Document Revision Chart

The following chart lists the revisions made to this document tracked by version.

<table>
<thead>
<tr>
<th>#. #</th>
<th>Section Modified and Revision Description</th>
<th>Date</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>New Document</td>
<td>06/22/2010</td>
<td>M. Limousin</td>
</tr>
</tbody>
</table>
1.0 PURPOSE: To document the general requirements for original planned shipments of GE Water equipment and material sent to/from a GE Water facility, fabricator, export packager or directly to site (for both inbound and outbound project shipments). General packaging, marking, preserving, and shipping requirements for domestic and international shipments are outlined.

2.0 SCOPE: This document applies to all Equipment shipments made by Suppliers to GE Water facilities or directly to Site installations, where specified in the Purchase Order. It also applies to equipment shipped from GE Water facilities to Customer Sites, where specified in the Customer or Project requirements.

3.0 RESPONSIBILITIES: The following departments are responsible for compliance to this document in their respective areas:
- Engineering
- Sourcing
- Shipping

4.0 DEFINITIONS:
4.1 General:
1) **Domestic**: The transfer (merchandise/commodity) within a country.
2) **Export – Overland**: To carry or send (merchandise/commodity) to some other country or outside an economic union using overland transport.
3) **Export – Overseas**: To carry or send (merchandise/commodity) to some other country or outside an economic union using overland and oversea transport.
4) **External Supplier**: A supplier that is outside of GE Water & Process Technologies.
5) **Import**: To bring (merchandise/commodity) into a place or country from another country.
6) **Internal Supplier**: A supplier that is from within GE Water (a Manufacturing department).
7) **Supplier**: The individual, company, corporation, sole proprietorship, or partnership that is being requested to provide a specific product in accordance with this specification.

4.2 Packaging:
1) **Compressive Creep**: The gradual loss of thickness that may occur if a cushioning material is placed under a constant load for a long time. Product loosens in its cushion and becomes vulnerable to excessive
movement. Spreading the load over a larger area of cushioning usually reduces the risk of compressive creep.

2) **Hazardous Materials**: Any material that poses a present or potential hazard to the health or safety of humans or to the environment. GE Water manufacturers are required to prepare Materials Safety Data Sheets (MSDSs) for all hazardous materials. A material may be considered hazardous because of its quantity, concentration, or physical or chemical characteristics.

3) **Hygroscopic**: Taking up and retaining moisture.

4) **Maximum Container ID**: The maximum size that can be safely handled by the mode of transport selected.

5) **Oversized**: Merchandise or Commodity that, due to the size or weight, must use specialized transportation - sometimes referred to as over-dimensional freight.

6) **Packaging**: The application and use of adequate protective measures to prevent damage during transportation and storage, including application of package wraps, cushioning, and complete identification markings.

7) **Packing**: The final placement of items or packages in exterior shipping containers or other media, including necessary blocking, bracing, cushioning, weatherproofing, exterior strapping, and marking.

8) **Preserving**: Method used to maintain the quality, fit, function, and form of the item being shipped.

9) **Protective Coatings**: Provide a barrier against oxygen and water. Materials that have extremely low permeability are best able to minimize corrosion to metal surfaces.

10) **Shipping Crate/Package Weight Limit**: The maximum weight that can be safely transported on or in a package of given size and structural makeup. Follow the crate guidelines in Section 6.5 Packaging.

### 5.0 RECORD RETENTION

This document creates a quality record; see the Index for specific information.

### 6.0 PROCEDURE:

#### 6.1 COMMUNICATION

1) Supplier questions should be directed to the GE Water Buyer.

2) The GE Water Buyer then directs questions to the appropriate department.

3) The Supplier submits any deviations from this Procedure to the GE Water Buyer for approval prior to shipment.

#### 6.2 PRESERVING

1) Requirements
a) Products susceptible to corrosion must be packaged in a dry non-corrosive environment for the duration of shipment and any specified storage interval.

b) The degree of protection depends on the item being packaged.

2) Cleaning

a) Before application of preservative materials, all surfaces that require protection from corrosion are cleaned with solvents or detergents for removal of oil, grease, salts, dirt, fingerprints, and contaminants.

1. Solvents that contain chlorofluorocarbons (CFC’s), trichloroethane, or other ozone depleting compounds are not used.

2. Solvents used must be Environmental Health & Safety reviewed with effort given to eliminate dangerous products, replacing them with products that minimize user’s exposure risk.

3. Cleaned parts are handled with clean gloves to avoid re-contamination before, during and after preservation.

b) After cleaning, immediately dry to remove cleaning solutions or any remaining moisture left on the commodity or part to be preserved. Use clean cloths, heat lamps or a drying room.

c) Finally, place the unit in a low humidity environment prior to the packaging of the unit, allowing excess moisture to evaporate.

NOTE: The period of time depends on moisture present on the unit and within the environment.

d) Other processes are acceptable, pending GE approval.

3) Selection and Application

a) Items not covered by GE Water specifications are preserved and protected for the duration of the shipment and the storage cycle is determined by the GE Water contract.

1. Preservation agents that do not meet the ordering specification must be submitted for approval from GE Water and annotation on the storage preservation docket of the required time intervals for reapplication.

