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Double Wall Tanks - OTSB400 / OTSB750 / OTSB1000 / OTSB1500

Installation Instructions

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Preface:

INSTALLATION SAFETY SUPPLEMENT

Double Wall Tanks - OTSB400 / OTSB750 / OTSB1000 / OTSB1500

Compatible Fluids = Oil, Diesel Fuel and Automotive Motor Oils only.



IMPORTANT

1. Macnaught supports the manufacturers recommendations that the tanks are for indoor use only.
2. Due to the weight limitations of the double wall tanks, Macnaught recommends that any dispensing equipment be remote mounted (e.g. Wall, Gantry etc..) and not mounted directly onto the tank.



CAUTION

3. As per the manufacturers recommendations:-

- a. The maximum weight applied to the top of the tank must not exceed 9kg.
- b. The maximum weight applied to the plastic bung openings (nozzles) on top of the tanks must be no more than 2.27kg.

* Please refer to the Roth installation instructions supplied with the tank for detailed installation information and instructions.

4. It is the responsibility of the installer to ensure that the tank has been installed safely and securely using the appropriate hardware as required to comply with the local and state installation and laws and regulations.

Macnaught does not accept responsibility for damages or loss caused to or contributed to by the installation.

Please refer to Macnaught's Terms and conditions for full warranty details.



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Construction:

1. The Roth EcoDWT plus 3 storage tank is a double wall tank (DWT) providing both primary and secondary containment tanks for #2 oil, diesel fuel and both new and used automotive motor oils. It is engineered to be the finest storage tank available for residential and light commercial use and one that will provide decades of trouble free service.



2. As the name indicates, it is the ecologically sound choice for oil storage, additionally providing three distinct advantages (the “plus 3”) over common single wall tanks: superior fire protection over most single wall tanks by keeping the oil cooler and therefore less stress on the tank seams, as shown in UL fire tests; the combination of a steel tank encasing a plastic tank protects the oil products, particularly bio-fuels, with the best light and diffusion barrier; when properly secured in place, the double wall tank provides excellent safe oil storage in flood prone locations, a record established in over forty years of use.



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3. The primary containment tank is made of high density polyethylene resin and is formed by a rigorously controlled blow molding process. Polyethylene is a material that combines flexibility with very high resistance to the corrosive effects of both acids and water. Acids are found in all oil products and are, in combination with water, the primary cause of steel tank failure. Water is commonly found in oil storage tanks from water vapor, introduced by the vent piping primarily during the emptying of the tank, condensing inside the tank as the air cools when in contact with the cooler oil. The use of polyethylene, with its high resistance to corrosion, essentially eliminates the foremost reason for oil tank failure.

4. The secondary containment tank is made with 19 gauge galvanized steel. The use of steel offers strength to resist damage to the inner tank from impacts by other objects, rigidity to support the flexible inner tank, and the ability for electrical grounding of the tank where required by local code. The outer tank sides and bottom are formed from one sheet of steel, which is then shaped to receive the panels used at each end of the tank. The seams are caulked and then rolled in a three step robotic procedure, producing a strong, fluid tight and weld-free joint.

5. Each inner and outer tank is tested for defects and liquid tightness. The inner tank is pressure tested to 4.35psi. It is also weighed to make sure it contains the correct amount of material, and finally measured ultrasonically at critical points to verify that it has the required wall thickness. Each sheet of steel for the outer tank is inspected for damage or blemishes that could compromise the galvanized coating. Once the outer tank is assembled, it is pressure tested to .25 - .30psi to ensure the integrity of its seams. The inner tank is then placed inside the outer tank, gaskets placed around the four openings of the inner tank, and the outer tank top installed, riveted into place, and its edge rolled. The leak detector, #3 gaskets, plastic and die-cast metal adaptors, cap nuts and dust plugs are then installed, labels affixed, the warranty packet and tank base placed on top of the tank, and finally a protective plastic shrink wrap is put over the top of the completed tank.

