Commander Series Tank

Operating Manual

BigPondTankTM

PCI MFG.

Contents

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I. Overview

Congratulations on the purchase of your Mobile Pond from PCI Manufacturing, LLC. The tanks are fully engineered and designed to enable customers to store large volumes of fluids for fracing, construction, environmental or waste-water operations (see Section II, Designed Fluid Weight). The tanks are not intended to replace mobile storage tanks but will significantly reduce the number of tanks used in traditional applications. The Mobile Pond saves time in setup and fuel costs transporting to/from the site and diminish the environmental impact by reducing truck traffic and leaks associated with connecting multiple tanks on the tank battery.

Setting up the Mobile Pond is a quick and straightforward exercise. Once a location is selected and the site prepared by grading and compacting the surface, underlayment pads are traditionally used as the base for the tank walls. Many operators mark the pad with an outline of the diameter of the tank(s), allowing the setup crew to see where the wall sections need to be placed easily. Trenches are also often dug at this time to capture fluids associated with any minor leaks in the tank liners. Temporary supports hold up the first several panels until enough of the tank is built to allow it to support itself.

Panels are held together using an 11-lug system on the connecting plates that are 'pinned' together with the supplied hardware. While the *MobAssist™* can manipulate the panels in most cases to allow the pins to drop in place, bolt-down clamps are also provided to allow the panels to be clamped together, making pin installation easy.

Many customers start hanging the liner once the first several panels are up using the aluminum liner clamps included with the pond. The number of clamps varies with the diameter of the pond, and they are fully de-burred to prevent damage to the liner. They are installed at the top of the panels around the perimeter of the tank, except where the suction line(s) will be installed. The weight of the aluminum suction line requires that they be set directly on the top of the panel, while the rest of the accessories are typically placed over the liner clamps.

Once the tank is complete, accessories can be mounted using the supplied U-bolt kits. Standard accessories include:

- Eight (8) 4" fill lines
- Three (3) circulation lines
- One (1) 12" steel suction line with 4" recirculation line attached
- Two (2) entry/exit ladders
- Eight (8) temporary panel supports
- One (1) observation platform and ladder

Optional accessories include the *MobAssist™*, PCI's patened articulating mast that allows easy manipulation of the tank panels from the truck to the installation at the site. Other optional accessories are offered and discussed in Section VII, Installing Mobile Pond Accessories.

II. Storing and Transporting Panels

Panels for the Mobile Pond are designed to form a circle the diameter of which will hold the stated capacity when filled to 11.5 feet. Each panel has its own unique 'curvature' that, when fully assembled, forms a perfect circle. As such, panels should never be swapped, modified or used in any other manner than the original design. The panels are not interchangeable (from one size to another) and cannot be used to form larger or smaller diameter ponds.

The benefit of this design is that panels are stackable, limited only by height restrictions on US highways (13' 6") or by the maximum height of the tele-handlers in a company's yard. In most cases, the panels associated with the most popular Mobile Ponds (24,000, 35,000 and 40,000 bbl) may be transported on three flatbed trucks by stacking up to six panels on each trailer.

When storing or transporting panels, it is critical that the panels be properly supported to maintain their structural integrity and ensure proper fit during assembly. Three (3) temporary supports are provided with each Mobile Pond with initial shipment(s). Examples of the supports that may be used when storing or transporting panels are shown in Appendix A.

III. Site Preparation

Site preparation to install a Mobile Pond is largely driven by the diameter of the tanks. Following is a table showing diameters for the various sizes offered by PCI Manufacturing as of June 1, 2012. (See Appendix B for more details.)

- 9,000 Barrels: 75' diameter
- 24,000 Barrels: 125' diameter
- 35,000 Barrels: 150' diameter
- 40,000 Barrels: 160' diameter
- 48,000 Barrels: 175' diameter

The site for Mobile Ponds must be level with a 30' buffer (e.g., more than the diameter of the tank) to allow sufficient room to move the tele-handler installing the panels. If the site must be leveled to install the tank, it is critical that the tanks be installed only on the 'cut side' of the location, never the 'fill' side, as excessive settling may occur when the tank is filled. See Appendix B for details regarding the soil preparation required before setting a pond.