2. Any preservation agent and method of removal must always be included with all commodity shipments and long-term storage procedures.

b) Unless otherwise specified, in the ordering sheet or purchase order, the equipment is painted and preserved per the applicable GE Water Process Specification. Resolution of conflicts in documents or clarifications should be directed to the GE Water Sourcing.
d) All machined surfaces of materials susceptible to atmospheric corrosion require preservation and protection.
   1. Typical corrosion preservative materials include VPI (Vapor Phase Inhibitor) or VCI (Vapor Corrosion Inhibitor) impregnated materials such as papers, foams, plastics, oils, thin film and waxy coatings.
   2. Preservative material must easily be removed with approved solvents or other suitable cleaning methods, before unit installation and operation.

e) In all cases, appropriate quantities of suitable and compatible corrosion preservative materials are used. Preservative manufacturer's instructions for use and application are used. If there is any doubt about product compatibility with equipment during shipment and storage, consult the product manufacturer or GE Water Sourcing.

4) Plated and Bare Metal Surfaces
   a) Plated and bare metal surfaces must be protected from direct contact with wood or fiberboard using a durable non-hygroscopic material.
      1. Bare metal and plated surfaces must be properly and adequately preserved against corrosion and discoloration.
      2. Metal surfaces that are susceptible to corrosion should be finished, painted, or coated to provide permanent protection.
      NOTE: Gases require special approval by the GE Water Buyer due to the potential hazards.
   b) Coatings for metal need to:
      1. Produce uniform high resistance to electrical current,
      2. Be pore-free,
      3. Have excellent adhesion,
      4. Be resistant to damage from impact and abrasion,
      5. Be resistant to moisture absorption,
      6. Be splash resistant to product spills, and
      7. Resist degradation with time and exposure to the environment.

5) Protection of Critical Surfaces and Openings
   a) All machined, bright finished, or other critical surfaces are protected by preserving, wrapping, capping, plugging, blocking, covering, and/or other suitable methods to protect against corrosion, dust, moisture, abrasion, or any other damage that is detrimental to the appearance and/or function of the part or equipment. These
surfaces must be protected for the duration of the transport and storage cycle of the GE Water product.

b) Pressure sensitive adhesive tape can only be used when approved by the GE Water Engineer.
   1. Tape may be used to secure plastic bags or plastic coverings only as temporary covers.
   2. Tape may not leave adhesive residue on any surface after being removed.

c) Blind Holes (open one end only) and through holes (open both ends) must contain an appropriate amount of VCI containing material. These holes must then be sealed or capped in accordance with this specification. Note that through holes must be capped or plugged at both ends.

6) Pipes/Metal Rods/Similar Items
   a) It is critical that sub-components and assemblies be protected against corrosion during the shipment and storage of these items to include protection externally as well as internally with items such as pipes/hollow rods.
   b) Items not covered by GE Water specifications are preserved and protected for the duration of the shipment, and the storage cycle is to be determined by the GE Water contract. Preservation agents that do not meet the ordering specification must be submitted for approval from the Buyer and annotation on the storage docket of the required time intervals for reapplication.

7) External Thread Protection
   a) Protect all external threads greater than 1" diameter from physical damage with a suitable non-hygroscopic thread protection material such as plastic shielding, wax impregnated fiberboard, or other suitable protective material.
   b) Materials such as untreated fiberboard or wood are not in direct contact with metal surfaces.

8) Electrical Equipment
   a) A suitable quantity of a VCI impregnated material is placed inside all electrical control cabinets, junction boxes, breaker panels, and other similar electrical equipment, that contain electrical instrumentation, terminal strips, switches, relays, etc., for all shipments.
   b) The VCI product may or may not need to be removed prior to equipment operation depending upon the type used and the equipment being protected. If VCI product must be removed before
equipment operation, then there should be clear and easily visible instructions indicating this.

9) Gaskets
   a) Synthetic gasket materials are appropriately wrapped to minimize dust contamination and exposure to sunlight.

10) Barrier and Wrapping
   a) General

1. It is designed to exclude or retain water, water vapor, grease, or certain gases within or outside of the package. The type and amount used depends on the expected relative humidity & exposure time.
   - Plastic Barrier Materials - Short term only, moisture migrates through quickly.
   - Foil Laminated Barrier Materials - Long term solution, moisture migrates through slowly
   - Tap Sealed Joints - Short term moisture protection for barrier joints
   - Vacuum Pack - Air pressure is removed from the interior of the barrier material, joints are heat sealed, and desiccants are always used.

2. Wooden braces should always be placed on the outside of the barrier bag and positioned so that puncture to the barrier bag will not occur.

3. Exposure of finished and unfinished surfaces to hygroscopic materials or materials that contain moisture must be avoided unless proper precautions are taken.

4. Never seal wood or other high moisture cellulose products in a barrier bag environment.

b) Shrink Wrap

1. The Heat shrink-wrap must be blue or white and have a minimum thickness of 7 mils. Transparent shrink-wrap, often called cling wrap, is not allowed for covering equipment. A VCI Poly film is recommended due to its corrosion resistance properties.

2. Ensure that water does not become trapped and corrode the commodity and ensure that the manufacturers recommendations for application are followed.
3. Shrink-wrap can be used as an alternative to crating of enclosed structural members and fluid system skids.

