

# **PACKAGING / SHIPPING PREPARATION AND STORAGE PROCEDURES**

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## **1) INTRODUCTION AND SAFETY**

### **a) GENERAL**

- i) The first section of this document describes safety considerations with regard to the handling and storage of Carbis equipment.
- ii) The second section of this document describes the basic packaging procedures employed by Carbis in preparing equipment and components for shipment to the customer site.
- iii) The third section of this document describes the procedures and standards necessary for customer on-site off-loading, handling, and storage of Carbis equipment.
- iv) It is the owner's responsibility to inspect the shipment for completeness by comparing the shipment with the parts identified in the Parts Lists, including the items identified in the Hardware and Power System Component Lists.
  - (1) Check for any shipping damages or missing components, and report the same to Carbis.
  - (2) Check for loose bolts. All fastening hardware that has been factory installed has been done so to remain tight. If any fastening hardware has been loosened, it must be tightened before using the product.
- v) Appropriate Personnel Protective Equipment (PPE), such as gloves, safety glasses, safety shoes, etc., should be worn at all times during handling and storage of Carbis equipment.

### **b) OSHA STORAGE REGULATIONS 1910.176**

- i) The following OSHA safety regulations regarding storage of materials are quoted from 1910.176:
  - (1) 1910.176(b): Secure storage: "Storage of materials shall not create a hazard. Bags, bundles, etc. stored in tiers shall be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse."
  - (2) 1910.176(c): Housekeeping: "Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage. Vegetation control will be exercised when necessary."

### **c) OSHA STORAGE GUIDELINES**

- i) The pertinent sections of the safety guidelines offered below for reference are taken from the U.S. Department of Labor OSHA Office of Training and Education, May 1996, Construction Safety and Health Outreach Program, MOVING, HANDLING, AND STORING MATERIALS.
  - (1) When manually moving materials, employees should seek help when a load is so bulky it cannot be properly grasped or lifted, when they cannot see around or over it, or when a load cannot be safely handled.

- (2) When an employee is placing blocks under raised loads, the employee should ensure that the load is not released until his or her hands are clearly removed from the load. Blocking materials and timbers should be large and strong enough to safely support the load. Materials with evidence of cracks, rounded corners, splintered pieces, or dry rot should not be used for blocking.
- (3) Workers should use appropriate protective equipment. For loads with sharp or rough edges, wear gloves or other hand and forearm protection. To avoid injuries to the hands and eyes, use gloves and eye protection. When the loads are heavy or bulky, the mover should also wear steel-toed safety shoes or boots to prevent foot injuries if the worker slips or accidentally drops a load.
- (4) When mechanically moving materials, avoid overloading the equipment by letting the weight, size, and shape of the material being moved dictate the type of equipment used for transporting it. All materials handling equipment has rated capacities that determine the maximum weight the equipment can safely handle and the conditions under which it can handle those weights. The equipment-rated capacities must be displayed on each piece of equipment and must not be exceeded except for load testing. When picking up items with a powered industrial truck, the load must be centered on the forks and as close to the mast as possible to minimize the potential for the truck tipping or the load falling. A lift truck must never be overloaded because it would be hard to control and could easily tip over. Extra weight must not be placed on the rear of a counterbalanced forklift to offset an overload. The load must be at the lowest position for traveling, and the truck manufacturer's operational requirements must be followed. All stacked loads must be correctly piled and cross-tiered, where possible. Precautions also should be taken when stacking and storing material.
- (5) Stored materials must not create a hazard. Storage areas must be kept free from accumulated materials that may cause tripping, fires, or explosions, or that may contribute to the harboring of rats and other pests. When stacking and piling materials, it is important to be aware of such factors as the materials' height and weight, how accessible the stored materials are to the user, and the condition of the containers where the materials are being stored.
- (6) All bound material should be stacked, placed on racks, blocked, interlocked, or otherwise secured to prevent it from sliding, falling, or collapsing.
- (7) When stacking materials, height limitations should be observed.
- (8) Bags and bundles must be stacked in interlocking rows to remain secure. Boxed materials must be banded or held in place using cross-ties or shrink plastic fiber.
- (9) Drums, barrels, and kegs must be symmetrically stacked. If stored on their sides, the bottom tiers must be blocked to keep them from rolling. When stacked on end, put planks, sheets of plywood dunnage, or pallets between each tier to make a firm, flat, stacking surface. When stacking materials two or more tiers high, the bottom tier must be chocked on each side to prevent shifting in either direction.
- (10) When stacking, consider the need for availability of the material. Material that cannot be stacked due to size, shape, or fragility can be safely stored on shelves or in bins. Structural steel, bar stock, poles, and other cylindrical materials, unless in racks, must be stacked and blocked to prevent spreading or tilting. Pipes and bars should not be stored in racks that face main aisles; this could create a hazard to passers-by when supplies are being removed.

