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## Handling and Installation of Fiberglass Tanks

HEE is not responsible for damage to its products through improper installation, maintenance, use or attempts to operate it beyond its mechanical or electrical capacity intentionally or otherwise. HEE is also not responsible for damage due to unauthorized repair.

All information, recommendations and suggestions appearing in our literature and catalogs are based upon tests and data believed to be reliable. However, it is the user's responsibility to determine the suitability of our products for each application.

The following HEE fiberglass tank handling and installation instructions are designed to help customers install Fiberglass Chemical Storage Tanks properly and in a minimum of time. Proper tank handling and installation are extremely important to long term corrosion resistance and low maintenance tank life.

Tank handling and installation instructions outlined in this brochure are only recommendations and do not relieve the purchaser from full responsibility for proper inspection, handling and installation of the tank. Unknown situations and conditions, not covered in this brochure, are also the responsibility of the purchaser. Failure by the purchaser to take the precautions outlined in these instructions will void the tank warranty.

HEE specifically does not assume any responsibility for the unloading of tanks from commercial owned trucks. Shipment will be considered complete when the truck arrives at the job site and prior to removal of the tanks by the customer. HEE employees or representatives will not direct nor be responsible for the removal of tanks from commercial trucks.

The presence of a HEE employee or representative at the delivery or installation site does not relieve the purchaser of any of his responsibility for proper handling and installation.

### PREPARATION FOR SHIPMENT

HEE will take every precaution possible when preparing a tank for shipment. Small, open top, vertical vessels will not be covered for shipment unless so specified by the customer. Movement will be by lifting lugs, if specified, in the case of closed top tanks, eye bolts in the case of open top tanks, or the tanks may be installed on a pallet. If the tanks are installed on a pallet, they will be bolted or strapped to prevent movement.

Large vertical and horizontal tanks are shipped in a horizontal position by one of two methods. Normally these tanks are strapped directly to the truck deck. No shipping cradles or skids are necessary. An alternate method, if specified, is to place them on wooden cradles or wooden skids of appropriate diameter, contoured to the tank and fastened in at least two locations.

### TANK INSPECTION

The customer should arrange for an inspector or a responsible person at the jobsite to inspect and supervise the offloading of the tank. If damage has occurred during transit, it should be noted on the delivery receipt prior to signing acceptance. If damage has occurred, a claim should be filed immediately with the freight carrier by the purchaser. If a claim is not filed, the customer assumes all liability for a damaged tank. The purchaser accepts all future responsibility for any repairs not performed by HEE prior to the tank being put into service.

## TANK RECEIVING INSPECTION

The following should be used as a guideline in making an inspection of the tanks prior to unloading. Inspection should be made both inside and out.

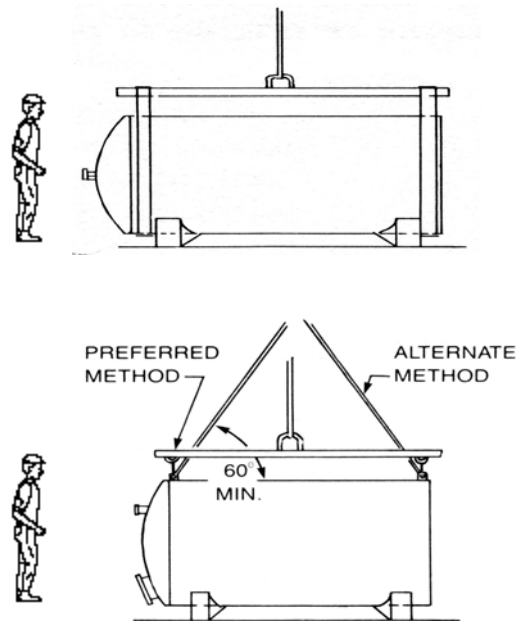
1. Always check the load for any signs of breakage, abrasion, shifting, or rotation that may have resulted in damage to the tank.
2. If shipping cradles are used, check for any signs that they may have moved, shifted, or rotated resulting in cracks or crazes at point of contact.
3. Check all nozzles, if applicable, to see if any damage has occurred.

