

EcoDWT plus 3

IMPORTANT INFORMATION - FOLLOW ALL INSTRUCTIONS

**For Single and Multiple Tank Applications
For Outside Tank Applications**

Listed in compliance to UL Standard SU 2258 and
ULC Standard CAN/ULC-S670-14

Meets the requirements of NFPA 31 and CSA B-139

Roth Industries
268 Bellew Ave South
Watertown, NY 13601

USA Contact Info:

Toll Free: 888-266-7684
Fax: 866-462-2914
E-mail: info@roth-usa.com

Canadian Contact Info:

Toll Free: 800-969-7684
Fax: 866-462-2914
E-mail: service@roth-canada.com

www.heatingoilstoragetanks.com

Table of Contents

Section 1 - The Roth Industries EcoDWT plus 3 Double Wall Tank	Page 4
Construction	Page 4
Models and Specifications	Page 5
Third Party Testing	Page 6
Installation Training and Certification	Page 6
Warranty Terms and Certification Registration	Page 7
Section 2 - Installation Parts And Accessories	Page 8
Parts Supplied with Tank	Page 8
Installation Accessories	Page 9
Section 3 - Pre-Installation	Page 12
Permits and Approvals	Page 12
Warnings and Cautions	Page 12
Tank Unpacking and Inspection	Page 13
Section 4 - Interior Single Tank Installation	Page 14
Site Selection	Page 14
Locating the Tank	Page 15
Tank Base Installation	Page 16
Piping Connections	Page 17
Fill Piping	Page 19
Vent Piping	Page 19
Fuel Supply Piping	Page 20
Oil De-Aerator	Page 21
Fuel Gauge	Page 22
Flood and Earthquake Considerations	Page 23
Tie Down Kit	Page 23
Testing and Inspection	Page 24
Section 5 - Interior Multiple Tank Installation	Page 25
General	Page 25
Locating the Tanks	Page 25
Placement - Side by Side	Page 25
Expansion Kits	Page 26

Placement - End to End	Page 34
Fuel Gauges	Page 34

Section 6 - Outdoor Tank Installation **Page 35**

General	Page 35
Site Preparation	Page 35
Masonry Tank Supports	Page 35
Weather Tight Cover	Page 36
Fill and Vent Pipes	Page 39
Fuel Supply Piping	Page 39
Fuel Gauge	Page 39

Section 7 - Completed Installation Review and Warranty Documentation **Page 40**

Section 8 - Yearly Maintenance and Troubleshooting **Page 41**

Yearly Maintenance	Page 41
Troubleshooting	Page 42

Addendum

Fill Chart	Page 44
------------	---------

Section 1 - The Roth Industries EcoDWT plus 3 Double Wall Tank

Construction

1. The Roth EcoDWT plus 3 storage tank is identified as a Closed Secondary Containment Tank (in Canada) and a Diked Tank (in USA) providing both primary and secondary containment tanks for **#2 fuel oil, diesel fuel, bio-fuels up to B20, and both new and used automotive motor oils**. It is engineered to be the finest fuel storage tank available for residential and light commercial use and one that will provide decades of trouble free service.



Figure 1.1

2. As the name indicates, it is the ecologically sound choice for fuel 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 fuel oil products, particularly bio-fuels, with the best light and diffusion barrier; when properly secured in place, the closed secondary containment/dike tank provides excellent safe fuel oil storage in flood prone locations, a record established in over forty years of use.
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 fuel oil products and are, in combination with water, the primary cause of steel tank failure. Water is commonly found in fuel 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 fuel 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.

Models and Specifications

Tank Model	DWT 400L	DWT 620L	DWT 1000L	DWT 1000LH	DWT 1500L
Nom. Capacity US gal (liters)	110 (400)	165 (620)	275 (1000)	275 (1000)	400 (1500)
Length inches (cm)	29 (74)	29 (74)	43 (110)	51 (130)	64 (163)
Width inches (cm)	28 (72)	28 (72)	28 (72)	30 (76)	30 (76)
Height inches (cm)	44 (112)	61 (155)	61 (155)	54 (137)	68 (173)
Min. Height Req'd inches (cm)	49 (125)	66 (168)	66 (168)	60 (152)	76 (193)
Weight lbs (kg)	106 (48)	132 (60)	167 (76)	208 (94)	333 (151)
Shipping Weight lbs (kg)	115 (52)	143 (65)	185 (84)	230 (104)	358 (162)

Approximate Footprint for Multiple DWT Installations

Tank Model	DWT 400L	DWT 620L	DWT 1000L	DWT 1000LH	DWT 1500L
2 Tanks Side by Side inches (cm)	29 X 60 (74 X 152)	29 X 60 (74 X 152)	43 x 60 (110 x 152)	51 x 63 (130 x 160)	64 x 63 (163 x 160)
3 Tanks Side by Side inches (cm)	29 X 92 (74 X 234)	29 X 92 (74 X 234)	43 x 92 (110 x 234)	51 x 96 (130 x 244)	64 x 96 (163 x 244)
4 Tanks Side by Side inches (cm)	29 X 124 (74 X 315)	29 X 124 (74 X 315)	43 x 124 (110 x 315)	51 x 129 (130 x 328)	N/A
5 Tanks Side by Side inches (cm)	29 X 156 (74 X 397)	29 X 156 (74 X 397)	43 x 156 (110 x 397)	51 x 162 (130 x 411)	N/A
2 Tanks End to End inches (cm)	N/A	N/A	28 x 90 (72 x 229)	N/A	N/A

Third Party Testing and Approvals

1. Consistent with the company's goal of providing the finest fuel storage tank available, the Roth EcoDWT plus 3 meets and exceeds all applicable codes.
2. The primary U.S. code governing fuel 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 SU2258 and CAN/ULC-S670 Standards and each tank bears the cULus mark.

Installation Training and Certification

1. To ensure the highest level of operation and customer satisfaction, Roth Industries requires each installer to receive training in the proper installation of a Roth tank.
2. Installation by a non-certified installer will void the warranty.
3. This training is offered through the network of manufacturer's representatives that Roth maintains, allowing installers to receive training in their immediate area.
4. Once he/she has completed the training, each installer receives a certificate of completion that states he/she is a certified Roth EcoDWT plus 3 installer.

Warranty Terms and Certificate Registration

- 1. Under the terms of the warranty, Roth Industries warrants the Product against defects in materials and workmanship for a period of thirty (30) years from the “Start Date”.*
- 2. During the first ten (10) years of the warranty period, Roth shall (i) at its discretion, either repair the Product or provide a replacement product of similar size, design and quality, and (ii) pay all labor costs associated with such repair and/or replacement, all of which shall be at Roth’s expense up to a maximum of one thousand (\$1,000) USD in each case. Purchaser shall be responsible for payment of the costs of shipping, freight and insurance on any replacement product, all of which shall be at Purchaser’s expense.*
- 3. In addition, during this first ten (10) year period ONLY, in the event that all conditions contained in the Limited Warranty are otherwise satisfied, Roth shall also reimburse purchaser, up to a maximum amount of US \$2 million, for the costs and expenses incurred by Purchaser for damage to purchaser’s property directly and proximately caused by a leakage of oil from a defective Product.*
- 4. During years eleven (11) through year thirty (30) of the warranty period, Roth shall, at its discretion, either repair the Product or provide a replacement product (or 100% credit towards the purchase price of a replacement product) of similar size, design and quality. Purchaser shall be responsible for payment of all labor costs associated with such repair and/or replacement, as well as the costs of shipping, freight and insurance on any replacement product, all of which shall be at Purchaser’s expense.*
- 5. The warranty period (“Start Date”) begins at the date of installation of the Product as recorded on the warranty card and submitted to Roth after installation. If the warranty card is not submitted, the warranty period (“Start Date”) begins at the date of manufacture of the Product. If the Product was installed more than twelve (12) months after the date of its manufacture, or if the date of installation cannot be reasonably ascertained, Roth may determine, in its reasonable discretion, that the Warranty Period begins as of the date of manufacture of the Product (“Start Date”).*
- 6. Though statements above are a part of the warranty statement, they do not reflect all warranty conditions. Please read the limited warranty certificate to be informed of all conditions and rights.***

Section 2 - Installation Parts and Accessories

Parts Supplied with Tank

Quantity	Part #	Description
4	-	Threaded Dust Plug
4	2350000024	Plastic Cap Nut
2	2350000025	2" NPT Plastic Adaptor
2	2350006801	2" NPT Die-Cast Metal Adaptor
4	2350000031	#3 Gasket
4	2350005738	Bulkhead Nuts
1	Various	Leak Detector
1	-	Installation Packet including Warranty Certificate Forms (2), Parts Check List & Installation Instructions
1	Various	Tank Base

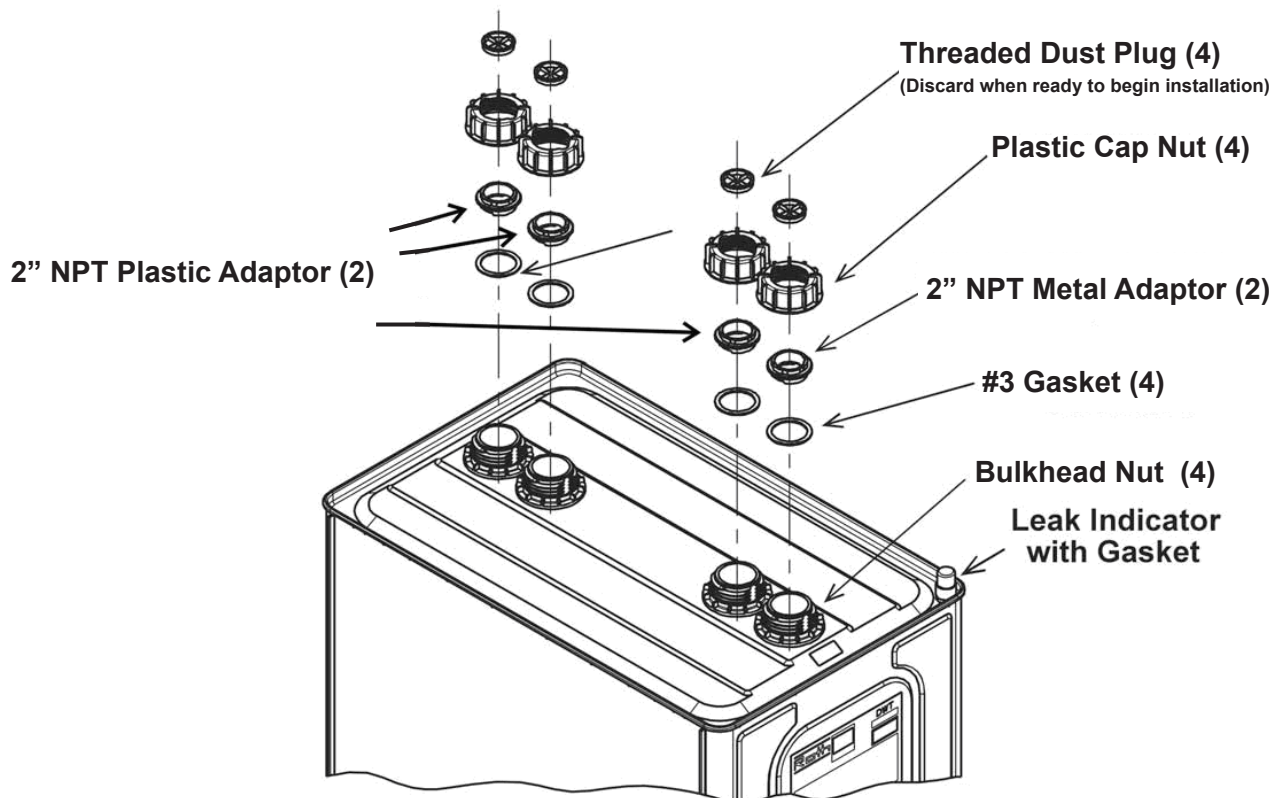
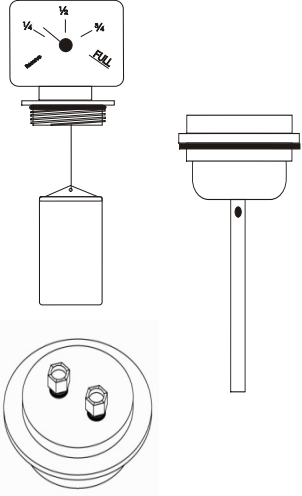
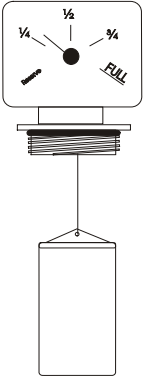
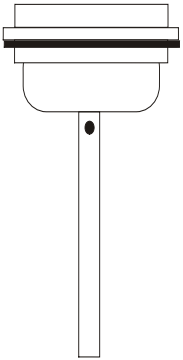