11) Desiccants
   a) These are best if used in a closed/sealed moisture barrier or a rigid/sealed container. Desiccant cannot be used in the same enclosed space as VCI Products.
   1. Desiccant must not contact the commodity, and should be evenly dispersed within the package.
   2. In selecting a desiccant, the following must be considered:
      • Air space size
      • Nature/type of the material to be used
      • Moisture surrounding the package
      • Desired shelf/storage life
      • Atmospheric conditions when/where the package is sealed.
   b) The minimum quantity of desiccant to be placed inside a bag is determined from the manufacturer’s recommendation.
   c) In large enclosed areas, desiccant bags are suspended to allow moisture collection away from material. If the supplier is unable to self-determine if a desiccant should be used, then contact the GE Water Engineer.
   d) Clay Desiccants: They are made from montmorillonite clay, which has a special affinity for moisture. Clay desiccants are naturally occurring, non-hazardous, moisture adsorbent substances. This clay is chemically inert and non-corrosive. The layered structure attracts and absorbs moisture onto the surface and between the layers of the clay.
   e) Silica Gel: This is silicon dioxide (SiO2), an amorphous form of silica. Two important properties of silica gel are that it is non-toxic and non-corrosive.
   f) Molecular Sieve: This is a manufactured crystalline version of Elite and is a non-hazardous material.

12) Humidity Indicators
   a) They must be used when specified by Purchase Order or Project requirements for items requiring desiccant, i.e. instruments, electrical equipment, electronics. Place a humidity indicator behind an inspection window or immediately within the closing edge of the barrier material and as far as practicable from the nearest unit of desiccant. See Figure 1.
   b) Use a three-spot paper card type 1x4 inches in size or approved alternative. The spots indicate relative humidity of 30 percent, 20 percent, and 10 percent, top to bottom, by changing color from blue to pink.
6.3 STORING

1) Requirements
   a) Minimum specified by Purchase Order or Project requirements.
   b) Proper amounts of desiccants, VCI to be used according to cube of interior space. If the supplier is unable to self-determine if a desiccant should be used, then contact the GE Water Engineer.
   c) Properly marked to identify “indoor” or “outdoor” storage - waterproof stenciling to prevent deterioration from water or sun.

2) Packaging
   a) Easy access for maintenance of commodity and preservation material.

3) Preservation Docket
   a) For all items going into storage (regardless of storage duration), the supplier (or GE Water Shipping Department for internal shipments) provides a preservation docket (checklist) on the outside of the product or container next to the packing list.
   b) This docket allows for the written summary of all maintenance requirements for internal/external storage. (See the Preservation Docket form – Control #215-001-001 for a sample maintenance requirement document.)
   c) The written summary includes:
      • Inception date of storage,
      • Preservation maintenance requirement schedule/history,
      • Equipment maintenance requirement schedule/history,
      • Expected date of removal from storage.

6.4 PACKING
GE Water Marking, Preserving, Packaging, and Shipping

SPS-PSSWTR-0010
Rev: 1.0

1) **Unit and Accessories** - All packaged items must:
   a) Be secure in carton or crate with bracing & blocking in place.
   b) Never exceed the recommended weight for a package or skid.
   c) Have all internal and external documentation in place.
   d) Have shock & vibration protection in place. Contact GE Water Engineer if questions arise if shock and vibration protection is needed.
   e) Have the proper markings on the shipping container for domestic or international shipments.
   f) Utilize color-coded packaging items that are attached to the unit or accessories that can be removed and discarded i.e. shipping nuts, screws, general shipping hardware (yellow is universal color).
   g) Have unit protected against corrosion (preservation).
   h) Have proper handling/cautionary labels attached.
   i) Be securely closed (all containers).
   j) Accessories properly packaged.
   k) Protect from corrosion.

2) **Bundling/Strapping**
   a) One must create a block or solid unit of cargo for shipping, designed to permit forklift and sling access, and limited to items up to 3500 lbs. See Figure 2.
   b) One must use a heavy-duty steel strapping/banding, tempered for maximum tensile strength and ductility and able to absorb impact shocks without breaking. A heavy-duty steel banding straps with width and thickness dimensions of 1-1/4” x .035” or greater, are recommended.
   c) A skid specifically designed to fit the bundled item(s) is placed under the straps to permit forklift and sling access. See Figure 3 below.
   d) A non-hygroscopic material must separate all steel banding from the commodity. Banding and clips that are to be used directly over the product with the non-moisture absorbing material separation must be galvanized. Standard banding that is in compliance with this specification may be used in applications over properly packaged items, crates, and wooden boxes.

3) **Piping**
   a) Openings must be securely covered during transport and storage and easily reattached to allow removal for inspections.
   b) Piping is supported in such a way to allow forklift or sling access when unloaded at the site and prevent direct placement on the ground.

** Bundling - steel banding placement of single shape items or for items that have no trouble with handling, transport, or storage
** Corrosion preservation required for shipment & storage of pipes & Single shaped items
** Pipes must be sealed with a yellow cap both ends (yellow tape can be added to plain white cap’s surface)
** (W) These should not apply
Figure 2
Non-hygroscopic shock absorbing sheeting is required between all surfaces of items. Abrasion protection is required. Place under banding & between items as shown.

All bundled items must be secured on an appropriate sized skid using steel banding.

Bundling (steel banding) for structural steel, walkways, or fabricated assemblies.

Forklift Access

Figure 3
Figure 4

Butt Weld Pipe Ends

Covers to be made from galvanized or stainless steel

Figure 5

Butt Weld Pipe Ends

Covers to be made from Plastic

Figure 6

Butt Weld Pipe Ends

Covers to be made from Plastic
4) Reels
   a) Large reels are blocked and braced on all 4 sides
   b) Small reels fewer than 2 feet in diameter are boxed.