6. The completed tank has four connections at the top and, unlike a standard steel tank, none elsewhere. By eliminating a connection below the oil level in the tank, a potential source of leakage is eliminated. The four connections can be used interchangeably, providing the installer with greater flexibility in accommodating difficult or unusual piping installations.



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Models and Specifications

Tank Model	DWT 400L	DWT 750L	DWT 1000L	DWT 1500L
Nom. Capacity US gal (litres)	110 (400)	165 (620)	275 (1000)	400 (1500)
Length inches (cm)	29 (74)	29 (74)	43 (110)	64 (163)
Width inches (cm)	28 (72)	28 (72)	28 (72)	30 (76)
Height inches (cm)	44 (112)	61 (155)	61 (155)	68 (173)
Min. Height Req'd inches (cm)	49 (125)	66 (168)	66 (168)	76 (193)
Weight lbs (kg)	106 (48)	132 (60)	167 (76)	333 (151)
Shipping Weight lbs (kg)	115 (52)	143 (65)	185 (84)	358 (162)

Third Party Testing and Approvals

1. Consistent with the company's goal of providing the finest storage tank available, the Roth EcoDWT plus 3 meets and exceeds all applicable codes.
2. The primary U.S. code governing oil tank manufacturing and installation is the National Fire Protection Association (NFPA) code, Section 31.
3. The corresponding Canadian code is CSA B-139.
4. The Roth EcoDWT plus 3 has been tested by both the U.S. and Canadian divisions of the Underwriters Laboratories (UL). As a result of passing stringent fire and safety tests, the Roth EcoDWT plus 3 is listed under UL standard SU2258 and each tank bears the UL mark - c UL us.



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IMPORTANT

Unpacking and Inspection

1. The top and upper portions of the Roth EcoDWT plus 3 are covered with shrink wrap plastic designed to keep the top of the tank weather tight. The shrink wrap must be left in place until the tank has been moved inside. It is transparent, so the tank top and connections can be examined for damage. The base for each tank is shipped on top of the tank to protect the fittings during shipping.
2. The tanks are inspected for damage before shipment from the manufacturing facility and must be inspected for shipping damage upon delivery. If damage is found, contact the shipper.
3. In the course of shipping and handling after the tanks leave the Roth warehouse, some minor denting and scraping of the tanks may occur. Minor scratches and scrapes on the surface of the galvanized steel outer tank can be easily repaired by cleaning the surface with any common degreaser and then coating the affected area with any zinc bearing paint designed for such repairs. Most hardware and building supply stores will carry one or more brands of galvanizing repair products.
4. Dents of a $\frac{1}{4}$ inch depth or less above the curved portions of the sides or in the end panels are generally considered minor and will not affect the integrity of the tank. If the deepest part of the dent forms a sharp projection against the inner tank, or if the dent is on or below the curved sides, this can abrade the surface of the inner tank over time and weaken it. A tank damaged in this way should not be used.
5. If the rolled seam has been struck and is distorted to the left or right $\frac{1}{4}$ inch or less, the sealing compound will still be intact. Any seam distorted more than $\frac{1}{4}$ inch or directly dented in will have the sealing compound compromised and should not be used. Any tank installed with unacceptable dents will not be covered by the warranty.



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Tank Installation

Site Selection

1. Level surface - The Roth EcoDWT plus 3 is an upright tank having a higher center of gravity than a standard single wall tank. This design allows a smaller footprint than a typical single wall tank. The result is also a taller tank profile, requiring the tank to be installed so that it is plumb to within a ½ inch of vertical, as checked on both an end and a side. If the tank is not plumb the proper alignment of piping connections will prove difficult, especially with the use of expansion kits for multiple tank setups. The accuracy of the gauge and the correct operation of the vent whistle will also be affected. If the tank is more than ½ inch out of plumb, then the surface must be leveled with an appropriate leveling compound or the product warranty is void.