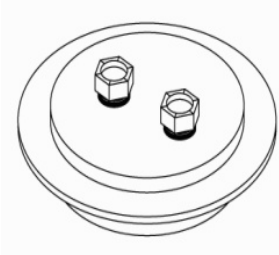
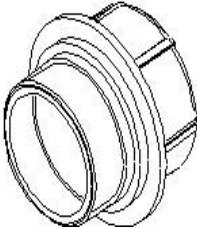
Figure 2.1

Installation Accessories

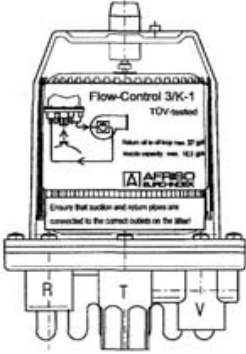
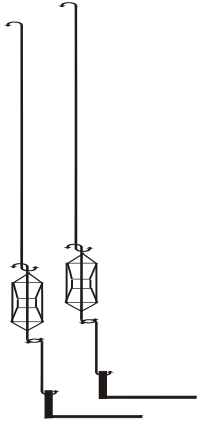
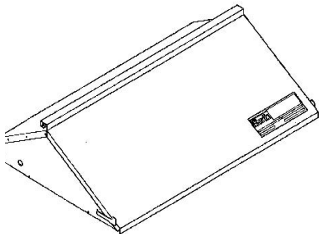
Accessory	Description	Part #	Tank Model-Tubing
	<p>Installation Kit</p> <p>Includes:</p> <ul style="list-style-type: none"> • Fuel Gauge • Vent Alarm • 3/8" or 1/2" Duplex Bushing (as listed below) 	<p>2315000401</p> <p>2315000402</p> <p>2315001001</p> <p>2315001002</p> <p>2315001101</p> <p>2315001102</p> <p>2315001501</p> <p>2315001502</p>	<p>400L - 3/8"</p> <p>400L - 1/2"</p> <p>620L/1000L - 3/8"</p> <p>620L/1000L - 1/2"</p> <p>1000LH - 3/8"</p> <p>1000LH - 1/2"</p> <p>1500L - 3/8"</p> <p>1500L - 1/2"</p>
	<p>Fuel Level Gauge</p> <ul style="list-style-type: none"> • 2" NPT connection with O-ring seal • Hand tighten only • 30 psi pressure rating 	<p>2335003411</p> <p>2335001863</p> <p>2335003832</p> <p>2335000191</p>	<p>400L</p> <p>620L & 1000L</p> <p>1000LH</p> <p>1500L</p>
	<p>Vent Alarm</p> <ul style="list-style-type: none"> • Specific for Roth EcoDWT Plus 3 Tanks • All metal construction • 2" FPT built-in adaptor for easy connection to vent piping 	<p>2350000999</p>	<p>All Models</p>

All parts and accessories on pages 8-11 are covered by a one-year warranty from the date of installation.

Installation Accessories

Accessory	Description	Part #	Tank Model
	<p>Duplex Bushing</p> <ul style="list-style-type: none"> • Flange designed to seal against tank opening with flat #3 gasket (supplied) • Supplied with two slip-through compression fittings to receive copper tubing • Compression fittings can be removed to install iron pipe • Can be used with either one-pipe or two pipe fuel oil line systems 	<p>2350000026</p> <p>2350000027</p>	<p>All Models</p> <p>3/8" Tubing</p> <p>1/2" Tubing</p>
	<p>Die Cast 2" NPT Tank Adapter</p> <ul style="list-style-type: none"> • Provides 2" female connection point • Two (2) adapters included with each tank • For connecting the fill pipe to the tank in single tank or "separate fill & vent" multiple tank applications and the fuel gauge • For connecting a non-Roth duplex tank bushing when "hard piping" fuel supply lines (<i>this requires the purchase of a second adapter in many cases</i>) 	<p>2350006801</p>	<p>All Models</p>

Installation Accessories

Accessory	Description	Part #	Tank Model
	<p>Fuel Oil De-Aerator</p> <ul style="list-style-type: none"> • Eliminates return oil line • Removes air bubbles from oil that can vapor lock burners • Reduces pressure build up in burner pump • Highly recommended for outdoor installations 	2335100191	All Models
	<p>Tie Down Kit</p> <ul style="list-style-type: none"> • Clips over top rim of tank • Base bolts to floor/ concrete • Turnbuckles adjust tension • 2 tie downs per kit • Anchor/lag bolts supplied by installer • Use one kit in low risk areas and multiple kits in high risk areas 	2335000222 2335100222 2335200222 2335400222	400L 620L & 1000L 1000LH 1500L
	<p>Roth Tank Cover</p> <ul style="list-style-type: none"> • Required for outdoor tank installations • Assembles and installs quickly • Fastens to tank lip • Knock-outs on both ends and back (total of 4) for fuel oil supply lines • May be used for multiple tank installations with separate fill and vent lines when fuel oil supply lines are manifolded outside the covers. 	2335100749 2335100757 2335003721 2335002054	400L & 620L 1000L 1000LH 1500L

Section 3 – Pre-Installation

Permits and Approvals

Installing a single Roth EcoDWT plus 3 inside a building is a straightforward process. Nearly all municipalities have codes governing the installation and use of fuel oil tanks. Always consult with the code officers and inspectors before installing a Roth EcoDWT plus 3 to be sure you are in compliance with all applicable local codes and have obtained all required permits. Code officers may be unfamiliar with the Roth double wall tank, so time taken in acquainting the officer(s) with the tank's unique advantages and certifications will usually make final approval much easier.

It is very important to read and familiarize yourself with these instructions before installing the tank(s). There are a number of steps that are crucial to a successful installation and to maintaining the warranty.



- This symbol indicates a condition which could affect the warranty.



- This symbol indicates a crucial step in a successful installation.

Warnings and Cautions

To the Wholesaler:

1. Fully inspect the tank for shipping damage. 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, the shipping company, not Roth Industries, must be notified.
2. Do not remove shrink wrap covering unless it will be replaced with similar material.
3. Do not store tanks outside without shrink wrap covering to prevent water seepage into the interstitial space between the two tanks and to prevent the destruction or loss of the supplied warranty materials.
4. Tanks should not be stored outside or uncovered for more than thirty (30) days to prevent UV degradation of plastic materials
5. Confirm that the warranty package is with the tank. It is located on top of the tank under the shrink wrap and easily visible. If it is missing contact Roth for a replacement package.

To the Installer:



1. The warranty will be voided if the installer has not successfully completed the Roth tank installation and certification course.
2. Do not remove the shrink wrap until the tank has either been moved inside or is ready to have the Roth cover placed on it if an outside installation.
3. Failure to follow the instructions given in the Roth installation and certification course and in this manual may:



- a. Void the tank warranty.
- b. Compromise the structural integrity of the tank, requiring its replacement.
- c. Result in personal injury and/or property damage.
- d. Make the installer liable to penalties under applicable state and local law.



4. Do not install without obtaining appropriate permits and approvals.
5. Always install the Roth tank according to applicable building and health codes for fuel oil storage systems.

Tank 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 weathertight. The shrink wrap must be left in place until the tank has been moved inside or is ready to have the Roth cover placed on it if an outside installation. 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, the wholesaler or shipper, not Roth Industries, must be notified.
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 ¼ 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.

Contact the Roth Industries Technical Department if you have any questions concerning dents or scraping on the units. Typically, you will be asked to send pictures of the tank.

Section 4 – Interior Single Tank Installation

Site Selection

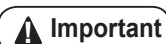
When choosing the location for a Roth EcoDWT plus 3, the following standards must be met:



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 $\frac{1}{2}$ 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 fuel gauge and the correct operation of the vent whistle will also be affected. If the tank is more than $\frac{1}{2}$ 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 fuel 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. Although minimum required installation clearances for the DWT are provided on page 5 of this document, 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.

- 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 runoff 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 and fuel 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 fuel 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:



NFPA 31-7.5.7 - Minimum separation distance 5 Ft (installations in the USA)

CSA B139 - Minimum separation distance 2 Ft (installations in Canada)

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.

Front/Back View

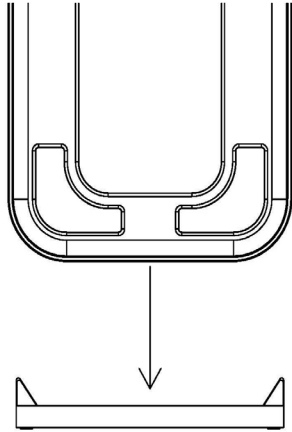


Figure 4.1

Side View

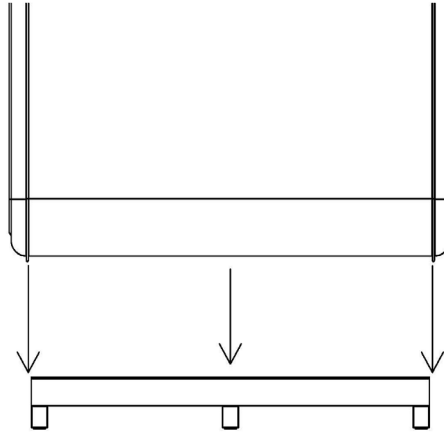


Figure 4.2

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.

⚠ Important

2. In accordance to NFPA 31 Chapter 9 and and CSA B-139 clause 9.3, 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.

⚠ Important

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 fuel 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.

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 ¼ 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.