The center point for the pond should be marked and the perimeter of the tank outlined (spray paint works best) in order for a tractor or bobtail to level the area where the panels contact the ground. *This is the most critical step in the process (ensuring the perimeter is absolutely level), as this will directly affect fitment of the panels to one another, particularly the first three to four panels.* PCI strongly recommends that the elevation be shot (measured) around the perimeter to be certain panels will lie evenly on the ground. The less deviation in perimeter elevation, the faster the panels can be assembled. Based on past experience, not leveling the perimeter can turn a 2.5-hour job setting up panels into a 6- to 8-hour project. The inside, however, can have some leveling variation, as this does not affect panel installation or compromise liner integrity.

While not mandatory, it is best to compact the entire Mobile Pond site before setting the panels; this will minimize settling once the Mobile Pond is filled. No specialized materials are necessary—customers should ensure the surface is smooth enough to lay the tank's pad without any sharp objects pointed upward; sand is the most common material used to ensure a smooth, uniform surface.

III.I. Site Preparation

The following is an approved Commander Series alternative ground prep SOP which can be implemented with the approval of Client representative. Taking care to insure the base is prepared correctly will make the setup safer, easier, shorter duration, and prevent possible base failure.

- The site should be level and any slope greater than 18" across the diameter of the tank foot print will require approval/signoff by the customer.
- Tank should rest on a flat, stable soil base with a bearing capacity of 1,500 PSF
- All subgrade under the footprint – either prior to fill or after cut – must be scarified & moisture conditioned to at least 12" deep
- That subgrade & all subsequent fill must be moisture conditioned & compacted to at least 95% standard compaction
- If the site is too wet to achieve specified compaction, the wet material may have to be removed and replaced with a structural fill, ¾ minus road base, or other suitable material and compacted.
- The compacted area should encompass the entire foot print of the tank plus (6) six feet outside the perimeter. (See Appendix B.1)
- The inside of the center area should be graded to drain down to the suction intake area.
- The grade (slope) should be such that it drains the base area water to the intake suction.
- The final end elevation should be low enough to cover the intake suction with water when the structure is being drained.
- The low point (suction sump) will be about (1) one foot in distance from the inside bottom edge of the panel and (6) six inches deep.
- Care must be used when excavating the compacted area, and any compacted area disturbed close to the panel base must be compacted again.
- Clean fill sand should be used in case of minor base irregularities. After the panels are erected, and in case of uneven base conditions, the sand will be swept up against the panel's base to provide a sloping cushion to prevent liner from being pushed out.
- Care should be taken to eliminate low spots at the base of the tank where rain water may collect and compromise the bearing strength of the tank base.
- All rocks, debris, such as roots, shall be removed from within the tank foot print.

IV. Setting Up The Panels

Once the site is ready and the perimeter level, the pad should be placed on the site, marked at the center point and marked for the diameter for the tank(s) to make setting the panels easy. The perimeter line should be on the graded/leveled line discussed in Section III.

The MobAssist™ should be connected and tested to ensure a full range of motion and checked for leaking connections or lines. Ensure the hoses at the connection point are free to move without binding/pinching or contacting bolts or other objects on the arm. The MobAssist™ is a patented device designed to make maneuvering panels from the truck to the installed position onsite a breeze. The device attaches to most tele-handlers with a 12.5" wide boom, including SkyTrak, JLG, CAT and a variety of others, and requires that hydraulic 'wet lines' be installed out to the end of the arm to permit moving the mast. While not mandatory, the hydraulic lines allow full use of the BPT MobAssist™ in moving the panels around during the installation process. The MobAssist™ was recently upgraded; see Appendix C for more details.

Temporary panel supports (eight provided) should be used once the first panel is set to ensure it remains stable; the supports will not be necessary after the second panel is installed, depending on wind and other conditions.

As the panels are moved from the truck to the site, personnel should be ready with the air gun, ladders, bolt-down clamps and pins to assemble and secure the panel connecting plates. Personnel on the ground will guide the placement of the temporary supports into the respective slots on the panels.