2. Weight bearing capacity - Since #2 oil weighs 7.2 lbs/gallon, a model 1000L (275 gal.) tank will hold approximately 1730 lbs when full, which brings the total weight of the tank to about 1900 lbs or just short of a ton. Since the model 1000L has a footprint of 8.3 ft², this means the load bearing surface is carrying about 227 lbs/ft². NFPA 31-7.3 and CSA B-139: 7.3.8 have specific requirements for oil tank foundations that must be followed. The base for the Roth DWT requires full contact support under each of the tubular legs to produce a properly stable installation. Use of masonry blocks such as pavers, sidewalk blocks, and cement wall blocks will not provide sufficient support and, if used, will void the warranty.

3. Minimum clearance - A minimum of 2 inches of clearance is needed between the Roth EcoDWT plus 3 and any wall, post, or other permanently installed structural member, support, or barrier. When the tank is filled with oil, its sides could expand horizontally as much as 2 inches, so the clearance is required to prevent contact between, and undue pressure being applied to, either the tank side or the structure next to it. This distance also allows for inspection of the tank sides. CSA B139: 7.3.5 states that a minimum clearance of 460 mm (18 in) be made along one side and one end for service accessibility. Roth recommends that 2 FT (24") of clearance be left above the tank to facilitate removal of the leak detector. Installations with greater than the required minimum clearance, but less than 2 FT of overhead clearance shall not void product warranty.



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4. Proper drainage - Although the Roth EcoDWT plus 3 outer tank and base are made from galvanized steel with a minimum expected life span of 30 years with normal use, prolonged exposure to water and water-borne salts and/or acids can significantly reduce that life span. It is very important that the tank installation site has good drainage, and that the surface the tank rests on is dry for the majority of the time. Any water from wash areas or water softener units must be directed away from where the tank is located. In the same way, tanks installed outside must be protected from run off from higher ground or adjacent structures that can undermine the support structure or expose the tank to corrosive conditions (such as rainwater containing acids generated by wood burning appliances and deposited on structure roofs).

Locating the tank

1. Make sure the tank will fit through all doors, stairs, halls, and turns taken to reach its intended placement. The tank cannot be dismantled or otherwise altered to make it fit through smaller spaces and any attempt to do so will destroy its structural integrity as well as void the warranty.
2. Examine the desired tank location for deficiencies in the load bearing surface, such as irregularities, slope, and dampness. If a level pad will be poured on the existing floor, it should extend 6 inches past all exposed sides of the tank.
3. Examine planned pathways of the fill piping, vent piping supply line for distances and obstructions. The tank should have no more than 25 feet of fill piping. There is 4.35 gal of oil in 25 ft. of 2" fill pipe. Greater lengths of fill piping increase the possibility of a tank overflow caused by the amount of oil still in the piping that will need to drain into the tank after the vent whistle stops sounding.
4. If the length of the fill pipe will exceed 25 feet, Roth can, upon request, supply a vent alarm with a longer sounding tube which will be blocked by the rising oil level sooner and therefore stop whistling earlier, alerting the driver to stop filling the tank. Some reduction in average capacity may result with the use of special order vent alarms.
5. Maximum oil supply (and return where applicable) lines length shall be in accordance with the burner/pump manufacturer's recommendations.
6. The following installation guidelines must be followed when considering tank separation distance from the heating appliance: Minimum separation distance 5Ft.



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7. Because the connection points of the inner polyethylene tank project above the outer tank top, the DWT must not be installed near a window that will allow exposure to sunlight (UV radiation) on these connections. Although the polyethylene does have limited UV inhibitors in it, prolonged exposure to sunlight can start breaking down the exposed plastic. The same precaution applies to the clear plastic cover on the leak detector.

8. After the site is prepared, remove shrink wrap and other packing materials and thoroughly inspect the tank and accessories for any hidden damage or missing parts. If damaged, contact the wholesaler the tank was purchased from for resolution.

9. Once the inspection is complete, the installation can begin. Each tank has 4 connection ports on the top. These can be used interchangeably during installation for the various tank fittings, providing maximum flexibility for the planned connections.

The certification label on the tank should be visible after installation.

Tank Base Installation

1. The Roth EcoDWT plus 3 uses a one piece base assembly, known as a cradle base, for support. This base is shipped on top of the tank to provide protection for the fitting connections and is held in place by the shrink wrap plastic.

