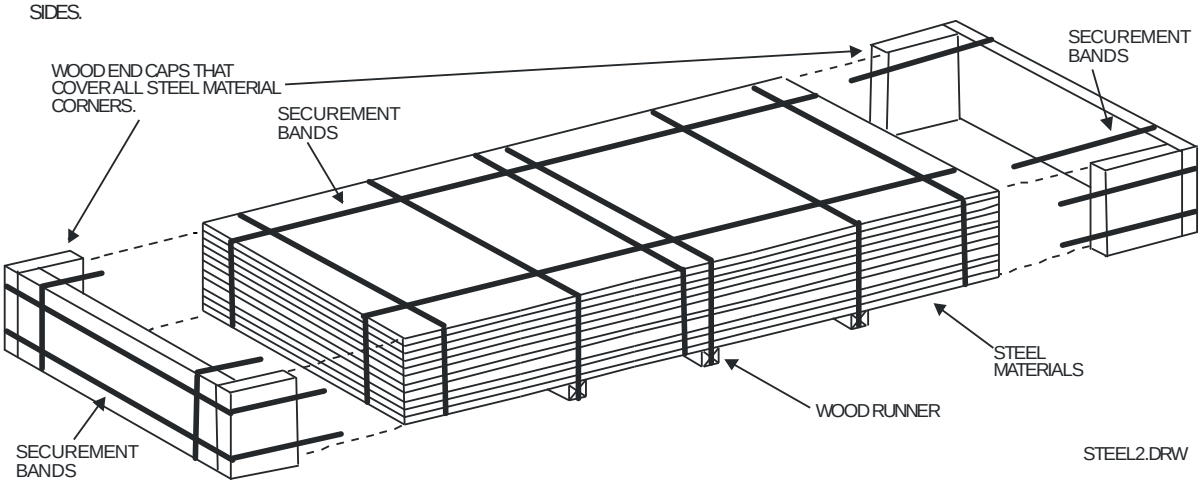

Figure "C" - Steel Bundle with Multiple Length Pieces

EXAMPLE #3

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WOOD MEMBERS USED TO BLOCK ENDS OF MATERIALS NOT UNIFORM IN SIZE.