5) Temporary Shipping Covers/Dust Cover
   a) These are used to keep dust, moisture and other contaminants away from items being shipped.
   b) These covers must be brightly colored (yellow preferred) so that they can be easily identified and removed when required. See Figures 4, 5 and 6 above. The plastic inserts shown in Figure 6 should be positively secured with a plate or other means to prevent cracking and/or loss during transport or storage.

6.5 PACKAGING
1) Packaging Guide - Refer to Table 1 below.

<table>
<thead>
<tr>
<th>PRODUCTS - TRANSPORT - PARTICULAR SPECIFICATIONS</th>
<th>PACKAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metallic equipment in general (for example chimneys, cyclones, hoppers, filters, heat exchangers, tanks, silos etc.)</td>
<td>SADDLES</td>
</tr>
<tr>
<td>• without applied instrumentation or insulation</td>
<td>CRATE</td>
</tr>
<tr>
<td>• volume &gt; 5 m³ (15 cubic ft) (Export only due to oversized shipping costs)</td>
<td>CASE</td>
</tr>
<tr>
<td>• without applied instrumentation or insulation</td>
<td>CRATE</td>
</tr>
<tr>
<td>• volume ≤ 5 m³ (15 cubic ft.)</td>
<td>SADDLES / PALLET</td>
</tr>
<tr>
<td>• with applied instrumentation (e.g. pressure gauges, electrovalves, etc.) or insulated</td>
<td>CASE</td>
</tr>
<tr>
<td>• of any volume or dimensions</td>
<td>CASE</td>
</tr>
<tr>
<td>Non-metallic equipment in general (e.g. glass fibre reinforced plastic tanks, silos in PVC, plastic constructions etc.)</td>
<td>CRATE</td>
</tr>
<tr>
<td>• conventional sea transport / air transport</td>
<td>SADDLES / PALLET</td>
</tr>
<tr>
<td>• sea transport in container / road transport / railway transport</td>
<td>CASE</td>
</tr>
<tr>
<td>Accessories, parts, spare parts</td>
<td>CASE</td>
</tr>
<tr>
<td>Machinery in general (e.g. agitators, centrifuges, generators, pumps, lift trucks, mixers, cranes and hoists, compressors, noise control cabins etc.)</td>
<td>CASE</td>
</tr>
</tbody>
</table>
### PRODUCTS - TRANSPORT - PARTICULAR SPECIFICATIONS

<table>
<thead>
<tr>
<th>Packages (e.g. turbines, compressors, generating sets, furnaces, bag filters, boilers, alternators, extruders, palletizers, pneumatic hauling units, water treatment units, lifts and goods lifts, refrigerating groups, air conditioning systems, fire fighting systems, electric transformers, etc.)</th>
<th>PACKAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>- any type of transport</td>
<td>CASE</td>
</tr>
<tr>
<td>- with possible intermediate storages</td>
<td>CASE</td>
</tr>
<tr>
<td>- road / railway transport</td>
<td>CRATE</td>
</tr>
<tr>
<td>- without intermediate storages</td>
<td>CASE</td>
</tr>
<tr>
<td>- without instrumental equipment sensitive to dust or humidity</td>
<td>CASE</td>
</tr>
</tbody>
</table>

| Instrumental laboratory and electric equipment sensitive to dust or humidity (e.g. electric motors with protection < IP 54, electric panels, transformer etc.) | CASE |

| Instrumental laboratory and electric equipment insensitive to dust or humidity (e.g. electric motors with protection ≥ IP 54, pressure gauges etc.) | CASE |

<table>
<thead>
<tr>
<th>Electrical cables wound in reels</th>
<th>STAVED REEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Φ &gt; 80 cm (30 inches)</td>
<td>CRATE</td>
</tr>
<tr>
<td>- Φ ≤ 80 cm (30 inches)</td>
<td>CRATE</td>
</tr>
</tbody>
</table>

| Cable trays (with small parts pre-packed in small-sized cases) Fiber glass protective boxes without electrical and instrumental components inside | PALLET |

<table>
<thead>
<tr>
<th>Plates</th>
<th>CASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick couplings</td>
<td></td>
</tr>
<tr>
<td>Bolts and tie rods</td>
<td></td>
</tr>
<tr>
<td>Expansion bends</td>
<td></td>
</tr>
<tr>
<td>Flanges</td>
<td></td>
</tr>
<tr>
<td>Gaskets</td>
<td></td>
</tr>
<tr>
<td>Fittings</td>
<td></td>
</tr>
<tr>
<td>Piping valves and relevant accessories</td>
<td></td>
</tr>
<tr>
<td>Lugs</td>
<td></td>
</tr>
<tr>
<td>Manifolds</td>
<td></td>
</tr>
</tbody>
</table>

| Pre-fabricated steel structural works and structural shapes with sturdy carrying structure ≤ 5 mm thick (¼ inch) | CRATE |

| Stairs, ladders, guards, parapets, handrails, steps, gratings whether shaped or not, cable trays, chequered and/or pre-coated plates Calendered plates and bearings that can be easily piled up Pipes and piping in general: conduit pipes, stainless steel or other metal pipes, nonmetallic pipes in general (PVC, fiber glass), pre-fabricated piping, standard or coated carbon steel pipes of diameter up to DN80 (3”) | CRATE |
### PRODUCTS - TRANSPORT - PARTICULAR SPECIFICATIONS