The following steps should be taken to safely set up the first several panels:

1. Use the MobAssist™ to pick up the first panel off the trailer or ground and position it just above the perimeter line on the pad. If the site is on a tight location (minimal room around the perimeter), choose the most confined spot to set your first panel. Next, personnel should attach the four temporary panel supports before the operator sets the panel on the ground.
2. With the first panel set in place, the tele-handler operator can move to the second panel, following the same steps described previously.
3. Once four or more panels are in place, the temporary supports may be removed.

The tele-handler and MobAssist™ will help position the panel to allow the lugs on the left side of the panel to come through the holes on the right side of the adjoining connecting plate such that they fit flat against one another. Pins should be placed at the top and bottom of the panels, and, if needed, the bolt-down clamp may be used to bring the two plates close enough for the pins to easily drop in through the holes in the lugs. Appendix D shows pictures of the lugs with pins secured.

Many customers start pulling the liner up and over the completed panels after five to seven panels are set, reducing setup time. Care should be exercised, however, that the panels are stable enough to install the liner without toppling them.

PPE needed to set up a Mobile Pond:

- Four (4) universal fall restraint harnesses with 4' lanyards
- Four (4 pairs each) overshoes or steel-toe rubber boots

Tools needed to set up a Mobile Pond include:

- ¾" deep socket for the liner clamps and most accessories
- Air compressor
- Air impact gun
- 1⅛" impact socket
- Wrenches in various sizes, mainly ¾"
- SkyTrak on location
- Hammers
- 10' ladder
- Only needed without the MobAssist™: at least two long chains, 15' ⅜ DOS alloy chain sling, rated for 15,000-lb at 60 degrees
- Rope for liner clamps & tethering lifted loads
- Ten (10) cans inverted spray paint
- Four (4) 2" × 20' straps
- Four (4) 2" × 10' straps
- One (1) ⅜" × 15' DOS alloy chain sling
- Two (2) ⅜" × 30' chain with grab hooks
- One (1) 200' surveyor's tape measure
- One (1) 1" × 25" tape measure
- Two (2) rolls of duct tape
- Ten (10) liner vice-grip clamps
- Two (2) 18v cordless impact driver
- Two (2) ¾" ½" drive deep socket impact
- One (1) digging bar
- One (1) ½' air impact driver with quick-connect to hose
- One (1) 1⅛" ½" drive deep socket impact
- One (1) ⅜" × 50' air hose with quick connect to compressor
- One (1) 5/16" – 15/16" combination wrench set
- One (1) ¾"–1¼" combination wrench set
- Two (2) 4-lb drilling of blacksmith hammer
- One (1) 36" wrecking bar
- One (1) 24" aligning pry bar
- Four (4) square point shovels
- Two (2) round point shovels
- Seventy (70) sand tubes/bags
- Two (2) 10' step ladder
- One (1) 16' extension ladder
- One (1) Job Box for tools

Rental Tools/Equipment Needed:

- One (1) 8K–12K JLG or Cat tele-handler with a 12.5" wide boom (see Appendix C)
- Bucket loader or attachment for tele-handler
- Two (2) articulated man lifts (must be able to go up and over tank wall)
- One (1) 90 CFM gas-powered portable air compressor with quick connect to air hose
- One (1) 3500-W gas-powered generator

Miscellaneous:

- Five (5) yards of clean sand for the tank edges

V. Installing the Liner with Commander Series Clamps

Installing the tank liner may seem like a straightforward process. However, liner manufacturers offer a variety of different types, and special care must be taken to avoid weakening the liner when unfolding it for installation. An RWI, Commander Series Operation Supervisor will provide instruction concerning the deployment of the geotextile ground pad and liner. These instructions must be followed to insure the safest most accurate deployment possible.

Resource West provides unique stainless steel liner clamps with each Commander Series Tank. The number of clamps varies with the size of the tanks (e.g., the diameter). Once the liner is pulled up/over the top of the panel, the clamps can be dropped in place and the cleaver hammered into place to ensure the liner remains in place. Take care that the fill and suction lines are placed directly on the top of the Mobile Pond panel as to not interfere with the clamps.