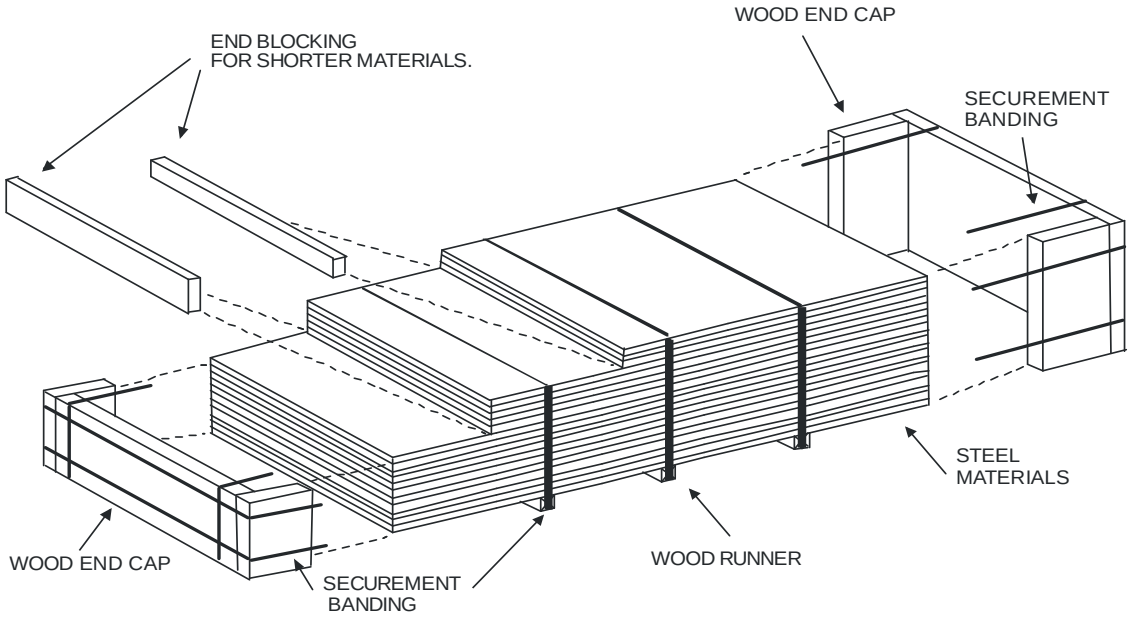
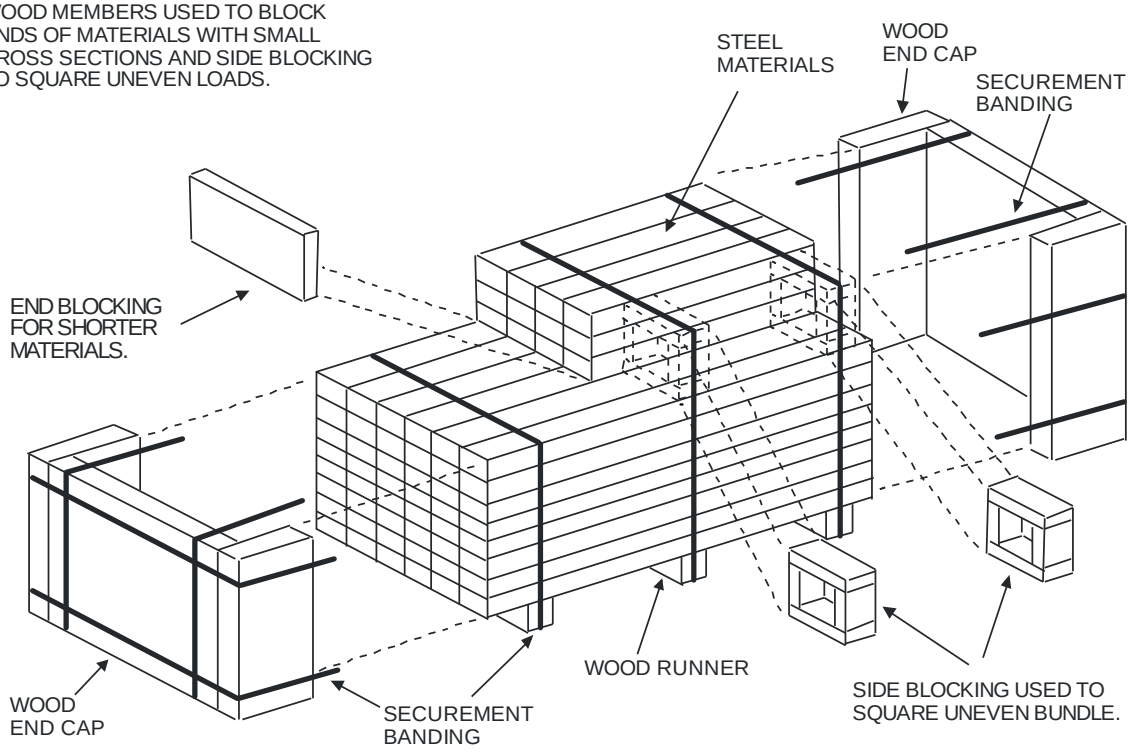


Figure "D" - Metal Bundle With Small Cross Sections and Uneven Lengths & Widths

EXAMPLE # 4

WOOD MEMBERS USED TO BLOCK ENDS OF MATERIALS WITH SMALL CROSS SECTIONS AND SIDE BLOCKING TO SQUARE UNEVEN LOADS.

STEEL3.DRW



13.10 General Reference #10 - Packaging for Six Sigma

13.10.1 Packaging CTQs (Critical To Quality)

13.10.1.1 Product Protection

- Match protection to mode of transport and destination
- Shock & vibration
- Surface protection
- Moisture protection
- Crush protection
- ESD protection
- Corrosion protection
- General Cleanliness
- Temperature Sensitivity

13.10.1.2 Material Handling

- Fork access, 2-way vs. 4-way
- Pallet truck access
- Global equipment compatibility

13.10.1.3 Product Identification

- Clear identification during distribution
- Clear identification for Customs clearance
- Clear identification at customer site and installation

13.10.1.4 Size & Weight

- Efficient transport and distribution
- Efficient delivery
- Efficient weight to volume ratio

13.10.1.5 Efficient Pack & Unpack

- Minimize cycle time
- Minimize number of people required
- Minimize tools required & use only standard tools

13.10.1.6 Reusability

- Reusable vs. disposable
- Cost effective return & reuse process required for reusables
- Secure crates with screws and other easy open fasteners instead of nails

13.10.1.7 Lean

- Efficient presentation for manufacturing use
- Efficient delivery and install at customer site