2. The base consists of two or more steel tubular “legs” running horizontally the full width of the tank with the cradle assembly attached to them. The design of the base requires the legs to be in contact with the floor for their entire length, or distortion and possible failure of the base can occur.

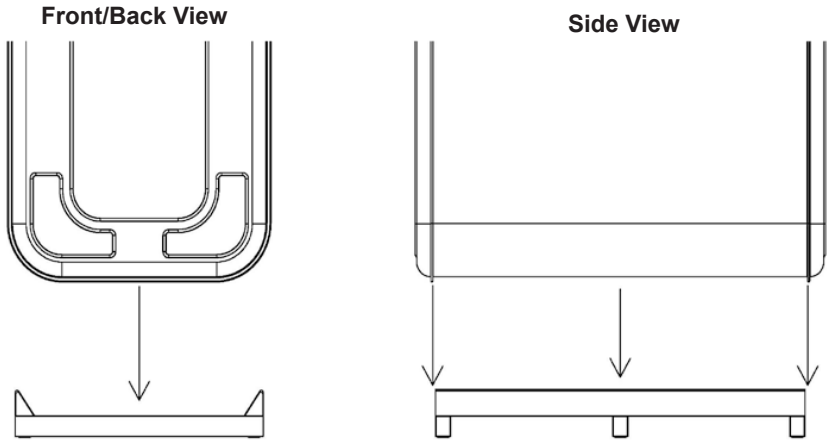
3. Once the site is ready for the tank to be set in place, simply set the base on the floor in the approximate location the tank will be installed and place the tank on the base. There is no need to connect the base to the tank, as it is designed to lock in place when the tank is filled with oil. Once the tank is on the base, the unit can be easily slid to its permanent location, allowing for proper clearances.

Failure to use the base will result in eventual tank failure and will void the warranty.



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Piping Connections

1. All connections to the Roth EcoDWT plus 3 use a flat rubber #3 gasket to seal against the tank opening and to ensure the connection is odor free. The various fittings are secured to the tank with a large black plastic cap nut. Once installed, 18 ft-lb of torque applied to the cap nut seals the connection; hand tightening is the acceptable equivalent of this. The connections to the tank are designed to seal against atmospheric pressure only and not the higher fluid or pumping pressures. It can not be considered an oil tight connection. In the event the tank is overfilled, the connection may allow oil to seep onto the top of the tank.
2. All fill and vent piping for the Roth EcoDWT plus 3 shall be wrought (black) iron or steel. The use of copper piping is not permitted. When replacing an existing tank connected to copper fill and/or vent piping, the copper piping shall also be replaced to conform to the above regulation.
3. The piping connections for the tank are designed for 2" pipe with NPT threads. Although NFPA 31 – 7.5.9 allows the vent pipe to be a minimum diameter of 1 1/4", Roth Industries requires that the vent pipe be 1 1/2" minimum diameter for its complete length to the outside termination. The 1 1/2" NPT piping is required to keep the tank from being over-pressurized during filling. The vent pipe must be the same diameter or larger than the fill pipe.
4. The fill pipe diameter for above ground oil storage tanks under 660 gallon capacity is not specifically addressed in NFPA 31. Minimum fill pipe allowable by Roth for installation of the DWT is 1 1/2" NPT for its entire length to the outside termination. Failure to use 1 1/2" diameter or larger piping for both the fill and the vent piping on the Roth tank will void the warranty.



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Example:

If a DWT is being installed as a replacement to an existing tank and the installer decides to use an existing 1 1/2" fill line re-plumbed with the required swing joints, the piping from the vent whistle to the vent cap outside the building must also incorporate the swing joints and be a minimum of 1 1/2" NPT as well.

5. Do not use pipe sealants or PTFE tape on any threaded plastic connections, as these products can cause the plastic to degrade. These sealants can be used on metal to metal connections.