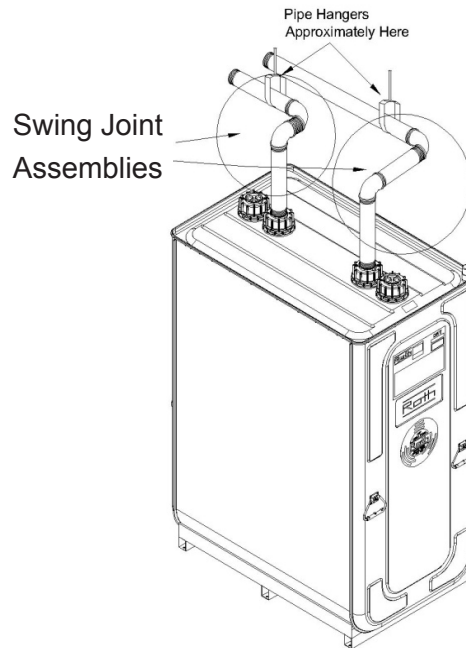


Figure 4.3

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.
5. Swing joints must also be used in the piping from the tank to the outside fill port. The horizontal runs must be pitched toward tank connections to ensure no oil remains trapped in the pipes after filling.

⚠ Important

⚠ Important

⚠ Important

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.

Fuel Supply Piping

New Fuel Lines

1. Consult your local codes for acceptable piping material for supply lines between tank and burner.
2. Maximum fuel oil supply (and return where applicable) lines length shall be in accordance with the burner/pump manufacturer's recommendations.
3. Install a 3/8" or 1/2" duplex bushing (see page 9 or 10) onto tank by removing cap nut and 2" plastic adaptor and inserting duplex bushing into desired opening. Be sure that the #3 gasket is seated evenly on the opening. Replace cap nut over bushing and hand tighten.
4. Slip-through brass compression fittings are supplied with the duplex bushing for use with copper pipe. The fittings are threaded into the top of the bushing. Install copper pipe through the fittings to a level that is a minimum of 1" (2.5 cm) above the bottom of the tank to prevent drawing dirt up into the fuel line. Tighten compression fittings.
5. When piping with black iron, the compression fittings are removed from the duplex bushing and 1/2" pipe or an adaptor is threaded into each side of the duplex bushing. If the required piping is greater than 1/2", a 2" die cast adaptor must be purchased (in addition to the adaptor supplied with the tank) and reduced to the required size.
6. It is preferable to use an uninterrupted length of copper tubing from the tank to the burner or between required in-line valve assemblies without in-line fittings. If fittings are used, flare fittings are recommended to ensure a proper vacuum seal. In some jurisdictions, code requires flare fittings be used when connecting fuel lines.
7. When installing a **one pipe system**, cap the unused opening in the duplex bushing by removing the compression fitting and installing a plug or insert a piece of copper capped on at least one end through the compression fitting and tighten.

8. When installing a **two pipe system**, insert the return piping through the duplex bushing and into the tank below the lowest expected fuel level. If the return line will be terminated above the lowest expected fuel level install a check valve on the supply line to maintain prime during burner off cycles.

Oil De-Aerator

1. Instead of using a return line, an oil de-aerator can be used.
2. The oil de-aerator performs three important functions:
 - a. The primary function is to remove tiny air bubbles trapped in the oil. These bubbles expand when the pump stops and can force oil in the nozzle to drip into the combustion chamber. This has the potential to cause smoke which can cause the nozzle to soot up. In addition, this can also cause the next ignition of the burner to produce smoke and vibration from the excessive oil in the combustion chamber. This air is separated from the oil in the de-aerator's reservoir and vented accordingly.
 - b. The de-aerator also does away with the need for a return line from the pump to the tank. The pump draws more oil than is used by the burner. The unused oil causes excessive pressures and resulting component wear in the pump. Traditionally, a return line has been used to eliminate this pressure, but this causes repeated stirring of the oil in the tank and more contaminants being pulled into the filter, shortening its useful life. A return line is also carrying oil under pressure and if it is damaged, can rapidly release oil into the area between the burner and the tank.
 - c. The oil de-aerator improves combustion by raising the temperature of the incoming oil. The colder oil is, the denser and more resistant to effective atomization by the nozzle it becomes. This results in less efficient ignition and combustion of the oil. A de-aerator maintains a small reservoir of warmed oil at all times. When more oil is needed from tank, it is mixed with this warm oil, ensuring a more efficient operation of the burner system.
 - d. The oil de-aerator eliminates condensation in outdoor installations caused by warm oil returning into a cold tank.
5. The oil de-aerator is installed next to the burner pump. On one side of the de-aerator, the line from the tank is installed. On the other side, a line is installed leading to the inlet of the pump. Finally, a third line is installed from the outlet of the pump back to the de-aerator. When operating, the pump draws oil into a reservoir in the de-aerator. Once full, the oil in the reservoir is used by the burner system, with oil being drawn from the tank to refill the reservoir when the reservoir's oil level drops.

Oil De-Aerator

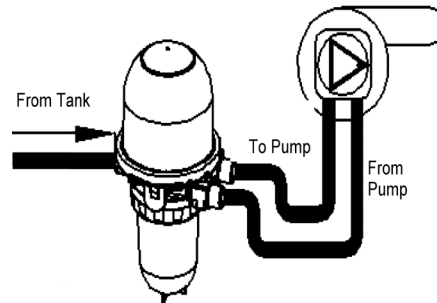


Figure 4.4

Fuel Gauge

1. Roth fuel level gauges are sealed gauges with 2" threaded connections, gasketed seals and cord style floats.
2. The gauge can be installed on any opening on the top of the tank with the use of one of two 2" metallic adaptors supplied.
3. Install the gauge by removing the dust cap from the selected 2" metallic adaptor. The cap nut should not be removed. Slip the float of the gauge through the cap nut and 2" plastic adapter, lower the float slowly until the float reaches the tank bottom or the liquid level in the tank. Screw the gauge into the adaptor. Loosen cap nut to orient the gauge and then hand tighten or mechanically tighten to 18 ft. lbs.
4. It is extremely important that the float be lowered slowly into the tank to prevent damaging the rewind mechanism inside the gauge body. Simply dropping the float into the tank will usually destroy the rewind mechanism and will void the gauge warranty.
5. It is recommended that the fuel gauge not be installed in a port adjacent to the fuel oil supply line to avoid tangling the float with the supply line during filling.
6. The gauge may not indicate a full tank after the tank receives a fuel oil delivery. The fuel delivery technician will stop filling when the vent alarm whistle stops. There may still be some capacity left in the tank at this time. In addition, code requires an air buffer of a minimum of six inches or 5% of tank volume at the top of the tank to compensate for thermal expansion of the liquid. To check actual volume in the tank, measure the height of the fluid in the tank and refer to the fill chart in this manual.
7. The reserve indicator on the gauge is a guide only and not precise. The top of the indicator is approximately 1/8th the total volume of the tank.

⚠ Important

⚠ Important

Do not use any Teflon tape or pipe sealant on the gauge threads, as this will affect the integrity of the plastic.

Flood and Earthquake Considerations

1. Always consult local codes and regulations regarding above ground fuel oil storage tank installations in earthquake or flood prone areas. For seismic rated anchoring requirements, contact the Roth Technical Department.
2. In areas where a threat of flooding or high winds exists, or in basements with a history of flooding, use of the Roth tie-down kits is recommended. In areas of known earthquake activity, consult local codes for required restraint systems. In both cases, the masonry or steel foundation and related structures must meet applicable codes and be capable of keeping the tank anchored in place.
3. Under no circumstances should any penetrating fasteners be used to secure tank restraints to the tank. Use of penetrating fasteners will destroy the integrity of the secondary containment and very possibly the integrity of the primary tank as well and will void the warranty.



Tie Down Kit

1. Tie down kits are used as an aid to keep the tanks from shifting, tipping over or floating off the base.
2. The kit includes two tie downs, one for each side of the tank. Each tie down consists of long and short support rods with hooks on each end, turnbuckle and pre-drilled angle bracket.
3. Assemble kits onto tank to assist in locating fastening holes in concrete. Place long support rods onto the top rim of the tank. Hook the turnbuckle onto the long and short support rods. Hook the angle bracket onto the short support rod. Adjust the turnbuckle until the angle bracket touches the concrete and mark the fastening holes.
4. Anchor angle brackets to cement with field supplied fasteners. Loosen turnbuckle until short support rod can be hooked onto angle bracket. Tighten turnbuckle on each side evenly in an alternating pattern. Kits should be tight without deforming tank rim or sides of tank. **Do not overtighten.**
5. Be sure tank remains level during and after tightening the tie down kits.
6. Tie down kits may not be effective if the tank is less than half full and a flooding event occurs. In areas with a risk of flooding, please contact Roth Industries Technical Department to determine best method for securing tank.
7. Use one kit in low risk areas and multiple kits in high risk areas and with the 1000L & 1500L tanks.

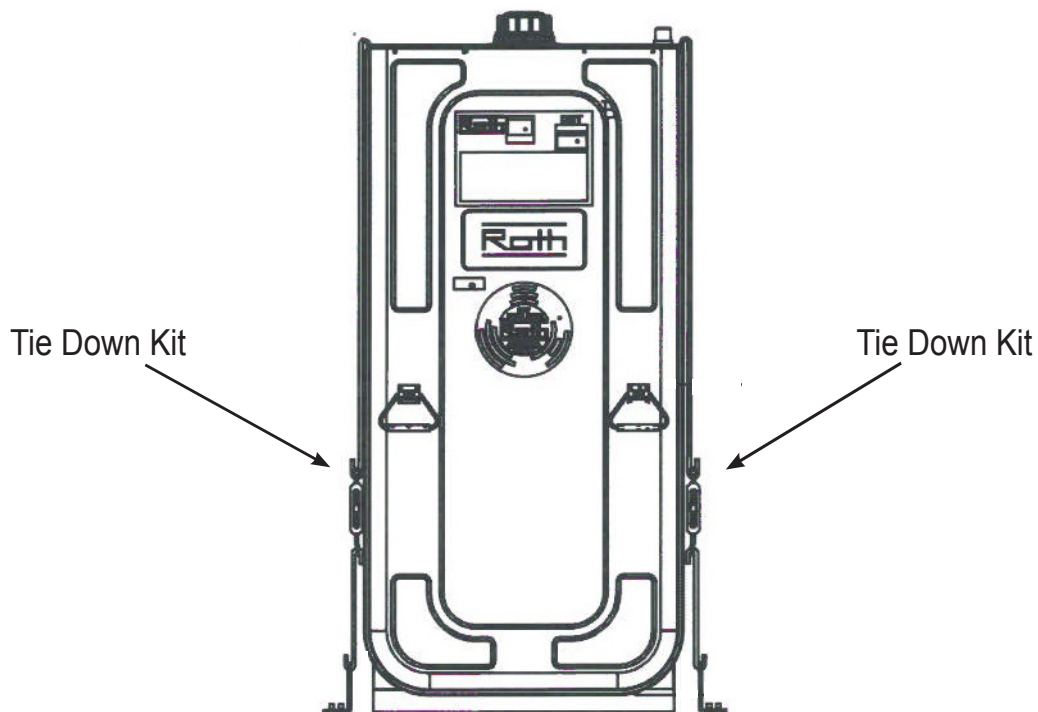


Figure 4.5

Testing and Inspection

1. As mentioned in Section 1, the inner and outer tanks of the Roth EcoDWT plus 3 are pressure tested at the factory to UL specifications (4.35 psi & 0.3psi). Further pressure testing is not necessary and can result in damage to the tanks if attempted.
2. If pressure testing of the piping is required by local codes, all affected piping should be disconnected from the tank and one end sealed prior to performing testing. If local codes require testing with piping attached, pressurization of the piping and tank should be no more than 0.5 psi (3.5 kPa) using a leak detection solution on the fittings.
3. A hydrostatic test consisting of a thorough inspection of all connections during the first filling should be conducted.
4. Leaks found during these tests are generally from misaligned piping and loose fittings, or, on rare occasions, from defective fittings. Once the problem has been identified and corrected, review all aspects of the installation.