13.10.1.8 Stability

- Minimize height of product center of gravity
- Design base footprint & fork access points to match center of gravity

13.10.1.9 Validation Testing

- Global shipping validation testing
- Trial shipments

13.10.1.10 Packaging Materials

- Use standard materials
- Use material suppliers available near packing location
- Use materials already in use at packing location

13.10.1.11 Safety/EHS

- Ergonomic packing and unpacking
- No pinch points
- No sharp edges
- Comply with manual handling weight limits

13.10.1.12 Regulatory Compliance

- Comply with all shipper and receiver local and national regulations
- Comply with all hazardous material transportation regulations
- Comply with special wood import regulations (China, Brazil, United States, Canada, etc.)

13.10.1.13 Environmental Considerations

- No loose fill cushioning/dunnage materials
- Avoid use of EPS (styrene) foam materials
- Comply with receiver material disposal requirements

13.10.1.14 Documentation

- Package design
- Material specifications
- Package assembly

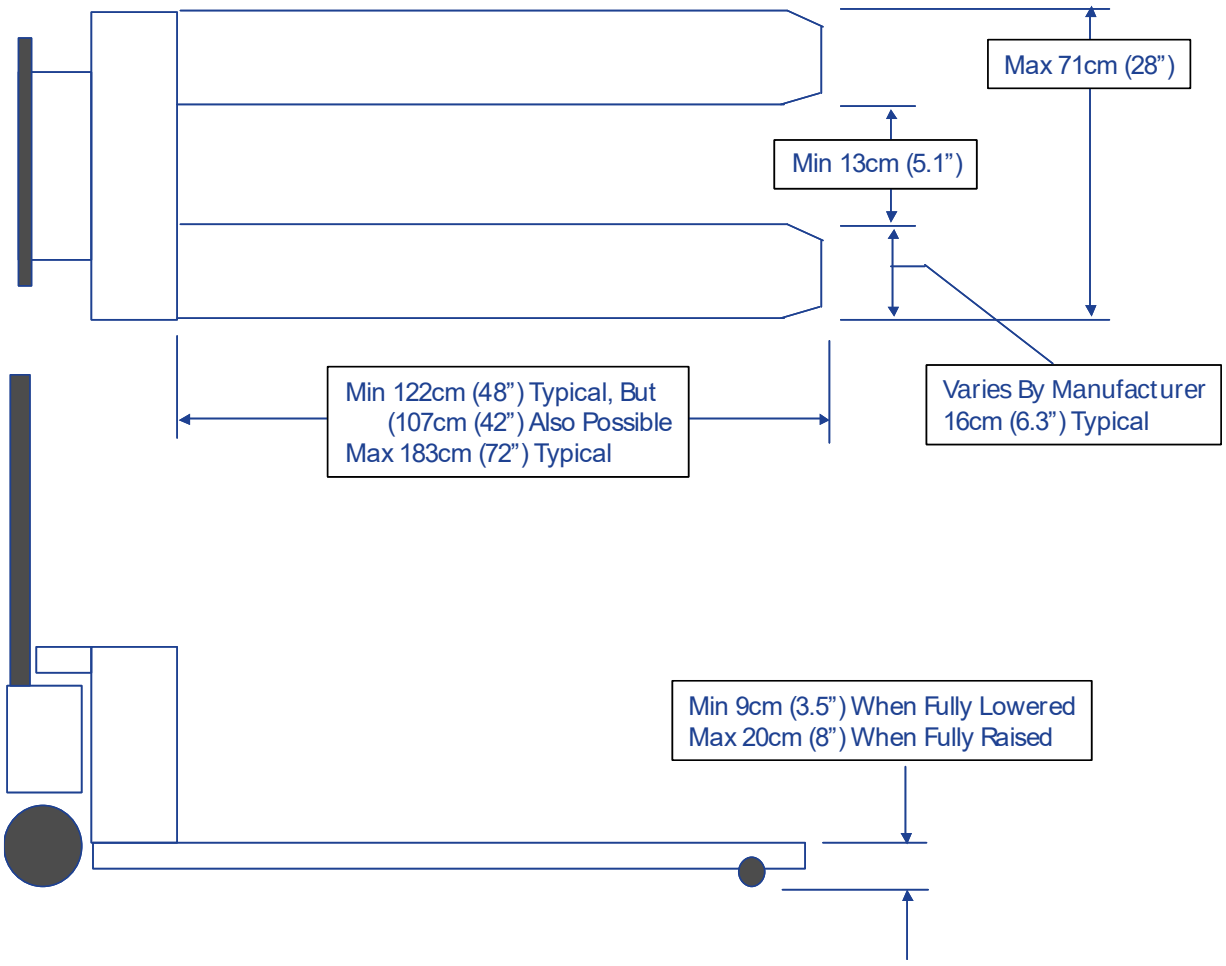
13.10.1.15 Cost

- Total cost analysis (Product/Packaging/Distribution)