<table>
<thead>
<tr>
<th>Package</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bundle</td>
<td>Pre-fabricated steel structural works and structural shapes with sturdy</td>
</tr>
<tr>
<td></td>
<td>carrying structure &gt; 5 mm thick (1/4 inch)</td>
</tr>
<tr>
<td></td>
<td>Standard or coated carbon steel pipes of diameter over DN80 (3″)</td>
</tr>
<tr>
<td>Pallet</td>
<td>Products that are not dangerous (see the safety sheet - point 14; e.g.</td>
</tr>
<tr>
<td></td>
<td>refractory, sand, cement, powders, resins, coal, gravel) and that are</td>
</tr>
<tr>
<td></td>
<td>prepacked in metallic drums, sacks, big bags</td>
</tr>
<tr>
<td>Case</td>
<td>• road transport / sea transport in container</td>
</tr>
<tr>
<td></td>
<td>• air transport / conventional sea transport</td>
</tr>
<tr>
<td>Crate</td>
<td>Products that are not dangerous and that are prepacked in plastic drums</td>
</tr>
<tr>
<td></td>
<td>Rock wool and fiber glass prepacked (e.g. in rolls)</td>
</tr>
<tr>
<td>Case Homologated</td>
<td>Products that are not dangerous and that are prepacked in cartons</td>
</tr>
<tr>
<td></td>
<td>Dangerous products (refer to “Hazardous Materials” – currently para 8.2)</td>
</tr>
</tbody>
</table>

**Table 1**

2) **Solid Wood**
   a) **General Requirements**
      1. Solid wood packaging & bracing must be free of bark, live pest or
         plants, and free of insect damage (i.e. Holes)
      2. Wood should not directly contact commodity unless a medium is
         used between solid wood and dunnage.
      3. Acceptable Solid Wood Packaging Alternatives are External Grade
         Plywood, Metal or Plastic Skids Crates, and Containers. External
         Grade OSB Board can only be used with GE Water approval.
   b) **SMP 15**
      1. ISPM-15 requires that all non-manufactured wood packaging
         materials (NMWP) or solid wood packing materials (SWPM) must
         be either heat treated or fumigated regardless of the country of
         export. The requirement includes the proper marking of all treated
         materials per the IPPC standard for export to some countries.
      2. It is the responsibility of the GE Water supplier to ensure
         compliance with ISPM-15. Visit the following web sites for
         additional information regarding this directive.
         - IPPC - [http://www.ippc.int/IPP/En/default.html](http://www.ippc.int/IPP/En/default.html)
   c) **Wooden Crates**
      1. For international shipments, all items are crated in accordance
         with approved packaging procedure. Sample crate examples are
         shown in Figure 7.
2. For domestic shipments, alternative material may be used instead of fully crating for shipment.

3. Open or slotted crates are acceptable with approval by a GE Water Buyer.

4. All non-containerized equipment must be crated for export and shipment. The GE Water buyers have the authority to grant written exceptions if not covered under the ordering specifications. It is required that all GE Water product being placed in exterior storage follow the crate guidelines outlined in this specification unless a written exception has been granted or the packaging requirements are covered under the ordering specifications.

5. Crate Considerations
   - Minimum fork access 29 inches.
   - Minimum sling openings 4 inches.
   - Minimum 1-inch clearance between crate top, walls, and the commodity. Unless commodity has been prepackaged prior to crating and the one-inch
clearance has already been incorporated into the interior package.

- For crates greater than 8 feet high the minimum roof thickness is ¾ inch.
- The minimum width (thickness) is 1/2” for plywood.
- Crate weight limit is determined by the maximum weight that can safely be supported by the crate, by the method of transport, and the method of loading and offloading.

### REQUIRED CRATE SIZES

<table>
<thead>
<tr>
<th>LOAD NET WEIGHT (LBS.)</th>
<th>PACKAGING METHOD</th>
<th>MATERIALS</th>
<th>PRESERVATION METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-100 Lbs.</td>
<td>Skid enclosed bottom Fragility protection where required. Internal bracing and blocking of unit. Wooden box. Corrugated carton w/ secondary over-pack Crates should be of sturdy construction to allow stacking to a maximum height of 96” (2.438 meters) without damage to the crate or contents unless specified clearly on the exterior of the crate.</td>
<td>Corrugated in secondary container 3/8” Plywood Minimum</td>
<td>See preservation Barrier bag &amp; desiccant, Vacuum sealed. Surface coatings/Oils VCI Paper</td>
</tr>
<tr>
<td>100-250 Lbs.</td>
<td>Skid enclosed bottom Fragility protection where required. Internal bracing and blocking of unit. Wooden box or Full crate. Crates should be of sturdy construction to allow stacking to a maximum height of 96” (2.438 meters) without damage to the crate or contents unless specified clearly on the exterior of the crate.</td>
<td>Asphalt paper / VCI Paper Corrugated in secondary container for accessories 1/2” Plywood Minimum</td>
<td>See preservation Bar Asphalt lining &amp; desiccant Surface coatings/Oils VCI Paper</td>
</tr>
<tr>
<td>250-500 Lbs.</td>
<td>Skid enclosed bottom Fragility protection where required. Internal bracing and blocking of unit. Asphalt Lined Wooden box or Full crate. Crates should be of sturdy</td>
<td>Asphalt paper / VCI Paper Corrugated in secondary container for accessories 1/2” Plywood Minimum</td>
<td>See preservation Asphalt lining &amp; desiccant Surface coatings/Oils VCI Paper</td>
</tr>
<tr>
<td>Weight Range</td>
<td>Description</td>
<td>Protection Details</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>--------------------</td>
<td></td>
</tr>
<tr>
<td>500-750 Lbs.</td>
<td>Skid enclosed bottom, Fragility protection where required, Internal bracing and blocking of unit, Asphalt Lined Full crate. Crates should be of sturdy construction to allow stacking to a maximum height of 96&quot; (2.438 meters) without damage to the crate or contents unless specified clearly on the exterior of the crate.</td>
<td>Asphalt paper / VCI Paper Corrugated in secondary container for accessories 1/2&quot; Plywood Minimum.</td>
<td></td>
</tr>
<tr>
<td>750-1000 Lbs.</td>
<td>Skid enclosed bottom, Fragility protection where required, Internal bracing and blocking of unit, Asphalt Lined Full crate. Crates should be of sturdy construction to allow stacking to a maximum height of 96&quot; (2.438 meters) without damage to the crate or contents unless specified clearly on the exterior of the crate.</td>
<td>Asphalt paper / VCI Paper Corrugated in secondary container for accessories 1/2&quot; Plywood Minimum.</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2**