Section 5 - Interior Multiple Tank Installation

General

1. Multiple tank installations provide greater flexibility in applications where a greater fuel storage capacity is needed.
2. Multiple smaller tanks can be used in locations where a single larger tank will not fit or the pathway to the location is too small for a larger tank to fit through.
3. NFPA 31 – 7.5.31.1 states that the maximum individual tank capacity in a non-dedicated room shall not exceed 660 gallons and the maximum aggregate capacity shall not exceed 1375 gallons. A total of five (5) 400L, 620L, 1000L, and 1000LH tanks and a total of three (3) 1500L tanks can be installed within the 1375 gallon aggregate capacity. **Be aware that local codes may restrict these capacities.**
4. CSA B139: 7.4.5 states the aggregate capacity is limited to 1100 imp. gallons. In addition, tanks installed in lowest story of a building shall not exceed 5000 liters (1100 imp. gallons). **Be aware that local codes may restrict these capacities.**
5. Multiple tank installations can have individual fill and vent piping, or, with the use of Roth expansion kits, common fill and vent piping.

Locating the Tanks

1. The same criteria used to determine the location for a single tank installation apply to a multiple tank installation. The requirements for clearances, floor conditions, and piping are essentially the same. (See Page 17)
2. The spacing between the tanks is determined by the kit pipe assemblies, with the separation distance designed to be a minimum of 4" (2" per tank).
3. The use of multiple tanks results in a greater concentration of weight in a small area. The load bearing capacity of the floor should be considered, especially in very old homes where thin unreinforced slabs were poured over dirt floors. There should be no concerns with homes built with reinforced concrete slabs.

Placement – Side by Side

1. When installing multiple tanks with the intention of using a common fill and/or supply line, all the tanks must be the same model, at the same height, level and plumb. Different models cannot be manifolded together without a risk of unequal draining or filling. The tanks must be the same distance from



Important

the wall or other straight reference line to ensure that the piping and tees are square to each other so that they seal properly (see Fig. 5.1 below).

2. The four connection ports on each tank can be used interchangeably for fill pipes, vent pipes, the fuel gauges, or oil supply lines to the burner. This arrangement gives the installer the flexibility to accommodate any restrictions or obstacles at the site of the tanks.

Expansion Kits

General

1. Expansion kits are used to construct manifold piping systems that allow multiple EcoDWT plus 3 tanks to be installed side by side or end to end and to be filled at the same time from a single fill connection, as well as having all the tanks vent through a single vent port.
2. Expansion Kits are used for indoor installations only.
3. The Roth Expansion Kits meet NFPA 31 and CSA B-139 standards for multiple tank installations.
4. The Expansion Kits function by directing the flow of the oil from the incoming 2 inch line into 1/2 inch reducers installed in each fill tee. The reducers cause the oil in the main line to be pressurized and to flow into all the connected tanks at the same time and the same rate.
5. To properly pressurize the main line requires that the pumping rate at the truck be between 40 and 85 gpm (150 L/m and 300 L/m), with a pressure not to exceed 85 psi. If the pumping rate is below this amount, then the tank nearest the fill point will fill faster than the rest of the tanks in line and leave the others tanks only partially full when the driver stops filling.
6. Piping connections in the Expansion Kits are made with the use of o-rings to provide oil tight seals. Do not use Teflon or other thread sealants on connections using o-rings.
7. It is critical to note that the fill and vent tees have flat sections on the threaded ends from the casting process. These cannot be sealed with pipe dope or Teflon tape, but must be sealed with the supplied 2" metal adapter with o-ring.
8. Failure to use the supplied o-rings and adapters will result in spillage and/or oil fumes being vented into the surrounding space during filling.
9. Installation using the o-rings requires tightening the 2" adapter until the o-ring

 **Important**

 **Important**

contacts the face of the tee, then turning the adapter approximately one more full turn until the o-ring is secured snugly between the adapter and the tee. Over tightening can displace the o-ring and cause a leak during filling.



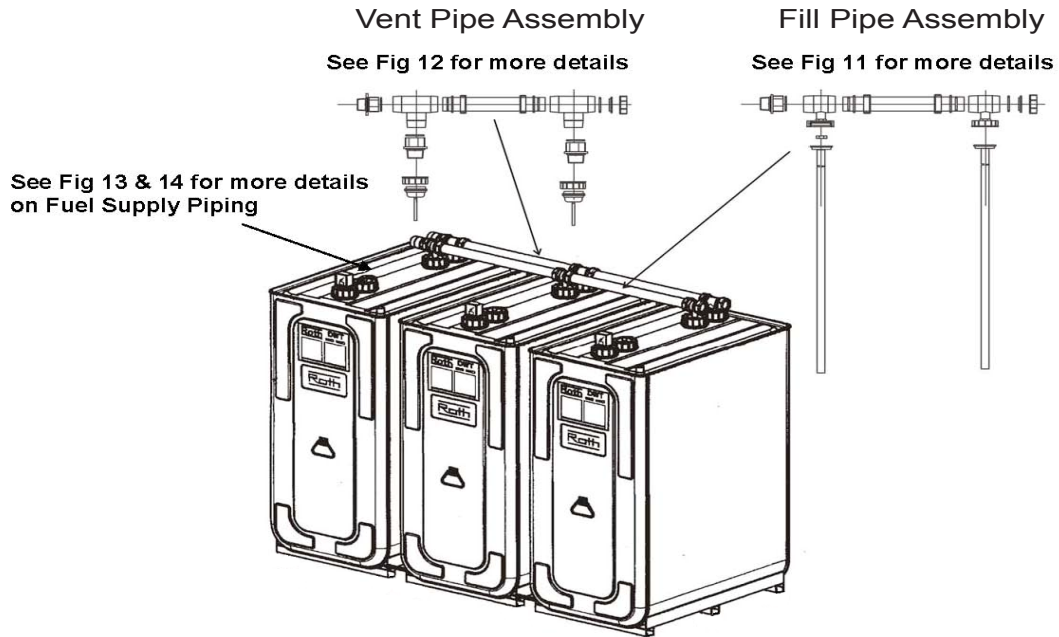
10. Each tank must have its own vent alarm.

The installer must check the local code to determine if separate fill pipes for each tank are required or if the Expansion Kits may be used.

Name	Part #	Description
Kit #1	2315107012	First Two (2) 400L, 620L or 1000L Tanks - Side by Side
Kit #2	2315107013	3rd, 4th and 5th 400L, 620L or 1000L Tanks - Side by Side
Kit #3	2315105343	Two (2) 1000L Tanks - End to End*
Kit #4	2315106910	First Two (2) 1000LH or 1500L Tanks - Side by Side
Kit #5	2315106911	3rd, 4th and 5th 1000LH Tanks - Side by Side or 3rd 1500L Tanks - Side by Side**

* Kit #3 is limited to two (2) Roth EcoDWT plus 3 1000L tanks installed end to end.

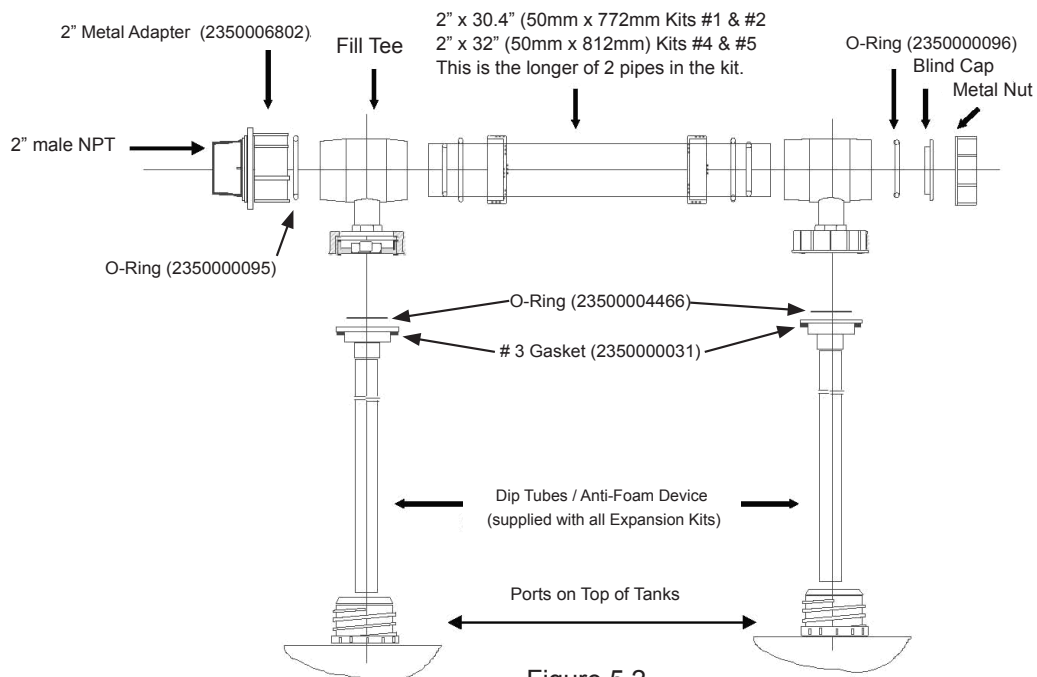
** Kit #5 is limited to three (3) Roth EcoDWT plus 3 1500L tanks installed side by side.



Installation

Before installation of an Expansion Kit, it is important that the contents of the kit be compared to the parts list included in the bag of gaskets and small parts that comes with every kit. If any parts are missing, contact the supplier for replacement parts.

Fill Pipe Assembly



1. Assembly Parts

- a. The **fill tees** reduce the diameter of the fluid path from 2 inches to 1/2 inch. This reduction maintains the minimum fluid pressure needed to cause the oil to flow into each tank at the same rate.
- b. The **tee to tee connecting pipe**, made of galvanized steel, connects to the fill tees by means of slip nuts sealed by o-rings.
- c. The **blind end cap** provides the seal at the end of the fill assembly opposite the inflow end of the manifold.
- d. The **2" metal adapter** provides the transition from the tee at the inflow point of the manifold to the installer supplied fill piping. The male threads on the adapter are 2" NPT. The female threads are 2" BSPP. Do not substitute adaptors from other sources.
- e. The **anti-foam or dip tubes** are designed to minimize the foaming of the oil in the tank during filling. Without these tubes, the foam can be thick enough to block the vent alarm and cause it to stop sounding prematurely, resulting in a partially filled tank.