13.11 General Reference #11 - Typical Pallet Truck Specifications

Other dimensions are possible, but these represent global standards from the major pallet truck manufacturers.

Typical Pallet Truck Specifications



13.12 General Reference #12 – Protection Level Selection Matrix

13.12.1 Matrix - See Sections 11.12.2 & 11.12.3 For Level Code & Region Definitions

		RECEIVER - (SHIP TO LOCATION) MINIMUM PACKAGE PROTECTION LEVEL																					
SHIPPER - (SHIP FROM LOCATION)	**MODE**	USA MAINLAND	USA ALASKA	USA HAWAII	CANADA	MEXICO	LATIN AMERICA	COLUMBIA	DOMINICAN REPUBLIC	WESTERN EUROPE **	EASTERN EUROPE **	SCANDANAVIA **	AFRICA	ISRAEL	MIDDLE EAST **	INDIA	INDONEASIA **	HONG KONG	CHINA	KOREA	JAPAN	AUSTRALIA	NEW ZEALAND
USA	Truck (LTL - Non Air Ride)	DT2	DT2		IT2	IT2																	
	Truck (TL - Air Ride)	DT1	DT1		IT1	IT1																	
	Truck (TL - Non Air Ride)	DT1	DT1		IT1	IT1																	
	Truck (Van - Air Ride)	DT1	DT1		IT1	IT1																	
	Air	DA2	DA2	DA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean		IO2	IO2			IO2	IO2	IO2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2	1O2
Mexico	Truck (LTL - Non Air Ride)	IT2	IT2		IT2	DT2																	
	Truck (TL - Air Ride)	IT1	IT1		IT1	DT1																	
	Truck (TL - Non Air Ride)	IT1	IT1		IT1	DT1																	
	Truck (Van - Air Ride)	IT1	IT1		IT1	DT1																	
	Air	IA2	IA2	IA2	IA2	DA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean		IO2	IO2			IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2
Japan	Truck (LTL - Non Air Ride)																				DT2		
	Truck (TL - Air Ride)																				DT1		
	Truck (TL - Non Air Ride)																				DT1		
	Truck (Van - Air Ride)																				DT1		
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA3	DA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2
India	Truck (LTL - Non Air Ride)									IT3	IT3			IT3	IT3	DT3	IT3	IT3	IT3	IT3			
	Truck (TL - Air Ride)									IT1	IT1			IT1	IT1	DT1	IT1	IT1	IT1	IT1			
	Truck (TL - Non Air Ride)									IT1	IT1			IT1	IT1	DT1	IT1	IT1	IT1	IT1			
	Truck (Van - Air Ride)									IT1	IT1			IT1	IT1	DT1	IT1	IT1	IT1	IT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	DA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2		IO2	IO2			IO2	IO2	IO2
China	Truck (LTL - Non Air Ride)									IT3	IT3			IT3	IT3	IT3	IT3	IT3	DT3	IT3			
	Truck (TL - Air Ride)									IT1	IT1			IT1	IT1	IT1	IT1	IT1	DT1	IT1			
	Truck (TL - Non Air Ride)									IT1	IT			IT1	IT1	IT1	IT1	IT1	DT1	IT1			
	Truck (Van - Air Ride)									IT1	IT1			IT1	IT1	IT1	IT1	IT1	DT1	IT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	DA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2		IO2				IO2	IO2	IO2