## GENERAL HANDLING INSTRUCTIONS FOR TANKS

HEE tanks are designed to withstand normal handling procedures. Here are some normal precautions to follow to prevent damage to the tank:

1. Operators of hoist equipment should follow proper rigging procedures at all times. Care should be taken to prevent the tank from swinging out of control.
2. Always lift – NEVER roll or slide a tank.
3. When moving a tank, do not drop or allow hard impact.
4. Never let tools strike or drop on either the inside or outside of the tank.
5. Ladders used inside the tanks should be wood or have rubber protectors.
6. Workman entering a tank should wear soft-soled shoes.
7. Never use cables or chains around the tank.
8. Never lift a tank by using any fittings or appurtenance other than the lift lugs. When lifting lugs are not provided as part of the equipment, woven fabric riggen-slings of 3 inch minimum are recommended.
9. If storing tanks prior to installation, tie down securely. Tank should be placed only on firm level surface which is free of stones, tools and other small objects, because these cause high stress points. When stored outdoors, vessels should be adequately secured to prevent movement due to wind or water flotation.
10. Do not allow cables, hooks, or spreader bar to swing against the tank.

FIGURE 1 TANK HANDLING INSTRUCTIONS



## UNLOADING OF TANKS

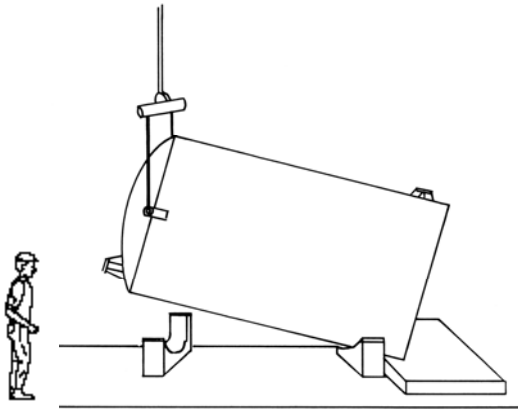
Palletized tanks can be safely removed from the truck using a forklift. All other tanks should be removed from the truck using the designated lifting lugs. For large-diameter tanks, a spreader bar and lines to appropriate lifting lugs, or a clevis and lines to lifting lugs shall be used to unload tanks shipped on a flat bed trailer. The angle between the lifting lines and top of tanks must always be 60 degrees or greater. When lifting lugs are not provided, tanks should be lifted off using two canvas or nylon slings or straps and a spreader bar which is attached to the hoist cable. These three methods of unloading are shown in Figure 1.

Large tanks should be righted, as shown in Figure 2, by hoisting with spreader bar and lines to the lifting or clevis and lines of lifting lugs. Adequate padding is necessary to protect the pivot point. Workmen should keep control over the tank with guidelines to insure the tank is gently brought to rest upon its base.

Use a spreader bar and lines or clevis lines to appropriate lift lugs to move tank when in an upright position.

Insure size of lifting equipment, lines, and clevises are capable of handling the weight of the tank.

**FIGURE 2 TANK HANDLING INSTRUCTIONS**



**Caution:**

All lifting lugs must be used properly.

**TANK INSTALLATION**

1. The support base for flat bottomed vertical vessels should provide full and uniform support over the entire bottom area. The support base should be properly designed to prevent settling or deflection under maximum design loads.

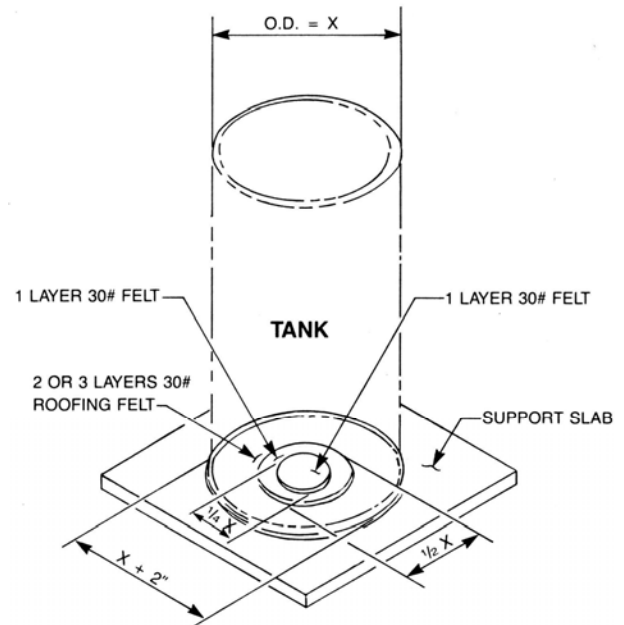
2. The support base surface should be nonporous and free of cracks, depressions and vertical projections. Reinforced concrete, trowel finished to American Concrete Institute Specifications (ACI-301-72, Section 11.7.3, "Trowel Finish") is often used as a support base.