6. Both fill and vent pipes must be constructed with swing joints between the tank openings and the point where the piping exits the tank room wall or ceiling. When the Roth EcoDWT plus 3 is filled, its sides expand and the top correspondingly drops. Although the drop is only 1/4 inch or less, if it is not compensated for a gap will form between the tank fitting, fitting gasket, and tank opening, permitting oil fumes to seep from the tank into the surrounding space. Swing joints permit the piping to move with the tank as it expands and contracts. Note: Installation should be monitored during first fill to verify leak tightness of pipe joints. Tank fittings should be checked immediately following first fill to insure piping alignment. To do this, remove the large cap nut on the tank fitting and check for gaps between the adapter fitting, gasket and tank opening. Adjust piping alignment, if necessary, to eliminate any gaps. Re-tighten cap nuts per instructions

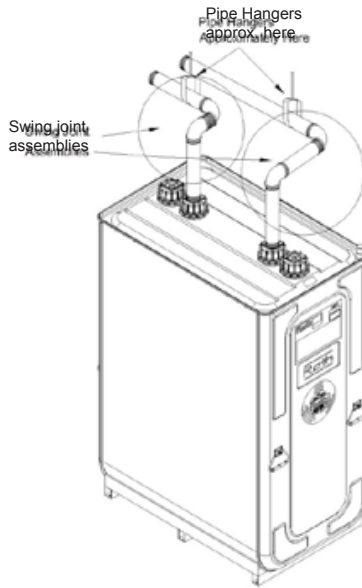
7. The elbow closest to the tank directs the pipe coming from the tank to a direction parallel to the wall that fill and vent points will be located on. The second elbow then turns the pipe to pass through the wall to the outside.

8. The use of the swing joint also allows the pipes above the tank to meet the code requirement that they be pitched toward the tank to ensure drainage of all the fuel from the pipes.

9. Be sure the piping connections are perpendicular to the tank top and produce uniform sealing at all points with the surface of the tank opening.

10. The horizontal runs of fill and vent piping must be pitched toward tank connections to ensure no oil remains trapped in the pipes after filling.

11. The fill and vent piping must terminate outside with approved fittings and be properly secured to the structure according to the requirements of NFPA 31, CSA B-139 and local code.



Fill Piping

1. Each tank has one 2 inch die-cast NPT adapter shipped with it to be used for connecting the fill pipe to the tank. Thread the fill pipe into this adapter and proceed with the piping to the fill point outside the building.
2. The metal to metal connection between the fill piping and the adapter must be sealed with pipe sealant or tape suitable for petroleum applications.
3. The fill (and vent) piping must be supported with hangers so that its weight will not deform the plastic connections or tank top. The maximum distance between hangers is 10 feet for 2 inch pipe .The first hanger must be as close to the swing joint as possible.
4. The piping connection at the tank must be plumb to prevent distortion of the plastic cap nuts and to ensure proper sealing by the flat rubber gasket.



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Vent Piping

1. The required vent alarm is a safety device with 2 inch NPT threads designed to receive a 2 inch vent pipe. It produces a whistling noise from the air being forced through it as the tank is filled with oil. Once the oil reaches the lower end of the sounding tube, the air is blocked from passing through the tube and is diverted to the bypass port. This silences the whistle and alerts the driver that the tank is full.
2. The metal to metal connection between the vent piping and the vent alarm must be sealed with pipe sealant or tape suitable for petroleum applications.
3. The requirements for proper pipe support, pitched horizontal runs, use of swing joints and the tank connection are the same as the fill piping (see 3-5 above).

Failure to use 1 1/2" minimum diameter vent piping or swing joints on vent and fill piping will void the warranty.