Continued on next page…

Korea	Truck (LTL - Non Air Ride)										IT3					IT3	IT3	IT3	IT3	DT3			
	Truck (TL - Air Ride)										IT1					IT1	IT1	IT1	IT1	DT1			
	Truck (TL - Non Air Ride)										IT1					IT1	IT1	IT1	IT1	DT1			
	Truck (Van - Air Ride)										IT1					IT1	IT1	IT1	IT1	DT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	DA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2				IO2				IO2	IO2	IO2
W. Europe	Truck (LTL - Non Air Ride)									DT2	IT3	IT2		IT2	IT3	IT3			IT3				
	Truck (TL - Air Ride)									DT1	IT1	IT1		IT1	IT1	IT1			IT1				
	Truck (TL - Non Air Ride)									DT1	IT1	IT1		IT1	IT1	IT1			IT1				
	Truck (Van - Air Ride)									DT1	IT1	IT1		IT1	IT1	IT1			IT1				
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	DA2	IA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2			IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2
E. Europe	Truck (LTL - Non Air Ride)									IT3	DT3	IT3		IT3	IT3	IT3	IT3	IT3	IT3	IT3			
	Truck (TL - Air Ride)									IT1	DT1	IT1		IT1	IT1	IT1	IT1	IT1	IT1	IT1			
	Truck (TL - Non Air Ride)									IT1	DT1	IT1		IT1	IT1	IT1	IT1	IT1	IT1	IT1			
	Truck (Van - Air Ride)									IT1	DT1	IT1		IT1	IT1	IT1	IT1	IT1	IT1	IT1			
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	DA3	IA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2			IO2	IO2	IO2	IO2		IO2	IO2			IO2	IO2	IO2
Scandanavia	Truck (LTL - Non Air Ride)									IT2	IT3	DT2		IT2	IT3	IT3			IT3				
	Truck (TL - Air Ride)									IT1	IT1	DT1		IT1	IT1	IT1			IT1				
	Truck (TL - Non Air Ride)									IT1	IT1	DT1		IT1	IT1	IT1			IT1				
	Truck (Van - Air Ride)									IT1	IT1	DT1		IT1	IT1	IT1			IT1				
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	DA2	IA2	IA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2
Israel	Truck (LTL - Non Air Ride)									IT2	IT3	IT2		DT2	IT3	IT3			IT3				
	Truck (TL - Air Ride)									IT1	IT1	IT1		DT1	IT1	IT1			IT1				
	Truck (TL - Non Air Ride)									IT1	IT1	IT1		DT1	IT1	IT1			IT1				
	Truck (Van - Air Ride)									IT1	IT1	IT1		DT1	IT1	IT1			IT1				
	Air	IA2	IA2	IA2	IA2	IA2	IA2	IA3	IA3	IA2	IA3	IA2	IA2	DA2	IA3	IA3	IA3	IA3	IA3	IA2	IA2	IA2	IA2
	Ocean	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2	IO2				IO2	IO2			IO2	IO2	IO2