3. Vertical equipment having a cone or dished bottom will have an alternate type of mounting arrangement such as a FRP or steel skirt, or legs. These must be considered as special cases, for each unit will have its own condition of load concentration. Special support design is therefore required for each individual installation.

4. Each flat bottom unit should be set on a cushioning pad to minimize stresses caused by seams, shrinkage distortion, and/or support base irregularities. Where irregularities are less than 1/2 inch (12.7 mm) in depth; several layers of 30lb. roofing felt equal in diameter to the outside diameter of the equipment plus 2 inches ( O.D. + 2 in. ), should be laid directly on the surface of the support base.

The center of the pad should be built up by the addition of two layers of the same material, one equal in diameter to 1/2 and the other 1/4 the diameter of the equipment, (See figure 3).

**Figure 3 -Flat Bottom Tank Installation Instructions**



5. A suitable pad sheet material or proper environmental resistance material may be substituted for the roofing felt.

6. Where irregularities in the surface of the support base are greater than 1/2 inch (12.7 mm) in depth, as asphalt type of paving mastic can be troweled into these areas and pressure or tamped to provide a reasonably hard, flat and level surface. Time should be allowed for the mastic to harden (4 hrs. minimum) before the first layer of roofing felt is applied.

7. Where a vessel has a bottom drain, provisions should be made in the base pad with clearance so that contact will not occur between the pad the nozzles or nozzle flange.

8. Where a trench in a base pad is required to accommodate bottom discharge piping, a structural trench cover should be installed flush with the top of the base pad to minimize the unsupported area of the tank.

9. All flat bottom equipment should be secured in place by bolting to the base pad through hold down lugs. This precaution will minimize the chance of equipment damage at nozzle locations and area of other attachments due to movement of the unit.

**DO NOT** tighten down hold down lugs until tank is filled. Shims should be placed beneath the tie-down lugs, where needed, and the hold-down bars then bolted down securely. Avoid building up the shims so high that the tank load could be carried by the tie-down lugs rather than by the tank bottom.

10. All vessels nozzles below the liquid level should be joined to piping through a flexible connection. A shutoff valve should be connected directly to the nozzle with a flexible bellows or hose joining the valve to the piping.

11. Valves which are attached to tank nozzles should be independently supported so that closing and opening of a valve does not transmit the total torque load directly to the nozzle.

12. Flanged nozzles have standard ANSI 150lbs. flange bolt hole arrangement. Full face gaskets are to be used. Gasket material exceeding 70 durometer (and less than 1/8" thick) should not be used. Metal washers should be used under all bolt heads and nuts which would otherwise be in contact with the FRP flanges. Nut and bolt threads should be lubricated prior to tightening. Bolting take-up torque should be applied uniformly, alternating 180 degrees and rotating as near 90 degrees as possible. Refer to Table 1 for recommended torque requirements.

**Table 1**

Nominal Flange Diameter (inches)	Torque Increments (ft-lbs)	Recommended Torque Full-Pressure Seal (ft-lbs)
1/2 - 4	5	20
5 - 12	10	30
14 - 16	10	50
18 - 20	10	60
24 - 36	15	75

**TANK LIMITATIONS**

**ENVIRONMENT**

1. This tank has been sold for a specified chemical storage application. Because certain chemical environments will damage the tanks, please consult HEE on change.

**INSTALLATION**

1. Follow all handling and installation instructions.
2. Tank requires smooth continuous bottom support.
3. No Sharp projections are allowed under tank bottom.
4. Tanks must be anchored when used outdoors.

**AIR LOADING**

1. Tank *must* be vented during filling periods.
2. Hold down lugs *must* be secured to the pad per current HEE Installation Instructions and tank design calculations.

**PRESSURE/VACUUM**

1. Unless specifically designed for pressure/vacuum service, tanks are for atmospheric services only and pressure/vacuum is not to be applied to tank. Consult an HEE representative before any pressure/vacuum other than liquid head is applied.
2. For tanks specifically designed for pressure/vacuum service, see the tank's nameplate for maximum design/operating conditions.

**PRODUCT STORAGE**

1. Do not exceed conditions of storage as specified on service label.
2. If storage environment changes are required, contact a HEE representative for approval of new conditions.
3. Do not allow stored material to freeze.

**VENTING SYSTEM**

1. Do not restrict tank vent. Modifications to tank venting may result in over pressure or over vacuum conditions.

**CAPACITY**

1. Filling above the tank straight-wall height may result in structural damage to the tank.

**ACCESSORIES**

1. Agitators, mixers, and coils or other accessories must be supported as recommended and approved by HEE.