## **2) PACKAGING AND SHIPPING PREPARATION**

### **a) GENERAL**

- i) This section describes various standard methods that Carbis uses in packaging equipment and components in preparation for shipment to customer sites.
- ii) There are several factors that determine how certain components are prepared for shipment, such as customer-specific requirements, carrier requirements/limitations, component size/configuration, etc. All special requirements will be addressed by Carbis on an as-needed basis. Where customer-specific requirements supersede Carbis standards, additional costs may be incurred for specialized packaging/shipping requirements.

### **b) LOOSE EQUIPMENT**

- i) Most fabricated equipment and components whose functions are structural in nature, such as platforms, pedestals, columns, stair units, structural members, fixed ladders, gangways, monolithic safety cages, cage end frames, carriages, and inboard/outboard handrails will ship loose without any special packaging.
- ii) Loose handrails of like configuration are generally banded together for shipment.
- iii) Some equipment may include assembled/attached drive units such as large anti-friction roller bearings, hand winches, power system components, assembled drive rods with bearings and sprockets, etc.
- iv) Where necessary, equipment may ship strapped on dunnage.

### **c) CRATED ITEMS**

- i) The crating of equipment and components for shipment will primarily be determined by customer requirements, carrier requirements, equipment requirements such as size or configuration, or as otherwise determined at the discretion of Carbis expertise.
- ii) Typically, equipment will be crated for shipment by air and/or container, such as for international shipments.
- iii) Where determined by size or configuration, loading arms are subject to being banded to pallets.

- iv) The following power system components are typically wrapped with clear plastic and crated:
  - (1) Hydraulic power units
  - (2) Pneumatic control valve assemblies
  - (3) Electrical control panels/enclosures
  - (4) Electrical drive units (gear motors, winches, linear actuators, etc.)
  - (5) Hydraulic/pneumatic actuators (cylinders, motors, etc.)

**d) CONTAINERS**

- i) Fastening components such as nuts and bolts are shipped in quart, gallon, and five-gallon metal or plastic buckets.
- ii) Miscellaneous loose power system fittings, hoses, valves, regulators, pendants, switches, remote-mounted lights, etc. that are not otherwise pre-assembled (see **b**) iii) above) are shipped in sealed containers, and crated where necessary.
- iii) Miscellaneous loose drive system components such as bearings, sprockets, couplers, chain and chain components, wire rope and wire rope components, etc. that are not otherwise pre-assembled (see **b**) iii) above) are shipped in sealed containers, and crated where necessary.

**e) PROCESS ASSEMBLIES**

- i) Preparation of Loading Arms, Loading Racks, and Skid Systems for shipment are as follows:
  - (1) All painted surfaces are bubble-wrapped.
  - (2) All small, loose components are shipped in sealed containers.
  - (3) Open ends of pipe and fittings are covered by plastic flange covers, caps, or plugs as dictated by the pipe end configuration.

**f) MISCELLANEOUS**


- i) All equipment prepared for domestic shipment only is subject to being tarped for delivery as dictated by customer requirements.
- ii) A non-hardening heavy film corrosion inhibitor is applied to all bearings, load rollers, and pre-assembled drive components.
- iii) Where required, Carbis Engineering will electronically submit MSDS sheets to customers.
- iv) Each shipment includes one Bill of Lading that lists all assemblies and identifies how they are packaged for shipment.

**g) SPARE PARTS**

- i) In general, spare parts of any nature will ship packaged in the same manner as the original part in the initial shipment.
- ii) For any part that shipped attached to equipment in the initial shipment, the spare part will ship either in a sealed container or wrapped in clear plastic.
- iii) Where deemed appropriate, the spare part will also ship crated.

### **3) CUSTOMER SITE STORAGE**

#### **a) GENERAL**

- i) This section describes the procedures necessary for the off-loading, handling, and storage of Carbis equipment on-site at the customer's facility.
- ii) It is the owner's responsibility to provide the appropriate off-loading devices and expertise, including the services of a qualified rigger, to safely and effectively rig and handle the Carbis equipment and components during the off-loading process in accordance with the most recent industry practices for safe rigging.
- iii) Pay particular attention to eccentric loading conditions such as counterweighted components, including those whose eccentric loads are visually apparent, and adjust the off-loading and handling procedures to accommodate such conditions.
- iv)  **WARNING** For elevating cage/platform/Modal support columns with internal counterweights, verify that the counterweight chains are securely attached to the tops of the carriages mounted on the support columns. If the connections come loose during shipping or handling, make certain to reconnect them; failure to do so can cause the chains to slide into the tubes and the carriages to slide down against the lower stops during handling, which could cause equipment damage, personnel injury, or death.
- v) Care must be taken to protect and preserve the equipment and components during the handling and storage process.
- vi) If segments of a shipment are separated for storage for any length of time, the owner is responsible for appropriately identifying the separated equipment/components based upon their specific identification in the original Bill of Lading supplied with the original shipment.
- vii) Equipment and components shall be stored with protection from puncture, dirt, grease, mechanical abrasions, or other damage.
- viii) Stored equipment and components should be periodically inspected. If there are any indications of damage in any form, corrective steps must be taken. Perform a complete inspection of all stored equipment and components at the end of one year and treat accordingly as required.