VI. Installing Accessories on Mobile Ponds

PCI's Mobile Ponds come complete with accessories needed to fill, circulate and empty the tank as well as several safety and convenience items. A quick reference of standard accessories is shown in Appendix F. The standard BPT comes with the following items:

- Mobile Pond panels (numbers vary with tank size), complete with all mounting brackets needed to install standard or optional accessories
- Eight (8) 4" steel fill lines (other sizes available)
- Three (3) 4" steel circulation lines (other sizes available)
- One (1) 12" steel suction line with 4" recirculation line attaced
- Eight (8) temporary panel supports
- Six (6) bolt-down panel mating clamps
- Two (2) OSHA-required exit ladders
- One (1) 30" observation platform and ladder

Optional accessories include:

- MobAssist™
- 2" (average) thick foam insulation

The fill, circulation and suction lines are secured to the respective panels with the included U-bolt kits. Each panel has universal brackets that are welded in place to secure these accessories.
The exit ladders are also secured to the panels with bolt kits that use the universal brackets.

The supports for the observation ladder(s) attach to the panels horizontal bracing with supplied bolts. Typically, every panel has holes/provisions for the observation ladders; customers will need to decide in advance where the observation ladders will be bolted in place. Install the observation platforms bolts loosely to the panel until all are in place, and then proceed to tighten down the bolts to secure the ladder.

The *MobAssist*™ is a patented device designed to make maneuvering panels from the truck to the installed position onsite a breeze. The device attaches to most tele-handlers with a 12.5" width boom, including SkyTrak, JLG, CAT and a variety of others, and requires that hydraulic 'wet lines' be installed out to the end of the arm of the tele-handler to permit moving the mast. While not mandatory, the hydraulic lines allow full utilization of the MobAssist™ in moving the panels around during the installation process. See Appendix C for more details.

The optional 2" foam insulation is a Bayer Material Science product, BaySeal™ CC. This is closed-cell polyurethane foam providing both a high R-value and minimal air/moisture infiltration. See Appendix G for more information.

VII. Precautions

Customers should strictly abide by the following precautions:

- Fluids to be used with the Mobile Ponds should never exceed the design standard of 8.333 lb/gal.; contact Customer Care at Resource West should you have any questions regarding the impact of heavier fluids
- Mobile Ponds should be placed only on stable, level, compacted (ideally) soils on the cut side of a site, never the fill side. See Appendix B for further details regarding site preparation.
- Drivers should be reminded to unhook all hoses from suction lines before leaving the location. The fill line is designed with a 'break-away' flange where the hose connects; however, damage to the line(s), liner inside the tank and related equipment may still occur. See Appendix H for details on the break-away flange. Suction and circulation lines do not have a break-away device.
- Customers should carefully follow the manufacturer's procedures for installing and packing up the flexible pads and liners, as they can become damaged by being either stretched or creased during installation or while being folded up to move to the next location.

VIII. Customer Care/Helpline

PCI Manufacturing gladly offers onsite training for customers purchasing the Mobile Pond, allowing crews to become efficient in setting up and disassembling the tanks. See your Sales Representative for more information.

PCI further encourages customers to contact the pads and liner manufacturers to arrange for onsite assistance and training to ensure the longest useful life of these items.

Should customers experience any problems or need replacement parts or additional accessories, they may call our toll-free number at 800-256-5633 and ask for the Customer Care or the PCI Sales Department.

IX. Appendix A: Mobile Pond Supports

Supports used to transport and store panels.