6. **Crate Lumber**
   - New/free of defects.
   - Knots must not exceed 1/4th the width of the structural member or 1/3rd the width of a sheathing board.
   - Moisture content of lumber must not exceed 20% and not less than 10% for standard grade.
   - No.4 pine or better (Spruce is acceptable/approvable).
   - Plywood to be minimum of 3/8" type 3 weather resistant or exterior grade CDX plywood thick for items less than 100 lbs.
   - Plywood to be minimum of 1/2" thick type 3 weather resistant or exterior grade CDX plywood for items greater than 100 lbs.
7. Crate Hardware
   - Screws & cement nails coated (preferred), acceptable alternative twist nails.
   - Type size and strength appropriate for item being crated and size of crate.
   - Hardware holding equipment shall be bolted to the skid. Washers, nuts are required.
   - Counter sinking of bolt heads into the bottom of the runners.

8. Banding – Metal or plastic banding may be used as added protection against hardware failure. See Figure 8 below.

![Figure 8](image)

9. Waterproofing
   - All wooden boxes/cases/crates are built to ensure water does not penetrate and corrode the equipment but still allows drainage from the bottom.
   1. Items 25,000 lbs. or greater should have an engineered approved skid design for shipment.
   2. A lifting base must be provided for structural steel, bars, tubing, piping, and ductwork. The maximum allowable over-hang on any skid is 6 inches.
   3. Skid wood or wood bracing cannot come in direct contact with the commodity.
   4. Refer to the Required Skid and Header Sizes in Table.
Table 3

3) Void/Void Fillers
   a) Non-hygroscopic materials used to fill voids in container.
   b) Closed cell foams (polyethylene) are acceptable.
   c) Paper base materials acceptable if sealed in plastic.
   d) Antifoam (Polyurethane foams) is acceptable provided separation is maintained between the foam and the commodity.

4) Corrugated Cartons
   a) Corrugated cartons may be used as an alternative to wooden crates if the following criteria meet your shipment details.
   b) If corrugated cartons are needed for shipments that fall outside of below criteria then approval must be received from a GE Water Buyer.
      1. Destination is a domestic location.
      2. Weight does not exceed 150lbs or 68 kgs.
      3. It does not contain hazardous material.
      4. It does not contain liquid or fluids.
   c) Corrugated cartons with wooden base
      1. Straps MUST be used across both directions - IATA requirement for all Air shipments.
   d) Stacking
      1. Inner cushioning material as in i.e. polyurethane, polyethylene foam is to be placed between the top of the carton and the top of the commodity.
6.6 MARKINGS

1) Requirement - Mandatory for equipment/shipments for GE Water. See Figures 9-12 below.

2) Stenciling
   a) Markings for crated equipment are to be applied in English with (black) non-fading paint using a block-lettering stencil.
   b) Alternatives for non-crated items are a stainless steel engraved nameplate, plywood or plastic cutouts attached to the component. Affix by banding or bolting to a support member of the commodity.

3) Letter Size - Is determined by the panel size. Largest possible stencil size for panel must be used.
4) Placement - Marking will be placed on two adjacent sides with following information. See Figure 13.
a) Container Gross Weight lbs. (add Kg for international shipments)

b) Container Dimensions inches (add cm for international shipments)

c) Customer Name

d) Tag Number

e) Item Description

f) GE Purchase Order #

 g) Container Case/Package Number

 h) Storage/Maintenance Requirements (Indoors, or Outdoors)

---

Marking Placed on Two Adjacent Sides

**Figure 13**

5) Cautionary Markings - The following is added to the exterior of all shipping containers.

a) Center of Gravity (balance) - Required on all unstable packages. For internal shipments, GE Water Engineering will work with the GE Water Shipping Dept to determine if the shipment is unstable, requiring CoG marking.

b) If the center of gravity can not be marked due to its location on the unit and a plywood panel can not be affixed to allow the for marking it’s location. A print sealed in plastic, affixed to the commodity in a visible location is required for all unstable packages. The print must show a side profile and end profile with the CoG precisely located on each view.

c) Handle with care, fragile, etc.

d) Glass - Must be marked “Glass” separate or combination “Fragile-Glass” precautionary mark.

e) Liquids - Must identify as Liquid, or contains Liquid.

f) Sling Locations - Mark special locations or notched skid locations

g) Other special requirements/precautionary warning marked appropriately.
h) Refer to Table 4 below for Typical Precautionary Marks.