2. Connection Sealing

- a. All the gaskets and o-rings shown are necessary for a leak proof assembly.
- b. The fill tee has flat sections without threads from the casting process, so the connection between the fill tee and the incoming fill piping must use the 2" metal adapter with o-ring.
- c. Connect the 2" metal adapter to the fill tee by tightening the adapter until the o-ring contacts the face of the tee, then turning the adapter approximately one additional full turn until the o-ring is secured snugly between the adapter and the tee.
- d. The slip nuts on the connecting pipe will be tightened approximately one quarter turn after the o-ring makes contact with the face of the tee, or until the o-ring is secured snugly in place.
- e. The plastic cap nuts that lock the fill tees to the tank ports are to be hand tightened or mechanically tightened to 18 ft-lb of torque. Over tightening the cap nuts by using pipe wrenches or tools will deform or break them.
- f. The connection between the expansion kit and the installer supplied fill piping can be made on either the left or right end of the manifold assembly. The threads on this connection must be sealed with the use of thread sealant or tape suitable for petroleum applications.
- g. It is very important that the connections are not over tightened or the o-rings and gaskets can be displaced out of their positions, causing an oil leak during filling.



Vent Pipe Assembly

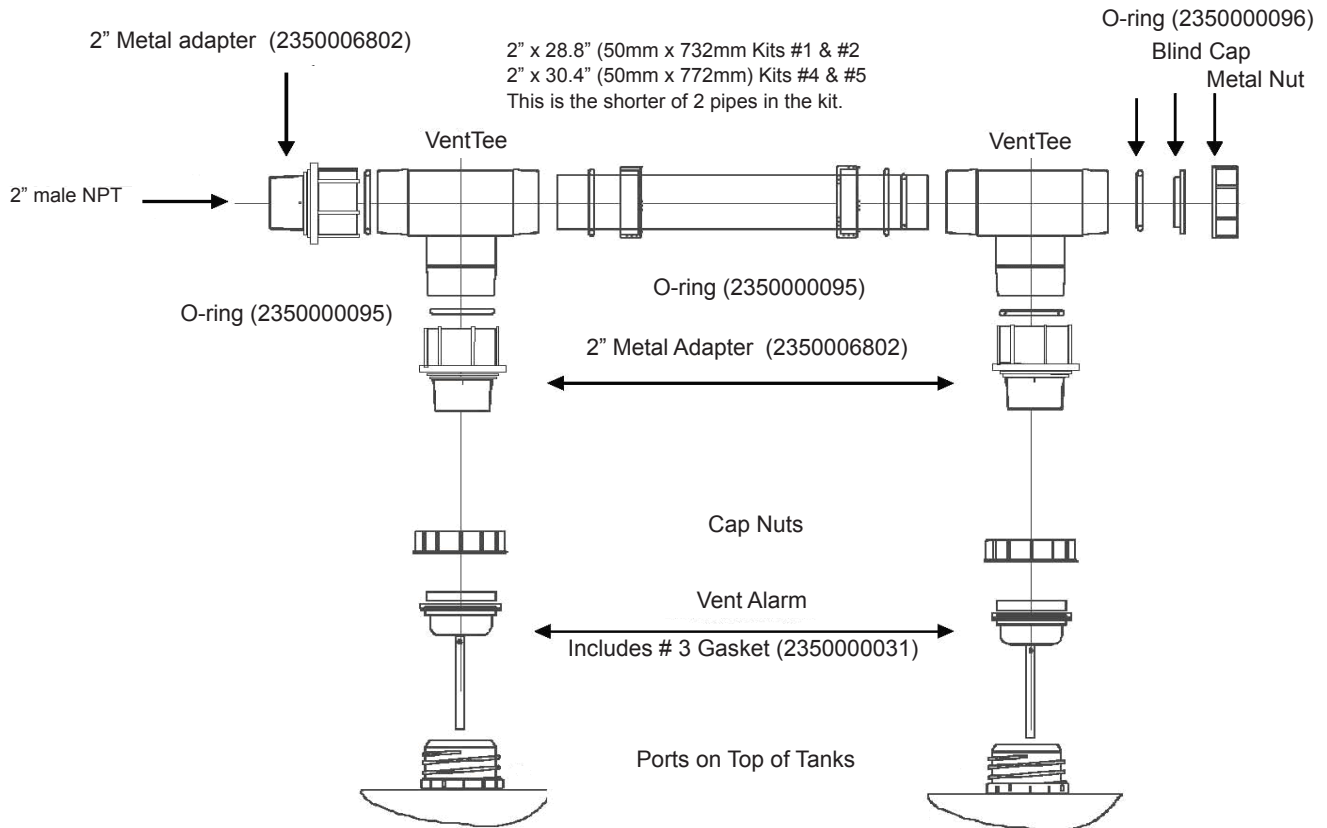


Figure 5.3

1. Assembly Parts

- a. The **vent tee** is a full 2 inches in diameter and provides an ample unobstructed outlet for the air forced out of the tank during filling. A plastic perforated plate covering the internal opening of the center, or bull connection, of the tee prevents debris in the vent pipe from dropping into the vent alarm.
- b. The **tee to tee connecting pipe**, made of galvanized steel, connects to the vent tees by means of slip nuts sealed by o-rings.
- c. The **blind end cap** seals the end of the vent assembly opposite the outflow end.
- d. The **2" metal adapter** provides the transition from the tee at the outflow point to the installer supplied vent piping and also to the vent alarm. The adapter seals against the vent tee with an o-ring. The male threads on the adapter are 2" NPT. The female threads are 2" BSPP. Do not substitute adaptors from other sources.

Important

2. Connection Sealing

- a. All the gaskets and o-rings shown are necessary for a leak proof assembly.
- b. The vent tee has flat sections without threads from the casting process, the connection between the fill tee and the outgoing vent piping must use the 2" metal adapter with o-ring.
- c. Connect the 2" metal adapter to the vent tee by tightening the adapter until the o-ring contacts the face of the tee, then turning the adapter approximately one additional full turn until the o-ring is secured snugly between the adapter and the tee.
- d. The slip nuts on the connecting pipe will be tightened approximately one quarter turn after the o-ring makes contact with the face of the tee, or until the o-ring is secured snugly in place.
- e. The connection between the expansion kit and the installer supplied vent piping can be made on either the left or right end of the manifold assembly. This connection can be sealed with the use of thread sealant or tape suitable for petroleum applications.

 Important

 Important

3. Vent Alarm

- a. Each tank in a multiple tank installation must have a separate Vent Alarm (#235000999) or an equivalent sized UL® listed vent whistle/device to detect the proper fill level of each tank.
- b. The Roth Vent Alarm with #3 gasket is placed into the tank port. The plastic cap nuts that secure the vent alarms to the tank ports are to be hand tightened or mechanically tightened to 18 ft-lb of torque. Over tightening the cap nuts by using pipe wrenches or tools will deform or break them.
- c. The Roth Vent alarm connects to the Expansion Kit vent assembly using the 2" metal adapter with o-ring. Failure to use the 2" metal adapter will result in an improper connection between the Vent Alarm and the vent tee which will cause nuisance oil odors or possible leaks.

 Important

Most areas will allow a common vent pipe for multiple tanks even if they require separate fill pipes. Be sure to check your local codes to verify.

Fuel Supply Piping

1. Piping the fuel supply on a multiple Roth EcoDWT plus 3 installation is done with the either copper tubing or black iron pipe.
2. Each Roth duplex bushing is equipped with two brass slide through compression fittings for hard and soft copper. Feed the copper through the fitting. Position the tubing 1" - 2" above the bottom of the tank to avoid getting debris that might have settled in the bottom of the tank in the feed piping. The compression fittings are then tightened.
3. When piping with black iron, the compression fittings are removed and 3/8" or 1/2" pipe is threaded into each side of the duplex bushing. If the required piping is greater than 1/2" a 2" die cast adapter and appropriate reducers can be used in place of the duplex bushing. The adaptor must be purchased in addition to the one supplied with the tank.
4. The piping configuration is known as "equal manifold" and requires balancing the suction in the supply line and the flow in the return line (if used) equally across all the tank connections. (see figure 5.5)
5. When done properly, the oil in each tank will be drawn out at the same rate, keeping the same quantity of oil in all the tanks.
6. The interconnected piping also results in the oil levels equalizing in all the tanks after the shutdown of the burner pump(s) by allowing the oil to siphon from one tank to the other until all are at the same level.
7. The manifold assembly requires equal length piping coming out of each tank to a common tee to balance the suction and return flow. As more tanks are added to the installation, more tees are needed and the resulting piping will resemble a pyramid in design.
8. With three or more tanks, it may be necessary to install shut-off valves at each tank to facilitate purging air from the piping during priming of the system. The maximum burner lift available from the bottom of the tank to the highest point of the piping is determined by the performance of the burner fuel pump. Please refer to the pump manufacturer's instructions for maximum available lift. (In most cases a 1 pipe system has 8 feet (2.4m) of maximum lift regardless of whether a single or 2 stage fuel pump is used.)