13.12.2 Packaging Matrix Protection Level Definitions

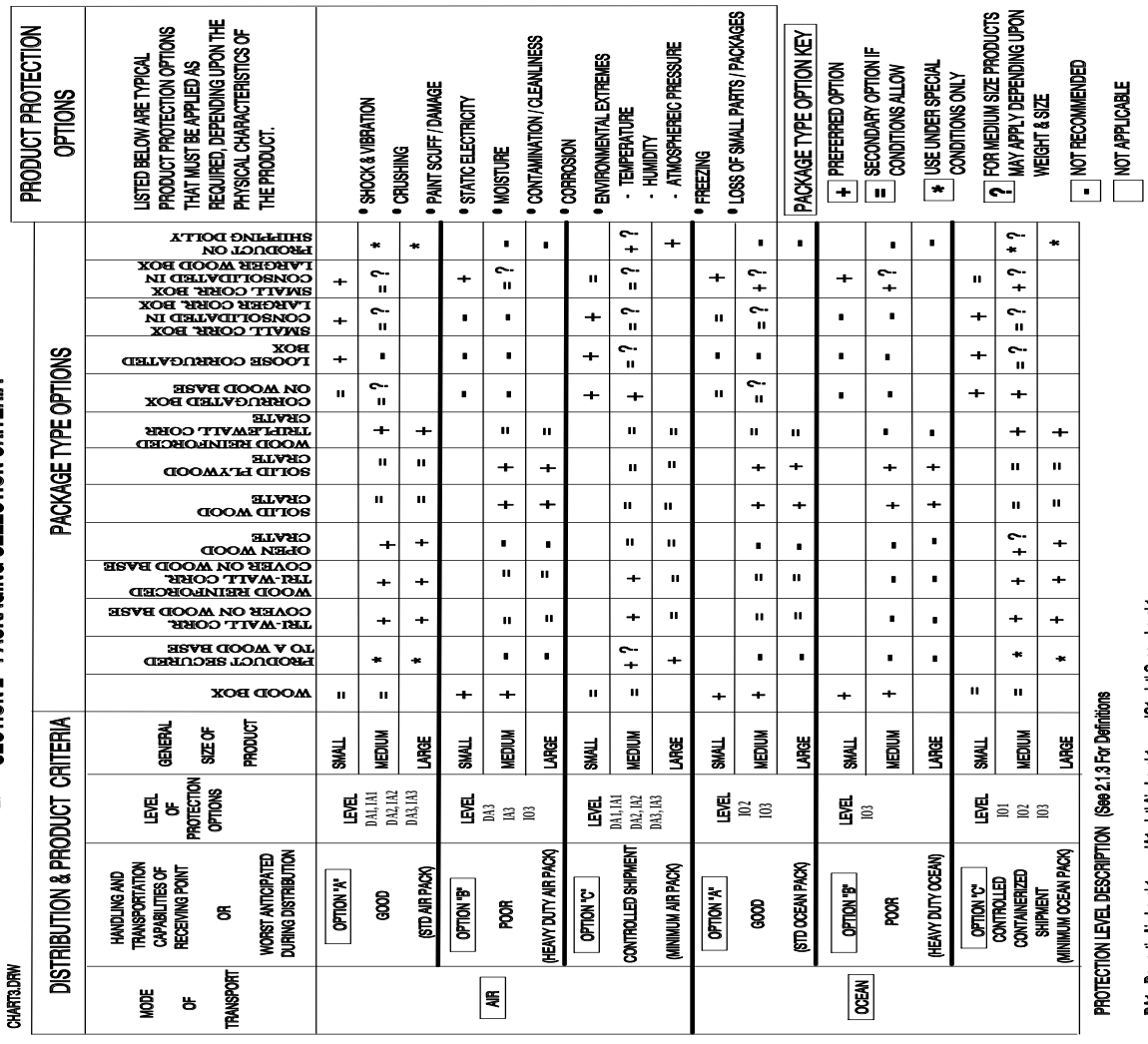
Package Protection Level	Description	Type Of Shipment	Package Description (Minimum Required)	Minimum Barrier Around Product	Minimum Desiccant	Typical Protection Period
DOMESTIC						
DA1	Light Duty Air Pack	Controlled shipment, or small parcels with good handling at shipping and receiving end.	Corrugated box	Dust/moisture cover	None	2 weeks
DA2	Standard Air Pack	Std air shipment	Open wood crate, corrugated box with adequate cushioning and stacking strength.	Dust/moisture cover	None	2 weeks
DA3	Heavy Duty Air Pack	Rough handling, Outdoor storage, Wet environment.	Solid wood or plywood crate.	Vapor barrier, 0.15mm (.006 inch) PE	Supplier Spec	3 months
DT1	Light Duty Truck Pack	Van & some TL	Light corrugated boxes, unpackaged items on dollies, items on wheels wrapped for scuff protection, items in open or closed reusable packages.	Dust/moisture cover	None	2 weeks
DT2	Standard Truck Pack	LTL & some TL	Open wood crate, corrugated box with adequate cushioning and stacking strength.	Dust/moisture cover	None	2 weeks
DT3	Heavy Duty Truck Pack	LTL w/rough handling	Solid wood or plywood crate.	Dust/moisture cover	None	2 weeks
DR1	Reusable Pack	Milkrun, Controlled shipment, Supplier delivery	Light corrugated boxes, unpackaged items on dollies, items on wheels wrapped for scuff protection, items in open or closed reusable packages.	Dust/moisture cover	None	2 weeks
INTERNATIONAL						
IA1	Light Duty Air Pack	Controlled shipment, or small parcels with good handling at shipping and receiving end.	Corrugated box	Dust/moisture cover	None	2 weeks
IA2	Standard Air Pack	Std air shipment	Open wood crate or triplewall corrugated crate/box	Dust/moisture cover	None	2 weeks
IA3	Heavy Duty Air Pack	Rough handling, Outdoor storage, Wet environment.	Solid wood or plywood crate	Vapor barrier, 0.15mm (.006 inch) PE	Supplier Spec	3 months
IO1	Light Duty Ocean Pack	Controlled ocean shipment, with good handling at shipping and receiving end.	Light corrugated boxes, unpackaged item on dolly or wood base., items on wheels secured to prevent rolling.	Vapor barrier, 0.15mm (.006 inch) PE	Supplier Spec for each package or for entire container	3 months
IO2	Standard Ocean Pack	Typical ocean shipment, air shipment with rough handling or storage	Solid wood or plywood crate	Vapor barrier, 0.15mm (.006 inch) PE	Supplier Spec for each package or for entire container	3 months
IO3	Heavy Duty Ocean Pack	Rough handling, Outdoor or long term storage	Solid wood or plywood crate	Heat sealed foil liner	Supplier Spec for each package or for entire container	12 months
IT1	Light Duty Truck Pack	Van & Some TL	Light corrugated boxes, unpackaged items on dollies, items on wheels wrapped for scuff protection, items in open or closed reusable packages.	Dust/moisture cover	None	2 weeks
IT2	Standard Truck Pack	LTL & Some TL	Open wood crate, corrugated box with adequate cushioning and stacking strength.	Dust/moisture cover	None	2 weeks
IT3	Heavy Duty Truck Pack	LTL w/rough handling	Solid wood or plywood crate	Vapor barrier, 0.15mm (.006 inch) PE	Supplier Spec	3 months
IR1	Reusable Pack	Milkrun, Controlled shipment, Supplier delivery	Light corrugated boxes, unpackaged items on dollies, items on wheels wrapped for scuff protection, items in open or closed reusable packages.	Dust/moisture cover	None	2 weeks