![Precautionary Marks Diagram]

**Table 4**

6) **Packing Slips**

a) The packing list is the primary method used to inventory shipped components. The packing list must identify the contents within each individual package if the container has multiple packages with different items.

b) Standard requirements needed for each packing slip:
- GE PO # or Contract # with Client
- GE Tag Number
- GE PO Line #
- GE PO Quantity
- Item/equipment per GE PO or Contract
- Unit of Measure
- Country of Origin
For internal shipments, each GE Water location will create its own packing slips meeting unique needs and requirements specific to that location.

7) Attaching
   a) Use caution when affixing to prevent breach of inner vapor barrier, case liners, or other packaging of the equipment.
   b) Minimum of one placed internally and one secured externally on the package.
   c) Do not attach the packing list directly to painted equipment, where the removal of the packing list may cause damage to the painted surface.
   d) It is recommended that the packing list be attached with a tape or glue adhesive. If placed in contact with the commodity, the tape or glue cannot leave a residue.
   e) If the packing list is stapled to the package, then the staples must be covered with waterproof tape.

8) Packing List Enclosure - Place in a waterproof pouch labeled Packing List.

6.7 SHIPPING
1) Transport Modes

   NOTE: Shipments originating from or destined for the EU must comply fully with ADR and IMDG regulations.

   a) Air
      1. All air shipments must be authorized in writing by GE Water.
      2. 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.
      3. 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:
         • 74 cm (29 Inches) - Most efficient and economical air service.
         • 160 cm (63 Inches) - Still very good efficiency and economy.
         • 206 cm (81 Inches) - Point where problems and costs increase greatly.
         • 241 cm (95 Inches) - 747 cargo aircraft only possible carrier above this height.
b) Ocean
1. Products shipping by ocean are typically loaded in Standard Containers (solid top & open top), Flat Rack Containers and shipped as Break Bulk. See Figure 14.
2. Standard containers can be loaded below or on the deck of the vessel. Flat rack containers are typically loaded above deck. Non-containerized shipments can be loaded below or above deck.

Figure 14

3. Independent of which type of ocean vessel or container type, all shipments MUST have securing points for proper lashing and securing.
4. Due to longer transit times, protection from corrosion and humidity is greatest when shipping by ocean.
5. Container equipment can be used as outer packaging as long as the container is delivered to final destination and can be used for storage. Products inside must be properly blocked and braced

c) Land
1. Typical equipment types are closed vans or open deck flatbeds.
2. Closed vans normally require a loading dock; flatbeds can be loaded/offloaded from any open side.
3. Less than truckload (LTL) shipments require added structural protection due to multiple terminal handlings and stacking/mixing with other company’s products.
4. The carrier MUST block loaded skids with wood or load bars to prevent shifting of the load during transport.
5. If the product is not fully enclosed, a tarp may be required by the supplier or carrier to protect from incremental weather
6. Independent of which type of equipment, all shipments MUST have securing points for proper lashing and securing.

2) Hazardous Materials (References to DOT and EPA apply to US shipments only).
   a) No GE Water shipments, either Intra-US or International, may contain any materials such as paints, stains, inks, paint thinners, solvents, or other materials that may otherwise render the shipment hazardous, (if the GE Water supplier is shipping hazardous materials not covered under the ordering specifications, then the following clause applies), “without the expressed written approval of the GE Water Buyer.” Hazardous shipments should move on their own set of documents (invoice, BOL).
   b) A supplier of hazardous material must provide the following:
      • D.O.T. proper shipping name
      • D.O.T. hazard class
      • Identification number (UN/NA)
      • Packing group (if applicable)
      • Exact weight of the hazardous material in each package
      • Required type of International or D.O.T. (diamond hazard) label
      • International or D.O.T. ground packaging requirements
      • 24-hour emergency response contact number
      • Or as required by the country of export and import and those countries located on the transport route.
   c) Package in accordance with rules and regulations of the IMO (International Maritime Organization), IATA (International Air Transport Association), and ASTM (American Society for Testing and Materials) packaging for hazardous materials and DOT, or in accordance with applicable regulations of your country.
   d) GE Water supplier must be in compliance with all OSHA rules, regulations and standards governing hazardous materials, their use and disposal as well as employee and public safety requirements mandated by OSHA, or in accordance with applicable regulations of your country.
      • 29 CFR - hazardous material requirements OSHA.
      • Compliance with all OSHA MSDS requirements.
   e) GE Water supplier must be in compliance with all EPA rules, regulations and standards governing hazardous materials, their use and disposal, or in accordance with applicable regulations of your country.
      • 40 CFR - hazardous material requirements EPA
f) Packaging must meet all regulations and requirements for the chosen mode of transportation. As well as country specific requirements not listed in this document.

1. **Ocean**
   - Title 49 (49 CFR) – Transportation
   - PART 176 - CARRIAGE BY VESSEL
   - IMDG (International Maritime Dangerous Goods)
   - IMDG (International Maritime Dangerous Goods) Code
   - Needs to reflect the Power & Water spec latest revision
   - Packaging GE Water Specification
   - In accordance with applicable regulations of your country and with all regulations of the countries located on the transport route where compliance is required because of off-loading of the vessel, as well as those regulations of the receiving country of the shipment.