**b) DURATION AND LOCATION**

i) DURATION

- (1) SHORT-TERM storage is defined as duration time up to three months outdoor storage or up to six months indoor storage.
- (2) LONG-TERM storage is defined as duration time in excess of three months outdoor storage or in excess of six months indoor storage, up to one year.
- (3) EXTENDED TERM storage is defined as duration time in excess of one year.

ii) LOCATION

- (1) INDOOR STORAGE condition is considered containment within a permanent enclosed structure that prevents direct contact of weather elements with the stored equipment and components.
- (2) OUTDOOR STORAGE condition is considered any location outside of a permanent enclosed structure.
- (3) Tarps or other similar coverings for equipment stored outdoors are not considered indoor storage.

**c) LOOSE EQUIPMENT**

- i) All fabricated loose equipment and components as described in section **2) PACKAGING AND SHIPPING PREPARATION** above can be stored outdoors short-term, unprotected, provided the following conditions are met:

- (1) Members shall be stored on wood or other suitable blocking materials such that they are not in contact with the ground and will be above water in case of inclement weather.
- (2) Stacked members shall be padded or blocked so damage to coatings or finishes will be prevented. Suitable padding or blocking materials include, but are not limited to, oak timber, pine timber, carpeting, and rubber matting.
- (3) Flat pieces, or pieces that could hold water, should be stored with one end higher than the other to let water drain off.
- (4) Components must be stacked in a safe and secure manner that will prevent them from tipping, falling, or otherwise moving.
- (5) Open ends of hollow components should be capped to protect against dirt and other foreign matter.

- ii) If the aforementioned fabricated loose equipment and components are to be stored outdoors for longer than three months, then they must be tarped or otherwise appropriately covered.

**d) CRATED ITEMS**

- i) All crated items as described in section **2) PACKAGING AND SHIPPING PREPARATION** above can be stored outdoors short-term provided the following conditions are met:
  - (1) Crated items must be stored on dunnage or pallets to prevent direct contact with the ground.
  - (2) Crated items should only be stacked with the smaller and lighter crates stacked on larger and heavier crates. If crates are stacked, they must be stacked in a safe and secure manner, including interlocked where practical, that will prevent them from tipping, falling, or otherwise moving.
  - (3) Crated items must be tarped or otherwise appropriately covered for short-term storage outdoors.
- ii) If the aforementioned crated items are to be stored for longer than three months, they must be stored indoors.

**e) CONTAINERS**

- i) All parts shipped in containers must be stored indoors for short or long-term storage.
  - (1) Containers should only be stacked with the smaller and lighter containers stacked on larger and heavier containers. If containers are stacked, they must be stacked in a safe and secure manner, including interlocked where practical, that will prevent them from tipping, falling, or otherwise moving.

**f) PROCESS ASSEMBLIES**

- i) Process assemblies such as Loading Arms, Loading Racks, and Skid Systems can be stored outdoors short-term provided the following conditions are met:
  - (1) Process assemblies and associated crated items should be stored on dunnage or pallets to prevent direct contact with the ground and to ensure they are above water in case of inclement weather.
  - (2) Crated items must be tarped or otherwise appropriately covered for short-term storage outdoors.
  - (3) All open pipe and fitting ends must be covered during storage.
- ii) If the aforementioned process assemblies are to be stored for longer than three months, they must be stored indoors.

**g) MISCELLANEOUS**

- i) A coating of a non-hardening heavy film corrosion inhibitor must be applied to all drive components such as bearings, load rollers, sprockets, etc. that are to be stored for ***any*** length of time. Check the inhibitor manufacturer's directions for the frequency of reapplying the inhibitor.

**h) SPARE PARTS**

- i) All spare parts shall be stored indoors regardless of duration.
- ii) Wire rope should be coiled on a spool for storage in a dry place to reduce corrosion. Do not store wire rope where chemicals have been stored because chemicals and their fumes can attack the metal. Always clean and lubricate wire rope before storing it.
- iii) Avoid storing roller chain and sprockets in high temperature/high humidity and dusty environments. Also, when storing roller chain for any length of time, apply lubrication and completely wrap the chain in grease paper before storing away.

**i) EXTENDED TERM STORAGE**

- i) The following criteria apply to all Carbis equipment and components that are to be stored for an extended period in excess of one year:
  - (1) All items are to be visually inspected every three months for any signs of damage or corrosion, and steps taken to correct the damage and prevent any further damage.
  - (2) Apply any protective coating such as corrosion inhibitors or lubricants to those components requiring such coating based upon the coating manufacturer's recommended frequency.