Multiple tank fuel supply and return piping schematics

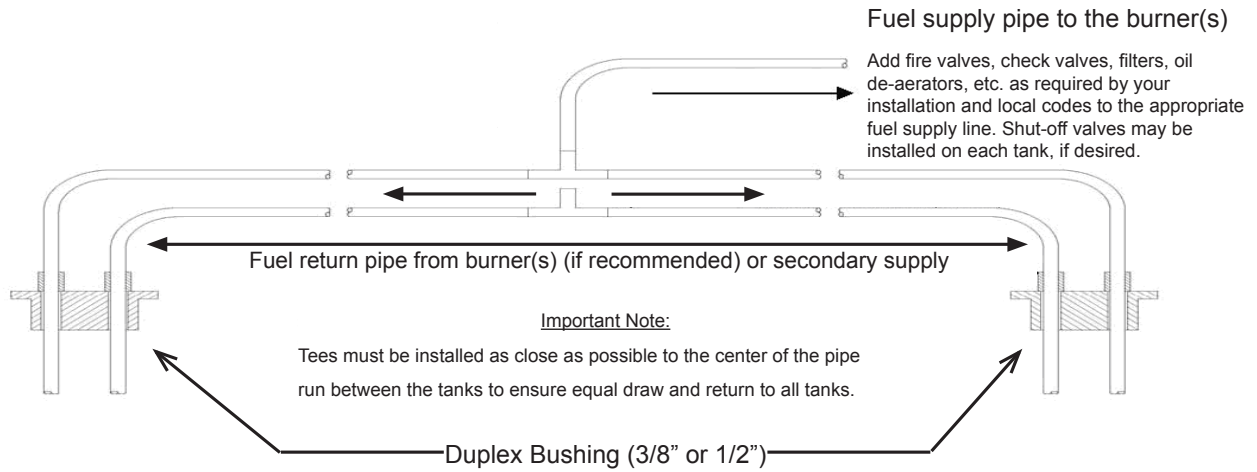


Figure 5.4

The "Equal Manifold" Piping Method

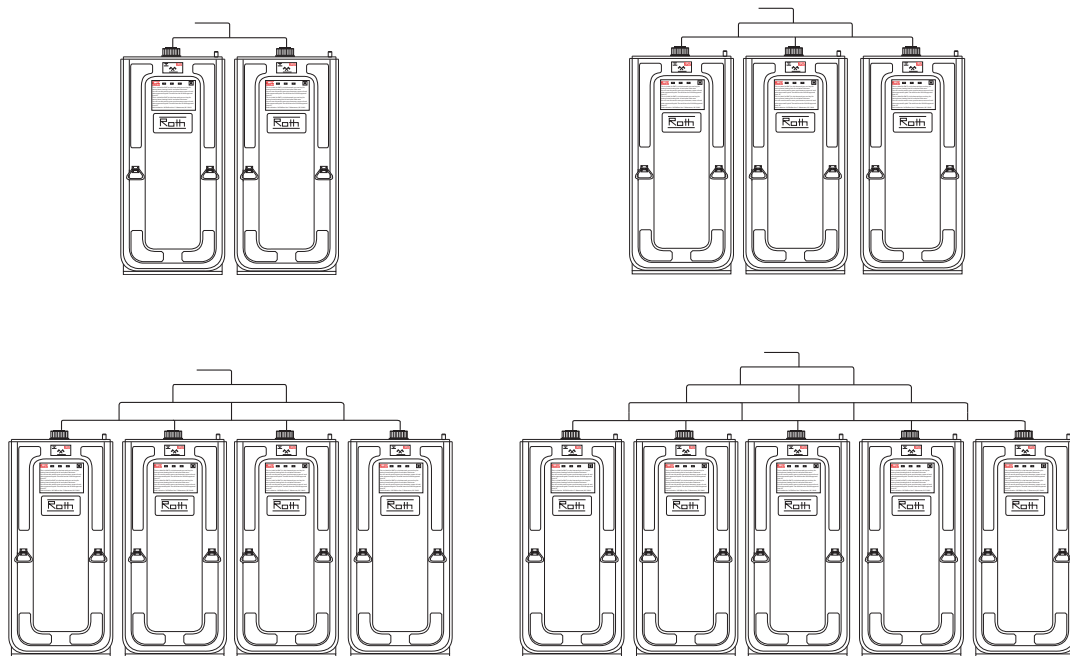


Figure 5.5

Placement End to End (Two 1000L Only)

1. Roth offers an Expansion Kit #3 (#2315105343) for the indoor installation of two (2) 1000L tanks end to end.
2. This kit is not available for any other model tank and there is no Expansion Kit that will allow a third, fourth, or fifth tank to be added to the end to end configuration.
3. All the requirements for a side to side installation apply to the end to end installation, including alignment of tanks, Vent Alarms in each tank, use of swing joints and proper pipe hanger supports for the fill and vent piping, use of duplex bushings and copper tubing oil supply lines or black iron pipe, and filling rates of between 40 and 85 gpm (150-325 lpm) at no more than 85 psi (586 kPa).
4. Unlike the side by side installations, the fitting arrangement for the end to end installation must be as shown in Fig 5.6 below.

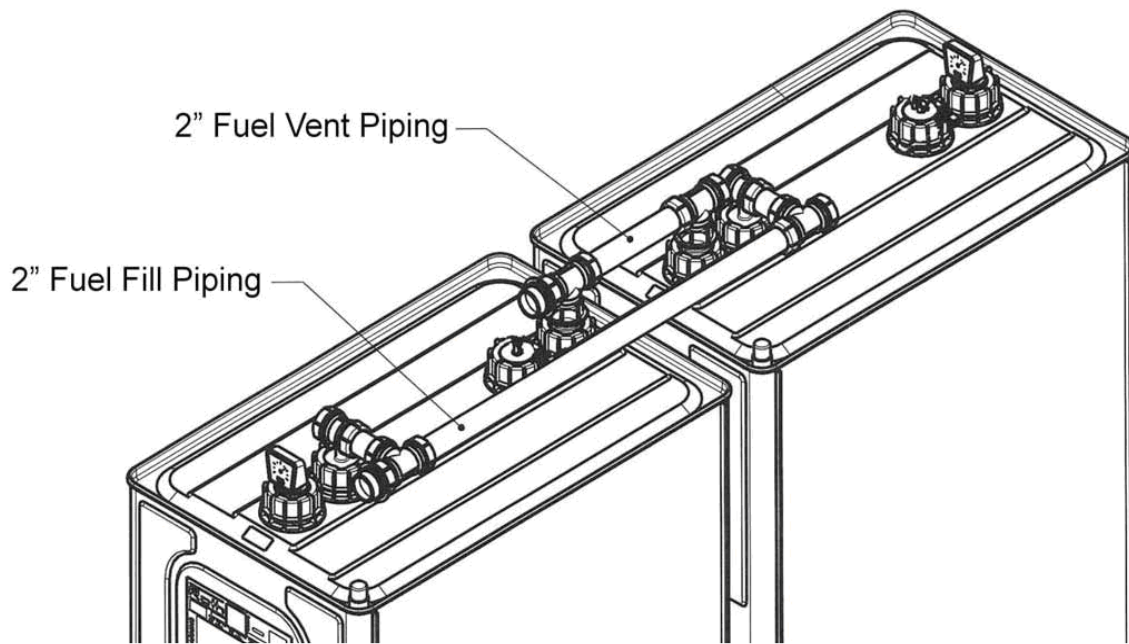


Figure 5.6

Fuel Gauges

1. The fuel gauges, if used, are installed in the same manner as a single tank installation. It is recommended that the gauges not be installed adjacent to the oil supply lines to avoid them becoming wrapped around the lines during filling.
2. Do not use any PTFE tape or pipe sealant on the gauge threads, as this will affect the integrity of the plastic. The gauges are supplied with an o-ring to seal them against the adapters.

Section 6 - Outdoor Tank Installation

General

1. The Roth EcoDWT plus 3 is designed for outdoor installation as well as indoor use and, generally speaking, the same installation requirements apply to both types of installations. Certain important differences do exist and are explained below.
2. The installer must consult local codes and regulations to understand and comply with specific requirements for the installation and use of outdoor above ground fuel oil storage tanks.

Site Preparation

3. The site preparation for a Roth EcoDWT plus 3 requires that the sod be removed to a minimum depth of 6 inches or until undisturbed subsoil is reached and that the sod then be replaced with tamped crushed stone for drainage. Attention must be paid to the site's drainage patterns and potential exposure to erosion, flooding, or high winds. Siting the tank installation on undisturbed subsoil should always be the first option chosen.
4. There are times, though, that the tank is being installed as part of a larger construction project or on the site of a removed underground tank where the subsoil has been excavated and replaced. In these situations, the disturbed subsoil must be allowed to settle until it can provide proper support for the tank installation.



Placing the tank installation on disturbed and unsettled soil can result in the pad and tank tipping unacceptably and even dangerously as the soil settles unevenly and will void the warranty.

Masonry Tank Supports



1. As with an inside installation, a NFPA 31 approved masonry or steel base or pad must be provided for the tank to rest on. This pad, if masonry, should be a one piece concrete slab. (see Figure 6-1) For the models 400L to 1000LH, the pad should be a minimum of 4 inches thick and extend 6 inches past the tank on each side. For the model 1500L the pad thickness should be increased to 6 inches. The minimum recommended reinforcing in this pad is 6 inch by 6 inch W4/W4 welded wire mesh to prevent it from cracking with possible uneven settling. In Canada, refer to CSA B139 7.3.7,8 for specific requirements.
2. The use of precast, rebar reinforced lintels is also an option. (see Figure 6-2) If installed parallel to the support legs, the lintel will provide the required

continuous support for the leg. If the lintels are installed perpendicular to the support legs, then enough lintels must be installed side by side to support the legs for their complete length.

3. The site preparation for the use of lintels requires removal of existing sod to a minimum depth of 6 inches or until undisturbed subsoil is reached. The removed soil is then replaced with tamped crushed stone. The minimum requirements for lintels used is 4 inches thick by 8 inches wide by long enough to extend 6 inches past each side or end of the tank, depending upon orientation. The lintels should be firmly bedded in the stone on all exposed sides to help prevent lateral movement. Regardless which way the lintels are oriented, their top face should be a minimum of 1 inch above the lowest point of the surrounding grade to ensure the base does not sit in water.



Lintels cannot be used with the Roth tie down kit to provide wind or flood protection as one lintel does not weigh enough to offset the tank's buoyancy.

The use of sidewalk blocks, bricks, or pavers is not permitted as they do not provide continuous support for the tank legs and will cause uneven settling. This will void the warranty.



Figure 6-1



Figure 6-2

Weather-Tight Covers

General



1. All outdoor installations must include proper installation of the Roth outdoor cover (see installation accessories) or the warranty will be void.
2. The top of the Roth EcoDWT plus 3 must be protected from rain, snow, and

sunlight. If the top of the tank is not kept weathertight, accumulating water on top of it will seep down into the interstitial space (the space between the inner and outer tank) and gradually fill it up. This water can have two effects:

- a. The first is to produce enough hydraulic lift on the inner tank to cause the outer tank top to separate partially or even, in extreme cases, completely from the tank body.
- b. The second effect occurs in the winter. The water freezes and expands, pressing in against the inner tank. Then, when a thaw occurs, the more water seeps into the interstitial and adds to the existing water. Over several freeze/thaw cycles, the inner tank can become completely collapsed. Two indications of this occurring are the tank holds less and less oil at each delivery and when one of the ports on top of the tank is opened, the sides of the inner tank can be easily seen bowed toward the center of the tank.



3. If either situation occurs, remedial action must be taken immediately to protect the structural integrity of the inner and outer tanks. Failure to take immediate action can damage the tank to the point of requiring replacement, which will not be covered under the warranty.
4. If an outdoor installation is planned using multiple tanks, each tank must have its own cover. Any attempt to modify a cover to route the fill and/or vent piping to a point outside the cover will void the warranty.
5. The covers are equipped with knockouts to route the oil supply piping through the cover. A field supplied UL® listed outdoor rated bushing must be used to create a water tight seal around the piping.
6. If the tank is located in a fully enclosing structure the Roth tank cover is not needed. If a multiple tank installation is located in a fully enclosing structure the expansion kits may be used and all the requirements for an indoor installation apply.



Cover Assembly and Installation

1. Attach fixed roof element (1) to side panels (4 & 5) using pan head phillips screws (6). Place Side panels on inside of roof element. Screw from the outside in. Attach lanyards at this time. (see figure 6-3 on page 35 for location)
2. Place hinge panel (3), mobil roof element (2) and hinge (11) assembly onto side panels at lower front and screw from outside in using pan head phillips screws (6). Fasten hinge panel to side panel lips (top down) using pan head phillips screws (6).