2. **Barge**
   - Title 49 (49 CFR) - Transportation
   - PART 176--CARRIAGE BY VESSEL
   - IMDG (International Maritime Dangerous Goods)
   - IMDG (International Maritime Dangerous Goods) Code
   - Needs to reflect the Power & Water spec latest revision
   - Packaging GE Water Specification
   - In accordance with applicable regulations of your country and with all regulations of the countries located on the transport route, as well as those regulations of the receiving country of the shipment.

3. **Truck (Land Shipments)**
   - Title 49 (49 CFR) - Transportation
   - PART 177 - CARRIAGE BY PUBLIC HIGHWAY
   - Needs to reflect the Power & Water spec latest revision
   - Packaging GE Water Specification
   - In accordance with applicable regulations of your country and with all regulations of the countries located on the transport route, as well as those regulations of the receiving country of the shipment.

4. **Rail**
   - Title 49 (49 CFR) - Transportation
   - PART 174 - CARRIAGE BY RAIL
   - AAR (Association of American Railroads) Rule or Standard
• Needs to reflect the Power & Water spec latest revision
  Packaging GE Water Specification
• In accordance with applicable regulations of your
  country and with all regulations of the countries located
  on the transport route, as well as those regulations of
  the receiving country of the shipment.

5. Air
• Title 49 (49 CFR) - Transportation
• PART 175 - CARRIAGE BY AIRCRAFT
• ICAO (International Civil Aviation Organization)
• Safe Transport of Dangerous Goods by Air (ICAO TI)
• IATA (International Air Transport Association)
• Dangerous Goods Regulations
• Shippers Declaration
• Needs to reflect the Power & Water spec latest revision
  Packaging GE Water Specification
• In accordance with applicable regulations of your
  country and with all regulations of the countries located
  on the transport route, as well as those regulations of
  the receiving country of the shipment.

g) Packaging must follow all hazardous regulatory requirements for
   countries being exported to and the requirements of the sending
   country.

h) Hazardous materials being ground shipped must comply with all
   regulations of the countries located on the transport route.
1. Hazardous materials must be properly labeled, marked,
   documented, and placed carded in strict accordance with
   sections 172.000 through 172.600 of 49 CFR and all other
   applicable sections of 49 CFR as well as the requirements of
   all ISTA and IMO rules and regulations, if applicable, or in
   accordance with applicable regulations of your country and
   with all regulations of the countries located on the transport
   route, as well as those regulations of the receiving country
   of the shipment.
2. Proper labeling, marking and documentation for hazardous
   materials is the responsibility of GE supplier.

i) Testing of packaging, in certain cases, may be required when
   dealing with hazardous materials. Certification of the packaging
   may be necessary.

j) The supplier must declare any hazardous materials at the time of
   reporting shipping information to the logistics group. No
   Exceptions!
k) A copy of the shipper’s IMO declaration or IATA declaration along with the MSDS sheets (in English) must be presented to the logistics group a minimum of 48 hours prior to the arrival of the freight in the USA. There are No Exceptions! (Due to new regulation requiring that the manifest be provided to customs 24 hours prior to arrival of products or goods.)

l) Emergency Response Information Requirement

1. The GE Water Supplier must provide an MSDS (Material Safety Data Sheet) for all hazardous materials to be shipped.

2. The GE Water Supplier must follow strict emergency response guidelines presented in sections 172.600 through 172.606 of 49 CFR and all other applicable sections of 49 CFR as well as the IATA and IMO rules and regulations if applicable, or country specific requirements.

3. The GE Water Supplier or manufacturer is legally responsible for the improper marking, packaging, or documentation of all Hazardous Material Shipments for GE Water.

6.8 HANDLING

1) Load Stability

a) Pallets/Crates/Cartons that have unstable loads have wood and/or steel bases designed to prevent tipping of packaged item. Base of packaging must be oversized to compensate for off center of gravity. Product should be able to be tilted one end 22° from vertical and released without tipping over.

b) For tall narrow length and width items, the item should be positioned horizontally on the pallet if possible. (Laid down)

c) For tall narrow length and width items that are unable to lay flat the supplier should attempt to consolidate multiple units onto larger skid.

d) If consolidation is not possible and the item cannot be positioned horizontally, then the skid must be oversized by ½ the height in the length and width at a minimum.

2) Stacking

a) Packaging should be designed to allow for supporting a 90-inch stack height.

b) If item cannot be stacked it should be clearly marked “DO NOT STACK”, “DO NOT TOP LOAD”.

3) Manual and Powered Mechanical Lifting

a) Hand trucks/fork trucks/overhead lifting equipment. See Figure 15 below.
4) Shock/Tilt Sensors (examples shown in Figures 16 & 17).
   a) The purpose of these sensors is a visual indicator to the recipient that a more careful inspection of the product is needed.
   b) Activated sensors do not mean that the product is damaged. Apply if product meets one or more of the following criteria:
      1. Large, sensitive products in crates where concealed damage is a problem.
      2. Very fragile products that require special handling.
      3. Shock sensitive products with a history of damage.
      4. Tall, top heavy products prone to tilting
      5. Special packages designed specifically to ship upright.

For internal shipments, GE Water Engineering will determine if GE Water Shipping will need to install sensors prior to crating, loading, or coordinate with Shipping on when best to conduct this task.

Figure 15