Yearly Maintenance

1. Inspect the site (floor or pad) for any shifting, cracking or unevenness. If any of these conditions exist the integrity of the tank and the installation may be compromised. Steps must be taken to provide a sturdy, level site for the tank.
2. Check that the tank is firmly and squarely set on the base.
3. Inspect all four sides of the tank, the base, and the top for any areas where the galvanized coating has broken down, allowing rust to start. If any spots like this are found, then lightly clean the area with steel wool or fine grit sandpaper, wipe clean, and then coat with any zinc bearing paint intended for galvanized metal.
4. Inspect all the seams in the tank, particularly the seam between the tank body and the top. If there has been excessive pressurization of the tank during filling, the rivets that hold the top in place can be seen pulling into or through the material behind them or the top's rim will begin lifting enough to expose the tank body's edge. If either condition is noted the tank will need to be replaced.
5. Check the plastic cap nuts for tightness. They have been found to gradually loosen with the natural expansion and contraction of the tank during filling and emptying, as well as the expansion and contraction of the plastic nuts themselves from the temperature changes. If they are loose turn them until they are hand tight. This will be sufficient to seal the gasket with the appropriate pressure.



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6. As pipe joints can loosen over time, inspect all pipe joints for evidence of leakage by oil. If such evidence is found, then contact an oil service technician or plumber to come and re-tighten the joints.

7. Inspect fill and vent piping for plumpness and that the piping slopes back to tank. Check to see the support brackets are secure and are keeping the weight of the pipes off the tank.

8. Check the top of the tank for any stains that may have occurred from oil seeping onto the top of the tank. If there is oil present on top of the tank, then this must be cleaned up or it will gradually seep into the interstitial space between the two tanks.

9. Oil stains or oil on top of the tank is usually a sign that the tank was overfilled at some point. The oil company should be notified about this leakage and to verify that the Vent Alarm is working correctly. If it is, then further investigation needs to be done to determine how the overfill occurred and to ensure it isn't repeated.

10. If the tank is installed outdoors, check that the cover is secured to the tank. Remove any debris that may have accumulated inside the cover and check that the water tight bushings for the supply piping are securely in place.



Troubleshooting

1. The red band is showing in the leak detector.
 - a. Remove the leak detector from the interstitial (space between the two tanks) by pulling up out of the sealing rubber bushing and observe the amount of fluid (oil or water) visible on the end of the detector tube.
 - b. If the amount of fluid on the tube is less than a few inches it is nearly always an indication that fluid has seeped into the interstitial from the top of the tank from overfilling the tank or, if an outside installation, precipitation due to an unsecured tank cover.
 - c. If the amount of fluid on the tube is close to or equal to the amount of oil in the inner tank then it is an indication of a possible leak in the inner tank and the installation needs a closer inspection.
 - d. Fluid can be removed from the interstitial with a hand pump or with a long rod that has an absorbent material attached to it if the amount is small. The cleanup can be finished by using oil absorbent powder, which will also remove most of the oil smell.

2. Oil smell near the tank
 - a. If there is the presence of oil on the top of the tank it is an indication of:
 1. Leaky pipe joints. Contact an oil service technician or plumber.
 2. Plastic cap nuts are loose. Hand tighten or mechanically tighten to 18 ft-lb of torque.
 3. Overfill during filling. The oil company should be notified about this leakage and to verify that the Vent Alarm is working correctly.
 - b. If no oil is visible on the top of the tank the following must be checked:
 1. Plastic cap nuts may be loose. Hand tighten or mechanically tighten to 18ft-lb of torque.
 2. The fill and vent piping is not plumb causing unequal pressure on the o-ring resulting in an air gap on one side of the o-ring. Contact your oil service technician or plumber.
 3. Compression fittings on the duplex bushing may be loose.
 - c. Check the leak detector and following instructions above if red band is showing.



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3. Tank sides are bulging and creases have formed on the sides of the tank
 - a. The sides of the tank may expand up to two (2) inches per side when filled. This is a normal condition.
 - b. Tank sides bulging more than normal is an indication of one of the following:
 1. Too high of a pumping rate during filling. The pumping rate should be 40 - 85gpm (150LPM - 300LPM) with a maximum line pressure of 85 psi.
 2. Restriction in the vent piping. This can be caused by debris in the vent piping and/or vent cap or a problem with the vent whistle. Contact your oil service technician if the vent whistle is causing the problem.
 3. The interstitial has water in it and the water has frozen at some point.

Note:

This product should be disposed of according to all applicable local and national government environment regulations and guidelines.