DWT Cover Parts List

Part	Quantity	Description
1	1	Fixed Roof Element
2	1	Mobile Roof Element (Hatch) Hinge Door w/ Panel
3	1	Hinge Panel (Attached to Hinge Door)
4	1	Left Side Wall
5	1	Right Side Wall
6	20	Pan Head Philips Screw No. 10 size x 3/4"
7	10	Slotted Hex Washer Head Screw No. 10 size x 3/4"
8	2	Pin with Lanyard
9	4	Blind Plug
10	1	Handle
11	2-4*	Hinge

* 400L & 620L - 2 hinges 1000L - 3 hinges 1000LH & 1500L - 4 hinges

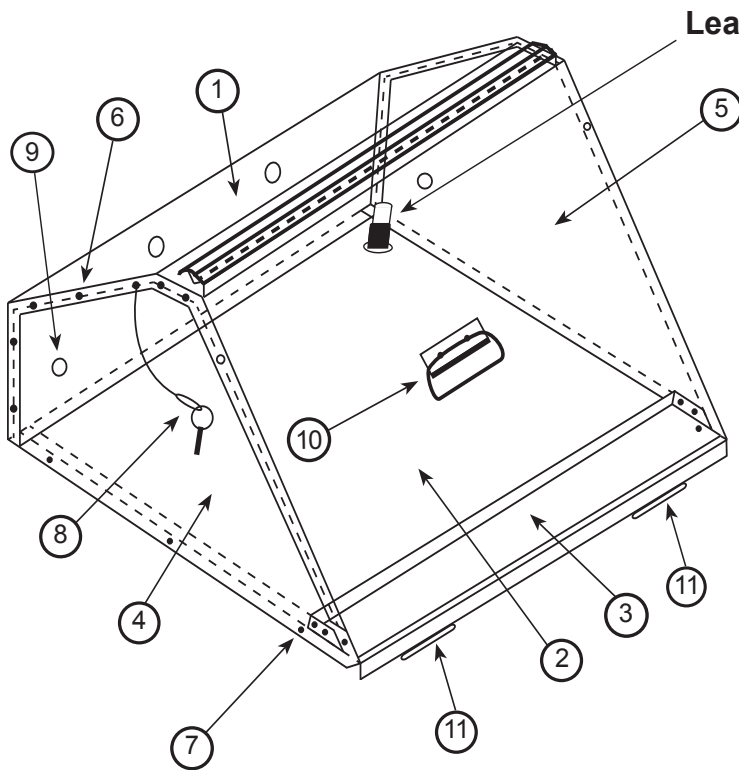


Figure 6-3

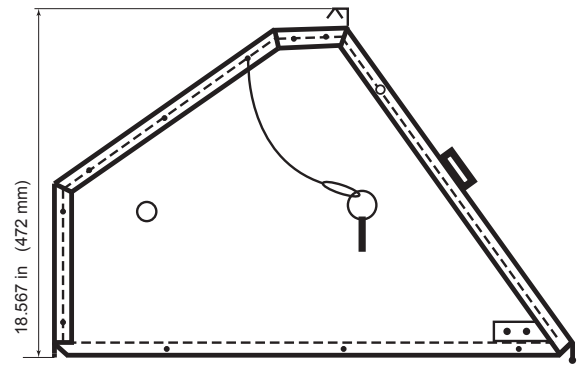


Figure 6-4

3. Place assembled cover onto tank. Leak detector should be in rear right corner of tank when cover is open. (see figure 6-3 on page 35 for location)
4. Drill starter holes into top lip of tank at pre-drilled holes in sides and fixed roof element. Fasten cover onto tank using slotted hex washer head screws (7).

Fill and Vent Piping

1. The fill and vent piping must be enclosed under the Roth individual tank cover.
2. Appropriate fill and vent termination ends shall be used.
3. The Expansion Kits can not be used if multiple tanks are installed outdoors either side by side or end to end with the individual tank covers. Each tank must have it's own fill and vent connections.
4. Local code may mandate specific elevation differences between the fill and vent outlets.

Fuel Supply Piping

1. Piping the oil supply line is performed identically to an indoor installation.
2. The piping is routed through one of the prepared knockouts in the tank cover to reach the point where it enters the structure and should include a horizontal loop, sloped down, ahead of entry into the building to allow for minor tank movement.
3. A UL® listed outdoor rated bushing is required to provide a water-tight seal around the piping where it exits the cover.
4. In a multiple tank installation the supply lines are connected in the same manner as in an indoor installation (see page 29-30), with the connections between the supply lines being made outside of the covers.

 **Important**

Fuel Gauge

1. The fuel gauge, if used, is installed in the same manner as an indoor installation (see pg 21).
2. It is recommended that the gauge not be installed adjacent to the oil supply line to avoid it becoming wrapped around it during filling.
3. Do not use any PTFE tape or pipe sealant on the gauge threads, as this will affect the integrity of the plastic. The gauge is supplied with an o-ring to seal it against the adapter.

 **Important**

Section 7 - Completed Installation Review and Warranty Documentation

1. Once the Roth EcoDWT plus 3 installation is complete, the installer shall review all the work done to verify it is in compliance with the instructions received in training and in this manual, as well as in compliance with applicable local code requirements.
2. Once the review is finished and all requirements are met, the two warranty certificates included with each tank must be completely filled in. One will be returned to Roth Industries at the address found on the certificate and the other will be retained by the tank owner for his/her records. Online warranty registration is also available at www.heatingoilstoragetanks.com.
3. Accurate completion of the certificates is extremely important, since this is the only proof that the installation met all warranty requirements.
4. The serial number and date of manufacture are printed on the silver label affixed to each certificate. The date of installation, the name of the tank owner, complete address of the installation, and the installer and/or installation company all need to be provided for the certificate to be valid.
5. Once the completed certificate is received by Roth, the information is then entered in the database for internal record keeping and company use only. Roth does not send out notification that the warranty certificate has been received, but owners can call to verify that certificate has been received. This information is for warranty purposes only and will not be shared with any other company for reasons other than warranty maintenance.
6. The warranty is valid on the Roth EcoDWT plus 3 where it is originally installed and therefore remains in effect if ownership of the property is transferred. Any questions concerning the installation or the warranty can be addressed by calling Roth Industries at the telephone numbers listed on the front cover of this manual.
7. The first time the tank is filled, an observer, preferably the installer, should be present to determine that there are no problems that need to be addressed. It is much easier to remedy these problems before the tank is full.

Register your warranty online at www.heatingoilstoragetanks.com

Section 8 - Yearly Maintenance and Troubleshooting

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, contact Roth Industries to arrange an inspection of the tank.
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.
6. As pipe joints can loosen over time, inspect all pipe joints for evidence of leakage by fuel oil. If such evidence is found, then contact an oil service technician or plumber to come and retighten the joints.
7. Inspect fill and vent piping for plumbness 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. If the stains are old with no odor, cleanup is optional.
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 fuel supply piping are securely in place.

By following these procedures, the Roth EcoDWT plus 3 will provide decades of reliable and trouble free fuel oil storage. If in doubt, always call the Roth certified installer or use the numbers in this manual to reach Roth Industries.

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 unsecure 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. Call Roth Industries Inc. to arrange such an 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 then 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.
- 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 - 85 gpm (150 LPM - 300 LPM) 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. Call Roth Industries Inc. to arrange an inspection.
- 4. Unequal tank levels in multiple tank installations using expansion kits
 - a. Check all connections on expansion kit, fill and vent piping.
 - b. Check the fuel supply piping for proper piping according to instructions and for improper connections, obstructions or leaks.
 - c. Check fill and vent piping for obstructions.
 - d. Check with fuel delivery company that proper flow and pressure are used and maintained during filling.
 - e. A transfer pump may be used to even tank levels.

Roth EcoDWT plus 3 Fill Chart

400L
110 gal

620L
165 gal

1000L
275 gal

1000LH
275 gal

1500L
400 gal

Fuel Level		Fuel Content			Fuel Content			Fuel Content			Fuel Content			Fuel Content		
in.	mm	US gal	Liters	% Full	US gal	Liters	% Full	US gal	Liters	% Full	US gal	Liters	% Full	US gal	Liters	% Full
1	25.4															
2	50.8															
3	76.2	5	19	4%	5	19	3%	9	34	3%	11	40	2%	11	40	2%
4	101.6	9	34	8%	9	34	5%	15	57	5%	16	60	6%	22	82	5%
5	127.0	10	38	9%	10	38	6%	16	61	6%	21	80	8%	28	106	
6	152.4	14	53	12%	14	53	9%	24	91	9%	26	100	10%	34	130	8%
7	177.8	16	61	14%	16	61	10%	27	102	10%	32	120	12%	40	154	
8	203.2	18	68	16%	18	68	11%	31	117	11%	37	140	13%	47	178	11%
9	228.6	22	83	19%	22	83	14%	38	144	14%	42	160	15%	54	203	
10	254.0	25	95	22%	25	95	16%	42	159	16%	48	180	17%	60	228	14%
11	279.4	27	102	23%	27	102	17%	45	170	17%	53	200	19%	67	254	
12	304.8	29	110	25%	29	110	18%	48	182	18%	58	220	21%	74	280	17%
13	330.2	34	129	30%	34	129	21%	57	216	21%	63	240	23%	81	307	
14	355.6	36	136	31%	36	136	22%	60	227	22%	69	260	25%	88	334	20%
15	381.0	38	144	33%	38	144	23%	64	242	23%	74	280	27%	95	360	
16	406.4	40	151	35%	40	151	25%	68	257	25%	79	300	29%	102	387	24%
17	431.8	45	170	39%	45	170	27%	75	284	27%	85	320	31%	109	413	
18	457.2	47	178	41%	47	178	29%	79	299	29%	90	340	33%	116	440	27%
19	482.6	49	185	43%	49	185	30%	82	310	30%	95	360	35%	123	465	
20	508.0	51	193	44%	51	193	31%	86	326	31%	100	380	37%	129	490	30%
21	533.4	56	212	49%	56	212	34%	93	352	34%	106	400	39%	136	515	
22	558.8	58	220	50%	58	220	35%	97	367	35%	111	420	40%	143	540	33%
23	584.2	60	227	52%	60	227	37%	101	382	37%	116	440	42%	150	565	
24	609.6	65	246	57%	65	246	39%	108	409	39%	122	460	44%	156	590	36%
25	635.0	67	254	58%	67	254	41%	113	428	41%	127	480	46%	163	615	
26	660.4	70	265	61%	70	265	42%	116	439	42%	132	500	48%	169	640	39%
27	685.8	72	273	63%	72	273	44%	120	454	44%	137	520	50%	176	665	
28	711.2	77	291	67%	77	291	47%	128	484	47%	143	540	52%	182	690	42%
29	736.6	79	299	69%	79	299	48%	132	500	48%	148	560	54%	189	715	
30	762.0	81	307	70%	81	307	49%	135	511	49%	153	580	56%	196	740	45%
31	787.4	84	318	73%	84	318	51%	140	530	51%	159	600	58%	203	765	
32	812.8	89	337	77%	89	337	54%	148	56	54%	164	620	60%	209	790	48%
33	838.2	91	344	79%	91	344	55%	152	575	55%	169	640	62%	216	815	
34	863.6	93	352	81%	93	352	57%	156	590	57%	174	660	64%	222	840	51%
35	889.0	98	371	85%	98	371	59%	164	621	59%	180	680	66%	229	865	
36	914.4	100	379	87%	100	379	61%	167	632	61%	185	700	67%	235	890	54%
37	939.8	102	386	89%	102	386	62%	171	647	62%	190	720	69%	242	915	
38	965.2	104	394	90%	104	394	63%	174	659	63%	196	740	71%	248	940	57%
39	990.6	109	413	95%	109	413	66%	182	689	66%	200	760	73%	255	965	
40	1016.0				112	424	68%	186	704	68%	206	780	75%	262	990	60%
41	1041.4				114	431	69%	190	719	69%	211	800	77%	269	1015	
42	1066.8				116	439	70%	193	731	70%	217	820	79%	275	1040	63%
43	1092.2				120	454	73%	201	761	73%	222	840	81%	282	1065	
44	1117.6				123	466	75%	205	776	75%	227	860	83%	288	1090	67%
45	1143.0				125	473	76%	209	791	76%	232	880	85%	295	1117	
46	1168.4				127	481	77%	213	806	77%	238	900	87%	302	1143	70%
47	1193.8				132	500	80%	221	836	80%	243	920	89%	309	1170	
48	1219.2				134	507	82%	224	848	82%	248	940	92%	316	1196	73%
49	1244.6				137	519	83%	228	863	83%	254	960	95%	323	1223	
50	1270.0				141	534	86%	236	896	86%				330	1250	76%
51	1295.4				144	545	87%	240	908	87%				337	1278	
52	1320.8				146	553	89%	245	927	89%				345	1305	80%
53	1346.2				148	560	90%	248	939	90%				352	1333	
54	1371.6				153	579	93%	255	965	93%				359	1360	83%
55	1397.0				155	587	94%	259	980	94%				367	1390	
56	1422.4				157	594	95%	263	995	95%				375	1420	87%
57	1447.8													383	1450	
58	1473.2													391	1480	90%
59	1498.6													399	1510	
60	1524.0													407	1540	94%
61	1549.4													412	1560	95%

Any fuel oil storage tank can only be filled to a maximum of 95% capacity to allow for expansion when fuel is warmed.