X. Appendix B: Site Preparation

Site Preparation

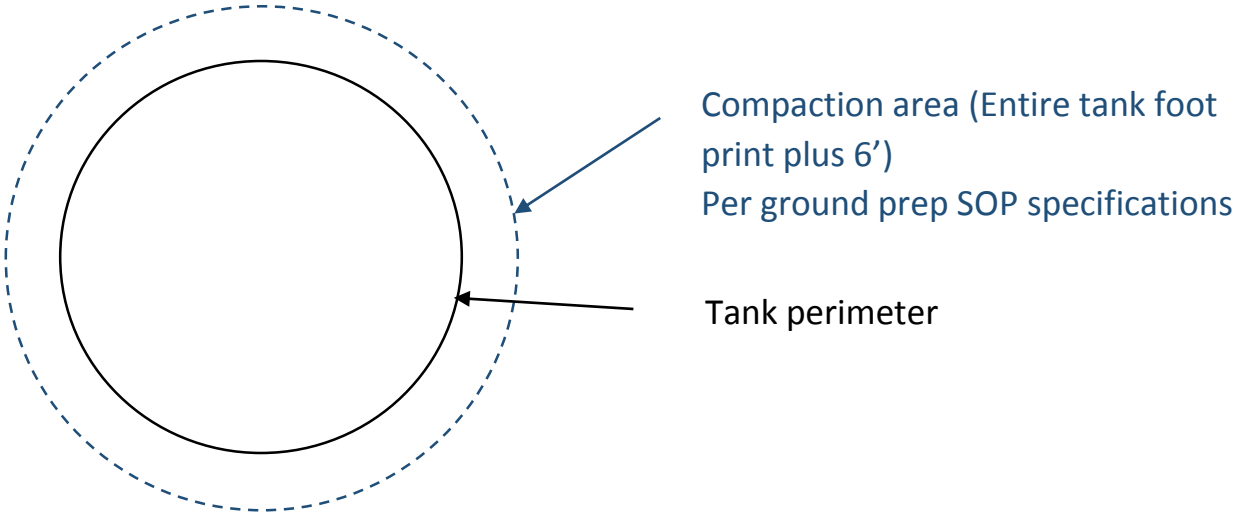
Note that the site is cleared of debris and flat.

The minimum requirements for subgrade prep under a mobile pond are as follows:

All subgrade under the tank's footprint—either before fill or after cut—must be scarified and moisture-conditioned to at least 12” deep. That subgrade and all subsequent fill must be moisture-conditioned and compacted to at least 95% standard compaction. The subgrade also needs to be graded completely level under the tank footprint. An 8” layer of either pit run gravel or crushed aggregate with a maximum particle size of 2.5” is required for a working surface and a moisture barrier on top of the compacted subgrade. The entire area under the tanks should be covered with rock, and it should extend outside the tank perimeter at least 20 ft. This layer must also be moisture-conditioned and compacted to 95% standard. There can be no dips or humps in the final surface under the tank. If the surface finish is course or has sharp rock shards, a thin layer of sand may be required to prevent the liner being punctured. The pad must be level to accommodate the panel installation, to ensure the ability to fill the tank to 11.5 feet and to allow a consistent 6 inches of free board at the top of the tank wall.

COMMANDER Series
ABOVE GROUND STORAGE TANKS

X. Appendix B.1: Site Preparation



The site should be level and any slope greater than 18" across the diameter of the tank foot print will require approval/signoff by the customer. Tank should rest on a flat, stable soil base with a bearing capacity of 1,500 PSF, all subgrade under the footprint – either prior to fill or after cut – must be scarified & moisture conditioned to at least 12" deep. That subgrade & all subsequent fill must be moisture conditioned & compacted to at least 95% standard compaction. If the site is too wet to achieve specified compaction, the wet material may have to be removed and replaced with a structural fill, ¾ minus road base, or other suitable material and compacted. The compacted area should encompass the entire foot print of the tank plus (6) six feet outside the perimeter (See above). The grade (slope) should be such that it drains the base area water to the intake suction. The final end elevation should be low enough to cover the intake suction with water when the structure is being drained.

The low point (suction sump) will be about (1) one foot in distance from the inside bottom edge of the panel and (6) six inches deep. Care must be used when excavating the compacted area, and any compacted area disturbed close to the panel base must be compacted again.

Clean fill sand should be used in case of minor base irregularities. After the panels are erected, and in case of uneven base conditions, the sand will be swept up against the panel's base to provide a sloping cushion to prevent liner from being pushed out. Care should be taken to eliminate low spots at the base of the tank where rain water may collect and compromise the bearing strength of the tank base. All rocks, debris, such as roots, shall be removed from within the tank foot print.

XI. Appendix C: BPT MobAssist™

MobAssist width (standard spec)—12.5"

XII. Appendix D: Mobile Pond Lugs with Pins

Connecting plate pin placement

Connecting plate 'suck down' caps

Temporary panel supports, Gen II