13.12.3 Packaging Matrix Region Definitions

WESTERN EUROPE	EASTERN EUROPE	SCANDINAVIA	MIDDLE EAST	INDONESIA
France	Slovakia	Norway	Syria	New Guinea
Spain	Croatia	Sweden	Saudi Arabia	Borneo
Portugal	Hungary	Finland	Yemen	Sumatra
UK	Czech Republic	Denmark	Oman	Malaysia
Germany	Poland	Iceland	Iraq	Burma
Switzerland	Lithuania	Greenland	Iran	Thailand
Belgium	Latvia		Egypt	Cambodia
Netherlands	Estonia		Afghanistan	Vietnam
Italy	Russia (CIS)		Pakistan	Laos
Austria	Ukraine		Lebanon	Philippines
	Kazakhstan		Kuwait	
	Turkey			
	Romania			
	Bulgaria			

2. SECTION 2 - PACKAGING SELECTION CRITERIA

CHART3.DRW



Appendix A List of Symbols, Abbreviations, Definitions, Acronyms

This listing is meant to aid the reader in the understanding of this document. This will include some industry standard terminology and may not include all definitions of content listed within this document.

Active Label
A label that undergoes a physical change indicating that a specific action has taken place. (i.e., Shockwatch & Tiltwatch Labels, Humidity Indicators, Etc.)

Controlled Ocean Container Shipment
A shipment where the ocean container is loaded in a controlled environment, either by the shipper or their agent, and is not broken until it arrives at the final destination, where it is unloaded in a controlled environment by the receiving pole or their agent.

Finished Good Product
Product that can be used on a manufacturing production line, but is more typically shipped direct or reshipped, without any repackaging, to customers as a complete system or component of a system.

Goods Receiving Point
The country of destination and all phases included in the distribution routing are expected to have good, safe handling and transportation systems to move the product from the point of entry to the final customer site.

Individual Pack
Products packaged with a quantity of one item (part number) in one package.

Individual Package
A product that is packaged and labeled in the final packaging configuration which will allow it to be shipped directly to the final customer with no repackaging. The package is labeled correctly with all required documentation on the outside of the package, to prevent the need to open the package when received by a Wabtec distribution facility.

Individual Pack, Single Trip Containers
Products packaged with a quantity of one item (part number) in one package. The package is not designed for reuse.

Individual Pack, Double Trip Containers
Products packaged with a quantity of one item (part number) in one package. The package must be designed to protect the product for the initial shipment to the end user, and also, the return shipment of the same or a similar product to the supplier.

Large Product
Products weighing greater than 1000 kg (2200 lbs.) that typically require special packing and handling considerations.

Medium Product

Products weighing greater than 32 kg (70 lbs.), but less than or equal to 1000 kg (2200 lbs.), that usually require mechanical handling. These products usually ship in a crate or large box with wood runners and must provide access for fork trucks, hand trucks, or other handling equipment.

Milk Run
A closed loop trucking process that moves Wabtec products and components between Suppliers and Wabtec Manufacturing facilities, and Distribution Centers.