Filling above the 95% level is not permitted

The length of the vent whistle may further reduce the maximum fill level.

Roth Industries, Inc. ("Roth")

Limited Warranty Certificate

for Tanks installed on or after January 1, 2012

The Roth Double Wall Tank ("Roth Eco DWT plus 3" or "Product") is constructed with an inner tank, which is the primary oil storage tank, and an outer containment tank, which is the secondary containment basin. The inner tank is made of corrosion proof polyethylene. The outer containment tank is made of corrosion resistant galvanized steel.

Provided that:

1.the Roth Eco DWT plus 3 is installed in accordance with the applicable installation instructions and specifications by a Roth Certified Installer, and

2.the Roth Eco DWT plus 3 is used for its intended purpose, and in particular is used for storage only of domestic heating fuel oil or diesel fuel for home heating ("Heating Fuel") and in strict accordance with the Roth Eco DWT plus 3 manuals, instructions and specifications furnished by Roth,

ROTH WARRANTS THE PRODUCT AGAINST LEAKAGES CAUSED BY DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF THIRTY (30) YEARS FROM THE WARRANTY START DATE SET FORTH BELOW ("Warranty Period"), SUBJECT TO ORDINARY WEAR AND TEAR AND NORMAL USE, AND SUBJECT TO THE TERMS OF THIS LIMITED WARRANTY.

This warranty applies solely and exclusively to a defect in materials or workmanship to the Product, and not to any defect in materials or workmanship of any other items, including but not limited to the fill, vent and/or return system (including the seals), multiple tank connections and other accessories and/or the improper handling, installation or filling of Heating Fuel into the Product.

This warranty shall remain in effect for the original purchaser ("Purchaser") and subsequent transferees, but only while the tank remains at the site of original installation. Roth's sole and exclusive obligations, arising from, as a result of, or in connection with this Limited Warranty or the Product shall be limited to the following:

1.Product Repair or Replacement: Commencing on the warranty Start Date defined below for a period of thirty (30) years thereafter (the "Warranty Period"), Roth shall (i) at its discretion, either repair the Product or provide a replacement product (or 100% credit towards the purchase price of a replacement product) of similar size, design and quality, and

2.Labor Costs, Shipping, Insurance: Commencing on the warranty Start Date through the first ten (10) years of the Warranty Period, Roth shall pay all labor costs associated with such repair and/or replacement, all of which shall be at Roth's expense, up to a maximum of one thousand (\$1,000) USD in each case. Purchaser shall be responsible for payment of the costs of shipping, freight and insurance on any replacement product, all of which shall be at Purchaser's expense.

3.Property Damage to Purchaser's Property: Commencing on the warranty Start Date through year ten (10) of the Warranty Period, Roth shall also reimburse Purchaser, up to a maximum amount of \$2 million USD, for the costs and expenses incurred by Purchaser for damage to Purchaser's property directly and proximately caused by a leakage of Heating Fuel from a defective Product, including any and all On-Site environmental cleanup or remediation. On-Site cleanup or remediation means the taking of reasonable steps and the incurring of reasonable expenses for the response, abatement, investigation and removal actions required by law due to a leak on lands owned or controlled by the Product owner where the Product is located, but shall exclude any responsibility to remediate any contamination of adjoining lands or ground water and subject to the above limitations and exclusions. Roth Industries will directly perform the On-Site cleanup required to a reasonable standard and up to a maximum of \$2 million (inclusive of all costs and expenses whatsoever).

EXCEPT AS SPECIFICALLY SET FORTH IN THIS LIMITED WARRANTY, ROTH HEREBY EXPRESSLY DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS, IMPLIED AND STATUTORY, WITH RESPECT TO THE PRODUCT, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

The obligations of Roth under this Limited Warranty shall not apply in the event that the Product (i) has been installed, assembled or repaired by anyone other than Roth or an authorized Roth installer, representative or dealer; (ii) has been altered in any manner whatsoever; (iii) has been subject to misuse, neglect, abuse, improper storage, alteration, improper or insufficient maintenance, unauthorized repairs, an accident or accidents, fire, flood, earthquake other casualty or acts of God, act of war, or hostile disturbance; (iv) has had its serial number altered, effaced or removed; (v) has been assembled or installed other than in accordance with the Product instructions and specifications furnished by Roth; (vi) has been used for a function or application other than that for which it was designed, i.e., solely as a storage tank for Heating Fuel; or (vii) has been subjected to improper handling, filling or overfilling of the Product.

Warranty Start Date; Warranty Period; Additional Conditions:

1. The Product warranty period shall start from the date of installation, on condition that the Product is installed within twelve (12) months of the date of manufacture of the Product and the date of installation can be reasonably ascertained by Roth. If the Product was installed more than twelve (12) months after the date of its manufacture, or if the date of installation cannot be reasonably ascertained, Roth may determine, in its reasonable discretion, that the Warranty Period begins as of the date of manufacture of the Product ("Start Date").

2. The Warranty Period shall be for thirty (30) years after the Start Date ("Warranty Period").

3. THIS LIMITED WARRANTY SHALL BE VOID IF THE PRODUCT IS MOVED FROM THE PLACE OF ORIGINAL INSTALLATION OR IF THE PLACE OF ORIGINAL INSTALLATION CANNOT BE ASCERTAINED IN THE REASONABLE DISCRETION OF ROTH.

4. The installation, assembly and use of component parts in connection with the Product from sources other than Roth or its authorized installers, representatives or dealers shall void the obligations of Roth under this Limited Warranty. Roth expressly disclaims any liability arising out of any combination of the Product with the products of third-parties.

Limitation of Liability

Roth's sole and exclusive liability for any claim arising from, as a result of, or in connection with this Limited Warranty or the Product shall be limited exclusively to the terms of this Limited Warranty, whether such claim is based on breach of warranty, tort, negligence, strict liability, product liability or otherwise. ROTH, ITS AFFILIATES, OFFICERS, EMPLOYEES, AGENTS OR REPRESENTATIVES, SHALL IN NO EVENT BE LIABLE FOR ANY INCIDENTAL, SPECIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES ARISING FROM, AS A RESULT OF OR IN CONNECTION WITH THIS LIMITED WARRANTY OR THE PRODUCT.

No cause of action, regardless of form, arising from or in any manner connected with this Limited Warranty or the Product may be brought against Roth more than one (1) year after the date such cause of action accrued.

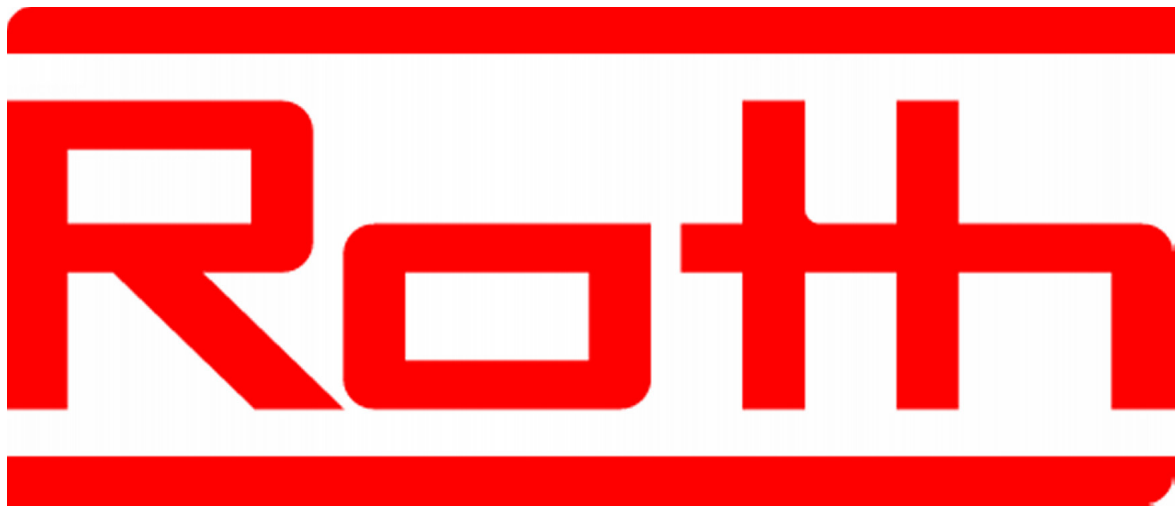
This is a Limited Warranty which gives you specific legal rights, and you may have other rights which vary from state to state or province to province. This Limited Warranty is valid only for tanks installed in the United States and Canada on or after January 1, 2012. This Limited Warranty is governed by the laws of the State of Delaware.

Warranty Claim

1. In the event of an alleged defect in the Product, please call customer assistance immediately without delay at Ph: 888-266-7684 to obtain a Service Order Number, and to arrange for an inspection of the Product by Roth or its authorized installer, representative or dealer.

2. Purchaser must also notify Roth in writing at the address below of the leakage caused by a defect in materials or workmanship within ten (10) days after the leakage is discovered or reasonably should have been discovered, known hereafter as "Purchaser's Notice".

THE FAILURE TO TIMELY NOTIFY ROTH INDUSTRIES OF A WARRANTY CLAIM AS SET FORTH ABOVE SHALL VOID THIS LIMITED WARRANTY.



Roth, a family-owned business established in Germany over 60 years ago, now operates in 40 countries worldwide with \$250 million in sales and 1,100 employees. The North American division operates two manufacturing plants in upstate New York. Roth specializes in environmentally-friendly products that produce, distribute and store energy for the finest homes.

ENERGY PRODUCTION:
Solar and Heat Pump Systems

ENERGY STORAGE:
Septic, Cistern, Rainwater Collection and Oil Storage Tanks

ENERGY DISTRIBUTION:
Radiant Floor Heating and Pex-c Plumbing Systems

ROTH NORTH AMERICA

Toll Free US: 888.266.7684
P: 315.475.0100 F: 315.475.0200
info@roth-usa.com

www.heatingoilstoragetanks.com