Minimum Pack
When a product ships with very little protective packaging. The package usually consists of a light wrapping of plastic film, cushioned paper, bubble wrap, or other similar material, with some means of handling provided. The product can have built-in wheels, built-in fork openings, be attached to a shipping dolly, or be secured to a wood base.

Multi-Pack
Products packaged with more than one item (all the same part number) in one package.

Multi-Pack, Single Trip Containers
Products packaged with more than one item (all the same part number) in one package. The package is not designed for reuse.

Packaging
All products made of any materials of any nature to be used for the containment, protection, handling, delivery, and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. Non-returnable items used for the same purpose shall also be considered to constitute packaging. Packaging consists only of:
(a**) sales packaging or primary packaging**, i.e., packaging conceived so as to constitute a sales unit to the final user or consumer at the point of purchase;
(b) **grouped packaging or secondary packaging**, i.e., packaging conceived so as to constitute at the point of purchase a grouping of a certain number of sales units, whether the latter is sold as such to the final user or consumer or whether it serves only as a means to replenish the shelves at the point of sale; it can be removed from the product without affecting its characteristics;
(c) **transport packaging or tertiary packaging**, i.e., packaging conceived to facilitate handling and transport of a number of sales units or grouped packaging in order to prevent physical handling and transport damage. Transport packaging does not include road, rail, ship, and air containers, etc.

Passive Label
A label that provides written information only. (i.e., "Fragile", "Handle With Care", "This End Up", Etc.)

Poor Receiving Point
The country of destination, or any phase included in the distribution routing, is known, or is expected to have a rough, unsafe handling and/or transportation system to move the product from the point of entry to the final customer site, requiring extra protection from the product's packaging.

Primary Access Panel
The primary panel of a package to be opened for access and removal of internal goods. Packages may have multiple primary access panels.

Processed / Manufactured Wood
Wood based material constructed using glue, heat, and pressure, or any combination thereof. Plywood, OSB, LVL, LSL, PSL and fiberboard are examples of processed wood.

Production Product
Product being shipped to a Wabtec manufacturing facility, specifically for use on a manufacturing line. Not intended for reshipment to a Wabtec customer.

Service Part
Product shipped to customers for repair or replacement of existing systems.

"Repairable" or "Exchange Part"
A part that is repaired by a Wabtec repair source, or a repair supplier, for placement into the parts network. The part is repaired on a return and exchange program; a rebuilt part is sent to a Field Engineer, and the defective part (RG) is returned for credit, to be rebuilt.

Reusable/Returnable Containers
Containers specifically designed to be returned to the supplier for reuse. Applies to containers designed for both single and multiple items.

"RG" (Returned Good)
A defective Service Part returned from the field.

Small Products
Products weighing 32 kg (70 lbs.) or less that can usually be packed and handled manually by one person. A means for mechanical handling may be provided for convenience but is not required. Usually shipped in wood or corrugated boxes and often consolidated with other small packages in a larger wood or corrugated box for shipment. Often shipped using overnight carriers where rough handling conditions can be expected.

Solid Wood, Raw Wood & Non-Manufactured Wood
Wood that has not been processed or changed from its natural state. Lumber and boards are an example of solid wood and can be either softwood or hardwood species. (Note: In this document, Solid Wood and Non-Manufactured Wood are used interchangeably.)

Specialty Packaging
Packaging designed & engineered for a specific part. These requirements will be defined on the part drawing or purchase specification & take precedence over the general requirements of this guideline.

Transport Packaging

Packaging conceived to facilitate handling and transport of a number of sales units or grouped packaging in order to prevent physical handling and transport damage. Transport packaging does not include road, rail, ship, or air containers.

Unit Load

Final packaging solution combining multiple items or a single item into a shippable unit. Typically handled by non-manual means (fork-truck, pallet jack, overhead crane).

Appendix B Example/Reference Documents

Documents listed in this section are not intended to be included in their entirety. In most cases, only the sections that are referenced in the body of the document are considered relevant. However, there are instances where the document or a link is listed and must be read in full for a complete understanding of requirements.

Industry Standards and Documents

Reference	Description
ISO 780	Packaging – Pictorial marking for handling of goods
ISO 1043	Plastics – Symbols and Abbreviated Terms
ISO 11469	Plastics – Generic Identification and Marking of Plastics Products

Other Wabtec Standards and Documents

Reference	Description
84A225720	Wooden Packaging Requirements
7.5.5 QSR	Material Handling, Packaging, and Storage